```
                                        spare1},
        logicalChannelGroup             INTEGER (0..3)          OPTIONAL            -- Need OR
    }       OPTIONAL,                                                               -- Cond UL
    ...,
    [[  logicalChannelSR-Mask-r9        ENUMERATED {setup}      OPTIONAL        -- Cond SRmask
    ]],
    [[  logicalChannelSR-Prohibit-r12   BOOLEAN                 OPTIONAL        -- Need ON
    ]],
    [[  laa-UL-Allowed-r14              BOOLEAN                 OPTIONAL,       -- Need ON
        bitRateQueryProhibitTimer-r14   ENUMERATED {
                                        s0, s0dot4, s0dot8, s1dot6, s3, s6, s12,
                                        s30}                OPTIONAL        --Need OR
    ]]
}

-- ASN1STOP
```

LogicalChannelConfig field descriptions
bitRateQueryProhibitTimer The timer is used for bit rate recommendation query in TS 36.321 [6, 5.x], in seconds. Value s0 means 0s, s0dot4 means 0.4s and so on.
bucketSizeDuration Bucket Size Duration for logical channel prioritization in TS 36.321 [6]. Value in milliseconds. Value ms50 corresponds to 50 ms, ms100 corresponds to 100 ms and so on.
laa-UL-Allowed Indicates whether the data of a logical channel is allowed to be transmitted via UL of LAA SCells. Value *TRUE* indicates that the logical channel is allowed to be sent via UL of LAA SCells. Value *FALSE* indicates that the logical channel is not allowed to be sent via UL of LAA SCells.
logicalChannelGroup Mapping of logical channel to logical channel group for BSR reporting in TS 36.321 [6].
logicalChannelSR-Mask Controlling SR triggering on a logical channel basis when an uplink grant is configured. See TS 36.321 [6].
logicalChannelSR-Prohibit Value *TRUE* indicates that the *logicalChannelSR-ProhibitTimer* is enabled for the logical channel. E-UTRAN only (optionally) configures the field (i.e. indicates value *TRUE*) if *logicalChannelSR-ProhibitTimer* is configured. See TS 36.321 [6].
prioritisedBitRate Prioritized Bit Rate for logical channel prioritization in TS 36.321 [6]. Value in kilobytes/second. Value kBps0 corresponds to 0 kB/second, kBps8 corresponds to 8 kB/second, kBps16 corresponds to 16 kB/second and so on. Infinity is the only applicable value for SRB1 and SRB2
priority Logical channel priority in TS 36.321 [6]. Value is an integer.

Conditional presence	Explanation
SRmask	The field is optionally present if *ul-SpecificParameters* is present, need OR; otherwise it is not present.
UL	The field is mandatory present for UL logical channels; otherwise it is not present.

– *LWA-Configuration*

The IE *LWA-Configuration* is used to setup/modify/release LTE-WLAN Aggregation.

```
-- ASN1START

LWA-Configuration-r13 ::=           CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        lwa-Config-r13                  LWA-Config-r13
    }
}

LWA-Config-r13 ::=  SEQUENCE {
    lwa-MobilityConfig-r13          WLAN-MobilityConfig-r13     OPTIONAL,   -- Need ON
    lwa-WT-Counter-r13              INTEGER (0..65535)          OPTIONAL,   -- Need ON
    ...,
    [[  wt-MAC-Address-r14      OCTET STRING (SIZE (6)) OPTIONAL    -- Need ON
    ]]
}
```


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```
-- ASN1STOP
```

LWA-Configuration field descriptions
lwa-MobilityConfig Indicates the parameters used for WLAN mobility.
lwa-WT-Counter Indicates the parameter used by UE for WLAN authentication.
wt-MAC-Address Indicates the WT MAC address of the WT handling the LWA operation for the UE. The UE uses this MAC address in uplink transmissions to enable routing of LWA uplink data from the AP to the WT. E-UTRAN configures the field only if *ul-LWA-Config-r14* is configured for at least one LWA bearer.

– *LWIP-Configuration*

The IE *LWIP-Configuration* is used to add, modify or release DRBs that are using LWIP Tunnel.

```
-- ASN1START

LWIP-Configuration-r13 ::=          CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        lwip-Config-r13                 LWIP-Config-r13
    }
}

LWIP-Config-r13 ::= SEQUENCE {
    lwip-MobilityConfig-r13         WLAN-MobilityConfig-r13     OPTIONAL,   -- Need ON
    tunnelConfigLWIP-r13            TunnelConfigLWIP-r13        OPTIONAL,   -- Need ON
    ...
}

-- ASN1STOP
```

LWIP-Configuration field descriptions
lwip-MobilityConfig Indicates the WLAN mobility set for LWIP.
tunnelConfigLWIP Indicates the parameters used for establishing the LWIP tunnel.

– *MAC-MainConfig*

The IE *MAC-MainConfig* is used to specify the MAC main configuration for signalling and data radio bearers. All MAC main configuration parameters can be configured independently per Cell Group (i.e. MCG or SCG), unless explicitly specified otherwise.

MAC-MainConfig information element

```
-- ASN1START

MAC-MainConfig ::=                  SEQUENCE {
    ul-SCH-Config                       SEQUENCE {
        maxHARQ-Tx                          ENUMERATED {
                                                n1, n2, n3, n4, n5, n6, n7, n8,
                                                n10, n12, n16, n20, n24, n28,
                                                spare2, spare1}     OPTIONAL,   -- Need ON
        periodicBSR-Timer                   PeriodicBSR-Timer-r12   OPTIONAL,   -- Need ON
        retxBSR-Timer                       RetxBSR-Timer-r12,
        ttiBundling                         BOOLEAN
    }                                                               OPTIONAL,   -- Need ON
    drx-Config                          DRX-Config                  OPTIONAL,   -- Need ON
    timeAlignmentTimerDedicated         TimeAlignmentTimer,
    phr-Config                          CHOICE {
        release                             NULL,
        setup                               SEQUENCE {
            periodicPHR-Timer                   ENUMERATED {sf10, sf20, sf50, sf100, sf200,
                                                            sf500, sf1000, infinity},
```


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```
            prohibitPHR-Timer                   ENUMERATED {sf0, sf10, sf20, sf50, sf100,
                                                            sf200, sf500, sf1000},
            dl-PathlossChange                   ENUMERATED {dB1, dB3, dB6, infinity}
        }
    }                                                       OPTIONAL,   -- Need ON
    ...,
    [[  sr-ProhibitTimer-r9                 INTEGER (0..7)          OPTIONAL    -- Need ON
    ]],
    [[  mac-MainConfig-v1020                SEQUENCE {
            sCellDeactivationTimer-r10          ENUMERATED {
                                                    rf2, rf4, rf8, rf16, rf32, rf64, rf128,
                                                    spare}          OPTIONAL,   -- Need OP
            extendedBSR-Sizes-r10               ENUMERATED {setup}      OPTIONAL,   -- Need OR
            extendedPHR-r10                     ENUMERATED {setup}      OPTIONAL    -- Need OR
        }                                                       OPTIONAL    -- Need ON
    ]],
    [[  stag-ToReleaseList-r11              STAG-ToReleaseList-r11  OPTIONAL,   -- Need ON
        stag-ToAddModList-r11               STAG-ToAddModList-r11   OPTIONAL,   -- Need ON
        drx-Config-v1130                    DRX-Config-v1130        OPTIONAL    -- Need ON
    ]],
    [[  e-HARQ-Pattern-r12                  BOOLEAN                 OPTIONAL,   -- Need ON
        dualConnectivityPHR                 CHOICE {
            release                             NULL,
            setup                               SEQUENCE {
                phr-ModeOtherCG-r12                 ENUMERATED {real, virtual}
            }
        }                                                       OPTIONAL,   -- Need ON
        logicalChannelSR-Config-r12     CHOICE {
            release                             NULL,
            setup                               SEQUENCE {
                logicalChannelSR-ProhibitTimer-r12      ENUMERATED {sf20, sf40, sf64, sf128, sf512,
sf1024, sf2560, spare1}
            }
        }                                                       OPTIONAL        -- Need ON
    ]],
    [[  drx-Config-v1310                    DRX-Config-v1310        OPTIONAL,       -- Need ON
        extendedPHR2-r13                    BOOLEAN     OPTIONAL,       -- Need ON
        eDRX-Config-CycleStartOffset-r13    CHOICE {
            release                         NULL,
            setup
                                            CHOICE {
            sf5120                                  INTEGER(0..1),
            sf10240                                 INTEGER(0..3)
            }
        }                                       OPTIONAL    -- Need ON
    ]],
    [[  drx-Config-r13                      CHOICE {
            release                             NULL,
            setup                               DRX-Config-r13
        }                                                       OPTIONAL    -- Need ON
    ]],
    [[  skipUplinkTx-r14                    CHOICE {
            release                             NULL,
            setup                               SEQUENCE {
                skipUplinkTxSPS-r14                 ENUMERATED {true}       OPTIONAL,   -- Need OR
                skipUplinkTxDynamic-r14             ENUMERATED {true}       OPTIONAL    -- Need OR
            }
        }                                                       OPTIONAL,   -- Need ON
        dataInactivityTimerConfig-r14       CHOICE {
            release                             NULL,
            setup                               SEQUENCE {
                dataInactivityTimer-r14             DataInactivityTimer-r14
            }
        }                                               OPTIONAL   -- Need ON
    ]],
    [[  rai-Activation-r14                  ENUMERATED {true}           OPTIONAL    -- Need OR
    ]]
}

MAC-MainConfigSCell-r11 ::=         SEQUENCE {
    stag-Id-r11                         STAG-Id-r11     OPTIONAL,   -- Need OP
    ...
}

DRX-Config ::=                      CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        onDurationTimer                     ENUMERATED {
```


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```
                                        psf1, psf2, psf3, psf4, psf5, psf6,
                                        psf8, psf10, psf20, psf30, psf40,
                                        psf50, psf60, psf80, psf100,
                                        psf200},
        drx-InactivityTimer             ENUMERATED {
                                        psf1, psf2, psf3, psf4, psf5, psf6,
                                        psf8, psf10, psf20, psf30, psf40,
                                        psf50, psf60, psf80, psf100,
                                        psf200, psf300, psf500, psf750,
                                        psf1280, psf1920, psf2560, psf0-v1020,
                                        spare9, spare8, spare7, spare6,
                                        spare5, spare4, spare3, spare2,
                                        spare1},
        drx-RetransmissionTimer         ENUMERATED {
                                        psf1, psf2, psf4, psf6, psf8, psf16,
                                        psf24, psf33},
        longDRX-CycleStartOffset        CHOICE {
            sf10                            INTEGER(0..9),
            sf20                            INTEGER(0..19),
            sf32                            INTEGER(0..31),
            sf40                            INTEGER(0..39),
            sf64                            INTEGER(0..63),
            sf80                            INTEGER(0..79),
            sf128                           INTEGER(0..127),
            sf160                           INTEGER(0..159),
            sf256                           INTEGER(0..255),
            sf320                           INTEGER(0..319),
            sf512                           INTEGER(0..511),
            sf640                           INTEGER(0..639),
            sf1024                          INTEGER(0..1023),
            sf1280                          INTEGER(0..1279),
            sf2048                          INTEGER(0..2047),
            sf2560                          INTEGER(0..2559)
        },
        shortDRX                        SEQUENCE {
            shortDRX-Cycle                  ENUMERATED  {
                                                sf2, sf5, sf8, sf10, sf16, sf20,
                                                sf32, sf40, sf64, sf80, sf128, sf160,
                                                sf256, sf320, sf512, sf640},
            drxShortCycleTimer              INTEGER (1..16)
        }       OPTIONAL                                            -- Need OR
    }
}

DRX-Config-v1130 ::=                    SEQUENCE {
    drx-RetransmissionTimer-v1130           ENUMERATED {psf0-v1130} OPTIONAL,   --Need OR
    longDRX-CycleStartOffset-v1130          CHOICE {
        sf60-v1130                              INTEGER(0..59),
        sf70-v1130                              INTEGER(0..69)
    }                                                               OPTIONAL,   --Need OR
    shortDRX-Cycle-v1130                    ENUMERATED  {sf4-v1130} OPTIONAL    --Need OR
}
DRX-Config-v1310 ::=                    SEQUENCE {
    longDRX-CycleStartOffset-v1310      SEQUENCE {
        sf60-v1310                              INTEGER(0..59)
    }                                                               OPTIONAL    --Need OR
}

DRX-Config-r13 ::=                  SEQUENCE {
    onDurationTimer-v1310                   ENUMERATED {psf300, psf400, psf500, psf600,
                                                psf800, psf1000, psf1200, psf1600}
                                                    OPTIONAL,   --Need OR
    drx-RetransmissionTimer-v1310           ENUMERATED {psf40, psf64, psf80, psf96, psf112,
                                                psf128, psf160, psf320}
                                                    OPTIONAL,   --Need OR
    drx-ULRetransmissionTimer-r13           ENUMERATED {psf0, psf1, psf2, psf4, psf6, psf8, psf16,
                                                    psf24, psf33, psf40, psf64, psf80, psf96,
                                                    psf112, psf128, psf160, psf320}
                                                    OPTIONAL    --Need OR
}

PeriodicBSR-Timer-r12 ::=               ENUMERATED {
                                        sf5, sf10, sf16, sf20, sf32, sf40, sf64, sf80,
                                        sf128, sf160, sf320, sf640, sf1280, sf2560,
                                        infinity, spare1}

RetxBSR-Timer-r12 ::=                   ENUMERATED {
                                        sf320, sf640, sf1280, sf2560, sf5120,
```


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```
                                                sf10240, spare2, spare1}

STAG-ToReleaseList-r11 ::=  SEQUENCE (SIZE (1..maxSTAG-r11)) OF STAG-Id-r11

STAG-ToAddModList-r11 ::=   SEQUENCE (SIZE (1..maxSTAG-r11)) OF STAG-ToAddMod-r11

STAG-ToAddMod-r11 ::=       SEQUENCE {
    stag-Id-r11                 STAG-Id-r11,
    timeAlignmentTimerSTAG-r11  TimeAlignmentTimer,
    ...
}

STAG-Id-r11::=              INTEGER (1..maxSTAG-r11)

-- ASN1STOP
```


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MAC-MainConfig field descriptions
dl-PathlossChange DL Pathloss Change and the change of the required power backoff due to power management (as allowed by P-MPRc [42]) for PHR reporting in TS 36.321 [6]. Value in dB. Value dB1 corresponds to 1 dB, dB3 corresponds to 3 dB and so on. The same value applies for each serving cell (although the associated functionality is performed independently for each cell).
drx-Config Used to configure DRX as specified in TS 36.321 [6]. E-UTRAN configures the values in *DRX-Config-v1130* only if the UE indicates support for IDC indication. E-UTRAN configures *drx-Config-v1130, drx-Config-v1310 and drx-Config-r13* only if *drx-Config* (without suffix) is configured. E-UTRAN configures *drx-Config-r13* only if UE supports CE or if the UE is configured with uplink of an LAA SCell.
drx-InactivityTimer Timer for DRX in TS 36.321 [6]. Value in number of PDCCH sub-frames. Value psf0 corresponds to 0 PDCCH sub-frame and behaviour as specified in 7.3.2 applies, value psf1 corresponds to 1 PDCCH sub-frame, psf2 corresponds to 2 PDCCH sub-frames and so on.
drx-RetransmissionTimer Timer for DRX in TS 36.321 [6]. Value in number of PDCCH sub-frames. Value psf0 corresponds to 0 PDCCH sub-frame and behaviour as specified in 7.3.2 applies, value psf1 corresponds to 1 PDCCH sub-frame, psf2 corresponds to 2 PDCCH sub-frames and so on. In case *drx-RetransmissionTimer-v1130* or *drx-RetransmissionTimer-v1310* is signalled, the UE shall ignore *drx-RetransmissionTimer* (i.e. without suffix).
drx-ULRetransmissionTimer Timer for DRX in TS 36.321 [6]. Value in number of PDCCH sub-frames. Value psf0 correponds to 0 PDCCH sub-frame and behaviour as specified in 7.3.2 applies, value psf1 corresponds to 1 PDCCH sub-frame, psf2 corresponds to 2 PDCCH sub-frames and so on.
drxShortCycleTimer Timer for DRX in TS 36.321 [6]. Value in multiples of shortDRX-Cycle. A value of 1 corresponds to shortDRX-Cycle, a value of 2 corresponds to 2 * shortDRX-Cycle and so on.
dualConnectivityPHR Indicates if power headroom shall be reported using Dual Connectivity Power Headroom Report MAC Control Element defined in TS 36.321 [6] (value *setup*). If PHR functionality and dual connectivity are configured, E-UTRAN always configures the value *setup* for this field and configures *phr-Config* and *dualConnectivityPHR* for both CGs.
e-HARQ-Pattern TRUE indicates that enhanced HARQ pattern for TTI bundling is enabled for FDD. E-UTRAN enables this field only when *ttiBundling* is set to *TRUE*.
eDRX-Config-CycleStartOffset Indicates *longDRX-Cycle* and *drxStartOffset* in TS 36.321 [6]. The value of *longDRX-Cycle* is in number of sub-frames. The value of *drxStartOffset*, in number of subframes, is indicated by the value of *eDRX-Config-CycleStartOffset* multiplied by 2560 plus the offset value configured in *longDRX-CycleStartOffset*. E-UTRAN only configures value *setup* when the value in *longDRX-CycleStartOffset* is sf2560.
extendedBSR-Sizes If value *setup* is configured, the BSR index indicates extended BSR size levels as defined in TS 36.321 [6, Table 6.1.3.1-2].
extendedPHR Indicates if power headroom shall be reported using the Extended Power Headroom Report MAC control element defined in TS 36.321 [6] (value *setup*). E-UTRAN always configures the value *setup* if more than one and up to eight Serving Cell(s) with uplink is configured and none of the serving cells with uplink configured has a *servingCellIndex* higher than seven and if PUCCH on SCell is not configured and if dual connectivity is not configured. E-UTRAN configures *extendedPHR* only if *phr-Config* is configured. The UE shall release *extendedPHR* if *phr-Config* is released.
extendedPHR2 Indicates if power headroom shall be reported using the Extended Power Headeroom Report MAC Control Element defined in TS 36.321 [6] (value *setup*). E-UTRAN always configures the value *setup* if any of the serving cells with uplink configured has a *servingCellIndex* higher than seven in case dual connectivity is not configured or if PUCCH SCell (with any number of serving cells with uplink configured) is configured. E-UTRAN configures *extendedPHR2* only if *phr-Config* is configured. The UE shall release *extendedPHR2* if *phr-Config* is released.
logicalChannelSR-ProhibitTimer Timer used to delay the transmission of an SR for logical channels enabled by *logicalChannelSR-Prohibit.* Value sf20 corresponds to 20 subframes, sf40 corresponds to 40 subframes, and so on. See TS 36.321 [6].
longDRX-CycleStartOffset *longDRX-Cycle* and *drxStartOffset* in TS 36.321 [6] unless *eDRX-Config-CycleStartOffse*t is configured. The value of l*ongDRX-Cycle* is in number of sub-frames. Value sf10 corresponds to 10 sub-frames, sf20 corresponds to 20 sub-frames and so on. If *shortDRX-Cycle* is configured, the value of *longDRX-Cycle* shall be a multiple of the *shortDRX-Cycle* value. The value of *drxStartOffset* value is in number of sub-frames. In case *longDRX-CycleStartOffset-v1130* is signalled, the UE shall ignore *longDRX-CycleStartOffset* (i.e. without suffix). In case *longDRX-CycleStartOffset-v1310* is signalled, the UE shall ignore *longDRX-CycleStartOffset* (i.e. without suffix).
maxHARQ-Tx Maximum number of transmissions for UL HARQ in TS 36.321 [6].

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MAC-MainConfig field descriptions
onDurationTimer Timer for DRX in TS 36.321 [6]. Value in number of PDCCH sub-frames. Value psf1 corresponds to 1 PDCCH sub-frame, psf2 corresponds to 2 PDCCH sub-frames and so on. In case *onDurationTimer-v1310* is signalled, the UE shall ignore *onDurationTimer* (i.e. without suffix).
periodicBSR-Timer Timer for BSR reporting in TS 36.321 [6]. Value in number of sub-frames. Value sf10 corresponds to 10 sub-frames, sf20 corresponds to 20 sub-frames and so on.
periodicPHR-Timer Timer for PHR reporting in TS 36.321 [6]. Value in number of sub-frames. Value sf10 corresponds to 10 subframes, sf20 corresponds to 20 subframes and so on.
phr-ModeOtherCG Indicates the mode (i.e. *real* or *virtual)* used for the PHR of the activated cells that are part of the other Cell Group (i.e. MCG or SCG), when DC is configured.
prohibitPHR-Timer Timer for PHR reporting in TS 36.321 [6]. Value in number of sub-frames. Value sf0 corresponds to 0 subframes and behaviour as specified in 7.3.2 applies, sf100 corresponds to 100 subframes and so on.
rai-Activation Activation of release assistance indication (RAI) in TS 36.321 [6] for BL UEs.
retxBSR-Timer Timer for BSR reporting in TS 36.321 [6]. Value in number of sub-frames. Value sf640 corresponds to 640 sub-frames, sf1280 corresponds to 1280 sub-frames and so on.
sCellDeactivationTimer SCell deactivation timer in TS 36.321 [6]. Value in number of radio frames. Value rf4 corresponds to 4 radio frames, value rf8 corresponds to 8 radio frames and so on. E-UTRAN only configures the field if the UE is configured with one or more SCells other than the PSCell and PUCCH SCell. If the field is absent, the UE shall delete any existing value for this field and assume the value to be set to *infinity*. The same value applies for each SCell of a Cell Group (i.e. MCG or SCG) (although the associated functionality is performed independently for each SCell). Field *sCellDeactivationTimer* does not apply for the PUCCH SCell.
shortDRX-Cycle Short DRX cycle in TS 36.321 [6]. Value in number of sub-frames. Value sf2 corresponds to 2 sub-frames, sf5 corresponds to 5 subframes and so on. In case *shortDRX-Cycle-v1130* is signalled, the UE shall ignore *shortDRX-Cycle* (i.e. without suffix). Short DRX cycle is not configured for UEs in CE.
skipUplinkTxDynamic If configured, the UE skips UL transmissions for an uplink grant other than a configured uplink grant if no data is available for transmission in the UE buffer as described in TS 36.321 [6].
skipUplinkTxSPS If configured, the UE skips UL transmissions for a configured uplink grant if no data is available for transmission in the UE buffer as described in TS 36.321 [6]. E-UTRAN always configures *skipUplinkTxSPS* when *semiPersistSchedIntervalUL* is shorter than sf10.
sr-ProhibitTimer Timer for SR transmission on PUCCH in TS 36.321 [6]. Value in number of SR period(s) of shortest SR period of any serving cell with PUCCH. Value 0 means that behaviour as specified in 7.3.2 applies. Value 1 corresponds to one SR period, Value 2 corresponds to 2*SR periods and so on. SR period is defined in TS 36.213 [23, table 10.1.5-1].
stag-Id Indicates the TAG of an SCell, see TS 36.321 [6]. Uniquely identifies the TAG within the scope of a Cell Group (i.e. MCG or SCG). If the field is not configured for an SCell (e.g. absent in *MAC-MainConfigSCell*), the SCell is part of the PTAG.
stag-ToAddModList, stag-ToReleaseList Used to configure one or more STAGs. E-UTRAN ensures that a STAG contains at least one SCell with configured uplink. If, due to SCell release a reconfiguration would result in an 'empty' TAG, E-UTRAN includes release of the concerned TAG.
timeAlignmentTimerSTAG Indicates the value of the time alignment timer for an STAG, see TS 36.321 [6].
ttiBundling TRUE indicates that TTI bundling TS 36.321 [6] is enabled while FALSE indicates that TTI bundling is disabled. TTI bundling can be enabled for FDD and for TDD for configurations 0, 1 and 6 and additionally for configurations 2 and 3 when *symPUSCH-UpPTS-r14* is configured. The functionality is performed independently per Cell Group (i.e. MCG or SCG), but E-UTRAN does not configure TTI bundling for the SCG. For a TDD PCell, E-UTRAN does not simultaneously enable TTI bundling and semi-persistent scheduling in this release of specification. Furthermore, for a Cell Group, E-UTRAN does not simultaneously configure TTI bundling and SCells with configured uplink, and E-UTRAN does not simultaneously configure TTI bundling and eIMTA.

–

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– *P-C-AndCBSR*

The IE *P-C-AndCBSR* is used to specify the power control and codebook subset restriction configuration.

P-C-AndCBSR information elements

```
-- ASN1START

P-C-AndCBSR-r11 ::= SEQUENCE {
    p-C-r11                     INTEGER (-8..15),
    codebookSubsetRestriction-r11   BIT STRING
}

P-C-AndCBSR-r13 ::= SEQUENCE {
    p-C-r13                     INTEGER (-8..15),
    cbsr-Selection-r13          CHOICE{
        nonPrecoded-r13             SEQUENCE {
            codebookSubsetRestriction1-r13              BIT STRING,
            codebookSubsetRestriction2-r13              BIT STRING
        },
        beamformedK1a-r13           SEQUENCE {
            codebookSubsetRestriction3-r13              BIT STRING
        },
        beamformedKN-r13            SEQUENCE {
            codebookSubsetRestriction-r13               BIT STRING
        }
    },
    ...
}

P-C-AndCBSR-Pair-r13a ::=   SEQUENCE (SIZE (1..2)) OF P-C-AndCBSR-r11

P-C-AndCBSR-Pair-r13 ::=    SEQUENCE (SIZE (1..2)) OF P-C-AndCBSR-r13

-- ASN1STOP
```

P-C-AndCBSR field descriptions
cbsr-Selection Indicates which codebook subset restriction parameter(s) are to be used. E-UTRAN applies values *nonPrecoded* when *eMIMO-Type* is set to *nonPrecoded*. E-UTRAN applies value *beamformedK1a* when *eMIMO-Type* is set to *beamformed*, *alternativeCodebookEnabledBeamformed* is set to *TRUE* and *csi-RS-ConfigNZPIdListExt* is not configured. E-UTRAN applies value *beamformedKN* when *csi-RS-ConfigNZPIdListExt* is configured. E-UTRAN applies value *beamformedKN* when *eMIMO-Type* is set to *beamformed*, *csi-RS-ConfigNZPIdListExt* is not configured and *alternativeCodebookEnabledBeamformed* is set to *FALSE*.
codebookSubsetRestriction Parameter: codebookSubsetRestriction, see TS 36.213 [23] and TS 36.211 [21]. The number of bits in the *codebookSubsetRestriction* for applicable transmission modes is defined in TS 36.213 [23].
codebookSubsetRestriction1 Parameter: codebookSubsetRestriction1, see TS 36.213 [23, Table 7.2-1d]. The number of bits in the *codebookSubsetRestriction1* for applicable transmission modes is defined in TS 36.213 [23].
codebookSubsetRestriction2 Parameter: codebookSubsetRestriction2, see TS 36.213 [23, Table 7.2-1e]. The number of bits in the *codebookSubsetRestriction2* for applicable transmission modes is defined in TS 36.213 [23].
codebookSubsetRestriction3 Parameter: codebookSubsetRestriction3, see TS 36.213 [23, Table 7.2-1f]. The UE shall ignore *codebookSubsetRestriction-r11* or *codebookSubsetRestriction-r10* if *codebookSubsetRestriction3-r13* is configured. The number of bits in the *codebookSubsetRestriction3* for applicable transmission modes is defined in TS 36.213 [23].
p-C Parameter: P_c , see TS 36.213 [23, 7.2.5].
P-C-AndCBSR-Pair E-UTRAN includes a single entry if the UE is configured with TM9. If the UE is configured with TM10 and E-UTRAN includes 2 entries, this indicates that the subframe patterns configured for CSI (CQI/PMI/PTI/RI/CRI) reporting (i.e. as defined by field *csi-MeasSubframeSet1* and *csi-MeasSubframeSet2*, or as defined by *csi-MeasSubframeSets-r12*) are to be used for this CSI process, while including a single entry indicates that the subframe patterns are not to be used for this CSI process. For a UE configured with TM10, E-UTRAN does not include 2 entries with *csi-MeasSubframeSet1* and *csi-MeasSubframeSet2* for CSI processes concerning a secondary frequency. Furthermore, E-UTRAN includes 2 entries when configuring both *cqi-pmi-ConfigIndex* and *cqi-pmi-ConfigIndex2*.

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– *PDCCH-ConfigSCell*

The IE *PDCCH-ConfigSCell* specifies PDCCH monitoring parameters that E-UTRAN may configure for a serving cell.

PDCCH-ConfigSCell information element

```
-- ASN1START

PDCCH-ConfigSCell-r13 ::=       SEQUENCE {
    skipMonitoringDCI-format0-1A-r13    ENUMERATED {true}               OPTIONAL    -- Need OR
}

PDCCH-ConfigLAA-r14 ::=     SEQUENCE {
    maxNumberOfSchedSubframes-Format0B-r14  ENUMERATED {sf2, sf3, sf4}  OPTIONAL,       -- Need OR
    maxNumberOfSchedSubframes-Format4B-r14  ENUMERATED {sf2, sf3, sf4}  OPTIONAL,       -- Need OR
    skipMonitoringDCI-Format0A-r14              ENUMERATED {true}       OPTIONAL,       -- Need OR
    skipMonitoringDCI-Format4A-r14              ENUMERATED {true}       OPTIONAL,       -- Need OR
    pdcch-CandidateReductions-Format0A-r14
                                PDCCH-CandidateReductions-r13           OPTIONAL,       -- Need ON
    pdcch-CandidateReductions-Format4A-r14
                                PDCCH-CandidateReductionsLAA-UL-r14     OPTIONAL,        -- Need ON
    pdcch-CandidateReductions-Format0B-r14
                                PDCCH-CandidateReductionsLAA-UL-r14     OPTIONAL,        -- Need ON
    pdcch-CandidateReductions-Format4B-r14
                                PDCCH-CandidateReductionsLAA-UL-r14     OPTIONAL        -- Need ON
}

PDCCH-CandidateReductionValue-r13 ::= ENUMERATED {n0, n33, n66, n100}

PDCCH-CandidateReductionValue-r14 ::= ENUMERATED {n0, n50, n100, n150}

PDCCH-CandidateReductions-r13 ::= CHOICE {
    release                         NULL,
    setup                           SEQUENCE {
        pdcch-candidateReductionAL1-r13     PDCCH-CandidateReductionValue-r13,
        pdcch-candidateReductionAL2-r13     PDCCH-CandidateReductionValue-r13,
        pdcch-candidateReductionAL3-r13     PDCCH-CandidateReductionValue-r13,
        pdcch-candidateReductionAL4-r13     PDCCH-CandidateReductionValue-r13,
        pdcch-candidateReductionAL5-r13     PDCCH-CandidateReductionValue-r13
    }
}

PDCCH-CandidateReductionsLAA-UL-r14 ::= CHOICE {
    release                         NULL,
    setup                           SEQUENCE {
        pdcch-candidateReductionAL1-r14     PDCCH-CandidateReductionValue-r13,
        pdcch-candidateReductionAL2-r14     PDCCH-CandidateReductionValue-r13,
        pdcch-candidateReductionAL3-r14     PDCCH-CandidateReductionValue-r14,
        pdcch-candidateReductionAL4-r14     PDCCH-CandidateReductionValue-r14,
        pdcch-candidateReductionAL5-r14     PDCCH-CandidateReductionValue-r14
    }
}

-- ASN1STOP
```


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***PDCCH-ConfigSCell* field descriptions**
maxNumberOfSchedSubframes-Format0B Indicates maximum number of schedulable subframes for DCI format 0B as specified in TS 36.213 [23]. Value sf2 corresponds to 2 subframes, value sf3 corresponds to 3 subframes and so on.
maxNumberOfSchedSubframes-Format4B Indicates maximum number of schedulable subframes for DCI format 4B as specified in TS 36.213 [23]. Value sf2 corresponds to 2 subframes, value sf3 corresponds to 3 subframes and so on.
skipMonitoringDCI-format0-1A Indicates whether the UE is configured to omit monitoring DCI fromat 0/1A, see TS 36.213 [23, 9.1.1].
skipMonitoringDCI-Format0A Indicates whether the UE is configured to omit monitoring DCI fromat 0A as specified in TS 36.213 [23].
skipMonitoringDCI-Format4A Indicates whether the UE is configured to omit monitoring DCI fromat 4A as specified in TS 36.213 [23].
pdcch-candidateReductionALx Indicates reduced (E)PDCCH monitoring requirements on UE specific search space of the x-th aggregation level, see TS 36.213 [23, 9.1.1]. Value n0 corresponds to 0%, value n33 corresponds to 33% and so on.
pdcch-CandidateReductions-Formatx Indicates number of blind detections on UE specific search space for each aggregation layer as specified in TS 36.213 [23]. The field can only be present when the UE is configured with uplink of an LAA SCell. If *pdcch-CandidateReductions-Formatx* is not configured, *pdcch-CandidateReductions-r13* applies to the corresponding DCIs (if configured).

– *PDCP-Config*

The IE *PDCP-Config* is used to set the configurable PDCP parameters for data radio bearers.

***PDCP-Config* information element**

```
-- ASN1START

PDCP-Config ::=                     SEQUENCE {
    discardTimer                        ENUMERATED {
                                            ms50, ms100, ms150, ms300, ms500,
                                            ms750, ms1500, infinity
    }                                                       OPTIONAL,           -- Cond Setup
    rlc-AM                              SEQUENCE {
        statusReportRequired                BOOLEAN
    }                                                       OPTIONAL,           -- Cond Rlc-AM
    rlc-UM                              SEQUENCE {
        pdcp-SN-Size                        ENUMERATED {len7bits, len12bits}
    }                                                       OPTIONAL,           -- Cond Rlc-UM
    headerCompression                   CHOICE {
        notUsed                             NULL,
        rohc                                SEQUENCE {
            maxCID                              INTEGER (1..16383)              DEFAULT 15,
            profiles                            SEQUENCE {
                profile0x0001                       BOOLEAN,
                profile0x0002                       BOOLEAN,
                profile0x0003                       BOOLEAN,
                profile0x0004                       BOOLEAN,
                profile0x0006                       BOOLEAN,
                profile0x0101                       BOOLEAN,
                profile0x0102                       BOOLEAN,
                profile0x0103                       BOOLEAN,
                profile0x0104                       BOOLEAN
            },
            ...
        }
    },
    ...,
    [[  rn-IntegrityProtection-r10      ENUMERATED {enabled}    OPTIONAL    -- Cond RN
    ]],
    [[  pdcp-SN-Size-v1130              ENUMERATED {len15bits}  OPTIONAL    -- Cond Rlc-AM2
    ]],
    [[  ul-DataSplitDRB-ViaSCG-r12      BOOLEAN     OPTIONAL,   -- Need ON
        t-Reordering-r12                ENUMERATED {
                                        ms0, ms20, ms40, ms60, ms80, ms100, ms120, ms140,
                                        ms160, ms180, ms200, ms220, ms240, ms260, ms280, ms300,
                                        ms500, ms750, spare14, spare13, spare12, spare11, spare10,
                                        spare9, spare8, spare7, spare6, spare5, spare4, spare3,
                                        spare2, spare1}                 OPTIONAL    -- Cond SetupS
    ]],
```


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```
    [[  ul-DataSplitThreshold-r13       CHOICE {
            release                     NULL,
            setup                       ENUMERATED {
                                        b0, b100, b200, b400, b800, b1600, b3200, b6400, b12800,
                                        b25600, b51200, b102400, b204800, b409600, b819200,
                                        spare1}
        }                                                           OPTIONAL,   -- Need ON
        pdcp-SN-Size-v1310              ENUMERATED {len18bits}  OPTIONAL,   -- Cond Rlc-AM3
        statusFeedback-r13              CHOICE {
            release                     NULL,
            setup                       SEQUENCE {
                statusPDU-TypeForPolling-r13        ENUMERATED {type1, type2}       OPTIONAL,   --
Need ON
                statusPDU-Periodicity-Type1-r13     ENUMERATED {
                                        ms5, ms10, ms20, ms30, ms40, ms50, ms60, ms70, ms80, ms90,
                                        ms100, ms150, ms200, ms300, ms500, ms1000, ms2000, ms5000,
                                        ms10000, ms20000, ms50000}      OPTIONAL,   -- Need ON
                statusPDU-Periodicity-Type2-r13     ENUMERATED {
                                        ms5, ms10, ms20, ms30, ms40, ms50, ms60, ms70, ms80, ms90,
                                        ms100, ms150, ms200, ms300, ms500, ms1000, ms2000, ms5000,
                                        ms10000, ms20000, ms50000}      OPTIONAL,   -- Need ON
                statusPDU-Periodicity-Offset-r13    ENUMERATED {
                                        ms1, ms2, ms5, ms10, ms25, ms50, ms100, ms250, ms500,
                                        ms2500, ms5000, ms25000}    OPTIONAL    -- Need ON
            }
        }                                                           OPTIONAL    -- Need ON
    ]],
    [[  ul-LWA-Config-r14           CHOICE {
            release                     NULL,
            setup                       SEQUENCE {
                ul-LWA-DRB-ViaWLAN-r14      BOOLEAN,
                ul-LWA-DataSplitThreshold-r14   ENUMERATED {
                                        b0, b100, b200, b400, b800, b1600, b3200, b6400,
                                        b12800, b25600, b51200, b102400, b204800, b409600,
                                        b819200 }           OPTIONAL    -- Need OR
            }
        }                                                       OPTIONAL,       -- Need ON
        uplinkOnlyHeaderCompression-r14     CHOICE {
            notUsed-r14                         NULL,
            rohc-r14                            SEQUENCE {
                maxCID-r14                          INTEGER (1..16383)      DEFAULT 15,
                profiles-r14                        SEQUENCE {
                    profile0x0006-r14                   BOOLEAN
                },
                ...
            }
        }                                                   OPTIONAL -- Need ON
    ]]
}

-- ASN1STOP
```


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***PDCP-Config* field descriptions**
discardTimer Indicates the discard timer value specified in TS 36.323 [8]. Value in milliseconds. Value ms50 means 50 ms, ms100 means 100 ms and so on.
headerCompression E-UTRAN does not reconfigure header compression for an MCG DRB except for upon handover and upon the first reconfiguration after RRC connection re-establishment. E-UTRAN does not reconfigure header compression for a SCG DRB except for upon SCG change involving PDCP re-establishment. For split and LWA DRBs E-UTRAN configures only *notUsed.* If *headerCompression* is configured, the UE shall apply the configured ROHC profile(s) in both uplink and downlink.
maxCID Indicates the value of the MAX_CID parameter as specified in TS 36.323 [8]. The total value of MAX_CIDs across all bearers for the UE should be less than or equal to the value of *maxNumberROHC-ContextSessions* parameter as indicated by the UE. E-UTRAN configures the same value for *maxCID* in both *headerCompression* and *uplinkOnlyHeaderCompression*.
pdcp-SN-Size Indicates the PDCP Sequence Number length in bits. For RLC UM: value *len7bits* means that the 7-bit PDCP SN format is used and *len12bits* means that the 12-bit PDCP SN format is used. For RLC AM: value *len15bits* means that the 15-bit PDCP SN format is used, value *len18bits* means that the 18-bit PDCP SN format is used, otherwise if the field is not included upon setup of the PCDP entity 12-bit PDCP SN format is used, as specified in TS 36.323 [8].
profiles The profiles used by both compressor and decompressor in both UE and E-UTRAN. The field indicates which of the ROHC profiles specified in TS 36.323 [8] are supported, i.e. value *true* indicates that the profile is supported. Profile 0x0000 shall always be supported when the use of ROHC is configured. If support of two ROHC profile identifiers with the same 8 LSB's is signalled, only the profile corresponding to the highest value shall be applied. E-UTRAN does not configure ROHC while *t-Reordering* is configured (i.e. for split DRBs, for LWA bearers or upon reconfiguration from split or LWA to MCG DRB).
statusFeedback Indicates whether the UE shall send PDCP Status Report periodically or by E-UTRAN polling as specified in TS 36.323 [8]. E-UTRAN configures this field only for LWA DRB.
statusPDU-TypeForPolling Indicates the PDCP Control PDU option when it is triggered by E-UTRAN polling. Value *type1* indicates using the legacy PDCP Control PDU for PDCP status reporting and value *type2* indicates using the LWA specific PDCP Control PDU for LWA status reporting as specified in TS 36.323 [8].
statusPDU-Periodicity-Type1 Indicates the value of the PDCP Status reporting periodicity for *type1* Status PDU, as specified in TS 36.323 [8]. Value in milliseconds. Value ms5 means 5 ms, ms10 means 10 ms and so on.
statusPDU-Periodicity-Type2 Indicates the value of the PDCP Status reporting periodicity for *type2* Status PDU, as specified in TS 36.323 [8]. Value in milliseconds. Value ms5 means 5 ms, ms10 means 10 ms and so on.
statusPDU-Periodicity-Offset Indicates the value of the offset for *type2* Status PDU periodicity, as specified in TS 36.323 [8]. Value in milliseconds. Value ms1 means 1 ms, ms2 means 2 ms and so on.
t-Reordering Indicates the value of the reordering timer, as specified in TS 36.323 [8]. Value in milliseconds. Value ms0 means 0 ms and behaviour as specified in 7.3.2 applies, ms20 means 20 ms and so on.
rn-IntegrityProtection Indicates that integrity protection or verification shall be applied for all subsequent packets received and sent by the RN on the DRB.
statusReportRequired Indicates whether or not the UE shall send a PDCP Status Report upon re-establishment of the PDCP entity and upon PDCP data recovery as specified in TS 36.323 [8].
ul-DataSplitDRB-ViaSCG Indicates whether the UE shall send PDCP PDUs via SCG as specified in TS 36.323 [8]. E-UTRAN only configures the field (i.e. indicates value *TRUE*) for split DRBs.
ul-DataSplitThreshold Indicates the threshold value for uplink data split operation specified in TS 36.323 [8]. Value b100 means 100 Bytes, b200 means 200 Bytes and so on. E-UTRAN only configures this field for split DRBs.
ul-LWA-DRB-ViaWLAN Indicates whether the UE shall send PDCP PDUs via the LWAAP entity as specified in TS 36.323 [8]. E-UTRAN only configures this field (i.e. indicates value *TRUE*) for LWA DRBs.
ul-LWA-DataSplitThreshold Indicates the threshold value for uplink data split operation as specified in TS 36.323 [8]. Value b0 means 0 Bytes, b100 means 100 Bytes and so on. E-UTRAN only configures this field for LWA DRBs.

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PDCP-Config field descriptions
uplinkOnlyHeaderCompression Indicates the ROHC configuration that the UE shall apply uplink-only ROHC operations, see TS 36.323 [8]. E-UTRAN only configures this field when *headerCompression* is not configured. E-UTRAN does not reconfigure header compression for an MCG DRB except for upon handover and upon the first reconfiguration after RRC connection re-establishment. E-UTRAN does not reconfigure header compression for a SCG DRB except for upon SCG change involving PDCP re-establishment. For split and LWA DRBs E-UTRAN configures only *notUsed*.

Conditional presence	Explanation
Rlc-AM	The field is mandatory present upon setup of a PDCP entity for a radio bearer configured with RLC AM. The field is optional, need ON, in case of reconfiguration of a PDCP entity at handover, at the first reconfiguration after RRC re-establishment or at SCG change involving PDCP re-establishment or PDCP data recovery for a radio bearer configured with RLC AM. Otherwise the field is not present.
Rlc-AM2	The field is optionally present, need OP, upon setup of a PDCP entity for a radio bearer configured with RLC AM. Otherwise the field is not present.
Rlc-AM3	The field is optionally present, need OP, upon setup of a PDCP entity for a radio bearer configured with RLC AM, if *pdcp-SN-Size-v1130* is absent. Otherwise the field is not present.
Rlc-UM	The field is mandatory present upon setup of a PDCP entity for a radio bearer configured with RLC UM. It is optionally present, Need ON, upon handover within E-UTRA, upon the first reconfiguration after re-establishment and upon SCG change involving PDCP re-establishment. Otherwise the field is not present.
RN	The field is optionally present when signalled to the RN, need OR. Otherwise the field is not present.
Setup	The field is mandatory present in case of radio bearer setup. Otherwise the field is optionally present, need ON.
SetupS	The field is mandatory present in case of setup of or reconfiguration to a split DRB or LWA DRB. The field is optionally present upon reconfiguration of a split DRB or LWA DRB or upon DRB type change from split to MCG DRB or from LWA to LTE only, need ON. Otherwise the field is not present.

– *PDSCH-Config*

The IE *PDSCH-ConfigCommon* and the IE *PDSCH-ConfigDedicated* are used to specify the common and the UE specific PDSCH configuration respectively.

PDSCH-Config information element

```
-- ASN1START

PDSCH-ConfigCommon ::=      SEQUENCE {
    referenceSignalPower                INTEGER (-60..50),
    p-b                                 INTEGER (0..3)
}

PDSCH-ConfigCommon-v1310 ::=    SEQUENCE {
    pdsch-maxNumRepetitionCEmodeA-r13   ENUMERATED {
                                            r16, r32 }                  OPTIONAL,   -- Need OR
    pdsch-maxNumRepetitionCEmodeB-r13   ENUMERATED {
                                            r192, r256, r384, r512, r768, r1024,
                                            r1536, r2048}                   OPTIONAL    -- Need OR
}

PDSCH-ConfigDedicated::=        SEQUENCE {
    p-a                                 ENUMERATED {
                                            dB-6, dB-4dot77, dB-3, dB-1dot77,
                                            dB0, dB1, dB2, dB3}
}

PDSCH-ConfigDedicated-v1130 ::=     SEQUENCE {
    dmrs-ConfigPDSCH-r11                DMRS-Config-r11                 OPTIONAL,   -- Need ON
    qcl-Operation                       ENUMERATED {typeA, typeB}           OPTIONAL,   -- Need OR
    re-MappingQCLConfigToReleaseList-r11    RE-MappingQCLConfigToReleaseList-r11    OPTIONAL,   --
Need ON
```


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```
    re-MappingQCLConfigToAddModList-r11     RE-MappingQCLConfigToAddModList-r11     OPTIONAL    --
Need ON
}

PDSCH-ConfigDedicated-v1280 ::=     SEQUENCE {
    tbsIndexAlt-r12                     ENUMERATED {a26, a33}               OPTIONAL    -- Need OR
}

PDSCH-ConfigDedicated-v1310 ::=     SEQUENCE {
    dmrs-ConfigPDSCH-v1310              DMRS-Config-v1310                   OPTIONAL    -- Need ON
}

PDSCH-ConfigDedicated-v1430 ::=     SEQUENCE {
    ce-PDSCH-MaxBandwidth-r14           ENUMERATED {bw5, bw20}              OPTIONAL,   -- Need OP
    ce-PDSCH-TenProcesses-r14           ENUMERATED {on}                     OPTIONAL,   -- Need OR
    ce-HARQ-AckBundling-r14             ENUMERATED {on}                     OPTIONAL,   -- Need OR
    ce-SchedulingEnhancement-r14        ENUMERATED {range1, range2}         OPTIONAL,   -- Need OR
    tbsIndexAlt2-r14                        ENUMERATED {b33}                OPTIONAL    -- Need OR
}

PDSCH-ConfigDedicatedSCell-v1430 ::=        SEQUENCE {
    tbsIndexAlt2-r14                        ENUMERATED {b33}                OPTIONAL    -- Need OR
}

RE-MappingQCLConfigToAddModList-r11 ::=     SEQUENCE (SIZE (1..maxRE-MapQCL-r11)) OF PDSCH-RE-
MappingQCL-Config-r11

RE-MappingQCLConfigToReleaseList-r11 ::=    SEQUENCE (SIZE (1..maxRE-MapQCL-r11)) OF PDSCH-RE-
MappingQCL-ConfigId-r11

PDSCH-RE-MappingQCL-Config-r11 ::=      SEQUENCE {
    pdsch-RE-MappingQCL-ConfigId-r11    PDSCH-RE-MappingQCL-ConfigId-r11,
    optionalSetOfFields-r11             SEQUENCE {
        crs-PortsCount-r11                  ENUMERATED {n1, n2, n4, spare1},
        crs-FreqShift-r11                   INTEGER (0..5),
        mbsfn-SubframeConfigList-r11        CHOICE {
            release                             NULL,
            setup                               SEQUENCE {
                subframeConfigList                  MBSFN-SubframeConfigList
            }
        }                                                               OPTIONAL,   -- Need ON
        pdsch-Start-r11                     ENUMERATED {reserved, n1, n2, n3, n4, assigned}
    }                                                                   OPTIONAL,   -- Need OP
    csi-RS-ConfigZPId-r11               CSI-RS-ConfigZPId-r11,
    qcl-CSI-RS-ConfigNZPId-r11          CSI-RS-ConfigNZPId-r11          OPTIONAL,   -- Need OR
    ...,
    [[  mbsfn-SubframeConfigList-v1430  CHOICE {
            release                     NULL,
            setup                       SEQUENCE {
                subframeConfigList-v1430    MBSFN-SubframeConfigList-v1430
            }
        }                                                               OPTIONAL    -- Need OP
    ]]
}

-- ASN1STOP
```


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PDSCH-Config field descriptions
ce-HARQ-AckBundling Activation of PDSCH HARQ-ACK bundling in half duplex FDD in CE mode A, see TS 36.212 [22] and TS 36.213 [23].
ce-PDSCH-MaxBandwidth Maximum PDSCH channel bandwidth in CE mode A and B, see TS 36.212 [22] and TS 36.213 [23]. Value bw5 corresponds to 5 MHz, and value bw20 corresponds to 20 MHz. If this field is absent, the UE shall release any existing value and set the maximum PDSCH channel bandwidth in CE mode A and B to 1.4 MHz. Parameter: transmission bandwidth configuration, see TS 36.101 [42, table 5.6-1]. The max bandwidth can by configured to 5MHz for BL UEs and 5MHz or 20MHz for UEs in CE.
ce-PDSCH-TenProcesses Configuration of 10 (instead of 8) DL HARQ processes in FDD in CE mode A, see TS 36.212 [22] and TS 36.213 [23].
ce-SchedulingEnhancement Activation of dynamic HARQ-ACK delay for PDSCH in CE mode A controlled by the DCI, see TS 36.212 [22] and TS 36.213 [23]. Value range1 corresponds to the first range of HARQ-ACK delays, and value range2 corresponds to second range of HARQ-ACK delays.
mbsfn-SubframeConfigList Indicates the MBSFN configuration for the CSI-RS resources. If *optionalSetOfFields* is absent, the field is released.
optionalSetOfFields If absent, the UE releases the configuration provided previously, if any, and applies the values from the serving cell configured on the same frequency.
p-a Parameter: P_A , see TS 36.213 [23, 5.2]. Value dB-6 corresponds to -6 dB, dB-4dot77 corresponds to -4.77 dB etc.
p-b Parameter: P_B , see TS 36.213 [23, Table 5.2-1].
pdsch-maxNumRepetitionCEmodeA Maximum value to indicate the set of PDSCH repetition numbers for CE mode A, see TS 36.211 [21] and TS 36.213 [23].
pdsch-maxNumRepetitionCEmodeB Maximum value to indicate the set of PDSCH repetition numbers for CE mode B, see TS 36.211 [21] and TS 36.213 [23].
pdsch-Start The starting OFDM symbol of PDSCH for the concerned serving cell, see TS 36.213 [23. 7.1.6.4]. Values 1, 2, 3 are applicable when *dl-Bandwidth* for the concerned serving cell is greater than 10 resource blocks, values 2, 3, 4 are applicable when *dl-Bandwidth* for the concerned serving cell is less than or equal to 10 resource blocks, see TS 36.211 [21, Table 6.7-1]. Value *n1* corresponds to 1, value *n2* corresponds to 2 and so on.
qcl-CSI-RS-ConfigNZPId Indicates the CSI-RS resource that is quasi co-located with the PDSCH antenna ports, see TS 36.213 [23, 7.1.9]. E-UTRAN configures this field if and only if the UE is configured with *qcl-Operation* set to *typeB*.
qcl-Operation Indicates the quasi co-location behaviour to be used by the UE, type A and type B, as described in TS 36.213 [23, 7.1.10].
referenceSignalPower Parameter: *Reference-signal power*, which provides the downlink reference-signal EPRE, see TS 36.213 [23, 5.2]. The actual value in dBm.
re-MappingQCLConfigToAddModList, re-MappingQCLConfigToReleaseList For a serving frequency E-UTRAN configures at least one *PDSCH-RE-MappingQCL-Config* when transmission mode 10 is configured for the serving cell on this carrier frequency. Otherwise it does not configure this field.
tbsIndexAlt Indicates the applicability of the alternative TBS index for the I_{TBS} 26 and 33 (see TS 36.213 [23, Table 7.1.7.2.1-1]) to all subframes scheduled by DCI format 2C or 2D. Value a26 refers to the alternative TBS index I_{TBS} 26A, and value a33 refers to the alternative TBS index I_{TBS} 33A. If this field is not configured, the UE shall use I_{TBS} 26 specified in Table 7.1.7.2.1-1 in TS 36.213 [23] for all subframes instead. If neither this field nor tbsIndexAlt2 configures an alternative TBS index for I_{TBS} 33, the UE shall use I_{TBS} 33 specified in Table 7.1.7.2.1-1 in TS 36.213 [23] for all subframes instead.
tbsIndexAlt2 Indicates the applicability of the alternative TBS index for the I_{TBS} 33 (see TS 36.213 [23, Table 7.1.7.2.1-1]) to all subframes. Value *b33* refers to the alternative TBS index I_{TBS} 33B. If neither this field nor *tbsIndexAlt* configures an alternative TBS index for I_{TBS} 33, the UE shall use I_{TBS} 33 specified in Table 7.1.7.2.1-1 in TS 36.213 [23] for all subframes instead.

– *PDSCH-RE-MappingQCL-ConfigId*

The IE *PDSCH-RE-MappingQCL-ConfigId* is used to identify a set of PDSCH parameters related to resource element mapping and quasi co-location, as configured by the IE *PDSCH-RE-MappingQCL-Config*. The identity is unique within the scope of a carrier frequency.

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PDSCH-RE-MappingQCL-ConfigId information elements

```
-- ASN1START

PDSCH-RE-MappingQCL-ConfigId-r11 ::=        INTEGER (1..maxRE-MapQCL-r11)

-- ASN1STOP
```

– PerCC-GapIndicationList

The IE *PerCC-GapIndicationList* is used to specify the UE measurement gap preference.

PerCC-GapIndication information elements

```
-- ASN1START
PerCC-GapIndicationList-r14 ::=     SEQUENCE (SIZE (1..maxServCell-r13)) OF PerCC-GapIndication-r14

PerCC-GapIndication-r14 ::=         SEQUENCE {
    servCellId-r14                              ServCellIndex-r13,
    gapIndication-r14                           ENUMERATED {gap, ncsg, nogap-noNcsg}
}

-- ASN1STOP
```

PerCC-GapIndication field descriptions
servCellId This field identifies the serving cell for which the measurement gap perference is provided.
gapIndication This field is used to indicate the measurement gap preference per component carrier (serving cell) by the UE both in non-CA and CA configurations. Value *gap* indicates that a measurement gap is needed for the associated *servCellId*, value *nogap-noNcsg* indicates that neither a measurement gap nor a ncsg is needed for the associated *servCellId*, value *ncsg* indicates that ncsg is needed for the associated *servCellId*. The UE shall indicate the per CC measurement gap preference consistently for the same non-CA or CA configuration and measurement configuration during the same RRC connection.

– PHICH-Config

The IE *PHICH-Config* is used to specify the PHICH configuration.

PHICH-Config information element

```
-- ASN1START

PHICH-Config ::=                    SEQUENCE {
    phich-Duration                      ENUMERATED {normal, extended},
    phich-Resource                      ENUMERATED {oneSixth, half, one, two}
}

-- ASN1STOP
```

PHICH-Config field descriptions
phich-Duration Parameter: *PHICH-Duration*, see TS 36.211 [21, Table 6.9.3-1].
phich-Resource Parameter: *Ng*, see TS 36.211 [21, 6.9]. Value oneSixth corresponds to 1/6, half corresponds to 1/2 and so on.

– PhysicalConfigDedicated

The IE *PhysicalConfigDedicated* is used to specify the UE specific physical channel configuration.

PhysicalConfigDedicated information element

```
-- ASN1START
```


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```
PhysicalConfigDedicated ::=     SEQUENCE {
    pdsch-ConfigDedicated               PDSCH-ConfigDedicated           OPTIONAL,       -- Need ON
    pucch-ConfigDedicated               PUCCH-ConfigDedicated           OPTIONAL,       -- Need ON
    pusch-ConfigDedicated               PUSCH-ConfigDedicated           OPTIONAL,       -- Need ON
    uplinkPowerControlDedicated         UplinkPowerControlDedicated     OPTIONAL,       -- Need ON
    tpc-PDCCH-ConfigPUCCH               TPC-PDCCH-Config                OPTIONAL,       -- Need ON
    tpc-PDCCH-ConfigPUSCH               TPC-PDCCH-Config                OPTIONAL,       -- Need ON
    cqi-ReportConfig                    CQI-ReportConfig                OPTIONAL,       -- Cond CQI-
r8
    soundingRS-UL-ConfigDedicated       SoundingRS-UL-ConfigDedicated   OPTIONAL,       -- Need ON
    antennaInfo                         CHOICE {
        explicitValue                       AntennaInfoDedicated,
        defaultValue                        NULL
    }                                                                   OPTIONAL,   -- Cond AI-r8
    schedulingRequestConfig             SchedulingRequestConfig         OPTIONAL,       -- Need ON
    ...,
    [[  cqi-ReportConfig-v920               CQI-ReportConfig-v920       OPTIONAL,       -- Cond CQI-
r8
        antennaInfo-v920                    AntennaInfoDedicated-v920   OPTIONAL        -- Cond AI-
r8
    ]],
    [[  antennaInfo-r10                 CHOICE {
            explicitValue-r10               AntennaInfoDedicated-r10,
            defaultValue                    NULL
        }                                                               OPTIONAL,   -- Cond AI-r10
        antennaInfoUL-r10               AntennaInfoUL-r10               OPTIONAL,       -- Need ON
        cif-Presence-r10                BOOLEAN                         OPTIONAL,       -- Need ON
        cqi-ReportConfig-r10            CQI-ReportConfig-r10            OPTIONAL,   -- Cond CQI-r10
        csi-RS-Config-r10               CSI-RS-Config-r10               OPTIONAL,       -- Need ON
        pucch-ConfigDedicated-v1020     PUCCH-ConfigDedicated-v1020     OPTIONAL,       -- Need ON
        pusch-ConfigDedicated-v1020     PUSCH-ConfigDedicated-v1020     OPTIONAL,       -- Need ON
        schedulingRequestConfig-v1020   SchedulingRequestConfig-v1020   OPTIONAL,       -- Need ON
        soundingRS-UL-ConfigDedicated-v1020
                                SoundingRS-UL-ConfigDedicated-v1020     OPTIONAL,       -- Need ON
        soundingRS-UL-ConfigDedicatedAperiodic-r10
                            SoundingRS-UL-ConfigDedicatedAperiodic-r10  OPTIONAL,       -- Need ON
        uplinkPowerControlDedicated-v1020
                                    UplinkPowerControlDedicated-v1020   OPTIONAL        -- Need ON
    ]],
    [[  additionalSpectrumEmissionCA-r10            CHOICE {
            release                                 NULL,
            setup                                   SEQUENCE {
                additionalSpectrumEmissionPCell-r10     AdditionalSpectrumEmission
            }
        }           OPTIONAL    -- Need ON
    ]],
    [[  -- DL configuration as well as configuration applicable for DL and UL
        csi-RS-ConfigNZPToReleaseList-r11
                                    CSI-RS-ConfigNZPToReleaseList-r11   OPTIONAL,       -- Need ON
        csi-RS-ConfigNZPToAddModList-r11
                                    CSI-RS-ConfigNZPToAddModList-r11    OPTIONAL,       -- Need ON
        csi-RS-ConfigZPToReleaseList-r11
                                    CSI-RS-ConfigZPToReleaseList-r11    OPTIONAL,       -- Need ON
        csi-RS-ConfigZPToAddModList-r11 CSI-RS-ConfigZPToAddModList-r11 OPTIONAL,       -- Need ON
        epdcch-Config-r11               EPDCCH-Config-r11               OPTIONAL,       -- Need ON
        pdsch-ConfigDedicated-v1130     PDSCH-ConfigDedicated-v1130     OPTIONAL,       -- Need ON
    -- UL configuration
        cqi-ReportConfig-v1130          CQI-ReportConfig-v1130          OPTIONAL,       -- Need ON
        pucch-ConfigDedicated-v1130     PUCCH-ConfigDedicated-v1130     OPTIONAL,       -- Need ON
        pusch-ConfigDedicated-v1130     PUSCH-ConfigDedicated-v1130     OPTIONAL,       -- Need ON
        uplinkPowerControlDedicated-v1130
                                    UplinkPowerControlDedicated-v1130   OPTIONAL        -- Need ON
    ]],
    [[  antennaInfo-v1250               AntennaInfoDedicated-v1250      OPTIONAL,   -- Cond AI-r10
        eimta-MainConfig-r12            EIMTA-MainConfig-r12            OPTIONAL,       -- Need ON
        eimta-MainConfigPCell-r12       EIMTA-MainConfigServCell-r12    OPTIONAL,       -- Need ON
        pucch-ConfigDedicated-v1250     PUCCH-ConfigDedicated-v1250     OPTIONAL,       -- Need ON
        cqi-ReportConfigPCell-v1250     CQI-ReportConfig-v1250          OPTIONAL,       -- Need ON
        uplinkPowerControlDedicated-v1250
                                    UplinkPowerControlDedicated-v1250   OPTIONAL,       -- Need ON
        pusch-ConfigDedicated-v1250     PUSCH-ConfigDedicated-v1250     OPTIONAL,       -- Need ON
        csi-RS-Config-v1250             CSI-RS-Config-v1250             OPTIONAL        -- Need ON
    ]],
    [[  pdsch-ConfigDedicated-v1280         PDSCH-ConfigDedicated-v1280 OPTIONAL        -- Need ON
    ]],
    [[  pdsch-ConfigDedicated-v1310         PDSCH-ConfigDedicated-v1310 OPTIONAL,       -- Need ON
        pucch-ConfigDedicated-r13           PUCCH-ConfigDedicated-r13   OPTIONAL,       -- Need ON
```


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```
        pusch-ConfigDedicated-r13           PUSCH-ConfigDedicated-r13   OPTIONAL,       -- Need ON
        pdcch-CandidateReductions-r13
                                    PDCCH-CandidateReductions-r13   OPTIONAL,       -- Need ON
        cqi-ReportConfig-v1310                  CQI-ReportConfig-v1310  OPTIONAL,       -- Need ON
        soundingRS-UL-ConfigDedicated-v1310
                                SoundingRS-UL-ConfigDedicated-v1310     OPTIONAL,       -- Need ON
        soundingRS-UL-ConfigDedicatedUpPTsExt-r13
                        SoundingRS-UL-ConfigDedicatedUpPTsExt-r13       OPTIONAL,       -- Need ON
        soundingRS-UL-ConfigDedicatedAperiodic-v1310
                        SoundingRS-UL-ConfigDedicatedAperiodic-v1310    OPTIONAL,       -- Need ON
        soundingRS-UL-ConfigDedicatedAperiodicUpPTsExt-r13
                SoundingRS-UL-ConfigDedicatedAperiodicUpPTsExt-r13      OPTIONAL,       -- Need ON
        csi-RS-Config-v1310             CSI-RS-Config-v1310             OPTIONAL,       -- Need ON
        ce-Mode-r13                 CHOICE {
            release                     NULL,
            setup                       ENUMERATED {ce-ModeA,ce-ModeB}
        }                                                               OPTIONAL,       -- Need ON
        csi-RS-ConfigNZPToAddModListExt-r13 CSI-RS-ConfigNZPToAddModListExt-r13 OPTIONAL,   -- Need
ON
        csi-RS-ConfigNZPToReleaseListExt-r13    CSI-RS-ConfigNZPToReleaseListExt-r13    OPTIONAL --
Need ON
    ]],
    [[  cqi-ReportConfig-v1320                  CQI-ReportConfig-v1320  OPTIONAL        -- Need ON
    ]],
    [[  typeA-SRS-TPC-PDCCH-Group-r14   CHOICE {
            release                         NULL,
            setup                           SEQUENCE (SIZE (1..32)) OF SRS-TPC-PDCCH-Config-r14
        }                                                               OPTIONAL,       -- Need ON
        must-Config-r14                         CHOICE{
            release                             NULL,
            setup                               SEQUENCE {
                k-max-r14                       ENUMERATED {l1, l3},
                p-a-must-r14                    ENUMERATED {
                                                    dB-6, dB-4dot77, dB-3, dB-1dot77,
                                                    dB0, dB1, dB2, dB3} OPTIONAL        -- Need ON
            }
        }                                                               OPTIONAL,       -- Need ON
        pusch-EnhancementsConfig-r14        PUSCH-EnhancementsConfig-r14        OPTIONAL,   -- Need
ON
        ce-pdsch-pusch-EnhancementConfig-r14        ENUMERATED {on}     OPTIONAL,   -- Need OR
        antennaInfo-v1430               AntennaInfoDedicated-v1430      OPTIONAL,   -- Need ON
        pucch-ConfigDedicated-v1430     PUCCH-ConfigDedicated-v1430     OPTIONAL,   -- Need ON
        pdsch-ConfigDedicated-v1430     PDSCH-ConfigDedicated-v1430     OPTIONAL,       -- Need ON
        pusch-ConfigDedicated-v1430     PUSCH-ConfigDedicated-v1430 OPTIONAL,       -- Need ON
        soundingRS-UL-PeriodicConfigDedicatedList-r14           SEQUENCE (SIZE (1..2)) OF
SoundingRS-UL-ConfigDedicated   OPTIONAL,       -- Cond PeriodicSRSPCell
        soundingRS-UL-PeriodicConfigDedicatedUpPTsExtList-r14   SEQUENCE (SIZE (1..4)) OF
SoundingRS-UL-ConfigDedicatedUpPTsExt-r13   OPTIONAL,       -- Cond PeriodicSRSExt
        soundingRS-UL-AperiodicConfigDedicatedList-r14          SEQUENCE (SIZE (1..2)) OF
SoundingRS-UL-ConfigDedicatedAperiodic-r10  OPTIONAL,       -- Cond AperiodicSRS
        soundingRS-UL-ConfigDedicatedApUpPTsExtList-r14 SEQUENCE (SIZE (1..4)) OF SoundingRS-UL-
ConfigDedicatedAperiodicUpPTsExt-r13    OPTIONAL,       -- Cond AperiodicSRSExt
        csi-RS-Config-v1430             CSI-RS-Config-v1430             OPTIONAL,       -- Need ON
        csi-RS-ConfigZP-ApList-r14              CSI-RS-ConfigZP-ApList-r14  OPTIONAL,   -- Need ON
        cqi-ReportConfig-v1430                  CQI-ReportConfig-v1430  OPTIONAL,   -- Need ON
        semiOpenLoop-r14                        BOOLEAN                 OPTIONAL    -- Need ON
    ]]
}

PhysicalConfigDedicated-v1370 ::=   SEQUENCE {
    pucch-ConfigDedicated-v1370         PUCCH-ConfigDedicated-v1370     OPTIONAL        -- Need ON
}

PhysicalConfigDedicatedSCell-r10 ::=        SEQUENCE {
    -- DL configuration as well as configuration applicable for DL and UL
    nonUL-Configuration-r10                 SEQUENCE {
        antennaInfo-r10
                                            AntennaInfoDedicated-r10    OPTIONAL,       -- Need ON
        crossCarrierSchedulingConfig-r10
                                    CrossCarrierSchedulingConfig-r10    OPTIONAL,       -- Need ON
        csi-RS-Config-r10                       CSI-RS-Config-r10       OPTIONAL,       -- Need ON
        pdsch-ConfigDedicated-r10               PDSCH-ConfigDedicated   OPTIONAL        -- Need ON
    }                                                                   OPTIONAL,   -- Cond SCellAdd
    -- UL configuration
    ul-Configuration-r10                    SEQUENCE {
        antennaInfoUL-r10                       AntennaInfoUL-r10       OPTIONAL,       -- Need ON
        pusch-ConfigDedicatedSCell-r10
                                PUSCH-ConfigDedicatedSCell-r10      OPTIONAL,   -- Cond PUSCH-SCell1
```


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```
        uplinkPowerControlDedicatedSCell-r10
                                UplinkPowerControlDedicatedSCell-r10    OPTIONAL,       -- Need ON
        cqi-ReportConfigSCell-r10           CQI-ReportConfigSCell-r10   OPTIONAL,       -- Need ON
        soundingRS-UL-ConfigDedicated-r10
                                        SoundingRS-UL-ConfigDedicated   OPTIONAL,       -- Need ON
        soundingRS-UL-ConfigDedicated-v1020
                                    SoundingRS-UL-ConfigDedicated-v1020 OPTIONAL,       -- Need ON
        soundingRS-UL-ConfigDedicatedAperiodic-r10
                            SoundingRS-UL-ConfigDedicatedAperiodic-r10  OPTIONAL    -- Need ON
    }                                                                   OPTIONAL,   -- Cond CommonUL
    ...,
    [[  -- DL configuration as well as configuration applicable for DL and UL
        csi-RS-ConfigNZPToReleaseList-r11
                                    CSI-RS-ConfigNZPToReleaseList-r11   OPTIONAL,       -- Need ON
        csi-RS-ConfigNZPToAddModList-r11
                                    CSI-RS-ConfigNZPToAddModList-r11    OPTIONAL,       -- Need ON
        csi-RS-ConfigZPToReleaseList-r11
                                    CSI-RS-ConfigZPToReleaseList-r11    OPTIONAL,       -- Need ON
        csi-RS-ConfigZPToAddModList-r11
                                        CSI-RS-ConfigZPToAddModList-r11 OPTIONAL,       -- Need ON
        epdcch-Config-r11                   EPDCCH-Config-r11           OPTIONAL,       -- Need ON
        pdsch-ConfigDedicated-v1130         PDSCH-ConfigDedicated-v1130 OPTIONAL,       -- Need ON
    -- UL configuration
        cqi-ReportConfig-v1130              CQI-ReportConfig-v1130      OPTIONAL,       -- Need ON
        pusch-ConfigDedicated-v1130
                                    PUSCH-ConfigDedicated-v1130     OPTIONAL,   -- Cond PUSCH-SCell1
        uplinkPowerControlDedicatedSCell-v1130
                                    UplinkPowerControlDedicated-v1130   OPTIONAL        -- Need ON
    ]],
    [[  antennaInfo-v1250                   AntennaInfoDedicated-v1250  OPTIONAL,       -- Need ON
        eimta-MainConfigSCell-r12
                                        EIMTA-MainConfigServCell-r12    OPTIONAL,       -- Need ON
        cqi-ReportConfigSCell-v1250         CQI-ReportConfig-v1250      OPTIONAL,       -- Need ON
        uplinkPowerControlDedicatedSCell-v1250
                                    UplinkPowerControlDedicated-v1250   OPTIONAL,       -- Need ON
        csi-RS-Config-v1250                 CSI-RS-Config-v1250         OPTIONAL        -- Need ON
    ]],
    [[  pdsch-ConfigDedicated-v1280         PDSCH-ConfigDedicated-v1280 OPTIONAL        -- Need ON
    ]],
    [[  pucch-Cell-r13                      ENUMERATED {true}       OPTIONAL,   -- Cond PUCCH-SCell1
        pucch-SCell                         CHOICE{
            release                             NULL,
            setup                               SEQUENCE {
                pucch-ConfigDedicated-r13
                                                PUCCH-ConfigDedicated-r13   OPTIONAL,       -- Need ON
                schedulingRequestConfig-r13
                                            SchedulingRequestConfigSCell-r13    OPTIONAL,       -- Need ON
                tpc-PDCCH-ConfigPUCCH-SCell-r13
                                                TPC-PDCCH-ConfigSCell-r13   OPTIONAL,       -- Need ON
                pusch-ConfigDedicated-r13
                                            PUSCH-ConfigDedicated-r13   OPTIONAL,   -- Cond PUSCH-SCell
                uplinkPowerControlDedicated-r13
                                    UplinkPowerControlDedicatedSCell-v1310  OPTIONAL    -- Need ON
            }
        }                                                               OPTIONAL,   -- Need ON
        crossCarrierSchedulingConfig-r13
                        CrossCarrierSchedulingConfig-r13    OPTIONAL,  -- Cond Cross-Carrier-Config
        pdcch-ConfigSCell-r13               PDCCH-ConfigSCell-r13       OPTIONAL,       -- Need ON
        cqi-ReportConfig-v1310              CQI-ReportConfig-v1310      OPTIONAL,       -- Need ON
        pdsch-ConfigDedicated-v1310         PDSCH-ConfigDedicated-v1310 OPTIONAL,       -- Need ON
        soundingRS-UL-ConfigDedicated-v1310
                                    SoundingRS-UL-ConfigDedicated-v1310     OPTIONAL,       -- Need ON
        soundingRS-UL-ConfigDedicatedUpPTsExt-r13
                            SoundingRS-UL-ConfigDedicatedUpPTsExt-r13   OPTIONAL,       -- Need ON
        soundingRS-UL-ConfigDedicatedAperiodic-v1310
                        SoundingRS-UL-ConfigDedicatedAperiodic-v1310    OPTIONAL,       -- Need ON
        soundingRS-UL-ConfigDedicatedAperiodicUpPTsExt-r13
                    SoundingRS-UL-ConfigDedicatedAperiodicUpPTsExt-r13  OPTIONAL,       -- Need ON
        csi-RS-Config-v1310                 CSI-RS-Config-v1310         OPTIONAL,       -- Need ON
        laa-SCellConfiguration-r13          LAA-SCellConfiguration-r13  OPTIONAL,       -- Need ON
        csi-RS-ConfigNZPToAddModListExt-r13 CSI-RS-ConfigNZPToAddModListExt-r13 OPTIONAL,   -- Need
ON
        csi-RS-ConfigNZPToReleaseListExt-r13    CSI-RS-ConfigNZPToReleaseListExt-r13    OPTIONAL  --
Need ON
    ]],
    [[  cqi-ReportConfig-v1320              CQI-ReportConfig-v1320  OPTIONAL        -- Need ON
    ]],
    [[  laa-SCellConfiguration-v1430        LAA-SCellConfiguration-v1430
```


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```
                                                                    OPTIONAL,   -- Need ON
        typeB-SRS-TPC-PDCCH-Config-r14      SRS-TPC-PDCCH-Config-r14    OPTIONAL,   -- Need ON

        uplinkPUSCH-LessPowerControlDedicated-v1430         UplinkPUSCH-LessPowerControlDedicated-
v1430 OPTIONAL,     -- Need ON
        soundingRS-UL-PeriodicConfigDedicatedList-r14                   SEQUENCE (SIZE (1..2)) OF
SoundingRS-UL-ConfigDedicated                       OPTIONAL,      -- Cond PeriodicSRS
        soundingRS-UL-PeriodicConfigDedicatedUpPTsExtList-r14                   SEQUENCE (SIZE
(1..4)) OF SoundingRS-UL-ConfigDedicatedUpPTsExt-r13                        OPTIONAL,      -- Cond
PeriodicSRSExt
        soundingRS-UL-AperiodicConfigDedicatedList-r14                  SEQUENCE (SIZE (1..2)) OF
SoundingRS-AperiodicSet-r14                     OPTIONAL,      -- Cond AperiodicSRS
        soundingRS-UL-ConfigDedicatedApUpPTsExtList-r14                 SEQUENCE (SIZE (1..4)) OF
SoundingRS-AperiodicSetUpPTsExt-r14             OPTIONAL,      -- Cond AperiodicSRSExt
        must-Config-r14                         CHOICE{
            release                             NULL,
            setup                               SEQUENCE {
                k-max-r14                       ENUMERATED {l1, l3},
                p-a-must-r14                    ENUMERATED {
                                                    dB-6, dB-4dot77, dB-3, dB-1dot77,
                                                    dB0, dB1, dB2, dB3} OPTIONAL        -- Need ON
            }
        }                                                           OPTIONAL,       -- Need ON
        pusch-ConfigDedicated-v1430             PUSCH-ConfigDedicatedSCell-v1430    OPTIONAL,   --
Need ON
        csi-RS-Config-v1430                     CSI-RS-Config-v1430         OPTIONAL,   -- Need ON
        csi-RS-ConfigZP-ApList-r14              CSI-RS-ConfigZP-ApList-r14      OPTIONAL,   -- Need
ON
        cqi-ReportConfig-v1430                  CQI-ReportConfig-v1430  OPTIONAL,   -- Need ON
        semiOpenLoop-r14                        BOOLEAN                     OPTIONAL,   -- Need ON
        pdsch-ConfigDedicatedSCell-v1430        PDSCH-ConfigDedicatedSCell-v1430        OPTIONAL
    -- Need ON
    ]]
}

PhysicalConfigDedicatedSCell-v1370 ::=  SEQUENCE {
    pucch-SCell-v1370               CHOICE{
        release                         NULL,
        setup                           SEQUENCE {
            pucch-ConfigDedicated-v1370     PUCCH-ConfigDedicated-v1370     OPTIONAL    -- Need ON
        }
    }
}

LAA-SCellConfiguration-r13 ::=          SEQUENCE {
    subframeStartPosition-r13               ENUMERATED {s0, s07},
    laa-SCellSubframeConfig-r13             BIT STRING (SIZE(8))
}

LAA-SCellConfiguration-v1430 ::=        SEQUENCE {
    crossCarrierSchedulingConfig-UL-r14 CHOICE {
        release                                 NULL,
        setup                                   SEQUENCE {
            crossCarrierSchedulingConfigLAA-UL-r14      CrossCarrierSchedulingConfigLAA-UL-r14
        }
    }                                                   OPTIONAL,   -- Cond Cross-Carrier-ConfigUL
    lbt-Config-r14                          LBT-Config-r14          OPTIONAL,       -- Need ON
    pdcch-ConfigLAA-r14                     PDCCH-ConfigLAA-r14     OPTIONAL,       -- Need ON
    absenceOfAnyOtherTechnology-r14         ENUMERATED {true}       OPTIONAL,       -- Need OR
    soundingRS-UL-ConfigDedicatedAperiodic-v1430
                        SoundingRS-UL-ConfigDedicatedAperiodic-v1430    OPTIONAL        -- Need ON
}

LBT-Config-r14 ::=      CHOICE{
    maxEnergyDetectionThreshold-r14             INTEGER(-85..-52),
    energyDetectionThresholdOffset-r14          INTEGER(-13..20)
}

CSI-RS-ConfigNZPToAddModList-r11 ::=    SEQUENCE (SIZE (1..maxCSI-RS-NZP-r11)) OF CSI-RS-ConfigNZP-
r11

CSI-RS-ConfigNZPToAddModListExt-r13 ::= SEQUENCE (SIZE (1..maxCSI-RS-NZP-v1310)) OF CSI-RS-
ConfigNZP-r11

CSI-RS-ConfigNZPToReleaseList-r11 ::=   SEQUENCE (SIZE (1..maxCSI-RS-NZP-r11)) OF CSI-RS-
ConfigNZPId-r11
```


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```
CSI-RS-ConfigNZPToReleaseListExt-r13 ::=    SEQUENCE (SIZE (1..maxCSI-RS-NZP-v1310)) OF CSI-RS-
ConfigNZPId-v1310

CSI-RS-ConfigZPToAddModList-r11 ::= SEQUENCE (SIZE (1..maxCSI-RS-ZP-r11)) OF CSI-RS-ConfigZP-r11

CSI-RS-ConfigZPToReleaseList-r11 ::=    SEQUENCE (SIZE (1..maxCSI-RS-ZP-r11)) OF CSI-RS-ConfigZPId-
r11

SoundingRS-AperiodicSet-r14 ::= SEQUENCE{
    srs-CC-SetIndexList-r14
                                SEQUENCE (SIZE (1..4)) OF SRS-CC-SetIndex-r14
                                                          OPTIONAL,  -- Cond SRS-Trigger-TypeA
    soundingRS-UL-ConfigDedicatedAperiodic-r14
                                                  SoundingRS-UL-ConfigDedicatedAperiodic-r10
}

SoundingRS-AperiodicSetUpPTsExt-r14 ::= SEQUENCE{
    srs-CC-SetIndexList-r14
                                SEQUENCE (SIZE (1..4)) OF SRS-CC-SetIndex-r14
                                                         OPTIONAL,   -- Cond SRS-Trigger-TypeA
    soundingRS-UL-ConfigDedicatedAperiodicUpPTsExt-r14
                                             SoundingRS-UL-ConfigDedicatedAperiodicUpPTsExt-r13
}

-- ASN1STOP
```


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***PhysicalConfigDedicated* field descriptions**
absenceOfAnyOtherTechnology Presence of this field indicates absence on a long term basis (e.g. by level of regulation) of any other technology sharing the carrier; absence of this field indicates the potential presence of any other technology sharing the carrier, as specified in TS 36.213 [23].
additionalSpectrumEmissionPCell E-UTRAN does not configure this field in this release of the specification.
antennaInfo A choice is used to indicate whether the *antennaInfo* is signalled explicitly or set to the default antenna configuration as specified in section 9.2.4.
ce-Mode Indicates the CE mode as specified in TS 36.213 [23].
ce-pdsch-pusch-Enhancement-Config Activation of new numbers of repetitions for PUSCH and modulation restrictions for PDSCH/PUSCH in CE mode A, see TS 36.212 [22] and TS 36.213 [23].
csi-RS-Config For a serving frequency E-UTRAN does not configure *csi-RS-Config* (includes *zeroTxPowerCSI-RS*) when transmission mode 10 is configured for the serving cell on this carrier frequency.
csi-RS-ConfigNZPToAddModList For a serving frequency E-UTRAN configures one or more *CSI-RS-ConfigNZP* only when transmission mode 9 or 10 is configured for the serving cell on this carrier frequency. For a serving frequency, EUTRAN configures a maximum number of *CSI-RS-ConfigNZP* in accordance with transmission mode (including CSI processes), eMIMO (including class) and associated UE capabilities (e.g. k-Max, n-MaxList).
csi-RS-ConfigZP-ApList The aperiodic ZP CSI-RS for PDSCH rate matching. The field *subframeConfig* is applicable to semi-persistent CSI RS reporting. In other cases, the UE shall ignore field *subframeConfig*.
csi-RS-ConfigZPToAddModList For a serving frequency E-UTRAN configures one or more *CSI-RS-ConfigZP* only when transmission mode 10 is configured for the serving cell on this carrier frequency.
eimta-MainConfigPCell, eimta-MainConfigSCell If E-UTRAN configures *eimta-MainConfigPCell* or *eimta-MainConfigSCell* for one serving cell in a frequency band, E-UTRAN configures *eimta-MainConfigPCell* or *eimta-MainConfigSCell* for all serving cells residing on the frequency band. E-UTRAN configures *eimta-MainConfigPCell* or *eimta-MainConfigSCell* only if *eimta-MainConfig* is configured.
energyDetectionThresholdOffset Indicates the offset to the default maximum energy detection threshold value. Unit in dB. Value -13 corresponds to -13dB, value -12 corresponds to -12dB, and so on (i.e. in steps of 1dB) as specified in TS 36.213 [23].
epdcch-Config indicates the *EPDCCH-Config* for the cell. E-UTRAN does not configure *EPDCCH-Config* for an SCell that is configured with value *other* for *schedulingCellInfo* in *CrossCarrierSchedulingConfig*.
k-max Indicates the maximum number of interfering spatial layers signaled in the assistance information for MUST. Value l1 corresponds to 1 layer, Value l3 corresponds to 3 layers.
laa-SCellSubframeConfig A bit-map indicating LAA SCell subframe configuration, "1" denotes that the corresponding subframe is allocated as MBSFN subframe. The bitmap is interpreted as follows: Starting from the first/leftmost bit in the bitmap, the allocation applies to subframes #1, #2, #3, #4, #6, #7, #8, and #9.
maxEnergyDetectionThreshold Indicates the absolute maximum energy detection threshold value. Unit in dBm. Value -85 corresponds to -85 dBm, value -84 corresponds to -84 dBm, and so on (i.e. in steps of 1dBm) as specified in TS 36.213 [23]. If the field is not configured, the UE shall use a default maximum energy detection threshold value as specified in TS 36.213 [23].
p-a-must Parameter: P_A, see TS 36.213 [23, 5.2]. Value dB-6 corresponds to -6 dB, dB-4dot77 corresponds to -4.77 dB etc.
pdsch-ConfigDedicated-v1130 For a serving frequency E-UTRAN configures *pdsch-ConfigDedicated-v1130* only when transmission mode 10 is configured for the serving cell on this carrier frequency.
pdsch-ConfigDedicated-v1280 For a serving frequency E-UTRAN configures *pdsch-ConfigDedicated-v1280* only when transmission mode 9 or 10 is configured for the serving cell on this carrier frequency.
pucch-Cell If present, PUCCH feedback of this SCell is sent on the PUCCH SCell. If absent, PUCCH feedback of this SCell is sent on PCell or PSCell, or if the cell concerns the PUCCH SCell, on the concerned cell. If this field is not modified upon change of PUCCH SCell, the UE shall always send the PUCCH feedback of the concerned SCell using the configured PUCCH SCell.
pucch-ConfigDedicated-r13 E-UTRAN configures *pucch-ConfigDedicated-r13* only if *pucch-ConfigDedicated* is not configured.
pucch-ConfigDedicated-v1370 E-UTRAN only configures *pucch-ConfigDedicated-v1370* if *pucch-ConfigDedicated-r13* is configured.

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***PhysicalConfigDedicated* field descriptions**
pucch-SCell If present, the concerned SCell is the PUCCH SCell. E-UTRAN only configures this field upon SCell addition i.e. this field is only released when the SCell is released.
pusch-ConfigDedicated-r13 E-UTRAN configures *pusch-ConfigDedicated-r13* only if *pusch-ConfigDedicated* is not configured.
pusch-ConfigDedicated-v1250 E-UTRAN configures *pusch-ConfigDedicated-v1250* only if *tpc-SubframeSet* is configured.
pusch-EnhancementsConfig Indicates that the UE shall transmit in the PUSCH enhancement mode if *pusch-EnhancementsConfig* is set to *setup*, see TS 36.211 [21] and TS 36.213 [23].
semiOpenLoop Value TRUE indicates that semi-open-loop transmission is used for deriving CSI reporting and corresponding PDSCH transmission (DMRS).
soundingRS-UL-PeriodicConfigDedicatedList Indicates periodic soundingRS configuration except for the extension sounding symbols of the UpPTs subframe.
soundingRS-UL-PeriodicConfigDedicatedUpPTsExtList Indicates periodic soundingRS configuration in extension sounding symbols of the UpPTs subframe.
soundingRS-UL-AperiodicConfigDedicatedList Indicates aperiodic soundingRS configuration except for the extension sounding symbols of the UpPTs subframe.
soundingRS-UL-DedicatedApUpPTsExtList Indicates aperiodic soundingRS configuration in extension sounding symbols of the UpPTs subframe.
srs-CC-SetIndexList Indicates the *srs-CC-SetIndex* list which the *soundingRS-UL-ConfigDedicatedAperiodic* and *soundingRS-UL-ConfigDedicatedAperiodicUpPTsExt* belongs to.
subframeStartPosition Indicates possible starting positions of transmission in the first subframe of the DL transmission burst, see TS 36.211 [21].Value *s0* means the starting position is subframe boundary, *s07* means the starting position is either subframe boundary or slot boundary.
tpc-PDCCH-ConfigPUCCH PDCCH configuration for power control of PUCCH using format 3/3A, see TS 36.212 [22].
tpc-PDCCH-ConfigPUSCH PDCCH configuration for power control of PUSCH using format 3/3A, see TS 36.212 [22].
typeA-SRS-TPC-PDCCH-Group Indicates Type A trigger configuration for SRS transmission on a PUSCH-less SCell. E-UTRAN configures the UE with either *typeA-SRS-TPC-PDCCH-Group* or *typeB-SRS-TPC-PDCCH-Group*, if any.
uplinkPowerControlDedicated E-UTRAN configures *uplinkPowerControlDedicated-v1130* only if *uplinkPowerControlDedicated* (without suffix) is configured.
uplinkPowerControlDedicatedSCell E-UTRAN configures *uplinkPowerControlDedicatedSCell-v1130* only if *uplinkPowerControlDedicatedSCell-r10* is configured for this serving cell.

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Conditional presence	Explanation
AI-r8	The field is optionally present, need ON, if *antennaInfoDedicated-r10* is absent. Otherwise the field is not present
AI-r10	The field is optionally present, need ON, if *antennaInfoDedicated* is absent. Otherwise the field is not present
AperiodicSRS	If *soundingRS-UL-ConfigDedicatedAperiodic-r10* is absent, the field is optional, Need ON. Otherwise the field is not present and the UE shall delete any existing value for this field.
AperiodicSRSExt	If *soundingRS-UL-ConfigDedicatedAperiodicUpPTsExt-r13* is absent, the field is optional, Need ON. Otherwise the field is not present and the UE shall delete any existing value for this field.
CommonUL	The field is mandatory present if *ul-Configuration* of *RadioResourceConfigCommonSCell-r10* is present; otherwise it is optional, need ON.
CQI-r8	The field is optionally present, need ON, if *cqi-ReportConfig-r10* is absent. Otherwise the field is not present
CQI-r10	The field is optionally present, need ON, if *cqi-ReportConfig* is absent. Otherwise the field is not present
Cross-Carrier-Config	The field is optionally present, need ON, if *crossCarrierSchedulingConfig-r10* is absent. Otherwise the field is not present
Cross-Carrier-ConfigUL	The field is optionally present, need ON, if *crossCarrierSchedulingConfig-r10* and *crossCarrierSchedulingConfig-r13* are absent or *schedulingCellInfo* is set to 'own'. Otherwise the field is not present.
PeriodicSRS	If *soundingRS-UL-ConfigDedicated-r10* is absent, the field is optional, Need ON. Otherwise the field is not present and the UE shall delete any existing value for this field.
PeriodicSRSPCell	If *soundingRS-UL-ConfigDedicated* is absent, the field is optional, Need ON. Otherwise the field is not present and the UE shall delete any existing value for this field.
PeriodicSRSExt	If *soundingRS-UL-ConfigDedicatedUpPTsExt-r13* is absent, the field is optional, Need ON. Otherwise the field is not present and the UE shall delete any existing value for this field.
PUCCH-SCell1	The field is optionally present, need OR, for SCell not configured with *pucch-configDedicated-r13*. Otherwise it is not present.
PUSCH-SCell	The field is optionally present, need ON, if *pusch-ConfigDedicatedSCell-r10 and pusch-ConfigDedicated-v1130* are absent. Otherwise the field is not present
PUSCH-SCell1	The field is optionally present, need ON, for SCell not configured with *pucch-configDedicated-r13*. Otherwise it is not present.
SCellAdd	The field is mandatory present if *cellIdentification* is present; otherwise it is optional, need ON.
SRS-Trigger-TypeA	The field is mandatory present if *typeA-SRS-TPC-PDCCH-Group-r14* is present. Otherwise the field is not present and the UE shall delete any existing value for this field.

NOTE 1: During handover, the UE performs a MAC reset, which involves reverting to the default CQI/ SRS/ SR configuration in accordance with subclause 5.3.13 and TS 36.321 [6, 5.9 & 5.2]. Hence, for these parts of the dedicated radio resource configuration, the default configuration (rather than the configuration used in the source PCell) is used as the basis for the delta signalling that is included in the message used to perform handover.

NOTE 2: Since delta signalling is not supported for the common SCell configuration, E-UTRAN can only add or release the uplink of an SCell by releasing and adding the concerned SCell.

– *P-Max*

The IE *P-Max* is used to limit the UE's uplink transmission power on a carrier frequency and is used to calculate the parameter *Pcompensation* defined in TS 36.304 [4]. Corresponds to parameter P_{EMAX} or $P_{EMAX,c}$ in TS 36.101 [42]. The UE transmit power on one serving cell shall not exceed the configured maximum UE output power of the serving cell determined by this value as specified in TS 36.101 [42, 6.2.5 or 6.2.5A] or, when transmitting sidelink discovery announcements within the coverage of the concerned cell, as specified in TS 36.101 [42, 6.2.5D].

P-Max information element

```
-- ASN1START

P-Max ::=               INTEGER (-30..33)

-- ASN1STOP
```


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– *PRACH-Config*

The IE *PRACH-ConfigSIB* and IE *PRACH-Config* are used to specify the PRACH configuration in the system information and in the mobility control information, respectively.

PRACH-Config information elements

```
-- ASN1START

PRACH-ConfigSIB ::=             SEQUENCE {
    rootSequenceIndex                   INTEGER (0..837),
    prach-ConfigInfo                    PRACH-ConfigInfo
}

PRACH-ConfigSIB-v1310 ::=           SEQUENCE {
    rsrp-ThresholdsPrachInfoList-r13        RSRP-ThresholdsPrachInfoList-r13,
    mpdcch-startSF-CSS-RA-r13           CHOICE {
        fdd-r13                             ENUMERATED {v1, v1dot5, v2, v2dot5, v4, v5, v8,
                                                v10},
        tdd-r13                             ENUMERATED {v1, v2, v4, v5, v8, v10, v20, spare}
    }                                                                       OPTIONAL,   -- Cond MP
    prach-HoppingOffset-r13             INTEGER (0..94)                     OPTIONAL,   -- Need OR
    prach-ParametersListCE-r13          PRACH-ParametersListCE-r13
}

PRACH-Config ::=                    SEQUENCE {
    rootSequenceIndex                   INTEGER (0..837),
    prach-ConfigInfo                    PRACH-ConfigInfo                    OPTIONAL    -- Need ON
}

PRACH-Config-v1310 ::=              SEQUENCE {
    rsrp-ThresholdsPrachInfoList-r13        RSRP-ThresholdsPrachInfoList-r13        OPTIONAL,   --
Cond MP
    mpdcch-startSF-CSS-RA-r13           CHOICE {
        fdd-r13                             ENUMERATED {v1, v1dot5, v2, v2dot5, v4, v5, v8,
                                                v10},
        tdd-r13                             ENUMERATED {v1, v2, v4, v5, v8, v10, v20, spare}
    }                                                                       OPTIONAL,   -- Cond MP
    prach-HoppingOffset-r13             INTEGER (0..94)                     OPTIONAL,   -- Need OR
    prach-ParametersListCE-r13          PRACH-ParametersListCE-r13          OPTIONAL,   -- Cond MP
    initial-CE-level-r13                    INTEGER (0..3)      OPTIONAL    -- Need OR
}

PRACH-Config-v1430 ::=              SEQUENCE {
    rootSequenceIndexHighSpeed-r14              INTEGER (0..837),
    zeroCorrelationZoneConfigHighSpeed-r14      INTEGER (0..12),
    prach-ConfigIndexHighSpeed-r14              INTEGER (0..63),
    prach-FreqOffsetHighSpeed-r14               INTEGER (0..94)
}

PRACH-ConfigSCell-r10 ::=               SEQUENCE {
    prach-ConfigIndex-r10                   INTEGER (0..63)
}

PRACH-ConfigInfo ::=                SEQUENCE {
    prach-ConfigIndex                   INTEGER (0..63),
    highSpeedFlag                       BOOLEAN,
    zeroCorrelationZoneConfig           INTEGER (0..15),
    prach-FreqOffset                    INTEGER (0..94)
}

PRACH-ParametersListCE-r13 ::=  SEQUENCE (SIZE(1..maxCE-Level-r13)) OF PRACH-ParametersCE-r13

PRACH-ParametersCE-r13 ::=          SEQUENCE {
    prach-ConfigIndex-r13                   INTEGER (0..63),
    prach-FreqOffset-r13                    INTEGER (0..94),
    prach-StartingSubframe-r13              ENUMERATED {sf2, sf4, sf8, sf16, sf32, sf64, sf128,
                                                        sf256}              OPTIONAL,   -- Need OP
    maxNumPreambleAttemptCE-r13
                                ENUMERATED {n3, n4, n5, n6, n7, n8, n10}    OPTIONAL,   -- Need OP
    numRepetitionPerPreambleAttempt-r13     ENUMERATED {n1,n2,n4,n8,n16,n32,n64,n128},
    mpdcch-NarrowbandsToMonitor-r13         SEQUENCE (SIZE(1..2)) OF
                                                    INTEGER (1..maxAvailNarrowBands-r13),
    mpdcch-NumRepetition-RA-r13             ENUMERATED {r1, r2, r4, r8, r16,
                                                        r32, r64, r128, r256},
    prach-HoppingConfig-r13                 ENUMERATED {on,off}
}
```


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```
RSRP-ThresholdsPrachInfoList-r13 ::= SEQUENCE (SIZE(1..3)) OF RSRP-Range

-- ASN1STOP
```


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***PRACH-Config* field descriptions**
initial-CE-level Indicates initial PRACH CE level at random access, see TS 36.321 [6]. If not configured, UE selects PRACH CE level based on measured RSRP level, see TS 36.321 [6].
highSpeedFlag Parameter: High-speed-flag, see TS 36.211 [21, 5.7.2]. TRUE corresponds to Restricted set and FALSE to Unrestricted set.
maxNumPreambleAttemptCE Maximum number of preamble transmission attempts per CE level. See TS 36.321 [6]. If the field is absent, the UE shall use the default value n3.
mpdcch-NarrowbandsToMonitor Narrowbands to monitor for MPDCCH for RAR, see TS 36.213 [23, 6.2]. Field values (1..*maxAvailNarrowBands-r13*) correspond to narrowband indices (0..[*maxAvailNarrowBands-r13*-1]) as specified in TS 36.211 [21].
mpdcch-NumRepetition-RA Maximum number of repetitions for MPDCCH common search space (CSS) for RAR, Msg3 and Msg4, see TS 36.211 [21].
mpdcch-startSF-CSS-RA Starting subframe configuration for MPDCCH common search space (CSS), including RAR, Msg3 retransmission, PDSCH with contention resolution and PDSCH with CCCH MAC SDU, see TS 36.211 [21] and TS 36.213 [23]. Value v1 corresponds to 1, value v1dot5 corresponds to 1.5, and so on.
numRepetitionPerPreambleAttempt Number of PRACH repetitions per attempt for each CE level, See TS 36.211 [21].
prach-ConfigIndex Parameter: *prach-ConfigurationIndex*, see TS 36.211 [21, 5.7.1].
prach-ConfigIndexHighSpeed Parameter: *prach-ConfigurationIndexHighSpeed, see* TS 36.211 [21, 5.7.1]. If this field is present, the UE shall ignore *prach-ConfigIndex*.
prach-FreqOffset Parameter: *prach-FrequencyOffset,* see TS 36.211 [21, 5.7.1]. For TDD the value range is dependent on the value of *prach-ConfigIndex*.
prach-FreqOffsetHighSpeed Parameter: *prach-FrequencyOffsetHighSpeed, see* TS 36.211 [21, 5.7.1]. For TDD the value range is dependent on the value of *prach-ConfigIndexHighSpeed*. If this field is present, the UE shall ignore *prach-FreqOffset*.
prach-HoppingConfig Coverage level specific frequency hopping configuration for PRACH.
prach-HoppingOffset Parameter: PRACH frequency hopping offset, expressed as a number of resource blocks, see TS 36.211 [21, 5.7.1]
prach-ParametersListCE Configures PRACH parameters for each CE level. The first entry in the list is the PRACH parameters of CE level 0, the second entry in the list is the PRACH parameters of CE level 1, and so on.
prach-StartingSubframe PRACH starting subframe periodicity, expressed in number of subframes available for preamble transmission (PRACH opportunities), see TS 36.211 [21]. Value sf2 corresponds to 2 subframes, sf4 corresponds to 4 subframes and so on. EUTRAN configures the PRACH starting subframe periodicity larger than or equal to the number of PRACH repetitions per attempt for each CE level (*numRepetitionPerPreambleAttempt*). If the field is absent, the value is determined implicitly in TS 36.211 [21, 5.7.1].
rootSequenceIndex Parameter: *RACH_ROOT_SEQUENCE*, see TS 36.211 [21, 5.7.1].
rootSequenceIndexHighSpeed The field indicates starting logical root sequence index used to derive the 64 random access preambles based on restricted set type B in high speed scenario, see TS 36.211 [21, 5.7.2]. If this field is present, the UE shall generate random access preambles based on restricted set type B and ignore *rootSequenceIndex*.
rsrp-ThresholdsPrachInfoList The criterion for BL UEs and UEs in CE to select PRACH resource set. Up to 3 RSRP threshold values are signalled to determine the CE level for PRACH, see TS 36.213 [23]. The first element corresponds to RSRP threshold 1, the second element corresponds to RSRP threshold 2 and so on, see TS 36.321 [6]. The UE shall ignore this field if only one CE level, i.e. CE level 0, is configured in *prach-ParametersListCE*. The number of RSRP thresholds present in *rsrp-ThresholdsPrachInfoList* is equal to the number of CE levels configured in *prach-ParametersListCE* minus one.
zeroCorrelationZoneConfig Parameter: N_{CS} configuration, see TS 36.211 [21, 5.7.2: table 5.7.2-2] for preamble format 0..3 and TS 36.211 [21, 5.7.2: table 5.7.2-3] for preamble format 4.
zeroCorrelationZoneConfigHighSpeed The field indicates N_{CS} configuration for the restricted set type B in high speed scenario, see TS 36.211 [21, 5.7.2]. If this field is present, the UE shall generate random access preambles based on restricted set type B and ignore *zeroCorrelationZoneConfig*.

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Conditional presence	Explanation
MP	The field is mandatory present.

– *PresenceAntennaPort1*

The IE *PresenceAntennaPort1* is used to indicate whether all the neighbouring cells use Antenna Port 1. When set to *TRUE*, the UE may assume that at least two cell-specific antenna ports are used in all neighbouring cells.

PresenceAntennaPort1 information element

```
-- ASN1START

PresenceAntennaPort1 ::=                BOOLEAN

-- ASN1STOP
```

– *PUCCH-Config*

The IE *PUCCH-ConfigCommon* and IE *PUCCH-ConfigDedicated* are used to specify the common and the UE specific PUCCH configuration respectively.

PUCCH-Config information elements

```
-- ASN1START

PUCCH-ConfigCommon ::=              SEQUENCE {
    deltaPUCCH-Shift                    ENUMERATED {ds1, ds2, ds3},
    nRB-CQI                             INTEGER (0..98),
    nCS-AN                              INTEGER (0..7),
    n1PUCCH-AN                          INTEGER (0..2047)
}

PUCCH-ConfigCommon-v1310 ::=        SEQUENCE {
    n1PUCCH-AN-InfoList-r13                 N1PUCCH-AN-InfoList-r13         OPTIONAL,   -- Need OR
    pucch-NumRepetitionCE-Msg4-Level0-r13   ENUMERATED {n1, n2, n4, n8}     OPTIONAL,   -- Need OR
    pucch-NumRepetitionCE-Msg4-Level1-r13   ENUMERATED {n1, n2, n4, n8}     OPTIONAL,   -- Need OR
    pucch-NumRepetitionCE-Msg4-Level2-r13   ENUMERATED {n4, n8, n16, n32}   OPTIONAL,   -- Need OR
    pucch-NumRepetitionCE-Msg4-Level3-r13   ENUMERATED {n4, n8, n16, n32}   OPTIONAL    -- Need OR
}

PUCCH-ConfigCommon-v1430 ::=        SEQUENCE {
    pucch-NumRepetitionCE-Msg4-Level3-r14   ENUMERATED {n64, n128}  OPTIONAL    -- Need OR
}

PUCCH-ConfigDedicated ::=           SEQUENCE {
    ackNackRepetition                   CHOICE{
        release                             NULL,
        setup                               SEQUENCE {
            repetitionFactor                    ENUMERATED {n2, n4, n6, spare1},
            n1PUCCH-AN-Rep                      INTEGER (0..2047)
        }
    },
    tdd-AckNackFeedbackMode             ENUMERATED {bundling, multiplexing} OPTIONAL    -- Cond TDD
}

PUCCH-ConfigDedicated-v1020 ::=     SEQUENCE {
    pucch-Format-r10                    CHOICE {
        format3-r10                     PUCCH-Format3-Conf-r13,
        channelSelection-r10                SEQUENCE {
            n1PUCCH-AN-CS-r10                   CHOICE {
                release                             NULL,
                setup                               SEQUENCE {
                    n1PUCCH-AN-CS-List-r10              SEQUENCE (SIZE (1..2)) OF N1PUCCH-AN-CS-r10
                }
            }                                                                   OPTIONAL    -- Need ON
        }
    }                                                                           OPTIONAL,   -- Need OR
    twoAntennaPortActivatedPUCCH-Format1a1b-r10     ENUMERATED {true}       OPTIONAL,   -- Need OR
    simultaneousPUCCH-PUSCH-r10                     ENUMERATED {true}       OPTIONAL,   -- Need OR
```


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```
    n1PUCCH-AN-RepP1-r10                            INTEGER (0..2047)       OPTIONAL    -- Need OR
}

PUCCH-ConfigDedicated-v1130 ::=     SEQUENCE {
    n1PUCCH-AN-CS-v1130                 CHOICE {
        release                             NULL,
        setup                               SEQUENCE {
            n1PUCCH-AN-CS-ListP1-r11            SEQUENCE (SIZE (2..4)) OF INTEGER (0..2047)
        }
    }                                                                           OPTIONAL,   -- Need ON
    nPUCCH-Param-r11                    CHOICE {
        release                             NULL,
        setup                               SEQUENCE {
            nPUCCH-Identity-r11                 INTEGER (0..503),
            n1PUCCH-AN-r11                      INTEGER (0..2047)
        }
    }                                                                           OPTIONAL    -- Need ON
}

PUCCH-ConfigDedicated-v1250 ::=     SEQUENCE {
    nkaPUCCH-Param-r12                  CHOICE {
        release                             NULL,
        setup                               SEQUENCE {
            nkaPUCCH-AN-r12                     INTEGER (0..2047)
        }
    }
}

PUCCH-ConfigDedicated-r13 ::=       SEQUENCE {
--Release 8
    ackNackRepetition-r13               CHOICE{
        release                             NULL,
        setup                               SEQUENCE {
            repetitionFactor-r13                ENUMERATED {n2, n4, n6, spare1},
            n1PUCCH-AN-Rep-r13              INTEGER (0..2047)
        }
    },
    tdd-AckNackFeedbackMode-r13         ENUMERATED {bundling, multiplexing} OPTIONAL,   -- Cond TDD
--Release 10
    pucch-Format-r13                    CHOICE {
        format3-r13                             SEQUENCE {
            n3PUCCH-AN-List-r13 SEQUENCE (SIZE (1..4)) OF INTEGER (0..549)  OPTIONAL,   -- Need ON
            twoAntennaPortActivatedPUCCH-Format3-r13        CHOICE {
                release                                         NULL,
                setup                                           SEQUENCE {
                    n3PUCCH-AN-ListP1-r13   SEQUENCE (SIZE (1..4)) OF INTEGER (0..549)
                }
            }                                                               OPTIONAL    -- Need ON
        },
        channelSelection-r13                SEQUENCE {
            n1PUCCH-AN-CS-r13                   CHOICE {
                release                             NULL,
                setup                               SEQUENCE {
                    n1PUCCH-AN-CS-List-r13              SEQUENCE (SIZE (1..2)) OF N1PUCCH-AN-CS-r10,
                    n1PUCCH-AN-CS-ListP1-r13            SEQUENCE (SIZE (2..4)) OF INTEGER (0..2047)
                }
            }                                                               OPTIONAL    -- Need ON
        },
        format4-r13                         SEQUENCE {
            format4-resourceConfiguration-r13           SEQUENCE (SIZE (4)) OF Format4-resource-r13,
            format4-MultiCSI-resourceConfiguration-r13  SEQUENCE (SIZE (1..2)) OF Format4-resource-
r13 OPTIONAL    -- Need OR
        },
        format5-r13             SEQUENCE {
            format5-resourceConfiguration-r13           SEQUENCE (SIZE (4)) OF Format5-resource-r13,
            format5-MultiCSI-resourceConfiguration-r13  Format5-resource-r13 OPTIONAL   -- Need OR
        }
    }                                                                           OPTIONAL,   -- Need OR
    twoAntennaPortActivatedPUCCH-Format1a1b-r13     ENUMERATED {true}       OPTIONAL,   -- Need OR
    simultaneousPUCCH-PUSCH-r13                     ENUMERATED {true}       OPTIONAL,   -- Need OR
    n1PUCCH-AN-RepP1-r13                            INTEGER (0..2047)       OPTIONAL,   -- Need OR
--Release 11
    nPUCCH-Param-r13                    CHOICE {
        release                             NULL,
        setup                               SEQUENCE {
            nPUCCH-Identity-r13                 INTEGER (0..503),
            n1PUCCH-AN-r13                      INTEGER (0..2047)
        }
```


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```
    }                                                                                   OPTIONAL,   -- Need ON
--Release 12
    nkaPUCCH-Param-r13                  CHOICE {
        release                             NULL,
        setup                               SEQUENCE {
            nkaPUCCH-AN-r13                     INTEGER (0..2047)
        }
    }                                                                                   OPTIONAL,   -- Need ON
--Release 13
    spatialBundlingPUCCH-r13            BOOLEAN,
    spatialBundlingPUSCH-r13            BOOLEAN,
    harq-TimingTDD-r13                  BOOLEAN,
    codebooksizeDetermination-r13       ENUMERATED {dai,cc}                 OPTIONAL,   -- Need OR
    maximumPayloadCoderate-r13          INTEGER (0..7)                      OPTIONAL,   -- Need OR
    pucch-NumRepetitionCE-r13           CHOICE {
        release                     NULL,
        setup                       CHOICE {
            modeA                       SEQUENCE {
                pucch-NumRepetitionCE-format1-r13                   ENUMERATED {r1, r2, r4, r8},
                pucch-NumRepetitionCE-format2-r13                   ENUMERATED {r1, r2, r4, r8}
            },
            modeB                       SEQUENCE {
                pucch-NumRepetitionCE-format1-r13                   ENUMERATED {r4, r8, r16, r32},
                pucch-NumRepetitionCE-format2-r13                   ENUMERATED {r4, r8, r16, r32}
            }
        }
    }                                                                               OPTIONAL    --Need ON
}

PUCCH-ConfigDedicated-v1370 ::=     SEQUENCE {
    pucch-Format-v1370                  CHOICE {
        release NULL,
        setup   PUCCH-Format3-Conf-r13
    }
}

PUCCH-Format3-Conf-r13 ::=  SEQUENCE {
    n3PUCCH-AN-List-r13 SEQUENCE (SIZE (1..4)) OF INTEGER (0..549)  OPTIONAL,   -- Need ON
    twoAntennaPortActivatedPUCCH-Format3-r13        CHOICE {
        release                                         NULL,
        setup                                           SEQUENCE {
            n3PUCCH-AN-ListP1-r13   SEQUENCE (SIZE (1..4)) OF INTEGER (0..549)
        }
    }                                                                   OPTIONAL    -- Need ON
}

PUCCH-ConfigDedicated-v1430 ::=     SEQUENCE {
    pucch-NumRepetitionCE-format1-r14       ENUMERATED {r64,r128}       OPTIONAL    -- Need OR
}

Format4-resource-r13    ::=             SEQUENCE {
    startingPRB-format4-r13                 INTEGER (0..109),
    numberOfPRB-format4-r13                 INTEGER (0..7)
}

Format5-resource-r13    ::=             SEQUENCE {
    startingPRB-format5-r13                 INTEGER (0..109),
    cdm-index-format5-r13                   INTEGER (0..1)
}



N1PUCCH-AN-CS-r10   ::= SEQUENCE (SIZE (1..4)) OF INTEGER (0..2047)

N1PUCCH-AN-InfoList-r13 ::= SEQUENCE (SIZE(1..maxCE-Level-r13)) OF INTEGER (0..2047)

-- ASN1STOP
```


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***PUCCH-Config* field descriptions**
ackNackRepetition Parameter indicates whether ACK/NACK repetition is configured, see TS 36.213 [23, 10.1].
cdm-index-format5 Parameter n_{oc} see TS 36.211 [21, 5.4.2c] for determining PUCCH resource(s) of PUCCH format 5.
codebooksizeDetermination Parameter indicates whether HARQ codebook size is determined with downlink assignment indicator based solution or number of configured CCs, see TS 36.212 [22, 5.2.2.6, 5.2.3.1 and 5.3.3.1.2] and TS 36.213 [23, 10.1.2.2.3, 10.1.3.2.3, 10.1.3.2.3.1, 10.1.3.2.3.2 and 10.1.3.2.4]..
deltaPUCCH-Shift Parameter: $\Delta_{\mathrm{shift}}^{\mathrm{PUCCH}}$, see TS 36.211 [21, 5.4.1], where ds1 corresponds to value 1, ds2 corresponds to value 2 etc.
harq-TimingTDD Parameter indicates for a TDD SCell when aggregated with a TDD PCell of different UL/DL configurations whether deriving the HARQ timing for such a cell is done in the same way as the DL HARQ timing of an FDD SCell with a TDD PCell, see TS 36.213 [23, 10.2].
maximumPayloadCoderate Maximum payload or code rate for multi P-CSI on each PUCCH resource, see TS 36.213 [23,10.1.1].
n1PUCCH-AN Parameter: $N_{PUCCH}^{(1)}$, see TS 36.213 [23, 10.1]. *n1PUCCH-AN-r11* indicates UE-specific PUCCH AN resource offset, see TS 36.213 [23, 10.1].
n1PUCCH-AN-CS-List Parameter: $n_{\mathrm{PUCCH},j}^{(1)}$ for antenna port p_0 for PUCCH format 1b with channel selection, see TS 36.213 [23, 10.1.2.2.1, 10.1.3.2.1].
n1PUCCH-AN-CS-ListP1 Parameter: $n_{\mathrm{PUCCH},j}^{(1,\tilde{p}_1)}$ for antenna port p_1 for PUCCH format 1b with channel selection, see TS 36.213 [23, 10.1]. E-UTRAN configures this field only when *pucch-Format* is set to *channelSelection*.
n1PUCCH-AN-Rep, n1PUCCH-AN-RepP1 Parameter: $n_{\mathrm{PUCCH,\,ANRep}}^{(1,p)}$ for antenna port P0 and for antenna port P1 respectively, see TS 36.213 [23, 10.1].
n3PUCCH-AN-List, n3PUCCH-AN-ListP1 Parameter: $n_{\mathrm{PUCCH}}^{(3,p)}$ for antenna port P0 and for antenna port P1 respectively, see TS 36.213 [23, 10.1].
nCS-An Parameter: $N_{cs}^{(1)}$ see TS 36.211 [21, 5.4].
nkaPUCCH-AN Parameter: $N_{\mathrm{PUCCH}}^{\mathrm{K_A}}$, see TS 36.213 [23, 10.1.3]. *nkaPUCCH-AN-r12* indicates PUCCH format 1a/1b starting offset for the subframe set K^A, see TS 36.213 [23, 10.1.3]. E-UTRAN configures *nkaPUCCH-AN* only if *eimta-MainConfig* is configured.
nPUCCH-Identity Parameter: $n_{\mathrm{ID}}^{\mathrm{PUCCH}}$, see TS 36.211 [21, 5.5.1.5].
nRB-CQI Parameter: $N_{\mathrm{RB}}^{(2)}$, see TS 36.211 [21, 5.4].
numberOfPRB-format4 Parameter $n_{PUCCH}^{(4)}$ see TS 36.213 [23, Table 10.1.1-2] for determining PUCCH resource(s) of PUCCH format 4.
n1PUCCH-AN-InfoList Starting offsets of the PUCCH resource(s) indicated by SIB1-BR. The first entry in the list is the starting offset of the PUCCH resource(s) of CE level 0, the second entry in the list is the starting offset of the PUCCH resource(s) of CE level 1, and so on. If E-UTRAN includes *n1PUCCH-AN-InfoList*, it includes the same number of entries as in *prach-ParametersListCE*. See TS 36.213 [23].
pucch-Format Parameter indicates one of the PUCCH formats for transmission of HARQ-ACK, see TS 36.213 [23, 10.1]. For TDD, if the UE is configured with PCell only, the *channelSelection* indicates the transmission of HARQ-ACK multiplexing as defined in Tables 10.1.3-5, 10.1.3-6, and 10.1.3-7 in TS 36.213 [23] for PUCCH, and in 7.3 in TS 36.213 [23] for PUSCH. E-UTRAN only configures *pucch-Format-v1370* when *pucch-Format-r13* is configured and set to *format4* or *format5*.

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***PUCCH-Config* field descriptions**
pucch-NumRepetitionCE Number of PUCCH repetitions for PUCCH format 1/1a and for PUCCH format 2/2a/2b for CE modes A and B, see TS 36.211 [21] and TS 36.213 [23]. The UE shall ignore *pucch-NumRepetitionCE-format2-r13,* if received*,* for CE mode B in this release of specification. For UE in CE mode B supporting extended PUCCH repetition, if *pucch-NumRepetitionCE-format1-r14* is included then the UE shall ignore *pucch-NumRepetitionCE-format1-r13*.
pucch-NumRepetitionCE-Msg4-Level0, pucch-NumRepetitionCE-Msg4-Level1, pucch-NumRepetitionCE-Msg4-Level2, pucch-NumRepetitionCE-Msg4-Level3 Number of repetitions for PUCCH carrying HARQ response to PDSCH containing Msg4 for PRACH CE levels 0, 1, 2 and 3, see TS 36.211 [21] and TS 36.213 [23]. Value n1 corresponds to 1 repetition, value n2 corresponds to 2 repetitions, and so on. For BL UEs or non-BL UEs in enhanced coverage supporting extended PUCCH repetition, if *pucch-NumRepetitionCE-Msg4-Level3-r14* is included then the UE shall ignore *pucch-NumRepetitionCE-Msg4-Level3-r13*.
repetitionFactor Parameter N_{ANRep} see TS 36.213 [23, 10.1] where n2 corresponds to repetition factor 2, n4 to 4.
simultaneousPUCCH-PUSCH Parameter indicates whether simultaneous PUCCH and PUSCH transmissions is configured, see TS 36.213 [23, 10.1 and 5.1.1]. E-UTRAN configures this field for the PCell, only when the *nonContiguousUL-RA-WithinCC-Info* is set to *supported* in the band on which PCell is configured. Likewise, E-UTRAN configures this field for the PSCell, only when the *nonContiguousUL-RA-WithinCC-Info* is set to *supported* in the band on which PSCell is configured. Likewise, E-UTRAN configures this field for the PUCCH SCell, only when the *nonContiguousUL-RA-WithinCC-Info* is set to *supported* in the band on which PUCCH SCell is configured.
spatialBundlingPUCCH Parameter indicates whether spatial bundling is enabled or not for PUCCH, see TS 36.212 [22, 5.2.3.1].
spatialBundlingPUSCH Parameter indicates whether spatial bundling is enabled or not for PUSCH, see see TS 36.212 [22, 5.2.2.6].
startingPRB-format4 Parameter $n_{PUCCH}^{(4)}$ see TS 36.211 [21, 5.4.3] for determining PUCCH resource(s) of PUCCH format 4.
startingPRB-format5 Parameter $n_{\text{PUCCH}}^{(5)}$ see TS 36.211 [21, 5.4.3] for determining PUCCH resource(s) of PUCCH format 5.
tdd-AckNackFeedbackMode Parameter indicates one of the TDD ACK/NACK feedback modes used, see TS 36.213 [23, 7.3 and 10.1.3]. The value bundling corresponds to use of ACK/NACK bundling whereas, the value multiplexing corresponds to ACK/NACK multiplexing as defined in Tables 10.1.3-2, 10.1.3-3, and 10.1.3-4 in TS 36.213 [23]. The same value applies to both ACK/NACK feedback modes on PUCCH as well as on PUSCH.
twoAntennaPortActivatedPUCCH-Format1a1b Indicates whether two antenna ports are configured for PUCCH format 1a/1b for HARQ-ACK, see TS 36.213 [23, 10.1]. The field also applies for PUCCH format 1a/1b transmission when *format3* is configured, see TS 36.213 [23, 10.1.2.2.2, 10.1.3.2.2].
twoAntennaPortActivatedPUCCH-Format3 Indicates whether two antenna ports are configured for PUCCH format 3 for HARQ-ACK, see TS 36.213 [23, 10.1].

Conditional presence	Explanation
TDD	The field is mandatory present for TDD if the *pucch-Format* is not present. If the *pucch-Format* is present, the field is not present and the UE shall delete any existing value for this field. It is not present for FDD and the UE shall delete any existing value for this field.

– *PUSCH-Config*

The IE *PUSCH-ConfigCommon* is used to specify the common PUSCH configuration and the reference signal configuration for PUSCH and PUCCH. The IE *PUSCH-ConfigDedicated* is used to specify the UE specific PUSCH configuration.

***PUSCH-Config* information element**

```
-- ASN1START

PUSCH-ConfigCommon ::=              SEQUENCE {
    pusch-ConfigBasic                   SEQUENCE {
        n-SB                                INTEGER (1..4),
        hoppingMode                         ENUMERATED {interSubFrame, intraAndInterSubFrame},
        pusch-HoppingOffset                 INTEGER (0..98),
        enable64QAM                         BOOLEAN
```


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```
    },
    ul-ReferenceSignalsPUSCH            UL-ReferenceSignalsPUSCH
}

PUSCH-ConfigCommon-v1270 ::=        SEQUENCE {
    enable64QAM-v1270                       ENUMERATED {true}
}

PUSCH-ConfigCommon-v1310 ::=    SEQUENCE {
    pusch-maxNumRepetitionCEmodeA-r13   ENUMERATED {
                                            r8, r16, r32 }                  OPTIONAL,   -- Need OR
    pusch-maxNumRepetitionCEmodeB-r13   ENUMERATED {
                                            r192, r256, r384, r512, r768, r1024,
                                            r1536, r2048}                   OPTIONAL,   -- Need OR
    pusch-HoppingOffset-v1310
                                    INTEGER (1..maxAvailNarrowBands-r13)    OPTIONAL    -- Need OR
}

PUSCH-ConfigDedicated ::=           SEQUENCE {
    betaOffset-ACK-Index                INTEGER (0..15),
    betaOffset-RI-Index                 INTEGER (0..15),
    betaOffset-CQI-Index                INTEGER (0..15)
}

PUSCH-ConfigDedicated-v1020 ::=     SEQUENCE {
    betaOffsetMC-r10                    SEQUENCE {
        betaOffset-ACK-Index-MC-r10         INTEGER (0..15),
        betaOffset-RI-Index-MC-r10          INTEGER (0..15),
        betaOffset-CQI-Index-MC-r10         INTEGER (0..15)
    }                                                                       OPTIONAL,   -- Need OR
    groupHoppingDisabled-r10            ENUMERATED {true}                   OPTIONAL,   -- Need OR
    dmrs-WithOCC-Activated-r10          ENUMERATED {true}                   OPTIONAL    -- Need OR
}

PUSCH-ConfigDedicated-v1130 ::=     SEQUENCE {
    pusch-DMRS-r11                      CHOICE {
        release                             NULL,
        setup                               SEQUENCE {
            nPUSCH-Identity-r11                 INTEGER (0..509),
            nDMRS-CSH-Identity-r11              INTEGER (0..509)
        }
    }
}

PUSCH-ConfigDedicated-v1250::=      SEQUENCE {
    uciOnPUSCH                          CHOICE {
        release                             NULL,
        setup                                   SEQUENCE {
            betaOffset-ACK-Index-SubframeSet2-r12           INTEGER (0..15),
            betaOffset-RI-Index-SubframeSet2-r12            INTEGER (0..15),
            betaOffset-CQI-Index-SubframeSet2-r12           INTEGER (0..15),
            betaOffsetMC-r12                        SEQUENCE {
                betaOffset-ACK-Index-MC-SubframeSet2-r12    INTEGER (0..15),
                betaOffset-RI-Index-MC-SubframeSet2-r12     INTEGER (0..15),
                betaOffset-CQI-Index-MC-SubframeSet2-r12    INTEGER (0..15)
            }                                                               OPTIONAL    -- Need OR
        }
    }
}
PUSCH-ConfigDedicated-r13 ::=           SEQUENCE {
    betaOffset-ACK-Index-r13                INTEGER (0..15),
    betaOffset2-ACK-Index-r13               INTEGER (0..15)                 OPTIONAL,   -- Need OR
    betaOffset-RI-Index-r13                 INTEGER (0..15),
    betaOffset-CQI-Index-r13                INTEGER (0..15),
    betaOffsetMC-r13                        SEQUENCE {
        betaOffset-ACK-Index-MC-r13             INTEGER (0..15),
        betaOffset2-ACK-Index-MC-r13            INTEGER (0..15)             OPTIONAL,   -- Need OR
        betaOffset-RI-Index-MC-r13              INTEGER (0..15),
        betaOffset-CQI-Index-MC-r13             INTEGER (0..15)
    }                                                                       OPTIONAL,   -- Need OR
    groupHoppingDisabled-r13                ENUMERATED {true}               OPTIONAL,   -- Need OR
    dmrs-WithOCC-Activated-r13              ENUMERATED {true}               OPTIONAL,   -- Need OR
    pusch-DMRS-r11                          CHOICE {
        release                                 NULL,
        setup                                   SEQUENCE {
            nPUSCH-Identity-r13                     INTEGER (0..509),
            nDMRS-CSH-Identity-r13                  INTEGER (0..509)
        }
```


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```
    }                                                                       OPTIONAL,   -- Need ON
    uciOnPUSCH                              CHOICE {
        release                                 NULL,
        setup                                   SEQUENCE {
            betaOffset-ACK-Index-SubframeSet2-r13           INTEGER (0..15),
            betaOffset2-ACK-Index-SubframeSet2-r13          INTEGER (0..15) OPTIONAL,   -- Need OR
            betaOffset-RI-Index-SubframeSet2-r13            INTEGER (0..15),
            betaOffset-CQI-Index-SubframeSet2-r13           INTEGER (0..15),
            betaOffsetMC-r12                            SEQUENCE {
                betaOffset-ACK-Index-MC-SubframeSet2-r13    INTEGER (0..15),
                betaOffset2-ACK-Index-MC-SubframeSet2-r13   INTEGER (0..15) OPTIONAL,   -- Need OR
                betaOffset-RI-Index-MC-SubframeSet2-r13     INTEGER (0..15),
                betaOffset-CQI-Index-MC-SubframeSet2-r13    INTEGER (0..15)
            }                                                               OPTIONAL    -- Need OR
        }
    }                                                                       OPTIONAL,   -- Need ON
    pusch-HoppingConfig-r13                 ENUMERATED {on}                 OPTIONAL    -- Need OR
}

PUSCH-ConfigDedicated-v1430 ::=         SEQUENCE {
    ce-PUSCH-NB-MaxTBS-r14                  ENUMERATED {on}                 OPTIONAL,   -- Need OR
    ce-PUSCH-MaxBandwidth-r14               ENUMERATED {bw5}                OPTIONAL,   -- Need OR
    tdd-PUSCH-UpPTS-r14                     TDD-PUSCH-UpPTS-r14             OPTIONAL,   -- Need ON
    ul-DMRS-IFDMA-r14                       BOOLEAN,
    enable256QAM-r14                        Enable256QAM-r14                OPTIONAL    -- Need ON
}

PUSCH-ConfigDedicatedSCell-r10 ::=      SEQUENCE {
    groupHoppingDisabled-r10                ENUMERATED {true}               OPTIONAL,   -- Need OR
    dmrs-WithOCC-Activated-r10              ENUMERATED {true}               OPTIONAL    -- Need OR
}

PUSCH-ConfigDedicatedSCell-v1430 ::=            SEQUENCE {
    enable256QAM-r14                        Enable256QAM-r14                OPTIONAL    -- Need OR
}

TDD-PUSCH-UpPTS-r14 ::=                 CHOICE {
    release                                 NULL,
    setup                                   SEQUENCE {
        symPUSCH-UpPTS-r14                      ENUMERATED {sym1, sym2, sym3, sym4, sym5, sym6}
                                                                            OPTIONAL,   -- Need ON
        dmrs-LessUpPTS-Config-r14               ENUMERATED {true}           OPTIONAL    -- Need OR
    }
}

Enable256QAM-r14 ::=                    CHOICE {
        release                             NULL,
        setup                               CHOICE {
            tpc-SubframeSet-Configured-r14      SEQUENCE {
                    subframeSet1-DCI-Format0-r14                                        BOOLEAN,
                    subframeSet1-DCI-Format4-r14                                        BOOLEAN,
                    subframeSet2-DCI-Format0-r14                                        BOOLEAN,
                    subframeSet2-DCI-Format4-r14                                        BOOLEAN
            },
            tpc-SubframeSet-NotConfigured-r14   SEQUENCE {
                    dci-Format0-r14     BOOLEAN,
                    dci-Format4-r14     BOOLEAN
            }
        }
}

PUSCH-EnhancementsConfig-r14 ::=        CHOICE {
    release                         NULL,
    setup                           SEQUENCE {
        pusch-HoppingOffsetPUSCH-Enh-r14            INTEGER (1..100)        OPTIONAL,   -- Need ON
        interval-ULHoppingPUSCH-Enh-r14         CHOICE {
            interval-FDD-PUSCH-Enh-r14              ENUMERATED {int1, int2, int4, int8},
            interval-TDD-PUSCH-Enh-r14              ENUMERATED {int1, int5, int10, int20}
        }                                                                   OPTIONAL    -- Need ON
    }
}

UL-ReferenceSignalsPUSCH ::=        SEQUENCE {
    groupHoppingEnabled                 BOOLEAN,
    groupAssignmentPUSCH                INTEGER (0..29),
    sequenceHoppingEnabled              BOOLEAN,
    cyclicShift                         INTEGER (0..7)
}
```


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```
-- ASN1STOP
```


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***PUSCH-Config* field descriptions**
betaOffset-ACK-Index, betaOffset2-ACK-Index, betaOffset-ACK-Index-MC, betaOffset2-ACK-Index-MC
Parameter: $I_{offset}^{HARQ-ACK}$, $I_{offset,X}^{HARQ-ACK}$, $I_{offset,MC}^{HARQ-ACK}$ and $I_{offset,MC,X}^{HARQ-ACK}$, for single- and multiple-codeword respectively, see TS 36.213 [23, Table 8.6.3-1]. *betaOffset-ACK-Index* and *betaOffset2-ACK-Index* are used for single-codeword and *betaOffset-ACK-Index-MC* and *betaOffset2-ACK-Index-MC* are used for multiple-codeword. If *betaOffset2-ACK-Index* is configured; *betaOffset-ACK-Index* is used when up to 22 HARQ-ACK bits are transmitted otherwise *betaOffset2-ACK-Index* is used. If *betaOffset-ACK2-Index-MC* is configured; *betaOffset-ACK-Index-MC* is used when up to 22 HARQ-ACK bits are transmitted otherwise *betaOffset2-ACK-Index-MC* is used. One value applies for all serving cells with an uplink in a cell group (MCG or SCG or the group of cells configured to send PUCCH on the same cell in case PUCCH SCell is configured) and not configured with uplink power control subframe sets. The same value also applies for subframe set 1 of all serving cells with an uplink in that cell group and configured with uplink power control subframe sets (the associated functionality is common i.e. not performed independently for each cell).
betaOffset-ACK-Index-SubframeSet2, betaOffset2-ACK-Index-SubframeSet2, betaOffset-ACK-Index-MC-SubframeSet2, betaOffset2-ACK-Index-MC-SubframeSet2
Parameter: $I_{offset,set2}^{HARQ-ACK}$, $I_{offset,set2,X}^{HARQ-ACK}$, $I_{offset,MC,set2}^{HARQ-ACK}$ and $I_{offset,MC,set2,X}^{HARQ-ACK}$ respectively, see TS 36.213 [23, Table 8.6.3-1]. *betaOffset-ACK-Index-SubframeSet2* and *betaOffset2-ACK-Index-SubframeSet2* are used for single-codeword, *betaOffset-ACK-Index-MC-SubframeSet2*, *betaOffset2-ACK-Index-MC-SubframeSet2* are used for multiple-codeword. If *betaOffset2-ACK-Index-SubframeSet2* is configured; *betaOffset-ACK-Index-SubframeSet2* is used when up to 22 HARQ-ACK bits are transmitted otherwise *betaOffset2-ACK-Index-SubframeSet2* is used. If *betaOffset2-ACK-Index-MC-SubframeSet2* is configured; *betaOffset-ACK-Index-MC-SubframeSet2* is used when up to 22 HARQ-ACK bits are transmitted otherwise *betaOffset2-ACK-Index-MC-SubframeSet2* is used. One value applies for subframe set 2 of all serving cells with an uplink in a cell group (MCG or SCG or the group of cells configured to send PUCCH on the same cell in case PUCCH SCell is configured) and configured with uplink power control subframe sets (the associated functionality is common i.e. not performed independently for each cell configured with uplink power control subframe sets).
betaOffset-CQI-Index, betaOffset-CQI-Index-MC
Parameter: I_{offset}^{CQI}, for single- and multiple-codeword respectively, see TS 36.213 [23, Table 8.6.3-3]. One value applies for all serving cells with an uplink in a cell group (MCG or SCG or the group of cells configured to send PUCCH on the same cell in case PUCCH SCell is configured) and not configured with uplink power control subframe sets. The same value also applies for subframe set 1 of all serving cells with an uplink in that cell group and configured with uplink power control subframe sets (the associated functionality is common i.e. not performed independently for each cell).
betaOffset-CQI-Index-SubframeSet2, betaOffset-CQI-Index-MC-SubframeSet2
Parameter: I_{offset}^{CQI}, for single- and multiple-codeword respectively, see TS 36.213 [23, Table 8.6.3-3]. One value applies for subframe set 2 of all serving cells with an uplink in a cell group (MCG or SCG or the group of cells configured to send PUCCH on the same cell in case PUCCH SCell is configured) and configured with uplink power control subframe sets (the associated functionality is common i.e. not performed independently for each cell configured with uplink power control subframe sets).
betaOffset-RI-Index, betaOffset-RI-Index-MC
Parameter: I_{offset}^{RI}, for single- and multiple-codeword respectively, see TS 36.213 [23, Table 8.6.3-2]. One value applies for all serving cells with an uplink in a cell group (MCG or SCG or the group of cells configured to send PUCCH on the same cell in case PUCCH SCell is configured) and not configured with uplink power control subframe sets. The same value also applies for subframe set 1 of all serving cells with an uplink in that cell group and configured with uplink power control subframe sets (the associated functionality is common i.e. not performed independently for each cell).
betaOffset-RI-Index-SubframeSet2, betaOffset-RI-Index-MC-SubframeSet2
Parameter: I_{offset}^{RI}, for single- and multiple-codeword respectively, see TS 36.213 [23, Table 8.6.3-2]. One value applies for subframe set 2 of all serving cells with an uplink in a cell group (MCG or SCG or the group of cells configured to send PUCCH on the same cell in case PUCCH SCell is configured) and configured with uplink power control subframe sets (the associated functionality is common i.e. not performed independently for each cell configured with uplink power control subframe sets).
ce-PUSCH-MaxBandwidth
Maximum PUSCH channel bandwidth in CE mode A, see TS 36.212 [22] and TS 36.213 [23]. Value bw5 corresponds to 5 MHz. If this field is not configured, the maximum PUSCH channel bandwidth in CE mode A set to 1.4 MHz. The maximum PUSCH channel bandwidth in CE mode B is 1.4 MHz regardless of the setting of this parameter. Parameter: transmission bandwidth configuration, see TS 36.101 [42, table 5.6-1].
ce-PUSCH-NB-MaxTBS
Activation of 2984 bits maximum PUSCH TBS in 1.4 MHz in CE mode A, see TS 36.212 [22] and TS 36.213 [23].
cyclicShift
Parameters: *cyclicShift*, *s*ee TS 36.211 [21, Table 5.5.2.1.1-2].
dmrs-LessUpPTS-Config
Indicates the UE not to transmit DMRS for PUSCH in UpPTS, see TS36.211 [21, 5.5.2.1.2].

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***PUSCH-Config* field descriptions**
dmrs-WithOCC-Activated Parameter: *Activate-DMRS-with OCC*, see TS 36.211 [21, 5.5.2.1].
enable256QAM See TS 36.213 [23, 8.6.1]. If *enable256QAM* is included and if uplink power control subframe sets are configured by *tpc-SubframeSet*, the field indicates (if set to TRUE) per uplink power control subframe set and DCI format 0 and 4 that 256QAM is allowed for UE UL categories 16 to 20 indicated in *ue-CategoryUL-v1430,* while FALSE indicates that 256 QAM is not allowed. If *enable256QAM* is included and if uplink power control subframe sets are not configured by *tpc-SubframeSet,* the field indicates (if set to TRUE) per uplink power control subframe set and DCI format 0 and 4 that 256QAM is allowed for UE UL categories 16 to 20 indicated in *ue-CategoryUL-v1430,* while FALSE indicates that 256 QAM is not allowed.
enable64QAM See TS 36.213 [23, 8.6.1]. If *enable64QAM* (without suffix) is set to TRUE, it indicates that 64QAM is allowed for UE categories 5 and 8 indicated in *ue-Category* and UL categories indicated in *ue-CategoryUL* which support UL 64QAM and can fallback to category 5 or 8, see TS 36.306 [5, Table 4.1A-2 and Table 4.1A-6], while FALSE indicates that 64QAM is not allowed. If *enable64QAM-v1270* is set to TRUE, it indicates that 64QAM is allowed for UL categories indicated in *ue-CategoryUL* which support UL 64QAM but cannot fallback category 5 or 8, see TS 36.306 [5, Table 4.1A-2 and Table 4.1A-6]. E-UTRAN configures *enable64QAM-v1270* only when *enable64QAM* (without suffix) is set to TRUE.
interval-ULHoppingPUSCH-Enh Number of consecutive absolute subframes over which PUSCH stays at the same PRBs before hopping to other PRBs. For *interval-FDD-PUSCH-Enh*, int1 corresponds to 1 subframe, int2 corresponds to 2 subframes, and so on. For *interval-TDD-PUSCH-Enh*, int1 corresponds to 1 subframe, int5 corresponds to 5 subframes, and so on. See TS 36.211 [21, 5.3.4].
groupAssignmentPUSCH Parameter: ΔSS See TS 36.211 [21, 5.5.1.3].
groupHoppingDisabled Parameter: *Disable-sequence-group-hopping*, see TS 36.211 [21, 5.5.1.3].
groupHoppingEnabled Parameter: *Group-hopping-enabled*, see TS 36.211 [21, 5.5.1.3].
hoppingMode Parameter: *Hopping-mode*, see TS 36.211 [21, 5.3.4].
nDMRS-CSH-Identity Parameter: $N_{\mathrm{ID}}^{\mathrm{csh\_DMRS}}$, see TS 36.211 [21, 5.5.2.1.1].
nPUSCH-Identity Parameter: $n_{\mathrm{ID}}^{\mathrm{PUSCH}}$, see TS 36.211 [21, 5.5.1.5].
n-SB Parameter: N_{sb} see TS 36.211 [21, 5.3.4].
pusch-HoppingConfig For BL UEs and UEs in CE, frequency hopping activation/deactivation for unicast PUSCH, see TS 36.211 [21]
pusch-hoppingOffset Except for BL UEs and UEs in CE, parameter: $N_{\mathrm{RB}}^{\mathrm{HO}}$, see TS 36.211 [21, 5.3.4]. For BL UEs and UEs in CE, the *pusch-hoppingOffset-v1310* indicates the parameter $f_{\mathrm{NB,hop}}^{\mathrm{PUSCH}}$, see TS 36.211 [21, 5.3.4]. . In case *pusch-hoppingOffset-v1310* is signalled, the BL UEs and UEs in CE shall ignore *pusch-hoppingOffset* (i.e. without suffix).
pusch-HoppingOffsetPUSCH-Enh Indicates the freqeuncy domain hopping offset between PRBs for PUSCH in frequency hopping, see TS 36.211 [21, 5.3.4]. Value 1 corresponds to 1 PRB, value 2 corresponds to 2 PRBs, and so on.
pusch-maxNumRepetitionCEmodeA Maximum value to indicate the set of PUSCH repetition numbers for CE mode A, see TS 36.211 [21] and TS 36.213 [23]. E-UTRAN does not configure value r8. If the field is not configured, the UE shall apply the default value as defined in TS 36.213 [23, 8.0].
pusch-maxNumRepetitionCEmodeB Maximum value to indicate the set of PUSCH repetition numbers for CE mode B, see TS 36.211 [21] and TS 36.213 [23].
sequenceHoppingEnabled Parameter: *Sequence-hopping-enabled*, see TS 36.211 [21, 5.5.1.4].
symPUSCH-UpPTS Indicates the number of data symbols that configured for PUSCH transmission in UpPTS. Values *sym2*, *sym3*, *sym4*, *sym5* and *sym6* can be used for normal cyclic prefix and values *sym1*, *sym2*, *sym3*, *sym4* and *sym5* can be used for extended cyclic prefix, see TS 36.213 [23, 8.6.2] and TS 36.211 [21, 5.3.4].
ul-DMRS-IFDMA Value *TRUE* indicates that the UE is configured with enhanced UL DMRS.
ul-ReferenceSignalsPUSCH Used to specify parameters needed for the transmission on PUSCH (or PUCCH).

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– *RACH-ConfigCommon*

The IE *RACH-ConfigCommon* is used to specify the generic random access parameters.

RACH-ConfigCommon information element

```
-- ASN1START

RACH-ConfigCommon ::=       SEQUENCE {
    preambleInfo                        SEQUENCE {
        numberOfRA-Preambles                ENUMERATED {
                                                n4, n8, n12, n16, n20, n24, n28,
                                                n32, n36, n40, n44, n48, n52, n56,
                                                n60, n64},
        preamblesGroupAConfig               SEQUENCE {
            sizeOfRA-PreamblesGroupA            ENUMERATED {
                                                    n4, n8, n12, n16, n20, n24, n28,
                                                    n32, n36, n40, n44, n48, n52, n56,
                                                    n60},
            messageSizeGroupA                   ENUMERATED {b56, b144, b208, b256},
            messagePowerOffsetGroupB            ENUMERATED {
                                                    minusinfinity, dB0, dB5, dB8, dB10, dB12,
                                                    dB15, dB18},
            ...
        }           OPTIONAL                                                    -- Need OP
    },
    powerRampingParameters              PowerRampingParameters,
    ra-SupervisionInfo                  SEQUENCE {
        preambleTransMax                    PreambleTransMax,
        ra-ResponseWindowSize               ENUMERATED {
                                                sf2, sf3, sf4, sf5, sf6, sf7,
                                                sf8, sf10},
        mac-ContentionResolutionTimer       ENUMERATED {
                                                sf8, sf16, sf24, sf32, sf40, sf48,
                                                sf56, sf64}
    },
    maxHARQ-Msg3Tx                      INTEGER (1..8),
    ...,
    [[  preambleTransMax-CE-r13         PreambleTransMax                    OPTIONAL,   -- Need OR
        rach-CE-LevelInfoList-r13       RACH-CE-LevelInfoList-r13           OPTIONAL    -- Need OR
    ]]
}

RACH-ConfigCommon-v1250 ::=     SEQUENCE {
    txFailParams-r12                SEQUENCE {
        connEstFailCount-r12                ENUMERATED {n1, n2, n3, n4},
        connEstFailOffsetValidity-r12       ENUMERATED {s30, s60, s120, s240,
                                                        s300, s420, s600, s900},
        connEstFailOffset-r12               INTEGER (0..15)     OPTIONAL    -- Need OP
    }
}

RACH-ConfigCommonSCell-r11 ::=      SEQUENCE {
    powerRampingParameters-r11              PowerRampingParameters,
    ra-SupervisionInfo-r11                  SEQUENCE {
        preambleTransMax-r11                    PreambleTransMax
    },
    ...
}

RACH-CE-LevelInfoList-r13 ::=   SEQUENCE (SIZE (1..maxCE-Level-r13)) OF RACH-CE-LevelInfo-r13

RACH-CE-LevelInfo-r13 ::=       SEQUENCE {
    preambleMappingInfo-r13             SEQUENCE {
        firstPreamble-r13                   INTEGER(0..63),
        lastPreamble-r13                    INTEGER(0..63)
    },
    ra-ResponseWindowSize-r13           ENUMERATED {sf20, sf50, sf80, sf120, sf180,
                                                    sf240, sf320, sf400},

    mac-ContentionResolutionTimer-r13   ENUMERATED {sf80, sf100, sf120,
                                                    sf160, sf200, sf240, sf480, sf960},
    rar-HoppingConfig-r13               ENUMERATED {on,off},
    ...
```


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```
}

PowerRampingParameters ::=          SEQUENCE {
    powerRampingStep                    ENUMERATED {dB0, dB2,dB4, dB6},
    preambleInitialReceivedTargetPower  ENUMERATED {
                                            dBm-120, dBm-118, dBm-116, dBm-114, dBm-112,
                                            dBm-110, dBm-108, dBm-106, dBm-104, dBm-102,
                                            dBm-100, dBm-98, dBm-96, dBm-94,
                                            dBm-92, dBm-90}
}

PreambleTransMax ::=                ENUMERATED {
                                            n3, n4, n5, n6, n7, n8, n10, n20, n50,
                                            n100, n200}

-- ASN1STOP
```

RACH-ConfigCommon field descriptions
connEstFailCount Number of times that the UE detects T300 expiry on the same cell before applying *connEstFailOffset*.
connEstFailOffset Parameter "Qoffset$_{temp}$" in TS 36.304 [4]. If the field is not present the value of infinity shall be used for "Qoffset$_{temp}$".
connEstFailOffsetValidity Amount of time that the UE applies *connEstFailOffset* before removing the offset from evaluation of the cell. Value s30 corresponds to 30 seconds, s60 corresponds to 60 seconds, and so on.
mac-ContentionResolutionTimer Timer for contention resolution in TS 36.321 [6]. Value in subframes. Value sf8 corresponds to 8 subframes, sf16 corresponds to 16 subframes and so on.
maxHARQ-Msg3Tx Maximum number of Msg3 HARQ transmissions in TS 36.321 [6], used for contention based random access. Value is an integer.
messagePowerOffsetGroupB Threshold for preamble selection in TS 36.321 [6]. Value in dB. Value minusinfinity corresponds to –infinity. Value dB0 corresponds to 0 dB, dB5 corresponds to 5 dB and so on.
messageSizeGroupA Threshold for preamble selection in TS 36.321 [6]. Value in bits. Value b56 corresponds to 56 bits, b144 corresponds to 144 bits and so on.
numberOfRA-Preambles Number of non-dedicated random access preambles in TS 36.321 [6]. Value is an integer. Value n4 corresponds to 4, n8 corresponds to 8 and so on.
powerRampingStep Power ramping factor in TS 36.321 [6]. Value in dB. Value dB0 corresponds to 0 dB, dB2 corresponds to 2 dB and so on.
preambleInitialReceivedTargetPower Initial preamble power in TS 36.321 [6]. Value in dBm. Value dBm-120 corresponds to -120 dBm, dBm-118 corresponds to -118 dBm and so on.
preambleMappingInfo Provides the mapping of premables to groups for each CE level, as specified in TS 36.321 [6]. When random access preambles group B is used, *firstPreamble-r13* is set to 0 and *lastPreamble-r13* is set to *numberOfRA-Preambles*-1.
preamblesGroupAConfig Provides the configuration for preamble grouping in TS 36.321 [6]. If the field is not signalled, the size of the random access preambles group A [6] is equal to *numberOfRA-Preambles*.
preambleTransMax, preambleTransMax-CE Maximum number of preamble transmission in TS 36.321 [6]. Value is an integer. Value n3 corresponds to 3, n4 corresponds to 4 and so on.
rach-CE-LevelInfoList Provides RACH information each coverage level. The first entry in the list contains RACH information of CE level 0, the second entry in the list contains RACH information of CE level 1, and so on. If E-UTRAN includes *rach-CE-LevelInfoList,* it includes the same number of entries as in *prach-ParametersListCE.*
ra-ResponseWindowSize Duration of the RA response window in TS 36.321 [6]. Value in subframes. Value sf2 corresponds to 2 subframes, sf3 corresponds to 3 subframes and so on. The same value applies for each serving cell (although the associated functionality is performed independently for each cell).
rar-HoppingConfig Frequency hopping activation/deactivation for RAR/Msg3/Msg4 for a CE level, see TS 36.211 [21].
sizeOfRA-PreamblesGroupA Size of the random access preambles group A in TS 36.321 [6]. Value is an integer. Value n4 corresponds to 4, n8 corresponds to 8 and so on.

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– *RACH-ConfigDedicated*

The IE *RACH-ConfigDedicated* is used to specify the dedicated random access parameters.

RACH-ConfigDedicated information element

```
-- ASN1START

RACH-ConfigDedicated ::=        SEQUENCE {
    ra-PreambleIndex                    INTEGER (0..63),
    ra-PRACH-MaskIndex                  INTEGER (0..15)
}

-- ASN1STOP
```

RACH-ConfigDedicated field descriptions
ra-PRACH-MaskIndex Explicitly signalled PRACH Mask Index for RA Resource selection in TS 36.321 [6].
ra-PreambleIndex Explicitly signalled Random Access Preamble for RA Resource selection in TS 36.321 [6].

– *RadioResourceConfigCommon*

The IE *RadioResourceConfigCommonSIB* and IE *RadioResourceConfigCommon* are used to specify common radio resource configurations in the system information and in the mobility control information, respectively, e.g., the random access parameters and the static physical layer parameters.

RadioResourceConfigCommon information element

```
-- ASN1START

RadioResourceConfigCommonSIB ::=    SEQUENCE {
    rach-ConfigCommon                   RACH-ConfigCommon,
    bcch-Config                         BCCH-Config,
    pcch-Config                         PCCH-Config,
    prach-Config                        PRACH-ConfigSIB,
    pdsch-ConfigCommon                  PDSCH-ConfigCommon,
    pusch-ConfigCommon                  PUSCH-ConfigCommon,
    pucch-ConfigCommon                  PUCCH-ConfigCommon,
    soundingRS-UL-ConfigCommon          SoundingRS-UL-ConfigCommon,
    uplinkPowerControlCommon            UplinkPowerControlCommon,
    ul-CyclicPrefixLength               UL-CyclicPrefixLength,
    ...,
    [[  uplinkPowerControlCommon-v1020  UplinkPowerControlCommon-v1020      OPTIONAL    -- Need OR
    ]],
    [[  rach-ConfigCommon-v1250         RACH-ConfigCommon-v1250             OPTIONAL    -- Need OR
    ]],
    [[  pusch-ConfigCommon-v1270        PUSCH-ConfigCommon-v1270            OPTIONAL    -- Need OR
    ]],
    [[  bcch-Config-v1310               BCCH-Config-v1310                   OPTIONAL,   -- Need OR
        pcch-Config-v1310               PCCH-Config-v1310                   OPTIONAL,   -- Need OR
        freqHoppingParameters-r13       FreqHoppingParameters-r13           OPTIONAL,   -- Need OR
        pdsch-ConfigCommon-v1310        PDSCH-ConfigCommon-v1310            OPTIONAL,   -- Need OR
        pusch-ConfigCommon-v1310        PUSCH-ConfigCommon-v1310            OPTIONAL,   -- Need OR
        prach-ConfigCommon-v1310        PRACH-ConfigSIB-v1310               OPTIONAL,   -- Need OR
        pucch-ConfigCommon-v1310        PUCCH-ConfigCommon-v1310            OPTIONAL    -- Need OR
    ]],
    [[  highSpeedConfig-r14             HighSpeedConfig-r14                 OPTIONAL,   -- Need OR
        prach-Config-v1430              PRACH-Config-v1430                  OPTIONAL,   -- Need OR
        pucch-ConfigCommon-v1430        PUCCH-ConfigCommon-v1430            OPTIONAL    -- Need OR
    ]]
}

RadioResourceConfigCommon ::=       SEQUENCE {
    rach-ConfigCommon                   RACH-ConfigCommon                   OPTIONAL,   -- Need ON
    prach-Config                        PRACH-Config,
    pdsch-ConfigCommon                  PDSCH-ConfigCommon                  OPTIONAL,   -- Need ON
    pusch-ConfigCommon                  PUSCH-ConfigCommon,
    phich-Config                        PHICH-Config                        OPTIONAL,   -- Need ON
    pucch-ConfigCommon                  PUCCH-ConfigCommon                  OPTIONAL,   -- Need ON
    soundingRS-UL-ConfigCommon          SoundingRS-UL-ConfigCommon          OPTIONAL,   -- Need ON
```


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```
    uplinkPowerControlCommon            UplinkPowerControlCommon            OPTIONAL,   -- Need ON
    antennaInfoCommon                   AntennaInfoCommon                   OPTIONAL,   -- Need ON
    p-Max                               P-Max                               OPTIONAL,   -- Need OP
    tdd-Config                          TDD-Config                          OPTIONAL,   -- Cond TDD
    ul-CyclicPrefixLength               UL-CyclicPrefixLength,
    ...,
    [[  uplinkPowerControlCommon-v1020  UplinkPowerControlCommon-v1020      OPTIONAL    -- Need ON
    ]],
    [[  tdd-Config-v1130                TDD-Config-v1130                    OPTIONAL    -- Cond TDD3
    ]],
    [[  pusch-ConfigCommon-v1270        PUSCH-ConfigCommon-v1270            OPTIONAL    -- Need OR
    ]],
    [[
        prach-Config-v1310              PRACH-Config-v1310                  OPTIONAL,   -- Need ON
        freqHoppingParameters-r13       FreqHoppingParameters-r13           OPTIONAL,   -- Need ON
        pdsch-ConfigCommon-v1310        PDSCH-ConfigCommon-v1310            OPTIONAL,   -- Need ON
        pucch-ConfigCommon-v1310        PUCCH-ConfigCommon-v1310            OPTIONAL,   -- Need ON
        pusch-ConfigCommon-v1310        PUSCH-ConfigCommon-v1310            OPTIONAL,   -- Need ON
        uplinkPowerControlCommon-v1310  UplinkPowerControlCommon-v1310      OPTIONAL    -- Need ON
    ]],
    [[  highSpeedConfig-r14             HighSpeedConfig-r14                 OPTIONAL,   -- Need OR
        prach-Config-v1430              PRACH-Config-v1430                  OPTIONAL,   -- Need OR
        pucch-ConfigCommon-v1430        PUCCH-ConfigCommon-v1430            OPTIONAL,   -- Need OR
        tdd-Config-v1430                TDD-Config-v1430                    OPTIONAL    -- Cond TDD3
    ]],
    [[
        tdd-Config-v1450                TDD-Config-v1450                    OPTIONAL    -- Cond TDD3
    ]]
}

RadioResourceConfigCommonPSCell-r12 ::= SEQUENCE {
    basicFields-r12                     RadioResourceConfigCommonSCell-r10,
    pucch-ConfigCommon-r12              PUCCH-ConfigCommon,
    rach-ConfigCommon-r12               RACH-ConfigCommon,
    uplinkPowerControlCommonPSCell-r12  UplinkPowerControlCommonPSCell-r12,
    ...,
    [[  uplinkPowerControlCommonPSCell-v1310
                                  UplinkPowerControlCommon-v1310      OPTIONAL    -- Need ON
    ]]
}

RadioResourceConfigCommonPSCell-v12f0 ::=   SEQUENCE {
    basicFields-v12f0                   RadioResourceConfigCommonSCell-v10l0
}

RadioResourceConfigCommonPSCell-v1440 ::=   SEQUENCE {
    basicFields-v1440                   RadioResourceConfigCommonSCell-v1440
}

RadioResourceConfigCommonSCell-r10 ::=  SEQUENCE {
    -- DL configuration as well as configuration applicable for DL and UL
    nonUL-Configuration-r10                 SEQUENCE {
        -- 1: Cell characteristics
        dl-Bandwidth-r10                        ENUMERATED {n6, n15, n25, n50, n75, n100},
        -- 2: Physical configuration, general
        antennaInfoCommon-r10                   AntennaInfoCommon,
        mbsfn-SubframeConfigList-r10            MBSFN-SubframeConfigList    OPTIONAL,   -- Need OR
        -- 3: Physical configuration, control
        phich-Config-r10                        PHICH-Config,
        -- 4: Physical configuration, physical channels
        pdsch-ConfigCommon-r10                  PDSCH-ConfigCommon,
        tdd-Config-r10                          TDD-Config                  OPTIONAL    -- Cond
TDDSCell
    },
    -- UL configuration
    ul-Configuration-r10                SEQUENCE {
        ul-FreqInfo-r10                     SEQUENCE {
            ul-CarrierFreq-r10                  ARFCN-ValueEUTRA            OPTIONAL,   -- Need OP
            ul-Bandwidth-r10                    ENUMERATED {n6, n15,
                                                    n25, n50, n75, n100}    OPTIONAL,   -- Need OP
            additionalSpectrumEmissionSCell-r10     AdditionalSpectrumEmission
        },
        p-Max-r10                           P-Max                           OPTIONAL,   -- Need OP
        uplinkPowerControlCommonSCell-r10       UplinkPowerControlCommonSCell-r10,
        -- A special version of IE UplinkPowerControlCommon may be introduced
        -- 3: Physical configuration, control
        soundingRS-UL-ConfigCommon-r10      SoundingRS-UL-ConfigCommon,
        ul-CyclicPrefixLength-r10           UL-CyclicPrefixLength,
```


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```
        -- 4: Physical configuration, physical channels
        prach-ConfigSCell-r10                   PRACH-ConfigSCell-r10       OPTIONAL,   -- Cond TDD-
OR-NoR11
        pusch-ConfigCommon-r10              PUSCH-ConfigCommon
    }                                                                       OPTIONAL,   -- Need OR
    ...,
    [[  ul-CarrierFreq-v1090                ARFCN-ValueEUTRA-v9e0           OPTIONAL    -- Need OP
    ]],
    [[  rach-ConfigCommonSCell-r11          RACH-ConfigCommonSCell-r11      OPTIONAL,   -- Cond
ULSCell
        prach-ConfigSCell-r11               PRACH-Config                    OPTIONAL,   -- Cond UL
        tdd-Config-v1130                    TDD-Config-v1130                OPTIONAL,   -- Cond TDD2
        uplinkPowerControlCommonSCell-v1130
                                UplinkPowerControlCommonSCell-v1130         OPTIONAL    -- Cond UL
    ]],
    [[  pusch-ConfigCommon-v1270        PUSCH-ConfigCommon-v1270            OPTIONAL    -- Need OR
    ]],
    [[  pucch-ConfigCommon-r13              PUCCH-ConfigCommon      OPTIONAL,   -- Cond UL
        uplinkPowerControlCommonSCell-v1310
                                UplinkPowerControlCommonSCell-v1310 OPTIONAL    -- Cond UL
    ]],
    [[  highSpeedConfigSCell-r14        HighSpeedConfigSCell-r14            OPTIONAL,   -- Need OR
        prach-Config-v1430              PRACH-Config-v1430                  OPTIONAL,   -- Cond UL
    ul-Configuration-r14                SEQUENCE {
        ul-FreqInfo-r14                     SEQUENCE {
            ul-CarrierFreq-r14                  ARFCN-ValueEUTRA-r9         OPTIONAL,   -- Need OP
            ul-Bandwidth-r14                    ENUMERATED {n6, n15,
                                                    n25, n50, n75, n100}    OPTIONAL,   -- Need OP
            additionalSpectrumEmissionSCell-r14     AdditionalSpectrumEmission
        },
        p-Max-r14                           P-Max                           OPTIONAL,   -- Need OP
        soundingRS-UL-ConfigCommon-r14      SoundingRS-UL-ConfigCommon,
        ul-CyclicPrefixLength-r14           UL-CyclicPrefixLength,
        prach-ConfigSCell-r14                   PRACH-ConfigSCell-r10       OPTIONAL,   -- Cond TDD-
OR-NoR11
        uplinkPowerControlCommonPUSCH-LessCell-v1430
    UplinkPowerControlCommonPUSCH-LessCell-v1430    OPTIONAL    -- Need OR
}                                                                           OPTIONAL,   -- Cond ULSRS
    harq-ReferenceConfig-r14                ENUMERATED {sa2,sa4,sa5}    OPTIONAL,       -- Need
OR
    soundingRS-FlexibleTiming-r14           ENUMERATED {true}           OPTIONAL        -- Need
OR
    ]],
    [[  mbsfn-SubframeConfigList-v1430      MBSFN-SubframeConfigList-v1430      OPTIONAL-- Need ON
    ]]
}

RadioResourceConfigCommonSCell-v10l0 ::=    SEQUENCE {
    -- UL configuration
    ul-Configuration-v10l0              SEQUENCE {
        additionalSpectrumEmissionSCell-v10l0       AdditionalSpectrumEmission-v10l0
    }
}

RadioResourceConfigCommonSCell-v1440 ::=    SEQUENCE {
    ul-Configuration-v1440              SEQUENCE {
        ul-FreqInfo-v1440                   SEQUENCE {
            additionalSpectrumEmissionSCell-v1440       AdditionalSpectrumEmission-v10l0
        }
    }
}

BCCH-Config ::=                     SEQUENCE {
    modificationPeriodCoeff             ENUMERATED {n2, n4, n8, n16}
}

BCCH-Config-v1310 ::=               SEQUENCE {
    modificationPeriodCoeff-v1310       ENUMERATED {n64}
}

FreqHoppingParameters-r13 ::=       SEQUENCE {
    dummy           ENUMERATED {nb2, nb4}               OPTIONAL,
    dummy2          CHOICE {
        interval-FDD-r13                        ENUMERATED {int1, int2, int4, int8},
        interval-TDD-r13                        ENUMERATED {int1, int5, int10, int20}
    }                                                                       OPTIONAL,
    dummy3          CHOICE {
        interval-FDD-r13                        ENUMERATED {int2, int4, int8, int16},
```


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```
        interval-TDD-r13                        ENUMERATED { int5, int10, int20, int40}
    }                                                                       OPTIONAL,
    interval-ULHoppingConfigCommonModeA-r13 CHOICE {
        interval-FDD-r13                        ENUMERATED {int1, int2, int4, int8},
        interval-TDD-r13                        ENUMERATED {int1, int5, int10, int20}
    }                                                                       OPTIONAL,   -- Cond MP-A
    interval-ULHoppingConfigCommonModeB-r13 CHOICE {
        interval-FDD-r13                        ENUMERATED {int2, int4, int8, int16},
        interval-TDD-r13                        ENUMERATED { int5, int10, int20, int40}
    }                                                                       OPTIONAL,   -- Cond MP-B
    dummy4              INTEGER (1..maxAvailNarrowBands-r13)            OPTIONAL
}

PCCH-Config ::=                     SEQUENCE {
    defaultPagingCycle                  ENUMERATED {
                                            rf32, rf64, rf128, rf256},
    nB                                  ENUMERATED {
                                            fourT, twoT, oneT, halfT, quarterT, oneEighthT,
                                            oneSixteenthT, oneThirtySecondT}
}

PCCH-Config-v1310 ::=               SEQUENCE {
    paging-narrowBands-r13              INTEGER (1..maxAvailNarrowBands-r13),
    mpdcch-NumRepetition-Paging-r13     ENUMERATED {r1, r2, r4, r8, r16, r32, r64, r128, r256},
    nB-v1310                            ENUMERATED {one64thT, one128thT, one256thT}
                                                                            OPTIONAL    -- Need OR
}

UL-CyclicPrefixLength ::=           ENUMERATED {len1, len2}

HighSpeedConfig-r14 ::=         SEQUENCE {
    highSpeedEnhancedMeasFlag-r14           ENUMERATED {true}               OPTIONAL,   -- Need OR
    highSpeedEnhancedDemodulationFlag-r14   ENUMERATED {true}               OPTIONAL    -- Need OR
}

HighSpeedConfigSCell-r14 ::=        SEQUENCE {
    highSpeedEnhancedDemodulationFlag-r14   ENUMERATED {true}               OPTIONAL    -- Need OR
}

-- ASN1STOP
```


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RadioResourceConfigCommon field descriptions
additionalSpectrumEmissionSCell The UE requirements related to *additionalSpectrumEmissionSCell* are defined in TS 36.101 [42]. E-UTRAN configures the same value in *additionalSpectrumEmissionSCell* for all SCell(s) of the same band with UL configured. The *additionalSpectrumEmissionSCell* is applicable for all serving cells (including PCell) of the same band with UL configured.
defaultPagingCycle Default paging cycle, used to derive 'T' in TS 36.304 [4]. Value rf32 corresponds to 32 radio frames, rf64 corresponds to 64 radio frames and so on.
dummy This field is not used in the specification. If received it shall be ignored by the UE.
harq-ReferenceConfig Indicates UL/ DL configuration used as the DL HARQ reference configuration for this serving cell. Value sa2 corresponds to Configuration2, sa4 to Configuration4 etc, as specified in TS 36.211 [21, table 4.2-2]. E-UTRAN configures the same value for all serving cells residing on same frequency band.
highSpeedEnhancedMeasFlag If the field is present, the UE shall apply the high speed measurement enhancements as specified in TS 36.133 [16].
highSpeedEnhancedDemodulationFlag If the field is present, the UE shall apply the advanced receiver in SFN scenario as specified in TS 36.101 [6].
interval-DLHoppingConfigCommonModeX Number of consecutive absolute subframes over which MPDCCH or PDSCH for CE mode X stays at the same narrowband before hopping to another narrowband. For interval-FDD, int1 corresponds to 1 subframe, int2 corresponds to 2 subframes, and so on. For interval-TDD, int1 corresponds to 1 subframe, int5 corresponds to 5 subframes, and so on.
interval-ULHoppingConfigCommonModeX Number of consecutive absolute subframes over which PUCCH or PUSCH for CE mode X stays at the same narrowband before hopping to another narrowband. For interval-FDD, int1 corresponds to 1 subframe, int2 corresponds to 2 subframes, and so on. For interval-TDD, int1 corresponds to 1 subframe, int5 corresponds to 5 subframes, and so on.
modificationPeriodCoeff Actual modification period, expressed in number of radio frames= *modificationPeriodCoeff* * *defaultPagingCycle*. n2 corresponds to value 2, n4 corresponds to value 4, n8 corresponds to value 8, n16 corresponds to value 16, and n64 corresponds to value 64.
mpdcch-NumRepetition-Paging Maximum number of repetitions for MPDCCH common search space (CSS) for paging, see TS 36.211 [21].
mpdcch-pdsch-HoppingOffset Parameter: $f_{NB,hop}^{DL}$, see TS 36.211 [21, 6.4.1].
mpdcch-pdsch-HoppingNB The number of narrowbands for MPDCCH/PDSCH frequency hopping. Value nb2 corresponds to 2 narrowbands and value nb4 corresponds to 4 narrowbands.
nB Parameter: nB is used as one of parameters to derive the Paging Frame and Paging Occasion according to TS 36.304 [4]. Value in multiples of 'T' as defined in TS 36.304 [4]. A value of fourT corresponds to 4 * T, a value of twoT corresponds to 2 * T and so on. In case *nB-v1310* is signalled, the UE shall ignore *nB* (i.e. without suffix). EUTRAN configures *nB-v1310* only in the BR version of SI message.
paging-narrowBands Number of narrowbands used for paging, see TS 36.304 [4], TS 36.212 [22] and TS 36.213 [23].
p-Max Pmax to be used in the target cell. If absent the UE applies the maximum power according to the UE capability.
prach-ConfigSCell Indicates a PRACH configuration for an SCell. The field is not applicable for an LAA SCell in this release.
rach-ConfigCommonSCell Indicates a RACH configuration for an SCell. The field is not applicable for an LAA SCell in this release.
soundingRS-FlexibleTiming Indicates the SRS flexible timing (if configured) for aperiodic SRS triggered by DL grant. If the SRS transmission is collided with ACK/NACK, postpone once to the next configured SRS transmission opportunity.
ul-Bandwidth Parameter: transmission bandwidth configuration, N_{RB}, in uplink, see TS 36.101 [42, table 5.6-1]. Value n6 corresponds to 6 resource blocks, n15 to 15 resource blocks and so on. If for FDD this parameter is absent, the uplink bandwidth is equal to the downlink bandwidth. For TDD this parameter is absent and it is equal to the downlink bandwidth.
ul-CarrierFreq For FDD: If absent, the (default) value determined from the default TX-RX frequency separation defined in TS 36.101 [42, table 5.7.3-1] applies. For TDD: This parameter is absent and it is equal to the downlink frequency.

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RadioResourceConfigCommon field descriptions
additionalSpectrumEmissionSCell The UE requirements related to *additionalSpectrumEmissionSCell* are defined in TS 36.101 [42]. E-UTRAN configures the same value in *additionalSpectrumEmissionSCell* for all SCell(s) of the same band with UL configured. The *additionalSpectrumEmissionSCell* is applicable for all serving cells (including PCell) of the same band with UL configured.
ul-CyclicPrefixLength Parameter: Uplink cyclic prefix length see TS 36.211 [21, 5.2.1] where len1 corresponds to normal cyclic prefix and len2 corresponds to extended cyclic prefix.

Conditional presence	Explanation
MP-A	The field is mandatory present for CE mode A. Otherwise the field is optional, Need OR.
MP-B	The field is mandatory present for CE mode B. Otherwise the field is optional, Need OR.
TDD	The field is optional for TDD, Need ON; it is not present for FDD and the UE shall delete any existing value for this field.
TDD2	If *tdd-Config-r10* is present, the field is optional, Need OR. Otherwise the field is not present and the UE shall delete any existing value for this field.
TDD3	If *tdd-Config* is present, the field is optional, Need OR. Otherwise the field is not present and the UE shall delete any existing value for this field.
TDD-OR-NoR11	If *prach-ConfigSCell-r11* is absent, the field is optional for TDD, Need OR. Otherwise the field is not present and the UE shall delete any existing value for this field.
TDDSCell	This field is mandatory present for TDD; it is not present for FDD and LAA SCell, and the UE shall delete any existing value for this field.
UL	If the SCell is part of the STAG or concerns the PSCell or PUCCH SCell and if *ul-Configuration* is included, the field is optional, Need OR. Otherwise the field is not present and the UE shall delete any existing value for this field.
ULSCell	For the PSCell (IE is included in *RadioResourceConfigCommonPSCell*) the field is absent. Otherwise, if the SCell is part of the STAG and if *ul-Configuration* is included, the field is optional, Need OR. Otherwise the field is not present and the UE shall delete any existing value for this field.
ULSRS	If *ul-Configuration-r10* is absent, the field is optional, Need OR. Otherwise the field is not present and the UE shall delete any existing value for this field.

– *RadioResourceConfigDedicated*

The IE *RadioResourceConfigDedicated* is used to setup/modify/release RBs, to modify the MAC main configuration, to modify the SPS configuration and to modify dedicated physical configuration.

RadioResourceConfigDedicated information element

```
-- ASN1START

RadioResourceConfigDedicated ::=        SEQUENCE {
    srb-ToAddModList                    SRB-ToAddModList            OPTIONAL,       -- Cond HO-Conn
    drb-ToAddModList                    DRB-ToAddModList            OPTIONAL,       -- Cond HO-
toEUTRA
    drb-ToReleaseList                   DRB-ToReleaseList           OPTIONAL,       -- Need ON
    mac-MainConfig                      CHOICE {
            explicitValue                   MAC-MainConfig,
            defaultValue                    NULL
    }       OPTIONAL,                                                               -- Cond HO-
toEUTRA2
    sps-Config                          SPS-Config                  OPTIONAL,       -- Need ON
    physicalConfigDedicated             PhysicalConfigDedicated     OPTIONAL,       -- Need ON
    ...,
    [[  rlf-TimersAndConstants-r9       RLF-TimersAndConstants-r9           OPTIONAL    -- Need ON
    ]],
    [[  measSubframePatternPCell-r10    MeasSubframePatternPCell-r10        OPTIONAL    -- Need ON
    ]],
    [[  neighCellsCRS-Info-r11          NeighCellsCRS-Info-r11              OPTIONAL    -- Need ON
    ]],
    [[  naics-Info-r12              NAICS-AssistanceInfo-r12            OPTIONAL    -- Need ON
    ]],
    [[  neighCellsCRS-Info-r13          NeighCellsCRS-Info-r13              OPTIONAL,   -- Cond
CRSIM
        rlf-TimersAndConstants-r13      RLF-TimersAndConstants-r13          OPTIONAL    -- Need ON
    ]],
    [[  sps-Config-v1430                SPS-Config-v1430                    OPTIONAL    -- Cond SPS
```


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```
    ]]
}

RadioResourceConfigDedicated-v1370 ::=      SEQUENCE {
    physicalConfigDedicated-v1370       PhysicalConfigDedicated-v1370       OPTIONAL    -- Need ON
}

RadioResourceConfigDedicatedPSCell-r12 ::=      SEQUENCE {
    -- UE specific configuration extensions applicable for an PSCell
    physicalConfigDedicatedPSCell-r12       PhysicalConfigDedicated     OPTIONAL,   -- Need ON
    sps-Config-r12                          SPS-Config                  OPTIONAL,   -- Need ON
    naics-Info-r12                          NAICS-AssistanceInfo-r12    OPTIONAL,   -- Need ON
    ...,
    [[  neighCellsCRS-InfoPSCell-r13        NeighCellsCRS-Info-r13      OPTIONAL    -- Need ON
    ]],
    [[  sps-Config-v1430                SPS-Config-v1430                OPTIONAL    -- Cond SPS2
    ]]
}

RadioResourceConfigDedicatedPSCell-v1370 ::=        SEQUENCE {
    physicalConfigDedicatedPSCell-v1370     PhysicalConfigDedicated-v1370   OPTIONAL    -- Need ON
}

RadioResourceConfigDedicatedSCG-r12 ::=     SEQUENCE {
    drb-ToAddModListSCG-r12             DRB-ToAddModListSCG-r12         OPTIONAL,   -- Need ON
    mac-MainConfigSCG-r12               MAC-MainConfig                  OPTIONAL,   -- Need ON
    rlf-TimersAndConstantsSCG-r12       RLF-TimersAndConstantsSCG-r12   OPTIONAL,   -- Need ON
    ...
}

RadioResourceConfigDedicatedSCell-r10 ::=   SEQUENCE {
    -- UE specific configuration extensions applicable for an SCell
    physicalConfigDedicatedSCell-r10        PhysicalConfigDedicatedSCell-r10    OPTIONAL,   -- Need
ON
    ...,
    [[  mac-MainConfigSCell-r11         MAC-MainConfigSCell-r11         OPTIONAL    -- Cond SCellAdd
    ]],
    [[  naics-Info-r12              NAICS-AssistanceInfo-r12        OPTIONAL    -- Need ON
    ]],
    [[  neighCellsCRS-InfoSCell-r13         NeighCellsCRS-Info-r13      OPTIONAL    -- Need ON
    ]],
    [[  physicalConfigDedicatedSCell-v1370  PhysicalConfigDedicatedSCell-v1370  OPTIONAL    -- Need
ON
    ]]
}

SRB-ToAddModList ::=                SEQUENCE (SIZE (1..2)) OF SRB-ToAddMod

SRB-ToAddMod ::=    SEQUENCE {
    srb-Identity                        INTEGER (1..2),
    rlc-Config                          CHOICE {
        explicitValue                       RLC-Config,
        defaultValue                        NULL
    }       OPTIONAL,                                                   -- Cond Setup
    logicalChannelConfig                CHOICE {
        explicitValue                       LogicalChannelConfig,
        defaultValue                        NULL
    }       OPTIONAL,                                                   -- Cond Setup
    ...
}

DRB-ToAddModList ::=                SEQUENCE (SIZE (1..maxDRB)) OF DRB-ToAddMod

DRB-ToAddModListSCG-r12 ::=     SEQUENCE (SIZE (1..maxDRB)) OF DRB-ToAddModSCG-r12

DRB-ToAddMod ::=    SEQUENCE {
    eps-BearerIdentity                  INTEGER (0..15)         OPTIONAL,       -- Cond DRB-Setup
    drb-Identity                        DRB-Identity,
    pdcp-Config                         PDCP-Config             OPTIONAL,       -- Cond PDCP
    rlc-Config                          RLC-Config              OPTIONAL,       -- Cond SetupM
    logicalChannelIdentity              INTEGER (3..10)         OPTIONAL,       -- Cond DRB-SetupM
    logicalChannelConfig                LogicalChannelConfig    OPTIONAL,       -- Cond SetupM
    ...,
    [[  drb-TypeChange-r12                  ENUMERATED {toMCG}      OPTIONAL,       -- Need OP
        rlc-Config-v1250                    RLC-Config-v1250        OPTIONAL        -- Need ON
    ]],
    [[  rlc-Config-v1310                    RLC-Config-v1310        OPTIONAL,       -- Need ON
        drb-TypeLWA-r13                     BOOLEAN                 OPTIONAL,       -- Need ON
```


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```
        drb-TypeLWIP-r13                    ENUMERATED {lwip, lwip-DL-only,
                                             lwip-UL-only, eutran}      OPTIONAL        -- Need ON
    ]],
    [[  rlc-Config-v1430                    RLC-Config-v1430        OPTIONAL,       -- Need ON
        lwip-UL-Aggregation-r14             BOOLEAN                 OPTIONAL,       -- Cond LWIP
        lwip-DL-Aggregation-r14             BOOLEAN                 OPTIONAL,       -- Cond LWIP
        lwa-WLAN-AC-r14         ENUMERATED {ac-bk, ac-be, ac-vi, ac-vo} OPTIONAL    -- Cond UL-LWA
    ]]
}

DRB-ToAddModSCG-r12 ::= SEQUENCE {
    drb-Identity-r12                    DRB-Identity,
    drb-Type-r12                        CHOICE {
        split-r12                           NULL,
        scg-r12                             SEQUENCE {
            eps-BearerIdentity-r12              INTEGER (0..15) OPTIONAL,   -- Cond DRB-Setup
            pdcp-Config-r12                     PDCP-Config     OPTIONAL    -- Cond PDCP-S
        }
    }                                                           OPTIONAL,   -- Cond SetupS2
    rlc-ConfigSCG-r12                   RLC-Config              OPTIONAL,   -- Cond SetupS
    rlc-Config-v1250                        RLC-Config-v1250            OPTIONAL,   -- Need ON
    logicalChannelIdentitySCG-r12       INTEGER (3..10)         OPTIONAL,   -- Cond DRB-SetupS
    logicalChannelConfigSCG-r12         LogicalChannelConfig    OPTIONAL,   -- Cond SetupS
    ...,
    [[  rlc-Config-v1430                    RLC-Config-v1430        OPTIONAL        -- Need ON
    ]]
}

DRB-ToReleaseList ::=               SEQUENCE (SIZE (1..maxDRB)) OF DRB-Identity

MeasSubframePatternPCell-r10 ::=        CHOICE {
    release                             NULL,
    setup                           MeasSubframePattern-r10
}

NeighCellsCRS-Info-r11 ::=      CHOICE {
    release                         NULL,
    setup                           CRS-AssistanceInfoList-r11
}

CRS-AssistanceInfoList-r11 ::=  SEQUENCE (SIZE (1..maxCellReport)) OF CRS-AssistanceInfo-r11

CRS-AssistanceInfo-r11 ::= SEQUENCE {
    physCellId-r11                      PhysCellId,
    antennaPortsCount-r11               ENUMERATED {an1, an2, an4, spare1},
    mbsfn-SubframeConfigList-r11        MBSFN-SubframeConfigList,
    ...,
    [[  mbsfn-SubframeConfigList-v1430  MBSFN-SubframeConfigList-v1430      OPTIONAL    -- Need ON
    ]]
}

NeighCellsCRS-Info-r13 ::=      CHOICE {
    release                         NULL,
    setup                           CRS-AssistanceInfoList-r13
}

CRS-AssistanceInfoList-r13 ::=  SEQUENCE (SIZE (1..maxCellReport)) OF CRS-AssistanceInfo-r13

CRS-AssistanceInfo-r13 ::= SEQUENCE {
    physCellId-r13                      PhysCellId,
    antennaPortsCount-r13               ENUMERATED {an1, an2, an4, spare1},
    mbsfn-SubframeConfigList-r13        MBSFN-SubframeConfigList            OPTIONAL,   -- Need ON
    ...,
    [[  mbsfn-SubframeConfigList-v1430  MBSFN-SubframeConfigList-v1430      OPTIONAL    -- Need ON
    ]]
}

NAICS-AssistanceInfo-r12 ::=        CHOICE {
    release                         NULL,
    setup                           SEQUENCE {
        neighCellsToReleaseList-r12     NeighCellsToReleaseList-r12         OPTIONAL,   -- Need ON
        neighCellsToAddModList-r12      NeighCellsToAddModList-r12          OPTIONAL,   -- Need ON
        servCellp-a-r12                 P-a                                 OPTIONAL    -- Need ON
    }
}

NeighCellsToReleaseList-r12 ::=     SEQUENCE (SIZE (1..maxNeighCell-r12)) OF PhysCellId
```


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```
NeighCellsToAddModList-r12 ::=  SEQUENCE (SIZE (1..maxNeighCell-r12)) OF NeighCellsInfo-r12

NeighCellsInfo-r12  ::=           SEQUENCE {
    physCellId-r12                PhysCellId,
    p-b-r12                       INTEGER (0..3),
    crs-PortsCount-r12            ENUMERATED {n1, n2, n4, spare},
    mbsfn-SubframeConfig-r12      MBSFN-SubframeConfigList                OPTIONAL,   -- Need ON
    p-aList-r12                   SEQUENCE (SIZE (1..maxP-a-PerNeighCell-r12)) OF P-a,
    transmissionModeList-r12      BIT STRING (SIZE(8)),
    resAllocGranularity-r12       INTEGER (1..4),
    ...
}
P-a ::= ENUMERATED {    dB-6, dB-4dot77, dB-3, dB-1dot77,
                                  dB0, dB1, dB2, dB3}

-- ASN1STOP
```


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***RadioResourceConfigDedicated* field descriptions**
crs-PortsCount Parameter represents the number of antenna ports for cell-specific reference signal used by the signaled neighboring cell where n1 corresponds to 1 antenna port, n2 to 2 antenna ports etc. see TS 36.211 [21, 6.10.1].
drb-Identity In case of DC, the DRB identity is unique within the scope of the UE i.e. an SCG DRB can not use the same value as used for an MCG or split DRB. For a split DRB the same identity is used for the MCG- and SCG parts of the configuration.
drb-ToAddModListSCG When an SCG is configured, E-UTRAN configures at least one SCG or split DRB.
drb-Type This field indicates whether the DRB is split or SCG DRB. E-UTRAN does not configure split and SCG DRBs simultaneously for the UE.
drb-TypeChange Indicates that a split/SCG DRB is reconfigured to an MCG DRB (i.e. E-UTRAN only signals the field in case the DRB type changes).
drb-TypeLWA Indicates whether a DRB is (re)configured as an LWA DRB or an LWA DRB is reconfigured not to use WLAN resources. NOTE 1
drb-TypeLWIP Indicates whether a DRB is (re)configured to use LWIP Tunnel in UL and DL (value *lwip*), DL only (value *lwip-DL-only*), UL only (value *lwip-UL-only*) or not to use LWIP Tunnel (value *eutran*).
logicalChannelConfig For SRBs a choice is used to indicate whether the logical channel configuration is signalled explicitly or set to the default logical channel configuration for SRB1 as specified in 9.2.1.1 or for SRB2 as specified in 9.2.1.2.
logicalChannelIdentity The logical channel identity for both UL and DL.
lwa-WLAN-AC For LWA bearers, indicates the corresponding WLAN access category for uplink. AC-BK (value *ac-bk*) corresponds to Background access category, AC-BE (value *ac-be*) corresponds to Best Effort access category, AC-VI (value *ac-vi*) corresponds to Video access category and AC-VO (value *ac-vo*) corresponds to Voice access category as defined by IEEE 802.11-2012 [67]. If *lwa-WLAN-AC* is not configured, it is left up to UE to decide which IEEE 802.11 AC value to use when performing transmissions of packets for this DRB over WLAN in the uplink.
lwip-DL-Aggregation, lwip-UL-Aggregation Indicates whether LWIP is configured to utilize LWIP aggregation in DL or UL.
mac-MainConfig Although the ASN.1 includes a choice that is used to indicate whether the mac-MainConfig is signalled explicitly or set to the default MAC main configuration as specified in 9.2.2, EUTRAN does not apply "*defaultValue*".
mbsfn-SubframeConfig Defines the MBSFN subframe configuration used by the signaled neighboring cell. If absent, UE assumes no MBSFN configuration for the neighboring cell.
measSubframePatternPCell Time domain measurement resource restriction pattern for the PCell measurements (RSRP, RSRQ and the radio link monitoring).
neighCellsCRS-Info, neighCellsCRS-InfoSCell, neighCellsCRS-InfoPSCell This field contains assistance information used by the UE to mitigate interference from CRS while performing RRM/RLM/CSI measurement or data demodulation or DL control channel demodulation. When the received CRS assistance information is for a cell with CRS non-colliding with that of the CRS of the cell to measure, the UE may use the CRS assistance information to mitigate CRS interference. When the received CRS assistance information is for a cell with CRS colliding with that of the CRS of the cell to measure, the UE may use the CRS assistance information to mitigate CRS interference RRM/RLM (as specified in TS 36.133 [16]) and for CSI (as specified in TS 36.101 [42]) on the subframes indicated by *measSubframePatternPCell*, *measSubframePatternConfigNeigh*, *csi-MeasSubframeSet1* if configured, and the CSI subframe set 1 if *csi-MeasSubframeSets-r12* is configured. The UE may use CRS assistance information to mitigate CRS interference from the cells in the *CRS-AssistanceInfoList* for the demodulation purpose or DL control channel demodulation as specified in TS 36.101 [42]. EUTRAN does not configure *neighCellsCRS-Info-r11* or *neighCellsCRS-Info-r13* if *eimta-MainConfigPCell-r12* is configured.
neighCellsToAddModList This field contains assistance information used by the UE to cancel and suppress interference of a neighbouring cell. If this field is present for a neighbouring cell, the UE assumes that the transmission parameters listed in the sub-fields are used by the neighbouring cell. If this field is present for a neighbouring cell, the UE assumes the neighbour cell is subframe and SFN synchronized to the serving cell, has the same system bandwidth, UL/DL and special subframe configuration, and cyclic prefix length as the serving cell.
p-aList Indicates the restricted subset of power offset for QPSK, 16QAM, and 64QAM PDSCH transmissions for the neighbouring cell by using the parameter P_A , see TS 36.213 [23, 5.2]. Value dB-6 corresponds to -6 dB, dB-4dot77 corresponds to -4.77 dB etc.

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p-b Parameter: P_B , indicates the cell-specific ratio used by the signaled neighboring cell, see TS 36.213 [23, Table 5.2-1].
physicalConfigDedicated The default dedicated physical configuration is specified in 9.2.4.
resAllocGranularity Indicates the resource allocation and precoding granularity in PRB pair level of the signaled neighboring cell, see TS 36.213 [23, 7.1.6].
rlc-Config For SRBs a choice is used to indicate whether the RLC configuration is signalled explicitly or set to the values defined in the default RLC configuration for SRB1 in 9.2.1.1 or for SRB2 in 9.2.1.2. RLC AM is the only applicable RLC mode for SRB1 and SRB2. E-UTRAN does not reconfigure the RLC mode of DRBs except when a full configuration option is used, and may reconfigure the RLC SN field size and the AM RLC LI field size only upon handover within E-UTRA or upon the first reconfiguration after RRC connection re-establishment or upon SCG Change for SCG and split DRBs.
servCellp-a Indicates the power offset for QPSK C-RNTI based PDSCH transmissions used by the serving cell, see TS 36.213 [23, 5.2]. Value dB-6 corresponds to -6 dB, dB-4dot77 corresponds to -4.77 dB etc.
sps-Config The default SPS configuration is specified in 9.2.3. Except for handover or releasing SPS for MCG, E-UTRAN does not reconfigure *sps-Config* for MCG when there is a configured downlink assignment or a configured uplink grant for MCG (see TS 36.321 [6]). Except for SCG change or releasing SPS for SCG, E-UTRAN does not reconfigure *sps-Config* for SCG when there is a configured downlink assignment or a configured uplink grant for SCG (see TS 36.321 [6]).
srb-Identity Value 1 is applicable for SRB1 only. Value 2 is applicable for SRB2 only.
transmissionModeList Indicates a subset of transmission mode 1, 2, 3, 4, 6, 8, 9, 10, for the signaled neighboring cell for which *NeighCellsInfo* applies. When TM10 is signaled, other signaled transmission parameters in *NeighCellsInfo* are not applicable to up to 8 layer transmission scheme of TM10. E-UTRAN may indicate TM9 when TM10 with QCL type A and DMRS scrambling with $n_{\mathrm{ID}}^{(i)} = N_{\mathrm{ID}}^{\mathrm{cell}}$ in TS 36.211 [21, 6.10.3.1] is used in the signalled neighbour cell and TM9 or TM10 with QCL type A and DMRS scrambling with $n_{\mathrm{ID}}^{(i)} = N_{\mathrm{ID}}^{\mathrm{cell}}$ in TS 36.211 [21, 6.10.3.1] is used in the serving cell. UE behaviour with NAICS when TM10 is used is only defined when QCL type A and DMRS scrambling with $n_{\mathrm{ID}}^{(i)} = N_{\mathrm{ID}}^{\mathrm{cell}}$ in TS 36.211 [21, 6.10.3.1] is used for the serving cell and all signalled neighbour cells. The first/ leftmost bit is for transmission mode 1, the second bit is for transmission mode 2, and so on.

NOTE 1: It is up to eNB to ensure that the field indicating LWA bearer type is set to FALSE when LWA bearer is no longer used (e.g. during handover or re-establishment where LWA configuration is released).

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Conditional presence	Explanation
UL-LWA	The field is optionally present, need ON if *ul-LWA-Config-r14* is present. Otherwise the field is not present.
CRSIM	The field is optionally present, need ON, if *neighCellsCRS-Info-r11* is not present; otherwise it is not present.
DRB-Setup	The field is mandatory present if the corresponding DRB is being set up; otherwise it is not present.
DRB-SetupM	The field is mandatory present upon setup of MCG or split DRB; The field is optionally present, Need ON, upon change from SCG to MCG DRB; otherwise it is not present.
DRB-SetupS	The field is mandatory present upon setup of SCG or split DRB, or upon change from MCG to split DRB; The field is optionally present, Need ON, upon change from MCG to SCG DRB; otherwise it is not present.
HO-Conn	The field is mandatory present in case of handover to E-UTRA or when the *fullConfig* is included in the *RRCConnectionReconfiguration* message or in case of RRC connection establishment (excluding *RRConnectionResume*); otherwise the field is optionally present, need ON. Upon connection establishment/ re-establishment only SRB1 is applicable (excluding *RRConnectionResume*).
HO-toEUTRA	The field is mandatory present in case of handover to E-UTRA or when the *fullConfig* is included in the *RRCConnectionReconfiguration* message; In case of RRC connection establishment (excluding *RRConnectionResume*); and RRC connection re-establishment the field is not present; otherwise the field is optionally present, need ON.
HO-toEUTRA2	The field is mandatory present in case of handover to E-UTRA or when the *fullConfig* is included in the *RRCConnectionReconfiguration* message; otherwise the field is optionally present, need ON.
LWIP	The field is optionally present, Need ON, if *drbTypeLWIP-r13* is not set to eutran; otherwise it is not present and the UE shall delete any existing value for this field.
PDCP	The field is mandatory present if the corresponding DRB is being setup; the field is optionally present, need ON, upon reconfiguration of the corresponding split DRB or LWA DRB, upon the corresponding DRB type change from split to MCG bearer, upon the corresponding DRB type change from MCG to split bearer or LWA bearer, upon the corresponding DRB type change from LWA to LTE only bearer, upon handover within E-UTRA and upon the first reconfiguration after re-establishment but in all these cases only when *fullConfig* is not included in the *RRCConnectionReconfiguration* message; otherwise it is not present.
PDCP-S	The field is mandatory present if the corresponding DRB is being setup; the field is optionally present, need ON, upon SCG change; otherwise it is not present.
RLC-Setup	This field is optionally present if the corresponding DRB is being setup, need ON; otherwise it is not present.
SCellAdd	The field is optionally present, need ON, upon SCell addition; otherwise it is not present.
Setup	The field is mandatory present if the corresponding SRB/DRB is being setup; otherwise the field is optionally present, need ON.
SetupM	The field is mandatory present upon setup of an MCG or split DRB; otherwise the field is optionally present, need ON.
SetupS	The field is mandatory present upon setup of an SCG or split DRB, as well as upon change from MCG to split DRB; otherwise the field is optionally present, need ON.
SetupS2	The field is mandatory present upon setup of an SCG or split DRB, as well as upon change from MCG to split or SCG DRB. For an SCG DRB the field is optionally present, need ON. Otherwise the field is not present.
SPS	The field is optionally present, need ON, if sps-Config (without suffix) is not configured; otherwise it is not present.
SPS2	The field is optionally present, need ON, if sps-Config-r12 is not configured; otherwise it is not present.

– *RCLWI-Configuration*

The IE *RCLWI-Configuration* is used to add, modify or release the RCLWI configuration.

```
-- ASN1START

RCLWI-Configuration-r13 ::=         CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        rclwi-Config-r13                    RCLWI-Config-r13
    }
}

RCLWI-Config-r13 ::=                SEQUENCE {
```


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```
    command                             CHOICE {
        steerToWLAN-r13                     SEQUENCE {
            mobilityConfig-r13                  WLAN-Id-List-r12
        },
        steerToLTE-r13                      NULL
    },
    ...
}

-- ASN1STOP
```

– *RLC-Config*

The IE *RLC-Config* is used to specify the RLC configuration of SRBs and DRBs.

RLC-Config information element

```
-- ASN1START

RLC-Config ::=              CHOICE {
    am                                  SEQUENCE {
        ul-AM-RLC                           UL-AM-RLC,
        dl-AM-RLC                           DL-AM-RLC
    },
    um-Bi-Directional                   SEQUENCE {
        ul-UM-RLC                           UL-UM-RLC,
        dl-UM-RLC                           DL-UM-RLC
    },
    um-Uni-Directional-UL               SEQUENCE {
        ul-UM-RLC                           UL-UM-RLC
    },
    um-Uni-Directional-DL               SEQUENCE {
        dl-UM-RLC                           DL-UM-RLC
    },
    ...
}

RLC-Config-v1250 ::=                SEQUENCE {
    ul-extended-RLC-LI-Field-r12            BOOLEAN,
    dl-extended-RLC-LI-Field-r12            BOOLEAN
}

RLC-Config-v1310 ::=                SEQUENCE {
    ul-extended-RLC-AM-SN-r13                   BOOLEAN,
    dl-extended-RLC-AM-SN-r13                   BOOLEAN,
    pollPDU-v1310                               PollPDU-v1310       OPTIONAL    -- Need OR
}

RLC-Config-v1430 ::=                CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        pollByte-r14                        PollByte-r14
    }
}

UL-AM-RLC ::=                       SEQUENCE {
    t-PollRetransmit                    T-PollRetransmit,
    pollPDU                             PollPDU,
    pollByte                            PollByte,
    maxRetxThreshold                    ENUMERATED {
                                            t1, t2, t3, t4, t6, t8, t16, t32}
}

DL-AM-RLC ::=                       SEQUENCE {
    t-Reordering                        T-Reordering,
    t-StatusProhibit                    T-StatusProhibit
}

UL-UM-RLC ::=                       SEQUENCE {
    sn-FieldLength                      SN-FieldLength
}

DL-UM-RLC ::=                       SEQUENCE {
    sn-FieldLength                      SN-FieldLength,
    t-Reordering                        T-Reordering
```


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```
}

SN-FieldLength ::=                  ENUMERATED {size5, size10}

T-PollRetransmit ::=                ENUMERATED {
                                        ms5, ms10, ms15, ms20, ms25, ms30, ms35,
                                        ms40, ms45, ms50, ms55, ms60, ms65, ms70,
                                        ms75, ms80, ms85, ms90, ms95, ms100, ms105,
                                        ms110, ms115, ms120, ms125, ms130, ms135,
                                        ms140, ms145, ms150, ms155, ms160, ms165,
                                        ms170, ms175, ms180, ms185, ms190, ms195,
                                        ms200, ms205, ms210, ms215, ms220, ms225,
                                        ms230, ms235, ms240, ms245, ms250, ms300,
                                        ms350, ms400, ms450, ms500, ms800-v1310,
                                        ms1000-v1310, ms2000-v1310, ms4000-v1310,
                                         spare5, spare4, spare3, spare2, spare1}

PollPDU ::=                         ENUMERATED {
                                        p4, p8, p16, p32, p64, p128, p256, pInfinity}

PollPDU-v1310 ::=                   ENUMERATED {
                                        p512, p1024, p2048, p4096, p6144, p8192, p12288, p16384}

PollByte ::=                        ENUMERATED {
                                        kB25, kB50, kB75, kB100, kB125, kB250, kB375,
                                        kB500, kB750, kB1000, kB1250, kB1500, kB2000,
                                        kB3000, kBinfinity, spare1}

PollByte-r14 ::=                    ENUMERATED {
                                        kB1, kB2, kB5, kB8, kB10, kB15, kB3500,
                                        kB4000, kB4500, kB5000, kB5500, kB6000, kB6500,
                                        kB7000, kB7500, kB8000, kB9000, kB10000, kB11000, kB12000,
                                        kB13000, kB14000, kB15000, kB16000, kB17000, kB18000,
                                        kB19000, kB20000, kB25000, kB30000, kB35000, kB40000}

T-Reordering ::=                    ENUMERATED {
                                        ms0, ms5, ms10, ms15, ms20, ms25, ms30, ms35,
                                        ms40, ms45, ms50, ms55, ms60, ms65, ms70,
                                        ms75, ms80, ms85, ms90, ms95, ms100, ms110,
                                        ms120, ms130, ms140, ms150, ms160, ms170,
                                        ms180, ms190, ms200, ms1600-v1310}

T-StatusProhibit ::=                ENUMERATED {
                                        ms0, ms5, ms10, ms15, ms20, ms25, ms30, ms35,
                                        ms40, ms45, ms50, ms55, ms60, ms65, ms70,
                                        ms75, ms80, ms85, ms90, ms95, ms100, ms105,
                                        ms110, ms115, ms120, ms125, ms130, ms135,
                                        ms140, ms145, ms150, ms155, ms160, ms165,
                                        ms170, ms175, ms180, ms185, ms190, ms195,
                                        ms200, ms205, ms210, ms215, ms220, ms225,
                                        ms230, ms235, ms240, ms245, ms250, ms300,
                                        ms350, ms400, ms450, ms500, ms800-v1310,
                                        ms1000-v1310, ms1200-v1310, ms1600-v1310, ms2000-v1310,
ms2400-v1310, spare2,
                                        spare1}

-- ASN1STOP
```


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RLC-Config field descriptions
dl-extended-RLC-LI-Field, ul-extended-RLC-LI-Field Indicates the RLC LI field size. Value *TRUE* means that 15 bit LI length shall be used, otherwise 11 bit LI length shall be used; see TS 36.322 [7]. E-UTRAN enables this field only when *RLC-Config* (without suffix) is set to *am.*
maxRetxThreshold Parameter for RLC AM in TS 36.322 [7]. Value t1 corresponds to 1 retransmission, t2 to 2 retransmissions and so on.
pollByte Parameter for RLC AM in TS 36.322 [7]. Value kB25 corresponds to 25 kBytes, kB50 to 50 kBytes and so on. kBInfinity corresponds to an infinite amount of kBytes. In case *pollByte-r14* is signalled, the UE shall ignore pollByte (i.e. without suffix).
pollPDU Parameter for RLC AM in TS 36.322 [7]. Value p4 corresponds to 4 PDUs, p8 to 8 PDUs and so on. pInfinity corresponds to an infinite number of PDUs. In case *pollPDU-r13* is signalled, the UE shall ignore *pollPDU* (i.e. without suffix). E-UTRAN enables *pollPDU-v1310* field only when *RLC-Config* (without suffix) is set to *am.*
sn-FieldLength Indicates the UM RLC SN field size, see TS 36.322 [7], in bits. Value size5 means 5 bits, size10 means 10 bits.
t-PollRetransmit Timer for RLC AM in TS 36.322 [7], in milliseconds. Value ms5 means 5ms, ms10 means 10ms and so on. EUTRAN configures values msX-v1310 (with suffix) only if UE supports CE.
t-Reordering Timer for reordering in TS 36.322 [7], in milliseconds. Value ms0 means 0ms and behaviour as specified in 7.3.2 applies, ms5 means 5ms and so on.
t-StatusProhibit Timer for status reporting in TS 36.322 [7], in milliseconds. Value ms0 means 0ms and behaviour as specified in 7.3.2 applies, ms5 means 5ms and so on. EUTRAN configures values msX-v1310 (with suffix) only if UE supports operation in CE.
ul-extended-RLC-AM-SN, dl-extended-RLC-AM-SN Indicates whether or not the UE shall use the exteneded SN and SO length for AM bearer. Value *TRUE* means that 16 bit SN length and 16 bit SO length shall be used, otherwise 10 bit SN length and 15 bit SO length shall be used; see TS 36.322 [7].

– *RLF-TimersAndConstants*

The IE *RLF-TimersAndConstants* contains UE specific timers and constants applicable for UEs in RRC_CONNECTED.

***RLF-TimersAndConstants* information element**

```
-- ASN1START

RLF-TimersAndConstants-r9 ::=           CHOICE {
    release                                 NULL,
    setup                                   SEQUENCE {
        t301-r9                                 ENUMERATED {
                                                    ms100, ms200, ms300, ms400, ms600, ms1000, ms1500,
                                                    ms2000},
        t310-r9                                 ENUMERATED {
                                                    ms0, ms50, ms100, ms200, ms500, ms1000, ms2000},
        n310-r9                                 ENUMERATED {
                                                    n1, n2, n3, n4, n6, n8, n10, n20},
        t311-r9                                 ENUMERATED {
                                                    ms1000, ms3000, ms5000, ms10000, ms15000,
                                                    ms20000, ms30000},
        n311-r9                                 ENUMERATED {
                                                    n1, n2, n3, n4, n5, n6, n8, n10},
        ...
    }
}

RLF-TimersAndConstants-r13 ::=          CHOICE {
    release                                 NULL,
    setup                                   SEQUENCE {
        t301-v1310                              ENUMERATED {
                                                    ms2500, ms3000, ms3500, ms4000, ms5000,
                                                    ms6000, ms8000, ms10000},
        ...,
        [[  t310-v1330                          ENUMERATED {ms4000, ms6000} OPTIONAL    -- Need ON
        ]]
    }
}
```


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```
RLF-TimersAndConstantsSCG-r12 ::=           CHOICE {
    release                                 NULL,
    setup                                   SEQUENCE {
        t313-r12                                ENUMERATED {
                                                    ms0, ms50, ms100, ms200, ms500, ms1000, ms2000},
        n313-r12                                ENUMERATED {
                                                    n1, n2, n3, n4, n6, n8, n10, n20},
        n314-r12                                ENUMERATED {
                                                    n1, n2, n3, n4, n5, n6, n8, n10},
        ...
    }
}

-- ASN1STOP
```

***RLF-TimersAndConstants* field descriptions**
n3xy Constants are described in section 7.4. n1 corresponds with 1, n2 corresponds with 2 and so on.
t3xy Timers are described in section 7.3. Value ms0 corresponds with 0 ms, ms50 corresponds with 50 ms and so on. E-UTRAN configures *RLF-TimersAndConstants-r13* only if UE supports *ce-ModeB*. UE shall use the extended values *t3xy-v1310* and *t3xy-v1330*, if present, and ignore the values signaled by *t3xy-r9*.

– *RN-SubframeConfig*

The IE *RN-SubframeConfig* is used to specify the subframe configuration for an RN.

RN-SubframeConfig information element

```
-- ASN1START

RN-SubframeConfig-r10 ::=       SEQUENCE {
    subframeConfigPattern-r10           CHOICE {
        subframeConfigPatternFDD-r10    BIT STRING (SIZE(8)),
        subframeConfigPatternTDD-r10    INTEGER (0..31)
    }                                                               OPTIONAL,   -- Need ON
    rpdcch-Config-r10               SEQUENCE {
        resourceAllocationType-r10      ENUMERATED {type0, type1, type2Localized, type2Distributed,
                                                    spare4, spare3, spare2, spare1},
        resourceBlockAssignment-r10         CHOICE {
            type01-r10                          CHOICE {
                nrb6-r10                            BIT STRING (SIZE(6)),
                nrb15-r10                           BIT STRING (SIZE(8)),
                nrb25-r10                           BIT STRING (SIZE(13)),
                nrb50-r10                           BIT STRING (SIZE(17)),
                nrb75-r10                           BIT STRING (SIZE(19)),
                nrb100-r10                          BIT STRING (SIZE(25))
            },
            type2-r10                           CHOICE {
                nrb6-r10                            BIT STRING (SIZE(5)),
                nrb15-r10                           BIT STRING (SIZE(7)),
                nrb25-r10                           BIT STRING (SIZE(9)),
                nrb50-r10                           BIT STRING (SIZE(11)),
                nrb75-r10                           BIT STRING (SIZE(12)),
                nrb100-r10                          BIT STRING (SIZE(13))
            },
            ...
        },
        demodulationRS-r10              CHOICE {
            interleaving-r10                ENUMERATED {crs},
            noInterleaving-r10              ENUMERATED {crs, dmrs}
        },
        pdsch-Start-r10                 INTEGER (1..3),
        pucch-Config-r10                CHOICE {
            tdd                             CHOICE {
                channelSelectionMultiplexingBundling    SEQUENCE {
                    n1PUCCH-AN-List-r10         SEQUENCE (SIZE (1..4)) OF INTEGER (0..2047)
                },
                fallbackForFormat3              SEQUENCE {
                    n1PUCCH-AN-P0-r10               INTEGER (0..2047),
                    n1PUCCH-AN-P1-r10               INTEGER (0..2047)       OPTIONAL    -- Need OR
                }
```


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```
            },
            fdd                                 SEQUENCE {
                n1PUCCH-AN-P0-r10                   INTEGER (0..2047),
                n1PUCCH-AN-P1-r10                   INTEGER (0..2047)           OPTIONAL    -- Need OR
            }
        },
        ...
    }                                                                           OPTIONAL,   -- Need ON
    ...
}

-- ASN1STOP
```

***RN-SubframeConfig* field descriptions**
demodulationRS   Indicates which reference signals are used for R-PDCCH demodulation according to TS 36.216 [55, 7.4.1]. Value interleaving corresponds to cross-interleaving and value noInterleaving corresponds to no cross-interleaving according to TS 36.216 [55, 7.4.2 and 7.4.3].
n1PUCCH-AN-List   Parameter: $n^{(1)}_{\mathrm{PUCCH},i}$, see TS 36.216, [55, 7.5.1]. This parameter is only applicable for TDD. Configures PUCCH HARQ-ACK resources if the RN is configured to use HARQ-ACK channel selection, HARQ-ACK multiplexing or HARQ-ACK bundling.
n1PUCCH-AN-P0, n1PUCCH-AN-P1   Parameter: $n^{(1,p)}_{\mathrm{PUCCH}}$, for antenna port P0 and for antenna port P1 respectively, see TS 36.216, [55, 7.5.1] for FDD and [55, 7.5.2] for TDD.
pdsch-Start   Parameter: *DL-StartSymbol*, see TS 36.216 [55, Table 5.4-1].
resourceAllocationType   Represents the resource allocation used: type 0, type 1 or type 2 according to TS 36.213 [23, 7.1.6]. Value type0 corresponds to type 0, value type1 corresponds to type 1, value type2Localized corresponds to type 2 with localized virtual resource blocks and type2Distributed corresponds to type 2 with distributed virtual resource blocks.
resourceBlockAssignment   Indicates the resource block assignment bits according to TS 36.213 [23, 7.1.6]. Value type01 corresponds to type 0 and type 1, and the value type2 corresponds to type 2. Value nrb6 corresponds to a downlink system bandwidth of 6 resource blocks, value nrb15 corresponds to a downlink system bandwidth of 15 resource blocks, and so on.
subframeConfigPatternFDD   Parameter: *SubframeConfigurationFDD*, see TS 36.216 [55, Table 5.2-1]. Defines the DL subframe configuration for eNB-to-RN transmission, i.e. those subframes in which the eNB may indicate downlink assignments for the RN. The radio frame in which the pattern starts (i.e. the radio frame in which the first bit of the *subframeConfigPatternFDD* corresponds to subframe #0) occurs when SFN mod 4 = 0.
subframeConfigPatternTDD   Parameter: *SubframeConfigurationTDD*, see TS 36.216 [55, Table 5.2-2]. Defines the DL and UL subframe configuration for eNB-RN transmission.

– *SchedulingRequestConfig*

The IE *SchedulingRequestConfig* is used to specify the Scheduling Request related parameters

***SchedulingRequestConfig* information element**

```
-- ASN1START

SchedulingRequestConfig ::=     CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        sr-PUCCH-ResourceIndex              INTEGER (0..2047),
        sr-ConfigIndex                      INTEGER (0..157),
        dsr-TransMax                        ENUMERATED {
                                                n4, n8, n16, n32, n64, spare3, spare2, spare1}
    }
}

SchedulingRequestConfig-v1020 ::=   SEQUENCE {
    sr-PUCCH-ResourceIndexP1-r10        INTEGER (0..2047)           OPTIONAL        -- Need OR
}
```


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```
SchedulingRequestConfigSCell-r13 ::=        CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        sr-PUCCH-ResourceIndex-r13          INTEGER (0..2047),
        sr-PUCCH-ResourceIndexP1-r13        INTEGER (0..2047)           OPTIONAL,       -- Need OR
        sr-ConfigIndex-r13                  INTEGER (0..157),
        dsr-TransMax-r13                    ENUMERATED {
                                                n4, n8, n16, n32, n64, spare3, spare2, spare1}
    }

}

-- ASN1STOP
```

***SchedulingRequestConfig* field descriptions**
dsr-TransMax Parameter for SR transmission in TS 36.321 [6, 5.4.4]. The value n4 corresponds to 4 transmissions, n8 corresponds to 8 transmissions and so on. EUTRAN configures the same value for all serving cells for which this field is configured.
sr-ConfigIndex Parameter I_{SR}. See TS 36.213 [23,10.1]. The values 156 and 157 are not applicable for Release 8.
sr-PUCCH-ResourceIndex, sr-PUCCH-ResourceIndexP1 Parameter: $n_{\mathrm{PUCCH,SRI}}^{(1,p)}$ for antenna port P0 and for antenna port P1 respectively, see TS 36.213 [23, 10.1]. E-UTRAN configures *sr-PUCCH-ResourceIndexP1* only if *sr-PUCCHResourceIndex* is configured.

– *SoundingRS-UL-Config*

The IE *SoundingRS-UL-Config* is used to specify the uplink Sounding RS configuration for periodic and aperiodic sounding.

***SoundingRS-UL-Config* information element**

```
-- ASN1START

SoundingRS-UL-ConfigCommon ::=      CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        srs-BandwidthConfig                 ENUMERATED {bw0, bw1, bw2, bw3, bw4, bw5, bw6, bw7},
        srs-SubframeConfig                  ENUMERATED {
                                                sc0, sc1, sc2, sc3, sc4, sc5, sc6, sc7,
                                                sc8, sc9, sc10, sc11, sc12, sc13, sc14, sc15},
        ackNackSRS-SimultaneousTransmission BOOLEAN,
        srs-MaxUpPts                        ENUMERATED {true}           OPTIONAL    -- Cond TDD
    }
}

SoundingRS-UL-ConfigDedicated ::=   CHOICE{
    release                             NULL,
    setup                               SEQUENCE {
        srs-Bandwidth                       ENUMERATED {bw0, bw1, bw2, bw3},
        srs-HoppingBandwidth                ENUMERATED {hbw0, hbw1, hbw2, hbw3},
        freqDomainPosition                  INTEGER (0..23),
        duration                            BOOLEAN,
        srs-ConfigIndex                     INTEGER (0..1023),
        transmissionComb                    INTEGER (0..1),
        cyclicShift                         ENUMERATED {cs0, cs1, cs2, cs3, cs4, cs5, cs6, cs7}
    }
}

SoundingRS-UL-ConfigDedicated-v1020 ::= SEQUENCE {
    srs-AntennaPort-r10                 SRS-AntennaPort
}

SoundingRS-UL-ConfigDedicated-v1310 ::= CHOICE{
    release                             NULL,
    setup                               SEQUENCE {
        transmissionComb-v1310              INTEGER (2..3)              OPTIONAL,   -- Need OR
        cyclicShift-v1310                   ENUMERATED {cs8, cs9, cs10, cs11}   OPTIONAL,   -- Need
OR
        transmissionCombNum-r13             ENUMERATED {n2, n4}     OPTIONAL    -- Need OR
```


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```
    }
}

SoundingRS-UL-ConfigDedicatedUpPTsExt-r13 ::=   CHOICE{
    release                             NULL,
    setup                               SEQUENCE {
        srs-UpPtsAdd-r13                        ENUMERATED {sym2, sym4},
        srs-Bandwidth-r13                   ENUMERATED {bw0, bw1, bw2, bw3},
        srs-HoppingBandwidth-r13            ENUMERATED {hbw0, hbw1, hbw2, hbw3},
        freqDomainPosition-r13              INTEGER (0..23),
        duration-r13                        BOOLEAN,
        srs-ConfigIndex-r13                 INTEGER (0..1023),
        transmissionComb-r13                INTEGER (0..3),
        cyclicShift-r13                     ENUMERATED {cs0, cs1, cs2, cs3, cs4, cs5, cs6, cs7,
                                                        cs8, cs9, cs10, cs11},
        srs-AntennaPort-r13                 SRS-AntennaPort,
        transmissionCombNum-r13             ENUMERATED {n2, n4}
    }
}

SoundingRS-UL-ConfigDedicatedAperiodic-r10 ::=  CHOICE{
    release                             NULL,
    setup                               SEQUENCE {
        srs-ConfigIndexAp-r10               INTEGER (0..31),
        srs-ConfigApDCI-Format4-r10         SEQUENCE (SIZE (1..3)) OF SRS-ConfigAp-r10  OPTIONAL,--
Need ON
        srs-ActivateAp-r10                  CHOICE {
                release                         NULL,
                setup                           SEQUENCE {
                    srs-ConfigApDCI-Format0-r10         SRS-ConfigAp-r10,
                    srs-ConfigApDCI-Format1a2b2c-r10        SRS-ConfigAp-r10,
                    ...
                }
        }                                                                   OPTIONAL    -- Need ON
    }
}

SoundingRS-UL-ConfigDedicatedAperiodic-v1310 ::=    CHOICE{
    release                             NULL,
    setup                               SEQUENCE {
        srs-ConfigApDCI-Format4-v1310       SEQUENCE (SIZE (1..3)) OF SRS-ConfigAp-v1310
    OPTIONAL,--Need ON
        srs-ActivateAp-v1310                CHOICE {
                release                         NULL,
                setup                           SEQUENCE {
                    srs-ConfigApDCI-Format0-v1310       SRS-ConfigAp-v1310  OPTIONAL,   -- Need ON
                    srs-ConfigApDCI-Format1a2b2c-v1310  SRS-ConfigAp-v1310  OPTIONAL    -- Need ON
                }
        }                                                                   OPTIONAL    -- Need ON
    }
}

SoundingRS-UL-ConfigDedicatedAperiodicUpPTsExt-r13 ::=  CHOICE{
    release                             NULL,
    setup                               SEQUENCE {
        srs-UpPtsAdd-r13                    ENUMERATED {sym2, sym4},
        srs-ConfigIndexAp-r13               INTEGER (0..31),
        srs-ConfigApDCI-Format4-r13         SEQUENCE (SIZE (1..3)) OF SRS-ConfigAp-r13  OPTIONAL,--
Need ON
        srs-ActivateAp-r13                  CHOICE {
                release                         NULL,
                setup                           SEQUENCE {
                    srs-ConfigApDCI-Format0-r13         SRS-ConfigAp-r13,
                    srs-ConfigApDCI-Format1a2b2c-r13        SRS-ConfigAp-r13
                }
        }                                                                   OPTIONAL    -- Need ON
    }
}

SoundingRS-UL-ConfigDedicatedAperiodic-v1430 ::=    CHOICE{
    release                             NULL,
    setup                               SEQUENCE {
        srs-SubframeIndication-r14          INTEGER (1..4)  OPTIONAL        -- Need ON
    }
}

SRS-ConfigAp-r10 ::= SEQUENCE {
    srs-AntennaPortAp-r10               SRS-AntennaPort,
```


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```
    srs-BandwidthAp-r10                 ENUMERATED {bw0, bw1, bw2, bw3},
    freqDomainPositionAp-r10            INTEGER (0..23),
    transmissionCombAp-r10              INTEGER (0..1),
    cyclicShiftAp-r10                   ENUMERATED {cs0, cs1, cs2, cs3, cs4, cs5, cs6, cs7}
}

SRS-ConfigAp-v1310 ::= SEQUENCE {
    transmissionCombAp-v1310            INTEGER (2..3)                      OPTIONAL,   -- Need OR
    cyclicShiftAp-v1310                 ENUMERATED {cs8, cs9, cs10, cs11}   OPTIONAL,   -- Need OR
    transmissionCombNum-r13             ENUMERATED {n2, n4}         OPTIONAL    -- Need OR
}

SRS-ConfigAp-r13 ::= SEQUENCE {
    srs-AntennaPortAp-r13               SRS-AntennaPort,
    srs-BandwidthAp-r13                 ENUMERATED {bw0, bw1, bw2, bw3},
    freqDomainPositionAp-r13            INTEGER (0..23),
    transmissionCombAp-r13              INTEGER (0..3),
    cyclicShiftAp-r13                   ENUMERATED {cs0, cs1, cs2, cs3, cs4, cs5, cs6, cs7,
                                            cs8, cs9, cs10, cs11},
    transmissionCombNum-r13             ENUMERATED {n2, n4}
}

SRS-AntennaPort ::=                 ENUMERATED {an1, an2, an4, spare1}

-- ASN1STOP
```


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SoundingRS-UL-Config field descriptions
ackNackSRS-SimultaneousTransmission Parameter: *Simultaneous-AN-and-SRS*, see TS 36.213 [23, 8.2]. For SCells without PUCCH configured, this field is not applicable and the UE shall ignore the value.
cyclicShift, cyclicShiftAp Parameter: n_SRS for periodic and aperiodic sounding reference signal transmission respectively except for an LAA SCell. See TS 36.211 [21, 5.5.3.1], where cs0 corresponds to 0 etc.
duration Parameter: Duration for periodic sounding reference signal transmission except for an LAA SCell. See TS 36.213 [21, 8.2]. FALSE corresponds to "single" and value TRUE to "indefinite".
freqDomainPosition, freqDomainPositionAp Parameter: n_{RRC} for periodic and aperiodic sounding reference signal transmission respectively, see TS 36.211 [21, 5.5.3.2].
srs-AntennaPort, srs-AntennaPortAp Indicates the number of antenna ports used for periodic and aperiodic sounding reference signal transmission respectively, see TS 36.211 [21, 5.5.3]. UE shall release *srs-AntennaPort* if *SoundingRS-UL-ConfigDedicated* is released.
srs-Bandwidth, srs-BandwidthAp Parameter: B_{SRS} for periodic and aperiodic sounding reference signal transmission respectively, see TS 36.211 [21, tables 5.5.3.2-1, 5.5.3.2-2, 5.5.3.2-3 and 5.5.3.2-4]. For LAA SCell only bw0 is applied.
srs-BandwidthConfig Parameter: SRS Bandwidth Configuration. See TS 36.211, [21, table 5.5.3.2-1, 5.5.3.2-2, 5.5.3.2-3 and 5.5.3.2-4]. Actual configuration depends on UL bandwidth. bw0 corresponds to value 0, bw1 to value 1 and so on.
srs-ConfigApDCI-Format0 / srs-ConfigApDCI-Format1a2b2c / srs-ConfigApDCI-Format4 Parameters indicate the resource configurations for aperiodic sounding reference signal transmissions triggered by DCI formats 0, 1A, 2B, 2C, 4. See TS 36.213 [23, 8.2].
srs-ConfigIndex, srs-ConfigIndexAp Parameter: I_{SRS} for periodic and aperiodic sounding reference signal transmission respectively except for an LAA SCell. See TS 36.213 [23, table 8.2-1 and table 8.2-2] for periodic and TS 36.213 [23, table 8.2-4 and table 8.2-5] for aperiodic SRS transmission.
srs-HoppingBandwidth Parameter: SRS hopping bandwidth $b_{hop} \in \{0,1,2,3\}$ for periodic sounding reference signal transmission except for an LAA SCell, see TS 36.211 [21, 5.5.3.2] where hbw0 corresponds to value 0, hbw1 to value 1 and so on.
srs-MaxUpPts Parameter: srsMaxUpPts, see TS 36.211 [21, 5.5.3.2]. If this field is present, reconfiguration of $m_{\mathrm{SRS},0}^{\max}$ applies for UpPts, otherwise reconfiguration does not apply.
srs-SubframeConfig Parameter: SRS SubframeConfiguration except for an LAA SCell. See TS 36.211, [21, table 5.5.3.3-1] applies for FDD whereas TS 36.211 [21, table 5.5.3.3-2] applies for TDD. sc0 corresponds to value 0, sc1 corresponds to value 1 and so on.
srs-SubframeIndication Parameter: SRS subframe indication in SRS parameter set configuration for aperiodic sounding reference signal transmission on an LAA SCell configured with uplink, see TS 36.213 [23].
srs-UpPtsAdd The field only applies for TDD and frame structure type 3, see TS 36.211 [21]. If E-UTRAN configures both *soundingRS-UL-ConfigDedicatedUpPTsExt* and *soundingRS-UL-ConfigDedicatedAperiodicUpPTsExt srs-UpPtsAdd* in both fields is set to the same value. If E-UTRAN configures *soundingRS-UL-PeriodicConfigDedicatedUpPTsExtList-r14* with a number of *soundingRS-UL-ConfigDedicatedUpPTsExt* and/or *soundingRS-UL-AperiodicConfigDedicatedList-r14* with a number of *soundingRS-UL-ConfigDedicatedAperiodicUpPTsExt*, *srs-UpPtsAdd* in all fields are set to the same value.
transmissionComb, transmissionCombAp Parameter: $\bar{k}_{\mathrm{TC}} \in \{0..3\}$ for periodic and aperiodic sounding reference signal transmission respectively, see TS 36.211 [21, 5.5.3.2].

Conditional presence	Explanation
TDD	This field is optional present for TDD, need OR; it is not present for FDD and the UE shall delete any existing value for this field.

– *SPS-Config*

The IE *SPS-Config* is used to specify the semi-persistent scheduling configuration.

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SPS-Config information element

```
-- ASN1START

SPS-Config ::=  SEQUENCE {
    semiPersistSchedC-RNTI          C-RNTI                  OPTIONAL,           -- Need OR
    sps-ConfigDL                    SPS-ConfigDL            OPTIONAL,           -- Need ON
    sps-ConfigUL                    SPS-ConfigUL            OPTIONAL            -- Need ON
}

SPS-Config-v1430 ::=    SEQUENCE {
    ul-SPS-V-RNTI-r14                   C-RNTI                  OPTIONAL,           -- Need OR
    sl-SPS-V-RNTI-r14                   C-RNTI                  OPTIONAL,           -- Need OR
    sps-ConfigUL-ToAddModList-r14       SPS-ConfigUL-ToAddModList-r14   OPTIONAL,   -- Need ON
    sps-ConfigUL-ToReleaseList-r14      SPS-ConfigUL-ToReleaseList-r14  OPTIONAL,   -- Need ON
    sps-ConfigSL-ToAddModList-r14       SPS-ConfigSL-ToAddModList-r14   OPTIONAL,   -- Need ON
    sps-ConfigSL-ToReleaseList-r14      SPS-ConfigSL-ToReleaseList-r14  OPTIONAL    -- Need ON
}

SPS-ConfigUL-ToAddModList-r14 ::= SEQUENCE (SIZE (1..maxConfigSPS-r14)) OF SPS-ConfigUL

SPS-ConfigUL-ToReleaseList-r14 ::= SEQUENCE (SIZE (1..maxConfigSPS-r14)) OF SPS-ConfigIndex-r14

SPS-ConfigSL-ToAddModList-r14 ::= SEQUENCE (SIZE (1..maxConfigSPS-r14)) OF SPS-ConfigSL-r14

SPS-ConfigSL-ToReleaseList-r14 ::= SEQUENCE (SIZE (1..maxConfigSPS-r14)) OF SPS-ConfigIndex-r14

SPS-ConfigDL ::=    CHOICE{
    release                         NULL,
    setup                           SEQUENCE {
        semiPersistSchedIntervalDL          ENUMERATED {
                                                sf10, sf20, sf32, sf40, sf64, sf80,
                                                sf128, sf160, sf320, sf640, spare6,
                                                spare5, spare4, spare3, spare2,
                                                spare1},
        numberOfConfSPS-Processes           INTEGER (1..8),
        n1PUCCH-AN-PersistentList           N1PUCCH-AN-PersistentList,
        ...,
        [[  twoAntennaPortActivated-r10     CHOICE {
                release                         NULL,
                setup                           SEQUENCE {
                    n1PUCCH-AN-PersistentListP1-r10 N1PUCCH-AN-PersistentList
                }
            }                                                                   OPTIONAL    -- Need ON
        ]]
    }
}

SPS-ConfigUL ::=    CHOICE {
    release                         NULL,
    setup                           SEQUENCE {
        semiPersistSchedIntervalUL          ENUMERATED {
                                                sf10, sf20, sf32, sf40, sf64, sf80,
                                                sf128, sf160, sf320, sf640, sf1-v1430,
                                                sf2-v1430, sf3-v1430, sf4-v1430, sf5-v1430,
                                                spare1},
        implicitReleaseAfter                ENUMERATED {e2, e3, e4, e8},
        p0-Persistent                       SEQUENCE {
            p0-NominalPUSCH-Persistent          INTEGER (-126..24),
            p0-UE-PUSCH-Persistent              INTEGER (-8..7)
        }       OPTIONAL,                                               -- Need OP
        twoIntervalsConfig                  ENUMERATED {true}           OPTIONAL,   -- Cond TDD
        ...,
        [[  p0-PersistentSubframeSet2-r12       CHOICE {
                release                             NULL,
                setup                               SEQUENCE {
                    p0-NominalPUSCH-PersistentSubframeSet2-r12          INTEGER (-126..24),
                    p0-UE-PUSCH-PersistentSubframeSet2-r12              INTEGER (-8..7)
                }
            }                                                           OPTIONAL    -- Need ON
        ]],
        [[  numberOfConfUlSPS-Processes-r13         INTEGER (1..8)      OPTIONAL    -- Need OR
        ]],
        [[  fixedRV-NonAdaptive-r14                 ENUMERATED {true}       OPTIONAL,   -- Need OR
            sps-ConfigIndex-r14                     SPS-ConfigIndex-r14     OPTIONAL,   -- Need OR
            semiPersistSchedIntervalUL-v1430        ENUMERATED {
                                                sf50, sf100, sf200, sf300, sf400, sf500,
                                                sf600, sf700, sf800, sf900, sf1000, spare5,
```


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```
                                        spare4, spare3, spare2, spare1} OPTIONAL    -- Need OR

        ]]
    }
}

SPS-ConfigSL-r14 ::=    SEQUENCE {
    sps-ConfigIndex-r14             SPS-ConfigIndex-r14,
    semiPersistSchedIntervalSL-r14  ENUMERATED {
                                        sf20, sf50, sf100, sf200, sf300, sf400,
                                        sf500, sf600, sf700, sf800, sf900, sf1000,
                                        spare4, spare3, spare2, spare1}
}

SPS-ConfigIndex-r14 ::=         INTEGER (1..maxConfigSPS-r14)

N1PUCCH-AN-PersistentList ::=       SEQUENCE (SIZE (1..4)) OF INTEGER (0..2047)

-- ASN1STOP
```


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***SPS-Config* field descriptions**
fixedRV-NonAdaptive If this field is present and *skipUplinkTxSPS* is configured, non-adaptive retransmissions on configured uplink grant uses redundancy version 0, otherwise the redundancy version for each retransmission is updated based on the sequence of redundancy versions as described in TS 36.321 [6].
implicitReleaseAfter Number of empty transmissions before implicit release, see TS 36.321 [6, 5.10.2]. Value e2 corresponds to 2 transmissions, e3 corresponds to 3 transmissions and so on. If *skipUplinkTxSPS* is configured, the UE shall ignore this field.
n1PUCCH-AN-PersistentList, n1PUCCH-AN-PersistentListP1 List of parameter: $n_{\mathrm{PUCCH}}^{(1,p)}$ for antenna port P0 and for antenna port P1 respectively, see TS 36.213 [23, 10.1]. Field *n1-PUCCH-AN-PersistentListP1* is applicable only if the *twoAntennaPortActivatedPUCCH-Format1a1b* in *PUCCH-ConfigDedicated-v1020* is set to *true*. Otherwise the field is not configured.
numberOfConfSPS-Processes The number of configured HARQ processes for downlink Semi-Persistent Scheduling, see TS 36.321 [6].
numberOfConfUlSPS-Processes The number of configured HARQ processes for uplink Semi-Persistent Scheduling, see TS 36.321 [6]. E-UTRAN always configures this field for asynchronous UL HARQ. Otherwise it does not configure this field.
p0-NominalPUSCH-Persistent Parameter: $P_{\mathrm{O\_NOMINAL\_PUSCH}}(0)$. See TS 36.213 [23, 5.1.1.1], unit dBm step 1. This field is applicable for persistent scheduling, only. If choice setup is used and *p0-Persistent* is absent, apply the value of *p0-NominalPUSCH* for *p0-NominalPUSCH-Persistent.* If uplink power control subframe sets are configured by *tpc-SubframeSet*, this field applies for uplink power control subframe set 1.
p0-NominalPUSCH-PersistentSubframeSet2 Parameter: $P_{\mathrm{O\_NOMINAL\_PUSCH}}(0)$. See TS 36.213 [23, 5.1.1.1], unit dBm step 1. This field is applicable for persistent scheduling, only. If *p0-PersistentSubframeSet2-r12* is not configured, apply the value of *p0-NominalPUSCH-SubframeSet2-r12* for *p0-NominalPUSCH-PersistentSubframeSet2.* E-UTRAN configures this field only if uplink power control subframe sets are configured by *tpc-SubframeSet*, in which case this field applies for uplink power control subframe set 2.
p0-UE-PUSCH-Persistent Parameter: $P_{\mathrm{O\_UE\_PUSCH}}(0)$. See TS 36.213 [23, 5.1.1.1], unit dB. This field is applicable for persistent scheduling, only. If choice setup is used and *p0-Persistent* is absent, apply the value of p0-UE-PUSCH for *p0-UE-PUSCH-Persistent.* If uplink power control subframe sets are configured by *tpc-SubframeSet*, this field applies for uplink power control subframe set 1.
p0-UE-PUSCH-PersistentSubframeSet2 Parameter: $P_{\mathrm{O\_UE\_PUSCH}}(0)$. See TS 36.213 [23, 5.1.1.1], unit dB. This field is applicable for persistent scheduling, only. If *p0-PersistentSubframeSet2-r12* is not configured, apply the value of *p0-UE-PUSCH-SubframeSet2* for *p0-UE-PUSCH-PersistentSubframeSet2.* E-UTRAN configures this field only if uplink power control subframe sets are configured by *tpc-SubframeSet*, in which case this field applies for uplink power control subframe set 2.
semiPersistSchedC-RNTI Semi-persistent Scheduling C-RNTI, see TS 36.321 [6].
semiPersistSchedIntervalDL Semi-persistent scheduling interval in downlink, see TS 36.321 [6]. Value in number of sub-frames. Value sf10 corresponds to 10 sub-frames, sf20 corresponds to 20 sub-frames and so on. For TDD, the UE shall round this parameter down to the nearest integer (of 10 sub-frames), e.g. sf10 corresponds to 10 sub-frames, sf32 corresponds to 30 sub-frames, sf128 corresponds to 120 sub-frames.
semiPersistSchedIntervalSL Semi-persistent scheduling interval in sidelink, see TS 36.321 [6]. Value in number of sub-frames. Value sf20 corresponds to 20 sub-frames, sf50 corresponds to 50 sub-frames and so on.
semiPersistSchedIntervalUL Semi-persistent scheduling interval in uplink, see TS 36.321 [6]. Value in number of sub-frames. Value sf10 corresponds to 10 sub-frames, sf20 corresponds to 20 sub-frames and so on. For TDD, when the configured Semi-persistent scheduling interval is greater than or equal to 10 sub-frames, the UE shall round this parameter down to the nearest integer (of 10 sub-frames), e.g. sf10 corresponds to 10 sub-frames, sf32 corresponds to 30 sub-frames, sf128 corresponds to 120 sub-frames. If *semiPersistSchedIntervalUL-v1430* is configured, the UE only considers this extension (and ignore*s semiPersistSchedIntervalUL* i.e. without suffix*).*
sl-SPS-V-RNTI SL Semi-Persistent Scheduling V-RNTI for V2X sidelink communication, see TS 36.321 [6].
sps-ConfigIndex Indicates the index of one of multiple SL/UL SPS configurations.
sps-ConfigSL-ToAddModList Indicates the SL SPS configurations to be added or modified, identified by *SPS-ConfigIndex*.
sps-ConfigSL-ToReleaseList Indicates the SL SPS configurations to be released, identified by *SPS-ConfigIndex*.

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SPS-Config field descriptions
sps-ConfigUL-ToAddModList Indicates the UL SPS configurations to be added or modified, identified by *SPS-ConfigIndex*.
sps-ConfigUL-ToReleaseList Indicates the UL SPS configurations to be released, identified by *SPS-ConfigIndex*.
twoIntervalsConfig Trigger of two-intervals-Semi-Persistent Scheduling in uplink. See TS 36.321 [6, 5.10]. If this field is present and the configured Semi-persistent scheduling interval greater than or equal to 10 sub-frames, two-intervals-SPS is enabled for uplink. Otherwise, two-intervals-SPS is disabled.
ul-SPS-V-RNTI UL Semi-Persistent Scheduling V-RNTI for UEs capable of multiple uplink SPS configurations and which support V2X communication, see TS 36.321 [6].

Conditional presence	Explanation
TDD	This field is optional present for TDD, need OR; it is not present for FDD and the UE shall delete any existing value for this field.

– *SRS-TPC-PDCCH-Config*

The IE *SRS-TPC-PDCCH-Config* is used to specify the RNTIs and indexes for A-SRS trigger and TPC according to TS 36.212 [22].

SRS-TPC-PDCCH-Config information element

```
-- ASN1START

SRS-TPC-PDCCH-Config-r14 ::=                    CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        srs-TPC-RNTI-r14                                    BIT STRING (SIZE (16)),
        startingBitOfFormat3B-r14                           INTEGER (0..31),
        fieldTypeFormat3B-r14                               INTEGER (1..4),
        srs-CC-SetIndexlist-r14                                 SEQUENCE (SIZE(1..4)) OF SRS-CC-
SetIndex-r14    OPTIONAL    -- Cond SRS-Trigger-TypeA

    }
}

SRS-CC-SetIndex-r14 ::=         SEQUENCE {
    cc-SetIndex-r14             INTEGER (0..3),
    cc-IndexInOneCC-Set-r14     INTEGER (0..7)
}

-- ASN1STOP
```


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SRS-TPC-PDCCH-Config field descriptions
cc-IndexInOneCC-Set Indicates the CC index in one CC set for Type A associated with the group DCI with SRS request field (optional) and TPC commands for a PUSCH-less SCell
cc-SetIndex Indicates the CC set index for Type A associated with the group DCI with SRS request field (optional) and TPC commands for a PUSCH-less SCell.
fieldTypeFormat3B The type of a field within the group DCI with SRS request fields (optional) and TPC commands for a PUSCH-less SCell, which indicates how many bits in the field are for SRS request (0 or 1/2) and how many bits in the field are for TPC (1 or 2). Note that for Type A, there is a common SRS request field for all SCells in the set, but each SCell has its own TPC command bits. See TS 36.212 [22, 5.3.3.1.7A]. EUTRAN configures this field with the same value for all PUSCH-less SCells.
srs-CC-SetIndexlist Indicates the index of the *SRS-TPC-PDCCH-Config* for Type A trigger by the group DCI with SRS request field (optional) and TPC commands for a PUSCH-less SCell. Each set may contain at most 8 CCs.
srs-TPC-RNTI RNTI for SRS trigger and power control using DCI format 3B, see TS 36.212 [22, 5.1.3.1].
startingBitOfFormat3B The starting bit position of a block within the group DCI with SRS request fields (optional) and TPC commands for a PUSCH-less SCell.

Conditional presence	Explanation
SRS-Trigger-TypeA	The field is mandatory present if *typeA-SRS-TPC-PDCCH-Group-r14* is present. Otherwise the field is not present and the UE shall delete any existing value for this field.

– *TDD-Config*

The IE *TDD-Config* is used to specify the TDD specific physical channel configuration.

TDD-Config information element

```
-- ASN1START

TDD-Config ::=                      SEQUENCE {
    subframeAssignment                  ENUMERATED {
                                            sa0, sa1, sa2, sa3, sa4, sa5, sa6},
    specialSubframePatterns             ENUMERATED {
                                            ssp0, ssp1, ssp2, ssp3, ssp4,ssp5, ssp6, ssp7,
                                            ssp8}
}

TDD-Config-v1130 ::=                SEQUENCE {
    specialSubframePatterns-v1130       ENUMERATED {ssp7,ssp9}
}

TDD-Config-v1430 ::=                SEQUENCE {
    specialSubframePatterns-v1430       ENUMERATED {ssp10}
}

TDD-Config-v1450 ::=                SEQUENCE {
    specialSubframePatterns-v1450       ENUMERATED {ssp10-CRS-LessDwPTS}
}

TDD-ConfigSL-r12 ::=        SEQUENCE {
    subframeAssignmentSL-r12                ENUMERATED {
                                            none, sa0, sa1, sa2, sa3, sa4, sa5, sa6}
}

-- ASN1STOP
```


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TDD-Config field descriptions
specialSubframePatterns Indicates Configuration as in TS 36.211 [21, table 4.2-1] where *ssp0* points to Configuration 0, *ssp1* to Configuration 1 etc. Value *ssp7* points to Configuration 7 for extended cyclic prefix, value *ssp9* points to Configuration 9 for normal cyclic prefix and value *ssp10* points to Configration 10 for normal cyclic prefix. Value *ssp10-CRS-LessDwPTS* corresponds to *ssp10* without CRS transmission on the 5th symbol of DwPTS. E-UTRAN signals *ssp7* only when setting *specialSubframePatterns* (without suffix i.e. the version defined in REL-8) to *ssp4*. E-UTRAN signals value *ssp9* only when setting *specialSubframePatterns* (without suffix) to *ssp5*. E-UTRAN signals value *ssp10* only when setting *specialSubframePatterns* (without suffix) to *ssp0* or *ssp5*. If *specialSubframePatterns-v1130*, *specialSubframePatterns-v1430,* or *specialSubframePatterns-v1450* is present, the UE shall ignore *specialSubframePatterns* (without suffix). If *specialSubframePatterns-v1430* or *specialSubframePatterns-v1450* is present, the UE shall ignore *specialSubframePatterns-v1130.* E-UTRAN does not simultanuosly configure *TDD-Config-v1430* and *TDD-Config-v1450.*
subframeAssignment Indicates DL/UL subframe configuration where sa0 points to Configuration 0, sa1 to Configuration 1 etc. as specified in TS 36.211 [21, table 4.2-2]. E-UTRAN configures the same value for serving cells residing on same frequency band.
subframeAssignmentSL Indicates UL/ DL subframe configuration where sa0 points to Configuration 0, sa1 to Configuration 1 etc. as specified in TS 36.211 [21, table 4.2-2]. The value *none* means that no TDD specific physical channel configuration is applicable (i.e. the carrier on which *MasterInformationBlock-SL* is transmitted is an FDD UL carrier or the carrier on which *MasterInformationBlock-SL-V2X* is transmitted is a carrier for V2X sidelink communication).

– *TimeAlignmentTimer*

The IE *TimeAlignmentTimer* is used to control how long the UE considers the serving cells belonging to the associated TAG to be uplink time aligned. Corresponds to the Timer for time alignment in TS 36.321 [6]. Value in number of sub-frames. Value sf500 corresponds to 500 sub-frames, sf750 corresponds to 750 sub-frames and so on.

TimeAlignmentTimer information element

```
-- ASN1START

TimeAlignmentTimer ::=                  ENUMERATED {
                                                sf500, sf750, sf1280, sf1920, sf2560, sf5120,
                                                sf10240, infinity}
-- ASN1STOP
```

– *TPC-PDCCH-Config*

The IE *TPC-PDCCH-Config* is used to specify the RNTIs and indexes for PUCCH and PUSCH power control according to TS 36.212 [22]. The power control function can either be setup or released with the IE.

TPC-PDCCH-Config information element

```
-- ASN1START

TPC-PDCCH-Config ::=                    CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        tpc-RNTI                            BIT STRING (SIZE (16)),
        tpc-Index                           TPC-Index
    }
}

TPC-PDCCH-ConfigSCell-r13 ::=                   CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        tpc-Index-PUCCH-SCell-r13       TPC-Index
    }
}

TPC-Index ::=                           CHOICE {
    indexOfFormat3                      INTEGER (1..15),
    indexOfFormat3A                     INTEGER (1..31)
}

-- ASN1STOP
```


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TPC-PDCCH-Config field descriptions
indexOfFormat3 Index of N when DCI format 3 is used. See TS 36.212 [22, 5.3.3.1.6].
IndexOfFormat3A Index of M when DCI format 3A is used. See TS 36.212 [22, 5.3.3.1.7].
tpc-Index Index of N or M, see TS 36.212 [22, 5.3.3.1.6 and 5.3.3.1.7], where N or M is dependent on the used DCI format (i.e. format 3 or 3a).
tpc-Index-PUCCH-SCell Index of N or M, see TS 36.212 [22, 5.3.3.1.6 and 5.3.3.1.7], where N or M is dependent on the used DCI format (i.e. format 3 or 3a).
tpc-RNTI RNTI for power control using DCI format 3/3A, see TS 36.212 [22].

– *TunnelConfigLWIP*

The IE *TunnelConfigLWIP* is used to setup/release LWIP Tunnel.

```
-- ASN1START

TunnelConfigLWIP-r13 ::= SEQUENCE {
    ip-Address-r13          IP-Address-r13,
    ike-Identity-r13            IKE-Identity-r13,
    ...,
    [[  lwip-Counter-r13    INTEGER (0..65535)      OPTIONAL    -- Cond LWIP-Setup
    ]]
}

IKE-Identity-r13 ::= SEQUENCE {
    idI-r13                 OCTET STRING
}

IP-Address-r13 ::= CHOICE {
    ipv4-r13                    BIT STRING (SIZE (32)),
    ipv6-r13                    BIT STRING (SIZE (128))
}

-- ASN1STOP
```

TunnelConfigLWIP field descriptions
ip-Address Parameter indicates the LWIP-SeGW IP Address to be used by the UE for initiating LWIP Tunnel establishment [32].
ike-Identity Parameter indicates the IKE Identity elements (IDi) to be used in IKE Authentication Procedures [32].
lwip-Counter Indicates the parameter used by UE for computing the security keys used in LWIP tunnel establishment, as specified in TS 33.401 [32].

Conditional presence	Explanation
LWIP-Setup	The field is mandatory present upon setup of LWIP tunnel. Otherwise the field is optional, Need ON.

– *UplinkPowerControl*

The IE *UplinkPowerControlCommon* and IE *UplinkPowerControlDedicated* are used to specify parameters for uplink power control in the system information and in the dedicated signalling, respectively.

UplinkPowerControl information elements

```
-- ASN1START

UplinkPowerControlCommon ::=        SEQUENCE {
```


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```
    p0-NominalPUSCH                     INTEGER (-126..24),
    alpha                               Alpha-r12,
    p0-NominalPUCCH                     INTEGER (-127..-96),
    deltaFList-PUCCH                    DeltaFList-PUCCH,
    deltaPreambleMsg3                   INTEGER (-1..6)
}

UplinkPowerControlCommon-v1020 ::=  SEQUENCE {
    deltaF-PUCCH-Format3-r10                ENUMERATED {deltaF-1, deltaF0, deltaF1, deltaF2,
                                                        deltaF3, deltaF4, deltaF5, deltaF6},
    deltaF-PUCCH-Format1bCS-r10             ENUMERATED {deltaF1, deltaF2, spare2, spare1}
}

UplinkPowerControlCommon-v1310 ::=  SEQUENCE {
    deltaF-PUCCH-Format4-r13          ENUMERATED {deltaF16, deltaF15, deltaF14,deltaF13, deltaF12,
                                      deltaF11, deltaF10, spare1}          OPTIONAL,   -- Need OR
    deltaF-PUCCH-Format5-13           ENUMERATED { deltaF13, deltaF12, deltaF11, deltaF10, deltaF9,
                                      deltaF8, deltaF7, spare1}            OPTIONAL    -- Need OR
}

UplinkPowerControlCommonPSCell-r12 ::=      SEQUENCE {
-- For uplink power control the additional/ missing fields are signalled (compared to SCell)
    deltaF-PUCCH-Format3-r12                ENUMERATED {deltaF-1, deltaF0, deltaF1, deltaF2,
                                                        deltaF3, deltaF4, deltaF5, deltaF6},
    deltaF-PUCCH-Format1bCS-r12             ENUMERATED {deltaF1, deltaF2, spare2, spare1},
    p0-NominalPUCCH-r12                     INTEGER (-127..-96),
    deltaFList-PUCCH-r12                    DeltaFList-PUCCH
}


UplinkPowerControlCommonSCell-r10 ::=   SEQUENCE {
    p0-NominalPUSCH-r10                 INTEGER (-126..24),
    alpha-r10                           Alpha-r12
}

UplinkPowerControlCommonSCell-v1130 ::= SEQUENCE {
    deltaPreambleMsg3-r11               INTEGER (-1..6)
}

UplinkPowerControlCommonSCell-v1310 ::= SEQUENCE {
-- For uplink power control the additional/ missing fields are signalled (compared to SCell)
    p0-NominalPUCCH                         INTEGER (-127..-96),
    deltaFList-PUCCH                        DeltaFList-PUCCH,
    deltaF-PUCCH-Format3-r12                ENUMERATED {deltaF-1, deltaF0, deltaF1,
                                            deltaF2, deltaF3, deltaF4, deltaF5,
                                            deltaF6}                        OPTIONAL,   -- Need OR
    deltaF-PUCCH-Format1bCS-r12             ENUMERATED {deltaF1, deltaF2,
                                            spare2, spare1}                 OPTIONAL,   -- Need OR
    deltaF-PUCCH-Format4-r13                ENUMERATED {deltaF16, deltaF15, deltaF14,
                                            deltaF13, deltaF12, deltaF11, deltaF10,
                                            spare1}                         OPTIONAL,   -- Need OR
    deltaF-PUCCH-Format5-13                 ENUMERATED { deltaF13, deltaF12, deltaF11,
                                            deltaF10, deltaF9, deltaF8, deltaF7,
                                            spare1}                         OPTIONAL    -- Need OR
}
UplinkPowerControlCommonPUSCH-LessCell-v1430 ::=    SEQUENCE {
    p0-Nominal-PeriodicSRS-r14                      INTEGER (-126..24)      OPTIONAL,   -- Need OR
    p0-Nominal-AperiodicSRS-r14                     INTEGER (-126..24)      OPTIONAL,   -- Need OR
    alpha-SRS-r14                               Alpha-r12                   OPTIONAL    -- Need OR
}

UplinkPowerControlDedicated ::=     SEQUENCE {
    p0-UE-PUSCH                         INTEGER (-8..7),
    deltaMCS-Enabled                    ENUMERATED {en0, en1},
    accumulationEnabled                 BOOLEAN,
    p0-UE-PUCCH                         INTEGER (-8..7),
    pSRS-Offset                         INTEGER (0..15),
    filterCoefficient                   FilterCoefficient                   DEFAULT fc4
}

UplinkPowerControlDedicated-v1020 ::= SEQUENCE {
    deltaTxD-OffsetListPUCCH-r10        DeltaTxD-OffsetListPUCCH-r10        OPTIONAL,   -- Need OR
    pSRS-OffsetAp-r10                   INTEGER (0..15)                     OPTIONAL    -- Need OR
}

UplinkPowerControlDedicated-v1130 ::=       SEQUENCE {
    pSRS-Offset-v1130                   INTEGER (16..31)                    OPTIONAL,   -- Need OR
    pSRS-OffsetAp-v1130                 INTEGER (16..31)                    OPTIONAL,   -- Need OR
```


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```
    deltaTxD-OffsetListPUCCH-v1130          DeltaTxD-OffsetListPUCCH-v1130  OPTIONAL    -- Need OR
}

UplinkPowerControlDedicated-v1250 ::=   SEQUENCE {
    set2PowerControlParameter       CHOICE {
        release                         NULL,
        setup                           SEQUENCE {
            tpc-SubframeSet-r12                 BIT STRING (SIZE(10)),
            p0-NominalPUSCH-SubframeSet2-r12        INTEGER (-126..24),
            alpha-SubframeSet2-r12              Alpha-r12,
            p0-UE-PUSCH-SubframeSet2-r12            INTEGER (-8..7)
        }
    }
}

UplinkPUSCH-LessPowerControlDedicated-v1430 ::=     SEQUENCE {
    p0-UE-PeriodicSRS-r14                       INTEGER (-8..7)             OPTIONAL,   -- Need OR
    p0-UE-AperiodicSRS-r14                      INTEGER (-8..7)             OPTIONAL,   -- Need OR
    accumulationEnabled-r14                     BOOLEAN
}

UplinkPowerControlDedicatedSCell-r10 ::=        SEQUENCE {
    p0-UE-PUSCH-r10                     INTEGER (-8..7),
    deltaMCS-Enabled-r10                    ENUMERATED {en0, en1},
    accumulationEnabled-r10             BOOLEAN,
    pSRS-Offset-r10                     INTEGER (0..15),
    pSRS-OffsetAp-r10                   INTEGER (0..15)                     OPTIONAL,   -- Need OR
    filterCoefficient-r10               FilterCoefficient                   DEFAULT fc4,
    pathlossReferenceLinking-r10        ENUMERATED {pCell, sCell}
}

UplinkPowerControlDedicatedSCell-v1310 ::=  SEQUENCE {
--Release 8
    p0-UE-PUCCH                         INTEGER (-8..7),
--Release 10
    deltaTxD-OffsetListPUCCH-r10        DeltaTxD-OffsetListPUCCH-r10        OPTIONAL    -- Need OR
}

Alpha-r12 ::=                       ENUMERATED {al0, al04, al05, al06, al07, al08, al09, al1}

DeltaFList-PUCCH ::=                SEQUENCE {
    deltaF-PUCCH-Format1                ENUMERATED {deltaF-2, deltaF0, deltaF2},
    deltaF-PUCCH-Format1b               ENUMERATED {deltaF1, deltaF3, deltaF5},
    deltaF-PUCCH-Format2                ENUMERATED {deltaF-2, deltaF0, deltaF1, deltaF2},
    deltaF-PUCCH-Format2a               ENUMERATED {deltaF-2, deltaF0, deltaF2},
    deltaF-PUCCH-Format2b               ENUMERATED {deltaF-2, deltaF0, deltaF2}
}

DeltaTxD-OffsetListPUCCH-r10 ::=    SEQUENCE {
    deltaTxD-OffsetPUCCH-Format1-r10        ENUMERATED {dB0, dB-2},
    deltaTxD-OffsetPUCCH-Format1a1b-r10     ENUMERATED {dB0, dB-2},
    deltaTxD-OffsetPUCCH-Format22a2b-r10    ENUMERATED {dB0, dB-2},
    deltaTxD-OffsetPUCCH-Format3-r10        ENUMERATED {dB0, dB-2},
    ...

}

DeltaTxD-OffsetListPUCCH-v1130 ::=  SEQUENCE {
    deltaTxD-OffsetPUCCH-Format1bCS-r11     ENUMERATED {dB0, dB-1}
}

-- ASN1STOP
```


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UplinkPowerControl field descriptions
accumulationEnabled Parameter: Accumulation-enabled, see TS 36.213 [23, 5.1.1.1, 5.1.3.1]. TRUE corresponds to "enabled" whereas FALSE corresponds to "disabled".
alpha Parameter: *α* See TS 36.213 [23, 5.1.1.1] where al0 corresponds to 0, al04 corresponds to value 0.4, al05 to 0.5, al06 to 0.6, al07 to 0.7, al08 to 0.8, al09 to 0.9 and al1 corresponds to 1. This field applies for uplink power control subframe set 1 if uplink power control subframe sets are configured by *tpc-SubframeSet*.
alpha-SRS Parameter: α_{SRS}. See TS 36.213 [23, 5.1.3.1] where al0 corresponds to 0, al04 corresponds to value 0.4, al05 to 0.5, al06 to 0.6, al07 to 0.7, al08 to 0.8, al09 to 0.9 and al1 corresponds to 1. This field applies for SRS power control on a PUSCH-less SCell.
alpha-SubframeSet2 Parameter: *α*. See TS 36.213 [23, 5.1.1.1] where al0 corresponds to 0, al04 corresponds to value 0.4, al05 to 0.5, al06 to 0.6, al07 to 0.7, al08 to 0.8, al09 to 0.9 and al1 corresponds to 1. This field applies for uplink power control subframe set 2 if uplink power control subframe sets are configured by *tpc-SubframeSet*.
deltaF-PUCCH-FormatX Parameter: $\Delta_{\text{F\_PUCCH}}(F)$ for the PUCCH formats 1, 1b, 2, 2a, 2b, 3, 4, 5 and 1b with channel selection. See TS 36.213 [23, 5.1.2] where deltaF-2 corresponds to -2 dB, deltaF0 corresponds to 0 dB and so on.
deltaMCS-Enabled Parameter: *Ks* See TS 36.213 [23, 5.1.1.1]. en0 corresponds to value 0 corresponding to state "disabled". en1 corresponds to value 1.25 corresponding to "enabled".
deltaPreambleMsg3 Parameter: $\Delta_{PREAMBLE\_Msg3}$ *see* TS 36.213 [23, 5.1.1.1]. Actual value = field value * 2 [dB].
deltaTxD-OffsetPUCCH-FormatX Parameter: $\Delta_{TxD}(F')$ for the PUCCH formats 1, 1a/1b, 1b with channel selection, 2/2a/2b and 3 when two antenna ports are configured for PUCCH transmission. See TS 36.213 [23, 5.1.2.1] where dB0 corresponds to 0 dB, dB-1 corresponds to -1 dB, dB-2 corresponds to -2 dB. EUTRAN configures the field *deltaTxD-OffsetPUCCH-Format1bCS-r11* for the PCell and/or the PSCell only.
filterCoefficient Specifies the filtering coefficient for RSRP measurements used to calculate path loss, as specified in TS 36.213 [23, 5.1.1.1]. The same filtering mechanism applies as for *quantityConfig* described in 5.5.3.2.
p0-Nominal-AperiodicSRS Parameter: $P_{\text{O\_NOMINAL\_SRS,c}}(m)$ where *m*=1. See TS 36.213 [23, 5.1.3.1], unit dBm.
p0-Nominal-PeriodicSRS Parameter: $P_{\text{O\_NOMINAL\_SRS,c}}(m)$ where *m*=0. See TS 36.213 [23, 5.1.3.1], unit dBm.
p0-NominalPUCCH Parameter: $P_{\text{O\_NOMINAL\_PUCCH}}$ See TS 36.213 [23, 5.1.2.1], unit dBm.
p0-NominalPUSCH Parameter: $P_{\text{O\_NOMINAL\_PUSCH}}(1)$ See TS 36.213 [23, 5.1.1.1], unit dBm. This field is applicable for non-persistent scheduling only. This field applies for uplink power control subframe set 1 if uplink power control subframe sets are configured by *tpc-SubframeSet*.
p0-NominalPUSCH-SubframeSet2 Parameter: $P_{\text{O\_NOMINAL\_PUSCH}}(1)$. See TS 36.213 [23, 5.1.1.1], unit dBm. This field is applicable for non-persistent scheduling only. This field applies for uplink power control subframe set 2 if uplink power control subframe sets are configured by *tpc-SubframeSet*.
p0-UE-AperiodicSRS Parameter: $P_{\text{O\_UE\_SRS,c}}(m)$ where *m*=1. See TS 36.213 [23, 5.1.3.1], unit dB.
p0-UE-PeriodicSRS Parameter: $P_{\text{O\_UE\_SRS,c}}(m)$ where *m*=0. See TS 36.213 [23, 5.1.3.1], unit dB.
p0-UE-PUCCH Parameter: $P_{\text{O\_UE\_PUCCH}}$ See TS 36.213 [23, 5.1.2.1]. Unit dB
p0-UE-PUSCH Parameter: $P_{\text{O\_UE\_PUSCH}}(1)$ See TS 36.213 [23, 5.1.1.1], unit dB. This field is applicable for non-persistent scheduling, only. This field applies for uplink power control subframe set 1 if uplink power control subframe sets are configured by *tpc-SubframeSet*.

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UplinkPowerControl field descriptions
p0-UE-PUSCH-SubframeSet2 Parameter: $P_{O\_UE\_PUSCH}(1)$ See TS 36.213 [23, 5.1.1.1], unit dB. This field is applicable for non-persistent scheduling, only. This field applies for uplink power control subframe set 2 if uplink power control subframe sets are configured by *tpc-SubframeSet*.
pathlossReferenceLinking Indicates whether the UE shall apply as pathloss reference either the downlink of the PCell or of the SCell that corresponds with this uplink (i.e. according to the *cellIdentification* within the field *sCellToAddMod*). For SCells part of an STAG E-UTRAN sets the value to sCell.
pSRS-Offset, pSRS-OffsetAp Parameter: P_{SRS_OFFSET} for periodic and aperiodic sounding reference signal transmission repectively. See TS 36.213 [23, 5.1.3.1]. For *Ks*=1.25, the actual parameter value is *pSRS-Offset* value – 3. For *Ks*=0, the actual parameter value is -10.5 + 1.5**pSRS-Offset* value. If *pSRS-Offset-v1130* is included, the UE ignores *pSRS-Offset* (i.e., without suffix). Likewise, if *pSRS-OffsetAp-v1130* is included, the UE ignores *pSRS-OffsetAp-r10*. For *Ks*=0, E-UTRAN does not set values larger than 26.
tpc-SubframeSet Indicates the uplink subframes (including UpPTS in special subframes) of the uplink power control subframe sets. Value 0 means the subframe belongs to uplink power control subframe set 1, and value 1 means the subframe belongs to uplink power control subframe set 2.

– *WLAN-Id-List*

The IE *WLAN-Id-List* is used to list WLAN(s) for configuration of WLAN measurements and WLAN mobility set.

```
-- ASN1START

WLAN-Id-List-r13 ::=                SEQUENCE (SIZE (1..maxWLAN-Id-r13)) OF WLAN-Identifiers-r12

-- ASN1STOP
```

– *WLAN-MobilityConfig*

The IE *WLAN-MobilityConfig* is used for configuration of WLAN mobility set and WLAN Status Reporting. E-UTRAN configures at least one WLAN identifier in the *WLAN-MobilityConfig*.

```
-- ASN1START

WLAN-MobilityConfig-r13 ::=     SEQUENCE {
    wlan-ToReleaseList-r13              WLAN-Id-List-r13            OPTIONAL,   -- Need ON
    wlan-ToAddList-r13                  WLAN-Id-List-r13            OPTIONAL,   -- Need ON
    associationTimer-r13                ENUMERATED {s10, s30,
                                         s60, s120, s240}           OPTIONAL,   -- Need OR
    successReportRequested-r13          ENUMERATED {true}           OPTIONAL,   -- Need OR
    ...,
    [[  wlan-SuspendConfig-r14          WLAN-SuspendConfig-r14      OPTIONAL    -- Need ON
    ]]
}

-- ASN1STOP
```

WLAN-MobilityConfig field descriptions
associationTimer Indicates the maximum time for connection to WLAN before connection failure reporting is initiated. Value s10 means 10 seconds, value s30 means 30 seconds and so on. E-UTRAN includes *associationTimer* only upon change in WLAN mobility set, *lwa-WT-Counter* or *lwip-Counter*.
successReportRequested Indicates whether the UE shall report successful connection to WLAN. Applicable to LWA and LWIP.
wlan-ToAddList Indicates the WLAN identifiers to be added to the WLAN mobility set.
wlan-ToReleaseList Indicates the WLAN identifiers to be removed from the WLAN mobility set.

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6.3.3 Security control information elements

– *NextHopChainingCount*

The IE *NextHopChainingCount* is used to update the K_{eNB} key and corresponds to parameter NCC: See TS 33.401 [32, 7.2.8.4].

***NextHopChainingCount* information element**

```
-- ASN1START

NextHopChainingCount ::=                    INTEGER (0..7)

-- ASN1STOP
```

– *SecurityAlgorithmConfig*

The IE *SecurityAlgorithmConfig* is used to configure AS integrity protection algorithm (SRBs) and AS ciphering algorithm (SRBs and DRBs). For RNs, the IE *SecurityAlgorithmConfig* is also used to configure AS integrity protection algorithm for DRBs between the RN and the E-UTRAN.

***SecurityAlgorithmConfig* information element**

```
-- ASN1START

SecurityAlgorithmConfig ::=         SEQUENCE {
    cipheringAlgorithm                  CipheringAlgorithm-r12,
    integrityProtAlgorithm              ENUMERATED {
                                            eia0-v920, eia1, eia2, eia3-v1130, spare4, spare3,
                                            spare2, spare1, ...}
}

CipheringAlgorithm-r12 ::=              ENUMERATED {
                                            eea0, eea1, eea2, eea3-v1130, spare4, spare3,
                                            spare2, spare1, ...}

-- ASN1STOP
```

***SecurityAlgorithmConfig* field descriptions**
cipheringAlgorithm Indicates the ciphering algorithm to be used for SRBs and DRBs, as specified in TS 33.401 [32, 5.1.3.2].
integrityProtAlgorithm Indicates the integrity protection algorithm to be used for SRBs, as specified in TS 33.401 [32, 5.1.4.2]. For RNs, also indicates the integrity protection algorithm to be used for integrity protection-enabled DRB(s).

– *ShortMAC-I*

The IE *ShortMAC-I* is used to identify and verify the UE at RRC connection re-establishment. The 16 least significant bits of the MAC-I calculated using the security configuration of the source PCell, as specified in 5.3.7.4.

***ShortMAC-I* information element**

```
-- ASN1START

ShortMAC-I ::=                      BIT STRING (SIZE (16))

-- ASN1STOP
```


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6.3.4 Mobility control information elements

– *AdditionalSpectrumEmission*

If an extension is signalled using the extended value range (as defined by IE *AdditionalSpectrumEmission-v10l0*), the corresponding original field, using the value range as defined by IE *AdditionalSpectrumEmission* i.e. without suffix) shall be set to value 32, if signalled. UE supporting an LTE band assigned NS values larger than 32 as defined in TS 36.101 [42, 6.2.4], needs to support extension signaling (as defined by IE *AdditionalSpectrumEmission-v10l0*).

AdditionalSpectrumEmission information element

```
-- ASN1START

AdditionalSpectrumEmission ::=      INTEGER (1..32)

AdditionalSpectrumEmission-v10l0 ::=    INTEGER (33..288)

-- ASN1STOP
```

– *ARFCN-ValueCDMA2000*

The IE *ARFCN-ValueCDMA2000* used to indicate the CDMA2000 carrier frequency within a CDMA2000 band, see C.S0002 [12].

ARFCN-ValueCDMA2000 information element

```
-- ASN1START

ARFCN-ValueCDMA2000 ::=         INTEGER (0..2047)

-- ASN1STOP
```

– *ARFCN-ValueEUTRA*

The IE *ARFCN-ValueEUTRA* is used to indicate the ARFCN applicable for a downlink, uplink or bi-directional (TDD) E-UTRA carrier frequency, as defined in TS 36.101 [42]. If an extension is signalled using the extended value range (as defined by IE *ARFCN-ValueEUTRA-v9e0*), the UE shall only consider this extension (and hence ignore the corresponding original field, using the value range as defined by IE *ARFCN-ValueEUTRA* i.e. without suffix, if signalled). In dedicated signalling, E-UTRAN only provides an EARFCN corresponding to an E-UTRA band supported by the UE.

ARFCN-ValueEUTRA information element

```
-- ASN1START

ARFCN-ValueEUTRA ::=                INTEGER (0..maxEARFCN)

ARFCN-ValueEUTRA-v9e0 ::=           INTEGER (maxEARFCN-Plus1..maxEARFCN2)

ARFCN-ValueEUTRA-r9 ::=             INTEGER (0..maxEARFCN2)

-- ASN1STOP
```

NOTE: For fields using the original value range, as defined by IE *ARFCN-ValueEUTRA* i.e. without suffix, value *maxEARFCN* indicates that the E-UTRA carrier frequency is indicated by means of an extension. In such a case, UEs not supporting the extension consider the field to be set to a not supported value.

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– *ARFCN-ValueGERAN*

The IE *ARFCN-ValueGERAN* is used to specify the ARFCN value applicable for a GERAN BCCH carrier frequency, see TS 45.005 [20].

ARFCN-ValueGERAN information element

```
-- ASN1START

ARFCN-ValueGERAN ::=            INTEGER (0..1023)

-- ASN1STOP
```

– *ARFCN-ValueUTRA*

The IE *ARFCN-ValueUTRA* is used to indicate the ARFCN applicable for a downlink (Nd, FDD) or bi-directional (Nt, TDD) UTRA carrier frequency, as defined in TS 25.331 [19].

ARFCN-ValueUTRA information element

```
-- ASN1START

ARFCN-ValueUTRA ::=                INTEGER (0..16383)

-- ASN1STOP
```

– *BandclassCDMA2000*

The IE *BandclassCDMA2000* is used to define the CDMA2000 band in which the CDMA2000 carrier frequency can be found, as defined in C.S0057 [24, table 1.5-1].

BandclassCDMA2000 information element

```
-- ASN1START

BandclassCDMA2000 ::=                  ENUMERATED {
                                           bc0, bc1, bc2, bc3, bc4, bc5, bc6, bc7, bc8,
                                           bc9, bc10, bc11, bc12, bc13, bc14, bc15, bc16,
                                           bc17, bc18-v9a0, bc19-v9a0, bc20-v9a0, bc21-v9a0,
                                           spare10, spare9, spare8, spare7, spare6, spare5, spare4,
                                           spare3, spare2, spare1, ...}

-- ASN1STOP
```

– *BandIndicatorGERAN*

The IE *BandIndicatorGERAN* indicates how to interpret an associated GERAN carrier ARFCN, see TS 45.005 [20]. More specifically, the IE indicates the GERAN frequency band in case the ARFCN value can concern either a DCS 1800 or a PCS 1900 carrier frequency. For ARFCN values not associated with one of these bands, the indicator has no meaning.

BandIndicatorGERAN information element

```
-- ASN1START

BandIndicatorGERAN ::=          ENUMERATED {dcs1800, pcs1900}

-- ASN1STOP
```

– *CarrierFreqCDMA2000*

The IE *CarrierFreqCDMA2000* used to provide the CDMA2000 carrier information.

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***CarrierFreqCDMA2000* information element**

```
-- ASN1START

CarrierFreqCDMA2000 ::=         SEQUENCE {
    bandClass                           BandclassCDMA2000,
    arfcn                           ARFCN-ValueCDMA2000
}

-- ASN1STOP
```

– *CarrierFreqGERAN*

The IE *CarrierFreqGERAN* is used to provide an unambiguous carrier frequency description of a GERAN cell.

***CarrierFreqGERAN* information element**

```
-- ASN1START

CarrierFreqGERAN ::=            SEQUENCE {
    arfcn                           ARFCN-ValueGERAN,
    bandIndicator                   BandIndicatorGERAN
}

-- ASN1STOP
```

***CarrierFreqGERAN* field descriptions**
arfcn GERAN ARFCN of BCCH carrier.
bandIndicator Indicates how to interpret the ARFCN of the BCCH carrier.

– *CarrierFreqsGERAN*

The IE *CarrierFreqListGERAN* is used to provide one or more GERAN ARFCN values, as defined in TS 45.005 [43], which represents a list of GERAN BCCH carrier frequencies.

***CarrierFreqsGERAN* information element**

```
-- ASN1START

CarrierFreqsGERAN ::=           SEQUENCE {
    startingARFCN                       ARFCN-ValueGERAN,
    bandIndicator                       BandIndicatorGERAN,
    followingARFCNs                     CHOICE {
        explicitListOfARFCNs                ExplicitListOfARFCNs,
        equallySpacedARFCNs                 SEQUENCE {
            arfcn-Spacing                       INTEGER (1..8),
            numberOfFollowingARFCNs             INTEGER (0..31)
        },
        variableBitMapOfARFCNs              OCTET STRING (SIZE (1..16))
    }
}

ExplicitListOfARFCNs ::=            SEQUENCE (SIZE (0..31)) OF ARFCN-ValueGERAN

-- ASN1STOP
```


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***CarrierFreqsGERAN* field descriptions**
arfcn-Spacing Space, d, between a set of equally spaced ARFCN values.
bandIndicator Indicates how to interpret the ARFCN of the BCCH carrier.
explicitListOfARFCNs The remaining ARFCN values in the set are explicitly listed one by one.
followingARFCNs Field containing a representation of the remaining ARFCN values in the set.
numberOfFollowingARFCNs The number, n, of the remaining equally spaced ARFCN values in the set. The complete set of (n+1) ARFCN values is defined as: {s, ((s + d) mod 1024), ((s + 2*d) mod 1024) ... ((s + n*d) mod 1024)}.
startingARFCN The first ARFCN value, s, in the set.
variableBitMapOfARFCNs Bitmap field representing the remaining ARFCN values in the set. The leading bit of the first octet in the bitmap corresponds to the ARFCN = ((s + 1) mod 1024), the next bit to the ARFCN = ((s + 2) mod 1024), and so on. If the bitmap consist of N octets, the trailing bit of octet N corresponds to ARFCN = ((s + 8*N) mod 1024). The complete set of ARFCN values consists of ARFCN = s and the ARFCN values, where the corresponding bit in the bitmap is set to "1".

– *CarrierFreqListMBMS*

The IE *CarrierFreqListMBMS* is used to indicate the E-UTRA ARFCN values of the one or more MBMS frequencies the UE is interested to receive.

CarrierFreqListMBMS information element

```
-- ASN1START

CarrierFreqListMBMS-r11 ::=     SEQUENCE (SIZE (1..maxFreqMBMS-r11)) OF ARFCN-ValueEUTRA-r9

-- ASN1STOP
```

– *CDMA2000-Type*

The IE *CDMA2000-Type* is used to describe the type of CDMA2000 network.

CDMA2000-Type information element

```
-- ASN1START

CDMA2000-Type ::=                   ENUMERATED {type1XRTT, typeHRPD}

-- ASN1STOP
```

– *CellIdentity*

The IE *CellIdentity* is used to unambiguously identify a cell within a PLMN.

CellIdentity information element

```
-- ASN1START

CellIdentity ::=                    BIT STRING (SIZE (28))

-- ASN1STOP
```

– *CellIndexList*

The IE *CellIndexList* concerns a list of cell indices, which may be used for different purposes.

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***CellIndexList* information element**

```
-- ASN1START

CellIndexList ::=                       SEQUENCE (SIZE (1..maxCellMeas)) OF CellIndex

CellIndex ::=                           INTEGER (1..maxCellMeas)

-- ASN1STOP
```

– *CellReselectionPriority*

The IE *CellReselectionPriority* concerns the absolute priority of the concerned carrier frequency/ set of frequencies (GERAN)/ bandclass (CDMA2000), as used by the cell reselection procedure. Corresponds with parameter "priority" in TS 36.304 [4]. Value 0 means: lowest priority. The UE behaviour for the case the field is absent, if applicable, is specified in TS 36.304 [4].

***CellReselectionPriority* information element**

```
-- ASN1START

CellReselectionPriority ::=             INTEGER (0..7)

-- ASN1STOP
```

– *CellSelectionInfoCE*

The IE *CellSelectionInfoCE* contains cell selection information for CE. The *q-RxLevMinCE* corresponds to parameter $Q_{rxlevmin\_CE}$ in TS 36.304 [4]. The *q-QualMinRSRQ-CE* corresponds to parameter $Q_{qualmin\_CE}$ in TS 36.304 [4]. If *q-QualMinRSRQ-CE* is not present, the UE applies the (default) value of negative infinity for $Q_{qualmin}$.

***CellSelectionInfoCE* information element**

```
-- ASN1START

CellSelectionInfoCE-r13 ::=     SEQUENCE {
    q-RxLevMinCE-r13                Q-RxLevMin,
    q-QualMinRSRQ-CE-r13            Q-QualMin-r9                        OPTIONAL    -- Need OR
}

-- ASN1STOP
```

– *CellSelectionInfoCE1*

The IE *CellSelectionInfoCE1* contains cell selection information for BL UEs or UEs in CE supporting CE Mode B. The *q-RxLevMinCE1* corresponds to parameter $Q_{rxlevmin\_CE1}$ in TS 36.304 [4]. If *delta-RxLevMinCE1* is not included, actual value $Q_{rxlevmin\_CE1}$ = *q-RxLevMinCE1* * 2 [dBm]. If *delta-RxLevMinCE1* is included, the actual value $Q_{rxlevmin\_CE1}$ = (*q-RxLevMinCE1* + *delta-RxLevMinCE1*) * 2 [dBm]. The *q-QualMinRSRQ-CE1* corresponds to parameter $Q_{qualmin\_CE1}$ in TS 36.304 [4]. If *q-QualMinRSRQ-CE1* is not present, the UE applies the (default) value of negative infinity for $Q_{qualmin}$.

***CellSelectionInfoCE1* information element**

```
-- ASN1START

CellSelectionInfoCE1-r13 ::=        SEQUENCE {
    q-RxLevMinCE1-r13               Q-RxLevMin,
    q-QualMinRSRQ-CE1-r13           Q-QualMin-r9                        OPTIONAL    -- Need OR
}

CellSelectionInfoCE1-v1360 ::=      SEQUENCE {
    delta-RxLevMinCE1-v1360                 INTEGER (-8..-1)
}
-- ASN1STOP
```


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– *CellReselectionSubPriority*

The IE *CellReselectionSubPriority* indicates a fractional value to be added to the value of cellReselectionPriority to obtain the absolute priority of the concerned carrier frequency for E-UTRA.-Value oDot2 corresponds to 0.2, oDot4 corresponds to 0.4 and so on.

CellReselectionSubPriority information element

```
-- ASN1START

CellReselectionSubPriority-r13 ::=          ENUMERATED {oDot2, oDot4, oDot6, oDot8}

-- ASN1STOP
```

– *CSFB-RegistrationParam1XRTT*

The IE *CSFB-RegistrationParam1XRTT* is used to indicate whether or not the UE shall perform a CDMA2000 1xRTT pre-registration if the UE does not have a valid / current pre-registration.

```
-- ASN1START

CSFB-RegistrationParam1XRTT ::=     SEQUENCE {
    sid                                 BIT STRING (SIZE (15)),
    nid                                 BIT STRING (SIZE (16)),
    multipleSID                         BOOLEAN,
    multipleNID                         BOOLEAN,
    homeReg                             BOOLEAN,
    foreignSIDReg                       BOOLEAN,
    foreignNIDReg                       BOOLEAN,
    parameterReg                        BOOLEAN,
    powerUpReg                          BOOLEAN,
    registrationPeriod                  BIT STRING (SIZE (7)),
    registrationZone                    BIT STRING (SIZE (12)),
    totalZone                           BIT STRING (SIZE (3)),
    zoneTimer                           BIT STRING (SIZE (3))
}

CSFB-RegistrationParam1XRTT-v920 ::=    SEQUENCE {
    powerDownReg-r9                     ENUMERATED {true}
}

-- ASN1STOP
```


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CSFB-RegistrationParam1XRTT field descriptions
foreignNIDReg The CDMA2000 1xRTT NID roamer registration indicator.
foreignSIDReg The CDMA2000 1xRTT SID roamer registration indicator.
homeReg The CDMA2000 1xRTT Home registration indicator.
multipleNID The CDMA2000 1xRTT Multiple NID storage indicator.
multipleSID The CDMA2000 1xRTT Multiple SID storage indicator.
nid Used along with the *sid* as a pair to control when the UE should Register or Re-Register with the CDMA2000 1xRTT network.
parameterReg The CDMA2000 1xRTT Parameter-change registration indicator.
powerDownReg The CDMA2000 1xRTT Power-down registration indicator. If set to TRUE, the UE that has a valid / current CDMA2000 1xRTT pre-registration will perform a CDMA2000 1xRTT power down registration when it is switched off.
powerUpReg The CDMA2000 1xRTT Power-up registration indicator.
registrationPeriod The CDMA2000 1xRTT Registration period.
registrationZone The CDMA2000 1xRTT Registration zone.
sid Used along with the *nid* as a pair to control when the UE should Register or Re-Register with the CDMA2000 1xRTT network.
totalZone The CDMA2000 1xRTT Number of registration zones to be retained.
zoneTimer The CDMA2000 1xRTT Zone timer length.

– *CellGlobalIdEUTRA*

The IE *CellGlobalIdEUTRA* specifies the Evolved Cell Global Identifier (ECGI), the globally unique identity of a cell in E-UTRA.

CellGlobalIdEUTRA information element

```
-- ASN1START

CellGlobalIdEUTRA ::=                   SEQUENCE {
    plmn-Identity                           PLMN-Identity,
    cellIdentity                            CellIdentity
}

-- ASN1STOP
```

CellGlobalIdEUTRA field descriptions
cellIdentity Identity of the cell within the context of the PLMN.
plmn-Identity Identifies the PLMN of the cell as given by the first PLMN entry in the *plmn-IdentityList* in *SystemInformationBlockType1*.

– *CellGlobalIdUTRA*

The IE *CellGlobalIdUTRA* specifies the global UTRAN Cell Identifier, the globally unique identity of a cell in UTRA.

CellGlobalIdUTRA information element

```
-- ASN1START
```


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```
CellGlobalIdUTRA ::=                    SEQUENCE {
    plmn-Identity                           PLMN-Identity,
    cellIdentity                            BIT STRING (SIZE (28))
}

-- ASN1STOP
```

CellGlobalIdUTRA field descriptions
cellIdentity
UTRA Cell Identifier which is unique within the context of the identified PLMN as defined in TS 25.331 [19].
plmn-Identity
Identifies the PLMN of the cell as given by the common PLMN broadcast in the MIB, as defined in TS 25.331 [19].

– *CellGlobalIdGERAN*

The IE *CellGlobalIdGERAN* specifies the Cell Global Identification (CGI), the globally unique identity of a cell in GERAN.

CellGlobalIdGERAN information element

```
-- ASN1START

CellGlobalIdGERAN ::=                   SEQUENCE {
    plmn-Identity                           PLMN-Identity,
    locationAreaCode                        BIT STRING (SIZE (16)),
    cellIdentity                        BIT STRING (SIZE (16))
}

-- ASN1STOP
```

CellGlobalIdGERAN field descriptions
cellIdentity
Cell Identifier which is unique within the context of the GERAN location area as defined in TS 23.003 [27].
locationAreaCode
A fixed length code identifying the location area within a PLMN as defined in TS 23.003 [27].
plmn-Identity
Identifies the PLMN of the cell, as defined in TS 23.003 [27]..

– *CellGlobalIdCDMA2000*

The IE *CellGlobalIdCDMA2000* specifies the Cell Global Identification (CGI), the globally unique identity of a cell in CDMA2000.

CellGlobalIdCDMA2000 information element

```
-- ASN1START

CellGlobalIdCDMA2000 ::=                CHOICE {
    cellGlobalId1XRTT                       BIT STRING (SIZE (47)),
    cellGlobalIdHRPD                        BIT STRING (SIZE (128))
}

-- ASN1STOP
```

CellGlobalIdCDMA2000 field descriptions
cellGlobalId1XRTT
Unique identifier for a CDMA2000 1xRTT cell, corresponds to BASEID, SID and NID parameters (in that order) defined in C.S0005 [25].
cellGlobalIdHRPD
Unique identifier for a CDMA2000 HRPD cell, corresponds to SECTOR ID parameter defined in C.S0024 [26, 14.9].

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– *CellSelectionInfoNFreq*

The IE *CellSelectionInfoNFreq* includes the parameters used for cell selection on a neighbouring frequency, see TS 36.304 [4].

CellSelectionInfoNFreq information element

```
-- ASN1START

CellSelectionInfoNFreq-r13 ::=  SEQUENCE {
    -- Cell selection information as in SIB1
    q-RxLevMin-r13                  Q-RxLevMin,
    q-RxLevMinOffset                    INTEGER (1..8)          OPTIONAL,   -- Need OP
    -- Cell re-selection information as in SIB3
    q-Hyst-r13                          ENUMERATED {
                                            dB0, dB1, dB2, dB3, dB4, dB5, dB6, dB8, dB10,
                                            dB12, dB14, dB16, dB18, dB20, dB22, dB24},
    q-RxLevMinReselection-r13           Q-RxLevMin,
    t-ReselectionEUTRA-r13              T-Reselection
}

-- ASN1STOP
```

– *CSG-Identity*

The IE *CSG-Identity* is used to identify a Closed Subscriber Group.

CSG-Identity information element

```
-- ASN1START

CSG-Identity ::=                    BIT STRING (SIZE (27))

-- ASN1STOP
```

– *FreqBandIndicator*

The IE *FreqBandIndicator* indicates the E-UTRA operating band as defined in TS 36.101 [42, table 5.5-1]. If an extension is signalled using the extended value range (as defined by IE *FreqBandIndicator-v9e0*), the UE shall only consider this extension (and hence ignore the corresponding original field, using the value range as defined by IE *FreqBandIndicator* i.e. without suffix, if signalled).

FreqBandIndicator information element

```
-- ASN1START

FreqBandIndicator ::=                   INTEGER (1..maxFBI)

FreqBandIndicator-v9e0 ::=              INTEGER (maxFBI-Plus1..maxFBI2)

FreqBandIndicator-r11 ::=               INTEGER (1..maxFBI2)

-- ASN1STOP
```

NOTE: For fields using the original value range, as defined by IE *FreqBandIndicator* i.e. without suffix, value *maxFBI* indicates that the frequency band is indicated by means of an extension. In such a case, UEs not supporting the extension consider the field to be set to a not supported value.

– *MobilityControlInfo*

The IE *MobilityControlInfo* includes parameters relevant for network controlled mobility to/within E-UTRA.

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MobilityControlInfo information element

```
-- ASN1START

MobilityControlInfo ::=     SEQUENCE {
    targetPhysCellId                    PhysCellId,
    carrierFreq                         CarrierFreqEUTRA                    OPTIONAL,   -- Cond HO-
toEUTRA2
    carrierBandwidth                    CarrierBandwidthEUTRA               OPTIONAL,   -- Cond HO-
toEUTRA
    additionalSpectrumEmission          AdditionalSpectrumEmission          OPTIONAL,   -- Cond HO-
toEUTRA
    t304                                ENUMERATED {
                                            ms50, ms100, ms150, ms200, ms500, ms1000,
                                            ms2000, ms10000-v1310},
    newUE-Identity                      C-RNTI,
    radioResourceConfigCommon           RadioResourceConfigCommon,
    rach-ConfigDedicated                RACH-ConfigDedicated                OPTIONAL,   -- Need OP
    ...,
    [[  carrierFreq-v9e0                CarrierFreqEUTRA-v9e0               OPTIONAL    -- Need ON
    ]],
    [[  drb-ContinueROHC-r11            ENUMERATED {true}                   OPTIONAL    -- Cond HO
    ]],
    [[  mobilityControlInfoV2X-r14  MobilityControlInfoV2X-r14              OPTIONAL,   -- Need ON
        handoverWithoutWT-Change-r14    ENUMERATED {keepLWA-Config, sendEndMarker}  OPTIONAL,   --
Cond HO
        makeBeforeBreak-r14             ENUMERATED {true}                   OPTIONAL,   -- Need OR
        rach-Skip-r14                   RACH-Skip-r14                       OPTIONAL,   -- Need OR
        sameSFN-Indication-r14          ENUMERATED {true}                   OPTIONAL    -- Cond HO-
SFNsynced
    ]],
    [[
        mib-RepetitionStatus-r14        BOOLEAN                             OPTIONAL,   -- Need OR
        schedulingInfoSIB1-BR-r14       INTEGER (0..31)                     OPTIONAL    -- Cond HO-
SFNsynced
    ]]
}

MobilityControlInfo-v10l0 ::=       SEQUENCE {
    additionalSpectrumEmission-v10l0    AdditionalSpectrumEmission-v10l0    OPTIONAL    -- Need ON
}

MobilityControlInfoSCG-r12 ::=      SEQUENCE {
    t307-r12                            ENUMERATED {
                                            ms50, ms100, ms150, ms200, ms500, ms1000,
                                            ms2000, spare1},
    ue-IdentitySCG-r12                  C-RNTI                          OPTIONAL,   -- Cond SCGEst,
    rach-ConfigDedicated-r12            RACH-ConfigDedicated            OPTIONAL,   -- Need OP
    cipheringAlgorithmSCG-r12       CipheringAlgorithm-r12      OPTIONAL,   -- Need ON
    ...,
    [[  makeBeforeBreakSCG-r14          ENUMERATED {true}               OPTIONAL,   -- Need OR
        rach-SkipSCG-r14                RACH-Skip-r14                   OPTIONAL    -- Need OR
    ]]
}

MobilityControlInfoV2X-r14 ::=  SEQUENCE {
    v2x-CommTxPoolExceptional-r14       SL-CommResourcePoolV2X-r14      OPTIONAL,       -- Need OR
    v2x-CommRxPool-r14                  SL-CommRxPoolListV2X-r14        OPTIONAL,       -- Need OR
    v2x-CommSyncConfig-r14              SL-SyncConfigListV2X-r14        OPTIONAL,       -- Need OR
    cbr-MobilityTxConfigList-r14        SL-CBR-CommonTxConfigList-r14   OPTIONAL        -- Need OR
}

CarrierBandwidthEUTRA ::=           SEQUENCE {
    dl-Bandwidth                        ENUMERATED {
                                                n6, n15, n25, n50, n75, n100, spare10,
                                                spare9, spare8, spare7, spare6, spare5,
                                                spare4, spare3, spare2, spare1},
    ul-Bandwidth                        ENUMERATED {
                                                n6, n15, n25, n50, n75, n100, spare10,
                                                spare9, spare8, spare7, spare6, spare5,
                                                spare4, spare3, spare2, spare1} OPTIONAL -- Need OP
}

CarrierFreqEUTRA ::=                SEQUENCE {
    dl-CarrierFreq                      ARFCN-ValueEUTRA,
    ul-CarrierFreq                      ARFCN-ValueEUTRA                OPTIONAL    -- Cond FDD
}
```


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```
CarrierFreqEUTRA-v9e0 ::=           SEQUENCE {
    dl-CarrierFreq-v9e0                 ARFCN-ValueEUTRA-r9,
    ul-CarrierFreq-v9e0                 ARFCN-ValueEUTRA-r9         OPTIONAL    -- Cond FDD
}

RACH-Skip-r14 ::=                   SEQUENCE {
    targetTA-r14                    CHOICE {
        ta0-r14                         NULL,
        mcg-PTAG-r14                        NULL,
        scg-PTAG-r14                        NULL,
        mcg-STAG-r14                    STAG-Id-r11,
        scg-STAG-r14                    STAG-Id-r11
    },
    ul-ConfigInfo-r14               SEQUENCE {
        numberOfConfUL-Processes-r14            INTEGER (1..8),
        ul-SchedInterval-r14            ENUMERATED {sf2, sf5, sf10},
        ul-StartSubframe-r14            INTEGER (0..9),
        ul-Grant-r14                    BIT STRING (SIZE (16))
    }                                                               OPTIONAL    -- Need OR
}

-- ASN1STOP
```


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***MobilityControlInfo* field descriptions**
additionalSpectrumEmission For a UE with no SCells configured for UL in the same band as the PCell, the UE shall apply the value for the PCell instead of the corresponding value from *SystemInformationBlockType2* or *SystemInformationBlockType1*. For a UE with SCell(s) configured for UL in the same band as the PCell, the UE shall, in case all SCells configured for UL in that band are released after handover completion, apply the value for the PCell instead of the corresponding value from *SystemInformationBlockType2* or *SystemInformationBlockType1*. The UE requirements related to IE *AdditionalSpectrumEmission* are defined in TS 36.101 [42, table 6.2.4-1] for UEs neither in CE nor BL UEs and TS 36.101 [42, table 6.2.4E-1] for UEs in CE or BL UEs.
carrierBandwidth Provides the parameters *Downlink bandwidth*, and *Uplink bandwidth*, see TS 36.101 [42].
carrierFreq Provides the EARFCN to be used by the UE in the target cell.
cbr-MobilityTxConfigList Indicates the list of CBR ranges and the list of PSSCH transmission parameter configurations available to configure congestion control to the UE for V2X sidelink communication during handover.
cipheringAlgorithmSCG Indicates the ciphering algorithm to be used for SCG DRBs. E-UTRAN includes the field upon SCG change when one or more SCG DRBs are configured. Otherwise E-UTRAN does not include the field.
dl-Bandwidth Parameter: *Downlink bandwidth*, see TS 36.101 [42].
drb-ContinueROHC This field indicates whether to continue or reset, for this handover, the header compression protocol context for the RLC UM bearers configured with the header compression protocol. Presence of the field indicates that the header compression protocol context continues while absence indicates that the header compression protocol context is reset. E-UTRAN includes the field only in case of a handover within the same eNB.
handoverWithoutWT-Change Indicates whether UE performs handover where LWA configuration is retained with the same WT If sendEndMarker is configured, the LWA end-marker for PDCP key change indication is used as defined in [8]. If value keepLWA-Config is configured, LWA end marker is not used and UE shall only retain the LWA configuration.
makeBeforeBreak Indicates that the UE shall continue uplink transmission/ downlink reception with the source cell(s) before performing the first transmission through PRACH to the target intra-frequency PCell, or performing initial PUSCH transmission to the target intra-frequency PCell while *rach-Skip* is configured.
makeBeforeBreakSCG Indicates that the UE shall continue uplink transmission/ downlink reception with the source cell(s) before performing the first transmission through PRACH to the target intra-frequency PSCell, or performing initial PUSCH transmission to the target intra-frequency PSCell while *rach-SkipSCG* is configured.
mib-RepetitionStatus Indicates whether additional MIB repetition is enabled in the target cell or not. Value TRUE indicates additional MIB repetition is enabled in the target cell. Value FALSE indicates additional MIB repetition is not enabled in the target cell. The absence of this field indicates additional MIB repetition may or may not be enabled in the target cell. See 5.2.1.2 and TS 36.211 [21, 6.4.1]. This field is applicable to BL UE or UE in CE.
mobilityControlInfoV2X Indicates the sidelink configurations of the target cell for V2X sidelink communication during handover.
numberOfConfUL-Processes The number of configured HARQ processes for preallocated uplink grant, see TS 36.321 [6, 5.20].
rach-ConfigDedicated The dedicated random access parameters. If absent the UE applies contention based random access as specified in TS 36.321 [6].
rach-Skip This field indicates whether random access procedure for the target PCell is skipped.
rach-SkipSCG This field indicates whether random access procedure for the target PSCell is skipped.
sameSFN-Indication This field indicates that the target cell has the same SFN as the source cell and that the BL UE or UE in CE is not required to acquire *MasterInformationBlock* in the target PCell during handover to obtain the SFN of the target cell, as specified in section 5.3.5.4.
schedulingInfoSIB1-BR Indicates the index to the tables that define *SystemInformationBlockType1-BR* scheduling information. The tables are specified in TS 36.213 [23, Table 7.1.6-1 and Table 7.1.7.2.7-1]. Value 0 means *SystemInformationBlockType1-BR* is not scheduled. If absent when *sameSFN-Indication* is present, UE assumes that *SystemInformationBlockType1-BR* scheduling information in target cell may be different from source cell.
t304 Timer T304 as described in section 7.3. ms50 corresponds with 50 ms, ms100 corresponds with 100 ms and so on. EUTRAN includes extended value *ms10000-v1310* only when UE supports CE.

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***MobilityControlInfo* field descriptions**
additionalSpectrumEmission For a UE with no SCells configured for UL in the same band as the PCell, the UE shall apply the value for the PCell instead of the corresponding value from *SystemInformationBlockType2* or *SystemInformationBlockType1*. For a UE with SCell(s) configured for UL in the same band as the PCell, the UE shall, in case all SCells configured for UL in that band are released after handover completion, apply the value for the PCell instead of the corresponding value from *SystemInformationBlockType2* or *SystemInformationBlockType1*. The UE requirements related to IE *AdditionalSpectrumEmission* are defined in TS 36.101 [42, table 6.2.4-1] for UEs neither in CE nor BL UEs and TS 36.101 [42, table 6.2.4E-1] for UEs in CE or BL UEs.
t307 Timer T307 as described in section 7.3. ms50 corresponds with 50 ms, ms100 corresponds with 100 ms and so on.
targetTA This field refers to the timing adjustment indication, see TS 36.213 [23], indicating the N_{TA} value which the UE shall use for the target PTAG of handover or the target PSTAG of SCG change. *ta0* corresponds to N_{TA}=0. *mcg-PTAG* corresponds to the latest N_{TA} value of the PTAG associated with MCG. *scg-PTAG* corresponds to the latest N_{TA} value of the PTAG associated with SCG. *mcg-STAG* corresponds to the latest N_{TA} value of a MCG STAG indicated by the STAG-Id. *scg-STAG* corresponds to the latest N_{TA} value of a SCG STAG indicated by the STAG-Id.
ul-Bandwidth Parameter: *Uplink bandwidth*, see TS 36.101 [42, table 5.6-1]. For TDD, the parameter is absent and it is equal to downlink bandwidth. If absent for FDD, apply the same value as applies for the downlink bandwidth.
ul-Grant Indicates the resources of the target PCell/PSCell to be used for the uplink transmission of PUSCH [23, 8.8].
ul-SchedInterval Indicates the scheduling interval in uplink, see TS 36.321 [6, 5.20]. Value in number of sub-frames. Value sf2 corresponds to 2 subframes, sf5 corresponds to 5 subframes and so on.
ul-StartSubframe Indicates the subframe in which the UE may initiate the uplink transmission, see TS 36.321 [6, 5.20]. Value 0 corresponds to subframe number 0, 1 correponds to subframe number 1 and so on. The subframe indicating a valid uplink grant according to the calculation of UL grant configured by *ul-StartSubframe* and *ul-SchedInterval*, see TS 36.321 [6, 5.20], is the same across all radio frames.
v2x-CommRxPool Indicates reception pools for receiving V2X sidelink communication during handover.
v2x-CommSyncConfig Indicates synchronization configurations for performing V2X sidelink communication during handover.
v2x-CommTxPoolExceptional Indicates the transmission resources by which the UE is allowed to transmit V2X sidelink communication during handover.

Conditional presence	Explanation
FDD	The field is mandatory with default value (the default duplex distance defined for the concerned band, as specified in TS 36.101 [42]) in case of “FDD”; otherwise the field is not present.
HO	This field is optionally present, need OP, in case of handover within E-UTRA when the *fullConfig* is not included; otherwise the field is not present.
HO-SFNsynced	This field is optionally present, need OP, in case of source E-UTRA and target E-UTRA cells are SFN synchronised.
HO-toEUTRA	The field is mandatory present in case of inter-RAT handover to E-UTRA; otherwise the field is optionally present, need ON.
HO-toEUTRA2	The field is absent if *carrierFreq-v9e0* is present. Otherwise it is mandatory present in case of inter-RAT handover to E-UTRA and optionally present, need ON, in all other cases.
SCGEst	This field is mandatory present in case of SCG establishment; otherwise the field is optionally present, need ON.

– *MobilityParametersCDMA2000 (1xRTT)*

The *MobilityParametersCDMA2000* contains the parameters provided to the UE for handover and (enhanced) CSFB to 1xRTT support, as defined in C.S0097 [53].

***MobilityParametersCDMA2000* information element**

```
-- ASN1START

MobilityParametersCDMA2000 ::=          OCTET STRING
```


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```
-- ASN1STOP
```

– MobilityStateParameters

The IE *MobilityStateParameters* contains parameters to determine UE mobility state.

MobilityStateParameters information element

```
-- ASN1START

MobilityStateParameters ::=         SEQUENCE {
    t-Evaluation                        ENUMERATED {
                                            s30, s60, s120, s180, s240, spare3, spare2, spare1},
    t-HystNormal                        ENUMERATED {
                                            s30, s60, s120, s180, s240, spare3, spare2, spare1},
    n-CellChangeMedium                  INTEGER (1..16),
    n-CellChangeHigh                    INTEGER (1..16)
}

-- ASN1STOP
```

***MobilityStateParameters* field descriptions**
n-CellChangeHigh The number of cell changes to enter high mobility state. Corresponds to N_{CR_H} in TS 36.304 [4].
n-CellChangeMedium The number of cell changes to enter medium mobility state. Corresponds to N_{CR_M} in TS 36.304 [4].
t-Evaluation The duration for evaluating criteria to enter mobility states. Corresponds to T_{CRmax} in TS 36.304 [4]. Value in seconds, s30 corresponds to 30 s and so on.
t-HystNormal The additional duration for evaluating criteria to enter normal mobility state. Corresponds to $T_{CRmaxHyst}$ in TS 36.304 [4]. Value in seconds, s30 corresponds to 30 s and so on.

– MultiBandInfoList

MultiBandInfoList information element

```
-- ASN1START

MultiBandInfoList ::=   SEQUENCE (SIZE (1..maxMultiBands)) OF FreqBandIndicator

MultiBandInfoList-v9e0 ::=  SEQUENCE (SIZE (1..maxMultiBands)) OF MultiBandInfo-v9e0

MultiBandInfoList-v10j0 ::= SEQUENCE (SIZE (1..maxMultiBands)) OF NS-PmaxList-r10

MultiBandInfoList-v10l0 ::= SEQUENCE (SIZE (1..maxMultiBands)) OF NS-PmaxList-v10l0

MultiBandInfoList-r11 ::=   SEQUENCE (SIZE (1..maxMultiBands)) OF FreqBandIndicator-r11

MultiBandInfo-v9e0 ::=      SEQUENCE {
    freqBandIndicator-v9e0              FreqBandIndicator-v9e0      OPTIONAL    -- Need OP
}

-- ASN1STOP
```

– NS-PmaxList

The IE *NS-PmaxList* concerns a list of *additionalPmax* and *additionalSpectrumEmission*, as defined in TS 36.101 [42, table 6.2.4-1] for UEs neither in CE nor BL UEs and TS 36.101 [42, table 6.2.4E-1] for UEs in CE or BL UEs, for a given frequency band. E-UTRAN does not include the same value of *additionalSpectrumEmission* in *SystemInformationBlockType2* within this list.

NS-PmaxList information element

```
-- ASN1START
```


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```
NS-PmaxList-r10 ::=             SEQUENCE (SIZE (1..maxNS-Pmax-r10)) OF NS-PmaxValue-r10

NS-PmaxList-v1010 ::=           SEQUENCE (SIZE (1..maxNS-Pmax-r10)) OF NS-PmaxValue-v1010

NS-PmaxValue-r10 ::=            SEQUENCE {
    additionalPmax-r10                  P-Max                           OPTIONAL,   -- Need OP
    additionalSpectrumEmission          AdditionalSpectrumEmission
}

NS-PmaxValue-v1010 ::=          SEQUENCE {
    additionalSpectrumEmission-v1010    AdditionalSpectrumEmission-v1010    OPTIONAL    -- Need OP
}

-- ASN1STOP
```

– *PhysCellId*

The IE *PhysCellId* is used to indicate the physical layer identity of the cell, as defined in TS 36.211 [21].

PhysCellId information element

```
-- ASN1START

PhysCellId ::=                      INTEGER (0..503)

-- ASN1STOP
```

– *PhysCellIdRange*

The IE *PhysCellIdRange* is used to encode either a single or a range of physical cell identities. The range is encoded by using a *start* value and by indicating the number of consecutive physical cell identities (including *start*) in the range. For fields comprising multiple occurrences of *PhysCellIdRange*, E-UTRAN may configure overlapping ranges of physical cell identities.

PhysCellIdRange information element

```
-- ASN1START

PhysCellIdRange ::=             SEQUENCE {
    start                           PhysCellId,
    range                           ENUMERATED {
                                        n4, n8, n12, n16, n24, n32, n48, n64, n84,
                                        n96, n128, n168, n252, n504, spare2,
                                        spare1}                     OPTIONAL    -- Need OP
}

-- ASN1STOP
```

***PhysCellIdRange* field descriptions**
range Indicates the number of physical cell identities in the range (including *start*). Value n4 corresponds with 4, n8 corresponds with 8 and so on. The UE shall apply value 1 in case the field is absent, in which case only the physical cell identity value indicated by *start* applies.
start Indicates the lowest physical cell identity in the range.

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– PhysCellIdRangeUTRA-FDDList

The IE *PhysCellIdRangeUTRA-FDDList* is used to encode one or more of *PhysCellIdRangeUTRA-FDD*. While the IE *PhysCellIdRangeUTRA-FDD* is used to encode either a single physical layer identity or a range of physical layer identities, i.e. primary scrambling codes. Each range is encoded by using a *start* value and by indicating the number of consecutive physical cell identities (including *start*) in the range.

PhysCellIdRangeUTRA-FDDList information element

```
-- ASN1START

PhysCellIdRangeUTRA-FDDList-r9::=       SEQUENCE (SIZE (1..maxPhysCellIdRange-r9)) OF
PhysCellIdRangeUTRA-FDD-r9

PhysCellIdRangeUTRA-FDD-r9 ::=          SEQUENCE {
        start-r9                            PhysCellIdUTRA-FDD,
        range-r9                            INTEGER (2..512)                OPTIONAL    -- Need OP
}

-- ASN1STOP
```

PhysCellIdRangeUTRA-FDDList field descriptions
range   Indicates the number of primary scrambling codes in the range (including *start*). The UE shall apply value 1 in case the field is absent, in which case only the primary scrambling code value indicated by *start* applies.
start   Indicates the lowest primary scrambling code in the range.

– PhysCellIdCDMA2000

The IE *PhysCellIdCDMA2000* identifies the PNOffset that represents the "Physical cell identity" in CDMA2000.

PhysCellIdCDMA2000 information element

```
-- ASN1START

PhysCellIdCDMA2000 ::=          INTEGER (0..maxPNOffset)

-- ASN1STOP
```

– PhysCellIdGERAN

The IE *PhysCellIdGERAN* contains the Base Station Identity Code (BSIC).

PhysCellIdGERAN information element

```
-- ASN1START

PhysCellIdGERAN ::=             SEQUENCE {
    networkColourCode                   BIT STRING (SIZE (3)),
    baseStationColourCode               BIT STRING (SIZE (3))
}

-- ASN1STOP
```

PhysCellIdGERAN field descriptions
baseStationColourCode   Base station Colour Code as defined in TS 23.003 [27].
networkColourCode   Network Colour Code as defined in TS 23.003 [27].

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– PhysCellIdUTRA-FDD

The IE *PhysCellIdUTRA-FDD* is used to indicate the physical layer identity of the cell, i.e. the primary scrambling code, as defined in TS 25.331 [19].

PhysCellIdUTRA-FDD information element

```
-- ASN1START

PhysCellIdUTRA-FDD ::=              INTEGER (0..511)

-- ASN1STOP
```

– PhysCellIdUTRA-TDD

The IE *PhysCellIdUTRA-TDD* is used to indicate the physical layer identity of the cell, i.e. the cell parameters ID (TDD), as specified in TS 25.331 [19]. Also corresponds to the Initial Cell Parameter Assignment in TS 25.223 [46].

PhysCellIdUTRA-TDD information element

```
-- ASN1START

PhysCellIdUTRA-TDD ::=              INTEGER (0..127)

-- ASN1STOP
```

– PLMN-Identity

The IE *PLMN-Identity* identifies a Public Land Mobile Network. Further information regarding how to set the IE are specified in TS 23.003 [27].

PLMN-Identity information element

```
-- ASN1START

PLMN-Identity ::=                   SEQUENCE {
    mcc                                 MCC                 OPTIONAL,                   -- Cond MCC
    mnc                                 MNC
}

MCC ::=                             SEQUENCE (SIZE (3)) OF
                                            MCC-MNC-Digit

MNC ::=                             SEQUENCE (SIZE (2..3)) OF
                                            MCC-MNC-Digit

MCC-MNC-Digit ::=                   INTEGER (0..9)


-- ASN1STOP
```

***PLMN-Identity* field descriptions**
mcc The first element contains the first MCC digit, the second element the second MCC digit and so on. If the field is absent, it takes the same value as the mcc of the immediately preceding IE PLMN-Identity. See TS 23.003 [27].
mnc The first element contains the first MNC digit, the second element the second MNC digit and so on. See TS 23.003 [27].

Conditional presence	Explanation
MCC	This IE is mandatory when *PLMN-Identity* is included in *CellGlobalIdEUTRA*, in *CellGlobalIdUTRA,* in *CellGlobalIdGERAN* or in *RegisteredMME*. This IE is also mandatory in the first occurrence of the IE *PLMN-Identity* within the IE *PLMN-IdentityList*. Otherwise it is optional, need OP.

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– *PLMN-IdentityList3*

Includes a list of PLMN identities.

PLMN-IdentityList3 information element

```
-- ASN1START

PLMN-IdentityList3-r11 ::=              SEQUENCE (SIZE (1..16)) OF PLMN-Identity

-- ASN1STOP
```

– *PreRegistrationInfoHRPD*

```
-- ASN1START

PreRegistrationInfoHRPD ::=         SEQUENCE {
    preRegistrationAllowed              BOOLEAN,
    preRegistrationZoneId               PreRegistrationZoneIdHRPD   OPTIONAL, -- cond PreRegAllowed
    secondaryPreRegistrationZoneIdList  SecondaryPreRegistrationZoneIdListHRPD  OPTIONAL -- Need OR
}

SecondaryPreRegistrationZoneIdListHRPD ::=  SEQUENCE (SIZE (1..2)) OF PreRegistrationZoneIdHRPD

PreRegistrationZoneIdHRPD ::=           INTEGER (0..255)

-- ASN1STOP
```

***PreRegistrationInfoHRPD* field descriptions**
preRegistrationAllowed TRUE indicates that a UE shall perform a CDMA2000 HRPD pre-registration if the UE does not have a valid / current pre-registration. FALSE indicates that the UE is not allowed to perform CDMA2000 HRPD pre-registration in the current cell.
preRegistrationZoneID ColorCode (see C.S0024 [26], C.S0087 [44]) of the CDMA2000 Reference Cell corresponding to the HRPD sector under the HRPD AN that is configured for this LTE cell. It is used to control when the UE should register or re-register.
secondaryPreRegistrationZoneIdList List of SecondaryColorCodes (see C.S0024 [26], C.S0087 [44]) of the CDMA2000 Reference Cell corresponding to the HRPD sector under the HRPD AN that is configured for this LTE cell. They are used to control when the UE should re-register.

Conditional presence	Explanation
PreRegAllowed	The field is mandatory in case the *preRegistrationAllowed* is set to *true.* Otherwise the field is not present and the UE shall delete any existing value for this field.

– *Q-QualMin*

The IE *Q-QualMin* is used to indicate for cell selection/ re-selection the required minimum received RSRQ level in the (E-UTRA) cell. Corresponds to parameter $Q_{qualmin}$ in TS 36.304 [4]. Actual value $Q_{qualmin}$ = field value [dB].

Q-QualMin information element

```
-- ASN1START

Q-QualMin-r9 ::=                    INTEGER (-34..-3)

-- ASN1STOP
```

– *Q-RxLevMin*

The IE *Q-RxLevMin* is used to indicate for cell selection/ re-selection the required minimum received RSRP level in the (E-UTRA) cell. Corresponds to parameter $Q_{rxlevmin}$ in TS 36.304 [4]. Actual value $Q_{rxlevmin}$ = field value * 2 [dBm].

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Q-RxLevMin information element

```
-- ASN1START

Q-RxLevMin ::=                      INTEGER (-70..-22)

-- ASN1STOP
```

– *Q-OffsetRange*

The IE *Q-OffsetRange* is used to indicate a cell, CSI-RS resource or frequency specific offset to be applied when evaluating candidates for cell re-selection or when evaluating triggering conditions for measurement reporting. The value in dB. Value dB-24 corresponds to -24 dB, dB-22 corresponds to -22 dB and so on.

Q-OffsetRange information element

```
-- ASN1START

Q-OffsetRange ::=                       ENUMERATED {
                                                dB-24, dB-22, dB-20, dB-18, dB-16, dB-14,
                                                dB-12, dB-10, dB-8, dB-6, dB-5, dB-4, dB-3,
                                                dB-2, dB-1, dB0, dB1, dB2, dB3, dB4, dB5,
                                                dB6, dB8, dB10, dB12, dB14, dB16, dB18,
                                                dB20, dB22, dB24}

-- ASN1STOP
```

– *Q-OffsetRangeInterRAT*

The IE *Q-OffsetRangeInterRAT* is used to indicate a frequency specific offset to be applied when evaluating triggering conditions for measurement reporting. The value in dB.

Q-OffsetRangeInterRAT information element

```
-- ASN1START

Q-OffsetRangeInterRAT ::=                   INTEGER (-15..15)

-- ASN1STOP
```

– *ReselectionThreshold*

The IE *ReselectionThreshold* is used to indicate an Rx level threshold for cell reselection. Actual value of threshold = field value * 2 [dB].

ReselectionThreshold information element

```
-- ASN1START

ReselectionThreshold ::=                INTEGER (0..31)

-- ASN1STOP
```

– *ReselectionThresholdQ*

The IE *ReselectionThresholdQ* is used to indicate a quality level threshold for cell reselection. Actual value of threshold = field value [dB].

ReselectionThresholdQ information element

```
-- ASN1START

ReselectionThresholdQ-r9 ::=            INTEGER (0..31)
```


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```
-- ASN1STOP
```

– SCellIndex

The IE *SCellIndex* concerns a short identity, used to identify an SCell.

SCellIndex information element

```
-- ASN1START

SCellIndex-r10 ::=                      INTEGER (1..7)
SCellIndex-r13 ::=                      INTEGER (1..31)

-- ASN1STOP
```

– ServCellIndex

The IE *ServCellIndex* concerns a short identity, used to identify a serving cell (i.e. the PCell or an SCell). Value 0 applies for the PCell, while the *SCellIndex* that has previously been assigned applies for SCells.

ServCellIndex information element

```
-- ASN1START

ServCellIndex-r10 ::=                   INTEGER (0..7)
ServCellIndex-r13 ::=                INTEGER (0..31)

-- ASN1STOP
```

– SpeedStateScaleFactors

The IE *SpeedStateScaleFactors* concerns factors, to be applied when the UE is in medium or high speed state, used for scaling a mobility control related parameter.

SpeedStateScaleFactors information element

```
-- ASN1START

SpeedStateScaleFactors ::=          SEQUENCE {
    sf-Medium                           ENUMERATED {oDot25, oDot5, oDot75, lDot0},
    sf-High                             ENUMERATED {oDot25, oDot5, oDot75, lDot0}
}
-- ASN1STOP
```

SpeedStateScaleFactors field descriptions
sf-High The concerned mobility control related parameter is multiplied with this factor if the UE is in High Mobility state as defined in TS 36.304 [4]. Value oDot25 corresponds to 0.25, oDot5 corresponds to 0.5, oDot75 corresponds to 0.75 and so on.
sf-Medium The concerned mobility control related parameter is multiplied with this factor if the UE is in Medium Mobility state as defined in TS 36.304 [4]. Value oDot25 corresponds to 0.25, oDot5 corresponds to 0.5, oDot75 corresponds to 0.75 and so on.

– SystemInfoListGERAN

The IE *SystemInfoListGERAN* contains system information of a GERAN cell.

SystemInfoListGERAN information element

```
-- ASN1START
```


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```
SystemInfoListGERAN ::=             SEQUENCE (SIZE (1..maxGERAN-SI)) OF
                                        OCTET STRING (SIZE (1..23))

-- ASN1STOP
```

***SystemInfoListGERAN* field descriptions**
SystemInfoListGERAN
Each OCTET STRING contains one System Information (SI) message as defined in TS 44.018 [45, table 9.1.1] excluding the L2 Pseudo Length, the RR management Protocol Discriminator and the Skip Indicator or a complete Packet System Information (PSI) message as defined in TS 44.060 [36, table 11.2.1].

– *SystemTimeInfoCDMA2000*

The IE *SystemTimeInfoCDMA2000* informs the UE about the absolute time in the current cell. The UE uses this absolute time knowledge to derive the CDMA2000 Physical cell identity, expressed as PNOffset, of neighbour CDMA2000 cells.

NOTE: The UE needs the CDMA2000 system time with a certain level of accuracy for performing measurements as well as for communicating with the CDMA2000 network (HRPD or 1xRTT).

***SystemTimeInfoCDMA2000* information element**

```
-- ASN1START

SystemTimeInfoCDMA2000 ::=          SEQUENCE {
    cdma-EUTRA-Synchronisation          BOOLEAN,
    cdma-SystemTime                     CHOICE {
        synchronousSystemTime               BIT STRING (SIZE (39)),
        asynchronousSystemTime              BIT STRING (SIZE (49))
    }
}

-- ASN1STOP
```

***SystemTimeInfoCDMA2000* field descriptions**
asynchronousSystemTime
The CDMA2000 system time corresponding to the SFN boundary at or after the ending boundary of the SI-Window in which *SystemInformationBlockType8* is transmitted. E-UTRAN includes this field if the E-UTRA frame boundary is not aligned to the start of CDMA2000 system time. This field size is 49 bits and the unit is 8 CDMA chips based on 1.2288 Mcps.
cdma-EUTRA-Synchronisation
TRUE indicates that there is no drift in the timing between E-UTRA and CDMA2000. FALSE indicates that the timing between E-UTRA and CDMA2000 can drift. NOTE 1
synchronousSystemTime
CDMA2000 system time corresponding to the SFN boundary at or after the ending boundary of the SI-window in which *SystemInformationBlockType8* is transmitted. E-UTRAN includes this field if the E-UTRA frame boundary is aligned to the start of CDMA2000 system time. This field size is 39 bits and the unit is 10 ms based on a 1.2288 Mcps chip rate.

NOTE 1: The following table shows the recommended combinations of the *cdma-EUTRA-Synchronisation* field and the choice of cdma-SystemTime included by E-UTRAN for FDD and TDD:

FDD/TDD	*cdma-EUTRA-Synchronisation*	*synchronousSystemTime*	*asynchronousSystemTime*
FDD	FALSE	Not Recommended	Recommended
FDD	TRUE	Recommended	Recommended
TDD	FALSE	Not Recommended	Recommended
TDD	TRUE	Recommended	Recommended

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– *TrackingAreaCode*

The IE *TrackingAreaCode* is used to identify a tracking area within the scope of a PLMN, see TS 24.301 [35].

TrackingAreaCode information element

```
-- ASN1START

TrackingAreaCode ::=                BIT STRING (SIZE (16))

-- ASN1STOP
```

– *T-Reselection*

The IE *T-Reselection* concerns the cell reselection timer $Treselection_{RAT}$ for E-UTRA, UTRA, GERAN or CDMA2000. Value in seconds. For value 0, behaviour as specified in 7.3.2 applies.

T-Reselection information element

```
-- ASN1START

T-Reselection ::=                   INTEGER (0..7)

-- ASN1STOP
```

– *T-ReselectionEUTRA-CE*

The IE *T-ReselectionEUTRA-CE* concerns the cell reselection timer $Treselection_{EUTRA\_CE}$ as specified in TS 36.304 [4]. Value in seconds. For value 0, behaviour as specified in 7.3.2 applies.

T-ReselectionEUTRA-CE information element

```
-- ASN1START

T-ReselectionEUTRA-CE-r13 ::=               INTEGER (0..15)

-- ASN1STOP
```

6.3.5 Measurement information elements

– *AllowedMeasBandwidth*

The IE *AllowedMeasBandwidth* is used to indicate the maximum allowed measurement bandwidth on a carrier frequency as defined by the parameter Transmission Bandwidth Configuration "N_{RB}" TS 36.104 [47]. The values mbw6, mbw15, mbw25, mbw50, mbw75, mbw100 indicate 6, 15, 25, 50, 75 and 100 resource blocks respectively.

AllowedMeasBandwidth information element

```
-- ASN1START

AllowedMeasBandwidth ::=                ENUMERATED {mbw6, mbw15, mbw25, mbw50, mbw75, mbw100}

-- ASN1STOP
```

– *CSI-RSRP-Range*

The IE *CSI-RSRP-Range* specifies the value range used in CSI-RSRP measurements and thresholds. Integer value for CSI-RSRP measurements according to mapping table in TS 36.133 [16].

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CSI-RSRP-Range information element

```
-- ASN1START

CSI-RSRP-Range-r12 ::=                      INTEGER(0..97)

-- ASN1STOP
```

– *Hysteresis*

The IE *Hysteresis* is a parameter used within the entry and leave condition of an event triggered reporting condition. The actual value is field value * 0.5 dB.

Hysteresis information element

```
-- ASN1START

Hysteresis ::=                          INTEGER (0..30)

-- ASN1STOP
```

– *LocationInfo*

The IE *LocationInfo* is used to transfer detailed location information available at the UE to correlate measurements and UE position information.

LocationInfo information element

```
-- ASN1START

LocationInfo-r10 ::=    SEQUENCE {
    locationCoordinates-r10                 CHOICE {
        ellipsoid-Point-r10                     OCTET STRING,
        ellipsoidPointWithAltitude-r10          OCTET STRING,
    ...,
        ellipsoidPointWithUncertaintyCircle-r11                 OCTET STRING,
        ellipsoidPointWithUncertaintyEllipse-r11                OCTET STRING,
        ellipsoidPointWithAltitudeAndUncertaintyEllipsoid-r11   OCTET STRING,
        ellipsoidArc-r11                                        OCTET STRING,
        polygon-r11                                             OCTET STRING
    },
    horizontalVelocity-r10                  OCTET STRING                OPTIONAL,
    gnss-TOD-msec-r10                       OCTET STRING                OPTIONAL,
    ...
}

-- ASN1STOP
```


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LocationInfo field descriptions
ellipsoidArc Parameter *EllipsoidArc* defined in TS36.355 [54]. The first/leftmost bit of the first octet contains the most significant bit.
ellipsoid-Point Parameter *Ellipsoid-Point* defined in TS36.355 [54]. The first/leftmost bit of the first octet contains the most significant bit.
ellipsoidPointWithAltitude Parameter *EllipsoidPointWithAltitude* defined in TS36.355 [54]. The first/leftmost bit of the first octet contains the most significant bit.
ellipsoidPointWithAltitudeAndUncertaintyEllipsoid Parameter *EllipsoidPointWithAltitudeAndUncertaintyEllipsoid* defined in TS36.355 [54]. The first/leftmost bit of the first octet contains the most significant bit.
ellipsoidPointWithUncertaintyCircle Parameter *Ellipsoid-PointWithUncertaintyCircle* defined in TS36.355 [54]. The first/leftmost bit of the first octet contains the most significant bit.
ellipsoidPointWithUncertaintyEllipse Parameter *EllipsoidPointWithUncertaintyEllipse* defined in TS36.355 [54]. The first/leftmost bit of the first octet contains the most significant bit.
gnss-TOD-msec Parameter *Gnss-TOD-msec* defined in TS36.355 [54]. The first/leftmost bit of the first octet contains the most significant bit.
horizontalVelocity Parameter *HorizontalVelocity* defined in TS36.355 [54]. The first/leftmost bit of the first octet contains the most significant bit.
polygon Parameter *Polygon* defined in TS36.355 [54]. The first/leftmost bit of the first octet contains the most significant bit.

– *MBSFN-RSRQ-Range*

The IE *MBSFN-RSRQ-Range* specifies the value range used in MBSFN RSRQ measurements. Integer value for MBSFN RSRQ measurements according to mapping table in TS 36.133 [16].

MBSFN-RSRQ-Range information element

```
-- ASN1START

MBSFN-RSRQ-Range-r12 ::=                INTEGER(0..31)
-- ASN1STOP
```

– *MeasConfig*

The IE *MeasConfig* specifies measurements to be performed by the UE, and covers intra-frequency, inter-frequency and inter-RAT mobility as well as configuration of measurement gaps.

MeasConfig information element

```
-- ASN1START

MeasConfig ::=                      SEQUENCE {
    -- Measurement objects
    measObjectToRemoveList              MeasObjectToRemoveList              OPTIONAL,   -- Need ON
    measObjectToAddModList              MeasObjectToAddModList              OPTIONAL,   -- Need ON
    -- Reporting configurations
    reportConfigToRemoveList            ReportConfigToRemoveList            OPTIONAL,   -- Need ON
    reportConfigToAddModList            ReportConfigToAddModList            OPTIONAL,   -- Need ON
    -- Measurement identities
    measIdToRemoveList                  MeasIdToRemoveList                  OPTIONAL,   -- Need ON
    measIdToAddModList                  MeasIdToAddModList                  OPTIONAL,   -- Need ON
    -- Other parameters
    quantityConfig                      QuantityConfig                      OPTIONAL,   -- Need ON
    measGapConfig                       MeasGapConfig                       OPTIONAL,   -- Need ON
    s-Measure                           RSRP-Range                          OPTIONAL,   -- Need ON
    preRegistrationInfoHRPD             PreRegistrationInfoHRPD             OPTIONAL,   -- Need OP
    speedStatePars          CHOICE {
        release                             NULL,
        setup                               SEQUENCE {
            mobilityStateParameters             MobilityStateParameters,
```


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```
            timeToTrigger-SF                    SpeedStateScaleFactors
        }
    }                                                                       OPTIONAL,   -- Need ON
    ...,
    [[  measObjectToAddModList-v9e0         MeasObjectToAddModList-v9e0     OPTIONAL    -- Need ON
    ]],
    [[  allowInterruptions-r11              BOOLEAN                         OPTIONAL    -- Need ON
    ]],
    [[  measScaleFactor-r12         CHOICE {
            release                     NULL,
            setup                       MeasScaleFactor-r12
        }                                                           OPTIONAL,   -- Need ON
        measIdToRemoveListExt-r12           MeasIdToRemoveListExt-r12       OPTIONAL,   -- Need ON
        measIdToAddModListExt-r12           MeasIdToAddModListExt-r12       OPTIONAL,   -- Need ON
        measRSRQ-OnAllSymbols-r12       BOOLEAN                         OPTIONAL    -- Need ON
    ]],
    [[
        measObjectToRemoveListExt-r13       MeasObjectToRemoveListExt-r13   OPTIONAL,   -- Need ON
        measObjectToAddModListExt-r13       MeasObjectToAddModListExt-r13   OPTIONAL,   -- Need ON
        measIdToAddModList-v1310            MeasIdToAddModList-v1310        OPTIONAL,   -- Need ON
        measIdToAddModListExt-v1310         MeasIdToAddModListExt-v1310     OPTIONAL    -- Need ON
    ]],
    [[  measGapConfigPerCC-List-r14         MeasGapConfigPerCC-List-r14     OPTIONAL,   -- Need ON
        measGapSharingConfig-r14            MeasGapSharingConfig-r14        OPTIONAL    -- Need ON
    ]]
}

MeasIdToRemoveList ::=              SEQUENCE (SIZE (1..maxMeasId)) OF MeasId

MeasIdToRemoveListExt-r12 ::=       SEQUENCE (SIZE (1..maxMeasId)) OF MeasId-v1250

MeasObjectToRemoveList ::=          SEQUENCE (SIZE (1..maxObjectId)) OF MeasObjectId

MeasObjectToRemoveListExt-r13 ::=   SEQUENCE (SIZE (1..maxObjectId)) OF MeasObjectId-v1310

ReportConfigToRemoveList ::=        SEQUENCE (SIZE (1..maxReportConfigId)) OF ReportConfigId

-- ASN1STOP
```


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MeasConfig field descriptions
allowInterruptions Value TRUE indicates that the UE is allowed to cause interruptions to serving cells when performing measurements of deactivated SCell carriers for *measCycleSCell* of less than 640ms, as specified in TS 36.133 [16]. E-UTRAN enables this field only when an SCell is configured.
measGapConfig Used to setup and release measurement gaps. E-UTRAN includes either *measGapConfig* or *measGapConfigPerCC-List*, if any.
measGapConfigPerCC-List Used to setup and release serving cell sepecific measurement gaps. E-UTRAN includes either *measGapConfig* or *measGapConfigPerCC*-List, if any.
measGapSharingConfig Used to setup and release measurement gap sharing for intra- and inter-frequency measurement for BL UEs.
measIdToAddModList List of measurement identities. Field *measIdToAddModListExt* includes additional measurement identities i.e. extends the size of the measurement identity list using the general principles specified in 5.1.2. If E-UTRAN includes *measIdToAddModList-v1310* it includes the same number of entries, and listed in the same order, as in *measIdToAddModList* (i.e. without suffix). If E-UTRAN includes *measIdToAddModListExt-v1310,* it includes the same number of entries, and listed in the same order, as in *measIdToAddModListExt-r12.*
measIdToRemoveList List of measurement identities to remove. Field *measIdToRemoveListExt* includes additional measurement identities i.e. extends the size of the measurement identity list using the general principles specified in 5.1.2.
measObjectToAddModList If E-UTRAN includes *measObjectToAddModList-v9e0* it includes the same number of entries, and listed in the same order, as in *measObjectToAddModList* (i.e. without suffix). Field *measObjectToAddModListExt* includes additional measurement object identities i.e. extends the size of the measurement object identity list using the general principles specified in 5.1.2.
measObjectToRemoveList List of measurement objects to remove. Field *measObjectToRemoveListExt* includes additional measurement object identities i.e. extends the size of the measurement object identity list using the general principles specified in 5.1.2.
measRSRQ-OnAllSymbols Value *TRUE* indicates that the UE shall, when performing RSRQ measurements, perform RSRQ measurement on all OFDM symbols in accordance with TS 36.214 [48]. If *widebandRSRQ-Meas* is enabled for the frequency in *MeasObjectEUTRA,* the UE shall, when performing RSRQ measurements, perform RSRQ measurement on all OFDM symbols with wider bandwidth for concerned frequency in accordance with TS 36.214 [48].
measScaleFactor Even if *reducedMeasPerformance* is not included in any *measObjectEUTRA* or *measObjectUTRA*, E-UTRAN may configure this field. The UE behavior is specified in TS 36.133 [16].
preRegistrationInfoHRPD The CDMA2000 HRPD Pre-Registration Information tells the UE if it should pre-register with the CDMA2000 HRPD network and identifies the Pre-registration zone to the UE.
reportConfigToRemoveList List of measurement reporting configurations to remove.
s-Measure PCell quality threshold controlling whether or not the UE is required to perform measurements of intra-frequency, inter-frequency and inter-RAT neighbouring cells. Value “0” indicates to disable *s-Measure*.
timeToTrigger-SF The *timeToTrigger* in *ReportConfigEUTRA* and in *ReportConfigInterRAT* are multiplied with the scaling factor applicable for the UE’s speed state.

– *MeasDS-Config*

The IE *MeasDS-Config* specifies information applicable for discovery signals measurement.

MeasDS-Config information elements

```
-- ASN1START

MeasDS-Config-r12 ::=           CHOICE {
    release                         NULL,
    setup                           SEQUENCE {
        dmtc-PeriodOffset-r12           CHOICE {
            ms40-r12                        INTEGER(0..39),
            ms80-r12                        INTEGER(0..79),
            ms160-r12                       INTEGER(0..159),
            ...
        },
```


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```
        ds-OccasionDuration-r12     CHOICE {
            durationFDD-r12                 INTEGER(1..maxDS-Duration-r12),
            durationTDD-r12                 INTEGER(2..maxDS-Duration-r12)
        },
        measCSI-RS-ToRemoveList-r12 MeasCSI-RS-ToRemoveList-r12 OPTIONAL,   -- Need ON
        measCSI-RS-ToAddModList-r12 MeasCSI-RS-ToAddModList-r12 OPTIONAL,   -- Need ON
        ...
    }
}

MeasCSI-RS-ToRemoveList-r12 ::= SEQUENCE (SIZE (1..maxCSI-RS-Meas-r12)) OF MeasCSI-RS-Id-r12

MeasCSI-RS-ToAddModList-r12 ::= SEQUENCE (SIZE (1..maxCSI-RS-Meas-r12)) OF MeasCSI-RS-Config-r12

MeasCSI-RS-Id-r12 ::=           INTEGER (1..maxCSI-RS-Meas-r12)

MeasCSI-RS-Config-r12 ::=       SEQUENCE {
    measCSI-RS-Id-r12               MeasCSI-RS-Id-r12,
    physCellId-r12                  INTEGER (0..503),
    scramblingIdentity-r12          INTEGER (0..503),
    resourceConfig-r12              INTEGER (0..31),
    subframeOffset-r12              INTEGER (0..4),
    csi-RS-IndividualOffset-r12     Q-OffsetRange,
    ...
}

-- ASN1STOP
```

***MeasDS-Config* field descriptions**
csi-RS-IndividualOffset CSI-RS individual offset applicable to a specific CSI-RS resource. Value dB-24 corresponds to -24 dB, dB-22 corresponds to -22 dB and so on.
dmtc-PeriodOffset Indicates the discovery signals measurement timing configuration (DMTC) periodicity (*dmtc-Periodicity*) and offset (*dmtc-Offset*) for this frequency. For DMTC periodicity, value ms40 corresponds to 40ms, ms80 corresponds to 80ms and so on. The value of DMTC offset is in number of subframe(s). The duration of a DMTC occasion is 6ms.
ds-OccasionDuration Indicates the duration of discovery signal occasion for this frequency. Discovery signal occasion duration is common for all cells transmitting discovery signals on one frequency. If the *carrierFreq* in the measurement object is on an unlicensed band as specified in [42], the UE shall ignore the field *ds-OccasionDuration* for the carrier frequency and apply a value 1 instead.
measCSI-RS-ToAddModList List of CSI-RS resources to add/ modify in the CSI-RS resource list for discovery signals measurement.
measCSI-RS-ToRemoveList List of CSI-RS resources to remove from the CSI-RS resource list for discovery signals measurement.
physCellId Indicates the physical cell identity where UE may assume that the CSI-RS and the PSS/SSS/CRS corresponding to the indicated physical cell identity are quasi co-located with respect to average delay and doppler shift.
resourceConfig Parameter: CSI reference signal configuration, see TS 36.211 [21, table 6.10.5.2-1 and 6.10.5.2-2]. If the *carrierFreq* in the measurement object is on an unlicensed band as specified in [42], E-UTRAN does not configure the values {0, 4, 5, 9, 10, 11, 18, 19}.
scramblingIdentity Parameter: Pseudo-random sequence generator parameter, n_{ID}, see TS 36.213 [23, 7.2.5].
subframeOffset Indicates the subframe offset between SSS of the cell indicated by physCellId and the CSI-RS resource in a discovery signal occasion. The field *subframeOffset* is set to values 0 if the *carrierFreq* in the measurement object is on an unlicensed band as specified in [42].

– *MeasGapConfig*

The IE *MeasGapConfig* specifies the measurement gap configuration and controls setup/ release of measurement gaps.

***MeasGapConfig* information element**

```
-- ASN1START
```


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```
MeasGapConfig ::=                   CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        gapOffset                           CHOICE {
                gp0                                 INTEGER (0..39),
                gp1                                 INTEGER (0..79),

                ...,
                gp2-r14                             INTEGER (0..39),
                gp3-r14                             INTEGER (0..79),
                gp-ncsg0-r14                        INTEGER (0..39),
                gp-ncsg1-r14                        INTEGER (0..79),
                gp-ncsg2-r14                        INTEGER (0..39),
                gp-ncsg3-r14                        INTEGER (0..79),
                gp-nonUniform1-r14                  INTEGER (0..1279),
                gp-nonUniform2-r14                  INTEGER (0..2559),
                gp-nonUniform3-r14                  INTEGER (0..5119),
                gp-nonUniform4-r14                  INTEGER (0..10239)
        }
    }
}


-- ASN1STOP
```

***MeasGapConfig* field descriptions**
gapOffset Value *gapOffset* of *gp0* corresponds to gap offset of Gap Pattern Id "0" with MGRP = 40ms, *gapOffset* of *gp1* corresponds to gap offset of Gap Pattern Id "1" with MGRP = 80ms, *gapOffset* of *gp2* corresponds to gap offset of Gap Pattern Id "2" with MGRP = 40ms and MGL = 3ms, *gapOffset* of *gp3* Gap Pattern Id "3" with MGRP = 80ms and MGL = 3ms, *gapOffset* of *gp-ncsg0* corresponds to gap offset of NCSG Pattern Id "0" with VIRP = 40ms and ML = 4ms, *gapOffset* of *gp-ncsg1* corresponds to gap offset of of NCSG Pattern Id "1" with VIRP = 80ms and ML = 4ms, *gapOffset* of *gp-ncsg2* corresponds to gap offset of NCSG Pattern Id "2" with VIRP = 40ms and ML = 3ms, *gapOffset* of *gp-ncsg3* corresponds to gap offset of of NCSG Pattern Id "3" with VIRP = 80ms and ML =3ms. *gapOffset* of *gp-nonUniform1* corresponds to gap offset of non uniform gap pattern Id "1" with LMGRP = 1280ms, *gapOffset* of *gp-nonUniform2* corresponds to gap offset of non uniform gap pattern Id "2" with LMGRP = 2560ms, *gapOffset* of *gp-nonUniform3* corresponds to gap offset of non uniform gap pattern Id "3" with LMGRP = 5120ms, *gapOffset* of *gp-nonUniform4* corresponds to gap offset of non uniform gap pattern Id "4" with LMGRP = 10240ms. Also used to specify the measurement gap pattern to be applied, as defined in TS 36.133 [16]. For Gap Patterns (including non-uniform gap patterns, but excluding NCSG patterns), E-UTRAN includes the same *gapOffset* value (gap pattern id and gap offset) for all serving cells that are configured with a Gap Pattern. For NCSG Patterns, E-UTRAN includes *gapOffset* value indicating VIRP and gap offset consistent with the Gap Pattern configuration (MGRP and gap offset).
servCellId Identifies the serving cell for which measurement gap configuration is provided (setup) or deleted (release).

– *MeasGapConfigPerCC-List*

The IE *MeasGapConfigPerCC-List* specifies the measurement gap configuration and controls setup/ release of measurement gaps.

***MeasGapConfigPerCC-List* information element**

```
-- ASN1START

MeasGapConfigPerCC-List-r14 ::= CHOICE {
    release                     NULL,
    setup                       SEQUENCE {
        measGapConfigToRemoveList-r14   MeasGapConfigToRemoveList-r14   OPTIONAL,   -- Need ON
        measGapConfigToAddModList-r14   MeasGapConfigToAddModList-r14   OPTIONAL    -- Need ON
    }
}

MeasGapConfigToRemoveList-r14 ::=   SEQUENCE (SIZE (1..maxServCell-r13)) OF ServCellIndex-r13

MeasGapConfigToAddModList-r14 ::=   SEQUENCE (SIZE (1..maxServCell-r13)) OF MeasGapConfigPerCC-r14

MeasGapConfigPerCC-r14 ::=  SEQUENCE {
    servCellId-r14              ServCellIndex-r13,
    measGapConfigCC-r14         MeasGapConfig
}
```


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```
-- ASN1STOP
```

MeasGapConfigPerCC-List field descriptions
measGapConfigToAddModList List of serving cells and corresponding serving cell specific measurement gap configuration to add /modify.
measGapConfigToRemoveList List of serving cells for which measurement gap configuration is removed.

– *MeasGapSharingConfig*

The IE *MeasGapSharingConfig* specifies the measurement gap sharing scheme and controls setup/ release of measurement gap sharing.

MeasGapSharingConfig information element

```
-- ASN1START

MeasGapSharingConfig-r14 ::=            CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        measGapSharingScheme-r14                ENUMERATED {scheme00, scheme01, scheme10, scheme11}

    }
}

-- ASN1STOP
```

MeasGapSharingConfig field descriptions
measGapSharingScheme Indicates the measurement gaps sharing scheme for BL UEs in CE mode A and CE mode B, see TS 36.133 [16, Table 8.13.2.1.1.1-2 and Table 8.13.3.1.1.1-3]. Value *scheme00* corresponds to “00”, value *scheme01* corresponds to “01”, and so on.

– *MeasId*

The IE *MeasId* is used to identify a measurement configuration, i.e., linking of a measurement object and a reporting configuration.

MeasId information element

```
-- ASN1START

MeasId ::=                          INTEGER (1..maxMeasId)

MeasId-v1250 ::=                    INTEGER (maxMeasId-Plus1..maxMeasId-r12)

-- ASN1STOP
```

– *MeasIdToAddModList*

The IE *MeasIdToAddModList* concerns a list of measurement identities to add or modify, with for each entry the *measId*, the associated *measObjectId* and the associated *reportConfigId*. Field *measIdToAddModListExt* includes additional measurement identities i.e. extends the size of the measurement identity list using the general principles specified in 5.1.2.

MeasIdToAddModList information element

```
-- ASN1START

MeasIdToAddModList ::=              SEQUENCE (SIZE (1..maxMeasId)) OF MeasIdToAddMod

MeasIdToAddModList-v1310 ::=        SEQUENCE (SIZE (1..maxMeasId)) OF MeasIdToAddMod-v1310
```


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```
MeasIdToAddModListExt-r12 ::=       SEQUENCE (SIZE (1..maxMeasId)) OF MeasIdToAddModExt-r12

MeasIdToAddModListExt-v1310 ::=     SEQUENCE (SIZE (1..maxMeasId)) OF MeasIdToAddMod-v1310

MeasIdToAddMod ::=  SEQUENCE {
    measId                              MeasId,
    measObjectId                        MeasObjectId,
    reportConfigId                      ReportConfigId
}

MeasIdToAddModExt-r12 ::=   SEQUENCE {
    measId-v1250                        MeasId-v1250,
    measObjectId-r12                    MeasObjectId,
    reportConfigId-r12                  ReportConfigId
}

MeasIdToAddMod-v1310 ::=    SEQUENCE {
    measObjectId-v1310          MeasObjectId-v1310      OPTIONAL
}

-- ASN1STOP
```

***MeasIdToAddModList* field descriptions**
measObjectId
If the *measObjectId-v1310* is included, the *measObjectId* or *measObjectId-r12* is ignored by the UE.

– *MeasObjectCDMA2000*

The IE *MeasObjectCDMA2000* specifies information applicable for inter-RAT CDMA2000 neighbouring cells.

***MeasObjectCDMA2000* information element**

```
-- ASN1START

MeasObjectCDMA2000 ::=              SEQUENCE {
    cdma2000-Type                       CDMA2000-Type,
    carrierFreq                         CarrierFreqCDMA2000,
    searchWindowSize                    INTEGER (0..15)                     OPTIONAL,   -- Need ON
    offsetFreq                          Q-OffsetRangeInterRAT               DEFAULT 0,
    cellsToRemoveList                   CellIndexList                       OPTIONAL,   -- Need ON
    cellsToAddModList                   CellsToAddModListCDMA2000           OPTIONAL,   -- Need ON
    cellForWhichToReportCGI             PhysCellIdCDMA2000                  OPTIONAL,   -- Need ON
    ...
}

CellsToAddModListCDMA2000 ::=       SEQUENCE (SIZE (1..maxCellMeas)) OF CellsToAddModCDMA2000

CellsToAddModCDMA2000 ::=   SEQUENCE {
    cellIndex                           INTEGER (1..maxCellMeas),
    physCellId                          PhysCellIdCDMA2000
}

-- ASN1STOP
```


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MeasObjectCDMA2000 field descriptions
carrierInfo Identifies CDMA2000 carrier frequency for which this configuration is valid.
cdma2000-Type The type of CDMA2000 network: CDMA2000 1xRTT or CDMA2000 HRPD.
cellIndex Entry index in the neighbouring cell list.
cellsToAddModList List of cells to add/ modify in the neighbouring cell list.
cellsToRemoveList List of cells to remove from the neighbouring cell list.
physCellId CDMA2000 Physical cell identity of a cell in neighbouring cell list expressed as PNOffset.
searchWindowSize Provides the search window size to be used by the UE for the neighbouring pilot, see C.S0005 [25].

– *MeasObjectEUTRA*

The IE *MeasObjectEUTRA* specifies information applicable for intra-frequency or inter-frequency E-UTRA cells.

MeasObjectEUTRA information element

```
-- ASN1START

MeasObjectEUTRA ::=                 SEQUENCE {
    carrierFreq                         ARFCN-ValueEUTRA,
    allowedMeasBandwidth                AllowedMeasBandwidth,
    presenceAntennaPort1                PresenceAntennaPort1,
    neighCellConfig                     NeighCellConfig,
    offsetFreq                          Q-OffsetRange               DEFAULT dB0,
    -- Cell list
    cellsToRemoveList                   CellIndexList               OPTIONAL,       -- Need ON
    cellsToAddModList                   CellsToAddModList           OPTIONAL,       -- Need ON
    -- Black list
    blackCellsToRemoveList              CellIndexList               OPTIONAL,       -- Need ON
    blackCellsToAddModList              BlackCellsToAddModList      OPTIONAL,       -- Need ON
    cellForWhichToReportCGI             PhysCellId                  OPTIONAL,       -- Need ON
    ...,
    [[measCycleSCell-r10                MeasCycleSCell-r10      OPTIONAL,       -- Need ON
        measSubframePatternConfigNeigh-r10  MeasSubframePatternConfigNeigh-r10  OPTIONAL
                -- Need ON
    ]],
    [[widebandRSRQ-Meas-r11             BOOLEAN OPTIONAL        -- Cond WB-RSRQ
    ]],
    [[  altTTT-CellsToRemoveList-r12    CellIndexList               OPTIONAL,       -- Need ON
        altTTT-CellsToAddModList-r12    AltTTT-CellsToAddModList-r12    OPTIONAL,       -- Need ON
        t312-r12                        CHOICE {
            release                         NULL,
            setup                           ENUMERATED {ms0, ms50, ms100, ms200,
                                             ms300, ms400, ms500, ms1000}
        }                                                       OPTIONAL,       -- Need ON
        reducedMeasPerformance-r12      BOOLEAN                     OPTIONAL,       -- Need ON
        measDS-Config-r12               MeasDS-Config-r12           OPTIONAL        -- Need ON
    ]],
    [[
        whiteCellsToRemoveList-r13      CellIndexList               OPTIONAL,       -- Need ON
        whiteCellsToAddModList-r13      WhiteCellsToAddModList-r13  OPTIONAL,       -- Need ON
        rmtc-Config-r13             RMTC-Config-r13         OPTIONAL,       -- Need ON
        carrierFreq-r13                 ARFCN-ValueEUTRA-v9e0       OPTIONAL            -- Need ON
    ]],
    [[
        tx-ResourcePoolToRemoveList-r14 Tx-ResourcePoolMeasList-r14     OPTIONAL,   -- Need ON
        tx-ResourcePoolToAddList-r14    Tx-ResourcePoolMeasList-r14     OPTIONAL,   -- Need ON
        fembms-MixedCarrier-r14             BOOLEAN                 OPTIONAL            -- Need ON
    ]]
}

MeasObjectEUTRA-v9e0 ::=            SEQUENCE {
    carrierFreq-v9e0                    ARFCN-ValueEUTRA-v9e0
}

CellsToAddModList ::=               SEQUENCE (SIZE (1..maxCellMeas)) OF CellsToAddMod
```


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```
CellsToAddMod ::=   SEQUENCE {
    cellIndex                           INTEGER (1..maxCellMeas),
    physCellId                          PhysCellId,
    cellIndividualOffset                Q-OffsetRange
}

BlackCellsToAddModList ::=          SEQUENCE (SIZE (1..maxCellMeas)) OF BlackCellsToAddMod

BlackCellsToAddMod ::=  SEQUENCE {
    cellIndex                           INTEGER (1..maxCellMeas),
    physCellIdRange                     PhysCellIdRange
}

MeasCycleSCell-r10 ::=              ENUMERATED {sf160, sf256, sf320, sf512,
                                                sf640, sf1024, sf1280, spare1}

MeasSubframePatternConfigNeigh-r10 ::=  CHOICE {
    release                                 NULL,
    setup                                   SEQUENCE {
        measSubframePatternNeigh-r10            MeasSubframePattern-r10,
        measSubframeCellList-r10                MeasSubframeCellList-r10    OPTIONAL    -- Cond
always
    }
}

MeasSubframeCellList-r10 ::=    SEQUENCE (SIZE (1..maxCellMeas)) OF PhysCellIdRange

AltTTT-CellsToAddModList-r12 ::=    SEQUENCE (SIZE (1..maxCellMeas)) OF AltTTT-CellsToAddMod-r12

AltTTT-CellsToAddMod-r12 ::=    SEQUENCE {
    cellIndex-r12                           INTEGER (1..maxCellMeas),
    physCellIdRange-r12                     PhysCellIdRange
}

WhiteCellsToAddModList-r13 ::=          SEQUENCE (SIZE (1..maxCellMeas)) OF WhiteCellsToAddMod-r13

WhiteCellsToAddMod-r13 ::=  SEQUENCE {
    cellIndex-r13                           INTEGER (1..maxCellMeas),
    physCellIdRange-r13                     PhysCellIdRange
}

RMTC-Config-r13 ::= CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        rmtc-Period-r13                 ENUMERATED {ms40, ms80, ms160, ms320, ms640},
        rmtc-SubframeOffset-r13         INTEGER(0..639)                 OPTIONAL,       -- Need ON
        measDuration-r13                ENUMERATED {sym1, sym14, sym28, sym42, sym70},
        ...
    }
}

Tx-ResourcePoolMeasList-r14 ::= SEQUENCE (SIZE (1..maxSL-PoolToMeasure-r14)) OF SL-V2X-
TxPoolReportIdentity-r14

-- ASN1STOP
```


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MeasObjectEUTRA field descriptions
altTTT-CellsToAddModList List of cells to add/ modify in the cell list for which the alternative time to trigger specified by *alternativeTimeToTrigger* in *reportConfigEUTRA*, if configured, applies.
altTTT-CellsToRemoveList List of cells to remove from the list of cells for alternative time to trigger.
blackCellsToAddModList List of cells to add/ modify in the black list of cells.
blackCellsToRemoveList List of cells to remove from the black list of cells.
carrierFreq Identifies E-UTRA carrier frequency for which this configuration is valid. E-UTRAN does not configure more than one measurement object for the same physical frequency regardless of the E-ARFCN used to indicate this. CarrierFreq-r13 is included only when the extension list measObjectToAddModListExt-r13 is used. If *carrierFreq-r13* is present, *carrierFreq* (i.e., without suffix) shall be set to value *maxEARFCN*.
cellIndex Entry index in the cell list. An entry may concern a range of cells, in which case this value applies to the entire range.
cellIndividualOffset Cell individual offset applicable to a specific cell. Value dB-24 corresponds to -24 dB, dB-22 corresponds to -22 dB and so on.
cellsToAddModList List of cells to add/ modify in the cell list.
cellsToRemoveList List of cells to remove from the cell list.
fembms-MixedCarrier If this field is set to *TRUE*, the cells on the carrier frequency indicated by the *measObject* are FeMBMS/Unicast-mixed cells.
measCycleSCell The parameter is used only when an SCell is configured on the frequency indicated by the *measObject* and is in deactivated state, see TS 36.133 [16, 8.3.3]. E-UTRAN configures the parameter whenever an SCell is configured on the frequency indicated by the *measObject*, but the field may also be signalled when an SCell is not configured. Value *sf160* corresponds to 160 sub-frames, *sf256* corresponds to 256 sub-frames and so on.
measDS-Config Parameters applicable to discovery signals measurement on the carrier frequency indicated by *carrierFreq*.
measDuration Number of consecutive symbols for which the Physical Layer reports samples of RSSI, see TS 36.214 [48]. Value *sym1* corresponds to one symbol, *sym14* corresponds to 14 symbols, and so on.
measSubframeCellList List of cells for which *measSubframePatternNeigh* is applied.
measSubframePatternNeigh Time domain measurement resource restriction pattern applicable to neighbour cell RSRP and RSRQ measurements on the carrier frequency indicated by *carrierFreq*. For cells in *measSubframeCellList* the UE shall assume that the subframes indicated by *measSubframePatternNeigh* are non-MBSFN subframes, and have the same special subframe configuration as PCell.
offsetFreq Offset value applicable to the carrier frequency. Value dB-24 corresponds to -24 dB, dB-22 corresponds to -22 dB and so on.
physCellId Physical cell identity of a cell in the cell list.
physCellIdRange Physical cell identity or a range of physical cell identities.
reducedMeasPerformance If set to *TRUE*, the EUTRA carrier frequency is configured for reduced measurement performance, otherwise it is configured for normal measurement performance, see TS 36.133 [16].
rmtc-Config Parameters applicable to RSSI and channel occupancy measurement on the carrier frequency indicated by *carrierFreq*.
rmtc-Period Indicates the RSSI measurement timing configuration (RMTC) periodicity for this frequency. Value *ms40* corresponds to 40 ms periodicity, *ms80* corresponds to 80 ms periodicity and so on, see TS 36.214 [48].
rmtc-SubframeOffset Indicates the RSSI measurement timing configuration (RMTC) subframe offset for this frequency. The value of *rmtc-SubframeOffset* should be smaller than the value of *rmtc-Period*, see TS 36.214 [48]. For inter-frequency measurements, this field is optional present and if it is not configured, the UE chooses a random value as *rmtc-SubframeOffset* for *measDuration* which shall be selected to be between 0 and the configured *rmtc-Period* with equal probability.

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***MeasObjectEUTRA* field descriptions**
t312 The value of timer T312. Value ms0 represents 0 ms, ms50 represents 50 ms and so on.
tx-ResourcePoolToAddList List of transmission pools identities to be added to the list of pools configured for CBR measurements and for which *poolReportId* is included in *SL-V2X-ConfigDedicated* or *SystemInformationBlockType21*.
t***x-ResourcePoolToRemoveList*** List of transmission resource pools identities to be removed from the list of pools configured for CBR measurements and for which *poolReportId* is included in *SL-V2X-ConfigDedicated* or *SystemInformationBlockType21*.
widebandRSRQ-Meas If this field is set to TRUE, the UE shall, when performing RSRQ measurements, use a wider bandwidth in accordance with TS 36.133 [16].
whiteCellsToAddModList List of cells to add/modify in the white list of cells.
whiteCellsToRemoveList List of cells to remove from the white list of cells.

Conditional presence	Explanation
always	The field is mandatory present.
WB-RSRQ	The field is optionally present, need ON, if the measurement bandwidth indicated by *allowedMeasBandwidth* is 50 resource blocks or larger; otherwise it is not present and the UE shall delete any existing value for this field, if configured.

– *MeasObjectGERAN*

The IE *MeasObjectGERAN* specifies information applicable for inter-RAT GERAN neighbouring frequencies.

***MeasObjectGERAN* information element**

```
-- ASN1START

MeasObjectGERAN ::=                 SEQUENCE {
    carrierFreqs                        CarrierFreqsGERAN,
    offsetFreq                          Q-OffsetRangeInterRAT       DEFAULT 0,
    ncc-Permitted                       BIT STRING(SIZE (8))        DEFAULT '11111111'B,
    cellForWhichToReportCGI             PhysCellIdGERAN             OPTIONAL,   -- Need ON
    ...
}

-- ASN1STOP
```

***MeasObjectGERAN* field descriptions**
ncc-Permitted Field encoded as a bit map, where bit N is set to "0" if a BCCH carrier with NCC = N-1 is not permitted for monitoring and set to "1" if a BCCH carrier with NCC = N-1 is permitted for monitoring; N = 1 to 8; bit 1 of the bitmap is the leading bit of the bit string.
carrierFreqs If E-UTRAN includes *cellForWhichToReportCGI*, it includes only one GERAN ARFCN value in *carrierFreqs*.

– *MeasObjectId*

The IE *MeasObjectId* used to identify a measurement object configuration.

***MeasObjectId* information element**

```
-- ASN1START

MeasObjectId ::=                    INTEGER (1..maxObjectId)

MeasObjectId-v1310 ::=          INTEGER (maxObjectId-Plus1-r13..maxObjectId-r13)

MeasObjectId-r13 ::=                INTEGER (1..maxObjectId-r13)

-- ASN1STOP
```


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– *MeasObjectToAddModList*

The IE *MeasObjectToAddModList* concerns a list of measurement objects to add or modify

MeasObjectToAddModList information element

```
-- ASN1START

MeasObjectToAddModList ::=          SEQUENCE (SIZE (1..maxObjectId)) OF MeasObjectToAddMod

MeasObjectToAddModListExt-r13 ::=   SEQUENCE (SIZE (1..maxObjectId)) OF MeasObjectToAddModExt-r13

MeasObjectToAddModList-v9e0 ::=     SEQUENCE (SIZE (1..maxObjectId)) OF MeasObjectToAddMod-v9e0

MeasObjectToAddMod ::=  SEQUENCE {
    measObjectId                        MeasObjectId,
    measObject                          CHOICE {
        measObjectEUTRA                     MeasObjectEUTRA,
        measObjectUTRA                      MeasObjectUTRA,
        measObjectGERAN                     MeasObjectGERAN,
        measObjectCDMA2000                  MeasObjectCDMA2000,
        ...,
        measObjectWLAN-r13                  MeasObjectWLAN-r13
    }
}

MeasObjectToAddModExt-r13 ::=   SEQUENCE {
    measObjectId-r13                    MeasObjectId-v1310,
    measObject-r13                          CHOICE {
        measObjectEUTRA-r13                 MeasObjectEUTRA,
        measObjectUTRA-r13                  MeasObjectUTRA,
        measObjectGERAN-r13                 MeasObjectGERAN,
        measObjectCDMA2000-r13              MeasObjectCDMA2000,
        ...,
        measObjectWLAN-v1320                MeasObjectWLAN-r13
    }
}

MeasObjectToAddMod-v9e0 ::= SEQUENCE {
    measObjectEUTRA-v9e0                MeasObjectEUTRA-v9e0        OPTIONAL    -- Cond eutra
}

-- ASN1STOP
```

Conditional presence	Explanation
eutra	The field is optional present, need OR, if for the corresponding entry in *MeasObjectToAddModList* or *MeasObjectToAddModListExt-r13* field *measObject* is set to *measObjectEUTRA* and its sub-field *carrierFreq* is set to *maxEARFCN*. Otherwise the field is not present and the UE shall delete any existing value for this field.

– *MeasObjectUTRA*

The IE *MeasObjectUTRA* specifies information applicable for inter-RAT UTRA neighbouring cells.

MeasObjectUTRA information element

```
-- ASN1START

MeasObjectUTRA ::=                  SEQUENCE {
    carrierFreq                         ARFCN-ValueUTRA,
    offsetFreq                          Q-OffsetRangeInterRAT       DEFAULT 0,
    cellsToRemoveList                   CellIndexList               OPTIONAL,           -- Need ON
    cellsToAddModList                   CHOICE {
        cellsToAddModListUTRA-FDD           CellsToAddModListUTRA-FDD,
        cellsToAddModListUTRA-TDD           CellsToAddModListUTRA-TDD
    }                                                               OPTIONAL,           -- Need ON
    cellForWhichToReportCGI             CHOICE {
        utra-FDD                            PhysCellIdUTRA-FDD,
        utra-TDD                            PhysCellIdUTRA-TDD
```


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```
    }                                                                   OPTIONAL,   -- Need ON
    ...,
    [[  csg-allowedReportingCells-v930          CSG-AllowedReportingCells-r9    OPTIONAL        --
Need ON
    ]],
    [[  reducedMeasPerformance-r12              BOOLEAN             OPTIONAL        -- Need ON
    ]]
}

CellsToAddModListUTRA-FDD ::=       SEQUENCE (SIZE (1..maxCellMeas)) OF CellsToAddModUTRA-FDD

CellsToAddModUTRA-FDD ::=   SEQUENCE {
    cellIndex                           INTEGER (1..maxCellMeas),
    physCellId                          PhysCellIdUTRA-FDD
}

CellsToAddModListUTRA-TDD ::=       SEQUENCE (SIZE (1..maxCellMeas)) OF CellsToAddModUTRA-TDD

CellsToAddModUTRA-TDD ::=   SEQUENCE {
    cellIndex                           INTEGER (1..maxCellMeas),
    physCellId                          PhysCellIdUTRA-TDD
}

CSG-AllowedReportingCells-r9 ::=        SEQUENCE {
    physCellIdRangeUTRA-FDDList-r9          PhysCellIdRangeUTRA-FDDList-r9  OPTIONAL    -- Need OR
}
-- ASN1STOP
```

***MeasObjectUTRA* field descriptions**
carrierFreq Identifies UTRA carrier frequency for which this configuration is valid. E-UTRAN does not configure more than one measurement object for the same physical frequency regardless of the ARFCN used to indicate this.
cellIndex Entry index in the neighbouring cell list.
cellsToAddModListUTRA-FDD List of UTRA FDD cells to add/ modify in the neighbouring cell list.
cellsToAddModListUTRA-TDD List of UTRA TDD cells to add/modify in the neighbouring cell list.
cellsToRemoveList List of cells to remove from the neighbouring cell list.
csg-allowedReportingCells One or more ranges of physical cell identities for which UTRA-FDD reporting is allowed.
reducedMeasPerformance If set to *TRUE* the UTRA carrier frequency is configured for reduced measurement performance, otherwise it is configured for normal measurement performance, see TS 36.133 [16].

– *MeasObjectWLAN*

The IE *MeasObjectWLAN* specifies information applicable for inter-RAT WLAN measurements. E-UTRAN configures at least one WLAN identifier in the *MeasObjectWLAN*.

```
-- ASN1START

MeasObjectWLAN-r13 ::=  SEQUENCE {
    carrierFreq-r13                 CHOICE {
        bandIndicatorListWLAN-r13       SEQUENCE (SIZE (1..maxWLAN-Bands-r13)) OF WLAN-
BandIndicator-r13,
        carrierInfoListWLAN-r13         SEQUENCE (SIZE (1..maxWLAN-CarrierInfo-r13)) OF WLAN-
CarrierInfo-r13
    }       OPTIONAL,   -- Need ON
    wlan-ToAddModList-r13               WLAN-Id-List-r13            OPTIONAL,   -- Need ON
    wlan-ToRemoveList-r13               WLAN-Id-List-r13            OPTIONAL,   -- Need ON
    ...
}

WLAN-BandIndicator-r13 ::=  ENUMERATED {band2dot4, band5, band60-v1430, spare5, spare4, spare3,
spare2, spare1, ...}

-- ASN1STOP
```


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MeasObjectWLAN field descriptions
bandIndicatorListWLAN Includes the list of WLAN bands. Value band2dot4 indicates the 2.4GHz band, value band5 indicates the 5GHz band and value band60 indicates the 60GHz band.
carrierInfoListWLAN Includes the list of WLAN carrier information for the measurement object.
wlan-ToAddModList Includes the list of WLAN identifiers to be added to the measurement configuration.
wlan-ToRemoveList Includes the list of WLAN identifiers to be removed from the measurement configuration.

– *MeasResults*

The IE *MeasResults* covers measured results for intra-frequency, inter-frequency and inter- RAT mobility.

MeasResults information element

```
-- ASN1START

MeasResults ::=                     SEQUENCE {
    measId                              MeasId,
    measResultPCell                 SEQUENCE {
        rsrpResult                          RSRP-Range,
        rsrqResult                          RSRQ-Range
    },
    measResultNeighCells                CHOICE {
        measResultListEUTRA                 MeasResultListEUTRA,
        measResultListUTRA                  MeasResultListUTRA,
        measResultListGERAN                 MeasResultListGERAN,
        measResultsCDMA2000                 MeasResultsCDMA2000,
        ...
    }                                                                   OPTIONAL,
    ...,
    [[  measResultForECID-r9                MeasResultForECID-r9        OPTIONAL
    ]],
    [[  locationInfo-r10                    LocationInfo-r10            OPTIONAL,
        measResultServFreqList-r10          MeasResultServFreqList-r10  OPTIONAL
    ]],
    [[  measId-v1250                        MeasId-v1250                OPTIONAL,
        measResultPCell-v1250               RSRQ-Range-v1250            OPTIONAL,
        measResultCSI-RS-List-r12           MeasResultCSI-RS-List-r12   OPTIONAL
    ]],
    [[  measResultForRSSI-r13               MeasResultForRSSI-r13       OPTIONAL,
        measResultServFreqListExt-r13       MeasResultServFreqListExt-r13 OPTIONAL,
        measResultSSTD-r13                  MeasResultSSTD-r13          OPTIONAL,
        measResultPCell-v1310               SEQUENCE {
            rs-sinr-Result-r13                  RS-SINR-Range-r13
        }                                                               OPTIONAL,
        ul-PDCP-DelayResultList-r13         UL-PDCP-DelayResultList-r13 OPTIONAL,
        measResultListWLAN-r13              MeasResultListWLAN-r13      OPTIONAL
    ]],
    [[  measResultPCell-v1360               RSRP-Range-v1360            OPTIONAL
    ]],
    [[  measResultListCBR-r14               MeasResultListCBR-r14       OPTIONAL,
        measResultListWLAN-r14              MeasResultListWLAN-r14      OPTIONAL
    ]]
}

MeasResultListEUTRA ::=             SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultEUTRA

MeasResultEUTRA ::= SEQUENCE {
    physCellId                          PhysCellId,
    cgi-Info                            SEQUENCE {
        cellGlobalId                        CellGlobalIdEUTRA,
        trackingAreaCode                    TrackingAreaCode,
        plmn-IdentityList                   PLMN-IdentityList2          OPTIONAL
    }                                                           OPTIONAL,
    measResult                          SEQUENCE {
        rsrpResult                          RSRP-Range                  OPTIONAL,
        rsrqResult                          RSRQ-Range                  OPTIONAL,
        ...,
        [[  additionalSI-Info-r9                AdditionalSI-Info-r9    OPTIONAL
        ]],
```


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```
        [[  primaryPLMN-Suitable-r12            ENUMERATED {true}           OPTIONAL,
            measResult-v1250                    RSRQ-Range-v1250            OPTIONAL
        ]],
        [[  rs-sinr-Result-r13                  RS-SINR-Range-r13           OPTIONAL,
            cgi-Info-v1310                      SEQUENCE {
                freqBandIndicator-r13               FreqBandIndicator-r11       OPTIONAL,
                multiBandInfoList-r13               MultiBandInfoList-r11       OPTIONAL,
                freqBandIndicatorPriority-r13       ENUMERATED {true}           OPTIONAL
            }                                                                   OPTIONAL
        ]],
        [[
            measResult-v1360                    RSRP-Range-v1360                    OPTIONAL
        ]]
    }
}

MeasResultServFreqList-r10 ::=  SEQUENCE (SIZE (1..maxServCell-r10)) OF MeasResultServFreq-r10

MeasResultServFreqListExt-r13 ::=   SEQUENCE (SIZE (1..maxServCell-r13)) OF MeasResultServFreq-r13

MeasResultServFreq-r10 ::=          SEQUENCE {
    servFreqId-r10                      ServCellIndex-r10,
    measResultSCell-r10                 SEQUENCE {
        rsrpResultSCell-r10                 RSRP-Range,
        rsrqResultSCell-r10                 RSRQ-Range
    }                                                           OPTIONAL,
    measResultBestNeighCell-r10         SEQUENCE {
        physCellId-r10                      PhysCellId,
        rsrpResultNCell-r10                 RSRP-Range,
        rsrqResultNCell-r10                 RSRQ-Range
    }                                                           OPTIONAL,
    ...,
    [[  measResultSCell-v1250               RSRQ-Range-v1250    OPTIONAL,
        measResultBestNeighCell-v1250       RSRQ-Range-v1250    OPTIONAL
    ]],
    [[  measResultSCell-v1310               SEQUENCE {
            rs-sinr-Result-r13                  RS-SINR-Range-r13
        }       OPTIONAL,
        measResultBestNeighCell-v1310       SEQUENCE {
            rs-sinr-Result-r13                  RS-SINR-Range-r13
        }       OPTIONAL
    ]]
}

MeasResultServFreq-r13 ::=          SEQUENCE {
    servFreqId-r13                      ServCellIndex-r13,
    measResultSCell-r13                 SEQUENCE {
        rsrpResultSCell-r13                 RSRP-Range,
        rsrqResultSCell-r13                 RSRQ-Range-r13,
        rs-sinr-Result-r13                  RS-SINR-Range-r13   OPTIONAL
    }                                                           OPTIONAL,
    measResultBestNeighCell-r13         SEQUENCE {
        physCellId-r13                      PhysCellId,
        rsrpResultNCell-r13                 RSRP-Range,
        rsrqResultNCell-r13                 RSRQ-Range-r13,
        rs-sinr-Result-r13                  RS-SINR-Range-r13   OPTIONAL
    }                                                           OPTIONAL,
    ...,
    [[  measResultBestNeighCell-v1360       SEQUENCE {
            rsrpResultNCell-v1360               RSRP-Range-v1360
        }                                                       OPTIONAL
    ]]
}

MeasResultCSI-RS-List-r12 ::=   SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultCSI-RS-r12

MeasResultCSI-RS-r12 ::=        SEQUENCE {
    measCSI-RS-Id-r12               MeasCSI-RS-Id-r12,
    csi-RSRP-Result-r12             CSI-RSRP-Range-r12,
    ...
}

MeasResultListUTRA ::=              SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultUTRA

MeasResultUTRA ::=  SEQUENCE {
    physCellId                          CHOICE {
        fdd                                 PhysCellIdUTRA-FDD,
        tdd                                 PhysCellIdUTRA-TDD
```


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```
    },
    cgi-Info                            SEQUENCE {
        cellGlobalId                        CellGlobalIdUTRA,
        locationAreaCode                    BIT STRING (SIZE (16))          OPTIONAL,
        routingAreaCode                     BIT STRING (SIZE (8))           OPTIONAL,
        plmn-IdentityList                   PLMN-IdentityList2              OPTIONAL
    }                                                                       OPTIONAL,
    measResult                          SEQUENCE {
        utra-RSCP                           INTEGER (-5..91)                OPTIONAL,
        utra-EcN0                           INTEGER (0..49)                 OPTIONAL,
        ...,
        [[  additionalSI-Info-r9                AdditionalSI-Info-r9                OPTIONAL
        ]],
        [[  primaryPLMN-Suitable-r12            ENUMERATED {true}           OPTIONAL
        ]]
    }
}

MeasResultListGERAN ::=             SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultGERAN

MeasResultGERAN ::= SEQUENCE {
    carrierFreq                         CarrierFreqGERAN,
    physCellId                          PhysCellIdGERAN,
    cgi-Info                            SEQUENCE {
        cellGlobalId                        CellGlobalIdGERAN,
        routingAreaCode                     BIT STRING (SIZE (8))           OPTIONAL
    }                                                                       OPTIONAL,
    measResult                          SEQUENCE {
        rssi                                INTEGER (0..63),
        ...
    }
}

MeasResultsCDMA2000 ::=             SEQUENCE {
    preRegistrationStatusHRPD           BOOLEAN,
    measResultListCDMA2000              MeasResultListCDMA2000
}

MeasResultListCDMA2000 ::=          SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultCDMA2000

MeasResultCDMA2000 ::=  SEQUENCE {
    physCellId                          PhysCellIdCDMA2000,
    cgi-Info                            CellGlobalIdCDMA2000                OPTIONAL,
    measResult                          SEQUENCE {
        pilotPnPhase                        INTEGER (0..32767)              OPTIONAL,
        pilotStrength                       INTEGER (0..63),
        ...
    }
}

MeasResultListWLAN-r13 ::=      SEQUENCE (SIZE (1..maxCellReport)) OF MeasResultWLAN-r13

MeasResultListWLAN-r14 ::=      SEQUENCE (SIZE (1..maxWLAN-Id-Report-r14)) OF MeasResultWLAN-r13

MeasResultWLAN-r13 ::=  SEQUENCE {
    wlan-Identifiers-r13                WLAN-Identifiers-r12,
    carrierInfoWLAN-r13                 WLAN-CarrierInfo-r13    OPTIONAL,
    bandWLAN-r13                        WLAN-BandIndicator-r13  OPTIONAL,
    rssiWLAN-r13                        WLAN-RSSI-Range-r13,
    availableAdmissionCapacityWLAN-r13  INTEGER (0..31250)      OPTIONAL,
    backhaulDL-BandwidthWLAN-r13        WLAN-backhaulRate-r12   OPTIONAL,
    backhaulUL-BandwidthWLAN-r13        WLAN-backhaulRate-r12   OPTIONAL,
    channelUtilizationWLAN-r13          INTEGER (0..255)        OPTIONAL,
    stationCountWLAN-r13                INTEGER (0..65535)      OPTIONAL,
    connectedWLAN-r13                   ENUMERATED {true}       OPTIONAL,
    ...
}

MeasResultListCBR-r14 ::=           SEQUENCE (SIZE (1..maxCBR-Report-r14)) OF MeasResultCBR-r14

MeasResultCBR-r14 ::=   SEQUENCE {
    poolIdentity-r14        SL-V2X-TxPoolReportIdentity-r14,
    cbr-PSSCH-r14           SL-CBR-r14,
    cbr-PSCCH-r14           SL-CBR-r14              OPTIONAL
}

MeasResultForECID-r9 ::=        SEQUENCE {
    ue-RxTxTimeDiffResult-r9            INTEGER (0..4095),
```


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```
    currentSFN-r9                           BIT STRING (SIZE (10))
}

PLMN-IdentityList2 ::=              SEQUENCE (SIZE (1..5)) OF PLMN-Identity

AdditionalSI-Info-r9 ::=            SEQUENCE {
    csg-MemberStatus-r9             ENUMERATED {member}             OPTIONAL,
    csg-Identity-r9                     CSG-Identity                        OPTIONAL
}
MeasResultForRSSI-r13 ::=           SEQUENCE {
    rssi-Result-r13                         RSSI-Range-r13,
    channelOccupancy-r13                    INTEGER (0..100),
    ...
}

UL-PDCP-DelayResultList-r13 ::=     SEQUENCE (SIZE (1..maxQCI-r13)) OF UL-PDCP-DelayResult-r13


UL-PDCP-DelayResult-r13 ::=         SEQUENCE {
    qci-Id-r13                          ENUMERATED {qci1, qci2, qci3, qci4, spare4, spare3, spare2,
                                        spare1},
    excessDelay-r13                     INTEGER (0..31),
    ...
}

-- ASN1STOP
```


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MeasResults field descriptions
availableAdmissionCapacityWLAN Indicates the available admission capacity of WLAN as defined in IEEE 802.11-2012 [67].
backhaulDL-BandwidthWLAN Indicates the backhaul available downlink bandwidth of WLAN, equal to Downlink Speed times Downlink Load defined in Wi-Fi Alliance Hotspot 2.0 [76].
backhaulUL-BandwidthWLAN Indicates the backhaul available uplink bandwidth of WLAN, equal to Uplink Speed times Uplink Load defined in Wi-Fi Alliance Hotspot 2.0 [76].
bandWLAN Indicates the WLAN band.
carrierInfoWLAN Indicates the WLAN channel information.
cbr-PSSCH Indicates the CBR measurement results on the PSSCH of the pool indicated by *poolIdentity*. If *adjacencyPSCCH-PSSCH* is set to *TRUE* for the pool indicated by *poolIdentity*, this field indicates the CBR measurement of both the PSSCH and PSCCH resources which are measured together.
cbr-PSCCH Indicates the CBR measurement results on the PSCCH of the pool indicated by *poolIdentity.* This field is only included if *adjacencyPSCCH-PSSCH* is set to *FALSE* for the pool indicated by *poolIdentity*.
channelOccupancy Indicates the percentage of samples when the RSSI was above the configured *channelOccupancyThreshold* for the associated *reportConfig*.
channelUtilizationWLAN Indicates WLAN channel utilization as defined in IEEE 802.11-2012 [67].
connectedWLAN Indicates whether the UE is connected to the WLAN for which the measurement results are applicable.
csg-MemberStatus Indicates whether or not the UE is a member of the CSG of the neighbour cell.
currentSFN Indicates the current system frame number when receiving the UE Rx-Tx time difference measurement results from lower layer.
excessDelay Indicates excess queueing delay ratio in UL, according to excess delay ratio measurement report mapping table, as defined in TS 36.314 [71, Table 4.2.1.1.1-1]
locationAreaCode A fixed length code identifying the location area within a PLMN, as defined in TS 23.003 [27].
measId Identifies the measurement identity for which the reporting is being performed. If the *measId-v1250* is included, the *measId* (i.e. without a suffix) is ignored by eNB.
measResult Measured result of an E-UTRA cell; Measured result of a UTRA cell; Measured result of a GERAN cell or frequency; Measured result of a CDMA2000 cell; Measured result of a WLAN; Measured result of UE Rx–Tx time difference; Measured result of UE SFN, radio frame and subframe timing difference; or Measured result of RSSI and channel occupancy.
measResultCSI-RS-List Measured results of the CSI-RS resources in discovery signals measurement.
measResultListCDMA2000 List of measured results for the maximum number of reported best cells for a CDMA2000 measurement identity.
measResultListEUTRA List of measured results for the maximum number of reported best cells for an E-UTRA measurement identity. For BL UEs or UEs in CE, when operating in CE Mode B, *measResult-v1360* is reported if the measured RSRP is less than -140 dBm.
measResultListGERAN List of measured results for the maximum number of reported best cells or frequencies for a GERAN measurement identity.
measResultListUTRA List of measured results for the maximum number of reported best cells for a UTRA measurement identity.
measResultListWLAN List of measured results for the maximum number of reported best WLAN outside the WLAN mobility set and connected WLAN, if any, for a WLAN measurement identity.

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***MeasResults* field descriptions**
measResultPCell Measured result of the PCell. For BL UEs or UEs in CE, when operating in CE Mode B, *measResultPCell-v1360* is reported if the measured RSRP is less than -140 dBm.
measResultsCDMA2000 Contains the CDMA2000 HRPD pre-registration status and the list of CDMA2000 measurements.
MeasResultServFreqList Measured results of the serving frequencies: the measurement result of each SCell, if any, and of the best neighbouring cell on each serving frequency. For BL UEs or UEs in CE, when operating in CE Mode B, *measResultBestNeighCell-v1360* is reported if the measured RSRP is less than -140 dBm.
pilotPnPhase Indicates the arrival time of a CDMA2000 pilot, measured relative to the UE's time reference in units of PN chips, see C.S0005 [25]. This information is used in either SRVCC handover or enhanced 1xRTT CS fallback procedure to CDMA2000 1xRTT.
pilotStrength CDMA2000 Pilot Strength, the ratio of pilot power to total power in the signal bandwidth of a CDMA2000 Forward Channel. See C.S0005 [25] for CDMA2000 1xRTT and C.S0024 [26] for CDMA2000 HRPD.
poolIdentity The identity of the transmission resource pool which is corresponding to the *poolReportId* configured in a resource pool for V2X sidelink communication.
plmn-IdentityList The list of PLMN Identity read from broadcast information when the multiple PLMN Identities are broadcast.
preRegistrationStatusHRPD Set to TRUE if the UE is currently pre-registered with CDMA2000 HRPD. Otherwise set to FALSE. This can be ignored by the eNB for CDMA2000 1xRTT.
qci-Id Indicates QCI value for which *excessDelay* is provided, according to TS 36.314 [71].
routingAreaCode The RAC identity read from broadcast information, as defined in TS 23.003 [27].
rsrpResult Measured RSRP result of an E-UTRA cell. The rsrpResult is only reported if configured by the eNB.
rsrqResult Measured RSRQ result of an E-UTRA cell. The rsrqResult is only reported if configured by the eNB.
rssi GERAN Carrier RSSI. RXLEV is mapped to a value between 0 and 63, TS 45.008 [28]. When mapping the RXLEV value to the RSSI bit string, the first/leftmost bit of the bit string contains the most significant bit.
rssi-Result Measured RSSI result in dBm.
rs-sinr-Result Measured RS-SINR result of an E-UTRA cell. The *rs-sinr-Result* is only reported if configured by the eNB.
rssiWLAN Measured WLAN RSSI result in dBm.
stationCountWLAN Indicates the total number stations currently associated with this WLAN as defined in IEEE 802.11-2012 [67].
ue-RxTxTimeDiffResult UE Rx-Tx time difference measurement result of the PCell, provided by lower layers. If *ue-RxTxTimeDiffPeriodicalTDD-r13* is set to *TRUE*, the measurement mapping is according to EUTRAN TDD UE Rx-Tx time difference report mapping in TS 36.133 [16] and measurement result includes $N_{TAoffset}$, else the measurement mapping is according to EUTRAN FDD UE Rx-Tx time difference report mapping in TS 36.133 [16].
utra-EcN0 According to CPICH_Ec/No in TS 25.133 [29] for FDD. Fourteen spare values. The field is not present for TDD.
utra-RSCP According to CPICH_RSCP in TS 25.133 [29] for FDD and P-CCPCH_RSCP in TS 25.123 [30] for TDD. Thirty-one spare values.
wlan-Identifiers Indicates the WLAN parameters used for identification of the WLAN for which the measurement results are applicable.

– *MeasResultSSTD*

The IE *MeasResultSSTD* consists of SFN, radio frame and subframe boundary difference between the PCell and the PSCell as specified in TS 36.214 [48] and TS 36.133 [16].

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MeasResultSSTD information element

```
-- ASN1START

MeasResultSSTD-r13 ::=                      SEQUENCE {
    sfn-OffsetResult-r13                        INTEGER (0..1023),
    frameBoundaryOffsetResult-r13               INTEGER (-5..4),
    subframeBoundaryOffsetResult-r13            INTEGER (0..127)
}

-- ASN1STOP
```

MeasResultSSTD field descriptions
sfn-OffsetResult Indicates the SFN difference between the PCell and the PSCell as an integer value according to TS 36.214 [48].
frameBoundaryOffsetResult Indicates the frame boundary difference between the PCell and the PSCell as an integer value according to TS 36.214 [48].
subframeBoundaryOffsetResult Indicates the subframe boundary difference between the PCell and the PSCell as an integer value according to the mapping table in TS 36.133 [16].

– *MeasScaleFactor*

The IE *MeasScaleFactor* specifies the factor for scaling the measurement performance requirements in TS 36.133 [16].

MeasScaleFactor information element

```
-- ASN1START

MeasScaleFactor-r12 ::=         ENUMERATED {sf-EUTRA-cf1, sf-EUTRA-cf2}

-- ASN1STOP
```

NOTE: If the *reducedMeasPerformance* is not included in any *measObjectEUTRA* or *measObjectUTRA* and the *measScaleFactor* is included in the *measConfig*, E-UTRAN can configure any of the values for the *measScaleFactor* as specified in TS 36.133 [16].

– *QuantityConfig*

The IE *QuantityConfig* specifies the measurement quantities and layer 3 filtering coefficients for E-UTRA and inter-RAT measurements.

QuantityConfig information element

```
-- ASN1START

QuantityConfig ::=                  SEQUENCE {
    quantityConfigEUTRA                 QuantityConfigEUTRA                 OPTIONAL,   -- Need ON
    quantityConfigUTRA                  QuantityConfigUTRA                  OPTIONAL,   -- Need ON
    quantityConfigGERAN                 QuantityConfigGERAN                 OPTIONAL,   -- Need ON
    quantityConfigCDMA2000              QuantityConfigCDMA2000              OPTIONAL,   -- Need ON
    ...,
    [[  quantityConfigUTRA-v1020        QuantityConfigUTRA-v1020            OPTIONAL    -- Need ON
    ]],
    [[  quantityConfigEUTRA-v1250       QuantityConfigEUTRA-v1250           OPTIONAL    -- Need ON
    ]],
    [[  quantityConfigEUTRA-v1310       QuantityConfigEUTRA-v1310           OPTIONAL,   -- Need ON
        quantityConfigWLAN-r13          QuantityConfigWLAN-r13              OPTIONAL    -- Need ON
    ]]
}

QuantityConfigEUTRA ::=             SEQUENCE {
    filterCoefficientRSRP               FilterCoefficient                   DEFAULT fc4,
    filterCoefficientRSRQ               FilterCoefficient                   DEFAULT fc4
```


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```
}

QuantityConfigEUTRA-v1250 ::=       SEQUENCE {
    filterCoefficientCSI-RSRP-r12       FilterCoefficient                   OPTIONAL        -- Need
OR
}

QuantityConfigEUTRA-v1310 ::=       SEQUENCE {
    filterCoefficientRS-SINR-r13        FilterCoefficient                   DEFAULT fc4
}

QuantityConfigUTRA ::=              SEQUENCE {
    measQuantityUTRA-FDD                ENUMERATED {cpich-RSCP, cpich-EcN0},
    measQuantityUTRA-TDD                ENUMERATED {pccpch-RSCP},
    filterCoefficient                   FilterCoefficient                   DEFAULT fc4
}

QuantityConfigUTRA-v1020 ::=        SEQUENCE {
    filterCoefficient2-FDD-r10          FilterCoefficient                   DEFAULT fc4
}

QuantityConfigGERAN ::=             SEQUENCE {
    measQuantityGERAN                   ENUMERATED {rssi},
    filterCoefficient                   FilterCoefficient                   DEFAULT fc2
}

QuantityConfigCDMA2000 ::=          SEQUENCE {
    measQuantityCDMA2000                ENUMERATED {pilotStrength, pilotPnPhaseAndPilotStrength}
}

QuantityConfigWLAN-r13 ::=          SEQUENCE {
    measQuantityWLAN-r13                ENUMERATED {rssiWLAN},
    filterCoefficient-r13               FilterCoefficient                   DEFAULT fc4
}

-- ASN1STOP
```

***QuantityConfig* field descriptions**
filterCoefficient2-FDD Specifies the filtering coefficient used for the UTRAN FDD measurement quantity, which is not included in *measQuantityUTRA-FDD*, when *reportQuantityUTRA-FDD* is present in *ReportConfigInterRAT*.
filterCoefficientCSI-RSRP Specifies the filtering coefficient used for CSI-RSRP.
filterCoefficientRSRP Specifies the filtering coefficient used for RSRP.
filterCoefficientRSRQ Specifies the filtering coefficient used for RSRQ.
filterCoefficientRS-SINR Specifies the filtering coefficient used for RS-SINR.
measQuantityCDMA2000 Measurement quantity used for CDMA2000 measurements. *pilotPnPhaseAndPilotStrength* is only applicable for *MeasObjectCDMA2000* of *cdma2000-Type* = *type1XRTT*.
measQuantityGERAN Measurement quantity used for GERAN measurements.
measQuantityUTRA Measurement quantity used for UTRA measurements.
measQuantityWLAN Measurement quantity used for WLAN measurements.
quantityConfigCDMA2000 Specifies quantity configurations for CDMA2000 measurements.
quantityConfigEUTRA Specifies filter configurations for E-UTRA measurements.
quantityConfigGERAN Specifies quantity and filter configurations for GERAN measurements.
quantityConfigUTRA Specifies quantity and filter configurations for UTRA measurements. Field *quantityConfigUTRA-v1020* is applicable only when reportQuantityUTRA-FDD is configured.
quantityConfigWLAN Specifies quantity and filter configurations for WLAN measurements.

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– *ReportConfigEUTRA*

The IE *ReportConfigEUTRA* specifies criteria for triggering of an E-UTRA measurement reporting event. The E-UTRA measurement reporting events concerning CRS are labelled A*N* with *N* equal to 1, 2 and so on.

Event A1: Serving becomes better than absolute threshold;

Event A2: Serving becomes worse than absolute threshold;

Event A3: Neighbour becomes amount of offset better than PCell/ PSCell;

Event A4: Neighbour becomes better than absolute threshold;

Event A5: PCell/ PSCell becomes worse than absolute threshold1 AND Neighbour becomes better than another absolute threshold2;

Event A6: Neighbour becomes amount of offset better than SCell.

The E-UTRA measurement reporting events concerning CSI-RS are labelled C*N* with *N* equal to 1 and 2.

Event C1: CSI-RS resource becomes better than absolute threshold;

Event C2: CSI-RS resource becomes amount of offset better than reference CSI-RS resource.

The E-UTRA measurement reporting events concerning CBR are labelled VN with N equal to 1 and 2.

Event V1: CBR becomes larger than absolute threshold;

Event V2: CBR becomes smaller than absolute threshold.

ReportConfigEUTRA information element

```
-- ASN1START

ReportConfigEUTRA ::=               SEQUENCE {
    triggerType                         CHOICE {
        event                               SEQUENCE {
            eventId                             CHOICE {
                eventA1                             SEQUENCE {
                    a1-Threshold                        ThresholdEUTRA
                },
                eventA2                             SEQUENCE {
                    a2-Threshold                        ThresholdEUTRA
                },
                eventA3                             SEQUENCE {
                    a3-Offset                           INTEGER (-30..30),
                    reportOnLeave                       BOOLEAN
                },
                eventA4                             SEQUENCE {
                    a4-Threshold                        ThresholdEUTRA
                },
                eventA5                             SEQUENCE {
                    a5-Threshold1                       ThresholdEUTRA,
                    a5-Threshold2                       ThresholdEUTRA
                },
                ...,
                eventA6-r10                         SEQUENCE {
                    a6-Offset-r10                       INTEGER (-30..30),
                    a6-ReportOnLeave-r10                BOOLEAN
                },
                eventC1-r12                         SEQUENCE {
                    c1-Threshold-r12                    ThresholdEUTRA-v1250,
                    c1-ReportOnLeave-r12                BOOLEAN
                },
                eventC2-r12                         SEQUENCE {
                    c2-RefCSI-RS-r12                    MeasCSI-RS-Id-r12,
                    c2-Offset-r12                       INTEGER (-30..30),
                    c2-ReportOnLeave-r12                BOOLEAN
                },
                eventV1-r14                         SEQUENCE {
                    v1-Threshold-r14                    SL-CBR-r14
                },
                eventV2-r14                         SEQUENCE {
```


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```
                    v2-Threshold-r14                    SL-CBR-r14
                }
            },
            hysteresis                          Hysteresis,
            timeToTrigger                       TimeToTrigger
        },
        periodical                              SEQUENCE {
            purpose                                 ENUMERATED {
                                                        reportStrongestCells, reportCGI}
        }
    },
    triggerQuantity                     ENUMERATED {rsrp, rsrq},
    reportQuantity                      ENUMERATED {sameAsTriggerQuantity, both},
    maxReportCells                      INTEGER (1..maxCellReport),
    reportInterval                      ReportInterval,
    reportAmount                        ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},
    ...,
    [[  si-RequestForHO-r9                  ENUMERATED {setup}      OPTIONAL,   -- Cond reportCGI
        ue-RxTxTimeDiffPeriodical-r9        ENUMERATED {setup}      OPTIONAL    -- Need OR
    ]],
    [[  includeLocationInfo-r10             ENUMERATED {true}       OPTIONAL,   -- Need OR
        reportAddNeighMeas-r10              ENUMERATED {setup}      OPTIONAL    -- Need OR
    ]],
    [[  alternativeTimeToTrigger-r12        CHOICE {
            release                             NULL,
            setup                               TimeToTrigger
        }                                                       OPTIONAL,   -- Need ON
        useT312-r12                         BOOLEAN             OPTIONAL,   -- Need ON
        usePSCell-r12                       BOOLEAN             OPTIONAL,   -- Need ON
        aN-Threshold1-v1250                 RSRQ-RangeConfig-r12        OPTIONAL,   -- Need ON
        a5-Threshold2-v1250                 RSRQ-RangeConfig-r12        OPTIONAL,   -- Need ON
        reportStrongestCSI-RSs-r12          BOOLEAN             OPTIONAL,   -- Need ON
        reportCRS-Meas-r12                  BOOLEAN             OPTIONAL,   -- Need ON
        triggerQuantityCSI-RS-r12           BOOLEAN             OPTIONAL        -- Need ON
    ]],
    [[  reportSSTD-Meas-r13                 BOOLEAN             OPTIONAL,       -- Need ON
        rs-sinr-Config-r13                  CHOICE {
            release                             NULL,
            setup                               SEQUENCE {
                triggerQuantity-v1310               ENUMERATED {sinr}       OPTIONAL,   -- Need ON
                aN-Threshold1-r13                   RS-SINR-Range-r13       OPTIONAL,   -- Need ON
                a5-Threshold2-r13                   RS-SINR-Range-r13       OPTIONAL,   -- Need ON
                reportQuantity-v1310                ENUMERATED {rsrpANDsinr, rsrqANDsinr, all}
            }
        }                                                               OPTIONAL,   -- Need ON
        useWhiteCellList-r13                BOOLEAN                     OPTIONAL,   -- Need ON
        measRSSI-ReportConfig-r13           MeasRSSI-ReportConfig-r13   OPTIONAL,   -- Need ON
        includeMultiBandInfo-r13            ENUMERATED {true}           OPTIONAL,   -- Cond
reportCGI
        ul-DelayConfig-r13                  UL-DelayConfig-r13          OPTIONAL    -- Need ON
    ]],
    [[  ue-RxTxTimeDiffPeriodicalTDD-r13    BOOLEAN                     OPTIONAL    -- Need ON
    ]],
    [[
        purpose-v1430           ENUMERATED {reportLocation, sidelink, spare2, spare1}
                                                            OPTIONAL    -- Need ON
    ]]
}

RSRQ-RangeConfig-r12 ::=            CHOICE {
    release                             NULL,
    setup                               RSRQ-Range-v1250
}

ThresholdEUTRA ::=                  CHOICE{
    threshold-RSRP                      RSRP-Range,
    threshold-RSRQ                      RSRQ-Range
}

ThresholdEUTRA-v1250 ::=            CSI-RSRP-Range-r12

MeasRSSI-ReportConfig-r13 ::=   SEQUENCE {
    channelOccupancyThreshold-r13           RSSI-Range-r13              OPTIONAL    -- Need OR
}

-- ASN1STOP
```


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ReportConfigEUTRA field descriptions
a3-Offset/ a6-Offset/ c2-Offset Offset value to be used in EUTRA measurement report triggering condition for event a3/ a6/ c2. The actual value is field value * 0.5 dB.
alternativeTimeToTrigger Indicates the time to trigger applicable for cells specified in *altTTT-CellsToAddModList* of the associated measurement object, if configured
aN-ThresholdM/ cN-ThresholdM Threshold to be used in EUTRA measurement report triggering condition for event number aN/ cN. If multiple thresholds are defined for event number aN/ cN, the thresholds are differentiated by M. E-UTRAN configures *aN-Threshold1* only for events A1, A2, A4, A5 and *a5-Threshold2* only for event A5.
c1-ReportOnLeave/ c2-ReportOnLeave Indicates whether or not the UE shall initiate the measurement reporting procedure when the leaving condition is met for a CSI-RS resource in *csi-RS-TriggeredList*, as specified in 5.5.4.1.
c2-RefCSI-RS Identity of the CSI-RS resource from the *measCSI-RS-ToAddModList* of the associated *measObject*, to be used as the reference CSI-RS resource in EUTRA measurement report triggering condition for event c2.
channelOccupancyThreshold RSSI threshold which is used for channel occupancy evaluation.
eventId Choice of E-UTRA event triggered reporting criteria. EUTRAN may set this field to *eventC1* or *eventC2* only if *measDS-Config* is configured in the associated *measObject* with one or more CSI-RS resources. The *eventC1* and *eventC2* are not applicable for the *eventId* if RS-SINR is configured as *triggerQuantity* or *reportQuantity*.
includeMultiBandInfo If this field is present, the UE shall acquire and include multi band information in the measurement report.
maxReportCells Max number of cells, excluding the serving cell, to include in the measurement report concerning CRS, and max number of CSI-RS resources to include in the measurement report concerning CSI-RS.
measRSSI-ReportConfig If this field is present, the UE shall perform measurement reporting for RSSI and channel occupancy and ignore the *triggerQuantity*, *reportQuantity* and *maxReportCells* fields. E-UTRAN only sets this field to *true* when setting *triggerType* to *periodical* and *purpose* to *reportStrongestCells*.
reportAmount Number of measurement reports applicable for *triggerType event* as well as for *triggerType periodical*. In case *purpose* is set to *reportCGI* or *reportSSTD-Meas* is set to *true*, only value 1 applies.
reportCRS-Meas Inidicates that UE shall include rsrp, rsrq together with csi-rsrp in the measurement report, if possible.
reportOnLeave/ a6-ReportOnLeave Indicates whether or not the UE shall initiate the measurement reporting procedure when the leaving condition is met for a cell in *cellsTriggeredList*, as specified in 5.5.4.1.
reportQuantity The quantities to be included in the measurement report. The value both means that both the rsrp and rsrq quantities are to be included in the measurement report. The value *rsrpANDsinr* and *rsrqANDsinr* mean that both *rsrp* and *rs-sinr* quantities, and both *rsrq* and *rs-sinr* quantities are to be included respectively in the measurement report. The value *all* means that *rsrp*, *rsrq* and *rs-sinr* are to be included in the measurement report. In case *triggerQuantityCSI-RS* is included, only value *sameAsTriggerQuantity* applies. If *reportQuantity*-v*1310* is configured, the UE only considers this extension (and ignores *reportQuantity* i.e. without suffix).
reportSSTD-Meas If this field is set to *true*, the UE shall measure SSTD between the PCell and the PSCell as specified in TS 36.214 [48] and ignore the *triggerQuantity*, *reportQuantity* and *maxReportCells* fields. E-UTRAN only sets this field to *true* when setting *triggerType* to *periodical* and *purpose* to *reportStrongestCells*.
reportStrongestCSI-RSs Indicates that periodical CSI-RS measurement report is performed. EUTRAN configures value *TRUE* only if *measDS-Config* is configured in the associated *measObject* with one or more CSI-RS resources.
si-RequestForHO The field applies to the *reportCGI* functionality, and when the field is included, the UE is allowed to use autonomous gaps in acquiring system information from the neighbour cell, applies a different value for T321, and includes different fields in the measurement report.
ThresholdEUTRA For RSRP: RSRP based threshold for event evaluation. The actual value is field value – 140 dBm. For RSRQ: RSRQ based threshold for event evaluation. The actual value is (field value – 40)/2 dB. For RS-SINR: RS-SINR based threshold for event evaluation. The actual value is (field value -46)/2 dB. For CSI-RSRP: CSI-RSRP based threshold for event evaluation. The actual value is field value – 140 dBm. EUTRAN configures the same threshold quantity for all the thresholds of an event.
timeToTrigger Time during which specific criteria for the event needs to be met in order to trigger a measurement report.

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ReportConfigEUTRA field descriptions
triggerQuantity The quantity used to evaluate the triggering condition for the event concerning CRS**.** EUTRAN sets the value according to the quantity of the *ThresholdEUTRA* for this event. The values rsrp, rsrq and *sinr* correspond to Reference Signal Received Power (RSRP), Reference Signal Received Quality (RSRQ) and Reference Signal Signal to Noise and Interference Ratio (RS-SINR), see TS 36.214 [48]. If *triggerQuantity-v1310* is configured, the UE only considers this extension (and ignores *triggerQuantity* i.e. without suffix).
triggerQuantityCSI-RS The quantity used to evaluate the triggering condition for the event concerning CSI-RS**.** The value *TRUE* corresponds to CSI Reference Signal Received Power (CSI-RSRP), see TS 36.214 [48]. E-UTRAN configures value *TRUE* if and only if the measurement reporting event concerns CSI-RS.
ue-RxTxTimeDiffPeriodical If this field is present, the UE shall perform UE Rx-Tx time difference measurement reporting and ignore the fields *triggerQuantity*, *reportQuantity* and *maxReportCells*. If the field is present, the only applicable values for the corresponding *triggerType* and *purpose* are periodical and reportStrongestCells respectively.
ue-RxTxTimeDiffPeriodicalTDD If this field is set to *TRUE*, the UE shall perform UE Rx-Tx time difference measurement reporting according to EUTRAN TDD UE Rx-Tx time difference report mapping in TS 36.133 [16]. If the field is configured, the *ue-RxTxTimeDiffPeriodical* shall be configured. The field is applicable for TDD only.
usePSCell If this field is set to *TRUE* the UE shall use the PSCell instead of the PCell. E-UTRAN configures value *TRUE* only for events A3 and A5, see 5.5.4.4 and 5.5.4.6.
useT312 If value *TRUE* is configured, the UE shall use the timer T312 with the value *t312* as specified in the corresponding *measObject*. If the corresponding *measObject* does not include the timer T312 then the timer T312 is considered as not configured. E-UTRAN configures value *TRUE* only if *triggerType* is set to *event*.
useWhiteCellList Indicates whether only the cells included in the white-list of the associated *measObject* are applicable as specified in 5.5.4.1. E-UTRAN does not configure the field for events A1, A2, C1 and C2.
ul-DelayConfig If the field is present, E-UTRAN configures UL PDCP Packet Delay per QCI measurement and the UE shall ignore the fields *triggerQuantity* and *maxReportCells*. The applicable values for the corresponding *triggerType* and *reportInterval* are *periodical* and (one of the) ms1024, ms2048, ms5120 or ms10240 respectively.The *reportInterval* indicates the periodicity for performing and reporting of UL PDCP Delay per QCI measurement as specified in TS 36.314 [71].

Conditional presence	Explanation
reportCGI	The field is optional, need OR, in case *purpose* is included and set to *reportCGI*; otherwise the field is not present and the UE shall delete any existing value for this field.

– *ReportConfigId*

The IE *ReportConfigId* is used to identify a measurement reporting configuration.

***ReportConfigId* information element**

```
-- ASN1START

ReportConfigId ::=                  INTEGER (1..maxReportConfigId)

-- ASN1STOP
```

– *ReportConfigInterRAT*

The IE *ReportConfigInterRAT* specifies criteria for triggering of an inter-RAT measurement reporting event. The inter-RAT measurement reporting events for UTRAN, GERAN and CDMA2000 are labelled B*N* with *N* equal to 1, 2 and so on. The inter-RAT measurement reporting events for WLAN are labelled W*N* with *N* equal to 1, 2 and so on.

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Event B1: Neighbour becomes better than absolute threshold;

Event B2: PCell becomes worse than absolute threshold1 AND Neighbour becomes better than another absolute threshold2.

Event W1: WLAN becomes better than a threshold;

Event W2: All WLAN inside WLAN mobility set become worse than a threshold1 and a WLAN outside WLAN mobility set becomes better than a threshold2;

Event W3: All WLAN inside WLAN mobility set become worse than a threshold.

The b1 and b2 event thresholds for CDMA2000 are the CDMA2000 pilot detection thresholds are expressed as an unsigned binary number equal to [-2 x 10 log 10 E_c/I_o] in units of 0.5dB, see C.S0005 [25] for details.

ReportConfigInterRAT information element

```
-- ASN1START

ReportConfigInterRAT ::=            SEQUENCE {
    triggerType                         CHOICE {
        event                               SEQUENCE {
            eventId                             CHOICE {
                eventB1                             SEQUENCE {
                    b1-Threshold                        CHOICE {
                        b1-ThresholdUTRA                    ThresholdUTRA,
                        b1-ThresholdGERAN                   ThresholdGERAN,
                        b1-ThresholdCDMA2000                ThresholdCDMA2000
                    }
                },
                eventB2                             SEQUENCE {
                    b2-Threshold1                       ThresholdEUTRA,
                    b2-Threshold2                       CHOICE {
                        b2-Threshold2UTRA                   ThresholdUTRA,
                        b2-Threshold2GERAN                  ThresholdGERAN,
                        b2-Threshold2CDMA2000               ThresholdCDMA2000
                    }
                },
                ...,
                eventW1-r13                     SEQUENCE {
                    w1-Threshold-r13            WLAN-RSSI-Range-r13
                },
                eventW2-r13                     SEQUENCE {
                    w2-Threshold1-r13           WLAN-RSSI-Range-r13,
                    w2-Threshold2-r13           WLAN-RSSI-Range-r13
                },
                eventW3-r13                     SEQUENCE {
                    w3-Threshold-r13            WLAN-RSSI-Range-r13
                }
            },
            hysteresis                      Hysteresis,
            timeToTrigger                   TimeToTrigger
        },
        periodical                              SEQUENCE {
            purpose                             ENUMERATED {
                                                    reportStrongestCells,
                                                    reportStrongestCellsForSON,
                                                    reportCGI}
        }
    },
    maxReportCells                      INTEGER (1..maxCellReport),
    reportInterval                      ReportInterval,
    reportAmount                        ENUMERATED {r1, r2, r4, r8, r16, r32, r64, infinity},
    ...,
    [[  si-RequestForHO-r9                  ENUMERATED {setup}      OPTIONAL    -- Cond reportCGI
    ]],
    [[  reportQuantityUTRA-FDD-r10          ENUMERATED {both}       OPTIONAL    -- Need OR
    ]],
    [[  includeLocationInfo-r11             BOOLEAN                 OPTIONAL    -- Need ON
    ]],
    [[  b2-Threshold1-v1250                 CHOICE {
            release                             NULL,
            setup                               RSRQ-Range-v1250
        }                                                           OPTIONAL    -- Need ON
    ]],
```


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```
    [[  reportQuantityWLAN-r13              ReportQuantityWLAN-r13  OPTIONAL    -- Need ON
    ]],
    [[  reportAnyWLAN-r14                   BOOLEAN                 OPTIONAL    -- Need ON
    ]]
}

ThresholdUTRA ::=                   CHOICE{
    utra-RSCP                           INTEGER (-5..91),
    utra-EcN0                           INTEGER (0..49)
}

ThresholdGERAN ::=              INTEGER (0..63)

ThresholdCDMA2000 ::=           INTEGER (0..63)

ReportQuantityWLAN-r13 ::=      SEQUENCE {
    bandRequestWLAN-r13                         ENUMERATED {true}   OPTIONAL,   -- Need OR
    carrierInfoRequestWLAN-r13                  ENUMERATED {true}   OPTIONAL,   -- Need OR
    availableAdmissionCapacityRequestWLAN-r13   ENUMERATED {true}   OPTIONAL,   -- Need OR
    backhaulDL-BandwidthRequestWLAN-r13         ENUMERATED {true}   OPTIONAL,   -- Need OR
    backhaulUL-BandwidthRequestWLAN-r13         ENUMERATED {true}   OPTIONAL,   -- Need OR
    channelUtilizationRequestWLAN-r13           ENUMERATED {true}   OPTIONAL,   -- Need OR
    stationCountRequestWLAN-r13                 ENUMERATED {true}   OPTIONAL,   -- Need OR
    ...
}

-- ASN1STOP
```


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ReportConfigInterRAT field descriptions
availableAdmissionCapacityRequestWLAN The value true indicates that the UE shall include, if available, WLAN Available Admission Capacity in measurement reports.
backhaulDL-BandwidthRequestWLAN The value true indicates that the UE shall include, if available, WLAN Backhaul Downlink Bandwidth in measurement reports.
backhaulUL-BandwidthRequestWLAN The value true indicates that the UE shall include, if available, WLAN Backhaul Uplink Bandwidth in measurement reports.
bandRequestWLAN The value true indicates that the UE shall include WLAN band in measurement reports.
bN-ThresholdM Threshold to be used in inter RAT measurement report triggering condition for event number bN. If multiple thresholds are defined for event number bN, the thresholds are differentiated by M.
carrierInfoRequestWLAN The value true indicates that the UE shall include, if available, WLAN Carrier Information in measurement reports.
channelUtilizationRequest-WLAN The value true indicates that the UE shall include, if available, WLAN Channel Utilization in measurement reports.
eventId Choice of inter-RAT event triggered reporting criteria.
maxReportCells Max number of cells, excluding the serving cell, to include in the measurement report. In case *purpose* is set to *reportStrongestCellsForSON* only value 1 applies. For inter-RAT WLAN, it is the maximum number of WLANs to include in the measurement report.
Purpose *reportStrongestCellsForSON* applies only in case *reportConfig* is linked to a *measObject* set to *measObjectUTRA* or *measObjectCDMA2000*.
reportAmount Number of measurement reports applicable for *triggerType event* as well as for *triggerType periodical*. In case *purpose* is set to *reportCGI* or reportStrongestCellsForSON only value 1 applies.
reportAnyWLAN Indicates UE to report any WLAN AP meeting the triggering requirements, even if it is not included in the corresponding *MeasObjectWLAN*.
reportQuantityUTRA-FDD The quantities to be included in the UTRA measurement report**.** The value *both* means that both the cpich RSCP and cpich EcN0 quantities are to be included in the measurement report.
si-RequestForHO The field applies to the *reportCGI* functionality, and when the field is included, the UE is allowed to use autonomous gaps in acquiring system information from the neighbour cell, applies a different value for T321, and includes different fields in the measurement report.
stationCountRequestWLAN The value true indicates that the UE shall include, if available, WLAN Station Count in measurement reports.
b1-ThresholdGERAN, b2-Threshold2GERAN The actual value is field value – 110 dBm.
b1-ThresholdUTRA, b2-Threshold2UTRA *utra-RSCP* corresponds to CPICH_RSCP in TS 25.133 [29] for FDD and P-CCPCH_RSCP in TS 25.123 [30] for TDD. *utra-EcN0* corresponds to CPICH_Ec/No in TS 25.133 [29] for FDD, and is not applicable for TDD. For *utra-RSCP*: The actual value is field value – 115 dBm. For *utra-EcN0*: The actual value is (field value – 49)/2 dB.
timeToTrigger Time during which specific criteria for the event needs to be met in order to trigger a measurement report.
triggerType E-UTRAN does not configure the value *periodical* in case *reportConfig* is linked to a *measObject* set to *measObjectWLAN*.

Conditional presence	Explanation
reportCGI	The field is optional, need OR, in case *purpose* is included and set to *reportCGI*; otherwise the field is not present and the UE shall delete any existing value for this field.

– *ReportConfigToAddModList*

The IE *ReportConfigToAddModList* concerns a list of reporting configurations to add or modify

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***ReportConfigToAddModList* information element**

```
-- ASN1START

ReportConfigToAddModList ::=        SEQUENCE (SIZE (1..maxReportConfigId)) OF ReportConfigToAddMod

ReportConfigToAddMod ::=    SEQUENCE {
    reportConfigId                      ReportConfigId,
    reportConfig                        CHOICE {
        reportConfigEUTRA                   ReportConfigEUTRA,
        reportConfigInterRAT                ReportConfigInterRAT
    }
}


-- ASN1STOP
```

– *ReportInterval*

The *ReportInterval* indicates the interval between periodical reports. The *ReportInterval* is applicable if the UE performs periodical reporting (i.e. when *reportAmount* exceeds 1), for *triggerType event* as well as for *triggerType periodical*. Value ms120 corresponds with 120 ms, ms240 corresponds with 240 ms and so on, while value min1 corresponds with 1 min, min6 corresponds with 6 min and so on.

***ReportInterval* information element**

```
-- ASN1START

ReportInterval ::=                  ENUMERATED {
                                        ms120, ms240, ms480, ms640, ms1024, ms2048, ms5120, ms10240,
                                        min1, min6, min12, min30, min60, spare3, spare2, spare1}

-- ASN1STOP
```

– *RSRP-Range*

The IE *RSRP-Range* specifies the value range used in RSRP measurements and thresholds. Integer value for RSRP measurements according to mapping table in TS 36.133 [16]. A given field using *RSRP-Range-v1360* shall only be signalled if the corresponding original field (using *RSRP-Range* i.e. without suffix) is set to value 0.

***RSRP-Range* information element**

```
-- ASN1START

RSRP-Range ::=                      INTEGER(0..97)

RSRP-Range-v1360 ::=                    INTEGER(-17..-1)

RSRP-RangeSL-r12 ::=                INTEGER(0..13)

RSRP-RangeSL2-r12 ::=               INTEGER(0..7)

RSRP-RangeSL3-r12 ::=               INTEGER(0..11)

RSRP-RangeSL4-r13 ::=               INTEGER(0..49)

-- ASN1STOP
```


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RSRP-Range field descriptions
RSRP-Range For BL UEs or UEs in CE, when operating in CE Mode B, *RSRP-Range-v1360* (i.e., with suffix) is reported if the measured RSRP is less than -140 dBm.
RSRP-RangeSL Value 0 corresponds to -infinity, value 1 to -115dBm, value 2 to -110dBm, and so on (i.e. in steps of 5dBm) until value 12, which corresponds to -60dBm, while value 13 corresponds to +infinity.
RSRP-RangeSL2 Value 0 corresponds to -infinity, value 1 to -110dBm, value 2 to -100dBm, and so on (i.e. in steps of 10dBm) until value 6, which corresponds to -60dBm, while value 7 corresponds to +infinity.
RSRP-RangeSL3 Value 0 corresponds to -110dBm, value 1 to -105dBm, value 2 to -100dBm, and so on (i.e. in steps of 5dBm) until value 10, which corresponds to -60dBm, while value 11 corresponds to +infinity.
RSRP-RangeSL4 Indicates the range for SD-RSRP. Value 0 corresponds to -130dBm, value 1 to -128dBm, value 2 to -126dBm, and so on (i.e. in steps of 2dBm) until value 48, which corresponds to -34dBm, while value 49 corresponds to +infinity.

– *RSRQ-Range*

The IE *RSRQ-Range* specifies the value range used in RSRQ measurements and thresholds. Integer value for RSRQ measurements is according to mapping table in TS 36.133 [16]. A given field using *RSRQ-Range-v1250* shall only be signalled if the corresponding original field (using *RSRQ-Range* i.e. without suffix) is set to value 0 or 34. Only a UE indicating support of *extendedRSRQ-LowerRange-r12* or *rsrq-OnAllSymbols-r12* may report *RSRQ-Range-v1250*, and this may be done without explicit configuration from the E-UTRAN. If received, the UE shall use the value indicated by the *RSRQ-Range-v1250* and ignore the value signalled by *RSRQ-Range* (without the suffix). *RSRQ-Range-r13* covers the original range and extended *RSRQ-Range-v1250*. *RSRQ-Range-r13* may be signalled without the corresponding original field and without any requirements for indicated support of *extendedRSRQ-LowerRange-r12* or *rsrq-OnAllSymbols-r12*.

RSRQ-Range information element

```
-- ASN1START

RSRQ-Range ::=                      INTEGER(0..34)

RSRQ-Range-v1250 ::=                INTEGER(-30..46)

RSRQ-Range-r13 ::=              INTEGER(-30..46)

-- ASN1STOP
```

– *RSRQ-Type*

The IE *RSRQ-Type* specifies the RSRQ value type used in RSRQ measurements, see TS 36.214 [48].

RSRQ-Type information element

```
-- ASN1START

RSRQ-Type-r12 ::=                   SEQUENCE {
    allSymbols-r12                          BOOLEAN,
    wideBand-r12                            BOOLEAN
}

-- ASN1STOP
```

RSRQ-Type field descriptions
allSymbols Value TRUE indicates use of all OFDM symbols when performing RSRQ measurements.
wideBand Value TRUE indicates use of a wider bandwidth when performing RSRQ measurements.

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– *RS-SINR-Range*

The IE *RS-SINR-Range* specifies the value range used in RS-SINR measurements and thresholds. Integer value for RS-SINR measurements is according to mapping table in TS 36.133 [16].

RS-SINR-Range information element

```
-- ASN1START

RS-SINR-Range-r13 ::=                       INTEGER(0..127)

-- ASN1STOP
```

– *RSSI-Range-r13*

The IE *RSSI-Range* specifies the value range used in RSSI measurements and thresholds. Integer value for RSSI measurements is according to mapping table in TS 36.133 [16].

RSSI-Range information element

```
-- ASN1START

RSSI-Range-r13 ::=                      INTEGER(0..76)

-- ASN1STOP
```

– *TimeToTrigger*

The IE *TimeToTrigger* specifies the value range used for time to trigger parameter, which concerns the time during which specific criteria for the event needs to be met in order to trigger a measurement report. Value ms0 corresponds to 0 ms and behaviour as specified in 7.3.2 applies, ms40 corresponds to 40 ms, and so on.

TimeToTrigger information element

```
-- ASN1START

TimeToTrigger ::=                   ENUMERATED {
                                        ms0, ms40, ms64, ms80, ms100, ms128, ms160, ms256,
                                        ms320, ms480, ms512, ms640, ms1024, ms1280, ms2560,
                                        ms5120}

-- ASN1STOP
```

– *UL-DelayConfig*

The IE *UL-DelayConfig* IE specifies the configuration of the UL PDCP Packet Delay per QCI measurement specified in TS36.314 [71].

UL-DelayConfig information element

```
-- ASN1START

UL-DelayConfig-r13 ::=                  CHOICE {
        release                             NULL,
        setup                               SEQUENCE {
            delayThreshold-r13                          ENUMERATED {
                                                ms30, ms40, ms50, ms60, ms70, ms80,
                                                ms90,ms100, ms150, ms300, ms500, ms750, spare4,
                                            spare3, spare2, spare1}
        }
}

-- ASN1STOP
```


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UL-DelayConfig field descriptions
delayThreshold Indicates the delay threshold value used by UE to provide results of UL PDCP Packet Delay per QCI measurement as specified in TS 36.314 [71]. Value in milliseconds. Value ms30 means 30 ms and so on.

– *WLAN-CarrierInfo*

The IE *WLAN-CarrierInfo* is used to identify the WLAN frequency band information, as specified in Annex E in [67].

WLAN-CarrierInfo information element

```
-- ASN1START

WLAN-CarrierInfo-r13 ::=        SEQUENCE {
    operatingClass-r13      INTEGER (0..255)            OPTIONAL,   -- Need ON
    countryCode-r13         ENUMERATED {unitedStates, europe, japan, global, ...}   OPTIONAL,   --
Need ON
    channelNumbers-r13      WLAN-ChannelList-r13        OPTIONAL,   -- Need ON
    ...
}

WLAN-ChannelList-r13 ::=    SEQUENCE (SIZE (1..maxWLAN-Channels-r13)) OF WLAN-Channel-r13

WLAN-Channel-r13 ::=    INTEGER(0..255)

-- ASN1STOP
```

WLAN-CarrierInfo field descriptions
channelNumbers Indicates the WLAN channels as defined in IEEE 802.11-2012 [67]. Value 0 is not used.
countryCode Indicates the country code of WLAN as defined in IEEE 802.11-2012 [67].
operatingClass Indicates the Operating Class of WLAN as defined in IEEE 802.11-2012 [67].

– *WLAN-RSSI-Range*

The IE *WLAN-RSSI-Range* specifies the value range used in WLAN RSSI measurements and thresholds. Integer value for WLAN RSSI measurements is according to mapping table in TS 36.133 [16]. Value 0 corresponds to -infinity, value 1 to -100dBm, value 2 to -99dBm, and so on (i.e. in steps of 1dBm) until value 140, which corresponds to 39dBm, while value 141 corresponds to +infinity.

WLAN-RSSI-Range information element

```
-- ASN1START

WLAN-RSSI-Range-r13 ::=                     INTEGER(0..141)

-- ASN1STOP
```

– *WLAN-Status*

The IE *WLAN-Status* indicates the current status of WLAN connection. The values are set as described in Sections 5.6.15.2 and 5.6.15.4.

WLAN-Status information element

```
-- ASN1START

WLAN-Status-r13 ::=     ENUMERATED {successfulAssociation, failureWlanRadioLink,
failureWlanUnavailable, failureTimeout}
```


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```
WLAN-Status-v1430 ::=   ENUMERATED {suspended, resumed}

-- ASN1STOP
```

– *WLAN-SuspendConfig*

The IE *WLAN-SuspendConfig* is used for configuration of WLAN suspend/resume functionality.

```
-- ASN1START

WLAN-SuspendConfig-r14 ::=  SEQUENCE {
    wlan-SuspendResumeAllowed-r14           BOOLEAN     OPTIONAL,   -- Need ON
    wlan-SuspendTriggersStatusReport-r14        BOOLEAN     OPTIONAL    -- Need ON
}

-- ASN1STOP
```

***WLAN-SuspendConfig* field descriptions**
wlan-SuspendResumeAllowed Indicates whether the UE is allowed to use suspend-resume mechanism, i.e., to indicate WLAN being temporarily unavailable and WLAN being available again after temporary unavailability.
wlan-SuspendTriggersStatusReport Indicates whether the UE shall trigger PDCP status report as defined in [8] when WLAN is temporarily unavailable and UE reports this status.

6.3.6 Other information elements

– *AbsoluteTimeInfo*

The IE *AbsoluteTimeInfo* indicates an absolute time in a format YY-MM-DD HH:MM:SS and using BCD encoding. The first/ leftmost bit of the bit string contains the most significant bit of the most significant digit of the year and so on.

AbsoluteTimeInfo information element

```
-- ASN1START

AbsoluteTimeInfo-r10 ::=                BIT STRING (SIZE (48))

-- ASN1STOP
```

– *AreaConfiguration*

The *AreaConfiguration* indicates area for which UE is requested to perform measurement logging. If not configured, measurement logging is not restricted to specific cells or tracking areas but applies as long as the RPLMN is contained in *plmn-IdentityList* stored in *VarLogMeasReport*.

AreaConfiguration information element

```
-- ASN1START

AreaConfiguration-r10 ::=   CHOICE {
    cellGlobalIdList-r10            CellGlobalIdList-r10,
    trackingAreaCodeList-r10        TrackingAreaCodeList-r10
}

AreaConfiguration-v1130 ::=     SEQUENCE {
    trackingAreaCodeList-v1130      TrackingAreaCodeList-v1130
}

CellGlobalIdList-r10 ::=                SEQUENCE (SIZE (1..32)) OF CellGlobalIdEUTRA

TrackingAreaCodeList-r10 ::=            SEQUENCE (SIZE (1..8)) OF TrackingAreaCode

TrackingAreaCodeList-v1130 ::=  SEQUENCE {
```


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```
    plmn-Identity-perTAC-List-r11           SEQUENCE (SIZE (1..8)) OF PLMN-Identity
}

-- ASN1STOP
```

***AreaConfiguration* field descriptions**
plmn-Identity-perTAC-List Includes the PLMN identity for each of the TA codes included in *trackingAreaCodeList*. The PLMN identity listed first in *plmn-Identity-perTAC-List* corresponds with the TA code listed first in *trackingAreaCodeList* and so on.

– *BandCombinationList*

The IE *BandCombinationList* contains a list of CA band combinations.

BandCombinationList information element

```
-- ASN1START

BandCombinationList-r14 ::= SEQUENCE (SIZE (1..maxBandComb-r13)) OF BandCombination-r14

BandCombination-r14 ::= SEQUENCE (SIZE (1..maxSimultaneousBands-r10)) OF BandIndication-r14

BandIndication-r14 ::=  SEQUENCE {
    bandEUTRA-r14                   FreqBandIndicator-r11,
    ca-BandwidthClassDL-r14         CA-BandwidthClass-r10,
    ca-BandwidthClassUL-r14         CA-BandwidthClass-r10           OPTIONAL
}

-- ASN1STOP
```

– *C-RNTI*

The IE *C-RNTI* identifies a UE having a RRC connection within a cell.

C-RNTI information element

```
-- ASN1START

C-RNTI ::=                          BIT STRING (SIZE (16))

-- ASN1STOP
```

– *DedicatedInfoCDMA2000*

The *DedicatedInfoCDMA200*0 is used to transfer UE specific CDMA2000 information between the network and the UE. The RRC layer is transparent for this information.

DedicatedInfoCDMA2000 information element

```
-- ASN1START

DedicatedInfoCDMA2000 ::=               OCTET STRING

-- ASN1STOP
```

– *DedicatedInfoNAS*

The IE *DedicatedInfoNAS* is used to transfer UE specific NAS layer information between the network and the UE. The RRC layer is transparent for this information.

DedicatedInfoNAS information element

```
-- ASN1START
```


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```
DedicatedInfoNAS ::=        OCTET STRING

-- ASN1STOP
```

– *FilterCoefficient*

The IE *FilterCoefficient* specifies the measurement filtering coefficient. Value *fc0* corresponds to k = 0, *fc1* corresponds to k = 1, and so on.

FilterCoefficient information element

```
-- ASN1START

FilterCoefficient ::=                   ENUMERATED {
                                            fc0, fc1, fc2, fc3, fc4, fc5,
                                            fc6, fc7, fc8, fc9, fc11, fc13,
                                            fc15, fc17, fc19, spare1, ...}

-- ASN1STOP
```

– *LoggingDuration*

The *LoggingDuration* indicates the duration for which UE is requested to perform measurement logging. Value min10 corresponds to 10 minutes, value min20 corresponds to 20 minutes and so on.

LoggingDuration information element

```
-- ASN1START

LoggingDuration-r10 ::=         ENUMERATED {
                                    min10, min20, min40, min60, min90, min120, spare2, spare1}

-- ASN1STOP
```

– *LoggingInterval*

The *LoggingInterval* indicates the periodicity for logging measurement results. Value ms1280 corresponds to 1.28s, value ms2560 corresponds to 2.56s and so on.

LoggingInterval information element

```
-- ASN1START

LoggingInterval-r10 ::=         ENUMERATED {
                                    ms1280, ms2560, ms5120, ms10240, ms20480,
                                    ms30720, ms40960, ms61440}

-- ASN1STOP
```

– *MeasSubframePattern*

The IE *MeasSubframePattern* is used to specify a subframe pattern. The first/leftmost bit corresponds to the subframe #0 of the radio frame satisfying SFN mod x = 0, where SFN is that of PCell and x is the size of the bit string divided by 10. "1" denotes that the corresponding subframe is used.

MeasSubframePattern information element

```
-- ASN1START

MeasSubframePattern-r10 ::= CHOICE {
    subframePatternFDD-r10              BIT STRING (SIZE (40)),
    subframePatternTDD-r10              CHOICE {
        subframeConfig1-5-r10                   BIT STRING (SIZE (20)),
```


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```
        subframeConfig0-r10                     BIT STRING (SIZE (70)),
        subframeConfig6-r10                     BIT STRING (SIZE (60)),
        ...
    },
    ...
}

-- ASN1STOP
```

– *MMEC*

The IE *MMEC* identifies an MME within the scope of an MME Group within a PLMN, see TS 23.003 [27].

MMEC information element

```
-- ASN1START

MMEC ::=                            BIT STRING (SIZE (8))

-- ASN1STOP
```

– *NeighCellConfig*

The IE *NeighCellConfig* is used to provide the information related to MBSFN and TDD UL/DL configuration of neighbour cells.

NeighCellConfig information element

```
-- ASN1START

NeighCellConfig ::=         BIT STRING (SIZE (2))

-- ASN1STOP
```

***NeighCellConfig* field descriptions**
neighCellConfig
Provides information related to MBSFN and TDD UL/DL configuration of neighbour cells of this frequency 00: Not all neighbour cells have the same MBSFN subframe allocation as the serving cell on this frequency, if configured, and as the PCell otherwise 10: The MBSFN subframe allocations of all neighbour cells are identical to or subsets of that in the serving cell on this frequency, if configured, and of that in the PCell otherwise 01: No MBSFN subframes are present in all neighbour cells 11: Different UL/DL allocation in neighbouring cells for TDD compared to the serving cell on this frequency, if configured, and compared to the PCell otherwise For TDD, 00, 10 and 01 are only used for same UL/DL allocation in neighbouring cells compared to the serving cell on this frequency, if configured, and compared to the PCell otherwise.

– *OtherConfig*

The IE *OtherConfig* contains configuration related to other configuration

OtherConfig information element

```
-- ASN1START

OtherConfig-r9 ::= SEQUENCE {
    reportProximityConfig-r9            ReportProximityConfig-r9        OPTIONAL,   -- Need ON
    ...,
    [[  idc-Config-r11                  IDC-Config-r11                  OPTIONAL,   -- Need ON
        powerPrefIndicationConfig-r11   PowerPrefIndicationConfig-r11   OPTIONAL,   -- Need ON
        obtainLocationConfig-r11        ObtainLocationConfig-r11        OPTIONAL    -- Need ON
    ]],
```


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```
    [[  bw-PreferenceIndicationTimer-r14        ENUMERATED {s0, s0dot5, s1, s2, s5, s10, s20,
                                            s30, s60, s90, s120, s300, s600, spare3,
                                            spare2, spare1}         OPTIONAL,   -- Need OR
        sps-AssistanceInfoReport-r14        BOOLEAN             OPTIONAL,   -- Need ON
        delayBudgetReportingConfig-r14  CHOICE{
            release                 NULL,
            setup                   SEQUENCE{
                delayBudgetReportingProhibitTimer-r14   ENUMERATED {
                                                        s0, s0dot4, s0dot8,
                                                        s1dot6, s3, s6, s12, s30}
            }
        }                                                       OPTIONAL,   -- Need ON
        rlm-ReportConfig-r14            CHOICE {
            release                 NULL,
            setup                   SEQUENCE{
                rlmReportTimer-r14              ENUMERATED {s0, s0dot5, s1, s2, s5, s10, s20, s30,
                                                s60, s90, s120, s300, s600, spare3, spare2, spare1},
                rlmReportRep-MPDCCH-r14         ENUMERATED {setup}      OPTIONAL    -- Need OR
            }
        }   OPTIONAL    -- Need ON
    ]],
    [[  overheatingAssistanceConfig-r14 CHOICE{
            release                 NULL,
            setup                   SEQUENCE{
                overheatingIndicationProhibitTimer-r14  ENUMERATED {s0, s0dot5, s1, s2, s5, s10,
                                                         s20, s30, s60, s90, s120, s300, s600,
                                                         spare3, spare2, spare1}
            }
        }   OPTIONAL        -- Need ON
    ]]
}

IDC-Config-r11 ::=              SEQUENCE {
    idc-Indication-r11                  ENUMERATED {setup}              OPTIONAL,   -- Need OR
    autonomousDenialParameters-r11      SEQUENCE {
            autonomousDenialSubframes-r11           ENUMERATED {n2, n5, n10, n15,
                                                        n20, n30, spare2, spare1},
            autonomousDenialValidity-r11            ENUMERATED {
                                                        sf200, sf500, sf1000, sf2000,
                                                        spare4, spare3, spare2, spare1}
    }       OPTIONAL,       -- Need OR
    ...,
    [[  idc-Indication-UL-CA-r11            ENUMERATED {setup}      OPTIONAL    -- Cond idc-Ind
    ]],
    [[  idc-HardwareSharingIndication-r13   ENUMERATED {setup}      OPTIONAL    -- Need OR
    ]]
}

ObtainLocationConfig-r11 ::= SEQUENCE {
    obtainLocation-r11              ENUMERATED {setup}                  OPTIONAL    -- Need OR
}

PowerPrefIndicationConfig-r11 ::= CHOICE{
    release                 NULL,
    setup                   SEQUENCE{
        powerPrefIndicationTimer-r11        ENUMERATED {s0, s0dot5, s1, s2, s5, s10, s20,
                                            s30, s60, s90, s120, s300, s600, spare3,
                                            spare2, spare1}
    }
}

ReportProximityConfig-r9 ::= SEQUENCE {
    proximityIndicationEUTRA-r9     ENUMERATED {enabled}            OPTIONAL,   -- Need OR
    proximityIndicationUTRA-r9      ENUMERATED {enabled}            OPTIONAL    -- Need OR
}

-- ASN1STOP
```


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OtherConfig field descriptions
autonomousDenialSubframes Indicates the maximum number of the UL subframes for which the UE is allowed to deny any UL transmission. Value n2 corresponds to 2 subframes, n5 to 5 subframes and so on. E-UTRAN does not configure autonomous denial for frequencies on which SCG cells are configured.
autonomousDenialValidity Indicates the validity period over which the UL autonomous denial subframes shall be counted. Value sf200 corresponds to 200 subframes, sf500 corresponds to 500 subframes and so on.
bw-PreferenceIndicationTimer Prohibit timer for bandwidth preference indication reporting. Value in seconds. Value s0 means prohibit timer is set to 0 second, value s0dot5 means prohibit timer is set to 0.5 second, value s1 means prohibit timer is set to 1 second and so on.
delayBudgetReportingProhibitTimer Prohibit timer for delay budget reporting. Value in seconds. Value s0 means prohibit timer is set to 0 second, value s0dot4 means prohibit timer is set to 0.4 second, and so on.
idc-HardwareSharingIndication The field is used to indicate whether the UE is allowed indicate in *InDeviceCoexIndication* that the cause of the problems are due to hardware sharing, and whether the UE is allowed to omit the TDM assistance information.
idc-Indication The field is used to indicate whether the UE is configured to initiate transmission of the *InDeviceCoexIndication* message to the network.
idc-Indication-UL-CA The field is used to indicate whether the UE is configured to provide IDC indications for UL CA using the *InDeviceCoexIndication* message.
obtainLocation Requests the UE to attempt to have detailed location information available using GNSS. E-UTRAN configures the field only if *includeLocationInfo* is configured for one or more measurements.
overheatingAssistanceConfig Configuration for the UE to report assistance information to inform the eNB about UE detected internal overheating.
overheatingIndicationProhibitTimer Prohibit timer for overheating assistance information reporting. Value in seconds. Value s0 means prohibit timer is set to 0 seconds, value s0dot5 means prohibit timer is set to 0.5 second, value s1 means prohibit timer is set to 1 second and so on.
powerPrefIndicationTimer Prohibit timer for Power Preference Indication reporting. Value in seconds. Value s0 means prohibit timer is set to 0 second, value s0dot5 means prohibit timer is set to 0.5 second, value s1 means prohibit timer is set to 1 second and so on.
reportProximityConfig Indicates, for each of the applicable RATs (EUTRA, UTRA), whether or not proximity indication is enabled for CSG member cell(s) of the concerned RAT. Note.
rlmReportTimer Prohibit timer for RLM event reporting, i.e. "early-out-of-sync" and "early-in-sync" event reporting, as specified in section 5.6.10. Value in seconds. Value s0 means prohibit timer is set to 0 second, value s0dot5 means prohibit timer is set to 0.5 second, value s1 means prohibit timer is set to 1 second and so on.
rlmReportRep-MPDCCH The field is used to indicate whether the UE is configured to report excess repetitions on MPDCCH.
sps-AssistanceInfoReport Value TRUE indicates that the UE is allowed to report SPS-AssistanceInformation.

NOTE: Enabling/ disabling of proximity indication includes enabling/ disabling of the related functionality e.g. autonomous search in connected mode.

Conditional presence	Explanation
idc-Ind	The field is optionally present if *idc-Indication* is present, need OR. Otherwise the field is not present.

– *RAND-CDMA2000 (1xRTT)*

The *RAND-CDMA2000* concerns a random value, generated by the eNB, to be passed to the CDMA2000 upper layers.

RAND-CDMA2000 information element

```
-- ASN1START

RAND-CDMA2000 ::=                       BIT STRING (SIZE (32))
```


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```
-- ASN1STOP
```

– RAT-Type

The IE *RAT-Type* is used to indicate the radio access technology (RAT), including E-UTRA, of the requested/ transferred UE capabilities.

RAT-Type information element

```
-- ASN1START

RAT-Type ::=                        ENUMERATED {
                                        eutra, utra, geran-cs, geran-ps, cdma2000-1XRTT,
                                        spare3, spare2, spare1, ...}

-- ASN1STOP
```

– ResumeIdentity

The IE *ResumeIdentity* is used to identify the suspended UE context

ResumeIdentity information element

```
-- ASN1START

ResumeIdentity-r13 ::=                  BIT STRING (SIZE(40))

-- ASN1STOP
```

– RRC-TransactionIdentifier

The IE *RRC-TransactionIdentifier* is used, together with the message type, for the identification of an RRC procedure (transaction).

RRC-TransactionIdentifier information element

```
-- ASN1START

RRC-TransactionIdentifier ::=       INTEGER (0..3)

-- ASN1STOP
```

– S-TMSI

The IE *S-TMSI* contains an S-Temporary Mobile Subscriber Identity, a temporary UE identity provided by the EPC which uniquely identifies the UE within the tracking area, see TS 23.003 [27].

S-TMSI information element

```
-- ASN1START

S-TMSI ::=                          SEQUENCE {
    mmec                                MMEC,
    m-TMSI                              BIT STRING (SIZE (32))
}

-- ASN1STOP
```


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S-TMSI field descriptions
m-TMSI
The first/leftmost bit of the bit string contains the most significant bit of the M-TMSI.

– *TraceReference*

The *TraceReference* contains parameter Trace Reference as defined in TS 32.422 [58].

TraceReference information element

```
-- ASN1START

TraceReference-r10 ::=          SEQUENCE {
    plmn-Identity-r10               PLMN-Identity,
    traceId-r10                     OCTET STRING (SIZE (3))
}

-- ASN1STOP
```

– *UE-CapabilityRAT-ContainerList*

The IE *UE-CapabilityRAT-ContainerList* contains list of containers, one for each RAT for which UE capabilities are transferred, if any.

UE-CapabilityRAT-ContainerList information element

```
-- ASN1START

UE-CapabilityRAT-ContainerList ::=SEQUENCE (SIZE (0..maxRAT-Capabilities)) OF UE-CapabilityRAT-
Container

UE-CapabilityRAT-Container ::= SEQUENCE {
    rat-Type                        RAT-Type,
    ueCapabilityRAT-Container       OCTET STRING
}

-- ASN1STOP
```

UECapabilityRAT-ContainerList field descriptions
ueCapabilityRAT-Container
Container for the UE capabilities of the indicated RAT. The encoding is defined in the specification of each RAT: For E-UTRA: the encoding of UE capabilities is defined in IE *UE-EUTRA-Capability*. For UTRA: the octet string contains the INTER RAT HANDOVER INFO message defined in TS 25.331 [19]. For GERAN CS: the octet string contains the concatenated string of the Mobile Station Classmark 2 and Mobile Station Classmark 3. The first 5 octets correspond to Mobile Station Classmark 2 and the following octets correspond to Mobile Station Classmark 3. The Mobile Station Classmark 2 is formatted as 'TLV' and is coded in the same way as the *Mobile Station Classmark 2* information element in TS 24.008 [49]. The first octet is the *Mobile station classmark 2 IEI* and its value shall be set to 33H. The second octet is the *Length of mobile station classmark 2* and its value shall be set to 3. The octet 3 contains the first octet of the value part of the *Mobile Station Classmark 2* information element, the octet 4 contains the second octet of the value part of the *Mobile Station Classmark 2* information element and so on. For each of these octets, the first/ leftmost/ most significant bit of the octet contains b8 of the corresponding octet of the Mobile Station Classmark 2. The Mobile Station Classmark 3 is formatted as 'V' and is coded in the same way as the value part in the *Mobile station classmark 3* information element in TS 24.008 [49]. The sixth octet of this octet string contains octet 1 of the value part of *Mobile station classmark 3*, the seventh of octet of this octet string contains octet 2 of the value part of *Mobile station classmark 3* and so on. Note. For GERAN PS: the encoding of UE capabilities is formatted as 'V' and is coded in the same way as the value part in the *MS Radio Access Capability* information element in TS 24.008 [49]. For CDMA2000-1XRTT: the octet string contains the A21 Mobile Subscription Information and the encoding of this is defined in A.S0008 [33]. The A21 Mobile Subscription Information contains the supported CDMA2000 1xRTT band class and band sub-class information.

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NOTE: The value part is specified by means of CSN.1, which encoding results in a bit string, to which final padding may be appended up to the next octet boundary TS 24.008 [49]. The first/ leftmost bit of the CSN.1 bit string is placed in the first/ leftmost/ most significant bit of the first octet. This continues until the last bit of the CSN.1 bit string, which is placed in the last/ rightmost/ least significant bit of the last octet.

– *UE-EUTRA-Capability*

The IE *UE-EUTRA-Capability* is used to convey the E-UTRA UE Radio Access Capability Parameters, see TS 36.306 [5], and the Feature Group Indicators for mandatory features (defined in Annexes B.1 and C.1) to the network. The IE *UE-EUTRA-Capability* is transferred in E-UTRA or in another RAT.

NOTE 0: For (UE capability specific) guidelines on the use of keyword OPTIONAL, see Annex A.3.5.

UE-EUTRA-Capability information element

```
-- ASN1START

UE-EUTRA-Capability ::=         SEQUENCE {
    accessStratumRelease                AccessStratumRelease,
    ue-Category                         INTEGER (1..5),
    pdcp-Parameters                     PDCP-Parameters,
    phyLayerParameters                  PhyLayerParameters,
    rf-Parameters                       RF-Parameters,
    measParameters                      MeasParameters,
    featureGroupIndicators              BIT STRING (SIZE (32))              OPTIONAL,
    interRAT-Parameters             SEQUENCE {
        utraFDD                             IRAT-ParametersUTRA-FDD             OPTIONAL,
        utraTDD128                          IRAT-ParametersUTRA-TDD128              OPTIONAL,
        utraTDD384                          IRAT-ParametersUTRA-TDD384              OPTIONAL,
        utraTDD768                          IRAT-ParametersUTRA-TDD768              OPTIONAL,
        geran                               IRAT-ParametersGERAN                    OPTIONAL,
        cdma2000-HRPD                       IRAT-ParametersCDMA2000-HRPD            OPTIONAL,
        cdma2000-1xRTT                      IRAT-ParametersCDMA2000-1XRTT           OPTIONAL
    },
    nonCriticalExtension                UE-EUTRA-Capability-v920-IEs        OPTIONAL
}

-- Late non critical extensions
UE-EUTRA-Capability-v9a0-IEs ::=    SEQUENCE {
    featureGroupIndRel9Add-r9           BIT STRING (SIZE (32))              OPTIONAL,
    fdd-Add-UE-EUTRA-Capabilities-r9    UE-EUTRA-CapabilityAddXDD-Mode-r9   OPTIONAL,
    tdd-Add-UE-EUTRA-Capabilities-r9    UE-EUTRA-CapabilityAddXDD-Mode-r9   OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v9c0-IEs        OPTIONAL
}

UE-EUTRA-Capability-v9c0-IEs ::=        SEQUENCE {
    interRAT-ParametersUTRA-v9c0        IRAT-ParametersUTRA-v9c0        OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v9d0-IEs    OPTIONAL
}

UE-EUTRA-Capability-v9d0-IEs ::=        SEQUENCE {
    phyLayerParameters-v9d0             PhyLayerParameters-v9d0         OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v9e0-IEs    OPTIONAL
}

UE-EUTRA-Capability-v9e0-IEs ::=    SEQUENCE {
    rf-Parameters-v9e0                  RF-Parameters-v9e0                  OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v9h0-IEs        OPTIONAL
}

UE-EUTRA-Capability-v9h0-IEs ::=    SEQUENCE {
    interRAT-ParametersUTRA-v9h0        IRAT-ParametersUTRA-v9h0            OPTIONAL,
    -- Following field is only to be used for late REL-9 extensions
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v10c0-IEs        OPTIONAL
}

UE-EUTRA-Capability-v10c0-IEs ::=   SEQUENCE {
    otdoa-PositioningCapabilities-r10   OTDOA-PositioningCapabilities-r10       OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v10f0-IEs           OPTIONAL
}

UE-EUTRA-Capability-v10f0-IEs ::=   SEQUENCE {
```


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```
    rf-Parameters-v10f0                 RF-Parameters-v10f0                     OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v10i0-IEs           OPTIONAL
}

UE-EUTRA-Capability-v10i0-IEs ::=   SEQUENCE {
    rf-Parameters-v10i0                 RF-Parameters-v10i0                     OPTIONAL,
    -- Following field is only to be used for late REL-10 extensions
    lateNonCriticalExtension            OCTET STRING (CONTAINING UE-EUTRA-Capability-v10j0-IEs)
    OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v11d0-IEs           OPTIONAL
}

UE-EUTRA-Capability-v10j0-IEs ::=   SEQUENCE {
    rf-Parameters-v10j0                 RF-Parameters-v10j0                     OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                             OPTIONAL
}

UE-EUTRA-Capability-v11d0-IEs ::=   SEQUENCE {
    rf-Parameters-v11d0                 RF-Parameters-v11d0                     OPTIONAL,
    otherParameters-v11d0               Other-Parameters-v11d0                  OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v11x0-IEs           OPTIONAL
}

UE-EUTRA-Capability-v11x0-IEs ::=   SEQUENCE {
    -- Following field is only to be used for late REL-11 extensions
    lateNonCriticalExtension            OCTET STRING                                OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v12b0-IEs               OPTIONAL
}

UE-EUTRA-Capability-v12b0-IEs ::= SEQUENCE {
    rf-Parameters-v12b0                 RF-Parameters-v12b0                     OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v12x0-IEs           OPTIONAL
}

UE-EUTRA-Capability-v12x0-IEs ::= SEQUENCE {
    -- Following field is only to be used for late REL-12 extensions
    lateNonCriticalExtension            OCTET STRING                            OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v1370-IEs           OPTIONAL
}

UE-EUTRA-Capability-v1370-IEs ::= SEQUENCE {
    ce-Parameters-v1370                 CE-Parameters-v1370                     OPTIONAL,
    fdd-Add-UE-EUTRA-Capabilities-v1370 UE-EUTRA-CapabilityAddXDD-Mode-v1370    OPTIONAL,
    tdd-Add-UE-EUTRA-Capabilities-v1370 UE-EUTRA-CapabilityAddXDD-Mode-v1370    OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v1380-IEs           OPTIONAL
}

UE-EUTRA-Capability-v1380-IEs ::= SEQUENCE {
    rf-Parameters-v1380                 RF-Parameters-v1380                     OPTIONAL,
    ce-Parameters-v1380                 CE-Parameters-v1380,
    fdd-Add-UE-EUTRA-Capabilities-v1380 UE-EUTRA-CapabilityAddXDD-Mode-v1380,
    tdd-Add-UE-EUTRA-Capabilities-v1380 UE-EUTRA-CapabilityAddXDD-Mode-v1380,
    -- Following field is only to be used for late REL-13 extensions
    nonCriticalExtension                SEQUENCE {}                             OPTIONAL
}

-- Regular non critical extensions
UE-EUTRA-Capability-v920-IEs ::=        SEQUENCE {
    phyLayerParameters-v920             PhyLayerParameters-v920,
    interRAT-ParametersGERAN-v920           IRAT-ParametersGERAN-v920,
    interRAT-ParametersUTRA-v920            IRAT-ParametersUTRA-v920            OPTIONAL,
    interRAT-ParametersCDMA2000-v920        IRAT-ParametersCDMA2000-1XRTT-v920  OPTIONAL,
    deviceType-r9                           ENUMERATED {noBenFromBatConsumpOpt} OPTIONAL,
    csg-ProximityIndicationParameters-r9    CSG-ProximityIndicationParameters-r9,
    neighCellSI-AcquisitionParameters-r9    NeighCellSI-AcquisitionParameters-r9,
    son-Parameters-r9                       SON-Parameters-r9,
    nonCriticalExtension                    UE-EUTRA-Capability-v940-IEs        OPTIONAL
}

UE-EUTRA-Capability-v940-IEs ::=    SEQUENCE {
    lateNonCriticalExtension            OCTET STRING (CONTAINING UE-EUTRA-Capability-v9a0-IEs)
                                                                                OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v1020-IEs       OPTIONAL
}

UE-EUTRA-Capability-v1020-IEs ::=   SEQUENCE {
    ue-Category-v1020                   INTEGER (6..8)                          OPTIONAL,
    phyLayerParameters-v1020            PhyLayerParameters-v1020                OPTIONAL,
```


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```
    rf-Parameters-v1020                 RF-Parameters-v1020                     OPTIONAL,
    measParameters-v1020                MeasParameters-v1020                    OPTIONAL,
    featureGroupIndRel10-r10            BIT STRING (SIZE (32))                  OPTIONAL,
    interRAT-ParametersCDMA2000-v1020   IRAT-ParametersCDMA2000-1XRTT-v1020     OPTIONAL,
    ue-BasedNetwPerfMeasParameters-r10  UE-BasedNetwPerfMeasParameters-r10      OPTIONAL,
    interRAT-ParametersUTRA-TDD-v1020   IRAT-ParametersUTRA-TDD-v1020           OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v1060-IEs           OPTIONAL
}

UE-EUTRA-Capability-v1060-IEs ::=   SEQUENCE {
    fdd-Add-UE-EUTRA-Capabilities-v1060 UE-EUTRA-CapabilityAddXDD-Mode-v1060    OPTIONAL,
    tdd-Add-UE-EUTRA-Capabilities-v1060 UE-EUTRA-CapabilityAddXDD-Mode-v1060    OPTIONAL,
    rf-Parameters-v1060                 RF-Parameters-v1060                     OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v1090-IEs           OPTIONAL
}

UE-EUTRA-Capability-v1090-IEs ::=   SEQUENCE {
    rf-Parameters-v1090                 RF-Parameters-v1090                     OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v1130-IEs           OPTIONAL
}

UE-EUTRA-Capability-v1130-IEs ::=   SEQUENCE {
    pdcp-Parameters-v1130               PDCP-Parameters-v1130,
    phyLayerParameters-v1130            PhyLayerParameters-v1130                OPTIONAL,
    rf-Parameters-v1130                 RF-Parameters-v1130,
    measParameters-v1130                MeasParameters-v1130,
    interRAT-ParametersCDMA2000-v1130   IRAT-ParametersCDMA2000-v1130,
    otherParameters-r11                 Other-Parameters-r11,
    fdd-Add-UE-EUTRA-Capabilities-v1130 UE-EUTRA-CapabilityAddXDD-Mode-v1130    OPTIONAL,
    tdd-Add-UE-EUTRA-Capabilities-v1130 UE-EUTRA-CapabilityAddXDD-Mode-v1130    OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v1170-IEs           OPTIONAL
}

UE-EUTRA-Capability-v1170-IEs ::=   SEQUENCE {
    phyLayerParameters-v1170            PhyLayerParameters-v1170                OPTIONAL,
    ue-Category-v1170                   INTEGER (9..10)                         OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v1180-IEs           OPTIONAL
}

UE-EUTRA-Capability-v1180-IEs ::=   SEQUENCE {
    rf-Parameters-v1180                 RF-Parameters-v1180                     OPTIONAL,
    mbms-Parameters-r11                 MBMS-Parameters-r11                     OPTIONAL,
    fdd-Add-UE-EUTRA-Capabilities-v1180 UE-EUTRA-CapabilityAddXDD-Mode-v1180    OPTIONAL,
    tdd-Add-UE-EUTRA-Capabilities-v1180 UE-EUTRA-CapabilityAddXDD-Mode-v1180    OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v11a0-IEs           OPTIONAL
}

UE-EUTRA-Capability-v11a0-IEs ::=   SEQUENCE {
    ue-Category-v11a0                   INTEGER (11..12)                        OPTIONAL,
    measParameters-v11a0                MeasParameters-v11a0                    OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v1250-IEs           OPTIONAL
}

UE-EUTRA-Capability-v1250-IEs ::=   SEQUENCE {
    phyLayerParameters-v1250            PhyLayerParameters-v1250                OPTIONAL,
    rf-Parameters-v1250                 RF-Parameters-v1250                     OPTIONAL,
    rlc-Parameters-r12                  RLC-Parameters-r12                      OPTIONAL,
    ue-BasedNetwPerfMeasParameters-v1250    UE-BasedNetwPerfMeasParameters-v1250    OPTIONAL,
    ue-CategoryDL-r12                   INTEGER (0..14)                         OPTIONAL,
    ue-CategoryUL-r12                   INTEGER (0..13)                         OPTIONAL,
    wlan-IW-Parameters-r12              WLAN-IW-Parameters-r12                  OPTIONAL,
    measParameters-v1250                MeasParameters-v1250                    OPTIONAL,
    dc-Parameters-r12                   DC-Parameters-r12                       OPTIONAL,
    mbms-Parameters-v1250               MBMS-Parameters-v1250                   OPTIONAL,
    mac-Parameters-r12                  MAC-Parameters-r12                      OPTIONAL,
    fdd-Add-UE-EUTRA-Capabilities-v1250 UE-EUTRA-CapabilityAddXDD-Mode-v1250    OPTIONAL,
    tdd-Add-UE-EUTRA-Capabilities-v1250 UE-EUTRA-CapabilityAddXDD-Mode-v1250    OPTIONAL,
    sl-Parameters-r12               SL-Parameters-r12                   OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v1260-IEs           OPTIONAL
}

UE-EUTRA-Capability-v1260-IEs ::=   SEQUENCE {
    ue-CategoryDL-v1260                 INTEGER (15..16)                        OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v1270-IEs           OPTIONAL
}

UE-EUTRA-Capability-v1270-IEs ::= SEQUENCE {
    rf-Parameters-v1270                 RF-Parameters-v1270                     OPTIONAL,
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    nonCriticalExtension               UE-EUTRA-Capability-v1280-IEs           OPTIONAL
}

UE-EUTRA-Capability-v1280-IEs ::= SEQUENCE {
    phyLayerParameters-v1280           PhyLayerParameters-v1280                OPTIONAL,
    nonCriticalExtension               UE-EUTRA-Capability-v1310-IEs           OPTIONAL
}

UE-EUTRA-Capability-v1310-IEs ::= SEQUENCE {
    ue-CategoryDL-v1310             ENUMERATED {n17, m1}                    OPTIONAL,
    ue-CategoryUL-v1310             ENUMERATED {n14, m1}                    OPTIONAL,
    pdcp-Parameters-v1310               PDCP-Parameters-v1310,
    rlc-Parameters-v1310                RLC-Parameters-v1310,
    mac-Parameters-v1310                MAC-Parameters-v1310                    OPTIONAL,
    phyLayerParameters-v1310            PhyLayerParameters-v1310                OPTIONAL,
    rf-Parameters-v1310                 RF-Parameters-v1310                     OPTIONAL,
    measParameters-v1310                MeasParameters-v1310                    OPTIONAL,
    dc-Parameters-v1310                 DC-Parameters-v1310                     OPTIONAL,
    sl-Parameters-v1310                 SL-Parameters-v1310                     OPTIONAL,
    scptm-Parameters-r13                SCPTM-Parameters-r13                    OPTIONAL,
    ce-Parameters-r13                   CE-Parameters-r13                       OPTIONAL,
    interRAT-ParametersWLAN-r13         IRAT-ParametersWLAN-r13,
    laa-Parameters-r13                  LAA-Parameters-r13                      OPTIONAL,
    lwa-Parameters-r13                  LWA-Parameters-r13                      OPTIONAL,
    wlan-IW-Parameters-v1310                WLAN-IW-Parameters-v1310,
    lwip-Parameters-r13                 LWIP-Parameters-r13,
    fdd-Add-UE-EUTRA-Capabilities-v1310 UE-EUTRA-CapabilityAddXDD-Mode-v1310    OPTIONAL,
    tdd-Add-UE-EUTRA-Capabilities-v1310 UE-EUTRA-CapabilityAddXDD-Mode-v1310    OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v1320-IEs           OPTIONAL
}

UE-EUTRA-Capability-v1320-IEs ::= SEQUENCE {
    ce-Parameters-v1320                 CE-Parameters-v1320                     OPTIONAL,
    phyLayerParameters-v1320            PhyLayerParameters-v1320                OPTIONAL,
    rf-Parameters-v1320                 RF-Parameters-v1320                     OPTIONAL,
    fdd-Add-UE-EUTRA-Capabilities-v1320 UE-EUTRA-CapabilityAddXDD-Mode-v1320    OPTIONAL,
    tdd-Add-UE-EUTRA-Capabilities-v1320 UE-EUTRA-CapabilityAddXDD-Mode-v1320    OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v1330-IEs           OPTIONAL
}

UE-EUTRA-Capability-v1330-IEs ::= SEQUENCE {
    ue-CategoryDL-v1330                 INTEGER (18..19)                        OPTIONAL,
    phyLayerParameters-v1330            PhyLayerParameters-v1330                OPTIONAL,
    ue-CE-NeedULGaps-r13                ENUMERATED {true}                   OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v1340-IEs       OPTIONAL
}

UE-EUTRA-Capability-v1340-IEs ::= SEQUENCE {
    ue-CategoryUL-v1340             INTEGER (15)                            OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v1350-IEs           OPTIONAL
}

UE-EUTRA-Capability-v1350-IEs ::= SEQUENCE {
    ue-CategoryDL-v1350             ENUMERATED {oneBis}                     OPTIONAL,
    ue-CategoryUL-v1350             ENUMERATED {oneBis}                     OPTIONAL,
    ce-Parameters-v1350             CE-Parameters-v1350,
    nonCriticalExtension            UE-EUTRA-Capability-v1360-IEs           OPTIONAL
}

UE-EUTRA-Capability-v1360-IEs ::= SEQUENCE {
    other-Parameters-v1360      Other-Parameters-v1360                  OPTIONAL,
    nonCriticalExtension        UE-EUTRA-Capability-v1430-IEs           OPTIONAL
}

UE-EUTRA-Capability-v1430-IEs ::= SEQUENCE {
    phyLayerParameters-v1430            PhyLayerParameters-v1430,
    ue-CategoryDL-v1430                 ENUMERATED {m2}                         OPTIONAL,
    ue-CategoryUL-v1430                 ENUMERATED {n16, n17, n18, n19, n20, m2}    OPTIONAL,
    ue-CategoryUL-v1430b                ENUMERATED {n21}                        OPTIONAL,
    mac-Parameters-v1430                MAC-Parameters-v1430                    OPTIONAL,
    measParameters-v1430                MeasParameters-v1430                    OPTIONAL,
    pdcp-Parameters-v1430               PDCP-Parameters-v1430                   OPTIONAL,
    rlc-Parameters-v1430                RLC-Parameters-v1430,
    rf-Parameters-v1430                 RF-Parameters-v1430                     OPTIONAL,
    laa-Parameters-v1430                LAA-Parameters-v1430                    OPTIONAL,
    lwa-Parameters-v1430                LWA-Parameters-v1430                    OPTIONAL,
    lwip-Parameters-v1430               LWIP-Parameters-v1430                   OPTIONAL,
    otherParameters-v1430               Other-Parameters-v1430,
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```
    mmtel-Parameters-r14                MMTEL-Parameters-r14                    OPTIONAL,
    mobilityParameters-r14              MobilityParameters-r14                  OPTIONAL,
    ce-Parameters-v1430                 CE-Parameters-v1430,
    fdd-Add-UE-EUTRA-Capabilities-v1430 UE-EUTRA-CapabilityAddXDD-Mode-v1430    OPTIONAL,
    tdd-Add-UE-EUTRA-Capabilities-v1430 UE-EUTRA-CapabilityAddXDD-Mode-v1430    OPTIONAL,
    mbms-Parameters-v1430               MBMS-Parameters-v1430                   OPTIONAL,
    sl-Parameters-v1430                 SL-Parameters-v1430                     OPTIONAL,
    ue-BasedNetwPerfMeasParameters-v1430    UE-BasedNetwPerfMeasParameters-v1430        OPTIONAL,
    highSpeedEnhParameters-r14          HighSpeedEnhParameters-r14              OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v1440-IEs           OPTIONAL
}

UE-EUTRA-Capability-v1440-IEs ::= SEQUENCE {
    lwa-Parameters-v1440                LWA-Parameters-v1440,
    mac-Parameters-v1440                MAC-Parameters-v1440,
    nonCriticalExtension                UE-EUTRA-Capability-v1450-IEs           OPTIONAL
}

UE-EUTRA-Capability-v1450-IEs ::= SEQUENCE {
    phyLayerParameters-v1450            PhyLayerParameters-v1450        OPTIONAL,
    rf-Parameters-v1450                 RF-Parameters-v1450         OPTIONAL,
    otherParameters-v1450               OtherParameters-v1450,
    ue-CategoryDL-v1450                 INTEGER (20)                    OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                     OPTIONAL
}

UE-EUTRA-CapabilityAddXDD-Mode-r9 ::=   SEQUENCE {
    phyLayerParameters-r9               PhyLayerParameters                  OPTIONAL,
    featureGroupIndicators-r9           BIT STRING (SIZE (32))              OPTIONAL,
    featureGroupIndRel9Add-r9           BIT STRING (SIZE (32))              OPTIONAL,
    interRAT-ParametersGERAN-r9         IRAT-ParametersGERAN                OPTIONAL,
    interRAT-ParametersUTRA-r9          IRAT-ParametersUTRA-v920            OPTIONAL,
    interRAT-ParametersCDMA2000-r9      IRAT-ParametersCDMA2000-1XRTT-v920  OPTIONAL,
    neighCellSI-AcquisitionParameters-r9    NeighCellSI-AcquisitionParameters-r9    OPTIONAL,
    ...
}

UE-EUTRA-CapabilityAddXDD-Mode-v1060 ::=    SEQUENCE {
    phyLayerParameters-v1060            PhyLayerParameters-v1020            OPTIONAL,
    featureGroupIndRel10-v1060          BIT STRING (SIZE (32))              OPTIONAL,
    interRAT-ParametersCDMA2000-v1060   IRAT-ParametersCDMA2000-1XRTT-v1020 OPTIONAL,
    interRAT-ParametersUTRA-TDD-v1060   IRAT-ParametersUTRA-TDD-v1020       OPTIONAL,
    ...,
    [[  otdoa-PositioningCapabilities-r10   OTDOA-PositioningCapabilities-r10   OPTIONAL
    ]]
}

UE-EUTRA-CapabilityAddXDD-Mode-v1130 ::=    SEQUENCE {
    phyLayerParameters-v1130            PhyLayerParameters-v1130            OPTIONAL,
    measParameters-v1130                MeasParameters-v1130                OPTIONAL,
    otherParameters-r11                 Other-Parameters-r11                OPTIONAL,
    ...
}

UE-EUTRA-CapabilityAddXDD-Mode-v1180 ::=    SEQUENCE {
    mbms-Parameters-r11                 MBMS-Parameters-r11
}

UE-EUTRA-CapabilityAddXDD-Mode-v1250 ::=    SEQUENCE {
    phyLayerParameters-v1250            PhyLayerParameters-v1250            OPTIONAL,
    measParameters-v1250                MeasParameters-v1250                OPTIONAL
}

UE-EUTRA-CapabilityAddXDD-Mode-v1310 ::=    SEQUENCE {
    phyLayerParameters-v1310            PhyLayerParameters-v1310            OPTIONAL
}

UE-EUTRA-CapabilityAddXDD-Mode-v1320 ::=    SEQUENCE {
    phyLayerParameters-v1320            PhyLayerParameters-v1320            OPTIONAL,
    scptm-Parameters-r13                SCPTM-Parameters-r13                OPTIONAL
}

UE-EUTRA-CapabilityAddXDD-Mode-v1370 ::=    SEQUENCE {
    ce-Parameters-v1370                 CE-Parameters-v1370                 OPTIONAL
}

UE-EUTRA-CapabilityAddXDD-Mode-v1380 ::=    SEQUENCE {
    ce-Parameters-v1380                 CE-Parameters-v1380
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}

UE-EUTRA-CapabilityAddXDD-Mode-v1430 ::=    SEQUENCE {
    phyLayerParameters-v1430            PhyLayerParameters-v1430            OPTIONAL,
    mmtel-Parameters-r14                MMTEL-Parameters-r14                OPTIONAL
}

AccessStratumRelease ::=            ENUMERATED {
                                        rel8, rel9, rel10, rel11, rel12, rel13,
                                        rel14, spare1, ...}

MobilityParameters-r14 ::=          SEQUENCE {
    makeBeforeBreak-r14                 ENUMERATED {supported}                  OPTIONAL,
    rach-Less-r14                       ENUMERATED {supported}                  OPTIONAL
}

DC-Parameters-r12 ::=           SEQUENCE {
    drb-TypeSplit-r12                       ENUMERATED {supported}          OPTIONAL,
    drb-TypeSCG-r12                         ENUMERATED {supported}          OPTIONAL
}

DC-Parameters-v1310 ::=         SEQUENCE {
    pdcp-TransferSplitUL-r13                ENUMERATED {supported}          OPTIONAL,
    ue-SSTD-Meas-r13                        ENUMERATED {supported}          OPTIONAL
}

MAC-Parameters-r12 ::=              SEQUENCE {
    logicalChannelSR-ProhibitTimer-r12  ENUMERATED {supported}              OPTIONAL,
    longDRX-Command-r12             ENUMERATED {supported}                  OPTIONAL
}

MAC-Parameters-v1310 ::=                SEQUENCE {
    extendedMAC-LengthField-r13     ENUMERATED {supported}              OPTIONAL,
    extendedLongDRX-r13             ENUMERATED {supported}              OPTIONAL
}

MAC-Parameters-v1430 ::=                SEQUENCE {
    shortSPS-IntervalFDD-r14            ENUMERATED {supported}              OPTIONAL,
    shortSPS-IntervalTDD-r14            ENUMERATED {supported}              OPTIONAL,
    skipUplinkDynamic-r14               ENUMERATED {supported}              OPTIONAL,
    skipUplinkSPS-r14                   ENUMERATED {supported}              OPTIONAL,
    multipleUplinkSPS-r14               ENUMERATED {supported}              OPTIONAL,
    dataInactMon-r14                    ENUMERATED {supported}              OPTIONAL
}

MAC-Parameters-v1440 ::=                SEQUENCE {
    rai-Support-r14                 ENUMERATED {supported}          OPTIONAL
}

RLC-Parameters-r12 ::=              SEQUENCE {
    extended-RLC-LI-Field-r12           ENUMERATED {supported}
}

RLC-Parameters-v1310 ::=                SEQUENCE {
    extendedRLC-SN-SO-Field-r13             ENUMERATED {supported}          OPTIONAL
}

RLC-Parameters-v1430 ::=                SEQUENCE {
    extendedPollByte-r14                        ENUMERATED {supported}          OPTIONAL
}

PDCP-Parameters ::=             SEQUENCE {
    supportedROHC-Profiles              SEQUENCE {
        profile0x0001                       BOOLEAN,
        profile0x0002                       BOOLEAN,
        profile0x0003                       BOOLEAN,
        profile0x0004                       BOOLEAN,
        profile0x0006                       BOOLEAN,
        profile0x0101                       BOOLEAN,
        profile0x0102                       BOOLEAN,
        profile0x0103                       BOOLEAN,
        profile0x0104                       BOOLEAN
    },
    maxNumberROHC-ContextSessions       ENUMERATED {
                                            cs2, cs4, cs8, cs12, cs16, cs24, cs32,
                                            cs48, cs64, cs128, cs256, cs512, cs1024,
                                            cs16384, spare2, spare1}                DEFAULT cs16,
    ...
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}

PDCP-Parameters-v1130 ::=       SEQUENCE {
    pdcp-SN-Extension-r11                   ENUMERATED {supported}          OPTIONAL,
    supportRohcContextContinue-r11          ENUMERATED {supported}          OPTIONAL
}

PDCP-Parameters-v1310 ::=               SEQUENCE {
    pdcp-SN-Extension-18bits-r13            ENUMERATED {supported}  OPTIONAL
}

PDCP-Parameters-v1430 ::=               SEQUENCE {
    supportedUplinkOnlyROHC-Profiles-r14        SEQUENCE {
        profile0x0006-r14                       BOOLEAN
    },
    maxNumberROHC-ContextSessions-r14       ENUMERATED {
                                            cs2, cs4, cs8, cs12, cs16, cs24, cs32,
                                            cs48, cs64, cs128, cs256, cs512, cs1024,
                                            cs16384, spare2, spare1}                DEFAULT cs16
}

PhyLayerParameters ::=              SEQUENCE {
    ue-TxAntennaSelectionSupported      BOOLEAN,
    ue-SpecificRefSigsSupported     BOOLEAN
}

PhyLayerParameters-v920 ::=     SEQUENCE {
    enhancedDualLayerFDD-r9         ENUMERATED {supported}          OPTIONAL,
    enhancedDualLayerTDD-r9         ENUMERATED {supported}          OPTIONAL
}

PhyLayerParameters-v9d0 ::=         SEQUENCE {
    tm5-FDD-r9                      ENUMERATED {supported}          OPTIONAL,
    tm5-TDD-r9                      ENUMERATED {supported}          OPTIONAL
}

PhyLayerParameters-v1020 ::=            SEQUENCE {
    twoAntennaPortsForPUCCH-r10             ENUMERATED {supported}                  OPTIONAL,
    tm9-With-8Tx-FDD-r10                    ENUMERATED {supported}                  OPTIONAL,
    pmi-Disabling-r10                       ENUMERATED {supported}                  OPTIONAL,
    crossCarrierScheduling-r10              ENUMERATED {supported}                  OPTIONAL,
    simultaneousPUCCH-PUSCH-r10             ENUMERATED {supported}                  OPTIONAL,
    multiClusterPUSCH-WithinCC-r10          ENUMERATED {supported}                  OPTIONAL,
    nonContiguousUL-RA-WithinCC-List-r10    NonContiguousUL-RA-WithinCC-List-r10    OPTIONAL
}

PhyLayerParameters-v1130 ::=            SEQUENCE {
    crs-InterfHandl-r11                     ENUMERATED {supported}                  OPTIONAL,
    ePDCCH-r11                              ENUMERATED {supported}                  OPTIONAL,
    multiACK-CSI-Reporting-r11              ENUMERATED {supported}                  OPTIONAL,
    ss-CCH-InterfHandl-r11                  ENUMERATED {supported}                  OPTIONAL,
    tdd-SpecialSubframe-r11                 ENUMERATED {supported}                  OPTIONAL,
    txDiv-PUCCH1b-ChSelect-r11              ENUMERATED {supported}                  OPTIONAL,
    ul-CoMP-r11                             ENUMERATED {supported}                  OPTIONAL
}

PhyLayerParameters-v1170 ::=            SEQUENCE {
    interBandTDD-CA-WithDifferentConfig-r11 BIT STRING (SIZE (2))           OPTIONAL
}

PhyLayerParameters-v1250 ::=            SEQUENCE {
    e-HARQ-Pattern-FDD-r12                  ENUMERATED {supported}          OPTIONAL,
    enhanced-4TxCodebook-r12                ENUMERATED {supported}          OPTIONAL,
    tdd-FDD-CA-PCellDuplex-r12              BIT STRING (SIZE (2))           OPTIONAL,
    phy-TDD-ReConfig-TDD-PCell-r12          ENUMERATED {supported}          OPTIONAL,
    phy-TDD-ReConfig-FDD-PCell-r12          ENUMERATED {supported}          OPTIONAL,
    pusch-FeedbackMode-r12                  ENUMERATED {supported}          OPTIONAL,
    pusch-SRS-PowerControl-SubframeSet-r12  ENUMERATED {supported}          OPTIONAL,
    csi-SubframeSet-r12                     ENUMERATED {supported}          OPTIONAL,
    noResourceRestrictionForTTIBundling-r12 ENUMERATED {supported}          OPTIONAL,
    discoverySignalsInDeactSCell-r12        ENUMERATED {supported}          OPTIONAL,
    naics-Capability-List-r12               NAICS-Capability-List-r12       OPTIONAL
}

PhyLayerParameters-v1280 ::=            SEQUENCE {
    alternativeTBS-Indices-r12              ENUMERATED {supported}          OPTIONAL
}
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PhyLayerParameters-v1310 ::=            SEQUENCE {
    aperiodicCSI-Reporting-r13              BIT STRING (SIZE (2))           OPTIONAL,
    codebook-HARQ-ACK-r13                   BIT STRING (SIZE (2))           OPTIONAL,
    crossCarrierScheduling-B5C-r13          ENUMERATED {supported}          OPTIONAL,
    fdd-HARQ-TimingTDD-r13                  ENUMERATED {supported}          OPTIONAL,
    maxNumberUpdatedCSI-Proc-r13            INTEGER(5..32)                  OPTIONAL,
    pucch-Format4-r13                       ENUMERATED {supported}          OPTIONAL,
    pucch-Format5-r13                       ENUMERATED {supported}          OPTIONAL,
    pucch-SCell-r13                         ENUMERATED {supported}          OPTIONAL,
    spatialBundling-HARQ-ACK-r13            ENUMERATED {supported}          OPTIONAL,
    supportedBlindDecoding-r13              SEQUENCE {
        maxNumberDecoding-r13                   INTEGER(1..32)                  OPTIONAL,
        pdcch-CandidateReductions-r13           ENUMERATED {supported}          OPTIONAL,
        skipMonitoringDCI-Format0-1A-r13        ENUMERATED {supported}          OPTIONAL
    }                                                                           OPTIONAL,
    uci-PUSCH-Ext-r13                       ENUMERATED {supported}          OPTIONAL,
    crs-InterfMitigationTM10-r13            ENUMERATED {supported}          OPTIONAL,
    pdsch-CollisionHandling-r13             ENUMERATED {supported}          OPTIONAL
}

PhyLayerParameters-v1320 ::=            SEQUENCE {
    mimo-UE-Parameters-r13                  MIMO-UE-Parameters-r13          OPTIONAL
}

PhyLayerParameters-v1330 ::=            SEQUENCE {
    cch-InterfMitigation-RefRecTypeA-r13    ENUMERATED {supported}          OPTIONAL,
    cch-InterfMitigation-RefRecTypeB-r13    ENUMERATED {supported}          OPTIONAL,
    cch-InterfMitigation-MaxNumCCs-r13      INTEGER (1.. maxServCell-r13)   OPTIONAL,
    crs-InterfMitigationTM1toTM9-r13        INTEGER (1.. maxServCell-r13)   OPTIONAL
}

PhyLayerParameters-v1430 ::=            SEQUENCE {
    ce-PUSCH-NB-MaxTBS-r14                  ENUMERATED {supported}          OPTIONAL,
    ce-PDSCH-PUSCH-MaxBandwidth-r14         ENUMERATED {bw5, bw20}          OPTIONAL,
    ce-HARQ-AckBundling-r14                 ENUMERATED {supported}          OPTIONAL,
    ce-PDSCH-TenProcesses-r14               ENUMERATED {supported}          OPTIONAL,
    ce-RetuningSymbols-r14                  ENUMERATED {n0, n1}             OPTIONAL,
    ce-PDSCH-PUSCH-Enhancement-r14          ENUMERATED {supported}          OPTIONAL,
    ce-SchedulingEnhancement-r14            ENUMERATED {supported}          OPTIONAL,
    ce-SRS-Enhancement-r14                  ENUMERATED {supported}          OPTIONAL,
    ce-PUCCH-Enhancement-r14                ENUMERATED {supported}          OPTIONAL,
    ce-ClosedLoopTxAntennaSelection-r14     ENUMERATED {supported}          OPTIONAL,
    tdd-SpecialSubframe-r14                 ENUMERATED {supported}          OPTIONAL,
    tdd-TTI-Bundling-r14                    ENUMERATED {supported}          OPTIONAL,
    dmrs-LessUpPTS-r14                      ENUMERATED {supported}          OPTIONAL,
    mimo-UE-Parameters-v1430                MIMO-UE-Parameters-v1430        OPTIONAL,
    alternativeTBS-Index-r14                ENUMERATED {supported}          OPTIONAL,
    feMBMS-Unicast-Parameters-r14           FeMBMS-Unicast-Parameters-r14   OPTIONAL
}

PhyLayerParameters-v1450 ::=            SEQUENCE {
    ce-SRS-EnhancementWithoutComb4-r14      ENUMERATED {supported}          OPTIONAL,
    crs-LessDwPTS-r14                       ENUMERATED {supported}          OPTIONAL
}

MIMO-UE-Parameters-r13 ::=              SEQUENCE {
    parametersTM9-r13                       MIMO-UE-ParametersPerTM-r13     OPTIONAL,
    parametersTM10-r13                      MIMO-UE-ParametersPerTM-r13     OPTIONAL,
    srs-EnhancementsTDD-r13                 ENUMERATED {supported}          OPTIONAL,
    srs-Enhancements-r13                    ENUMERATED {supported}          OPTIONAL,
    interferenceMeasRestriction-r13         ENUMERATED {supported}          OPTIONAL
}

MIMO-UE-Parameters-v1430 ::=            SEQUENCE {
    parametersTM9-v1430                     MIMO-UE-ParametersPerTM-v1430   OPTIONAL,
    parametersTM10-v1430                    MIMO-UE-ParametersPerTM-v1430   OPTIONAL
}

MIMO-UE-ParametersPerTM-r13 ::=         SEQUENCE {
    nonPrecoded-r13                         MIMO-NonPrecodedCapabilities-r13    OPTIONAL,
    beamformed-r13                          MIMO-UE-BeamformedCapabilities-r13  OPTIONAL,
    channelMeasRestriction-r13              ENUMERATED {supported}              OPTIONAL,
    dmrs-Enhancements-r13                   ENUMERATED {supported}              OPTIONAL,
    csi-RS-EnhancementsTDD-r13              ENUMERATED {supported}              OPTIONAL
}

MIMO-UE-ParametersPerTM-v1430 ::=       SEQUENCE {
    nzp-CSI-RS-AperiodicInfo-r14            SEQUENCE {
```


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```
        nMaxProc-r14                            INTEGER(5..32),
        nMaxResource-r14                        ENUMERATED {ffs1, ffs2, ffs3, ffs4}
    }                                                                   OPTIONAL,
    nzp-CSI-RS-PeriodicInfo-r14             SEQUENCE {
        nMaxResource-r14                        ENUMERATED {ffs1, ffs2, ffs3, ffs4}
    }                                                                   OPTIONAL,
    zp-CSI-RS-AperiodicInfo-r14                 ENUMERATED {supported}          OPTIONAL,
    ul-dmrs-Enhancements-r14                ENUMERATED {supported}              OPTIONAL,
    densityReductionNP-r14                  ENUMERATED {supported}              OPTIONAL,
    densityReductionBF-r14                  ENUMERATED {supported}              OPTIONAL,
    hybridCSI-r14                           ENUMERATED {supported}              OPTIONAL,
    semiOL-r14                              ENUMERATED {supported}              OPTIONAL,
    csi-ReportingNP-r14                     ENUMERATED {supported}              OPTIONAL,
    csi-ReportingAdvanced-r14               ENUMERATED {supported}              OPTIONAL
}

MIMO-CA-ParametersPerBoBC-r13 ::=       SEQUENCE {
    parametersTM9-r13                       MIMO-CA-ParametersPerBoBCPerTM-r13      OPTIONAL,
    parametersTM10-r13                      MIMO-CA-ParametersPerBoBCPerTM-r13      OPTIONAL
}

MIMO-CA-ParametersPerBoBC-v1430 ::=     SEQUENCE {
    parametersTM9-v1430                     MIMO-CA-ParametersPerBoBCPerTM-v1430    OPTIONAL,
    parametersTM10-v1430                    MIMO-CA-ParametersPerBoBCPerTM-v1430    OPTIONAL
}

MIMO-CA-ParametersPerBoBCPerTM-r13 ::=  SEQUENCE {
    nonPrecoded-r13                         MIMO-NonPrecodedCapabilities-r13    OPTIONAL,
    beamformed-r13                          MIMO-BeamformedCapabilityList-r13   OPTIONAL,
    dmrs-Enhancements-r13                   ENUMERATED {different}              OPTIONAL
}

MIMO-CA-ParametersPerBoBCPerTM-v1430 ::=    SEQUENCE {
    csi-ReportingNP-r14                     ENUMERATED {different}              OPTIONAL,
    csi-ReportingAdvanced-r14               ENUMERATED {different}              OPTIONAL
}

MIMO-NonPrecodedCapabilities-r13 ::=    SEQUENCE {
    config1-r13                             ENUMERATED {supported}          OPTIONAL,
    config2-r13                             ENUMERATED {supported}          OPTIONAL,
    config3-r13                             ENUMERATED {supported}          OPTIONAL,
    config4-r13                             ENUMERATED {supported}          OPTIONAL
}

MIMO-UE-BeamformedCapabilities-r13 ::=      SEQUENCE {
    altCodebook-r13                         ENUMERATED {supported}          OPTIONAL,
    mimo-BeamformedCapabilities-r13         MIMO-BeamformedCapabilityList-r13
}

MIMO-BeamformedCapabilityList-r13 ::=       SEQUENCE (SIZE (1..maxCSI-Proc-r11)) OF MIMO-
BeamformedCapabilities-r13

MIMO-BeamformedCapabilities-r13 ::=     SEQUENCE {
    k-Max-r13                               INTEGER (1..8),
    n-MaxList-r13                           BIT STRING (SIZE (1..7))        OPTIONAL
 }

NonContiguousUL-RA-WithinCC-List-r10 ::= SEQUENCE (SIZE (1..maxBands)) OF NonContiguousUL-RA-
WithinCC-r10

NonContiguousUL-RA-WithinCC-r10 ::=     SEQUENCE {
    nonContiguousUL-RA-WithinCC-Info-r10    ENUMERATED {supported}                  OPTIONAL
}

RF-Parameters ::=                   SEQUENCE {
    supportedBandListEUTRA              SupportedBandListEUTRA
}

RF-Parameters-v9e0 ::=                  SEQUENCE {
    supportedBandListEUTRA-v9e0             SupportedBandListEUTRA-v9e0             OPTIONAL
}

RF-Parameters-v1020 ::=             SEQUENCE {
    supportedBandCombination-r10            SupportedBandCombination-r10
}

RF-Parameters-v1060 ::=             SEQUENCE {
    supportedBandCombinationExt-r10         SupportedBandCombinationExt-r10
```


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```
}

RF-Parameters-v1090 ::=                 SEQUENCE {
    supportedBandCombination-v1090          SupportedBandCombination-v1090          OPTIONAL
}

RF-Parameters-v10f0 ::=                 SEQUENCE {
    modifiedMPR-Behavior-r10                    BIT STRING (SIZE (32))              OPTIONAL
}

RF-Parameters-v10i0 ::=                 SEQUENCE {
    supportedBandCombination-v10i0          SupportedBandCombination-v10i0          OPTIONAL
}

RF-Parameters-v10j0 ::=                 SEQUENCE {
    multiNS-Pmax-r10                        ENUMERATED {supported}                  OPTIONAL
}

RF-Parameters-v1130 ::=             SEQUENCE {
    supportedBandCombination-v1130          SupportedBandCombination-v1130          OPTIONAL
}

RF-Parameters-v1180 ::=             SEQUENCE {
    freqBandRetrieval-r11                   ENUMERATED {supported}          OPTIONAL,
    requestedBands-r11                      SEQUENCE (SIZE (1.. maxBands)) OF FreqBandIndicator-r11
                        OPTIONAL,
    supportedBandCombinationAdd-r11         SupportedBandCombinationAdd-r11     OPTIONAL
}

RF-Parameters-v11d0 ::=                 SEQUENCE {
    supportedBandCombinationAdd-v11d0       SupportedBandCombinationAdd-v11d0       OPTIONAL
}

RF-Parameters-v1250 ::=             SEQUENCE {
    supportedBandListEUTRA-v1250             SupportedBandListEUTRA-v1250           OPTIONAL,
    supportedBandCombination-v1250          SupportedBandCombination-v1250          OPTIONAL,
    supportedBandCombinationAdd-v1250       SupportedBandCombinationAdd-v1250       OPTIONAL,
    freqBandPriorityAdjustment-r12          ENUMERATED {supported}                  OPTIONAL
}

RF-Parameters-v1270 ::=             SEQUENCE {
    supportedBandCombination-v1270          SupportedBandCombination-v1270          OPTIONAL,
    supportedBandCombinationAdd-v1270       SupportedBandCombinationAdd-v1270       OPTIONAL
}

RF-Parameters-v1310 ::=             SEQUENCE {
    eNB-RequestedParameters-r13         SEQUENCE {
        reducedIntNonContCombRequested-r13  ENUMERATED {true}                       OPTIONAL,
        requestedCCsDL-r13                  INTEGER (2..32)                         OPTIONAL,
        requestedCCsUL-r13                  INTEGER (2..32)                         OPTIONAL,
        skipFallbackCombRequested-r13       ENUMERATED {true}                       OPTIONAL
    }                                                                               OPTIONAL,
    maximumCCsRetrieval-r13                 ENUMERATED {supported}                  OPTIONAL,
    skipFallbackCombinations-r13            ENUMERATED {supported}                  OPTIONAL,
    reducedIntNonContComb-r13               ENUMERATED {supported}                  OPTIONAL,
    supportedBandListEUTRA-v1310            SupportedBandListEUTRA-v1310            OPTIONAL,
    supportedBandCombinationReduced-r13     SupportedBandCombinationReduced-r13     OPTIONAL
}

RF-Parameters-v1320 ::=             SEQUENCE {
    supportedBandListEUTRA-v1320            SupportedBandListEUTRA-v1320            OPTIONAL,
    supportedBandCombination-v1320          SupportedBandCombination-v1320          OPTIONAL,
    supportedBandCombinationAdd-v1320       SupportedBandCombinationAdd-v1320       OPTIONAL,
    supportedBandCombinationReduced-v1320   SupportedBandCombinationReduced-v1320   OPTIONAL
}

RF-Parameters-v1380 ::=             SEQUENCE {
    supportedBandCombination-v1380          SupportedBandCombination-v1380          OPTIONAL,
    supportedBandCombinationAdd-v1380       SupportedBandCombinationAdd-v1380       OPTIONAL,
    supportedBandCombinationReduced-v1380   SupportedBandCombinationReduced-v1380   OPTIONAL
}

RF-Parameters-v12b0 ::=             SEQUENCE {
    maxLayersMIMO-Indication-r12            ENUMERATED {supported}                  OPTIONAL
}

RF-Parameters-v1430 ::=             SEQUENCE {
    supportedBandCombination-v1430          SupportedBandCombination-v1430          OPTIONAL,
```


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```
    supportedBandCombinationAdd-v1430       SupportedBandCombinationAdd-v1430       OPTIONAL,
    supportedBandCombinationReduced-v1430   SupportedBandCombinationReduced-v1430   OPTIONAL,
    eNB-RequestedParameters-v1430           SEQUENCE {
        requestedDiffFallbackCombList-r14       BandCombinationList-r14
    }                                                                               OPTIONAL,
    diffFallbackCombReport-r14              ENUMERATED {supported}                  OPTIONAL
}

RF-Parameters-v1450 ::=             SEQUENCE {
    supportedBandCombination-v1450          SupportedBandCombination-v1450          OPTIONAL,
    supportedBandCombinationAdd-v1450       SupportedBandCombinationAdd-v1450       OPTIONAL,
    supportedBandCombinationReduced-v1450   SupportedBandCombinationReduced-v1450   OPTIONAL
}

SupportedBandCombination-r10 ::= SEQUENCE (SIZE (1..maxBandComb-r10)) OF BandCombinationParameters-
r10

SupportedBandCombinationExt-r10 ::= SEQUENCE (SIZE (1..maxBandComb-r10)) OF
BandCombinationParametersExt-r10

SupportedBandCombination-v1090 ::= SEQUENCE (SIZE (1..maxBandComb-r10)) OF
BandCombinationParameters-v1090

SupportedBandCombination-v10i0 ::= SEQUENCE (SIZE (1..maxBandComb-r10)) OF
BandCombinationParameters-v10i0

SupportedBandCombination-v1130 ::= SEQUENCE (SIZE (1..maxBandComb-r10)) OF
BandCombinationParameters-v1130

SupportedBandCombination-v1250 ::= SEQUENCE (SIZE (1..maxBandComb-r10)) OF
BandCombinationParameters-v1250

SupportedBandCombination-v1270 ::= SEQUENCE (SIZE (1..maxBandComb-r10)) OF
BandCombinationParameters-v1270

SupportedBandCombination-v1320 ::= SEQUENCE (SIZE (1..maxBandComb-r10)) OF
BandCombinationParameters-v1320

SupportedBandCombination-v1380 ::= SEQUENCE (SIZE (1..maxBandComb-r10)) OF
BandCombinationParameters-v1380

SupportedBandCombination-v1430 ::= SEQUENCE (SIZE (1..maxBandComb-r10)) OF
BandCombinationParameters-v1430

SupportedBandCombination-v1450 ::= SEQUENCE (SIZE (1..maxBandComb-r10)) OF
BandCombinationParameters-v1450

SupportedBandCombinationAdd-r11 ::= SEQUENCE (SIZE (1..maxBandComb-r11)) OF
BandCombinationParameters-r11

SupportedBandCombinationAdd-v11d0 ::= SEQUENCE (SIZE (1..maxBandComb-r11)) OF
BandCombinationParameters-v10i0

SupportedBandCombinationAdd-v1250 ::= SEQUENCE (SIZE (1..maxBandComb-r11)) OF
BandCombinationParameters-v1250

SupportedBandCombinationAdd-v1270 ::= SEQUENCE (SIZE (1..maxBandComb-r11)) OF
BandCombinationParameters-v1270

SupportedBandCombinationAdd-v1320 ::= SEQUENCE (SIZE (1..maxBandComb-r11)) OF
BandCombinationParameters-v1320

SupportedBandCombinationAdd-v1380 ::= SEQUENCE (SIZE (1..maxBandComb-r11)) OF
BandCombinationParameters-v1380

SupportedBandCombinationAdd-v1430 ::= SEQUENCE (SIZE (1..maxBandComb-r11)) OF
BandCombinationParameters-v1430

SupportedBandCombinationAdd-v1450 ::= SEQUENCE (SIZE (1..maxBandComb-r11)) OF
BandCombinationParameters-v1450

SupportedBandCombinationReduced-r13 ::= SEQUENCE (SIZE (1..maxBandComb-r13)) OF
BandCombinationParameters-r13

SupportedBandCombinationReduced-v1320 ::=   SEQUENCE (SIZE (1..maxBandComb-r13)) OF
BandCombinationParameters-v1320
```


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```
SupportedBandCombinationReduced-v1380 ::=   SEQUENCE (SIZE (1..maxBandComb-r13)) OF
BandCombinationParameters-v1380

SupportedBandCombinationReduced-v1430 ::=   SEQUENCE (SIZE (1..maxBandComb-r13)) OF
BandCombinationParameters-v1430

SupportedBandCombinationReduced-v1450 ::=   SEQUENCE (SIZE (1..maxBandComb-r13)) OF
BandCombinationParameters-v1450

BandCombinationParameters-r10 ::= SEQUENCE (SIZE (1..maxSimultaneousBands-r10)) OF BandParameters-
r10

BandCombinationParametersExt-r10 ::= SEQUENCE {
    supportedBandwidthCombinationSet-r10    SupportedBandwidthCombinationSet-r10    OPTIONAL
}

BandCombinationParameters-v1090 ::= SEQUENCE (SIZE (1..maxSimultaneousBands-r10)) OF BandParameters-
v1090

BandCombinationParameters-v10i0::= SEQUENCE {
    bandParameterList-v10i0         SEQUENCE (SIZE (1..maxSimultaneousBands-r10)) OF
            BandParameters-v10i0    OPTIONAL
}

BandCombinationParameters-v1130 ::= SEQUENCE {
    multipleTimingAdvance-r11       ENUMERATED {supported}                  OPTIONAL,
    simultaneousRx-Tx-r11           ENUMERATED {supported}                  OPTIONAL,
    bandParameterList-r11           SEQUENCE (SIZE (1..maxSimultaneousBands-r10)) OF BandParameters-
v1130   OPTIONAL,
    ...
}

BandCombinationParameters-r11 ::=   SEQUENCE {
    bandParameterList-r11           SEQUENCE (SIZE (1..maxSimultaneousBands-r10)) OF
            BandParameters-r11,
    supportedBandwidthCombinationSet-r11    SupportedBandwidthCombinationSet-r10    OPTIONAL,
    multipleTimingAdvance-r11       ENUMERATED {supported}                  OPTIONAL,
    simultaneousRx-Tx-r11           ENUMERATED {supported}                  OPTIONAL,
    bandInfoEUTRA-r11               BandInfoEUTRA,
    ...
}

BandCombinationParameters-v1250::= SEQUENCE {
    dc-Support-r12                  SEQUENCE {
        asynchronous-r12                ENUMERATED {supported}          OPTIONAL,
        supportedCellGrouping-r12       CHOICE {
                threeEntries-r12                BIT STRING (SIZE(3)),
                fourEntries-r12                 BIT STRING (SIZE(7)),
                fiveEntries-r12                 BIT STRING (SIZE(15))
        }                                                               OPTIONAL
    }                                                                   OPTIONAL,
    supportedNAICS-2CRS-AP-r12      BIT STRING (SIZE (1..maxNAICS-Entries-r12))     OPTIONAL,
    commSupportedBandsPerBC-r12             BIT STRING (SIZE (1.. maxBands))        OPTIONAL,
    ...
}

BandCombinationParameters-v1270 ::= SEQUENCE {
    bandParameterList-v1270         SEQUENCE (SIZE (1..maxSimultaneousBands-r10)) OF
            BandParameters-v1270        OPTIONAL
}

BandCombinationParameters-r13 ::= SEQUENCE {
    differentFallbackSupported-r13  ENUMERATED {true}               OPTIONAL,
    bandParameterList-r13           SEQUENCE (SIZE (1..maxSimultaneousBands-r10)) OF BandParameters-
r13,
    supportedBandwidthCombinationSet-r13    SupportedBandwidthCombinationSet-r10    OPTIONAL,
    multipleTimingAdvance-r13       ENUMERATED {supported}              OPTIONAL,
    simultaneousRx-Tx-r13           ENUMERATED {supported}              OPTIONAL,
    bandInfoEUTRA-r13               BandInfoEUTRA,
    dc-Support-r13                  SEQUENCE {
        asynchronous-r13            ENUMERATED {supported}              OPTIONAL,
        supportedCellGrouping-r13       CHOICE {
                threeEntries-r13                BIT STRING (SIZE(3)),
                fourEntries-r13                 BIT STRING (SIZE(7)),
                fiveEntries-r13                 BIT STRING (SIZE(15))
        }                                                               OPTIONAL
    }                                                                   OPTIONAL,
    supportedNAICS-2CRS-AP-r13      BIT STRING (SIZE (1..maxNAICS-Entries-r12)) OPTIONAL,
```


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```
    commSupportedBandsPerBC-r13     BIT STRING (SIZE (1.. maxBands))        OPTIONAL
}

BandCombinationParameters-v1320 ::= SEQUENCE {
    bandParameterList-v1320         SEQUENCE (SIZE (1..maxSimultaneousBands-r10)) OF
            BandParameters-v1320        OPTIONAL,
    additionalRx-Tx-PerformanceReq-r13      ENUMERATED {supported}                OPTIONAL
}

BandCombinationParameters-v1380 ::= SEQUENCE {
    bandParameterList-v1380         SEQUENCE (SIZE (1..maxSimultaneousBands-r10)) OF
            BandParameters-v1380        OPTIONAL
}

BandCombinationParameters-v1430 ::= SEQUENCE {
    bandParameterList-v1430         SEQUENCE (SIZE (1..maxSimultaneousBands-r10)) OF
            BandParameters-v1430        OPTIONAL,
    v2x-SupportedTxBandCombListPerBC-r14            BIT STRING (SIZE (1.. maxBandComb-r13))
    OPTIONAL,
    v2x-SupportedRxBandCombListPerBC-r14            BIT STRING (SIZE (1.. maxBandComb-r13))
    OPTIONAL
}

BandCombinationParameters-v1450 ::= SEQUENCE {
    bandParameterList-v1450         SEQUENCE (SIZE (1..maxSimultaneousBands-r10)) OF
            BandParameters-v1450        OPTIONAL
}

SupportedBandwidthCombinationSet-r10 ::=    BIT STRING (SIZE (1..maxBandwidthCombSet-r10))

BandParameters-r10 ::= SEQUENCE {
    bandEUTRA-r10                   FreqBandIndicator,
    bandParametersUL-r10            BandParametersUL-r10                    OPTIONAL,
    bandParametersDL-r10            BandParametersDL-r10                    OPTIONAL
}

BandParameters-v1090 ::= SEQUENCE {
    bandEUTRA-v1090                 FreqBandIndicator-v9e0                  OPTIONAL,
    ...
}

BandParameters-v10i0::= SEQUENCE {
    bandParametersDL-v10i0      SEQUENCE (SIZE (1..maxBandwidthClass-r10)) OF CA-MIMO-ParametersDL-
v10i0
}

BandParameters-v1130 ::= SEQUENCE {
    supportedCSI-Proc-r11           ENUMERATED {n1, n3, n4}
}

BandParameters-r11 ::= SEQUENCE {
    bandEUTRA-r11                   FreqBandIndicator-r11,
    bandParametersUL-r11            BandParametersUL-r10                    OPTIONAL,
    bandParametersDL-r11            BandParametersDL-r10                    OPTIONAL,
    supportedCSI-Proc-r11           ENUMERATED {n1, n3, n4}                 OPTIONAL
}

BandParameters-v1270 ::= SEQUENCE {
    bandParametersDL-v1270          SEQUENCE (SIZE (1..maxBandwidthClass-r10)) OF CA-MIMO-
ParametersDL-v1270
}

BandParameters-r13 ::= SEQUENCE {
    bandEUTRA-r13                   FreqBandIndicator-r11,
    bandParametersUL-r13                BandParametersUL-r13                OPTIONAL,
    bandParametersDL-r13                BandParametersDL-r13                OPTIONAL,
    supportedCSI-Proc-r13           ENUMERATED {n1, n3, n4}         OPTIONAL
}

BandParameters-v1320 ::= SEQUENCE {
    bandParametersDL-v1320          MIMO-CA-ParametersPerBoBC-r13
}

BandParameters-v1380 ::=    SEQUENCE {
    txAntennaSwitchDL-r13           INTEGER (1..32)                 OPTIONAL,
    txAntennaSwitchUL-r13           INTEGER (1..32)                 OPTIONAL
}
```


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```
BandParameters-v1430 ::= SEQUENCE {
    bandParametersDL-v1430          MIMO-CA-ParametersPerBoBC-v1430 OPTIONAL,
    ul-256QAM-r14                       ENUMERATED {supported}      OPTIONAL,
    ul-256QAM-perCC-InfoList-r14        SEQUENCE (SIZE (2..maxServCell-r13)) OF UL-256QAM-perCC-
Info-r14        OPTIONAL,
    retuningTimeInfoBandList-r14        SEQUENCE (SIZE (1..maxSimultaneousBands-r10)) OF
            RetuningTimeInfo-r14    OPTIONAL
}

BandParameters-v1450 ::= SEQUENCE {
    must-CapabilityPerBand-r14      MUST-Parameters-r14     OPTIONAL
}

V2X-BandParameters-r14 ::= SEQUENCE {
    v2x-FreqBandEUTRA-r14           FreqBandIndicator-r11,
    bandParametersTxSL-r14          BandParametersTxSL-r14              OPTIONAL,
    bandParametersRxSL-r14          BandParametersRxSL-r14              OPTIONAL
}

BandParametersTxSL-r14 ::= SEQUENCE {
    v2x-BandwidthClassTxSL-r14      V2X-BandwidthClassSL-r14,
    v2x-eNB-Scheduled-r14           ENUMERATED {supported}              OPTIONAL,
    v2x-HighPower-r14               ENUMERATED {supported}              OPTIONAL
}

BandParametersRxSL-r14 ::= SEQUENCE {
    v2x-BandwidthClassRxSL-r14      V2X-BandwidthClassSL-r14,
    v2x-HighReception-r14           ENUMERATED {supported}              OPTIONAL
}

V2X-BandwidthClassSL-r14 ::= SEQUENCE (SIZE (1..maxBandwidthClass-r10)) OF V2X-BandwidthClass-r14

UL-256QAM-perCC-Info-r14 ::= SEQUENCE {
    ul-256QAM-perCC-r14         ENUMERATED {supported}              OPTIONAL
}

BandParametersUL-r10 ::= SEQUENCE (SIZE (1..maxBandwidthClass-r10)) OF CA-MIMO-ParametersUL-r10

BandParametersUL-r13 ::= CA-MIMO-ParametersUL-r10

CA-MIMO-ParametersUL-r10 ::= SEQUENCE {
    ca-BandwidthClassUL-r10             CA-BandwidthClass-r10,
    supportedMIMO-CapabilityUL-r10      MIMO-CapabilityUL-r10               OPTIONAL
}

BandParametersDL-r10 ::= SEQUENCE (SIZE (1..maxBandwidthClass-r10)) OF CA-MIMO-ParametersDL-r10

BandParametersDL-r13 ::= CA-MIMO-ParametersDL-r13

CA-MIMO-ParametersDL-r10 ::= SEQUENCE {
    ca-BandwidthClassDL-r10             CA-BandwidthClass-r10,
    supportedMIMO-CapabilityDL-r10      MIMO-CapabilityDL-r10               OPTIONAL
}

CA-MIMO-ParametersDL-v10i0 ::= SEQUENCE {
    fourLayerTM3-TM4-r10                ENUMERATED {supported}              OPTIONAL
}

CA-MIMO-ParametersDL-v1270 ::= SEQUENCE {
    intraBandContiguousCC-InfoList-r12          SEQUENCE (SIZE (1..maxServCell-r10)) OF
IntraBandContiguousCC-Info-r12
}

CA-MIMO-ParametersDL-r13 ::= SEQUENCE {
    ca-BandwidthClassDL-r13                 CA-BandwidthClass-r10,
    supportedMIMO-CapabilityDL-r13          MIMO-CapabilityDL-r10               OPTIONAL,
    fourLayerTM3-TM4-r13                        ENUMERATED {supported}              OPTIONAL,
    intraBandContiguousCC-InfoList-r13      SEQUENCE (SIZE (1..maxServCell-r13)) OF
IntraBandContiguousCC-Info-r12
}

IntraBandContiguousCC-Info-r12 ::= SEQUENCE {
    fourLayerTM3-TM4-perCC-r12          ENUMERATED {supported}              OPTIONAL,
    supportedMIMO-CapabilityDL-r12      MIMO-CapabilityDL-r10               OPTIONAL,
    supportedCSI-Proc-r12               ENUMERATED {n1, n3, n4}             OPTIONAL
}

CA-BandwidthClass-r10 ::= ENUMERATED {a, b, c, d, e, f, ...}
```


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```
V2X-BandwidthClass-r14 ::= ENUMERATED {a, b, c, d, e, f, ...}

MIMO-CapabilityUL-r10 ::= ENUMERATED {twoLayers, fourLayers}

MIMO-CapabilityDL-r10 ::= ENUMERATED {twoLayers, fourLayers, eightLayers}

MUST-Parameters-r14 ::= SEQUENCE {
    must-TM234-UpTo2Tx-r14                    ENUMERATED {supported}      OPTIONAL,
    must-TM89-UpToOneInterferingLayer-r14     ENUMERATED {supported}      OPTIONAL,
    must-TM10-UpToOneInterferingLayer-r14     ENUMERATED {supported}      OPTIONAL,
    must-TM89-UpToThreeInterferingLayers-r14  ENUMERATED {supported}      OPTIONAL,
    must-TM10-UpToThreeInterferingLayers-r14  ENUMERATED {supported}      OPTIONAL
}

SupportedBandListEUTRA ::=          SEQUENCE (SIZE (1..maxBands)) OF SupportedBandEUTRA

SupportedBandListEUTRA-v9e0::=          SEQUENCE (SIZE (1..maxBands)) OF SupportedBandEUTRA-v9e0

SupportedBandListEUTRA-v1250 ::=        SEQUENCE (SIZE (1..maxBands)) OF SupportedBandEUTRA-v1250

SupportedBandListEUTRA-v1310 ::=        SEQUENCE (SIZE (1..maxBands)) OF SupportedBandEUTRA-v1310

SupportedBandListEUTRA-v1320 ::=        SEQUENCE (SIZE (1..maxBands)) OF SupportedBandEUTRA-v1320

SupportedBandEUTRA ::=              SEQUENCE {
    bandEUTRA                           FreqBandIndicator,
    halfDuplex                          BOOLEAN
}

SupportedBandEUTRA-v9e0 ::=     SEQUENCE {
    bandEUTRA-v9e0                      FreqBandIndicator-v9e0      OPTIONAL
}

SupportedBandEUTRA-v1250 ::=        SEQUENCE {
    dl-256QAM-r12                       ENUMERATED {supported}      OPTIONAL,
    ul-64QAM-r12                        ENUMERATED {supported}      OPTIONAL
}

SupportedBandEUTRA-v1310 ::=        SEQUENCE {
    ue-PowerClass-5-r13         ENUMERATED {supported}      OPTIONAL
}
SupportedBandEUTRA-v1320 ::=        SEQUENCE {
    intraFreq-CE-NeedForGaps-r13                ENUMERATED {supported}              OPTIONAL,
    ue-PowerClass-N-r13         ENUMERATED {class1, class2, class4}     OPTIONAL
}

MeasParameters ::=                  SEQUENCE {
    bandListEUTRA                       BandListEUTRA
}

MeasParameters-v1020 ::=            SEQUENCE {
    bandCombinationListEUTRA-r10            BandCombinationListEUTRA-r10
}

MeasParameters-v1130 ::=            SEQUENCE {
    rsrqMeasWideband-r11            ENUMERATED {supported}                  OPTIONAL
}

MeasParameters-v11a0 ::=            SEQUENCE {
    benefitsFromInterruption-r11            ENUMERATED {true}               OPTIONAL
}

MeasParameters-v1250 ::=            SEQUENCE {
    timerT312-r12                       ENUMERATED {supported}      OPTIONAL,
    alternativeTimeToTrigger-r12        ENUMERATED {supported}      OPTIONAL,
    incMonEUTRA-r12                     ENUMERATED {supported}      OPTIONAL,
    incMonUTRA-r12                      ENUMERATED {supported}      OPTIONAL,
    extendedMaxMeasId-r12               ENUMERATED {supported}      OPTIONAL,
    extendedRSRQ-LowerRange-r12         ENUMERATED {supported}      OPTIONAL,
    rsrq-OnAllSymbols-r12               ENUMERATED {supported}      OPTIONAL,
    crs-DiscoverySignalsMeas-r12        ENUMERATED {supported}      OPTIONAL,
    csi-RS-DiscoverySignalsMeas-r12     ENUMERATED {supported}      OPTIONAL
}

MeasParameters-v1310 ::=            SEQUENCE {
    rs-SINR-Meas-r13                        ENUMERATED {supported}      OPTIONAL,
    whiteCellList-r13                       ENUMERATED {supported}      OPTIONAL,
```


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```
    extendedMaxObjectId-r13                 ENUMERATED {supported}      OPTIONAL,
    ul-PDCP-Delay-r13                       ENUMERATED {supported}      OPTIONAL,
    extendedFreqPriorities-r13              ENUMERATED {supported}      OPTIONAL,
    multiBandInfoReport-r13                 ENUMERATED {supported}      OPTIONAL,
    rssi-AndChannelOccupancyReporting-r13   ENUMERATED {supported}      OPTIONAL
}

MeasParameters-v1430 ::=            SEQUENCE {
    ceMeasurements-r14                      ENUMERATED {supported}      OPTIONAL,
    ncsg-r14                                ENUMERATED {supported}              OPTIONAL,
    shortMeasurementGap-r14                 ENUMERATED {supported}              OPTIONAL,
    perServingCellMeasurementGap-r14        ENUMERATED {supported}              OPTIONAL,
    nonUniformGap-r14                       ENUMERATED {supported}              OPTIONAL
}

BandListEUTRA ::=                   SEQUENCE (SIZE (1..maxBands)) OF BandInfoEUTRA

BandCombinationListEUTRA-r10 ::=    SEQUENCE (SIZE (1..maxBandComb-r10)) OF BandInfoEUTRA

BandInfoEUTRA ::=                   SEQUENCE {
    interFreqBandList                   InterFreqBandList,
    interRAT-BandList                   InterRAT-BandList       OPTIONAL
}

InterFreqBandList ::=               SEQUENCE (SIZE (1..maxBands)) OF InterFreqBandInfo

InterFreqBandInfo ::=               SEQUENCE {
    interFreqNeedForGaps                BOOLEAN
}

InterRAT-BandList ::=               SEQUENCE (SIZE (1..maxBands)) OF InterRAT-BandInfo

InterRAT-BandInfo ::=               SEQUENCE {
    interRAT-NeedForGaps                BOOLEAN
}

IRAT-ParametersUTRA-FDD ::=     SEQUENCE {
    supportedBandListUTRA-FDD           SupportedBandListUTRA-FDD
}

IRAT-ParametersUTRA-v920 ::=        SEQUENCE {
    e-RedirectionUTRA-r9                ENUMERATED {supported}
}

IRAT-ParametersUTRA-v9c0 ::=        SEQUENCE {
    voiceOverPS-HS-UTRA-FDD-r9                      ENUMERATED {supported}      OPTIONAL,
    voiceOverPS-HS-UTRA-TDD128-r9                   ENUMERATED {supported}      OPTIONAL,
    srvcc-FromUTRA-FDD-ToUTRA-FDD-r9                ENUMERATED {supported}      OPTIONAL,
    srvcc-FromUTRA-FDD-ToGERAN-r9                   ENUMERATED {supported}      OPTIONAL,
    srvcc-FromUTRA-TDD128-ToUTRA-TDD128-r9          ENUMERATED {supported}      OPTIONAL,
    srvcc-FromUTRA-TDD128-ToGERAN-r9                ENUMERATED {supported}      OPTIONAL
}

IRAT-ParametersUTRA-v9h0 ::=        SEQUENCE {
    mfbi-UTRA-r9                        ENUMERATED {supported}
}

SupportedBandListUTRA-FDD ::=       SEQUENCE (SIZE (1..maxBands)) OF SupportedBandUTRA-FDD

SupportedBandUTRA-FDD ::=           ENUMERATED {
                                        bandI, bandII, bandIII, bandIV, bandV, bandVI,
                                        bandVII, bandVIII, bandIX, bandX, bandXI,
                                        bandXII, bandXIII, bandXIV, bandXV, bandXVI, ...,
                                        bandXVII-8a0, bandXVIII-8a0, bandXIX-8a0, bandXX-8a0,
                                        bandXXI-8a0, bandXXII-8a0, bandXXIII-8a0, bandXXIV-8a0,
                                        bandXXV-8a0, bandXXVI-8a0, bandXXVII-8a0, bandXXVIII-8a0,
                                        bandXXIX-8a0, bandXXX-8a0, bandXXXI-8a0, bandXXXII-8a0}

IRAT-ParametersUTRA-TDD128 ::=      SEQUENCE {
    supportedBandListUTRA-TDD128        SupportedBandListUTRA-TDD128
}

SupportedBandListUTRA-TDD128 ::=    SEQUENCE (SIZE (1..maxBands)) OF SupportedBandUTRA-TDD128

SupportedBandUTRA-TDD128 ::=        ENUMERATED {
                                        a, b, c, d, e, f, g, h, i, j, k, l, m, n,
                                        o, p, ...}
```


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```
IRAT-ParametersUTRA-TDD384 ::=      SEQUENCE {
    supportedBandListUTRA-TDD384        SupportedBandListUTRA-TDD384
}

SupportedBandListUTRA-TDD384 ::=    SEQUENCE (SIZE (1..maxBands)) OF SupportedBandUTRA-TDD384

SupportedBandUTRA-TDD384 ::=        ENUMERATED {
                                        a, b, c, d, e, f, g, h, i, j, k, l, m, n,
                                        o, p, ...}

IRAT-ParametersUTRA-TDD768 ::=      SEQUENCE {
    supportedBandListUTRA-TDD768        SupportedBandListUTRA-TDD768
}

SupportedBandListUTRA-TDD768 ::=    SEQUENCE (SIZE (1..maxBands)) OF SupportedBandUTRA-TDD768

SupportedBandUTRA-TDD768 ::=        ENUMERATED {
                                        a, b, c, d, e, f, g, h, i, j, k, l, m, n,
                                        o, p, ...}

IRAT-ParametersUTRA-TDD-v1020 ::=       SEQUENCE {
    e-RedirectionUTRA-TDD-r10               ENUMERATED {supported}
}

IRAT-ParametersGERAN ::=            SEQUENCE {
    supportedBandListGERAN              SupportedBandListGERAN,
    interRAT-PS-HO-ToGERAN              BOOLEAN
}

IRAT-ParametersGERAN-v920 ::=       SEQUENCE {
    dtm-r9                              ENUMERATED {supported}          OPTIONAL,
    e-RedirectionGERAN-r9               ENUMERATED {supported}          OPTIONAL
}

SupportedBandListGERAN ::=          SEQUENCE (SIZE (1..maxBands)) OF SupportedBandGERAN

SupportedBandGERAN ::=              ENUMERATED {
                                        gsm450, gsm480, gsm710, gsm750, gsm810, gsm850,
                                        gsm900P, gsm900E, gsm900R, gsm1800, gsm1900,
                                        spare5, spare4, spare3, spare2, spare1, ...}

IRAT-ParametersCDMA2000-HRPD ::=    SEQUENCE {
    supportedBandListHRPD               SupportedBandListHRPD,
    tx-ConfigHRPD                       ENUMERATED {single, dual},
    rx-ConfigHRPD                       ENUMERATED {single, dual}
}

SupportedBandListHRPD ::=           SEQUENCE (SIZE (1..maxCDMA-BandClass)) OF BandclassCDMA2000

IRAT-ParametersCDMA2000-1XRTT ::=   SEQUENCE {
    supportedBandList1XRTT              SupportedBandList1XRTT,
    tx-Config1XRTT                      ENUMERATED {single, dual},
    rx-Config1XRTT                      ENUMERATED {single, dual}
}

IRAT-ParametersCDMA2000-1XRTT-v920 ::=  SEQUENCE {
    e-CSFB-1XRTT-r9                     ENUMERATED {supported},
    e-CSFB-ConcPS-Mob1XRTT-r9           ENUMERATED {supported}          OPTIONAL
}

IRAT-ParametersCDMA2000-1XRTT-v1020 ::= SEQUENCE {
    e-CSFB-dual-1XRTT-r10               ENUMERATED {supported}
}

IRAT-ParametersCDMA2000-v1130 ::=       SEQUENCE {
    cdma2000-NW-Sharing-r11                 ENUMERATED {supported}      OPTIONAL
}

SupportedBandList1XRTT ::=          SEQUENCE (SIZE (1..maxCDMA-BandClass)) OF BandclassCDMA2000

IRAT-ParametersWLAN-r13 ::=     SEQUENCE {
    supportedBandListWLAN-r13       SEQUENCE (SIZE (1..maxWLAN-Bands-r13)) OF WLAN-BandIndicator-r13
                    OPTIONAL
}

CSG-ProximityIndicationParameters-r9 ::=    SEQUENCE {
    intraFreqProximityIndication-r9 ENUMERATED {supported}          OPTIONAL,
    interFreqProximityIndication-r9 ENUMERATED {supported}          OPTIONAL,
```


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```
    utran-ProximityIndication-r9        ENUMERATED {supported}          OPTIONAL
}

NeighCellSI-AcquisitionParameters-r9 ::=    SEQUENCE {
    intraFreqSI-AcquisitionForHO-r9 ENUMERATED {supported}          OPTIONAL,
    interFreqSI-AcquisitionForHO-r9 ENUMERATED {supported}          OPTIONAL,
    utran-SI-AcquisitionForHO-r9        ENUMERATED {supported}          OPTIONAL
}

SON-Parameters-r9 ::=               SEQUENCE {
    rach-Report-r9                      ENUMERATED {supported}          OPTIONAL
}

UE-BasedNetwPerfMeasParameters-r10 ::=  SEQUENCE {
    loggedMeasurementsIdle-r10              ENUMERATED {supported}      OPTIONAL,
    standaloneGNSS-Location-r10             ENUMERATED {supported}      OPTIONAL
}

UE-BasedNetwPerfMeasParameters-v1250 ::=    SEQUENCE {
    loggedMBSFNMeasurements-r12             ENUMERATED {supported}
}

UE-BasedNetwPerfMeasParameters-v1430 ::=    SEQUENCE {
    locationReport-r14                      ENUMERATED {supported}      OPTIONAL
}

OTDOA-PositioningCapabilities-r10 ::=   SEQUENCE {
    otdoa-UE-Assisted-r10                   ENUMERATED {supported},
    interFreqRSTD-Measurement-r10           ENUMERATED {supported}      OPTIONAL
}

Other-Parameters-r11 ::=                SEQUENCE {
    inDeviceCoexInd-r11                     ENUMERATED {supported}      OPTIONAL,
    powerPrefInd-r11                        ENUMERATED {supported}      OPTIONAL,
    ue-Rx-TxTimeDiffMeasurements-r11        ENUMERATED {supported}      OPTIONAL
}

Other-Parameters-v11d0 ::=              SEQUENCE {
    inDeviceCoexInd-UL-CA-r11               ENUMERATED {supported}      OPTIONAL
}

Other-Parameters-v1360 ::=  SEQUENCE {
    inDeviceCoexInd-HardwareSharingInd-r13      ENUMERATED {supported}      OPTIONAL
}

Other-Parameters-v1430 ::=          SEQUENCE {
    bwPrefInd-r14                   ENUMERATED {supported}      OPTIONAL,
    rlm-ReportSupport-r14           ENUMERATED {supported}      OPTIONAL
}

OtherParameters-v1450 ::=   SEQUENCE {
    overheatingInd-r14              ENUMERATED {supported}      OPTIONAL
}

MBMS-Parameters-r11 ::=             SEQUENCE {
    mbms-SCell-r11                          ENUMERATED {supported}      OPTIONAL,
    mbms-NonServingCell-r11                 ENUMERATED {supported}      OPTIONAL
}

MBMS-Parameters-v1250 ::=               SEQUENCE {
    mbms-AsyncDC-r12                        ENUMERATED {supported}      OPTIONAL
}

MBMS-Parameters-v1430 ::=               SEQUENCE {
    fembmsDedicatedCell-r14             ENUMERATED {supported}      OPTIONAL,
    fembmsMixedCell-r14                 ENUMERATED {supported}      OPTIONAL,
    subcarrierSpacingMBMS-khz7dot5-r14  ENUMERATED {supported}      OPTIONAL,
    subcarrierSpacingMBMS-khz1dot25-r14 ENUMERATED {supported}      OPTIONAL
}

FeMBMS-Unicast-Parameters-r14 ::=       SEQUENCE {
    unicast-fembmsMixedSCell-r14            ENUMERATED {supported}      OPTIONAL,
    emptyUnicastRegion-r14                  ENUMERATED {supported}      OPTIONAL
}

SCPTM-Parameters-r13 ::=                SEQUENCE {
    scptm-ParallelReception-r13                 ENUMERATED {supported}      OPTIONAL,
    scptm-SCell-r13                             ENUMERATED {supported}      OPTIONAL,
```


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```
    scptm-NonServingCell-r13                    ENUMERATED {supported}      OPTIONAL,
    scptm-AsyncDC-r13                           ENUMERATED {supported}      OPTIONAL
}

CE-Parameters-r13 ::=       SEQUENCE {
    ce-ModeA-r13                        ENUMERATED {supported}              OPTIONAL,
    ce-ModeB-r13                        ENUMERATED {supported}              OPTIONAL
}

CE-Parameters-v1320 ::=     SEQUENCE {
    intraFreqA3-CE-ModeA-r13                ENUMERATED {supported}              OPTIONAL,
    intraFreqA3-CE-ModeB-r13                ENUMERATED {supported}              OPTIONAL,
    intraFreqHO-CE-ModeA-r13                ENUMERATED {supported}              OPTIONAL,
    intraFreqHO-CE-ModeB-r13                ENUMERATED {supported}              OPTIONAL
}

CE-Parameters-v1350 ::=     SEQUENCE {
    unicastFrequencyHopping-r13             ENUMERATED {supported}              OPTIONAL
}

CE-Parameters-v1370 ::=     SEQUENCE {
    tm9-CE-ModeA-r13                        ENUMERATED {supported}          OPTIONAL,
    tm9-CE-ModeB-r13                        ENUMERATED {supported}          OPTIONAL
}

CE-Parameters-v1380 ::=     SEQUENCE {
    tm6-CE-ModeA-r13                        ENUMERATED {supported}          OPTIONAL
}

CE-Parameters-v1430 ::=     SEQUENCE {
    ce-SwitchWithoutHO-r14                  ENUMERATED {supported}              OPTIONAL
}

LAA-Parameters-r13 ::=              SEQUENCE {
    crossCarrierSchedulingLAA-DL-r13            ENUMERATED {supported}      OPTIONAL,
    csi-RS-DRS-RRM-MeasurementsLAA-r13          ENUMERATED {supported}      OPTIONAL,
    downlinkLAA-r13                             ENUMERATED {supported}      OPTIONAL,
    endingDwPTS-r13                             ENUMERATED {supported}      OPTIONAL,
    secondSlotStartingPosition-r13              ENUMERATED {supported}      OPTIONAL,
    tm9-LAA-r13                                 ENUMERATED {supported}      OPTIONAL,
    tm10-LAA-r13                                ENUMERATED {supported}      OPTIONAL
}

LAA-Parameters-v1430 ::=                SEQUENCE {
    crossCarrierSchedulingLAA-UL-r14            ENUMERATED {supported}      OPTIONAL,
    uplinkLAA-r14                               ENUMERATED {supported}      OPTIONAL,
    twoStepSchedulingTimingInfo-r14             ENUMERATED {nPlus1, nPlus2, nPlus3} OPTIONAL,
    uss-BlindDecodingAdjustment-r14             ENUMERATED {supported}      OPTIONAL,
    uss-BlindDecodingReduction-r14              ENUMERATED {supported}      OPTIONAL,
    outOfSequenceGrantHandling-r14              ENUMERATED {supported}      OPTIONAL
}

WLAN-IW-Parameters-r12 ::=  SEQUENCE {
    wlan-IW-RAN-Rules-r12                   ENUMERATED {supported}      OPTIONAL,
    wlan-IW-ANDSF-Policies-r12                      ENUMERATED {supported}      OPTIONAL
}

LWA-Parameters-r13 ::=      SEQUENCE {
    lwa-r13                     ENUMERATED {supported}      OPTIONAL,
    lwa-SplitBearer-r13         ENUMERATED {supported}      OPTIONAL,
    wlan-MAC-Address-r13        OCTET STRING (SIZE (6))     OPTIONAL,
    lwa-BufferSize-r13          ENUMERATED {supported}      OPTIONAL
}

LWA-Parameters-v1430 ::=        SEQUENCE {
    lwa-HO-WithoutWT-Change-r14         ENUMERATED {supported}      OPTIONAL,
    lwa-UL-r14                          ENUMERATED {supported}      OPTIONAL,
    wlan-PeriodicMeas-r14               ENUMERATED {supported}      OPTIONAL,
    wlan-ReportAnyWLAN-r14              ENUMERATED {supported}      OPTIONAL,
    wlan-SupportedDataRate-r14          INTEGER (1..2048)           OPTIONAL
}

LWA-Parameters-v1440 ::=        SEQUENCE {
    lwa-RLC-UM-r14                      ENUMERATED {supported}      OPTIONAL
}

WLAN-IW-Parameters-v1310 ::=    SEQUENCE {
    rclwi-r13                                       ENUMERATED {supported}      OPTIONAL
```


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```
}

LWIP-Parameters-r13 ::=     SEQUENCE {
    lwip-r13                    ENUMERATED {supported}              OPTIONAL
}

LWIP-Parameters-v1430 ::=       SEQUENCE {
    lwip-Aggregation-DL-r14                 ENUMERATED {supported}              OPTIONAL,
    lwip-Aggregation-UL-r14                 ENUMERATED {supported}              OPTIONAL
}

NAICS-Capability-List-r12 ::= SEQUENCE (SIZE (1..maxNAICS-Entries-r12)) OF NAICS-Capability-Entry-
r12


NAICS-Capability-Entry-r12  ::= SEQUENCE {
    numberOfNAICS-CapableCC-r12             INTEGER(1..5),
    numberOfAggregatedPRB-r12               ENUMERATED {
                                                n50, n75, n100, n125, n150, n175,
                                                n200, n225, n250, n275, n300, n350,
                                                n400, n450, n500, spare},
    ...
}

SL-Parameters-r12 ::=               SEQUENCE {
    commSimultaneousTx-r12                  ENUMERATED {supported}      OPTIONAL,
    commSupportedBands-r12                  FreqBandIndicatorListEUTRA-r12  OPTIONAL,
    discSupportedBands-r12                  SupportedBandInfoList-r12   OPTIONAL,
    discScheduledResourceAlloc-r12          ENUMERATED {supported}      OPTIONAL,
    disc-UE-SelectedResourceAlloc-r12       ENUMERATED {supported}      OPTIONAL,
    disc-SLSS-r12                           ENUMERATED {supported}      OPTIONAL,
    discSupportedProc-r12                   ENUMERATED {n50, n400}      OPTIONAL
}

SL-Parameters-v1310 ::=             SEQUENCE {
    discSysInfoReporting-r13                    ENUMERATED {supported}      OPTIONAL,
    commMultipleTx-r13                          ENUMERATED {supported}      OPTIONAL,
    discInterFreqTx-r13                         ENUMERATED {supported}      OPTIONAL,
    discPeriodicSLSS-r13                        ENUMERATED {supported}      OPTIONAL
}

SL-Parameters-v1430 ::=             SEQUENCE {
    zoneBasedPoolSelection-r14              ENUMERATED {supported}              OPTIONAL,
    ue-AutonomousWithFullSensing-r14        ENUMERATED {supported}              OPTIONAL,
    ue-AutonomousWithPartialSensing-r14     ENUMERATED {supported}              OPTIONAL,
    sl-CongestionControl-r14                ENUMERATED {supported}              OPTIONAL,
    v2x-TxWithShortResvInterval-r14         ENUMERATED {supported}              OPTIONAL,
    v2x-numberTxRxTiming-r14                INTEGER(1..16)                      OPTIONAL,
    v2x-nonAdjacentPSCCH-PSSCH-r14          ENUMERATED {supported}              OPTIONAL,
    slss-TxRx-r14                           ENUMERATED {supported}              OPTIONAL,
    v2x-SupportedBandCombinationList-r14    V2X-SupportedBandCombination-r14    OPTIONAL
}

V2X-SupportedBandCombination-r14 ::=        SEQUENCE (SIZE (1..maxBandComb-r13)) OF V2X-
BandCombinationParameters-r14

V2X-BandCombinationParameters-r14 ::=   SEQUENCE (SIZE (1.. maxSimultaneousBands-r10)) OF V2X-
BandParameters-r14

SupportedBandInfoList-r12 ::=       SEQUENCE (SIZE (1..maxBands)) OF SupportedBandInfo-r12

SupportedBandInfo-r12 ::=           SEQUENCE {
    support-r12                             ENUMERATED {supported}  OPTIONAL
}

FreqBandIndicatorListEUTRA-r12 ::=      SEQUENCE (SIZE (1..maxBands)) OF FreqBandIndicator-r11

MMTEL-Parameters-r14 ::=            SEQUENCE {
    delayBudgetReporting-r14                    ENUMERATED {supported}      OPTIONAL,
    pusch-Enhancements-r14                      ENUMERATED {supported}      OPTIONAL,
    recommendedBitRate-r14                      ENUMERATED {supported}      OPTIONAL,
    recommendedBitRateQuery-r14                 ENUMERATED {supported}      OPTIONAL
}

RetuningTimeInfo-r14 ::= SEQUENCE {
    retuningInfo                SEQUENCE {
        rf-RetuningTimeDL-r14           ENUMERATED {n0, n0dot5, n1, n1dot5, n2, n2dot5, n3,
                                                    n3dot5, n4, n4dot5, n5, n5dot5, n6, n6dot5,
```


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```
                                                n7, spare1}     OPTIONAL,
        rf-RetuningTimeUL-r14           ENUMERATED {n0, n0dot5, n1, n1dot5, n2, n2dot5, n3,
                                                    n3dot5, n4, n4dot5, n5, n5dot5, n6, n6dot5,
                                                    n7, spare1}     OPTIONAL
    }
}

HighSpeedEnhParameters-r14 ::= SEQUENCE {
    measurementEnhancements-r14     ENUMERATED {supported}      OPTIONAL,
    demodulationEnhancements-r14    ENUMERATED {supported}      OPTIONAL,
    prach-Enhancements-r14          ENUMERATED {supported}      OPTIONAL
}

-- ASN1STOP
```


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UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
accessStratumRelease Set to rel14 in this version of the specification. NOTE 7.	-
additionalRx-Tx-PerformanceReq Indicates whether the UE supports the additional Rx and Tx performance requirement for a given band combination as specified in TS 36.101 [42].	-
alternativeTBS-Indices Indicates whether the UE supports alternative TBS indices I_{TBS} 26A and 33B as specified in TS 36.213 [23].	-
alternativeTBS-Index Indicates whether the UE supports alternative TBS index I_{TBS} 33B as specified in TS 36.213 [23].	-
alternativeTimeToTrigger Indicates whether the UE supports alternativeTimeToTrigger.	No
aperiodicCSI-Reporting Indicates whether the UE supports aperiodic CSI reporting with 3 bits of the CSI request field size as specified in TS 36.213 [23, 7.2.1] and/or aperiodic CSI reporting mode 1-0 and mode 1-1 as specified in TS 36.213 [23, 7.2.1]. The first bit is set to "1" if the UE supports the aperiodic CSI reporting with 3 bits of the CSI request field size. The second bit is set to “1” if the UE supports the aperiodic CSI reporting mode 1-0 and mode 1-1.	No
bandCombinationListEUTRA One entry corresponding to each supported band combination listed in the same order as in *supportedBandCombination.*	-
BandCombinationParameters-v1090, BandCombinationParameters-v10i0, BandCombinationParameters-v1270 If included, the UE shall include the same number of entries, and listed in the same order, as in *BandCombinationParameters-r10.*	-
BandCombinationParameters-v1130 The field is applicable to each supported CA bandwidth class combination (i.e. CA configuration in TS 36.101 [42, Section 5.6A.1]) indicated in the corresponding band combination. If included, the UE shall include the same number of entries, and listed in the same order, as in *BandCombinationParameters-r10.*	-
bandEUTRA E-UTRA band as defined in TS 36.101 [42]. In case the UE includes *bandEUTRA-v9e0* or *bandEUTRA-v1090*, the UE shall set the corresponding entry of *bandEUTRA* (i.e. without suffix) or *bandEUTRA-r10* respectively to *maxFBI.*	-
bandListEUTRA One entry corresponding to each supported E-UTRA band listed in the same order as in *supportedBandListEUTRA*.	-
bandParameterList-v1380 If included, the UE shall include the same number of entries listed in the same order as the band entries in the corresponding band combination.	-
bandParametersUL, bandParametersDL Indicates the supported parameters for the band. Each of *CA-MIMO-ParametersUL* and *CA-MIMO-ParametersDL* can be included only once for one band in a single band combination entry.	-
beamformed (in MIMO-CA-ParametersPerBoBCPerTM) If signalled, the field indicates for a particular transmission mode, the UE capabilities concerning beamformed EBF/ FD-MIMO operation (class B) applicable for the concerned band combination.	-
beamformed (in MIMO-UE-ParametersPerTM) Indicates for a particular transmission mode, the UE capabilities concerning beamformed EBF/ FD-MIMO operation (class B) applicable for band combinations for which the concerned capabilities are not signalled.	TBD
benefitsFromInterruption Indicates whether the UE power consumption would benefit from being allowed to cause interruptions to serving cells when performing measurements of deactivated SCell carriers for *measCycleSCell* of less than 640ms, as specified in TS 36.133 [16].	No
bwPrefInd Indicates whether the UE supports maximum PDSCH/PUSCH bandwidth preference indication.	-
ca-BandwidthClass The CA bandwidth class supported by the UE as defined in TS 36.101 [42, Table 5.6A-1]. The UE explicitly includes all the supported CA bandwidth class combinations in the band combination signalling. Support for one CA bandwidth class does not implicitly indicate support for another CA bandwidth class.	-

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UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
cch-InterfMitigation-RefRecTypeA, cch-InterfMitigation-RefRecTypeB, cch-InterfMitigation-MaxNumCCs The field *cch-InterfMitigation-RefRecTypeA* defines whether the UE supports Type A downlink control channel interference mitigation (CCH-IM) receiver "LMMSE-IRC + CRS-IC" for PDCCH/PCFICH/PHICH/EPDCCH receive processing (Enhanced downlink control channel performance requirements Type A in the TS 36.101 [6]). The field *cch-InterfMitigation-RefRecTypeB* defines whether the UE supports Type B downlink CCH-IM receiver "E-LMMSE-IRC + CRS-IC" for PDCCH/PCFICH/PHICH receive processing in synchronous networks (Enhanced downlink control channel performance requirements Type B in the TS 36.101 [6]). The UE supporting the capability defined by *cch-InterfMitigation-RefRecTypeB-r13* shall also support the capability defined by *cch-InterfMitigation-RefRecTypeA-r13*. If the UE sets one or more of the fields *cch-InterfMitigation-RefRecTypeA* and *cch-InterfMitigation-RefRecTypeB* to "supported", the UE shall include the parameter *cch-InterfMitigation-MaxNumCCs* to indicate that the UE supports CCH-IM on at least one arbitrary downlink CC for up to *cch-InterfMitigation-MaxNumCCs* downlink CC CA configuration. The UE shall not include the parameter *cch-InterfMitigation-MaxNumCCs* if neither *cch-InterfMitigation-RefRecTypeA* nor *cch-InterfMitigation-RefRecTypeB* is present. The UE may not perform CCH-IM on more than 1 DL CCs. For example, the UE sets "*cch-InterfMitigation-MaxNumCCs* = 3" to indicate that UE supports CCH-IM on at least one DL CC for supported non-CA, 2DL CA and 3DL CA configurations. For CA scenarios, the CCH-IM is guaranteed to be supported on at least one arbitrary component carrier.	-
cdma2000-NW-Sharing Indicates whether the UE supports network sharing for CDMA2000.	-
ce-ClosedLoopTxAntennaSelection Indicates whether the UE supports UL closed-loop Tx antenna selection in CE mode A, as specified in TS 36.212 [22].	Yes
ce-HARQ-AckBundling Indicates whether the UE supports HARQ-ACK bundling in half duplex FDD in CE mode A, as specified in TS 36.212 [22] and TS 36.213 [23].	-
ce-ModeA, ce-ModeB Indicates whether the UE supports operation in CE mode A and/or B, as specified in TS 36.211 [21] and TS 36.213 [23].	-
ceMeasurements Indicates whether the UE supports intra-frequency RSRQ measurements and inter-frequency RSRP and RSRQ measurements in RRC_CONNECTED, as specified in TS 36.133 [16] and TS 36.304 [4].	-
ce-PDSCH-PUSCH-Enhancement Indicates whether the UE supports new numbers of repetitions for PUSCH and modulation restrictions for PDSCH/PUSCH in CE mode A as specified in TS 36.212 [22] and TS 36.213 [23].	No
ce-PDSCH-PUSCH-MaxBandwidth Indicates the maximum supported PDSCH/PUSCH channel bandwidth in CE mode A and B, as specified in TS 36.212 [22] and TS 36.213 [23]. Value bw5 corresponds to 5 MHz and value bw20 corresponds to 20 MHz. If the field is absent the maximum PDSCH/PUSCH channel bandwidth in CE mode A and B is 1.4 MHz. If the setting of this parameter is 20 MHz, the max supported PUSCH channel bandwidth in CE mode A is 5 MHz. The maximum PUSCH channel bandwidth in CE mode B is 1.4 MHz regardless of the setting of this parameter. Parameter: transmission bandwidth configuration, see TS 36.101 [42, table 5.6-1].	Yes
ce-PDSCH-TenProcesses Indicates whether the UE supports 10 DL HARQ processes in FDD in CE mode A.	-
ec-PUCCH-Enhancement Indicates whether the UE supports repetition levels 64 and 128 for PUCCH in CE Mode B, as specified in TS 36.211 [21] and in TS 36.213 [23].	No
ce-PUSCH-NB-MaxTBS Indicates whether the UE supports 2984 bits max UL TBS in 1.4 MHz in CE mode A operation, as specified in TS 36.212 [22] and TS 36.213 [23].	Yes
ce-RetuningSymbols Indicates the number of retuning symbols in CE mode A and B as specified in TS 36.211 [21]. Value n0 corresponds to 0 retuning symbols and value n1 corresponds to 1 retuning symbol. If the field is absent the number of retuning symbols in CE mode A and B is 2.	No
ce-SchedulingEnhancement Indicates whether the UE supports dynamic HARQ-ACK delay in CE mode A as specified in TS 36.212 [22] and TS 36.213 [23].	No

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UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
ce-SRS-Enhancement Indicates whether the UE supports SRS coverage enhancement in TDD with support of SRS combs 2 and 4 as specified in TS 36.213 [23]. This field can be included only if *ce-SRS-EnhancementWithoutComb4* is not included.	-
ce-SRS-EnhancementWithoutComb4 Indicates whether the UE supports SRS coverage enhancement in TDD with support of SRS comb 2 but without support of SRS comb 4 as specified in TS 36.213 [23]. This field can be included only if *ce-SRS-Enhancement* is not included.	-
ce-SwitchWithoutHO Indicate whether the UE supports switching between normal mode and enhanced coverage mode without handover.	-
channelMeasRestriction Indicates for a particular transmission mode whether the UE supports channel measurement restriction.	TBD
codebook-HARQ-ACK Indicates whether the UE supports determining HARQ ACK codebook size based on the DAI-ased solution and/or the number of configured CCs. The first bit is set to "1" if the UE supports the DAI-based codebook size determination. The second bit is set to “1” if the UE supports the codebook determination based on the number of configured CCs.	No
commMultipleTx Indicates whether the UE supports multiple transmissions of sidelink communication to different destinations in one SC period. If *commMultipleTx-r13* is set to supported then the UE support 8 transmitting sidelink processes.	-
commSimultaneousTx Indicates whether the UE supports simultaneous transmission of EUTRA and sidelink communication (on different carriers) in all bands for which the UE indicated sidelink support in a band combination (using *commSupportedBandsPerBC*).	-
commSupportedBands Indicates the bands on which the UE supports sidelink communication, by an independent list of bands i.e. separate from the list of supported E UTRA band, as indicated in *supportedBandListEUTRA*.	-
commSupportedBandsPerBC Indicates, for a particular band combination, the bands on which the UE supports simultaneous reception of EUTRA and sidelink communication. If the UE indicates support simultaneous transmission (using *commSimultaneousTx*), it also indicates, for a particular band combination, the bands on which the UE supports simultaneous transmission of EUTRA and sidelink communication. The first bit refers to the first band included in *commSupportedBands*, with value 1 indicating sidelink is supported.	-
configN (in MIMO-CA-ParametersPerBoBCPerTM) If signalled, the field indicates for a particular transmission mode whether the UE supports non-precoded EBF/ FD-MIMO (class A) related configuration N for the concerned band combination.	-
configN (in MIMO-UE-ParametersPerTM) Indicates for a particular transmission mode whether the UE supports non-precoded EBF/ FD-MIMO (class A) related configuration N for band combinations for which the concerned capabilities are not signalled.	TBD
crossCarrierScheduling	Yes
crossCarrierScheduling-B5C Indicates whether the UE supports cross carrier scheduling beyond 5 DL CCs.	No
crossCarrierSchedulingLAA-DL Indicates whether the UE supports cross-carrier scheduling from a licensed carrier for LAA cell(s) for downlink. This field can be included only if *downlinkLAA* is included.	-
crossCarrierSchedulingLAA-UL Indicates whether the UE supports cross-carrier scheduling from a licensed carrier for LAA cell(s) for uplink. This field can be included only if *uplinkLAA* is included.	-
crs-DiscoverySignalsMeas Indicates whether the UE supports CRS based discovery signals measurement, and PDSCH/EPDCCH RE mapping with zero power CSI-RS configured for discovery signals.	FFS
crs-InterfHandl Indicates whether the UE supports CRS interference handling.	No
crs-InterfMitigationTM10 The field defines whether the UE supports CRS interference mitigation in transmission mode 10. The UE supporting the *crs-InterfMitigationTM10* capability shall also support the *crs-InterfHandl* capability.	-

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UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
crs-InterfMitigationTM1toTM9 Indicates whether the UE supports CRS interference mitigation (IM) while operating in the following transmission modes (TM): TM 1, TM 2, …, TM 8 and TM 9. The UE shall not include the field if it does not support CRS IM in TMs 1-9. If the field is present, the UE supports CRS-IM on at least one arbitrary downlink CC for up to *crs-InterfMitigationTM1toTM9-r13* downlink CC CA configuration. The UE signals *crs-InterfMitigationTM1toTM9-r13* value to indicate the maximum *crs-InterfMitigationTM1toTM9-r13* downlink CC CA configuration where UE may apply CRS IM. For example, the UE sets "*crs-InterfMitigationTM1toTM9-r13* = 3" to indicate that the UE supports CRS-IM on at least one DL CC for supported non-CA, 2DL CA and 3DL CA configurations. The UE supporting the *crs-InterfMitigationTM1toTM9-r13* capability shall also support the *crs-InterfHandl-r11* capability.	-
crs-LessDwPTS Indicates whether the UE supports TDD special subframe configuration 10 without CRS transmission on the 5th symbol of DwPTS, i.e. *ssp10-CRS-LessDwPTS*, as specified in TS 36.211 [17].	-
csi-RS-DiscoverySignalsMeas Indicates whether the UE supports CSI-RS based discovery signals measurement. If this field is included, the UE shall also include *crs-DiscoverySignalsMeas*.	FFS
csi-RS-DRS-RRM-MeasurementsLAA Indicates whether the UE supports performing RRM measurements on LAA cell(s) based on CSI-RS-based DRS. This field can be included only if *downlinkLAA* is included.	-
csi-RS-EnhancementsTDD Indicates for a particular transmission mode whether the UE supports CSI-RS enhancements applicable for TDD.	No
csi-SubframeSet Indicates whether the UE supports REL-12 DL CSI subframe set configuration, REL-12 DL CSI subframe set dependent CSI measurement/feedback, configuration of up to 2 CSI-IM resources for a CSI process with no more than 4 CSI-IM resources for all CSI processes of one frequency if the UE supports tm10, configuration of two ZP-CSI-RS for tm1 to tm9, PDSCH RE mapping with two ZP-CSI-RS configurations, and EPDCCH RE mapping with two ZP-CSI-RS configurations if the UE supports EPDCCH. This field is only applicable for UEs supporting TDD.	-
dataInactMon Indicates whether the UE supports the data inactivity monitoring as specified in TS 36.321 [6].	-
dc-Support Including this field indicates that the UE supports synchronous DC and power control mode 1. Including this field for a band combination entry comprising of single band entry indicates that the UE supports intra-band contiguous DC. Including this field for a band combination entry comprising of two or more band entries, indicates that the UE supports DC for these bands and that the serving cells corresponding to a band entry shall belong to one cell group (i.e. MCG or SCG). Including field *asynchronous* indicates that the UE supports asynchronous DC and power control mode 2. Including this field for a TDD/FDD band combination indicates that the UE supports TDD/FDD DC for this band combination.	-
delayBudgetReporting Indicates whether the UE supports delay budget reporting.	No
demodulationEnhancements This field defines whether the UE supports advanced receiver in SFN scenario as specified in TS 36.101 [42].	-
deviceType UE may set the value to "*noBenFromBatConsumpOpt*" when it does not foresee to particularly benefit from NW-based battery consumption optimisation. Absence of this value means that the device does benefit from NW-based battery consumption optimisation.	-
diffFallbackCombReport Indicates that the UE supports reporting of UE radio access capabilities for the CA band combinations asked by the eNB as well as, if any, reporting of different UE radio access capabilities for their fallback band combination as specified in TS 36.331 [5]. The UE does not report fallback combinations if their UE radio access capabilities are the same as the ones for the CA band combination asked by the eNB.	-
differentFallbackSupported Indicates that the UE supports different capabilities for at least one fallback case of this band combination.	-
discInterFreqTx Indicates whether the UE support sidelink discovery announcements either a) on the primary frequency only or b) on other frequencies also, regardless of the UE configuration (e.g. CA, DC). The UE may set discInterFreqTx to supported when having a separate transmitter or if it can request sidelink discovery transmission gaps.	-

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UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
discoverySignalsInDeactSCell Indicates whether the UE supports the behaviour on DL signals and physical channels when SCell is deactivated and discovery signals measurement is configured as specified in TS 36.211 [21, 6.11A]. This field is included only if UE supports carrier aggregation and includes *crs-DiscoverySignalsMeas*.	FFS
discPeriodicSLSS Indicates whether the UE supports periodic (i.e. not just one time before sidelink discovery announcement) Sidelink Synchronization Signal (SLSS) transmission and reception for sidelink discovery.	-
discScheduledResourceAlloc Indicates whether the UE supports transmission of discovery announcements based on network scheduled resource allocation.	-
disc-UE-SelectedResourceAlloc Indicates whether the UE supports transmission of discovery announcements based on UE autonomous resource selection.	-
disc-SLSS Indicates whether the UE supports Sidelink Synchronization Signal (SLSS) transmission and reception for sidelink discovery.	-
discSupportedBands Indicates the bands on which the UE supports sidelink discovery. One entry corresponding to each supported E UTRA band, listed in the same order as in *supportedBandListEUTRA*.	-
discSupportedProc Indicates the number of processes supported by the UE for sidelink discovery.	-
discSysInfoReporting Indicates whether the UE supports reporting of system information for inter-frequency/PLMN sidelink discovery.	-
dl-256QAM Indicates whether the UE supports 256QAM in DL on the band.	-
dmrs-Enhancements (in MIMO-CA-ParametersPerBoBCPerTM) If signalled, the field indicates for a particular transmission mode, that for the concerned band combination the DMRS enhancements are different than the value indicated by field *dmrs-Enhancements* in *MIMO-UE-ParametersPerTM*.	-
dmrs-Enhancements (in MIMO-UE-ParametersPerTM) Indicates for a particular transmission mode whether the UE supports DMRS enhancements for the indicated transmission mode.	TBD
dmrs-LessUpPTS Indicates whether the UE supports not to transmit DMRS for PUSCH in UpPTS.	No
downlinkLAA Presence of the field indicates that the UE supports downlink LAA operation including identification of downlink transmissions on LAA cell(s) for full downlink subframes, decoding of common downlink control signalling on LAA cell(s), CSI feedback for LAA cell(s), RRM measurements on LAA cell(s) based on CRS-based DRS.	-
drb-TypeSCG Indicates whether the UE supports SCG bearer.	-
drb-TypeSplit Indicates whether the UE supports split bearer except for PDCP data transfer in UL.	-
dtm Indicates whether the UE supports DTM in GERAN.	-
e-CSFB-1XRTT Indicates whether the UE supports enhanced CS fallback to CDMA2000 1xRTT or not.	Yes
e-CSFB-ConcPS-Mob1XRTT Indicates whether the UE supports concurrent enhanced CS fallback to CDMA2000 1xRTT and PS handover/ redirection to CDMA2000 HRPD.	Yes
e-CSFB-dual-1XRTT Indicates whether the UE supports enhanced CS fallback to CDMA2000 1xRTT for dual Rx/Tx configuration. This bit can only be set to supported if *tx-Config1XRTT* and *rx-Config1XRTT* are both set to dual.	Yes
e-HARQ-Pattern-FDD Indicates whether the UE supports enhanced HARQ pattern for TTI bundling operation for FDD.	-
emptyUnicastRegion Indicates whether the UE supports unicast reception in subframes with empty unicast control region as described in TS 36.213 [23] Section 12. This field can be included only if *unicast-fembmsMixedSCell* and *crossCarrierScheduling* are included.	-
endingDwPTS	-

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UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
Indicates whether the UE supports reception ending with a subframe occupied for a DwPTS-duration as described in TS 36.211 [21] and TS 36.213 [23]. This field can be included only if *downlinkLAA* is included.	
Enhanced-4TxCodebook Indicates whether the UE supports enhanced 4Tx codebook.	No
enhancedDualLayerTDD Indicates whether the UE supports enhanced dual layer (PDSCH transmission mode 8) for TDD or not.	-
ePDCCH Indicates whether the UE can receive DCI on UE specific search space on Enhanced PDCCH.	Yes
e-RedirectionUTRA	Yes
e-RedirectionUTRA-TDD Indicates whether the UE supports enhanced redirection to UTRA TDD to multiple carrier frequencies both with and without using related SIB provided by *RRCConnectionRelease* or not.	Yes
extendedFreqPriorities Indicates whether the UE supports extended E-UTRA frequency priorities indicated by *cellReselectionSubPriority* field.	-
extendedLongDRX Indicates whether the UE supports extended long DRX cycle values of 5.12s and 10.24s in RRC_CONNECTED.	-
extendedMaxMeasId Indicates whether the UE supports extended number of measurement identies as defined by *maxMeasId-r12*.	No
extendedMaxObjectId Indicates whether the UE supports extended number of measurement object identies as defined by *maxObjectId-r13*.	No
extendedPollByte Indicates whether the UE supports extended pollByte values as defined by *pollByte-r14*.	-
extended-RLC-LI-Field Indicates whether the UE supports 15 bit RLC length indicator.	-
extendedRLC-SN-SO-Field Indicates whether the UE supports 16 bits of RLC sequence number and segmentation offset.	-
extendedRSRQ-LowerRange Indicates whether the UE supports the extended RSRQ lower value range from -34dB to -19.5dB in measurement configuration and reporting as specified in TS 36.133 [16].	No
fdd-HARQ-TimingTDD Indicates whether UE supports FDD HARQ timing for TDD SCell when configured with TDD PCell.	-
featureGroupIndicators, featureGroupIndRel9Add, featureGroupIndRel10 The definitions of the bits in the bit string are described in Annex B.1 (for *featureGroupIndicators* and *featureGroupIndRel9Add*) and in Annex C.1 (for *featureGroupIndRel10*).	Yes
fembmsMixedCell Indicates whether the UE in RRC_CONNECTED supports MBMS reception with 15 kHz subcarrier spacings via MBSFN from FeMBMS/Unicast mixed cells on a frequency indicated in an *MBMSInterestIndication* message.	
fembmsDedicatedCell Indicates whether the UE in RRC_CONNECTED supports MBMS reception with 15 kHz subcarrier spacings via MBSFN from MBMS-dedicated cells on a frequency indicated in an *MBMSInterestIndication* message.	
fourLayerTM3-TM4 Indicates whether the UE supports 4-layer spatial multiplexing for TM3 and TM4.	-
fourLayerTM3-TM4-perCC Indicates whether the UE supports 4-layer spatial multiplexing for TM3 and TM4 for the component carrier.	-
freqBandPriorityAdjustment Indicates whether the UE supports the prioritization of frequency bands in *multiBandInfoList* over the band in *freqBandIndicator* as defined by *freqBandIndicatorPriority-r12*.	-
freqBandRetrieval Indicates whether the UE supports reception of *requestedFrequencyBands.*	-
halfDuplex If *halfDuplex* is set to true, only half duplex operation is supported for the band, otherwise full duplex operation is supported.	-

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UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
incMonEUTRA Indicates whether the UE supports increased number of E-UTRA carrier monitoring in RRC_IDLE and RRC_CONNECTED, as specified in TS 36.133 [16].	No
incMonUTRA Indicates whether the UE supports increased number of UTRA carrier monitoring in RRC_IDLE and RRC_CONNECTED, as specified in TS 36.133 [16].	No
inDeviceCoexInd Indicates whether the UE supports in-device coexistence indication as well as autonomous denial functionality.	Yes
inDeviceCoexInd-HardwareSharingInd Indicates whether the UE supports indicating hardware sharing problems when sending the *InDeviceCoexIndication*, as well as omitting the TDM assistance information. A UE that supports hardware sharing indication shall also indicate support of LAA operation.	-
inDeviceCoexInd-UL-CA Indicates whether the UE supports UL CA related in-device coexistence indication. This field can be included only if *inDeviceCoexInd* is included. The UE supports *inDeviceCoexInd-UL-CA* in the same duplexing modes as it supports *inDeviceCoexInd*.	-
interBandTDD-CA-WithDifferentConfig Indicates whether the UE supports inter-band TDD carrier aggregation with different UL/DL configuration combinations. The first bit indicates UE supports the configuration combination of SCell DL subframes are a subset of PCell and PSCell by SIB1 configuration and the configuration combination of SCell DL subframes are a superset of PCell and PSCell by SIB1 configuration; the second bit indicates UE supports the configuration combination of SCell DL subframes are neither superset nor subset of PCell and PSCell by SIB1 configuration. This field is included only if UE supports inter-band TDD carrier aggregation.	-
interferenceMeasRestriction Indicates whether the UE supports interference measurement restriction.	TBD
interFreqBandList One entry corresponding to each supported E-UTRA band listed in the same order as in *supportedBandListEUTRA*.	-
interFreqNeedForGaps Indicates need for measurement gaps when operating on the E-UTRA band given by the entry in *bandListEUTRA* or on the E-UTRA band combination given by the entry in *bandCombinationListEUTRA* and measuring on the E-UTRA band given by the entry in *interFreqBandList*.	-
interFreqProximityIndication Indicates whether the UE supports proximity indication for inter-frequency E-UTRAN CSG member cells.	-
interFreqRSTD-Measurement Indicates whether the UE supports inter-frequency RSTD measurements for OTDOA positioning [54].	Yes
interFreqSI-AcquisitionForHO Indicates whether the UE supports, upon configuration of si-RequestForHO by the network, acquisition and reporting of relevant information using autonomous gaps by reading the SI from a neighbouring inter-frequency cell.	Yes
interRAT-BandList One entry corresponding to each supported band of another RAT listed in the same order as in the *interRAT-Parameters*.	-
interRAT-NeedForGaps Indicates need for DL measurement gaps when operating on the E-UTRA band given by the entry in *bandListEUTRA or on the E-UTRA band combination given by the entry in bandCombinationListEUTRA* and measuring on the inter-RAT band given by the entry in the *interRAT-BandList*.	-
interRAT-ParametersWLAN Indicates whether the UE supports WLAN measurements configured by *MeasObjectWLAN* with corresponding quantity and report configuration in the supported WLAN bands.	-
interRAT-PS-HO-ToGERAN Indicates whether the UE supports inter-RAT PS handover to GERAN or not.	Yes
intraBandContiguousCC-InfoList Indicates, per serving carrier of which the corresponding bandwidth class includes multiple serving carriers (i.e. bandwidth class B, C, D and so on), the maximum number of supported layers for spatial multiplexing in DL and the maximum number of CSI processes supported. The number of entries is equal to the number of component carriers in the corresponding bandwidth class. The UE shall support the setting indicated in each entry of the list regardless of the order of entries in the list.The UE shall include the field only if it supports 4-layer spatial multiplexing in transmission mode3/4 for a subset of component carriers in the corresponding	-

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UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
bandwidth class, or if the maximum number of supported layers for at least one component carrier is higher than *supportedMIMO-CapabilityDL-r10* in the corresponding bandwidth class, or if the number of CSI processes for at least one component carrier is higher than *supportedCSI-Proc-r11* in the corresponding band. This field may also be included for bandwidth class A but in such a case without including any sub-fields in *IntraBandContiguousCC-Info-r12* (see NOTE 6).	
intraFreqA3-CE-ModeA Indicates whether the UE when operating in CE Mode A supports *eventA3* for intra-frequency neighbouring cells.	-
intraFreqA3-CE-ModeB Indicates whether the UE when operating in CE Mode B supports *eventA3* for intra-frequency neighbouring cells.	-
intraFreq-CE-NeedForGaps Indicates need for measurement gaps when operating in CE on the E-UTRA band given by the entry in *supportedBandListEUTRA*.	
intraFreqHO-CE-ModeA Indicates whether the UE when operating in CE Mode A supports intra-frequency handover.	-
intraFreqHO-CE-ModeB Indicates whether the UE when operating in CE Mode B supports intra-frequency handover.	-
intraFreqProximityIndication Indicates whether the UE supports proximity indication for intra-frequency E-UTRAN CSG member cells.	-
intraFreqSI-AcquisitionForHO Indicates whether the UE supports, upon configuration of si-RequestForHO by the network, acquisition and reporting of relevant information using autonomous gaps by reading the SI from a neighbouring intra-frequency cell.	Yes
k-Max (in MIMO-CA-ParametersPerBoBCPerTM) If signalled, the field indicates for a particular transmission mode the maximum number of NZP CSI RS resource configurations supported within a CSI process applicable for the concerned band combination.	-
k-Max (in MIMO-UE-ParametersPerTM) Indicates for a particular transmission mode the maximum number of NZP CSI RS resource configurations supported within a CSI process applicable for band combinations for which the concerned capabilities are not signalled.	TBD
locationReport Indicates whether the UE supports reporting of its geographical location information to eNB.	-
loggedMBSFNMeasurements Indicates whether the UE supports logged measurements for MBSFN. A UE indicating support for logged measurements for MBSFN shall also indicate support for logged measurements in Idle mode.	-
loggedMeasurementsIdle Indicates whether the UE supports logged measurements in Idle mode.	-
logicalChannelSR-ProhibitTimer Indicates whether the UE supports the *logicalChannelSR-ProhibitTimer* as defined in TS 36.321 [6].	-
longDRX-Command Indicates whether the UE supports Long DRX Command MAC Control Element.	-
lwa Indicates whether the UE supports LTE-WLAN Aggregation (LWA). The UE which supports LWA shall also indicate support of *interRAT-ParametersWLAN-r13*.	-
lwa-BufferSize Indicates whether the UE supports the layer 2 buffer sizes for “with support for split bearers” as defined in Table 4.1-3 and 4.1A-3 of TS 36.306 [5] for LWA.	-
lwa-HO-WithoutWT-Change Indicates whether the UE supports handover where LWA configuration is retained without WT change and using LWA end-marker for PDCP key change indication for LWA operation.	-
lwa-RLC-UM Indicates whether the UE supports RLC UM for LWA bearer.	-
lwa-SplitBearer Indicates whether the UE supports the split LWA bearer (as defined in TS 36.300 [9]).	-
lwa-UL Indicates whether the UE supports UL transmission over WLAN for LWA bearer.	-
lwip Indicates whether the UE supports LTE/WLAN Radio Level Integration with IPsec Tunnel (LWIP). The UE which supports LWIP shall also indicate support of *interRAT-*	-

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UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
ParametersWLAN-r13.	
lwip-Aggregation-DL, lwip-Aggregation-UL Indicates whether the UE supports aggregation of LTE and WLAN over DL/UL LWIP. The UE that indicates support of LWIP aggregation over DL or UL shall also indicate support of *lwip*.	-
makeBeforeBreak Indicates whether the UE supports intra-frequency Make-Before-Break handover, and whether the UE which indicates *dc-Parameters* supports intra-frequency Make-Before-Break SeNB change, as defined in TS 36.300 [9].	-
maximumCCsRetrieval Indicates whether UE supports reception of *requestedMaxCCsDL* and *requestedMaxCCsUL*.	-
maxLayersMIMO-Indication Indicates whether the UE supports the network configuration of *maxLayersMIMO*. If the UE supports *fourLayerTM3-TM4* or *intraBandContiguousCC-InfoList*, UE supports the configuration of *maxLayersMIMO* for these two cases regardless of indicating *maxLayersMIMO-Indication*.	-
maxNumberDecoding Indicates the maximum number of blind decodes in UE-specific search space per UE in one subframe for CA with more than 5 CCs as defined in TS 36.213 [23] which is supported by the UE. The number of blind decodes supported by the UE is the field value * 32. Only values 5 to 32 can be used in this version of the specification.	No
maxNumberROHC-ContextSessions Set to the maximum number of concurrently active ROHC contexts supported by the UE, excluding context sessions that leave all headers uncompressed. cs2 corresponds with 2 (context sessions), cs4 corresponds with 4 and so on. The network ignores this field if the UE supports none of the ROHC profiles in *supportedROHC-Profiles*. If the UE indicates both *maxNumberROHC-ContextSessions* and *maxNumberROHC-ContextSessions-r14*, same value shall be indicated.	-
maxNumberUpdatedCSI-Proc Indicates the maximum number of CSI processes to be updated across CCs.	No
mbms-AsyncDC Indicates whether the UE in RRC_CONNECTED supports MBMS reception via MRB on a frequency indicated in an *MBMSInterestIndication* message, where (according to *supportedBandCombination*) the carriers that are or can be configured as serving cells in the MCG and the SCG are not synchronized. If this field is included, the UE shall also include *mbms-SCell* and *mbms-NonServingCell*. The field indicates that the UE supports the feature for xDD if *mbms-SCell* and *mbms-NonServingCell* are supported for xDD.	-
mbms-NonServingCell Indicates whether the UE in RRC_CONNECTED supports MBMS reception via MRB on a frequency indicated in an *MBMSInterestIndication* message, where (according to *supportedBandCombination* and to network synchronization properties) a serving cell may be additionally configured. If this field is included, the UE shall also include the *mbms-SCell* field.	Yes
mbms-SCell Indicates whether the UE in RRC_CONNECTED supports MBMS reception via MRB on a frequency indicated in an *MBMSInterestIndication* message, when an SCell is configured on that frequency (regardless of whether the SCell is activated or deactivated).	Yes
measurementEnhancements This field defines whether UE supports measurement enhancements in high speed scenario as specified in TS 36.133 [16].	-
mfbi-UTRA It indicates if the UE supports the signalling requirements of multiple radio frequency bands in a UTRA FDD cell, as defined in TS 25.307 [65].	-
MIMO-BeamformedCapabilityList A list of pairs of {k-Max, n-MaxList} values with the nth entry indicating the values that the UE supports for each CSI process in case n CSI processes would be configured.	-
MIMO-CapabilityDL The number of supported layers for spatial multiplexing in DL. The field may be absent for category 0 and category 1 UE in which case the number of supported layers is 1.	-
MIMO-CapabilityUL The number of supported layers for spatial multiplexing in UL. Absence of the field means that the number of supported layers is 1.	-
MIMO-CA-ParametersPerBoBC A set of MIMO parameters provided per band of a band combination. In case a subfield is absent, the concerned capabilities are the same as indicated at the per UE level (i.e. by MIMO-UE-ParametersPerTM).	-

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UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
modifiedMPR-Behavior Field encoded as a bit map, where at least one bit N is set to "1" if UE supports modified MPR/A-MPR behaviour N, see TS 36.101 [42]. All remaining bits of the field are set to "0". The leading / leftmost bit (bit 0) corresponds to modified MPR/A-MPR behaviour 0, the next bit corresponds to modified MPR/A-MPR behaviour 1 and so on. Absence of this field means that UE does not support any modified MPR/A-MPR behaviour.	-
multiACK-CSIreporting Indicates whether the UE supports multi-cell HARQ ACK and periodic CSI reporting and SR on PUCCH format 3.	Yes
multiBandInfoReport Indicates whether the UE supports the acquisition and reporting of multi band information for *reportCGI*.	-
multiClusterPUSCH-WithinCC	Yes
multiNS-Pmax Indicates whether the UE supports the mechanisms defined for cells broadcasting *NS-PmaxList*.	-
multipleTimingAdvance Indicates whether the UE supports multiple timing advances for each band combination listed in *supportedBandCombination*. If the band combination comprised of more than one band entry (i.e., inter-band or intra-band non-contiguous band combination), the field indicates that the same or different timing advances on different band entries are supported. If the band combination comprised of one band entry (i.e., intra-band contiguous band combination), the field indicates that the same or different timing advances across component carriers of the band entry are supported.	-
multipleUplinkSPS Indicates whether the UE supports multiple uplink SPS and reporting SPS assistance information. A UE indicating *multipleUplinkSPS* shall also support V2X communication via Uu, as defined in TS 36.300 [9].	-
must-CapabilityPerBand Indicates that UE supports MUST as specified in 36.212 [22 5.3.3.1] on the band in the band combination.	-
must-TM234-UpTo2Tx-r14 Indicates that the UE supports MUST operation for TM2/3/4 using up to 2Tx.	-
must-TM89-UpToOneInterferingLayer-r14 Indicates that the UE supports MUST operation for TM8/9 with assistance information for up to 1 interfering layer.	-
must-TM89-UpToThreeInterferingLayers-r14 Indicates that the UE supports MUST operation for TM8/9 with assistance information for up to 3 interfering layers.	-
must-TM10-UpToOneInterferingLayer-r14 Indicates that the UE supports MUST operation for TM10 with assistance information for up to 1 interfering layer.	-
must-TM10-UpToThreeInterferingLayers-r14 Indicates that the UE supports MUST operation for TM10 with assistance information for up to 3 interfering layers.	-

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UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
naics-Capability-List Indicates that UE supports NAICS, i.e. receiving assistance information from serving cell and using it to cancel or suppress interference of neighbouring cell(s) for at least one band combination. If not present, UE does not support NAICS for any band combination. The field *numberOfNAICS-CapableCC* indicates the number of component carriers where the NAICS processing is supported and the field *numberOfAggregatedPRB* indicates the maximum aggregated bandwidth across these of component carriers (expressed as a number of PRBs) with the restriction that NAICS is only supported over the full carrier bandwidth. The UE shall indicate the combination of {*numberOfNAICS-CapableCC, numberOfNAICS-CapableCC*} for every supported *numberOfNAICS-CapableCC*, e.g. if a UE supports {x CC, y PRBs} and {x-n CC, y-m PRBs} where n>=1 and m>=0, the UE shall indicate both. - For *numberOfNAICS-CapableCC* = 1, UE signals one value for *numberOfAggregatedPRB* from the range {50, 75, 100}; - For *numberOfNAICS-CapableCC* = 2, UE signals one value for *numberOfAggregatedPRB* from the range {50, 75, 100, 125, 150, 175, 200}; - For *numberOfNAICS-CapableCC* = 3, UE signals one value for *numberOfAggregatedPRB* from the range {50, 75, 100, 125, 150, 175, 200, 225, 250, 275, 300}; - For *numberOfNAICS-CapableCC* = 4, UE signals one value for *numberOfAggregatedPRB* from the range {50, 100, 150, 200, 250, 300, 350, 400}; - For *numberOfNAICS-CapableCC* = 5, UE signals one value for *numberOfAggregatedPRB* from the range {50, 100, 150, 200, 250, 300, 350, 400, 450, 500}.	-
ncsg Indicates whether the UE supports measurement NCSG Pattern Id 0, 1, 2 and 3, as specified in TS 36.133 [16]. If this field is included and the UE supports asynchronous DC, the UE shall support NCSG Pattern Id 0, 1, 2 and 3. If this field is included but the UE does not support asynchronous DC, only NCSG Pattern Id 0 and 1 shall be supported	No
n-MaxList (in MIMO-UE-ParametersPerTM) Indicates for a particular transmission mode the maximum number of NZP CSI RS ports supported within a CSI process applicable for band combinations for which the concerned capabilities are not signalled. For *k-Max* values exceeding 1, the UE shall include the field and signal *k-Max* minus 1 bits. The first bit indicates *n-Max2*, with value 0 indicating 8 and value 1 indicating 16. The second bit indicates *n-Max3*, with value 0 indicating 8 and value 1 indicating 16. The third bit indicates *n-Max4*, with value 0 indicating 8 and value 1 indicating 32. The fourth bit indicates *n-Max5*, with value 0 indicating 16 and value 1 indicating 32. The fifth bit indicates *n-Max6*, with value 0 indicating 16 and value 1 indicating 32. The sixt bit indicates *n-Max7*, with value 0 indicating 16 and value 1 indicating 32. The seventh bit indicates *n-Max8*, with value 0 indicating 16 and value 1 indicating 64.	TBD
n-MaxList (in MIMO-CA-ParametersPerBoBCPerTM) If signalled, the field indicates for a particular transmission mode the maximum number of NZP CSI RS ports supported within a CSI process applicable for band the concerned combination. Further details are as indicated for *n-MaxList* in *MIMO-UE-ParametersPerTM*.	-
NonContiguousUL-RA-WithinCC-List One entry corresponding to each supported E-UTRA band listed in the same order as in *supportedBandListEUTRA*.	No
nonPrecoded (in MIMO-UE-ParametersPerTM) Indicates for a particular transmission mode the UE capabilities concerning non-precoded EBF/ FD-MIMO operation (class A) for band combinations for which the concerned capabilities are not signalled.	TBD
nonPrecoded (in MIMO-CA-ParametersPerBoBCPerTM) If signalled, the field indicates for a particular transmission mode, the UE capabilities concerning non-precoded EBF/ FD-MIMO operation (class A) applicable for the concerned band combination.	-

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UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
nonUniformGap Indicates whether the UE supports measurement non uniform Pattern Id 1, 2, 3 and 4 as specified in TS 36.133 [16].	No
noResourceRestrictionForTTIBundling Indicate wheter the UE supports TTI bundling operation without resource allocation restriction.	-
otdoa-UE-Assisted Indicates whether the UE supports UE-assisted OTDOA positioning [54].	Yes
outOfSequenceGrantHandling Indicates whether the UE supports PUSCH transmissions with out of sequence UL grants as defined in TS 36.213 [22]. This field can be included only if uplinkLAA is included.	-
overheatingInd Indicates whether the UE supports overheating assistance information.	No
pdcch-CandidateReductions Indicates whether the UE supports PDCCH candidate reduction on UE specific search space as specified in TS 36.213 [23, 9.1.1].	No
pdcp-SN-Extension Indicates whether the UE supports 15 bit length of PDCP sequence number.	-
pdcp-SN-Extension-18bits Indicates whether the UE supports 18 bit length of PDCP sequence number.	-
pdcp-TransferSplitUL Indicates whether the UE supports PDCP data transfer split in UL for the *drb-TypeSplit* as specified in TS 36.323 [8].	-
pdsch-CollisionHandling Indicates whether the UE supports PDSCH collision handling as specified in TS 36.213 [23].	-
perServingCellMeasurementGap Indicates whether the UE supports per serving cell measurement gap indication, as specified in TS 36.133 [16].	-
phy-TDD-ReConfig-FDD-PCell Indicates whether the UE supports TDD UL/DL reconfiguration for TDD serving cell(s) via monitoring PDCCH with eIMTA-RNTI on a FDD PCell, and HARQ feedback according to UL and DL HARQ reference configurations. This bit can only be set to supported only if the UE supports FDD PCell and *phy-TDD-ReConfig-TDD-PCell* is set to supported.	-
phy-TDD-ReConfig-TDD-PCell Indicates whether the UE supports TDD UL/DL reconfiguration for TDD serving cell(s) via monitoring PDCCH with eIMTA-RNTI on a TDD PCell, and HARQ feedback according to UL and DL HARQ reference configurations, and PUCCH format 3.	-
pmi-Disabling	Yes
powerPrefInd Indicates whether the UE supports power preference indication.	No
prach-Enhancements This field defines whether the UE supports random access preambles generated from restricted set type B in high speed scenoario as specified in TS 36.211 [21].	-
pucch-Format4 Indicates whether the UE supports PUCCH format 4.	Yes
pucch-Format5 Indicates whether the UE supports PUCCH format 5.	Yes
pucch-SCell Indicates whether the UE supports PUCCH on SCell.	No
pusch-Enhancements Indicates whether the UE supports the PUSCH enhancement mode as specified in TS 36.211 [21] and TS 36.213 [23].	Yes
pusch-FeedbackMode Indicates whether the UE supports PUSCH feedback mode 3-2.	No
pusch-SRS-PowerControl-SubframeSet Indicates whether the UE supports subframe set dependent UL power control for PUSCH and SRS. This field is only applicable for UEs supporting TDD.	-
rach-Less Indicates whether the UE supports RACH-less handover, and whether the UE which indicates *dc-Parameters* supports RACH-less SeNB change, as defined in TS 36.300 [9].	-
rach-Report Indicates whether the UE supports delivery of rachReport.	-
rai-Support Defines whether the UE supports release assistance indication (RAI) as specified in TS 36.321 [6] for BL UEs.	No
rclwi	-

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UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
Indicates whether the UE supports RCLWI, i.e. reception of *rclwi-Configuration*. The UE which supports RLCWI shall also indicate support of *interRAT-ParametersWLAN-r13*. The UE which supports RCLWI and *wlan-IW-RAN-Rules* shall also support applying WLAN identifiers received in *rclwi-Configuration* for the access network selection and traffic steering rules when in RRC_IDLE.	
recommendedBitRate Indicates whether the UE supports the bit rate recommendation message from the eNB to the UE as specified in TS 36.321 [6, 6.1.3.13].	No
recommendedBitRateQuery Indicates whether the UE supports the bit rate recommendation query message from the UE to the eNB as specified in TS 36.321 [6, 6.1.3.13]. If this field is included, the UE shall also include the *recommendedBitRate* field.	No
reducedIntNonContComb Indicates whether the UE supports receiving *requestReducedIntNonContComb* that requests the UE to exclude supported intra-band non-contiguous CA band combinations other than included in capability signalling as specified in TS 36.306 [5, 4.3.5.21].	-
reducedIntNonContCombRequested Indicates that the UE excluded supported intra-band non-contiguous CA band combinations other than included in capability signalling as specified in TS 36.306 [5, 4.3.5.21].	-
retuningTimeInfoBandList Indicates, for a particular pair of bands, the RF retuning time when switching between the band pair to transmit SRS on a PUSCH-less SCell as specified in 36.212 [22] and 36.213 [23]. If included, the UE shall include a number of entries as indicated in the following, and listed in the same order, as in *bandParameterList* for the concerned band combination: - For the first band, the UE shall include the same number of entries as in *bandParameterList* i.e. first entry corresponds to first band in *bandParameterList* and so on, - For the second band, the UE shall include one entry less i.e. first entry corresponds to the second band in *bandParameterList* and so on - And so on	
requestedBands Indicates the frequency bands requested by E-UTRAN.	-
requestedCCsDL, requestedCCsUL Indicates the maximum number of CCs requested by E-UTRAN.	-
requestedDiffFallbackCombList Indicates the CA band combinations for which report of different UE capabilities is requested by E-UTRAN.	-
rf-RetuningTimeDL Indicates the interruption time on DL reception within a band pair during the RF retuning for switching between the band pair to transmit SRS on a PUSCH-less SCell. n0 represents 0 OFDM symbols, n0dot5 represents 0.5 OFDM symbols, n1 represents 1 OFDM symbol and so on.	-
rf-RetuningTimeUL Indicates the interruption time on UL transmission within a band pair during the RF retuning for switching between the band pair to transmit SRS on a PUSCH-less SCell. n0 represents 0 OFDM symbols, n0dot5 represents 0.5 OFDM symbols, n1 represents 1 OFDM symbol and so on.	-
rlm-ReportSupport Indicates whether the UE supports RLM event and information reporting.	
rsrqMeasWideband Indicates whether the UE can perform RSRQ measurements with wider bandwidth.	Yes
rsrq-OnAllSymbols Indicates whether the UE can perform RSRQ measurement on all OFDM symbols and also support the extended RSRQ upper value range from -3dB to 2.5dB in measurement configuration and reporting as specified in TS 36.133 [16].	No
rs-SINR-Meas Indicates whether the UE can perform RS-SINR measurements in RRC_CONNECTED as specified in TS 36.214 [48].	-
rssi-AndChannelOccupancyReporting Indicates whether the UE supports performing measurements and reporting of RSSI and channel occupancy. This field can be included only if *downlinkLAA* is included.	-

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UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
scptm-AsyncDC Indicates whether the UE in RRC_CONNECTED supports MBMS reception via SC-MRB on a frequency indicated in an *MBMSInterestIndication* message, where (according to *supportedBandCombination*) the carriers that are or can be configured as serving cells in the MCG and the SCG are not synchronized. If this field is included, the UE shall also include *scptm-SCell* and *scptm-NonServingCell*.	Yes
scptm-NonServingCell Indicates whether the UE in RRC_CONNECTED supports MBMS reception via SC-MRB on a frequency indicated in an *MBMSInterestIndication* message, where (according to *supportedBandCombination* and to network synchronization properties) a serving cell may be additionally configured. If this field is included, the UE shall also include the *scptm-SCell* field.	Yes
scptm-Parameters Presence of the field indicates that the UE supports SC-PTM reception as specified in TS 36.306 [5].	Yes
scptm-SCell Indicates whether the UE in RRC_CONNECTED supports MBMS reception via SC-MRB on a frequency indicated in an *MBMSInterestIndication* message, when an SCell is configured on that frequency (regardless of whether the SCell is activated or deactivated).	Yes
scptm-ParallelReception Indicates whether the UE in RRC_CONNECTED supports parallel reception in the same subframe of DL-SCH transport blocks transmitted using C-RNTI/Semi-Persistent Scheduling C-RNTI and using SC-RNTI/G-RNTI as specified in TS 36.306 [5].	Yes
secondSlotStartingPosition Indicates whether the UE supports reception of subframes with second slot starting position as described in TS 36.211 [21] and TS 36.213 [23]. This field can be included only if *downlinkLAA* is included.	-
shortMeasurementGap Indicates whether the UE supports 3ms measurement gap lengths as specified in TS 36.133 [16].	No
shortSPS-IntervalFDD Indicates whether the UE supports uplink SPS intervals shorter than 10 subframes in FDD mode.	-
shortSPS-IntervalTDD Indicates whether the UE supports uplink SPS intervals shorter than 10 subframes in TDD mode.	-
simultaneousPUCCH-PUSCH	Yes
simultaneousRx-Tx Indicates whether the UE supports simultaneous reception and transmission on different bands for each band combination listed in *supportedBandCombination*. This field is only applicable for inter-band TDD band combinations. A UE indicating support of *simultaneousRx-Tx* and *dc-Support-r12* shall support different UL/DL configurations between PCell and PSCell.	-
skipFallbackCombinations Indicates whether UE supports receiving reception of *requestSkipFallbackComb* that requests UE to exclude fallback band combinations from capability signalling.	-
skipFallbackCombRequested Indicates whether *requestSkipFallbackComb* is requested by E-UTRAN.	-
skipMonitoringDCI-Format0-1A Indicates whether UE supports blind decoding reduction on UE specific search space by not monitoring DCI Format 0 and 1A as specified in TS 36.213 [23, 9.1.1].	No
skipUplinkDynamic Indicates whether the UE supports skipping of UL transmission for an uplink grant indicated on PDCCH if no data is available for transmission as described in TS 36.321 [6].	-
skipUplinkSPS Indicates whether the UE supports skipping of UL transmission for a configured uplink grant if no data is available for transmission as described in TS 36.321 [6].	-
sl-CongestionControl Indicates whether the UE supports Channel Busy Ratio measurement and reporting of Channel Busy Ratio measurement results to eNB for V2X sidelink communication.	-
slss-TxRx Indicates whether the UE supports SLSS/PSBCH transmission and reception in UE autonomous resource selection mode and eNB scheduled mode in a band for V2X sidelink communication.	-
spatialBundling-HARQ-ACK Indicates whether UE supports HARQ-ACK spatial bundling on PUCCH or PUSCH as specified in TS 36.213 [23, 7.3.1 and 7.3.2].	No

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UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
srs-Enhancements Indicates whether the UE supports SRS enhancements.	TBD
srs-EnhancementsTDD Indicates whether the UE supports TDD specific SRS enhancements.	No
srvcc-FromUTRA-FDD-ToGERAN Indicates whether UE supports SRVCC handover from UTRA FDD PS HS to GERAN CS.	-
srvcc-FromUTRA-FDD-ToUTRA-FDD Indicates whether UE supports SRVCC handover from UTRA FDD PS HS to UTRA FDD CS.	-
srvcc-FromUTRA-TDD128-ToGERAN Indicates whether UE supports SRVCC handover from UTRA TDD 1.28Mcps PS HS to GERAN CS.	-
srvcc-FromUTRA-TDD128-ToUTRA-TDD128 Indicates whether UE supports SRVCC handover from UTRA TDD 1.28Mcps PS HS to UTRA TDD 1.28Mcps CS.	-
ss-CCH-InterfHandl Indicates whether the UE supports synchronisation signal and common channel interference handling.	Yes
standaloneGNSS-Location Indicates whether the UE is equipped with a standalone GNSS receiver that may be used to provide detailed location information in RRC measurement report and logged measurements.	-
subcarrierSpacingMBMS-khz7dot5, subcarrierSpacingMBMS-khz1dot25 Indicates the supported subcarrier spacings for MBSFN subframes in addition to 15 kHz subcarrier spacing. *subcarrierSpacingMBMS-khz1dot25* and *subcarrierSpacingMBMS-khz7dot5* indicates that the UE supports 1.25 and 7.5 kHz respectively for MBSFN subframes as described in TS36.211 [21, 6.12]. This field is included only if *fembmsMixedCell* or *fembmsDedicatedCell* is included.	
supportedBandCombination Includes the supported CA band combinations, if any, and may include all the supported non-CA bands.	-
supportedBandCombinationAdd-r11 Includes additional supported CA band combinations in case maximum number of CA band combinations of *supportedBandCombination* is exceeded.	-
SupportedBandCombinationAdd-v11d0, SupportedBandCombinationAdd-v1250, SupportedBandCombinationAdd-v1270, SupportedBandCombinationAdd-v1320, SupportedBandCombinationAdd-v1380, SupportedBandCombinationAdd-v1430, SupportedBandCombinationAdd-v1450 If included, the UE shall include the same number of entries, and listed in the same order, as in *SupportedBandCombinationAdd-r11*.	-
SupportedBandCombinationExt, SupportedBandCombination-v1090, SupportedBandCombination-v10i0, SupportedBandCombination-v1130, SupportedBandCombination-v1250, SupportedBandCombination-v1270, SupportedBandCombination-v1320, SupportedBandCombination-v1380, SupportedBandCombination-v1430, SupportedBandCombination-v1450 If included, the UE shall include the same number of entries, and listed in the same order, as in *supportedBandCombination-r10*.	-
supportedBandCombinationReduced Includes the supported CA band combinations, and may include the fallback CA combinations specified in TS 36.101 [42, 4.3A]. This field also indicates whether the UE supports reception of *requestReducedFormat*.	
SupportedBandCombinationReduced-v1320, SupportedBandCombinationReduced-v1380, SupportedBandCombinationReduced-v1430, SupportedBandCombinationReduced-v1450 If included, the UE shall include the same number of entries, and listed in the same order, as in *supportedBandCombinationReduced-r13*.	-
SupportedBandGERAN GERAN band as defined in TS 45.005 [20].	No
SupportedBandList1XRTT One entry corresponding to each supported CDMA2000 1xRTT band class.	-
SupportedBandListEUTRA Includes the supported E-UTRA bands. This field shall include all bands which are indicated in *BandCombinationParameters*.	-
SupportedBandListEUTRA-v9e0, SupportedBandListEUTRA-v1250, SupportedBandListEUTRA-v1310, SupportedBandListEUTRA-v1320 If included, the UE shall include the same number of entries, and listed in the same order, as in *supportedBandListEUTRA* (i.e. without suffix).	-

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UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
SupportedBandListGERAN	No
SupportedBandListHRPD One entry corresponding to each supported CDMA2000 HRPD band class.	-
supportedBandListWLAN Indicates the supported WLAN bands by the UE.	-
SupportedBandUTRA-FDD UTRA band as defined in TS 25.101 [17].	-
SupportedBandUTRA-TDD128 UTRA band as defined in TS 25.102 [18].	-
SupportedBandUTRA-TDD384 UTRA band as defined in TS 25.102 [18].	-
SupportedBandUTRA-TDD768 UTRA band as defined in TS 25.102 [18].	-
supportedBandwidthCombinationSet The *supportedBandwidthCombinationSet* indicated for a band combination is applicable to all bandwidth classes indicated by the UE in this band combination. Field encoded as a bit map, where bit N is set to "1" if UE support Bandwidth Combination Set N for this band combination, see 36.101 [42]. The leading / leftmost bit (bit 0) corresponds to the Bandwidth Combination Set 0, the next bit corresponds to the Bandwidth Combination Set 1 and so on. The UE shall neither include the field for a non-CA band combination, nor for a CA band combination for which the UE only supports Bandwidth Combination Set 0.	-
supportedCellGrouping This field indicates for which mapping of serving cells to cell groups (i.e. MCG or SCG) the UE supports asynchronous DC. This field is only present for a band combination with more than two but less than six band entries where the UE supports asynchronous DC. If this field is not present but asynchronous operation is supported, the UE supports all possible mappings of serving cells to cell groups for the band combination. The bitmap size is selected based on the number of entries in the combinations, i.e., in case of three entries, the bitmap corresponding to *threeEntries* is selected and so on. A bit in the bit string set to 1 indicates that the UE supports asynchronous DC for the cell grouping option represented by the concerned bit position. Each bit position represents a different cell grouping option, as illustrated by a table, see NOTE 5. A cell grouping option is represented by a number of bits, each representing a particular band entry in the band combination with the left-most bit referring to the band listed first in the band combination, etc. Value 0 indicates that the carriers of the corresponding band entry are mapped to a first cell group, while value 1 indicates that the carriers of the corresponding band entry are mapped to a second cell group. It is noted that the mapping table does not include entries with all bits set to the same value (0 or 1) as this does not represent a DC scenario (i.e. indicating that the UE supports that all carriers of the corresponding band entry are in one cell group).	-
supportedCSI-Proc Indicates the maximum number of CSI processes supported on a component carrier within a band. Value n1 corresponds to 1 CSI process, value n3 corresponds to 3 CSI processes, and value n4 corresponds to 4 CSI processes. If this field is included, the UE shall include the same number of entries listed in the same order as in *BandParameters*. If the UE supports at least 1 CSI process on any component carrier, then the UE shall include this field in all bands in all band combinations.	-
supportedNAICS-2CRS-AP If included, the UE supports NAICS for the band combination. The UE shall include a bitmap of the same length, and in the same order, as in *naics-Capability-List,* to indicate 2 CRS AP NAICS capability of the band combination. The first/ leftmost bit points to the first entry of *naics-Capability-List*, the second bit points to the second entry of *naics-Capability-List*, and so on. For band combinations with a single component carrier, UE is only allowed to indicate {*numberOfNAICS-CapableCC*, *numberOfAggregatedPRB*} = {1, 100} if NAICS is supported.	-
supportRohcContextContinue Indicates whether the UE supports ROHC context continuation operation where the UE does not reset the current ROHC context upon handover.	-
supportedROHC-Profiles Indicates the ROHC profiles that UE supports in both uplink and downlink.	-
supportedUplinkOnlyROHC-Profiles Indicates the ROHC profiles that UE supports in uplink and not in downlink, see TS 36.323 [8]	-
tdd-SpecialSubframe Indicates whether the UE supports TDD special subframe defined in TS 36.211 [21]. A UE shall indicate *tdd-SpecialSubframe-r11* if it supports the TDD special subframes ssp7 and ssp9. A UE shall indicate *tdd-SpecialSubframe-r14* if it supports the TDD special subframe ssp10.	No

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UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
tdd-FDD-CA-PCellDuplex The presence of this field indicates that the UE supports TDD/FDD CA in any supported band combination including at least one FDD band with *bandParametersUL* and at least one TDD band with *bandParametersUL*. The first bit is set to "1" if UE supports the TDD PCell. The second bit is set to "1" if UE supports FDD PCell. This field is included only if the UE supports band combination including at least one FDD band with *bandParametersUL* and at least one TDD band with *bandParametersUL*. If this field is included, the UE shall set at least one of the bits as "1". If this field is included with DC, then it is applicable within a CG, and the presence of this field indicates the capability of the UE to support TDD/FDD CA with at least one FDD band and at least one TDD band in the same CG, with the value indicating the support for TDD/FDD PCell (PSCell).	-
tdd-TTI-Bundling The presence of this field indicates whether the UE supporting TDD special subframe configuration 10 also supports TTI bundling for TDD configuration 2 and 3 when PUSCH transimission in UpPTS is configured, see TS 36.213 [23, 8.0]. If this field is present, the *tdd-SpecialSubframe-r14* shall be present.	No
timerT312 Indicates whether the UE supports T312.	No
tm5-FDD Indicates whether the UE supports the PDSCH transmission mode 5 in FDD.	-
tm5-TDD Indicates whether the UE supports the PDSCH transmission mode 5 in TDD.	-
tm6-CE-ModeA Indicates whether the UE supports tm6 operation in CE mode A, see TS 36.213 [23, 7.2.3]. This field can be included only if *ce-ModeA* is included.	Yes
tm9-CE-ModeA Indicates whether the UE supports tm9 operation in CE mode A, see TS 36.213 [23, 7.2.3]. This field can be included only if *ce-ModeA* is included.	Yes
tm9-CE-ModeB Indicates whether the UE supports tm9 operation in CE mode B, see TS 36.213 [23, 7.2.3]. This field can be included only if *ce-ModeB* is included.	Yes
tm9-LAA Indicates whether the UE supports tm9 operation on LAA cell(s). This field can be included only if *downlinkLAA* is included.	-
tm9-With-8Tx-FDD Indicates whether the UE supports PDSCH transmission mode 9 with 8 CSI reference signal ports for FDD when not operating in CE mode.	No
tm10-LAA Indicates whether the UE supports tm10 operation on LAA cell(s). This field can be included only if *downlinkLAA* is included.	-
twoAntennaPortsForPUCCH	No
twoStepSchedulingTimingInfo Presence of this field indicates that the UE supports uplink scheduling using PUSCH trigger A and PUSCH trigger B (as defined in TS 36.213 [23]). This field also indicates the timing between the PUSCH trigger B and the earliest time the UE supports performing the associated UL transmission. For reception of PUSCH trigger B in subframe N, value *nPlus1* indicates that the UE supports performing the UL transmission in subframe N+1, value *nPlus2* indicates that the UE supports performing the UL transmission in subframe N+2, and so on. This field can be included only if *uplinkLAA* is included.	-
txAntennaSwitchDL, txAntennaSwitchUL The presence of *txAntennaSwitchUL* indicates the UE supports transmit antenna selection for this UL band in the band combination as described in TS 36.213 [23, 8.2 and 8.7]. The field *txAntennaSwitchDL* indicates the entry number of the first-listed band with UL in the band combination that affects this DL. The field *txAntennaSwitchUL* indicates the entry number of the first-listed band with UL in the band combination that switches together with this UL. Value 1 means first entry, value 2 means second entry and so on. All DL and UL that switch together indicate the same entry number.	-
txDiv-PUCCH1b-ChSelect Indicates whether the UE supports transmit diversity for PUCCH format 1b with channel selection.	Yes
uci-PUSCH-Ext Indicates whether the UE supports an extension of UCI delivering more than 22 HARQ-ACK bits on PUSCH as specified in TS 36.212 [22, 5.2.2.6] and TS 36.213 [23, 8.6.3].	No

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UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
ue-AutonomousWithFullSensing Indicates whether the UE supports transmitting PSCCH/PSSCH using UE autonomous resource selection mode with full sensing (i.e., continuous channel monitoring) for V2X sidelink communication and the UE supports maximum transmit power associated with Power class 3 V2X UE, see TS 36.101 [42].	-
ue-AutonomousWithPartialSensing Indicates whether the UE supports transmitting PSCCH/PSSCH using UE autonomous resource selection mode with partial sensing (i.e., channel monitoring in a limited set of subframes) for V2X sidelink communication and the UE supports maximum transmit power associated with Power class 3 V2X UE, see TS 36.101 [42].	-
ue-Category UE category as defined in TS 36.306 [5]. Set to values 1 to 12 in this version of the specification.	-
ue-CategoryDL UE DL category as defined in TS 36.306 [5]. Value *n17* corresponds to UE category 17, value *m1* corresponds to UE category M1, value *oneBis* corresponds to UE category 1bis, value m2 corresponds to UE category M2. For ASN.1 compatibility, a UE indicating DL category 0, m1 or m2 shall also indicate any of the categories (1..5) in *ue-Category* (without suffix), which is ignored by the eNB, a UE indicating UE category oneBis shall also indicate UE category 1 in *ue-Category* (without suffix), and a UE indicating UE category m2 shall also indicate UE category m1. The field *ue-CategoryDL* is set to values 0, m1, oneBis, m2, 4, 6, 7, 9 to 16, n17, 18, 19, 20 in this version of the specification.	-
ue-CategoryUL UE UL category as defined in TS 36.306 [5]. Value *n14* corresponds to UE category 14, value *m1* corresponds to UE category M1, value *oneBis* corresponds to UE category 1bis. The field *ue-CategoryUL* is set to values m1, 0, oneBis, 3, 5, 7, 8, 13, n14 or 15 to 20 in this version of the specification. Value *n21* corresponds to UE category 21.	-
ue-CE-NeedULGaps Indicates whether the UE needs uplink gaps during continuous uplink transmission in FDD as specified in TS 36.211 [21] and TS 36.306 [5].	-
ue-PowerClass-N, ue-PowerClass-5 Indicates whether the UE supports UE power class 1, 2, 4 or 5 in the E-UTRA band, see TS 36.101 [42] and TS 36.307 [79]. UE includes either *ue-PowerClass-N* or *ue-PowerClass-5*. If neither *ue-PowerClass-N* nor *ue-PowerClass-5* is included, UE supports the default UE power class in the E-UTRA band, see TS 36.101 [42].	-
ue-Rx-TxTimeDiffMeasurements Indicates whether the UE supports Rx - Tx time difference measurements.	No
ue-SpecificRefSigsSupported	No
ue-SSTD-Meas Indicates whether the UE supports SSTD measurements between the PCell and the PSCell as specified in TS 36.214 [48] and TS 36.133 [16].	-
ue-TxAntennaSelectionSupported TRUE indicates that the UE is capable of supporting UE transmit antenna selection such that all the supported bands are affected by transmit antenna switching, as described in TS 36.213 [23, 8.7]. E-UTRAN ignores this field if *bandParameterList-v1380* is included.	Yes
ul-CoMP Indicates whether the UE supports UL Coordinated Multi-Point operation.	No
ul-64QAM Indicates whether the UE supports 64QAM in UL on the band. This field is only present when the field ue-*CategoryUL* indicates UL UE category that supports UL 64QAM, see TS 36.306 [5, Table 4.1A-2]. If the field is present for one band, the field shall be present for all bands including downlink only bands.	-
ul-256QAM Indicates whether the UE supports 256QAM in UL on the band in the band combination. This field is only present when the field ue-*CategoryUL* indicates UL UE category that supports 256QAM in UL, see TS 36.306 [5, Table 4.1A-2]. The UE includes this field only if the field *ul-256QAM-perCC-InfoLis*t is not included.	-
ul-256QAM-perCC-InfoList Indicates, per serving carrier of which the corresponding bandwidth class includes multiple serving carriers (i.e. bandwidth class B, C, D and so on), whether the UE supports 256QAM in the band combination. The number of entries is equal to the number of component carriers in the corresponding bandwidth class. The UE shall support the setting indicated in each entry of the list regardless of the order of entries in the list. This field is only present when the field *ue-CategoryUL* indicates UL UE category that supports 256QAM in UL, see TS 36.306 [5, Table 4.1A-2]. The UE includes this field only if the field *ul-256QAM* is not included.	-
ul-PDCP-Delay	-

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UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
Indicates whether the UE supports UL PDCP Packet Delay per QCI measurement as specified in TS 36.314 [71].	
uplinkLAA Presence of the field indicates that the UE supports uplink LAA operation.	-
uss-BlindDecodingAdjustment Indicates whether the UE supports blind decoding adjustment on UE specific search space as defined in TS 36.213 [22]. This field can be included only if uplinkLAA is included.	-
uss-BlindDecodingReduction Indicates whether the UE supports blind decoding reduction on UE specific search space by not monitoring DCI format 0A/0B/4A/4B as defined in TS 36.213 [22]. This field can be included only if uplinkLAA is included.	-
unicastFrequencyHopping Indicates whether the UE supports frequency hopping for unicast MPDCCH/PDSCH (configured by *mpdcch-pdsch-HoppingConfig*) and unicast PUSCH (configured by *pusch-HoppingConfig*).	-
unicast-fembmsMixedSCell Indicates whether the UE supports unicast reception from FeMBMS/Unicast mixed cell. This field is included only if UE supports carrier aggregation.	-
utran-ProximityIndication Indicates whether the UE supports proximity indication for UTRAN CSG member cells.	-
utran-SI-AcquisitionForHO Indicates whether the UE supports, upon configuration of si-RequestForHO by the network, acquisition and reporting of relevant information using autonomous gaps by reading the SI from a neighbouring UMTS cell.	Yes
v2x-BandwidthClass The bandwidth class for V2X sidelink transmission supported by the UE as defined in TS 36.101 [42, Table 5.6G.1-3]. The UE explicitly includes all the supported bandwidth class combinations for V2X sidelink transmission or reception in the band combination signalling. Support for one bandwidth class does not implicitly indicate support for another bandwidth class.	-
v2x-eNB-Scheduled Indicates whether the UE supports transmitting PSCCH/PSSCH using dynamic scheduling, SPS in eNB scheduled mode for V2X sidelink communication, reporting SPS assistance information and the UE supports maximum transmit power associated with Power class 3 V2X UE, see TS 36.101 [42] in a band.	-
v2x-HighPower Indicates whether the UE supports maximum transmit power associated with Power class 2 V2X UE for V2X sidelink transmission in a band, see TS 36.101 [42].	-
v2x-HighReception Indicates whether the UE supports reception of 20 PSCCH in a subframe and decoding of 136 RBs per subframe counting both PSCCH and PSSCH in a band for V2X sidelink communication.	-
v2x-nonAdjacentPSCCH-PSSCH Indicates whether the UE supports transmission and reception in the configuration of non-adjacent PSCCH and PSSCH for V2X sidelink communication.	-
v2x-numberTxRxTiming Indicates the number of multiple reference TX/RX timings counted over all the configured sidelink carriers for V2X sidelink communication.	-
v2x-SupportedBandCombinationList Indicates the supported band combination list on which the UE supports simultaneous transmission and/or reception of V2X sidelink communication.	
v2x-SupportedTxBandCombListPerBC, v2x-SupportedRxBandCombListPerBC Indicates, for a particular band combination of EUTRA, the supported band combination list among *v2x-SupportedBandCombinationList* on which the UE supports simultaneous transmission or reception of EUTRA and V2X sidelink communication respectively. The first bit refers to the first entry of *v2x-SupportedBandCombinationList*, with value 1 indicating V2X sidelink transmission/reception is supported.	-
v2x-TxWithShortResvInterval Indicates whether the UE supports 20 ms and 50 ms resource reservation periods for UE autonomous resource selection and eNB scheduled resource allocation for V2X sidelink communication.	-
voiceOverPS-HS-UTRA-FDD Indicates whether UE supports IMS voice according to GSMA IR.58 profile in UTRA FDD.	-
voiceOverPS-HS-UTRA-TDD128 Indicates whether UE supports IMS voice in UTRA TDD 1.28Mcps.	-

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UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
whiteCellList Indicates whether the UE supports EUTRA white cell listing to limit the set of cells applicable for measurements.	-
wlan-IW-RAN-Rules Indicates whether the UE supports RAN-assisted WLAN interworking based on access network selection and traffic steering rules.	-
wlan-IW-ANDSF-Policies Indicates whether the UE supports RAN-assisted WLAN interworking based on ANDSF policies.	-
wlan-MAC-Address Indicates the WLAN MAC address of this UE.	-
wlan-PeriodicMeas Indicates whether the UE supports periodic reporting of WLAN measurements.	-
wlan-ReportAnyWLAN Indicates whether the UE supports reporting of WLANs not listed in the *measObjectWLAN*.	-
wlan-SupportedDataRate Indicates the maximum WLAN data rate supported by the UE over all LWA bearers. Actual value of supported data rate is field value * 10 Mbps (i.e., value 1 corresponds to 10 Mbps, value 2 corresponds to 20 Mbps and so on).	-

NOTE 1: The IE *UE-EUTRA-Capability* does not include AS security capability information, since these are the same as the security capabilities that are signalled by NAS. Consequently, AS need not provide "man-in-the-middle" protection for the security capabilities.

NOTE 2: The column FDD/ TDD diff indicates if the UE is allowed to signal, as part of the additional capabilities for an XDD mode i.e. within *UE-EUTRA-CapabilityAddXDD-Mode-xNM*, a different value compared to the value signalled elsewhere within *UE-EUTRA-Capability* (i.e. the common value, supported for both XDD modes). A '-' is used to indicate that it is not possible to signal different values (used for fields for which the field description is provided for other reasons). Annex E specifies for which TDD and FDD serving cells a UE supporting TDD/FDD CA shall support a capability for which it indicates support within the capability signalling.

NOTE 3: The *BandCombinationParameters* for the same band combination can be included more than once.

NOTE 4: UE CA and measurement capabilities indicate the combinations of frequencies that can be configured as serving frequencies.

NOTE 5: The grouping of the cells to the first and second cell group, as indicated by *supportedCellGrouping*, is shown in the table below. The leading / leftmost bit of *supportedCellGrouping* corresponds to the Bit String Position 1.

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Nr of Band Entries:	5	4	3
Length of Bit-String:	15	7	3
Bit String Position	Cell grouping option (0= first cell group, 1= second cell group)		
1	00001	0001	001
2	00010	0010	010
3	00011	0011	011
4	00100	0100	
5	00101	0101	
6	00110	0110	
7	00111	0111	
8	01000		
9	01001		
10	01010		
11	01011		
12	01100		
13	01101		
14	01110		
15	01111		

NOTE 6: UE includes the *intraBandContiguousCC-InfoList-r12* also for bandwidth class A because of the presence conditions in *BandCombinationParameters-v1270*. For example, if UE supports CA_1A_41D band combination, if UE includes the field *intraBandContiguousCC-InfoList-r12* for band 41, the UE includes *intraBandContiguousCC-InfoList-r12* also for band 1.

NOTE 7: For a UE that indicates release X in field *accessStratumRelease* but supports a feature specified in release X+ N (i.e. early UE implementation), the ASN.1 comprehension requirement are specified in Annex F.

– *UE-RadioPagingInfo*

The *UE-RadioPagingInfo* IE contains UE capability information needed for paging.

UE-RadioPagingInfo information element

```
-- ASN1START

UE-RadioPagingInfo-r12 ::=              SEQUENCE {
    ue-Category-v1250                   INTEGER (0)         OPTIONAL,
    ...,
    [[  ue-CategoryDL-v1310                     ENUMERATED {m1}     OPTIONAL,
        ce-ModeA-r13                            ENUMERATED {true}   OPTIONAL,
        ce-ModeB-r13                            ENUMERATED {true}   OPTIONAL
    ]]

}

-- ASN1STOP
```

UE-RadioPagingInfo field descriptions
ce-ModeA, ce-ModeB Indicates whether the UE supports operation in CE mode A and/or B, as specified in TS 36.211 [21] and TS 36.213 [23].
ue-Category, ue-CategoryDL UE category as defined in TS 36.306 [5]. A category M2 UE shall always include the field *ue-CategoryDL-v1310* in this version of the specification.

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– *UE-TimersAndConstants*

The IE *UE-TimersAndConstants* contains timers and constants used by the UE in either RRC_CONNECTED or RRC_IDLE.

UE-TimersAndConstants information element

```
-- ASN1START

UE-TimersAndConstants ::=           SEQUENCE {
    t300                                ENUMERATED {
                                            ms100, ms200, ms300, ms400, ms600, ms1000, ms1500,
                                            ms2000},
    t301                                ENUMERATED {
                                            ms100, ms200, ms300, ms400, ms600, ms1000, ms1500,
                                            ms2000},
    t310                                ENUMERATED {
                                            ms0, ms50, ms100, ms200, ms500, ms1000, ms2000},
    n310                                ENUMERATED {
                                            n1, n2, n3, n4, n6, n8, n10, n20},
    t311                                ENUMERATED {
                                            ms1000, ms3000, ms5000, ms10000, ms15000,
                                            ms20000, ms30000},
    n311                                ENUMERATED {
                                            n1, n2, n3, n4, n5, n6, n8, n10},
    ...,
    [[  t300-v1310                      ENUMERATED {
                                            ms2500, ms3000, ms3500, ms4000, ms5000, ms6000, ms8000,
                                            ms10000}        OPTIONAL,   -- Need OR
        t301-v1310                      ENUMERATED {
                                            ms2500, ms3000, ms3500, ms4000, ms5000, ms6000, ms8000,
                                            ms10000}        OPTIONAL    -- Need OR

    ]],
    [[  t310-v1330                          ENUMERATED {ms4000, ms6000}
                                                            OPTIONAL    -- Need OR
    ]]
}

-- ASN1STOP
```

***UE-TimersAndConstants* field descriptions**
n3xy Constants are described in section 7.4. n1 corresponds with 1, n2 corresponds with 2 and so on.
t3xy Timers are described in section 7.3. Value ms0 corresponds with 0 ms, ms50 corresponds with 50 ms and so on. EUTRAN includes an extended value *t3xy-v1310 and t3xy-v1330* only in the Bandwidth Reduced (BR) version of the SIB. UEs that support Coverage Enhancement (CE) mode B shall use the extended values *t3xy-v1310 and t3xy-v1330*, if present, and ignore the value signaled by *t3xy* (without the suffix).

– *VisitedCellInfoList*

The IE *VisitedCellInfoList* includes the mobility history information of maximum of 16 most recently visited cells or time spent outside E-UTRA. The most recently visited cell is stored first in the list. The list includes cells visited in RRC_IDLE and RRC_CONNECTED states.

VisitedCellInfoList information element

```
-- ASN1START

VisitedCellInfoList-r12 ::= SEQUENCE (SIZE (1..maxCellHistory-r12)) OF VisitedCellInfo-r12

VisitedCellInfo-r12 ::=             SEQUENCE {
    visitedCellId-r12                   CHOICE {
        cellGlobalId-r12                        CellGlobalIdEUTRA,
        pci-arfcn-r12                           SEQUENCE {
            physCellId-r12                          PhysCellId,
            carrierFreq-r12                         ARFCN-ValueEUTRA-r9
```


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```
        }
    }                                                                   OPTIONAL,
    timeSpent-r12                       INTEGER (0..4095),
    ...
}

-- ASN1STOP
```

***VisitedCellInfoList* field descriptions**
timeSpent
This field indicates the duration of stay in the cell or outside E-UTRA approximated to the closest second. If the duration of stay exceeds 4095s, the UE shall set it to 4095s.

– *WLAN-OffloadConfig*

The IE *WLAN-OffloadConfig* includes information for traffic steering between E-UTRAN and WLAN. The fields are applicable to both RAN-assisted WLAN interworking based on access network selection and traffic steering rules and RAN-assisted WLAN interworking based on ANDSF policies unless stated otherwise in the field description.

***WLAN-OffloadConfig* information element**

```
-- ASN1START

WLAN-OffloadConfig-r12 ::=              SEQUENCE {
    thresholdRSRP-r12                       SEQUENCE {
        thresholdRSRP-Low-r12                   RSRP-Range,
        thresholdRSRP-High-r12                  RSRP-Range
    }                                                               OPTIONAL, -- Need OR
    thresholdRSRQ-r12                       SEQUENCE {
        thresholdRSRQ-Low-r12                   RSRQ-Range,
        thresholdRSRQ-High-r12                  RSRQ-Range
    }                                                               OPTIONAL, -- Need OR
    thresholdRSRQ-OnAllSymbolsWithWB-r12    SEQUENCE {
        thresholdRSRQ-OnAllSymbolsWithWB-Low-r12            RSRQ-Range,
        thresholdRSRQ-OnAllSymbolsWithWB-High-r12           RSRQ-Range
    }                                                               OPTIONAL, -- Need OP
    thresholdRSRQ-OnAllSymbols-r12          SEQUENCE {
         thresholdRSRQ-OnAllSymbolsLow-r12                  RSRQ-Range,
         thresholdRSRQ-OnAllSymbolsHigh-r12                 RSRQ-Range
    }                                                               OPTIONAL, -- Need OP
    thresholdRSRQ-WB-r12                    SEQUENCE {
        thresholdRSRQ-WB-Low-r12                            RSRQ-Range,
        thresholdRSRQ-WB-High-r12                           RSRQ-Range
    }                                                               OPTIONAL, -- Need OP

    thresholdChannelUtilization-r12         SEQUENCE {
        thresholdChannelUtilizationLow-r12      INTEGER (0..255),
        thresholdChannelUtilizationHigh-r12     INTEGER (0..255)
    }                                                               OPTIONAL, -- Need OR
    thresholdBackhaul-Bandwidth-r12         SEQUENCE {
        thresholdBackhaulDL-BandwidthLow-r12    WLAN-backhaulRate-r12,
        thresholdBackhaulDL-BandwidthHigh-r12   WLAN-backhaulRate-r12,
        thresholdBackhaulUL-BandwidthLow-r12    WLAN-backhaulRate-r12,
        thresholdBackhaulUL-BandwidthHigh-r12   WLAN-backhaulRate-r12
    }                                                               OPTIONAL, -- Need OR
    thresholdWLAN-RSSI-r12                      SEQUENCE {
        thresholdWLAN-RSSI-Low-r12                  INTEGER (0..255),
        thresholdWLAN-RSSI-High-r12                 INTEGER (0..255)
    }                                                               OPTIONAL, -- Need OR
    offloadPreferenceIndicator-r12          BIT STRING (SIZE (16))      OPTIONAL, -- Need OR
    t-SteeringWLAN-r12                      T-Reselection               OPTIONAL, -- Need OR
    ...
}

WLAN-backhaulRate-r12 ::=                   ENUMERATED
                                        {r0, r4, r8, r16, r32, r64, r128, r256, r512,
                                        r1024, r2048, r4096, r8192, r16384, r32768, r65536,
r131072,
                                        r262144, r524288, r1048576, r2097152, r4194304, r8388608,
                                        r16777216, r33554432, r67108864, r134217728, r268435456,
                                        r536870912, r1073741824, r2147483648, r4294967296}

-- ASN1STOP
```


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***WLAN-OffloadConfig* field descriptions**
offloadPreferenceIndicator Indicates the offload preference indicator. Parameter: OPI in TS 24.312 [66]. Only applicable to RAN-assisted WLAN interworking based on ANDSF policies.
thresholdBackhaulDLBandwidth-High Indicates the backhaul available downlink bandwidth threshold used by the UE for traffic steering to WLAN. Parameter: $Thresh_{BackhRateDLWLAN, High}$ in TS 36.304 [4]. Value in kilobits/second. Value rN corresponds to N kbps.
thresholdBackhaulDLBandwidth-Low Indicates the backhaul available downlink bandwidth threshold used by the UE for traffic steering to E-UTRAN. Parameter: $Thresh_{BackhRateDLWLAN, Low}$ in TS 36.304 [4]. Value in kilobits/second. Value rN corresponds to N kbps.
thresholdBackhaulULBandwidth-High Indicates the backhaul available uplink bandwidth threshold used by the UE for traffic steering to WLAN. Parameter: $Thresh_{BackhRateULWLAN, High}$ in TS 36.304 [4]. Value in kilobits/second. Value rN corresponds to N kbps.
thresholdBackhaulULBandwidth-Low Indicates the backhaul available uplink bandwidth threshold used by the UE for traffic steering to E-UTRAN. Parameter: $Thresh_{BackhRateULWLAN, Low}$ in TS 36.304 [4]. Value in kilobits/second. Value rN corresponds to N kbps.
thresholdChannelUtilization-High Indicates the WLAN channel utilization (BSS load) threshold used by the UE for traffic steering to E-UTRAN. Parameter: $Thresh_{ChUtilWLAN, High}$ in TS 36.304 [4].
thresholdChannelUtilization-Low Indicates the WLAN channel utilization (BSS load) threshold used by the UE for traffic steering to WLAN. Parameter: $Thresh_{ChUtilWLAN, Low}$ in TS 36.304 [4].
thresholdRSRP-High Indicates the RSRP threshold (in dBm) used by the UE for traffic steering to E-UTRAN. Parameter: $Thresh_{ServingOffloadWLAN, HighP}$ in TS 36.304 [4].
thresholdRSRP-Low Indicates the RSRP threshold (in dBm) used by the UE for traffic steering to WLAN. Parameter: $Thresh_{ServingOffloadWLAN, LowP}$ in TS 36.304 [4].
thresholdRSRQ-High,thresholdRSRQ-OnAllSymbolsHigh, thresholdRSRQ-WB-High, thresholdRSRQ-OnAllSymbolsWithWB-High Indicates the RSRQ threshold (in dB) used by the UE for traffic steering to E-UTRAN. Parameter: $Thresh_{ServingOffloadWLAN, HighQ}$ in TS 36.304 [4]. The UE shall only apply one of threshold values of *thresholdRSRQ-OnAllSymbolsWithWB-High, thresholdRSRQ-OnAllSymbolsHigh, thresholdRSRQ-WB-High* and *thresholdRSRQ-High* as present in *wlan-OffloadConfigCommon* and forward this to upper layer. NOTE 1.
thresholdRSRQ-Low,thresholdRSRQ-OnAllSymbolsLow, thresholdRSRQ-WB-Low, thresholdRSRQ-OnAllSymbolsWithWB-Low Indicates the RSRQ threshold (in dB) used by the UE for traffic steering to WLAN. Parameter: $Thresh_{ServingOffloadWLAN, LowQ}$ in TS 36.304 [4]. The UE shall only apply one of threshold values of *thresholdRSRQ-OnAllSymbolsWithWB-Low, thresholdRSRQ-OnAllSymbolsLow, thresholdRSRQ-WB-Low* and *thresholdRSRQ-Low* as present in *wlan-OffloadConfigCommon* and forward this to upper layer. NOTE 1.
thresholdWLAN-RSSI-High Indicates the WLAN RSSI threshold used by the UE for traffic steering to WLAN. Parameter: $Thresh_{WLANRSSI, High}$ in TS 36.304 [4]. Value 0 corresponds to -128dBm, 1 corresponds to -127dBm and so on.
thresholdWLAN-RSSI-Low Indicates the WLAN RSSI threshold used by the UE for traffic steering to E-UTRAN. Parameter: $Thresh_{WLANRSSI, Low}$ in TS 36.304 [4]. Value 0 corresponds to -128dBm, 1 corresponds to -127dBm and so on.
t-SteeringWLAN Indicates the timer value during which the rules should be fulfilled before starting traffic steering between E-UTRAN and WLAN. Parameter: $Tsteering_{WLAN}$ in TS 36.304 [4]. Only applicable to RAN-assisted WLAN interworking based on access network selection and traffic steering rules.

NOTE 1: Within SIB17, E-UTRAN includes the fields corresponding to same RSRQ types as included in SIB1. E.g. if E-UTRAN includes *q-QualMinRSRQ-OnAllSymbols* in SIB1 it also includes *thresholdRSRQ-OnAllSymbols* in SIB17. Within the *RRCConnectionReconfiguration* message E-UTRAN only includes *thresholdRSRQ*, setting the value according to the RSRQ type used for E-UTRAN. The UE shall apply the RSRQ fields (RSRQ threshold, high and low) corresponding to one RSRQ type i.e. the same as it applies for E-UTRAN.

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6.3.7 MBMS information elements

– *MBMS-NotificationConfig*

The IE *MBMS-NotificationConfig* specifies the MBMS notification related configuration parameters, that are applicable for all MBSFN areas.

MBMS-NotificationConfig information element

```
-- ASN1START

MBMS-NotificationConfig-r9 ::=              SEQUENCE {
    notificationRepetitionCoeff-r9      ENUMERATED {n2, n4},
    notificationOffset-r9               INTEGER (0..10),
    notificationSF-Index-r9             INTEGER (1..6)
}

MBMS-NotificationConfig-v1430 ::=               SEQUENCE {
    notificationSF-Index-v1430              INTEGER (7..10)
}

-- ASN1STOP
```

MBMS-NotificationConfig field descriptions
notificationOffset Indicates, together with the *notificationRepetitionCoeff*, the radio frames in which the MCCH information change notification is scheduled i.e. the MCCH information change notification is scheduled in radio frames for which: SFN mod notification repetition period = *notificationOffset*.
notificationRepetitionCoeff Actual change notification repetition period common for all MCCHs that are configured= shortest modification period/ *notificationRepetitionCoeff*. The 'shortest modificaton period' corresponds with the lowest value of *mcch-ModificationPeriod* of all MCCHs that are configured. Value n2 corresponds to coefficient 2, and so on.
notificationSF-Index Indicates the subframe used to transmit MCCH change notifications on PDCCH. FDD: Value 1, 2, 3, 4, 5 and 6 correspond with subframe #1, #2, #3 #6, #7, and #8 respectively. Value 7, 8, 9 and 10 correspond with subframe #0, #4, #5 and #9 respectively. If *notificationSF-Index-v1430* is included, UE ignores *notificationSF-Index-r9*. TDD: Value 1, 2, 3, 4, and 5 correspond with subframe #3, #4, #7, #8, and #9 respectively.

– *MBMS-ServiceList*

The IE *MBMS-ServiceList* provides the list of MBMS services which the UE is receiving or interested to receive.

MBMS-ServiceList information element

```
-- ASN1START

MBMS-ServiceList-r13 ::=            SEQUENCE (SIZE (0..maxMBMS-ServiceListPerUE-r13)) OF MBMS-
ServiceInfo-r13

MBMS-ServiceInfo-r13 ::=                SEQUENCE    {
    tmgi-r13                            TMGI-r9
}

-- ASN1STOP
```

– *MBSFN-AreaId*

The IE *MBSFN-AreaId* identifies an MBSFN area by means of a locally unique value at lower layers i.e. it concerns parameter N_{ID}^{MBSFN} in TS 36.211 [21, 6.10.2.1].

MBSFN-AreaId information element

```
-- ASN1START
```


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```
MBSFN-AreaId-r12 ::=                    INTEGER (0..255)

-- ASN1STOP
```

– *MBSFN-AreaInfoList*

The IE *MBSFN-AreaInfoList* contains the information required to acquire the MBMS control information associated with one or more MBSFN areas.

MBSFN-AreaInfoList information element

```
-- ASN1START

MBSFN-AreaInfoList-r9 ::=           SEQUENCE (SIZE(1..maxMBSFN-Area)) OF MBSFN-AreaInfo-r9

MBSFN-AreaInfo-r9 ::=               SEQUENCE {
    mbsfn-AreaId-r9                     MBSFN-AreaId-r12,
    non-MBSFNregionLength               ENUMERATED {s1, s2},
    notificationIndicator-r9            INTEGER (0..7),
    mcch-Config-r9                      SEQUENCE {
        mcch-RepetitionPeriod-r9        ENUMERATED {rf32, rf64, rf128, rf256},
        mcch-Offset-r9                  INTEGER (0..10),
        mcch-ModificationPeriod-r9      ENUMERATED {rf512, rf1024},
        sf-AllocInfo-r9                 BIT STRING (SIZE(6)),
        signallingMCS-r9                ENUMERATED {n2, n7, n13, n19}
    },
    ...,
    [[  mcch-Config-r14             SEQUENCE {
            mcch-RepetitionPeriod-v1430     ENUMERATED {rf1, rf2, rf4, rf8,
                                            rf16 }      OPTIONAL,   -- Need OR
            mcch-ModificationPeriod-v1430   ENUMERATED {rf1, rf2, rf4, rf8, rf16, rf32, rf64, rf128,
                                            rf256, spare7}                  OPTIONAL    -- Need OR
        }                                                                   OPTIONAL,   -- Need OR
        subcarrierSpacingMBMS-r14       ENUMERATED {khz-7dot5, khz-1dot25}  OPTIONAL    -- Need OR
    ]]
}

-- ASN1STOP
```


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MBSFN-AreaInfoList field descriptions
mcch-ModificationPeriod Defines periodically appearing boundaries, i.e. radio frames for which SFN mod *mcch-ModificationPeriod* = 0. The contents of different transmissions of MCCH information can only be different if there is at least one such boundary in-between them. In case *mcch-ModificationPeriod-v1430* is configured, the UE shall ignore the *mcch-ModificationPeriod-r9*.
mcch-Offset Indicates, together with the *mcch-RepetitionPeriod*, the radio frames in which MCCH is scheduled i.e. MCCH is scheduled in radio frames for which: SFN mod *mcch-RepetitionPeriod* = *mcch-Offset*.
mcch-RepetitionPeriod Defines the interval between transmissions of MCCH information, in radio frames, Value rf32 corresponds to 32 radio frames, rf64 corresponds to 64 radio frames and so on. In case *mcch-RepetitionPeriod-v1430* is configured, the UE shall ignore the *mcch-RepetitionPeriod-r9*.
non-MBSFNregionLength Indicates how many symbols from the beginning of the subframe constitute the non-MBSFN region. This value applies in all subframes of the MBSFN area used for PMCH transmissions as indicated in the MSI. The values s1 and s2 correspond with 1 and 2 symbols, respectively: see TS 36.211 [21, Table 6.7-1].
notificationIndicator Indicates which PDCCH bit is used to notify the UE about change of the MCCH applicable for this MBSFN area. Value 0 corresponds with the least significant bit as defined in TS 36.212 [22, 5.3.3.1] and so on.
sf-AllocInfo Indicates the subframes of the radio frames indicated by the *mcch-RepetitionPeriod* and the *mcch-Offset*, that may carry MCCH. Value "1" indicates that the corresponding subframe is allocated. The following mapping applies: FDD: The first/ leftmost bit defines the allocation for subframe #1 of the radio frame indicated by *mcch-RepetitionPeriod* and *mcch-Offset*, the second bit for #2, the third bit for #3, the fourth bit for #6, the fifth bit for #7 and the sixth bit for #8. TDD: The first/leftmost bit defines the allocation for subframe #3 of the radio frame indicated by *mcch-RepetitionPeriod* and *mcch-Offset*, the second bit for #4, third bit for #7, fourth bit for #8, fifth bit for #9. Uplink subframes are not allocated. The last bit is not used.
signallingMCS Indicates the MCS applicable for the subframes indicated by the field *sf-AllocInfo* and for each (P)MCH that is configured for this MBSFN area, for the first subframe allocated to the (P)MCH within each MCH scheduling period (which may contain the MCH scheduling information provided by MAC). Value n2 corresponds with the value 2 for parameter I_{MCS} in TS 36.213 [23, Table 7.1.7.1-1], and so on.
subcarrierSpacingMBMS The value indicates subcarrier spacing for MBSFN subframes and khz-7dot5 refers to 7.5kHz subcarrier spacing and khz-1dot25 refers to 1.25 kHz subcarrier spacing as defined in TS36.211 [21, 6.12]. These subframes do not have non-MBSFN region. If *subcarrierSpacingMBMS* is present, then *non-MBSFNregionLength* shall be ignored. EUTRAN configures parameter *subcarrierSpacingMBMS* only when the MBSFN subframes have subcarrier spacing other than 15kHz.

– *MBSFN-SubframeConfig*

The IE *MBSFN-SubframeConfig* defines subframes that are reserved for MBSFN in downlink.

MBSFN-SubframeConfig information element

```
-- ASN1START

MBSFN-SubframeConfig ::=            SEQUENCE {
    radioframeAllocationPeriod          ENUMERATED {n1, n2, n4, n8, n16, n32},
    radioframeAllocationOffset          INTEGER (0..7),
    subframeAllocation                  CHOICE {
        oneFrame                            BIT STRING (SIZE(6)),
        fourFrames                          BIT STRING (SIZE(24))
    }
}

MBSFN-SubframeConfig-v1430 ::=      SEQUENCE {
    subframeAllocation-v1430                CHOICE {
        oneFrame-v1430                      BIT STRING (SIZE(2)),
        fourFrames-v1430                    BIT STRING (SIZE(8))
    }
}

-- ASN1STOP
```


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***MBSFN-SubframeConfig* field descriptions**
fourFrames A bit-map indicating MBSFN subframe allocation in four consecutive radio frames, "1" denotes that the corresponding subframe is allocated for MBSFN. The bitmap is interpreted as follows: FDD: Starting from the first radioframe and from the first/leftmost bit in the bitmap, the allocation applies to subframes #1, #2, #3, #6, #7, and #8 in the sequence of the four radio-frames. TDD: Starting from the first radioframe and from the first/leftmost bit in the bitmap, the allocation applies to subframes #3, #4, #7, #8, and #9 in the sequence of the four radio-frames. The last four bits are not used. E-UTRAN allocates uplink subframes only if *eimta-MainConfig* is configured.
fourFrames-v1430 A bit-map indicating MBSFN subframe allocation in four consecutive radio frames, "1" denotes that the corresponding subframe is allocated for MBSFN. The bitmap is interpreted as follows: FDD: Starting from the first radioframe and from the first/leftmost bit in the bitmap, the allocation applies to subframes #4 and #9 in the sequence of the four radio-frames.
oneFrame "1" denotes that the corresponding subframe is allocated for MBSFN. The following mapping applies: FDD: The first/leftmost bit defines the MBSFN allocation for subframe #1, the second bit for #2, third bit for #3, fourth bit for #6, fifth bit for #7, sixth bit for #8. TDD: The first/leftmost bit defines the allocation for subframe #3, the second bit for #4, third bit for #7, fourth bit for #8, fifth bit for #9. E-UTRAN allocates uplink subframes only if *eimta-MainConfig* is configured. The last bit is not used.
oneFrame-v1430 "1" denotes that the corresponding subframe is allocated for MBSFN. The following mapping applies: FDD: The first/leftmost bit defines the MBSFN allocation for subframe #4 and the second bit for #9.
radioFrameAllocationPeriod, radioFrameAllocationOffset Radio-frames that contain MBSFN subframes occur when equation *SFN* mod *radioFrameAllocationPeriod* = *radioFrameAllocationOffset* is satisfied. Value n1 for *radioframeAllocationPeriod* denotes value 1, n2 denotes value 2, and so on. When *fourFrames* is used for *subframeAllocation*, the equation defines the first radio frame referred to in the description below. Values *n1* and *n2* are not applicable when *fourFrames* is used.
subframeAllocation Defines the subframes that are allocated for MBSFN within the radio frame allocation period defined by the *radioFrameAllocationPeriod* and the *radioFrameAllocationOffset*.

– *PMCH-InfoList*

The IE *PMCH-InfoList* specifies configuration of all PMCHs of an MBSFN area, while IE *PMCH-InfoListExt* includes additional PMCHs, i.e. extends the PMCH list using the general principles specified in 5.1.2. The information provided for an individual PMCH includes the configuration parameters of the sessions that are carried by the concerned PMCH. For all PMCH that E-UTRAN includes in *PMCH-InfoList*, the list of ongoing sessions has at least one entry.

PMCH-InfoList information element

```
-- ASN1START

PMCH-InfoList-r9 ::=                SEQUENCE (SIZE (0..maxPMCH-PerMBSFN)) OF PMCH-Info-r9

PMCH-InfoListExt-r12 ::=            SEQUENCE (SIZE (0..maxPMCH-PerMBSFN)) OF PMCH-InfoExt-r12

PMCH-Info-r9 ::=                    SEQUENCE {
    pmch-Config-r9                      PMCH-Config-r9,
    mbms-SessionInfoList-r9         MBMS-SessionInfoList-r9,
    ...
}

PMCH-InfoExt-r12 ::=                SEQUENCE {
    pmch-Config-r12                     PMCH-Config-r12,
    mbms-SessionInfoList-r12            MBMS-SessionInfoList-r9,
    ...
}

MBMS-SessionInfoList-r9 ::=     SEQUENCE (SIZE (0..maxSessionPerPMCH)) OF MBMS-SessionInfo-r9

MBMS-SessionInfo-r9 ::=         SEQUENCE {
    tmgi-r9                             TMGI-r9,
    sessionId-r9                        OCTET STRING (SIZE (1))         OPTIONAL,   -- Need OR
    logicalChannelIdentity-r9           INTEGER (0..maxSessionPerPMCH-1),
    ...
}

PMCH-Config-r9 ::=                  SEQUENCE {
```


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```
    sf-AllocEnd-r9                      INTEGER (0..1535),
    dataMCS-r9                          INTEGER (0..28),
    mch-SchedulingPeriod-r9         ENUMERATED {
                                        rf8, rf16, rf32, rf64, rf128, rf256, rf512, rf1024},
    ...
}

PMCH-Config-r12 ::=                 SEQUENCE {
    sf-AllocEnd-r12                     INTEGER (0..1535),
    dataMCS-r12                         CHOICE {
        normal-r12                          INTEGER (0..28),
        higerOrder-r12                      INTEGER (0..27)
    },
    mch-SchedulingPeriod-r12        ENUMERATED {
                                        rf4, rf8, rf16, rf32, rf64, rf128, rf256, rf512, rf1024},
    ...,
    [[  mch-SchedulingPeriod-v1430      ENUMERATED {rf1, rf2}           OPTIONAL    -- Need OR
    ]]
}

TMGI-r9 ::=                     SEQUENCE {
    plmn-Id-r9                          CHOICE {
        plmn-Index-r9                       INTEGER (1..maxPLMN-r11),
        explicitValue-r9                    PLMN-Identity
    },
    serviceId-r9                        OCTET STRING (SIZE (3))
}

-- ASN1STOP
```

***PMCH-InfoList* field descriptions**
dataMCS   Indicates the value for parameter I_{MCS} in TS 36.213 [23], which defines the MCS applicable for the subframes of this (P)MCH as indicated by the field *commonSF-Alloc*. Value *normal* corresponds to Table 7.1.7.1-1 and value *higherOrder* corresponds to Table 7.1.7.1-1A. The MCS does however neither apply to the subframes that may carry MCCH i.e. the subframes indicated by the field *sf-AllocInfo* within *SystemInformationBlockType13* nor for the first subframe allocated to this (P)MCH within each MCH scheduling period (which may contain the MCH scheduling information provided by MAC).
mch-SchedulingPeriod   Indicates the MCH scheduling period i.e. the periodicity used for providing MCH scheduling information at lower layers (MAC) applicable for an MCH. Value rf8 corresponds to 8 radio frames, rf16 corresponds to 16 radio frames and so on. The *mch-SchedulingPeriod* starts in the radio frames for which: SFN mod *mch-SchedulingPeriod* = 0. E-UTRAN configures *mch-SchedulingPeriod* of the (P)MCH listed first in *PMCH-InfoList* to be smaller than or equal to *mcch-RepetitionPeriod*. In case *mch-SchedulingPeriod-v1430* is configured, the UE shall ignore *mch-SchedulingPeriod-r12*.
plmn-Index   Index of the entry across the *plmn-IdentityList* fields within *SystemInformationBlockType1*.
sessionId   Indicates the optional MBMS Session Identity, which together with TMGI identifies a transmission or a possible retransmission of a specific MBMS session: see TS 29.061 [51, Sections 20.5, 17.7.11, 17.7.15]. The field is included whenever upper layers have assigned a session identity i.e. one is available for the MBMS session in E-UTRAN.
serviceId   Uniquely identifies the identity of an MBMS service within a PLMN. The field contains octet 3- 5 of the IE Temporary Mobile Group Identity (TMGI) as defined in TS 24.008 [49]. The first octet contains the third octet of the TMGI, the second octet contains the fourth octet of the TMGI and so on.
sf-AllocEnd   Indicates the last subframe allocated to this (P)MCH within a period identified by field *commonSF-AllocPeriod*. The subframes allocated to (P)MCH corresponding with the nth entry in *pmch-InfoList* are the subsequent subframes starting from either the next subframe after the subframe identified by *sf-AllocEnd* of the $(n-1)^{th}$ listed (P)MCH or, for n=1, the first subframe defined by field *commonSF-Alloc*, through the subframe identified by *sf-AllocEnd* of the nth listed (P)MCH. Value 0 corresponds with the first subframe defined by field *commonSF-Alloc*.

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6.3.7a SC-PTM information elements

– *SC-MTCH-InfoList*

The IE *SC-MTCH-InfoList* provides the list of ongoing MBMS sessions transmitted via SC-MRB and for each MBMS session, the associated G-RNTI and scheduling information.

***SC-MTCH-InfoList* information element**

```
-- ASN1START

SC-MTCH-InfoList-r13 ::=            SEQUENCE (SIZE (0..maxSC-MTCH-r13)) OF SC-MTCH-Info-r13

SC-MTCH-Info-r13 ::=                SEQUENCE    {
    mbmsSessionInfo-r13                     MBMSSessionInfo-r13,
    g-RNTI-r13                              BIT STRING(SIZE(16)),
    sc-mtch-schedulingInfo-r13              SC-MTCH-SchedulingInfo-r13          OPTIONAL,   -- Need
OP
    sc-mtch-neighbourCell-r13               BIT STRING (SIZE(maxNeighCell-SCPTM-r13))   OPTIONAL, --
Need OP
    ...,
    [[  p-a-r13                             ENUMERATED {
                                                dB-6, dB-4dot77, dB-3, dB-1dot77,
                                                dB0, dB1, dB2, dB3}     OPTIONAL    -- Need ON
    ]]
}

MBMSSessionInfo-r13 ::=             SEQUENCE    {
    tmgi-r13                                TMGI-r9,
    sessionId-r13                           OCTET STRING (SIZE (1))     OPTIONAL    -- Need OR
}

SC-MTCH-SchedulingInfo-r13::=       SEQUENCE    {
    onDurationTimerSCPTM-r13                ENUMERATED {
                                                psf1, psf2, psf3, psf4, psf5, psf6,
                                                psf8, psf10, psf20, psf30, psf40,
                                                psf50, psf60, psf80, psf100,
                                                psf200},
    drx-InactivityTimerSCPTM-r13            ENUMERATED {
                                                psf0, psf1, psf2, psf4, psf8,
                                                psf10, psf20, psf40,
                                                psf80, psf160, ps320,
                                                psf640, psf960,
                                                psf1280, psf1920, psf2560},
    schedulingPeriodStartOffsetSCPTM-r13    CHOICE {
        sf10                                    INTEGER(0..9),
        sf20                                    INTEGER(0..19),
        sf32                                    INTEGER(0..31),
        sf40                                    INTEGER(0..39),
        sf64                                    INTEGER(0..63),
        sf80                                    INTEGER(0..79),
        sf128                                   INTEGER(0..127),
        sf160                                   INTEGER(0..159),
        sf256                                   INTEGER(0..255),
        sf320                                   INTEGER(0..319),
        sf512                                   INTEGER(0..511),
        sf640                                   INTEGER(0..639),
        sf1024                                  INTEGER(0..1023),
        sf2048                                  INTEGER(0..2048),
        sf4096                                  INTEGER(0..4096),
        sf8192                                  INTEGER(0..8192)
    },
    ...
}

-- ASN1STOP
```


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SC-MTCH-InfoList field descriptions
drx-InactivityTimerSCPTM Timer for SC-MTCH in TS 36.321 [6]. Value in number of PDCCH sub-frames. Value psf0 corresponds to 0 PDCCH sub-frame and behaviour as specified in 7.3.2 applies, psf1 corresponds to 1 PDCCH sub-frame, psf2 corresponds to 2 PDCCH sub-frames and so on.
g-RNTI G-RNTI used to scramble the scheduling and transmission of a SC-MTCH.
mbmsSessionInfo Indicates the ongoing MBMS session in a SC-MTCH.
onDurationTimerSCPTM Timer for SC-MTCH reception in TS 36.321 [6]. Value in number of PDCCH sub-frames. Value psf1 corresponds to 1 PDCCH sub-frame, psf2 corresponds to 2 PDCCH sub-frames and so on.
p-a Parameter: P_A'' , for the SC-MTCH per G-RNTI, see TS 36.213 [23, 5.2]. Value dB-6 corresponds to -6 dB, dB-4dot77 corresponds to -4.77 dB etc.
schedulingPeriodStartOffsetSCPTM *SCPTM-SchedulingCycle* and *SCPTM-SchedulingOffset* in TS 36.321 [6]. The value of *SCPTM-SchedulingCycle* is in number of sub-frames. Value sf10 corresponds to 10 sub-frames, sf20 corresponds to 20 sub-frames and so on. The value of *SCPTM-SchedulingOffset* is in number of sub-frames. The E-UTRAN does not configure a maximum value 2048 for sf2048, 4096 for sf4096 or 8192 for sf8192.
sc-mtch-neighbourCell Indicates neighbour cells which also provide this service on SC-MTCH. The first bit is set to 1 if the service is provided on SC-MTCH in the first cell in *scptmNeighbourCellList*, otherwise it is set to 0. The second bit is set to 1 if the service is provided on SC-MTCH in the second cell in *scptmNeighbourCellList*, and so on. If this field is absent, the UE shall assume that this service is not available on SC-MTCH in any neighbour cell.
sc-mtch-schedulingInfo DRX information for the SC-MTCH. If this field is absent, the SC-MTCH may be scheduled in any subframe.

– *SC-MTCH-InfoList-BR*

The IE *SC-MTCH-InfoList-BR* provides the list of ongoing MBMS sessions transmitted via SC-MRB and for each MBMS session, the associated G-RNTI and scheduling information.

SC-MTCH-InfoList-BR information element

```
-- ASN1START

SC-MTCH-InfoList-BR-r14 ::=     SEQUENCE (SIZE (0..maxSC-MTCH-BR-r14)) OF SC-MTCH-Info-BR-r14

SC-MTCH-Info-BR-r14 ::=             SEQUENCE    {
    sc-mtch-CarrierFreq-r14                 ARFCN-ValueEUTRA-r9,
    mbmsSessionInfo-r14                     MBMSSessionInfo-r13,
    g-RNTI-r14                              BIT STRING(SIZE(16)),
    sc-mtch-schedulingInfo-r14          SC-MTCH-SchedulingInfo-BR-r14               OPTIONAL,   --
Need OP
    sc-mtch-neighbourCell-r14               BIT STRING (SIZE(maxNeighCell-SCPTM-r13))   OPTIONAL, --
Need OP
    mpdcch-Narrowband-SC-MTCH-r14               INTEGER (1.. maxAvailNarrowBands-r13),
    mpdcch-NumRepetition-SC-MTCH-r14            ENUMERATED {r1, r2, r4, r8, r16,
                                                            r32, r64, r128, r256},
    mpdcch-StartSF-SC-MTCH-r14      CHOICE {
            fdd-r14                             ENUMERATED {v1, v1dot5, v2, v2dot5, v4,
                                                            v5, v8, v10},
            tdd-r14                             ENUMERATED {v1, v2, v4, v5, v8, v10,
                                                            v20}
    },
    mpdcch-PDSCH-HoppingConfig-SC-MTCH-r14      ENUMERATED {on, off},
    mpdcch-PDSCH-CEmodeConfig-SC-MTCH-r14       ENUMERATED {ce-ModeA, ce-ModeB},
    mpdcch-PDSCH-MaxBandwidth-SC-MTCH-r14       ENUMERATED {bw1dot4, bw5},
    mpdcch-Offset-SC-MTCH-r14                   ENUMERATED {zero, oneEighth, oneQuarter,
                                                            threeEighth, oneHalf, fiveEighth,
                                                            threeQuarter, sevenEighth},

    p-a-r14                                     ENUMERATED { dB-6, dB-4dot77, dB-3,
                                                            dB-1dot77, dB0, dB1, dB2,
                                                            dB3}                OPTIONAL,-- Need OR
    ...
}

SC-MTCH-SchedulingInfo-BR-r14::=    SEQUENCE    {
```


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```
    onDurationTimerSCPTM-r14                ENUMERATED {
                                                psf300, psf400, psf500, psf600,
                                                psf800, psf1000, psf1200, psf1600},
    drx-InactivityTimerSCPTM-r14            ENUMERATED {
                                                psf0, psf1, psf2, psf4, psf8, psf16,
                                                psf32, psf64, psf128, psf256, ps512,
                                                psf1024, psf2048, psf4096, psf8192, psf16384},
    schedulingPeriodStartOffsetSCPTM-r14    CHOICE {
        sf10                                    INTEGER(0..9),
        sf20                                    INTEGER(0..19),
        sf32                                    INTEGER(0..31),
        sf40                                    INTEGER(0..39),
        sf64                                    INTEGER(0..63),
        sf80                                    INTEGER(0..79),
        sf128                                   INTEGER(0..127),
        sf160                                   INTEGER(0..159),
        sf256                                   INTEGER(0..255),
        sf320                                   INTEGER(0..319),
        sf512                                   INTEGER(0..511),
        sf640                                   INTEGER(0..639),
        sf1024                                  INTEGER(0..1023),
        sf2048                                  INTEGER(0..2047),
        sf4096                                  INTEGER(0..4095),
        sf8192                                  INTEGER(0..8191)
    },
    ...
}

-- ASN1STOP
```


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SC-MTCH-InfoList-BR field descriptions
drx-InactivityTimerSCPTM Timer for SC-MTCH in TS 36.321 [6]. Value in number of MPDCCH sub-frames. Value psf0 corresponds to 0 MPDCCH sub-frame and behaviour as specified in 7.3.2 applies, psf1 corresponds to 1 MPDCCH sub-frame, psf2 corresponds to 2 MPDCCH sub-frames and so on.
g-RNTI G-RNTI used to scramble the scheduling and transmission of a SC-MTCH
mbmsSessionInfo Indicates the ongoing MBMS session in a SC-MTCH.
mpdcch-Narrowband-SC-MTCH Narrowband for MPDCCH for SC-MTCH, see TS 36.213 [23].
mpdcch-NumRepetitions-SC-MTCH The maximum number of MPDCCH repetitions the UE needs to monitor for SC-MTCH, see TS 36.213 [23].
mpdcch-Offset-SC-MTCH Fractional period offset of starting subframes for MPDCCH search space for SC-MTCH, see TS 36.213 [23].
mpdcch-PDSCH-CEmodeConfig-SC-MTCH Coverage enhancement mode configuration for MPDCCH/PDSCH for SC-MTCH, see TS 36.213 [23].
mpdcch-PDSCH-HoppingConfig-SC-MTCH Frequency hopping configuration for MPDCCH/PDSCH for SC-MTCH, see TS 36.213 [23].
mpdcch-PDSCH-MaxBandwidth-SC-MTCH Maximum PDSCH channel bandwidth for SC-MTCH, see TS 36.213 [23]. Value *bw1dot4* corresponds to 1.4 MHz channel bandwidth and value *bw5* corresponds to 5 MHz channel bandwidth. Corresponding maximum TBS are specified in TS 36.213 [23, 7.1.7.2].
mpdcch-StartSF-SC-MTCH Starting subframes configuration of the MPDCCH search space for SC-MTCH, see TS 36.213 [23].
onDurationTimerSCPTM Timer for SC-MTCH reception in TS 36.321 [6]. Value in number of MPDCCH sub-frames. Value psf300 corresponds to 300 MPDCCH sub-frames, psf400 corresponds to 400 MPDCCH sub-frames and so on.
schedulingPeriodStartOffsetSCPTM *SCPTM-SchedulingCycle* and *SCPTM-SchedulingOffset* in TS 36.321 [6]. The value of *SCPTM-SchedulingCycle* is in number of sub-frames. Value sf10 corresponds to 10 sub-frames, sf20 corresponds to 20 sub-frames and so on. The value of *SCPTM-SchedulingOffset* is in number of sub-frames.
sc-mtch-CarrierFreq Downlink carrier used for multicast SC-MTCH transmissions.
sc-mtch-neighbourCell Indicates neighbour cells which also provide this service on SC-MTCH. The first bit is set to 1 if the service is provided on SC-MTCH in the first cell in *scptmNeighbourCellList*, otherwise it is set to 0. The second bit is set to 1 if the service is provided on SC-MTCH in the second cell in *scptmNeighbourCellList*, and so on. If this field is absent, the UE shall assume that this service is not available on SC-MTCH in any neighbour cell.
sc-mtch-schedulingInfo DRX information for the SC-MTCH. If this field is absent, DRX is not used for SC-MTCH reception.
p-a Parameter: P_A'' for the SC-MTCH per G-RNTI, see TS 36.213 [23, 5.2]. Value dB-6 corresponds to -6 dB, dB-4dot77 corresponds to -4.77 dB etc.

– *SCPTM-NeighbourCellList*

The IE *SCPTM-NeighbourCellList* indicates a list of neighbour cells where ongoing MBMS sessions provided via SC-MRB in the current cells are also provided.

```
-- ASN1START

SCPTM-NeighbourCellList-r13 ::=     SEQUENCE (SIZE (1..maxNeighCell-SCPTM-r13)) OF PCI-ARFCN-r13

PCI-ARFCN-r13 ::=                   SEQUENCE {
        physCellId-r13                      PhysCellId,
        carrierFreq-r13                     ARFCN-ValueEUTRA-r9     OPTIONAL
}

-- ASN1STOP
```


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***SCPTM-NeighbourCellList* field description**
carrierFreq   Indicates the frequency of the neighbour cell indicated by *physCellId*. Absence of the IE means that the neighbour cell is on the same frequency as the current cell.

6.3.8 Sidelink information elements

– *SL-AnchorCarrierFreqList-V2X*

The IE *SL-AnchorCarrierFreqList-V2X* specifies the SL V2X anchor frequencies i.e. frequencies that include inter-carrier resource configuration for V2X sidelink communication.

SL-AnchorCarrierFreqList-V2X information element

```
-- ASN1START

SL-AnchorCarrierFreqList-V2X-r14 ::= SEQUENCE (SIZE (1..maxFreqV2X-r14)) OF ARFCN-ValueEUTRA-r9

-- ASN1STOP
```

– *SL-CBR-CommonTxConfigList*

The IE *SL-CBR-CommonTxConfigList* indicates the list of PSSCH transmission parameters (such as MCS, sub-channel number, retransmission number, CR limit) in *sl-CBR-PSSCH-TxConfigList*, and the list of CBR ranges in *cbr-RangeCommonConfigList,* to configure congestion control to the UE for V2X sidelink communication.

SL-CBR-CommonTxConfigList information element

```
-- ASN1START

SL-CBR-CommonTxConfigList-r14 ::=   SEQUENCE {
    cbr-RangeCommonConfigList-r14   SEQUENCE (SIZE (1..maxSL-V2X-CBRConfig-r14)) OF SL-CBR-Levels-
Config-r14,
    sl-CBR-PSSCH-TxConfigList-r14   SEQUENCE (SIZE (1..maxSL-V2X-TxConfig-r14)) OF SL-CBR-PSSCH-
TxConfig-r14
}

SL-CBR-Levels-Config-r14 ::=        SEQUENCE (SIZE (1..maxCBR-Level-r14)) OF SL-CBR-r14


SL-CBR-PSSCH-TxConfig-r14 ::=       SEQUENCE {
    cr-Limit-r14                    INTEGER(0..10000),
    tx-Parameters-r14               SL-PSSCH-TxParameters-r14
}

SL-CBR-r14 ::=                      INTEGER(0..100)

-- ASN1STOP
```


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SL-CBR-CommonTxConfigList field descriptions
cbr-RangeCommonConfigList Indicates the list of CBR ranges. Each entry of the list indicates in *SL-CBR-Levels-Config* the upper bound of the CBR range for the respective entry. The upper bounds of the CBR ranges are configured in ascending order for consecutive entries of *cbr-RangeCommonConfigList*. For the first entry of *cbr-RangeCommonConfigList* the lower bound of the CBR range is 0.
cr-Limit Indicates the maximum limit on the occupancy ratio. Value 0 corresponds to 0, value 1 to 0.0001, value 2 to 0.0002, and so on (i.e. in steps of 0.0001) until value 10000, which corresponds to 1.
sl-CBR-PSSCH-TxConfigList Indicates the list of available PSSCH transmission parameters (such as MCS, sub-channel number, retransmission number and CR limit) configurations.
SL-CBR Value 0 corresponds to 0, value 1 to 0.01, value 2 to 0.02, and so on.
tx-Parameters Indicates PSSCH transmission parameters.

– *SL-CBR-PPPP-TxConfigList*

The IE *SL-CBR-PPPP-TxConfigList* indicates the mapping between PSSCH transmission parameter (such as MCS, PRB number, retransmission number, CR limit) sets by using the indexes of the configurations provided in *sl-CBR-PSSCH-TxConfigList*, CBR ranges by an index to the entry of the CBR range configuration in *cbr-RangeCommonConfigList*, and PPPP ranges. It also indicates the default PSSCH transmission parameters to be used when CBR measurement results are not available.

SL-CBR-PPPP-TxConfigList information element

```
-- ASN1START

SL-CBR-PPPP-TxConfigList-r14 ::=    SEQUENCE (SIZE (1..8)) OF SL-PPPP-TxConfigIndex-r14

SL-PPPP-TxConfigIndex-r14 ::=       SEQUENCE {
    priorityThreshold-r14           SL-Priority-r13,
    defaultTxConfigIndex-r14        INTEGER(0..maxCBR-Level-1-r14),
    cbr-ConfigIndex-r14             INTEGER(0..maxSL-V2X-CBRConfig-1-r14),
    tx-ConfigIndexList-r14          SEQUENCE (SIZE (1..maxCBR-Level-r14)) OF Tx-ConfigIndex-r14
}

Tx-ConfigIndex-r14 ::=              INTEGER(0..maxSL-V2X-TxConfig-1-r14)

-- ASN1STOP
```

SL-CBR-PPPP-TxConfigList field descriptions
cbr-ConfigIndex Indicates the CBR ranges to be used by an index to the entry of the CBR range configuration in *cbr-RangeCommonConfigList*.
defaultTxConfigIndex Indicates the PSSCH transmission parameters to be used by the UEs which do not have available CBR measurement results, by means of an index to the corresponding entry in *tx-ConfigIndexList*. Value 0 indicates the first entry in *tx-ConfigIndexList*. The field is ignored if the UE has available CBR measurement results.
priorityThreshold Indicates the upper bound of PPPP range which is associated with the configurations in *cbr-ConfigIndex* and in *tx-ConfigIndexList*. The upper bounds of the PPPP ranges are configured in ascending order for consecutive entries of *SL-PPPP-TxConfigIndex* in *SL-CBR-PPPP-TxConfigList*. For the first entry of *SL-PPPP-TxConfigIndex,* the lower bound of the PPPP range is 1.
tx-ConfigIndexList Indicates the list of the PSSCH transmission parameters and CR limit by the indexes to the entries of the configurations in *sl-CBR-PSSCH-TxConfigList*. Each index in *tx-ConfigIndexList* sequentially maps to each CBR range indicated by *cbr-ConfigIndex*.

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– *SL-CommConfig*

The IE *SL-CommConfig* specifies the dedicated configuration information for sidelink communication. In particular it concerns the transmission resource configuration for sidelink communication on the primary frequency.

SL-CommConfig information element

```
-- ASN1START

SL-CommConfig-r12 ::=               SEQUENCE    {
    commTxResources-r12                 CHOICE {
        release                             NULL,
        setup                               CHOICE {
            scheduled-r12                   SEQUENCE {
                sl-RNTI-r12                     C-RNTI,
                mac-MainConfig-r12              MAC-MainConfigSL-r12,
                sc-CommTxConfig-r12             SL-CommResourcePool-r12,
                mcs-r12                         INTEGER (0..28)                 OPTIONAL    -- Need
OP
            },
            ue-Selected-r12                 SEQUENCE {
                -- Pool for normal usage
                commTxPoolNormalDedicated-r12   SEQUENCE {
                    poolToReleaseList-r12           SL-TxPoolToReleaseList-r12 OPTIONAL,    -- Need
ON
                    poolToAddModList-r12            SL-CommTxPoolToAddModList-r12 OPTIONAL  -- Need
ON
                }
            }
        }
    }                                                                           OPTIONAL,   -- Need ON
    ...,
    [[  commTxResources-v1310                   CHOICE {
            release                         NULL,
            setup                           CHOICE {
                scheduled-v1310                 SEQUENCE {
                    logicalChGroupInfoList-r13          LogicalChGroupInfoList-r13,
                    multipleTx-r13                      BOOLEAN
                },
                ue-Selected-v1310               SEQUENCE {
                    commTxPoolNormalDedicatedExt-r13    SEQUENCE {
                        poolToReleaseListExt-r13            SL-TxPoolToReleaseListExt-r13 OPTIONAL,
    -- Need ON
                        poolToAddModListExt-r13             SL-CommTxPoolToAddModListExt-r13
    OPTIONAL    -- Need ON
                    }
                }
            }
        }                                                                       OPTIONAL,   -- Need ON
        commTxAllowRelayDedicated-r13       BOOLEAN         OPTIONAL    -- Need ON
    ]]
}

LogicalChGroupInfoList-r13 ::=      SEQUENCE (SIZE (1..maxLCG-r13)) OF SL-PriorityList-r13

SL-CommTxPoolToAddModList-r12 ::=       SEQUENCE (SIZE (1..maxSL-TxPool-r12)) OF SL-
CommTxPoolToAddMod-r12

SL-CommTxPoolToAddModListExt-r13 ::=    SEQUENCE (SIZE (1..maxSL-TxPool-v1310)) OF SL-
CommTxPoolToAddModExt-r13

SL-CommTxPoolToAddMod-r12 ::=       SEQUENCE    {
    poolIdentity-r12                    SL-TxPoolIdentity-r12,
    pool-r12                            SL-CommResourcePool-r12
}

SL-CommTxPoolToAddModExt-r13 ::=        SEQUENCE    {
    poolIdentity-v1310                  SL-TxPoolIdentity-v1310,
    pool-r13                            SL-CommResourcePool-r12
}

MAC-MainConfigSL-r12 ::=        SEQUENCE    {
    periodic-BSR-TimerSL                PeriodicBSR-Timer-r12       OPTIONAL,   -- Need ON
    retx-BSR-TimerSL                    RetxBSR-Timer-r12
}

-- ASN1STOP
```


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SL-CommConfig field descriptions
commTxAllowRelayDedicated Indicates whether the UE is allowed to transmit relay related sidelink communication using the configured dedicated transmission resources i.e. either via scheduled or via UE selected resources.
commTxPoolNormalDedicated Indicates a pool of transmission resources the UE is allowed to use while in RRC_CONNECTED.
logicalChGroupInfoList Indicates for each logical channel group the list of associated priorities, used as specified in TS 36.321 [6], in order of increasing logical channel group identity.
mcs Indicates the MCS as defined in TS 36.212 [23, 14.2.1]. If not configured, the selection of MCS is up to UE implementation.
multipleTx Indicates whether the UE should perform multiple transmissions to different destinations in one SC period in accordance with TS 36.321 [6, 5.14.1.1]. Value TRUE indicates that multiple transmissions should be performed.
sc-CommTxConfig Indicates a pool of resources for SC when E-UTRAN schedules Tx resources (i.e. when indices included in DCI format 5 indicate the actual data resources to be used as specified in TS 36.212 [22, 5.3.3.1.9]).
scheduled Indicates the configuration for the case E-UTRAN schedules the transmission resources based on sidelink specific BSR from the UE.
ue-Selected Indicates the configuration for the case the UE selects the transmission resources from a pool of resources configured by E-UTRAN.

– *SL-CommResourcePool*

The IE *SL-CommResourcePool* and *SL-CommResourcePoolV2X* specifies the configuration information for an individual pool of resources for sidelink communication and V2X sidelink communication respectively. The IE covers the configuration of both the sidelink control information and the data.

SL-CommResourcePool information element

```
-- ASN1START

SL-CommTxPoolList-r12 ::=       SEQUENCE (SIZE (1..maxSL-TxPool-r12)) OF SL-CommResourcePool-r12

SL-CommTxPoolListExt-r13 ::=    SEQUENCE (SIZE (1..maxSL-TxPool-v1310)) OF SL-CommResourcePool-r12

SL-CommTxPoolListV2X-r14 ::=        SEQUENCE (SIZE (1..maxSL-V2X-TxPool-r14)) OF SL-
CommResourcePoolV2X-r14

SL-CommRxPoolList-r12 ::=       SEQUENCE (SIZE (1..maxSL-RxPool-r12)) OF SL-CommResourcePool-r12

SL-CommRxPoolListV2X-r14 ::=        SEQUENCE (SIZE (1..maxSL-V2X-RxPool-r14)) OF SL-
CommResourcePoolV2X-r14

SL-CommResourcePool-r12 ::=     SEQUENCE {
    sc-CP-Len-r12                       SL-CP-Len-r12,
    sc-Period-r12                       SL-PeriodComm-r12,
    sc-TF-ResourceConfig-r12            SL-TF-ResourceConfig-r12,
    data-CP-Len-r12                     SL-CP-Len-r12,
    dataHoppingConfig-r12               SL-HoppingConfigComm-r12,
    ue-SelectedResourceConfig-r12           SEQUENCE {
        data-TF-ResourceConfig-r12              SL-TF-ResourceConfig-r12,
        trpt-Subset-r12                     SL-TRPT-Subset-r12  OPTIONAL    -- Need OP
    }                                                               OPTIONAL,   -- Need OR
    rxParametersNCell-r12               SEQUENCE {
        tdd-Config-r12                  TDD-Config                  OPTIONAL,   -- Need OP
        syncConfigIndex-r12         INTEGER (0..15)
    }                                                               OPTIONAL,   -- Need OR
    txParameters-r12                    SEQUENCE {
        sc-TxParameters-r12             SL-TxParameters-r12,
        dataTxParameters-r12            SL-TxParameters-r12
    }                                                               OPTIONAL,   -- Cond Tx
    ...,
    [[  priorityList-r13                SL-PriorityList-r13         OPTIONAL    -- Cond Tx
    ]]
```


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```
}

SL-CommResourcePoolV2X-r14 ::=      SEQUENCE {
    sl-OffsetIndicator-r14              SL-OffsetIndicator-r12      OPTIONAL,   -- Need OR
    sl-Subframe-r14                     SubframeBitmapSL-r14,
    adjacencyPSCCH-PSSCH-r14            BOOLEAN,
    sizeSubchannel-r14                  ENUMERATED {
                                        n4, n5, n6, n8, n9, n10, n12, n15, n16, n18, n20, n25, n30,
                                        n48, n50, n72, n75, n96, n100, spare13, spare12, spare11,
                                        spare10, spare9, spare8, spare7, spare6, spare5, spare4,
                                        spare3, spare2, spare1},
    numSubchannel-r14                   ENUMERATED {n1, n3, n5, n8, n10, n15, n20, spare1},
    startRB-Subchannel-r14              INTEGER (0..99),
    startRB-PSCCH-Pool-r14              INTEGER (0..99)             OPTIONAL,   -- Need OR
    rxParametersNCell-r14               SEQUENCE {
        tdd-Config-r14                  TDD-Config                  OPTIONAL,   -- Need OP
        syncConfigIndex-r14             INTEGER (0..15)
    }                                                               OPTIONAL,   -- Need OR
    dataTxParameters-r14                SL-TxParameters-r12         OPTIONAL,   -- Cond Tx
    zoneID-r14                          INTEGER (0..7)              OPTIONAL,   -- Need OR
    threshS-RSSI-CBR-r14                    INTEGER (0..45)             OPTIONAL,   -- Need OR
    poolReportId-r14                    SL-V2X-TxPoolReportIdentity-r14     OPTIONAL,   -- Need OR
    cbr-pssch-TxConfigList-r14          SL-CBR-PPPP-TxConfigList-r14    OPTIONAL,   -- Need OR
    resourceSelectionConfigP2X-r14      SL-P2X-ResourceSelectionConfig-r14  OPTIONAL,   -- Cond P2X
    syncAllowed-r14                     SL-SyncAllowed-r14              OPTIONAL,   -- Need OR
    restrictResourceReservationPeriod-r14   SL-RestrictResourceReservationPeriodList-r14
    OPTIONAL,   -- Need OR
    ...
}

SL-TRPT-Subset-r12 ::=          BIT STRING (SIZE (3..5))

SL-V2X-TxPoolReportIdentity-r14::=      INTEGER (1..maxSL-PoolToMeasure-r14)

-- ASN1STOP
```


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***SL-CommResourcePool* field descriptions**
adjacencyPSCCH-PSSCH Indicates whether a UE shall always transmit PSCCH and PSSCH in adjacent RBs (indicated by TRUE) or in non-adjacent RBs (indicated by FALSE) (see TS 36.213 [23]).
cbr-pssch-TxConfigList Indicates the mapping between PPPPs, CBR ranges by using indexes of the entry in cbr-RangeCommonConfigList, and PSSCH transmission parameters and CR limit by using indexes of the entry in sl-CBR-PSSCH-TxConfigList. If *SL-CommResourcePoolV2X* is included in *MobilityControlInfoV2X*, it refers to *cbr-MobilityTxConfigList* for *cbr-RangeCommonConfigList* and *sl-CBR-PSSCH-TxConfigList*. If *SL-CommResourcePoolV2X* is included in *SL-V2X-ConfigDedicated*, it refers to *cbr-DedicatedTxConfigList* for *cbr-RangeCommonConfigList* and *sl-CBR-PSSCH-TxConfigList*. Otherwise, it refers to *cbr-CommonTxConfigList* included in the *SystemInformationBlockType21* of the serving cell / PCell for *cbr-RangeCommonConfigList* and *sl-CBR-PSSCH-TxConfigList*.
numSubchannel indicates the number of subchannels in the corresponding resource pool (see TS 36.213 [23]).
poolReportId The identity of the transmission resource pool used for CBR measurement reporting, which is corresponding to the *poolIdentity* reported in *measResultListCBR*. This field is only present in the transmission pools configured in *RRCConnectionReconfiguration* and *v2x-CommTxPoolExceptional, p2x-CommTxPoolNormalCommon, v2x-CommTxPoolNormalCommon, v2x-CommTxPoolNormal in SystemInformationBlockType21*. Otherwise, the field is absent.
resourceSelectionConfigP2X Indicates the allowed resource selection mechanism(s), i.e. partial sensing and/or random selection, for P2X related V2X sidelink communication.
restrictResourceReservationPeriod If configured, the field *restrictResourceReservationPeriod* configured in *v2x-ResourceSelectionConfig* shall be ignored for transmission on this pool.
sc-Period Indicates the period over which resources are allocated in a cell for SC and over which scheduled and UE selected data transmissions occur, see PSCCH period in TS 36.213 [23]. Value in number of subframes. Value sf40 corresponds to 40 subframes, sf80 corresponds to 80 subframes and so on. E-UTRAN configures values sf40, sf80, sf160 and sf320 for FDD and for TDD config 1 to 5, values sf70, sf140 and sf280 for TDD config 0, and finally values sf60, sf120 and sf240 for TDD config 6.
sizeSubchannel Indicates the number of PRBs of each subchannel in the corresponding resource pool (see TS 36.213 [23]). The value n5 denotes 5 PRBs; n6 denotes 6 PRBs and so on. E-UTRAN configures values n5, n6, n10, n15, n20, n25, n50, n75 and n100 in the case of *adjacencyPSCCH-PSSCH* set to TRUE; otherwise, E-UTRAN configures values n4, n5, n6, n8, n9, n10, n12, n15, n16, n18, n20, n30, n48, n72 and n96 in the case of *adjacencyPSCCH-PSSCH* set to FALSE,
sl-OffsetIndicator Indicates the offset of the first subframe of a resource pool, i.e., the starting subframe of the repeating bitmap *sl-Subframe*, within a SFN cycle. If absent, the resource pool starts from first subframe of SFN=0.
sl-Subframe Indicates the bitmap of the resource pool, which is defined by repeating the bitmap within a SFN cycle (see TS 36.213 [23]).
startRB-PSCCH-Pool Indicates the lowest RB index of the PSCCH pool (see TS 36.213 [23]). This field is absent when a pool is (pre)configured such that a UE always transmits SC and data in adjacent RBs in the same subframe.
startRB-Subchannel Indicates the lowest RB index of the subchannel with the lowest index (see TS 36.213 [23]).
syncAllowed Indicates the allowed synchronization reference(s) which is (are) allowed to use the configured resource pool.
syncConfigIndex Indicates the synchronisation configuration that is associated with a reception pool, by means of an index to the corresponding entry of *commSyncConfig* in *SystemInformationBlockType18* for sidelink communication*, or* by means of an index to the corresponding entry of *v2x-SyncConfig* in *SystemInformationBlockType21* for V2X sidelink communication.
tdd-Config TDD configuration associated with the reception pool of the cell indicated by *syncConfigIndex*. Absence of the field indicates the same duplex mode as the cell providing this field and the same UL/DL configuration as indicated by *subframeAssignment* in *SystemInformationBlockType1* in case of TDD.
threshS-RSSI-CBR Indicates the S-RSSI threshold for determining the contribution of a sub-channel to the CBR measurement, as specified in TS 36.214 [48]. Value 0 corresponds to -112 dBm, value 1 to -110 dBm, value n to (-112 + n*2) dBm, and so on.
trpt-Subset Indicates the subset of T-RPT available (see TS 36.213 [23, 14.1.1.1.1]). Consists of a bitmap which is used to indicate the set of available 'k' values to be used for sidelink communication (see TS 36.213 [23, 14.1.1.3]). If T-RPT subset configuration is not signaled/ preconfigured then UE assumes the whole T-RPT set is available.

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zoneID
Indicates the zone ID for which the UE shall use this resource pool as described in 5.10.13.2. The field is absent in *v2x-CommTxPoolExceptional, p2x-CommTxPoolNormalCommon* and *v2x-CommRxPool* in SIB21 or in *mobilityControlInfoV2X*.

Conditional presence	Explanation
Tx	The field is mandatory present when included in *commTxPoolNormalDedicated*, *commTxPoolNormalDedicatedExt*, *commTxPoolNormalCommon*, *commTxPoolNormalCommonExt, commTxPoolExceptional*, *sc-CommTxConfig*, *v2x-CommTxPoolNormalCommon*, *v2x-CommTxPoolExceptional, v2x-CommTxPoolNormalDedicated*, *p2x-CommTxPoolNormalCommon* or *v2x-CommTxPoolNormal* and *p2x-CommTxPoolNormal* in *v2x-InterFreqInfoList*. Otherwise the field is not present.
P2X	The field is mandatory present when included in *p2x-CommTxPoolNormalCommon*, *v2x-CommTxPoolNormalDedicated* in *sl-V2X-ConfigDedicated* for P2X related V2X sidelink communication or *p2x-CommTxPoolNormal* in *v2x-InterFreqInfoList*. Otherwise the field is not present.

– *SL-CommTxPoolSensingConfig*

The IE *SL-CommTxPoolSensingConfig* specifies V2X sidelink communication configurations used for UE autonomous resource selection.

SL-CommTxPoolSensingConfig **information element**

```
-- ASN1START

SL-CommTxPoolSensingConfig-r14 ::=      SEQUENCE {
    pssch-TxConfigList-r14                  SL-PSSCH-TxConfigList-r14,
    thresPSSCH-RSRP-List-r14                SL-ThresPSSCH-RSRP-List-r14,
    restrictResourceReservationPeriod-r14   SL-RestrictResourceReservationPeriodList-r14
    OPTIONAL,   -- Need OR
    probResourceKeep-r14                ENUMERATED {v0, v0dot2, v0dot4, v0dot6, v0dot8,
                                                    spare3,spare2, spare1},
    p2x-SensingConfig-r14                   SEQUENCE {
        minNumCandidateSF-r14               INTEGER (1..13),
        gapCandidateSensing-r14             BIT STRING (SIZE (10))
    }       OPTIONAL,   -- Need OR
    sl-ReselectAfter-r14                ENUMERATED {n1, n2, n3, n4, n5, n6, n7, n8, n9,
                                                    spare7, spare6, spare5, spare4, spare3, spare2,
                                                    spare1}             OPTIONAL        -- Need OR
}

-- ASN1STOP
```


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SL-CommTxPoolSensingConfig field descriptions
gapCandidateSensing Indicates which subframe should be sensed when a certain subframe is considered as a candidate resource (see TS 36.213 [23]).
minNumCandidateSF Indicates the minimum number of subframes that are included in the possible candidate resources.
p2x-SensingConfig Indicates the sensing configuration for P2X related V2X sidelink communication transmission only.
probResourceKeep Indicates the probability with which the UE keeps the current resource when the resource reselection counter reaches zero for sensing based UE autonomous resource selection (see TS 36.321 [6]).
pssch-TxConfigList Indicates PSSCH TX parameters such as MCS, PRB number, retransmission number, associated to different UE absolute speeds and different synchronization reference types for UE autonomous resource selection (see TS 36.213 [23]).
restrictResourceReservationPeriod Indicates which values are allowed for the signaling of the resource reservation period in PSCCH.
sl-ReselectAfter Indicates the number of consecutive skipped transmissions before triggering resource reselection for V2X sidelink communication (see TS 36.321 [6]).
thresPSSCH-RSRP-List Indicates a list of 64 thresholds, and the threshold should be selected based on the priority in the decoded SCI and the priority in the SCI to be transmitted (see TS 36.213 [23]). A resource is excluded if it is indicated or reserved by a decoded SCI and PSSCH RSRP in the associated data resource is above a threshold.

– *SL-CP-Len*

The IE *SL-CP-Len* indicates the cyclic prefix length, see TS 36.211 [21].

SL-CP-Len information element

```
-- ASN1START

SL-CP-Len-r12 ::=               ENUMERATED {normal, extended}

-- ASN1STOP
```

– *SL-DiscConfig*

The IE *SL-DiscConfig* specifies the dedicated configuration information for sidelink discovery.

SL-DiscConfig information element

```
-- ASN1START

SL-DiscConfig-r12 ::=                   SEQUENCE {
    discTxResources-r12                     CHOICE {
        release                             NULL,
        setup                               CHOICE {
            scheduled-r12                   SEQUENCE {
                discTxConfig-r12                    SL-DiscResourcePool-r12 OPTIONAL, -- Need ON
                discTF-IndexList-r12                SL-TF-IndexPairList-r12     OPTIONAL, -- Need ON
                discHoppingConfig-r12               SL-HoppingConfigDisc-r12
                                                        OPTIONAL    -- Need ON
            },
            ue-Selected-r12                 SEQUENCE {
                discTxPoolDedicated-r12         SEQUENCE {
                    poolToReleaseList-r12           SL-TxPoolToReleaseList-r12 OPTIONAL,    -- Need
ON
                    poolToAddModList-r12            SL-DiscTxPoolToAddModList-r12 OPTIONAL  -- Need
ON
                }                                                       OPTIONAL    -- Need ON
            }
        }
    }                                                                   OPTIONAL,   -- Need ON
    ...,
    [[  discTF-IndexList-v1260              CHOICE {
            release                             NULL,
```


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```
            setup                                   SEQUENCE {
                discTF-IndexList-r12b                   SL-TF-IndexPairList-r12b
            }
        }                                                                   OPTIONAL    -- Need ON
    ]],
    [[  discTxResourcesPS-r13           CHOICE {
            release                             NULL,
            setup                               CHOICE {
                scheduled-r13                       SL-DiscTxConfigScheduled-r13,
                ue-Selected-r13                     SEQUENCE {
                    discTxPoolPS-Dedicated-r13          SL-DiscTxPoolDedicated-r13
                }
            }
        }                                                                   OPTIONAL,   -- Need ON
        discTxInterFreqInfo-r13         CHOICE {
            release                             NULL,
            setup                               SEQUENCE {
                discTxCarrierFreq-r13               ARFCN-ValueEUTRA-r9         OPTIONAL,   -- Need
OR
                discTxRefCarrierDedicated-r13       SL-DiscTxRefCarrierDedicated-r13    OPTIONAL, --
Need OR
                discTxInfoInterFreqListAdd-r13          SL-DiscTxInfoInterFreqListAdd-r13   OPTIONAL
    -- Need ON
            }
        }                                                                   OPTIONAL,   -- Need ON
        gapRequestsAllowedDedicated-r13     BOOLEAN         OPTIONAL,   -- Need ON
        discRxGapConfig-r13                 CHOICE {
            release                             NULL,
            setup                               SL-GapConfig-r13
        }                                                                   OPTIONAL,   -- Need ON
        discTxGapConfig-r13                 CHOICE {
            release                             NULL,
            setup                               SL-GapConfig-r13
        }                                                                   OPTIONAL,   -- Need ON
        discSysInfoToReportConfig-r13       CHOICE {
            release                             NULL,
            setup                               SL-DiscSysInfoToReportFreqList-r13
        }                                                                   OPTIONAL    -- Need ON
    ]]
}

SL-DiscSysInfoToReportFreqList-r13 ::= SEQUENCE (SIZE (1..maxFreq)) OF ARFCN-ValueEUTRA-r9

SL-DiscTxInfoInterFreqListAdd-r13 ::=   SEQUENCE {
    discTxFreqToAddModList-r13              SEQUENCE (SIZE (1..maxFreq)) OF SL-
DiscTxResourceInfoPerFreq-r13   OPTIONAL,   -- Need ON
    discTxFreqToReleaseList-r13             SEQUENCE (SIZE (1..maxFreq)) OF ARFCN-ValueEUTRA-r9
    OPTIONAL,   -- Need ON
    ...
}

SL-DiscTxResourceInfoPerFreq-r13 ::=    SEQUENCE    {
    discTxCarrierFreq-r13                   ARFCN-ValueEUTRA-r9,
    discTxResources-r13                     SL-DiscTxResource-r13   OPTIONAL,   -- Need OR
    discTxResourcesPS-r13                   SL-DiscTxResource-r13   OPTIONAL,   -- Need OR
    discTxRefCarrierDedicated-r13           SL-DiscTxRefCarrierDedicated-r13    OPTIONAL,   -- Need
OR
    discCellSelectionInfo-r13                   CellSelectionInfoNFreq-r13          OPTIONAL,   --
Need OR
    ...
}

SL-DiscTxResource-r13 ::=               CHOICE {
    release                             NULL,
    setup                               CHOICE {
        scheduled-r13                   SL-DiscTxConfigScheduled-r13,
        ue-Selected-r13                 SL-DiscTxPoolDedicated-r13
    }
}

SL-DiscTxPoolToAddModList-r12 ::=       SEQUENCE (SIZE (1..maxSL-TxPool-r12)) OF SL-
DiscTxPoolToAddMod-r12

SL-DiscTxPoolToAddMod-r12 ::=       SEQUENCE    {
    poolIdentity-r12                    SL-TxPoolIdentity-r12,
    pool-r12                            SL-DiscResourcePool-r12
}
```


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```
SL-DiscTxConfigScheduled-r13 ::=            SEQUENCE {
    discTxConfig-r13                    SL-DiscResourcePool-r12 OPTIONAL, -- Need ON
    discTF-IndexList-r13                SL-TF-IndexPairList-r12b    OPTIONAL, -- Need ON
    discHoppingConfig-r13               SL-HoppingConfigDisc-r12    OPTIONAL,-- Need ON
    ...
}

SL-DiscTxPoolDedicated-r13 ::=          SEQUENCE {
    poolToReleaseList-r13           SL-TxPoolToReleaseList-r12 OPTIONAL,    -- Need ON
    poolToAddModList-r13            SL-DiscTxPoolToAddModList-r12 OPTIONAL  -- Need ON
}

SL-TF-IndexPairList-r12 ::=     SEQUENCE (SIZE (1..maxSL-TF-IndexPair-r12)) OF SL-TF-IndexPair-r12

SL-TF-IndexPair-r12 ::=     SEQUENCE    {
    discSF-Index-r12                    INTEGER (1.. 200)       OPTIONAL,   -- Need ON
    discPRB-Index-r12                   INTEGER (1.. 50)        OPTIONAL    -- Need ON
}

SL-TF-IndexPairList-r12b ::=        SEQUENCE (SIZE (1..maxSL-TF-IndexPair-r12)) OF SL-TF-IndexPair-
r12b

SL-TF-IndexPair-r12b ::=        SEQUENCE    {
    discSF-Index-r12b                   INTEGER (0..209)        OPTIONAL,    -- Need ON
    discPRB-Index-r12b                  INTEGER (0..49)         OPTIONAL     -- Need ON
}

SL-DiscTxRefCarrierDedicated-r13 ::=    CHOICE {
    pCell                               NULL,
    sCell                               SCellIndex-r10
}

-- ASN1STOP
```

***SL-DiscConfig* field descriptions**
discCellSelectionInfo Parameters that may be used by the UE to select/ reselect a cell on the concerned non serving frequency. If absent, the UE acquires the information from the target cell on the concerned frequency. See TS 36.304 [4, 11.4].
discSysInfoToReportConfig Indicates the request to start a *SidelinkUEInformation* procedure for reporting system information acquired during an inter-frequency discovery procedure.
discTF-IndexList Indicates a list of time-frequency resource indices pair where each pair of indices corresponds to one discovery message. E-UTRAN only configures *discTF-IndexList-r12b* when configuring the UE with scheduled SL discovery Tx resources. When receiving *discTF-IndexList-r12b*, the UE shall only consider this field (and hence ignore *discTF-IndexList-r12*, if included or previously configured).
discTxConfig Indicates the resources configuration used when E-UTRAN schedules Tx resources (i.e. the fields *discSF-Index* and *discPRB-Index* indicate the actual resources to be used).
discTxInterFreqInfo Indicates frequency applicable for the resources indicated by *discTxResources-r12* (i.e. original resource field may cover first inter-frequency), and possibly resource allocations on additional frequencies as may be indicated by field *discTxInfoInterFreqListAdd*.
discTxRefCarrierDedicated Indicates if the PCell or an SCell is to be used as reference for DL measurements and synchronization, instead of the DL frequency paired with the one used to transmit sidelink discovery announcements on, see TS 36.213 [23, 14.3.1].
discTxResources Indicates the resources assigned to the UE for discovery announcements, which can either be a pool from which the UE may select or a set of resources specifically assigned for use by the UE.
discTxResourcesPS Indicates the resources assigned to the UE for PS discovery announcements, which can either be a pool from which the UE may select or a set of resources specifically assigned for use by the UE.
SL-TF-IndexPair A pair of indices, one for the time domain and one for the frequency domain, indicating the start of resources within the pool covered by *discTxConfig*, see TS 36.211 [21, 9.5.6] for one discovery message. The upper limits of *discSF-Index* and *discPRB-Index* are defined in TS 36.213 [23, 14.3.1].

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– *SL-DiscResourcePool*

The IE *SL-DiscResourcePool* specifies the configuration information for an individual pool of resources for sidelink discovery.

SL-DiscResourcePool information element

```
-- ASN1START

SL-DiscTxPoolList-r12 ::=       SEQUENCE (SIZE (1..maxSL-TxPool-r12)) OF SL-DiscResourcePool-r12

SL-DiscRxPoolList-r12 ::=       SEQUENCE (SIZE (1..maxSL-RxPool-r12)) OF SL-DiscResourcePool-r12

SL-DiscResourcePool-r12 ::=     SEQUENCE    {
    cp-Len-r12                      SL-CP-Len-r12,
    discPeriod-r12                  ENUMERATED {rf32, rf64, rf128,
                                                rf256, rf512, rf1024, rf16-v1310, spare},
    numRetx-r12                 INTEGER (0..3),
    numRepetition-r12               INTEGER (1..50),
    tf-ResourceConfig-r12           SL-TF-ResourceConfig-r12,
    txParameters-r12                SEQUENCE {
        txParametersGeneral-r12     SL-TxParameters-r12,
        ue-SelectedResourceConfig-r12   SEQUENCE {
            poolSelection-r12               CHOICE {
                rsrpBased-r12                   SL-PoolSelectionConfig-r12,
                random-r12                      NULL
            },
            txProbability-r12           ENUMERATED {p25, p50, p75, p100}
        }                                                       OPTIONAL    -- Need OR
    }                                                           OPTIONAL,   -- Cond Tx
    rxParameters-r12                SEQUENCE {
        tdd-Config-r12                  TDD-Config                  OPTIONAL,   -- Need OR
        syncConfigIndex-r12         INTEGER (0..15)
    }                                                           OPTIONAL,   -- Need OR
    ...,
    [[  discPeriod-v1310                CHOICE {
            release                             NULL,
            setup                               ENUMERATED {rf4, rf6, rf7, rf8,
                                                    rf12, rf14, rf24, rf28}
            }                                                   OPTIONAL,   -- Need ON
        rxParamsAddNeighFreq-r13        CHOICE {
            release                         NULL,
            setup                           SEQUENCE {
                physCellId-r13                  PhysCellIdList-r13
            }
        }                                                       OPTIONAL,   -- Need ON
        txParamsAddNeighFreq-r13        CHOICE {
            release                         NULL,
            setup                           SEQUENCE {
                physCellId-r13                  PhysCellIdList-r13,
                p-Max                           P-Max                   OPTIONAL,   -- Need OP
                tdd-Config-r13                  TDD-Config              OPTIONAL,   -- Cond TDD-OR
                tdd-Config-v1130                TDD-Config-v1130        OPTIONAL,   -- Cond TDD-OR
                freqInfo                            SEQUENCE {
                    ul-CarrierFreq                      ARFCN-ValueEUTRA    OPTIONAL,   -- Need OP
                    ul-Bandwidth                        ENUMERATED {n6, n15, n25, n50, n75, n100}
                                                                            OPTIONAL,   -- Need OP
                additionalSpectrumEmission          AdditionalSpectrumEmission
                },
                referenceSignalPower                INTEGER (-60..50),
                syncConfigIndex-r13             INTEGER (0..15)         OPTIONAL    -- Need OR
            }
        }                                                       OPTIONAL    -- Need ON
    ]],
    [[  txParamsAddNeighFreq-v1370      CHOICE {
            release                         NULL,
            setup                           SEQUENCE {
                freqInfo-v1370                  SEQUENCE {
                    additionalSpectrumEmission-v1370        AdditionalSpectrumEmission-v1010
                }
            }
        }                                                       OPTIONAL    -- Need ON
    ]]
}

PhysCellIdList-r13  ::=     SEQUENCE (SIZE (1.. maxSL-DiscCells-r13)) OF PhysCellId
```


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```
SL-PoolSelectionConfig-r12 ::=      SEQUENCE {
    threshLow-r12                           RSRP-RangeSL2-r12,
    threshHigh-r12                          RSRP-RangeSL2-r12
}

-- ASN1STOP
```

***SL-DiscResourcePool* field descriptions**
discPeriod   Indicates the period over which resources are allocated in a cell for discovery message transmission/reception, see PSDCH period in TS 36.213 [23]. Value in number of radio frames. Value rf32 corresponds to 32 radio frames, rf64 corresponds to 64 radio frames and so on. The extended values apply for PS discovery (not only for sidelink relaying). When broadcasting an extended value, E-UTRAN sets the original field to spare to ensure legacy UEs ignore the concerned pool entry.
numRepetition   Indicates the number of times *subframeBitmap* is repeated for mapping to subframes that occurs within a *discPeriod*. The highest value E-UTRAN uses is value 5 for FDD and TDD configuration 0, value 13 for TDD configuration 1, value 25 for TDD configuration 2, value 17 for TDD configuration 3, value 25 for TDD configuration 4, value 50 for TDD configuration 5 and value 7 for TDD configuration 6. E-UTRAN configures *numRepetition* and *subframeBitmap* such that the mapped subframes do not exceed the *discPeriod*.
poolSelection   Indicates the mechanism for selecting a (transmission) pool when multiple candidates are provided. E-UTRAN configures the same value (i.e. a pool selection method) for all candidate pools within one pool list (*discTxPoolCommon* or *discTxPoolDedicated*) but the pool selection method in different pool lists may or may not be the same.
syncConfigIndex   Indicates the synchronisation configuration that is associated with a reception or transmission pool, by means of an index to the corresponding entry of *discSyncConfig* in *SystemInformationBlockType19*.
threshLow, threshHigh   Specifies the thresholds used to select a resource pool in RSRP based pool selection. The E-UTRAN should configure *threshLow* and *threshHigh* such that the UE selects only one resource pool upon RSRP based pool selection.
txProbability   Indicates the probability of transmitting announcement in a discovery period when configured with a pool of resources, see TS 36.321 [6].

Conditional presence	Explanation
TDD-OR	The field is optional present for TDD, need OR; it is not present for FDD.
Tx	The field is mandatory present when included in *discTxPoolDedicated* or *discTxPoolCommon*. Otherwise the field is not present.

– *SL-DiscSysInfoReport*

The IE *SL-DiscSysInfoReport* contains the parameters related to sidelink discovery acquired from system information of inter-frequency cells (including inter-PLMN).

***SL-DiscSysInfoReport* information element**

```
-- ASN1START

SL-DiscSysInfoReport-r13 ::=    SEQUENCE {
    plmn-IdentityList-r13           PLMN-IdentityList           OPTIONAL,
    cellIdentity-13                 CellIdentity                OPTIONAL,
    carrierFreqInfo-13              ARFCN-ValueEUTRA-r9         OPTIONAL,
    discRxResources-r13             SL-DiscRxPoolList-r12       OPTIONAL,
    discTxPoolCommon-r13            SL-DiscTxPoolList-r12       OPTIONAL,
    discTxPowerInfo-r13             SL-DiscTxPowerInfoList-r12  OPTIONAL,
    discSyncConfig-r13              SL-SyncConfigNFreq-r13      OPTIONAL,
    discCellSelectionInfo-r13       SEQUENCE {
        q-RxLevMin-r13                  Q-RxLevMin,
        q-RxLevMinOffset-r13            INTEGER (1..8)          OPTIONAL
    }                                                           OPTIONAL,
    cellReselectionInfo-r13         SEQUENCE {
        q-Hyst-r13                      ENUMERATED {
                                                dB0, dB1, dB2, dB3, dB4, dB5, dB6, dB8, dB10,
                                                dB12, dB14, dB16, dB18, dB20, dB22, dB24},
        q-RxLevMin-r13                  Q-RxLevMin,
```


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```
        t-ReselectionEUTRA-r13          T-Reselection
    }                                                       OPTIONAL,
    tdd-Config-r13                  TDD-Config              OPTIONAL,
    freqInfo-r13                    SEQUENCE {
        ul-CarrierFreq-r13              ARFCN-ValueEUTRA            OPTIONAL,
        ul-Bandwidth-r13                ENUMERATED {n6, n15, n25, n50, n75, n100}
                                                                    OPTIONAL,
        additionalSpectrumEmission-r13  AdditionalSpectrumEmission  OPTIONAL
    }                                                           OPTIONAL,
    p-Max-r13                       P-Max   OPTIONAL,
    referenceSignalPower-r13        INTEGER (-60..50)   OPTIONAL,
    ...,
    [[
    freqInfo-v1370                  SEQUENCE {
        additionalSpectrumEmission-v1370    AdditionalSpectrumEmission-v10l0
    }                                                       OPTIONAL
    ]]
}

-- ASN1STOP
```

***SL-DiscSysInfoReport* field descriptions**
carrierFreqInfo Indicates the frequency of the cell from which the UE acquired the system information relevant for discovery
cellIdentity Indicated the identity of the cell from which the UE acquired the system information relevant for discovery
plmn-IdentityList Indicates the list of PLMN identity of the cell from which the UE acquired the system information relevant for discovery

– *SL-DiscTxPowerInfo*

The IE *SL-DiscTxPowerInfo* specifies power control parameters for one or more power classes.

SL-DiscTxPowerInfo information element

```
-- ASN1START

SL-DiscTxPowerInfoList-r12 ::=  SEQUENCE (SIZE (maxSL-DiscPowerClass-r12)) OF SL-DiscTxPowerInfo-r12

SL-DiscTxPowerInfo-r12 ::=              SEQUENCE    {
    discMaxTxPower-r12                          P-Max,
    ...
}

-- ASN1STOP
```

***SL-DiscTxPowerInfo* field descriptions**
discMaxTxPower Indicates the P-Max parameter used to calculate the maximum transmit power a UE configured with the concerned range class, see TS 24.333 [70, 4.2.11]. The first entry in *SL-DiscTxPowerInfoList* corresponds to UE range class 'short', the second entry corresponds to 'medium' and the third entry corresponds to 'long'.

– *SL-GapConfig*

The IE *SL-GapConfig* indicates the gaps, requested or assigned, to enable the UE to receive or transmit sidelink discovery, intra or inter frequency (includings inter-PLMN).

SL-GapConfig information element

```
-- ASN1START

SL-GapConfig-r13 ::=                SEQUENCE {
    gapPatternList-r13              SL-GapPatternList-r13
}

SL-GapPatternList-r13 ::=   SEQUENCE (SIZE (1..maxSL-GP-r13)) OF SL-GapPattern-r13
```


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```
SL-GapPattern-r13 ::=               SEQUENCE {
    gapPeriod-r13                       ENUMERATED {sf40, sf60, sf70, sf80, sf120, sf140, sf160,
                                                sf240, sf280, sf320, sf640, sf1280, sf2560, sf5120,
                                                sf10240},
    gapOffset-r12                       SL-OffsetIndicator-r12,
    gapSubframeBitmap-r13               BIT STRING (SIZE (1..10240)),
    ...
}

-- ASN1STOP
```

***SL-GapConfig* field descriptions**
gapOffset Indicates the offset from the start of SFN 0 to the start of the first *gapPeriod*. If the SFN period is not an integer multiple of *gapPeriod*, no subframes within this period (i.e. from SFN 0 to offset) are considered part of the gap.
gapPeriod Indicates the period by which *gapSubframeBitmap* is repeated.
gapSubframeBitmap Indicates the subframes of one or more individual gaps, not only covering the subframes of the associated discovery resources but also including e.g. re-tuning and synchronisation delays. The UE and E-UTRAN signal bit strings of valid sizes only i.e. sizes equal to or less than *gapPeriod*. Value 1 indicates that the UE is allowed to use the subframe for sidelink discovery.

– *SL-GapRequest*

The IE *SL-GapRequest* indicates the gaps requested by the UE to receive or transmit sidelink discovery, intra or inter frequency (includings inter-PLMN).

SL-GapRequest information element

```
-- ASN1START

SL-GapRequest-r13 ::=               SEQUENCE (SIZE (1..maxFreq)) OF SL-GapFreqInfo-r13

SL-GapFreqInfo-r13 ::=              SEQUENCE {
    carrierFreq-r13                 ARFCN-ValueEUTRA-r9                 OPTIONAL,
    gapPatternList-r13              SL-GapPatternList-r13
}

-- ASN1STOP
```

– *SL-HoppingConfig*

The IE *SL-HoppingConfig* indicates the hopping configuration used for sidelink.

SL-HoppingConfig information element

```
-- ASN1START

SL-HoppingConfigComm-r12 ::=        SEQUENCE    {
    hoppingParameter-r12                INTEGER (0..504),
    numSubbands-r12                     ENUMERATED {ns1, ns2, ns4},
    rb-Offset-r12                       INTEGER (0..110)
}

SL-HoppingConfigDisc-r12 ::=    SEQUENCE    {
    a-r12                                   INTEGER (1..200),
    b-r12                                   INTEGER (1..10),
    c-r12                                   ENUMERATED {n1, n5}
}

-- ASN1STOP
```


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SL-HoppingConfig field descriptions
a Per cell parameter: $N_{PSDCH}^{(1)}$ see TS 36.213 [23, 14.3.1].
b Per UE parameter: $N_{PSDCH}^{(2)}$ see TS 36.213 [23, 14.3.1].
c Per cell parameter: $N_{PSDCH}^{(3)}$ see TS 36.213 [23, 14.3.1]
hoppingParameter Affects the hopping performed as specificed in TS 36.213 [23, 14.1.1.2 and 14.1.1.4]. In case value 504 is received, the value used by the UE is 510.
numSubbands Parameter: N_{sb} see TS 36.211 [21, 9.3.6].
rb-Offset Parameter: $N_{\mathrm{RB}}^{\mathrm{HO}}$, see TS 36.211 [21, 9.3.6].

– *SL-InterFreqInfoListV2X*

The IE *SL-InterFreqInfoListV2X* indicates synchronization and resource allocation configurations of the neighboring frequency for V2X sidelink communication.

SL-InterFreqInfoListV2X information element

```
-- ASN1START

SL-InterFreqInfoListV2X-r14 ::= SEQUENCE (SIZE (0..maxFreqV2X-1-r14)) OF SL-InterFreqInfoV2X-r14

SL-InterFreqInfoV2X-r14 ::=         SEQUENCE {
    plmn-IdentityList-r14               PLMN-IdentityList           OPTIONAL,       -- Need OP
    v2x-CommCarrierFreq-r14             ARFCN-ValueEUTRA-r9,
    sl-MaxTxPower-r14                   P-Max               OPTIONAL,       -- Need OR
    sl-Bandwidth-r14                    ENUMERATED {n6, n15, n25, n50, n75, n100}   OPTIONAL,   --
Need OR
    v2x-SchedulingPool-r14              SL-CommResourcePoolV2X-r14              OPTIONAL,   -- Need
OR
    v2x-UE-ConfigList-r14       SL-V2X-UE-ConfigList-r14    OPTIONAL,   -- Need OR
    ...,
    [[  additionalSpectrumEmissionV2X-r14       CHOICE {
            additionalSpectrumEmission-r14          AdditionalSpectrumEmission,
            additionalSpectrumEmission-v1440        AdditionalSpectrumEmission-v10l0
        }               OPTIONAL        -- Need ON
    ]]
}

-- ASN1STOP
```

SL-InterFreqInfoListV2X field descriptions
plmn-IdentityList Indicates PLMN identities of this frequency for reception of V2X sidelink communication. If this field is not present, the UE considers this frequency for reception of V2X sidelink communication concerns the first PLMN entry in the *plmn-IdentityLis*t in *SystemInformationBlockType1*.
sl-MaxTxPower Indicates the maximum transmission power for transmitting V2X sidelink communication on the corresponding frequency.
additionalSpectrumEmissionV2X Indicates the *additionalSpectrumEmission* value defined in TS 36.101 [42, 6.2.4] for V2X sidelink communication.
v2x-SchedulingPool Indicates the resource pool for inter-carrier scheduled resource allocation. This field is configured in RRC dedicated signalling only when *scheduled* is configured in IE *SL-V2X-ConfigDedicated*.
v2x-UE-ConfigList Indicates the inter-carrier resource configuration. If there is only one entry in the list without *physCellId* configured, the configuration is applied to the frequency identified by *v2x-CommCarrierFreq* (i.e. carrier specific configuration); if the entry of this field includes *physCellIdList*, the configuration is applied to the cell(s) identified by *physCellIdList* (i.e. cell specific configuration).

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– *SL-V2X-UE-ConfigList*

The IE *SL-V2X-UE-ConfigList* indicates inter-frequency resource configuration per-carrier or per-cell.

SL-V2X-UE-ConfigList information element

```
-- ASN1START

SL-V2X-UE-ConfigList-r14 ::=    SEQUENCE (SIZE (1.. maxCellIntra)) OF SL-V2X-InterFreqUE-Config-r14

SL-V2X-InterFreqUE-Config-r14 ::=       SEQUENCE {
    physCellIdList-r14                  PhysCellIdList-r13                  OPTIONAL,   -- Need OR
    typeTxSync-r14                      SL-TypeTxSync-r14                   OPTIONAL,   -- Need OR
    v2x-SyncConfig-r14                  SL-SyncConfigListNFreqV2X-r14       OPTIONAL,   -- Need OR
    v2x-CommRxPool-r14                  SL-CommRxPoolListV2X-r14                OPTIONAL,   -- Need
OR
    v2x-CommTxPoolNormal-r14                SL-CommTxPoolListV2X-r14                OPTIONAL,   --
Need OR
    p2x-CommTxPoolNormal-r14                SL-CommTxPoolListV2X-r14                OPTIONAL,   --
Need OR
    v2x-CommTxPoolExceptional-r14       SL-CommResourcePoolV2X-r14          OPTIONAL,   -- Need OR
    v2x-ResourceSelectionConfig-r14     SL-CommTxPoolSensingConfig-r14      OPTIONAL,   -- Need OR
    zoneConfig-r14                      SL-ZoneConfig-r14                   OPTIONAL,   -- Need OR
    offsetDFN-r14                       INTEGER (0..1000)                   OPTIONAL,   -- Need OR
    ...
}

-- ASN1STOP
```

SL-V2X-UE-ConfigList field descriptions
offsetDFN Indicates the timing offset for the UE to determine DFN timing when GNSS is used for timing reference. Value 0 corresponds to 0 milliseconds, value 1 corresponds to 0.001 milliseconds, value 2 corresponds to 0.002 milliseconds, and so on.
p2x-CommTxPoolNormal Indicates the resources on a carrier frequency by which the UE may transmit P2X related V2X sidelink communication.
physCellIdList If configured, the resource configuration is applicable for the cell(s) identified by this field. Otherwise, the resource configuration is for a given carrier frequency.
typeTxSync Indicates the prioritized synchronization type (i.e. eNB or GNSS) for performing V2X sidelink communication on a carrier frequency.
v2x-CommRxPool Indicates the resources on a carrier frequency by which the UE may receive V2X sidelink communication. This field is absent within *v2x-InterFreqInfoList* included in *RRCConnectionReconfiguration* except if received with *MobilityControlInfo* or *MobilityControlInfoV2X*.
v2x-CommTxPoolExceptional Indicates the resources on a carrier frequency by which the UE may transmit V2X sidelink communication in exceptional conditions, as specified in 5.10.13.
v2x-CommTxPoolNormal Indicates the resources on a carrier frequency by which the UE may transmit V2X sidelink communication.
v2x-SyncConfig Indicates the synchronization configuration used for transmission/reception of SLSS on the given frequency.

– *SL-OffsetIndicator*

The IE *SL-OffsetIndicator* indicates the offset of the pool of resources relative to SFN 0 of the cell from which it was obtained or, when out of coverage, relative to DFN 0.

SL-OffsetIndicator information element

```
-- ASN1START

SL-OffsetIndicator-r12 ::=          CHOICE {
    small-r12                               INTEGER (0..319),
    large-r12                               INTEGER (0..10239)
}
```


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```
SL-OffsetIndicatorSync-r12 ::=          INTEGER (0..39)

SL-OffsetIndicatorSync-v1430 ::=        INTEGER (40..159)

SL-OffsetIndicatorSync-r14 ::=          INTEGER (0..159)

-- ASN1STOP
```

***SL-OffsetIndicator* field descriptions**
SL-OffsetIndicator In *sc-TF-ResourceConfig*, it indicates the offset of the first period of pool of resources within a SFN cycle. For *data-TF-ResourceConfig*, it corresponds to the *offsetIndicator* as defined in TS 36.213 [23, 14.1.3].
SL-OffsetIndicatorSync For sidelink discovery and sidelink communication, synchronisation resources are present in those SFN and subframes which satisfy the relation: (SFN*10+ *Subframe Number*) mod 40 = *SL-OffsetIndicatorSync*. For V2X sidelink communication, synchronisation resources are present in those SFN and subframes which satisfy the relation: (SFN*10+ *Subframe Number*) mod 160 = *SL-OffsetIndicatorSync*.

– *SL-P2X-ResourceSelectionConfig*

The IE *SL-P2X-ResourceSelectionConfig* includes the configuration of resource selection for P2X related V2X sidelink communication. E-UTRAN configures at least one resource selection mechanism.

SL-P2X-ResourceSelectionConfig information element

```
-- ASN1START

SL-P2X-ResourceSelectionConfig-r14 ::=          SEQUENCE {
    partialSensing-r14              ENUMERATED {true}               OPTIONAL,   -- Need OR
    randomSelection-r14             ENUMERATED {true}               OPTIONAL    -- Need OR
}

-- ASN1STOP
```

***SL-P2X-ResourceSelectionConfig* field descriptions**
partialSensing Indicates that partial sensing is allowed for UE autonomous resource selection in a resource pool.
randomSelection Indicates that random selection is allowed for UE autonomous resource selection in a resource pool.

– *SL-PeriodComm*

The IE *SL-PeriodComm* indicates the period over which resources allocated in a cell for sidelink communication.

SL-PeriodComm information element

```
-- ASN1START

SL-PeriodComm-r12 ::=                   ENUMERATED {sf40, sf60, sf70, sf80, sf120, sf140,
                                                    sf160, sf240, sf280, sf320, spare6, spare5,
                                                    spare4, spare3, spare2, spare}

-- ASN1STOP
```

– *SL-Priority*

The IE *SL-Priority* indicates the one or more priorities of resource pool used for sidelink communication, or of a logical channel group used in case of scheduled sidelink communication resources, see TS 36.321 [6].

SL-Priority information element

```
-- ASN1START
```


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```
SL-PriorityList-r13 ::=     SEQUENCE (SIZE (1..maxSL-Prio-r13)) OF SL-Priority-r13

SL-Priority-r13 ::=         INTEGER (1..8)

-- ASN1STOP
```

– *SL-PSSCH-TxConfigList*

The IE *SL-PSSCH-TxConfigList* indicates PSSCH transmission parameters. When lower layers select parameters from the range indicated in IE *SL-PSSCH-TxConfigList*, the UE considers both configurations in IE *SL-PSSCH-TxConfigList* and the CBR-dependent configurations represented in IE *SL-CBR-PPPP-TxConfigList*. Only one IE *SL-PSSCH-TxConfig* is provided per *typeTxSync*.

SL-PSSCH-TxConfigList information element

```
-- ASN1START

SL-PSSCH-TxConfigList-r14 ::=   SEQUENCE (SIZE (1..maxPSSCH-TxConfig-r14)) OF SL-PSSCH-TxConfig-r14

SL-PSSCH-TxConfig-r14 ::=       SEQUENCE {
    typeTxSync-r14              SL-TypeTxSync-r14       OPTIONAL,   -- Need OR
    thresUE-Speed-r14           ENUMERATED {kmph60, kmph80, kmph100, kmph120,
                                kmph140, kmph160, kmph180, kmph200},
    parametersAboveThres-r14    SL-PSSCH-TxParameters-r14,
    parametersBelowThres-r14    SL-PSSCH-TxParameters-r14,
    ...
}

SL-PSSCH-TxParameters-r14 ::=       SEQUENCE {
    minMCS-PSSCH-r14            INTEGER (0..31),
    maxMCS-PSSCH-r14            INTEGER (0..31),
    minSubChannel-NumberPSSCH-r14       INTEGER (1..20),
    maxSubchannel-NumberPSSCH-r14       INTEGER (1..20),
    allowedRetxNumberPSSCH-r14  ENUMERATED {n0, n1, both, spare1},
    maxTxPower-r14              SL-TxPower-r14              OPTIONAL            -- Cond CBR
}

-- ASN1STOP
```

***SL-PSSCH-TxConfigList* field descriptions**
allowedRetxNumberPSSCH Indicates the allowed retransmission number for transmissions on PSSCH (see TS 36.213 [23]). The value n0 indicates no retransmission for a transport block allowed; the value n1 indicates that the UE shall perform one retransmission for a transport block; and the value both indicates that the UE may autonomously select no retransmission or one retransmission for a transport block.
maxTxPower Indicates the maximum transmission power for transmission on PSSCH and PSCCH (see TS 36.213 [23]).
minMCS-PSSCH, maxMCS-PSSCH Indicates the minimum and maximum MCS values used for transmissions on PSSCH (see TS 36.213 [23]).
minSubchannel-NumberPSSCH, maxSubchannel-NumberPSSCH Indicates the minimum and maximum number of sub-channels which may be used for transmissions on PSSCH (see TS 36.213 [23]).
thresUE-Speed Indicates a UE speed threshold.
typeTxSync Indicates the synchronization reference type (see TS 36.213 [23]). For configurations by the eNB, only *gnss* and *enb* can be configured; and for pre-configuration, only *gnss* and *ue* can be configured. If the field is absent, the configuration is applicable for all synchronization reference types.
parametersAboveThres Indicates TX parameters for the UE speed above *thresUE-Speed*.
parametersBelowThres Indicates TX parameters for the UE speed below *thresUE-Speed*.

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Conditional presence	Explanation
CBR	The field is optionally present, need OR, in IE *SL-CBR-CommonTxConfigList-r14, or in IE SL-CBR-PreconfigTxConfigList-r14*. Otherwise the field is not present. Need OR.

– *SL-RestrictResourceReservationPeriodList*

The IE *SL-RestrictResourceReservationPeriodList* indicates which values are allowed for the signaling of the resource reservation period in PSCCH for V2X sidelink communication, see TS 36.321 [6].

SL-RestrictResourceReservationPeriodList information element

```
-- ASN1START

SL-RestrictResourceReservationPeriodList-r14 ::=    SEQUENCE (SIZE (1..maxReservationPeriod-r14)) OF
SL-RestrictResourceReservationPeriod-r14

SL-RestrictResourceReservationPeriod-r14 ::=        ENUMERATED {v0dot2, v0dot5, v1, v2, v3, v4, v5,
v6, v7, v8, v9, v10, spare4,spare3, spare2, spare1}

-- ASN1STOP
```

***SL-RestrictResourceReservationPeriodList* field descriptions**
SL-RestrictResourceReservationPeriod
Value *v0dot2* means *SL-RestrictResourceReservationPeriod* is set to 0.2, value v0dot5 means *SL-RestrictResourceReservationPeriod* is set to 0.5, value v1 means SL-RestrictResourceReservationPeriod is set to 1, and so on. Value *v0dot2* and value *v0dot5* are configured in a pool-specific manner only. E-UTRAN should not set value v0dot2 and v0dot5 for transmission pool for P2X related V2X sidelink communication.

– *SLSSID*

The IE *SLSSID* identifies a cell and is used by the receiving UE to detect asynchronous neighbouring cells, and by transmitting UEs to extend the synchronisation signals beyond the cell's coverage area.

SLSSID information element

```
-- ASN1START

SLSSID-r12 ::=                  INTEGER (0..167)

-- ASN1STOP
```

– *SL-SyncAllowed*

The IE *SL-SyncAllowed* indicates the allowed the synchronization references for a transmission resource pool for V2X sidelink communication.

SL-SyncAllowed information element

```
-- ASN1START

SL-SyncAllowed-r14 ::=      SEQUENCE {
    gnss-Sync-r14                       ENUMERATED {true}               OPTIONAL,   -- Need OR
    enb-Sync-r14                        ENUMERATED {true}               OPTIONAL,   -- Need OR
    ue-Sync-r14                         ENUMERATED {true}               OPTIONAL    -- Need OR
}

-- ASN1STOP
```


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SL-SyncAllowed field descriptions
enb-Sync If configured, the (pre-) configured resources can be used if the UE is directly or indirectly synchronized to eNB (i.e., synchronized to a reference UE which is directly synchronized to eNB).
gnss-Sync If configured, the (pre-) configured resources can be used if the UE is directly or indirectly synchronized to GNSS (i.e. synchronized to a reference UE which is directly synchronized to GNSS).
ue-Sync If configured, the (pre-) configured resources can be used if the UE is synchronized to a reference UE which is synchronized to neither GNSS nor eNB directly or indirectly.

– *SL-SyncConfig*

The IE *SL-SyncConfig* specifies the configuration information concerning reception of synchronisation signals from neighbouring cells as well as concerning the transmission of synchronisation signals for sidelink communication and sidelink discovery.

SL-SyncConfig information element

```
-- ASN1START

SL-SyncConfigList-r12 ::=       SEQUENCE (SIZE (1..maxSL-SyncConfig-r12)) OF SL-SyncConfig-r12

SL-SyncConfigListV2X-r14 ::=    SEQUENCE (SIZE (1.. maxSL-V2X-SyncConfig-r14)) OF SL-SyncConfig-r12

SL-SyncConfig-r12 ::=                   SEQUENCE {
    syncCP-Len-r12                          SL-CP-Len-r12,
    syncOffsetIndicator-r12             SL-OffsetIndicatorSync-r12,
    slssid-r12                              SLSSID-r12,
    txParameters-r12                            SEQUENCE {
        syncTxParameters-r12                    SL-TxParameters-r12,
        syncTxThreshIC-r12                      RSRP-RangeSL-r12,
        syncInfoReserved-r12                    BIT STRING (SIZE (19))  OPTIONAL    -- Need OR
    }                                                                   OPTIONAL,   -- Need OR
    rxParamsNCell-r12                       SEQUENCE {
        physCellId-r12                          PhysCellId,
        discSyncWindow-r12              ENUMERATED {w1, w2}
    }                                                                   OPTIONAL,   -- Need OR
    ...,
    [[  syncTxPeriodic-r13                  ENUMERATED {true}           OPTIONAL    -- Need OR
    ]],
    [[  syncOffsetIndicator-v1430       SL-OffsetIndicatorSync-v1430    OPTIONAL,   -- Need OR
        gnss-Sync-r14                   ENUMERATED {true}               OPTIONAL    -- Need OR
    ]]
}

SL-SyncConfigListNFreq-r13 ::=      SEQUENCE (SIZE (1..maxSL-SyncConfig-r12)) OF SL-SyncConfigNFreq-
r13

SL-SyncConfigListNFreqV2X-r14 ::=       SEQUENCE (SIZE (1..maxSL-V2X-SyncConfig-r14)) OF SL-
SyncConfigNFreq-r13

SL-SyncConfigNFreq-r13 ::=          SEQUENCE {
    asyncParameters-r13                 SEQUENCE {
        syncCP-Len-r13                      SL-CP-Len-r12,
        syncOffsetIndicator-r13             SL-OffsetIndicatorSync-r12,
        slssid-r13                          SLSSID-r12
    }                                                               OPTIONAL,   -- Need OR
    txParameters-r13                    SEQUENCE {
        syncTxParameters-r13                SL-TxParameters-r12,
        syncTxThreshIC-r13                  RSRP-RangeSL-r12,
        syncInfoReserved-r13                BIT STRING (SIZE (19))  OPTIONAL,   -- Need OR
        syncTxPeriodic-r13                  ENUMERATED {true}       OPTIONAL    -- Need OR
    }                                                               OPTIONAL,   -- Need OR
    rxParameters-r13                    SEQUENCE {
        discSyncWindow-r13                  ENUMERATED {w1, w2}
    }                                                                   OPTIONAL,   -- Need OR
    ...,
    [[  syncOffsetIndicator-v1430       SL-OffsetIndicatorSync-v1430    OPTIONAL,   -- Need OR
        gnss-Sync-r14                   ENUMERATED {true}               OPTIONAL    -- Need OR
    ]]
}
```


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```
-- ASN1STOP
```


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SL-SyncConfig field descriptions
discSyncWindow Indicates the synchronization window over which the UE expects that SLSS or discovery resources indicated by the pool configuration (see TS 36.213 [23, 14.4]). The value *w1* denotes 5 milliseconds. The value *w2* denotes the length corresponding to normal cyclic prefix divided by 2.
syncCP-Len In case of V2X sidelink communications this field is always configured to *normal*.
syncInfoReserved Reserved for future use.
syncOffsetIndicator E-UTRAN should ensure *syncOffsetIndicator* is set to the same value as *syncOffsetIndicator1* or *syncOffsetIndicator2* in *preconfigSync* within *SL-Preconfiguration*, if configured. If *syncOffsetIndicator-v1430* is configured, the UE shall ignore the field *syncOffsetIndicator-r12*. E-UTRAN should ensure *syncOffsetIndicators* is set to *syncOffsetIndicator1* in *v2x-CommPreconfigSync* within *SL-V2X-Preconfiguration*, if *syncOffsetIndicator3* is pre-configured in *SL-V2X-Preconfiguration or if gnss-Sync is included in the corresponding entry and syncOffsetIndicator3 is not pre-configured in SL-V2X-Preconfiguration for a concerned frequency*.
syncTxPeriodic Indicates whether in each discovery period in which UE transmits discovery, the UE transmits SLSS once or periodically (i.e. every 40ms). In the latter case (periodic) the UE also transmits the *MasterInformationBlock-SL* message alongside. E-UTRAN configures this field only for synchronisation configurations applicable for PS discovery.
syncTxThreshIC Indicates the threshold used while in coverage. In case the RSRP measurement of the cell chosen for transmission of sidelink communication/ discovery announcements/ V2X sidelink communication, or of the cell used as reference for DL measurements and synchronization, is below the level indicated by this field, the UE may transmit SLSS (i.e. become synchronisation reference) when performing the corresponding sidelink transmission..
txParameters Includes parameters relevant only for transmission. E-UTRAN includes the field in one entry per list, as included in *commSyncConfig* or *discSyncConfig*.
gnss-Sync if configured, the synchronization configuration is used for SLSS transmission/reception when the UE is synchronized to GNSS, by using slssid=0 and ignoring *slssid-r12* configured. If not configured, the synchronization configuration is used for SLSS transmission/reception when the UE is synchronized to eNB, by using the configured *slssid-r12*.

– *SL-TF-ResourceConfig*

The IE *SL-TF-ResourceConfig* specifies a set of time/ frequency resources used for sidelink.

SL-TF-ResourceConfig information element

```
-- ASN1START

SL-TF-ResourceConfig-r12 ::=        SEQUENCE    {
    prb-Num-r12                         INTEGER (1..100),
    prb-Start-r12                       INTEGER (0..99),
    prb-End-r12                         INTEGER (0..99),
    offsetIndicator-r12                 SL-OffsetIndicator-r12,
    subframeBitmap-r12                  SubframeBitmapSL-r12
}

SubframeBitmapSL-r12 ::=        CHOICE {
    bs4-r12                                 BIT STRING (SIZE (4)),
    bs8-r12                                 BIT STRING (SIZE (8)),
    bs12-r12                                BIT STRING (SIZE (12)),
    bs16-r12                                BIT STRING (SIZE (16)),
    bs30-r12                                BIT STRING (SIZE (30)),
    bs40-r12                                BIT STRING (SIZE (40)),
    bs42-r12                                BIT STRING (SIZE (42))
}

SubframeBitmapSL-r14 ::=        CHOICE {
    bs10-r14                                BIT STRING (SIZE (10)),
    bs16-r14                                BIT STRING (SIZE (16)),
    bs20-r14                                BIT STRING (SIZE (20)),
    bs30-r14                                BIT STRING (SIZE (30)),
    bs40-r14                                BIT STRING (SIZE (40)),
    bs50-r14                                BIT STRING (SIZE (50)),
    bs60-r14                                BIT STRING (SIZE (60)),
```


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```
    bs100-r14                               BIT STRING (SIZE (100))
}

-- ASN1STOP
```

***SL-TF-ResourceConfig* field descriptions**
prb-Start, prb-End, prb-Num Sidelink transmissions on a sub-frame can occur on PRB with index greater than or equal to *prb-Start* and less than *prb-Start* + *prb-Num*, and on PRB with index greater than *prb-End* - *prb-Num* and less than or equal to *prb-End*. Even for neighbouring cells, *prb-Start* and *prb-End* are relative to PRB #0 of the cell from which it was obtained. See TS 36.213 [23, 14.1.3, 14.2.3, 14.3.3].
subframeBitmap Indicates the subframe bitmap indicating resources used for sidelink. For sidelink communication, E-UTRAN configures value *bs40* for FDD and the following values for TDD: value *bs42* for configuration0, value *bs16* for configuration1, value bs8 for configuration2, value *bs12* for configuration3, value *bs8* for configuration4, value *bs4* for configuration5 and value *bs30* for configuration6. For V2X sidelink communication, E-UTRAN configures value *bs16*, *bs20* or *bs100* for FDD or Frame Structure Type 1 as defined in 3GPP TS 36.211 [21], and the following values for TDD or Frame Structure Type 2 as defined in 3GPP TS 36.211 [21]: value *bs60* for configuration0, value *bs40* for configuration1, value bs20 for configuration2, value *bs30* for configuration3, value *bs20* for configuration4, value *bs10* for configuration5 and value *bs50* for configuration6.

– *SL-TxPower*

The IE *SL-TxPower* is used to limit the UE's sidelink transmission power on a carrier frequency. The unit is dBm. Value minusinfinity corresponds to –infinity.

SL-TxPower information element

```
-- ASN1START

SL-TxPower-r14 ::=      CHOICE {
    minusinfinity-r14               NULL,
    txPower-r14                     INTEGER (-41..31)
}

-- ASN1STOP
```

– *SL-TypeTxSync*

The IE *SL-TypeTxSync* indicates the synchronization reference type.

SL-TypeTxSync information element

```
-- ASN1START

SL-TypeTxSync-r14 ::=       ENUMERATED {gnss, enb, ue}

-- ASN1STOP
```

– *SL-ThresPSSCH-RSRP-List*

IE *SL-ThresPSSCH-RSRP-List* indicates a threshold used for sensing based UE autonomous resource selection (see TS 36.213 [23]). A resource is excluded if it is indicated or reserved by a decoded SCI and PSSCH RSRP in the associated data resource is above the threshold defined by IE *SL-ThresPSSCH-RSRP-List*.

SL-ThresPSSCH-RSRP-List information element

```
-- ASN1START

SL-ThresPSSCH-RSRP-List-r14 ::= SEQUENCE (SIZE (64)) OF SL-ThresPSSCH-RSRP-r14

SL-ThresPSSCH-RSRP-r14 ::=      INTEGER (0..66)

-- ASN1STOP
```


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SL-ThresPSSCH-RSRP-List field descriptions
SL-ThresPSSCH-RSRP Value 0 corresponds to minus infinity dBm, value 1 corresponds to -128dBm, value 2 corresponds to -126dBm, value n corresponds to (-128 + (n-1)*2) dBm and so on, value 66 corresponds to infinity dBm.

– *SL-TxParameters*

The IE *SL-TxParameters* identifies a set of parameters configured for sidelink transmission, used for communication, discovery and synchronisation.

SL-TxParameters information element

```
-- ASN1START

SL-TxParameters-r12 ::=             SEQUENCE    {
    alpha-r12                               Alpha-r12,
    p0-r12                                  P0-SL-r12
}

P0-SL-r12 ::=                           INTEGER (-126..31)

-- ASN1STOP
```

SL-TxParameters field descriptions
alpha Parameter(s): $\alpha_{PSSCH,1}$, $\alpha_{PSSCH,2}$, $\alpha_{PSSCH,3}$, $\alpha_{PSSCH,4}$, $\alpha_{PSCCH,1}$, $\alpha_{PSCCH,2}$, $\alpha_{PSDCH,1}$, α_{PSSS} See TS 36.213 [23, 14.1.1.5, 14.2.1.3, 14.3.1, 14.4] where al0 corresponds to 0, al04 corresponds to value 0.4, al05 to 0.5, al06 to 0.6, al07 to 0.7, al08 to 0.8, al09 to 0.9 and al1 corresponds to 1. This field applies for sidelink power control.
p0 Parameter: $P_{O\_PSSCH,1}$, $P_{O\_PSSCH,2}$, $P_{O\_PSSCH,3}$, $P_{O\_PSSCH,4}$, $P_{O\_PSCCH,1}$, $P_{O\_PSCCH,2}$, $P_{O\_PSDCH,1}$, P_{O_PSSS} see TS 36.213 [23, 14.1.1.5, 14.2.1.3, 14.3.1, 14.4], unit dBm.

– *SL-TxPoolIdentity*

The IE *SL-TxPoolIdentity* identifies an individual pool entry configured for sidelink transmission, used for communication and discovery.

SL-TxPoolIdentity information element

```
-- ASN1START

SL-TxPoolIdentity-r12 ::=           INTEGER (1.. maxSL-TxPool-r12)

SL-TxPoolIdentity-v1310 ::=     INTEGER (maxSL-TxPool-r12Plus1-r13.. maxSL-TxPool-r13)

SL-V2X-TxPoolIdentity-r14 ::=       INTEGER (1.. maxSL-V2X-TxPool-r14)

-- ASN1STOP
```

– *SL-TxPoolToReleaseList*

The IE *SL-TxPoolToReleaseList* is used to release one or more individual pool entries used for sidelink transmission, for communication and discovery.

SL-TxPoolToReleaseList information element

```
-- ASN1START

SL-TxPoolToReleaseList-r12 ::=  SEQUENCE (SIZE (1..maxSL-TxPool-r12)) OF SL-TxPoolIdentity-r12
```


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```
SL-TxPoolToReleaseListExt-r13 ::=   SEQUENCE (SIZE (1..maxSL-TxPool-v1310)) OF SL-TxPoolIdentity-
v1310

-- ASN1STOP
```

– SL-V2X-ConfigDedicated

The IE *SL-V2X-ConfigDedicated* specifies the dedicated configuration information for V2X sidelink communication.

SL-V2X-ConfigDedicated information element

```
-- ASN1START

SL-V2X-ConfigDedicated-r14 ::=              SEQUENCE    {
    commTxResources-r14                 CHOICE {
        release                             NULL,
        setup                               CHOICE {
            scheduled-r14                   SEQUENCE {
                sl-V-RNTI-r14           C-RNTI,
                mac-MainConfig-r14              MAC-MainConfigSL-r12,
                v2x-SchedulingPool-r14          SL-CommResourcePoolV2X-r14  OPTIONAL,   -- Need ON
                mcs-r14                         INTEGER (0..31)             OPTIONAL,   -- Need OR
                logicalChGroupInfoList-r14      LogicalChGroupInfoList-r13
            },
            ue-Selected-r14                 SEQUENCE {
                -- Pool for normal usage
                v2x-CommTxPoolNormalDedicated-r14   SEQUENCE {
                    poolToReleaseList-r14   SL-TxPoolToReleaseListV2X-r14  OPTIONAL,    -- Need ON
                    poolToAddModList-r14        SL-TxPoolToAddModListV2X-r14        OPTIONAL,   --
Need ON
                    v2x-CommTxPoolSensingConfig-r14     SL-CommTxPoolSensingConfig-r14
                                                                            OPTIONAL    -- Need ON
                }
            }
        }
    }                                                                       OPTIONAL,   -- Need ON
    v2x-InterFreqInfoList-r14           SL-InterFreqInfoListV2X-r14         OPTIONAL,   -- Need ON
    thresSL-TxPrioritization-r14            SL-Priority-r13                         OPTIONAL,   --
Need OR
    typeTxSync-r14                      SL-TypeTxSync-r14                   OPTIONAL,   -- Need OR
    cbr-DedicatedTxConfigList-r14       SL-CBR-CommonTxConfigList-r14   OPTIONAL,   -- Need OR
    ...
}

SL-TxPoolToAddModListV2X-r14 ::=        SEQUENCE (SIZE (1.. maxSL-V2X-TxPool-r14)) OF SL-
TxPoolToAddMod-r14

SL-TxPoolToAddMod-r14 ::=   SEQUENCE    {
    poolIdentity-r14                    SL-V2X-TxPoolIdentity-r14,
    pool-r14                            SL-CommResourcePoolV2X-r14
}

SL-TxPoolToReleaseListV2X-r14 ::=   SEQUENCE (SIZE (1.. maxSL-V2X-TxPool-r14)) OF SL-V2X-
TxPoolIdentity-r14

-- ASN1STOP
```


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SL-V2X-ConfigDedicated field descriptions
cbr-DedicatedTxConfigList Indicates the dedicated list of CBR range division and the list of PSCCH TX configurations available to configure congestion control to the UE for V2X sidelink communication.
logicalChGroupInfoList Indicates for each logical channel group the list of associated priorities, used as specified in TS 36.321 [6], in order of increasing logical channel group identity.
mcs Indicates the MCS as defined in TS 36.213 [23, 14.2.1]. If not configured, the selection of MCS is up to UE implementation.
scheduled Indicates the configuration for the case E-UTRAN schedules the transmission resources based on sidelink specific BSR from the UE.
sl-V-RNTI Indicates the RNTI used for DCI dynamically scheduling sidelink resources for V2X sidelink communication.
thresSL-TxPrioritization Indicates the threshold used to determine whether SL V2X transmission is prioritized over uplink transmission if they overlap in time (see TS 36.321 [6]). This value shall overwrite *thresSL-TxPrioritization* configured in *SIB21* or *SL-V2X-Preconfiguration* if any.
typeTxSync Indicates the prioritized synchronization type (i.e. eNB or GNSS) for performing V2X sidelink communication on PCell.
ue-Selected Indicates the configuration for the case the UE selects the transmission resources from a pool of resources configured by E-UTRAN.
v2x-InterFreqInfoList Indicates synchronization and resource allocation configurations of other carrier frequencies than the serving carrier frequency for V2X sidelink communication. For inter-carrier scheduled resource allocation, CIF=1 in DCI-5A corresponds to the first entry in this frequency list, CIF=2 corresponds to the second entry, and so on (see TS 36.213 [23]). CIF=0 in DCI-5A corresponds to the frequency where the DCI is received.
v2x-SchedulingPool Indicates a pool of resources when E-UTRAN schedules Tx resources for V2X sidelink communications.

– *SL-ZoneConfig*

The IE *SL-ZoneConfig* indicates zone configurations used for V2X sidelink communication.

SL-ZoneConfig information element

```
-- ASN1START

SL-ZoneConfig-r14 ::=       SEQUENCE {
    zoneLength-r14  ENUMERATED { m5, m10, m20, m50, m100, m200, m500, spare1},
    zoneWidth-r14   ENUMERATED { m5, m10, m20, m50, m100, m200, m500, spare1},
    zoneIdLongiMod-r14  INTEGER (1..4),
    zoneIdLatiMod-r14   INTEGER (1..4)
}

-- ASN1STOP
```

SL-ZoneConfig field descriptions
zoneLength Indicates the length of each geographic zone. Value m5 corresponds to 5 meters, m10 corresponds to 10 meters and so on.
zoneWidth Indicates the width of each geographic zone. Value m5 corresponds to 5 meters, m10 corresponds to 10 meters and so on.
zoneIdLongiMod Indicates the total number of zones that is configured with respect to longitude.
zoneIdLatiMod Indicates the total number of zones that is configured with respect to latitude.

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6.4 RRC multiplicity and type constraint values

– Multiplicity and type constraint definitions

```
-- ASN1START

maxACDC-Cat-r13             INTEGER ::= 16  -- Maximum number of ACDC categories (per PLMN)
maxAvailNarrowBands-r13     INTEGER ::= 16  -- Maximum number of narrowbands
maxBandComb-r10             INTEGER ::= 128 -- Maximum number of band combinations.
maxBandComb-r11             INTEGER ::= 256 -- Maximum number of additional band combinations.
maxBandComb-r13             INTEGER ::= 384 -- Maximum number of band combinations in Rel-13
maxBands                    INTEGER ::= 64  -- Maximum number of bands listed in EUTRA UE caps
maxBandwidthClass-r10       INTEGER ::= 16  -- Maximum number of supported CA BW classes per band
maxBandwidthCombSet-r10     INTEGER ::= 32  -- Maximum number of bandwidth combination sets per
                                            -- supported band combination
maxCBR-Level-r14            INTEGER ::= 16  -- Maximum number of CBR levels
maxCBR-Level-1-r14          INTEGER ::= 15
maxCBR-Report-r14           INTEGER ::= 72  -- Maximum number of CBR results in a report
maxCDMA-BandClass           INTEGER ::= 32  -- Maximum value of the CDMA band classes
maxCE-Level-r13             INTEGER ::= 4   -- Maximum number of CE levels
maxCellBlack                INTEGER ::= 16  -- Maximum number of blacklisted physical cell identity
                                            -- ranges listed in SIB type 4 and 5
maxCellHistory-r12          INTEGER ::= 16  -- Maximum number of visited EUTRA cells reported
maxCellInfoGERAN-r9         INTEGER ::= 32  -- Maximum number of GERAN cells for which system in-
                                            -- formation can be provided as redirection assistance
maxCellInfoUTRA-r9          INTEGER ::= 16  -- Maximum number of UTRA cells for which system
                                            -- information can be provided as redirection
                                            -- assistance
maxCombIDC-r11              INTEGER ::= 128 -- Maximum number of reported UL CA combinations
maxCSI-IM-r11               INTEGER ::= 3   -- Maximum number of CSI-IM configurations
                                            -- (per carrier frequency)
maxCSI-IM-r12               INTEGER ::= 4   -- Maximum number of CSI-IM configurations
                                            -- (per carrier frequency)
minCSI-IM-r13               INTEGER ::= 5   -- Minimum number of CSI IM configurations from which
                                            -- REL-13 extension is used
maxCSI-IM-r13               INTEGER ::= 24  -- Maximum number of CSI-IM configurations
                                            -- (per carrier frequency)
maxCSI-IM-v1310             INTEGER ::= 20  -- Maximum number of additional CSI-IM configurations
                                            --  (per carrier frequency)
maxCSI-Proc-r11             INTEGER ::= 4   -- Maximum number of CSI processes (per carrier
                                            --  frequency)
maxCSI-RS-NZP-r11           INTEGER ::= 3   -- Maximum number of CSI RS resource
                                            --  configurations using non-zero Tx power
                                            --  (per carrier frequency)
minCSI-RS-NZP-r13           INTEGER ::= 4   -- Minimum number of CSI RS resource from which
                                            -- REL-13 extension is used
maxCSI-RS-NZP-r13           INTEGER ::= 24  -- Maximum number of CSI RS resource
                                            --  configurations using non-zero Tx power
                                            --  (per carrier frequency)
maxCSI-RS-NZP-v1310         INTEGER ::= 21  -- Maximum number of additional CSI RS resource
                                            --  configurations using non-zero Tx power
                                            --  (per carrier frequency)
maxCSI-RS-ZP-r11            INTEGER ::= 4   -- Maximum number of CSI RS resource
                                            --  configurations using zero Tx power(per carrier
                                            --  frequency)
maxCQI-ProcExt-r11          INTEGER ::= 3   -- Maximum number of additional periodic CQI
                                            -- configurations (per carrier frequency)
maxFreqUTRA-TDD-r10         INTEGER ::= 6   -- Maximum number of UTRA TDD carrier frequencies for
                                            -- which system information can be provided as
                                            -- redirection assistance
maxCellInter                INTEGER ::= 16  -- Maximum number of neighbouring inter-frequency
                                            -- cells listed in SIB type 5
maxCellIntra                INTEGER ::= 16  -- Maximum number of neighbouring intra-frequency
                                            -- cells listed in SIB type 4
maxCellListGERAN            INTEGER ::= 3   -- Maximum number of lists of GERAN cells
maxCellMeas                 INTEGER ::= 32  -- Maximum number of entries in each of the
                                            -- cell lists in a measurement object
maxCellReport               INTEGER ::= 8   -- Maximum number of reported cells/CSI-RS resources
maxConfigSPS-r14            INTEGER ::= 8   -- Maximum number of simultaneous SPS configurations
maxCSI-RS-Meas-r12          INTEGER ::= 96  -- Maximum number of entries in the CSI-RS list
                                            -- in a measurement object
maxDRB                      INTEGER ::= 11  -- Maximum number of Data Radio Bearers
maxDS-Duration-r12          INTEGER ::= 5   -- Maximum number of subframes in a discovery signals
                                            -- occasion
maxDS-ZTP-CSI-RS-r12        INTEGER ::= 5   -- Maximum number of zero transmission power CSI-RS for
                                            -- a serving cell concerning discovery signals
```


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```
maxEARFCN                    INTEGER ::= 65535   -- Maximum value of EUTRA carrier frequency
maxEARFCN-Plus1              INTEGER ::= 65536   -- Lowest value extended EARFCN range
maxEARFCN2                   INTEGER ::= 262143  -- Highest value extended EARFCN range
maxEPDCCH-Set-r11            INTEGER ::= 2   -- Maximum number of EPDCCH sets
maxFBI                       INTEGER ::= 64  -- Maximum value of fequency band indicator
maxFBI-Plus1                     INTEGER ::= 65  -- Lowest value extended FBI range
maxFBI2                      INTEGER ::= 256 -- Highest value extended FBI range
maxFreq                      INTEGER ::= 8   -- Maximum number of carrier frequencies
maxFreqIDC-r11               INTEGER ::= 32  -- Maximum number of carrier frequencies that are
                                             -- affected by the IDC problems
maxFreqMBMS-r11              INTEGER ::= 5   -- Maximum number of carrier frequencies for which an
                                             -- MBMS capable UE may indicate an interest
maxFreqV2X-r14               INTEGER ::= 8   -- Maximum number of carrier frequencies for which V2X
                                             -- sidelink communication can be configured
maxFreqV2X-1-r14                 INTEGER ::= 7   -- Highest index of frequencies
maxGERAN-SI                  INTEGER ::= 10  -- Maximum number of GERAN SI blocks that can be
                                             -- provided as part of NACC information
maxGNFG                      INTEGER ::= 16  -- Maximum number of GERAN neighbour freq groups
maxLCG-r13                   INTEGER ::= 4   -- Maximum number of logical channel groups
maxLogMeasReport-r10         INTEGER ::= 520 -- Maximum number of logged measurement entries
                                             --  that can be reported by the UE in one message
maxMBSFN-Allocations         INTEGER ::= 8   -- Maximum number of MBSFN frame allocations with
                                             -- different offset
maxMBSFN-Area                INTEGER ::= 8
maxMBSFN-Area-1              INTEGER ::= 7
maxMBMS-ServiceListPerUE-r13    INTEGER ::= 15  -- Maximum number of services which the UE can
                                            -- include in the MBMS interest indication
maxMeasId                    INTEGER ::= 32
maxMeasId-Plus1              INTEGER ::= 33
maxMeasId-r12                INTEGER ::= 64
maxMultiBands                INTEGER ::= 8   -- Maximum number of additional frequency bands
                                             -- that a cell belongs to
maxNS-Pmax-r10               INTEGER ::= 8   -- Maximum number of NS and P-Max values per band
maxNAICS-Entries-r12             INTEGER ::= 8   -- Maximum number of supported NAICS combination(s)
maxNeighCell-r12                 INTEGER ::= 8   -- Maximum number of neighbouring cells in NAICS
                                             -- configuration (per carrier frequency)
maxNeighCell-SCPTM-r13       INTEGER ::= 8   -- Maximum number of SCPTM neighbour cells
maxObjectId                  INTEGER ::= 32
maxObjectId-Plus1-r13        INTEGER ::= 33
maxObjectId-r13              INTEGER ::= 64
maxP-a-PerNeighCell-r12      INTEGER ::= 3   -- Maximum number of power offsets for a neighbour cell
                                             -- in NAICS configuration
maxPageRec                   INTEGER ::= 16  --
maxPhysCellIdRange-r9        INTEGER ::= 4   -- Maximum number of physical cell identity ranges
maxPLMN-r11                  INTEGER ::= 6   -- Maximum number of PLMNs
maxPLMN-1-r14                INTEGER ::= 5   -- Maximum number of PLMNs minus one
maxPNOffset                  INTEGER ::= 511 -- Maximum number of CDMA2000 PNOffsets
maxPMCH-PerMBSFN             INTEGER ::= 15
maxPSSCH-TxConfig-r14        INTEGER ::= 16  -- Maximum number of PSSCH TX configurations
maxQCI-r13                   INTEGER ::= 6   -- Maximum number of QCIs
maxRAT-Capabilities          INTEGER ::= 8   -- Maximum number of interworking RATs (incl EUTRA)
maxRE-MapQCL-r11             INTEGER ::= 4   -- Maximum number of PDSCH RE Mapping configurations
                                             --  (per carrier frequency)
maxReportConfigId            INTEGER ::= 32
maxReservationPeriod-r14     INTEGER ::= 16  -- Maximum number of resource reservation periodicities
                                             --  for sidelink V2X communication
maxRSTD-Freq-r10             INTEGER ::= 3   -- Maximum number of frequency layers for RSTD
                                             -- measurement
maxSAI-MBMS-r11              INTEGER ::= 64  -- Maximum number of MBMS service area identities
                                             -- broadcast per carrier frequency
maxSCell-r10                 INTEGER ::= 4   -- Maximum number of SCells
maxSCell-r13                 INTEGER ::= 31  -- Highest value of extended number range of SCells
maxSC-MTCH-r13               INTEGER ::= 1023    -- Maximum number of SC-MTCHs in one cell
maxSC-MTCH-BR-r14            INTEGER ::= 128 -- Maximum number of SC-MTCHs in one cell for feMTC
maxSL-CommRxPoolNFreq-r13    INTEGER ::= 32  -- Maximum number of individual sidelink communication
                                             -- Rx resource pools on neighbouring freq
maxSL-CommRxPoolPreconf-v1310    INTEGER ::= 12  -- Maximum number of additional preconfigured
                                                 -- sidelink communication Rx resource pool entries
maxSL-TxPool-r12Plus1-r13    INTEGER ::= 5   -- First additional individual sidelink
                                                 -- Tx resource pool
maxSL-TxPool-v1310           INTEGER ::= 4   -- Maximum number of additional sidelink
                                                 -- Tx resource pool entries
maxSL-TxPool-r13             INTEGER ::= 8   -- Maximum number of individual sidelink
                                                 -- Tx resource pools
maxSL-CommTxPoolPreconf-v1310    INTEGER ::= 7   -- Maximum number of additional preconfigured
                                                 -- sidelink Tx resource pool entries
maxSL-Dest-r12           INTEGER ::= 16          -- Maximum number of sidelink destinations
maxSL-DiscCells-r13      INTEGER ::= 16          -- Maximum number of cells with similar sidelink
```


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```
                                                -- configurations
maxSL-DiscPowerClass-r12    INTEGER ::= 3       -- Maximum number of sidelink power classes
maxSL-DiscRxPoolPreconf-r13     INTEGER ::= 16  -- Maximum number of preconfigured sidelink
                                                -- discovery Rx resource pool entries
maxSL-DiscSysInfoReportFreq-r13 INTEGER ::= 8   -- Maximum number of frequencies to include in a
                                                -- SidelinkUEInformation for SI reporting
maxSL-DiscTxPoolPreconf-r13     INTEGER ::= 4   -- Maximum number of preconfigured sidelink
                                                -- discovery Tx resource pool entries
maxSL-GP-r13            INTEGER ::= 8   -- Maximum number of gap patterns that can be requested
                                        -- for a frequency or assigned
maxSL-PoolToMeasure-r14     INTEGER ::= 72  -- Maximum number of TX resource pools for CBR
                                                -- measurement and report
maxSL-Prio-r13          INTEGER ::= 8   -- Maximum number of entries in sidelink priority list
maxSL-RxPool-r12            INTEGER ::= 16  -- Maximum number of individual sidelink Rx resource
pools
maxSL-SyncConfig-r12        INTEGER ::= 16  -- Maximum number of sidelink Sync configurations
maxSL-TF-IndexPair-r12  INTEGER ::= 64  -- Maximum number of sidelink Time Freq resource index
                                        --  pairs
maxSL-TxPool-r12            INTEGER ::= 4   -- Maximum number of individual sidelink Tx resource
pools
maxSL-V2X-RxPool-r14        INTEGER ::= 16  -- Maximum number of RX resource pools for
                                                -- V2X sidelink communication
maxSL-V2X-RxPoolPreconf-r14 INTEGER ::= 16      -- Maximum number of RX resource pools for
                                                -- V2X sidelink communication
maxSL-V2X-TxPool-r14        INTEGER ::= 8   -- Maximum number of TX resource pools for
                                                -- V2X sidelink communication
maxSL-V2X-TxPoolPreconf-r14 INTEGER ::= 8       -- Maximum number of TX resource pools for
                                                -- V2X sidelink communication
maxSL-V2X-SyncConfig-r14    INTEGER ::= 16  -- Maximum number of sidelink Sync configurations
                                                -- for V2X sidelink communication
maxSL-V2X-CBRConfig-r14     INTEGER ::= 4   -- Maximum number of CBR range configurations
                                                -- for V2X sidelink communication congestion
                                                -- control
maxSL-V2X-CBRConfig-1-r14   INTEGER ::= 3
maxSL-V2X-TxConfig-r14      INTEGER ::= 64  -- Maximum number of TX parameter configurations
                                                -- for V2X sidelink communication congestion
                                                -- control
maxSL-V2X-TxConfig-1-r14    INTEGER ::= 63
maxSL-V2X-CBRConfig2-r14        INTEGER ::= 8   -- Maximum number of CBR range configurations in
                                                -- pre-configuration for V2X sidelink
                                                -- communication congestion control
maxSL-V2X-CBRConfig2-1-r14  INTEGER ::= 7
maxSL-V2X-TxConfig2-r14     INTEGER ::= 128 -- Maximum number of TX parameter
                                                -- configurations in pre-configuration for V2X
                                                -- sidelink communication congestion control
maxSL-V2X-TxConfig2-1-r14   INTEGER ::= 127
maxSTAG-r11                 INTEGER ::= 3   -- Maximum number of STAGs
maxServCell-r10             INTEGER ::= 5   -- Maximum number of Serving cells
maxServCell-r13             INTEGER ::= 32  -- Highest value of extended number range of Serving
cells
maxServiceCount             INTEGER ::= 16  -- Maximum number of MBMS services that can be included
                                            --  in an MBMS counting request and response
maxServiceCount-1           INTEGER ::= 15
maxSessionPerPMCH           INTEGER ::= 29
maxSessionPerPMCH-1         INTEGER ::= 28
maxSIB                      INTEGER ::= 32  -- Maximum number of SIBs
maxSIB-1                    INTEGER ::= 31
maxSI-Message               INTEGER ::= 32  -- Maximum number of SI messages
maxSimultaneousBands-r10    INTEGER ::= 64  -- Maximum number of simultaneously aggregated bands
maxSubframePatternIDC-r11   INTEGER ::= 8   -- Maximum number of subframe reservation patterns
                                            -- that the UE can simultaneously recommend to the
                                            -- E-UTRAN for use.
maxTrafficPattern-r14       INTEGER ::= 8   -- Maximum number of periodical traffic patterns
                                            -- that the UE can simultaneously report to the
                                            -- E-UTRAN.
maxUTRA-FDD-Carrier         INTEGER ::= 16  -- Maximum number of UTRA FDD carrier frequencies
maxUTRA-TDD-Carrier         INTEGER ::= 16  -- Maximum number of UTRA TDD carrier frequencies
maxWLAN-Id-r12              INTEGER ::= 16  -- Maximum number of WLAN identifiers
maxWLAN-Bands-r13           INTEGER ::= 8   -- Maximum number of WLAN bands
maxWLAN-Id-r13              INTEGER ::= 32  -- Maximum number of WLAN identifiers
maxWLAN-Channels-r13        INTEGER ::= 16  -- maximum number of WLAN channels used in
                                            -- WLAN-CarrierInfo
maxWLAN-CarrierInfo-r13     INTEGER ::= 8   -- Maximum number of WLAN Carrier Information
maxWLAN-Id-Report-r14       INTEGER ::= 32  -- Maximum number of WLAN IDs to report

-- ASN1STOP
```

NOTE: The value of maxDRB aligns with SA2.

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– End of EUTRA-RRC-Definitions

```
-- ASN1START

END

-- ASN1STOP
```

6.5 PC5 RRC messages

NOTE: The messages included in this section reflect the current status of the discussions. Additional messages may be included at a later stage.

6.5.1 General message structure

– *PC5-RRC-Definitions*

This ASN.1 segment is the start of the PC5 RRC PDU definitions.

```
-- ASN1START

PC5-RRC-Definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
    TDD-ConfigSL-r12
FROM EUTRA-RRC-Definitions;

-- ASN1STOP
```

– *SBCCH-SL-BCH-Message*

The *SBCCH-SL-BCH-Message* class is the set of RRC messages that may be sent from the UE to the UE via SL-BCH on the SBCCH logical channel.

```
-- ASN1START

SBCCH-SL-BCH-Message ::= SEQUENCE {
    message                 SBCCH-SL-BCH-MessageType
}

SBCCH-SL-BCH-MessageType ::=                        MasterInformationBlock-SL

-- ASN1STOP
```

– *SBCCH-SL-BCH-Message-V2X*

The *SBCCH-SL-BCH-Message-V2X* class is the set of RRC messages that may be sent from the UE to the UE via SL-BCH on the SBCCH logical channel for V2X sidelink communication.

```
-- ASN1START

SBCCH-SL-BCH-Message-V2X-r14 ::= SEQUENCE {
    message                 SBCCH-SL-BCH-MessageType-V2X-r14
}

SBCCH-SL-BCH-MessageType-V2X-r14 ::=                MasterInformationBlock-SL-V2X-r14

-- ASN1STOP
```


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6.5.2 Message definitions

– *MasterInformationBlock-SL*

The *MasterInformationBlock-SL* includes the information transmitted by a UE transmitting SLSS, i.e. acting as synchronisation reference, via SL-BCH.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: SBCCH

Direction: UE to UE

MasterInformationBlock-SL

```
-- ASN1START

MasterInformationBlock-SL ::=       SEQUENCE {
    sl-Bandwidth-r12                    ENUMERATED {
                                            n6, n15, n25, n50, n75, n100},
    tdd-ConfigSL-r12                    TDD-ConfigSL-r12,
    directFrameNumber-r12               BIT STRING (SIZE (10)),
    directSubframeNumber-r12            INTEGER (0..9),
    inCoverage-r12                      BOOLEAN,
    reserved-r12                        BIT STRING (SIZE (19))
}


-- ASN1STOP
```

***MasterInformationBlock-SL* field descriptions**
directFrameNumber Indicates the frame number in which SLSS and SL-BCH are transmitted. The subframe in the frame corresponding to *directFrameNumber* is indicated by *directSubframeNumber*.
inCoverage Value *TRUE* indicates that the UE transmitting the *MasterInformationBlock-SL* is in E-UTRAN coverage.
sl-Bandwidth Parameter: transmission bandwidth configuration. n6 corresponds to 6 resource blocks, n15 to 15 resource blocks and so on.

– *MasterInformationBlock-SL-V2X*

The *MasterInformationBlock-SL-V2X* includes the information transmitted by a UE transmitting SLSS, i.e. acting as synchronisation reference, via SL-BCH for V2X sidelink communication.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: SBCCH

Direction: UE to UE

MasterInformationBlock-SL-V2X

```
-- ASN1START

MasterInformationBlock-SL-V2X-r14 ::=       SEQUENCE {
    sl-Bandwidth-r14                    ENUMERATED {
                                            n6, n15, n25, n50, n75, n100},
    tdd-ConfigSL-r14                    TDD-ConfigSL-r12,
    directFrameNumber-r14               BIT STRING (SIZE (10)),
    directSubframeNumber-r14            INTEGER (0..9),
    inCoverage-r14                      BOOLEAN,
    reserved-r14                        BIT STRING (SIZE (27))
```


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```
}


-- ASN1STOP
```

***MasterInformationBlock-SL-V2X* field descriptions**
directFrameNumber Indicates the frame number in which SLSS and SL-BCH for V2X sidelink communication are transmitted. The subframe in the frame corresponding to *directFrameNumber* is indicated by *directSubframeNumber*.
inCoverage Value *TRUE* indicates that the UE transmitting the *MasterInformationBlock-SL-V2X* for V2X sidelink communication is in E-UTRAN coverage.
sl-Bandwidth Parameter: transmission bandwidth configuration. n6 corresponds to 6 resource blocks, n15 to 15 resource blocks and so on.

– End of *PC5-RRC-Definitions*

```
-- ASN1START

END

-- ASN1STOP
```

6.6 Direct Indication Information

Direct Indication information is transmitted on MPDCCH using P-RNTI but without associated *Paging* message. Table 6.6-1 defines the Direct Indication information, see TS 36.212 [22, 5.3.3.1.14].

When bit n is set to 1, UE shall behave as if the corresponding field is set in the *Paging* message, see 5.3.2.3. Bit 1 is the least significant bit.

Table 6.6-1: Direct Indication information

Bit	Direct Indication information
1	*systemInfoModification*
2	*etws-Indication*
3	*cmas-Indication*
4	*eab-ParamModification*
5	*systemInfoModification-eDRX*
6, 7, 8	Not used, and shall be ignored by UE if received.

6.6a Direct Indication FeMBMS

On MBMS-dedicated cell and on FeMBMS/Unicast-mixed cell, a Direct Indication FeMBMS is transmitted on PDCCH together with 8-bit MCCH change notification using M-RNTI, see TS 36.212 [22, 5.3.3.1.4]. Table 6.6a-1 defines the Direct Indication FeMBMS.

When the first bit is set to 1, UE shall behave as if *systemInfoModification* field is set in the *Paging* message and when the second bit is set to 1, UE shall behave as if both *etws-Indication* and *cmas-Indication* are set in the *Paging* message, see 5.3.2.3. Bit 1 is the least significant bit.

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Table 6.6a-1: Direct Indication FeMBMS

Bit	Direct Indication FeMBMS
1	*systemInfoModification*
2	*etws-Indication* and *cmas-Indication*

6.7 NB-IoT RRC messages

6.7.1 General NB-IoT message structure

```
-- ASN1START

NBIOT-RRC-Definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
    RRCConnectionReestablishmentReject,
    SecurityModeCommand,
    SecurityModeComplete,
    SecurityModeFailure,
    AdditionalSpectrumEmission,
    ARFCN-ValueEUTRA-r9,
    CellIdentity,
    DedicatedInfoNAS,
    DRB-Identity,
    InitialUE-Identity,
    IntraFreqBlackCellList,
    IntraFreqNeighCellList,
    maxBands,
    maxCellBlack,
    maxCellInter,
    maxFBI2,
    maxFreq,
    maxMultiBands,
    maxPageRec,
    maxPLMN-r11,
    maxSAI-MBMS-r11,
    maxSIB,
    maxSIB-1,
    MBMS-SAI-r11,
    MBMS-SAI-List-r11,
    MBMSSessionInfo-r13,
    NextHopChainingCount,
    PagingUE-Identity,
    PLMN-Identity,
    P-Max,
    PowerRampingParameters,
    PreambleTransMax,
    PhysCellId,
    Q-OffsetRange,
    Q-QualMin-r9,
    Q-RxLevMin,
    ReestabUE-Identity,
    RegisteredMME,
    ReselectionThreshold,
    ResumeIdentity-r13,
    RRC-TransactionIdentifier,
    RSRP-Range,
    ShortMAC-I,
    S-TMSI,
    SystemInformationBlockType16-r11,
    SystemInfoValueTagSI-r13,
    T-Reordering,
    TimeAlignmentTimer,
    TMGI-r9,
    TrackingAreaCode,
    DataInactivityTimer-r14

FROM EUTRA-RRC-Definitions;
```


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```
-- ASN1STOP
```

– BCCH-BCH-Message-NB

The *BCCH-BCH-Message-NB* class is the set of RRC messages that may be sent from the E-UTRAN to the UE via BCH on the BCCH logical channel.

```
-- ASN1START

BCCH-BCH-Message-NB ::= SEQUENCE {
    message                 BCCH-BCH-MessageType-NB
}


BCCH-BCH-MessageType-NB::=  MasterInformationBlock-NB


-- ASN1STOP
```

– BCCH-DL-SCH-Message-NB

The *BCCH-DL-SCH-Message-NB* class is the set of RRC messages that may be sent from the E-UTRAN to the UE via DL-SCH on the BCCH logical channel.

```
-- ASN1START

BCCH-DL-SCH-Message-NB ::= SEQUENCE {
    message                 BCCH-DL-SCH-MessageType-NB
}

BCCH-DL-SCH-MessageType-NB ::= CHOICE {
    c1                      CHOICE {
        systemInformation-r13               SystemInformation-NB,
        systemInformationBlockType1-r13     SystemInformationBlockType1-NB
    },
    messageClassExtension   SEQUENCE {}
}

-- ASN1STOP
```

– PCCH-Message-NB

The *PCCH-Message-NB* class is the set of RRC messages that may be sent from the E-UTRAN to the UE on the PCCH logical channel.

```
-- ASN1START

PCCH-Message-NB ::= SEQUENCE {
    message                 PCCH-MessageType-NB
}

PCCH-MessageType-NB ::= CHOICE {
    c1                      CHOICE {
        paging-r13                          Paging-NB
    },
    messageClassExtension   SEQUENCE {}
}

-- ASN1STOP
```

– DL-CCCH-Message-NB

The *DL-CCCH-Message-NB* class is the set of RRC messages that may be sent from the E-UTRAN to the UE on the downlink CCCH logical channel.

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```
-- ASN1START

DL-CCCH-Message-NB ::= SEQUENCE {
    message                 DL-CCCH-MessageType-NB
}

DL-CCCH-MessageType-NB ::= CHOICE {
    c1                      CHOICE {
        rrcConnectionReestablishment-r13        RRCConnectionReestablishment-NB,
        rrcConnectionReestablishmentReject-r13  RRCConnectionReestablishmentReject,
        rrcConnectionReject-r13                 RRCConnectionReject-NB,
        rrcConnectionSetup-r13                  RRCConnectionSetup-NB,
        spare4 NULL, spare3 NULL, spare2 NULL, spare1 NULL
    },
    messageClassExtension   SEQUENCE {}
}

-- ASN1STOP
```

– *DL-DCCH-Message-NB*

The *DL-DCCH-Message-NB* class is the set of RRC messages that may be sent from the E-UTRAN to the UE on the downlink DCCH logical channel.

```
-- ASN1START

DL-DCCH-Message-NB ::= SEQUENCE {
    message                 DL-DCCH-MessageType-NB
}

DL-DCCH-MessageType-NB ::= CHOICE {
    c1                      CHOICE {
        dlInformationTransfer-r13               DLInformationTransfer-NB,
        rrcConnectionReconfiguration-r13        RRCConnectionReconfiguration-NB,
        rrcConnectionRelease-r13                RRCConnectionRelease-NB,
        securityModeCommand-r13                 SecurityModeCommand,
        ueCapabilityEnquiry-r13                 UECapabilityEnquiry-NB,
        rrcConnectionResume-r13                 RRCConnectionResume-NB,
        spare2 NULL, spare1 NULL
    },
    messageClassExtension   SEQUENCE {}
}

-- ASN1STOP
```

– *UL-CCCH-Message-NB*

The *UL-CCCH-Message-NB* class is the set of RRC messages that may be sent from the UE to the E-UTRAN on the uplink CCCH logical channel.

```
-- ASN1START


UL-CCCH-Message-NB ::= SEQUENCE {
    message                 UL-CCCH-MessageType-NB
}

UL-CCCH-MessageType-NB ::= CHOICE {
    c1                      CHOICE {
        rrcConnectionReestablishmentRequest-r13 RRCConnectionReestablishmentRequest-NB,
        rrcConnectionRequest-r13                RRCConnectionRequest-NB,
        rrcConnectionResumeRequest-r13          RRCConnectionResumeRequest-NB,
        spare1 NULL
    },
    messageClassExtension   SEQUENCE {}
}

-- ASN1STOP
```


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– *SC-MCCH-Message-NB*

The *SC-MCCH-Message-NB* class is the set of RRC messages that may be sent from the E-UTRAN to the NB-IoT UE on the SC-MCCH logical channel.

```
-- ASN1START

SC-MCCH-Message-NB ::= SEQUENCE {
    message                 SC-MCCH-MessageType-NB
}


SC-MCCH-MessageType-NB ::= CHOICE {
    c1                      CHOICE {
        scptmConfiguration-r14                      SCPTMConfiguration-NB-r14
    },
    messageClassExtension   SEQUENCE {}
}

-- ASN1STOP
```

– *UL-DCCH-Message-NB*

The *UL-DCCH-Message-NB* class is the set of RRC messages that may be sent from the UE to the E-UTRAN on the uplink DCCH logical channel.

```
-- ASN1START

UL-DCCH-Message-NB ::= SEQUENCE {
    message                 UL-DCCH-MessageType-NB
}

UL-DCCH-MessageType-NB ::= CHOICE {
    c1                      CHOICE {
        rrcConnectionReconfigurationComplete-r13    RRCConnectionReconfigurationComplete-NB,
        rrcConnectionReestablishmentComplete-r13    RRCConnectionReestablishmentComplete-NB,
        rrcConnectionSetupComplete-r13              RRCConnectionSetupComplete-NB,
        securityModeComplete-r13                    SecurityModeComplete,
        securityModeFailure-r13                     SecurityModeFailure,
        ueCapabilityInformation-r13                 UECapabilityInformation-NB,
        ulInformationTransfer-r13                   ULInformationTransfer-NB,
        rrcConnectionResumeComplete-r13             RRCConnectionResumeComplete-NB,
        spare8 NULL, spare7 NULL,
        spare6 NULL, spare5 NULL, spare4 NULL,
        spare3 NULL, spare2 NULL, spare1 NULL
    },
    messageClassExtension   SEQUENCE {}
}

-- ASN1STOP
```

6.7.2 NB-IoT Message definitions

– *DLInformationTransfer-NB*

The *DLInformationTransfer-NB* message is used for the downlink transfer of NAS dedicated information.

Signalling radio bearer: SRB1or SRB1bis

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

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***DLInformationTransfer-NB* message**

```
-- ASN1START

DLInformationTransfer-NB ::=    SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            dlInformationTransfer-r13       DLInformationTransfer-NB-r13-IEs,
            spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

DLInformationTransfer-NB-r13-IEs ::=    SEQUENCE {
    dedicatedInfoNAS-r13                    DedicatedInfoNAS,
    lateNonCriticalExtension                OCTET STRING                    OPTIONAL,
    nonCriticalExtension                    SEQUENCE {}                     OPTIONAL
}

-- ASN1STOP
```

– *MasterInformationBlock-NB*

The *MasterInformationBlock-NB* includes the system information transmitted on BCH.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: BCCH

Direction: E-UTRAN to UE

MasterInformationBlock-NB

```
-- ASN1START

MasterInformationBlock-NB ::=   SEQUENCE {
    systemFrameNumber-MSB-r13       BIT STRING (SIZE (4)),
    hyperSFN-LSB-r13                BIT STRING (SIZE (2)),
    schedulingInfoSIB1-r13          INTEGER (0..15),
    systemInfoValueTag-r13          INTEGER (0..31),
    ab-Enabled-r13                  BOOLEAN,
    operationModeInfo-r13           CHOICE {
        inband-SamePCI-r13              Inband-SamePCI-NB-r13,
        inband-DifferentPCI-r13         Inband-DifferentPCI-NB-r13,
        guardband-r13                   Guardband-NB-r13,
        standalone-r13                  Standalone-NB-r13
    },
    spare                           BIT STRING (SIZE (11))
}

ChannelRasterOffset-NB-r13 ::= ENUMERATED {khz-7dot5, khz-2dot5, khz2dot5, khz7dot5}

Guardband-NB-r13 ::=            SEQUENCE {
    rasterOffset-r13                ChannelRasterOffset-NB-r13,
    spare                           BIT STRING (SIZE (3))
}

Inband-SamePCI-NB-r13 ::=       SEQUENCE {
    eutra-CRS-SequenceInfo-r13      INTEGER (0..31)
}

Inband-DifferentPCI-NB-r13 ::=  SEQUENCE {
    eutra-NumCRS-Ports-r13          ENUMERATED {same, four},
    rasterOffset-r13                ChannelRasterOffset-NB-r13,
    spare                           BIT STRING (SIZE (2))
}

Standalone-NB-r13 ::=           SEQUENCE {
    spare                           BIT STRING (SIZE (5))
```


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```
}

-- ASN1STOP
```

***MasterInformationBlock-NB* field descriptions**
ab-Enabled Value TRUE indicates that access barring is enabled and that the UE shall acquire *SystemInformationBlockType14-NB* before initiating RRC connection establishment or resume.
eutra-CRS-SequenceInfo Information of the carrier containing NPSS/NSSS/NPBCH. Each value is associated with an E-UTRA PRB index as an offset from the middle of the LTE system sorted out by channel raster offset. See TS 36.211[21] and TS 36.213 [23].
eutra-NumCRS-Ports Number of E-UTRA CRS antenna ports, either the same number of ports as NRS or 4 antenna ports. See TS 36.211 [21], TS 36.212 [22], and TS 36.213 [23].
hyperSFN-LSB Indicates the 2 least significant bits of hyper SFN. The remaining bits are present in *SystemInformationBlockType1-NB*.
operationModeInfo Deployment scenario (in-band/guard-band/standalone) and related information. See TS 36.211 [21] and TS 36.213 [23]. *Inband-SamePCI* indicates an in-band deployment and that the NB-IoT and LTE cell share the same physical cell id and have the same number of NRS and CRS ports. *Inband-DifferentPCI* indicates an in-band deployment and that the NB-IoT and LTE cell have different physical cell id. *guardband* indicates a guard-band deployment. *standalone* indicates a standalone deployment.
rasterOffset NB-IoT offset from LTE channel raster. Unit in kHz in set { -7.5, -2.5, 2.5, 7.5} See TS 36.211[21] and TS 36.213 [23].
schedulingInfoSIB1 This field contains an index to a table specified in TS 36.213 [23, Table 16.4.1.3-3] that defines *SystemInformationBlockType1-NB* scheduling information.
systemFrameNumber-MSB Defines the 4 most significant bits of the SFN. As indicated in TS 36.211 [21], the 6 least significant bits of the SFN are acquired implicitly by decoding the NPBCH.
systemInfoValueTag Common for all SIBs other than MIB-NB, SIB14-NB and SIB16-NB.

– *Paging-NB*

The *Paging-NB* message is used for the notification of one or more UEs.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: PCCH

Direction: E-UTRAN to UE

***Paging-NB* message**

```
-- ASN1START

Paging-NB ::=                       SEQUENCE {
    pagingRecordList-r13                PagingRecordList-NB-r13         OPTIONAL,   -- Need ON
    systemInfoModification-r13          ENUMERATED {true}               OPTIONAL,   -- Need ON
    systemInfoModification-eDRX-r13     ENUMERATED {true}               OPTIONAL,   -- Need ON
    nonCriticalExtension                SEQUENCE {}                     OPTIONAL
}

PagingRecordList-NB-r13 ::=         SEQUENCE (SIZE (1..maxPageRec)) OF PagingRecord-NB-r13

PagingRecord-NB-r13 ::=             SEQUENCE {
    ue-Identity-r13                     PagingUE-Identity,
    ...
}
```


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```
-- ASN1STOP
```

Paging-NB field descriptions
systemInfoModification If present: indication of a BCCH modification other than for *SystemInformationBlockType14-NB* (SIB14-NB) and *SystemInformationBlockType16-NB* (SIB16-NB). This indication does not apply to UEs using eDRX cycle longer than the BCCH modification period.
systemInfoModification-eDRX If present: indication of a BCCH modification other than for *SystemInformationBlockType14-NB* (SIB14-NB) and *SystemInformationBlockType16-NB* (SIB16-NB). This indication applies only to UEs using eDRX cycle longer than the BCCH modification period.
ue-Identity Provides the NAS identity of the UE that is being paged.

– *RRCConnectionReconfiguration-NB*

The *RRCConnectionReconfiguration-NB* message is the command to modify an RRC connection. It may convey information for resource configuration (including RBs, MAC main configuration and physical channel configuration) including any associated dedicated NAS information.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

RRCConnectionReconfiguration-NB message

```
-- ASN1START

RRCConnectionReconfiguration-NB ::= SEQUENCE {
    rrc-TransactionIdentifier              RRC-TransactionIdentifier,
    criticalExtensions                     CHOICE {
        c1                                     CHOICE{
            rrcConnectionReconfiguration-r13       RRCConnectionReconfiguration-NB-r13-IEs,
            spare1 NULL
        },
        criticalExtensionsFuture           SEQUENCE {}
    }
}

RRCConnectionReconfiguration-NB-r13-IEs ::= SEQUENCE {
    dedicatedInfoNASList-r13           SEQUENCE (SIZE(1..maxDRB-NB-r13)) OF
                                                DedicatedInfoNAS        OPTIONAL,   -- Need ON
    radioResourceConfigDedicated-r13   RadioResourceConfigDedicated-NB-r13 OPTIONAL,   -- Need ON
    fullConfig-r13                     ENUMERATED {true}                   OPTIONAL,   -- Cond
Reestab
    lateNonCriticalExtension           OCTET STRING                        OPTIONAL,
    nonCriticalExtension               SEQUENCE {} OPTIONAL
}

-- ASN1STOP
```

RRCConnectionReconfiguration-NB field descriptions
dedicatedInfoNASList This field is used to transfer UE specific NAS layer information between the network and the UE. The RRC layer is transparent for each PDU in the list.
fullConfig Indicates the full configuration option is applicable for the RRC Connection Reconfiguration message.

Conditional presence	Explanation
Reestab	This field is optionally present, need ON upon the first reconfiguration after RRC connection re-establishment; otherwise the field is not present.

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– *RRCConnectionReconfigurationComplete-NB*

The *RRCConnectionReconfigurationComplete-NB* message is used to confirm the successful completion of an RRC connection reconfiguration.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

RRCConnectionReconfigurationComplete-NB message

```
-- ASN1START

RRCConnectionReconfigurationComplete-NB ::= SEQUENCE {
    rrc-TransactionIdentifier              RRC-TransactionIdentifier,
    criticalExtensions                     CHOICE {
        rrcConnectionReconfigurationComplete-r13    RRCConnectionReconfigurationComplete-NB-r13-IEs,
        criticalExtensionsFuture                    SEQUENCE {}
    }
}

RRCConnectionReconfigurationComplete-NB-r13-IEs ::= SEQUENCE {
    lateNonCriticalExtension           OCTET STRING                    OPTIONAL,
    nonCriticalExtension               SEQUENCE {}                     OPTIONAL
}

-- ASN1STOP
```

– *RRCConnectionReestablishment-NB*

The *RRCConnectionReestablishment-NB* message is used to re-establish SRB1.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: E-UTRAN to UE

RRCConnectionReestablishment-NB message

```
-- ASN1START


RRCConnectionReestablishment-NB ::= SEQUENCE {
    rrc-TransactionIdentifier          RRC-TransactionIdentifier,
    criticalExtensions                 CHOICE {
        c1                                 CHOICE{
            rrcConnectionReestablishment-r13    RRCConnectionReestablishment-NB-r13-IEs,
            spare1  NULL
        },
        criticalExtensionsFuture           SEQUENCE {}
    }
}

RRCConnectionReestablishment-NB-r13-IEs ::= SEQUENCE {
    radioResourceConfigDedicated-r13           RadioResourceConfigDedicated-NB-r13,
    nextHopChainingCount-r13                   NextHopChainingCount,
    lateNonCriticalExtension                   OCTET STRING                        OPTIONAL,
    nonCriticalExtension                       RRCConnectionReestablishment-NB-v1430-IEs   OPTIONAL
}

RRCConnectionReestablishment-NB-v1430-IEs ::=   SEQUENCE {
    dl-NAS-MAC                         BIT STRING (SIZE (16)), -- Cond Reestablish-CP
    nonCriticalExtension               SEQUENCE {}             OPTIONAL
}
```


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```
-- ASN1STOP
```

RRCConnectionReestablishment-NB field descriptions
dl-NAS-MAC Downlink authentication token, see TS 33.401 [32]. If this field is present, the UE shall ignore the field *nextHopChainingCount*.

Conditional presence	Explanation
Reestablish-CP	This field is mandatory present for NB-IoT UE using the Control Plane CIoT EPS optimisation; otherwise the field is not present.

– *RRCConnectionReestablishmentComplete-NB*

The *RRCConnectionReestablishmentComplete-NB* message is used to confirm the successful completion of an RRC connection re-establishment.

Signalling radio bearer: SRB1 or SRB1bis

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

RRCConnectionReestablishmentComplete-NB message

```
-- ASN1START

RRCConnectionReestablishmentComplete-NB ::= SEQUENCE {
    rrc-TransactionIdentifier              RRC-TransactionIdentifier,
    criticalExtensions                     CHOICE {
        rrcConnectionReestablishmentComplete-r13    RRCConnectionReestablishmentComplete-NB-r13-IEs,
        criticalExtensionsFuture                    SEQUENCE {}
    }
}

RRCConnectionReestablishmentComplete-NB-r13-IEs ::= SEQUENCE {
    lateNonCriticalExtension           OCTET STRING                    OPTIONAL,
    nonCriticalExtension               SEQUENCE {}                     OPTIONAL
}

-- ASN1STOP
```

– *RRCConnectionReestablishmentRequest-NB*

The *RRCConnectionReestablishmentRequest-NB* message is used to request the reestablishment of an RRC connection.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: UE to E-UTRAN

RRCConnectionReestablishmentRequest-NB message

```
-- ASN1START

RRCConnectionReestablishmentRequest-NB ::= SEQUENCE {
    criticalExtensions                 CHOICE {
        rrcConnectionReestablishmentRequest-r13
                                           RRCConnectionReestablishmentRequest-NB-r13-IEs,
        later                              CHOICE {
            rrcConnectionReestablishmentRequest-r14
```


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```
                                        RRCConnectionReestablishmentRequest-NB-r14-IEs,
            criticalExtensionsFuture    SEQUENCE {}
        }
    }
}

RRCConnectionReestablishmentRequest-NB-r13-IEs ::= SEQUENCE {
    ue-Identity-r13                 ReestabUE-Identity,
    reestablishmentCause-r13        ReestablishmentCause-NB-r13,
    spare                           BIT STRING (SIZE (25))
}

RRCConnectionReestablishmentRequest-NB-r14-IEs ::= SEQUENCE {
    ue-Identity-r14                 ReestabUE-Identity-CP-NB-r14,
    reestablishmentCause-r14        ReestablishmentCause-NB-r13,
    spare                           BIT STRING (SIZE (4))
}

ReestablishmentCause-NB-r13 ::=     ENUMERATED {
                                        reconfigurationFailure, otherFailure,
                                        spare2, spare1}

ReestabUE-Identity-CP-NB-r14 ::=    SEQUENCE {
    s-TMSI-r14                          S-TMSI,
    ul-NAS-MAC-r14                      BIT STRING (SIZE (16)),
    ul-NAS-Count-r14                    BIT STRING (SIZE (5))
}

-- ASN1STOP
```

***RRCConnectionReestablishmentRequest-NB* field descriptions**
reestablishmentCause Indicates the failure cause that triggered the re-establishment procedure. eNB is not expected to reject a *RRCConnectionReestablishmentRequest* due to unknown cause value being used by the UE.
ue-Identity UE identity included to retrieve UE context and to facilitate contention resolution by lower layers.
ul-NAS-Count For description of this field see TS 33.401 [32].
ul-NAS-MAC For description of this field see TS 33.401 [32].

– *RRCConnectionReject-NB*

The *RRCConnectionReject-NB* message is used to reject the RRC connection establishment or RRC connection resume.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: E-UTRAN to UE

RRCConnectionReject-NB message

```
-- ASN1START

RRCConnectionReject-NB ::=              SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            rrcConnectionReject-r13             RRCConnectionReject-NB-r13-IEs,
            spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

RRCConnectionReject-NB-r13-IEs ::=      SEQUENCE {
    extendedWaitTime-r13                    INTEGER (1..1800),
    rrc-SuspendIndication-r13               ENUMERATED {true}           OPTIONAL,   -- Need ON
```


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```
    lateNonCriticalExtension               OCTET STRING               OPTIONAL,
    nonCriticalExtension                   SEQUENCE {}                OPTIONAL
}

-- ASN1STOP
```

***RRCConnectionReject-NB* field descriptions**
extendedWaitTime Value in seconds.
rrc-SuspendIndication If present, this field indicates that the UE should remain suspended and not release its stored context.

– *RRCConnectionRelease-NB*

The *RRCConnectionRelease-NB* message is used to command the release of an RRC connection.

Signalling radio bearer: SRB1 or SRB1bis

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

***RRCConnectionRelease-NB* message**

```
-- ASN1START

RRCConnectionRelease-NB ::=     SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            rrcConnectionRelease-r13            RRCConnectionRelease-NB-r13-IEs,
            spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

RRCConnectionRelease-NB-r13-IEs ::= SEQUENCE {
    releaseCause-r13                    ReleaseCause-NB-r13,
    resumeIdentity-r13                  ResumeIdentity-r13              OPTIONAL,   -- Need OR
    extendedWaitTime-r13                INTEGER (1..1800)               OPTIONAL,   -- Need ON
    redirectedCarrierInfo-r13           RedirectedCarrierInfo-NB-r13    OPTIONAL,   -- Need ON
    lateNonCriticalExtension            OCTET STRING                    OPTIONAL,
    nonCriticalExtension                RRCConnectionRelease-NB-v1430-IEs       OPTIONAL
}

RRCConnectionRelease-NB-v1430-IEs ::=   SEQUENCE {
    redirectedCarrierInfo-v1430         RedirectedCarrierInfo-NB-v1430  OPTIONAL,   -- Cond
Redirection
    extendedWaitTime-CPdata-r14         INTEGER (1..1800)   OPTIONAL,   -- Cond NoExtendedWaitTime
    nonCriticalExtension                SEQUENCE {}                     OPTIONAL
}

ReleaseCause-NB-r13 ::=                 ENUMERATED {loadBalancingTAUrequired, other,
                                                    rrc-Suspend, spare1}
RedirectedCarrierInfo-NB-r13::=         CarrierFreq-NB-r13

RedirectedCarrierInfo-NB-v1430  ::=     SEQUENCE {
    redirectedCarrierOffsetDedicated-r14    ENUMERATED{
                                                dB1, dB2, dB3, dB4, dB5, dB6, dB8, dB10,
                                                dB12, dB14, dB16, dB18, dB20, dB22, dB24, dB26},
    t322-r14                                ENUMERATED{
                                                min5, min10, min20, min30, min60, min120, min180,
                                                spare1}
}

-- ASN1STOP
```


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***RRCConnectionRelease-NB* field descriptions**
extendedWaitTime Value in seconds.
extendedWaitTime-CPdata Wait time for data transfer using the Control Plane CIoT EPS optimisation. Value in seconds. See TS 24.301 [35].
redirectedCarrierInfo The r*edirectedCarrierInfo* indicates a carrier frequency (downlink for FDD) and is used to redirect the UE to a NB-IoT carrier frequency, by means of the cell selection upon leaving RRC_CONNECTED as specified in TS 36.304 [4].
redirectedCarrierOffsetDedicated Parameter "$Qoffsetdedicated_{frequency}$" in TS 36.304 [4]. For NB-IoT carrier frequencies, a UE that supports multi-band cells considers the *redirectedCarrierOffsetDedicated* to be common for all overlapping bands (i.e. regardless of the EARFCN that is used).
releaseCause The *releaseCause* is used to indicate the reason for releasing the RRC Connection. E-UTRAN should not set the *releaseCause* to *loadBalancingTAURequired* if the *extendedWaitTime* is present.
t322 Timer T322 as described in section 7.3. Value minN corresponds to N minutes.

Conditional presence	Explanation
NoExtendedWaitTime	The field is optionally present, need ON, if the *extendedWaitTime* is not included; otherwise the field is not present.
Redirection	The field is optionally present, need ON, if *redirectedCarrierInfo* is included; otherwise the field is not present.

– *RRCConnectionRequest-NB*

The *RRCConnectionRequest-NB* message is used to request the establishment of an RRC connection.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: UE to E-UTRAN

***RRCConnectionRequest-NB* message**

```
-- ASN1START

RRCConnectionRequest-NB ::=     SEQUENCE {
    criticalExtensions                  CHOICE {
        rrcConnectionRequest-r13            RRCConnectionRequest-NB-r13-IEs,
        criticalExtensionsFuture            SEQUENCE {}
    }
}

RRCConnectionRequest-NB-r13-IEs ::=     SEQUENCE {
    ue-Identity-r13                         InitialUE-Identity,
    establishmentCause-r13                  EstablishmentCause-NB-r13,
    multiToneSupport-r13                    ENUMERATED {true}               OPTIONAL,
    multiCarrierSupport-r13                 ENUMERATED {true}               OPTIONAL,
    spare                                   BIT STRING (SIZE (22))
}

-- ASN1STOP
```


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***RRCConnectionRequest-NB* field descriptions**
establishmentCause Provides the establishment cause for the RRC connection request as provided by the upper layers. eNB is not expected to reject a *RRCConnectionRequest* due to unknown cause value being used by the UE.
multiCarrierSupport If present, this field indicates that the UE supports multi-carrier operation.
multiToneSupport If present, this field indicates that the UE supports UL multi-tone transmissions on NPUSCH.
ue-Identity UE identity included to facilitate contention resolution by lower layers.

– *RRCConnectionResume-NB*

The *RRCConnectionResume-NB* message is used to resume the suspended RRC connection.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

***RRCConnectionResume-NB* message**

```
-- ASN1START

RRCConnectionResume-NB ::=      SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            rrcConnectionResume-r13             RRCConnectionResume-NB-r13-IEs,
            spare1                              NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

RRCConnectionResume-NB-r13-IEs ::=      SEQUENCE {
    radioResourceConfigDedicated-r13        RadioResourceConfigDedicated-NB-r13 OPTIONAL,       --
Need ON
    nextHopChainingCount-r13                NextHopChainingCount,
    drb-ContinueROHC-r13                    ENUMERATED {true}               OPTIONAL,   -- Need OP
    lateNonCriticalExtension                OCTET STRING                    OPTIONAL,
    nonCriticalExtension                    SEQUENCE {}                     OPTIONAL
}

-- ASN1STOP
```

***RRCConnectionResume-NB* field descriptions**
drb-ContinueROHC This field indicates whether to continue or reset the header compression protocol context for the DRBs configured with the header compression protocol. Presence of the field indicates that the header compression protocol context continues while absence indicates that the header compression protocol context is reset.

– *RRCConnectionResumeComplete-NB*

The *RRCConnectionResumeComplete-NB* message is used to confirm the successful completion of an RRC connection resumption

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Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

RRCConnectionResumeComplete-NB message

```
-- ASN1START

RRCConnectionResumeComplete-NB ::= SEQUENCE {
    rrc-TransactionIdentifier              RRC-TransactionIdentifier,
    criticalExtensions                         CHOICE {
        rrcConnectionResumeComplete-r13            RRCConnectionResumeComplete-NB-r13-IEs,
        criticalExtensionsFuture                   SEQUENCE {}
    }
}

RRCConnectionResumeComplete-NB-r13-IEs ::= SEQUENCE {
    selectedPLMN-Identity-r13                  INTEGER (1..maxPLMN-r11)    OPTIONAL,
    dedicatedInfoNAS-r13                       DedicatedInfoNAS    OPTIONAL,
    lateNonCriticalExtension                   OCTET STRING                    OPTIONAL,
    nonCriticalExtension                       SEQUENCE {}                     OPTIONAL
}

-- ASN1STOP
```

RRCConnectionResumeComplete-NB field descriptions
selectedPLMN-Identity   Index of the PLMN selected by the UE from the *plmn-IdentityList* included in *SystemInformationBlockType1-NB*. 1 if the 1st PLMN is selected from the *plmn-IdentityList* included in SIB1-NB, 2 if the 2nd PLMN is selected from the *plmn-IdentityList* included in SIB1-NB and so on.

– *RRCConnectionResumeRequest-NB*

The *RRCConnectionResumeRequest-NB* message is used to request the resumption of a suspended RRC connection.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: UE to E-UTRAN

RRCConnectionResumeRequest-NB message

```
-- ASN1START

RRCConnectionResumeRequest-NB ::=   SEQUENCE {
    criticalExtensions                     CHOICE {
        rrcConnectionResumeRequest-r13         RRCConnectionResumeRequest-NB-r13-IEs,
        criticalExtensionsFuture               SEQUENCE {}
    }
}

RRCConnectionResumeRequest-NB-r13-IEs ::=   SEQUENCE {
    resumeID-r13                               ResumeIdentity-r13,
    shortResumeMAC-I-r13                           ShortMAC-I,
    resumeCause-r13                            EstablishmentCause-NB-r13,
    spare                                      BIT STRING (SIZE (9))
}

-- ASN1STOP
```


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***RRCConnectionResumeRequest-NB* field descriptions**
resumeCause   Provides the resume cause for the RRC connection resume request as provided by the upper layers.   eNB is not expected to reject a *RRCConnectionResumeRequest* due to unknown cause value being used by the UE.
resumeID   UE identity to facilitate UE context retrieval at eNB.
shortResumeMAC-I   Authentication token to facilitate UE authentication at eNB.

– *RRCConnectionSetup-NB*

The *RRCConnectionSetup-NB* message is used to establish SRB1 and SRB1bis.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: E-UTRAN to UE

RRCConnectionSetup-NB message

```
-- ASN1START

RRCConnectionSetup-NB ::=       SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            rrcConnectionSetup-r13              RRCConnectionSetup-NB-r13-IEs,
            spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

RRCConnectionSetup-NB-r13-IEs ::=       SEQUENCE {
    radioResourceConfigDedicated-r13        RadioResourceConfigDedicated-NB-r13,
    lateNonCriticalExtension                OCTET STRING                        OPTIONAL,
    nonCriticalExtension                    SEQUENCE {}                         OPTIONAL
}

-- ASN1STOP
```

– *RRCConnectionSetupComplete-NB*

The *RRCConnectionSetupComplete-NB* message is used to confirm the successful completion of an RRC connection establishment.

Signalling radio bearer: SRB1bis

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

RRCConnectionSetupComplete-NB message

```
-- ASN1START

RRCConnectionSetupComplete-NB ::=   SEQUENCE {
    rrc-TransactionIdentifier               RRC-TransactionIdentifier,
    criticalExtensions                      CHOICE{
            rrcConnectionSetupComplete-r13      RRCConnectionSetupComplete-NB-r13-IEs,
            criticalExtensionsFuture            SEQUENCE {}
    }
}
```


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```
RRCConnectionSetupComplete-NB-r13-IEs ::= SEQUENCE {
    selectedPLMN-Identity-r13               INTEGER (1..maxPLMN-r11),
    s-TMSI-r13                              S-TMSI                          OPTIONAL,
    registeredMME-r13                       RegisteredMME                   OPTIONAL,
    dedicatedInfoNAS-r13                    DedicatedInfoNAS,
    attachWithoutPDN-Connectivity-r13       ENUMERATED {true}               OPTIONAL,
    up-CIoT-EPS-Optimisation-r13            ENUMERATED {true}               OPTIONAL,
    lateNonCriticalExtension                OCTET STRING                    OPTIONAL,
    nonCriticalExtension                    RRCConnectionSetupComplete-NB-v1430-IEs OPTIONAL
}

RRCConnectionSetupComplete-NB-v1430-IEs ::= SEQUENCE {
    gummei-Type-r14                             ENUMERATED { mapped}    OPTIONAL,
    dcn-ID-r14                                  INTEGER (0..65535)          OPTIONAL,
    nonCriticalExtension                        SEQUENCE {}                 OPTIONAL
}

-- ASN1STOP
```

***RRCConnectionSetupComplete-NB* field descriptions**
attachWithoutPDN-Connectivity This field is used to indicate that the UE performs an Attach without PDN connectivity procedure, as indicated by the upper layers, TS 24.301 [35].
dcn-ID The Dedicated Core Network Identity, see TS 23.401 [41].
gummei-Type This field is used to indicate that the GUMMEI included is mapped (from 2G/3G identifiers) as indicated by the upper layers, TS 24.301 [35].
registeredMME This field is used to transfer the GUMMEI of the MME where the UE is registered, as provided by upper layers.
selectedPLMN-Identity Index of the PLMN selected by the UE from the *plmn-IdentityList* included in *SystemInformationBlockType1-NB*. 1 if the 1st PLMN is selected from the *plmn-IdentityList* included in SIB1, 2 if the 2nd PLMN is selected from the *plmn-IdentityList* included in SIB1 and so on.
up-CIoT-EPS-Optimisation This field is included when the UE supports S1-U data transfer or the User plane CIoT EPS Optimisation, as indicated by the upper layers, see TS 24.301 [35].

– *SCPTMConfiguration-NB*

The *SCPTMConfiguration-NB* message contains the control information applicable for MBMS services transmitted via SC-MRB.

Signalling radio bearer: N/A

RLC-SAP: UM

Logical channel: SC-MCCH

Direction: E-UTRAN to UE

SCPTMConfiguration-NB message

```
-- ASN1START

SCPTMConfiguration-NB-r14 ::=   SEQUENCE {
    sc-mtch-InfoList-r14            SC-MTCH-InfoList-NB-r14,
    scptm-NeighbourCellList-r14     SCPTM-NeighbourCellList-NB-r14      OPTIONAL,   -- Need OP
    lateNonCriticalExtension        OCTET STRING                        OPTIONAL,
    nonCriticalExtension            SEQUENCE {}                         OPTIONAL
}

-- ASN1STOP
```


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SCPTMConfiguration-NB field descriptions
sc-mtch-InfoList Provides the configuration of each SC-MTCH in the current cell.
scptm-NeighbourCellList List of neighbour cells providing MBMS services via SC-MRB. When absent, the UE shall assume that MBMS services listed in the *SCPTMConfiguration-NB* message are not provided via SC-MRB in any neighbour cell.

– *SystemInformation-NB*

The *SystemInformation-NB* message is used to convey one or more System Information Blocks. All the SIBs included are transmitted with the same periodicity.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: BCCH

Direction: E-UTRAN to UE

***SystemInformation-NB* message**

```
-- ASN1START

SystemInformation-NB ::=        SEQUENCE {
    criticalExtensions                  CHOICE {
        systemInformation-r13               SystemInformation-NB-r13-IEs,
        criticalExtensionsFuture            SEQUENCE {}
    }
}
SystemInformation-NB-r13-IEs ::=    SEQUENCE {
    sib-TypeAndInfo-r13                 SEQUENCE (SIZE (1..maxSIB)) OF CHOICE {
        sib2-r13                            SystemInformationBlockType2-NB-r13,
        sib3-r13                            SystemInformationBlockType3-NB-r13,
        sib4-r13                            SystemInformationBlockType4-NB-r13,
        sib5-r13                            SystemInformationBlockType5-NB-r13,
        sib14-r13                           SystemInformationBlockType14-NB-r13,
        sib16-r13                           SystemInformationBlockType16-NB-r13,
        ...,
        sib15-v1430                         SystemInformationBlockType15-NB-r14,
        sib20-v1430                         SystemInformationBlockType20-NB-r14,
        sib22-v1430                         SystemInformationBlockType22-NB-r14
    },
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
}

-- ASN1STOP
```

– *SystemInformationBlockType1-NB*

The *SystemInformationBlockType1-NB* message contains information relevant when evaluating if a UE is allowed to access a cell and defines the scheduling of other system information.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: BCCH

Direction: E-UTRAN to UE

***SystemInformationBlockType1-NB* message**

```
-- ASN1START

SystemInformationBlockType1-NB ::=  SEQUENCE {
    hyperSFN-MSB-r13                    BIT STRING (SIZE (8)),
```


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```
    cellAccessRelatedInfo-r13           SEQUENCE {
        plmn-IdentityList-r13               PLMN-IdentityList-NB-r13,
        trackingAreaCode-r13                TrackingAreaCode,
        cellIdentity-r13                    CellIdentity,
        cellBarred-r13                      ENUMERATED {barred, notBarred},
        intraFreqReselection-r13            ENUMERATED {allowed, notAllowed}
    },
    cellSelectionInfo-r13               SEQUENCE {
        q-RxLevMin-r13                      Q-RxLevMin,
        q-QualMin-r13                       Q-QualMin-r9
    },
    p-Max-r13                           P-Max                   OPTIONAL,   -- Need OP
    freqBandIndicator-r13               FreqBandIndicator-NB-r13,
    freqBandInfo-r13                    NS-PmaxList-NB-r13              OPTIONAL,   -- Need OR
    multiBandInfoList-r13               MultiBandInfoList-NB-r13        OPTIONAL,   -- Need OR
    downlinkBitmap-r13                  DL-Bitmap-NB-r13                OPTIONAL,   -- Need OP,
    eutraControlRegionSize-r13          ENUMERATED {n1, n2, n3}         OPTIONAL,   -- Cond inband
    nrs-CRS-PowerOffset-r13             ENUMERATED {dB-6,      dB-4dot77, dB-3,
                                                    dB-1dot77, dB0,       dB1,
                                                    dB1dot23,  dB2,       dB3,
                                                    dB4,       dB4dot23,  dB5,
                                                    dB6,       dB7,       dB8,
                                                    dB9}        OPTIONAL,   -- Cond inband-SamePCI
    schedulingInfoList-r13              SchedulingInfoList-NB-r13,
    si-WindowLength-r13                 ENUMERATED {ms160,  ms320,  ms480,  ms640,
                                                    ms960,  ms1280, ms1600, spare1},
    si-RadioFrameOffset-r13             INTEGER (1..15)     OPTIONAL,   -- Need OP
    systemInfoValueTagList-r13          SystemInfoValueTagList-NB-r13   OPTIONAL,   -- Need OR
    lateNonCriticalExtension            OCTET STRING                    OPTIONAL,
    nonCriticalExtension                SystemInformationBlockType1-NB-v1350    OPTIONAL
}

SystemInformationBlockType1-NB-v1350 ::=    SEQUENCE {
    cellSelectionInfo-v1350             CellSelectionInfo-NB-v1350  OPTIONAL,   -- Cond Qrxlevmin
    nonCriticalExtension                SystemInformationBlockType1-NB-v1430    OPTIONAL
}

SystemInformationBlockType1-NB-v1430 ::=    SEQUENCE {
    cellSelectionInfo-v1430             CellSelectionInfo-NB-v1430      OPTIONAL,   -- Need OR
    nonCriticalExtension                SystemInformationBlockType1-NB-v1450
    OPTIONAL
}

SystemInformationBlockType1-NB-v1450 ::= SEQUENCE {
    nrs-CRS-PowerOffset-v1450               ENUMERATED {dB-6,  dB-4dot77, dB-3,
                                                    dB-1dot77, dB0,       dB1,
                                                    dB1dot23,  dB2,       dB3,
                                                    dB4,       dB4dot23,  dB5,
                                                    dB6,       dB7,       dB8,
                                                    dB9}        OPTIONAL,   -- Cond inband-SamePCI-
ExceptAnchor
    nonCriticalExtension                SEQUENCE {}                 OPTIONAL
}

PLMN-IdentityList-NB-r13 ::=        SEQUENCE (SIZE (1..maxPLMN-r11)) OF PLMN-IdentityInfo-NB-r13

PLMN-IdentityInfo-NB-r13 ::=        SEQUENCE {
    plmn-Identity-r13                       PLMN-Identity,
    cellReservedForOperatorUse-r13          ENUMERATED {reserved, notReserved},
    attachWithoutPDN-Connectivity-r13       ENUMERATED {true}   OPTIONAL    -- Need OP
}

SchedulingInfoList-NB-r13 ::= SEQUENCE (SIZE (1..maxSI-Message-NB-r13)) OF SchedulingInfo-NB-r13

SchedulingInfo-NB-r13::=        SEQUENCE {
    si-Periodicity-r13              ENUMERATED {rf64, rf128, rf256, rf512,
                                                rf1024, rf2048, rf4096, spare},
    si-RepetitionPattern-r13        ENUMERATED {every2ndRF, every4thRF, every8thRF, every16thRF},
    sib-MappingInfo-r13             SIB-MappingInfo-NB-r13,
    si-TB-r13                       ENUMERATED {b56, b120, b208, b256, b328, b440, b552, b680}
}

SystemInfoValueTagList-NB-r13 ::=   SEQUENCE (SIZE (1.. maxSI-Message-NB-r13)) OF
                                        SystemInfoValueTagSI-r13

SIB-MappingInfo-NB-r13 ::=          SEQUENCE (SIZE (0..maxSIB-1)) OF SIB-Type-NB-r13

SIB-Type-NB-r13 ::=                 ENUMERATED {
```


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```
                                        sibType3-NB-r13, sibType4-NB-r13, sibType5-NB-r13,
                                        sibType14-NB-r13, sibType16-NB-r13, sibType15-NB-r14,
                                        sibType20-NB-r14, sibType22-NB-r14}

CellSelectionInfo-NB-v1350 ::=      SEQUENCE {
    delta-RxLevMin-v1350                INTEGER (-8..-1)
}

CellSelectionInfo-NB-v1430 ::=      SEQUENCE {
    powerClass14dBm-Offset-r14          ENUMERATED {dB-6, dB-3, dB3, dB6, dB9, dB12}    OPTIONAL, --
    Need OP
    ce-authorisationOffset-r14          ENUMERATED {dB5, dB10, dB15, dB20, dB25, dB30, dB35}
    OPTIONAL    --  Need OP
}

-- ASN1STOP
```


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***SystemInformationBlockType1-NB* field descriptions**
attachWithoutPDN-Connectivity If present, the field indicates that attach without PDN connectivity as specified in TS 24.301 [35] is supported for this PLMN.
ce-authorisationOffset Parameter "$Qoffset_{authorization}$" in TS 36.304 [4]. Value in dB. Value dB5 corresponds to 5 dB, dB10 corresponds to 10 dB and so on. If the field is absent, the value of 0 dB shall be used for "$Qoffset_{authorization}$".
cellBarred Barred means the cell is barred, as defined in TS 36.304 [4].
cellIdentity Indicates the cell identity.
cellReservedForOperatorUse As defined in TS 36.304 [4].
cellSelectionInfo Cell selection information as specified in TS 36.304 [4].
downlinkBitmap NB-IoT downlink subframe configuration for downlink transmission. If the bitmap is not present, the UE shall assume that all subframes are valid (except for subframes carrying NPSS/NSSS/NPBCH/SIB1-NB) as specified in TS 36.213 [23, 16.4].
eutraControlRegionSize Indicates the control region size of the E-UTRA cell for the in-band operation mode, see TS 36.213 [23]. Unit is in number of OFDM symbols.
freqBandInfo A list of *additionalPmax* and *additionalSpectrumEmission* values as defined in TS 36.101 [42, 6.2.4F] for the frequency band in *freqBandIndicator*.
hyperSFN-MSB Indicates the 8 most significant bits of hyper-SFN. Together with hyperSFN-LSB in MIB-NB, the complete hyper-SFN is built up. hyper-SFN is incremented by one when the SFN wraps around.
intraFreqReselection Used to control cell reselection to intra-frequency cells when the highest ranked cell is barred, or treated as barred by the UE, as specified in TS 36.304 [4].
multiBandInfoList A list of additional frequency band indicators, *additionalPmax* and *additionalSpectrumEmission* values, as defined in TS 36.101 [42, table 5.5-1]. If the UE supports the frequency band in the *freqBandIndicator* IE it shall apply that frequency band. Otherwise, the UE shall apply the first listed band which it supports in the *multiBandInfoList* IE.
nrs-CRS-PowerOffset NRS power offset between NRS and E-UTRA CRS, see TS 36.213 [23, 16.2.2]. Unit in dB. Default value of 0.
plmn-IdentityList List of PLMN identities. The first listed *PLMN-Identity* is the primary PLMN.
powerClass14dBm-Offset Parameter "Poffset" in TS 36.304 [4]. Only applicable for UE supporting *powerClassNB-14dBm*. Value in dB. Value dB-6 corresponds to -6 dB, dB-3 corresponds to -3 dB and so on. If the fied is absent, the UE applies the (default) value of 0 dB for "Poffset" in TS 36.304 [4].
p-Max Value applicable for the cell. If absent the UE applies the maximum power according to the UE capability.
q-QualMin Parameter "$Q_{qualmin}$" in TS 36.304 [4].
q-RxLevMin, delta-RxLevMin Parameter $Q_{rxlevmin}$ in TS 36.304 [4]. If *delta-RxLevMin* is not included, actual value $Q_{rxlevmin}$ = *q-RxLevMin* * 2 [dBm]. If *delta-RxLevMin* is included, actual value $Q_{rxlevmin}$ = (*q-RxLevMin* + *delta-RxLevMin*) * 2 [dBm].
schedulingInfoList Indicates additional scheduling information of SI messages.
si-Periodicity Periodicity of the SI-message in radio frames, such that rf256 denotes 256 radio frames, rf512 denotes 512 radio frames, and so on.
si-RadioFrameOffset Offset in number of radio frames to calculate the start of the SI window. If the field is absent, no offset is applied.
si-RepetitionPattern Indicates the starting radio frames within the SI window used for SI message transmission. Value every2ndRF corresponds to every 2 radio frames, value every4thRF corresponds to every 4 radio frames and so on. The first transmission of the SI message is transmitted from the first radio frame of the SI window.

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***SystemInformationBlockType1-NB* field descriptions**
si-TB This field indicates the transport block size in number of bits and the corresponding number of consecutive NB-IoT downlink subframes that are used to broadcast the SI message. Value b56 corresponds to 56 bits, b120 corresponds to 120 bits and so on. TBS of 56 bits and 120 bits are transmitted over 2 sub-frames, other TBS are transmitted over 8 sub-frames, see TS 36.213 [23, Table 16.4.1.5.1-1].
si-WindowLength Common SI scheduling window for all SIs. Unit in milliseconds, where ms160 denotes 160 milliseconds, ms320 denotes 320 milliseconds and so on.
sib-MappingInfo List of the SIBs mapped to this *SystemInformation* message. There is no mapping information of SIB2-NB; it is always present in the first *SystemInformation* message listed in the *schedulingInfoList* list.
systemInfoValueTagList Indicates SI message specific value tags. It includes the same number of entries, and listed in the same order, as in SchedulingInfoList.
systemInfoValueTagSI SI message specific value tag as specified in Clause 5.2.1.3. Common for all SIBs within the SI message other than SIB14-NB.
trackingAreaCode A *trackingAreaCode* that is common for all the PLMNs listed.

Conditional presence	Explanation
inband	The field is mandatory present if IE *operationModeInfo* in MIB-NB is set to *inband-SamePCI* or *inband-DifferentPCI*. Otherwise the field is not present.
inband-SamePCI	The field is mandatory present, if IE *operationModeInfo* in MIB-NB is set *to inband-SamePCI*. Otherwise the field is not present.
inband-SamePCI-ExceptAnchor	The field is optionally present if IE *operationModeInfo* in MIB-NB is set to a value other than *inband-SamePCI*, and at least one non-anchor carrier is inband carrier and uses the same PCI as the E-UTRA carrier. Otherwise the field is not present.
Qrxlevmin	This field is optionally present, Need OR, if *q-RxLevMin* is set to the minimum value. Otherwise the field is not present.

– *UECapabilityEnquiry-NB*

The *UECapabilityEnquiry-NB* message is used to request the transfer of UE radio access capabilities for NB-IoT.

Signalling radio bearer: SRB1 or SRB1bis

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

***UECapabilityEnquiry-NB* message**

```
-- ASN1START

UECapabilityEnquiry-NB ::=  SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            ueCapabilityEnquiry-r13             UECapabilityEnquiry-NB-r13-IEs,
            spare1                              NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

UECapabilityEnquiry-NB-r13-IEs ::=  SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
}

-- ASN1STOP
```


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– *UECapabilityInformation-NB*

The *UECapabilityInformation-NB* message is used to transfer of UE radio access capabilities requested by the E-UTRAN.

Signalling radio bearer: SRB1 or SRB1bis

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

UECapabilityInformation-NB message

```
-- ASN1START

UECapabilityInformation-NB ::=  SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE{
            ueCapabilityInformation-r13     UECapabilityInformation-NB-r13-IEs,
            criticalExtensionsFuture        SEQUENCE {}
    }
}

UECapabilityInformation-NB-r13-IEs ::=  SEQUENCE {
    ue-Capability-r13                   UE-Capability-NB-r13,
    ue-RadioPagingInfo-r13              UE-RadioPagingInfo-NB-r13,
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                UECapabilityInformation-NB-Ext-r14-IEs
        OPTIONAL
}

UECapabilityInformation-NB-Ext-r14-IEs ::=  SEQUENCE {
    ue-Capability-ContainerExt-r14          OCTET STRING (CONTAINING UE-Capability-NB-Ext-r14-IEs),
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
}

-- ASN1STOP
```

***UECapabilityInformation-NB* field descriptions**
ue-RadioPagingInfo   This field contains UE capability information used for paging.

– *ULInformationTransfer-NB*

The *ULInformationTransfer-NB* message is used for the uplink transfer of NAS information.

Signalling radio bearer: SRB1 or SRB1bis

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

ULInformationTransfer-NB message

```
-- ASN1START

ULInformationTransfer-NB ::=    SEQUENCE {
    criticalExtensions                  CHOICE {
            ulInformationTransfer-r13       ULInformationTransfer-NB-r13-IEs,
            criticalExtensionsFuture        SEQUENCE {}
    }
}

ULInformationTransfer-NB-r13-IEs ::=    SEQUENCE {
    dedicatedInfoNAS-r13                    DedicatedInfoNAS,
```


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```
    lateNonCriticalExtension                OCTET STRING                    OPTIONAL,
    nonCriticalExtension                    SEQUENCE {}                     OPTIONAL
}

-- ASN1STOP
```

6.7.3 NB-IoT information elements

6.7.3.1 NB-IoT System information blocks

– *SystemInformationBlockType2-NB*

The IE *SystemInformationBlockType2-NB* contains radio resource configuration information that is common for all UEs.

NOTE: UE timers and constants related to functionality for which parameters are provided in another SIB are included in the corresponding SIB.

***SystemInformationBlockType2-NB* information element**

```
-- ASN1START

SystemInformationBlockType2-NB-r13 ::=  SEQUENCE {
    radioResourceConfigCommon-r13           RadioResourceConfigCommonSIB-NB-r13,
    ue-TimersAndConstants-r13               UE-TimersAndConstants-NB-r13,
    freqInfo-r13                            SEQUENCE {
        ul-CarrierFreq-r13                      CarrierFreq-NB-r13          OPTIONAL,   -- Need OP
        additionalSpectrumEmission-r13          AdditionalSpectrumEmission
    },
    timeAlignmentTimerCommon-r13            TimeAlignmentTimer,
    multiBandInfoList-r13   SEQUENCE (SIZE (1..maxMultiBands)) OF AdditionalSpectrumEmission
    OPTIONAL,   -- Need OR
    lateNonCriticalExtension                OCTET STRING                    OPTIONAL,
    ...,
    [[  cp-Reestablishment-r14              ENUMERATED {true}               OPTIONAL        -- Need
OP
    ]]
}

-- ASN1STOP
```

***SystemInformationBlockType2-NB* field descriptions**
additionalSpectrumEmission The UE requirements related to IE *AdditionalSpectrumEmission* are defined in TS 36.101 [42, 6.2.4F].
cp-Reestablishment This field indicates if the NB-IoT UE is allowed to trigger RRC connection re-establishment when AS security has not been activated.
multiBandInfoList A list of *additionalSpectrumEmission* i.e. one for each additional frequency band included in *multiBandInfoList* in *SystemInformationBlockType1-NB,* listed in the same order.
ul-CarrierFreq Uplink carrier frequency as defined in TS 36.101 [42, 5.7.3F]. If *operationModeInfo* in the MIB-NB is set to *standalone* and the field is absent, the value of the carrier frequency is determined by the TX-RX frequency separation defined in TS 36.101 [42, table 5.7.4-1] and the value of the carrier frequency offset is 0. If *operationModeInfo* in the MIB-NB is not set to *standalone,* the field is mandatory present.

– *SystemInformationBlockType3-NB*

The IE *SystemInformationBlockType3-NB* contains cell re-selection information common for intra-frequency, and inter-frequency cell re-selection as well as intra-frequency cell re-selection information other than neighbouring cell related.

***SystemInformationBlockType3-NB* information element**

```
-- ASN1START
```


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```
SystemInformationBlockType3-NB-r13 ::=  SEQUENCE {
    cellReselectionInfoCommon-r13           SEQUENCE {
        q-Hyst-r13                              ENUMERATED {
                                                    dB0, dB1, dB2, dB3, dB4, dB5, dB6, dB8, dB10,
                                                    dB12, dB14, dB16, dB18, dB20, dB22, dB24
                                                    }
    },
    cellReselectionServingFreqInfo-r13      SEQUENCE {
        s-NonIntraSearch-r13                    ReselectionThreshold
    },
    intraFreqCellReselectionInfo-r13        SEQUENCE {
        q-RxLevMin-r13                          Q-RxLevMin,
        q-QualMin-r13                           Q-QualMin-r9            OPTIONAL,   -- Need OP
        p-Max-r13                               P-Max                   OPTIONAL,   -- Need OP
        s-IntraSearchP-r13                      ReselectionThreshold,
        t-Reselection-r13                       T-Reselection-NB-r13
    },
    freqBandInfo-r13                        NS-PmaxList-NB-r13              OPTIONAL,   -- Need OR
    multiBandInfoList-r13                   SEQUENCE (SIZE (1..maxMultiBands)) OF
                                                NS-PmaxList-NB-r13          OPTIONAL,   -- Need OR
    lateNonCriticalExtension                    OCTET STRING                OPTIONAL,
    ...,
    [[  intraFreqCellReselectionInfo-v1350  IntraFreqCellReselectionInfo-NB-v1350 OPTIONAL  -- Cond
Qrxlevmin
    ]],
    [[  intraFreqCellReselectionInfo-v1360  IntraFreqCellReselectionInfo-NB-v1360 OPTIONAL  -- Need
OR
    ]],
    [[  intraFreqCellReselectionInfo-v1430  IntraFreqCellReselectionInfo-NB-v1430 OPTIONAL  -- Need
OR
    ]],
    [[  cellReselectionInfoCommon-v1450     CellReselectionInfoCommon-NB-v1450  OPTIONAL    -- Need
OR
    ]]
}

IntraFreqCellReselectionInfo-NB-v1350 ::=   SEQUENCE {
    delta-RxLevMin-v1350                        INTEGER (-8..-1)
}

IntraFreqCellReselectionInfo-NB-v1360 ::=   SEQUENCE {
    s-IntraSearchP-v1360                            ReselectionThreshold-NB-v1360
}

IntraFreqCellReselectionInfo-NB-v1430 ::=   SEQUENCE {
    powerClass14dBm-Offset-r14      ENUMERATED {dB-6, dB-3, dB3, dB6, dB9, dB12}    OPTIONAL,   --
Need OP
    ce-AuthorisationOffset-r14      ENUMERATED {dB5, dB10, dB15, dB20, dB25, dB30, dB35}    OPTIONAL
    -- Need OP
}

CellReselectionInfoCommon-NB-v1450 ::=  SEQUENCE {
    s-SearchDeltaP-r14                  ENUMERATED {dB6, dB9, dB12, dB15}
}

-- ASN1STOP
```


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SystemInformationBlockType3-NB field descriptions
ce-AuthorisationOffset Parameter "$Qoffset_{authorization}$" in TS 36.304 [4]. Value in dB. Value dB5 corresponds to 5 dB, dB10 corresponds to 10 dB and so on. If the field is absent, the UE applies the value of ce-*authorisationOffset* in *SystemInformationBlockType1-NB*.
multiBandInfoList A list of *additionalPmax* and *additionalSpectrumEmission* values as defined in TS 36.101 [42, 6.2.4F] applicable for the intra-frequency neighbouring NB-IoT cells if the UE selects the frequency band from *freqBandIndicator* in *SystemInformationBlockType1-NB*.
powerClass14dBm-Offset Parameter "Poffset" in TS 36.304 [4], only applicable for UE supporting *powerClassNB-14dBm*. Value in dB. Value dB-6 corresponds to -6 dB, dB-3 corresponds to -3 dB and so on. If the field is absent, the UE applies the (default) value of 0 dB for "Poffset" in TS 36.304 [4].
p-Max Value applicable for the intra-frequency neighbouring E-UTRA cells. If absent the UE applies the maximum power according to the UE capability.
q-Hyst Parameter Q_{hyst} in TS 36.304 [4], Value in dB. Value dB1 corresponds to 1 dB, dB2 corresponds to 2 dB and so on.
q-QualMin Parameter "$Q_{qualmin}$" in TS 36.304 [4], applicable for intra-frequency neighbour cells. If the field is not present, the UE applies the (default) value of negative infinity for $Q_{qualmin}$.
q-RxLevMin, delta-RxLevMin Parameter "$Q_{rxlevmin}$" in TS 36.304 [4], applicable for intra-frequency neighbour cells. If *delta-RxLevMin* is not included, actual value $Q_{rxlevmin}$ = *q-RxLevMin* * 2 [dBm]. If *delta-RxLevMin* is included, actual value $Q_{rxlevmin}$ = (*q-RxLevMin* + *delta-RxLevMin*) * 2 [dBm].
s-IntraSearchP Parameter "$S_{IntraSearchP}$" in TS 36.304 [4]. In case *s-IntraSearchP-v1360* is included, the UE shall ignore *s-IntraSearchP* (i.e. without suffix).
s-NonIntraSearch Parameter "$S_{nonIntraSearchP}$" in TS 36.304 [4].
s-SearchDeltaP Parameter "$S_{SearchDeltaP}$" in TS 36.304 [4]. This parameter is only applicable for UEs supporting relaxed monitoring as specified in TS 36.306 [5]. Value dB6 corresponds to 6 dB, dB9 corresponds to 9 dB and so on.
t-Reselection Parameter "$Treselection_{NB\text{-}IoT\_Intra}$" in TS 36.304 [4].

Conditional presence	Explanation
Qrxlevmin	This field is optionally present, Need OR, if *q-RxLevMin* is set to the minimum value. Otherwise the field is not present.

– *SystemInformationBlockType4-NB*

The IE *SystemInformationBlockType4-NB* contains neighbouring cell related information relevant only for intra-frequency cell re-selection. The IE includes cells with specific re-selection parameters.

SystemInformationBlockType4-NB information element

```
-- ASN1START

SystemInformationBlockType4-NB-r13 ::=      SEQUENCE {
    intraFreqNeighCellList-r13          IntraFreqNeighCellList  OPTIONAL,   -- Need OR
    intraFreqBlackCellList-r13          IntraFreqBlackCellList  OPTIONAL,   -- Need OR
    lateNonCriticalExtension            OCTET STRING            OPTIONAL,
    ...
}


-- ASN1STOP
```

SystemInformationBlockType4-NB field descriptions
intraFreqBlackCellList List of blacklisted intra-frequency neighbouring cells.
intraFreqNeighCellList List of intra-frequency neighbouring cellswith specific cell re-selection parameters.

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– *SystemInformationBlockType5-NB*

The IE *SystemInformationBlockType5-NB* contains information relevant only for inter-frequency cell re-selection i.e. information about other NB-IoT frequencies and inter-frequency neighbouring cells relevant for cell re-selection. The IE includes cell re-selection parameters common for a frequency.

SystemInformationBlockType5-NB information element

```
-- ASN1START

SystemInformationBlockType5-NB-r13 ::=  SEQUENCE {
    interFreqCarrierFreqList-r13            InterFreqCarrierFreqList-NB-r13,
    t-Reselection-r13                       T-Reselection-NB-r13,
    lateNonCriticalExtension                OCTET STRING                    OPTIONAL,
    ...,
    [[  scptm-FreqOffset-r14                INTEGER (1..8)                  OPTIONAL    -- Need OP
    ]]
}


InterFreqCarrierFreqList-NB-r13 ::=     SEQUENCE (SIZE (1..maxFreq)) OF InterFreqCarrierFreqInfo-NB-
r13


InterFreqCarrierFreqInfo-NB-r13 ::= SEQUENCE {
    dl-CarrierFreq-r13                  CarrierFreq-NB-r13,
    q-RxLevMin-r13                      Q-RxLevMin,
    q-QualMin-r13                       Q-QualMin-r9                    OPTIONAL,       -- Need OP
    p-Max-r13                           P-Max                           OPTIONAL,       -- Need OP
    q-OffsetFreq-r13                    Q-OffsetRange                   DEFAULT dB0,
    interFreqNeighCellList-r13          InterFreqNeighCellList-NB-r13   OPTIONAL,       -- Need OR
    interFreqBlackCellList-r13          InterFreqBlackCellList-NB-r13   OPTIONAL,       -- Need OR
    multiBandInfoList-r13               MultiBandInfoList-NB-r13        OPTIONAL,       -- Need OR
    ...,
    [[  delta-RxLevMin-v1350            INTEGER (-8..-1)        OPTIONAL    -- Cond Qrxlevmin
    ]],
    [[  powerClass14dBm-Offset-r14      ENUMERATED {dB-6, dB-3, dB3, dB6, dB9, dB12}
OPTIONAL,   --  Need OP
        ce-AuthorisationOffset-r14      ENUMERATED {dB5, dB10, dB15, dB20, dB25, dB30, dB35}
    OPTIONAL    -- Need OP
    ]]
}

InterFreqNeighCellList-NB-r13 ::=       SEQUENCE (SIZE (1..maxCellInter)) OF PhysCellId


InterFreqBlackCellList-NB-r13 ::=       SEQUENCE (SIZE (1..maxCellBlack)) OF PhysCellId


-- ASN1STOP
```


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***SystemInformationBlockType5-NB* field descriptions**
ce-AuthorisationOffset Parameter "$Qoffset_{authorization}$" in TS 36.304 [4]. Value in dB. Value dB5 corresponds to 5 dB, dB10 corresponds to 10 dB and so on. If the field is absent, the UE applies the value of ce-*authorisationOffset* in *SystemInformationBlockType1-NB*.
p-Max Value applicable for the neighbouring NB-IoT cells on this carrier frequency. If absent the UE applies the maximum power according to the UE capability.
interFreqBlackCellList List of blacklisted inter-frequency neighbouring cells.
interFreqCarrierFreqList List of neighbouring inter-frequencies. E-UTRAN does not configure more than one entry for the same physical frequency regardless of the E-ARFCN used to indicate this.
interFreqNeighCellList List of inter-frequency neighbouring cells.
multiBandInfoList Indicates the list of frequency bands, with the associated *additionalPmax* and *additionalSpectrumEmission* values as defined in TS 36.101 [42, 6.2.4], in addition to the band represented by dl-CarrierFreq for which cell reselection parameters are common.
powerClass14dBm-Offset Parameter "Poffset" in TS 36.304 [4], only applicable for UE supporting *powerClassNB-14dBm*. Value in dB. Value dB-6 corresponds to -6 dB, dB-3 corresponds to -3 dB and so on. If the field is absent, the UE applies the (default) value of 0 dB for "Poffset" in TS 36.304 [4]
q-OffsetFreq Parameter "$Qoffset_{frequency}$" in TS 36.304 [4].
q-QualMin Parameter "$Q_{qualmin}$" in TS 36.304 [4]. If the field is not present, the UE applies the (default) value of negative infinity for $Q_{qualmin}$.
q-RxlevMin, delta-RxLevMin Parameter "$Q_{RxLevmin}$" in TS 36.304 [4]. If *delta-RxLevMin* is not included, actual value $Q_{rxlevmin}$ = *q-RxLevMin* * 2 [dBm]. If *delta-RxLevMin* is included, actual value $Q_{rxlevmin}$ = (*q-RxLevMin* + *delta-RxLevMin*) * 2 [dBm].
scptm-FreqOffset Parameter $Qoffset_{SCPTM}$ in TS 36.304 [4]. Actual value $Qoffset_{SCPTM}$ = field value * 2 [dB]. If the field is absent, the UE uses infinite dBs for the SC-PTM frequency offset with cell ranking as specified in TS 36.304 [4].
t-Reselection Parameter "$Treselection_{NB\text{-}IoT\_Inter}$" in TS 36.304 [4].

Conditional presence	Explanation
Qrxlevmin	This field is optionally present, Need OR, if *q-RxLevMin* is set to the minimum value. Otherwise the field is not present.

– *SystemInformationBlockType14-NB*

The IE *SystemInformationBlockType14-NB* contains the AB parameters.

***SystemInformationBlockType14-NB* information element**

```
-- ASN1START

SystemInformationBlockType14-NB-r13 ::= SEQUENCE {
    ab-Param-r13                    CHOICE {
        ab-Common-r13                   AB-Config-NB-r13,
        ab-PerPLMN-List-r13             SEQUENCE (SIZE (1..maxPLMN-r11)) OF AB-ConfigPLMN-NB-r13
    }                                                                   OPTIONAL, -- Need OR
    lateNonCriticalExtension        OCTET STRING                        OPTIONAL,
    ...
}

AB-ConfigPLMN-NB-r13 ::=    SEQUENCE {
    ab-Config-r13                   AB-Config-NB-r13                    OPTIONAL -- Need OR
}

AB-Config-NB-r13 ::=        SEQUENCE {
    ab-Category-r13                 ENUMERATED {a, b, c},
    ab-BarringBitmap-r13            BIT STRING (SIZE(10)),
    ab-BarringForExceptionData-r13  ENUMERATED {true}                   OPTIONAL,   -- Need OP
```


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```
    ab-BarringForSpecialAC-r13      BIT STRING (SIZE(5))
}

-- ASN1STOP
```

***SystemInformationBlockType14-NB* field descriptions**
ab-BarringBitmap Access class barring for AC 0-9. The first/ leftmost bit is for AC 0, the second bit is for AC 1, and so on.
ab-BarringForExceptionData Indicates whether ExceptionData is subject to access barring.
ab-BarringForSpecialAC Access class barring for AC 11-15. The first/ leftmost bit is for AC 11, the second bit is for AC 12, and so on.
ab-Category Indicates the category of UEs for which AB applies. Value *a* corresponds to all UEs, value *b* corresponds to the UEs that are neither in their HPLMN nor in a PLMN that is equivalent to it, and value *c* corresponds to the UEs that are neither in the PLMN listed as most preferred PLMN of the country where the UEs are roaming in the operator-defined PLMN selector list on the USIM, nor in their HPLMN nor in a PLMN that is equivalent to their HPLMN, see TS 22.011 [10].
ab-Common The AB parameters applicable for all PLMN(s).
ab-PerPLMN-List The AB parameters per PLMN, listed in the same order as the PLMN(s) occur in *plmn-IdentityList* in *SystemInformationBlockType1-NB*.

– *SystemInformationBlockType15-NB*

The IE *SystemInformationBlockType15-NB* contains the MBMS Service Area Identities (SAI) of the current and/ or neighbouring carrier frequencies.

***SystemInformationBlockType15-NB* information element**

```
-- ASN1START

SystemInformationBlockType15-NB-r14 ::= SEQUENCE {
    mbms-SAI-IntraFreq-r14                  MBMS-SAI-List-r11               OPTIONAL,   -- Need OR
    mbms-SAI-InterFreqList-r14              MBMS-SAI-InterFreqList-NB-r14   OPTIONAL,   -- Need OR
    lateNonCriticalExtension                OCTET STRING                    OPTIONAL,
    ...
}

MBMS-SAI-InterFreqList-NB-r14 ::=       SEQUENCE (SIZE (1..maxFreq)) OF MBMS-SAI-InterFreq-NB-r14

MBMS-SAI-InterFreq-NB-r14 ::=           SEQUENCE {
    dl-CarrierFreq-r14                      CarrierFreq-NB-r13,
    mbms-SAI-List-r14                       MBMS-SAI-List-r11,
    multiBandInfoList-r14                   AdditionalBandInfoList-NB-r14   OPTIONAL    -- Need OR
}

-- ASN1STOP
```

***SystemInformationBlockType15-NB* field descriptions**
mbms-SAI-InterFreqList Contains a list of neighboring frequencies including additional frequency bands, if any, that provide MBMS services and the corresponding MBMS SAIs.
mbms-SAI-IntraFreq Contains the list of MBMS SAIs for the current frequency. A duplicate MBMS SAI indicates that this and all following SAIs are not offered by this cell but only by neighbour cells on the current frequency. For MBMS service continuity, the UE shall use all MBMS SAIs listed in *mbms-SAI-IntraFreq* to derive the MBMS frequencies of interest.
mbms-SAI-List Contains a list of MBMS SAIs for a specific frequency.
multiBandInfoList A list of additional frequency bands applicable for the cells participating in the SC-PTM transmission.

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– SystemInformationBlockType16-NB

The IE *SystemInformationBlockType16-NB* contains information related to GPS time and Coordinated Universal Time (UTC). The UE may use the parameters provided in this system information block to obtain the UTC, the GPS and the local time.

```
-- ASN1START

SystemInformationBlockType16-NB-r13 ::= SystemInformationBlockType16-r11

-- ASN1STOP
```

– SystemInformationBlockType20-NB

The IE *SystemInformationBlockType20-NB* contains the information required to acquire the control information associated with transmission of MBMS using SC-PTM.

SystemInformationBlockType20-NB information element

```
-- ASN1START

SystemInformationBlockType20-NB-r14 ::= SEQUENCE {
    npdcch-SC-MCCH-Config-r14               NPDCCH-SC-MCCH-Config-NB-r14,
    sc-mcch-CarrierConfig-r14               CHOICE {
        dl-CarrierConfig-r14                    DL-CarrierConfigCommon-NB-r14,
        dl-CarrierIndex-r14                     INTEGER (0.. maxNonAnchorCarriers-NB-r14)
    },
    sc-mcch-RepetitionPeriod-r14            ENUMERATED {rf32, rf128, rf512, rf1024,
                                                        rf2048, rf4096, rf8192, rf16384},
    sc-mcch-Offset-r14                      INTEGER (0..10),
    sc-mcch-ModificationPeriod-r14          ENUMERATED { rf32, rf128, rf256, rf512, rf1024,
                                                    rf2048, rf4096, rf8192, rf16384, rf32768,
                                                    rf65536, rf131072, rf262144, rf524288,
                                                    rf1048576, spare1},
    sc-mcch-SchedulingInfo-r14              SC-MCCH-SchedulingInfo-NB-r14       OPTIONAL,   -- Need
OP
    lateNonCriticalExtension                OCTET STRING                        OPTIONAL,
    ...
}

NPDCCH-SC-MCCH-Config-NB-r14 ::=    SEQUENCE {
    npdcch-NumRepetitions-SC-MCCH-r14       ENUMERATED {r1, r2, r4, r8, r16,
                                                        r32, r64, r128, r256,
                                                        r512, r1024, r2048},
    npdcch-StartSF-SC-MCCH-r14              ENUMERATED {v1dot5, v2, v4, v8,
                                                        v16, v32, v48, v64},
    npdcch-Offset-SC-MCCH-r14               ENUMERATED {zero, oneEighth, oneQuarter,
                                                        threeEighth, oneHalf, fiveEighth,
                                                        threeQuarter, sevenEighth}
}

SC-MCCH-SchedulingInfo-NB-r14::=    SEQUENCE    {
    onDurationTimerSCPTM-r14                    ENUMERATED {
                                                    pp1, pp2, pp3, pp4,
                                                    pp8, pp16, pp32, spare},
    drx-InactivityTimerSCPTM-r14                ENUMERATED {
                                                    pp0, pp1, pp2, pp3,
                                                    pp4, pp8, pp16, pp32},
    schedulingPeriodStartOffsetSCPTM-r14        CHOICE {
        sf10                                        INTEGER(0..9),
        sf20                                        INTEGER(0..19),
        sf32                                        INTEGER(0..31),
        sf40                                        INTEGER(0..39),
        sf64                                        INTEGER(0..63),
        sf80                                        INTEGER(0..79),
        sf128                                       INTEGER(0..127),
        sf160                                       INTEGER(0..159),
        sf256                                       INTEGER(0..255),
        sf320                                       INTEGER(0..319),
        sf512                                       INTEGER(0..511),
        sf640                                       INTEGER(0..639),
        sf1024                                      INTEGER(0..1023),
        sf2048                                      INTEGER(0..2047),
```


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```
        sf4096                                      INTEGER(0..4095),
        sf8192                                      INTEGER(0..8191)
    },
    ...
}

-- ASN1STOP
```

***SystemInformationBlockType20-NB* field descriptions**
dl-CarrierConfig Downlink carrier used for SC-MCCH.
dl-CarrierIndex Index to a downlink carrier signalled in system information. Value '0' corresponds to the anchor carrier, value '1' corresponds to the first entry in *dl-ConfigList* in *SystemInformationBlockType22-NB,* value '2' corresponds to the second entry in *dl-ConfigList* and so on.
drx-InactivityTimerSCPTM Timer for SC-MCCH reception in TS 36.321 [6]. Value in number of NPDCCH periods. Value pp1 corresponds to 1 NPDCCH period, pp2 corresponds to 2 NPDCCH periods and so on.
npdcch-NumRepetitions-SC-MCCH The maximum number of NPDCCH repetitions the UE needs to monitor for SC-MCCH multicast search space, see TS 36.213 [23].
npdcch-Offset-SC-MCCH Fractional period offset of starting subframe for NPDCCH multicast search space for SC-MCCH, see TS 36.213 [23].
npdcch-StartSF-SC-MCCH Starting subframes configuration of the NPDCCH multicast search space for SC-MCCH, see TS 36.213 [23].
onDurationTimerSCPTM Timer for SC-MCCH reception in TS 36.321 [6]. Value in number of NPDCCH periods. Value pp1 corresponds to 1 NPDCCH period, pp2 corresponds to 2 NPDCCH periods and so on.
schedulingPeriodStartOffsetSCPTM *SCPTM-SchedulingCycle* and *SCPTM-SchedulingOffset* in TS 36.321 [6]. The value of *SCPTM-SchedulingCycle* is in number of sub-frames. Value sf10 corresponds to 10 sub-frames, sf20 corresponds to 20 sub-frames and so on. The value of *SCPTM-SchedulingOffset* is in number of sub-frames.
sc-mcch-CarrierConfig Downlink carrier that is used for SC-MCCH.
sc-mcch-ModificationPeriod Defines periodically appearing boundaries, i.e. radio frames for which (H-SFN * 1024 +SFN) mod *sc-mcch-ModificationPeriod* = 0. The contents of different transmissions of SC-MCCH information can only be different if there is at least one such boundary in-between them. Value rf32 corresponds to 32 radio frames, value rf128 corresponds to 128 radio frames and so on.
sc-mcch-Offset Indicates, together with the sc-mcch-RepetitionPeriod, the boundary of the repetition period: (H-SFN * 1024 +SFN) mod *sc-mcch-RepetitionPeriod* = sc-mcch-Offset.
sc-mcch-RepetitionPeriod Defines the interval between transmissions of SC-MCCH information, in radio frames. Value rf32 corresponds to 32 radio frames, rf128 corresponds to 128 radio frames and so on.
sc-mcch-SchedulingInfo DRX information for the SC-MCCH. If the field is absent, DRX is not used for SC-MCCH reception.

– *SystemInformationBlockType22-NB*

The IE *SystemInformationBlockType22-NB* contains radio resource configuration for paging and random access procedure on non-anchor carriers.

SystemInformationBlockType22-NB information element

```
-- ASN1START

SystemInformationBlockType22-NB-r14 ::= SEQUENCE {
    dl-ConfigList-r14                   DL-ConfigCommonList-NB-r14   OPTIONAL,  -- Need OR
    ul-ConfigList-r14                   UL-ConfigCommonList-NB-r14   OPTIONAL,  -- Need OR
    pagingWeightAnchor-r14              PagingWeight-NB-r14         OPTIONAL,   -- Cond pcch-config
    nprach-ProbabilityAnchorList-r14    NPRACH-ProbabilityAnchorList-NB-r14 OPTIONAL,   -- Cond
nprach-config
    lateNonCriticalExtension            OCTET STRING                    OPTIONAL,
    ...
}
```


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```
DL-ConfigCommonList-NB-r14 ::=      SEQUENCE (SIZE (1.. maxNonAnchorCarriers-NB-r14)) OF
                                        DL-ConfigCommon-NB-r14

UL-ConfigCommonList-NB-r14 ::=      SEQUENCE (SIZE (1.. maxNonAnchorCarriers-NB-r14)) OF
                                        UL-ConfigCommon-NB-r14


DL-ConfigCommon-NB-r14 ::=          SEQUENCE {
    dl-CarrierConfig-r14                DL-CarrierConfigCommon-NB-r14,
    pcch-Config-r14                     PCCH-Config-NB-r14          OPTIONAL, -- Need OR
    ...
}

PCCH-Config-NB-r14 ::=              SEQUENCE {
    npdcch-NumRepetitionPaging-r14      ENUMERATED {
                                            r1, r2, r4, r8, r16, r32, r64, r128,
                                            r256, r512, r1024, r2048,
                                            spare4, spare3, spare2, spare1} OPTIONAL, -- Need OP
    pagingWeight-r14                    PagingWeight-NB-r14     DEFAULT w1,
    ...
}

PagingWeight-NB-r14 ::=             ENUMERATED {w1, w2, w3, w4, w5, w6, w7, w8,
                                            w9, w10, w11, w12, w13, w14, w15, w16}

UL-ConfigCommon-NB-r14 ::=          SEQUENCE {
    ul-CarrierFreq-r14                  CarrierFreq-NB-r13,
    nprach-ParametersList-r14           NPRACH-ParametersList-NB-r14    OPTIONAL, -- Need OR
    ...
}

NPRACH-ParametersList-NB-r14 ::=        SEQUENCE (SIZE (1.. maxNPRACH-Resources-NB-r13)) OF
                                            NPRACH-Parameters-NB-r14


NPRACH-Parameters-NB-r14 ::=            SEQUENCE {
    nprach-Parameters-r14                   SEQUENCE {
        nprach-Periodicity-r14                  ENUMERATED {ms40, ms80, ms160, ms240,
                                                            ms320, ms640, ms1280, ms2560}
                                                    OPTIONAL,   -- NEED OP
        nprach-StartTime-r14                    ENUMERATED {ms8, ms16, ms32, ms64,
                                                            ms128, ms256, ms512, ms1024}
                                                    OPTIONAL,   -- NEED OP
        nprach-SubcarrierOffset-r14             ENUMERATED {n0, n12, n24, n36, n2, n18, n34, spare1}
                                                    OPTIONAL,   -- NEED OP
        nprach-NumSubcarriers-r14               ENUMERATED {n12, n24, n36, n48}
                                                     OPTIONAL,  -- NEED OP
        nprach-SubcarrierMSG3-RangeStart-r14    ENUMERATED {zero, oneThird, twoThird, one}
                                                    OPTIONAL,   -- NEED OP
        npdcch-NumRepetitions-RA-r14            ENUMERATED {r1, r2, r4, r8, r16, r32, r64, r128,
                                                            r256, r512, r1024, r2048,
                                                            spare4, spare3, spare2, spare1}
                                                    OPTIONAL,   -- NEED OP
        npdcch-StartSF-CSS-RA-r14               ENUMERATED {v1dot5, v2, v4, v8, v16, v32, v48, v64}
                                                    OPTIONAL,   -- NEED OP
        npdcch-Offset-RA-r14                    ENUMERATED {zero, oneEighth, oneFourth, threeEighth}
                                                    OPTIONAL,   -- NEED OP
        nprach-NumCBRA-StartSubcarriers-r14     ENUMERATED {n8, n10, n11, n12, n20, n22, n23, n24,
                                                            n32, n34, n35, n36, n40, n44, n46, n48}
                                                    OPTIONAL,   -- NEED OP
        npdcch-CarrierIndex-r14                 INTEGER (1..maxNonAnchorCarriers-NB-r14)
                                                    OPTIONAL,   -- Need OP
        ...
    }   OPTIONAL    -- Need OR
}

NPRACH-ProbabilityAnchorList-NB-r14 ::= SEQUENCE (SIZE (1.. maxNPRACH-Resources-NB-r13)) OF
                                            NPRACH-ProbabilityAnchor-NB-r14

NPRACH-ProbabilityAnchor-NB-r14 ::=     SEQUENCE {
    nprach-ProbabilityAnchor-r14            ENUMERATED {
                                                zero, oneSixteenth, oneFifteenth, oneFourteenth,
                                                oneThirteenth, oneTwelfth, oneEleventh, oneTenth,
                                                oneNinth, oneEighth, oneSeventh, oneSixth,
                                                oneFifth, oneFourth, oneThird, oneHalf}
                                                        OPTIONAL    -- Need OP
}
```


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```
-- ASN1STOP
```

***SystemInformationBlockType22-NB* field descriptions**
dl-CarrierConfig Provides the configuration of the DL non-anchor carrier.
dl-ConfigList List of DL non-anchor carriers and associated configuration that can be used for paging and/or random access.
npdcch-CarrierIndex Index of the carrier in the list of DL non anchor carriers. The first entry in the list has index '1', the second entry has index '2' and so on. If the field is absent, the DL anchor carrier is used.
npdcch-NumRepetitionPaging Maximum number of repetitions for NPDCCH common search space (CSS) for paging, see TS 36.213 [23, 16.6]. If the field is absent, the value *of npdcch-NumRepetitionPaging* configured in *SystemInformationBlockType2-NB* in IE *pcch-Config* applies.
npdcch-NumRepetitions-RA Maximum number of repetitions for NPDCCH common search space (CSS) for RAR, Msg3 retransmission and Msg4, see TS 36.213 [23, 16.6]. If the field is absent, the value of *npdcch-NumRepetitions-RA* configured in *SystemInformationBlockType2-NB* for the NPRACH resource in the corresponding entry of *nprach-ParametersList* applies.
npdcch-Offset-RA Fractional period offset of starting subframe for NPDCCH common search space (CSS Type 2), see TS 36.213 [23, 16.6]. If the field is absent, the value of *npdcch-Offset-RA* configured in *SystemInformationBlockType2-NB* for the NPRACH resource in the corresponding entry of *nprach-ParametersList* applies.
npdcch-StartSF-CSS-RA Starting subframe configuration for NPDCCH common search space (CSS), including RAR, Msg3 retransmission, and Msg4, see TS 36.213 [23, 16.6]. If the field is absent, the value of *npdcch-StartSF-CSS-RA* configured in *SystemInformationBlockType2-NB* for the NPRACH resource in the corresponding entry of *nprach-ParametersList* applies.
nprach-NumCBRA-StartSubcarriers The number of start subcarriers from which a UE can randomly select a start subcarrier as specified in TS 36.321 [6]. The start subcarrier indices that the UE is allowed to randomly select from, are given by: *nprach-SubcarrierOffset* + [0, *nprach-NumCBRA-StartSubcarriers* - 1]. If the field is absent, the value of *nprach-NumCBRA-StartSubcarriers* configured in *SystemInformationBlockType2-NB* for the NPRACH resource in the corresponding entry of *nprach-ParametersList* applies.
nprach-NumSubcarriers Number of sub-carriers in a NPRACH resource, see TS 36.211 [21, 10.1.6]. In number of subcarriers. If the field is absent, the value of *nprach-NumSubcarriers* configured in *SystemInformationBlockType2-NB* for the PRACH resource in the corresponding entry of *nprach-ParametersList* applies.
nprach-ParametersList Configure NPRACH parameters for each NPRACH resource on one non-anchor UL carrier. Up to three NPRACH resources can be configured on one non-anchor UL carrier. Each NPRACH resource is associated with a different number of NPRACH repetitions. E-UTRAN includes the same number of entries, and listed in the same order, as in *nprach-ParametersList* in *SystemInformationBlockType2-NB*.
nprach-Periodicity Periodicity of a NPRACH resource, see TS 36.211 [21, 10.1.6]. Unit in millisecond. If the field is absent, the value of *nprach-Periodicity* configured in *SystemInformationBlockType2-NB* for the NPRACH resource in the corresponding entry in *nprach-ParametersList* applies.
nprach-ProbabilityAnchor Configure the selection probability for the anchor carrier NPRACH resource. Value zero corresponds to a probability of 0, oneSixteenth corresponds to the probability of 1/16, oneFifteenth corresponds to the probability of 1/15, and so on. If the field is absent, the selection probability of the anchor carrier NPRACH resource is 1. All non-anchor carriers NPRACH resources have equal probability between them. The probability of selecting a non-anchor carrier NPRACH resource is (1- *nprach-ProbabilityAnchor*).
nprach-ProbabilityAnchorList Configures the selection probability for each NPRACH resource on the anchor carrier. E-UTRAN includes the same number of entries, and listed in the same order, as in *nprach-ParametersList* in *SystemInformationBlockType2-NB.*

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nprach-StartTime Start time of the NPRACH resource in one period, see TS 36.211 [21, 10.1.6]. Unit in millisecond. If the field is absent, the value of *nprach-StartTime* configured in *SystemInformationBlockType2-NB* for the NPRACH resource in the corresponding entry of *nprach-ParametersList* applies.
nprach-SubcarrierOffset Frequency location of the NPRACH resource, see TS 36.211 [21, 10.1.6]. In number of subcarriers, offset from sub-carrier 0. If the field is absent, the value of *nprach-SubcarrierOffset* configured in *SystemInformationBlockType2-NB* for the NPRACH resource in the corresponding entry of *nprach-ParametersList* applies.
nprach-SubcarrierMSG3-RangeStart Fraction for calculating the starting subcarrier index of the range reserved for indication of UE support for multi-tone Msg3 transmission, within the NPRACH resource, see TS 36.211 [21, 10.1.6]. Multi-tone Msg3 transmission is not supported for {32, 64, 128} repetitions of NPRACH. For at least one of the NPRACH resources with the number of NPRACH repetitions other than {32, 64, 128}, the value of *nprach-SubcarrierMSG3-RangeStart* should not be 0. If *nprach-SubcarrierMSG3-RangeStart* is equal to *oneThird* or *twoThird* the start subcarrier indexes for the two partitions are given by: *nprach-SubcarrierOffset* + [0, FLOOR (*nprach-NumCBRA-StartSubcarriers * nprach-SubcarrierMSG3-RangeStart*) -1] for the single-tone Msg3 NPRACH partition; *nprach-SubcarrierOffset* + [FLOOR (*nprach-NumCBRA-StartSubcarriers * nprach-SubcarrierMSG3-RangeStart*), *nprach-NumCBRA-StartSubcarriers* - 1] for the multi-tone Msg3 NPRACH partition; If the field is absent, the value of *nprach-SubcarrierMSG3-RangeStar*t configured in *SystemInformationBlockType2-NB* for the NPRACH resource in the corresponding entry of *nprach-ParametersList* applies.
pagingWeight Weight of the non-anchor paging carrier for uneven paging load distribution across the carriers. Value w1 corresponds to a relative weight of 1, w2 corresponds to a relative weight of 2, and so on. The paging load for a carrier 'i' is equal to w(i)/W where i is equal to 0 for the anchor carrier and equal to the index of the carrier in the *dl-ConfigList* for a non-anchor carrier, W is the sum of the weights of all paging carriers. To avoid correlation between paging carrier and paging occasion, the weights should be assigned such that: nB * W <= 16384.
pagingWeightAnchor Weight of the anchor carrier for uneven paging load distribution across the carriers. Value w1 corresponds to a relative weight of 1, w2 corresponds to a relative weight of 2, and so on. If the field is absent, the (default) value of w0 is applied, i.e. the anchor carrier is not used for paging.
pcch-Config Configure the PCCH parameters for the non-anchor DL carrier.
ul-CarrierFreq UL carrier frequency of the non-anchor carrier as defined in TS 36.101 [42, 5.7.3F].
ul-ConfigList List of UL non-anchor carriers and associated configuration that can be used for random access.

Conditional presence	Explanation
pcch-Config	This field is optionally present, Need OP, if the field *dl-ConfigList* is present and at least one of the carriers in *dl-ConfigList* is configured for paging. Otherwise the field is not present and only the anchor carrier is used for paging.
nprach-config	This field is mandatory present, if the field *ul-ConfigList* is present and at least one of the carriers in *ul-ConfigList* is configured for random access. Otherwise the field is not present and only the anchor carrier is used for random access.

6.7.3.2 NB-IoT Radio resource control information elements

– *CarrierConfigDedicated-NB*

The IE *CarrierConfigDedicated-NB* is used to specify a carrier in NB-IoT.

***CarrierConfigDedicated-NB* information elements**

```
-- ASN1START

CarrierConfigDedicated-NB-r13 ::=       SEQUENCE {
    dl-CarrierConfig-r13        DL-CarrierConfigDedicated-NB-r13,
    ul-CarrierConfig-r13        UL-CarrierConfigDedicated-NB-r13
}
```


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```
DL-CarrierConfigDedicated-NB-r13 ::=    SEQUENCE {
    dl-CarrierFreq-r13                      CarrierFreq-NB-r13,
    downlinkBitmapNonAnchor-r13             CHOICE {
        useNoBitmap-r13                         NULL,
        useAnchorBitmap-r13                     NULL,
        explicitBitmapConfiguration-r13         DL-Bitmap-NB-r13,
        spare                                   NULL
    }       OPTIONAL,    -- Need ON
    dl-GapNonAnchor-r13                     CHOICE {
        useNoGap-r13                            NULL,
        useAnchorGapConfig-r13                  NULL,
        explicitGapConfiguration-r13            DL-GapConfig-NB-r13,
        spare                                   NULL
    }       OPTIONAL,    -- Need ON
    inbandCarrierInfo-r13                   SEQUENCE {
        samePCI-Indicator-r13                   CHOICE  {
            samePCI-r13                             SEQUENCE {
                indexToMidPRB-r13                       INTEGER (-55..54)
            },
            differentPCI-r13                        SEQUENCE {
                eutra-NumCRS-Ports-r13                  ENUMERATED {same, four}
            }
        }                           OPTIONAL,       -- Cond anchor-guardband
        eutraControlRegionSize-r13              ENUMERATED {n1, n2, n3}
    }                               OPTIONAL,       -- Cond non-anchor-inband
    ...,
    [[  nrs-PowerOffsetNonAnchor-v1330      ENUMERATED {dB-12, dB-10, dB-8, dB-6,
                                                        dB-4, dB-2, dB0, dB3}
                                    OPTIONAL    -- Need ON
    ]]
}

UL-CarrierConfigDedicated-NB-r13 ::=    SEQUENCE {
    ul-CarrierFreq-r13          CarrierFreq-NB-r13      OPTIONAL,   -- Need OP
    ...
}

-- ASN1STOP
```


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CarrierConfigDedicated-NB field descriptions
dl-CarrierConfig Downlink carrier used for all unicast transmissions.
dl-CarrierFreq DL carrier frequency. The downlink carrier is not in a E-UTRA PRB which contains E-UTRA PSS/SSS/PBCH.
dl-GapNonAnchor Downlink transmission gap configuration for the anchor/ non-anchor carrier, see TS 36.211 [21, 10.2.3.4].
downlinkBitmapNonAnchor NB-IoT downlink subframe configuration for downlink transmission on the anchor/ non-anchor carrier. See TS 36.213 [23, 16.4].
eutraControlRegionSize Indicates the control region size of the E-UTRA cell for the in-band operation mode, see TS 36.213 [23]. Unit is in number of OFDM symbols. If *operationModeInfo* in MIB-NB is set to *inband-SamePCI* or *inband-DifferentPCI*, it should be set to the value broadcast in SIB1-NB.
eutra-NumCRS-Ports Number of E-UTRA CRS antenna ports, either the same number of ports as NRS or 4 antenna ports. See TS 36.211 [21], TS 36.212 [22], and TS 36.213 [23].
inbandCarrierInfo Provides the configuration of the anchor/ non-anchor inband carrier.
indexToMidPRB The PRB index is signaled by offset from the middle of the EUTRA system.
nrs-PowerOffsetNonAnchor Provides the power offset of the downlink narrowband reference-signal EPRE of the anchor/ non-anchor carrier relative to the anchor carrier, unit in dB. Value dB-12 corresponds to -12 dB, dB-10 corresponds to -10 dB and so on. See TS 36.213 [23, 16.2.2].
samePCI-Indicator This parameter specifies whether the anchor/ non-anchor carrier reuses the same PCI as the EUTRA carrier.
ul-CarrierConfig Uplink anchor/ non-anchor carrier used for all unicast transmissions.
ul-CarrierFreq UL carrier frequency as defined in TS 36.101 [42, 5.7.3F]. If absent, the same TX-RX frequency separation and carrier frequency offset as for the anchor carrier applies.

Conditional presence	Explanation
non-anchor-inband	The field is mandatory present if the anchor/ non-anchor carrier is an inband carrier; otherwise it is not present.
anchor-guardband	The field is mandatory present if *operationModeInfo* is set to *guardband* in the MIB; otherwise it is not present.

– *CarrierFreq-NB*

The IE *CarrierFreq-NB* is used to provide the NB-IoT carrier frequency, as defined in TS 36.101 [42].

CarrierFreq-NB information elements

```
-- ASN1START

CarrierFreq-NB-r13 ::=      SEQUENCE {
    carrierFreq-r13             ARFCN-ValueEUTRA-r9,
    carrierFreqOffset-r13       ENUMERATED {
                                    v-10, v-9, v-8, v-7, v-6, v-5, v-4, v-3, v-2, v-1, v-0dot5,
                                      v0,  v1,  v2,  v3,  v4,  v5,  v6,  v7,  v8,  v9
                                    }   OPTIONAL    -- Need ON
}

-- ASN1STOP
```

CarrierFreq-NB field descriptions
carrierFreq Provides the ARFCN applicable for the NB-IoT carrier frequency as defined in TS 36.101 [42, Table 5.7.3-1].
carrierFreqOffset Offset of the NB-IoT channel number to EARFCN as defined in TS 36.101 [42, 5.7.3F]. Value v-10 means -10, v-9 means -9, and so on.

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– *DL-Bitmap-NB*

The IE *DL-Bitmap-NB* is used to specify the set of NB-IoT downlink subframes for downlink transmission.

DL-Bitmap-NB information element

```
-- ASN1START

DL-Bitmap-NB-r13 ::=            CHOICE {
    subframePattern10-r13           BIT STRING (SIZE (10)),
    subframePattern40-r13           BIT STRING (SIZE (40))
}

-- ASN1STOP
```

DL-Bitmap-NB field descriptions
subframePattern10, subframePattern40   NB-IoT downlink subframe configuration over 10ms or 40ms for inband and 10ms for standalone/guardband. The first/leftmost bit corresponds to the subframe #0 of the radio frame satisfying SFN mod x = 0, where x is the size of the bit string divided by 10. Value 0 in the bitmap indicates that the corresponding subframe is invalid for downlink transmission. Value 1 in the bitmap indicates that the corresponding subframe is valid for downlink transmission.

– *DL-CarrierConfigCommon-NB*

The IE *DL-CarrierConfigCommon-NB is* used to specify the common configuration of a DL non-anchor carrier in NB-IoT.

DL-CarrierConfigCommon-NB information elements

```
-- ASN1START

DL-CarrierConfigCommon-NB-r14 ::=   SEQUENCE {
    dl-CarrierFreq-r14                  CarrierFreq-NB-r13,
    downlinkBitmapNonAnchor-r14         CHOICE {
        useNoBitmap-r14                     NULL,
        useAnchorBitmap-r14                 NULL,
        explicitBitmapConfiguration-r14     DL-Bitmap-NB-r13
    },
    dl-GapNonAnchor-r14                 CHOICE {
        useNoGap-r14                        NULL,
        useAnchorGapConfig-r14              NULL,
        explicitGapConfiguration-r14        DL-GapConfig-NB-r13
    },
    inbandCarrierInfo-r14               SEQUENCE {
        samePCI-Indicator-r14               CHOICE  {
            samePCI-r14                         SEQUENCE {
                indexToMidPRB-r14                   INTEGER (-55..54)
            },
            differentPCI-r14                    SEQUENCE {
                eutra-NumCRS-Ports-r14              ENUMERATED {same, four}
            }
        }   OPTIONAL,       -- Cond anchor-guardband
        eutraControlRegionSize-r14          ENUMERATED {n1, n2, n3}
    }   OPTIONAL,       -- Cond non-anchor-inband
    nrs-PowerOffsetNonAnchor-r14        ENUMERATED {dB-12, dB-10, dB-8, dB-6,
                                                    dB-4, dB-2, dB0, dB3}   DEFAULT dB0,
    ...
}

-- ASN1STOP
```


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DL-CarrierConfigCommon-NB field descriptions
dl-CarrierFreq DL carrier frequency. The downlink carrier is not in a E-UTRA PRB which contains E-UTRA PSS/SSS/PBCH.
dl-GapNonAnchor Downlink transmission gap configuration for the non-anchor carrier, see TS 36.211 [21, 10.2.3.4].
downlinkBitmapNonAnchor NB-IoT downlink subframe configuration for downlink transmission on the non-anchor carrier. See TS 36.213 [23, 16.4].
eutraControlRegionSize Indicates the control region size of the E-UTRA cell for the in-band operation mode, see TS 36.213 [23]. Unit is in number of OFDM symbols. If *operationModeInfo* in MIB-NB is set to *inband-SamePCI* or *inband-DifferentPCI*, it should be set to the value broadcast in SIB1-NB.
eutra-NumCRS-Ports Number of E-UTRA CRS antenna ports, either the same number of ports as NRS or 4 antenna ports. See TS 36.211 [21], TS 36.212 [22], and TS 36.213 [23].
inbandCarrierInfo Provides the configuration of a non-anchor inband carrier.
indexToMidPRB The PRB index is signaled by offset from the middle of the EUTRA system.
nrs-PowerOffsetNonAnchor Provides the downlink narrowband reference-signal EPRE offset of the non-anchor carrier relative to the downlink narrowband reference-signal EPRE of the anchor carrier, unit in dB. Value dB-12 corresponds to -12 dB, dB-10 corresponds to -10 dB and so on. See TS 36.213 [23, 16.2.2].
samePCI-Indicator This parameter specifies whether the non-anchor carrier reuses the same PCI as the EUTRA carrier.

Conditional presence	Explanation
non-anchor-inband	The field is mandatory present if the non-anchor carrier is an inband carrier; otherwise it is not present.
anchor-guardband	The field is mandatory present, if *operationModeInfo* is set to *guardband* in the MIB; otherwise it is not present.

– *DL-GapConfig-NB*

The IE *DL-GapConfig-NB* is used to specify the downlink gap configuration for NPDCCH and NPDSCH. Downlink gaps apply to all NPDCCH/NPDSCH transmissions except for BCCH.

DL-GapConfig-NB information element

```
-- ASN1START


DL-GapConfig-NB-r13 ::=     SEQUENCE {
    dl-GapThreshold-r13         ENUMERATED {n32, n64, n128, n256},
    dl-GapPeriodicity-r13       ENUMERATED {sf64, sf128, sf256, sf512},
    dl-GapDurationCoeff-r13     ENUMERATED {oneEighth, oneFourth, threeEighth, oneHalf}
}

-- ASN1STOP
```

DL-GapConfig-NB field descriptions
dl-GapDurationCoeff Coefficient to calculate the gap duration of a DL transmission: dl-GapDurationCoeff * dl-GapPeriodicity, Duration in number of subframes. See TS 36.211 [21, 10.2.3.4].
dl-GapPeriodicity Periodicity of a DL transmission gap in number of subframes. See TS 36.211 [21, 10.2.3.4].
dl-GapThreshold Threshold on the maximum number of repetitions configured for NPDCCH before application of DL transmission gap configuration. See TS 36.211 [21, 10.2.3.4].

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– LogicalChannelConfig-NB

The IE *LogicalChannelConfig-NB* is used to configure the logical channel parameters.

LogicalChannelConfig-NB information element

```
-- ASN1START

LogicalChannelConfig-NB-r13 ::=     SEQUENCE {
    priority-r13                        INTEGER (1..16)         OPTIONAL,       -- Cond UL
    logicalChannelSR-Prohibit-r13       BOOLEAN                 OPTIONAL,       -- Need ON
    ...
}

-- ASN1STOP
```

LogicalChannelConfig-NB field descriptions
logicalChannelSR-Prohibit Value *TRUE* indicates that the *logicalChannelSR-ProhibitTimer* is enabled for the logical channel. If *logicalChannelSR-Prohibit* is configured (i.e. indicates value *TRUE*), E-UTRAN also configures *logicalChannelSR-ProhibitTimer*. See TS 36.321 [6].
priority Logical channel priority in TS 36.321 [6]. Value is an integer.

Conditional presence	Explanation
UL	The field is mandatory present for UL logical channels; otherwise it is not present.

– MAC-MainConfig-NB

The IE *MAC-MainConfig-NB* is used to specify the MAC main configuration for signalling and data radio bearers.

MAC-MainConfig-NB information element

```
-- ASN1START

MAC-MainConfig-NB-r13 ::=           SEQUENCE {
    ul-SCH-Config-r13                   SEQUENCE {
        periodicBSR-Timer-r13               PeriodicBSR-Timer-NB-r13        OPTIONAL,   -- Need ON
        retxBSR-Timer-r13                   RetxBSR-Timer-NB-r13
    }                                                                       OPTIONAL,   -- Need ON
    drx-Config-r13                      DRX-Config-NB-r13               OPTIONAL,   -- Need ON
    timeAlignmentTimerDedicated-r13     TimeAlignmentTimer,
    logicalChannelSR-Config-r13         CHOICE {
        release                             NULL,
        setup                               SEQUENCE {
            logicalChannelSR-ProhibitTimer-r13  ENUMERATED {
                                                    pp2, pp8, pp32, pp128, pp512,
                                                    pp1024, pp2048, spare}
        }
    }                                                                       OPTIONAL,   -- Need ON
    ...,
    [[  rai-Activation-r14                      ENUMERATED {true}           OPTIONAL,   -- Need OR
        dataInactivityTimerConfig-r14   CHOICE {
            release                             NULL,
            setup                               SEQUENCE {
                dataInactivityTimer-r14             DataInactivityTimer-r14
            }
        }                                                                   OPTIONAL    -- Need ON
    ]],
    [[  drx-Cycle-v1430                 ENUMERATED {
                                    sf1280, sf2560, sf5120, sf10240}    OPTIONAL    -- Need ON
    ]],
    [[  ra-CFRA-Config-r14      ENUMERATED {true}           OPTIONAL        -- Need ON
    ]]
}

PeriodicBSR-Timer-NB-r13 ::=        ENUMERATED {
```


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```
                                        pp2, pp4, pp8, pp16, pp64, pp128, infinity, spare}

RetxBSR-Timer-NB-r13 ::=            ENUMERATED {
                                        pp4, pp16, pp64, pp128, pp256, pp512, infinity, spare}

DRX-Config-NB-r13 ::=               CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        onDurationTimer-r13                 ENUMERATED {
                                                pp1, pp2, pp3, pp4, pp8, pp16, pp32, spare},
        drx-InactivityTimer-r13             ENUMERATED {
                                                pp0, pp1, pp2, pp3, pp4, pp8, pp16, pp32},
        drx-RetransmissionTimer-r13         ENUMERATED {
                                                pp0, pp1, pp2, pp4, pp6, pp8, pp16, pp24,
                                                pp33, spare7, spare6, spare5,
                                                spare4, spare3, spare2, spare1},
        drx-Cycle-r13                       ENUMERATED {
                                                sf256, sf512, sf1024, sf1536, sf2048, sf3072,
                                                sf4096, sf4608, sf6144, sf7680, sf8192, sf9216,
                                                spare4, spare3, spare2, spare1},
        drx-StartOffset-r13                 INTEGER (0..255),
        drx-ULRetransmissionTimer-r13       ENUMERATED {
                                                pp0, pp1, pp2, pp4, pp6, pp8, pp16, pp24,
                                                pp33, pp40, pp64, pp80, pp96,
                                                pp112, pp128, pp160, pp320}
    }
}


-- ASN1STOP
```


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MAC-MainConfig-NB field descriptions
drx-Config Used to configure DRX as specified in TS 36.321 [6].
drx-Cycle *longDRX-Cycle* in TS 36.321 [6]. The value of l*ongDRX-Cycle* is in number of sub-frames. Value sf256 corresponds to 256 sub-frames, sf512 corresponds to 512 sub-frames and so on. In case *drx-Cycle-v1430* is signalled, the UE shall ignore *drx-Cycle-r13*.
drx-StartOffset *drxStartOffset* in TS 36.321 [6]. Value is in number of sub-frames by step of (*drx-cycle* / 256).
drx-InactivityTimer Timer for DRX in TS 36.321 [6]. Value in number of PDCCH periods. Value pp0 corresponds to 0 PDCCH period and behaviour as specified in 7.3.2 applies, pp1 corresponds to 1 PDCCH period, pp2 corresponds to 2 PDCCH periods and so on.
drx-RetransmissionTimer Timer for DRX in TS 36.321 [6]. Value in number of PDCCH periods. Value pp0 corresponds to 0 PDCCH period and behaviour as specified in 7.3.2 applies, pp1 corresponds to 1 PDCCH period, pp2 corresponds to 2 PDCCH periods and so on.
drx-ULRetransmissionTimer Timer for DRX in TS 36.321 [6]. Value in number of PDCCH periods. Value pp0 corresponds to 0 PDCCH period and behaviour as specified in 7.3.2 applies, value pp1 corresponds to 1 PDCCH period, pp2 corresponds to 2 PDCCH periods and so on.
logicalChannelSR-ProhibitTimer Timer used to delay the transmission of an SR. See TS 36.321 [6]. Value in number of PDCCH periods. Value pp2 corresponds to 2 PDCCH periods, pp8 corresponds to 8 PDCCH periods and so on.
periodicBSR-Timer Timer for BSR reporting in TS 36.321 [6]. Value in number of PDCCH periods. Value pp2 corresponds to 2 PDCCH periods, pp4 corresponds to 4 PDCCH periods and so on.
ra-CFRA-Config Activation of contention free random access (CFRA), see TS 36.321 [6].
rai-Activation Activation of release assistance indication (RAI) in TS 36.321 [6].
retxBSR-Timer Timer for BSR reporting in TS 36.321 [6]. Value in number of PDCCH periods. Value pp4 corresponds to 4 PDCCH periods, pp16 corresponds to 16 PDCCH periods and so on.
onDurationTimer Timer for DRX in TS 36.321 [6]. Value in number of PDCCH periods. Value pp1 corresponds to 1 PDCCH period, pp2 corresponds to 2 PDCCH periods and so on.
timeAlignmentTimer Indicates the value of the time alignment timer, see TS 36.321 [6].

– *NPDCCH-ConfigDedicated-NB*

The IE *NPDCCH-ConfigDedicated-NB* specifies the subframes and resource blocks for NPDCCH monitoring.

NPDCCH-ConfigDedicated-NB information element

```
-- ASN1START

NPDCCH-ConfigDedicated-NB-r13 ::=   SEQUENCE {
    npdcch-NumRepetitions-r13           ENUMERATED {r1, r2, r4, r8, r16, r32, r64, r128,
                                                    r256, r512, r1024, r2048,
                                                    spare4, spare3, spare2, spare1},
    npdcch-StartSF-USS-r13              ENUMERATED {v1dot5, v2, v4, v8, v16, v32, v48, v64},
    npdcch-Offset-USS-r13               ENUMERATED {zero, oneEighth, oneFourth, threeEighth}
}

-- ASN1STOP
```


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NPDCCH-ConfigDedicated-NB field descriptions
npdcch-NumRepetitions Maximum number of repetitions for NPDCCH UE specific search space (USS), see TS 36.213 [23, 16.6]. UE monitors one set of values (consisting of aggregation level, number of repetitions and number of blind decodes) according to the configured maximum number of repetitions.
npdcch-Offset-USS Fractional period offset of starting subframe for NPDCCH UE specific search space (USS), see TS 36.213 [23, 16.6].
npdcch-StartSF-USS Starting subframe configuration for an NPDCCH UE-specific search space, see TS 36.213 [23, 16.6]. Value v1dot5 corresponds to 1.5, value 2 corresponds to 2 and so on.

– *NPDSCH-ConfigCommon-NB*

The IE *NPDSCH-ConfigCommon-NB* is used to specify the common NPDSCH configuration.

NPDSCH-ConfigCommon-NB information element

```
-- ASN1START


NPDSCH-ConfigCommon-NB-r13 ::=  SEQUENCE {
    nrs-Power-r13                   INTEGER (-60..50)
}

-- ASN1STOP
```

NPDSCH-ConfigCommon-NB field descriptions
nrs-Power Provides the downlink narrowband reference-signal EPRE, see TS 36.213 [23, 16.2]. The actual value in dBm.

– *NPRACH-ConfigSIB-NB*

The IE *NPRACH-ConfigSIB-NB* is used to specify the NPRACH configuration for the anchor carrier.

NPRACH-ConfigSIB-NB information elements

```
-- ASN1START

NPRACH-ConfigSIB-NB-r13 ::=         SEQUENCE {
    nprach-CP-Length-r13                ENUMERATED {us66dot7, us266dot7},
    rsrp-ThresholdsPrachInfoList-r13    RSRP-ThresholdsNPRACH-InfoList-NB-r13   OPTIONAL,   -- need
OR
    nprach-ParametersList-r13       NPRACH-ParametersList-NB-r13
}

NPRACH-ConfigSIB-NB-v1330 ::=       SEQUENCE {
    nprach-ParametersList-v1330         NPRACH-ParametersList-NB-v1330
}

NPRACH-ConfigSIB-NB-v1450 ::=       SEQUENCE {
    maxNumPreambleAttemptCE-r14         ENUMERATED {n3, n4, n5, n6, n7, n8, n10, spare1}
}

NPRACH-ParametersList-NB-r13 ::=    SEQUENCE (SIZE (1.. maxNPRACH-Resources-NB-r13)) OF NPRACH-
Parameters-NB-r13

NPRACH-ParametersList-NB-v1330 ::=  SEQUENCE (SIZE (1.. maxNPRACH-Resources-NB-r13)) OF NPRACH-
Parameters-NB-v1330

NPRACH-Parameters-NB-r13::=         SEQUENCE {
    nprach-Periodicity-r13                  ENUMERATED {ms40, ms80, ms160, ms240,
                                                        ms320, ms640, ms1280, ms2560},
    nprach-StartTime-r13                    ENUMERATED {ms8, ms16, ms32, ms64,
                                                        ms128, ms256, ms512, ms1024},
    nprach-SubcarrierOffset-r13             ENUMERATED {n0, n12, n24, n36, n2, n18, n34, spare1},
    nprach-NumSubcarriers-r13               ENUMERATED {n12, n24, n36, n48},
    nprach-SubcarrierMSG3-RangeStart-r13    ENUMERATED {zero, oneThird, twoThird, one},
    maxNumPreambleAttemptCE-r13             ENUMERATED {n3, n4, n5, n6, n7, n8, n10, spare1},
```


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```
    numRepetitionsPerPreambleAttempt-r13    ENUMERATED {n1, n2, n4, n8, n16, n32, n64, n128},
    npdcch-NumRepetitions-RA-r13            ENUMERATED {r1, r2, r4, r8, r16, r32, r64, r128,
                                                        r256, r512, r1024, r2048,
                                                        spare4, spare3, spare2, spare1},
    npdcch-StartSF-CSS-RA-r13               ENUMERATED {v1dot5, v2, v4, v8, v16, v32, v48, v64},
    npdcch-Offset-RA-r13                    ENUMERATED {zero, oneEighth, oneFourth, threeEighth}
}

NPRACH-Parameters-NB-v1330 ::=      SEQUENCE {
    nprach-NumCBRA-StartSubcarriers-r13     ENUMERATED {n8, n10, n11, n12, n20, n22, n23, n24,
                                                        n32, n34, n35, n36, n40, n44, n46, n48}
}

RSRP-ThresholdsNPRACH-InfoList-NB-r13 ::= SEQUENCE (SIZE(1..2)) OF RSRP-Range

-- ASN1STOP
```


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***NPRACH-ConfigSIB-NB* field descriptions**
maxNumPreambleAttemptCE Maximum number of preamble transmission attempts per NPRACH resource. See TS 36.321 [6]. If the UE supports enhanced random access power control and *maxNumPreambleAttemptCE-r14* is included, the UE shall use *maxNumPreambleAttemptCE-r14* instead of *maxNumPreambleAttemptCE-r13* for the first entry in *nprach-ParametersList*.
npdcch-NumRepetitions-RA Maximum number of repetitions for NPDCCH common search space (CSS) for RAR, Msg3 retransmission and Msg4, see TS 36.213 [23, 16.6].
npdcch-Offset -RA Fractional period offset of starting subframe for NPDCCH common search space (CSS Type 2), see TS 36.213 [23, 16.6].
npdcch-StartSF-CSS-RA Starting subframe configuration for NPDCCH common search space (CSS), including RAR, Msg3 retransmission, and Msg4, see TS 36.213 [23, 16.6].
nprach-CP-Length Cyclic prefix length for NPRACH transmission (T_{CP}), see TS 36.211 [21, 10.1.6]. Value us66dot7 corresponds to 66.7 microseconds and value us266dot7 corresponds to 266.7 microseconds.
nprach-NumCBRA-StartSubcarriers The number of start subcarriers from which a UE can randomly select a start subcarrier as specified in TS 36.321 [6]. The start subcarrier indices that the UE is allowed to randomly select from, are given by: *nprach-SubcarrierOffset* + [0, *nprach-NumCBRA-StartSubcarriers* - 1]
nprach-NumSubcarriers Number of sub-carriers in a NPRACH resource, see TS 36.211 [21, 10.1.6]. In number of subcarriers.
nprach-ParametersList Configures NPRACH parameters for each NPRACH resource. Up to three PRACH resources can be configured in a cell. Each NPRACH resource is associated with a different number of NPRACH repetitions.
nprach-Periodicity Periodicity of a NPRACH resource, see TS 36.211 [21, 10.1.6]. Unit in millisecond.
nprach-StartTime Start time of the NPRACH resource in one period, see TS 36.211 [21, 10.1.6]. Unit in millisecond.
nprach-SubcarrierOffset Frequency location of the NPRACH resource, see TS 36.211 [21, 10.1.6]. In number of subcarriers, offset from sub-carrier 0.
nprach-SubcarrierMSG3-RangeStart Fraction for calculating the starting subcarrier index of the range reserved for indication of UE support for multi-tone Msg3 transmission, within the NPRACH resource, see TS 36.211 [21, 10.1.6]. Multi-tone Msg3 transmission is not supported for {32, 64, 128} repetitions of NPRACH. For at least one of the NPRACH resources with the number of NPRACH repetitions other than {32, 64, 128}, the value of *nprach-SubcarrierMSG3-RangeStart* should not be 0. If *nprach-SubcarrierMSG3-RangeStart* is equal to oneThird*}*or twoThird the start subcarrier indexes for the two partitions are given by: *nprach-SubcarrierOffset* + [0, floor(*nprach-NumCBRA-StartSubcarriers * nprach-SubcarrierMSG3-RangeStart*) -1] for the single-tone Msg3 NPRACH partition; *nprach-SubcarrierOffset* + [floor(*nprach-NumCBRA-StartSubcarriers * nprach-SubcarrierMSG3-RangeStart*)*, nprach-NumCBRA-StartSubcarriers* - 1] for the multi-tone Msg3 NPRACH partition;
numRepetitionsPerPreambleAttempt Number of NPRACH repetitions per attempt for each NPRACH resource, See TS 36.211 [21, 10.1.6].
rsrp-ThresholdsPrachInfoList The criterion for UEs to select a NPRACH resource. Up to 2 RSRP threshold values can be signalled. The first element corresponds to RSRP threshold 1, the second element corresponds to RSRP threshold 2. See TS 36.321 [6]. If absent, there is only one NPRACH resource. A UE that supports *powerClassNB-14dBm-r14* shall correct the RSRP threshold values before applying them as follows: RSRP threshold = Signalled RSRP threshold - min{0, (14-min(23, P-Max)) where P-Max*:* is the value of *p-Max* field in *SystemInformationBlockType1-NB*.

– *NPUSCH-Config-NB*

The IE *NPUSCH-ConfigCommon-NB* is used to specify the common NPUSCH configuration. The IE *NPUSCH-ConfigDedicated-NB* is used to specify the UE specific NPUSCH configuration.

***NPUSCH-Config-NB* information element**

```
-- ASN1START
```


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```
NPUSCH-ConfigCommon-NB-r13 ::=      SEQUENCE {
    ack-NACK-NumRepetitions-Msg4-r13    SEQUENCE (SIZE(1.. maxNPRACH-Resources-NB-r13)) OF
                                            ACK-NACK-NumRepetitions-NB-r13,
    srs-SubframeConfig-r13              ENUMERATED {
                                            sc0, sc1, sc2, sc3, sc4, sc5, sc6, sc7,
                                            sc8, sc9, sc10, sc11, sc12, sc13, sc14, sc15
                                            }                           OPTIONAL,   -- Need OR
    dmrs-Config-r13                     SEQUENCE {
        threeTone-BaseSequence-r13          INTEGER (0..12)             OPTIONAL,   -- Need OP
        threeTone-CyclicShift-r13           INTEGER (0..2),
        sixTone-BaseSequence-r13            INTEGER (0..14)             OPTIONAL,   -- Need OP
        sixTone-CyclicShift-r13             INTEGER (0..3),
        twelveTone-BaseSequence-r13         INTEGER (0..30)             OPTIONAL    -- Need OP
    }       OPTIONAL,   -- Need OR
    ul-ReferenceSignalsNPUSCH-r13       UL-ReferenceSignalsNPUSCH-NB-r13
}

UL-ReferenceSignalsNPUSCH-NB-r13 ::=     SEQUENCE {
    groupHoppingEnabled-r13               BOOLEAN,
    groupAssignmentNPUSCH-r13             INTEGER (0..29)
}

NPUSCH-ConfigDedicated-NB-r13 ::=   SEQUENCE {
    ack-NACK-NumRepetitions-r13         ACK-NACK-NumRepetitions-NB-r13  OPTIONAL,   -- Need ON
    npusch-AllSymbols-r13               BOOLEAN                         OPTIONAL,   -- Cond SRS
    groupHoppingDisabled-r13            ENUMERATED {true}               OPTIONAL    -- Need OR
}

ACK-NACK-NumRepetitions-NB-r13  ::= ENUMERATED {r1, r2, r4, r8, r16, r32, r64, r128}


-- ASN1STOP
```

***NPUSCH-Config-NB* field descriptions**
ack-NACK-NumRepetitions Number of repetitions for the ACK NACK resource unit carrying HARQ response to NPDSCH, see TS 36.213 [23, 16.4.2]. If absent, the value of *ack-NACK-NumRepetitions-Msg4* signalled in SIB2 is used.
ack-NACK-NumRepetitions-Msg4 Number of repetitions for ACK/NACK HARQ response to NPDSCH containing Msg4 per NPRACH resource, see TS 36.213 [23, 16.4.2].
groupAssignmentNPUSCH See TS 36.211 [21, 10.1.4.1.3].
groupHoppingDisabled See TS 36.211 [21, 10.1.4.1.3].
groupHoppingEnabled See TS 36.211 [21, 10.1.4.1.3].
npusch-AllSymbols If set to TRUE, the UE shall use all NB-IoT symbols for NPUSCH transmission. If set to FALSE, the UE punctures the NPUSCH transmissions in the symbols that collides with SRS. If the field is not present, the UE uses all NB-IoT symbols for NPUSCH transmission. See TS 36.211 [21, 10.1.3.6].
sixTone-BaseSequence The base sequence of DMRS sequence in a cell for 6 tones transmission; see TS 36.211 [21, 10.1.4.1.2]. If absent, it is given by NB-IoT CellID mod 14. Value 14 is not used.
sixTone-CyclicShift Define 4 cyclic shifts for the 6-tone case, see TS 36.211 [21, 10.1.4.1.2].
srs-SubframeConfig SRS SubframeConfiguration. See TS 36.211 [21, table 5.5.3.3-1]. Value sc0 corresponds to value 0, sc1 to value 1 and so on.
threeTone-BaseSequence The base sequence of DMRS sequence in a cell for 3 tones transmission; see TS 36.211 [21, 10.1.4.1.2]. If absent, it is given by NB-IoT CellID mod 12. Value 12 is not used.
threeTone-CyclicShift Define 3 cyclic shifts for the 3-tone case, see TS 36.211 [21, 10.1.4.1.2].
twelveTone-BaseSequence The base sequence of DMRS sequence in a cell for 12 tones transmission; see TS 36.211 [21, 10.1.4.1.2]. If absent, it is given by NB-IoT CellID mod 30. Value 30 is not used.
ul-ReferenceSignalsNPUSCH Used to specify parameters needed for the transmission on NPUSCH.

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Conditional presence	Explanation
SRS	This field is optionally present, need OP, if *srs-SubframeConfig* is broadcasted. Otherwise, the IE is not present.

– *PDCP-Config-NB*

The IE *PDCP-Config-NB* is used to set the configurable PDCP parameters for data radio bearers.

PDCP-Config-NB information element

```
-- ASN1START

PDCP-Config-NB-r13 ::=      SEQUENCE {
    discardTimer-r13            ENUMERATED {
                                    ms5120, ms10240, ms20480, ms40960,
                                    ms81920, infinity, spare2, spare1
                                    }   OPTIONAL,           -- Cond Setup
    headerCompression-r13       CHOICE {
        notUsed                     NULL,
        rohc                        SEQUENCE {
            maxCID-r13                  INTEGER (1..16383)              DEFAULT 15,
            profiles-r13                SEQUENCE {
                profile0x0002               BOOLEAN,
                profile0x0003               BOOLEAN,
                profile0x0004               BOOLEAN,
                profile0x0006               BOOLEAN,
                profile0x0102               BOOLEAN,
                profile0x0103               BOOLEAN,
                profile0x0104               BOOLEAN
            },
            ...
        }
    },
    ...
}

-- ASN1STOP
```

***PDCP-Config-NB* field descriptions**
discardTimer Indicates the discard timer value specified in TS 36.323 [8]. Value in milliseconds. Value ms5120 means 5120 ms, ms10240 means 10240 ms and so on.
headerCompression E-UTRAN does not reconfigure header compression except optionally upon RRC Connection Resumption.
maxCID Indicates the value of the MAX_CID parameter as specified in TS 36.323 [8]. The total value of MAX_CIDs across all bearers for the UE should be less than or equal to the value of *maxNumberROHC-ContextSessions* parameter as indicated by the UE.
profiles The profiles used by both compressor and decompressor in both UE and E-UTRAN. The field indicates which of the ROHC profiles specified in TS 36.323 [8] are supported, i.e. value *true* indicates that the profile is supported. Profile 0x0000 shall always be supported when the use of ROHC is configured. If support of two ROHC profile identifiers with the same 8 LSB's is signalled, only the profile corresponding to the highest value shall be applied.

Conditional presence	Explanation
Setup	The field is mandatory present in case of radio bearer setup. Otherwise the field is optionally present, need ON.

– *PhysicalConfigDedicated-NB*

The IE *PhysicalConfigDedicated-NB* is used to specify the UE specific physical channel configuration.

PhysicalConfigDedicated-NB information element

```
-- ASN1START
```


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```
PhysicalConfigDedicated-NB-r13 ::=  SEQUENCE {
    carrierConfigDedicated-r13          CarrierConfigDedicated-NB-r13       OPTIONAL,   -- Need ON
    npdcch-ConfigDedicated-r13          NPDCCH-ConfigDedicated-NB-r13       OPTIONAL,   -- Need ON
    npusch-ConfigDedicated-r13          NPUSCH-ConfigDedicated-NB-r13       OPTIONAL,   -- Need ON
    uplinkPowerControlDedicated-r13     UplinkPowerControlDedicated-NB-r13  OPTIONAL,   -- Need ON
    ...,
    [[  twoHARQ-ProcessesConfig-r14     ENUMERATED {true}   OPTIONAL    -- Need OR
    ]],
    [[  interferenceRandomisationConfig-r14 ENUMERATED {true}   OPTIONAL    -- Need OR
    ]]
}

-- ASN1STOP
```

***PhysicalConfigDedicated-NB* field descriptions**
carrierConfigDedicated Non-anchor carrier used for all unicast transmissions.
interferenceRandomisationConfig Interference randomisation enabled in connected mode, except for random access procedure in connected mode, see TS 36.211 [21]. For random access in connected mode interference randomisation on non-anchor is used and is not used on anchor carrier, see TS 36.211 [21].
npdcch-ConfigDedicated NPDCCH configuration.
npusch-ConfigDedicated UL unicast configuration.
twoHARQ-ProcessesConfig Activation of two HARQ processes, see TS 36.212 [22] and TS 36.213 [23].
uplink-PowerControlDedicated UL power control parameter.

– *RACH-ConfigCommon-NB*

The IE *RACH-ConfigCommon-NB* is used to specify the generic random access parameters.

***RACH-ConfigCommon-NB* information element**

```
-- ASN1START

RACH-ConfigCommon-NB-r13 ::=        SEQUENCE {
    preambleTransMax-CE-r13             PreambleTransMax,
    powerRampingParameters-r13          PowerRampingParameters,
    rach-InfoList-r13                   RACH-InfoList-NB-r13,
    connEstFailOffset-r13               INTEGER (0..15)                 OPTIONAL,   -- Need OP
    ...,
    [[  powerRampingParameters-v1450    PowerRampingParameters-NB-v1450 OPTIONAL    -- Need OR
    ]]
}

RACH-InfoList-NB-r13 ::=    SEQUENCE (SIZE (1.. maxNPRACH-Resources-NB-r13)) OF RACH-Info-NB-r13

RACH-Info-NB-r13    ::=     SEQUENCE {
    ra-ResponseWindowSize-r13           ENUMERATED {
                                            pp2, pp3, pp4, pp5, pp6, pp7, pp8, pp10},
    mac-ContentionResolutionTimer-r13   ENUMERATED {
                                            pp1, pp2, pp3, pp4, pp8, pp16, pp32, pp64}
}

PowerRampingParameters-NB-v1450  ::=        SEQUENCE {
    preambleInitialReceivedTargetPower-v1450        ENUMERATED {
                                                    dBm-130, dBm-128, dBm-126, dBm-124, dBm-122,
                                                    dBm-88, dBm-86, dBm-84,dBm-82, dBm-80}
                                                    OPTIONAL,   -- Need OR
    powerRampingParametersCE1-r14               SEQUENCE {
        powerRampingStepCE1-r14                     ENUMERATED {dB0, dB2, dB4, dB6},
        preambleInitialReceivedTargetPowerCE1-r14   ENUMERATED {
                                                    dBm-130, dBm-128, dBm-126, dBm-124, dBm-122,
                                                    dBm-120, dBm-118, dBm-116, dBm-114, dBm-112,
                                                    dBm-110, dBm-108, dBm-106, dBm-104, dBm-102,
                                                    dBm-100, dBm-98, dBm-96, dBm-94, dBm-92,
                                                    dBm-90, dBm-88, dBm-86, dBm-84, dBm-82, dBm-80}
```


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```
    } OPTIONAL  -- Need OR
}

-- ASN1STOP
```

***RACH-ConfigCommon-NB* field descriptions**
connEstFailOffset Parameter "Qoffset$_{temp}$" in TS 36.304 [4]. If the field is not present the value of infinity shall be used for "Qoffset$_{temp}$".
mac-ContentionResolutionTimer Timer for contention resolution in TS 36.321 [6]. Value in PDCCH periods. Value pp1 corresponds to 1 PDCCH period, pp2 corresponds to 2 PDCCH periods and so on. The value considered by the UE is: *mac-ContentionResolutionTimer* = Min (signaled value x PDCCH period, 10.24s).
powerRampingParameters, powerRampingParametersCE1 Power ramping step and preamble initial received target power – same as TS 36.213 [23] and TS 36.321 [6]. If the UE does not support enhanced random access power control and more than one repetition level is configured in the cell, then the UE transmits NPRACH with max power except for the lowest repetition level. Otherwise, the UE uses NPRACH power ramping. If the UE supports enhanced random access power control and *powerRampingParameters-v1450* is signalled, the UE uses NPRACH power ramping across repetition levels as specified in TS 36.321 [6]. If *preambleInitialReceivedTargetPower-v1450* is present, the UE shall use *preambleInitialReceivedTargetPower-v1450* instead of *preambleInitialReceivedTargetPower* (i.e. without suffix). If *powerRampingParametersCE1* is present, the UE shall use *powerRampingParametersCE1* instead of *powerRampingParameters* for NPRACH power ramping in the second repetition level.
preambleTransMax-CE Maximum number of preamble transmission in TS 36.321 [6]. Value is an integer.
ra-ResponseWindowSize Duration of the RA response window in TS 36.321 [6]. Value in PDCCH periods. Value pp2 corresponds to 2 PDDCH periods, pp3 corresponds to 3 PDCCH periods and so on. The value considered by the UE is: *ra-ResponseWindowSize* = Min (signaled value x PDCCH period, 10.24s).

– *RadioResourceConfigCommonSIB-NB*

The IE *RadioResourceConfigCommonSIB-NB* is used to specify common radio resource configurations in the system information, e.g., the random access parameters and the static physical layer parameters.

***RadioResourceConfigCommonSIB-NB* information element**

```
-- ASN1START

RadioResourceConfigCommonSIB-NB-r13 ::= SEQUENCE {
    rach-ConfigCommon-r13                   RACH-ConfigCommon-NB-r13,
    bcch-Config-r13                         BCCH-Config-NB-r13,
    pcch-Config-r13                         PCCH-Config-NB-r13,
    nprach-Config-r13                       NPRACH-ConfigSIB-NB-r13,
    npdsch-ConfigCommon-r13                 NPDSCH-ConfigCommon-NB-r13,
    npusch-ConfigCommon-r13                 NPUSCH-ConfigCommon-NB-r13,
    dl-Gap-r13                              DL-GapConfig-NB-r13         OPTIONAL,       -- Need OP
    uplinkPowerControlCommon-r13            UplinkPowerControlCommon-NB-r13,
    ...,
    [[  nprach-Config-v1330                 NPRACH-ConfigSIB-NB-v1330   OPTIONAL        -- Need OR
    ]],
    [[  nprach-Config-v1450                 NPRACH-ConfigSIB-NB-v1450   OPTIONAL        -- Cond
EnhPowerControl
    ]]
}

BCCH-Config-NB-r13 ::=                  SEQUENCE {
    modificationPeriodCoeff-r13             ENUMERATED {n16, n32, n64, n128}
}


PCCH-Config-NB-r13 ::=                  SEQUENCE {
    defaultPagingCycle-r13                  ENUMERATED {rf128, rf256, rf512, rf1024},
    nB-r13                                  ENUMERATED {
                                                fourT, twoT, oneT, halfT, quarterT, one8thT,
                                                one16thT, one32ndT, one64thT,
                                                one128thT, one256thT, one512thT, one1024thT,
                                                spare3, spare2, spare1},
    npdcch-NumRepetitionPaging-r13          ENUMERATED {
                                                r1, r2, r4, r8, r16, r32, r64, r128,
```


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```
                                                r256, r512, r1024, r2048,
                                                spare4, spare3, spare2, spare1}
}

-- ASN1STOP
```

RadioResourceConfigCommonSIB-NB field descriptions
defaultPagingCycle Default paging cycle, used to derive 'T' in TS 36.304 [4]. Value rf128 corresponds to 128 radio frames, rf256 corresponds to 256 radio frames and so on.
dl-Gap Downlink transmission gap configuration for the anchor carrier. See TS 36.211 [21, 10.2.3.4]. If the field is absent, there is no gap.
modificationPeriodCoeff Actual modification period, expressed in number of radio frames= *modificationPeriodCoeff * defaultPagingCycle*. n16 corresponds to value 16, n32 corresponds to value 32, and so on. The BCCH modification period should be larger or equal to 40.96s.
nB Parameter: nB is used as one of parameters to derive the Paging Frame and Paging Occasion according to TS 36.304 [4]. Value in multiples of 'T' as defined in TS 36.304 [4]. A value of fourT corresponds to 4 * T, a value of twoT corresponds to 2 * T and so on.
npdcch-NumRepetitionPaging Maximum number of repetitions for NPDCCH common search space (CSS) for paging, see TS 36.213 [23, 16.6].

Conditional presence	Explanation
EnhPowerControl	This field is optional present, need OR, if *PowerRampingParameters-NB-v1450* is included in SIB2-NB. Otherwise the field is not present.

– *RadioResourceConfigDedicated-NB*

The IE *RadioResourceConfigDedicated-NB* is used to setup/modify/release RBs, to modify the MAC main configuration, and to modify dedicated physical configuration.

RadioResourceConfigDedicated-NB information element

```
-- ASN1START

RadioResourceConfigDedicated-NB-r13 ::= SEQUENCE {
    srb-ToAddModList-r13                    SRB-ToAddModList-NB-r13         OPTIONAL,   -- Need ON
    drb-ToAddModList-r13                    DRB-ToAddModList-NB-r13         OPTIONAL,   -- Need ON
    drb-ToReleaseList-r13                   DRB-ToReleaseList-NB-r13        OPTIONAL,   -- Need ON
    mac-MainConfig-r13                      CHOICE {
        explicitValue-r13                       MAC-MainConfig-NB-r13,
        defaultValue-r13                        NULL
    }                                                                       OPTIONAL,   -- Need ON
    physicalConfigDedicated-r13             PhysicalConfigDedicated-NB-r13  OPTIONAL,   -- Need ON
    rlf-TimersAndConstants-r13              RLF-TimersAndConstants-NB-r13   OPTIONAL,   -- Need ON
    ...
}

SRB-ToAddModList-NB-r13 ::=         SEQUENCE (SIZE (1)) OF SRB-ToAddMod-NB-r13

SRB-ToAddMod-NB-r13 ::=             SEQUENCE {
    rlc-Config-r13                      CHOICE {
        explicitValue                       RLC-Config-NB-r13,
        defaultValue                        NULL
    }       OPTIONAL,                                                       -- Cond Setup
    logicalChannelConfig-r13            CHOICE {
        explicitValue                       LogicalChannelConfig-NB-r13,
        defaultValue                        NULL
    }       OPTIONAL,                                                       -- Cond Setup
    ...,
    [[  rlc-Config-v1430                RLC-Config-NB-v1430         OPTIONAL    -- Need ON
    ]]
}

DRB-ToAddModList-NB-r13 ::=         SEQUENCE (SIZE (1..maxDRB-NB-r13)) OF DRB-ToAddMod-NB-r13

DRB-ToAddMod-NB-r13 ::=             SEQUENCE {
```


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```
    eps-BearerIdentity-r13              INTEGER (0..15)             OPTIONAL,   -- Cond DRB-Setup
    drb-Identity-r13                    DRB-Identity,
    pdcp-Config-r13                     PDCP-Config-NB-r13          OPTIONAL,   -- Cond Setup
    rlc-Config-r13                      RLC-Config-NB-r13           OPTIONAL,   -- Cond Setup
    logicalChannelIdentity-r13          INTEGER (3..10)             OPTIONAL,   -- Cond DRB-Setup
    logicalChannelConfig-r13            LogicalChannelConfig-NB-r13 OPTIONAL,   -- Cond Setup
    ...,
    [[  rlc-Config-v1430                RLC-Config-NB-v1430         OPTIONAL    -- Need ON
    ]]
}

DRB-ToReleaseList-NB-r13 ::=        SEQUENCE (SIZE (1..maxDRB-NB-r13)) OF DRB-Identity

-- ASN1STOP
```

***RadioResourceConfigDedicated-NB* field descriptions**
logicalChannelConfig For SRB a choice is used to indicate whether the logical channel configuration is signalled explicitly or set to the default logical channel configuration for SRB1 as specified in 9.2.1.1.
logicalChannelIdentity The logical channel identity for both UL and DL for a DRB. Value 3 is not used.
mac-MainConfig The default MAC MAIN configuration is specified in 9.2.2.
physicalConfigDedicated The default dedicated physical configuration is specified in 9.2.4.
rlc-Config For SRBs a choice is used to indicate whether the RLC configuration is signalled explicitly or set to the values defined in the default RLC configuration for SRB1 in 9.2.1.1. RLC AM is the only applicable RLC mode.

Conditional presence	Explanation
DRB-Setup	The field is mandatory present if the corresponding DRB is being set up; otherwise it is not present.
Setup	The field is mandatory present if the corresponding SRB/DRB is being setup; otherwise the field is optionally present, need ON.

– *RLC-Config-NB*

The IE *RLC-Config-NB* is used to specify the RLC configuration of SRBs and DRBs.

RLC-Config-NB information element

```
-- ASN1START

RLC-Config-NB-r13 ::=   CHOICE  {
    am                      SEQUENCE {
        ul-AM-RLC-r13               UL-AM-RLC-NB-r13,
        dl-AM-RLC-r13               DL-AM-RLC-NB-r13
    },
    ...
}

RLC-Config-NB-v1430 ::= SEQUENCE {
    t-Reordering-r14            T-Reordering        OPTIONAL        -- Cond twoHARQ
}

UL-AM-RLC-NB-r13 ::=        SEQUENCE {
    t-PollRetransmit-r13        T-PollRetransmit-NB-r13,
    maxRetxThreshold-r13        ENUMERATED {t1, t2, t3, t4, t6, t8, t16, t32}
}

DL-AM-RLC-NB-r13 ::=        SEQUENCE {
    enableStatusReportSN-Gap-r13    ENUMERATED {true}   OPTIONAL
}

T-PollRetransmit-NB-r13 ::= ENUMERATED {
                                ms250,  ms500,  ms1000, ms2000, ms3000, ms4000,
                                ms6000, ms10000, ms15000, ms25000, ms40000, ms60000,
                                ms90000, ms120000, ms180000, spare1}
```


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```
-- ASN1STOP
```

RLC-Config-NB field descriptions
enableStatusReportSN-Gap Indicates that status reporting due to detection of reception failure is enabled, as specified in TS 36.322 [7].
maxRetxThreshold Parameter for RLC AM in TS 36.322 [7]. Value t1 corresponds to 1 retransmission, t2 to 2 retransmissions and so on.
t-PollRetransmit Timer for RLC AM in TS 36.322 [7], in milliseconds. Value msX means X ms, msY means Y ms and so on.
t-Reordering Timer for reordering in TS 36.322 [7], in milliseconds.

Conditional presence	Explanation
twoHARQ	The field is mandatory present if *twoHARQ-ProcessesConfig* is set to TRUE. Otherwise, the field is not present and, if previously configured, the timer is released.

– *RLF-TimersAndConstants-NB*

The IE *RLF-TimersAndConstants-NB* contains UE specific timers and constants applicable for UEs in RRC_CONNECTED.

RLF-TimersAndConstants-NB information element

```
-- ASN1START


RLF-TimersAndConstants-NB-r13 ::=   CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        t301-r13                            ENUMERATED {
                                                ms2500, ms4000, ms6000, ms10000,
                                                ms15000, ms25000, ms40000, ms60000},
        t310-r13                            ENUMERATED {
                                                ms0, ms200, ms500, ms1000, ms2000, ms4000, ms8000},
        n310-r13                            ENUMERATED {
                                                n1, n2, n3, n4, n6, n8, n10, n20},
        t311-r13                            ENUMERATED {
                                                ms1000, ms3000, ms5000, ms10000, ms15000,
                                                ms20000, ms30000},
        n311-r13                            ENUMERATED {
                                                n1, n2, n3, n4, n5, n6, n8, n10},
        ...,
        [[ t311-v1350                       ENUMERATED {
                                                ms40000, ms60000, ms90000, ms120000}
                                                        OPTIONAL    -- Need OR
        ]]
    }
}

-- ASN1STOP
```

RLF-TimersAndConstants-NB field descriptions
n3xy Constants are described in section 7.4. n1 corresponds with 1, n2 corresponds with 2 and so on.
t3xy Timers are described in section 7.3. Value ms0 corresponds with 0 ms, ms200 corresponds with 200 ms and so on. The UE shall use the extended value *t311-v1350*, if present, and ignore the value signaled by *t311-r13*.

– *UplinkPowerControl-NB*

The IE *UplinkPowerControlCommon-NB* and IE *UplinkPowerControlDedicated-NB* are used to specify parameters for uplink power control in the system information and in the dedicated signalling, respectively.

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***UplinkPowerControl-NB* information elements**

```
-- ASN1START


UplinkPowerControlCommon-NB-r13 ::= SEQUENCE {
    p0-NominalNPUSCH-r13                INTEGER (-126..24),
    alpha-r13                           ENUMERATED {al0, al04, al05, al06, al07, al08, al09, al1},
    deltaPreambleMsg3-r13               INTEGER (-1..6)
}

UplinkPowerControlDedicated-NB-r13 ::=  SEQUENCE {
    p0-UE-NPUSCH-r13                        INTEGER (-8..7)
}

-- ASN1STOP
```

***UplinkPowerControl-NB* field descriptions**
alpha
Parameter: $\alpha_c(1)$. See TS 36.213 [23, 16.2.1.1] where al0 corresponds to 0, al04 corresponds to value 0.4, al05 to 0.5, al06 to 0.6, al07 to 0.7, al08 to 0.8, al09 to 0.9 and al1 corresponds to 1.
deltaPreambleMsg3
Parameter: $\Delta_{PREAMBLE\_Msg3}$. See TS 36.213 [23, 16.2.1.1]. Actual value = IE value * 2 [dB].
p0-NominalNPUSCH
Parameter: $P_{O\_NOMINAL\_NPUSCH,c}$ (1). See TS 36.213 [23, 16.2.1.1], unit dBm.
p0-UE-NPUSCH
Parameter: $P_{O\_UE\_NPUSCH,c}$ (1). See TS 36.213 [23, 16.2.1.1], unit dB.

6.7.3.3 NB-IoT Security control information elements

Void

6.7.3.4 NB-IoT Mobility control information elements

– *AdditionalBandInfoList-NB*

AdditionalBandInfoList-NB information element

```
-- ASN1START

AdditionalBandInfoList-NB-r14 ::=   SEQUENCE (SIZE (1..maxMultiBands)) OF FreqBandIndicator-NB-r13

-- ASN1STOP
```

– *FreqBandIndicator-NB*

The IE *FreqBandIndicator-NB* indicates the E-UTRA operating band as defined in TS 36.101 [42, table 5.5-1].

FreqBandIndicator-NB information element

```
-- ASN1START

FreqBandIndicator-NB-r13 ::=            INTEGER (1.. maxFBI2)

-- ASN1STOP
```


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– *MultiBandInfoList-NB*

MultiBandInfoList-NB information element

```
-- ASN1START

MultiBandInfoList-NB-r13 ::=    SEQUENCE (SIZE (1..maxMultiBands)) OF MultiBandInfo-NB-r13

MultiBandInfo-NB-r13 ::=        SEQUENCE {
    freqBandIndicator-r13           FreqBandIndicator-NB-r13        OPTIONAL,    -- Need OR
    freqBandInfo-r13                NS-PmaxList-NB-r13              OPTIONAL     -- Need OR
}

-- ASN1STOP
```

– NS-PmaxList-NB

The IE *NS-PmaxList-NB* concerns a list of *additionalPmax* and *additionalSpectrumEmission* as defined in TS 36.101 [42, 6.2.4F] for a given frequency band. E-UTRAN does not include the same value of *additionalSpectrumEmission* in *SystemInformationBlockType2-NB* within this list.

***NS-PmaxList-NB* information element**

```
-- ASN1START

NS-PmaxList-NB-r13 ::=          SEQUENCE (SIZE (1..maxNS-Pmax-NB-r13)) OF NS-PmaxValue-NB-r13

NS-PmaxValue-NB-r13 ::=         SEQUENCE {
    additionalPmax-r13              P-Max                       OPTIONAL,   -- Need OR
    additionalSpectrumEmission-r13  AdditionalSpectrumEmission
}

-- ASN1STOP
```

– *ReselectionThreshold-NB*

The IE *ReselectionThreshold-NB* is used to indicate an Rx level threshold for cell reselection. Actual value of threshold = field value * 2 [dB].

***ReselectionThreshold-NB* information element**

```
-- ASN1START

ReselectionThreshold-NB-v1360 ::=           INTEGER (32..63)

-- ASN1STOP
```

– *T-Reselection-NB*

The IE *T-Reselection-NB* concerns the cell reselection timer $Treselection_{RAT}$ for NB-IoT.

Value in seconds. s0 means 0 second and behaviour as specified in 7.3.2 applies, s3 means 3 seconds and so on.

T-Reselection-NB information element

```
-- ASN1START

T-Reselection-NB-r13 ::=        ENUMERATED {s0, s3, s6, s9, s12, s15, s18, s21}

-- ASN1STOP
```

6.7.3.5 NB-IoT Measurement information elements

Void

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6.7.3.6 NB-IoT Other information elements

– *EstablishmentCause-NB*

The IE *EstablishmentCause-NB* provides the establishment cause for the RRC connection request or the RRC connection resume request as provided by the upper layers.

***EstablishmentCause-NB* information element**

```
-- ASN1START

EstablishmentCause-NB-r13 ::=           ENUMERATED {
                                            mt-Access, mo-Signalling, mo-Data, mo-ExceptionData,
                                            delayTolerantAccess-v1330, spare3, spare2, spare1}

-- ASN1STOP
```

– *UE-Capability-NB*

The IE *UE-Capability-NB* is used to convey the NB-IoT UE Radio Access Capability Parameters, see TS 36.306 [5]. The IE *UE-Capability-NB* is transferred in NB-IoT only.

***UE-Capability-NB* information element**

```
-- ASN1START

UE-Capability-NB-r13 ::=        SEQUENCE {
    accessStratumRelease-r13        AccessStratumRelease-NB-r13,
    ue-Category-NB-r13              ENUMERATED {nb1}                    OPTIONAL,
    multipleDRB-r13                 ENUMERATED {supported}              OPTIONAL,
    pdcp-Parameters-r13             PDCP-Parameters-NB-r13              OPTIONAL,
    phyLayerParameters-r13          PhyLayerParameters-NB-r13,
    rf-Parameters-r13               RF-Parameters-NB-r13,
    dummy                           SEQUENCE {}                         OPTIONAL
}

UE-Capability-NB-Ext-r14-IEs ::=        SEQUENCE {
    ue-Category-NB-r14                  ENUMERATED {nb2}                OPTIONAL,
    mac-Parameters-r14                  MAC-Parameters-NB-r14           OPTIONAL,
    phyLayerParameters-v1430            PhyLayerParameters-NB-v1430     OPTIONAL,
    rf-Parameters-v1430                 RF-Parameters-NB-v1430,
    nonCriticalExtension                UE-Capability-NB-v1440-IEs      OPTIONAL
}

UE-Capability-NB-v1440-IEs ::=      SEQUENCE {
    phyLayerParameters-v1440            PhyLayerParameters-NB-v1440     OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                     OPTIONAL
}

AccessStratumRelease-NB-r13 ::=     ENUMERATED {rel13, rel14, spare6, spare5, spare4, spare3,
spare2, spare1, ...}

PDCP-Parameters-NB-r13      ::= SEQUENCE {
    supportedROHC-Profiles-r13          SEQUENCE {
        profile0x0002                       BOOLEAN,
        profile0x0003                       BOOLEAN,
        profile0x0004                       BOOLEAN,
        profile0x0006                       BOOLEAN,
        profile0x0102                       BOOLEAN,
        profile0x0103                       BOOLEAN,
        profile0x0104                       BOOLEAN
    },
    maxNumberROHC-ContextSessions-r13   ENUMERATED {cs2, cs4, cs8, cs12}    DEFAULT cs2,
    ...
}

MAC-Parameters-NB-r14       ::=     SEQUENCE {
    dataInactMon-r14                    ENUMERATED {supported}                  OPTIONAL,
    rai-Support-r14                     ENUMERATED {supported}              OPTIONAL
}

PhyLayerParameters-NB-r13   ::=     SEQUENCE {
```


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```
    multiTone-r13                       ENUMERATED {supported}          OPTIONAL,
    multiCarrier-r13                    ENUMERATED {supported}          OPTIONAL
    }

PhyLayerParameters-NB-v1430 ::=     SEQUENCE {
    multiCarrier-NPRACH-r14             ENUMERATED {supported}          OPTIONAL,
    twoHARQ-Processes-r14               ENUMERATED {supported}          OPTIONAL
}

PhyLayerParameters-NB-v1440 ::=     SEQUENCE {
    interferenceRandomisation-r14       ENUMERATED {supported}          OPTIONAL
}

RF-Parameters-NB-r13    ::=         SEQUENCE {
    supportedBandList-r13               SupportedBandList-NB-r13,
    multiNS-Pmax-r13                    ENUMERATED {supported}      OPTIONAL
}

RF-Parameters-NB-v1430 ::=          SEQUENCE {
    powerClassNB-14dBm-r14              ENUMERATED {supported}      OPTIONAL
}

SupportedBandList-NB-r13 ::=        SEQUENCE (SIZE (1..maxBands)) OF SupportedBand-NB-r13

SupportedBand-NB-r13    ::=         SEQUENCE {
    band-r13                            FreqBandIndicator-NB-r13,
    powerClassNB-20dBm-r13              ENUMERATED {supported}      OPTIONAL
}

-- ASN1STOP
```


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UE-Capability-NB field descriptions
accessStratumRelease Set to rel14 in this version of the specification.
dataInactMon Indicates whether the UE supports the data inactivity monitoring as specified in TS 36.321 [6].
dummy This field is not used in the specification. It shall not be sent by the UE.
interferenceRandomisation Indicates whether the UE supports interference randomisation in connected mode as defined in TS.36.211 [21].
maxNumberROHC-ContextSessions Set to the maximum number of concurrently active ROHC contexts supported by the UE, excluding context sessions that leave all headers uncompressed. cs2 corresponds with 2 (context sessions), cs4 corresponds with 4 and so on. The network ignores this field if the UE supports none of the ROHC profiles in *supportedROHC-Profiles*.
multiCarrier Defines whether the UE supports multi -carrier operation.
multicarrier-NPRACH Defines whether the UE supports NPRACH on non-anchor carrier as specified in TS 36.321 [6].
multipleDRB Defines whether the UE supports multiple DRBs.
multiNS-Pmax Defines whether the UE supports the mechanisms defined for NB-IoT cells broadcasting *NS-PmaxList-NB*.
multiTone Defines whether the UE supports UL multi-tone transmissions on NPUSCH.
powerClassNB-14dBm Defines whether the UE supports power class 14dBm in all the bands supported by the UE as specified in TS 36.101 [42]. If *powerClassNB-20dBm* is included, the UE shall not include the field *powerClassNB-14dBm*.
powerClassNB-20dBm Defines whether the UE supports power class 20dBm in NB-IoT for the band, as specified in TS 36.101 [42]. If neither *powerClassNB-14dBm* nor *powerClassNB-20dBm* is included, UE supports power class 23 dBm in the NB-IoT band.
rai-Support Defines whether the UE supports release assistance indication (RAI) as specified in TS 36.321 [6].
supportedBandList Includes the supported NB-IoT bands as defined in TS 36.101 [42].
supportedROHC-Profiles List of supported ROHC profiles as defined in TS 36.323 [8].
twoHARQ-Processes Defines whether the UE supports two HARQ processes operation in DL and UL as specified in TS 36.212 [22] and TS 36.213 [23].
ue-Category-NB UE category as defined in TS 36.306 [5]. Value nb1 corresponds to UE category NB1, value nb2 corresponds to UE category NB2. A UE shall always include the field *ue-Category-NB-r13* in this version of the specification.

NOTE 1: The IE *UE-Capability-NB* does not include AS security capability information, since these are the same as the security capabilities that are signalled by NAS. Consequently AS need not provide "man-in-the-middle" protection for the security capabilities.

– *UE-RadioPagingInfo-NB*

The IE *UE-RadioPagingInfo-NB* contains UE NB-IoT capability information needed for paging.

UE-RadioPagingInfo-NB information element

```
-- ASN1START

UE-RadioPagingInfo-NB-r13 ::=       SEQUENCE {
    ue-Category-NB-r13              ENUMERATED {nb1}            OPTIONAL,
    ...,
    [[ multiCarrierPaging-r14       ENUMERATED {true}           OPTIONAL
```


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```
    ]]
}

-- ASN1STOP
```

UE-RadioPagingInfo-NB field descriptions
multiCarrierPaging Indicates whether the UE supports paging on non-anchor carriers as defined in TS 36.304 [4].
ue-Category-NB UE NB-IoT category as defined in TS 36.306 [5]. A UE shall always include the field *ue-Category-NB-r13* in this version of the specification.

– *UE-TimersAndConstants-NB*

The IE *UE-TimersAndConstants-NB* contains timers and constants used by the UE in either RRC_CONNECTED or RRC_IDLE.

UE-TimersAndConstants-NB information element

```
-- ASN1START

UE-TimersAndConstants-NB-r13 ::=    SEQUENCE {
    t300-r13                            ENUMERATED {
                                            ms2500, ms4000, ms6000, ms10000,
                                            ms15000, ms25000, ms40000, ms60000},
    t301-r13                            ENUMERATED {
                                            ms2500, ms4000, ms6000, ms10000,
                                            ms15000, ms25000, ms40000, ms60000},
    t310-r13                            ENUMERATED {
                                            ms0, ms200, ms500, ms1000, ms2000, ms4000, ms8000},
    n310-r13                            ENUMERATED {
                                            n1, n2, n3, n4, n6, n8, n10, n20},
    t311-r13                            ENUMERATED {
                                            ms1000, ms3000, ms5000, ms10000, ms15000,
                                            ms20000, ms30000},
    n311-r13                            ENUMERATED {
                                            n1, n2, n3, n4, n5, n6, n8, n10},
    ...,
    [[ t311-v1350                       ENUMERATED {
                                            ms40000, ms60000, ms90000, ms120000}
                                                        OPTIONAL    -- Need OR
    ]]
}

-- ASN1STOP
```

***UE-TimersAndConstants-NB* field descriptions**
n3xy Constants are described in section 7.4. n1 corresponds with 1, n2 corresponds with 2 and so on.
t3xy Timers are described in section 7.3. Value ms0 corresponds with 0 ms, ms200 corresponds with 200 ms and so on. The UE shall use the extended value *t311-v1350*, if present, and ignore the value signaled by *t311-r13*.

6.7.3.7 NB-IoT MBMS information elements

Void

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6.7.3.7a NB-IoT SC-PTM information elements

– *SC-MTCH-InfoList-NB*

The IE *SC-MTCH-InfoList-NB* provides the list of ongoing MBMS sessions transmitted via SC-MRB and for each MBMS session, the associated G-RNTI and scheduling information.

***SC-MTCH-InfoList-NB* information element**

```
-- ASN1START

SC-MTCH-InfoList-NB-r14 ::=         SEQUENCE (SIZE (0.. maxSC-MTCH-NB-r14)) OF SC-MTCH-Info-NB-r14

SC-MTCH-Info-NB-r14 ::=                 SEQUENCE    {
    sc-mtch-CarrierConfig-r14           CHOICE {
        dl-CarrierConfig-r14                    DL-CarrierConfigCommon-NB-r14,
        dl-CarrierIndex-r14                 INTEGER (0.. maxNonAnchorCarriers-NB-r14)
    },
    mbmsSessionInfo-r14                 MBMSSessionInfo-r13,
    g-RNTI-r14                          BIT STRING(SIZE(16)),
    sc-mtch-SchedulingInfo-r14          SC-MTCH-SchedulingInfo-NB-r14       OPTIONAL,   -- Need OP
    sc-mtch-NeighbourCell-r14           BIT STRING (SIZE(maxNeighCell-SCPTM-NB-r14))    OPTIONAL, --
Need OP
    npdcch-NPDSCH-MaxTBS-SC-MTCH-r14        ENUMERATED {n680, n2536},
    npdcch-NumRepetitions-SC-MTCH-r14   ENUMERATED {r1, r2, r4, r8, r16,
                                                    r32, r64, r128, r256,
                                                    r512, r1024, r2048, spare4,
                                                    spare3, spare2, spare1},
    npdcch-StartSF-SC-MTCH-r14          ENUMERATED {v1dot5, v2, v4, v8,
                                                    v16, v32, v48, v64},
    npdcch-Offset-SC-MTCH-r14           ENUMERATED {zero, oneEighth, oneQuarter,
                                                    threeEighth, oneHalf, fiveEighth,
                                                    threeQuarter, sevenEighth},
    ...
}

SC-MTCH-SchedulingInfo-NB-r14 ::=       SEQUENCE    {
    onDurationTimerSCPTM-r14                ENUMERATED {
                                                pp1, pp2, pp3, pp4,
                                                pp8, pp16, pp32, spare},
    drx-InactivityTimerSCPTM-r14            ENUMERATED {
                                                pp0, pp1, pp2, pp3,
                                                pp4, pp8, pp16, pp32},
    schedulingPeriodStartOffsetSCPTM-r14    CHOICE {
        sf10                                    INTEGER(0..9),
        sf20                                    INTEGER(0..19),
        sf32                                    INTEGER(0..31),
        sf40                                    INTEGER(0..39),
        sf64                                    INTEGER(0..63),
        sf80                                    INTEGER(0..79),
        sf128                                   INTEGER(0..127),
        sf160                                   INTEGER(0..159),
        sf256                                   INTEGER(0..255),
        sf320                                   INTEGER(0..319),
        sf512                                   INTEGER(0..511),
        sf640                                   INTEGER(0..639),
        sf1024                                  INTEGER(0..1023),
        sf2048                                  INTEGER(0..2047),
        sf4096                                  INTEGER(0..4095),
        sf8192                                  INTEGER(0..8191)
    },
    ...
}

-- ASN1STOP
```


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SC-MTCH-InfoList-NB field descriptions
dl-CarrierConfig Downlink carrier used for SC-MTCH.
dl-CarrierIndex Index to a downlink carrier signalled in system information. Value '0' corresponds to the anchor carrier, value '1' corresponds to the first entry in *dl-ConfigList* in *SystemInformationBlockType22-NB,* value '2' corresponds to the second entry in *dl-ConfigList* and so on.
drx-InactivityTimerSCPTM Timer for SC-MTCH reception in TS 36.321 [6]. Value in number of NPDCCH periods. Value pp1 corresponds to 1 NPDCCH period, pp2 corresponds to 2 NPDCCH periods and so on.
g-RNTI G-RNTI used to scramble the scheduling and transmission of a SC-MTCH.
mbmsSessionInfo Indicates the ongoing MBMS session in a SC-MTCH.
npdcch-NPDSCH-MaxTBS-SC-MTCH Maximum NPDSCH TBS for the SC-MTCH, see TS 36.213 [23]. Value *n680* corresponds to 680 bits and value *n2536* corresponds to 2536 bits.
npdcch-NumRepetition-SC-MTCH The maximum number of NPDCCH repetitions the UE needs to monitor for SC-MTCH multicast search space, see TS 36.213 [23].
npdcch-Offset-SC-MTCH Fractional period offset of starting subframe for NPDCCH multicast search space for SC-MTCH, see TS 36.213 [23].
npdcch-startSF-SC-MTCH Starting subframes configuration of the NPDCCH multicast search space for SC-MTCH, see TS 36.213 [23].
onDurationTimerSCPTM Timer for SC-MTCH reception in TS 36.321 [6]. Value in number of NPDCCH periods. Value pp1 corresponds to 1 NPDCCH period, pp2 corresponds to 2 NPDCCH periods and so on.
schedulingPeriodStartOffsetSCPTM *SCPTM-SchedulingCycle* and *SCPTM-SchedulingOffset* in TS 36.321 [6]. The value of *SCPTM-SchedulingCycle* is in number of sub-frames. Value sf10 corresponds to 10 sub-frames, sf20 corresponds to 20 sub-frames and so on. The value of *SCPTM-SchedulingOffset* is in number of sub-frames.
sc-mtch-CarrierConfig Downlink carrier that is used for SC-MTCH.
sc-mtch-NeighbourCell Indicates neighbour cells which also provide this service on SC-MTCH. The first bit is set to 1 if the service is provided on SC-MTCH in the first cell in *scptmNeighbourCellList*, otherwise it is set to 0. The second bit is set to 1 if the service is provided on SC-MTCH in the second cell in *scptmNeighbourCellList*, and so on. If this field is absent, the UE shall assume that this service is not available on SC-MTCH in any neighbour cell.
sc-mtch-SchedulingInfo DRX information for the SC-MTCH. If this field is absent, DRX is not used for the SC-MTCH.

– *SCPTM-NeighbourCellList-NB*

The IE *SCPTM-NeighbourCellList-NB* indicates a list of neighbour cells where ongoing MBMS sessions provided via SC-MRB in the current cells are also provided.

```
-- ASN1START

SCPTM-NeighbourCellList-NB-r14 ::=  SEQUENCE (SIZE (1..maxNeighCell-SCPTM-NB-r14)) OF PCI-ARFCN-NB-
r14

PCI-ARFCN-NB-r14 ::=                SEQUENCE {
    physCellId-r14                      PhysCellId,
    carrierFreq-r14                     CarrierFreq-NB-r13      OPTIONAL    -- Need OP
}

-- ASN1STOP
```


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SCPTM-NeighbourCellList-NB field descriptions
physCellId Physical Cell Identity of the neighbour cell.
carrierFreq Carrier frequency of the neighbour cell. Absence of the IE means that the neighbour cell is on the same frequency as the current cell.

6.7.4 NB-IoT RRC multiplicity and type constraint values

– Multiplicity and type constraint definitions

```
-- ASN1START

maxNPRACH-Resources-NB-r13  INTEGER ::= 3   -- Maximum number of NPRACH resources for NB-IoT
maxNonAnchorCarriers-NB-r14 INTEGER ::= 15  -- Maximum number of non-anchor carriers for NB-IoT
maxDRB-NB-r13               INTEGER ::= 2   -- Maximum number of Data Radio Bearers for NB-IoT
maxNeighCell-SCPTM-NB-r14   INTEGER ::= 8   -- Maximum number of SCPTM neighbour cells
maxNS-Pmax-NB-r13           INTEGER ::= 4   -- Maximum number of NS and P-Max values per band
maxSC-MTCH-NB-r14           INTEGER ::= 64  -- Maximum number of SC-MTCHs in one cell for NB-IoT
maxSI-Message-NB-r13        INTEGER ::= 8   -- Maximum number of SI messages for NB-IoT

-- ASN1STOP
```

– End of NBIOT-RRC-Definitions

```
-- ASN1START

END

-- ASN1STOP
```

6.7.5 Direct Indication Information

Direct Indication information is transmitted on NPDCCH using P-RNTI but without associated *Paging-NB* message. Table 6.7.5-1 defines the Direct Indication information, see TS 36.212 [22, 6.4.3.3].

When bit n is set to 1, the UE shall behave as if the corresponding field is set in the *Paging-NB* message, see 5.3.2.3. Bit 1 is the least significant bit.

Table 6.7.5-1: Direct Indication information

Bit	Field in *Direct Indication information*
1	*systemInfoModification*
2	*systemInfoModification-eDRX*
3, 4, 5, 6, 7, 8	Not used, and shall be ignored by UE if received

7 Variables and constants

7.1 UE variables

NOTE: To facilitate the specification of the UE behavioural requirements, UE variables are represented using ASN.1. Unless explicitly specified otherwise, it is however up to UE implementation how to store the variables. The optionality of the IEs in ASN.1 is used only to indicate that the values may not always be available.

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– *EUTRA-UE-Variables*

This ASN.1 segment is the start of the E-UTRA UE variable definitions.

```
-- ASN1START

EUTRA-UE-Variables DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
    AbsoluteTimeInfo-r10,
    AreaConfiguration-r10,
    AreaConfiguration-v1130,
    CarrierFreqGERAN,
    CellIdentity,
    ConnEstFailReport-r11,
    SpeedStateScaleFactors,
    C-RNTI,
    LoggingDuration-r10,
    LoggingInterval-r10,
    LogMeasInfo-r10,
    MeasCSI-RS-Id-r12,
    MeasId,
    MeasId-v1250,
    MeasIdToAddModList,
    MeasIdToAddModListExt-r12,
    MeasIdToAddModList-v1310,
    MeasIdToAddModListExt-v1310,
    MeasObjectToAddModList,
    MeasObjectToAddModList-v9e0,
    MeasObjectToAddModListExt-r13,
    MeasScaleFactor-r12,
    MobilityStateParameters,
    NeighCellConfig,
    PhysCellId,
    PhysCellIdCDMA2000,
    PhysCellIdGERAN,
    PhysCellIdUTRA-FDD,
    PhysCellIdUTRA-TDD,
    PLMN-Identity,
    PLMN-IdentityList3-r11,
    QuantityConfig,
    ReportConfigToAddModList,
    RLF-Report-r9,
    TargetMBSFN-AreaList-r12,
    TraceReference-r10,
    Tx-ResourcePoolMeasList-r14,
    VisitedCellInfoList-r12,
    maxCellMeas,
    maxCSI-RS-Meas-r12,
    maxMeasId,
    maxMeasId-r12,
    UL-DelayConfig-r13,
    WLAN-CarrierInfo-r13,
    WLAN-Identifiers-r12,
    WLAN-Id-List-r13,
    WLAN-Status-r13,
    WLAN-Status-v1430,
    WLAN-SuspendConfig-r14

FROM EUTRA-RRC-Definitions;

-- ASN1STOP
```

– *VarConnEstFailReport*

The UE variable *VarConnEstFailReport* includes the connection establishment failure information.

VarConnEstFailReport UE variable

```
-- ASN1START
```


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```
VarConnEstFailReport-r11 ::=        SEQUENCE {
    connEstFailReport-r11               ConnEstFailReport-r11,
    plmn-Identity-r11                   PLMN-Identity
}

-- ASN1STOP
```

– *VarLogMeasConfig*

The UE variable *VarLogMeasConfig* includes the configuration of the logging of measurements to be performed by the UE while in RRC_IDLE, covering intra-frequency, inter-frequency, inter-RAT mobility and MBSFN related measurements. If MBSFN logging is configured, the UE performs logging of measurements while in both RRC_IDLE and RRC_CONNECTED. Otherwise, the UE performs logging of measurements only while in RRC_IDLE.

VarLogMeasConfig UE variable

```
-- ASN1START

VarLogMeasConfig-r10 ::=                SEQUENCE {
    areaConfiguration-r10           AreaConfiguration-r10       OPTIONAL,
    loggingDuration-r10             LoggingDuration-r10,
    loggingInterval-r10             LoggingInterval-r10
}

VarLogMeasConfig-r11 ::=        SEQUENCE {
    areaConfiguration-r10           AreaConfiguration-r10       OPTIONAL,
    areaConfiguration-v1130         AreaConfiguration-v1130     OPTIONAL,
    loggingDuration-r10             LoggingDuration-r10,
    loggingInterval-r10             LoggingInterval-r10
}

VarLogMeasConfig-r12 ::=        SEQUENCE {
    areaConfiguration-r10           AreaConfiguration-r10       OPTIONAL,
    areaConfiguration-v1130         AreaConfiguration-v1130     OPTIONAL,
    loggingDuration-r10             LoggingDuration-r10,
    loggingInterval-r10             LoggingInterval-r10,
    targetMBSFN-AreaList-r12        TargetMBSFN-AreaList-r12    OPTIONAL
}

-- ASN1STOP
```

– *VarLogMeasReport*

The UE variable *VarLogMeasReport* includes the logged measurements information.

VarLogMeasReport UE variable

```
-- ASN1START

VarLogMeasReport-r10 ::=                SEQUENCE {
    traceReference-r10                  TraceReference-r10,
    traceRecordingSessionRef-r10            OCTET STRING (SIZE (2)),
    tce-Id-r10                          OCTET STRING (SIZE (1)),
    plmn-Identity-r10                   PLMN-Identity,
    absoluteTimeInfo-r10                AbsoluteTimeInfo-r10,
    logMeasInfoList-r10                 LogMeasInfoList2-r10
}

VarLogMeasReport-r11 ::=            SEQUENCE {
    traceReference-r10                  TraceReference-r10,
    traceRecordingSessionRef-r10        OCTET STRING (SIZE (2)),
    tce-Id-r10                          OCTET STRING (SIZE (1)),
    plmn-IdentityList-r11               PLMN-IdentityList3-r11,
    absoluteTimeInfo-r10                AbsoluteTimeInfo-r10,
    logMeasInfoList-r10                 LogMeasInfoList2-r10
}

LogMeasInfoList2-r10 ::=                SEQUENCE (SIZE (1..maxLogMeas-r10)) OF LogMeasInfo-r10

-- ASN1STOP
```


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– *VarMeasConfig*

The UE variable *VarMeasConfig* includes the accumulated configuration of the measurements to be performed by the UE, covering intra-frequency, inter-frequency and inter-RAT mobility related measurements.

NOTE: The amount of measurement configuration information, which a UE is required to store, is specified in subclause 11.1. If the number of frequencies configured for a particular RAT exceeds the minimum performance requirements specified in [16], it is up to UE implementation which frequencies of that RAT are measured. If the total number of frequencies for all RATs provided to the UE in the measurement configuration exceeds the minimum performance requirements specified in [16], it is up to UE implementation which frequencies/RATs are measured.

VarMeasConfig UE variable

```
-- ASN1START

VarMeasConfig ::=                   SEQUENCE {
    -- Measurement identities
    measIdList                          MeasIdToAddModList                  OPTIONAL,
    measIdListExt-r12                   MeasIdToAddModListExt-r12           OPTIONAL,
    measIdList-v1310                        MeasIdToAddModList-v1310                OPTIONAL,
    measIdListExt-v1310                 MeasIdToAddModListExt-v1310         OPTIONAL,
    -- Measurement objects
    measObjectList                      MeasObjectToAddModList              OPTIONAL,
    measObjectListExt-r13               MeasObjectToAddModListExt-r13       OPTIONAL,
    measObjectList-v9i0                 MeasObjectToAddModList-v9e0         OPTIONAL,
    -- Reporting configurations
    reportConfigList                    ReportConfigToAddModList            OPTIONAL,
    -- Other parameters
    quantityConfig                      QuantityConfig                      OPTIONAL,
    measScaleFactor-r12                 MeasScaleFactor-r12                 OPTIONAL,
    s-Measure                           INTEGER (-140..-44)                 OPTIONAL,
    speedStatePars                      CHOICE {
        release                             NULL,
        setup                               SEQUENCE {
            mobilityStateParameters             MobilityStateParameters,
            timeToTrigger-SF                    SpeedStateScaleFactors
        }
    }                                                                       OPTIONAL,
    allowInterruptions-r11          BOOLEAN                             OPTIONAL
}

-- ASN1STOP
```

– *VarMeasReportList*

The UE variable *VarMeasReportList* includes information about the measurements for which the triggering conditions have been met.

VarMeasReportList UE variable

```
-- ASN1START

VarMeasReportList ::=               SEQUENCE (SIZE (1..maxMeasId)) OF VarMeasReport
VarMeasReportList-r12 ::=           SEQUENCE (SIZE (1..maxMeasId-r12)) OF VarMeasReport

VarMeasReport ::=                   SEQUENCE {
    -- List of measurement that have been triggered
    measId                              MeasId,
    measId-v1250                        MeasId-v1250                    OPTIONAL,
    cellsTriggeredList                  CellsTriggeredList              OPTIONAL,
    csi-RS-TriggeredList-r12            CSI-RS-TriggeredList-r12        OPTIONAL,
    poolsTriggeredList-r14              Tx-ResourcePoolMeasList-r14 OPTIONAL,
    numberOfReportsSent                 INTEGER
}

CellsTriggeredList ::=              SEQUENCE (SIZE (1..maxCellMeas)) OF CHOICE {
    physCellIdEUTRA                         PhysCellId,
    physCellIdUTRA                          CHOICE {
        fdd                                     PhysCellIdUTRA-FDD,
        tdd                                     PhysCellIdUTRA-TDD
    },
```


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```
    physCellIdGERAN                         SEQUENCE {
        carrierFreq                             CarrierFreqGERAN,
        physCellId                              PhysCellIdGERAN
    },
    physCellIdCDMA2000                      PhysCellIdCDMA2000,
    wlan-Identifiers-r13                    WLAN-Identifiers-r12
}

CSI-RS-TriggeredList-r12 ::=        SEQUENCE (SIZE (1..maxCSI-RS-Meas-r12)) OF MeasCSI-RS-Id-r12

-- ASN1STOP
```

– *VarMobilityHistoryReport*

The UE variable *VarMobilityHistoryReport* includes the mobility history information.

```
-- ASN1START
VarMobilityHistoryReport-r12 ::=    VisitedCellInfoList-r12

-- ASN1STOP
```

– *VarRLF-Report*

The UE variable *VarRLF-Report* includes the radio link failure information or handover failure information.

***VarRLF-Report* UE variable**

```
-- ASN1START

VarRLF-Report-r10 ::=               SEQUENCE {
    rlf-Report-r10                          RLF-Report-r9,
    plmn-Identity-r10                       PLMN-Identity
}

VarRLF-Report-r11 ::=               SEQUENCE {
    rlf-Report-r10                      RLF-Report-r9,
    plmn-IdentityList-r11               PLMN-IdentityList3-r11
}

-- ASN1STOP
```

– *VarShortMAC-Input*

The UE variable *VarShortMAC-Input* specifies the input used to generate the shortMAC-I.

***VarShortMAC-Input* UE variable**

```
-- ASN1START

VarShortMAC-Input ::=                   SEQUENCE {
    cellIdentity                            CellIdentity,
    physCellId                              PhysCellId,
    c-RNTI                                  C-RNTI
}

-- ASN1STOP
```

***VarShortMAC-Input* field descriptions**
cellIdentity Set to CellIdentity of the current cell.
c-RNTI Set to C-RNTI that the UE had in the PCell it was connected to prior to the failure.
physCellId Set to the physical cell identity of the PCell the UE was connected to prior to the failure.

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– *VarShortResumeMAC-Input*

The UE variable *VarShortResumeMAC-Input* specifies the input used to generate the *shortResumeMAC-I* during RRC Connection Resume procedure.

VarShortResumeMAC-Input UE variable

```
-- ASN1START

VarShortResumeMAC-Input-r13 ::=     SEQUENCE {
    cellIdentity-r13                        CellIdentity,
    physCellId-r13                          PhysCellId,
    c-RNTI-r13                              C-RNTI,
    resumeDiscriminator-r13                 BIT STRING(SIZE(1))
}

-- ASN1STOP
```

VarShortResumeMAC-Input field descriptions
cellIdentity Set to CellIdentity of the current cell.
c-RNTI Set to C-RNTI that the UE had in the PCell it was connected to prior to suspension of the RRC connection.
physCellId Set to the physical cell identity of the PCell the UE was connected to prior to suspension of the RRC connection..
resumeDiscriminator A constant that allows differentiation in the calculation of the MAC-I for *shortResumeMAC-I* The resumeDiscriminator is set to '1'

– *VarWLAN-MobilityConfig*

The UE variable *VarWLAN-MobilityConfig* includes information about WLAN for access selection and mobility.

VarWLAN-MobilityConfig UE variable

```
-- ASN1START

VarWLAN-MobilityConfig ::=              SEQUENCE {
    wlan-MobilitySet-r13                WLAN-Id-List-r13            OPTIONAL,
    successReportRequested              ENUMERATED {true}           OPTIONAL,
    wlan-SuspendConfig-r14              WLAN-SuspendConfig-r14      OPTIONAL
}

-- ASN1STOP
```

***VarWLAN-MobilityConfig* field descriptions**
wlan-MobilitySet Indicates the WLAN mobility set configured.
successReportRequested Indicates whether the UE shall report successful connection to WLAN. Applicable to LWA and LWIP.

– *VarWLAN-Status*

The UE variable *VarWLAN-Status* includes information about the status of WLAN connection for LWA, RCLWI or LWIP.

VarWLAN-Status UE variable

```
-- ASN1START

VarWLAN-Status-r13 ::=              SEQUENCE {
    status-r13                              WLAN-Status-r13,
    status-r14                              WLAN-Status-v1430   OPTIONAL
}
```


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```
-- ASN1STOP
```

VarWLAN-Status field descriptions
status Indicates the connection status to WLAN and causes for connection failures.

– Multiplicity and type constraint definitions

This section includes multiplicity and type constraints applicable (only) for UE variables.

```
-- ASN1START

maxLogMeas-r10              INTEGER ::= 4060-- Maximum number of logged measurement entries
                                        --  that can be stored by the UE

-- ASN1STOP
```

– End of *EUTRA-UE-Variables*

```
-- ASN1START

END

-- ASN1STOP
```

7.1a NB-IoT UE variables

NOTE: To facilitate the specification of the UE behavioural requirements, UE variables are represented using ASN.1. Unless explicitly specified otherwise, it is however up to UE implementation how to store the variables. The optionality of the IEs in ASN.1 is used only to indicate that the values may not always be available.

– *NBIOT-UE-Variables*

This ASN.1 segment is the start of the NB-IoT UE variable definitions.

```
-- ASN1START

NBIOT-UE-Variables DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
    VarShortMAC-Input,
    VarShortResumeMAC-Input-r13

FROM EUTRA-UE-Variables;

VarShortMAC-Input-NB-r13        ::=     VarShortMAC-Input

VarShortResumeMAC-Input-NB-r13  ::=     VarShortResumeMAC-Input-r13

-- ASN1STOP
```

– End of *NBIOT-UE-Variables*

```
-- ASN1START

END

-- ASN1STOP
```


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7.2 Counters

Counter	Reset	Incremented	When reaching max value

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7.3 Timers

7.3.1 Timers (Informative)

Timer	Start	Stop	At expiry
T300 NOTE1	Transmission of *RRCConnectionRequest* or *RRCConnectionResumeRequest*	Reception of *RRCConnectionSetup*, *RRCConnectionReject* or *RRCConnectionResume* message, cell re-selection and upon abortion of connection establishment by upper layers	Perform the actions as specified in 5.3.3.6
T301 NOTE1	Transmission of *RRCConnectionReestablishmentRequest*	Reception of *RRCConnectionReestablishment* or *RRCConnectionReestablishmentReject* message as well as when the selected cell becomes unsuitable	Go to RRC_IDLE
T302	Reception of *RRCConnectionReject* while performing RRC connection establishment	Upon entering RRC_CONNECTED and upon cell re-selection	Inform upper layers about barring alleviation as specified in 5.3.3.7
T303	Access barred while performing RRC connection establishment for mobile originating calls	Upon entering RRC_CONNECTED and upon cell re-selection	Inform upper layers about barring alleviation as specified in 5.3.3.7
T304	Reception of *RRCConnectionReconfiguration* message including the *MobilityControl Info* or reception of *MobilityFromEUTRACommand* message including *CellChangeOrder*	Criterion for successful completion of handover within E-UTRA, handover to E-UTRA or cell change order is met (the criterion is specified in the target RAT in case of inter-RAT)	In case of cell change order from E-UTRA or intra E-UTRA handover, initiate the RRC connection re-establishment procedure; In case of handover to E-UTRA, perform the actions defined in the specifications applicable for the source RAT.
T305	Access barred while performing RRC connection establishment for mobile originating signalling	Upon entering RRC_CONNECTED and upon cell re-selection	Inform upper layers about barring alleviation as specified in 5.3.3.7
T306	Access barred while performing RRC connection establishment for mobile originating CS fallback.	Upon entering RRC_CONNECTED and upon cell re-selection	Inform upper layers about barring alleviation as specified in 5.3.3.7
T307	Reception of *RRCConnectionReconfiguration* message including *MobilityControlInfoSCG*	Successful completion of random access on the PSCell, upon initiating re-establishment and upon SCG release	Inform E-UTRAN about the SCG change failure by initiating the SCG failure information procedure as specified in 5.6.13.
T308	Access barred due to ACDC while performing RRC connection establishment subject to ACDC	Upon entering RRC_CONNECTED and upon cell re-selection	Inform upper layers about barring alleviation for ACDC as specified in 5.3.3.7
T310 NOTE1 NOTE2	Upon detecting physical layer problems for the PCell i.e. upon receiving N310 consecutive out-of-sync indications from lower layers	Upon receiving N311 consecutive in-sync indications from lower layers for the PCell, upon triggering the handover procedure and upon initiating the connection re-establishment procedure	If security is not activated: go to RRC_IDLE else: initiate the connection re-establishment procedure

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Timer	Start	Stop	At expiry
T311 NOTE1	Upon initiating the RRC connection re-establishment procedure	Selection of a suitable E-UTRA cell or a cell using another RAT.	Enter RRC_IDLE
T312 NOTE2	Upon triggering a measurement report for a measurement identity for which T312 has been configured, while T310 is running	Upon receiving N311 consecutive in-sync indications from lower layers, upon triggering the handover procedure, upon initiating the connection re-establishment procedure, and upon the expiry of T310	If security is not activated: go to RRC_IDLE else: initiate the connection re-establishment procedure
T313 NOTE2	Upon detecting physical layer problems for the PSCell i.e. upon receiving N313 consecutive out-of-sync indications from lower layers	Upon receiving N314 consecutive in-sync indications from lower layers for the PSCell, upon initiating the connection re-establishment procedure, upon SCG release and upon receiving *RRCConnectionReconfiguration* including *MobilityControlInfoSCG*	Inform E-UTRAN about the SCG radio link failure by initiating the SCG failure information procedure as specified in 5.6.13.
T320	Upon receiving *t320* or upon cell (re)selection to E-UTRA from another RAT with validity time configured for dedicated priorities (in which case the remaining validity time is applied).	Upon entering RRC_CONNECTED, when PLMN selection is performed on request by NAS, or upon cell (re)selection to another RAT (in which case the timer is carried on to the other RAT).	Discard the cell reselection priority information provided by dedicated signalling.
T321	Upon receiving *measConfig* including a *reportConfig* with the *purpose* set to *reportCGI*	Upon acquiring the information needed to set all fields of *cellGlobalId* for the requested cell, upon receiving *measConfig* that includes removal of the *reportConfig* with the *purpose* set to *reportCGI*	Initiate the measurement reporting procedure, stop performing the related measurements and remove the corresponding *measId*
T322 NOTE1	Upon receiving *redirectedCarrierOffsetDedicated* included in *RedirectedCarrierInfo*	Upon entering RRC_CONNECTED, when PLMN selection is performed on request by NAS, or upon cell (re)selection to another RAT.	Release *redirectedCarrierOffsetDedicated*.
T325	Timer (re)started upon receiving *RRCConnectionReject* message with *deprioritisationTimer*.		Stop deprioritisation of all frequencies or E-UTRA signalled by *RRCConnectionReject.*
T330	Upon receiving *LoggedMeasurementConfiguration* message	Upon log volume exceeding the suitable UE memory, upon initiating the release of *LoggedMeasurementConfiguration* procedure	Perform the actions specified in 5.6.6.4
T340 NOTE2	Upon transmitting *UEAssistanceInformation* message with *powerPrefIndication* set to *normal*	Upon initiating the connection re-establishment procedure	No action.
T341 NOTE2	Upon transmitting *UEAssistanceInformation* message with *bw-Preference.*	Upon resuming an RRC connection or upon initiating the connection re-establishment procedure	No action.
T342 NOTE2	Upon transmitting *DelayBudgetReport* message.	Upon initiating the connection re-establishment and connection resume procedures	No action.
T350	Upon entering RRC_IDLE if *t350* has been received in wlan-OffloadInfo.	Upon entering RRC_CONNECTED, or upon cell reselection.	Perform the actions specified in 5.6.12.4.

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Timer	Start	Stop	At expiry
T351	Reception of *RRCConnectionReconfiguration* message including the association*Timer* in *WLAN-MobilityConfig*.	Upon successful connection to WLAN, upon WLAN connection failure, upon leaving RRC_CONNECTED, upon triggering the handover procedure, or upon initiating the connection re-establishment procedure.	Perform WLAN Connection Status Reporting specified in 5.6.15.2.
T360	Upon performing the redistribution target selection as specified in TS 36.304 [4].	Upon entering RRC_CONNECTED, upon receiving a Paging message including *redistributionIndication*; upon reselecting a cell not belonging to the redistribution target.	Stop considering a frequency or cell to be redistribution target, and perform the redistribution target selection if the condition specified in TS 36.304 [4] is met.
T370	Upon receiving *SL-DiscConfig* including a *discSysInfoToReportConfig* set to *setup.*	Upon initiating the transmission of *SidelinkUEInformation* including *discSysInfoReportFreqList*, upon receiving *SL-DiscConfig* including *discSysInfoToReportConfig* set to *release*, upon handover and re-establishment.	Release *discSysInfoToReportConfig*.
T314 NOTE2	Upon early detecting physical layer problems for the PCell i.e. upon receiving N310 consecutive "early-out-of-sync" indications from lower layers.	Upon receiving N311 consecutive in-sync indications from lower layers for the PCell, upon triggering the handover procedure and upon initiating the connection re-establishment procedure	Initiate the UE Assistance Information procedure to report early detection of physical layer problems in accordance with 5.6.10.
T315 NOTE2	Upon detecting physical layer improvements of the PCell i.e. upon receiving N311 consecutive "early-in-sync" indications from lower layers.	Upon receiving N310 consecutive "early-out-of-sync" indications from lower layers for the PCell.	Initiate the UE Assistance Information procedure to report detection of physical layer improvements in accordance with 5.6.10.
T343 NOTE2	Upon transmitting *UEAssistanceInformation* message with *RLM-Report* including *earlyOutOfSync*.	Upon initiating the connection re-establishment procedure	No action.
T344 NOTE2	Upon transmitting *UEAssistanceInformation* message with *RLM-Report* including *earlyInSync*.	Upon initiating the connection re-establishment procedure	No action.
T345	Upon transmitting *UEAssistanceInformation* message with *overheatingAssistance*	Upon initiating the connection re-establishment procedure	No action.
NOTE1: Only the timers marked with "NOTE1" are applicable to NB-IoT. NOTE2: The behaviour as specified in 7.3.2 applies.			

7.3.2 Timer handling

When the UE applies zero value for a timer, the timer shall be started and immediately expire unless explicitly stated otherwise.

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7.4 Constants

Constant	Usage
N310	Maximum number of consecutive "out-of-sync" or "early-out-of-sync" indications for the PCell received from lower layers
N311	Maximum number of consecutive "in-sync" or "early-in-sync" indications for the PCell received from lower layers
N313	Maximum number of consecutive "out-of-sync" indications for the PSCell received from lower layers
N314	Maximum number of consecutive "in-sync" indications for the PSCell received from lower layers

8 Protocol data unit abstract syntax

8.1 General

The RRC PDU contents in clause 6, clause 9.3.2 and clause 10 are described using abstract syntax notation one (ASN.1) as specified in ITU-T Rec. X.680 [13] and X.681 [14]. Transfer syntax for RRC PDUs is derived from their ASN.1 definitions by use of Packed Encoding Rules, unaligned as specified in ITU-T Rec. X.691 [15].

The following encoding rules apply in addition to what has been specified in X.691:

- When a bit string value is placed in a bit-field as specified in 15.6 to 15.11 in X.691, the leading bit of the bit string value shall be placed in the leading bit of the bit-field, and the trailing bit of the bit string value shall be placed in the trailing bit of the bit-field.

NOTE: The terms 'leading bit' and 'trailing bit' are defined in ITU-T Rec. X.680. When using the 'bstring' notation, the leading bit of the bit string value is on the left, and the trailing bit of the bit string value is on the right.

- When decoding types constrained with the ASN.1 Contents Constraint ("CONTAINING"), automatic decoding of the contained type should not be performed because errors in the decoding of the contained type should not cause the decoding of the entire RRC message PDU to fail. It is recommended that the decoder first decodes the outer PDU type that contains the OCTET STRING or BIT STRING with the Contents Constraint, and then decodes the contained type that is nested within the OCTET STRING or BIT STRING as a separate step.

- When decoding a) RRC message PDUs, b) BIT STRING constrained with a Contents Constraint, or c) OCTET STRING constrained with a Contents Constraint, PER decoders are required to never report an error if there are extraneous zero or non-zero bits at the end of the encoded RRC message PDU, BIT STRING or OCTET STRING.

8.2 Structure of encoded RRC messages

An RRC PDU, which is the bit string that is exchanged between peer entities/ across the radio interface contains the basic production as defined in X.691.

RRC PDUs shall be mapped to and from PDCP SDUs (in case of DCCH) or RLC SDUs (in case of PCCH, BCCH, BR-BCCH, CCCH or MCCH) upon transmission and reception as follows:

- when delivering an RRC PDU as an PDCP SDU to the PDCP layer for transmission, the first bit of the RRC PDU shall be represented as the first bit in the PDCP SDU and onwards; and

- when delivering an RRC PDU as an RLC SDU to the RLC layer for transmission, the first bit of the RRC PDU shall be represented as the first bit in the RLC SDU and onwards; and

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- upon reception of an PDCP SDU from the PDCP layer, the first bit of the PDCP SDU shall represent the first bit of the RRC PDU and onwards; and
- upon reception of an RLC SDU from the RLC layer, the first bit of the RLC SDU shall represent the first bit of the RRC PDU and onwards.

8.3 Basic production

The 'basic production' is obtained by applying UNALIGNED PER to the abstract syntax value (the ASN.1 description) as specified in X.691. It always contains a multiple of 8 bits.

8.4 Extension

The following rules apply with respect to the use of protocol extensions:

- A transmitter compliant with this version of the specification shall, unless explicitly indicated otherwise on a PDU type basis, set the extension part empty. Transmitters compliant with a later version may send non-empty extensions;
- A transmitter compliant with this version of the specification shall set spare bits to zero;

8.5 Padding

If the encoded RRC message does not fill a transport block, the RRC layer shall add padding bits. This applies to PCCH, BCCH and BR-BCCH.

Padding bits shall be set to 0 and the number of padding bits is a multiple of 8.

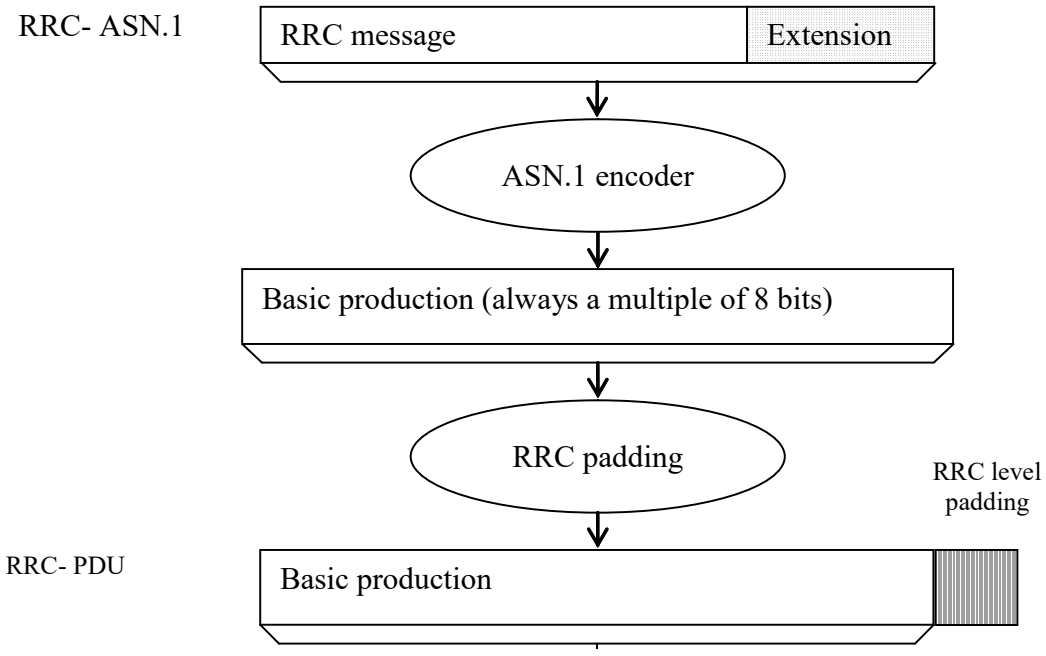


Figure 8.5-1: RRC level padding

9 Specified and default radio configurations

Specified and default configurations are configurations of which the details are specified in the standard. Specified configurations are fixed while default configurations can be modified using dedicated signalling.

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9.1 Specified configurations

9.1.1 Logical channel configurations

9.1.1.1 BCCH configuration

Parameters

Name	Value	Semantics description	Ver
PDCP configuration	N/A		
RLC configuration	TM		
MAC configuration	TM		

NOTE: RRC will perform padding, if required due to the granularity of the TF signalling, as defined in 8.5.

9.1.1.2 CCCH configuration

Parameters

Name	Value	Semantics description	Ver
PDCP configuration	N/A		
RLC configuration	TM		
MAC configuration		Normal MAC headers are used	
Logical channel configuration			
priority	1	Highest priority	
prioritisedBitRate	infinity		
bucketSizeDuration	N/A		
logicalChannelGroup	0		
logicalChannelSR-Mask-r9	release		v920

9.1.1.3 PCCH configuration

Parameters

Name	Value	Semantics description	Ver
PDCP configuration	N/A		
RLC configuration	TM		
MAC configuration	TM		

NOTE: RRC will perform padding, if required due to the granularity of the TF signalling, as defined in 8.5.

9.1.1.4 MCCH and MTCH configuration

Parameters

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Name	Value	Semantics description	Ver
PDCP configuration	N/A		
RLC configuration	UM		
sn-FieldLength	size5		
t-Reordering	0		

9.1.1.5 SBCCH configuration

Parameters

Name	Value	Semantics description	Ver
PDCP configuration	N/A		
RLC configuration	TM		
MAC configuration	TM		

NOTE: RRC will perform padding, if required due to the granularity of the TF signalling, as defined in 8.5.

9.1.1.6 STCH configuration

Parameters

Name	Value	Semantics description	Ver
PDCP configuration			
discardTimer	Undefined	Up to UE implementation	
pdcp-SN-Size	16		
maxCID	15		
profiles			
RLC configuration		Uni-directional UM RLC UM window size is set to 0	
		Uni-directional UM RLC UM window size is set to 0 for sidelink communication	v1440
sn-FieldLength	5		
logicalChannelIdentity	Undefined	Selected by the transmitting UE, up to UE implementation	
Logical channel configuration			
priority	Undefined	Selected by the transmitting UE, up to UE implementation	
prioritisedBitRate	Undefined	Selected by the transmitting UE, up to UE implementation	
bucketSizeDuration	Undefined	Selected by the transmitting UE, up to UE implementation	
logicalChannelGroup	3		
t-Reordering	Undefined	Only used for V2X sidelink communication. Selected by the receiving UE, up to UE implementation	v1440
MAC configuration			

9.1.1.7 SC-MCCH and SC-MTCH configuration

Parameters

Name	Value	Semantics description	Ver
PDCP configuration	N/A		

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Name	Value	Semantics description	Ver
RLC configuration	UM		
sn-FieldLength	size5		
t-Reordering	0		

9.1.1.8 BR-BCCH configuration

Parameters

Name	Value	Semantics description	Ver
PDCP configuration	N/A		
RLC configuration	TM		
MAC configuration	TM		

NOTE: RRC will perform padding, if required due to the granularity of the TF signalling, as defined in 8.5.

9.1.2 SRB configurations

9.1.2.1 SRB1

Parameters

Name	Value	Semantics description	Ver
RLC configuration			
logicalChannelIdentity	1		

9.1.2.1a SRB1bis

Parameters

Name	Value	Semantics description	Ver
RLC configuration			
logicalChannelIdentity	3		

9.1.2.2 SRB2

Parameters

Name	Value	Semantics description	Ver
RLC configuration			
logicalChannelIdentity	2		

9.2 Default radio configurations

The following sections only list default values for REL-8 parameters included in protocol version v8.5.0. For all fields introduced in a later protocol version, the default value is "released" unless explicitly specified otherwise. If UE is to apply default configuration while it is configured with some critically extended fields, the UE shall apply the original

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version with only default values. For the following fields, introduced in a protocol version later than v8.5.0, the default corresponds with "value not applicable":

- *codeBookSubsetRestriction-v920*;
- *pmi-RI-Report*;

NOTE 1: Value "N/A" indicates that the UE does not apply a specific value (i.e. upon switching to a default configuration, E-UTRAN can not assume the UE keeps the previously configured value). This implies that E-UTRAN needs to configure a value before invoking the related functionality.

NOTE 2: In general, the signalling should preferably support a "release" option for fields introduced after v8.5.0. The "value not applicable" should be used restrictively, mainly limited to for fields which value is relevant only if another field is set to a value other than its default.

9.2.1 SRB configurations

9.2.1.1 SRB1

Parameters

Name	Value	NB-IoT	Semantics description	Ver
RLC configuration CHOICE	am	am		
ul-RLC-Config				
>*t-PollRetransmit*	ms45	ms25000		
>*pollPDU*	infinity	N/A		
>*pollByte*	infinity	N/A		
>*maxRetxThreshold*	t4	t4		
dl-RLC-Config				
>*t-Reordering*	ms35	released		
>*t-StatusProhibit*	ms0	N/A		
>*enableStatusReportSN-Gap*	N/A	disabled		
Logical channel configuration				
priority	1	1	Highest priority	
prioritisedBitRate	infinity	N/A		
bucketSizeDuration	N/A	N/A		
logicalChannelGroup	0	N/A		
logicalChannelSR-Prohibit	N/A	TRUE		

9.2.1.2 SRB2

Parameters

Name	Value	Semantics description	Ver
RLC configuration CHOICE	am		
ul-RLC-Config			

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Name	Value	Semantics description	Ver
>*t-PollRetransmit*	ms45		
>*pollPDU*	infinity		
>*pollByte*	infinity		
>*maxRetxThreshold*	t4		
dl-RLC-Config			
>*t-Reordering*	ms35		
>*t-StatusProhibit*	ms0		
Logical channel configuration			
priority	3		
prioritisedBitRate	infinity		
bucketSizeDuration	N/A		
logicalChannelGroup	0		

9.2.2 Default MAC main configuration

Parameters

Name	Value	NB-IoT	Semantics description	Ver
MAC main configuration				
maxHARQ-tx	n5	N/A		
periodicBSR-Timer	infinity	pp8		
retxBSR-Timer	sf2560	infinity		
ttiBundling	FALSE	N/A		
drx-Config	release	N/A		
phr-Config	release	N/A		

9.2.3 Default semi-persistent scheduling configuration

SPS-Config			
>*sps-ConfigDL*	release		
>*sps-ConfigUL*	release		

9.2.4 Default physical channel configuration

Parameters (not applicable for NB-IoT)

Name	Value	Semantics description	Ver
PDSCH-ConfigDedicated			

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Name	Value	Semantics description	Ver
>p-a	dB0		
PUCCH-ConfigDedicated *> tdd-AckNackFeedbackMode* *>ackNackRepetition*	 bundling release	 Only valid for TDD mode	
PUSCH-ConfigDedicated *>betaOffset-ACK-Index* *>betaOffset-RI-Index* *>betaOffset-CQI-Index*	 10 12 15		
UplinkPowerControlDedicated *>p0-UE-PUSCH* *>deltaMCS-Enabled* *>accumulationEnabled* *>p0-UE-PUCCH* *>pSRS-Offset* *> filterCoefficient*	 0 en0 (disabled) TRUE 0 7 fc4		
tpc-pdcch-ConfigPUCCH	release		
tpc-pdcch-ConfigPUSCH	release		
CQI-ReportConfig *> CQI-ReportPeriodic* *> cqi-ReportModeAperiodic* *> nomPDSCH-RS-EPRE-Offset*	 release N/A N/A		
SoundingRS-UL-ConfigDedicated	release		
AntennaInfoDedicated *>transmissionMode* *>codebookSubsetRestriction* *>ue-TransmitAntennaSelection*	 tm1, tm2 N/A release	 If the number of PBCH antenna ports is one, tm1 is used as default; otherwise tm2 is used as default	
SchedulingRequestConfig	release		

Parameters applicable for NB-IoT

Name	Value	Semantics description	Ver
NPUSCH-ConfigDedicated-NB			

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Name	Value	Semantics description	Ver
> *ack-NACK-NumRepetitions* > *npusch-AllSymbols*	N/A TRUE		
UplinkPowerControlDedicated *>p0-UE-NPUSCH*	 0		

9.2.5 Default values timers and constants

Parameters

Name	Value	Semantics description	Ver
t310	ms1000		
n310	n1		
t311	ms1000		
n311	n1		

9.3 Sidelink pre-configured parameters

9.3.1 Specified parameters

This section only list parameters which value is specified in the standard.

Parameters

Name	Value	Semantics description	Ver
preconfigSync *>syncTxParameters* *>>alpha*	 0		
preconfigComm *>sc-TxParameters* *>>alpha* *>dataTxParameters* *>>alpha*	 0 0		
v2x-CommPreconfigSync *>syncTxParameters* *>>alpha*	 0		
v2x-CommTxPoolList, p2x-CommTxPoolList *>dataTxParameters* *>>alpha*	 0		

9.3.2 Pre-configurable parameters

This ASN.1 segment is the start of the E-UTRA definitions of pre-configured sidelink parameters.

NOTE 1: Upper layers are assumed to provide a set of pre-configured parameters that are valid at the current UE location if any, see TS 24.334 [69, 10.2].

```
-- ASN1START

EUTRA-Sidelink-Preconf DEFINITIONS AUTOMATIC TAGS ::=

BEGIN
```


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```
IMPORTS
    AdditionalSpectrumEmission,
    AdditionalSpectrumEmission-v10l0,
    ARFCN-ValueEUTRA-r9,
    FilterCoefficient,
    maxCBR-Level-r14,
    maxCBR-Level-1-r14,
    maxFreq,
    maxFreqV2X-r14,
    maxSL-TxPool-r12,
    maxSL-CommRxPoolPreconf-v1310,
    maxSL-CommTxPoolPreconf-v1310,
    maxSL-DiscRxPoolPreconf-r13,
    maxSL-DiscTxPoolPreconf-r13,
    maxSL-V2X-CBRConfig2-r14,
    maxSL-V2X-CBRConfig2-1-r14,
    maxSL-V2X-RxPoolPreconf-r14,
    maxSL-V2X-TxConfig2-r14,
    maxSL-V2X-TxConfig2-1-r14,
    maxSL-V2X-TxPoolPreconf-r14,
    P-Max,
    ReselectionInfoRelay-r13,
    SL-AnchorCarrierFreqList-V2X-r14,
    SL-CBR-Levels-Config-r14,
    SL-CBR-PSSCH-TxConfig-r14,
    SL-CommTxPoolSensingConfig-r14,
    SL-CP-Len-r12,
    SL-HoppingConfigComm-r12,
    SL-OffsetIndicator-r12,
    SL-OffsetIndicatorSync-r12,
    SL-OffsetIndicatorSync-v1430,
    SL-PeriodComm-r12,
    RSRP-RangeSL3-r12,
    SL-PriorityList-r13,
    SL-TF-ResourceConfig-r12,
    SL-TRPT-Subset-r12,
    SL-TxParameters-r12,
    SL-ZoneConfig-r14,
    P0-SL-r12,
    TDD-ConfigSL-r12,
    SubframeBitmapSL-r14,
    SL-P2X-ResourceSelectionConfig-r14,
    SL-RestrictResourceReservationPeriodList-r14,
    SL-SyncAllowed-r14,
    SL-OffsetIndicatorSync-r14,
    SL-Priority-r13
FROM EUTRA-RRC-Definitions;

-- ASN1STOP
```

– *SL-Preconfiguration*

The IE *SL-Preconfiguration* includes the sidelink pre-configured parameters.

SL-Preconfiguration information elements

```
-- ASN1START

SL-Preconfiguration-r12 ::=     SEQUENCE {
    preconfigGeneral-r12                SL-PreconfigGeneral-r12,
    preconfigSync-r12                   SL-PreconfigSync-r12,
    preconfigComm-r12                   SL-PreconfigCommPoolList4-r12,
    ...,
    [[  preconfigComm-v1310             SEQUENCE {
            commRxPoolList-r13          SL-PreconfigCommRxPoolList-r13,
            commTxPoolList-r13          SL-PreconfigCommTxPoolList-r13      OPTIONAL
        }                                                                       OPTIONAL,
        preconfigDisc-r13               SEQUENCE {
            discRxPoolList-r13              SL-PreconfigDiscRxPoolList-r13,
            discTxPoolList-r13              SL-PreconfigDiscTxPoolList-r13      OPTIONAL
        }                                                                       OPTIONAL,
        preconfigRelay-r13              SL-PreconfigRelay-r13               OPTIONAL
    ]]
```


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```
}

SL-PreconfigGeneral-r12 ::=     SEQUENCE {
    -- PDCP configuration
    rohc-Profiles-r12                   SEQUENCE {
        profile0x0001-r12                       BOOLEAN,
        profile0x0002-r12                       BOOLEAN,
        profile0x0004-r12                       BOOLEAN,
        profile0x0006-r12                       BOOLEAN,
        profile0x0101-r12                       BOOLEAN,
        profile0x0102-r12                       BOOLEAN,
        profile0x0104-r12                       BOOLEAN
    },
    -- Physical configuration
    carrierFreq-r12                     ARFCN-ValueEUTRA-r9,
    maxTxPower-r12                      P-Max,
    additionalSpectrumEmission-r12      AdditionalSpectrumEmission,
    sl-bandwidth-r12                    ENUMERATED {n6, n15, n25, n50, n75, n100},
    tdd-ConfigSL-r12                    TDD-ConfigSL-r12,
    reserved-r12                        BIT STRING (SIZE (19)),
    ...,
    [[  additionalSpectrumEmission-v1440        AdditionalSpectrumEmission-v10l0        OPTIONAL
    ]]
}

SL-PreconfigSync-r12 ::=    SEQUENCE {
    syncCP-Len-r12                      SL-CP-Len-r12,
    syncOffsetIndicator1-r12            SL-OffsetIndicatorSync-r12,
    syncOffsetIndicator2-r12            SL-OffsetIndicatorSync-r12,
    syncTxParameters-r12                P0-SL-r12,
    syncTxThreshOoC-r12                 RSRP-RangeSL3-r12,
    filterCoefficient-r12               FilterCoefficient,
    syncRefMinHyst-r12                  ENUMERATED {dB0, dB3, dB6, dB9, dB12},
    syncRefDiffHyst-r12                 ENUMERATED {dB0, dB3, dB6, dB9, dB12, dBinf},
    ...,
    [[  syncTxPeriodic-r13                  ENUMERATED {true}           OPTIONAL
    ]]
}

SL-PreconfigCommPoolList4-r12 ::=   SEQUENCE (SIZE (1..maxSL-TxPool-r12)) OF SL-PreconfigCommPool-
r12

SL-PreconfigCommRxPoolList-r13 ::=  SEQUENCE (SIZE (1..maxSL-CommRxPoolPreconf-v1310)) OF SL-
PreconfigCommPool-r12

SL-PreconfigCommTxPoolList-r13 ::=  SEQUENCE (SIZE (1..maxSL-CommTxPoolPreconf-v1310)) OF SL-
PreconfigCommPool-r12

SL-PreconfigCommPool-r12 ::=        SEQUENCE {
-- This IE is same as SL-CommResourcePool with rxParametersNCell absent
    sc-CP-Len-r12                       SL-CP-Len-r12,
    sc-Period-r12                       SL-PeriodComm-r12,
    sc-TF-ResourceConfig-r12            SL-TF-ResourceConfig-r12,
    sc-TxParameters-r12                 P0-SL-r12,
    data-CP-Len-r12                     SL-CP-Len-r12,
    data-TF-ResourceConfig-r12          SL-TF-ResourceConfig-r12,
    dataHoppingConfig-r12               SL-HoppingConfigComm-r12,
    dataTxParameters-r12                P0-SL-r12,
    trpt-Subset-r12                     SL-TRPT-Subset-r12,
    ...,
    [[  priorityList-r13                SL-PriorityList-r13         OPTIONAL    -- For Tx
    ]]
}

SL-PreconfigDiscRxPoolList-r13 ::=  SEQUENCE (SIZE (1..maxSL-DiscRxPoolPreconf-r13)) OF SL-
PreconfigDiscPool-r13

SL-PreconfigDiscTxPoolList-r13 ::=  SEQUENCE (SIZE (1..maxSL-DiscTxPoolPreconf-r13)) OF SL-
PreconfigDiscPool-r13

SL-PreconfigDiscPool-r13 ::=        SEQUENCE {
-- This IE is same as SL-DiscResourcePool with rxParameters absent
    cp-Len-r13                      SL-CP-Len-r12,
    discPeriod-r13              ENUMERATED {rf4, rf6, rf7, rf8, rf12, rf14, rf16, rf24, rf28,
                                            rf32, rf64, rf128, rf256, rf512, rf1024, spare},
    numRetx-r13                 INTEGER (0..3),
    numRepetition-r13               INTEGER (1..50),
```


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```
    tf-ResourceConfig-r13           SL-TF-ResourceConfig-r12,
    txParameters-r13                SEQUENCE {
        txParametersGeneral-r13     P0-SL-r12,
        txProbability-r13           ENUMERATED {p25, p50, p75, p100}
    }                                                       OPTIONAL,
    ...
}

SL-PreconfigRelay-r13 ::=   SEQUENCE {
    reselectionInfoOoC-r13          ReselectionInfoRelay-r13
}

-- ASN1STOP
```

***SL-Preconfiguration* field descriptions**
carrierFreq Indicates the carrier frequency for out of coverage sidelink communication and sidelink discovery. In case of FDD it is uplink carrier frequency and the corresponding downlink frequency can be determined from the default TX-RX frequency separation defined in TS 36.101 [42, table 5.7.3-1].
additionalSpectrumEmission The UE requirements related to IE *AdditionalSpectrumEmission* are defined in TS 36.101 [42, 6.2.4]. If *additionalSpectrumEmissionExt-r14* is configured, the UE only considers *additionalSpectrumEmissionExt-r14* (and ignore*s additionalSpectrumEmission-r12).*
commRxPoolList Indicates a list of reception pools for sidelink communication in addition to the resource pools indicated by *preconfigComm*.
commTxPoolList Indicates a list of transmission pools for sidelink communication in addition to the first resource pool within *preconfigComm*.
preconfigComm Indicates a list of resource pools. The first resource pool in the list is used for both reception and transmission of sidelink communication. The other resource pools, if present, are only used for reception of sidelink communication.
syncRefDiffHyst Hysteresis when evaluating a SyncRef UE using relative comparison. Value *dB0* corresponds to 0 dB, *dB3* to 3 dB and so on, value *dBinf* corresponds to infinite dB.
syncRefMinHyst Hysteresis when evaluating a SyncRef UE using absolute comparison. Value *dB0* corresponds to 0 dB, *dB3* to 3 dB and so on.

NOTE 1: The network may configure one or more of the reception only resource pools in *preconfigComm* to cover reception from in coverage UEs using scheduled resource allocation. For such a resource pool the network should set all bits of *subframeBitmap* to 1 and *offsetIndicator* to indicate the subframe immediately following the sidelink control information.

NOTE 2: The network should ensure that the resources defined by the first entry in *preconfigComm* (used for transmission by an out of coverage UE) do not overlap with those of the pool(s) covering scheduled transmissions by in coverage UEs. Furthermore, the network should ensure that for none of the entries in *preconfigComm* the resources defined by *sc-TF-ResourceConfig* overlap.

– *SL-V2X-Preconfiguration*

The IE *SL-V2X-Preconfiguration* includes the sidelink pre-configured parameters used for V2X sidelink communication.

***SL-V2X-Preconfiguration* information elements**

```
-- ASN1START

SL-V2X-Preconfiguration-r14 ::= SEQUENCE {
    v2x-PreconfigFreqList-r14       SL-V2X-PreconfigFreqList-r14,
    anchorCarrierFreqList-r14       SL-AnchorCarrierFreqList-V2X-r14            OPTIONAL,
    cbr-PreconfigList-r14           SL-CBR-PreconfigTxConfigList-r14            OPTIONAL,
    ...
}

SL-CBR-PreconfigTxConfigList-r14 ::=    SEQUENCE {
```


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```
    cbr-RangeCommonConfigList-r14   SEQUENCE (SIZE (1..maxSL-V2X-CBRConfig2-r14)) OF SL-CBR-Levels-
Config-r14,
    sl-CBR-PSSCH-TxConfigList-r14   SEQUENCE (SIZE (1..maxSL-V2X-TxConfig2-r14)) OF SL-CBR-PSSCH-
TxConfig-r14
}

SL-V2X-PreconfigFreqList-r14 ::=    SEQUENCE (SIZE (1..maxFreqV2X-r14)) OF SL-V2X-PreconfigFreqInfo-
r14

SL-V2X-PreconfigFreqInfo-r14 ::=        SEQUENCE {
    v2x-CommPreconfigGeneral-r14        SL-PreconfigGeneral-r12,
    v2x-CommPreconfigSync-r14           SL-PreconfigV2X-Sync-r14                OPTIONAL,
    v2x-CommRxPoolList-r14              SL-PreconfigV2X-RxPoolList-r14,
    v2x-CommTxPoolList-r14              SL-PreconfigV2X-TxPoolList-r14,
    p2x-CommTxPoolList-r14              SL-PreconfigV2X-TxPoolList-r14,
    v2x-ResourceSelectionConfig-r14         SL-CommTxPoolSensingConfig-r14          OPTIONAL,
    zoneConfig-r14                      SL-ZoneConfig-r14                       OPTIONAL,
    syncPriority-r14                    ENUMERATED {gnss, enb},
    thresSL-TxPrioritization-r14        SL-Priority-r13                         OPTIONAL,
    offsetDFN-r14                       INTEGER (0..1000)                   OPTIONAL,
    ...
}

SL-PreconfigV2X-RxPoolList-r14 ::=  SEQUENCE (SIZE (1..maxSL-V2X-RxPoolPreconf-r14)) OF SL-V2X-
PreconfigCommPool-r14

SL-PreconfigV2X-TxPoolList-r14 ::=  SEQUENCE (SIZE (1..maxSL-V2X-TxPoolPreconf-r14)) OF SL-V2X-
PreconfigCommPool-r14

SL-V2X-PreconfigCommPool-r14 ::=        SEQUENCE {
-- This IE is same as SL-CommResourcePoolV2X with rxParametersNCell absent
    sl-OffsetIndicator-r14              SL-OffsetIndicator-r12      OPTIONAL,
    sl-Subframe-r14                     SubframeBitmapSL-r14,
    adjacencyPSCCH-PSSCH-r14            BOOLEAN,
    sizeSubchannel-r14                  ENUMERATED {
                                        n4, n5, n6, n8, n9, n10, n12, n15, n16, n18, n20, n25, n30,
                                        n48, n50, n72, n75, n96, n100, spare13, spare12, spare11,
                                        spare10, spare9, spare8, spare7, spare6, spare5, spare4,
                                        spare3, spare2, spare1},
    numSubchannel-r14                   ENUMERATED {n1, n3, n5, n8, n10, n15, n20, spare1},
    startRB-Subchannel-r14              INTEGER (0..99),
    startRB-PSCCH-Pool-r14              INTEGER (0..99)             OPTIONAL,
    dataTxParameters-r14                P0-SL-r12,
    zoneID-r14                          INTEGER (0..7)              OPTIONAL,
    threshS-RSSI-CBR-r14                    INTEGER (0..45)             OPTIONAL,
    cbr-pssch-TxConfigList-r14          SL-CBR-PPPP-TxPreconfigList-r14 OPTIONAL,
    resourceSelectionConfigP2X-r14      SL-P2X-ResourceSelectionConfig-r14  OPTIONAL,
    syncAllowed-r14                     SL-SyncAllowed-r14              OPTIONAL,
    restrictResourceReservationPeriod-r14   SL-RestrictResourceReservationPeriodList-r14
    OPTIONAL,   -- Need OR
    ...
}

SL-PreconfigV2X-Sync-r14 ::=    SEQUENCE {
    syncOffsetIndicators-r14            SL-V2X-SyncOffsetIndicators-r14,
    syncTxParameters-r14                P0-SL-r12,
    syncTxThreshOoC-r14                 RSRP-RangeSL3-r12,
    filterCoefficient-r14               FilterCoefficient,
    syncRefMinHyst-r14                  ENUMERATED {dB0, dB3, dB6, dB9, dB12},
    syncRefDiffHyst-r14                 ENUMERATED {dB0, dB3, dB6, dB9, dB12, dBinf},
    ...
}

SL-V2X-SyncOffsetIndicators-r14 ::= SEQUENCE {
    syncOffsetIndicator1-r14            SL-OffsetIndicatorSync-r14,
    syncOffsetIndicator2-r14            SL-OffsetIndicatorSync-r14,
    syncOffsetIndicator3-r14            SL-OffsetIndicatorSync-r14          OPTIONAL
}

SL-CBR-PPPP-TxPreconfigList-r14 ::= SEQUENCE (SIZE (1..8)) OF SL-PPPP-TxPreconfigIndex-r14

SL-PPPP-TxPreconfigIndex-r14 ::=    SEQUENCE {
    priorityThreshold-r14           SL-Priority-r13,
    defaultTxConfigIndex-r14        INTEGER(0..maxCBR-Level-1-r14),
    cbr-ConfigIndex-r14             INTEGER(0..maxSL-V2X-CBRConfig2-1-r14),
    tx-ConfigIndexList-r14          SEQUENCE (SIZE (1..maxCBR-Level-r14)) OF Tx-PreconfigIndex-r14
}
```


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```
Tx-PreconfigIndex-r14 ::=           INTEGER(0..maxSL-V2X-TxConfig2-1-r14)

END

-- ASN1STOP
```


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SL-V2X-Preconfiguration field descriptions
adjacencyPSCCH-PSSCH Indicates whether a UE always transmits PSCCH and PSSCH in adjacent RBs (indicated by TRUE) or it may transmit PSCCH and PSSCH in non-adjacent RBs (indicated by FALSE). This parameter appears only when a pool is configured such that a UE transmits PSCCH and the associated PSSCH in the same subframe.
anchorCarrierFreqList Indicates carrier frequencies which may include inter-carrier resource configuration for V2X sidelink communication.
cbr-PreconfigList Indicates the preconfigured list of CBR ranges and the list of PSSCH transmission configurations available to configure congestion control to the UE for V2X sidelink communication.
cbr-pssch-TxConfigList Indicates the mapping between PPPPs, CBR ranges by using indexes of the entry in *cbr-RangeCommonConfigList* in *cbr-PreconfigList*, and PSSCH transmission parameters and CR limits by using indexes of the entry in *sl-CBR-PSSCH-TxConfigList* in *cbr-PreconfigLis*t.
numSubchannel Indicates the number of subchannels in the corresponding resource pool.
offsetDFN Indicates the timing offset for the UE to determine DFN timing when GNSS is used for timing reference. Value 0 corresponds to 0 milliseconds, value 1 corresponds to 0.001 milliseconds, value 2 corresponds to 0.002 milliseconds, and so on.
resourceSelectionConfigP2X Indicates the allowed resource selection mechanism(s), i.e. partial sensing and/or random selection, for P2X related V2X sidelink communication.
restrictResourceReservationPeriod If configured, the field *restrictResourceReservationPeriod* configured in *v2x-ResourceSelectionConfig* shall be ignored for transmission on this pool.
sizeSubchannel Indicates the number of PRBs of each subchannel in the corresponding resource pool. The value n5 denotes 5 PRBs; n6 denotes 6 PRBs and so on. The values n5, n6, n10, n15, n20, n25, n50, n75 and n100 apply in the case of *adjacencyPSCCH-PSSCH* set to TRUE; the values n4, n5, n6, n8, n9, n10, n12, n15, n16, n18, n20, n30, n48, n72 and n96 apply in the case of *adjacencyPSCCH-PSSCH* set to FALSE,
sl-OffsetIndicator Indicates the offset of the first subframe of a resource pool within a SFN cycle. If absent, the resource pool starts from first subframe of SFN=0.
sl-Subframe Indicates the bitmap of the resource pool, which is is defined by repeating the bitmap within a SFN cycle (see TS 36.213 [23]).
startRB-Subchannel Indicates the lowest RB index of the subchannel with the lowest index.
startRB-PSCCH-Pool Indicates the lowest RB index of the PSCCH pool.
syncAllowed Indicates the allowed synchronization reference(s) which is (are) allowed to use the pre-configured resource pool.
syncPriority Indicates the synchronization priority order. In case the UE does not detect any cell which configures synchronization configuration on the carrier frequency in *anchorCarrierFreqList*, if this field is set to *gnss*, the UE shall prioritize GNSS over the UE directly synchronized to eNB; if this field is set to *enb*, the UE shall prioritize the UE directly synchronized to eNB over GNSS.
thresSL-TxPrioritization Indicates the threshold used to determine whether SL V2X transmission is prioritized over uplink transmission if they overlap in time (see TS 36.321 [6]).
threshS-RSSI-CBR Indicates the S-RSSI threshold for determining the contribution of a sub-channel to the CBR measurement, as specified in TS 36.214 [48]. Value 0 corresponds to -112 dBm, value 1 to -110 dBm, value n to (-112 + n*2) dBm, and so on.
v2x-CommRxPoolList Indicates a list of reception pools for V2X sidelink communication.
v2x-CommTxPoolList Indicates a list of transmission pools for V2X sidelink communication.
v2x-ResourceSelectionConfig Indicates V2X sidelink communication configurations used for UE autonomous resource selection.
zoneConfig Indicates zone configurations used for V2X sidelink communication in 5.10.13.2.
zoneID Indicates the zone ID for which the UE shall use this resource pool as described in 5.10.13.2. The field is absent in *v2x-CommRxPoolList* and p2x-CommTxPoolList in *SL-V2X-PreconfigFreqInfo*.

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10 Radio information related interactions between network nodes

10.1 General

This section specifies RRC messages that are transferred between network nodes. These RRC messages may be transferred to or from the UE via another Radio Access Technology. Consequently, these messages have similar characteristics as the RRC messages that are transferred across the E-UTRA radio interface, i.e. the same transfer syntax and protocol extension mechanisms apply.

10.2 Inter-node RRC messages

10.2.1 General

This section specifies RRC messages that are sent either across the X2- or the S1-interface, either to or from the eNB, i.e. a single 'logical channel' is used for all RRC messages transferred across network nodes. The information could originate from or be destined for another RAT.

– *EUTRA-InterNodeDefinitions*

This ASN.1 segment is the start of the E-UTRA inter-node PDU definitions.

```
-- ASN1START

EUTRA-InterNodeDefinitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
    AntennaInfoCommon,
    AntennaInfoDedicated-v10i0,
    ARFCN-ValueEUTRA,
    ARFCN-ValueEUTRA-v9e0,
    ARFCN-ValueEUTRA-r9,
    CellIdentity,
    C-RNTI,
    DL-DCCH-Message,
    DRB-Identity,
    DRB-ToReleaseList,
    FreqBandIndicator-r11,
    InDeviceCoexIndication-r11,
    LWA-Config-r13,
    MasterInformationBlock,
    maxBands,
    maxFreq,
    maxDRB,
    maxSCell-r10,
    maxSCell-r13,
    maxServCell-r10,
    maxServCell-r13,
    MBMSInterestIndication-r11,
    MeasConfig,
    MeasGapConfig,
    MeasGapConfigPerCC-List-r14,
    MeasResultForRSSI-r13,
    MeasResultListWLAN-r13,
    OtherConfig-r9,
    PhysCellId,
    P-Max,
    PowerCoordinationInfo-r12,
    SidelinkUEInformation-r12,
    SL-CommConfig-r12,
    SL-DiscConfig-r12,
    RadioResourceConfigDedicated,
    RCLWI-Configuration-r13,
    RSRP-Range,
```


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```
    RSRQ-Range,
    RSRQ-Range-v1250,
    RS-SINR-Range-r13,
    SCellToAddModList-r10,
    SCellToAddModListExt-r13,
    SCG-ConfigPartSCG-r12,
    SecurityAlgorithmConfig,
    SCellIndex-r10,
    SCellIndex-r13,
    SCellToReleaseList-r10,
    SCellToReleaseListExt-r13,
    ServCellIndex-r10,
    ServCellIndex-r13,
    ShortMAC-I,
    MeasResultSSTD-r13,
    SL-V2X-ConfigDedicated-r14,
    SystemInformationBlockType1,
    SystemInformationBlockType1-v890-IEs,
    SystemInformationBlockType2,
    UEAssistanceInformation-r11,
    UECapabilityInformation,
    UE-CapabilityRAT-ContainerList,
    UE-RadioPagingInfo-r12,
    WLANConnectionStatusReport-r13,
    WLAN-OffloadConfig-r12
FROM EUTRA-RRC-Definitions;

-- ASN1STOP
```

10.2.2 Message definitions

– *HandoverCommand*

This message is used to transfer the handover command generated by the target eNB.

Direction: target eNB to source eNB/ source RAN

HandoverCommand message

```
-- ASN1START

HandoverCommand ::=                 SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            handoverCommand-r8                  HandoverCommand-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

HandoverCommand-r8-IEs ::=          SEQUENCE {
    handoverCommandMessage              OCTET STRING (CONTAINING DL-DCCH-Message),
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
}

-- ASN1STOP
```

HandoverCommand field descriptions
handoverCommandMessage
Contains the entire DL-DCCH-Message including the *RRCConnectionReconfiguration* message used to perform handover within E-UTRAN or handover to E-UTRAN, generated (entirely) by the target eNB.

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NOTE: The source BSC, in case of inter-RAT handover from GERAN to E-UTRAN, expects that the HandoverCommand message includes DL-DCCH-Message only. Thus, criticalExtensionsFuture, spare1-spare7 and nonCriticalExtension should not be used regardless whether the source RAT is E-UTRAN, UTRAN or GERAN.

– *HandoverPreparationInformation*

This message is used to transfer the E-UTRA RRC information used by the target eNB during handover preparation, including UE capability information.

Direction: source eNB/ source RAN to target eNB

HandoverPreparationInformation message

```
-- ASN1START

HandoverPreparationInformation ::=  SEQUENCE {
    criticalExtensions                CHOICE {
        c1                                CHOICE{
            handoverPreparationInformation-r8   HandoverPreparationInformation-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

HandoverPreparationInformation-r8-IEs ::= SEQUENCE {
    ue-RadioAccessCapabilityInfo        UE-CapabilityRAT-ContainerList,
    as-Config                           AS-Config                   OPTIONAL,       -- Cond HO
    rrm-Config                          RRM-Config                  OPTIONAL,
    as-Context                          AS-Context              OPTIONAL,       -- Cond HO
    nonCriticalExtension                HandoverPreparationInformation-v920-IEs     OPTIONAL
}

HandoverPreparationInformation-v920-IEs ::= SEQUENCE {
    ue-ConfigRelease-r9                 ENUMERATED {
                                        rel9, rel10, rel11, rel12, v10j0, v11e0,
                                        v1280, rel13, ..., rel14}           OPTIONAL,   -- Cond HO2
    nonCriticalExtension                HandoverPreparationInformation-v9d0-IEs     OPTIONAL
}

HandoverPreparationInformation-v9d0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING (CONTAINING HandoverPreparationInformation-
v9j0-IEs)   OPTIONAL,
    nonCriticalExtension                HandoverPreparationInformation-v9e0-IEs         OPTIONAL
}

-- Late non-critical extensions:
HandoverPreparationInformation-v9j0-IEs ::= SEQUENCE {
    -- Following field is only for pre REL-10 late non-critical extensions
    lateNonCriticalExtension            OCTET STRING                    OPTIONAL,
    nonCriticalExtension                HandoverPreparationInformation-v10j0-IEs        OPTIONAL
}

HandoverPreparationInformation-v10j0-IEs ::= SEQUENCE {
    as-Config-v10j0                     AS-Config-v10j0         OPTIONAL,
    -- Following field is only for late non-critical extensions from REL-10
    nonCriticalExtension                SEQUENCE {}             OPTIONAL
}

-- Regular non-critical extensions:
HandoverPreparationInformation-v9e0-IEs ::= SEQUENCE {
    as-Config-v9e0                      AS-Config-v9e0                  OPTIONAL,   -- Cond HO2
    nonCriticalExtension                HandoverPreparationInformation-v1130-IEs        OPTIONAL
}

HandoverPreparationInformation-v1130-IEs    ::= SEQUENCE {
    as-Context-v1130                    AS-Context-v1130                OPTIONAL,   -- Cond HO2
    nonCriticalExtension                HandoverPreparationInformation-v1250-IEs
    OPTIONAL
}

HandoverPreparationInformation-v1250-IEs ::= SEQUENCE {
```


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```
    ue-SupportedEARFCN-r12              ARFCN-ValueEUTRA-r9             OPTIONAL,   -- Cond HO3
    as-Config-v1250                 AS-Config-v1250             OPTIONAL,   -- Cond HO2
    nonCriticalExtension                HandoverPreparationInformation-v1320-IEs
    OPTIONAL
}

HandoverPreparationInformation-v1320-IEs ::= SEQUENCE {
    as-Config-v1320                     AS-Config-v1320                 OPTIONAL,   -- Cond HO2
    as-Context-v1320                    AS-Context-v1320                OPTIONAL,   -- Cond HO2
    nonCriticalExtension                HandoverPreparationInformation-v1430-IEs
    OPTIONAL
}

HandoverPreparationInformation-v1430-IEs ::= SEQUENCE {
    as-Config-v1430                 AS-Config-v1430                     OPTIONAL,   -- Cond HO2
    makeBeforeBreakReq-r14          ENUMERATED {true}               OPTIONAL,   -- Cond HO2
    nonCriticalExtension            SEQUENCE {}                         OPTIONAL
}

-- ASN1STOP
```

***HandoverPreparationInformation* field descriptions**
as-Config The radio resource configuration. Applicable in case of intra-E-UTRA handover. If the target receives an incomplete *MeasConfig* and *RadioResourceConfigDedicated* in the *as-Config*, the target eNB may decide to apply the full configuration option based on the *ue-ConfigRelease*.
as-Context Local E-UTRAN context required by the target eNB.
makeBeforeBreakReq To request the target eNB to add the *makeBeforeBreak* indication in the *mobilityControlInfo* in case of intra-frequency handover.
rrm-Config Local E-UTRAN context used depending on the target node's implementation, which is mainly used for the RRM purpose.
ue-ConfigRelease Indicates the RRC protocol release or version applicable for the current UE configuration. This could be used by target eNB to decide if the full configuration approach should be used. If this field is not present, the target assumes that the current UE configuration is based on the release 8 version of RRC protocol. NOTE 1.
ue-RadioAccessCapabilityInfo For E-UTRA radio access capabilities, it is up to E-UTRA how the backward compatibility among *supportedBandCombinationReduced*, *supportedBandCombination* and *supportedBandCombinationAdd* is ensured. If *supportedBandCombinationReduced* and *supportedBandCombination*/*supportedBandCombinationAdd* are included into *ueCapabilityRAT-Container*, it can be assumed that the value of fields, *requestedBands*, *reducedIntNonContCombRequested* and *requestedCCsXL* are consistend with all supported band combination fields. NOTE 2
ue-SupportedEARFCN Includes UE supported EARFCN of the handover target E-UTRA cell if the target E-UTRA cell belongs to multiple frequency bands.

NOTE 1: The source typically sets the *ue-ConfigRelease* to the release corresponding with the current dedicated radio configuration. The source may however also consider the common radio resource configuration e.g. in case interoperability problems would appear if the UE temporary continues extensions of this part of the configuration in a target PCell not supporting them.

NOTE 2: The following table indicates per source RAT whether RAT capabilities are included or not.

Source RAT	E-UTRA capabilites	UTRA capabilities	GERAN capabilities
UTRAN	Included	May be included, ignored by eNB if received	May be included
GERAN CS	Excluded	May be included, ignored by eNB if received	Included
GERAN PS	Excluded	May be included, ignored by eNB if received	Included
E-UTRAN	Included	May be included	May be included

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Conditional presence	Explanation
HO	The field is mandatory present in case of handover within E-UTRA; otherwise the field is not present.
HO2	The field is optional present in case of handover within E-UTRA; otherwise the field is not present.
HO3	The field is optional present in case of handover from GERAN to E-UTRA, otherwise the field is not present.

– *SCG-Config*

This message is used to transfer the SCG radio configuration generated by the SeNB.

Direction: Secondary eNB to master eNB

SCG-Config message

```
-- ASN1START

SCG-Config-r12 ::=                  SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            scg-Config-r12                  SCG-Config-r12-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

SCG-Config-r12-IEs ::=              SEQUENCE {
    scg-RadioConfig-r12                 SCG-ConfigPartSCG-r12               OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
}

-- ASN1STOP
```

SCG-Config field descriptions
scg-RadioConfig-r12   Includes the change of the dedicated SCG configuration and, upon addition of an SCG cell, the common SCG configuration.   The SeNB only includes a new SCG cell in response to a request from MeNB, but may include release of an SCG cell release or release of the SCG part of an SCG/Split DRB without prior request from MeNB. The SeNB does not use this field to initiate release of the SCG.

– *SCG-ConfigInfo*

This message is used by MeNB to request the SeNB to perform certain actions e.g. to establish, modify or release an SCG, and it may include additional information e.g. to assist the SeNB with assigning the SCG configuration.

Direction: Master eNB to secondary eNB

SCG-ConfigInfo message

```
-- ASN1START

SCG-ConfigInfo-r12 ::=                  SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            scg-ConfigInfo-r12                  SCG-ConfigInfo-r12-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}
```


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```
SCG-ConfigInfo-r12-IEs ::=          SEQUENCE {
    radioResourceConfigDedMCG-r12   RadioResourceConfigDedicated        OPTIONAL,
    sCellToAddModListMCG-r12        SCellToAddModList-r10               OPTIONAL,
    measGapConfig-r12               MeasGapConfig                       OPTIONAL,
    powerCoordinationInfo-r12       PowerCoordinationInfo-r12           OPTIONAL,
    scg-RadioConfig-r12             SCG-ConfigPartSCG-r12               OPTIONAL,
    eutra-CapabilityInfo-r12        OCTET STRING (CONTAINING UECapabilityInformation)   OPTIONAL,
    scg-ConfigRestrictInfo-r12      SCG-ConfigRestrictInfo-r12          OPTIONAL,
    mbmsInterestIndication-r12      OCTET STRING (CONTAINING
                                        MBMSInterestIndication-r11)     OPTIONAL,
    measResultServCellListSCG-r12   MeasResultServCellListSCG-r12       OPTIONAL,
    drb-ToAddModListSCG-r12         DRB-InfoListSCG-r12                 OPTIONAL,
    drb-ToReleaseListSCG-r12        DRB-ToReleaseList                   OPTIONAL,
    sCellToAddModListSCG-r12        SCellToAddModListSCG-r12            OPTIONAL,
    sCellToReleaseListSCG-r12       SCellToReleaseList-r10              OPTIONAL,
    p-Max-r12                           P-Max                               OPTIONAL,
    nonCriticalExtension            SCG-ConfigInfo-v1310-IEs            OPTIONAL
}

SCG-ConfigInfo-v1310-IEs ::=        SEQUENCE {
    measResultSSTD-r13              MeasResultSSTD-r13                  OPTIONAL,
    sCellToAddModListMCG-Ext-r13        SCellToAddModListExt-r13            OPTIONAL,
    measResultServCellListSCG-Ext-r13   MeasResultServCellListSCG-Ext-r13   OPTIONAL,
    sCellToAddModListSCG-Ext-r13        SCellToAddModListSCG-Ext-r13            OPTIONAL,
    sCellToReleaseListSCG-Ext-r13   SCellToReleaseListExt-r13           OPTIONAL,
    nonCriticalExtension            SCG-ConfigInfo-v1330-IEs            OPTIONAL
}

SCG-ConfigInfo-v1330-IEs ::=        SEQUENCE {
    measResultListRSSI-SCG-r13      MeasResultListRSSI-SCG-r13          OPTIONAL,
    nonCriticalExtension            SCG-ConfigInfo-v1430-IEs                            OPTIONAL
}

SCG-ConfigInfo-v1430-IEs ::=        SEQUENCE {
    makeBeforeBreakSCG-Req-r14      ENUMERATED {true}                   OPTIONAL,
    measGapConfigPerCC-List         MeasGapConfigPerCC-List-r14         OPTIONAL,
    nonCriticalExtension            SEQUENCE {}                         OPTIONAL
}

DRB-InfoListSCG-r12 ::=             SEQUENCE (SIZE (1..maxDRB)) OF DRB-InfoSCG-r12

DRB-InfoSCG-r12 ::=             SEQUENCE {
    eps-BearerIdentity-r12          INTEGER (0..15)             OPTIONAL,   -- Cond DRB-Setup
    drb-Identity-r12                DRB-Identity,
    drb-Type-r12                    ENUMERATED {split, scg}     OPTIONAL,   -- Cond DRB-Setup
    ...
}

SCellToAddModListSCG-r12 ::=    SEQUENCE (SIZE (1..maxSCell-r10)) OF Cell-ToAddMod-r12

SCellToAddModListSCG-Ext-r13 ::=    SEQUENCE (SIZE (1..maxSCell-r13)) OF Cell-ToAddMod-r12

Cell-ToAddMod-r12 ::=               SEQUENCE {
    sCellIndex-r12                      SCellIndex-r10,
    cellIdentification-r12              SEQUENCE {
        physCellId-r12                      PhysCellId,
        dl-CarrierFreq-r12                  ARFCN-ValueEUTRA-r9
    }                                                           OPTIONAL,   -- Cond SCellAdd
    measResultCellToAdd-r12             SEQUENCE {
        rsrpResult-r12                      RSRP-Range,
        rsrqResult-r12                      RSRQ-Range
    }                                                           OPTIONAL,   -- Cond SCellAdd2
    ...,
    [[      sCellIndex-r13                  SCellIndex-r13              OPTIONAL,
        measResultCellToAdd-v1310           SEQUENCE {
            rs-sinr-Result-r13                  RS-SINR-Range-r13
        }                                                       OPTIONAL    -- Cond SCellAdd2
    ]]
}

MeasResultServCellListSCG-r12 ::=   SEQUENCE (SIZE (1..maxServCell-r10)) OF MeasResultServCellSCG-
r12

MeasResultServCellListSCG-Ext-r13 ::=   SEQUENCE (SIZE (1..maxServCell-r13)) OF
MeasResultServCellSCG-r12

MeasResultServCellSCG-r12 ::=           SEQUENCE {
```


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```
    servCellId-r12                      ServCellIndex-r10,
    measResultSCell-r12                 SEQUENCE {
        rsrpResultSCell-r12                 RSRP-Range,
        rsrqResultSCell-r12                 RSRQ-Range
    },
    ...,
    [[      servCellId-r13                      ServCellIndex-r13       OPTIONAL,
        measResultSCell-v1310               SEQUENCE {
            rs-sinr-ResultSCell-r13             RS-SINR-Range-r13
        }                                                               OPTIONAL
    ]]
}

MeasResultListRSSI-SCG-r13 ::=  SEQUENCE (SIZE (1..maxServCell-r13)) OF MeasResultRSSI-SCG-r13

MeasResultRSSI-SCG-r13 ::=          SEQUENCE {
    servCellId-r13                      ServCellIndex-r13,
    measResultForRSSI-r13               MeasResultForRSSI-r13
}

SCG-ConfigRestrictInfo-r12 ::=      SEQUENCE {
    maxSCH-TB-BitsDL-r12                INTEGER (1..100),
    maxSCH-TB-BitsUL-r12                INTEGER (1..100)
}

-- ASN1STOP
```

***SCG-ConfigInfo* field descriptions**
drb-ToAddModListSCG Includes DRBs the SeNB is requested to establish or modify (DRB type change).
drb-ToReleaseListSCG Includes DRBs the SeNB is requested to release.
makeBeforeBreakSCG-Req To request the target eNB to add the *makeBeforeBreakSCG* indication in the *mobilityControlInfoSCG* in case of intra-frequency SCG change.
maxSCH-TB-BitsXL Indicates the maximum DL-SCH/UL-SCH TB bits that may be scheduled in a TTI. Specified as a percentage of the value defined for the applicable UE category.
measGapConfig Includes the current measurement gap configuration.
measResultListRSSI-SCG Includes RSSI measurement results of SCG (serving) cells
measResultSSTD Includes measurement results of UE SFN and Subframe Timing Difference between the PCell and the PSCell.
measResultServCellListSCG Includes measurement results of SCG (serving) cells.
radioResourceConfigDedMCG Includes the current dedicated MCG radio resource configuration.
sCellIndex If sCellIndex-r13 is present, sCellIndex-r12 shall be ignored.
sCellToAddModListMCG, sCellToAddModListMCG-Ext Includes the current MCG SCell configuration. Field *sCellToAddModListMCG* is used to add the first 4 SCells with *sCellIndex-r10* while *sCellToAddModListMCG-Ext* is used to add the rest.
sCellToAddModListSCG, sCellToAddModListSCG-Ext Includes SCG cells the SeNB is requested to establish. Measurement results may be provided for these cells. Field *sCellToAddModListSCG* is used to add the first 4 SCells with *sCellIndex-r12* while *sCellToAddModListSCG-Ext* is used to add the rest.
sCellToReleaseListSCG, sCellToReleaseListSCG-Ext Includes SCG cells the SeNB is requested to release.
scg-RadioConfig Includes the current dedicated SCG configuration.
scg-ConfigRestrictInfo Includes fields for which MeNB explictly indicates the restriction to be observed by SeNB.
servCellId If servCellId-r13 is present, servCellId-r12 shall be ignored.
p-Max Cell specific value i.e. as broadcast by PCell.

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Conditional presence	Explanation
DRB-Setup	The field is mandatory present in case DRB establishment is requested; otherwise the field is not present.
SCellAdd	The field is mandatory present in case SCG cell establishment is requested; otherwise the field is not present.
SCellAdd2	The field is optional present in case SCG cell establishment is requested; otherwise the field is not present.

– *UEPagingCoverageInformation*

This message is used to transfer UE paging coverage information, covering both upload to and download from the EPC.

Direction: eNB to/from EPC

UEPagingCoverageInformation message

```
-- ASN1START

UEPagingCoverageInformation ::= SEQUENCE {
    criticalExtensions                CHOICE {
        c1                                CHOICE{
            uePagingCoverageInformation-r13         UEPagingCoverageInformation-r13-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

UEPagingCoverageInformation-r13-IEs ::= SEQUENCE {
    mpdcch-NumRepetition-r13                INTEGER (1..256)    OPTIONAL,
    nonCriticalExtension                    SEQUENCE {}         OPTIONAL
}

-- ASN1STOP
```

***UEPagingCoverageInformation* field descriptions**
mpdcch-NumRepetition Number of repetitions for MPDCCH. The value is an estimate of the required number of repetitions for MPDCCH for paging.

– *UERadioAccessCapabilityInformation*

This message is used to transfer UE radio access capability information, covering both upload to and download from the EPC.

Direction: eNB to/ from EPC

UERadioAccessCapabilityInformation message

```
-- ASN1START

UERadioAccessCapabilityInformation ::= SEQUENCE {
    criticalExtensions                CHOICE {
        c1                                CHOICE{
            ueRadioAccessCapabilityInformation-r8
                                                UERadioAccessCapabilityInformation-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

UERadioAccessCapabilityInformation-r8-IEs ::= SEQUENCE {
    ue-RadioAccessCapabilityInfo        OCTET STRING (CONTAINING UECapabilityInformation),
```


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```
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
}

-- ASN1STOP
```

***UERadioAccessCapabilityInformation* field descriptions**
ue-RadioAccessCapabilityInfo Including E-UTRA, GERAN, and CDMA2000-1xRTT Bandclass radio access capabilities (separated). UTRA radio access capabilities are not included. For E-UTRA radio access capabilities, it is up to E-UTRA how the backward compatibility among *supportedBandCombinationReduced*, *supportedBandCombination* and *supportedBandCombinationAdd* is ensured. If *supportedBandCombinationReduced* and *supportedBandCombination*/*supportedBandCombinationAdd* are included into *ueCapabilityRAT-Container*, it can be assumed that the value of fields, *requestedBands*, *reducedIntNonContCombRequested* and *requestedCCsXL* are consistent with all supported band combination fields.

– *UERadioPagingInformation*

This message is used to transfer radio paging information, covering both upload to and download from the EPC.

Direction: eNB to/ from EPC

***UERadioPagingInformation* message**

```
-- ASN1START

UERadioPagingInformation ::= SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            ueRadioPagingInformation-r12            UERadioPagingInformation-r12-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

UERadioPagingInformation-r12-IEs ::= SEQUENCE {
    ue-RadioPagingInfo-r12              OCTET STRING (CONTAINING UE-RadioPagingInfo-r12),
    nonCriticalExtension                UERadioPagingInformation-v1310-IEs          OPTIONAL
}

UERadioPagingInformation-v1310-IEs ::= SEQUENCE {
    supportedBandListEUTRAForPaging-r13     SEQUENCE (SIZE (1..maxBands)) OF FreqBandIndicator-r11
OPTIONAL,
    nonCriticalExtension                    SEQUENCE {}                             OPTIONAL

}

-- ASN1STOP
```

***UERadioPagingInformation* field descriptions**
ue-RadioPagingInfo The field is used to transfer UE capability information used for paging. The eNB generates the *ue-RadioPagingInfo* and the contained UE capability information is absent when not supported by the UE.
supportedBandListEUTRAForPaging Indicates the UE supported frequency bands which is derived by the eNB from *UE-EUTRA-Capability*.

10.3 Inter-node RRC information element definitions

– *AS-Config*

The *AS-Config* IE contains information about RRC configuration information in the source eNB which can be utilized by target eNB to determine the need to change the RRC configuration during the handover preparation phase. The

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information can also be used after the handover is successfully performed or during the RRC connection re-establishment or resume.

AS-Config information element

```
-- ASN1START

AS-Config ::=               SEQUENCE {
    sourceMeasConfig                    MeasConfig,
    sourceRadioResourceConfig           RadioResourceConfigDedicated,
    sourceSecurityAlgorithmConfig       SecurityAlgorithmConfig,
    sourceUE-Identity                   C-RNTI,
    sourceMasterInformationBlock        MasterInformationBlock,
    sourceSystemInformationBlockType1   SystemInformationBlockType1(WITH COMPONENTS
                                            {..., nonCriticalExtension ABSENT}),
    sourceSystemInformationBlockType2   SystemInformationBlockType2,
    antennaInfoCommon                   AntennaInfoCommon,
    sourceDl-CarrierFreq                ARFCN-ValueEUTRA,
    ...,
    [[  sourceSystemInformationBlockType1Ext    OCTET STRING (CONTAINING
                                                SystemInformationBlockType1-v890-IEs)   OPTIONAL,
        sourceOtherConfig-r9                OtherConfig-r9
    -- sourceOtherConfig-r9 should have been optional. A target eNB compliant with this transfer
    -- syntax should support receiving an AS-Config not including this extension addition group
    -- e.g. from a legacy source eNB
    ]],
    [[  sourceSCellConfigList-r10           SCellToAddModList-r10           OPTIONAL
    ]],
    [[  sourceConfigSCG-r12                 SCG-Config-r12      OPTIONAL
    ]]
}

AS-Config-v9e0 ::=              SEQUENCE {
    sourceDl-CarrierFreq-v9e0       ARFCN-ValueEUTRA-v9e0
}

AS-Config-v10j0 ::=             SEQUENCE {
    antennaInfoDedicatedPCell-v10i0     AntennaInfoDedicated-v10i0          OPTIONAL
}

AS-Config-v1250 ::=             SEQUENCE {
    sourceWlan-OffloadConfig-r12        WLAN-OffloadConfig-r12              OPTIONAL,
    sourceSL-CommConfig-r12             SL-CommConfig-r12                   OPTIONAL,
    sourceSL-DiscConfig-r12             SL-DiscConfig-r12                   OPTIONAL
}

AS-Config-v1320 ::=             SEQUENCE {
    sourceSCellConfigList-r13           SCellToAddModListExt-r13            OPTIONAL,
    sourceRCLWI-Configuration-r13       RCLWI-Configuration-r13             OPTIONAL
}

AS-Config-v1430 ::=             SEQUENCE {
    sourceSL-V2X-CommConfig-r14         SL-V2X-ConfigDedicated-r14                  OPTIONAL,
    sourceLWA-Config-r14                LWA-Config-r13                      OPTIONAL,
    sourceWLAN-MeasResult-r14           MeasResultListWLAN-r13              OPTIONAL
}

-- ASN1STOP
```

NOTE: The *AS-Config* re-uses information elements primarily created to cover the radio interface signalling requirements. Consequently, the information elements may include some parameters that are not relevant for the target eNB e.g. the SFN as included in the *MasterInformationBlock*.

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AS-Config field descriptions
antennaInfoCommon This field provides information about the number of antenna ports in the source PCell.
sourceDL-CarrierFreq Provides the parameter Downlink EARFCN in the source PCell, see TS 36.101 [42]. If the source eNB provides *AS-Config-v9e0*, it sets *sourceDl-CarrierFreq* (i.e. without suffix) to *maxEARFCN*.
sourceLWA-Config LWA configuration in the source PCell when handover is triggered.
sourceOtherConfig Provides other configuration in the source PCell.
sourceMasterInformationBlock *MasterInformationBlock* transmitted in the source PCell.
sourceMeasConfig Measurement configuration in the source cell. The measurement configuration for all measurements existing in the source eNB when handover is triggered shall be included. See 10.5.
sourceRCLWI-Configuration RCLWI Configuration in the source PCell.
sourceSL-CommConfig This field covers the sidelink communication configuration.
sourceSL-DiscConfig This field covers the sidelink discovery configuration.
sourceRadioResourceConfig Radio configuration in the source PCell. The radio resource configuration for all radio bearers existing in the source PCell when handover is triggered shall be included. See 10.5.
sourceSCellConfigList Radio resource configuration (common and dedicated) of the SCells configured in the source eNB.
sourceSecurityAlgorithmConfig This field provides the AS integrity protection (SRBs) and AS ciphering (SRBs and DRBs) algorithm configuration used in the source PCell.
sourceSystemInformationBlockType1 *SystemInformationBlockType1 (*or *SystemInformationBlockType1-BR)* transmitted in the source PCell.
sourceSystemInformationBlockType2 *SystemInformationBlockType2* transmitted in the source PCell.
sourceSL-V2X-CommConfig Indicates the V2X sidelink communication related configurations configured in the source eNB.
sourceWLAN-MeasResult WLAN measurement results in the source PCell when handover is triggered.

– *AS-Context*

The IE *AS-Context* is used to transfer local E-UTRAN context required by the target eNB.

AS-Context information element

```
-- ASN1START

AS-Context ::=                          SEQUENCE {
    reestablishmentInfo                     ReestablishmentInfo         OPTIONAL    -- Cond HO
}

AS-Context-v1130 ::=                    SEQUENCE {
    idc-Indication-r11                      OCTET STRING (CONTAINING
                                            InDeviceCoexIndication-r11) OPTIONAL,   -- Cond HO2
    mbmsInterestIndication-r11              OCTET STRING (CONTAINING
                                            MBMSInterestIndication-r11) OPTIONAL,   -- Cond HO2
    powerPrefIndication-r11                 OCTET STRING (CONTAINING
                                            UEAssistanceInformation-r11)    OPTIONAL,   -- Cond HO2
    ...,
    [[  sidelinkUEInformation-r12               OCTET STRING (CONTAINING
                                                SidelinkUEInformation-r12)  OPTIONAL    -- Cond HO2
    ]]
}

AS-Context-v1320 ::=                    SEQUENCE {
    wlanConnectionStatusReport-r13          OCTET STRING (CONTAINING
```


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```
                                                WLANConnectionStatusReport-r13) OPTIONAL    -- Cond HO2
}

-- ASN1STOP
```

AS-Context field descriptions
idc-Indication Including information used for handling the IDC problems.
reestablishmentInfo Including information needed for the RRC connection re-establishment.

Conditional presence	Explanation
HO	The field is mandatory present in case of handover within E-UTRA; otherwise the field is not present.
HO2	The field is optional present in case of handover within E-UTRA; otherwise the field is not present.

– *ReestablishmentInfo*

The *ReestablishmentInfo* IE contains information needed for the RRC connection re-establishment.

***ReestablishmentInfo* information element**

```
-- ASN1START

ReestablishmentInfo ::=             SEQUENCE {
    sourcePhysCellId                    PhysCellId,
    targetCellShortMAC-I                ShortMAC-I,
    additionalReestabInfoList           AdditionalReestabInfoList               OPTIONAL,
    ...
}

AdditionalReestabInfoList ::=       SEQUENCE ( SIZE (1..maxReestabInfo) ) OF AdditionalReestabInfo

AdditionalReestabInfo ::=   SEQUENCE{
    cellIdentity                        CellIdentity,
    key-eNodeB-Star                     Key-eNodeB-Star,
    shortMAC-I                          ShortMAC-I
}

Key-eNodeB-Star ::=                 BIT STRING (SIZE (256))

-- ASN1STOP
```

ReestablishmentInfo field descriptions
additionalReestabInfoList Contains a list of shortMAC-I and KeNB* for cells under control of the target eNB, required for potential re-establishment by the UE in these cells to succeed.
Key-eNodeB-Star Parameter KeNB*: See TS 33.401 [32, 7.2.8.4]. If the cell identified by *cellIdentity* belongs to multiple frequency bands, the source eNB selects the DL-EARFCN for the KeNB* calculation using the same logic as UE uses when selecting the DL-EARFCN in IDLE as defined in section 6.2.2. This parameter is only used for X2 handover, and for S1 handover, it shall be ignored by target eNB.
sourcePhyCellId The physical cell identity of the source PCell, used to determine the UE context in the target eNB at re-establishment.
targetCellShortMAC-I The ShortMAC-I for the handover target PCell, in order for potential re-establishment to succeed.

– *RRM-Config*

The *RRM-Config* IE contains information about UE specific RRM information before the handover which can be utilized by target eNB.

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***RRM-Config* information element**

```
-- ASN1START

RRM-Config ::=              SEQUENCE {
    ue-InactiveTime             ENUMERATED {
                                    s1, s2, s3, s5, s7, s10, s15, s20,
                                    s25, s30, s40, s50, min1, min1s20c, min1s40,
                                    min2, min2s30, min3, min3s30, min4, min5, min6,
                                    min7, min8, min9, min10, min12, min14, min17, min20,
                                    min24, min28, min33, min38, min44, min50, hr1,
                                    hr1min30, hr2, hr2min30, hr3, hr3min30, hr4, hr5, hr6,
                                    hr8, hr10, hr13, hr16, hr20, day1, day1hr12, day2,
                                    day2hr12, day3, day4, day5, day7, day10, day14, day19,
                                    day24, day30, dayMoreThan30}        OPTIONAL,
    ...,
    [[  candidateCellInfoList-r10   CandidateCellInfoList-r10       OPTIONAL
    ]]
}

CandidateCellInfoList-r10 ::=   SEQUENCE (SIZE (1..maxFreq)) OF CandidateCellInfo-r10

CandidateCellInfo-r10 ::=       SEQUENCE {
    -- cellIdentification
    physCellId-r10                  PhysCellId,
    dl-CarrierFreq-r10              ARFCN-ValueEUTRA,
    -- available measurement results
    rsrpResult-r10                  RSRP-Range          OPTIONAL,
    rsrqResult-r10                  RSRQ-Range          OPTIONAL,
    ...,
    [[  dl-CarrierFreq-v1090            ARFCN-ValueEUTRA-v9e0       OPTIONAL
    ]],
    [[  rsrqResult-v1250                RSRQ-Range-v1250            OPTIONAL
    ]],
    [[  rs-sinr-Result-r13              RS-SINR-Range-r13           OPTIONAL
    ]]
}

-- ASN1STOP
```

***RRM-Config* field descriptions**
candidateCellInfoList A list of the best cells on each frequency for which measurement information was available, in order of decreasing RSRP.
dl-CarrierFreq The source includes *dl-CarrierFreq-v1090* if and only if *dl-CarrierFreq-r10* is set to *maxEARFCN*.
ue-InactiveTime Duration while UE has not received or transmitted any user data. Thus the timer is still running in case e.g., UE measures the neighbour cells for the HO purpose. Value s1 corresponds to 1 second, s2 corresponds to 2 seconds and so on. Value min1 corresponds to 1 minute, value min1s20 corresponds to 1 minute and 20 seconds, value min1s40 corresponds to 1 minute and 40 seconds and so on. Value hr1 corresponds to 1 hour, hr1min30 corresponds to 1 hour and 30 minutes and so on.

10.4 Inter-node RRC multiplicity and type constraint values

– Multiplicity and type constraints definitions

```
-- ASN1START

maxReestabInfo              INTEGER ::= 32  -- Maximum number of KeNB* and shortMAC-I forwarded
                                            -- at handover for re-establishment preparation

-- ASN1STOP
```

– End of *EUTRA-InterNodeDefinitions*

```
-- ASN1START
```


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```
END

-- ASN1STOP
```

10.5 Mandatory information in *AS-Config*

The *AS-Config* transferred between source eNB and target-eNB shall include all IEs necessary to describe the AS context. The conditional presence in section 6 is only applicable for eNB to UE communication.

The "need" or "cond" statements are not applied in case of sending the IEs from source eNB to target eNB. Some fields shall be included regardless of the "need" or "cond" e.g. *discardTimer*. The *AS-Config* re-uses information elements primarily created to cover the radio interface signalling requirements. The information elements may include some parameters that are not relevant for the target eNB e.g. the SFN as included in the *MasterInformationBlock*.

All the fields in the *AS-Config* as defined in 10.3 that are introduced after v9.2.0 and that are optional for eNB to UE communication shall be included, if the functionality is configured. The fields in the *AS-Config* that are defined before and including v9.2.0 shall be included as specified in the following.

Within the *sourceRadioResourceConfig, sourceMeasConfig* and *sourceOtherConfig*, the source eNB shall include fields that are optional for eNB to UE communication, if the functionality is configured unless explicitly specified otherwise in the following:

- in accordance with a condition that is explicitly stated to be applicable; or
- a default value is defined for the concerned field; and the configured value is the same as the default value that is defined; or
- the need of the field is OP and the current UE configuration corresponds with the behaviour defined for absence of the field;

The following fields, if the functionality is configured, are not mandatory for the source eNB to include in the *AS-Config* since delta signalling by the target eNB for these fields is not supported:

- *semiPersistSchedC-RNTI*
- *measGapConfig*

For the measurement configuration, a corresponding operation as 5.5.6.1 and 5.5.2.2a is executed by target eNB.

10.6 Inter-node NB-IoT messages

10.6.1 General

This section specifies NB-IoT RRC messages that are sent either across the X2- or the S1-interface, either to or from the eNB, i.e. a single 'logical channel' is used for all NB-IoT RRC messages transferred across network nodes.

– *NB-IoT-InterNodeDefinitions*

This ASN.1 segment is the start of the NB-IoT inter-node PDU definitions.

```
-- ASN1START

NBIOT-InterNodeDefinitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

IMPORTS
    C-RNTI,
    PhysCellId,
    SecurityAlgorithmConfig,
    ShortMAC-I
FROM EUTRA-RRC-Definitions
```


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```
    AdditionalReestabInfoList
FROM EUTRA-InterNodeDefinitions

    CarrierFreq-NB-r13,
    RadioResourceConfigDedicated-NB-r13,
    UECapabilityInformation-NB,
    UE-Capability-NB-r13,
    UE-Capability-NB-Ext-r14-IEs,
    UE-RadioPagingInfo-NB-r13
FROM NBIOT-RRC-Definitions;

-- ASN1STOP
```

10.6.2 Message definitions

– *HandoverPreparationInformation-NB*

This message is used to transfer the UE context from the eNB where the RRC connection has been suspended and transfer it to the eNB where the RRC Connection has been requested to be resumed.

Direction: source eNB to target eNB

***HandoverPreparationInformation-NB* message**

```
-- ASN1START

HandoverPreparationInformation-NB ::=   SEQUENCE {
    criticalExtensions                      CHOICE {
        c1                                      CHOICE{
            handoverPreparationInformation-r13      HandoverPreparationInformation-NB-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

HandoverPreparationInformation-NB-IEs ::= SEQUENCE {
    ue-RadioAccessCapabilityInfo-r13        UE-Capability-NB-r13,
    as-Config-r13                           AS-Config-NB,
    rrm-Config-r13                          RRM-Config-NB                   OPTIONAL,
    as-Context-r13                          AS-Context-NB                   OPTIONAL,
    nonCriticalExtension                    HandoverPreparationInformation-NB-v1380-IEs
    OPTIONAL
}

HandoverPreparationInformation-NB-v1380-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                HandoverPreparationInformation-NB-Ext-r14-IEs   OPTIONAL
}

HandoverPreparationInformation-NB-Ext-r14-IEs ::= SEQUENCE {
    ue-RadioAccessCapabilityInfoExt-r14     OCTET STRING (CONTAINING UE-Capability-NB-Ext-r14-IEs)
    OPTIONAL,
    nonCriticalExtension                    SEQUENCE {}                     OPTIONAL
}

-- ASN1STOP
```

***HandoverPreparationInformation-NB* field descriptions**
as-Config The radio resource configuration.
as-Context The local E-UTRAN context required by the target eNB.
rrm-Config The local E-UTRAN context used depending on the target node's implementation, which is mainly used for the RRM purpose.
ue-RadioAccessCapabilityInfo, ue-RadioAccessCapabilityInfoExt The NB-IoT UE Radio Access Capability Parameters, see TS 36.306 [5].

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– *UEPagingCoverageInformation-NB*

This message is used to transfer UE paging coverage information for NB-IoT, covering both upload to and download from the EPC.

Direction: eNB to/from EPC

UEPagingCoverageInformation-NB message

```
-- ASN1START

UEPagingCoverageInformation-NB ::= SEQUENCE {
    criticalExtensions                 CHOICE {
        c1                                 CHOICE{
            uePagingCoverageInformation-r13         UEPagingCoverageInformation-NB-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture           SEQUENCE {}
    }
}

UEPagingCoverageInformation-NB-IEs ::= SEQUENCE {
--  the possible value(s) can differ from those sent on Uu
    npdcch-NumRepetitionPaging-r13          INTEGER (1..2048)   OPTIONAL,
    nonCriticalExtension                    SEQUENCE {}         OPTIONAL
}

-- ASN1STOP
```

UEPagingCoverageInformation-NB field descriptions
npdcch-NumRepetitionPaging   Number of repetitions for NPDCCH, see TS 36.211 [21].This value is an estimate of the required number of repetitions for NPDCCH.

– *UERadioAccessCapabilityInformation-NB*

This message is used to transfer UE NB-IoT Radio Access capability information, covering both upload to and download from the EPC.

Direction: eNB to/ from EPC

UERadioAccessCapabilityInformation-NB message

```
-- ASN1START

UERadioAccessCapabilityInformation-NB ::= SEQUENCE {
    criticalExtensions                      CHOICE {
        c1                                      CHOICE{
            ueRadioAccessCapabilityInformation-r13
                                                    UERadioAccessCapabilityInformation-NB-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture                SEQUENCE {}
    }
}

UERadioAccessCapabilityInformation-NB-IEs ::= SEQUENCE {
    ue-RadioAccessCapabilityInfo-r13            OCTET STRING (CONTAINING UE-Capability-NB-r13),
    nonCriticalExtension                        UERadioAccessCapabilityInformation-NB-v1380-IEs
    OPTIONAL
}

UERadioAccessCapabilityInformation-NB-v1380-IEs ::= SEQUENCE {
    lateNonCriticalExtension                OCTET STRING                        OPTIONAL,
    nonCriticalExtension                    UERadioAccessCapabilityInformation-NB-r14-IEs
    OPTIONAL
}

UERadioAccessCapabilityInformation-NB-r14-IEs ::= SEQUENCE {
    ue-RadioAccessCapabilityInfo-r14        OCTET STRING (CONTAINING UECapabilityInformation-NB)
    OPTIONAL,
```


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```
    nonCriticalExtension                    SEQUENCE {}                     OPTIONAL
}

-- ASN1STOP
```

***UERadioAccessCapabilityInformation-NB* field descriptions**
ue-RadioAccessCapabilityInfo The NB-IoT UE Radio Access Capability Parameters, see TS 36.306 [5].

– *UERadioPagingInformation-NB*

This message is used to transfer NB-IoT radio paging information, covering both upload to and download from the EPC.

Direction: eNB to/ from EPC

***UERadioPagingInformation-NB* message**

```
-- ASN1START

UERadioPagingInformation-NB ::= SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            ueRadioPagingInformation-r13            UERadioPagingInformation-NB-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

UERadioPagingInformation-NB-IEs ::= SEQUENCE {
    ue-RadioPagingInfo-r13              OCTET STRING (CONTAINING UE-RadioPagingInfo-NB-r13),
    nonCriticalExtension                SEQUENCE {}                                 OPTIONAL
}

-- ASN1STOP
```

***UERadioPagingInformation-NB* field descriptions**
ue-RadioPagingInfo The field is used to transfer UE NB-IoT capability information used for paging. The eNB generates the *ue-RadioPagingInfo* and the contained UE capability information is absent when not supported bythe UE.

10.7 Inter-node NB-IoT RRC information element definitions

– *AS-Config-NB*

The *AS-Config-NB* IE contains information about NB-IoT RRC configuration information in the source eNB which can be utilized by target eNB.

***AS-Config-NB* information element**

```
-- ASN1START

AS-Config-NB ::=                    SEQUENCE {
    sourceRadioResourceConfig-r13           RadioResourceConfigDedicated-NB-r13,
    sourceSecurityAlgorithmConfig-r13       SecurityAlgorithmConfig,
    sourceUE-Identity-r13                   C-RNTI,
    sourceDl-CarrierFreq-r13                CarrierFreq-NB-r13,
    ...
}

-- ASN1STOP
```


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AS-Config-NB field descriptions
sourceDL-CarrierFreq Provides the parameter Downlink EARFCN in the source PCell, see TS 36.101 [42].
sourceRadioResourceConfig Radio configuration in the source PCell. The radio resource configuration for all radio bearers existing in the source PCell shall be included. See 10.9.
sourceSecurityAlgorithmConfig This field provides the AS integrity protection (SRBs) and AS ciphering (SRBs and DRBs) algorithm configuration used in the source PCell.

– *AS-Context-NB*

The IE *AS-Context-NB* is used to transfer the UE context required by the target eNB.

AS-Context-NB information element

```
-- ASN1START

AS-Context-NB ::=                       SEQUENCE {
    reestablishmentInfo-r13                 ReestablishmentInfo-NB          OPTIONAL,
    ...
}

-- ASN1STOP
```

AS-Context-NB field descriptions
reestablishmentInfo Including information needed for the RRC connection re-establishment.

– *ReestablishmentInfo-NB*

The *ReestablishmentInfo-NB* IE contains information needed for the RRC connection re-establishment.

ReestablishmentInfo-NB information element

```
-- ASN1START

ReestablishmentInfo-NB ::=          SEQUENCE {
    sourcePhysCellId-r13                    PhysCellId,
    targetCellShortMAC-I-r13                ShortMAC-I,
    additionalReestabInfoList-r13           AdditionalReestabInfoList               OPTIONAL,
    ...
}



-- ASN1STOP
```

ReestablishmentInfo-NB field descriptions
additionalReestabInfoList Contains a list of shortMAC-I and KeNB* for cells under control of the target eNB, required for potential re-establishment by the UE in these cells to succeed.
sourcePhyCellId The physical cell identity of the source PCell, used to determine the UE context in the target eNB at re-establishment.
targetCellShortMAC-I The ShortMAC-I for the target PCell, in order for potential re-establishment to succeed.

– *RRM-Config-NB*

The *RRM-Config-NB* IE contains information about UE specific RRM information which can be utilized by target eNB.

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***RRM-Config-NB* information element**

```
-- ASN1START

RRM-Config-NB ::=               SEQUENCE {
    ue-InactiveTime             ENUMERATED {
                                    s1, s2, s3, s5, s7, s10, s15, s20,
                                    s25, s30, s40, s50, min1, min1s20, min1s40,
                                    min2, min2s30, min3, min3s30, min4, min5, min6,
                                    min7, min8, min9, min10, min12, min14, min17, min20,
                                    min24, min28, min33, min38, min44, min50, hr1,
                                    hr1min30, hr2, hr2min30, hr3, hr3min30, hr4, hr5, hr6,
                                    hr8, hr10, hr13, hr16, hr20, day1, day1hr12, day2,
                                    day2hr12, day3, day4, day5, day7, day10, day14, day19,
                                    day24, day30, dayMoreThan30}        OPTIONAL,
    ...
}

-- ASN1STOP
```

***RRM-Config-NB* field descriptions**
ue-InactiveTime Duration while UE has not received or transmitted any user data. Value s1 corresponds to 1 second, s2 corresponds to 2 seconds and so on. Value min1 corresponds to 1 minute, value min1s20 corresponds to 1 minute and 20 seconds, value min1s40 corresponds to 1 minute and 40 seconds and so on. Value hr1 corresponds to 1 hour, hr1min30 corresponds to 1 hour and 30 minutes and so on.

10.8 Inter-node RRC multiplicity and type constraint values

– Multiplicity and type constraints definitions

– End of *NB-IoT-InterNodeDefinitions*

```
-- ASN1START

END

-- ASN1STOP
```

10.9 Mandatory information in *AS-Config-NB*

The *AS-Config-NB* transferred between source eNB and target-eNB shall include all IEs necessary to describe the AS context. The conditional presence in section 6 is only applicable for eNB to UE communication.

The "Need" or "Cond" statements are not applied in case of sending the IEs from source eNB to target eNB. Some information elements shall be included regardless of the "Need" or "Cond" e.g. *discardTimer*. The *AS-Config-NB* re-uses information elements primarily created to cover the radio interface signalling requirements.

Within the *sourceRadioResourceConfig,* the source eNB shall include fields that are optional for eNB to UE communication, if the functionality is configured unless explicitly specified otherwise in the following:

- in accordance with a condition that is explicitly stated to be applicable; or
- a default value is defined for the concerned field; and the configured value is the same as the default value that is defined; or
- the need of the field is OP and the current UE configuration corresponds with the behaviour defined for absence of the field;

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11 UE capability related constraints and performance requirements

11.1 UE capability related constraints

The following table lists constraints regarding the UE capabilities that E-UTRAN is assumed to take into account.

Parameter	Description	Value	NB-IoT
#DRBs	The number of DRBs that a UE shall support	8	(0, 1, 2) NOTE1
#RLC-AM	The number of RLC AM entities that a UE shall support	10	(2, 3) NOTE1
#minCellperMeasObjectEUTRA	The minimum number of neighbour cells (excluding black list cells) that a UE shall be able to store within a MeasObjectEUTRA. NOTE.	32	N/A
#minBlackCellRangesperMeasObjectEUTRA	The minimum number of blacklist cell PCI ranges that a UE shall be able to store within a MeasObjectEUTRA	32	N/A
#minCellperMeasObjectUTRA	The minimum number of neighbour cells that a UE shall be able to store within a MeasObjectUTRA. NOTE.	32	N/A
#minCellperMeasObjectGERAN	The minimum number of neighbour cells that a UE shall be able to store within a measObjectGERAN. NOTE.	32	N/A
#minCellperMeasObjectCDMA2000	The minimum number of neighbour cells that a UE shall be able to store within a measObjectCDMA2000. NOTE.	32	N/A
#minCellTotal	The minimum number of neighbour cells (excluding black list cells) that UE shall be able to store in total in all measurement objects configured	256	N/A
NOTE: In case of CGI reporting, the limit regarding the cells E-UTRAN can configure includes the cell for which the UE is requested to report CGI i.e. the amount of neighbour cells that can be included is at most (# minCellperMeasObjectRAT - 1), where RAT represents EUTRA/UTRA/GERAN/CDMA2000 respectively.			
NOTE1: #DRBs based on UE capability, #RLC-AM =#DRBs + 2.			

11.2 Processing delay requirements for RRC procedures

The UE performance requirements for RRC procedures are specified in the following tables, by means of a value N:

N = the number of 1ms subframes from the end of reception of the E-UTRAN -> UE message on the UE physical layer up to when the UE shall be ready for the reception of uplink grant for the UE -> E-UTRAN response message with no access delay other than the TTI-alignment (e.g. excluding delays caused by scheduling, the random access procedure or physical layer synchronisation).

NOTE: No processing delay requirements are specified for RN-specific procedures.

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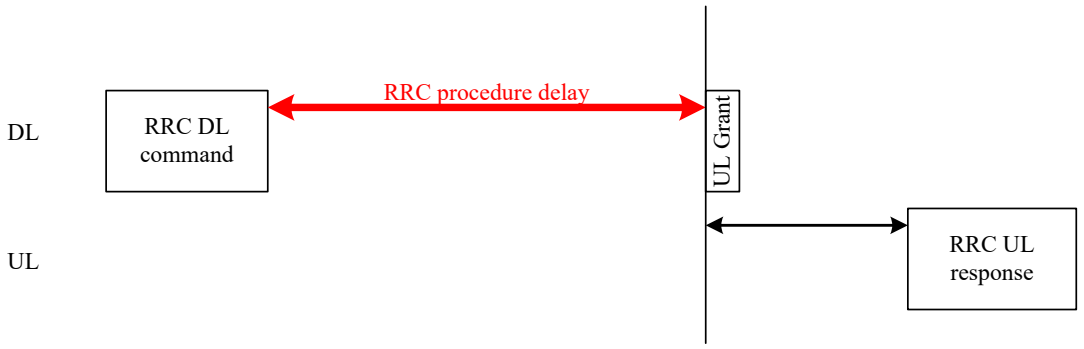


Figure 11.2-1: Illustration of RRC procedure delay

Table 11.2-1: UE performance requirements for RRC procedures for UEs other than NB-IoT UEs

Procedure title:	E-UTRAN -> UE	UE -> E-UTRAN	N	Notes

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Procedure title:	E-UTRAN -> UE	UE -> E-UTRAN	N	Notes
RRC Connection Control Procedures				
RRC connection establishment	*RRCConnectionSetup or RRCConnectionResume*	*RRCConnectionSetupComplete or RRCConnectionResumeComplete*	15	
RRC connection release	*RRCConnectionRelease*		NA	
RRC connection re-configuration (radio resource configuration)	*RRCConnectionReconfiguration*	*RRCConnectionReconfigurationComplete*	15	
RRC connection re-configuration (measurement configuration)	*RRCConnectionReconfiguration*	*RRCConnectionReconfigurationComplete*	15	
RRC connection re-configuration (intra-LTE mobility)	*RRCConnectionReconfiguration*	*RRCConnectionReconfigurationComplete*	15	
RRC connection reconfiguration (SCell addition/release)	*RRCConnectionReconfiguration*	*RRCConnectionReconfigurationComplete*	20	
RRC connection reconfiguration (SCG establishment/ release, SCG cell addition/ release)	*RRCConnectionReconfiguration*	*RRCConnectionReconfigurationComplete*	20	
RRC connection re-establishment	*RRCConnectionReestablishment*	*RRCConnectionReestablishmentComplete*	15	
Initial security activation	*SecurityModeCommand*	*SecurityModeCommandComplete/SecurityModeCommandFailure*	10	
Initial security activation + RRC connection re-configuration (RB establishment)	*SecurityModeCommand, RRCConnectionReconfiguration*	*RRCConnectionReconfigurationComplete*	20	The two DL messages are transmitted in the same TTI
Paging	*Paging*		NA	
Inter RAT mobility				
Handover to E-UTRA	*RRCConnectionReconfiguration (sent by other RAT)*	*RRCConnectionReconfigurationComplete*	NA	The performance of this procedure is specified in [50] in case of handover from GSM and [29], [30] in case of handover from UTRA.
Handover from E-UTRA	*MobilityFromEUTRACommand*		NA	The performance of this procedure is specified in [16]
Handover from E-UTRA to CDMA2000	*HandoverFromEUTRAPreparationRequest (CDMA2000)*		NA	Used to trigger the handover preparation procedure with a CDMA2000 RAT. The performance of this procedure is specified in [16]
Measurement procedures				
Measurement Reporting		*MeasurementReport*	NA	
Other procedures				
UE capability transfer	*UECapabilityEnquiry*	*UECapabilityInformation*	10	
Counter check	*CounterCheck*	*CounterCheckResponse*	10	
Proximity indication		*ProximityIndication*	NA	

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Procedure title:	E-UTRAN -> UE	UE -> E-UTRAN	N	Notes
UE information	*UEInformationRequest*	*UEInformationResponse*	15	
MBMS counting	*MBMSCountingRequest*	*MBMSCountingResponse*	NA	
MBMS interest indication		*MBMSInterestIndication*	NA	
In-device coexistence indication		*InDeviceCoexIndication*	NA	
UE assistance information		*UEAssistanceInformation*	NA	
SCG failure information		*SCGFailureInformation*	NA	
Sidelink UE information		*SidelinkUEInformation*	NA	
WLAN Connection Status Reporting		*WLANConnectionStatusReport*	NA	
Delay Budget Report		*DelayBudgetReport*	NA	

Table 11.2-2: UE performance requirements for RRC procedures for NB-IoT UEs

Procedure title:	E-UTRAN -> UE	UE -> E-UTRAN	N	Notes
RRC Connection Control Procedures				
RRC connection establishment	*RRCConnectionSetup-NB or RRCConnectionResume-NB*	*RRCConnectionSetupComplete-NB or RRCConnectionResumeComplete-NB*	45	
RRC connection release	*RRCConnectionRelease-NB*		NA	
RRC connection re-configuration (radio resource configuration)	*RRCConnectionReconfiguration-NB*	*RRCConnectionReconfigurationComplete-NB*	45	
RRC connection re-establishment	*RRCConnectionReestablishment-NB*	*RRCConnectionReestablishmentComplete-NB*	45	
Initial security activation	*SecurityModeCommand*	*SecurityModeCommandComplete/SecurityModeCommandFailure*	35	
Initial security activation + RRC connection re-configuration (RB establishment)	*SecurityModeCommand, RRCConnectionReconfiguration-NB*	*RRCConnectionReconfigurationComplete-NB*	55	The two DL messages are transmitted in the same TTI
Paging	*Paging-NB*		NA	
Other procedures				
UE capability transfer	*UECapabilityEnquiry-NB*	*UECapabilityInformation-NB*	35	

11.3 Void

Annex A (informative): Guidelines, mainly on use of ASN.1

Editor's note No agreements have been reached concerning the extension of RRC PDUs so far. Any statements in this section about the protocol extension mechanism should be considered as FFS.

A.1 Introduction

The following clauses contain guidelines for the specification of RRC protocol data units (PDUs) with ASN.1.

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A.2 Procedural specification

A.2.1 General principles

The procedural specification provides an overall high level description regarding the UE behaviour in a particular scenario.

It should be noted that most of the UE behaviour associated with the reception of a particular field is covered by the applicable parts of the PDU specification. The procedural specification may also include specific details of the UE behaviour upon reception of a field, but typically this should be done only for cases that are not easy to capture in the PDU section e.g. general actions, more complicated actions depending on the value of multiple fields.

Likewise, the procedural specification need not specify the UE requirements regarding the setting of fields within the messages that are send to E-UTRAN i.e. this may also be covered by the PDU specification.

A.2.2 More detailed aspects

The following more detailed conventions should be used:

- Bullets:
  - Capitals should be used in the same manner as in other parts of the procedural text i.e. in most cases no capital applies since the bullets are part of the sentence starting with 'The UE shall:'
  - All bullets, including the last one in a sub-clause, should end with a semi-colon i.e. an ';'
- Conditions
  - Whenever multiple conditions apply, a semi-colon should be used at the end of each conditions with the exception of the last one, i.e. as in 'if cond1; or cond2:

A.3 PDU specification

A.3.1 General principles

A.3.1.1 ASN.1 sections

The RRC PDU contents are formally and completely described using abstract syntax notation (ASN.1), see X.680 [13], X.681 (02/2002) [14].

The complete ASN.1 code is divided into a number of ASN.1 sections in the specifications. In order to facilitate the extraction of the complete ASN.1 code from the specification, each ASN.1 section begins with a text paragraph consisting entirely of an *ASN.1 start tag*, which consists of a double hyphen followed by a single space and the text string "ASN1START" (in all upper case letters). Each ASN.1 section ends with a text paragraph consisting entirely of an *ASN.1 stop tag*, which consists of a double hyphen followed by a single space and the text "ASN1STOP" (in all upper case letters):

```
-- ASN1START

-- ASN1STOP
```

The text paragraphs containing the ASN.1 start and stop tags should not contain any ASN.1 code significant for the complete description of the RRC PDU contents. The complete ASN.1 code may be extracted by copying all the text paragraphs between an ASN.1 start tag and the following ASN.1 stop tag in the order they appear, throughout the specification.

NOTE: A typical procedure for extraction of the complete ASN.1 code consists of a first step where the entire RRC PDU contents description (ultimately the entire specification) is saved into a plain text (ASCII) file format, followed by a second step where the actual extraction takes place, based on the occurrence of the ASN.1 start and stop tags.

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A.3.1.2 ASN.1 identifier naming conventions

The naming of identifiers (i.e., the ASN.1 field and type identifiers) should be based on the following guidelines:

- Message (PDU) identifiers should be ordinary mixed case without hyphenation. These identifiers, *e.g.*, the *RRCConnectionModificationCommand*, should be used for reference in the procedure text. Abbreviated forms of these identifiers should not be used.

- Type identifiers other than PDU identifiers should be ordinary mixed case, with hyphenation used to set off acronyms only where an adjacent letter is a capital, *e.g.*, *EstablishmentCause, SelectedPLMN* (not *Selected-PLMN*, since the "d" in "Selected" is lowercase)*, InitialUE-Identity* and *MeasSFN-SFN-TimeDifference*.

- Field identifiers shall start with a lowercase letter and use mixed case thereafter, *e.g.*, *establishmentCause*. If a field identifier begins with an acronym (which would normally be in upper case), the entire acronym is lowercase (*plmn-Identity*, not *pLMN-Identity*). The acronym is set off with a hyphen (*ue-Identity*, not *ueIdentity*), in order to facilitate a consistent search pattern with corresponding type identifiers.

- Identifiers that are likely to be keywords of some language, especially widely used languages, such as C++ or Java, should be avoided to the extent possible.

- Identifiers, other than PDU identifiers, longer than 25 characters should be avoided where possible. It is recommended to use abbreviations, which should be done in a consistent manner i.e. use 'Meas' instead of 'Measurement' for all occurrences. Examples of typical abbreviations are given in table A.3.1.2.1-1 below.

- *For future extension:* When an extension is introduced a suffix is added to the identifier of the concerned ASN.1 field and/ or type. A suffix of the form "-rX" is used, with X indicating the release, for ASN.1 fields or types introduced in a later release (i.e. a release later than the original/ first release of the protocol) as well as for ASN.1 fields or types for which a revision is introduced in a later release replacing a previous version, *e.g.*, *Foo-r9* for the Rel-9 version of the ASN.1 type *Foo*. A suffix of the form "-rXb" is used for the first revision of a field that it appears in the same release (X) as the original version of the field, "-rXc" for a second intra-release revision and so on. A suffix of the form "-vXYZ" is used for ASN.1 fields or types that only are an extension of a corresponding earlier field or type (see sub-clause A.4), e.g., *AnElement-v10b0* for the extension of the ASN.1 type *AnElement* introduced in version 10.11.0 of the specification. A number *0...9, 10, 11, etc.* is used to represent the first part of the version number, indicating the release of the protocol. Lower case letters *a, b, c, etc.* are used to represent the second (and third) part of the version number if they are greater than 9. In the procedural specification, in field descriptions as well as in headings suffices are not used, unless there is a clear need to distinguish the extension from the original field.

- More generally, in case there is a need to distinguish different variants of an ASN.1 field or IE, a suffix should be added at the end of the identifiers e.g. *MeasObjectUTRA*, *ConfigCommon*. When there is no particular need to distinguish the fields (e.g. because the field is included in different IEs), a common field identifier name may be used. This may be attractive e.g. in case the procedural specification is the same for the different variants.

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Table A.3.1.2-1: Examples of typical abbreviations used in ASN.1 identifiers

Abbreviation	Abbreviated word
Comm	Communication
Conf	Confirmation
Config	Configuration
Disc	Discovery
DL	Downlink
Ext	Extension
Freq	Frequency
Id	Identity
Ind	Indication
Info	Information
Meas	Measurement
Neigh	Neighbour(ing)
Param(s)	Parameter(s)
Persist	Persistent
Phys	Physical
Proc	Process
Reestab	Reestablishment
Req	Request
Rx	Reception
Sched	Scheduling
Sync	Synchronisation
Thresh	Threshold
Tx/ Transm	Transmission
UL	Uplink

NOTE: The table A.3.1.2.1-1 is not exhaustive. Additional abbreviations may be used in ASN.1 identifiers when needed.

A.3.1.3 Text references using ASN.1 identifiers

A text reference into the RRC PDU contents description from other parts of the specification is made using the ASN.1 field or type identifier of the referenced element. The ASN.1 field and type identifiers used in text references should be in the *italic font style*. The "do not check spelling and grammar" attribute in Word should be set. Quotation marks (i.e., " ") should not be used around the ASN.1 field or type identifier.

A reference to an RRC PDU type should be made using the corresponding ASN.1 type identifier followed by the word "message", e.g., a reference to the *RRCConnectionRelease* message.

A reference to a specific part of an RRC PDU, or to a specific part of any other ASN.1 type, should be made using the corresponding ASN.1 field identifier followed by the word "field", e.g., a reference to the *prioritisedBitRate* field in the example below.

```
-- /example/ ASN1START

LogicalChannelConfig ::=            SEQUENCE {
    ul-SpecificParameters               SEQUENCE {
        priority                            Priority,
        prioritisedBitRate                  PrioritisedBitRate,
        bucketSizeDuration                  BucketSizeDuration,
        logicalChannelGroup                 INTEGER (0..3)
    }       OPTIONAL
}

-- ASN1STOP
```

NOTE: All the ASN.1 start tags in the ASN.1 sections, used as examples in this annex to the specification, are deliberately distorted, in order not to include them when the ASN.1 description of the RRC PDU contents is extracted from the specification.

A reference to a specific type of information element should be made using the corresponding ASN.1 type identifier preceded by the acronym "IE", e.g., a reference to the IE *LogicalChannelConfig* in the example above.

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References to a specific type of information element should only be used when those are generic, i.e., without regard to the particular context wherein the specific type of information element is used. If the reference is related to a particular context, e.g., an RRC PDU type (message) wherein the information element is used, the corresponding field identifier in that context should be used in the text reference.

A reference to a specific value of an ASN.1 field should be made using the corresponding ASN.1 value without using quotation marks around the ASN.1 value, e.g., 'if the *status* field is set to value *true*'.

A.3.2 High-level message structure

Within each logical channel type, the associated RRC PDU (message) types are alternatives within a CHOICE, as shown in the example below.

```
-- /example/ ASN1START

DL-DCCH-Message ::= SEQUENCE {
    message                 DL-DCCH-MessageType
}

DL-DCCH-MessageType ::= CHOICE {
    c1                      CHOICE {
        dlInformationTransfer                   DLInformationTransfer,
        handoverFromEUTRAPreparationRequest     HandoverFromEUTRAPreparationRequest,
        mobilityFromEUTRACommand                MobilityFromEUTRACommand,
        rrcConnectionReconfiguration            RRCConnectionReconfiguration,
        rrcConnectionRelease                    RRCConnectionRelease,
        securityModeCommand                     SecurityModeCommand,
        ueCapabilityEnquiry                     UECapabilityEnquiry,
        spare1 NULL
    },
    messageClassExtension   SEQUENCE {}
}

-- ASN1STOP
```

A nested two-level CHOICE structure is used, where the alternative PDU types are alternatives within the inner level *c1* CHOICE.

Spare alternatives (i.e., *spare1* in this case) may be included within the *c1* CHOICE to facilitate future extension. The number of such spare alternatives should not extend the total number of alternatives beyond an integer-power-of-two number of alternatives (i.e., eight in this case).

Further extension of the number of alternative PDU types is facilitated using the *messageClassExtension* alternative in the outer level CHOICE.

A.3.3 Message definition

Each PDU (message) type is specified in an ASN.1 section similar to the one shown in the example below.

```
-- /example/ ASN1START

RRCConnectionReconfiguration ::=    SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            rrcConnectionReconfiguration-r8     RRCConnectionReconfiguration-r8-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

RRCConnectionReconfiguration-r8-IEs ::= SEQUENCE {
    -- Enter the IEs here.
    ...
}

-- ASN1STOP
```


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Hooks for *critical* and *non-critical* extension should normally be included in the PDU type specification. How these hooks are used is further described in sub-clause A.4.

Critical extensions are characterised by a redefinition of the PDU contents and need to be governed by a mechanism for protocol version agreement between the encoder and the decoder of the PDU, such that the encoder is prevented from sending a critically extended version of the PDU type, which is not comprehended by the decoder.

Critical extension of a PDU type is facilitated by a two-level CHOICE structure, where the alternative PDU contents are alternatives within the inner level *c1* CHOICE. Spare alternatives (i.e., *spare3* down to *spare1* in this case) may be included within the *c1* CHOICE. The number of spare alternatives to be included in the original PDU specification should be decided case by case, based on the expected rate of critical extension in the future releases of the protocol.

Further critical extension, when the spare alternatives from the original specifications are used up, is facilitated using the *criticalExtensionsFuture* in the outer level CHOICE.

In PDU types where critical extension is not expected in the future releases of the protocol, the inner level *c1* CHOICE and the spare alternatives may be excluded, as shown in the example below.

```
-- /example/ ASN1START

RRCConnectionReconfigurationComplete ::= SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        rrcConnectionReconfigurationComplete-r8
                                            RRCConnectionReconfigurationComplete-r8-IEs,
        criticalExtensionsFuture            SEQUENCE {}
    }
}

RRCConnectionReconfigurationComplete-r8-IEs ::= SEQUENCE {
    -- Enter the IEs here. --                                                    -- Cond condTag
    ...
}

-- ASN1STOP
```

Non-critical extensions are characterised by the addition of new information to the original specification of the PDU type. If not comprehended, a non-critical extension may be skipped by the decoder, whilst the decoder is still able to complete the decoding of the comprehended parts of the PDU contents.

Non-critical extensions at locations other than the end of the message or other than at the end of a field contained in a BIT or OCTET STRING are facilitated by use of the ASN.1 extension marker "...". The original specification of a PDU type should normally include the extension marker at the end of the sequence of information elements contained.

Non-critical extensions at the end of the message or at the end of a field that is contained in a BIT or OCTET STRING are facilitated by use of an empty sequence that is marked OPTIONAL e.g. as shown in the following example:

```
-- /example/ ASN1START

RRCMessage-r8-IEs ::=                   SEQUENCE {
    field1                                  InformationElement1,
    field2                                  InformationElement2,
    nonCriticalExtension                    SEQUENCE {}                     OPTIONAL
}

-- ASN1STOP
```

The ASN.1 section specifying the contents of a PDU type may be followed by a *field description* table where a further description of, e.g., the semantic properties of the fields may be included. The general format of this table is shown in the example below. The field description table is absent in case there are no fields for which further description needs to be provided e.g. because the PDU does not include any fields, or because an IE is defined for each field while there is nothing specific regarding the use of this IE that needs to be specified.

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%PDU-TypeIdentifier% field descriptions
%field identifier% Field description.
%field identifier% Field description.

The field description table has one column. The header row shall contain the ASN.1 type identifier of the PDU type.

The following rows are used to provide field descriptions. Each row shall include a first paragraph with a *field identifier* (in ***bold and italic*** font style) referring to the part of the PDU to which it applies. The following paragraphs at the same row may include (in regular font style), e.g., semantic description, references to other specifications and/ or specification of value units, which are relevant for the particular part of the PDU.

The parts of the PDU contents that do not require a field description shall be omitted from the field description table.

A.3.4 Information elements

Each IE (information element) type is specified in an ASN.1 section similar to the one shown in the example below.

```
-- /example/ ASN1START

PRACH-ConfigSIB ::=                 SEQUENCE {
    rootSequenceIndex                   INTEGER (0..1023),
    prach-ConfigInfo                    PRACH-ConfigInfo
}

PRACH-Config ::=                    SEQUENCE {
    rootSequenceIndex                   INTEGER (0..1023),
    prach-ConfigInfo                    PRACH-ConfigInfo                    OPTIONAL    -- Need ON
}

PRACH-ConfigInfo ::=                SEQUENCE {
    prach-ConfigIndex                   ENUMERATED {ffs},
    highSpeedFlag                       ENUMERATED {ffs},
    zeroCorrelationZoneConfig           ENUMERATED {ffs}
}

-- ASN1STOP
```

IEs should be introduced whenever there are multiple fields for which the same set of values apply. IEs may also be defined for other reasons e.g. to break down a ASN.1 definition in to smaller pieces.

A group of closely related IE type definitions, like the IEs *PRACH-ConfigSIB* and *PRACH-Config* in this example, are preferably placed together in a common ASN.1 section. The IE type identifiers should in this case have a common base, defined as the *generic type identifier*. It may be complemented by a suffix to distinguish the different variants. The "*PRACH-Config*" is the generic type identifier in this example, and the "*SIB*" suffix is added to distinguish the variant. The sub-clause heading and generic references to a group of closely related IEs defined in this way should use the generic type identifier.

The same principle should apply if a new version, or an extension version, of an existing IE is created for *critical* or *non-critical* extension of the protocol (see sub-clause A.4). The new version, or the extension version, of the IE is included in the same ASN.1 section defining the original. A suffix is added to the type identifier, using the naming conventions defined in sub-clause A.3.1.2, indicating the release or version of the where the new version, or extension version, was introduced.

Local IE type definitions, like the IE *PRACH-ConfigInfo* in the example above, may be included in the ASN.1 section and be referenced in the other IE types defined in the same ASN.1 section. The use of locally defined IE types should be encouraged, as a tool to break up large and complex IE type definitions. It can improve the readability of the code. There may also be a benefit for the software implementation of the protocol end-points, as these IE types are typically provided by the ASN.1 compiler as independent data elements, to be used in the software implementation.

An IE type defined in a local context, like the IE *PRACH-ConfigInfo*, should not be referenced directly from other ASN.1 sections in the RRC specification. An IE type which is referenced in more than one ASN.1 section should be defined in a separate sub-clause, with a separate heading and a separate ASN.1 section (possibly as one in a set of

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closely related IE types, like the IEs *PRACH-ConfigSIB* and *PRACH-Config* in the example above). Such IE types are also referred to as 'global IEs'.

NOTE: Referring to an IE type, that is defined as a local IE type in the context of another ASN.1 section, does not generate an ASN.1 compilation error. Nevertheless, using a locally defined IE type in that way makes the IE type definition difficult to find, as it would not be visible at an outline level of the specification. It should be avoided.

The ASN.1 section specifying the contents of one or more IE types, like in the example above, may be followed by a *field description* table, where a further description of, e.g., the semantic properties of the fields of the information elements may be included. This table may be absent, similar as indicated in sub-clause A.3.3 for the specification of the PDU type. The general format of the *field description* table is the same as shown in sub-clause A.3.3 for the specification of the PDU type.

A.3.5 Fields with optional presence

A field with optional presence may be declared with the keyword DEFAULT. It identifies a default value to be assumed, if the sender does not include a value for that field in the encoding:

```
-- /example/ ASN1START

PreambleInfo ::=                    SEQUENCE {
    numberOfRA-Preambles                INTEGER (1..64)                     DEFAULT 1,
    ...
}

-- ASN1STOP
```

Alternatively, a field with optional presence may be declared with the keyword OPTIONAL. It identifies a field for which a value can be omitted. The omission carries semantics, which is different from any normal value of the field:

```
-- /example/ ASN1START

PRACH-Config ::=                SEQUENCE {
    rootSequenceIndex                   INTEGER (0..1023),
    prach-ConfigInfo                    PRACH-ConfigInfo                    OPTIONAL    -- Need ON
}

-- ASN1STOP
```

The semantics of an optionally present field, in the case it is omitted, should be indicated at the end of the paragraph including the keyword OPTIONAL, using a short comment text with a need statement. The need statement includes the keyword "Need", followed by one of the predefined semantics tags (OP, ON or OR) defined in sub-clause 6.1. If the semantics tag OP is used, the semantics of the absent field are further specified either in the field description table following the ASN.1 section, or in procedure text.

The addition of OPTIONAL keywords for capability groups is based on the following guideline. If there is more than one field in the lower level IE, then OPTIONAL keyword is added at the group level. If there is only one field in the lower level IE, OPTIONAL keyword is not added at the group level.

A.3.6 Fields with conditional presence

A field with conditional presence is declared with the keyword OPTIONAL. In addition, a short comment text shall be included at the end of the paragraph including the keyword OPTIONAL. The comment text includes the keyword "Cond", followed by a condition tag associated with the field ("UL" in this example):

```
-- /example/ ASN1START

LogicalChannelConfig ::=            SEQUENCE {
    ul-SpecificParameters               SEQUENCE {
        priority                            INTEGER (0),
        ...
    }       OPTIONAL                                                        -- Cond UL
}

-- ASN1STOP
```


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When conditionally present fields are included in an ASN.1 section, the field description table after the ASN.1 section shall be followed by a *conditional presence* table. The conditional presence table specifies the conditions for including the fields with conditional presence in the particular ASN.1 section.

Conditional presence	Explanation
UL	**Specification of the conditions for including the field associated with the condition tag = "UL". Semantics in case of optional presence under certain conditions may also be specified.**

The conditional presence table has two columns. The first column (heading: "Conditional presence") contains the condition tag (in *italic* font style), which links the fields with a condition tag in the ASN.1 section to an entry in the table. The second column (heading: "Explanation") contains a text specification of the conditions and requirements for the presence of the field. The second column may also include semantics, in case of an optional presence of the field, under certain conditions i.e. using the same predefined tags as defined for optional fields in A.3.5.

Conditional presence should primarily be used when presence of a field despends on the presence and/ or value of other fields within the same message. If the presence of a field depends on whether another feature/ function has been configured, while this function can be configured indepedently e.g. by another message and/ or at another point in time, the relation is best reflected by means of a statement in the field description table.

If the ASN.1 section does not include any fields with conditional presence, the conditional presence table shall not be included.

Whenever a field is only applicable in specific cases e.g. TDD, use of conditional presence should be considered.

A.3.7 Guidelines on use of lists with elements of SEQUENCE type

Where an information element has the form of a list (the SEQUENCE OF construct in ASN.1) with the type of the list elements being a SEQUENCE data type, an information element shall be defined for the list elements even if it would not otherwise be needed.

For example, a list of PLMN identities with reservation flags is defined as in the following example:

```
-- /example/ ASN1START

PLMN-IdentityInfoList ::=               SEQUENCE (SIZE (1..6)) OF PLMN-IdentityInfo

PLMN-IdentityInfo ::=               SEQUENCE {
    plmn-Identity                       PLMN-Identity,
    cellReservedForOperatorUse          ENUMERATED {reserved, notReserved}
}

-- ASN1STOP
```

rather than as in the following (bad) example, which may cause generated code to contain types with unpredictable names:

```
-- /bad example/ ASN1START

PLMN-IdentityList ::=                   SEQUENCE (SIZE (1..6)) OF SEQUENCE {
    plmn-Identity                           PLMN-Identity,
    cellReservedForOperatorUse              ENUMERATED {reserved, notReserved}
}

-- ASN1STOP
```


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A.4 Extension of the PDU specifications

A.4.1 General principles to ensure compatibility

It is essential that extension of the protocol does not affect interoperability i.e. it is essential that implementations based on different versions of the RRC protocol are able to interoperate. In particular, this requirement applies for the following kind of protocol extensions:

- Introduction of new PDU types (i.e. these should not cause unexpected behaviour or damage).
- Introduction of additional fields in an extensible PDUs (i.e. it should be possible to ignore uncomprehended extensions without affecting the handling of the other parts of the message).
- Introduction of additional values of an extensible field of PDUs. If used, the behaviour upon reception of an uncomprehended value should be defined.

It should be noted that the PDU extension mechanism may depend on the logical channel used to transfer the message e.g. for some PDUs an implementation may be aware of the protocol version of the peer in which case selective ignoring of extensions may not be required.

The non-critical extension mechanism is the primary mechanism for introducing protocol extensions i.e. the critical extension mechanism is used merely when there is a need to introduce a 'clean' message version. Such a need appears when the last message version includes a large number of non-critical extensions, which results in issues like readability, overhead associated with the extension markers. The critical extension mechanism may also be considered when it is complicated to accommodate the extensions by means of non-critical extension mechanisms.

A.4.2 Critical extension of messages and fields

The mechanisms to critically extend a message are defined in A.3.3. There are both "outer branch" and "inner branch" mechanisms available. The "outer branch" consists of a CHOICE having the name *criticalExtensions*, with two values, *c1* and *criticalExtensionsFuture*. The *criticalExtensionsFuture* branch consists of an empty SEQUENCE, while the c1 branch contains the "inner branch" mechanism.

The "inner branch" structure is a CHOICE with values of the form "*MessageName-rX-IEs*" (e.g., "*RRCConnectionReconfiguration-r8-IEs*") or "*spareX*", with the spare values having type NULL. The "-rX-IEs" structures contain the *complete* structure of the message IEs for the appropriate release; i.e., the critical extension branch for the Rel-10 version of a message includes all Rel-8 and Rel-9 fields (that are not obviated in the later version), rather than containing only the additional Rel-10 fields.

The following guidelines may be used when deciding which mechanism to introduce for a particular message, i.e. only an 'outer branch', or an 'outer branch' in combination with an 'inner branch' including a certain number of spares:

- For certain messages, e.g. initial uplink messages, messages transmitted on a broadcast channel, critical extension may not be applicable.
- An outer branch may be sufficient for messages not including any fields.
- The number of spares within inner branch should reflect the likelihood that the message will be critically extended in future releases (since each release with a critical extension for the message consumes one of the spare values). The estimation of the critical extension likelyhood may be based on the number, size and changeability of the fields included in the message.
- In messages where an inner branch extension mechanism is available, all spare values of the inner branch should be used before any critical extensions are added using the outer branch.

The following example illustrates the use of the critical extension mechanism by showing the ASN.1 of the original and of a later release

```
-- /example/ ASN1START                  -- Original release

RRCMessage ::=                          SEQUENCE {
    rrc-TransactionIdentifier               RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
```


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```
            rrcMessage-r8                       RRCMessage-r8-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

-- ASN1STOP
```

```
-- /example/ ASN1START                  -- Later release

RRCMessage ::=                          SEQUENCE {
    rrc-TransactionIdentifier               RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            rrcMessage-r8                       RRCMessage-r8-IEs,
            rrcMessage-r10                      RRCMessage-r10-IEs,
            rrcMessage-r11                      RRCMessage-r11-IEs,
            rrcMessage-r14                      RRCMessage-r14-IEs
        },
        later                           CHOICE {
            c2                                  CHOICE{
                rrcMessage-r16                      RRCMessage-r16-IEs,
                spare7 NULL, spare6 NULL, spare5 NULL, spare4 NULL,
                spare3 NULL, spare2 NULL, spare1 NULL
            },
            criticalExtensionsFuture                SEQUENCE {}
        }
    }
}

-- ASN1STOP
```

It is important to note that critical extensions may also be used at the level of individual fields i.e. a field may be replaced by a critically extended version. When sending the extended version, the original version may also be included (e.g. original field is mandatory, EUTRAN is unaware if UE supports the extended version). In such cases, a UE supporting both versions may be required to ignore the original field. The following example illustrates the use of the critical extension mechanism by showing the ASN.1 of the original and of a later release

```
-- /example/ ASN1START                  -- Original release

RRCMessage ::=                          SEQUENCE {
    rrc-TransactionIdentifier               RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            rrcMessage-r8                       RRCMessage-r8-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

RRCMessage-rN-IEs ::= SEQUENCE {
    field1-rN                           ENUMERATED {
                                            value1, value2, value3, value4} OPTIONAL,   -- Need ON
    field2-rN                           InformationElement2-rN              OPTIONAL,   -- Need ON
    nonCriticalExtension                RRCConnectionReconfiguration-vMxy-IEs   OPTIONAL
}

RRCConnectionReconfiguration-vMxy-IEs ::= SEQUENCE {
    field2-rM                           InformationElement2-rM          OPTIONAL, -- Cond NoField2rN
    nonCriticalExtension                SEQUENCE {}                     OPTIONAL
}

-- ASN1STOP
```

Conditional presence	Explanation
NoField2rN	The field is optionally present, need ON, if *field2-rN* is absent. Otherwise the field is not present

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Finally, it is noted that a critical extension may be introduced in the same release as the one in which the original field was introduced e.g. to correct an essential ASN.1 error. In such cases a UE capability may be introduced, to assist E-UTRAN in deciding whether or not to use the critically extension.

A.4.3 Non-critical extension of messages

A.4.3.1 General principles

The mechanisms to extend a message in a non-critical manner are defined in A.3.3. W.r.t. the use of extension markers, the following additional guidelines apply:

- When further non-critical extensions are added to a message that has been critically extended, the inclusion of these non-critical extensions in earlier critical branches of the message should be avoided when possible.
- The extension marker ("…") is the primary non-critical extension mechanism that is used unless a length determinant is not required. Examples of cases where a length determinant is not required:
  - at the end of a message,
  - at the end of a structure contained in a BIT STRING or OCTET STRING
- When an extension marker is available, non-critical extensions are preferably placed at the location (e.g. the IE) where the concerned parameter belongs from a logical/ functional perspective (referred to as the '*default extension location*')
- It is desirable to aggregate extensions of the same release or version of the specification into a group, which should be placed at the lowest possible level.
- In specific cases it may be preferrable to place extensions elsewhere (referred to as the '*actual extension location*') e.g. when it is possible to aggregate several extensions in a group. In such a case, the group should be placed at the lowest suitable level in the message. <TBD: ref to seperate example>
- In case placement at the default extension location affects earlier critical branches of the message, locating the extension at a following higher level in the message should be considered.
- In case an extension is not placed at the default extension location, an IE should be defined. The IE's ASN.1 definition should be placed in the same ASN.1 section as the default extension location. In case there are intermediate levels in-between the actual and the default extension location, an IE may be defined for each level. Intermediate levels are primarily introduced for readability and overview. Hence intermediate levels need not allways be introduced e.g. they may not be needed when the default and the actual extension location are within the same ASN.1 section. <TBD: ref to seperate example>

A.4.3.2 Further guidelines

Further to the general principles defined in the previous section, the following additional guidelines apply regarding the use of extension markers:

- Extension markers within SEQUENCE
  - Extension markers are primarily, but not exclusively, introduced at the higher nesting levels
  - Extension markers are introduced for a SEQUENCE comprising several fields as well as for information elements whose extension would result in complex structures without it (e.g. re-introducing another list)
  - Extension markers are introduced to make it possible to maintain important information structures e.g. parameters relevant for one particular RAT
  - Extension markers are also used for size critical messages (i.e. messages on BCCH, BR-BCCH, PCCH and CCCH), although introduced somewhat more carefully
  - The extension fields introduced (or frozen) in a specific version of the specification are grouped together using double brackets.
- Extension markers within ENUMERATED

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- Spare values are used until the number of values reaches the next power of 2, while the extension marker caters for extension beyond that limit
- A suffix of the form "vXYZ" is used for the identifier of each new value, e.g. "value-vXYZ".

- Extension markers within CHOICE:
  - Extension markers are introduced when extension is foreseen and when comprehension is not required by the receiver i.e. behaviour is defined for the case where the receiver cannot comprehend the extended value (e.g. ignoring an optional CHOICE field). It should be noted that defining the behaviour of a receiver upon receiving a not comprehended choice value is not required if the sender is aware whether or not the receiver supports the extended value.
  - A suffix of the form "vXYZ" is used for the identifier of each new choice value, e.g. "choice-vXYZ".

Non-critical extensions at the end of a message/ of a field contained in an OCTET or BIT STRING:

- When a nonCriticalExtension is actually used, a "Need" statement should not be provided for the field, which always is a group including at least one extension and a field facilitating further possible extensions. For simplicity, it is recommended not to provide a "Need" statement when the field is not actually used either.

Further, more general, guidelines:

- In case a need statement is not provided for a group, a "Need" statement is provided for all individual extension fields within the group i.e. including for fields that are not marked as OPTIONAL. The latter is to clarify the action upon absence of the whole group.

A.4.3.3 Typical example of evolution of IE with local extensions

The following example illustrates the use of the extension marker for a number of elementary cases (sequence, enumerated, choice). The example also illustrates how the IE may be revised in case the critical extension mechanism is used.

NOTE In case there is a need to support further extensions of release n while the ASN.1 of release (n+1) has been frozen, without requiring the release n receiver to support decoding of release (n+1) extensions, more advanced mechanisms are needed e.g. including multiple extension markers.

```
-- /example/ ASN1START

InformationElement1 ::=             SEQUENCE {
    field1                              ENUMERATED {
                                            value1, value2, value3, value4-v880,
                                            ..., value5-v960 },
    field2                              CHOICE {
        field2a                             BOOLEAN,
        field2b                             InformationElement2b,
        ...,
        field2c-v960                        InformationElement2c-r9
    },
    ...,
    [[  field3-r9                           InformationElement3-r9      OPTIONAL        -- Need OR
    ]],
    [[  field3-v9a0                         InformationElement3-v9a0    OPTIONAL,       -- Need OR
        field4-r9                           InformationElement4         OPTIONAL        -- Need OR
    ]]
}

InformationElement1-r10 ::=         SEQUENCE {
    field1                              ENUMERATED {
                                            value1, value2, value3, value4-v880,
                                            value5-v960, value6-v1170, spare2, spare1, ... },
    field2                              CHOICE {
        field2a                             BOOLEAN,
        field2b                             InformationElement2b,
        field2c-v960                        InformationElement2c-r9,
        ...,
        field2d-v12b0                       INTEGER (0..63)
    },
    field3-r9                           InformationElement3-r10         OPTIONAL,   -- Need OR
    field4-r9                           InformationElement4             OPTIONAL,   -- Need OR
    field5-r10                          BOOLEAN,
```


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```
    field6-r10                          InformationElement6-r10         OPTIONAL,   -- Need OR
    ...,
    [[  field3-v1170                        InformationElement3-v1170       OPTIONAL    -- Need OR
    ]]
}

-- ASN1STOP
```

Some remarks regarding the extensions of *InformationElement1* as shown in the above example:

- The *InformationElement1* is initially extended with a number of non-critical extensions. In release 10 however, a critical extension is introduced for the message using this IE. Consequently, a new version of the IE *InformationElement1* (i.e. *InformationElement1-r10*) is defined in which the earlier non-critical extensions are incorporated by means of a revision of the original field.
- The *value4-v880* is replacing a spare value defined in the original protocol version for *field1*. Likewise *value6-v1170* replaces *spare3* that was originally defined in the r10 version of *field1*
- Within the critically extended release 10 version of *InformationElement1*, the names of the original fields/ IEs are not changed, unless there is a real need to distinguish them from other fields/ IEs. E.g. the *field1* and *InformationElement4* were defined in the original protocol version (release 8) and hence not tagged. Moreover, the *field3-r9* is introduced in release 9 and not re-tagged; although, the *InformationElement3* is also critically extended and therefore tagged *InformationElement3-r10* in the release 10 version of InformationElement1.

A.4.3.4 Typical examples of non critical extension at the end of a message

The following example illustrates the use of non-critical extensions at the end of the message or at the end of a field that is contained in a BIT or OCTET STRING i.e. when an empty sequence is used.

```
-- /example/ ASN1START

RRCMessage-r8-IEs ::=           SEQUENCE {
    field1                          InformationElement1,
    field2                          InformationElement2,
    field3                          InformationElement3                 OPTIONAL,   -- Need ON
    nonCriticalExtension            RRCMessage-v860-IEs                 OPTIONAL
}

RRCMessage-v860-IEs ::=         SEQUENCE {
    field4-v860                     InformationElement4                 OPTIONAL,   -- Need OP
    field5-v860                     BOOLEAN                             OPTIONAL,   -- Cond C54
    nonCriticalExtension            RRCMessage-v940-IEs                 OPTIONAL
}

RRCMessage-v940-IEs ::=         SEQUENCE {
    field6-v940                     InformationElement6-r9                  OPTIONAL,   -- Need OR
    nonCriticalExtensions           SEQUENCE {}                             OPTIONAL
}

-- ASN1STOP
```

Some remarks regarding the extensions shown in the above example:

- The *InformationElement4* is introduced in the original version of the protocol (release 8) and hence no suffix is used.

A.4.3.5 Examples of non-critical extensions not placed at the default extension location

The following example illustrates the use of non-critical extensions in case an extension is not placed at the default extension location.

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– *ParentIE-WithEM*

The IE *ParentIE-WithEM* is an example of a high level IE including the extension marker (EM). The root encoding of this IE includes two lower level IEs *ChildIE1-WithoutEM* and *ChildIE2-WithoutEM* which not include the extension marker. Consequently, non-critical extensions of the Child-IEs have to be included at the level of the Parent-IE.

The example illustrates how the two extension IEs *ChildIE1-WithoutEM-vNx0* and *ChildIE2-WithoutEM-vNx0* (both in release N) are used to connect non-critical extensions with a default extension location in the lower level IEs to the actual extension location in this IE.

ParentIE-WithEM information element

```
-- /example/ ASN1START

ParentIE-WithEM ::=                 SEQUENCE {
    -- Root encoding, including:
    childIE1-WithoutEM                  ChildIE1-WithoutEM              OPTIONAL,       -- Need ON
    childIE2-WithoutEM                  ChildIE2-WithoutEM              OPTIONAL,       -- Need ON
    ...,
    [[  childIE1-WithoutEM-vNx0             ChildIE1-WithoutEM-vNx0     OPTIONAL,       -- Need ON
        childIE2-WithoutEM-vNx0             ChildIE2-WithoutEM-vNx0     OPTIONAL        -- Need ON
    ]]
}

-- ASN1STOP
```

Some remarks regarding the extensions shown in the above example:

- The fields *childIEx-WithoutEM-vNx0* may not really need to be optional (depends on what is defined at the next lower level).
- In general, especially when there are several nesting levels, fields should be marked as optional only when there is a clear reason.

– *ChildIE1-WithoutEM*

The IE *ChildIE1-WithoutEM* is an example of a lower level IE, used to control certain radio configurations including a configurable feature which can be setup or released using the local IE *ChIE1-ConfigurableFeature*. The example illustrates how the new field *chIE1-NewField* is added in release N to the configuration of the configurable feature. The example is based on the following assumptions:

- when initially configuring as well as when modifying the new field, the original fields of the configurable feature have to be provided also i.e. as if the extended ones were present within the setup branch of this feature.
- when the configurable feature is released, the new field should be released also.
- when omitting the original fields of the configurable feature the UE continues using the existing values (which is used to optimise the signalling for features that typically continue unchanged upon handover).
- when omitting the new field of the configurable feature the UE releases the existing values and discontinues the associated functionality (which may be used to support release of unsupported functionality upon handover to an eNB supporting an earlier protocol version).

The above assumptions, which affect the use of conditions and need codes, may not always apply. Hence, the example should not be re-used blindly.

ChildIE1-WithoutEM information elements

```
-- /example/ ASN1START

ChildIE1-WithoutEM ::=              SEQUENCE {
    -- Root encoding, including:
    chIE1-ConfigurableFeature           ChIE1-ConfigurableFeature       OPTIONAL        -- Need ON
}
```


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```
ChildIE1-WithoutEM-vNx0 ::=     SEQUENCE {
    chIE1-ConfigurableFeature-vNx0      ChIE1-ConfigurableFeature-vNx0  OPTIONAL    -- Cond ConfigF
}

ChIE1-ConfigurableFeature ::=       CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        -- Root encoding
    }
}

ChIE1-ConfigurableFeature-vNx0 ::=  SEQUENCE {
    chIE1-NewField-rN                   INTEGER (0..31)
}

-- ASN1STOP
```

Conditional presence	Explanation
ConfigF	The field is optional present, need OR, in case of *chIE1-ConfigurableFeature* is included and set to "setup"; otherwise the field is not present and the UE shall delete any existing value for this field.

– *ChildIE2-WithoutEM*

The IE *ChildIE2-WithoutEM* is an example of a lower level IE, typically used to control certain radio configurations. The example illustrates how the new field *chIE1-NewField* is added in release N to the configuration of the configurable feature.

***ChildIE2-WithoutEM* information element**

```
-- /example/ ASN1START

ChildIE2-WithoutEM ::=              CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        -- Root encoding
    }
}

ChildIE2-WithoutEM-vNx0 ::=         SEQUENCE {
    chIE2-NewField-rN                   INTEGER (0..31)                 OPTIONAL    -- Cond ConfigF
}

-- ASN1STOP
```

Conditional presence	Explanation
ConfigF	The field is optional present, need OR, in case of *chIE2-ConfigurableFeature* is included and set to "setup"; otherwise the field is not present and the UE shall delete any existing value for this field.

A.5 Guidelines regarding inclusion of transaction identifiers in RRC messages

The following rules provide guidance on which messages should include a Transaction identifier

1: DL messages on CCCH that move UE to RRC-Idle should not include the RRC transaction identifier.

2: All network initiated DL messages by default should include the RRC transaction identifier.

3: All UL messages that are direct response to a DL message with an RRC Transaction identifier should include the RRC Transaction identifier.

4: All UL messages that require a direct DL response message should include an RRC transaction identifier.

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5: All UL messages that are not in response to a DL message nor require a corresponding response from the network should not include the RRC Transaction identifier.

A.6 Protection of RRC messages (informative)

The following list provides information which messages can be sent (unprotected) prior to security activation and which messages can be sent unprotected after security activation. Those messages indicated "-" in "P" column should never be sent unprotected by eNB or UE. Further requirements are defined in the procedural text.

P…Messages that can be sent (unprotected) prior to security activation

A - I…Messages that can be sent without integrity protection after security activation

A - C…Messages that can be sent unciphered after security activation

NA… Message can never be sent after security activation

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Message	P	A-I	A-C	Comment
CSFBParametersRequestCDMA2000	+	-	-	
CSFBParametersResponseCDMA2000	+	-	-	
CounterCheck	-	-	-	
CounterCheckResponse	-	-	-	
DelayBudgetReport	-	-	-	
DLInformationTransfer	+	-	-	
HandoverFromEUTRAPreparationRequest (CDMA2000)	-	-	-	
InDeviceCoexIndication	-	-	-	
InterFreqRSTDMeasurementIndication	-	-	-	
LoggedMeasurementsConfiguration	-	-	-	
MasterInformationBlock	+	+	+	
MBMSCountingRequest	+	+	+	
MBMSCountingResponse	-	-	-	
MBMSInterestIndication	+	-	-	
MBSFNAreaConfiguration	+	+	+	
MeasurementReport	-	-	-	Measurement configuration may be sent prior to security activation. But: In order to protect privacy of UEs, MEASUREMENT REPORT is only sent from the UE after successful security activation.
MobilityFromEUTRACommand	-	-	-	
Paging	+	+	+	
ProximityIndication	-	-	-	
RNReconfiguration	-	-	-	
RNReconfigurationComplete	-	-	-	
RRCConnectionReconfiguration	+	-	-	The message shall not be sent unprotected before security activation if it is used to perform handover or to establish SRB2 and DRBs
RRCConnectionReconfigurationComplete	+	-	-	Unprotected, if sent as response to RRCConnectionReconfiguration which was sent before security activation
RRCConnectionReestablishment	-	+	+	This message is not protected by PDCP operation.
RRCConnectionReestablishmentComplete	-	-	-	
RRCConnectionReestablishmentReject	-	+	+	One reason to send this may be that the security context has been lost, therefore sent as unprotected.
RRCConnectionReestablishmentRequest	-	-	+	This message is not protected by PDCP operation. However, a short MAC-I is included.
RRCConnectionReject	+	NA	NA	
RRCConnectionRelease	+	-	-	Justification for P: If the RRC connection only for signalling not requiring DRBs or ciphered messages, or the signalling connection has to be released prematurely, this message is sent as unprotected.
RRCConnectionRequest	+	NA	NA	
RRCConnectionResume	-	-	+	When this message is transmitted, security is activated but suspended. Integrity verification is done after the message received by RRC.
RRCConnectionResumeRequest	-	-	+	This message is not protected by PDCP operation. However, a short MAC-I is included.
RRCConnectionResumeComplete	-	-	-	
RRCConnectionSetup	+	NA	NA	
RRCConnectionSetupComplete	+	NA	NA	
SCGFailureInformation	-	-	-	
SCPTMConfiguration	+	+	+	

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Message	P	A-I	A-C	Comment
SecurityModeCommand	+	NA	NA	Integrity protection applied, but no ciphering (integrity verification done after the message received by RRC)
SecurityModeComplete	-	NA	NA	Integrity protection applied, but no ciphering. Ciphering is applied after completing the procedure.
SecurityModeFailure	+	NA	NA	Neither integrity protection nor ciphering applied.
SidelinkUEInformation	+	-	-	
SystemInformation	+	+	+	
SystemInformationBlockType1	+	+	+	
UEAssistanceInformation	-	-	-	
UECapabilityEnquiry	+	-	-	
UECapabilityInformation	+	-	-	
UEInformationRequest	-	-	-	
UEInformationResponse	-	-	-	In order to protect privacy of UEs, UEInformationResponse is only sent from the UE after successful security activation
ULHandoverPreparationTransfer (CDMA2000)	-	-	-	This message should follow HandoverFromEUTRAPreparationRequest
ULInformationTransfer	+	-	-	
WLANConnectionStatusReport	-	-	-	

A.7 Miscellaneous

The following miscellaneous conventions should be used:

- References: Whenever another specification is referenced, the specification number and optionally the relevant subclause, table or figure, should be indicated in addition to the pointer to the References section e.g. as follows: 'see TS 36.212 [22, 5.3.3.1.6]'.

- UE capabilities: TS 36.306 [5] specifies that E-UTRAN should in general respect the UE's capabilities. Hence there is no need to include statement clarifying that E-UTRAN, when setting the value of a certain configuration field, shall respect the related UE capabilities unless there is a particular need e.g. particularly complicated cases.

Annex B (normative): Release 8 and 9 AS feature handling

B.1 Feature group indicators

This annex contains the definitions of the bits in fields *featureGroupIndicators* (in Table B.1-1) and *featureGroupIndRel9Add* (in Table B.1-1a).

In this release of the protocol, the UE shall include the fields *featureGroupIndicators* in the IE *UE-EUTRA-Capability* and *featureGroupIndRel9Add* in the IE *UE-EUTRA-Capability-v9a0*. All the functionalities defined within the field *featureGroupIndicators* defined in Table B.1-1 or Table B.1-1a are mandatory for the UE (with exceptions for category M1 and M2 UEs), if the related capability (frequency band, RAT, SR-VCC or Inter-RAT ANR) is also supported. For a specific indicator, if all functionalities for a feature group listed in Table B.1-1 have been implemented and tested, the UE shall set the indicator as one (1), else (i.e. if any one of the functionalities in a feature group listed in Table B.1-1 or Table B.1-1a, which have not been implemented or tested), the UE shall set the indicator as zero (0).

The UE shall set all indicators that correspond to RATs not supported by the UE as zero (0).

The UE shall set all indicators, which do not have a definition in Table B.1-1 or Table B.1-1a, as zero (0).

If the optional fields *featureGroupIndicators* or *featureGroupIndRel9Add* are not included by a UE of a future release, the network may assume that all features pertaining to the RATs supported by the UE, respectively listed in Table B.1-1 or Table B.1-1a and deployed in the network, have been implemented and tested by the UE.

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In Table B.1-1, a 'VoLTE capable UE' corresponds to a UE which is IMS voice capable and a 'MCPTT capable UE' corresponds to a UE which supports MCPTT voice application as defined in TS 23.179 [73].

The indexing in Table B.1-1a starts from index 33, which is the leftmost bit in the field *featureGroupIndRel9Add*.

Table B.1-1: Definitions of feature group indicators

Index of indicator (bit number)	**Definition** (description of the supported functionality, if indicator set to one)	**Notes**	**If indicated "Yes" the feature shall be implemented and successfully tested for this version of the specification**	***FDD/ TDD diff***
1 (leftmost bit)	- Intra-subframe frequency hopping for PUSCH scheduled by UL grant - DCI format 3a (TPC commands for PUCCH and PUSCH with single bit power adjustments) - Aperiodic CQI/PMI/RI reporting on PUSCH: Mode 2-0 – UE selected subband CQI without PMI - Aperiodic CQI/PMI/RI reporting on PUSCH: Mode 2-2 – UE selected subband CQI with multiple PMI	- set to 1 by category M1 and M2 UEs that have implemented and successfully tested "Aperiodic CQI/PMI/RI reporting on PUSCH: Mode 2-0 – UE selected subband CQI without PMI"		Yes
2	- Simultaneous CQI and ACK/NACK on PUCCH, i.e. PUCCH format 2a and 2b - Absolute TPC command for PUSCH - Resource allocation type 1 for PDSCH - Periodic CQI/PMI/RI reporting on PUCCH: Mode 2-0 – UE selected subband CQI without PMI - Periodic CQI/PMI/RI reporting on PUCCH: Mode 2-1 – UE selected subband CQI with single PMI	- If a category M1 or M2 UE does not support this feature group, this bit shall be set to 0.		Yes
3	- 5bit RLC UM SN - 7bit PDCP SN	- can only be set to 1 if the UE has set bit number 7 to 1.	Yes, if UE supports VoLTE, MCPTT, or both. Yes, if UE supports SRVCC to EUTRAN from GERAN.	No

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4	- Short DRX cycle	- can only be set to 1 if the UE has set bit number 5 to 1. - not supported by category M1 or M2 UE		Yes
5	- Long DRX cycle - DRX command MAC control element		Yes	No
6	- Prioritised bit rate		Yes	No
7	- RLC UM	- can only be set to 0 if the UE does neither support VoLTE nor MCPTT	Yes, if UE supports VoLTE, MCPTT, or both. Yes, if UE supports SRVCC to EUTRAN from GERAN.	No
8	- EUTRA RRC_CONNECTED to UTRA FDD or UTRA TDD CELL_DCH PS handover, if the UE supports either only UTRAN FDD or only UTRAN TDD - EUTRA RRC_CONNECTED to UTRA FDD CELL_DCH PS handover, if the UE supports both UTRAN FDD and UTRAN TDD	- can only be set to 1 if the UE has set bit number 22 to 1	Yes (except for category M1 and M2 UEs) for FDD, if UE supports UTRA FDD.	Yes
9	- EUTRA RRC_CONNECTED to GERAN GSM_Dedicated handover	- related to SR-VCC - can only be set to 1 if the UE has set bit number 23 to 1	Yes (except for category M1 and M2 UEs), if UE supports SRVCC to EUTRAN from GERAN.	Yes
10	- EUTRA RRC_CONNECTED to GERAN (Packet_) Idle by Cell Change Order - EUTRA RRC_CONNECTED to GERAN (Packet_) Idle by Cell Change Order with NACC (Network Assisted Cell Change)			Yes
11	- EUTRA RRC_CONNECTED to CDMA2000 1xRTT CS Active handover	- related to SR-VCC - can only be set to 1 if the UE has sets bit number 24 to 1		Yes
12	- EUTRA RRC_CONNECTED to CDMA2000 HRPD Active handover	- can only be set to 1 if the UE has set bit number 26 to 1		Yes
13	- Inter-frequency handover (within FDD or TDD)	- can only be set to 1 if the UE has set bit number 25 to 1	Yes (except for category M1 and M2 UEs), unless UE only supports band 13	No
14	- Measurement reporting event: Event A4 – Neighbour > threshold - Measurement reporting event: Event A5 – Serving < threshold1 & Neighbour > threshold2		Yes (except for category M1 and M2 UEs)	No
15	- Measurement reporting event: Event B1 – Neighbour > threshold for UTRAN FDD or UTRAN TDD, if the UE supports either only UTRAN FDD or only UTRAN TDD and has set bit number 22 to 1 - Measurement reporting event: Event B1 – Neighbour > threshold for UTRAN FDD or UTRAN TDD, if the UE supports both UTRAN FDD and UTRAN TDD and has set bit number 22 or 39 to 1, respectively - Measurement reporting event: Event B1 – Neighbour > threshold for GERAN, 1xRTT or HRPD, if the UE has set bit number 23, 24 or 26 to 1, respectively	- can only be set to 1 if the UE has set at least one of the bit number 22, 23, 24, 26 or 39 to 1. - even if the UE sets bits 41, it shall still set bit 15 to 1 if measurement reporting event B1 is tested for all RATs supported by UE - If a category M1 or M2 UE does not support this feature group, this bit shall be set to 0.	Yes for FDD, if UE supports only UTRAN FDD and does not support UTRAN TDD or GERAN or 1xRTT or HRPD	Yes
16	- Intra-frequency periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportStrongestCells*	- If a category M1 or M2 UE does not support this feature group, this bit shall be set to 0.	Yes	No

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	- Inter-frequency periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportStrongestCells*, if the UE has set bit number 25 to 1 - Inter-RAT periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportStrongestCells* for UTRAN FDD or UTRAN TDD, if the UE supports either only UTRAN FDD or only UTRAN TDD and has set bit number 22 to 1 - Inter-RAT periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportStrongestCells* for UTRAN FDD or UTRAN TDD, if the UE supports both UTRAN FDD and UTRAN TDD and has set bit number 22 or 39 to 1, respectively - Inter-RAT periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportStrongestCells* for GERAN, 1xRTT or HRPD, if the UE has set bit number 23, 24 or 26 to 1, respectively. NOTE: Event triggered periodical reporting (i.e., with *triggerType* set to *event* and with *reportAmount* > 1) is a mandatory functionality of event triggered reporting and therefore not the subject of this bit.			
17	Intra-frequency ANR features including: - Intra-frequency periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportStrongestCells* - Intra-frequency periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportCGI*	- can only be set to 1 if the UE has set bit number 5 to 1. - If a category M1 or M2 UE does not support this feature group, this bit shall be set to 0.	Yes	No
18	Inter-frequency ANR features including: - Inter-frequency periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportStrongestCells* - Inter-frequency periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportCGI*	- can only be set to 1 if the UE has set bit number 5 and bit number 25 to 1. - If a category M1 or M2 UE does not support this feature group, this bit shall be set to 0.	Yes, unless UE only supports band 13	No
19	Inter-RAT ANR features including: - Inter-RAT periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportStrongestCells* for GERAN, if the UE has set bit number 23 to 1 - Inter-RAT periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportStrongestCellsForSON* for UTRAN FDD or UTRAN TDD, if the UE supports either only UTRAN FDD or only UTRAN TDD and has set bit number 22 to 1 - Inter-RAT periodical measurement reporting where *triggerType* is set to	- can only be set to 1 if the UE has set bit number 5 to 1 and the UE has set at least one of the bit number 22, 23, 24 or 26 to 1. - even if the UE sets bits 33 to 37, it shall still set bit 19 to 1 if inter-RAT ANR features are tested for all RATs for which inter-RAT measurement reporting is indicated		Yes

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	periodical and *purpose* is set to *reportStrongestCellsForSON* for UTRAN FDD or UTRAN TDD, if the UE supports both UTRAN FDD and UTRAN TDD and has set bit number 22 or 39 to 1, respectively - Inter-RAT periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportStrongestCellsForSON* for 1xRTT or HRPD, if the UE has set bit number 24 or 26 to 1, respectively - Inter-RAT periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportCGI* for UTRAN FDD or UTRAN TDD, if the UE supports either only UTRAN FDD or only UTRANTDD and has set bit number 22 to 1 - Inter-RAT periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportCGI* for UTRAN FDD or UTRAN TDD, if the UE supports both UTRAN FDD and UTRAN TDD and has set bit number 22 or 39 to 1, respectively - Inter-RAT periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportCGI* for GERAN, 1xRTT or HRPD, if the UE has set bit number 23, 24 or 26 to 1, respectively	as tested		
20	If bit number 7 is set to 0: - SRB1 and SRB2 for DCCH + 8x AM DRB If bit number 7 is set to 1: - SRB1 and SRB2 for DCCH + 8x AM DRB - SRB1 and SRB2 for DCCH + 5x AM DRB + 3x UM DRB NOTE: UE which indicate support for a DRB combination also support all subsets of the DRB combination. Therefore, release of DRB(s) never results in an unsupported DRB combination.	- Regardless of what bit number 7 and bit number 20 is set to, UE shall support at least SRB1 and SRB2 for DCCH + 4x AM DRB - Regardless of what bit number 20 is set to, if bit number 7 is set to 1, UE shall support at least SRB1 and SRB2 for DCCH + 4x AM DRB + 1x UM DRB	Yes	No
21	- Predefined intra- and inter-subframe frequency hopping for PUSCH with N_sb > 1 - Predefined inter-subframe frequency hopping for PUSCH with N_sb > 1	- If a category M1 or M2 UE does not support this feature group, this bit shall be set to 0.		No
22	- UTRAN FDD or UTRAN TDD measurements, reporting and measurement reporting event B2 in E-UTRA connected mode, if the UE supports either only UTRAN FDD or only UTRAN TDD - UTRAN FDD measurements, reporting and measurement reporting event B2 in E-UTRA connected mode, if the UE supports both UTRAN FDD and UTRAN TDD	- If a category M1 or M2 UE does not support this feature group, this bit shall be set to 0.	Yes for FDD, if UE supports UTRA FDD	Yes
23	- GERAN measurements, reporting and measurement reporting event B2 in E-	- If a category M1 or M2 UE does not		Yes

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	UTRA connected mode	support this feature group, this bit shall be set to 0.		
24	- 1xRTT measurements, reporting and measurement reporting event B2 in E-UTRA connected mode	- If a category M1 or M2 UE does not support this feature group, this bit shall be set to 0.	Yes for FDD, if UE supports enhanced 1xRTT CSFB for FDD Yes for TDD, if UE supports enhanced 1xRTT CSFB for TDD	Yes
25	- Inter-frequency measurements and reporting in E-UTRA connected mode NOTE: The UE setting this bit to 1 and indicating support for FDD and TDD frequency bands in the UE capability signalling implements and is tested for FDD measurements while the UE is in TDD, and for TDD measurements while the UE is in FDD.	- A category M1 or M2 UE shall set this bit to 1 only if *ceMeasurements-r14* is supported.	Yes, unless UE only supports band 13	No
26	- HRPD measurements, reporting and measurement reporting event B2 in E-UTRA connected mode	- If a category M1 or M2 UE does not support this feature group, this bit shall be set to 0.	Yes for FDD, if UE supports HRPD	Yes
27	- EUTRA RRC_CONNECTED to UTRA FDD or UTRA TDD CELL_DCH CS handover, if the UE supports either only UTRAN FDD or only UTRAN TDD - EUTRA RRC_CONNECTED to UTRA FDD CELL_DCH CS handover, if the UE supports both UTRAN FDD and UTRAN TDD	- related to SR-VCC - can only be set to 1 if the UE has set bit number 8 to 1 and supports SR-VCC from EUTRA defined in TS 24.008 [49] - If a category M1 or M2 UE does not support this feature group, this bit shall be set to 0.	Yes for FDD, if UE supports VoLTE and UTRA FDD	Yes
28	- TTI bundling	- If a category M1 or M2 UE does not support this feature group, this bit shall be set to 0.	Yes for FDD	Yes
29	- Semi-Persistent Scheduling	- If a category M1 or M2 UE does not support this feature group, this bit shall be set to 0.		Yes
30	- Handover between FDD and TDD	- can only be set to 1 if the UE has set bit number 13 to 1		No
31	- Indicates whether the UE supports the mechanisms defined for cells broadcasting multi band information i.e. comprehending *multiBandInfoList*, disregarding in RRC_CONNECTED the related system information fields and understanding the EARFCN signalling for all bands, that overlap with the bands supported by the UE, and that are defined in the earliest version of TS 36.101 [42] that includes all UE supported bands.		Yes	No
32	Undefined			

NOTE: The column FDD/ TDD diff indicates if the UE is allowed to signal different values for FDD and TDD.

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Table B.1-1a: Definitions of feature group indicators

Index of indicator (bit number)	**Definition** (description of the supported functionality, if indicator set to one)	**Notes**	**If indicated "Yes" the feature shall be implemented and successfully tested for this version of the specification**	***FDD/ TDD diff***
33 (leftmost bit)	Inter-RAT ANR features for UTRAN FDD including: - Inter-RAT periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportStrongestCellsForSON* - Inter-RAT periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportCGI*	- can only be set to 1 if the UE has set bit number 5 and bit number 22 to 1.		Yes
34	Inter-RAT ANR features for GERAN including: - Inter-RAT periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportStrongestCells* - Inter-RAT periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportCGI*	- can only be set to 1 if the UE has set bit number 5 and bit number 23 to 1.		Yes
35	Inter-RAT ANR features for 1xRTT including: - Inter-RAT periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportStrongestCellsForSON* - Inter-RAT periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportCGI*	- can only be set to 1 if the UE has set bit number 5 and bit number 24 to 1.		Yes
36	Inter-RAT ANR features for HRPD including: - Inter-RAT periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportStrongestCellsForSON* - Inter-RAT periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportCGI*	- can only be set to 1 if the UE has set bit number 5 and bit number 26 to 1.		Yes
37	Inter-RAT ANR features for UTRAN TDD including: - Inter-RAT periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportStrongestCellsForSON* - Inter-RAT periodical measurement reporting where *triggerType* is set to *periodical* and *purpose* is set to *reportCGI*	- can only be set to 1 if the UE has set bit number 5 and at least one of the bit number 22 (for UEs supporting only UTRA TDD) or the bit number 39 to 1.		Yes
38	- EUTRA RRC_CONNECTED to UTRA TDD CELL_DCH PS handover, if the UE supports both UTRAN FDD and UTRAN TDD	- can only be set to 1 if the UE has set bit number 39 to 1		Yes
39	- UTRAN TDD measurements, reporting and measurement reporting event B2 in E-UTRA connected mode, if the UE supports both UTRAN FDD and UTRAN TDD	- If a category M1 or M2 UE does not support this feature group, this bit shall be set to 0.		Yes
40	- EUTRA RRC_CONNECTED to UTRA	- related to SR-VCC		Yes

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	TDD CELL_DCH CS handover, if the UE supports both UTRAN FDD and UTRAN TDD	- can only be set to 1 if the UE has set bit number 38 to 1		
41	Measurement reporting event: Event B1 – Neighbour > threshold for UTRAN FDD, if the UE supports UTRAN FDD and has set bit number 22 to 1	- If a category M1 or M2 UE does not support this feature group, this bit shall be set to 0.	Yes for FDD, unless UE has set bit number 15 to 1	Yes
42	- DCI format 3a (TPC commands for PUCCH and PUSCH with single bit power adjustments)	- If a category M1 or M2UE supports this feature group, this bit shall be set to 1. For a UE of all other categories, this bit shall be set to 0.		Yes
43	Undefined			
44	Undefined			
45	Undefined			
46	Undefined			
47	Undefined			
48	Undefined			
49	Undefined			
50	Undefined			
51	Undefined			
52	Undefined			
53	Undefined			
54	Undefined			
55	Undefined			
56	Undefined			
57	Undefined			
58	Undefined			
59	Undefined			
60	Undefined			
61	Undefined			
62	Undefined			
63	Undefined			
64	Undefined			

NOTE: The column FDD/ TDD diff indicates if the UE is allowed to signal different values for FDD and TDD. Annex E specifies for which TDD and FDD serving cells a UE supporting TDD/FDD CA shall support a feature for which it indicates support within the FGI signalling.

Clarification for mobility from EUTRAN and inter-frequency handover within EUTRAN

There are several feature groups related to mobility from E-UTRAN and inter-frequency handover within EUTRAN. The description of these features is based on the assumption that we have 5 main "functions" related to mobility from E-UTRAN:

A. Support of measurements and cell reselection procedure in idle mode

B. Support of RRC release with redirection procedure in connected mode

C. Support of Network Assisted Cell Change in connected mode

D. Support of measurements and reporting in connected mode

E. Support of handover procedure in connected mode

All functions can be applied for mobility to Inter-frequency to EUTRAN, GERAN, UTRAN, CDMA2000 HRPD and CDMA2000 1xRTT except for function C) which is only applicable for mobility to GERAN. Table B.1-2 below summarises the mobility functions that are supported based on the UE capability signaling (band support) and the setting of the feature group support indicators.

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Table B.1-2: Mobility from E-UTRAN

Feature	GERAN	UTRAN	HRPD	1xRTT	EUTRAN
A. Measurements and cell reselection procedure in E-UTRA idle mode	Supported if GERAN band support is indicated	Supported if UTRAN band support is indicated	Supported if CDMA2000 HRPD band support is indicated	Supported if CDMA2000 1xRTT band support is indicated	Supported for supported bands
B. RRC release with blind redirection procedure in E-UTRA connected mode	Supported if GERAN band support is indicated	Supported if UTRAN band support is indicated	Supported if CDMA2000 HRPD band support is indicated	Supported if CDMA2000 1xRTT band support is indicated	Supported for supported bands
C. Cell Change Order (with or without) Network Assisted Cell Change) in E-UTRA connected mode	Group 10	N.A.	N.A.	N.A.	N.A.
D. Inter-frequency/RAT measurements, reporting and measurement reporting event B2 (for inter-RAT) in E-UTRA connected mode	Group 23	Group 22/39	Group 26	Group 24	Group 25
E. Inter-frequency/RAT handover procedure in E-UTRA connected mode	Group 9 (GSM_connected handover) Separate UE capability bit defined in TS 36.306 [5] for PS handover	Group 8/38 (PS handover) or Group 27/40 (SRVCC handover)	Group 12	Group 11	Group 13 (within FDD or TDD) Group 30 (between FDD and TDD)

In case measurements and reporting function is not supported by UE, the network may still issue the mobility procedures redirection (B) and CCO (C) in a blind fashion.

B.2 CSG support

In this release of the protocol, it is mandatory for the UE to support a minimum set of CSG functionality consisting of:

- Identifying whether a cell is CSG or not;
- Ignoring CSG cells in cell selection/reselection.

Additional CSG functionality in AS, i.e. the requirement to detect and camp on CSG cells when the "CSG whitelist" is available or when manual CSG selection is triggered by the user, are related to the corresponding NAS features. This additional AS functionality consists of:

- Manual CSG selection;
- Autonomous CSG search;
- Implicit priority handling for cell reselection with CSG cells.

It is possible that this additional CSG functionality in AS is not supported or tested in early UE implementations.

Note that since the above AS features relate to idle mode operations, the capability support is not signalled to the network. For these reasons, no "feature group indicator" is assigned to this feature to indicate early support in Rel-8.

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Annex C (normative):Release 10 AS feature handling

C.1 Feature group indicators

This annex contains the definitions of the bits in field *featureGroupIndRel10*.

In this release of the protocol, the UE shall include the field *featureGroupIndRel10* in the IE *UE-EUTRA-Capability-v1020-IEs*. All the functionalities defined within the field *featureGroupIndRel10* defined in Table C.1-1 are mandatory for the UE, if the related capability (spatial multiplexing in UL, PDSCH transmission mode 9, carrier aggregation, handover to EUTRA, or RAT) is also supported. For a specific indicator, if all functionalities for a feature group listed in Table C.1-1 have been implemented and tested, the UE shall set the indicator as one (1), else (i.e. if any one of the functionalities in a feature group listed in Table C.1-1 have not been implemented or tested), the UE shall set the indicator as zero (0).

The UE shall set all indicators that correspond to RATs not supported by the UE as zero (0).

The UE shall set all indicators, which do not have a definition in Table C.1-1, as zero (0).

If the optional field *featureGroupIndRel10* is not included by a UE of a future release, the network may assume that all features, listed in Table C.1-1 and deployed in the network, have been implemented and tested by the UE.

The indexing in Table C.1-1 starts from index 101, which is the leftmost bit in the field *featureGroupIndRel10*.

Table C.1-1: Definitions of feature group indicators

Index of indicator	Definition (description of the supported functionality, if indicator set to one)	Notes	If indicated "Yes" the feature shall be implemented and successfully tested for this version of the specification	FDD/ TDD diff
101 (leftmost bit)	- DMRS with OCC (orthogonal cover code) and SGH (sequence group hopping) disabling	- if the UE supports two or more layers for spatial multiplexing in UL, this bit shall be set to 1. - If a category 0 or 1bis UE does not support this feature, this bit shall be set to 0.		No
102	- Trigger type 1 SRS (aperiodic SRS) transmission (Up to X ports) NOTE: X = number of supported layers on given band			Yes
103	- PDSCH transmission mode 9 when up to 4 CSI reference signal ports are configured and when not operating in CE mode	- for Category 8 UEs, this bit shall be set to 1.		Yes
104	- PDSCH transmission mode 9 for TDD when 8 CSI reference signal ports are configured and when not operating in CE mode	- if the UE does not support TDD, this bit is irrelevant (capability signalling exists for FDD for this feature), and this bit shall be set to 0. - for Category 8 UEs, this bit shall be set to 1.		No
105	- Periodic CQI/PMI/RI reporting on PUCCH: Mode 2-0 – UE selected subband CQI without PMI, when PDSCH transmission mode 9 is configured - Periodic CQI/PMI/RI reporting on PUCCH: Mode 2-1 – UE selected subband CQI with single PMI, when PDSCH transmission mode 9 and up to 4 CSI reference signal ports are	- this bit can be set to 1 only if indices 2 (Table B.1-1) and 103 are set to 1. - For UEs capable of TDD-FDD CA, this bit can be set to 1 for both FDD and TDD if index 2 is set to 1 for both FDD and TDD, and index 103 is set to 1 for at least one of FDD and TDD duplex		Yes

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	configured	modes.		
106	- Periodic CQI/PMI/RI/PTI reporting on PUCCH: Mode 2-1 – UE selected subband CQI with single PMI, when PDSCH transmission mode 9 and 8 CSI reference signal ports are configured	- this bit can be set to 1 only if the UE supports PDSCH transmission mode 9 with 8 CSI reference signal ports (i.e., for TDD, if index 104 is set to 1, and for FDD, if *tm9-With-8Tx-FDD-r10* is set to 'supported') and if index 2 (Table B.1-1) is set to 1. - For UEs capable of TDD-FDD CA, this bit can be set to 1 for both FDD and TDD if at least one of index 104 and *tm9-With-8Tx-FDD-r10* is set to 1/'supported', and if index 2 is set to 1 for both FDD and TDD.		Yes
107	- Aperiodic CQI/PMI/RI reporting on PUSCH: Mode 2-0 – UE selected subband CQI without PMI, when PDSCH transmission mode 9 is configured - Aperiodic CQI/PMI/RI reporting on PUSCH: Mode 2-2 – UE selected subband CQI with multiple PMI, when PDSCH transmission mode 9 and up to 4 CSI reference signal ports are configured	- this bit can be set to 1 only if indices 1 (Table B.1-1) and 103 are set to 1. - For UEs capable of TDD-FDD CA, this bit can be set to 1 for both FDD and TDD if index 1 is set to 1 for both FDD and TDD, and index 103 is set to 1 for at least one of FDD and TDD duplex modes.		Yes
108	- Aperiodic CQI/PMI/RI reporting on PUSCH: Mode 2-2 – UE selected subband CQI with multiple PMI, when PDSCH transmission mode 9 and 8 CSI reference signal ports are configured	- this bit can be set to 1 only if the UE supports PDSCH transmission mode 9 with 8 CSI reference signal ports (i.e., for TDD, if index 104 is set to 1, and for FDD, if *tm9-With-8Tx-FDD-r10* is set to 'supported') and if index 1 (Table B.1-1) is set to 1. - For UEs capable of TDD-FDD CA, this bit can be set to 1 for both FDD and TDD if at least one of index 104 and *tm9-With-8Tx-FDD-r10* is set to 1/'supported', and if index 1 is set to 1 for both FDD and TDD.		Yes
109	- Periodic CQI/PMI/RI reporting on PUCCH Mode 1-1, submode 1	- this bit can be set to 1 only if the UE supports PDSCH transmission mode 9 with 8 CSI reference signal ports (i.e., for TDD, if index 104 is set to 1, and for FDD, if *tm9-With-8Tx-FDD-r10* is set to 'supported'). - For UEs capable of TDD-FDD CA, this bit can be set to 1 for both FDD and TDD if at least one of index 104 and *tm9-With-8Tx-FDD-r10* is set to 1/'supported'.		Yes
110	- Periodic CQI/PMI/RI reporting on PUCCH Mode 1-1, submode 2	- this bit can be set to 1 only if the UE supports PDSCH transmission mode 9 with 8 CSI reference signal ports (i.e., for TDD, if index 104 is set to 1, and for FDD, if *tm9-With-8Tx-FDD-r10* is set to 'supported').		Yes

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		- For UEs capable of TDD-FDD CA, this bit can be set to 1 for both FDD and TDD if at least one of index 104 and *tm9-With-8Tx-FDD-r10* is set to 1/'supported'.		
111	- Measurement reporting trigger Event A6	- this bit can be set to 1 only if the UE supports carrier aggregation.		Yes
112	- SCell addition within the handover to EUTRA procedure	- this bit can be set to 1 only if the UE supports carrier aggregation and the handover to EUTRA procedure.		Yes
113	- Trigger type 0 SRS (periodic SRS) transmission on X Serving Cells NOTE: X = number of supported component carriers in a given band combination	- this bit can be set to 1 only if the UE supports carrier aggregation in UL.		Yes
114	- Reporting of both UTRA CPICH RSCP and Ec/N0 in a Measurement Report	- this bit can be set to 1 only if index 22 (Table B.1-1) is set to 1.		No
115	- time domain ICIC RLM/RRM measurement subframe restriction for the serving cell - time domain ICIC RRM measurement subframe restriction for neighbour cells - time domain ICIC CSI measurement subframe restriction	- If a category M1 or M2 UE does not support this feature group, this bit shall be set to 0.		Yes
116	- Relative transmit phase continuity for spatial multiplexing in UL	- this bit can be set to 1 only if the UE supports two or more layers for spatial multiplexing in UL.		Yes
117	Undefined			
118	Undefined			
119	Undefined			
120	Undefined			
121	Undefined			
122	Undefined			
123	Undefined			
124	Undefined			
125	Undefined			
126	Undefined			
127	Undefined			
128	Undefined			
129	Undefined			
130	Undefined			
131	Undefined			
132	Undefined			

NOTE: The column FDD/ TDD diff indicates if the UE is allowed to signal different values for FDD and TDD. Annex E specifies for which TDD and FDD serving cells a UE supporting TDD/FDD CA shall support a feature for which it indicates support within the FGI signalling.

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Annex D (informative): Descriptive background information

D.1 Signalling of Multiple Frequency Band Indicators (Multiple FBI)

D.1.1 Mapping between frequency band indicator and multiple frequency band indicator

This subclause describes the use of the Multiple Frequency Band Indicator (MFBI) lists and the E-UTRA frequency bands in *SystemInformationBlockType1* by means of an example as shown in Figure D.1.1-1. In this example:

- E-UTRAN cell belongs to band B90 and also bands B6, B7, B91, and B92.
- The *freqBandIndicatorPriority* field is not present in *SystemInformationBlockType1*.
- E-UTRAN uses B64 to indicate the presence of B90 in *freqBandIndicator-v9e0*.
- For the MFBI list of this cell, E-UTRAN uses B64 in *MultiBandInfoList* to indicate the position and priority of the bands in *MultiBandInfoList-v9e0*.
- The UE, after reading *SystemInformationBlockType1*, generates an MFBI list with priority of B91, B6, B92, and B7. If the UE supports the frequency band in the *freqBandIndicator-v9e0* IE it applies that frequency band. Otherwise, the UE applies the first listed band in the MFBI list which it supports.

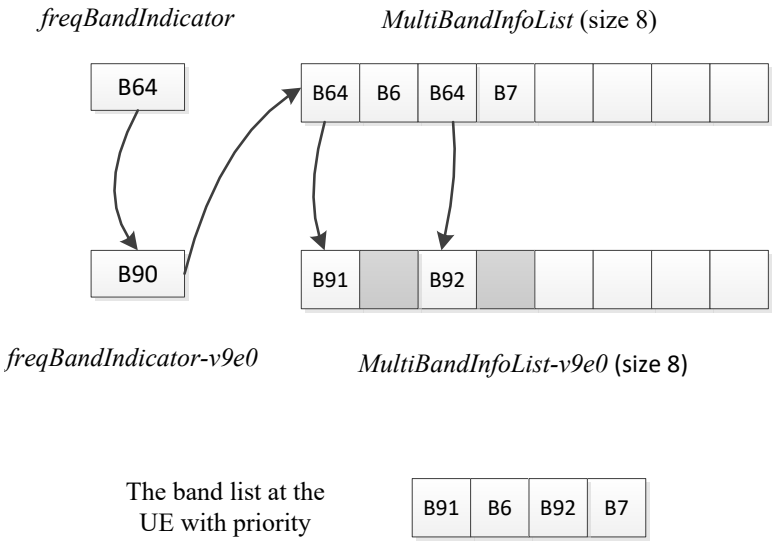


Figure D.1.1-1: Mapping of frequency bands to *MultiBandInfoList/MultiBandInfoList-v9e0*

D.1.2 Mapping between inter-frequency neighbour list and multiple frequency band indicator

This subclause describes the use of the Multiple Frequency Band Indicator (MFBI) lists and the E-UTRA frequencies signalled in *SystemInformationBlockType5* by means of an example as shown in Figure D.1.2-1. In this example:

- E-UTRAN includes 4 frequencies (EARFCNs): the bands associated with f1 and f4 belong to bands lower than 64; the bands associated with f2 and f3 belong to bands larger than 64. The reserved EARFCN value of 65535 is used to indicate the presence of *ARFCN-ValueEUTRA-v9e0*.

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- The band associated with f1 has two overlapping bands, B1 and B2 (lower than 64); the band associated with f2 has one overlapping band, B91; the band associated with f3 has four overlapping bands B3, B4, B92, and B93; the band associated with f4 does not have overlapping bands.

- E-UTRAN includes 4 lists in both *interFreqCarrierFreqList-v8h0* and *interFreqCarrierFreqList-v9e0* and ensure the order of the lists is matching. Each list corresponds to one EARFCN and contains up to 8 bands. The first list corresponds to f1, the second list corresponds to f2, and so on. The grey lists mean not including *MultiBandInfoList* or *MultiBandInfoList-v9e0*, i.e. the corresponding EARFCN does not have any overlapping frequency bands in *MultiBandInfoList* or *MultiBandInfoList-v9e0*.

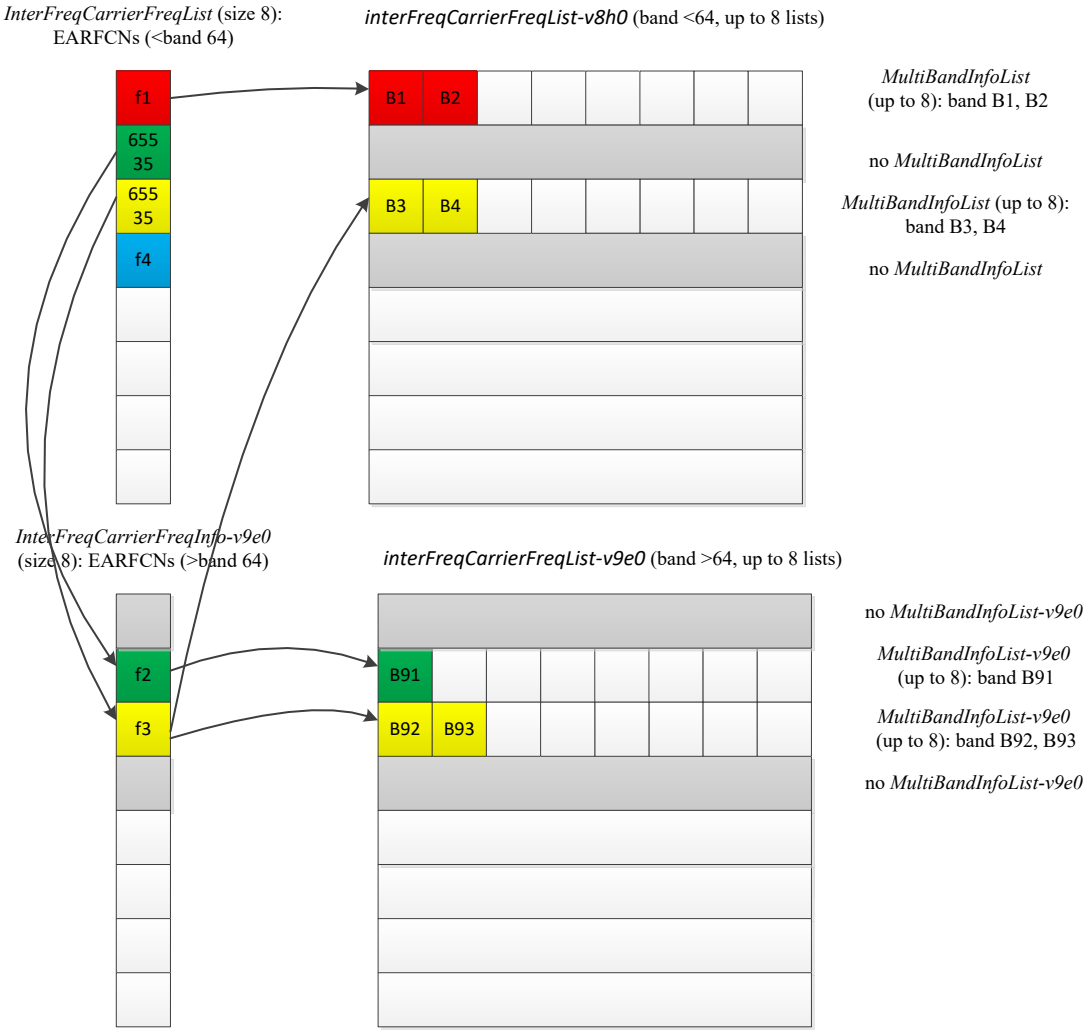


Figure D.1.2-1: Mapping of EARFCNs to MultiBandInfoList/MultiBandInfoList-v9e0

D.1.3 Mapping between UTRA FDD frequency list and multiple frequency band indicator

This subclause describes the use of the Multiple Frequency Band Indicator (MFBI) lists and the UTRA FDD frequencies signalled in *SystemInformationBlockType6* by means of an example as shown in Figure D.1.3-1. In this example:

- E-UTRAN includes 4 UTRA FDD frequencies (UARFCNs).

- The bands associated with f1 and f4 have no overlapping bands. The band associated with f2 has two overlapping bands, B1 and B2. The band associated with f3 has one overlapping band, B3.

- E-UTRAN includes 4 lists in *carrierFreqListUTRA-FDD-v8h0* with the first and fourth entry not including *MultiBandInfoList*.

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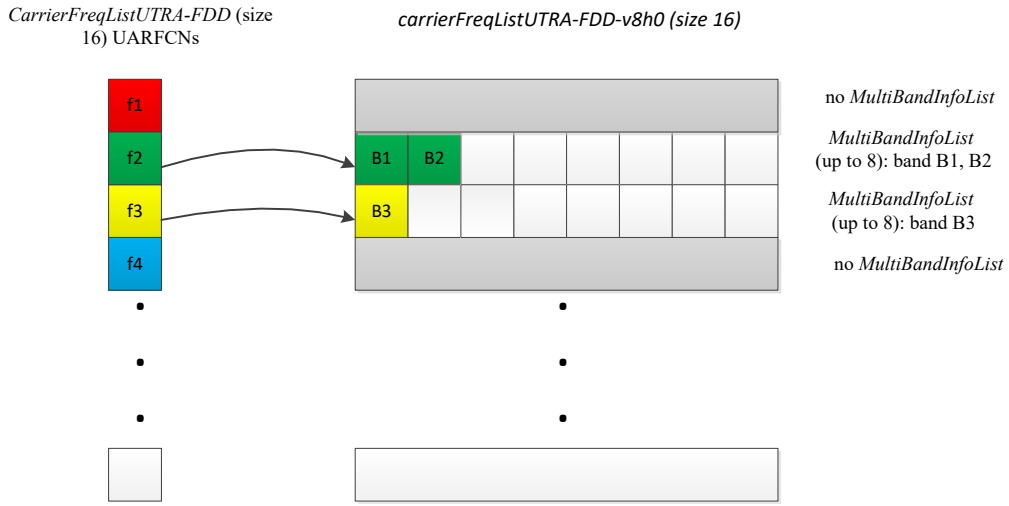


Figure D.1.3-1: Mapping of UARFCNs to *MultiBandInfoList*

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Annex E (normative): TDD/FDD differentiation of FGIs/capabilities in TDD-FDD CA

Annex E specifies for which TDD and FDD serving cells a UE supporting TDD/FDD CA shall support a feature/capability for which it indicates support within the FGI/capability signalling.

A UE that indicates support for TDD/ FDD CA:

- For the fields for which the UE is allowed to indicate different support for FDD and TDD, the UE shall support the feature on the PCell and/or SCell(s), as specified in tables E-1, E-2 and E-3 in accordance to the following rules:
  - PCell: the UE shall support the feature for the PCell, if the UE indicates support of the feature for the PCell duplex mode;
  - SCell: the UE shall support the feature for SCell(s), if the UE indicates support of the feature for the SCell duplex mode;
  - Per serving cell: the UE shall support the feature for a serving cell if the UE indicates support of the feature for the serving cell's duplex mode;
  - All serving cells: UE shall support the feature if the UE indicates support of the feature for both TDD and FDD duplex modes;
- For the fields where the UE is not allowed to indicate different support for FDD and TDD, the UE shall support the feature for PCell and SCell(s) if the UE indicates support of the feature via the common FGI/capability bit.

Table E-1: Rel-8/9 FGIs for which FDD/TDD differentiation is allowed (from Annex B)

Index of indicator	Classification
1	Per serving cell
2	All serving cells
4	All serving cells
8	PCell
9	PCell
10	PCell
11	PCell
12	PCell
15	PCell
19	PCell
22	PCell
23	PCell
24	PCell
26	PCell
27	PCell
28	PCell
29	PCell
33	PCell
34	PCell
35	PCell
36	PCell
37	PCell
38	PCell
39	PCell
40	PCell
41	PCell

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Table E-2: Rel-10 FGIs for which FDD/TDD differentiation is allowed (from Annex C)

Index of indicator	Classification
102	Per serving cell
103	Per serving cell
105	All serving cells
106	All serving cells
107	All serving cells
108	All serving cells
109	All serving cells
110	All serving cells
111	SCell
112	PCell
113	Per serving cell
115	PCell
116	Per serving cell

Table E-3: Rel-12 UE-EUTRA capabilities for which FDD/TDD differentiation is allowed

UE-EUTRA-Capability	Classification
crossCarrierScheduling	All serving cells
e-CSFB-1XRTT	PCell
e-CSFB-ConcPS-Mob1XRTT	PCell
e-CSFB-dual-1XRTT	PCell
ePDCCH	Per serving cell
e-RedirectionUTRA	PCell
e-RedirectionUTRA-TDD	PCell
inDeviceCoexInd	All serving cells
interFreqRSTD-Measurement	PCell
interFreqSI-AcquisitionForHO	PCell
interRAT-PS-HO-ToGERAN	PCell
intraFreqSI-AcquisitionForHO	PCell
mbms-Scell	SCell
mbms-NonServingCell	SCell
multiACK-CSIreporting	PCell
multiClusterPUSCH-WithinCC	Per serving cell
otdoa-UE-Assisted	PCell
pmi-Disabling	Per serving cell
rsrqMeasWideband	Per serving cell
simultaneousPUCCH-PUSCH	All serving cells
ss-CCH-InterfHandl	PCell
txDiv-PUCCH1b-ChSelect	PCell
ue-TxAntennaSelectionSupported	All serving cells
utran-SI-AcquisitionForHO	PCell

Annex F (normative): UE requirements on ASN.1 comprehension

This subclause specifies UE requirements regarding the ASN.1 transfer syntax support i.e. the ASN.1 definitions to be comprehended by the UE.

A UE that indicates release X in field *accessStratumRelease* shall comprehend the entire transfer syntax (ASN.1) of release X, in particular at least the first version upon ASN.1 freeze. The UE is however not required to support dedicated signalling related transfer syntax associated with optional features it does not support.

In case a UE that indicates release X in field *accessStratumRelease* supports a feature specified in release X+ N (i.e. early UE implementation) additional requirements apply.

Cricitical extensions (dedicated signaling)

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If the early implemented feature involves one or more critical extensions (i.e. case of dedicated signaling), the UE shall comprehend the parts of the transfer syntax (ASN.1) of release X+ N that are related to the feature implemented early. This in particular concerns the ASN.1 parts related to configuration of the feature. The UE obviously also has to support the ASN.1 parts related to indicating support of the feature (in UE capabilities).

If configuration of an early implemented feature introduced in release X+ N involves a message or field that has been critically extended, the UE shall support configuration of all features supported by the UE that are associated with sub-fields of this critical extension. Apart from the early implemented feature(s), the UE need however not support functionality beyond what is defined in the release the UE indicates in access stratum release.

Let's consider the example of a UE indicating value X in field *accessStratumRelease* that supports the features associated with fields A1, A3 and A5 of *InformationElementA* (see ASN.1 below). The feature implemented early is associated with field A5, and can only be configured by the –rX+N version of *InformationElementA*. In such case, the UE should support configuration of the features associated with fields A1, A3 and A5 by the –rX+N version of *InformationElementA*. If however one of the features was modified, e.g. the feature associated with *fieldA3*, E-UTRAN should assume the UE only supports the feature according to the release it indicated in field *accessStratumRelease* (X). I.e. UE is neither required to support the additional code-point (*n80-vX+N0*) nor the additional sub-field (*fieldA3a*).

```
InformationElementA-rX ::=      SEQUENCE {
    fieldA1-rX                      InformationElementA1-rX             OPTIONAL,   -- Need ON
    fieldA2-rX                      InformationElementA2-rX             OPTIONAL,   -- Need OR
    fieldA3-rX                      InformationElementA3-rX             OPTIONAL    -- Need OR
}

InformationElementA-rX+N ::=    SEQUENCE {
    fieldA1-rX+N                    InformationElementA1-rX             OPTIONAL,   -- Need ON
    fieldA2-rX+N                    InformationElementA2-rX             OPTIONAL,   -- Need OR
    fieldA3-rX+N                    InformationElementA3-rX+N           OPTIONAL,   -- Need OR
    fieldA4-rX+N                    InformationElementA4-rX+N           OPTIONAL,   -- Need OR
    fieldA5-rX+N                    InformationElementA5-rX+N           OPTIONAL    -- Need OR
}

InformationElementA3-rX+N ::=   SEQUENCE {
    fieldA1a-rX+N                   InformationElementA1a-rX            OPTIONAL,   -- Need ON
    fieldA2a-rX+N                   ENUMERATED {n10, n20, n40,
                                          n80-vX+N0}                        OPTIONAL,   -- Need OR
    fieldA3a-rX+N                   InformationElementA3a-rX+N          OPTIONAL    -- Need OR
}
```

Non-cricitical extensions (broadcast signaling)

If the early implemented feature involves one or more non-critical extensions in broadcast signaling (i.e. system information), the UE shall comprehend the parts of the transfer syntax (ASN.1) of release X+ N that are related to the feature implemented early. The SIB(s) containing the release X+ N fields related to the early implemented features may also include other extensions concerning releases from X upto X+N. The UE shall comprehend such intermediate fields (but again is not required to support the functionality associated with these intermediate fields, in case this concerns optional features not supported by the UE).

Annex G (informative): Change history

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Change history							
Date	TSG #	TSG Doc.	CR	Rev	Cat	Subject/Comment	New version
12/2007	RP-38	RP-070920	-			Approved at TSG-RAN #38 and placed under Change Control	8.0.0
03/2008	RP-39	RP-080163	0001	4		CR to 36.331 with Miscellaneous corrections	8.1.0
03/2008	RP-39	RP-080164	0002	2		CR to 36.331 to convert RRC to agreed ASN.1 format	8.1.0
05/2008	RP-40	RP-080361	0003	1		CR to 36.331 on Miscellaneous clarifications/ corrections	8.2.0
09/2008	RP-41	RP-080693	0005	-		CR on Miscellaneous corrections and clarifications	8.3.0
12/2008	RP-42	RP-081021	0006	-		Miscellaneous corrections and clarifications	8.4.0
03/2009	RP-43	RP-090131	0007	-		Correction to the Counter Check procedure	8.5.0
	RP-43	RP-090131	0008	-		CR to 36.331-UE Actions on Receiving SIB11	8.5.0
	RP-43	RP-090131	0009	1		Spare usage on BCCH	8.5.0
	RP-43	RP-090131	0010	-		Issues in handling optional IE upon absence in GERAN NCL	8.5.0
	RP-43	RP-090131	0011	-		CR to 36.331 on Removal of useless RLC re-establishment at RB release	8.5.0
	RP-43	RP-090131	0012	1		Clarification to RRC level padding at PCCH and BCCH	8.5.0
	RP-43	RP-090131	0013	-		Removal of Inter-RAT message	8.5.0
	RP-43	RP-090131	0014	-		Padding of the SRB-ID for security input	8.5.0
	RP-43	RP-090131	0015	-		Validity of ETWS SIB	8.5.0
	RP-43	RP-090131	0016	1		Configuration of the Two-Intervals-SPS	8.5.0
	RP-43	RP-090131	0017	-		Corrections on Scaling Factor Values of Qhyst	8.5.0
	RP-43	RP-090131	0018	1		Optionality of srsMaxUppts	8.5.0
	RP-43	RP-090131	0019	-		CR for discussion on field name for common and dedicated IE	8.5.0
	RP-43	RP-090131	0020	-		Corrections to Connected mode mobility	8.5.0
	RP-43	RP-090131	0021	-		Clarification regarding the measurement reporting procedure	8.5.0
	RP-43	RP-090131	0022	1		Corrections on s-Measure	8.5.0
	RP-43	RP-090131	0023	1		R1 of CR0023 (R2-091029) on combination of SPS and TTI bundling for TDD	8.5.0
	RP-43	RP-090131	0024	-		L3 filtering for path loss measurements	8.5.0
	RP-43	RP-090131	0025	1		S-measure handling for reportCGI	8.5.0
	RP-43	RP-090131	0026	1		Measurement configuration clean up	8.5.0
	RP-43	RP-090131	0027	-		Alignment of measurement quantities for UTRA	8.5.0
	RP-43	RP-090131	0028	-		CR to 36.331 on L1 parameters ranges alignment	8.5.0
	RP-43	RP-090131	0029	-		Default configuration for transmissionMode	8.5.0
	RP-43	RP-090131	0030	-		CR to 36.331 on RRC Parameters for MAC, RLC and PDCP	8.5.0
	RP-43	RP-090131	0031	1		CR to 36.331 - Clarification on Configured PRACH Freq Offset	8.5.0
	RP-43	RP-090131	0032	-		Clarification on TTI bundling configuration	8.5.0
	RP-43	RP-090131	0033	1		Update of R2-091039 on Inter-RAT UE Capability	8.5.0
	RP-43	RP-090133	0034	-		Feature Group Support Indicators	8.5.0
	RP-43	RP-090131	0036	-		Corrections to RLF detection	8.5.0
	RP-43	RP-090131	0037	-		Indication of Dedicated Priority	8.5.0
	RP-43	RP-090131	0038	2		Security Clean up	8.5.0
	RP-43	RP-090131	0039	-		Correction of TTT value range	8.5.0
	RP-43	RP-090131	0040	-		Correction on CDMA measurement result IE	8.5.0
	RP-43	RP-090131	0041	1		Clarification of Measurement Reporting	8.5.0
	RP-43	RP-090131	0042	-		Spare values in DL and UL Bandwidth in MIB and SIB2	8.5.0
	RP-43	RP-090131	0044	1		Clarifications to System Information Block Type 8	8.5.0
	RP-43	RP-090131	0045	-		Reception of ETWS secondary notification	8.5.0
	RP-43	RP-090131	0046	1		Validity time for ETWS message Id and Sequence No	8.5.0
	RP-43	RP-090131	0047	-		CR for Timers and constants values used during handover to E-UTRA	8.5.0
	RP-43	RP-090131	0048	-		Inter-RAT Security Clarification	8.5.0
	RP-43	RP-090131	0049	-		CR to 36.331 on consistent naming of 1xRTT identifiers	8.5.0
	RP-43	RP-090131	0050	-		Capturing RRC behavior regarding NAS local release	8.5.0
	RP-43	RP-090131	0051	-		Report CGI before T321 expiry and UE null reporting	8.5.0
	RP-43	RP-090131	0052	-		System Information and 3 hour validity	8.5.0
	RP-43	RP-090131	0053	1		Inter-Node AS Signalling	8.5.0
	RP-43	RP-090131	0054	-		Set of values for the parameter "messagePowerOffsetGroupB"	8.5.0
	RP-43	RP-090131	0055	-		CR to paging reception for ETWS capable UEs in RRC_CONNECTED	8.5.0
	RP-43	RP-090131	0056	1		CR for CSG related items in 36.331	8.5.0
	RP-43	RP-090131	0057	1		SRS common configuration	8.5.0
	RP-43	RP-090131	0058	-		RRC processing delay	8.5.0
	RP-43	RP-090131	0059	-		CR for HNB Name	8.5.0
	RP-43	RP-090131	0060	3		Handover to EUTRA delta configuration	8.5.0
	RP-43	RP-090131	0063	-		Delivery of Message Identifier and Serial Number to upper layers for ETWS	8.5.0
	RP-43	RP-090131	0066	-		Clarification on the maximum size of cell lists	8.5.0
	RP-43	RP-090131	0067	-		Missing RRC messages in 'Protection of RRC messages'	8.5.0
	RP-43	RP-090131	0069	1		Clarification on NAS Security Container	8.5.0
	RP-43	RP-090131	0071	-		Extension of range of CQI/PMI configuration index	8.5.0
	RP-43	RP-090131	0072	1		Access barring alleviation in RRC connection establishment	8.5.0
	RP-43	RP-090367	0077	6		Corrections to feature group support indicators	8.5.0
	RP-43	RP-090131	0078	-		CR from email discussion to capture DRX and TTT handling	8.5.0
	RP-43	RP-090131	0079	1		Need Code handling on BCCH messages	8.5.0
	RP-43	RP-090131	0080	-		Unification of T300 and T301 and removal of miscallaneous FFSs	8.5.0

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	RP-43	RP-090131	0084	1		Proposed CR modifying the code-point definitions of neighbourCellConfiguration	8.5.0
	RP-43	RP-090131	0087	2		Remove Redundant Optionality in SIB8	8.5.0
	RP-43	RP-090131	0089	-		Corrections to the generic error handling	8.5.0
	RP-43	RP-090131	0090	-		Configurability of T301	8.5.0
	RP-43	RP-090131	0091	1		Correction related to TTT	8.5.0
	RP-43	RP-090131	0095	-		CR for 36.331 on SPS-config	8.5.0
	RP-43	RP-090131	0096	2		CR for Deactivation of periodical measurement	8.5.0
	RP-43	RP-090131	0099	2		SMC and reconfiguration	8.5.0
	RP-43	RP-090131	0101	-		TDD handover	8.5.0
	RP-43	RP-090131	0102	-		Corrections to system information acquisition	8.5.0
	RP-43	RP-090131	0106	-		Some Corrections and Clarifications to 36.331	8.5.0
	RP-43	RP-090131	0109	-		Clarification on the Maximum number of ROHC context sessions parameter	8.5.0
	RP-43	RP-090131	0110	-		Transmission of rrm-Config at Inter-RAT Handover	8.5.0
	RP-43	RP-090131	0111	1		Use of SameRefSignalsInNeighbor parameter	8.5.0
	RP-43	RP-090131	0112	-		Default serving cell offset for measurement event A3	8.5.0
	RP-43	RP-090131	0114	-		dl-EARFCN missing in HandoverPreparationInformation	8.5.0
	RP-43	RP-090131	0115	-		Cleanup of references to 36.101	8.5.0
	RP-43	RP-090131	0117	-		Correction to the value range of UE-Categories	8.5.0
	RP-43	RP-090131	0122	1		Correction on RRC connection re-establishment	8.5.0
	RP-43	RP-090131	0124	-		Performing Measurements to report CGI for CDMA2000	8.5.0
	RP-43	RP-090131	0125	-		CDMA2000-SystemTimeInfo in VarMeasurementConfiguration	8.5.0
	RP-43	RP-090131	0126	-		UE Capability Information for CDMA2000 1xRTT	8.5.0
	RP-43	RP-090131	0127	-		CDMA2000 related editorial changes	8.5.0
	RP-43	RP-090131	0128	-		Draft CR to 36.331 on State mismatch recovery at re-establishment	8.5.0
	RP-43	RP-090131	0129	1		Draft CR to 36.331 on Renaming of AC barring related IEs	8.5.0
	RP-43	RP-090131	0130	2		Draft CR to 36.331 on Inheriting of dedicated priorities at inter-RAT reselection	8.5.0
	RP-43	RP-090131	0135	-		Proposed CR to 36.331 Description alignment for paging parameter, nB	8.5.0
	RP-43	RP-090131	0139	2		Miscellaneous corrections and clarifications resulting from ASN.1 review	8.5.0
	RP-43	RP-090131	0141	1		Correction regarding Redirection Information fo GERAN	8.5.0
	RP-43	RP-090131	0142	-		Further ASN.1 review related issues	8.5.0
	RP-43	RP-090131	0143	-		Periodic measurements	8.5.0
	RP-43	RP-090131	0144	1		Further analysis on code point "OFF" for ri-ConfigIndex	8.5.0
	RP-43	RP-090131	0145	1		Adding and deleting same measurement or configuration in one message	8.5.0
	RP-43	RP-090131	0147	-		Corrections to IE dataCodingScheme in SIB11	8.5.0
	RP-43	RP-090131	0148	-		Clarification on Mobility from E-UTRA	8.5.0
	RP-43	RP-090131	0149	-		36.331 CR related to “not applicable”	8.5.0
	RP-43	RP-090131	0150	1		UE radio capability transfer	8.5.0
	RP-43	RP-090131	0151	-		CR to 36.331 on value of CDMA band classes	8.5.0
	RP-43	RP-090131	0152	-		Corrections to DRB modification	8.5.0
	RP-43	RP-090131	0153	-		Correction to presence condition for pdcp-config	8.5.0
	RP-43	RP-090131	0155	-		TDD HARQ-ACK feedback mode	8.5.0
	RP-43	RP-090275	0157	-		Corrections regarding use of carrierFreq for CDMA (SIB8) and GERAN (measObject)	8.5.0
	RP-43	RP-090321	0156	1		Sending of GERAN SI/PSI information at Inter-RAT Handover	8.5.0
	RP-43	RP-090339	0158	-		Clarification of CSG support	8.5.0
06/2009	RP-44	RP-090516	0159	-		Octet alignment of VarShortMAC-Input	8.6.0
	RP-44	RP-090516	0160	3		Minor corrections to the feature grouping	8.6.0
	RP-44	RP-090516	0161	-		Security clarification	8.6.0
	RP-44	RP-090516	0162	1		Sending of GERAN SI/PSI information at Inter-RAT Handover	8.6.0
	RP-44	RP-090516	0163	1		Correction of UE measurement model	8.6.0
	RP-44	RP-090516	0164	-		Restricting the reconfiguration of UM RLC SN field size	8.6.0
	RP-44	RP-090516	0165	1		36.331 CR on Clarification on cell change order from GERAN to E-UTRAN	8.6.0
	RP-44	RP-090516	0166	-		36.331 CR - Handling of expired TAT and failed D-SR	8.6.0
	RP-44	RP-090516	0167	1		Proposed CR to 36.331 Clarification on mandatory information in AS-Config	8.6.0
	RP-44	RP-090516	0168	2		Miscellaneous small corrections	8.6.0
	RP-44	RP-090516	0173	-		Clarification on the basis of delta signalling	8.6.0
	RP-44	RP-090516	0177	-		CR on Alignment of CCCH and DCCH handling of missing mandatory field	8.6.0
	RP-44	RP-090516	0180	2		Handling of Measurement Context During HO Preparation	8.6.0
	RP-44	RP-090516	0181	-		Clarification of key-eNodeB-Star in AdditionalReestabInfo	8.6.0
	RP-44	RP-090516	0182	1		UE Capability Transfer	8.6.0
	RP-44	RP-090516	0186	1		Clarification regarding mobility from E-UTRA in-between SMC and SRB2/DRB setup	8.6.0
	RP-44	RP-090516	0188	1		Correction and completion of specification conventions	8.6.0
	RP-44	RP-090516	0195	2		RB combination in feature group indicator	8.6.0
	RP-44	RP-090516	0196	1		CR for need code for fields in mobilityControlInfo	8.6.0
	RP-44	RP-090497	0197	-		Alignment of pusch-HoppingOffset with 36.211	8.6.0
	RP-44	RP-090570	0198	-		Explicit srb-Identity values for SRB1 and SRB2	8.6.0
	RP-44	RP-090516	0199	-		Removing use of *defaultValue* for *mac-MainConfig*	8.6.0
09/2009	RP-45	RP-090906	0200	-		Proposed update of the feature grouping	8.7.0

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	RP-45	RP-090906	0201	-		Clarification on measurement object configuration for serving frequency	8.7.0
	RP-45	RP-090906	0202	-		Correction regarding SRVCC	8.7.0
	RP-45	RP-090906	0203	-		Indication of DRB Release during HO	8.7.0
	RP-45	RP-090906	0204	1		Correction regarding application of dedicated resource configuration upon handover	8.7.0
	RP-45	RP-090906	0205	-		REL-9 protocol extensions in RRC	8.7.0
	RP-45	RP-090906	0206	-		In-order delivery of NAS PDUs at RRC connection reconfiguration	8.7.0
	RP-45	RP-090906	0207	-		Correction on Threshold of Measurement Event	8.7.0
	RP-45	RP-090906	0210	-		Clarification on dedicated resource of RA procedure	8.7.0
	RP-45	RP-090906	0213	1		Cell barring when MasterInformationBlock or SystemInformationBlock1 is missing	8.7.0
	RP-45	RP-090915	0218	-		Security threat with duplicate detection for ETWS	8.7.0
	RP-45	RP-090906	0224	-		Clarification on supported handover types in feature grouping	8.7.0
	RP-45	RP-090906	0250	1		Handling of unsupported / non-comprehended frequency band and emission requirement	8.7.0
	RP-45	RP-090906	0251	-		RB combinations in feature group indicator 20	8.7.0
09/2009	RP-45	RP-090934	0220	1		Introduction of Per-QCI radio link failure timers (option 1)	9.0.0
	RP-45	RP-090926	0222	-		Null integrity protection algorithm	9.0.0
	RP-45	RP-090926	0223	-		Emergency Support Indicator in BCCH	9.0.0
	RP-45	RP-090934	0230	2		CR to 36.331 for Enhanced CSFB to 1xRTT with concurrent PS handover	9.0.0
	RP-45	RP-090934	0243	-		REL-9 on Miscellaneous editorial corrections	9.0.0
	RP-45	RP-090934	0247	-		Periodic CQI/PMI/RI masking	9.0.0
	RP-45	RP-090933	0252	-		Introduction of CMAS	9.0.0
12/2009	RP-46	RP-091346	0253	1		(Rel-9)-clarification on the description of redirectedCarrierInfo	9.1.0
	RP-46	RP-091346	0254	1		Adding references to RRC processing delay for inter-RAT mobiltiy messages	9.1.0
	RP-46	RP-091314	0256	-		Alignment of srs-Bandwidth with 36.211	9.1.0
	RP-46	RP-091341	0257	5		Baseline CR capturing eMBMS agreements	9.1.0
	RP-46	RP-091343	0258	3		Capturing agreements on inbound mobility	9.1.0
	RP-46	RP-091314	0260	-		Clarification of preRegistrationZoneID/secondaryPreRegistrationZoneID	9.1.0
	RP-46	RP-091346	0261	-		Clarification on NCC for IRAT HO	9.1.0
	RP-46	RP-091314	0263	-		Clarification on P-max	9.1.0
	RP-46	RP-091314	0265	1		Clarification on the definition of maxCellMeas	9.1.0
	RP-46	RP-091346	0266	-		Correction of q-RxLevMin reference in SIB7	9.1.0
	RP-46	RP-091346	0267	-		Correction on SPS-Config field descriptions	9.1.0
	RP-46	RP-091346	0268	1		correction on the definition of CellsTriggeredList	9.1.0
	RP-46	RP-091345	0269	-		Correction relating to CMAS UE capability	9.1.0
	RP-46	RP-091314	0271	1		Feature grouping bit for SRVCC handover	9.1.0
	RP-46	RP-091314	0272	1		Correction and completion of extension guidelines	9.1.0
	RP-46	RP-091344	0273	-		RACH optimization Stage-3	9.1.0
	RP-46	RP-091345	0274	-		Stage 3 correction for CMAS	9.1.0
	RP-46	RP-091346	0276	1		SR prohibit mechanism for UL SPS	9.1.0
	RP-46	RP-091346	0277	-		Parameters used for enhanced 1xRTT CS fallback	9.1.0
	RP-46	RP-091346	0281	-		Correction on UTRAN UE Capability transfer	9.1.0
	RP-46	RP-091346	0285	-		Maximum number of CDMA2000 neighbors in SIB8	9.1.0
	RP-46	RP-091340	0288	1		Introduction of UE Rx-Tx Time Difference measurement	9.1.0
	RP-46	RP-091346	0297	-		Introduction of SR prohibit timer	9.1.0
	RP-46	RP-091346	0298	-		Remove FFSs from RAN2 specifications	9.1.0
	RP-46	RP-091343	0301	1		Renaming Allowed CSG List (36.331 Rel-9)	9.1.0
	RP-46	RP-091346	0305	-		Re-introduction of message segment discard time	9.1.0
	RP-46	RP-091346	0306	1		Application of ASN.1 extension guidelines	9.1.0
	RP-46	RP-091346	0309	1		Support for Dual Radio 1xCSFB	9.1.0
	RP-46	RP-091346	0311	-		Shorter SR periodicity	9.1.0
	RP-46	RP-091342	0316	-		CR to 36.331 for Introduction of Dual Layer Transmission	9.1.0
	RP-46	RP-091343	0318	1		Draft CR to 36.331 on Network ordered SI reporting	9.1.0
	RP-46	RP-091346	0322	-		UE e1xcsfb capabilities correction	9.1.0
	RP-46	RP-091331	0327	1		Clarification on coding of ETWS related IEs	9.1.0
03/2010	RP-47	RP-100285	0331	-		Clarification of CGI reporting	9.2.0
	RP-47	RP-100305	0332	-		Clarification on MCCH change notification	9.2.0
	RP-47	RP-100308	0333	-		Clarification on measurement for serving cell only	9.2.0
	RP-47	RP-100306	0334	-		Clarification on proximity indication configuraiton in handover to E-UTRA	9.2.0
	RP-47	RP-100308	0335	-		Clarification on radio resource configuration in handover to E-UTRA procedure	9.2.0
	RP-47	RP-100308	0336	-		Clarification on UE maximum transmission power	9.2.0
	RP-47	RP-100308	0337	-		Correction to field descriptions of UE-EUTRA-Capability	9.2.0
	RP-47	RP-100305	0338	-		Correction to MBMS scheduling terminology	9.2.0
	RP-47	RP-100308	0339	-		Corrections to SIB8	9.2.0
	RP-47	RP-100306	0340	-		CR 36.331 R9 for Unifying SI reading for ANR and inbound mobility	9.2.0
	RP-47	RP-100308	0341	1		CR to 36.331 for 1xRTT pre-registration information in SIB8	9.2.0
	RP-47	RP-100305	0342	-		CR to 36.331 on corrections for MBMS	9.2.0
	RP-47	RP-100306	0343	1		CR to 36.331 on CSG identity reporting	9.2.0
	RP-47	RP-100308	0344	2		CR to 36.331 on Optionality of Rel-9 UE features	9.2.0
	RP-47	RP-100308	0345	1		CR to 36.331 on Service Specific Acces Control (SSAC)	9.2.0

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	RP-47	RP-100308	0346	-		Introduction of power-limited device indication in UE capability.	9.2.0
	RP-47	RP-100305	0347	-		Missing agreement in MCCH change notification.	9.2.0
	RP-47	RP-100305	0348	1		Corrections related to MCCH change notification and value ranges	9.2.0
	RP-47	RP-100306	0349	2		Prohibit timer for proximity indication	9.2.0
	RP-47	RP-100306	0350	1		Proximity Indication after handover and re-establishment	9.2.0
	RP-47	RP-100305	0351	-		Specifying the exact mapping of notificationIndicator in SIB13 to PDCCH bits	9.2.0
	RP-47	RP-100308	0352	-		Corrections out of ASN.1 review scope	9.2.0
	RP-47	RP-100308	0353	-		CR on clarification of system information change	9.2.0
	RP-47	RP-100285	0358	-		Measurement Result CDMA2000 Cell	9.2.0
	RP-47	RP-100304	0361	-		Correction on the range of UE Rx-Tx time difference measurement result	9.2.0
	RP-47	RP-100305	0362	-		Small clarifications regarding MBMS	9.2.0
	RP-47	RP-100308	0363	-		Introduction of REL-9 indication within field accessStratumRelease	9.2.0
	RP-47	RP-100306	0364	-		Extending mobility description to cover inbound mobility	9.2.0
	RP-47	RP-100308	0365	1		Clarification regarding enhanced CSFB to 1XRTT	9.2.0
	RP-47	RP-100308	0368	-		Handling of dedicated RLF timers	9.2.0
	RP-47	RP-100305	0370	1		Clarification on UE's behavior of receiving MBMS service	9.2.0
	RP-47	RP-100305	0371	-		MBMS Service ID and Session ID	9.2.0
	RP-47	RP-100305	0372	1		Inclusion of non-MBSFN region length in SIB13	9.2.0
	RP-47	RP-100309	0374	1		CR to 36.331 for e1xCSFB access class barring parameters in SIB8	9.2.0
	RP-47	RP-100308	0375	-		Multiple 1xRTT/HRPD target cells in MobilityFromEUTRACommand	9.2.0
	RP-47	RP-100308	0376	-		Independent support indicators for Dual-Rx CSFB and S102 in SIB8	9.2.0
	RP-47	RP-100285	0378	-		Clarification on DRX StartOffset for TDD	9.2.0
	RP-47	RP-100308	0379	1		Miscellaneous corrections from REL-9 ASN.1 review	9.2.0
	RP-47	RP-100308	0381	-		Need codes and missing conventions	9.2.0
	RP-47	RP-100308	0383	1		Introduction of Full Configuration Handover for handling earlier eNB releases	9.2.0
	RP-47	RP-100308	0385	-		Clarification to SFN reference in RRC	9.2.0
	RP-47	RP-100308	0390	-		RSRP and RSRQ based Thresholds	9.2.0
	RP-47	RP-100189	0392	3		Redirection enhancements to GERAN	9.2.0
	RP-47	RP-100308	0398	-		Cell reselection enhancements CR for 36.331	9.2.0
	RP-47	RP-100307	0401	3		CR on UE-originated RLFreporting for MRO SON use case	9.2.0
	RP-47	RP-100309	0402	3		CR to 36.331 on Redirection enhancements to UTRAN	9.2.0
	RP-47	RP-100306	0403	2		Proximity status indication handling at mobility	9.2.0
	RP-47	RP-100305	0404	-		Upper layer aspect of MBSFN area id	9.2.0
	RP-47	RP-100308	0405	-		Redirection for enhanced 1xRTT CS fallback with concurrent PSHO	9.2.0
	RP-47	RP-100301	0406	-		Avoiding interleaving transmission of CMAS notifications	9.2.0
	RP-47	RP-100308	0407	1		Introduction of UE GERAN DTM capability indicator	9.2.0
	RP-47	RP-100381	0408	2		Introducing provisions for late ASN.1 corrections	9.2.0
	RP-47	RP-100245	0411	-		Correction/ alignment of REL-9 UE capability signalling	9.2.0
06/2010	RP-48	RP-100553	0412	-		Clarification for mapping between warning message and CB-data	9.3.0
	RP-48	RP-100556	0413	-		Clarification of radio link failure related actions	9.3.0
	RP-48	RP-100554	0414	-		Clarification on UE actions upon leaving RRC_CONNECTED	9.3.0
	RP-48	RP-100553	0415	-		Correction on CMAS system information	9.3.0
	RP-48	RP-100554	0416	1		Corrections to MBMS	9.3.0
	RP-48	RP-100536	0418	-		Decoding of unknown future extensions	9.3.0
	RP-48	RP-100556	0419	1		Miscellaneous small corrections and clarifications	9.3.0
	RP-48	RP-100551	0420	-		Prohibit timer for proximity indication	9.3.0
	RP-48	RP-100556	0421	-		RLF report for MRO correction	9.3.0
	RP-48	RP-100546	0423	1		Missing UTRA bands in IRAT-ParametersUTRA-FDD	9.3.0
	RP-48	RP-100556	0424	-		Correction on handling of dedicated RLF timers	9.3.0
	RP-48	RP-100556	0431	1		Protection of RRC messages	9.3.0
	RP-48	RP-100556	0433	-		Handling missing Essential system information	9.3.0
	RP-48	RP-100551	0434	1		Clarification on UMTS CSG detected cell reporting in LTE	9.3.0
	RP-48	RP-100556	0436	-		Introducing provisions for late corrections	9.3.0
	RP-48	RP-100556	0437	-		Clarification regarding / alignment of REL-9 UE capabilities	9.3.0
09/2010	RP-49	RP-100845	0440	-		Correction to 3GPP2 reference for interworking with cdma2000 1x	9.4.0
	RP-49	RP-100851	0441	-		Clarification on UL handover preparation transfer	9.4.0
	RP-49	RP-100851	0442	1		Clarifications regarding fullConfiguration	9.4.0
	RP-49	RP-100851	0443	-		Clarifications regarding handover to E-UTRAN	9.4.0
	RP-49	RP-100854	0444	-		Correction on the table of conditionally mandatory Release 9 features	9.4.0
	RP-49	RP-100851	0445	-		Corrections to TS36.331 on MeasConfig IE	9.4.0
	RP-49	RP-100853	0446	2		CR to 36.331 on clarification for MBMS PTM RBs	9.4.0
	RP-49	RP-100851	0447	-		Introduction of late corrections container for E-UTRA UE capabilities	9.4.0
	RP-49	RP-100851	0448	-		Renaming of containers for late non-critical extensions	9.4.0
	RP-49	RP-100851	0452	-		Clarifications Regarding Redirection from LTE	9.4.0
	RP-49	RP-100845	0456	-		Description of multi-user MIMO functionality in feature group indicator table	9.4.0
	RP-49	RP-100845	0458	-		Correct the PEMAX_H to PEMAX	9.4.0
	RP-49	RP-100851	0460	-		Clarification for feature group indicator bit 11	9.4.0
	RP-49	RP-100851	0465	1		Clarification of FGI setting for inter-RAT features not supported by the UE	9.4.0
	RP-49	RP-101008	0475	1		FGI settings in Rel-9	9.4.0
12/2010	RP-50	RP-101197	0483	-		Clarification on Meaning of FGI Bits	9.5.0
	RP-50	RP-101197	0485	-		Clarification regarding reconfiguration of the quantityConfig	9.5.0

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	RP-50	RP-101210	0486	1		Corrections to the presence of IE regarding DRX and CQI	9.5.0
	RP-50	RP-101210	0493	-		The field descriptions of MeasObjectEUTRA	9.5.0
	RP-50	RP-101197	0498	1		Clarification of FGI settings non ANR periodical measurement reporting	9.5.0
	RP-50	RP-101209	0500	-		Corrections to RLF Report	9.5.0
	RP-50	RP-101206	0519	1		T321 timer fix	9.5.0
	RP-50	RP-101197	0524	-		Restriction of AC barring parameter setting	9.5.0
	RP-50	RP-101210	0525	-		Removal of SEQUENCE OF SEQUENCE in UEInformationResponse	9.5.0
	RP-50	RP-101197	0526	1		Clarification regarding default configuration value N/A	9.5.0
	RP-50	RP-101431	0532	-		Splitting FGI bit 3	9.5.0
	RP-50	RP-101183	0476	4		36.331 CR on Introduction of Minimization of Drive Tests	10.0.0
	RP-50	RP-101293	0477	4		AC-Barring for Mobile Originating CSFB call	10.0.0
	RP-50	RP-101214	0478	-		Addition of UE-EUTRA-Capability descriptions	10.0.0
	RP-50	RP-101214	0481	-		Clarification on Default Configuration for CQI-ReportConfig	10.0.0
	RP-50	RP-101215	0487	-		CR to 36.331 adding e1xCSFB support for dual Rx/Tx UE	10.0.0
	RP-50	RP-101227	0488	1		Introduction of Carrier Aggregation and UL/ DL MIMO	10.0.0
	RP-50	RP-101228	0489	1		Introduction of relays in RRC	10.0.0
	RP-50	RP-101214	0490	1		Priority indication for CSFB with re-direction	10.0.0
	RP-50	RP-101214	0491	-		SIB Size Limitations	10.0.0
	RP-50	RP-101214	0513	-		Combined Quantity Report for IRAT measurement of UTRAN	10.0.0
	RP-50	RP-101214	0527	1		UE power saving and Local release	10.0.0
	RP-50	RP-101429	0530	1		Inclusion of new UE categories in Rel-10	10.0.0
03/2011	RP-51	RP-110282	0533	-		36331_CRxxx_Protection of Logged Measurements Configuration	10.1.0
	RP-51	RP-110294	0534	1		Stage-3 CR for MBMS enhancement	10.1.0
	RP-51	RP-110282	0535	-		Clean up MDT-related text	10.1.0
	RP-51	RP-110282	0536	-		Clear MDT configuration and logs when the UE is not registered	10.1.0
	RP-51	RP-110280	0537	-		Correction to the field description of nB	10.1.0
	RP-51	RP-110289	0538	-		CR on impact on UP with remove&add approach_2	10.1.0
	RP-51	RP-110282	0539	-		CR to 36.331 on corrections for MDT	10.1.0
	RP-51	RP-110290	0543	-		Introduction of CA/MIMO capability signalling and measurement capability signalling in CA	10.1.0
	RP-51	RP-110282	0544	-		MDT PDU related clarifications	10.1.0
	RP-51	RP-110282	0545	-		Correction on release of logged measurement configuration while in another RAT	10.1.0
	RP-51	RP-110289	0546	-		Miscellaneous Corrections for CA Running RRC CR	10.1.0
	RP-51	RP-110280	0547	1		Miscellaneous small clarifications and corrections	10.1.0
	RP-51	RP-110293	0548	4		Necessary changes for RLF reporting enhancements	10.1.0
	RP-51	RP-110282	0549	1		Memory size for logged measurements capable UE	10.1.0
	RP-51	RP-110289	0550	-		Parameters confusion of non-CA and CA configurations	10.1.0
	RP-51	RP-110272	0553	-		Presence condition for cellSelectionInfo-v920 in SIB1	10.1.0
	RP-51	RP-110282	0554	1		Removal of MDT configuration at T330 expiry	10.1.0
	RP-51	RP-110289	0556	1		Signalling aspects of existing LTE-A parameters	10.1.0
	RP-51	RP-110280	0557	1		Some Corrections on measurement	10.1.0
	RP-51	RP-110291	0558	-		Stored system information for RNs	10.1.0
	RP-51	RP-110291	0559	-		Support of Integrity Protection for Relay	10.1.0
	RP-51	RP-110290	0561	2		Updates of L1 parameters for CA and UL/DL MIMO	10.1.0
	RP-51	RP-110291	0571	1		Note for Dedicated SIB for RNs	10.1.0
	RP-51	RP-110272	0579	-		Correction to cs-fallbackIndicator field description	10.1.0
	RP-51	RP-110289	0580	-		Clarification to the default configuration of sCellDeactivationTimer	10.1.0
	RP-51	RP-110289	0581	-		Miscellaneous corrections to TS 36.331 on Carrier Aggregation	10.1.0
	RP-51	RP-110280	0584	-		Correction of configuration description in SIB2	10.1.0
	RP-51	RP-110265	0587	-		Clarification of band indicator in handover from E-UTRAN to GERAN	10.1.0
	RP-51	RP-110285	0588	1		36331_CRxxxx Support of Delay Tolerant access requests	10.1.0
	RP-51	RP-110292	0590	-		Update of R2-110807 on CSI measurement resource restriction for time domain ICIC	10.1.0
	RP-51	RP-110292	0591	-		Update of R2-110821 on RRM/RLM resource restriction for time domain ICIC	10.1.0
	RP-51	RP-110290	0592	-		Corrections on UE capability related parameters	10.1.0
	RP-51	RP-110282	0596	-		Validity time for location information in Immediate MDT	10.1.0
	RP-51	RP-110280	0597	-		CR to 36.331 adding UE capability indicator for dual Rx/Tx e1xCSFB	10.1.0
	RP-51	RP-110289	0598	-		Miscellaneous corrections to CA	10.1.0
	RP-51	RP-110280	0599	-		Further correction to combined measurement report of UTRAN	10.1.0
	RP-51	RP-110280	0600	-		Correction to the reference of ETWS	10.1.0
	RP-51	RP-110269	0602	1		Introduction of OTDOA inter-freq RSTD measurement indication procedure	10.1.0
	RP-51	RP-110280	0603	-		Correction of use of RRCConnectionReestablishment message for contention resolution	10.1.0
	RP-51	RP-110282	0604	-		CR to 36.331 on MDT neighbour cell measurements logging	10.1.0
	RP-51	RP-110272	0609	-		Minor ASN.1 corrections for the UEInformationResponse message	10.1.0
	RP-51	RP-110280	0613	-		Clarification regarding dedicated RLF timers and constants	10.1.0
	RP-51	RP-110282	0615	-		Release of Logged Measurement Configuration	10.1.0
	RP-51	RP-110280	0616	-		Some corrections on TS 36.331	10.1.0
	RP-51	RP-110280	0623	-		AC barring procedure clean up	10.1.0
	RP-51	RP-110282	0624	-		Counter proposal to R2-110826 on UE capabilities for MDT	10.1.0
	RP-51	RP-110280	0628	1		UE information report for RACH	10.1.0

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	RP-51	RP-110289	0629	2		Measurement on the deactivated SCells	10.1.0
	RP-51	RP-110282	0632	1		Trace configuration paremeters for Logged MDT	10.1.0
	RP-51	RP-110282	0635	-		Clarification on stop condition for timer T3330	10.1.0
	RP-51	RP-110282	0637	-		User consent for MDT	10.1.0
	RP-51	RP-110280	0638	-		Correction on the range of CQI resource index	10.1.0
	RP-51	RP-110272	0640	1		Small corrections to ETWS & CMAS system information	10.1.0
	RP-51	RP-110290	0641	1		UE capability signaling structure w.r.t carrier aggregation, MIMO and measurement gap	10.1.0
	RP-51	RP-110289	0642	1		Normal PHR and the multiple uplink carriers	10.1.0
	RP-51	RP-110280	0643	1		Corrections to TS36.331 on SIB2 handling	10.1.0
	RP-51	RP-110280	0644	1		Adding a Power Management indication in PHR	10.1.0
	RP-51	RP-110289	0646	1		Clarification for CA and TTI bundling in RRC	10.1.0
	RP-51	RP-110443	0648	1		Updates to FGI settings	10.1.0
06/2011	RP-52	RP-110836	0651	-		Add MBMS counting procedure to processing delay requirement for RRC procedure Section 11.2	10.2.0
	RP-52	RP-110830	0653	-		Add pre Rel-10 procedures to processing delay requirement for RRC procedure Section 11.2	10.2.0
	RP-52	RP-110847	0654	1		Addition of a specific reference for physical configuration fields	10.2.0
	RP-52	RP-110839	0656	-		Clarification of inter-frequency RSTD measurement indication procedure	10.2.0
	RP-52	RP-110830	0658	-		Clarification of optionality of UE features without capability	10.2.0
	RP-52	RP-110839	0660	-		Clarification on the definition of maxCellBlack	10.2.0
	RP-52	RP-110839	0661	-		Clarification on upper layer requested connection release	10.2.0
	RP-52	RP-110850	0662	3		Clarification regarding eICIC measurements	10.2.0
	RP-52	RP-110839	0663	-		CR for s-measure handling	10.2.0
	RP-52	RP-110851	0664	1		CR on clarification of RLF Report in Carrier Aggregation	10.2.0
	RP-52	RP-110830	0669	-		FGI bit for handover between LTE FDD/TDD	10.2.0
	RP-52	RP-110847	0670	2		Further updates on L1 parameters	10.2.0
	RP-52	RP-110839	0671	2		General error handling for extension fields	10.2.0
	RP-52	RP-110851	0672	2		Additional information for RLF report	10.2.0
	RP-52	RP-110843	0673	-		Introduction of TCE ID for logged MDT	10.2.0
	RP-52	RP-110670	0674	4		Miscellaneous corrections (related to review in preparation for ASN.1 freeze)	10.2.0
	RP-52	RP-110843	0675	-		PLMN check for MDT logging	10.2.0
	RP-52	RP-110839	0677	-		UE actions upon leaving RRC_CONNECTED	10.2.0
	RP-52	RP-110847	0678	-		Clarification on bandEUTRA-r10 and supportedBandListEUTRA	10.2.0
	RP-52	RP-110837	0679	-		Updated value range for the Extended Wait Timer	10.2.0
	RP-52	RP-110839	0680	1		Value range of DRX-InactivityTimer	10.2.0
	RP-52	RP-110828	0693	1		Correction for SR-VCC and QCI usage	10.2.0
	RP-52	RP-110847	0694	-		Restructuring of CQI-ReportConfig-r10	10.2.0
	RP-52	RP-110839	0695	2		Correction on DL allocations in MBSFN subframes	10.2.0
	RP-52	RP-110850	0700	-		Reference SFN for MeasSubframePattern	10.2.0
	RP-52	RP-110846	0701	-		Clarifications to CA related field descriptions	10.2.0
	RP-52	RP-110847	0702	-		Corrections to codebookSubsetRestriction and SRS parameters	10.2.0
	RP-52	RP-110834	0704	-		Corrections to the handling of ri-ConfigIndex for TM9	10.2.0
	RP-52	RP-110715	0710	2		UE capabilities for Rel-10 LTE features with eICIC measurement restrictions as FGI (Alt.1)	10.2.0
	RP-52	RP-110839	0713	-		CR to 36.331 on redirected utra-TDD carrier frequency	10.2.0
	RP-52	RP-110839	0714	-		Explicit AS signalling for mapped PTMSI/GUTI	10.2.0
	RP-52	RP-110847	0718	-		Counter proposal for Updates of mandatory information in AS-Config	10.2.0
	RP-52	RP-110839	0719	-		CR for Reconfiguration of discardTimer in PDCP-Config	10.2.0
	RP-52	RP-110847	0723	-		On the missing multiplicity of UE capability parameters	10.2.0
	RP-52	RP-110830	0735	-		Radio frame alignment of CSA and MSP	10.2.0
	RP-52	RP-110847	0740	-		Reconfiguration involving critically extended IEs (using fullFieldConfig i.e. option 2)	10.2.0
	RP-52	RP-110839	0744	-		Counter proposal to R2-112753 on CR to remove CSG Identity validity limited to CSG cell	10.2.0
	RP-52	RP-110839	0746	1		Increase of prioritisedBitRate	10.2.0
	RP-52	RP-110847	0747	-		CA and MIMO Capabilities in LTE Rel-10	10.2.0
09/2011	RP-53	RP-111297	0752	-		TS36.331 Correction	10.3.0
	RP-53	RP-111297	0754	-		maxNumberROHC-ContextSessions when no ROHC profile is supported	10.3.0
	RP-53	RP-111280	0757	-		Correction to Subframe Allocation End in PMCH-Info	10.3.0
	RP-53	RP-111288	0761	-		Correction on PUCCH configuration for Un interface	10.3.0
	RP-53	RP-111297	0762	-		Miscellaneous corrections to 36.331	10.3.0
	RP-53	RP-111278	0764	2		36.331 correction on CSG identity validity to allow introduction of CSG RAN sharing	10.3.0
	RP-53	RP-111283	0770	2		AdditionalSpectrumEmissions in CA	10.3.0
	RP-53	RP-111297	0773	-		CR to 36.331 on Small correction of PHR parameter	10.3.0
	RP-53	RP-111283	0775	2		Clarifications to P-max on CA	10.3.0
	RP-53	RP-111280	0784	-		Clarification on for which subframes signalling MCS applies	10.3.0
	RP-53	RP-111283	0792	-		Corrections in RRC	10.3.0
	RP-53	RP-111297	0793	-		Replace the tables with exception list in 10.5 AS-Config	10.3.0
	RP-53	RP-111297	0796	-		Corrections to the field descriptions	10.3.0
	RP-53	RP-111283	0798	-		Configuration of simultaneous PUCCH&PUSCH	10.3.0
	RP-53	RP-111297	0806	-		Corrections to release of csi-SubframePatternConfig and cqi-Mask	10.3.0

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	RP-53	RP-111272	0810	-		GERAN SI format for cell change order&PS handover& enhanced redirection to GERAN	10.3.0
	RP-53	RP-111283	0811	-		Corrections to PUCCH-Config field descriptions	10.3.0
12/2011	RP-54	RP-111711	0812	1		Clarification of PCI range for CSG cells	10.4.0
	RP-54	RP-111716	0813	-		Clarifications to Default Radio Configurations	10.4.0
	RP-54	RP-111716	0814	1		Corrections to enhancedDualLayerTDD	10.4.0
	RP-54	RP-111716	0815	-		Miscellaneous small corrections	10.4.0
	RP-54	RP-111716	0816	1		Correction on notation of SRS transmission comb	10.4.0
	RP-54	RP-111706	0823	1		36.331 CR SPS reconfiguration	10.4.0
	RP-54	RP-111716	0827	2		Clarification of list sizes in measurement configuration stored by UE	10.4.0
	RP-54	RP-111706	0835	-		Clarification of the event B1 and ANR related FGI bits	10.4.0
	RP-54	RP-111714	0840	1		Clarification on MBSFN and measurement resource restrictions	10.4.0
	RP-54	RP-111706	0845	-		Clarification on parallel message transmission upon connection re-establishment	10.4.0
03/2012	RP-55	RP-120326	0855	1		Limiting MBMS counting responses to within the PLMN	10.5.0
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	RP-55	RP-120326	0862	1		Clarification on MBSFN and measurement resource restrictions	10.5.0
	RP-55	RP-120325	0871	-		On SIB10/11 Reception Timing	10.5.0
	RP-55	RP-120326	0875	1		Clarification on MBMS counting for uncipherable services	10.5.0
	RP-55	RP-120325	0876	-		Minor correction regarding limited service access on non-CSG-member cell	10.5.0
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	RP-55	RP-120356	0895	1		Introducing means to signal different FDD/TDD Capabilities/FGIs for Dual-xDD UE	10.5.0
	RP-55	RP-120321	0899	-		Clarification on SRB2 resumption upon connection re-establishment (parallel message transmission)	10.5.0
	RP-55	RP-120321	0900	1		Duplicated ASN.1 naming correction	10.5.0
06/2012	RP-56	RP-120805	0909	-		SPS Reconfiguration	10.6.0
	RP-56	RP-120805	0912	1		Change in Scheduling Information for ETWS	10.6.0
	RP-56	RP-120807	0914	-		Clarification of mch-SchedulingPeriod configuration	10.6.0
	RP-56	RP-120808	0916	1		Change in Scheduling Information for CMAS	10.6.0
	RP-56	RP-120814	0919	1		Introducing means to signal different REL-10 FDD/TDD Capabilities/FGIs for Dual-xDD UE	10.6.0
	RP-56	RP-120812	0920	1		Clarification on setting of dedicated NS value for CA by E-UTRAN	10.6.0
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	RP-56	RP-120813	0957	1		Korean Public Alert System (KPAS) in relation to CMAS	10.6.0
	RP-56	RP-120812	0969	1		Introduction of supported bandwidth combinations for CA	10.6.0
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	RP-56	RP-120813	0973	1		EU-Alert in relation to CMAS	11.0.0
09/2012	RP-57	RP-121371	0982	1		Introduction of EAB	11.1.0
	RP-57	RP-121381	0990	-		Additional special subframe configuration related correction	11.1.0
	RP-57	RP-121423	1000	4		36.331 CR introducing In-Device Coexistence (IDC)	11.1.0
	RP-57	RP-121359	1008	-		Voice support Capabilities	11.1.0
	RP-57	RP-121361	1013	-		Differentiating UTRAN modes in FGIs	11.1.0
	RP-57	RP-121368	1022	1		Introduction of absolute priority based measurements and reselection in CELL_FACH State in 36.331	11.1.0
	RP-57	RP-121370	1024	-		Introducing MDT enhancements for REL-11	11.1.0
	RP-57	RP-121349	1025	2		Introducing Carrier aggregation enhancements for REL-11	11.1.0
	RP-57	RP-121375	1026	-		Introducing MBMS enhancements for REL-11	11.1.0
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	RP-57	RP-121395	1055	-		CR on scell measurement cycle	11.1.0
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	RP-57	RP-121280	1060	-		Correction for PUCCH/SRS Release	11.1.0
12/2012	RP-58	RP-121933	1063	-		Correction related to differentiating UTRAN modes in FGIs	11.2.0
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	RP-58	RP-121951	1067	3		Carrier Aggregation Enhancement RAN1 parameters	11.2.0
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	RP-58	RP-121946	1071	1		Correction of the signaling for Uncertainty and Confidence	11.2.0
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	RP-58	RP-121940	1073	-		CR to 36.331 on SIB15 acquisition	11.2.0
	RP-58	RP-121957	1074	1		Handling of 1xCSFB failure	11.2.0
	RP-58	RP-121957	1075	-		Miscellaneous corrections	11.2.0
	RP-58	RP-121958	1076	1		RAN overload control using RRC connection Rejection	11.2.0
	RP-58	RP-121954	1077	-		RRC support for CoMP in UL	11.2.0
	RP-58	RP-121951	1078	-		Some clarification to Carrier aggregation enhancements	11.2.0
	RP-58	RP-121939	1079	1		Validity of EAB SIB and acquisition of SIB1	11.2.0
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	RP-58	RP-121946	1100	-		Correction on MDT multi-PLMN support	11.2.0
	RP-58	RP-121953	1102	-		Clarification and alignment of handling of other configuration	11.2.0
	RP-58	RP-121970	1103	6		Introducing support for Coordinated Multi-Point (CoMP) operation	11.2.0
	RP-58	RP-121922	1105	2		Introducing further UE aspects regarding multi band cells	11.2.0
	RP-58	RP-121947	1120	-		CR to 36.331 on additional information in RLF report for inter-RAT MRO	11.2.0
	RP-58	RP-121952	1125	1		Correction on Power preference indication	11.2.0
	RP-58	RP-121950	1127	1		SIB1 provisioning via dedicated signalling	11.2.0
	RP-58	RP-121936	1128	2		Measurement reporting of Scells	11.2.0
	RP-58	RP-121956	1129	1		Introduction of EPDCCH parameters in TS 36.331	11.2.0
	RP-58	RP-121961	1130	2		Introduction of Rel-11 UE capabilities	11.2.0
	RP-58	RP-121958	1131	-		Introducion of wideband RSRQ measurements	11.2.0
	RP-58	RP-121958	1146	-		Introduction of network sharing for CDMA2000 inter-working	11.2.0
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03/2013	RP-59	RP-130246	1182	2		Miscellaneous corrections from review preceeding ASN.1 freeze	11.3.0
	RP-59	RP-130243	1186	2		DL COMP capability related correction	11.3.0
	RP-59	RP-130231	1193	1		Mandatory supporting of B1 measurement to UMTS FDD (FGI bit 15)	11.3.0
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	RP-59	RP-130241	1231	2		PPI and IDC indication upon handover	11.3.0
	RP-59	RP-130227	1235	1		Correcting further UE aspects regarding multi band cells	11.3.0
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	RP-59	RP-130241	1244	-		IDC-SubframePattern length for FDD	11.3.0
	RP-59	RP-130249	1252	-		Introduction of wideband RSRQ measurements in RRC_IDLE	11.3.0
	RP-59	RP-130240	1255	-		Optional support of RLF report for inter-RAT MRO	11.3.0
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06/2013	RP-60	RP-130805	1267	-		Clarification on the redirection to UTRA-TDD frequency in case of CSFB High Priority	11.4.0
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	RP-60	RP-130809	1271	-		Clarification on KASME key usage	11.4.0
	RP-60	RP-130808	1272	-		Correction on multi-TA capability	11.4.0
	RP-60	RP-130808	1273	-		MBMS interest indication upon handover/ re-establishment	11.4.0
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	RP-60	RP-130808	1276	-		Corrections to field description of pdsch-Start-r11	11.4.0
	RP-60	RP-130809	1277	-		Need code corrections in Rel-11 RRC	11.4.0
	RP-60	RP-130808	1278	-		Miscellanous small corrections	11.4.0
	RP-60	RP-130809	1279	1		FDD/TDD diff column correction for FGI31	11.4.0
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	RP-60	RP-130804	1303	1		Clarification on inclusion of non-CA band combinations	11.4.0
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	RP-60	RP-130805	1323	-		Clarification on the configuration of the extended PHR	11.4.0
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09/2013	RP-61	RP-131311	1335	-		Clarification on PhysCellIdRange	11.5.0
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	RP-61	RP-131319	1343	-		Clarification of MFBI impact on MBMS service continuity	11.5.0
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12/2013	RP-62	RP-131986	1366	-		Introduction of capability bit for UTRA MFBI	11.6.0
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	RP-65	RP-141496	1615	1		Clarification on determining MBMS frequencies of interest in MBMSInterestIndication	12.3.0
	RP-65	RP-141506	1579	1		Introduction of signaling support for low complexity UEs	12.3.0
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	RP-65	RP-141511	1559	2		Correction to stop condition for "Chiba offset"	12.3.0
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	RP-66	RP-142140	1697	1		Prohibit timer for SR	12.4.0
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	RP-66	RP-142140	1669	2		Clarification on statusReportRequired handling	12.4.0
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	RP-66	RP-142113	1686	1		UE capability for modified MPR behavior	12.4.0
	RP-66	RP-142132	1664	1		Support of Discovery Signals measurement in TS 36.331	12.4.0
	RP-66	RP-142139	1670	2		RRC Parameters for NAICS	12.4.0
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	RP-73	RP-161758	2346	-		nrs-Power signaling for NB-IoT non-anchor carrier	13.3.0
09/2016	RP-73	RP-161746	2261	1		Introducing V2V to TS 36.331	14.0.0
	RP-73	RP-161745	2340	1		Introduction of enhanced LAA for LTE	14.0.0
	RP-73	RP-161747	2341	-		Introduction of L2 Latency reduction techniques	14.0.0
12/2016	RP-74	RP-162318	2362	-		Clarification on the RRC connection resume procedure	14.1.0
	RP-74	RP-162313	2364	1		Clarification on AS-Config	14.1.0
	RP-74	RP-162316	2366	1		Corrections to LWA release	14.1.0
	RP-74	RP-162327	2373	1		Signalling of LWIP aggregation	14.1.0
	RP-74	RP-162318	2375	1		Miscellaneous corrections to TS 36.331	14.1.0
	RP-74	RP-162317	2377	-		Clarification on valid value range of codebookConfigNx fields	14.1.0
	RP-74	RP-162321	2378	-		Miscellaneous corrections to eLAA	14.1.0
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	RP-74	RP-162316	2386	-		Corrections to WLAN status monitoring	14.1.0
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	RP-74	RP-162314	2398	1		Data available for transmission	14.1.0
	RP-74	RP-162315	2400	1		Correction on Downlink power allocation for SC-PTM	14.1.0
	RP-74	RP-162328	2402	-		Corrections on V2V in TS 36.331	14.1.0
	RP-74	RP-162314	2403	-		Correction on field description of up/cp-CIoT-EPS-Optimisation	14.1.0
	RP-74	RP-162327	2404	-		Extension of PollByte	14.1.0
	RP-74	RP-162317	2407	-		Clarification on Rel-13 CCH-IM UE capability	14.1.0
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	RP-74	RP-162313	2428	-		Minor changes regarding UE category	14.1.0
	RP-74	RP-162309	2435	1		Correction of NOTE 3 in UE-EUTRA-Capability related to multiple CA-MIMO-ParametersDL/UL	14.1.0
	RP-74	RP-162311	2441	1		Clarification on reporting of the plmn-IdentityList	14.1.0
	RP-74	RP-162317	2446	2		Correction on SSTD Measurement Reporting	14.1.0
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	RP-74	RP-162328	2457	1		Correction and Clarification to TS 36.331	14.1.0
	RP-74	RP-162313	2459	1		Correction to frequecy hopping configuration	14.1.0
	RP-74	RP-162314	2461	-		Correction to non-anchor carrier configuration	14.1.0
	RP-74	RP-162329	2462	1		UE capabilities for Latency Reduction	14.1.0
	RP-74	RP-162311	2466	1		Conrrections on sidelink pre-configurations and default configurations	14.1.0
	RP-74	RP-162317	2469	-		Minor corrections for Rel-13 eD2D	14.1.0
	RP-74	RP-162324	2471	3		Introduction of SRS switching for LTE	14.1.0
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	RP-74	RP-162314	2474	-		Clarification on system information acquisition for NB-IoT	14.1.0
	RP-74	RP-162314	2476	-		Editorial correction for NB-IoT	14.1.0
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	RP-74	RP-162313	2490	-		RSRP threshold when only CE level 0 is used	14.1.0
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	RP-74	RP-162313	2495	-		Correction to presence of uplink frequency hopping interval parameter	14.1.0
	RP-74	RP-162315	2497	1		Correction to SC-PTM scheduling period start offset	14.1.0
	RP-74	RP-162316	2504	-		Correction to WLAN measurement configuration	14.1.0
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	RP-74	RP-162313	2519	1		Acknowledgement delay of RRCConnectionRelease message for eMTC UEs	14.1.0
	RP-74	RP-162314	2525	-		Correction on channel bandwidth definition for NB-IoT	14.1.0
	RP-74	RP-162316	2534	1		Clarifications on empty WLAN identifiers	14.1.0
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	RP-74	RP-162350	2546	-		timeInfoUTC in SIB16	14.1.0
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	RP-74	RP-162309	2552	-		Clarification on prioritization of multiple Pmax values	14.1.0
	RP-74	RP-162329	2553	-		CR on RV setting with UL skipping	14.1.0
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	RP-75	RP-170636	2560	1	B	Introducing Rel-14 FeMTC into RRC	14.2.0
	RP-75	RP-170643	2563	1	F	Correction on V2X sidelink communication in TS 36.331	14.2.0
	RP-75	RP-170668	2565	1	B	Introduction of a new special subframe configuration	14.2.0
	RP-75	RP-170652	2576	1	A	Providing SIB1-BR via dedicated RRC signalling	14.2.0
	RP-75	RP-170641	2577	1	B	Introduction of eDECOR	14.2.0
	RP-75	RP-170636	2578	1	B	Introduction of SC-PTM for feMTC and NB-IoT enhancements	14.2.0
	RP-75	RP-170629	2580	1	B	Introducing RRC parameters for eFD-MIMO (REL-14)	14.2.0
	RP-75	RP-170657	2582	1	A	Indication of S1-U data transfer	14.2.0
	RP-75	RP-170650	2585	1	A	Addition of extended EARFCNs in SCGFailureInformation message	14.2.0
	RP-75	RP-170652	2587	-	A	Clarification on the configuration of the extended values for nB	14.2.0
	RP-75	RP-170652	2589	-	A	Clarification on the support of FGI 42 for category M1 UE	14.2.0
	RP-75	RP-170656	2591	1	A	Miscellaneous corrections to NB-IoT	14.2.0
	RP-75	RP-170643	2592	1	F	Corrections to resource reservation period for V2X	14.2.0
	RP-75	RP-170651	2598	-	A	Correction on the initiation of WLAN connection status report	14.2.0
	RP-75	RP-170654	2600	-	A	Correction on longDRX-CycleStartOffset	14.2.0
	RP-75	RP-170643	2601	2	F	Correction and Clarification to TS 36.331	14.2.0
	RP-75	RP-170653	2603	2	A	Correction on mpdcch-pdsch-HoppingConfig	14.2.0
	RP-75	RP-170636	2613	3	B	FeMTC UE CE mode and maximum PDSCH/PUSCH BW preference indication	14.2.0
	RP-75	RP-170635	2615	2	B	Introduce V2X in TS 36.331	14.2.0
	RP-75	RP-170643	2616	2	F	Introduce a new parameter for V2X resource reselection	14.2.0
	RP-75	RP-170656	2622	2	A	Extension of $Q_{RxLevMin}$ value range	14.2.0
	RP-75	RP-170655	2624	-	A	Clarification on prioritization of multiple Pmax values	14.2.0
	RP-75	RP-170637	2625	2	B	Introduction of NB-IoT Enhancements other than Multicast	14.2.0
	RP-75	RP-170651	2627	1	A	Corrections to WLAN status monitoring	14.2.0
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	RP-75	RP-170654	2637	-	A	Correction of reference to GERAN specification	14.2.0
	RP-75	RP-170652	2641	1	A	IOT indication for unicast MPDCCH/PDSCH/PUSCH frequency hopping	14.2.0
	RP-75	RP-170632	2642	3	B	Introducing 256QAM in UL	14.2.0
	RP-75	RP-170654	2644	-	A	Correction CIoT cell indications to UE NAS	14.2.0
	RP-75	RP-170633	2645	1	B	Introduction of FeMBMS to 36.331	14.2.0
	RP-75	RP-170643	2646	1	F	Corrections to the exceptional pool	14.2.0
	RP-75	RP-170653	2651	2	A	New S-criteria for enhanced coverage in idle mode	14.2.0
	RP-75	RP-170651	2655	-	A	Corrections in UE capability reporting	14.2.0
	RP-75	RP-170642	2660	2	C	Functional modification of retrieving different UE capabilities for a fallback band combination	14.2.0
	RP-75	RP-170638	2663	2	B	Introduction of Voice and Video enhancements for LTE	14.2.0
	RP-75	RP-170654	2665	1	A	The support of UL 64QAM	14.2.0
	RP-75	RP-170645	2666	1	F	Miscellaneous Corrections on SRS Switching	14.2.0
	RP-75	RP-170646	2667	1	B	Introduction of SRS switching capability for LTE	14.2.0
	RP-75	RP-170652	2671	-	A	Clarification for pucch-NumRepetitionCE-format2-r13 for CE mode B	14.2.0
	RP-75	RP-170643	2673	-	F	Correction on the preconfigured power control parameter for V2X sidelink communication	14.2.0
	RP-75	RP-170653	2675	2	A	Correction of pusch-hoppingOffset	14.2.0
	RP-75	RP-170628	2676	3	B	Introduction of Enhanced LTE-WLAN Aggregation (eLWA)	14.2.0
	RP-75	RP-170651	2678	-	A	Need behaviour of availableAdmissionCapacityRequestWLAN	14.2.0
	RP-75	RP-170644	2685	1	B	Addition of geographical location reporting in 36.331	14.2.0
	RP-75	RP-170630	2689	3	B	Introduction of mobility enhancement solutions in RRC	14.2.0
	RP-75	RP-170651	2694	-	A	Clarification on data handling for LWA bearer	14.2.0
	RP-75	RP-170634	2696	2	B	CR for introduction of NCSG and per CC measurement gap	14.2.0
	RP-75	RP-170634	2697	1	B	CR for introduction of NCSG, short measurement gaps and configuration of CC measurement gap	14.2.0
	RP-75	RP-170321	2698	-	F	Correction to PRACH resource configuration for high speed scenario	14.2.0
	RP-75	RP-170807	2701	1	A	Feature optionality for Cat.1bis UE	14.2.0
	RP-75	RP-170656	2703	-	A	Extension of timer T311	14.2.0
	RP-75					Fixed ASN.1 syntax check error (“PLMN-IdentityList-MBMS-14” -> “PLMN-IdentityList-MBMS-r14”)	14.2.1
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06/2017	RP-76	RP-171226	2705	2	F	Correction to exceptional pool usage in TS 36.331	14.3.0
	RP-76	RP-171237	2706	1	F	Support eDECOR for NB-IoT	14.3.0
	RP-76	RP-171231	2709	1	F	Correction on UE capabilities for eLAA	14.3.0
	RP-75	RP-171243	2711	3	A	Correction on WLAN connection status report monitoring for LWIP	14.3.0
	RP-76	RP-171236	2712	3	F	Correction on eLWA	14.3.0
	RP-76	RP-171225	2713	2	B	Introduction of new Transport Block Size for DL 256QAM	14.3.0
	RP-76	RP-171236	2714	2	F	UE capabilities for eLWA	14.3.0
	RP-76	RP-171227	2715	2	B	Introducing a new SL master information block for V2X sidelink communication	14.3.0
	RP-76	RP-171236	2720	2	F	Clarifications to eLWA	14.3.0
	RP-76	RP-171247	2728	2	B	Introduction of a new UL UE category for 300Mbps with 64QAM	14.3.0
	RP-76	RP-171425	2872	3	F	Miscellaneous general corrections and clarifications resulting from ASN.1 review	14.3.0
	RP-76	RP-171223	2734	2	F	Introduction of SFN indication in handover message	14.3.0

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	RP-76	RP-171233	2741	5	F	Clarification of intra-frequency applicability of makeBeforeBreak HO	14.3.0
	RP-76	RP-171224	2745	3	F	Correction to the value range of ce-AuthorisationOffset	14.3.0
	RP-76	RP-171224	2746	2	C	Introduction of Overload Control for Control plane data only	14.3.0
	RP-76	RP-171223	2748	2	F	SC-MCCH information change notification for FeMTC and NB-IoT enhancements	14.3.0
	RP-76	RP-171223	2749	1	F	Alignment of the parameter names for SC-PTM DRX for SC-MCCH and SC-MTCH	14.3.0
	RP-76	RP-171233	2752	3	F	Corrections to RACH-less handover and SCG change	14.3.0
	RP-76	RP-171222	2759	7	F	Corrections to per-CC measurement gap configuration and add the support for UE reporting of numFreqEffectiveReduced when frequencies are configured for reduced measurement performance	14.3.0
	RP-76	RP-171233	2760	1	F	Corrections to make before break mobility	14.3.0
	RP-76	RP-171243	2768	2	F	Clarification regarding requesting fallback combinations with different capabilities	14.3.0
	RP-76	RP-171226	2771	1	F	Leap second change for DFN timing	14.3.0
	RP-76	RP-171244	2773	1	A	Correction to RACH CE level info list	14.3.0
	RP-76	RP-171223	2775	2	C	CE mode configuration/deconfiguration without handover	14.3.0
	RP-76	RP-171227	2791	3	F	Correction on V2X Rx pool for inter-frequency configuration in 36.331	14.3.0
	RP-76	RP-171248	2795	1	A	Entry-Level UE Support UL 64QAM	14.3.0
	RP-76	RP-171235	2797	1	F	FDD TDD difference for VoLTE capability	14.3.0
	RP-76	RP-171242	2804	1	A	Setting of FGI 107 and 108 in case of TDD-FDD CA	14.3.0
	RP-76	RP-171226	2813	1	F	Correction of RRCConnectionReconfiguration reception for V2X	14.3.0
	RP-76	RP-171227	2820	-	F	CR on V2X miscellaneous RRC corrections	14.3.0
	RP-76	RP-171224	2823	2	B	Introduction of RRC connection re-establishment for NB-IoT control plane	14.3.0
	RP-76	RP-171243	2826	-	A	Miscellaneous corrections to CA enhancements	14.3.0
	RP-76	RP-171244	2828	2	A	Clarification to MIB repetitions	14.3.0
	RP-76	RP-171243	2830	3	A	LAA/WiFi sharing indiction	14.3.0
	RP-76	RP-171225	2831	-	B	Enable Uplink-Only RoHC operations	14.3.0
	RP-76	RP-171245	2833	1	A	Clarification on contention based random access for NB-IoT	14.3.0
	RP-76	RP-171245	2836	-	A	Editorial correction on ab-Barring parameter	14.3.0
	RP-76	RP-171223	2842	-	F	Correction to FGI 25	14.3.0
	RP-76	RP-171223	2844	1	F	Correction to InterFreqRSTDMeasurementIndication message	14.3.0
	RP-76	RP-171223	2845	2	B	Introduction of enhanced RLM reporting	14.3.0
	RP-76	RP-171245	2848	1	A	Correction on the UE AS context handling	14.3.0
	RP-76	RP-171245	2849	1	A	Correction on attach without PDN connectivity	14.3.0
	RP-76	RP-171233	2851	1	F	Miscellaneous RRC corrections on mobility enhancement	14.3.0
	RP-76	RP-171245	2853	1	A	Clarification on logicalChannelSR-ProhibitTimer for NB-IOT	14.3.0
	RP-76	RP-171223	2854	2	F	Correction to SC-MCCH and SC-MTCH configuration without delta configuration	14.3.0
	RP-76	RP-171230	2869	1	F	Correction of SRS switching	14.3.0
	RP-76	RP-171223	2870	2	F	Miscellaneous feMTC corrections and clarifications resulting from ASN.1 review	14.3.0
	RP-76	RP-171237	2871	-	F	Miscellaneous eDECOR corrections and clarifications resulting from ASN.1 review	14.3.0
	RP-76	RP-171221	2873	1	F	Miscellaneous feMBMS corrections and clarifications resulting from ASN.1 review	14.3.0
	RP-76	RP-171221	2874	1	B	UE capabilities for feMBMS	14.3.0
	RP-76	RP-171224	2876	1	F	Long DRX values with regular wake-up cycle – Option 1	14.3.0
	RP-76	RP-171244	2879	-	A	Correction on terminology of SI for eMTC	14.3.0
	RP-76	RP-171223	2882	1	F	Correction on the descritption of ce-srsEnhancement for FeMTC	14.3.0
	RP-76	RP-171223	2883	2	B	Measurement gap sharing for FeMTC intra- and inter-frequency measurement	14.3.0
	RP-76	RP-171223	2884	1	F	Minor correction in TS 36.331 for feMTC	14.3.0
	RP-76	RP-171223	2885	2	F	Corrections on reconfiguration between CE mode and normal mode in eMTC	14.3.0
	RP-76	R2-1705852	2887	1	F	Clarification regarding eFD-MIMO configuration (REL-14)	14.3.0
	RP-76	RP-171235	2889	1	F	Correction of issues related to ASN.1 review for eVoLTE	14.3.0
	RP-76	RP-171230	2890	1	F	Merging of retuningTimeBandPairList with regular supported BC capabilites (ASN.1 review issue S.059)	14.3.0
	RP-76	RP-171222	2891	-	F	Consistent gap pattern configuration for serving cells	14.3.0
	RP-76	RP-171407	2903	2	B	Introduction of UE capability for V2X in 36.331	14.3.0
	RP-76	RP-171227	2905	1	F	Correction on V2X behavior in 36.331	14.3.0
	RP-76	RP-171246	2912	2	B	EUTRAN sharing enhancement	14.3.0
	RP-76	RP-171244	2919	-	A	Clarification on additionalSpectrumEmission for eMTC	14.3.0
	RP-76	RP-171245	2920	-	A	Clarification on additionalSpectrumEmission for NB-IoT	14.3.0
	RP-76	RP-171224	2927	-	F	Correction to CarrierConfigDedicated-NB	14.3.0
	RP-76	RP-171224	2929	2	F	Miscellaneous NB-IoT corrections and clarifications resulting from ASN.1 review	14.3.0
	RP-76	RP-171245	2931	2	A	Extension of SIntraSearchP value range	14.3.0
	RP-76	RP-171223	2932	-	F	Maximum PDSCH/PUSCH BW preference indication handling for handover	14.3.0
	RP-76	RP-171225	2938	3	F	Revert PDCP state variable HFN and SN back to the values used in the source cell	14.3.0

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	RP-76	RP-171236	2942	1	F	ASN.1 corrections for eLWA	14.3.0
	RP-76	RP-171241	2943	-	A	Clarification on UE capability and early feature support	14.3.0
	RP-76	RP-171243	2944	-	A	Clarification regarding EBF-FDMIMO configuration (REL-13)	14.3.0
	RP-76	RP-171245	2945	1	A	Generic clarification of "first bit" as leftmost bit	14.3.0
	RP-76	RP-171229	2948	-	B	Introduction of UE capabilities for high speed	14.3.0
	RP-76	RP-171229	2949	-	F	Correction of high speed	14.3.0
	RP-76	RP-171227	2950	-	F	CR on reduction of SIB21 size	14.3.0
	RP-76	RP-171244	2952	1	A	Configuration of preamble groups for CE levels and preamble groups A/B	14.3.0
	RP-76	RP-171244	2954	1	A	Extension of RSRP range for eMTC	14.3.0
	RP-76	RP-171169	2958	-	C	FeMBMS/unicast-mixed carrier flag in measurement object	14.3.0
09/2017	RP-77	RP-171919	2807	4	A	Correction to PUCCH-ConfigDedication	14.4.0
	RP-77	RP-171914	2961	2	F	Correction on SPS assistance information in TS 36.331	14.4.0
	RP-77	RP-171914	2977	1	F	Miscellaneous correction to V2X in TS 36.331	14.4.0
	RP-77	RP-171914	2978	2	B	Introduction of new NS values for V2X sidelink communication	14.4.0
	RP-77	RP-171918	2980	3	A	Adding abstract syntax notation one chapter of sidelink pre-configuration.	14.4.0
	RP-77	RP-171914	2983	1	F	Correction on TTI bundling for TDD configurations 2 and 3	14.4.0
	RP-77	RP-171911	2984	2	F	Corrections on the use of plmn-IdentityList in field descriptions	14.4.0
	RP-77	RP-171915	2985	2	F	RRC Connection Re-establishment for Control Plane CIoT EPS Optimization	14.4.0
	RP-77	RP-171919	2989	-	A	Clarification that DL only bands are not supported in NB-IoT	14.4.0
	RP-77	RP-171915	2990	1	F	Cleanup for NB-IoT Enhancements	14.4.0
	RP-77	RP-171920	2992	2	A	Clarification on SI repetition pattern	14.4.0
	RP-77	RP-171914	2993	2	F	CR on conditon for RRC connection establishment and condition for sidelink UE information for V2X sidelink communication	14.4.0
	RP-77	RP-171913	2994	2	F	Correction on RACH-less SeNB Change	14.4.0
	RP-77	RP-171915	2995	-	F	Corrections on eVoLTE	14.4.0
	RP-77	RP-171914	2997	2	F	Corrections to random selection for P2X related V2X sidelink communication	14.4.0
	RP-77	RP-171916	3002	2	A	additionalSpectrumEmission extension	14.4.0
	RP-77	RP-171915	3008	1	F	Correction of field descriptions for recommendedBitRate and recommendedBitRateQuery	14.4.0
	RP-77	RP-171919	3014	2	A	RRM Measurement Clarification on Discovery Signals for LAA	14.4.0
	RP-77	RP-171919	3018	-	A	Correction in PUSCH Config description	14.4.0
	RP-77	RP-171913	3022	-	F	Cat-M1 indication by Cat-M2 UE	14.4.0
	RP-77	RP-171920	3025	1	A	Clarification on the freqHoppingParametersDL during handover	14.4.0
	RP-77	RP-171920	3027	1	A	Clarification on rsrp-ThresholdsPrachInfoList during handover	14.4.0
	RP-77	RP-171913	3028	-	F	Clarification on systemInformationBlockType2Dedicated	14.4.0
	RP-77	RP-171920	3030	2	A	Clarification on Bandwidth Reduced operation	14.4.0
	RP-77	RP-171915	3036	-	F	Correction for connEstFailOffset	14.4.0
	RP-77	RP-171911	3040	-	F	Clarification on LWIP aggregation	14.4.0
	RP-77	RP-171913	3041	1	F	Correction to eLAA configuration	14.4.0
	RP-77	RP-171914	3042	2	C	Packet Reordering for Sidelink	14.4.0
	RP-77	RP-171920	3044	1	A	Corrections on TS 36.331 for Rel-13 MTC	14.4.0
	RP-77	RP-171913	3047	-	F	Corrections on Bandwidth preference indication for Rel-14 MTC	14.4.0
	RP-77	RP-171913	3048	1	F	Corrections on TS 36.331 for Rel-14 MTC	14.4.0
	RP-77	RP-171914	3051	2	F	Clarification on NCSG UE capability	14.4.0
	RP-77	RP-171914	3052	1	F	Corrections to UL 256 QAM capability field descriptions	14.4.0
	RP-77	RP-171914	3054	1	F	Clarification on per CC measurement gap	14.4.0
	RP-77	RP-171915	3055	1	C	Introduction of RLC UM support for LWA	14.4.0
	RP-77	RP-171919	3057	-	A	Correction on eCA with Dual Connectivity	14.4.0
	RP-77	RP-171913	3059	-	F	Clarification of the PTAG value for the RACH-less handover	14.4.0
	RP-77	RP-171920	3063	1	A	Clarification on number of RACH CE levels vs number of RSRP thresholds	14.4.0
	RP-77	RP-171915	3064	1	F	Correction to contention free random access	14.4.0
	RP-77	RP-171913	3065	2	C	Introduction of Release Assistance Indication	14.4.0
	RP-77	RP-171920	3067	2	A	TM9 capabilities in CE mode	14.4.0
	RP-77	RP-171915	3068	1	F	Introduction of interference randomisation in NB-IoT	14.4.0
	RP-77	RP-171919	3070	-	A	Clarification on PUCCH SCell change	14.4.0
12/2017	RP-78	RP-172615	2968	5	F	Cleaning up CQI and CSI-RS-related configurations (related to Rel-14 ASN.1 review issue N.099)	14.5.0
	RP-78	RP-172615	2982	8	B	Introduction of the overheating indication	14.5.0
	RP-78	RP-172616	3037	4	F	Target cell optional PBCH repetition status indication	14.5.0
	RP-78	RP-172624	3046	3	A	Corrections on paging monitoring in RRC_CONNECTED in Rel-13 eMTC	14.5.0
	RP-78	RP-172721	3071	3	B	Introduction of DL 2Gbps Category	14.5.0
	RP-78	RP-172617	3072	3	F	Correction to Inter-frequency reception for V2X sidelink communication	14.5.0
	RP-78	RP-172617	3073	4	F	CR on SIB21 reading	14.5.0
	RP-78	RP-172622	3081	2	A	UE capabilities for Tx antenna selection	14.5.0
	RP-78	RP-172617	3084	3	F	Transmission of P2X sidelink communication in Exceptional Pool	14.5.0
	RP-78	RP-172617	3085	2	F	Correction on SubframeBitmap Configuration in Band 47	14.5.0
	RP-78	RP-172616	3088	1	F	Correction on SRS switching capabilities field description	14.5.0
	RP-78	RP-172617	3090	2	F	Clarification on Interference Randomisation in NB-IoT in 36.331	14.5.0
	RP-78	RP-172616	3091	1	F	MUST capability	14.5.0
	RP-78	RP-172624	3096	4	A	Corrections on field description of cellSelectionInfoCE for eMTC	14.5.0
	RP-78	RP-172617	3107	2	F	Correction to UE capabilities	14.5.0

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	RP-78	RP-172623	3108	1	A	Define requirement for reception of number of simultaneous SC-PTM services	14.5.0
	RP-78	RP-172616	3110	3	B	Signaling of NCSG Support for Inter-F Measurement	14.5.0
	RP-78	RP-172623	3112	2	A	Clarification on csi-RS-ConfigNZPId	14.5.0
	RP-78	RP-172617	3113	4	F	Correction to UE-Capability-NB extension and provision for late rel-13 corrections	14.5.0
	RP-78	RP-172624	3120	1	F	Alignment of FGI4 (Short DRX) for Cat M1 and M2	14.5.0
	RP-78	RP-172616	3127	-	F	UE capability for support of SRS enhancements without support of comb 4	14.5.0
	RP-78	RP-172624	3129	1	F	MBSFN subframes for target cell during handover to CE cell	14.5.0
	RP-78	RP-172615	3132	3	C	Reject of unprotected redirect to GERAN	14.5.0
	RP-78	RP-172616	3135	2	F	Correction to actions related to InterFreqRSTDMeasurementIndication message	14.5.0
	RP-78	RP-172616	3137	1	F	Clarification on srs-UpPtsAdd in SRS coverage enhancement	14.5.0
	RP-78	RP-172616	3138	1	F	Scheduling information of SIB1-BR when skipping MIB during HO	14.5.0
	RP-78	RP-172624	3140	1	A	Introducing a definition for the term UE in CE	14.5.0
	RP-78	RP-172617	3153	2	F	NRS-CRS power offset configuration for NB-IoT	14.5.0
	RP-78	RP-172617	3154	3	C	Introduction of relaxed monitoring in NB-IoT	14.5.0
	RP-78	RP-172617	3157	1	F	Successful acknowledgement of RRCConnectionRelease	14.5.0
	RP-78	RP-172624	3160	1	A	TM6 capabilities in CE mode	14.5.0
	RP-78	RP-172616	3169	1	F	Correction on the field description of ce-PDSCH-TenProcesses	14.5.0
	RP-78	RP-172617	3175	1	F	Small corrections to CarrierConfigDedicated, T322 and t-reordering default configuration	14.5.0
	RP-78	RP-172617	3176	1	F	Correction to random access power control in 36.331	14.5.0
	RP-78	RP-172616	3180	1	B	Introduction of a new configuration for ssp10 with less CRS	14.5.0
	RP-78	RP-172617	3184	-	F	Correction on zone configuration in transmission pool selection	14.5.0
	RP-78	RP-172622	3190	-	A	DCI monitoring subframes for eIMTA	14.5.0
	RP-78	RP-172623	3194	-	F	SFN desynchronizaion between eNB and eDRX UE	14.5.0
01/2018	RP-78					Removed revision marks (MCC)	14.5.1

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