2> else:

3> if the last transmission of the *SidelinkUEInformation* message included *discRxInterest*:

4> initiate transmission of the *SidelinkUEInformation* message to indicate it is no longer interested in sidelink discovery reception in accordance with 5.10.2.3;

2> if the UE is configured by upper layers to transmit non-PS related sidelink discovery announcements on the primary frequency or on one or more frequencies included in *discInterFreqList*, if included in *SystemInformationBlockType19*, with *discTxResources* included and not set to *noTxOnCarrier*:

3> if the UE did not transmit a *SidelinkUEInformation* message since entering RRC_CONNECTED state; or

3> if since the last time the UE transmitted a *SidelinkUEInformation* message the UE connected to a PCell not broadcasting *SystemInformationBlockType19*; or

3> if the last transmission of the *SidelinkUEInformation* message did not include *discTxResourceReq*; or if the sidelink discovery announcement resources required by the UE have changed (i.e. resulting in a change of *discTxResourceReq*) since the last transmission of the *SidelinkUEInformation* message:

4> initiate transmission of the *SidelinkUEInformation* message to indicate the sidelink discovery announcement resources required by the UE in accordance with 5.10.2.3;

2> else:

3> if the last transmission of the *SidelinkUEInformation* message included *discTxResourceReq*:

4> initiate transmission of the *SidelinkUEInformation* message to indicate it does no longer require sidelink discovery announcement resources in accordance with 5.10.2.3;

2> if configured by upper layers to transmit PS related sidelink discovery announcements on the primary frequency or, in case of non-relay PS related transmission, on one or more frequencies included in *discInterFreqList*, if included in *SystemInformationBlockType19*, with *discTxResourcesPS* included and not set to *noTxOnCarrier*:

3> if the UE did not transmit a *SidelinkUEInformation* message since entering RRC_CONNECTED state; or

3> if since the last time the UE transmitted a *SidelinkUEInformation* message the UE connected to a PCell not broadcasting *SystemInformationBlockType19*; or

3> if the last transmission of the *SidelinkUEInformation* message did not include *discTxResourceReqPS*; or if the PS related sidelink discovery announcement resources required by the UE have changed (i.e. resulting in a change of *discTxResourceReqPS*) since the last transmission of the *SidelinkUEInformation* message:

4> if configured by upper layers to transmit non-relay PS related sidelink discovery announcements; or

4> if the UE is acting as relay; and if *SystemInformationBlockType19* includes *discConfigRelay*; and if the RSRP measurement of the PCell is below *discThreshHiRelayUE*, if included in *SystemInformationBlockType19*; and above *discThreshLoRelayUE*, if included in *SystemInformationBlockType19*:

4> if the UE is selecting a relay/ has a selected relay; and if *SystemInformationBlockType19* includes *discConfigRelay*; and if *discThreshHiRemoteUE* is not included or the RSRP measurement of the PCell is below *discThreshHiRemoteUE*:

5> initiate transmission of the *SidelinkUEInformation* message to indicate the PS related sidelink discovery announcement resources required by the UE in accordance with 5.10.2.3;

2> else:

3> if the last transmission of the *SidelinkUEInformation* message included *discTxResourceReqPS*:

4> initiate transmission of the *SidelinkUEInformation* message to indicate it does no longer require public safety related sidelink discovery announcement resources in accordance with 5.10.2.3;

2> if configured by upper layers to monitor or transmit sidelink discovery announcements; and if the UE requires sidelink discovery gaps, to perform such actions:

3> if the UE did not transmit a *SidelinkUEInformation* message since entering RRC_CONNECTED state; or

3> if since the last time the UE transmitted a *SidelinkUEInformation* message the UE connected to a PCell not broadcasting *SystemInformationBlockType19*; or

3> if the last transmission of the *SidelinkUEInformation* message did not include the gaps required to monitor or transmit the sidelink discovery announcements (i.e. UE requiring gaps to monitor discovery announcements while *discRxGapReq* was not included or UE requiring gaps to transmit discovery announcements while *discTxGapReq* was not included); or if the sidelink discovery gaps required by the UE have changed (i.e. resulting in a change of *discRxGapReq* or *discTxGapReq*) since the last transmission of the *SidelinkUEInformation* message:

4> if the UE is configured with *gapRequestsAllowedDedicated* set to *true*; or

4> if the UE is not configured with *gapRequestsAllowedDedicated* and *gapRequestsAllowedCommon* is included in *SystemInformationBlockType19*:

5> initiate transmission of the *SidelinkUEInformation* message to indicate the sidelink discovery gaps required by the UE in accordance with 5.10.2.3;

2> else:

3> if the last transmission of the *SidelinkUEInformation* message included *discTxGapReq* or *discRxGapReq*:

4> initiate transmission of the *SidelinkUEInformation* message to indicate it does no longer require sidelink discovery gaps in accordance with 5.10.2.3;

2> if the UE is configured to report parameters related to Sidelink operations from system information of carriers other than the primary for reporting (i.e. *RRCConnectionReconfiguration* with *SL-SysInfoReportConfig*) and the UE supports reporting of System Information for inter-frequency/PLMN discovery:

3> if the UE acquired the relevant parameters from theSystem Information of one or more cells on those carriers and T370 is running:

4> if the UE has configured lower layers to transmit the sidelink discovery announcements on those cells, or

4> if the UE has configured lower layers to monitor sidelink discovery announcements on those cells;

5> initiate transmission of the SidelinkUEInformation message to report the acquired System Information parameters and stop T370.

5.10.2.3 Actions related to transmission of *SidelinkUEInformation* message

The UE shall set the contents of the *SidelinkUEInformation* message as follows:

1> if the UE initiates the procedure to indicate it is (no more) interested to receive sidelink communication or discovery or to request (configuration/ release) of sidelink communication or discovery transmission resources (i.e. UE includes all concerned information, irrespective of what triggered the procedure):

2> if *SystemInformationBlockType18* is broadcast by the PCell:

3> if configured by upper layers to receive sidelink communication:

4> include *commRxInterestedFreq* and set it to the sidelink communication frequency;

3> if configured by upper layers to transmit sidelink communication:

4> include *commTxResourceReq* and set its fields as follows:

5> set *carrierFreq* to indicate the sidelink communication frequency i.e. the same value as indicated in *commRxInterestedFreq* if included;

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5> set *destinationInfoList* to include the sidelink communication transmission destination(s) for which it requests E-UTRAN to assign dedicated resources;

3> if configured by upper layers to transmit non-relay related sidelink one to one communication:

4> include *commTxResourceReq121* and set its fields as follows:

5> set *carrierFreq* to indicate the sidelink one to one communication frequency i.e. the same value as indicated in *commRxInterestedFreq* if included;

5> set *destinationInfoListUC* to include the sidelink one to one communication transmission destination(s) for which it requests E-UTRAN to assign dedicated resources;

3> if configured by upper layers to transmit relay related sidelink communication; and

3> if the UE is acting as relay; or if the UE has a selected relay:

4> include *commTxResourceReqRelay* and set its fields as follows:

5> set *destinationInfoListUC* to include the (unicast) sidelink communication transmission destination(s) for which it requests E-UTRAN to assign dedicated resources;

4> include *ue-Type* and set it to *relayUE* if the UE is acting as relay and to *remoteUE* otherwise;

2> if *SystemInformationBlockType19* is broadcast by the PCell:

3> if configured by upper layers to receive sidelink discovery announcements on a serving frequency or one or more frequencies included in *discInterFreqList*, if included in *SystemInformationBlockType19*:

4> include discRxInterest;

3> else if the UE is configured by upper layers to transmit sidelink discovery announcements:

4> for each frequency the UE is configured to transmit non-PS related sidelink discovery announcements on that concerns the primary frequency or that is included in *discInterFreqList* with *discTxResources* included and not set to *noTxOnCarrier*:

5> include *discTxResourceReq* and set it to indicate the number of discovery messages for sidelink discovery announcement(s) for which it requests E-UTRAN to assign dedicated resources as well as the concerned frequency, if different from the primary;

3> if configured by upper layers to transmit PS related sidelink discovery announcements; and

3> if the frequency the UE is configured to transmit PS related sidelink discovery announcements on either concerns the primary frequency or, in case of non-relay PS related transmission, if the frequency is included in *discInterFreqList* with *discTxResourcesPS* included and not set to *noTxOnCarrier*:

4> if configured by upper layers to transmit non-relay PS related sidelink discovery announcements; or

4> if the UE is acting as relay; and if *SystemInformationBlockType19* includes *discConfigRelay*; and if the RSRP measurement of the PCell is below *discThreshHiRelayUE*, if included in *SystemInformationBlockType19*; and above *discThreshLoRelayUE*, if included in *SystemInformationBlockType19*; or

4> if the UE is selecting a relay/ has a selected relay; and if *SystemInformationBlockType19* includes *discConfigRelay*; and if *discThreshHiRemoteUE* is not included or the RSRP measurement of the PCell is below *discThreshHiRemoteUE*:

5> include *discTxResourceReqPS* and set it to indicate the number of discovery messages for PS related sidelink discovery announcement(s) for which it requests E-UTRAN to assign dedicated resources as well as the concerned frequency, if different from the primary;

1> else (i.e. UE request transmission and/ or reception gaps):

2> if the UE is configured with *gapRequestsAllowedDedicated* set to *true*; or

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2> if the UE is not configured with *gapRequestsAllowedDedicated* and *gapRequestsAllowedCommon* is included in *SystemInformationBlockType19*:

3> if the UE requires gaps to monitor the sidelink discovery announcements the UE is configured to monitor by upper layers:

4> include *discRxGapRequest* and set it to indicate, for each frequency that either concerns the primary or is included in *discInterFreqList* on which the UE is configured to monitor sidelink discovery announcements and for which it requires gaps to do so, the gap pattern(s) as well as the concerned frequency, if different from the primary;

3> if the UE requires gaps to transmit the sidelink discovery announcements the UE is configured to transmit by upper layers:

4> include *discTxGapRequest* and set it to indicate, for each frequency that either concerns the primary or is included in *discInterFreqList* on which the UE is configured to transmit sidelink discovery announcements and for which it requires gaps to do so, the gap pattern(s) as well as the concerned frequency, if different from the primary;

1> else if the UE initiates the procedure to report the system information parameters related to sidelink operations of carriers other than the primary:

2> include *SL-SysInfoReportList* and set it to report the system information parameter acquired from the cells on those carriers

The UE shall submit the *SidelinkUEInformation* message to lower layers for transmission.

5.10.3 Sidelink communication monitoring

A UE capable of sidelink communication that is configured by upper layers to receive sidelink communication shall:

1> if the conditions for sidelink operation as defined in 5.10.1a are met:

2> if in coverage on the frequency used for sidelink communication, as defined in TS 36.304 [4, 11.4]:

3> if the cell chosen for sidelink communication reception broadcasts *SystemInformationBlockType18* including *commRxPool*:

4> configure lower layers to monitor sidelink control information and the corresponding data using the pool of resources indicated by *commRxPool*;

NOTE 1: If *commRxPool* includes one or more entries including *rxParametersNCell*, the UE may only monitor such entries if the associated PSS/SSS or SLSSIDs is detected. When monitoring such pool(s), the UE applies the timing of the concerned PSS/SSS or SLSS.

2> else (i.e. out of coverage on the sidelink carrier):

3> configure lower layers to monitor sidelink control information and the corresponding data using the pool of resources that were preconfigured (i.e. *preconfigComm* in *SL-Preconfiguration* defined in 9.3);

NOTE 2: The UE may monitor in accordance with the timing of the selected SyncRef UE, or if the UE does not have a selected SyncRef UE, based on the UE's own timing.

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5.10.4 Sidelink communication transmission

A UE capable of sidelink communication that is configured by upper layers to transmit sidelink communication and has related data to be transmitted or a UE capable of relay related sidelink communication that is configured by upper layers to transmit relay related sidelink communications shall:

1> if the conditions for sidelink operation as defined in 5.10.1a are met:

2> if in coverage on the frequency used for sidelink communication, as defined in TS 36.304 [4, 11.4]:

3> if the UE is in RRC_CONNECTED and uses the PCell for sidelink communication:

4> if the UE is configured, by the current PCell/ the PCell in which physical layer problems or radio link failure was detected, with *commTxResources* set to *scheduled*:

5> if T310 or T311 is running; and if the PCell at which the UE detected physical layer problems or radio link failure broadcasts *SystemInformationBlockType18* including *commTxPoolExceptional*; or

5> if T301 is running and the cell on which the UE initiated connection re-establishment broadcasts *SystemInformationBlockType18* including *commTxPoolExceptional*:

6> configure lower layers to transmit the sidelink control information and the corresponding data using the pool of resources indicated by the first entry in *commTxPoolExceptional*;

5> else:

6> configure lower layers to request E-UTRAN to assign transmission resources for sidelink communication;

4> else if the UE is configured with *commTxPoolNormalDedicated*:

5> if *priorityList* is included for the entries of *commTxPoolNormalDedicated*:

6> configure lower layers to transmit the sidelink control information and the corresponding data using the one or more pools of resources indicated by *commTxPoolNormalDedicated* i.e. indicate all entries of this field to lower layers;

5> else:

6> configure lower layers to transmit the sidelink control information and the corresponding data using the pool of resources indicated by the first entry in *commTxPoolNormalDedicated*;

3> else (i.e. sidelink communication in RRC_IDLE or on cell other than PCell in RRC_CONNECTED):

4> if the cell chosen for sidelink communication transmission broadcasts *SystemInformationBlockType18*:

5> if *SystemInformationBlockType18* includes *commTxPoolNormalCommon*:

6> if *priorityList* is included for the entries of *commTxPoolNormalCommon*:

7> configure lower layers to transmit the sidelink control information and the corresponding data using the one or more pools of resources indicated by *commTxPoolNormalCommon* i.e. indicate all entries of this field to lower layers;

6> else:

7> configure lower layers to transmit the sidelink control information and the corresponding data using the pool of resources indicated by the first entry in *commTxPoolNormalCommon*;

5> else if *SystemInformationBlockType18* includes *commTxPoolExceptional*:

6> from the moment the UE initiates connection establishment until receiving an *RRCConnectionReconfiguration* including *sl-CommConfig* or until receiving an *RRCConnectionRelease* or an *RRCConnectionReject*;

7> configure lower layers to transmit the sidelink control information and the corresponding data using the pool of resources indicated by the first entry in *commTxPoolExceptional*;

2> else (i.e. out of coverage on sidelink carrier):

3> if *priorityList* is included for the entries of *preconfigComm* in *SL-Preconfiguration* defined in 9.3:

4> configure lower layers to transmit the sidelink control information and the corresponding data using the one or more pools of resources indicated *preconfigComm* i.e. indicate all entries of this field to lower layers and in accordance with the timing of the selected SyncRef UE, or if the UE does not have a selected SyncRef UE, based on the UEs own timing;

3> else:

4> configure lower layers to transmit the sidelink control information and the corresponding data using the pool of resources that were preconfigured i.e. indicated by the first entry in *preconfigComm* in *SL-Preconfiguration* defined in 9.3 and in accordance with the timing of the selected SyncRef UE, or if the UE does not have a selected SyncRef UE, based on the UEs own timing;

1> if the transmission concerns relay communication; and the UE is capable of sidelink relay or remote operation:

2> if the UE is in RRC_IDLE; and if the UE is selecting a relay/ has a selected relay: configure lower layers to transmit the sidelink control information and the corresponding data using the resources, as specified previously in this section, only if the following condition is met:

3> if the RSRP measurement of the cell on which the UE camps is below *discThreshHiRemoteUE*, if included in *SystemInformationBlockType19*;

2> configure lower layers to transmit the sidelink control information and the corresponding data using the resources, as specified previously in this section, only if the following condition is met:

3> if the UE configured lower layers with a pool of resources included in *SystemInformationBlockType18* (i.e. *commTxPoolNormalCommon* or *commTxPoolExceptional*), and *commTxAllowRelayCommon* is included in *SystemInformationBlockType18*; or

3> if the UE configured lower layers with resources provided by dedicated signalling (i.e. *commTxPoolResources* set to *scheduled* or *ue-Selected*), and the UE is configured with *commTxAllowRelayDedicated* while its value is set to *true*

5.10.5 Sidelink discovery monitoring

A UE capable of non-PS related sidelink discovery that is configured by upper layers to monitor sidelink discovery announcements shall:

1> for each frequency the UE is configured to monitor non-PS related sidelink discovery announcements on, prioritising the frequencies included in *discInterFreqList*, if included in *SystemInformationBlockType19*:

2> if the PCell/ the cell the UE is camping on indicates the pool of resources to monitor sidelink discovery announcements on by *discRxResources* within *discInterFreqList* in *SystemInformationBlockType19*:

3> configure lower layers to monitor sidelink discovery announcements using the pool of resources indicated by *discRxResources* in *SystemInformationBlockType19*,

2> else if the cell used for sidelink discovery monitoring broadcasts *SystemInformationBlockType19*:

3> configure lower layers to monitor sidelink discovery announcements using the pool of resources indicated by *discRxPool* in *SystemInformationBlockType19*,

NOTE 1: The requirement not to affect normal UE operation also applies for the acquisition of sidelink discovery related system and synchronisation information from inter-frequency cells.

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NOTE 2: The UE is not required to monitor all pools simultaneously.

NOTE 3: It is up to UE implementation to decide whether a cell is sufficiently good to be used to monitor sidelink discovery announcements.

NOTE 4: If *discRxPool* includes one or more entries including *rxParameters*, the UE may only monitor such entries if the associated SLSSIDs are detected. When monitoring such pool(s) the UE applies the timing of the corresponding SLSS.

2> if the UE is configured with *discRxGapConfig* and requires gaps to monitor sidelink discovery announcements on the concerned frequency;

3> configure lower layers to monitor the concerned frequency using the gaps indicated by *discRxGapConfig*,

2> else:

3> configure lower layers to monitor the concerned frequency without affecting normal operation i.e. receive during idle periods or by using a spare receiver;

A UE capable of PS related sidelink discovery that is configured by upper layers to monitor PS related sidelink discovery announcements shall:

1> if out of coverage on the frequency, as defined in TS 36.304 [4, 11.4]:

2> configure lower layers to monitor sidelink discovery announcements using the pool of resources that were preconfigured (i.e. indicated by *discRxPoolList* within *preconfigDisc* in *SL-Preconfiguration* defined in 9.3);

1> else if the PCell/ the cell the UE is camping on indicates a pool of resources to monitor sidelink discovery announcements on by *discRxPool PS* within *discInterFreqList* in *SystemInformationBlockType19*:

2> configure lower layers to monitor sidelink discovery announcements using the pool of resources indicated by *discRxPoolPS* in *SystemInformationBlockType19*;

1> else if configured by upper layers to transmit non-relay PS related sidelink discovery announcements; and if the cell used for sidelink discovery monitoring broadcasts *SystemInformationBlockType19*:

2> configure lower layers to monitor sidelink discovery announcements using the pool of resources indicated by *discRxPoolPS* in *SystemInformationBlockType19*;

1> if the UE is configured with *discRxGapConfig* and requires gaps to monitor sidelink discovery announcements on the concerned frequency;

2> configure lower layers to monitor the concerned frequency using the gaps indicated by *discRxGapConfig*,

1> else:

2> configure lower layers to monitor the concerned frequency without affecting normal operation i.e. receive during idle periods or by using a spare receiver;

5.10.6 Sidelink discovery announcement

A UE capable of sidelink discovery that is configured by upper layers to transmit non-PS related sidelink discovery announcements shall, for each frequency the UE is configured to transmit such announcements on:

NOTE 1: In case the configured resources are insufficient it is up to UE implementation to decide which sidelink discovery announcements to transmit.

1> if the frequency used to transmit sidelink discovery concerns the serving frequency (RRC_IDLE)/ primary frequency (RRC_CONNECTED):

2> if the UE's serving cell (RRC_IDLE) or PCell (RRC_CONNECTED) is suitable as defined in TS 36.304 [4]:

3> if the UE is in RRC_CONNECTED (i.e. PCell is used for sidelink discovery announcement):

4> if the UE is configured with *discTxResources* set to *scheduled*:

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5> configure lower layers to transmit the sidelink discovery announcement using the assigned resources indicated by *scheduled* in *discTxResources*;

4> else if the UE is configured with *discTxPoolDedicated* (i.e. *discTxResources* set to *ue-Selected*):

5> select an entry of the list of resource pool entries in *discTxPoolDedicated* and configure lower layers to use it to transmit the sidelink discovery announcements as specified in 5.10.6a;

3> else if T300 is not running (i.e. UE in RRC_IDLE, announcing via serving cell):

4> if SystemInformationBlockType19 of the serving cell includes discTxPoolCommon:

5> select an entry of the list of resource pool entries in *discTxPoolCommon* and configure lower layers to use it to transmit the sidelink discovery announcements as specified in 5.10.6a;

NOTE 2: When performing resource pool selection based on RSRP, the UE uses the latest results of the available measurements used for cell reselection evaluation in RRC_IDLE/ for measurement report triggering evaluation in RRC_CONNECTED, which are performed in accordance with the performance requirements specified in TS 36.133 [16].

1> else if, for the frequency used to transmit sidelink discovery on, the UE is configured with dedicated resources (i.e. with *discTxResources* in *discTxInterFreqInfo* within *sl-DiscConfig*), and the conditions for sidelink operation as defined in 5.10.1a are met:

2> if the UE is configured with *discTxResources* set to *scheduled*:

3> configure lower layers to transmit the sidelink discovery announcement using the assigned resources indicated by *scheduled* in *discTxResources*;

2> else if the UE is configured with *discTxPoolDedicated* (i.e. *discTxResources* set to *ue-Selected*):

3> select an entry of the list of resource pool entries in *discTxPoolDedicated* and configure lower layers to use it to transmit the sidelink discovery announcements as specified in 5.10.6a;

1> else if the frequency used to transmit sidelink discovery on is included in *discInterFreqList* within *SystemInformationBlockType19* of the serving cell/ PCell, while *discTxResources* in the corresponding entry of *discInterFreqList* is set to *discTxPoolCommon* (i.e. serving cell/ PCell broadcasts pool of resources) and the conditions for sidelink operation as defined in 5.10.1a are met; or

1> else if *discTxPoolCommon* is included in *SystemInformationBlockType19* acquired from cell selected on the discovery announcement frequency; and the conditions for sidelink operation as defined in 5.10.1a are met:

2> select an entry of the list of resource pool entries in *discTxPoolCommon* and configure lower layers to use it to transmit the sidelink discovery announcements as specified in 5.10.6a;

1> if the UE is configured with *discTxGapConfig* and requires gaps to transmit sidelink discovery announcements on the concerned frequency;

2> configure lower layers to transmit on the concerned frequency using the gaps indicated by *discTxGapConfig*,

1> else:

2> configure lower layers to transmit on the concerned frequency without affecting normal operation i.e. receive during idle periods or by using a spare receiver;

A UE capable of PS related sidelink discovery that is configured by upper layers to transmit PS related sidelink discovery announcements shall:

1> if out of coverage on the frequency used to transmit PS related sidelink discovery announcements:

2> if configured by upper layers to transmit non-relay PS related sidelink discovery announcements; or

2> if the UE is selecting a relay/ has a selected relay:

3> configure lower layers to transmit sidelink discovery announcements using the pool of resources that were preconfigured and in accordance with the following;

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4> randomly select, using a uniform distribution, an entry of *preconfigDisc* in *SL-Preconfiguration* defined in 9.3;

4> using the timing of the selected SyncRef UE, or if the UE does not have a selected SyncRef UE, based on the UEs own timing;

1> else if the frequency used to transmit sidelink discovery concerns the serving frequency (RRC_IDLE)/ primary frequency (RRC_CONNECTED); and if the UE's serving cell (RRC_IDLE) or PCell (RRC_CONNECTED) is suitable as defined in TS 36.304 [4]:

2> if configured by upper layers to transmit non-relay PS related sidelink discovery announcements; or

2> if the UE is acting as relay; and if the RSRP measurement of the PCell/ the cell on which the UE camps is below *discThreshHiRelayUE*, if included in *SystemInformationBlockType19*; and above *discThreshLoRelayUE*, if included in *SystemInformationBlockType19*; or

2> if the UE is selecting a relay/ has a selected relay; and if the RSRP measurement of the cell on which the UE camps is below *discThreshHiRemoteUE*, if included in *SystemInformationBlockType19*:

3> if the UE is configured with *discTxPoolPS-Dedicated*; or

3> if the UE is in RRC_IDLE; and if *discTxPoolPS-Common* is included in *SystemInformationBlockType19*:

4> select an entry of the list of resource pool entries and configure lower layers to use it to transmit the sidelink discovery announcements as specified in 5.10.6a;

3> else if the UE is configured with *discTxResourcesRelay* set to *scheduled*:

4> configure lower layers to transmit the sidelink discovery announcement using the assigned resources indicated by *scheduled* in *discTxResourcesRelay*;

1> else if, for the frequency used to transmit sidelink discovery on, the UE is configured with dedicated resources (i.e. with *discTxResourcesPS* in *discTxInterFreqInfo* within *sl-DiscConfig*); and the conditions for sidelink operation as defined in 5.10.1a are met:

2> if configured by upper layers to transmit non-relay PS related sidelink discovery announcements:

3> if the UE is configured with *discTxResourcesPS* set to *scheduled*:

4> configure lower layers to transmit the sidelink discovery announcement using the assigned resources indicated by *scheduled* in *discTxResources*;

3> else if the UE is configured with *discTxPoolDedicated* (i.e. *discTxResourcesPS* set to *ue-Selected*):

4> select an entry of the list of resource pool entries in *discTxPoolDedicated* and configure lower layers to use it to transmit the sidelink discovery announcements as specified in 5.10.6a;

1> else if the frequency used to transmit sidelink discovery on is included in *discInterFreqList* within *SystemInformationBlockType19* of the serving cell/ PCell, while *discTxResourcesPS* in the corresponding entry of *discInterFreqList* is set to *discTxPoolCommon* (i.e. serving cell/ PCell broadcasts pool of resources) and the conditions for sidelink operation as defined in 5.10.1a are met:

2> if configured by upper layers to transmit non-relay PS related sidelink discovery announcements:

3> select an entry of the list of resource pool entries in *discTxPoolCommon* and configure lower layers to use it to transmit the sidelink discovery announcements as specified in 5.10.6a;

1> else if *discTxPoolPS-Common* is included in *SystemInformationBlockType19* acquired from cell selected on the discovery announcement frequency; and the conditions for sidelink operation as defined in 5.10.1a are met:

2> if configured by upper layers to transmit non-relay PS related sidelink discovery announcements

3> select an entry of the list of resource pool entries in *discTxPoolCommon* and configure lower layers to use it to transmit the sidelink discovery announcements as specified in 5.10.6a;

1> if the UE is configured with *discTxGapConfig* and requires gaps to transmit sidelink discovery announcements on the concerned frequency;

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2> configure lower layers to transmit on the concerned frequency using the gaps indicated by *discTxGapConfig*,

1> else:

2> configure lower layers to transmit on the concerned frequency without affecting normal operation i.e. transmit during idle periods or by using a spare receiver;

5.10.6a Sidelink discovery announcement pool selection

A UE that is is configured with a list of resource pool entries for sidelink discovery announcement transmission shall:

1> if *poolSelection* within *poolToAddModList* is set to *rsrpBased*:

2> select an entry of *poolToAddModList* for which the RSRP measurement of the reference cell as indicated by *discTxRefCarrier*, after applying the layer 3 filter defined by *quantityConfig* as specified in 5.5.3.2 , is in-between *threshLow* and *threshHigh*;

1> else:

2> randomly select, using a uniform distribution, an entry of *poolToAddModList*;

1> configure lower layers to transmit the sidelink discovery announcement using the selected pool of resources;

5.10.6b Sidelink discovery announcement reference carrier selection

A UE capable of sidelink discovery that is configured by upper layers to transmit sidelink discovery announcements shall:

1> for each frequency the UE is transmitting sidelink discovery announcements on, select a cell to be used as reference for synchronisation and DL measurements in accordance with the following:

2> if the frequency concerns the primary carrier: use the PCell as reference;

2> else if the frequency concerns a secondary carrier: use the concerned SCell as reference;

2> else if the UE is configured with *discTxRefCarrierDedicated* for the frequency: use the cell indicated by this field as reference;

2> else if the UE is configured with *discTxRefCarrierCommon* for the frequency: use the serving cell (RRC_IDLE)/ PCell (RRC_CONNECTED) as reference;

2> else: use the DL frequency paired with the one used to transmit sidelink discovery announcements on as reference;

5.10.7 Sidelink synchronisation information transmission

5.10.7.1 General

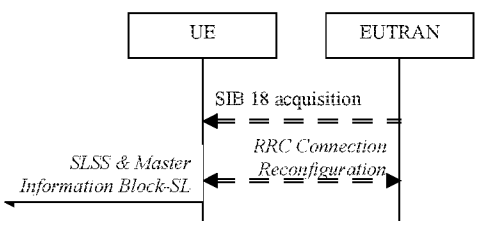


Figure 5.10.7.1-1: Synchronisation information transmission for sidelink communication, in (partial) coverage

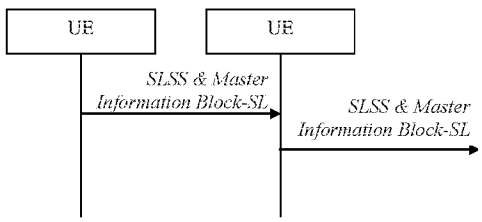


Figure 5.10.7.1-2: Synchronisation information transmission for sidelink communication/ discovery, out of coverage

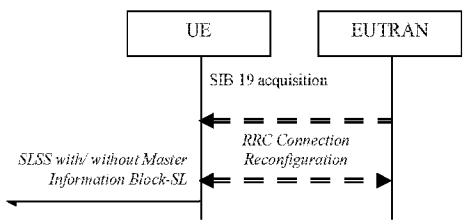


Figure 5.10.7.1-3: Synchronisation information transmission for sidelink discovery, in (partial) coverage

The purpose of this procedure is to provide synchronisation information to a UE. The synchronisation information concerns a Sidelink Synchronisation Signal (SLSS) for sidelink discovery, while it concerns an SLSS, timing information and some additional configuration parameters (i.e. the *MasterInformationBlock-SL* message) for sidelink communication. A UE transmits synchronisation information either when E-UTRAN configures it to do so by dedicated signalling (i.e. network based), or when not configured by dedicated signalling (i.e. UE based) and E-UTRAN broadcasts (in coverage) or pre-configures a threshold (out of coverage).

The synchronisation information transmitted by the UE may be derived from information/ signals received from E-UTRAN (in coverage) or received from a UE acting as synchronisation reference for the transmitting UE. In the remainder, the UE acting as synchronisation reference is referred to as SyncRef UE.

5.10.7.2 Initiation

A UE capable of SLSS transmission shall, when transmitting sidelink discovery announcements in accordance with 5.10.6 and when the following conditions are met:

1> if in coverage on the frequency used for sidelink discovery, as defined in TS 36.304 [4, 11.4]:

2> if in RRC_CONNECTED; and if *networkControlledSyncTx* is configured and set to *on*; or

2> if *networkControlledSyncTx* is not configured, and *syncTxThreshIC* is included in *SystemInformationBlockType19*; and the RSRP measurement of the reference cell, selected as defined in 5.10.6b, is below the value of *syncTxThreshIC*:

3> if the sidelink discovery announcements do not concern public safety; or if *syncTxPeriodic* is not included:

4> transmit SLSS on the frequency used for sidelink discovery in accordance with 5.10.7.3 and TS 36.211 [21];

3> else (i.e. periodic):

4> transmit SLSS on the frequency used for sidelink discovery in accordance with 5.10.7.3 and TS 36.211 [21];

4> transmit the *MasterInformationBlock-SL* message on the frequency used for sidelink discovery, in the same subframe as SLSS, and in accordance with 5.10.7.4;

1> else (i.e. out of coverage, public safety):

2> transmit SLSS on the frequency used for sidelink discovery in accordance with 5.10.7.3 and TS 36.211 [21];

2> transmit the *MasterInformationBlock-SL* message on the frequency used for sidelink discovery , in the same subframe as SLSS, and in accordance with 5.10.7.4;

A UE capable of sidelink communication that is configured by upper layers to transmit sidelink communication shall, irrespective of whether or not it has data to transmit:

1> if the conditions for sidelink operation as defined in 5.10.1a are met:

2> if in RRC_CONNECTED; and if *networkControlledSyncTx* is configured and set to *on*:

3> transmit SLSS in accordance with 5.10.7.3 and TS 36.211 [21];

3> transmit the *MasterInformationBlock-SL* message, in the same subframe as SLSS, and in accordance with 5.10.7.4;

A UE shall, when transmitting sidelink communication in accordance with 5.10.4 and when the following conditions are met:

1> if in coverage on the frequency used for sidelink communication, as defined in TS 36.304 [4, 11.4]:

2> if the UE is in RRC_CONNECTED; and *networkControlledSyncTx* is not configured; and *syncTxThreshIC* is included in *SystemInformationBlockType18*; and the RSRP measurement of the cell chosen for sidelink communication transmission is below the value of *syncTxThreshIC*; or

2> if the UE is in RRC_IDLE; and *syncTxThreshIC* is included in *SystemInformationBlockType18*; and the RSRP measurement of the cell chosen for sidelink communication transmission is below the value of *syncTxThreshIC*:

3> transmit SLSS in accordance with 5.10.7.3 and TS 36.211 [21];

3> transmit the *MasterInformationBlock-SL* message, in the same subframe as SLSS, and in accordance with 5.10.7.4;

1> else (i.e. out of coverage):

2> if *syncTxThreshOoC* is included in the preconfigured sidelink parameters (i.e. *SL-Preconfiguration* defined in 9.3); and the UE has no selected SyncRef UE or the S-RSRP measurement result of the selected SyncRef UE is below the value of *syncTxThreshOoC*:

3> transmit SLSS in accordance with 5.10.7.3 and TS 36.211 [21];

3> transmit the *MasterInformationBlock-SL* message, in the same subframe as SLSS, and in accordance with 5.10.7.4;

5.10.7.3 Transmission of SLSS

The UE shall select the SLSSID and the subframe in which to transmit SLSS as follows:

1> if triggered by sidelink discovery announcement and in coverage on the frequency used for sidelink discovery, as defined in TS 36.304 [4, 11.4]:

2> select the SLSSID included in the entry of *discSyncConfig* included in the received *SystemInformationBlockType19*, that includes *txParameters*;

2> use *syncOffsetIndicator* corresponding to the selected SLSSID;

2> for each pool used for the transmission of discovery announcements (each corresponding to the selected SLSSID):

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3> if a subframe indicated by *syncOffsetIndicator* corresponds to the first subframe of the discovery transmission pool;

4> if *discTxGapConfig* is configured and includes the concerned subframe; or the subframe is not used for regular uplink transmission:

5> select the concerned subframe;

3> else

4> if *discTxGapConfig* is configured and includes the concerned subframe; or the subframe is not used for regular uplink transmission:

5> select the subframe indicated by *syncOffsetIndicator* that precedes and which, in time domain, is nearest to the first subframe of the discovery transmission pool;

3> if the sidelink discovery announcements concern public safety; and if *syncTxPeriodic* is included:

4> additionally select every subframe that is 40 subframes after the selected subframe;

1> if triggered by sidelink communication and in coverage on the frequency used for sidelink communication, as defined in TS 36.304 [4, 11.4]:

2> select the SLSSID included in the entry of *commSyncConfig* that is included in the received *SystemInformationBlockType18* and includes *txParameters*;

2> use *syncOffsetIndicator* corresponding to the selected SLSSID;

2> if in RRC_CONNECTED; and if *networkControlledSyncTx* is configured and set to *on*:

3> select the subframe(s) indicated by *syncOffsetIndicator*;

2> else (when transmitting communication):

3> select the subframe(s) indicated by *syncOffsetIndicator* within the SC period in which the UE intends to transmit sidelink control information or data;

1> else (i.e. out of coverage on sidelink carrier):

2> select the synchronisation reference UE (i.e. SyncRef UE) as defined in 5.10.8;

2> if the UE has a selected SyncRef UE and *inCoverage* in the *MasterInformationBlock-SL* message received from this UE is set to *TRUE*; or

2> if the UE has a selected SyncRef UE and *inCoverage* in the *MasterInformationBlock-SL* message received from this UE is set to *FALSE* while the SLSS from this UE is part of the set defined for out of coverage, see TS 36.211 [21]:

3> select the same SLSSID as the SLSSID of the selected SyncRef UE;

3> select the subframe in which to transmit the SLSS according to the *syncOffsetIndicator1* or *syncOffsetIndicator2* included in the preconfigured sidelink parameters (i.e. *preconfigSync* in *SL-Preconfiguration* defined in 9.3), such that the subframe timing is different from the SLSS of the selected SyncRef UE;

2> else if the UE has a selected SyncRef UE:

3> select the SLSSID from the set defined for out of coverage having an index that is 168 more than the index of the SLSSID of the selected SyncRef UE, see TS 36.211 [21];

3> select the subframe in which to transmit the SLSS according to *syncOffsetIndicator1* or *syncOffsetIndicator2* included in the preconfigured sidelink parameters (i.e. *preconfigSync* in *SL-Preconfiguration* defined in 9.3), such that the subframe timing is different from the SLSS of the selected SyncRef UE;

2> else (i.e. no SyncRef UE selected):

3> randomly select, using a uniform distribution, an SLSSID from the set of sequences defined for out of coverage, see TS 36.211 [21];

3> select the subframe in which to transmit the SLSS according to the *syncOffsetIndicator1* or *syncOffsetIndicator2* (arbitrary selection between these) included in the preconfigured sidelink parameters (i.e. *preconfigSync* in *SL-Preconfiguration* defined in 9.3);

5.10.7.4 Transmission of *MasterInformationBlock-SL* message

The UE shall set the contents of the *MasterInformationBlock-SL* message as follows:

1> if triggered by sidelink communication and in coverage on the frequency used for sidelink communication, as defined in TS 36.304 [4, 11.4]; or

1> if triggered by sidelink discovery and in coverage on the frequency used for sidelink discovery, as defined in TS 36.304 [4, 11.4]:

2> set *inCoverage* to *TRUE*;

2> set *sl-Bandwidth* to the value of *ul-Bandwidth* as included in the received *SystemInformationBlockType2* of the cell chosen for sidelink communication;

2> if *tdd-Config* is included in the received *SystemInformationBlockType1*:

3> set *subframeAssignmentSL* to the value representing the same meaning as of *subframeAssignment* that is included in *tdd-Config* in the received *SystemInformationBlockType1*;

2> else:

3> set *subframeAssignmentSL* to *none*;

2> if *syncInfoReserved* is included in an entry of *commSyncConfig* from the received *SystemInformationBlockType18*;

3> set *reserved* to the value of *syncInfoReserved* in the received *SystemInformationBlockType18*;

2> else:

3> set all bits in *reserved* to 0;

1> else if the UE has a selected SyncRef UE (as defined in 5.10.8):

2> set *inCoverage* to *FALSE*;

2> set *sl-Bandwidth*, *subframeAssignmentSL* and *reserved* to the value of the corresponding field included in the received *MasterInformationBlock-SL*;

1> else (i.e. no SyncRef UE selected):

2> set *inCoverage* to *FALSE*;

2> set *sl-Bandwidth*, *subframeAssignmentSL* and *reserved* to the value of the corresponding field included in the preconfigured sidelink parameters (i.e. *preconfigGeneral* in *SL-Preconfiguration* defined in 9.3);

1> set *directFrameNumber* and *directSubframeNumber* according to the subframe used to transmit the SLSS, as specified in 5.10.7.3;

1> submit the *MasterInformationBlock-SL* message to lower layers for transmission upon which the procedure ends;

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5.10.7.5 Void

5.10.8 Sidelink synchronisation reference

5.10.8.1 General

The purpose of this procedure is to select a synchronisation reference and used a.o. when transmitting sidelink communication or synchronisation information.

5.10.8.2 Selection and reselection of synchronisation reference UE (SyncRef UE)

The UE shall:

1> for the frequency used for sidelink communication, if out of coverage on that frequency as defined in TS 36.304 [4, 11.4] and for each other frequency used for sidelink discovery on which the UE is out of coverage, as defined in TS 36.304 [4, 11.4]:

2> perform a full search (i.e. covering all subframes and all possible SLSSIDs) to detect candidate SLSS, in accordance with TS 36.133 [16]

2> when evaluating the one or more detected SLSSIDs, apply layer 3 filtering as specified in 5.5.3.2 using the preconfigured *filterCoefficient* as defined in 9.3, before using the S-RSRP measurement results;

2> if the UE has selected a SyncRef UE:

3> if the S-RSRP of the strongest candidate SyncRef UE exceeds the minimum requirement TS 36.133 [16] by *syncRefMinHyst* and the strongest candidate SyncRef UE belongs to the same priority group as the current SyncRef UE and the S-RSRP of the strongest candidate SyncRef UE exceeds the S-RSRP of the current SyncRef UE by *syncRefDiffHyst*; or

3> if the S-RSRP of the candidate SyncRef UE exceeds the minimum requirement TS 36.133 [16] by *syncRefMinHyst* and the candidate SyncRef UE belongs to a higher priority group than the current SyncRef UE; or

3> if the S-RSRP of the current SyncRef UE is less than the minimum requirement TS 36.133 [16]:

4> consider no SyncRef UE to be selected;

2> if the UE has not selected a SyncRef UE,

3> if the UE detects one or more SLSSIDs for which the S-RSRP exceeds the minimum requirement defined in TS 36.133 [16] by *syncRefMinHyst* and for which the UE received the corresponding *MasterInformationBlock-SL* message (candidate SyncRef UEs), select a SyncRef UE according to the following priority order:

4> UEs of which *inCoverage*, included in the *MasterInformationBlock-SL* message received from this UE, is set to *TRUE*, starting with the UE with the highest S-RSRP result (priority group 1);

4> UE which SLSSID is part of the set defined for in coverage, starting with the UE with the highest S-RSRP result (priority group 2);

4> Other UEs, starting with the UE with the highest S-RSRP result (priority group 3);

5.10.9 Sidelink common control information

5.10.9.1 General

The sidelink common control information is carried by a single message, the *MasterInformationBlock-SL* (MIB-SL) message. The MIB-SL includes timing information as well as some configuration parameters and is transmitted via SL-BCH.

The MIB-SL uses a fixed schedule with a periodicity of 40 ms without repetitions. In particular, the MIB-SL is scheduled in subframes indicated by *syncOffsetIndicator* i.e. for which (10*DFN + subframe number) mod 40 = *syncOffsetIndicator*.

The sidelink common control information may change at any transmission i.e. neither a modification period nor a change notification mechanism is used.

A UE configured to receive or transmit sidelink communication shall:

1> if the UE has a selected SyncRef UE, as specified in 5.10.8.2:

2> ensure having a valid version of the *MasterInformationBlock-SL* message of that SyncRefUE;

5.10.9.2 Actions related to reception of *MasterInformationBlock-SL* message

Upon receiving *MasterInformationBlock-SL*, the UE shall:

1> apply the values of *sl-Bandwidth*, *subframeAssignmentSL*, *directFrameNumber* and *directSubframeNumber* included in the received *MasterInformationBlock-SL* message;

5.10.10 Sidelink relay operation

5.10.10.1 General

This procedure is used by a UE supporting sidelink relay operation and involves evaluation of the AS-layer conditions that need to be met in order for upper layers to configure a relay UE to receive/ transmit relay related sidelink discovery/ communication. The AS-layer conditions merely comprise of being configured with radio resources that can be used for transmission.

5.10.10.2 AS- conditions communication transmission for relay UE

A UE capable of sidelink relay operation shall inform upper layers that it is configured with radio resources that can be used for relay related sidelink communication transmission if the following conditions are met:

1> if in RRC_CONNECTED; and if the UE is configured with *commTxPoolResources* set to *scheduled* or *ue-Selected*; and the UE is configured with *commTxAllowRelayDedicated* while its value is set to *true*;

5.10.10.3 AS- conditions discovery transmission for relay UE

A UE capable of sidelink relay operation shall inform upper layers that it is configured with radio resources that can be used for relay related sidelink discovery transmission if the following conditions are met:

1> if in RRC_IDLE; and if the UE's serving cell is suitable as defined in TS 36.304 [4]; and if *SystemInformationBlockType19* includes *discConfigPS* including *discTxPoolPS-Common* and *discConfigRelay*:

2> if neither *discThreshHiRelayUE* nor *discThreshLoRelayUE* is included in *SystemInformationBlockType19*;

2> else if AS-layer conditions specified in this section were not met; and if the RSRP measurement of the PCell is below *discThreshHiRelayUE* by *discHystMaxRelayUE*, if included in *SystemInformationBlockType19*; and above *discThreshLoRelayUE* by *discHystMinRelayUE*, if included in *SystemInformationBlockType19* (entry);

2> if AS-layer conditions specified in this section were met; and if the RSRP measurement of the PCell is below *discThreshHiRelayUE*, if included in *SystemInformationBlockType19*; and above *discThreshLoRelayUE*, if included in *SystemInformationBlockType19* (stay);

1> else if in RRC_CONNECTED; and if *discTxResourcesPS* is configured (i.e. set to *scheduled* or *ue-Selected*);

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5.10.11 Sidelink remote operation

5.10.11.1 General

This procedure is used by a UE supporting sidelink remote operation and involves evaluation of the AS-layer conditions that need to be met in order for upper layers to configure a remote UE to receive/ transmit relay related sidelink discovery/ communication. The AS-layer conditions merely comprise of being configured with radio resources that can be used for transmission, as well as whether or not having a selected relay.

5.10.11.2 AS- conditions relay communication transmission for remote UE

A UE capable of sidelink remote operation shall inform upper layers that it is configured with radio resources that can be used for relay related sidelink communication transmission if the following conditions are met:

1> if the UE is out of coverage; and is preconfigured with *SL-Preconfiguration* including *discTxPoolList* and *preconfigRelay*; or

1> else if in RRC_IDLE; and if the UE's serving cell is suitable as defined in TS 36.304 [4]; and if *SystemInformationBlockType18* includes *commTxPoolNormalCommon* and *commTxAllowRelayCommon*; and if *SystemInformationBlockType19* includes *discConfigRelay*:

2> if *discThreshHiRemoteUE* is not included in *SystemInformationBlockType19*;

2> else if the AS-layer radio conditions specified in this section were previously not met; and if the RSRP measurement of the PCell is below *discThreshHiRemoteUE* by *discHystMaxRemoteUE* (entry);

2> if the AS-layer radio conditions specified in this section were previously met; and the RSRP measurement of the PCell is below *discThreshHiRemoteUE* (stay);

1> if in RRC_CONNECTED; and if the UE is configured with *commTxPoolResources* set to *scheduled* or *ue-Selected*; and the UE is configured with *commTxAllowRelayDedicated* while its value is set to *true*;

5.10.11.3 AS- conditions discovery transmission for remote UE

A UE capable of sidelink remote operation shall inform upper layers that it is configured with radio resources that can be used for relay related sidelink discovery transmission if the following conditions are met:

1> if the UE is out of coverage; and is preconfigured with *SL-Preconfiguration* including *discTxPoolList* and *preconfigRelay*; or

1> else if in RRC_IDLE; and if the UE's serving cell is suitable as defined in TS 36.304 [4]; and if *discConfigPS* is included in *SystemInformationBlockType19*; or

2> if *discThreshHiRemoteUE* is not included in *SystemInformationBlockType19*;

2> else if the AS-layer radio conditions specified in this section were previously not met; and if *discConfigRelay* is included in *SystemInformationBlockType19* while the RSRP measurement of the PCell is below *discThreshHiRemoteUE* by *discHystMaxRemoteUE* (entry);

2> if the AS-layer radio conditions specified in this section were previously met; and if *discConfigRelay* is included in *SystemInformationBlockType19* while the RSRP measurement of the PCell is below *discThreshHiRemoteUE* (stay);

1> else if in RRC_CONNECTED; and if *discTxResourcesPS* is configured (i.e. set to *scheduled* or *ue-Selected*);:

5.10.11.4 Selection and reselection of relay

A UE capable of sidelink remote operation that is configured by upper layers to search for a sidelink relay shall:

1> if out of coverage on the frequency used for sidelink communication, as defined in TS 36.304 [4, 11.4]; or

1> if the serving frequency is used for sidelink communication and the RSRP measurement of the cell on which the UE camps (RRC_IDLE)/ the PCell (RRC_CONNECTED) is below *discThreshHiRemoteUE*:

2> search for candidate relays, in accordance with TS 36.133 [16]

2> when evaluating the one or more detected relays, apply layer 3 filtering as specified in 5.5.3.2 across measurements that concern the same ProSe Relay UE ID and using the preconfigured *filterCoefficient* as defined in 9.3, before using the SD-RSRP measurement results;

NOTE 1: The details of the interaction with upper layers are up to UE implementation.

2> if the UE does not have a selected relay:

3> select a candidate relay which SD-RSRP exceeds *q-RxLevMin* included in either *reselectionInfoRemoteUE-IC* (in coverage) or *reselectionInfoRemoteUE-OC* (out of coverage) by *minHyst*;

2> else if SD-RSRP of the currently selected relay is below *q-RxLevMin* included in either *reselectionInfoRemoteUE-IC* (in coverage) or *reselectionInfoRemoteUE-OC* (out of coverage); or

2> else upper layers indicate not to use the currently selected relay. (i.e. relay reselection).

3> select a candidate relay which SD-RSRP exceeds *q-RxLevMin* included in either *reselectionInfoRemoteUE-IC* (in coverage) or *reselectionInfoRemoteUE-OC* (out of coverage) by *minHyst*;

2> else if the UE did not detect any candidate relay which SD-RSRP exceeds *q-RxLevMin* included in either *reselectionInfoRemoteUE-IC* (in coverage) or *reselectionInfoRemoteUE-OC* (out of coverage) by *minHyst*:

3> consider no relay to be selected;

NOTE 2: The UE may perform relay reselection in a manner resulting in selection of the sidelink relay, amongst all candidate relays meeting higher layer criteria, that has the best radio link quality. Further details, including interaction with upper layers, are up to UE implementation.

6 Protocol data units, formats and parameters (tabular & ASN.1)

6.1 General

The contents of each RRC message is specified in sub-clause 6.2 using ASN.1 to specify the message syntax and using tables when needed to provide further detailed information about the fields specified in the message syntax. The syntax of the information elements that are defined as stand-alone abstract types is further specified in a similar manner in sub-clause 6.3.

The need for fields to be present in a message or an abstract type, i.e., the ASN.1 fields that are specified as OPTIONAL in the abstract notation (ASN.1), is specified by means of comment text tags attached to the OPTIONAL statement in the abstract syntax. All comment text tags are available for use in the downlink direction only. The meaning of each tag is specified in table 6.1-1.

Table 6.1-1: Meaning of abbreviations used to specify the need for fields to be present

Abbreviation	Meaning
Cond *conditionTag* (Used in downlink only)	*Conditionally present* A field for which the need is specified by means of conditions. For each *conditionTag*, the need is specified in a tabular form following the ASN.1 segment. In case, according to the conditions, a field is not present, the UE takes no action and where applicable shall continue to use the existing value (and/ or the associated functionality) unless explicitly stated otherwise (e.g. in the conditional presence table or in the description of the field itself).
Need OP (Used in downlink only)	*Optionally present* A field that is optional to signal. For downlink messages, the UE is not required to take any special action on absence of the IE beyond what is specified in the procedural text or the field description table following the ASN.1 segment. The UE behaviour on absence should be captured either in the procedural text or in the field description.
Need ON	*Optionally present, No action*

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Abbreviation	Meaning
(Used in downlink only)	A field that is optional to signal. If the message is received by the UE, and in case the information element is absent, the UE takes no action and where applicable shall continue to use the existing value (and/ or the associated functionality).
Need OR (Used in downlink only)	*Optionally present, Release* A field that is optional to signal. If the message is received by the UE, and in case the information element is absent, the UE shall discontinue/ stop using/ delete any existing value (and/ or the associated functionality).

Any field with Need ON in system information shall be interpreted as Need OR.

Need codes may not be specified for a parent extension field/ extension group, used in downlink, which includes one or more child extension fields. Upon absence of such a parent extension field/ extension group, the UE shall:

- For each individual child extension field, including extensions that are mandatory to include in the optional group, act in accordance with the need code that is defined for the extension;
- Apply this behaviour not only for child extension fields included directly within the optional parent extension field/ extension group, but also for extension fields defined at further nesting levels as long as for none of the fields in-between the concerned extension field and the parent extension field a need code is specified;

NOTE 1: The above applies for groups of non critical extensions using double brackets (referred to as extension groups), as well as non-critical extensions at the end of a message or at the end of a structure contained in a BIT STRING or OCTET STRING (referred to as parent extension fields).

Need codes, conditions and ASN.1 defaults specified for a particular (child) field only apply in case the (parent) field including the particular field is present. This rule does not apply for optional parent extension fields/ extension groups without need codes.

NOTE 2: The previous rule implies that E-UTRAN has to include such a parent extension field to release a child field that is either:

- Optional with need OR, or
- Conditional while the UE releases the child field when absent.

The handling of need codes as specified in the previous is illustrated by means of an example, as shown in the following ASN.1.

```
-- /example/ ASN1START

RRCMessage-r8-IEs ::=               SEQUENCE {
    field1                              InformationElement1,
    field2                              InformationElement2             OPTIONAL,   -- Need ON
    nonCriticalExtension                RRCMessage-v8a0-IEs             OPTIONAL
}

RRCMessage-v8a0-IEs ::=             SEQUENCE {
    field3                              InformationElement3             OPTIONAL,   -- Need ON
    nonCriticalExtension                RRCMessage-v940-IEs             OPTIONAL
}

RRCMessage-v940-IEs ::=             SEQUENCE {
    field4                              InformationElement4             OPTIONAL,   -- Need OR
    nonCriticalExtension                SEQUENCE {}                     OPTIONAL
}

InformationElement1 ::=         SEQUENCE {
    field11                         InformationElement11                OPTIONAL,   -- Need ON
    field12                         InformationElement12                OPTIONAL,   -- Need OR
    ...,
    [[  field13                         InformationElement13            OPTIONAL,   -- Need OR
        field14                         InformationElement14            OPTIONAL    -- Need ON
    ]]
}

InformationElement2 ::=         SEQUENCE {
    field21                         InformationElement11                OPTIONAL,   -- Need OR
    ...
}
```


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```
-- ASN1STOP
```

The handling of need codes as specified in the previous implies that:

- if *field2* in *RRCMessage-r8-IEs* is absent, the UE does not modify *field21*;
- if *field2* in *RRCMessage-r8-IEs* is present but does not include *field21*, the UE releases *field21*;
- if the extension group containing *field13* is absent, the UE releases *field13* and does not modify *field14*;
- if *nonCriticalExtension* defined by IE *RRCMessage-v8a0-IEs* is absent, the UE does not modify *field3* and releases *field4*;

6.2 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.

6.2.1 General message structure

– *EUTRA-RRC-Definitions*

This ASN.1 segment is the start of the E-UTRA RRC PDU definitions.

```
-- ASN1START

EUTRA-RRC-Definitions DEFINITIONS AUTOMATIC TAGS ::=

BEGIN

-- ASN1STOP
```

– *BCCH-BCH-Message*

The *BCCH-BCH-Message* 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 ::= SEQUENCE {
    message                 BCCH-BCH-MessageType
}

BCCH-BCH-MessageType ::=                        MasterInformationBlock

-- ASN1STOP
```

– *BCCH-DL-SCH-Message*

The *BCCH-DL-SCH-Message* 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 ::= SEQUENCE {
    message                 BCCH-DL-SCH-MessageType
}

BCCH-DL-SCH-MessageType ::= CHOICE {
    c1                      CHOICE {                    SystemInformation,
```

```
        systemInformationBlockType1             SystemInformationBlockType1
    },
    messageClassExtension   SEQUENCE {}
}

-- ASN1STOP
```

– MCCH-Message

The *MCCH-Message* class is the set of RRC messages that may be sent from the E-UTRAN to the UE on the MCCH logical channel.

```
-- ASN1START

MCCH-Message ::=            SEQUENCE {
    message                     MCCH-MessageType
}

MCCH-MessageType ::= CHOICE {
    c1                          CHOICE {
        mbsfnAreaConfiguration-r9       MBSFNAreaConfiguration-r9
    },
    later                       CHOICE {
        c2                              CHOICE{
            mbmsCountingRequest-r10             MBMSCountingRequest-r10
        },
        messageClassExtension   SEQUENCE {}
    }
}

-- ASN1STOP
```

– PCCH-Message

The *PCCH-Message* 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 ::= SEQUENCE {
    message                 PCCH-MessageType
}

PCCH-MessageType ::= CHOICE {
    c1                      CHOICE {
        paging                                  Paging
    },
    messageClassExtension   SEQUENCE {}
}

-- ASN1STOP
```

– DL-CCCH-Message

The *DL-CCCH-Message* class is the set of RRC messages that may be sent from the E-UTRAN to the UE on the downlink CCCH logical channel.

```
-- ASN1START

DL-CCCH-Message ::= SEQUENCE {
    message                 DL-CCCH-MessageType
}

DL-CCCH-MessageType ::= CHOICE {
    c1                      CHOICE {
        rrcConnectionReestablishment            RRCConnectionReestablishment,
        rrcConnectionReestablishmentReject      RRCConnectionReestablishmentReject,
        rrcConnectionReject                     RRCConnectionReject,
        rrcConnectionSetup                      RRCConnectionSetup
```


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```
    },
    messageClassExtension    SEQUENCE {}
}

-- ASN1STOP
```

-- DL-DCCH-Message

The *DL-DCCH-Message* class is the set of RRC messages that may be sent from the E-UTRAN to the UE or from the E-UTRAN to the RN on the downlink DCCH logical channel.

```
-- ASN1START

DL-DCCH-Message ::= SEQUENCE {
    message                 DL-DCCH-MessageType
}

DL-DCCH-MessageType ::= CHOICE {
    c1                      CHOICE {
        csfbParametersResponseCDMA2000          CSFBParametersResponseCDMA2000,
        dlInformationTransfer                   DLInformationTransfer,
        handoverFromEUTRAPreparationRequest     HandoverFromEUTRAPreparationRequest,
        mobilityFromEUTRACommand                MobilityFromEUTRACommand,
        rrcConnectionReconfiguration            RRCConnectionReconfiguration,
        rrcConnectionRelease                    RRCConnectionRelease,
        securityModeCommand                     SecurityModeCommand,
        ueCapabilityEnquiry                     UECapabilityEnquiry,
        counterCheck                            CounterCheck,
        ueInformationRequest-r9                 UEInformationRequest-r9,
        loggedMeasurementConfiguration-r10      LoggedMeasurementConfiguration-r10,
        rnReconfiguration-r10                   RNReconfiguration-r10,
        spare4 NULL,
        spare3 NULL, spare2 NULL, spare1 NULL
    },
    messageClassExtension    SEQUENCE {}
}

-- ASN1STOP
```

-- UL-CCCH-Message

The *UL-CCCH-Message* 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 ::= SEQUENCE {
    message                 UL-CCCH-MessageType
}

UL-CCCH-MessageType ::= CHOICE {
    c1                      CHOICE {
        rrcConnectionReestablishmentRequest     RRCConnectionReestablishmentRequest,
        rrcConnectionRequest                    RRCConnectionRequest
    },
    messageClassExtension    SEQUENCE {}
}

-- ASN1STOP
```

-- UL-DCCH-Message

The *UL-DCCH-Message* class is the set of RRC messages that may be sent from the UE to the E-UTRAN or from the RN to the E-UTRAN on the uplink DCCH logical channel.

```
-- ASN1START

UL-DCCH-Message ::= SEQUENCE {
    message                 UL-DCCH-MessageType
```


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```
}

UL-DCCH-MessageType ::= CHOICE {
    c1                      CHOICE {
        csfbParametersRequestCDMA2000           CSFBParametersRequestCDMA2000,
        measurementReport                       MeasurementReport,
        rrcConnectionReconfigurationComplete    RRCConnectionReconfigurationComplete,
        rrcConnectionReestablishmentComplete    RRCConnectionReestablishmentComplete,
        rrcConnectionSetupComplete              RRCConnectionSetupComplete,
        securityModeComplete                    SecurityModeComplete,
        securityModeFailure                     SecurityModeFailure,
        ueCapabilityInformation                 UECapabilityInformation,
        ulHandoverPreparationTransfer           ULHandoverPreparationTransfer,
        ulInformationTransfer                   ULInformationTransfer,
        counterCheckResponse                    CounterCheckResponse,
        ueInformationResponse-r9                UEInformationResponse-r9,
        proximityIndication-r9                  ProximityIndication-r9,
        rnReconfigurationComplete-r10           RNReconfigurationComplete-r10,
        mbmsCountingResponse-r10                MBMSCountingResponse-r10,
        interFreqRSTDMeasurementIndication-r10  InterFreqRSTDMeasurementIndication-r10
    },
    messageClassExtension   CHOICE {
        c2                              CHOICE {
            ueAssistanceInformation-r11         UEAssistanceInformation-r11,
            inDeviceCoexIndication-r11          InDeviceCoexIndication-r11,
            mbmsInterestIndication-r11          MBMSInterestIndication-r11,
            scgFailureInformation-r12           SCGFailureInformation-r12,
            sidelinkUEInformation-r12           SidelinkUEInformation-r12,
            spare1 NULL, spare0 NULL,
            spare9 NULL, spare8 NULL, spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        messageClassExtensionFuture-r11 SEQUENCE {}
    }
}

-- ASN1STOP
```

– SC-MCCH-Message

The *SC-MCCH-Message* class is the set of RRC messages that may be sent from the E-UTRAN to the UE on the SC-MCCH logical channel.

```
-- ASN1START

SC-MCCH-Message ::= SEQUENCE {
    message                 SC-MCCH-MessageType
}


SC-MCCH-MessageType ::= CHOICE {
    c1                      CHOICE {
        scptmConfiguration-r13                  SCPTMConfiguration-r13
    },
    messageClassExtension   SEQUENCE {}
}

-- ASN1STOP
```

6.2.2 Message definitions

– *CounterCheck*

The *CounterCheck* message is used by the E-UTRAN to indicate the current COUNT MSB values associated to each DRB and to request the UE to compare these to its COUNT MSB values and to report the comparison results to E-UTRAN.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

CounterCheck message

```
-- ASN1START

CounterCheck ::=            SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            counterCheck-r8                     CounterCheck-r8-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

CounterCheck-r8-IEs ::= SEQUENCE {
    drb-CountMSB-InfoList               DRB-CountMSB-InfoList,
    nonCriticalExtension                CounterCheck-v8a0-IEs               OPTIONAL
}

CounterCheck-v8a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
}

DRB-CountMSB-InfoList ::=       SEQUENCE (SIZE (1..maxDRB)) OF DRB-CountMSB-Info

DRB-CountMSB-Info ::=   SEQUENCE {
    drb-Identity                    DRB-Identity,
    countMSB-Uplink                 INTEGER(0..33554431),
    countMSB-Downlink               INTEGER(0..33554431)
}

-- ASN1STOP
```

***CounterCheck* field descriptions**
count-MSB-Downlink
Indicates the value of 25 MSBs from downlink COUNT associated to this DRB.
count-MSB-Uplink
Indicates the value of 25 MSBs from uplink COUNT associated to this DRB.
drb-CountMSB-InfoList
Indicates the MSBs of the COUNT values of the DRBs.

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– *CounterCheckResponse*

The *CounterCheckResponse* message is used by the UE to respond to a *CounterCheck* message.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

CounterCheckResponse message

```
-- ASN1START

CounterCheckResponse ::=            SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        counterCheckResponse-r8             CounterCheckResponse-r8-IEs,
        criticalExtensionsFuture            SEQUENCE {}
    }
}

CounterCheckResponse-r8-IEs ::= SEQUENCE {
    drb-CountInfoList                   DRB-CountInfoList,
    nonCriticalExtension                CounterCheckResponse-v8a0-IEs       OPTIONAL
}

CounterCheckResponse-v8a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
}

DRB-CountInfoList ::=           SEQUENCE (SIZE (0..maxDRB)) OF DRB-CountInfo

DRB-CountInfo ::=   SEQUENCE {
    drb-Identity                    DRB-Identity,
    count-Uplink                    INTEGER(0..4294967295),
    count-Downlink                  INTEGER(0..4294967295)
}

-- ASN1STOP
```

***CounterCheckResponse* field descriptions**
count-Downlink
Indicates the value of downlink COUNT associated to this DRB.
count-Uplink
Indicates the value of uplink COUNT associated to this DRB.
drb-CountInfoList
Indicates the COUNT values of the DRBs.

– *CSFBParametersRequestCDMA2000*

The *CSFBParametersRequestCDMA2000* message is used by the UE to obtain the CDMA2000 1xRTT Parameters from the network. The UE needs these parameters to generate the CDMA2000 1xRTT Registration message used to register with the CDMA2000 1xRTT Network which is required to support CSFB to CDMA2000 1xRTT.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

CSFBParametersRequestCDMA2000 message

```
-- ASN1START
```

```
CSFBParametersRequestCDMA2000 ::= SEQUENCE {
    criticalExtensions                  CHOICE {
        csfbParametersRequestCDMA2000-r8    CSFBParametersRequestCDMA2000-r8-IEs,
        criticalExtensionsFuture            SEQUENCE {}
    }
}

CSFBParametersRequestCDMA2000-r8-IEs ::= SEQUENCE {
    nonCriticalExtension                CSFBParametersRequestCDMA2000-v8a0-IEs   OPTIONAL
}

CSFBParametersRequestCDMA2000-v8a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                             OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                              OPTIONAL
}

-- ASN1STOP
```

-- CSFBParametersResponseCDMA2000

The *CSFBParametersResponseCDMA2000* message is used to provide the CDMA2000 1xRTT Parameters to the UE so the UE can register with the CDMA2000 1xRTT Network to support CSFB to CDMA2000 1xRTT.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

CSFBParametersResponseCDMA2000 message

```
-- ASN1START

CSFBParametersResponseCDMA2000 ::= SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                      CHOICE {
        csfbParametersResponseCDMA2000-r8       CSFBParametersResponseCDMA2000-r8-IEs,
        criticalExtensionsFuture                SEQUENCE {}
    }
}

CSFBParametersResponseCDMA2000-r8-IEs ::= SEQUENCE {
    rand                                RAND-CDMA2000,
    mobilityParameters                  MobilityParametersCDMA2000,
    nonCriticalExtension                CSFBParametersResponseCDMA2000-v8a0-IEs OPTIONAL
}

CSFBParametersResponseCDMA2000-v8a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                             OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                              OPTIONAL
}

-- ASN1STOP
```

-- DLInformationTransfer

The *DLInformationTransfer* message is used for the downlink transfer of NAS or non-3GPP dedicated information.

Signalling radio bearer: SRB2 or SRB1 (only if SRB2 not established yet. If SRB2 is suspended, E-UTRAN does not send this message until SRB2 is resumed.)

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

DLInformationTransfer message

```
-- ASN1START

DLInformationTransfer ::=           SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            dlInformationTransfer-r8            DLInformationTransfer-r8-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

DLInformationTransfer-r8-IEs ::=    SEQUENCE {
    dedicatedInfoType                   CHOICE {
        dedicatedInfoNAS                    DedicatedInfoNAS,
        dedicatedInfoCDMA2000-1XRTT         DedicatedInfoCDMA2000,
        dedicatedInfoCDMA2000-HRPD          DedicatedInfoCDMA2000
    },
    nonCriticalExtension                DLInformationTransfer-v8a0-IEs      OPTIONAL
}

DLInformationTransfer-v8a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
}

-- ASN1STOP
```

– *HandoverFromEUTRAPreparationRequest* (CDMA2000)

The *HandoverFromEUTRAPreparationRequest* message is used to trigger the handover preparation procedure with a CDMA2000 RAT. This message is also used to trigger a tunneled preparation procedure with a CDMA2000 1xRTT RAT to obtain traffic channel resources for the enhanced CS fallback to CDMA2000 1xRTT, which may also involve a concurrent preparation for handover to CDMA2000 HRPD. Also, this message is used to trigger the dual Rx/Tx redirection procedure with a CDMA2000 1xRTT RAT.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

HandoverFromEUTRAPreparationRequest message

```
-- ASN1START

HandoverFromEUTRAPreparationRequest ::= SEQUENCE {
    rrc-TransactionIdentifier       RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            handoverFromEUTRAPreparationRequest-r8
                                                HandoverFromEUTRAPreparationRequest-r8-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

HandoverFromEUTRAPreparationRequest-r8-IEs ::= SEQUENCE {
    cdma2000-Type                   CDMA2000-Type,
    rand                            RAND-CDMA2000               OPTIONAL,   -- Cond cdma2000-Type
    mobilityParameters              MobilityParametersCDMA2000  OPTIONAL,   -- Cond cdma2000-Type
    nonCriticalExtension            HandoverFromEUTRAPreparationRequest-v890-IEs    OPTIONAL
}

HandoverFromEUTRAPreparationRequest-v890-IEs ::= SEQUENCE {
    lateNonCriticalExtension        OCTET STRING                OPTIONAL,
    nonCriticalExtension            HandoverFromEUTRAPreparationRequest-v920-IEs    OPTIONAL
```

```
}

HandoverFromEUTRAPreparationRequest-v920-IEs ::= SEQUENCE {
    concurrPrepCDMA2000-HRPD-r9     BOOLEAN                 OPTIONAL,   -- Cond cdma2000-Type
    nonCriticalExtension            HandoverFromEUTRAPreparationRequest-v1020-IEs   OPTIONAL
}

HandoverFromEUTRAPreparationRequest-v1020-IEs ::= SEQUENCE {
    dualRxTxRedirectIndicator-r10       ENUMERATED {true}       OPTIONAL,       -- Cond cdma2000-1XRTT
    redirectCarrierCDMA2000-1XRTT-r10   CarrierFreqCDMA2000     OPTIONAL,   -- Cond dualRxTxRedirect
    nonCriticalExtension                SEQUENCE {}             OPTIONAL
}

-- ASN1STOP
```

HandoverFromEUTRAPreparationRequest field descriptions
concurrPrepCDMA2000-HRPD   Value TRUE indicates that upper layers should initiate concurrent preparation for handover to CDMA2000 HRPD in addition to preparation for enhanced CS fallback to CDMA2000 1xRTT.
dualRxTxRedirectIndicator   Value TRUE indicates that the second radio of the dual Rx/Tx UE is being redirected to CDMA2000 1xRTT [51].
redirectCarrierCDMA2000-1XRTT   Used to indicate the CDMA2000 1xRTT carrier frequency where the UE is being redirected to.

Conditional presence	Explanation
cdma2000-1XRTT	The field is optionally present, need ON, if the *cdma2000-Type* = *type1XRTT*; otherwise it is not present.
cdma2000-Type	The field is mandatory present if the *cdma2000-Type* = *type1XRTT*; otherwise it is not present.
dualRxTxRedirect	The field is optionally present, need ON, if *dualRxTxRedirectIndicator* is present; otherwise it is not present.

– *InDeviceCoexIndication*

The *InDeviceCoexIndication* message is used to inform E-UTRAN about IDC problems which can not be solved by the UE itself, as well as to provide information that may assist E-UTRAN when resolving these problems.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

InDeviceCoexIndication message

```
-- ASN1START

InDeviceCoexIndication-r11 ::=      SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            inDeviceCoexIndication-r11          InDeviceCoexIndication-r11-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

InDeviceCoexIndication-r11-IEs ::=  SEQUENCE {
    affectedCarrierFreqList-r11         AffectedCarrierFreqList-r11                 OPTIONAL,
    tdm-AssistanceInfo-r11              TDM-AssistanceInfo-r11                      OPTIONAL,
    lateNonCriticalExtension            OCTET STRING                                OPTIONAL,
    nonCriticalExtension                InDeviceCoexIndication-v11d0-IEs            OPTIONAL
}

InDeviceCoexIndication-v11d0-IEs ::=    SEQUENCE {
    ul-CA-AssistanceInfo-r11            SEQUENCE {
```

```
        affectedCarrierFreqCombList-r11 AffectedCarrierFreqCombList-r11          OPTIONAL,
        victimSystemType-r11              VictimSystemType-r11
    }                                                                             OPTIONAL,
    nonCriticalExtension              SEQUENCE {}                                 OPTIONAL
}

AffectedCarrierFreqList-r11 ::= SEQUENCE (SIZE (1..maxFreqIDC-r11)) OF AffectedCarrierFreq-r11

AffectedCarrierFreq-r11 ::= SEQUENCE {
    carrierFreq-r11           MeasObjectId,
    interferenceDirection-r11   ENUMERATED {eutra, other, both, spare}
}

AffectedCarrierFreqCombList-r11 ::= SEQUENCE (SIZE (1..maxCombIDC-r11)) OF AffectedCarrierFreqComb-
r11

AffectedCarrierFreqComb-r11 ::= SEQUENCE (SIZE (2..maxServCell-r10)) OF MeasObjectId

IDC-AssistanceInfo-r11 ::=   CHOICE {
    drx-AssistanceInfo-r11              SEQUENCE {
        drx-CycleLength-r11                 ENUMERATED {sf40, sf64, sf80, sf128, sf160,
                                                sf256, spare2, spare1},
        drx-Offset-r11                      INTEGER (0..255)    OPTIONAL,
        drx-ActiveTime-r11                  ENUMERATED {sf20, sf30, sf40, sf60, sf80,
                                                sf100, spare2, spare1}
    },
    idc-SubframePatternList-r11         IDC-SubframePatternList-r11,
    ...
}

IDC-SubframePatternList-r11 ::= SEQUENCE (SIZE (1..maxSubframePatternIDC-r11)) OF IDC-
SubframePattern-r11

IDC-SubframePattern-r11 ::= CHOICE {
    subframePatternFDD-r11              BIT STRING (SIZE (8)),
    subframePatternTDD-r11              CHOICE {
        subframeConfig0-r11                 BIT STRING (SIZE (70)),
        subframeConfig1-5-r11               BIT STRING (SIZE (10)),
        subframeConfig6-r11                 BIT STRING (SIZE (60))
    },
    ...
}

VictimSystemType-r11 ::= SEQUENCE {
    gps-r11                             ENUMERATED {true}               OPTIONAL,
    glonass-r11                         ENUMERATED {true}               OPTIONAL,
    wlan-r11                            ENUMERATED {true}               OPTIONAL,
    galileo-r11                         ENUMERATED {true}               OPTIONAL,
    wlan-r11                            ENUMERATED {true}               OPTIONAL,
    bluetooth-r11                       ENUMERATED {true}               OPTIONAL
}

-- ASN1STOP
```

InDeviceCoexIndication field descriptions
affectedCarrierFreqCombList
Indicates a list of E-UTRA carrier frequencies that are affected by IDC problems due to Inter-Modulation Distortion and harmonics from E-UTRA when configured with UL CA.
affectedCarrierFreqList
List of E-UTRA carrier frequencies affected by IDC problems.
drx-ActiveTime
Indicates the desired active time that the E-UTRAN is recommended to configure. Value in number of subframes. Value sf20 corresponds to 20 subframes, sf30 corresponds to 30 subframes and so on.
drx-CycleLength
Indicates the desired DRX cycle length that the E-UTRAN is recommended to configure. Value in number of subframes. Value sf40 corresponds to 40 subframes, sf64 corresponds to 64 subframes and so on.
drx-Offset
Indicates the desired DRX starting offset that the E-UTRAN is recommended to configure. The UE shall set the value of drx-Offset smaller than the value of *drx-CycleLength*. The starting frame and subframe satisfy the relation: [(SFN * 10) + subframe number] modulo (*drx-CycleLength*) = *drx-Offset*.
idc-SubframePatternList
A list of one or more subframe patterns indicating which HARQ process E-UTRAN is requested to abstain from using. Value 0 indicates that E-UTRAN is requested to abstain from using the subframe. For FDD, the radio frame in which the pattern starts (i.e. the radio frame in which the first/leftmost bit of the *subframePatternFDD* corresponds to subframe #0) occurs when SFN mod 2 = 0. For TDD, 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. The UE shall indicate a subframe pattern that follows HARQ time line, as specified in TS 36.213 [23], i.e. if a subframe is set to 1 in the subframe pattern, also the corresponding subframes carrying the potential UL grant [23, 8.0], the UL HARQ retransmission [23, 8.0] and the DL/UL HARQ feedback [23, 7.3, 8.3 and 9.1.2] shall be set to 1.
interferenceDirection
Indicates the direction of IDC interference. Value *eutra* indicates that only E-UTRA is victim of IDC interference, value *other* indicates that only another radio is victim of IDC interference and value *both* indicates that both E-UTRA and another radio are victims of IDC interference. The other radio refers to either the ISM radio or GNSS (see 3GPP TR 36.816 [63]).
victimSystemType
Indicate the list of victim system types to which IDC interference is caused from E-UTRA when configured with UL CA. Value *gps*, *glonass*, *bds* and *galileo* indicates the type of GNSS. Value *wlan* indicates WLAN and value *bluetooth* indicates Bluetooth.

-- *InterFreqRSTDMeasurementIndication*

The *InterFreqRSTDMeasurementIndication* message is used to indicate that the UE is going to either start or stop OTDOA inter-frequency RSTD measurement which requires measurement gaps as specified in TS 36.133 [16, 8.1.2.6].

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

InterFreqRSTDMeasurementIndication message

```
-- ASN1START

InterFreqRSTDMeasurementIndication-r10 ::=          SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            interFreqRSTDMeasurementIndication-r10  InterFreqRSTDMeasurementIndication-r10-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

InterFreqRSTDMeasurementIndication-r10-IEs ::=      SEQUENCE {
    rstd-InterFreqIndication-r10        CHOICE {
        start                               SEQUENCE {
            rstd-InterFreqInfoList-r10          RSTD-InterFreqInfoList-r10
        },
        stop                                NULL
```


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```
    },
    lateNonCriticalExtension            OCTET STRING                    OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                     OPTIONAL
}

RSTD-InterFreqInfoList-r10 ::=  SEQUENCE (SIZE(1..maxRSTD-Freq-r10)) OF RSTD-InterFreqInfo-r10

RSTD-InterFreqInfo-r10 ::=      SEQUENCE {
    carrierFreq-r10                 ARFCN-ValueEUTRA,
    measPRS-Offset-r10              INTEGER (0..39),
    ...,
    [[  carrierFreq-v1090           ARFCN-ValueEUTRA-v9e0               OPTIONAL
    ]]
}

-- ASN1STOP
```

InterFreqRSTDMeasurementIndication field descriptions
carrierFreq   The EARFCN value of the carrier received from upper layers for which the UE needs to perform the inter-frequency RSTD measurements. If the UE includes *carrierFreq-v1090*, it shall set *carrierFreq-r10* to *maxEARFCN*.
measPRS-Offset   Indicates the requested gap offset for performing inter-frequency RSTD measurements. It is the smallest subframe offset from the beginning of subframe 0 of SFN=0 of the serving cell of the requested gap for measuring PRS positioning occasions in the carrier frequency *carrierFreq* for which the UE needs to perform the inter-frequency RSTD measurements. The PRS positioning occasion information is received from upper layers. The value of *measPRS-Offset* is obtained by mapping the starting subframe of the PRS positioning occasion in the measured cell onto the corresponding subframe in the serving cell and is calculated as the serving cell's number of subframes from SFN=0 mod 40.   The UE shall take into account any additional time required by the UE to start PRS measurements on the other carrier when it does this mapping for determining the *measPRS-Offset*.   NOTE: Figure 6.2.2-1 illustrates the *measPRS-Offset* field.
rstd-InterFreqIndication   Indicates the inter-frequency RSTD measurement action, i.e. the UE is going to start or stop inter-frequency RSTD measurement.

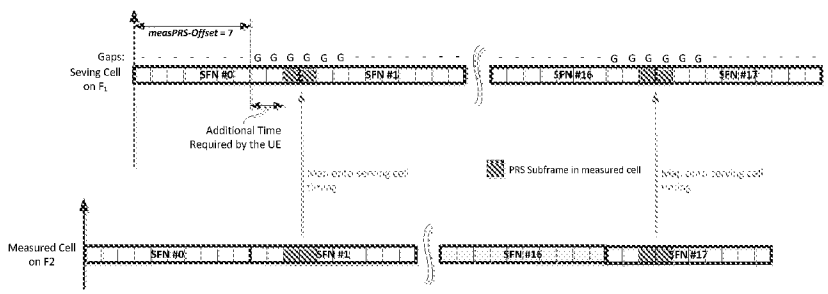


Figure 6.2.2-1 (informative): Exemplary calculation of *measPRS-Offset* field.

— *LoggedMeasurementConfiguration*

The *LoggedMeasurementConfiguration* message is used by E-UTRAN to configure the UE to perform logging of measurement results while in RRC_IDLE or to perform logging of measurement results for MBSFN while in both RRC_IDLE and RRC_CONNECTED. It is used to transfer the logged measurement configuration for network performance optimisation, see TS 37.320 [60].

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

LoggedMeasurementConfiguration message

```
-- ASN1START

LoggedMeasurementConfiguration-r10 ::=  SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            loggedMeasurementConfiguration-r10      LoggedMeasurementConfiguration-r10-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture                SEQUENCE {}
    }
}


LoggedMeasurementConfiguration-r10-IEs ::= SEQUENCE {
    traceReference-r10              TraceReference-r10,
    traceRecordingSessionRef-r10    OCTET STRING (SIZE (2)),
    tce-Id-r10                      OCTET STRING (SIZE (1)),
    absoluteTimeInfo-r10            AbsoluteTimeInfo-r10,
    areaConfiguration-r10           AreaConfiguration-r10       OPTIONAL,   -- Need OR
    loggingDuration-r10             LoggingDuration-r10,
    loggingInterval-r10             LoggingInterval-r10,
    nonCriticalExtension            LoggedMeasurementConfiguration-v1080-IEs    OPTIONAL
}

LoggedMeasurementConfiguration-v1080-IEs ::= SEQUENCE {
    laterNonCriticalExtension-r10   OCTET STRING                                OPTIONAL,
    nonCriticalExtension            LoggedMeasurementConfiguration-v1130-IEs    OPTIONAL
}

LoggedMeasurementConfiguration-v1130-IEs ::= SEQUENCE {
    plmn-IdentityList-r11           PLMN-IdentityList2-r11      OPTIONAL,   -- Need OR
    areaConfiguration-v1130         AreaConfiguration-v1130     OPTIONAL,   -- Need OR
    nonCriticalExtension            LoggedMeasurementConfiguration-v1250-IEs    OPTIONAL
}

LoggedMeasurementConfiguration-v1250-IEs ::= SEQUENCE {
    targetMBSFN-AreaList-r12    TargetMBSFN-AreaList-r12        OPTIONAL,   -- Need OP
    nonCriticalExtension            SEQUENCE {}                 OPTIONAL
}

TargetMBSFN-AreaList-r12 ::=            SEQUENCE (SIZE (0..maxMBSFN-Area)) OF TargetMBSFN-Area-r12

TargetMBSFN-Area-r12 ::=                SEQUENCE {
    mbsfn-AreaId-r12                    MBSFN-AreaId-r12        OPTIONAL,   -- Need OR
    carrierFreq-r12                     ARFCN-ValueEUTRA-r9,
    ...
}

-- ASN1STOP
```

LoggedMeasurementConfiguration field descriptions
absoluteTimeInfo
Indicates the absolute time in the current cell.
areaConfiguration
Used to restrict the area in which the UE performs measurement logging to cells broadcasting either one of the included cell identities or one of the included tracking area codes/ identities.
plmn-IdentityList
Indicates a set of PLMNs defining when the UE performs measurement logging as well as the associated status indication and information retrieval i.e. the UE performs these actions when the RPLMN is part of this set of PLMNs.
targetMBSFN-AreaList
Used to indicate logging of MBSFN measurements and further restrict the area and frequencies for which the UE performs measurement logging for MBSFN. If both MBSFN area id and carrier frequency are present, a specific MBSFN area is indicated. If only carrier frequency is present, all MBSFN areas on that carrier frequency are indicated. If there is no entry in the list, any MBSFN area is indicated.
tce-Id
Parameter Trace Collection Entity Id: See TS 32.422 [58].
traceRecordingSessionRef
Parameter Trace Recording Session Reference: See TS 32.422 [58]

– MasterInformationBlock

The *MasterInformationBlock* includes the system information transmitted on BCH.

Signalling radio bearer: N/A

RLC-SAP: TM

Logical channel: BCCH

Direction: E-UTRAN to UE

MasterInformationBlock

```
-- ASN1START

MasterInformationBlock ::=          SEQUENCE {
    dl-Bandwidth                        ENUMERATED {
                                            n6, n15, n25, n50, n75, n100},
    phich-Config                        PHICH-Config,
    systemFrameNumber                   BIT STRING (SIZE (8)),
    spare                               BIT STRING (SIZE (10))
}


-- ASN1STOP
```

MasterInformationBlock field descriptions
dl-Bandwidth
Parameter: transmission bandwidth configuration, N_{RB} in downlink, see TS 36.101 [42, table 5.6-1]. n6 corresponds to 6 resource blocks, n15 to 15 resource blocks and so on.
systemFrameNumber
Defines the 8 most significant bits of the SFN. As indicated in TS 36.211 [21, 6.6.1], the 2 least significant bits of the SFN are acquired implicitly in the P-BCH decoding, i.e. timing of 40ms P-BCH TTI indicates 2 least significant bits (within 40ms P-BCH TTI, the first radio frame: 00, the second radio frame: 01, the third radio frame: 10, the last radio frame: 11). One value applies for all serving cells of a Cell Group (i.e. MCG or SCG). The associated functionality is common (i.e. not performed independently for each cell).

– MBMSCountingRequest

The *MBMSCountingRequest* message is used by E-UTRAN to count the UEs that are receiving or interested to receive specific MBMS services.

Signalling radio bearer: N/A

RLC-SAP: UM

Logical channel: MCCH

Direction: E-UTRAN to UE

MBMSCountingRequest message

```
-- ASN1START

MBMSCountingRequest-r10 ::=     SEQUENCE {
    countingRequestList-r10         CountingRequestList-r10,
    lateNonCriticalExtension        OCTET STRING                        OPTIONAL,
    nonCriticalExtension            SEQUENCE {}                         OPTIONAL
}

CountingRequestList-r10 ::= SEQUENCE (SIZE (1..maxServiceCount)) OF CountingRequestInfo-r10

CountingRequestInfo-r10 ::=     SEQUENCE {
    tmgi-r10                            TMGI-r9,
    ...
}

-- ASN1STOP
```

– *MBMSCountingResponse*

The *MBMSCountingResponse* message is used by the UE to respond to an *MBMSCountingRequest* message.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

MBMSCountingResponse message

```
-- ASN1START

MBMSCountingResponse-r10 ::=            SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            countingResponse-r10                MBMSCountingResponse-r10-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

MBMSCountingResponse-r10-IEs ::=    SEQUENCE {
    mbsfn-AreaIndex-r10             INTEGER (0..maxMBSFN-Area-1)                    OPTIONAL,
    countingResponseList-r10        CountingResponseList-r10            OPTIONAL,
    lateNonCriticalExtension        OCTET STRING                        OPTIONAL,
    nonCriticalExtension            SEQUENCE {}                         OPTIONAL
}

CountingResponseList-r10 ::=        SEQUENCE (SIZE (1..maxServiceCount)) OF CountingResponseInfo-r10

CountingResponseInfo-r10 ::=        SEQUENCE {
    countingResponseService-r10 INTEGER (0..maxServiceCount-1),
    ...
}

-- ASN1STOP
```

MBMSCountingResponse field descriptions

countingResponseList
List of MBMS services which the UE is receiving or interested to receive. Value 0 for field *countingResponseService* corresponds to the first entry in *countingRequestList* within *MBMSCountingRequest*, value 1 corresponds to the second entry in this list and so on.

mbsfn-AreaIndex
Index of the entry in field *mbsfn-AreaInfoList* within *SystemInformationBlockType13*. Value 0 corresponds to the first entry in *mbsfn-AreaInfoList* within *SystemInformationBlockType13*, value 1 corresponds to the second entry in this list and so on.

-- MBMSInterestIndication

The *MBMSInterestIndication* message is used to inform E-UTRAN that the UE is receiving/ interested to receive or no longer receiving/ interested to receive MBMS via an (SC-)MRB.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

MBMSInterestIndication message

```
-- ASN1START

MBMSInterestIndication-r11 ::=      SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            interestIndication-r11              MBMSInterestIndication-r11-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

MBMSInterestIndication-r11-IEs ::=  SEQUENCE {
    mbms-FreqList-r11                   CarrierFreqListMBMS-r11         OPTIONAL,
    mbms-Priority-r11                   ENUMERATED {true}               OPTIONAL,
    lateNonCriticalExtension            OCTET STRING                    OPTIONAL,
    nonCriticalExtension                MBMSInterestIndication-r13-IEs  OPTIONAL
}

MBMSInterestIndication-r13-IEs ::=  SEQUENCE {
    mbms-Services-r13                   MBMSServiceList-r13             OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                     OPTIONAL
}

-- ASN1STOP
```

MBMSInterestIndication field descriptions

mbms-FreqList
List of MBMS frequencies on which the UE is receiving or interested to receive MBMS via an (SC-)MRB.

mbms-Priority
Indicates whether the UE prioritises MBMS reception above unicast reception. The field is present (i.e. value *true*), if the UE prioritises reception of all listed MBMS frequencies above reception of any of the unicast bearers. Otherwise the field is absent.

-- MBSFNAreaConfiguration

The *MBSFNAreaConfiguration* message contains the MBMS control information applicable for an MBSFN area. For each MBSFN area included in *SystemInformationBlockType13* E-UTRAN configures an MCCH (i.e. the MCCH identifies the MBSFN area) and signals the *MBSFNAreaConfiguration* message.

Signalling radio bearer: N/A

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RLC-SAP: UM

Logical channel: MCCH

Direction: E-UTRAN to UE

MBSFNAreaConfiguration message

```
-- ASN1START

MBSFNAreaConfiguration-r9 ::=           SEQUENCE {
    commonSF-Alloc-r9                       CommonSF-AllocPatternList-r9,
    commonSF-AllocPeriod-r9                 ENUMERATED {
                                                rf4, rf8, rf16, rf32, rf64, rf128, rf256},
    pmch-InfoList-r9                        PMCH-InfoList-r9,
    nonCriticalExtension                    MBSFNAreaConfiguration-v930-IEs OPTIONAL
}

MBSFNAreaConfiguration-v930-IEs ::= SEQUENCE {
    lateNonCriticalExtension                OCTET STRING                            OPTIONAL,
    nonCriticalExtension                    MBSFNAreaConfiguration-v1250-IEs        OPTIONAL
}

MBSFNAreaConfiguration-v1250-IEs ::= SEQUENCE {
    pmch-InfoListExt-r12                    PMCH-InfoListExt-r12                    OPTIONAL,   -- Need OR
    nonCriticalExtension                    SEQUENCE {}                             OPTIONAL
}

CommonSF-AllocPatternList-r9 ::=    SEQUENCE (SIZE (1..maxMBSFN-Allocations)) OF MBSFN
-SubframeConfig

-- ASN1STOP
```

***MBSFNAreaConfiguration* field descriptions**
commonSF-Alloc Indicates the subframes allocated to the MBSFN area. E-UTRAN always sets this field to cover at least the subframes configured by *SystemInformationBlockType13* for this MCCH, regardless of whether any MBMS sessions are ongoing.
commonSF-AllocPeriod Indicates the period during which resources corresponding with field *commonSF-Alloc* are divided between the (P)MCH that are configured for this MBSFN area. The subframe allocation patterns, as defined by *commonSF-Alloc*, repeat continously during this period. Value rf4 corresponds to 4 radio frames, rf8 corresponds to 8 radio frames and so on. The *commonSF-AllocPeriod* starts in the radio frames for which: SFN mod *commonSF-AllocPeriod* = 0.
pmch-InfoList EUTRAN may include *pmch-InfoListExt* even if *pmch-InfoList* does not include *maxPMCH-PerMBSFN* entries. EUTRAN configures at most *maxPMCH-PerMBSFN* entries i.e. across *pmch-InfoList* and *pmch-InfoListExt*.

-- MeasurementReport

The *MeasurementReport* message is used for the indication of measurement results.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

MeasurementReport message

```
-- ASN1START

MeasurementReport ::=               SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            measurementReport-r8                MeasurementReport-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
```


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```
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

MeasurementReport-r8-IEs ::=        SEQUENCE {
    measResults                         MeasResults,
    nonCriticalExtension                MeasurementReport-v8a0-IEs                  OPTIONAL
}

MeasurementReport-v8a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                                OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                                 OPTIONAL
}

-- ASN1STOP
```

– *MobilityFromEUTRACommand*

The *MobilityFromEUTRACommand* message is used to command handover or a cell change from E-UTRA to another RAT (3GPP or non-3GPP), or enhanced CS fallback to CDMA2000 1xRTT.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

MobilityFromEUTRACommand message

```
-- ASN1START

MobilityFromEUTRACommand ::=        SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            mobilityFromEUTRACommand-r8         MobilityFromEUTRACommand-r8-IEs,
            mobilityFromEUTRACommand-r9             MobilityFromEUTRACommand-r9-IEs,
            spare2 NULL, spare1     NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

MobilityFromEUTRACommand-r8-IEs ::= SEQUENCE {
    cs-FallbackIndicator                BOOLEAN,
    purpose                             CHOICE{
        handover                            Handover,
        cellChangeOrder                     CellChangeOrder
    },
    nonCriticalExtension                MobilityFromEUTRACommand-v8a0-IEs   OPTIONAL
}

MobilityFromEUTRACommand-v8a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                MobilityFromEUTRACommand-v8a0-IEs   OPTIONAL
}

MobilityFromEUTRACommand-v8a0-IEs ::= SEQUENCE {
    bandIndicator                       BandIndicatorGERAN          OPTIONAL,   -- Cond GERAN
    nonCriticalExtension                SEQUENCE {}                 OPTIONAL
}

MobilityFromEUTRACommand-r9-IEs ::= SEQUENCE {
    cs-FallbackIndicator                BOOLEAN,
    purpose                             CHOICE{
        handover                            Handover,
        cellChangeOrder                     CellChangeOrder,
        e-CSFB-r9                           E-CSFB-r9,
        ...
    },
    nonCriticalExtension                MobilityFromEUTRACommand-v930-IEs   OPTIONAL
```

```
}

MobilityFromEUTRACommand-v930-IEs ::= SEQUENCE {
    lateNonCriticalExtension          OCTET STRING                          OPTIONAL,
    nonCriticalExtension              MobilityFromEUTRACommand-v960-IEs     OPTIONAL
}

MobilityFromEUTRACommand-v960-IEs ::= SEQUENCE {
    bandIndicator                     BandIndicatorGERAN          OPTIONAL,    -- Cond GERAN
    nonCriticalExtension              SEQUENCE {}                 OPTIONAL
}

Handover ::=                        SEQUENCE {
    targetRAT-Type                      ENUMERATED {
                                            utra, geran, cdma2000-1XRTT, cdma2000-HRPD,
                                            spare4, spare3, spare2, spare1, ...},
    targetRAT-MessageContainer          OCTET STRING,
    nas-SecurityParamFromEUTRA          OCTET STRING (SIZE (1))     OPTIONAL,    -- Cond UTRAGERAN
    systemInformation                   SI-OrPSI-GERAN              OPTIONAL    -- Cond PSHO
}

CellChangeOrder ::=             SEQUENCE {
    t304                                ENUMERATED {
                                            ms100, ms200, ms500, ms1000,
                                            ms2000, ms4000, ms8000, spare1},
    targetRAT-Type                      CHOICE {
          geran                             SEQUENCE {
              physCellId                        PhysCellIdGERAN,
              carrierFreq                       CarrierFreqGERAN,
              networkControlOrder               BIT STRING (SIZE (2))       OPTIONAL,    -- Need OP
              systemInformation                 SI-OrPSI-GERAN              OPTIONAL     -- Need OP
          },
          ...
    }
}

SI-OrPSI-GERAN ::=                  CHOICE {
    si                                  SystemInfoListGERAN,
    psi                                 SystemInfoListGERAN
}

E-CSFB-r9 ::=                       SEQUENCE {
    messageContCDMA2000-1XRTT-r9        OCTET STRING        OPTIONAL,    -- Need ON
    mobilityCDMA2000-HRPD-r9            ENUMERATED {
                                            handover, redirection
                                        }                   OPTIONAL,    -- Need OP
    messageContCDMA2000-HRPD-r9     OCTET STRING        OPTIONAL,    -- Cond concHO
    redirectCarrierCDMA2000-HRPD-r9 CarrierFreqCDMA2000 OPTIONAL     -- Cond concRedir
}

-- ASN1STOP
```

MobilityFromEUTRACommand field descriptions
bandIndicator Indicates how to interpret the ARFCN of the BCCH carrier.
carrierFreq contains the carrier frequency of the target GERAN cell.
cs-FallbackIndicator Value *true* indicates that the CS Fallback procedure to UTRAN or GERAN is triggered.
messageContCDMA2000-1XRTT This field contains a message specified in CDMA2000 1xRTT standard that either tells the UE to move to specific 1xRTT target cell(s) or indicates a failure to allocate resources for the enhanced CS fallback to CDMA2000 1xRTT.
messageContCDMA2000-HRPD This field contains a message specified in CDMA2000 HRPD standard that either tells the UE to move to specific HRPD target cell(s) or indicates a failure to allocate resources for the handover to CDMA2000 HRPD.
mobilityCDMA2000-HRPD This field indicates whether or not mobility to CDMA2000 HRPD is to be performed by the UE and it also indicates the type of mobility to CDMA2000 HRPD that is to be performed; If this field is not present the UE shall perform only the enhanced CS fallback to CDMA2000 1xRTT.
nas-SecurityParamFromEUTRA Used to deliver the key synchronisation and Key freshness for the E-UTRAN to UTRAN handovers as specified in TS 33.401. The content of the parameter is defined in TS24.301.
networkControlOrder Parameter NETWORK_CONTROL_ORDER in TS 44.060 [36].
purpose Indicates which type of mobility procedure the UE is requested to perform. EUTRAN always applies value *e-CSFB* in case of enhanced CS fallback to CDMA2000 (e.g. also when that procedure results in handover to CDMA2000 1XRTT only, in handover to CDMA2000 HRPD only or in redirection to CDMA2000 HRPD only).
redirectCarrierCDMA2000-HRPD The *redirectCarrierCDMA2000-HRPD* indicates a CDMA2000 carrier frequency and is used to redirect the UE to a HRPD carrier frequency.
SystemInfoListGERAN If *purpose* = *CellChangeOrder* and if the field is not present, the UE has to acquire SI/PSI from the GERAN cell.
t304 Timer T304 as described in section 7.3. Value ms100 corresponds with 100 ms, ms200 corresponds with 200 ms and so on.
targetRAT-Type Indicates the target RAT type.
targetRAT-MessageContainer The field contains a message specified in another standard, as indicated by the *targetRAT-Type*, and carries information about the target cell identifier(s) and radio parameters relevant for the target radio access technology. NOTE 1. A complete message is included, as specified in the other standard.

Conditional presence	Explanation
concHO	The field is mandatory present if the *mobilityCDMA2000-HRPD* is set to "*handover*"; otherwise the field is optional present, need ON.
concRedir	The field is mandatory present if the *mobilityCDMA2000-HRPD* is set to "*redirection*"; otherwise the field is not present.
GERAN	The field should be present if the *purpose* is set to "*handover*" and the *targetRAT-Type* is set to "*geran*"; otherwise the field is not present
PSHO	The field is mandatory present in case of PS handover toward GERAN; otherwise the field is optionally present, but not used by the UE
UTRAGERAN	The field is mandatory present if the *targetRAT-Type* is set to "*utra*" or "*geran*"; otherwise the field is not present

NOTE 1: The correspondence between the value of the *targetRAT-Type*, the standard to apply and the message contained within the *targetRAT-MessageContainer* is shown in the table below:

targetRAT-Type	Standard to apply	targetRAT-MessageContainer
cdma2000-1XRTT	C.S0001 or later, C.S0007 or later, C.S0008 or later	
cdma2000-HRPD	C.S0024 or later	
geran	GSM TS 04.18, version 8.5.0 or later, or 3GPP TS 44.018 (clause 9.1.15)	HANDOVER COMMAND
	3GPP TS 44.060, version 6.13.0 or later (clause 11.2.43)	PS HANDOVER COMMAND
	3GPP TS 44.060, version 7.6.0 or later (clause 11.2.46)	DTM HANDOVER COMMAND
utra	3GPP TS 25.331 (clause 10.2.16a)	HANDOVER TO UTRAN COMMAND

– *Paging*

The *Paging* 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 message

```
-- ASN1START

Paging ::=                  SEQUENCE {
    pagingRecordList            PagingRecordList                    OPTIONAL,   -- Need ON
    systemInfoModification      ENUMERATED {true}                   OPTIONAL,   -- Need ON
    etws-Indication             ENUMERATED {true}                   OPTIONAL,   -- Need ON
    nonCriticalExtension        Paging-v890-IEs                     OPTIONAL
}

Paging-v890-IEs ::=         SEQUENCE {
    lateNonCriticalExtension    OCTET STRING                            OPTIONAL,
    nonCriticalExtension        Paging-v920-IEs                         OPTIONAL
}

Paging-v920-IEs ::=         SEQUENCE {
    cmas-Indication-r9          ENUMERATED {true}                   OPTIONAL,   -- Need ON
    nonCriticalExtension            Paging-v1130-IEs                OPTIONAL
}

Paging-v1130-IEs ::=            SEQUENCE {
    eab-ParamModification-r11   ENUMERATED {true}                   OPTIONAL,   -- Need ON
    nonCriticalExtension        Paging-v13xx-IEs                    OPTIONAL
}

Paging-v13xx-IEs ::=        SEQUENCE {
    redistributionIndication-r13    ENUMERATED {true}               OPTIONAL,   --Need ON
    systemInfoModification-eDRX-r13 ENUMERATED {true}               OPTIONAL,   -- Need ON
    nonCriticalExtension        SEQUENCE {}                         OPTIONAL
}

PagingRecordList ::=            SEQUENCE (SIZE (1..maxPageRec)) OF PagingRecord

PagingRecord ::=                SEQUENCE {
    ue-Identity                     PagingUE-Identity,
    cn-Domain                       ENUMERATED {ps, cs},
    ...
}

PagingUE-Identity ::=           CHOICE {
    s-TMSI                          S-TMSI,
    imsi                            IMSI,
    ...
}

IMSI ::=                        SEQUENCE (SIZE (6..21)) OF IMSI-Digit
```


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```
IMSI-Digit ::=                  INTEGER (0..9)

-- ASN1STOP
```

Paging field descriptions
cmas-Indication
If present: indication of a CMAS notification.
cn-Domain
Indicates the origin of paging.
eab-ParamModification
If present: indication of an EAB parameters (SIB14) modification.
etws-Indication
If present: indication of an ETWS primary notification and/ or ETWS secondary notification.
imsi
The International Mobile Subscriber Identity, a globally unique permanent subscriber identity, see TS 23.003 [27]. The first element contains the first IMSI digit, the second element contains the second IMSI digit and so on.
redistributionIndication
If present: indication to trigger E-UTRAN inter-frequency Redistribution procedure as specified in 5.2.4.10 [4]
systemInfoModification
If present: indication of a BCCH modification other than SIB10, SIB11, SIB12 and SIB14.
systemInfoModification-eDRX
If present: indication of a BCCH modification other than SIB10, SIB11, SIB12 and SIB14 for UEs in extended DRX. This indication applies only to UEs having eDRX cycle longer than the BCCH modification period.
ue-Identity
Provides the NAS identity of the UE that is being paged.

– *ProximityIndication*

The *ProximityIndication* message is used to indicate that the UE is entering or leaving the proximity of one or more CSG member cell(s).

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

***ProximityIndication* message**

```
-- ASN1START

ProximityIndication-r9 ::= SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            proximityIndication-r9              ProximityIndication-r9-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
            },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

ProximityIndication-r9-IEs ::= SEQUENCE {
    type-r9                             ENUMERATED {entering, leaving},
    carrierFreq-r9                      CHOICE {
        eutra-r9                            ARFCN-ValueEUTRA,
        utra-r9                             ARFCN-ValueUTRA,
        ...,
        eutra2-v9e0                         ARFCN-ValueEUTRA-v9e0
    },
    nonCriticalExtension                ProximityIndication-v930-IEs
    OPTIONAL
}

ProximityIndication-v930-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
```

```
}
-- ASN1STOP
```

ProximityIndication field descriptions
carrierFreq
Indicates the RAT and frequency of the CSG member cell(s), for which the proximity indication is sent. For E-UTRA and UTRA frequencies, the UE shall set the ARFCN according to a band it previously considered suitable for accessing (one of) the CSG member cell(s), for which the proximity indication is sent.
type
Used to indicate whether the UE is entering or leaving the proximity of CSG member cell(s).

– *RNReconfiguration*

The *RNReconfiguration* is a command to modify the RN subframe configuration and/or to convey changed system information.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to RN

RNReconfiguration message

```
-- ASN1START

RNReconfiguration-r10 ::=           SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            rnReconfiguration-r10               RNReconfiguration-r10-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

RNReconfiguration-r10-IEs ::=       SEQUENCE {
    rn-SystemInfo-r10                   RN-SystemInfo-r10           OPTIONAL,       -- Need ON
    rn-SubframeConfig-r10               RN-SubframeConfig-r10           OPTIONAL,   -- Need ON
    lateNonCriticalExtension            OCTET STRING                    OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                     OPTIONAL
}

RN-SystemInfo-r10 ::=               SEQUENCE {
    systemInformationBlockType1-r10     OCTET STRING (CONTAINING SystemInformationBlockType1)
    OPTIONAL,   -- Need ON
    systemInformationBlockType2-r10     SystemInformationBlockType2     OPTIONAL,       -- Need ON
    ...
}


-- ASN1STOP
```

– *RNReconfigurationComplete*

The *RNReconfigurationComplete* message is used to confirm the successful completion of an RN reconfiguration.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: RN to E-UTRAN

RNReconfigurationComplete message

```
-- ASN1START

RNReconfigurationComplete-r10 ::=       SEQUENCE {
    rrc-TransactionIdentifier               RRC-TransactionIdentifier,
    criticalExtensions                      CHOICE {
        c1                                      CHOICE{
            rnReconfigurationComplete-r10           RNReconfigurationComplete-r10-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture                SEQUENCE {}
    }
}

RNReconfigurationComplete-r10-IEs ::=   SEQUENCE {
    lateNonCriticalExtension                OCTET STRING                    OPTIONAL,
    nonCriticalExtension                    SEQUENCE {}                     OPTIONAL
}

-- ASN1STOP
```

– *RRCConnectionReconfiguration*

The *RRCConnectionReconfiguration* message is the command to modify an RRC connection. It may convey information for measurement configuration, mobility control, radio resource configuration (including RBs, MAC main configuration and physical channel configuration) including any associated dedicated NAS information and security configuration.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

RRCConnectionReconfiguration message

```
-- ASN1START

RRCConnectionReconfiguration ::=    SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            rrcConnectionReconfiguration-r8     RRCConnectionReconfiguration-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

RRCConnectionReconfiguration-r8-IEs ::= SEQUENCE {
    measConfig                          MeasConfig                      OPTIONAL,       -- Need ON
    mobilityControlInfo                 MobilityControlInfo             OPTIONAL,       -- Cond HO
    dedicatedInfoNASList                SEQUENCE (SIZE(1..maxDRB)) OF
                                            DedicatedInfoNAS            OPTIONAL,       -- Cond nonHO
    radioResourceConfigDedicated        RadioResourceConfigDedicated    OPTIONAL,       -- Cond HO-toEUTRA
    securityConfigHC                    SecurityConfigHC                OPTIONAL,       -- Cond HC
    nonCriticalExtension                RRCConnectionReconfiguration-v890-IEs   OPTIONAL
}
```

```
RRCConnectionReconfiguration-v890-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING (CONTAINING RRCConnectionReconfiguration-v8a0-
IEs)    OPTIONAL,
    nonCriticalExtension                RRCConnectionReconfiguration-v920-IEs   OPTIONAL
}

   Late non critical extensions:
RRCConnectionReconfiguration-v8a0-IEs ::= SEQUENCE {
    -- Following field is only for pre REL-10 late non critical extensions
    lateNonCriticalExtension            OCTET STRING                            OPTIONAL,
    nonCriticalExtension                RRCConnectionReconfiguration-v1010-IEs      OPTIONAL
}

RRCConnectionReconfiguration-v1010-IEs ::= SEQUENCE {
    antennaInfoDedicatedPCell-v1010     AntennaInfoDedicated-v1010          OPTIONAL,   -- Need ON
    -- Following field is only for late non-critical extensions from REL-10
    nonCriticalExtension                SEQUENCE {}             OPTIONAL
}

   Regular non critical extensions:
RRCConnectionReconfiguration-v920-IEs ::= SEQUENCE {
    otherConfig-r9                      OtherConfig-r9                  OPTIONAL,       Need ON
    fullConfig-r9                       ENUMERATED {true}               OPTIONAL,   -- Cond HO-
Reestab
    nonCriticalExtension                RRCConnectionReconfiguration-v1020-IEs  OPTIONAL
}

RRCConnectionReconfiguration-v1020-IEs ::= SEQUENCE {
    sCellToReleaseList-r10              SCellToReleaseList-r10          OPTIONAL,   -- Need ON
    sCellToAddModList-r10               SCellToAddModList-r10           OPTIONAL,   -- Need ON
    nonCriticalExtension                RRCConnectionReconfiguration-v1130-IEs  OPTIONAL
}

RRCConnectionReconfiguration-v1130-IEs ::= SEQUENCE {
    systemInformationBlockType1Dedicated-r11 OCTET STRING (CONTAINING SystemInformationBlockType1)
                                                                        OPTIONAL,   -- Need ON
    nonCriticalExtension                RRCConnectionReconfiguration-v1250-IEs  OPTIONAL
}

RRCConnectionReconfiguration-v1250-IEs ::= SEQUENCE {
    wlan-OffloadInfo-r12                CHOICE {
        release                             NULL,
        setup                               SEQUENCE {
            wlan-OffloadConfigDedicated-r12     WLAN-OffloadConfig-r12,
            t350-r12                            ENUMERATED {min5, min10, min20, min30, min60,
                                                min120, min180, spare1}     OPTIONAL        Need ON
        }
    }                                                                   OPTIONAL,           Need ON
    scg-Configuration-r12               SCG-Configuration-r12       OPTIONAL,   -- Cond
nonFullConfig
    sl-SyncTxControl-r12                SL-SyncTxControl-r12            OPTIONAL,   -- Need ON
    sl-DiscConfig-r12                   SL-DiscConfig-r12               OPTIONAL,   -- Need ON
    sl-CommConfig-r12                   SL-CommConfig-r12               OPTIONAL,   -- Need ON
    nonCriticalExtension                RRCConnectionReconfiguration-v13xy-IEs  OPTIONAL
}

RRCConnectionReconfiguration-v13xy-IEs ::= SEQUENCE {
    sCellToReleaseListExt-r13           SCellToReleaseListExt-r13       OPTIONAL,   -- Need ON
    sCellToAddModListExt-r13            SCellToAddModListExt-r13        OPTIONAL,   -- Need ON
    nonCriticalExtension                SEQUENCE {}                     OPTIONAL
}

SL-SyncTxControl-r12 ::=            SEQUENCE {
    networkControlledSyncTx-r12             ENUMERATED {on, off}        OPTIONAL        -- Need ON
}

PSCellToAddMod-r12 ::=              SEQUENCE {
    sCellIndex-r12                      SCellIndex-r10,
    cellIdentification-r12              SEQUENCE {
        physCellId-r12                      PhysCellId,
        dl-CarrierFreq-r12                  ARFCN-ValueEUTRA-r9
    }                                                               OPTIONAL,       Cond SCellAdd
    radioResourceConfigCommonPSCell-r12     RadioResourceConfigCommonPSCell-r12 OPTIONAL,   -- Cond
SCellAdd
    radioResourceConfigDedicatedPSCell-r12  RadioResourceConfigDedicatedPSCell-r12  OPTIONAL,   --
Cond SCellAdd2
    ....
    [[  antennaInfoDedicatedPSCell-v1280        AntennaInfoDedicated-v10l0  OPTIONAL   -- Need ON
```

```
    ]],
    [[  sCellIndex-r13                  SCellIndex-r13  OPTIONAL        -- Need ON
    ]]
}

PowerCoordinationInfo-r12 ::= SEQUENCE {
    p-MeNB-r12                          INTEGER (1..16),
    p-SeNB-r12                          INTEGER (1..16),
    powerControlMode-r12                INTEGER {1..2}
}

SCellToAddModList-r10 ::=       SEQUENCE (SIZE (1..maxSCell-r10)) OF SCellToAddMod-r10

SCellToAddModListExt-r13 ::=    SEQUENCE (SIZE (maxSCell-Plus1..maxSCell-r13)) OF SCellToAddMod-r13

SCellToAddMod-r10 ::=           SEQUENCE {
    sCellIndex-r10                      SCellIndex-r10,
    cellIdentification-r10              SEQUENCE {
        physCellId-r10                      PhysCellId,
        dl-CarrierFreq-r10                  ARFCN-ValueEUTRA
    }                                                           OPTIONAL,   -- Cond SCellAdd
    radioResourceConfigCommonSCell-r10      RadioResourceConfigCommonSCell-r10  OPTIONAL,   -- Cond
SCellAdd
    radioResourceConfigDedicatedSCell-r10   RadioResourceConfigDedicatedSCell-r10   OPTIONAL,
Cond SCellAdd2
    ...,
    [[  dl-CarrierFreq-v1090                ARFCN-ValueEUTRA-v9e0   OPTIONAL    -- Cond EARFCN-max
    ],
    [[  antennaInfoDedicatedSCell-v1010     AntennaInfoDedicated-v1010  OPTIONAL     -- Need ON
    ]]
}

SCellToAddMod-r13 ::=           SEQUENCE {
    sCellIndex-v13xy                    SCellIndex-v13xy,
    cellIdentification-r13              SEQUENCE {
        physCellId-r13                      PhysCellId,
        dl-CarrierFreq-r13                  ARFCN-ValueEUTRA-r9
    }                                                           OPTIONAL,   -- Cond SCellAdd
    radioResourceConfigCommonSCell-r13      RadioResourceConfigCommonSCell-r10  OPTIONAL,   -- Cond
SCellAdd
    radioResourceConfigDedicatedSCell-r13   RadioResourceConfigDedicatedSCell-r10   OPTIONAL   --
Cond SCellAdd2
}

SCellToReleaseList-r10 ::=          SEQUENCE (SIZE (1..maxSCell-r10)) OF SCellIndex-r10

SCellToReleaseListExt-r13 ::=       SEQUENCE (SIZE (maxSCell-Plus1..maxSCell-r13)) OF
SCellIndex-v13xy

SCG-Configuration-r12 ::=           CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        scg-ConfigPartMCG-r12               SEQUENCE {
            scg-Counter-r12                     INTEGER (0.. 65535)         OPTIONAL,   -- Need ON
            powerCoordinationInfo-r12           PowerCoordinationInfo-r12   OPTIONAL,   -- Need ON
            ...
        },                                                              OPTIONAL,   -- Need ON
        scg-ConfigPartSCG-r12               SCG-ConfigPartSCG-r12       OPTIONAL,   -- Need ON
    }
}

SCG-ConfigPartSCG-r12 ::=           SEQUENCE {
    radioResourceConfigDedicatedSCG-r12 RadioResourceConfigDedicatedSCG-r12 OPTIONAL,       Need ON
    sCellToReleaseListSCG-r12           SCellToReleaseList-r10      OPTIONAL,   -- Need ON
    pSCellToAddMod-r12                  PSCellToAddMod-r12          OPTIONAL,   -- Need ON
    sCellToAddModListSCG-r12            SCellToAddModList-r10       OPTIONAL,   -- Need ON
    mobilityControlInfoSCG-r12          MobilityControlInfoSCG-r12  OPTIONAL,   -- Need ON
    ...,
    [[
    sCellToReleaseListSCG-Ext-r13           SCellToReleaseListExt-r13       OPTIONAL,   -- Need ON
    sCellToAddModListSCG-Ext-r13                SCellToAddModListExt-r13    OPTIONAL    -- Need ON
    ]]
}

SecurityConfigHO ::=                SEQUENCE {
    handoverType                        CHOICE {
        intraLTE                            SEQUENCE {
```

```
        securityAlgorithmConfig             SecurityAlgorithmConfig     OPTIONAL,   -- Cond
fullConfig
        keyChangeIndicator                  BOOLEAN,
        nextHopChainingCount                NextHopChainingCount
    },
    interRAT                            SEQUENCE {
        securityAlgorithmConfig             SecurityAlgorithmConfig,
        nas-SecurityParamToEUTRA            OCTET STRING (SIZE(6))
    }
  },
  ...
}

-- ASN1STOP
```

RRCConnectionReconfiguration 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.
keyChangeIndicator
true is used only in an intra-cell handover when a K_{eNB} key is derived from a K_{ASME} key taken into use through the latest successful NAS SMC procedure, as described in TS 33.401 [32] for K_{eNB} re-keying. false is used in an intra-LTE handover when the new K_{eNB} key is obtained from the current K_{eNB} key or from the NH as described in TS 33.401 [32].
nas-securityParamToEUTRA
This field is used to transfer UE specific NAS layer information between the network and the UE. The RRC layer is transparent for this field, although it affects activation of AS- security after inter-RAT handover to E-UTRA. The content is defined in TS 24.301.
networkControlledSyncTx
This field indicates whether the UE shall transmit synchronisation information (i.e. become synchronisation source). Value *On* indicates the UE to transmit synchronisation information while value *Off* indicates the UE to not transmit such information.
nextHopChainingCount
Parameter NCC: See TS 33.401 [32].
p-MeNB
Indicates the guaranteed power for the MeNB, as specified in 36.213 [23].
powerControlMode
Indicates the power control mode used in DC. Value 1 corresponds to DC power control mode 1 and value 2 indicates DC power control mode 2, as specified in 36.213 [23].
p-SeNB
Indicates the guaranteed power for the SeNB as specified in 36.213 [23, Table 5.1.4.2-1].
sCellIndex
In case of DC, the SCellIndex is unique within the scope of the UE i.e. an SCG cell can not use the same value as used for an MCG cell. For *PSCellToAddMod*, if *sCellIndex-r13* is present, *sCellIndex-r12* shall be ignored.
sCellToAddModListSCG
Indicates the SCG cell to be added or modified. The field is used for SCG cells other than the PSCell (which is added/ modified by field *pSCellToAddMod*).
sCellToReleaseListSCG
Indicates the SCG cell to be released. The field is also used to release the PSCell e.g. upon change of PSCell, upon system information change for the PSCell.
scg-Counter
A counter used upon initial configuration of SCG security as well as upon refresh of S-K_{eNB}. E-UTRAN includes the field upon SCG change when one or more SCG DRBs are configured. Otherwise E-UTRAN does not include the field.
t350
Timer T350 as described in section 7.3. Value *minN* corresponds to N minutes.

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Conditional presence	Explanation
EARFCN-max	The field is mandatory present if *dl-CarrierFreq-r10* is included and set to *maxEARFCN*. Otherwise the field is not present.
fullConfig	This field is mandatory present for handover within E-UTRA when the *fullConfig* is included; otherwise it is optionally present, Need OP.
HO	The field is mandatory present in case of handover within E-UTRA or to E-UTRA; otherwise the field is not present.
HO-Reestab	This field is optionally present, need ON, in case of handover within E-UTRA or upon the first reconfiguration after RRC connection re-establishment; otherwise the field is not present.
HO-toEUTRA	The field is mandatory present in case of handover to E-UTRA or for reconfigurations when *fullConfig* is included; otherwise the field is optionally present, need ON.
nonFullConfig	The field is not present in case of handover within E-UTRA when the *fullConfig* is included or in case of handover to E-UTRA; otherwise it is optional present, need ON.
nonHO	The field is not present in case of handover within E-UTRA or to E-UTRA; otherwise it is optional present, need ON.
SCellAdd	The field is mandatory present upon SCell addition; otherwise it is not present.
SCellAdd2	The field is mandatory present upon SCell addition; otherwise it is optionally present, need ON.

-- RRCConnectionReconfigurationComplete

The *RRCConnectionReconfigurationComplete* 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 message

```
-- ASN1START

RRCConnectionReconfigurationComplete ::= SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        rrcConnectionReconfigurationComplete-r8
                                            RRCConnectionReconfigurationComplete-r8-IEs,
        criticalExtensionsFuture            SEQUENCE {}
    }
}

RRCConnectionReconfigurationComplete-r8-IEs ::= SEQUENCE {
    nonCriticalExtension                RRCConnectionReconfigurationComplete-v8a0-IEs   OPTIONAL
}

RRCConnectionReconfigurationComplete-v8a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                                    OPTIONAL,
    nonCriticalExtension                RRCConnectionReconfigurationComplete-v1020-IEs  OPTIONAL
}

RRCConnectionReconfigurationComplete-v1020-IEs ::= SEQUENCE {
    rlf-InfoAvailable-r10               ENUMERATED {true}               OPTIONAL,
    logMeasAvailable-r10                ENUMERATED {true}               OPTIONAL,
    nonCriticalExtension                RRCConnectionReconfigurationComplete-v1130-IEs  OPTIONAL
}

RRCConnectionReconfigurationComplete-v1130-IEs ::= SEQUENCE {
    connEstFailInfoAvailable-r11        ENUMERATED {true}               OPTIONAL,
    nonCriticalExtension                RRCConnectionReconfigurationComplete-v1250-IEs  OPTIONAL
}

RRCConnectionReconfigurationComplete-v1250-IEs ::= SEQUENCE {
    logMeasAvailableMBSFN-r12           ENUMERATED {true}               OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                     OPTIONAL
}
```


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```
-- ASN1STOP
```

– RRCConnectionReestablishment

The *RRCConnectionReestablishment* message is used to re-establish SRB1.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: E-UTRAN to UE

RRCConnectionReestablishment message

```
-- ASN1START

RRCConnectionReestablishment ::=    SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            rrcConnectionReestablishment-r8     RRCConnectionReestablishment-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4    NULL,
            spare3 NULL, spare2 NULL, spare1    NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

RRCConnectionReestablishment-r8-IEs ::= SEQUENCE {
    radioResourceConfigDedicated        RadioResourceConfigDedicated,
    nextHopChainingCount                NextHopChainingCount,
    nonCriticalExtension                RRCConnectionReestablishment-v8a0-IEs   OPTIONAL
}

RRCConnectionReestablishment-v8a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                            OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                             OPTIONAL
}

-- ASN1STOP
```

– RRCConnectionReestablishmentComplete

The *RRCConnectionReestablishmentComplete* message is used to confirm the successful completion of an RRC connection reestablishment.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

RRCConnectionReestablishmentComplete message

```
-- ASN1START

RRCConnectionReestablishmentComplete ::= SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        rrcConnectionReestablishmentComplete-r8
                                            RRCConnectionReestablishmentComplete-r8-IEs,
        criticalExtensionsFuture            SEQUENCE {}
    }
```

```
}

RRCConnectionReestablishmentComplete-r8-IEs ::= SEQUENCE {
    nonCriticalExtension                RRCConnectionReestablishmentComplete-v920-IEs   OPTIONAL
}

RRCConnectionReestablishmentComplete-v920-IEs ::= SEQUENCE {
    rlf-InfoAvailable-r9                ENUMERATED {true}               OPTIONAL,
    nonCriticalExtension                RRCConnectionReestablishmentComplete-v9a0-IEs   OPTIONAL
}

RRCConnectionReestablishmentComplete-v9a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                RRCConnectionReestablishmentComplete-v1020-IEs  OPTIONAL
}

RRCConnectionReestablishmentComplete-v1020-IEs ::= SEQUENCE {
    logMeasAvailable-r10                ENUMERATED {true}               OPTIONAL,
    nonCriticalExtension                RRCConnectionReestablishmentComplete-v1130-IEs  OPTIONAL
}

RRCConnectionReestablishmentComplete-v1130-IEs ::= SEQUENCE {
    connEstFailInfoAvailable-r11        ENUMERATED {true}               OPTIONAL,
    nonCriticalExtension                RRCConnectionReestablishmentComplete-v1250-IEs  OPTIONAL
}

RRCConnectionReestablishmentComplete-v1250-IEs ::= SEQUENCE {
    logMeasAvailableMBSFN-r12           ENUMERATED {true}               OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                     OPTIONAL
}

-- ASN1STOP
```

RRCConnectionReestablishmentComplete field descriptions
rlf-InfoAvailable
This field is used to indicate the availability of radio link failure or handover failure related measurements

-- *RRCConnectionReestablishmentReject*

The *RRCConnectionReestablishmentReject* message is used to indicate the rejection of an RRC connection reestablishment request.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: E-UTRAN to UE

RRCConnectionReestablishmentReject message

```
-- ASN1START

RRCConnectionReestablishmentReject ::= SEQUENCE {
    criticalExtensions                  CHOICE {
        rrcConnectionReestablishmentReject-r8
                                            RRCConnectionReestablishmentReject-r8-IEs,
        criticalExtensionsFuture            SEQUENCE {}
    }
}

RRCConnectionReestablishmentReject-r8-IEs ::= SEQUENCE {
    nonCriticalExtension                RRCConnectionReestablishmentReject-v9a0-IEs OPTIONAL
}

RRCConnectionReestablishmentReject-v9a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
}

-- ASN1STOP
```

-- RRCConnectionReestablishmentRequest

The *RRCConnectionReestablishmentRequest* 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 message

```
-- ASN1START

RRCConnectionReestablishmentRequest ::= SEQUENCE {
    criticalExtensions                  CHOICE {
        rrcConnectionReestablishmentRequest-r8
                                            RRCConnectionReestablishmentRequest-r8-IEs,
        criticalExtensionsFuture            SEQUENCE {}
    }
}

RRCConnectionReestablishmentRequest-r8-IEs ::= SEQUENCE {
    ue-Identity                         ReestabUE-Identity,
    reestablishmentCause                ReestablishmentCause,
    spare                               BIT STRING (SIZE (2))
}

ReestabUE-Identity ::=              SEQUENCE {
    c-RNTI                              C-RNTI,
    physCellId                          PhysCellId,
    shortMAC-I                          ShortMAC-I
}

ReestablishmentCause ::=            ENUMERATED {
                                        reconfigurationFailure, handoverFailure,
                                        otherFailure, spare1}

-- ASN1STOP
```

***RRCConnectionReestablishmentRequest* field descriptions**

physCellId
The Physical Cell Identity of the PCell the UE was connected to prior to the failure.

reestablishmentCause
Indicates the failure cause that triggered the re-establishment procedure.

ue-Identity
UE identity included to retrieve UE context and to facilitate contention resolution by lower layers.

-- RRCConnectionReject

The *RRCConnectionReject* message is used to reject the RRC connection establishment.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: E-UTRAN to UE

RRCConnectionReject message

```
-- ASN1START
```


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```
RRCConnectionReject ::=             SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            rrcConnectionReject-r8              RRCConnectionReject-r8-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

RRCConnectionReject-r8-IEs ::=      SEQUENCE {
    waitTime                            INTEGER (1..16),
    nonCriticalExtension                RRCConnectionReject-v8a0-IEs        OPTIONAL
}

RRCConnectionReject-v8a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                RRCConnectionReject-v1020-IEs       OPTIONAL
}

RRCConnectionReject-v1020-IEs ::=   SEQUENCE {
    extendedWaitTime-r10                INTEGER (1..1800)                   OPTIONAL,     -- Need ON
    nonCriticalExtension                RRCConnectionReject-v1130-IEs       OPTIONAL
}

RRCConnectionReject-v1130-IEs ::=   SEQUENCE {
    deprioritisationReq-r11             SEQUENCE {
        deprioritisationType-r11            ENUMERATED {frequency, e-utra},
        deprioritisationTimer-r11           ENUMERATED {min5, min10, min15, min30}
    }                                                                       OPTIONAL,     -- Need ON
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
}

-- ASN1STOP
```

RRCConnectionReject field descriptions
deprioritisationReq   Indicates whether the current frequency or RAT is to be de-prioritised. The UE shall be able to store a depriotisation request for up to 8 frequencies (applicable when receiving another frequency specific deprioritisation request before T325 expiry).
deprioritisationTimer   Indicates the period for which either the current carrier frequency or E-UTRA is deprioritised. Value *minN* corresponds to N minutes.
extendedWaitTime   Value in seconds for the wait time for Delay Tolerant access requests.
waitTime   Wait time value in seconds.

– *RRCConnectionRelease*

The *RRCConnectionRelease* message is used to command the release of an RRC connection.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

RRCConnectionRelease message

```
-- ASN1START

RRCConnectionRelease ::=            SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            rrcConnectionRelease-r8             RRCConnectionRelease-r8-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
```

```
        criticalExtensionsFuture            SEQUENCE {}
    }
}

RRCConnectionRelease-r8-IEs ::=     SEQUENCE {
    releaseCause                        ReleaseCause,
    redirectedCarrierInfo               RedirectedCarrierInfo               OPTIONAL,       -- Need ON
    idleModeMobilityControlInfo         IdleModeMobilityControlInfo         OPTIONAL,       -- Need OP
    nonCriticalExtension                RRCConnectionRelease-v890-IEs       OPTIONAL
}

RRCConnectionRelease-v890-IEs ::=   SEQUENCE {
    lateNonCriticalExtension            OCTET STRING (CONTAINING RRCConnectionRelease-v9e0-IEs)
    OPTIONAL,
    nonCriticalExtension                RRCConnectionRelease-v920-IEs       OPTIONAL
}

-- Late non critical extensions
RRCConnectionRelease-v9e0-IEs ::= SEQUENCE {
    redirectedCarrierInfo-v9e0          RedirectedCarrierInfo-v9e0          OPTIONAL,       -- Cond
NoRedirect-r8
    idleModeMobilityControlInfo-v9e0    IdleModeMobilityControlInfo-v9e0    OPTIONAL,       -- Cond
IdleInfoEUTRA
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
}

-- Regular non critical extensions
RRCConnectionRelease-v920-IEs ::=   SEQUENCE {
    cellInfoList-r9                     CHOICE {
        geran-r9                            CellInfoListGERAN-r9,
        utra-FDD-r9                         CellInfoListUTRA-FDD-r9,
        utra-TDD-r9                         CellInfoListUTRA-TDD-r9,
        ...,
        utra-TDD-r10                        CellInfoListUTRA-TDD-r10
    }                                                                       OPTIONAL,       Cond RedirectionOrHO
    nonCriticalExtension                RRCConnectionRelease-v1020-IEs      OPTIONAL
}

RRCConnectionRelease-v1020-IEs ::=  SEQUENCE {
    extendedWaitTime-r10                INTEGER (1..1800)           OPTIONAL,   -- Need ON
    nonCriticalExtension                SEQUENCE {}                 OPTIONAL
}

ReleaseCause ::=                    ENUMERATED {loadBalancingTAURequired,
                                        other, cs-FallbackHighPriority-v1020, spare1}

RedirectedCarrierInfo ::=           CHOICE {
    eutra                               ARFCN-ValueEUTRA,
    geran                               CarrierFreqsGERAN,
    utra-FDD                            ARFCN-ValueUTRA,
    utra-TDD                            ARFCN-ValueUTRA,
    cdma2000-HRPD                       CarrierFreqCDMA2000,
    cdma2000-1xRTT                      CarrierFreqCDMA2000,
    ...,
    utra-TDD-r10                        CarrierFreqListUTRA-TDD-r10
}

RedirectedCarrierInfo-v9e0 ::=      SEQUENCE {
    eutra-v9e0                          ARFCN-ValueEUTRA-v9e0
}

CarrierFreqListUTRA-TDD-r10 ::=     SEQUENCE (SIZE (1..maxFreqUTRA-TDD-r10)) OF ARFCN-ValueUTRA

IdleModeMobilityControlInfo ::=     SEQUENCE {
    freqPriorityListEUTRA               FreqPriorityListEUTRA               OPTIONAL,       -- Need ON
    freqPriorityListGERAN               FreqsPriorityListGERAN              OPTIONAL,       -- Need ON
    freqPriorityListUTRA-FDD            FreqPriorityListUTRA-FDD            OPTIONAL,       -- Need ON
    freqPriorityListUTRA-TDD            FreqPriorityListUTRA-TDD            OPTIONAL,       -- Need ON
    bandClassPriorityListHRPD           BandClassPriorityListHRPD           OPTIONAL,       -- Need ON
    bandClassPriorityList1XRTT          BandClassPriorityList1XRTT          OPTIONAL,       -- Need ON
    t320                                ENUMERATED {
                                            min5, min10, min20, min30, min60, min120, min180,
                                            spare1}                         OPTIONAL,       -- Need OR
    ...,
    [[  freqPriorityListExtEUTRA-r12        FreqPriorityListExtEUTRA-r12        OPTIONAL        --
Need ON
    ]],
```

```
    [[  freqPriorityListEUTRA-v13xy         FreqPriorityListEUTRA-v13xy         OPTIONAL,       --
Need ON
        freqPriorityListExtEUTRA-v13xy      FreqPriorityListExtEUTRA-v13xy      OPTIONAL        --
Need ON
    ]]
}

IdleModeMobilityControlInfo-v9e0 ::=    SEQUENCE {
    freqPriorityListEUTRA-v9e0          SEQUENCE (SIZE (1..maxFreq)) OF FreqPriorityEUTRA-v9e0
}

FreqPriorityListEUTRA ::=           SEQUENCE (SIZE (1..maxFreq)) OF FreqPriorityEUTRA

FreqPriorityListExtEUTRA-r12 ::=        SEQUENCE (SIZE (1..maxFreq)) OF FreqPriorityEUTRA-r12

FreqPriorityListEUTRA-v13xy ::=         SEQUENCE (SIZE (1..maxFreq)) OF FreqPriorityEUTRA-v13xy

FreqPriorityListExtEUTRA-v13xy ::=      SEQUENCE (SIZE (1..maxFreq)) OF FreqPriorityEUTRA-v13xy

FreqPriorityEUTRA ::=               SEQUENCE {
    carrierFreq                         ARFCN-ValueEUTRA,
    cellReselectionPriority             CellReselectionPriority
}

FreqPriorityEUTRA-v9e0 ::=          SEQUENCE {
    carrierFreq-v9e0                    ARFCN-ValueEUTRA-v9e0       OPTIONAL    -- Cond EARFCN-max
}

FreqPriorityEUTRA-r12 ::=               SEQUENCE {
    carrierFreq-r12                     ARFCN-ValueEUTRA-r9,
    cellReselectionPriority-r12         CellReselectionPriority
}

FreqPriorityEUTRA-v13xy ::=             SEQUENCE {
    cellReselectionSubPriority-r13              CellReselectionSubPriority-r13      OPTIONAL
Need ON
}

FreqsPriorityListGERAN ::=          SEQUENCE (SIZE (1..maxGNFG)) OF FreqsPriorityGERAN

FreqsPriorityGERAN ::=              SEQUENCE {
    carrierFreqs                        CarrierFreqsGERAN,
    cellReselectionPriority             CellReselectionPriority
}

FreqPriorityListUTRA-FDD ::=        SEQUENCE (SIZE (1..maxUTRA-FDD-Carrier)) OF FreqPriorityUTRA-FDD

FreqPriorityUTRA-FDD ::=            SEQUENCE {
    carrierFreq                         ARFCN-ValueUTRA,
    cellReselectionPriority             CellReselectionPriority
}

FreqPriorityListUTRA-TDD ::=        SEQUENCE (SIZE (1..maxUTRA-TDD-Carrier)) OF FreqPriorityUTRA-TDD

FreqPriorityUTRA-TDD ::=            SEQUENCE {
    carrierFreq                         ARFCN-ValueUTRA,
    cellReselectionPriority             CellReselectionPriority
}

BandClassPriorityListHRPD ::=       SEQUENCE (SIZE (1..maxCDMA-BandClass)) OF BandClassPriorityHRPD

BandClassPriorityHRPD ::=           SEQUENCE {
    bandClass                           BandclassCDMA2000,
    cellReselectionPriority             CellReselectionPriority
}

BandClassPriorityList1XRTT ::=  SEQUENCE (SIZE (1..maxCDMA-BandClass)) OF BandClassPriority1XRTT

BandClassPriority1XRTT ::=          SEQUENCE {
    bandClass                           BandclassCDMA2000,
    cellReselectionPriority             CellReselectionPriority
}

CellInfoListGERAN-r9 ::=        SEQUENCE (SIZE (1..maxCellInfoGERAN-r9)) OF CellInfoGERAN-r9

CellInfoGERAN-r9 ::=                SEQUENCE {
    physCellId-r9                       PhysCellIdGERAN,
    carrierFreq-r9                      CarrierFreqGERAN,
```

```
    systemInformation-r9                SystemInfoListGERAN
}

CellInfoListUTRA-FDD-r9 ::=         SEQUENCE (SIZE (1..maxCellInfoUTRA-r9)) OF CellInfoUTRA-FDD-r9

CellInfoUTRA-FDD-r9 ::=             SEQUENCE {
    physCellId-r9                       PhysCellIdUTRA-FDD,
    utra-BCCH-Container-r9              OCTET STRING
}

CellInfoListUTRA-TDD-r9 ::=         SEQUENCE (SIZE (1..maxCellInfoUTRA-r9)) OF CellInfoUTRA-TDD-r9

CellInfoUTRA-TDD-r9 ::=             SEQUENCE {
    physCellId-r9                       PhysCellIdUTRA-TDD,
    utra-BCCH-Container-r9              OCTET STRING
}

CellInfoListUTRA-TDD-r10 ::=        SEQUENCE (SIZE (1..maxCellInfoUTRA-r9)) OF CellInfoUTRA-TDD-r10

CellInfoUTRA-TDD-r10 ::=            SEQUENCE {
    physCellId-r10                      PhysCellIdUTRA-TDD,
    carrierFreq-r10                     ARFCN-ValueUTRA,
    utra-BCCH-Container-r10             OCTET STRING
}

-- ASN1STOP
```

RRCConnectionRelease field descriptions
carrierFreq or bandClass
The carrier frequency (UTRA and E-UTRA) and band class (HRPD and 1xRTT) for which the associated cellReselectionPriority is applied.
carrierFreqs
The list of GERAN carrier frequencies organised into one group of GERAN carrier frequencies.
cellInfoList
Used to provide system information of one or more cells on the redirected inter-RAT carrier frequency. The system information can be used if, upon redirection, the UE selects an inter-RAT cell indicated by the *physCellId* and *carrierFreq* (GERAN and UTRA TDD) or by the *physCellId* (other RATs). The choice shall match the *redirectedCarrierInfo*. In particular, E-UTRAN only applies value *utra-TDD-r10* in case *redirectedCarrierInfo* is set to *utra-TDD-r10*.
cellReselectionSubPriority
Fractional priority value added to *cellReselectionPriority* for the carrier.
extendedWaitTime
Value in seconds for the wait time for Delay Tolerant access requests.
freqPriorityListX
Provides a cell reselection priority for each frequency, by means of separate lists for each RAT (including E-UTRA). The UE shall be able to store at least 3 occurrences of *FreqsPriorityGERAN*. If E-UTRAN includes *freqPriorityListEUTRA-v9e0* it includes the same number of entries, and listed in the same order, as in *freqPriorityListEUTRA* (i.e. without suffix). Field *freqPriorityListExt* includes additional neighbouring inter-frequencies, i.e. extending the size of the inter-frequency carrier list using the general principles specified in 5.1.2. EUTRAN only includes *freqPriorityListExtEUTRA* if *freqPriorityListEUTRA* (i.e without suffix) includes *maxFreq* entries.
idleModeMobilityControlInfo
Provides dedicated cell reselection priorities. Used for cell reselection as specified in TS 36.304 [4]. For E-UTRA and UTRA frequencies, a UE that supports multi-band cells for the concerned RAT considers the dedicated priorities to be common for all overlapping bands (i.e. regardless of the ARFCN that is used).
redirectedCarrierInfo
The *redirectedCarrierInfo* indicates a carrier frequency (downlink for FDD) and is used to redirect the UE to an E-UTRA or an inter-RAT carrier frequency, by means of the cell selection upon leaving RRC_CONNECTED as specified in TS 36.304 [4].
releaseCause
The *releaseCause* is used to indicate the reason for releasing the RRC Connection. The cause value *cs-FallbackHighPriority* is only applicable when *redirectedCarrierInfo* is present with the value set to *utra-FDD*, *utra-TDD* or *utra-TDD-r10*. E-UTRAN should not set the *releaseCause* to *loadBalancingTAURequired* or to *cs-FallbackHighPriority* if the *extendedWaitTime* is present.
systemInformation
Container for system information of the GERAN cell i.e. one or more System Information (SI) messages as defined in TS 44.018 [45, table 9.1.1].
t320
Timer T320 as described in section 7.3. Value minN corresponds to N minutes.
utra-BCCH-Container
Contains System Information Container message as defined in TS 25.331 [19].

Conditional presence	Explanation
EARFCN-max	The field is mandatory present if the corresponding *carrierFreq* (i.e. without suffix) is set to *maxEARFCN*. Otherwise the field is not present.
IdleInfoEUTRA	The field is optionally present, need OP, if the *IdleModeMobilityControlInfo* (i.e. without suffix) is included and includes *freqPriorityListEUTRA*; otherwise the field is not present.
NoRedirect-r8	The field is optionally present, need OP, if the *redirectedCarrierInfo* (i.e. without suffix) is not included; otherwise the field is not present.
Redirection	The field is optionally present, need ON, if the *redirectedCarrierInfo* is included and set to *geran*, *utra-FDD*, *utra-TDD* or *utra-TDD-r10*; otherwise the field is not present.

— RRCConnectionRequest

The *RRCConnectionRequest* 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 message

```
-- ASN1START

RRCConnectionRequest ::=            SEQUENCE {
    criticalExtensions                  CHOICE {
        rrcConnectionRequest-r8             RRCConnectionRequest-r8-IEs,
        criticalExtensionsFuture            SEQUENCE {}
    }
}

RRCConnectionRequest-r8-IEs ::=     SEQUENCE {
    ue-Identity                         InitialUE-Identity,
    establishmentCause                  EstablishmentCause,
    spare                               BIT STRING (SIZE (1))
}

InitialUE-Identity ::=              CHOICE {
    s-TMSI                              S-TMSI,
    randomValue                         BIT STRING (SIZE (40))
}

EstablishmentCause ::=              ENUMERATED {
                                        emergency, highPriorityAccess, mt-Access, mo-Signalling,
                                        mo-Data, delayTolerantAccess-v1020, mo-VoiceCall-v1280,
spare1}

-- ASN1STOP
```

***RRCConnectionRequest* field descriptions**
establishmentCause
Provides the establishment cause for the RRC connection request as provided by the upper layers. W.r.t. the cause value names: highPriorityAccess concerns AC11..AC15, 'mt' stands for 'Mobile Terminating' and 'mo' for 'Mobile Originating'.
randomValue
Integer value in the range 0 to $2^{40} - 1$.
ue-Identity
UE identity included to facilitate contention resolution by lower layers.

-- *RRCConnectionSetup*

The *RRCConnectionSetup* message is used to establish SRB1.

Signalling radio bearer: SRB0

RLC-SAP: TM

Logical channel: CCCH

Direction: E-UTRAN to UE

RRCConnectionSetup message

```
-- ASN1START

RRCConnectionSetup ::=              SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            rrcConnectionSetup-r8               RRCConnectionSetup-r8-IEs,
            spare7 NULL,
```

```
        spare6 NULL, spare5 NULL, spare4 NULL,
        spare3 NULL, spare2 NULL, spare1 NULL
      },
      criticalExtensionsFuture          SEQUENCE {}
    }
}

RRCConnectionSetup-r8-IEs ::=       SEQUENCE {
    radioResourceConfigDedicated        RadioResourceConfigDedicated,
    nonCriticalExtension                RRCConnectionSetup-v8a0-IEs         OPTIONAL
}

RRCConnectionSetup-v8a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
}

-- ASN1STOP
```

-- RRCConnectionSetupComplete

The *RRCConnectionSetupComplete* message is used to confirm the successful completion of an RRC connection establishment.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

RRCConnectionSetupComplete message

```
-- ASN1START

RRCConnectionSetupComplete ::=      SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            rrcConnectionSetupComplete-r8       RRCConnectionSetupComplete-r8-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

RRCConnectionSetupComplete-r8-IEs ::= SEQUENCE {
    selectedPLMN-Identity               INTEGER (1..maxPLMN-r11),
    registeredMME                       RegisteredMME                       OPTIONAL,
    dedicatedInfoNAS                    DedicatedInfoNAS,
    nonCriticalExtension                RRCConnectionSetupComplete-v8a0-IEs OPTIONAL
}

RRCConnectionSetupComplete-v8a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                RRCConnectionSetupComplete-v1020-IEs    OPTIONAL
}

RRCConnectionSetupComplete-v1020-IEs ::= SEQUENCE {
    gummei-Type-r10                     ENUMERATED {native, mapped}         OPTIONAL,
    rlf-InfoAvailable-r10               ENUMERATED {true}                   OPTIONAL,
    logMeasAvailable-r10                ENUMERATED {true}                   OPTIONAL,
    rn-SubframeConfigReq-r10            ENUMERATED {required, notRequired}  OPTIONAL,
    nonCriticalExtension                RRCConnectionSetupComplete-v1130-IEs    OPTIONAL
}

RRCConnectionSetupComplete-v1130-IEs ::= SEQUENCE {
    connectFailInfoAvailable-r11        ENUMERATED {true}                   OPTIONAL,
    nonCriticalExtension                RRCConnectionSetupComplete-v1250-IEs        OPTIONAL
}

RRCConnectionSetupComplete-v1250-IEs ::= SEQUENCE {
    mobilityState-r12                   ENUMERATED {normal, medium, high, spare}    OPTIONAL,
```

```
    mobilityHistoryAvail-r12            ENUMERATED {true}               OPTIONAL,
    logMeasAvailableMBSFN-r12           ENUMERATED {true}               OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                     OPTIONAL
}

RegisteredMME ::=                   SEQUENCE {
    plmn-Identity                       PLMN-Identity                       OPTIONAL,
    mmegi                               BIT STRING (SIZE (16)),
    mmec                                MMEC
}

-- ASN1STOP
```

RRCConnectionSetupComplete field descriptions
gummei-Type This field is used to indicate whether the GUMMEI included is native (assigned by EPC) or mapped (from 2G/3G identifiers).
mmegi Provides the Group Identity of the registered MME within the PLMN, as provided by upper layers, see TS 23.003 [27].
mobilityState This field indicates the UE mobility state (as defined in TS 36.304 [4, 5.2.4.3]) just prior to UE going into RRC_CONNECTED state. The UE indicates the value of *medium* and *high* when being in Medium-mobility and High-mobility states respectively. Otherwise the UE indicates the value *normal*.
registeredMME This field is used to transfer the GUMMEI of the MME where the UE is registered, as provided by upper layers.
rn-SubframeConfigReq If present, this field indicates that the connection establishment is for an RN and whether a subframe configuration is requested or not.
selectedPLMN-Identity Index of the PLMN selected by the UE from the *plmn-IdentityList* included in SIB1. 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.

– SCGFailureInformation

The *SCGFailureInformation* message is used to provide information regarding failures detected by the UE.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

SCGFailureInformation message

```
-- ASN1START

SCGFailureInformation-r12 ::=       SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            scgFailureInformation-r12           SCGFailureInformation-r12-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

SCGFailureInformation-r12-IEs ::=   SEQUENCE {
    failureReportSCG-r12                failureReportSCG-r12            OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
}

failureReportSCG-r12 ::=            SEQUENCE {
    failureType-r12                     ENUMERATED {t313-Expiry, randomAccessProblem,
                                                    rlc-MaxNumRetx, scg-ChangeFailure },
    measResultServFreqList-r12          MeasResultServFreqList-r10      OPTIONAL,
    measResultNeighCells-r12            MeasResultList2EUTRA-r9         OPTIONAL,
    ...,
```

```
    [[
    measResultServFreqListExt-r13           MeasResultServFreqListExt-r13       OPTIONAL
    ]]
}

-- ASN1STOP
```

– SCPTMConfiguration

The *SCPTMConfiguration* 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 message

```
-- ASN1START

SCPTMConfiguration-r13 ::=      SEQUENCE {
    sc-mtch-InfoList-r13            SC-MTCH-InfoList-r13,
    scptmNeighbourCellList-r13      SCPTMNeighbourCellList-r13          OPTIONAL,
    ...
}

-- ASN1STOP
```

SCPTMConfiguration field descriptions
sc-mtch-InfoList
Provides the configuration of each SC-MTCH in the current cell.
scptmNeighbourCellList
List of neighbour cells providing MBMS services via SC-MRB. Absence of this field means that MBMS services listed in the SCPTMConfiguration message are not provided via SC-MRB in any neighbour cell.

– SecurityModeCommand

The *SecurityModeCommand* message is used to command the activation of AS security.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

SecurityModeCommand message

```
-- ASN1START

SecurityModeCommand ::=             SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            securityModeCommand-r8              SecurityModeCommand-r8-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

SecurityModeCommand-r8-IEs ::=      SEQUENCE {
```

```
    securityConfigSMC                   SecurityConfigSMC,
    nonCriticalExtension                SecurityModeCommand-v8a0-IEs        OPTIONAL
}

SecurityModeCommand-v8a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
}

SecurityConfigSMC ::=                   SEQUENCE {
    securityAlgorithmConfig                 SecurityAlgorithmConfig,
    ...
}

-- ASN1STOP
```

– *SecurityModeComplete*

The *SecurityModeComplete* message is used to confirm the successful completion of a security mode command.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

SecurityModeComplete message

```
-- ASN1START

SecurityModeComplete ::=            SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        securityModeComplete-r8             SecurityModeComplete-r8-IEs,
        criticalExtensionsFuture            SEQUENCE {}
    }
}

SecurityModeComplete-r8-IEs ::=     SEQUENCE {
    nonCriticalExtension                SecurityModeComplete-v8a0-IEs
    OPTIONAL
}

SecurityModeComplete-v8a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
}

-- ASN1STOP
```

– *SecurityModeFailure*

The *SecurityModeFailure* message is used to indicate an unsuccessful completion of a security mode command.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

SecurityModeFailure message

```
-- ASN1START

SecurityModeFailure ::=             SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
```

```
    criticalExtensions                  CHOICE {
        securityModeFailure-r8              SecurityModeFailure-r8-IEs,
        criticalExtensionsFuture            SEQUENCE {}
    }
}

SecurityModeFailure-r8-IEs ::=      SEQUENCE {
    nonCriticalExtension                SecurityModeFailure-v8a0-IEs
    OPTIONAL
}

SecurityModeFailure-v8a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
}

-- ASN1STOP
```

– *SidelinkUEInformation*

The *SidelinkUEInformation* message is used for the indication of sidelink information to the eNB.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

SidelinkUEInformation message

```
-- ASN1START

SidelinkUEInformation-r12 ::=       SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            sidelinkUEInformation-r12           SidelinkUEInformation-r12-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

SidelinkUEInformation-r12-IEs ::=   SEQUENCE {
    commRxInterestedFreq-r12        ARFCN-ValueEUTRA-r9         OPTIONAL,
    commTxResourceReq-r12           SL-CommTxResourceReq-r12    OPTIONAL,
    discRxInterest-r12              ENUMERATED {true}           OPTIONAL,
    discTxResourceReq-r12           INTEGER (1..63)             OPTIONAL,
    lateNonCriticalExtension        OCTET STRING                OPTIONAL,
    nonCriticalExtension            SidelinkUEInformation-v13x0-IEs OPTIONAL
}

SidelinkUEInformation-v13x0-IEs ::= SEQUENCE {
    commTxResourceReqU2N-r13        SL-CommTxResourceReqUC-r13  OPTIONAL,
    commTxResourceInfoReqRelay-r13      SEQUENCE {
        commTxResourceReqRelay-r13          SL-CommTxResourceReqUC-r13,
        ue-Type-r13                         ENUMERATED {relayUE, remoteUE}
    }                                                           OPTIONAL,
    discTxResourceReq-v13x0         SEQUENCE {
        carrierFreqDiscTx-r13           INTEGER (1..maxFreq),
        discTxResourceReqAddFreq-r13    SL-DiscTxResourceReqPerFreqList-r13 OPTIONAL
    }                                                           OPTIONAL,
    discTxResourceReqPS-r13         SL-DiscTxResourceReq-r13    OPTIONAL,
    discRxGapReq-r13                    SL-GapRequest-r13           OPTIONAL,
    discTxGapReq-r13                    SL-GapRequest-r13           OPTIONAL,
    discSysInfoReportList-r13           SL-SysInfoReportList-r13    OPTIONAL,
    nonCriticalExtension            SEQUENCE {}                 OPTIONAL
}

SL-CommTxResourceReq-r12 ::=        SEQUENCE {
    carrierFreq-r12                 ARFCN-ValueEUTRA-r9         OPTIONAL,
    destinationInfoList-r12         SL-DestinationInfoList-r12
}
```

```
SL-CommTxResourceReqUC-r13 ::=      SEQUENCE {
    carrierFreq-r13                 ARFCN-ValueEUTRA-r9         OPTIONAL,
    destinationInfoListUC-r13           SL-DestinationInfoListUC-r13
}

SL-DiscTxResourceReqPerFreqList-r13 ::= SEQUENCE (SIZE (1..maxFreq)) OF SL-DiscTxResourceReq-r13

SL-DiscTxResourceReq-r13 ::=        SEQUENCE {
    carrierFreq-r13                 ARFCN-ValueEUTRA-r9         OPTIONAL,
    discTxResourceReq-r13           INTEGER (1..63)
}

SL-DestinationInfoList-r12 ::=  SEQUENCE (SIZE (1..maxSL-Dest-r12)) OF SL-DestinationIdentity-r12

SL-DestinationIdentity-r12 ::=  BIT STRING (SIZE (24))

SL-DestinationInfoListUC-r13 ::=    SL-DestinationInfoList-r12

SL-SysInfoReportList-r13 ::=    SEQUENCE (SIZE (1.. maxSL-DiscSysInfoReportFreq-r13)) OF SL-
SysInfoReport-r13

-- ASN1STOP
```

***SidelinkUEInformation* field descriptions**
carrierFreqDiscTx
Indicates the frequency by the index of the entry in field *discInterFreqList* within *SystemInformationBlockType19*. Value 0 corresponds to the first entry in *discInterFreqList* within SystemInformationBlockType19, value 1 corresponds to the second entry in this list and so on.
commRxInterestedFreq
Indicates the frequency on which the UE is interested to receive sidelink communication.
commTxResourceReq
Indicates the frequency on which the UE is interested to transmit sidelink communication as well as the sidelink communication transmission destination(s) for which the UE requests E-UTRAN to assign dedicated resources.
commTxResourceReq121
Indicates the frequency on which the UE is interested to transmit non-relay related sidelink one to one communication as well as the sidelink communication transmission destination(s) for which the UE requests E-UTRAN to assign dedicated resources.
commTxResourceReqRelay
Indicates the relay related sidelink communication transmission destination(s) for which the relay or remote UE requests E-UTRAN to assign dedicated resources i.e. either contains relay or remote UE's unicast destination identity.
destinationInfoList
Indicates the destination which is identified by the ProSe Layer-2 Group ID as specified in TS 23.303 [68].
destinationInfoListUC
Indicates the unicast destination, as specified in TS 23.303 [68].
discRxInterest
Indicates that the UE is interested to monitor sidelink discovery announcements.
discTxResourceReq
Indicates the number of separate discovery message(s) the UE wants to transmit every discovery period. This field concerns the resources the UE requires every discovery period for transmitting sidelink discovery announcement(s).
discTxResourceReqPS
Indicates the number of separate public safety related discovery message(s) the UE wants to transmit every discovery period. This field concerns the resources the UE requires every discovery period for transmitting public safety related sidelink discovery announcement(s).
discSysInfoReportList
Indicates a list of acquired System Information from SIBs of cells on configured carrier frequencies.

– *SystemInformation*

The *SystemInformation* 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 message

```
-- ASN1START

SystemInformation ::=               SEQUENCE {
    criticalExtensions                  CHOICE {
        systemInformation-r8                SystemInformation-r8-IEs,
        criticalExtensionsFuture            SEQUENCE {}
    }
}
SystemInformation-r8-IEs ::=        SEQUENCE {
    sib-TypeAndInfo                     SEQUENCE (SIZE (1..maxSIB)) OF CHOICE {
        sib2                                SystemInformationBlockType2,
        sib3                                SystemInformationBlockType3,
        sib4                                SystemInformationBlockType4,
        sib5                                SystemInformationBlockType5,
        sib6                                SystemInformationBlockType6,
        sib7                                SystemInformationBlockType7,
        sib8                                SystemInformationBlockType8,
        sib9                                SystemInformationBlockType9,
        sib10                               SystemInformationBlockType10,
        sib11                               SystemInformationBlockType11,
        ...,
        sib12-v920                          SystemInformationBlockType12-r9,
        sib13-v920                          SystemInformationBlockType13-r9,
        sib14-v1130                         SystemInformationBlockType14-r11,
        sib15-v1130                         SystemInformationBlockType15-r11,
        sib16-v1130                         SystemInformationBlockType16-r11,
        sib17-v1250                         SystemInformationBlockType17-r12,
        sib18-v1250                         SystemInformationBlockType18-r12,
        sib19-v1250                         SystemInformationBlockType19-r12,
        sib20-v13x0                         SystemInformationBlockType20-r13
    },
    nonCriticalExtension                SystemInformation-v8a0-IEs          OPTIONAL
}

SystemInformation-v8a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
}

-- ASN1STOP
```

– *SystemInformationBlockType1*

SystemInformationBlockType1 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 message

```
-- ASN1START

SystemInformationBlockType1 ::=     SEQUENCE {
    cellAccessRelatedInfo               SEQUENCE {
        plmn-IdentityList                   PLMN-IdentityList,
        trackingAreaCode                    TrackingAreaCode,
```

```
        cellIdentity                    CellIdentity,
        cellBarred                      ENUMERATED {barred, notBarred},
        intraFreqReselection            ENUMERATED {allowed, notAllowed},
        csg-Indication                  BOOLEAN,
        csg-Identity                    CSG-Identity            OPTIONAL    -- Need OR
    },
    cellSelectionInfo               SEQUENCE {
        q-RxLevMin                      Q-RxLevMin,
        q-RxLevMinOffset                INTEGER (1..8)          OPTIONAL    -- Need OP
    },
    p-Max                           P-Max                       OPTIONAL,           Need OP
    freqBandIndicator               FreqBandIndicator,
    schedulingInfoList              SchedulingInfoList,
    tdd-Config                      TDD-Config                  OPTIONAL,   -- Cond TDD
    si-WindowLength                 ENUMERATED {
                                        ms1, ms2, ms5, ms10, ms15, ms20,
                                        ms40},
    systemInfoValueTag              INTEGER (0..31),
    nonCriticalExtension            SystemInformationBlockType1-v890-IEs    OPTIONAL
}

SystemInformationBlockType1-v890-IEs::= SEQUENCE {
    lateNonCriticalExtension        OCTET STRING (CONTAINING SystemInformationBlockType1-v8h0-
IEs)            OPTIONAL,
    nonCriticalExtension            SystemInformationBlockType1-v920-IEs    OPTIONAL
}

-- Late non critical extensions
SystemInformationBlockType1-v8h0-IEs ::=    SEQUENCE {
    multiBandInfoList               MultiBandInfoList       OPTIONAL,   -- Need OR
    nonCriticalExtension            SystemInformationBlockType1-v9e0-IEs    OPTIONAL
}

SystemInformationBlockType1-v9e0-IEs ::= SEQUENCE {
    freqBandIndicator-v9e0          FreqBandIndicator-v9e0      OPTIONAL,       Cond FBI-max
    multiBandInfoList-v9e0          MultiBandInfoList-v9e0      OPTIONAL,   -- Cond mFBI-max
    nonCriticalExtension            SystemInformationBlockType1-v10j0-IEs   OPTIONAL
}

SystemInformationBlockType1-v10j0-IEs ::= SEQUENCE {
    freqBandInfo-r10                NS-PmaxList-r10             OPTIONAL,   -- Need OR
    multiBandInfoList-v10j0         MultiBandInfoList-v10j0     OPTIONAL,   -- Need OP
    nonCriticalExtension            SEQUENCE {}                 OPTIONAL
}

   Regular non critical extensions
SystemInformationBlockType1-v920-IEs ::=    SEQUENCE {
    ims-EmergencySupport-r9         ENUMERATED {true}           OPTIONAL,       Need OR
    cellSelectionInfo-v920          CellSelectionInfo-v920      OPTIONAL,   -- Cond RSRQ
    nonCriticalExtension            SystemInformationBlockType1-v1130-IEs   OPTIONAL
}

SystemInformationBlockType1-v1130-IEs ::=   SEQUENCE {
    tdd-Config-v1130            TDD-Config-v1130            OPTIONAL,   -- Cond TDD-OR
    cellSelectionInfo-v1130         CellSelectionInfo-v1130     OPTIONAL,   -- Cond WB-RSRQ
    nonCriticalExtension            SystemInformationBlockType1-v1250-IEs   OPTIONAL
}

SystemInformationBlockType1-v1250-IEs ::=   SEQUENCE {
    cellAccessRelatedInfo-v1250             SEQUENCE {
        category0Allowed-r12                    ENUMERATED {true}       OPTIONAL        Need OP
    },
    cellSelectionInfo-v1250             CellSelectionInfo-v1250     OPTIONAL,   -- Cond RSRQ2
    freqBandIndicatorPriority-r12       ENUMERATED {true}           OPTIONAL,   -- Cond mFBI
    nonCriticalExtension            SystemInformationBlockType1-v13xy-IEs   OPTIONAL
}

SystemInformationBlockType1-v13xy-IEs ::=   SEQUENCE {
    hyperSFN                        BIT STRING (SIZE (10))      OPTIONAL,
    eDRXAllowed         ENUMERATED {true}       OPTIONAL,
    nonCriticalExtension            SEQUENCE {}                 OPTIONAL
}

PLMN-IdentityList ::=               SEQUENCE (SIZE (1..maxPLMN-r11)) OF PLMN-IdentityInfo

PLMN-IdentityInfo ::=               SEQUENCE {
    plmn-Identity                       PLMN-Identity,
    cellReservedForOperatorUse          ENUMERATED {reserved, notReserved}
```

```
}

SchedulingInfoList ::= SEQUENCE (SIZE (1..maxSI-Message)) OF SchedulingInfo

SchedulingInfo ::=  SEQUENCE {
    si-Periodicity                  ENUMERATED {
                                        rf8, rf16, rf32, rf64, rf128, rf256, rf512},
    sib-MappingInfo                 SIB-MappingInfo
}

SIB-MappingInfo ::= SEQUENCE (SIZE (0..maxSIB-1)) OF SIB-Type

SIB-Type ::=                        ENUMERATED {
                                        sibType3, sibType4, sibType5, sibType6,
                                        sibType7, sibType8, sibType9, sibType10,
                                        sibType11, sibType12-v920, sibType13-v920,
                                        sibType14-v1130, sibType15-v1130,
                                        sibType16-v1130, sibType17-v1250, sibType18-v1250,
                                        ..., sibType19-v1250, sibType20-v13xy}

CellSelectionInfo-v920 ::=          SEQUENCE {
    q-QualMin-r9                        Q-QualMin-r9,
    q-QualMinOffset-r9                  INTEGER (1..8)                  OPTIONAL    -- Need OP
}

CellSelectionInfo-v1130 ::=         SEQUENCE {
    q-QualMinWB-r11                     Q-QualMin-r9
}

CellSelectionInfo-v1250 ::=         SEQUENCE {
    q-QualMinRSRQ-OnAllSymbols-r12              Q-QualMin-r9
}

-- ASN1STOP
```

SystemInformationBlockType1 field descriptions
category0Allowed The presence of this field indicates category 0 UEs are allowed to access the cell.
cellBarred barred means the cell is barred, as defined in TS 36.304 [4].
cellReservedForOperatorUse As defined in TS 36.304 [4].
csg-Identity Identity of the Closed Subscriber Group the cell belongs to.
csg-Indication If set to TRUE the UE is only allowed to access the cell if it is a CSG member cell, if selected during manual CSG selection or to obtain limited service, see TS 36.304 [4].
eDRXAllowed Indicates if idle mode extended DRX is allowed in the cell. The UE shall not operate in idle mode extended DRX unless *eDRXAllowed* is set to *TRUE*.
freqBandIndicatorPriority If the field is present and supported by the UE, the UE shall prioritize the frequency bands in the *multiBandInfoList* IE in decreasing priority order. Only if the UE does not support any of the frequency band in *multiBandInfoList*, the UE shall use the value in *freqBandIndicator* IE. Otherwise, the UE applies frequency band according to the rules defined in *multiBandInfoList*.
freqBandInfo A list of *additionalPmax* and *additionalSpectrumEmission* values as defined in TS 36.101 [42, table 6.2.4-1] for the frequency band in *freqBandIndicator*.
hyperSFN Indicates hyper SFN which increments by one when the SFN wraps around.
ims-EmergencySupport Indicates whether the cell supports IMS emergency bearer services for UEs in limited service mode. If absent, IMS emergency call is not supported by the network in the cell for UEs in limited service mode.
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, as defined in TS 36.101 [42, table 5.5-1] that the cell belongs to. 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. If E-UTRAN includes *multiBandInfoList-v9e0* it includes the same number of entries, and listed in the same order, as in *multiBandInfoList* (i.e. without suffix). See Annex D for more descriptions. The UE shall ignore the rule defined in this field description if *freqBandIndicatorPriority* is present and supported by the UE.
multiBandInfoList-v10j0 A list of *additionalPmax* and *additionalSpectrumEmission* values as defined in TS 36.101 [42, table 6.2.4-1] for the frequency bands in *multiBandInfoList* (i.e. without suffix) and *multiBandInfoList-v9e0*. If E-UTRAN includes *multiBandInfoList-v10j0*, it includes the same number of entries, and listed in the same order, as in *multiBandInfoList* (i.e. without suffix).
plmn-IdentityList List of PLMN identities. The first listed *PLMN-Identity* is the primary PLMN.
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]. If *cellSelectionInfo-v920* is not present, the UE applies the (default) value of negative infinity for $Q_{qualmin}$. NOTE 1.
q-QualMinRSRQ-OnAllSymbols If this field is present and supported by the UE, the UE shall, when performing RSRQ measurements, perform RSRQ measurement on all OFDM symbols in accordance with TS 36.214 [48]. NOTE 1.
q-QualMinOffset Parameter "$Q_{qualminoffset}$" in TS 36.304 [4]. Actual value $Q_{qualminoffset}$ = IE value [dB]. If *cellSelectionInfo-v920* is not present or the field is not present, the UE applies the (default) value of 0 dB for $Q_{qualminoffset}$. Affects the minimum required quality level in the cell.
q-QualMinWB If this field is present and supported by the UE, the UE shall, when performing RSRQ measurements, use a wider bandwidth in accordance with TS 36.133 [16]. NOTE 1.
q-RxLevMinOffset Parameter $Q_{rxlevminoffset}$ in TS 36.304 [4]. Actual value $Q_{rxlevminoffset}$ = IE value * 2 [dB]. If absent, the UE applies the (default) value of 0 dB for $Q_{rxlevminoffset}$. Affects the minimum required Rx level in the cell.
sib-MappingInfo List of the SIBs mapped to this *SystemInformation* message.There is no mapping information of SIB2; it is always present in the first *SystemInformation* message listed in the *schedulingInfoList* list.

SystemInformationBlockType1 field descriptions
category0Allowed The presence of this field indicates category 0 UEs are allowed to access the cell.
si-Periodicity Periodicity of the SI-message in radio frames, such that rf8 denotes 8 radio frames, rf16 denotes 16 radio frames, and so on.
si-WindowLength Common SI scheduling window for all SIs. Unit in milliseconds, where ms1 denotes 1 millisecond, ms2 denotes 2 milliseconds and so on.
systemInfoValueTag Common for all SIBs other than MIB, SIB1, SIB10, SIB11, SIB12 and SIB14. Change of MIB and SIB1 is detected by acquisition of the corresponding message.
trackingAreaCode A *trackingAreaCode* that is common for all the PLMNs listed.

NOTE 1: The value the UE applies for parameter "$Q_{qualmin}$" in TS 36.304 [4] depends on the *q-QualMin* fields signalled by E-UTRAN and supported by the UE. In case multiple candidate options are available, the UE shall select the highest priority candidate option according to the priority order indicated by the following table (top row is highest priority).

q-QualMinRSRQ-OnAllSymbols	q-QualMinWB	Value of parameter "$Q_{qualmin}$" in TS 36.304 [4]
Included	Included	*q-QualMinRSRQ-OnAllSymbols – (q-QualMin – q-QualMinWB)*
Included	Not included	*q-QualMinRSRQ-OnAllSymbols*
Not included	Included	*q-QualMinWB*
Not included	Not included	*q-QualMin*

Conditional presence	Explanation
FBI-max	The field is mandatory present if *freqBandIndicator* (i.e. without suffix) is set to *maxFBI*. Otherwise the field is not present.
mFBI	The field is optional present, Need OR, if *multiBandInfoList* is present. Otherwise the field is not present.
mFBI-max	The field is mandatory present if one or more entries in *multiBandInfoList* (i.e. without suffix, introduced in -v8h0) is set to *maxFBI*. Otherwise the field is not present.
RSRQ	The field is mandatory present if SIB3 is being broadcast and *threshServingLowQ* is present in SIB3; otherwise optionally present, Need OP.
RSRQ2	The field is mandatory present if *q-QualMinRSRQ-OnAllSymbols* is present in SIB3; otherwise it is not present and the UE shall delete any existing value for this field.
TDD	This field is mandatory present for TDD; it is not present for FDD and the UE shall delete any existing value for this field.
TDD-OR	The field is optional present for TDD, need OR; it is not present for FDD.
WB-RSRQ	The field is optionally present, need OP if the measurement bandwidth indicated by *allowedMeasBandwidth* in *systemInformationBlockType3* is 50 resource blocks or larger; otherwise it is not present.

– *UEAssistanceInformation*

The *UEAssistanceInformation* message is used for the indication of UE assistance information to the eNB.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

UEAssistanceInformation message

```
-- ASN1START

UEAssistanceInformation-r11 ::=             SEQUENCE {
    criticalExtensions                      CHOICE {
        c1                                      CHOICE {
```

```
            ueAssistanceInformation-r11         UEAssistanceInformation-r11-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

UEAssistanceInformation-r11-IEs ::=     SEQUENCE {
    powerPrefIndication-r11             ENUMERATED {normal, lowPowerConsumption}    OPTIONAL,
    lateNonCriticalExtension            OCTET STRING                                OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                                 OPTIONAL
}

-- ASN1STOP
```

UEAssistanceInformation field descriptions

powerPrefIndication
Value *lowPowerConsumption* indicates the UE prefers a configuration that is primarily optimised for power saving. Otherwise the value is set to *normal*.

– UECapabilityEnquiry

The *UECapabilityEnquiry* message is used to request the transfer of UE radio access capabilities for E-UTRA as well as for other RATs.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

UECapabilityEnquiry message

```
-- ASN1START

UECapabilityEnquiry ::=             SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            ueCapabilityEnquiry-r8              UECapabilityEnquiry-r8-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

UECapabilityEnquiry-r8-IEs ::=      SEQUENCE {
    ue-CapabilityRequest                UE-CapabilityRequest,
    nonCriticalExtension                UECapabilityEnquiry-v8a0-IEs        OPTIONAL
}

UECapabilityEnquiry-v8a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                UECapabilityEnquiry-v1180-IEs
    OPTIONAL
}

UECapabilityEnquiry-v1180-IEs ::= SEQUENCE {
    requestedFrequencyBands-r11         SEQUENCE (SIZE (1..16)) OF FreqBandIndicator-r11
                OPTIONAL,
    nonCriticalExtension                UECapabilityEnquiry-v13xy-IEs
    OPTIONAL
}

UECapabilityEnquiry-v13zy-IEs ::= SEQUENCE {
    requestReducedFormat-r13            ENUMERATED {true}                   OPTIONAL,
    skipFallbackCombinations-r13        ENUMERATED {true}                   OPTIONAL,
    requestedMaxCCsDL-r13           INTEGER (2..32)                     OPTIONAL,
    requestedMaxCCsUL-r13           INTEGER (2..32)                     OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
```

```
}

UE-CapabilityRequest ::=        SEQUENCE (SIZE (1..maxRAT-Capabilities)) OF RAT-Type

-- ASN1STOP
```

UECapabilityEnquiry field descriptions
requestReducedFormat   Indicates that the UE if supported is requested to provide supported CA band combinations in the *supportedBandCombinations-r13* instead of the *supportedBandCombination-r10*.
skipFallbackCombinations   Indicates that the UE shall explicitly exclude fallback CA band combinations in capability signalling.
ue-CapabilityRequest   List of the RATs for which the UE is requested to transfer the UE radio access capabilities i.e. E-UTRA, UTRA, GERAN-CS, GERAN-PS, CDMA2000.
requestedFrequencyBands   List of frequency bands for which the UE is requested to provide supported CA band combinations and non CA bands.
requestedMaxCCsDL, requestedMaxCCsUL   Indicates the maximum number of CCs for which the UE is requested to provide supported CA band combinations and non-CA bands.

– *UECapabilityInformation*

The *UECapabilityInformation* message is used to transfer of UE radio access capabilities requested by the E-UTRAN.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

UECapabilityInformation message

```
-- ASN1START

UECapabilityInformation ::=         SEQUENCE {
    rrc-TransactionIdentifier           RRC-TransactionIdentifier,
    criticalExtensions                  CHOICE {
        c1                                  CHOICE{
            ueCapabilityInformation-r8          UECapabilityInformation-r8-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

UECapabilityInformation-r8-IEs ::=  SEQUENCE {
    ue-CapabilityRAT-ContainerList      UE-CapabilityRAT-ContainerList,
    nonCriticalExtension                UECapabilityInformation-v8a0-IEs    OPTIONAL
}

UECapabilityInformation-v8a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                UECapabilityInformation-v1250-IEs   OPTIONAL
}

UECapabilityInformation-v1250-IEs ::= SEQUENCE {
    ue-RadioPagingInfo-r12              UE-RadioPagingInfo-r12              OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
}

-- ASN1STOP
```

***UECapabilityInformation* field descriptions**

ue-RadioPagingInfo
This field contains information used for paging of category 0 UEs.

– *UEInformationRequest*

The *UEInformationRequest* is the command used by E-UTRAN to retrieve information from the UE.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: E-UTRAN to UE

UEInformationRequest message

```
-- ASN1START

UEInformationRequest-r9-IEs ::=         SEQUENCE {
    rach-ReportReq-r9                       BOOLEAN,
    rlf-ReportReq-r9                        BOOLEAN,
    nonCriticalExtension                    UEInformationRequest-v930-IEs       OPTIONAL
}

UEInformationRequest-v930-IEs ::= SEQUENCE {
    lateNonCriticalExtension                OCTET STRING                        OPTIONAL,
    nonCriticalExtension                    UEInformationRequest-v1020-IEs      OPTIONAL
}

UEInformationRequest-v1020-IEs ::=  SEQUENCE {
    logMeasReportReq-r10                    ENUMERATED {true}                   OPTIONAL,   -- Need ON
    nonCriticalExtension                    UEInformationRequest-v1130-IEs      OPTIONAL
}

UEInformationRequest-v1130-IEs ::= SEQUENCE {
    conEstFailReportReq-r11                 ENUMERATED {true}                   OPTIONAL,   -- Need ON
    nonCriticalExtension                    UEInformationRequest-v1250-IEs      OPTIONAL
}

UEInformationRequest-v1250-IEs ::= SEQUENCE {
    mobilityHistoryReportReq-r12            ENUMERATED {true}                   OPTIONAL,   -- Need ON
    nonCriticalExtension                    SEQUENCE {}                         OPTIONAL
}

-- ASN1STOP
```

***UEInformationRequest* field descriptions**

rach-ReportReq
This field is used to indicate whether the UE shall report information about the random access procedure.

– *UEInformationResponse*

The *UEInformationResponse* message is used by the UE to transfer the information requested by the E-UTRAN.

Signalling radio bearer: SRB1 or SRB2 (when logged measurement information is included)

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

UEInformationResponse message

```
-- ASN1START

UEInformationResponse-r9 ::=        SEQUENCE {
    rrc-TransactionIdentifier       RRC-TransactionIdentifier,
    criticalExtensions              CHOICE {
        c1                          CHOICE {
            ueInformationResponse-r9            UEInformationResponse-r9-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

UEInformationResponse-r9-IEs ::=    SEQUENCE {
    rach-Report-r9                  SEQUENCE {
        numberOfPreamblesSent-r9        NumberOfPreamblesSent-r11,
        contentionDetected-r9           BOOLEAN
    }                                                   OPTIONAL,
    rlf-Report-r9                   RLF-Report-r9       OPTIONAL,
    nonCriticalExtension            UEInformationResponse-v930-IEs          OPTIONAL
}

-- Late non critical extensions
UEInformationResponse-v9e0-IEs ::= SEQUENCE {
    rlf-Report-v9e0                 RLF-Report-v9e0             OPTIONAL,
    nonCriticalExtension            SEQUENCE {}                 OPTIONAL
}

-- Regular non critical extensions
UEInformationResponse-v930-IEs ::=  SEQUENCE {
    lateNonCriticalExtension        OCTET STRING (CONTAINING UEInformationResponse-v9e0-IEs)
    OPTIONAL,
    nonCriticalExtension            UEInformationResponse-v1020-IEs     OPTIONAL
}

UEInformationResponse-v1020-IEs ::= SEQUENCE {
    logMeasReport-r10               LogMeasReport-r10           OPTIONAL,
    nonCriticalExtension            UEInformationResponse-v1130-IEs     OPTIONAL
}

UEInformationResponse-v1130-IEs ::= SEQUENCE {
    connEstFailReport-r11           ConnEstFailReport-r11       OPTIONAL,
    nonCriticalExtension            UEInformationResponse-v1250-IEs OPTIONAL
}

UEInformationResponse-v1250-IEs ::= SEQUENCE {
    mobilityHistoryReport-r12       MobilityHistoryReport-r12   OPTIONAL,
    nonCriticalExtension            SEQUENCE {}                 OPTIONAL
}

RLF-Report-r9 ::=                   SEQUENCE {
    measResultLastServCell-r9           SEQUENCE {
        rsrpResult-r9                       RSRP-Range,
        rsrqResult-r9                       RSRQ-Range          OPTIONAL
    },
    measResultNeighCells-r9             SEQUENCE {
        measResultListEUTRA-r9              MeasResultList2EUTRA-r9         OPTIONAL,
        measResultListUTRA-r9               MeasResultList2UTRA-r9          OPTIONAL,
        measResultListGERAN-r9              MeasResultList2GERAN            OPTIONAL,
        measResultsCDMA2000-r9              MeasResultList2CDMA2000-r9      OPTIONAL
    }   OPTIONAL,
    ...,
    [[  locationInfo-r10                LocationInfo-r10        OPTIONAL,
        failedPCellId-r10                   CHOICE {
            cellGlobalId-r10                    CellGlobalIdEUTRA,
            pci-arfcn-r10                       SEQUENCE {
                physCellId-r10                      PhysCellId,
                carrierFreq-r10                     ARFCN-ValueEUTRA
            }
```

```
        },                                                  OPTIONAL,
        reestablishmentCellId-r10       CellGlobalIdEUTRA   OPTIONAL,
        timeConnFailure-r10             INTEGER (0..1023)   OPTIONAL,
        connectionFailureType-r10       ENUMERATED {rlf, hof}   OPTIONAL,
        previousPCellId-r10             CellGlobalIdEUTRA   OPTIONAL
    }],
    [[  failedPCellId-v1090             SEQUENCE {
            carrierFreq-v1090               ARFCN-ValueEUTRA-v9e0
        }                                                   OPTIONAL
    ]],
    [[  basicFields-r11                 SEQUENCE {
            c-RNTI-r11                      C-RNTI,
            rlf-Cause-r11                   ENUMERATED {
                                                t310-Expiry, randomAccessProblem,
                                                rlc-MaxNumRetx, t312-Expiry-r12},
            timeSinceFailure-r11            TimeSinceFailure-r11
        },                                                  OPTIONAL,
        previousUTRA-CellId-r11         SEQUENCE {
            carrierFreq-r11                 ARFCN-ValueUTRA,
            physCellId-r11                  CHOICE {
                fdd-r11                         PhysCellIdUTRA-FDD,
                tdd-r11                         PhysCellIdUTRA-TDD
            },
            cellGlobalId-r11                CellGlobalIdUTRA    OPTIONAL
        },                                                  OPTIONAL,
        selectedUTRA-CellId-r11         SEQUENCE {
            carrierFreq-r11                 ARFCN-ValueUTRA,
            physCellId-r11                  CHOICE {
                fdd-r11                         PhysCellIdUTRA-FDD,
                tdd-r11                         PhysCellIdUTRA-TDD
            }
        }                                                   OPTIONAL
    ]],
    [[  failedPCellId-v1250             SEQUENCE {
            tac-failedPCell-r12             TrackingAreaCode
        },                                                  OPTIONAL,
        measResultLastServCell-v1250    RSRQ-Range-v1250    OPTIONAL,
        lastServCellRSRQ-Type-r12       RSRQ-Type-r12       OPTIONAL,
        measResultListEUTRA-v1250       MeasResultList2EUTRA-v1250  OPTIONAL
    ]],
    [[  droppedQCI-r13                  ENUMERATED {qci1}   OPTIONAL
    ]]
}

RLF-Report-v9e0 ::=             SEQUENCE {
    measResultListEUTRA-v9e0        MeasResultList2EUTRA-v9e0
}

MeasResultList2EUTRA-r9 ::=         SEQUENCE (SIZE (1..maxFreq)) OF MeasResult2EUTRA-r9

MeasResultList2EUTRA-v9e0 ::=       SEQUENCE (SIZE (1..maxFreq)) OF MeasResult2EUTRA-v9e0

MeasResultList2EUTRA-v1250 ::=      SEQUENCE (SIZE (1..maxFreq)) OF MeasResult2EUTRA-v1250

MeasResult2EUTRA-r9 ::=         SEQUENCE {
    carrierFreq-r9                  ARFCN-ValueEUTRA,
    measResultList-r9               MeasResultListEUTRA
}

MeasResult2EUTRA-v9e0 ::=           SEQUENCE {
    carrierFreq-v9e0                    ARFCN-ValueEUTRA-v9e0       OPTIONAL
}

MeasResult2EUTRA-v1250 ::=          SEQUENCE {
    rsrq-Type-r12                       RSRQ-Type-r12       OPTIONAL
}

MeasResultList2UTRA-r9 ::=      SEQUENCE (SIZE (1..maxFreq)) OF MeasResult2UTRA-r9

MeasResult2UTRA-r9 ::=          SEQUENCE {
    carrierFreq-r9                  ARFCN-ValueUTRA,
    measResultList-r9               MeasResultListUTRA
}

MeasResultList2CDMA2000-r9 ::=  SEQUENCE (SIZE (1..maxFreq)) OF MeasResult2CDMA2000-r9

MeasResult2CDMA2000-r9 ::=      SEQUENCE {
    carrierFreq-r9                  CarrierFreqCDMA2000,
```


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```
    measResultLList-r9                  MeasResultsCDMA2000
}

LogMeasReport-r10 ::=               SEQUENCE {
    absoluteTimeStamp-r10               AbsoluteTimeInfo-r10,
    traceReference-r10                  TraceReference-r10,
    traceRecordingSessionRef-r10        OCTET STRING (SIZE (2)),
    tce-Id-r10                          OCTET STRING (SIZE (1)),
    logMeasInfoList-r10                 LogMeasInfoList-r10,
    logMeasAvailable-r10                ENUMERATED {true}               OPTIONAL,
    ...
}

LogMeasInfoList-r10 ::=         SEQUENCE (SIZE (1..maxLogMeasReport-r10)) OF LogMeasInfo-r10

LogMeasInfo-r10 ::=         SEQUENCE {
    locationInfo-r10                    LocationInfo-r10        OPTIONAL,
    relativeTimeStamp-r10               INTEGER (0..7200),
    servCellIdentity-r10                CellGlobalIdEUTRA,
    measResultServCell-r10              SEQUENCE {
        rsrpResult-r10                      RSRP-Range,
        rsrqResult-r10                      RSRQ-Range
    },
    measResultNeighCells-r10            SEQUENCE {
        measResultListEUTRA-r10             MeasResultList2EUTRA-r9     OPTIONAL,
        measResultListUTRA-r10              MeasResultList2UTRA-r9      OPTIONAL,
        measResultListGERAN-r10             MeasResultList2GERAN-r10    OPTIONAL,
        measResultListCDMA2000-r10          MeasResultList2CDMA2000-r9  OPTIONAL
    }   OPTIONAL,
    ...,
    [[  measResultListEUTRA-v1090           MeasResultList2EUTRA-v9e0   OPTIONAL
    ]],
    [[  measResultListMBSFN-r12             MeasResultListMBSFN-r12 OPTIONAL,
        measResultServCell-v1250            RSRQ-Range-v1250            OPTIONAL,
        servCellRSRQ-Type-r12               RSRQ-Type-r12               OPTIONAL,
        measResultListEUTRA-v1250           MeasResult.ListEUTRA-v1250  OPTIONAL
    ]],
    [[  inDeviceCoexDetected-r13            ENUMERATED {true}           OPTIONAL
    ]]
}

MeasResultListMBSFN-r12 ::=             SEQUENCE (SIZE (1..maxMBSFN-Area)) OF MeasResultMBSFN-r12

MeasResultMBSFN-r12 ::=             SEQUENCE {
    mbsfn-Area-r12                      SEQUENCE {
        mbsfn-AreaId-r12                    MBSFN-AreaId-r12,
        carrierFreq-r12                     ARFCN-ValueEUTRA-r9
    },
    rsrpResultMBSFN-r12                 RSRP-Range,
    rsrqResultMBSFN-r12                 MBSFN-RSRQ-Range-r12,
    signallingBLER-Result-r12           BLER-Result-r12             OPTIONAL,
    dataBLER-MCH-ResultList-r12         DataBLER-MCH-ResultList-r12 OPTIONAL,
    ...
}

DataBLER-MCH-ResultList-r12 ::=         SEQUENCE (SIZE (1.. maxPMCH-PerMBSFN)) OF DataBLER-MCH-
Result-r12

DataBLER-MCH-Result-r12 ::=             SEQUENCE {
    mch-Index-r12                       INTEGER (1..maxPMCH-PerMBSFN),
    dataBLER-Result-r12                 BLER-Result-r12
}

BLER-Result-r12 ::=                 SEQUENCE {
    bler-r12                            BLER-Range-r12,
    blocksReceived-r12                  SEQUENCE {
        n-r12                               BIT STRING (SIZE (3)),
        m-r12                               BIT STRING (SIZE (8))
    }
}

BLER-Range-r12 ::=                  INTEGER(0..31)

MeasResultList2GERAN-r10 ::=            SEQUENCE (SIZE (1..maxCellListGERAN)) OF MeasResultList2GERAN

ConnEstFailReport-r11 ::=           SEQUENCE {
    failedCellId-r11                    CellGlobalIdEUTRA,
    locationInfo-r11                    LocationInfo-r10                OPTIONAL,
```

```
    measResultFailedCell-r11                SEQUENCE {
        rsrpResult-r11                          RSRP-Range,
        rsrqResult-r11                          RSRQ-Range              OPTIONAL
    },
    measResultNeighCells-r11                SEQUENCE {
        measResultListEUTRA-r11                 MeasResultList2EUTRA-r9         OPTIONAL,
        measResultListUTRA-r11                  MeasResultList2UTRA-r9          OPTIONAL,
        measResultListGERAN-r11                 MeasResultList2GERAN            OPTIONAL,
        measResultsCDMA2000-r11                 MeasResultList2CDMA2000-r9      OPTIONAL
    }   OPTIONAL,
    numberOfPreamblesSent-r11           NumberOfPreamblesSent-r11,
    contentionDetected-r11              BOOLEAN,
    maxTxPowerReached-r11               BOOLEAN,
    timeSinceFailure-r11                TimeSinceFailure-r11,
    measResultListEUTRA-v1130           MeasResultList2EUTRA-v9e0       OPTIONAL,
    ...,
    [[  measResultFailedCell-v1250      RSRQ-Range-v1250                OPTIONAL,
        failedCellRSRQ-Type-r12         RSRQ-Type-r12                   OPTIONAL,
        measResultListEUTRA-v1250       MeasResultList2EUTRA-v1250      OPTIONAL
    ]]
}

NumberOfPreamblesSent-r11 ::=       INTEGER (1..200)

TimeSinceFailure-r11 ::=            INTEGER (0..172800)

MobilityHistoryReport-r12 ::=   VisitedCellInfoList-r12

-- ASN1STOP
```

UEInformationResponse field descriptions
absoluteTimeStamp Indicates the absolute time when the logged measurement configuration logging is provided, as indicated by E-UTRAN within *absoluteTimeInfo*.
bler Indicates the measured BLER value. The coding of BLER value is defined in TS 36.133 [16].
blocksReceived Indicates total number of MCH blocks, which were received by the UE and used for the corresponding BLER calculation, within the measurement period as defined in TS 36.133 [16].
carrierFreq In case the UE includes *carrierFreq-v9e0* and/ or *carrierFreq-v1090*, the UE shall set the corresponding entry of *carrierFreq-r9* and/ or *carrierFreq-r10* respectively to *maxEARFCN*. For E-UTRA and UTRA frequencies, the UE sets the ARFCN according to the band used when obtaining the concerned measurement results.
connectionFailureType This field is used to indicate whether the connection failure is due to radio link failure or handover failure.
contentionDetected This field is used to indicate that contention was detected for at least one of the transmitted preambles, see TS 36.321 [6].
c-RNTI This field indicates the C-RNTI used in the PCell upon detecting radio link failure or the C-RNTI used in the source PCell upon handover failure.
droppedQCI This field is used to indicate the radio link failure concerned bearer with QCI value equal 1, see TS 24.301 [35].
dataBLER-MCH-ResultList Includes a BLER result per MCH on subframes using *dataMCS*, with the applicable MCH(s) listed in the same order as in *pmch-InfoList* within *MBSFNAreaConfiguration*.
failedCellId This field is used to indicate the cell in which connection establishment failed.
failedPCellId This field is used to indicate the PCell in which RLF is detected or the target PCell of the failed handover. The UE sets the EARFCN according to the band used for transmission/ reception when the failure occurred.
inDeviceCoexDetected Indicates the reason for measurement logging suspension due to IDC problem detection.
maxTxPowerReached This field is used to indicate whether or not the maximum power level was used for the last transmitted preamble, see TS 36.321 [6].
mch-Index Indicates the MCH by referring to the entry as listed in *pmch-InfoList* within *MBSFNAreaConfiguration*.
measResultFailedCell This field refers to the last measurement results taken in the cell, where connection establishment failure happened.
measResultLastServCell This field refers to the last measurement results taken in the PCell, where radio link failure or handover failure happened.
measResultListEUTRA If *measResultListEUTRA-v9e0*, *measResultListEUTRA-v1090* or *measResultListEUTRA-v1130* is included, the UE shall include the same number of entries, and listed in the same order, as in *measResultListEUTRA-r9*, *measResultListEUTRA-r10* and/ or *measResultListEUTRA-r11* respectively.
measResultListEUTRA-v1250 If included in *RLF-Report-r9* the UE shall include the same number of entries, and listed in the same order, as in *measResultListEUTRA-r9*; If included in *LogMeasInfo-r10* the UE shall include the same number of entries, and listed in the same order, as in *measResultListEUTRA-r10*; If included in *ConnEstFailReport-r11* the UE shall include the same number of entries, and listed in the same order, as in *measResultListEUTRA-r11*;
mobilityHistoryReport This field is used to indicate the time of stay in 16 most recently visited E-UTRA cells or of stay out of E-UTRA.
numberOfPreamblesSent This field is used to indicate the number of RACH preambles that were transmitted. Corresponds to parameter PREAMBLE_TRANSMISSION_COUNTER in TS 36.321 [6].
previousPCellId This field is used to indicate the source PCell of the last handover (source PCell when the last *RRC-Connection-Reconfiguration* message including *mobilityControlInfo*was received).
previousUTRA-CellId This field is used to indicate the source UTRA cell of the last successful handover to E-UTRAN, when RLF occurred at the target PCell. The UE sets the ARFCN according to the band used for transmission/ reception on the concerned cell.

UEInformationResponse field descriptions
reestablishmentCellId
This field is used to indicate the cell in which the re-establishment attempt was made after connection failure.
relativeTimeStamp
Indicates the time of logging measurement results, measured relative to the *absoluteTimeStamp*. Value in seconds.
rlf-Cause
This field is used to indicate the cause of the last radio link failure that was detected. In case of handover failure information reporting (i.e., the *connectionFailureType* is set to '*hof*'), the UE is allowed to set this field to any value.
selectedUTRA-CellId
This field is used to indicate the UTRA cell that the UE selects after RLF is detected, while T311 is running. The UE sets the ARFCN according to the band selected for transmission/ reception on the concerned cell.
signallingBLER-Result
Includes a BLER result of MBSFN subframes using *signallingMCS*.
tac-FailedPCell
This field is used to indicate the Tracking Area Code of the PCell in which RLF is detected.
tce-Id
Parameter Trace Collection Entity Id: See TS 32.422 [58].
timeConnFailure
This field is used to indicate the time elapsed since the last HO initialization until connection failure. Actual value = IE value * 100ms. The maximum value 1023 means 102.3s or longer.
timeSinceFailure
This field is used to indicate the time that elapsed since the connection (establishment) failure. Value in seconds. The maximum value 172800 means 172800s or longer.
traceRecordingSessionRef
Parameter Trace Recording Session Reference: See TS 32.422 [58].

– *ULHandoverPreparationTransfer (CDMA2000)*

The *ULHandoverPreparationTransfer* message is used for the uplink transfer of handover related CDMA2000 information when requested by the higher layers.

Signalling radio bearer: SRB1

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

ULHandoverPreparationTransfer message

```
-- ASN1START

ULHandoverPreparationTransfer ::=   SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            ulHandoverPreparationTransfer-r8        ULHandoverPreparationTransfer-r8-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

ULHandoverPreparationTransfer-r8-IEs ::= SEQUENCE {
    cdma2000-Type                       CDMA2000-Type,
    meid                                BIT STRING (SIZE (56))  OPTIONAL,
    dedicatedInfo                       DedicatedInfoCDMA2000,
    nonCriticalExtension                ULHandoverPreparationTransfer-v8a0-IEs  OPTIONAL
}

ULHandoverPreparationTransfer-v8a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    nonCriticalExtension                SEQUENCE {}                         OPTIONAL
}

-- ASN1STOP
```

ULHandoverPreparationTransfer field descriptions

meid
The 56 bit mobile identification number provided by the CDMA2000 Upper layers.

– *ULInformationTransfer*

The *ULInformationTransfer* message is used for the uplink transfer of NAS or non-3GPP dedicated information.

Signalling radio bearer: SRB2 or SRB1(only if SRB2 not established yet). If SRB2 is suspended, the UE does not send this message until SRB2 is resumed

RLC-SAP: AM

Logical channel: DCCH

Direction: UE to E-UTRAN

ULInformationTransfer message

```
-- ASN1START

ULInformationTransfer ::=           SEQUENCE {
    criticalExtensions                  CHOICE {
        c1                                  CHOICE {
            ulInformationTransfer-r8            ULInformationTransfer-r8-IEs,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
        criticalExtensionsFuture            SEQUENCE {}
    }
}

ULInformationTransfer-r8-IEs ::=    SEQUENCE {
    dedicatedInfoType           CHOICE {
        dedicatedInfoNAS                DedicatedInfoNAS,
        dedicatedInfoCDMA2000-1XRTT     DedicatedInfoCDMA2000,
        dedicatedInfoCDMA2000-HRPD      DedicatedInfoCDMA2000
    },
    nonCriticalExtension            ULInformationTransfer-v8a0-IEs
    OPTIONAL
}

ULInformationTransfer-v8a0-IEs ::= SEQUENCE {
    lateNonCriticalExtension        OCTET STRING                    OPTIONAL,
    nonCriticalExtension            SEQUENCE {}                     OPTIONAL
}

-- ASN1STOP
```

6.3 RRC information elements

6.3.1 System information blocks

– *SystemInformationBlockType2*

The IE *SystemInformationBlockType2* 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 information element

```
-- ASN1START

SystemInformationBlockType2 ::=     SEQUENCE {
    ac-BarringInfo                      SEQUENCE {
        ac-BarringForEmergency              BOOLEAN,
```


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```
        ac-BarringForMO-Signalling          AC-BarringConfig                OPTIONAL,    -- Need OP
        ac-BarringForMO-Data                AC-BarringConfig                OPTIONAL     -- Need OP
    }                                                                       OPTIONAL,    -- Need OP
    radioResourceConfigCommon           RadioResourceConfigCommonSIB,
    ue-TimersAndConstants               UE-TimersAndConstants,
    freqInfo                            SEQUENCE {
        ul-CarrierFreq                      ARFCN-ValueEUTRA                OPTIONAL,    -- Need OP
        ul-Bandwidth                        ENUMERATED {n6, n15, n25, n50, n75, n100}
                                                                            OPTIONAL,    -- Need OP
        additionalSpectrumEmission          AdditionalSpectrumEmission
    },
    mbsfn-SubframeConfigList            MBSFN-SubframeConfigList            OPTIONAL,    -- Need OR
    timeAlignmentTimerCommon            TimeAlignmentTimer,

    ...,
    lateNonCriticalExtension        OCTET STRING (CONTAINING SystemInformationBlockType2-v8h0-IEs)
                                        OPTIONAL,
    [[  ssac-BarringForMMTEL-Voice-r9       AC-BarringConfig                OPTIONAL,    -- Need OP
        ssac-BarringForMMTEL-Video-r9       AC-BarringConfig                OPTIONAL     -- Need OP
    ]],
    [[  ac-BarringForCSFB-r10               AC-BarringConfig            OPTIONAL        -- Need OP
    ]],
    [[  ac-BarringSkipForMMTELVoice-r12     ENUMERATED {true}           OPTIONAL,       -- Need OP
        ac-BarringSkipForMMTELVideo-r12     ENUMERATED {true}           OPTIONAL,    -- Need OP
        ac-BarringSkipForSMS-r12            ENUMERATED {true}           OPTIONAL,       -- Need OP
        ac-BarringPerPLMN-List-r12          AC-BarringPerPLMN-List-r12  OPTIONAL    -- Need OP
    ]],
    [[  voiceServiceCauseIndication-r12     ENUMERATED {true}           OPTIONAL        -- Need OP
    ]],
    [[  acdc-BarringForCommon-r13           ACDC-BarringForCommon-r13       OPTIONAL,    -- Need OP
        acdc-BarringPerPLMN-List-r13        ACDC-BarringPerPLMN-List-r13    OPTIONAL     -- Need OP
    ]]
}

SystemInformationBlockType2-v8h0-IEs ::=    SEQUENCE {
    multiBandInfoList               SEQUENCE (SIZE (1..maxMultiBands)) OF AdditionalSpectrumEmission
    OPTIONAL,   -- Need OP
    nonCriticalExtension            SystemInformationBlockType2-v8e0-IEs    OPTIONAL
}

SystemInformationBlockType2-v8e0-IEs ::= SEQUENCE {
    ul-CarrierFreq-v8e0                 ARFCN-ValueEUTRA-v8e0       OPTIONAL,   -- Cond ul-FreqMax
    nonCriticalExtension                SEQUENCE {}                 OPTIONAL
}

AC-BarringConfig ::=                SEQUENCE {
    ac-BarringFactor                    ENUMERATED {
                                            p00, p05, p10, p15, p20, p25, p30, p40,
                                            p50, p60, p70, p75, p80, p85, p90, p95},
    ac-BarringTime                      ENUMERATED {s4, s8, s16, s32, s64, s128, s256, s512},
    ac-BarringForSpecialAC              BIT STRING (SIZE(5))
}

MBSFN-SubframeConfigList ::=        SEQUENCE (SIZE (1..maxMBSFN-Allocations)) OF MBSFN-
SubframeConfig

AC-BarringPerPLMN-List-r12 ::=      SEQUENCE (SIZE (1.. maxPLMN-r11)) OF AC-BarringPerPLMN-r12

AC-BarringPerPLMN-r12 ::=           SEQUENCE {
    plmn-IdentityIndex-r12              INTEGER (1..maxPLMN-r11),
    ac-BarringInfo-r12                  SEQUENCE {
        ac-BarringForEmergency-r12          BOOLEAN,
        ac-BarringForMO-Signalling-r12      AC-BarringConfig    OPTIONAL,   -- Need OP
        ac-BarringForMO-Data-r12            AC-BarringConfig    OPTIONAL    -- Need OP
    }                                                           OPTIONAL,   -- Need OP
    ac-BarringSkipForMMTELVoice-r12     ENUMERATED {true}       OPTIONAL,   -- Need OP
    ac-BarringSkipForMMTELVideo-r12     ENUMERATED {true}       OPTIONAL,   -- Need OP
    ac-BarringSkipForSMS-r12            ENUMERATED {true}       OPTIONAL,   -- Need OP
    ac-BarringForCSFB-r12               AC-BarringConfig        OPTIONAL,   -- Need OP
    ssac-BarringForMMTEL-Voice-r12      AC-BarringConfig        OPTIONAL,   -- Need OP
    ssac-BarringForMMTEL-Video-r12      AC-BarringConfig        OPTIONAL    -- Need OP
}

ACDC-BarringForCommon-r13 ::=       SEQUENCE {
    acdc-HPLMNOnly-r13                  BOOLEAN,
    barringPerACDC-CategoryList-r13         BarringPerACDC-CategoryList-r13
}

ACDC-BarringPerPLMN-List-r13 ::=    SEQUENCE (SIZE (1.. maxPLMN-r11)) OF ACDC-BarringPerPLMN-r13
```

```
ACDC-BarringPerPLMN-r13 ::=         SEQUENCE {
    plmn-IdentityIndex-r13              INTEGER (1..maxPLMN-r11),
    acdc-HPLMNonly-r13                  BOOLEAN,
    barringPerACDC-CategoryList-r13             BarringPerACDC-CategoryList-r13
}

BarringPerACDC-CategoryList-r13 ::= SEQUENCE (SIZE (1..maxACDC-Cat-r13)) OF BarringPerACDC-Category-
r13

BarringPerACDC-Category-r13 ::= SEQUENCE {
    acdc-CatValue-r13               INTEGER (1..maxACDC-Cat-r13),
    acdc-BarringConfig-r13          SEQUENCE {
        ac-BarringFactor-r13            ENUMERATED {
                                            p00, p05, p10, p15, p20, p25, p30, p40,
                                            p50, p60, p70, p75, p80, p85, p90, p95},
        ac-BarringTime-r13              ENUMERATED {s4, s8, s16, s32, s64, s128, s256, s512},
                                            OPTIONAL
    }
}

-- ASN1STOP
```

SystemInformationBlockType2 field descriptions
ac-BarringFactor If the random number drawn by the UE is lower than this value, access is allowed. Otherwise the access is barred. The values are interpreted in the range [0,1): p00 = 0, p05 = 0.05, p10 = 0.10,..., p95 = 0.95. Values other than p00 can only be set if all bits of the corresponding *ac-BarringForSpecialAC* are set to 0
ac-BarringForCSFB Access class barring for mobile originating CS fallback.
ac-BarringForEmergency Access class barring for AC 10.
ac-BarringForMO-Data Access class barring for mobile originating calls.
ac-BarringForMO-Signalling Access class barring for mobile originating signalling.
ac-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.
ac-BarringTime Mean access barring time value in seconds.
acdc-BarringConfig Barring configuration for an ACDC category. If the field is absent, access to the cell is considered as not barred for the ACDC category in accordance with subclause 5.3.3.13.
acdc-CatValue Indicates the ACDC category as defined in TS 24.105 [72].
acdc-HPLMNonly Indicates whether ACDC is applicable for UEs not in their HPLMN for the corresponding PLMN. *TRUE* indicates that ACDC is applicable only for UEs in their HPLMN for the corresponding PLMN. *FALSE* indicates that ACDC is applicable for both UEs in their HPLMN and UEs not in their HPLMN for the corresponding PLMN.
additionalSpectrumEmission The UE requirements related to IE *AdditionalSpectrumEmission* are defined in TS 36.101 [42, table 6.2.4.1].
barringPerACDC-CategoryList A list of barring information per ACDC category according to the order defined in TS 22.011 [10]. The first entry in the list corresponds to the highest ACDC category of which applications are the least restricted in access attempts at a cell, the second entry in the list corresponds to the ACDC category of which applications are restricted more than applications of the highest ACDC category in access attempts at a cell, and so on. The last entry in the list corresponds to the lowest ACDC category of which applications are the most restricted in access attempts at a cell.
mbsfn-SubframeConfigList Defines the subframes that are reserved for MBSFN in downlink.
multiBandInfoList A list of *additionalSpectrumEmission* i.e. one for each additional frequency band included in *multiBandInfoList* in *SystemInformationBlockType1*, listed in the same order.
plmn-IdentityIndex Index of the PLMN in *plmn-IdentityList* included in SIB1. Value 1 indicates the PLMN listed 1st in *plmn-IdentityList* included in SIB1, Value 2 indicates the PLMN listed 2nd in *plmn-IdentityList* included in SIB1 and so on.
ssac-BarringForMMTEL-Video Service specific access class barring for MMTEL video originating calls.
ssac-BarringForMMTEL-Voice Service specific access class barring for MMTEL voice originating calls.
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.
voiceServiceCauseIndication Indicates whether UE is requested to use the establishment cause *mo-VoiceCall* for mobile originating MMTEL voice calls.

Conditional presence	Explanation
ul-FreqMax	The field is mandatory present if *ul-CarrierFreq* (i.e. without suffix) is present and set to *maxEARFCN*. Otherwise the field is not present.

-- SystemInformationBlockType3

The IE *SystemInformationBlockType3* contains cell re-selection information common for intra-frequency, inter-frequency and/ or inter-RAT cell re-selection (i.e. applicable for more than one type of cell re-selection but not necessarily all) as well as intra-frequency cell re-selection information other than neighbouring cell related.

SystemInformationBlockType3 information element

```
-- ASN1START

SystemInformationBlockType3 ::=     SEQUENCE {
    cellReselectionInfoCommon           SEQUENCE {
        q-Hyst                              ENUMERATED {
                                                dB0, dB1, dB2, dB3, dB4, dB5, dB6, dB8, dB10,
                                                dB12, dB14, dB16, dB18, dB20, dB22, dB24},
        speedStateReselectionPars           SEQUENCE {
            mobilityStateParameters             MobilityStateParameters,
            q-HystSF                            SEQUENCE {
                sf-Medium                           ENUMERATED {
                                                        dB-6, dB-4, dB-2, dB0},
                sf-High                             ENUMERATED {
                                                        dB-6, dB-4, dB-2, dB0}
            }                                                       OPTIONAL        -- Need OP
        },
    cellReselectionServingFreqInfo      SEQUENCE {
        s-NonIntraSearch                    ReselectionThreshold        OPTIONAL,       -- Need OP
        threshServingLow                    ReselectionThreshold,
        cellReselectionPriority             CellReselectionPriority
    },
    intraFreqCellReselectionInfo        SEQUENCE {
        q-RxLevMin                          Q-RxLevMin,
        p-Max                               P-Max                       OPTIONAL,       -- Need OP
        s-IntraSearch                       ReselectionThreshold        OPTIONAL,       -- Need OP
        allowedMeasBandwidth                AllowedMeasBandwidth        OPTIONAL,       -- Need OP
        presenceAntennaPort1                PresenceAntennaPort1,
        neighCellConfig                     NeighCellConfig,
        t-ReselectionEUTRA                  T-Reselection,
        t-ReselectionEUTRA-SF               SpeedStateScaleFactors      OPTIONAL        -- Need OP
    },
    ...,
    lateNonCriticalExtension            OCTET STRING (CONTAINING SystemInformationBlockType3-
v1020-IEs)  OPTIONAL,
    [[  s-IntraSearch-v920              SEQUENCE {
            s-IntraSearchP-r9               ReselectionThreshold,
            s-IntraSearchQ-r9               ReselectionThresholdQ-r9
                                                                    OPTIONAL,       -- Need OP
        s-NonIntraSearch-v920           SEQUENCE {
            s-NonIntraSearchP-r9            ReselectionThreshold,
            s-NonIntraSearchQ-r9            ReselectionThresholdQ-r9
                                                                    OPTIONAL,       -- Need OP
        q-QualMin-r9                    Q-QualMin-r9                OPTIONAL,       -- Need OP
        threshServingLowQ-r9            ReselectionThresholdQ-r9    OPTIONAL        -- Need OP
    ]],
    [[  q-QualMinWB-r11                 Q-QualMin-r9                OPTIONAL    -- Cond WB-RSRQ
    ]],
    [[  s-QualMinWBRSRQ-OnAllSymbols-r12        Q-QualMin-r9                OPTIONAL            --
Cond RSRQ
    ]],
    [[  cellReselectionServingFreqInfo-v13xy CellReselectionServingFreqInfo-v13xy   OPTIONAL,     --
Need OP
        redistributionServingInfo-r13           RedistributionServingInfo-r13 OPTIONAL  --Need OR
    ]]
}

RedistributionServingInfo-r13 ::=       SEQUENCE {
    redistributionFactorServing-r13     INTEGER(0..10),
    redistributionFactorCell-r13        ENUMERATED{true}                OPTIONAL,   --Need OP
    t360-r13                            ENUMERATED {min4, min8, min16, min32,infinity,
                                            spare3,spare2,spare1},
    redistrOnPagingOnly-r13             ENUMERATED {true}       OPTIONAL        Need OP
}

CellReselectionServingFreqInfo-v13xy ::=    SEQUENCE {
    cellReselectionSubPriority-r13              CellReselectionSubPriority-r13
}
```


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```
-- Late non critical extensions
SystemInformationBlockType3-v1010-IEs ::= SEQUENCE {
    freqBandInfo-r10                MS-FreqList-r10                 OPTIONAL,   -- Need OR
    multiBandInfoList-v1010         MultiBandInfoList-v1010         OPTIONAL,   -- Need OR
    nonCriticalExtension            SEQUENCE {}                     OPTIONAL
}

-- ASN1STOP
```

SystemInformationBlockType3 field descriptions

allowedMeasBandwidth
If absent, the value corresponding to the downlink bandwidth indicated by the *dl-Bandwidth* included in *MasterInformationBlock* applies.

cellReselectionInfoCommon
Cell re-selection information common for cells.

cellReselectionServingFreqInfo
Information common for Cell re-selection to inter-frequency and inter-RAT cells.

cellReselectionSubPriority
Fractional priority value added to *cellReselectionPriority* for the carrier.

freqBandInfo
A list of *additionalPmax* and *additionalSpectrumEmission* values as defined in TS 36.101 [42, table 6.2.4-1] applicable for the intra-frequency neighbouring E-UTRA cells if the UE selects the frequenby band from *freqBandIndicator* in *SystemInformationBlockType1*.

intraFreqCellReselectionInfo
Cell re-selection information common for intra-frequency cells.

multiBandInfoList-v10j0
A list of *additionalPmax* and *additionalSpectrumEmission* values as defined in TS 36.101 [42, table 6.2.4-1] applicable for the intra-frequency neighbouring E-UTRA cells if the UE selects the frequenby bands in *multiBandInfoList* (i.e. without suffix) or *multiBandInfoList-v9e0*. If E-UTRAN includes *multiBandInfoList-v10j0*, it includes the same number of entries, and listed in the same order, as in *multiBandInfoList* (i.e. without suffix).

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.

redistrOnPagingOnly
If this field is present and the UE is redistribution capable, the UE shall only wait for the paging message to trigger E-UTRAN Inter-frequency Redistribution procedure as specified in 5.2.4.10 of 36.304[4].

q-Hyst
Parameter Q_{hyst} in 36.304 [4]. Value in dB. Value dB1 corresponds to 1 dB, dB2 corresponds to 2 dB and so on.

q-HystSF
Parameter "Speed dependent ScalingFactor for Q_{hyst}" in TS 36.304 [4]. The sf-Medium and sf-High concern the additional hysteresis to be applied, in Medium and High Mobility state respectively, to Q_{hyst} as defined in TS 36.304 [4]. In dB. Value dB-6 corresponds to -6dB, dB-4 corresponds to -4dB and so on.

q-QualMin
Parameter "$Q_{qualmin}$" in TS 36.304 [4], applicable for intra-frequency neighrbour cells. If the field is not present, the UE applies the (default) value of negative infinity for $Q_{qualmin}$. NOTE 1.

q-QualMinRSRQ-OnAllSymbols
If this field is present and supported by the UE, the UE shall, when performing RSRQ measurements, perform RSRQ measurement on all OFDM symbols in accordance with TS 36.214 [48]. NOTE 1.

q-QualMinWB
If this field is present and supported by the UE, the UE shall, when performing RSRQ measurements, use a wider bandwidth in accordance with TS 36.133 [16]. NOTE 1.

q-RxLevMin
Parameter "$Q_{rxlevmin}$" in TS 36.304 [4], applicable for intra-frequency neighbour cells.

redistributionFactorCell
If *redistributionFactorCell* is present, this value is only applicable for the serving cell otherwise it is applicable for serving frequency

redistributionFactorServing
Parameter *redistributionFactorServing* in TS 36.304 [4].

s-IntraSearch
Parameter "$S_{IntraSearchP}$" in TS 36.304 [4]. If the field *s-IntraSearchP* is present, the UE applies the value of *s-IntraSearchP* instead. Otherwise if neither *s-IntraSearch* nor *s-IntraSearchP* is present, the UE applies the (default) value of infinity for $S_{IntraSearchP}$.

s-IntraSearchP
Parameter "$S_{IntraSearchP}$" in TS 36.304 [4]. See descriptions under *s-IntraSearch*.

s-IntraSearchQ
Parameter "$S_{IntraSearchQ}$" in TS 36.304 [4]. If the field is not present, the UE applies the (default) value of 0 dB for $S_{IntraSearchQ}$.

s-NonIntraSearch
Parameter "$S_{nonIntraSearchP}$" in TS 36.304 [4]. If the field *s-NonIntraSearchP* is present, the UE applies the value of *s-NonIntraSearchP* instead. Otherwise if neither *s-NonIntraSearch* nor *s-NonIntraSearchP* is present, the UE applies the (default) value of infinity for $S_{nonIntraSearchP}$.

s-NonIntraSearchP
Parameter "$S_{nonIntraSearchP}$" in TS 36.304 [4]. See descriptions under *s-NonIntraSearch*.

s-NonIntraSearchQ
Parameter "$S_{nonIntraSearchQ}$" in TS 36.304 [4]. If the field is not present, the UE applies the (default) value of 0 dB for $S_{nonIntraSearchQ}$.

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SystemInformationBlockType3 field descriptions
speedStateReselectionPars Speed dependent reselection parameters, see TS 36.304 [4]. If this field is absent, i.e, *mobilityStateParameters* is also not present, UE behaviour is specified in TS 36.304 [4].
t360 Parameter "T360" in TS 36.304 [4].
threshServingLow Parameter "$Thresh_{Serving,\ LowP}$" in TS 36.304 [4].
threshServingLowQ Parameter "$Thresh_{Serving,\ LowQ}$" in TS 36.304 [4].
t-ReselectionEUTRA Parameter "$Treselection_{EUTRA}$" in TS 36.304 [4].
t-ReselectionEUTRA-SF Parameter "Speed dependent ScalingFactor for $Treselection_{EUTRA}$" in TS 36.304 [4]. If the field is not present, the UE behaviour is specified in TS 36.304 [4].

NOTE 1: The value the UE applies for parameter "$Q_{qualmin}$" in TS 36.304 [4] depends on the *q-QualMin* fields signalled by E-UTRAN and supported by the UE. In case multiple candidate options are available, the UE shall select the highest priority candidate option according to the priority order indicated by the following table (top row is highest priority).

q-QualMinRSRQ-OnAllSymbols	q-QualMinWB	Value of parameter "$Q_{qualmin}$" in TS 36.304 [4]
Included	Included	*q-QualMinRSRQ-OnAllSymbols – (q-QualMin – q-QualMinWB)*
Included	Not included	*q-QualMinRSRQ-OnAllSymbols*
Not included	Included	*q-QualMinWB*
Not included	Not included	*q-QualMin*

Conditional presence	Explanation
RSRQ	The field is optionally present, Need OR, if *threshServingLowQ* is present in SIB3; otherwise it is not present.
WB-RSRQ	The field is optionally present, need OP if the measurement bandwidth indicated by *allowedMeasBandwidth* is 50 resource blocks or larger; otherwise it is not present.

– SystemInformationBlockType4

The IE *SystemInformationBlockType4* contains neighbouring cell related information relevant only for intra-frequency cell re-selection. The IE includes cells with specific re-selection parameters as well as blacklisted cells.

SystemInformationBlockType4 information element

```
-- ASN1START

SystemInformationBlockType4 ::=     SEQUENCE {
    intraFreqNeighCellList              IntraFreqNeighCellList      OPTIONAL,       Need OR
    intraFreqBlackCellList              IntraFreqBlackCellList              OPTIONAL,   -- Need OR
    csg-PhysCellIdRange                 PhysCellIdRange             OPTIONAL,       Cond CSG
    ...,
    lateNonCriticalExtension                OCTET STRING                    OPTIONAL
}

IntraFreqNeighCellList ::=      SEQUENCE (SIZE (1..maxCellIntra)) OF IntraFreqNeighCellInfo

IntraFreqNeighCellInfo ::=      SEQUENCE {
    physCellId                          PhysCellId,
    q-OffsetCell                        Q-OffsetRange,
    ...
}

IntraFreqBlackCellList ::=      SEQUENCE (SIZE (1..maxCellBlack)) OF PhysCellIdRange

-- ASN1STOP
```

SystemInformationBlockType4 field descriptions
csg-PhysCellIdRange Set of physical cell identities reserved for CSG cells on the frequency on which this field was received. The received *csg-PhysCellIdRange* applies if less than 24 hours has elapsed since it was received and the UE is camped on a cell of the same primary PLMN where this field was received. The 3 hour validity restriction (section 5.2.1.3) does not apply to this field. The UE shall not apply any stored *csg-PhysCellIdRange* when it is in *any cell selection* state defined in TS 36.304 [4].
intraFreqBlackCellList List of blacklisted intra-frequency neighbouring cells.
intraFreqNeighbCellList List of intra-frequency neighbouring cells with specific cell re-selection parameters.
q-OffsetCell Parameter "Qoffset$_{s,n}$" in TS 36.304 [4].

Conditional presence	Explanation
CSG	This field is optional, need OP, for non-CSG cells, and mandatory for CSG cells.

– *SystemInformationBlockType5*

The IE *SystemInformationBlockType5* contains information relevant only for inter-frequency cell re-selection i.e. information about other E-UTRA frequencies and inter-frequency neighbouring cells relevant for cell re-selection. The IE includes cell re-selection parameters common for a frequency as well as cell specific re-selection parameters.

SystemInformationBlockType5 information element

```
-- ASN1START

SystemInformationBlockType5 ::=     SEQUENCE {
    interFreqCarrierFreqList            InterFreqCarrierFreqList,
    ...,
    lateNonCriticalExtension            OCTET STRING    (CONTAINING SystemInformationBlockType5-
v8h0-IEs)           OPTIONAL,
    [[  interFreqCarrierFreqList-v1250  InterFreqCarrierFreqList-v1250      OPTIONAL,       -- Need OR
        interFreqCarrierFreqListExt-r12 InterFreqCarrierFreqListExt-r12     OPTIONAL    -- Need OR
    ]],
    [[  interFreqCarrierFreqListExt-v1260   InterFreqCarrierFreqListExt-v1260   OPTIONAL    -- Need
OR
    ]],
    [[  interFreqCarrierFreqList-v13xy      InterFreqCarrierFreqList-v13xy      OPTIONAL,   -- Need
OR
        interFreqCarrierFreqListExt-v13xy   InterFreqCarrierFreqListExt-v13xy   OPTIONAL    -- Need
OR
    ]]
}

SystemInformationBlockType5-v8h0-IEs ::=    SEQUENCE {
    interFreqCarrierFreqList-v8h0 SEQUENCE (SIZE (1..maxFreq)) OF InterFreqCarrierFreqInfo-v8h0
        OPTIONAL,   -- Need OR
    nonCriticalExtension            SystemInformationBlockType5-v9e0-IEs
    OPTIONAL
}

SystemInformationBlockType5-v9e0-IEs ::=    SEQUENCE {
    interFreqCarrierFreqList-v9e0   SEQUENCE (SIZE (1..maxFreq)) OF InterFreqCarrierFreqInfo-v9e0
            OPTIONAL,       -- Need OR
    nonCriticalExtension            SystemInformationBlockType5-v10j0-IEs   OPTIONAL
}

SystemInformationBlockType5-v10j0-IEs ::=   SEQUENCE {
    interFreqCarrierFreqList-v10j0  SEQUENCE (SIZE (1..maxFreq)) OF InterFreqCarrierFreqInfo-v10j0
            OPTIONAL,   -- Need OR
    nonCriticalExtension            SEQUENCE {}                     OPTIONAL
}

InterFreqCarrierFreqList ::=        SEQUENCE (SIZE (1..maxFreq)) OF InterFreqCarrierFreqInfo

InterFreqCarrierFreqList-v1250 ::=  SEQUENCE (SIZE (1.. maxFreq)) OF InterFreqCarrierFreqInfo-v1250

InterFreqCarrierFreqListExt-r12 ::= SEQUENCE (SIZE (1.. maxFreq)) OF InterFreqCarrierFreqInfo-r12
```


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```
InterFreqCarrierFreqListExt-v1280 ::=   SEQUENCE (SIZE (1.. maxFreq)) OF InterFreqCarrierFreqInfo-
        v1090

InterFreqCarrierFreqList-v13xy ::=  SEQUENCE (SIZE (1.. maxFreq)) OF InterFreqCarrierFreqInfo-v13xy

InterFreqCarrierFreqListExt-v13xy ::=   SEQUENCE (SIZE (1.. maxFreq)) OF InterFreqCarrierFreqInfo-
        v13xy

InterFreqCarrierFreqInfo ::=    SEQUENCE {
    dl-CarrierFreq                  ARFCN-ValueEUTRA,
    q-RxLevMin                      Q-RxLevMin,
    p-Max                           P-Max                           OPTIONAL,       -- Need OP
    t-ReselectionEUTRA              T-Reselection,
    t-ReselectionEUTRA-SF           SpeedStateScaleFactors          OPTIONAL,       -- Need OP
    threshX-High                    ReselectionThreshold,
    threshX-Low                     ReselectionThreshold,
    allowedMeasBandwidth            AllowedMeasBandwidth,
    presenceAntennaPort1            PresenceAntennaPort1,
    cellReselectionPriority         CellReselectionPriority         OPTIONAL,       -- Need OP
    neighCellConfig                 NeighCellConfig,
    q-OffsetFreq                    Q-OffsetRange                   DEFAULT dB0,
    interFreqNeighCellList          InterFreqNeighCellList          OPTIONAL,       -- Need OR
    interFreqBlackCellList          InterFreqBlackCellList          OPTIONAL,       -- Need OR
    ...,
    [[  q-QualMin-r9                Q-QualMin-r9                    OPTIONAL,       -- Need OP
        threshX-Q-r9                SEQUENCE {
            threshX-HighQ-r9            ReselectionThresholdQ-r9,
            threshX-LowQ-r9             ReselectionThresholdQ-r9
        }                                                           OPTIONAL        -- Cond RSRQ
    ]],
    [[  q-QualMinWB-r11             Q-QualMin-r9                    OPTIONAL        -- Cond WB-RSRQ
    ]]
}

InterFreqCarrierFreqInfo-v8h0 ::=       SEQUENCE {
    multiBandInfoList               MultiBandInfoList               OPTIONAL    -- Need OR
}

InterFreqCarrierFreqInfo-v9e0 ::=   SEQUENCE {
    dl-CarrierFreq-v9e0             ARFCN-ValueEUTRA-v9e0   OPTIONAL,   -- Cond dl-FreqMax
    multiBandInfoList-v9e0          MultiBandInfoList-v9e0  OPTIONAL    -- Need OR
}

InterFreqCarrierFreqInfo-v10j0 ::=  SEQUENCE {
    freqBandInfo-r10                NS-PmaxList-r10             OPTIONAL,   -- Need OR
    multiBandInfoList-v10j0         MultiBandInfoList-v10j0     OPTIONAL    -- Need OR
}

InterFreqCarrierFreqInfo-v1250 ::=      SEQUENCE {
    reducedMeasPerformance-r12      ENUMERATED {true}       OPTIONAL,       -- Need OP
    q-QualMinRSRQ-OnAllSymbols-r12  Q-QualMin-r9                    OPTIONAL    -- Cond RSRQ2
}

InterFreqCarrierFreqInfo-r12 ::=        SEQUENCE {
    dl-CarrierFreq-r12              ARFCN-ValueEUTRA-r8,
    q-RxLevMin-r12                  Q-RxLevMin,
    p-Max-r12                       P-Max                           OPTIONAL,       -- Need OP
    t-ReselectionEUTRA-r12          T-Reselection,
    t-ReselectionEUTRA-SF-r12       SpeedStateScaleFactors          OPTIONAL,       -- Need OP
    threshX-High-r12                ReselectionThreshold,
    threshX-Low-r12                 ReselectionThreshold,
    allowedMeasBandwidth-r12        AllowedMeasBandwidth,
    presenceAntennaPort1-r12        PresenceAntennaPort1,
    cellReselectionPriority-r12     CellReselectionPriority         OPTIONAL,       -- Need OP
    neighCellConfig-r12             NeighCellConfig,
    q-OffsetFreq-r12                Q-OffsetRange                   DEFAULT dB0,
    interFreqNeighCellList-r12      InterFreqNeighCellList          OPTIONAL,       -- Need OR
    interFreqBlackCellList-r12      InterFreqBlackCellList          OPTIONAL,       -- Need OR
    q-QualMin-r12                   Q-QualMin-r9                    OPTIONAL,       -- Need OP
    threshX-Q-r12                   SEQUENCE {
        threshX-HighQ-r12               ReselectionThresholdQ-r9,
        threshX-LowQ-r12                ReselectionThresholdQ-r9
    }                                                               OPTIONAL,   -- Cond RSRQ
    q-QualMinWB-r12                 Q-QualMin-r9                    OPTIONAL,   -- Cond WB-RSRQ
    multiBandInfoList-r12           MultiBandInfoList-r11           OPTIONAL,   -- Need OR
    reducedMeasPerformance-r12      ENUMERATED {true}               OPTIONAL,   -- Need OR
    q-QualMinRSRQ-OnAllSymbols-r12  Q-QualMin-r9                    OPTIONAL,   -- Cond RSRQ2
...
```

```
}

InterFreqCarrierFreqInfo-v13xy  ::= SEQUENCE {
    cellReselectionSubPriority-r13      CellReselectionSubPriority-r13      OPTIONAL,       -- Need
OP
    redistributionInterFreqInfo-r13     RedistributionInterFreqInfo-r13     OPTIONAL --Need OP
}

InterFreqNeighCellList ::=          SEQUENCE (SIZE (1..maxCellInter)) OF InterFreqNeighCellInfo

InterFreqNeighCellInfo ::=          SEQUENCE {
    physCellId                          PhysCellId,
    q-OffsetCell                        Q-OffsetRange
}

InterFreqBlackCellList ::=          SEQUENCE (SIZE (1..maxCellBlack)) OF PhysCellIdRange

RedistributionInterFreqInfo-r13 ::=     SEQUENCE {
    redistributionFactorFreq-r13            RedistributionFactor-r13    OPTIONAL,   --Need OP
    redistributionNeighCellList-r13         RedistributionNeighCellList-r13     OPTIONAL     Need
OP
}

RedistributionNeighCellList-r13 ::= SEQUENCE (SIZE (1..maxCellInter)) OF RedistributionNeighCell-r13

RedistributionNeighCell-r13 ::=     SEQUENCE {
    physCellId                              PhysCellId,
    redistributionFactorCell-r13            RedistributionFactor-r13
}

RedistributionFactor-r13 ::=    INTEGER(1..10)

   ASN1STOP
```

SystemInformationBlockType5 field descriptions
cellReselectionSubPriority
Fractional priority value added to *cellReselectionPriority* for the carrier.
freqBandInfo
A list of *additionalPmax* and *additionalSpectrumEmission* values as defined in TS 36.101 [42, table 6.2.4-1] for the frequency band represented by *dl-CarrierFreq* for which cell reselection parameters are common.
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. If E-UTRAN includes *interFreqCarrierFreqList-v8h0*, *interFreqCarrierFreqList-v9e0*, *interFreqCarrierFreqList-v1250* and/or *interFreqCarrierFreqList-v13xy*, it includes the same number of entries, and listed in the same order, as in *interFreqCarrierFreqList* (i.e. without suffix). See Annex D for more descriptions.
interFreqCarrierFreqListExt
List of additional neighbouring inter-frequencies, i.e. extending the size of the inter-frequency carrier list using the general principles specified in 5.1.2. E-UTRAN does not configure more than one entry for the same physical frequency regardless of the E-ARFCN used to indicate this. EUTRAN may include *interFreqCarrierFreqListExt* even if *interFreqCarrierFreqList* (i.e without suffix) does not include *maxFreq* entries. If E-UTRAN includes *interFreqCarrierFreqListExt-v13xy* it includes the same number of entries, and listed in the same order, as in *interFreqCarrierFreqListExt-r12*.
interFreqNeighCellList
List of inter-frequency neighbouring cells with specific cell re-selection parameters.
multiBandInfoList
Indicates the list of frequency bands in addition to the band represented by *dl-CarrierFreq* for which cell reselection parameters are common. E-UTRAN indicates at most *maxMultiBands* frequency bands (i.e. the total number of entries across both *multiBandInfoList* and *multiBandInfoList-v9e0* is below this limit).
multiBandInfoList-v10j0
A list of *additionalPmax* and *additionalSpectrumEmission* values as defined in TS 36.101 [42, table 6.2.4-1] for the frequency bands in *multiBandInfoList* (i.e. without suffix) and *multiBandInfoList-v9e0*. If E-UTRAN includes *multiBandInfoList-v10j0*, it includes the same number of entries, and listed in the same order, as in *multiBandInfoList* (i.e. without suffix).
p-Max
Value applicable for the neighbouring E-UTRA cells on this carrier frequency. If absent the UE applies the maximum power according to the UE capability.
q-OffsetCell
Parameter "$Qoffset_{s,n}$" 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 $Q_{qualmin}$. NOTE 1.
q-QualMinRSRQ-OnAllSymbols
If this field is present and supported by the UE, the UE shall, when performing RSRQ measurements, perform RSRQ measurement on all OFDM symbols in accordance with TS 36.214 [48]. NOTE 1.
q-QualMinWB
If this field is present and supported by the UE, the UE shall, when performing RSRQ measurements, use a wider bandwidth in accordance with TS 36.133 [16]. NOTE 1.
redistributionFactorFreq
Parameter *redistributionFactorFreq* in TS 36.304 [4].
redistributionFactorCell
Parameter *redistributionFactorCell* in TS 36.304 [4].
reducedMeasPerformance
Value *TRUE* indicates that the neighbouring inter-frequency is configured for reduced measurement performance, see TS 36.133 [16]. If the field is not included, the neighbouring inter-frequency is configured for normal measurement performance, see TS 36.133 [16].
threshX-High
Parameter "$Threshx_{,HighP}$" in TS 36.304 [4].
threshX-HighQ
Parameter "$Threshx_{,HighQ}$" in TS 36.304 [4].
threshX-Low
Parameter "$Threshx_{,LowP}$" in TS 36.304 [4].
threshX-LowQ
Parameter "$Threshx_{,LowQ}$" in TS 36.304 [4].
t-ReselectionEUTRA
Parameter "$Treselection_{EUTRA}$" in TS 36.304 [4].

SystemInformationBlockType5 field descriptions
t-ReselectionEUTRA-SF
Parameter "Speed dependent ScalingFactor for $T_{reselectionEUTRA}$" in TS 36.304 [4]. If the field is not present, the UE behaviour is specified in TS 36.304 [4].

NOTE 1: The value the UE applies for parameter "$Q_{qualmin}$" in TS 36.304 [4] depends on the *q-QualMin* fields signalled by E-UTRAN and supported by the UE. In case multiple candidate options are available, the UE shall select the highest priority candidate option according to the priority order indicated by the following table (top row is highest priority).

q-QualMinRSRQ-OnAllSymbols	q-QualMinWB	Value of parameter "$Q_{qualmin}$" in TS 36.304 [4]
Included	Included	*q-QualMinRSRQ-OnAllSymbols – (q-QualMin – q-QualMinWB)*
Included	Not included	*q-QualMinRSRQ-OnAllSymbols*
Not included	Included	*q-QualMinWB*
Not included	Not included	*q-QualMin*

Conditional presence	Explanation
dl-FreqMax	The field is mandatory present if, for the corresponding entry in *interFreqCarrierFreqList* (i.e. without suffix), *dl-CarrierFreq* (i.e. without suffix) is set to *maxEARFCN*. Otherwise the field is not present.
RSRQ	The field is mandatory present if *threshServingLowQ* is present in *systemInformationBlockType3*; otherwise it is not present.
RSRQ2	The field is mandatory present for all EUTRA carriers listed in SIB5 if *q-QualMinRSRQ-OnAllSymbols* is present in SIB3; otherwise it is not present and the UE shall delete any existing value for this field.
WB-RSRQ	The field is optionally present, need OP if the measurement bandwidth indicated by *allowedMeasBandwidth* is 50 resource blocks or larger; otherwise it is not present.

– SystemInformationBlockType6

The IE *SystemInformationBlockType6* contains information relevant only for inter-RAT cell re-selection i.e. information about UTRA frequencies and UTRA neighbouring cells relevant for cell re-selection. The IE includes cell re-selection parameters common for a frequency.

SystemInformationBlockType6 information element

```
-- ASN1START

SystemInformationBlockType6 ::=     SEQUENCE {
    carrierFreqListUTRA-FDD             CarrierFreqListUTRA-FDD         OPTIONAL,       -- Need OR
    carrierFreqListUTRA-TDD             CarrierFreqListUTRA-TDD         OPTIONAL,       -- Need OR
    t-ReselectionUTRA                   T-Reselection,
    t-ReselectionUTRA-SF                SpeedStateScaleFactors          OPTIONAL,       -- Need OP
    ...,
    lateNonCriticalExtension            OCTET STRING    (CONTAINING SystemInformationBlockType6-
v8h0-IEs)                   OPTIONAL,
    [[  carrierFreqListUTRA-FDD-v1250 SEQUENCE (SIZE (1..maxUTRA-FDD-Carrier)) OF
                                        CarrierFreqInfoUTRA-v1250       OPTIONAL,       Cond UTRA-FDD
        carrierFreqListUTRA-TDD-v1250 SEQUENCE (SIZE (1..maxUTRA-TDD-Carrier)) OF
                                        CarrierFreqInfoUTRA-v1250       OPTIONAL,   -- Cond UTRA-TDD
        carrierFreqListUTRA-TDD-Ext-r12 CarrierFreqListUTRA-FDD-Ext-r12 OPTIONAL,   -- Cond UTRA-FDD
        carrierFreqListUTRA-TDD-Ext-r12     CarrierFreqListUTRA-TDD-Ext-r12 OPTIONAL        -- Cond
UTRA-TDD
    ]]
}

SystemInformationBlockType6-v8h0-IEs ::=    SEQUENCE {
    carrierFreqListUTRA-FDD-v8h0 SEQUENCE (SIZE (1..maxUTRA-FDD-Carrier)) OF CarrierFreqInfoUTRA-
FDD-v8h0 OPTIONAL,      Cond UTRA-FDD
    nonCriticalExtension
SEQUENCE {}                         OPTIONAL
}

CarrierFreqInfoUTRA-v1250 ::=       SEQUENCE {
    reducedMeasPerformance-r12      ENUMERATED {true}       OPTIONAL        -- Need OP
}
```

```
CarrierFreqListUTRA-FDD ::=     SEQUENCE (SIZE (1..maxUTRA-FDD-Carrier)) OF CarrierFreqUTRA-FDD

CarrierFreqUTRA-FDD ::=             SEQUENCE {
    carrierFreq                         ARFCN-ValueUTRA,
    cellReselectionPriority             CellReselectionPriority         OPTIONAL,       -- Need OP
    threshX-High                        ReselectionThreshold,
    threshX-Low                         ReselectionThreshold,
    q-RxLevMin                          INTEGER (-60..-13),
    p-MaxUTRA                           INTEGER (-50..33),
    q-QualMin                           INTEGER (-24..0),
    ...,
    [[  threshX-Q-r9                    SEQUENCE {
            threshX-HighQ-r9                ReselectionThresholdQ-r9,
            threshX-LowQ-r9                 ReselectionThresholdQ-r9
        }                                                       OPTIONAL        -- Cond FSRQ
    ]]
}

CarrierFreqInfoUTRA-FDD-v8h0 ::=            SEQUENCE {
    multiBandInfoList                   SEQUENCE (SIZE (1..maxMultiBands)) OF FreqBandIndicator-
UTRA-FDD                OPTIONAL        -- Need OR
}

CarrierFreqListUTRA-FDD-Ext-r12 ::= SEQUENCE (SIZE (1..maxUTRA-FDD-Carrier)) OF
                                    CarrierFreqUTRA-FDD-Ext-r12

CarrierFreqUTRA-FDD-Ext-r12 ::=             SEQUENCE {
    carrierFreq-r12                     ARFCN-ValueUTRA,
    cellReselectionPriority-r12         CellReselectionPriority         OPTIONAL,    -- Need OP
    threshX-High-r12                    ReselectionThreshold,
    threshX-Low-r12                     ReselectionThreshold,
    q-RxLevMin-r12                      INTEGER (-60..-13),
    p-MaxUTRA-r12                       INTEGER (-50..33),
    q-QualMin-r12                       INTEGER (-24..0),
    threshX-Q-r12                       SEQUENCE {
            threshX-HighQ-r12               ReselectionThresholdQ-r9,
            threshX-LowQ-r12                ReselectionThresholdQ-r9
        }                                                   OPTIONAL,       -- Cond FSRQ
    multiBandInfoList-r12               SEQUENCE (SIZE (1..maxMultiBands)) OF FreqBandIndicator-
UTRA-FDD                OPTIONAL,   -- Need OR
    reducedMeasPerformance-r12          ENUMERATED {true}               OPTIONAL,   -- Need OP
    ...
}

CarrierFreqListUTRA-TDD ::=     SEQUENCE (SIZE (1..maxUTRA-TDD-Carrier)) OF CarrierFreqUTRA-TDD

CarrierFreqUTRA-TDD ::=             SEQUENCE {
    carrierFreq                         ARFCN-ValueUTRA,
    cellReselectionPriority             CellReselectionPriority         OPTIONAL,       -- Need OP
    threshX-High                        ReselectionThreshold,
    threshX-Low                         ReselectionThreshold,
    q-RxLevMin                          INTEGER (-60..-13),
    p-MaxUTRA                           INTEGER (-50..33),
    ...
}

CarrierFreqListUTRA-TDD-Ext-r12 ::= SEQUENCE (SIZE (1..maxUTRA-FDD-Carrier)) OF
                                    CarrierFreqUTRA-TDD-r12

CarrierFreqUTRA-TDD-r12 ::= SEQUENCE {
    carrierFreq-r12                     ARFCN-ValueUTRA,
    cellReselectionPriority-r12         CellReselectionPriority         OPTIONAL,       -- Need OP
    threshX-High-r12                    ReselectionThreshold,
    threshX-Low-r12                     ReselectionThreshold,
    q-RxLevMin-r12                      INTEGER (-60..-13),
    p-MaxUTRA-r12                       INTEGER (-50..33),
    reducedMeasPerformance-r12          ENUMERATED {true}               OPTIONAL,   -- Need OP
    ...
}

FreqBandIndicator-UTRA-FDD ::=              INTEGER (1..86)

   ASN1STOP
```

SystemInformationBlockType6 field descriptions
carrierFreqListUTRA-FDD
List of carrier frequencies of UTRA FDD. E-UTRAN does not configure more than one entry for the same physical frequency regardless of the ARFCN used to indicate this. If E-UTRAN includes *carrierFreqListUTRA-FDD-v8h0* and/or *carrierFreqListUTRA-FDD-v1250*, it includes the same number of entries, and listed in the same order, as in *carrierFreqListUTRA-FDD* (i.e. without suffix). See Annex D for more descriptions.
carrierFreqListUTRA-FDD-Ext
List of additional carrier frequencies of UTRA FDD. E-UTRAN does not configure more than one entry for the same physical frequency regardless of the ARFCN used to indicate this. EUTRAN may include *carrierFreqListUTRA-FDD-Ext* even if *carrierFreqListUTRA-FDD* (i.e without suffix) does not include *maxUTRA-FDD-Carrier* entries.
carrierFreqListUTRA-TDD
List of carrier frequencies of UTRA TDD. E-UTRAN does not configure more than one entry for the same physical frequency regardless of the ARFCN used to indicate this If E-UTRAN includes *carrierFreqListUTRA-TDD-v1250*, it includes the same number of entries, and listed in the same order, as in *carrierFreqListUTRA-TDD* (i.e. without suffix).
carrierFreqListUTRA-TDD-Ext
List of additional carrier frequencies of UTRA TDD. E-UTRAN does not configure more than one entry for the same physical frequency regardless of the ARFCN used to indicate this. EUTRAN may include *carrierFreqListUTRA-TDD-Ext* even if *carrierFreqListUTRA-TDD* (i.e without suffix) does not include *maxUTRA-TDD-Carrier* entries.
multiBandInfoList
Indicates the list of frequency bands in addition to the band represented by *carrierFreq* in the *CarrierFreqUTRA-FDD* for which UTRA cell reselection parameters are common.
p-MaxUTRA
The maximum allowed transmission power on the (uplink) carrier frequency, see TS 25.304 [40]. In dBm
q-QualMin
Parameter "$Q_{qualmin}$" in TS 25.304 [40]. Actual value = IE value [dB].
q-RxLevMin
Parameter "$Q_{rxlevmin}$" in TS 25.304 [40]. Actual value = IE value * 2+1 [dBm].
reducedMeasPerformance
Value *TRUE* indicates that the UTRA carrier frequency is configured for reduced measurement performance, see TS 36.133 [16]. If the field is not included, the UTRA carrier frequency is configured for normal measurement performance, see TS 36.133 [16].
t-ReselectionUTRA
Parameter "$Treselection_{UTRAN}$" in TS 36.304 [4].
t-ReselectionUTRA-SF
Parameter "Speed dependent ScalingFactor for $Treselection_{UTRA}$" in TS 36.304 [4]. If the field is not present, the UE behaviour is specified in TS 36.304 [4].
threshX-High
Parameter "$Threshx_{,HighP}$" in TS 36.304 [4].
threshX-HighQ
Parameter "$Threshx_{,HighQ}$" in TS 36.304 [4].
threshX-Low
Parameter "$Threshx_{,LowP}$" in TS 36.304 [4].
threshX-LowQ
Parameter "$Threshx_{,LowQ}$" in TS 36.304 [4].

Conditional presence	Explanation
RSRQ	The field is mandatory present if the *threshServingLowQ* is present in *systemInformationBlockType3*; otherwise it is not present.
UTRA-FDD	The field is optionally present, need OR, if the *carrierFreqListUTRA-FDD* is present. Otherwise it is not present.
UTRA-TDD	The field is optionally present, need OR, if the *carrierFreqListUTRA-TDD* is present. Otherwise it is not present.

– SystemInformationBlockType7

The IE *SystemInformationBlockType7* contains information relevant only for inter-RAT cell re-selection i.e. information about GERAN frequencies relevant for cell re-selection. The IE includes cell re-selection parameters for each frequency.

SystemInformationBlockType7 information element

```
-- ASN1START

SystemInformationBlockType7 ::=     SEQUENCE {
  t-ReselectionGERAN                    T-Reselection,
```


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```
    t-ReselectionGERAN-SF           SpeedStateScaleFactors          OPTIONAL,   -- Need OR
    carrierFreqsInfoList            CarrierFreqsInfoListGERAN       OPTIONAL,   -- Need OP
    ...,
    lateNonCriticalExtension            OCTET STRING                OPTIONAL
}

CarrierFreqsInfoListGERAN ::=       SEQUENCE (SIZE (1..maxGNFG)) OF CarrierFreqsInfoGERAN

CarrierFreqsInfoGERAN ::=       SEQUENCE {
    carrierFreqs                    CarrierFreqsGERAN,
    commonInfo                      SEQUENCE {
        cellReselectionPriority         CellReselectionPriority     OPTIONAL,   -- Need OP
        ncc-Permitted                   BIT STRING (SIZE (8)),
        q-RxLevMin                      INTEGER (0..45),
        p-MaxGERAN                      INTEGER (0..39)             OPTIONAL,   -- Need OP
        threshX-High                    ReselectionThreshold,
        threshX-Low                     ReselectionThreshold
    },
    ...
}

    ASN1STOP
```

SystemInformationBlockType7 field descriptions
carrierFreqs
The list of GERAN carrier frequencies organised into one group of GERAN carrier frequencies.
carrierFreqsInfoList
Provides a list of neighbouring GERAN carrier frequencies, which may be monitored for neighbouring GERAN cells. The GERAN carrier frequencies are organised in groups and the cell reselection parameters are provided per group of GERAN carrier frequencies.
commonInfo
Defines the set of cell reselection parameters for the group of GERAN carrier frequencies.
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 the 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.
p-MaxGERAN
Maximum allowed transmission power for GERAN on an uplink carrier frequency, see TS 45.008 [28]. Value in dBm. Applicable for the neighbouring GERAN cells on this carrier frequency. If *pmaxGERAN* is absent, the maximum power according to the UE capability is used.
q-RxLevMin
Parameter "$Q_{rxlevmin}$" in TS 36.304 [1], minimum required RX level in the GSM cell. The actual value of $Q_{rxlevmin}$ in dBm = (IE value * 2) – 115.
threshX-High
Parameter "$Thresh_{X,HighP}$" in TS 36.304 [4].
threshX-Low
Parameter "$Thresh_{X,LowP}$" in TS 36.304 [4].
t-ReselectionGERAN
Parameter "$T_{reselection_{GERAN}}$" in TS 36.304 [4].
t-ReselectionGERAN-SF
Parameter "Speed dependent ScalingFactor for $T_{reselection_{GERAN}}$" in TS 36.304 [4]. If the field is not present, the UE behaviour is specified in TS 36.304 [4].

– SystemInformationBlockType8

The IE *SystemInformationBlockType8* contains information relevant only for inter-RAT cell re-selection i.e. information about CDMA2000 frequencies and CDMA2000 neighbouring cells relevant for cell re-selection. The IE includes cell re-selection parameters common for a frequency as well as cell specific re-selection parameters.

SystemInformationBlockType8 information element

```
-- ASN1START

SystemInformationBlockType8 ::=     SEQUENCE {
    systemTimeInfo                      SystemTimeInfoCDMA2000          OPTIONAL,   -- Need OR
    searchWindowSize                    INTEGER (0..15)                 OPTIONAL,   -- Need OP
    parameters1XRTT                     SEQUENCE {
        preRegistrationInfoHRPD             PreRegistrationInfoHRPD,
```

```
        cellReselectionParametersHRPD       CellReselectionParametersCDMA2000   OPTIONAL -- Need OR
    }                                                                           OPTIONAL,   -- Need OR
    parameters1XRTT                 SEQUENCE {
        csfb-RegistrationParam1XRTT         CSFB-RegistrationParam1XRTT     OPTIONAL,   -- Need OR
        longCodeState1XRTT                  BIT STRING (SIZE (42))          OPTIONAL,   -- Need OR
        cellReselectionParameters1XRTT      CellReselectionParametersCDMA2000   OPTIONAL -- Need OR
    }                                                                           OPTIONAL,   -- Need OR
    ...,
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    [[  csfb-SupportForDualRxUEs-r9         BOOLEAN                         OPTIONAL,   -- Need OR
        cellReselectionParametersHRPD-v920  CellReselectionParametersCDMA2000-v920  OPTIONAL,
Cond NCL-HRPD
        cellReselectionParameters1XRTT-v920 CellReselectionParametersCDMA2000-v920  OPTIONAL,   --
Cond NCL-1XRTT
        csfb-RegistrationParam1XRTT-v920    CSFB-RegistrationParam1XRTT-v920        OPTIONAL,   --
Cond RES-1XRTT
        ac-BarringConfig1XRTT-r9            AC-BarringConfig1XRTT-r9    OPTIONAL    -- Cond REG-
1XRTT
    ]],
    [[  csfb-DualRxTxSupport-r10            ENUMERATED {true}           OPTIONAL        -- Cond REG
1XRTT
    ]],
    [[  s1dd-PerPLMN-List-r11               S1DD-PerPLMN-List-r11       OPTIONAL    -- Need OR
    ]]
}

CellReselectionParametersCDMA2000 ::= SEQUENCE {
    bandClassList                       BandClassListCDMA2000,
    neighCellList                       NeighCellListCDMA2000,
    t-ReselectionCDMA2000               T-Reselection,
    t-ReselectionCDMA2000-SF            SpeedStateScaleFactors              OPTIONAL        -- Need OP
}

CellReselectionParametersCDMA2000-r11 ::= SEQUENCE {
    bandClassList                       BandClassListCDMA2000,
    neighCellList-r11                   SEQUENCE (SIZE (1..16)) OF NeighCellCDMA2000-r11,
    t-ReselectionCDMA2000               T-Reselection,
    t-ReselectionCDMA2000-SF            SpeedState3caleFactors              OPTIONAL    -- Need OP
}

CellReselectionParametersCDMA2000-v920 ::= SEQUENCE {
    neighCellList-v920                  NeighCellListCDMA2000-v920
}

NeighCellListCDMA2000 ::=           SEQUENCE (SIZE (1..16)) OF NeighCellCDMA2000

NeighCellCDMA2000 ::=   SEQUENCE {
    bandClass                           BandclassCDMA2000,
    neighCellsPerFreqList               NeighCellsPerBandclassListCDMA2000
}

NeighCellCDMA2000-r11 ::=   SEQUENCE {
    bandClass                           BandclassCDMA2000,
    neighFreqInfoList-r11               SEQUENCE (SIZE (1..16)) OF NeighCellsPerBandclassCDMA2000-
r11
}

NeighCellsPerBandclassListCDMA2000 ::= SEQUENCE (SIZE (1..16)) OF NeighCellsPerBandclassCDMA2000

NeighCellsPerBandclassCDMA2000 ::=  SEQUENCE {
    arfcn                               ARFCN-ValueCDMA2000,
    physCellIdList                      PhysCellIdListCDMA2000
}

NeighCellsPerBandclassCDMA2000-r11 ::=  SEQUENCE {
    arfcn                               ARFCN-ValueCDMA2000,
    physCellIdList-r11                  SEQUENCE (SIZE (1..4)) OF PhysCellIdCDMA2000
}

NeighCellListCDMA2000-v920 ::=      SEQUENCE (SIZE (1..16)) OF NeighCellCDMA2000-v920

NeighCellCDMA2000-v920 ::=          SEQUENCE {
    neighCellsPerFreqList-v920          NeighCellsPerBandclassListCDMA2000-v920
}

NeighCellsPerBandclassListCDMA2000-v920 ::= SEQUENCE (SIZE (1..16)) OF
NeighCellsPerBandclassCDMA2000-v920
```

```
NeighCellsPerBandclassCDMA2000-v920 ::= SEQUENCE {
    physCellIdList-v920                 PhysCellIdListCDMA2000-v920
}

PhysCellIdListCDMA2000 ::=          SEQUENCE (SIZE (1..16)) OF PhysCellIdCDMA2000

PhysCellIdListCDMA2000-v920 ::=     SEQUENCE (SIZE (0..24)) OF PhysCellIdCDMA2000

BandClassListCDMA2000 ::=           SEQUENCE (SIZE (1..maxCDMA-BandClass)) OF BandClassInfoCDMA2000

BandClassInfoCDMA2000 ::=   SEQUENCE {
    bandClass                           BandclassCDMA2000,
    cellReselectionPriority             CellReselectionPriority             OPTIONAL,   -- Need OP
    threshX-High                        INTEGER (0..63),
    threshX-Low                         INTEGER (0..63),
    ...
}

AC-BarringConfig1XRTT-r9 ::=        SEQUENCE {
    ac-Barring0to9-r9                   INTEGER (0..63),
    ac-Barring10-r9                     INTEGER (0..7),
    ac-Barring11-r9                     INTEGER (0..7),
    ac-Barring12-r9                     INTEGER (0..7),
    ac-Barring13-r9                     INTEGER (0..7),
    ac-Barring14-r9                     INTEGER (0..7),
    ac-Barring15-r9                     INTEGER (0..7),
    ac-BarringMsg-r9                    INTEGER (0..7),
    ac-BarringReg-r9                    INTEGER (0..7),
    ac-BarringLng-r9                    INTEGER (0..7)
}

S1B8-PerPLMN-List-r11 ::=           SEQUENCE (SIZE (1..maxPLMN-r11)) OF S1B8-PerPLMN-r11

S1B8-PerPLMN-r11 ::=                SEQUENCE {
    plmn-Identity-r11                   INTEGER (1..maxPLMN-r11),
    parametersCDMA2000-r11              CHOICE {
        explicitValue                       ParametersCDMA2000-r11,
        defaultValue                        NULL
    }
}

ParametersCDMA2000-r11 ::=          SEQUENCE {
    systemTimeInfo-r11                  CHOICE  {
        explicitValue                       SystemTimeInfoCDMA2000,
        defaultValue                        NULL
    }                                                       OPTIONAL,       Need OR
    searchWindowSize-r11                INTEGER (0..15),
    parametersHRPD-r11                  SEQUENCE {
        preRegistrationInfoHRPD-r11         PreRegistrationInfoHRPD,
        cellReselectionParametersHRPD-r11   CellReselectionParametersCDMA2000-r11   OPTIONAL -- Need
OR
    }       OPTIONAL,   -- Need OR
    parameters1XRTT-r11                 SEQUENCE {
        csfb-RegistrationParam1XRTT-r11     CSFB-RegistrationParam1XRTT         OPTIONAL, -- Need OP
        csfb-RegistrationParam1XRTT-Ext-r11 CSFB-RegistrationParam1XRTT-v920     OPTIONAL, -- Cond
REG-1XRTT-PerPLMN
        longCodeState1XRTT-r11              BIT STRING (SIZE (42))  OPTIONAL, -- Cond PerPLMN-Lc
        cellReselectionParameters1XRTT-r11  CellReselectionParametersCDMA2000-r11   OPTIONAL, --
Need OR
        ac-BarringConfig1XRTT-r11           AC-BarringConfig1XRTT-r9            OPTIONAL, -- Cond
REG-1XRTT-PerPLMN
        csfb-SupportForDualRxUes-r11        BOOLEAN                             OPTIONAL, -- Need OR
        csfb-DualRxTxSupport-r11            ENUMERATED {true}           OPTIONAL -- Cond REG-1XRTT-
PerPLMN
    }       OPTIONAL,   -- Need OP
    ...
}

-- ASN1STOP
```

SystemInformationBlockType8 field descriptions
ac-BarringConfig1XRTT Contains the access class barring parameters the UE uses to calculate the access class barring factor, see C.S0097 [53].
ac-Barring0to9 Parameter used for calculating the access class barring factor for access overload classes 0 through 9. It is the parameter "PSIST" in C.S0004 [34] for access overload classes 0 through 9.
ac-BarringEmg Parameter used for calculating the access class barring factor for emergency calls and emergency message transmissions for access overload classes 0 through 9. It is the parameter "PSIST_EMG" in C.S0004 [34].
ac-BarringMsg Parameter used for modifying the access class barring factor for message transmissions. It is the parameter "MSG_PSIST" in C.S0004 [34].
ac-BarringN Parameter used for calculating the access class barring factor for access overload class N (N = 10 to 15). It is the parameter "PSIST" in C.S0004 [34] for access overload class N.
ac-BarringReg Parameter used for modifying the access class barring factor for autonomous registrations. It is the parameter "REG_PSIST" in C.S0004 [34].
bandClass Identifies the Frequency Band in which the Carrier can be found. Details can be found in C.S0057 [24, Table 1.5].
bandClassList List of CDMA2000 frequency bands.
cellReselectionParameters1XRTT Cell reselection parameters applicable only to CDMA2000 1xRTT system.
cellReselectionParameters1XRTT-Ext Cell reselection parameters applicable for cell reselection to CDMA2000 1XRTT system.
cellReselectionParameters1XRTT-v920 Cell reselection parameters applicable for cell reselection to CDMA2000 1XRTT system. The field is not present if *cellReselectionParameters1XRTT* is not present; otherwise it is optionally present.
cellReselectionParametersHRPD Cell reselection parameters applicable for cell reselection to CDMA2000 HRPD system.
cellReselectionParametersHRPD-Ext Cell reselection parameters applicable for cell reselection to CDMA2000 HRPD system.
cellReselectionParametersHRPD-v920 Cell reselection parameters applicable for cell reselection to CDMA2000 HRPD system. The field is not present if *cellReselectionParametersHRPD* is not present; otherwise it is optionally present.
csfb-DualRxTxSupport Value TRUE indicates that the network supports dual Rx/Tx enhanced 1xCSFB, which enables UEs capable of dual Rx/Tx enhanced 1xCSFB to switch off their 1xRTT receiver/transmitter while camped in E-UTRAN [51].
csfb-RegistrationParam1XRTT Contains the parameters the UE will use to determine if it should perform a CDMA2000 1xRTT Registration/Re-Registration. This field is included if either CSFB or enhanced CS fallback to CDMA2000 1xRTT is supported.
csfb-SupportForDualRxUEs Value TRUE indicates that the network supports dual Rx CSFB [51].
longCodeState1XRTT The state of long code generation registers in CDMA2000 1XRTT system as defined in C.S0002 [12, Section 1.3] at $\lceil t/10 \rceil \times 10 + 320$ ms, where *t* equals to the *cdma-SystemTime*. This field is required for 1xRTT inter-RAT ANR, SRVCC handover and enhanced CS fallback to CDMA2000 1xRTT operation. Otherwise this IE is not needed. This field is excluded when estimating changes in system information, i.e. changes of *longCodeState1XRTT* should neither result in system information change notifications nor in a modification of *systemInfoValueTag* in SIB1.
neighCellList List of CDMA2000 neighbouring cells. The total number of neighbouring cells in neighCellList for each RAT (1XRTT or HRPD) is limited to 32.
neighCellList-v920 Extended List of CDMA2000 neighbouring cells. The combined total number of CDMA2000 neighbouring cells in both *neighCellList* and *neighCellList-v920* is limited to 32 for HRPD and 40 for 1xRTT.

SystemInformationBlockType8 field descriptions

neighCellsPerFreqList

List of carrier frequencies and neighbour cell ids in each frequency within a CDMA2000 Band, see C.S0002 [12] or C.S0024 [26].

neighCellsPerFreqList-v920

Extended list of neighbour cell ids, in the same CDMA2000 Frequency Band as the corresponding instance in "NeighCellListCDMA2000".

parameters1XRTT

Parameters applicable for interworking with CDMA2000 1XRTT system.

parametersCDMA2000

Provides the corresponding SIB8 parameters for the CDMA2000 network associated with the PLMN indicated in *plmn-Identity*. A choice is used to indicate whether for this PLMN the parameters are signalled explicitly or set to the (default) values common for all PLMNs i.e. the values not included in *sib8-PerPLMN-List*.

parametersHRPD

Parameters applicable only for interworking with CDMA2000 HRPD systems.

physCellIdList

Identifies the list of CDMA2000 cell ids, see C.S0002 [12] or C.S0024 [26].

physCellIdList-v920

Extended list of CDMA2000 cell ids, in the same CDMA2000 ARFCN as the corresponding instance in "NeighCellsPerBandclassCDMA2000".

plmn-Identity

Indicates the PLMN associated with this CDMA2000 network. Value 1 indicates the PLMN listed 1st in *plmn-IdentityList* included in SIB1, value 2 indicates the PLMN listed 2nd in *plmn-IdentityList* included in SIB1 and so on. A PLMN which identity is not indicated in the *sib8-PerPLMN-List*, does not support inter-working with CDMA2000.

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.

searchWindowSize

The search window size is a CDMA2000 parameter to be used to assist in searching for the neighbouring pilots. For values see C.S0005 [25, Table 2.6.6.2.1-1] and C.S0024 [26, Table 8.7.6.2-4]. This field is required for a UE with *rx-ConfigHRPD= single* and/ or *rx-Config1XRTT= single* to perform handover, cell re-selection, UE measurement based redirection and enhanced 1xRTT CS fallback from E-UTRAN to CDMA2000 according to this specification and TS 36.304 [4].

sib8-PerPLMN-List

This field provides the values for the interworking CDMA2000 networks corresponding, if any, to the UE's RPLMN.

systemTimeInfo

Information on CDMA2000 system time. This field is required for a UE with *rx-ConfigHRPD= single* and/ or *rx-Config1XRTT= single* to perform handover, cell re-selection, UE measurement based redirection and enhanced 1xRTT CS fallback from E-UTRAN to CDMA2000 according to this specification and TS 36.304 [4]. This field is excluded when estimating changes in system information, i.e. changes of *systemTimeInfo* should neither result in system information change notifications nor in a modification of *systemInfoValueTag* in SIB1.
For the field included in *ParametersCDMA2000*, a choice is used to indicate whether for this PLMN the parameters are signalled explicitly or set to the (default) value common for all PLMNs i.e. the value not included in *sib8-PerPLMN-List*.

threshX-High

Parameter "$Thresh_{X,HighP}$" in TS 36.304 [4]. This specifies the high threshold used in reselection towards this CDMA2000 band class expressed as an unsigned binary number equal to FLOOR ($-2 \times 10 \times \log_{10} E_c/I_o$) in units of 0.5 dB, as defined in C.S0005 [25].

threshX-Low

Parameter "$Thresh_{X,LowP}$" in TS 36.304 [4]. This specifies the low threshold used in reselection towards this CDMA2000 band class expressed as an unsigned binary number equal to FLOOR ($-2 \times 10 \times \log_{10} E_c/I_o$) in units of 0.5 dB, as defined in C.S0005 [25].

t-ReselectionCDMA2000

Parameter "$Treselection_{CDMA\_HRPD}$" or "$Treselection_{CDMA\_1xRTT}$" in TS 36.304 [4].

t-ReselectionCDMA2000-SF

Parameter "Speed dependent ScalingFactor for $Treselection_{CDMA-HRPD}$" or "$Treselection_{CDMA-1xRTT}$" in TS 36.304 [4]. If the field is not present, the UE behaviour is specified in TS 36.304 [4].

Conditional presence	Explanation
NCL-1XRTT	The field is optional present, need OR, if *cellReselectionParameters1XRTT* is present; otherwise it is not present.
NCL-HRPD	The field is optional present, need OR, if *cellReselectionParametersHRPD* is present; otherwise it is not present.
PerPLMN-LC	The field is optional present, need OR, when *systemTimeInfo* is included in *SIB8PerPLMN* for this CDMA2000 network; otherwise it is not present.
REG-1XRTT	The field is optional present, need OR, if *csfb-RegistrationParam1XRTT* is present; otherwise it is not present.
REG-1XRTT-PerPLMN	The field is optional present, need OR, if *csfb-RegistrationParam1XRTT* is included in *SIB8PerPLMN* for this CDMA2000 network; otherwise it is not present.

-- SystemInformationBlockType9

The IE *SystemInformationBlockType9* contains a home eNB name (HNB Name).

SystemInformationBlockType9 information element

```
-- ASN1START

SystemInformationBlockType9 ::=     SEQUENCE {
    hnb-Name                            OCTET STRING (SIZE(1..48))      OPTIONAL,   -- Need OR
    ...,
    lateNonCriticalExtension                OCTET STRING                OPTIONAL
}

-- ASN1STOP
```

***SystemInformationBlockType9* field descriptions**
hnb-Name
Carries the name of the home eNB, coded in UTF-8 with variable number of bytes per character, see TS 22.011 [10].

-- SystemInformationBlockType10

The IE *SystemInformationBlockType10* contains an ETWS primary notification.

SystemInformationBlockType10 information element

```
-- ASN1START

SystemInformationBlockType10 ::=    SEQUENCE {
    messageIdentifier                   BIT STRING (SIZE (16)),
    serialNumber                        BIT STRING (SIZE (16)),
    warningType                         OCTET STRING (SIZE (2)),
    dummy                               OCTET STRING (SIZE (50))    OPTIONAL,       -- Need OP
    ...,
    lateNonCriticalExtension            OCTET STRING                OPTIONAL
}

-- ASN1STOP
```

SystemInformationBlockType10 field descriptions

messageIdentifier

Identifies the source and type of ETWS notification. The leading bit (which is equivalent to the leading bit of the equivalent IE defined in TS 36.413 [39, 9.2.1.44]) contains bit 7 of the first octet of the equivalent IE, defined in and encoded according to TS 23.041 [37, 9.4.3.2.1], while the trailing bit contains bit 0 of the second octet of the same equivalent IE.

serialNumber

Identifies variations of an ETWS notification. The leading bit (which is equivalent to the leading bit of the equivalent IE defined in TS 36.413 [39, 9.2.1.45]) contains bit 7 of the first octet of the equivalent IE, defined in and encoded according to TS 23.041 [37, 9.4.3.2.2], while the trailing bit contains bit 0 of the second octet of the same equivalent IE.

dummy

This field is not used in the specification. If received it shall be ignored by the UE.

warningType

Identifies the warning type of the ETWS primary notification and provides information on emergency user alert and UE popup. The first octet (which is equivalent to the first octet of the equivalent IE defined in TS 36.413 [39, 9.2.1.50]) contains the first octet of the equivalent IE defined in and encoded according to TS 23.041 [37, 9.3.24], and so on.

-- SystemInformationBlockType11

The IE *SystemInformationBlockType11* contains an ETWS secondary notification.

SystemInformationBlockType11 information element

```
-- ASN1START

SystemInformationBlockType11 ::=    SEQUENCE {
    messageIdentifier                   BIT STRING (SIZE (16)),
    serialNumber                        BIT STRING (SIZE (16)),
    warningMessageSegmentType           ENUMERATED {notLastSegment, lastSegment},
    warningMessageSegmentNumber         INTEGER (0..63),
    warningMessageSegment               OCTET STRING,
    dataCodingScheme                    OCTET STRING (SIZE (1))         OPTIONAL,   -- Cond Segment1
    ...,
    lateNonCriticalExtension                OCTET STRING                OPTIONAL
}

-- ASN1STOP
```

SystemInformationBlockType11 field descriptions

dataCodingScheme

Identifies the alphabet/coding and the language applied variations of an ETWS notification. The octet (which is equivalent to the octet of the equivalent IE defined in TS 36.413 [39, 9.2.1.52]) contains the octet of the equivalent IE defined in TS 23.041 [37, 9.4.3.2.3] and encoded according to TS 23.038 [38].

messageIdentifier

Identifies the source and type of ETWS notification. The leading bit (which is equivalent to the leading bit of the equivalent IE defined in TS 36.413 [39, 9.2.1.44]) contains bit 7 of the first octet of the equivalent IE, defined in and encoded according to TS 23.041 [37, 9.4.3.2.1], while the trailing bit contains bit 0 of second octet of the same equivalent IE.

serialNumber

Identifies variations of an ETWS notification. The leading bit (which is equivalent to the leading bit of the equivalent IE defined in TS 36.413 [39, 9.2.1.45]) contains bit 7 of the first octet of the equivalent IE, defined in and encoded according to TS 23.041 [37, 9.4.3.2.2], while the trailing bit contains bit 0 of second octet of the same equivalent IE.

warningMessageSegment

Carries a segment of the *Warning Message Contents* IE defined in TS 36.413 [39, 9.2.1.53]. The first octet of the *Warning Message Contents* IE is equivalent to the first octet of the *CB data* IE defined in and encoded according to TS 23.041 [37, 9.4.2.2.5] and so on.

warningMessageSegmentNumber

Segment number of the ETWS warning message segment contained in the SIB. A segment number of zero corresponds to the first segment, one corresponds to the second segment, and so on.

warningMessageSegmentType

Indicates whether the included ETWS warning message segment is the last segment or not.

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Conditional presence	Explanation
Segment1	The field is mandatory present in the first segment of SIB11, otherwise it is not present.

-- SystemInformationBlockType12

The IE *SystemInformationBlockType12* contains a CMAS notification.

SystemInformationBlockType12 information element

```
-- ASN1START

SystemInformationBlockType12-r9 ::= SEQUENCE {
    messageIdentifier-r9                BIT STRING (SIZE (16)),
    serialNumber-r9                     BIT STRING (SIZE (16)),
    warningMessageSegmentType-r9        ENUMERATED {notLastSegment, lastSegment},
    warningMessageSegmentNumber-r9      INTEGER (0..63),
    warningMessageSegment-r9            OCTET STRING,
    dataCodingScheme-r9                 OCTET STRING (SIZE (1))         OPTIONAL,   -- Cond Segment1
    lateNonCriticalExtension            OCTET STRING                    OPTIONAL,
    ...
}

-- ASN1STOP
```

***SystemInformationBlockType12* field descriptions**
dataCodingScheme
Identifies the alphabet/coding and the language applied variations of a CMAS notification. The octet (which is equivalent to the octet of the equivalent IE defined in TS 36.413 [39, 9.2.1.52]) contains the octet of the equivalent IE defined in TS 23.041 [37, 9.4.3.2.3] and encoded according to TS 23.038 [38].
messageIdentifier
Identifies the source and type of CMAS notification. The leading bit (which is equivalent to the leading bit of the equivalent IE defined in TS 36.413 [39, 9.2.1.44]) contains bit 7 of the first octet of the equivalent IE, defined in and encoded according to TS 23.041 [37, 9.4.3.2.1], while the trailing bit contains bit 0 of second octet of the same equivalent IE.
serialNumber
Identifies variations of a CMAS notification. The leading bit (which is equivalent to the leading bit of the equivalent IE defined in TS 36.413 [39, 9.2.1.45]) contains bit 7 of the first octet of the equivalent IE, defined in and encoded according to TS 23.041 [37, 9.4.3.2.2], while the trailing bit contains bit 0 of second octet of the same equivalent IE.
warningMessageSegment
Carries a segment of the *Warning Message Contents* IE defined in TS 36.413 [39]. The first octet of the *Warning Message Contents* IE is equivalent to the first octet of the *CB data* IE defined in and encoded according to TS 23.041 [37, 9.4.2.2.5] and so on.
warningMessageSegmentNumber
Segment number of the CMAS warning message segment contained in the SIB. A segment number of zero corresponds to the first segment, one corresponds to the second segment, and so on.
warningMessageSegmentType
Indicates whether the included CMAS warning message segment is the last segment or not.

Conditional presence	Explanation
Segment1	The field is mandatory present in the first segment of SIB12, otherwise it is not present.

-- SystemInformationBlockType13

The IE *SystemInformationBlockType13* contains the information required to acquire the MBMS control information associated with one or more MBSFN areas.

SystemInformationBlockType13 information element

```
-- ASN1START

SystemInformationBlockType13-r9 ::= SEQUENCE {
    mbsfn-AreaInfoList-r9               MBSFN-AreaInfoList-r9,
```

```
    notificationConfig-r9               MBMS-NotificationConfig-r9,
    lateNonCriticalExtension            OCTET STRING                    OPTIONAL,
    ...
}

-- ASN1STOP
```

SystemInformationBlockType13 field descriptions
notificationConfig
Indicates the MBMS notification related configuration parameters. The UE shall ignore this field when *dl-Bandwidth* included in *MasterInformationBlock* is set to n6.

– SystemInformationBlockType14

The IE *SystemInformationBlockType14* contains the EAB parameters.

SystemInformationBlockType14 information element

```
-- ASN1START

SystemInformationBlockType14-r11 ::=    SEQUENCE {
    eab-Param-r11                           CHOICE {
        eab-Common-r11                          EAB-Config-r11,
        eab-PerPLMN-List-r11                    SEQUENCE (SIZE (1..maxPLMN-r11)) OF EAB-ConfigPLMN
-r11
    }                                                   OPTIONAL,  -- Need OR
    lateNonCriticalExtension            OCTET STRING            OPTIONAL,
    ...
}

EAB-ConfigPLMN-r11 ::=              SEQUENCE {
    eab-Config-r11                      EAB-Config-r11              OPTIONAL -- Need OR
}

EAB-Config-r11 ::=                  SEQUENCE {
    eab-Category-r11                    ENUMERATED {a, b, c},
    eab-BarringBitmap-r11               BIT STRING (SIZE (10))
}

-- ASN1STOP
```

SystemInformationBlockType14 field descriptions
eab-BarringBitmap
Extended 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.
eab-Category
Indicates the category of UEs for which EAB 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].
eab-Common
The EAB parameters applicable for all PLMN(s).
eab-PerPLMN-List
The EAB parameters per PLMN, listed in the same order as the PLMN(s) occur in *plmn-IdentityList* in *SystemInformationBlockType1*.

– SystemInformationBlockType15

The IE *SystemInformationBlockType15* contains the MBMS Service Area Identities (SAI) of the current and/ or neighbouring carrier frequencies.

SystemInformationBlockType15 information element

```
-- ASN1START

SystemInformationBlockType15-r11 ::=    SEQUENCE {
    mbms-SAI-InterFreq-r11                  MBMS-SAI-List-r11               OPTIONAL,   -- Need OR
```

```
    mbms-SAI-InterFreqList-r11              MBMS-SAI-InterFreqList-r11      OPTIONAL,   -- Need OR
    lateNonCriticalExtension                OCTET STRING                    OPTIONAL,
    ...,
    [[  mbms-SAI-InterFreqList-v1140        MBMS-SAI-InterFreqList-v1140    OPTIONAL    -- Cond
InterFreq
    ]]
}

MBMS-SAI-List-r11 ::=                   SEQUENCE (SIZE (1..maxSAI-MBMS-r11)) OF MBMS-SAI-r11

MBMS-SAI-r11 ::=                        INTEGER (0..65535)

MBMS-SAI-InterFreqList-r11 ::=          SEQUENCE (SIZE (1..maxFreq)) OF MBMS-SAI-InterFreq-r11

MBMS-SAI-InterFreqList-v1140 ::=        SEQUENCE (SIZE (1..maxFreq)) OF MBMS-SAI-InterFreq-v1140

MBMS-SAI-InterFreq-r11 ::=              SEQUENCE {
    dl-CarrierFreq-r11                      ARFCN-ValueEUTRA-r9,
    mbms-SAI-List-r11                       MBMS-SAI-List-r11
}

MBMS-SAI-InterFreq-v1140 ::=            SEQUENCE {
        multiBandInfoList-r11               MultiBandInfoList-r11           OPTIONAL    -- Need OR
}


-- ASN1STOP
```

SystemInformationBlockType15 field descriptions
mbms-SAI-InterFreqList
Contains a list of neighboring frequencies including additional 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 MBSFN transmission.

Conditional presence	Explanation
interFreq	The field is optionally present, need OR, if the *mbms-SAI-InterFreqList-r11* is present. Otherwise it is not present.

– SystemInformationBlockType16

The IE *SystemInformationBlockType16* 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.

NOTE: The UE may use the time information for numerous purposes, possibly involving upper layers e.g. to assist GPS initialisation, to synchronise the UE clock (a.o. to determine MBMS session start/ stop).

SystemInformationBlockType16 information element

```
-- ASN1START

SystemInformationBlockType16-r11 ::=        SEQUENCE {
    timeInfo-r11                            SEQUENCE {
        timeInfoUTC-r11                         INTEGER (0..549755813887),
        daylightSavingTime-r11                  BIT STRING (SIZE (2))       OPTIONAL,   -- Need OR
        leapSeconds-r11                         INTEGER (-127..128)         OPTIONAL,   -- Need OR
        localTimeOffset-r11                     INTEGER (-63..64)           OPTIONAL    -- Need OR
    }                                                                       OPTIONAL,   -- Need OR
    lateNonCriticalExtension            OCTET STRING                    OPTIONAL,
    ...
}
```

```
-- ASN1STOP
```

SystemInformationBlockType16 field descriptions
dayLightSavingTime
It indicates if and how daylight saving time (DST) is applied to obtain the local time. The semantics is the same as the semantics of the *Daylight Saving Time* IE in TS 24.301 [35] and TS 24.008 [49]. The first/leftmost bit of the bit string contains the b2 of octet 3, i.e. the value part of the *Daylight Saving Time* IE, and the second bit of the bit string contains b1 of octet 3.
leapSeconds
Number of leap seconds offset between GPS Time and UTC. UTC and GPS time are related i.e. GPS time - *leapSeconds* = UTC time.
localTimeOffset
Offset between UTC and local time in units of 15 minutes. Actual value = IE value * 15 minutes. Local time of the day is calculated as UTC time + *localTimeOffset*.
timeInfoUTC
Coordinated Universal Time corresponding to the SFN boundary at or immediately after the ending boundary of the SI-window in which *SystemInformationBlockType16* is transmitted. The field counts the number of UTC seconds in 10 ms units since 00:00:00 on Gregorian calendar date 1 January, 1900 (midnight between Sunday, December 31, 1899 and Monday, January 1, 1900), including leap seconds and other additions prior to 1972. NOTE 1. This field is excluded when estimating changes in system information, i.e. changes of *timeInfoUTC* should neither result in system information change notifications nor in a modification of *systemInfoValueTag* in SIB1.

NOTE 1: For the sake of the field definition, it is assumed UTC existed prior to 1 January 1972. As this field counts total elapsed time, conversion to calendar UTC time needs to allow for leap second and other calendar adjustments since 1 January 1900. For example, time 00:00 on 1 January 1972 UTC corresponds to a *timeInfoUTC* of 2,272,060,800 seconds.

– *SystemInformationBlockType17*

The IE *SystemInformationBlockType17* contains information relevant for traffic steering between E-UTRAN and WLAN.

SystemInformationBlockType17 information element

```
-- ASN1START

SystemInformationBlockType17-r12 ::=    SEQUENCE {
    wlan-OffloadInfoPerPLMN-List-r12        SEQUENCE (SIZE (1..maxPLMN-r11)) OF
                                            WLAN-OffloadInfoPerPLMN-r12          OPTIONAL, -- Need OR
    lateNonCriticalExtension                OCTET STRING                         OPTIONAL,
    ...
}

WLAN-OffloadInfoPerPLMN-r12 ::=             SEQUENCE {
        wlan-OffloadConfigCommon-r12        WLAN-OffloadConfig-r12      OPTIONAL,   -- Need OR
        wlan-Id-List-r12                    WLAN-Id-List-r12            OPTIONAL,   -- Need OR
        ...
}

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

WLAN-Identifiers-r12 ::=            SEQUENCE {
    ssid-r12                        OCTET STRING (SIZE (1..32))     OPTIONAL,   -- Need OR
    bssid-r12                       OCTET STRING (SIZE (6))         OPTIONAL,   -- Need OR
    hessid-r12                      OCTET STRING (SIZE (6))         OPTIONAL,   -- Need OR
    ...
}

-- ASN1STOP
```

SystemInformationBlockType17 field descriptions
bssid
Basic Service Set Identifier (BSSID) defined in IEEE 802.11-2012 [67].
hessid
Homogenous Extended Service Set Identifier (HESSID) defined in IEEE 802.11-2012 [67].

SystemInformationBlockType17 field descriptions

ssid
Service Set Identifier (SSID) defined in IEEE 802.11-2012 [67].

wlan-OffloadInfoPerPLMN-List
The WLAN offload configuration per PLMN includes the same number of entries, listed in the same order as the PLMN(s) in *plmn-IdentityList* in *SystemInformationBlockType1*.

– SystemInformationBlockType18

The IE *SystemInformationBlockType18* indicates E-UTRAN supports the Sidelink UE information procedure and may contain sidelink communication related resource configuration information.

SystemInformationBlockType18 information element

```
-- ASN1START

SystemInformationBlockType18-r12 ::= SEQUENCE {
    commConfig-r12                  SEQUENCE {
        commRxPool-r12                  SL-CommRxPoolList-r12,
        commTxPoolNormalCommon-r12      SL-CommTxPoolList-r12           OPTIONAL,   -- Need OR
        commTxPoolExceptional-r12       SL-CommTxPoolList-r12           OPTIONAL,   -- Need OR
        commSyncConfig-r12              SL-SyncConfigList-r12       OPTIONAL        Need OR
    }                                                                   OPTIONAL,   -- Need OR
    lateNonCriticalExtension        OCTET STRING                        OPTIONAL,
    ...,
    [[  commTxPoolNormalCommonExt-r13       SL-CommTxPoolListExt-r13    OPTIONAL,   -- Need OR
        commTxAllowRelayCommon-r13          ENUMERATED {true}           OPTIONAL    -- Need OR
    ]]
}

-- ASN1STOP
```

SystemInformationBlockType18 field descriptions

commRxPool
Indicates the resources by which the UE is allowed to receive sidelink communication while in RRC_IDLE and while in RRC_CONNECTED.

commSyncConfig
Indicates the configuration by which the UE is allowed to receive and transmit synchronisation information. E-UTRAN configures *commSyncConfig* including *txParameters* when configuring UEs by dedicated signalling to transmit synchronisation information.

commTxPoolExceptional
Indicates the resources by which the UE is allowed to transmit sidelink communication in exceptional conditions, as specified in 5.10.4.

commTxPoolNormalCommon
Indicates the resources by which the UE is allowed to transmit sidelink communication while in RRC_IDLE or when in RRC_CONNECTED while transmitting sidelink via a frequency other than the primary.

commTxAllowRelayCommon
Indicates whether the UE is allowed to transmit relay related data using the transmission pools included in SIB18 i.e. either via *commTxPoolNormalCommon* or via *commTxPoolExceptional*.

– SystemInformationBlockType19

The IE *SystemInformationBlockType19* indicates E-UTRAN supports the sidelink UE information procedure and may contain sidelink discovery related resource configuration information.

SystemInformationBlockType19 information element

```
-- ASN1START

SystemInformationBlockType19-r12 ::= SEQUENCE {
    discConfig-r12                  SEQUENCE {
        discRxPool-r12                  SL-DiscRxPoolList-r12,
        discTxPoolCommon-r12            SL-DiscTxPoolList-r12           OPTIONAL,   -- Need OR
        discTxPowerInfo-r12             SL-DiscTxPowerInfoList-r12  OPTIONAL,   -- Cond Tx
        discSyncConfig-r12              SL-SyncConfigList-r12       OPTIONAL        Need OR
    }                                                                   OPTIONAL,   -- Need OR
```


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```
    discInterFreqList-r12               SL-CarrierFreqInfoList-r12      OPTIONAL,   -- Need OR
    lateNonCriticalExtension            OCTET STRING                        OPTIONAL,
    ...,
    [[  discConfig-v13x0                SEQUENCE {
          discInterFreqList-v13x0           SL-CarrierFreqInfoList-v13z0    OPTIONAL,   -- Need OR
          gapRequestsAllowedCommon          ENUMERATED {true}               OPTIONAL    -- Need OR
        }                                                                   OPTIONAL,   -- Need OR
        discConfigRelay-r13             SEQUENCE {
          discThreshHighRelayUE-r13         RSRP-Range                      OPTIONAL,   -- Need OR
          discThreshLowRelayUE-r13          RSRP-Range                      OPTIONAL,   -- Need OR
          discHystMaxRelayUE-r13            ENUMERATED {dB0, dB2, dB4, dB6, dB8, dB10, dB12, dB14, dB16, dB18, dB20, dB22, dB24},
          discHystMinRelayUE-r13            ENUMERATED {dB0, dB2, dB4, dB6, dB8, dB10, dB12, dB14, dB16, dB18, dB20, dB22, dB24},
          discThreshHighRemoteUE-r13        RSRP-Range                      OPTIONAL,   -- Need OR
          discHystMaxRemoteUE-r13           ENUMERATED {dB0, dB2, dB4, dB6, dB8, dB10, dB12, dB14, dB16, dB18, dB20, dB22, dB24},
          reselectionInfoRemoteUE-IC-r13    ReselectionInfoRelay-r13
        }                                                                   OPTIONAL,   -- Need OR
        discConfigPS-r13                SEQUENCE {
          discRxPoolPS-r13                  SL-DiscRxPoolList-r12,
          discTxPoolPS-Common-r13           SL-DiscTxPoolList-r12           OPTIONAL    -- Need OR
        }                                                                   OPTIONAL    -- Need OR
    ]]
}

SL-CarrierFreqInfoList-r12 ::=  SEQUENCE (SIZE (1..maxFreq)) OF SL-CarrierFreqInfo-r12

SL-CarrierFreqInfoList-v13x0 ::=    SEQUENCE (SIZE (1..maxFreq)) OF SL-CarrierFreqInfo-v13x0

SL-CarrierFreqInfo-r12::=       SEQUENCE {
    carrierFreq-r12                     ARFCN-ValueEUTRA-r9,
    plmn-IdentityList-r12               PLMN-IdentityList4-r12          OPTIONAL    -- Need OP
}

ReselectionInfoRelay-r13 ::=    SEQUENCE {
    q-RxLevMin-r13                      Q-RxLevMin,
    -- Note that the mapping of invidual values may be different for FC5, but the granularity/
    -- number of values is same as for Uu
    filterCoefficient-r13               FilterCoefficient,
    minHyst-r13                         ENUMERATED {dB0, dB2,
                                            dB4, dB6, dB8, dB10, dB12, dB14, dB16, dB18, dB20, dB22, dB24},
    ...
}

CellSelectionInfoNFreq-r13 ::=  SEQUENCE {
    -- Cell selection information as in SIB4
    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          OPTIONAL,   -- Need OP
    t-ReselectionEUTRA-r13              T-Reselection
}

SL-CarrierFreqInfo-v13x0::=     SEQUENCE {
    discTxResources-r13                 SL-DiscTxPoolList-r12               OPTIONAL,   -- Need OR
    discRxResourcesPS-r13               SL-DiscRxPoolList-r12               OPTIONAL,   -- Need OR
    discTxResources-r13                 SL-DiscTxResourcesInterFreq-r13     OPTIONAL,   -- Need OR
    discTxResourcesPS-r13               SL-DiscTxResourcesInterFreq-r13     OPTIONAL,   -- Need OR
    discTxPowerInfo-r13                 SL-DiscTxPowerInfoList-r12          OPTIONAL,   -- Cond Tx
    discTxRefCarrierCommon-r13          ENUMERATED {pCell}                  OPTIONAL,   -- Need OR
    discSyncConfig-r13                  SL-SyncConfigListNFreq-r12              OPTIONAL,       -- Need OP
    cellSelectionInfo-r13               CellSelectionInfoNFreq-r13          OPTIONAL    -- Need OR
}

PLMN-IdentityList4-r12 ::=  SEQUENCE (SIZE (1..maxPLMN-r11)) OF PLMN-IdentityInfo2-r12

PLMN-IdentityInfo2-r12 ::=      CHOICE {
    plmn-Index-r12                      INTEGER (1..maxPLMN-r11),
    plmn-Identity-r12                   PLMN-Identity
}

SL-DiscTxResourcesInterFreq-r13 ::= CHOICE {
    acquireSI-FromCarrier-r13           NULL,
    discTxPoolCommon-r13                SL-DiscTxPoolList-r12,
    requestDedicated-r13                NULL,
    noTxOnCarrier-r13                   NULL
```

```
}
-- ASN1STOP
```

SystemInformationBlockType19 field descriptions
cellSelectionInfo 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.
discInterFreqList Indicates the neighbouring frequencies on which sidelink discovery announcement is supported. May also provide further information i.e. reception resource pool and/ or transmission resource pool, or an indication how resources could be obtained.
discRxPool Indicates the resources by which the UE is allowed to receive sidelink discovery announcements while in RRC_IDLE and while in RRC_CONNECTED.
discRxPoolPS Indicates the resources by which the UE is allowed receive relay and other public safety related sidelink discovery announcements while in RRC_IDLE and while in RRC_CONNECTED.
discSyncConfig Indicates the configuration by which the UE is allowed to receive and transmit synchronisation information. E-UTRAN configures *discSyncConfig* including *txParameters* when configuring UEs by dedicated signalling to transmit synchronisation information.
discThreshHiRemoteUE Indicates when a remote UE that is in network coverage may use the broadcast PS related sidelink discovery Tx resource pool, if broadcast, or request Tx resources by dedicated signalling otherwise. The parameter equally applies for Tx resources for relay related communication.
discThreshXxRelayUE Indicates when a relay UE that is in network coverage may use the broadcast PS related sidelink discovery Tx resource pool, if broadcast, or request Tx resources by dedicated signalling otherwise.
discTxPoolCommon Indicates the resources by which the UE is allowed to transmit sidelink discovery announcements while in RRC_IDLE.
discTxPoolPS-Common Indicates the resources by which the UE is allowed to transmit relay and other public safety related sidelink discovery announcements while in RRC_IDLE.
discTxRefCarrierCommon Indicates if the PCell (RRC_CONNECTED)/ serving cell (RRC_IDLE) is to be used as reference DL measurements and synchronization, instead of the frequency used to transmit sidelink discovery announcements on, see TS 36.213 [23, 14.3.1].
plmn-IdentityList List of PLMN identities for the neighbouring frequency indicated by *carrierFreq*. Absence of the field indicates the same PLMN identities as listed in *plmn-IdentityList* (without suffix) in *SystemInformationBlockType1*.
plmn-Index Index of the corresponding entry in field *plmn-IdentityList* (without suffix) within *SystemInformationBlockType1*.
q-RxLevMinReselection In case the field is absent, the UE shall apply *q-RxLevMin*.
reselectionInfoRemoteUE Includes the parameters used by the UE when selecting/ reselecting a sidelink relay.

Conditional presence	Explanation
Tx	The field is mandatory present if *discTxPoolCommon* is included. Otherwise the field is optional present, need OR.

– *SystemInformationBlockType20*

The IE *SystemInformationBlockType20* contains the information required to acquire the control information associated transmission of MBMS using SC-PTM.

SystemInformationBlockType20 information element

```
-- ASN1START

SystemInformationBlockType20-r13 ::=     SEQUENCE {
   sc-mcch-RepetitionPeriod-r13          ENUMERATED {rf2, rf4, rf8, rf16, rf32, rf64, rf128, rf256},
   sc-mcch-Offset-r13                    INTEGER (0..10),
   sc-mcch-Subframe-r13                  INTEGER (0..9),
```

```
    sc-mcch-ModificationPeriod-r13  ENUMERATED {rf2, rf4, rf8, rf16, rf32, rf64, rf128, rf256,
                                        rf512, rf1024},
    lateNonCriticalExtension        OCTET STRING                    OPTIONAL,
    ...
}

-- ASN1STOP
```

SystemInformationBlockType20 field descriptions
sc-mcch-ModificationPeriod
Defines periodically appearing boundaries, i.e. radio frames for which 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.
sc-mcch-Offset
Indicates, together with the *sc-mcch-RepetitionPeriod*, the radio frames in which SC-MCCH is scheduled i.e. MCCH is scheduled in radio frames for which: SFN mod *mcch-RepetitionPeriod* = *mcch-Offset*.
sc-mcch-Subframe
Indicates the subframe in which SC-MCCH is scheduled
sc-mcch-RepetitionPeriod
Defines the interval between transmissions of SC-MCCH information, in radio frames, Value rf32 corresponds to 32 radio frames, rf64 corresponds to 64 radio frames and so on.

6.3.2 Radio resource control information elements

– *AntennaInfo*

The IE *AntennaInfoCommon* and the *AntennaInfoDedicated* are used to specify the common and the UE specific antenna configuration respectively.

AntennaInfo information elements

```
-- ASN1START

AntennaInfoCommon ::=               SEQUENCE {
    antennaPortsCount                   ENUMERATED {an1, an2, an4, spare1}
}

AntennaInfoDedicated ::=            SEQUENCE {
    transmissionMode                    ENUMERATED {
                                            tm1, tm2, tm3, tm4, tm5, tm6,
                                            tm7, tm8-v920},
    codebookSubsetRestriction           CHOICE {
        n2TxAntenna-tm2                     BIT STRING (SIZE (2)),
        n4TxAntenna-tm3                     BIT STRING (SIZE (4)),
        n2TxAntenna-tm4                     BIT STRING (SIZE (6)),
        n4TxAntenna-tm4                     BIT STRING (SIZE (64)),
        n2TxAntenna-tm5                     BIT STRING (SIZE (4)),
        n4TxAntenna-tm5                     BIT STRING (SIZE (16)),
        n2TxAntenna-tm6                     BIT STRING (SIZE (4)),
        n4TxAntenna-tm6                     BIT STRING (SIZE (16))
    }       OPTIONAL,                                               -- Cond TM
    ue-TransmitAntennaSelection         CHOICE{
            release                         NULL,
            setup                           ENUMERATED {closedLoop, openLoop}
    }
}

AntennaInfoDedicated-v920 ::=       SEQUENCE {
    codebookSubsetRestriction-v920      CHOICE {
        n2TxAntenna-tm8-r9                  BIT STRING (SIZE (6)),
        n4TxAntenna-tm8-r9                  BIT STRING (SIZE (32))
    }       OPTIONAL                                                -- Cond TM8
}

AntennaInfoDedicated-r10 ::=        SEQUENCE {
    transmissionMode-r10                ENUMERATED {
                                            tm1, tm2, tm3, tm4, tm5, tm6, tm7, tm8-v920,
                                            tm9-v1020, tm10-v1130, spare6, spare5, spare4,
                                            spare3, spare2, spare1},
    codebookSubsetRestriction-r10       BIT STRING          OPTIONAL,       -- Cond TM9
```

```
    ue-TransmitAntennaSelection      CHOICE{
        release                          NULL,
        setup                            ENUMERATED {closedLoop, openLoop}
    }
}

AntennaInfoDedicated-v1010 ::=   SEQUENCE {
    maxLayersMIMO-r10                ENUMERATED {twoLayers, fourLayers, eightLayers}     OPTIONAL   --
Need OR
}

AntennaInfoDedicated-v1250 ::=       SEQUENCE {
    alternativeCodebookEnabledFor4TX-r12     BOOLEAN
}

-- ASN1STOP
```

AntennaInfo field descriptions
alternativeCodebookEnabledFor4TX
Indicates whether code book in TS 36.213 [23] Table 7.2.4-0A to Table 7.2.4-0D is being used for deriving CSI feedback and reporting. E-UTRAN only configures the field if the UE is configured with a) *tm8* or *tm9*, b) PMI/RI reporting and c) 4 CRS ports.
antennaPortsCount
Parameter represents the number of cell specific antenna ports where an1 corresponds to 1, an2 to 2 antenna ports etc. see TS 36.211 [21, 6.2.1].
codebookSubsetRestriction
Parameter: *codebookSubsetRestriction*, see TS 36.213 [23, 7.2] and TS 36.211 [21, 6.3.4.2.3]. The number of bits in the *codebookSubsetRestriction* for applicable transmission modes is defined in TS 36.213 [23, Table 7.2-1b]. If the UE is configured with *transmissionMode* tm8, E-UTRAN configures the field *codebookSubsetRestriction* if PMI/RI reporting is configured. If the UE is configured with *transmissionMode* tm9, E-UTRAN configures the field *codebookSubsetRestriction* if PMI/RI reporting is configured and if the number of CSI-RS ports is greater than 1. E-UTRAN does not configure the field *codebookSubsetRestriction* in other cases where the UE is configured with *transmissionMode* tm8 or tm9.
maxLayersMIMO
Indicates the maximum number of layers for spatial multiplexing used to determine the rank indication bit width and Kc determination of the soft buffer size for the corresponding serving cell according to TS 36.212 [22]. EUTRAN configures this field only when *transmissionMode* is set to *tm3*, *tm4*, *tm9* or *tm10* for the corresponding serving cell. When configuring the field for a serving cell which *transmissionMode* is set to *tm3* or *tm4*, EUTRAN only configures value *fourLayers*. For a serving cell which *transmissionMode* is set to *tm9* or *tm10*, EUTRAN only configures the field only if *intraBandContiguousCC-InfoList* is indicated for the band and the band combination of the corresponding serving cell.
transmissionMode
Points to one of Transmission modes defined in TS 36.213 [23, 7.1] where tm1 refers to transmission mode 1, tm2 to transmission mode 2 etc.
ue-TransmitAntennaSelection
For value *setup* the field indicates whether UE transmit antenna selection control is closed-loop or open-loop as described in TS 36.213 [23, 8.7]. EUTRAN configures the same value for all serving cells.

Conditional presence	Explanation
TM	The field is mandatory present if the *transmissionMode* is set to tm3, tm4, tm5 or tm6. Otherwise the field is not present and the UE shall delete any existing value for this field.
TM8	The field is optional present, need OR, if *AntennaInfoDedicated* is included and *transmissionMode* is set to *tm8*. If *AntennaInfoDedicated* is included and *transmissionMode* is set to a value other than *tm8*, the field is not present and the UE shall delete any existing value for this field. Otherwise the field is not present.
TMX	The field is mandatory present if the *transmissionMode-r10* is set to *tm3*, *tm4*, *tm5* or *tm6*. The field is optionally present, need OR, if the *transmissionMode-r10* is set to *tm8* or *tm9*. Otherwise the field is not present and the UE shall delete any existing value for this field.

— *AntennaInfoUL*

The IE *AntennaInfoUL* is used to specify the UL antenna configuration.

***AntennaInfoUL* information elements**

```
-- ASN1START
```


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```
AntennaInfoUL-r10 ::=       SEQUENCE {
    transmissionModeUL-r10              ENUMERATED {tm1, tm2, spare6, spare5,
                                                    spare4, spare3, spare2, spare1} OPTIONAL,   --
Need OR
    fourAntennaPortActivated-r10            ENUMERATED {setup}          OPTIONAL        -- Need OR
}

-- ASN1STOP
```

AntennaInfoUL field descriptions
fourAntennaPortActivated
Parameter indicates if four antenna ports are used. See TS 36.213 [23, 8.2]. E-UTRAN optionally configures *fourAntennaPortActivated* only if *transmissionModeUL* is set to *tm2*.
transmissionModeUL
Points to one of UL Transmission modes defined in TS 36.213 [23, 8.0] where tm1 refers to transmission mode 1, tm2 to transmission mode 2 etc.

— *CQI-ReportConfig*

The IE *CQI-ReportConfig* is used to specify the CQI reporting configuration.

CQI-ReportConfig information elements

```
-- ASN1START

CQI-ReportConfig ::=                SEQUENCE {
    cqi-ReportModeAperiodic         CQI-ReportModeAperiodic OPTIONAL,           -- Need OR
    nomPDSCH-RS-EPRE-Offset             INTEGER (-1..6),
    cqi-ReportPeriodic              CQI-ReportPeriodic  OPTIONAL                -- Need ON
}

CQI-ReportConfig-v920 ::=       SEQUENCE {
    cqi-Mask-r9                     ENUMERATED {setup}      OPTIONAL,       -- Cond cqi-Setup
    pmi-RI-Report-r9                ENUMERATED {setup}      OPTIONAL        -- Cond PMIRI
}

CQI-ReportConfig-r10 ::=    SEQUENCE {
    cqi-ReportAperiodic-r10             CQI-ReportAperiodic-r10         OPTIONAL,   -- Need ON
    nomPDSCH-RS-EPRE-Offset         INTEGER (-1..6),
    cqi-ReportPeriodic-r10              CQI-ReportPeriodic-r10          OPTIONAL,   -- Need ON
    pmi-RI-Report-r9                    ENUMERATED {setup}              OPTIONAL,   -- Cond
PMIRICell
    csi-SubframePatternConfig-r10       CHOICE {
        release                         NULL,
        setup                           SEQUENCE {
            csi-MeasSubframeSet1-r10            MeasSubframePattern-r10,
            csi-MeasSubframeSet2-r10            MeasSubframePattern-r10
        }
    }                                                                       OPTIONAL    -- Need ON
}

CQI-ReportConfig-v1130 ::=  SEQUENCE {
    cqi-ReportPeriodic-v1130            CQI-ReportPeriodic-v1130,
    cqi-ReportBoth-r11                  CQI-ReportBoth-r11
}

CQI-ReportConfig-v1250 ::=      SEQUENCE {
    csi-SubframePatternConfig-r12       CHOICE {
        release                         NULL,
        setup                           SEQUENCE {
            csi-MeasSubframeSets-r12            BIT STRING (SIZE (10))
        }
    }                                                       OPTIONAL,   -- Need ON
    cqi-ReportBoth-v1250                CQI-ReportBoth-v1250        OPTIONAL,   -- Need ON
    cqi-ReportAperiodic-v1250   CQI-ReportAperiodic-v1250       OPTIONAL,       Need ON
    altCQI-Table-r12                ENUMERATED {
                                        allSubframes, csi-SubframeSet1,
                                        csi-SubframeSet2, spare1}       OPTIONAL        -- Need OP
}

CQI-ReportConfig-v1310 ::=          SEQUENCE {
```

```
    cqi-ReportAperiodic-v13xy           CQI-ReportAperiodic-v13xy   OPTIONAL,       -- Need ON
    cqi-ReportPeriodic-v13xy            CQI-ReportPeriodic-v13xy        OPTIONAL        -- Need ON
}

CQI-ReportConfigSCell-r10 ::=               SEQUENCE {
    cqi-ReportModeAperiodic-r10         CQI-ReportModeAperiodic OPTIONAL,           -- Need OR
    nomPDSCH-RS-EPRE-Offset-r10             INTEGER (-1..6),
    cqi-ReportPeriodicSCell-r10         CQI-ReportPeriodic-r10          OPTIONAL,   -- Need ON
    pmi-FI-Report-r10                   ENUMERATED {setup}              OPTIONAL    -- Cond
PMIRISCell
}

CQI-ReportConfigSCell-v13x0 ::=     SEQUENCE {
    cqi-ReportPeriodicSCell-v13x0           CQI-ReportPeriodic-v13xy
}

CQI-ReportPeriodic ::=      CHOICE {
    release                         NULL,
    setup                           SEQUENCE {
        cqi-PUCCH-ResourceIndex             INTEGER (0..1185),
        cqi-pmi-ConfigIndex                 INTEGER (0..1023),
        cqi-FormatIndicatorPeriodic         CHOICE {
            widebandCQI                         NULL,
            subbandCQI                          SEQUENCE {
                k                                   INTEGER (1..4)
            }
        },
        ri-ConfigIndex                      INTEGER (0..1023)   OPTIONAL,           -- Need OR
        simultaneousAckNackAndCQI           BOOLEAN
    }
}

CQI-ReportPeriodic-r10 ::=      CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        cqi-PUCCH-ResourceIndex-r10         INTEGER (0..1184),
        cqi-PUCCH-ResourceIndexP1-r10       INTEGER (0..1184)               OPTIONAL,   -- Need OR
        cqi-pmi-ConfigIndex             INTEGER (0..1023),
        cqi-FormatIndicatorPeriodic-r10     CHOICE {
            widebandCQI-r10                     SEQUENCE {
                csi-ReportMode-r10          ENUMERATED {submode1, submode2}     OPTIONAL    -- Need OR
            },
            subbandCQI-r10                      SEQUENCE {
                k                               INTEGER (1..4),
                periodicityFactor-r10               ENUMERATED {n2, n4}
            }
        },
        ri-ConfigIndex                  INTEGER (0..1023)       OPTIONAL,               -- Need OR
        simultaneousAckNackAndCQI       BOOLEAN,
        cqi-Mask-r9                     ENUMERATED {setup}      OPTIONAL,               -- Need OR
        csi-ConfigIndex-r10             CHOICE {
            release                         NULL,
            setup                           SEQUENCE {
                cqi-pmi-ConfigIndex2-r10        INTEGER (0..1023),
                ri-ConfigIndex2-r10             INTEGER (0..1023)       OPTIONAL        -- Need OR
            }
        }       OPTIONAL                                                            -- Need ON
    }
}


CQI-ReportPeriodic-v1130 ::=    SEQUENCE {
    simultaneousAckNackAndCQI-Format3-r11       ENUMERATED {setup}      OPTIONAL,   -- Need OR
    cqi-ReportPeriodicProcExtToReleaseList-r11  CQI-ReportPeriodicProcExtToReleaseList-r11
    OPTIONAL,   -- Need ON
    cqi-ReportPeriodicProcExtToAddModList-r11   CQI-ReportPeriodicProcExtToAddModList-r11   OPTIONAL
    -- Need ON
}

CQI-ReportPeriodic-v13xy ::=    SEQUENCE {
    cri-ReportConfig-r13            CRI-ReportConfig-r13            OPTIONAL,   -- Need ON
    simultaneousAckNackAndCQI-Format4-Format5-r13       ENUMERATED {setup}      OPTIONAL    -- Need OR
}


CQI-ReportPeriodicProcExtToAddModList-r11 ::=       SEQUENCE (SIZE (1..maxCQI-ProcExt-r11)) OF CQI-
ReportPeriodicProcExt-r11
```

```
CQI-ReportPeriodicProcExtToReleaseList-r11 ::=  SEQUENCE (SIZE (1..maxCQI-ProcExt-r11)) OF CQI-
ReportPeriodicProcExtId-r11

CQI-ReportPeriodicProcExt-r11 ::=       SEQUENCE {
    cqi-ReportPeriodicProcExtId-r11 CQI-ReportPeriodicProcExtId-r11,
    cqi-pmi-ConfigIndex-r11         INTEGER (0..1023),
    cqi-FormatIndicatorPeriodic-r11 CHOICE {
        widebandCQI-r11             SEQUENCE {
            csi-ReportMode-r11          ENUMERATED {submode1, submode2} OPTIONAL      -- Need OR
        },
        subbandCQI-r11              SEQUENCE {
            k                           INTEGER (1..4),
            periodicityFactor-r11       ENUMERATED {n2, n4}
        }
    },
    ri-ConfigIndex-r11              INTEGER (0..1023)                   OPTIONAL,   -- Need OR
    csi-ConfigIndex-r11             CHOICE {
        release                         NULL,
        setup                           SEQUENCE {
            cqi-pmi-ConfigIndex2-r11        INTEGER (0..1023),
            ri-ConfigIndex2-r11             INTEGER (0..1023)       OPTIONAL        -- Need OR
        }
    }                                                               OPTIONAL,       -- Need ON
    ...,
    [[  cri-ReportConfig-r13            CRI-ReportConfig-r13                OPTIONAL    -- Need ON
    ]]
}

CQI-ReportAperiodic-r10 ::=     CHOICE {
    release                         NULL,
    setup                           SEQUENCE {
        cqi-ReportModeAperiodic-r10         CQI-ReportModeAperiodic,
        aperiodicCSI-Trigger-r10            SEQUENCE {
            trigger1-r10                        BIT STRING (SIZE (8)),
            trigger2-r10                        BIT STRING (SIZE (8))
        }                                                               OPTIONAL    -- Need OR
    }
}

CQI-ReportAperiodic-v1250   ::=     CHOICE {
    release                         NULL,
    setup                           SEQUENCE {
        aperiodicCSI-Trigger-v1250          SEQUENCE {
            trigger-SubframeSetIndicator-r13    ENUMERATED {s1, s2},
            trigger1-SubframeSetIndicator-r12   BIT STRING (SIZE (8)),
            trigger2-SubframeSetIndicator-r12   BIT STRING (SIZE (8))
        }
    }
}

CQI-ReportAperiodic-v13zy   ::=     CHOICE {
    release                         NULL,
    setup                           SEQUENCE {
        cqi-ReportModeAperiodic-r13     CQI-ReportModeAperiodic,
        aperiodicCSI-Trigger-v13xy          SEQUENCE {
            trigger1-r13                        BIT STRING (SIZE (32)),
            trigger2-r13                        BIT STRING (SIZE (32)),
            trigger3-r13                        BIT STRING (SIZE (32)),
            trigger4-r13                        BIT STRING (SIZE (32)),
            trigger5-r13                        BIT STRING (SIZE (32)),
            trigger6-r13                        BIT STRING (SIZE (32))
        }                                                               OPTIONAL,   -- Need OR
        aperiodicCSI-Trigger2-r13       SEQUENCE {
            trigger1-SubframeSetIndicator-r13   BIT STRING (SIZE (32)),
            trigger2-SubframeSetIndicator-r13   BIT STRING (SIZE (32)),
            trigger3-SubframeSetIndicator-r13   BIT STRING (SIZE (32)),
            trigger4-SubframeSetIndicator-r13   BIT STRING (SIZE (32)),
            trigger5-SubframeSetIndicator-r13   BIT STRING (SIZE (32)),
            trigger6-SubframeSetIndicator-r13   BIT STRING (SIZE (32))
        }                                                               OPTIONAL    -- Need OR
    }
}

CQI-ReportAperiodicProc-r11 ::=     SEQUENCE {
    cqi-ReportModeAperiodic-r11         CQI-ReportModeAperiodic,
    trigger01-r11                       BOOLEAN,
    trigger10-r11                       BOOLEAN,
    trigger11-r11                       BOOLEAN
```


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```
}

CQI-ReportPeriodicProc-r13 ::=      SEQUENCE {
    triggerY01-r13                      BOOLEAN,
    triggerY10-r13                      BOOLEAN,
    triggerY11-r13                      BOOLEAN,
    triggerZ100-r13                     BOOLEAN,
    triggerZ101-r13                     BOOLEAN,
    triggerZ110-r13                     BOOLEAN,
    triggerZ111-r13                     BOOLEAN}

CQI-ReportModeAperiodic ::=             ENUMERATED {
                                        rm12, rm20, rm22, rm30, rm31,
                                        rm12-v1250, rm10-v13xy, rm11-v13xx
}

CQI-ReportBoth-r11 ::=              SEQUENCE {
    csi-IM-ConfigToReleaseList-r11      CSI-IM-ConfigToReleaseList-r11  OPTIONAL,    -- Need ON
    csi-IM-ConfigToAddModList-r11       CSI-IM-ConfigToAddModList-r11   OPTIONAL,    -- Need ON
    csi-ProcessToReleaseList-r11        CSI-ProcessToReleaseList-r11    OPTIONAL,    -- Need ON
    csi-ProcessToAddModList-r11         CSI-ProcessToAddModList-r11     OPTIONAL     -- Need ON
}

CQI-ReportBoth-v1250 ::=            SEQUENCE {
    csi-IM-ConfigToReleaseListExt-r12       CSI-IM-ConfigId-v1250   OPTIONAL,    -- Need ON
    csi-IM-ConfigToAddModListExt-r12        CSI-IM-ConfigExt-r12    OPTIONAL     -- Need ON
}

CSI-IM-ConfigToAddModList-r11 ::=       SEQUENCE (SIZE (1..maxCSI-IM-r11)) OF CSI-IM-Config-r11

CSI-IM-ConfigToReleaseList-r11 ::=      SEQUENCE (SIZE (1..maxCSI-IM-r11)) OF CSI-IM-ConfigId-r11

CSI-ProcessToAddModList-r11 ::=     SEQUENCE (SIZE (1..maxCSI-Proc-r11)) OF CSI-Process-r11

CSI-ProcessToReleaseList-r11 ::=    SEQUENCE (SIZE (1..maxCSI-Proc-r11)) OF CSI-ProcessId-r11

CQI-ReportBothProc-r11 ::=          SEQUENCE {
    ri-Ref-CSI-ProcessId-r11            CSI-ProcessId-r11               OPTIONAL,        -- Need OR
    pmi-RI-Report-r11                   ENUMERATED {setup}              OPTIONAL         -- Need OR
}

CRI-ReportConfig-r13 ::=            CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        cri-ConfigIndex-r13                 INTEGER (0..65535),
        cri-ConfigIndex2-r13                ENUMERATED {n1, n2, n4, n8, n16, n32}   OPTIONAL     --
Need OP
    }
}

-- ASN1STOP
```

CQI-ReportConfig field descriptions

altCQI-Table
Indicates the applicability of the alternative CQI table (i.e. Table 7.2.3-2 in TS 36.213 [23]) for both aperiodic and periodic CSI reporting for the concerned serving cell. Value *allSubframes* means the alternative CQI table applies to all the subframes and CSI processes, if configured, and value *csi-SubframeSet1* means the alternative CQI table applies to CSI subframe set1, and value *csi-SubframeSet2* means the alternative CQI table applies to CSI subframe set2. EUTRAN sets the value to *csi-SubframeSet1* or *csi-SubframeSet2* only if *transmissionMode* is set in range *tm1* to *tm9* and *csi-SubframePatternConfig-r10* is configured for the concerned serving cell and different CQI tables apply to the two CSI subframe sets; otherwise EUTRAN sets the value to *allSubframes*. If this field is not present, the UE shall use Table 7.2.3-1 in TS 36.213 [23] for all subframes and CSI processes, if configured.

aperiodicCSI-Trigger
Indicates for which serving cell(s) the aperiodic CSI report is triggered when one or more SCells are configured. *trigger1* corresponds to the CSI request field 10 and *trigger2* corresponds to the CSI request field 11, see TS 36.213 [23, table 7.2.1-1A], and so on. The leftmost bit, bit 0 in the bit string corresponds to the cell with *ServCellIndex*=0 and bit 1 in the bit string corresponds to the cell with *ServCellIndex*=1 etc. Each bit has either value 0 (means no aperiodic CSI report is triggered) or value 1 (means the aperiodic CSI report is triggered). At most 5 bits can be set to value 1 in the bit string in *aperiodicCSI-Trigger-r10*. E-UTRAN configures value 1 only for cells configured with *transmissionMode* set in range *tm1 to tm9*. One value applies for all serving cells configured with *transmissionMode* set in range *tm1 to tm9* (the associated functionality is common i.e. not performed independently for each cell).

cqi-Mask
Limits CQI/PMI/PTI/RI reports to the on-duration period of the DRX cycle, see TS 36.321 [6]. One value applies for all CSI processes and all serving cells (the associated functionality is common i.e. not performed independently for each cell).

cqi-FormatIndicatorPeriodic
Parameter: *PUCCH CQI Feedback Type*, see TS 36.213 [23, table 7.2.2-1]. Depending on transmissionMode, reporting mode is implicitly given from the table.

cqi-pmi-ConfigIndex
Parameter: *CQI/PMI Periodicity and Offset Configuration Index* $I_{CQI/PMI}$, see TS 36.213 [23, tables 7.2.2-1A and 7.2.2-1C]. If subframe patterns for CSI (CQI/PMI/PTI/RI) reporting are configured (i.e. *csi-SubframePatternConfig* is configured), the parameter applies to the subframe pattern corresponding to *csi-MeasSubframeSet1* or corresponding to the CSI subframe set 1 indicated by *csi-MeasSubframeSets-r12*.

cqi-pmi-ConfigIndex2
Parameter: *CQI/PMI Periodicity and Offset Configuration Index* $I_{CQI/PMI}$, see TS 36.213 [23, tables 7.2.2-1A and 7.2.2-1C]. The parameter applies to the subframe pattern corresponding to *csi-MeasSubframeSet2* or corresponding to the CSI subframe set 2 indicated by *csi-MeasSubframeSets-r12*.

cqi-PUCCH-ResourceIndex, cqi-PUCCH-ResourceIndexP1
Parameter $n_{PUCCH}^{(2,p)}$ for antenna port P0 and for antenna port P1 respectively, see TS 36.213 [23, 7.2]. E-UTRAN does not apply value 1185. One value applies for all CSI processes.

cqi-ReportAperiodic
E-UTRAN does not configure *CQI-ReportAperiodic* when transmission mode 10 is configured for all serving cells. E-UTRAN configures *cqi-ReportAperiodic-v1250* only if *cqi-ReportAperiodic-r10* and *csi-MeasSubframeSets-r12* are configured.

cqi-ReportModeAperiodic
Parameter: *reporting mode*. Value rm12 corresponds to Mode 1-2, rm20 corresponds to Mode 2-0, rm22 corresponds to Mode 2-2 etc. PUSCH reporting modes are described in TS 36.213 [23, 7.2.1]. The UE shall ignore *cqi-ReportModeAperiodic-r10* when transmission mode 10 is configured for the serving cell on this carrier frequency. The UE shall ignore *cqi-ReportModeAperiodic-r10* configured for the PCell/ PSCell when the transmission bandwidth of the PCell/PSCell in downlink is 6 resource blocks.

CQI-ReportPeriodicProcExt
A set of periodic CQI related parameters for which E-UTRAN may configure different values for each CSI process. For a serving frequency E-UTRAN configures one or more *CQI-ReportPeriodicProcExt* only when transmission mode 10 is configured for the serving cell on this carrier frequency.

cri-ConfigIndex2
Parameter: CRI Config Index ICRI, see TS 36.213 []. The parameter applies to the subframe pattern corresponding to *csi-MeasSubframeSet2* or corresponding to the CSI subframe set 2 indicated by *csi-MeasSubframeSets*. E-UTRAN configures *cri-ConfigIndex2* only if *cri-ConfigIndex* is configured.

cri-ReportConfig
E-UTRAN configures the field only if the UE is configured with *eMIMO-Type* set to *beamformed* and if multiple references to RS configuration using non-zero power transmission are configured (i.e. if *csi-RS-ConfigNZPIdListExt* is configured).

csi-ConfigIndex
E-UTRAN configures *csi-ConfigIndex* only for PCell and only if *csi-SubframePatternConfig* is configured. The UE shall release *csi-ConfigIndex* if *csi-SubframePatternConfig* is released.

csi-IM-ConfigToAddModList
For a serving frequency E-UTRAN configures one or more *CSI-IM-Config* only when transmission mode 10 is configured for the serving cell on this carrier frequency.

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CQI-ReportConfig field descriptions

csi-MeasSubframeSets
Indicates the two CSI subframe sets. Value 0 means the subframe belongs to CSI subframe set 1 and value 1 means the subframe belongs to CSI subframe set 2. CSI subframe set 1 refers to $C_{CSI,0}$ in TS 36.213 [23, 7.2] and CSI subframe set 2 refers to $C_{CSI,1}$ in TS 36.213 [23, 7.2]. EUTRAN does not configure *csi-MeasSubframeSet1-r10* and *csi-MeasSubframeSet2-r10* if either *csi-MeasSubframeSets-r12* for PCell or *eimta-MainConfigPCell-r12* is configured.

csi-MeasSubframeSet1, csi-MeasSubframeSet2
Indicates the CSI measurement subframe sets. *csi-MeasSubframeSet1* refers to $C_{CSI,0}$ in TS 36.213 [23, 7.2] and *csi-MeasSubframeSet2* refers to $C_{CSI,1}$ in TS 36.213 [23, 7.2]. E-UTRAN only configures the two CSI measurement subframe sets for the PCell.

csi-ProcessToAddModList
For a serving frequency E-UTRAN configures one or more *CSI-Process* only when transmission mode 10 is configured for the serving cell on this carrier frequency.

csi-ReportMode
Parameter: *PUCCH_format1-1_CSI_reporting_mode*, see TS 36.213 [23, 7.2.2].

K
Parameter: K, see TS 36.213 [23, 7.2.2].

nomPDSCH-RS-EPRE-Offset
Parameter: Δ_{offset} see TS 36.213 [23, 7.2.3]. Actual value = IE value * 2 [dB].

periodicityFactor
Parameter: H', see TS 36.213 [23, 7.2.2].

pmi-RI-Report
See TS 36.213 [23, 7.2]. The presence of this field means PMI/RI reporting is configured; otherwise the PMI/RI reporting is not configured. EUTRAN configures this field only when *transmissionMode* is set to *tm8*, *tm9* or *tm10*. The UE shall ignore *pmi-RI-Report-r9*/ *pmi-RI-Report-r10* when transmission mode 10 is configured for the serving cell on this carrier frequency.

ri-ConfigIndex
Parameter: *RI Config Index* I_{RI}, see TS 36.213 [23, 7.2.2-1B]. If subframe patterns for CSI (CQI/PMI/PTI/RI) reporting are configured (i.e. *csi-SubframePatternConfig* is configured), the parameter applies to the subframe pattern corresponding to *csi-MeasSubframeSet1*.

ri-ConfigIndex2
Parameter: *RI Config Index* I_{RI}, see TS 36.213 [23, 7.2.2-1B]. The parameter applies to the subframe pattern corresponding to *csi-MeasSubframeSet2* or corresponding to the CSI subframe set 2 indicated by *csi-MeasSubframeSets-r12*. E-UTRAN configures *ri-ConfigIndex2* only if *ri-ConfigIndex* is configured.

ri-Ref-CSI-ProcessId
CSI process whose RI value the UE inherits when reporting RI, in the same subframe, for CSI reporting. E-UTRAN ensures that the CSI process that inherits the RI value is configured in accordance with the conditions specified in 36.213 [23, 7.2.1, 7.2.2].

simultaneousAckNackAndCQI
Parameter: *Simultaneous-AN-and-CQI*, see TS 36.213 [23, 10.1]. TRUE indicates that simultaneous transmission of ACK/NACK and CQI is allowed. One value applies for all CSI processes. For SCells except for the PSCell and PUCCH SCell this field is not applicable and the UE shall ignore the value.

simultaneousAckNackAndCQI-Format3
Indicates that the UE shall perform simultaneous transmission of HARQ A/N and periodic CQI report multiplexing on PUCCH format 3, see TS 36.213 [23, 7.2, 10.1.1]. E-UTRAN configures this information only when *pucch-Format* is set to *format3*. One value applies for all CSI processes. For SCells except for the PSCell and PUCCH SCell this field is not applicable and the UE shall ignore the value.

simultaneousAckNackAndCQI-Format4-Format5
Indicates that the UE shall perform simultaneous transmission of HARQ A/N and periodic CSI report multiplexing on PUCCH format 4 and format 5, see TS 36.213 [23, x.y]. E-UTRAN configures this information only when *pucch-Format* is set to *format4* or *format5*. One value applies for all CSI processes. For SCells except for the PSCell and PUCCH SCell this field is not applicable and the UE shall ignore the value.

trigger01
Indicates whether or not reporting for this CSI-process or reporting for this CSI-process corresponding to a CSI subframe set is triggered by CSI request field set to 01, for a CSI request applicable for the serving cell on the same frequency as the CSI process, see TS 36.213 [23, table 7.2.1-1B].

trigger10, trigger11
Indicates whether or not reporting for this CSI-process or reporting for this CSI-process corresponding to a CSI subframe set is triggered by CSI request field set to 10 or 11, see TS 36.213 [23, table 7.2.1-1B]. EUTRAN configures at most 5 CSI processes, across all serving frequencies within each CG, to be triggered by a CSI request field set to value 10. The same restriction applies for value 11. In case E-UTRAN simultaneously triggers CSI requests for more than 5 CSI processes some limitations apply, see TS 36.213 [23].

trigger001
Indicates whether or not reporting for this CSI-process or reporting for this CSI-process corresponding to a CSI subframe set is triggered by CSI request field set to 001, for a CSI request applicable for the serving cell on the same frequency as the CSI process, see TS 36.213 [23, table 7.2.1-1B].

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CQI-ReportConfig field descriptions
trigger010, trigger011, trigger100, trigger101, Trigger110, Trigger111 Indicates whether or not reporting for this CSI-process or reporting for this CSI-process corresponding to a CSI subframe set is triggered by CSI request field set to 010, 011, 100, 101, 110 or 111, see TS 36.213 [23, table 7.2.1-1B].
trigger-SubframeSetIndicator For a serving cell configured with *csi-MeasSubframeSets-r12*, indicates for which CSI subframe set the aperiodic CSI report is triggered for the serving cell if the aperiodic CSI is triggered by the CSI request field 01, see TS 36.213 [23, table 7.2.1-1C]. Value s1 corresponds to CSI subframe set 1 and value s2 corresponds to CSI subframe set 2.
trigger1-SubframeSetIndicator Indicates for which CSI subframe set the aperiodic CSI report is triggered when aperiodic CSI is triggered by the CSI request field 10, see TS 36.213 [23, table 7.2.1-1C].The leftmost bit, bit 0 in the bit string corresponds to the cell with *ServCellIndex*=0 and bit 1 in the bit string corresponds to the cell with *ServCellIndex*=1 etc. Each bit has either value 0 (means that aperiodic CSI report is triggered for CSI subframe set 1) or value 1 (means that aperiodic CSI report is triggered for CSI subframe set 2).
trigger2-SubframeSetIndicator Indicates for which CSI subframe set the aperiodic CSI report is triggered when aperiodic CSI is triggered by the CSI request field 11, see TS 36.213 [23, table 7.2.1-1C].The leftmost bit, bit 0 in the bit string corresponds to the cell with *ServCellIndex*=0 and bit 1 in the bit string corresponds to the cell with *ServCellIndex*=1 etc. Each bit has either value 0 (means that aperiodic CSI report is triggered for CSI subframe set 1) or value 1 (means that aperiodic CSI report is triggered for CSI subframe set 2).
trigger3-SubframeSetIndicator Indicates for which CSI subframe set the aperiodic CSI report is triggered when aperiodic CSI is triggered by the CSI request field xy, see TS 36.213 [23, table Y].The leftmost bit, bit 0 in the bit string corresponds to the cell with *ServCellIndex*=0 and bit 1 in the bit string corresponds to the cell with I=1 etc. Each bit has either value 0 (means that aperiodic CSI report is triggered for CSI subframe set 1) or value 1 (means that aperiodic CSI report is triggered for CSI subframe set 2).
trigger4-SubframeSetIndicator Indicates for which CSI subframe set the aperiodic CSI report is triggered when aperiodic CSI is triggered by the CSI request field xy, see TS 36.213 [23, table Y].The leftmost bit, bit 0 in the bit string corresponds to the cell with ServCellIndex=0 and bit 1 in the bit string corresponds to the cell with I=1 etc. Each bit has either value 0 (means that aperiodic CSI report is triggered for CSI subframe set 1) or value 1 (means that aperiodic CSI report is triggered for CSI subframe set 2).
trigger5-SubframeSetIndicator Indicates for which CSI subframe set the aperiodic CSI report is triggered when aperiodic CSI is triggered by the CSI request field xy, see TS 36.213 [23, table Y].The leftmost bit, bit 0 in the bit string corresponds to the cell with ServCellIndex=0 and bit 1 in the bit string corresponds to the cell with I=1 etc. Each bit has either value 0 (means that aperiodic CSI report is triggered for CSI subframe set 1) or value 1 (means that aperiodic CSI report is triggered for CSI subframe set 2).
trigger6-SubframeSetIndicator Indicates for which CSI subframe set the aperiodic CSI report is triggered when aperiodic CSI is triggered by the CSI request field xy, see TS 36.213 [23, table Y].The leftmost bit, bit 0 in the bit string corresponds to the cell with ServCellIndex=0 and bit 1 in the bit string corresponds to the cell with I=1 etc. Each bit has either value 0 (means that aperiodic CSI report is triggered for CSI subframe set 1) or value 1 (means that aperiodic CSI report is triggered for CSI subframe set 2).

Conditional presence	Explanation
cqi-Setup	This field is not present for an Scell except for the PSCell, while it is conditionally present for the PCell and the PSCell according to the following. The field is optional present, need OR, if the *cqi-ReportPeriodic* in the *cqi-ReportConfig* is set to *setup*. If the field *cqi-ReportPeriodic* is present and set to *release*, the field is not present and the UE shall delete any existing value for this field. Otherwise the field is not present.
PMIRI	The field is optional present, need OR, if *cqi-ReportPeriodic* is included and set to *setup*, or *cqi-ReportModeAperiodic* is included. If the field *cqi-ReportPeriodic* is present and set to *release* and *cqi-ReportModeAperiodic* is absent, the field is not present and the UE shall delete any existing value for this field. Otherwise the field is not present.
PMIRIPCell	The field is optional present, need OR, if *cqi-ReportPeriodic* is included in the *CQI-ReportConfig-r10* and set to *setup*, or *cqi-ReportAperiodic* is included in the *CQI-ReportConfig-r10* and set to *setup*. If the field *cqi-ReportPeriodic* is present in the *CQI-ReportConfig-r10* and set to *release* and *cqi-ReportAperiodic* is included in the *CQI-ReportConfig-r10* and set to *release*, the field is not present and the UE shall delete any existing value for this field. Otherwise the field is not present.
PMIRISCell	The field is optional present, need OR, if *cqi-ReportPeriodicSCell* is included and set to *setup*, or *cqi-ReportModeAperiodic-r10* is included in the *CQI-ReportConfigSCell*. If the field *cqi-ReportPeriodicSCell* is present and set to *release* and *cqi-ReportModeAperiodic-r10* is absent in the *CQI-ReportConfigSCell*, the field is not present and the UE shall delete any existing value for this field. Otherwise the field is not present.

– *CQI-ReportPeriodicProcExtId*

The IE *CQI-ReportPeriodicProcExtId* is used to identify a periodic CQI reporting configuration that E-UTRAN may configure in addition to the configuration specified by the IE *CQI-ReportPeriodic-r10*. These additional configurations are specified by the IE *CQI-ReportPeriodicProcExt-r11*. The identity is unique within the scope of a carrier frequency.

CQI-ReportPeriodicProcExtId information elements

```
-- ASN1START

CQI-ReportPeriodicProcExtId-r11 ::=             INTEGER (1..maxCQI-ProcExt-r11)

-- ASN1STOP
```

– *CrossCarrierSchedulingConfig*

The IE *CrossCarrierSchedulingConfig* is used to specify the configuration when the cross carrier scheduling is used in a cell.

CrossCarrierSchedulingConfig information elements

```
-- ASN1START

CrossCarrierSchedulingConfig-r13 ::=        SEQUENCE {
    schedulingCellInfo-r10                  CHOICE {
        own-r10                             SEQUENCE {                  -- No cross carrier
scheduling
            cif-Presence-r10                    BOOLEAN
        },
        other-r10                           SEQUENCE {                  -- Cross carrier
scheduling
            schedulingCellId-r10                ServCellIndex-r10,
            pdsch-Start-r10                     INTEGER (1..4)
        }
    }
}

CrossCarrierSchedulingConfig-r13 ::=        SEQUENCE {
    schedulingCellInfo-r13                  CHOICE {
        own-r13                             SEQUENCE {                  -- No cross carrier
scheduling
            cif-presence-r13                    BOOLEAN
        },
        other-r13                           SEQUENCE {                  -- Cross carrier scheduling
            schedulingCellId-r13                ServCellIndexFull-r13,
            pdsch-Start-r13                     INTEGER (1..4),
```

```
            cif-InSchedulingCell-r13                INTEGER (1..7)
        }
    }
}

-- ASN1STOP
```

CrossCarrierSchedulingConfig field descriptions
cif-Presence
The field is used to indicate whether carrier indicator field is present (value TRUE) or not (value FALSE) in PDCCH/ EPDCCH DCI formats, see TS 36.212 [22, 5.3.3.1].
cif- InSchedulingCell
The field indicates the CIF value used in the scheduling cell to indicate this cell, see TS 36.212 [22, 5.3.3.1].
pdsch-Start
The starting OFDM symbol of PDSCH for the concerned SCell, see TS 36.213 [23, 7.1.6.4]. Values 1, 2, 3 are applicable when *dl-Bandwidth* for the concerned SCell is greater than 10 resource blocks, values 2, 3, 4 are applicable when *dl-Bandwidth* for the concerned SCell is less than or equal to 10 resource blocks, see TS 36.211 [21, Table 6.7-1].
schedulingCellId
Indicates which cell signals the downlink allocations and uplink grants, if applicable, for the concerned SCell. In case the UE is configured with DC, the scheduling cell is part of the same cell group (i.e. MCG or SCG) as the scheduled cell.

-- *CSI-IM-Config*

The IE *CSI-IM-Config* is the CSI Interference Measurement (IM) configuration that E-UTRAN may configure on a serving frequency, see TS 36.213 [23, 7.2.6].

CSI-IM-Config information elements

```
-- ASN1START

CSI-IM-Config-r11 ::=           SEQUENCE {
    csi-IM-ConfigId-r11             CSI-IM-ConfigId-r11,
    resourceConfig-r11              INTEGER (0..31),
    subframeConfig-r11              INTEGER (0..154),
    ...
}

CSI-IM-ConfigExt-r12 ::=        SEQUENCE {
    csi-IM-ConfigId-v1250           CSI-IM-ConfigId-v1250,
    resourceConfig-r12              INTEGER (0..31),
    subframeConfig-r12              INTEGER (0..154),
    ...
}

-- ASN1STOP
```

CSI-IM-Config field descriptions
resourceConfig
Parameter: CSI reference signal configuration, see TS 36.213 [23, 7.2.6] and TS 36.211 [21, table 6.10.5.2-1 and 6.10.5.2-2] for 4 REs.
subframeConfig
Parameter: I_{CSI-RS}, see TS 36.213 [23, 7.2.6] and TS 36.211 [21, table 6.10.5.3-1].

-- *CSI-IM-ConfigId*

The IE *CSI-IM-ConfigId* is used to identify a CSI-IM configuration that is configured by the IE *CSI-IM-Config*. The identity is unique within the scope of a carrier frequency.

CSI-IM-ConfigId information elements

```
-- ASN1START

CSI-IM-ConfigId-r11 ::=                 INTEGER (1..maxCSI-IM-r11)
```

```
CSI-IM-ConfigId-r12 ::=                 INTEGER (1..maxCSI-IM-r12)
CSI-IM-ConfigId-v12x0 ::=               INTEGER (maxCSI-IM-r12)

-- ASN1STOP
```

– *CSI-Process*

The IE *CSI-Process* is the CSI process configuration that E-UTRAN may configure on a serving frequency.

CSI-Process information elements

```
-- ASN1START

CSI-Process-r11 ::=     SEQUENCE {
    csi-ProcessId-r11           CSI-ProcessId-r11,
    csi-RS-ConfigNZPId-r11      CSI-RS-ConfigNZPId-r11,
    csi-IM-ConfigId-r11         CSI-IM-ConfigId-r11,
    p-C-AndCBSRList-r11 SEQUENCE (SIZE (1..2)) OF P-C-AndCBSR-r11,
    cqi-ReportBothProc-r11      CQI-ReportBothProc-r11          OPTIONAL,       -- Need OR
    cqi-ReportPeriodicProcId-r11    INTEGER (0..maxCQI-ProcExt-r11)     OPTIONAL,       -- Need OR
    cqi-ReportAperiodicProc-r11 CQI-ReportAperiodicProc-r11     OPTIONAL,       -- Need OR
    ...,
    [[  alternativeCodebookEnabledFor4TXProc-r12    ENUMERATED {true}   OPTIONAL,   -- Need ON
        csi-IM-ConfigIdList-r12     CHOICE {
            release                     NULL,
            setup                       SEQUENCE (SIZE (1..2)) OF CSI-IM-ConfigId-r12
        }                                                       OPTIONAL,   -- Need ON
        cqi-ReportAperiodicProc2-r12    CHOICE {
            release                     NULL,
            setup                       CQI-ReportAperiodicProc-r11
        }                                                       OPTIONAL    -- Need ON
    ]],
    [[  cqi-ReportAperiodicProc-r13     CQI-ReportAperiodicProc-r13     OPTIONAL,       -- Need ON
        cqi-ReportAperiodicProc2-r13        CHOICE {
            release                     NULL,
            setup                       CQI-ReportAperiodicProc-r13
        }                                                       OPTIONAL,       -- Need ON
        eMIMO-Type-r13              CHOICE {
            release                     NULL,
            setup                       CHOICE {
                nonPrecoded-r13             CSI-RS-InfoNonPrecoded-r13,
                beamformed-r13              CSI-RS-InfoBeamformed-r13
            }
        }                                                       OPTIONAL    -- Need ON
    ]]
}

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

P-C-AndCBSR-r13 ::= SEQUENCE {
    legacySet                       SEQUENCE {
        p-C-r11                     INTEGER (-8..15),
        codebookSubsetRestriction1-r13  BIT STRING
    }                                                   OPTIONAL,   -- Cond BeamformedNa
    codebookSubsetRestriction2-r13  BIT STRING      OPTIONAL,   -- Cond NonPreCoded
    codebookSubsetRestriction3-r13  BIT STRING      OPTIONAL    -- Cond BeamformedK1a
}

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

-- ASN1STOP
```

CSI-Process field descriptions
alternativeCodebookEnabledFor4TXProc Indicates whether code book in TS 36.213 [23] Table 7.2.4-0A to Table 7.2.4-0D is being used for deriving CSI feedback and reporting for a CSI process. EUTRAN may configure the field only if the number of CSI-RS ports for non-zero power transmission CSI-RS configuration is 4.
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].
codebookSubsetRestriction2List If p-C-AndCBSRList-r13 is included, E-UTRAN includes 2 entries otherwise 1 (i.e. E-UTRAN configures the same number of entries for the original and the CBSR2 field
codebookSubsetRestriction3 E-UTRAN configures the field only if neither p-C-AndCBSRListExt nor *alternativeCodebookEnabledBeamformed* is not configured.
cqi-ReportAperiodicProc If *csi-MeasSubframeSets-r12* is configured for the same frequency as the CSI process, *cqi-ReportAperiodicProc* applies for CSI subframe set 1. If *csi-MeasSubframeSet1-r10* or *csi-MeasSubframeSet2-r10* are configured for the same frequency as the CSI process, *cqi-ReportAperiodicProc* applies for CSI subframe set 1 or CSI subframe set 2. Otherwise, *cqi-ReportAperiodicProc* applies for all subframes
cqi-ReportAperiodicProc2 *cqi-ReportAperiodicProc2* is configured only if *csi-MeasSubframeSets-r12* is configured for the same frequency as the CSI process. *cqi-ReportAperiodicProc2* is for CSI subframe set 2. E-UTRAN shall set *cqi-ReportModeAperiodic-r11* in *cqi-ReportAperiodicProc2* the same as in *cqi-ReportAperiodicProc*.
cqi-ReportBothProc Includes CQI configuration parameters applicable for both aperiodic and periodic CSI reporting, for which CSI process specific values may be configured. E-UTRAN configures the field if and only if *cqi-ReportPeriodicProcId* is included and/ or if *cqi-ReportAperiodicProc* is included.
cqi-ReportPeriodicProcId Refers to a periodic CQI reporting configuration that is configured for the same frequency as the CSI process. Value 0 refers to the set of parameters defined by the REL-10 CQI reporting configuration fields, while the other values refer to the additional configurations E-UTRAN assigns by *CQI-ReportPeriodicProcExt-r11* (and as covered by *CQI-ReportPeriodicProcExtId*).
csi-IM-ConfigId Refers to a CSI-IM configuration that is configured for the same frequency as the CSI process.
csi-IM-ConfigIdList Refers to one or two CSI-IM configurations that are configured for the same frequency as the CSI process. *csi-IM-ConfigIdList* can include 2 entries only if *csi-MeasSubframeSets-r12* is configured for the same frequency as the CSI process. UE shall ignore *csi-IM-ConfigId-r11* if *csi-IM-ConfigIdList-r12* is configured.
csi-RS-ConfigNZPId Refers to a CSI RS configuration using non-zero power transmission that is configured for the same frequency as the CSI process.
p-C Parameter: P_C, see TS 36.213 [23, 7.2.5].
p-C-AndCBSRList A *p-C-AndCBSRList* including 2 entries indicates that the subframe patterns configured for CSI (CQI/PMI/PTI/RI) 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 a single entry indicates that the subframe patterns are not to be used for this CSI process. E-UTRAN does not include 2 entries in *p-C-AndCBSRList* with *csi-MeasSubframeSet1* and *csi-MeasSubframeSet2* for CSI processes concerning a secondary frequency. E-UTRAN includes 2 entries in *p-C-AndCBSRList* when configuring both *cqi-pmi-ConfigIndex* and *cqi-pmi-ConfigIndex2*. If included in *CSI-RS-InfoBeamformed* within *CSI-RS-Config* (i.e. TM9), E-UTRAN configures a single entry.

Conditional presence	Explanation
BeamformedK1a	The field is optionally present, need OR, if included in *CSI-RS-InfoBeamformed* while neither *csi-RS-ConfigNZPIdListExt* nor *alternativeCodebookEnabledBeamformed* is configured. Otherwise the field is not present
BeamformedKna	The field is optionally present, need OR, if included in *CSI-RS-InfoBeamformed* while *csi-RS-ConfigNZPIdListExt* is configured but *alternativeCodebookEnabledBeamformed* is not. Otherwise the field is not present
NonPreCoded	The field is optionally present, need OR, if included in CSI-RS-InfoNonPrecoded. Otherwise the field is not present

– CSI-ProcessId

The IE *CSI-ProcessId* is used to identify a CSI process that is configured by the IE *CSI-Process*. The identity is unique within the scope of a carrier frequency.

CSI-ProcessId information elements

```
-- ASN1START

CSI-ProcessId-r11 ::=       INTEGER (1..maxCSI-Proc-r11)

-- ASN1STOP
```

– CSI-RS-Config

The IE *CSI-RS-Config* is used to specify the CSI (Channel-State Information) reference signal configuration.

CSI-RS-Config information elements

```
-- ASN1START

CSI-RS-Config-r10 ::=       SEQUENCE {
    csi-RS-r10                  CHOICE {
        release                     NULL,
        setup                       SEQUENCE {
            antennaPortsCount-r10           ENUMERATED {an1, an2, an4, an8},
            resourceConfig-r10              INTEGER (0..31),
            subframeConfig-r10              INTEGER (0..154),
            p-C-r10                         INTEGER (-8..15)
        }
    }                                                           OPTIONAL,           -- Need ON
    zeroTxPowerCSI-RS-r10       ZeroTxPowerCSI-RS-Conf-r12      OPTIONAL            -- Need ON
}

CSI-RS-Config-v1250 ::=     SEQUENCE {
    zeroTxPowerCSI-RS2-r12      ZeroTxPowerCSI-RS-Conf-r12      OPTIONAL,           -- Need ON
    ds-ZeroTxPowerCSI-RS-r12        CHOICE {
        release                     NULL,
        setup                       SEQUENCE {
            zeroTxPowerCSI-RS-List-r12      SEQUENCE (SIZE (1..maxDS-2TP-CSI-RS-r12)) OF
ZeroTxPowerCSI-RS-r12
        }
    }                                                           OPTIONAL            -- Need
ON
}

CSI-RS-Config-v13x0 ::=     SEQUENCE {
    eMIMO-Type-r13              CHOICE {
        release                     NULL,
        setup                       CHOICE {
            nonPrecoded-r13             CSI-RS-InfoNonPrecoded-r13,
            beamformed-r13              CSI-RS-InfoBeamformed-r13
        }
    }                                                   OPTIONAL    -- Need ON
}

ZeroTxPowerCSI-RS-Conf-r12 ::=  CHOICE {
        release                     NULL,
        setup                       ZeroTxPowerCSI-RS-r12
}

ZeroTxPowerCSI-RS-r12 ::=   SEQUENCE {
    zeroTxPowerResourceConfigList-r12       BIT STRING (SIZE (16)),
    zeroTxPowerSubframeConfig-r12           INTEGER (0..154)
}

-- ASN1STOP
```

CSI-RS-Config field descriptions
antennaPortsCount
Parameter represents the number of antenna ports used for transmission of CSI reference signals where value an1 corresponds to 1 antenna port, an2 to 2 antenna ports and so on, see TS 36.211 [21, 6.10.5].
ds-ZeroTxPowerCSI-RS
Parameter for additional *zeroTxPowerCSI-RS* for a serving cell, concerning the CSI-RS included in discovery signals.
zeroTxPowerCSI-RS2
Parameter for additional *zeroTxPowerCSI-RS* for a serving cell. E-UTRAN configures the field only if *csi-MeasSubframeSets-r12* and *TM 1 – 9* are configured for the serving cell.
p-C
Parameter: P_C, see TS 36.213 [23, 7.2.5].
resourceConfig
Parameter: CSI reference signal configuration, see TS 36.211 [21, table 6.10.5.2-1 and 6.10.5.2-2].
subframeConfig
Parameter: I_{CSI-RS}, see TS 36.211 [21, table 6.10.5.3-1].
zeroTxPowerResourceConfigList
Parameter: *ZeroPowerCSI-RS*, see TS 36.213 [23, 7.2.7].
zeroTxPowerSubframeConfig
Parameter: I_{CSI-RS}, see TS 36.211 [21, table 6.10.5.3-1].

– *CSI-RS-ConfigNZP*

The IE *CSI-RS-ConfigNZP* is the CSI-RS resource configuration using non-zero power transmission that E-UTRAN may configure on a serving frequency.

***CSI-RS-ConfigNZP* information elements**

```
-- ASN1START

CSI-RS-ConfigNZP-r11 ::=            SEQUENCE {
    csi-RS-ConfigNZPId-r11              CSI-RS-ConfigNZPId-r11,
    antennaPortsCount-r11               ENUMERATED {an1, an2, an4, an8},
    resourceConfig-r11                  INTEGER (0..31),
    subframeConfig-r11                  INTEGER (0..154),
    scramblingIdentity-r11              INTEGER (0..503),
    qcl-CRS-Info-r11                    SEQUENCE {
        qcl-ScramblingIdentity-r11          INTEGER (0..503),
        crs-PortsCount-r11                  ENUMERATED {n1, n2, n4, spare1},
        mbsfn-SubframeConfigList-r11        CHOICE {
            release                             NULL,
            setup                               SEQUENCE {
                subframeConfigList                  MBSFN-SubframeConfigList
            }
        }                                                               OPTIONAL    -- Need ON
    }                                                                   OPTIONAL,   -- Need OR
    ...,
    [[  eMIMO-Info-r13                  CHOICE {
            release                         NULL,
            setup                           SEQUENCE {
                nzp-resourceConfigList-r13      SEQUENCE (SIZE (2..8)) OF ResourceConfig-r13,
                cdmType                         ENUMERATED {cdm2, cdm4} OPTIONAL    -- Need OR
            }
        }                                                               OPTIONAL    -- Need ON
    ]]
}

ResourceConfig-r13 ::=              INTEGER (0..31)

-- ASN1STOP
```

CSI-RS-ConfigNZP field descriptions
antennaPortsCount
Parameter represents the number of antenna ports used for transmission of CSI reference signals where an1 corresponds to 1, an2 to 2 antenna ports etc. see TS 36.211 [21, 6.10.5].
cdmType
EUTRAN configures this field only for CSI processes that include *eMIMO-Type* set to *nonPrecoded*.
qcl-CRS-Info
Indicates CRS antenna ports that is quasi co-located with the CSI-RS antenna ports, see TS 36.213 [23, 7.2.5]. EUTRAN configures this field if and only if the UE is configured with *qcl-Operation* set to *typeB*.
resourceConfig
Parameter: CSI reference signal configuration, see TS 36.211 [21, table 6.10.5.2-1 and 6.10.5.2-2].
subframeConfig
Parameter: I_{CSI-RS}, see TS 36.211 [21, table 6.10.5.3-1].
scramblingIdentity
Parameter: Pseudo-random sequence generator parameter, n_{ID}, see TS 36.213 [23, 7.2.5].

-- *CSI-RS-ConfigNZPId*

The IE *CSI-RS-ConfigNZPId* is used to identify a CSI-RS resource configuration using non-zero transmission power, as configured by the IE *CSI-RS-ConfigNZP*. The identity is unique within the scope of a carrier frequency.

***CSI-RS-ConfigNZPId* information elements**

```
-- ASN1START

CSI-RS-ConfigNZPId-r11 ::=              INTEGER (1..maxCSI-RS-NZP-r11)

-- ASN1STOP
```

-- *CSI-RS-ConfigZP*

The IE *CSI-RS-ConfigZP* is the CSI-RS resource configuration, for which UE assumes zero transmission power, that E-UTRAN may configure on a serving frequency.

***CSI-RS-ConfigZP* information elements**

```
-- ASN1START

CSI-RS-ConfigZP-r11 ::=     SEQUENCE {
    csi-RS-ConfigZPId-r11       CSI-RS-ConfigZPId-r11,
    resourceConfigList-r11      BIT STRING (SIZE (16)),
    subframeConfig-r11          INTEGER (0..154),
    ...
}

-- ASN1STOP
```

CSI-RS-ConfigZP field descriptions
resourceConfigList
Parameter: *ZeroPowerCSI-RS*, see TS 36.213 [23, 7.2.7].
subframeConfig
Parameter: I_{CSI-RS}, see TS 36.211 [21, table 6.10.5.3-1].

-- *CSI-RS-ConfigZPId*

The IE *CSI-RS-ConfigZPId* is used to identify a CSI-RS resource configuration for which UE assumes zero transmission power, as configured by the IE *CSI-RS-ConfigZP*. The identity is unique within the scope of a carrier frequency.

CSI-RS-ConfigZPId information elements

```
-- ASN1START

CSI-RS-ConfigZPId-r11 ::=                   INTEGER (1..maxCSI-RS-ZP-r11)

-- ASN1STOP
```

– CSI-RS-Info

The IE *CSI-RS-Info* is used to specify CSI-RS related configuration information.

CSI-RS-Info information elements

```
-- ASN1START

CSI-RS-InfoNonPrecoded-r13 ::=          SEQUENCE {
    p-C-AndCBSRList-r13                     SEQUENCE (SIZE (1..2)) OF P-C-AndCBSR-r13   OPTIONAL,   -
Need OR
    codebookConfigN1-r13                    ENUMERATED {an1, an2, an3, an4, an8},
    codebookConfigN2-r13                    ENUMERATED {an1, an2, an3, an4, an8},
    codebookOverSamplingRateConfig-O1-r13   ENUMERATED {na,an4,an8},
    codebookOverSamplingRateConfig-O2-r13   ENUMERATED {na,an4,an8},
    codebookConfig-r13                      ENUMERATED {an1, an2, an3, an4},
    interferenceMeasRestriction-r13         ENUMERATED {on}         OPTIONAL    -- Need OR
}

CSI-RS-InfoBeamformed-r13::=            SEQUENCE    {
    csi-RS-ConfigNZPIdListExt-r13           SEQUENCE (SIZE (1..7)) OF CSI-RS-ConfigNZPId-r11
    OPTIONAL,   -- Need OR
    csi-IM-ConfigIdListExt-r13              SEQUENCE (SIZE (1..7)) OF CSI-IM-ConfigIdInfo-r13
    OPTIONAL,   -- Need OR
    p-C-AndCBSR-PerResourceConfigList-r13   SEQUENCE (SIZE (1..7)) OF P-C-AndCBSR-PerResourceConfig-
r13 OPTIONAL,   -- Need OR
    alternativeCodebookEnabledBeamformed-r13    ENUMERATED {true}   OPTIONAL,       Need OR
    channelMeasRestriction-r13              ENUMERATED {on}         OPTIONAL    -- Need OR
}

CSI-IM-ConfigIdInfo-r13 ::= SEQUENCE {
    csi-IM-ConfigId-r13                 CSI-IM-ConfigId-r11     OPTIONAL,
    interferenceMeasRestriction-r13         ENUMERATED {on}         OPTIONAL    -- Need OR
}

-- ASN1STOP
```

CSI-RS-Info field descriptions

alternativeCodebookEnabledBeamformed
If included in *CSI-Process* (i.e. TM10), the field indicates whether code book in TS 36.213 [23] Table 7.2.4-9 to Table 7.2.4-20 is being used for deriving CSI feedback and reporting for a CSI process. EUTRAN configures the field only for a process referring to a single RS configuration using non-zero power transmission (i.e a process for which *csi-RS-ConfigNZPIdListExt* is not configured).

codebookConfigN1
Indicates the number of antenna ports per polarization in dimension x as used for transmission of CSI reference signals. Value an1 corresponds to 1 antenna port, an2 to 2 antenna ports and so on, see TS 36.213 [23].

codebookOverSamplingRateConfig-Ox
Indicates the spatial over-sampling rate in dimension x as used for transmission of CSI reference signals. Value an1 corresponds to 1 antenna port, an2 to 2 antenna ports and so on, see TS 36.213 [23].

CSI-RS-InfoBeamformed
E-UTRAN configures field *csi-IM-ConfigIdListExt* only if the IE is included in CSI-Process (i.e. when TM10 is configured for the serving cell).

interferenceMeasRestriction
E-UTRAN configures the field only if *csi-IM-ConfigIdList* is configured (i.e. with TM10).

– DMRS-Config

The IE *DMRS-Config* is the DMRS configuration that E-UTRAN may configure on a serving frequency.

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***DMRS-Config* information elements**

```
   ASN1START

DMRS-Config-r11 ::=     CHOICE {
   release                  NULL,
   setup                    SEQUENCE {
      scramblingIdentity-r11      INTEGER (0..503),
      scramblingIdentityS-r11     INTEGER (0..503)
   }
}
DMRS-Config-v13x0 ::=       SEQUENCE {
      dmrs-tableAlt-r13             ENUMERATED {true}          OPTIONAL    -- Need OR
}

   ASN1STOP
```

***DMRS-Config* field descriptions**
scramblingIdentity, scramblingIdentity2
Parameter: $n_{ID}^{DMRS,i}$, see TS 36.211 [21, 6.10.3.1]
dmrs-tableAlt
The field indicates whether or not to use an alternative table for DMRS upon PDSCH transmission, see TS 36.213 [23].

– *DRB-Identity*

The IE *DRB-Identity* is used to identify a DRB used by a UE.

***DRB-Identity* information elements**

```
-- ASN1START

DRB-Identity ::=                INTEGER (1..32)

-- ASN1STOP
```

– *EPDCCH-Config*

The IE EPDCCH-Config specifies the subframes and resource blocks for EPDCCH monitoring that E-UTRAN may configure for a serving cell.

***EPDCCH-Config* information element**

```
-- ASN1START

EPDCCH-Config-r11 ::=       SEQUENCE{
   config-r11       CHOICE {
      release                   NULL,
         setup                     SEQUENCE {
         subframePatternConfig-r11   CHOICE {
            release                     NULL,
            setup                       SEQUENCE {
               subframePattern-r11            MeasSubframePattern-r10
            }
         }                                                              OPTIONAL,  -- Need ON
         startSymbol-r11            INTEGER (1..4)                      OPTIONAL,    Need OP
         setConfigToReleaseList-r11  EPDCCH-SetConfigToReleaseList-r11  OPTIONAL,  -- Need ON
         setConfigToAddModList-r11   EPDCCH-SetConfigToAddModList-r11   OPTIONAL    Need ON
      }
   }
}

EPDCCH-SetConfigToAddModList-r11 ::=    SEQUENCE (SIZE(1..maxEPDCCH-Set-r11)) OF EPDCCH-SetConfig-
r11

EPDCCH-SetConfigToReleaseList-r11 ::=   SEQUENCE (SIZE(1..maxEPDCCH-Set-r11)) OF EPDCCH-SetConfigId-
r11
```

```
EPDCCH-SetConfig-r11 ::=          SEQUENCE {
    setConfigId-r11                   EPDCCH-SetConfigId-r11,
    transmissionType-r11              ENUMERATED {localised, distributed},
    resourceBlockAssignment-r11       SEQUENCE{
        numberPRB-Pairs-r11               ENUMERATED {n2, n4, n8},
        resourceBlockAssignment-r11       BIT STRING (SIZE(4..38))
    },
    dmrs-ScramblingSequenceInt-r11    INTEGER (0..503),
    pucch-ResourceStartOffset-r11     INTEGER (0..2047),
    re-MappingQCL-ConfigId-r11        PDSCH-RE-MappingQCL-ConfigId-r11    OPTIONAL, -- Need OP
    ...,
    [[  csi-RS-ConfigZPId2-r13                CHOICE {
          release                             NULL,
          setup                               CSI-RS-ConfigZPId-r11
      }                                                                   OPTIONAL    -- Need ON
    ]]
}

EPDCCH-SetConfigId-r11 ::=   INTEGER (0..1)

-- ASN1STOP
```

EPDCCH-Config field descriptions
csi-RS-ConfigZPId2
Indicates the rate matching parameters in addition to those indicated by *re-MappingQCL-ConfigId*. E-UTRAN configures this field only when tm10 is configured.
dmrs-ScramblingSequenceInt
The DMRS scrambling sequence initialization parameter $n_{ID,i}^{EPDCCH}$ defined in TS 36.211[21, 6.10.3A.1].
EPDCCH-SetConfig
Provides EPDCCH configuration set. See TS 36.213 [23, 9.1.4]. E-UTRAN configures at least one *EPDCCH-SetConfig* when *EPDCCH-Config* is configured.
numberPRB-Pairs
Indicates the number of physical resource-block pairs used for the EPDCCH set. Value n2 corresponds to 2 physical resource-block pairs; n4 corresponds to 4 physical resource-block pairs and so on. Value n8 is not supported if *dl-Bandwidth* is set to 6 resource blocks.
pucch-ResourceStartOffset
PUCCH format 1a, 1b and 3 resource starting offset for the EPDCCH set. See TS 36.213 [23, 10.1].
re-MappingQCL-ConfigId
Indicates the starting OFDM symbol, the related rate matching parameters and quasi co-location assumption for EPDCCH when the UE is configured with tm10. This field provides the identity of a configured *PDSCH-RE-MappingQCL-Config*. E-UTRAN configures this field only when tm10 is configured.
resourceBlockAssignment
Indicates the index to a specific combination of physical resource-block pair for EPDCCH set. See TS 36.213 [23, 9.1.4.4]. The size of *resourceBlockAssignment* is specified in TS 36.213 [23, 9.1.4.4] and based on *numberPRB-Pairs* and the signalled value of *dl-Bandwidth*.
setConfigId
Indicates the identity of the EPDCCH configuration set.
startSymbol
Indicates the OFDM starting symbol for any EPDCCH and PDSCH scheduled by EPDCCH on the same cell, see TS 36.213 [23, 9.1.4.1]. If not present, the UE shall release the configuration and shall derive the starting OFDM symbol of EPDCCH and PDSCH scheduled by EPDCCH from PCFICH. Values 1, 2, and 3 are applicable for *dl-Bandwidth* greater than 10 resource blocks. Values 2, 3, and 4 are applicable otherwise. E-UTRAN does not configure the field for UEs configured with tm10.
subframePatternConfig
Configures the subframes which the UE shall monitor the UE-specific search space on EPDCCH, except for pre-defined rules in TS 36.213 [23, 9.1.4]. If the field is not configured when EPDCCH is configured, the UE shall monitor the UE-specific search space on EPDCCH in all subframes except for pre-defined rules in TS 36.213 [23, 9.1.4].
transmissionType
Indicates whether distributed or localized EPDCCH transmission mode is used as defined in TS 36.211 [21, 6.8A.1].

-- *EIMTA-MainConfig*

The IE *EIMTA-MainConfig* is used to specify the eIMTA-RNTI used for eIMTA and the subframes used for monitoring PDCCH with eIMTA-RNTI. The IE *EIMTA-MainConfigServCell* is used to specify the eIMTA related parameters applicable for the concerned serving cell.

***EIMTA-MainConfig* information element**

```
-- ASN1START

EIMTA-MainConfig-r12 ::=        CHOICE {
    release                         NULL,
    setup                           SEQUENCE {
        eimta-RNTI-r12                  C-RNTI,
        eimta-CommandPeriodicity-r12    ENUMERATED {sf10, sf20, sf40, sf60},
        eimta-CommandSubframeSet-r12    BIT STRING (SIZE(10))
    }
}

EIMTA-MainConfigSCell-r12 ::=       CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        eimta-UL-DL-ConfigIndex-r12             INTEGER (0..5),
        eimta-HARQ-ReferenceConfig-r12      ENUMERATED {sa2,sa4,sa5},
        mbsfn-SubframeConfigList-v1250      CHOICE {
                release                             NULL,
                setup                               SEQUENCE {
                subframeConfigList-r12              MBSFN-SubframeConfigList
                }
        }
    }
}

-- ASN1STOP
```

***EIMTA-MainConfig* field descriptions**
eimta-CommandPeriodicity
Configures the periodicity to monitor PDCCH with eIMTA-RNTI, see TS 36.213 [23, 13.1]. Value sf10 corresponds to 10 subframes, sf20 corresponds to 20 subframes and so on.
eimta-CommandSubframeSet
Configures the subframe(s) to monitor PDCCH with eIMTA-RNTI within the periodicity configured by *eimta-CommandPeriodicity*. The 10 bits correspond to all subframes in the last radio frame within each periodicity. The left most bit is for subframe 0 and so on. Each bit can be of value 0 or 1. The value of 1 means that the corresponding subframe is configured for monitoring PDCCH with eIMTA-RNTI, and the value of 0 means otherwise. In case of TDD as PCell, only the downlink subframes indicated by the UL/ DL configuration in SIB1 can be configured for monitoring PDCCH with eIMTA-RNTI. In case of FDD as PCell, any of the ten subframes can be configured for monitoring PDCCH with eIMTA-RNTI.
eimta-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.
eimta-UL-DL-ConfigIndex
Index of *I*, see TS 36.212 [22, 5.3.3.1.4]. E-UTRAN configures the same value for all serving cells residing on same frequency band.
mbsfn-SubframeConfigList
Configure the MBSFN subframes for the UE on this serving cell. An uplink subframe indicated by the DL/UL subframe configuration in SIB1 can be configured as MBSFN subframe.

– *LogicalChannelConfig*

The IE *LogicalChannelConfig* is used to configure the logical channel parameters.

***LogicalChannelConfig* information element**

```
-- ASN1START

LogicalChannelConfig ::=            SEQUENCE {
    ul-SpecificParameters               SEQUENCE {
        priority                            INTEGER (1..16),
        prioritisedBitRate                  ENUMERATED {
                                                kBps0, kBps8, kBps16, kBps32, kBps64, kBps128,
                                                kBps256, infinity, kBps512-v1020, kBps1024-v1020,
                                                kBps2048-v1020, spare5, spare4, spare3, spare2,
                                                spare1},
        bucketSizeDuration                  ENUMERATED {
                                                ms50, ms100, ms150, ms300, ms500, ms1000, spare2,
                                                spare1},
```


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```
        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
    ]]
}

-- ASN1STOP
```

LogicalChannelConfig field descriptions
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.
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.

-- 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},
            prohibitPHR-Timer               ENUMERATED {sf0, sf10, sf20, sf50, sf100,
                                                        sf200, sf500, sf1000},
            dl-PathlossChange               ENUMERATED {dB1, dB3, dB6, infinity}
        }
    }                                                           OPTIONAL,   -- Need ON
    ...,
```


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```
    [[  sr-ProhibitTimer-r9                 INTEGER (0..7)          OPTIONAL    -- Need ON
    ]],
    [[  mac-MainConfig-v1020                SEQUENCE {
            sCellDeactivationTimer-r10          ENUMERATED {
                                                    rf2, rf4, rf8, rf16, rf32, rf64, rf128,
                                                    spare1}         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
    ]],
    [[  extendedPHR2-r13                    ENUMERATED {setup}      OPTIONAL,       -- Need ON
        eDRX-Config-CycleStartOffset-r13    CHOICE {
            release                             NULL,
            setup                               CHOICE {
                sf512                               INTEGER(0..1),
                sf1024                              INTEGER(0..3)
            }
        }                                       OPTIONAL    -- Need ON
    ]]
}

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

DRX-Config ::=                      CHOICE {
    release                             NULL,
    setup                               SEQUENCE {
        onDurationTimer                     ENUMERATED {
                                                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,
                                                spare5, spare6, spare7, spare8,
                                                spare9, 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
}

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,
                                            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
```

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* only if *drx-Config* (without suffix) is configured.

drx-InactivityTimer
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.

drx-RetransmissionTimer
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 *drx-RetransmissionTimer-v1130* is signalled, the UE shall ignore *drx-RetransmissionTimer* (i.e. without suffix).

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 2 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 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-CycleStartOffset* is configured. The value of *longDRX-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).

maxHARQ-Tx
Maximum number of transmissions for UL HARQ in TS 36.321 [6].

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.

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.

MAC-MainConfig field descriptions
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, sf100 corresponds to 100 subframes and so on.
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).
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 no timer for SR transmission on PUCCH is configured. 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 only for configurations 0, 1 and 6. 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.

– *PDCCH-Config*

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

PDCCH-Config information element

```
-- ASN1START

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

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

PDCCH-CandidateReductions-r13 ::= SEQUENCE {
    pdcch-candidateReductionAL1     PDCCH-CandidateReductionValue-r13,
    pdcch-candidateReductionAL2     PDCCH-CandidateReductionValue-r13,
    pdcch-candidateReductionAL4     PDCCH-CandidateReductionValue-r13,
    pdcch-candidateReductionAL8     PDCCH-CandidateReductionValue-r13
}

-- ASN1STOP
```

PDCCH-Config field descriptions
skipMonitoringDCI-format0-1A
Indicates the whether UE is configured to omit monitoring DCI fromat 0/1A, see TS 36.213 [23, 9.1].
pdcch-candidateReductionAL.x
Indicates reduced (E)PDCCH monitoring requirements on user specific search space of the x-th aggregation level, see TS 36.213 [23, 9.1]. n0 corresponds to value 0%, n33 corresponds to 33% and so on.

– *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
    ]],
    [[  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-v13xx              ENUMERATED {len16bits}  OPTIONAL    -- Cond Rlc-AM3
    ]]

}

-- ASN1STOP
```

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 DRBs E-UTRAN configures only *notUsed*.
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.
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 or upon reconfiguration from split to MCG DRB).
t-Reordering Indicates the value of the reordering timer, as specified in TS 36.323 [8]. Value in milliseconds. Value ms0 means 0 ms, 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.

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. The field is optionally present upon reconfiguration of a split DRB or upon DRB type change from split to MCG DRB, 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-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    PB-MappingQCLConfigToReleaseList-r11    OPTIONAL,   --
Need ON
    re-MappingQCLConfigToAddModList-r11     RE-MappingQCLConfigToAddModList-r11     OPTIONAL,   --
Need ON
}

PDSCH-ConfigDedicated-v1260 ::=     SEQUENCE {
    pa-IndexAl-r12                  ENUMERATED {a26, a33}               OPTIONAL    -- Need OR
}

PDSCH-ConfigDedicated-v13x0 ::=     SEQUENCE {
    dmrs-ConfigPDSCH-v13x0              DMRS-Config-v13x0                   OPTIONAL    -- Need ON
}

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-RS-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
    ...
}

-- ASN1STOP
```

PDSCH-Config field descriptions
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-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 IE.
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 and 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.

***PDSCH-RE-MappingQCL-ConfigId* information elements**

```
-- ASN1START

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

-- ASN1STOP
```

– *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

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
        c-rnti-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
        pusch-ConfigDedicated-v1250             PUSCH-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-v13x0             PDSCH-ConfigDedicated-v13x0     OPTIONAL,    -- Need ON
        pucch-ConfigDedicated-r13               PUCCH-ConfigDedicated-v13xy     OPTIONAL,    -- Need ON
        pusch-ConfigDedicated-r13               PUSCH-ConfigDedicated-v13xy     OPTIONAL,    -- Need ON
        cqi-ReportConfig-v13xy                  CQI-ReportConfig-v13xy          OPTIONAL,       -- Need ON
        soundingRS-UL-ConfigDedicated-v13x0
                                SoundingRS-UL-ConfigDedicated-v13x0     OPTIONAL,           -- Need ON
        soundingRS-UL-ConfigDedicatedUpPtsExt-r13
                                SoundingRS-UL-ConfigDedicatedUpPtsExt-r13       OPTIONAL,       --
Need ON
        soundingRS-UL-ConfigDedicatedAperiodic-v13x0
                                SoundingRS-UL-ConfigDedicatedAperiodic-v13x0    OPTIONAL,    -- Need
ON
        soundingRS-UL-ConfigDedicatedAperiodicUpPtsExt-r13
                                SoundingRS-UL-ConfigDedicatedAperiodicUpPtsExt-r13      OPTIONAL,
    -- Need ON
        cqi-ReportConfigPCell-v13x0             CQI-ReportConfig-v13xy          OPTIONAL,    -- Need ON
        csi-RS-Config-v13x0                     CSI-RS-Config-v13x0             OPTIONAL        -- Need ON
    ]]
}

PhysicalConfigDedicatedSCell-r10 ::=        SEQUENCE {
    -- DL configuration as well as configuration applicable for DL and UL
    nonULConfiguration-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,    --
Need ON
        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,       -- Need ON
        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-v1350  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-ConfigDedicated-r13         PUCCH-ConfigDedicated       OPTIONAL,       -- Need ON
       pucch-ConfigDedicatedExt1-r13     PUCCH-ConfigDedicated-v1020 OPTIONAL,   -- Need ON
       pucch-ConfigDedicatedExt2-r13     PUCCH-ConfigDedicated-v1130 OPTIONAL,   -- Need ON
       pucch-ConfigDedicatedExt3-r13     PUCCH-ConfigDedicated-v1250 OPTIONAL,   -- Cond eimta
       pucch-ConfigDedicatedExt4-r13     PUCCH-ConfigDedicated-v15ay OPTIONAL,   -- Need ON
       pucch-Cell-r13                    ENUMERATED {true}           OPTIONAL,   -- Cond
PUCCH_SCell
       crossCarrierSchedulingConfig-r13  CrossCarrierSchedulingConfig-r13     OPTIONAL,   -- Cond
Cross-Carrier-Config
       schedulingRequestConfig-r13       SchedulingRequestConfig     OPTIONAL,          -- Need ON
       schedulingRequestConfigExt-r13    SchedulingRequestConfig-v1020   OPTIONAL,   -- Need ON
       tpc-PDCCH-ConfigPUCCH-SCell-r13   TPC-PDCCH-ConfigSCell       OPTIONAL,       Cond PUCCH-
SCell
       pusch-ConfigDedicated-r13         PUSCH-ConfigDedicated       OPTIONAL,       Cond PUSCH-
SCell
       pusch-ConfigDedicatedExt-r13      PUSCH-ConfigDedicated-v1020 OPTIONAL,   -- Cond PUSCH-
SCell
       pusch-ConfigDedicatedExt2-r13     PUSCH-ConfigDedicated-v15ay OPTIONAL,   -- Cond PUSCH-
SCell
       uplinkPowerControlDedicated-r13   UplinkPowerControlDedicated OPTIONAL,   -- Cond UL-
Power-SCell
       uplinkPowerControlDedicatedExt-r13  UplinkPowerControlDedicated-v1310   OPTIONAL,   -- Cond
UL-Power-SCell
       pdsch-ConfigSCell-r13             PDSCH-ConfigSCell-r13       OPTIONAL,   -- Need ON
       cqi-ReportConfig-v13xy                CQI-ReportConfig-v13xy                OPTIONAL,
Need ON
       pdsch-ConfigDedicated-v13x0       PDSCH-ConfigDedicated-v13x0     OPTIONAL,       Need ON
       soundingRS-UL-ConfigDedicated-v13x0
                                 SoundingRS-UL-ConfigDedicated-v13x0     OPTIONAL,       -- Need ON
       soundingRS-UL-ConfigDedicatedUpPTsExt-r13
                                 SoundingRS-UL-ConfigDedicatedUpPTsExt-r13       OPTIONAL,       --
Need ON
       soundingRS-UL-ConfigDedicatedAperiodic-v13x0
                                 SoundingRS-UL-ConfigDedicatedAperiodic-v13x0    OPTIONAL,   -- Need
ON
       soundingRS-UL-ConfigDedicatedAperiodicUpPTsExt-r13
                                 SoundingRS-UL-ConfigDedicatedAperiodicUpPTsExt-r13      OPTIONAL,
      Need ON
       csi-RS-Config-v13x0               CSI-RS-Config-v13x0           OPTIONAL,   -- Need ON
       laa-SCellConfiguration-r13        LAA-SCellConfiguration-r13    OPTIONAL    -- Need ON
    ]]
}

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

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

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

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

-- ASN1STOP
```

PhysicalConfigDedicated field descriptions
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.
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 10 is configured for the serving cell on this carrier frequency. EUTRAN configures a maximum of one *CSI-RS-ConfigNZP* for a serving frequency on which the UE supports only one CSI process (i.e. *supportedCSI-Proc* is indicated as ***n1***).
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.
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*.
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.
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 PUCCH feedback of this SCell is not sent on PCell or PSCell, this field is present if SCell is used to send PUCCH feedback of this SCell (or cell).
pusch-ConfigDedicated-v1250
E-UTRAN configures *pusch-ConfigDedicated-v1250* only if *tpc-SubframeSet* is configured.
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].
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.

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
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
PUCCH-SCell	The field is optionally present for PUCCH SCell. Otherwise it is not present.
PUSCH-SCell	The field is optionally present, need ON, if *PUSCH-ConfigDedicatedSCell* is absent. Otherwise the field is not present
SCellAdd	The field is mandatory present if *cellIdentification* is present; otherwise it is optional, need ON.
UL-Power-SCell	The field is optionally present, need ON, if *uplinkPowerControlDedicatedSCell* is absent. Otherwise the field is not present

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
```

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

```
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)
}

-- ASN1STOP
```

PRACH-Config field descriptions
highSpeedFlag
Parameter: High-speed-flag, see TS 36.211, [21, 5.7.2].TRUE corresponds to Restricted set and FALSE to Unrestricted set.
prach-ConfigIndex
Parameter: *prach-ConfigurationIndex*, see TS 36.211 [21, 5.7.1]
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*.
rootSequenceIndex
Parameter: *RACH_ROOT_SEQUENCE*, see TS 36.211 [21, 5.7.1].
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.

– *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-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                         SEQUENCE {
            n2PUCCH-AN-List-r10 SEQUENCE (SIZE (1..4)) OF INTEGER (0..549)  OPTIONAL,   -- Need ON
            twoAntennaPortActivatedPUCCH-format3-r10        CHOICE {
                release                                         NULL,
                setup                                           SEQUENCE {
                    n3PUCCH-AN-ListP1-r10   SEQUENCE (SIZE (1..4)) OF INTEGER (0..549)
                }
            }                                                                   OPTIONAL    -- Need ON
        },
        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-formatla1b-r10     ENUMERATED {true}       OPTIONAL,   -- Need OR
    simultaneousPUCCH-PUSCH-r10                     ENUMERATED {true}       OPTIONAL,   -- Need OR
    n1PUCCH-AN-RepP-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-r13                    CHOICE {
        release                             NULL,
        setup                               SEQUENCE {
            nPUCCH-Identity-r13                 INTEGER (0..503),
            n1PUCCH-AN-r13                      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-v13xy ::=     SEQUENCE {
    spatialBundlingPUCCH                BOOLEAN,
    spatialBundlingPUSCH                BOOLEAN,
    harq-TimingTDD                      BOOLEAN,
    codebookSizeDetermination-r13       INTEGER(0..1),
    maximumPayloadCoderate-r13          INTEGER (0..7),
    pucch-Format-r13                    CHOICE {
        format4-r13                         SEQUENCE {
            format4-resourceConfiguration           SEQUENCE (SIZE (4)) OF Format4-resource-r13,
            format4-MultiCSI-resourceConfiguration  SEQUENCE (SIZE (1..2)) OF Format4-resource-r13
OPTIONAL      -- Need OR
        },
        format5-r13             SEQUENCE {
            format5-resourceConfiguration           SEQUENCE (SIZE (4)) OF Format5-resource-r13,
            format5-MultiCSI-resourceConfiguration  SEQUENCE (SIZE (1..2)) OF Format5-resource-r13
OPTIONAL      -- Need OR

        }
    }                                                                           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),
```

```
    cdma-Index-format5-r13                  INTEGER (0..1)
}


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

-- ASN1STOP
```

PUCCH-Config field descriptions
ackNackRepetition Parameter indicates whether ACK/NACK repetition is configured, see TS 36.213 [23, 10.1].
codebooksizeDetermination Parameter indicates whether HARQ codebook size is determined with downlink assignment indicator based solution or number of configured CCs, see TS 36.213 [23, 7.3].
deltaPUCCH-Shift Parameter: $\Delta_{\text{shift}}^{\text{PUCCH}}$, see 36.211 [21, 5.4.1], where ds1 corresponds to value 1 ds2 to 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 Parameter xx see TS 36.213 [23,7.2]. Maximum payload or code rate for multi P-CSI on each PUCCH resource.
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: $n_{\text{PUCCH},j}^{(1)}$ 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: $n_{\text{PUCCH},j}^{(1,\tilde{p}_1)}$ 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: $n_{\text{PUCCH, ANRep}}^{(1,p)}$ for antenna port P0 and for antenna port P1 respectively, see TS 36.213 [23, 10.1].
n3PUCCH-AN-List, n3PUCCH-AN-ListP1 Parameter: $n_{\text{PUCCH}}^{(3,p)}$ 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: $N_{\text{PUCCH}}^{K_A}$, 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: $n_{\text{ID}}^{\text{PUCCH}}$, see TS 36.211 [21, 5.5.1.5].
nRB-CQI Parameter: $N_{\text{RB}}^{(2)}$, see TS 36.211 [21, 5.4].
numberOfPRB-format4, startingPRB-format4 Parameter $n_{PUCCH}^{(4)}$ see TS 36.213 [23,x.y]. PUCCH resource(s) of PUCCH format 4.
numberOfPRB-format5, cdm-index-format5 Parameter $n_{PUCCH}^{(5)}$ see TS 36.213 [23,x.y]. PUCCH resource(s) of PUCCH format 5.
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.
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.

PUCCH-Config field descriptions
spatialBundlingPUCCH Parameter indicates whether spatial bundling is enabled or not for PUCCH, see TS 36.213 [23, 7.3]
spatialBundlingPUSCH Parameter indicates whether spatial bundling is enabled or not for PUSCH, see TS 36.213 [23, 7.3]
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
    },
    ul-ReferenceSignalsPUSCH            UL-ReferenceSignalsPUSCH
}

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

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)
        }
    }
```


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```
}

PUSCH-ConfigDedicated-v1250 ::=          SEQUENCE {
    uci-OnPUSCH                  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-v13xy ::=          SEQUENCE {
    betaOffset-r13                          SEQUENCE {
        betaOffset-ACK-Index-r13                INTEGER (0..15),
        betaOffset2-ACK-Index-r13               INTEGER (0..15)
    }                                                               OPTIONAL,   -- Need OR
    betaOffsetMC-r13                        SEQUENCE {
        betaOffset-ACK-Index-MC-r13             INTEGER (0..15),
        betaOffset2-ACK-Index-MC-r13            INTEGER (0..15)
    }                                                               OPTIONAL,   -- Need OR
    betaOffset-Subframeset2-r13             SEQUENCE {
        betaOffset-ACK-Index-SubframeSet2-r13   INTEGER (0..15),
        betaOffset2-ACK-Index-SubframeSet2-r13  INTEGER (0..15)
    }                                                               OPTIONAL,   -- Need OR
    betaOffset-Subframeset2-MC-r13          SEQUENCE {
        betaOffset-ACK-Index-MC-SubframeSet2-r13    INTEGER (0..15),
        betaOffset2-ACK-Index-MC-SubframeSet2-r13   INTEGER (0..15)
    }                                                               OPTIONAL    -- Need OR
}

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

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

-- ASN1STOP
```

PUSCH-Config field descriptions
betaOffset-ACK-Index, betaOffset-ACK-Index-MC
Parameter: $I_{offset}^{HARQ-ACK}$, for single- and multiple-codeword respectively, see TS 36.213 [23, Table 8.6.3-1]. One value applies for all serving cells with an uplink 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 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, betaOffset-ACK-Index-MC-SubframeSet2
Parameter: $I_{offset}^{HARQ-ACK}$, for single- and multiple-codeword respectively, see TS 36.213 [23, Table 8.6.3-1]. One value applies for subframe set 2 of all serving cells with an uplink 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 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 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 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 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 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 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).
cyclicShift
Parameters: *cyclicShift*, see TS 36.211 [21, Table 5.5.2.1.1-2].
dmrs-WithOCC-Activated
Parameter: *Activate-DMRS-with OCC*, see TS 36.211 [21, 5.5.2.1].
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* while FALSE indicates that 64QAM is not allowed. If *enable64QAM-v1270* is set to TRUE, it indicates that 64QAM is allowed for UL categories 5 and 13 indicated in *ue-CategoryUL*. E-UTRAN configures *enable64QAM-v1270* only when *enable64QAM* (without suffix) is set to TRUE.
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: $N_{ID}^{csh\_DMRS}$, see TS 36.211 [21, 5.5.2.1.1].
nPUSCH-Identity
Parameter: n_{ID}^{PUSCH}, see TS 36.211 [21, 5.5.1.5].
n-SB
Parameter: N_{sb}, see TS 36.211 [21, 5.3.4].
pusch-hoppingOffset
Parameter: N_{RB}^{HO}, see TS 36.211 [21, 5.3.4].
sequenceHoppingEnabled
Parameter: *Sequence-hopping-enabled*, see TS 36.211 [21, 5.5.1.4].
ul- ReferenceSignalsPUSCH
Used to specify parameters needed for the transmission on PUSCH (or PUCCH).

– *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),
    ...
}

RACH-ConfigCommon-v1250 ::=     SEQUENCE {
    txFailParams-r12                SEQUENCE {
        connEstFailCount-r12                SNUMERATED {n1, n2, n3, n4},
        connEstFailOffsetValidity-r12       SNUMERATED {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
    },
    ...
}

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
```


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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.
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
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.
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).
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.

-- 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
    ]]
}

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
    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
    ]],
    [[  uplinkPowerControlCommon-v13xy  UplinkPowerControlCommon-v13xy      OPTIONAL    -- Need ON
    ]]
}

RadioResourceConfigCommonPSCell-r12 ::= SEQUENCE {
    basicFields-r12                     RadioResourceConfigCommonSCell-r10,
    pucch-ConfigCommon-r12              PUCCH-ConfigCommon,
    rach-ConfigCommon-r12               RACH-ConfigCommon,
    uplinkPowerControlCommonPSCell-r12  UplinkPowerControlCommonPSCell-r13,
    ...,
    [[  uplinkPowerControlCommon-v13xy  UplinkPowerControlCommon-v13xy      OPTIONAL    -- Need ON
    ]]
}

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
        -- 2: Physical configuration, control
        soundingRS-UL-ConfigCommon-r10      SoundingRS-UL-ConfigCommon,
        ul-CyclicPrefixLength-r10           UL-CyclicPrefixLength,
        -- 4: Physical configuration, physical channels
        prach-ConfigSCell-r10                   PRACH-ConfigSCell-r10       OPTIONAL,   -- Cond TDD-
OR-VoRl
        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-v14xx UplinkPowerControlCommonPSCell-r12  OPTIONAL    -- Cond
UL
    ]]
}

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

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

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

-- ASN1STOP
```

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.
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 and n16 corresponds to value 16.
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.
p-Max Pmax to be used in the target cell. If absent the UE applies the maximum power according to the UE capability.
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.
UL-CyclicPrefixLength Parameter: Uplink cyclic prefix length see 36.211 [21, 5.2.1] where len1 corresponds to normal cyclic prefix and len2 corresponds to extended cyclic prefix.

Conditional presence	Explanation
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 the UE shall delete any existing value for this field.
UL	If the SCell is part of the STAG or concerns the PSCell 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.

– *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,
```


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```
        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
    ]]
}

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
    ]]
}

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
    ]]

}

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-v13xy                    RLC-Config-v13xy        OPTIONAL        -- Need ON
    ]]
}

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
    ...
}

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,
    ...
}

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
    ...
}

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

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),
```

```
    ...
}
F-a ::= ENUMERATED {    dB-6, dB-4dot77, dB-3, dB-1dot77,
                        dB0, dB1, dB2, dB3}

-- ASN1STOP
```

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).
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.
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. 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 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.
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.

RadioResourceConfigDedicated field descriptions
servCellp-a Indicates the power offset for QPSK C-RNTI based PDSCH transmissions used by the serving cell, see 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.

Conditional presence	Explanation
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; otherwise the field is optionally present, need ON. Upon connection establishment/ re-establishment only SRB1 is applicable.
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 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.
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, upon the corresponding DRB type change from split to MCG bearer, upon the corresponding DRB type change from MCG to split 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.

– *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
    },
    ...
}
```


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

RLC-Config-v13xx ::=            SEQUENCE {
    ul-extended-RLC-AM-SN-r13               BOOLEAN,
    dl-extended-RLC-AM-SN-r13               BOOLEAN,
    pollPDU-v13zy                           PollPDU-v13zy       OPTIONAL    -- Need OR
}

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
}

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, spare9, spare8,
                                    spare7, spare6, spare5, spare4, spare3,
                                    spare2, spare1}

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

PollPDU-v13zy ::=               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}

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, spare1}

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, spare8, spare7,
                                    spare6, spare5, spare4, spare3, spare2,
                                    spare1}
```

```
-- ASN1STOP
```

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.
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-v13xy* 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.
t-Reordering
Timer for reordering in TS 36.322 [7], in milliseconds. Value ms0 means 0ms, ms5 means 5ms and so on.
t-StatusProhibit
Timer for status reporting in TS 36.322 [7], in milliseconds. Value ms0 means 0ms, ms5 means 5ms and so on.
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-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.

– *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 {
            type0-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
                }
            },
            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: $n_{\mathrm{PUCCH},i}^{(1)}$, 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: $n_{\mathrm{PUCCH}}^{(1,p)}$, 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
}

-- 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: $n^{(1,p)}_{PUCCH,SRI}$ 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-v13x0 ::= CHOICE{
    release                             NULL,
    setup                               SEQUENCE {
        transmissionComb-v13x0              INTEGER (3..3)              OPTIONAL,       Need OR
        cyclicShift-v13x0                   ENUMERATED {cs8, cs9, cs10, cs11}   OPTIONAL,    -- Need
OR
        transmissionCombNum-r13             ENUMERATED {n2, n4}     OPTIONAL    -- Need OR
    }
}

SoundingRS-UL-ConfigDedicatedUpPtsExt-r13 ::=   CHOICE{
    release                             NULL,
    setup                               SEQUENCE {
        srs-UpPtsAdd                        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}
```


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```
    }
}

SoundingRS-UL-ConfigDedicatedApPeriodic-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-Format1aNew2bNew2c-r10       SRS-ConfigAp-r10,
                    ...
                }
        }                                                               OPTIONAL    -- Need ON
    }
}

SoundingRS-UL-ConfigDedicatedApPeriodic-v13x0 ::=    CHOICE{
    release                             NULL,
    setup                               SEQUENCE {
        srs-ConfigApDCI-Format4-v13x0       SEQUENCE (SIZE (1..3)) OF SRS-ConfigAp-v13x0
    OPTIONAL,--Need ON
        srs-ActivateAp-v13x0                CHOICE {
                release                         NULL,
                setup                           SEQUENCE {
                    srs-ConfigApDCI-Format0-v13x0       SRS-ConfigAp-v13x0  OPTIONAL,   -- Need ON
                    srs-ConfigApDCI-Format1aNew2bNew2c-v13x0  SRS-ConfigAp-v13x0  OPTIONAL,   -- Need ON
                    ...
                }
        }                                                               OPTIONAL    -- Need ON
    }
}

SoundingRS-UL-ConfigDedicatedApPeriodicUpPtsExt-r13 ::=  CHOICE{
    release                             NULL,
    setup                               SEQUENCE {
        srs-UpPtsAdd                        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-Format1aNew2bNew2c-r13       SRS-ConfigAp-r13,
                    ...
                }
        }                                                               OPTIONAL    -- Need ON
    }
}

SRS-ConfigAp-r10 ::= SEQUENCE {
    srs-AntennaPortAp-r10               SRS-AntennaPort,
    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-v13x0 ::= SEQUENCE {
    transmissionCombAp-v13x0            INTEGER (2..3)                  OPTIONAL,   -- Need OR
    cyclicShiftAp-v13x0                 ENUMERATED {cs8, cs9, cs10, cs11}   OPTIONAL,   -- Need OR
    transmissionCombNum-r13             ENUMERATED {n2, n4}         OPTIONAL    -- Need OR
}

SRS-ConfigAp-r13 ::= SEQUENCE {
    srs-AntennaPortAp-r10               SRS-AntennaPort,
    srs-BandwidthAp-r10                 ENUMERATED {bw0, bw1, bw2, bw3},
    freqDomainPositionAp-r10            INTEGER (0..23),
    transmissionCombAp-r10              INTEGER (0..3),
    cyclicShiftAp-r10                   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
```

SoundingRS-UL-Config field descriptions
ackNackSRS-SimultaneousTransmission Parameter: *Simultaneous-AN-and-SRS*, see TS 36.213 [23, 8.2]. For SCells 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. See TS 36.211 [21, 5.5.3.1], where cs0 corresponds to 0 etc.
duration Parameter: Duration for periodic sounding reference signal transmission. 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].
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. 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, 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. 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 to value 1 and so on.
srs-UpPtsAdd The field only applies for TDD. If E-UTRAN configures both *soundingRS-UL-ConfigDedicatedUpPTsExt* and *soundingRS-UL-ConfigDedicatedAperiodicUpPTsExt* it shall set *srs-UpPtsAdd* to in both fields to the same value.
transmissionComb, transmissionCombAp Parameter: $\overline{k}_{\mathrm{TC}} \in \{0..3\}$ 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.

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-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, spare6,
                                                spare5, spare4, spare3, spare2,
                                                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
        ]]
    }
}

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

-- ASN1STOP
```


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SPS-Config field descriptions
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.
n1PUCCH-AN-PersistentList , n1PUCCH-AN-PersistentListP1
List of parameter: $n_{PUCCH}^{(1,p)}$ 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 Semi-Persistent Scheduling, see TS 36.321 [6].
p0-NominalPUSCH-Persistent
Parameter: $P_{O\_NOMINAL\_PUSCH}(0)$. 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: $P_{O\_NOMINAL\_PUSCH}(0)$. 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: $P_{O\_UE\_PUSCH}(0)$. 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: $P_{O\_UE\_PUSCH}(0)$. 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.
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, 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.
twoIntervalsConfig
Trigger of two-intervals-Semi-Persistent Scheduling in uplink. See TS 36.321 [6, 5.10]. If this field is present, two-intervals-SPS is enabled for uplink. Otherwise, two-intervals-SPS is disabled.

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.

-- *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,
                                        ssp9}
}

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

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

-- ASN1STOP
```

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 and value *ssp9* points to Configuration 9 for normal cyclic prefix. 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*. If *specialSubframePatterns-v1130* is present, the UE shall ignore *specialSubframePatterns* (without suffix).
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).

– *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 ::=               CHOICE {
    release                         NULL,
    setup                           SEQUENCE {
        tpc-Index-PUCCH-SCell-r13       TPC-Index
```

```
    }
}

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

-- ASN1STOP
```

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, x.y], 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]

– *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 {
    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-v13xy ::=  SEQUENCE {
    deltaF-PUCCH-Format4                ENUMERATED {deltaFX, deltaFX1, deltaFX2,deltaFX3, deltaFX4,
                                        deltaFX5, deltaFX6, deltaFX7}    OPTIONAL,          Need OR
    deltaF-PUCCH-Format5                ENUMERATED { deltaFX, deltaFX1, deltaFX2, deltaFX3, deltaFX4,
                                        deltaFX5, deltaFX6, deltaFX7}    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
}

UplinkPowerControlCommonPSCell-v13xy ::=        SEQUENCE {
-- For uplink power control the additional/ missing fields are signalled (compared to SCell)
    deltaF-PUCCH-Format4                ENUMERATED {deltaFX, deltaFX1, deltaFX2,deltaFX3, deltaFX4,
                                        deltaFX5, deltaFX6, deltaFX7}    OPTIONAL,          -- Need OR
    deltaF-PUCCH-Format5                ENUMERATED { deltaFX, deltaFX1, deltaFX2,deltaFX3, deltaFX4,
                                        deltaFX5, deltaFX6, deltaFX7}    OPTIONAL          -- Need OR
}
```


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

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

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-r13        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
    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)
        }
    }
}

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}
}

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 {d30, d32},
    deltaTxD-OffsetPUCCH-Format1ab-r10      ENUMERATED {d30, d32},
    deltaTxD-OffsetPUCCH-Format22a2b-r10    ENUMERATED {d30, d32},
    deltaTxD-OffsetPUCCH-Format3-r10        ENUMERATED {d30, d32},
    ...
}

DeltaTxD-OffsetListPUCCH-v1130 ::=  SEQUENCE {
    deltaTxD-OffsetPUCCH-Format1bCS-r11     ENUMERATED {d30, d32}
}
  ASN1STOP
```

UplinkPowerControl field descriptions
accumulationEnabled
Parameter: Accumulation-enabled, see TS 36.213 [23, 5.1.1.1]. 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-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: $\Delta_{F\_PUCCH}(F)$ 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 = IE 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-NominalPUCCH
Parameter: $P_{O\_NOMINAL\_PUCCH}$ See TS 36.213 [23, 5.1.2.1], unit dBm.
p0-NominalPUSCH
Parameter: $P_{O\_NOMINAL\_PUSCH}(1)$ 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: $P_{O\_NOMINAL\_PUSCH}(1)$. 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-PUCCH
Parameter: $P_{O\_UE\_PUCCH}$ See TS 36.213 [23, 5.1.2.1]. Unit dB
p0-UE-PUSCH
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 1 if uplink power control subframe sets are configured by *tpc-SubframeSet*.
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.

***UplinkPowerControl* field descriptions**

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.

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
```

6.3.4 Mobility control information elements

-- AdditionalSpectrumEmission

***AdditionalSpectrumEmission* information element**

```
-- ASN1START

AdditionalSpectrumEmission ::=      INTEGER (1..32)

-- 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.

-- 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
```


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```
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.

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 44 005 [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
```

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.

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
```

– CellReselectionSubPriority

The IE *CellReselectionSubPriority* indicates an input parameter to derive the ultimate priority of the concerned carrier frequency for E-UTRAN to be used in Cell Reselection process, as defined in TS 36.304 [4]. The value of *CellReselectionSubPriority* is added to the value of *cellReselectionPriority*. 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
```

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.

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***CellGlobalIdUTRA* information element**

```
-- ASN1START

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].

– *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.

***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, spare1},
    newUE-Identity                  C-RNTI,
    radioResourceConfigCommon       RadioResourceConfigCommon,
    rach-ConfigDedicated            RACH-ConfigDedicated            OPTIONAL,     Need OP
```


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```
    ...,
    [[  carrierFreq-v9e0              CarrierFreqEUTRA-v9e0                 OPTIONAL    -- Need ON
    ]],
    [[  sib5-ContinueROHC-r11         ENUMERATED {true}                     OPTIONAL    -- Cond EO
    ]]
}

MobilityControlInfoSCG-r12 ::=      SEQUENCE {
    t307-r12                            ENUMERATED {
                                            ms50, ms100, ms150, ms200, ms500, ms1000,
                                            ms2000, spare1},
    ue-IdentitySCG-r12                  C-RNTI                                OPTIONAL,   -- Cond SCGadr,
    rach-ConfigDedicated-r12            RACH-ConfigDedicated                  OPTIONAL,   -- Need OP
    cipheringAlgorithmSCG-r12       CipheringAlgorithm-r12      OPTIONAL,   -- Need ON
    ...
}

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
}

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

-- ASN1STOP
```

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].
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.
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.
rach-ConfigDedicated The dedicated random access parameters. If absent the UE applies contention based random access as specified in TS 36.321 [6].
t304 Timer T304 as described in section 7.3. ms50 corresponds with 50 ms, ms100 corresponds with 100 ms and so on.
t307 Timer T307 as described in section 7.3. ms50 corresponds with 50 ms, ms100 corresponds with 100 ms and so on.
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.

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-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

-- 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, 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-v1020 ::= SEQUENCE (SIZE (1..maxMultiBands)) OF NS-PmaxList-r10

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 a given frequency band. E-UTRAN does not include the same value of *additionalSpectrumEmission* in *SystemInformationType2* within this list.

***NS-PmaxList* information element**

```
-- ASN1START

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

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

-- 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.

– 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].

– *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.

– *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 36.304 [4]. Actual value $Q_{qualmin}$ = IE 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 36.304 [4]. Actual value $Q_{rxlevmin}$ = IE value * 2 [dBm].

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 {
```


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```
                                        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 = IE 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 = IE value [dB].

ReselectionThresholdQ information element

```
-- ASN1START

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

  ASN1STOP
```

-- SCellIndex

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

SCellIndex information element

```
  ASN1START

SCellIndex-r10 ::=                      INTEGER (1..7)
SCellIndex-v13xy ::=                    INTEGER (8..31)
SCellIndex-r13 ::=                      INTEGER (1..31)

-- ASN1STOP
```


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-- *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-v13xy ::=                 INTEGER (8..31)
ServCellIndexFull-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

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].

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– *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

– *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
```


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— *T-Reselection*

The IE *T-Reselection* concerns the cell reselection timer $T_{reselection_{RAT}}$ for E-UTRA, UTRA, GERAN or CDMA2000. Value in seconds.

***T-Reselection* information element**

```
-- ASN1START
T-Reselection ::=                   INTEGER (0..7)
-- 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].

***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 IE 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
```

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..34)

-- 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,
            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
        measPSRq-OnAllSymbols-r12       BOOLEAN                         OPTIONAL    -- Need ON
    ]],
    [[  ul-DelayConfig-r13          UL-DelayConfig-r13      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

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

-- ASN1STOP
```

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.
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).
measObjectToRemoveList
List of measurement objects to remove.
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.
ul-DelayConfig
Used to setup and release UL PDCP Packet Delay per QCI measurement.

– 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),
            ...
        },
        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. The field *ds-OccasionDuration* is set to values 1 for an LAA SCell.
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]. The values {0, 4, 5, 9, 10, 11, 18, 19} are not applicable for an LAA SCell.
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 for an LAA SCell.

– *MeasGapConfig*

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

***MeasGapConfig* information element**

```
-- ASN1START

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

-- 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. Also used to specify the measurement gap pattern to be applied, as defined in TS 36.133 [16].

– 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

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

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

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

-- ASN1STOP
```

– 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
    ...
```


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```
}

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

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

-- ASN1STOP
```

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
        measRSSI-Config-r13             MeasRSSI-Config-r13         OPTIONAL        -- Need ON
    ]]
}
```

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

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

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
}

MeasCycleCell-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
}

MeasRSSI-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}
    }
}
-- ASN1STOP
```

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.
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.
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.
measRSSI-Config
Parameters applicable to RSSI and channel occupancy measurement on the carrier frequency indicated by *carrierFreq*.
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-Period
Indicates the RSSI and channel occupancy 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 and channel occupancy measurement timing configuration (RMTC) subframe offset for this frequency, see TS 36.214 [48]. For inter-frequency measurements, if this field is not configured, the UE chooses a random starting offset for *measDuration*.
t312
The value of timer T312. Value *ms0* represents 0 ms, *ms50* represents 50 ms and so on.
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.

MeasObjectEUTRA field descriptions
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)

-- ASN1STOP
```

-- *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

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

MeasObjectToAddMod ::=  SEQUENCE {
    measObjectId                        MeasObjectId,
    measObject                          CHOICE {
```

```
        measObjectEUTRA                 MeasObjectEUTRA,
        measObjectUTRA                  MeasObjectUTRA,
        measObjectGERAN                 MeasObjectGERAN,
        measObjectCDMA2000              MeasObjectCDMA2000,
        ...
    }
}

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* 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 15,
    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
    }                                                               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].

– *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-v13xy           SEQUENCE {
            rs-sinrResult-r13                   RS-SINR-Range-r13
        }                                                               OPTIONAL,
        ul-PDCP-DelayResultList-r13     UL-PDCP-DelayResultList-r13     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
        ]],
        [[  primaryPLMN-Suitable-r12            ENUMERATED {true}           OPTIONAL,
            measResult-v1250                    RSRQ-Range-v1250            OPTIONAL
        ]],
        [[  rs-sinrResult-r13                   RS-SINR-Range-r13           OPTIONAL
        ]]
    }
}

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

MeasResultServFreqListExt-r13 ::=   SEQUENCE (SIZE (maxServCell-Plus1..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-v13xy               SEQUENCE {
            rs-sinrResult-r13                   RS-SINR-Range-r13
        }       OPTIONAL,
        measResultBestNeighCell-v13zy       SEQUENCE {
            rs-sinrResult-r13                   RS-SINR-Range-r13
        }       OPTIONAL
    ]]
}

MeasResultServFreq-r13 ::=          SEQUENCE {
    servFreqId-r13                      ServCellIndexFull-r13,
    measResultSCell-r13                 SEQUENCE {
        rsrpResultSCell-r13                 RSRP-Range,
        rsrqResultSCell-r13                 RSRQ-Range-v13zz,
        rs-sinrResult-r13                   RS-SINR-Range-r13   OPTIONAL
    }                                                       OPTIONAL,
    measResultBestNeighCell-r13         SEQUENCE {
        physCellId-r13                      PhysCellId,
        rsrpResultNCell-r10                 RSRP-Range,
        rsrqResultNCell-r13                 RSRQ-Range-v13zz,
        rs-sinrResult-r13                   RS-SINR-Range-r13   OPTIONAL
    }                                                       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
    },
    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),
        ...
    }
}

MeasResultCDMA2000 ::=              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),
        ...
    }
}

MeasResultForECID-r9 ::=        SEQUENCE {
    ue-RxTxTimeDiffResult-r9            INTEGER (0..4095),
    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},
    carrierDelay-r13                    INTEGER (0..31)
}

-- ASN1STOP
```


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MeasResults field descriptions
channelOccupancy Indicates the percentage of samples when the RSSI was above the configured *channelOccupancyThreshold* for the associated *reportConfig*.
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 UE Rx–Tx time difference; or Measured result of UE SFN and subframe timing difference.
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.
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.
measResultPCell Measured result of the PCell.
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.
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.
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.

MeasResults field descriptions
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.
rs-sinrResult Measured RS-SINR result of an E-UTRA cell. The *rs-sinrResult* is only reported if configured by the eNB.
ue-RxTxTimeDiffResult UE Rx-Tx time difference measurement result of the PCell, provided by lower layers. According to 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.

– *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].

***MeasResultSSTD* information element**

```
-- ASN1START

MeasResultSSTD-r13 ::=                  SEQUENCE {
    sfn-OffsetResult-r13                    INTEGER (0..1023),
    frameBoundaryOffsetResult-r13           INTEGER (-4..5),
    subframeBoundaryOffsetResult-r13        INTEGER (0..63)
}

-- 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-sf1, sf-EUTRA-sf2}

-- 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-v13xy       QuantityConfigEUTRA-v13xy           OPTIONAL        -- Need ON
    ]]
}

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

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

QuantityConfigEUTRA-v13xy ::=       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}
}

-- ASN1STOP
```


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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.
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.

-- *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.

***ReportConfigEUTRA* information element**

```
-- ASN1START

ReportConfigEUTRA ::=               SEQUENCE {
    triggerType                         CHOICE {
        event                               SEQUENCE {
            eventId                             CHOICE {
                eventA1                             SEQUENCE {
                    a1-Threshold                        ThresholdEUTRA
                },
                eventA2                             SEQUENCE {
                    a2-Threshold                        ThresholdEUTRA
                },
```


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```
            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
            }
        },
        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
    use3312-r12                     BOOLEAN         OPTIONAL,   -- Need ON
    usePSCell-r12                   BOOLEAN         OPTIONAL,   -- Need ON
    s-Threshold1-v1250              RSRQ-RangeConfig-r12        OPTIONAL,   -- Need ON
    s-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
    triggerQuantity-v13xy       CHOICE {
        release                     NULL,
        setup                       ENUMERATED {xlcc}
    }                                               OPTIONAL,   -- Need ON
    s-ThresholdSINR-r13         CHOICE {
        release                     NULL,
        setup                       SEQUENCE {
            threshold1-r13              ThresholdEUTRA-v13xy        OPTIONAL,   -- Need ON
            threshold2-r13              ThresholdEUTRA-v13xy        OPTIONAL    -- Need ON
        }
    }                                               OPTIONAL,   -- Cond SINR
    reportQuantity-v13xy        CHOICE {
        release                     NULL,
        setup                       ENUMERATED {rsrpAND3dB, rsrqAND3dB, all}
    }                                               OPTIONAL,   -- Need ON
    useWhiteCellList-r13        BOOLEAN         OPTIONAL,   -- Need ON
    measRSSI-ReportConfig-r13       MeasRSSI-ReportConfig-r13   OPTIONAL      -- Need OR
]]
}
```

```
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

ThresholdEUTRA-v13zy ::=            PS-SINR-Range-r13

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

END ASN1STOP
```

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 IE 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.
aN-ThresholdSINR
Threshold to be used in EUTRA measurement report triggering condition for event number aN. If multiple thresholds are defined for event number aN, the thresholds are differentiated by M. When configured, UE ignores aN-ThresholdM. E-UTRAN configures threshold1 only for events A1, A2, A4 and A5 and 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*.
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 RSSI and channel occupancy measurement reporting.
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
Indicates 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.
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 IE value – 140 dBm. For RSRQ: RSRQ based threshold for event evaluation. The actual value is (IE value – 40)/2 dB. For RS-SINR: RS-SINR based threshold for event evaluation. The actual value is [FFS] dB. For CSI-RSRP: CSI-RSRP based threshold for event evaluation. The actual value is IE 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.

コメント(2): [HT1]: TSD by RAN4

Excessive but intention is to refer to the same table having 128 values?

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].
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.
usePSCell If this field is set to *TRUE* the UE shall use the PSCell instead of the PCell. E-UTRAN configures value *TRUE* only *TRU* 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 If value *TRUE* is configured, the UE shall consider cells to be applicable for measurements as specified in 5.5.4.1.

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.
SINR	The field is mandatory, need ON, if *triggerQuantity* is set to *sinr*; otherwise it 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 are labelled B*N* with *N* equal to 1, 2 and so on.

Event B1: Neighbour becomes better than absolute threshold;

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

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 {
```


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```
                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
                }
            },
            ...
        },
        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
]]
}

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

ThresholdGERAN ::=          INTEGER (0..63)

ThresholdCDMA2000 ::=       INTEGER (0..63)

-- ASN1STOP
```

ReportConfigInterRAT field descriptions
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.
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.
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.
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.
ThresholdGERAN The actual value is IE value – 110 dBm.
ThresholdUTRA *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 IE value – 115 dBm. For *utra-EcN0*: The actual value is (IE value – 49)/2 dB.
timeToTrigger Time during which specific criteria for the event needs to be met in order to trigger a measurement report.

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

***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.

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***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].

***RSRP-Range* information element**

```
-- ASN1START

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

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

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

RSRP-RangeSL3-r13 ::=               INTEGER (0..11)

-- ASN1STOP
```

***RSRP-Range* field descriptions**
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.

– *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* information element**

```
-- ASN1START

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

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

RSRQ-Range-v13xx ::=                INTEGER (-30..46)

-- ASN1STOP
```


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-- *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.

-- *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, 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},
            delayReportInterval-r13                 ENUMERATED {
                                                    ms1024, ms2048, ms5120, ms10240}
        }
}

-- ASN1STOP
```

***UL-DelayConfig* field descriptions**
delayReportInterval
Indicates the periodicity for performing and reporting of UL PDCP Packet Delay per QCI measurement specified in TS 36.314 [71]. Value in milliseconds. Value ms1024 means 1024 ms and so on.
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.

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
}

-- ASN1STOP
```

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

-- ASN1STOP
```

AreaConfiguration field descriptions

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

– 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 *DedicatedInfoCDMA2000* 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

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)),
        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
    ]]
}

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
    ]]
}

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, spare2,
                                            spare1}
    }
}

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

-- ASN1STOP
```

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.
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.
powerPrefIndicationTimer   Prohibit timer for Power Preference Indication reporting. Value in seconds. Value s0 means prohibit timer is set to 0 second or not set, 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.

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))

-- 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
```

– *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
```

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
```


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-- 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 (1..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.

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.

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,
```


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```
    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 {
    rf-Parameters-v10f0             RF-Parameters-v10f0                 OPTIONAL,
    nonCriticalExtension            UE-EUTRA-Capability-v1010-IEs       OPTIONAL
}

UE-EUTRA-Capability-v1010-IEs ::=   SEQUENCE {
    rf-Parameters-v1010             RF-Parameters-v1010                 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,
    -- Following field is only to be used for late REL-11 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 {noBenefromBatConsumpOpt} 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,
    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,
```

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    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,
    nonCriticalExtension                UE-EUTRA-Capability-v1280-IEs           OPTIONAL
}

UE-EUTRA-Capability-v1280-IEs ::= SEQUENCE {
    phyLayerParameters-v1280            PhyLayerParameters-v1280                OPTIONAL,
    nonCriticalExtension                UE-EUTRA-Capability-v13x0-IEs           OPTIONAL
}

UE-EUTRA-Capability-v13x0-IEs ::= SEQUENCE {
    dc-Parameters-v13x0                 DC-Parameters-v13x0                     OPTIONAL,
    measParameters-v13xy                MeasParameters-v13xy                    OPTIONAL,
    mac-Parameters-v13x0                MAC-Parameters-v13x0                    OPTIONAL,
    pdcp-Parameters-v13x0           PDCP-Parameters-v13x0               OPTIONAL,
    phyLayerParameters-v13x0            PhyLayerParameters-v13x0                OPTIONAL,
    rf-Parameters-v13x0             RF-Parameters-v13x0                 OPTIONAL,
    rlc-Parameters-v13x0                RLC-Parameters-v13x0                    OPTIONAL,
    ue-CategoryDL-v13x0             INTEGER (17)                        OPTIONAL,
    ue-CategoryUL-v13x0             INTEGER (14)                        OPTIONAL,
    scptm-Parameters-v13x0              SCPTM-Parameters-v13x0                  OPTIONAL,
    sl-Parameters-r13               SL-Parameters-r13                   OPTIONAL,
    supportOfLAA-r13                    ENUMERATED {supported}                  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
}

AccessStratumRelease ::=            ENUMERATED {
```

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                                    rel9, rel10, rel11, rel12, spare3,
                                    spare2, spare1, ...}

DC-Parameters-r12 ::=           SEQUENCE {
    drb-TypeSplit-r12               ENUMERATED {supported}          OPTIONAL,
    drb-TypeSCG-r12                 ENUMERATED {supported}          OPTIONAL
}

DC-Parameters-v13x0 ::=         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-v13x0 ::=            SEQUENCE {
    extendedMAC-LengthField-r13     ENUMERATED {supported}          OPTIONAL,
    extendedLongDRX-r13             ENUMERATED {supported}          OPTIONAL
}

RLC-Parameters-r12 ::=          SEQUENCE {
    extended-RLC-LI-Field-r12           ENUMERATED {supported}
}

RLC-Parameters-v13x0 ::=            SEQUENCE {
    extendedRLC-SN-SO-Field-r13         ENUMERATED {supported}
}

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,
    ...
}

PDCP-Parameters-v1130 ::=       SEQUENCE {
    pdcp-SN-Extension-r11           ENUMERATED {supported}          OPTIONAL,
    supportRohcContextContinue-r11      ENUMERATED {supported}          OPTIONAL
}

PDCP-Parameters-v1430 ::=           SEQUENCE {
    pdcp-SN-Extension-18bits-r13        ENUMERATED {supported}
}

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,
    tm8-With-6Tx-FDD-r10                    ENUMERATED {supported}              OPTIONAL,
    pmi-Disabling-r10                       ENUMERATED {supported}              OPTIONAL,
```

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    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-v1260 ::=            SEQUENCE {
    alternativeTBS-Indices-r12              ENUMERATED {supported}          OPTIONAL
}
PhyLayerParameters-v13x0 ::=            SEQUENCE {
    codebook-HARQ-ACK-r13                   BIT STRING (SIZE (2))           OPTIONAL,
    fdd-Harq-TimingTDD-r13                  ENUMERATED {supported}          OPTIONAL,
    maxNumberUpdatedCSI-Proc-r13                INTEGER(5..32)                  OPTIONAL,
    supportedBlindDecoding-r13              INTEGER(1..32)                  OPTIONAL,
    pucch-Format4-r13                       ENUMERATED {supported}          OPTIONAL,
    pucch-Format5-r13                       ENUMERATED {supported}          OPTIONAL,
    pucch-SCell-r13                         ENUMERATED {supported}          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-v10j0 ::=             SEQUENCE {
    supportedBandCombination-r10            SupportedBandCombination-r10
}

RF-Parameters-v1060 ::=             SEQUENCE {
    supportedBandCombinationExt-r10         SupportedBandCombinationExt-r10
}

RF-Parameters-v1090 ::=                 SEQUENCE {
    supportedBandCombination-v1090          SupportedBandCombination-v1090      OPTIONAL
}

RF-Parameters-v10f0 ::=                 SEQUENCE {
    modifiedMPR-Behavior-r10                BIT STRING (SIZE (32))          OPTIONAL
}
```


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```
RF-Parameters-v1010 ::=             SEQUENCE {
    supportedBandCombination-v1010          SupportedBandCombination-v10.0          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-v13a0 ::=             SEQUENCE {
    requestedMaximumCCs-r13                 ENUMERATED {supported, includeUL,
                                                includedDL, includedBoth}       OPTIONAL,
    skipFallbackCombinations-r13                ENUMERATED {supported, included}
    OPTIONAL,
    supportedBandCombinations-r13       SupportedBandCombinations-r13               OPTIONAL,
    supportedMIMO-CapabilityDL-r13      MIMO-CapabilityDL-r10                       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-v1010 ::= SEQUENCE (SIZE (1..maxBandComb-r10)) OF
BandCombinationParameters-v1010

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

SupportedBandCombinationAdd-r11 ::= SEQUENCE (SIZE (1..maxBandComb-r11)) OF
BandCombinationParameters-r11

SupportedBandCombinationAdd-v11d0 ::= SEQUENCE (SIZE (1..maxBandComb-r11)) OF
BandCombinationParameters-v10c0

SupportedBandCombinationAdd-v1250 ::= SEQUENCE (SIZE (1..maxBandComb-r11)) OF
BandCombinationParameters-v1250

SupportedBandCombinationAdd-v1270 ::= SEQUENCE (SIZE (1..maxBandComb-r11)) OF
BandCombinationParameters-v1270
```

```
SupportedBandCombinations-r13 ::=   SEQUENCE {
    bandCombinationList-r13                 BandCombinationList-r13
}

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

BandCombination-r13 ::=     SEQUENCE {
    additionalFallbackSupported-r13     ENUMERATED {true}               OPTIONAL,
    bandCombinationParameters-r13       BandCombinationParametersCommon-r13
}

BandCombinationParametersCommon-r13 ::= SEQUENCE {
    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,
    bandInfoUTRA-r13                BandInfoUTRA,
    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-r13))     OPTIONAL,
    commSupportedBandsPerDC-r13     BIT STRING (SIZE (1.. maxBands))        OPTIONAL
}


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-v10c0::= SEQUENCE {
bandParameterList-v10c0         SEQUENCE (SIZE (1..maxSimultaneousBands-r10)) OF
          BandParameters-v10c0      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,
    bandInfoUTRA-r11                BandInfoUTRA,
    ...
}

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,
    commSupportedBandsPerDC-r12             BIT STRING (SIZE (1.. maxBands))        OPTIONAL,
    ...
}
```

```
BandCombinationParameters-v1270 ::= SEQUENCE {
    bandParameterList-v1270         SEQUENCE (SIZE (1..maxSimultaneousBands-r10)) OF
        BandParameters-v1270            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-v1010 ::= SEQUENCE {
    bandParametersDL-v1010      SEQUENCE (SIZE (1..maxBandwidthClass-r10)) OF CA-MIMO-ParametersDL
v1010
}

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
}

BandParametersUL-r13 ::= SEQUENCE (SIZE (1..maxBandwidthClass-r10)) OF CA-MIMO-ParametersUL-r10

BandParametersUL-r13 ::= SEQUENCE OF CA-MIMO-ParametersUL-r10


CA-MIMO-ParametersUL-r10 ::= SEQUENCE {
    ca-BandwidthClassUL-r10             CA-BandwidthClass-r10,
    supportedMIMO-CapabilityUL-r10      MIMO-CapabilityUL-r10               OPTIONAL
}

BandParametersDL-r13 ::= SEQUENCE (SIZE (1..maxBandwidthClass-r10)) OF CA-MIMO-ParametersDL-r10

BandParametersDL-r13 ::= SEQUENCE OF 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-v1010 ::= 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,
```

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    supportedMIMO-CapabilityDL-r13          MIMO-CapabilityDL-r13               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-r13          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, ...}

MIMO-CapabilityDL-r10 ::= ENUMERATED {twoLayers, fourLayers}

MIMO-CapabilityUL-r10 ::= ENUMERATED {twoLayers, fourLayers, eightLayers}

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

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
}

MeasParameters ::=                  SEQUENCE {
    bandListEUTRA                       BandListEUTRA
}

MeasParameters-v1020 ::=            SEQUENCE {
    bandCombinationListEUTRA-r10            BandCombinationListEUTRA-r10
}

MeasParameters-v1130 ::=            SEQUENCE {
    rsrqMeasWideband-r11            ENUMERATED {supported}              OPTIONAL
}

MeasParameters-v1140 ::=            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,
    extendedMaxMeasIdle-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-v13xy ::=            SEQUENCE {
    rs-SINR-Meas-r13                    ENUMERATED {supported}      OPTIONAL,
    whiteCellList-r13       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
}

RAT-ParametersUTRA-FDD ::=      SEQUENCE {
    supportedBandListUTRA-FDD           SupportedBandListUTRA-FDD
}

RAT-ParametersUTRA-v920 ::=         SEQUENCE {
    e-RedirectionUTRA-r9                ENUMERATED {supported}
}

RAT-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
}

RAT-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}

RAT-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, ...}

RAT-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, ...}

RAT-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, ...}

RAT-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-v10Z0 ::= 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

CSG-ProximityIndicationParameters-r9 ::=    SEQUENCE {
    intraFreqProximityIndication-r9 ENUMERATED {supported}          OPTIONAL,
    interFreqProximityIndication-r9 ENUMERATED {supported}          OPTIONAL,
    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}
}

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-v1320 ::=              SEQUENCE {
    inDeviceCoexInd-v1320-CA-r11            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
}

SCPTM-Parameters-v1340 ::=              SEQUENCE {
    scptm-ParallelReception-r13                 ENUMERATED {supported}      OPTIONAL
}

WLAN-IW-Parameters-r12 ::=  SEQUENCE {
    wlan-IW-RAN-Rules-r12                   ENUMERATED {supported}      OPTIONAL,
    wlan-IW-ANDSF-Policies-r12                  ENUMERATED {supported}      OPTIONAL
}

MAICS-Capability-List-r12 ::= SEQUENCE (SIZE (1..maxMAICS-Entries-r12)) OF MAICS-Capability-Entry-
r12


MAICS-Capability-Entry-r12  ::= SEQUENCE {
    numberOfMAICS-CapableCC-r12             INTEGER(1..5),
    numberOfAggregatedPRB-r12               ENUMERATED {
                                                n25, 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                  SupportedBandListSL-r12     OPTIONAL,
    discScheduledResourceAlloc-r12          ENUMERATED {supported}      OPTIONAL,
    disc-UE-SelectedResourceAlloc-r12       ENUMERATED {supported}      OPTIONAL,
    disc-SLSS-r12                           ENUMERATED {supported}      OPTIONAL,
    discSupportedTxPerc-r12                 ENUMERATED {n50, n60}       OPTIONAL
}

SL-Parameters-r13 ::=               SEQUENCE {
    discSysInfoReporting-r13                    ENUMERATED {supported}      OPTIONAL
}

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

-- ASN1STOP
```

UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
accessStratumRelease Set to rel12 in this version of the specification.	-
additionalFallbackSupported Indicates that the UE supports different capabilities for at least one fallback case of this band combination.	-
alternativeTBS-Indices Indicates whether the UE supports alternative TBS indices for I_{TBS} 26 and 33 as specified in TS 36.213 [23].	-
alternativeTimeToTrigger Indicates whether the UE supports alternativeTimeToTrigger.	No
bandCombinationListEUTRA One entry corresponding to each supported band combination listed in the same order as in *supportedBandCombination*.	-
BandCombinationParameters-v1090 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*.	-
bandParametersUL, bandParametersDL Indicates the supported parameters for the band. UE shall indicate parameters for only one CA uplink or downlink bandwidth class in a single band entry for one band combination entry.	-
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
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.	-
cdma2000-NW-Sharing Indicates whether the UE supports network sharing for CDMA2000.	-
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.	-
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.	-
crossCarrierScheduling	Yes
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

UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
crs-InterfHandl Indicates whether the UE supports CRS interference handling.	No
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-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.	-
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.	-
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.	-
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 [17, 6.11A]. This field is included only if UE supports carrier aggregation and includes *crs-DiscoverySignalsMeas*.	FFS
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 discovery. -	-
dl-256QAM Indicates whether the UE supports 256QAM in DL on the band.	-
drb-TypeSCG, drb-TypeSplit The *drb-TypeSplit* indicates whether the UE supports split bearer except for PDCP data transfer in UL. The *drb-TypeSCG* indicates whether the UE supports SCG bearer.	-
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	-

UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
FDD.	
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
extendedLongDRX Indicates whether the UE support extended long DRX cycles of 5.12s and 10.24s in connected mode.	-
extendedMaxMeasId Indicates whether the UE supports extended number of measurement identies as defined by *maxMeasId-r12*.	No
extended-RLC-LI-Field Indicates whether the UE supports 15 bit RLC length indicator.	-
extended-RLC-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
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.	-
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-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*.	-

UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
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.	-
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-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 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.	-
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
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.	-

UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
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*.	-
maxNumberUpdatedCSI Indicates the maximum number of CSI processes to be updated across CCs.	-
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*.	TBD
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
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
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-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.	-
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
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.	-

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 maximum 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. - 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}.	-
NonContiguousUL-RA-WithinCC-List One entry corresponding to each supported E-UTRA band listed in the same order as in *supportedBandListEUTRA*.	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
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].	-
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
pucch-Format4 Indicates whether the UE supports PUCCH format 4.	-
pucch-Format5 Indicates whether the UE supports PUCCH format 5.	-
pucch-SCell Indicates whether the UE supports PUCCH on SCell.	-
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-Report Indicates whether the UE supports delivery of rachReport.	-
requestedBands Indicates the frequency bands requested by E-UTRAN.	-
requestedMaximumCCs Indicates whether UE supports reception of *requestedMaximumCCsDL* and *requestedMaximumCCsUL*.	-
rsrqMeasWideband	Yes

UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
Indicates whether the UE can perform RSRQ measurements with wider bandwidth.	
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].	-
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 TS36.306 [5].	TBD
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 *skipFallbackCombinations* that requests UE to exclude fallback band combinations from capability signalling.	-
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.	-
supportedBandCombination Includes the supported CA band combinations, if any, and may include all the supported non-CA bands.	-
supportedBandCombination-r13 Includes the supported CA band combinations, and may include the fallback CA combinations specified in TS 36.101 [42, 4.3A].	
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 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 If included, the UE shall include the same number of entries, and listed in the same order, as in *supportedBandCombination-r10*.	-
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 If included, the UE shall include the same number of entries, and listed in the same order, as in *supportedBandListEUTRA* (i.e. without suffix).	-

UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
SupportedBandListGERAN	No
SupportedBandListHRPD One entry corresponding to each supported CDMA2000 HRPD band class.	-
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.	-
supportedBlindDecoding Number of blind decodes supported per TTI in UE-specific search space as defined in TS 36.306 [5]. Only values 5 to 32 can be used in this version of the specification.	-
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 6 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.	-
supportOfLAA Indicates whether the UE supports LAA operation.	-
supportRohcContextContinue Indicates whether the UE supports ROHC context continuation operation where the UE does not reset the current ROHC context upon handover.	-
tdd-SpecialSubframe Indicates whether the UE supports TDD special subframe defined in TS 36.211 [21].	No
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	-

UE-EUTRA-Capability field descriptions	*FDD/ TDD diff*
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).	
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.	-
tm9-With-8Tx-FDD	No
twoAntennaPortsForPUCCH	No
txDiv-PUCCH1b-ChSelect Indicates whether the UE supports transmit diversity for PUCCH format 1b with channel selection.	Yes
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]. For ASN.1 compatibility, a UE indicating DL category 0 shall also indicate any of the categories (1..5) in *ue-Category* (without suffix), which is ignored by the eNB. The field *ue-CategoryDL* is set to values 0, 6, 7, 9 to 17 in this version of the specification.	-
ue-CategoryUL UE UL category as defined in TS 36.306 [5]. The field *ue-CategoryUL-r12* is set to values 0, 3, 5, 7, 8, 13 and 14 in this version of the specification.	-
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].	-
ue-TxAntennaSelectionSupported TRUE indicates that the UE is capable of supporting UE transmit antenna selection as described in TS 36.213 [23, 8.7].	Yes
ul-CoMP Indicates whether the UE supports UL Coordinated Multi-Point operation.	No
utran-ProximityIndication Indicates whether the UE supports proximity indication for UTRAN CSG member cells.	-
ul-64QAM Indicates whether the UE supports 64QAM in UL on the band. This field is only present when the field ue-*CategoryUL* is set to 5, 8 or 13.	-
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
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.	-
whiteCellList Indicates whether the UE supports *whiteCellList-r13* 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.	-

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: All the combinations of *CA-MIMO-ParametersUL* and *CA-MIMO-ParametersDL* for one band and across all the bands in each *BandCombinationParameters* are supported by the UE and have the same measurement gap requirement (i.e. the same *BandInfoEUTRA* applies). 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.

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		

– *UE-RadioPagingInfo*

The *UE-RadioPagingInfo* IE contains information needed for paging of category 0 UE.

UE-RadioPagingInfo information element

```
-- ASN1START

UE-RadioPagingInfo-r13 ::=          SEQUENCE {
    ue-Category-v1250               INTEGER (0)         OPTIONAL,
    ...
```


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```
}
-- ASN1STOP
```

-- 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},
    ...
}

-- 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.

-- 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
        }
    }                                                               OPTIONAL,
    timeSpent-r12                   INTEGER (0..4095),
    ...
}

-- ASN1STOP
```


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***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 OP
    thresholdRSRQ-r12                       SEQUENCE {
        thresholdRSRQ-Low-r12                   RSRQ-Range,
        thresholdRSRQ-High-r12                  RSRQ-Range
    }                                                               OPTIONAL,   -- Need OP
    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 OP
    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
    thresholdBeaconRSSI-r12                 SEQUENCE {
        thresholdBeaconRSSI-Low-r12             INTEGER (0..255),
        thresholdBeaconRSSI-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
```

***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.
thresholdBeaconRSSI-High Indicates the Beacon RSSI threshold used by the UE for traffic steering to WLAN. Parameter: $Thresh_{BeaconRSSIWLAN, High}$ in TS 36.304 [4]. Value 0 corresponds to -128dBm, 1 corresponds to -127dBm and so on.
thresholdBeaconRSSI-Low Indicates the Beacon RSSI threshold used by the UE for traffic steering to E-UTRAN. Parameter: $Thresh_{BeaconRSSIWLAN, Low}$ in TS 36.304 [4]. Value 0 corresponds to -128dBm, 1 corresponds to -127dBm and so on.
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.
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.

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)
}

-- 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. TDD: Value 1, 2, 3, 4, and 5 correspond with subframe #3, #4, #7, #8, and #9 respectively.

-- MBMSServiceList

The IE *MBMSServiceList* provides the list of MBMS services which the UE is receiving or interested to receive.

MBMSServiceList information element

```
-- ASN1START

MBMSServiceList-r13 ::=         SEQUENCE (SIZE (0..maxMBMSServiceListPerUE-r13)) OF MBMSServiceInfo-
r13

MBMSServiceInfo-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

MBSFN-AreaId-r12 ::=                    INTEGER (0..255)

-- ASN1STOP
```


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-- 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}
    },
    ...
}

-- ASN1STOP
```

***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
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.
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, Section 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 Modulation and Coding Scheme (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.

-- MBSFN-SubframeConfig

The IE *MBSFN-SubframeConfig* defines subframes that are reserved for MBSFN in downlink.

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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))
    }
}
-- ASN1STOP
```

***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.
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.
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 {
    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),
        higherOrder-r12                     INTEGER (0..27)
    },
    mch-SchedulingPeriod-r12        ENUMERATED {
                                        rf4, rf8, rf16, rf32, rf64, rf128, rf256, rf512, rf1024},
    ...
}

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 Modulation and Coding Scheme (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*.
plmn-Index
Index of the entry in field *plmn-IdentityList* 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 n^{th} 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 n^{th} listed (P)MCH. Value 0 corresponds with the first subframe defined by field *commonSF-Alloc*.

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                              C-RNTI,
    sc-mtch-schedulingInfo-r13              SC-MTCH-SchedulingInfo-r13          OPTIONAL,
    sc-mtch-neighbourCell-r13               BIT STRING (SIZE(maxNeighCellSCPTM-r13))    OPTIONAL,
    ...
}

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)
    },
    ...
}

-- ASN1STOP
```

SC-MTCH-InfoList field descriptions
mbmsSessionInfo Indicates the ongoing MBMS session in a SC-MTCH.
g-RNTI G-RNTI used to scramble the scheduling and transmission of a SC-MTCH.
sc-mtch-schedulingInfo DRX information for the SC-MTCH. If this field absent, the SC-MTCH may be scheduled in any subframe.
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.
drx-InactivityTimerSCPTM Timer for SC-MTCH in TS 36.321 [6]. Value in number of PDCCH sub-frames. Value psf0 corresponds to timer not configured, psf1 corresponds to 1 PDCCH sub-frame, psf2 corresponds to 2 PDCCH sub-frames and so on.
schedulingPeriodStartOffsetSCPTM *SC-MTCH-SchedulingCycle* and *SC-MTCH-SchedulingOffset* in TS 36.321 [6]. The value of SC-MTCH-SchedulingCycle is in number of sub-frames. Value sf10 corresponds to 10 sub-frames, sf20 corresponds to 20 sub-frames and so on.
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, this service is not available on SC-MTCH in any neighbour cell.

– *SCPTMNeighbourCellList*

The IE *SCPTMNeighbourCellList* indicates a list of neighbour cells where ongoing MBMS sessions provided via SC-MRB in the current cells are also provided.

```
-- ASN1START

SCPTMNeighbourCellList-r13 ::=      SEQUENCE (SIZE (1..maxNeighCellSCPTM-r13)) OF CellIdentity

-- ASN1STOP
```

6.3.8 Sidelink information elements

– *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
                }
```


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```
            }
        }
    }                                                                   OPTIONAL,   -- Need ON
    ...,
    [[ scheduled-r13x0                  CHOICE {
        release                             NULL,
        setup                               SEQUENCE {
            logicalChGroupInfoList-r13          LogicalChGroupInfoList-r13,
            multipleTxAllowed-r13               BOOLEAN
        }
    }                                                                   OPTIONAL,   -- Need ON
    ue-Selected-r13x0                   SEQUENCE {
        commTxPoolNormalDedicatedExt-r13    SEQUENCE {
            poolToReleaseLstExt-r13             SL-TxPoolToReleaseLstExt-r13 OPTIONAL, -- Need
ON
            poolToAddModLstExt-r13              SL-CommTxPoolToAddModLstExt-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-CommTxPoolToAddModLst-r12 ::=        SEQUENCE (SIZE (1..maxSL-TxPool-r12)) OF SL-
CommTxPoolToAddMod-r12

SL-CommTxPoolToAddModLstExt-r13 ::=     SEQUENCE (SIZE (1..maxSL-CommTxPool-v13x0)) OF SL-
CommTxPoolToAddModExt-r13

SL-CommTxPoolToAddMod-r12 ::=       SEQUENCE    {
    poolIdentity-r12                    SL-TxPoolIdentity-r12,
    pool-r12                            SL-CommResourcePool-r12
}

SL-CommTxPoolToAddModExt-r13 ::=        SEQUENCE    {
    poolIdentity-v13x0                  SL-CommTxPoolIdentity-v13x0,
    pool-r13                            SL-CommResourcePool-r13
}

MAC-MainConfigSL-r12 ::=        SEQUENCE    {
    periodic-BSR-TimerSL                PeriodicBSR-Timer-r12       OPTIONAL,   -- Need ON
    retx-BSR-TimerSL                    RetxBSR-Timer-r12
}

  ASN1STOP
```

SL-CommConfig field descriptions
commTxAllowRelayDedicated Indicates for whether the UE is not allowed to transmit relay related data using the configured dedicated transmission resources i.e. neither via scheduled nor 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].
mcs Indicates the Modulation and Coding Scheme as defined in TS 36.212 [23, 14.2.1]. If not configured, the selection of Modulation and Coding Scheme is up to UE implementation.
multipleTxAllowed Indicates whether or not multiple transmissions in one SC period is allowed.
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* specifies the configuration information for an individual pool of resources for sidelink communication. 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-CommTxPool-v13x0)) OF SL-CommResourcePool-
r13

SL-CommRxPoolList-r12 ::=          SEQUENCE (SIZE (1..maxSL-RxPool-r12)) OF SL-CommResourcePool-r12

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
    ]]

}

SL-TRPT-Subset-r12 ::=             BIT STRING (SIZE (3..5))

-- ASN1STOP
```

SL-CommResourcePool field descriptions
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, sf60 corresponds to 60 subframes and so on. E-UTRAN configures values sf40, sf60, 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.
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*.
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.
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.

Conditional presence	Explanation
Tx	The field is mandatory present when included in *commTxPoolNormalDedicated*, *commTxPoolNormalCommon* or *commTxPoolExceptional*. Otherwise the field is not present.

– 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-v1250              CHOICE {
            release                             NULL,
            setup                               SEQUENCE {
                discTF-IndexList-r12                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
ON
                discTxRefCarrierDedicated-r13       SL-DiscTxRefCarrierDedicated-r13    OPTIONAL,
Need ON
                discTxInfoInterFreqListExt-r13          SL-DiscTxInfoInterFreqListExt-r13   OPTIONAL
    -- Need ON
            }
        }                                                               OPTIONAL,    -- Need ON
        gapRequestsAllowedDedicated-r13     ENUMERATED {false, true}    OPTIONAL,    -- Need ON
        discPSGapConfig-r13                 CHOICE {
            release                             NULL,
            setup                               SL-GapConfig-r13
        }                                                               OPTIONAL,    -- Need ON
        discTxGapConfig-r13                 CHOICE {
```

```
        release                         NULL,
        setup                           SL-GapConfig-r12
    }                                                   OPTIONAL,   -- Need ON
    discSysInfoReportConfig-r13         CHOICE {
        release                         NULL,
        setup                           SL-DiscSysInfoReportFreqList-r13
    }                                                   OPTIONAL    -- Need ON
  ]]
}

SL-DiscSysInfoReportFreqList-r13 ::= SEQUENCE (SIZE (1..maxFreq)) OF ARFCN-ValueEUTRA-r9

SL-DiscTxInfoInterFreqListExt-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 ON
    discTxResourcesPS-r13                   SL-DiscTxResource-r13   OPTIONAL,   -- Need ON
    discTxRefCarrierDedicated-r13           SL-DiscTxRefCarrierDedicated-r13    OPTIONAL,       Need
ON
    cellSelectionInfo-r13                   CellSelectionInfoNFreq-r13          OPTIONAL    -- Need
ON
}

SL-DiscTxResource-r12 ::=               CHOICE {
    release                             NULL,
    setup                               CHOICE {
        scheduled-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
        },
        ue-Selected-r13                 SEQUENCE {
            discTxPoolDedicated-r13         SEQUENCE {
                poolToReleaseList-r13           SL-TxPoolToReleaseList-r12 OPTIONAL,    -- Need ON
                poolToAddModList-r13            SL-DiscTxPoolToAddModList-r12 OPTIONAL  -- Need ON
            }                                                   OPTIONAL    -- Need ON
        }
    }
}

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
}

SL-DiscTxConfigScheduled-r13 ::=            SEQUENCE {
    discTxConfig-r13                    SL-DiscResourcePool-r12 OPTIONAL,  -- Need ON
    discTF-IndexList-r13                SL-TF-IndexPairList-r12     OPTIONAL, -- Need ON
    discHoppingConfig-r13               SL-HoppingConfigDisc-r12
}

SL-DiscTxPoolDedicated-r13 ::=          SEQUENCE {
    poolToReleaseList-r12           SL-TxPoolToReleaseList-r12 OPTIONAL,        Need ON
    poolToAddModList-r12            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
```


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```
    discPRB-Index-r12b                  INTEGER (0..49)         OPTIONAL    -- Need ON
}

SL-DiscTxRefCarrierDedicated-r13 ::=    CHOICE {
    pCell                               NULL,
    sCell                               SCellIndex-r10
}

  ASN1STOP
```

SL-DiscConfig field descriptions
discTxRefCarrierDedicated Indicates if the PCell or an SCell is to be used as reference DL measurements and synchronization, instead of the frequency used to transmit sidelink discovery announcements on, see TS 36.213 [23, 14.3.1].
discTxInterFreqInfo Indicates frequency applicable for the resources indicated by *discTxResources*, and possibly resource allocations on additional frequencies by field *discTxInfoInterFreqListExt*.
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).
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.
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).
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].
discSysInfoReportConfig Indicates the request to start a SidelinkUEInformation procedure for reporting system information acquired during an inter-frequency discovery procedure. When receiving a discSysInfoReportConfig setup, the UE shall start timer T370 with the timer value set to [60] seconds. When receiving a discSysInfoReportConfig release, the UE shall stop timer T370.

Conditional presence	Explanation
DiscTxSetup	The field is mandatory present if discTxResources are being established (either normal or for relay discovery); otherwise it is not present.

– *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-v13a0, spare1},
    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,
```


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```
            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-v13x0                 CHOICE {
        release                         NULL,
        setup                           ENUMERATED {rf4, rf7, rf8, rf14, rf28,
                                            spare3, spare2, spare}
    }                                                   OPTIONAL,   -- Need ON
-- Note: Extended values apply for PS discovery (not only for relay). E-UTRAN sets original
-- field to spare value to ensure legacy UEs ignore the concerned entry
    rxParamsAddNeighFreq-r13        SEQUENCE {
        physCellId-r13                  PhysCellId
    }                                                   OPTIONAL,   -- Need ON
    txParamsAddNeighFreq-r13        SEQUENCE {
        physCellId-r13                  PhysCellId,
        p-Max                           P-Max               OPTIONAL,   -- Need OP
        tdd-Config-r13                  TDD-Config          OPTIONAL,   -- Need OR
        tdd-Config-v1310                TDD-Config-v1310    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 ON
    }
]]
}

SL-PoolSelectionConfig-r13 ::=      SEQUENCE {
    threshLow-r12                   RSRP-RangeSL-r12,
    threshHigh-r12                  RSRP-RangeSL-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.
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 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-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 assigned by E-UTRAN to enable the UE to receive or transmit sidelink discovery, intra or inter frequency.

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

SL-GapPattern-r13 ::=               SEQUENCE {
    gapPeriod-r13                       ENUMERATED {rf4, rf7, rf8, rf14, rf16, rf28, rf32,
                                                rf64, rf128, rf256, rf512, rf1024, spare},
    gapOffset-r12                       SL-OffsetIndicator-r12,
    gapSubframeBitmap-r13               BIT STRING (SIZE (1..132840))
}

-- ASN1STOP
```

SL-GapConfig field descriptions
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 delays. The UE and E-UTRAN signal bit strings of valid sizes only i.e. sizes up to (10* *gapPeriod*).

-- SL-GapRequest

The IE *SL-GapRequest* indicates the gaps requested by the UE to receive or transmit sidelink discovery, intra or inter frequency.

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
```

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 TS36.213 [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_{RB}^{HO}, see TS 36.211 [21, 9.3.6].

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– *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)
}

SL-OffsetIndicatorSync-r12 ::=          INTEGER (0..39)

-- 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 Synchronisation resources are present in those SFN and subframes which satisfy the relation: (SFN*10+ *Subframe Number*) mod 40 = *SL-OffsetIndicatorSync*.

– *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, spare1}

-- ASN1STOP
```

– *SL-Priority*

The IE *SL-Priority* indicates the priority of resource pool used for sidelink communication, see TS 36.211 [21].

SL-Priority information element

```
-- ASN1START

SL-PriorityList-r13 ::=     SEQUENCE (SIZE (1..maxSL-Prio-r13)) OF SL-Priority-r13

SL-Priority-r13 ::=         INTEGER (1..8)

-- ASN1STOP
```

– *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-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-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                      PSRP-RangeSL-r12,
        syncInfoReserved-r12                    BIT STRING (SIZE (13))  OPTIONAL    -- Need OR
    }                                                                   OPTIONAL,   -- Need OR
    rxParameNCell-r12                       SEQUENCE {
        physCellId-r12                          PhysCellId,
        discSyncWindow-r12              ENUMERATED {w1, w2}
    }                                                                   OPTIONAL,   -- Need OR
    ...,
    [[  syncTxPeriodic-r13                  ENUMERATED {true}           OPTIONAL    -- Need OR
    ]]
}

SL-SyncConfigListNFreq-r12 ::=      SEQUENCE (SIZE (1..maxSL-SyncConfig-r12)) 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                  PSRP-RangeSL-r12,
        syncInfoReserved-r13                BIT STRING (SIZE (14))  OPTIONAL,   -- Need OR
        syncTxPeriodic-r13                  ENUMERATED {true}       OPTIONAL    -- Need OR
    }                                                               OPTIONAL,   -- Need OR
    rxParameters-r13                    SEQUENCE {
        discSyncWindow-r13                  ENUMERATED {w1, w2}
    }                                                               OPTIONAL,   -- Need OR
    ...
}
-- ASN1STOP
```

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.
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.
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, 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*.

– SL-SysInfoReport

The IE *SL-SysInfoReport* contains the parameters related to Sidelink operations from system information of inter-frequency cells

***SL-SysInfoReport* information element**

```
-- ASN1START

SL-SysInfoReport-r13 ::=            SEQUENCE {
    plmn-IdentityList-r13               PLMN-IdentityList           OPTIONAL,
    cellIdentity-r13                    CellIdentity                OPTIONAL,
    carrierFreqInfo-r13                 ARFCN-ValueEUTRA-r9         OPTIONAL,
    discRxResources-r13                 SL-DiscRxPoolList-r13       OPTIONAL,
    discTxPoolCommon-r13                SL-DiscTxPoolList-r13       OPTIONAL,
    discTxPowerInfo-r13                 SL-DiscTxPowerInfoList-r13  OPTIONAL,
    discSyncConfig-r13                  SEQUENCE {
        asyncParameters-r13                 SEQUENCE {
            syncCP-Len-r13                      SL-CP-Len-r13,
            syncOffsetIndicator-r13             SL-OffsetIndicatorSync-r12,
            slssid-r13                          SLSSID-r12
        }                                                               OPTIONAL,
        txParameters-r13                    SEQUENCE {
            syncTxParameters-r13                SL-TxParameters-r12,
            syncTxThreshIC-r13                  RSRP-RangeSL-r12,
            syncInfoReserved-r13                BIT STRING (SIZE (19))  OPTIONAL,
            syncTxPeriodic-r13                  ENUMERATED {true}       OPTIONAL
        }                                                               OPTIONAL
    }                                                                   OPTIONAL,
    cellSelectionInfo-r13               SEQUENCE {
        q-RxLevMin-r13                      Q-RxLevMin,
        q-RxLevMinOffset-r13                INTEGER (1..8)              OPTIONAL
    }   OPTIONAL,
    q-Hyst-r13                          ENUMERATED {
                                            dB0, dB1, dB2, dB3, dB4, dB5, dB6, dB8, dB10,
                                            dB12, dB14, dB16, dB18, dB20, dB22, dB24}
                                                                        OPTIONAL,

    q-RxLevMin-r13                      Q-RxLevMin  OPTIONAL,
    t-ReselectionEUTRA-r13              T-Reselection   OPTIONAL,
    t312-Config-r13                     T312-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-r12                       P-Max   OPTIONAL,
    referenceSignalPower-r13        INTEGER (-60..50)   OPTIONAL
}

-- ASN1STOP
```

SL-SysInfoReport field descriptions
plmn-IdentityList
Indicates the list of PLMN identity 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
SL-CarrierFreqInfo
Indicates the frequency of the cell from which the UE acquired the system information relevant for discovery

– *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))
}

-- 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 TS36.213 [23, 14.1.3, 14.2.3, 14.3.3].
subframeBitmap
Indicates the subframe bitmap indicating resources used for sidelink. 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.

– *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): $\alpha_{PSSCH,1}$, $\alpha_{PSSCH,2}$, $\alpha_{PSCCH,1}$, $\alpha_{PSCCH,2}$, $\alpha_{PSDCH,1}$, α_{PSSS} See TS 36.213 [23, 14.1.1.5, 14.2.1.2, 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: $P_{O\_PSSCH,1}$, $P_{O\_PSSCH,2}$, $P_{O\_PSCCH,1}$, $P_{O\_PSCCH,2}$, $P_{O\_PSDCH,1}$, P_{O_PSSS} see TS 36.213 [23, 14.1.1.5, 14.2.1.2, 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-CommTxPoolIdentity-v13x0 ::=     INTEGER (maxSL-CommTxPool-r12Plus1-r13.. maxSL-CommTxPool-r13)

SL-CommTxPoolIdentity-r13 ::=       INTEGER (1.. maxSL-CommTxPool-r13)

-- 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

SL-TxPoolToReleaseListExt-r13 ::=   SEQUENCE (SIZE (1..maxSL-CommTxPool-v13x0)) OF SL-
CommTxPoolIdentity-v13x0

-- ASN1STOP
```

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)
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 SUTRA UE caps
maxBandwidthClass-r10           INTEGER ::= 16   -- Maximum number of supported CA BW classes per band
maxBandwidthComboSet-r10        INTEGER ::= 32   -- Maximum number of bandwidth combination sets per
                                                    supported band combination
maxCDMA-BandClass               INTEGER ::= 32   -- Maximum value of the CDMA band classes
```


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```
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)
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)
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
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-r13          INTEGER ::= 5    -- Maximum number of subframes in a discovery signals
                                             -- occasion
maxDS-2TP-CSI-RS-r12        INTEGER ::= 5    -- Maximum number of zero transmission power CSI-RS for
                                             -- a serving cell concerning discovery signals
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 frequency 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 ::= 9    -- Maximum number of carrier frequencies for which an
                                             -- MBMS capable UE may indicate an interest
maxSERAN-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 ::= 600  -- 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
maxMBMSServiceListPerUE-r13     INTEGER ::= 16  -- 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)
maxNeighCellSCPTM-r13       INTEGER ::= 8    -- Maximum number of SCPTM neighbour cells
maxObjectId                 INTEGER ::= 32
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
maxPNOffset                     INTEGER ::= 511  -- Maximum number of CDMA2000 PNOffsets
maxPMLH-PerMESH                 INTEGER ::= 16
maxQCI-r13                      INTEGER ::= 6    -- Maximum number of QCIs
maxRAT-Capabilities             INTEGER ::= 8    -- Maximum number of interworking RATs (incl EUTRA)
maxRE-MacQCL-r11                INTEGER ::= 4    -- Maximum number of PDSCH RE Mapping configurations
                                                    (per carrier frequency)
maxReportConfigId               INTEGER ::= 32
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
maxSCell-Plus1                  INTEGER ::= 5    -- Lowest value of extended number range of SCells
maxSC-MTCH-r13                  INTEGER ::= 1024     -- Maximum number of SC-MTCHs in one cell
maxSL-CommRxPoolNeReq-r13       INTEGER ::= 32   -- Maximum number of individual sidelink communication
                                                    Rx resource pools on neighbouring freq
maxSL-CommRxPoolPreconf-v13x0       INTEGER ::= 12   -- Maximum number of additional preconfigured
                                                        sidelink communication Rx resource pool entries
maxSL-CommTxPool-r12Plus1-r13   INTEGER ::= 8    -- First additional individual sidelink
                                                 communication Tx resource pool
maxSL-CommTxPool-v13x0              INTEGER ::= 4    -- Maximum number of additional sidelink
                                                     -- communication Tx resource pool entries
maxSL-CommTxPool-r13                INTEGER ::= 8    -- Maximum number of individual sidelink
                                                     -- communication Tx resource pools
maxSL-CommTxPoolPreconf-v13x0   INTEGER ::= 7    -- Maximum number of additional preconfigured
                                                 -- sidelink communication Tx resource pool entries
maxSL-Dest-r12          INTEGER ::= 16   -- Maximum number of sidelink destinations
maxSL-DiscPowerClass-r12    INTEGER ::= 3    -- Maximum number of sidelink power classes
maxSL-DiscRxPoolPreconf-r13     INTEGER ::= 4        -- Maximum number of preconfigured sidelink
                                                     -- discovery Rx resource pool entries
maxSL-DiscSysInfoReportFreq-r13 INTEGER ::= 8        -- Maximum number of frequencies to include in a
                                                     -- UESidelinkInformation for SI reporting
maxSL-DiscTxPoolPreconf-r13     INTEGER ::= 1        -- 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-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-r13            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
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
maxServCell-Plus1               INTEGER ::= 6    -- Lowest 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
maxSubframePatternTDD-r11       INTEGER ::= 8    -- Maximum number of subframe reservation patterns
                                                 -- that the UE can simultaneously recommend to the
                                                 -- E-UTRAN for use.
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

-- ASN1STOP
```

NOTE: The value of maxDRB aligns with SA2.

-- 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-Config-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
```

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 {
```


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```
    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.

-- End of *PC5-RRC-Definitions*

```
-- ASN1START

END

-- ASN1STOP
```

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.

-- *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,
    MeasGap-Config-r13,
    MeasId,
    MeasId-v1250,
    MeasIdToAddModList,
    MeasIdToAddModListExt-r12,
    MeasObjectToAddModList,
```

```
    MeasObjectToAddModList-v9e0,
    MeasScaleFactor-r12,
    MobilityStateParameters,
    NeighCellConfig,
    PhysCellId,
    PhysCellIdCDMA2000,
    PhysCellIdEUTRA,
    PhysCellIdUTRA-FDD,
    PhysCellIdUTRA-TDD,
    PLMN-Identity,
    PLMN-IdentityList3-r11,
    QuantityConfig,
    ReportConfigToAddModList,
    RLF-Report-r9,
    TargetMBSFN-AreaList-r12,
    TraceReference-r10,
    VisitedCellInfoList-r12,
    maxCellMeas,
    maxCSI-RS-Meas-r12,
    maxMeasId,
    maxMeasId-r12,
    UL-DelayConfig-r13
FROM EUTRA-RRC-Definitions;

-- ASN1STOP
```

– *VarConnEstFailReport*

The UE variable *VarConnEstFailReport* includes the connection establishment failure information.

VarConnEstFailReport UE variable

```
-- ASN1START

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
```

– 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,
    -- Measurement objects
    measObjectList                  MeasObjectToAddModList              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,
    numberOfReportsSent                 INTEGER
}

CellsTriggeredList ::=              SEQUENCE (SIZE (1..maxCellMeas)) OF CHOICE {
    physCellIdEUTRA                         PhysCellId,
    physCellIdUTRA                          CHOICE {
        fdd                                     PhysCellIdUTRA-FDD,
        tdd                                     PhysCellIdUTRA-TDD
    },
    physCellIdGERAN                         SEQUENCE {
        carrierFreq                             CarrierFreqGERAN,
        physCellId                              PhysCellIdGERAN
    },
    physCellIdCDMA2000                      PhysCellIdCDMA2000
}

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
```


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```
}
-- 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.

-- 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
```

7.2 Counters

Counter	Reset	Incremented	When reaching max value

7.3 Timers (Informative)

Timer	Start	Stop	At expiry
T300	Transmission of *RRCConnectionRequest*	Reception of *RRCConnectionSetup* or *RRCConnectionReject* message, cell re-selection and upon abortion of connection establishment by upper layers	Perform the actions as specified in 5.3.3.6
T301	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 *MobilityControlInfo* 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	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
T311	Upon initiating the RRC connection re-establishment procedure	Selection of a suitable E-UTRA cell or a cell using another RAT.	Enter RRC_IDLE

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Timer	Start	Stop	At expiry
T312	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	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*
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	Upon transmitting *UEAssistanceInformation* message with *powerPrefIndication* set to *normal*	Upon initiating the connection re-establishment procedure	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.
T370	Upon receiving *SL-DiscConfig* including a *discSysInfoReportConfig*.	Upon initiating the SidelinkUEInformation to send *SysInfoReport*, upon receiving *SL-DiscConfig* that includes removal of *discSysInfoReportConfig*.	Stop performing the related System Information acquisition.

7.4 Constants

Constant	Usage
N310	Maximum number of consecutive "out-of-sync" indications for the PCell received from lower layers
N311	Maximum number of consecutive "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 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, 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

- 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

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- 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 and BCCH.

Padding bits shall be set to 0 and the number of padding bits is a multiple of 8.

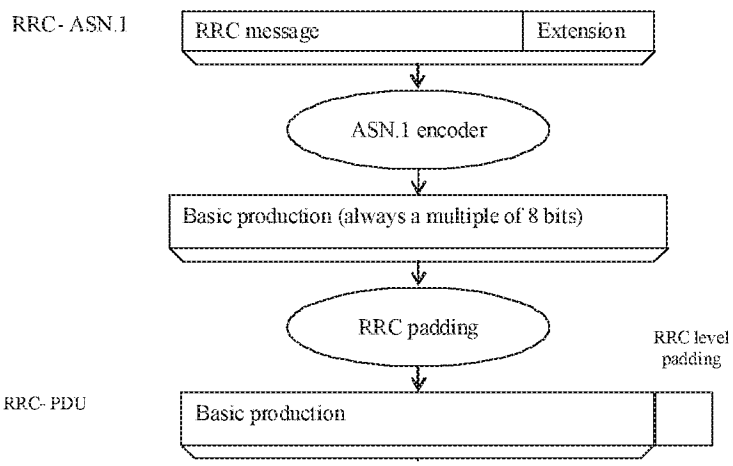


Figure 8.5-1: RRC level padding

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

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		

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Name	Value	Semantics description	Ver
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	
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		
MAC configuration			
maxHARQ-Tx	4		

9.1.1.7 SC-MCCH and SC-MTCH configuration

Parameters

Name	Value	Semantics description	Ver
PDCP configuration	N/A		
RLC configuration	UM		
Sn-FieldLength	size5		
t-Reordering	0		

9.1.2 SRB configurations

9.1.2.1 SRB1

Parameters

Name	Value	Semantics description	Ver
RLC configuration			
logicalChannelIdentity	1		

9.1.2.2 SRB2

Parameters

Name	Value	Semantics description	Ver
RLC configuration			
logicalChannelIdentity	2		

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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 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	Semantics description	Ver
RLC configuration CHOICE	am		
ul-RLC-Config *>t-PollRetransmit* *>pollPDU* *>pollByte* *>maxRetxThreshold*	 ms45 infinity infinity t4		
dl-RLC-Config *>t-Reordering* *>t-StatusProhibit*	 ms35 ms0		
Logical channel configuration			
priority	1	Highest priority	
prioritisedBitRate	infinity		
bucketSizeDuration	N/A		
logicalChannelGroup	0		

9.2.1.2 SRB2

Parameters

Name	Value	Semantics description	Ver
RLC configuration CHOICE	am		
ul-RLC-Config *>t-PollRetransmit* *>pollPDU* *>pollByte* *>maxRetxThreshold*	 ms45 infinity infinity t4		
dl-RLC-Config *>t-Reordering* *>t-StatusProhibit*	 ms35 ms0		
Logical channel configuration			
priority	3		
prioritisedBitRate	infinity		
bucketSizeDuration	N/A		
logicalChannelGroup	0		

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9.2.2 Default MAC main configuration

Parameters

Name	Value	Semantics description	Ver
MAC main configuration			
maxHARQ-tx	n5		
periodicBSR-Timer	infinity		
retxBSR-Timer	sf2560		
ttiBundling	FALSE		
drx-Config	release		
phr-Config	release		

9.2.3 Default semi-persistent scheduling configuration

SPS-Config >*sps-ConfigDL* >*sps-ConfigUL*	 release release		

9.2.4 Default physical channel configuration

Parameters

Name	Value	Semantics description	Ver
PDSCH-ConfigDedicated >*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		

9.2.5 Default values timers and constants

Parameters

Name	Value	Semantics description	Ver

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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	

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

IMPORTS
    AdditionalSpectrumEmission,
    ARFCN-ValueEUTRA-r9,
    FilterCoefficient,
    maxSL-TxPool-r12,
    maxSL-CommRxPoolPreconf-v13x0,
    maxSL-CommTxPoolPreconf-v13x0,
    maxSL-DiscRxPoolPreconf-r13,
    maxSL-DiscTxPoolPreconf-r13,
    P-Max,
    ReselectionInfoRelay-r13,
    SL-CP-Len-r12,
    SL-HoppingConfigComm-r12,
    SL-OffsetIndicator-r12,
    SL-PeriodComm-r12,
    PSBCH-RangeSL3-r13,
    SL-PriorityList-r13,
    SL-TF-ResourceConfig-r12,
    SL-TRP-Subset-r12,
    T0-SL-r12,
    TDD-ConfigSL-r12
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-v13x0             SEQUENCE {
            commRxPoolListExt-r13           SL-PreconfigCommRxPoolListExt-r13,
            commTxPoolListExt-r13           SL-PreconfigCommTxPoolListExt-r13       OPTIONAL
        }                                                                           OPTIONAL,
        preconfigDisc-r13               SEQUENCE {
            discRxPoolList-r13              SL-PreconfigDiscRxPoolList-r13,
            discTxPoolList-r13              SL-PreconfigDiscTxPoolList-r13      OPTIONAL
        }                                                                       OPTIONAL,
        preconfigRelay-r13              SL-PreconfigRelay-r13               OPTIONAL
    ]]
}

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-r8,
    maxTxPower-r12                      P-Max,
    additionalSpectrumEmissionCA-r12    AdditionalSpectrumEmission,
    sl-Bandwidth-r12                    ENUMERATED {n6, n15, n25, n50, n75, n100},
    tdd-ConfigSL-r12                    TDD-ConfigSL-r12,
    reserved-r12                        BIT STRING (SIZE (19)),
    ...
}

SL-PreconfigSync-r12 ::=    SEQUENCE {
    syncCP-Len-r12                      SL-CP-Len-r12,
    syncOffsetIndicator1-r12            SL-OffsetIndicatorSync-r12,
    syncOffsetIndicator2-r12            SL-OffsetIndicatorSync-r12,
    syncTxParameters-r12                SL-SL-r12,
    syncTxThreshOoC-r12                 RSRP-RangeSLD-r13,
    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    -- Need OR
    ]]
}

SL-PreconfigCommPoolList4-r12 ::=   SEQUENCE (SIZE (1..maxSL-TxPool-r12)) OF SL-PreconfigCommPool-
r12

SL-PreconfigCommRxPoolListExt-r13 ::=   SEQUENCE (SIZE (1..maxSL-CommRxPoolPreconf-v13x0)) OF SL-
PreconfigCommPool-r12

SL-PreconfigCommTxPoolListExt-r13 ::=   SEQUENCE (SIZE (1..maxSL-CommTxPoolPreconf-v13x0)) 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,
```

```
    dataTF-ResourceConfig-r12           SL-TF-ResourceConfig-r12,
    dataHoppingConfig-r12               SL-HoppingConfigComm-r12,
    dataTxParameters-r12                PC-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 txParameters absent
    cp-Len-r13                          SL-CP-Len-r12,
    discPeriod-r13                  ENUMERATED {rf4, rf7, rf8, rf14, rf16, rf28, rf32, rf64,
                                            rf128, rf256, rf512, rf1024, spare4, spare3,
                                            spare2, spare1},
    numRetx-r13                     INTEGER (0..3),
    numRepetition-r13                   INTEGER (1..50),
    tf-ResourceConfig-r13               SL-TF-ResourceConfig-r12,
    txParameters-r13                    SEQUENCE {
        txParameters-Control-r13        PC-SL-r12,
        txProbability-r13               ENUMERATED {p25, p50, p75, p100}
                                                                    OPTIONAL,
    }
    ...
}

SL-PreconfigRelay-r13 ::=   SEQUENCE {
    reselectionInfoRemoteUE-OoC-r13         ReselectionInfoRelay-r13
}

END

-- ASN1STOP
```

SL-Preconfiguration field descriptions
carrierFreq Indicates the carrier frequency for sidelink operation. 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].
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.

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-v1010,
    ARFCN-ValueEUTRA,
    ARFCN-ValueEUTRA-v9e0,
    ARFCN-ValueEUTRA-r9,
    CellIdentity,
    C-RNTI,
    DL-CCCH-Message,
    DRB-Identity,
    DRB-ToReleaseList,
    FreqBandIndicator-r11,
    InDeviceCoexIndication-r11,
    MasterInformationBlock,
    maxBands,
    maxFreq,
    maxOPR,
    maxSCell-r10,
    maxSCell-r13,
    maxSCell-Plus1,
    maxServCell-r10,
    maxServCell-Plus1,
    maxServCell-r13,
    MBMSInterestIndication-r11,
    MeasConfig,
    MeasGapConfig,
    OtherConfig-r9,
    PhysCellId,
    P-Max,
    PowerCoordinationInfo-r12,
    SidelinkUEInformation-r12,
    SL-CommConfig-r12,
    SL-DiscConfig-r12,
    RadioResourceConfigDedicated,
    RSRP-Range,
    RSRQ-Range,
    RSRQ-Range-v1250,
    RS-SINR-Range-r13,
```


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```
    SCellToAddModList-r10,
    SCellToAddModListExt-r13,
    SCG-ConfigPartSCG-r12,
    SecurityAlgorithmConfig,
    SCellIndex-r10,
    SCellIndex-r13,
    SCellToReleaseList-r10,
    SCellToReleaseListExt-r13,
    ServCellIndex-r10,
    ServCellIndexExt-r13,
    ShortMAC-I,
    MeasResultSSTD-r13,
    SystemInformationBlockType1,
    SystemInformationBlockType1-v890-IEs,
    SystemInformationBlockType2,
    UEAssistanceInformation-r11,
    UECapabilityInformation,
    UE-CapabilityRAT-ContainerList,
    UE-RadioPagingInfo-r12,
    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.

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.

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-- *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 {
                                        rel8, rel9, rel10, rel11, rel12, v1020, v1130,
                                        v1250, spare1, ...}             OPTIONAL,   -- Cond HO2
    nonCriticalExtension                HandoverPreparationInformation-v9d0-IEs     OPTIONAL
}

HandoverPreparationInformation-v9d0-IEs ::= SEQUENCE {
    lateNonCriticalExtension            OCTET STRING (CONTAINING HandoverPreparationInformation-
v9jC-IEs)    OPTIONAL,
    nonCriticalExtension                HandoverPreparationInformation-v9e0-IEs         OPTIONAL
}

-- Late non-critical extensions:
HandoverPreparationInformation-v9jC-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 {
    ue-SupportedEARFCN-r12              ARFCN-ValueEUTRA-r9             OPTIONAL,   -- Cond HO2
    as-Config-v1250                 AS-Config-v1250             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.
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 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 capabilities	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

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                                  CHOICE1
            scg-Config-r12                      SCG-Config-r12-IEs,
            spare7 NULL,
            spare6 NULL, spare5 NULL, spare4 NULL,
            spare3 NULL, spare2 NULL, spare1 NULL
        },
```


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```
        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 {}
    }
}

SCG-ConfigInfo-r12-IEs ::=          SEQUENCE {
    radioResourceConfigDedicatedMCG-r12 RadioResourceConfigDedicated         OPTIONAL,
    sCellToAddModListMCG-r12            SCellToAddModList-r10                OPTIONAL,
    measGapConfig-r12                   MeasGapConfig                        OPTIONAL,
    powerCoordinationInfo-r12           PowerCoordinationInfo-r12            OPTIONAL,
    scg-RadioConfig-r12                 SCG-ConfigPartSCG-r12                OPTIONAL,
    extra 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-v13x0-IEs             OPTIONAL
}

SCG-ConfigInfo-v13x0-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                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 (maxSCell-Plus1..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-v13xy       SEQUENCE {
            rs-sinrResult-r13               RS-SINR-Range-r13
        }                                                   OPTIONAL    -- Cond SCellAdd2
    ]]
}

MeasResultServCellListSCG-r12 ::=   SEQUENCE (SIZE (1..maxServCell-r10)) OF MeasResultServCellSCG-
r12

MeasResultServCellListSCG-Ext-r13 ::=   SEQUENCE (SIZE (maxServCell-Plus1..maxServCell-r13)) OF
MeasResultServCellSCG-r12

MeasResultServCellSCG-r12 ::=       SEQUENCE {
    servCellId-r13                  ServCellIndex-r10,
    measResultSCell-r12             SEQUENCE {
        rsrpResultSCell-r12             RSRP-Range,
        rsrqResultSCell-r12             RSRQ-Range
    },
    ...,
    [[      servCellId-r13                  ServCellIndexFull-r13       OPTIONAL,
        measResultSCell-v13xy           SEQUENCE {
            rs-sinrResultSCell-r13          RS-SINR-Range-r13
        }                                                   OPTIONAL
    ]]
}

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.
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.
measResultSSTD Includes measurement results of UE SSTD 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 Includes the current MCG SCell configuration.
sCellToAddModListSCG Includes SCG cells the SeNB is requested to establish. Measurement results may be provided for these cells.
sCellToReleaseListSCG Includes SCG cells the SeNB is requested to release.
scg-RadioConfig Includes the current dedicated SCG configuration.
scg-ConfigRestrictInfo Includes fields for which MeNB explicitly 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.

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.

– *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),
    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.

– *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-v13xy-IEs          OPTIONAL
}

UERadioPagingInformation-v13xy-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 radio paging information required for a category 0 UE. The eNB generates the *ue-RadioPagingInfo* and the contained *ue-Category-v1250* is absent when the UE is not a category 0 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 information can also be used after the handover is successfully performed or during the RRC connection re-establishment.

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***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
    ]],
    [[  sourceConfigRCS-r12                 RCS-Config-r12      OPTIONAL
    ]]
}

AS-Config-v9e0 ::=              SEQUENCE {
    sourceDl-CarrierFreq-v9e0       ARFCN-ValueEUTRA-v9e0
}

AS-Config-v10j0 ::=             SEQUENCE {
    antennaInfoDedicatedPCell-v10l0     AntennaInfoDedicated-v10l0          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
}

-- 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*.

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*.
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.
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* transmitted in the source PCell.
sourceSystemInformationBlockType2 *SystemInformationBlockType2* transmitted in the source PCell.

– *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
    ]]
}

-- 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.

***RRM-Config* information element**

```
-- ASN1START

RRM-Config ::=              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, min36, 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-sinrResult-v13xy             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

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 information elements 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.

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
#DRBs	The number of DRBs that a UE shall support	8
#RLC-AM	The number of RLC AM entities that a UE shall support	10
#minCellperMeasObject EUTRA	The minimum number of neighbour cells (excluding black list cells) that a UE shall be able to store within a MeasObjectEUTRA. NOTE.	32
#minBlackCellRangesperMeasObjectEUTRA	The minimum number of blacklist cell PCI ranges that a UE shall be able to store within a MeasObjectEUTRA	32
#minCellperMeasObject UTRA	The minimum number of neighbour cells that a UE shall be able to store within a MeasObjectUTRA. NOTE.	32
#minCellperMeasObject GERAN	The minimum number of neighbour cells that a UE shall be able to store within a measObjectGERAN. NOTE.	32
#minCellperMeasObject CDMA2000	The minimum number of neighbour cells that a UE shall be able to store within a measObjectCDMA2000. NOTE.	32
#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
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.		

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11.2 Processing delay requirements for RRC procedures

The UE performance requirements for RRC procedures are specified in the following table, 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.

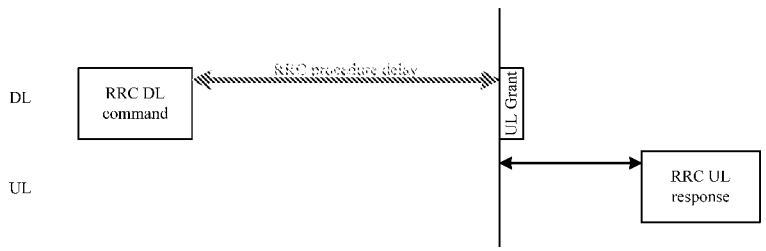


Figure 11.2-1: Illustration of RRC procedure delay

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*	*RRCConnectionSetupComplete*	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	

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.

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.

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

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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.

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
```