

Exhibit 1021

Overview of 3GPP Release 9 V0.1.1 (2010-09)

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Foreword

The coloured highlight of the Unique Identifier (UID) reflects the status of the work items e.g. **ongoing**, **completed**, etc. Stopped Features and Studies are listed at the end of the present document.

Legend:

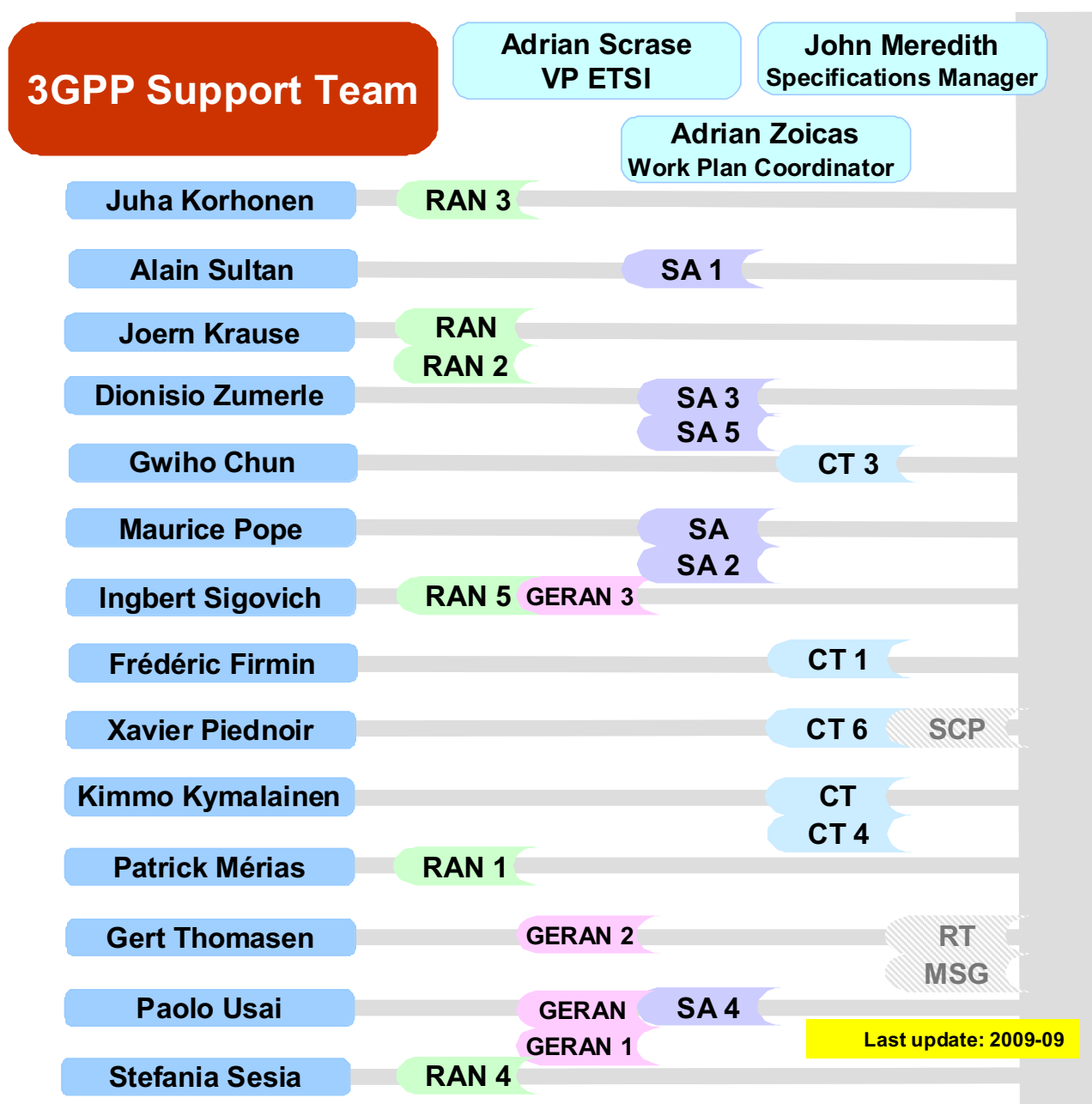
Completed WI

Ongoing WI

Moved WI to/from another Release

Stopped WI

The present document has been produced by the ETSI [MCC department](#) headed by Adrian Scrase. The overall document was coordinated by Adrian Zoicas (MCC Work Plan Coordinator), who wishes to thank all the contributors for their dedication and quality of inputs.



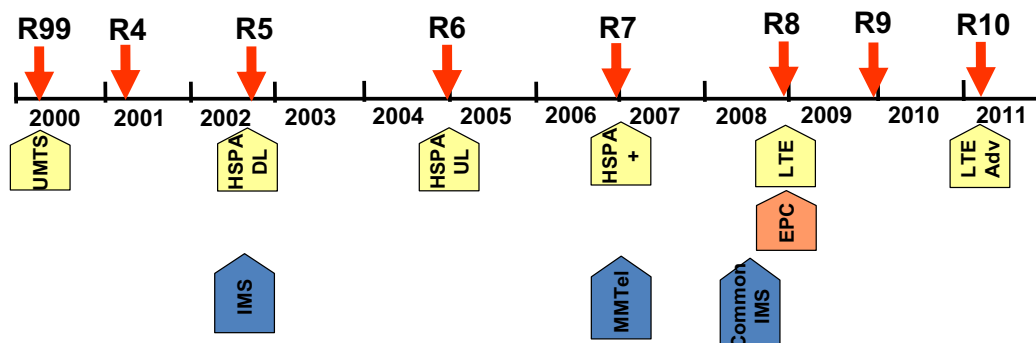
1 Scope

The present document contains a high-level description of the 3GPP Release 9 (Rel-9) Features.

Its latest version is available at: http://www.3gpp.org/ftp/Information/WORK_PLAN/Description_Releases/

3GPP Release Timeline

- 3GPP synchronizes specification development into releases
- Releases cover the areas of:
 - Accesses (GSM, EDGE, HSPA, LTE, LTE-Advanced, etc.)
 - Core Network (GSM Core, EPC)
 - Services (IMS, MMTel)



For each Feature (or independent item), references are given to guide the reader on how to deepen the subject: the Work Item Description (WID) as well as the list of impacted specifications is provided at the beginning of each clause describing the feature. The impact of a given feature on a particular specification is described in the Change Request (CR) list, which can be found at the end of the respective specification, or alternatively in the CR database, which contains the full list of CRs for all 3GPP specifications.

Chapter 2 of the present document contains global references, and provides links towards the 3GPP Specifications, the meeting contributions, the Work Plan, the Work Item Descriptions (WIDs) and the CR database.

2 References

- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

2.1 Specifications

Global information on the Specifications (also called "specs") can be found at:

<http://www.3gpp.org/specs/specs.htm>

The latest versions of all 3GPP specifications, containing the most recent corrections and additions, are available at:

<http://www.3gpp.org/ftp/Specs/latest/>

For specific purposes, older versions might be needed. These versions are available at:

<http://www.3gpp.org/ftp/Specs/Archive/>

where the specifications are sorted by series and then by folders containing all the available versions of a given spec (one folder per spec), for all Releases.

2.2 Tdocs

The Temporary Documents (tdocs) are mainly the original papers written by the 3GPP Members, and are the inputs for elaborating the specs. They are available (sorted by 3GPP technical groups (Technical Specification Groups (TSGs) and Working Groups (WGs)) at:

<http://www.3gpp.org/ftp/>

starting with 'tsg....'.

2.3 Work Plan, Work Items and Study Items

Work Item Description (WID) / Study Item Description (SID) is a form which initial version provides the target to be reached before starting the work. Potential subsequent versions precise the target and foreseen completion dates according the actual work progress. WIDs / SIDs are stored in:

http://www.3gpp.org/ftp/Information/WI_sheets/

The 3GPP Work Plan is a living document, periodically updated, containing the full list of Work Items and Study Items, as well as summary information for each WI, as: the WG in charge of it, its starting date and (foreseen or actual) completion date, the actual progress, etc. The 3GPP Work Plan is available at:

http://www.3gpp.org/ftp/Information/WORK_PLAN/

2.4 Change Request database

A specification is originally drafted and maintained by a rapporteur, who compiles the contents from discussions in the WGs and TSGs. When it is considered to be 80% complete, it is brought under a so-called "change control" process. After this, changes to the specification can only be made using Change Requests (CRs) that are usually agreed by consensus in the WG responsible for the specification, and then formally approved by the relevant TSG.

The CR database contains information on CRs including a Work Item code, a CR number that is unique for a certain specification (different CR versions are possible, but only one can ever be approved), the status of each CR, references to the source Individual 3GPP Member(s) and relevant WG/TSG temporary documents numbers and meetings.

This database is available in:

http://www.3gpp.org/ftp/Information/Databases/Change_Request/

Further information on CR is available at:

<http://www.3gpp.org/specs/CR.htm>

3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply.

EPC	
EPS	Evolved Packet System
E-UTRAN	
IMS	IP Multimedia Subsystem
LTE	
RAB	Radio Access Bearer
SAES	System Architecture Evolution Specification

4 Enhanced Home NodeB / eNodeB (EHNB)

UID_400035

Resources: S1,S2,S3,S5,C1,C6,R2,R3,R4,GP

This work is a continuation of the Rel-8 Feature Home NodeB / eNodeB (HomeNB) UID_380065.

Unique_ID	Name	Acronym	Resource
400035	Enhanced Home NodeB / eNodeB	EHNB	
400047	Stage 1 for EHNB	EHNB	S1
410026	Architecture aspects of EHNB	EHNB	S2
420035	Security aspects of Enhanced Home NodeB / eNodeB	EHNB-Sec	S3
450003	CT1 aspects - Support of Home NB and Home eNB enhancements	EHNB-CT1	C1
450004	CT6 aspects - Support of Home NB and Home eNB enhancements	EHNB-CT6	C6
420036	3G HNB Gateway and LTE HeNB Gateway OAM&P	HNB-OAM_GW	S5
430012	3G HNB and LTE HeNB OAM&P Type 1 Interface	HNB_eHNB-OAM_Type1	S5
440066	3G HNB and LTE HeNB OAM&P Type 2 Interface	HNB_eHNB-OAM_Type2	S5
420008	LTE FDD Home eNodeB RF Requirements	HeNB-RF_FDD	R4
430005	LTE TDD Home eNodeB RF Requirements	HeNB-RF_TDD	R4
430025	Home NB and Home eNB enhancements - RAN3 aspects	EHNB-RAN3	R3
430026	Home NB and Home eNB enhancements - RAN2 aspects	EHNB-RAN2	R2
440001	Home NB and Home eNB enhancements - GERAN aspects	EHNB-GERAN	GP

Supporting Companies: Alcatel-Lucent, AT&T, Qualcomm, Huawei, Nokia Siemens Networks, Bouygues Telecom, Orange, France Telecom, Telecom Italia, NEC, Softbank Mobile, Samsung, T-Mobile International.

4.1 Stage 1 for EHNB UID_400047

Resources: S1

Unique_ID	Name	Hyperlink	TSs and TRs
400047	Stage 1 for EHNB	SP-080791	22.220, 22.011

Rel-8 specifies the basic functionalities for the support of Home Node B (HNB) and Home eNodeB (HeNB). Rel-9 builds on these foundations and adds further functionalities that enable mobile operators to provide more advanced services as well as improving the user experience. There is no change on underlying Rel-8 assumptions, i.e.:

- HNB and HeNB will be deployed as small UTRA and EUTRAN cells, respectively in domestic, small office and similar environment
- The HNB and HeNB interconnects with the 3G core and Evolved Packet Core respectively over a fixed broadband access network (e.g. DSL, Cable, etc.).
- Full mobility into and out of a HeNB coverage will be supported including service continuity where applicable.
- Operators and owners of HeNB and HNB will be able to control the access to the resources provided.

This work focuses on security, quality of service, charging and access restrictions HNB and HeNB.

This work continues the work started in Rel-8 and develops common and, when necessary, specific requirements for both HNB/HeNB access systems.

Using as baseline the requirements on HNB / HeNB, included in TS 22.011, the aim is to consolidate all the requirements in a new Stage 1 specification. Consideration was given, but not limited, to the following:

- Home NodeB UTRA access to 3G services
- Home eNodeB E-UTRA access to Evolved Packet System services
- Support of PWS, ETWS
- Operational requirements for compliance with Radio communications license conditions;
- Authentication of HNB/HeNB as well as of the registered location
- QoS requirements when interworking with Home Gateways – specified by TISPAN WG5 – for connecting (e.g. via xDSL) with the core network. QoS provided to users and possible categorization of users.
- Plug and play (usability) aspects and self-organization requirements

- Requirements for customizing services for HNB/HeNB e.g. over DSL or cable
- Support of guest users
- Roaming aspects
- Support of HeNB in the corporate environment
- Support of legacy terminals
- Local IP Access to the home based network
- Managed Remote Access to home based network
- Local IP Access to the Internet
- IMS Capable HNB subsystem
- Open access and hybrid access
- OA&M Requirements
- Television Service

Service Aspects: Service requirements may result from the need of tailoring some services for access from HNB/HeNB, taking into account access capabilities and possible limitations e.g. QoS and bandwidth restrictions. Examples of services that may be applicable include Public Warning System (PWS), MBMS.

Charging Aspects: Consideration was given to differential charging for different classes of subscriber e.g. the owner of the HNB/HeNB and authorised "visiting guest" subscribers.

Security Aspects: For the deployment of HNB/HeNB security requirements had been examined by SA3.

4.2 Architecture aspects of EHNB UID_410026

Resources: S2

Unique_ID	Name	Hyperlink	TSs_and_TRs
410026	Architecture aspects of EHNB	SP-080636	23.830, 23.401, 23.402, 23.060

Linked work items

- Study on Home (e)NodeB Security (SA3)
- Study of Self-Organizing Networks (SON) related OAM interfaces for Home NodeB (SA5)
- Support of UTRA HNB (RAN2)
- WID HNB/EHNB Rel-8 (SA1)
- UTRAN Architecture for 3G HNB deployment (RAN3)
- WID on Enhanced Home NodeB / eNodeB for Rel-9 (SA1)
- CSG and Idle Mode Mobility for LTE Home eNodeB
- CSG and Idle Mode Mobility for 3G Home NodeB

SA1 has defined the HNB/HeNB requirement and agreed that the HNB/HeNB provides services to members of Closed Subscriber Groups (CSG), and membership, including temporary membership, of CSGs is managed by both the registered owner of the HNB/HeNB and the network operator. Moreover, SA#40 has agreed a new WID on Enhanced HNB/HeNB with the goal to consolidate the service requirements in a new Stage 1 specification for Rel-9.

The RAN3 study on the deployment of the 3G Home Node B in UTRAN concluded that the support of the 3G Home Node B could be ensured in principle within the framework in the UTRAN architecture defined in TS 25.401, with the support of legacy UEs and legacy core networks. However, the expected UTRAN UE mobility performance would be quite poor because in UTRAN the mobility and access control handling was not designed with 3G HomeNodeB in mind.

It is expected that similar problems will arise in LTE if it is allowed that LTE capable UEs exist that are not aware of the HeNB / CSG. Therefore, RAN2 has developed concepts to improve this handling for LTE introducing CSG ID and whitelist concepts. The support of Home eNodeB concept is currently captured within the scope of LTE WID.

RAN2 has also initiated a WI to improve the 3G UE performance for Rel-8 also supporting the CSG ID and whitelist concepts.

SA5 TR 32.821 studies the SON OAM architecture for both HNB/HeNB, differences between the SON OAM architecture for these and for the macro NodeB/eNodeB, and making preparation for a later implementation work item.

The introduction of these new concepts will improve UE performance and UE battery life time for new terminals supporting this CSG concept. It is also important that legacy mechanisms for 3G Home NB and UEs co-exist with any new concepts to ensure pre-Rel-8 UTRAN UE will be supported.

3GPP has currently not defined CSG architecture for the support of CSG concept in 3G HNB, HeNB, CN/EPC and UE. To progress the standardization of CSG concept in affected WGs it is necessary for SA2 to study a CSG architecture and the CSG and whitelist support.

Hence this Work Item performs this work.

The SA2 work was phased in a manner to document, in the first phase, the work ongoing in other WGs and identify any outstanding issue not properly addressed in Rel-8. In a second phase, SA2 carried out the architecture work addressing the remaining aspects of HNB/HeNB according to SA1 requirements.

The objective of this work was to study the architecture aspects for 3G HNB and HeNB in the following areas:

- distribution of functions on network nodes for 3G HNB and LTE HeNB support
- architecture support of CSGs and whitelist handling
- architecture support of security, authentication and discovery processes related to 3G HNB / HeNB
- architecture support of mobility and Access Control
- identification of Rel-8 impacts of 3G HNB

In the first phase, TR 23.830 describes the overall concept and architecture of HNB/HeNB. The initial focus was to identify the aspects addressed in other WGs as part of their already ongoing work, in order to avoid inter-Release compatibility issues at a later stage.

In the second phase, the enhancements required in the future can be developed according to SA1 requirements.

RAN3 architecture work on HNB/HeNB was taken into account in the overall architecture appropriately.

4.3 Security aspects of EHNB **UID_420035**

Resources: S3

Unique_ID	Name	Hyperlink	TSs_and_TRs
420035	Security aspects of Enhanced Home NodeB / eNodeB	SP-080879	new 33.320

SA3 studied security aspects of HNB/HeNB, including security architecture, threat analysis, and security requirement. TS 33.320 includes solutions for mitigating threats according to the security requirements identified in TR 33.820.

TS 33.320 specifies the security architecture, i.e. the security features, security mechanisms and security procedures for the HNB/HeNB including the security gateway at edge of the core network and OAM links.

4.4 CT1 aspects - Support of Home NB and Home eNB enhancements **UID_450003 (target Dec 2010)**

Resources: C1

Unique_ID	Name	Acronym	Resource	Finish	Compl	Hyperlink	rapporteur	Notes	TSs_and_TRs
450003	CT1 aspects - Support of Home NB and Home eNB enhancements	EHNB-CT1	C1	10/12/2010	95%	CP-090741	Qualcomm	CP#49 the SA1-reqs are moving. CT1 will align when the work in SA1 is clear. Roaming aspects for manual CSG selection, Support of temporary users and CSG membership changes, Support of user controlled	23.122, 24.008, 24.285, 24.301

								and operator controlled lists	
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CT1 covered:

- Roaming aspects for manual CSG selection
- Support of temporary users and CSG membership changes
- Support of user controlled and operator controlled lists

4.5 CT6 aspects - Support of Home NB and Home eNB enhancements **UID_450004**

Resources: C6

Unique_ID	Name	Hyperlink	TSs_and_TRs
450004	CT6 aspects - Support of Home NB and Home eNB enhancements	CP-090741	31.102

CT6 added the storing of CSG related data items on the USIM

4.6 3G HNB Gateway and LTE HeNB Gateway OAM&P **UID_420036**

Resources: S5

References

Document	Title/Contents
WID(s)	
SP-100087	WID on 3G HNB Gateway and LTE HeNB Gateway OAM&P
Impacted Specifications	
TS 32.632	Telecommunication management; Configuration Management (CM); Core Network Resources Integration Reference Point (IRP); Network Resource Model (NRM)
TS 32.633	Telecommunication management; Configuration Management (CM); Core network resources Integration Reference Point (IRP); Common Object Request Broker Architecture (CORBA) Solution Set (SS)
TS 32.635	Telecommunication management; Configuration Management (CM); Core network resources Integration Reference Point (IRP); Bulk CM eXtensible Markup Language (XML) file format definition
New Dedicated Specifications/Reports	
TS 32.771	Telecommunication management; Home Node B (HNB) Subsystem (HNS) Network Resource Model (NRM) Integration Reference Point (IRP); Requirements
TS 32.772	Telecommunication management; Home Node B (HNB) Subsystem (HNS) Network Resource Model (NRM) Integration Reference Point (IRP); Information Service
TS 32.773	Telecommunication management; Home Node B (HNB) Subsystem (HNS) Network Resource Model (NRM) Integration Reference Point (IRP); Common Object Request Broker Architecture (CORBA) Solution Set (SS)
TS 32.775	Telecommunication management; Home Node B (HNB) Subsystem (HNS) Network Resource Model (NRM) Integration Reference Point (IRP); Bulk CM eXtensible Markup Language (XML) file format definition
TS 32.781	Telecommunication management; Home enhanced Node B (HeNB) Subsystem (HeNS) Network Resource Model (NRM) Integration Reference Point (IRP); Requirements
TS 32.782	Telecommunication management; Home enhanced Node B (HeNB) Subsystem (HeNS) Network Resource Model (NRM) Integration Reference Point (IRP); Information Service
TS 32.783	Telecommunication management; Home enhanced Node B (HeNB) Subsystem (HeNS) Network Resource Model (NRM) Integration Reference Point (IRP); Common Object Request Broker Architecture (CORBA) Solution Set (SS)
TS 32.785	Telecommunication management; Home enhanced Node B (HeNB) Subsystem (HeNS) Network Resource Model (NRM) Integration Reference Point (IRP); Bulk CM eXtensible Markup Language (XML) file format definition

Unique_ID	Name	Hyperlink	TSs_and_TRs
420036	3G HNB Gateway and LTE HeNB Gateway OAM&P	SP-100087	32.632, 32.633, 32.635, new (32.771, 32.772, 32.773, 32.775, 32.781, 32.782, 32.783, 32.785)

SA5 studied a SON related OAM interface for HNB. TSG RAN has agreed on the architecture of UMTS HNB, in which the HNB Gateway (HNB-GW), located in UTRAN, is connected to the legacy CN via the Iu reference point, to the HNB at the Iu-H interface and implements the new functionalities requested for the deployment of HNBs (see TR R3.020 and TS 25.467). The detailed architecture is shown in the following figure.

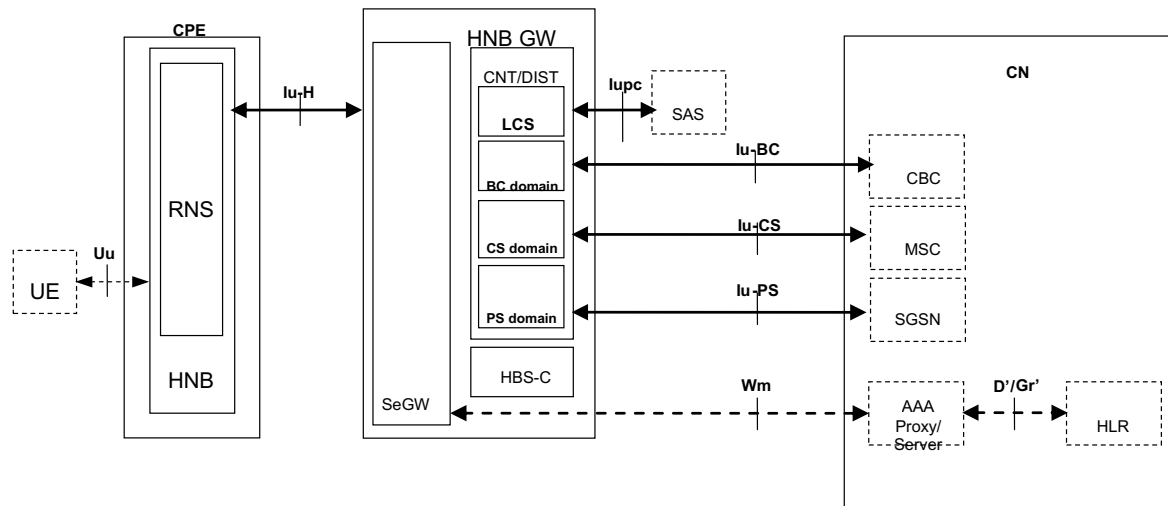


Figure : UTRAN HNB logical Architecture

Furthermore, the LTE HeNB architecture specified in TS 36.300, in which HeNB GW functionalities have been determined. The detailed architecture is shown in the following figure.

According to the TS 36.300, the deployment of HeNB GW can allow the S1 interface between the HeNB and the EPC to scale to support a large number of HeNBs. The HeNB GW serves as a concentrator for the C-Plane, specifically the S1-MME interface.

Therefore, the HNB-GW or HeNB-GW is logical entity implementing specific functionalities requested for the deployment of HNBs or HeNB in UTRAN or E-UTRAN. The corresponding OAM interface, the Itf-North bound interface of HNB-GW or HeNB-GW management system needs to be extended to satisfy the requirement of managing HNB-GW or HeNB-GW.

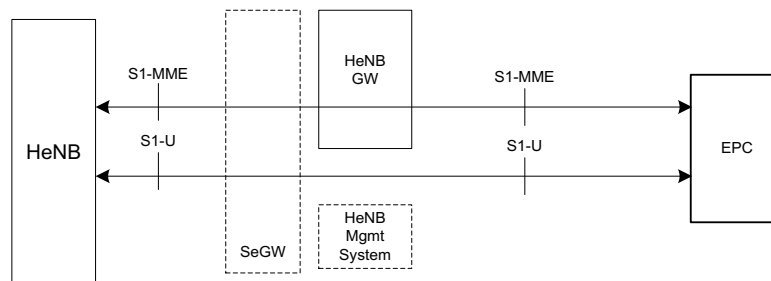


Figure : E-UTRAN HeNB logical Architecture

The following had been addressed:

1. Configuration management
 - Define configuration data over Itf-N for HNB-GW and HeNB-GW
2. Fault management
 - Identify the fault detection mode for the HNB-GW and HeNB-GW
 - Define alarm information & alarm report over Itf-N from the HNB-GW and HeNB-GW

Standardization of HeNB-GW management over Itf-N re-used the results of standardization of HNB GW management.

4.7 3G HNB and LTE HeNB OAM&P Type 1 Interface

UID_430012

Resources: S5

References

Document	Title/Contents
WID(s)	
SP-090208	WID on 3G HNB and LTE HeNB OAM&P Type 1 Interface
Impacted Specifications	
TS 32.581	Telecommunications management; Home Node B (HNB) Operations, Administration, Maintenance and Provisioning (OAM&P); Concepts and requirements for Type 1 interface HNB to HNB Management System (HMS)
TS 32.582	Telecommunications management; Home Node B (HNB) Operations, Administration, Maintenance and Provisioning (OAM&P); Information model for Type 1 interface HNB to HNB Management System (HMS)
TS 32.583	Telecommunications management; Home Node B (HNB) Operations, Administration, Maintenance and Provisioning (OAM&P); Procedure flows for Type 1 interface HNB to HNB Management System (HMS)
TS 32.584	Telecommunications management; Home Node B (HNB) Operations, Administration, Maintenance and Provisioning (OAM&P); XML definitions for Type 1 interface HNB to HNB Management System (HMS)
New Dedicated Specifications/Reports	
TS 32.591	Telecommunication management; Home enhanced Node B (HeNB) Operations, Administration, Maintenance and Provisioning (OAM&P); Concepts and requirements for Type 1 interface HeNB to HeNB Management System (HeMS)
TS 32.592	Telecommunication management; Home enhanced Node B (HeNB) Operations, Administration, Maintenance and Provisioning (OAM&P); Information model for Type 1 interface HeNB to HeNB Management System (HeMS)
TS 32.593	Telecommunication management; Home enhanced Node B (HeNB) Operations, Administration, Maintenance and Provisioning (OAM&P); Procedure flows for Type 1 interface HeNB to HeNB Management System (HeMS)
TS 32.594	Telecommunication management; Home enhanced Node B (HeNB) Operations, Administration, Maintenance and Provisioning (OAM&P); XML definitions for Type 1 interface HeNB to HeNB Management System (HeMS)

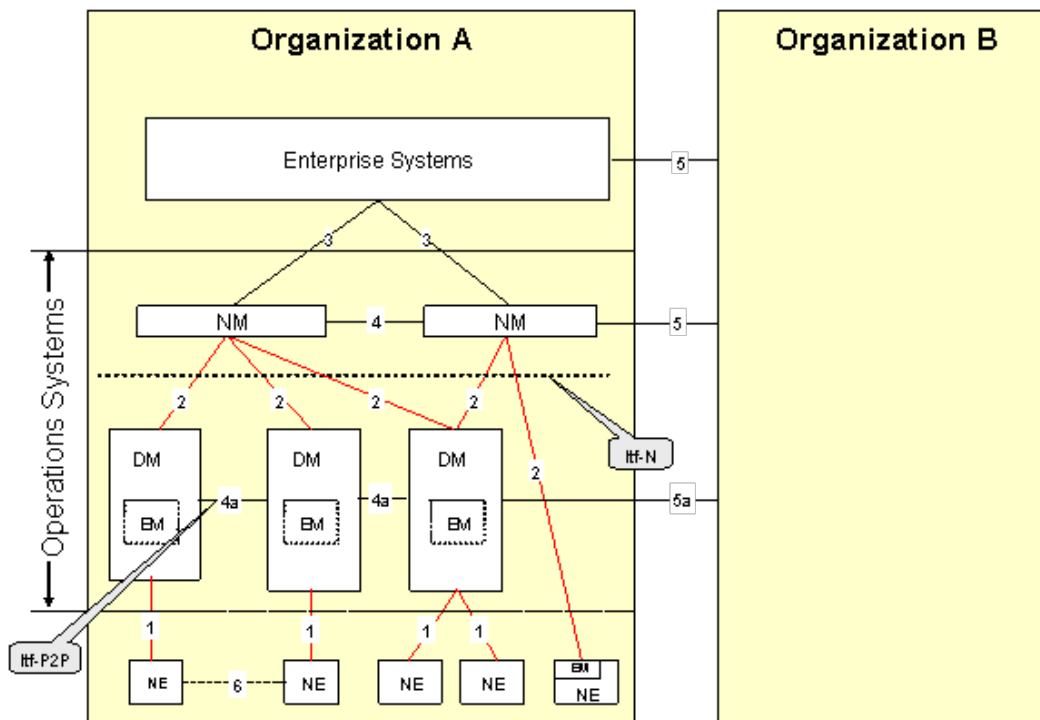
Unique_ID	Name	Hyperlink	TSs_and_TRs
430012	3G HNB and LTE HeNB OAM&P Type 1 Interface	SP-090208	32.581, 32.582, 32.583, 32.584, new (32.591, 32.592, 32.593, 32.594)

In order to complement the work done in RAN, SA5 provided corresponding OAM solution for 3G Home NodeB and LTE Home eNodeB. SA5 standardized management services that are specific to HNB/HeNB because:

- quantity of HNB/HeNB is likely to be large
- there may be many HNB/HeNB vendors
- HNB/HeNB may be purchased easily by end users in market
- location of HNB/HeNB could be on a private site which may not be accessible for frequent on-site maintenance

SA5 has studied HNB/HeNB OAM and SON aspects. TR 32.821 lists management differences between HNB/HeNB. TR 32.821 provides requirements for managing HNB/HeNB and the consequences on the management interface.

Based on TR 32.821, the interface Type 1 and 2 (see following figure) were standardized for HNB/HeNB OAM&P.



This work defines corresponding OAM solution for HNB/HeNB on interface Type 1 management including:

1 Management on Standard Interfaces Type 1 for HNB/HeNB:

- Investigate what standardization is needed for management of HNB/HeNB over interface Type 1
- Define the standardization for HNB/HeNB management over interface Type 1
- Standardization on HeNB management over interface Type 1 shall re-use the results of the standardisation on HNB management to the maximum extent possible.

2 Specification work for HNB/HeNB includes:

- Stage 1 Concepts and Requirements
 1. Configuration and Auto-configuration Management
 2. Fault Management
 3. Performance Management
 4. Security aspects of OAM
- Stage 2 Architecture and Information Model
 1. Architecture for HNB/HeNB Management for CM, FM and PM
 2. Object Classes for
 - Configuration and Auto-configuration Management for:
 - HNB/HeNB Access Network
 - Core Network (related to HNB/HeNB)
 - Transport Network (related to HNB/HeNB)
 - Fault Management
 - Performance Management
 3. Stage 2 for contents definition for CM, FM, PM and Logging
- HNB/HeNB to Management system procedure flow
 1. OAM Procedural flows for HNB/HeNB Discovery, registration, configuration updates
 2. OAM Procedural flows for FM
 3. OAM Procedural flows for PM
- Stage 3 Data Model and XML Data Format
 1. Data Model and XML Data Format for CM, FM and PM

4.8 3G HNB and LTE HeNB OAM&P Type 2 Interface

UID_440066

Resources: S5

References

Document	Title/Contents
WID(s)	
SP-090315	WID on 3G HNB and LTE HeNB OAM&P Type 2 Interface
Impacted Specifications	
-	-
New Dedicated Specifications/Reports	
TS 32.571	Telecommunication management; Home Node B (HNB) and Home eNode B (HeNB) management; Type 2 interface concepts and requirements
TS 32.572	Telecommunication management; Home Node B (HNB) and Home eNode B (HeNB) management; Type 2 interface models and mapping functions

Unique_ID	Name	Hyperlink	TSS_and_TRs
440066	3G HNB and LTE HeNB OAM&P Type 2 Interface	SP-090315	new 32.571, 32.572

The architecture supporting Type 2 interface does not violate the architecture in TS 32.583 supporting Type 1 interface.

This work defines corresponding OAM solution for HNB/HeNB on interface Type 2 management including:

- Enhanced Management on standard interfaces Type 2 for HNB/HeNB:
 - Investigate enhancements (to current set of IRP specifications) needed for management of HNB/HeNB
 - Specify the enhancements mentioned above
- Functionalities aspects considered for HNB/HeNB management on interface Type 2 e.g.:
 - Configuration management
 - Fault management
 - Performance management
 - Security management
- Specification of a function that, by using device management services offered via the Type 1 interface for management of HeNB, can offer the network management services offered via the Type 2 interface for H(e)NBs.

4.9 LTE FDD Home eNodeB RF Requirements **UID_420008**

Resources: R4

References

Document	Title/Contents
WID(s)	
RP-091300	WID on LTE FDD Home eNodeB RF Requirements
Impacted Specifications	
TS 36.104	Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception
TS 36.141	Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) conformance testing
New Dedicated Specifications/Reports	
TR 36.921	E-UTRA; FDD Home eNodeB (HeNB) Radio Frequency (RF) requirements analysis

Unique_ID	Name	Hyperlink	Status_Report	TSs_and_TRs
420008	LTE FDD Home eNodeB RF Requirements	RP-091300	RP-100035	new TR 36.921, 36.104, 36.141

Within the course of increasing terminal penetration and Fixed-Mobile Convergence, an upcoming demand for HeNBs is to provide attractive services and data rates in home environments.

E-UTRAN was developed and defined under the assumption of coordinated network deployment whereas HeNBs are typically associated with uncoordinated and large scale deployment.

This work amends HeNBs related RF specifications based on experience gathered in the RAN4 part of TR 25.820 to support HeNBs application. No changes to the UE RF specifications are foreseen. It is limited to E-UTRA FDD mode.

The interference analysis is similar to that conducted for UTRA so the conclusions broadly apply to E-UTRA as well.

Objective 1

- The existing E-UTRA BS class does not fully address the RF requirements of the HeNB application. Correspondingly, specify RF requirements for HeNB in TS 36.104, taking the work done for HNB as a basis.
- Furthermore, test specification TS 36.141 needed to be updated accordingly.
- HeNB-specific additions to TS 36.104 / 36.141 were accommodated similarly to that for the UTRA HNB.

Objective 2

TR 25.820 showed that for the CSG HNB there are occasions where overall system performance may be enhanced by controlling the HNB output power dependent on the strength of signal from the macro cell layer and from other HNB. Control of CSG HNB output power mitigates interference to the macro layer and other CSG HNB. Correspondingly, it is expected that similar observations may be made for the HeNB. Objective 2 should ensure that operators have the ability to achieve control of HeNB power; in particular that operator has:

- means to obtain measurements of the strength of signals and the identity (to allow macro neighbour cell list building) from the macro cell layer and from other HeNBs. Measurements may be made by the HeNB or may make use of existing measurements defined for the UE; no new UE measurements will be defined.
- means to set maximum output power of the HeNB (expected changes to TS 36.104).
- guidance on how to control HeNB power and expected performance levels in the relevant scenarios. There are additional factors that may be controlled in E-UTRA in comparison with UTRA, such as variable bandwidth and allocation of radio sub-carriers; work will be conducted to investigate if similar mechanisms may be used for controlling HeNB resource allocation versus the macro cell layer and versus other HeNBs. Additionally, mechanisms may be applied to control HeNB coverage in the case of open access HeNB. TR 36.921 captures this guidance.

4.10 LTE TDD Home eNodeB RF Requirements **UID_430005**

Resources: R4

References

Document	Title/Contents
WID(s)	
RP-091386	WID on LTE TDD Home eNodeB RF Requirements
Impacted Specifications	
TS 36.104	Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception
TS 36.141	Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) conformance testing
TS 36.300	Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2
TS 36.331	Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification
TS 36.413	Evolved Universal Terrestrial Radio Access (E-UTRA); S1 Application Protocol (S1AP)
New Dedicated Specifications/Reports	
TR 36.922	Evolved Universal Terrestrial Radio Access (E-UTRA); LTE TDD Home eNodeB RF Requirements

Unique_ID	Name	Hyperlink	Status_Report	TSs_and_TRs
430005	LTE TDD Home eNodeB RF Requirements	RP-091386	RP-100036	new TR 36.922, 36.104, 36.141, 36.300, 36.331, 36.413

With increasing popularity of data services and Fixed-Mobile Convergence, an upcoming demand for HeNBs is observed to provide attractive services and data rates in home environments. Currently, many operators have TDD spectrum blocks in the bands of 1880/1900-1920MHz, 2010-2025MHz and 2.3GHz. Furthermore, the ongoing worldwide auctions of 2.6GHz may provide larger room for the deployment of LTE TDD systems. LTE TDD HeNB can be foreseen as a candidate solution for these TDD spectrums.

The aim of introducing HeNB is to enhance the coverage and performance of E-UTRAN in the home environment. However, the HeNBs are customer behaviour products and possibly with arbitrary deployment, which may lead to interference to the macro sites and other CSG HeNBs. And there are TDD specific interference scenarios that do not exist in FDD HeNB deployments. Therefore, it's necessary to study the specific RF requirements for the TDD HeNBs as well as the mitigation methods to solve the potential interference.

This work amends the E-UTRAN eNodeB related RF specifications base the work on the experience gathered in the RAN4 specific part of TR 25.820 and TR25.866 to support the E-UTRA TDD Home eNodeB application.

This work is limited to the E-UTRA TDD mode. Possible differences between E-UTRA TDD and FDD HeNB RF requirements may reside in the following aspects: operating bands related co-existence spurious emission and blocking requirements, synchronization requirements and interference control schemes.

Objective 1

Specify RF requirements for E-UTRA TDD Home eNodeB in TS36.104 and corresponding updates on the test specification in TS36.141. Some requirements could refer to the outcome of existing/ongoing related studies.

Objective 2

Find effective interference control schemes to ensure good performance of both macro layer and HeNB. Although some of the studies could refer to UTRA HNB related work experience, e.g. deployment/interference scenarios, amount of studies are needed to find out the effective interference control schemes due to different physical techniques and system characters between E-UTRA and UTRA. The work included that the operator has:

- means to obtain interference control related measurements reports from HeNB and/or UE attached to HeNB, e.g. the strength of signals and the identity from the macro cell layer and from other HeNBs.
- means to set the maximum output power and/or frequency of HeNB (expected changes to TS 36.104).
- means to coordinate the HeNB and eNB timing and TDD configuration (expected changes to TS 36.104).
- guidance on how to control HeNB power and expected performance levels in the relevant scenarios. TR 36.922 captures this guidance.

4.11 Home NB and Home eNB enhancements - RAN3 aspects

UID_430025

Resources: R3

References

Document	Title/Contents
WID(s)	
RP-090349	WID on Home NB and Home eNB enhancements - RAN3 aspects
Impacted Specifications	
TS 25.468	
TS 25.469	
TS 25.467	
TS 25.467	
TS 25.413	
TS 25.469	
TS 36.413	
TS 36.401	
New Dedicated Specifications/Reports	
TS 25.444	lth data transport

Unique_ID	Name	Hyperlink	Status_Report	TSs_and_TRs
430025	Home NB and Home eNB enhancements - RAN3 aspects	RP-090349	RP-091050	25.413, 25.467, 25.467, 25.468, 25.469, 25.469, 36.401, 36.413, new 25.444

Rel-8 WI for HNB Architecture (RP-040487) covered basic functionality required to support use of HNBs and HNB-GW with closed access and with HNB to macro HO. Rel-8 LTE also included basic Home eNB functionality. Consideration was not included on the performance aspects of the HNB and Home eNB in the home environment.

To support similar performance levels expected by users from the macro network, the HNB needs to make optimum use of DSL connections used for backhaul, particularly the limited UL bandwidth.

For both HNB and HeNB the limited HO scenarios of just 'Hand-out' limit the performance that the user will experience, and need to be extended to cover the 'Hand-in' scenario.

In addition, to meet regulatory requirements in some countries, support of ETWS/PWS is required.

Objectives

- For 3G Home NB consider the benefits and techniques to support UL muxing and compression and the possible benefits to using similar techniques on DL. The scheme(s) selected would be able to operate optionally, and allow interoperation between HNB-GW and pre-Rel-9 HNBs..
- Define the requirements and consider the techniques to support the following hand-over scenario:
 - In-bound mobility 3G Macro to HNB HO
 - 3G HNB to 3G HNB HO
 - In-bound mobility LTE Macro to HNeB HO
 - LTE HeNB to LTE HeNB HO
- Define the requirements and consider techniques for supporting ETWS/PWS scenarios
- Consider the feasibility of supporting the following access scenarios:
 - Open Access
 - Hybrid Access

Complete RAN aspects of local breakout if requested by SA2.

4.12 Home NB and Home eNB enhancements - RAN2 aspects

UID_430026

Resources: R2

References

Document	Title/Contents
WID(s)	
RP-091392	WID on Home NB and Home eNB enhancements - RAN2 aspects
Impacted Specifications	
TS 25.304	
TS 25.331	
TS 25.367	
TS 36.300	
TS 36.304	
TS 36.331	
New Dedicated Specifications/Reports	
-	-

Unique_ID	Name	Hyperlink	Status_Report	TSs_and_TRs
430026	Home NB and Home eNB enhancements - RAN2 aspects	RP-091392	RP-100037	25.304, 25.331, 25.367, 36.300, 36.304, 36.331

Home (e)NodeB support was introduced in Rel-8. RAN2 has completed the Rel-8 UMTS work item of "Support of UTRA HNB" which was limited to support of idle mode mobility procedures to/from CSG cells (including support for legacy mobiles). As part of Rel-8 LTE, RAN2 also achieved basic solutions for supporting idle mode mobility procedures e.g. reselection to/from CSG cells.

However, the solution achieved in Rel-8 does not meet all the requirements set out by SA1 for Rel-9. For instance, active mode mobility from/to CSG cells is required to ensure service continuity. Moreover, RAN2 did not consider the support of hybrid mode access cells which is also an SA1 requirement for Rel-9. Hence, it is reasonable to continue the work in Rel-9 to support the SA1 requirements.

This work took into account the conclusions of the SA2 study on the CSG architecture for Rel-9.

Objectives

Common Rel-9 UTRA and E-UTRA work should ensure minimal divergence, especially for the mobility procedures.

The work is based on existing Rel-8 concepts and enhances agreed Rel-8 mechanisms of supporting home (e)NodeBs. Legacy mechanisms should co-exist with concepts chosen by this WI to ensure pre-Rel-9 mobiles are also supported. Enhancements to existing Rel-8 mechanisms:

- Continue support for LTE Rel-8 UEs and pre-Rel-9 UMTS UEs according to LTE Rel-8 and UMTS pre-Rel-9 rules
- Support SA1 inter-PLMN roaming scenarios for Idle and Active mode
- Between, Macro cells, CSG cells and Hybrid access Cells:
 - Manual CSG selection
 - Autonomous CSG reselection
 - Support of Hybrid cell selection and reselection
- Active Mode Mobility Support only for the following cases:
 - Inbound handover to CSG cell (from Macro, CSG and Hybrid access cells)
 - Inbound handover to Hybrid cell (from Macro, CSG and Hybrid access cells)

4.12.1 Conformance Test Aspects – Home NB enhancements for FDD UID_490020 (target Dec 2011)

Resources: R5

Unique_ID	Name	Resource	Finish	Compl	Hyperlink	rapporteur	Notes	TSs_and_TRs
490020	Conformance Test Aspects – Home NB enhancements for FDD	R5	16/12/2011	0%	RP-100935	Huawei	UTRA. Testing for UID_430026 Support of Home NB and Home eNB enhancements RAN2 aspects (25.304, 25.331, 25.367)	34.108, 34.123-1, 34.123-2, 34.123-3

4.13 Home NB and Home eNB enhancements - GERAN aspects

UID_440001

Resources: GP

References

Document	Title/Contents
WID(s)	
GP-090975	WID on Home NB and Home eNB enhancements - GERAN aspects
Impacted Specifications	
TS 43.055	
TS 43.129	
TS 44.018	
TS 44.060	
TS 45.008	
TS 48.008	
TS 48.018	
New Dedicated Specifications/Reports	
-	-

Unique_ID	Name	Acronym	Finish_Date	Hyperlink	WI_rapporteur_name	Notes	Impacted_TSs_and_TRs
440001	Home NB and Home eNB enhancements - GERAN aspects	EHNB-GERAN	03/09/2010	GP-090975	Nokia Siemens Networks	GP#47 completed. GP#42 WID approved	43.055, 43.129, 44.018, 44.060, 45.008, 48.008, 48.018

Home (e)NodeB support has been introduced in Rel-8. TSG RAN completed the Rel-8 work items which were limited to support of idle mode mobility procedures to/from UTRAN and E-UTRAN CSG cells (including – for the case of UTRAN CSG cells – support for legacy mobiles) and to active mode mobility from CSG cells to macro cells. The solutions for supporting these mobility procedures (e.g. reselection to/from CSG cells etc.) have been included in the RAN specifications. Solutions for idle mode mobility from GERAN to UTRAN or E-UTRAN CSG cells have also been included in Rel-8 GERAN specifications.

However, the solutions achieved in Rel-8 do not meet all the requirements set out by SA1 for Rel-9. For instance, active mode mobility from GERAN to CSG cells is required to ensure service continuity. It should be noted that for GERAN to E-UTRAN HeNB this restricts to the case of packet transfer mode in GERAN and excludes the cases of dedicated mode and dual transfer mode given there is no SRVCC from CS to PS. For GERAN to UTRAN HNB, all RR modes are covered. Moreover, the support of hybrid mode access cells which is also an SA1 requirement for Rel-9 was not considered. Hence, it is reasonable to continue the work in Rel-9 to support the SA1 requirements in TS 22.220.

This work took into account the conclusions of the SA2 study on CSG architecture for Rel-9 in TR 23.830.

The work is based on existing Rel-8 concepts and enhances agreed Rel-8 mechanisms of supporting home (e)NodeBs. Legacy mechanisms should co-exist with concepts chosen by this WI to ensure pre-Rel-9 CSG capable mobiles will also be supported. Enhancements to existing Rel-8 mechanisms:

- Support of cell selection and reselection to UTRAN HNBs and E-UTRAN HeNBs in hybrid access mode from GERAN
 - Manual CSG selection
 - Autonomous CSG reselection
- Packet Transfer Mode Mobility Support only for the following cases:
 - Inbound mobility to UTRAN HNBs (either in closed or hybrid access mode) from GERAN
 - Inbound mobility to E-UTRAN HeNBs (either in closed or hybrid access mode) from GERAN
- Dedicated Mode and Dual Transfer Mode Mobility Support only for the following cases:
 - Inbound mobility to UTRAN HNBs (either in closed or hybrid access mode) from GERAN

For the purpose of this work item, "UTRAN" includes both UTRAN FDD and UTRAN TDD modes, and "E-UTRAN" includes both E-UTRAN FDD and E-UTRAN TDD modes.

5 User Data Convergence (UDC) **UID_400034**

Resources: S1,C4,S5

References

Document	Title/Contents
WID(s)	
SP-080448	SA1 WID on User Data Convergence (UDC)
CP-090017	CT4 WID on User Data Convergence Technical Realization
CP-090516	CT4 WID on User Data Convergence: Protocol description
SP-090309	SA5 WID on User Data Convergence - Modelling and Management
SP-090310	SA5 WID on UDC – Common Baseline Information Model
SP-090311	SA5 WID on UDC – Framework for Model Handling and Management
Impacted Specifications	
TS 22.101	Service aspects; Service principles
New Dedicated Specifications/Reports	
TR 22.985	User Data Convergence - S1
TS 23.335	User Data Convergence (UDC); Technical Realization and Information Flows - C4
TS 29.335	User Data Convergence - Protocol Specification for the Uu interface (stage 3) - C4

Supporting Companies: China Mobile, T-Mobile, Telecom Italia, Sprint, Alcatel-Lucent, Ericsson, Huawei, Nokia Siemens Networks, ZTE, TeliaSonera.

Triggered by TR 32.808 (Telecommunication management; Study of Common Profile Storage (CPS) Framework of User Data for network services and management) produced under the Rel-8 SA5 Study UID_320006 (OAM7-CPS).

This work is linked to Rel-9 Feature End-User Identity (EUI) UID_370027.

Unique_ID	Name	Resource	Hyperlink	TSs_and_TRs
400034	User Data Convergence		SP-080448	-
400046	Stage 1 for UDC	S1	SP-080448	22.985, 22.101
430003	UDC Technical Realization (Stage 2)	C4	CP-090017	new 23.335
450002	UDC Protocol Description	C4	CP-090516	new 29.335
440060	User Data Convergence - Modelling and Management	S5	SP-090309	-
440062	UDC – Framework for Model Handling and Management	S5	SP-090311	32.172, new 32.181
440061	UDC – Common Baseline Information Model	S5	SP-090310	32.172, new 32.182

UID_400046 Stage 1 for UDC

With the increase of service entities and the resulting user data types, User Data Convergence (UDC) is required to ensure the consistency of storage and data models. UDC:

- simplifies the overall network topology and interfaces
- overcomes the data capacity bottleneck of a single entry point
- avoids data duplication and inconsistency
- reduces CAPEX and OPEX.

UDC simplifies creation of new services and facilitates service development and deployment through a common set of user data.

UDC promotes service and network convergence to support the increasing number of new services including Internet services and UE applications. A new facility User Data Repository (UDR) is considered for UDC.

In UDC, all the user data is stored in a single UDR allowing access from core and service network entities. To achieve high performance, reliability, security and scalability, the UDR entity may consist of a network of different components distributed geographically, and exposes capabilities via open interfaces in multiple access entry points.

SA1 has set requirements on UDC, based on which architecture, interface and protocol can be specified. SA1 has:

1. Categorized the user data of services which would be converged in UDC
2. Identified requirements on the common data model framework with focus on extensibility
3. Identified the UDC requirements to support new services including their provisioning

Before SA3 work is progressed, high level requirements should be identified by SA1 to avoid downgrading current security for existing databases and services.

Unique_ID	Name	Resource	Hyperlink	TSs_and_TRs
430003	UDC Technical Realization (Stage 2)	C4	CP-090017	new 23.335

The User Data Convergence (UDC) concept is described in TS 22.101:

"The User Data Convergence concept supports a layered architecture, separating the data from the application logic in the 3GPP system, so that user data is stored in a logically unique repository allowing access from core and service layer entities, named application front-ends. Network Elements (NEs) and functionalities should be designed to access profile data remotely and without storing them permanently locally, i.e. the front-ends shall work in a subscriber data-less configuration."

TS 22.101 sets requirements for UDC so that user data can be moved from where it originated, to a facility called User Data Repository (UDR) where it can be accessed, stored and managed in a common way.

This work addresses information flows between application front-ends and UDR, including definition of any reference point between those, for the technical realization of the UDC concept and any associated architecture aspects.

The UDC technical realization has no impact on traffic mechanisms, reference points and protocols of existing NEs.

Convergence of user data unifies the user data access interface and its protocol. In addition, the logical centralization of user data implies the support of user data provisioning, that is, user data manipulation like creation, deletion, reading, modification and other operations.

To accommodate multiple applications and services, a common baseline Information Model was developed, as identified by TS 22.101. An Information Model denotes an abstract, formal representation of entity types, including their properties and relationships, the operations that can be performed on them, and related rules and constraints. **SA5 will develop the Information Model in consultation with CT4.**

This CT4 BB is expected to consist of a number of tasks to specify the protocol(s) for repository access and for notifications of traffic and provisioning events.

This work addresses information flows between application front-ends and the UDR, including definition of any reference point between those, for:

1. Data storage and retrieval between the application front-ends and the UDR entity
2. Notifications and subscriptions to notifications flows (traffic and provisioning) between the application front-ends and the UDR, including validation of data.

The objectives of the resulting tasks (Information Model, Repository Access and Notifications Protocol(s)) will be considered once the information flows have begun and any possible architecture aspects addressed.

The UDC concept needs to be backwards compatible with 3GPP systems, i.e. it does not have an impact on traffic mechanisms, reference points and protocols of existing NEs. The internal UDR architecture is not be part of this work.

MMI aspects: Due to the logical centralization of user data, it is necessary for UDC to support the provisioning on the user data, that is, user data manipulations like add, delete, change and other operations.

Security aspects: UDC shall preserve user authentication and authorization of services across domains, ensuring secured users' access to network. 3rd party applications and non trusted network elements should only be able to access the user data after proper authentication and authorization taking into account security and privacy requirements.#

Unique_ID	Name	Resource	Hyperlink	TSs_and_TRs
450002	UDC Protocol Description	C4	CP-090516	new 29.335

The User Data Convergence (UDC) concept supports separation of data from the application logic in the 3GPP system, so that user data is stored in a logically unique repository allowing access from core and service layer entities, named application "front-ends". These "front-ends" shall work in a dataless configuration, that is, without storing profile data permanently locally.

TS 23.335 provides the technical realization (Stage 2) for UDC, defining a new interface between the User Data Repository (UDR) and the application Front-Ends (FEs). The protocol or protocols for such new interface are specified in this work item description.

CT4 produced the Stage 3 (protocol definition) for the new Ud interface for UDC, including:

- protocol selection
- protocol description, including, standard extensions (if needed)
- detailed procedures and signalling flows
- detailed behaviour of UDC functional entities

The protocol considered the information model developed by SA5. However, the underlying data model is not subject of standardization in this work item.

Unique_ID	Name	Resource	Hyperlink	TSs_and_TRs
440060	User Data Convergence - Modelling and Management	S5	SP-090309	-
440062	UDC – Framework for Model Handling and Management	S5	SP-090311	32.172, new 32.181
440061	UDC – Common Baseline Information Model	S5	SP-090310	32.172, new 32.182

The UDC will simplify the overall network topology and interfaces, avoid data duplication and inconsistency and simplify creation of new services by providing easy access to the user data.

TR 22.985 and TS 22.101 provide the requirements for User data convergence enabling user data be moved from local storage to a facility called User Data Repository (UDR) where it can be accessed, stored and managed in a common way.

Convergence of user data will unify the user data access interface and its protocol. In addition, the logical centralization of user data implies the support of user data provisioning, that is, user data manipulation like creation, deletion, reading, modification and other operations.

In order to accommodate multiple applications and services, existing and new ones, a framework for model handling and management of the UDC has to be developed including:

- UDC information models
- UDC information model handling
- Application management
- Consolidated data model management

The objective of this work item is to develop the overall management of the User Data Convergence by specifications developed in a number of dependent work tasks.

In order to accommodate multiple applications and services, existing and new ones, a framework for model handling and management of the UDC shall be developed as identified by TS 22.101. This framework includes:

- UDC information models:
 - UDC information model infrastructure containing the common baseline information model, application information models, and the specialised information model.
 - the specification of the common baseline information model
- UDC information model handling:
 - provide a template and guidelines explaining the design of application information models to be used together with the common baseline information model to create the specialized information model.
 - describe the process to combine the common baseline information model with application information models in order to produce an operator-specific specialised information model
- Application management data:
 - access control data for an application to UDC: identification and authentication
 - assignment to an application data model, including linkage to the consolidated data model
 - subscription rights for specific events on specific data of specific users
- Consolidated data model management
 - lifecycle management of the consolidated data model in the UDR and in the provisioning entity.

- activation/deactivation of application adaptation

The work considered existing work such as the Common Profile Storage and the Subscription Management.

The work was synchronized with other SDOs (e.g. OMA ServUserProf enabler).

6 Public Warning System (PWS) **UID_380057**

Resources: S1,C1,C4,R2

References

Document	Title/Contents
WID(s)	
SP-070876	SA1 WID on Public Warning System (PWS) Requirements
CP-090437	C1,C4 WID on Stage 3 for PWS
RP-090649	R2 WID on RAN aspects of PWS
Impacted Specifications	
-	-
New Dedicated Specifications/Reports	
TS 22.268	Public Warning System (PWS) requirements - S1

Supporting Companies: AT&T, T-Mobile, Ericsson, Nokia, Nortel Networks, Nokia Siemens Network.

This work has a larger scope than the Rel-8 Feature UID_370051 (ETWS).

This work was triggered by TR 22.968 (Study on requirements for an Public Warning System (PWS) service) produced under the Rel-8 Study UID_320025 (FS_PWS).

Unique_ID	Name	Resource	Hyperlink	TSs_and_TRs
380057	Public Warning System		SP-070876	-
380058	Stage 1 for PWS	S1	SP-070876	22.268
440029	Stage 3 for PWS	C1,C4	CP-090437	-
440030	CT1 aspects of PWS-St3	C1	CP-090437	23.041
440031	CT4 aspects of PWS-St3	C4	CP-090437	29.168
440005	Public Warning System (PWS) – RAN aspects	R2,R3	RP-090649	36.300, 36.302, 36.331, 36.413

UID_380058 Stage 1 for PWS (S1)

There are many acts of nature and some accidents caused by man that threaten considerable damage and potential loss of life over a wide range of different geographical areas. Some examples are related to severe weather (e.g. hurricane/typhoon, tornado, flood) while others are related industrial activity (e.g. chemical spill, threat of explosion, biological/radiological hazard). When these events occur, it is essential that emergency information from local agencies (e.g. government/public service organisations) is provided to people within the affected areas so actions can be taken to reduce damage and avoid loss of life.

In some cases, warnings are already made via commercial or government-owned radio or television broadcast facilities. With the significant deployment of cellular mobile networks and their ability to provide broadcast services, warnings can also be transmitted to large numbers of subscribers via their UE who are not listening to radio or TV broadcasts, or may not be within range of a radio or TV broadcast but are within coverage area of their wireless services provider. Support over cellular mobile networks is to supplement other notification methods.

The use of a PWS in GSM and UMTS networks is currently under consideration to various degrees by government agencies in many countries for national or regional use.

FCC's Commercial Mobile Service Alert Advisory Committee (CMSAAC) made recommendations on requirements, architecture and protocols for a Commercial Mobile Alert Service (CMAS) for the United States. CMSAAC recommendations and final FCC rules specify the regulatory requirements for a text-based PWS in the US.

In Europe, PWS requirements and examination of possible technologies have been documented in ETSI TS 102 182.

3GPP develops PWS requirements on a global basis, recognizing that regional requirements might differ.

This work specifies requirements for a text-based PWS service.
Requirements for a Multimedia-based PWS service are FFS.

The impacts on current specifications and existing networks by the introduction of this service should be minimized. Support of this service is optional to operators and/or subscribers based on regional requirements and mandates.

This service should be provided by using low cost and simple mechanisms based on those available within existing mobile networks. As new UE functionality may be required, existing UEs are not required to support this service.

These requirements should also address how a public warning message interacts with other services that may be in use at the time when the message is received (e.g. during a voice call).

Alerts or warning messages should be provided to users in a way that distinguishes them from non-PWS messages.

Operators shall have the capability to not charge subscribers.

It shall minimize the ability to spoof public warning messages and provide a means for the recipient to authenticate the source of the public warning message.

UID_440029 Stage 3 for PWS (C1,C4)

Both Stage 2 and Stage 3 work are covered by this WI. Stage 2 work related to UTRAN and GERAN and related to message identifiers was performed by CT1. The rest of the stage 2 work is within the scope of SA2.

UID_440005 RAN aspects of PWS (R2,R3)

The work fulfils the following objectives:

Extend the Warning System support of the E-UTRA/E-UTRAN beyond Rel-8 ETWS by providing:

- E-UTRA/E-UTRAN support for multiple parallel Warning Notifications
- E-UTRAN support for replacing and cancelling a Warning Notification
- E-UTRAN support for repeating the Warning Notification with a repetition period as short as 2 seconds and as long as 24 hours
- E-UTRA support for more generic "PWS" indication in the Paging Indication

Specifically this work enhances the E-UTRA Rel-8 ETWS functionality to meet the above objectives by:

- extending the S1AP Write-Replace Warning procedure to support multiple outstanding Warning Notifications and Update and Cancel primitives
- extending the LTE-Uu (RRC ETWS broadcast) mechanism to support multiple Warning Notifications, paging the UE with a "PWS" indication, and repetition of warning notifications (with repetition periods as short as 2 seconds and as large as 24 hours)
- updating the E-UTRA/E-UTRAN stage 2 specification

Last Status Report in RP-091052.

7 IMS Emergency Calls over GPRS and EPS

Resources: S1,S2,S3,C1,C3,C4,R2,R3,R5

Unique_ID	Name	Resource	Hyperlink
380064	Support for IMS Emergency Calls over GPRS and EPS		SP-080844
410036	Stage 1 for IMS Emergency Calls over GPRS and EPS	S1	SP-080844
410037	Stage 2 for IMS Emergency Calls over GPRS and EPS	S2	SP-080844
420022	Security aspects for IMS Emergency Calls over GPRS and EPS	S3	SP-080844
440035	Stage 3 for IMS Emergency Calls over GPRS and EPS	C1,C3,C4	CP-090564
420041	Support for IMS Emergency Calls over LTE	R2,R3	RP-081140
470017	Conformance Test Aspects – Support for IMS Emergency Calls over LTE	R5	RP-100118
410038	SRVCC support for IMS Emergency Calls	S2,C1,C4,C3	SP-090099

7.1 Support for IMS Emergency Calls over GPRS and EPS

UID_380064

Resources: S1,S2,S3,C1,C3,C4,R2,R3,R5

References

Document	Title/Contents
WID(s)	
SP-080844	SA WID on Support for IMS Emergency Calls over GPRS and EPS
CP-090564	CT WID on Support for IMS Emergency Calls over GPRS and EPS
Impacted Specifications	
TS 22.101	Service aspects; Service principles -S1
TS 23.060	General Packet Radio Service (GPRS); Service description; Stage 2 - S2
TS 23.167	IP Multimedia Subsystem (IMS) emergency sessions - S2
TS 23.203	Policy and Charging Control Architecture - S2
TS 23.221	Architectural requirements - S2
TS 23.228	IMS Stage 2 - S2
TS 23.271	Functional stage 2 description of Location Services (LCS) - S2
TS 23.401	GPRS enhancements for LTE access - S2
TS 23.402	Architecture enhancements for non-3GPP accesses - S2
TS 33.401	3GPP System Architecture Evolution (SAE); Security architecture - S3
TS 33.402	3GPP System Architecture Evolution (SAE); Security aspects of non-3GPP accesses - S3
New Dedicated Specifications/Reports	
TR 23.869	Support for Internet Protocol (IP) based IP Multimedia Subsystem (IMS) Emergency calls over General Packet Radio Service (GPRS) and Evolved Packet Service (EPS) - S2

Supporting Companies: Alcatel Lucent, Qualcomm, Telecom Italia, SiRF Technology, Nortel, TCS, Motorola, Ericsson, Nokia, Nokia Siemens Networks, Verizon, Cisco, Rogers Wireless, AT&T, Andrew, Huawei.

Unique_ID	Name	Resource	Hyperlink
380064	Support for IMS Emergency Calls over GPRS and EPS		SP-080844
410036	Stage 1 for IMS Emergency Calls over GPRS and EPS	S1	SP-080844
410037	Stage 2 for IMS Emergency Calls over GPRS and EPS	S2	SP-080844
420022	Security aspects for IMS Emergency Calls over GPRS and EPS	S3	SP-080844
440035	Stage 3 for IMS Emergency Calls over GPRS and EPS	C1,C3,C4	CP-090564
440036	CT1 aspects - Stage 3 for IMS Emergency Calls over GPRS and EPS	C1	CP-090564
480029	Conformance Test Aspects - CT1 aspects of IMS Emergency Calls over GPRS and EPS	R5	RP-100567
440037	CT3 aspects - Stage 3 for IMS Emergency Calls over GPRS and EPS	C3	CP-090564
440038	CT4 aspects - Stage 3 for IMS Emergency Calls over GPRS and EPS	C4	CP-090564

UID_410036, 410037, 420022

IMS Emergency Calls over GPRS and EPS (S1,S2,S3)

Unique_ID	Name	Resource	Hyperlink	TSs_and_TRs
410036	Stage 1 for IMS Emergency Calls over GPRS and EPS	S1	SP-080844	22.101
410037	Stage 2 for IMS Emergency Calls over GPRS and EPS	S2	SP-080844	23.869, 23.060, 23.167, 23.203, 23.221, 23.228, 23.271, 23.401, 23.402
420022	Security aspects for IMS Emergency Calls over GPRS and EPS	S3	SP-080844	33.401, 33.402

There is a need to establish Emergency Sessions in PS mode via GPRS access and IMS for meeting regional regulatory requirements for PS based emergency calls, and to remain competitive with other wireless PS technologies (e.g. WLAN and cdma2000). There is also a need to support IMS Emergency Sessions over EPS. This work:

- updates requirements for supporting IMS emergency calls over GERAN, UTRAN and E-UTRAN access
- For both cases a) UE in normal service mode (UE has sufficient credentials and is authorized to receive the service) and b) UE in limited service (UE does not have sufficient credentials or is not authorized to receive the service), provides functionality meeting TS 22.101, 23.167 and other relevant specifications for Emergency Session handling for emergency calls over:
 - GPRS using GERAN and UTRAN access
 - EPS using E-UTRAN access
- specifies EPS functionality supporting IMS emergency call handover between 3GPP and non-3GPP access (access network specific impacts for UE to attach to non-3GPP access network for emergency calls is out of 3GPP scope).
- specifies adding EPS support of IMS emergency calls complying with applicable requirements for provision of location information.

As defined in TS 22.101 and 22.030, different MMI should be available to invoke emergency services.

Implications for emergency access to PS domain and IMS without security credentials were considered.

UID 440035 Stage 3 for IMS Emergency Calls over GPRS and EPS (C1,C3,C4)

Unique_ID	Name	Resource	Hyperlink	TSs_and_TRs
440035	Stage 3 for IMS Emergency Calls over GPRS and EPS		CP-090564	-
440036	CT1 aspects - Stage 3 for IMS Emergency Calls over GPRS and EPS	C1	CP-090564	23.122, 24.008, 24.229, 24.301, 24.302
440037	CT3 aspects - Stage 3 for IMS Emergency Calls over GPRS and EPS	C3	CP-090564	29.212, 29.213, 29.214, 29.215
440038	CT4 aspects - Stage 3 for IMS Emergency Calls over GPRS and EPS	C4	CP-090564	23.003, 23.008, 29.060, 29.272, 29.273, 29.274, 29.275, 29.276

To meet regional regulatory requirements for PS based emergency calls functionality is needed to establish an emergency session in PS mode via GPRS access and the IMS. Standardized support for IMS Emergency Sessions over EPS (Evolved Packet System) is also required. This work:

- Updated requirements on the support of IMS emergency calls over UTRAN and E-UTRAN access.
- Specified functionality needed to meet the requirements as defined in TS 22.101, 23.167 and other relevant specifications for emergency session handling for IMS emergency calls over the GPRS using UTRAN access both in the case where the UE is in normal service mode (e.g., UE has sufficient credentials and is authorized to receive the service) and where the UE is in limited service (e.g. the UE does not have sufficient credentials or is not authorized to receive the service).
- Specified functionality needed to meet the requirements as defined in TS 22.101, 23.167 and other relevant specifications for emergency session handling for emergency calls over the EPS using UTRAN and E-UTRAN access both in the case where the UE is in normal service mode (e.g., UE has sufficient credentials and is authorized to receive the service) and where the UE is in limited service (e.g. the UE does not have sufficient credentials or is not authorized to receive the service).
- Specified EPS functionality for supporting IMS emergency call handovers between 3GPP and non-3GPP access.

Access network specific impact on UE to attach to non-3GPP access network for emergency calls is out of 3GPP scope.

Revisions to location requirements are covered by a separate work item.

7.1.1 Conformance Test Aspects - CT1 aspects of IMS Emergency Calls over GPRS and EPS **UID_480029 (target Mar 2011)**

Resources: R5

Unique_ID	Name	Finish	Compl	Hyperlink	Status_Report	rapporteur	Notes	TSs_and_TRs
480029	Conformance Test Aspects - CT1 aspects for IMS Emergency Calls over GPRS and EPS	18/03/2011	10%	RP-100567	RP-100746	Samsung	Testing for UID_440036 CT1 aspects - Stage 3 of Support for IMS Emergency Calls over GPRS and EPS	34.108, 34.123-1, 34.123-2, 34.123-3, 34.229-1, 34.229-2, 34.229-3, 36.508, 36.523-1, 36.523-2, 36.523-3

7.2 Support for IMS Emergency Calls over LTE **UID_420041**

Resources: R2

References

Document	Title/Contents
WID(s)	
RP-081140	WID on Support for IMS Emergency Calls over LTE
Impacted Specifications	
TS 36.331	Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification
TS 36.413	Evolved Universal Terrestrial Radio Access (E-UTRA) ; S1 Application Protocol (S1AP)
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Alcatel-Lucent, Verizon Wireless, Nortel, AT&T, Qualcomm, Motorola, Nokia, Nokia Siemens Networks, Ericsson, Samsung.

Unique_ID	Name	Resource	Hyperlink	TSs_and_TRs
420041	Support for IMS Emergency Calls over LTE	R2,R3	RP-081140	36.331, 36.413

Many aspects of emergency calls over E-UTRAN are already addressed including the necessary cause values, Access class barring, priority handling etc. Additional work addresses:

1. Access for UICC-less UEs especially related to handling integrity protection
2. Any additional RAN aspect identified as part of the SA2 work item on emergency calls over E-UTRAN
3. Any aspects identified by SA2 for transfer of emergency calls to CS mode using SRVCC

Location services are covered by a separate WI (UID_430006 LCS for LTE and EPS) and any aspect associated with emergency calls not covered by it is covered by this WI.

Implications for emergency access without security credentials were considered.

7.2.1 Conformance Test Aspects – Support for IMS Emergency Calls over LTE **UID_470017 (target Dec 2010)**

Resources: R5

Unique_ID	Name	Finish	Compl	Hyperlink	Status_Report	rapporteur	Notes	TSs_and_TRs
470017	Conformance Test Aspects – Support for IMS Emergency Calls over LTE	10/12/2010	50%	RP-100118	RP-100742	Ericsson	RP#49 completion 09/10=>12/10	36.508, 36.523-1, 36.523-2, 36.523-3

7.3 SRVCC support for IMS Emergency Calls **UID_410038**

Resources: S2,C1,C4,C3

References

Document	Title/Contents
WID(s)	
SP-090099	SA2 WID on SR VCC support for IMS Emergency Calls
CP-090882	CT WID on CT aspects of SRVCC support for IMS Emergency Calls
Impacted Specifications	
TS 23.216	Single Radio Voice Call Continuity (SRVCC); Stage 2
TS 23.237	IP Multimedia Subsystem (IMS) Service Continuity; Stage 2
New Dedicated Specifications/Reports	
TR 23.870	SR VCC support for IMS Emergency Calls

Supporting Companies: China Mobile, Ericsson, Nokia-Siemens Networks, Verizon, Qualcomm, TeleCommunication Systems, Rogers Wireless, Nortel, Huawei, Nokia, AT&T, ZTE.

Unique_ID	Name	Resource	Hyperlink	TSs_and_TRs
410038	SRVCC support for IMS Emergency Calls	S2,C1,C4,C3	SP-090099	-
410138	SRVCC support for IMS Emergency Calls	S2	SP-090099	23.870, 23.216, 23.237
460018	CT aspects of SRVCC support for IMS Emergency Calls	C1,C4,C3	CP-090882	-

This work is linked to:

UID_350030	Single Radio Voice Call Continuity for 3GPP	(SAES-SRVCC)
UID_360020	Voice Call Continuity for CDMA2000 1X	(SAES-VCC_1X)
UID_320031	Study on Service Continuity for Emergency Voice Calls	(FS_VCCem) TR 23.826
UID_400048	Stage 2 for LCS_CPS_EPS	TR 23.891 (Evaluation of LCS Control Plane Solutions for EPS)

When providing IMS emergency calls over EPS, emergency calls need to continue when SRVCC handover occurs from E-UTRAN/HSMA to UTRAN/GERAN or from E-UTRAN to CDMA2000 1x, otherwise the regulation is violated. This work provides support for IMS emergency calls handover - including EPS and IMS aspects - in following cases:

- from E-UTRAN to CDMA2000 1x CS using SRVCC
- from E-UTRAN to UTRAN/GERAN CS using SRVCC (Note: If HSPA to UTRAN/GERAN SRVCC solution is part of Rel-8 then solution needs to be developed for the HSPA case as well.)

Location continuity aspects are part of this work.

Some IMS aspects in TR 23.826 Feasibility study on Voice Call Continuity (VCC) support for emergency calls, **may be used** as part of the overall solution for SRVCC for IMS emergency calls.

Unique_ID	Name	Resource	Hyperlink	TSs_and_TRs
460018	CT aspects of SRVCC support for IMS Emergency Calls		CP-090882	-
440027	CT1 aspects of SRVCC support for IMS Emergency Calls	C1	CP-090882	24.229, 24.237
440028	CT4 aspects of SRVCC support for IMS Emergency Calls	C4	CP-090882	29.205, 29.280
460019	CT3 aspects of SRVCC support for IMS Emergency Calls	C3	CP-090882	29.163

- Stage 3 specifications of SR-VCC handover procedures from EUTRAN to UTRAN
- Stage 3 specifications of SR-VCC handover procedures from HSPA to UTRAN
- Stage 3 specifications of SR-VCC handover procedures from EUTRAN to CDMA2000 1x
- Specified functionalities and interfaces of EPS entities to support IMS emergency call when SR-VCC happens

8 LCS for LTE and EPS UID_430006

Unique_ID	Name	Resource	Hyperlink	Notes
430006	LCS for LTE and EPS			
400038	LCS Control Plane Solution for EPS	S2,C4,C1	SP-080445	Triggered by abandoned Study UID_380068 (FS_LCS_EPS). Linked to Feature Support for IMS Emergency Calls over GPRS and EPS (UID_380064)
420006	Positioning Support for LTE	R2,R1,R3,R4	RP-091389	UID_400038 (LCS Control Plane Solution for EPS) depends on this WI

8.1 LCS Control Plane Solution for EPS UID_400038

Resources: S2,C4,C1

References

Document	Title/Contents
WID(s)	
SP-080445	SA2 WID on LCS Control Plane Solution for EPS
Impacted Specifications	
TS 23.271	Functional stage 2 description of Location Services (LCS)
TS 23.401	General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access
TS 23.402	Architecture enhancements for non-3GPP accesses
New Dedicated Specifications/Reports	
TR 23.891	Evaluation of LCS Control Plane Solutions for EPS

Supporting Companies: AT&T, Ericsson, NTT DoCoMo, Alcatel-Lucent, SK Telecom, Polaris Wireless, TCS, TruePosition, Andrew, Qualcomm Europe, China Mobile, Thales, NEC.

Triggered by the abandoned Study Evaluation of LCS Control Plane Solutions for EPS (FS_LCS_EPS) UID_380068.

This work is linked to the Rel-9 Feature Support for IMS Emergency Calls over GPRS and EPS (UID_380064).

Unique_ID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
400038	LCS Control Plane Solution for EPS	-	SP-080445	Linked to Feature Support for IMS Emergency Calls over GPRS and EPS (UID_380064)	-
400048	Stage 2 for LCS Control Plane Solution for EPS	S2	SP-080445	-	23.891, 23.271, 23.401, 23.402

LCS requirements can be fulfilled by Control Plane solution, User Plane solution or a combination of both. The following LCS capabilities are more appropriately served in the Control Plane environment:

- obtaining location of UE which does not support User Plane location
- User Plane location may not meet response delay requirements e.g. emergency services, lawful interception
- security applications that require to avoid or minimize detection and a higher level of accuracy than cell/sector
- network based location methods that require channel and configuration information that is most readily available in the Control Plane environment
- provision of LCS by operators not wishing to implement only User Plane location, but also Control Plane and/or hybrid approaches as well (e.g. operators supporting Control Plane LCS for 2G/3G access networks)

This work:

- 1) develops an LCS Reference Architecture for EPS
- 2) provides Core Network capability consistent with the requirements in TS 22.071.

A design goal is to minimize LCS unique changes subject to meeting stated regulatory requirements. Radio signal measurements and/or position methods for E-UTRAN are considered by TSG RAN.

Unique_ID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
440020	CT4 aspects - Control Plane LCS in the EPC	C4	CP-090811	IANA registrations outstanding. Stage 3 SLs and SLg interfaces & transport	24.080, 29.002, 29.272, 29.230, new 24.171,

				of positioning messages between E-SMLC and MME in the scope of UID_420006 (Positioning Support for LTE)	29.171, 29.172, 29.173
440120	CT1 aspects - Control Plane LCS in the EPC	C1	CP-090811	-	24.301

SA2 TS 23.271 (LCS Stage 2) creates new interfaces in the EPC:

- SLg between the GMLC and the MME
- SLs between the E-SMLC and the MME
- Diameter-based SLh between the HSS and the HGMLC

Enhancements may also be required for two existing interfaces:

- MAP-based Lh
- Lr

The Lr interface is defined by the OMA LOC working group and hence any enhancements would require liaison with OMA. It is necessary to define these new interfaces in the EPC as well as any modifications to the existing interfaces in order to have a functioning LCS Control Plane solution in the EPS.

Stage 3 definition is needed for MT-LR privacy notification and verification and MO-LR requests between the UE and MME as described in TS 23.271. Positioning message transport needs to be supported between the MME and UE transparently to the E-UTRAN as defined in TS 36.305 and should enable multiple E-SMLCs as required in TS 23.271.

Objectives:

1. Create a new specification which defines the transport and location transaction support for the SLg interface.

The functionality and messaging on the SLg should be nearly identical to that which already exists on the Lg, although the use of SS7 versus IP transport should be evaluated. SLg functionality needs to support location for IMS emergency calls as well as commercial MT-LR and MO-LR

2. Create a new specification for the SLs interface

Define the transport and session layer support for this interface based on the procedural description in TS 23.271 (LCS stage 2). Assume that positioning support and associated signalling will be defined in RAN but provide the means to transport this signalling between the E-SMLC and MME in a manner that enables transfer to the eNodeB or UE with minimum impact to the MME. Liaise with RAN2/3 to ensure SLs support meets RAN needs.

3. Create a new specification for the Diameter-based SLh interface

The functionality and messaging on the Diameter-based SLh interface should be nearly identical to that which already exists on the MAP-based Lh interface, while the transport and session layer will be based on the Diameter protocol instead of MAP.

4. Determine if the MAP-based Lh interface must be modified, how and execute any required changes
5. Determine if the Lr interface must be modified and, if so, liaise requirements to OMA LOC
6. Create a new specification for the stage 3 definition of MT-LR privacy messages and MO-LR messages
7. Determine whether positioning message transport between the UE and MME requires some additional NAS message support (e.g. to enable multiple E-SMLCs and/or multiple positioning sessions) and, if so, include this in TS 24.301

Evaluate the need for LCS signalling control (e.g. suspension) to avoid delay to EMM, ESM and other higher priority signalling

8.2 Positioning Support for LTE **UID_420006**

Resources: R2,R1,R3,R4

References

Document	Title/Contents
WID(s)	
RP-080995	WID on Positioning Support for LTE
Impacted Specifications	
TS 34.213	E-UTRA Physical layer procedures
TS 36.133	E-UTRA Requirements for support of radio resource management
TS 36.211	E-UTRA Physical channels and modulation
TS 36.214	E-UTRA Physical layer – Measurements
TS 36.300	E-UTRA and E-UTRAN Overall description; Stage 2
TS 36.331	E-UTRA Radio Resource Control (RRC); Protocol specification
TS 36.410	E-UTRA S1 layer 1 general aspects and principles
TS 36.413	E-UTRAN S1 Application Protocol (S1AP)
New Dedicated Specifications/Reports	
TS 36.171	Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for Support of Assisted Global Navigation Satellite System (A-GNSS) - R4
TS 36.305	Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Stage 2 functional specification of User Equipment (UE) positioning in E-UTRAN - R2
TS 36.355	Evolved Universal Terrestrial Radio Access (E-UTRA); LTE Positioning Protocol (LPP) - R2
TS 36.455	Evolved Universal Terrestrial Radio Access (E-UTRA); LTE Positioning Protocol A (LPPa) - R3

Supporting Companies:

Unique_ID	Name	Hyperlink	Status_Report	Notes	TSs_and_TRs
420006	Positioning Support for LTE	RP-091389	RP-100442	UID_400038 (LCS Control Plane Solution for EPS) depends on this WI	34.213, 36.133, 36.211, 36.214, 36.300, 36.305, 36.331, 36.355, 36.410, 36.413, 36.455, new 36.171

This work is linked to Rel-9:

UID_400038 LCS Control Plane Solution for EPS (depends on this WI)

UID_380064 Support for IMS Emergency Calls over GPRS and EPS (is extended by this WI)

EPS and LTE were introduced in Rel-8 but without any explicit support for positioning, which is however needed for:

- Support IMS emergency calls over EPS (the only location solution currently endorsed by 3GPP is OMA SUPL 2.0). SUPL 2.0 in an LTE context allows positioning using cell ID, enhanced cell ID, A-GPS and A-GNSS but does not currently allow other methods analogous to methods already defined for GSM, WCDMA, 1xRTT and Ev-DO such as E-OTD, OTDOA/IPDL, U-TDOA and AFLT.
Such methods have historically been useful and even essential to act as a backup to A-GPS in regions where emergency calls are subject to strong regulation.
- LCS Control Plane Solution for EPS (no positioning support has yet been defined except for a basic cell ID method between the E-UTRAN and MME).
- OMA SUPL 2.0 (for LTE access, would be restricted to use of A-GPS, A-GNSS, E-CID and cell ID).

Performance of positioning for LTE access should equal/exceed other access types due to increasing level of regulatory requirement in some regions and increasing demands imposed by new LCS applications.

This work includes support for the following positioning capabilities and features in association with LTE access:

- positioning protocol(s) supporting both Control Plane LCS solution for EPS and OMA SUPL
- UE assisted and UE based A-GNSS
- a downlink terrestrial positioning method, analogous to E-OTD, OTDOA and AFLT, capable of operating in UE assisted and UE based modes (a single downlink method is defined)
- enhanced cell ID measurements coming from the UE and/or eNode B

The solution is backward compatible with Rel-8 networks and UEs that support LTE and EPS.

8.2.1 Conformance Test Aspects – Positioning Support for LTE

UID_470018 (target Mar 2011)

Resources: R5

Unique_ID	Name	Finish	Compl	Hyperlink	Status_Report	rapporteur	Notes	TSs_and_TRs
470018	Conformance Test Aspects – Positioning Support for LTE	11/03/2011	40%	RP-100617	RP-100743	Alcatel-Lucent	-	36.508, 36.509, 36.521-3, new 36.571-1/2/3/4/5

9 MBMS support in EPS / LTE

Unique_ID	Name	WG	Hyperlink
400039	MBMS support in EPS	-	SP-080737
430007	MBMS support in LTE	R2,R3,R4	RP-091457

9.1 MBMS support in EPS UID_400039

Resources: S2,S3,S5,C3,C4

References

Document	Title/Contents WID(s)
SP-080737	SA2 WID on MBMS support in EPS
SP-090052	SA5 WID on MBMS Charging in EPS
CP-090325	WID on CT4 aspects of MBMS support in EPS
CP-090330	WID on CT3 aspects of MBMS support in EPS
RP-091457	RAN2 WID on MBMS support in LTE
Impacted Specifications	
TS 23.246	Multimedia Broadcast/Multicast Service (MBMS); Architecture and functional description - S2
TS 32.273	Telecommunication management; Charging management; Multimedia Broadcast and Multicast Service (MBMS) charging -S5
TS 32.251	Telecommunication management; Charging management; Packet Switched (PS) domain charging -S5
TS 32.298	Telecommunication management; Charging management; Charging Data Record (CDR) parameter description -S5
TS 32.299	Telecommunication management; Charging management; Diameter charging applications -S5
TS 33.246	3G Security; Security of Multimedia Broadcast/Multicast Service (MBMS) - S3
TS 36.101	User Equipment (UE) radio transmission and reception - R4
TS 36.104	Base Station (BS) radio transmission and reception - R4
TS 36.141	Base Station (BS) conformance testing - R4
TS 36.300	Overall description; Stage 2 - R2
TS 36.304	User Equipment (UE) procedures in idle mode - R2
TS 36.321	Medium Access Control (MAC) protocol specification - R2
TS 36.322	Radio Link Control (RLC) protocol specification - R2
TS 36.323	Packet Data Convergence Protocol (PDCP) specification - R2
TS 36.331	Radio Resource Control (RRC); Protocol specification - R2
TS 36.413	S1 Application Protocol (S1AP) - R3
TS 36.440	General aspects and principles for interfaces supporting Multimedia Broadcast Multicast Service (MBMS) within E-UTRAN - R3
TS 36.441	Layer 1 for interfaces supporting Multimedia Broadcast Multicast Service (MBMS) within E-UTRAN - R3
TS 36.442	Signalling Transport for interfaces supporting Multimedia Broadcast Multicast Service (MBMS) within E-UTRAN - R3
TS 36.444	M3 Application Protocol (M3AP) - R3
TS 36.445	M1 Data Transport - R3
TS 36.446	M1 User Plane protocol - R3
New Dedicated Specifications/Reports	
-	-

Supporting Companies: China Mobile, Ericsson, ZTE, Huawei, Orange, NTT DoCoMo, Nextwave, CATT, Qualcomm Europe, NEC.

Unique_ID	Name	WG	Hyperlink
400039	MBMS support in EPS		SP-080737
400040	Stage 2 for MBMS support in EPS	S2	SP-080737
420023	Security for MBMS support in EPS	S3	SP-080737
430033	MBMS Charging in EPS	S5	SP-090052
440025	CT4 aspects of MBMS support in EPS (Stage 3)	C4	CP-090325
440026	CT3 aspects of MBMS support in EPS (Stage 3)	C3	CP-090330

Unique_ID	Name	WG	Hyperlink	TSs_and_TRs
400040	Stage 2 for MBMS support in EPS	S2	SP-080737	23.246
420023	Security for MBMS support in EPS	S3	SP-080737	33.246

E-UTRAN provides a high-data-rate, low-latency and packet-optimized radio-access used for point-to-point services. TSG RAN specifies Multimedia Broadcast Multicast Service (MBMS) functionality for E-UTRAN, including e.g. Multicast/Broadcast over a Single Frequency Network (MBSFN) operation.

Accordingly mechanisms to support MBMS in EPC are needed in order to provide MBMS over E-UTRAN. When GERAN/UTRAN is served by EPC it is necessary to specify how EPC provides MBMS over this access as well.

This work species the architecture and procedures or procedure enhancements to support MBMS over E-UTRAN/UTRAN/GERAN accesses served by EPC for the "Evolved Broadcast transmission mode".

SA3 specified new security functionality, e.g. related to Network Domain Security (NDS).

Unique_ID	Name	WG	Hyperlink	TSs_and_TRs
430033	MBMS Charging in EPS	S5	SP-090052	32.273, 32.251, 32.298, 32.299

MBMS support in EPS is covered by SA2 in TS 23.246 (MBMS architecture and functional description) and SA5 aligns charging specifications TS 32.273, 32.251, 32.298 and 32.299 by adding description, associated AVPs and corresponding charging fields in CDRs.

Unique_ID	Name	WG	Hyperlink	TSs_and_TRs
440025	CT4 aspects of MBMS support in EPS (Stage 3)	C4	CP-090325	29.274, 29.281, 23.007, 23.008

MBMS is a point-to-multipoint service in which data is transmitted from a single source entity to multiple recipients. Transmitting the same data to multiple recipients allows network resources to be shared.

The MBMS bearer service in EPS ONLY offers evolved broadcast mode.

MBMS architecture enables the efficient usage of radio-network and core-network resources, with an emphasis on radio interface efficiency.

CT4 specified the Stage 3 protocols and information elements for MBMS support in EPS; more specifically procedures, message names and associated information elements for MBMS in EPS.

Unique_ID	Name	WG	Hyperlink	TSs_and_TRs
440026	CT3 aspects of MBMS support in EPS (Stage 3)	C3	CP-090330	29.061

CT3 worked on protocols to include MBMS Gi enhancement to support SGi-mb, and Gmb enhancement to support SGmb:

- Supporting data delivery with content synchronization and optional header compression capsulated in the data between BM-SC and MBMS GW via SGi-mb interface
- Supporting control plane evolved for EPS session between BM-SC and MBMS GW via SGmb interface
- Message Flows and message definitions

9.2 MBMS support in LTE **UID_430007**

Resources: R2,R3,R4

Unique ID	Name	WG	Hyperlink	TSs and TRs
430007	MBMS support in LTE	R2,R3,R4	RP-091457	25.446, 36.101, 36.104, 36.141, 36.300, 36.304, 36.321, 36.322, 36.323, 36.331, 36.440, 36.441, 36.442, 36.444, 36.445

Supporting Companies: Huawei, KDDI, China Mobile, CATT, T-Mobile, NEC, Nokia, Nokia Siemens Networks, LG Electronics, ZTE, Nortel, Ericsson, Alcatel-Lucent, Motorola, Orange.

This work is related to:

UID_400039	MBMS support in EPS	(Rel-9 Feature for this Building Block))
UID_330018	LTE – Physical Layer	(LTE physical layer is MBMS-ready)
UID_330019	LTE – Radio Interface Layer 2 and 3 Protocol Aspect	(MBMS was initially part of Rel-8)
UID_330020	LTE – eUTRAN Interfaces	(MBMS was initially part of Rel-8)

SA specifies the architecture, procedures and procedure enhancements to support MBMS over E-UTRAN/ UTRAN/ GERAN accesses served by EPC (UID_400039).

TSG RAN needs now to resume the specification of MBMS over E-UTRAN. This work provides a limited broadcast MBMS functionality using MBSFN transmission scheme in order to finish in a timely manner. i.e.:

- One cell belongs to only one MBSFN area (i.e. no overlapping areas, this restriction can be revisited during work).
- Multiple non overlapping MBSFN areas can be supported in a PLMN
- MBSFN areas are static (no dynamic changing areas, changes are made by O&M)
- No support for HeNB
- No new mobility procedures for MBMS (i.e. no inter frequency layer convergence or dispersion)
- Broadcast transmission mode in only a shared carrier deployment (no dedicated carrier)
- MBSFN without feedback (i.e. no ACK/NACK or counting)
- Signalling support for LTE MBMS (e.g. MCCH over LTE-Uu)

10 SA1 Features

10.1 Value-Added Services for Short Message Service (VAS4SMS) **UID_370026**

Resources: S1,C4,C1

References

Document	Title/Contents
WID(s)	
SP-070572	S1 WID on Support of Value Added Services for Short Message Service
CP-090813	CT WID on Value-Added Services for SMS (VAS4SMS); Interface and Signalling Flow
Impacted Specifications	
TS 23.040	Technical realization of the Short Message Service (SMS) - C1
New Dedicated Specifications/Reports	
TS 22.142	Value Added Services (VAS) for Short Message Service (SMS) requirements - S1
TS 23.142	Value-added Services for SMS (VAS4SMS); Interface and Signalling Flow - C4

Supporting Companies: China Mobile, TeliaSonera, Comverse, Huawei, RIM, ZTE.

Unique ID	Name	Resource	Hyperlink
370026	Value-Added Services for Short Message Service		SP-070572
370126	Stage 1 for VAS4SMS	S1	SP-070572
410011	VAS4SMS Interface and Signalling Flow - CT4 aspects	C4	CP-090813
410014	VAS4SMS Interface and Signalling Flow - CT1 aspects	C1	CP-090813

This work is based on Rel-8 TR 22.942 (Study on Value-Added Services for Short Message Service) UID_340034.

With VAS4SMS, both the calling and called party can experience some enhanced services based on legacy SMS, such as message forwarding, message filtering, message receipt, message auto reply, etc.

With VAS4SMS, the user can experience VASs when sending or receiving point-to-point short messages.

Additional features may emerge in the future.

Support and implementation of VAS4SMS in the network or UE is optional.

However, backwards compatibility with UEs and networks that do not support VAS4SMS needs to be ensured.

Although some VAS4SMS maybe implemented in UE, there is also a need to support these services in the network.

Due to potential limitations of the current architecture to deploy VAS4SMS, roaming and interworking, support was especially considered.

TS 22.142 specifies the requirements for VAS4SMS currently including: SMS forwarding, SMS filtering, SMS receipt, SMS VPN, SMS network storage, SMS auto reply and SMS personal signature. TS 22.142 includes:

- Service definition of different value-added services for SMS
- Service interaction between different value-added services for SMS
- Interworking and interaction requirements on the VAS part of VAS4SMS with other messaging services assuring no overlap with OMA and the linked 3GPP work item UID_340031 Support of Service-Level Interworking for Messaging Services (MESSIW)
- Provisioning aspects of the VAS4SMS, e.g. registration, activation, deactivation and withdrawal

CT4 and CT1 have specified Stages 2 and 3 for VAS4SMS with backwards compatibility with SMS.

The solution took into account the SMS router functionality, including specification of:

- Architecture for VAS4SMS
- Signalling flows for VAS4SMS, etc.

10.2 Definition of End-User Identity (EUI) **UID_370027**

Resources: S1

References

Document	Title/Contents
WID(s)	
SP-090380	SA1 WID on Definition of End-User Identity (EUI)
Impacted Specifications	
TR 21.905	Vocabulary for 3GPP Specifications
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Nokia Siemens Networks, T-Mobile, Vodafone, Nokia, Huawei, Ericsson

Unique_ID	Name	Hyperlink	Notes
370027	Definition of End-User Identity	SP-090380	Stage 1 work closed at 5% completion due to lack of input (added only the EUI definition in 21.905)

This work is linked to:

Rel-8 UID_31081 Personal Network Management (PNM)
 Rel-9 UID_400031 Support of Personal Area Networks and Enhancements to Personal Network Management (PAN_EPNM)
 TR 32.808 UID_320006 Study on Common Profile Storage (CPS) Framework of User Data for network services and management

In many countries the market penetration of mobile communication services exceeds already 100 %.
 Multi-subscription scenarios imply that the average user of 3GPP networks uses more than one mobile terminal.

A typical scenario is when a person uses multiple terminals over different accesses, potentially using separate subscriptions for each access.

Use cases were addressed in the PNM framework (TS 22.259) without the introduction of "end-user" as a new identity. PNM functionality is constrained due to this limitation. Insofar handling of various subscriptions belonging to one user can be improved substantially when different identities (and related profiles) can be associated with a single "end-user". This allows information correlation between subscriptions in order to enable integrated charging, QoS provisioning, handover as in VCC or proper inter-working across multiple application layers (access - service - application).

The overall goal was to identify an "end-user" associated with one or multiple mobile identities (e.g. IMSIs, IMPIs). This work defines the "end-user" in 3GPP as a consumer of communication services being associated with identities related to one or multiple subscribers (e.g. IMSIs, MSISDNs, IMPIs, IMPUs, ...) and application-specific identities. These identities can belong to different subscriptions.

This work does not impact existing identities used in 3GPP or the relationships among them.
 The EUI is an identity used by the operator and is not visible or used by the user.

Service requirements from existing 3GPP work (e.g. PNM) were taken as a basis to deduce requirements on EUI. Charging aspects related to subscriptions associated with the "end-user" may need to be identified. Introduction of an "end-user" concept shall not compromise security and privacy of individual 3GPP users or the subscribers associated with the "end-user". Utilizing the concept of "end-user" in the context of emergency services may improve the (personal) security of an individual 3GPP user.

SA#42 Stage 1 work closed at 5% completion due to lack of input (added only the EUI definition in 21.905)

10.3 Customized Ringing Signal (CRS) UID_380067

Resources: S1,C1

References

Document	Title/Contents
WID(s)	
SP-080502	SA1 WID on Customized Ringing Signal Requirements (CRS)
CP-090444	CT1 WID on Stage 3 for IMS CRS Service
Impacted Specifications	
TS 22.173	IP Multimedia Core Network Subsystem (IMS) Multimedia Telephony Service and supplementary services; Stage 1 - S1
TS 24.173	IMS Multimedia telephony service and supplementary services; Stage 3 - C1
New Dedicated Specifications/Reports	
TS 22.183	Customized Ringing Signal (CRS) requirements; Stage 1 - S1
TS 24.183	IP Multimedia Subsystem (IMS) Customized Ringing Signal (CRS) service; Stage 3 - C1

Supporting Companies: SK Telecom, Samsung, Comverse, LG Electronics, Huawei, China Mobile, Toshiba, France Telecom, Orange.

This work is linked to UID_370029 TISPAN requirements for customized multimedia information services.

Unique_ID	Name	Resource	Hyperlink
380067	Customized Ringing Signal		SP-080502
410025	Stage 1 for CRS	S1	SP-080502
440041	Stage 3 for IMS CRS Service	C1	CP-090444

Customized Ringing Signal (CRS) is a Value Added Service by which an operator enables the subscriber to customize the ringing signal which is played to the called party. Subject to the consent by the terminating party, with CRS, the calling party can configure the preferred text, multimedia clips or other customized ringing will be shown to the callee's terminal instead of traditional ones.

This work specifies service requirements for CRS in CS CN and IMS, including the transfer of Stage1 for Customized Originating Multimedia Information Services from TISPAN to 3GPP (based on use cases and service description of COMIP and COMIF contained in ETSI TR 181 015).

Stage 3 aspect of Customized Ringing Signal service were standardized by CT1 without any Stage 2 work.

This work provides solutions for the following features:

- Normal procedures for CRS services in IMS domain
- Provisioning and Withdrawal IMS CRS services
- Activation and Deactivation and Update IMS CRS services

10.x Enhancements to Multimedia Priority Service (ePRIOR)

UID_390073 (moved to Rel-10)

Resources: S1

10.4 Support of Personal Area Networks and Enhancements to Personal Network Management

UID_400031

Resources: S1,C1

References

Document	Title/Contents
WID(s)	
SP-080430	SA1 WID on Support of Personal Area Networks and Enhancements to Personal Network Management
CP-090435	CT1 WID on Stage 2/3 for PAN_EPNM
Impacted Specifications	
TS 22.259	Service requirements for Personal Network Management (PNM); Stage 1
TS 23.259	Personal Network Management (PNM); Procedures and Information Flows; Stage 2 - C1
TS 24.259	Personal Network Management (PNM); Stage 3 - C1
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Vodafone, NTT DoCoMo, NEC, Toshiba, Panasonic, Telcordia Technologies, Huawei.

Unique_ID	Name	Resource	Hyperlink	TSs_and_TRs
400031	Support of Personal Area Networks and Enhancements to Personal Network Management		SP-080430	
400043	Stage 1 for PAN_EPNM	S1	SP-080430	22.259
430002	Stage 2 for PAN_EPNM	C1	CP-090435	23.259
430102	Stage 3 for PAN_EPNM	C1	CP-090435	24.259

Rel-7 UID_31059 (FS_AIPN) resulted in TR 22.978 All-IP network (AIPN) feasibility study.

TR 22.978 considered requirements on prospective Personal Networks (PN) and Personal Area Networks (PAN) beneficial for deployment in a mixed CS/PS domain, independent from AIPN or its successor EPS.

Personal Network (PN) in the context of AIPN, consists of more than one device (terminal or server provided by the AIPN operator) under the control of one user providing access to the AIPN.

These devices are interconnected by the AIPN such that the user perceives a continuous secure connection regardless of their relative locations. The user controls the PN using facilities provided by the AIPN.

Why this feature?

Many subscribers own more than one terminal and subscription, e.g. ordinary handset for telephony, car phone, PDA for emails when on the move, data card with laptop for work when in semi-stationary mode.

Although these terminals are mainly taken for a particular usage, many are able to support more than one sort of service, e.g. telephony is supported by all but the data card. Customers may not carry always their full set of "gadgets", but still want to be reachable. Management is not very friendly for the user for e.g. to set forwarding options, to switch-on/off terminals, to provide partners with multiple addresses.

PN provides efficient means for the user to manage his terminals.

Personal Area Network (PAN) in the context of AIPN consists of more than one device (terminal) controlled by, and physically close to, the same user (person). All the devices within a PAN use the same USIM.

These devices are connected together using internal PAN means.

The user obtains services from the AIPN using his multiple devices which all access the users USIM through the PAN to gain access to the AIPN. The user controls the PAN directly.

Why this feature?

Complimentary to PN, customers use devices which are capable to support certain services, but neither they are equipped with USIM nor with the radio access means, e.g. a PDA or laptop might be better suited to play a video stream with reasonable quality than a 3G phone with very limited screen size. Current interconnection means

between auxiliary devices and 3G terminals are very much of a proprietary nature and come with security constraints, e.g. for setting up a session via an auxiliary device.

This work specifies the provision of PAN supporting CS/PS services and enhances the existing PN functionality. Originating and terminating services shall be available via PN and PAN functionality in an easy-to-use manner without compromising reachability. The availability and the invocation of the features may incur charges.

CT1 specified Stage 2/3 supporting PAN and enhancements to PNM including mechanisms for:

- a user to register/deregister a PNE that can be used in a PAN
- a user to activate/deactivate the PNEs registered to a PAN
- redirecting the terminating services or any media components of the services addressed to any of the PNEs belonging to a PN to a certain PNE within the same PN based on the user's configuration
- a certain PNE of their PN as default PNE for the terminating services or any media components of the services
- supporting PN access control for PNE networks

10.5 Multi-Media Telephony Service enhancements (eMMTel)

UID_400032

Resources: S1,S5,C1

Unique_ID	Name	Resource
400032	Multi-Media Telephony Service enhancements	
400044	Stage 1 for eMMTel	S1
430031	Multimedia Telephony (MMTel) Service and Supplementary Services - Online Charging and completion for Offline Charging (all supplementary services)	S5
430032	Support of Real-time Transfer of Tariff Information (RTTI) in IMS charging	S5
440032	Stage 3 - Enhancements for Completion of Communications Supplementary service	C1

References

Document	Title/Contents
WID(s)	
SP-080503	SA1 WID on Multi-Media Telephony Service enhancements (eMMTel)
Impacted Specifications	
TS 22.173	IP Multimedia Core Network Subsystem (IMS) Multimedia Telephony Service and supplementary services; Stage 1
New Dedicated Specifications/Reports	
-	-

UID_400044 Stage 1 for eMMTel

Supporting Companies: France Telecom, Orange, BT, Ericsson, TeliaSonera

Rel-7/8 defined 18 conversational services applicable to IMS in TS 22.173 (Multi-media Telephony Service and supplementary services; Stage 1). All these services provide the basis of real time conversational communication. They are based on the existing services on PSTN and ISDN and maintain a high degree of interoperability with legacy network services, and similarity with existing services from the user point of view. This 1st step was completed in Rel-8. The 2nd step enhances the existing services in TS 22.173 by utilizing the flexibility of IMS and enables:

- dynamic blocking of incoming calls/communications from specific users (identities)
- user control of lists (allowing and preventing) invocation of specific supplementary services
- supplementary service invocation by date (in addition to time)
- user control of options for busy and no reply supplementary service invocation
- user control and interrogation of invoked supplementary services
- clarification of applicability of PNM to MMTel
- clarification of existing means to control context based information

A high degree of interoperability with legacy networks is maintained, but interactions with users and user applications are enhanced. This work was co-ordination with other bodies (e.g. OMA).

UID_430031 Multimedia Telephony (MMTel) Service and Supplementary Services - Online Charging and completion for Offline Charging (all supplementary services) (SA5)

References

Document	Title/Contents
WID(s)	
SP-090196	SA5 WID on Multimedia Telephony (MMTel) Service and Supplementary Services - Online Charging and completion for Offline Charging (all supplementary services)
Impacted Specifications	
TS 32.275	Telecommunication management; Charging management; MultiMedia Telephony (MMTel) charging
TS 32.298	Telecommunication management; Charging management; Charging Data Record (CDR) parameter description
TS 32.299	Telecommunication management; Charging management; Diameter charging applications
New Dedicated Specifications/Reports	
-	-

Current MMTel charging specification covers only a subset of TS 22.173 Supplementary Services for Offline charging. Online charging was also not fully specified.

This work completes the MMTel service and supplementary services offline charging for covering the whole set of TS 22.173 defined supplementary services. It enhances TS 32.275, 32.299 and 32.298 by adding description, associated AVPs and corresponding charging fields in the charging data records.

This work also fully covers online charging in TS 32.275, and enhances TS 32.299 for the defined credit-control application for MMTel service and supplementary services.

UID_430032 Support of Real-time Transfer of Tariff Information (RTTI) in IMS charging (SA5)

References

Document	Title/Contents
WID(s)	
SP-090306	SA5 WID on Support of Real-time Transfer of Tariff Information (RTTI) in IMS charging
Impacted Specifications	
TS 32.240	Telecommunication management; Charging management; Charging architecture and principles
TS 32.280	Telecommunication management; Charging management; Advice of Charge (AoC) service
TS 32.298	Telecommunication management; Charging management; Charging Data Record (CDR) parameter description
TS 32.299	Telecommunication management; Charging management; Diameter charging applications
New Dedicated Specifications/Reports	
-	-

This work is linked to SA5 Rel-8 UID_380042 AoC support in IMS Charging (IMSTSS). SA3/CT3 coordination needed on 29.658 (SIP transfer of tariff information).

CT3 TS 29.658 (TISPAN; SIP Transfer of IP Multimedia Service Tariff Information; Protocol specification) describes the SIP transfer of tariff information for both charging and advice of charge purposes.

TS 29.658 is also known as the specification describing the Real-time Transfer of Tariff Information (RTTI).

SA5 Rel-8 work item "AoC support in IMS Charging" needs the support of CT3 TS 29.658.

In order to cover AoC for Charging (AoCC) when tariff information is received according to RTTI, not only the AoC but also the charging aspects of TS 29.658 are required (S5-091027).

Moreover, some operators require also the charging aspects of TS 29.658 in order to support online and offline charging with external tariff/add-on charge information. This requirement relies on several points.

On one side, due to multiplication of interconnection scenarios and of service providers (e.g. 3rd party service providers), RTTI handling for charging purposes is needed to clear up the charging of prepaid and postpaid customers. On the another side, operators have to cope with new legislative constraints (e.g. loi Chatel in France) regarding consumers protection.

The SA5 IMS charging specifications currently do not consider the possibility to handle tariff/add-on charge information received according to TS 29.658 (RTTI). The charging functions must be capable of arbitrating incoming RTTI in order to decide whether it shall be considered or rejected, for offline or online charging. This gap should be covered as soon as possible.

The work creates a framework to handle RTTI for offline and online charging in SA5 IMS charging specifications. A new TS / enhance TS 32.240, 32.298 and 32.299 add functionality, description, AVP and charging fields in CDRs. This work also updates TS 32.280 (AoC service) according to enhancements introduced in other specifications. It was coordinated with SA3 (transfer of SIP messages carrying RTTI must be reliable and secure) and CT3 TS 29.658.

UID_440032 Stage 3 - Enhancements for Completion of Communications Supplementary service (CT1)

Unique ID	Name	Hyperlink	TS
440032	Stage 3 - Enhancements for Completion of Communications Supplementary service	CP-090490	24.642

Work on CCBS/CCNR supplementary services has been transferred from TISPAN to 3GPP as part of moving common IMS work from ETSI to 3GPP. No Stage 2 work was identified to implement the added enhancements to Stage 1.

Enhancement to Completion of Communications supplementary service has been added to Stage 1 of Multimedia Telephony Service and supplementary services (TS 22.173). Consequently, evolution of Stage 3 of Completion of Communications to Busy Subscriber (CCBS) and Completion of Communications by No Reply (CCNR) supplementary services (TS 24.642) is needed to allow implementation of this enhancement.

CT1 specified how the time to expiry of the CCBS and the terminating party identity can be provided by the network to the user, either at successful activation, or as a result of an interrogation.

10.6 IMS Services Centralization and Continuity UID_410032

Resources: S1,S2,C1

References

Document	Title/Contents
WID(s)	
SP-080633	SA1 Feature WID on IMS Services Centralization and Continuity
SP-080507	SA1 BB WID on Inter-Device Transfer – Requirements
SP-080561	SA2 BB WID on IMS Service Continuity Enhancements: Service, Policy and Interactions
CP-090440	CT1 WID on Stage 3 - IMS Service Continuity Enhancements: Service, Policy, Interactions and Inter UE Transfer
SP-080634	SA2 BB WID on IMS Centralized Services
CP-090883	CT1 WID on Stage 3 - Enhancements to IMS Centralized Services
CP-090640	CT1 WID on Stage 3 - IMS Centralized Services support via I1 interface
Impacted Specifications	
TS 22.101	Service aspects; Service principles
TS 22.228	Service requirements for the Internet Protocol (IP) multimedia core network subsystem (IMS); Stage 1
TS 23.216	Single Radio Voice Call Continuity (SRVCC); Stage 2 - S2
TS 23.237	IP Multimedia Subsystem (IMS) Service Continuity; Stage 2 - S2
TS 23.292	IP Multimedia System (IMS) centralized services; Stage 2 - S2
New Dedicated Specifications/Reports	
TR 23.838	IMS Service Continuity Enhancements: Service, Policy and Interactions - S2
TR 23.883	IMS Centralized Services study - Phase 2 - S2
TS 24.294	ICS Protocol via I1 Interface - C1

Supporting Companies: China Mobile, T-Mobile International, Huawei, Mavenir, LG Electronics, NEC, Nortel, Samsung, AT&T, Marvell, Alcatel-Lucent, Telecom Italia, NTT DOCOMO, Research in Motion.

410032	IMS Services Centralization and Continuity		SP-080633
410033	Stage 1 - Inter-Device Transfer – Requirements	S1	SP-080507
410034	Stage 2 - IMS Service Continuity Enhancements: Service, Policy and Interactions	S2	SP-080561
440034	Stage 3 - IMS Service Continuity Enhancements: Service, Policy, Interactions and Inter UE Transfer	C1	CP-090440
410035	Stage 2 - IMS Centralized Services	S2	SP-080634
440033	Stage 3 - Enhancements to IMS Centralized Services	C1	CP-090883
430004	Stage 3 - IMS Centralized Services support via I1 interface	C1	CP-090640

3GPP Rel-8 has worked on:

- IMS Centralized Service Control (ICSRA) UID_370025
- IMS Service Continuity (IMS-Cont) UID_390056

These two functionalities allow IMS to control the service delivery as well as enable services to progress over heterogeneous networks. Some aspects of these functionalities have been postponed to subsequent releases.

This work covers more advanced aspects of IMS services centralization and continuity, some documented in Rel-8 TRs. As there is a wide degree of commonality between these two areas (e.g. they are both provided by the same application server and are functionalities that can be invoked as part of the same service), this work enables to achieve consistency in the activity of all the 3GPP groups working on this feature.

SA1 set additional requirements for IMS Centralized Services and IMS Service Continuity (e.g. Inter-Device Transfer).

SA2 covered:

- IMS Service Continuity Enhancements: Service, Policy and Interactions

This BB shall specify solutions to provide enhancements for Rel-8 IMS Service Continuity and for mobility of media components of a session between different devices under the control of the same user.

- IMS Centralized Services

This BB shall specify support of CS video telephony and support of the I1 interface that have been left out of Release 8. In addition, it shall include work on aspects requiring further study (Supplementary Services data synchronization, the management of TAS user configuration data when PS access cannot be used).

SA4 has a general objective to identify and implement potential stage 3 updates to MTSI (MMTeL) and IMS based PSS and MBMS multimedia codecs and protocols resulting from this work.

UID 410033 Inter-Device Transfer – Requirements (SA1)

Unique_ID	Name	Acronym	Resource	Hyperlink	TSs_and_TRs
410033	Stage 1 - Inter-Device Transfer – Requirements	IMS_SCC-IDT	S1	SP-080507	22.101, 22.228

Rel-8 SA1 TS 22.101 addressed service continuity requirements for IMS Centralized Services.

Rel-8 SA2 TR 23.893 studied the capability to perform session continuity at IMS level, as well as transfer of media components and session control between different devices (e.g. mobile, fixed).

SA1 Rel-9 TS 22.101 sets service continuity requirements for IDT, in particular:

- IDT of media components
- Transferring media components to target device(s) and the session control to a target device
- Transferring media components to target device(s) whilst keeping their control in the source device

Subsequently SA2 defined the architecture for the Inter-Device Transfer (IDT).

UID 410034 IMS Service Continuity Enhancements: Service, Policy and Interactions (SA2)

Unique_ID	Name	Acronym	Hyperlink	TSs_and_TRs
410034	Stage 2 - IMS Service Continuity Enhancements: Service, Policy and Interactions	IMS_SCC-SPI	SP-080561	23.838, 23.237, 23.292, 23.216

Rel-8 SA2 TR 23.893 (Feasibility study on multimedia session continuity; Stage 2) studied the general issue of IMS-level multimedia session continuity, including potential enhancements to IMS specifications that can improve the multimedia session continuity experience.

Results of this study were standardized in TS 23.237 (IP Multimedia Subsystem (IMS) Service Continuity; Stage 2).

Due to time constraints some features (e.g. Inter-Device Transfer, Network-initiated Session Transfer) studied in Rel-8 SA2 TR 23.893 were not standardized.

Also some further enhancements (such as management of operator policy and user preferences, service continuity for speech and video, mid-call services during session transfer for scenarios currently not supported) for Rel-8 IMS Service Continuity are required in order to provide an efficient IMS-level service continuity.

This work provides enhancements to Rel-8 IMS Service Continuity and solutions for mobility of media components of a session between different devices under the control of the same user (IDT) with regards to the following aspects:

- for IMS Service Continuity Enhancement:
 - o Management of operator policy and user preferences
 - o Interaction and coexistence with underlying mobility mechanisms and corresponding policies
 - o Further capabilities for the support of mid-call services during session transfer, in addition to those defined in TS 23.292, 23.237 and 23.216
 - o Session Continuity for speech and video
- for IDT:
 - o IDT scenarios for transferring/retrieval/addition/deletion of media components
 - o Transferring media components and the service control to the target device
 - o Transferring media components to the target device whilst keeping the service control in the source device

IMS Service Continuity is restricted to service continuity using IMS procedures, i.e. mobility mechanisms on the IP-CAN level are not within the scope of this work. This work does not overlap with the underlying SAE and SRVCC features, even though there could be cross-references between the corresponding specifications.

TR 23.838 (IP Multimedia Subsystem (IMS) service continuity enhancements; Service, policy and interactions) studied solutions providing a resolution to the identified issues.

UID 440034 Stage 3 - IMS Service Continuity Enhancements: Service, Policy, Interactions and Inter UE Transfer (CT1)

440034	Stage 3 - IMS Service Continuity Enhancements: Service, Policy, Interactions and Inter UE Transfer	IMS_SCC-SPI	C1	CP-090440	24.216, 24.229, 24.237
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UID_410035 IMS Centralized Services (SA2)

Unique_ID	Name	Acronym	Resource	Hyperlink	TSs_and_TRs
410035	Stage 2 - IMS Centralized Services	IMS_SCC-ICS	S2	SP-080634	23.292, new 23.883

This work specifies the aspects of ICS that have previously been studied and concluded on.

This work is to completing the ICS aspects left out of Rel-8 (e.g. support of CS video telephony and I1 interface).

Some aspects require further study in TR 23.883 (IMS Centralized Services study – Phase 2) before specification:

- supplementary services data synchronization
- management of Telephony Application Server (TAS) user configuration when PS access is not available or is available but cannot be used

Consideration was given to attaining a consistent user experience, and managing and enforcing operator policies as well as user preferences. Heterogeneous access technologies over which the IMS service is provided shall also be taken into account.

A certain degree of standardization with regards to the user interface is seen as beneficial in order to facilitate the use of the services.

Mechanisms to achieve maximum possible flexibility level in implementing billing solutions for operators were investigated. Data needed for operator's billing system is recorded with sufficient level of detail was considered. Charging models were developed.

UID_440033 Stage 3 - Enhancements to IMS Centralized Services (CT1)

440033	Stage 3 - Enhancements to IMS Centralized Services	IMS_SCC-ICS	C1	CP-090883	24.292, 24.604, 24.607, 24.608, 24.611, 24.623
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UID_430004 IMS Centralized Services support via I1 interface - Stage 3 (CT1)

430004	Stage 3 - IMS Centralized Services support via I1 interface	IMS_SCC-ICS_I1	C1	CP-090640	24.237, 24.292, new 24.294
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SA2 has moved from Rel-8 to Rel-9 the ICS protocol via I1 interface between ICS UE and SCC AS.

Rel-9 TS 23.292 specifies information flows related to I1 interface.

This work defines a new application layer protocol to support of the I1 interface, including:

- structure of the I1 protocol
- behaviour of function entities using I1
- interaction between ICS UE and SCC AS including procedures for control of session and supplementary services
- protocol specification and implementation

The ICS protocol via I1 interface between ICS UE and SCC AS has previously been studied in SA2 and has been moved to Rel-9 from Rel-8. The requirement, information flows related to I1 interface have been specified in TS 23.292 V9.0.0. The new application layer protocol over I1 interface shall be defined to support ICS.

This work item defined a new application layer protocol to support of the I1 interface, including:

- The structure of the I1 protocol
- Behaviour of function entities using I1.
- The interaction between the ICS UE and the SCC AS including session control procedures and supplementary services control procedures.
- Protocol specification and implementation.

10.7 Service Specific Access Control in EPS (SSAC)

UID_420020

Resources: S1,C1

References

Document	Title/Contents
WID(s)	
SP-080882	SA1 WID on Service Specific Access Control in EPS
CP-090885	CT1 WID on Service Specific Access Control Requirements for CT1
Impacted Specifications	
TS 22.011	Service accessibility (SA1 CR0136)
TS 24.173	IMS Multimedia telephony communication service and supplementary services; Stage 3 - C1
TS 27.007	AT command set for User Equipment (UE) - C1
New Dedicated Specifications/Reports	
-	-

Supporting Companies: NTT DoCoMo, NEC, OKI, KDDI, Softbank Mobile.

Unique_ID	Name	Acronym	Resource	Hyperlink	TSs_and_TRs
420020	Service Specific Access Control in EPS	SSAC		SP-080882	-
420021	Stage 1 for SSAC	SSAC	S1	SP-080882	22.011 CR0136
440040	Stage 3 for SSAC	SSAC	C1	CP-090885	24.173, 27.007

Triggered by TR 22.986 (Study on service specific access control in the Evolved Packet System (EPS)) produced under the Rel-9 Study UID_400036 (FS_SSAC).

In an emergency situation, like Earthquake or Tsunami, degradation of QoS and lack of security may be experienced. Degradation in service availability and performance can be accepted in such situations but mechanisms are desirable to minimize such degradation and maximize the efficiency of the remaining resources.

When Domain Specific Access Control (DSAC) mechanism was introduced for UMTS, the original motivation was to enable PS service continuation during congestion in CS nodes in case of major disaster like Earthquake or Tsunami.

In fact, the use case of DSAC in real UMTS deployment situation has been to apply access control separately on different types of services, such as voice and other PS services.

E.g. people's psychological behaviour is to make a voice call in emergency situations and it is not likely to change. Hence, a mechanism is needed to separately restrict voice calls and other services.

EPS is a PS-domain only system, so DSAC access control would not be applied anymore in case of disaster. Considering the characteristics of voice and non-voice calls in EPS, SSAC requirements **could be** to separately restrict voice and non-voice calls.

For a paid service there are QoS requirements. The SP could choose to shut down the service if the requirements cannot be met. In an emergency situation the most important is to keep communication channels uninterrupted, therefore the SP should preferably allow for a best effort (degradation of) service in preference to shutting down the service. During an emergency situation there should be a possibility for an SP to also grant services, give extended credit to subscribers with accounts running empty. Under some circumstances (e.g. a terrorist attack), overload access control may be invoked giving access only to authorities or a predefined set of users. It is up to national authorities to define and implement such schemes.

TS 22.011 sets requirements for providing Service Specific Access Control (SSAC) in EPS as studied in TR 22.986.

UID_440040 Stage 3 for SSAC (CT1)

Unique_ID	Name	Acronym	Resource	Hyperlink	TSs_and_TRs
440040	Stage 3 for SSAC	SSAC	C1	CP-090885	24.173, 27.007

11 SA2 Features

11.1 Access Network Discovery and Selection Function enhancements (eANDSF) **UID_420024**

Resources: S2,C1

References

Document	Title/Contents
WID(s)	
SP-080887	SA2 WID on Access Network Discovery and Selection Function enhancements
Impacted Specifications	
TS 22.278	Service requirements for the Evolved Packet System (EPS) clauses 7.1.5, 7.1.6 (SA1)
TS 23.002	Network architecture
TS 23.402	Architecture enhancements for non-3GPP accesses
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Motorola, Telecom Italia, Telcordia, BT, Orange , Toshiba America Research, Alcatel-Lucent, Huawei

Unique ID	Name	Resource	Hyperlink	TSs and TRs
420040	Stage 2 for eANDSF	S2	SP-080887	23.402, 23.002

Linked to Rel-8 Stage 2 of "3GPP System Architecture Evolution Specification - Evolved Packet System" UID_320005

Rel-9 TS 22.278 contains stage 1 requirements on ANDSF not fulfilled yet by stage 2. E.g. there is no stage 2 mechanism for VPLMN to provide UE with access network discovery information and policies.

This requires extending Rel-8 ANDSF procedures and architecture to cover also roaming scenarios.

In addition, Rel-8 stage 2 does not define any interfaces between ANDSF and other Network Elements. However, such interfaces may be required to enable ANDSF to retrieve e.g. security information, UE's current position, inter-system mobility policies from another entity, or retrieve information to simplify the configuration/maintenance of ANDSF. There are no interactions between ANDSF procedures and PLMN selection procedures for any scenario.

SA1: No new use cases defined. This work implements service requirements covered in TS 22.278.

SA2:

- enabled ANDSF procedures for roaming scenario (fulfil the applicable stage 1 requirements)
- specified functionality enabling ANDSF to retrieve e.g. security information, UE's current position, inter-system mobility policies from another entity, or retrieve information to simplify the configuration maintenance of ANDSF.

SA3 needs to handle the security aspects of the enhanced architecture:

- security aspects when ANDSF is in the HPLMN
- security aspects when ANDSF is in the VPLMN
- security issues over the interfaces between ANDSF and other Network Elements

Unique ID	Name	Resource	Hyperlink	TSs and TRs
450006	CT1 aspects - eANDSF	C1	CP-090742	24.302, 24.312

TS 23.402 specified stage-2 mechanism for the VPLMN to provide the UE with access network discovery information and policies. This requires extending the Rel-8 ANDSF procedures to cover also roaming scenarios, i.e. the discovery and communication with ANDSF server while UE is attached in VPLMN.

In addition, TS 33.402 has enhanced ANDSF security architecture by recommending the use of GBA-Push mechanism (TS 33.223) for push-based ANDSF security establishment. This requires changes to the push-based security establishment ANDSF procedures for Rel-9.

Objectives

- For a UE to discover and establish a connection to the HPLMN ANDSF server while in VPLMN
- For a UE to discover and establish a connection to the VPLMN ANDSF server
- Resolve the usage of ANDSF policies and information when both HPLMN and VPLMN ANDSF policies and information are available to the UE
- Apply the GBA-Push mechanism to the push-based ANDSF security establishment procedure

11.2 Multiple PDN to the Same APN for PMIP-based Interfaces (MUPSAP) **UID 430034**

Resources: S2,C4,C1

References

Document	Title/Contents
WID(s)	
SP-090098	SA2 WID on Multiple PDN to the Same APN for PMIP-based Interfaces
CP-090515	CT WID on Multiple PDN Connection to the Same APN for PMIP-based Interfaces (Stage 3)
Impacted Specifications	
TS 23.003	Numbering, addressing and identification - S2
TS 23.060	General Packet Radio Service (GPRS); Service description; Stage 2 - S2
TS 23.401	General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access - S2
TS 23.402	Architecture enhancements for non-3GPP accesses - S2
TS 23.008	Organization of subscriber data - C4
TS 29.275	Proxy Mobile IPv6 (PMIPv6) based Mobility and Tunnelling protocols; Stage 3 - C4
TS 29.282	Mobile IPv6 vendor specific option format and usage within 3GPP - C4
TS 24.302	Access to the Evolved Packet Core (EPC) via non-3GPP access networks; Stage 3 - C1
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Samsung, Verizon Wireless, Huawei, NTT DoCoMo, Cisco, ZTE, Starent Networks, Nortel, NEC.

Unique_ID	Name	Resource	Hyperlink	TSs_and_TRs
430034	Multiple PDN Connection to the Same APN for PMIP-based Interfaces		SP-090098	-
430134	Stage 2 for MUPSAP	S2	SP-090098	23.060, 23.203, 23.401, 23.402
450007	MUPSAP - CT4 aspects	C4	CP-090515	29.275, 23.008, 29.282
450008	MUPSAP - CT1 aspects	C1	CP-090515	24.302

This work supplements Rel-8 Stage 2 of "3GPP System Architecture Evolution Specification - Evolved Packet System" UID_320005. It completes support for Multiple PDN Connection to the Same APN for PMIP-based Reference Points. In Rel-8, PMIP-based interfaces (i.e. PMIP-based S5/S8, S2a and S2b) do not support a feature available using other equivalent interfaces (e.g. GTP-based S5/S8) in Rel-8. Stage 1 is contained in TS 22.278:

GTP-based interfaces support multiple PDN connections to the same APN.

Lack of support for PMIP-based interfaces creates discontinuities in services when a UE transitions from a deployed system where this capability is present to one where the capability is absent. This discontinuity leads to a poor user experience and degrades the uniformity and quality of the entire architecture and also is not aligned with TS 22.278.

This work provides changes to Rel-8 architecture (including PMIP-based S5/S8 and PMIP-based non-3GPP access) to enable establishment and disconnection of multiple PDN connections to the same APN uniformly across the EPS from any access as well as handover of multiple PDN connections to the same APN across the EPS between two accesses. The solution does not require UE distinguishing if S5/S8 is GTP- or PMIP-based.

Whether the S5/S8 interface is PMIP-based or GTP-based remains transparent to the UE.

Differences between capabilities in a PMIP-based and GTP-based deployment are reduced.

Differences between capabilities of 3GPP and non-3GPP accesses are reduced, so continuity of service upon handoff between the two systems is improved.

11.3 System aspects of vocoder rate adaptation for LTE

UID_450049

Resources: S2,S4,R2

References

Document	Title/Contents
WID(s)	
SP-090653	SA2/4 WID on System aspects of vocoder rate adaptation for LTE
RP-090978	RAN2 WID on Vocoder rate adaptation for LTE
Impacted Specifications	
TS 23.401	General Packet Radio Service (GPRS) enhancements for Evolved Universal Terrestrial Radio Access Network (E-UTRAN) access - S2
TS 26.114	IP Multimedia Subsystem (IMS); Multimedia telephony; Media handling and interaction - S4
TS 36.300	Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2 - R2
New Dedicated Specifications/Reports	
-	-

Supporting Companies: AT&T, Alcatel-Lucent, Huawei, Ericsson, ST-Ericsson, Nokia Siemens Networks, Samsung, Qualcomm.

Unique_ID	Name	Resource	Hyperlink	Status_Report	TSs_and_TRs
450049	System aspects of vocoder rate adaptation for LTE	S2,S4,R2	SP-090653	-	
450050	SA2 system aspects of vocoder rate adaptation for LTE	S2	SP-090653	-	23.401 CR#1103r3
450051	SA4 system aspects of vocoder rate adaptation for LTE	S4	SP-090653	-	26.114
440013	Vocoder rate adaptation for LTE	R2	RP-090978	RP-090704	36.300 CR#0114

This work was triggered by RAN2 UID_440013 Vocoder rate adaptation for LTE.

It is beneficial (from OpEx/CapEx viewpoint) for operators to be able to control the codec rate based on load criteria.

At peak hour there is a desire to trade off quality for additional capacity.

This work enables vocoder rate change in LTE networks, in particular to let the UE select a more appropriate and radio resource friendly AMR encoder for VoIP.

This functionality should be available as early as possible to minimize the number of deployed UEs not supporting coded rate adaptation to load.

This work specifies system enhancements to enable codec rate selection at voice call setup over E-UTRAN.

12 SA3 Features

12.1 Access Security Enhancements **UID_33025**

Resources: S3

References

Document	Title/Contents
WID(s)	
SP-040865	WID for Access Security Enhancements
Impacted Specifications	
TS 33.102	3G security; Security architecture
TS 43.020	Security-related network functions
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Ericsson, Qualcomm, Vodafone, Telenor, Nokia, BT Group, Siemens.

Unique_ID	Name	TSs_and_TRs
33025	Access Security Enhancements	33.102, 43.020

CRs 33.102,43.020 on A5/2 removal done long time ago. A5/4 introduction CRs will be done under UID_440057 (128 bit encryption for GSM and GPRS). Stopped TR 33.801.

12.2 Protection against Unsolicited Communication for IMS (PUCI) **UID_410027**

Resources: S1,S3

References

Document	Title/Contents
WID(s)	
SP-080482	SA3 WID on Protection against Unsolicited Communication for IMS (PUCI)
Impacted Specifications	
TS 22.228	Service requirements for the Internet Protocol (IP) multimedia core network subsystem (IMS); Stage 1
New Dedicated Specifications/Reports	
TR 33.937	Study of mechanisms for Protection against Unsolicited Communication for IMS (PUCI) - S3

Supporting Companies: AT&T, BT, China Mobile, Ericsson, KDDI, NEC, Nokia, Nokia Siemens Networks, NTT DoCoMo, Qualcomm, Rogers Wireless, Samsung, Softbank Mobile, T-Mobile, Telenor

Unique_ID	Name	Resource	Notes	TSs_and_TRs
410027	Protection against Unsolicited Communication for IMS (PUCI)		No specification work done in Rel-9. Related work in OMA Categorization Based Content Screening	-
410028	Stage 1 for PUCI	S1	-	22.228
410029	SA3 work on PUCI	S3	No normative work done in Rel-9	new 33.937

This work is linked to:

- Rel-8 Feature: Security Enhancements for IMS (IMS-Sec) UID_360017
- TR 22.893 Study on advanced requirements for IP interconnect (FS_IPXS) UID_380083
- TISPAN WG7: TR 187 009 Feasibility study of prevention of unsolicited communications in the NGN
- OMA: Categorization Based Content Screening (CBCS)
- ITU X.1231: Requirement on countering spam, TD 2496

In the e-mail environment the instance of spam – the common name used to refer to bulk Unsolicited Communication (UC) where the benefit is weighted in favour of the sender – has proliferated in recent years. This development hinges upon the fact that setting up of communication (e.g. e-mail) to numerous recipients can be automated easily at no or

negligible cost to the sender. Since the same is true also for IMS based communication (e.g. for IMS VoIP) – especially when IMS peering on a global scale starts to emerge – there is a real threat that UC will occur also in mobile communications networks developed by 3GPP. UC can thus jeopardize the success of IMS and have strong impact on mobile operator's business especially because IMS is expected to provide core services like voice. Therefore, a solution was developed against UC in IMS protecting end customers and operator services.

UC prevention solutions are being developed in several standardization bodies:

- OMA is developing solutions on Categorization Based Content Screening (CBCS), which is limited to offline checking of stored content, as opposed to real-time evaluation during session establishment proposed in this work.
- TISPAN concluded TR 187 009 and is specifying UC prevention solutions that handles specific issues related to TISPAN access, but not that related to common IMS. Appendix A shows the scope of TISPAN ongoing work.

3GPP is responsible for the common IMS part. As UC is expected to target in particular IMS services, SA3 has developed a solution for Protection against UC in common IMS (PUCI). PUCI is considered a stand-alone feature that neither overlaps nor is linked to other IMS activities like authentication/authorization and media plane security. Hence, a work addressing only the UC thread across the relevant 3GPP WG was recommended.

3GPP enhanced the TISPAN study and developed solutions from there on.

This work provides solutions to protect the terminating party from receiving UC of any form.

It developed a service agnostic solution that can protect already standardized IMS services, and equally be applied to future IMS services with no or little modification.

SA3 produced TR 33.937 and will provide later a new TS if there is no existing TS where the solution can be added.

This work is aligned with TISPAN which takes care about the impact of UC prevention mechanisms to the non-common-IMS related part. A common solution for PUCI is aimed both for 3GPP and TISPAN deployments.

This work is also aligned with IETF, ITU, OMA and GSMA.

MMI aspects: Since UC prevention services may block certain traffic from the recipient user, special care must be taken to allow the user sufficient control over these services. Also regulatory requirements concerning customer protection need to be satisfied.

It shall be possible to charge a customer for UC prevention services.

12.3 IMS Media Plane Security **UID_430036**

Resources: S3,C1,C4,C3

References

Document	Title/Contents
WID(s)	
SP-090128	WID on IMS Media Plane Security
CP-090884	WID on IMS Media Plane Security (MEDIASEC CORE)
Impacted Specifications	
23.218, 24.229	CT1
29.238, 23.334, 29.334	CT3
29.162	CT4
New Dedicated Specifications/Reports	
TR 33.828	IMS media plane security
TS 33.328	Solutions for IMS media plane security

Supporting Companies: Alcatel-Lucent, BT, Ericsson, Orange, Nokia, Nokia Siemens Networks, Qualcomm, Rogers Wireless, Telenor, TeliaSonera, Verizon, Vodafone.

Unique_ID	Name	Resource	Hyperlink	TSs_and_TRs
430036	IMS Media Plane Security		SP-090128	-
430136	SA3 aspects - MEDIASEC	S3	SP-090128	new 33.828, 33.328
460020	CN aspects of IMS Media Plane Security		CP-090884	-
450010	CT1 aspects - MEDIASEC	C1	CP-090884	23.218, 24.229
450021	CT4 aspects - MEDIASEC	C4	CP-090884	29.238, 23.334, 29.334
460021	CT3 aspects - MEDIASEC	C3	CP-090884	29.162

Stage 1 was defined by SA3 in consultation with SA1.

In IMS specifications up to and including Rel-8, only security for SIP signalling has been considered. For the protection of IMS media, i.e. security for the IMS user plane, IMS has relied so far on security provided by lower layers, e.g. on encryption provided by GERAN or UTRAN. With Common IMS, however, it has become possible to use IMS over a wide variety of Access Networks (ANs). These ANs provide security of varying strengths, or, in some cases, no security at all. For some ANs, strong security mechanisms may have been defined, e.g. WPA2 for WLAN, but these mechanisms may be disabled in practical deployments, e.g. in WLAN hotspots, for usability reasons.

It is therefore desirable to set a standard for the security of IMS media, which guarantees protection of IMS media against eavesdropping and undetected modification in a uniform manner across ANs.

Furthermore, media transport in the CN, although generally less vulnerable than in the AN, may also be realized in varying ways with different guarantees of protection in the future. Therefore, depending on the requirements of operators and users, protection of media transport across the CN may also be required.

It is therefore also desirable to define a standard for the security of IMS media, which guarantees protection of IMS media against eavesdropping and undetected modification between a terminal and a network server acting as a media endpoint, or in an end-to-end fashion between two terminal devices.

IMS media security may serve different purposes and its relevance for different user groups may vary according to its design and features. This work provides:

1. security for media usable across all access networks
2. end-to-end media security solution to satisfy major user categories
3. high quality end-to-end media security for important user groups like enterprises, National Security and Public Safety (NSPS) organizations and different government authorities

These objectives were adapted from TR 33.828 (IMS media plane security) clause 4.1.1.

As protocols for actual media plane protection, well established protocols like SRTP and (PSK-)TLS should be used. Open issues are with respect to how the key management solution for these media plane protection protocols is designed and where the end-points for the media protection are located.

The results allow operators to provide protection for IMS media, which is already now provided by Voice-over-IP offerings competing with IMS. Furthermore, the results allow offering high quality end-to-end media security as a value added service to important user groups.

MMI-Aspects: IMS media protection should work without user involvement. However, depending on the requirements of certain user groups, users may want to have the possibility to configure their security settings.

It shall be possible to charge a customer for high quality end-to-end media security as a Value Added Service.

CT1 and CT4 specified the Stage 3 required to implement the SA3 Stage 2 in TS 33.328 to provide:

- end-to-middle protection using Security Descriptions (SDES)
- end-to-end protection using Security Descriptions (SDES)
- end-to-end protection using a Key Management Server (KMS)

12.4 GBAPush enhancements (Generic push layer)

UID_440053

Resources: S3

References

Document	Title/Contents
WID(s)	
SP-090282	WID for GBAPush enhancements (Generic push layer)
Impacted Specifications	
-	-
New Dedicated Specifications/Reports	
TS 33.224	Generic Authentication Architecture (GAA); Generic push layer

Supporting Companies:

Unique_ID	Name	Resource	Hyperlink	TSs_and_TRs
440053	GBAPush enhancements (Generic push layer)	S3	SP-090282	new 33.224

GBAPush was completed in Rel-8, but the Generic Push Layer (started in Rel-8) was moved to Rel-9 at SA#42. SA#42 moved TS 33.224 to Rel-9 whereas TS 33.223 was completed as Rel-8 under the Feature GBAPush (Generic Bootstrapping Architecture Push Function) UID_390146.

The work provides a "generic push layer" where a generic protection mechanism is specified for the messages that are pushed by the network for which the protection is based on GAA push functionality (GBAPush).

12.5 Extended Identity Management (GBA-IdM) UID_440054

Resources: S3,C4

References

Document	Title/Contents
WID(s)	
SP-090284	SA3 WID on Extended Identity Management
Impacted Specifications	
TS 29.109	Generic Authentication Architecture (GAA); Zh and Zn Interfaces based on the Diameter protocol; Stage 3 - C4
New Dedicated Specifications/Reports	
TR 33.924	Identity management and 3GPP security interworking; Identity management and Generic Authentication Architecture (GAA) interworking

Supporting Companies: Nokia, Nokia Siemens Networks, AT & T Wireless, Orange.

Unique_ID	Name	Acronym	Resource	Hyperlink	Notes	TSs_and_TRs
440054	Extended Identity Management	GBA-IdM	S3	SP-090284	Stage 1 not identified (GBA Liberty Interworking has been outlined and GBA--OpenID interworking is analogous)	new 33.924, CT4 29.109 (added service code)

SA3 outlined the interworking of the operator controlled GBA with the Liberty Alliance Identity Management. New additional systems are deployed and used in the fixed network. If it is wanted to enable interworking of operator centric identity management, then smooth interworking with new systems that are utilized need to be outlined. If this is not done, then a seamless interworking is not possible on global scale with different network types and it would be difficult to leverage the existing customer base and security level that operators have.

The objective was to extend the current identity management as outlined in TS 33.220, TS 33.222 and TR 33.980 with the latest developments on identity management outside of the 3GPP sphere (e.g. OpenID). This allows a better integration and usage of an identity management for 3GPP services and seamless integration with existing services that are not standardized in 3GPP.

The new TR 33.924 describes the interworking between GBA and identity management system OpenID.

This work also resulted in improvements of TR 33.980, TS 33.220 or TS 29.109 (e.g. adding a GBA Service type code).

This work supports services by providing an operator centric identity management that integrates with current Internet state of the art on identity management systems. OpenID is used by services like e.g. Facebook, Google, Twitter, YouTube, Wikipedia, Flickr, LinkedIn, Yahoo, MySpace, eBay, PayPal, Apple, Microsoft, Hotmail, Skype, NYTimes, Wordpress, Xing, Sourceforge, ThePirateBay, msn, BBC, Amazon, Bloglines, Mozilla, Ubuntu, geocaching, heise.

12.6 Network Domain Security enhancements to support backhaul security **UID_440056**

Resources: S3

References

Document	Title/Contents
WID(s)	
SP-090286	SA3 WID on Network Domain Security (NDS) enhancements to support backhaul security
Impacted Specifications	
SA3	TS 33.102, 33.210, 33.310, 33.401, 33.402
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Ericsson, Motorola, NEC, Nokia Siemens Networks, T-Mobile, Telenor, TeliaSonera, Vodafone.

This is a continuation of Rel-8 UID_390044 SAE security architecture. Covers gaps in backhaul security in SAE (also applicable to UTRAN and GERAN backhaul).

There is a need to deploy IPsec on the backhaul network especially for LTE and evolved HSPA networks which use Ethernet/IP for backhaul transmission and where user plane ciphering terminates in the Base Station (BS) site. The current 3GPP SAE security architecture in TS 33.401 specifies the use of certificate based IPsec and IKEv2 according to the Network Domain Security (NDS) specifications TS 33.210 (NDS/IP) and TS 33.310 (NDS/AF) for protecting backhaul link communications from the eNB to the core network and for direct eNB-eNB communications. However, the NDS specifications were originally designed for establishing IPsec between core Network Elements (NEs) and some enhancements are needed to address the particular requirements of BSs.

One area which needs to be enhanced is the specification of certificate enrolment methods for BSs. In TS 33.310, CMPv2 and PKCS-based approaches are specified as the protocols to be used for certificate lifecycle management, including certificate enrolment. However, some aspects of certificate enrolment need to be more fully defined. In particular, it is not currently specified how the initial enrolment using CMP shall be secured. It is important an appropriate method(s) are standardised to ensure interoperability between BSs and the supporting certificate management infrastructure. It is also important that the selected method(s) are compatible with Self-Organizing Network (SON) procedures that may be used by the BS.

While the most pressing need is to address the special requirements of BSs, it would be useful if the enhancements would be applicable to core NEs that use NDS. It would also be desirable if the solution for backhaul security in the case of operator owned and installed BSs could be aligned as far as possible with the solution for backhaul security in the case of H(e)NBs which are installed by the customer.

This work enhances the NDS specifications to provide better support for backhaul security, namely it:

- Specified IPsec certificate enrolment methods for BSs and/or the use of factory provisioned certificates for IPsec security association establishment.
- Specified a method to ensure that BSs are provisioned with the appropriate trusted root certificates.
- Ensured that BS IPsec certificate enrolment procedures and security association establishment are compatible with SON procedures as appropriate.
- Carried out other modifications to NDS/IP and NDS/AF specifications, as required, to address the particular requirements of BSs. Examples include adaptation of CRL handling, and/or provision of an AAA interface at the SeGW to handle BS authorization.
- Ensured enhancements to NDS/IP and NDS/AF to address BS requirements can also be used by core NEs as appropriate.
- Aligned the backhaul solution for operator owned and installed Base Stations with the solution for H(e)NBs.

12.7 128 bit encryption for GSM and GPRS (A5/4-GEA4)

UID_440057

Resources: S3,C1,G2,G3new

References

Document	Title/Contents
WID(s)	
SP-090287	SA3 WID on 128 bit encryption for GSM and GPRS
GP-091212	GERAN WID on 128 bit encryption for GSM and GPRS
Impacted Specifications	
TS 55.226, 33.102,43.020	SA3
TS 24.008,44.064	CT1
TS 44.018,48.008,48.018,48.058	GERAN2
TS 51.010	GERAN3new
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Ericsson, Orange, Telenor, TeliaSonera, Vodafone.

Unique_ID	Name	Hyperlink	Notes	TSs_and_TRs
440057	128 bit encryption for GSM and GPRS	SP-090287	Allow 128 as an alternative to 64 bit keys (Stage 2/3 + Test spec)	
440157	SA3 part of 128 bit encryption for GSM and GPRS	SP-090287		33.102,43.020, new 55.226
440357	CT1 part of 128 bit encryption for GSM and GPRS	SP-090287		24.008,44.064
440457	CT4 part of 128 bit encryption for GSM and GPRS	SP-090287	Kc128 enhancements are carried as UMTS keys => no impact on CT4 29.002, 29.060	
440557	GERAN2 part of 128 bit encryption for GSM and GPRS	GP-091212		44.018,48.008,48.018,48.058
440657	GERAN3new (testing) part of 128 bit encryption for GSM and GPRS	GP-091212		51.010

Current 3GPP specifications for GSM and GPRS encryption support an encryption key length of 64 bits.

While 64 bit keys still provide a reasonable level of security, 64 is short by today's standards; for most environments, a key length of 128 bits is now generally considered to be the minimum key length when designing new security mechanisms based on symmetric cryptography. Both UMTS and LTE support an encryption key length of 128 bits.

Some work has already been done to support 128 bit encryption in GSM and GPRS. In particular, when the cryptographic algorithm design group ETSI SAGE specified the 64 bit A5/3 and GEA3 algorithms in TS 55.216, they also defined 128 bit versions called A5/4 and GEA4 in TS 55.226.

While there are several ways in which GSM and GPRS security could be enhanced, a security review in SA3 TR 33.801 reveals that support for 128 bit encryption keys is one of the most effective enhancements. A further reason to standardise support for 128 bit encryption now, is that deployment of 64 bit A5/3 encryption is becoming a reality and there is an opportunity to upgrade Base Stations to support the 128 bit version, A5/4, at the same time.

The objective of this work is to fully standardise support for 128 bit encryption in GSM and GPRS, including:

- Specify the use of the 3G AKA protocol to generate 128 bit GSM and GPRS encryption keys
- Specify the use of 128 bit keys to perform GSM circuit switched encryption using A5/4 (including EDGE)
- Specify the use of 128 bit keys to perform GPRS packet switched encryption using GEA4 (including EDGE)
- Update specifications as necessary to allow UE to indicate support of A5/4 and GEA4
- Update specifications to allow MSC and SGSN to instruct UE to use A5/4 and GEA4
- Update specifications to support the transport of 128 bit GSM encryption keys between MSC and BTS during establishing of encryption
- Update specifications to support the transport of 128 bit GSM/GPRS security contexts within the network during mobility events
- Update specifications to support algorithm change when moving in and out of areas that support A5/4 and GEA4
- Specify key conversion functions, as required, e.g. to switch between 128 bit GERAN encryption and 64 bit GERAN encryption, or between 128 bit GERAN encryption and 128 bit UTRAN/E-UTRAN encryption
- Update of test specifications as necessary

13 SA4 Features

13.1 Timed Graphics **UID_420027**

Resources: S4

References

Document	Title/Contents
WID(s)	
SP-080683	WID for Timed Graphics
Impacted Specifications	
TS 26.114	IP Multimedia Subsystem (IMS); Multimedia telephony; Media handling and interaction
TS 26.140	Multimedia Messaging Service (MMS); Media formats and codecs
TS 26.234	Transparent end-to-end Packet-switched Streaming Service (PSS); Protocols and codecs
TS 26.244	Transparent end-to-end packet switched streaming service (PSS); 3GPP file format (3GP)
TS 26.245	Transparent end-to-end Packet switched Streaming Service (PSS); Timed text format
TS 26.346	Multimedia Broadcast/Multicast Service (MBMS); Protocols and codecs
New Dedicated Specifications/Reports	
TS 26.430	Timed Graphics

Supporting Companies: Ericsson, Samsung, China Mobile, Huawei, Nokia.

This work provides graphics in parallel to a video stream without requiring an umbrella scene descriptor such as 3GPP Dynamic and Interactive Multimedia Scenes (DIMS) in TS 26.142.

The user experience of multimedia can be enhanced by enabling the separate encoding of graphics. TS26.142 (DIMS) enables creation of graphical interfaces and applications but not a simple media type as, for example, audio and video. TS 26.245 defines timed text (e.g. subtitles or karaoke) as a simple media type, but has next to no graphics capabilities. In other words, there is currently no way to encode modern name tags, score boxes or results tables, for example, as graphics in a stream parallel to a video stream.

The first advantage is to enable high quality text and graphics at a low cost. Given certain bit-rate and video settings, sending graphics and text outside the stream gives a substantially increases perceived quality. Not only is the text/graphics difficult (=costly) to encode as video, it also looks worse than when encoded directly as graphics/text.

The second major advantage of sending vector graphics in a separate stream is when the video resolution does not match the screen resolution. In the mobile world this is very common as screens are getting larger and larger with time. By sending the graphics like this they can be rendered to the actual screen size irrespective of the size of the video always giving sharp text and graphics.

This work specifies a simple timed graphics media type. The focus being graphics in parallel to a video stream without requiring an umbrella scene descriptor such as DIMS. It ensures that acceptable user experience can be achieved while improving service efficiency. It specifies:

- a simple timed graphics media type, reusing parts of 3GPP DIMS where relevant.
- associated RTP payload type, storage in 3GP files and inclusion in MMS, PSS, MBMS and MTSI reusing parts of the 3GPP DIMS payload format where relevant.

It provides a media type which can be delivered using existing services. It enhances MBMS, PSS, MMS and MTSI.

Charging is outside the scope of SA4, however, charging models for IMS charging are valid.

Security is outside the scope of SA4, however, IMS security features are valid.

13.2 Managing MTSI Media Adaptation UID_430037

Resources: S4

References

Document	Title/Contents
WID(s)	
SP-090021	WID for Managing MTSI Media Adaptation
Impacted Specifications	
TS 26.114	IP Multimedia Subsystem (IMS); Multimedia telephony; Media handling and interaction
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Samsung, Huawei, Research In Motion, China Mobile, Telecom Italia.

This work extends the Rel-8 UID_34041 MTSI Video - Dynamic Rate Adaptation/Signalling of Image Size. It updates speech/video adaptation algorithms used by network to control MTSI client terminal in congestion or poor transmission conditions.

In MTSI, signalling methods between UEs are specified for media adaptation, i.e. controlling the bit-rate of video, and the mode and packetization of speech, to cope with the variations in link quality and congestion. Typical adaptation algorithms for speech and video consist of tens of parameters and require efficient methods for operators to describe and update the algorithms in MTSI client in terminal, regardless of devices and vendors. Basic tools to facilitate the management of adaptation algorithms are provided.

It identified a set of key parameters that can be used in typical adaptation algorithms to control the behaviour of MTSI client in terminal in the event of congestion or poor transmission conditions, and define an OMA DM Management Object (MO) such that the identified key parameters can be initialized and updated via device management servers. The key parameters can include target values related to service quality or conditional variables that trigger certain actions.

The key parameters are selected such that enough flexibility of adaptation algorithms can be maintained but the number of controllable parameters used in each adaptation algorithm needs to be kept within manageable ranges. By assigning and updating the key parameters, the network can control the bit-rate trajectory of UEs in an indirect way. The MO can be extended with additional interior and leaf nodes to address new adaptation requirements.

This work has no impact on service requirements or architecture.

This work:

- Identified a set of key parameters that can be used in typical media adaptation algorithms to control the behaviour of MTSI client in terminal in the event of congestion or poor transmission conditions
- Defined MTSI Media Adaptation Management Object (3GPP MTSIMA MO) with adaptation-related nodes corresponding to the identified key parameters
- Provided guidance on the management of media adaptation algorithms with 3GPP MTSIMA MO by explaining the "effect" of each key parameter on the service quality
- Provided explanatory examples of using the key parameters to reach desired effects on the service quality

This work enhances service quality and facilitates the deployment procedure of MTSI.

Charging is outside the scope of SA4, however, charging models for IMS charging are valid.

13.3 PSS and MBMS extensions **UID_430038**

Resources: S4

References

Document	Title/Contents
WID(s)	
SP-090262	WID for PSS and MBMS extensions
Impacted Specifications	
TS 26.234	Transparent end-to-end Packet-switched Streaming Service (PSS); Protocols and codecs
TS 26.346	Multimedia Broadcast/Multicast Service (MBMS); Protocols and codecs
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Ericsson, Nokia, China Mobile, Vodafone.

This work extends Rel-8 UID_34043 (PSS_MBMS_OMTV) and ensures compatibility with UID_34046 (IMS_PSS_MBMS_US).

Mobile TV and Mobile Web Radio are important services for evolved mobile networks, which use PSS and MBMS User Services. This work provides:

- PSS and MBMS User Services enabler improvements:
 - a. HTTP Streaming enhancements
 - b. Quality of Experience (QoE) metrics and reporting improvements
 - c. Improved key management for MBMS download
 - d. Other technical enhancements and improvements
- Guidelines for PSS and MBMS User Services (e.g. Mobile TV or Mobile Web Radio)

13.4 Improved Video Support for PSS and MBMS UID_430039

Resources: S4

References

Document	Title/Contents
WID(s)	
SP-090263	WID for Improved Video Support for PSS and MBMS
Impacted Specifications	
TS 26.234	Transparent End-to-End Packet Switched Streaming Service (PSS); Protocols and Codecs
TS 26.244	Transparent End-to-End Packet Switched Streaming Service (PSS); 3GPP File Format (3GP)
TS 26.346	Multimedia Broadcast/Multicast Services (MBMS); Protocols and Codecs
New Dedicated Specifications/Reports	
TR 26.903	Improved video support for Packet Switched Streaming (PSS) and Multimedia Broadcast/Multicast Service (MBMS) Services

Supporting Companies: Nokia, Orange, Thomson, Samsung, Fraunhofer Gesellschaft, Ericsson.

Mobile terminals nowadays are compatible with several access technologies and equipped with larger screens and higher screen resolutions. The evolution of access technologies and screen sizes is likely to continue in future and the solution(s) take into account these developments, e.g. through the co-existence of several UE generations inside the same network.

This work adds support for more advanced H.264 profiles and levels to match PSS and MBMS capabilities and larger screen sizes (H.264 Scalable Baseline Profile is an example of a more advanced H.264 profile). This work:

- specified the appropriate H.264/AVC minimal level support requirements
- evaluated benefits and deployment scenarios of scalable video and of advanced H.264/AVC profiles
- specified the appropriate codec profiles and levels
- modified/extended the related enablers (i.e. transport and storage formats)
- adjusted existing service components and functionality for improved integration of scalable video
- guidelines the usage and deployment of video for identified use cases

13.5 IMS based PSS and MBMS User Service extensions

UID_430046

Resources: S4

References

Document	Title/Contents
WID(s)	
SP-090225	WID for Managing MTSI Media Adaptation
Impacted Specifications	
TS 26.237	IMS based PSS and MBMS User Service; Protocols
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Ericsson, HUAWEI, China Mobile, Orange, Telecom Italia.

This work extends the Rel-8

- SA4 WI "IMS initiated and controlled PSS and MBMS User Service" UID_34046 (IMS_PSS_MBMS_US) and
- SA2 WI "IMS Service Continuity Enhancements: Service, Policy and Interactions" UID_410034 (IMSSCC-SPI).

TS 26.237 defines IMS based PSS and MBMS User Services, allowing the realization of PSS and MBMS streaming User Services in an IMS infrastructure using the SIP protocol. It also allows the use of core IMS functions and enablers in order to utilize mechanisms such as QoS and Policy control to improve the service experience.

Some extensions have been identified that would help realization of further services like service blending, networked bookmarking and inter UE session transfers, parental control, download services (currently the specification is limited to streaming services), User Generated Content and Interactivity.

- Example of service blending of IMS based PSS&MBMS services with communication services, presence and group management: if the IMS based PSS&MBMS client can publish presence information about the current streaming program/content that is being consumed, then users in the same group can see that in their presence client and may further join the same program at the same time. E.g. Olle and Thorsten are watching a live football game. Clinton, who is one of their buddies, can see that in his presence list. Clinton selects the possibility to watch the same program and to setup a simultaneous voice and chat session with Olle and Thorsten to comment the game. Another example is the realization of User Generated Content (UGC) service where the content is provided by communication services and is distributed using IMS based PSS&MBMS services.

Also, now that parallel IMS sessions may be ongoing for one IMS client, it is necessary to define how to handle the parallel IMS sessions according to network configuration of UEs, e.g. how incoming calls should be handled while in an IMS based PSS Streaming session.

- An example of networked bookmark service is when information like content id and current presentation timestamp about a ongoing streaming session on one IMS based device information is transferred to another IMS based device. Here, the streaming session is restarted at the provided presentation timestamp.
- An example of inter UE session transfer is when a user is currently watching a VoD program on its IMS based device A. The user subscription may allow him to watch the same content on another IMS based device B e.g. while on the move. In this case, the user may activate IMS based PSS&MBMS client and select ongoing sessions for retrieval on device B (pull transfer). The user may also control the transfer from device A to device B (push). In both cases, the program is either totally transferred including control, but it may also transfer part of the media components (this has second priority). The intention was to re-use the SA2 work on "IMS Service Continuity Enhancements: Service, Policy and Interactions" (UID_410034) and to align with equivalent IPTV session transfer requirements and specifications (e.g. OIPF phase 2 and TISPAN R3).
- An example of interactivity of IMS based PSS&MBMS streaming service is when a user is watching a live programming using IMS based streaming service. The user can enjoy advertising, voting and auctioning related current programming/content. E.g. when a user enjoy American idol, a TV talent contest show, he can vote for his favourite singer.

These were the reasons to extend the IMS based PSS and MBMS User Service specifications.

This work has no impact on service requirements or architecture.

This work produced CRs to TS 26.237 on IMS based PSS and MBMS User Service to address:

- IMS based download services e.g. MBMS download, PSS progressive download, etc
- Networked Bookmark Service
- Inter UE session transfers aligned with other standardization activities e.g. within 3GPP SA2, OIPF, TISPAN
- Consider support of non-IMS terminals in the IMS based PSS and MBMS architecture. Any possible extensions will be transparent to the non-IMS terminals.
- Service blending with communication service, presence and group management and user generated content distribution
- Integration of remaining PSS and MBMS User Services improvements (timeshifting, QoE reporting) and features from other ongoing work (e.g. Timed Graphics)
- Parental control services
- Interactivity of PSS and MBMS user services such as voting when watching a streaming program

13.6 Syndicated Feed Reception within 3GPP environments

UID_440051

Resources: S4

References

Document	Title/Contents
WID(s)	
SP-090260	WID for Syndicated Feed Reception within 3GPP environments
Impacted Specifications	
-	-
New Dedicated Specifications/Reports	
TS 26.150	Syndicated Feed Reception (SFR) within 3GPP environments; Protocols and codecs

Supporting Companies: Ericsson, Vodafone, RealNetworks, Samsung, Research in Motion.

Syndicated feeds, using such technologies as Atom and Really Simple Syndication (RSS), are widely used on today's Internet for various scheduled pull applications such as podcasts. There are a number of non-compatible proprietary extensions and a number of different RSS variants that may need to be installed and updated.

OMA DCD has defined Channel and Content Metadata and related mechanisms for content delivery (including RSS and ATOM feeds) using Content Metadata XML extensions independently of any bearers. As a consequence, there are no specific optimizations for 3GPP services/bearers. OMA DCD specification allows embedding of OMA DCD XML namespace elements into RSS and ATOM document (RSS and ATOM feed "content packaging formats"). The OMA DCD Channel and Content Metadata are intended to offer different content delivery alternatives to receivers.

This work re-uses and references DCD client server transactions and metadata as much as possible (3GPP SA4 may ask OMA DCD for modification, extension or clarification of the DCD enabler).

Goals:

- to ensure delivery with respect to low power consumption constraints of mobile terminals
- ability to obtain associated media from alternate bearers and locales on the UE
- to optimize resources of mobile access networks
- to give guidance on the usage of syndicated schemas.

This work has no impact on service requirements or architecture.

This work created TS 26.150 for optimized syndication that:

- Reuse and reference DCD client server transactions and DCD metadata for syndicated feeds (such as RSS, ATOM, DCD) as much as possible to be used over MBMS and PSS (collaboration with OMA DCD expected e.g. for the mapping of DCD over MBMS and PSS).
- Define 3GPP XML schema extensions, if needed, to document specific usage of 3GPP Services such as Packet Switched Streaming (e.g. RTSP resource as referenced enclosures)
- Ensure backward compatibility with existing syndicated feed readers such as RSS/ATOM.
- Adopt a method of advertising, before retrieval, all required codecs/profiles/levels within a media file reference.
- Express advice of expected codec support on target devices e.g. PSS codecs
- Provide guidance/recommendations for optimal use of mobile UE and networks for various syndication schemas

13.7 Distortion Measurement Test Methods and Requirements

UID_450048

Resources: S4

References

Document	Title/Contents
WID(s)	
SP-090575	WID for Distortion Measurement Test Methods and Requirements
Impacted Specifications	
TS 26.131	Terminal acoustic characteristics for telephony
TS 26.132	Speech and telephony terminal acoustic test specification
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Motorola, Orange, Sony Ericsson, Qualcomm.

Noise Suppression algorithms have been widely implemented in order to improve subjective quality. Current distortion test methods in TS 26.132 do not accommodate the subsequent introduction of noise suppression algorithms in the UE. Test signals, especially at low levels, may be treated by certain noise suppression algorithms as a noise-like signal, resulting in possibly inapplicable measurements and test failure. TS 26.132 (clause 7.8.1) notes:

NOTE: Depending on the type of codec the test signal used may need to be adapted. If a sine wave is not usable, an alternative test signal could be a band limited noise signal centred on the above frequencies.

NOTE: It should be ensured that the test signal is treated by speech processing algorithms as a speech-like signal, and not a noise-like signal. Test signals with a time-stationary envelope may be treated by certain algorithms, e.g. noise suppression algorithms defined in TS 26.077, as a noise-like signal.

There is a need for updating the existing distortion test measurement methods to reflect the evolution of technology, for example in noise suppression algorithms otherwise the existing test methods and requirements may not allow such development.

This work analyzed and enhanced the distortion requirements and test methods in TS 26.131 and TS 26.132 for both narrowband and wideband telephony cases by:

- Analyzing the distortion test method and requirements in TS 26.131 and TS 26.132 with regards to the impact of noise suppression algorithms
- Defining test signal attributes, levels and limits in order to fully assess terminals implementing noise suppression algorithms and define distortion performance requirements
- Ensuring distortion test methods take into account newly developed noise suppression mechanisms
- Proposing updates of specifications on requirements and test methods for distortion testing.

14 SA5's Operations, Administration, Maintenance and Provisioning OAM&P 9 **UID_420029**

Resources: S5

Unique_ID	Name	Hyperlink
420029	OAM&P 9	
420030	Network Infrastructure Management	
420031	Software Management for Network Elements	SP-080756
440064	Service Oriented Architecture (SOA) for IRP	SP-090313
440065	IRP SOAP Solution Sets continuation from Rel-8	SP-090314
420032	Performance Management	
440059	Enhancement of UTRAN Performance Measurements	SP-090308
430041	Enhancement of E-UTRAN Performance Measurements	SP-090053
430042	Enhancement of EPC Performance Measurements	SP-090049
430043	Self-Organizing Networks (SON) - OAM aspects	
390007	SON self-optimization management	SP-100091
440067	Automatic Radio Network Configuration Data Preparation	SP-090869
440058	Subscription Management (SuM) evolution	SP-090307

14.1 Software Management for Network Elements **UID_420031**

Resources: S5

References

Document	Title/Contents
WID(s)	
SP-080756	WID for Management of software entities residing in Network Elements
Impacted Specifications	
TS 32.531	Telecommunication management; Software management concepts and IRP requirements
TS 32.532	Telecommunication management; Software management IRP Information Service
TS 32.533	Telecommunication management; Software management IRP; CORBA Solution Set
New Dedicated Specifications/Reports	
TS 32.537	Telecommunication management; Software management IRP; SOAP Solution Set

Supporting Companies: Huawei, Nokia Siemens Networks, China Mobile, Telefonica, Nortel Networks, Alcatel-Lucent, Samsung, Qualcomm, Vodafone, T-Mobile.

Unique_ID	Name	Acronym	Hyperlink	TSs_and_TRs
420031	Software Management for Network Elements	OAM9-NE_SWM	SP-080756	32.531, 32.532, 32.533, new 32.537

The Software Management functionality includes management of software entities residing in Network Elements. Although these software entities are vendor specific, the management operations performed on these software entities are generic enough and hence can be standardized. As Service Providers (SPs) expand their networks they are increasingly looking at networks that are built not by a single vendor but to de-risk the entire activity, SPs typically purchase equipments from multiple vendors. However, SPs in turn expect that each vendor should seamlessly integrate with existing network topology. For example, the behaviour of software entities when executed or activated is vendor specific but the interfaces exposed to execute these operations from a management interface can be generic and vendor independent. Importance is placed integrating new software into a network without causing unnecessary service disruptions and maintaining high level of quality for the network (see SA5 TS 32.101 Telecommunication management; Principles and high level requirements).

Software Management function is useful especially when we need to manage a large number of managed elements widely distributed geographically. The main focus is the management of new software releases and correction patches.

A standardized interface for software management allows SPs to rollout new services quickly and efficiently in a multivendor environment.

This work provides non-automated software management features. These features may be invoked independently and can be considered complimentary to automated software management features specified in 3GPP Rel-8. This in turn provides flexibility to sSPs. These new features were specified based on IRP methodology principles:

- Define appropriate IRP requirement specifications for Software Management
- Define Information Service (IS) specifications related to Software Management
- Define Solution Set (SS) specifications for Software Management over CORBA and SOAP

Functionalities considered e.g.:

- Downloading software
- Installation of software
- Activation of software
- Backup and Restore of software
- Fallback of software
- Validation and Terminate Validation operations on software

14.2 Service Oriented Architecture (SOA) for IRP UID_440064

Resources: S5

References

Document	Title/Contents
WID(s)	
SP-090313	WID for Service Oriented Architecture (SOA) for IRP
Impacted Specifications	
TS 32.101	Telecommunication management; Principles and high level requirements
TS 32.102	Telecommunication management; Architecture
TS 32.150	Telecommunication management; Integration Reference Point (IRP) Concept and definitions
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Ericsson, Nokia Siemens Networks, Huawei Technologies, Orange, Vodafone, TeliaSonera, Alcatel Lucent, Motorola, T-Mobile.

Triggered by Rel-9 UID_400029 Study on Service Oriented Architecture (SOA) for IRP (TR 32.824).

Unique_ID	Name	Hyperlink	TSs_and_TRs
440064	Service Oriented Architecture (SOA) for IRP	SP-090313	32.101, 32.102, 32.150

Service Oriented Architecture (SOA) is gaining acceptance in the IS/IT industry. It promises to manage change [1], automate and simplify IT processes [1], optimize implementation [2], maximize (implementation) flexibility and scalability [3], facilitate integration beyond the enterprise (between companies, between partners and customers) [4], simplify development [5] and maintenance; etc. Principles of SOA are currently applied to network management [8,9].

IRP (Integration Reference Point) is the standard for wireless network management since year 2000, jointly developed by 3GPP and 3GPP2. IRP architecture follows closely that defined by ITU-T TMN [6].

Besides IRP specifications, 3GPP also publishes IRP methodology (e.g. guidelines, templates on how to develop, maintain and publish IRP specifications).

The IRP specification methodology is shared and jointly evolved and maintained by SDOs such as ITU-T.

References:

- [1] [SOA Management and Security](#)
- [2] [IBM CICS Service Flow Feature enables composition of CICS applications to create CICS business services](#)
- [3] [SOA/Web services-based applications](#)
- [4] [Extending the Benefits of SOA beyond the Enterprise, TIBCO](#)
- [5] [BEA Announces WebLogic 9.2; Award-Winning Family Raises the Bar on SOA Enablement](#)
- [6] ITU-T TMN
- [8] TS 188 001 NGN Management OSS Architecture, ETSI
- [9] M.3060 Principles for the Management of Next Generation Networks, ITU-T

TR 32.824 analyzed the IRP architecture and provided a gap analysis on what enhancement would be needed for the current set of IRP specifications such that it could claim to have the full set of characteristics of SOA.

SOA provides methods for systems development and integration where systems group functionality around business processes and packages these as interoperable services. SOA infrastructure allows different applications to exchange data with one another as they participate in business processes.

The IRP approach is well suited for operating within an SOA environment (see TR 32.824 clause 6). In an operator's environment, the FCAPS (*Fault, Configuration, Accounting, Performance, Security*) types of service, supported by the various IRPs are one of many key inputs to the aforementioned business processes.

The various IRPs will evolve further for fitting even better into an SOA infrastructure. This work included:

- support of SOA infrastructure in Telecom management; Principles and high level requirements (TS 32.101)
- descriptions of a) SOA infrastructure and b) relationship between SOA infrastructure and IRP Architecture in TS 32.102 and TS 32.150

14.3 IRP SOAP Solution Sets continuation from Rel-8

UID_440065

Resources: S5

References

Document	Title/Contents
WID(s)	
SP-090314	WID for IRP SOAP Solution Sets continuation from Rel-8
Impacted Specifications	
TS	32.121, 32.122, 32.123, 32.321, 32.322, 32.323, 32.325, 32.331, 32.332, 32.333, 32.335, 32.351, 32.352, 32.353, 32.381, 32.382, 32.383, 32.385, 32.391, 32.392, 32.393, 32.395, 32.441, 32.442, 32.443 (include references to the SOAP SS)
New Dedicated Specifications/Reports	
TS 32.127	Telecommunication management; Advanced Alarm Management (AAM) Integration Reference Point (IRP); SOAP solution set
TS 32.327	Telecommunication management; Test management Integration Reference Point (IRP); SOAP Solution Set (SS)
TS 32.337	Telecommunication management; Notification Log (NL) Integration Reference Point (IRP); SOAP Solution Set (SS)
TS 32.357	Telecommunication management; Communication Surveillance (CS) Integration Reference Point (IRP); SOAP Solution Set (SS)
TS 32.387	Telecommunication management; Partial Suspension of Itf-N Integration Reference Point (IRP); SOAP Solution Set (SS)
TS 32.397	Telecommunication management; Delta synchronization Integration Reference Point (IRP); SOAP Solution Set (SS)
TS 32.447	Telecommunication management; Trace Management Integration Reference Point (IRP); SOAP Solution Set (SS)

Supporting Companies: Ericsson, Motorola, ip.access, Huawei.

Unique_ID	Name	Hyperlink	TSs_and_TRs
440065	IRP SOAP Solution Sets continuation from Rel-8	SP-090314	New (32.127/ 327/ 337/ 357/ 387/ 397/ 447/ 397/ 447/ 507/ 537), 32.121,32.122,32.123,32.321,32.322,32.323,32.325,32.331,32.332,32.333,32.335,32.351,32.352,32.353,32.381,32.382,32.383,32.385,32.391,32.392,32.393,32.395,32.441,32.442,32.443

Rel-8 introduced SOAP Solution Sets for IRPs (UID_400030) and this work completes the portfolio of SOAP SS.

Both SA5 TR 32.809 (Feasibility Study of XML-based (SOAP/HTTP) IRP Solution Sets) and TR 32.818 (Study on 3GPP SA5 / MTOSI XML harmonization) recommended the use of SOAP/XML-based SSs to support all IRPs.

This work provides the missing SOAP SS for the following Interface IRPs:

- Advanced Alarm Management IRP
- Test Management IRP
- Notification Log IRP
- Communication Surveillance IRP
- Partial Suspension of Itf-N IRP
- Delta Synchronization IRP
- Trace Management IRP

14.4 Enhancement of UTRAN Performance Measurements

UID_440059

Resources: S5

References

Document	Title/Contents
WID(s)	
SP-090308	WID for Enhancement of UTRAN Performance Measurements
Impacted Specifications	
TS 32.405	Telecommunication management; Performance Management (PM); Performance measurements Universal Terrestrial Radio Access Network (UTRAN)
New Dedicated Specifications/Reports	
-	-

Supporting Companies: China Mobile, Qualcomm, Huawei, ZTE.

Unique_ID	Name	Hyperlink	TSs_and_TRs
440059	Enhancement of UTRAN Performance Measurements	SP-090308	32.405

In order to optimize the network more accurately and troubleshoot quickly, measurements related to air interface from UE and RNC should be collected and analyzed.

Many measurements have been defined in TS 25.215 and TS 25.225. Measurement results are transferred by measurement reporting procedure from the UE to UTRAN. The MEASUREMENT REPORT message can be transferred periodic according to the IE "Periodical Reporting Criteria" or an event in stored IE "Measurement reporting criteria" was triggered.

This work analyzes the MEASUREMENT REPORT message to define performance measurements in TS 32.405. It defines performance measurements in TS 32.405 based on measurements defined in TS 25.215 and TS 25.225 that are reported to RNC using RRC protocol specified in TS 25.331.

For this purpose, a new collection method was defined: PDF(Probability Distribution Function).

For example, the performance measurement result of measurement P-CCPCH RSCP should be the number of each reported value (P-CCPCH RSCP_LEV_00.. P-CCPCH RSCP_LEV_91), namely how many UEs with RSCP_LEV_00, how many UEs with RSCP_LEV_01 etc, not the reported value itself.

14.5 Enhancement of E-UTRAN Performance Measurements

UID_430041

Resources: S5

References

Document	Title/Contents
WID(s)	
SP-090053	WID for Enhancement of performance measurements for E-UTRAN
Impacted Specifications	
TS 32.425	Telecommunication management; Performance Management (PM); Performance measurements Evolved Universal Terrestrial Radio Access Network (E-UTRAN)
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Motorola, Huawei, Vodafone, T-Mobile, Telefonica, ZTE, Qualcomm.

Unique_ID	Name	Hyperlink	TSs_and_TRs
430041	Enhancement of E-UTRAN Performance Measurements	SP-090053	32.425

Performance measurements for E-UTRAN were defined in Rel-8 TS 32.425 however, there are still some missing, e.g. performance measurements for manual network optimization (e.g. interference control and optimization, coverage and capacity optimization) and SON (in particular the self-optimization part).

Like the performance measurements defined in TS 32.425, any enhancement of the E-UTRAN performance measurements shall be motivated by the use case or requirement for performance management or SON purpose.

For manual network optimization, the use case or requirement for each proposed performance measurement is in the scope of this work item.

For SON, the use case or requirement is not within the scope of this work, which only defines the related E-UTRAN performance measurements which are clearly stated as mandatory over Itf-N in the SON use cases, requirements or solutions. In case of SON use cases, requirements, or solutions are agreed by relevant SA5work items covering SON.

PM IRP can be reused for E-UTRAN performance management, so the enhanced performance measurement definition for E-UTRAN is managed via PM IRP, e.g. the performance measurement definition has a consistent format which can be collected and monitored via PM IRP.

This work enhances performance measurements in TS 32.425 to be transferred over Itf-N for E-UTRAN to support the performance management or SON purpose. The same Rel-8 E-UTRAN performance measurements rules are followed:

- performance measurements that are not necessary to be transferred over Itf-N are not in the scope of this work item, but it is also allowed to enlarge the scope of this work item to define the E-UTRAN performance measurements for other management interfaces (e.g. Itf-P2P) if necessary.
- This work item covers the performance measurements for both macro eNodeB and home eNodeB, and it is clearly stated in the definition if the performance measurement is only applicable for one but not both of macro eNodeB and home eNodeB.
- The E-UTRAN performance measurements are defined in a top-down approach, each measurement definition gets at least one supporting use case or requirement agreed before being inserted into the specification.
- This work item does not cover use cases and requirements for SON related measurements agreed in other places, but only specifies the measurement definitions.

The enhancement of performance measurements have identical characteristics as those defined in Rel-8 TS 32.425.

14.6 Enhancement of EPC Performance Measurements

UID_ 430042

Resources: S5

References

Document	Title/Contents
WID(s)	
SP-090049	WID for Enhancement of EPC Performance Measurements
Impacted Specifications	
TS 32.426	Telecommunication management; Performance Management (PM); Performance measurements Evolved Packet Core (EPC) network
New Dedicated Specifications/Reports	
-	-

Supporting Companies: China Mobile, Motorola, ZTE, Huawei, Nokia Siemens Networks, T-Mobile, Vodafone.

Unique_ID	Name	Hyperlink	TSs_and_TRs
430042	Enhancement of EPC Performance Measurements	SP-090049	32.426

Performance Management (PM) is a basic management function for EPC, and performance measurements are the base for PM. Some EPC measurements were defined in Rel-8 TS 32.426, but the measurement definition is not complete and some measurements still need to be defined (e.g. measurements related to S4, S5, S12 interface). Performance measurement definitions reuse the template defined in TS 32.404.

This work adds measurements related to S4, S5, S12 interface and more measurements for MME in TS 32.426.

14.7 Subscription Management (SuM) evolution UID_440058

References

Document	Title/Contents
WID(s)/Status Report	
SP-090307	WID on Subscription Management (SuM) evolution
Impacted Specifications	
TS 32.140	Telecommunication management; Subscription Management (SuM) requirements
TS 32.141	Telecommunication management; Subscription Management (SuM) architecture
TS 32.152	Telecommunication management; Integration Reference Point (IRP) Information Service (IS) Unified Modelling Language (UML) repertoire
TS 32.172	Telecommunication management; Subscription Management (SuM) Network Resource Model (NRM) Integration Reference Point (IRP): Information Service (IS)
TS 32.175	Telecommunication management; Subscription Management (SuM) Network Resource Model (NRM) Integration Reference Point (IRP): eXtensible Markup Language (XML) definition
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Ericsson, Verizon Wireless, Alcatel-Lucent, T-Mobile, Nokia Siemens Networks.

Unique_ID	Name	Hyperlink	TSs_and_TRs
440058	Subscription Management (SuM) evolution	SP-090307	32.140, 32.141, 32.152, 32.172, 32.175

Service Providers and Operators expressed the to provide a holistic and coherent view of customer/user/subscriber related information in the network, from the viewpoints of service and resource management layers as specified by TMF's eTOM processes. Current 3GPP SuM specifications cover the service management layer only to a very limited extent; instead, focus has been on the resource layer and its management. It is needed to couple information models of service layer with information models of resource layer within the information domain related to customer/ user/ subscriber. Furthermore, to obtain flexible product offerings, this is required to be a "loose" coupling in order to support configuration changes in service layer while avoiding unnecessary changes in resource layer. The current information model in SuM NRM (TS 32.172) does not offer such a coupling.

The current model is also inconsistent in modelling of user identifiers.

In general, a more coherent approach for modelling user's service data profiles is of interest.

SuM should offer a framework to enable rapid development of provisioning support for new services in a way conforming to a standard model.

Besides 3GPP's own interest in addressing the above concerns to support 3GPP/LTE networks and services delivered on top of these networks, ETSI TISPAN asked 3GPP to address these concerns in order to re-use the evolved 3GPP SuM specifications as basis for extensions to support the TISPAN NGN network.

This work provides an evolved SuM information model that offers loose coupling to service layer data and logic, as well as offering a generic framework for modelling of user's service data profiles. Backward compatibility with the existing SuM information model was considered.

Consistency with information entities defined in the User Data Convergence (UID_400034 Rel-9 UDC) baseline common information model were ensured.

Use case analysis followed by requirement re-assessment provided updates of Information Service and Solution Set.

The work aims to provide enhanced management support for services. No additional security aspects compared to existing SuM specifications were considered.

15 CT Features

15.1 CS-IBCF and CS-TrGW definition in 3GPP specifications (CS-IBCF) **UID_400008**

Resources: C3,C4

References

Document	Title/Contents
WID(s)	
CP-090073	C3 WID on CS-IBCF and CS-TrGW definition in 3GPP specifications
Impacted Specifications	
TS 23.231	SIP-I based circuit-switched core network; Stage 2 - C4
TS 29.232	Media Gateway Controller (MGC) - Media Gateway (MGW) interface; Stage 3 - C4
TS 29.235	Interworking between SIP-I based circuit-switched core network and other networks - C3
New Dedicated Specifications/Reports	
TS 29.238	Interconnection Border Control Functions (IBCF) – Transition Gateway (TrGW) interface; Ix interface - C4

Supporting Companies: Telecom Italia, Vodafone, Ericsson, Alcatel-Lucent, Huawei.

Unique ID	Name	Hyperlink	TSs_and_TRs
400008	CS-IBCF and CS-TrGW definition in 3GPP specifications	CP-090073	-
400109	CT3 aspects of CS-IBCF	CP-090073	29.235
400010	CT4 aspects of CS-IBCF	CP-090073	23.231, 29.232, new 29.238

BB moved as Feature from Rel-8. Stage 1 in Rel-8 TS 22.101 [UID_380060 IP Interconnection of Services (IPinterc)].
Linked work items:

UID_380061	IPinterc	Stage 1 for IP Interconnection of Services
UID_360025	SIP_Nc	Support of (G)MSC-S – (G)MSC-S Nc Interface based on the SIP-I protocol
UID_370003	IMSTSS	Add IBCF to IMS Charging

NOTE: IBCF Interconnect Border Control Function

Communication networks are evolving towards packet-based interconnection. SA1 completed work to support interconnect models proposed by GSMA etc. (identifying additional requirements for IP inter-connect between two MSC Servers) reflecting operator's need to deploy session border control functionalities for IMS and CS domains.

This work addresses the above requirements by defining two new functional entities called CS-IBCF and CS-TrGW. Alignment with existing functionalities in IMS (i.e. IBCF and TrGW) are guaranteed as much as possible. This work defined detailed stage 2 procedures (functional requirements and information flows) and the corresponding stage 3 protocol for CS-Ix. CT3, CT4 provided Stage 2 and Stage 3 including:

- Specified Stage 2 border control concepts and the logical architecture aspects
- CS-IBCF and CS-TrGW are logical functions that may be realized within different physical nodes
- logical border control functions are desired to be transparent to the underlying application and SIP-I architecture
- specified Stage 3 procedures and functionalities for the CS-IBCF and CS-TrGW
- defined the interaction between CS-IBCF and CS-TrGW (i.e. CS-Ix interface)
- defined the support for the border control functions collocated with the (G)MSC/CS-MGW and therefore any requirements for the CS-Ix interface may result in enhancements to Mc interface
- prepared the CS-Ix interface for a possible future combination with an IMS border control function interface by avoiding unnecessary procedural differences

Extensions to existing protocols (e.g. SIP-I for Nc) impacting SIP-I protocol for Nc interface should be minimized.

15.2 IMS-IBCF – TrGW definitions in 3GPP (IMS_IBCF)

UID_410008

Resources: C4,C3

References

Document	Title/Contents
WID(s)	
CP-090019	WID on IMS-IBCF – TrGW definitions in 3GPP
Impacted Specifications	
TS 29.162	Interworking between the IM CN subsystem and IP networks - C3
TS 29.235	Interworking between SIP-I based circuit-switched core network and other networks - C3
New Dedicated Specifications/Reports	
TS 29.238	Interconnection Border Control Functions (IBCF) – Transition Gateway (TrGW) interface, Ix Interface; Stage 3 - C4

Supporting Companies: Alcatel-Lucent, Ericsson , Vodafone, Telecom Italia, Huawei, Nokia Siemens Networks.

Unique_ID	Name	TSs_and_TRs
410008	IMS – Interconnection Border Control Function (IBCF) – Transition Gateway (TrGW); Ix Interface; Stage 3	-
410108	CT4 part of IMS_IBCF	new 29.238
410208	CT3 part of IMS_IBCF	29.162, 29.235

TS 23.228 defines the Ix reference point and provides Stage 2 information. Interface Ix is used to control the IMS Transition Gateway (TrGW).

CT3 specified detailed stage 2 procedures (functional requirements and information flows) and CT4 specified the corresponding stage 3 protocol elements for Ix.

ETSI TISPAN H.248 Ia profile version 3 was used as input for this work in order to have harmonized 3GPP/TISPAN specifications and allow future endorsement of the 3GPP Ix profile by TISPAN.

15.3 IMS-ALGCF – IMA-MGW definitions in 3GPP UID_410009

Resources: C4

References

Document	Title/Contents
WID(s)	
CP-090020	WID on IMS-ALGCF – IMA-MGW definitions in 3GPP
Impacted Specifications	
-	-
New Dedicated Specifications/Reports	
TS 23.334	IMS Application Level Gateway Control Function (ALGCF) - IMS Access Media Gateway (IMA-MGW); Iq Interface; Procedures description
TS 29.334	IMS Application Level Gateway Control Function (ALGCF) - IMS Access Media Gateway (IMA-MGW); Iq Interface; Stage 3

Supporting Companies: Alcatel-Lucent, Ericsson , Vodafone, Telecom Italia, Huawei, Nokia Siemens Networks.

Unique ID	Name	Hyperlink	TSs and TRs
410009	IMS Application Level Gateway Control Function (ALGCF) – IMS Access Media Gateway (IMA-MGW); Iq Interface; Stage 2 and Stage 3	CP-090020	new (23.334, 29.334)

TS 23.228 defines the Iq reference point and provides Stage 2 information. Interface Iq is used to control the IMS Access Gateway (IMA-MGW) which may provide NAT and NAT Traversal support functions.

This work defines detailed Stage 2 procedures (functional requirements and information flows) and the corresponding Stage 3 protocol elements for the IMS ALG control Function – IMS Access Media Gateway Iq interface.

ETSI TISPAN H.248 Ia profile version 3 was used as input for this work in order to have harmonized 3GPP/TISPAN specifications and allow future endorsement of the 3GPP Iq profile by TISPAN.

15.4 Enhancements of IMS Customized Alerting Tone service (eCAT) **UID_420016**

Resources: C1

References

Document	Title/Contents
WID(s)	
CP-080796	CT1 WID on Enhancements of IMS Customized Alerting Tone (CAT) Service
Impacted Specifications	
TS 24.182	IP Multimedia Subsystem (IMS) Customized Alerting Tones (CAT) - C1
New Dedicated Specifications/Reports	
-	-

Supporting Companies: China Mobile, Huawei, ZTE, Ericsson, Nortel.

Unique_ID	Name	Hyperlink	Notes	TSs_and_TRs
420016	Enhancements of IMS Customized Alerting Tone (CAT) Service	CP-080796	Stage 1 in 22.182	-
420017	Stage 3 for Enhancements of IMS Customized Alerting Tone (CAT) Service	CP-080796		24.182

Rel-8 IMS CAT provides solutions with both Early Session and Forking models. Some functionality defined in TS 22.182 and TR 23.872 essential for a practicable IMS CAT service is not covered yet in CT1 Stage 3 TS 24.182 e.g.:

- Originating CAT: CAT is provided by the CAT AS in the originating network
- CAT stop: Originating user can control the CAT which is played in the call proceeding. Such as stop it, if possible, and re-start it again
- CAT priority and reject: CAT AS should be supplying servers (priority or reject) when there are conflicts between the originating CAT and terminating CAT in the call proceeding
- IMS CAT copy: Originating user can copy the terminating CAT, when the CAT AS is serving for the originating UE and the terminating UE
- CAT selection: Called party can change the CAT content which to be played to the calling party

15.5 Completion of IMS Restoration Procedures (eIMS_RP)

UID_440017

Resources: C3,C4,C1

References

Document	Title/Contents
WID(s)	
CP-091050	WID on Completion of IMS Restoration Procedures
Impacted Specifications	
TS 23.380	IMS Restoration Procedures - C4
TR 23.820	Study of IMS restoration procedures - C4
TS 24.229	Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3 - C1
TS 29.061	Interworking between the Public Land Mobile Network (PLMN) supporting packet based services and Packet Data Networks (PDN) - C3
TS 29.212	Policy and charging control over Gx reference point - C3
TS 29.213	Policy and charging control signalling flows and Quality of Service (QoS) parameter mapping - C3
TS 29.214	Policy and charging control over Rx reference point - C3
TS 29.215	Policy and Charging Control (PCC) over S9 reference point - C3
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Ericsson, Orange, Vodafone, China Mobile.

Unique_ID	Name	Resource	TSs_and_TRs
440017	Completion of IMS Restoration Procedures		-
440018	CT4 aspects of eIMS_RP	C4	23.380, 23.820
440019	CT1 aspects of eIMS_RP	C1	24.229
460022	CT3 aspects of eIMS_RP	C3	29.061, 29.212, 29.213, 29.214, 29.215

This work is a continuation of Continuation of the Rel-8 Feature UID_400012 IMS Restoration Procedures.

During Rel-8 IMS restoration procedures were specified in TS 23.380 covering S-CSCF service interruption. There are features included in Rel-8 TR 23.820 (e.g. P-CSCF restoration procedures) that were not finalized in Rel-8 and therefore not covered in TS 23.380. This work completes the IMS restoration procedures; especially to specify solutions for P-CSCF service interruption.

15.6 IMS Stage 3 - IETF Protocol Alignment (IMSProtoc3)

UID_ 440039

Resources: C1

References

Document	Title/Contents
WID(s)	
CP-090491	WID on IMS Stage 3 - IETF Protocol Alignment
Impacted Specifications	
TS 23.218	IP Multimedia (IM) session handling; IM call model; Stage 2
TS 24.229	Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3
TR 24.930	Signalling flows for the session setup in the IP Multimedia core network Subsystem (IMS) based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Alcatel-Lucent, Research in Motion, Orange, Nortel Networks.

Unique_ID	Name	Resource	Hyperlink	TSs_and_TRs
440039	IMS Stage 3 - IETF Protocol Alignment	C1	CP-090491	23.218, 24.229, 24.930

In Rel-5, the IMS was defined to support IP Multimedia services. The feature set in Rel-5 provides a basis for IP Multimedia support. At Release 6, 7 and 8 further work was identified. At Release 9 the need for other new capabilities is being identified, and there is still significant ongoing work in IETF that should be documented in relation to its impact on IMS.

This work ensured protocol alignment between 3GPP Stage 3 IMS work and IETF. Review of existing and future capabilities provided in SIP by IETF, and provide documentation as whether these capabilities are supported in the IM CN subsystem or not. In addition, there were minor enhancements to IMS.

CT1 has minimized changes under Rel-9 to the IMS Core in TS 24.229.

15.7 Operational description of the Inter-IMS Network to Network Interface (II-NNI) **UID 440070**

Resources: C3

References

Document	Title/Contents
WID(s)	
CP-090331	WID on Operational description of the Inter-IMS Network to Network Interface (II-NNI)
Impacted Specifications	
TS 29.165	Inter-IMS Network to Network Interface (NNI) - C3
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Orange, Telecom Italia, Verizon, Vodafone, Telia Sonera, Deutsche Telekom, Ericsson, Alcatel-Lucent, Huawei, Nokia Siemens Networks.

Unique_ID	Name	Acronym	Hyperlink	TSs_and_TRs
440070	Operational description of the Inter-IMS Network to Network Interface	II-NNI	CP-090331	29.165

The difficulty of the interconnection between two networks is to adopt common procedures and syntax to avoid inter-operability issues which at best lead to minor impacts on the services and at worst to an impossible call connection or a call release. Thus for the specific case of two IMS it is necessary to have an accurate knowledge of what are the procedures and the syntax used at the Ici and Izi interfaces in order to be able to evaluate the discrepancies between their profiles. This need is all the more important given that the two IMS may not be managed by the same operator and that the national or international regulatory requirements for interoperability must be taken into account.

The present TS 29.165 aims to provide such description of the II-NNI in order to support end-to-end service interoperability. While TS 24.229 describes the 3GPP profile for SIP/SDP signalling and media and the related procedures, it is written in a general IMS context and thus considers application of SIP and SDP for equipment and functions in a framework larger than the interconnection one and does not address directly the specific case of the interconnection. Taking into consideration the Rel- 8 work, most of the information about the II-NNI can be directly extracted from the TS29.165, but the specification can be improved to better understand the II-NNI profile. For instance the reading of the II-NNI profile can be improved to avoid wrong interpretations of the TS 24.229 in the interconnection context, and by the definition of the capabilities, as expressed by listing relevant RFCs, which are mandatory or optional to support over the II-NNI.

Related procedures for IMS entities such as the IBCF had been studied. Based upon the Rel-8 work on TS 29.165, this work produced a standard reference for service interconnection between two IMS in continuity with the Rel-8 work.

This work:

- completed and improved TS 29.165 to make it more useful for an operator as an II-NNI reference specification. The existing structure of TS 29.165 was preserved as far as possible to give at best continuity of the already done work.
- addressed remaining issues in TS 29.165 summarizing relevant statements in TS 24.229 for the II-NNI at the Ici reference point. All those statements will be described in the specific context of the interconnection.
- addressed all the relevant topics which may lead to misunderstandings at the II-NNI because of several possible options of implementation. If possible, the preferred option in the specific framework of the interconnection was given.
- improved the end-to-end support over the II-NNI of the IMS services and capabilities.

15.8 Definition of M1 interface for Control Plane LCS (EMC2)

UID_450005

Resources: C1

References

Document	Title/Contents
WID(s)	
CP-090746	WID on Definition of M1 interface for Control Plane LCS (Stage 3)
Impacted Specifications	
TS 24.229	Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Polaris Wireless , Qualcomm, TeleCommunication Systems , Alcatel-Lucent , Verizon , Nokia Siemens Networks, NEC, NTT DoCoMo, Andrew Corporation.

Unique_ID	Name	Resource	Notes	TSs_and_TRs
450005	Definition of M1 interface for Control Plane LCS (Stage 3)	C1	Stage 3 for Rel-7 Emergency Calls (EMC1). Related to Rel-9 UID_400038 LCS Control Plane Solution for EPS. Stage 2 in Rel-9 UID_400038 (23.271), UID_410037 (23.167)	24.229

SA2 has discussed the location retrieval capability between the E-CSCF and LRF for IMS emergency call and concluded that the interface between E-CSCF and LRF, i.e. M1, needs to be specified in Rel9 to allow multi vendor deployment of E-CSCF and GMLC (LRF). See SA2's LS in S2-096077.

M1 interface is not standardized yet but it is a required interface in Rel-9 to meet the regulatory requirements in various regions when providing voice service over the packet network, i.e. IMS VoIP.

Related Feature		
Unique ID	Title	Nature of relationship
EMC1	Emergency Calls	The M1 interface is a missing part of the EMC1 WI in Rel-7.
400038	LCS Control Plane Solution for EPS	Supports stage 3 definition of SLs and SLg interfaces in 400038, Supports stage 3 definition for MO-LR and MT-LR between the UE and MME.

SA2 has agreed that the location service capabilities for IMS emergency call, e.g. retrieving or validating location information, is provided over the M1 interface between the E-CSCF and LRF. In providing the voice service over the IMS, the location related capabilities are required to meet the regulatory requirements in the various regions. Therefore, the stage3 specification of the M1 interface needs to be specified within the Rel-9 scope. The Li interface was a missing part of the work required for the Rel-7 Work Item EMC1.

Overall architecture of the location service including IMS emergency call is specified in TS 23.271(LCS Stage 2), and procedures between E-CSCF and LRF over M1 interface are specified in TS23.167 (IMS emergency sessions Stage 2).

This work produced a new specification for M1 interface between E-CSCF and LRF for IMS emergency calls. The M1 interface provides the capability for E-CSCF to request the LRF for location information, validate location information, obtain the routing information or correlation information.

15.9 PCC enhancements **UID_450009**

Resources: C3

References

Document	Title/Contents
WID(s)	
CP-090744	WID on PCC enhancements
Impacted Specifications	
TS 29.212	Policy and charging control over Gx reference point
TS 29.213	Policy and charging control signalling flows and Quality of Service (QoS) parameter mapping
TS 29.215	Policy and Charging Control (PCC) over S9 reference point
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Huawei, Orange, Alcatel-Lucent, NEC, Bridgewater Systems, Qualcomm, ZTE, T-Mobile, NTT DoCoMo.

Unique_ID	Name	Acronym	Resource	Hyperlink	TSs_and_TRs
450009	PCC enhancements	PCC-Enh	C3	CP-090744	29.212, 29.213, 29.215

Related Feature		
Unique ID	Title	Nature of relationship
	PCC SAES-St3-PCC	This work builds on the functionality specified in previous releases under PCC and SAES-St3-PCC

There is an SA2 Feature level WID for Multiple PDN Connection to the Same APN for PMIP-based Interfaces (MUPSAP), and also SA2# 73 has discussed the support of multiple PDN connectivity to same APN in PCC.

The main impact to the PCC is during HO and during initial attach.

The PCRF needs to make a decision of which IP CAN session this request should map when Gateway Control Session is established. The agreement of SA2#73 meeting is a PDN Connection Identifier is used to differentiate PDN connections provided over the Gxx and Gx interfaces to allow the PCRF to discern PDN connections to same APN.

In SA2#73 meeting, several other PCC related issues were also discussed and agreed, such as usage notification and reporting to PCRF, etc. The corresponding work was provided by CT3 as follows:

- PCC/Qos rule authorization in case of Multiple PDN Connection to the Same APN for PMIP-based Interfaces
- Gx and Gxx leg linking in PCRF in case of Multiple PDN Connection to the Same APN for PMIP-based Interfaces during initial attach
- Gx and Gxx leg linking in PCRF in case of Multiple PDN Connection to the Same APN for PMIP-based Interfaces during inter/intra system handover
- Gx and Gxx leg linking in PCRF in case of Multiple PDN Connection to the Same APN for PMIP-based Interfaces during UE-initiated Connectivity to Additional PDN
- The impact to S9 to support above functions
- Usage notification and reporting to PCRF
- Other minor enhancements to PCC functionality

15.10 3GPP IMS Conferencing Management Object **UID_460004**

Resources: C1

References

Document	Title/Contents
WID(s)	
-	WID - see CP#46 Report
Impacted Specifications	
-	-
New Dedicated Specifications/Reports	
TS 24.166	3GPP IP Multimedia Subsystem (IMS) conferencing Management Object (MO)

Supporting Companies: 3GPP TSG CT #46 plenary

Unique_ID	Name	Resource	Notes	TSs_and_TRs
460004	3GPP IMS Conferencing Management Object (MO)	C1	Linked to Rel-6 UID_11051 (IMS Management objects) under the Feature UID_32021 (IMS Phase 2). MO compatible with OMA DM v1.2 & upwards and defined using OMA DM Device Description Framework (OMA-ERELED_DM-V1_2)	new 24.166

15.11 In Case of Emergency (ICE) Graphics **UID_470004**

Resources: C6

References

Document	Title/Contents
WID(s)	
CP-100178	WID on In Case of Emergency (ICE) Graphics
Impacted Specifications	
31.102	Characteristics of the Universal Subscriber Identity Module (USIM) application
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Sagem Orga, Gemalto, Vodafone, Nokia, Giesecke & Devrient.

Unique_ID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
470004	In Case of Emergency (ICE) Graphics	C6	CP-100178	Added capability to store ICE graphical information (picture)	31.102 CR#0433

Linked work items

UID_380059 In Case of Emergency numbers storage and easy access on UICC (ICE) Rel-8

Justification

Complete the ICE Feature started in Rel-8 having requirements (Stage 1) in SA1 Rel-8 TS 22.030 and TS 22.101.

Quote from Wikipedia:

"The **In Case of Emergency**, or ICE, is a program which is used to enable first responders, such as paramedics, firefighters, police officers, to identify victims and contact their next of kin to obtain important medical information.(...)"

In developed countries some 80% or more of people carry a mobile phone, and the police or paramedics often use them to identify victims at road traffic accidents or other incidents. The idea of ICE is that everyone should put an emergency contact name and number into their phone under the headword "ICE". This would give the emergency services personnel a standard place to look. (...)"

Most newer phones offered by American cellphone company Verizon Wireless come with a special ICE contact list. This is made possible mostly in part because Verizon puts a User Interface on all of their phones made (...)"

While this contact list has been introduced on a proprietary mobile phone dependent way, a standardized solution is not available, making the use for "first responders" difficult, if not impossible.

Objective

A UE shall have the capability to store one or more ICE information on the UICC which the subscriber can optionally configure.

Provision is made for direct and unambiguous read access from the UE to ICE information stored on the UICC. Under control of the subscriber, this information can be made accessible even when the keypad is locked.

MMI-Aspects

The MMI shall provide for unambiguous identification of ICE information and easy read access. Under control of the subscriber, the ICE information can be made accessible even when the UE/UICC security features have been enabled (e.g. keypad is locked).

16 Improvements of the Radio Interface **UID_410023**

16.1 LCR TDD UE OTA Performance Requirements **UID_410017**

Resources: R4

References

Document	Title/Contents
WID(s)	
RP-080744	WID on LCR TDD UE OTA Performance Requirements
Impacted Specifications	
-	-
New Dedicated Specifications/Reports	
-	-

Supporting Companies: RITT, China Mobile, ZTE, CATT, TD Tech

Unique_ID	Name	Hyperlink	Status_Report	TSs_and_TRs
410017	LCR TDD UE OTA Performance Requirements	RP-080744	RP-090389	Produced no TR 25.8xy

UE antenna Over The Air (OTA) performance and test requirements were already considered by RAN4 and RAN5. Low Chip Rate (LCR) TDD UE OTA performance can save network cost and promote network service quality.

The output power of LCR TDD Base Stations is smaller than of GSM and WCDMA and the uplink technology is more complicated. Therefore Total Radiated Power (TRP) and TIS [(Total Integrated Sensitivity also known as Total Radiated Sensitivity (TRS))] requirements need special consideration.

The objective was to create LCR TDD UE OTA performance requirements including development of:

- LCR TDD UE OTA model
- LCR TDD UE OTA performance requirements based on the OTA model
- LCR TDD UE OTA performance limit

No TR 25.8xy (LCR TDD UE OTA performance requirements) was produced.

- R4-091791 UTRA LCR TDD OTA test results analysis
- R4-091968 UTRA LCR TDD OTA performance requirements

16.2 RF requirements for Multicarrier and Multi-RAT BS

UID_410019

Resources: R4,G1

References

Document	Title/Contents
WID(s)	
RP-091381	RAN4 WID on RF requirements for Multicarrier and Multi-RAT BS
GP-081945	GERAN WID on RF requirements for Multicarrier and Multi-RAT BS
Impacted Specifications	
TS 25.104	Base Station (BS) radio transmission and reception (FDD)
TS 25.105	Base Station (BS) radio transmission and reception (TDD)
TS 36.104	Evolved Universal Terrestrial Radio Access (E-UTRA); Base Station (BS) radio transmission and reception
TS 45.005	GSM/EDGE Base Station (BS) radio transmission and reception - GP
TS 51.021	GSM/EDGE Base Station System (BSS) equipment specification; Radio aspects - GP
New Dedicated Specifications/Reports	
TS 37.104	E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) radio transmission and reception
TS 37.113	E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) Electromagnetic Compatibility (EMC)
TS 37.141	E-UTRA, UTRA and GSM/EDGE; Multi-Standard Radio (MSR) Base Station (BS) conformance testing
TR 37.900	RF requirements for Multicarrier and Multi-RAT BS

Supporting Companies: Alcatel-Lucent, Ericsson, Huawei, Nokia Siemens Networks, NTT DoCoMo, TeliaSonera, T-Mobile.

Unique_ID	Name	Ressource	Hyperlink	Status_Report	Notes / TSs_and_TRs
410019	RF requirements for Multicarrier and Multi-RAT BS	R4,G1	RP-091381	RP-100027	RF requirements specification applicable to Multi-Standard Radio (MSR) Base Station with multiple carriers and/or multiple 3GPP Radio Access Technologies (RAT)
420009	RAN4 part of RF requirements for Multicarrier and Multi RAT BS	R4	RP-091381	RP-100027	25.104, 25.105, 36.104, new 37.104, 37.113, 37.141, 37.900
420001	GERAN part of RF requirements for Multicarrier and Multi RAT BS	G1	GP-081945	-	45.005, 51.021

Some E-UTRA BS RF requirements are today defined for both single carrier and multi-carrier BS. In certain scenarios, it is however not clear how requirements should be interpreted.

With E-UTRA comes the possibility to have multicarrier BS where the carriers have different bandwidths, ultimately spanning from 1.4 to 20 MHz. There is also a possibility for multicarrier BS, where the carriers use different 3GPP RATs, possibly combining E-UTRA with UTRA FDD/TDD and/or GSM. Requirements for such more complex scenarios are not covered by the present specifications.

NOTE: In the E-UTRA specifications, a limited set of multi-carrier scenarios are covered by informative text on how to set requirements. This is limited to multi-carrier BS with contiguous carriers, 5 MHz and higher channel BW and only for E-UTRA, and for E-UTRA in combination with UTRA.

RAN4 first identified relevant scenarios and then write an RF requirements specification that is applicable to Multi-Standard Radio (MSR) Base Station with multiple carriers and/or multiple 3GPP Radio Access Technologies (RAT), according to the following:

- The new specification will cover RF requirements for GSM, UTRA, and E-UTRA (both FDD and TDD modes), for relevant single and multicarrier scenarios and will take into account the regulatory framework in different regions.
- The new specification will include BS transmission and reception requirements, but no baseband performance requirements.
- Existing RF specifications will remain and be applicable within their current scope.

- For a multi-RAT/multi-carrier Base Station, the new RF requirements specification will be applicable for that equipment, together with the baseband requirements of the relevant existing specifications.

GERAN part of RF requirements for Multicarrier and Multi RAT BS

UID_420001

Unique_ID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
420001	GERAN part of RF requirements for Multicarrier and Multi RAT BS	G1	GP-081945	GP#44 Core spec completed (ongoing BS conformance spec). GP#40 WID approved	45.005, 51.021

Modifications of GSM/EDGE specifications allow the usage of multicarrier BTSs. Usage of several 3GPP Radio Access Technologies (RATs) within the same frequency band has been introduced. Operators are therefore allowed to use any single or combination of technologies in frequency bands previously were reserved for GSM alone. Hence relevant technology migration scenarios from co-existence and interworking perspective need to be investigated. Additionally, a common specification on RF requirements for Multicarrier and Multi-RAT Base Stations facilitates and adds flexibility and cost advantages for these migration scenarios.

With E-UTRA comes the possibility to have multicarrier BS where the carriers have different bandwidths, ultimately spanning from 1.4 to 20 MHz. There is also a possibility for multicarrier BS, where the carriers use different 3GPP RATs, possibly combining E-UTRA with UTRA FDD/TDD and/or GSM. Requirements for such more complex scenarios are not covered by the present specifications.

This supports the RAN4 work, which has the objective to first identify relevant technology migration scenarios and then write an RF requirements specification that is applicable to Multi-Standard Radio (MSR) Base Station. It reviewed the GERAN relevant parts and prepared input for adapting the existing GERAN requirements to an MSR specification with a goal to minimize changes to these requirements.

16.3 Extended UMTS/LTE 800 **UID_420010**

Resources: R4,R2,R3,R5

References

Document	Title/Contents
	WID(s)
RP-080884	WID on Extended UMTS/LTE 800
	Impacted Specifications
TS 25.101	UE Radio transmission and reception (FDD)
TS 25.104	BS Radio transmission and reception (FDD)
TS 25.113	BS and repeater EMC
TS 25.133	Requirements for support of RRM (FDD)
TS 25.141	BS conformance testing (FDD)
TS 25.306	UE Radio Access capabilities
TS 25.307	Requirements on UE supporting a release-independent frequency band
TS 25.331	RRC; protocol specification
TS 25.461	UTRAN lunt interface: Layer 1
TS 25.466	UTRAN lunt interface: Application part
TS 34.124	EMC requirements for mobile terminals and ancillary equipment
TS 36.101	E-UTRA; UE Radio transmission and reception
TS 36.104	E-UTRA; BS Radio transmission and reception
TS 36.113	E-UTRA; BS and repeater EMC
TS 36.124	E-UTRA; EMC requirements for mobile terminals and ancillary equipment
TS 36.133	E-UTRA; Requirements for support of RRM
TS 36.141	E-UTRA; BS conformance testing
TS 36.331	E-UTRA; RRC; protocol specification
	New Dedicated Specifications/Reports
TR 36.800	Extended UMTS/LTE 800 Work Item Technical Report

34.108	Common test environments for UE; Conformance testing
34.121-1	UE conformance specification; Radio transmission and reception (FDD) Part 1: Conformance specification
34.121-2	UE conformance specification; Radio transmission and reception (FDD); Part 2: ICS
34.123-1	UE conformance specification; Part 1: Protocol conformance specification
34.123-2	UE conformance specification; Part 2: ICS
34.123-3	UE conformance specification; Part 3: Abstract test suites (ATSs)
36.508	E-UTRA and EPC; Common test environments for UE conformance testing
36.521-1	E-UTRA; UE conformance specification; Radio transmission and reception; Part 1: Conformance Testing
36.521-2	E-UTRA; UE conformance specification; Radio transmission and reception; Part 2: ICS
36.521-3	E-UTRA; UE conformance specification; Radio transmission and reception; Part 3: RRM Conformance Testing
36.523-1	UE conformance specification; Part 1: Protocol conformance specification
36.523-2	UE conformance specification; Part 2: ICS
36.523-3	UE conformance specification; Part 3: Abstract Test Suites (ATS)

Supporting Companies: NTT DoCoMo, KDDI, Fujitsu, NEC, Hitachi, Kyocera, Motorola, Nortel, Nokia Siemens Networks, Samsung, Panasonic.

Unique_ID	Name	Ressource	Hyperlink	Status_Report	TSs_and_TRs
420010	Extended UMTS/LTE 800 MHz	R4,R2,R3	RP-080884	RP-090687	25.101, 25.104, 25.113, 25.133, 34.124, 36.101, 36.104, 36.113, 36.124, 36.133, 36.141, 25.306, 25.307, 25.331, 36.331, 25.461, 25.466, new 36.800

RAN4 completed UMTS800 (Band VI) in Dec 2003 and a commercial service was launched in Jun 2005.

A frequency re-arrangement plan in 800MHz band in Japan before and beyond 2012, allocated the lower band (UL:815 - 830 MHz / DL:860 - 875 MHz) to cdma2000 and the upper band (UL:830 - 845 MHz / DL:875 - 890 MHz) to UMTS. The Information and Communications council of Japan studied the possibility to introduce LTE into both above bands and co-existence with the following technologies: UMTS, cdma2000, MCA system (ARIB standard RCR STD-23, 85).

This work:

- studied extended UMTS/LTE 800 for potential deployment in Japan:
 - Band A for LTE:
 - 815 - 830 MHz: Up-link (UE transmit, Node B receive)
 - 860 - 875 MHz: Down-link (Node B transmit, UE receive)
 - Band B for UMTS/LTE:
 - 830 - 845 MHz: Up-link (UE transmit, Node B receive)
 - 875 - 890 MHz: Down-link (Node B transmit, UE receive)
- generated CRs to update the appropriate specifications

16.4 UMTS/LTE 800 MHz for Europe **UID_430009**

Resources: R4,R2,R3

References

Document	Title/Contents
	WID(s)
RP-090156	WID on UMTS/LTE in 800 MHz for Europe
	Impacted Specifications
TS 25.101	UE Radio transmission and reception (FDD)
TS 25.104	BS Radio transmission and reception (FDD)
TS 25.113	BS and repeater EMC
TS 25.133	Requirements for support of RRM (FDD)
TS 25.141	BS conformance testing (FDD)
TS 25.306	UE Radio Access capabilities
TS 25.307	Requirements on UE supporting a release-independent frequency band
TS 25.331	RRC; protocol specification
TS 25.461	UTRAN lunt interface: Layer 1
TS 25.466	UTRAN lunt interface: Application part
TS 34.124	EMC requirements for mobile terminals and ancillary equipment
TS 36.101	E-UTRA; UE Radio transmission and reception
TS 36.104	E-UTRA; BS Radio transmission and reception
TS 36.113	E-UTRA; BS and repeater EMC
TS 36.124	E-UTRA; EMC requirements for mobile terminals and ancillary equipment
TS 36.133	E-UTRA; Requirements for support of RRM
TS 36.141	E-UTRA; BS conformance testing
TS 36.331	E-UTRA; RRC; protocol specification
	New Dedicated Specifications/Reports
TR 36.810	Universal Terrestrial Radio Access (UTRA) and Evolved Universal Terrestrial Radio Access (E-UTRA); UMTS / LTE 800 for Europe Work Item Technical Report

Supporting Companies: Ericsson, T-Mobile Intl., Orange, Telecom Italia, TeliaSonera, Nokia Siemens Networks, Nokia, Motorola, Qualcomm.

Unique_ID	Name	Ressource	Hyperlink	Status_Report	TSs_and_TRs
430009	UMTS/LTE 800 MHz for Europe	R4,R2,R3	RP-090156	RP-100028	25.101, 25.104, 25.113, 25.133, 25.141, 34.124, 36.101, 36.104, 36.113, 36.124, 36.133, 36.141, new 36.810, 25.306, 25.307, 25.331, 36.331, 25.461, 25.466

Switching off analogue TV (Digital Dividend) makes available for IMT services a portion of UHF spectrum in Region 1. WRC identified the upper portion of UHF spectrum (790-862 MHz) for IMT applications. In particular, note 5.xxx states [World Radiocommunication Conference – Provisional Final Acts – Geneva, 22 October – 16 November 2007]

"In Region 1, the allocation to the mobile, except aeronautical mobile, service on a primary basis in the frequency band 790-862 MHz shall come into effect from 17 June 2015 and shall be subject to agreement obtained under No. 9.21 with respect to the aeronautical radionavigation service in countries mentioned in No. 5.312. For countries party to the GE06 Agreement, the use of stations of the mobile service is also subject to the successful application of the procedures of that Agreement. Resolution 224 (Rev.WRC 07) and Resolution [COM4/13] (Rev.WRC 07) shall apply. (WRC-07)"

EU Commission prepared recommendations for the 790-862 MHz band (Digital Dividend). This band was previously allocated for broadcasting services, but is reassigned to mobile services due to transition from analogue to digital TV. The band is divided into 2 x 30 MHz for FDD operations. This band has good propagation conditions and might be available throughout Europe; hence provides a good opportunity to deploy networks with good area coverage.

Consequently, this work introduces a new frequency band (790-862 MHz) for both UMTS and LTE. This work:

- studied UMTS/LTE in upper UHF band for potential deployment in ITU Region 1 (790-862 MHz band / FDD)
- developed channel arrangement in line with ECC decision
- generated CRs to update the appropriate specifications

16.4.1 Conformance Test Aspects – UMTS/LTE in 800 MHz for Europe

UID_440007**Resources:** R5

Unique_ID	Name	Hyperlink	Status_Report	rapporteur	Notes	TSs_and_TRs
440007	Conformance Test Aspects – UMTS/LTE in 800 MHz for Europe	RP-090485	RP-100736	Ericsson	RP#49 completed	UTRA, LTE 34.108, 34.121-1, 34.121-2, 36.508, 36.521-1, 36.521-2, 36.521-3

16.5 Performance requirement for LCR TDD with UE speeds up to 350 km/h **UID_430010**

Resources: R4

References

Document	Title/Contents
WID(s)	
RP-090258	WID on Performance requirement for LCR TDD with UE speeds up to 350 km/h
Impacted Specifications	
TS 25.102	User Equipment (UE) radio transmission and reception (TDD)
TS 25.105	Base Station (BS) radio transmission and reception (TDD)
TS 25.142	Base Station (BS) conformance testing (TDD)
New Dedicated Specifications/Reports	
-	-

Supporting Companies: CATT, CATR, CMCC, TD-Tech, ZTE.

Unique_ID	Name	Hyperlink	Status_Report	TSs_and_TRs
430010	Performance requirement for LCR TDD with UE speeds up to 350 km/h	RP-090258	RP-091035	25.102, 25.105, 25.142

UE behaviour in high mobility environments up to 120 km/h is contained in current TDD specifications. With increasing number of applications at even higher speeds, further work is needed to ensure appropriate performance levels in terms of data rates (throughput) and QoS. Limited to LCR TDD this work:

- identified realistic propagation conditions and multipath models for high speed trains
- performed simulations for BS and UE in high speed environment up to 350 km/h.
- developed UE minimum performance requirements for LCR-TDD UE in high speed conditions
- developed BS minimum performance requirements for LCR-TDD BS in high speed train conditions

16.5.1 Conformance Test Aspects – Performance requirement for LCR TDD with UE speeds up to 350 km/h **UID_470019**

Resources: R5

Unique_ID	Name	Hyperlink	Status_Report	TSs_and_TRs
470019	Conformance Test Aspects – Performance requirement for LCR TDD with UE speeds up to 350 km/h	RP-100167	RP-100496	UTRA 34.122

16.6 Extended UMTS/LTE 1500 MHz **UID_440004**

Resources: R4,R2,R3,R5

References

Document	Title/Contents
	WID(s)
RP-090470	WID on Extended UMTS/LTE 1500 MHz
	Impacted Specifications
TS	25.101, 25.104, 25.113, 25.133, 25.141, 25.306, 25.307, 25.331, 25.461, 25.466, 34.124, 36.101, 36.104, 36.113, 36.124, 36.133, 36.141, 36.331
	New Dedicated Specifications/Reports
TR 36.821	Extended UMTS/LTE 1500 work item technical report
TS 36.307	Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements on User Equipments (UEs) supporting a release-independent frequency band

Supporting Companies: NTT DoCoMo, Softbank Mobile, eMobile, KDDI, Fujitsu, Panasonic, NEC, Sharp, Anritsu, Nokia Siemens Networks, Huawei, ZTE, Hitachi, Kyocera, Alcatel-Lucent, Couei, Renesas, Qualcomm.

Unique_ID	Name	Ressource	Hyperlink	Status_Report	TSS_and_TRs
440004	Extended UMTS/LTE 1500 MHz	R4,R2,R3	RP-090470	RP-100029	25.101, 25.104, 25.113, 25.133, 25.141, 25.306, 25.307, 25.331, 25.461, 25.466, 34.124, 36.101, 36.104, 36.113, 36.124, 36.133, 36.141, 36.331, new (36.821, 36.307)

UMTS1500 for Japan in Band XI (UL: 1427.9 – 1452.9 MHz / DL: 1475.9 – 1500.9 MHz) was completed in Sep 2007. UMTS commercial services for this band have not been launched yet. Meanwhile the study on the technical conditions for LTE has been conducted by the Telecommunications Council of Japan which includes co-existence studies with the following existing technologies: Radio astronomy systems and Mobile satellite communications service. Based on the study outcomes, MIC (Ministry of Internal Affairs and Communications) elaborated draft guidelines for establishment of specified Base Stations for the introduction of the 3.9-generation mobile communications system and consulted with the Radio Regulatory Council about the guideline. The Council endorsed the guideline which contains the frequency re-arrangement plan for the 1.5 GHz band (R4-091867 / RP-090469 ARIB). The band plan is constituted from three component sub-bands:

Block A: UL: 1427.9 – 1437.9 MHz / DL: 1475.9 – 1485.9 MHz
 Block B: UL: 1437.9 – 1447.9 MHz / DL: 1485.9 – 1495.9 MHz
 Block C: UL: 1447.9 – 1462.9 MHz / DL: 1495.9 – 1510.9 MHz

Based on this, existing Band 11 (36.101) and XI (25.101) are not aligned with the above MIC block allocation:

TS 25.101	XI	UL : 1427.9 - 1452.9 MHz	DL : 1475.9 - 1500.9 MHz
TS 36.101	11	UL : 1427.9 - 1452.9 MHz	DL : 1475.9 - 1500.9 MHz

Block A and B are a sub-set of existing band XI/11.

Existing duplexer cannot support block A, B and C without requiring a split band approach. Hence, considering the existing Band 11 / XI allocation and the new band plan (Block A/B/C), and taking into practical RF implementation, the existing Band 11 / XI was redefined with reduction of 5MHz bandwidth and a new band was also specified.

New Band 11 / XI	UL : 1427.9 – 1447.9 MHz	DL : 1475.9 – 1495.9 MHz
New Band Y	UL : 1447.9 – 1462.9 MHz	DL : 1495.9 – 1510.9 MHz

To allow future performance enhancements in duplexer technologies, UEs supporting the existing Band XI/ 11 and the new operating band, a similar specification relaxation to that adopted for Band 3 and Band 9 was made. This work studied extended UMTS/LTE 1500 for potential deployment in Japan:

Band XI / 11 with reduction of 5MHz bandwidth for UMTS/LTE [Block A, Block B]:

1427.9 – 1447.9 MHz: Up-link
 1475.9 – 1495.9 MHz: Down-link

Band Y for UMTS/LTE [Block C]:

1447.9 – 1462.9 MHz: Up-link
 1495.9 – 1510.9 MHz: Down-link

For terminals supporting both Band XI / 11 with reduction of 5MHz bandwidth and Band Y, a suitable specification relaxation was defined.

16.6.1 Conformance Test Aspects – Extended UMTS/LTE 1500 MHz

UID_450017

Resources: R5

Unique_ID	Name	Hyperlink	Status_Report	TSs_and_TRs
450017	Conformance Test Aspects – Extended UMTS/LTE 1500 MHz	RP-091366	RP-100487	34.108, 34.121-1, 34.121-2, 34.123-1, 34.123-2, 36.508, 36.521-1, 36.521-2, 36.521-3, 36.523-1, 36.523-2, 36.523-3

16.7 TDD UE over the Air (Antenna) conformance testing methodology

UID_440012

Resources: R5

References

Document	Title/Contents
WID(s)	
RP-090621	WID on TDD UE Over The Air (Antenna) conformance testing methodology
Impacted Specifications	
TS 34.114	User Equipment (UE) / Mobile Station (MS) Over The Air (OTA) antenna performance; Conformance testing
New Dedicated Specifications/Reports	
-	-

Supporting Companies: CATR, CMCC, CATT, ZTE, Huawei, Motorola, Nokia.

Unique_ID	Name	Hyperlink	Status_Report	TSs_and_TRs
440012	TDD UE Over The Air (Antenna) conformance testing methodology	RP-090621	RP-090727	34.114

RAN4 completed TR 25.914 on UE and MS antenna performance evaluation method. RAN4 also completed the Over the Air (Antenna) minimum performance requirements for the speech mode (terminal close to head) in TS 25.144. In order to create test requirements for UE and MS conformance testing it is important that the measurement method described in TR 25.914 is properly specified. The test methodology for FDD UE and MS has been fixed in TS 34.114. Test methodology for TDD UE should be finalized. This work enables development of conformance tests for TDD UEs.

This work adds in TS 34.114 test methodology for OTA (Antenna) conformance testing for TDD UE in speech mode based on TR 25.914 and performance limits set by RAN4. TS 34.114 covers TD-SCDMA terminals.

16.8 Conformance Test Aspects – SMS over IMS in E-UTRAN

UID_450018

Resources: R5

References

Document	Title/Contents
WID(s)	
RP-090959	WID on Conformance Test Aspects – SMS over IMS in E-UTRAN
Impacted Specifications	
TS 34.229-1	IP multimedia call control protocol based on SIP and Session Description Protocol (SDP); Part 1: Protocol conformance
TS 34.229-2	IP multimedia call control protocol based on SIP and SDP; Part 2: Implementation Conformance Statement spec
TS 34.229-3	IP multimedia call control protocol based on (SI) and Session Description Protocol (SDP); Part 3: Abstract Test Suite
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Alcatel-Lucent, Qualcomm, Verizon, Rohde & Schwarz.

Unique_ID	Name	Hyperlink	Status_Report	TSs_and_TRs
450018	Conformance Test Aspects – SMS over IMS in E-UTRAN	RP-090959	RP-100072	34.229-1, 34.229-2, 34.229-3

SMS needs to be tested to verify that the functionality of SMS over IMS in E-UTRAN complies with specification. This work provides conformance test specifications for SMS over IMS in E-UTRAN.

17 RAN improvements **UID_430013**

17.1 Dual-Cell HSUPA **UID_430014**

Resources: R1,R2,R3,R4

References

Document	Title/Contents
WID(s)	
RP-090014	WID on Dual-Cell HSUPA
Impacted Specifications	
TS	25.101, 25.104, 25.133, 25.211, 25.212, 25.213, 25.214, 25.215, 25.319, 25.306, 25.321, 25.331, 25.423, 25.433
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Nokia Siemens Networks, Nokia, Telefonica, Orange, Ericsson, Qualcomm, Alcatel-Lucent, Softbank Mobile, Telecom Italia, Huawei, Samsung.

Unique_ID	Name	Hyperlink	Status_Report	TSs_and_TRs
430014	Dual-Cell HSUPA	RP-090014	RP-100030	25.101, 25.104, 25.133, 25.211, 25.212, 25.213, 25.214, 25.215, 25.319, 25.306, 25.321, 25.331, 25.423, 25.433

With the increased use of packet data services, increased data rates introduced for HSDPA evolution as well as the supportable bandwidth imbalance between uplink and downlink after the introduction of Dual Cell HSDPA to Rel-8 the aggregation of two carriers in the uplink can be seen as an obvious solution complementing the work already completed for the downlink operation. This work:

- specified Dual Cell HSUPA operation for the following scenarios:
 - a. The dual carrier transmission only applies to HSUPA UL physical channels and DPCCH.
 - b. The carriers belong to the same Node-B and are on adjacent carriers
 - c. Operation with at least 2 carriers configured simultaneously in downlink. In this case the duplex distance between uplink carrier n and downlink carrier n will respect single carrier rules.
- introduced Stage 2 level definition of the Dual Cell HSUPA in TS 25.319
- introduced the functionality for the relevant specifications of
 - a. UL and DL control channel structure.
 - b. L2/L3 protocols and procedures
 - c. UTRAN network interfaces
 - d. UE RF and performance requirements
 - e. BS RF and performance requirements
 - f. RRM requirements

The definition of signalling solutions took into account the work on combination of Dual Cell HSDPA and MIMO. Stage 3 took into account the possible forward compatibility for further extensions of multi-carrier operation.

17.2 Support for different bands for Dual-Cell HSDPA

UID_430015

Resources: R4,R2,R3

References

Document	Title/Contents
WID(s)	
RP-090973	WID on Support for different bands for Dual-Cell HSDPA
Impacted Specifications	
TS	25.101, 25.104, 25.133, 25.306, 25.308, 25.331, 25.423, 25.433
New Dedicated Specifications/Reports	
TS 25.317	Requirements on User Equipments (UEs) supporting a release-independent frequency band combination

Supporting Companies: Nokia Siemens Networks, Nokia, Telefonica, Telecom Italia, Ericsson, Qualcomm, Alcatel-Lucent, Softbank Mobile, eMobile.

Unique_ID	Name	Hyperlink	Status_Report	TSs_and_TRs
430015	Support for different bands for Dual-Cell HSDPA	RP-090973	RP-091038	25.101, 25.104, 25.133, 25.306, 25.308, 25.331, 25.423, 25.433, new 25.317

Rel-8 study on multi-carrier HSDPA resulted with a work item under which Dual-Cell HSDPA operation was defined for two adjacent carrier cells operating in the same frequency band. Given the fragmentation of frequency resources

across different bands, it is also foreseen that enabling carrier aggregation across frequency bands would allow a larger portion of network deployments to take the Dual-Cell HSDPA in use. This work:

- specified Dual-Cell HSDPA operation for limited set of band combinations:
 - a. physical layer operation is unchanged from Rel-8 DC-HSDPA operation
 - b. paired cells can operate on two different bands in addition to Rel-8 adjacent carrier-only operation
 - c. two cells belong to the same Node-B and mobility is based on one of the carriers only (anchor carrier)
 - d. focus on limited set of band combinations allowed in order to keep the UE RF implementation feasible.
 - Target was to have only one band combination per Region.
 - For Region 1 combining a 900 MHz band cell with a cell operating in 2100 MHz.
 - For Region 2, PCS and AWS bands can be considered when RAN4 identifies suitable band combination.
 - For Region 3 band combinations to be considered separately and could result in more than one combination due to different allocations within the region.
- evaluated the impact on network planning and deployment

Possible forward compatibility aspects for further extensions of multi-carrier operation were considered.

17.3 Combination of DC-HSDPA with MIMO UID_430016

Resources: R1,R2,R3,R4

References

Document	Title/Contents
	WID(s)
RP-090332	WID on Combination of DC-HSDPA with MIMO
	Impacted Specifications
TS	25.101, 25.104, 25.133, 25.211, 25.212, 25.213, 25.214, 25.215, 25.308, 25.321, 25.331, 26.306, 25.423, 25.433
	New Dedicated Specifications/Reports
-	-

Supporting Companies: Ericsson, Nokia, Nokia Siemens Networks, Qualcomm Europe, eMobile, Softbank Mobile, Alcatel-Lucent, Vodafone Group, Huawei, ZTE, Telecom Italia Mobile, Philips, Samsung.

Unique_ID	Name	Hyperlink	Status_Report	TSs_and_TRs
430016	Combination of DC-HSDPA with MIMO	RP-090332	RP-091039	25.101, 25.104, 25.133, 25.211, 25.212, 25.213, 25.214, 25.215, 25.308, 25.321, 25.331, 26.306, 25.423, 25.433

HSPA features continue to be deployed successfully in many networks. HSPA based mobile internet offerings are becoming ever more popular and data usage continues to increase rapidly.

Based on MIMO functionality introduced in Rel-7, DC-HSDPA performance gains hold also in combination MIMO. MIMO in combination with DC-HSDPA allows deploying Rel-7 MIMO to benefit from DC-HSDPA functionality defined in Rel-8. RAN1 studied performance, feasibility and complexity aspects of this combination in R1-091082. This work:

- specified dual cell HSDPA operation in combination with MIMO for the following scenarios:
 - a. dual carrier transmission only applies to HSDPA physical channels
 - b. carriers belong to the same Node-B and are on adjacent carriers
 - c. functionality currently defined for DC-HSDPA and for MIMO reused where possible
- introduced the functionality for the relevant specifications of:
 - a. UL and DL control channel structure
 - b. L2/L3 protocols
 - c. UTRAN network interfaces
 - d. UE RF and performance requirements with the work task breakdown

Definition of signalling solutions took account of the work item on Dual Cell HSUPA, but the use of DC HSDPA with MIMO does not dependent on the use of Dual Cell HSUPA. Also when defining Stage 3 details, the possible forward compatibility aspects for supporting >2 and ≤4 carriers was taken into account when feasible. However, full specification of the support for >2 carriers is not part of this work item objectives.

17.3.1 Conformance Test Aspects – Combination of DC-HSDPA with MIMO UID_490019 (target Jun 2011)

Resources: R5

Unique_ID	Name	Finish	Compl	Hyperlink	Status_Report	rapporteur	Notes	TSs_and_TRs
490019	Conformance Test Aspects – Combination of DC-HSDPA with MIMO	17/06/2011	0%	RP-101001	-	Ericsson	UTRA, Testing for Rel-9 UID_430016 Combination of DC-HSDPA with MIMO	34.108, 34.121-1, 34.121-2, 34.123-1, 34.123-2, 34.123-3

17.4 Transmit Antenna Array (TxAA) extension for non-MIMO UEs **UID_430018**

Resources: R1,R2,R3,R4

References

Document	Title/Contents
WID(s)	
RP-090013	WID on TxAA extension for non-MIMO UEs
Impacted Specifications	
TS	25.101, 25.104, 25.211, 25.212, 25.213, 25.214, 25.215, 25.308, 25.306, 25.321, 25.331, 25.423, 25.433
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Nokia, Nokia Siemens Networks, Phillips, Motorola, Ericsson, Orange, Samsung, Telefonica.

Unique_ID	Name	Hyperlink	Status_Report	TSs_and_TRs
430018	Transmit Antenna Array (TxAA) extension for non-MIMO UEs	RP-090013	RP-091040	25.101, 25.104, 25.211, 25.212, 25.213, 25.214, 25.215, 25.308, 25.306, 25.321, 25.331, 25.423, 25.433

TxAA fallback mode of UTRA Rel-7 MIMO provides rather large part of MIMO gains especially the cell edge gains. Currently TxAA fallback mode and related throughput gains are only available for UEs supporting MIMO. Noticeable average cell physical layer throughput gains and cell edge physical layer bit rate increases could be achieved for non-MIMO UEs as well with similar flexibility as in MIMO deployment if the TxAA fallback mode support is extended for other UEs as well. Through extension of TxAA fallback mode to non-MIMO UE the TxAA fallback mode gains would even be available for 1 Rx UEs, which would provide larger benefits from the MIMO deployments and investments as the usage of two BS Tx antennas could be broadened to many different device categories including smaller handheld devices. Additionally TxAA fallback mode could be used with FDPCH and would not require the whole cell to be in TX diversity mode. This work:

- extended Rel-7 TxAA fallback mode for MIMO UEs to non-MIMO UEs and specified related physical layer
- updated the L2/L3 specifications to support the TxAA to non-MIMO UEs
- defined minimum UE requirements for TxAA for non-MIMO UEs

17.5 Cell Portion for 1.28 Mcps TDD **UID_440014**

Resources: R3,R1,R4

References

Document	Title/Contents
WID(s)	
RP-090659	WID on Cell Portion for 1.28 Mcps TDD
Impacted Specifications	
TS	25.102, 25.105, 25.123, 25.225, 25.423, 25.433
New Dedicated Specifications/Reports	
-	-

Supporting Companies: CATT, ZTE, RITT, TD Tech, Potevio.

Unique_ID	Name	Hyperlink	Status_Report	TSs_and_TRs
440014	Cell Portion for 1.28 Mcps TDD	RP-090659	RP-091041	25.102, 25.105, 25.123, 25.225, 25.423, 25.433

BeamForming (BF) technique can eliminate the system interference so as to improve the system capacity. When BF is used for 1.28 Mcps TDD, users located in different beams may use the same code resource and this can significantly improve the system capacity. By defining some new measurements for BF, RRM could also be improved and potential improvement of system capacity could be achieved. This work facilitates the use of BF in 1.28 Mcps TDD in an efficient and cost effective way. It defined cell portion for a part of cell that is covered by a specific BF antenna.

18 LTE improvements **UID_420007**

Unique_ID	Name	Ressource	Hyperlink	Status_Report
420007	LTE improvements			-
430019	LTE Pico NodeB RF Requirements	R4	RP-091155	RP-091045
430029	Enhanced Dual-Layer transmission for LTE	R1,R2,R4	RP-091385	RP-100034

18.1 LTE Pico NodeB RF Requirements **UID_430019**

Resources: R4

References

Document	Title/Contents
WID(s)	
RP-091155	WID on LTE Pico NodeB RF Requirements
Impacted Specifications	
TS 36.104	E-UTRA Base Station (BS) radio transmission and reception
TS 36.141	E-UTRA Base Station (BS) conformance testing
New Dedicated Specifications/Reports	
TR 36.931	Evolved Universal Terrestrial Radio Access (E-UTRA); RF requirements for LTE Pico NodeB

Supporting Companies: Huawei, Alcatel-Lucent, China Mobile, Motorola, NTT DoCoMo, NEC, Telecom Italia, Telefonica, T-Mobile Intl.

Unique_ID	Name	Hyperlink	Status_Report	TSs and TRs
430019	LTE Pico NodeB RF Requirements	RP-091155	RP-091045	36.104, 36.141, new 36.931

Rel-8 LTE BS specifications for general-purpose applications were done according to application for macro scenario. Rel-8 identified that other LTE BS classes are For Further Study.

This work adds a new BS class to the existing macro BS. Pico BS has small coverage and is typically used to increase capacity in areas with dense user population and high traffic intensity (e.g. train stations, stadiums).

NOTE: For UMTS, BS classification was defined for different deployment scenarios. Different BS classes (Macro, Micro, Pico) have different applications and correspondingly different RF requirements.

This work defined LTE Pico BS and specified the corresponding RF requirements by:

- definition of LTE Pico BS class
- RF requirements for LTE Pico BS class
- introduction of BS transmission and reception requirements, but no new baseband performance requirements
- update of conformance test specifications

18.2 Enhanced Dual-Layer transmission for LTE UID_430029

Resources: R1,R2,R4

References

Document	Title/Contents
	WID(s)
RP-091385	WID on Enhanced Dual-Layer transmission for LTE
	Impacted Specifications
TS	36.101, 36.211, 36.212, 36.213, 36.331
	New Dedicated Specifications/Reports
-	-

Supporting Companies: Alcatel-Lucent, CATT, China Mobile, Ericsson, Huawei, Qualcomm Europe, Motorola, TD-tech, ZTE, CATR, Nokia Siemens Networks, Nokia, Samsung, Philips.

Unique_ID	Name	Hyperlink	Status_Report	TSs_and_TRs
430029	Enhanced Dual-Layer transmission for LTE	RP-091385	RP-100034	36.101, 36.211, 36.212, 36.213, 36.331

E-UTRAN targets for high data rate, high system capacity and large coverage to provide excellent user experience. BeamForming (BF) is one of the technologies helping to reach this goal. BF has been proven beneficial for increasing cell throughput and especially essential to users at cell edge in the commercial network of LCR-TDD.

LTE Rel-8 already supports single-layer BF based on user-specific Reference Symbols (also referred to as Dedicated RS or DRS or DM RS). To further evolve the DRS based BF technology, multi-layer BF is proposed for LTE Rel-9. This is expected to provide clear benefits compared to single layer DRS based BF technology existing in Rel-8. In particular, extending the Rel-8 single-layer BF operation to a multi-layer version provides a good opportunity for a LCR-TDD operator to migrate its network to an LTE network while continuing to use DRS based BF technology, leveraging the installed based of existing antenna arrays.

This work item adds radio link enhancement techniques for LTE:

- Support single user dual-layer BF using UE specific RS for both LTE-TDD and FDD
- Design of UE specific demodulation reference signals and mapping of physical data channel to resource elements aims for forward compatibility with LTE-A Demodulation RS:
 - a. Specification of dynamic indication of DM RS port in case of rank-1 transmission to enable scheduling of two UEs with rank-1 transmission using different orthogonal DM RS ports on the same PDSCH resources
 - b. Specification of performance requirements potentially needed for UE demodulation with rank-1 transmission in the presence of inter-cell interference and intra-cell interference of co-scheduled UE using different orthogonal DM RS port on the same PDSCH resources, with no explicit signalling of the presence of co-scheduled UE.
 - c. Specification of performance requirements for UE demodulation with both rank-1 and rank-2 transmission in the presence of inter-cell interference only.
- Principles exploiting channel reciprocity were considered in the feedback design where applicable.
- New/enhanced features and capabilities should be backward compatible with networks and UEs compliant with LTE Rel-8, and also should be extensions of Rel-8 BF.

18.2.1 UE Conformance Test Aspects – Enhanced Dual-layer transmission for LTE TDD UID_490018 (target Mar 2011)

Resources: R5

Unique_ID	Name	Finish	Compl	Hyperlink	Status_Report	rapporteur	Notes	TSs_and_TRs
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490018	UE Conformance Test Aspects – Enhanced Dual-layer transmission for LTE TDD	18/03/2011	0%	RP-100868	-	China Mobile	Testing for UID_430029 (Enhanced Dual-Layer transmission for LTE)	36.508, 36.521-1, 36.521-2
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19 Self-Organizing Networks

19.1 Study on Self-Organizing Networks (SON) related OAM interfaces for Home NodeB **UID_360007**

Resources: S5

References

Document	Title/Contents
WID(s)	
SP-070308	SID on Study of Self-Organising Networks (SON) related OAM interfaces for Home NodeB
Impacted Specifications	
-	-
New Dedicated Specifications/Reports	
TR 32.821	Telecommunication management; Study of Self-Organising Networks (SON) related OAM Interfaces for Home NodeB

Supporting Companies: Huawei, Nortel, Nokia Siemens Networks, T-Mobile, Vodafone, ZTE.

This Study is linked to SA5 TR 32.816 Study of Management for LTE and SAE (UID_340036).

SA5 has agreed to accept Self-Organizing Networks (SON) when studying LTE&SAE OAM architecture. TSG RAN has agreed to study UMTS home NodeB (see RP-070257) and LTE home NodeB (see RP-070262).

UE, NodeB and OAM system (both Element Management System (EMS) and Network Management System (NMS)) are involved in the LTE/UMTS system for supporting SON as listed below:

- Interface between NMS and EMS;
- Interface between 2 EMSs;
- Interface between EMS and NodeB;
- Interface between 2 NodeBs;
- Interface between UE and NodeB;

For both LTE and UMTS home NodeB, SON is necessary because:

- Number of home NodeB can be very big;
- Subscriber may frequently switch on and off the home NodeB;
- Operator may not be able to access home NodeB physically as it is located on the subscriber's premises;

SA5 had a leading role in defining GSM, 3G OAM specifications and this should continue on SON related OAM interfaces, especially for LTE and UMTS home NodeB. SA5 studied:

- Define SON OAM architecture for both LTE and UMTS home NodeB;
- Identify differences between SON OAM architecture for LTE Macro eNodeB and for LTE and UMTS home NodeB; Propose aligned SON OAM architecture.
- Identify what can be standardized in SA5 on SON for LTE and UMTS NodeB;
- Propose/pave the way for a subsequent Implementation Work Item;

19.2 Study on Self-healing of Self-Organizing Networks (SON)

UID 390017

Resources: S5

References

Document	Title/Contents
WID(s)	
SP-080076	SID on Study on Self-healing of SON
Impacted Specifications	
-	-
New Dedicated Specifications/Reports	
TR 32.823	Telecommunication management; Study on Self-healing of SON (self-optimizing networks) Self-Optimization & Self-Healing OAM Requirements

Supporting Companies: ZTE, Vodafone, T-Mobile, Telecom Italia, Telefonica, Motorola

This Study is linked to SA5 TR 32.816 Study of Management for LTE and SAE (UID_340036).

Self-testing and Self-healing have been recommended as subtasks of SON in the NGMN white paper.

Self-testing and self-healing means that a system detects itself problems and mitigates or solves them avoiding user impact and significantly reducing maintenance costs. This Study focuses on Self-healing only.

This study collected requirements and identified possible solutions for SON Self-healing.

19.3 Self-Organizing Networks (SON) **UID_420011**

Resources: R3,R2

References

Document	Title/Contents
WID(s)	
RP-090162	WID on Self-Organizing Networks (SON)
Impacted Specifications	
TS 36.300	Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2
TS 36.423	Evolved Universal Terrestrial Radio Access Network (E-UTRAN); X2 Application Protocol (X2AP)
New Dedicated Specifications/Reports	
TR 36.902	Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Self-configuring and self-optimizing network (SON) use cases and solutions

Supporting Companies: Alcatel-Lucent, CMCC, Huawei, KDDI, Motorola, NEC, Nokia Siemens Networks, NTT DoCoMo, Orange, Qualcomm, Samsung, Telecom Italia, Telia Sonera, T-Mobile, ZTE.

Unique_ID	Name	Hyperlink	Status_Report	TSSs_and_TRs
420011	Self-Organizing Networks (SON)	RP-090162	RP-100038	25.413, 36.300, 36.413, 36.423, 48.018, new 36.902

SON uses cases are described in LTE TR 36.902. In Rel-8 first functions to cover use cases had been implemented, and this work was continued in Rel-9.

Different SON use cases are relevant at different times of NW operation, e.g. during initial roll-out, early phases of operation, or operation of a mature NW with high load. Rel-9 work focussed on the solutions for LTE introduction. Technical solutions for the goals and requirements were based on existing measurements wherever possible.

This work provides technical solutions for use cases contained in TR 36.902 and with particular relevance to early phases of network roll-out and operation, i.e.:

- Coverage and Capacity optimization (Note: the use case includes interference reduction techniques in TR 36.902)
- Mobility Load balancing optimization
- Mobility Robustness optimization
- RACH Optimisation

SON aspects that are specific of closed or hybrid access are not covered by this WI.

Decisions were based on quantitative evaluations in case of alternative technical solutions.

Priority was given to solutions based on existing UE measurements and procedures.

The required activities to achieve these objectives included:

- refine the use-case level requirements (review current status of the use cases in TR 36.902)
- define evaluation scenarios, if necessary
- identify system functions to serve the use cases
- provide stage 2 specification
- provide stage 3 specification
- If needed, define O&M requirements for radio-related functions to be performed in the O&M domain
- contact any other TSG/WG if impact in their domain is encountered

19.4 Self-Organizing Networks - OAM aspects **UID_430043**

19.4.1 SON self-optimization management **UID_390007**

References

Document	Title/Contents
WID(s)/Status Report	
SP-090762	WID on SON self-optimization management
Impacted Specifications	
TS 32.425	Telecommunication management; Performance Management (PM); Performance measurements Evolved Universal Terrestrial Radio Access Network (E-UTRAN)
New Dedicated Specifications/Reports	
TS 32.521	Telecommunication management; Self-Organizing Networks (SON); Self-optimization; Concepts and requirements
TS 32.522	Telecommunication management; Self-Organizing Networks (SON); Self-optimization; Stage 2
TS 32.523	Telecommunication management; Self-Organizing Networks (SON); Self-optimization; Stage 3
TS 32.525	Telecommunication management; Self-Organizing Networks (SON); Self-optimization; Policy Network Resource Model (NRM) Integration Reference Point (IRP); Bulk CM eXtensible Markup Language (XML) file format definition

Supporting Companies: Huawei, China Mobile, Motorola, Nokia Siemens Networks, Nortel, Orange, Telecom Italia, Telefonica, TeliaSonera, Deutsche Telekom, Vodafone, ZTE, Ericsson.

Unique ID	Name	Acronym	Hyperlink	TSs and TRs
390007	SON self-optimization management	LTE_SON-OAM	SP-100091	32.425, new 32.521, 32.522, 32.523, 32.525

SON target is to maintain network quality and performance with a minimum of manual intervention from the operator. Self-optimization functionality monitors and analyzes performance management data, and automatically triggers optimization action on the affected network node(s) when necessary. This significantly reduces manual interventions and replaces them with automatically triggered re-optimizations, re-configurations, or software reloads/upgrades thereby helping to reduce operating expense.

TSG RAN work on SON for RRM also requires OAM support, hence the scope of SON self optimization also includes:

- Load balancing
- Handover Parameter optimization
- Interference control
- Capacity and coverage optimization
- RACH optimization

Objectives of this work were to:

- collect and document self-optimization OAM requirements for SON.
- define (in cooperation with RAN WGs) inputs to and outputs from the self-optimization Entity, its location in the management architecture, and the degree of standardization of the associated algorithms.
- identify and document required self-optimization related additions to the affected specifications.
- ensure that the OAM specifications support load balancing, HandOver (HO) parameter optimization, interference control, capacity and coverage optimization and RACH optimization.

19.4.1 Automatic Radio Network Configuration Data Preparation

UID_440067

Resources: S5

References

Document	Title/Contents
WID(s)	
SP-090317	WID for Automatic Radio Network Configuration Data Preparation
Impacted Specifications	
TS 32.501	Telecommunication management; Self-Configuration of Network Elements; Concepts and Integration Reference Point (IRP) Requirements
TS 32.502	Telecommunication management; Self-Configuration of Network Elements Integration Reference Point (IRP); Information Service (IS)
TS 32.503	Telecommunication management; Self-Configuration of Network Elements Integration Reference Point (IRP); Common Object Request Broker Architecture (CORBA) Solution Set (SS)
New Dedicated Specifications/Reports	
TS 32.507	Telecommunication management; Self-configuration of network elements; Integration Reference Point (IRP): SOAP Solution Set (SS)

Supporting Companies: Nokia Siemens Networks, Orange, Telefonica, Ericsson, Huawei, Alcatel-Lucent, T-Mobile, Vodafone,

Unique_ID	Name	Hyperlink	Notes	TSs_and_TRs
440067	Automatic Radio Network Configuration Data Preparation	SP-090869	SP#48 completed	32.501, 32.502, 32.503, 32.505, new 32.507

Self-Configuration (TS 32.501 clause 6.5.2.6 entitled "Radio Configuration Data" was For Further Study. Hence, TS 32.502/3 do not completely fulfil TR 32.816 clause 5.1.5.1 (Study on management of E-UTRAN and EPC).

When radio Network Elements (e.g. cells and/or eNBs) are inserted into an operational radio network, some network configuration parameters cannot be set before-hand because they have interdependencies with the configuration of operational NEs. "Dynamic Radio Network Configuration Data Preparation" comprises the generation and distribution of such interdependent parameters to the newly inserted network element and optionally already operational NEs.

This functionality allows fully automatic establishment of an eNB into a network. Otherwise an operator needs to set these configurations manually. Without this functionality self-configuration cannot be considered not fully as "self".

This work provides technical solutions for Automatic Radio Network Configuration Data Preparation, i.e.:

- Analyzes which configuration parameter cannot be determined before-hand by the IRP Agent or by the self-configuration process and what input might be needed to generate them.
- Defines new functionality to trigger distribution of such parameters. This functionality fits to the existing self-configuration functionalities and re-uses existing IRPs, wherever possible.

This includes to:

- refine/define the requirements
- define the Resource model
- define operation and notifications (Information Service)
- define solution sets

20 GERAN Features

20.1 A-GNSS Performances and Testing Procedures

UID_38002

Resources: G1

References

Document	Title/Contents
WID(s)	
GP-081785	WID on A-GNSS Performances and Testing Procedures
GP-081786	WID on A-GNSS Minimum Performances
GP-081787	WID on A-GNSS Testing Procedures
Impacted Specifications	
TS 45.005	Radio transmission and reception - G1
TS 51.010-1	Mobile Station (MS) conformance specification - G3new
New Dedicated Specifications/Reports	
TS 51.010-7	Mobile Station (MS) conformance specification; Part 7: Location Services (LCS) test scenarios and assistance data

Supporting Companies: Thales, Broadcom, RITT, SiRF Technology, Spirent.

Unique_ID	Name	Hyperlink	Notes	TSs_and_TRs
38002	A-GNSS Performances and Testing Procedures	GP-092342	Linked to Rel-10 RAN4 UID_450027 (A-GNSS Minimum Performance for UTRAN)	-
38003	A-GNSS Minimum Performances	GP-081786	-	45.005

This work builds a solid framework for AGNSS testing taking into account the potential multiplicity of tests cases:

- Builds classes of test cases representative of the multiplicity of tests cases, in terms of performance and signalling;
- Provides classes of tests cases and associated minimum performance requirements;
- Is flexible enough to integrate new constellations;

This work:

- Defines a framework for signalling tests.
- Defines minimum performance requirements implying 1st definition of GNSS use cases and conditions of usage.
- Defines the minimum performance tests procedures.

20.1.1 A-GNSS Testing Procedures **UID_38004 (target Nov 2010)**

Resources: G3new

Unique_ID	Name	Acronym	Resource	Finish	Compl	Hyperlink	rapporteur	Notes	TSs_and_TRs
38004	A-GNSS Testing Procedures	AGNSSPTP-MStest	G3new	12/11/2010	60%	GP-092343	Thales	GP#46 completion 05/10=>11/10. GP#44 exception to 05/10 in GP-092344	51.010-1, new 51.010-7

20.2 Study on Multi-User Reusing-One-Slot (MUROS)

UID_50590 (target Nov 2010)

Resources: GP

References

Document	Title/Contents
WID(s)	
GP-072033	WID on Study on Multi-User Reusing-One-Slot
Impacted Specifications	
-	-
New Dedicated Specifications/Reports	
TR 45.914	Circuit switched voice capacity evolution for GSM/EDGE Radio Access Network (GERAN)

Supporting Companies: China Mobile, Ericsson, Nokia Siemens Networks, Nokia, Nortel Networks, NXP, Qualcomm, Telecom Italia, Vodafone.

Unique_ID	Name	Acronym	Resource	Finish	Compl	Hyperlink	rapporteur	Notes	TSs_and_TRs
50590	Study on Multi-User Reusing-One-Slot	MUROS	GP	12/11/2010	98%	GP-072033	Nokia Siemens Networks	GP#46 completion =09/10=>11/10. Spin-off implementation WI UID_420002 VAMOS (Voice services over Adaptive Multi-user channels on One Slot)	45.914

This feature increases voice capacity of GERAN by a factor of two per BTS transceiver. The increase in user amount and voice traffic puts a huge pressure on operators especially within populous countries. Furthermore, as voice service price gets cheaper, most operators face the challenge to obtain efficient utilization of hardware and spectrum resource.

One approach of increasing voice capacity is to multiplex more than one user on a single time slot and ARFCN, thus the capacity can be significantly improved for a certain TRX hardware and possibly spectrum resource. Furthermore, such a feature is expected to provide voice capacity improvement both for full rate and half rate channels.

This work further enhances the voice capacity of GERAN by means of multiplexing at least two users simultaneously on the same radio resource both in downlink and in uplink. Channels under interest for doubled voice capacity are TCH/FS, TCH/HS, TCH/EFS, TCH/AFS, TCH/AHS and TCH/WFS with related associated signalling channels.

Implementation impact of Multi-User Reusing-One-Slot (MUROS) to the MS was investigated by analyzing different receiver types, e.g. legacy GMSK terminals supporting or not DARP phase 1 (Downlink Advanced Receiver Performance). For this the design of a new set of training sequences with improved cross correlation properties to the existing set of training sequences is foreseen and expected to be evaluated. Furthermore, the introduction of MUROS should change hardware as little as possible and should not decrease voice quality. The impact on network planning and frequency reuse was investigated.

The study included investigation of different optimised pulse shapes for MUROS for both the uplink and the downlink. For this purpose, link-level and system-level performance evaluation was used; including investigation into usage at the band edge, at the edge of an operator's band allocation and in country border regions with no frequency coordination. Impacts to the Abis interface was investigated.

Any TRX hardware capable of multiplexing more than one user on a single ARFCN time slot shall support legacy GMSK mobiles, this includes non-SAIC mobiles and SAIC mobiles.

Spin-off implementation WI UID_420002 VAMOS (Voice services over Adaptive Multi-user channels on One Slot)

20.3 Voice services over Adaptive Multi-user channels on One Slot (VAMOS) **UID_420002 (target Nov 2010)**

Resources: GP,G1,G2

References

Document	Title/Contents
	WID(s)
GP-081949	WID on Voice services over Adaptive Multi-user channels on One Slot
GP-081964	WID on VAMOS Stage 2
GP-081965	WID on VAMOS Stage 3
GP-081966	WID on VAMOS Radio Performance Requirements
	Impacted Specifications
TS 45.001	Stage 2 (Overview of VAMOS solution)
TS	Stage 3 (24.008, 44.018, 45.002, 45.003, 45.004, 45.008, 48.008, 48.058)
TS 45.005	GSM/EDGE Base Station (BS) radio transmission and reception (Test Scenarios for VAMOS Performance requirement)
	New Dedicated Specifications/Reports
-	-

Supporting Companies: China Mobile, Ericsson, Huawei, Motorola, Nokia, Nokia Siemens Networks, Qualcomm, Samsung, STMicroelectronics, Vodafone, Telecom Italia.

Unique_ID	Name	Resource	Finish	Compl	Hyperlink	rapporteur	Notes	TSs_and_TRs
420002	Voice services over Adaptive Multi-user channels on One Slot	GP,G1,G2	02/03/2012	74%	GP-081949	Nokia Siemens Networks, China Mobile	GP#46 completion 05/10=>09/10. GP#44 exception to 05/10 in GP-092470. GP#40 WID approved. Triggered by UID_50590 (MUROS) Study on Multi-User Reusing-One-Slot	-
420003	VAMOS Stage 2	GP,G1,G2	21/05/2010	100%	GP-081964		GP#46 completed	45.001
420004	VAMOS Stage 3	GP,G1,G2	26/11/2010	95%	GP-081965		GP#47 completion 09/10=>11/10. GP#44 exception to 05/10 in GP-092470	24.008, 44.018, 45.002, 45.003, 45.004, 45.008, 48.008, 48.058
420005	VAMOS Radio Performance Requirements	GP,G1,G2	26/11/2010	80%	GP-081966		GP#47 completion 09/10=>11/10. GP#44 exception to 05/10 in GP-092470	45.005 (Test Scenarios for VAMOS Performance requirements)

This work was triggered by UID_50590 (MUROS) Study on Multi-User Reusing-One-Slot

VAMOS is expected to increase voice capacity by a factor of two per BTS transceiver by creating new types of speech traffic channels in GERAN. The increase in user numbers and voice traffic puts a huge pressure on operators especially within populous countries. Furthermore, as voice service price gets cheaper, most operators face the challenge to obtain efficient utilization of hardware and spectrum resource.

Rel-8 Study on Multi-User Reusing-One-Slot (MUROS) UID_50590 TR 45.914 (CS voice capacity evolution for GERAN) investigated techniques aiming to increase voice capacity of GERAN. Among candidates the Adaptive Symbol Constellation concept has been identified to include techniques common to the co-TCH and the Orthogonal Sub Channels proposals. Solution for the uplink is identical for these three concepts. Voice capacity is increased by multiplexing two users simultaneously on the same radio resource defined by a single time slot, specific ARFCN and specific sequence of TDMA frame numbers as defined for full rate and half rate GSM speech channels.

The objective was to further enhance the voice capacity of GERAN by means of multiplexing two users simultaneously on the same radio resource both in downlink and in uplink.

Channels under interest for doubled voice capacity are TCH/FS, TCH/HS, TCH/EFS, TCH/AFS, TCH/AHS and TCH/WFS with related associated signalling channels.

In uplink two GMSK modulated signals are transmitted simultaneously on the same timeslot and ARFCN in a given cell by two different mobiles, whilst in downlink one or more quaternary constellation mappings are used in order to multiplex two speech users simultaneously on a given timeslot.

Legacy GMSK terminals not supporting DARP phase I capability will be supported provided feasibility has been shown. Legacy DARP phase I capable terminals will be supported as well as new VAMOS aware mobiles designed to at least support a new set of training sequences with improved cross correlation properties compared to the existing set of training sequences.

Two different mobile support levels are envisaged for VAMOS aware mobiles:

- VAMOS aware mobiles with legacy architecture: These mobiles are supporting DARP phase 1 capability and can operate the new designed training sequences. Radio performance requirements for these mobiles will be specified with higher priority.
- VAMOS aware mobiles with advanced receiver architectures.

Introduction of VAMOS should change hardware as little as possible and should not decrease voice quality and maintain robustness of signalling channels compared to legacy GMSK terminals. Impacts on network planning and frequency reuse shall be minimal.

Any TRX hardware capable of multiplexing more than one user on a single ARFCN time slot shall support legacy GMSK mobiles, this includes non-DARP phase I mobiles and DARP phase I mobiles.

20.3.1 VAMOS - MS conformance testing **UID_420002 (target Mar 2012)**

Resources: G3new

Unique_ID	Name	Resource	Finish	Compl	Hyperlink	rapporteur	Notes	TSs_and_TRs
490005	VAMOS - MS conformance testing	G3new	02/03/2012	10%	GP-101604	Research In Motion	GP#47 WID approved.	51.010-1, 51.010-2

20.4 Cell Broadcast protocol Base Station Controller – Cell Broadcast Centre (CEBRO) **UID_440002**

Resources: GP,C1

References

Document	Title/Contents
WID(s)	
GP-091022	GERAN WID on Cell Broadcast protocol Base Station Controller – Cell Broadcast Centre (BSC-CBC)
Impacted Specifications	
TS 23.041	Technical realization of Cell Broadcast Service (CBS) - C1
New Dedicated Specifications/Reports	
TS 48.049	Base Station Controller – Cell Broadcast Centre (BSC - CBC) Interface Specification - GP

Supporting Companies: AT&T, Huawei, Nokia Siemens Networks, Ericsson, T-Mobile USA, Vodafone, ZTE.

Unique_ID	Name	Hyperlink	TSs_and_TRs
440002	Cell Broadcast protocol Base Station Controller – Cell Broadcast Centre	GP-091022	-
440102	GERAN part of CEBRO	GP-091022	new 48.049
440202	CT1 part of CEBRO	GP-091022	23.041

In a PLMN with BSCs from more than one vendor, a Cell Broadcast Centre (CBC) serving these BSCs must today be able to support more than one CBC – BSC interface signalling protocol, since there is no such standardized protocol for GSM, as there is for UMTS (see TS 25.419).

TS 23.041 describes what information is possible to exchange between CBC and BSC. Currently this description is not detailed enough to unambiguously implement a CBC – BSC interface.

In order for a CBC to interwork with BSCs from different vendors without having to support a multitude of CBC – BSC interface signalling protocols, it is necessary to standardize one CBC – BSC interface signalling protocol.

This work specifies a detailed signalling protocol including both physical layers and upper layers for the CBC – BSC interface allowing interworking between CBCs and BSCs via a standardized interface.

The lower protocol layers is based on TCP/IP in order to be in line with the corresponding IuBC interface for UMTS, which could benefit both operators and vendors in term of avoiding unnecessary deployment and development efforts.

The layer 3 interface signalling protocol including signalling procedures, messages and information elements is in line with the contents of the GSM applicable parts of TS 23.041 and is defined using tabular format.

20.5 Hybrid Location (HILT) UID_440003

Resources: GP

References

Document	Title/Contents
WID(s)	
GP-091075	GERAN WID on Hybrid Location
Impacted Specifications	
TS 43.059	Functional Stage 2 description of LCS in GERAN
TS 48.071	Location Services: SMLC-BSS interface
New Dedicated Specifications/Reports	
-	-

Supporting Companies:

TruePosition, AT&T, Polaris Wireless, Telecommunication Systems (TCS).

Unique_ID	Name	Hyperlink	Notes	TSs_and_TRs
440003	Hybrid Location	GP-091075	Hybrid Integrated Location Technology=HILT	43.059, 48.071

Addition of Hybrid Location (HL), defined as concurrent use of a single network-centric location technology (cell-based techniques or U-TDOA) in combination with a single mobile-centric location technology (EOTD or A-GNSS) in response to a single location request, optimizes location accuracy, increases location yield and minimizes the latency of location delivery over multiple sequential location requests. The use of simultaneous, concurrent positioning by a mobile-centric and a network-centric technology allows the SMLC to combine raw signal data in a true HL calculation or allows for a fallback location technology in the case that one technology might fail due to current conditions (e.g. no line of sight to satellites or insufficient neighbouring cells).

As added benefit, the HL technique also reduces overhead messaging associated with multiple sequential location requests.

UTRAN currently allows for a HL solution for location technologies that use separate resources.

This functionality is blocked in GERAN. The HL functionality should be supported for all location attempts dependent on BSS capability.

This work provides the ability to run concurrent location technology requests in parallel for positioning methods that use separate resources, in that a single mobile-centric technology in combination with a single network-centric technology is allowed thus increasing the probability of providing an accurate location in a wider variety of field scenarios with minimal latency.

This work preserves the BSS ability to not support HL by indicating its capability or its loading status.

The mobile-centric and network-centric location technology combinations are to be extensible, able to add additional future location technology selections as standardized in GERAN. No MS impacts are envisaged.

21 SA1 Studies

21.1 Study on Service Specific Access Control in EPS

UID_400036

Resources: S1

References

Document	Title/Contents
WID(s)	
SP-080319	SA1 WID on Feasibility Study on Service Specific Access Control in EPS
Impacted Specifications	
-	-
New Dedicated Specifications/Reports	
TR 22.986	Study on service specific access control in the Evolved Packet System (EPS)

Supporting Companies: NTT DoCoMo, NEC, OKI, KDDI, Softbank Mobile.

In an emergency situation, like Earthquake or Tsunami, degradation of quality of service and lack of security may be experienced. Degradation in service availability and performance can be accepted in such situations but mechanisms are desirable to minimize such degradation and maximize the efficiency of the remaining resources.

When Domain Specific Access Control (DSAC) mechanism was introduced for UMTS, the original motivation was to enable PS service continuation during congestion in CS Nodes in the case of major disaster like Earthquake or Tsunami.

In fact, the use case of DSAC in real UMTS deployment situation has been to apply access control separately on different types of services, such as voice and other packet-switched services.

For example, people's psychological behaviour is to make a voice call in emergency situations and it is not likely to change. Hence, a mechanism will be needed to separately restrict voice calls and other services.

EPS is a PS-Domain only system, so DSAC access control would not be applied anymore in case of disaster. So SSAC should study what specific features are recommended when the network is subjected to decreased capacity and functionality. Considering the characteristics of voice and non-voice calls in EPS, requirements of the SSAC could be to restrict the voice calls and non-voice calls separately.

For a normal paid service there are QoS requirements. The provider can choose to shut down the service if the requirements cannot be met. In an emergency situation the most important thing is to keep communication channels uninterrupted, therefore the provider should preferably allow for a best effort (degradation of) service in preference to shutting the service down. During an emergency situation there should be a possibility for the service provider also to grant services, give extended credit to subscribers with accounts running empty. Under some circumstances (e.g. the terrorist attack in London on the 7 of July in 2005 [18]), overload access control may be invoked giving access only to authorities or a predefined set of users. It is up to national authorities to define and implement such schemes.

TR 22.986 studied use-cases and requirements for providing SSAC Access Control in EPS.

Spin-off Feature UID_420020 (SSAC)

22 SA2 Studies

22.1 Study on CS Domain Services over EPS access

UID_350052

Resources: S2

References

Document	Title/Contents
	WID(s)
SP-080800	WID on Study on CS Domain Services over evolved PS access
	Impacted Specifications
-	-
	New Dedicated Specifications/Reports
TR 23.879	Study on Circuit Switched (CS) domain services over evolved Packet Switched (PS) access

Supporting Companies: T-Mobile, Bouygues Telecom, Intel, InterDigital, Bridgeport Networks, RIM, Huawei, Ericsson, Alcatel-Lucent, Bouygues Telecom, Huawei, InterDigital, Kineto, Motorola, Nortel, Orange, Research In Motion, Samsung, Starent, Telefonica, T-Mobile, ZTE.

Study linked to Combinational Services UID_31064, Services Alignment and Migration (ServAl) UID_330017 and 3GPP System Architecture Evolution (SAES) UID_32085.

PS radio networks capabilities evolve becoming more and more attractive for carrying also real time speech traffic such as traditional TS11 and TS12. In order to make the best use of such resources, access from the deployed CN infrastructure and services should be possible. This allows avoiding a major switch in the voice call control paradigm as well as retaining the currently provided functionalities such as the charging mechanisms (calling party pays), supplementary services provision, IN services, etc. As CS networks continue to be employed in the future, also handover needs to be taken into account.

Give the proven track record of the current call control, this work investigates architectures suitable to support CS Domain Services over new types of accesses and manage the handover of calls from a traditional bearer to the new available ones. This study also aims to ensure that the user experience remains as consistent/satisfactory as it is today.

The 1st phase studied alternatives for supporting CS voice services on EPS. CS Fall Back (CSFB) specified in Rel-8 supports CS voice services for E-UTRAN UEs using UTRAN/GERAN access. However, the CSFB solution requires LTE coverage to overlap with 2G/3G CS coverage.

The 2nd phase studied solutions to allow CS domain services via E-UTRAN without requiring overlapping 2G/3G coverage.

This study describes an architecture capable of extending the 'traditional' MSC-Server based set of CS voice, supplementary, IN and value-adding services and business principles (e.g. for roaming and interconnect) to the evolved PS access. The intention is also to give a CS handover-like user experience for voice calls when changing between evolved PS and legacy CS accesses, without requiring upgrades to the legacy CS radio access (e.g. DTM regarding voice call HO, PS HO, VoIMS). The architecture is however not limited to the provision of speech services over evolved PS accesses; on the contrary, through the exploitation of the Combinational services, it is possible to harness the capabilities of IMS to provide new, innovative services to the end user. Handover of the parallel PS session towards legacy 3GPP access was considered as well, but may be limited by the capabilities of the legacy radio.

Co-existence with IMS centric Single Radio VCC solutions was studied.

The study developed solutions allowing access to CS domain services via E-UTRAN access without requiring overlapping 2G/3G coverage. It also addressed roaming issues from both the UE and network perspective when the HPLMN supports CS services over EPS while the VPLMN provides another voice solution (e.g. IMS, CSFB), and vice versa. This included the impact on the UE when it supports more than one voice solution.

On security, it studied if re-authentication is required at time of handing over from one radio access to another.

22.2 Study on Extended Support of IMS Emergency Calls

UID_370043

Resources: S2

References

Document	Title/Contents
WID(s)	
SP-070547	SA2 WID on Study Item for Extended Support of IMS Emergency Calls
Impacted Specifications	
-	-
New Dedicated Specifications/Reports	
TR 23.868	Feasibility study on extension of support for IP Multimedia Subsystem (IMS) emergency calls

Supporting Companies: Qualcomm, TeleCommunication Systems, Alcatel-Lucent, Research in Motion.

The solution contained in TS 23.167 to support IMS Emergency Calls falls short of providing a solution to cover IP access from any network A and IMS support from any network B. The current solution assumes that IP access network A either belongs to the same 3GPP operator as IMS core network B or can access IMS core network B using 3GPP defined means (e.g. as an I-WLAN). The current solution does not support the case when IP access network A and IMS core network B belong to different operators and use non-3GPP defined means of access (e.g. IETF UDP/IP). This limitation admits the possibility of alternative non-3GPP solutions for the non-supported cases which may be incompatible or partially incompatible with the solution in TS 23.167. Such solutions may delay or jeopardize deployment of the solution in TS 23.167 by creating uncertainty/confusion within the industry and among regulators. Such solutions may also force some 3GPP vendors and 3GPP operators to implement and deploy both the 3GPP solution and at least one other solution (i.e. a non-3GPP solution). Having a 3GPP solution on the other hand that can support all expected user cases could avoid this.

The study mainly affects IMS although some impacts to IP-CAN are also likely. This study:

- evaluated feasibility of supporting IMS emergency calls for combinations of IP access network A and IMS core network B not supported in Rel-7 including but not limited to the following cases:
 - A is any IP access network and B is the home 3GPP compliant IMS network for any emergency calling UE with adequate security credentials
 - A is any IP access network and B is a visited 3GPP compliant IMS network for any emergency calling roaming UE with adequate security credentials
- evaluated enhancements to the Rel-7 solution for IMS emergency calls that may improve performance and/or reduce complexity
- evaluated feasibility of better aligning the solution in TS 23.167 with applicable IETF standards and draft standards (e.g., from the Ecrit and Geopriv working groups)
- Any enhancement to the support of IMS emergency calls shall remain backward compatible to the Rel-7 solution from the perspective of the UE and any 3GPP Network Element. Furthermore, any enhancement should be based on the Rel-7 solution and should avoid unnecessarily adding new network entities, protocols and interfaces and moving existing functions from one entity to another.

The work should not change support for IMS emergency calls from the user perspective or from the PSAP perspective.

On security, this work shall not degrade security for IMS emergency calls in the case of a UE with a valid UICC and receiving service from the home network or from a visited network with a roaming agreement with the home network.

22.3 Study on Service Continuity for VCC support for Emergency Voice Calls **UID_320031**

Resources: S2

References

Document	Title/Contents
WID(s)	
SP-080555	SID on Study of VCC support for Emergency Calls
Impacted Specifications	
-	-
New Dedicated Specifications/Reports	
TR 23.826	Feasibility study on Voice Call Continuity (VCC) support for emergency calls

Supporting Companies: Nortel, Alcatel-Lucent, AT&T, , CableLabs, Qualcomm, Huawei.

This study is linked to:

UID_32045	PS domain & IMS Impacts for supporting IMS Emergency Calls
UID_380040	IMS Centralized Services
UID_390057	IMS Service Continuity
UID_380064	Support for IMS Emergency Calls over GPRS and EPS

Rel-7 work item UID_32045 "PS domain & IMS Impacts for supporting IMS Emergency Calls" states:

"It shall be possible to establish an emergency session via the PS domain and the IM CN subsystem to meet the requirements defined in TS 22.101. Emergency sessions shall be routed to an emergency centre in accordance with national regulations. This may be based upon one or more default addresses stored in the ME and/or USIM and information about the origin of the session. It shall be allowed to establish a PS emergency session without the need to dial a dedicated number to avoid the mis-connection in roaming case, such as connect by menu, or a linkage to a car air bag control. The WI shall take into account requirements coming from fixed broadband access to IMS and seek for maximum commonality of architectural solutions between 3GPP and fixed broadband access to IMS."

However, this WI does not take into account subscribers, which, after initiating an emergency call, may need to move such that access transfer between the PS and CS domain is necessary to maintain the service.

Service requirements are such that for these subscribers, the access transfer of emergency calls should experience the same success as the access transfer of a regular call.

TR 23.826 studies the feasibility of developing capabilities allowing the access transfer of emergency calls in both the CS to IMS and IMS to CS directions. Consideration was given to methods that may require modification of standards, as well as methods that may be employed by configuration changes. A minimal objective is the support of service continuity for emergency voice calls originated in the home PS domain. The study considered feasibility of supporting:

- Emergency calls originated in the CS domain
- Roaming scenarios
- UEs that cannot be authenticated (e.g. UICC-less or with no roaming agreement)
- Continuity of location information

It considered architectural concepts from TS 23.292 and TS 23.237 in the proposed solutions, e.g. the use of an ICS enabled MSC server. The study did not cover single radio service continuity for emergency voice calls, though aspects of the solutions studied for dual radio service continuity for emergency voice calls may also be applicable to single radio service continuity for emergency voice calls (and vice versa). Service continuity of emergency voice calls depends on operator's service architecture to deliver access transfer request in the IMS to CS direction and CS to IMS direction.

23 SA3 Studies

23.1 Study on Security Aspects of Remote Provisioning and Change of Subscription for M2M Equipment **UID_370053**

Resources: S3,C6

References

Document	Title/Contents
WID(s)	
SP-070702	SA3 WID on Study on Security Aspects of Remote Provisioning and Change of Subscription for M2M Equipment
Impacted Specifications	
-	-
New Dedicated Specifications/Reports	
TR 33.812	Feasibility Study on remote management of USIM application on M2M equipment

Supporting Companies: BT, Ericsson, Motorola, Nokia, Nokia Siemens Networks, Rogers Wireless, TeliaSonera.

This study was triggered by the SA1 Rel-8 Study on Facilitating Machine to Machine Communication in GSM and UMTS (FS_M2M) UID_7027 in TR 22.868.

Machine to Machine (M2M) Communication is seen as a form of data communication between entities that when deployed do not necessarily need human interaction. One of the challenges with M2M communication is that deployed M2M equipment is managed remotely without any direct human interaction with the device.

This study evaluates the feasibility of remotely managed USIM application solutions from a security point of view.

Three aspects from SA1 TR 22.868 are:

- M2M equipment containing a USIM application should provide tamper-protection and mechanisms for detection/response on tampering
 - It should be possible to change subscription out in the field e.g. after contract expiry without human intervention
 - It should be possible to allocate the M2M equipments at initial power up to a network without human intervention
- These three aspects point towards a remote management of USIM application being a viable solution including:
- Download of USIM application parameters to a M2M equipment
 - Management and changes of these parameters to allow change of operator

The simplest way to introduce provisioning of a remote management of USIM application to M2M-equipment is to make use of already existing infrastructure as the mobile networks' global and secure authorization infrastructure. M2M equipment and the network can interact only over standardized interfaces within the scope of 3GPP.

This study evaluates the possibility of the network to provision remote management of USIM application in the M2M equipment in a secure way in a 3GPP system. It is envisioned that an M2M equipment is incorporated in a device that a) could be assembled by an equipment manufacturer, or b) could be assembled by an OEM manufacturer that includes the M2M equipment in the device. M2M equipment could be a device that is fully self-contained or a device with interfaces to attach, for example, sensors and on-site service equipment.

It studied the remote management of USIM application when the USIM application resides in the UICC and when the USIM application resides in the M2M equipment. It included definition of a trust model for remote management of USIM application and identified security threats and requirements. This study:

- investigated candidate security solutions that allow provisioning to take place in a secure manner
- investigated candidate signalling procedures for provisioning remote management of USIM application in M2M equipment
- identified what functionality of the current USIM application has to be covered by remote management of the USIM application
- identified what other functionality to be added due to the new USIM application provisioning method
- identified principle requirements for protected storage and the execution environment (e.g. by collaborating with relevant working groups such as the OMTP Hardware group)

24 SA5 Studies

24.1 Study of System Maintenance over Itf-N UID_360006

Resources: S5

References

Document	Title/Contents
	WID(s)
SP-070306	SID on Study on System Maintenance over Itf-N
	Impacted Specifications
-	-
	New Dedicated Specifications/Reports
TR 32.822	Telecommunication management; Study on System Maintenance over Itf-N

Supporting Companies: ZTE, China Mobile, Vodafone, Huawei, Nortel.

The EMS (Element Management System) plays an important role in the network management architecture, hence it is important that the EMS is properly managed and maintained. When the EMS is unavailable or down, the Operator, using IRPManager, is not able to manage the nodes. Vendors of EMS supply proprietary interfaces via which the EMS itself can be managed and maintained. Currently, the management of EMS is not standardized. SA5 studied:

- If new 3GPP specification is required (e.g. use potentially existing industry or de-facto commercial standards);
- EMS configuration data backup and restoration;
- Time Synchronization between IRPManager and IRPAgent;
- Resources monitoring on IRPAgent;
- Software version management of EMS;
- Should Communication Surveillance IRP, e.g. enhancement, be included;

The existing SA5 IRPs are mainly focused on the management of nodes such as UMTS network nodes (e.g. CM IRPs, Common IRPs, FM IRPs, PM IRP, Trace IRP). As shown in figure, currently there are no IRPs to support the management of EMS.

This study evaluates if some key or core EMS management functions can be standardized to support a better (most cost/effective) management paradigm in a multi-vendor network environment. This study focuses on managing the EMS, including e.g.:

- what kind of maintenance operations can be standardized;
- what kind of information in IRPAgent and YyyIRP shall be modelled;
- what standard/de-facto standards currently exist; comparison; benefits of having a 3GPP specified solution;

This Study could result in a baseline for maintenance of the IRPAgent system, which subsequently could lead defining a new interface IRP in a subsequent Implementation Work Item.

24.2 Study on Service Oriented Architecture (SOA) for IRP

UID 400029

Resources: S5

References

Document	Title/Contents
	WID(s)
SP-080281	SID on Study on SOA for IRP
	Impacted Specifications
-	-
	New Dedicated Specifications/Reports
TR 32.824	Study on SOA compliant need and additional capabilities for existing/currently planned Interface IRPs

Supporting Companies: Ericsson, Huawei, Nortel, TeliaSonera, Nokia Siemens Networks

Service Oriented Architecture (SOA) is currently gaining high attention and acceptance in the IS/IT industry.

It promises to manage change & automate and simplify IT processes ([SOA Management and Security](#)), optimize implementation, maximize (implementation) flexibility and scalability ([SOA/Web services-based applications](#)), facilitate integration beyond the enterprise (between companies, between partners and customers), simplify development and maintenance; etc.

Integration Reference Point (IRP) concept and set of specifications developed by 3GPP SA5 is the predominant standard for wireless network management since year 2000. 3GPP and 3GPP2 have developed it in close collaboration.

The IRP architecture follows closely the ITU-T TMN work.

Besides publishing the IRP specifications, 3GPP also publishes its IRP methodology (e.g., the guidelines, templates on how to develop, maintain and publish IRP specifications). Today, the IRP specification methodology is being shared and jointly evolved and maintained by a number of organizations, such as ITU-T.

The descriptions or definitions of SOA have been produced by various groups.

The principles of SOA are currently being applied to the field of network management.

This study:

- Identified requirements for an IRP to be SOA compliant
- identified subsequently if there are additional capabilities needed for existing and planned Interface IRPs such that they can be considered SOA compliant. "Compliant" does not mean protocol compliance, where protocol test cases are needed to test if the subject is "in compliance" or not.
- Based on the identification done in b), revise the identified Interface IRPs accordingly.
If step b) has identified e.g. that Entry Point IRP needs an extra capability allowing YyyIRPs to register their services such that IRPManagers can discover the availability of the services, then step c) should revise the Entry Point IRP Requirement, IS and SSs accordingly.

Capabilities in existing YyyIRP are used to secure the capabilities mentioned in steps b) and c) above. Network operators have sole responsibility to decide if such security capability is needed or not (3GPP should not decide).

Spin-off implementation WI UID_440064 Service Oriented Architecture (SOA) for IRP.

25 RAN Studies

25.1 Study on Evaluation of the inclusion of Path Loss Based Technology in the UTRAN **UID_380079**

Resources: R4

References

Document	Title/Contents
WID(s) / Status Report	
RP-071050	SID on Evaluation of the inclusion of Path Loss Based Technology in the UTRAN
Impacted Specifications	
-	-
New Dedicated Specifications/Reports	
TR 25.907	Evaluation of the inclusion of path loss based location technology in the UTRAN

Supporting Companies: AT&T, Thales, TCS, Polaris Wireless, SiRF Technology .

Unique ID	Name	Hyperlink	Status Report
380079	Study on Evaluation of the inclusion of Path Loss Based Technology in the UTRAN	RP-071050	RP-091080

Linked work items: UE Positioning

Pattern matching location method is used for GSM location by USA Carriers in accordance with FCC mandate for Phase II E-911 services. Pattern matching has also been deployed for use in commercial location-based services. Adding this location method allows existing GSM users of pattern matching technology to gracefully migrate and improve the performance of their networks in UMTS.

The goal is to determine if pattern matching can address the needs for improved wireless location accuracies, particularly in challenging urban and indoor call scenarios, as demonstrated by FCC issued regulations with tighter accuracy requirements for E911 emergency calls.

The implementation is a Radio Network Controller (RNC) based location service, leveraging information that currently exists in the Radio Resource Control (RRC) that interfaces to the UTRAN on the Iurc interface. This work:

- investigated performance advantages of adding path loss based location methods (e.g. pattern matching) to UTRAN
- identified changes to UTRAN specifications for adding this location method
- demonstrated that UE specifications will not be altered
- determined compatibility with the HSPA architecture

This study investigates if path loss based location complements the already standardized location methods and provides a basis for improving hybrid location techniques.

25.2 Study on LTE-Advanced **UID_390031**

Resources: R1,R2,R3,R4

References

Document	Title/Contents
WID(s)	
RP-091360	SID on Further advancements for E-UTRA (LTE-Advanced)
Impacted Specifications	
TR 36.913	Requirements for further advancements for E-UTRA (LTE-Advanced) - R1
New Dedicated Specifications/Reports	
TR 36.814	Evolved Universal Terrestrial Radio Access (E-UTRA); Further advancements for E-UTRA Physical layer aspects - R1
TR 36.912	Feasibility study for Further Advancements for E-UTRA (LTE-Advanced) - R1
TR 36.806	Evolved Universal Terrestrial Radio Access (E-UTRA); Relay architectures for E-UTRA (LTE-Advanced) - R2
TR 36.815	Further Advancements for E-UTRA; LTE-Advanced feasibility studies in RAN WG4 - R4

Supporting Companies: Alcatel-Lucent, AT&T, CATT, China Mobile, Ericsson, ETRI, Fujitsu, Huawei, InterDigital, LG Electronics, Mitsubishi Electric, Motorola, NEC, Nokia, Nokia Siemens Networks, Nortel, NTT DoCoMo, Orange, Panasonic, Philips, Qualcomm Europe, RIM, RITT, Rohde&Schwarz, Samsung, Sharp, Telecom Italia, Telefonica, Texas Instruments, T-Mobile Intl., Toshiba, Verizon, Vodafone, ZTE.

Unique ID	Name	Hyperlink	Status Report	TRs
390031	Study on LTE-Advanced	RP-091360	RP-100080	36.913 , new 36.814, 36.912, 36.806, 36.815

IMT-Advanced entered the ITU-R process addressing development of the terrestrial radio interface recommendations. ITU-R has issued a Circular Letter(CL) inviting submission of candidate Radio Interface Technologies (RITs) or set of RITs (SRITs) for IMT-Advanced; key features being:

- high degree of commonality of functionality worldwide while retaining the flexibility to support a wide range of services and applications in a cost efficient manner
- compatibility of services within IMT and with fixed networks
- capability of interworking with other radio access systems
- high quality mobile services
- user equipment suitable for worldwide use
- user-friendly applications, services and equipment
- worldwide roaming capability and
- enhanced peak data rates to support advanced services and applications (100 Mbit/s for high and 1 Gbit/s for low mobility were established as targets for research).

ITU-R WP 5D #2 (June 2008) concluded base line requirements for IMT-Advanced (CL July 2008 - Addendum)

WRC07 proposed additional spectrum bands to the prior identified bands for both IMT-2000 and IMT-Advanced:

- 450 MHz band
- UHF band (698 - 960 MHz)
- 2.3 GHz band
- C-band (3400 - 4200 MHz)

In 3GPP, E-UTRA should be further evolved in future releases in accordance with:

- 3GPP operators' requirements for E-UTRA evolution
- the need to meet/exceed the IMT-Advanced capabilities

Consequently, further advancements for E-UTRA (LTE-Advanced) were studied to meet:

- IMT-Advanced requirements (and provide RIT/SRIT proposals according to ITU-R schedule)
- 3GPP operators' requirements for E-UTRA evolution

NOTE: ITU-R Circular Letter (and future Addendums) were annexed to and are integral part of this Work Item

This study:

- A) Defined a framework for further advancements of LTE (referred to as LTE-Advanced) considering:
- time schedule of ITU-R
 - work on LTE-Advanced must not introduce any delay to completion of 3GPP Rel-8 LTE specifications
 - general enhancement of LTE specifications is maintained/progressed in a focused/efficient manner
- B) Defined LTE-Advanced requirements based on ITU-R requirements for IMT-Advanced as well as 3GPP operators' own requirements for advancing LTE considering:
- LTE radio technology and architecture improvements
 - Support all radio modes of operation
 - Support heterogeneous network i.e. mix deployments consisting of macro, pico, femto and relay nodes
 - Interworking with legacy RATs (scenarios and performance requirements)
 - Backward compatibility of LTE-Advanced E-UTRA/E-UTRAN with E-UTRA/E-UTRAN i.e.:
 - ✧ an LTE terminal can work in an LTE-Advanced E-UTRAN
 - ✧ an LTE-Advanced terminal can work in an E-UTRAN and
 - ✧ non-backward compatible elements could be considered based on RAN decision
 - Newly identified frequency bands and existing frequency bands, and their advantages and limitations, in particular, the consideration of the WRC07 conclusions, to ensure that LTE-Advanced can accommodate radio channel bandwidths commensurate with the availability in parts of the world of wideband channels in the spectrum allocations (above 20 MHz) and at the same time being mindful on the need to accommodate those parts of the world where the spectrum allocations will not have availability of wideband channels
- C) Identified potential solutions, technologies for enhancements of E-UTRA (LTE-Advanced) including:
- Physical layer
 - Radio interface layer 2 and RRC
 - E-UTRAN architecture
 - RF, including Aspects of wider channel bandwidth than 20 MHz
 - Advanced system concepts
- D) Developed 3GPP proposals for IMT-Advanced for submission to ITU-R as follows:
1. "Early Proposal" agreed at RAN#41 (Sep 2008) for submission to WP 5D #3 (Oct 2008)
 2. "Complete Technology" agreed at RAN#44 (May 2009) for submission to WP 5D #5 (Jun 2009)
 3. "Final" (incl. self-evaluation) agreed at RAN #45 (Sep 2009) for submission to WP 5D #6 (Oct 2009)
- E) Made recommendations for future implementation Work Items (WIs)

TR 36.815 " Further Advancements for E-UTRA; LTE-Advanced feasibility studies in RAN WG4" studies carrier aggregation used in LTE-Advanced deployment scenarios based on operator's input. TR 36.815 concludes that with LTE-Advanced it will be possible to contiguously aggregate component carriers in a spectrum efficient way, provided, the spacing between centre frequencies of component carriers is a multiple of 300 kHz.

UE architectures options to support the carrier aggregation scenarios were identified and feasible BS configurations to support the selected aggregation scenarios were found.

The impact of the carrier aggregation scenarios on the UE and BS RF requirements was also investigated. It was found that the LTE-Advanced RF requirements can be based on the re-use of existing structure of LTE Rel-8 requirements in a "building block" manner.

25.3 Study on 1.28 Mcps TDD Home NodeB UID_410016

Resources: R4

References

Document	Title/Contents
	WID(s)
RP-080767	SID on Study on 1.28 Mcps TDD Home NodeB
	Impacted Specifications
-	-
	New Dedicated Specifications/Reports
TR 25.866	1.28Mcps TDD Home Node B (HNB)

Supporting Companies: TD Tech, China Mobile, RITT, Huawei, Spreadtrum, CATT, ZTE

Unique ID	Name	Hyperlink	Status Report
410016	Study on 1.28 Mcps TDD Home NodeB	RP-080767	RP-091081

1.28Mcps TDD HNBs provide attractive services and data rates in home environments in China as a consequence of a large number of TD-SCDMA subscribers. UTRAN is not optimally suited for this application, as it was developed and defined under the assumption of coordinated network deployment. Actually HNBs are typically associated with uncoordinated and large scale deployment.

This study investigates amendments to specifications in order to fully support the application of 1.28Mcps TDD HNBs (e.g. architecture aspect, HO scenario and interference consideration, etc). New synchronization mechanism for was considered because there are more stringent synchronization requirements for 1.28Mcps TDD.

In order to minimize the impact on the existing overall network, the HNB concept for 1.28Mcps TDD shall operate with legacy terminal (from Rel-4 onwards) and Core Network, and should minimize impact on protocol interfaces. So far no UE impact is foreseen. This study provides a framework for 1.28Mcps TDD HNB (Femto/Pico) environment capable of providing users with high bit rate and low cost services. The study covered:

- Requirements (RAN4)
 - Identified any new, revised or missing RF requirements
 - Identified relevant deployment scenarios
- RF-related issues (RAN4)
 - Investigated RF related aspects such as interference scenarios and RF performance requirements
- Frequency accuracy (RAN4)
 - How much the frequency accuracy can be relaxed in home environment
- Associated class definitions (RAN4)
 - Investigated (based on requirements and scenario coverage in the current specification) whether the local area class can be extended to cover 1.28Mcps TDD HNB scenarios, or a new class needs to be defined
- Physical Layer (RAN1)
 - Investigated if and which 1.28Mcps TDD physical layer specifications might be impacted
- Architecture (RAN2, RAN3)
 - Investigated which UTRAN interfaces might be impacted for 1.28Mcps TDD HNB
 - Investigated whether HNB need to be synchronized among each other or with the macro network and how synchronization can be achieved in a scalable manner
- Implications of deployment and/or operational scenario for 1.28Mcps TDD HNB (RAN2, RAN3)
 - Potential for very high density of 1.28Mcps TDD HNBs (Note: rigorous planning is not necessarily possible and/or desirable for Consumer Premise Equipment)
- Mobility and access control (RAN2, RAN3)
 - Investigated if and which 1.28Mcps TDD air interfaces might be impacted

25.4 Study on E-UTRAN Mobility Evaluation and Enhancement UID_420012

Resources: R1

References

Document	Title/Contents
	WID(s)
RP-081137	SID on Study on E-UTRAN Mobility Evaluation and Enhancement
	Impacted Specifications
-	-
	New Dedicated Specifications/Reports
-	-

Supporting Companies: Qualcomm, T-Mobile, Orange, Telecom Italia, eMobile, Huawei.

Unique_ID	Name	Hyperlink	Status_Report
420012	Study on E-UTRAN Mobility Evaluation and Enhancement	RP-081137	RP-090426

E-UTRAN is expected to provide excellent user experience for both real-time and non-real time applications under a challenging mobility environment. An HSPA mobility performance evaluation identified some problem cases and an enhanced cell switching method was adopted in UTRAN Rel-8.

A similar evaluation of mobility performance was carried out for E-UTRAN. In particular, it considered the robustness of handover and its effect on both services real time (e.g. VoIP) and non real-time (e.g. FTP file download). This study:

- evaluated robustness and performance of the existing handover procedure in case of delay-sensitive real time services and in case of high throughput non-real time services
- determined the need to enhance the existing handover procedure
- if needed, identified and recommended enhancement technique(s)

RP#44 closed.

RP-090452 RAN1 LS to RAN on Conclusions for LTE Mobility Study Item - no further Rel-9 action / noTR needed)

25.5 Study on Minimization of drive-tests in Next Generation Networks **UID_430021**

Resources: R2

References

Document	Title/Contents
WID(s)	
RP-090341	SID on Minimization of drive-tests in next generation networks
Impacted Specifications	
-	-
New Dedicated Specifications/Reports	
TR 36.805	Study on Minimization of drive-tests in Next Generation Networks

Supporting Companies: AT&T, Huawei, KDDI, Motorola, NTT DoCoMo, Orange, Qualcomm, Telecom Italia, T-Mobile.

Unique_ID	Name	Hyperlink	Status_Report
430021	Study on Minimization of drive-tests in Next Generation Networks	RP-090341	RP-091084

Today operators strongly rely on manual drive-tests to collect the field measurements that are needed to monitor and optimize the performance of their networks. In the progressive deployment of Next Generation Networks, the reliability of traditional drive-test methods will be reduced and more adaptive network optimization tools will be needed. This will become even more important in heterogeneous deployments (e.g. where large number of femto nodes will be attached/detached to/from the network at any time in an unplanned manner). Therefore, it will be highly beneficial to automate the collection of UE measurements and thus minimize the need for operators to rely on manual drive-tests.

Another aspect is that drive-tests can usually only be done on roads, whereas users sometimes experience problems not accessible via drive-tests at all. Therefore feedback from UE experiencing problems is key for any automated optimization and to get an overview about the network status.

Furthermore the collected field measurements may be used for a wide scope of other SON use cases too (e.g. localized feedback from UEs can improve the value of any mobility robustness optimization). This study has therefore some synergies with other WIs in the area of SON. This study:

1. Defined use cases and requirements for minimising drive tests in next generation LTE/HSPA networks
2. Based on the defined use cases and requirements, it studied the need for defining new UE measurements logging and reporting capabilities for minimizing drive tests and analyze the impact on the UE

NOTE 1: policy control and transport mechanisms for the new UE measurement logging and reporting capabilities are outside of the scope of this study

NOTE 2: SA5 was kept informed about the progress of this study

NOTE 3: The study focussed on new logging and reporting capabilities for measurements already available at UE

TR 36.805 Conclusion

The following main conclusions were drawn in the study from the requirements for Minimization of Drive Tests.

1. MDT use cases: The most important use case for operators initially is on coverage optimisation; therefore the work on MDT should focus on this use case.
2. MDT measurements: Following UE measurements (or similar functionality) are considered with focus for this use case:
 - Periodical downlink pilot measurements
 - Serving Cell becomes worse than threshold
 - Transmit power headroom becomes less than threshold
 - Paging Channel Failure (PCCH Decode Error)

- Broadcast Channel failure
3. MDT measurement location association: In order to allow (i.e. during operator post-processing) the association between MDT measurements and position where the MDT measurement was taken, available positioning information in the UE is reported to the network together with the MDT measurement results.
 4. MDT measurement time association: In order to allow (i.e. during operator post-processing) the association between MDT measurements and time when the MDT measurement was taken, time stamping for the MDT measurements is added by the UE if it cannot be determined by the network (e.g. immediate reporting). This timestamp does not need to be very accurate.

The following two methods are evaluated for collection of UE measurements in the study of minimization of drive tests. Some simulations were carried out as part of the study and results are summarized in Annex A.

Method 1: UE based measurement logging

UE logs events and measurements available at the UE, which are obtained by the network from the UE.

Method 2: Existing RRM measurements and reporting

UE measurements are obtained through the existing RRM measurement and reporting mechanism. In addition, other knowledge and information in the network regarding the UE from which measurements are obtained can be combined with the UE measurements to derive the occurrence of particular event.

Evaluations: concluded that in case of the UE measurement "Power headroom becomes less than threshold", it would be beneficial if Power Headroom reporting would be accompanied by additional measurement/information available at eNB/NodeB (e.g. UL grant information) and/or the UE (e.g. pathloss), in order to increase the reliability of finding uplink coverage problems.

Comparison between Method 1 and Method 2:

in the existing RRM measurement reporting method the following information is missing:

- Reporting of accurate location information available in the UE;
- Problems found by IDLE mode UEs;
- Problems experienced when no RRC connection re-establishment is possible (i.e. going out-of-coverage);

UE logging mechanism should be able to provide solutions for above mentioned cases.

Further the following benefits of UE based logging were recognized in the study:

- UE based measurement logging will result in less signalling overhead than individual RRC measurement reporting, unless existing RRM measurement reporting for normal operations is sufficient.
- Obtaining a measurement from before a certain event takes place in a UE or at the time the event takes place [8] is difficult with the existing measurement reporting mechanism

The following benefits of utilizing the existing RRM measurement reporting (obtained through the normal operations without additional reporting) were further recognized in the study:

- As RRM measurement (with positioning information only for UMTS) reporting is also supported by legacy UE, measurement reporting from larger population of UE is obtainable also for minimization of drive test.

Impact analysis:

TR 36.805 showed that UE/end user/network impacts are manageable by taking into account the guidance in clause 7.

25.6 Study on Enhanced Interference Management for HNBs

UID_430027

Resources: R4

References

Document	Title/Contents
WID(s)	
RP-090361	SID on Enhanced Interference Management for HNBs
Impacted Specifications	
TR 25.967	FDD Home Node B (HNB) RF Requirements
New Dedicated Specifications/Reports	
-	-

Supporting Companies: Qualcomm, NTT DoCoMo, AT&T, Fujitsu, Mitsubishi, Panasonic, NEC, Airvana.

Unique_ID	Name	Hyperlink	Status_Report
430027	Study on Enhanced Interference Management for HNBs	RP-090361	RP-090429

This study is linked to UID_420008 LTE FDD Home eNodeB RF Requirements.

Rel-8 HNBs provide desirable service for a large number of deployment scenarios. However, as the density of HNBs increases, the inter-HNB, HNB-to-macro network and macro network-to-HNB interference becomes more significant.

It is desirable to maintain quality of service for macrocell UEs where the macro network is deployed on the same frequency as CSG HNBs. There may be cases where a macro UE is in close proximity of a CSG HNB and experiences interference from CSG HNB. In such scenarios, it is desirable to maintain idle mode and connected mode service that the macro UE is receiving from macro network.

It is also desirable to maintain quality of service for HNB UEs where the CSG HNB is deployed on the same frequency as the macro network. There may be cases where a HNB UE is in close proximity of a macro network and experiences interference from the macro network. In such scenarios, it is desirable to maintain idle mode and connected mode service that the HNB UE is receiving from CSG HNB.

It is also desirable to provide service to UEs at home by their own Home NodeB both to provide good coverage at home when the macro coverage is poor and to offload capacity from the macro network to HNBs. As the density of HNBs increases, the chance of two HNBs in neighbouring apartments sharing the same carrier frequency increases. In such scenarios, a UE at home may not be able to receive any service from its own HNB in a significant portion of its own apartment due to significant DL interference created by the neighbouring closed subscriber group (CSG) HNB.

Hence, interference coordination techniques are needed to (a) alleviate inter-HNB interference so that UEs are able to get service from their own HNB while at home, (b) to minimize the interference caused to the macro network service from nearby HNBs and (c) to minimize the interference caused to HNB service from nearby macro network.

This study evaluated interference coordination techniques:

1. among HNBs in Rel-9 to mitigate interference in dense HNB deployments and
2. between HNBs and macro network for maintaining the macro network service

Primary focus was on maintaining the macro network service and secondary focus on maintaining the HNB service.

This study:

- Identified solutions to issues described in TR 25.967 (solutions based on RF measurement and/or on signalling).
- Evaluated the improvements provided by these solutions and their complexity using Rel-8 UTRAN mechanisms as benchmark

Spin-off RAN3 UID_440015 Study on Enhanced Interference Management Mechanisms for HNBs

25.7 Study on Enhanced Interference Management Mechanisms for HNBs **UID_440015**

Resources: R3

References

Document	Title/Contents
	WID(s)
RP-090667	SID on Study on Enhanced Interference Management Mechanisms for HNBs
	Impacted Specifications
TR 25.967	FDD Home Node B (HNB) RF Requirements
	New Dedicated Specifications/Reports
-	-

Supporting Companies: Qualcomm, NTT DoCoMo, NEC, AT&T, Orange, Alcatel-Lucent, Mitsubishi, Telecom Italia, Airvana.

Unique_ID	Name	Hyperlink	Status_Report
440015	Study on Enhanced Interference Management Mechanisms for HNBs	RP-090667	RP-090733

Triggered by RAN4 UID_430027 Study on Enhanced Interference Management for HNBs, where RAN4 identified interference scenarios that benefit from enhanced interference management. More specifically, HNB DL to Macro DL (Interference Scenario 2 in TR 25.967), Alien HNB DL to HNB DL (Interference Scenario 6 in TR 25.967), Alien HNB UE to HNB UL (Interference Scenario 5 in TR 25.967), and Alien Macro UE to HNB UL (Interference Scenario 3 in TR 25.967) were identified as scenarios where enhanced interference management is beneficial. Potential enhanced interference management techniques were also identified to (a) minimize the interference caused to the macro network service from nearby HNBs (b) alleviate inter-HNB interference so that UEs are able to get service from their own HNB while at home. For example, for mitigating HNB DL interference to Macro UE in co-channel deployment, network-assisted methods such as controlling the HNB power or controlling the Macro UE adaptively as well as UE-assisted control of HNB transmit power and lowering the minimum HNB transmit power were studied and the corresponding text proposal for including these interference management methods in TR 25.967 was approved. Based on this study, RAN4 has recommended that design of methods for enabling enhanced interference management mechanisms be evaluated further.

This RAN3 study investigated enhanced interference management methods in Rel-9 between macro network and HNB as well as HNB and HNB to mitigate HNB-to-Macro interference, Macro-to-HNB interference and the inter-HNB interference. The study item focused primarily on HNB-to-macro interference, and secondarily on inter-HNB interference and macro-to-HNB interference.

This study:

- reviewed the outcome of Rel-9 RAN4 Study on Enhanced Interference Management for HNBs (TR 25.967)
- evaluated possible mechanisms on RNL, RRC or NAS level to control interference.

The study focussed on HNBs sharing the same carrier frequency with macro network as well as neighbouring HNBs sharing the same frequency. To address PSC disambiguation, techniques similar to those for active hand-in support can be re-used without further UE impact.

26 Rel-9 Completed Features and Studies

Unique ID	Name	Acronym	Resource	Hyperlink	Notes
0	Release 9 Features	-	-	-	-
400035	Enhanced Home NodeB / eNodeB	EHNB	S1,S2,S3, S5,C1,C6, R2,R3,R4, GP	SP-090214	CP#49 the SA1-reqs are moving. CT1 will align when the work in SA1 is clear
400047	Stage 1 for EHNB	EHNB	S1	SP-080791	CP#49 the SA1-reqs are moving. CT1 will align when the work in SA1 is clear. (was SP#44 completed.)
410026	Architecture aspects of EHNB	EHNB	S2	SP-080636	SP#45 completed
420035	Security aspects of Enhanced Home NodeB / eNodeB	EHNB-Sec	S3	SP-080879	SP#46 completed
450003	CT1 aspects - Support of Home NB and Home eNB enhancements	EHNB-CT1	C1	CP-090741	CP#49 the SA1-reqs are moving. CT1 will align when the work in SA1 is clear. Roaming aspects for manual CSG selection, Support of temporary users and CSG membership changes, Support of user controlled and operator controlled lists
450004	CT6 aspects - Support of Home NB and Home eNB enhancements	EHNB-CT6	C6	CP-090741	CP#47 completed. Storing of CSG related data items on the USIM
420036	3G HNB Gateway and LTE HeNB Gateway OAM&P	HNB-OAM_GW	S5	SP-100087	SP#47 completed
430012	3G HNB and LTE HeNB OAM&P Type 1 Interface	HNB_eHNB-OAM_Type1	S5	SP-090208	SP#47 completed
440066	3G HNB and LTE HeNB OAM&P Type 2 Interface	HNB_eHNB-OAM_Type2	S5	SP-090315	SP#47 completed
420008	LTE FDD Home eNodeB RF Requirements	HeNB-RF_FDD	R4	RP-091300	RP#47 completed
430005	LTE TDD Home eNodeB RF Requirements	HeNB-RF_TDD	R4	RP-091386	RP#47 completed
430025	Home NB and Home eNB enhancements - RAN3 aspects	EHNB-RAN3	R3	RP-090349	RP#46 completed (based on high priority items specified in RP-090995)
430026	Home NB and Home eNB enhancements - RAN2 aspects	EHNB-RAN2	R2	RP-091392	RP#47 completed
490020	Conformance Test Aspects – Home NB enhancements for FDD	EHNB-UTRA_FDD_UEConTest	R5	RP-100935	UTRA. Testing for UID_430026 Support of Home NB and Home eNB enhancements RAN2 aspects (25.304, 25.331, 25.367)
440001	Home NB and Home eNB enhancements - GERAN aspects	EHNB-GERAN	GP	GP-090975	GP#47 completed. GP#42 WID approved
370026	Value-Added Services for Short Message Service	VAS4SMS	S1,C4,C1	SP-070572	CP#46 completed
370126	Stage 1 for VAS4SMS	VAS4SMS	S1	SP-070572	SP#39 completed. SP#43 Feature moved to Rel-9
410011	CT4 aspects of VAS4SMS Interface and Signalling Flow	VAS4SMS	C4	CP-090813	CP#46 completed
410014	CT1 aspects of VAS4SMS Interface and Signalling Flow	VAS4SMS	C1	CP-090813	CP#46 completed
370027	Definition of End-User Identity	EUI	S1	SP-090380	SP#42 closed. Stage 1 work closed at 5% completion due to lack of input (added only the EUI definition in 21.905)
410024	Definition of End-User Identity	EUI	S1	SP-090380	SP#42 closed. Stage 1 work closed at 5% completion due to lack of input (added only the EUI definition in 21.905)
380067	Customized Ringing Signal	CRS	S1,C1	SP-080502	CP#48 completed
410025	Stage 1 for Customized Ringing Signal	CRS	S1	SP-080502	SP#42 completed.
440041	Stage 3 for IMS Customized Ringing Signal (CRS) Service	CRS	C1	CP-090444	CP#48 completed

380057	Public Warning System	PWS	S1,C1,C4,R2	SP-070876	TSG#46 completed. Larger scope than Rel-8 Feature UID_370051 (ETWS). Triggered by TR 22.968 Study UID_320025 (FS_PWS)
380058	Stage 1 for Public Warning System	PWS	S1	SP-070876	SP#42 completed
440029	Stage 3 for Public Warning System	PWS-St3	C1,C4	CP-090437	RP#46 completed
440030	CT1 aspects of Stage 3 for Public Warning System	PWS-St3	C1	CP-090437	CP#46 completed
440031	CT4 aspects of Stage 3 for Public Warning System	PWS-St3	C4	CP-090437	CP#46 completed
440005	Public Warning System (PWS) – RAN aspects	PWS-RAN	R2,R3	RP-090649	RP#46 completed
400031	Support of Personal Area Networks and Enhancements to Personal Network Management	PAN_EPNM	S1,C1	SP-080430	CP#48 completed
400043	Stage 1 for PAN_EPNM	PAN_EPNM	S1	SP-080430	SP#40 completed
430002	Stage 2 for Support of Personal Area Networks and Enhancements to Personal Network Management	PAN_EPNM	C1	CP-090435	CP#46 completed
430102	Stage 3 for Support of Personal Area Networks and Enhancements to Personal Network Management	PAN_EPNM	C1	CP-090435	CP#48 completed
400032	Multi-Media Telephony Service enhancements	eMMTel	S1,S5,C1	SP-080503	SP#47 completed
400044	Stage 1 for eMMTel	eMMTel	S1	SP-080503	SP#42 completed
430031	Multimedia Telephony (MMTel) Service and Supplementary Services - Online Charging and completion for Offline Charging (all supplementary services)	eMMTel-SS-CH	S5	SP-090196	SA#47 completed
430032	Support of Real-time Transfer of Tariff Information (RTTI) in IMS charging	IMSTSS-RTTI-CH	S5	SP-090306	SA#47 completed. Linked to SA5 Rel-8 UID_380042 AoC support in IMS Charging (IMSTSS)
440032	Stage 3 - Enhancements for Completion of Communications Supplementary service	eMMTel-CC	C1	CP-090490	CP#46 completed
400034	User Data Convergence (UDC)	UDC	S1,S5,C4	SP-080448	SP#48 completed. Triggered by Rel-8 SA5 Study of Common Profile Storage Framework of User Data for network services and management (UID_320006) TR 32.808
400046	Stage 1 for User Data Convergence (UDC)	UDC	S1	SP-080448	SP#42 completed
430003	User Data Convergence (UDC) Technical Realization (Stage 2)	UDC-CN	C4	CP-090017	CP#47 completed
450002	User Data Convergence (UDC) Protocol Description	UDC-CN	C4	CP-090516	CP#47 completed
440060	User Data Convergence (UDC) Modelling and Management	UDC-MMAN	S5	SP-090309	SP#48 completed
440062	UDC – Framework for Model Handling and Management	UDC-MMAN-MFRM	S5	SP-090311	SP#48 completed
440061	UDC – Common Baseline Information Model	UDC-MMAN-CBIM	S5	SP-090310	SP#47 completed
410032	IMS Services Centralization and Continuity	IMS_SCC	S1,S2,C1	SP-080633	CP#47 completed
410033	Stage 1 - Inter-Device Transfer – Requirements	IMS_SCC-IDT	S1	SP-080507	SP#42 completed
410034	Stage 2 - IMS Service Continuity Enhancements: Service, Policy and Interactions	IMS_SCC-SPI	S2	SP-080561	SP#44 completed. TR 23.838 for Approval
440034	Stage 3 - IMS Service Continuity Enhancements: Service, Policy, Interactions and Inter UE Transfer	IMS_SCC-SPI	C1	CP-090440	CP#47 completed
410035	Stage 2 - IMS Centralized Services	IMS_SCC-ICS	S2	SP-080634	SP#44 completed. TR 23.883 for Information + Approval
440033	Stage 3 - Enhancements to IMS Centralized Services	IMS_SCC-ICS	C1	CP-090883	CP#47 completed
430004	Stage 3 - IMS Centralized Services support via I1 interface	IMS_SCC-ICS_I1	C1	CP-090640	CP#47 completed
420020	Service Specific Access Control in EPS	SSAC	S1,C1	SP-080882	CP#47 completed. Triggered by Study UID_400036 on Service Specific Access Control in EPS (FS_SSAC)
420021	Stage 1 for Service Specific Access Control in EPS	SSAC	S1	SP-080882	SP#42 completed
440040	Stage 3 for Service Specific Access Control in EPS	SSAC	C1	CP-090885	CP#47 completed
380064	Support for IMS Emergency Calls over GPRS and EPS	IMS_EMER_GPRS_EPS	S1,S2,S3,C1,C3,C4,R2,R3,R5	SP-080844	SP#48 completed
410036	Stage 1 for IMS Emergency Calls over GPRS and EPS	IMS_EMER_GPRS_EPS	S1	SP-080844	SP#42 completed
410037	Stage 2 for IMS Emergency Calls over GPRS and EPS	IMS_EMER_GPRS_EPS	S2	SP-080844	SP#44 completed

420022	Security aspects for IMS Emergency Calls over GPRS and EPS	IMS_EMER_GPRS_EPS-Sec	S3	SP-080844	SP#48 completed
440035	Stage 3 for IMS Emergency Calls over GPRS and EPS	IMS_EMER_GPRS_EPS	C1,C3,C4,R5	CP-090564	CP#47 completed
440036	CT1 aspects - Stage 3 for IMS Emergency Calls over GPRS and EPS	IMS_EMER_GPRS_EPS	C1	CP-090564	CP#47 completed
480029	Conformance Test Aspects - CT1 aspects for IMS Emergency Calls over GPRS and EPS	IMS_EMER_GPRS_EPS_UEConTest	R5	RP-100567	Testing for UID_440036 CT1 aspects - Stage 3 of Support for IMS Emergency Calls over GPRS and EPS
440037	CT3 aspects - Stage 3 for IMS Emergency Calls over GPRS and EPS	IMS_EMER_GPRS_EPS	C3	CP-090564	CP#45 completed
440038	CT4 aspects - Stage 3 for IMS Emergency Calls over GPRS and EPS	IMS_EMER_GPRS_EPS	C4	CP-090564	CP#46 completed
420041	Support for IMS Emergency Calls over LTE	IMS_EMER_LTE	R2,R3	RP-081140	RP#45 completed
470017	Conformance Test Aspects – Support for IMS Emergency Calls over LTE	IMS_EMER_LTE_UEConTest	R5	RP-100118	RP#49 completion 09/10=>12/10. Testing for UID_420041 Support for IMS Emergency Calls over LTE
410038	SRVCC support for IMS Emergency Calls	IMS_EMER_GPRS_EPS-SRVCC	S2,C1,C4,C3	SP-090099	CP/SP#46 completed
410138	SRVCC support for IMS Emergency Calls	IMS_EMER_GPRS_EPS-SRVCC	S2	SP-090099	SP#46 completed. SP#43 WID updated SP-080562=>SP-090099 (added location continuity aspects)
460018	CT aspects of SRVCC support for IMS Emergency Calls	IMS_EMER_GPRS_EPS-SRVCC	C1,C4,C3	CP-090882	CP#46 completed. WID updated CP-090436=>CP-090882 (added CT3 part)
440027	CT1 aspects of SRVCC support for IMS Emergency Calls	IMS_EMER_GPRS_EPS-SRVCC	C1	CP-090882	CP#46 completed
440028	CT4 aspects of SRVCC support for IMS Emergency Calls	IMS_EMER_GPRS_EPS-SRVCC	C4	CP-090882	CP#46 completed
460019	CT3 aspects of SRVCC support for IMS Emergency Calls	IMS_EMER_GPRS_EPS-SRVCC	C3	CP-090882	CP#46 completed
430006	LCS for LTE and EPS	LCS_LTE_EPS	S2,C1,C4,R2,R1,R3,R4,R5	not applicable	RP#48 Core completed/Test ongoing
400038	LCS Control Plane Solution for EPS	LCS_EPS-CPS	S2,C4,C1	SP-080445	Triggered by abandoned Study UID_380068 (FS_LCS_EPS). Linked to Feature UID_380064 Support for IMS Emergency Calls over GPRS and EPS
400048	Stage 2 for LCS Control Plane Solution for EPS	LCS_EPS-CPS	S2	SP-080445	SP#44 completed
440020	CT4 aspects of Control Plane LCS in the EPC	LCS_EPS-CPS	C4	CP-090811	CP#47 completed (IANA registrations outstanding). Stage 3 SLs and SLg interfaces & transport of positioning messages between E-SMLC and MME in the scope of UID_420006 (Positioning Support for LTE)
440120	CT1 aspects of Control Plane LCS in the EPC	LCS_EPS-CPS	C1	CP-090811	CP#47 completed
420006	Positioning Support for LTE	LCS_LTE	R2,R1,R3,R4	RP-091389	RP#48 completed. UID_400038 (LCS Control Plane Solution for EPS) depends on this WI
470018	Conformance Test Aspects – Positioning Support for LTE	LCS_LTE_UEConTest	R5	RP-100617	RP#48 updated WID RP-100346=>RP-100617. Testing for UID_420006 Positioning Support for LTE
400039	MBMS support in EPS	MBMS_EPS	S2,S3,S5,C3,C4,R2,R3,R4	SP-080737	RP#47 completed. SP#46, CP#46 completed

400040	Stage 2 for MBMS support in EPS	MBMS_EPS	S2	SP-080737	SP#44 completed
420023	Security for MBMS support in EPS	MBMS_EPS	S3	SP-080737	SP#46 completed
430033	MBMS Charging in EPS	MBMS_EPS	S5	SP-090052	SP#46 completed
440025	CT4 aspects of MBMS support in EPS (Stage 3)	MBMS_EPS	C4	CP-090325	CP#46 completed
440026	CT3 aspects of MBMS support in EPS (Stage 3)	MBMS_EPS	C3	CP-090330	CP#46 completed
430007	MBMS support in LTE	MBMS_LTE	R2,R3,R4	RP-091457	RP#47 completed
420024	Access Network Discovery and Selection Function enhancements	eANDSF	S2,C1	SP-080887	CP#47 completed. No new Rel-9 use cases defined. Implement service requirements not covered in Rel-8
420040	Stage 2 for Access Network Discovery and Selection Function enhancements	eANDSF	S2	SP-080887	SP#44 completed
450006	CT1 aspects of Access Network Discovery and Selection Function enhancements	eANDSF	C1	CP-090742	CP#47 completed
430034	Multiple PDN Connection to the Same APN for PMIP-based Interfaces	MUPSAP	S2,C4,C1	SP-090098	CP#47 completed. Continues Rel-8 SAES Stage 2 UID_320005. Stage 1 in 22.278 (EPS Service requirements)
430134	Stage 2 for Multiple PDN Connection to the Same APN for PMIP-based Interfaces	MUPSAP	S2	SP-090098	SP#44 completed
450007	CT4 aspects of Multiple PDN Connection to the Same APN for PMIP-based Interfaces	MUPSAP	C4	CP-090515	CP#46 completed
450008	CT1 aspects of Multiple PDN Connection to the Same APN for PMIP-based Interfaces	MUPSAP	C1	CP-090515	CP#47 completed
450049	System aspects of vocoder rate adaptation for LTE	LTEimp-Vocoder	S2,S4,R2	SP-090653	SP#46 completed. Triggered by RAN2 UID_440013 Vocoder rate adaptation for LTE
450050	SA2 system aspects of vocoder rate adaptation for LTE	LTEimp-Vocoder	S2	SP-090653	SP#45 completed (CR adding support for Explicit Congestion Notification)
450051	SA4 system aspects of vocoder rate adaptation for LTE	LTEimp-Vocoder	S4	SP-090653	SP#46 completed
440013	Vocoder rate adaptation for LTE	LTEimp-Vocoder	R2	RP-090978	RP#45 completed
33025	Access Security Enhancements	ACCSEC2	S3	SP-040865	SP#44 completed. Stopped TR 33.801. CRs 33.102,43.020 on A5/2 removal done long time ago. A5/4 introduction CRs will be done under UID_440057 128 bit encryption for GSM and GPRS. SP#26 approved WID (improved GERAN security)
410027	Protection against Unsolicited Communication for IMS (PUCI)	PUCI	S3,S1	SP-080482	SP#46 TR 33.937 completed but no specification work done in Rel-9. Related work in OMA Categorization Based Content Screening
410028	Stage 1 for PUCI	PUCI	S1	SP-080482	SP#42 completed
410029	SA3 work on PUCI	PUCI	S3	SP-080482	SP#46 completed. No normative work done in Rel-9
430036	IMS Media Plane Security	MEDIASEC	S3,C1,C4,C3	SP-090128	CP#48 completed
430136	SA3 aspects of IMS Media Plane Security	MEDIASEC	S3	SP-090128	SP#47 completed
460020	CN aspects of IMS Media Plane Security	MEDIASEC_CORE	C1,C4,C3	CP-090884	CP#48 completed
450010	CT1 aspects of IMS Media Plane Security	MEDIASEC_CORE	C1	CP-090884	CP#47 completed
450021	CT4 aspects of IMS Media Plane Security	MEDIASEC_CORE	C4	CP-090884	CP#47 completed
460021	CT3 aspects of IMS Media Plane Security	MEDIASEC_CORE	C3	CP-090884	CP#48 completed
440053	GBAPush enhancements (Generic push layer)	eGBAPush	S3	SP-090282	SP#43 umbrella to host 33.224, moved from Rel-8 to Rel-9. SP#47 completed
420039	SA3 part of eGBAPush (Generic push layer)	eGBAPush	S3	SP-090282	SP#47 completed

440054	Extended Identity Management	GBA-IdM	S3	SP-090284	SP#46 completed. Stage 1 not identified (GBA Liberty Interworking has been outlined and GBA-OpenID interworking is analogous)
440056	Network Domain Security (NDS) enhancements to support backhaul security	NDS_Backhaul	S3,C4	SP-090286	SP#47 completed. Continuation of Rel-8 UID_390044 SAE security architecture. Covers gaps in backhaul security in SAE (also applicable to UTRAN and GERAN backhaul)
440156	SA3 part of Network Domain Security (NDS) enhancements to support backhaul security	NDS_Backhaul	S3	SP-090286	SP#47 completed
440256	CT4 part of Network Domain Security (NDS) enhancements to support backhaul security	NDS_Backhaul	C4	SP-090286	CP#46 completed. No impact on CT4 specs
440057	128 bit encryption for GSM and GPRS	A5/4-GEA4	S3,C1,C4,G2,G3new	SP-090287	Allow 128 as an alternative to 64 bit keys (Stage 2/3 + Test spec)
440157	SA3 part of 128 bit encryption for GSM and GPRS	A5/4-GEA4	S3	SP-090287	SP#46 completed
440357	CT1 part of 128 bit encryption for GSM and GPRS	A5/4-GEA4	C1	SP-090287	CP#45 completed
440457	CT4 part of 128 bit encryption for GSM and GPRS	A5/4-GEA4	C4	SP-090287	CP#46 completed. Kc128 enhancements are carried as UMTS keys => no impact on CT4 29.002, 29.060
440557	GERAN2 part of 128 bit encryption for GSM and GPRS	A5/4-GEA4	G2	GP-091212	GP#43 WID approved + completed
440657	GERAN3new (testing) part of 128 bit encryption for GSM and GPRS	A5/4-GEA4	G3new	GP-091212	GP#44 completed. GP#43 WID approved
420027	Timed Graphics	TG	S4	SP-080683	SP#47 completed. Provide graphics in parallel to a video stream (without requiring an umbrella scene descriptor such as 3GPP DIMS in TS 26.142)
430037	Managing MTSI Media Adaptation	M3A	S4	SP-090021	SP#46 completed. Work extending Rel-8 UID_34041 MTSI Video - Dynamic Rate Adaptation/Signalling of Image Size. Update speech/video adaptation algorithms used by network to control MTSI client terminal in congestion or poor transmission conditions.
440046	PSS and MBMS Aspects	PMA	S4	SP-090261	Umbrella WI
430038	PSS and MBMS extensions	PMA-MBS_Ext	S4	SP-090262	SP#47 completed. Extends Rel-8 UID_34043 (PSS_MBMS_OMTV) & ensures compatibility with UID_34046 (IMS_PSS_MBMS_US)
430039	Improved Video Support for PSS and MBMS	PMA-IVS	S4	SP-090263	SP#47 completed
430046	IMS based PSS and MBMS User Service extensions	IMS_PSS_MBMS_US_EXT	S4	SP-090225	SP#46 completed. Work extending Rel-8 UID_34046 (IMS_PSS_MBMS_US), SA2 UID_410034 IMSSCC-SPI (IMS Service Continuity Enhancements: Service, Policy and Interactions)
440051	Syndicated Feed Reception within 3GPP environments	SFR	S4	SP-090260	SP#46 completed. TS 26.150v100 for Approval. RSS optimized for mobile use. Reuse/reference OMA's enabler DCD.
450048	Distortion Measurement Test Methods and Requirements	DTMR	S4	SP-090575	SP#47 completed
420029	OAM&P 9	OAM9	S5	not applicable	SP#42 umbrella Feature created to host OAM WIs
420030	Network Infrastructure Management	OAM9-NIM	S5	not applicable	SP#42 umbrella BB created to host OAM WIs
420031	Software Management for Network Elements	OAM9-NE_SWM	S5	SP-080756	SP#47 completed

440064	Service Oriented Architecture (SOA) for IRP	OAM9	S5	SP-090313	SP#47 completed (covering SOA Architecture & SOA-supporting Solution Set). Triggered by UID_400029 Study on Service Oriented Architecture (SOA) for IRP (TR 32.824)
440065	IRP SOAP Solution Sets continuation from Rel-8	OAM9	S5	SP-090314	SP#47 completed. Continuation of Rel-8 UID_400030 IRP SOAP Solution Sets
420032	Performance Management	OAM9-PM	S5	not applicable	SP#42 umbrella BB created to host OAM WIs
440059	Enhancement of UTRAN Performance Measurements	OAM9	S5	SP-090308	SP#46 completed
430041	Enhancement of E-UTRAN Performance Measurements	OAM9	S5	SP-090053	SP#48 completed
430042	Enhancement of EPC Performance Measurements	OAM9	S5	SP-090049	SP#46 completed
430043	Self-Organizing Networks (SON) - OAM aspects	OAM9-SON	S5	not applicable	SP#43 umbrella BB created to host OAM WIs
390007	SON self-optimization management	LTE_SON-OAM	S5	SP-100091	SP#48 completed
440067	Automatic Radio Network Configuration Data Preparation	OAM9	S5	SP-090869	SP#48 completed
440058	Subscription Management (SuM) evolution	OAM9-SuM	S5	SP-090307	SP#48 completed
440068	Charging Management small Enhancements	CH9	S5	not applicable	SP#47 completed
400008	CS-IBCF and CS-TrGW definition in 3GPP specifications	CS-IBCF	C3,C4	CP-090073	CP#47 completed. Rel-8 UID_380061 (Ipinterc) covers Stage 1 in SA1 22.101, 22.228
400109	CT3 aspects of CS-IBCF and CS-TrGW definition in 3GPP specifications	CS-IBCF	C3	CP-090073	CP#47 completed
400010	CT4 aspects of CS-IBCF and CS-TrGW definition in 3GPP specifications	CS-IBCF	C4	CP-090073	CP#46 completed
410008	IMS – Interconnection Border Control Function (IBCF) – Transition Gateway (TrGW); Ix Interface; Stage 3	IMS_IBCF	C4,C3	CP-090019	CP#46 completed
410108	CT4 part of IMS – Interconnection Border Control Function (IBCF) – Transition Gateway (TrGW); Ix Interface; Stage 3	IMS_IBCF	C4	CP-090019	CP#46 completed
410208	CT3 part of IMS – Interconnection Border Control Function (IBCF) – Transition Gateway (TrGW); Ix Interface; Stage 3	IMS_IBCF	C3	CP-090019	CP#46 completed
410009	IMS Application Level Gateway Control Function (ALGCF) – IMS Access Media Gateway (IMA-MGW); Iq Interface; Stage 2 and Stage 3	IMS_AGCF	C4	CP-090020	CP#46 completed
420016	Enhancements of IMS Customized Alerting Tone (CAT) Service	eCAT	C1	CP-080796	CP#48 completed. Stage 1 in 22.182
420017	Stage 3 for Enhancements of IMS Customized Alerting Tone (CAT) Service	eCAT-SS	C1	CP-080796	CP#48 completed
440017	Completion of IMS Restoration Procedures	eIMS_RP	C3, C4,C1	CP-091050	CP#47 completed. Continuation of Rel-8 Feature UID_400012 IMS Restoration Procedures
440018	CT4 aspects of Completion of IMS Restoration Procedures	eIMS_RP	C4	CP-091050	CP#47 completed
440019	CT1 aspects of Completion of IMS Restoration Procedures	eIMS_RP	C1	CP-091050	CP#47 completed
460022	CT3 aspects of Completion of IMS Restoration Procedures	eIMS_RP	C3	CP-091050	CP#47 completed
440039	IMS Stage 3 - IETF Protocol Alignment	IMSProtoc3	C1	CP-090491	CP#47 completed
440070	Operational description of the Inter-IMS Network to Network Interface (II-NNI)	II-NNI	C3	CP-090331	CP#48 completed
450005	Definition of MI interface for Control Plane LCS (Stage 3)	EMC2	C1	CP-090746	CP#47 completed [Stage 3 for Rel-7 Emergency Calls (EMC1)]. Related to Rel-9 UID_400038 LCS Control Plane Solution for EPS. Stage 2 in Rel-9 UID_400038 (23.271), UID_410037 (23.167)
450009	PCC enhancements	PCC-Enh	C3	CP-090744	CP#46 completed

460004	3GPP IMS Conferencing Management Object (MO)	IMS_ConfMO	C1	CP#46 Report	CP#46 completed. Linked to Rel-6 UID_11051 (IMS Management objects) under the Feature UID_32021 (IMS Phase 2). MO compatible with OMA DM v1.2 & upwards and defined using OMA DM Device Description Framework (OMA-ERELD_DM-V1_2)
470004	In Case of Emergency (ICE) Graphics	ICE_Graphics	C6	CP-100178	CP#47 approved WID and completed. Added capability to store ICE graphical information (picture). Linked to CT6 Rel-8 ICE Feature UID_380059 In Case of Emergency numbers storage and easy access on UICC
410023	Rel-9 Improvements of the Radio Interface	RInImp9	RP_GP	not applicable	RP#41 umbrella Feature created to host Rel-9 WIs
410017	LCR TDD UE OTA Performance Requirements	RInImp9-RFLCROTA	R4	RP-080744	RP#44 completed technical work (RAN4 internal TR abandoned)
410019	RF requirements for Multicarrier and Multi-RAT BS	RInImp9-RFmulti	R4,G1	RP-091381	RP#47 completed. RF requirements specification applicable to Multi-Standard Radio (MSR) Base Station with multiple carriers and/or multiple 3GPP Radio Access Technologies (RAT)
420009	RAN4 part of RF requirements for Multicarrier and Multi RAT BS	RInImp9-Rfmulti	R4	RP-091381	RP#48 completed
420001	GERAN part of RF requirements for Multicarrier and Multi RAT BS	RInImp9-RFmulti-GERAN	G1	GP-081945	GP#44 Core spec completed (ongoing BS conformance spec). GP#40 WID approved
420010	Extended UMTS/LTE 800 MHz	RInImp9-UMTSLTE800	R4,R2,R3	RP-080884	RP#45 completed
430009	UMTS/LTE 800 MHz for Europe	RInImp9-UMTSLTE800 EU	R4,R2,R3	RP-090156	RP#47 completed
430010	Performance requirement for LCR TDD with UE speeds up to 350 km/h	RInImp9-LCRTDD350	R4	RP-090258	RP#46 completed
440004	Extended UMTS/LTE 1500 MHz	UMTSLTE1500	R4,R2,R3	RP-090470	RP#47 completed. For potential deployment in Japan
440006	Rel-9 Improvements of the Radio Interface - UE Conformance Testing	RInImp-UEConTest	R5	not applicable	-
440007	Conformance Test Aspects – UMTS/LTE in 800 MHz for Europe	RInImp-UEConTest-UMTSLTE800 EU	R5	RP-090485	RP#49 completed. Testing for UID_430009 UMTS/LTE 800 MHz for Europe
450017	Conformance Test Aspects – Extended UMTS/LTE 1500 MHz	UMTSLTE1500_UEConTest	R5	RP-091366	RP#48 completed
440012	TDD UE Over The Air (Antenna) conformance testing methodology	UEAnt_TDDTest	R5	RP-090621	RP#45 completed. Finalized TDD UE test methodology based on R4 TR 25.914 (UE and MS antenna performance evaluation method) and TS 25.144 Over the Air (Antenna) minimum performance requirements for the speech mode (terminal close to head)
470019	Conformance Test Aspects – Performance requirement for LCR TDD with UE speeds up to 350 km/h	RInImp9-LCRTDD350_UEConTest	R5	RP-100167	RP#48 completed. Testing for UID_430010 Performance requirement for LCR TDD with UE speeds up to 350 km/h
450018	Conformance Test Aspects – SMS over IMS in E-UTRAN	SMSoverIMS_UEConTest	R5	RP-090959	RP#47 completed
430013	Rel-9 RAN improvements	RANimp	RP	not applicable	RP#47 completed

430014	Dual-Cell HSUPA	RANimp-DC_HSUPA	R1,R2,R3,R4	RP-090014	RP#47 completed
430015	Support for different bands for Dual-Cell HSDPA	RANimp-MultiBand_DC_HSDPA	R4,R2,R3	RP-090973	RP#46 completed
430016	Combination of DC-HSDPA with MIMO	RANimp-DC_MIMO	R1,R2,R3,R4	RP-090332	RP#46 completed
430018	Transmit Antenna Array (TxAA) extension for non-MIMO UEs	RANimp-TxAA_nonMIMO	R1,R2,R3,R4	RP-090013	RP#46 completed
440014	Cell Portion for 1.28 Mcps TDD	CP_LCRTDD	R3,R1,R4	RP-090659	RP#46 completed
490025	Rel-9 RAN improvements - UE Conformance Testing	-	R5	not applicable	-
490019	Conformance Test Aspects – Combination of DC-HSDPA with MIMO	RANimp-DC_MIMO_UEConTest	R5	RP-101001	UTRA. Testing for Rel-9 UID_430016 Combination of DC-HSDPA with MIMO
420007	LTE improvements	LTEimp	RP	not applicable	-
430019	LTE Pico NodeB RF Requirements	LTEimp-Pico_eNB-RF	R4	RP-091155	RP#46 completed
430029	Enhanced Dual-Layer transmission for LTE	LTEimp-eDL	R1,R2,R4	RP-091385	RP#47 completed
490018	UE Conformance Test Aspects – Enhanced Dual-layer transmission for LTE TDD	LTEimp-eDL_UEConTest	R5	RP-100868	Testing for UID_430029 (Enhanced Dual-Layer transmission for LTE)
420011	Self-Organizing Networks (SON)	SON	R3,R2	RP-090162	RP#47 completed
38002	A-GNSS Performances and Testing Procedures	AGNSSPTP	GP	GP-092342	GP#46 still ongoing MS testing. Linked to Rel-10 RAN4 UID_450027 (A-GNSS Minimum Performance for UTRAN)
38003	A-GNSS Minimum Performances	AGNSSPTP-Perfreq	G1	GP-081786	GP#45 completed (open performance requirements alignment GPS/Galileo)
38004	A-GNSS Testing Procedures	AGNSSPTP-MStest	G3new	GP-092343	GP#46 completion 05/10=>11/10. GP#44 exception to 05/10 in GP-092344
50590	Study on Multi-User Reusing-One-Slot	MUROS	GP	GP-072033	GP#46 completion =09/10=>11/10 (was 11/08=>02/09=>05/09=>11/09=>03/10=>09/10). Spin-off implementation W/ UID_420002 VAMOS (Voice services over Adaptive Multi-user channels on One Slot)
420002	Voice services over Adaptive Multi-user channels on One Slot	VAMOS	GP,G1,G2	GP-081949	GP#46 completion 05/10=>09/10. GP#44 exception to 05/10 in GP-092470. GP#40 WID approved. Triggered by UID_50590 (MUROS) Study on Multi-User Reusing-One-Slot
420003	VAMOS Stage 2	VAMOS	GP,G1,G2	GP-081964	GP#46 completed
420004	VAMOS Stage 3	VAMOS	GP,G1,G2	GP-081965	GP#47 completion 09/10=>11/10. GP#44 exception to 05/10 in GP-092470
420005	VAMOS Radio Performance Requirements	VAMOS	GP,G1,G2	GP-081966	GP#47 completion 09/10=>11/10. GP#44 exception to 05/10 in GP-092470
490005	VAMOS - MS conformance testing	VAMOS_MStest	G3new	GP-101604	GP#47 WID approved.
440002	Cell Broadcast protocol Base Station Controller – Cell Broadcast Centre (BSC-CBC)	CEBRO	GP,C1	GP-091022	CP#47 completed. GP#45 completed. GP#42 WID approved
440102	GERAN part of Cell Broadcast protocol Base Station Controller – Cell Broadcast Centre	CEBRO	GP	GP-091022	GP#45 completed. GP#42 WID approved
440202	CT1 part of Cell Broadcast protocol Base Station Controller – Cell Broadcast Centre	CEBRO	C1	GP-091022	CP#47 completed

440003	Hybrid Location	HILT	GP	GP-091075	GP#44 completed. GP#42 WID approved (Hybrid Integrated Location Technology=HILT)
420099	(Small) Technical Enhancements and Improvements for Rel-9	TEI9	All	not applicable	SP#46 completed
460002	Test - (Small) Technical Enhancements and Improvements for Rel-9	TEI9_Test	R5,G3new	not applicable	GP#44 created
330017	Services Alignment and Migration	ServAI	S1	SP-070126	SP#41 closed (no tangible result of this work; no CR against TR 22.983). Triggered by Study UID_370086 (FSServAI)
410001	Stage 1 for ServAI	ServAI	S1	SP-070126	SP#41 closed (no tangible result of this work; no CR against TR 22.983)

Unique_ID	Name	Acronym	Resource	Hyperlink
0	Release 9 Studies	-	-	-
400036	Study on Service Specific Access Control in EPS	FS_SSAC	S1	SP-080319
350052	Study on CS Domain Services over EPS access	FS_CSoPS	S2	SP-080800
370043	Study on Extended Support of IMS Emergency Calls	FS_IMS-eCall	S2	SP-070547
320031	Study on Service Continuity for Emergency Voice Calls	FS_VCCEm	S2	SP-080555
370053	Study on Security Aspects of Remote Provisioning and Change of Subscription for M2M Equipment	FS_UM2M	S3,C6	SP-070702
360006	Study on System Maintenance over Itf-N		S5	SP-070306
360007	Study on Self-Organizing Networks (SON) related OAM interfaces for Home NodeB		S5	SP-080461
390017	Study on Self-healing of Self-Organizing Networks (SON)		S5	SP-080076
400029	Study on Service Oriented Architecture (SOA) for IRP		S5	SP-080281

Unique_ID	Name	Resource	Hyperlink	Status_Report
0	Release 9 RAN Studies	-	-	-
380079	Study on Evaluation of the inclusion of Path Loss Based Technology in the UTRAN	R4	RP-071050	RP-091080
390031	Study on LTE-Advanced	R1,R2,R3,R4	RP-091360	RP-100080
410016	Study on 1.28 Mcps TDD Home NodeB	R4	RP-080767	RP-091081
420012	Study on E-UTRAN Mobility Evaluation and Enhancement	R1	RP-081137	RP-090426
430021	Study on Minimization of drive-tests in Next Generation Networks	R2	RP-090341	RP-091084
430027	Study on Enhanced Interference Management for HNBs	R4	RP-090361	RP-090429
440015	Study on Enhanced Interference Management Mechanisms for HNBs	R3	RP-090667	RP-090733

21 Rel-9 Stopped Features and Studies

Unique_ID	Name	Resource
0	Release 9 Features	
380071	Deleted - Harmonization of Gq'/Rx for Common IMS	S2
380081	Deleted - Support of WiMAX - LTE Mobility	R2
380082	Deleted - Support of WiMAX - UMTS Mobility	R2
380086	Deleted - Definition of 3GPP UICC services over the new high-speed interface	C6
390040	Deleted - SAES Enhancements (non RAN aspects)	S2
440071	Deleted - Lawful Interception in the 3GPP Rel-9	S3
0	Release 9 Studies	
320026	Deleted - Study on Protection against SMS and MMS spam	S3

Annex A: Change history

Change history			
Date	Subject/Comment	Old	New
2008-09	1st draft despatched to TSG#41 for input / comment	-	0.0.1
2008-11	TSG#41 updates included	0.0.1	0.0.2
2008-12	Stage 1 completed Dec 2008 (SA1 exception concluded Jun 2009)	0.0.2	0.0.3
2009-01	Post-TSG#42 updates	0.0.3	0.0.4
2009-04	Post-TSG#43 updates	0.0.4	0.0.5
2009-06	Stage 2 completed Jun 2009 (SA2 exceptions concluded Sep 2009, SA3 exceptions concluded Mar 2010)	0.0.5	0.0.6
2009-09	Five SA3 Stage 2 exceptions to Dec 2009	0.0.6	0.0.7
2009-12	Stage 3 completed Dec 2009 (GERAN Stage 3 exceptions concluded Sep 2010) Three SA3 Stage 2 exceptions completed Dec 2009. Two SA3 Stage 2 exceptions to Mar 2010	0.0.7	0.0.8
2010-04	Post-TSG#47 updates. SA3 Stage 2 exceptions concluded. Most Stage 3 exceptions concluded.	0.0.8	0.0.9
2010-06	Post-TSG#48 updates. SA5, RAN Stage 3 exceptions concluded. 3 GERAN exceptions to Sep 2010	0.0.9	0.1.0
2010-09	Post-TSG#49 updates. Completed: UID_440001 Home NB and Home eNB enhancements - GERAN aspects UID_440007 Conformance Test Aspects – UMTS/LTE in 800 MHz for Europe Added New WIDs: UID_490020 Conformance Test Aspects – Home NB enhancements for FDD UID_490019 Conformance Test Aspects – Combination of DC-HSDPA with MIMO UID_490018 UE Conformance Test Aspects – Enhanced Dual-layer transmission for LTE TDD UID_490005 VAMOS - MS conformance testing (by GERAN3new) Moved to Rel-10 UID_390073 Enhancements to Multimedia Priority Service (ePRIOR)	0.1.0	0.1.1

Completed Release 9 Features

Unique_ID	Name	Acronym	Finish_Date	Hyperlink	WI_rapporteur_name	Notes	Impacted_TSs_and_TRs
440001	Home NB and Home eNB enhancements - GERAN aspects	EHNB-GERAN	03/09/2010	GP-090975	Nokia Siemens Networks	GP#47 completed. GP#42 WID approved	43.055, 43.129, 44.018, 44.060, 45.008, 48.008, 48.018

Completed Release 9 Testing

Unique_ID	Name	Resource	Hyperlink	Status_Report	rapporteur	Notes	TSs_and_TRs
440007	Conformance Test Aspects – UMTS/LTE in 800 MHz for Europe	R5	RP-090485	RP-100736	Ericsson	RP#49 completed. Testing for UID_430009 UMTS/LTE 800 MHz for Europe	UTRA, LTE 34.108, 34.121-1, 34.121-2, 36.508, 36.521-1, 36.521-2, 36.521-3

Ongoing Release 9 Features

Unique_ID	Name	Resource	Finish	Compl	Hyperlink	rapporteur	Notes	TSs_and_TRs
450003	CT1 aspects - Support of	C1	10/12/2010	95%	CP-	Qualcomm	CP#49 the SA1-reqs are	23.122, 24.008,

	Home NB and Home eNB enhancements				090741		moving. CT1 will align when the work in SA1 is clear. Roaming aspects for manual CSG selection, Support of temporary users and CSG membership changes, Support of user controlled and operator controlled lists	24.285, 24.301
38004	A-GNSS Testing Procedures	G3new	12/11/2010	60%	GP-092343	Thales	GP#46 completion 05/10=>11/10. GP#44 exception to 05/10 in GP-092344	51.010-1, new 51.010-7
420004	VAMOS Stage 3	GP,G1,G2	26/11/2010	95%	GP-081965	Nokia Siemens Networks, China Mobile	GP#47 completion 09/10=>11/10. GP#44 exception to 05/10 in GP-092470	24.008, 44.018, 45.002, 45.003, 45.004, 45.008, 48.008, 48.058
420005	VAMOS Radio Performance Requirements	GP,G1,G2	26/11/2010	80%	GP-081966	Nokia Siemens Networks, China Mobile	GP#47 completion 09/10=>11/10. GP#44 exception to 05/10 in GP-092470	45.005 (Test Scenarios for VAMOS Performance requirements)

Ongoing Release 9 Testing

Unique_ID	Name	Resource	Finish	Compl	Hyperlink	rapporteur	Notes	TSs_and_TRs
490020	Conformance Test Aspects – Home NB enhancements for FDD	R5	16/12/2011	0%	RP-100935	Huawei	UTRA. Testing for UID_430026 Support of Home NB and Home eNB enhancements RAN2 aspects (25.304, 25.331, 25.367)	34.108, 34.123-1, 34.123-2, 34.123-3
480029	Conformance Test Aspects - CT1 aspects for IMS Emergency Calls over GPRS and EPS	R5	18/03/2011	10%	RP-100567	Samsung	Testing for UID_440036 CT1 aspects - Stage 3 of Support for IMS Emergency Calls over GPRS and EPS	34.108, 34.123-1, 34.123-2, 34.123-3, 34.229-1, 34.229-2, 34.229-3, 36.508, 36.523-1, 36.523-2, 36.523-3
470017	Conformance Test Aspects – Support for IMS	R5	10/12/2010	50%	RP-100118	Ericsson	RP#49 completion 09/10=>12/10. Testing for	36.508, 36.523-1, 36.523-2,

	Emergency Calls over LTE						UID_420041 Support for IMS Emergency Calls over LTE	36.523-3
470018	Conformance Test Aspects – Positioning Support for LTE	R5	11/03/2011	40%	RP-100617	Alcatel-Lucent	RP#48 updated WID RP-100346=>RP-100617. Testing for UID_420006 Positioning Support for LTE	36.508, 36.509, 36.521-3, new 36.571-1/2/3/4/5
490019	Conformance Test Aspects – Combination of DC-HSDPA with MIMO	R5	17/06/2011	0%	RP-101001	Ericsson	UTRA. Testing for Rel-9 UID_430016 Combination of DC-HSDPA with MIMO	34.108, 34.121-1, 34.121-2, 34.123-1, 34.123-2, 34.123-3
490018	UE Conformance Test Aspects – Enhanced Dual-layer transmission for LTE TDD	R5	18/03/2011	0%	RP-100868	China Mobile	Testing for UID_430029 (Enhanced Dual-Layer transmission for LTE)	36.508, 36.521-1, 36.521-2
490005	VAMOS - MS conformance testing	G3new	02/03/2012	10%	GP-101604	Research In Motion	GP#47 WID approved.	51.010-1, 51.010-2