Overview of 3GPP Release 10 V0.1.6 (2012-09)

Contents

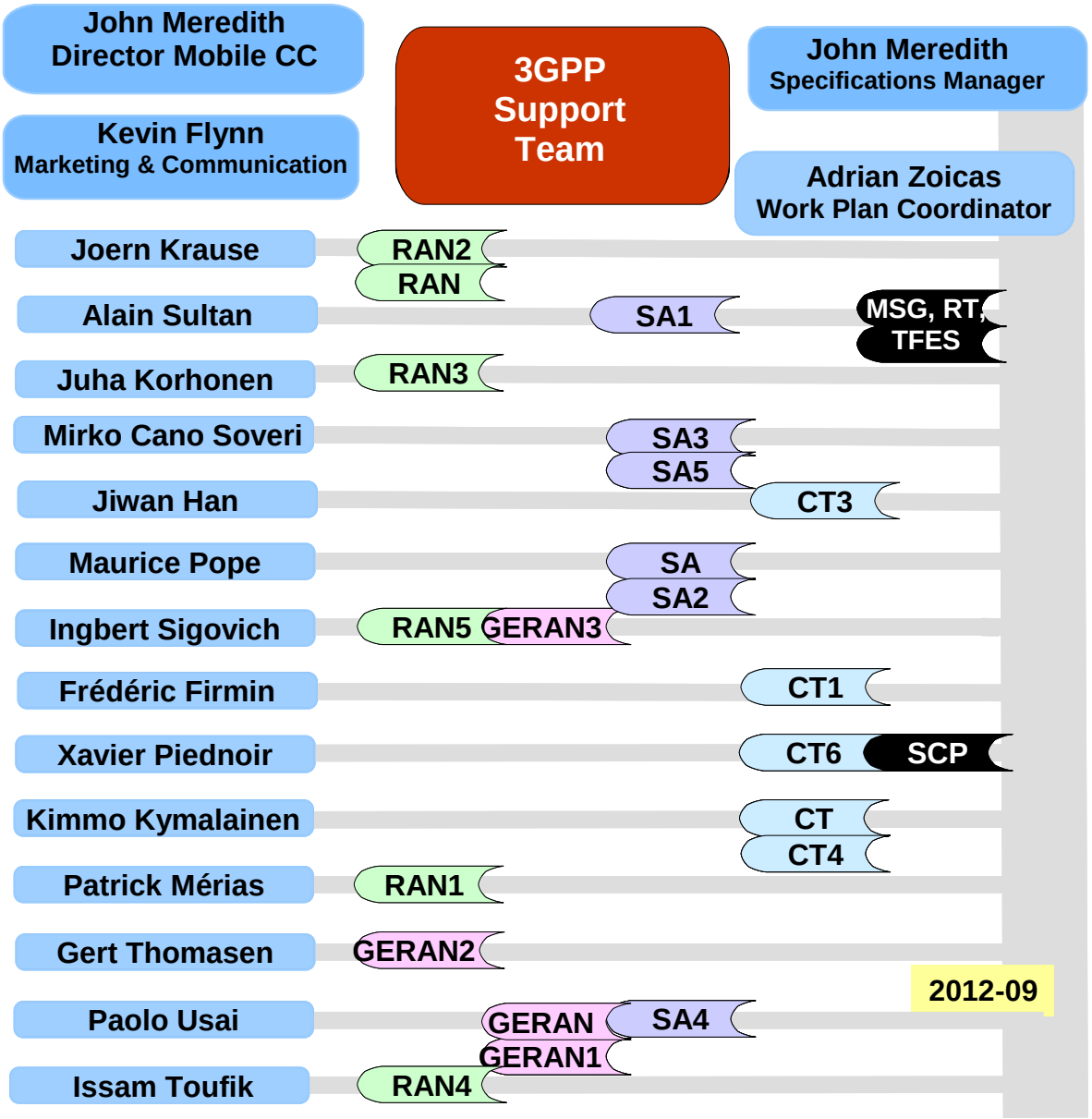
Foreword

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

3G Release 10 - See version 10 of TR 21.101

GSM/EDGE, Phase 2+ Release 10 - See Version 10 of TR 41.101

Freeze Dates

Release	TS/TR version)	Functional freeze date, indicative only (see note)
Rel-10	10.x.y	Stage 1 freeze March 2010
		Stage 2 freeze September 2010
		Stage 3 freeze March 2011 (protocols stable three months later)

Note: After "freezing", a Release can have no further additional functions added. However, detailed protocol specifications (stage 3) may not yet be complete. In addition, test specs may lag by some considerable time. A "frozen" Technical Specification is one which can have no further category B or C (new or modified functionality) Change Requests, other than to align earlier stages with later stages; thus all TSs pertaining to a Release may not necessarily be frozen at the time the Release itself is functionally frozen. Indeed since Release 7, the trend has been to freeze each of the three stages independently.

2 References

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

[2] 3GPP TS 21.101: "Technical Specifications and Technical Reports for a UTRAN-based 3GPP system". Version 10.x.y

[3] 3GPP TS 41.101: "Technical Specifications and Technical Reports for a GERAN-based 3GPP system". Version 10.x.y

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.

EMS	Energy Management System is a system of computer-aided tools used to monitor, control, and optimize the performance of the generation and/or transmission system.
EPC	
EPS	Evolved Packet System
E-UTRAN	
GAA	Generic Authentication Architecture
IMS	IP Multimedia Subsystem
LTE	
SAES	System Architecture Evolution Specification

4 SA1 / SA2 Features

UID	Name	Acronym	Resource	WI_rapporteur
390073	**Enhancements for Multimedia Priority Service**	eMPS	S1,S2,C4,C3,C1	Telcordia
410030	**Network Improvements for Machine-Type Communications**	NIMTC	S1,S2,S5,C1,C4,C6,G2,R2,R3,R5,G3new	KPN
430035	**Multi Access PDN Connectivity**	MAPCON	S2,C4,C1,C3	Telecom Italia
440052	**IMS Service Continuity – Inter Device Transfer enhancements**	IMS_SC_eIDT	S1,S2,C1,IETF	Huawei
450030	**IP-Short-Message-Gateway enhancements for CPM-SMS Interworking**	CPM-SMS	S1,S2,C3	China Mobile
450033	**Completion of Communications on Not Logged-in**	CCNL	S1,C1,C3	Deutsche Telekom
450035	**Local IP Access and Selected Internet IP Traffic Offload**	LIPA_SIPTO	S2,S1,S3,S5,C4,C1	Huawei, China Mobile
450041	**IP Flow Mobility and seamless WLAN offload**	IFOM	S2,S1,S5,C1,C3	Qualcomm
450044	**Enabling Coder Selection and Rate Adaptation for UTRAN and E-UTRAN for Load Adaptive Applications**	ECSRA_LAA	S2,S4,C4,C3,C1,IETF	Qualcomm
450053	**Extended H(e)NB features**	EHNBF	S1,S2,S3	NEC
460028	**Optimal Media Routing**	OMR	S2,S5,C3,C1,C4	Alcatel-Lucent
470026	**IMS Emergency Session Enhancements**	IESE	S1,S2,C1	Deutsche Telekom, T-Mobile
480037	**S2b Mobility based on GTP**	SMOG	S2,C4,C3,C1	Alcatel-Lucent
500006	**Policy Enhancements for Sponsored Connectivity and Coherent Access to Policy related Databases**	PEST	S2,C3	Qualcomm

4.1 Enhanced Multimedia Priority Service (eMPS) UID_390073

Resources: S1,S2,C4,C3,C1

UID	Name	Acronym	Resource	WI_rapporteur
390073	**Enhancements for Multimedia Priority Service**	eMPS	-	Telcordia
390074	**Stage 1**	ePRIOR	S1	Telcordia
460029	**Stage 2**	eMPS	S2	Telcordia, NTT DoCoMo
490008	**Stage 3**	eMPS-CN	C4,C3,C1	Ericsson

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
390073	**Enhancements for Multimedia Priority Service**	-	SP-080051	CP#51 completed. SP#49 moved Stage 1 from Rel-9 & Completed Stage 2. SP#40 Stage 1 completed. Continuation of Rel-8 Feature PRIOR (UID_340044)	-
390074	**Stage 1**	S1	SP-080051	ePRIOR started Mar 2006 as a Rel-8 Feature. It was delayed to Rel-9 (completed at SP#40), then moved to Rel-10 at SP#49 and demoted to Building Block level.	22.153, 22.278
460029	**Stage 2**	S2	SP-100647	SP#49 completed. Updated WID SP-100166=>SP-100647	-
460329	Stage 2 on eMPS for CSFB	S2	SP-100647	SP#49 completed	23.002, 23.203, 23.221, 23.228, 23.272, 23.401
460429	Stage 2 on eMPS for EPS Bearer Service	S2	SP-100647	SP#49 completed	23.002, 23.203, 23.221, 23.228, 23.272, 23.401
460529	Stage 2 on eMPS for IMS Aspects	S2	SP-100647	SP#49 completed	23.002, 23.203, 23.221, 23.228, 23.272, 23.401

Supporting Companies: Telcordia, NCS (National Communications System of the United States) , AT&T, NTT DoCoMo, KDDI, NEC, Toshiba, NTC, Panasonic, Hitachi, Sharp, Nokia Siemens Networks, Ericsson, ST-Ericsson, Huawei, Alcatel-Lucent, Motorola, Qualcomm, Samsung, ZTE

Supporting Companies: AT&T, NCS, Nortel Networks, T-Mobile, Telcordia.

This work is a continuation of the Rel-8 Feature Multimedia Priority Service work items (PRIOR) UID_340044.

Requirements for the Multimedia Priority Service (MPS) have been specified in TS 22.153. There is a need for an additional optional service invocation method for authentication/authorization purposes (e.g. using an input string).

Justification

MPS enables National Security/Emergency Preparedness (NS/EP) users (herein called Service Users) to make priority calls/sessions using the public networks during network congestion conditions. Service Users are the government-authorized personnel, emergency management officials and/or other authorized users. Effective disaster response and management rely on the Service User's ability to communicate during congestion conditions. Service Users are expected to receive priority treatment, in support of mission critical multimedia communications.

LTE/EPC Rel-9 supports IMS-based voice call origination by a Service User and voice call termination to a Service User with priority. However, mechanisms for completing a call with priority do not exist for call delivery to a regular user for a priority call originated by a Service User. MPS enhancements are needed to support priority treatment for Rel-10 and beyond for call termination and for the support of packet data and multimedia services.

MPS provides broadband IP-based multimedia services (IMS-based and non-IMS-based) over wireless networks in support of voice, video, and data services. Network support for MPS will require end-to-end priority treatment in call/session origination/termination including the Non Access Stratum (NAS) and Access Stratum (AS) signalling establishment procedures at originating/terminating network side as well as resource allocation in the core and radio networks for bearers. MPS also requires end-to-end priority treatment in case of roaming if supported by the visiting network and if the roaming user is authorized to receive priority service.

MPS requirement is already achieved in the 3G Circuit-Switched network. Therefore, if the network supports CS Fallback, it is necessary to provide at least the same capability as 3G CS-network in order not to degrade the level of

voice service. In CS Fallback, UE initiates the fallback procedures over the LTE as specified in TS 23.272 when UE decides to use the CS voice service for mobile originating and mobile terminating calls. To achieve priority handling of CS Fallback, NAS and AS signalling establishment procedures, common for both IP-based multimedia services and CS Fallback, shall be treated in a prioritized way.

Objective: Specify mechanisms for the priority handling of IMS based multimedia services (voice, video etc), PS data and CS-voice (for CS-Fallback) with regard to LTE/EPC:

- Mechanisms to allocate resources for signalling and media with priority based on subscribed priority or based on priority indicated by service signalling.
- For a terminating IMS session over LTE, a mechanism for the network to detect priority of the session and treat it with priority.

For CS Fallback, the following mechanism will be specified:

- A mechanism to properly handle the priority terminating voice call and enable the target UE to establish the AS and NAS connection to fall-back to the GERAN/UTRAN/1xRTT.

Service Aspects: Service Users need voice, video and data services support with priority treatment with 'near normal' performance during times of network congestion when non-Service Users may be experiencing degraded service.

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
490008	**Stage 3**	C4,C3,C1	CP-100878	CP#51 completed	Stage 3
490108	CT4 part	C4	CP-100878	CP#51 completed	23.008, 29.002, 29.228, 29.229, 29.272, 29.274, 29.277, 29.328, 29.329
490208	CT3 part	C3	CP-100878	CP#51 completed	29.212, 29.213, 29.214
490308	CT1 part	C1	CP-100878	CP#51 completed	24.008, 24.229, 24.301

Objective: Specify Stage3 eMPS according to Stage 2:

- update S6a interface for supporting eMPS (for CSFB, IMS, EPS bearer)
- update S11 interface for supporting eMPS (for IMS)
- update Sh interface for supporting eMPS (for IMS)
- update SIP/SDP protocol for supporting eMPS (for IMS)
- update Cx interface for supporting eMPS (for IMS)
- update the organization of subscriber data (for CSFB, IMS, EPS bearer)
- update Rx interface for supporting eMPS (for IMS)
- SPR data and PCRF interaction (for IMS)
- S102 impacts

4.2 Network Improvements for Machine-type Communications (NIMTC) UID_410030 (test ongoing)

Resources: S1,S2,S5,C1,C4,C6,G2,R2,R3,R5,G3new

UID	Name	Resource	Hyperlink	WI_rapporteur
410030	**Network Improvements for Machine-Type Communications**	-	SP-100863	KPN
410031	**Stage 1**	S1	SP-100863	KPN
490037	**Stage 2**	S2	SP-100863	Samsung
510040	**Charging**	S5	SP-110136	Ericsson
480005	**CN part of Stage 3**	C1,C4,C6	CP-110442	Ericsson
490003	**GERAN part (Stage 3)**	G2	GP-101647	Vodafone, Ericsson
570003	**MS Conformance Test Aspects for GERAN - Network Improvements for MTC**	G3new	GP-121141	ST-Ericsson
490024	**RAN mechanisms to avoid CN overload due to MTC**	R2,R3	RP-101026	Huawei
570004	**UE Conformance Test Aspects - Network Improvements for MTC**	R5	RP-121124	Ericsson

Supporting Companies: Alcatel-Lucent, China Mobile, Huawei, Motorola, NEC, Panasonic, Samsung, SoftBank Mobile, Telecom Italia, ZTE.

Triggered by TR 22.868 (Enhancements to 3GPP systems to support machine to machine communication) produced by the Rel-8 Study UID_7027 on Facilitating Machine to Machine Communication in GSM and UMTS (M2M).

UID	Name	Resource	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
410031	**Stage 1**	S1	SP-100863	KPN	SA#47 completed	22.011, new 22.368
490037	**Stage 2**	S2	SP-100863	Samsung	SP#49 completed	23.060, 23.236, 23.401
510040	**Charging**	S5	SP-110136	Ericsson	SP#51 completed	32.251, 32.298, 32.299

Stage 2 is considered complete via CRs introducing overload and congestion control:

- High level functional description
- MTC low priority indicator and general MTC indicator configured on device during manufacturing or via OMA DM/OTA
- Overload and Congestion control on different levels (CN and RAN):
    i. Overload and congestion control in MME & SGSN
    ii. Overload and congestion control in PDN-GW & GGSN

NOTE: MTC features and subscription aspects are postponed post-Rel10 and handled together with SIMTC

Justification

Excerpt from TR 22.868 on Machine-to-Machine (M2M) communications:

"It appears that there is market potential for M2M beyond the current "premium M2M market segment" i.e. the market segments that are currently using M2M. In particular it is possible to identify potential applications for mass M2M service, e.g. consumer products manufacturers could keep in touch with their products after they are shipped – car manufacturers could serve as an example for that. Another example is in the home environment where remote maintenance of heating and air condition, alarm systems and other applications can also be identified."

The study on MTM communications indicated the potential for machine-type communications over mobile networks. However, for example wireless sensor networks (e.g. Zigbee) in combination with fixed network communications are also a contender for the implementation of such applications. For mobile networks to be competitive for mass machine-type applications, it is important to optimise their support for machine-type communications. The current mobile networks are optimally designed for Human-to-Human communications, but are less optimal for MTM, machine-to-human, or human-to-machine applications. It is also important to enable network operators to offer MTC services at a low cost level, to match the expectations of mass-market machine-type services and applications.

At the end of Q1 2007, with the approval of TR 22.868 at SA#35, a study item into MTM communications was completed. At the time, a list of possible requirements was agreed upon, but no subsequent specification phase was started. For stage 1, this work item is intended to take the results on network improvements from the study item forward into a specification phase. Stage 2 architecture aspects will be studied based on the stage 1 normative specification..

Objective: to:

- provide network operators with lower operational costs when offering MTC services
- reduce the impact and effort of handling large MTC groups
- optimize network operations to minimize impact on device battery power usage
- stimulate new MTC applications by enabling operators to offer services tailored to MTC requirements

The M2M study item resulted in a list of possible requirements. The stage 1 objectives of this work item include:

- identify and specify general requirements for machine-type communications
- identify service aspects where network improvements (compared to the current H2H oriented services) are needed to cater for the specific nature of machine-type communications
- specify MTC requirements for these service aspects where network improvements are needed for MTC

M2M communications has many aspects, not all of which can be handled in a single WID. This WID therefore has the following focus:

- only MTC via mobile networks is considered, MTC solutions via wireless sensor networks and/or fixed communication networks are not included,
- the work item will specify a machine-type data communication service, it will not specify particular M2M applications
- only improvements on the radio and network side are considered, MTC aspects of (x)SIMs and/or new models for the management of (x)SIM are out of scope of this WID.

Based on requirements documented in the stage 1 specification, stage 2 will address system architecture impacts to support MTC scenarios and applications.

Reuse of existing 3GPP functions (e.g. session initiation and control) for machine-type data communication service should be investigated and leveraged if feasible.

Service Aspects:
MTC is seen as a form of data communication which involves one or more entities that do not necessarily need human interaction. A service optimised for machine-type communications is likely to differ from a service optimised for human-to-human communications.
There are many different applications which may make use of machine-type data communication. However, specification of these applications themselves is outside the scope of this WID.

Charging Aspects: Address CDR generation improvements. For some machine-type applications, there is a significant overhead of CDR generation wth regard to the actual payload of user data.

4.2.1 CN part of Stage 3 for NIMTC UID_480005

Resources: C1,C4,C6

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
480005	**CN part of Stage 3**	C1,C4,C6	CP-110442	CP#52 completed	Stage 3
480105	CT1 part	C1	CP-110442	CP#52 completed	23.122, 24.008, 24.301, new 24.368
480305	CT4 part	C4	CP-110442	CP#52 completed	23.003, 23.008, 29.002, 29.060, 29.230, 29.272, 29.274, 29.275, 29.282
510005	CT6 part	C6	not applicable	CP#52 completed	31.102

Stage 2 NIMTC impact on NAS, MAP and S6a/d and possibly GTP-C and Gx/Gxx/S9 protocols.

4.2.2 GERAN part of NIMTC (Stage 3) UID_490003 (test ongoing)

Resources: G2,G3new

UID	Name	Acronym	Resource	Finish	Comp	Hyperlink	Notes	TSs_TRs
490003	**GERAN part of Network Improvements for Machine-Type Communications (Stage 3)**	NIMTC	G2	02/09/2011	100%	GP-101647	GP#51 completed. GP#47 approved WID	44.018, 44.060
570003	**MS Conformance Test Aspects for GERAN - Network Improvements for Machine-Type Communications**	NIMTC_GERAN-MSTest	G3new	01/03/2013	0%	GP-121141	GP#55 approved WID. Testing for CT1 part of Stage 3 for NIMTC UID_480105, GERAN part of NIMTC (Stage 3) UID_490003	51.010-1, 51.010-2

Justification: Overloading of the network control channels by MTC devices is expected to be a major issue and to avoid problems in existing (and upgraded) networks a solution within the Release 10 timescale is seen as very desirable by the operator community.

It is expected that overloading can occur if, for example, an MTC server is malfunctioning, an external event triggers massive numbers of MTC devices to attach/connect all at once or a certain MTC application requires MTC devices to generate signalling/data transfer in a synchronised manner.

While it is understood that SA2 are working on studying generic solutions relating to potential overload problems (TR 23.888) it is felt that it would be of benefit for GERAN to work on a solution as soon as possible, especially as the current expectation is that GERAN based networks will be the ones most likely to be used to support MTC devices in the near to mid term. In particular a basic signalling congestion and overload control mechanism within the Release 10 timeframe is seen as necessary although enhancements in future releases.

Objective: to analyse and specify solutions relating to the support of MTC devices within GERAN networks to cater for signalling congestion and overload control. The following impacts have been identified:

1. Provide the network the ability to discriminate between MTC devices and non-MTC devices to help reduce loading on the radio interface..
2. Specify access control so that up to 100% of MTC devices can be prevented from attempting system access at any given point in time.
3. Review any MTC related GERAN impacted measures proposed by other 3GPP TSGs related to signalling congestion and overload control.

4.2.3 RAN mechanisms to avoid CN overload due to Machine-Type Communications UID_490024 (test ongoing)

Resources: R2,R3

UID	Name	Acronym	Resource	Finish	Comp	Hyperlink	Status_Report	Notes	TSs_TRs
490024	**RAN mechanisms to avoid CN overload due to Machine-Type Communications**	NIMTC-RAN_overload	R2,R3	18/03/2011	100%	RP-101026	RP-110063	RP#51 completed	UTRA, LTE 25.331, 25.413, 36.331, 36.413
570004	**UE Conformance Test Aspects - Network Improvements for Machine-Type Communications**	NIMTC-UEConTest	R5	01/03/2013	0%	RP-121124	-	Testing for CT1 part of Stage 3 UID_480105, RAN mechanisms to avoid CN overload due to MTC UID_490024	34.123-1, 34.123-2, 34.123-3, 36.523-1, 36.523-2, 36.523-3

Justification: Signalling congestion and overloading of Core Network nodes by MTC devices have been identified as key issues for which network improvements are essential in Rel-10 as concluded in TR 23.888. Requirements related to those network improvements are captured in TS 23.401, 23.060 and 23.236. Corresponding RAN support needs to be specified.
SA2 has identified that the total signalling from large numbers of MTC devices is a concern in at least two scenarios:

1. when an application requests many MTC devices to do "something" at the same time; and/or
2. when many MTC devices are roamers and their serving network fails, then they can all move onto the local competing networks, and potentially overload the not (yet) failed network(s).

Objective: Specify solutions to protect the network from signalling congestion and overload for above scenarios. Mechanisms specific to RAN performance are not part of this WI. The following impacts have been identified:

For RAN2
1. For both UMTS and LTE, introduce an additional establishment cause to allow RAN node to differentiate low priority MTC traffic/signalling (and possibly other MTC traffic/signalling) from other traffic/signalling.
2. RAN2 should review the SA2 overload scenarios (simultaneous access from many MTC devices and failure of the serving network for roaming UEs), consider what RAN solution can address these, and:
   – Identify and specify mechanisms to prevent MTC UEs from overloading the network

For RAN3
1. For both UMTS and LTE, modify the existing overload indication mechanism to allow RAN node to perform congestion/access control for MTC traffic/signalling.

4.3 Multi Access PDN Connectivity (MAPCON) UID_430035

Resources: S2,C4,C1,C3

UID	Name	Resource	WI_rapporteur
430035	**Multi Access PDN Connectivity**	S2,C4,C1,C3	Telecom Italia
430135	**Stage 2**	S2	Telecom Italia
500004	**CT aspects**	C4,C1,C3	ZTE

Supporting Companies: Telecom Italia, Orange, Samsung, LG Electronics, Telcordia, Toshiba, Interdigital, Cisco.

Triggered by TR 23.861 UID_410043 FS_MAPIM. Stage 1 in Rel-9 22.278 (6.2 - IP session control)

UID	Name	Resource	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
430135	**Stage 2**	S2	SP-090659	Telecom Italia	SP#49 completed	23.237, 23.401, 23.402

According to TS 22.278 if the UE is under the coverage of a 3GPP access and one or more non-3GPP accesses, it shall be possible for the UE to communicate using multiple access systems simultaneously. Nonetheless, this requirement is not fulfilled by the applicable stage 2 specifications.

Specifically, there are only partial means in Rel-9 Evolved Packet Core (EPC) to support connectivity to multiple PDNs over different accesses. In fact, a UE can connect to one PDN over a 3GPP access and a second PDN over a non-3GPP access, but handovers between the accesses in such scenario are not described in Rel-9.

Objective: extend Rel-9 EPC to allow a UE equipped with multiple network interfaces to establish multiple PDN connections to different APNs via different access systems. This enables:

- Establishment of PDN connections to different APNs over multiple accesses. A UE opens a new PDN connection on an access that was previously unused or on one of the accesses it is already simultaneously connected to.
- Selective transfer of PDN connections between accesses. Upon inter-system handover a UE transfers only a subset of the active PDN connections from the source to the target access, with the restriction that multiple PDN connections to the same APN shall be kept in one access.
- Transfer of all PDN connections out of a certain access system. A UE that is simultaneously connected to multiple access systems moves all the active PDN connections from the source to target access, e.g. in case the UE goes out of the coverage of the source access.

This work also provides mechanisms enabling operator's control on routing of active PDN connections across available accesses.

The scope of the work is restricted to scenarios where the UE is simultaneously connected to one 3GPP access and one, and only one, non-3GPP access. The non-3GPP access can be either trusted or untrusted.

The design of the required extensions to Rel-9 EPC is based on TR 23.861 Annex A that provides an overview of the changes that are expected in TS 23.401 and TS 23.402 for the UE to simultaneously connect to different PDNs via different access systems.

No impacts on Rel-9 PCC. Minimized impact on Rel-9 architecture. Ensured coexistence with IMS Service Continuity.

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
500004	**CT aspects**	C4,C1,C3	CP-100709	CP#51 completed	-
500104	CT4 aspects	C4	CP-100709	CP#50 completed	29.273, 29.272, 29.002, 23.008
500204	CT1 aspects	C1	CP-100709	CP#51 completed	24.302, 24.312
500304	CT3 aspects	C3	CP-100709	CP#51 completed	29.215

Justification

According to TS 22.278, if the UE is under the coverage of a 3GPP access and one or more non-3GPP accesses, it shall be possible for the UE to communicate using multiple access systems simultaneously. The requirement has been specified in Stage 2 which has principles as below:

- Multiple PDN connections to different APNs may use different access networks. The UE selects the access network where to route a specific PDN connection based on user preferences and operator’s policies.

- A UE that is capable of routing different simultaneously active PDN connections through different access networks can do so if the UE is authorized by subscription to access each of the involved PDNs and each of the involved access networks.
- The access networks the UE can stay simultaneously connected with shall include no more than one 3GPP access and one and only one non-3GPP access.
- The UE can transfer a subset or all the active PDN connections between accesses, with the restriction that multiple PDN connections to the same APN shall be kept in one access.

The corresponding impacts to the stage 3 Technical Specifications need to be specified.

Objective: Specify the stage 3 impacts to support Multi Access PDN Connectivity as follows:

- Updates to management of PDN connections for supporting Multi Access PDN Connectivity:
  a) specification of MAPCON principles;
  b) provisioning of Inter-System Routing Policies for MAPCON via the S14 interface.
- updates to the SWx, SWm, STa, S6a/S6d and Gr interfaces for supporting Multi Access PDN Connectivity:
  a) update by the HSS of the PDN GW Identity / APN pair(s) in the 3GPP AAA Server;
  b) update by the 3GPP AAA Server of the PDN GW data in the trusted non-3GPP IP access or ePDG;
  c) to remove the sending by the MME/S4-SGSN to the HSS of the Notify Request/Response and the MAP Update Location message for removal of the PGW id and APN pair when the UE detaches from EPC or deactivates the last PDN Connection via the 3GPP access.
- update of PCC interfaces for supporting Multi Access PDN Connectivity

  a) enhancement to the S9 interface to report information on the access network currently used by the PDN connection from the V-PCRF to H-PCRF.

4.4 IMS Service Continuity – Inter Device Transfer enhancements UID_440052 (open IETF)

Resources: S1,S2,C1,IETF

UID	Name	Acronym	Resource	WI_rapporteur
440052	IMS Service Continuity – Inter Device Transfer enhancements	IMS_SC_eIDT	-	Huawei
440152	**Stage 1 - IMS Service Continuity – Inter Device Transfer enhancements**	IMS_SC_eIDT	S1	Huawei
450029	**Stage 2 - IMS Inter-UE Transfer enhancements**	IMS_SC_eIDT	S2	Huawei
470001	**Stage 3 - IMS Inter-UE Transfer enhancements**	IMS_SC_eIDT	C1	Huawei
521001	**(IETF) Stage 3 - IMS Inter-UE Transfer enhancements**	IMS_SC_eIDT	C1-IETF	Christer Holmberg

Supporting Companies: Huawei, China Mobile , NEC, Telecom Italia, AT&T, ETRI, Samsung, NTT DoCoMo.

Rel-9 set Inter-Device Transfer requirements under UID_410033. Add additional scenarios and requirements for IDT.

UID	Name	Resource	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
440152	**Stage 1**	S1	SP-090452	Huawei	SA#47 completed	22.228

Justification

TS 22.228 Rel-9 specified the service requirements for setting up sessions and transferring media components of a session between different devices under the control of the same user (Inter-Device Transfer). It is intended to extend this capability to allow more than one user to control a session in which media components are delivered via one or more UEs belonging to the same or different (multiple) subscriptions under the same operator.

Moreover, SA2 specified the associated stage 2 in TS 23.237 Rel-9, which is based on the work done in TR 23.838 Rel-9. Not all features considered were standardized in Rel-9 due to time constraints, and SA2 is planning to enhance this work by introducing features (e.g. Inter-UE Transfer of session control) that were left out in Rel-9. Therefore, SA1 need to specify the service requirements to guide/support the SA2 work.

In addition, in order to ensure a consistent service experience in some use cases (e.g. IPTV), the Inter-UE Transfer could be complemented with the capability to replicate an ongoing multimedia session from one UE on another UE.

4 Objective

The objectives are to identify the service requirements to enable one or more IMS users to control a session in which media components are provided by one or more UEs belonging to the same or different (multiple) IMS subscriptions under the same operator, with the following aspects:

- Setting up and control of a session.
- Adding/deleting media to a session across different UE.
- Transferring media and/or control within a session across different UE.
- MMTel services support.
- Discovery of ongoing multimedia session on different UE
- Replication of an ongoing multimedia session to a different UE.

5 Service Aspects

See the objective section above. Also, user shall receive consistent service experience after transferring, manipulating sessions between devices. QoS related issues will also need to be considered.

6 MMI-Aspects

User shall receive consistent service experience after transferring, manipulating sessions between devices.

7 Charging Aspects

Additional charging requirements will be considered.

8 Security Aspects

Security impacts and privacy issues related to various scenarios will be considered (e.g. security consideration for shared multimedia experience across multiple users)

UID	Name	Resource	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
450029	**Stage 2**	S2	SP-100167	Huawei	SP#49 completed	23.237, 23.292, new 23.831

Supporting Companies: Huawei, Telecom Italia, NTT DoCoMo, Orange, NEC, Samsung, Qualcomm, Starent Networks, LG Electronics, Nokia Siemens Networks, ZTE

Justification

In TR 23.838 Rel-9, "IMS Service Continuity enhancements: Service, Policy and Interactions", solutions for mobility of media flows of a session between different UEs under the control of the same user (Inter-UE Transfer) have been identified; most of the results of the feasibility study have been specified in TS 23.237 Rel-9, "IMS Service Continuity". However, some features (e.g., Inter-UE Transfer: Transfer of Control of a Collaborative Session), studied during the feasibility study, were not specified in Rel-9 because of time constraints and so they need to be completed.

SA4 and TISPAN WG2 are willing to re-use the Inter-UE Transfer principle, as defined in SA2, for their work on IMS based PSS, MBMS User Services extensions and IPTV, respectively. SA1 has agreed to address these requirements as part of its work on the Rel-10 Work Item "IMS Service Continuity – Inter Device Transfer enhancements" (Stage 1).

4 Objective

The main objective is to provide enhancements to mobility of media flows of a session between different UEs (Inter-UE Transfer) with regards to the following aspects:

- Extension of Inter-UE Transfer and Collaborative Session capabilities specified in Rel-09 to multiple UEs belonging to different subscriptions under the same operator.
- Establishment of a Collaborative Session at session setup.
- Support for control of media components of a Collaborative Session by more than one UE simultaneously.
- Transfer of control of a Collaborative Session.
- Controller initiated media modification on a Controllee UE (e.g., video resolution).
- Discovery of ongoing IMS multimedia sessions on different UEs.
- Inter-UE Transfer initiated by the target UE when
    a. the target UE belongs to the Collaborative Session but it is not a Controller UE;
    b. the target UE does not belong to the Collaborative Session and wants to join;
    c. Inter-UE Transfer is performed without establishing a Collaborative Session.
- Replication of an ongoing multimedia session from one UE on another UE.
- Inter-UE Transfer between UEs connected to the IMS via an IP-CAN and ICS entities that provide interworking with UEs in the CS Domain.
- Execution of MMTEL services for Collaborative Sessions.

Aspects specified as a result of this work shall be backwards compatible with the IMS Service Continuity features specified in Rel-9.

5 Service Aspects

Consistent user experience will be ensured between heterogeneous access systems (e.g. different radio accesses) and between different UEs. Additionally, the architecture shall enable the operator to have control of media transfer or replication between UEs belonging to different subscriptions, e.g. to avoid that a media is transferred to a user that does not have the rights to receive it.

6 MMI-Aspects

The architecture should enable the user to receive a consistent service experience regardless of changing the access network (e.g. CS domain or IP-CAN) after service continuity or transferring sessions between different UEs.

7 Charging Aspects

The additional billing/charging impacts should be investigated. Specifically, the ability to generate the appropriate accounting parameters as media flows or IMS sessions are transferred or replicated between UEs and between IMS subscriptions, is necessary.

8 Security Aspects

Consideration shall be given to security aspects related to the delivery of IMS Service Continuity between different UEs belonging to the same or to different subscriptions under the same operator.

UID	Name	Resource	Hyperlink	WI_rapporteur	Notes	TSs
470001	**Stage 3**	C1	CP-110285	Huawei	CP#51 completed. WID updated CP-100334=>CP-110285	24.216, 24.229, 24.237, new (24.837, 24.337)
521001	**(IETF) Stage 3**	C1-IETF	CP-110285	Christer Holmberg	Passed WGLC	draft-ietf-sipcore-proxy-feature

Justification

IMS Service Continuity enhancements intend to produce enhancements to IMS specification to support the multimedia session continuity experience. The requirement, architecture and stage 2 information flows has been studied in TR 23.831 and are specified in TS 23.237. Stage 3 procedures are needed to support the implementation of IMS Service Continuity under 3GPP IMS architecture based on the work in TS 23.237.

4 Objective

The main objective is to enhance the related stage 3 specifications by providing enhancements to mobility of media flows of a session between different UEs (Inter-UE Transfer) with regards to the following aspects:

- Extension of Inter-UE Transfer and Collaborative Session capabilities specified in Rel-09 to multiple UEs belonging to different subscriptions under the same operator.
- Establishment of a Collaborative Session at session setup.
- Preferential routing of incoming session requests to Controller capable UEs.
- Support for control of media components of a Collaborative Session by more than one UE simultaneously.
- Transfer of control of a Collaborative Session.
- Controller initiated media modification on a Controllee UE (e.g., video resolution).
- Discovery of ongoing IMS multimedia sessions on different UEs.
- Inter-UE Transfer initiated by the target UE when
    - the target UE belongs to the Collaborative Session but it is not a Controller UE;
    - the target UE does not belong to the Collaborative Session and wants to join;
    - Inter-UE Transfer is performed without establishing a Collaborative Session.
- Replication of one or more media flows of an ongoing multimedia session on multiple UEs that are part of the collaborative session.
- Release of Collaborative Session
- Inter-UE Transfer between UEs connected to the IMS via an IP-CAN and ICS entities that provide interworking with UEs in the CS Domain.
- Execution of MMTEL services for Collaborative Sessions.

Aspects specified as a result of this work shall be backwards compatible with the IMS Service Continuity features specified in Rel-9.

4.5 IP-Short-Message-Gateway enhancements for CPM-SMS Interworking UID_450030

Resources: S1,S2,C3

UID	Name	Resource	WI_rapporteur
450030	**IP-Short-Message-Gateway enhancements for CPM-SMS Interworking**	S1,S2,C3	China Mobile
450031	**Stage 1 for CPM-SMS**	S1	China Mobile
450032	**Stage 2 for CPM-SMS**	S2	Orange
460017	**Stage 3 for IP-Short-Message-Gateway enhancements for CPM-SMS Interworking**	C3	Ericsson

Supporting Companies: Ericsson, China Mobile, ATT, Orange, Alcatel-Lucent, Acision, Comverse, LG Electronics, Samsung, ZTE, KDDI, T-Mobile, ST-Ericsson, Telecom Italia, China Unicom, Nokia Siemens Networks, Fujitsu, Huawei.

External requirements (Stage 1 in OMA-RD-CPM-V1_0-20090310-C).

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
450031	**Stage 1**	S1	SP-090615	SA#47 completed. External requirements (Stage 1 in OMA-RD-CPM-V1_0-20090310-C)	22.340
450032	**Stage 2**	S2	SP-090615	SP#47 completed	23.204, new TR 23.824

Justification

OMA has requested 3GPP to add improvements to the IP-SM-GW functionality for the support of interworking between CPM users and SMS Users.

CPM service offers among other services, both a pager mode messaging user experience similar to instant messaging, as well as a session-based mode messaging user experience. CPM has requirements to support interworking between a CPM user and an SMS user using both pager mode messaging and session-based messaging.

The IP-SM-GW currently supports the pager mode messaging interworking between instant messaging users and SMS users, but not the session-based mode.

Improvements to the IP-SM-GW are needed to support the session-based messaging interworking between CPM users and SMS users.

4 Objective

The stage-1 objective is to identify the service requirements to enable the session-based messaging interworking between SMS users and session based messaging users, with the following aspects:

- Establishment and release of a messaging session with an SMS user (the establishment may be subject to the consent of the SMS user),
- Delivery of session based message to an SMS user,
- Invite a SMS user to a session based group conversation with appropriate instructions on how to join, exit and message exchange.
- Give the service provider the opportunity to control the representation of messaging sessions (both for peer-to-peer and group sessions) towards the SMS user, with a number of options:
    1. Let the network accept the messaging session on behalf of the SMS user without seeking consent with the SMS user and subsequently relay the messages sent within the context of the messaging session.
    2. Let the network deny the creation of (certain types) of messaging sessions on behalf of the SMS user, without seeking consent with the SMS user.
    3. Let the network ask consent with the SMS user before accepting the messaging session, and let the SMS user determine whether the messaging session needs to be accepted.
- Notification of delivery status.

The stage-2 objective is to build upon the current principles and architecture of the IP-SM-GW, to enable the session-based messaging interworking between SMS users and session based messaging users, with the above-mentioned aspects. To enable this interworking, no impact to the current SMS protocols is expected.

5 Service Aspects

See the objective section above. Additionally, the interworking shall be transparent for the CPM user (i.e. the CPM user shall not be aware of the fact that the other party is an SMS user).

6 MMI-Aspects

Both CPM users and SMS users shall receive consistent service experience.

7 Charging Aspects

Additional charging requirements will be considered.

8 Security Aspects

Security impacts and privacy issues related to various scenarios will be considered.

UID	Name	Acronym	Resource	Hyperlink	Notes	TSs_and_TRs
460017	**Stage 3**	CPM-SMS	C3	CP-090859	CP#49 completed. Linked to Rel-8 UID_340031 Service-Level Interworking for Messaging Services (MESSIW) 23.204	29.311

The objective of this work item is to enhance TS 29.311 to support session-based messaging interworking between CPM users and SMS users for CPM-SMS based upon the current principles and architecture of the IP-SM-GW as specified in TS 23.204 with the following aspects:

- Establishment and release of a messaging session with an SMS user (the establishment may be subject to the consent of the SMS user),
- Delivery of messages with interworking between a CPM user and an SMS user using both pager mode messaging and session-based messaging.
- Invite a SMS user to a session based group conversation with appropriate instructions on how to join, exit and message exchange.
- Give the service provider the opportunity to control the representation of messaging sessions (both for peer-to-peer and group sessions) towards the SMS user, with a number of options:
    4. Let the network accept the messaging session on behalf of the SMS user without seeking consent of the SMS user and subsequently relay the messages sent within the context of the messaging session.
    5. Let the network deny the creation of (certain types) of messaging sessions on behalf of the SMS user, without seeking consent of the SMS user.
    6. Let the network ask consent with the SMS user before accepting the messaging session, and let the SMS user determine whether the messaging session needs to be accepted.
- Notification of delivery status.

To enable this interworking, no impact to the current SMS protocols is expected and UEs from pre Release 10 have to be supported.

4.6 Completion of Communications on Not Logged-in (CCNL) UID_450033

Resources: S1,C1,C3

UID	Name	Resource	WI_rapporteur
450033	**Completion of Communications on Not Logged-in**	S1,C1,C3	Deutsche Telekom
450034	**Stage 1**	S1	Deutsche Telekom
470002	**CT1 part of Stage 3**	C1	Deutsche Telekom
480006	**CT3 part of Stage 3**	C3	Deutsche Telekom

Supporting Companies: Deutsche Telekom, T-Mobile, Orange – France Telecom, China Mobile, Telecom Italia.

UID	Name	Resource	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
450034	**Stage 1**	S1	SP-090493	Deutsche Telekom	SP#45 completed	22.173 CR#0056r1

Justification

Call Completion services are widely used features in fixed line telephony and can partly also be found in mobile networks. With the migration to the Common IMS the existing ISDN services have been re-implemented using multimedia telephony to be able to provide a consistent user experience to the users.

Currently there are two types of Call Completion services: Call Completion to Busy Subscriber (CCBS) and Call Completion on No Reply (CCNR). As fixed line terminals used to be always online no further Call Completion services have been defined so far. However, with the migration to common-IMS the possibility for nomadicity came along and thus the importance of a feature to support Call Completion to users who are offline (i.e. not logged in) increases.

Mobile network users will also greatly benefit by the introduction of Call Completion on Not Logged-in.

Objective : to define the Call Completion on Not Logged-in (CCNL) feature for multimedia telephony, enabling an originating party to request an automatic call setup when a terminating party who is currently not logged becomes available (i.e. registers in the IMS) again.

Interactions with other features of the multimedia telephony will be specified.

Service Aspects

Service requirements for CCNL and interaction with other features of multimedia telephony

Charging Aspects

Charging requirements for CCNL will be defined.

UID	Name	Resource	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
470002	**CT1 part of Stage 3**	C1	CP-100335	Deutsche Telekom	CP#51 completed	24.173, 24.642
480006	**CT3 part of Stage 3**	C3	CP-100335	Deutsche Telekom	CP#49 completed	29.165

4.7 Local IP Access and Selected Internet IP Traffic Offload for H(e)NB SubSystem (LIPA_SIPTO) UID_450035

Resources: S2,S1,S3,S5,C4,C1

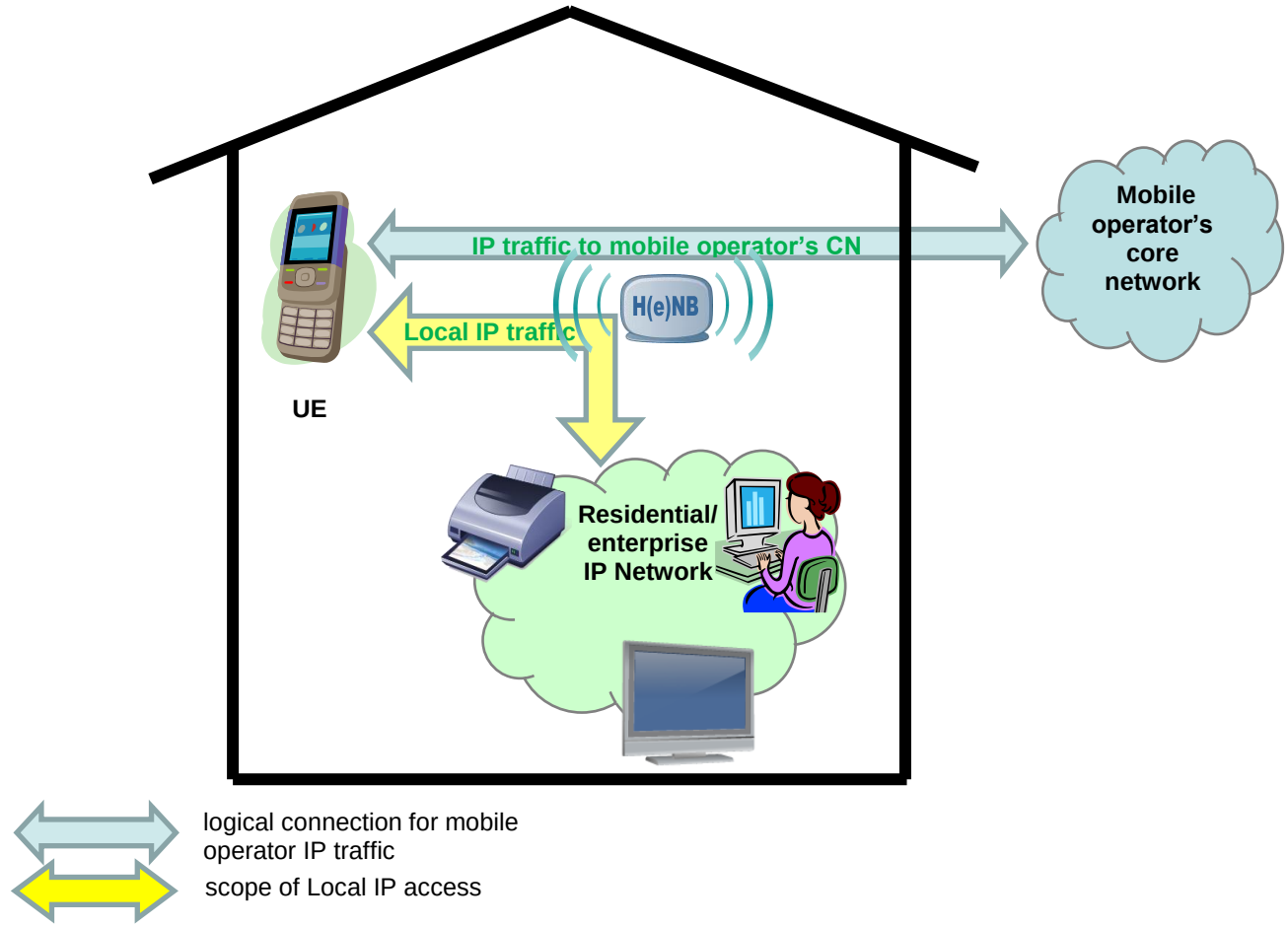
UID	Name	Acronym	Resource	WI_rapporteur
450035	**Local IP Access and Selected Internet IP Traffic Offload**	LIPA_SIPTO	-	Huawei, China Mobile
450037	**Stage 1**	LIPA_SIPTO	S1	Huawei, China Mobile
450036	**TR on LIPA_SIPTO**	LIPA_SIPTO	S2	Huawei, China Mobile
450039	**Security**	LIPA_SIPTO	S3	Huawei, Qualcomm
450040	**OAM&P**	LIPA_SIPTO	S5	Huawei, China Mobile
460039	**Charging**	LIPA_SIPTO	S5	Huawei, China Mobile
450138	**Stage 2 for Local IP Access**	LIPA	S2	Huawei, China Mobile
480008	**Stage 3 for Local IP Access**	LIPA	C4,C1	China Mobile
450038	**Stage 2 for SIPTO for macro networks**	SIPTO	S2	Huawei, China Mobile
480007	**Stage 3 for SIPTO for macro networks**	SIPTO	C4,C1	Huawei

Supporting Companies: Vodafone, Verizon Wireless, China Mobile, AT&T, Huawei, Qualcomm Europe, Alcatel-Lucent, NEC, Starent Networks, Samsung, Cisco, Airvana, LG Electronics, Panasonic, Toshiba, ZTE, BT, TeliaSonera, Juniper Networks, Motorola, SoftBank Mobile, Thomson, ip.access.

UID_400035 Enhanced Home NodeB/eNodeB (EHNB) has formerly covered Local IP Access to Internet and Local access to Home Network from the Home NodeB/eNodeB – features now covered by this WI. TS 22.220 (Service requirements for HNB and HeNB) defines Local IP Access (LIPA) and Selected IP Traffic Offload (SIPTO) as follows:

LIPA provides access for IP capable UEs connected via an H(e)NB (i.e. using H(e)NB radio access) to other IP capable entities in the same residential/enterprise IP network. Traffic for Local IP Access is expected to not traverse the mobile operator's network except H(e)NB. The residential/enterprise IP network itself and the entities within that network are not within the scope of 3GPP standardization.

Selected IP Traffic Offload (SIPTO) for H(e)NB SubSystem
It shall be possible that a H(e)NB SubSystem supports Selected IP Traffic Offload to provide access for a UE connected via a H(e)NB (i.e. using H(e)NB radio access) to a defined IP network (e.g. the Internet).



UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
450037	**Stage 1**	S1	SP-110131	SP#47 completed	22.101, 22.220
450036	**TR on LIPA_SIPTO**	S2	SP-110131	SP#51 completed. TR 23.829 for Approval	new TR 23.829
450039	**Security**	S3	SP-110131	SP#49 completed	33.102, 33.107, 33.108, 33.320, 33.401
450040	**OAM&P**	S5	SP-110131	SP#51 completed. Updated WID SP-100696=>SP-110131	32.581, 32.582, 32.584, 32.591, 32.592, 32.642, 32.646, 32.772, 32.782
460039	**Charging**	S5	SP-110131	SP#51 completed. Updated WID SP-100696=>SP-110131	32.251

Justification

In Rel-8 and Rel-9, 3GPP has specified functionalities for the support of Home Node B (HNB) and Home eNodeB (HeNB). This work item aims to build on these foundations and adds further functionalities that will enable the mobile operators to provide services in a more effective manner, as well as improving the user experience.

3GPP had requirements on Local IP Access to the home and Internet in TS 22.220 but those features were not completed as part of Release 9. However the interest for such features remains strong within the 3GPP operator community.

Additionally, due to the fact that 3GPP radio access technologies enable data transfer at higher data rates, the 3GPP operator community shows strong interest to offload selected IP traffic not only for the Home (e)NodeB Subsystem but also for the macro layer network, i.e. offload selected IP traffic from the cellular infrastructure and save transmission costs.

From a functional and architectural perspective, the issues to be addressed for selected IP traffic offload are similar for Home (e)NodeB Subsystem and for macro layer network and therefore are expected to lead to commonalities with regard to architecture decisions. To exploit the potential synergies between the solutions, it is seen appropriate to handle those use cases together within one single WID.

4 Objective

This work item aims to specify the following functionalities:

- Local IP access – LIPA – to residential/corporate local network for Home (e)NodeB Subsystem
- Selected IP traffic offload – SIPTO– above the RAN (e.g. Internet traffic) for Home (e)NodeB Subsystem
- Selected IP traffic offload above the RAN (internet traffic, corporate traffic, etc.) for the macro network

SA1 will need to consider the service requirements for the above cases.

The service requirements for Local IP access to residential/corporate local network for Home (e)NodeB Subsystem are defined in TS 22.220.

The service requirements for Selected IP traffic offload (internet traffic, corporate traffic, etc.) above the RAN for the macro network and the Home (e)NodeB Subsystem are defined in TS 22.101. Security, Charging and mobility aspects need to be considered.

SA2 will develop the architecture for Local IP Access and Selected IP Traffic Offload above the RAN based on the service requirements described above.

SA5 will need to provide requirements and solutions for supporting the above LIPA functionalities from OAM aspect based on the architecture defined by SA2.

5 Service Aspects

Service requirements for Local IP access to residential/corporate local network are documented in TS 22.220. Service requirements for Selected IP traffic offload above the RAN for the macro layer Network and the Home (e)NodeB Subsystem are documented in TS 22.101.

7 Charging Aspects

Charging specifications will be affected if IP traffic for the functionalities listed in the Objective section is to be accounted for, or charged for.

8 Security Aspects

Lawful Interception architecture is to be considered for the functionalities listed in the Objective section of the WID.

Security aspects are also to be considered for the functionalities listed in the Objective section of the WID.

4.7.1 Local IP Access (LIPA)

Resources: S2,C4,C1

UID	Name	Acronym	Resource	WI_rapporteur
450138	**Stage 2 for Local IP Access**	LIPA	S2	Huawei, China Mobile
480008	**Stage 3 for Local IP Access**	LIPA	C4,C1	China Mobile

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
450138	**Stage 2**	S2	SP-110131	SP#49 completed (has impacts to RAN)	23.060, 23.401

Stage-2 for LIPA (Local IP Access) is considered complete (SP-100527); co-located L-GW scenario (23.060, 23.401):

- Introduction of LIPA in UMTS and EPS
- Paging Handling for LIPA
- Gateway selection for LIPA
- LIPA Support for Service Discovery
- LIPA deactivation
- LIPA permissions and CSG information for LIPA-able APNs in the HSS
- Addition of correlation identifier for optimised routing in LIPA

NOTE: Standalone L-GW and mobility work has been postponed for a later 3GPP Release.

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
480008	**Stage 3**	C4,C1	CP-100292	CP#51 completed	-
480108	CT4 part of Stage 3	C4	CP-100292	CP#51 completed	23.008, 23.015, 29.002, 29.060, 29.272, 29.274, 29.281, 29.303
480208	CT1 part of Stage 3	C1	CP-100292	CP#51 completed	24.008, 24.301

3 Justification

Local IP Access provides access for IP capable UEs connected via a H(e)NB to other IP capable entities in the same residential/enterprise IP network.

The stage 3 specifications are needed to realize the stage 2 requirement studied in SA2 in the TS 23.060 and TS 23.401.

This building block will cover the stage3 LIPA part of the stage2 feature LIPA_SIPTO (SP-090761).

4 Objective

This work item aims to specify the following:

- User's subscription data modification for HSS/HLR to take into account dedicated APNs support for LIPA;
- Mechanisms for establishing LIPA PDN connectivity;
- The paging procedures for LIPA;

Expected impacts are on the NAS protocol, S6a/S6d, GTP-C protocols. The stage 3 specification work will start once normative stage 2 is available. The list of affected protocols will be updated as normative stage 2 is available.

4.7.2 Selected Internet IP Traffic Offload (SIPTO) for macro networks

Resources: S2,C4,C1

UID	Name	Acronym	Resource	WI_rapporteur
450038	**Stage 2 for SIPTO for macro networks**	SIPTO	S2	Huawei, China Mobile
480007	**Stage 3 for SIPTO for macro networks**	SIPTO	C4,C1	Huawei

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
450038	**Stage 2**	S2	SP-110131	SP#49 completed (SIPTO GW selection for wild card APN and for GERAN. Serving-GW selection for SIPTO. Corrections and Clarifications of the SIPTO procedure)	23.060, 23.401

Stage-2 for SIPTO (Selected IP Traffic Offload) for macro networks is considered complete (SP-100527):

- SIPTO GW selection for wild card APN
- SIPTO GW selection for GERAN
- Serving-GW selection for SIPTO
- Corrections and Clarifications of the SIPTO procedure

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
480007	**Stage 3**	C4,C1	CP-110091	CP#51 completed. Updated WID CP-100419=>CP-110091	-
480107	CT4 part of Stage 3	C4	CP-110091	CP#51 completed. Updated WID CP-100419=>CP-110091	23.003, 23.008, 29.002, 29.272, 29.303
480207	CT1 part of Stage 3	C1	CP-110091	CP#50 completed	24.008, 24.301

Justification

Selected IP traffic offload is required to enable the mobile operators to provide services in a more effective manner, as well as improving the user experience.

SIPTO is applicable to traffic offload for the macro-cellular access network and for the H(e)NB subsystem. Offload of selected types of IP traffic (e.g. internet traffic) towards a defined IP network close to the UE's point of attachment to the access network.

The stage 3 specifications are needed to realize the stage 2 requirement in the TS 23.060 and TS 23.401.

This building block will cover the stage3 SIPTO part of the stage2 feature LIPA_SIPTO (SP-090761).

4 Objective

The work item objectives are the following:

- User's subscription data modification for HSS/HLR to take into account which subscribed APNs can be offloaded, to specify the offload policy handling mechanism based on the subscription data received by the offload entity (to decide whether to offload the traffic or not).
- Specifying enhancements of GW Selection mechanism to take into account the user's location related information;
- Trigger of Re-establishment of PDN connections for SIPTO and other potential changes related to NAS;
- Other requirements from TS 23.060, TS 23.401 and other relevant specifications for the Selected IP traffic offload.

4.8 IP Flow Mobility and seamless WLAN offload (IFOM) UID_450041

Resources: S2,S1,S5,C1,C3

UID	Name	Acronym	Resource	Hyperlink	WI_rapporteur
450041	**IP Flow Mobility and seamless WLAN offload**	IFOM	-	SP-100089	Qualcomm
450042	**Stage 1**	IFOM	S1	SP-100089	Qualcomm
450043	**Stage 2**	IFOM	S2	SP-100089	Qualcomm
470021	**Charging**	IFOM	S5	SP-100089	Alcatel-Lucent
480009	**Stage 3**	IFOM-CT	C1,C3	CP-100715	Qualcomm

UID	Name	Resource	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
450042	**Stage 1**	S1	SP-100089	Qualcomm	SP#46 completed	22.278
450043	**Stage 2**	S2	SP-100089	Qualcomm	SP#49 completed	23.203, 23.402, new 23.261
470021	**Charging**	S5	SP-100089	Alcatel-Lucent	SP#51 completed	32.240, 32.251, 32.252, 32.298, 32.299

Supporting Companies: Qualcomm, Panasonic, Sharp, AT&T, Telecom Italia, Orange, Teliasonera, LGE, China Mobile, Deutsche Telekom, Interdigital, Telenor, BT, Alcatel-Lucent, Verizon, Cisco, Telcordia, Toshiba.

Triggered by TR 23.861 (UID_410043 Study on Multi Access PDN connectivity and IP flow mobility - MAPIM).

The increased data demand, caused by the increased use of 3rd party applications and Internet browsing is creating interest for new operator tools to lower the cost on providing data access. The increased availability of WLAN radio in many terminals and the increasing availability of WLAN access networks in many geographical locations provide means to achieve this goal.

When the subscriber happens to be under WLAN coverage, it is beneficial for the operator to offload some traffic (e.g. best effort) to the WLAN access. At the same time it may be beneficial to still keep some traffic (e.g. VoIP flow) in the cellular access. With this IP flow mobility solution the operator can lower it data access costs while the subscriber just experiences maximised bandwidth without any service disruption or interruption.

It is therefore of interest to 3GPP community to specify a solution for operators for a seamless WLAN offload via IP flow mobility. Based on this solution, operators can use WLAN as a seamless extension of their cellular access and thus increase the overall system capacity while minimising the access cost.

The MAPIM Study Item documented in TR 23.861 provides a technical solution for seamless WLAN offload which is mature enough to specify this capability as part of 3GPP normative specification.

Additionally it is possible to provide a limited non-seamless WLAN offload as done in current deployments via a transient IP connection via WLAN (referred also as Direct IP Access in I-WLAN). This implies that the UE uses the WLAN IP address and no IP address preservation is provided between WLAN and 3GPP accesses. While most details of this scenario are outside the scope of 3GPP as they are confined into the non-3GPP access, it is useful to define operator's policies in 3GPP to guide the behaviour of the UE.

Objective: to specify seamless WLAN offload via the following functionalities:

- IP flow mobility based on the solution described in section 7.1.1 in TR 23.861
    - Simultaneous connectivity to the same PDN via different accesses for S2c and H1 reference points.
    - Routing of different IP flows of the same PDN connection via different accesses for S2c and H1 reference points.
    - Movement of IP flow(s) of the same PDN connection at any time from one access to another via S2c and H1 reference points.
- Extensions to the ANDSF framework for
    - Provisioning of inter-system operator's policies for seamless WLAN offload with IP flow mobility based on the solution described in TR 23.861
    - Provisioning of operator's policies for usage of WLAN access to connect to the Internet without traversing operator's core network

Service Aspects: Service requirements for IP Flow Mobility are partially documented in TS 22.278 and additional aspects are captured in TR 23.861. TS 22.278 needs to be updated to capture the aspects currently only documented in TR 23.861.

Charging Aspects: Simultaneous accesses connectivity within the same PDN connection and mobility at IP flow level need to be considered for the charging solution.

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
480009	**Stage 3**	C1,C3	CP-100715	CP#51 completed	Stage 3
480109	CT1 part of Stage 3	C1	CP-100715	CP#51 completed	24.008, 24.301, 24.302, 24.303, 24.312, 24.327
480209	CT3 part of Stage 3	C3	CP-100715	CP#51 completed	29.212, 29.213, 29.214, 29.215

Justification

The increased data demand is creating interest for new operator tools to lower the cost on providing data access. The increased availability of WLAN radio in many terminals and the increasing availability of WLAN access networks in many geographical locations provide means to achieve this goal. When possible, it is beneficial for the operator to offload some traffic (e.g. best effort) to the WLAN access. At the same time it may be beneficial to still keep some traffic (e.g. VoIP flow) in the cellular access so that the subscriber can experience maximised bandwidth without any service disruption or interruption.

Stage 2 IFOM Work Item specifies a mechanism for a UE to simultaneously connect to a 3GPP access and WLAN and transmit/receive traffic belonging to different IP flows through different accesses. The mechanism enables both seamless and non-seamless IP flow mobility between a 3GPP access and WLAN. Seamless offload indicates the capability to seamlessly move one or more selected IP flows from a 3GPP network to WLAN (and vice-versa) while providing IP session continuity. Seamless offload is based on DS-MIPv6. Non-seamless offload indicates the possibility to exchange the traffic of one or more selected IP flows using WLAN IP address (referred also as Direct IP Access in I-WLAN) without providing any IP session continuity.

TS 23.261 defines the extensions to DS-MIPv6 required to exchange and seamlessly move different IP flows belonging to the same PDN connection between a 3GPP access and WLAN. In addition, TS 23.261 describes the required interaction with PCC and ANDSF.

TS 23.203 describes the extensions to PCC required to perform IP flow mobility. This requires the PCC architecture to be enhanced to handle multiple simultaneous access connections for a single IP CAN session.

TS 23.402 provides the extensions to ANDSF enabling the operator to indicate how the IP flows are routed through the available access systems and to perform seamless offload. Moreover, TS 23.402 describes the solution to perform non-seamless offload.

Objective : to enhance the stage 3 specifications based on the stage 2 requirements mentioned in the above section. This requires:

- Definition of the required procedures in UE to initiate and manage IP flows simultaneously connected to a 3GPP access and WLAN access;
- Definition of extensions to S2c and H1 interfaces enabling the UE to indicate to the HA how IP flows should be distributed between a 3GPP access and WLAN access.
- Definition of the extensions to Gx, Rx and S9 interfaces to enable PCRF to cope with the management of multiple simultaneous connections for a single IP CAN session.
- Definition of extensions to ANDSF Management Object (ANDSF MO) required to allow the operator to influence (through downloaded policies) how and what and which IP flows are routed between 3GPP access and WLAN access. This includes the possibility to indicate which IP flows and PDN connections (e.g. per APN) are required to be seamlessly offloaded and under what conditions and situations driven by the downloaded policies, and which are required to be non-seamlessly offloaded.
- Definition of required UE actions and procedures based on policies provided by ANDSF, both in the case of non-roaming and in the case of roaming. The UE may receive policies and indications from multiple ANDSFs: a method to resolve possible conflicts and order or precedence of policies is expected to be defined.
- Definition of UE or HA behaviour in case of abnormal or exceptional conditions are encountered when performing IP flow mobility, if abnormal or exceptional conditions are identified.

Security Aspects: No new interface is defined: the WI introduces only extensions to already secured interfaces, i.e. S2c, H1, S14, Gx, Rx, and S9. Hence, the WI has no impact on security aspects.

4.9 Enabling Coder Selection and Rate Adaptation for UTRAN and E-UTRAN for Load Adaptive Applications (ECSRA_LAA) UID_450044

Resources: S2,S4,C4,C3,C1,IETF

UID	Name	Resource	WI_rapporteur
450044	**Enabling Coder Selection and Rate Adaptation for UTRAN and E-UTRAN for Load Adaptive Applications**	-	Qualcomm
450045	**TR on ECSRA_LAA**	S2,S4	Qualcomm
450145	**SA4 review of TR**	S4	Qualcomm
450046	**Stage 2**	S2	Qualcomm
490038	**SA4 aspects**	S4	Qualcomm
490007	**CN aspects**	C4,C3,C1	Ericsson
490107	CT4 part of CN aspects	C4	Ericsson
531006	(IETF) CT4 part of CN aspects	C3-IETF, C4-IETF	Mark Jones
490207	CT3 part of CN aspects	C3	Ericsson
490307	CT1 part of CN aspects	C1	Ericsson

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
450045	**TR on ECSRA_LAA**	S2,S4	SP-100467	SP#48 completed	new 23.860
450145	**SA4 review of TR**	S4	SP-100467	SP#50 completed	new 23.860
450046	**Stage 2**	S2	SP-100467	SP#49 completed	23.060, 23.203, 23.228, 23.401
490038	**SA4 aspects**	S4	SP-100467	SP#51 completed	26.114

Supporting Companies: Qualcomm, AT&T, China Unicom, Huawei, Deutsche Telekom, Starent Networks, Alcatel-Lucent, Ericsson, ST-Ericsson, Nokia Siemens Networks, Nokia.

Triggered by Rel-9 UID_440013 Vocoder rate adaptation for LTE

Justification

It is beneficial for operators (from OpEx/CapEx viewpoint) to control the data rate for media types used in a service. At service initiation an appropriate codec must be selected first. Factors contributing to the codec selection process include network loading conditions such as: codecs supported by the end points and their preference order, and operator policies (e.g., codecs allowed for a service, possible service requirement for mid-call rate adaptation, data rate ranges allowed by the service for specific media types, etc.).
This work provides mechanisms for selecting a codec and if needed, the codec rate for load adaptive applications based on network loading conditions and operator policies in HSPA and LTE networks.

Multi-rate codecs are capable of operating within a rate-operating region between the Maximum Bit Rate (MBR) and Guaranteed Bit Rate (GBR). Support for MBR>GBR in LTE networks is provided in coordination with SA2 and SA4 to ensure that the system level design is consistent with this rate adaptation feature.

This work studies and specifies - in cooperation with SA4 and RAN2 - enhancements to pre Rel-10 codec selection and codec rate adaptation based on network loading conditions and operator policies over UTRA and E-UTRA.
Potential enhancements are definition of the signalling and interfaces which enable:

- performing codec selection based on network loading conditions and operator policies at call setup over both UTRA and E-UTRA
- performing codec data rate adaptation (if possible for the selected codec and needed by the service) based on network loading conditions at call setup over UTRA
- performing codec data rate adaptation (if possible for the selected codec and needed by the service) for non-voice RTP-based services based on network loading conditions at call setup over E-UTRA
- performing codec data rate adaptation (if possible for the selected codec and needed by the service) based on network loading indications during an on-going call over both UTRA and E-UTRA
- supporting codec rate adaptation by IMS Core Network entities (e.g. MGCF/MGW, IBCF/TrGW etc.)
- setting of MBR to be greater than the GBR over E-UTRA

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
490007	**CN aspects**	C4,C3,C1	CP-100702	CP#52 completed	Stage 2/3
490107	CT4 part	C4	CP-100702	CP#52 completed	23.334, 29.334, 29.238, 23.333, 29.333, 29.232, 29.332
531006	(IETF) CT4	C3-IETF, C4-IETF	CP-100702	CP#57 completed	RFC 6679 (was draft-ietf-avtcore-ecn-for-rtp)
490207	CT3 part	C3	CP-100702	CP#52 completed	29.162, 29.163, 29.213, 29.235, 29.292
490307	CT1 part	C1	CP-100702	CP#52 completed	24.229

Justification

The feasibility study in SA2 for Enabling Codec Selection and Rate Adaptation for UTRAN and E-UTRAN for Load Adaptive Applications (TR 23.860) has been concluded and has outlined possible new procedures for CN nodes to support Explicit Congestion Notification (ECN) for voice and video as currently defined for MTSI voice applications in 3G TS 26.114. In order to fully support the ECN for RTP traffic and interwork with CS rate control the IMS MGWs and MGW Controllers need to be updated.

It was agreed to allow MBR > GBR (refer to S2-102912 and S2-102915), this has the impacts to current PCC procedure.

Objective

The objective of this work is to investigate and specify the stage 3 protocol aspects to support ECN as defined in TS 26.114 within IMS and also interworking scenarios between IMS and CS. The stage 3 impacts are based primarily on section TR 23.860 clause 6.4. Proposed enhancements are:

- Support of Explicit Congestion Notification (ECN) by IMS Core Network entities (e.g., MGCF/MGW, IBCF/TrGW etc) including updates to H.248 profiles to support ECN and its associated parameters. (IMS ALG/IMS-AGW excluded)
- IMS ALG/AGW support for forwarding ECN bits
- Support of RTP/AVPF and SDPCapNeg (where not already supported) by IMS CN nodes
- Interworking of adaptation requests from MTSI client and CS network (including ICS and SRVCC) by IMS MGW and CS MGWs
- Interworking with non-ECN IP networks
- Interworking with non 3GPP ECN network or terminal
- Supporting the impacts to PCC

4.10 Extended H(e)NB features (EHNBF) UID_450053

Resources: S1,S2,S3

UID	Name	Acronym	Resource	WI_rapporteur
450053	**Extended H(e)NB features**	EHNBF	S1,S2,S3	NEC
450153	**Stage 1 of Extended H(e)NB features**	EHNBF	S1	NEC
420034	**IMS aspects of Architecture for Home NodeB**	EHNB-IMS	S2	Alcatel-Lucent
480034	**Extended H(e)NB Security features (Stage 2)**	EHNBF-Sec	S3	Huawei

Supporting Companies: KPN, Airbiquity, China Mobile, Inter Digital, Nortel, SK Telecom, Telecom Italia, ZTE, Verizon Wireless, Alcatel-Lucent, Samsung, AT&T, Motorola, Cisco, Qualcomm, Panasonic, Orange, Sierra Wireless, Vodafone, Ericsson, ST-Ericsson, Nokia Siemens Networks, Huawei, NTT DoCoMo, LG Electronics, Starent Networks, CATT, CATR, Juniper Networks, TeliaSonera, Fujitsu, NEC, Toshiba.

This work covers items beyond Rel-9 UID_400035 Enhanced Home NodeB / eNodeB (EHNB)

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
450153	**Stage 1 of Extended H(e)NB features**	S1	SP-100407	SP#47 completed	22.220

Justification

In Rel-8 and Rel-9, 3GPP has specified functionalities for the support of HNB and HeNB. This work item aims to build on these foundations and adds further functionalities that will enable the mobile operators to provide services in a more effective manner, as well as improving the user experience.
In addition, due to heavy workload in other SA and CT groups, several existing requirements in TS 22.220 could not be realized in stage 2/3 specifications within the time frame of Rel-9. These requirements are re-introduced in the present work item to allow finalization of work within Rel-10. This includes "Managed Remote Access to home based network".
Note, that requirements for "Selected IP Traffic Offload (SIPTO) for H(e)NB SubSystem" and "Local IP access" that also could not be realized in stage 2/3 specifications in Rel-9 are now captured in a separate Rel-10 work item: "Local IP Access & Internet Offload (LIPA)".

While in previous releases emphasis has mainly been placed on usage of H(e)NBs within domestic scenarios the current work item targets on enterprise scenarios and provides improvements for domestic use. Enterprise H(e)NB Subsystems require enhancements to satisfy to the extended demands of H(e)NB usage within enterprises and for business purposes.

Objective: to specify service requirements for the following functionalities:

- Support of enterprise scenarios that allow communication within the enterprise's local network, devices and services to be maintained when UEs move across multiple H(e)NBs of the enterprise
- Operator-control for mobility-related release of data sessions when UE leaves H(e)NB coverage

Re-introduction of service requirements that could not be realized within the time frame of Rel-9:

- Managed Remote Access to home based network
- IMS Interworking
- VPLMN-autonomous CSG roaming

Service Aspects: Within an enterprise the specific capabilities of H(e)NBs – high data throughput, local IP access, etc. in conjunction with the high security of the 3GPP network – allow an operator to offer attractive services to enterprise customers. The current work item aims at enhancing the capabilities provided in previous releases.

Charging Aspects: will be addressed.

Security Aspects of H(e)NBs in general and for usage within an enterprise need to be considered.

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
420034	**IMS aspects of Architecture for Home NodeB**	S2	SP-080799	SP#47 completed. Chosen solution has no normative impacts	new 23.832

Justification

In Rel-8, the 3GPP RAN group has specified an architecture for 3G Home NodeB (HNB) access within the framework of the UTRAN architecture defined in TS 25.401, with the support of pre-Rel-8 UEs and Core Networks in mind. An Iu based interface (Iuh) was specified between the 3G HNB and HNB-GW. The voice services are still offered via the

existing CS core network, i.e., MSC. With the successful deployment of 3G HNB, the number of HNBs can increase to millions and the minutes of usage per user can also increase significantly due to better coverage in house and fixed-line replacement. To handle the increased voice traffic, the operator can either continue to invest in the legacy CS equipment or to carry the traffic from HNB to the IMS core. The WID intends to provide operator the capability to carry the voice traffic load from HNB in IMS core, and thus offload the existing CS core network.

SA#40 has agreed a new WID on Enhanced Home NodeB / Home eNodeB with the goal to consolidate the service requirements in a new stage 1 specification for Rel-9. In support of these service requirements, and to address other HNB issues such as security and mobility, a SA2-sponsored Work Item entitled "Architecture Aspects of Home NodeB/eNodeB" has been agreed at SA#41.

This Work Item complements the "Architecture Aspects of Home NodeB/eNodeB" SA2 Work Item to include the particular architectural impacts that result from the introduction of IMS capable 3G HNB Subsystem.

Objective:

- specify an architecture to enable IMS capable HNB Subsystem to use the IMS rather than CS Core network for CS services that has a corresponding equivalent IMS services (voice service in IMS Multimedia Telephony, SMSIP)
- provide idle mode mobility and service continuity between IMS capable HNB Subsystem and 2G/3G macro cellular for all supported UE types
- provide support of pre-Rel-9 UE in IMS capable HNB Subsystem

Service Aspects: Users should receive services from IMS when attached to the Home NodeB.

MMI-Aspects: The architecture should enable the user to receive a consistent service experience regardless of the access network (e.g., macro cellular or Home NodeB).

Charging Aspects: The additional charging impacts should be investigated, specifically the ability to generate the appropriate accounting information as the subscriber moves between macro cellular and home NodeB.

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
480034	**Extended H(e)NB Security features (Stage 2)**	S3	SP-100257	SP#49 completed	33.320

Justification

In Rel-8 and Rel-9, 3GPP has specified functionalities for the support of Home Node B (HNB) and Home eNodeB (HeNB). The current Rel-10 work aims to build on these foundations and adds further functionalities that will enable the mobile operators to provide services in a more effective manner, as well as improving the user experience.

In addition, due to heavy workload in SA3 within the Rel-9 timeframe, several areas of security features for example mobility scenarios were not sufficiently considered and/or developed that are already completed in Rel-9 from RAN specification point of view.

Objective: to specify security requirements for the following functionalities:

- Support of mobility scenarios (e.g. inbound mobility 3G Macro to HNB HO, 3G HNB to 3G HNB HO, LTE Macro to HeNB HO, LTE HeNB to LTE HeNB HO, including session continuity) according to RAN3 Rel-10 WID 470105 (inter-RAT is not supported in the current work)
- Support of remediation and/or recovery in case of failure in collaboration with the work being done in SA5
- Support of enterprise H(e)NB in accordance with the features as described in SA1 WID on EHNBF and TS 22.220
- Support for future work on emergency call handling

4.11 Optimal Media Routeing (OMR) UID_460028

Resources: S2,S5,C3,C1

UID	Name	Resource	WI_rapporteur
460028	**Optimal Media Routing**	-	Alcatel-Lucent
460128	**Stage 2**	S2	Alcatel-Lucent
480010	**Stage 3**	C3,C1	Alcatel-Lucent
500013	**Charging**	S5	Alcatel-Lucent

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
460128	**Stage 2**	S2	SP-090803	SP#47 completed	23.228
500013	**Charging**	S5	SP-100772	SP#52 completed. Stage 3: Linked to CT3 TS 29.079 OMR within the IMS; Stage 3 (UID_480110)	32.260, 32.298, 32.299

Supporting Companies: Alcatel-Lucent, Nokia Siemens Networks, ZTE, Orange.

Triggered by TR 23.894 (UID_370050 Study on System enhancements for the use of IMS services in local breakout).

Justification

International communications and terminal roaming introduce a number of scenarios where sessions may traverse multiple IMS networks. The use of Border Control Functions makes both the signalling and bearer path traverse through the same networks and this could result in a non-optimal media path with a higher than optimal number of transition gateways inserted.

To ensure Quality of Service (QoS), minimal delay, and, in certain cases, minimal transport costs, there is a need to enable the routing of media traffic via an optimal path between those networks without including unnecessary parts of the path that the signalling flow needs to take.

The OMR algorithm also has the potential to reduce the number of calls where transcoding is applied and to reach a more optimal allocation of transcoding points.

Specification work should go ahead concluded Rel-10 TR 23.894 (UID_370050 Study on System enhancements for the use of IMS services in local breakout).

This work enables the routing of media traffic via an optimal path for scenarios where sessions traverse multiple IMS networks that use Border Control Functions. The solution is as recommended in the TR 23.894 conclusion.

- Optimal media routing procedures shall be transparent to the user.
- Changes in the media functions allocated for the purposes of optimal media routing should be made available through charging records.
- Additional security impacts that might be identified shall be addressed.

4.12 IMS Emergency Session Enhancements (IESE) UID_470026

Resources: S1,S2,C1

UID	Name	Resource	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
470026	**IMS Emergency Session Enhancements**	S1,S2,C1	SP-100170	Deutsche Telekom, T-Mobile	-	-
470027	**Stage 1**	S1	SP-100170	Deutsche Telekom, T-Mobile	SP#47 completed	22.101 CR#0343
470028	**Stage 2**	S2	SP-100170	Deutsche Telekom, T-Mobile	SP#49 completed	23.167
500005	**Stage 3**	C1	CP-100880	Deutsche Telekom	CP#52 completed	24.229

Supporting Companies: Deutsche Telekom, Orange, Belgacom, Alcatel-Lucent.

Justification

Source of external requirements: ETSI TISPAN TS 181.019 (Business Communication Requirements).

Additional IMS Emergency Session scenarios have been identified that need to be supported including:

1. ability to support an IMS emergency session that is initiated by a service when requested by the user (i.e. by an Application Server on behalf of the user);
2. ability to support IMS emergency sessions which were initiated using a private numbering plan (e.g. from hosted enterprises);
3. support of all authentication methods allowed for IMS to be used for Fixed Broadband Access in case of emergency sessions

Stage 1 has specified requirements for service initiated emergency calls, emergency calls from hosted enterprises, emergency calls being set up using a private numbering plan and emergency calls that must be authenticated by means of fixed broadband access authentication methods.

Stage 2 has specified an additional handling of emergency calls, based on the current architecture, to support the above-mentioned requirements.

4.13 S2b Mobility based on GTP (SMOG) UID_480037

Resources: S2,C4,C3,C1

UID	Name	Resource	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
480037	**S2b Mobility based on GTP**	S2,C4,C3,C1	SP-100357	Alcatel-Lucent	-	-
480137	**Stage 2**	S2	SP-100357	Alcatel-Lucent	SP#49 completed	23.002, 23.203, 23.402
490009	**Stage 3**	C4,C3,C1	CP-100644	Alcatel-Lucent	CP#51 Stage 3 completed	-
490109	CT4 part of Stage 3	C4	CP-100644	Alcatel-Lucent	CP#51 completed	23.003, 23.007, 23.008, 29.273, 29.274, 29.281, 29.303
490209	CT3 part of Stage 3	C3	CP-100644	Alcatel-Lucent	CP#51 completed	29.212, 29.213, 29.215
490309	CT1 part of Stage 3	C1	CP-100644	Alcatel-Lucent	CP#50 completed	24.302

Supporting Companies: Verizon Wireless, Alcatel-Lucent, Cisco, LG Electronics, Samsung, Orange , Juniper Networks, ZTE, Ericsson, Huawei.

Related to Rel-10 UID_470049 Study on S2b mobility based on GTP (TR 23.834), UID_350027 SAE for support for non-3GPP accesses (SAES-SA-FP_n3GPP)
Stage 1 in Rel-8 UID_320022 Requirements for evolution of the 3GPP system architecture (AIPN-SAE)

Justification

The increased data demand, caused by the increased use of 3rd party applications and Internet browsing is creating interest for new operator tools to lower the cost on providing data access. The increased availability of WLAN radio in many terminals and the increasing availability of WLAN access networks in many geographical locations provide means to achieve this goal.

It is beneficial to provide mobility support (i.e. preservation of IP address) while UE's move between 3GPP EPS RATs and WLAN.

WLAN RAT frequently happens to be associated to "untrusted" kind of non-3GPP access. Network-based mobility between E-UTRAN and untrusted non-3GPP accesses is provided by the S2b interface defined in 3G TS 23.402. This interface is based on PMIPv6.

With real EPS deployments approaching the time to be going live, it is now recognized it will be beneficial to also allow a GTP option for S2b network based mobility as this would simplify the architecture and operations of EPS networks supporting 3GPP and non-3GPP accesses by using a single mobility protocol.

Objective : to add an S2b based on GTP option according to the conclusions of the feasibility study. In particular this WI will develop the necessary stage 2 message flows necessary to support S2b based on GTP and mobility between S5/S8 based on GTP and S2b based on GTP.

Service Aspects: No service aspects beyond those already provided by PMIPv6-based S2b are foreseen to be impacted

4.14 Policy Enhancements for Sponsored Connectivity and Coherent Access to Policy related Data Bases (PEST) UID_500006

Resources: S2,C3

UID	Name	Resource	WI_rapporteur
500006	**Policy Enhancements for Sponsored Connectivity and Coherent Access to Policy related Databases**	S2,C3	Qualcomm
500106	**Stage 2**	S2	Qualcomm
500206	**CT3 aspects**	C3	ZTE

Supporting Companies: Qualcomm, AT&T, Ericsson, ST-Ericsson, Nokia Siemens Networks, Huawei, HiSilicon

Work Triggered by SA1, SA2 Rel-10 TR 23.813 Study on Policy solutions and enhancements (FS_PP) UID_440047. Provides Video Call seamless service continuity for 3G/LTE terminal user

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
500106	**Stage 2**	S2	SP-110196	SP#51 updated WID SP-100702=>SP-110196. SA#49 work completed as SA2 CRs approved under TEI10 (SP-10557)	23.002, 23.203

Justification

With the emerging of innovative IP services, the transactional data usage is becoming more and more prevalent on the mobile. For example, the user downloads a purchased ebook from an online store; the user purchases and downloads a game from an operator store; the user views free trailer clip from an online library to determine whether to buy the entire movie or not. In many cases, the Sponsor (e.g., Application service provider) pays for the user's data usage in order to allow the user to access the Application Service Provider's services. This enables additional revenue opportunities for both the Application service providers and the operators.

In particular, such dynamic data usage provided by the Sponsor allows the operator to increase revenues from the users with limited data plans. The user may have limited data plans allowing only a nominal data volume per month and the Sponsor may dynamically sponsor additional volume for the user to allow access to the services offered by the Application service providers.

The PCC framework can be enhanced to enable such use cases, in particular, it allows the operator to provide service control based on such sponsored services. For example, it allows a dynamic IP flow to be excluded from the user's data plan since a Sponsor might sponsor the data usage for the identified IP flows. For example, the user may use the limited data plan to browse an online store for interested books; but once a book is purchased, the data usage for downloading the book can be granted for free. In addition, the IP flow may also be granted certain level of QoS (e.g. video streaming).

TR 23.813 studied the feasibility of these scenarios of sponsored connectivity in the key issue 1 and converged into a set of extensions to the PCC procedures which will allow the operator to provide sponsored connectivity to sponsor entities.

In addition to Key Issue 1, SA2 also studied the feasibility of Key issue 2 - Coherent access to Policy related databases within TR 23.813. It enables UDR (User Data Repository) in the PCC architecture as an optional functional entity where PCC related subscriber data can be stored and retrieved by the PCRF through the Ud interface. This deployment scenario does not require SPR and allows the PCRF access to the PCC related subscriber data stored in the UDR.

Objective : to specify the PCC extensions which enable sponsor connectivity and coherent access to Policy related databases (i.e. UDR). This includes the following procedures:

For Sponsored Connectivity:

- Providing to the PCRF via Rx reference point the identity of the Sponsor, the service data flows identifying the sponsored sessions, and optionally, the threshold limits for the sponsored sessions;
- Enforcing sponsored connectivity rules at the PCEF based on monitoring key rules tied to sponsored connectivity;
- Charging support for the sponsored connectivity sessions

For Coherent access to Policy related databases:

- Enable PCRF to act as an application frontend to the UDR within the UDC architecture. In such a deployment scenario the PCRF has to support the Ud interface to access PCC related subscriber data stored in the UDR. Note that the SPR data is stored in the UDR and the information model remains unspecified.

Charging Aspects: Based on the architecture defined by SA2, SA5 needs to consider the Charging aspect for providing Sponsored Connectivity. **SA5 will provide charging in the next Release (Rel-11) under UID_510060.**

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
500206	**CT3 aspects**	C3	CP-100860	CP#51 completed	29.212, 29.213, 29.214, 29.215

Justification

WID Policy Enhancements for Sponsored Connectivity and Coherent Access to Policy related Databases (PEST) has been agreed in SA2 . That work item aims to specify the PCC extensions which enable sponsor connectivity and coherent access to Policy related databases (i.e. UDR). The following are the key issues:

- Policy enhancement for sponsored data connectivity

  This issue is to study policy enhancement needed for sponsored data connectivity. With the sponsored data connectivity, the service provider has a business relationship with the operator and pays the operator for user's connectivity in order to allow the user access to the service provider's services. The main work in stage 3 is enhancing Rx interface to support such functionality.

- Coherent access to Policy related databases

  This issue is to provide coherent accesses to operator policy databases, the conclusion is the PCRF can be seen as an application front end to the UDR within the UDC architecture, the main work in stage 3 is that the UDR is applied to store PCC related subscriber data, and the Ud interface is used to support conveying PCC related subscriber data..

TS 23.203 collects all the new requirements covered within the scope of this WI.

The following aspects require stage 3 work within the scope of this WI:

- PCC decisions based on the user profile stored at the UDR
- Allow PCRF to store subscriber information in the UDR (remaining quota) or subscription to changes in the user profile.
- Enable reporting for offline charging of sponsored services
- Sponsored service authorization over Rx
- Sponsored quota provisioning & reporting over Gx and over Rx

Objective : to specify the stage 3 aspect of Policy Evolution according to TS 23.203, impacts on Gx, Gxx, Rx, S9 procedures and reference points.

The following stage 3 aspects have to be specified within this WI:

- Adding the description that in case of UDC architecture is used, SPR and Sp can be replaced by UDR and Ud.
- Adding the description that the UDR is applied to store PCC related subscriber data, and the Ud interface is used to support conveying PCC related subscriber data. Note that when UDC architecture is used, the SPR data is stored in the UDR and the information model remains unspecified
- Update Gx Reference Point to support sponsored connectivity by including a reference to the sponsor identifier in the PCC Rule and enable monitoring for sponsored usage over Gx
- Update Rx Reference Point to authorize the AF to provide a dynamic service authorization for sponsored connectivity and to allow the AF to monitor sponsored usage.
- Update S9 Reference Point to support sponsored connectivity in roaming scenarios

5 SA3 Features

5.1 Lawful Interception in the 3GPP Rel-10 (LI10) UID_470029

Resources: S3

UID	Name	Hyperlink	WI_rapporteur	Notes	TS_and_TR
470029	**Lawful Interception in the 3GPP Rel-10**	SP-100108	PIDS, BT	SP#52 completed	33.106, 33.107, 33.108
470129	**LI for CAT (Customer Alerting Tones)**				
470229	**LI for CRS (Customized Ringing Signal)**				
470329	**LI for EPS enhancements**				
470429	**LI for VCC (Voice Call Continuity)**				
470529	**LI for MEDIASEC (IMS Media security)**				
470629	**LI for H(e)NB also with Local IP Access and Selected IP Traffic Offload (LIPA, SIPTO)**				
470729	**LI for MBMS enhancements**				
470829	**LI for LCLS (Local Call Local Switch)**				

Supporting Companies: Ministry of Economics and Technology (DE), Huawei, Ericsson, Rogers Wireless, National Technical Assistance Centre (UK), Ministère de l'Economie de l'Industrie et de l'Emploi (FR), BT, PIDS (NL), AT&T, Alcatel-Lucent, Vodafone, Federal Office for the Protection of the Constitution (DE), Technical Program Section (USA), Nokia Siemens Networks.

Assess all relevant function and services of Rel-10 to fulfil the national requirements on interception; at least for:

- CAT (Customer Alerting Tones) & CRS (Customized Ringing Signal)
- VCC (Voice call continuity)
- IMS Media security
- H(e)NB also with Local IP Access and Selected IP Traffic Offload
- eMBMS
- LCLS
- IMS Enhancements
- EPS Enhancements

This work updates LI specifications for the Rel-10 architecture and services as described above. It specifies the HI2 (Intercepted Related Information) and HI3 (Content) interfaces for delivery to the Law Enforcement Monitoring Facilities of 3G networks.
Details for the common IMS and the TISPAN LI needs have to be specified.
Dynamic triggering of interception between different domains should be investigated.

6 SA4 Features

UID	Name	Acronym	Resource	WI_rapporteur
470033	Optimization of IMS based PSS and MBMS User Service	OPT_IMS_PSS_MBMS_US	S4	Ericsson
470034	HTTP-based Streaming and Download Services	HTTP_SDS	S4,IETF	Qualcomm
480040	PSS and MBMS enhancements	MBS_Enh	S4	Ericsson
480041	Enhancements and Addition of Audio Tests to 26.131 and 26.132	EAAT	S4	Vodafone
510055	Video Coding Enhancements in MTSI	VCEM	S4	Ericsson

6.1 PSS and MBMS enhancements UID_480040

Resources: S4

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
480040	PSS and MBMS enhancements	SP-100305	Ericsson	SP#51 completed	26.234, 26.346

Supporting Companies: Ericsson, ST-Ericsson, Huawei, Qualcomm.

Linked to Rel-9 Feature UID_430038 PSS and MBMS extensions (PMA-MBS_Ext)

3 Justification

With the evolution of radio access technologies towards HSPA & LTE higher data rates are provided allowing more feature rich services with higher quality.

In case of a bookmarking service a user marks a point in time in streamed content and stores it for retrieval at a later time. After retrieval of the bookmark watching of the streamed content is continued.

A further enhancement of the streaming experience includes the transfer of a PSS streaming session from one device to another device e.g. using bookmark service.

In case of adaptive RTP streaming i.e. switching between different content rate versions of the same content, enhancements are possible e.g. signalling of the content rate version of the current streamed content to the client.

With the introduction of new codecs and features, it needs to be ensured that terminals announce their capabilities such that PSS servers can provide a wide range of devices with content suitable for the particular device in question.

Streaming session updates during a PSS session should be possible e.g. adding or removing media components.

No impact is expected in service requirements or architecture.

4 Objective

The objective of the work item is to provide

- PSS and MBMS User Services enabler enhancements
    - Networked bookmark service
    - Transfer of a PSS streaming session from one device to another device
    - Adaptive RTP streaming enhancements
    - Update of capability exchange in PSS
    - Handling session updates during a PSS session
    - Other technical enhancements and improvements

Guidelines for PSS and MBMS User Services. E.g. Mobile TV

6.2 Optimization of IMS based PSS and MBMS User Service UID_470033

Resources: S4

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
470033	**Optimization of IMS based PSS and MBMS User Service**	SP-100031	Ericsson	SP#51 completed	26.237

Work to enhance UID_430046 Rel-9 IMS_PSS_MBMS_US_EXT

Supporting Companies: Ericsson, ST-Ericsson, Orange, France Telecom, Huawei, China Mobile.

Justification

IMS based PSS and MBMS User Services are defined in TS 26.237. This specification preserves legacy PSS and MBMS streaming as well as download user services in an IMS infrastructure. It also allows the use of the core IMS functions and enablers in order to utilize mechanisms such as QoS and Policy control.

Features like network personal video recorder (N-PVR), forced play out, content referral, parental control, inter UE session transfer (currently the specification is limited to push mode) and content reporting configuration (currently the specification is limited to a fixed reporting timer without the possibility of timer value modification) would optimize the service experience for IMS based PSS and MBMS User Services even further.

In the case of N-PVR a user requests to record a live program in the network storage and consume the recorded program at a later time.

Forced play out is used to disallow certain trick play functions on any segment of the content. For example, "fast forward" or "seek to" are disallowed when a user is watching an advertisement.

In the case of content referral a specific piece of content or a service is recommended to other users. Content Recommendation could be initialized by the service provider or one of the users. For example user A is currently watching e.g. a clip of a football match and recommends this content to another user B. After accepting this recommendation user B is able to watch this clip on his own device.

In the case of parental control, the network will check the parent control level of the user. The network may refuse the initialization request or request the user's guardian to authorize the request.

Inter UE session transfer is defined in TS 26.237 for the push mode where a user is currently watching a VoD program on its device A and transfers the session to a device B. Another possible mode is the pull mode where the user activates device B and select ongoing sessions from device A for retrieval on device B. Pull mode is not defined by TS 26.237. Furthermore, a transfer of an ongoing session together with keeping the session on device A (replication) is not defined by TS 26.237. The intention here is to re-use specification work carried out by 3GPP SA2 and CT1 (e.g. carried out in SA2 WI "IMS Inter-UE Transfer enhancements" (BB UID_450029)) and to align with equivalent IPTV session transfer requirements and specifications (e.g. OIPF and TISPAN).

In case of content report configuration, the content reporting timer is modified by the service provider. The terminal will report back content changes after timer expiration.

For these reasons 3GPP should extend the IMS based PSS and MBMS User Service specification.

No impact is expected to service requirements or architecture.

Objective: to produce CRs to TS 26.237 on IMS based PSS and MBMS User Service to address

- Networked-PVR Recording Indication
- Explore Forced play out
- Content referral protocol
- Parental control enforcement
- Inter UE session transfer with pull mode and replication aligned with other standardization activities e.g. within 3GPP SA2 and CT1 and re-using specification work from them
- Content reporting configuration
- Integration of further PSS & MBMS User Services improvements and features from other ongoing work
- Other s of IMS based PSS and MBMS User Services

6.3 HTTP-based Streaming and Download Services UID_470034

Resources: S4,IETF

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
470034	**HTTP-based Streaming and Download Services**	SP-100032	Qualcomm	SP#52 completed	-
470134	**HTTP-based Streaming and Download Services in 3GPP**	SP-100032	Qualcomm	SP#52 completed	26.234, 26.244, 26.346, new TS 26.247
521002	**(IETF) HTTP-based Streaming and Download Services in 3GPP**	SP-100032	-	SP#53/IETF#81: Draft not included in 3GPP documentation	draft-gellens-mime-bucket-bis

Work to enhance UID_430038 Rel-9 PSS and MBMS extensions

Supporting Companies: Qualcomm, Nokia, Huawei, Apple, RealNetworks, Ericsson, ST-Ericsson, Research In Motion, InterDigital Communications.

Justification

With the evolution of radio access technologies towards HSPA & LTE higher data rates are provided allowing more feature rich services with higher quality. Access to multimedia services will grow significantly.

The most popular multimedia services today are services delivered over HTTP. Serving content from standard HTTP-servers has many advantages in terms of deployment costs and convergences with regular web services.

PSS and MBMS User Services include certain aspects on HTTP-based delivery of multimedia services including HTTP download, HTTP progressive download and Adaptive HTTP-Streaming, but these services are not clearly separated from the PSS User Service enablers and the PSS architecture. In addition, enhancements to the 3GPP HTTP-based multimedia services are envisaged in certain areas and guidelines in several areas are necessary to deploy the 3GPP HTTP-based services efficiently in 3GPP environments.

No impact is expected in service requirements or architecture.

Objective: to provide

- HTTP-based Streaming and Download (HSD) Services
    - Collection of 3GPP HTTP-based Streaming and Download (HSD) Services in a single new specification
    - Clarifications of the relation to PSS architecture and possibly improvements of architecture
    - Enhancement of the Rel-9 specification in a number of areas, such as:
        - Progressive Download Enhancements
        - Adaptive HTTP-based Streaming Improvements
        - Codec and Container Format Extensions
        - Security and Content Protection Aspects
        - Quality-of-Experience
        - Normative Client Behaviour
- Guidelines for HTTP-based Streaming and Download (HSD) Services, e.g. Content Preparation, serving from standard HTTP servers and Content Delivery Networks (CDNs), combination with RANs.
- Study the combination with other 3GPP services.

6.4 Enhancements and Addition of Audio Tests to 26.131 and 26.132 UID_480041

Resources: S4

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
480041	**Enhancements and Addition of Audio Tests to 26.131 and 26.132**	SP-100306	Vodafone	SP#52 completed. Reduce fragmentation in acoustic testing (3GPP SA4, ETSI STQ, GCF CAG, CTIA) & Review existing acoustic tests to determine need for new spec	26.131, 26.132

Supporting Companies: Vodafone, Vodafone D2, Deutsche Telekom, Samsung, Orange, Research In Motion, Rohde & Schwarz, Huawei, Motorola GmbH, Motorola Ltd, Qualcomm, Sony Ericsson Mobile.

Justification

The fragmented acoustic testing ecosystem that exists today, where test specifications between ETSI STQ, 3GPP SA4, CTIA and GCF are often not closely correlated, causes significant issues in both the expense of the testing ecosystem and the end user experience from devices deployed in live networks.

This fragmentation situation has also been identified by the Global Certification Forum (GCF) and has been liaised to 3GPP SA4 requesting the attention of the group.

By achieving alignment among the various test specifications, the process of testing new terminals can be optimised and the overall acoustic performance of terminals delivered to the end user can be better managed and ultimately improved.

Current audio testing does not completely reflect the needs of the customers. Some scenarios are not covered by 3GPP test specification at all, e.g. Double Talk and background noise performance, neither in Narrow band nor Wide band, in Handset, headset and Hands-free (handheld). Some test techniques are out of date and do not reflect latest developments. As more customers will change their telephony behaviour from fixed line to mobile (3GPP Systems), a negative customer experience with regards to Audio Quality must be prevented.

Objectives:

1) To reduce the fragmentation in the acoustic testing area by leading and driving alignment between the bodies in charge of developing the relevant test specifications. These bodies include 3GPP SA4, ETSI STQ, GCF CAG, CTIA etc.
2) To review the set of existing acoustic tests across the fora mentioned in the first objective and to determine if there is a need for new testing specification. If this need is identified, to be proactive in reviewing and introducing test material and driving alignment of this test material between the bodies in charge of developing the relevant test specifications.

Regarding the first objective, the ETSI STQ specifications have been identified by the authors of this Work Item and by the GCF in liaison statement S4-100307 as an appropriate initial set to analyse for suitability to include into TS 26.131 and TS 26.132. Furthermore, a number of areas were identified for potential revisions to the ETSI STQ specifications. The goal of this section of the work is to explore performance testing in the following areas:

- Delay Tests
- Uplink Tests – including level dependency of SLR, sidetone delay, background noise, etc
- Downlink Tests – including switching characteristics, speech quality, etc
- Tests for Receiving in Narrowband & Wideband based on DF-equalized HATS
- Extended Echo Tests
- Doubletalk Performance

Part of the first objective is for 3GPP SA4 to be active in initiating liaison communication between ETSI STQ, GCF CAG, ITU-T and 3GPP SA4 so that alignment and reduction of fragmentation can take place in all fora and that the accepted set of test material can be collaboratively developed and adopted.

For both of the objectives, possible changes and/or additions to 3GPP specifications will be justified with text regarding the benefits of the update. For example, this justification may consist of use cases, explanation of the benefits of harmonising a particular item, user experience enhancements, relevance, repeatability and reproducibility of the proposed test methods etc. Regarding the second objective, areas identified as requiring new specification text will be justified with analysis showing that this test material offers benefits and is not currently covered by existing test material.

6.5 Video Coding Enhancements in MTSI UID_510055

Resources: S4

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
510055	**Video Coding Enhancements in MTSI**	SP-110050	Ericsson	SP#51 completed. Linked to Rel-7 UID_7040 Multimedia Telephony Service for IMS - Media handling and interaction in MTSI (MTSI-MHI)	26.114

Supporting Companies: Ericsson, ST-Ericsson, LG Electronics, Nokia, Samsung, Huawei, Orange, Apple, Qualcomm

Justification

H.263 baseline video is currently the mandatory video codec in MTSI i.e. one that must be supported by MTSI clients in all terminals offering video communication. That video standard was defined in 1996 and was stable for long when MTSI was first specified in 2006. The H.264 video standard was first consented in ITU-T in May 2003. H.264 is more complex than H.263 but is on average seen as 30% more efficient than H.263 at the operating point considered (QVGA resolutions). H.264 was also included in MTSI but as an optional codec due to this extra complexity making it difficult for mobile terminals to support. Nowadays, mobile terminals on the market demonstrate screen resolutions and CPU power capabilities to support real-time video applications with better quality and efficiency provided by H.264; In general the usage of H.264 and thus the number of implementations in various contexts has increased drastically. At the same time, 3GPP access capabilities have evolved with higher bitrates making such real-time mobile video communication with better quality possible. As a result, it is justified to make H.264 a mandatory codec for Mobile video applications while H.263 could be made optional in the near future.

Current specifications on video codec capability can be mistakenly understood as that MPEG-4 is the most important video codec for MTSI, judged from its maximum bit-rate and image size enabled by level 3. We suggest that instead of specifying the maximum capability, we only need to limit its minimum capability, preferably to L1, the same as that for 3G-324M in TS 26.111. This way, further investment of hardware to MPEG-4 encoder can be avoided and the resource can be diverted to more useful elements, such as more sophisticated implementations of H.264 or a MPEG-4 decoder which can be used also by other services such as PSS and MBMS or local video playback

This work constitutes an enhancement to media handling already covered by Stage 1, 2 and 3 for MTSI. This new stage 3 work affects the status of video codec support neither affecting existing service requirements nor system architecture. However, TSG CT WG3 should be kept informed on potential impacts to CN terminating functions.

Objective

- Mandate the support of the currently recommended H.264 codec with upgraded level (higher complexity and bitrates for better quality in terms of resolution and framerate) in consideration to new bearer and terminal capabilities and user expectations (by increasing frame rate and bitrate).
- Recommend optional support for even higher H.264 levels for high end capable terminals (by increasing resolution, frame rate and bitrate).
- Consider new support requirements for level negotiation procedure at call setup to guarantee interworking at best possible capability levels.
- Agree a plan to make the support of H.263 optional in the same or future release in a way that enables reasonable support for interworking with any existing MTSI video terminal implementations.
- Consider the status of MPEG-4 visual, possibly aligning with 3G-324M.

The levels to be considered for mandatory support allow resolutions in the order of QVGA and frame rates in the range of 20 to 30fps. The levels to be considered for recommended optional support allow resolutions in the order of VGA and frame rates in the range of 25 to 30fps.

5 Service Aspects

This Work Item relates to the Multimedia Telephony Service for IMS. The service should be affected in a way that improves the video quality as perceived by the user while maintaining or even improving the efficiency over the 3GPP access. Interworking shall not be affected.

7 SA5 Features

UID	Name	Acronym	Resource
460031	**Rel-10 Operations, Administration, Maintenance and Provisioning (OAM&P)**	OAM10	S5,C4
470044	**Rel-10 Charging Management small Enhancements**	CH10	S5
470046	**Advice of Charge (AoC) service support enhancements**	eAoC	S5,C1

7.1 Operations, Administration, Maintenance and Provisioning (OAM&P)

UID	Name	Resource	WI_rapporteur
460031	**Rel-10 Operations, Administration, Maintenance and Provisioning (OAM&P)**	S5,C4	-
460032	**Rel-10 Network Infrastructure Management**	S5	-
460033	Common RAT Network Resource Model (NRM)	S5	Ericsson
470035	IRP Solution Set specification organisation improvements	S5	Nokia Siemens Networks, Huawei
470036	Deleted - Service Oriented Architecture (SOA) for IRP continuation from Rel-9	S5	Nokia Siemens Networks, Ericsson
480042	IRP Overview, Profiles & Usage Guide	S5	Nokia Siemens Networks
510041	Alarm Correlation and Root Cause Analysis	S5	Ericsson
510042	Inventory Management Network Resource Model enhancements	S5	Nokia Siemens Networks
460034	**Rel-10 Self-Organizing Networks (SON) - OAM aspects**	S5	-
460035	SON Self-optimization management continuation	S5	Huawei
460036	SON Self-healing management	S5	ZTE
470037	OAM aspects of Energy Saving in Radio Networks	S5	Nokia Siemens Networks
470038	**Rel-10 Subscription Management (SuM) evolution**	S5	Ericsson
470039	**Rel-10 Performance Management**	S5,C4	-
470040	Key Performance Indicators (KPIs) for IMS	S5	China Mobile
470041	Key Performance Indicators (KPIs) for EPC	S5	China Mobile
470042	**Management of UE based network performance measurements**	S5,C4	Huawei, Nokia Siemens Networks, Ericsson
470142	SA5 aspects of Management of UE based network performance measurements	S5	Huawei, Nokia Siemens Networks, Ericsson
510006	CN aspects of Management of UE based network performance measurements	C4	Nokia Siemens Networks
470043	3G HNB and LTE HeNB Subsystem performance measurements	S5	China Mobile

7.1.1 Common RAT Network Resource Model (NRM) UID_460033

Resources: S5

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
460033	Common RAT Network Resource Model (NRM)	SP-100293	Ericsson	SP#52 completed. Share equipment btw several RATs (RET,TMA,repeaters) to reduce costs. With existing modelling is difficult to see that several cells are affected when an antenna tilt is changed etc	32.616, 32.642, 32.646, 32.652, 32.656, 32.762, 32.766 new (32.791, 32.792, 32.796)

Supporting Companies: Ericsson, Orange, ZTE, Nokia Siemens Networks.

Many operators are using more than one RAT. To decrease costs, some equipment can be shared between several RATs, e.g. RET, TMA and repeaters. With the existing modelling, it is very difficult for an operator to see that several cells are affected when an antenna tilt is changed etc.

Objective: to study how a common modelling can be achieved, affecting GERAN, UTRAN and E-UTRAN NRMs on an acceptable level.
To introduce Common RAT Network Resource Model specifications that allows an easy navigation when equipment is shared between different cells. To not force old deployments in UTRAN, GERAN and E-UTRAN to be changed the new modelling is an alternative to the existing modelling.

7.1.2 IRP Solution Set specification organisation improvements UID_470035

Resources: S5

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
470035	IRP Solution Set specification organisation improvements	SP-100774	Nokia Siemens Networks, Huawei	SP#51 completed	32.153, new (32.111-6, 32.126, 32.176, 32.306, 32.316, 32.326, 32.336, 32.346, 32.356, 32.366, 32.376, 32.386, 32.396, 32.416, 32.446, 32.506/26/36, 32.606, 32.616, 32.626, 32.636, 32.646, 32.656, 32.666, 32.676, 32.696, 32.716, 32.726, 32.736, 32.746, 32.756, 32.766, 32.776, 32.786)

Supporting Companies: Ericsson, Nokia Siemens Networks, Huawei, Alcatel-Lucent, ZTE.

Justification

In S5-094089 presented in SA5#68 (Nov 2009), several issues were discussed relating to the legacy of IRP Solution Sets (CORBA, CMIP), and the evolution of Notification Log IRP XML specifications and their subsequent re-use in SOAP Solution Sets. Some inconsistencies in the specifications were identified, and also some inefficiencies in the ways of working in SA5 due to the multiplicity of related specifications leading to inconsistent and divergent specifications. Of the 5 potential solutions proposed, alternative 5 "*Move all SS (CORBA and SOAP) and XML definitions into a 32.xx6. Keep RS and IS as is.*" was selected.

Objective: to reorganise the Interface IRP Solution Set specifications, such that the CORBA SS (32.xx3), XML Definitions (32.XX5), and SOAP SS (32.XX7) are merged into a single Solution Set document, tentatively proposed as 32.XX6. The 32.XX3, 32.XX5, and 32.XX7 specs for Interface IRPs shall be withdrawn and replaced by 32.XX6

Affected existing specifications [None in the case of Study Items]				
Spec No	C	Subject	Approved at plenary#	Comment
32.153		Update the SS templates to give guidance to the merged SS's	SA#50 Dec. 2010	

Withdraw Specifications
32.111-3, 32.111-5, 32.111-7, 32.123, 32.125, 32.127, 32.175, 32.303, 32.305, 32.307, 32.313, 32.317, 32.323, 32.325, 32.327, 32.333, 32.335, 32.337, 32.343, 32.345, 32.347, 32.353, 32.355, 32.357, 32.363, 32.365, 32.367, 32.373, 32.375, 32.383, 32.385, 32.387, 32.393, 32.395, 32.397, 32.413, 32.415, 32.417, 32.443, 32.445, 32.447, 32.503, 32.505, 32.507, 32.533, 32.535, 32.537, 32.603, 32.607, 32.613, 32.615, 32.617, 32.623, 32.625, 32.633, 32.635, 32.643, 32.645, 32.653, 32.655, 32.663, 32.665, 32.667, 32.673, 32.675, 32.695, 32.713, 32.715, 32.723, 32.725, 32.733, 32.735, 32.743, 32.745, 32.753, 32.755, 32.763, 32.765, 32.773, 32.775, 32.783, 32.785

7.1.3 IRP Overview, Profiles & Usage Guide UID_480042

Resources: S5

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
480042	IRP Overview, Profiles & Usage Guide	SP-110277	Nokia Siemens Networks	SP#52 completed. Updated WID SP-100777=>SP-110277	new TS 32.103

Supporting Companies: Alcatel Lucent, Ericsson, Huawei, Motorola, Nokia Siemens Networks, Orange, ZTE, Vodafone, NEC.

Justification

SA5's IRP Framework and its embedded IRP Interface & NRM definitions have advanced considerably since it inception during R99. Currently there are 15 approved 3GPP NRM IRP specifications as well 18 approved 3GPP Interface IRP specifications, providing a complex set of network management capabilities for the monitoring and provisioning of various network and service technologies. In addition, other organization have adopted the IRP Framework and developed their technology-specific resource models (NRM IRPs).

Interface IRP are not only designed in a network technology neutral manner and to be SOA conformant, but also with a high degree of flexibility - to allow applicability towards management of a wide range of current and future equipment and systems. NRM IRP's on the other side are defined to enable management of specific network technologies and systems, and allow extensibility to support competitive differentiations.

To enable the industry (3GPP members as well as other industry organization), to more easily adopt the IRP Framework and applicable Interface & NRM definitions for its management needs, SA5 needs an additional specification covering:

- General Overview about the IRP Framework, and its Interface IRP's & NRM IRP's
- Overview about the dependencies between IRP's, to ensure relationships between IRP's are well understood
- Suggestions for IRP Profiles, enabling easier adaption and better interoperability
- IRP Usage guidelines, to ensure proper implementations
- Recommendations and Guidelines for the usage of the IRP Framework outside of 3GPP, to enable easier adoption by external organizations

Objective

Develop an IRP Overview, Profiles & Usage Guide specification, covering the following:

- Provide IRP Overview and identify IRP Relationships
    - General Overview about the IRP Framework, and its IRP's
    - Overview about the dependencies between IRP's
    - Recommendations and Guidelines for the usage of the IRP Framework outside of 3GPP
- Provide IRP Profiles recommendations
    - Suggestions for IRP Profiles
    - IRP Usage guidelines

7.1.4 Alarm Correlation and Root Cause Analysis UID_510041

Resources: S5

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
510041	Alarm Correlation and Root Cause Analysis	SP-110137	Ericsson	SP#53 completed. Triggered by Rel-10 TR 32.832 Study on Alarm Correlation and Alarm Root Cause Analysis UID_480045 & TR 32.829 Study on Harmonization of 3GPP Alarm IRP and TMF Interface Program Fault Management UID_460038	32.111-1, 32.111-2, 32.111-6

Supporting Companies: Alcatel-Lucent , CMCC, Ericsson, Huawei, NEC, Nokia Siemens Network, ZTE.

Justification

In a network, such as a fixed and mobile convergent (FMC) network, a single network fault (e.g. a network entity not performing at level expected by network operator) can result in the generation of multiple alarms from different networked entities, at different times. In a network, network management events, indicating changes in network configuration and/or performance, can be related to or causing network faults.

It is imperative that the network operator, the receiver of all the generated alarms and network events, be able to rapidly and accurately identify the causes of the alarms. Rapid and accurate root cause identification shortens the TTR (time to repair) and thus contribute to OPEX reduction.

It is imperative also that the network operator be able to identify network faults affecting its services and/or key customers. This ability directly contributes to the support of service contracts, between operators (providers of service) and service consumers.

The standardized capabilities supporting the operator's tasks mentioned above, are termed alarm correlation (AC) and root cause analysis (RCA).

Note that candidates subject of AC are not restricted to alarms. They can include network configuration changes, for example. Note that as well, the RCA may not always result in identifying an alarm but, depending on context and information available, may identify a network configuration change that is the root cause of the alarms.

Capabilities to correlate alarm and identify alarm root causes are considered as important features of FMC network management. See S5-101174 "Operator Common NGMN TOP10 Requirements".

This WI is based on recommendations from Rel-10 TR 32.823 Study on Alarm Correlation and Alarm Root Cause Analysis and Rel-10 TR 32.829 Study on FM harmonization.

Objective: to update specifications as follows:

1. The Requirements, benefits, context and use cases of AC and RCA;
2. Clarification of the semantics of the `correlatedNotification` attribute.
3. The `AlarmInformation` attributes that can report the result of AC and/or RCA or can assist the tasks of AC and/or RCA. Note that the `AlarmInformation` class is defined in TS 32.111-2, Alarm IRP IS.
4. An interface, packaged as additional functionalities to Alarm IRP, via which operator can receive the results of AC and RCA;
5. The context, such as location within the IRP Framework, in which the AC and RCA can be deployed.
6. Consider capabilities that were identified and recommended for implementation by Release 10 Study on FM harmonization (TR 32.829).

7.1.5 Inventory Management Network Resource Model enhancements UID_510042

Resources: S5

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
510042	Inventory Management Network Resource Model enhancements	SP-110141	Nokia Siemens Networks	SP#52 completed. Inventory NRM specified in Rel-6 is mainly hardware related. Rel-10 TR 32.828 recommends extending the scope of inventory NRM. Additionally, NGMN Top OPE Recs, v1.0 sets inventory enhancements as one of top 10 priority items	32.690, 32.691, 32.692, 32.696

Supporting Companies: Alcatel-Lucent, China Mobile, Deutsche Telekom, Ericsson, Huawei, Nokia Siemens Networks, Vodafone, ZTE.

Justification

The scope of current inventory NRM is mainly hardware related. The output of the Alignment of 3GPP Generic NRM IRP and TMF Shared Information/Data (SID) Model study item, the inventory enhancement part in Rel-10 TR 32.828 (UID_460037), recommends to extend the scope of Inventory NRM. Additionally, NGMN has defined inventory enhancements as one of the top 10 priority items in their NGMN Top OPE Recommendations document (Version 1.0 - see S5-101174).

Objective

The objective of this work item is to update in Rel-10 the 3GPP inventory NRM IRP based on findings and recommendations in Rel-10 TR 32.828. Such update will introduce a new inventory object model to capture inventory-type information for software, license, hardware and logical/physical resources, all related to resources under management. The inventory information is collected into inventory data files. File Transfer IRP is used for uploading the inventory data files to IRPManager.

7.1.6 SON Self-healing management UID_460036

Resources: S5

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
460035	SON Self-optimization management continuation	SP-110130	Huawei	SP#52 completed. Cont'd Rel-9 SON self-optimization management UID_390007	32.425, 32.521, 32.522, 32.526, 32.762, 32.766

Supporting Companies: ZTE, Vodafone, China Mobile, Nokia Siemens Networks, Huawei, Motorola, T-Mobile, Orange, Telecom Italia, Telefonica, TeliaSonera, China Telecom.

The target of Self-Healing (SH) is to recover from or mitigate errors in the network with a minimum of manual intervention from the operator.

Self-healing monitors and analyses relevant data like fault management, alarms, notifications, and self-test results etc. and automatically triggers or performs corrective actions on the affected Network Element(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 expenses.

4 Objective

- Collect and document Self-Healing OAM requirements, Stage 2 and Stage 3.
- Define – if needed in cooperation with RAN WGs - input to and output from the Self-Healing function, its location in the management architecture, and the degree of standardization of the associated algorithms.
- Identify and document required Self-Healing related additions to the affected existing specifications.

Ensure that the OAM specifications support the management of the Self-Healing functionality.

7.1.7 Self-Organizing Networks (SON) self- management continuation UID_460035

Resources: S5

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
460036	SON Self-healing management	SP-110150	ZTE	SP#51 completed. WID updated SP-100776=>SP-110150. Work moved to Rel-10 after split of the Rel-9 UID_390007 SON self-optimization (removed Self-Healing handling)	32.522, 32.526, 32.762, 32.766, new TS 32.541

Supporting Companies: Huawei, Vodafone, Deutsche Telekom, Motorola, Nokia Siemens Networks, Ericsson, NEC, Alcatel-Lucent, ZTE, China Telecom.

Rel-9 SON self- focused on the following use cases:

1) Load balancing
2) Handover Parameter
3) Interference control
4) Capacity and coverage
5) RACH

The management aspects of "Load balancing" and "Handover Parameter " have been fully discussed in Rel-9 while the management aspects of "Interference control", "RACH " and "Capacity and coverage " were not fully discussed due to the slower progress of the corresponding work in RAN.

Based on the situation at the end of Rel-9, it is required to continue the discussions on the management aspects of the following use cases:

1) Interference control
2) Capacity and coverage
3) RACH

Work has started in Rel-9 on the coordination functionality (e.g. turn on/off the automatic functions, coordination among the different targets in Handover use case etc.), but there is a need to extend this work to address the inclusion of additional coordination.

1) Coordination between manual operations via Itf-N and automatic functionalities.
2) Coordination between self- and other SON use cases.
3) Coordination between different self- use cases.
4) Coordination between different targets within one self- use case.

The discussion on coordination will include coordination of NRM defined parameters change, but will not be limited to the discussion of possible resolution of conflicting requests, regardless of the request source. Examples for such "conflicting request" are:

1. "ping-ponging" the value of an NRM defined parameter by two or more of the named requesting sources.
2. Overwriting an NRM defined parameter previously set by source B by source A.
3. Simultaneous requests by two or more sources to change an NRM defined parameter to different values.

The work item is not addressing resolution of conflicts between requests from different IRPManagers or conflicts resulting from requests via non-ItfN interfaces (e.g. craft terminals).

4 Objective

a) Specify the management aspects of the following SON self- use cases:
1) Interference control
2) Capacity and coverage
3) RACH

b) The solution for coordination related with the self- on the following aspects:
1) Coordination of manual operations via Itf-N and automatic functionalities.
2) Coordination between self- and other SON use cases.
3) Coordination between different self- use cases.
4) Coordination between different targets within one self- use case.

7.1.8 OAM aspects of Energy Saving in Radio Networks UID_470037

Resources: S5

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
470037	OAM aspects of Energy Saving in Radio Networks	SP-110128	Nokia Siemens Networks	SP#51 completed. WID updated SP-100226=>SP-110128. Triggered by Rel-10 TR 32.826 Study on Telecommunication Management; Energy Savings Management (FS_OAM_ESM) UID_430044	32.425, 32.522, 32.526, 32.626, 32.762, 32.766, new TS 32.551

Supporting Companies: Vodafone, Nokia Siemens Networks, Huawei, NEC, Alcatel-Lucent, Orange, Motorola, ZTE, Deutsche Telekom, Qualcomm, Telecom Italia, Ericsson.

Stage 3 work triggered by Rel-10 TR 32.826 Study on Telecommunication Management; Energy Savings Management (FS_OAM_ESM) UID_430044

Energy efficiency is important both from a cost and an environment perspective. There are strong requirements from operators on the management and monitoring of energy saving functions and the evaluation of its impact on the network and service quality. Therefore an efficient and standardized Management of Energy Saving functionality is needed.

Coordination with other functionalities like load balancing and optimization functions is also required.

The objectives of this work item are:

- Define Energy Savings Management OAM requirements and solutions for the following use cases,
    - eNodeB Overlaid
    - Carrier restricted
    - Capacity Limited Network

NOTE: Some more Energy Saving use cases may be considered during the progress of the work

- Define OAM requirements and solutions for coordination of ESM with other functions like
    - Self-Optimization
    - Self Healing
    - Traditional configuration management
    - Fault Management
- Select existing measurements which can be used for assessing the impact and effect of Energy Saving actions corresponding to above Energy Saving use cases.
- Define new measurements which are required for assessing the impact and effect of Energy Saving actions, including measurements of the energy consumption corresponding to above Energy Saving use cases.

For all the above existing standardized functionalities shall be reused as much as possible.

7.1.9 Rel-10 Subscription Management (SuM) evolution UID_470038

Resources: S5

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
470038	**Rel-10 Subscription Management (SuM) evolution**	SP-100086	Ericsson	SP#51 completed	32.172, 32.175, 32.176

Supporting Companies: Ericsson, Verizon Wireless, Alcatel-Lucent, Deutsche Telekom, Nokia Siemens Networks

3 Justification

There is a need expressed from service providers and operators 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 the TeleManagement Forum's eTOM processes. The current version of the 3GPP SuM specifications covers the service management layer only to a very limited extent; instead, the focus has been on the resource layer and its management. There is a need to couple information models of the service layer with the information models of resource layer within the information domain related to customer/user/subscriber.

The current model is also inconsistent in its 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 mentioned concerns to support the 3GPP/LTE networks and services delivered on top of these networks, ETSI TISPAN has requested 3GPP to address these concerns so that they may re-use the evolved 3GPP SuM specifications as the basis for extensions to support the TISPAN NGN network.

4 Objective

This Work Item is a continuous one based on the previous one completed in SuM Rel-9.

The Work Item main objective is to provide 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.

With a generic framework for modelling, there shall be Guidelines and Rules for applied model talking about how to rapidly introduce an applied model and make it complaint with the generic framework for modelling as normative annex part.

In order to bring about a better understanding for the functioning of the SuM IM, guidelines for instantiation, including instantiation examples, are proposed to be included as an Informative annex of the 3GPP SuM NRM specification.

The current model is also inconsistent in its modelling of user identifiers. In general, a more coherent approach for modelling user's service data profiles is of interest.

Regarding the proposal from TISPAN about "connection points to external models" (i.e. Mapping between SA5 SuM IOCs and other SDO class definitions such as SID model construct), this work item will continue on investigating the necessity to introduce this model mapping into SA5 SuM standardization. If it's agreed within SA5 then it will be introduced as Informative annex part.

It has to consider backward compatibility with the existing SuM information model if it's feasible.

Consistency with information entities to be defined in the User Data Convergence baseline common information model shall be ensured.

7.1.10 Key Performance Indicators (KPIs) for IMS UID_470040

Resources: S5

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
470040	Key Performance Indicators (KPIs) for IMS	SP-100083	China Mobile	SP#51 completed	new 32.454

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

3 Justification

Performance management is important for operators to manage their networks. Key Performance Indicators (KPIs) and performance measurements are in the scope of network performance management. Currently performance measurements for IMS have been defined in TS 32.409. In order to monitor and evaluate the whole IMS network performance, it is necessary to define KPIs for IMS.

4 Objective

For evaluation of IMS Network performance, a set of Key Performance Indicators (KPIs) shall be defined based on well described use cases and be standardized with a formula. Classification and definitions template of KPIs refers to TS 32.410 and 32.450.

The following are examples of IMS KPI for standardization:

- Origination call setup success rate
- Termination call setup success rate
- Forward session success rate

7.1.11 Key Performance Indicators (KPIs) for EPC UID_470041

Resources: S5

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
470041	Key Performance Indicators (KPIs) for EPC	SP-100084	China Mobile	SP#51 completed	new 32.455

Supporting Companies: China Mobile, Alcatel-Lucent, Huawei, ZTE.

3 Justification

Performance management is important for operators to manage their networks. Key Performance Indicators (KPIs) and performance measurements are in the scope of network performance management. Currently performance measurements for EPC have been defined in TS 32.426. In order to monitor and evaluate the whole EPC network performance, it is necessary to define KPIs for EPC.

4 Objective

For evaluation of EPC Network performance, a set of Key Performance Indicators (KPIs) shall be defined based on well described use cases and be standardized with a formula. Classification and definitions template of KPIs refers to TS 32.410 and 32.450.

The following are examples of EPC KPI for standardization:

- Dedicated bearer activation success rate
- Attach success rate
- Inter-system handover success rate

7.1.12 Management of UE based network performance measurements UID_470042

Resources: S5,C4

UID	Name	Resource	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
470042	**Management of UE based network performance measurements**	S5,C4	SP-100612	Huawei, Nokia Siemens Networks, Ericsson	SP#52 completed. Stage 2/3. Linked to UID_460003 Minimization of drive tests for E-UTRAN and UTRAN (MDT_UMTSLTE)	-
470142	SA5 aspects of Management of UE based network performance measurements	S5	SP-100612	Huawei, Nokia Siemens Networks, Ericsson	SP#52 completed	32.421, 32.422, 32.423, 32.441, 32.442, 32.446
510006	CN aspects of Management of UE based network performance measurements	C4	not applicable	Nokia Siemens Networks	CP#51 completed under the SA5 WI code	23.008 (CR#0330), 29.002 (CR#1007), 29.230 (CR#0207), 29.272 (CR#0329)

Linked to UID_460003 Minimization of drive tests for E-UTRAN and UTRAN (MDT_UMTSLTE)

Supporting Companies: Huawei, Orange, AT&T, Vodafone, Deutsche Telekom, China Mobile, Telecom Italia, NEC, Alcatel-Lucent, Nokia Siemens Networks, Qualcomm, Ericsson, ZTE, Motorola.

Justification

Rel-10 WI UID_460003 "Minimization of drive tests for E-UTRAN and UTRAN" was approved at TSG RAN#46. The RAN WI focuses on the control plane solution for the minimization of drive tests for E-UTRAN and UTRAN (MDT) and defines coverage as the priority use case to be considered in Rel-10.

========== Start of extract from RAN WID RP-091423 ==========

*"**The objective of this work item is to define the solutions for minimization of drive tests (MDT) using a Control Plane Architecture** (however, it is worth noting that the same information elements defined in the RRC specifications for providing information for UE to the E-UTRAN/UTRAN for the control plane MDT solution, can be utilised outside TSG RAN as the new MDT functionality will be captured to open 3GPP specifications available outside 3GPP.). The following prioritised use cases will be considered:*

- ***Coverage optimization** "*

Note: Solutions for the other MDT use cases identified in TR 36.805 are expected to be developed after completing the first prioritised use case based on operators' priorities. New or updated work item to be agreed then.

The following principles should be followed when developing the MDT solutions based on Control Plane Architecture:

- ***Both real time and non real time measurements will be considered**.*
- *Measurements are configured to the UE by E-UTRAN/UTRAN by RRC signalling, based on Network management systems measurement definitions configured to E-UTRAN/UTRAN. Measurement may be triggered by various rules, for example based on radio conditions dependent thresholds*
- *Duplication of the existing functionality should be avoided.*
- ***New measurement configurations and functionalities (e.g. UE measurements idle mode and during DRX operations and non-real time reporting, which includes storing some data in the UE memory) should be identified and specified for the prioritised MDT use cases.***
    - *End-user implications need to be kept acceptable (e.g. MDT solutions should be developed so that UE power consumption can be kept reasonable when MDT is deployed and used in the networks)*
    - *UE memory requirements for MDT support need to be carefully considered.*

- ***The MDT measurements reporting are sent via RRC signalling to the E-UTRAN/UTRAN. RRC signalling to report measurements should also have the capability to include***
    - *Set of available location information*
    - *Time information*
- ***The measurements from the UE can be combined/ processed with the network measurements already available in the E-UTRAN/ UTRAN and sent to the MDT-entity outside the E-UTRAN/UTRAN.*** *E- Also basic measurement objects are to be identified, which may be added to the results such as Cell ID, time (if relevant) before being transferred onwards to the respective MDT-entity outside the E-UTRAN/UTRAN.*

========== End of extract from RAN WID RP-091423 ==========

Support of MDT RAN functionality is required on Itf-N to allow the operator to configure the policies in order to control MDT activation and MDT data collection. According to the policies configured by the operator, the MDT data is collected and transferred from eNodeB to IRP Manager via Itf-N.
In order to fulfil the coverage use case, it will be necessary to be support on Itf-N:

- Operator selected area based MDT data collection
- Operator selected UE based MDT data collection.

The following functionalities are needed to operate MDT:

- Configuration on Itf-N of mechanisms to control and manage MDT function
- Availability of Itf-N operations to control and manage MDT data collection
- MDT data reporting format on Itf-N
- Procedures for propagation of MDT configuration data to concerned NEs

Objective: to specify MDT OAM requirements and solutions for UMTS and LTE system in line with the RAN agreed control plane MDT WI. The following aspects are required to be specified in this WI:

1. Management mechanisms which will be used by the operator to control MDT:
- Configuration of real time and non real time measurements
- Selection management mechanisms considering the impact on UE capabilities (e.g. power consumption, UE memory)
- Measurements reporting policies
- Operator selected UE based MDT data collection and operator selected area based MDT data collection; etc.

2. Operations to control and manage MDT data collection via Itf-N.
3. MDT data reporting format on Itf-N.
4. Procedures for MDT configuration data propagation to concerned NEs.
5. MDT related performance measurements

The operations for MDT management and procedures for MDT data propagation make use of the existing SA5 solutions as much as possible (e.g. Trace functionality, by extending the trace propagation to the UE and the trace reporting from the UE in SA5 Trace specifications).

SA5 provided Stage 2 to CT4, RAN2, RAN3 for MDT configuration propagation over the following interfaces: Iu, Iur, S1, X2, D, Gr, S6a, E, S10.

Responsibility:

Stage 1 and 2 for OAM&P:	SA5
Stage 3 for OAM&P:	SA5
Stage 3 for Signalling Protocols:	CT4, RAN2, RAN3

7.1.13 3G HNB and LTE HeNB Subsystem performance measurements UID_470043

Resources: S5

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
470043	3G HNB and LTE HeNB Subsystem performance measurements	SP-100081	China Mobile	SP#51 completed	32.582, 32.592, new (32.452, 32.453)

Supporting Companies: China Mobile, Huawei, Alcatel-Lucent, Nokia Siemens Networks, Qualcomm.

3 Justification

The HNB-OAM_GW WI in Rel-9 (UID 420036) is to standardize the North bound interface of H(e)NS. The original objectives of HNB-OAM_GW are targeting to specify H(e)NS NRM requirements, H(e)NS Information Service (IS), H(e)NS Solution Set (SS) and H(e)NS performance measurement (PM). However, there remain sufficient parts of H(e)NS PM need to be specified according to respective determinations in ongoing discussions of RAN2, RAN3 and SA2. As a result, the HNB-OAM_GW WI is still lacking HeNS PM specifications. In addition, HNB related performance data in HNS PM are still needed to be supplemented.

Therefore, it is proposed to analyze H(e)NS performance measurements to finalize uncompleted works in 32.452 and 32.453 in Rel-10.

4 Objective

- Complement the performance data in 32.452 for HNS performance measurement;
- Specify the performance data in 32.453 for HeNS performance measurement depending on conclusions in RAN2, RAN3 and SA2;
- Coordinate the availability of performance data between Type 1 and Type 2 interfaces.

7.2 Charging Management UID_470044

UID	Name	Acronym	Resource	WI_rapporteur
470044	**Rel-10 Charging Management small Enhancements**	CH10	S5	-
440063	**IWLAN mobility charging**	eIWLAN_Mob	S5	Orange
470046	**Advice of Charge (AoC) service support enhancements**	eAoC	S5,C1	Deutsche Telekom

7.2.1 IWLAN mobility charging UID_440063

Resources: S5

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
440063	**IWLAN mobility charging**	SP-100090	Orange	SP#51 completed. RAT differentiation for charging. Completes Rel-8 Feature IWLAN_Mob UID_370049 Mobility between 3GPP-WLAN Interworking and 3GPP Systems. Cooperation with CT1,CT3 on affected protocols	32.240, 32.252, 32.298, 32.299

Supporting Companies: Orange, ZTE, Qualcomm, China Mobile, Alcatel-Lucent, Huawei, Ericsson, Nokia Siemens Networks

Completes Rel-8 Feature UID_370049 "Mobility between 3GPP-WLAN Interworking and 3GPP Systems".

Rel-8 TS 23.327 Stage 2 I-WLAN mobility indicates the charging requirements to be met.
The capability to differentiate charging based on Radio Access Type (RAT) is one of these requirements.
Such a feature is required for operators and should support different operators' deployment options:

- Collocated GGSN/HA
- Standalone HA

Currently, only a high level information describes how the charging is supported for I-WLAN mobility.

This work specifies a solution meeting the Stage 2 and operators' requirements for I-WLAN mobility by covering:

- Charging support for I-WLAN Mobility
- Charging differentiation on RAT support for I-WLAN Mobility

7.2.2 Advice of Charge service support enhancements UID_470046

Resources: S5,C1

UID	Name	Acronym	Resource	WI_rapporteur
470046	**Advice of Charge (AoC) service support enhancements**	eAoC	S5,C1	Deutsche Telekom
470047	**SA5 part - AoC enhancements**	eAoC	S5	Deutsche Telekom
490010	**CT1 part - AoC enhancements (Stage 3)**	eAoC	C1	Deutsche Telekom

Continuation of Rel-8 BB UID_80042: Advice of Charge (AoC) support in IMS Charging (IMSTSS). Stage 2/3 work

Supporting Companies: Deutsche Telekom, Nokia Siemens Networks, Alcatel Lucent, Ericsson, AT&T.

SA5 part - AoC enhancements UID_470047

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
470047	**SA5 part - AoC enhancements**	S5	SP-100080	SP#51 completed. SA1 Stage 1 in 22.115	32.275, 32.280, 32.298, 32.299

AoC service support in IMS is specified in the TS 32.280. Key parts are: AoC architecture, AoC Information Model and Data Model, AoC-related Ro interface and protocol mapping guidance between AoC information, and the related Stage 3 protocol specifications CT1 TS 24.647 (AOC information to the User Equipment) and CT3 TS 29.658 (Real Time Transfer of Tariff Information, RTTI). Additionally, AoC subscription and formatting parameters retrieved from HSS are reflected in the CT4 TS 29.364.

SA5 has identified a number of inconsistencies and protocol mapping issues between these specifications:

- TS 24.647 contains several AoC protocol items not matching with 3GPP charging AVPs described in TS 32.280 and TS 32.299. Examples are Charged items, Charging Rate and Billing identification.
- For transmission of AoC Cost Information to the UE, the existing protocol items in TS 24.647 are incomplete. Unlike the Ro interface (TS 32.280 and TS 32.229), TS 24.647 is currently not able to distinguish between accumulated cost information and incremental cost information.
- The AoC information (TS 32.280, TS 32.299) and RTTI Specification (TS 29.658) are already able to distinguish between "current tariff" und "next tariff" and to transmit the whole tariff chain (current tariff + switchover time No. 1 + next tariff No. 1 + switchover time No. 2 + next tariff No. 2 + …). But the AoC UNI information in TS 24.647 does not support fully the same information. Thus, the AoC-S information cannot transmit the whole tariff chain to the UE.
- Some remaining mapping issues between AoC and Real-time Transfer of Tariff Information (RTTI, TS 29.658) need to be corrected as well.

Moreover, some operators require additional AoC features:

- Support of IMS-based PSTN/ISDN Emulation (PES) as designed by ETSI TISPAN TS 183 043.
- Support of the mobile-specific CAI format (Charge Advice Information).
- Consider adding additional values for Charged Items, Charging Rate, and Unit Types other than time or money (e.g. charging by volume).
- Add AoC-related information to Offline- and/or Online Charging (For example, AoC-related information in Offline Charging may be used by operators for statistic purposes).

Some of these additional AoC features are already supported by TS 32.280 and TS 32.299 but missing in the current Stage 3 Protocol Descriptions of the Advice of Charge (AOC) service in TS 24.647 and/or RTTI (TS 29.658).

Objective: to correct inconsistencies, correct protocol mapping issues, add new features and harmonize the AoC-related specifications, i.e. SA5 TS 32.280, CT1 TS 24.647 and CT3 TS 29.658. Changes to TS 24.647 and TS 29.658 need to be coordinated with CT1 and CT3.

- TS 32.280 needs to be corrected and enriched with regard to AoC Information Model, AoC Data Model and mapping guidance between AoC information and Stage 3 specifications of AoC UNI and RTTI.
- New Offline- and/or Online Charging AVPs need to be aligned with TS 32.298 and TS 32.299. Additionally, the impact for AOC as a supplementary service for MMTel shall be reflected in the TS 32.275.
- New or modified AoC Information having an impact on AoC subscription and formatting parameters needs to be aligned with CT4 TS 29.364 as well.

CT1 part - AoC enhancements (Stage 3) UID_490010

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
490010	**CT1 part - AoC enhancements (Stage 3)**	C1	CP-100645	CP#52 completed. SA1 Stage 1 in 22.115, 22.173, 22.024. Add mobile-specific CAI format and volume charging elements. Extensions to existing AoC XML	24.647

Justification

Operators require several additional enhancements to the existing AoC features. To fulfil these requirements, SA5 is working on a feature work item for AoC Service Support Enhancements (UID_470047, TS 32.280) which is based on SA1 requirements (TS 22.115, TS 22.173 and TS 22.024).

The following impact on TS 24.647 needs to be considered:

- Addition of Charge Advice Information (CAI) elements as well as volume charging elements which are supported by TS 32.280 and TS 32.299.
- Enhancements needed for transmission of AoC Cost information by AoC-D and AoC-E Corrections. The Type of charging information (TS 24.647) shall either be “subtotal charges” or “total charges” – which is obviously not the same as proposed by TS 32.280 and TS 32.299.
- Enhancements for transmission of AoC Tariff Information of the XML schema in TS 24.647 for AoC information model and AoC UNI is needed.
- Legacy protocol items which are not supported by NGN/IMS are not applicable in mapping tables in TS 32.280. Because they are no longer needed for IMS, these values could be also marked as not applicable from TS 24.647.

Objective: Implement new AoC features and apply modifications in CT1 TS 24.647.

- Addition of Charge Advice Information (CAI) elements and volume charging elements as specified in TS 32.280 and TS 32.299 for IMS in TS 24.647.
- Add volume charging elements as specified in TS 32.280 and TS 32.299 for IMS in TS 24.647.
- Enhancements for transmission of AoC Cost information by AoC-D and AoC-E in TS 24.647.
- Enhancements for transmission of AoC Tariff Information of the XML schema in TS 24.647.
- Not supported legacy protocol items shall be marked as not applicable from TS 24.647.

All enhancements and new AoC features shall be compatible to existing frozen releases and any duplicated solutions in and ETSI TISPAN shall be avoided.

8 CT Features

UID	Name	Acronym	Resource	WI_rapporteur
470003	**IMS Stage 3 - IETF Protocol Alignment - phase 4**	IMSProtoc4	C1	Alcatel-Lucent
480012	**Enhanced User Data Convergence (UDC) Model**	eUDC	C4	China Mobile
480014	**Further improvements of II-NNI Stage 3 based on operational feedback and evolution of other specifications**	II-NNI2	C3,IETF	Orange
480013	**AT Commands for IMS-configuration**	AT_IMS	C1	Ericsson
490011	**AT Commands for USIM Application Toolkit (USAT)**	AT_UICC	C1	ST-Ericsson
490012	**Communication Control for IMS by USIM (Stage 3)**	CC_IMS_USIM	C6	Gemalto
500003	**Dynamic view of SIP message for II-NNI (Stage 3)**	NNI_DV	C3	NTT
500007	**Introduction of Smart Card Web Server launch functionality**	SCWS_L	C6	Telecom Italia
500008	**USAT using AT Commands**	USAT_AT	C6	Giesecke & Devrient
500010	**Single Radio Voice Call Continuity (SRVCC) enhancements (Stage 3)**	eSRVCC	C1,C4,IETF	China Mobile
500011	**Single Radio Voice Call Continuity (SRVCC) in alerting phase (Stage 3)**	aSRVCC	C1	ZTE
500012	**PCRF failure and restoration**	PCRF_FR	C4,C3	NEC
510002	**Formalization of WLAN Files**	FoWF	C1	Deutsche Telekom
510007	**CS and IMS Interworking for CAT service - Early Session model**	CIIC_ES	C3	ZTE
510008	**EPC Node Restoration without Idle mode Signalling Reduction (ISR) activated**	EPC_NR	C4	Alcatel-Lucent
510108	**EPC Node Restoration with Idle mode Signalling Reduction (ISR) activated**	EPC_NR_ISR	C4	NEC
510009	**Mobile Terminating Roaming Forwarding with pre-paging**	MTRF	C4	Ericsson
510010	**UICC access to IMS Specification**	IMS-UICC-S	C6,C1	Gemalto
550006	**Testing for Terminal support of Rel-10 USIM, ISIM and USAT features**	USIM_R10_Test	C6	Gemalto

8.1 IMS Stage 3 - IETF Protocol Alignment UID_470003

Resources: C1

UID	Name	Acronym	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
470003	IMS Stage 3 - IETF Protocol Alignment - phase 4	IMSProtoc4	CP-100099	Alcatel-Lucent	CP#51 completed.	23.218, 24.229, 24.930

Supporting Companies: Alcatel-Lucent, Ericsson, Huawei, Nokia Siemens Networks, Research In Motion, ST-Ericsson.

Ensure protocol alignment between 3GPP Stage 3 IMS work and IETF. Review capabilities provided in SIP by IETF and document whether these capabilities are supported in the IM CN Subsystem or not

General

It is proposed to create a WID for IMS protocol development with Release 10 equivalent timescales in the same form as has been used for Rel-7, Rel-8 and Rel-9. While this is intended to be a short release, there are still a significant number of ongoing IETF developments that could appear within the Rel-10 timescales.

These can usefully be tagged with a specific work item code, rather than appearing under the ubiquitous TEI10.

See CP-080794 for the WID that was created for IMSProtoc2 in Rel-8 timescales.

See C1-091673 for the WID that was created for IMSProtoc3 in Rel-9 timescales.

In general this work item is about maintaining alignment of the development of the SIP used in IMS with that currently defined by IETF. Such changes are principally the end-to-end or end-to-application support of information without necessarily the need for other core network developments (such as interworking), and go beneath the level of detail of what is required from the stage 1 and stage 2 descriptions.

Having said that, there may be minor stage 1 and stage 2 enhancements produced under TEI8, or minor stage 1/stage 2 requirements coming from 3GPP2, OMA or ETSI TISPAN that could be further developed at stage 3 under this work item.

3 Justification

In Release 5, the IMS was defined to support IP Multimedia services. The feature set in Release 5 provides a basis for IP Multimedia support. At Release 6, 7, 8 and 9 further work was identified. At Release 10 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.

4 Objective

The areas to be considered are:

1. Ensure 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 to the above listed items, there may be minor technical improvements and enhancements to IMS, not of sufficient significance to be normally covered by a work item, that can be dealt with by this work item. The scope of this WID is protocol alignment, and those capabilities that may lead to new or enhanced IMS applications are not dealt with as part of this WID.

8.2 Enhanced User Data Convergence Model UID_480012

Resources: C4

To specify the CRUD (Create/Read/Update/Delete) operations based on SOAP protocol, which may be used by the applications having no high real-time requirement to the data access operations.

UID	Name	Acronym	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
480012	**Enhanced User Data Convergence (UDC) Model**	eUDC	CP-100295	China Mobile	CP#51 completed	29.335

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

Specify CRUD (Create/Read/Update/Delete) operations based on SOAP protocol, which may be used by the applications having no high real-time requirement to the data access operations

3 Justification

The TS 29.335 defines LDAP based CRUD (Create/Read/Update/Delete) messages and SOAP based S/N (subscription to notification/notification) messages respectively over the Ud interface as specified in the TS 23.335. LDAP was selected as the protocol for CRUD procedures due to the consideration of the high efficiency of LDAP for data access operations, though it is not much flexible for extension, and even does not support S/N procedures, which results in that each application FE applying CRUD and S/N procedures has to support two-protocol stack.

For applications with no high real-time requirement, such as provisioning systems, application servers, and SUPM servers, SOAP fulfils necessary application requirements for CRUD and S/N operations. There is hence no need for the corresponding FEs to support two-protocol stacks, which is much more complicated and should be avoided if possible.

4 Objective

The work item objectives are the following:

- Specify the CRUD operations based on SOAP protocol, which may be used by the applications having no high real-time requirement to the data access operations.

8.3 Further improvements of II-NNI Stage 3 UID_480014 (open IETF)

Resources: C3

UID	Name	Resource	Hyperlink	WI_rapporteur
480014	**Further improvements of II-NNI Stage 3 based on operational feedback and evolution of other specifications**	C3	CP-100326	Orange
480114	**Further improvements of II-NNI Stage 3**	C3	CP-100326	Orange
561001	**(IETF)...**	C3-IETF	CP-100326	Lionel Morand
561002	**(IETF)...**	C3-IETF	CP-100326	Christer Holmberg

UID	Name	Resource	Finish	Notes	TSs
480114	**Further improvements of II-NNI Stage 3**	C3	18/03/2011	CP#51 completed	29.165
561001	**(IETF)...**	C3-IETF	07/12/2012	RFC editors queue, miss reference	draft-ietf-sip-session-policy-framework
561002	**(IETF)...**	C3-IETF	07/12/2012	Passed WGLC (29.165)	draft-ietf-sipcore-proxy-feature

Supporting Companies: Orange, Ericsson, Telecom Italia, Deutsche Telekom, Huawei, NTT, Nokia Siemens Networks

Improvements of Rel-9 Feature UID_440027 Operational description of the Inter-IMS Network to Network Interface (II-NNI)

Related Study Item or Feature (if any)		
Unique ID	**Title**	**Nature of relationship**
440027	Operational description of the Inter-IMS Network to Network Interface (II-NNI)	

If no identified source of stage 2 information, justify:

No architectural change is present in this Work Item Description, since the aim is to continue Rel-8 work on a stage 3 specification.

Justification

This WID follows the Rel-8 FBI2-IOPSI Work Item and the Rel-9 II-NNI Work Item, which aimed to help operators to adopt common procedures and syntax to avoid inter-operability issues. The performed work helped in the interpretations of the TS 24.229 in the interconnection context, by the definition of the capabilities, expressed by listing relevant RFCs, which are mandatory or optional to support over the II-NNI. It is noted that the II-NNI profile will need to be improved due to evolutions of Release-10 specifications, and in parallel, due to operational feedback from real life deployments of SIP based IMS.

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 and Rel-9 work, most of the information about the II-NNI can be directly extracted from the TS 29.165, but the specification can be improved to better understand the II-NNI profile.

The II-NNI profile will need to be improved due to evolutions of Release-10 specifications, and in parallel, due to operational feedback from real life deployments of SIP based IMS.

Further work is necessary to establish a more detailed SIP profile on Interconnection interface between two operators, which would include the recommendation of support of certain parameters in SIP headers.

Currently the support of additional services beyond the supplementary services associated with the IMS multimedia telephony communication is not defined on II-NNI (ICS, SRVCC, IUT and MSC Server mid-call assisted feature, presence, etc).

A refinement of the documentation of different parameters of SDP at the II-NNI is also desirable. The transparency of certain SDP parameters between operators is necessary. In addition a documentation of the applicability of other SIP message bodies than SDP at the II-NNI is desirable.

The present TS 29.165 specification aims to provide such description of the II-NNI in order to support end-to-end service interoperability.

Related procedures for IMS entities such as the IBCF can be studied, and changes in normative procedures may be suggested to the responsible groups.

Objective : to continue the improvement of TS 29.165, following operational experience. It aims to facilitate the use of TS 29.165 for operators, as an II-NNI reference specification.

The work item will summarize relevant statements in TS 24.229 and other IMS specification for the II-NNI at the Ici reference point. All those statements will be described in the specific context of the interconnection.

Specific areas addressed will be:

- The work item will align the II-NNI documentation with changes in other IMS specifications due to other Rel-10 IMS work items.
- The work item will describe the applicability of parameters in SIP headers at the II-NNI.
- The work item will add information about the support of additional services beyond the supplementary services associated with the IMS multimedia telephony over the II-NNI (ICS, SRVCC, IUT and MSC Server mid-call assisted feature, presence, etc).
- The work will also address the refinement of the TS 29.165 SDP protocol section (e.g. handling of different parameters of SDP).
- This work item will describe the applicability of SIP message bodies at the II-NNI.

If the need for corrections, additions or modifications to SIP/SDP protocol or procedures are identified in the framework of this work item, change proposals will be transmitted to the WG responsible for the affected specifications.

8.4 AT Commands for IMS-configuration UID_480013

Resources: C1

UID	Name	Acronym	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
480013	AT Commands for IMS-configuration	AT_IMS	CP-100376	Ericsson	CP#51 completed	27.007

Supporting Companies: ST-Ericsson, Ericsson, HTC, Fujitsu, Nokia, Panasonic, Motorola.

Specify:
1) IMS-related AT-commands to configure MT and
2) IMS-related unsolicited response codes from MT to present to end-user

Justification

Usage of AT-commands is a standardised way to communicate between the Terminal Equipment (TE) and the Mobile Termination (MT). As UEs increase in complexity, a possible UE-architecture is to run applications (like games and MS-office suite) and MMI on an application processor (TE) and the GSM/UMTS/LTE stack on a signalling processor (MT).

AT-commands and result codes are used to have a standardised interface between the TE and the MT. AT-commands can also be used in automated testing to configure the MT with standardised and automated test-scripts. AT-commands for 3GPP are specified in TS 27.007.

Objective : In order for the TE to be able to configure the MT and be informed about events in the MT, AT-commands and response codes can be used in a standardised way. The objectives for the WID are to:

- specify IMS-related AT-commands that can be used to configure the MT; and
- specify IMS-related unsolicited response codes from the MT that can be used to present to the end-user.

8.5 AT Commands for USIM Application Toolkit (USAT) UID_490011

Resources: C1

UID	Name	Acronym	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
490011	AT Commands for USIM Application Toolkit (USAT)	AT_UICC	CP-100646	ST-Ericsson	CP#51 completed	27.007

Supporting Companies: Vodafone, Incard, ST-Ericsson, Giesecke & Devrient, Sagem Orga

Justification

In a configuration where the UICC is connected to a modem, the USIM Application Toolkit (USAT) defined in 3GPP TS 31.111 cannot be fully utilised because it ends at the modem and does not reach the entities with access to the resources targeted by the protocol (like display and keyboard). As a consequence the USAT commands like DISPLAY TEXT, PLAY TONE or GET INPUT cannot be used in this configuration.

Objective

This work item will extend 3GPP TS 27.007 to define AT commands for the exchange of USAT commands between the UICC and an entity connected to a modem and for the registration with the modem of the services which the connected entity can perform.

The AT-commands do not extend the profiles on the UICC or do not extend the current USAT-capabilities of the UICC.

In order to avoid using generic file access command and to provide quick access to information, the definition of a dedicated command in order to access the ICCID of the UICC is required.

Service Aspects

The new feature will enable USAT services to be used with entities connected to a modem.

8.6 Communication Control for IMS by USIM (Stage 3) UID_490012

Resources: C6

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
490012	**Communication Control for IMS by USIM (Stage 3)**	CP-100647	Gemalto	CT#51 completed	31.102, 31.103, 31.111

Stage 1 in TS 22.038 USAT service description.
Linked to CT6's UID_1273 Rel-5 BB Provisioning of IP-based multimedia services (24.229, 31.103) and UID_390021 Rel-8 BB CT6 aspects of SAE (31.102, 31.111)

Supporting Companies: Gemalto, Orange, France Telecom, Oberthur Card Systems, Giesecke & Devrient, China Mobile

Stage 1 in TS 22.038 USAT service description. Linked to CT6's UID_1273 Rel-5 BB Provisioning of IP-based multimedia services (24.229, 31.103) and UID_390021 Rel-8 BB CT6 aspects of SAE (31.102, 31.111)

Justification

It is stated in USAT requirements TS 22.038 sec 8.2 that:

"The communication control capability applies to all mobile originated requests independent of the applicable data exchange capability. Explicitly it applies to voice calls, IMS based communications and all services listed in the section USAT data exchange capabilities requirements".

IMS communication capabilities have to be taken into account, and all use cases from the operators to use Communication Control capability also apply to IMS communications (Voice call over IMS, multimedia telephony, etc.). User experience may be the same, whatever the underlying data exchange technology is used.

Objective : to define a Communication Control mechanism according to the requirements in TS 22.038 section 8.2 based on ISIM/USIM, which will apply to IMS based communications. The Communication Control mechanism will allow to initiate, terminate, allow, bar or modify IMS based communications. The Communication Control mechanism shall take into account the case where the called IMPU is a SIP URI or a tel URI.

8.7 Dynamic view of SIP message for II-NNI (Stage 3) UID_500003

Resources: C3

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
500003	**Dynamic view of SIP message for II-NNI (Stage 3)**	CP-100795	NTT	CP#52 completed. Linked to CT3 Rel-10 Feature UID_480014 Further improvements of II-NNI Stage 3 based on operational feedback and evolution of other specifications (II-NNI2)	29.165

Supporting Companies: NTT, NTT DoCoMo, France Telecom/Orange, Telecom Italia, Deutsche Telekom, Nokia Siemens Networks, NEC, Fujitsu, Huawei

Justification

TS 29.165 is addressing the Inter-IMS Network to Network Interface (II-NNI) consisting of Ici and Izi reference points between IMS networks. For the Ici reference point, the SIP profile over II-NNI is specified.

The SIP profile in the current version of TS 29.165 is focused on the capabilities which are supported over the II-NNI, but the conditions of setting SIP headers in the SIP messages which appear on II-NNI are not described.

Therefore, the II-NNI specification TS 29.165 does not yet provide fully sufficient information for testing purposes, and for identifying the network responsible of protocol errors. Taking into consideration the real inter-connection environment, some level of message based SIP profile over II-NNI is required for the reduction of potential errors during testing and operation.

To solve these problem and hence improve the usability of TS 29.165, the applicability of SIP header fields in SIP messages in a so-called "dynamic view" will be documented applying the methodology also commonly used in SIP related IETF RFCs: This methodology is used that documents the applicability of SIP header fields in SIP messages in a so-called "dynamic view" that also takes into account dynamic conditions, for instance the presence of a SIP header field in a SIP request message as condition for the SIP header field in the corresponding SIP response message.

Objective: to provide a SIP profile in dynamic view for II-NNI as complementary information in TS 29.165. This complementary information will be specified within a new informative annex in TS 29.165, and this work item does not modify the procedures specified in TS 24.229.

This feature will describe the applicability of SIP header fields in SIP messages in a dynamic view which shows the appearance conditions of SIP header fields based on TS 24.229 including specifications of MMTEL with its supplementary services.
The applicability of SIP header fields in dynamic view will be described for each request and response.

8.8 Introduction of Smart Card Web Server launch functionality UID_500007

Resources: C6

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
500007	**Introduction of Smart Card Web Server launch functionality**	CP-100883	Telecom Italia	CP#51 completed. Define a solution which allows enabling to launch Smart Card Web Server services in an easy and simple manner	31.102

Supporting Companies: Deutsche Telekom, France Telecom / Orange, Gemalto, Giesecke & Devrient, Sagem Orga, Telecom Italia, Telefonica

Justification: In 3GPP Smart Card Web Server is used as a building block to create services such as Contact Manager (TS 31.220). Nevertheless it is sometimes difficult for the user to get easy access to this feature. It would be beneficial if the user could get easy access to SCWS services.

Objective : to define a solution enabling to launch Smart Card Web Server services in an easy and simple manner.

8.9 USAT using AT Commands UID_500008

Resources: C6

UID	Name	Acronym	Resource	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
500008	**USAT using AT Commands**	USAT_AT	C6	CP-100884	Giesecke & Devrient	CP#51 completed	Stage 3 31.102, 31.111

Supporting Companies: Deutsche Telekom, France Telecom, Gemalto, Giesecke & Devrient, Sagem Orga, TeliaSonera

Stage 3 based on SA1 22.038CR#37r1 (Make USAT proactive capability reqs applicable to ME as a whole without regard to any particular configuration; e.g. a modem connected to an external display).

Justification

Mobile modems are becoming a significant sector of the mobile communications market. The architecture is based on three entities: the modem, the UICC with a USIM/ISIM and supporting USAT and the entity connected to the modem. This connected entity may be for example a PC, a display, a keypad etc. Currently support for USAT in these entities is being limited by the lack of standards defining how USAT should be extended to applications running in the connected entity through the interface between the modem and the connected entity.

CT1 has defined a mechanism by using the AT command set to provide a mechanism enabling to transport USAT to connected devices.

Objective: define the necessary mechanisms in the USIM and the USAT to support applications executed in the USIM and supported in connected entities:

- to discover the support of AT commands for USAT by the modem via the Terminal profile
- to discover the combined terminal profile for the modem together with the connected entity.
- to be notified when a connected entity initiates a USAT related session with the modem.
- to authenticate applications in connected entities
- to encrypt/decrypt the data that is exchanged between the USAT application and an application in a connected entity
- to check the integrity of the data that is exchanged between the USAT application and an application in a connected entity.

8.10 SRVCC enhancements (Stage 3) UID_500010 (open IETF)

Resources: C1,C4,IETF

UID	Name	Acronym	Resource	Hyperlink	WI_rapporteur
500010	**Single Radio Voice Call Continuity (SRVCC) enhancements (Stage 3)**	eSRVCC	-	CP-100881	China Mobile
500110	**CT1 part**	eSRVCC	C1	CP-100881	China Mobile
500210	**CT4 part**	eSRVCC	C4	CP-100881	China Mobile
521003	**(IETF) CT1 part**	eSRVCC	C1-IETF	CP-100881	Christer Holmberg

Name	Resource	Finish	Notes	TSs_and_TRs
CT1 part	C1	18/03/2011	CP#51 completed	24.229, 24.237
CT4 part	C4	18/03/2011	CP#51 completed	23.003, 23.008, 29.002, 29.230, 29.272, 29.305, 29.328, 29.329
(IETF) CT1 part	C1-IETF	07/12/2012	Passed WGLC	draft-ietf-sipcore-proxy-feature

Supporting Companies: China Mobile, Ericsson, ST-Ericsson, Huawei, ZTE, Nokia Siemens Network, Alcatel-Lucent, Samsung, NEC

Justification

Triggered by Rel-10 SA2 TR 23.856 Study on Single Radio Voice Call Continuity enhancements UID_440049. Normative Stage 2 changes have been captured in SA2 TS 23.237. This work covers the Stage 3.

Objective : to implement SIP based solution based on SA2 TS 23.237 covering:

- Functionalities of new entities and enhancements on existing entities;
- Procedures of enhanced SRVCC, with the support of mid-call feature during SRVCC handover;
- Procedures of identifier storage and exchange, i.e. ATU-STI, C-MSISDN, STN-SR and SRVCC capability.

Interaction with SRVCC Mid-call feature should be taken into account.

8.11 SRVCC in alerting phase (Stage 3) UID_500011 (open testing)

Resources: C1,R5

UID	Name	Acronym	Resource	Comp	Hyperlink	WI_rapporteur
500011	**Single Radio Voice Call Continuity (SRVCC) in alerting phase (Stage 3)**	aSRVCC	C1,R5	50%	CP-110145	ZTE
500111	**CT aspects**	aSRVCC	C1	100%	CP-110145	ZTE
570005	**Conformance test**	aSRVCC-UEConTest	R5	0%	RP-121128	NTT DoCoMo

UID	Name	Finish	Comp	Notes	TSs
500111	**CT aspects**	03/06/2011	100%	CP#52 completed	24.008, 24.237
570005	**Conformance test**	01/03/2013	0%	Testing for Rel-10 SRVCC in alerting phase (aSRVCC) that builds on Rel-8 service continuity feature by adding access transfer of media of an IM session in PS to CS direction during the alerting phase for access transfers as specified in TS 23.216	36.523-1, 36.523-2, 36.523-3

Supporting Companies: ZTE, China Mobile, Samsung, Nokia Siemens Networks, Ericsson, ST-Ericsson, Huawei

Builds on Rel-8 UID_390057 (IMS-Cont) TS 23.216 Stage 2. Provide Stage 3 for SRVCC PS-CS transfer of a call in alerting phase. Stage 2 TEI10 in TS 23.237 (6.3.2.1.4c/d, 6.3.2.1.7a/b)

Justification

This feature builds on the service continuity feature in Rel-8 by adding the ability to perform access transfer of media of an IM session in PS to CS direction in alerting phase for access transfers as specified in TS 23.216.

SRVCC PS-CS transfer of a call in alerting phase has been completely specified in Rel-10 Stage 2 TS 23.237 under TEI10 as shown in subclauses 6.3.2.1.4c, 6.3.2.1.4d, 6.3.2.1.7a and 6.3.2.1.7b.

Based on the stage 2 requirements, the relevant stage 3 specification work is needed.

Objective : to implement the specification for the SRVCC PS-CS transfer of a call in alerting phase based on Rel-10 Stage 2 TS 23.237.

8.12 PCRF failure and restoration UID_500012

Resources: C4,C3

UID	Name	Acronym	Resource	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
500012	**PCRF failure and restoration**	PCRF_FR	C4,C3	CP-100703	NEC	CP#51 completed	Stage 2/3 work
500112	**CT4 part**	PCRF_FR	C4	CP-100703	NEC	CP#51 completed	Stage 2 23.007, Stage 3 29.230
500212	**CT3 part**	PCRF_FR	C3	CP-100703	NEC	CP#51 completed	Stage 3 29.212, 29.213, 29.214, 29.215

Supporting Companies: NEC, NTT DoCoMo, Huawei, Ericsson, Bridgewater Systems, Cisco

Triggered by CT3 TR 29.816 Study on Policy and Charging Rules Function (PCRF) failure and restoration (FS_PCRF-FR) UID_450013

Justification

CT3 has performed a feasibility study on the topic of PCRF failure and restoration (results documented in TR 29.816) to define the service behaviour after a PCRF failure. It is now necessary to specify the stage 2 requirements applicable in PCRF failure and restoration scenarios, and their possible stage 3 protocol impacts, to ensure that the network can behave in a deterministic manner.

Objective

This WI aims at specifying stage 2 requirements and possible corresponding stage 3 protocols impacts for PCRF failure and restoration for both the non-roaming case and the roaming case, covering the following aspects:

- Restart/failure detection mechanism;
- PCRF reselection function, e.g. DRA behaviour;
- The procedure of PCRF clients when the PCRF is unavailable;
- The procedure at PCRF and PCRF clients after PCRF failure.

8.13 Formalization of WLAN Files UID_510002

Resources: C1

UID	Name	Acronym	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
510002	**Formalization of WLAN Files**	FoWF	CP-110288	Deutsche Telekom	CP#51 completed. TS 24.235 for Info+Approval. Define the ME files as specified in 24.234 in OMA Device Management structure	Stage 3: 24.234, new 24.235

Supporting Companies: Deutsche Telekom, Research In Motion, Orange, Vodafone, BT, Intel

Policy files already exist in Stage 3 TS 24.234, however no formal description exists.

Justification

3GPP TS 24.234 defines a number of policies that the operator can configure on the USIM and ME. The USIM files have been formally defined in since Rel-6, however the ME versions of the files are just mentioned but no formal description exists. CT groups typically define files stored in the ME using OMA Device Management.

Multi RAT devices are becoming more prevalent and WLAN is being used significantly more and more to offload internet based application data. Formal description of the existing ME files allows an operators, if they choose, to deploy a single mechanism to provision data in an ME.

Objective: **t**o define the ME files as specified in 3GPP TS 24.234 in OMA Device Management structure.

8.14 CS and IMS Interworking for CAT service - Early Session model UID_510007

Resources: C3

UID	Name	Acronym	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
510007	**CS and IMS Interworking for CAT service - Early Session model**	CIIC_ES	CP-110283	ZTE	CP#52 completed. Stage 1 in Rel-8 TS 22.182 Customized Alerting Tones (CAT) service. Stage 3 TS 24.182 defines 3 impl models: Gateway, Forking, Early Session. Specify missing CAT service interworking procedures btw CS & IMS networks	Stage 3 29.163, 29.235, 29.292

Supporting Companies: ZTE, China Mobile, CATT, CATR

Related Study Item or Feature (if any)		
Unique ID	**Title**	**Nature of relationship**
370028	Customized Alerting Tones (CAT) Requirements; Stage 1	Stage 1 service requirements

Justification

In stage 1 specification for CAT service, it has the requirement that the CAT service can be interworked between CS network and IMS network.

As specified in stage 3 specification 3GPP TS 24.182, it defined three models to implement the CAT service, the gateway model, forking model and early session model. But right now, interworking procedures between CS network and IMS network to support early session CAT are lacking.

Based on the stage 1 requirements, the relevant stage 3 specification work is needed

Objective : to enhance the interworking of the CAT service. It shall cover the following aspects:

For interworking a call between the CS domain (on the originating side) and IMS (on the terminating side), update codec negotiation and Mn procedures at MGCF/IM-MGW and MSC server enhanced for ICS to support early session model of CAT service over IMS;

8.15 EPC Node Restoration without Idle mode Signalling Reduction (ISR) activated UID_510008

Resources: C4

UID	Name	Acronym	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
510008	**EPC Node Restoration without Idle mode Signalling Reduction (ISR) activated**	EPC_NR	CP-110092	Alcatel-Lucent	CP#51 completed.	Stage 2/3: 23.007, 29.274

Supporting Companies: Alcatel-Lucent, NTT DoCoMo, ZTE, NEC, Nokia Siemens Networks, Huawei, Ericsson

Triggered by DRAFT TR 23.857 Study on EPC Nodes Restoration (FS_EPC_NR) UID_490014

If no identified source of stage 1 information, justify: SA1 does not define specific service requirements for failure and restoration scenarios.
If no identified source of stage 2 information, justify: This WI defines Stage 2 to be used for developing stage 3.

Justification

EPC nodes are expected to be highly reliable, but occasional restart or failure due to various reasons can not be avoided. CT4 identified in TR 23.857 certain serious mis-operations if the MME, S4-SGSN, SGW or PGW fails with the recovery mechanisms currently specified in 3GPP, e.g. a subscriber may not be able to receive any IMS terminating call during a long period following an MME failure, and concluded that certain enhancements would allow to provide service resiliency after an EPC node failure.

Objective: normative work according to conclusions of TR 23.857, for the MME and S4-SGSN failure with and without restart scenarios **when ISR is not activated**.

8.16 EPC Node Restoration with Idle mode Signalling Reduction (ISR) activated UID_510108

Resources: C4

UID	Name	Acronym	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
510108	**EPC Node Restoration with Idle mode Signalling Reduction (ISR) activated**	EPC_NR_ISR	CP-110287	NEC	CP#52 completed. Triggered by DRAFT TR 23.857 Study on EPC Nodes Restoration (FS_EPC_NR) UID_490014	Stage 2/3: 23.007, 29.274

Supporting Companies: NTT DoCoMo, Ericsson, Alcatel-Lucent, NEC, Nokia Siemens Networks, Huawei, NTC, ZTE

Related Study Item or Feature (if any		
Unique ID	**Title**	**Nature of relationship**
490014	Study on EPC Nodes Restoration	TR 23.857 Feasibility study

Triggered by DRAFT TR 23.857 Study on EPC Nodes Restoration (FS_EPC_NR) UID_490014

If no identified source of stage 1 information, justify: SA1 does not define specific service requirements for failure and restoration scenarios.
If no identified source of stage 2 information, justify: This WI defines Stage 2 to be used for developing stage 3.

Justification

EPC nodes are expected to be highly reliable, but occasional restart or failure due to various reasons can not be avoided. CT4 identified in TR 23.857 certain serious mis-operations if the MME, S4-SGSN, SGW or PGW fails with the recovery mechanisms currently specified in 3GPP, e.g. a subscriber may not be able to receive any IMS terminating call during a long period following an MME failure, and concluded that certain enhancements would allow to provide service resiliency after an EPC node failure.

Objective: normative work according to conclusions of TR 23.857, for the MME and S4-SGSN failure with and without restart scenarios **when ISR is activated**.

8.17 Mobile Terminating Roaming Forwarding with pre-paging UID_510009

Resources: C4

UID	Name	Acronym	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
510009	**Mobile Terminating Roaming Forwarding with pre-paging**	MTRF	CP-110093	Ericsson	CP#52 completed. Provides Stage 2/3 alternative solution to Mobile Terminating Roaming Retry to solve roaming events during paging, in particular to support CSFB. Hence, no new Stage 1 requirements exist	Stage 2/3: 23.012, 23.018, 23.116, 29.002

Supporting Companies: Ericsson, China Mobile, Alcatel-Lucent, Huawei, ZTE, Nokia Siemens Networks

If no identified source of stage 1 information, justify: This feature provides an alternative solution to MTRF to solve roaming events during paging, in particular to support CSFB. Therefore no new stage 1 requirement exists.

If no identified source of stage 2 information, justify: This feature provides an alternative solution to MTRF to solve roaming events during paging, in particular to support CSFB

Justification

In TS 23.018 Roaming Retry is specified for the case of mobile terminated calls where the MSC, to which the UE sends the LAU, is different from the MSC that sent the paging message to the UE, i.e. the UE has moved during the paging request. The Roaming Retry solution has the drawback that it impacts the GMSC, and hence it would be costly to deploy for operators with a large number of GMSC where there would otherwise be no reason to upgrade the GMSC.

Additionally the Roaming Retry procedure requires additional signalling to/from the GMSC to perform subsequent Send Routing Information (SRI) requests and user plane signalling to establish new NNI connection.; for international roaming scenarios this signalling can have significant affects on the call set up time.

Objective: to develop stage 2 and 3 protocol enhancements to support Roaming Forwarding. Impacts required:

- New procedures defined in TS 23.018 (basic call) and 23.012 (location update) to allow VMSCs to forward roaming data to the new VMSC rather than initiate a retry from the GMSC.
- Protocol extension to MAP to allow the transfer of roaming data between Old MSC and New MSC

8.18 UICC access to IMS Specification UID_510010

Resources: C6,C1

UID	Name	Resource	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
510010	**UICC access to IMS Specification**	C6,C1	CP-110279	Gemalto	CP#52 completed	-
510110	**CT6 part**	C6	CP-110279	Gemalto	CP#51 completed	31.102, 31.103, 31.111
510210	**CT1 part**	C1	CP-110279	Gemalto	CP#52 completed	24.229

Supporting Companies: China Mobile, France Telecom, Gemalto, Giesecke & Devrient, Research In Motion, Sagem Orga

Triggered by Rel-10 TR 31.828 Study on UICC access to IMS (FS_IMS-UICC) UID_480017. Specify mechanism in UICC and ME to make use of IMS functionality implemented in ME for case a) an ISIM is present b) no ISIM is present in UICC

Justification

IMS may allow operators to develop new value added applications as well as to enhance their existing solutions. These IMS-based applications may be located in the ME. Furthermore, additional IMS-based applications could reside and be executed in the UICC. This will lead to new opportunities and allow for example the development of operator-specific IMS-based applications that require a high level of security and portability.

The requirement in TS 22.101 clause 13.2.1a "UICC applications and IMS" states:

UICC applications may make use of IMS functionalities controlled by ME.

> *Note: This is to allow a UICC application to interact with an Application Server (AS) through IMS. Examples of UICC applications include identity management, banking applications, etc.*

Objective: to specify necessary mechanism in UICC and ME to make use of IMS functionality implemented in ME. Take into account cases where an ISIM is present where no ISIM is present in the UICC. Specified mechanism to allow:

- discovery of the support of the feature by each other (ME-UICC)
- discovery of the supported capability by the ME
- the UICC to receive messages pushed by an IMS application server
- the UICC to send messages to an IMS application server
- the UICC to be notified when IMS registration events occur.
- the identification of a message for which the destination is a UICC application.
- routing messages from and to UICC applications

This work item will implement the IARI based solution described in TR 31.828 "UICC access to IMS".

8.19 Testing for Terminal support of Rel-10 USIM, ISIM and USAT features UID_550006

Resources: C6

UID	Name	Acronym	Finish	Comp	Hyperlink	WI_rapporteur	Notes	TSs
550006	**Testing for Terminal support of Rel-10 USIM, ISIM and USAT features**	USIM_R10_Test	07/12/2012	40%	CP-120396	Gemalto	CP#56 updated WID CP-120174=>CP-120396.	31.121, 31.124, new TS 31.ABC (Conformance Testing of specific features)

NOTE: Testing for New features in Rel-10 specifications for USIM, ISIM applications and USIM Application Toolkit (USAT) in TS 31.102, 31.103, 31.111

Supporting Companies: China Mobile, Comprion, Gemalto, Oberthur Technologies, Oracle

Related Work Item(s)		
Unique ID	**Title**	**TS**
	Characteristics of the USIM application	31.102
	USIM Application Toollit (USAT)	31.111
	Characteristics of the ISIM application	31.103

Justification

New features have been introduced for Rel-10 in the specifications for the USIM and ISIM applications as well as for the USIM Application Toolkit (USAT). To verify the support of these features in Rel-10 compliant Terminals, the specification of related test cases is needed.

Objective: to develop test cases to verify the conformance of Terminals with Rel-10 features for the USIM and ISIM applications and Rel-10 features for the USIM Application Toolkit (USAT). Existing test specifications TS 31.121 and TS 31.124 will be updated to provide necessary test coverage unless it is felt that a dedicated document is needed (e.g. for Relay Node aspects).

This work item covers the following features:

- CSG list display control
- NAS configuration parameters
- SCWS launch pad
- Relay Node procedures
- UICC access to IMS (includes Open channel for IMS, IMS registration event, incoming IMS data event, Refresh IARI list, storage of IARI list in USIM or ISIM)
- Communication Control for IMS

10 Expected Output and Time scale

New specifications						
Spec No.	Title	Prime rsp. WG	2ndary rsp. WG(s)	Presented for information at plenary#	Approved at plenary#	Comments
31.ABC	Conformance Testing of specific features	CT6			CT #58	This is only to be created if needed.

Affected existing specifications				
Spec No.	CR	Subject	Approved at plenary#	Comments
31.121		Definition of USIM / ISIM Release 10 tests	CT#58 Dec 2012	
31.124		Definition of USAT release 10 tests	CT#58 Dec 2012	

9 UTRA Features

UID	Name	Resource	WI_rapporteur
380077	1.28 Mcps TDD Repeater	R4	RITT
450019	1.28 Mcps TDD Multi-carrier HSUPA	R1,R2,R3,R4	CATR
460014	1.28 Mcps TDD Home NodeB RF requirements	R4	TD Tech
470012	Multi-User Multiple-Input and Multiple-Output (MU-MIMO) for 1.28Mcps TDD	R1,R2,R3,R4	CATT
450027	AGNSS Minimum Performance for UTRAN	R4,R5	Thales
460005	Inclusion of RF Pattern Matching Technologies as positioning method in the UTRAN	R2,R3	Polaris Wireless
460015	Four carrier HSDPA	R1,R2,R3,R4,R5	Qualcomm
470013	Performance Requirements for two-antenna 1.28Mcps TDD Type 1 and Type 2 UE receiver	R4	TD Tech
480020	Automatic Neighbour Relation (ANR) for UTRAN	R3,R2,R5	ZTE
480021	Support of New Band Combinations for Dual-Band Dual Cell HSDPA	R4,R2	AT&T
480022	MIMO operation with non-MIMO coexistence in HSDPA	R4,R5	Qualcomm
490022	Interfrequency detected set measurements for UMTS	R2,R4	Nokia

9.1 1.28 Mcps TDD Repeater UID_380077

Resources: R4

UID	Name	Resource	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_and_TRs
380077	1.28 Mcps TDD Repeater	R4	RP-071003	RP-100039	RITT	RP#47 completed	UTRA 25.113, new 25.116, 25.153 (testing)

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

Repeaters are useful for extending the coverage into buildings, train/car tunnels, subways, highways, etc. Also, by installing repeaters at the sector borders or in highly dense areas, the transmitted power from the MS and the BS could be lowered, leading to an improvement in C/I and thereby capacity.

For installation of repeaters in cellular networks a specification is needed due to regulation (e.g. in China).

For operators without capability of handover to 2nd generation mobile systems, extending the coverage of LCR TDD is important especially in initial rollout.
For operators with capability of handover to 2nd generation mobile systems, user requirements (e.g. high data rates) may not be met by those systems and extended LCR TDD coverage might be needed.

This work specifies minimum RF characteristics for LCR TDD repeaters including at least:

- Spurious emissions
- Inter-modulation products
- Out of band gain
- Frequency stability
- Modulation accuracy
- Blocking characteristics
- Timing Accuracy

Conformance requirements and Electro Magnetic Compatibility (EMC) were specified as well.

9.2 1.28 Mcps TDD Multi-carrier HSUPA UID_450019

Resources: R1,R2,R3,R4

UID	Name	Resource	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_and_TRs
450019	**1.28 Mcps TDD Multi-carrier HSUPA**	R1,R2,R3,R4	RP-090990	RP-101079	CATR	RP#50 completed	UTRA 25.102, 25.105, 25.123, 25.221, 25.222, 25.223, 25.224, 25.225, 25.306, 25.319, 25.321, 25.331, 25.423, 25.427, 25.433

Supporting Companies: CATR, CATT, New Postcom, Potevio, Spreadtrum Communications, TD Tech, ZTE.

The introduction of 1.28Mcps TDD multi-carrier HSDPA in 3GPP Release 7 accounts for a significant peak data rate boost over single-frequency transmission framework. And this also leads to remarkable imbalance between downlink and uplink single user throughput. In this context, aggregation of multiple frequencies in the uplink can significantly increase uplink single-user throughput to satisfy increased use of packet data service.

This work:

- Specified multi-carrier HSUPA operation for the following scenarios:
    a. Multi-carrier transmission only applies to physical channels for scheduling E-DCH
    b. UE supporting multi-carrier E-DCH transmission should be capable of simultaneously transmitting on multiple carriers (up to 6). Multiple carriers assigned to one UE for E-DCH transmission shall be adjacent.
    c. The scheme of multi-carrier HSUPA operation should keep common with single-carrier HSUPA operation as much as possible, and different aspects to be introduced should be investigated carefully and justified.
    d. Backward compatible with pre-Rel-10 HSUPA operation
- Introduced a Stage 2 level definition of the multi-carrier HSUPA to TS25.319
- Introduced the functionality for the relevant specifications of
    a. Physical layer protocols and procedures
    b. L2/L3 protocols and procedures
    c. UTRAN network interfaces
- Introduced radio frequency performance requirements for relevant specifications and requirements for support of RRM

The framework of multi-carrier HSUPA operation took the existing multi-carrier HSDPA and Rel-8/9 LCR TDD HSPA+ architecture into account.

9.3 1.28 Mcps TDD Home NodeB RF requirements UID_460014

Resources: R4

UID	Name	Resource	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_and_TRs
460014	**1.28 Mcps TDD Home NodeB RF requirements**	R4	RP-100607	-	TD Tech	RP#50 completed	UTRA
460114	**Core part**	R4	RP-100607	RP-100446	TD Tech	RP#48 completed	25.105
460214	**Perf. part**	R4	RP-100607	RP-101081	TD Tech	RP#50 completed	25.142, new TR 25.968

Supporting Companies: TD Tech, CMCC, CATT, Picochip Designs, ZTE.

Triggered by FS_RAN-HNBLCRTDD UID_410016 Study on 1.28 Mcps TDD Home NodeB (TR 25.866)

1.28Mcps TDD Home NodeBs provide attractive services and data rates in home environments in China. Whereas UTRAN is not optimally suited for this application, as it was developed and defined under the assumption of coordinated network deployment. Actually home NodeBs are typically associated with uncoordinated and large scale deployment.

This work amends the 1.28Mcps TDD Home NodeB related RF specifications as suggested in RAN4 TR 25.866 to support the Home NodeBs application. No changes to the UE RF specifications were foreseen.

TR 25.866 on 1.28Mcps TDD Home NodeB feasibility concluded on RAN4 related matters that:

- 1.28Mcps TDD Home NodeBs should not degrade significantly the performance of networks deployed in other channels.
- Frequency reuse can increase the DL and UL throughput of 1.28Mcps TDD Home NodeBs. More effective interference mitigation schemes should be studied to enhance the throughput of both macro cell and home BS.
- 1.28Mcps TDD Home NodeBs should provide reasonable performance whether deployed in isolation or whether multiple Home NodeBs are deployed in the same area. However, in high density environments, techniques may be needed to mitigate inter-HNB interference.
- It is ensured that such an emission complies with regulatory requirements in force where that 1.28Mcps TDD Home NodeB is operating.

1.28Mcps TDD Home NodeB must support UE speeds up to 30 km/h.

Core

TR 25.866 suggests that existing 1.28Mcps TDD Base Station classes do not fully address the RF requirements of the Home NodeB application. TR 25.866 summarises where changes to TS 25.105 are expected to transmitter characteristics, receiver characteristics and performance respectively. Also guidance to mitigate interference and interference test is needed. This work:

- updates the RF requirement specification TS 25.105
- gives guidance to mitigate interference and interference test are need clarification.

For RAN4:

- facilitates the key RF requirements for 1.28Mcps TDD Home Node B transmitter and receiver characteristics
- Gives some interference mitigate guidance for Home Node B deployment

9.4 MU-MIMO for 1.28Mcps TDD UID_470012

Resources: R1,R2,R3,R4

UID	Name	Resource	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_and_TRs
470012	**Multi-User Multiple-Input and Multiple-Output (MU-MIMO) for 1.28Mcps TDD**	-	RP-100347	-	CATT	RP#52 completed	UTRA
470112	**Core part**	R1,R2,R3	RP-100347	RP-101085	CATT	RP#50 completed	25.221, 25.222, 25.224, 25.306, 25.308, 25.319, 25.331, 25.423, 25.425, 25.433, 25.435
470212	**Perf. part**	R4	RP-100347	RP-110520	CATT	RP#52 completed	25.102, 25.105, 25.142

Supporting Companies: CATT, CATR, Potevio, TD Tech, ZTE

The MU-MIMO technique for both uplink and downlink can further improve the spectral efficiency by allowing UEs share the same channelization codes and use different midamble shifts. Besides, for the scenarios when associated DPCH is not configured, MU-MIMO can provide an efficient and simple method for the network to obtain the essential results assisting the co-schedule decision, i.e. independent channel estimation results of the co-scheduled UEs.

Some initial evaluations and discussion has been done in RANs and during the RAN1#59 meeting, following working assumptions were agreed:

1 The special default midamble allocation scheme shall be introduced in CELL_DCH and CELL_FACH state to allow up to 4 different UEs use the same channelization codes and different midamble shifts for both HS-DSCH and E-DCH.
2 Only one capability shall be reported to NW by UE using L3 signalling and it is independent of SU-MIMO capability. NW shall indicate whether the special default midamble allocation scheme is configured.
3 The special default midamble allocation scheme can be configured together with SPS or SU-MIMO for one UE, but the special default midamble allocation scheme can not be used with SPS scheme or SU-MIMO scheme in one TTI for one UE.
4 E-HICH signature sequence allocation mechanism shall be optimized to allow the signature sequences for the UEs sharing the same channelization codes to be mapped on the same E-HICH.
5 The inter-cell interference caused by Special default midamble allocation scheme can be considered.
6 The periodic standalone midamble shall be introduced as an optional configuration.

Objective: to support up to 4-user MU-MIMO applicable to E-PUCH and HS-PDSCH for 1.28Mcps TDD to improve capacity and spectral efficiency. Less than 4 users MU-MIMO, e.g. 2-user MU-MIMO shall also be supported.

9.5 AGNSS Minimum Performance for UTRAN UID_450027

Resources: R4,R5

UID	Name	Resource	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_and_TRs
450027	**AGNSS Minimum Performance for UTRAN**	R4,R5	RP-100363	-	Thales	RP#53 completed	UTRA
450127	**AGNSS Minimum Performance Specification Development**	R4	RP-100363	RP-101078	Thales	RP#50 completed	new 25.172
480018	**AGNSS test case development for UMTS**	R5	RP-101405	RP-110979	Thales	RP#53 completed	34.108, 34.109, 34.123-1, 34.123-2, 34.123-3, 36.37.571-5, new 34.172

Triggered by Rel-7 UID_20050 (GNSS in UTRAN) and Rel-8 UID_400051 (Support for Additional NSS). Linked to GERAN Rel-8 UID_38002 (AGNSS Performances and Testing Procedures).

Supporting Companies: Thales, Spirent Communications, Qualcomm Europe, Alcatel-Lucent, SiRF.

Related Study Item or Feature (if any)		
UID	**Title**	**Nature of relationship**
20050	Global Navigation Satellite System (GNSS) in UTRAN	The present work item aims at defining the minimum performance requirements of the AGNSS feature included in Rel-7 .
400051	Support for Additional Navigation Satellite Systems (ANSS) for LCS	The present work item aims at defining the minimum performance requirements for the additional navigation satellite systems included in Rel-8.

The support for Galileo and Additional Navigation Satellite Systems (GANSS) has been introduced in 3GPP UTRAN Rel-7 specifications. Rel-7 of UTRAN supports Galileo, and additional navigation satellite systems, such as Modernized GPS, Glonass, QZSS, and SBAS have been introduced in Rel-8. This work has now been completed under the work items LCS3-GNSS-UTRAN and RANimp-ANSS.

There is currently no core specification (and associated conformance test cases) for the minimum performance of these GNSS receivers (comprising Galileo, Modernized GPS, Glonass, SBAS or QZSS) in UEs using AGNSS in the UTRAN.

A minimum performance specification, minimum performance conformance test cases and signalling test cases are all desirable to give the network operators implementing services based on AGNSS a baseline performance that can be relied on in all equipped UEs.

3GPP TSG GERAN is currently developing minimum performance requirements (WI AGNSSPTP-Perfreq) for A-GANSS in GERAN. The minimum performance requirements for UTRAN will be aligned as closely as possible with the GERAN specifications for minimum performance.

Objective: to define the minimum performance requirements for UEs supporting AGNSS in the UTRAN.
The minimum performance requirements for UEs supporting AGNSS in the UTRAN shall be aligned as closely as possible with the GERAN specifications for minimum performance.

9.6 Inclusion of RF Pattern Matching Technologies as positioning method in the UTRAN UID_460005

Resources: R2,R3

UID	Name	Resource	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_and_TRs
460005	**Inclusion of RF Pattern Matching Technologies as positioning method in the UTRAN**	R2,R3	RP-091427	RP-110048	Polaris Wireless	RP#51 completed	UTRA
460105	**Core part**	R2,R3	RP-091427	RP-110048	Polaris Wireless	RP#51 completed	25.305, 25.453

Supporting Companies: AT&T, TCS – TeleCommunication Systems, Thales Alenia, Polaris Wireless.

Triggered by Study UID_380079 Evaluation of the inclusion of Path Loss Based Technology in the UTRAN (25.907)

Parent Feature (or Study Item)		
Unique ID	**Title**	**TS**
380079	Evaluation of the inclusion of Path Loss Based Technology in the UTRAN	TR 25.907
20001	Rel-6 UE positioning	LCS2-UEpos

RF Pattern Matching technologies have been deployed and successfully utilized for location in accordance with the FCC mandate for Phase II E-911 services on GSM networks. The technology should be supported in the UTRAN to allow current service providers to maintain their LCS capabilities as they migrate their networks to UMTS. Also, continued improvement and development of the technology necessitates that it be managed and championed as an independent location technology.

Objective : to include RF Pattern Matching as a positioning method by adding parameters to PCAP messaging.

This WI complements already standardized location methods.

9.7 Four carrier HSDPA UID_460015 (open testing)

Resources: R1,R2,R3,R4,R5

UID	Name	Resource	Finish	Comp	Hyperlink	Status_Report	Notes	TSs_TRs
460015	**Four carrier HSDPA**	-	07/12/2012	86%	RP-100991	-	RP#53 completed	UTRA
460115	**Core part**	R1,R2,R3,R4	18/03/2011	100%	RP-100991	RP-110046	RP#51 completed. RP#52 TR 25.864 v200 for Approval	25.101, 25.104, 25.133, 25.211, 25.212, 25.213, 25.214, 25.215, 25.308, 25.331, 25.423, 25.433, 26.306, new TR 25.864
460215	**Perf. part**	R4	16/09/2011	100%	RP-100991	RP-110986	RP#53 completed	25.101, 25.104, 25.133, 25.141
540006	**Test part**	R5	07/12/2012	45%	RP-111565	RP-120961	-	34.108, 34.121-1, 34.121-2, 34.123-1, 34.123-2, 34.123-3

Supporting Companies: Qualcomm, Ericsson, ZTE, Nokia Siemens Networks, Nokia, Huawei, Interdigital Communications, Bouygues Telecom, China Unicom, emobile, Samsung, Softbank Mobile, Telecom Italia, Vodafone, Orange, Alcatel-Lucent, Alcatel-Lucent Shanghai Bell.

Large mobile broadband usage and possibilities for competitive offerings to customers is continuing to increase the demands on the HSPA radio network.

RAN #43 Mar 2009 discussed four different HSPA evolution components for multi-cell/carrier: dual band DC-HSDPA, DC-HSDPA with MIMO, DC-HSUPA and more than 2 carriers HSDPA. RAN#43 agreed to start activities on HSPA evolution with the first 3 components and that more than 2 carriers should be deferred to later. All of these initial 3 components have been finalized from a physical layer perspective and it is justified to now start the 4th component.

Building upon the MIMO functionality introduced in Rel-7, DC-HSDPA in Rel-8 and the combination with MIMO in Rel-9, the performance gains of DC-HSDPA with MIMO also hold with more than 2 carriers.

Objective

- Specify 3-4 cell HSDPA operation in combination with MIMO for the following scenarios:
  a. The 3-4 carrier transmission only applies to HSDPA physical channels.
  b. The carriers belong to the same Node-B.
  c. The carriers are configured to be spread across 1 or 2 bands.
  d. The carriers within one band are configured to be adjacent.
  e. Identification of which limited number of combinations (including which combinations of numbers of downlink carriers per band in the dual-band case and which carriers use MIMO) that should be targeted is part of the work item. The combinations developed under this WI will be added to the WID in RAN#47.
  f. 3-4 carriers HSDPA is independent of DC-HSUPA and thus it should be compatible with single UL carrier operation.
  g. Functionality currently defined for DC-HSDPA in combination with MIMO, DC-HSUPA and DB-HSDPA should be re-used unless non-re-use can be justified by clear benefits.
- Introduce the functionality in the relevant specifications of
  a. UL and DL control channel structure
  b. L2/L3 protocols
     b.1 The Layer 1/2/3 protocols shall be designed in such a way that they would not require changes to support non-adjacent channels in same band
  c. UTRAN network interfaces
  d. UE RF core requirements with the work task breakdown

9.8 Performance Requirements for two-antenna 1.28Mcps TDD Type 1&2 UE receiver UID_470013

Resources: R4

UID	Name	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_and_TRs
470013	**Performance Requirements for two-antenna 1.28Mcps TDD Type 1 and Type 2 UE receiver**	RP-100168	-	TD Tech	Stage 3. RP#52 completed	UTRA
470113	**Core part**	RP-100168	RP-100454	TD Tech	RP#48 completed	25.102
470213	**Perf. part**	RP-100168	RP-110521	TD Tech	RP#52 completed	25.102

Supporting Companies: CATR, CATT, CMCC, NewPostcom, Potevio, TD Tech, ZTE

3 Justification

With aid of two receiving antennas at UE side, 1.28Mcps TDD HSPA and HSPA+ network is able to achieve considerably higher downlink throughput by receiving diversity or interference cancellation method based on two antennas. On top of boosting average downlink throughput, regions where high data rate service, yielding a higher quality of user experience, is applicable can therefore be expanded.

Thereby it is beneficial to introduce two-antenna technique for 1.28Mcps TDD UE to help improve weak coverage and low geometry to achieve better user experience. Initial improvements will be carried out upon receiving diversity reference receiver (Type 1) and interference-aware cancellation reference receiver (Type 2).

It is proposed to define performance requirements for 1.28Mcps TDD using Type 1 and Type 2 receiver. However, no specific implementation solution is mandated by the performance requirements.

4 Objective : definition and performance requirement standardization of two types of 1.28Mcps TDD UE receiver with two antennas for the following work tasks

- Definition of Type 1 and Type 2 receiver in RAN4 specification
- Performance requirements in RAN4 specifications

9.9 Interfrequency detected set measurements for UMTS UID_490022

Resources: R2,R4

UID	Name	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_and_TRs
490022	**Interfrequency detected set measurements for UMTS**	RP-101015	RP-101093	Nokia	RP#50 completed	UTRA 25.133, 25.331

Supporting Companies: Nokia, Nokia Siemens Networks, Deutsche Telekom, Ericsson, ST-Ericsson, Huawei, Vodafone, Orange, NTT DoCoMo, ZTE

UE detected set reporting in cell-DCH has been used in intra-frequency scenarios to overcome neighbour cell list size limitation of 32 cells. It has also been used to detect neighbour cell list configuration errors. This work defines similar functionality for inter-frequency measurements, which has similar use cases and benefits.

RAN2 has defined signalling aspects related to cell-DCH configuration and operation of interfrequency detected set measurements, and result reporting.

RAN4 has updated cell-DCH inter-frequency measurement performance requirements, considering both performance of NCL measurements when detected set inter-frequency measurements are additionally configured, and also the performance of detected set measurement reports.

9.10 Automatic Neighbour Relation (ANR) for UTRAN UID_480020 (open testing)

Resources: R3,R2,R5

Automatic Neighbour Relation (ANR) function for UTRAN relieves operators from the burden of manually managing the Neighbour cell Relations (NRs)

UID	Name	Resource	Finish	Comp	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs
480020	**Automatic Neighbour Relation (ANR) for UTRAN**	R3,R2,R5	07/12/2012	94%	RP-100688	-	ZTE	RP#52 Core completed	UTRA
480120	**Core part**	R3,R2	03/06/2011	100%	RP-100688	RP-110522	ZTE	RP#52 completed	25.331, 25.413, 25.423, new TS 25.484 (Stage 2)
530039	**Test part**	R5	07/12/2012	90%	RP-120599	RP-120960	Ericsson	RP#57 completion 09/12=>12/12	34.108, 34.123-1, 34.123-2, 34.123-3

Supporting Companies: Alcatel-Lucent, AT&T, CATT, China Mobile, China Unicom, CHTTL, Deutsche Telekom, Huawei, Hitachi, ITRI, NEC, Nokia Siemens Networks, Nokia, Orange, Samsung, Telecom Italia, Telefonica, TeliaSonera, ZTE.

In LTE, Automatic Neighbour Relation (ANR) function discussed in both RAN and SA5 in EUTRAN context, which are documented in LTE TS 36.300 and TS 32.521.

It is costly and troublesome to retain neighbour cell relation information. So it is desirable to enable introduction of automated solutions to reduce the operator's costs for network maintenance and operation. The objective of the Automatic Neighbour Relation (ANR) function for UTRAN is to relieve operators from the burden of manually managing the Neighbour cell Relations (NRs).

4 Objective

To specify the ANR feature for the following scenarios:

- Intra-UTRAN case

  Including intra-RNS and inter-RNS case; the latter is limited to the case where it can rely on existing Iur connections between the two RNCs
- Inter_RAT case

  Essential scenarios: both UTRAN to GSM and UTRAN to LTE

The following work tasks are anticipated:

RAN2:

- Define the required UE support for ANR
  - End user perceived impacts including throughput and power consumption, UE and NW complexity, shall be considered.
- Contribute to the stage 2 description to cover the required UE & radio procedures
- Specify changes to stage 3 specification under RAN2 responsibility

RAN3:

- Define the required support over the existing network interfaces for establishing and maintaining neighbouring relation information, especially after detecting missing neighbouring relation
- Define the O&M requirements
- Finalize the overall stage-2 description for the feature
- Specify changes to stage 3 specification under RAN3 responsibility

9.11 Support of New Band Combinations for Dual-Band Dual Cell HSDPA UID_480021

Resources: R4,R2

Rel-9 Dual-Band Dual-Cell HSDPA (UID_430015 Support for different bands for Dual-Cell HSDPA) has one combination per region in principle. This work adds additional combinations: Band I and XI (Region 3) and Band II and V (Region 2)

UID	Name	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_and_TRs
480021	**Support of New Band Combinations for Dual-Band Dual Cell HSDPA**	RP-100657	-	AT&T	RP#52 completed	UTRA
480121	**Core part**	RP-100657	RP-110523	AT&T	RP#52 completed	25.101, 25.104, 25.141, 25.317

Supporting Companies: AT&T, Softbank Mobile, Ericsson, ST-Ericsson, Nokia Siemens Networks, Alcatel-Lucent, Telefonica, Telus.

Other justification		
TS or CR	**Clause**	**Remarks**
25.101	5, 6, 7, 8 and 9	User Equipment (UE) radio transmission and reception (FDD)
25.104	5	Base Station (BS) radio transmission and reception (FDD)
25.141	3	Base Station (BS) conformance testing (FDD)
25.317	-	Requirements on User Equipments (UEs) supporting a release-independent frequency band combination

Justification

Dual Band-Dual Cell-HSDPA (DB-DC-HSDPA) was defined in Rel-9 with limited scope of band combinations, one combination per region in principle. Some operators have determined that additional combinations will be required.

Objective:

- Add the following two band combinations
  - Band I and XI (Region 3),
  - Band II and V (Region 2), to DB-DC-HSDPA specifications
- Study the impacts of the combinations to the current DB-DC-HSDPA specifications and define appropriately when necessary.
- Study RF performance requirements and backward compatibility issues.
- Add the necessary changes to the relevant core UTRA requirements

9.12 MIMO operation with non-MIMO coexistence in HSDPA UID_480022

Resources: R4,R5

UID	Name	Resource	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_and_TRs
480022	**MIMO operation with non-MIMO coexistence in HSDPA**	R4,R5	RP-100993	-	Qualcomm	RP#52 completed	UTRA
490023	**Core part**	R4	RP-100993	RP-110524	Qualcomm	RP#52 completed	25.104
480122	**Perf. part**	R4	RP-100993	RP-110525	Qualcomm	RP#52 completed	25.101, 25.141
510017	**Test part**	R5	RP-110244	RP-120042	Qualcomm	RP#55completed	34.108, 34.121-1, 34.121-2, 34.123-1, 34.123-2, 34.123-3

Supporting Companies: Qualcomm, 3, Huawei, eMobile, T-Mobile USA, China Unicom, Ericsson, ST-Ericsson.

RP#49 updated WID RP-100687=>RP-100993 (changed Title: MIMO Testing in HSDPA => MIMO operation with non-MIMO coexistence in HSDPA)

3 Justification

The single user MIMO functionality was introduced in Release 7. In order to address the co-existence of MIMO and non-MIMO UEs in the same cell, a few workarounds were recently introduced in RAN1/2 specifications:

- Introduction of a MIMO cell antenna 2 S-CPICH power offset :
  - A different power offset may now be applied to the S-CPICH to reduce the interference impact caused by S-CPICH that is transmitted on a second transmit antenna from a NodeB to UEs that are not configured in MIMO mode. Recently, RAN1/2 CRs (Release 7 and beyond) were agreed to introduce signalling of S-CPICH power offset (if different from P-CPICH) to UEs that are configured in MIMO mode.
- HSDPA MIMO codebook restriction:
  - MIMO Node Bs with Ant1 P-CPICH and Ant2 S-CPICH can exploit the power of the two power amplifiers also when transmitting to non-MIMO UEs by implementing a power balancing network before the power amplifiers. As a result, RAN1/2 specifications have introduced a restriction to MIMO UEs by way of signalling in which the PCI reports can only indicate a subset of precoding vectors
- Downlink control channels in STTD mode:
  - A clarification was made in RAN1/2 specifications to optionally allow a MIMO UE to receive downlink control channels (HS-SCCH, F-DPCH, E-AGCH, E-HICH, E-RGCH) in STTD mode when the UE is configured in MIMO mode with P-CPICH & S-CPICH as phase references, but P-CPICH is not in STTD mode.

For the above MIMO workarounds, RAN4 performance requirements (demodulation and CQI reporting) do not exist.

Objective : performance requirements (RAN4 specifications) corresponding to the following workarounds when a user is configured with MIMO:

- Introduction of a MIMO cell antenna 2 S-CPICH power offset
  - Define the requirements for MIMO UEs operating in MIMO mode when P-CPICH and S-CPICH are configured with different power offsets
- Downlink control channels in STTD mode
  - Define the requirements for MIMO UEs operating in MIMO mode

10 LTE Features

UID	Name	Resource	WI_rapporteur
460007	**Carrier Aggregation for LTE**	R1,R2,R3,R4,R5	Nokia
460008	**Enhanced Downlink Multiple Antenna Transmission for LTE**	R1,R2,R4,R5	NTT DoCoMo
460009	**Uplink Multiple Antenna Transmission for LTE**	R1,R2,R4,R5	Huawei
460013	**Relays for LTE**	R1,R2,R4,S2,S3,C4,C6	Ericsson
470007	**Enhanced Inter-Cell Interference Control (ICIC) for non-Carrier Aggregation (CA) based deployments of heterogeneous networks for LTE**	R1,R2,R3,R4	China Mobile
470008	**LTE TDD in 2600MHz for US**	R4,R2,R3,R5	Clearwire
470009	**Adding 2 GHz band LTE FDD (Band 23) for Ancillary Terrestrial Component (ATC) of Mobile Satellite Service (MSS) in North America**	R2,R4,R5	DBSD (formerly ICO)
470010	**Adding L-Band (Band 24) LTE for Ancillary Terrestrial Component (ATC) of Mobile Satellite Service (MSS) in North America**	R4,R2,R5	LightSquared
470011	**LTE Self Optimizing Networks (SON) enhancements**	R3,R2,R4	Nokia Siemens Networks
480027	**Further enhancements to MBMS for LTE**	R2,R3,R5	Huawei

10.1 Carrier Aggregation for LTE UID_460007 (open testing)

Resources: R1,R2,R3,R4,R5

UID	Name	Resource	Finish	Comp	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_TRs
460007	**Carrier Aggregation for LTE**	-	07/12/2012	87%	RP-100661	-	Nokia	-	LTE
460107	**Core part**	R1,R2,R3,R4	03/06/2011	100%	RP-100661	RP-110535	Nokia	RP#52 completed. RP#56 new RAN4 TR (36.807, 36.808) v200 for Approval	36.101, 36.104, 36.133, 36.211, 36.212, 36.213, 36.300, 36.302, 36.306, 36.321, 36.331, 36.413, 36.423, 37.104, new RAN4 TR (36.807, 36.808)
460207	**Perf. part**	R4	09/12/2011	100%	RP-100661	RP-111452	Nokia	RP#54 completed	36.101, 36.104, 36.133, 36.141, 37.141
530040	**Test part**	R5	07/12/2012	50%	RP-121246	RP-120959	Nokia	RP#57 updated WID RP-111221=>RP-121246 (additional impacted specs 37.571-1, 37.571-3, 37.571-5)	36.508, 36.521-1, 36.521-2, 36.521-3, 36.523-1, 36.523-2, 36.523-3, 37.571-1, 37.571-3, 37.571-5

Supporting Companies: Alcatel-Lucent, Alcatel-Lucent Shanghai Bell, AT&T, CATR, CATT, China Mobile, China Unicom, Deutsche Telekom, Ericsson, Fujitsu, Huawei, KDDI, Kyocera, LG Electronics, Mitsubishi, Motorola, NEC, Nokia, Nokia Siemens Networks , NTT DoCoMo, Orange, Panasonic, Pantech, Qualcomm, Research In Motion, Samsung, Sharp, ST-Ericsson, Telecom Italia, TeliaSonera, Texas Instruments, Toshiba, Verizon, ZTE.

To fulfil the LTE-Advanced requirements as specified in 36.913, LTE-Advanced needs to also support wider transmission bandwidths than the currently supported 20 MHz specified in Rel.8/9 while maintaining the backwards compatibility with Rel-8/9. The preferred solution to this is *carrier aggregation* as defined during the LTE-Advanced study item, where multiple *component carriers* are aggregated to form a larger overall transmission bandwidth.

The work item should be based on agreements on carrier/spectrum aggregation taken during the LTE-Advanced study item and fulfil the following objectives:

- Specify carrier aggregation in LTE for the following scenarios
  - Rel-8/9 backward compatible carriers are the basic building blocks and should be supported; non-Rel-8/9-backward compatible component carriers and carrier segments are not considered in Rel-10
  - Rel-10 signalling should support aggregation of up to 5 DL CCs and 5 UL CCs, irrespective of intra- or inter-band CA.
  - With regards to FDD DL:
    - Rel-10 should support both intra- and inter-band aggregation.
    - Rel-10 should support inter-band aggregation under deployments with RRH and repeaters, i.e., with different signal reception timings across CCs of different bands.
  - With regards to FDD UL:
    - Work on intra-band aggregation should be prioritised in RAN4 till March 2011.
    - Deployment scenarios with RRH and repeaters implying multiple TA maintenance should be supported when inter-band aggregation is supported, e.g., in Rel-11.

- With regards to TDD:
  - Work on intra-band aggregation should be prioritised in RAN4 till March 2011, for both DL and UL.
  - Deployment scenarios with RRH and repeaters (and hence multiple TA maintenance) should be supported when inter-band aggregation is supported, e.g., in Rel-11.

- UE-specific asymmetric number of component carriers in DL and UL
- Component carriers can have any of the bandwidths supported in Rel-8
- Terminal complexity should be considered; the number of supported bands and band combinations per region should be limited
- The signalling and protocol specifications to support carrier aggregation shall be designed in a generic way, and able to support carrier aggregation scenarios that are introduced in later RAN4 Releases.
- Specification of carrier aggregation bands shall be done in Release independent manner.
- Carrier Aggregation scenarios which are not treated in Release 10 timeframe should be captured in appropriate TR for future reference.
- New work items should be created when new carrier aggregation scenarios are introduced in REL10 and future 3GPP specifications – Noting that CA operating bands are release independent

The generic band scenarios evaluated for the CA WID are

Intra - band Contiguous CA

E-UTRA CA Band	E-UTRA operating Band	Uplink (UL) band				Downlink (DL) band				Duplex mode
		UE transmit / BS receive			Channel BW MHz	UE receive / BS transmit			Channel BW MHz	
		F_{UL_low} (MHz) – F_{UL_high} (MHz)				F_{DL_low} (MHz) – F_{DL_high} (MHz)				
CA_40	40	2300	–	2400	[40[1)]]	2300	–	2400	[40[1)]]	TDD
CA_1	1	1920	–	1980	40	2110	–	2170	40	FDD
[1) For the first phase of LTE TDD CA for UE side, with eventual goal for 50MHz]										

Inter - band Non -Contiguous CA

E-UTRA CA Band	E-UTRA operating Band	Uplink (UL) band				Downlink (DL) band				Duplex mode
		UE transmit / BS receive			Channel BW MHz	UE receive / BS transmit			Channel BW MHz	
		F_{UL_low} (MHz) – F_{UL_high} (MHz)				F_{DL_low} (MHz) – F_{DL_high} (MHz)				
CA_1-5	1	1920	–	1980	10[1)]	2110	–	2170	10	FDD
	5	824	–	849	10[1)]	869	–	894	10	
1) Only one uplink component carrier is used in any of the two frequency bands at any time.										

- Introduce stage-2 description of carrier aggregation in TS36.300
- Introduce support of carrier aggregation in stage-3 specifications, including
  - UL and DL control channel structure
  - Clustered DFT-S-OFDM UL transmission scheme and control-data decoupling (simultaneous PUCCH and PUSCH transmission)
  - L1 procedures
  - L2/L3 protocols and procedures
  - UE and BS RF core requirements
  - RRM core requirements

The detailed specification shall take other work items addressing LTE-Advanced into account.

10.2 Enhanced Downlink Multiple Antenna Transmission for LTE UID_460008 (open testing)

Resources: R1,R2,R4,R5

UID	Name	Resource	Finish	Comp	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_TRs
460008	**Enhanced Downlink Multiple Antenna Transmission for LTE**	-	14/06/2013	81%	RP-100196	-	NTT DoCoMo	-	LTE
460108	**Core part**	R1,R2,R4	18/03/2011	100%	RP-100196	RP-110067	NTT DoCoMo	RP#51 completed. RP#56 new RAN4 TR 36.807 v200 for Approval	36.101, 36.104, 36.133, 36.201, 36.211, 36.212, 36.213, 36.300, 36.306, 36.321, 36.331, new RAN4 TR 36.807
460208	**Perf. part**	R4	02/03/2012	100%	RP-091429	RP-120053	NTT DoCoMo	RP#55 completed	36.101, 36.104, 36.133, 36.141
560012	**Test part**	R5	14/06/2013	15%	RP-120612	RP-120965	ZTE	Testing for 36.101, 36.133	36.508, 36.521-1, 36.521-2

Supporting Companies: Alcatel-Lucent, Alcatel-Lucent Shanghai bell, AT&T, CATR, CATT, China Mobile, Deutsche Telekom, Ericsson, Fujitsu, Huawei, Kyocera, LGE, Mitsubishi, Motorola, NEC, Nokia, Nokia Siemens Networks, NTT DoCoMo, Panasonic, Qualcomm, Research in Motion, Samsung, Sharp, ST-Ericsson, Telecom Italia, Texas Instruments, Toshiba, Verizon, Vodafone, ZTE.

Enhanced multi-antenna operation for supporting downlink SU-MIMO with up to eight layer spatial multiplexing is needed to fulfil target in TR 36.913 for LTE-Advanced on peak rate spectral efficiency of 30 b/s/Hz.

During the LTE-Advanced study, enhanced downlink MU-MIMO with UE specific reference signal was identified as critical to fulfil the IMT-Advanced requirements for average spectrum efficiency in some scenarios defined by ITU-R.

TR 36.913 also requires the target for average spectrum efficiency and the cell edge user throughput efficiency should be given a higher priority than the target for peak spectrum efficiency. It is also identified that CoMP could improve the cell edge throughput/cell capacity

Objectives:

- Specify downlink SU-MIMO for up to eight layer spatial multiplexing, considering practical antenna arrangements. According to agreements made during study item this includes
  - Additional reference signals (specify together with other multi-antenna transmission)
    - User-specific reference signals targeting PDSCH demodulation
    - Cell-specific reference signals targeting CSI estimation (CSI-RS)
  - Mapping of PDSCH to the non-control region of Normal and MBSFN subframes
  - CSI feedback scheme
  - DCI format
  - Introduce support for downlink SU-MIMO in stage-3 specifications also in the areas of
    - L2/L3 protocols and procedures
    - UE core requirements
- Specify the enhanced downlink MU-MIMO (subject to agreement in RAN1)
  - Additional reference signals (specify together with other multi-antenna transmission)
  - DCI format (specify together with other multi-antenna transmission)
  - feedback scheme
  - UE core requirements

- CSI RS design should take potential needs of DL CoMP into account
- CSI RS design should allow for accurate inter-cell measurements
- No additional features are specified in Rel-10 to support DL CoMP

10.3 Uplink Multiple Antenna Transmission for LTE UID_460009 (open testing)

Resources: R1,R2,R4,R5

UID	Name	Resource	Finish	Comp	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_TRs
460009	**Uplink Multiple Antenna Transmission for LTE**	-	07/12/2012	95%	RP-100959	-	Huawei	RP#56 new TR 36.807 v200 for Approval	LTE
460109	**Core part**	R1,R2,R4	03/06/2011	100%	RP-100959	RP-110537	Huawei	RP#52 completed. TR 36.817 v110 for Approval. RP#56 new TR 36.807 v200 for Approval	36.101, 36.104, 36.133, 36.201, 36.211, 36.212, 36.213, 36.300, 36.306, 36.321, 36.331, new RAN4 (TR 36.807, 36.817)
460209	**Perf. part**	R4	16/09/2011	100%	RP-100959	RP-110992	Huawei	RP#53 completed	36.101, 36.104, 36.133, 36.141, 36.817
540007	**Test part**	R5	07/12/2012	80%	RP-111614	RP-120962	Huawei	-	36.508, 36.521-1, 36.521-2, 36.521-3, 36.523-1, 36.523-2, 36.523-3

Supporting Companies: Alcatel-Lucent, Alcatel-Lucent Shanghai Bell, AT&T, CATR, CATT, China Mobile, Deutsche Telekom, Ericsson, Fujitsu, Huawei, KDDI, Kyocera, LGE, Mitsubishi, Motorola, NEC, Nokia, Nokia Siemens Networks, NTT DoCoMo, Panasonic, Qualcomm, Research In Motion, Samsung, Sharp, ST-Ericsson, Telecom Italia, Texas Instruments, Verizon, ZTE.

The multi-antenna operation for supporting UL SU-MIMO with up to four layer spatial multiplexing is needed to fulfil requirements in TR 36.913 for LTE-Advanced on peak rate spectral efficiency of 15 b/s/Hz. During the LTE-Advanced study item, UL transmission diversity for PUCCH and codebook based transmission for PUSCH will help ensure that LTE-Advanced system deployments offer good cell edge and average performance.

The work item should be based on agreements taken during the study item and fulfil the following objectives:

- Specify UL SU-MIMO for up to four layer spatial multiplexing, considering practical UE implementation. According to agreements made during study item this includes
  - Addition of precoded DRS
  - Additional SRS
  - Uplink transmit diversity scheme on the PUCCH
  - Additional physical control signalling
- Specify the UE RF core requirements
- Specify the BS core requirements

The detailed specification shall take other work items addressing LTE-Advanced into account.

Specify UE RF and BS performance requirements for UL multiple antenna transmission in LTE for the scenarios addressed in RAN1 and RAN2 specifications and the core part of RAN4 specifications.

10.4 Relays for LTE (LTE_Relay) UID_460013

Resources: R1,R2,R4,S2,S3,C4,C6

UID	Name	Resource	WI_rapporteur
460013	**Relays for LTE**	R1,R2,R4,S2,S3,C4,C6	Ericsson
460113	**Core part: Relays for LTE**	R1,R2,R4	Ericsson
520020	**Stage 2 for Relays for LTE**	S2	Vodafone
500038	**TR on LTE Relay Nodes Security**	S3	Qualcomm
500138	**Security for LTE Relay Nodes (Stage 2)**	S3	Qualcomm
510011	**CT6 aspects of LTE Relay Node Security**	C6	n/a
510012	**Core Network Impacts for Relay Nodes**	C4	Vodafone

UID	Name	Resource	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_and_TRs
460113	**Core part**	R1,R2,R4	RP-101911	RP-110540	Ericsson	RP#52 completed. Updated WID RP-101417=>RP-101911 (contains only Core part completed in Rel-10). Open RAN4 Core & Perf parts moved to new Rel-11	36.133, 36.201, 36.211, 36.212, 36.213, 36.300, 36.321, 36.323, 36.331, new RAN1 TS 36.216, new RAN4 (36.116, 36.826)

Supporting Companies: Vodafone, Orange, AT&T, Qualcomm, Verizon Wireless, SFR, Ericsson, ST-Ericsson, Nokia, Nokia Siemens Networks, Telefónica, eMobile, LG Electronics , Samsung, China Mobile, ZTE.

Relays have been studied as part of the LTE-Advanced study item. One of the prime perceived benefits of relaying is to provide extended LTE coverage in targeted areas at low cost. Providing this feature as early as possible is thus crucial to enable operators to meet user expectations for LTE, and maximise take-up of LTE devices.

In order to maximise the benefits for cost-effective coverage improvements, relays should be standardised.

The overall objective of the work item is to specify Relays at least for the coverage-improvement scenario, with the following configurations:

- The eNB-to-relay link operates in the same carrier frequency as the relay-to-UE link.
- The eNB-to-relay link operates in a different carrier frequency from the relay-to-UE link.

For each of the above configurations, the WI shall address the case where the eNB-to-relay link is operating in the same carrier frequency as eNB-to-UE link.

The Relay shall have the following characteristics:

- It control cells, each of which appears to a UE as a separate cell distinct from the donor cell
- The cells shall have their own Physical Cell ID (defined in LTE Rel-8) and the relay node shall transmit its own synchronization channels, reference symbols, …
- The UE shall receive scheduling information and HARQ feedback directly from the relay node and send its control channels (SR/CQI/ACK) to the relay node

No UE impact expected from functionality added by this WI and all legacy LTE UEs shall be served by the relay cell.

10.4.1 Security for LTE Relay Nodes (Stage 2) UID_500038

Resources: S3

UID	Name	Hyperlink	WI_rapporteur	Notes	TSs_and_TRs
500038	**TR on LTE Relay Nodes Security**	SP-100733	Qualcomm	SP#51 completed	33.816
500138	**Security for LTE Relay Nodes (Stage 2)**	SP-100733	Qualcomm	SP#51 completed (impacting Stage 3 in CT and RAN)	33.401 (CR#0437,0438), CT1 24.301, CT4 (29.272, 29.274), CT6 31.102, RAN2 (36.331, 36.323), RAN3 36.413

Relay nodes connect to LTE using the same protocol stack as a normal UE does. Sometimes it uses the same protocol stack but with minor modifications.

The introduction of relay nodes in LTE poses new threats to the system. For example, relay nodes may need the ability to perform certain tasks or receive certain kinds of services in an LTE network (e.g., reception of AS security context for UEs to be served by a relay node) which UEs are not allowed to perform or receive. This could lead to, e.g., eavesdropping, impersonation and DoS attacks against LTE and/or UEs attached to LTE. Moreover, the special services granted to relay nodes could be used by an attacker to perform theft of service attacks.

It must be ensured that the UEs connecting to LTE via a relay node enjoy the same level of security as if they connected directly via a non-RN eNB. It must also be ensured that the LTE network remains secure in the presence of relay nodes.

Objective: to ensure that relay nodes as specified by the parent work item (LTE_Relay-Core) do not introduce vulnerabilities in LTE and provide sufficient security for the UEs connecting to the LTE network through any eNB (a relay node or a non-RN eNB). The following identified threats shall be countered appropriately:

- Impersonation of a RN to attack the user(s) attached to the RN
- Attacks on the Un interface between RN and DeNB
    - Inserting a MitM
    - Attacking the traffic
- Impersonation of a RN to attack the network
- Attacks on the interface between the RN and UICC used for RN subscription authentication
- Attacks on the RN itself
- DoS Attacks

Other threats may be identified and countermeasures proposed before the close of the TR.

Platform security issues need to be considered.

Mobile relay nodes are out of scope since TS 36.300 has already captured that relay nodes do not support inter-cell handover. In addition multi-hop relay nodes are also out of scope since TS 36.300 has captured that a relay node may not use another relay node as a DeNB.

Attention was paid to the fact that the S11 reference point (between an MME and an S-GW) is terminated in the DeNB. The reason for terminating S11 in the DeNB is that the DeNB hosts S-GW like functionality for relays.

SA3-LI has investigated LI issues related to relay nodes.

UID	Name	Resource	Hyperlink	Notes	TSs_and_TRs
520020	**Stage 2 for Relays for LTE**	S2	not applicable	SP#52 SP-110338 (S2-85/S2-112851) 23.401 Cat F CR#2128 Completion of Relay procedure overview	23.401
510011	**CT6 aspects of LTE Relay Node Security**	C6	not applicable	CP#51 completed	31.101, 31.102
510012	**Core Network Impacts for Relay Nodes**	C4	CP-110094	CP#51 completed	23.003, 23.008, 29.303, 29.230, 29.272

10.5 Enhanced ICIC for non-CA based deployments of heterogeneous networks for LTE UID_470007 (open testing)

Resources: R1,R2,R3,R4,R5

UID	Name	Resource	Finish	Comp	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_TRs
470007	**Enhanced Inter-Cell Interference Control (ICIC) for non-Carrier Aggregation (CA) based deployments of heterogeneous networks for LTE**	-	07/12/2012	85%	RP-100383	-	China Mobile	RP#56 completed	LTE
470107	**Core part**	R1,R2,R3,R4	03/06/2011	100%	RP-100383	RP-110543	China Mobile	RP#52 completed	36.101, 36.133, 36.201, 36.211, 36.212, 36.213, 36.214, 36.300, 36.321, 36.331, 36.413, 36.423
470207	**Perf. part**	R4	15/06/2012	100%	RP-100383	RP-120461	China Mobile	RP#56 completed	36.101, 36.133
550001	**Test part**	R5	07/12/2012	15%	RP-120217	RP-120963	Qualcomm	-	36.508, 36.521-1, 36.521-2, 36.521-3, 36.523-1, 36.523-2, 36.523-3

Supporting Companies: Alcatel-Lucent, Alcatel-Lucent Shanghai Bell, AT&T, CATR, CATT, CMCC, Deutsche Telekom, Ericsson, ETRI, Hitachi, Huawei, KDDI, Kyocera , LG Electronics, LG Telecom, Motorola, Nokia, Nokia Siemens Networks, NTT DoCoMo, Orange, Panasonic, Pantech, Potevio, Qualcomm Incorporated, Research In Motion, Samsung, SKT, ST-Ericsson, TD-Tech, Telecom Italia, Verizon, ZTE.

3 Justification

With growing demand for data services, it is becoming increasingly difficult to meet the required data capacity and cell edge spectrum efficiency through simple cell splitting and current ICIC mechanism in Rel-8/9. The enhancement of Rel-8/9 ICIC mechanisms is necessary to efficiently support highly variable traffic loading as well as increasingly complexity and the network deployment scenarios with unbalanced transmit power nodes share the same frequency.

With growing demand for data services, it is becoming increasingly challenging to meet the required data capacity and cell edge spectrum efficiency through simple cell splitting and current ICIC mechanism in Rel-8/9. The enhancement of Rel-8/9 ICIC mechanisms is important to efficiently support highly variable traffic loading as well as increasingly complex network deployment scenarios with unbalanced transmit power nodes sharing the same frequency.

While carrier aggregation (CA) based solutions are attractive for situations with large availability of spectrum and UEs with CA capability, non-CA (i.e., co-channel) based solutions are important to enable efficient heterogeneous network deployments with small bandwidth availability and UEs without CA capability.

In networks with unbalanced transmit power nodes sharing the same frequency, interference conditions are expected to change from location to location (due to the possibly lower level of network planning of these deployments) and from time to time (due to the variable traffic load at each node). Here coordination of control and data channel interference is important to maintain the downlink and uplink cell coverage and thus good data channel performance.

Objective:

- Identify and evaluate non-CA based strategies of heterogeneous network deployments, as well as determine the standardization work necessary to support enhanced inter-cell interference coordination solutions for control and data channels if need is identified (targeted for completion by RAN#49)
    - The study shall include consideration of Rel-8/9 techniques and ensure backward compatibility for Rel-8/9 terminals as well as minimize physical layer air interface impact
- Following completion of the above feasibility evaluation, specify suitable solutions considering enhanced ICIC techniques for control and data channels

10.6 LTE TDD in 2600MHz for US UID_470008

Resources: R4,R2,R3,R5

UID	Name	Resource	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_and_TRs
470008	**LTE TDD in 2600MHz for US**	R4,R2,R3,R5	RP-101003	-	Clearwire	-	LTE
470108	**Core part**	R4,R2,R3	RP-101003	RP-100782	Clearwire	RP#49 completed	25.461, 25.466, 36.101, 36.104, 36.113, 36.124, 36.133, 36.141, 36.307, 36.331, 37.104, 37.113, 37.141, new TR 36.812
470208	**Perf. part**	R4	RP-101003	RP-100783	Clearwire	RP#49 completed	36.101, 36.104, 36.133, 36.141, 36.307, 37.104, 37.141, new TR 36.812
480019	**UE conformance test part**	R5	RP-100615	RP-101071	Clearwire	RP#50 completed	36.508, 36.521-1, 36.521-2, 36.521-3, 36.523-1, 36.523-2, 36.523-3

Supporting Companies: Clearwire, Sprint, NII Holdings, China Mobile, UK Broadband, Motorola, Huawei, TD Tech, WiChorus, ZTE, CATT, CATR, Nokia Siemens Networks, Cisco, Sequans, Alcatel-Lucent, Alcatel-Lucent Shanghai Bell, Rohde & Schwarz.

FCC designates the 2600MHz band in the US for, amongst other things, provision of broadband services. This 2496 – 2690MHz band is comprised of three sub-bands or segments:

- Lower band segment (LBS): 2496 to 2572MHz
- Middle band segment (MBS): 2572 to 2614MHz
- Upper band segment (UBS): 2614 to 2690MHz

RP-100183 provides more information on this band with further references. In summary, during the most recent reorganisation of the band, the FCC revised the regulations governing the use of this band to provide sufficient protection for the allowed services in adjacent allocations within the band, as well as for services adjacent to the lower edge of the LBS and upper edge of the UBS.

The band is divided into a number of channels, which in some cases are concatenated into blocks. The channels in the LBS cannot be owned by commercial operators and hence have to be leased; the majority of channels in the UBS can be owned directly by operators.

Licensing is on a geographical basis, meaning that each block can potentially have a different owner within a specific geographic area and, in certain areas, the availability of EBS channels (mainly in the LBS) is limited sometimes to the extent that there are no EBS channels available to lease. Consequently the amount of spectrum and exact channels vary not only on a market-by-market basis, but also on a site-by-site basis. This makes deployment by anything other than a TDD system challenging as it is difficult or impossible to pair up spectrum to deploy FDD systems. This has lead to operators to opt to use TDD technologies in this band.

With the advent of LTE and its inherent support for both FDD and TDD modes of operation, it is now possible for operators to consider deploying LTE in this band operating in TDD mode. While the 3GPP specifications do already specify appropriate emissions masks to meet FCC regulations associated with this band [see TS36.101 and TS36.104 and requirements for NS_04] as well as FDD and TDD operation in part of this frequency range as part of Bands 7 and 38 [see TS36.101 and TS36.104], the specifications do not define a band compatible with the appropriate US regulations or provide for TDD operation across the entire band.

Objective

1. Introduce support for the 2496 -2690MHz band for LTE-TDD in the US and countries with similar 2600MHz band regulations in the core requirements in RAN4 and RAN2 specifications. The scope of this WI excludes Europe.
2. Provide support for TDD mode only as there is no operator requirement for FDD mode support in this band in US.

10.7 Adding 2 GHz band LTE for ATC of MSS in North America UID_470009

Resources: R4,R2,R5

UID	Name	Resource	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_and_TRs
470009	**Adding 2 GHz band LTE FDD (Band 23) for Ancillary Terrestrial Component (ATC) of Mobile Satellite Service (MSS) in North America**	R2,R4,R5	RP-110775	-	DBSD	-	LTE
470109	**Core part**	R4,R2	RP-110775	RP-110545	DBSD	RP#52 completed	25.101, 25.104, 25.141, 25.461, 25.466, 36.101, 36.104, 36.113, 36.124, 36.133, 36.307, 37.104, 37.141, new TR 36.811
470209	**Perf. part**	R4	RP-110775	RP-110546	DBSD	RP#52 completed	36.101, 36.104, 36.113, 36.124, 36.133, 36.141, 36.307, 36.811
520012	**Test part**	R5	RP-110623	RP-111444	DBSD	RP#54 completed	36.508, 36.521-1, 36.521-2, 36.521-3, 36.523-1, 36.523-2, 36.523-3

Supporting Companies: Alcatel-Lucent, DBSD (formerly ICO Global), Elektrobit, Hughes Network Systems, Infineon , Qualcomm, Rohde & Schwarz, Skyterra, TerreStar Networks.

In North America (US and Canada), the FCC and Industry Canada have studied and approved rules granting authority to operator(s) to integrate Ancillary Terrestrial Component (ATC) into their Mobile Satellite Services (MSS) network(s).

The FCC has authorized two operators to deploy ATC networks in the S-band (Terrestar and DBSD North America, formerly ICO Global Communications) per the following authorizations:

- FCC DA 10-60 Terrestar : 2000 – 2010 MHz Uplink, 2190-2200 MHz Downlink
- FCC DA 09-38 DBSD: 2010 – 2020 MHz Uplink, 2180-2190 MHz Downlink

The purpose of this band class standardization is to enable the operators to offer enhanced mobile services through the terrestrial component with the spectrum resources allocated and authorized for MSS and ATC in this band. Note that all of the restrictions outlined in the ATC authorizations above apply.

The ATC network equipment will adhere to all 3GPP and FCC emission masks to protect adjacent band services. It is expected that during the work item progress the impacts will be studied.

This work item, targeted for the Rel-10 timeframe, proposes adding the 2 GHz band LTE for ATC of MSS in North America to the 3GPP specifications for the above purposes. The effort involves developing the minimum RF characteristics and performance requirements for terrestrial FDD E-UTRA (LTE) networks.

Objective Add the 2 GHz band LTE for ATC of MSS in North America to the appropriate 3GPP core & performance specifications for LTE FDD networks, in compliance with the relevant rules from the US and Canadian regulators for this band. Specifically:

2000 – 2020 MHz (UE transmit)
2180 – 2200 MHz (UE receive)

The scope of this WI excludes the European and Asian regions. Notwithstanding this, S-band UEs shall roam globally and meet all 3GPP specifications in roaming markets.

10.8 Adding L-Band LTE for ATC of MSS in North America UID_470010

Resources: R4,R2,R5

UID	Name	Resource	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_and_TRs
470010	**Adding L-Band (Band 24) LTE for Ancillary Terrestrial Component (ATC) of Mobile Satellite Service (MSS) in North America**	R4,R2,R5	RP-101284	-	LightSquared	RP#53 completed	LTE
470110	**Core part**	R4,R2	RP-101284	RP-101117	LightSquared	RP#51 completed	25.101, 25.104, 25.141, 25.461, 25.466, 34.124, 36.101, 36.104, 36.113, 36.124, 36.133, 36.307, 37.104, 37.141, new RAN4 TR 36.813
470210	**Perf. part**	R4	RP-101284	RP-110548	LightSquared	RP#52 completed	34.121-1, 36.101, 36.104, 36.113, 36.124, 36.133, 36.141, 36.307, 36.521-1, 36.813
510015	**Test part**	R5	RP-110777	RP-110980	LightSquared	RP#53 completed	36.508, 36.521-1, 36.521-2, 36.521-3, 36.523-2

Supporting Companies: Skyterra Communications, Alcatel-Lucent, Rohde & Schwarz, Qualcomm, Infineon, TerreStar, Huawei, DBSD (formerly ICO Global).

L-Band is licensed by the FCC as:

- 1525 – 1559 MHz: Down-link (eNodeB transmit, UE receive)
- 1626.5 – 1660.5 MHz: Up-link (UE transmit, eNodeB receive)

In 2003, the FCC changed its rules to permit the use of the L-band (and other bands) by satellite operators to provide nationwide terrestrial service. *See - "Flexibility for Delivery of Communications by MSS Providers in the 2 GHz Band, the L-Band, and the 1.6/2.4 GHz Bands", 18 FCC Rcd 1962 (2003)*

In 2004, the FCC granted SkyTerra a license to reuse its satellite spectrum to provide terrestrial service. See - *19 FCC Rcd 22144 (2004).* The FCC further revised these rules in 2005 to facilitate the deployment of more robust terrestrial networks. See - "*Second Order of Reconsideration", 20 FCC Rcd 4616 (2005).*

The Canadian government has approved similar rules to those adopted by the FCC.

Initially, Skyterra is planning on 5 & 10 MHz wide channel deployments, but this could change based on business needs. Our LTE ATC deployment will adhere to all 3GPP terrestrial out-of-band requirements for spurious emissions including those for UE, BS, and UE-to-UE emissions as defined in 3GPP TS 36.101 for the US (i.e. Bands 2, 4, 5, 10, 12, 13, 14, 17)

Spurious emission requirements from the addition of this new band are expected to be the same as those required from the addition of other new US bands in 3GPP.

Objective Add the L-Band LTE for ATC of MSS in North America to 3GPP core specifications for LTE FDD networks, in compliance with relevant rules from the US and Canadian regulators for the band:

1525 – 1559 MHz: Down-link (eNodeB transmit, UE receive)
1626.5 – 1660.5 MHz: Up-link (UE transmit, eNodeB receive)

This WI excludes Europe and Asia. Not withstanding this, L-Band-capable UEs shall roam globally and meet all 3GPP requirements in roaming markets.
Out-of-band emissions to non-3GPP bands will be governed by FCC/IC rules codified in the ATC Order and other FCC/IC rules. These FCC/IC out-of-band emission requirements will be taken into account in the RAN4 discussions.

10.9 LTE Self Optimizing Networks (SON) enhancements UID_470011

Resources: R3,R2,R4

UID	Name	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_and_TRs
470011	**LTE Self Optimizing Networks (SON) enhancements**	RP-101004	-	Nokia Siemens Networks	RP#52 completed	LTE
470111	**Core part**	RP-101004	RP-110547	Nokia Siemens Networks	RP#52 completed (Stage 1,2,3)	36.300, 36.331, 36.413, 36.423

Supporting Companies: Nokia Siemens Networks, NTT DoCoMo, Nokia Corp, Kyocera, Alcatel Lucent, Deutsche Telekom, Samsung, NEC, Qualcomm, Huawei, Orange, Motorola, CATT, ZTE, Ericsson, Fujitsu, Vodafone, China Mobile.

This WI continues work started in Rel-9. Some cases that were considered in the initial phases of SON development are listed in the TR 36.902. From this list, almost all use cases are already specified.

Capacity and Coverage Optimization (CCO) was already nominally part of the Rel-9 WI, but could not be completed due to amount of work related to other use cases.

Energy Savings are a very important topic, especially for operators, as solutions derived for this use case can significantly limit their expenses. According to TR 36.902 this solution should concern switching off cells or whole base stations. This may require additional standardised methods, once there is need identified for.

Basic functionality of Mobility Load Balancing (MLB) and Mobility Robustness Optimization (MRO), also listed in TR 36.902, were defined in Rel-9. However, successful roll-out of the LTE network requires analysing possible enhancements to the Rel-9 solutions for MLB and MRO. In particular, enhancements that address inter-RAT scenarios and inter-RAT information exchange must be considered. These enhancements should be addressed in Rel-10.

There may also be other use cases for LTE for which SON functionality would bring optimizations.

The upcoming LTE-A brings about also new challenges that can be addressed by SON. However, since not all features are clearly defined yet, it is difficult to work on SON algorithms for them. It is therefore proposed to assign lower priority to the features specific for LTE-A.

Objective: Use cases and scenarios elaborated within this WI:

Coverage and Capacity Optimization (CCO)

The use case is to enable detection of following problems:

- Priority 1: coverage problems, e.g. coverage holes
- Priority 2: capacity problems

The work on the detection methods is to be coordinated with the progress of other SON functionalities, in particular MRO and MDT.

It is expected that the work will be conducted in SA5, where methods to make the collected information available for OAM are specified, together with possible tools needed for corrective actions.

Mobility Robustness Optimization (MRO) enhancements

The use case is to enable detection and to provide tools for possible correction of following problems:

- Connection failures in inter-RAT environment:
  - Priority 1: at HOs from LTE to UMTS/GSM
  - Priority 2: at HOs from UMTS/GSM to LTE
- Obtaining UE measurements in case of unsuccessful re-establishment after connection failure
- Ping-pongs in idle mode (inter-RAT and intra-LTE environment)
- Ping-pongs in active mode (inter-RAT)
- HO to wrong cell (in intra-LTE environment) that does not cause connection failure (e.g. short stay problem)

Mobility Load Balancing (MLB) enhancements

The use case is to fulfil following objectives:

- Improving reliability of MLB in intra-LTE scenarios
- Improving functionality of the MLB in inter-RAT scenarios (the transport method agreed for Rel-9 should be used for Rel-10).

Applicability of Rel-9 and possible Rel-10 SON algorithms for HeNB had been considered, including:

- define the use-case level requirements & provide stage 2/3 specification
- Based on the enhanced solutions to define requirements for inter-RAT communication for MLB and MRO
- If needed, to define O&M requirements for radio-related functions to be performed in the O&M domain,

10.10 Further enhancements to MBMS for LTE UID_480027

Resources: R2,R3,R5

UID	Name	Resource	Finish	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_TRs
480027	**Further enhancements to MBMS for LTE**	-	02/03/2012	RP-101244	-	Huawei	RP#51 completed.	LTE
480127	**Core part**	R2,R3	18/03/2011	RP-101244	RP-110083	Huawei	RP#51 completed	25.446, 36.300, 36.321, 36.322, 36.323, 36.331, 36.440, 36.441, 36.442, 36.443, 36.444, 36.445
540008	**Test part**	R5	02/03/2012	RP-111615	RP-120049	Huawei	RP#55 completed	36.508, 36.523-1, 36.523-2, 36.523-3

NOTE: SA2 decided not to support MBR>GBR in Rel-10 MBMS. For SA2, MBR=GBR in Rel-10 MBMS. Hence RAN removed "enabling statistical multiplexing gains for variable bit rate services" in Objectives

Supporting Companies: Huawei, CATT, Alcatel Lucent , Alcatel-Lucent Shanghai Bell, China Mobile, Deutsche Telekom, Hitachi, LGE, MediaTek, NEC, Nokia Siemens Networks, Orange, Research In Motion, ZTE.

Related Study Item or Feature (if any)		
Unique ID	**Title**	**Nature of relationship**
400039	MBMS support in EPS	EPS supports MBMS since Rel-9
330018	LTE – Physical Layer	The LTE physical layer is MBMS-ready
330019	LTE – Radio Interface Layer 2 and 3 Protocol Aspect	MBMS was initially part of Rel-8
330020	LTE – eUTRAN Interfaces	MBMS was initially part of Rel-8
430007	MBMS support in LTE	MBMS LTE Rel-9

In Rel-9 a core set of MBMS features was specified. There is a need to further evolve this feature set in order to make the MBMS of LTE competitive.

In Rel-9 only Guaranteed Bit Rate (GBR) bearers exist for MBMS, and the MBR is always equal to the GBR.
This means that variable bit rate services are supported inefficiently. Mechanisms are needed to more efficiently support variable bit rate services (to allow MBR > GBR) by exploit statistical multiplexing multiple variable bit rate services on the MCH.

RAN3 removed the support for the Allocation and Retention Priority (ARP) and pre-emption function for MBMS E-RABs in order to complete Rel-9 on time. This should be supported in Rel-10.

In Rel-9 the network has no feedback from the MBMS UEs about the reception status of the MBMS service.
A mechanism is needed to determine if there are sufficient UEs interested in receiving a service to enable the operator to decide if it is appropriate to deliver the service via MBSFN. This will allow the operator to choose between enabling or disabling MBSFN transmission for each service.

Objective: to specify RAN enhancements for functionality to support MBMS over E-UTRAN as follows:

- Enable statistical multiplexing gains for variable bit rate services.
- Support of Allocation and Retention Priority (ARP) pre-emption function for MBMS E-RABs.
- Specify a simple mechanism to enable the network to know the reception status of UEs receiving a given MBMS service in the RRC connected mode;
    - To allow network to know whether or not it is appropriate to activate/deactivate the service via MBSFN.
    - The impact of such mechanisms on legacy devices should be minimized (it is tolerable if reception status of legacy devices stays unknown to the network).

- RAN groups should liaise with SA and CT according to the progress of aspects related to the non RAN parts of the solution

11 UTRA, LTE Features

UID	Name	Resource	WI_rapporteur
380173	UMTS/LTE 3500 MHz	R4,R2,R3,R5	Ericsson
460003	Minimization of Drive Tests for E-UTRAN and UTRAN	R2,R4,R3,R5	Nokia Siemens Networks
470005	HNB and HeNB Mobility Enhancements	R3,R2,R5	Alcatel-Lucent
480024	Expanded 1900 MHz Band for UTRA and LTE	R4,R2,R5	Sprint

11.1 UMTS/LTE 3500 MHz UID_380173 (open testing)

Resources: R4,R2,R3,R5

UID	Name	Resource	Finish	Comp	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_TRs
380173	UMTS/LTE 3500 MHz	-	07/12/2012	97%	RP-091380	-	Ericsson	RP#53 completed (open testing)	UTRA, LTE
380073	**Core part**	R4,R2,R3	16/09/2011	100%	RP-091380	RP-110987	Ericsson	RP#53 completed. TR 37.801v200 for Approval	25.101, 25.104, 25.113, 25.133, 25.141, 25.307, 25.307, 25.331, 25.461, 25.463, 34.124, 36.101, 36.104, 36.113, 36.141, 36.331, new 37.801
420013	**Conformance Test Aspects – LTE 3500**	R5	07/12/2012	91%	RP-080859	RP-120956	Ericsson	RP#56 completion 06/12=>12/12	36.508, 36.521-1, 36.521-2, 36.521-3
420014	**Conformance Test Aspects – UMTS 3500**	R5	15/06/2012	100%	RP-110386	RP-120450	Ericsson	RP#56 completed	34.108, 34.121-1, 34.121-2

Supporting Companies: TeliaSonera, Ericsson, Orange, Nokia, Nokia Siemens Networks, Huawei, Telecom Italia.

There are two new bands: 3.4-3.6 GHz and 3.6-3.8 GHz decided for Broadband Wireless Access, which are already widely available for licensing in Europe.
These bands have earlier been allocated to the Fixed Service on a primary basis in Region 1. Furthermore, the 3.4-3.6 GHz band was allocated to the mobile service on a primary basis and identified for IMT at WRC 07.
In Europe (Region 1) both bands can be used so block sizes could be large for any duplex arrangement.

The ECC Decision (07)02 not only designates the band 3.4-3.8 GHz for BWA deployment, it provides condition for "flexible usage modes within authorised BWA deployments". This regulatory provision allows licence holders to deploy various types of terminal stations, from fixed to mobile.

This work specifies UMTS/LTE 3500 for potential deployment in Europe and other regions. The band plans studied feasibility for WCDMA as well as LTE, and band arrangement were proposed for all applicable Regions.

11.2 Minimization of Drive Tests for E-UTRAN and UTRAN UID_460003 (open testing)

Resources: R2,R4,R3,R5

UID	Name	Resource	Finish	Comp	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_TRs
460003	**Minimization of Drive Tests for E-UTRAN and UTRAN**	-	07/12/2012	77%	RP-100360	-	Nokia Siemens Networks	RP#52 Core completed.	UTRA, LTE
460103	**Core part**	R2,R4,R3	03/06/2011	100%	RP-100360	RP-110528	Nokia Siemens Networks	RP#52 completed	25.133, 25.215, 25.304, 25.331, 25.423, 36.133, 36.214, 36.300, 36.304, 36.331, 36.413, 36.423, new 37.320 (Stage 2)
530041	**Test part**	R5	07/12/2012	50%	RP-120598	RP-120958	Ericsson	RP#57 completion 09/12=>12/12. Testing for LTE only	LTE 34.108, 34.109, 34.123-1, 34.123-2, 34.123-3, 36.508, 36.509, 36.523-1, 36.523-2, 36.523-3

Supporting Companies: Nokia Siemens Networks, Nokia, Deutsche Telekom, Ericsson , ST-Ericsson, Telefonica, Alcatel-Lucent, NTT DoCoMo, Samsung, China Mobile, Orange, Huawei, KDDI, LG Electronics, Motorola, AT&T, TeliaSonera, Qualcomm, CATT, Vodafone, Verizon, Panasonic, ZTE, NEC.

Triggered by UID_430021 TR 36.805 (Study on Minimization of drive-tests in NGN)

Using drive tests for network purposes is costly and causes also additional CO_2 emissions, so it is desirable to develop automated solutions, including involving UEs in the field, in 3GPP to reduce the operator costs for network deployment and operation. The studies done as part of the study item phase have shown that it is beneficial to collect UE measurements to enable a more efficient network optimization and it is feasible to use control plane solutions for providing the information from devices with the help of the radio access network. to solve the identified use cases.

Objective: to define the solutions for minimization of drive tests (MDT) using a Control Plane Architecture (however, it is worth noting that the same information elements defined in the RRC specifications for providing information for UE to the E-UTRAN/UTRAN for the control plane MDT solution, can be utilised outside TSG RAN as the new MDT functionality will be captured to open 3GPP specifications available outside 3GPP.). The following prioritised use cases will be considered:

- Coverage optimization

NOTE: Solutions for the other MDT use cases identified in TR 36.805 should be developed after completing the 1st prioritised use case based on operators' priorities (new or updated WI to be agreed then.

The following principles should be followed when developing the MDT solutions based on Control Plane Architecture:

- Both real time and non real time measurements will be considered.
- Measurements are configured to the UE by E-UTRAN/UTRAN by RRC signalling, based on Network management systems measurement definitions configured to E-UTRAN/UTRAN. Measurement may be triggered by various rules, for example based on radio conditions dependent thresholds
- Duplication of the existing functionality should be avoided.

- New measurement configurations and functionalities (e.g. UE measurements idle mode and during DRX operations and non-real time reporting, which includes storing some data in the UE memory) should be identified and specified for the prioritised MDT use cases.
    - End-user implications need to be kept acceptable (e.g. MDT solutions should be developed so that UE power consumption can be kept reasonable when MDT is deployed and used in the networks)
    - UE memory requirements for MDT support need to be carefully considered.
- The MDT measurements reporting are sent via RRC signalling to the E-UTRAN/UTRAN. RRC signalling to report measurements should also have the capability to include
    - Set of available location information
    - Time information
- The measurements from the UE can be combined/ processed with the network measurements already available in the E-UTRAN/ UTRAN and sent to the MDT-entity outside the E-UTRAN/UTRAN. E- Also basic measurement objects are to be identified, which may be added to the results such as Cell ID, time (if relevant) before being transferred onwards to the respective MDT-entity outside the E-UTRAN/UTRAN.

NOTE: It is not expected for the network measurements to be provided to the UE.

11.3 HNB and HeNB Mobility Enhancements UID_470005 (open testing)

Resources: R3,R2,R5

UID	Name	Resource	Finish	Comp	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_TRs
470005	**HNB and HeNB Mobility Enhancements**	R3,R2,R5	07/12/2012	60%	RP-110183	-	Alcatel-Lucent	RP#51 Core completed	UTRA, LTE
470105	**Core part**	R3,R2	18/03/2011	100%	RP-110183	RP-110058	Alcatel-Lucent	RP#51 completed	25.413, 25.467, 25.469, 36.300, 36.413, 36.423, new 25.471
550002	**Test part**	R5	07/12/2012	7%	RP-120218	RP-120964	Qualcomm	-	34.108, 34.123-1, 34.123-2, 34.123-3, 36.508, 36.523-1, 36.523-2, 36.523-3

Supporting Companies: Alcatel-Lucent, Alcatel-Lucent Shanghai Bell, NTT DoCoMo, AT&T, Samsung, Orange, NEC, CATT, Airvana, Fujitsu, Mitsubishi, ZTE, Panasonic, Telecom Italia, Kyocera, China Mobile.

- Rel-9 WI for Enhancements to HNB and HeNB (RP-090349) introduced support for in-bound mobility and H(e)NB to H(e)NB mobility. However, the Enhancement for H(e)NB to H(e)NB mobility was considered to be low priority for Rel-9 and hence should therefore be considered for Rel-10. The priority list (RP-090995) identifies this as: "2.6 for CSG to CSG mobility e.g. X2 support between HNBs, HO procedure termination at GW (in case of LTE)".
- In enterprise environments it is particularly important that the performance for Inter H(e)NB HO is optimized.
- During Rel-9 the operation of Inter CSG mobility was considered only for cases where access control is performed in the CN.
- In addition, in scenarios where the H(e)NB is utilized for enhancing coverage or capacity of an operator public network, the performance of eNB to HeNB HO and vice versa should be considered for , although this will need to balance the possible performance benefits against the increased complexity of additional interfaces and protocols.

Objective: A common UTRA and E-UTRA ensures that divergence between the systems is minimized.

For UMTS:

- Define the requirements and consider the techniques to support Enhanced HNB to HNB mobility.
- Define any necessary new protocols to support this, making re-use of concepts and definitions from existing specifications where appropriate.
- Consider enhancements for inter/intra-CSG handover, intra-HNB-GW

For LTE:

- Define the requirements and consider the techniques to support Enhanced HeNB to HeNB mobility, intra CSG only
- Define any necessary new protocols to support this, making re-use of concepts and definitions from existing specifications where appropriate.

11.4 Expanded 1900 MHz Band for UTRA and LTE UID_480024

Resources: R4,R2,R5

Create a new band that expands UTRA and E-UTRA band 2 to include frequencies between 1910 – 1915 MHz and 1990-1995 MHz (US FCC allocation)

UID	Name	Resource	Finish	Hyperlink	Status_Report	Notes	TSs_TRs
480024	**Expanded 1900 MHz Band for UTRA and LTE**	R4,R2,R5	07/09/2012	RP-100676	-	-	UTRA, LTE
480124	**Core part**	R4,R2	03/06/2011	RP-100676	RP-110529	RP#52 completed	25.101, 25.104, 25.113, 25.133, 25.141, 25.461, 25.466, 36.101, 36.104, 36.113, 36.124, 36.133, 36.141, 36.307, 36.331, new TR 36.818
480224	**Perf. part**	R4,R2	03/06/2011	RP-100676	RP-110530	RP#52 completed	25.101, 25.104, 25.113, 25.133, 25.141, 25.461, 25.466, 36.101, 36.104, 36.113, 36.124, 36.133, 36.141, 36.307, 36.331, new TR 36.818
520013	**Test part**	R5	07/09/2012	RP-110712	RP-120957	RP#57 completed	34.108, 34.121-1, 34.121-2, 34.123-1, 34.123-2, 34.123-3, 36.508, 36.521-1, 36.521-2, 36.521-3, 36.523-1, 36.523-2, 36.523-3

Supporting Companies: Sprint, China Mobile, Clearwire, Alcatel-Lucent, Huawei, Qualcomm, ZTE.

Other justification		
TS or CR(s) Or external document	**Clause**	**Remarks**
TS 36.101	5.1	Other frequency bands and channel bandwidths may be considered in future releases.
TS 36.104	5.1	Other frequency bands and channel bandwidths may be considered in future releases.
RP-010278	-	LS from TSG RAN to TSG SA on Operating Frequency Band as a Release independent work item

In 1994 the Federal Communications Commission (FCC) allocated 120 MHz of spectrum in the 1900 MHz band for broadband use (1850-1910 MHz & 1930-1990 MHz). 3GPP subsequently added the US PCS band to E-UTRAN as band 2. As part of an effort to eliminate interference within the 800 MHz public safety operations, the FCC re-banded parts of the 800 MHz spectrum and relocated some of the commercial operations from 800 MHz band to new broadband spectrum operating at 1910-1915 MHz and 1990-1995 MHz (G-Block).

Create a new band that expands, but does not replace, the existing definition for band 2 to include the G- Block (1850-1915 MHz and 1930-1995 MHz). This band is intended to address markets where these frequencies are currently available, or where regulations may allow it in the future. This Work Item shall not be construed as justification for relaxation of any parameters for the existing Band 2.

Objective: to create a new band that expands UTRA and E-UTRA band 2 to include frequencies between 1910 – 1915 MHz and 1990-1995 MHz in the core requirements in RAN4 and RAN2 specifications

12 UTRA, LTE, GERAN Features

12.1 Multi-standard radio BS RF requirements for non-contiguous spectrum deployments UID_480025

Resources: R4,G1

UID	Name	Resource	Hyperlink	Status_Report	WI_rapporteur	Notes	TSs_TRs
480025	**Multi-standard radio Base Station RF requirements for non-contiguous spectrum deployments**	R4,G1	RP-101402	-	Ericsson	RP#53 completed	UTRA, LTE, GERAN
480125	**Core part**	R4	RP-101402	RP-110531	Ericsson	RP#52 completed. TR 37.802 v100 for Approval	25.104, 36.104, 37.104, new TR 37.802
480225	**Perf. part**	R4	RP-101402	RP-110988	Ericsson	RP#53 completed	25.141, 36.141, 37.141, 37.802
490004	**GERAN Core part**	G1	GP-101618	-	Ericsson	GP#51 completed. GP#47 approved WID	45.005
540001	**GERAN BS Test part**	G1	GP-101618	-	Ericsson	GP#52 completed	51.021

Supporting Companies: Alcatel-Lucent, CHTTL, Deutsche Telekom, Ericsson , Huawei, Nokia Siemens Networks, Orange, Telefónica, Vodafone, ZTE.

3 Justification

A work item to specify RF performance requirements for Multi-Standard Radio (MSR) Base Stations (BS) was completed in RAN#47. However, the specification work only considered multi-RAT deployments where the spectrum transmitted within a band using common RF components was considered to be a single contiguous spectrum block. Therefore the scenario where common RF components are transmitting multiple non-contiguous spectrum blocks is not currently considered within the MSR specifications, and the assumption is that different RF components would need to be used for each block to ensure coexistence with other operators using the spectrum in between these blocks.

Given that the above non-contiguous block scenario exists in today's networks, it is essential that MSR BS requirements cover this case to allow operators to maximise the usage of MSR in the field, and for the cost saving benefits it brings.

Note that such requirements are already available for MC-BTS in GERAN.

Objective: to specify RF requirements for MSR specifications such that common RF components can be used for multi-RAT deployments where more than one spectrum block is in use, and where the blocks are non-contiguous in frequency within a band. It is proposed to primarily focus on the following scenario:

- Non-contiguous spectrum operation in 900MHz and 1800MHz where LTE, UTRA, and GSM deployment is considered, also considering the possibility that LTE is deployed in smaller spectrum blocks than 5MHz as well as equal and larger than 5MHz.

The work will focus on following steps:

1. Definition of the configuration scenarios to be reflected in specifications to ensure predictable MSR operation in practical deployed configurations.
2. Analyze if new requirements are needed in core specifications, only applicable in non-contiguous spectrum allocations.
3. Creation of the core requirements for dealing with the non-contiguous spectrum (for agreed cases).
4. Development of test configurations and specification of the test requirements corresponding to the core requirements applicable in non-contiguous spectrum allocations.

5. Requirements for MSR BS operating in contiguous spectrum shall remain unchanged.

ID	Name	Acronym	Resource	Hyperlink	Notes	TSs_and_TRs
490004	**GERAN part: Multi-standard radio Base Station RF requirements for non-contiguous spectrum deployments**	MSR_NC-GERAN	G1	GP-101618	GP#51 completed. GP#47 approved WID	45.005, 51.021

Supporting Companies: Vodafone, Ericsson, Alcatel-Lucent, Nokia Siemens Networks, Huawei, ZTE, Motorola

The Multi-Carrier BTS specification work completed in Rel-8 and the core part of Multi-Standard Radio (MSR) Base Station work completed in Rel-9. Both standards are enablers for energy saving, facilitate simultaneous use of different 3GPP radio access technologies (RAT) and further ease the migration from one 3GPP RAT to another. Consolidation and refarming of operators' GSM spectrum are slowly progressing through different regulatory phases at the international, regional and national levels. While this is progressing, it is expected that it may not be soon enough for operators to immediately take advantage of MSR base stations. A number of GSMA operators have spectrum that are non-contiguous in the GSM frequency bands and the current requirements for MSR do not take into account such deployment constraints. Therefore, a work item to extend the MSR requirements to include deployments on non-contiguous spectrum was submitted to 3GPP RAN and finally approved in RP-100689. This RAN work item is expected to have impacts on GERAN and, hence, it is important that all impacted technical specification groups and working groups are involved in defining the requirements for MSR BS for non-contiguous deployments. Thus, this work task is proposed as a companion to the main RAN work item RP-100689 where RAN4 is primarily responsible for updating the RAN affected specifications.

Objective: to support RAN4 in identifying deployment scenarios in non-contiguous spectrum allocations, suitability of configuring single-/multi-carrier GSM in non-contiguous blocks, specification of GERAN applicable RF requirements and specification of new MSR test cases in non-contiguous spectrum allocations.

GERAN will review the relevant parts within the scope of the MSR-NC work item and prepare input for possibly introducing new GERAN requirements to help update the MSR specification for non-contiguous deployments with a goal to avoid any changes to existing GERAN RF requirements. If essential, adds-on to relevant GERAN specifications regarding requirements and/or test cases only applicable in non-contiguous spectrum allocations may be considered without any modification of the already defined specifications relevant to MCBTS and MSR.

13 GERAN Features

UID	Name	Acronym	Resource	WI_rapporteur
440021	CN aspects of Local Call Local Switch	LCLS-CN	C4	Vodafone
430001	Local Call Local Switch	LCLS	GP,G2	Huawei
480002	Tightened Link Level Performance Requirements for Single Antenna MS	TIGHTER	G1,G2,C1,G3new	Renesas Mobile
490001	Support of Multi-Operator Core Network by GERAN	MOCN-GERAN	G2,S2,C1	Alcatel-Lucent
490002	Enhancements of Iur-g interface	eIurg	G2,R3	China Mobile, ZTE

13.1 CN aspects of Local Call Local Switch (LCLS-CN) UID_440021

Resources: C4

UID	Name	Finish	Hyperlink	WI_rapporteur	Notes	TSs_TRs
440021	CN aspects of Local Call Local Switch	18/03/2011	CP-100867	Vodafone	CP#51 completed	GERAN Stage 2/3
440022	TR on CN aspects of Local Call Local Switch	16/09/2010	CP-100867	Vodafone	CT#49 completed	new TR 23.889
490013	Stage 2/3 for CN aspects of Local Call Local Switch	18/03/2011	CP-100867	Vodafone	CP#51 completed	23.003, 23.009, 23.205, 23.231, 29.002, 29.205, 29.232, new TS 23.284

Transmission network is an important component for mobile communication networks. In some parts of the world (e.g. Africa, South America, South Asia etc.), operators face the difficulties to develop services and/or deploy networks due to the lack of or cost of fast and reliable backhaul transport resources. However, according to statistical data, many calls in a mobile communication network, especially in the above-mentioned areas, are local calls. That is, these calls are generated and terminated by users served by the same BTS or the same BTS cluster or the same BSC. For local calls, if local switch (voice data in user plane is looped in a BTS or a BSC) is performed, then transmission resource of Abis and/or A interface could be saved.

To avoid impacts to the support of various kinds of supplementary services (e.g., Multiparty Call, Explicit Call Transfer, etc.), and the support of Lawful Interception procedures, not only the BSS, but also the MSC needs to be involved in the establishment/release of the local switch. Furthermore, in order to perform local switching, the BSS needs to correlate the two legs of the call, i.e. it needs to know who is talking to whom. This information needs to be provided by the MSC. It is thus necessary to standardize this inter-working in order to be able to interconnect BSS equipments and CN equipments from different vendors.

Different levels of impacts to the CN should be considered where the different options may provide different levels of optimisation or transmission savings.

3GPP TSG GERAN defines LCLS functionality for the BSC and impacts to the A-Interface. A solution for LCLS may have major impacts on the core network regarding allocation of resources on the MGW, potential procedures for MGW removal/insertion, binding into supplementary service control within the core network (e.g. MPTY), Lawful Intercept procedures within the Core Network, Handover procedures, interaction with MSC-S pooling, etc. In this respect, an analysis of Core Network impacts is required to be performed before a solution is selected. The Core Network Work Item will provide the analysis (technical report) and normative work (technical specifications) for specifying the call flows and procedures for the Core Network and the A-Interface.

Objectives:

- Study and document the different solutions within the core network and associated access network impacts and evaluate their benefits compared to the impacts involved.
- Document the normative core network impacts to the MSC-S, MGW and associated core network interfaces to support the solution as detailed in the technical report in order to support the requirements for LCLS. Initial focus shall be to standardise the LCLS fundamental functionality as below:-
    - Ability to (re-)Establish Local Call Local Switch (LCLS Negotiation)
        - Call Leg Correlation

        - Signalling on A-interface (Stage 2 Call Flows only)
        - Signalling within Core Network
        - Impact to User Plane
        - Lawful Intercept
    - Ability to break LCLS
- Additional standardisation of impacts to supplementary services and existing features may be considered to be standardised, if the LCLS fundamental functionality is complete and sufficient time permits before closing this WI.
- Additional standardisation of an optional H.248 package to notify the MGW that the call is a LCLS may be considered to be standardised, if the LCLS fundamental functionality is complete and sufficient time permits before closing this WI.
- Additional standardisation of an enhanced solution for mid-call tones/announcements may be considered to be standardised, if the LCLS fundamental functionality is complete and sufficient time permits before closing this WI.

13.2 Local Call Local Switch (LCLS) UID_430001

Resources: GP,G2

UID	Name	Finish	Hyperlink	WI_rapporteur	Notes	TSs_TRs
430001	**Local Call Local Switch**	20/05/2011	GP-101989	Huawei	GP#50 completed. GP#41 WID approved	GERAN Stage 3: 48.008, 48.103

Supporting Companies: Alcatel-Lucent, China Mobile, Huawei, Motorola, Nokia Siemens Networks, Ericsson, Vodafone, ZTE.

Transmission network is an important component for mobile communication networks. In some parts of the world (e.g. Africa, South America, South Asia etc.), operators face the difficulties to develop services and/or deploy networks due to the lack of or cost of fast and reliable backhaul transport resources. However, according to statistical data, many calls in a mobile communication network, especially in the above-mentioned areas, are local calls. That is, these calls are generated and terminated by users served by in the same BTS or the same BTS cluster or the same BSC. For local calls, if local switch (voice data in user plane is looped in a BTS or a BSC) is performed, then transmission resource of Abis and/or A interface could be saved.

To avoid impacts to the support of various kinds of supplementary services (e.g. Multiparty Call, Explicit Call Transfer, etc.), and the support of Lawful Interception procedures, not only the BSS, but also the MSC needs to be involved in the establishment/release of the local switch. Furthermore, in order to perform local switching, the BSS needs to correlate the two legs of the call, i.e. it needs to know who is talking to whom. This information needs to be provided by the MSC. It is thus necessary to standardize this inter-working in order to be able to interconnect BSS equipments and CN equipments from different vendors.

This work standardizes procedures, messages and information elements on the A interface to enable Local Switch in the BSS for CS voice calls, while keeping the impact to the core network as small as possible.

A solution for LCLS may have major impacts on CN regarding allocation of resources on the MGW, potential procedures for MGW removal/insertion, binding into supplementary service control within the core network (e.g. MPTY), Lawful Intercept procedures within the CN, Handover procedures, interaction with MSC-S pooling, etc. In this respect, an analysis of CN impacts to is required to be performed before a solution is selected.

13.3 Tightened Link Level Performance Requirements for Single Antenna MS (TIGHTER) UID_480002 (open testing)

Resources: G1,G2,C1,G3new

UID	Name	Resource	Finish	Comp	Hyperlink	WI_rapporteur	Notes	TS_TR
480002	**Tightened Link Level Performance Requirements for Single Antenna MS**	-	23/11/2012	82%	GP-101083	Renesas Mobile	GP#46 approved WID	GERAN
480102	**CT1 part for TIGHTER**	C1	03/06/2011	100%	GP-101083	Renesas Mobile	CP#52 completed	24.008
480202	**TIGHTER Performance Requirements**	G1,G2	20/05/2011	100%	GP-101084	Renesas Mobile	GP#50 completed	45.005, 45.015
480302	**TIGHTER Testing**	G3new	23/11/2012	70%	GP-101085	Renesas Mobile	GP#53 completion 09/12=>11/12	51.010

Supporting Companies: Nokia, Nokia Siemens Networks, Telecom Italia, Vodafone, China Mobile, Com-Research, Renesas Technology Europe.

Justification: to further improve the link level performance for single antenna GSM terminals and thereby the radio network capacity for all GSM services when such terminals are operating in areas being either limited by sensitivity or interference.

The performance of single antenna MS have been continuously improved over time, so an overall tightening of the DL performance requirements for both reference sensitivity and interference limited scenarios will ensure a set of DL performance requirements reflecting "today's" possible DL single antenna MS performances

Objective: to tighten the single antenna MS link level performance requirements by at least 2 dB for **all** relevant GSM services; GSM Speech, AMR-NB GMSK, AMR-WB GMSK, GPRS, EGPRS, and EGPRS2, thereby improving the spectral efficiency of these services without any air interface changes.

Terminals indicating support to TIGHTER shall be compliant with the tightened performance requirements.
The tightened performance requirements shall be optional and release independent.

13.4 Support of Multi-Operator Core Network by GERAN (MOCN-GERAN) UID_490001

Resources: G2,S2,C1

UID	Name	Resource	Finish	Hyperlink	Notes	TSs
490001	**Support of Multi-Operator Core Network by GERAN**	G2,S2,C1	04/03/2011	GP-101443	GP#49 completed. SP/CP#50 completed.	GERAN
490101	**Stage 2**	S2	16/12/2010	GP-101443	SP#50 completed	23.251
490201	**CT1 part of Stage 3**	C1	10/12/2010	GP-101443	CP#50 completed	24.008 CR#1644
490301	**GERAN2 part of Stage 3**	G2	04/03/2011	GP-101443	GP#49 completed	48.008 CR#0325, 48.018 CR#0303

Supporting Companies: Alcatel-Lucent, Vodafone , Motorola, Telefónica, Ericsson, Huawei, Nokia Siemens Networks, ZTE

Justification

900 MHz spectrum re-farming to other RATs will lead operators to reduce GSM capacity and therefore to share their GSM networks, therefore providing operators with the most suitable (GE)RAN sharing method becomes a need. As re-farming means to significantly reduce the set of frequencies allocated to GSM the RAN sharing method as to be as efficient as possible regarding the use of remaining set of frequencies; it is the belief of supporting companies that MOCN (Multiple-Operator Core Network) is most suitable RAN Sharing method in this respect.

Furthermore supporting companies see benefits to have a convergence between GERAN and (E-)UTRAN Network sharing solutions.

It is proposed to manage Network Sharing for GERAN according to the MOCN configuration. The CN is not shared; configurations for which the CN is also shared (GWCN – GateWay CN configuration) are out of the scope of this WI.

On the other hand, as broadcasting of a PLMN list would mandate the use of the Extended BCCH feature and given the low penetration rate expected for MSs which would manage such a PLMN list, it is proposed to broadcast on the radio interface a Common PLMN ID, without introducing any PLMN list. This mechanism relies on a BSC of a shared GERAN routing all signalling between a mobile station and the core network, in a similar way than MOCN does for UTRAN/E-UTRAN. Such a requirement mandates the use of A-Flex (and Gb-Flex for the PS domain).

The way the Common PLMN has to be configured is not described by the specifications; however following CT1 feedback it is recommended to avoid the use of an already existing PLMN (which could e.g. belong to the MS forbidden PLMNs list).

Objective: to allow GERAN to manage Network Sharing by updating the A-Interface and Gb-Interface.

The CN shall be able to provide the BSC with the indication that following an attempt from a MS to access the Network (e.g. first attach) the CN has received a message which shall be rerouted (by the BSS) to another CN. As PLMN list is not broadcast the radio interface is not impacted (i.e. no impact to radio protocols on both network and MS sides).

13.5 Enhancements of Iur-g interface UID_490002

Resources: G2,R3

UID	Name	Acronym	Resource	Finish	Hyperlink	Status_Report	Notes	TSs_and_TRs
490002	**Enhancements of Iur-g interface**	eIurg	G2,R3	03/06/2011	GP-101758	-	RP#52 completed. GP#49 completed. GP#47 approved WID	GERAN,UTRA
490102	**GERAN part**	eIurg-GERAN	G2	04/03/2011	GP-101758	-	GP#49 completed. GP#48 updated WID GP-101659=>GP-101758 (restricting the scope to GERAN BSC and TD-SCDMA RNC only). GP#47 approved WID	43.130, 48.008
490021	**Core part**	eIurg-RAN	R3	03/06/2011	RP-101232	RP-110526	RP#52 completed	UTRA Stage 2 (25.401, 25.420), Stage 3 (25.423)

Supporting Companies: China Mobile, ZTE, Huawei, Nokia Siemens Networks, Alcatel-Lucent

Justification

The optional support of Iur-g interface in GERAN has been specified in TS 43.051 since Rel-5 by applying architecture/protocol stacks (.e.g. RNSAP) of UMTS to GERAN. However, the scopes of applied protocol stacks were limited and the usage of Iur-g functionalities was strict to Iu mode only. Furthermore, commercial deployment of GERAN Iu-mode seems to be delayed dramatically due to lack of business interests. Given the factors listed above, operators providing multi RATs services (.e.g. GERAN/WCDMA/TD-SCDMA) have to use conventional procedures through CN interfaces to fulfil the necessary interworking between RATs which seemed to be not optimized.

In case of multi RATS interworking .e.g. relocation from TD-SCDMA / LCR TDD RAN to GERAN, Iur-g relevant procedure allows solely signalling interaction through CN which is long delay procedure due to the radio resource preparation on target side is processed quite late since only the basic mobility procedure is used for Iur-g interface. TS 25.423 specifies enhanced relocation procedure in dedicated procedure by allowing direct signalling transfer prior to the normal basic mobility procedure between RNCs through Iur interface which could benefit the delay and performance of relocation. It is believed that this mechanism would also shorten the delay of relocation between BSC and RNC.

Objective: to analyse and specify solution for enhancements of Iur-g interface with regards to above justification for field on where operators have clearly shown their interests i.e. utilizing this enhancement between a BSC operating in *A/Gb mode* and an TD-SCDMA RNC through control plane only.

Enhancements of Iur-g interface is aiming to facilitate the improvement of network performance by optimized signalling procedures with no impact on radio interface towards mobile. Reusing as much as possible existing signalling procedures of other RATs in relevant fields could minimize the efforts during normative work.

To achieve this, enhancements of Iur-g interface include two aspects with limited impact on RNSAP:
- to support of Iur-g interface between a BSC operating in A/Gb mode and an TD-SCDMA RNC.
- to adopt partially RNSAP procedures to Iur-g interface with necessary modifications.

Objective of RAN3 part: Enhancements of Iur-g interface (Stage 2/3)

- to facilitate the improvement of network performance by optimized signalling procedures with no impact on radio interface towards mobile. Reuse as much as possible existing signalling procedures of other RATs in relevant fields could minimize the effort during normative work;

- to specify enhancements of Iur-g interface with regards to the above justification in areas where operators have clearly shown interest i.e. control plane based-only enhancements between a BSC operating in *A/Gb mode* and a LCR TDD RNC.
- to support Iur-g interface between a BSC operating in *A/Gb mode* and a LCR TDD RNC;
- to adopt partially RNSAP procedures to Iur-g interface with necessary modifications;

14 SA1 Studies

UID	Name	Acronym	Resource	WI_rapporteur
370045	**Study on enhanced voice service requirements for the Evolved Packet System (EPS)**	FS_EV_EPS	S1,S4	France Telecom
380083	**Study on advanced requirements for IP interconnect**	FS_IPXS	S1	Telefónica O2
410039	**Study on Personal Broadcast Service**	FS_PBS	S1	ETRI
410040	**Study on LCS support in SAE for non-3GPP accesses**	FS_LCS_n3GPP	S1	SK Telecom
430030	**Study on Haptic Services**	FS_Haptics	S1	SK Telecom

14.1 Study on enhanced voice service requirements for the EPS UID_370045

Resources: S1,S4

UID	Name	Resource	Hyperlink	WI_rapporteur	Notes	TR
370045	**Study on enhanced voice service requirements for the Evolved Packet System (EPS)**	S1,S4	SP-070698	France Telecom	Spin-off Feature UID_470030 Codec for Enhanced Voice Services	22.813
370047	**Use cases definition and service and system requirements**	S1	SP-070698	France Telecom	SP#47 completed	22.813
370048	**Codec specific part of FS_EV_EPS**	S4	SP-070698	Ericsson	SP#47 completed	22.813

Supporting Companies: Orange, Motorola, Research in Motion, Samsung, Telecom Italia, Telefónica O2, Ericsson.

EPS serves as basis of future 3GPP systems and supports enhanced and new services. Voice is an important service in EPS, hence enhanced speech conversational services towards very high audio quality are one important step forward.

New voice service requirements drive the need for enhanced codecs. Progress of speech coding technology makes possible important enhancement of coding efficiency, quality of service and overall speech coding performance over IP.

Especially IP-optimized coding with advanced functionalities may be relevant for end-to-end high-quality mobile telephony services in EPS environment. All of the mobile phone users, network operators and manufacturers of mobile terminals and of mobile network infrastructure have benefits from capacity enhancements enabled by coding efficiency improvements and enhanced quality telephony service over EPS. Users are able to make calls with improved speech quality. Improved coding represents a feature in mobile telephony, a fact which supports both network providers and manufacturers to broaden their range of products.

When introducing improved coding into 3GPP systems it is also essential to consider interoperability and cost aspects related to legacy services and legacy network deployments.

This study defines/analyzes new use cases in EPS environment and its future services and their corresponding requirements on speech codecs and evaluates if the new requirements are met by existing codecs (or if new ones are needed). The study:

- identifies use cases benefiting from enhanced voice and mixed content conversational multimedia service for EPS
- identifies service and system requirements
- identifies detailed codec requirements
- assesses existing codecs (and identifies the need for new ones) in respect to identified requirements

SA1 defined use cases and identified service and system requirements, while SA4 made the codec specific work (e.g. detailed codec requirements such as performance requirements and design constraints), including the assessment of existing 3GPP codecs. TR 22.813 describes use cases, service and system requirements and detailed codec requirements, codec assessment results and strategy for standardizing EPS voice codecs.

Spin-off Feature UID_470030 Codec for Enhanced Voice Services.

14.2 Study on advanced requirements for IP interconnect UID_380083

Resources: S1

UID	Name	Acronym	Hyperlink	WI_rapporteur	Notes	TR
380083	**Study on advanced requirements for IP interconnect**	FS_IPXS	SP-070878	Telefónica O2	SP#46 completed. Spin-off Feature Rel-11 UID_470051 Advanced IP Interconnection of Services	22.893

Supporting Companies: Telefonica O2, Telecom Italia, Orange, BT, Sprint, Vodafone, China Mobile.

Linked to the Rel-8 Feature UID_380060 IP Interconnection of Services (IPinterc).

IP is being introduced in the networks of both fixed and mobile operators as a more cost-effective alternative to Circuit Switched technology in the legacy PSTN/PLMN, as well as the underpinning transport for delivering IMS based Multimedia Services.

In order to ensure carrier grade end to end performance, appropriate interconnect solutions are required to support communications between users connected to different networks. A number of initiatives outside 3GPP addressed IP Interconnect ion of services scenarios and commercial models to achieve this; for example, the GSM Association has developed the IPX (**I**P **P**acket E**x**change). Also, ETSI has recently defined requirements and use case scenarios for IP Interconnection of services. These initiatives require the use of appropriate technical solutions and corresponding technical standards, some of which are already available and others which will require development in 3GPP.

Moreover, new models of interconnection may emerge in the market where Network Operators expose network capabilities to 3rd party Application Providers including user plane connectivity for the media related to the service.

This work identified technical requirements for carrier grade inter-operator IP Interconnection of Services for supporting Multimedia Services provided by IMS and for legacy voice PTSN/PLMN services transported over IP infrastructure (e.g. VoIP). These requirements considered convergent interconnect models developed outside 3GPP.

Requirements for IP Interconnection (service control and user plane aspects) between Operators and 3rd party Application Providers were identified for the support of IP interconnect models defined by other bodies (e.g. GSMA, ETSI, ITU-T). It also defined interoperability requirements of IP based services to ensure transparency to the end user.

Spin-off Rel-11 Feature UID_470051 Advanced IP Interconnection of Services (IPXS).

14.3 Study on Study on Personal Broadcast Service UID_410039

Resources: S1

UID	Name	Acronym	Hyperlink	WI_rapporteur	Notes	TR
410039	**Study on Personal Broadcast Service**	FS_PBS	SP-080504	ETRI	SP#47 completed	22.947

Supporting Companies: ETRI, SK Telecom, China Mobile, Toshiba, NEC.

Mobile Television Service is an important service to be supported in 3GPP LTE.

Personal Broadcasting is a service that allows any ordinary PC users to generate and distribute their own content using Internet. This is also known as User Generated Content (UGC).

The service may also be available to 3GPP users with minor efforts to LTE. There are foreseeable benefits of providing Personal Broadcast Service:

1) Lots of live broadcast shows will be available exclusively for 3GPP users.
2) Any organization or individual may broadcast their own contents on air using 3GPP access.
3) New service and device market will emerge, such as 3GPP Car Audio or Portable 3GPP Radio, etc.

Given the potential service and market, it is expected that Personal Broadcast Service may be one of major application that best utilize wide bandwidth provided by 3GPP system. Therefore, it is imperative to further investigate use cases and requirements of Personal Broadcast Service in order to identify functions necessary to support in 3GPP.

This study focussed on aspects necessary to support Personal Broadcast Service in 3GPP system by identifying e.g.:

- use cases of Personal Broadcast Service
- service and system aspects necessary for the support in 3GPP
- security and charging aspects pertinent to Personal Broadcast Service
- minimum set of requirements to support service specific 3GPP terminals e.g. Car Audio or Portable Radio.

Major function of the service specific 3GPP terminals is Audio or Video broadcast service reception, and capability for voice and data communication may be neglected.

- The service description of Personal Broadcast should be independent to underlying delivery method.
- Charging aspects with respect to each use case of Personal Broadcasting should be considered.
- Security aspects in relation to Personal Broadcast Service should be e considered.

TR 22.947 Conclusions

The Personal Broadcast Service is an enabling technology for any private organization or ordinary user to broadcast one's own contents on air. The service is characterized by one-to-many group mobile communication that the potential benefit has not been sufficiently studied. Use cases and benefits to users, operators as well as device manufacturers had been investigated. Some requirements and charging aspects necessary to support PBS are presented.

It is concluded that full range of service interaction between personal content providers and users may not be supported adequately in existing 3GPP specifications. Further enhancement in existing 3GPP specifications may be necessary..

14.4 Study on LCS support in SAE for non-3GPP accesses UID_410040

Resources: S1

UID	Name	Acronym	Hyperlink	WI_rapporteur	Notes	TR
410040	**Study on LCS support in SAE for non-3GPP accesses**	FS_LCS_n3GPP	SP-080648	SK Telecom	SP#47 completed	22.814

Supporting Companies: SK Telecom, Samsung, Intel, Sprint, ETRI, Polaris Wireless, Toshiba, KDDI.

One main concept of EPS is to support a variety of different access systems (existing and future) ensuring mobility and service continuity between these access systems. LCS support for non-3GPP accesses should also be taken into account. TS 22.071 has been applicable only to 3GPP accesses and any new requirements for non-3GPP accesses have not been considered yet. Moreover, existing requirements in TS 22.071 need to be reviewed whether service requirements for 3GPP access apply also to non-3GPP accesses.

Therefore it is necessary to consider how to support LCS in EPC for non-3GPP accesses (e.g. 3GPP2 and WiMAX). Supporting LCS in EPC for non-3GPP access does not mean that all positioning methods available in various kinds of non-3GPP accesses should be supported in EPS or inventing new positioning methods for other accesses. However, how to realize the presentation of location information in EPC when users are connected in non-3GPP accesses should at least be taken into account. In addition, the service scenarios should be discussed whether new service requirements are needed for the users camping on non-3GPP accesses through EPC.

This study examined whether requirements in TS 22.071 are applicable for non-3GPP accesses and identified new service requirements for the users connected to non-3GPP accesses through EPC such as: High level requirements of LCS support, Location information provided to the LCS client, QoS requirements of LCS support, Priority between different LCS services , Privacy requirements of LCS support, Periodic location report of LCS services, Impact on the LCS client and the LCS server to support LCS services.

Consideration was given to differential charging for different subscriber connected in non-3GPP accesses.

Requirements identified in TR 22.814:
In order to support roaming non-3GPP terminals that are connected to EPC it is assumed that location information, assisting location determination, may be exchanged between home and visited networks.
OMA RLP is a candidate for such information exchange, however, such protocol requirement is outside 3GPP mandate.

- LCS for non-3GPP networks shall be supported by interworking with V-GMLC (assuming it supports Lr interface) to the extent the LCS capabilities are supported by the non-3GPP network. The non-3GPP network must support the corresponding capabilities on the Lr interface.
- LCS shall be supported by interworking with non-3GPP network based on use of information in AAA and HSS.
- Interworking with non-3GPP network should be based on OMA SUPL when applicable.

TR 22.814 Conclusions
LCS is one of the killer services in current mobile telecommunication services. As EPC is designed as a common core for both 3GPP and non-3GPP accesses, it is essential to consider how to support LCS in EPC for non-3GPP accesses as well. This Study has identified potential requirements for LCS for non-3GPP access. However, the identified requirements are found to be addressed by other 3GPP specifications. Thus no more specification work is necessary.

14.5 Study on Haptic Services UID_430030

Resources: S1

UID	Name	Acronym	Hyperlink	WI_rapporteur	Notes	TR
430030	**Study on Haptic Services**	FS_Haptics	SP-090664	SK Telecom	SP#47 completed. Covers Mobile/Fixed/Cordless/etc terminals. Haptic (human-machine tactile communication) extend service offering & richness of user experience beyond current visual & auditory senses	22.987

Supporting Companies: SK Telecom, Telecom Italia, Sprint, Samsung, T-Mobile, Orange, Huawei, Softbank.

Originally supporting voice calls, the Telecommunication system conveyed auditory sense stimulation. SMS and MMS provide to the users visual sense stimulation by conveying messages in a written and image/graphical form. Recent Telecommunication systems extended the visual stimulation by adding motion video capabilities.

Despite these service enhancements Telecommunications still do not reach the full range of sensory expression and input used in human face-to-face communication and human activities.

Human-machine tactile communication or feedback (haptics) are undergoing rapid technology development.
This work investigates adding the haptic technology into 3GPP networks (e.g. mobile network, IMS mobile and fixed network) to extend the service offerings and richness of user experience beyond the current visual and auditory senses.

This work indentified current haptic technologies which might be deployed in 3GPP networks (e.g. mobile network, IMS mobile and fixed network), readiness for use and benefits for the user experience. This work included:

- Consultation with OMA to clarify scope, roles and coordination on the development of haptics services
- Identification of what tactile sense communication through the use of haptic technology is possible
- Identification of the level of adaptation that would be required for existing services to benefit from the enhancements provided by supporting haptics capabilities
- Identification of potential new services that could be built on the capabilities provided by haptics technologies, when used alone or in combination with existing telecommunication services

TR 22.987 - Relation to Open Mobile Alliance (OMA)

A standardized representation of haptic information should be developed for haptic service. Even though a common platform for haptic services enables network operators and 3rd party service providers to deliver various haptic information, the absence of a standardized representation of haptic information may prevent possible applications from being developed in telecommunication networks.

Therefore, 3GPP should work closely with OMA in order to define a standardized representation of haptic information. 3GPP should play a significant role in defining architecture, protocols, and other requirements from the viewpoint of network and service providers. But it should also work closely with OMA to define what data format works best for the representation of various types of input and outputs, and different UE capabilities.

TR 22.987 Conclusions

TR 22.987 evaluates benefits and technical feasibility of haptic services in telecommunication networks. Broadening the type of human senses that telecommunications may bring in to play, haptic services have the potential to enrich user experience as identified in the use cases such as Haptic Emoticon Delivery Service and Haptic Customized Alerting Tone Service. TR 22.987 identifies potential requirements to implement haptic services over telecommunication networks regarding network, UE, inter-working, data description, and charging perspectives. TR 22.987 also recommends the collaboration with other standardization bodies such as OMA or ISO TC 159 in defining application level haptic information. TR 22.987 has identified potential requirements for haptic services and their implementation that may lead to other TS or CRs.

15 SA2 Studies

UID	Name	Acronym	WI_rapporteur
370050	**Study on System enhancements for the use of IMS services in Local BreakOut and Optimal Routing of Media**	FS_IMS_LBO_ORM	Telecom Italia, BT
390055	**Study on Intra Domain Connection of RAN Nodes to Multiple CN Nodes**	FS_IDC	China Mobile
440049	**Study on Single Radio Voice Call Continuity enhancements**	FS_eSRVCC	China Mobile
470048	**Study on Single Radio Video Call Continuity for 3G-CS**	FS_vSRVCC	Samsung
470049	**Study on S2b Mobility based on GTP**	FS_SMOG	Alcatel-Lucent

15.1 Study on System enhancements for the use of IMS services in LBO and ORM UID_370050

Resources: S2

UID	Name	Acronym	Hyperlink	WI_rapporteur	Notes	TR
370050	**Study on System enhancements for the use of IMS services in Local BreakOut and Optimal Routing of Media**	FS_IMS_LBO_ORM	SP-080556	Telecom Italia, BT	SP#46 completed. Spin-off Feature UID_460028 Optimal Media Routeing (OMR).	23.894

Supporting Companies: Telecom Italia, Marvell, LG Electronics, Verizon, Alcatel-Lucent, BT, Vodafone, Nokia Siemens Networks, Nortel, Huawei, Motorola, Ericsson.

Linked to Study on Multimedia Session Continuity (FS_MMSC) UID_350051, Study on Centralized IMS Service Control (FS_ICS) UID_330012 and IMS inter-operator service interconnection interface (FBI2-IOPSI) UID_360011.

According to requirements for local breakout (TS 23.401, annex A), it shall be possible for a UE in a roaming scenario to simultaneously connect to one PDN directly accessible through the VPLMN and to PDNs reachable only from the HPLMN. In case of IMS services, the usage of local breakout (LBO) for a specific IMS session shall be authorized by the HPLMN; if LBO is not authorized for a given IMS session, which session shall be handled in home routed mode.

The above requirements imply that when the UE moves across PLMNs, even if the network-layer mobility mechanisms can sustain IP connectivity to a P-CSCF discovered in the HPLMN, a new P-CSCF may need to be discovered either in addition to or instead of the old one, in order to allow the request of new IMS services handled in LBO.

Furthermore, international communications and terminal roaming introduce a number of scenarios where sessions may traverse multiple IMS networks. The use of Border Control Function makes both the signalling and bearer path traverse through the same networks path and could make the media path not optimized.

In order to ensure Quality of Service (QoS) and, in certain cases, minimal routing costs, there is a need to enable the routing of media traffic via an optimal path between those networks, without necessarily being linked to the path that the signalling flow needs to take. The optimal media path between two endpoints may involve IP transit networks, which in normal circumstances are not included in the SIP signalling path. Current QoS reservation is negotiated based on the SIP pre-conditions model, and hence the lack of SIP signalling in the transit network presents a problem for the negotiation of QoS between the end-points.

TR 23.894 Conclusion on LBO dual IP address solutions:

Considering that:

- LBO single IP address solutions introduced in Rel-8 [8] allows for co-existence of IMS signalling anchored in the home network, along with media streams anchored in the home network, in the visited network or in both
- LBO dual IP address solutions may prevent the routeing of media or limit its effectiveness

TR 23.894 recommends to not further develop any LBO dual IP address solution for the roaming case as described in clause 6.1.1, i.e. with IP GW-H and IP GW-L belonging to serving networks owned by different operators.

TR 23.894 Conclusion on OMR:

TR 23.894 recommends that a combination of Alternative 1 and 2, described in clauses 7.2 and 7.3, should be used as the basis for specification of an OMR solution, as guided by the principles below. Any remaining issues identified in clauses 7.2 and 7.3 that are still applicable should be addressed during specification work.

- Whenever possible, decisions should be made during the forwarding of the SDP offer to minimize the amount of TrGW allocation and signalling required.
- When an IMS-ALG uses the proactive transcoding method with gateway reservation, further optimization decisions should be made during the forwarding of the SDP answer to minimize the need for a second SDP offer/answer transaction under some cases and to otherwise reduce the signalling required for optimization.
- When a second SDP offer/answer transaction is required for optimization during transcoding, it is preferred to complete the second SDP offer/answer transaction before forwarding the SDP answer for the first SDP offer/answer transaction. SIP procedures sometimes make this difficult. This problem is associated with the proactive transcoding solutions and not specific to OMR. Solutions should be agreed for proactive transcoding and should then be applicable to OMR with transcoding.
- IMS-ALGs making codec list changes should clearly represent the changes in the forwarded SDP in a robust way to represent additions, deletions and reordering of Codecs in the list, as well as unambiguous handling of auxiliary Codecs. The details of representing the codec changes are deferred to stage 3 work.
- The description of SDP extensions required for OMR should be functional with representation details deferred to stage 3 work.
- Means of handling forking are not yet addressed and details will be handled during specification work.
- The Active Bypass option is not recommended for standardisation.
- During the forwarding of the SDP answer, the first IMS-ALG to recognize that a second SDP offer/answer transaction is required for further optimization and that is able to successfully complete the required optimizations will initiate the second SDP offer/answer transaction.
- All SDP offer/answer procedures associated with OMR will follow RFC 3264 and other relevant specifications.
- There may be actions at interconnect that affect OMR and examples of these are discussed in Annex B.

Spin-off Feature UID_460028 Optimal Media Routeing (OMR).

15.2 Study on Intra Domain Connection of RAN Nodes to Multiple CN Nodes UID_390055

Resources: S2

UID	Name	Acronym	Hyperlink	WI_rapporteur	Notes	TR
390055	**Study on Intra Domain Connection of RAN Nodes to Multiple CN Nodes**	FS_IDC	SP-080094	China Mobile	SP#47 completed. Concluded no further normative work expected. Linked to 23.236	23.924 (was 23.823)

Supporting Companies: China Mobile, Huawei, ZTE, T-Mobile, Nokia Siemens Networks, RITT, LG Telecom.

Linked to TS 23.236 (Intra-domain connection of Radio Access Network nodes to multiple CN nodes).

TS 23.236 defines the Intra Domain Connection of RAN Nodes to Multiple CN Nodes for GSM and UMTS systems which are also referred to as MSC/SGSN pool. The NAS Node Selection Function (NNSF) is defined to select the specific CN node (i.e. MSC or SGSN) to which initial NAS signalling messages or LLC frames are routed. This function is used in RAN nodes and potentially in CN nodes (e.g. it is in the SGSN when the Gs interface is being used). There are some development issues for using NNSF in BSC/RNC nodes as detailed in TS 23.236:

- There are too many existing BSC/RNC in current networks at present, most of which do not support the NNSF function. It may be difficult to upgrade all these equipments, and to maintain them in future.
- If very limited part of BSC/RNC nodes support the NNSF function, no advantages could be seen from the feature especially in the initial stage of deploying MSC/SGSN Pool
- Mesh TDM circuit between BSC nodes and MSC/SGSN servers will be required because each BSC needs to be able to connect to each MSC/SGSN server in the pool area, and it may be hard to be implemented practically.
- Physical mesh connection can be avoided by introducing virtual MGW between BSCs and MSC servers but the TDM circuit configuration between each pair of BSC and MSC are still required. The TDM circuits between each pair of BSC and MSC can not be used by any other pair. Any changes of the core network (e.g. adding a new MSC into the pool area) will need the TDM circuits between the BSCs with the MSCs to be re-installed (re-plan the TDM circuits configuration between the BSCs with the MSCs or install new TDM circuits, e.g. add new TDM circuits between BSCs with the new MSC).
- More complex O&M as many BSC/RNC nodes and any operation on MSC/SGSN Pool will need to be processed on many nodes.

This work studied the implementation of NNSF function located above the BSC/RNC nodes for MSC/SGSN pool. Changes to fundamental architectural principles in TS 23.002 should be avoided. This work covered:

- Feasibility to implement NNSF function located above the BSC/RNC nodes, for both CS and PS domains, with and without Gs interface, including the network resilience aspects and studied impacts on the Mc interface
- The study should not pose impact to the MSC/SGSN that supports existing pool solution. Coexistence of the new NNSF located above the BSC/RNC nodes with legacy NNSF shall be possible.
- The study should pose no or minimum impact to the existing network entities as well as existing interfaces, and the new NNSF function shall not impact BSC/RNC.
- Use of NNSF function located above the BSC/RNC nodes in a MOCN(Multi Operator Core Network) configuration
- Use of NNSF function located above the BSC nodes when Gb interface is used
- Re-using of A-Interface TDM circuits to improve the resource utilization rate
- Consideration for A-Interface over IP should be taken into account
- The solution should provide the same redundancy capability as the existing MSC/SGSN solution

TR 23.924 Conclusions: It is feasible to deploy SNSF nodes above the BSC/RNC nodes to provide functions similar to those of the NNSF in BSC/RNC nodes as specified in TS 23.236. The solution described in TR 23.924 is one of the possible solutions to resolve the implementation issues of deploying NNSF within the BSC/RNC nodes for MSC Pool, and may be used as guideline for implementations in cases where operator does not upgrade the radio networks.

15.3 Study on Single Radio Voice Call Continuity enhancements UID_440049

Resources: S2

UID	Name	Acronym	Hyperlink	WI_rapporteur	Notes	TR
440049	**Study on Single Radio Voice Call Continuity enhancements**	FS_eSRVCC	SP-090363	China Mobile	SP#49 completed	23.856

Supporting Companies: China Mobile, ZTE, CATT, Vodafone, Orange, Ericsson, Alcatel-Lucent, Huawei.

SR-VCC has been standardized in Rel-8 to provide seamless continuity at UE handovers from E-UTRAN/HSPA to UTRAN/GERAN. SR-VCC being a procedure involving both CS and IMS domains, it is expected that Rel-8 SR-VCC performances might be possible to be enhanced e.g. in case of roaming. A study to evaluate the current performances of Rel-8 SR-VCC and whether enhancements could bring some benefits would be valuable. The enhancement solutions, if necessary, may involve both EPS aspects and IMS aspects.

The objective of this study is to first analyze the current performances of SR-VCC solution in Rel-8 from E-UTRAN/HSPA to UTRAN/GERAN, and then to evaluate additional mechanisms that should improve user experience.

These mechanisms should:

- Enhance SRVCC performance in the following directions:
  - from EUTRAN to UTRAN/GERAN;
  - from HSPA to UTRAN/GERAN.
- Take into account both non-roaming and roaming cases;
- Minimize impacts to the UE and ensure backward compatibility with UE of previous releases;
- Minimize impacts on network architecture.

TR 23.856 Conclusion:

Select the SIP anchoring based solution for normative work CR (TEI10) introducing and completing stage-2).
Analyzed performance of Rel-8 SRVCC solution from E-UTRAN/HSPA to UTRAN/GERAN.

15.4 Study on Single Radio Video Call Continuity for 3G-CS UID_470048

Resources: S2

UID	Name	Acronym	Hyperlink	WI_rapporteur	Notes	TR
470048	**Study on Single Radio Video Call Continuity for 3G-CS**	FS_vSRVCC	SP-100168	Samsung	SP#49 completed	23.886

Supporting Companies: NTT DoCoMo, NEC, NTC, Samsung, Nokia Siemens Networks.

Related to Rel-8 UID_350030 Single Radio Voice Call Continuity for 3GPP (SAES-SRVCC). Study how to provide Video Call seamless service continuity for 3G/LTE terminal user.

In the current SRVCC feature, the video call originated in E-UTRAN/HSPA with IMS and handed over to 3G-CS is not supported. The 3G video call is one of the fundamental CS services, therefore, in order to provide seamless service continuity for video calls and to prevent service quality for 3G/LTE terminal user regardless of the access system it connects, i.e. including the RAT change, SRVCC needs to support video call handover from IMS over E-UTRAN / HSPA to 3G-CS.

This work studies the Video Call seamless service continuity for 3G/LTE terminal user.

In Rel-8 SRVCC requirement, SA1 has specified in TS 22.278 that "Service continuity at domain and RAT change for TS 11, TS 12 and equivalent PS services" shall be supported. This provides basic SRVCC for voice call. It is also required that service shall be maintained during and following a change of network in either direction between a Rel-7 and earlier network and an Evolved Packet System.

In the current Rel-8 and Rel-9 SRVCC, the video call handover from E-UTRAN/HSPA to 3G-CS for service continuity is not specified yet. Therefore, this needs to be supported as one of the key services for 3G-CS, LTE and beyond.

Lack of stage 1 requirements for video call continuity was addressed as part of this study.

The objective of this study item is to identify the key issues (e.g. video SRVCC indication, video codec negotiation mechanism, performance requirements) to realize the video call continuity from E-UTRAN/HSPA to 3G-CS based on the Rel-8/9 SRVCC architecture specified in TS 23.216 and TS 23.237, and study the mechanism to resolve them. In this study, the architecture shall not be modified unless any of the key issues cannot be resolved.

The study has been performed to the scenarios where the video call originated in E-UTRAN/HSPA with IMS and the UE moves to UTRAN and continues the service over 3G in the CS domain.

15.5 Study on S2b Mobility based on GTP UID_470049

Resources: S2

UID	Name	Acronym	Hyperlink	WI_rapporteur	Notes	TR
470049	**Study on S2b Mobility based on GTP**	FS_SMOG	SP-100169	Alcatel-Lucent	SP#48 completed	23.834

Supporting Companies: Verizon Wireless, Alcatel-Lucent, Cisco, LG Electronics, Starent Networks, Samsung, Orange , Juniper Networks, ZTE.

Triggered by Rel-8 UID_350027 SAE for support for non-3GPP accesses.

Nature of relationship: S2b one of the interfaces defined for non-3GPP accesses support in EPS. Stage 1 in Rel-8 UID_320022 (AIPN-SAE) 22.278, 22.101.

The increased data demand, caused by the increased use of 3rd party applications and Internet browsing is creating interest for new operator tools to lower the cost on providing data access. The increased availability of WLAN radio in many terminals and the increasing availability of WLAN access networks in many geographical locations provide means to achieve this goal.

It is beneficial to provide mobility support (preserve IP address) while UEs move between 3GPP EPS RATs and WLAN.

WLAN RAT frequently happens to be associated to "untrusted" kind of non-3GPP access.
Network-based mobility between E-UTRAN and untrusted non-3GPP accesses is provided by the S2b interface defined in TS 23.402. This interface is based on PMIPv6.

With EPS deployments, it is beneficial to also allow a GTP option for S2b network based mobility as this would simplify the architecture and operations of EPS networks supporting 3GPP and WLAN accesses by using a single mobility protocol.

This study adds an S2b based on GTP option. It develops the necessary stage 2 message flows necessary to support S2b based on GTP and mobility between S5/S8 based on GTP and S2b based on GTP. The GTP S2b option is functionally equivalent to the already existing S2b option. No service aspects beyond those already provided by PMIPv6-based S2b are foreseen to be impacted, so no work is expected in this area.

TR 23.834 Evaluation

TR 23.834 shows that it is feasible to support GTP on the S2b interface with minimum impacts to EPC standards and implementations. The study of the solution proposed in clause 5.1 can be considered completed to the extent on making a decision on it and no major open issues have been identified.

- BBERF and Gxb are not required with GTP-based S2b.
- Deployment of an S9 interface is not required for roaming with home routed traffic.
- In all scenarios, the same UE functionalities are required for GTP based S2b as for PMIP based S2b.

TR 23.834 Conclusion

Providing a GTP based S2b interface as an alternative to the existing PMIP based S2b definition is a feasible option (Annex A identifies the SA2 specifications that require modifications to define a GTP based S2b interface).

16 SA4 Studies

UID	Name	Acronym	WI_rapporteur
430040	**Study on Surround Sound codec extension for PSS and MBMS**	FS_SS_PSS_MBMS	Fraunhofer Gesellschaft
480044	**Study on Improved Video Coding Support**	FS_IVCS	Nokia, ETRI

16.1 Study of Surround Sound codec extension for PSS and MBMS UID_430040

Resources: S4

UID	Name	Acronym	Hyperlink	WI_rapporteur	Notes	TR
430040	**Study on Surround Sound codec extension for PSS and MBMS**	FS_SS_PSS_MBMS	SP-090019	Fraunhofer Gesellschaft	SP#51 completed	26.950

Supporting Companies: Dolby Laboratories, Fraunhofer Gesellschaft, Philips, Orange.

Work to extend Rel-8 Extending PSS and MBMS User Services for optimized Mobile TV (UID_34043).

This work extends Rel-8 UID_34043 Extending PSS and MBMS User Services for optimized Mobile TV.
Mobile TV services are catching on. One way of making such services more attractive to end users is to offer an experience closer to home theatre. Surround sound capability is considered to be one of the key ingredients.
Mobile terminals become a means of transporting multimedia data into the home, as an extension of the use on-the-go. In an automotive environment, such multimedia content can be played back over the surround sound playback system. In this context, mobile terminals get connected to surround sound speaker set-ups.

MPS is an example of codec extension enabling the transport of surround sound in a bit-rate efficient way. Information about the original spatial sound field is conveyed as parametric data. This data is essential to decode surround audio in a way that is perceptually as close as possible to the original within bitrate constraints. Most importantly, MPS provides backward compatibility to a wide range of underlying monophonic or stereophonic audio codecs such as 3GPP Enhanced aacPlus and AMR-WB+. In this way, legacy UEs supporting 2-channel 3GPP audio codecs can consume a multi-channel audio service in stereo quality. This is an essential feature allowing a smooth introduction of multi-channel audio in 3GPP services that any 3GPP surround sound codec extension would need to support.
Essential features for surround sound in the context of mobile TV are mono/stereo compatibility, bitrate/quality scalability, headphone decoding mode, multi-channel decoding for loudspeakers. These features are supported by MPS. However, while the support of surround audio in the context of mobile TV seemingly is feasible and even desirable, it is not obvious that there will be a clear improvement with surround audio under the constraints imposed by applications in 3GPP mobile environments and devices. There is a need for selection of applicable methodology for verifying that the quality of surround sound rendered in relevant use cases (e.g. through headphones, in-car, in-home) meets expectations. There is hence the need to investigate if a surround sound feature in 3GPP mobile services would provide sufficient additional value that would justify the standardization of a corresponding codec extension. This study investigated the potential user experience benefits of surround audio in 3GPP services as follows:

- identified and document relevant use cases for surround sound in 3GPP
- identified suitable testing methodology for surround sound in relevant use cases of the PSS and MBMS services
- defined subjective minimum performance criteria to be met in order to motivate the consideration of a surround audio coding extension for adoption by 3GPP
- defined design constraints to be met by a surround audio codec extension method for adoption by 3GPP
- validated user benefits and feasibility of deployment of surround sound for PSS and MBMS services according to defined minimum performance criteria, bitrate and design constraints for all use cases (e.g. surround sound speaker set-up and headphone decoding mode) through evaluation of at least one surround sound coding method e.g. MPS.

If this study proves benefits and feasibility, a 2nd phase should standardize a surround audio codec extension for 3GPP PSS and MBMS services, for which the evaluated surround coding method(s) will be possible candidate(s).

16.2 Study on Improved Video Coding Support UID_480044

Resources: S4

UID	Name	Acronym	Hyperlink	WI_rapporteur	Notes	TR
480044	Study on Improved Video Coding Support	FS_IVCS	SP-100304	Nokia, ETRI	SP#51 completed	26.904

Supporting Companies: Nokia, Fraunhofer Gesellschaft, Technicolor, ETRI, Deutsche Telekom, Ericsson, ST-Ericsson.

Continues and extends Rel-9 Improved Video Support for PSS and MBMS (UID_430039).

Mobile terminals shipped nowadays are compatible with several access technologies and equipped with larger screens and higher screen resolutions

3 Justification

Evolved radio access technologies (HSPA & LTE) provide higher data rates, which allow the provision of services with higher quality. Mobile terminals shipped nowadays are compatible with several access technologies and equipped with larger screens and higher screen resolutions.

The evolution of access technologies, screen type (e.g. stereoscopic capability) and screen resolution is expected to continue and the investigated solution(s) will take this into account.

Use cases and solutions proposed in TR 26.903 "Improved video support for PSS and MBMS services" require further analysis of performance.

4 Objective

The objective of this Study Item is to continue the evaluation of H.264-based video codec extensions (e.g. supporting scalability) for the use cases identified in TR 26.903 "Improved video support for PSS and MBMS services". The study will also identify further use cases that may require additional improvements and it will evaluate video coding technologies suitable for them (e.g. stereoscopic video). The study includes PSS (including HTTP-based Streaming and Download) and MBMS.

The study is a continuation and extension of the work that resulted in TR 26.903, and will produce material that is additional to that in TR 26.903. . It considers both 2D video and stereoscopic 3D video.

The detailed objectives are:

- Identify new and refine existing use cases that may require improvements to the video coding support.
- Evaluate improved video coding technologies to support the use cases for advanced UEs.
- Evaluate the benefits and deployment scenarios of scalable video (e.g. H.264 Scalable Baseline/Scalable High Profile) and stereoscopic video (e.g. H.264 Multi View Coding, frame-compatible stereo) compared to the already used H.264/AVC profiles.
- Based on the outcome of the evaluations, recommend for the potential adoption, and hence deployment of selected video coding technologies, which would need to be addressed in a work item.
- Propose guidelines for the usage and deployment of the technologies for the identified use cases and if necessary identify necessary adjustment of existing service components and functionality for improved integration of the selected video coding technologies.

5 Service Aspects

This study item may result in recommendations for the support of improved video coding solutions based, e.g., on scalable video and/or stereoscopic video and the adjustment of existing service components and functionality for improved integration of the selected video coding technologies.

17 SA5 Studies

UID	Name	WI_rapporteur
410044	**Study on Rc Reference Point Functionalities and Message Flows**	Huawei
430044	**Study on Telecommunication Management; Energy Savings Management**	Orange, Vodafone
440069	**Study on Integration of Device Management Information with Itf-N**	Motorola
460037	**Study on Alignment of 3GPP Generic NRM IRP and TMF Shared Information Data (SID) model**	Nokia Siemens Networks
460038	**Study on Harmonization of 3GPP Alarm IRP and TMF Interface Program (TIP) Fault Management**	Nokia Siemens Networks, Alcatel-Lucent
480045	**Study on Alarm Correlation and Alarm Root Cause Analysis**	Ericsson
480046	**Study on Alignment of 3GPP PM IRP and TMF Interface Program (TIP) PM**	Alcatel-Lucent

17.1 Study on Rc Reference Point Functionalities and Message Flows UID_410044

Resources: S5

UID	Name	Hyperlink	WI_rapporteur	Notes	TR
410044	**Study on Rc Reference Point Functionalities and Message Flows**	SP-080464	Huawei	SP#47 completed	32.825

Supporting Companies: Huawei, China Mobile, Orange, China Unicom, ZTE.

Study to serve as basis for detailed specification in SA5 of Online Charging System (OCS) Rc reference point solution.

TR 32.825 Conclusions

The 3GPP Online Charging System (OCS) represents a collection of constituent functional components: Online Charging Functions (Session Based Charging Function, Event Based Charging Function), Account Balance Management Function, Charging Gateway Function, and Rating Function. 3GPP has also declared a set of references for the online charging system's functional components e.g. Ro, Rc, Re, Rr, Bo and CAP. It has been noted during this study that OCSs have been ubiquitously deployed by operators providing 3GPP access despite the fact that for a subset of the OCS functional component reference points such as Rc or Rr are not specified whilst other such as Re have not evolved significantly since its initial specification. The implication of this for the Rc reference point is that in existing deployments the operator has either chosen a single vendor for OCF and ABMF functional components with no integration required as the interface for the Rc reference point is an internal interface, or where different vendors are chosen to provide OCF and ABMF functional components have employed bespoke/proprietary means achieve the integration. During the study a number of operators have declared their desire to have an open standard based alternative to the above options. Concerns were raised that initial versions of a standardized interface for Rc reference point would lack the functionality of the existing proprietary interfaces but this is unavoidable and is not unique to this scenario and this gap should diminish as the standard evolves. Another concern raised was that there is an IPR divergence across ABMF vendors and this may provide challenges in defining an inclusive set of functionality for the standardised interface for the Rc reference point although this has not been explored in depth during the study period. Some companies pointed out that the use of external interfaces would have additional performance/latency overheads compared with internal interfaces although the operator feedback was to acknowledge this but that this was a trade-off that they have already accepted.

An observation that raised disquiet during the study period was that the experience for the one other standardized interface between two OCS constituent functional components i.e. the Re interface has not been widely adopted.

Not all areas were fully explored within in the study e.g. could certain Ro functions deliver all the required Rc functionality and thus have OCF simply proxy Ro messages to the ABMF with small enhancements.

Notwithstanding some of the concerns and caveats raised above a number of operators articulated specific use cases addressing challenges such as:

- A converged ABMF across charging domains (e.g. for operators who have consolidated their business lines wireless, wireline, cable, ISP, etc.)
- A plurality of OCF vendors across geographically diverse regions integrating with a centralised ABMF.
- An evolutionary path for operators leveraging their existing investment in legacy ABMF deployments (e.g. IN platforms) to a 3GPP compliant OCS.

The operators have defined a desire to have the option to use a standardized interface for the Rc reference point to assist in overcoming these challenges.

TR 32.825 Recommendation: To provide operators with guidance for deploying the options for Rc reference point in the form of an informative annex to TS 32.296 (OCS).

17.2 Study on Telecommunication Management; Energy Savings Management UID_430044

Resources: S5

UID	Name	Hyperlink	WI_rapporteur	Notes	TR
430044	**Study on Telecommunication Management; Energy Savings Management**	SP-090048	Orange, Vodafone	SP#47 completed. Study result might impact Feature UID_420011 Self Organising Networks (SON)	32.826

Supporting Companies: Alcatel-Lucent, China Mobile, Huawei, Orange, Telefonica, T-Mobile, Vodafone.

Sustainable development is a long-term commitment in which all of us should take part. As part of sustainable development, our fight against global warming should be without respite. Our activities have a limited impact on environment: in 2007, the total footprint of the ICT sector was about 2% of the estimated total emissions from human activity and telecoms are only a part of ICT which represents no more than 25% of these 2%.

Nevertheless, most mobile network operators aim at reducing their greenhouse emissions, by several means such as limiting their networks' energy consumption.

In new generation Radio Access Networks such as LTE, Energy Savings Management (ESM) function takes place especially when mobile network operators want e.g. to reduce Tx power, switch off/on cell, etc. based on measurements made in the network having shown that there is no need to maintain active the full set of NE capabilities.

This ESM study should contribute to the protection of our environment and the environment of future generations. This work studied automated Energy Savings Management features. Usage of existing IRPs is expected as much as possible, e.g. Configuration Management IRP, etc. However, this study may identify the need for defining a new IRP. The following operations may be considered in this study item (but not necessarily limited to):

- Retrieval of energy consumption measurements
- Retrieval of traffic load measurements
- Adjust Network Resources capabilities

SA5 is willing to work in cooperation with RANs that define e.g. eNodeB energy savings control mechanisms. Study result might impact Feature UID_420011 Self Organising Networks (SON).

TR 32.826 Conclusions

TR 32.826 describes the motivations of mobile network operators to introduce Energy Savings control mechanisms. The following use cases for achieving Energy Savings have been identified:

- ENB Overlaid
- Carrier Frequency Restricted
- Capacity-limited Network
- ENB Time Scheduled Switch Off/On

For the above use cases the energy saving states can be conceptually identified for the Network Element (NE):

- notParticipatingInEnergySaving state: state in which no energy saving functions is in progress.
- energySaving state: state in which the NE is powered off or restricted in physical resource usage in other ways.
- compensatingForEnergySaving state: state in which the NE is remaining powered on, and taking over the coverage areas of geographically closed NE in energySaving state.

From a network management perspective, there may be different ways to implement the processes of enabling and disabling ESM determining the cells to enter or leave the energySaving state:

- Centralized energy saving management
- Distributed energy saving management
- Hybrid energy saving management.

Based on the outcome study, normative work is needed. It is necessary to determine the usage of existing IRPs for the purpose of Energy Savings Management as well as potential definition of new IRP.

17.3 Study on Integration of Device Management Information with Itf-N UID_440069

Resources: S5

UID	Name	Hyperlink	WI_rapporteur	Notes	TR
440069	**Study on Integration of Device Management Information with Itf-N**	SP-100088	Motorola	SP#47 completed. TR 32.827 v100 for Information + Approval. WID updated SP-090462=>SP-100088. Study the missing Itf-N part in the Framework. Study changes to Itf-N to utilize UE based measurements	32.827

Supporting Companies: Motorola, Qualcomm, Vodafone, Telecom Italia, T-Mobile, Telefonica, Orange.

Study the missing Itf-N part in the Framework. Study changes to Itf-N to utilize UE based measurements.

For a rapid deployment of radio technologies, network s can be performed on the basis of measurements collected by the UE. UE measurements that can be useful for that purpose are currently under study in TSG RAN.

To minimize complexity and cost of managing this information from the UE, integrated management capabilities towards the UE would be beneficial, e.g. a standard / common approach to manage the UEs under different DMSs (Device Management Servers).

OMA has not defined yet an integration point for the DMS such as Itf-N, defined by SA5 for Energy Management Systems (EMS). An Energy Management System is a system of computer-aided tools used to monitor, control, and optimize the performance of the generation and/or transmission system. The lack of these interfaces makes the integration of DMS in a 3GPP network difficult.
The Broadband Forum is in the process of defining a North Bound Interface for their TR-069 DMS.

Objective: To study mechanisms for collection of UE measurements over Itf-N. This includes the mechanisms for Control Plane and User plane based solutions. The mechanisms over Itf-N shall consider the capability to support the scalability and real time positive control required to manage large numbers of UE.

TR 32.827 Scope: UE Management provides the network operator with the opportunity to manage and monitor the actual user experience of their subscribers via the remote management of the UE. UE management over Itf-N provides:

- the ability to minimize the complexity and reduce the OPEX and CAPEX costs of managing the UE by the integrated management capabilities.
- the capabilities for service provisioning and personalized subscriber profile backup for the UE via DMS, to improve the subscriber satisfaction and thus contribute to subscriber retention.

The UE can provide measurements of the quality of radio network and the actual service being delivered to the user, collection of these measurements via Itf-N can be used by Centralized SON or manual.

TR 32.827 studied UE management over Itf-N, including the following aspects:

- Subscriber profile configuration over Itf-N;
- Collection of UE measurements over Itf-N. Includes protocol definition over Itf-N and study of appropriate UE measurements defined in RANs;
- Retrieval of UE measurement logs over Itf-N. Includes file format definition over Itf-N and study of appropriate solutions for measurement logging policy configuration and log retrieval over Itf-N.

To support the UE measurement log collection via Itf-N, TR 32.827 studied how to support the UE measurement log transfer mechanisms measurement logging policy configuration and measurement log retrieval by DMS using existing UE management protocol procedures, and identify a suitable protocol from a network management perspective.
TR 32.827 also studied how to do the mapping between the selected protocol and Itf-N.

TR 32.827 Conclusion: In order to speed up progress on Minimizing Drive Test (MDT), no conclusion has been made.

17.4 Study on Alignment of 3GPP Generic NRM IRP and TMF SID model UID_460037

Resources: S5

UID	Name	Hyperlink	WI_rapporteur	Notes	TR
460037	**Study on Alignment of 3GPP Generic NRM IRP and TMF Shared Information Data (SID) model**	SP-090759	Nokia Siemens Networks	SP#51 completed	32.828

Supporting Companies: Nokia Siemens Networks, Vodafone, Alcatel-Lucent, AT&T, Deutsche Telekom, ZTE, Ericsson.

3GPP has developed and specified detailed Network Resource Models (NRMs) for the management of mobile networks, including a Generic Network Resource Model. TMF has done the same for the management of various kinds of fixed networks, as well as a Shared Information Data (SID) model providing common and generic definitions for network and service management aspects. Both sets of specifications have been developed independently. As a consequence the models are different.

Though there will always be a part in the NRMs and SID which are different due to the different network technologies modelled, there are numerous modelling aspects which do not have to be different between the two models for the different network technologies. Examples of these aspects are the top part of the NRMs and SID, modelling of resource inventory information, modelling of security aspects, modelling techniques and how vendor specific resource model extensions are managed using NRMs and SID.

Because both sets of specifications have been developed independently, the management of the mobile part and the fixed part is currently structured along silos with different management interfaces, resource models, management architectures, and management workflows. Aligned management interfaces, management models, management architectures, and management workflows would greatly benefit the industry. Advantages include

- CAPEX reduction (less development cost, less integration cost)
- OPEX reduction (configuration and re-configuration of mobile and fixed networks can be handled in the same manner and with the same work flows)
- enhanced management capabilities (e. g. consistent management of dependant configurations for mobile part and fixed part aspects)

4 Objective

The goal is to allow the two organizations to evolve their respective NRMs and SID in a manner that they would become aligned to support consistent and integrated management of mobile and fixed networks. To this end the subject Study Item shall

- identify the non-aligned, contradicting or overlapping parts of between NRMs and SID
- identify the non-aligned, contradicting or overlapping parts regarding specification methodology;
- propose possibilities to align the parts identified above.
- ensure that the proposal allows usage of the 3GPP Generic NRM IRP independently of SID
- ensure that the proposal allows usage of mobile specific NRMs be used as is
- drive the alignment process with TMF
- identify any required changes in the 3GPP specs
- identify required changes in the TMF specifications and communicate them to the TMF
- ensure that 3GPP remains full owner of the aligned part of the NRM specifications
- define a procedure how aligned specifications can be maintained and updated in a consistent manner

Special emphasis shall be given to the borderline between generic and harmonized part and the network technology specific parts of the models. In case new requirements are identified during the alignment process, they may be taken into account as well.

It is not intended to add the mobile specific parts of the 3GPP Network Resource Models to the TMF SID. These model aspects shall be published by 3GPP only. Interface aspects (e. g. the Alarm IRP) are outside of the scope of this WI.

17.5 Study on Harmonization of 3GPP Alarm IRP and TIP Fault Management UID_460038

Resources: S5

UID	Name	Hyperlink	WI_rapporteur	Notes	TR
460038	**Study on Harmonization of 3GPP Alarm IRP and TMF Interface Program (TIP) Fault Management**	SP-090760	Nokia Siemens Networks, Alcatel-Lucent	SP#51 completed	32.829

Supporting Companies: Nokia Siemens Networks, Alcatel-Lucent, Vodafone, AT&T, Deutsche Telekom, ZTE, Ericsson.

3 Justification

3GPP has developed and specified with the Alarm IRP an interface for Alarm Management. TMF has in MTOSI and OSSJ capabilities for Alarm Management as well. Currently TMF TIP studies how fault management can be aligned inside TMF.

However, there is no reason why fault management functions should be different, and an aligned management approach would greatly benefit the industry. An example of alignment within 3GPP SA5 IRP work is that multiple Solution Sets are aligned in that their supported management features are identical. Advantages of alignment include

- CAPEX reduction (less development cost, less integration cost)
- OPEX reduction (consistent handling of alarms)

4 Objective

The goal is to provide a consistent and aligned management of alarms in 3GPP and TMF TIP. To this end the subject Study Item shall

- identify similarities and differences of the alarm management capabilities in 3GPP and TMF TIP FM
- propose possibilities to align these capabilities (including the option of proposing the 3GPP Alarm IRP as TMF TIP FM solution)
- drive the alignment process with TMF
- identify any required changes in the 3GPP specs
- identify required changes in the TMF specifications and communicate them to the TMF
- define a procedure how aligned specifications can be maintained and updated in a consistent manner

Emphasis shall be given to IRP Methodology aspects, which are inherently important to the development of 3GPP management specifications. Backwards compatibility of the Alarm IRP shall be maintained as much as possible by re-using existing specifications to the maximum extent.

17.6 Study on Alarm Correlation and Alarm Root Cause Analysis UID_480045

Resources: S5

UID	Name	Hyperlink	WI_rapporteur	Notes	TR
480045	**Study on Alarm Correlation and Alarm Root Cause Analysis**	SP-100775	Ericsson	SP#51 completed	32.832

Supporting Companies: Alcatel-Lucent, Deutsche Telekom , Ericsson, Nokia Siemens Networks, ZTE, Motorola, Huawei, Orange, Vodafone, China Mobile.

In a network, such as a convergent network, a single network fault (e.g. an entity under management is not performing at service level as expected by network operator) will result in the generation of multiple alarms from affected entities under management and management systems, over space and time. It is imperative that the network operator, the receiver of all the generated alarms, be able to evaluate the received alarms to identify the entity having the network fault.

Rapid and accurate determination of faulty entity will shorten the time to repair, and thus have direct positive impact in OPEX reduction and indirectly, facilitate the support of service contracts, between operators (providers of service) and service consumers.

It is noted that alarm correlation and alarm root cause are considered as important features of convergent network management, see S5-101174 "Operator Common NGMN TOP10 Requirements".

4 Objective

The objectives of the study are:

1. Identify and define the management services offered by alarm correlation (AC) process and alarm root cause analysis (ARCA) process;
2. Identify the benefits of the AC process and ARCA process from views of network operators.
3. Identify the possible locations of the AC and ARCA processes within the IRP framework.
4. Identify possible IRP standard solutions, including enhancement of existing IRP standard solutions, that can offer the services identified in bullet 1.

17.7 Study on Alignment of 3GPP PM IRP and TIP PM UID_480046

Resources: S5

UID	Name	Hyperlink	WI_rapporteur	Notes	TR
480046	**Study on Alignment of 3GPP PM IRP and TMF Interface Program (TIP) PM**	SP-100291	Alcatel-Lucent	SP#51 completed	32.831

Supporting Companies: Alcatel-Lucent, Ericsson, Huawei, Nokia Siemens Networks, Vodafone, Deutsche Telekom, Orange, ZTE, China Unicom.

3 Justification

3GPP has developed and specified with the PM IRP an interface for Performance Management. TMF has in MTOSI and OSSJ capabilities for Performance Management as well. Currently TMF TIP studies how Performance management can be aligned inside TMF.

However, there is no reason why Performance management functions should be different, and an aligned management approach would greatly benefit the industry. An example of alignment within 3GPP SA5 IRP work is that multiple Solution Sets are aligned in that their supported management features are identical. Advantages of alignment include

- CAPEX reduction (less development cost, less integration cost)
- OPEX reduction (consistent handling of performance measurements collection)

4 Objective

The goal is to provide a consistent and aligned performance management and performance management interfaces in 3GPP and TMF. To this end the subject Work Item shall

- identify similarities and differences of the performance management capabilities in 3GPP and TMF TIP PM BA
- propose enhancements to 3GPP performance management solutions for converged networks and to satisfy TMF TIP PM BA requirements
- drive the alignment process with TMF
- identify any required changes in the 3GPP specs
- identify required changes in the TMF specifications and communicate them to TMF
- define a procedure how aligned specifications can be maintained and updated in a consistent manner

Emphasis shall be given to IRP Methodology aspects, which are inherently important to the development of 3GPP management specifications. Backwards compatibility of the PM IRP shall be maintained as much as possible by re-using existing specifications to the maximum extent.

18 CT Studies

UID	Name	Resource	WI_rapporteur
450013	Study on Policy and Charging Rules Function (PCRF) failure and restoration	C3	NEC
480016	Study on User Data Convergence (UDC) evolution	C4	Alcatel-Lucent
480017	Study on UICC access to IMS	C6	Gemalto

18.1 Study on Policy and Charging Rules Function (PCRF) failure and restoration UID_450013

Resources: C3

UID	Name	Hyperlink	Notes	TR
450013	Study on Policy and Charging Rules Function (PCRF) failure and restoration	CP-090861	CP#49 completed	29.816

Supporting Companies: NEC, Bridgewater Systems, Telecom Italia, Huawei, NTT DoCoMo, NTT, Alcatel-Lucent.

PCRF is a central node in the control plane architecture of EPC. Although resilient and high-available PCRF implementations are expected, an operator might not always judge the extra cost for such resilience be justified; hence they cannot be mandated. Consequently, partial or even total failures can occur. The network needs to be prepared for this case and must be able to react in a predictable and interoperable manner; thus standardized procedures and means of signalling are required. Current specifications have not taken that into account.

The target failure and recovery scenarios had been detailed; and the following scenarios had been addressed:

- Single PCRF deployment (including the functionally equivalent case of multiple PCRF deployment with fixed assignment of PCRFs);
- Multiple PCRFs and the DRA is used;

PCRF node failures of different type (e.g. complete outage, loss of dynamic data) had been studied.
Additionally the aspect of reliability in signalling connections had been studied.

The functional requirements for solutions to handle such cases in a standardized way need to be defined; the following network elements (including the roaming scenarios) had been considered:

- PCRF (H-PCRF, V-PCRF);
- PCEF
- BBERF;
- AF;
- DRA;

Diverse operator's preferences had been taken into account (e.g. minimal impact on user experience versus maximal control/minimum risk for the operator).

Potential solutions include:

- The procedures and signalling between PCRF and other PCC related network nodes;
- The procedures and signalling between Diameter clients (i.e. PCEF/BBERF/AF) and the DRA;

The study assumed implementation of basic session failover in the DIAMETER base protocol. Per solution the impacted 3GPP specifications and the necessary changes therein had been listed on the appropriate level of detail.

The study evaluated solutions and gives recommendations on what solutions should be chosen and specified by 3GPP.

Service Aspects: Means had been considered to allow minimizing service degradation and duration of unavailability for users in case of PCRF failure or unavailability, while observing operators' requirements for chargeability and security of delivered services.

Charging Aspects: Accurate charging of services is required to be maintained also under failure conditions, whilst taking also into account the admissible service degradation for users

18.2 Study on User Data Convergence (UDC) evolution UID_480016

Resources: C4

UID	Name	Hyperlink	Notes	TR
480016	**Study on User Data Convergence (UDC) evolution**	CP-100296	CP#51 completed	23.845

Supporting Companies: Alcatel-Lucent, ZTE, Hewlett-Packard, Deutsche Telekom.

To study UDC evolution from Features in Rel-9 UID_400034 and Rel-10 UID_480011 UDC Data Model.

UDC is a central concept regarding to the storage of Subscriber/ User Data, its access and its management.

In Rel-9 UDC, a certain number of topics requiring further investigation have been identified but not addressed.

It will be beneficial to analyse improvements and complements regarding to UDC, its architecture as well its protocols, so to enlarge its usage domain, its efficiency, to cover new requirements.

Objective: to study UDC evolution, identify possible solutions in the 3GPP standardisation scope by addressing:

- Multiple UDRs in a network: this requirement has been confirmed by SA1, further investigation will analyse if the current UDC architecture answer well this requirements or evaluate additional enhancements.
- Bulk of data operation: analyse the possibility of allowing the FE to perform the batch operation to achieve a bulk of user data and consider alternatives pro and con. This was excluded from Rel-9 due to time constraints
- Security aspects: in particular for 3rd party with SA3 involvement.
- Handling of shared user data: analyse s that allow user data which are shared by a significant number of users to be stored once in the UDR and once in an FE and transport only an identifier rather than the complete shared data on Ud.
- FE to FE communication: Analyse the possibility for FEs to directly communicate with each other rather than communicating via the UDR.
- Collision Detection Control (CDC) enhancements: Analyse the possibility of allowing the UDR to control the consistency of the data. This is, not to be dependant on the different FE willingness to use transactions/assertion controls, but to enforce from the UDR the data consistency.
- Enhancements to subscription to notification: Analyse the possibility of having subscription to notifications upon certain conditions/criteria (e.g. notify when a data changes to a specific value or when other data has a certain value). This was excluded from Rel-9 due to time constraints.
- Notification and transactions: notification related to a transaction when multiple updates occur

According to these topics, other 3GPP WGs will be involved according to their responsibility (e.g. SA2 for Architecture points, SA3 for security). From Rel9 experience, CT4 proposes to rely on LS exchanges when other groups are involved.

18.3 Study on UICC access to IMS UID_480017

Resources: C6

UID	Name	Hyperlink	Notes	TR
480017	**Study on UICC access to IMS**	CP-100424	CP#51 completed	31.828

Supporting Companies: Gemalto, Sagem-Orga, China Mobile, Telecom Italia.

IMS is foreseen to provide all the services, current and future, that existing mobile networks provide. IMS may allow operators to develop new value added applications as well as to enhance their existing solutions. These IMS-based applications may be located in the ME. Furthermore, additional IMS-based applications could reside and be executed in the UICC. This will lead to new opportunities and allow for example the development of operator-specific IMS-based applications that require a high level of security and portability.

4 Objective: to identify solutions providing the necessary mechanism in UICC and ME to make use of IMS functionality implemented in ME: a) an ISIM is present and b) no ISIM is present in the UICC.

The selected solution should allow

- discovery of the support of the feature by each other (ME-UICC)
- discovery of the supported capability by the ME
- UICC registration to IMS network through the ME.
- the UICC to receive messages pushed by an IMS application server
- the UICC to send messages to an IMS application server
- the UICC to be notified when IMS de-registration occurs.
- the identification of a message for which the destination is a UICC application.
- routing messages from and to UICC applications
- mutual authentication between the UICC and an IMS application server
- UICC applications to be identified by other applications in the IMS network

19 RAN Studies

UID	Name	Resource	WI_rapporteur
450014	**Study on Uplink Tx Diversity for HSPA**	R4	Qualcomm
460016	**Study on Solutions for Energy Saving within UTRA Node B**	R1,R3	Vodafone
470015	**Study on Potential solutions for energy saving for E-UTRAN**	R3,R2	China Mobile
470016	**Study on Improvements of distributed antenna for 1.28Mcps TDD**	R1,R2,R3	ZTE

19.1 Study on Uplink Tx Diversity for HSPA UID_450014

Resources: R4

UID	Name	Hyperlink	Status_Report	Notes	TR
450014	**Study on Uplink Tx Diversity for HSPA**	RP-090987	RP-100499	RP#48 completed	UTRA 25.863

Supporting Companies: Vodafone, Orange, Telecom Italia, Magnolia Broadband, AT&T, Qualcomm, Deutsche Telekom, ZTE.

Uplink transmit diversity techniques that do not require any new standardized dynamic feedback signalling between the network and the UE have the potential to improve the overall uplink link budget, thus improving uplink coverage and capacity, and possibly saving UE transmit power.
These potential benefits are highly attractive to operators of HSPA systems, in their goal of optimizing uplink throughput-coverage and minimizing UE battery consumption, particularly as they minimize the impact to the network.
The detailed techniques discussed in RAN4 were: switched antenna Tx diversity and transmit beamforming.
This study investigates UL Tx diversity techniques for HSPA that comply with the following architecture:

- not requiring any newly standardized dynamic feedback signalling between network and UE
- simultaneous transmission from 1 Tx antenna (e.g. switched antenna Tx diversity) or simultaneous transmission from 2 Tx antennas (e.g. transmit beamforming)

RAN1 evaluated the potential benefits of the indicated UL Tx diversity techniques.
RAN4 agreed on baseline assumptions and reference UE architecture for simulation and investigated:

- the impacts on the UE implementation
- how to ensure that the UE operating an uplink Tx diversity will not cause any detrimental effects to overall system performance. Issues such as wrongly directed transmit beam should be considered
- the impacts of Tx diversity on existing BS and UE RF and demodulation performance requirements, and analyse how to derive any additional performance/test requirements that are deemed needed as an outcome of the study, as well as understand the impacts of any such new requirements

TR 25.863 Conclusion

A link and system study was carried out by RAN1 to investigate UL Tx diversity techniques for HSPA under the constraint that no new standardized dynamic feedback signalling would be required between network and UE.
In particular, both forms of transmit diversity, 1) switched antenna Tx diversity (simultaneous transmission from 1 transmit antenna) and 2) beamforming (simultaneous transmission from 2 Tx antennas) were thoroughly investigated.
In general potential gains (or losses) from ULTD in terms of throughput and power saving varied between scenarios and companies. One potential explanation for the latter was that different companies assume different Node-B schedulers.
For slow fading propagation conditions some gains for the average and 10th percentile user throughputs for the TX-diversity users were noticed. In other scenarios (fast fading, negative long term antenna imbalance), smaller gains or some losses were also observed. A detailed conclusion on the system evaluation of these techniques and the set of assumptions on which the results rely can be found in clause 7.3 of TR 25.863.

RAN4 further discussed the practical aspects of these techniques. In general, there were agreements on a few topics including 1) impact on UE implementation, 2) partial agreement on impact on existing core requirements such as the need for relaxing the UE maximum output power requirement, 3) bursty traffic system performance under the assumption that there would be no additional Node-B demodulation losses,4) System performance degradation due to incorrect TPC delay It was considered that the UE modifications to support ULTD operation were feasible. It was also

argued by one company that the difficulty to devise appropriate test-cases might induce a risk for system performance degradation. It was also acknowledged that some relaxation would be required with regard to the UE maximum output power requirement for SATD operation in order to overcome the additional transmit chain insertion loss due to the added circuitry associated with the feature. Finally, it was agreed that incorrect estimate of delays corresponding to TPC commands at the UE causes negative impacts to open loop beamforming.

However, it was difficult to arrive at a consensus on the following topics:

- NodeB Demodulation losses associated with various possible algorithms.
- Effects from mixes of different uplink Tx diversity algorithms and/or legacy UEs.
- Feasibility of testing of new core Tx requirements.
- Feasibility of testing TPC delay correctness.
- UE battery power and heat savings.

More details on the RAN4 findings can be found in clause 13 of TR 25.863.

Based on the study performed here, it is considered that the UL Transmit Diversity techniques for HSPA can help improve the uplink coverage for TX-diversity users in some scenarios, while marginally improving system performance with large penetration of TX-diversity capable UE's.. It should be noted that there were some potential system performance concerns raised under some conditions (e.g. sub-optimal transmit diversity algorithms, high velocity propagation conditions along with zero antenna correlation and negative long term antenna imbalance) due to implications to non-TX-diversity users performance, and due to impact on the legacy Node B performance. For this purpose, it was recommended that higher layer signalling to enable/disable the uplink transmit diversity transmission should be considered as a possible method to mitigate some of these concerns, although it has not been evaluated whether such signalling can be effectively used in a dynamic manner. It should also be noted that the co-existence of open loop uplink transmit diversity with DC-HSUPA has not been studied.

19.2 Study on Solutions for energy saving within UTRA Node B UID_460016

Resources: R1,R3

UID	Name	Hyperlink	Status_Report	Notes	TR
460016	**Study on Solutions for Energy Saving within UTRA Node B**	RP-091439	RP-100796	RP#49 completed. Based on ETSI EE TS 102 706.	UTRA 25.927

Supporting Companies: Vodafone, Nokia Siemens Networks, Nokia, Orange, Telecom Italia, eMobile, ZTE, Telefónica, Qualcomm.

Due to the need to reduce energy consumption within operators' networks, and considering the large amount of UMTS network equipment deployed in the field around the world, the standardisation of methods to save energy in UMTS Node Bs is seen as an important area of study for 3GPP.

There has not been a large amount of focus on energy-saving in UMTS networks so far in 3GPP, although some solutions have been agreed in Release 9. Therefore it is proposed to start an initial study phase to identify solutions and perform any initial evaluation, such that a subset of these proposals can be used as the basis for further investigation of their feasibility.

Objective: to do an initial study to identify potential solutions to enable energy saving within UMTS Node-Bs, and do light initial evaluation of the proposed solutions, with the aim that a subset of them can be taken forward for further investigation as part of a more focused study in 3GPP.

The solutions identified in this study item should consider the following aspects:

- Impacts on the time for legacy and new UEs to gain access to service from the Node B
- Impacts on legacy and new terminals (e.g. power consumption, mobility)

Some initial indication of these aspects in relation to the proposed solutions should be provided.

Solutions that are backwards-compatible or non-backwards compatible towards legacy UEs are within the scope of this initial study.

19.3 Study on Potential solutions for energy saving for E-UTRAN UID_470015

Resources: R3,R2

UID	Name	Hyperlink	Status_Report	Notes	TR
470015	**Study on Potential solutions for energy saving for E-UTRAN**	RP-100674	RP-110597	RP#52 completed	LTE 36.927

Supporting Companies: China Mobile, Huawei, ZTE, Samsung, CATT, Telecom Italia, NTT DoCoMo, Nokia Siemens Networks, Orange, NEC, Deutsche Telekom, Ericsson, KDDI, Alcatel-Lucent, Alcatel-Lucent Shanghai Bell.

Justification

The power efficiency in the infrastructure and terminal should be an essential part of the cost-related requirements in LTE-A. There is a strong need to investigate possible network energy saving mechanisms to reduce CO2 emission and OPEX of operators.

Although some solutions have been proposed and part of them have been agreed in Release-9, there has not been a large amount of attention on energy saving for E-UTRAN so far. Many potential solutions are not fully shown and discussed yet. Therefore, it is proposed to start an initial study phase to identify solutions, evaluate their gains and impacts on specifications.

The following use cases will be considered in this study item:

- Intra-eNB energy saving
- Inter-eNB energy saving
- Inter-RAT energy saving

Intra-eNB energy saving, in EUTRAN network, a single cell can operate in energy saving mode when the resource utilization is sufficiently low. In this case, the reduction of energy consumption will be mainly based on traffic monitoring with regard to QoS and coverage assurance.

A lot of work on Inter-eNB energy saving has already been done for both LTE and UTRA in Rel-9. This Study Item will investigate additional aspects (if any) on top of what was already agreed for Rel-9.

Inter-RAT energy saving, in this use case, legacy networks, i.e. GERAN and UTRAN, provide radio coverage together with E-UTRAN. For example E-UTRAN Cell A is totally covered by UTRAN Cell B. Cell B is deployed to provide basic coverage of the voice or medium/low-speed data services in the area, while Cell A enhances the capability of the area to support high-speed data services. Then the energy saving procedure can be enabled based on the interaction of E-UTRAN and UTRAN system.

Note that energy saving for HeNB is out of the scope of this study item.

Objective; to identify potential solutions for energy saving in E-UTRAN and perform initial evaluation of the proposed solutions, so that a subset of them can be used as the basis for further investigation and standardization

Energy saving solutions identified in this study item should be justified by valid scenario(s), and based on cell/network load situation. Impacts on legacy and new terminals when introducing an energy saving solution should be carefully considered. The scope of the study item shall be as follows:

- User accessibility should be guaranteed when a cell transfers to energy saving mode
- Backward compatibility shall be ensured and the ability to provide energy saving for Rel-10 network deployment that serves a number of legacy UEs should be considered
- Solutions shall not impact the Uu physical layer
- The solutions should not impact negatively the UE power consumption

RAN2 will focus on the Intra-eNB energy saving, while RAN3 will work on Inter-RAT energy saving and potential additional Inter-eNB energy saving technology.

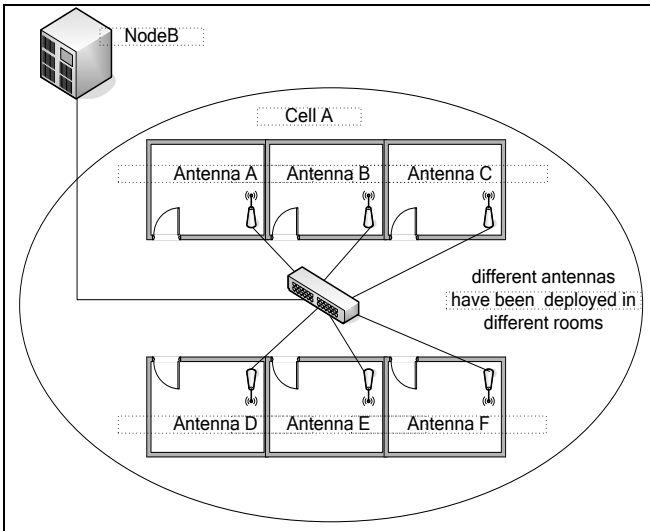
19.4 Study on Improvements of distributed antenna for 1.28Mcps TDD UID_470016

Resources: R1,R2,R3

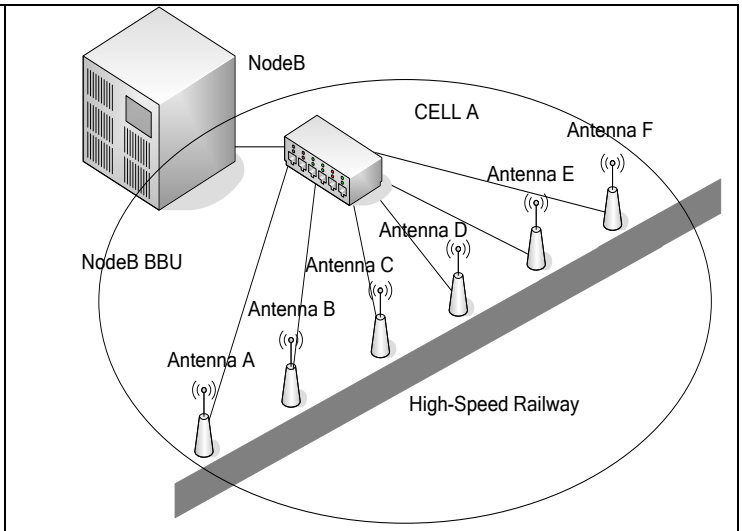
UID	Name	Hyperlink	Status_Report	Notes	TR
470016	**Study on Improvements of distributed antenna for 1.28Mcps TDD**	RP-100178	RP-101287	RP#50 completed	UTRA 25.865

Supporting Companies: ZTE, CATR, CATT, TD Tech, New Postcom Equipment, Potevio.

Multiple antennas can be deployed in one cell as distributed antenna, each antenna covering a different area.
In-door and High-Speed environments are two potential scenarios for the deployment of distributed antenna.



In-door Scenarios



High-Speed scenarios

For these scenarios (but not limited to them), some new requirements for distributed antenna have been given. Technical enhancements have been studied to see whether these new requirement can be fulfilled, and if not, optimization methods have been studied.

Potential enhancement techniques for the distributed antenna had been studied in the following areas:

1. **Physical resource reuse and Interference cancellation in distributed antenna scenarios**
   RAN1/2: possibility to reuse the physical control channel resource (e.g. HS-SCCH, E-AGCH) among different distributed antenna's coverage areas, and how to cancel the inter-antenna interference between different antennas.

2. **Synchronization maintains in distributed antenna scenarios**
   RAN1: can current synchronization maintain mechanism fulfil the requirement of the distributed antenna scenarios, if not, some potential optimization method is needed.

3. **Power control study in distributed antenna scenarios**
   RAN1: can current power control mechanism fulfil the requirement of the distributed antenna scenarios, if not, some potential optimization method is needed.

4. **Measurement and configuration in the distributed antenna scenarios**
   RAN3 can the current measurement and configuration mechanism fulfils the requirement of the distributed antenna scenarios, if not, some potential optimization method is needed.

Complexity and backward compatibility had been also taken into account.

20 Rel-10 Completed Features and Studies

UID	Name	Acronym	Resource	WI_rapporteur
0	Release 10 Features	-		-
390073	Enhancements for Multimedia Priority Service	eMPS	S1,S2,C4,C3,C1	Telcordia
410030	Network Improvements for Machine-Type Communications	NIMTC	S1,S2,S5,C1,C4,C6,G2,R2,R3,R5,G3new	KPN
430035	Multi Access PDN Connectivity	MAPCON	S2,C4,C1,C3	Telecom Italia
440052	IMS Service Continuity – Inter Device Transfer enhancements	IMS_SC_eIDT	S1,S2,C1,IETF	Huawei
450030	IP-Short-Message-Gateway enhancements for CPM-SMS Interworking	CPM-SMS	S1,S2,C3	China Mobile
450033	Completion of Communications on Not Logged-in	CCNL	S1,C1,C3	Deutsche Telekom
450035	Local IP Access and Selected Internet IP Traffic Offload	LIPA_SIPTO	S2,S1,S3,S5,C4,C1	Huawei, China Mobile
450041	IP Flow Mobility and seamless WLAN offload	IFOM	S2,S1,S5,C1,C3	Qualcomm
450044	Enabling Coder Selection and Rate Adaptation for UTRAN and E-UTRAN for Load Adaptive Applications	ECSRA_LAA	S2,S4,C4,C3,C1,IETF	Qualcomm
450053	Extended H(e)NB features	EHNBF	S1,S2,S3	NEC
460028	Optimal Media Routing	OMR	S2,S5,C3,C1	Alcatel-Lucent
470026	IMS Emergency Session Enhancements	IESE	S1,S2,C1	Deutsche Telekom, T-Mobile
480037	S2b Mobility based on GTP	SMOG	S2,C4,C3,C1	Alcatel-Lucent
500006	Policy Enhancements for Sponsored Connectivity and Coherent Access to Policy related Databases	PEST	S2,C3	Qualcomm
470029	Lawful Interception in the 3GPP Rel-10	LI10	S3	PIDS, BT
470033	Optimization of IMS based PSS and MBMS User Service	OPT_IMS_PSS_MBMS_US	S4	Ericsson
470034	HTTP-based Streaming and Download Services	HTTP_SDS	S4,IETF	Qualcomm
480040	PSS and MBMS enhancements	MBS_Enh	S4	Ericsson
480041	Enhancements and Addition of Audio Tests to 26.131 and 26.132	EAAT	S4	Vodafone
510055	Video Coding Enhancements in MTSI	VCEM	S4	Ericsson
460031	Rel-10 Operations, Administration, Maintenance and Provisioning (OAM&P)	OAM10	S5,C4	-
470044	Rel-10 Charging Management small Enhancements	CH10	S5	-
470046	Advice of Charge (AoC) service support enhancements	eAoC	S5,C1	Deutsche Telekom
470003	IMS Stage 3 IETF Protocol Alignment - phase 4	IMSProtoc4	C1	Alcatel-Lucent
480012	Enhanced User Data Convergence (UDC) Model	eUDC	C4	China Mobile
480014	Further improvements of II-NNI Stage 3 based on operational feedback and evolution of other specifications	II-NNI2	C3	Orange
480013	AT Commands for IMS-configuration	AT_IMS	C1	Ericsson
490011	AT Commands for USIM Application Toolkit (USAT)	AT_UICC	C1	ST-Ericsson
490012	Communication Control for IMS by USIM (Stage 3)	CC_IMS_USIM	C6	Gemalto
500003	Dynamic view of SIP message for Inter-IMS Network to Network Interface (II-NNI) (Stage 3)	NNI_DV	C3	NTT
500007	Introduction of Smart Card Web Server launch functionality	SCWS_L	C6	Telecom Italia
500008	USAT using AT Commands	USAT_AT	C6	Giesecke & Devrient
500010	Single Radio Voice Call Continuity (SRVCC) enhancements (Stage 3)	eSRVCC	C1,C4,R5,IETF	China Mobile
500011	Single Radio Voice Call Continuity (SRVCC) in alerting phase (Stage 3)	aSRVCC	C1,R5	ZTE
500012	PCRF failure and restoration	PCRF_FR	C4,C3	NEC
510002	Formalization of WLAN Files	FoWF	C1	Deutsche Telekom
510007	CS and IMS Interworking for CAT service - Early Session model	CIIC_ES	C3	ZTE
510008	EPC Node Restoration without Idle mode Signalling Reduction (ISR) activated	EPC_NR	C4	Alcatel-Lucent
510108	EPC Node Restoration with Idle mode Signalling Reduction (ISR) activated	EPC_NR_ISR	C4	NEC
510009	Mobile Terminating Roaming Forwarding with pre-paging	MTRF	C4	Ericsson
510010	UICC access to IMS Specification	IMS-UICC-S	C6,C1	Gemalto
550006	Testing for Terminal support of Rel-10 USIM, ISIM and USAT features	USIM_R10_Test	C6	Gemalto

440021	**CN aspects of Local Call Local Switch**	LCLS-CN	C4	Vodafone
430001	**Local Call Local Switch**	LCLS	GP,G2	Huawei
480002	**Tightened Link Level Performance Requirements for Single Antenna MS**	TIGHTER	G1,G2,C1,G3new	Renesas Mobile
490001	**Support of Multi-Operator Core Network by GERAN**	MOCN-GERAN	G2,S2,C1	Alcatel-Lucent
490002	**Enhancements of Iur-g interface**	eIurg	G2,R3	China Mobile, ZTE
380077	**1.28 Mcps TDD Repeater**	RANimp-Repeaters1.28TDD	R4	RITT
450019	**1.28 Mcps TDD Multi-carrier HSUPA**	TDD_MC_HSUPA	R1,R2,R3,R4	CATR
460014	**1.28 Mcps TDD Home NodeB RF requirements**	HNB_LCRTDD_RF	R4	TD Tech
470012	**Multi-User Multiple-Input and Multiple-Output (MU-MIMO) for 1.28Mcps TDD**	MUMIMO_LCR_TDD	R1,R2,R3,R4	CATT
450027	**AGNSS Minimum Performance for UTRAN**	AGNSSPerf_UTRAN	R4,R5	Thales
460005	**Inclusion of RF Pattern Matching Technologies as positioning method in the UTRAN**	LCS_UMTS_RFPMT	R2,R3	Polaris Wireless
460015	**Four carrier HSDPA**	4C_HSDPA	R1,R2,R3,R4,R5	Qualcomm
470013	**Performance Requirements for two-antenna 1.28Mcps TDD Type 1 and Type 2 UE receiver**	2ant_UE_LCR_TDD	R4	TD Tech
480020	**Automatic Neighbour Relation (ANR) for UTRAN**	ANR_UTRAN	R3,R2,R5	ZTE
480021	**Support of New Band Combinations for Dual-Band Dual Cell HSDPA**	DB_DC_HSDPA	R4,R2	AT&T
480022	**MIMO operation with non-MIMO coexistence in HSDPA**	MIMO_HSDPA	R4,R5	Qualcomm
490022	**Interfrequency detected set measurements for UMTS**	Interf_dset_meas_UMTS	R2,R4	Nokia
460007	**Carrier Aggregation for LTE**	LTE_CA	R1,R2,R3,R4,R5	Nokia
460008	**Enhanced Downlink Multiple Antenna Transmission for LTE**	LTE_eDL_MIMO	R1,R2,R4,R5	NTT DoCoMo
460009	**Uplink Multiple Antenna Transmission for LTE**	LTE_UL_MIMO	R1,R2,R4,R5	Huawei
460013	**Relays for LTE**	LTE_Relay	R1,R2,R4,S2,S3,C4,C6	Ericsson
470007	**Enhanced Inter-Cell Interference Control (ICIC) for non-Carrier Aggregation (CA) based deployments of heterogeneous networks for LTE**	eICIC_LTE	R1,R2,R3,R4,R5	China Mobile
470008	**LTE TDD in 2600MHz for US**	LTE_TDD_2600_US	R4,R2,R3,R5	Clearwire
470009	**Adding 2 GHz band LTE FDD (Band 23) for Ancillary Terrestrial Component (ATC) of Mobile Satellite Service (MSS) in North America**	S_Band_LTE_ATC_MSS	R2,R4,R5	DBSD
470010	**Adding L-Band (Band 24) LTE for Ancillary Terrestrial Component (ATC) of Mobile Satellite Service (MSS) in North America**	L_Band_LTE_ATC_MSS	R4,R2,R5	LightSquared
470011	**LTE Self Optimizing Networks (SON) enhancements**	SONenh_LTE	R3,R2,R4	Nokia Siemens Networks
480027	**Further enhancements to MBMS for LTE**	MBMS_LTE_enh	R2,R3,R5	Huawei
380173	**UMTS/LTE 3500 MHz**	RInImp8-UMTSLTE3500	R4,R2,R3,R5	Ericsson
460003	**Minimization of Drive Tests for E-UTRAN and UTRAN**	MDT_UMTSLTE	R2,R4,R3,R5	Nokia Siemens Networks
470005	**HNB and HeNB Mobility Enhancements**	HNB_HENB_mob_enh	R3,R2,R5	Alcatel-Lucent
480024	**Expanded 1900 MHz Band for UTRA and LTE**	E1900	R4,R2,R5	Sprint
480025	**Multi-standard radio Base Station RF requirements for non-contiguous spectrum deployments**	MSR_NC	R4,G1	Ericsson
440044	**(Small) Technical Enhancements and Improvements for Rel-10**	TEI10	All	-
521004	**(IETF) (Small) Technical Enhancements and Improvements for Rel-10 (draft-atarius)**	TEI10	C1-IETF	Andrew Allen
531001	**(IETF) (Small) Technical Enhancements and Improvements for Rel-10 (RFC6275)**	TEI10	C1-IETF	-
540004	**Test - (Small) Technical Enhancements and Improvements for Rel-10**	TEI10_Test	R5,G3new	n/a

UID	Name	Acronym	Resource	WI_rapporteur	TR
0	Release 10 Studies	-		-	-
370045	Study on enhanced voice service requirements for the Evolved Packet System (EPS)	FS_EV_EPS	S1,S4	France Telecom	22.813
380083	Study on advanced requirements for IP interconnect	FS_IPXS	S1	Telefónica O2	22.893
410039	Study on Personal Broadcast Service	FS_PBS	S1	ETRI	22.947
410040	Study on LCS support in SAE for non-3GPP accesses	FS_LCS_n3GPP	S1	SK Telecom	22.814
430030	Study on Haptic Services	FS_Haptics	S1	SK Telecom	22.987
370050	Study on System enhancements for the use of IMS services in Local BreakOut and Optimal Routing of Media	FS_IMS_LBO_ORM	S2	Telecom Italia, BT	23.894
390055	Study on Intra Domain Connection of RAN Nodes to Multiple CN Nodes	FS_IDC	S2	China Mobile	23.924 (was 23.823)
440049	Study on Single Radio Voice Call Continuity enhancements	FS_eSRVCC	S2	China Mobile	23.856
470048	Study on Single Radio Video Call Continuity for 3G-CS	FS_vSRVCC	S2	Samsung	23.886
470049	Study on S2b Mobility based on GTP	FS_SMOG	S2	Alcatel-Lucent	23.834
430040	Study on Surround Sound codec extension for PSS and MBMS	FS_SS_PSS_MBMS	S4	Fraunhofer Gesellschaft	26.950
480044	Study on Improved Video Coding Support	FS_IVCS	S4	Nokia, ETRI	26.904
410044	Study on Rc Reference Point Functionalities and Message Flows	FS_OAM_Rc	S5	Huawei	32.825
430044	Study on Telecommunication Management; Energy Savings Management	FS_OAM_ESM	S5	Orange, Vodafone	32.826
440069	Study on Integration of Device Management Information with Itf-N	FS_IDMI_Itf-N	S5	Motorola	32.827
460037	Study on Alignment of 3GPP Generic NRM IRP and TMF Shared Information Data (SID) model	FS_3GNRM_TMFSID	S5	Nokia Siemens Networks	32.828
460038	Study on Harmonization of 3GPP Alarm IRP and TMF Interface Program (TIP) Fault Management	FS_3G_TMF_FM	S5	Nokia Siemens Networks, Alcatel-Lucent	32.829
480045	Study on Alarm Correlation and Alarm Root Cause Analysis	FS_AC_ARCA	S5	Ericsson	32.832
480046	Study on Alignment of 3GPP PM IRP and TMF Interface Program (TIP) PM	FS_3G_TMF_PM	S5	Alcatel-Lucent	32.831
450013	Study on Policy and Charging Rules Function (PCRF) failure and restoration	FS_PCRF-FR	C3	NEC	29.816
480016	Study on User Data Convergence (UDC) evolution	FS_UDCe	C4	Alcatel-Lucent	23.845
480017	Study on UICC access to IMS	FS_IMS-UICC	C6	Gemalto	31.828
450014	Study on Uplink Tx Diversity for HSPA	FS_UL-TxDiv-HSPA	R4	Qualcomm	UTRA 25.863
460016	Study on Solutions for Energy Saving within UTRA Node B	FS_Energy_UMTS	R1,R3	Vodafone	UTRA 25.927
470015	Study on Potential solutions for energy saving for E-UTRAN	FS_Energy_LTE	R3,R2	China Mobile	LTE 36.927
470016	Study on Improvements of distributed antenna for 1.28Mcps TDD	FS_distr_ant_LCR_TDD	R1,R2,R3	ZTE	UTRA 25.865

21 Rel-10 Deleted Features and Studies

UID	Name	Acronym	Resource	WI_rapporteur
0	**Release 10 Features**	-		-
350014	**Deleted - Registration in Densely-populated area (RED)**	RED	S1	NTT DoCoMo
380062	**Deleted - Network Selection for non-3GPP Access**	N3GtoNSP	S1,C6	Telefónica O2
420025	**Deleted - GTP-based S8 chaining**	GTPchaining	S2	Huawei
430017	**Deleted - UTRAN 2 ms TTI uplink range improvement**	RANimp-2mTTI_ULimp	R1,R2,R3,R4	Nokia Siemens Networks
440043	**Deleted - Enhanced Home NodeB / eNodeB continuation of Rel-9**	eEHNB	S2	Alcatel-Lucent
460010	**Deleted - Fixed Wireless Customer-Premises Equipment (CPE) RF Requirements**	FW_CPE_RF	R4,R5	Verizon Wireless
460012	**Deleted - Latency reductions for LTE**	LTE_LATRED	R2,R1	Ericsson
470006	**Deleted - Enhanced Interference Management for Home NodeBs**	HNB_IM	R3	Qualcomm

UID	Name	Acronym	Resource	WI_rapporteur	TR
0	**Release 10 Studies**	-		-	-
400037	**Deleted - Study on Unauthenticated PS Emergency Calls**	FS_UAPSEC	S1	Nokia Siemens Networks	22.984
410042	**Deleted - Study on enhancements to IMS border functions for IMS Interconnection of services**	FS_eIMS_IBCF	S2	Starent Networks	23.848
440050	**Deleted - Study on EPC Charging enhancement**	FS_EPCcharg	S5	Nokia Siemens Networks	-
450012	**Deleted - Study on Interworking Proxy between GTP based and PMIP based interfaces**	FS_GTP-MIP-IW	C4	NTT DoCoMo	29.875

TSG#57 New Rel-10 Testing

UID	Name	Acronym	Resource	Hyperlink	WI_rapporteur	Notes
570003	**MS Conformance Test Aspects for GERAN - Network Improvements for Machine-Type Communications**	NIMTC_GERAN-MSTest	G3new	GP-121141	ST-Ericsson	GP#55 approved WID. Testing for CT1 part of Stage 3 for NIMTC UID_480105, GERAN part of NIMTC (Stage 3) UID_490003
570004	**UE Conformance Test Aspects - Network Improvements for Machine-Type Communications**	NIMTC-UEConTest	R5	RP-121124	Ericsson	Testing for CT1 part of Stage 3 UID_480105, RAN mechanisms to avoid CN overload due to MTC UID_490024
570005	**Conformance test aspects SRVCC in alerting phase**	aSRVCC-UEConTest	R5	RP-121128	NTT DoCoMo	Testing for Rel-10 SRVCC in alerting phase (aSRVCC) that builds on Rel-8 service continuity feature by adding access transfer of media of an IM session in PS to CS direction during the alerting phase for access transfers as specified in TS 23.216

TSG#57 Completed IETF dependency

UID	Name	Acronym	Resource	Notes	TSs_and_TRs
531006	(IETF) CT3, CT4 part of CN aspects of Enabling Coder Selection and Rate Adaptation for UTRAN and E-UTRAN for Load Adaptive Applications	ECSRA_LAA-CN	C3-IETF, C4-IETF	CP#57 completed	RFC 6679 (was draft-ietf-avtcore-ecn-for-rtp)

TSG#57 Completed Rel-10 Testing

UID	Name	Acronym	Resource	Notes	TSs_and_TRs
520013	**Test part: Expanded 1900 MHz Band for UTRA and LTE**	E1900-UEConTest	R5	RP#57 completed	34.108, 34.121-1, 34.121-2, 34.123-1, 34.123-2, 34.123-3, 36.508, 36.521-1, 36.521-2, 36.521-3, 36.523-1, 36.523-2, 36.523-3

Ongoing Rel-10 IETF dependency

UID	Name	Acronym	Resource	Rapporteur
521001	(IETF) Stage 3 - IMS Inter-UE Transfer enhancements	IMS_SC_eIDT	C1-IETF	Christer Holmberg
561001	(IETF) Further improvements of II-NNI Stage 3 based on operational feedback and evolution of other specifications	II-NNI2	C3-IETF	Lionel Morand
561002	(IETF) Further improvements of II-NNI Stage 3 based on operational feedback and evolution of other specifications	II-NNI2	C3-IETF	Christer Holmberg
521003	(IETF) CT1 part of Stage 3 for SRVCC enhancements	eSRVCC	C1-IETF	Christer Holmberg
521004	(IETF) (Small) Technical Enhancements and Improvements for Rel-10 (draft-atarius)	TEI10	C1-IETF	Andrew Allen

Ongoing Rel-10 Testing

UID	Name	Acronym	Resource	Rapporteur	Status_Report
570003	MS Conformance Test Aspects for GERAN - Network Improvements for Machine-Type Communications	NIMTC_GERAN-MSTest	G3new	ST-Ericsson	-
570004	UE Conformance Test Aspects - Network Improvements for Machine-Type Communications	NIMTC-UEConTest	R5	Ericsson	-
570005	Conformance test aspects SRVCC in alerting phase	aSRVCC-UEConTest	R5	NTT DoCoMo	-
550006	Testing for Terminal support of Rel-10 USIM, ISIM and USAT features	USIM_R10_Test	C6	Gemalto	-
480302	TIGHTER Testing	TIGHTER	G3new	Renesas Mobile	-
540006	Test part: Four carrier HSDPA	4C_HSDPA-UEConTest	R5	Qualcomm	RP-120961
530039	Test part: Automatic Neighbour Relation (ANR) for UTRAN	ANR_UTRAN-UEConTest	R5	Ericsson	RP-120960
530040	Test part: Carrier Aggregation for LTE	LTE_CA-UEConTest	R5	Nokia	RP-120959
560012	Test part: Enhanced Downlink Multiple Antenna Transmission for LTE	LTE_eDL_MIMO-UEConTest	R5	ZTE	RP-120965
540007	Test part: UL multiple antenna transmission for LTE	LTE_UL_MIMO-UEConTest	R5	Huawei	RP-120962
550001	Test part: Enhanced Inter-Cell Interference Control (ICIC) for non-Carrier Aggregation (CA) based deployments of heterogeneous networks for LTE	eICIC_LTE-UEConTest	R5	Qualcomm	RP-120963
420013	Conformance Test Aspects – LTE 3500	LTE-UEConTest_LTE3500	R5	Ericsson	RP-120956
530041	Test part: Minimization of Drive Tests for E-UTRAN and UTRAN	MDT_UMTSLTE-UEConTest	R5	Ericsson	RP-120958
550002	Test part: HeNB Mobility Enhancements	HNB_HENB_mob_enh-UEConTest_LTE	R5	Qualcomm	RP-120964

Annex A:
Change history

Change history		
Date	**Subject/Comment**	**Ver.**
2008-12	1st draft despatched to TSG#43 for input / comment	0.0.1
2009-04	Post-TSG#43 updates	0.0.2
2009-06	Post-TSG#44 updates	0.0.3
2009-09	Post-TSG#45 updates	0.0.4
2009-12	Post-TSG#46 updates	0.0.5
2010-04	Post-TSG#47 updates. Stage 1 was frozen Mar 2010 (2 Stage 1 exceptions granted to continue work on access control for CS Fallback and for the UDC data model)	0.0.6
2010-06	Post-TSG#48 updates. Completed 2 Stage 1 exceptions (access control for CS Fallback, UDC data model)	0.0.7
2010-09	Post-TSG#49 updates. Stage 2 was frozen Sep 2010. SA2 has either completed the required architecture work or address only a reduced scope as part of Rel-10. No Stage 2 exceptions were required or granted.	0.0.8
2011-02	Post-TSG#50 updates. SA3 Security for LTE Relay Nodes (Stage 2) exception until 03/2011 impacting Stage 3 in CT and RAN	0.0.9
2011-04	Post-TSG#51 updates. Stage 3 was frozen Mar 2011. Exceptions granted until Jun 2011	0.1.0
2011-06	Post-TSG#52 updates. Most Stage 3 exceptions completed. Five (5) Exceptions granted until Sep 2011 UID / Name / Acronym / Resource 490003 GERAN part of NIMTC (Stage 3) NIMTC G2 490004 GERAN part: MSR BS RF requirements for ... MSR_NC-Core G1 380073 UMTS/LTE 3500 MHz RInImp8-UMTSLTE3500 R4,R2,R3 500120 Core part: Extending 850 MHz Upper Band e850_UB-Core R4,R2,R3 510041 Alarm Correlation and Root Cause Analysis OAM-AC-RCA S5	0.1.1
2011-09	Post-TSG#53 updates. Four (4) out Five (5) Stage 3 exceptions completed. One moved to Rel-11: UID / Name / Acronym / Resource 500020 Extending 850 MHz Upper Band e850_UB R4,R2,R3	0.1.2
2012-01	Post-TSG#54 Dec 2011 updates	0.1.3
2012-03	Post-TSG#55 updates.	0.1.4
2012-06	Post-TSG#56 updates.	0.1.5
2012-09	Post-TSG#57 updates.	0.1.6