Technical Specification Group Services and System Aspects **TSGS#17(02)0530**

Meeting #17, Biarritz, France, 9-12 September 2002

Source: **TSG SA WG2**
Title: **CRs on 23.002**
Agenda Item: **7.2.3**

The following Change Requests (CRs) have been approved by TSG SA WG2 and are requested to be approved by TSG SA plenary #17.
Note: the source of all these CRs is now S2, even if the name of the originating company(ies) is still reflected on the cover page of all the attached CRs.

Tdoc #	Title	Spec	CR #	cat	Version in	WI	S2 meeting
S2-022189	The usage of Iu-interface signalling is missing in the E-interface description	23.002	056 rev 1	F	3.5.0	TEI	26
S2-022190	The usage of Iu-interface signalling is missing in the E-interface description	23.002	057 rev 1	A	4.4.0	TEI4	26
S2-022191	The usage of Iu-interface signalling is missing in the E-interface description	23.002	058 rev 1	A	5.7.0	TEI5	26
S2-021990	Mc interface	23.002	97r 2	F	5.7.0	IMS-CCR	25
S2-021953	Clean-up of 23.002	23.002	98r 1	F	5.7.0	IMS	25
S2-022616	Align LCS architecture based on impacts from Radio Access Networks (RAN & GERAN)	23.002	099 r2	F	4.4.0	LCS1	26
S2-022617	Align LCS architecture based on impacts from Radio Access Networks (RAN & GERAN)	23.002	100 r2	F	5.7.0	LCS1	26
S2-022516	IMS Reference Points	23.002	103 r1	F	5.7.0	IMS	26

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CHANGE REQUEST

| ⌘ | **23.002** CR **056** | ⌘rev | **1** | ⌘ | Current version: | **3.5.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	The usage of Iu-interface signalling is missing in the E-interface description
Source:	⌘	Siemens

Work item code:⌘	TEI		***Date:*** ⌘	13/08/2002

Category:	⌘	**F**	***Release:*** ⌘	R99

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*

Reason for change:	⌘	This CR corrects a left over. Iu-interface signalling is used on E-interface after inter 3G-MSC SRNS Relocations rather than A-interface signalling.
Summary of change: ⌘		Description of E-interface corrected and reference to 23.009 added.
Consequences if not approved:	⌘	Misalignment between specifications.

Clauses affected:	⌘	6.4.1.4

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

6.4.1.4 Interface between MSCs (E-interface)

When a mobile station moves from one MSC area to another during a call, a handover procedure has to be performed in order to continue the communication. For that purpose the MSCs have to exchange data to initiate and then to realise the operation.

After the handover operation has been completed, the MSCs will exchange information to transfer A- or Iu- interface signalling as ~~necessary~~defined in TS 23.009[6].

When a short message is to be transferred between a Mobile Station and Short Message Service Centre (SC), in either direction, this interface is used to transfer the message between the MSC serving the Mobile Station and the MSC which acts as the interface to the SC.

Signalling on this interface uses the Mobile Application Part (MAP), which in turn uses the services of Transaction Capabilities. See TS 29.002.

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CHANGE REQUEST

| ⌘ | **23.002** CR **057** | ⌘ rev | **1** | ⌘ | Current version: | **4.4.0** | ⌘ |

For HELP on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	The usage of Iu-interface signalling is missing in the E-interface description

Source:	⌘	Siemens

Work item code:	⌘	TEI		*Date:* ⌘	13/08/2002

Category:	⌘	**A**		*Release:* ⌘	Rel-4

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F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
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be found in 3GPP TR 21.900.

Use one of the following releases:
2   (GSM Phase 2)
R96   (Release 1996)
R97   (Release 1997)
R98   (Release 1998)
R99   (Release 1999)
Rel-4   (Release 4)
Rel-5   (Release 5)
Rel-6   (Release 6)

Reason for change:	⌘	This CR corrects a left over. Iu-interface signalling is used on E-interface after inter 3G-MSC SRNS Relocations rather than A-interface signalling.

Summary of change:	⌘	Description of E-interface corrected and reference to 23.009 added.

Consequences if not approved:	⌘	Misalignment between specifications.

Clauses affected:	⌘	6.4.1.4

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	

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When a short message is to be transferred between a Mobile Station and Short Message Service Centre (SC), in either direction, this interface is used to transfer the message between the MSC serving the Mobile Station and the MSC which acts as the interface to the SC.

Signalling on this interface uses the Mobile Application Part (MAP), which in turn uses the services of Transaction Capabilities. See TS 29.002.

<div align="right">*CR-Form-v7*</div>

CHANGE REQUEST

⌘	**23.002** CR **058**	⌘ rev	**1**	⌘	Current version:	**5.7.0**	⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network **X**

Title: ⌘	The usage of Iu-interface signalling is missing in the E-interface description
Source: ⌘	Siemens

Work item code: ⌘	TEI	***Date:*** ⌘	13/08/2002

Category: ⌘	**A**	***Release:*** ⌘	Rel-5

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use one of the following releases:
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R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*

Reason for change: ⌘	This CR corrects a left over. Iu-interface signalling is used on E-interface after inter 3G-MSC SRNS Relocations rather than A-interface signalling.
Summary of change: ⌘	Description of E-interface corrected and reference to 23.009 added.
Consequences if not approved: ⌘	Misalignment between specifications.

Clauses affected: ⌘	6.4.1.4

	Y	N		
Other specs affected: ⌘		X	Other core specifications	⌘
		X	Test specifications	
		X	O&M Specifications	

Other comments: ⌘	

How to create CRs using this form:
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When a short message is to be transferred between a Mobile Station and Short Message Service Centre (SC), in either direction, this interface is used to transfer the message between the MSC serving the Mobile Station and the MSC which acts as the interface to the SC.

Signalling on this interface uses the Mobile Application Part (MAP), which in turn uses the services of Transaction Capabilities. See TS 29.002.

3GPP TSG-SA2 Meeting #25   *Tdoc S2-021990*
Naantali, Finland, 24 – 28th June 2002

CR-Form-v4				

CHANGE REQUEST

⌘   **23.002 CR 97**   ⌘ ev **2** ⌘ Current version: **5.7.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network ☐   Core Network **X**

Title:	⌘	Change of Mc reference point name for IMS
Source:	⌘	Ericsson, Nortel
Work item code: ⌘		IMS-CCR ***Date:*** ⌘ 24th June 2002
Category:	⌘ **F**	***Release:*** ⌘ R5

Use <u>one</u> of the following categories:
    F *(correction)*
    A *(corresponds to a correction in an earlier release)*
    B *(addition of feature),*
    C *(functional modification of feature)*
    D *(editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
    2   *(GSM Phase 2)*
    R96   *(Release 1996)*
    R97   *(Release 1997)*
    R98   *(Release 1998)*
    R99   *(Release 1999)*
    REL-4 *(Release 4)*
    REL-5 *(Release 5)*

Reason for change: ⌘		Currently, Mc interface between MGCF & IM-MGW is defined to be the same as Mc between GMSC server and CS-MGW in stage 2 specs. When Mc was defined, there was only MGW defined as a node, currently there are CS-MGW and IM-MGW as it is expected that there are different (addition and subtraction) functions in these GWs. It has been identified to be different functionality in the WID in N4 (NP-020320) approved at last CN plenary. Due to these reasons, the Mc reference point between MGCF & IM-MGW is being renamed as Mn and the description of the reference point clarified. Also, change IM-MGW to IMS-MGW so as to not conflict with existing definition of " IM: Intermodulation" in 21.905
Summary of change: ⌘		Rename Mc between MGCF & IM-MGW to Mn and clarify the functions, rename IM-MGW to IMS-MGW
Consequences if ***not approved:***	⌘	Misalignment and wrong functional role of a reference point for IMS-CS interworking

Clauses affected:	⌘	5.5, 6.a.7.3, 4.1.2.1.2, 4a.7.2, 4a.7.3

Other specs ***affected:***	⌘ **X**	Other core specifications	⌘	29.163, 29.332
	☐	Test specifications		
	☐	O&M Specifications		

Other comments:	⌘	CN plenary concluded that LS to be sent to SA2 for this purpose.

***************FIRST CHANGE*******************

4.1.2.1.2   Circuit Switched - Media Gateway Function (CS-MGW)

Note: In this document the term Media Gateway Function (MGW) is used when there is no need to differentiate between the CS domain entity and the IP Multimedia CN Subsystem entity. When refering specifically to the CS domain entity the term CS-MGW is used. When refering specifically to the IP Multimedia CN Subsystem entity, the term IM<u>S</u>-MGW is used.

This component is PSTN/PLMN transport termination point for a defined network and interfaces UTRAN with the core network over Iu.

A CS-MGW may terminate bearer channels from a switched circuit network and media streams from a packet network (e.g., RTP streams in an IP network). Over Iu, the CS-MGW may support media conversion, bearer control and payload processing (e.g. codec, echo canceller, conference bridge) for support of different Iu options for CS services (AAL2/ATM based as well as RTP/UDP/IP based).

The CS-MGW:

- Interacts with MGCF, MSC server and GMSC server for resource control.

- Owns and handles resources such as echo cancellers etc.

- May need to have codecs.

The CS-MGW will be provisioned with the necessary resources for supporting UMTS/GSM transport media. Further tailoring (i.e packages) of the H.248 [52] may be required to support additional codecs and framing protocols, etc.

The CS-MGW bearer control and payload processing capabilities will also need to support mobile specific functions such as SRNS relocation/handover and anchoring. It is expected that current H.248 standard [52] mechanisms can be applied to enable this.

***************SECOND CHANGE*******************

4a.7.2   Media Gateway Control Function (MGCF)

The MGCF:

- Controls the parts of the call state that pertain to connection control for media channels in an IM<u>S</u>-MGW.

- Communicates with CSCF.

- Selects the CSCF depending on the routing number for incoming calls from legacy networks.

- Performs protocol conversion between ISUP and the IM subsystem call control protocols.

- Out of band information assumed to be received in MGCF and may be forwarded to CSCF/IM<u>S</u>-MGW.

4a.7.3   IP Multimedia <u>Subsystem</u> - Media Gateway Function (IM<u>S</u>-MGW)

Note: In this document the term Media Gateway Function (MGW) is used when there is no need to differentiate between the CS domain entity and the IP Multimedia CN Subsystem entity. When refering specifically to the CS domain entity the term CS-MGW is used. When refering specifically to the IP Multimedia CN Subsystem entity, the term IM<u>S</u>-MGW is used.

A IM<u>S</u>-MGW may terminate bearer channels from a switched circuit network and media streams from a packet network (e.g., RTP streams in an IP network). The IM<u>S</u>-MGW may support media conversion, bearer control and payload processing (e.g. codec, echo canceller, conference bridge), it:

- Interacts with the MGCF for resource control.

- Owns and handles resources such as echo cancellers etc.

- May need to have codecs.

The IMS-MGW will be provisioned with the necessary resources for supporting UMTS/GSM transport media. Further tailoring (i.e. packages) of the H.248 [52] may be required to support additional codecs and framing protocols, etc.

***************THIRD CHANGE*******************

5.5 Configuration of IM CN Subsystem entities

The configuration of IM CN Subsystem entities is presented in figure 6. In the figure, all the functions are considered implemented in different logical nodes. If two logical nodes are implemented in the same physical equipment, the relevant interfaces may become internal to that equipment.

Only the interfaces specifically linked to the IM subsystem are shown, i.e. all the SGSN, GGSN and HSS interfaces depicted in figure 1 are still supported by these entities even if not shown.
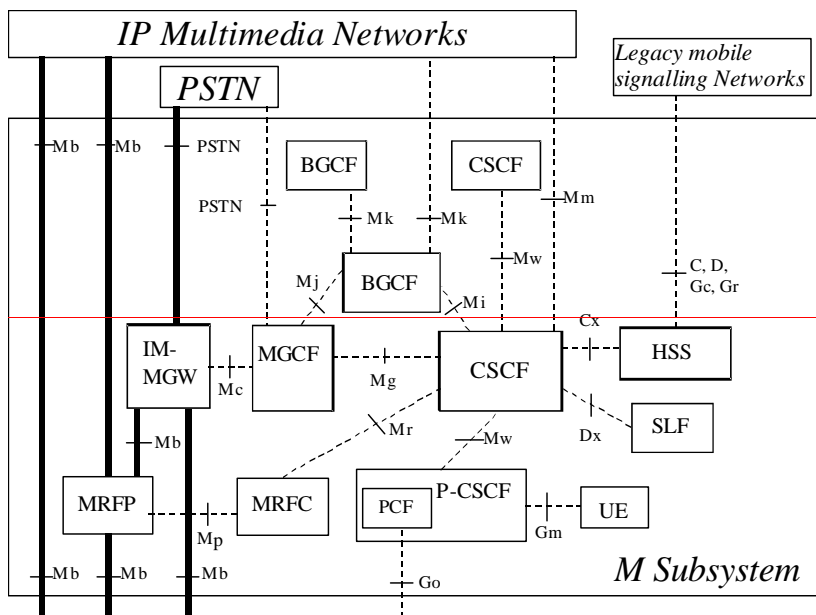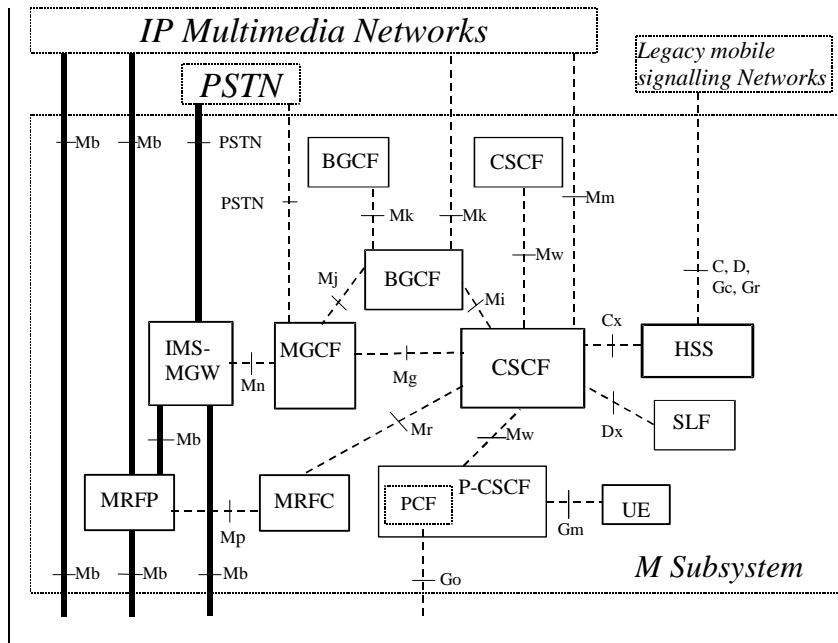
Figure 6: Configuration of IM Subsystem entities

The figure below depicts an overall view of the functional architecture for services.
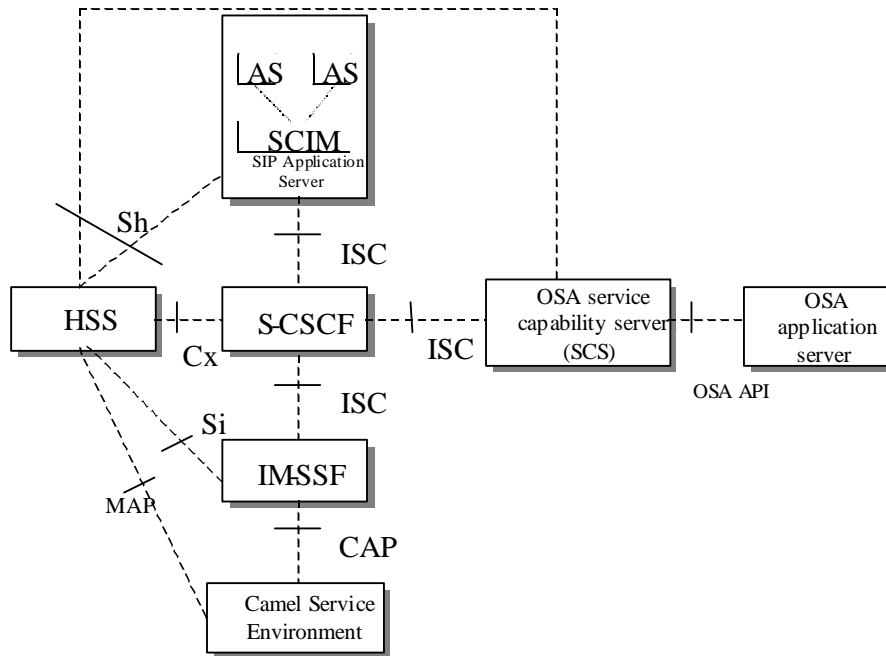
Figure 6a: Functional architecture for the provision of service in the IMS

Legend:
Bold lines: interfaces supporting user traffic;
Dashed lines: interfaces supporting only signalling.

*************FOURTH CHANGE*******************

6.4.1.7   Reference point (G)MSC server – CS-MGW (Mc Reference Point)

~~See also section 6a.7.3.~~

The Mc reference point describes the interfaces between the MGCF and IMS-MGW, between the MSC Server and CS-MGW, and between the GMSC Server and CS-MGW. It has the following properties:

- full compliance with the H.248 standard [52], baseline work of which is currently carried out in ITU-T Study Group 16, in conjunction with IETF MEGACO WG.

- flexible connection handling which allows support of different call models and different media processing purposes not restricted to H.323 usage [54].

- open architecture where extensions/Packages definition work on the interface may be carried out.

- dynamic sharing of MGW physical node resources. A physical MGW can be partitioned into logically separate virtual MGWs/domains consisting of a set of statically allocated Terminations.

- dynamic sharing of transmission resources between the domains as the MGW controls bearers and manage resources according to the H.248 protocols [52].

The functionality across the Mc reference point will need to support mobile specific functions such as SRNS relocation/handover and anchoring. It is expected that current H.248/IETF Megaco standard [52] mechanisms can be applied to enable this.

*************FIFTH CHANGE*******************

6a.7.3   Reference Point MGCF – IMS-MGW (~~Mc~~ Mn Reference Point)

~~See also section 6.4.1.7.~~

The ~~Mc~~ Mn reference point describes the interfaces between the MGCF and IMS-MGW in the IMS. ~~, between the MSC Server and CS-MGW, and between the GMSC Server and CS-MGW.~~ It has the following properties:

- full compliance with the H.248 standard functions for IMS – PSTN/PLMN interworking [52]~~, baseline work of which is currently carried out in ITU-T Study Group 16, in conjunction with IETF MEGACO WG.~~

- flexible connection handling which allows support of different call models and different media processing purposes not restricted to H.323 [54] usage.

- open architecture where extensions/Packages definition work on the interface may be carried out.

- dynamic sharing of IMS-MGW physical node resources. A physical IMS-MGW can be partitioned into logically separate virtual MGWs/domains consisting of a set of statically allocated Terminations.

- dynamic sharing of transmission resources between the domains as the IMS- MGW controls bearers and manage resources according to the H.248 [52] protocols and functions for IMS.

~~The functionality across the Mc reference point will need to support mobile specific functions such as SRNS relocation/handover and anchoring. It is expected that current H.248/IETF Megaco standard [52] mechanisms can be applied to enable this.~~

1st modified section

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2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1]   [void]

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

[2]   3GPP TS 22.016: " International Mobile station Equipment Identities (IMEI)".

[2a]   3GPP TS 22.060: " General Packet radio Service (GPRS); Service description; Stage 1".

[2b]   3GPP TS 22.071: " Location Services (LCS); Service description; Stage 1".

[2c]   3GPP TS 22.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL); Service description, Stage 1".

[3]   3GPP TS 23.003: " Numbering, addressing and identification".

[4]   3GPP TS 22.127: "Open Service Access (OSA)[void]

[5]   3GPP TS 23.008: " Organization of subscriber data".

[6]   3GPP TS 23.009: " Handover procedures".

[7]   3GPP TS 23.012: " Location Management Procedures".

[8]   3GPP TS 23.041: "Technical realization of Cell Broadcast Service (CBS)".

[9]   [void]

[9a]   3GPP TS 23.060: " General Packet Radio Service (GPRS); Service description; Stage 2".

[10]   [void]

[10a]   3GPP TS 43.064: "Digital cellular telecommunication system (Phase 2+); General Packet Radio service (GPRS); Overall description of the GPRS radio interface; Stage 2".

[10b]   3GPP TS 25.305: "Stage 2 Functional Specification of UE Positioning in UTRAN"

[10c]   3GPP TS 23.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 3 - Stage 2".

[11]   ITU-T Recommendation Q.1214 (05/1995): "Distributed Functional Plane for Intelligent Network CS-1"

[11a] 3GPP TS 23.101: "General UMTS Architecture".

[11b] 3GPP TS 23.110: "UMTS Access Stratum); Services and Functions".

[12] 3GPP TS 24.002: " GSM - UMTS Public Land Mobile Network (PLMN) access reference configuration".

[13] 3GPP TS 48.001: " Base Station System - Mobile-services Switching Centre (BSS - MSC) interface; General aspects".

[14] 3GPP TS 48.002: " Base Station System - Mobile-services Switching Centre (BSS - MSC) interface; Interface principles".

[14a] 3GPP TS 25.410: "UTRAN Iu Interface: general aspects and principles".

[15] 3GPP TS 48.004: " Base Station System - Mobile-services Switching Centre (BSS - MSC) interface Layer 1 specification".

[16] 3GPP TS 48.006: " Signalling transport mechanism specification for the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[17] 3GPP TS 48.008: " Mobile-services Switching Centre - Base Station System (MSC - BSS) interface; Layer 3 specification".

[18] [void]

[19] 3GPP TS 48.051: " Base Station Controller - Base Transceiver Station (BSC - BTS) interface; General aspects".

[20] 3GPP TS 48.052: " Base Station Controller - Base Transceiver Station (BSC - BTS) interface; Interface principles".

[21] 3GPP TS 48.054: " Base Station Controller - Base Transceiver Station (BSC - BTS) interface; Layer 1 structure of physical circuits".

[22] 3GPP TS 48.056: " Base Station Controller - Base Transceiver Station (BSC - BTS) interface; Layer 2 specification".

[23] 3GPP TS 48.058: " Base Station Controller - Base Transceiver Station (BSC - BTS) interface; Layer 3 specification".

[24] 3GPP TS 48.060: " In-band control of remote transcoders and rate adaptors for full rate traffic channels".

[25] 3GPP TS 48.061: " In-band control of remote transcoders and rate adaptors for half rate traffic channels".

[26] 3GPP TS 29.002: " Mobile Application Part (MAP) specification".

[27] 3GPP TS 22.228: "Service requirements for the IP Multimedia Core Network Subsystem"

 [void]

[28] [void]

[29] [void]

[30] [void]

[31] 3GPP TS 29.007: " General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".

[32]   3GPP TS 29.010: " Information element mapping between Mobile Station - Base Station System (MS – BSS) and Base Station System - Mobile-services Switching Centre (BSS - MSC); Signalling procedures and the Mobile Application Part (MAP)".

[33]   3GPP TS 29.011: " Signalling interworking for supplementary services".

[34]   3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[35]   3GPP TR 41.103: "GSM Release 5 specifications".

[36]   3GPP TR 43.051: "Technical Specification Group GSM/EDGE Radio Access Network; Overall description, Stage 2".

[37]   3GPP TS 23.226: "Global Text Telephony (GTT); Stage 2."

[38]   3GPP TS 26.226: "Cellular Text Telephone Modem; General Description"

[39]   3GPP TS 23.016:"Subscriber data management; Stage 2"

[40]   3GPP TS 23.066: "Support of Mobile Number Portability (MNP); Technical realization; Stage 2"

[41]   3GPP TS 43.068: "Voice Group Call Service (VGCS); Stage 2"

[42]   3GPP TS 43.069: "Voice Broadcast Service (VBS); Stage 2"

[43]   3GPP TS 23.205: "Bearer independent circuit switched core network; Stage 2"

[44]   3GPP TS 48.014: "Base Station System (BSS) – Serving GPRS Support Node (SGSN) interface; Gb interface Layer 1"

[45]   3GPP TS 48.016: "Base Station System (BSS) – Serving GPRS Support Node (SGSN) interface; Network service"

[46]   3GPP TS 48.018: "Base Station System (BSS) – Serving GPRS Support Node (SGSN); BSS GPRS Protocol (BSSGP)"

[47]   3GPP TS 48.031: "Serving Mobile Location Centre – Serving Mobile Location Centre (SMLC – SMLC); SMLCPP specification"

[48]   3GPP TS 29.016: "Serving GPRS Support Node (SGSN) – Visitor Location Register (VLR); Gs interface network service specification"

[49]   3GPP TS 29.018: "Serving GPRS Support Node (SGSN) – Visitor Location Register (VLR); Gs interface Layer 3 specification"

[50]   3GPP TS 49.031: "Network Location Services (LCS); Base Station System Application Part LCS extension (BSSAP-LE)

[51]   3GPP TS 29.060: "GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface"

[52]   ITU-T Recommendation H.248: "Gateway Control Protocol"

[53]   ITU-T Recommendation E.164: "The International public telecommunication numbering plan"

[54]   ITU-T Recommendation H.323: "Packet-based multimedia communications systems "

[55]   3GPP TS 44.071: " Mobile radio interface layer 3 Location Services (LCS) specification "

[56]   3GPP TS 23.271: "Functional stage 2 description of LCS"

[57]   ITU-T Recommendation I.363-2 :"B-ISDN ATM Adaptation Layer (AAL) type 2 specification"

[58]   ITU-T Recommendation H.245: "Control protocol for multimedia communication"

[59]   IETF RFC768:"User Datagram Protocol"

[60]   IETF RFC1889: "RTP: A Transport Protocol for Real-Time Applications"

[61]   IETF RFC~~2543~~3261: "SIP: Session Initiation Protocol"

[62]   LIF TS 101 "Mobile Location Protocol Specification"(Location Interoperability Forum 2001) [Available at http://www.locationforum.org/public_document_area.htm]

[63]   3GPP TS29.198: "Open Service Access (OSA) Application Programming Interface (API)"

[64]   3GPP TS 33.210: "3G Security; Network Domain Security; IP network layer security"

[65]   3GPP TS 23.236: " Intra Domain Connection of RAN Nodes to Multiple CN Nodes".

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next modified section

3.1   Public Land Mobile Network (PLMN)

A Public Land Mobile Network (PLMN) is established and operated by an administration or Recognized Private Operating Agency (RPOA) for the specific purpose of providing land mobile telecommunications service services to the public. A PLMN may be regarded as an extension of ~~a~~ networks (e.g. ISDN, corporate and public PDNs, etc); it is a collection of MSCs areas in CS domain and SGSN areas in PS domain within a common numbering plan (e.g. same National Destination Code) and a common routing plan. The MSCs are the functional interfaces between the fixed networks and a PLMN for call set-up in CS domain. The GGSN and the SGSN are the functional interfaces between the fixed networks and a PLMN for packet transmission in PS domain.

Functionally the PLMNs may be regarded as independent telecommunications entities even though different PLMNs may be interconnected through the ISDN/PSTN and PDNs for forwarding of calls or network information. A similar type of interconnection may exist for the interaction between the MSCs/SGSNs of one PLMN.

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next modified section

3.3a   IP Multimedia subsystem (IMS)

The IM subsystem comprises all CN elements for provision of IP multimedia services comprising audio, video, text, chat, etc. and a combination of them delivered over the PS domain. The entities related to IMS are CSCF, MGCF, MRF, etc. as defined in the stage 2 of the IM subsystem TS 23.228 [34]. See TS 22.228 [27] for some service examples of IMS.~~IM services.~~

~~[editor's note: the "IM services" are not defined! Proposed other definition: "The IM subsystem refers to the set of CN entities using the services provided by the PS domain to offer multimedia services. The entities of the IM subsystem are the CSCF, the MGCF, the MRF and some adaptation entities. These entities are defined bellow."]~~

~~The stage 2 of the IM subsystem is defined in [34].~~

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next modified section

3.13   Zones for Regional Subscription

A PLMN operator may define a number of regional subscription areas, each of which is a subset of the service area for an unrestricted mobile subscriber. A regional subscription area may be contained within the service area of a single

PLMN, or may lie within the service areas of two or more PLMNs. Each regional subscription area consists of one or more zones; each zone is contained within the service area of a PLMN.

The definition of a mobile subscriber's regional subscription area is stored within the HLR per National Destination Code(s) (NDC) of a PLMN and is transferred to the VLRs and/or SGSNs of that PLMN. The VLR and/or SGSN evaluates this information to extract the restricted or accessible MSC and/or ~~SGNS~~ SGSN areas and location areas to which the mobile subscriber is allowed to roam. The VLR and/or SGSN~~SGNS~~ informs the HLR if an entire MSC and/or ~~SGNS~~ SGSN area is restricted.

Zones for Regional Subscription and their handling are defined in TS 23.003 [3], TS 23.008 [5] and TS 29.002 [26].

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next modified section

4a.7.1   Call Session Control Function (CSCF)

The CSCF can act as Proxy CSCF (P-CSCF), Serving CSCF (S-CSCF) or Interrogating CSCF (I-CSCF). The P-CSCF is ~~characterised by being~~ the first contact point for the UE within the IM subsystem (IMS); the S-CSCF actually handles the session states in the network; the I-CSCF is mainly the contact point within an operator's network for all IMS connections destined to a subscriber of that network operator, or a roaming subscriber currently located within that network operator's service area. Further definitions of the P-, S- and I-CSCF are provided in TS 23.228 [34].

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next modified section

4a.7.7   Application Server (AS)

An Application Server (AS) i.e., SIP Application Server, OSA Application Server, or CAMEL IM-SSF, offers value added IM services and resides either in the user's home network or in a third party location. The third party could be a network or simply a stand-alone AS.

Note: The OSA Application Server does not directly interact with the IMS network entities but through the OSA Service Capability Servers (OSA SCS-s). Further information on OSA is provided in TS 22.127 [4].

The AS (SIP Application Server and/or the OSA Service Capability Server and/or IM-SSF) can communicate with the HSS. The Sh and Si interfaces are used for this purpose.

The Serving-CSCF to AS interface is used to provide services residing in an AS. Two cases were identified:

- Serving-CSCF to an AS in Home Network.

- Serving-CSCF to an AS in a trusted External Network (e.g., Third Party or Visited). The S-CSCF does not provide authentication and security functionality for secure direct third party access to the IM Subsystem. The OSA framework provides a standardized way for third party access to the IM Subsystem.

An Application Server may influence and impact the SIP session on behalf of the services supported by the operator's network. An AS may host and execute services.

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next modified section

6.4.1.9   Reference Point CS-MGW – CS-MGW (Nb Reference Point)

Over the Nb reference point the bearer control and transport are performed. The transport may be RTP/UDP/IP [59][60] or AAL2 (I.363-2) [57] for transport of user data. Different options for user data transport and bearer control shall be possible on Nb, for example: AAL2/Q.AAL2, STM/none, RTP/H.245, [58], IPBC.

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6a.7.1   Reference Point HSS – CSCF (Cx Reference Point)

The Cx reference point supports information transfer between CSCF and HSS.

The main procedures that require information transfer between CSCF and HSS are

1) Procedures related to Serving CSCF assignment

2) Procedures related to routing information retrieval from HSS to CSCF

3)Procedures related to UE-HSS infromation tunneling via CSCF

3) Procedures related to authorisation (e.g., checking of roaming agreement)

4) Procedures related to authentication: transfer of security parameters of the subscriber between HSS and CSCF

5) Procedures related to filter control: transfer of filter parameters of the subscriber from HSS to CSCF

Further information on the Cx reference point is provided in TS 23.228 [34].

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6a.7.6   Reference Point CSCF - MRFC (Mr Reference Point)

This reference point allows interaction between an S-CSCF and an MRFC.

The protocol used for the Mr reference point is SIP (as defined by RFC 2543 RFC 3261 [61], other relevant RFC's, and additional enhancements introduced to support 3GPP´s needs).

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6a.7.13 Reference Point CSCF- SLF (Dx Reference Point)

This interface between CSCF and SLF is used to retrieve the address of the HSS which holds the subscription for a given user.

This interface is not required in a single HSS environment. An example for a single HSS environment is a server farm architecture.

Details are described in 23.228 [34], sub-clause 5.8.1.

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next modified section

6a.7.15　Reference Point CSCF – AS (ISC Reference Point)

This interface between CSCF and the Application Servers (i.e., SIP Application Server, OSA Service Capability Server, or CAMEL IM-SSF) is used to provide services for the IMS.

Details are described in 23.228 [34], sub-clause 4.2.4.

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next modified section

6a.7.16　Reference Point HSS – SIP AS or OSA SCS (Sh Reference Point)

The Application Server (SIP Application Server and/or the OSA Sservice Ceapability Sserver) may communicate to the HSS. The Sh interface is used for this purpose. Details are described in 23.228 [34], sub-clause 4.2.4.

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end of changes

CR-Form-v7

CHANGE REQUEST

| ⌘ | **23.002** CR **99** | ⌘ **rev** | **2** | ⌘ | Current version: | **4.4.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐   ME ☐ Radio Access Network ☐ Core Network **X**

Title:	⌘	Align LCS architecture based on impacts from Radio Access Networks (RAN & GERAN)
Source:	⌘	Nokia

Work item code:⌘	LCS		**Date:** ⌘	08.08.2002

Category:	⌘	**F**	**Release:** ⌘	Rel-4

Use one of the following categories:
   F *(correction)*
   A *(corresponds to a correction in an earlier release)*
   B *(addition of feature),*
   C *(functional modification of feature)*
   D *(editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use one of the following releases:
2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

| **Reason for change:** | ⌘ | Architectural changes occurred from Release 99 to Release 4. Updates to 23.002 are needed to align this specification properly with current LCS specifications based on changes in the Radio Acess Networks, GERAN & RAN.

In GERAN, an NSS-based SMLC is no longer supported from Release 4 and onwards.
In UTRAN, in Release 4 the SMLC is integrated in the SRNC.

Additionally, updates to references were made due to specification numbering changes from Release 99 to Release 4. |
|---|---|---|

| **Summary of change:** ⌘ | Section 2: References updated specification numbering changed in R99 to Rel 4. Removed "Digital cellular telecommunications system (Phase 2+);" according 3GPP specification drafting rules TS 21.801, section 2.
Added LCS stage 2 references for GERAN LCS, RAN, LCS
Added 3GPP TS 43.068: " Voice Group Call Service (VGCS); Stage 2.", 3GPP TS 43.069: "Voice Broadcast service (VBS); Stage 2 references. (Editorial)

Section 4.1.2.2: Updated reference to 43.068 and 43.069 (Editorial)

Section 4a.3 LCS entities should refer to the current stage 2 specifications defined by TSG SA, TSG GERAN and TSG RAN.

Section 4a.3.1 (SMLC) This section was updated according to RAN & GERAN LCS release 4 specifications and architecture. (TS 25.305 & TS43.059)
Section 4a3.3 (LMU) changes reflect current GERAN/RAN LCS specifications & |
|---|---|

architecture. UTRAN LCS utilizes an associated LMU and a stand-alone LMU.

Section 5.2.1 Confirguration of LCS architecture diagram updated to reflect GERAN LCS entities. The Le interface is not standardized in Rel-4.

Section 5.2.2 Confirguration of LCS architecture diagram updated to reflect UTRAN LCS entities. The Le interface is not standardized in Rel-4.

Section 6.1.1 to 6.3.2: Editorial update of specification references

Section 6.4.1.8 Editorial
Section 6.4.1.9 Editorial
Section 6a.3.1 Aligned all MAP LCS interfaces under one section heading as in 23.271. (Lg, Lh, and Lc (which was not included in this section))
Section 6a.3.2 Removed – Ls interface not supported in Release 4 and onward.
Section 6a.3.3 Removed – Ls interface not supported in Release 4 and onward.
Section 6a.3.4 Move Lh i/f reference under section 6a.3.1
Duplicate Section 6a.3.4 should be Section 6a.3.5 Updated based on GERAN LCS specifications (UTRAN does not use Lb interface only integrated SMLC in Release 4)
Section 6a.3.6 Updated based on UTRAN & GERAN LCS specifications
Section 6a.3.7 Editorial
Section 6a.3.8 Defined Uu interface for Stand-Alone LMU and UE, positioning entities associated with the SRNC. (LCS for over the UTRAN air interface)

Consequences if not approved:	⌘	23.002 will have incorrect references and will not be aligned with current LCS architecture.

Clauses affected:	⌘	2, 4.1.2.2, 4a.3, 4a.3.1, 4a3.3, 5.2.1, 5.2.2, 6.1.1 – 6.3.2, 6.4.1.8, 6.4.1.9, 6a.3.2, 6a.3.3, 6a.3.4, 6a.3.5 6a.3.6, 6a.3.7, 6a.3.8

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	

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Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

**************** First Modified Section *********************

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1]   GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[1a]   3GPP TR 21.905: "3G Vocabulary".

[2]   3GPP TS 22.016: "Digital cellular telecommunications system (Phase 2+); International Mobile station Equipment Identities (IMEI)".

[2a]   3GPP TS 22.060: "Digital cellular telecommunications system (Phase 2+); General Packet radio Service (GPRS); Service Description; Stage 1".

[2b]   3GPP TS 22.071: "Digital cellular telecommunications system (Phase 2+); Location Services (LCS); Service Description; Stage 1".

[2c]   3GPP TS 22.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL); Service description, Stage 1".

[3]   3GPP TS 23.003: "Digital cellular telecommunications system (Phase 2+); Numbering, addressing and identification".

[4]   [void]

[5]   3GPP TS 23.008: "Digital cellular telecommunications system (Phase 2+); Organisation of subscriber data".

[6]   3GPP TS 23.009: "Digital cellular telecommunications system (Phase 2+); Handover procedures".

[7]   3GPP TS 23.012: "Digital cellular telecommunications system (Phase 2+); Location registration procedures".

[8]   3GPP TS 23.041: "Technical realization of Cell Broadcast Service (CBS)".

[9]   (void)

[9a]   3GPP TS 23.060: "~~Digital cellular telecommunication system (Phase 2+);~~ General Packet Radio Service (GPRS); Service Description; Stage 2".

[10]   3GPP TS 23.068: "~~Digital cellular telecommunications system (Phase 2+);~~ Voice Group Call Service (VGCS) stage 2".

[10a]   ~~GSM 03.64: "Digital cellular telecommunication system (Phase 2+);~~ 3GPP 43.064: "Overall Description of the General Packet Radio Service (GPRS) Radio Interface; Stage 2"".

[10b] ~~3GPP TS 23.071: "Digital cellular telecommunications system (Phase 2+); Location Services (LCS); Functional Description; Stage 2".~~ (void)

[10c] TS 23.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 3 - Stage 2".

[11] ITU-T Recommendation Q.1214 (05/1995): "Distributed Functional Plane for Intelligent Network CS-1"

[11a] 3GPP TS 23.101: "General UMTS Architecture".

[11b] 3GPP TS 23.110: "Access Stratum (AS): Services and Functions".

[12] GSM 04.02 R98: "Digital cellular telecommunications system (Phase 2+); GSM Public Land Mobile Network (PLMN) access reference configuration".

[13] ~~GSM 08.01~~3GPP TS 48.001: "~~Digital cellular telecommunications system (Phase 2+);~~ Base Station System - Mobile-services Switching Centre (BSS - MSC) interface General aspects".

[14] ~~GSM 08.02~~3GPP TS 48.002: "~~Digital cellular telecommunications system (Phase 2+);~~ Base Station System - Mobile-services Switching Centre (BSS - MSC) interface Interface principles".

[14a] 3GPP TS 25.410: "UTRAN Iu Interface: General Aspects and Principles".

[14b] 3GPP TS 25.41x-series on definition of the Iu interface.

[15] ~~GSM 08.04~~3GPP TS 48.004: "Digital cellular telecommunications system (Phase 1); Base Station System - Mobile-services Switching Centre (BSS - MSC) interface Layer 1 specification".

[16] ~~GSM 08.06~~3GPP TS 48.006: "~~Digital cellular telecommunications system (Phase 2+);~~ Signalling transport mechanism specification for the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[17] ~~GSM 08.08~~3GPP TS 48.008: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile Switching Centre - Base Station System (MSC - BSS) interface - Layer 3 specification".

[18] 3GPP TS 28.020: "~~Digital cellular telecommunications system (Phase 2+);~~ Rate adaptation on the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[19] ~~GSM 08.51~~3GPP TS 48.051: "~~Digital cellular telecommunications system (Phase 2+);~~ Base Station Controller - Base Transceiver Station (BSC - BTS) interface - General aspects".

[20] ~~GSM 08.52~~3GPP TS 48.052: "~~Digital cellular telecommunications system (Phase 2+);~~ Base Station Controller - Base Transceiver Station (BSC - BTS) interface - Interface principles".

[21] ~~GSM 08.54~~3GPP TS 48.054: "~~Digital cellular telecommunications system (Phase 2+);~~ Base Station Controller (BSC) to Base Transceiver Station (BTS) interface - Layer 1 structure of physical circuits".

[22] ~~GSM 08.56~~3GPP TS 48.056: "~~Digital cellular telecommunications system (Phase 2+);~~ Base Station Controller (BSC) to Base Transceiver Station (BTS) - Layer 2 specification".

[23] ~~GSM 08.58~~3GPP TS 48.058: "~~Digital cellular telecommunications system (Phase 2+);~~ Base Station Controller (BSC) to Base Transceiver Station (BTS) interface - Layer 3 specification".

[24] ~~GSM 08.60~~3GPP TS 48.060: "~~Digital cellular telecommunications system (Phase 2+);~~ Inband control of remote transcoders and rate adaptors".

[25] ~~GSM 08.61~~3GPP TS 48.061: "~~Digital cellular telecommunications system (Phase 2+);~~ Inband control of remote transcoders and rate adaptors (half rate)".

[26] 3GPP TS 29.002: "~~Digital cellular telecommunications system (Phase 2+);~~ Mobile Application Part (MAP) specification".

[27]	GSM 09.03 R98: "Digital cellular telecommunications system (Phase 2+); Signalling requirements on interworking between the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN) and the Public Land Mobile Network (PLMN)".

[28]	3GPP TS 29.004: "Digital cellular telecommunications system (Phase 2+); Interworking between the Public Land Mobile Network (PLMN) and the Circuit Switched Public Data Network (CSPDN)".

[29]	3GPP TS 29.005: "Digital cellular telecommunications system (Phase 2+); Interworking between the Public Land Mobile Network (PLMN) and the Packet Switched Public Data Network (PSPDN) for Packet Assembly/Disassembly facility (PAD) access".

[30]	3GPP TS 29.006: "Digital cellular telecommunications system (Phase 2+); Interworking between a Public Land Mobile Network (PLMN) and a Packet Switched Public Data Network/Integrated Services Digital Network (PSPDN/ISDN) for the support of packet switched data transmission services".

[31]	3GPP TS 29.007: "Digital cellular telecommunications system (Phase 2+); General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".

[32]	3GPP TS 29.010: "Digital cellular telecommunications system (Phase 2+); Information element mapping between Mobile Station - Base Station System and BSS - Mobile-services Switching Centre (MS - BSS - MSC) - Signalling procedures and the Mobile Application Part (MAP)".

[33]	3GPP TS 29.011: "Digital cellular telecommunications system (Phase 2+); Signalling interworking for supplementary services".

[34]	3GPP TR 41.001: "GSM Release specifications".

[35]	3GPP TS 43.051: "GERAN Overall Description, Stage 2".

[36]	3GPP TS 43.059: "Functional Stage 2 Description of Location Services in GERAN"

[37]	3GPP TS 25.305: "Functional Stage 2 Description of UE Positioning in UTRAN"

[38]	3GPP TS 23.271: "Functional Stage 2 Description of Location Services".

[39]	3GPP TS 43.068: " Voice Group Call Service (VGCS); Stage 2."

[40]	3GPP TS 43.069: "Voice Broadcast service (VBS); Stage 2."

[41]	3GPP TS 49.031 : "Location Services (LCS);Base Station System Application Part LCS Extension (BSSAP-LE) "

[42]	3GPP TS 44.071 : "Location Services (LCS); Mobile radio interface layer 3 Location Services (LCS) specification"

[43]	3GPP TS 48.031: "Location Services (LCS); Serving Mobile Location Centre - Serving Mobile Location Centre (SMLC - SMLC); SMLCPP specification"

[44]	3GPP TS 48.014: General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN) interface; Gb interface Layer 1

[45]	3GPP TS 48.016: General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN) Interface; Network Service

[46]	3GPP TS 48.018: General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN); BSS GPRS Protocol

**************** Next Modified Section ********************

4.1.2.2   The Gateway MSC (GMSC)

If a network delivering a call to the PLMN cannot interrogate the HLR, the call is routed to an MSC. This MSC will interrogate the appropriate HLR and then route the call to the MSC where the mobile station is located. The MSC which performs the routing function to the actual location of the MS is called the Gateway MSC (GMSC).

The acceptance of an interrogation to an HLR is the decision of the operator.

The choice of which MSCs can act as Gateway MSCs is for the operator to decide (i.e. all MSCs or some designated MSCs).

If the call is a voice group/broadcast call, it is routed directly from the GMSC to the VBS/VGCS Anchor MSC, based on information (VBS/VGCS call reference) contained in the dialled number. See also GSM 03.68 and 03.693GPP TS 43.068 [39] and 43.069[40].

When needed, the GMSC can be implemented in two different entities: the GMSC Server, handling only signalling, as defined bellow, and the CS-MGW, defined above. A GMSC Server and a CS-MGW make up the full functionality of a GMSC.

**************** Next Modified Section ********************

4a.3 The Location Services (LCS) entities

For further details on LCS in GSM, see GSM 03.71.

For further details on LCS in UMTS from system and core network point view, see 3GPP TS 23.17123.271[38].

For further details on LCS in UTRAN, see 3GPP TS 25.305.[37].

For further details on LCS in GERAN, see 3GPP TS 43.059 [36].

4a.3.1 Serving Mobile Location Center (SMLC)

In GSM, theThe Serving Mobile Location Center (SMLC) node is responsible for managing the overall co-ordination and scheduling of resources required to perform positioning of a mobile, and calculating the final location estimate and accuracy. There may be more than one SMLC in a PLMN.

In UMTSUTRAN, the SMLC functionality is integrated in SRNC.

In GERAN GSM, two types of SMLC are possible:

The SMLC functionality is integrated in the BSC, or NSS based SMLC: supports the Ls interface;

BSS based SMLC: A stand-alone SMLC that supports the Lb interface.

An NSS based SMLC supports positioning of a target MS via signaling on the Ls interface to the visited MSC. A BSSA GERAN based SMLC supports positioning via signaling on the Lb interface to the BSC serving the target MS. Both types of The GERAN SMLC may support the Lp interface to enable access to information and resources owned by another SMLC.

For UTRAN, tThe SMLC/SRNC controls a number of LMUs for the purpose of obtaining radio interface measurements to locate or help locate MS subscribers in the area that it serves. The SMLC/SRNC is administered with the capabilities and types of measurement produced by each of its LMUs.

In GERANSM, signaling between an NSS based SMLC and LMU is transferred via the MSC serving the LMU using the Ls interface and either the Um interface for a Type A LMU or the Abis interface for a Type B LMU Ssignaling between a BSS based SMLC and LMU is transferred via the BSC that serves or controls the LMU using the Lb interface and either the Um interface for a Type A LMU or the Abis interface for a Type B LMU.

In GERANGSM, for Location Services, when a Cell Broadcast Center (CBC) is associated with a BSC, the SMLC may interface to a CBC in order to broadcast assistance data using existing cell broadcast capabilities. The SMLC shall behave as a user, Cell Broadcast Entity, to the CBC [8].

For In UTRANMTS, for Location Services, the SRNC generates LCS assistance data. Broadcasting, encryption and charging of LCS assistance data. in UMTS is for further study and will be specified in later releases.

4a.3.2 Gateway Mobile Location Center (GMLC)

The Gateway Mobile Location Center (GMLC) is the first node an external Location Application accesses in the GSM PLMN. The GMLC performs registration authorization and requests routing information from the HLR. There may be more than one GMLC in a PLMN.

4a.3.3 Location Measurement Unit (LMU)

An LMU makes radio measurements to support one or more positioning methods.

In GERAN, twoTwo types of LMU are defined:

- **Type A LMU**: accessed over the normal GSM air interface (Um interface);

- **Type B LMU**:　accessed over the base station to controller interface (Abis interface in GSM ~~and Iub in UMTS~~).

A type A LMU is accessed exclusively over the GSM air interface (Um interface): there is no wired connection to any other network element. ~~In GSM, a~~ A type A LMU has a serving BTS and BSC that provide signaling access to a controlling SMLC. ~~With an NSS based SMLC, a type A LMU also has a serving MSC and VLR and a subscription profile in an HLR. A t~~Type A LMU always has a unique IMSI and supports all radio resource and mobility management functions of the GSM air interface (Um interface) that are necessary to support signaling using an SDCCH to the SMLC. A type A LMU supports those connection management functions necessary to support LCS signaling transactions with the SMLC and may support certain call control functions of to support signaling to an SMLC using a circuit switched data connection.

~~In UMTS, a type A LMU has signaling access to the SRNC. Type A LMU is not supported in UMTS release 1999.~~

~~In GSM, a~~ A Type B LMU is accessed over the Abis interface from a BSC. The LMU may be either a standalone network element addressed using some pseudo-cell ID or connected to or integrated in a BTS. Signaling to a Type B LMU is by means of messages routed through the controlling BSC ~~for a BSS based SMLC~~. See also 3GPP TS 43.059[36]. ~~or messages routed through a controlling BSC and MSC for an NSS based SMLC.~~

~~In UMTS, a Type B LMU is accessed over the Iub interface from an RNC. The LMU may be either a standalone network element addressed using some pseudo-cell ID or connected to or integrated in a Node B.~~

For UTRAN, an LMU makes radio measurements to support one or more positioning methods. These measurements fall into one of two categories:

(a) positioning measurements specific to one UE and used to compute its position;

(b) assistance measurements applicable to all UEs in a certain geographic area.

There are two classes of LMU:

- **Stand-Alone LMU:** communicates with RNCs via the Uu interface;

- **Associated LMU:** communicates with RNCs via the Iub interface. The associated LMU signalling protocol is the NBAP. The protocol for stand-alone LMU UTRAN signalling will be the RRC protocol.

A stand-alone LMU is accessed exclusively over the UTRAN air interface (Uu interface). There is no other connection from the stand-alone LMU to any other UTRAN network element.

An associated LMU is accessed over the Iub interface from an RNC. An associated LMU may make use of the radio apparatus and antennas of its associated Node B. The LMU may be either a logically separate network element addressed using some pseudo-cell ID, or connected to or integrated in a Node B. Signalling to an associated LMU is by means of messages routed through the controlling Node B. An associated LMU may be separated from the Node B, but still communicate with the Controlling RNC via the Node B Iub interface. The interface between the associated LMU and its Node B is not defined in Stage 2 functional specification of User Equipment (UE) positioning in UTRAN. See 3GPP TS 25.305 [37].

5.2   Configuration of LCS entities

5.2.1   Configuration of LCS entities in GERANSM

The configuration of LCS entities for GERANSM are is presented in figure 2. In the figure, all the functions are considered implemented in different logical nodes. If two logical nodes are implemented in the same physical equipment, the relevant interfaces may become internal to that equipment.
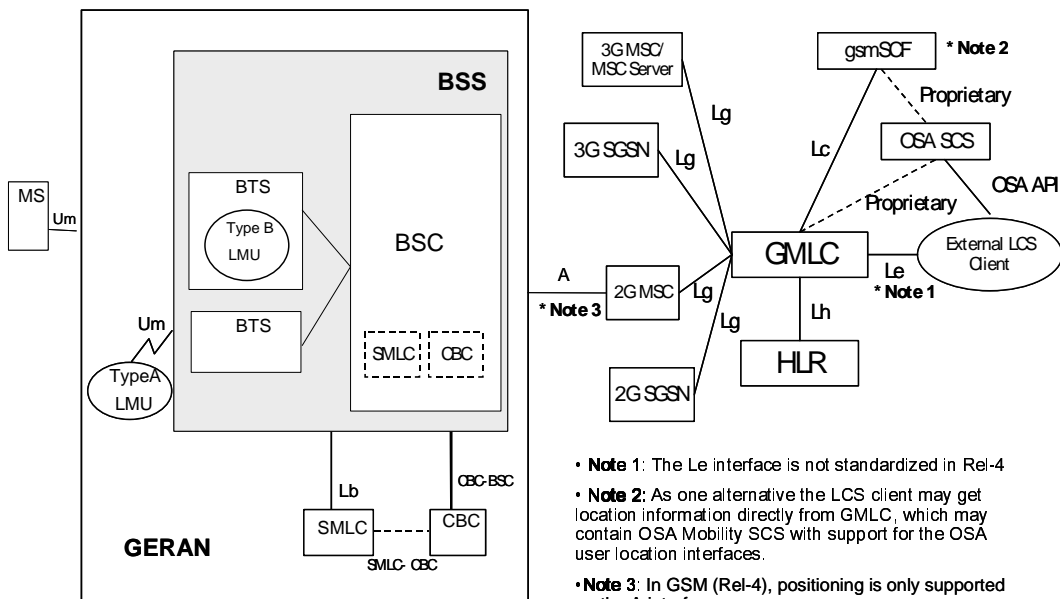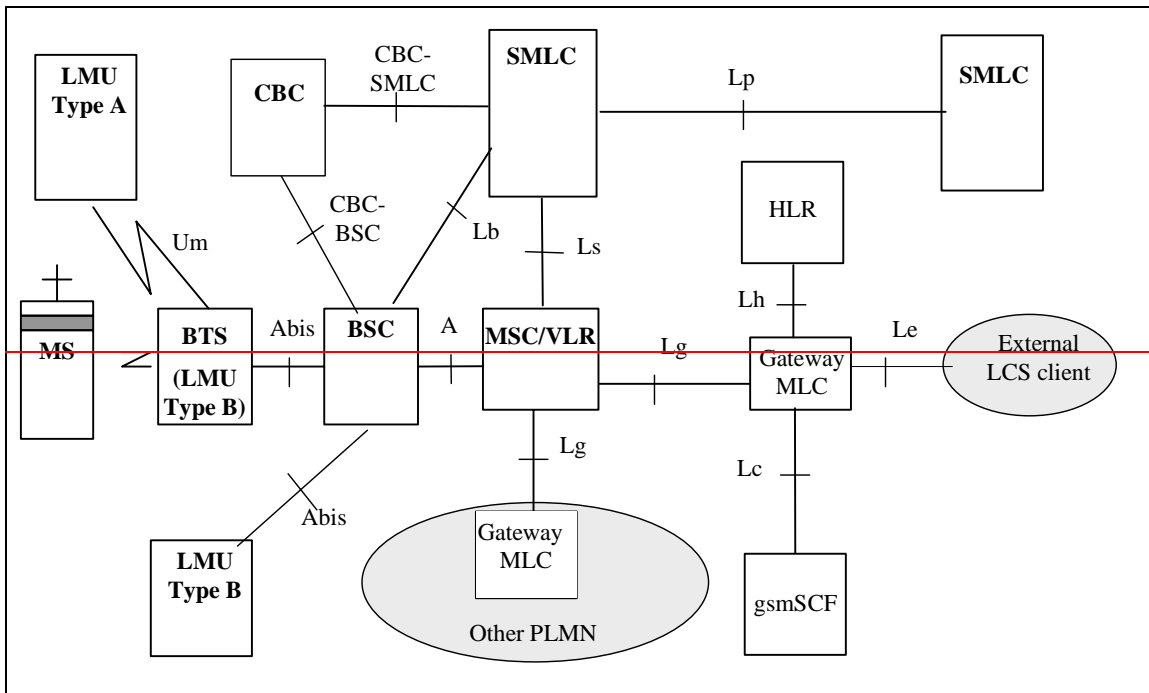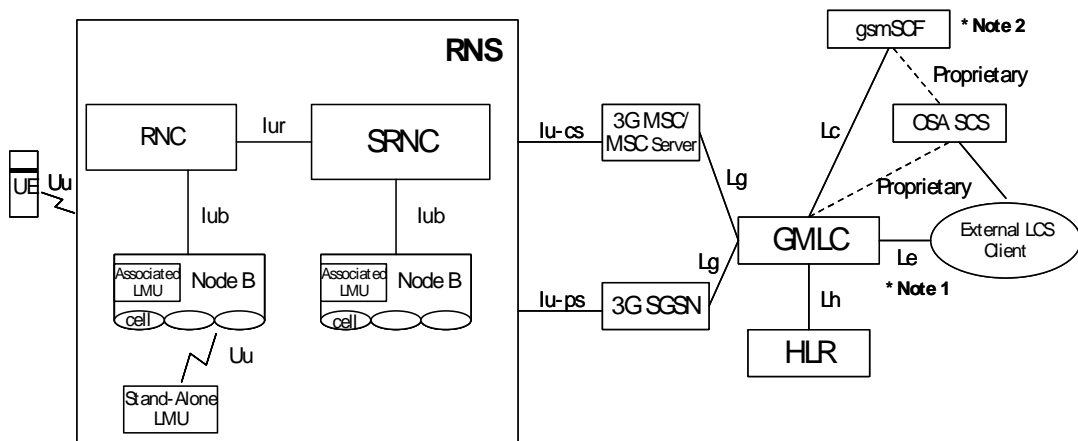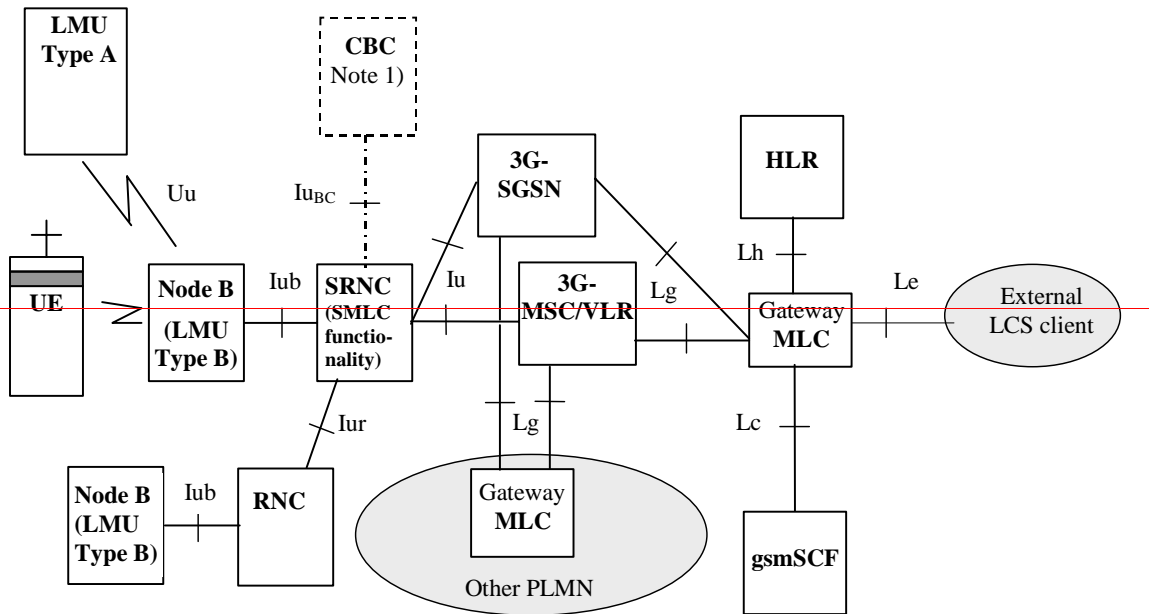

- **Note** 1: The Le interface is not standardized in Rel-4
- **Note** 2: As one alternative the LCS client may get location information directly from GMLC, which may contain OSA Mobility SCS with support for the OSA user location interfaces.
- **Note** 3: In GSM (Rel-4), positioning is only supported on the A interface

Figure 2: Configuration of LCS entities in ~~a GSM PLMN~~GERAN

5.2.2 Configuration of LCS entities in U TRAN ~~MTS~~

The basic configuration of U TRAN~~MTS~~ LCS is presented in figure 3. The~~re is no SMLC entity in this figure because the~~ SMLC functionality of UTRAN is integrated in SRNC.

~~NOTE: The usage of CBC for LCS assistance data in UMTS is for further study. The assistance data is generated in SRNC.~~

- **Note 1:** The Le interface is not standardized in Rel-4.
- **Note 2:** As one alternative the LCS client may get location information directly from GMLC, which may contain OSA Mobility SCS with support for the OSA user location interfaces.

Figure 3: Configuration of a LCS entities in ~~a UMTS PLMN~~UTRAN

**************** Next Modified Section *********************

6.1.1   Interface between Mobile Station and Base Station System (Um-interface)

The interface between the MS and the BSS is specified in the 44- 04- and 05- 45-series of GSM 3GPP Technical Specifications.

6.1.2   Interface between Mobile Station and Radio Network System (Uu-interface)

The interface between the MS and the RNS is specified in the 24- and 25-series of UMTS 3GPP Technical Specifications.

6.2   Interface between the Core Network and the Access Network

6.2.1   Interfaces between the CS domain and the Access Network

6.2.1.1   Interface between the MSC and Base Station System (A-interface)

The interface between the MSC and its BSS is specified in the 0848-series of GSM 3GPP Technical Specifications.

The BSS-MSC interface is used to carry information concerning:

-    BSS management;

-    call handling;

-    mobility management.

6.2.1.2   Interface between the MSC and RNS (Iu_CSIu-cs interface)

The interface between the MSC and its RNS is specified in the 25.41x-series of UMTS 3GPP Technical Specifications.

The RNS-MSC interface is used to carry information concerning:

-    RNS management;

-    call handling;

-    mobility management.

6.2.2   Interfaces between the PS domain and the Access Network

6.2.2.1   Interface between SGSN and BSS (Gb-interface)

The BSS-SGSN interface is used to carry information concerning:

-    packet data transmission;

-    mobility management.

The Gb interface is defined in GSM 3GPP TS 048.014[44], 048.016[45] and 048.018[46].

6.2.2.2 Interface between SGSN and RNS (Iu-PSIu-ps-interface)

The RNS-SGSN interface is used to carry information concerning:

- packet data transmission;

- mobility management.

The Iu-PSIu-ps interface is defined in the 25.41x-series of UMTS 3GPP Technical Specifications.

6.3 Interfaces internal to the Access Network

6.3.1 Interface between BSC and BTS (Abis-interface)

When the BSS consists of a Base Station Controller (BSC) and one or more Base Transceiver Stations (BTS), this interface is used between the BSC and BTS to support the services offered to the GSM users and subscribers.

The interface also allows control of the radio equipment and radio frequency allocation in the BTS.

The interface is specified in the 048.05x-series of GSM 3GPP Technical Specifications.

6.3.2 Interface between RNC and Node B (Iub-interface)

When the RNS consists of a Radio Network Controller (RNC) and one or more Node B, this interface is used between the RNC and Node B to support the services offered to the UMTS UTRAN users and subscribers.

The interface also allows control of the radio equipment and radio frequency allocation in the Node B.

The interface is specified in the 28.5x25.43x series of UMTS 3GPP Technical Specifications.

*************** Next Modified Section *********************

6.4.1.8 Reference Point MSC Server – GMSC Server (Nc Reference Point)

Over the Nc reference point, the Network-Network based call control is performed. Examples of this are ISUP or an evolvement of ISUP for bearer independent call control (BICC). In the R'00 architecture dDifferent options for signalling transport on Nc shall be possible including IP.

6.4.1.9 Reference Point CS-MGW – CS-MGW (Nb Reference Point)

Over the Nb reference point the bearer control and transport are performed. The transport may be RTP/UDP/IP or AAL2 for transport of user data. In the R00 architecture dDifferent options for user data transport and bearer control shall be possible on Nb, for example: AAL2/Q.AAL2, STM/none, RTP/H.245.

**************** Next Modified Section *********************

6a.3 LCS-specific interfaces

6a.3.1 MAP Interfaces

The following interfaces are based on MAP in LCS.

- **Lh interface:** interface between GMLC and HLR. This interface is used by the GMLC to request the address of the visited MSC or SGSN for a particular target UE whose location has been requested. (see TS 29.002 [26]).

- **Lg interface:** interface between GMLC - MSC and GMLC - SGSN. This interface is used by the GMLC to convey a location request to the MSC or SGSN currently serving a particular target UE whose location was requested. The interface is used by the MSC or SGSN to return location results to the GMLC. (see TS 29.002 [26]).

- **Lc interface:** between GMLC and gsmSCF, CAMEL. This interface is used to get location information for CAMEL based services. (see TS 29.002 [26]).

~~Interface between MSC and GMLC (Lg-interface)~~

~~The MSC - GMLC interface is used to exchange data needed by the MSC to perform subscriber authorization and allocate network resources. The GMLC provides the IMSI and requested Quality of Service information.~~

~~Signalling on this interface uses the Mobile Application Part (MAP), which in turn uses the services of Transaction Capabilities (TCAP) (see TS 29.002 [26]).~~

6a.3.2 (Void) ~~Interface between MSC and SMLC (Ls-interface)~~

~~The MSC -SMLC interface is used to exchange data needed by the SMLC to select a positioning method and compute a location estimate. The MSC provides the MS's location capabilities and requested Quality of Service information.~~

~~Signalling on this interface uses the Mobile Application Part (MAP), which in turn uses the services of Transaction Capabilities (TCAP). See TS 29.002.~~

6a.3.3 (Void) ~~Interface between SMLC and MSC/VLR (Ls-interface)~~

~~In GSM, an NSS based SMLC supports positioning of a target MS via signaling on the Ls interface to the visited MSC.~~

~~Signalling on this interface uses BSSAP-LE, which is specified in GSM 09.31.~~

~~In UMTS, the Ls interface is not standardized, because the SMLC functionality is included in SRNC~~(Void).

6a.3.4 (Void) ~~Interface between GMLC and HLR (Lh-interface)~~

~~This interface is used by the GMLC to retrieve the VMSC location and IMSI for a particular mobile.~~

~~Signalling on this interface uses the Mobile Application Part (MAP), which in turn uses the services of Transaction Capabilities (TCAP). See TS 29.002.~~

6a.3.54 Interface between BSC and SMLC (Lb-interface)

~~In GSM, a BSS based~~ SMLC supports positioning via signaling on the Lb interface to the BSC serving the target MS.

Signalling on this interface uses BSSAP-LE, which is specified in ~~GSM~~ TS 049.031 [41].

~~In UMTS, the Lb interface is not standardized, because the SMLC functionality is included in SRNC.~~

6a.3.6　Interface between Peer SMLCs (Lp-interface)

In GSMGERAN, both NSS and BSS-based a SMLCs may support the Lp interface to enable access to information and resources owned by another SMLC.

Signalling on this interface uses BSSAPP-LE, which is defined in GSMTS 049.031[41], and SMLCPP, which is specified in GSMTS 048.031[43].

In UMTSUTRAN, the SMLC functionality is included in SRNC and the Iur interface shall include the Lp interface type of functionality.

6a.3.7　Interface between BTS and LMU (Um-interface)

The Um/Uu interface specific to LCS is defined in 2TS 44.071[42].

6a.3.8　Inteface between SRNC, Stand-Alone LMU, and UE (Uu-interface)

The Uu interface is used to communicate among the UE Positioning entities associated with the SRNC, the UEs and the stand-alone LMU. The Uu interface may pass measurement requests and results to and from the UE or the stand-alone LMU. UE Positioning operations at the Uu interface are generally defined in the 24- and 25-series of 3GPP Technical Specifications.

CR-Form-v7

CHANGE REQUEST

⌘ **23.002** CR **100** ⌘ rev **3** ⌘ Current version: **5.7.0** ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network **X**

Title: ⌘	Align LCS architecture based on impacts from Radio Access Networks (RAN & GERAN)
Source: ⌘	Nokia
Work item code: ⌘ LCS	***Date:*** ⌘ 08.08.2002
Category: ⌘ **F**	***Release:*** ⌘ Rel-5

Use *one* of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use *one* of the following releases:
2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*

Reason for change: ⌘	Architectural changes occurred from Release 99 and onwards, updates to 23.002 are needed to align this specification properly with current LCS specifications based on changes in the Radio Acess Networks, GERAN & RAN.

In GERAN, an NSS-based SMLC is no longer supported from Release 4 and onwards.

In UTRAN, in Release 4 the SMLC is integrated in the SRNC, and in Release 5, the introduction of a SAS (Stand-Alone SMLC) is added. Updates made to reflect this change. |
| ***Summary of change:*** ⌘ | Section 2: Removed "Digital cellular telecommunications system (Phase 2+);" according 3GPP specification drafting rules TS 21.801, section 2.
Added LCS stage 2 references 43.059 (GERAN LCS Stage 2) and 25.453 UTRAN Iupc interface.
Section 4a.3 LCS entities should refer to the GERAN LCS stage 2.
Section 4a.3.1 (SMLC) This section was updated according to RAN & GERAN LCS release 5 specifications and architecture. (TS 25.305 & TS43.059)
Section 4a3.3 (LMU) changes reflect current GERAN/RAN LCS specifications & architecture.

Section 5.2.1 Confirguration of LCS architecture diagram updated to reflect GERAN LCS entities.

Section 5.2.2 Confirguration of LCS architecture diagram updated to reflect UTRAN LCS entities.
Section 6a.3.1 Aligned all MAP LCS interfaces under one section heading as in 23.271. (Lg, Lh, and Lc (which was not included in this section))
Section 6a.3.2 Removed – Ls interface not supported in Release 4 and onward. |

		Section 6a.3.3 Removed – Ls interface not supported in Release 4 and onward. Section 6a.3.4 Move Lh i/f reference under section 6a.3.1 Section 6a.3.5 Updated based on GERAN LCS specifications (UTRAN does not use the Lb interface) Section 6a.3.6 Updated based on UTRAN & GERAN LCS specifications Section 6a.3.9 Defined Uu interface for Stand-Alone LMU and UE, positioning entities associated with the SRNC. (LCS for over the UTRAN air interface) Section 6a.3.10 Added SRNC – SAS Iupc interface definition.
Consequences if not approved:	⌘	23.002 will have incorrect references and will not be aligned with current LCS architecture.

Clauses affected:	⌘	2, 4a.3, 4a.3.1, 4a3.3, 5.2.1, 5.2.2, 6a.3.2, 6a.3.3, 6a.3.5, 6a.3.6, 6a.3.8

		Y	N	
Other specs affected:	⌘		X	Other core specifications ⌘
			X	Test specifications
			X	O&M Specifications

Other comments:	⌘	

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1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1]	[void]

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

[2]	3GPP TS 22.016: " International Mobile station Equipment Identities (IMEI)".

[2a]	3GPP TS 22.060: " General Packet radio Service (GPRS); Service description; Stage 1".

[2b]	3GPP TS 22.071: " Location Services (LCS); Service description; Stage 1".

[2c]	3GPP TS 22.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL); Service description, Stage 1".

[3]	3GPP TS 23.003: " Numbering, addressing and identification".

[4]	[void]

[5]	3GPP TS 23.008: " Organization of subscriber data".

[6]	3GPP TS 23.009: " Handover procedures".

[7]	3GPP TS 23.012: " Location Management Procedures".

[8]	3GPP TS 23.041: "Technical realization of Cell Broadcast Service (CBS)".

[9]	[void]

[9a]	3GPP TS 23.060: " General Packet Radio Service (GPRS); Service description; Stage 2".

[10]	[void]

[10a]	3GPP TS 43.064: "Digital cellular telecommunication system (Phase 2+); General Packet Radio service (GPRS); Overall description of the GPRS radio interface; Stage 2".

[10b]	3GPP TS 25.305: "Stage 2 Functional Specification of UE Positioning in UTRAN"

[10c]	3GPP TS 23.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 3 - Stage 2".

[11]	ITU-T Recommendation Q.1214 (05/1995): "Distributed Functional Plane for Intelligent Network CS-1"

[11a]	3GPP TS 23.101: "General UMTS Architecture".

[11b]	3GPP TS 23.110: "UMTS Access Stratum); Services and Functions".

[12]   3GPP TS 24.002: " GSM - UMTS Public Land Mobile Network (PLMN) access reference configuration".

[13]   3GPP TS 48.001: " Base Station System - Mobile-services Switching Centre (BSS - MSC) interface; General aspects".

[14]   3GPP TS 48.002: " Base Station System - Mobile-services Switching Centre (BSS - MSC) interface; Interface principles".

[14a]   3GPP TS 25.410: "UTRAN Iu Interface: general aspects and principles".

[15]   3GPP TS 48.004: " Base Station System - Mobile-services Switching Centre (BSS - MSC) interface Layer 1 specification".

[16]   3GPP TS 48.006: " Signalling transport mechanism specification for the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[17]   3GPP TS 48.008: " Mobile-services Switching Centre - Base Station System (MSC - BSS) interface; Layer 3 specification".

[18]   [void]

[19]   3GPP TS 48.051: " Base Station Controller - Base Transceiver Station (BSC - BTS) interface; General aspects".

[20]   3GPP TS 48.052: " Base Station Controller - Base Transceiver Station (BSC - BTS) interface; Interface principles".

[21]   3GPP TS 48.054: " Base Station Controller - Base Transceiver Station (BSC - BTS) interface; Layer 1 structure of physical circuits".

[22]   3GPP TS 48.056: " Base Station Controller - Base Transceiver Station (BSC - BTS) interface; Layer 2 specification".

[23]   3GPP TS 48.058: " Base Station Controller - Base Transceiver Station (BSC - BTS) interface; Layer 3 specification".

[24]   3GPP TS 48.060: " In-band control of remote transcoders and rate adaptors for full rate traffic channels".

[25]   3GPP TS 48.061: " In-band control of remote transcoders and rate adaptors for half rate traffic channels".

[26]   3GPP TS 29.002: " Mobile Application Part (MAP) specification".

[27]   [void]

[28]   [void]

[29]   [void]

[30]   [void]

[31]   3GPP TS 29.007: " General requirements on interworking between the Public Land Mobile Network (PLMN) and the Integrated Services Digital Network (ISDN) or Public Switched Telephone Network (PSTN)".

[32]   3GPP TS 29.010: " Information element mapping between Mobile Station - Base Station System (MS – BSS) and Base Station System - Mobile-services Switching Centre (BSS - MSC); Signalling procedures and the Mobile Application Part (MAP)".

[33]   3GPP TS 29.011: " Signalling interworking for supplementary services".

[34]   3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[35]   3GPP TR 41.103: "GSM Release 5 specifications".

[36]   3GPP TR 43.051: "Technical Specification Group GSM/EDGE Radio Access Network; Overall description, Stage 2".

[37]   3GPP TS 23.226: "Global Text Telephony (GTT); Stage 2."

[38]   3GPP TS 26.226: "Cellular Text Telephone Modem; General Description"

[39]   3GPP TS 23.016:"Subscriber data management; Stage 2"

[40]   3GPP TS 23.066: "Support of Mobile Number Portability (MNP); Technical realization; Stage 2"

[41]   3GPP TS 43.068: "Voice Group Call Service (VGCS); Stage 2"

[42]   3GPP TS 43.069: "Voice Broadcast Service (VBS); Stage 2"

[43]   3GPP TS 23.205: "Bearer independent circuit switched core network; Stage 2"

[44]   3GPP TS 48.014: "Base Station System (BSS) – Serving GPRS Support Node (SGSN) interface; Gb interface Layer 1"

[45]   3GPP TS 48.016: "Base Station System (BSS) – Serving GPRS Support Node (SGSN) interface; N   etwork service"

[46]   3GPP TS 48.018: "Base Station System (BSS) – Serving GPRS Support Node (SGSN); BSS GPRS Protocol (BSSGP)"

[47]   3GPP TS 48.031: "Serving Mobile Location Centre – Serving Mobile Location Centre (SMLC – SMLC); SMLCPP specification"

[48]   3GPP TS 29.016: "Serving GPRS Support Node (SGSN) – Visitor Location Register (VLR); Gs interface network service specification"

[49]   3GPP TS 29.018: "Serving GPRS Support Node (SGSN) – Visitor Location Register (VLR); Gs interface Layer 3 specification"

[50]   3GPP TS 49.031: "Network Location Services (LCS); Base Station System Application Part LCS extension (BSSAP-LE)

[51]   3GPP TS 29.060: "GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface"

[52]   ITU-T Recommendation H.248: "Gateway Control Protocol"

[53]   ITU-T Recommendation E.164: "The International public telecommunication numbering plan"

[54]   ITU-T Recommendation H.323: "Packet-based multimedia communications systems "

[55]   3GPP TS 44.071: " Mobile radio interface layer 3 Location Services (LCS) specification "

[56]   3GPP TS 23.271: "Functional stage 2 description of LCS"

[57]   ITU-T Recommendation I.363-2 :"B-ISDN ATM Adaptation Layer (AAL) type 2 specification"

[58]   ITU-T Recommendation H.245: "Control protocol for multimedia communication"

[59]   IETF RFC768:"User Datagram Protocol"

[60]   IETF RFC1889: "RTP: A Transport Protocol for Real-Time Applications"

[61]   IETF RFC2543: "SIP: Session Initiation Protocol"

[62]   LIF TS 101 "Mobile Location Protocol Specification"(Location Interoperability Forum 2001) [Available at http://www.locationforum.org/public_document_area.htm]

[63]   3GPP TS29.198: "Open Service Access (OSA) Application Programming Interface (API)"

[64]   3GPP TS 33.210: "3G Security; Network Domain Security; IP network layer security"

[65]   3GPP TS 23.236: " Intra Domain Connection of RAN Nodes to Multiple CN Nodes".

[66]　　　　3GPP TS 43.059: "Functional Stage 2 Description of Location Services in GERAN"

[67]　　　　3GPP TS 25.453: "UTRAN Iupc interface PCAP signalling"

**************** Next Modified Section ********************

4a.3　The Location Services (LCS) entities

For further details on LCS in UMTSTRAN and GSM GERAN from system and core network point view, see TS 23.271 [56].
For further details on LCS in UTRAN, see TS 25.305 [10b].
For further details on LCS in GERAN, see TS 43.059 [66].

4a.3.1　Serving Mobile Location Center (SMLC)

In GSM, tThe Serving Mobile Location Center (SMLC) node is responsible for managing the overall co-ordination and scheduling of resources required to perform positioning of a mobile, and calculating the final location estimate and accuracy. There may be more than one SMLC in a PLMN.
In UMTSUTRAN, the SMLC functionality is integrated in SRNC, or is a stand-alone SMLC that supports the Iu-pc interface, see TS 25.453 [67].
In GERANGSM, two types of SMLC are possible:the SMLC functionality is integrated in the BSC or is a stand-alone SMLC that supports the Lb interface.
NSS based SMLC:　　　　supports the Ls interface;

BSS based SMLC:　　　　supports the Lb interface.

An NSS based SMLC supports positioning of a target MS via signaling on the Ls interface to the visited MSC. A BSS GERANbased SMLC supports positioning via signaling on the Lb interface to the BSC serving the target MS. Both types ofof the SMLC may support the Lp interface to enable access to information and resources owned by another SMLC.

In UTRAN, tThe SMLC/SRNC controls a number of LMUs for the purpose of obtaining radio interface measurements to locate or help locate MS subscribers in the area that it serves. The SMLC/SRNC is administered with the capabilities and types of measurement produced by each of its LMUs.

In GSMGERAN, signaling between an NSS based SMLC and LMU is transferred via the MSC serving the LMU using the Ls interface and either the Um interface for a Type A LMU or the Abis interface for a Type B LMU. Ssignaling between a BSS based SMLC and LMU is transferred via the BSC that serves or controls the LMU using the Lb interface and either the Um interface for a Type A LMU or the Abis interface for a Type B LMU.

In GSMGERAN, for Location Services, when a Cell Broadcast Center (CBC) is associated with a BSC, the SMLC may interface to a CBC in order to broadcast assistance data using existing cell broadcast capabilities. The SMLC shall behave as a user, Cell Broadcast Entity, to the CBC [8].

In UMTSUTRAN, for Location Services the SRNC generates LCS assistance data. Broadcasting, encryption and charging of LCS assistance data in UMTS UTRAN is for further study and will be specified in later releases.

4a.3.2　Gateway Mobile Location Center (GMLC)

The Gateway Mobile Location Center (GMLC) is the first node an external Location Application accesses in the GSMGERAN PLMN. The GMLC performs registration authorization and requests routing information from the HLR. There may be more than one GMLC in a PLMN.

4a.3.3　Location Measurement Unit (LMU)

An LMU makes radio measurements to support one or more positioning methods.
In GERAN, tTwo types of LMU are defined:
-　Type A LMU:　accessed over the normal GSM air interface (Um interface);

-　Type B LMU:　accessed over the base station to controller interface (Abis interface in GSMGERAN and Iub in UMTS).

A type A LMU is accessed exclusively over the GSM air interface (Um interface): there is no wired connection to any other network element.In GSM, a A type A LMU has a serving BTS and BSC that provide signaling access to a controlling SMLC. With an NSS based SMLC, a type A LMU also has a serving MSC and VLR and a subscription profile in an HLR. A The type A LMU always has a unique IMSI and supports all radio resource and mobility management functions of the GSM air interface that are necessary to support signaling using an SDCCH to the SMLC. A type A LMU supports those connection management functions necessary to support LCS signaling transactions with the SMLC and may support certain call control functions of to support signaling to an SMLC using a circuit switched data connection.

In UMTS, a type A LMU has signaling access to the SRNC. Type A LMU is not supported in UMTS release 1999.
In GSM, aA Type B LMU is accessed over the Abis interface from a BSC. The LMU may be either a standalone network element addressed using some pseudo-cell ID or connected to or integrated in a BTS. Signaling to a Type B LMU is by means of messages routed through the controlling BSC. See also 3GPP TS 43.059[66]. for a BSS based SMLC or messages routed through a controlling BSC and MSC for an NSS based SMLC.

In UMTS, a Type B LMU is accessed over the Iub interface from an RNC. The LMU may be either a standalone network element addressed using some pseudo-cell ID or connected to or integrated in a Node B.
For UTRAN, an LMU makes radio measurements to support one or more positioning methods. These measurements fall into one of two categories:

    (a) positioning measurements specific to one UE and used to compute its position;

    (b) assistance measurements applicable to all UEs in a certain geographic area.

There are two classes of LMU:
-    **Stand-Alone LMU:** communicates with RNCs via the Uu interface;

-    **Associated LMU:** communicates with RNCs via the Iub interface. The associated LMU signalling protocol is the NBAP. The protocol for stand-alone LMU UTRAN signalling will be the RRC protocol.

A stand-alone LMU is accessed exclusively over the UTRAN air interface (Uu interface). There is no other connection from the stand-alone LMU to any other UTRAN network element.
An associated LMU is accessed over the Iub interface from an RNC. An associated LMU may make use of the radio apparatus and antennas of its associated Node B. The LMU may be either a logically separate network element addressed using some pseudo-cell ID, or connected to or integrated in a Node B. Signalling to an associated LMU is by means of messages routed through the controlling Node B. An associated LMU may be separated from the Node B, but still communicate with the Controlling RNC via the Node B Iub interface. The interface between the associated LMU and its Node B is not defined in Stage 2 functional specification of User Equipment (UE) positioning in UTRAN. See 3GPP TS 25.305 [10b].

*************** Next Modified Section*****************

5.2   Configuration of LCS entities

5.2.1   Configuration of LCS entities in GSMGERAN

The configuration of LCS entities for GSMGERAN are is presented in figure 2. In the figure, aAll the functions are considered implemented in different logical nodes. If two logical nodes are implemented in the same physical equipment, the relevant interfaces may become internal to that equipment.
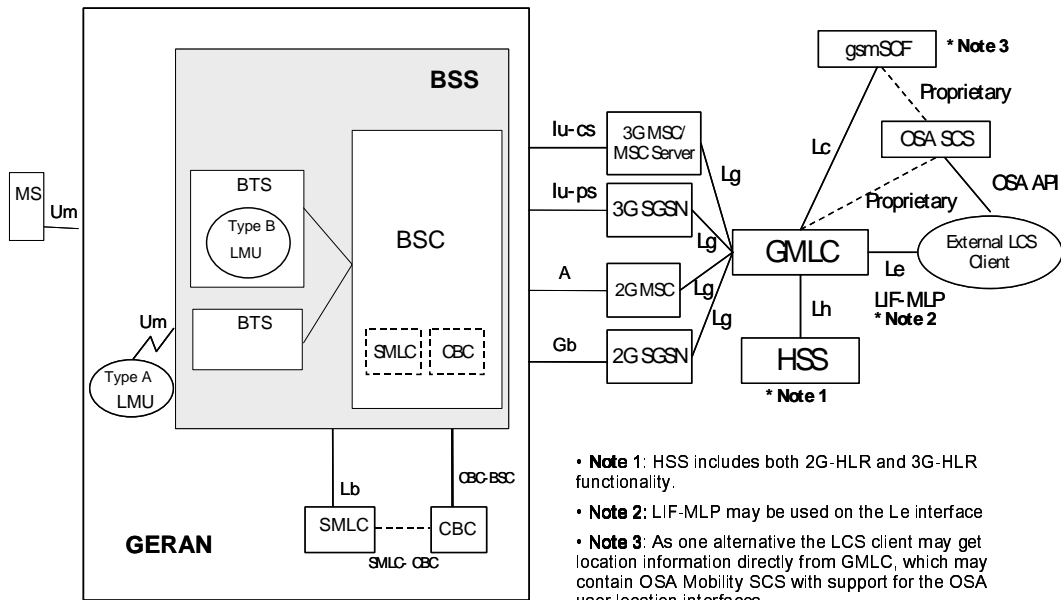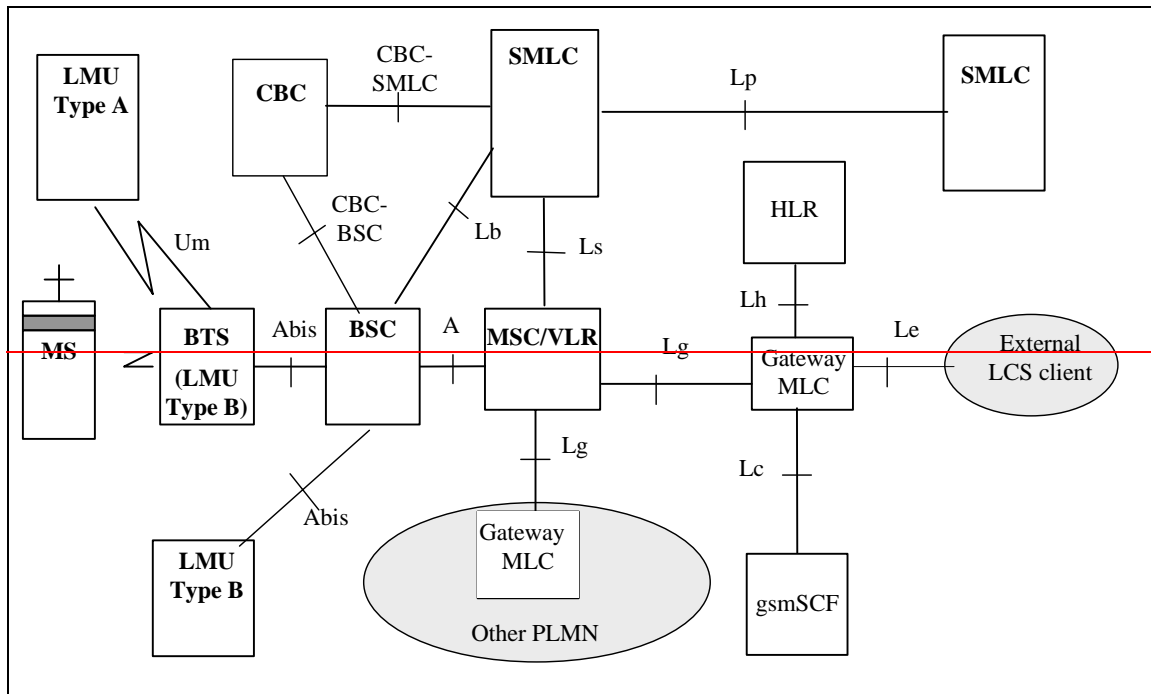
Figure 2: Configuration of LCS entities in a ~~GSM~~GERAN PLMN

5.2.2　Configuration of LCS entities in ~~UMTS~~UTRAN

The basic configuration of ~~UMTS~~UTRAN LCS is presented in figure 3. ~~There is no SMLC entity in this figure because the SMLC functionality of UTRAN is integrated in SRNC.~~

~~NOTE:　The usage of CBC for LCS assistance data in UMTS is for further study. The assistance data is generated in SRNC.~~
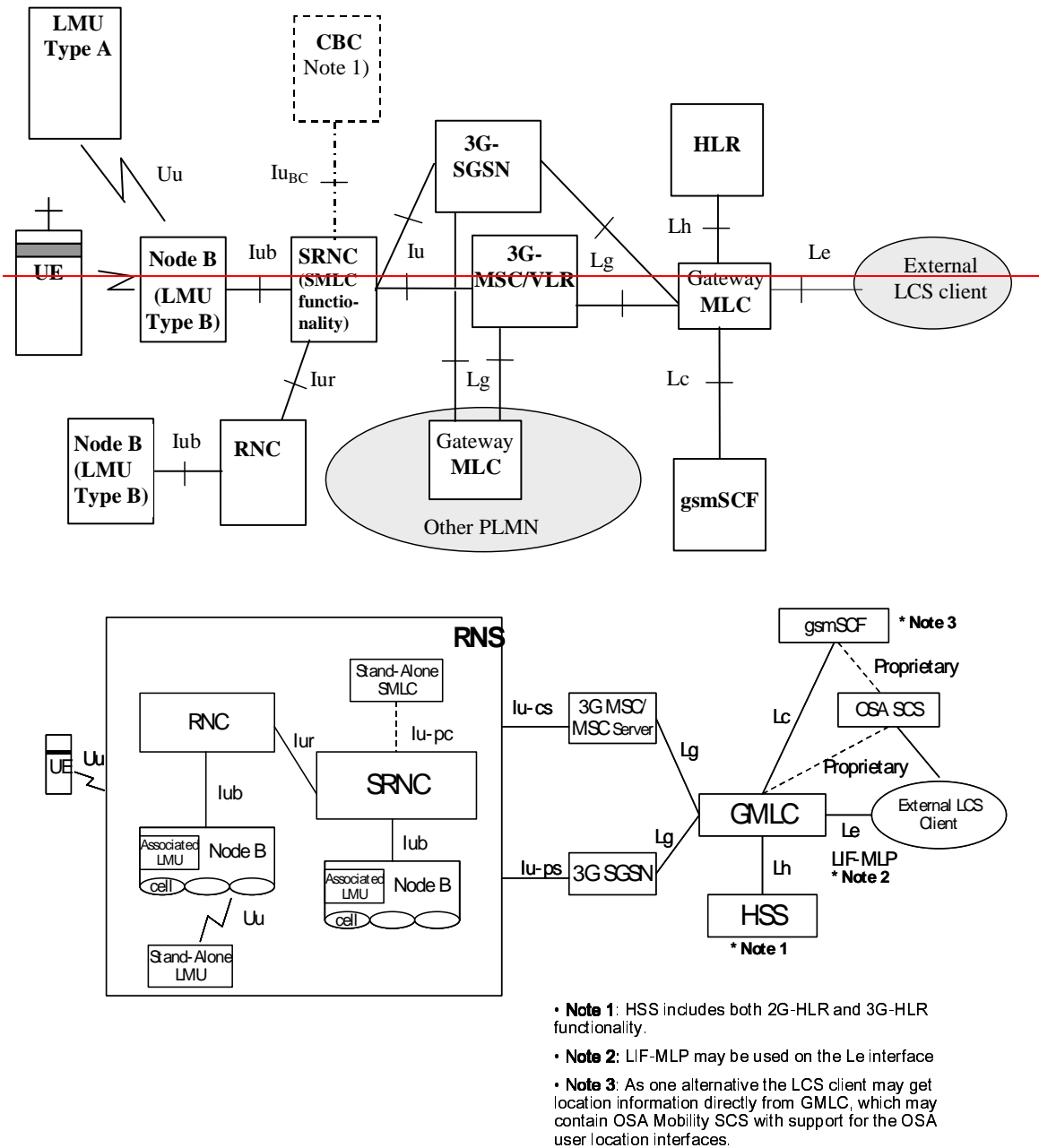
Figure 3: Configuration of a LCS entities in a ~~UMTS~~UTRAN PLMN

*************** Next Modified Section ********************

6a.3 LCS-specific interfaces

6a.3.1 MAP Interfaces

The following interfaces are based on MAP in LCS.
- **Lh interface:** interface between GMLC and HLR. This interface is used by the GMLC to request the address of the visited MSC or SGSN for a particular target UE whose location has been requested. (see TS 29.002 [26]).

- **Lg interface:** interface between GMLC - MSC and GMLC - SGSN. This interface is used by the GMLC to convey a location request to the MSC or SGSN currently serving a particular target UE whose location was requested. The interface is used by the MSC or SGSN to return location results to the GMLC. (see TS 29.002 [26]).

- **Lc interface:** between GMLC and gsmSCF, CAMEL. This interface is used to get location information for CAMEL based services. (see TS 29.002 [26]).

Interface between MSC and GMLC (Lg-interface)

The MSC - GMLC interface is used to exchange data needed by the MSC to perform subscriber authorization and allocate network resources. The GMLC provides the IMSI and requested Quality of Service information. Signalling on this interface uses the Mobile Application Part (MAP), which in turn uses the services of Transaction Capabilities (TCAP) (see TS 29.002 [26]).

6a.3.2   Interface between MSC and SMLC (Ls-interface) (Void)

The MSC - SMLC interface is used to exchange data needed by the SMLC to select a positioning method and compute a location estimate. The MSC provides the MS's location capabilities and requested Quality of Service information. Signalling on this interface uses the Mobile Application Part (MAP), which in turn uses the services of Transaction Capabilities (TCAP) (see TS 29.002 [26]).

6a.3.3   (Void)Interface between SMLC and MSC/VLR (Ls-interface)

In GSM, an NSS based SMLC supports positioning of a target MS via signaling on the Ls interface to the visited MSC. Signalling on this interface uses BSSAP-LE, which is specified in GSM 09.31. In UMTS, the Ls interface is not standardized, because the SMLC functionality is included in SRNC.

6a.3.4   (Void) Interface between GMLC and HLR (Lh-interface)

This interface is used by the GMLC to retrieve the VMSC location and IMSI for a particular mobile. Signalling on this interface uses the Mobile Application Part (MAP), which in turn uses the services of Transaction Capabilities (TCAP) (see TS 29.002 [26]).

6a.3.5   Interface between BSC and SMLC (Lb-interface)

In GSMGERAN, a BSS based the SMLC supports positioning via signaling on the Lb interface to the BSC serving the target MS.
Signalling on this interface uses BSSAP-LE, which is specified in TS 49.031 [50].
In UMTS, the Lb interface is not standardized, because the SMLC functionality is included in SRNC.

6a.3.6   Interface between Peer SMLCs (Lp-interface)

In GSMGERAN, both NSS and BSS basedthe SMLCs may support the Lp interface to enable access to information and resources owned by another SMLC.
Signalling on this interface uses BSSAPP-LE, which is defined in TS 49.031 [50], and SMLCPP, which is specified in TS 48.031 [47].
In UMTSUTRAN, the SMLC functionality is included in SRNC or a SMLC is connected to a RNC and the Iur interface shall includes the Lp interface type of functionality.

6a.3.7   Interface between BTS and LMU (Um-interface)

The Um/Uu interface specific to LCS is defined in TS 44.071 [55].

6a.3.8   Interface between GMLC and External LCS Client (Le-interface)

Signalling on this interface may use Mobile Location Protocol (MLP) [62] and Open Service Access Application Programming Interface (OSA-API) [63].

6a.3.9 Inteface between SRNC, Stand-Alone LMU, and UE (Uu-interface)

The Uu interface is used to communicate among the UE Positioning entities associated with the SRNC, the UEs and the stand-alone LMU. The Uu interface may pass measurement requests and results to and from the UE or the stand-alone

LMU. UE Positioning operations at the Uu interface are generally defined in the 24- and 25-series of 3GPP Technical Specifications.

6a.3.10 Interface between SRNC and SAS (Stand-Alone A-GPS SMLC) (Iupc-interface)

The Iupc interface defined for LCS is specified in TS 25.453 [67].

CR-Form-v7

CHANGE REQUEST

| ⌘ | **23.002** CR **103** | ⌘ **rev** | **1** | ⌘ | Current version: | **5.7.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐   ME ☐   Radio Access Network ☐   Core Network **X**

Title: ⌘	IMS Reference Points	
Source: ⌘	Siemens	
Work item code: ⌘	IMS	***Date:*** ⌘ 21/08/2002
Category: ⌘ **F**		***Release:*** ⌘ Rel-5

Use one of the following categories:
F (correction)
A (corresponds to a correction in an earlier release)
B (addition of feature),
C (functional modification of feature)
D (editorial modification)
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2   (GSM Phase 2)
R96   (Release 1996)
R97   (Release 1997)
R98   (Release 1998)
R99   (Release 1999)
Rel-4   (Release 4)
Rel-5   (Release 5)
Rel-6   (Release 6)

Reason for change: ⌘	Some of IMS reference point descriptions in 23.002 are out of date and need to be aligned with 23.228 and stage 3 specifications.
Summary of change: ⌘	The descriptions of Gm, Mg, and Mw reference points are corrected. The definition of the Mm reference point is moved to the correct place and slightly modified. A few other editorial alignments.
Consequences if not approved: ⌘	Incomplete specification and misalignment between specifications.

Clauses affected: ⌘	6a.7; 7	

	Y	N	
Other specs affected: ⌘		X	Other core specifications ⌘
		X	Test specifications
		X	O&M Specifications

Other comments: ⌘	Other corrections to IMS Reference Point descriptions are covered in CR 98r1 (S2-021953).

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be

downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

6a.7   IM Subsystem Reference Points

6a.7.1   Reference Point HSS – CSCF (Cx Reference Point)

The Cx reference point supports information transfer between CSCF and HSS.

The main procedures that require information transfer between CSCF and HSS are

1) Procedures related to Serving CSCF assignment

2) Procedures related to routing information retrieval from HSS to CSCF

3) Procedures related to UE-HSS infromation tunneling via CSCF

6a.7.2   Reference Point CSCF – UE (Gm Reference Point)

The Gm reference point supports the communication between UE and IM CN subsystem, e.g. related to registration and session control.

The protocol used for the Gm reference point is SIP (as defined by RFC 3261 [61], other relevant RFC's, and additional enhancements introduced to support 3GPP´s needs).

This interface is to allow UE to communicate with the CSCF e.g.

— Register with a CSCF,

— Call origination and termination

— Supplementary services control.

The Gm reference point supports information transfer between UE and serving CSCF. The main procedures that require information transfer between UE and serving CSCF are

— Procedures related to Serving CSCF registration,

— Procedures related to User service requests to the serving CSCF,

— Procedures related to the Authentication of the Application/Service,

— Procedures related to the CSCF's request for Core Network resources in the Visited Network.

6a.7.3   Reference Point MGCF – IM-MGW (Mc Reference Point)

See also section 6.4.1.7.

The Mc reference point describes the interfaces between the MGCF and IM-MGW, between the MSC Server and CS-MGW, and between the GMSC Server and CS-MGW. It has the following properties:

-   full compliance with the H.248 standard [52], baseline work of which is currently carried out in ITU-T Study Group 16, in conjunction with IETF MEGACO WG.

-   flexible connection handling which allows support of different call models and different media processing purposes not restricted to H.323 [54] usage.

-   open architecture where extensions/Packages definition work on the interface may be carried out.

-   dynamic sharing of MGW physical node resources. A physical MGW can be partitioned into logically separate virtual MGWs/domains consisting of a set of statically allocated Terminations.

- dynamic sharing of transmission resources between the domains as the MGW controls bearers and manage resources according to the H.248 [52] protocols.

The functionality across the Mc reference point will need to support mobile specific functions such as SRNS relocation/handover and anchoring. It is expected that current H.248/IETF Megaco standard [52] mechanisms can be applied to enable this.

6a.7.4 Reference Point MGCF – CSCF (Mg Reference Point)

The Mg reference point allows the MGCF to forward incoming session signalling (from the PSTN) to the CSCF for the purpose of interworking with PSTN networks.

The protocol used for the Mg reference point is based on external specifications, e.g. SIP (as defined by RFC 3261 [61], other relevant RFC's, and additional enhancements introduced to support 3GPP´s needs.) [61].

6a.7.5 void

Reference Point CSCF – Multimedia IP networks (Mm Reference Point)

This is an IP interface between CSCF and IP networks. This interface is used, for example, to receive a call request from another VoIP call control server or terminal.

6a.7.6 Reference Point CSCF – MRFC (Mr Reference Point)

The is Mr reference point allows interaction between an S-CSCF and an MRFC.

The protocol used for the Mr reference point is SIP (as defined by RFC 25433261 [61], other relevant RFC's, and additional enhancements introduced to support 3GPP´s needs).

6a.7.6a Reference Point MRFC – MRFP (Mp Reference Point)

The Mp reference point allows an MRFC to control media stream resources provided by an MRF.

The Mp reference point has the following properties:

- Full compliance with the H.248 standard [52].

- Open architecture where extensions (packages) definition work on the interface may be carried out.

6a.7.7 Reference Point CSCF – CSCF (Mw Reference Point)

The Mw reference pointinterface allows the Interrogating CSCF to direct mobile terminated calls to the Serving CSCFcommunication and forwarding of signalling messaging between CSCFs, e.g. during registration and session control.

6a.7.8 [void]

6a.7.9 Reference Point GGSN – PCF (Go Reference Point)

This interface allows the Policy Control Function (PCF) to apply policy to the bearer usage in the GGSN.

The Policy Control Function (PCF) is a logical entity of the P-CSCF. If the PCF is implemented in a separate physical node, the interface between the PCF and the P-CSCF is not standardized.

6a.7.10 Reference Point CSCF – BGCF (Mi reference point)

This reference point allows the Serving CSCF to forward the session signalling to the Breakout Gateway Control Function for the purpose of interworking to the PSTN networks.

The Mi reference point is based on external specifications i.e. SIP [61].

6a.7.11 Reference Point BGCF – MGCF (Mj reference point)

This reference point allows the Breakout Gateway Control Function to forward the session signalling to the Media Gateway Control Function for the purpose of interworking to the PSTN networks.

The Mj reference point is based on external specifications i.e. SIP [61].

6a.7.12 Reference Point BGCF – BGCF (Mk reference point)

This reference point allows the Breakout Gateway Control Function to forward the session signalling to another Breakout Gateway Control Function.

The Mk reference point is based on external specifications i.e. SIP [61].

6a.7.13 Reference Point CSCF- SLF (Dx Reference Point)

This interface between CSCF and SLF is used to retrieve the address of the HSS which holds the subscription for a given user.

This interface is not required in a single HSS environment. An example for a single HSS environment is a server farm architecture.

6a.7.14 Reference Point to IPv6 network services (Mb reference point)

Via the Mb reference point IPv6 network services are accessed. These IPv6 network services are used for user data transport. Note, that GPRS provides IPv6 network services to the UE, i.e. the GPRS Gi reference point and the IMS Mb reference point may be the same.

6a.7.15 Reference Point CSCF – AS (ISC Reference Point)

This interface between CSCF and the Application Servers (i.e., SIP Application Server, OSA Capability Server, or CAMEL IM-SSF) is used to provide services for the IMS.

6a.7.16 Reference Point HSS – SIP AS or OSA SCS (Sh Reference Point)

The Application Server (SIP Application Server and/or the OSA service capability server) may communicate to the HSS. The Sh interface is used for this purpose. Details are described in 23.228 [34], sub-clause 4.2.4.

6a.7.17 Reference Point HSS – CAMEL IM-SSF (Si Reference Point)

The CAMEL Application Server (IM-SSF) may communicate to the HSS. The Si interface is used for this purpose. Details are described in 23.228 [34], sub-clause 4.2.4.

7 Reference points between the PLMN and other networks

The reference points between the PLMN and other networks, including dedicated networks, are described in the 49-series of Technical Specifications and in the 29-series of Technical Specifications.

7.1 Reference point fixed networks - MSC

The MSC is based on a normal ISDN exchange. It has, for call control, the same reference points as the fixed network exchanges. The signalling reference point considered in the Technical Specifications is related to the signalling system No. 7 User Parts TUP and ISUP associated to the circuits used for incoming and outgoing calls.

7.2 Reference point GGSN - packet data networks (Gi reference point)

This is the reference point between the GGSN and a packet data network. It may be an operator external public or private packet data network or an intra operator packet data network, e.g. for provision of IMS services.

7.3 Reference point GMLC - external LCS Client (Le reference point)

At this reference point external LCS Clients request services from the PLMN.

7.4 Reference Point CSCF – Multimedia IP networks (Mm Reference Point)

This is an IP interface between CSCF and IP networks. This interface is used, for example, to receive a session request from another SIP server or terminal. Detailed specifications of the Mm reference point are not provided in this release of specifications.