3GPP TSG CN Plenary Meeting #27 **NP-050057**
9th – 11th March 2005 Tokyo, JAPAN.

Source: TSG CN WG4

Title: Corrections on Subscriber and Equipment Trace

Agenda item: 9.22

Document for: APPROVAL

Doc-2nd-Level	Spec	CR	Rev	Phase	Subject	Cat	Ver_C
N4-050211	23.018	144		Rel-6	Management Based Activation Impacts	B	6.3.0
N4-050212	29.002	749	1	Rel-6	Management Based Activation Impacts	B	6.8.0
N4-050299	23.205	045	7	Rel-6	Addition of the Trace package	B	6.0.0
N4-050304	29.232	060	7	Rel-6	Addition of the Trace package	B	6.0.0
N4-050305	29.060	470	7	Rel-6	Additional Trace information	C	6.7.0
N4-050306	23.008	134	4	Rel-6	Adding trace control and configuration parameters to subscriber data in HSS	B	6.4.0
N4-050308	23.012	19	2	Rel-6	Management Based Activation Impacts	B	6.2.0
N4-050309	29.060	543	1	Rel-6	Management Based Trace Activation Signalling	B	6.7.0
N4-050463	29.002	738	8	Rel-6	Rel-6 trace management additions to trace activation and deactivation procedures	F	6.8.0

3GPP TSG-CN WG4 Meeting #26 **N4-050211**
Sydney, AUSTRALIA. 14th to 18th February 2005.

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.018** **CR** **144** ⌘ **rev** **-** ⌘ Current version: **6.3.0** ⌘

*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 ☒

Title:	⌘	Management Based Activation Impacts
Source:	⌘	CN4
Work item code:	⌘	OEM-TRACE
Date:	⌘	01/11/2004
Category:	⌘	**B**
Release:	⌘	Rel-6

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:

Ph2	*(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)*
Rel-7	*(Release 7)*

Reason for change:	⌘	This CR adds the necessary impacts to enable IMEI(SV) transfer over E-i/f for Management Based Activation of a Trace Session in an RNC when a relocation occurs. It may happen that Management Based Activation is enabled in a target RNC after a relocation has occurred. In such a case, the non-anchor MSC needs to be aware of the IMEI(SV) so that it can send it over to the RNC. Thus, in the anchor MSC is necessary to always acquire IMEI(SV) from the UE.
Summary of change:	⌘	Modify Process_Access_Request_VLR procedure to always acquire IMEI(SV).
Consequences if not approved:	⌘	

Clauses affected:	⌘	

		Y	N			
Other specs affected:	⌘	X		Other core specifications	⌘	29.002-749, 23.012-019, 29.018-043
			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.

First modification

7.1.2 Functional requirements of VLR

7.1.2.1 Process OCH_VLR

7.1.2.2 Procedure Process_Access_Request_VLR

~~Sheet 1: the processing starting with the test "IMEISV stored" and finishing with the output signal "Send UESBI-Iu to RNC" is specific to PUESBINE. If the VLR does not support PUESBINE, the processing starts with the test "Identity known?"~~

Sheet 1: it is a network operator decision (subject to MoU requirements) how often an MS should be authenticated.

Sheet 1: it is a network operator decision (subject to MoU requirements) how often an MS should be authenticated.

Sheet 2: the process Subscriber_Present_VLR is described in 3GPP TS 29.002 [29].

Sheet 2: it is a network operator decision (subject to MoU requirements) whether a GSM connection should be ciphered. A UMTS connection shall always be ciphered.

Sheet 3: it is a network operator decision (subject to MoU requirements) how often an IMEI should be checked.

Sheet 3, sheet 4, sheet 5: the procedure CCBS_Report_MS_Activity is specific to CCBS; it is specified in 3GPP TS 23.093 [23].

Sheet 5: it is a network operator decision whether emergency calls are allowed from an ME with no SIM.

7.1.2.3 Procedure OG_Call_Subscription_Check_VLR

Sheet 1: it is an implementation option to carry out the check for operator determined barring of all outgoing calls before the check on provisioning of the requested basic service.

Sheet 1: the procedure Check_OG_Multicall_VLR is specific to Multicall; it is specified in 3GPP TS 23.135 [25]. If the VMSC does not support Multicall, processing continues from the "Yes" exit of the test "Result=Pass?".

Sheet 1: the procedure OG_CUG_Check is specific to CUG. If the VLR does not support CUG, processing continues from the "Yes" exit of the test "Result=Call allowed?".

Sheet 1: the procedure Get_LI_Subscription_Info_MO_VLR is specific to CLIR and COLP. If the VLR supports neither CLIR nor COLP, the procedure call is omitted.

Sheet 1: the procedure Get_AoC_Subscription_Info_VLR is specific to AoC.

Sheet 1: the procedure UUS_OCH_Check_Provision is specific to UUS; it is specified in 3GPP TS 23.087 [20]. If the VMSC does not support UUS, processing continues from the "Yes" exit of the test "Result=Pass?".

Sheet 2: the procedure CAMEL_OCH_VLR is specific to CAMEL; it is specified in 3GPP TS 23.078 [12]. If the VLR does not support CAMEL, processing continues from connector 1 to the call to the procedure Check_OG_Barring.

Sheet 2: the negative response "call barred" indicates whether the reason is operator determined barring or supplementary service barring, according to the result returned by the procedure Check_OG_Barring.

7.1.2.4 Procedure Obtain_Identity_VLR

It is a network operator decision whether open (non ciphered) identification of the MS by its IMSI is allowed.

7.1.2.5 Procedure Obtain_IMSI_VLR

7.1.2.6 Procedure Authenticate_VLR

Sheet 1: the number of unused authentication sets which triggers the VLR to request further authentication sets from the HLR is an operator option.

7.1.2.7 Procedure Obtain_Authentication_Sets_VLR

7.1.2.8 Procedure Start_Tracing_VLR

7.1.2.9 Procedure Check_IMEI _VLR

If the response from the EIR to a request to check an IMEI is:

- blacklisted, then service is not granted;
- greylisted, then service is granted, but the network operator may decide to initiate tracing;
- whitelisted, then service is granted.

7.1.2.10 Procedure Obtain_IMEI_VLR

7.1.2.11 Process Fetch_Authentication_Sets_VLR

7.1.2.12 Procedure Check_BAOC

Sheet 1: if the VLR receives an Abort message from the MSC while it is awaiting a response from the process MAF017, the message is saved for handling after return from the procedure.

7.1.2.13 Procedure OG_CUG_Check

If the VLR receives an Abort message from the MSC while it is awaiting a response from the process MAF014, the message is saved for handling after return from the procedure.

7.1.2.14 Procedure Get_LI_Subscription_Info_MO_VLR

If the VLR does not support CLIR, it omits the signal interchange with the process CLIR_MAF003.

If the VLR does not support COLP, it omits the signal interchange with the process COLP_MAF005.

If the VLR receives an Abort message from the MSC while it is awaiting a response from the process CLIR_MAF003 or the process COLP_MAF005, the message is saved for handling after return from the procedure.

7.1.2.15 Procedure Get_AoC_Subscription_Info_VLR

The indicator of whether or not AoC is provisioned is global data which can be read by the parent process.

7.1.2.16 Procedure Check_OG_Barring

Sheet 3: if the VLR receives an Abort message from the MSC while it is awaiting a response from the process MAF018 or MAF019, the message is saved for handling after return from the procedure.

7.1.2.17 Process Update_Location_VLR

The procedure Update_HLR_VLR is described in 3GPP TS 23.012 [6].

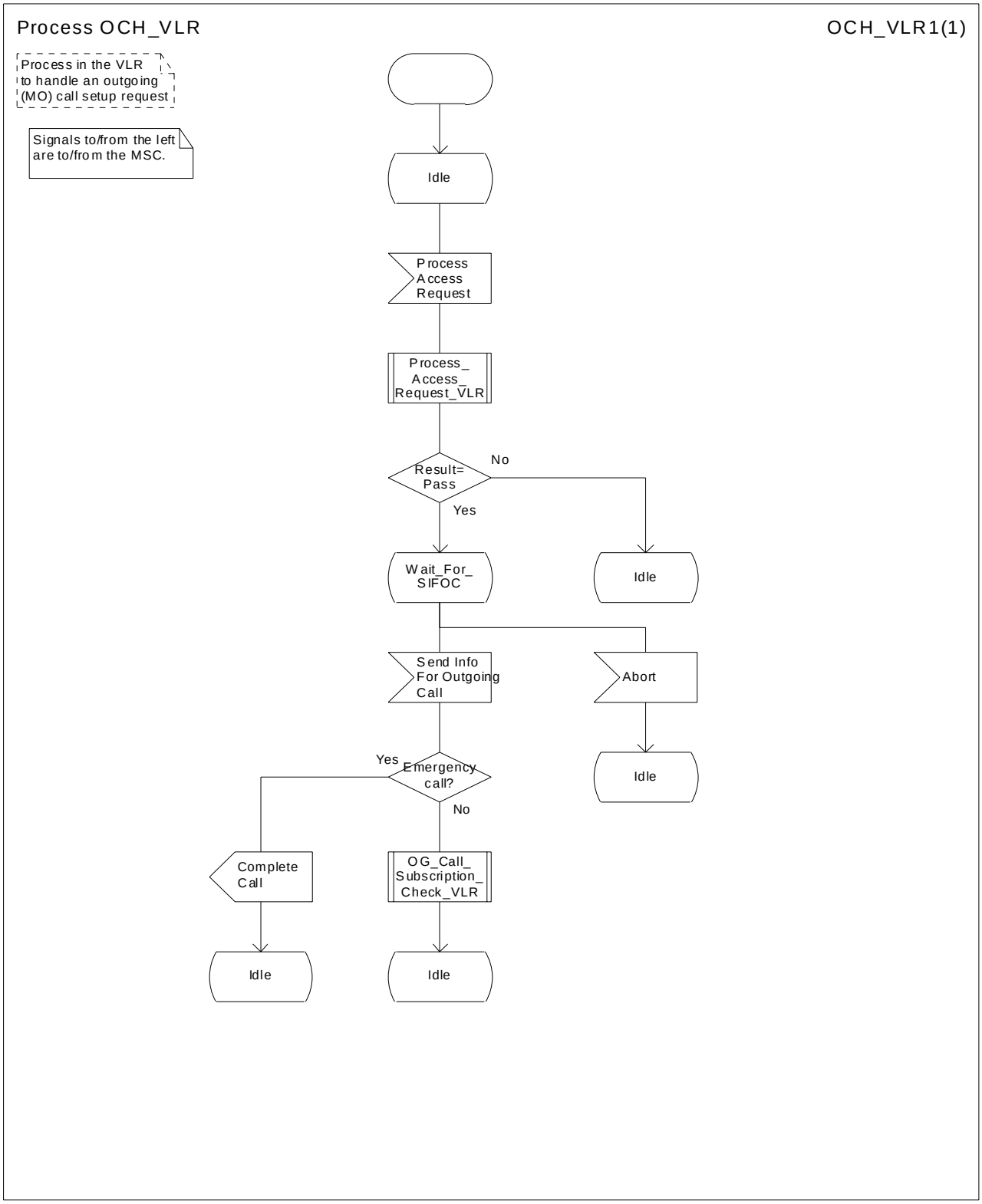
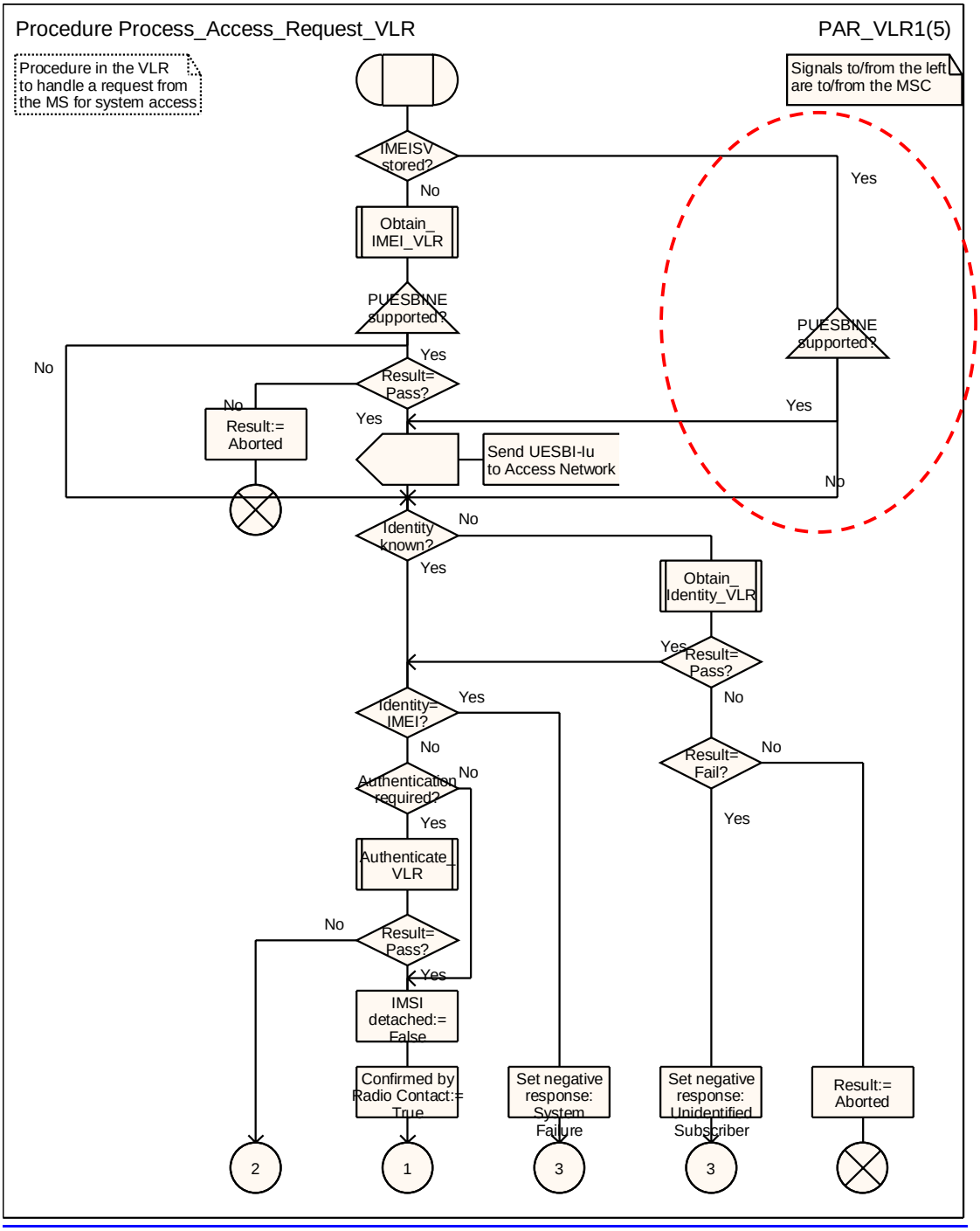


Figure 7.1.2.1: Process OCH_VLR


Procedure Process_Access_Request_VLR
PAR_VLR1(5)
Procedure in the VLR to handle a request from the MS for system access
Signals to/from the left are to/from the MSC
IMEISV stored?
Yes
No
Obtain_ IMEI_VLR
PUESBINE supported?
PUESBINE supported?
No
Yes
Result= Pass?
No
Result:= Aborted
Yes
Yes
Send UESBI-Iu to Access Network
No
Identity known?
No
Yes
Obtain_ Identity_VLR
Yes
Result= Pass?
Identity= IMEI?
Yes
No
No
Result= Fail?
No
Authentication required?
No
Yes
Yes
Authenticate_ VLR
No
Result= Pass?
Yes
IMSI detached:= False
Confirmed by Radio Contact:= True
Set negative response: System Failure
Set negative response: Unidentified Subscriber
Result:= Aborted
2
1
3
3

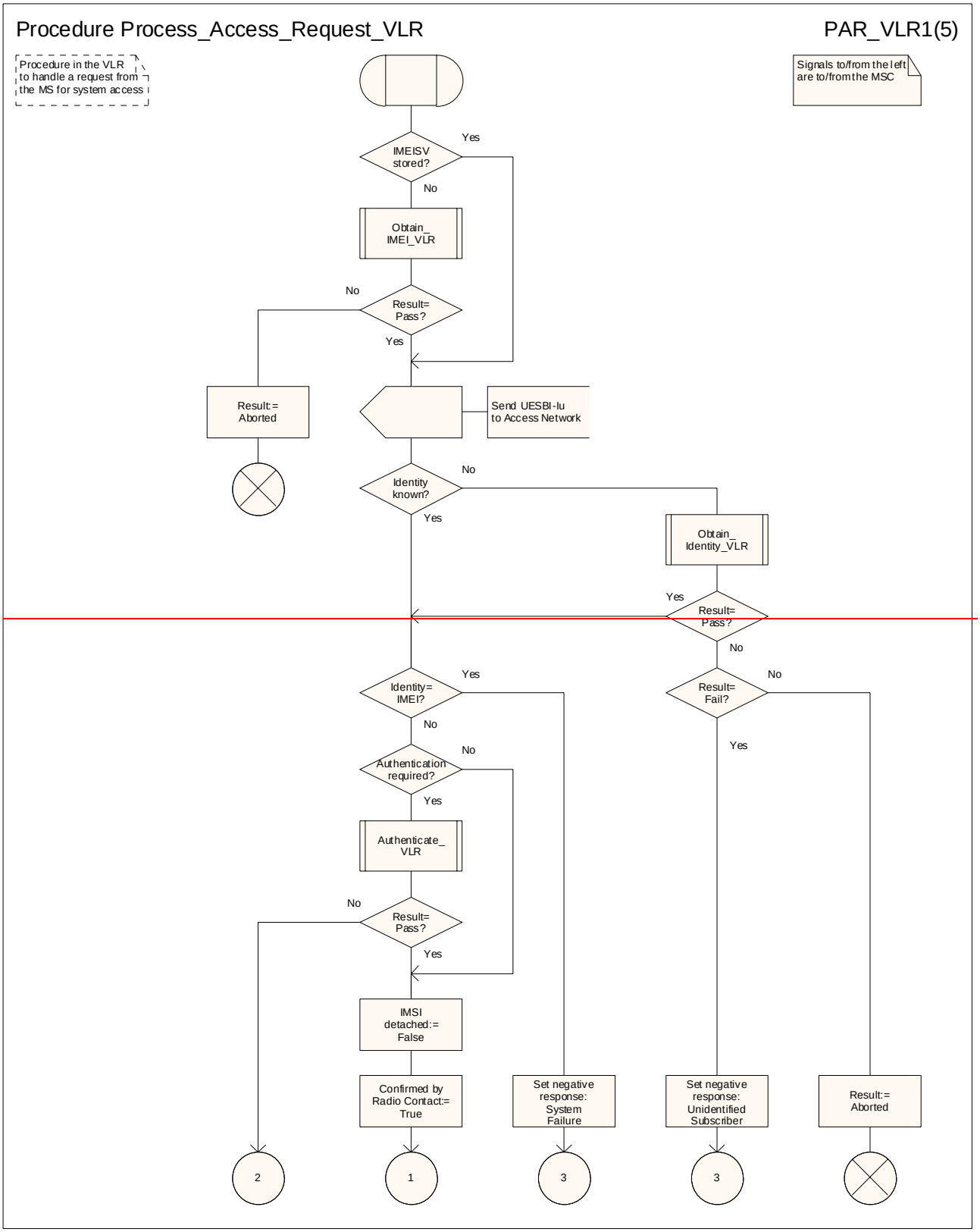


Figure 7.1.2.2a: Procedure Process_Access_Request_VLR (sheet 1)

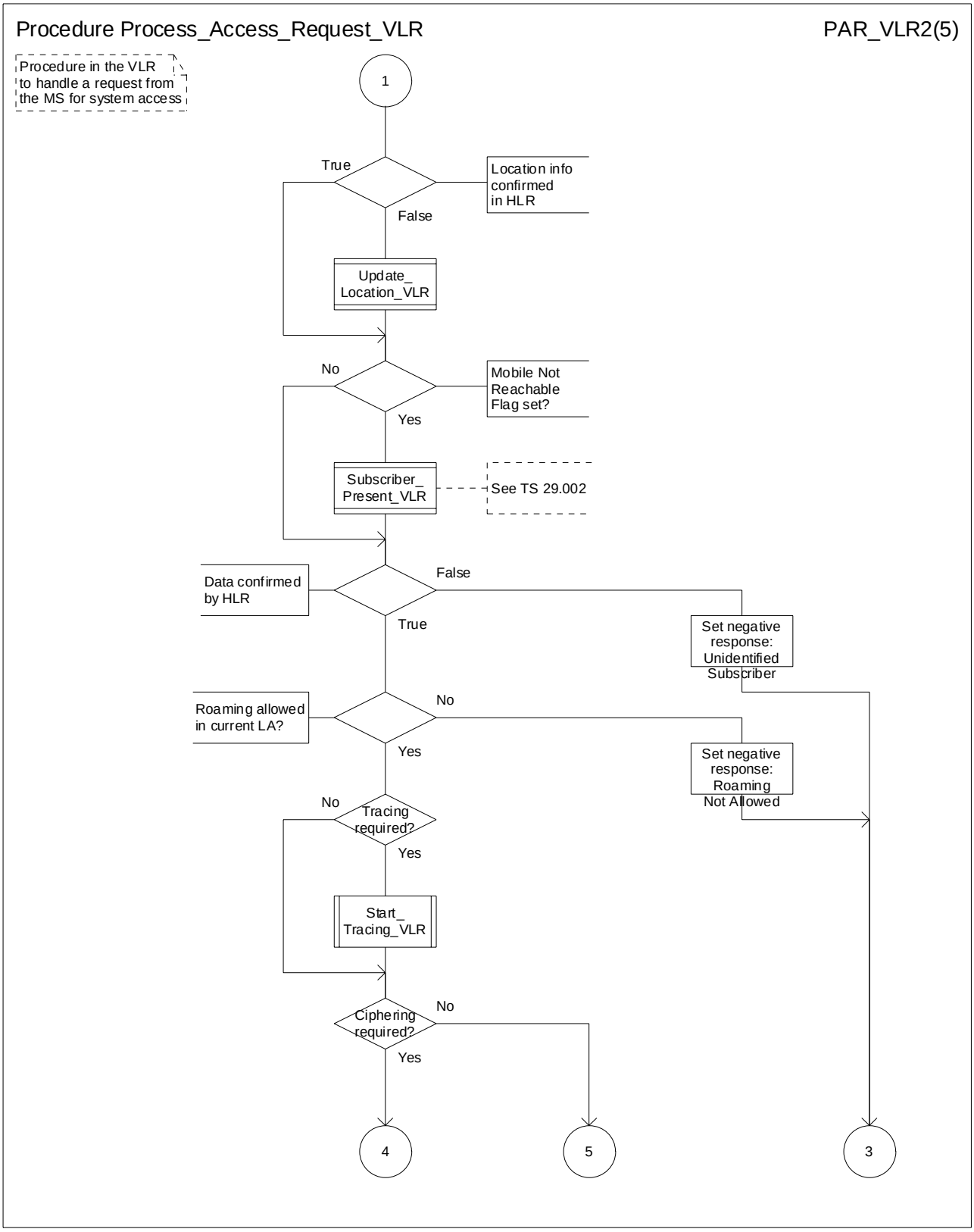


Figure 7.1.2.2b: Procedure Process_Access_Request_VLR (sheet 2)

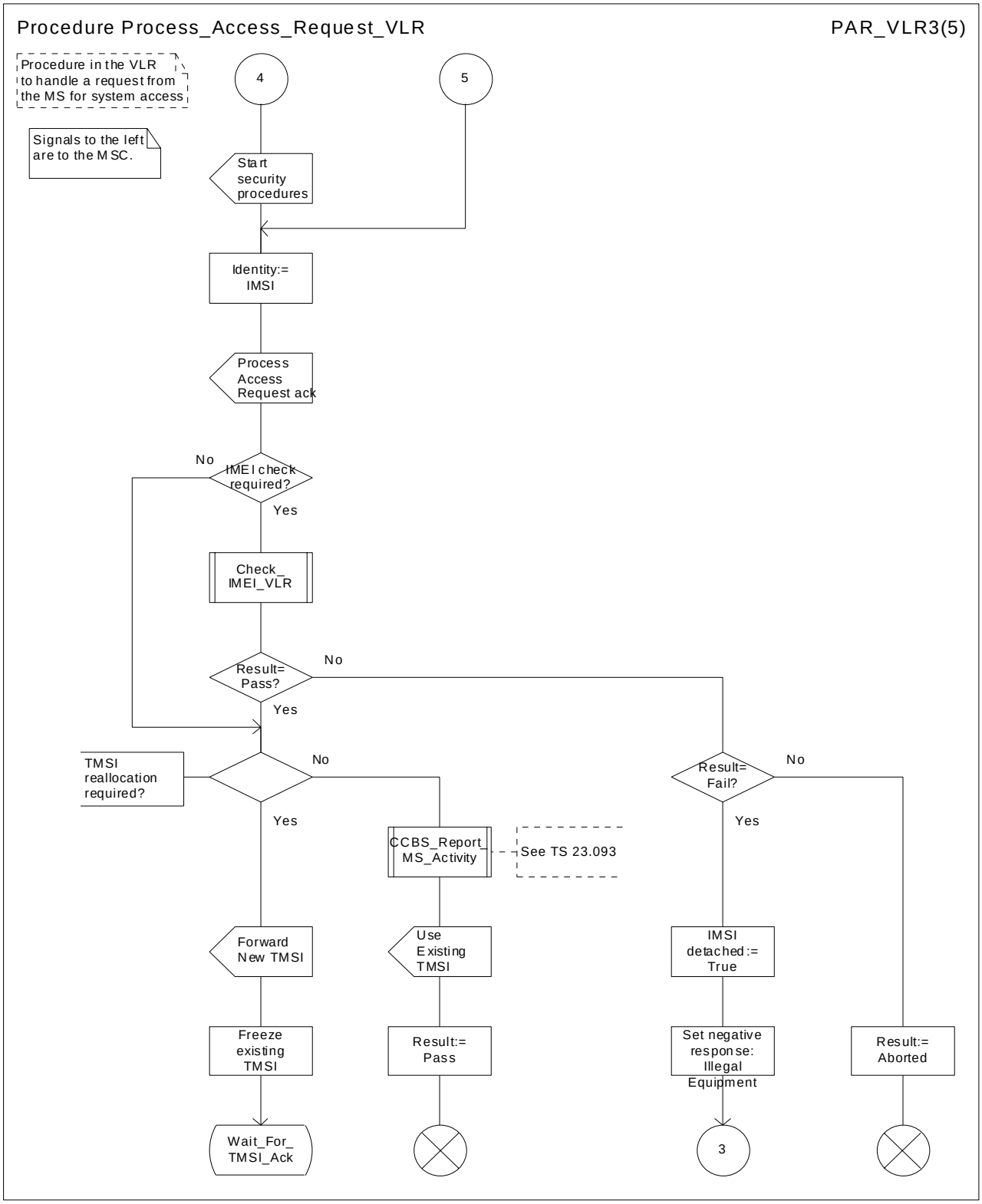


Figure 7.1.2.2c: Procedure Process_Access_Request_VLR (sheet 3)

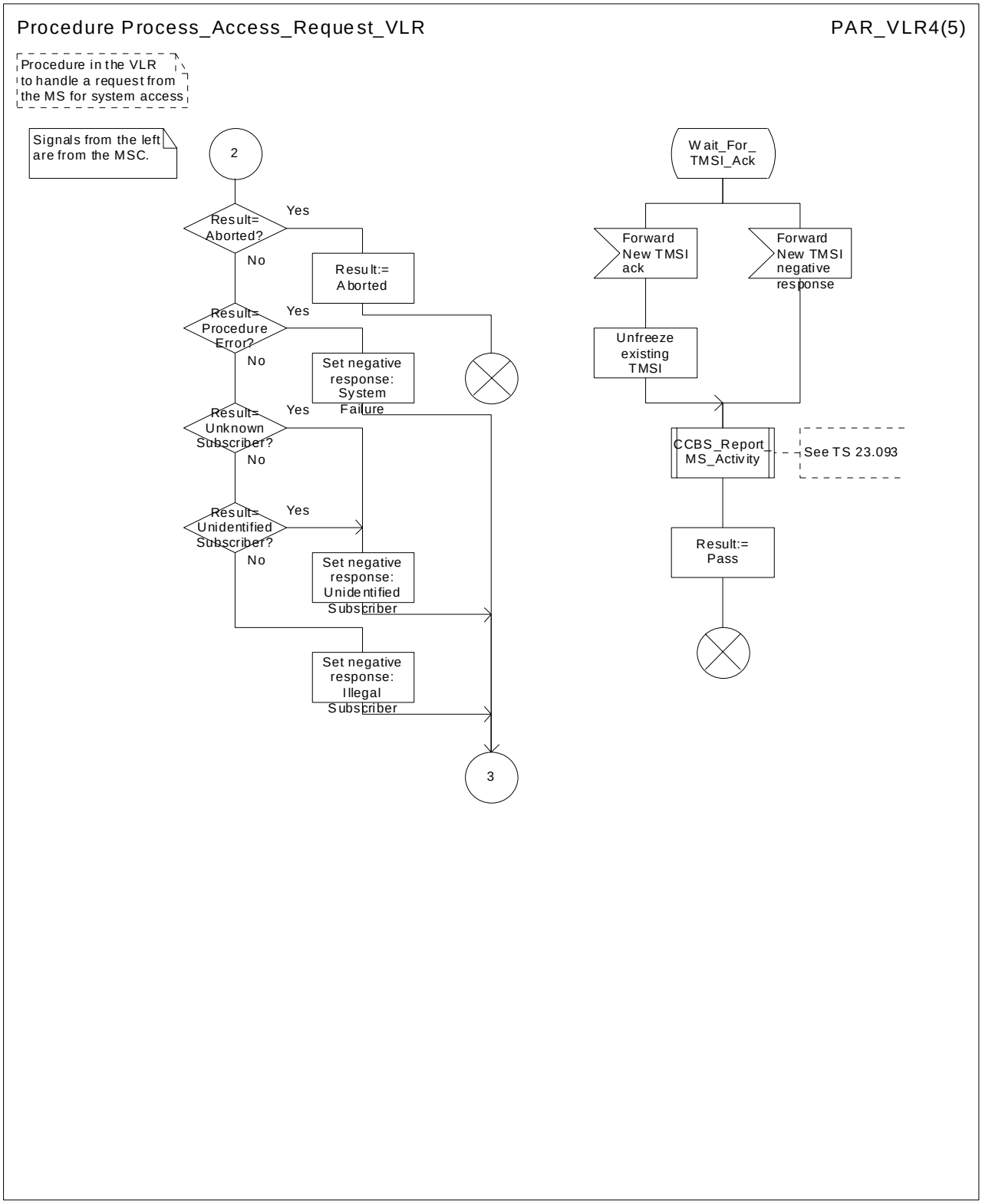


Figure 7.1.2.2d: Procedure Process_Access_Request_VLR (sheet 4)

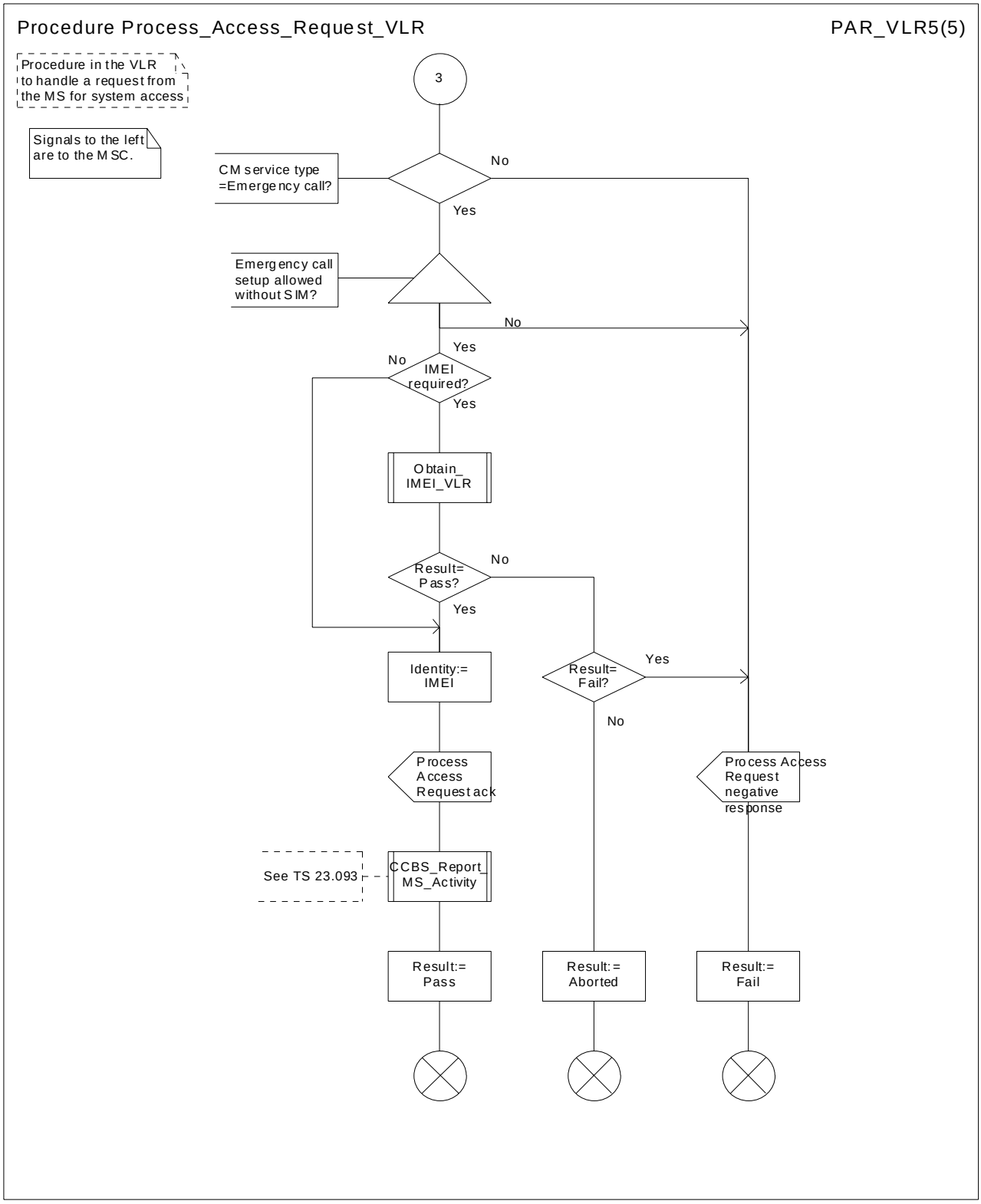


Figure 7.1.2.2e: Procedure Process_Access_Request_VLR (sheet 5)

Modification end

3GPP TSG-CN WG4 Meeting #26 **N4-050212**
Sydney, AUSTRALIA. 14th to 18th February 2005.

CR-Form-v7.1

CHANGE REQUEST

⌘ **29.002** **CR** **749** ⌘ **rev** **1** ⌘ Current version: **6.8.0** ⌘

*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 ☒

Title:	⌘	Management Based Activation Impacts
Source:	⌘	CN4
Work item code:	⌘	OEM-TRACE
Date:	⌘	04/02/2005
Category:	⌘	**B**
Release:	⌘	Rel-6

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:

Ph2	*(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)*
Rel-7	*(Release 7)*

Reason for change:	⌘	This CR adds the necessary impacts to enable IMEI(SV) transfer over E-i/f for Management Based Activation of a Trace Session in an RNC when a relocation occurs. It may happen that Management Based Activation is enabled in a target RNC after a relocation has occurred. In such a case, the non-anchor MSC needs to be aware of the IMEI(SV) so that it can send it over to the RNC. Thus, in the anchor MSC is necessary to send IMEI(SV) over E-i/f.
Summary of change:	⌘	Add IMEI(SV) in MAP-PREPARE-HANDOVER message.
Consequences if not approved:	⌘	

Clauses affected:	⌘	2, 8.4.1, 17.7.1

		Y	N			
Other specs affected:	⌘	X		Other core specifications	⌘	23.012-019, 23.018-144, 29.018-xxx
			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.

First modification

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] 3GPP TS 21.905: "3G Vocabulary".

[2] 3GPP TS 22.001: "Digital cellular telecommunications system (Phase 2+); Principles of telecommunication services supported by a Public Land Mobile Network (PLMN)".

[3] 3GPP TS 22.002: "Bearer Services Supported by a Public Land Mobile Network (PLMN)".

[4] 3GPP TS 22.003: "Circuit Teleservices Supported by a Public Land Mobile Network (PLMN)".

[5] 3GPP TS 22.004: "General on Supplementary Services".

[6] 3GPP TS 42.009: "Digital cellular telecommunications system (Phase 2+); Security aspects".

[7] 3GPP TS 22.016: "International Mobile station Equipment Identities (IMEI)".

[8] 3GPP TS 22.041: "Operator Determined Barring".

[9] 3GPP TS 22.081: "Line identification supplementary services - Stage 1".

[10] 3GPP TS 22.082: "Call Forwarding (CF) supplementary services - Stage 1".

[11] 3GPP TS 22.083: "Call Waiting (CW) and Call Hold (HOLD) Supplementary Services - Stage 1".

[12] 3GPP TS 22.084: "Multi Party (MPTY) Supplementary Services - Stage 1".

[13] 3GPP TS 22.085: "Closed User Group (CUG) supplementary services - Stage 1".

[14] 3GPP TS 22.086: "Advice of charge (AoC) Supplementary Services - Stage 1".

[15] 3GPP TS 22.088: "Call Barring (CB) supplementary services - Stage 1".

[16] 3GPP TS 22.090: "Unstructured Supplementary Service Data (USSD); - Stage 1".

[17] 3GPP TS 23.003: "Numbering, addressing and identification".

[18] Void

[19] 3GPP TS 23.007: "Restoration procedures".

[20] 3GPP TS 23.008: "Organisation of subscriber data".

[21] 3GPP TS 23.009: "Handover procedures".

[22] 3GPP TS 23.011: "Technical realization of Supplementary Services - General Aspects".

[23] 3GPP TS 23.012: "Location management procedures".

[24] 3GPP TS 43.020: "Security related network functions".

[25] 3GPP TS 23.038: "Alphabets and language".

[25a] 3GPP TS 23.039: " Interface protocols for the connection of Short Message Service Centres (SMSCs) to Short Message Entities (SMEs)".

[26] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS) Point to Point (PP)".

[26a] 3GPP TS 23.271: "Functional stage2 description of LCS".

[27] 3GPP TS 23.081: "Line Identification Supplementary Services - Stage 2".

[28] 3GPP TS 23.082: "Call Forwarding (CF) Supplementary Services - Stage 2".

[29] 3GPP TS 23.083: "Call Waiting (CW) and Call Hold (HOLD) Supplementary Services - Stage 2".

[30] 3GPP TS 23.084: "Multi Party (MPTY) Supplementary Services - Stage 2".

[31] 3GPP TS 23.085: "Closed User Group (CUG) Supplementary Services - Stage 2".

[32] 3GPP TS 23.086: "Advice of Charge (AoC) Supplementary Services - Stage 2".

[33] 3GPP TS 23.088: "Call Barring (CB) Supplementary Services - Stage 2".

[34] 3GPP TS 23.090: "Unstructured Supplementary Services Data (USSD) - Stage 2".

[34a] 3GPP TS 33.200: "3G Security; Network domain security; MAP application layer security".

[35] 3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols - Stage 3".

[36] 3GPP TS 24.010: "Mobile radio interface layer 3 Supplementary Services specification - General aspects".

[37] 3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[37a] 3GPP TS 44.071: "Location Services (LCS) – stage 3".

[38] 3GPP TS 24.080: "Mobile radio interface layer 3 supplementary services specification - Formats and coding".

[39] 3GPP TS 24.081: "Line identification supplementary services - Stage 3".

[40] 3GPP TS 24.082: "Call Forwarding (CF) Supplementary Services - Stage 3".

[41] 3GPP TS 24.083: "Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 3".

[42] 3GPP TS 24.084: "Multi Party (MPTY) Supplementary Services - Stage 3".

[43] 3GPP TS 24.085: "Closed User Group (CUG) Supplementary Services - Stage 3".

[44] 3GPP TS 24.086: "Advice of Charge (AoC) Supplementary Services - Stage 3".

[45] 3GPP TS 24.088: "Call Barring (CB) Supplementary Services - Stage 3".

[46] 3GPP TS 24.090: "Unstructured Supplementary Services Data - Stage 3".

[47] 3GPP TS 48.002: " Base Station System - Mobile-services Switching Centre (BSS - MSC) interface principles".

[48] 3GPP TS 48.006: "Signalling transport mechanism specification for the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[49] 3GPP TS 48.008: "Mobile Switching Centre - Base Station System (MSC - BSS) interface; Layer 3 specification".

[49a1] 3GPP TS 48.031: "Location Services (LCS); Serving Mobile Location Centre (SMLC) – Serving Mobile Location Centre (SMLC); SMLC Peer Protocol (SMLCPP)".

[49b] 3GPP TS 48.071: "Location Services (LCS); Serving Mobile Location Centre - Base Station System (SMLC - BSS) interface Layer 3 specification".

[50] 3GPP TS 49.001: "General network interworking scenarios".

[51] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[52] Void

[53] Void

[54] Void

[55] 3GPP TS 29.006: "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".

[56] 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)".

[57] 3GPP TS 29.008: "Application of the Base Station System Application Part (BSSAP) on the E-interface".

[58] 3GPP TS 29.010: "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)".

[59] 3GPP TS 29.011: "Signalling interworking for Supplementary Services".

[59a] 3GPP TS 49.031: "Digital cellular telecommunications system (Phase 2+); Location Services (LCS); Base Station System Application Part LCS Extension (BSSAP-LE)".

[60] Void

[61] GSM 12.08: "Digital cellular telecommunications system (Phase 2); Subscriber and Equipment Trace".

[62] ETS 300 102-1 (1990): "Integrated Services Digital Network (ISDN); User-network interface layer 3 specifications for basic call control".

[63] ETS 300 136 (1992): "Integrated Services Digital Network (ISDN); Closed User Group (CUG) supplementary service description".

[64] ETS 300 138 (1992): "Integrated Services Digital Network (ISDN); Closed User Group (CUG) supplementary service Digital Subscriber Signalling System No.one (DSS1) protocol".

[65] ETS 300 287: "Integrated Services Digital Network (ISDN); Signalling System No.7; Transaction Capabilities (TC) version 2".

[66] ETR 060: "Signalling Protocols and Switching (SPS); Guide-lines for using Abstract Syntax Notation One (ASN.1) in telecommunication application protocols".

[66b] ETR 091: "ETSI object identifier tree; Common domain Mobile domain"

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

[68] ITU-T Recommendation E.212: " The international identification plan for mobile terminals and mobile users".

[69] ITU-T Recommendation E.213: " Telephone and ISDN numbering plan for land mobile stations in public land mobile networks (PLMN) ".

[70] ITU-T Recommendation E.214: " Structure of the land mobile global title for the signalling connection control part (SCCP) ".

[71] ITU-T Recommendation Q.699: " Interworking between ISDN access and non-ISDN access over ISDN User Part of Signalling System No. 7 ".

[72] ITU-T Recommendation Q.711: "Specifications of Signalling System No.7; Functional description of the Signalling Connection Control Part".

[73] ITU-T Recommendation Q.712: "Definition and function of SCCP messages".

[74] ITU-T Recommendation Q.713: "Specifications of Signalling System No.7; SCCP formats and codes".

[75] ITU-T Recommendation Q.714: "Specifications of Signalling System No.7; Signalling Connection Control Part procedures".

[76] ITU-T Recommendation Q.716: "Specifications of Signalling System No.7; Signalling connection control part (SCCP) performances".

[77] ITU-T Recommendation Q.721 (1988): "Specifications of Signalling System No.7; Functional description of the Signalling System No.7 Telephone user part".

[78] ITU-T Recommendation Q.722 (1988): "Specifications of Signalling System No.7; General function of Telephone messages and signals".

[79] ITU-T Recommendation Q.723 (1988): "Specifications of Signalling System No.7; Formats and codes".

[80] ITU-T Recommendation Q.724 (1988): "Specifications of Signalling System No.7; Signalling procedures".

[81] ITU-T Recommendation Q.725 (1988): "Specifications of Signalling System No.7; Signalling performance in the telephone application".

[82] ITU-T Recommendation Q.761 (1988): "Specifications of Signalling System No.7; Functional description of the ISDN user part of Signalling System No.7".

[83] ITU-T Recommendation Q.762 (1988): "Specifications of Signalling System No.7; General function of messages and signals".

[84] ITU-T Recommendation Q.763 (1988): "Specifications of Signalling System No.7; Formats and codes".

[85] ITU-T Recommendation Q.764 (1988): "Specifications of Signalling System No.7; Signalling procedures".

[86] ITU-T Recommendation Q.767: "Specifications of Signalling System No.7; Application of the ISDN user part of CCITT signalling System No.7 for international ISDN interconnections".

[87] ITU-T Recommendation Q.771: "Specifications of Signalling System No.7; Functional description of transaction capabilities".

[88] ITU-T Recommendation Q.772: "Specifications of Signalling System No.7; Transaction capabilities information element definitions".

[89] ITU-T Recommendation Q.773: "Specifications of Signalling System No.7; Transaction capabilities formats and encoding".

[90] ITU-T Recommendation Q.774: "Specifications of Signalling System No.7; Transaction capabilities procedures".

[91] ITU-T Recommendation Q.775: "Specifications of Signalling System No.7; Guide-lines for using transaction capabilities".

[92] ITU-T Recommendation X.200: "Reference Model of Open systems interconnection for CCITT Applications".

[93] ITU-T Recommendation X.680: "Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation".

[93b] ITU-T Recommendation X.681: "Information technology – Abstract Syntax Notation One (ASN.1): Information object specification"

[94] ITU-T Recommendation X.690: "Information technology – ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)".

[95] ITU-T Recommendation X.210: "Open systems interconnection layer service definition conventions".

[97] 3GPP TS 23.018: "Basic Call Handling".

[98] 3GPP TS 23.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 4 - Stage 2".

[99] 3GPP TS 23.079: "Support of Optimal Routeing (SOR) - Stage 2".

[100] 3GPP TS 43.068: "Voice Group Call Service (VGCS) - Stage 2".

[101] 3GPP TS 43.069: "Voice Broadcast service (VBS) - Stage 2".

[102] ANSI T1.113: "Signaling System No. 7 (SS7) - ISDN User Part".

[103] Void

[104] 3GPP TS 23.060: "General Packet Radio Service (GPRS) Description; Stage 2".

[105] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".

[106] 3GPP TS 29.018: "General Packet Radio Service (GPRS); Serving GPRS Support Node (SGSN) - Visitors Location Register (VLR); Gs interface layer 3 specification".

[107] 3GPP TS 23.093: "Technical Realization of Completion of Calls to Busy Subscriber (CCBS); Stage 2".

[108] 3GPP TS 23.066: "Support of Mobile Number Portability (MNP); Technical Realisation Stage 2".

[109] ANSI T1.112 (1996): "Telecommunication – Signalling No. 7 - Signaling Connection Control Part (SCCP)".

[110] 3GPP TS 23.116: "Super-Charger Technical Realisation; Stage 2."

[111] Void.

[112] Void

[113] Void

[114] Void

[115] Void

[116] ITU-T Recommendation Q.850 (May 1998): "Usage of cause and location in the Digital Subscriber Signalling System No. 1 and the Signalling System No. 7 ISDN User Part".

[117] 3GPP TS 22.135: "Multicall; Service description; Stage 1".

[118] 3GPP TS 23.135: "Multicall supplementary service; Stage 2".

[119] 3GPP TS 24.135: "Multicall supplementary service; Stage 3".

[120] 3GPP TS 25.413: "UTRAN Iu Interface RANAP Signalling".

[121] 3GPP TS 29.202: "SS7 signalling transport in core network"

[122] 3GPP TS 23.032: "Universal Geographical Area Description (GAD)"

[123] 3GPP TS 22.071: " Location Services (LCS); Service description, Stage 1"

[124] ITU-T Recommendation X.880: "Data networks and open system communication - Open System Interconnection - Service definitions - Remote operations: Concepts, model and notation".

[125] 3GPP TS 23.278: “Customised Applications for Mobile Network Enhanced Logic (CAMEL) Phase 4 – Stage 2 IM CN Interworking (Rel-5)”

[126] 3GPP TS 23.172: "Technical realization of Circuit Switched (CS) multimedia service; UDI/RDI fallback and service modification"

[127] 3GPP TS 26.103: "Speech codec list for GSM and UMTS".

[128] 3GPP TS 23.141: "Presence Service; Architecture and Functional Description"

[129] 3GPP TS 23.094: "Follow Me (FM) – Stage 2"

[x] 3GPP TS 32.422: "Subscriber and equipment trace; Trace control and Configuration Management (CM)".

Next modification

8.4 Handover services

It should be noted that the handover services used on the B-interface have not been updated for Release 99. The B-interface is not fully operational specified. It is strongly recommended not to implement the B-interface as an external interface.

8.4.1 MAP_PREPARE_HANDOVER service

8.4.1.1 Definition

This service is used between MSC-A and MSC-B (E-interface) when a call is to be handed over or relocated from MSC-A to MSC-B.

The MAP_PREPARE_HANDOVER service is a confirmed service using the primitives from table 8.4/1.

8.4.1.2 Service primitives

Table 8.4/1: MAP_PREPARE_HANDOVER

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
Target Cell Id	C	C(=)		
Target RNC Id	C	C(=)		
HO-NumberNotRequired	C	C(=)		
IMSI	C	C(=)		
Integrity Protection Information	C	C(=)		
Encryption Information	C	C(=)		
Radio Resource Information	C	C(=)		
AN-APDU	C	C(=)	C	C(=)
Allowed GSM Algorithms	C	C(=)		
Allowed UMTS Algorithms	C	C(=)		
Radio Resource List	C	C(=)		
RAB ID	C	C(=)		

GERAN Classmark	C	C(=)		
BSSMAP Service Handover	C	C(=)		
BSSMAP Service Handover List	C	C(=)		
RANAP Service Handover	C	C(=)		
Iu-Currently Used Codec	C	C(=)		
Iu-Supported Codecs List	C	C(=)		
RAB Configuration Indicator	C	C(=)		
ASCI Call Reference	C	C(=)		
UESBI-Iu	C	C(=)		
IMEISV	C	C(=)		
Handover Number			C	C(=)
Relocation Number List			C	C(=)
Multicall Bearer Information			C	C(=)
Multiple Bearer Requested	C	C(=)		
Multiple Bearer Not Supported			C	C(=)
Selected UMTS Algorithms			C	C(=)
Chosen Radio Resource Information			C	C(=)
Iu-Selected Codec			C	C(=)
Iu-Available Codecs List			C	C(=)
User error			C	C(=)
Provider error				O

8.4.1.3 Parameter use

Invoke Id

For definition of this parameter see clause 7.6.1.

Target Cell Id

For definition of this parameter see clause 7.6.2. This parameter is only included if the service is not in an ongoing transaction. This parameter shall also be excluded if the service is a part of the Inter-MSC SRNS Relocation procedure or the inter-system handover GSM to UMTS procedure described in 3GPP TS 23.009.

Target RNC Id

For definition of this parameter see clause 7.6.2. This parameter shall be included if the service is a part of the Inter-MSC SRNS Relocation procedure or the inter-system handover GSM to UMTS procedure described in 3GPP TS 23.009.

HO-Number Not Required

For definition of this parameter see clause 7.6.6.

IMSI

For definition of this parameter see clause 7.6.2. This UMTS parameter shall be included if:

- available and
- if the access network protocol is BSSAP and
- there is an indication that the MS also supports UMTS.

Integrity Protection Information

For definition of this parameter see clause 7.6.6. This UMTS parameter shall be included if available and if the access network protocol is BSSAP.

Encryption Information

For definition of this parameter see clause 7.6.6. This UMTS parameter shall be included if available and if the access network protocol is BSSAP.

Radio Resource Information

For definition of this parameter see clause 7.6.6. This GSM parameter shall be included if the access network protocol is RANAP and there is an indication that the UE also supports GSM. If the parameter Radio Resource List is sent , the parameter Radio Resource Information shall not be sent.

AN-APDU

For definition of this parameter see clause 7.6.9.

Allowed GSM Algorithms

For definition of this parameter see clause 7.6.6. This parameters includes allowed GSM algorithms. This GSM parameter shall be included if:

- the service is a part of the Inter-MSC SRNS Relocation procedure and
- Ciphering or Security Mode Setting procedure has been performed.and
- there is an indication that the UE also supports GSM.

Allowed UMTS Algorithms

For definition of this parameter see clause 7.6.6. This UMTS parameter shall be included if all of the following conditions apply:

- access network protocol is BSSAP and
- Integrity Protection Information and Encryption Information are not available and

Ciphering or Security Mode Setting procedure has been performed.

Radio Resource List

For definition of this parameter see clause 7.6.6. This parameter shall be included if the access network protocol is RANAP and there is an indication that the UE also supports GSM. This parameter shall be sent when MSC-A requests multiple bearers to MSC-B. If the parameter Radio Resource Information is sent , the parameter Radio Resource List shall not be sent.

RAB ID

For definition of this parameter see subclause 7.6.2. This parameter shall be included when MSC-A supports multiple bearers and access network protocol is BSSAP and the RAB ID has a value other than 1.

GERAN Classmark

For definition of this parameter see subclause 7.6.6 This parameter shall be included if available.

BSSMAP Service Handover

For definition of this parameter see clause 7.6.6. It shall be present if it is available and the access network protocol is RANAP. If the parameter BSSMAP Service Handover List is sent, the parameter BSSMAP Service Handover shall not be sent.

BSSMAP Service Handover List

For definition of this parameter see clause 7.6.6. It shall be present if it is available and the access network protocol is RANAP. This parameter shall be sent when MSC-A requests multiple bearers to MSC-B. If the parameter BSSMAP Service Handover is sent, the parameter BSSMAP Service Handover List shall not be sent.

RANAP Service Handover

For definition of this parameter see clause 7.6.6. It shall be present if it is available and the access network protocol is BSSAP.

Iu-Currently Used Codec

For definition of this parameter see subclause 7.6.6. This parameter shall be included if the handover is requested for a speech bearer and the MS is in UMTS or GERAN Iu-mode access. This parameter shall not be included if the Iu-Supported Codecs List is not included.

Iu-Supported Codecs List

For definition of this parameter see subclause 7.6.6. This parameter shall be included by MSC-A, if the handover is requested for a speech bearer.

RAB Configuration Indicator

For definition of this parameter see subclause 7.6.6. This parameter may be included if the handover is requested for a speech bearer and MSC-A knows by means of configuration information that MSC-B supports the use of the Iu-Supported Codecs List parameter. This parameter shall not be included if the Iu-Supported Codecs List is not included.

ASCI Call Reference

This parameter contains either the broadcast call reference or group call reference. It shall be included if a subscriber is undergoing handover during a VGCS or VBS call, where MSC-B already has a Bearer established, so that MSC-B can determine the Group or Broadcast Call to which it shall attach the subscriber, see 3GPP TS 48.008 [49].

UESBI-Iu

For definition of this parameter see clause 7.6.6. It shall be present if it is available and the access network protocol is BSSAP.

IMEISV

For definition of the parameter see clause 7.6.2. This parameter is used for Management based Trace Activation (see 3GPP TS 32.422) and shall be present, if available.

Handover Number

For definition of this parameter see clause 7.6.2. This parameter shall be returned at handover, unless the parameter HO-NumberNotRequired is sent. If the parameter Handover Number is returned, the parameter Relocation Number List shall not be returned.

Relocation Number List

For definition of this parameter see clause 7.6.2. This parameter shall be returned at relocation, unless the parameter HO-NumberNotRequired is sent. If the parameter Relocation Number List is returned, the parameter Handover Number shall not be returned.

Multicall Bearer Information

For a definition of this parameter see clause 7.6.2. This parameter shall be returned at relocation in the case that MSC-B supports multiple bearers.

Multiple Bearer Requested

For a definition of this parameter see clause 7.6.2. This parameter shall be sent when MSC-A requests multiple bearers to MSC-B.

Multiple Bearer Not Supported

For a definition of this parameter see clause 7.6.2. This parameter shall be returned at relocation when MSC-B receives Multiple Bearer Requested parameter and MSC-B does not support multiple bearers.

Selected UMTS Algorithms

For definition of this parameter see clause 7.6.6. This parameters includes the UMTS integrity and optionally encryption algorithms selected by RNC under the control of MSC-B. This UMTS parameter shall be included if the service is a part of the inter MSC inter system handover from GSM to UMTS.

Chosen Radio Resource Information

For definition of this parameter see clause 7.6.6. This parameter shall be returned at relocation if the encapsulated PDU is RANAP RAB Assignment Response and MS is in GSM access.

Iu-Selected Codec

For definition of this parameter see subclause 7.6.6. This parameter shall be included if an Iu-Supported Codecs List was received in the service request and MSC-B supports the selection of codec based on the Iu-Supported Codecs List, even if the Iu-Selected Codec is equal to the Iu-Currently Used Codec received in the service request. This parameter shall not be included if the Iu-Supported Codecs List was not received in the service request.

Iu-Available Codecs List

For definition of this parameter see subclause 7.6.6. This parameter shall be included by an MSC-B supporting TrFO, if the Iu-Supported Codecs List was included by MSC-A and the target radio access is UMTS or GERAN Iu-mode.

User error

For definition of this parameter see clause 7.6.1. The following errors defined in clause 7.6.1 may be used, depending on the nature of the fault:

- No handover number available.
- Target cell outside group call area;
- System failure.
- Unexpected data value.
- Data Missing.

Provider error

See definition of provider errors in clause 7.6.1.

Next modification

17.7 MAP constants and data types

17.7.1 Mobile Service data types

……ommitted text……

```
-- handover types

ForwardAccessSignalling-Arg ::= [3] SEQUENCE {
    an-APDU                          AccessNetworkSignalInfo,
    integrityProtectionInfo          [0] IntegrityProtectionInformation  OPTIONAL,
    encryptionInfo                   [1] EncryptionInformation           OPTIONAL,
    keyStatus                        [2]  KeyStatus                     OPTIONAL,
    allowedGSM-Algorithms            [4]  AllowedGSM-Algorithms         OPTIONAL,
```

```
    allowedUMTS-Algorithms              [5]  AllowedUMTS-Algorithms       OPTIONAL,
    radioResourceInformation            [6] RadioResourceInformation      OPTIONAL,
    extensionContainer                  [3]  ExtensionContainer           OPTIONAL,
    ...,
    radioResourceList                   [7]  RadioResourceList            OPTIONAL,
    bssmap-ServiceHandover              [9]  BSSMAP-ServiceHandover       OPTIONAL,
    ranap-ServiceHandover               [8]  RANAP-ServiceHandover        OPTIONAL,
    bssmap-ServiceHandoverList          [10] BSSMAP-ServiceHandoverList   OPTIONAL,
    currentlyUsedCodec                  [11] Codec                        OPTIONAL,
    iuSupportedCodecsList               [12] SupportedCodecsList          OPTIONAL,
    rab-ConfigurationIndicator          [13] NULL                         OPTIONAL,
    iuSelectedCodec                     [14] Codec                        OPTIONAL }
```

```
AllowedGSM-Algorithms ::= OCTET STRING (SIZE (1))
    -- internal structure is coded as Algorithm identifier octet from
    -- Permitted Algorithms defined in 3GPP TS 48.008
    -- A node shall mark all GSM algorithms that are allowed in MSC-B
```

```
AllowedUMTS-Algorithms ::= SEQUENCE {
    integrityProtectionAlgorithms       [0]  PermittedIntegrityProtectionAlgorithms
    OPTIONAL,
    encryptionAlgorithms                [1]  PermittedEncryptionAlgorithms  OPTIONAL,
    extensionContainer                  [2]  ExtensionContainer           OPTIONAL,
    ...}
```

```
PermittedIntegrityProtectionAlgorithms ::=
         OCTET STRING (SIZE (1..maxPermittedIntegrityProtectionAlgorithmsLength))
    -- Octets contain a complete PermittedIntegrityProtectionAlgorithms data type
    -- as defined in 3GPP TS 25.413, encoded according to the encoding scheme
    -- mandated by 3GPP TS 25.413.
    -- Padding bits are included, if needed, in the least significant bits of the
    -- last octet of the octet string.
```

```
maxPermittedIntegrityProtectionAlgorithmsLength INTEGER ::= 9
```

```
PermittedEncryptionAlgorithms ::=
         OCTET STRING (SIZE (1..maxPermittedEncryptionAlgorithmsLength))
    -- Octets contain a complete PermittedEncryptionAlgorithms data type
    -- as defined in 3GPP TS 25.413, encoded according to the encoding scheme
    -- mandated by 3GPP TS 25.413
    -- Padding bits are included, if needed, in the least significant bits of the
    -- last octet of the octet string.
```

```
maxPermittedEncryptionAlgorithmsLength INTEGER ::= 9
```

```
KeyStatus ::= ENUMERATED {
    old  (0),
    new  (1),
    ...}
    -- exception handling:
    -- received values in range 2-31 shall be treated as "old"
    -- received values greater than 31 shall be treated as "new"
```

```
PrepareHO-Arg ::= [3] SEQUENCE {
    targetCellId                        [0] GlobalCellId                    OPTIONAL,
    ho-NumberNotRequired                NULL                                OPTIONAL,
    targetRNCId                         [1] RNCId                           OPTIONAL,
    an-APDU                             [2] AccessNetworkSignalInfo         OPTIONAL,
    multipleBearerRequested             [3] NULL                            OPTIONAL,
    imsi                                [4] IMSI                            OPTIONAL,
    integrityProtectionInfo             [5] IntegrityProtectionInformation  OPTIONAL,
    encryptionInfo                      [6] EncryptionInformation           OPTIONAL,
    radioResourceInformation            [7] RadioResourceInformation        OPTIONAL,
    allowedGSM-Algorithms               [9]  AllowedGSM-Algorithms          OPTIONAL,
    allowedUMTS-Algorithms              [10] AllowedUMTS-Algorithms         OPTIONAL,
    radioResourceList                   [11] RadioResourceList              OPTIONAL,
    extensionContainer                  [8] ExtensionContainer              OPTIONAL,
    ... ,
    rab-Id                              [12] RAB-Id                         OPTIONAL,
    bssmap-ServiceHandover              [13] BSSMAP-ServiceHandover         OPTIONAL,
    ranap-ServiceHandover               [14] RANAP-ServiceHandover          OPTIONAL,
    bssmap-ServiceHandoverList          [15] BSSMAP-ServiceHandoverList     OPTIONAL,
    asciCallReference                   [20] ASCI-CallReference             OPTIONAL,
    geran-classmark                     [16] GERAN-Classmark                OPTIONAL,
    iuCurrentlyUsedCodec                [17] Codec                          OPTIONAL,
    iuSupportedCodecsList               [18] SupportedCodecsList            OPTIONAL,
    rab-ConfigurationIndicator          [19] NULL                           OPTIONAL,
    uesbi-Iu                            [21] UESBI-Iu                       OPTIONAL,
    imeisv                              [xx] IMEI                           OPTIONAL    }
```

```
BSSMAP-ServiceHandoverList ::= SEQUENCE SIZE (1.. maxNumOfServiceHandovers) OF
                               BSSMAP-ServiceHandoverInfo
```

```
BSSMAP-ServiceHandoverInfo ::= SEQUENCE {
    bssmap-ServiceHandover              BSSMAP-ServiceHandover,
    rab-Id                              RAB-Id,
    -- RAB Identity is needed to relate the service handovers with the radio access bearers.
    ...}
```

```
maxNumOfServiceHandovers  INTEGER ::= 7
```

Modification end

3GPP TSG-CN WG4 Meeting #26 **N4-050299**
Sydney, Australia, 14th to 18th February 2005

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.205** **CR** **045** ⌘ **rev** **7** ⌘ Current version: **6.0.0** ⌘

*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 ☒

Title:	⌘	Addition of the trace package
Source:	⌘	CN4
Work item code:	⌘	OEM -Trace
Date:	⌘	15.2.2005
Category:	⌘	**B**
Release:	⌘	Rel-6

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)*
Rel-7	*(Release 7)*

Reason for change:	⌘	This contribution introduces the trace feature used in the MSC, GERAN, UTRAN and packet switched core network to the splitted MSC in the Bearer Independent Architecture. This far the MGW has been the only NE that is not capable for tracing. In order to utilise the trace in the MGW, MSC server should be capable for sending trace activation to the MGW like it sends the activation to GERAN, UTRAN and another MSC server in the case of HO. The introduction of the trace in the 23.205 enables to make needed additions to 29.232 to enable activation. In the MGW the tracing is used to collect user plane specific data e.g. IP statistics on Nb interface. Those statistics are going to be very useful for network monitoring purpose or in the network run up.
Summary of change:	⌘	Addition of Subscriber and equipment trace
Consequences if not approved:	⌘	Trace functionality will remain resctricted and not according to the approved TS 32.422.

Clauses affected:	⌘	2, New chapter after 6.1.3, 14.z (New chapter after 14.7), 16.2			
Other specs affected:	⌘	**Y** / **N**	Other core specifications	⌘	TS 29.232 CR060
		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.

****** Start of first modification******

2 References

.

.

.

[xx] 3GPP TS 32.421: " Subscriber and equipment trace: Trace concepts and requirements ".

[yy] 3GPP TS 32.422: “Subscriber and equipment trace: Trace control and configuration management”

[zz] 3GPP TS 32.423: “Subscriber and equipment trace: Trace data definition and management”

****** End of first modification******

****** Start of second modification******

6.1 Basic Mobile Originating Call

6.1.x Forward bearer establishment with Trace Session Activation

The mobile originating call shall be established in accordance with 3GPP TS 23.108 [17]. The following clauses describe the additional requirements for the bearer independent CS core network if a trace session is activated from a MSC Server to a MGW.

6.1.x.1 Trace activation

When a Trace Session is activated in the MSC Server and the trace control and configuration parameters requires Trace Session activation to the MGW, the MSC Server activates the Trace Session to the MGW by using the trace activation procedure.

6.1.x.2 Example

Figure 6.1.x.1 shows the network model for the mobile originating call. The "squared" line represents the call control signalling. The "dotted" line represents the bearer control signalling (not applicable in A/Gb mode for the A-interface) and the bearer. The MSC server seizes one context with two bearer terminations in the MGW. The bearer termination T1 is used for the bearer towards the RNC/BSC and the bearer termination T2 is used for the bearer towards the succeeding MGW.

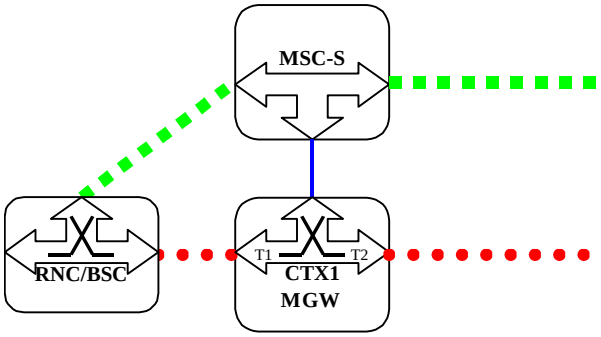


Figure 6.x.1: Basic Mobile Originating Call, Forward Bearer Establishment with Trace Session Activation (network model)

Figure 6.x.2 shows the message sequence chart example for the mobile originating call. In the example the MSC server activates the Trace Session to MGW when it request the creation of the incoming and outgoing termination with ADD request. MGW sends the Trace Session Activation result with NOTIFY request to MSC Server.

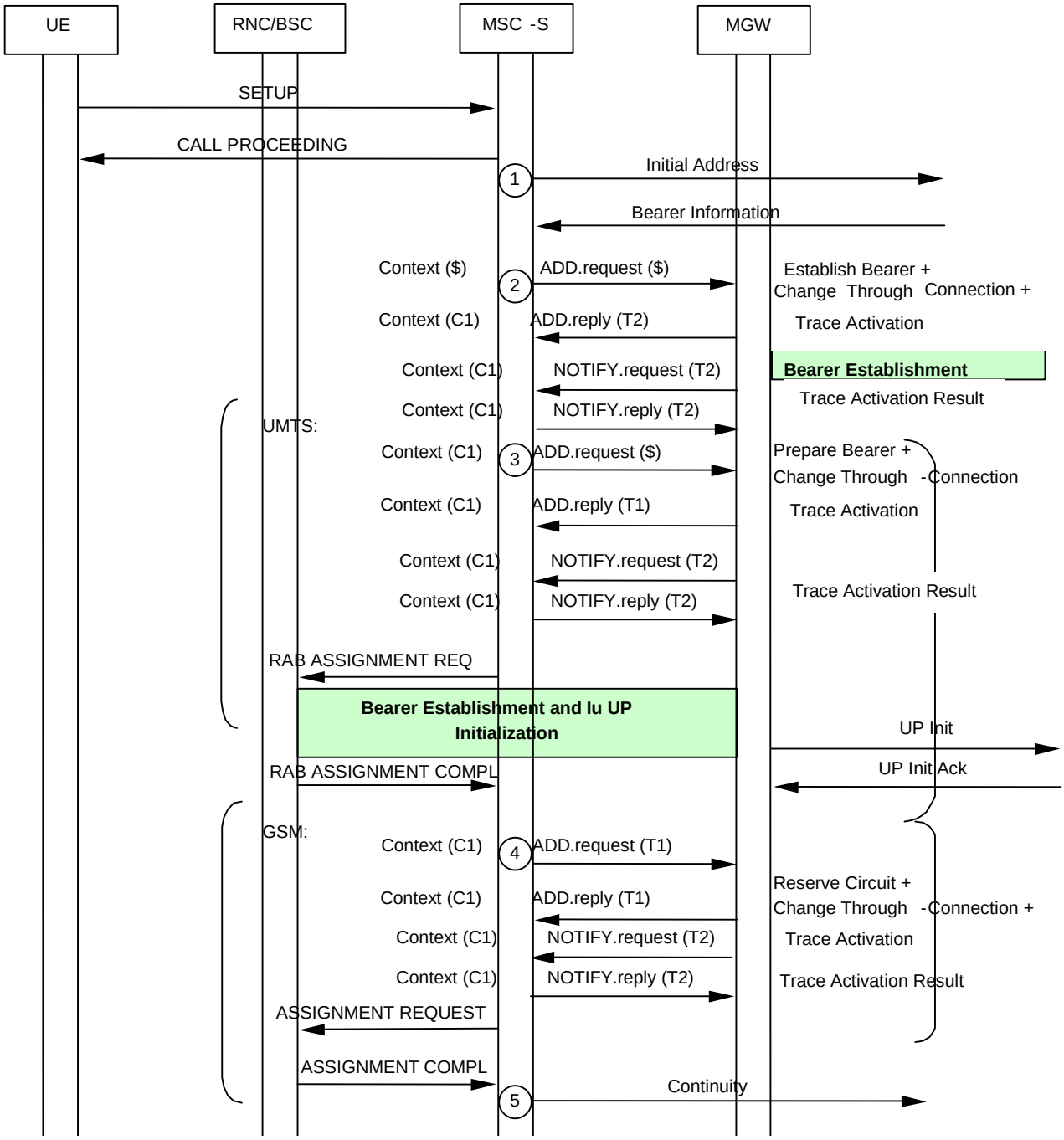


Figure 6.x.2/1: Basic Mobile Originating Call, Forward Bearer Establishment with Trace Session Activation (message sequence chart)

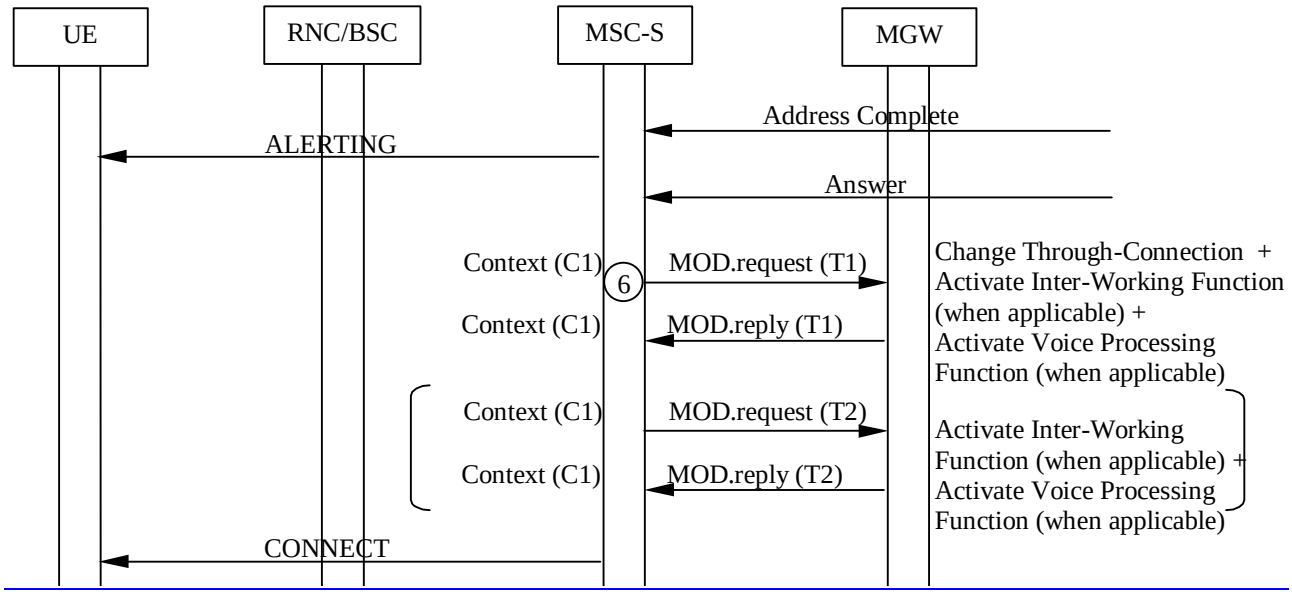


Figure 6.x.2/2: Basic Mobile Originating Call, Forward Bearer Establishment with Trace Session Activation (message sequence chart continue)

****** End of second modification******

****** Start of third modification******

14.z Subscriber and equipment trace

For the subscriber and equipment trace the MSC server may be activated for tracing (see 3GPP 32.421 [34]). Besides performing trace record generation, if Signalling based activation the MSC server shall forward the Trace Session activation to GERAN with BSSAP signaling, UTRAN with RANAP signaling (see 3GPP TS 25.413) and if the trace control and configuration parameters are defined so, the MGW. For detailed description of trace session activation mechanism see 3GPP TS 32.422 [yy]. The activation to the MGW is sent using a trace package which is included either to the Add or Modify command(s) in mobile originated call or mobile terminating call. In the case of handovers where new termination is created the trace package is also included into the Add command. If the MSC does not receive the optional trace interface list IE in the trace activation request it shall request tracing on all terminations that support the total MGW trace interfaces as defined in TS 32.422. The MSC Server shall only set the trace interface list value that is associated to the interface that the termination supports and optionally the Mc interface trace value if requested from the HLR. The content of the trace records generated in the MSC server and the MGW will follow the rules of 3GPP TS 32.421[xx] and 3GPP TS 32.422[yy], 3GPP TS 32.423 [zz]. The content of the MGW and MSC Server trace record is described in TS 32.423 [zz]

****** End of third modification******

****** Start of fourth modification******

16.2.48 Modify IP Transport Address

This procedure is used when IuCS on IP is supported by the MGW and IuUP in transparent mode is configured.

Table 16.49: Procedures between (G)MSC server and MGW: RNC IP address notification

Procedure	Initiated	Information element name	Information element required	Information element description
Modify IP Transport Address	MSC-S	Context	M	This information element indicates the context for the IP bearer termination.
		Bearer Termination	M	This information element indicates the IP bearer termination where the RNC IP Address is needed.
		IP Transport address	M	This information element indicates the IP address of the RNC
		Iu UDP Port	M	This information element indicates the Iu UDP Port in the RNC
Modify IP Address Ack	MGW	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the IP bearer termination where the command is executed.

16.2.xx Trace Activation

This procedure is used for activation of a Trace Session in a MGW.

Table 16.yy: Procedures between (G)MSC server and MGW: Trace Activation

Procedure	Initiated	Information element name	Information element required	Information element description
Trace Activation	MSC-S	Context	M	This information element indicates the context for the command.
		Bearer Termination	M	This information element indicates the bearer termination(s) for the command.
		Trace Reference	C	Defined in 3GPP TS 32.421 and 3GPP TS 32.422
		Trace Session Recording Reference	C	Defined in 3GPP TS 32.421 and 3GPP TS 32.422
		Triggering Events	C	Defined in 3GPP TS 32.421 and 3GPP TS 32.422
		Trace Depth	C	Defined in 3GPP TS 32.421 and 3GPP TS 32.422
		List of interfaces	O	Defined 3GPP TS 32.422
		Trace Activity Control	M	This information element indicates the trace activation)
		IMSI	C	This information element shows the IMSI of the traced subscriber. Either IMSI or IMEI(SV) must be provided.
		IMEI(SV)	C	This information element shows the IMEI(SV) of the traced equipment. Either IMSI or IMEI(SV) must be provided.
		Notify Trace Activation result	O	This information element requests a notification of the result of the trace activation.
Trace Activation Reply	MGW	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

16.2.yy Trace Deactivation

This procedure is used for deactivation of a Trace Session in a MGW..

Table 16.zz: Procedures between (G)MSC server and MGW: Trace Deactivation

Procedure	Initiated	Information element name	Information element required	Information element description
Trace Deactivation	MSC-S	Context	M	This information element indicates the context for the command.
		Bearer Termination	M	This information element indicates the bearer termination(s) for the command.
		Trace Reference	M	Defined in 3GPP TS 32.421 and 3GPP TS 32.422
		Trace Activity Control	M	This information element indicates the trace deactivation
Trace Deactivation Reply	MGW	Context	M	This information element indicates the context where the command was executed.
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed

16.2.zz Trace Activation result notification

This procedure is used for informing the MSC Server about the result of the Trace Session Activation.

Table 16.zz: Procedures between MGW and (G)MSC Server: Trace Activation result notification

Procedure	Initiated	Information element name	Information element required	Information element description
Trace Activation result notification	MGW	Context	M	This information element indicates the context for the command
		Bearer Termination	M	This information element indicates the bearer termination(s) for the command
		Result	M	This information element defines the result of the Trace Session Activation
Trace Activation result notification Ack	MSC-S	Context	M	This information element indicates the context where the command was executed
		Bearer Termination	M	This information element indicates the bearer termination where the command was executed.

17 Bearer Redirect

****** End of fourth modification******

3GPP TSG-CN WG4 Meeting #26 ***N4-050304***
Sydney, Australia, 14th to 18th February 2005

CR-Form-v7.1

CHANGE REQUEST

⌘ **29.232** **CR** **060** ⌘ **rev** **7** ⌘ Current version: **6.0.0** ⌘

*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 ☒

Title:	⌘	Addition of the trace package
Source:	⌘	Cn4
Work item code:	⌘	OEM -Trace
Date:	⌘	15.2.2005
Category:	⌘	**B**
Release:	⌘	Rel-6

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)*
Rel-7	*(Release 7)*

Reason for change:	⌘	This contribution adds a new optional UMTS package for the TS 29.232. The new package will enable MSC server to activate user plane traffic specific functionalities of the subscriber and equipment trace in the MGW. There is a need for tracing as described in 3GPP 32.421. Trace may be implemented partly in the MSC server and partly in the MGW. At the moment there is not any mechanism to activate the trace feature in the MGW using H.248 protocol. This contribution adds the new optional UMTS package for H.248.
Summary of change:	⌘	Addition of the trace package
Consequences if not approved:	⌘	Trace functionality not supported in MGW

Clauses affected:	⌘	2, 10, 14.2, 15.2			
Other specs affected:	⌘	**Y**	**N**		
		X		Other core specifications	⌘ TS 23.205 CR045
			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.

****** Start of first modification******

2 References

.

.

.

[xx] 3GPP TS 32.421: " Subscriber and equipment trace: Trace concepts and requirements ".

[yy] 3GPP TS 32.422: “Subscriber and equipment trace: Trace control and configuration management”

[zz] 3GPP TS 32.423: “Subscriber and equipment trace: Trace data definition and management”

****** End of first modification******

****** Start of second modification******

10 Formats and codes

Table 1 shows the parameters which are required, in addition to those defined in the subclause "Formats and Codes" of ITU-T Recommendation Q.1950 [23] (see 3GPP TS 29.205 [7]).

The coding rules applied in ITU-T Recommendation H.248.1 [10] for the applicable coding technique shall be followed for the UMTS capability set.

Table 1: Additional parameters required

actprot	Signal descriptor	As for the signal "Activate protocol" in subclause 15.1.2.3
Mode	Local control	As for the property "UP mode of operation" in subclause 15.1.1.1
Version	Local control	As for the property "Upversion" in subclause 15.1.1.1
Value	Local control	As for the property " Delivery of erroneous SDUs" in subclause 15.1.1.1
Interface	Local control	As for the property " Interface" in subclause 15.1.1.1
Initdirection	Local control	As for the property " Initialization Direction" in subclause 15.1.1.1
PLMN bearer capability	Local control	As for the property "PLMN BC" in subclause 15.1.2.1
Coding	Local control	As for the property " GSM channel coding" in subclause 15.1.2.1
Tfoenable	Local control	As for the property " TFO activity control" in subclause 15.1.3.1
Codeclist	Local control	As for the property" TFO Codec List" in subclause 15.1.3.1
Result	ObservedEvent descriptor	As for the ObservedEventDescriptor parameter "Protocol Negotiation Result" in subclause 15.1.2.2
Cause	ObservedEvent descriptor	As for the ObservedEventDescriptor parameter "Protocol Negotiation Result" in subclause 15.1.2.2
Rate	ObservedEvent descriptor	As for the ObservedEventDescriptor parameter "Rate Change" in subclause 15.1.2.2
Optimalcodec	ObservedEvent descriptor	As for the ObservedEventDescriptor parameter "Optimal Codec Type" in subclause 15.1.3.2
Distlist	ObservedEvent descriptor	As for the ObservedEventDescriptor parameter "Distant TFO List" in subclause 15.1.3.2
Off / value	Local control	As for the property "Echo cancelling" in subclause E.13.1 in ITU-T Recommendation H.248.1 [10]
Error	Error descriptor	As defined in the subclause "Command error code" in ITU-T Recommendation H.248.1 [10]
Reduction	ObservedEvent descriptor	As for the ObserverdEventDescriptor in "MGW Resource Congestion Handling– Indication" in subclause 14.1.15.
Bearer Modification Support	EventDescriptor	As for the EventsDescriptor in "Bearer Modification Support" in subclause 15.1.4.2.
Bearer modification possible	ObservedEvent descriptor	As for the ObserverdEventDescriptor in "Bearer Modification Support" in subclause 15.1.4.2.
Ctmstate	TerminationState	As for the TerminationState "Text termination connection state" in subclause 15.1.6.1.
Ctmtransport	Local control	As for the property "Text Transport" in subclause 15.1.6.1.
Ctmtext version	Local control	As for the property " Text Protocol Version" in subclause 15.1.6.1.
Connchng	ObservedEventDescriptor	As for the ObservedEventDescriptor " Connection State Change in subclause 15.1.6.2
Ctmbits	Statistics descriptor	As for the Statistics descriptor "Characters Transferred" in subclause 15.1.6.4
Bitrate	Local control	As for the property" Bitrate" in subclause 15.1.7.1
Ipaddress	Local control	As for the property" IP transport address" in subclause 15.1.8.1
UDPport	Local control	As for the property" UDP port " in subclause 15.1.8.1
Flextone	Local control	As for the signal "Flexible Tone " in subclause 15.1. 9.1
Trace reference	Local control	As for the property "Trace Reference" in subclause 15.2.1.1
Trace Recording Session Reference	Local control	As for the property "Trace Recording Session Reference" in subclause 15.2.1.1
Trace Depth	Local control	As for the property "Trace Depth" in subclause 15.2.1.1
Triggering events	Local control	As for the property "Triggering events" in subclause 15.2.1.1
List of interfaces	Local control	As for the property "List of interfaces" in subclause 15.2.1.1
IMSI	Local control	As for the property "IMSI" in subclause 15.2.1.1
IMEI(SV)	Local control	As for the property "IMEI(SV)" in subclause 15.2.1.1
Trace activativity request	Local control	As for the property "Trace Activation Control" in subclause 15.2.1.1
Trace Activation Result	ObservedEventDescriptor	As for the ObservedEventDescriptor " Trace Activation result" in subclause 15.2.1.2

****** End of second modification******

****** Start of third modification******

14.2.44 Confirm Bearer Characteristics

This procedure is the same as that defined in the subclause "Confirm Char" in ITU-T Recommendation Q.1950 [23] (see 3GPP TS 29.205 [7]) with additions as shown below.

Address Information	Control information	Bearer information
	If framing protocol used: UP mode = mode UPversion =version Delivery of erroneous SDUs=value Interface=interface Initdirerection=initdirection	

If the "Confirm Bearer Characteristics" procedure contains a codec that is not currently in use at the Termination when it receives this procedure, and if the framing protocol is used in support mode, the MGW shall be prepared to handle a framing protocol initialisation. If the "Confirm Bearer Characteristics" contains no codec or the codec that is already in use at the Termination when it receives this procedure, the MGW does not need to be prepared to handle a framing protocol initialisation.

14.2.xx Trace activation/deactivation

This procedure is activated when the "Trace activation/deactivation" procedure is initiated.

An ADD.req or MOD.req -command is sent with the following information.

1 ADD.req/MOD.req (Trace activation/deactivation) MGC to MGW

Address Information	Control information	Bearer information
	Transaction ID = z Termination ID = bearer1 Context ID = c1 Trace Reference Trace Recording Session Reference Trace Depth Triggering events List of interfaces IMSI IMEI(SV) Trace activity control = trace activity request If indication on Trace Activation Result requested: NotificationRequested (Event ID = x, "Trace activation result")	

Upon completion of processing command (1) an ADD.resp or MOD.resp command (2) is sent.

2 ADD.resp/MOD.resp/ MGW to MGC

Address Information	Control information	Bearer information
	Transaction ID = z Context ID = c1 TerminationID = bearer1	

14.2.xx Trace Activation result notification

When the procedure "Trace Activation result notification" is required, the following procedure is initiated:

The MGW sends a NOT.req command with the following information to indicate the result of the trace activation.

1 NOT.req (Trace Activation result Notification) MGW to MGC

Address Information	Control information	Bearer information
	Transaction ID = z Context ID = c1 Termination ID = bearer1 Event_ID (Event ID = x, "Trace activation result")	

When the processing of command (1) is complete, the MGC initiates the following procedure.

2 NOT.resp (Trace Activation result Notification) MGC to MGW

Address Information	Control information	Bearer information
	Transaction ID = z Context ID = c1 Termination ID = bearer1	

15 UMTS packages

****** End of third modification******

****** Start of fourth modification******

15.2 Optional UMTS packages

~~Void.~~

15.2.1 Trace Package

PackageID: calltrace (0x####)

[Editor's note: PackageID to be allocated by IANA]

Version: 1

Extends: None

This package defines properties for subscriber and equipment trace activation and deactivation properties to be attached to the trace record generated by MGW.

15.2~~.~~.1.1 Properties

Trace Activation Control

PropertyID: traceactivityrequest(0x0001)

Description: Defines if trace is activated or deactivated.

Type: Bool

Possible Values:

"on" (true): Trace Session is activated in MGW

"off" (false): Trace Session is deactivated in MGW

Defined in: Local Control descriptor

Characteristics: Read/Write

IMSI

PropertyID: imsi(0x0002)

Description: IMSI number of the traced subscriber to be attached to the trace record. Used for record identification like trace reference.

Type: Octet string

Possible Values: The IMSI is coded as defined in 3GPP TS 23.003.

Defined in: Local descriptor

Characteristics: Read/Write

IMEI(SV)

PropertyID: imei(sv)(0x0003)

Description: IMEI(SV) number of the traced equipment to be attached to the trace record. Used for record identification like trace reference.

Type: Octet string

Possible Values: The IMEI(SV) is coded as defined in 3GPP TS 23.003.

Defined in: Local descriptor

Characteristics: Read/Write

Trace Reference

PropertyID: tracereference(0x0004)

Description: Reference number to identify different Trace Session in OSS as defined in 3GPP TS 32.421 and 3GPP TS 32.422.

Type: Octet string

Possible Values: OSS (EM) defines when activating a Trace Session

Defined in: Local descriptor

Characteristics: Read/Write

Trace Recording Session Reference

PropertyID: tracerecsessionref(0x0005)

Description: A unique identifier within the Trace Session for identifying the Trace Recording sessions. Defined in 3GPP TS 32.421 and in 3GPP TS 32.422.

Type: Octet string

Possible Values: Described in 3GPP 32.422

Defined in: Local descriptor

Characteristics: Read/Write

Trace Depth

PropertyID: tracedepth(0x0006)

Description: Trace Depth as defined in 3GPP TS 32.421

Type: Enumaration

Possible Values: Defined in 3GPP TS 32.422

Defined in: Local descriptor

Characteristics: Read/Write

Triggrering Events

PropertyID: triggeringevent(0x0007)

Description: Triggrering Events as defined in 3GPP TS 32.422.

Type: Octet string

Possible Values: Defined in 3GPP TS 32.422.

Defined in: Local descriptor

Characteristics: Read/Write

List of interfaces

PropertyID: listofinterfaces(0x0008)

Description: List of interfaces to trace as defined in 3GPP TS 32.422

Type: Octet string

Possible Values: Defined in 3GPP TS 32.422

Defined in: Local descriptor

Characteristics: Read/Write

15.2.1.2 Events

Trace result

EventID: tracact (0x0001)

Description: Notification to the MSC Server if trace activation was successful/unsuccessfull in the MGW.

EventDescriptor parameters: None

ObservedEventsDescriptor parameters:

Result: Trace Activation Result

res (0x0001)

Type: enumeration

Possible values:

success (0x0001): “Trace Succesfully activated”

failure (0x0000): “Failure in trace activation”

15.2.1.3 Signals

None

15.2.1.4 Statistics

None

15.2.1.5 Procedures

For the network level procedures of the tracing see 3GPP 32.422.

For the trace records of the MGW see 3GPP 32.423

In H.248 interface MSC Server uses 'Trace Activity Control' property to indicate MGW that a termination should be placed under trace or should be taken out of trace. In the call establishing phase MSC Server sets trace package information into proper command (Add or Modify) associated to the termination to be traced. Tracing can be activated either by giving IMEI(SV) or IMSI number as a further information. MSC Server shall also provide the values for all other properties described in this package that is IMSI if trace is activated based on IMSI, IMEI(SV) if trace is activated based on IMEI(SV), Trace reference, Trace recording session reference, Trace depth, triggering events in MGW, list of interfaces in MGW. When MSC Server activates the t~~T~~race, it shall use 'Trace Activation Result' Event to detect if the Trace A~~a~~ctivation was succesful or not. MGW shall not reject the Add/Modify because of unsuccesful Trace Activation, but only send a Notification with this Event. Tracing is automatically deactivated in MGW when termination is taken out of the context in the end of the call. If the Termination is Moved to another Context, trace is automatically forwarded to new termination.

****** End of fourth modification******

3GPP TSG-CN WG4 Meeting #26 **N4-050305**
Sydney, Australia, 14th to 18th February 2005

CR-Form-v7.1

CHANGE REQUEST

⌘ **29.060** **CR** **470** ⌘ **rev** **7** ⌘ Current version: **6.7.0** ⌘

*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:	⌘	Additional Trace Information
Source:	⌘	CN4
Work item code:	⌘	OEM -Trace
Date:	⌘	16.2.2005
Category:	⌘	**B**
Release:	⌘	Rel-6

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)*
Rel-7	*(Release 7)*

Reason for change:	⌘	This contribution enhances Trace activation to GGSN to fulfill the requirements made by SA5 to Rel-6. New parameters have been added to Trace activation. - Trace Recording Session Reference (M) - Triggering events in GGSN (M) - Trace Depth (M) - List of interfaces to trace in GGSN (O) And includes also a mechanism for Trace Deactivation
Summary of change:	⌘	New IE for Additional Trace Information has been defined.
Consequences if not approved:	⌘	Trace functionality will remain restricted.

Clauses affected:	⌘	2, 7.3.1, 7.3.3, 7.5A.1.5, 7.5A.1.7 7.7, 7.7.49

Other specs affected: ⌘	Y	N		⌘
		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.

****** Start of first modification******

2 References

.

. *Text removed for clarity*

.

[xx] 3GPP TS 32.421: " Subscriber and equipment trace: Trace concepts and requirements "

[yy] 3GPP TS 32.422: " Subscriber and equipment trace: Trace Control and Configuration Management ".

[zz] 3GPP TS 32.423: “Subscriber and equipment trace: Trace data definition and management”.

****** End of first modification******

****** Start of second modification******

7.3.1 Create PDP Context Request

.

. *Text removed for clarity*

.

The SGSN shall include Trace Reference, Trace Type, Trigger Id, ~~and~~ OMC Identity and Additional Trace Info (Trace reference2, Trace Recording Session Reference, triggering events in GGSN, Trace Depth, List of interfaces to trace in GGSN and Trace Activity Control) in the message if GGSN trace is activated. The SGSN shall copy Trace Reference, Trace Type, ~~and~~ OMC Identity and Additional Trace Info from the trace request received from the HLR or OMC and the Trace Activity Control shall be set to Trace Activation.

For more detailed description of Trace Session activation/deactivation procedures see 3GPP TS 32.422 [yy]

For SGSN and GGSN trace record description see 3GPP TS 32.423 [zz]

The SGSN may include the Routeing Area Identity (RAI) of the SGSN where the MS is registered. The MCC and MNC components shall be populated with the MCC and MNC, respectively, of the SGSN where the MS is registered. The LAC and RAC components shall be populated by the SGSN with the value of 'FFFE' and 'FF', respectively.

The optional Private Extension contains vendor or operator specific information.

Table 5: Information Elements in a Create PDP Context Request

Information element	Presence requirement	Reference
IMSI	Conditional	7.7.2
Routeing Area Identity (RAI)	Optional	7.7.3
Recovery	Optional	7.7.11
Selection mode	Conditional	7.7.12
Tunnel Endpoint Identifier Data I	Mandatory	7.7.13
Tunnel Endpoint Identifier Control Plane	Conditional	7.7.14
NSAPI	Mandatory	7.7.17
Linked NSAPI	Conditional	7.7.17
Charging Characteristics	Conditional	7.7.23
Trace Reference	Optional	7.7.24
Trace Type	Optional	7.7.25
End User Address	Conditional	7.7.27
Access Point Name	Conditional	7.7.30
Protocol Configuration Options	Optional	7.7.31
SGSN Address for signalling	Mandatory	GSN Address 7.7.32
SGSN Address for user traffic	Mandatory	GSN Address 7.7.32
MSISDN	Conditional	7.7.33
Quality of Service Profile	Mandatory	7.7.34
TFT	Conditional	7.7.36
Trigger Id	Optional	7.7.41
OMC Identity	Optional	7.7.42
APN Restriction	Optional	7.7.49
RAT Type	Optional	7.7.50
User Location Information	Optional	7.7.51
MS Time Zone	Optional	7.7.52
IMEI(SV)	Optional	7.7.53
CAMEL Charging Information Container	Optional	7.7.54
Additional Trace Info	Optional	7.7.xx
Private Extension	Optional	7.7.46

****** End of second modification******

****** Start of third modification******

7.3.3 Update PDP Context Request

.

. Text removed for clarity

.

The SGSN shall include Trace Reference, Trace Type, Trigger Id, ~~and~~ OMC Identity and Additional Trace Info (Trace reference 2, Trace Recording Session Reference, triggering events in GGSN, Trace Depth, List of interfaces to trace in GGSN and Trace Activity Control) in the message if GGSN trace is activated while the PDP context is active. The SGSN shall copy Trace Reference, Trace Type, ~~and~~ OMC Identity and Additional Trace Info from the trace request

received from the HLR or OMC and the Trace Activity Control of the Additional Trace Info shall be set to Trace Activation.

If SGSN deactivates the Trace Session to GGSN, the SGSN shall include the Additional Trace Info in the message and the Trace Activity Control shall be set to Trace Deactivation.

For more detailed description of Trace Session activation/deactivation procedures see 3GPP TS 32.422 [yy]

For SGSN and GGSN trace record description see 3GPP TS 32.423 [zz]

The SGSN may include the Routeing Area Identity (RAI) of the SGSN where the MS is registered. The MCC and MNC components shall be populated with the MCC and MNC, respectively, of the SGSN where the MS is registered. The LAC and RAC components shall be populated by the SGSN with the value of 'FFFE' and 'FF', respectively.

The optional Private Extension contains vendor or operator specific information.

The MS includes the Protocol Configuration Options (PCO) information element in the request if the MS wishes to provide the GGSN with application specific parameters. The SGSN includes this IE in the Update PDP Context Request if the associated Modify PDP Context Request from the MS includes protocol configuration options. The SGSN shall copy the content of this IE transparently from the content of the PCO IE in the Modify PDP Context Request message.

Table 7: Information Elements in an SGSN-Initiated Update PDP Context Request

Information element	Presence requirement	Reference
IMSI	Conditional	7.7.2
Routeing Area Identity (RAI)	Optional	7.7.3
Recovery	Optional	7.7.11
Tunnel Endpoint Identifier Data I	Mandatory	7.7.13
Tunnel Endpoint Identifier Control Plane	Conditional	7.7.14
NSAPI	Mandatory	7.7.17
Trace Reference	Optional	7.7.24
Trace Type	Optional	7.7.25
Protocol Configuration Options	Optional	7.7.31
SGSN Address for Control Plane	Mandatory	GSN Address 7.7.32
SGSN Address for User Traffic	Mandatory	GSN Address 7.7.32
Alternative SGSN Address for Control Plane	Conditional	GSN Address 7.7.32
Alternative SGSN Address for User Traffic	Conditional	GSN Address 7.7.32
Quality of Service Profile	Mandatory	7.7.34
TFT	Optional	7.7.36
Trigger Id	Optional	7.7.41
OMC Identity	Optional	7.7.42
RAT Type	Optional	7.7.50
User Location Information	Optional	7.7.51
MS Time Zone	Optional	7.7.52
Additonal Trace Info	Optional	7.7.xx
Private Extension	Optional	7.7.46

. Text removed for clarity

.

****** End of third modification******

**** Start of fourth modification****

7.5A.1.5 Create MBMS Context Request

Text removed for clarity

The SGSN shall include an SGSN Address for control plane, which may differ from that provided by the underlying network service (e.g. IP). The GGSN shall store the SGSN Address and use them when sending control plane on this GTP tunnel for the UE.

The SGSN shall include a Recovery information element into the Create PDP Context Request if the SGSN is in contact with the GGSN for the very first time or if the SGSN has restarted recently and the new Restart Counter value has not yet been indicated to the GGSN. The GGSN that receives a Recovery information element in the Create MBMS Context Request message element shall handle it in the same way as when receiving an Echo Response message.

The SGSN shall include Trace Reference, Trace Type, Trigger Id, OMC Identity and Additional Trace Info in the message if GGSN trace is activated in the GGSN. The SGSN shall copy Trace Reference, Trace Type, and OMC Identity from the trace request received from the HLR or OMC and the Trace Activity Control shall be set to Trace Activation.

For more detailed description of Trace Session activation/deactivation procedures see 3GPP TS 32.422 [yy]

For SGSN and GGSN trace record description see 3GPP TS 32.423 [zz]

The SGSN shall include the Routeing Area Identity (RAI) of the SGSN where the UE is registered. The MCC and MNC components shall be populated with the MCC and MNC, respectively, of the SGSN where the UE is registered. The LAC and RAC components shall be populated by the SGSN with the value of 'FFFE' and 'FF', respectively.

The optional Private Extension contains vendor or operator specific information.

Table 7.5A.5: Information Elements in a Create MBMS Context Request

Information element	Presence requirement	Reference
IMSI	Conditional	7.7.2
Routeing Area Identity (RAI)	Mandatory	7.7.3
Recovery	Optional	7.7.11
Selection mode	Conditional	7.7.12
Tunnel Endpoint Identifier Control Plane	Conditional	7.7.14
NSAPI	Mandatory	7.7.17
Trace Reference	Optional	7.7.24
Trace Type	Optional	7.7.25
End User Address	Mandatory	7.7.27
Access Point Name	Mandatory	7.7.30
SGSN Address for signalling	Mandatory	GSN Address 7.7.32
MSISDN	Conditional	7.7.33
Trigger Id	Optional	7.7.41
OMC Identity	Optional	7.7.42
Additonal Trace Info	Optional	7.7.xx
Private Extension	Optional	7.7.46

Text removed for clarity

**** End of fourth modification****

**** Start of fifth modification****

7.5A.1.7 Update MBMS Context Request

An Update MBMS Context Request message shall be sent from a SGSN to a GGSN as part of the GPRS Inter SGSN Routeing Update procedure or to redistribute contexts due to load sharing. The message shall be sent by the new SGSN at the Inter SGSN Routeing Update procedure. The GGSN shall update the MBMS UE context fields accordingly.

The NSAPI information element together with the Tunnel Endpoint Identifier in the GTP header unambiguously identifies a MBMS Context in the GGSN.

The IMSI shall be included if the message is sent during an Inter SGSN change when changing the GTP version from GTP v0 to GTP v1; this is required, as the TEID in the header of the message is set to all zeros in this case.

The Tunnel Endpoint Identifier Control Plane field specifies a downlink Tunnel Endpoint Identifier Control Plane messages which is chosen by the SGSN. The GGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent downlink control plane messages that are related to the requested PDP context.

The SGSN shall include an SGSN Address for control plane, which may differ from that provided by the underlying network service (e.g. IP).

If an IPv4/IPv6 capable SGSN received IPv4 GGSN addresses from the old SGSN, it shall include IPv4 addresses in the fields SGSN Address for Control Plane and IPv6 addresses in the fields Alternative SGSN Address for Control Plane. Otherwise, an IPv4/IPv6 capable SGSN shall use only SGSN IPv6 addresses if it has GGSN IPv6 addresses available. If the GGSN supports IPv6 below GTP, it shall store and use the IPv6 SGSN addresses for communication with the SGSN and ignore the IPv4 SGSN addresses. If the GGSN supports only IPv4 below GTP, it shall store and use the IPv4 SGSN addresses for communication with the SGSN and ignore the IPv6 SGSN addresses. When active contexts are being redistributed due to load sharing, G-PDUs that are in transit across the Gn-interface are in an undetermined state and may be lost.

The SGSN shall include a Recovery information element into the Update MBMS Context Request if the SGSN is in contact with the GGSN for the very first time or if the SGSN has restarted recently and the new Restart Counter value has not yet been indicated to the GGSN.

The SGSN shall include Trace Reference, Trace Type, Trigger Id, ~~and~~ OMC Identity and Additional Trace Info in the message if GGSN trace is activated while the MBMS context is active. The SGSN shall copy Trace Reference, Trace Type, ~~and~~ OMC Identity and Additional Trace Info from the trace request received from the HLR or OMC and the Trace Activity Control shall be set to Trace Activation.

If SGSN deactivates the Trace Session to GGSN, the SGSN shall include the Additional Trace Info in the message and the Trace Activity Control shall be set to Trace Deactivation.

For more detailed description of Trace Session activation/deactivation procedures see 3GPP TS 32.422 [yy]

For SGSN and GGSN trace record description see 3GPP TS 32.423 [zz]

The SGSN shall include the Routeing Area Identity (RAI) of the SGSN where the UE is registered. The MCC and MNC components shall be populated with the MCC and MNC, respectively, of the SGSN where the UE is registered. The LAC and RAC components shall be populated by the SGSN with the value of 'FFFE' and 'FF', respectively.

The optional Private Extension contains vendor or operator specific information.

Table 7.5A.7: Information Elements in an Update MBMS Context Request

Information element	Presence requirement	Reference
IMSI	Conditional	7.7.2
Routeing Area Identity (RAI)	Mandatory	7.7.3
Recovery	Optional	7.7.11
Tunnel Endpoint Identifier Control Plane	Conditional	7.7.14
NSAPI	Mandatory	7.7.17
Trace Reference	Optional	7.7.24
Trace Type	Optional	7.7.25
SGSN Address for Control Plane	Mandatory	GSN Address 7.7.32
Alternative SGSN Address for Control Plane	Conditional	GSN Address 7.7.32
Trigger Id	Optional	7.7.41
OMC Identity	Optional	7.7.42
Additional Trace Info	Optional	7.7.xx
Private Extension	Optional	7.7.46

****** End of fifth modification******

****** Start of sixth modification******

7.7 Information Elements

A GTP Signalling message may contain several information elements. The TLV (Type, Length, Value) or TV (Type, Value) encoding format shall be used for the GTP information elements. The information elements shall be sorted, with the Type fields in ascending order, in the signalling messages. The Length field contains the length of the information element excluding the Type and Length field.

For all the length fields, bit 8 of the lowest numbered octet is the most significant bit and bit 1 of the highest numbered octet is the least significant bit.

Within information elements, certain fields may be described as spare. These bits shall be transmitted with the value defined for them. To allow for future features, the receiver shall not evaluate these bits.

The most significant bit in the Type field is set to 0 when the TV format is used and set to 1 for the TLV format.

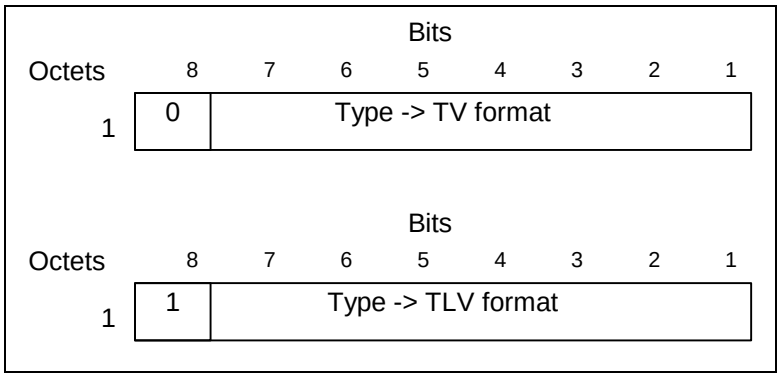


Figure 8: Type field for TV and TLV format

Table 37: Information Elements

IE Type Value	Format	Information Element	Reference
1	TV	Cause	7.7.1
2	TV	International Mobile Subscriber Identity (IMSI)	7.7.2
3	TV	Routeing Area Identity (RAI)	7.7.3
4	TV	Temporary Logical Link Identity (TLLI)	7.7.4
5	TV	Packet TMSI (P-TMSI)	7.7.5
6-7	Spare		
8	TV	Reordering Required	7.7.6
9	TV	Authentication Triplet	7.7.7
10	Spare		
11	TV	MAP Cause	7.7.8
12	TV	P-TMSI Signature	7.7.9
13	TV	MS Validated	7.7.10
14	TV	Recovery	7.7.11
15	TV	Selection Mode	7.7.12
16	TV	Tunnel Endpoint Identifier Data I	7.7.13
17	TV	Tunnel Endpoint Identifier Control Plane	7.7.14
18	TV	Tunnel Endpoint Identifier Data II	7.7.15
19	TV	Teardown Ind	7.7.16
20	TV	NSAPI	7.7.17
21	TV	RANAP Cause	7.7.18
22	TV	RAB Context	7.7.19
23	TV	Radio Priority SMS	7.7.20
24	TV	Radio Priority	7.7.21
25	TV	Packet Flow Id	7.7.22
26	TV	Charging Characteristics	7.7.23
27	TV	Trace Reference	7.7.24
28	TV	Trace Type	7.7.25
29	TV	MS Not Reachable Reason	7.7.25A
30	TV	Radio Priority LCS	7.7.25B
117-126	Reserved for the GPRS charging protocol (see GTP' in 3GPP TS 32.215 [18])		
127	TV	Charging ID	7.7.26
128	TLV	End User Address	7.7.27
129	TLV	MM Context	7.7.28
130	TLV	PDP Context	7.7.29
131	TLV	Access Point Name	7.7.30
132	TLV	Protocol Configuration Options	7.7.31
133	TLV	GSN Address	7.7.32
134	TLV	MS International PSTN/ISDN Number (MSISDN)	7.7.33
135	TLV	Quality of Service Profile	7.7.34
136	TLV	Authentication Quintuplet	7.7.35
137	TLV	Traffic Flow Template	7.7.36
138	TLV	Target Identification	7.7.37
139	TLV	UTRAN Transparent Container	7.7.38

IE Type Value	Format	Information Element	Reference
140	TLV	RAB Setup Information	7.7.39
141	TLV	Extension Header Type List	7.7.40
142	TLV	Trigger Id	7.7.41
143	TLV	OMC Identity	7.7.42
144	TLV	RAN Transparent Container	7.7.43
145	TLV	PDP Context Prioritization	7.7.45
146	TLV	Additional RAB Setup Information	7.7.45A
147	TLV	SGSN Number	7.7.47
148	TLV	Common Flags	7.7.48
149	TLV	APN Restriction	7.7.49
150	TLV	Radio Priority LCS	7.7.25B
151	TLV	RAT Type	7.7.50
152	TLV	User Location Information	7.7.51
153	TLV	MS Time Zone	7.7.52
154	TLV	IMEI(SV)	7.7.53
155	TLV	CAMEL Charging Information Container	7.7.54
156	TLV	MBMS UE Context	7.7.55
157	TLV	Temporary Mobile Group Identity (TMGI)	7.7.56
YYY	TLV	Additional Trace Info	7.7.xx
239-250	Reserved for the GPRS charging protocol (see GTP' in 3GPP TS 32.215 [18])		
251	TLV	Charging Gateway Address	7.7.44
252-254	Reserved for the GPRS charging protocol (see GTP' in 3GPP TS 32.215 [18])		
255	TLV	Private Extension	7.7.46

****** End of sixth modification******

****** Start of seventh modification******

7.7.xx Additional Trace Info

The additional Trace Info is used to inform the GGSN of the additional trace parameters. An Additional Trace Info consists of Trace Reference2, Trace Recording Session Reference, triggering events in GGSN, Trace Depth, List of interfaces to trace in GGSN and a Trace Activity Control. The encoding are defined in 3GPP TS 33.422 [yy].

The Trace Activity Control is used to indicate to GGSN whether the Trace is activated or deactivated.

Octets	Bits 8	7	6	5	4	3	2	1
1	Type =zzz (Decimal)							
2-3	Length							
4-6~~n~~	Trace Reference2							
	Trace Recording Session Reference							
7-8	Triggering events in GGSN							
9	Trace Depth							
10	List of interfaces in GGSN							
11	Trace Activity Control							

Figure xx: Additional Trace Info Information Element

Trace Activity Control	Value (Decimal)
Trace Activation	1
Trace Deactivation	0
All other values are reserved	

****** End of seventh modification******

3GPP TSG-CN WG4 Meeting #26 **N4-050306**
Sydney, Australia, 14th to 18th February 2005

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.008** **CR** **134** ⌘ **rev** **4** ⌘ Current version: **6.4.0** ⌘

*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 ☒

Title:	⌘	Adding trace control and configuration parameters to subscriber data in HSS
Source:	⌘	CN4
Work item code:	⌘	OAM-Trace
Date:	⌘	16.2.2005
Category:	⌘	**B**
Release:	⌘	Rel-6

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:

Ph2	*(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)*
Rel-7	*(Release 7)*

Reason for change:	⌘	Rel-6 trace functionality requires permanent storage for new trace parameters in the HSS.
Summary of change:	⌘	Trace control and configuration parameters as defined in 3GPP TS 32.422 are included to the subscriber data.
Consequences if not approved:	⌘	The trace functionality defined in 3GPP TS 32.42x series specifications and 3GPP TS 23.008 will not be consistent.

Clauses affected:	⌘	0.1, 2.11, 5.

		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.

Change in Clause 0.1

0.1 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] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 22.002: "Circuit Bearer Services (BS) supported by a Public Land Mobile Network (PLMN)".

[3] 3GPP TS 22.003: "Circuit Teleservices supported by a Public Land Mobile Network (PLMN)".

[4] 3GPP TS 22.004: "General on supplementary services".

[5] 3GPP TS 23.003: "Numbering, addressing and identification".

[6] 3GPP TS 23.007: "Restoration procedures".

[7] 3GPP TS 23.009: "Handover procedures".

[8] 3GPP TS 23.012: "Location Management Procedures".

[9] 3GPP TS 23.015: "Technical realization of Operator Determined Barring (ODB)".

[10] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS)".

[11] 3GPP TS 22.060: "General Packet Radio Service (GPRS); Service description; Stage 1".

[12] 3GPP TS 23.067: "Enhanced Multi-Level Precedence and Preemption service (EMLPP); Stage 2".

[13] 3GPP TS 23.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL); Stage 2".

[14] 3GPP TS 23.081: "Line identification supplementary services; Stage 2".

[15] 3GPP TS 23.082: "Call Forwarding (CF) Supplementary Services; Stage 2".

[16] 3GPP TS 23.083: "Call Waiting (CW) and Call Hold (HOLD) Supplementary Services; Stage 2".

[17] 3GPP TS 23.084: "Multi Party (MPTY) Supplementary Service; Stage 2".

[18] 3GPP TS 23.085: "Closed User Group (CUG) Supplementary Service; Stage 2".

[19] 3GPP TS 23.086: "Advice of Charge (AoC) Supplementary Service; Stage 2".

[20] 3GPP TS 23.088: "Call Barring (CB) Supplementary Service; Stage 2".

[21] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service Description; Stage 2".

[22] 3GPP TS 23.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL); Stage 2".

[23] 3GPP TS 23.090: "Unstructured Supplementary Service Data (USSD); Stage 2".

[24] 3GPP TS 23.116: "Super-Charger Technical Realization; Stage 2."

[25] 3GPP TS 23.135: "Multicall supplementary service; Stage 2"

[26] 3GPP TS 24.008: "Mobile radio interface Layer 3 specification; Core network protocols; Stage 3".

[27] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[28] 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)".

[29] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp interface".

[30] 3GPP TS 42.032: "Digital cellular telecommunications system (Phase 2+); Immediate Service Termination (IST) Service description - Stage 1".

[31] 3GPP TS 43.020: "Digital cellular telecommunications system (Phase 2+); Security-related network functions".

[32] 3GPP TS 43.035: "Digital cellular telecommunications system (Phase 2+); Immediate Service Termination (IST); Stage 2".

[33] 3GPP TS 43.068: "Digital cellular telecommunications system (Phase 2+); Voice Group Call Service (VGCS); Stage 2".

[34] 3GPP TS 43.069: "Digital cellular telecommunications system (Phase 2+); Voice Broadcast Service (VBS); Stage 2".

[35] 3GPP TS 23.071: "Location Services (LCS); Functional Description; Stage 2".

[36] GSM 12.03: "Digital cellular telecommunications system (Phase 2+) (GSM); Security management".

[37] 3GPP TS~~GSM~~ 5~~1~~2.008: "~~Digital cellular telecommunications system (Phase 2+) (~~GSM~~);~~ Subscriber and equipment trace".

[38] ITU-T Recommendation Q.763: "Signalling System No. 7 - ISDN User Part formats and codes".

[39] ANSI T1.113: "Signalling System No7 (SS7); Integrated Services Digital Network (ISDN) User Part"

[40] 3GPP TS 32.005 "Telecommunication Management; Charging and billing; 3G call and event data for the Circuit Switched (CS) domain".

[41] 3GPP TS 32.015: "Telecommunication Management; Charging and billing; 3G call and event data for the Packet Switched (PS) domain".

[42] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[43] 3GPP TS 29.228: "IP Multimedia (IM) Subsystem Cx and Dx interfaces; Signalling flows and message contents".

[44] 3GPP TS 29.229: "Cx and Dx Interfaces based on the Diameter protocol; Protocol details".

[45] IETF RFC 3261: "SIP: Session Initiation Protocol".

[46] IETF RFC 2396: "Uniform Resource Identifiers (URI): Generic Syntax".

[47] Void

[48] IETF RFC 2486: "The Network Access Identifier".

[49] 3GPP TS 33.203: "3G security; Access security for IP-based services".

[50] 3GPP TS 23.002: "Network Architecture".

[51] draft-ietf-aaa-diameter-08.txt: "Diameter Base Protocol", work in progress".

[52] 3GPP TS 33.102: "3G Security; Security Architecture".

[53] 3GPP TS 23.218: "IP Multimedia (IM) session handling; IM call model; Stage 2".

[54] 3GPP TS 29.328: "IP Multimedia Subsystem (IMS) Sh interface signalling flows and message contents (Release 5)".

[55] 3GPP TS 23.278: "Customised Applications for Mobile network Enhanced Logic (CAMEL) - IP Multimedia System (IMS) interworking; Stage 2".

[56] 3GPP TS 23.271: "".

[57] 3GPP TS 23.221: " Architectural requirements ".

[yy1] 3GPP TS 32.422: “Subscriber and equipment trace: Trace control and configuration management”.

[yy2] 3GPP TS 32.421: “Subscriber and equipment trace: Trace concepts and requirements”.

End of Change in Clause 0.1

Change in Clause 2.11

2.11 Data related to subscriber trace

2.11.1 Trace Reference

The Trace Reference is defined in 3GPP TS~~GSM~~ 5~~1~~2.008 [37].

The Trace Reference is permanent subscriber data and is conditionally stored in the HLR and VLR.

2.11.2 Trace Type

The Trace Type is defined in 3GPP~~GSM~~ TS 5~~1~~2.008 [37].

The Trace Type is permanent subscriber data and is conditionally stored in the HLR and VLR.

2.11.3 Operations Systems Identity

The Operations Systems Identity is defined in 3GPP~~GSM~~ TS 5~~1~~2.008 [37].

The Operations Systems Identity is permanent subscriber data and is conditionally stored in the HLR and VLR.

2.11.4 HLR Trace Type

The HLR Trace Type is defined in 3GPP TS~~GSM~~ ~~1~~52.008 [37].

The HLR Trace Type is permanent subscriber data and is conditionally stored in the HLR.

2.11.5 MAP Error On Trace

The MAP Error On Trace is defined in 3GPP TS ~~GSM 1~~52.008 [37].

The MAP Error On Trace is temporary subscriber data and is conditionally stored in the HLR.

2.11.6 Trace Activated in VLR

The Trace Activated in VLR flag is defined in 3GPP TS~~GSM~~ 5~~1~~2.008 [37].

The Trace Activated in VLR flag is temporary subscriber data and is conditionally stored in the HLR and VLR.

2.11.7 Trace Activated in SGSN

The Trace Activated in SGSN flag is defined in 3GPP TS~~GSM~~ 5~~1~~2.008 [37].

The Trace Activated in SGSN flag is temporary subscriber data and is conditionally stored in the HLR and SGSN.

2.11.8 Foreign Subscriber Registered in VLR

The Foreign Subscriber Registered in VLR flag is handled by operation and maintenance means in the VLR and is defined in 3GPP TS~~GSM~~ 5~~1~~2.008 [37].

The Foreign Subscriber Registered in VLR flag is permanent subscriber data and is conditionally stored in the VLR.

2.11.9 Trace Reference 2

Trace reference 2 is defined in 3GPP TS 32.421 [yy2[and in 3GPP TS 32.422 [yy1].

The Trace Reference 2 is permanent subscriber data and is conditionally stored in the HLR, VLR. And SGSN.

2.11.10 Trace depth

The Trace depth is defined in 3GPP TS 32.422 [yy1].

The Trace depth is permanent subscriber data and is conditionally stored in the HLR, VLR and SGSN.

2.11.10 List of NE types to trace

The List of NE types to trace is deinfed in 3GPP TS 32.422 [yy1].

The List of NE types to trace is permanent subscriber data and is conditionally stored in the HLR, VLR and SGSN.

2.11.11 Triggering events

The Triggering event is defined in 3GPP TS 32.422 [yy1].

The Triggering event is permanent subscriber data and is conditionally stored in the HLR, VLR and SGSN.

2.11.12 List of interfaces to trace

The List of interfaces to trace is defined in 3GPP TS 32.422 [yy1].

The List of interfaces to trace is permanent subscriber data and is conditionally stored in the HLR, VLR and SGSN.

End of Change in Clause 2.11

Change in Clause 5

5.1 Non-GPRS Network Access Mode Data Storage

Table 5.1: Overview of data stored for non-GPRS Network Access Mode (CS)

PARAMETER	SUBCLAUSE	HLR	VLR	TYPE
IMSI	2.1.1.1	M	M	P
Network Access Mode	2.1.1.2	M	-	P
International MS ISDN number	2.1.2	M	M	P
multinumbering MSISDNs	2.1.3	C	-	P
Basic MSISDN indicator	2.1.3.1	C	-	P
MSISDN-Alert indicator	2.1.3.2	C	-	P
TMSI	2.1.4	-	C	T
LMSI	2.1.8	C	C	T
Mobile Station Category	2.2.1	M	M	P
LMU Identifier	2.2.2	C	C	P
IMEISV	2.2.3	C	C	T
RAND, SRES and Kc	2.3.1		C	T
RAND, XRES, CK, IK and AUTN	2.3.2	M	C	T
Ciphering Key Sequence Number	2.3.3	-	M	T
Key Set Identifier (KSI)	2.3.4	-	M	T
MSRN	2.4.1	-	C	T
Location Area Identity	2.4.2	-	M	T
VLR number	2.4.5	M	-	T
MSC number	2.4.6	M	C	T
HLR number	2.4.7	-	C	T
Subscription restriction	2.4.10	C	-	P
RSZI lists	2.4.11.1	C	-	P
Zone Code List	2.4.11.2	-	C	P
MSC area restricted flag	2.4.12	M	-	T
LA not allowed flag	2.4.13	-	M	T
ODB-induced barring data	2.4.15.1	C	-	T
Roaming restriction due to unsupported feature	2.4.15.2	M	M	T
Cell Global ID or Service Area ID	2.4.16	-	C	T
LSA Identity	2.4.17.1	C	C	P
LSA Priority	2.4.17.2	C	C	P
LSA Preferential Access Indicator	2.4.17.2A	C	C	P
LSA Active Mode Support Indicator	2.4.17.2B	C	C	P
LSA Only Access Indicator	2.4.17.3	C	C	P
LSA Active Mode Indicator	2.4.17.4	C	C	P
VPLMN Identifier	2.4.17.5	C	-	P
Access Restriction Data	2.4.18	C	C	P
Provision of bearer service	2.5.1	M	M	P
Provision of teleservice	2.5.2	M	M	P
BC allocation	2.5.3	C	C	P
IMSI detached flag	2.7.1	-	C	T
Confirmed by Radio Contact indicator	2.7.4.1	-	M	T
Subscriber Data Confirmed by HLR indicator	2.7.4.2	-	M	T
Location Information Confirmed in HLR indicator	2.7.4.3	-	M	T
Check SS indicator	2.7.4.4	M	-	T
MS purged for non-GPRS flag	2.7.5	M	-	T
MNRR	2.7.7	C	-	T
Subscriber status	2.8.1	C	C	P
Barring of outgoing calls	2.8.2.1	C	C	P
Barring of incoming calls	2.8.2.2	C	-	P
Barring of roaming	2.8.2.3	C	-	P
Barring of premium rate calls	2.8.2.4	C	C	P
Barring of supplementary service management	2.8.2.5	C	C	P
Barring of registration of call forwarding	2.8.2.6	C	-	P
Barring of invocation of call transfer	2.8.2.7	C	C	P
Operator determined barring PLMN-specific data	2.8.3	C	C	P
Notification to CSE flag for ODB	2.8.4	C	-	T
gsmSCF address list for ODB	2.8.5	C	-	P
Handover Number	2.9.1	-	C	T
Messages Waiting Data	2.10.1	C	-	T

PARAMETER	SUBCLAUSE	HLR	VLR	TYPE
Mobile Station Not Reachable Flag	2.10.2	C	M	T
Memory Capacity Exceeded Flag	2.10.3	C	-	T
Trace Reference	2.11.1	C	C	P
Trace Type	2.11.2	C	C	P
Operations Systems Identity	2.11.3	C	C	P
HLR Trace Type	2.11.4	C	-	P
MAP Error On Trace	2.11.5	C	-	T
Trace Activated in VLR	2.11.6	C	C	T
Foreign Subscriber Registered in VLR	2.11.7	-	C	P
Trace Reference 2	2.11.9	C	C	P
Trace depth	2.11.10	C	C	P
List of NE types to trace	2.11.11	C	C	P
Triggering events	2.11.12	C	C	P
List of interfaces to trace	2.11.13	C	C	P
VGCS Group Membership List	2.12.1	C	C	P
VBS Group Membership List	2.12.2	C	C	P
Broadcast Call Initiation Allowed List	2.12.2.1	C	C	P
Originating CAMEL Subscription Information (O-CSI)	2.14.1.1/3.1	C	C	P
Terminating CAMEL Subscription Information (T-CSI)	2.14.1.2	C	-	P
VMSC Terminating CAMEL Subscription Information (VT-CSI)	2.14.1.2/3.2	C	C	P
Location Information/Subscriber state Information	2.14.1.3	C	-	P
USSD CAMEL subscription information(U-CSI)	2.14.1.4	C	-	P
SS invocation notification (SS-CSI)	2.14.1.5/3.2	C	C	P
Translation information flag(TIF-CSI)	2.14.1.6/3.6	C	C	P
Dialled service CAMEL Subscription Information (D-CSI)	2.14.1.11/3.7	C	C	P
USSD General CAMEL service information (UG-CSI)	2.14.2.4	C	-	P
O-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C		T
SS-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C		T
VT-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C		T
Short Message Service CAMEL Subscription Information(MO-SMS-CSI)	2.14.1.8/2.14.3.5	C	C	P
Short Message Service CAMEL Subscription Information(MT-SMS-CSI)	2.14.1.9/2.14.3.6	C	C	P
MO-SMS-CSI VLR Negotiated CAMEL Capability Handling	2.14.2.1	C		T
MT-SMS-CSI VLR Negotiated CAMEL Capability Handling	2.14.2.1	C		P
M-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C		T
VLR Supported CAMEL Phases	2.14.2.3	C		T
GsmSCF address for CSI	2.14.2.4	C		P
VLR Offered CAMEL4 CSIs	2.14.2.2A	C		T
IST Alert Timer	2.15.1	C	C	P
Privacy Exception List	2.16.1.1	C	C	P
GMLC Numbers	2.16.1.2	C	C	P
MO-LR List	2.16.1.3	C	C	P
Service Types	2.16.1.4	C	C	P
Age Indicator	2.17.1	C	C	T
CS Allocation/Retention priority	2.18.1	C	C	P

5.2 GPRS Network Access Mode Storage

Table 5.2: Overview of data used for GPRS Network Access Mode

PARAMETER	Subclause	HLR	VLR	SGSN	GGSN	TYPE
IMSI	2.1.1.1	M	M	M	M	P
Network Access Mode	2.1.1.2	M	-	C note1	-	P
International MS ISDN number	2.1.2	M	M	M	M	T
multinumbering MSISDNs	2.1.3	C	-	-	-	T
Basic MSISDN indicator	2.1.3.1	C	-	-	-	T .
MSISDN-Alert indicator	2.1.3.2	C	-	-	-	T
P-TMSI	2.1.5	-	-	C	-	T
TLLI	2.1.6	-	-	C	-	T
Random TLLI	2.1.7	-	-	C	-	T
IMEI	2.1.9	-	-	C	-	T
IMEISV	2.2.3	C	-	C	-	T
RAND/SRES and Kc	2.3.1		-	C	-	T
RAND, XRES, CK, IK, AUTN	2.3.2	M	-	C	-	T
Ciphering Key Sequence Number	2.3.3	-	-	M	-	T
Key Set Identifier (KSI)	2.3.4	-	-	M	-	T
Selected Ciphering Algorithm	2.3.5	-	-	M	-	T
Current Kc	2.3.6	-	-	M	-	T
P-TMSI Signature	2.3.7	-	-	C	-	T
Routing Area Identity	2.4.3	-	-	M	-	T
VLR Number	2.4.5	M	-	C note2	-	T
SGSN Number	2.4.8.1	M	C note2	-	-	T
GGSN Number	2.4.8.2	M	-	-	-	P
RSZI Lists	2.4.11.1	C	-	-	-	P
Zone Code List	2.4.11.2	-	-	C	-	P
RA not allowed flag	2.4.14a	-	-	M	-	T
SGSN area restricted flag	2.4.14	M	-	-	-	T
Roaming Restricted in the SGSN due to unsupported feature	2.4.15.3	M	-	M	-	T
Cell Global ID or Service Area ID	2.4.16	-	-	C	-	T
LSA Identity	2.4.17.1	C	C	C	-	P
LSA Priority	2.4.17.2	C	C	C	-	P
LSA Preferential Access Indicator	2.4.17.2A	C	C	C		P
LSA Active Mode Support Indicator	2.4.17.2B	C	C	C		P
LSA Only Access Indicator	2.4.17.3	C	C	C	-	P
LSA Active Mode Indicator	2.4.17.4	C	C	C	-	P
VPLMN Identifier	2.4.17.5	C	-	-	-	P
Access Restriction Data	2.4.18	C	-	C	-	P
Provision of teleservice	2.5.2	C	-	C	-	P
Transfer of SM option	2.5.4	M	-	-	-	P
MNRG	2.7.2	M	-	M	M	T
MM State	2.7.3	-	-	M	-	T
Subscriber Data Confirmed by HLR Indicator	2.7.4.2	-	-	M	-	T
Location Info Confirmed by HLR Indicator	2.7.4.3	-	-	M	-	T
MS purged for GPRS flag	2.7.6	M	-	-	-	T
MNRR	2.7.7	C	-	-	-	T
Subscriber Status	2.8.1	C	-	C	-	P
Barring of outgoing calls	2.8.2.1	C	-		-	P
Barring of roaming	2.8.2.3	C	-	C	-	P
Barring of Packet Oriented Services	2.8.2.8	C	-	C	-	P
ODB PLMN-specific data	2.8.3	C	-	C	-	P
Notification to CSE flag for ODB	2.8.4	C	-	-	-	T
gsmSCF address list for ODB	2.8.5	C	-	-	-	P
Trace Activated in SGSN	2.11.7	C	-	C	-	P
Trace Reference 2	2.11.9	C	-	C	C	P
Trace depth	2.11.10	C	-	C	C	P
List of NE types to trace	2.11.11	C	-	C	C	P
Triggering events	2.11.12	C	-	C	C	P
List of interfaces to trace	2.11.13	C	-	C	C	P
PDP Type	2.13.1	C	-	C	M	P
PDP Address	2.13.2	C	-	C	M	P
NSAPI	2.13.3	-	-	C	C	T
PDP State	2.13.4	-	-	C	-	T

PARAMETER	Subclause	HLR	VLR	SGSN	GGSN	TYPE
New SGSN Address	2.13.5	-	-	C	-	T
Access Point Name	2.13.6	C	-	C	C	P/T
GGSN Address in Use	2.13.7	-	-	C	-	T
VPLMN Address Allowed	2.13.8	C	-	C	-	P
Dynamic Address	2.13.9	-	-	-	C	T
SGSN Address	2.13.10	-	-	-	M	T
GGSN-list	2.13.11	M	-	-	-	T
Quality of Service Subscribed	2.13.12	C	-	C	-	P
Quality of Service Requested	2.13.13	-	-	C	-	T
Quality of Service Negotiated	2.13.14	-	-	C	M	T
SND	2.13.15	-	-	C	C	T
SNU	2.13.16	-	-	C	C	T
DRX Parameters	2.13.17	-	-	M	-	T
Compression	2.13.18	-	-	C	-	T
NGAF	2.13.19	-	-	C note2	-	T
Classmark	2.13.20	-	-	M	-	T
TEID	2.13.21	-	-	C	C	T
Radio Priority	2.13.22	-	-	C	-	T
Radio Priority SMS	2.13.23	-	-	C	-	T
PDP Context Identifier	2.13.24	C	-	C	-	T
PDP Context Charging Characteristics	2.13.25	C	-	C	C	P
GPRS CAMEL Subscription Information (GPRS-CSI)	2.14.1.10/2.14.4.4	C	-	C	-	C
MO Short Message Service CAMEL Subscription Information(MO-SMS-CSI)	2.14.1.8/2.14.4.1	C	-	C	-	C
MT Short Message Service CAMEL Subscription Information(MT-SMS-CSI)	2.14.1.9/2.14.4.2.	C	-	C	-	C
MO-SMS-CSI SGSN Negotiated CAMEL Capability Handling	2.14.2.1	C	-	-	-	P
MT-SMS-CSI SGSN Negotiated CAMEL Capability Handling	2.14.2.1	C	-	-	-	P
Mobility Management for GPRS event notification (MG-CSI)	2.14.1.12/2.14.4.4	C	-	C	-	C
MG-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C	-	-	-	P
GPRS-CSI Negotiated CAMEL Capability Handling	2.14.2.1	C	-	-	-	T
SGSN Supported CAMEL Phases	2.14.2.3	C	-	-	-	T
SGSN Offered CAMEL4 CSIs	2.14.2.2A	C	-	-	-	T
GsmSCF address for CSI	2.14.2.4	C	-	-	-	P
Age Indicator	2.16.1	C	-	C	-	T
Subscribed Charging Characteristics	2.19.1	C	-	C	C	P
Privacy Exception List	2.16.1.1	C	-	C	-	P
GMLC Numbers	2.16.1.2	C	-	C	-	P
MO-LR List	2.16.1.3	C	-	C	-	P
Service Types	2.16.1.4	C	-	C	-	P

The HLR column indicates only GPRS related use, i.e. if the HLR uses a parameter in non-GPRS Network Access Mode but not in GPRS Network Access Mode, it is not mentioned in this table 2.

NOTE 1: This parameter is relevant in the SGSN only when the Gs interface is installed.

NOTE 2: The VLR column is applicable if Gs interface is installed. It only indicates GPRS related data to be stored and is only relevant to GPRS subscribers registered in VLR.

For special condition of storage see in clause 2. See clause 4 for explanation of M, C, T and P in table 5.2.

End of Change in Clause 5

3GPP TSG-CN WG4 Meeting #26 **N4-050308**
Sydney, AUSTRALIA. 14th to 18th February 2005.

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.012** **CR** **019** ⌘ **rev** **2** ⌘ Current version: **6.2.0** ⌘

*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 ☒

Title:	⌘	Management Based Activation Impacts
Source:	⌘	CN4
Work item code:	⌘	OEM-TRACE
Date:	⌘	14/02/2005
Category:	⌘	**B**
Release:	⌘	Rel-6

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:
Ph2 *(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)*
Rel-7 *(Release 7)*

Reason for change:	⌘	This CR adds the necessary impacts to enable IMEI(SV) transfer over E-i/f for Management Based Activation of a Trace Session in an RNC when a relocation occurs. It may happen that Management Based Activation is enabled in a target RNC after relocation has occurred. In such a case, the non-anchor MSC needs to be aware of the IMEI(SV) so that it can send it down to the target RNC. Thus, in the anchor MSC it is necessary to always acquire IMEI(SV) from the UE. Also, this CR adds the necessary impacts to enable an MSC to send RANAP CN-INVOKE-TRACE message to RAN when a location update takes place and the current received IMEI(SV) from UE is also found in the IMEI(SV) trace list, received for Management Based Activation of a Trace Session in an RNC.
Summary of change:	⌘	Modify Update_Location_VLR procedure to always acquire IMEI(SV) during location update. Include a check between the current received IMEI(SV) from the UE and the IMEI(SV) trace list.
Consequences if not approved:	⌘	

Clauses affected:	⌘	1.1, 4.1.1, 4.1.2				
Other specs	⌘	**Y** ☒	**N** ☐	Other core specifications	⌘	29.002-749, 23.018-144, 29.018-043

affected:		X	Test specifications
		X	O&M Specifications
Other comments:	⌘	The agreed RAN CR is RP-040183.	

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.

First modification

1.1 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] 3GPP TR 21.905: "3G Vocabulary".

[2] 3GPP TS 23.002: "Network architecture".

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

[4] 3GPP TS 23.007: "Restoration procedures".

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

[5a] 3GPP TS 23.018: "Basic call handling; Technical realization".

[6] 3GPP TS 23.022: "Functions related to Mobile Station (MS) in idle mode".

[7] 3GPP TS 23.116: "Super-Charger Technical Realisation; Stage 2".

[8] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[9] 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)".

[10] 3GPP TS 43.020: "Security related network functions".

[11] 3GPP TS 23.078: " Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 4 – stage2 "

[11a] 3GPP TS 23.195: "Provision of UE Specific Behaviour Information to Network Entities".

[12] 3GPP TS 23.236: "Intra Domain Connection of RAN Nodes to Multiple CN Nodes"

[13] 3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols - Stage 3".

[14] 3GPP TS 29.010: "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)".

[xx] 3GPP TS 32.422: "Subscriber and equipment trace: Trace control and configuration management"

[yy] 3GPP TS 32.421: "Subscriber and equipment trace: Trace concepts and requirements"

[zz] 3GPP TS 25.413: "UTRAN Iu interface RANAP signalling"

Next modification

4.1 Location Updating

4.1.1 Detailed procedure in the MSC

4.1.1.1 Process Update_Location_Area_MSC

Sheet 1: Location Update corresponds to a Location_Registration_Request indicating any of the following:

- Normal location update;
- Periodic location update;
- IMSI attach.

Sheet 1: The procedures Check_IMEI_MSC, Obtain_IMEI_MSC and Obtain_IMSI_MSC are specified in 3GPP TS 23.018 [5a].

Sheet 1: The input signal "Send UESBI-Iu to Access Network" carries the IMEISV.

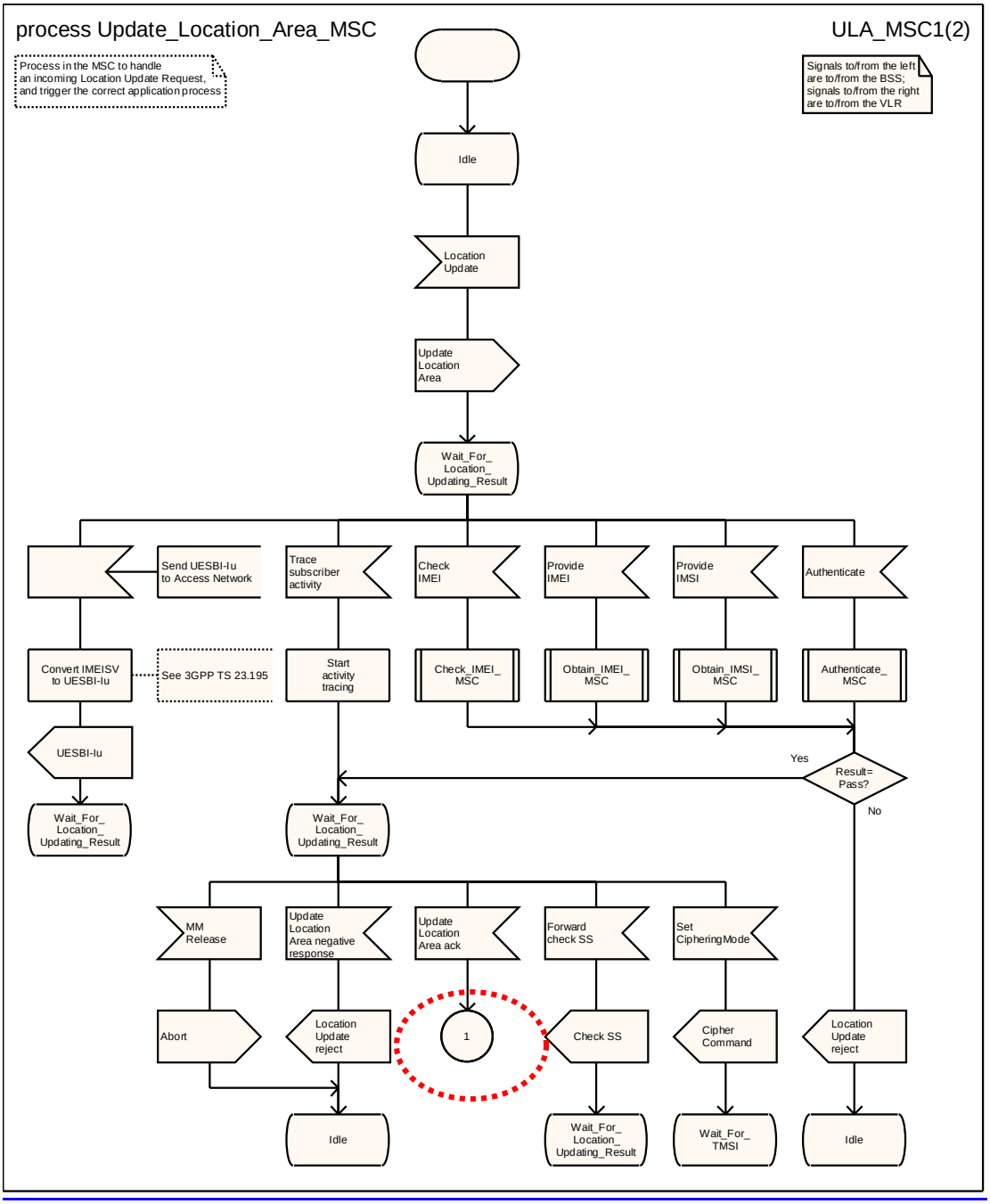
Sheet 1: The task "Convert IMEISV to UESBI" is defined in 3GPP TS 23.195 [11a].

Sheet 2: The procedure Check_IMEI_MSC is specified in 3GPP TS 23.018 [5a].

Sheet 2: When the MSC receives a Set Ciphering Mode request from the VLR, it sends a Start ciphering request towards the MS. After that, the Forward new TMSI and Update Location Area ack may be received in any order.

Sheet 2: IMEISV trace list shall be made available to the MSC. The list may contain IMEISV entries if Management Based Trace Activation is supported in RAN and MSC has received the trace list in the Uplink Information Transfer message (See 3GPP TS 32.422 [xx] and 25.413 [zz]). The test “Current IMEISV included in IMEISV trace list?” will follow the “no” case when no entries exist.

Sheet 2: For Trace Invocation in RAN concepts and procedures see 3GPP TSs 32.421 [yy], 32.422[xx] and 25.413[zz].


process Update_Location_Area_MSC
ULA_MSC1(2)
Process in the MSC to handle an incoming Location Update Request, and trigger the correct application process
Signals to/from the left are to/from the BSS; signals to/from the right are to/from the VLR
Idle
Location Update
Update Location Area
Wait_For_ Location_ Updating_Result
Send UESBI-Iu to Access Network
Trace subscriber activity
Check IMEI
Provide IMEI
Provide IMSI
Authenticate
Convert IMEISV to UESBI-Iu
See 3GPP TS 23.195
Start activity tracing
Check_IMEI_ MSC
Obtain_IMEI_ MSC
Obtain_IMSI_ MSC
Authenticate_ MSC
UESBI-Iu
Yes
Result= Pass?
No
Wait_For_ Location_ Updating_Result
Wait_For_ Location_ Updating_Result
MM Release
Update Location Area negative response
Update Location Area ack
Forward check SS
Set CipheringMode
Abort
Location Update reject
1
Check SS
Cipher Command
Location Update reject
Idle
Wait_For_ Location_ Updating_Result
Wait_For_ TMSI
Idle

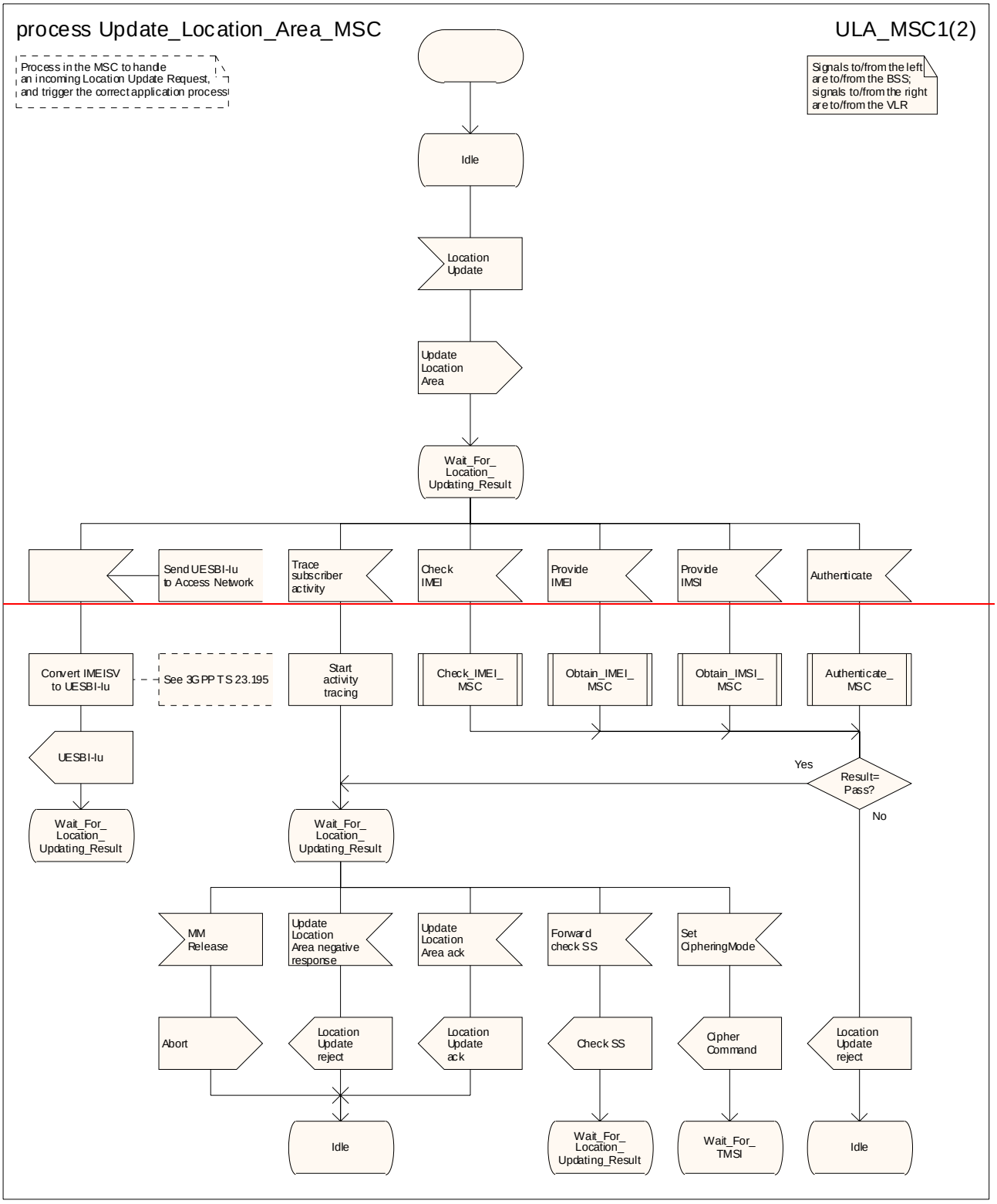
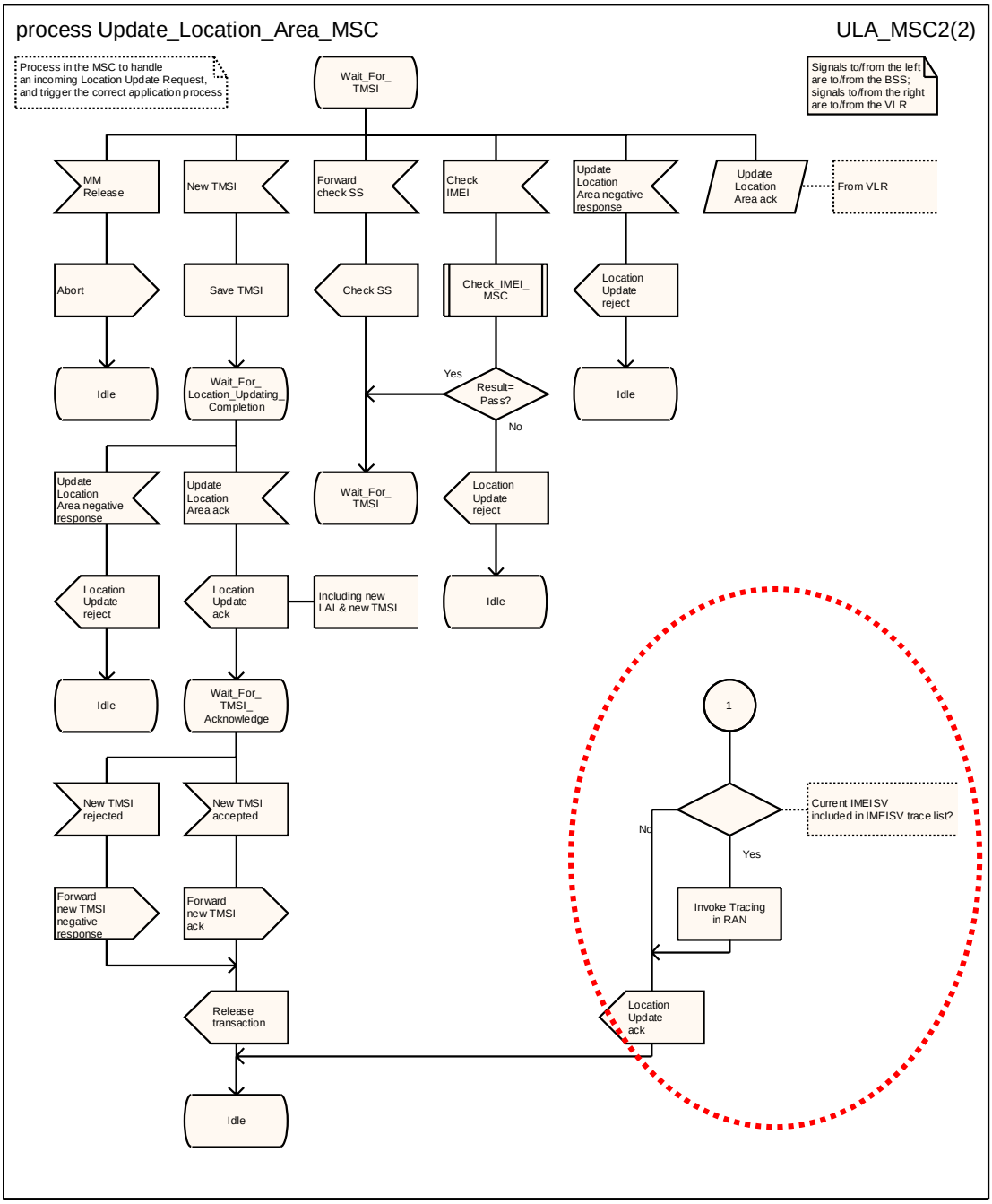


Figure 4.1.1.1 (sheet 1 of 2): Process Update_Location_Area_MSC


process Update_Location_Area_MSC
ULA_MSC2(2)
Process in the MSC to handle an incoming Location Update Request, and trigger the correct application process
Wait_For_ TMSI
Signals to/from the left are to/from the BSS; signals to/from the right are to/from the VLR
MM Release
New TMSI
Forward check SS
Check IMEI
Update Location Area negative response
Update Location Area ack
From VLR
Abort
Save TMSI
Check SS
Check_IMEI_ MSC
Location Update reject
Idle
Wait_For_ Location_Updating_ Completion
Yes
Result= Pass?
No
Idle
Update Location Area negative response
Update Location Area ack
Wait_For_ TMSI
Location Update reject
Location Update reject
Location Update ack
Including new LAI & new TMSI
Idle
Idle
Wait_For_ TMSI_ Acknowledge
New TMSI rejected
New TMSI accepted
Forward new TMSI negative response
Forward new TMSI ack
Release transaction
Idle
1
Current IMEISV included in IMEISV trace list?
No
Yes
Invoke Tracing in RAN
Location Update ack

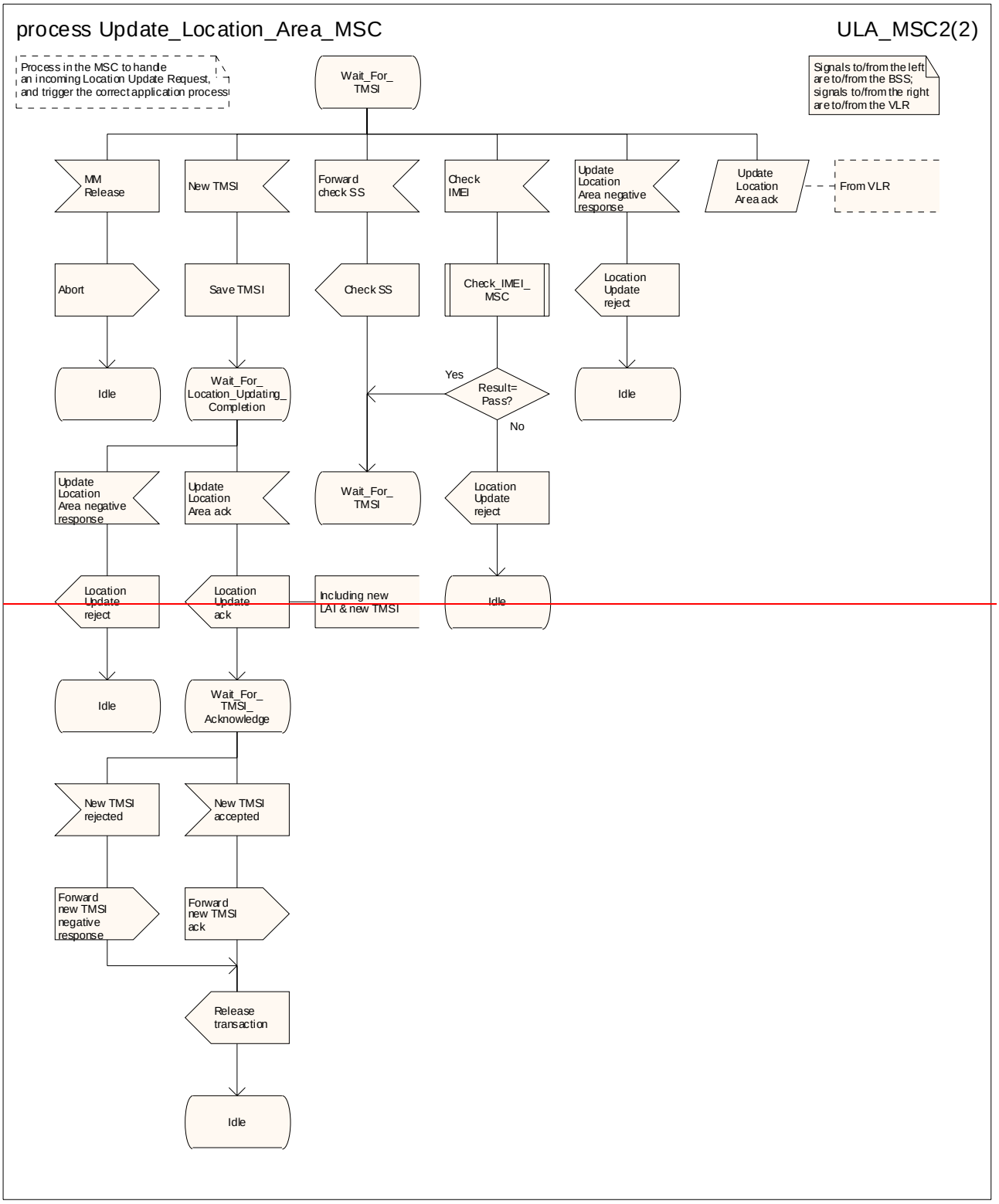


Figure 4.1.1.1 (sheet 2 of 2): Process Update_Location_Area_MSC

Next modification

4.1.2 Detailed procedure in the VLR

4.1.2.1 Process Update_Location_Area_VLR

General comment: at any stage in the location updating process the MSC may receive an indication from the BSS that the MM transaction has been released. The MSC then sends an Abort signal to the VLR. Upon receipt of this message, the VLR shall follow one of two possible courses of action.

The two possible courses of action and the conditions determining which course shall be taken are as follows:

1. If a successfully authenticated radio connection is already established before the Abort message is received, the VLR shall ignore the message.

2. If a successfully authenticated radio connection has not been established before the Abort message is received, the VLR shall abort the Update Location Area process and return to the idle state.

Sheet 1: the location area updating process will be activated by receiving an Update Location Area indication from the MSC. If there are parameter errors in the indication, the process is terminated with the appropriate error sent in the Update Location Area response to the MSC. Else, the behaviour will depend on the subscriber identity received, either an IMSI or a TMSI.

The Automatic Device Detection (ADD) function is an optional feature that allows the HLR to be updated with the current User Equipment (IMEISV) and thus enables the network to configure the subscriber’s equipment based on a predefined profile. The mechanism for the IMEISV retrieval by device management system (either from HLR or VLR) is outside the scope of this specification. As an optimisation, the VLR may optionally store whether or not the HLR supports the ADD feature and use this information to decide whether or not to send an update to the HLR.

Sheet 2: at the decision "HLR updating required?" the "True" branch shall be taken if and only if one or more of the following conditions is true:

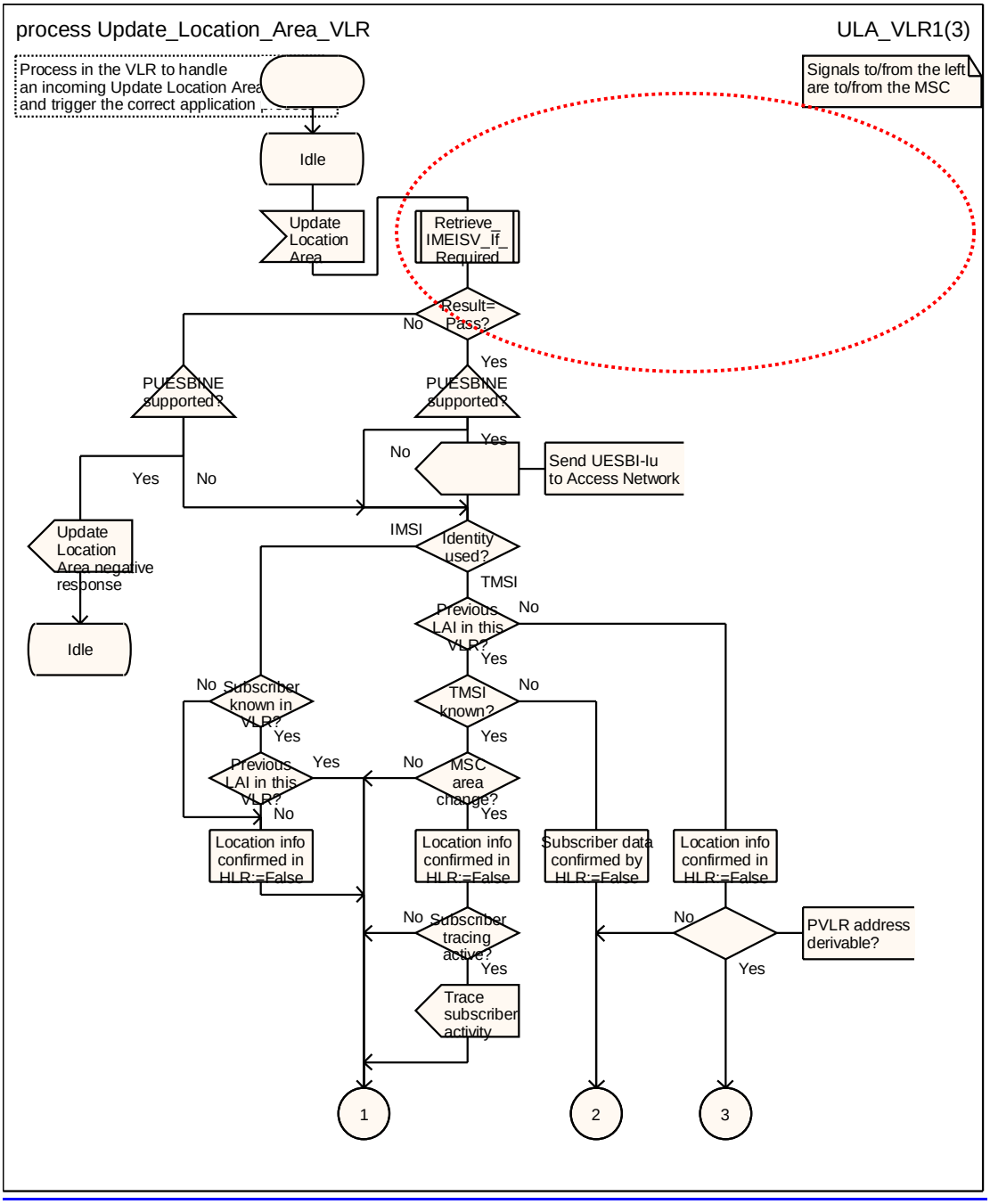
(1) Location Info Confirmed in HLR is false.

(2) Data Confirmed by HLR is false.

Sheet 2: : The execution of the test "HLR supports ADD?" and the action "set: skip subscriber data update" is an optional optimisation and depends on the presence of the relevant indication from the HLR that ADD functionality is supported. If this optimisation is not supported on the VLR or no indication is received, both are bypassed in which case processing continues at connector 4.

Sheet 3: the procedure Obtain_IMSI_VLR is specified in 3GPP TS 23.018 [5a].

The type of Location Update is retrieved in 3G TS 23.078 procedure ‘Set_Notification_Type’ and is returned into the ‘Notify’ variable; this information is necessary for the CAMEL Mobility Management event notification procedure 3G TS 23.078 ‘Notify_gsmSCF’.


process Update_Location_Area_VLR
ULA_VLR1(3)
Process in the VLR to handle an incoming Update Location Area and trigger the correct application
Signals to/from the left are to/from the MSC
Idle
Update Location Area
Retrieve_IMEISV_If_Required
Result= Pass?
No
Yes
PUESBINE supported?
PUESBINE supported?
Yes
No
Yes
No
Send UESBI-Iu to Access Network
Update Location Area negative response
Idle
IMSI
Identity used?
TMSI
Previous LAI in this VLR?
No
Yes
No Subscriber known in VLR?
TMSI known?
No
Yes
Yes
Previous LAI in this VLR?
Yes
No
MSC area change?
No
Yes
Location info confirmed in HLR:=False
Location info confirmed in HLR:=False
Subscriber data confirmed by HLR:=False
Location info confirmed in HLR:=False
No Subscriber tracing active?
No
PVLR address derivable?
Yes
Yes
Trace subscriber activity
1
2
3

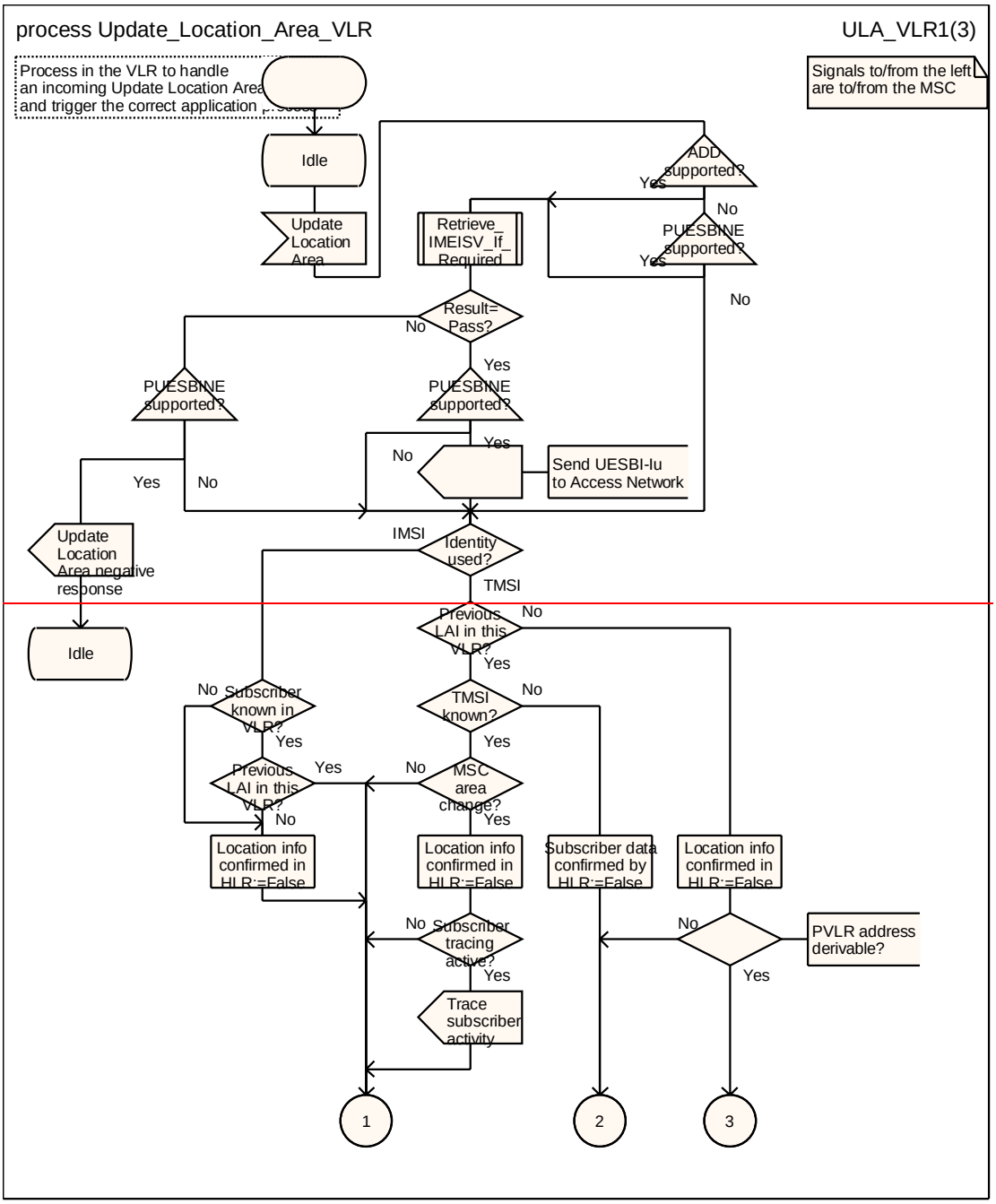


Figure 4.1.2.1 (sheet 1 of 3): Process Update_Location_Area_VLR

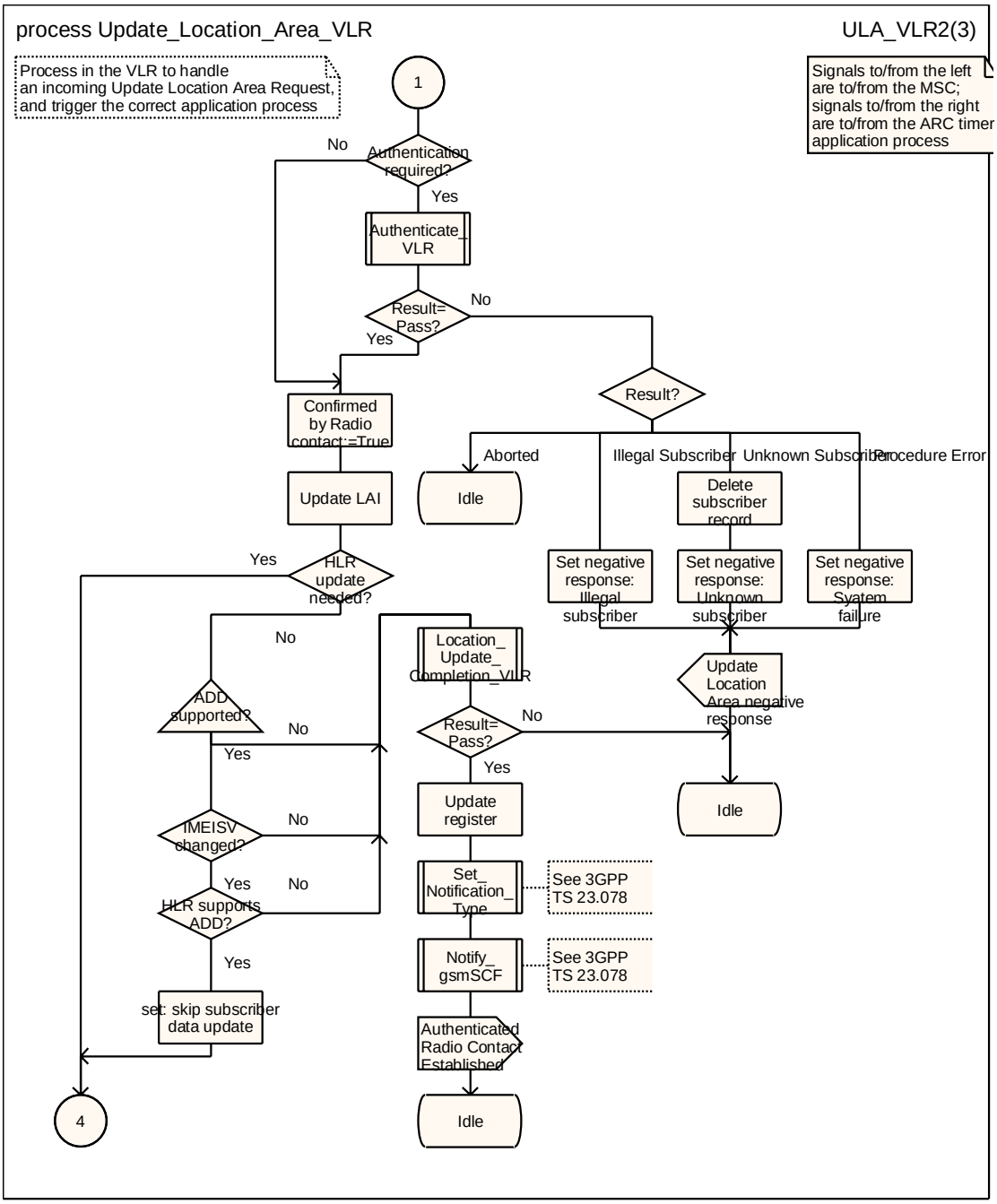


Figure 4.1.2.1 (sheet 2 of 3): Process Update_Location_Area_VLR

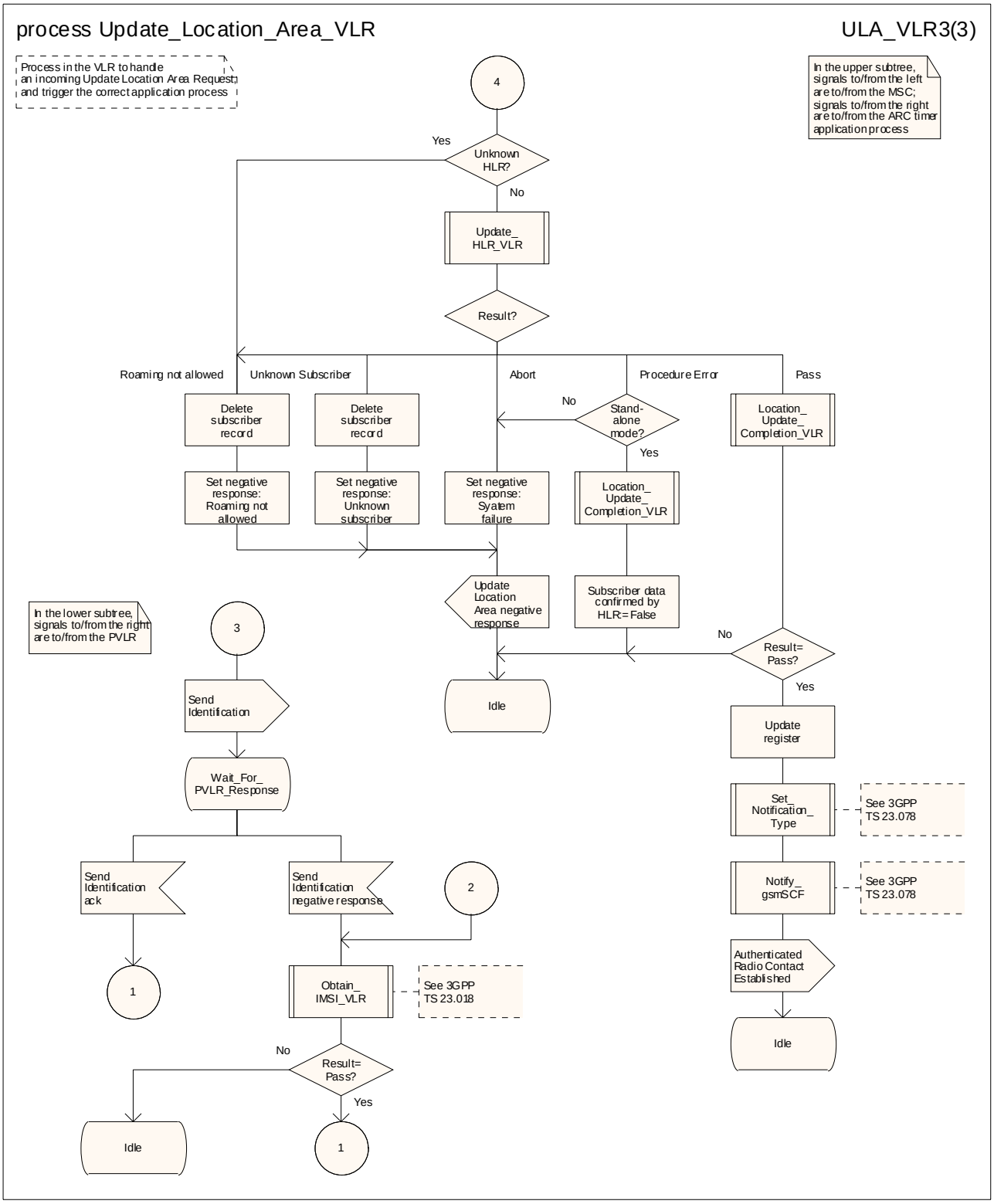


Figure 4.1.2.1 (sheet 3 of 3): Process Update_Location_Area_VLR

4.1.2.1a Procedure Retrieve_IMEISV_If_Required

The decision box "received IMEISV = stored IMEISV" takes the "No" exit if no IMEISV is stored.

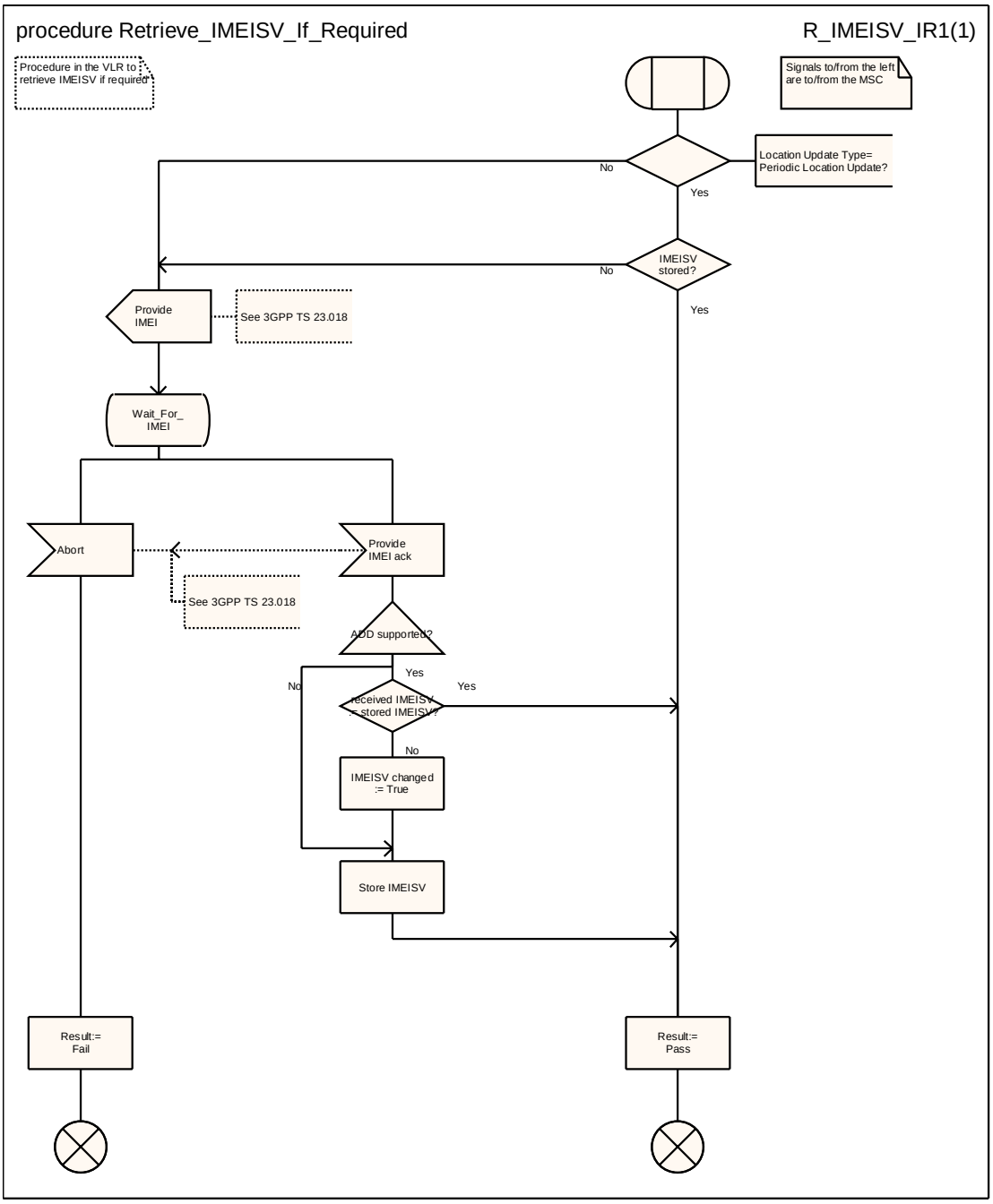


Figure 4.1.2.1A: Procedure Retrieve_IMEISV_If_Required

Modification end

3GPP TSG-CN WG4 Meeting #26 **Tdoc ⌘N4-050309**
Sidney, Australia, 14 – 18 February 2005

CR-Form-v7

CHANGE REQUEST

⌘ **29.060** **CR** 543 ⌘**rev** **1** ⌘ Current version: 6.7.0 ⌘

*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 ☒

Title:	⌘	Management Based Trace Activation Signalling
Source:	⌘	CN4
Work item code:	⌘	OEM-Trace
Date:	⌘	01/02/2005
Category:	⌘	**B**
Release:	⌘	Rel-6

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:	⌘	Management Based Trace Activation requires that the IMEISV is sent from old to new SGSN at ISRAU and SRNS Relocation.
Summary of change:	⌘	The reason for including the IMEISV in the MM Context in the messages SGSN Context Response and Forward Relocation Request is enhanced
Consequences if not approved:	⌘	Management Based Trace Activation will not work.

Clauses affected:	⌘	7.5.4, 7.5.6, 7.7.28			
		Y	**N**		
Other specs affected:	⌘	**X**		Other core specifications	⌘ 29.002-749, 23.018-144, 29.018-043, 23.012-019
			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.

First modification

7.5.4 SGSN Context Response

The old SGSN shall send an SGSN Context Response to the new SGSN as a response to a previous SGSN Context Request.

Possible Cause values are:

- 'Request Accepted'.
- 'IMSI not known'.
- 'System failure'.
- 'Mandatory IE incorrect'.
- 'Mandatory IE missing'.
- 'Optional IE incorrect'.
- 'Invalid message format'.
- 'P-TMSI Signature mismatch'.

If the Cause contains the value 'Request accepted', all information elements are mandatory, except PDP Context, MBMS UE Context, RAB Context and Private Extension.

If the Cause contains the value 'P-TMSI Signature mismatch' the IMSI information element and, for Intra Domain Connection of RAN Nodes to Multiple CN Nodes, a SGSN Address for control plane shall be included in the response, otherwise only the Cause information element shall be included in the response.

The old SGSN shall include a SGSN Address for control plane. The new SGSN shall store this SGSN Address and use it when sending control plane messages for the MS to the old SGSN in the SGSN context transfer procedure.

The Tunnel Endpoint Identifier Control Plane field specifies a Tunnel Endpoint Identifier, which is chosen by the old SGSN. The new SGSN shall include this Tunnel Endpoint Identifier in the GTP header of all subsequent control plane messages, which are sent from the new SGSN to the old SGSN and related to the PDP context(s) requested.

The IMSI information element contains the IMSI matching the TLLI or P-TMSI (for GSM or UMTS respectively) and RAI in the SGSN Context Request.

The MM Context contains necessary mobility management and security parameters. ~~An SGSN supporting the 'PUESBINE' feature (see 3GPP TS 23.195 [25] for more information) or the ADD feature (see 3GPP TS 22.101 [29] for more information) shall include the IMEISV in the MM Context when transferring the IMEISV from the old SGSN to the new SGSN.~~ The IMEISV shall, if available, be included in the MM Context from the old SGSN to the new SGSN.

All active PDP contexts in the old SGSN shall be included as PDP Context information elements. The PDP contexts are included in an implementation dependant prioritized order, and the most important PDP context is placed first. When the PDP Context Prioritization IE is included, it informs the new SGSN that the PDP contexts are sent prioritized. If the new SGSN is not able to maintain active all the PDP contexts received from the old SGSN when it is indicated that prioritization of the PDP contexts is applied, the new SGSN should use the prioritisation sent by old SGSN as input when deciding which PDP contexts to maintain active and which ones to delete.

If there is at least one active PDP context, the old SGSN shall start the T3-TUNNEL timer and store the address of the new SGSN in the "New SGSN Address" field of the MM context. The old SGSN shall wait for SGSN Context Acknowledge before sending T-PDUs to the new SGSN. If an SGSN Context Acknowledge message is not received within a time defined by T3-RESPONSE, the old SGSN shall retransmit the SGSN Context Response to the new SGSN as long as the total number of attempts is less than N3-REQUESTS. After N3-REQUESTS unsuccessfully attempts, the old SGSN shall proceed as described in section 'Reliable delivery of signalling messages' in case the transmission of a control plane message fails N3-REQUESTS times.

For each RAB using lossless PDCP context, the old SGSN shall include a RAB Context. If a RAB Context is included in the SGSN Context Response, the new SGSN shall ignore the N-PDU number fields and sequence number fields received in the PDP Context IE.

Radio Priority SMS contains the radio priority level for MO SMS transmission, and shall be included if a valid Radio Priority SMS value exists for the MS in the old SGSN.

Radio Priority LCS contains the radio priority level for MO LCS transmission, and shall be included if a valid Radio Priority LCS value exists for the MS in the old SGSN.

Radio Priority is the radio priority level that the MS uses when accessing the network for the transmission of uplink user data for a particular PDP context. One Radio Priority IE shall be included per PDP context that has a valid radio priority value assigned to it in the old SGSN.

Packet Flow Id is the packet flow identifier assigned to the PDP context. One Packet Flow Id IE shall be included per PDP context that has a valid packet flow identifier value assigned to it in the old SGSN.

Charging Characteristics IE contains the charging characteristics which apply for a PDP context; see 3GPP TS 32.215 [18]. One Charging Characteristics IE shall be included per PDP context IE. If no PDP context is active, this IE shall not be included. The mapping of a Charging Characteristics IE to a PDP Context IE is done according to the sequence of their appearance, e.g. the first Charging Characteristics IE is mapped to the first PDP Context IE.

All MBMS UE Contexts in the old SGSN shall be included as MBMS UE Context information elements if the new SGSN supports MBMS (i.e. MBMS support indication has been sent from the new SGSN).

The optional Private Extension contains vendor or operator specific information.

Table 27: Information Elements in a SGSN Context Response

Information element	Presence requirement	Reference
Cause	Mandatory	7.7.1
IMSI	Conditional	7.7.2
Tunnel Endpoint Identifier Control Plane	Conditional	7.7.14
RAB Context	Conditional	7.7.19
Radio Priority SMS	Optional	7.7.20
Radio Priority	Optional	7.7.21
Packet Flow Id	Optional	7.7.22
CharingCharacteristics	Optional	7.7.23
Radio Priority LCS	Optional	7.7.25B
MM Context	Conditional	7.7.28
PDP Context	Conditional	7.7.29
SGSN Address for Control Plane	Conditional	7.7.32
PDP Context Prioritization	Optional	7.7.45
MBMS UE Context	Optional	7.7.55
Private Extension	Optional	7.7.46

Next Modification

7.5.6 Forward Relocation Request

The old SGSN shall send a Forward Relocation Request to the new SGSN to convey necessary information to perform the SRNS Relocation procedure between new SGSN and Target RNC.

All information elements are mandatory, except PDP Context, MBMS UE Context and Private Extension.

The IMSI information element contains the IMSI of the target MS for SRNS Relocation procedure.

The old SGSN shall include a SGSN Address for control plane. The new SGSN shall store this SGSN Address and use it when sending control plane messages for the MS to the old SGSN in the SRNS Relocation procedure.

The Tunnel Endpoint Identifier Control Plane field specifies a tunnel endpoint identifier, which is chosen by the old SGSN. The new SGSN shall include this Tunnel Endpoint Identifier Control Plane in the GTP header of all subsequent control plane messages, which are sent from the new SGSN to the old SGSN.

The MM Context contains necessary mobility management and security parameters. The IMEISV shall, if available, be included in the MM Context from the old SGSN to the new SGSN. ~~An SGSN supporting the 'PUESBINE' feature (see 3GPP TS 23.195 [25] for more information) shall include the IMEISV in the MM Context when transferring the IMEISV from the old to the new SGSN.~~

All active PDP contexts in the old SGSN shall be included as PDP Context information elements. The PDP contexts are included in an implementation dependant prioritized order, and the most important PDP context is placed first. When the PDP Context Prioritization IE is included, it informs the new SGSN that the PDP contexts are sent prioritized. If the new SGSN is not able to maintain active all the PDP contexts received from the old SGSN when it is indicated that prioritization of the PDP contexts is applied, the new SGSN should use the prioritisation sent by old SGSN as input when deciding which PDP contexts to maintain active and which ones to delete. In case no PDP context is active, neither of these IEs shall be included.

All MBMS UE Contexts in the old SGSN shall be included as MBMS UE Context information elements.

UTRAN transparent container, Target identification and RANAP Cause are information from the source RNC in the old SGSN.

Charging Characteristics IE contains the charching characteristics which apply for a PDP context; see 3GPP TS 32.215 [18]. One Charging Characteristics IE shall be included per PDP context IE. If no PDP context is active, this IE shall not be included. The mapping of a Charging Characteristics IE to a PDP Context IE is done according to the sequence of their appearance, e.g. the first Charging Characteristics IE is mapped to the first PDP Context IE.

The optional Private Extension contains vendor or operator specific information.

Table 29: Information Elements in a Forward Relocation Request

Information element	Presence requirement	Reference
IMSI	Mandatory	7.7.2
Tunnel Endpoint Identifier Control Plane	Mandatory	7.7.14
RANAP Cause	Mandatory	7.7.18
Charging Characteristics	Optional	7.7.23
MM Context	Mandatory	7.7.28
PDP Context	Conditional	7.7.29
SGSN Address for Control plane	Mandatory	7.7.32
Target Identification	Mandatory	7.7.37
UTRAN transparent container	Mandatory	7.7.38
PDP Context Prioritization	Optional	7.7.45
MBMS UE Context	Optional	7.7.55
Private Extension	Optional	7.7.46

Next Modification

7.7.28 MM Context

The MM Context information element contains the Mobility Management, MS and security parameters that are necessary to transfer between SGSNs at the Inter SGSN Routeing Area Update procedure.

Security Mode indicates the type of security keys (GSM/UMTS) and Authentication Vectors (quintuplets/triplets) that are passed to the new SGSN.

Ciphering Key Sequence Number (CKSN) is described in 3GPP TS 24.008 [5]. Possible values are integers in the range [0; 6]. The value 7 is reserved. CKSN identifies Kc. During the Intersystem Change to 3G-SGSN, the KSI shall be assigned the value of CKSN.

Key Set Identifier (KSI) identifies CK and IK. During the Intersystem Change to 2G-SGSN, the CKSN shall be assigned the value of KSI.

Used Cipher indicates the GSM ciphering algorithm that is in use.

Kc is the GSM ciphering key of the GSM security context to be used by the new SGSN. This is the GSM security context agreed with the MS during the latest successful authentication procedure. Kc shall be present if GSM key is indicated in the Security Mode.

CK is the UMTS ciphering key of the UMTS security context to be used by the new SGSN. This is the UMTS security context agreed with the MS during the latest successful authentication procedure. CK shall be present if UMTS keys are indicated in the Security Mode.

IK is the UMTS integrity key of the UMTS security context to be used by the new SGSN. This is the UMTS security context agreed with the MS during the latest successful authentication procedure. IK shall be present if UMTS keys are indicated in the Security Mode.

The Triplet array contains triplets encoded as the value in the Authentication Triplet information element The Triplet array shall be present if indicated in the Security Mode.

The Quintuplet array contains Quintuplets encoded as the value in the Authentication Quintuplet information element. The Quintuplet array shall be present if indicated in the Security Mode. If the quintuplet array is present, the Quintuplet length field indicates its length.

DRX parameter indicates whether the MS uses DRX mode or not.

MS Network Capability provides the network with information concerning aspects of the MS related to GPRS. MS Network Capability and MS Network Capability Length are coded as in the value part described in 3GPP TS 24.008 [5].

DRX parameter is coded as described in 3GPP TS 24.008 [5], the value part only.

The two octets Container Length holds the length of the Container, excluding the Container Length octets.

Container contains one or several optional information elements as described in the clause 'Overview', from the clause 'General message format and information elements coding' in 3GPP TS 24.008 [5]. The IMEISV shall, if available, be included in the Container. ~~An SGSN supporting the 'PUESBINE' feature (see 3GPP TS 23.195 [25] for more information) or the ADD feature (see 3GPP TS 22.101 [29] for more information) shall include the IMEISV in the Container.~~

Octets	Bits 8	7	6	5	4	3	2	1
1	Type = 129 (Decimal)							
2-3	Length							
4	Spare 1111					CKSN		
5	Security Mode		No of Vectors			Used Cipher		
6-13	Kc							
14-m	Triplet [0..4]							
(m+1)-(m+2)	DRX parameter							
(m+3)	MS Network Capability Length							
(m+4)-n	MS Network Capability							
(n+1)-(n+2)	Container length							
(n+3)-o	Container							

Figure 40: MM Context Information Element with GSM Key and Triplets

Octets	Bits 8	7	6	5	4	3	2	1
1	Type = 129 (Decimal)							
2-3	Length							
4	Spare 1111					KSI		
5	Security Mode		No of Vectors			Spare 111		
6-21	CK							
22-37	IK							
38-39	Quintuplet Length							
40-m	Quintuplet [0..4]							
(m+1)-(m+2)	DRX parameter							
(m+3)	MS Network Capability Length							
(m+4)-n	MS Network Capability							
(n+1)-(n+2)	Container length							
(n+3)-o	Container							

Figure 41: MM Context Information Element with UMTS Keys and Quintuplets

Octets	Bits 8	7	6	5	4	3	2	1
1	Type = 129 (Decimal)							
2-3	Length							
4	Spare 1111					CKSN		
5	Security Mode		No of Vectors			Used Cipher		
6-13	Kc							
14-15	Quintuplet Length							
16-m	Quintuplet [0..4]							
(m+1)-(m+2)	DRX parameter							
(m+3)	MS Network Capability Length							
(m+4)-n	MS Network Capability							
n+1-n+2	Container length							
n+3-o	Container							

Figure 42: MM Context Information Element with GSM Keys and UMTS Quintuplets

Octets	Bits 8	7	6	5	4	3	2	1
1	Type = 129 (Decimal)							
2-3	Length							
4	Spare 1111					CKSN/KSI		
5	Security Mode		No of Vectors			Used Cipher		
6-21	CK							
22-37	IK							
38-39	Quintuplet Length							
40-m	Quintuplet [0..4]							
(m+1)-(m+2)	DRX parameter							
(m+3)	MS Network Capability length							
(m+4)-n	MS Network Capability							
(n+1)-(n+2)	Container length							
(n+3)-n	Container							

Figure 42A: MM Context Information Element with Used Cipher value, UMTS Keys and Quintuplets

Table 46: Used Cipher Values

Cipher Algorithm	Value (Decimal)
No ciphering	0
GEA/1	1
GEA/2	2
GEA/3	3
GEA/4	4
GEA/5	5
GEA/6	6
GEA/7	7

Table 47: Security Mode Values

Security Type	Value (Decimal)
GSM key and triplets	1
GSM key and quintuplets	3
UMTS key and quintuplets	2
Used cipher value, UMTS Keys and Quintuplets	0

End Modification

3GPP TSG-CN WG4 Meeting #26 **N4-050463**
Sydney, AUSTRALIA. 14th to 18th February 2005.

CR-Form-v7.1

CHANGE REQUEST

⌘ **29.002** **CR** **738** ⌘ **rev** **8** ⌘ Current version: **6.8.0** ⌘

*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 ☒

Title:	⌘	Rel-6 trace management additions to trace activation and deactivation procedures
Source:	⌘	CN4
Work item code:	⌘	OEM-Trace
Date:	⌘	18/02/2005
Category:	⌘	**F**
Release:	⌘	Rel-6

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:

Ph2	*(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)*
Rel-7	*(Release 7)*

Reason for change:	⌘	The trace activation and deactivation procedures need to be changed to allow the signalling based trace activation for Rel-6 trace managementas defined in 3GPP TS 32.422.
Summary of change:	⌘	New Rel-6 specific trace activation and deactivation parameters have been added to the Activate Trace Mode and Deactivate Trace Mode MAP services.
Consequences if not approved:	⌘	Trace functionality will remain restricted to the GSM trace defined in GSM 12.08 specification.
Clauses affected:	⌘	2, 7.6.10, 9.1.1, 9.1.2, 17.7.2

	Y	N			
Other specs affected: ⌘	X		Other core specifications	⌘	23.008 CR 134
		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.

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] 3GPP TS 21.905: "3G Vocabulary".

[2] 3GPP TS 22.001: "Digital cellular telecommunications system (Phase 2+); Principles of telecommunication services supported by a Public Land Mobile Network (PLMN)".

[3] 3GPP TS 22.002: "Bearer Services Supported by a Public Land Mobile Network (PLMN)".

[4] 3GPP TS 22.003: "Circuit Teleservices Supported by a Public Land Mobile Network (PLMN)".

[5] 3GPP TS 22.004: "General on Supplementary Services".

[6] 3GPP TS 42.009: "Digital cellular telecommunications system (Phase 2+); Security aspects".

[7] 3GPP TS 22.016: "International Mobile station Equipment Identities (IMEI)".

[8] 3GPP TS 22.041: "Operator Determined Barring".

[9] 3GPP TS 22.081: "Line identification supplementary services - Stage 1".

[10] 3GPP TS 22.082: "Call Forwarding (CF) supplementary services - Stage 1".

[11] 3GPP TS 22.083: "Call Waiting (CW) and Call Hold (HOLD) Supplementary Services - Stage 1".

[12] 3GPP TS 22.084: "Multi Party (MPTY) Supplementary Services - Stage 1".

[13] 3GPP TS 22.085: "Closed User Group (CUG) supplementary services - Stage 1".

[14] 3GPP TS 22.086: "Advice of charge (AoC) Supplementary Services - Stage 1".

[15] 3GPP TS 22.088: "Call Barring (CB) supplementary services - Stage 1".

[16] 3GPP TS 22.090: "Unstructured Supplementary Service Data (USSD); - Stage 1".

[17] 3GPP TS 23.003: "Numbering, addressing and identification".

[18] Void

[19] 3GPP TS 23.007: "Restoration procedures".

[20] 3GPP TS 23.008: "Organisation of subscriber data".

[21] 3GPP TS 23.009: "Handover procedures".

[22] 3GPP TS 23.011: "Technical realization of Supplementary Services - General Aspects".

[23] 3GPP TS 23.012: "Location management procedures".

[24] 3GPP TS 43.020: "Security related network functions".

[25] 3GPP TS 23.038: "Alphabets and language".

[25a] 3GPP TS 23.039: " Interface protocols for the connection of Short Message Service Centres (SMSCs) to Short Message Entities (SMEs)".

[26] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS) Point to Point (PP)".

[26a] 3GPP TS 23.271: "Functional stage2 description of LCS".

[27] 3GPP TS 23.081: "Line Identification Supplementary Services - Stage 2".

[28] 3GPP TS 23.082: "Call Forwarding (CF) Supplementary Services - Stage 2".

[29] 3GPP TS 23.083: "Call Waiting (CW) and Call Hold (HOLD) Supplementary Services - Stage 2".

[30] 3GPP TS 23.084: "Multi Party (MPTY) Supplementary Services - Stage 2".

[31] 3GPP TS 23.085: "Closed User Group (CUG) Supplementary Services - Stage 2".

[32] 3GPP TS 23.086: "Advice of Charge (AoC) Supplementary Services - Stage 2".

[33] 3GPP TS 23.088: "Call Barring (CB) Supplementary Services - Stage 2".

[34] 3GPP TS 23.090: "Unstructured Supplementary Services Data (USSD) - Stage 2".

[34a] 3GPP TS 33.200: "3G Security; Network domain security; MAP application layer security".

[35] 3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols - Stage 3".

[36] 3GPP TS 24.010: "Mobile radio interface layer 3 Supplementary Services specification - General aspects".

[37] 3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[37a] 3GPP TS 44.071: "Location Services (LCS) – stage 3".

[38] 3GPP TS 24.080: "Mobile radio interface layer 3 supplementary services specification - Formats and coding".

[39] 3GPP TS 24.081: "Line identification supplementary services - Stage 3".

[40] 3GPP TS 24.082: "Call Forwarding (CF) Supplementary Services - Stage 3".

[41] 3GPP TS 24.083: "Call Waiting (CW) and Call Hold (HOLD) supplementary services - Stage 3".

[42] 3GPP TS 24.084: "Multi Party (MPTY) Supplementary Services - Stage 3".

[43] 3GPP TS 24.085: "Closed User Group (CUG) Supplementary Services - Stage 3".

[44] 3GPP TS 24.086: "Advice of Charge (AoC) Supplementary Services - Stage 3".

[45] 3GPP TS 24.088: "Call Barring (CB) Supplementary Services - Stage 3".

[46] 3GPP TS 24.090: "Unstructured Supplementary Services Data - Stage 3".

[47] 3GPP TS 48.002: " Base Station System - Mobile-services Switching Centre (BSS - MSC) interface principles".

[48] 3GPP TS 48.006: "Signalling transport mechanism specification for the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[49] 3GPP TS 48.008: "Mobile Switching Centre - Base Station System (MSC - BSS) interface; Layer 3 specification".

[49a1] 3GPP TS 48.031: "Location Services (LCS); Serving Mobile Location Centre (SMLC) – Serving Mobile Location Centre (SMLC); SMLC Peer Protocol (SMLCPP)".

[49b] 3GPP TS 48.071: "Location Services (LCS); Serving Mobile Location Centre - Base Station System (SMLC - BSS) interface Layer 3 specification".

[50] 3GPP TS 49.001: "General network interworking scenarios".

[51] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[52] Void

[53] Void

[54] Void

[55] 3GPP TS 29.006: "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".

[56] 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)".

[57] 3GPP TS 29.008: "Application of the Base Station System Application Part (BSSAP) on the E-interface".

[58] 3GPP TS 29.010: "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)".

[59] 3GPP TS 29.011: "Signalling interworking for Supplementary Services".

[59a] 3GPP TS 49.031: "Digital cellular telecommunications system (Phase 2+); Location Services (LCS); Base Station System Application Part LCS Extension (BSSAP-LE)".

[60] Void

[61] ~~GSM~~3GPP TS ~~1~~52.008: "~~Digital cellular telecommunications system (Phase 2);~~ GSM Subscriber and Equipment Trace".

[62] ETS 300 102-1 (1990): "Integrated Services Digital Network (ISDN); User-network interface layer 3 specifications for basic call control".

[63] ETS 300 136 (1992): "Integrated Services Digital Network (ISDN); Closed User Group (CUG) supplementary service description".

[64] ETS 300 138 (1992): "Integrated Services Digital Network (ISDN); Closed User Group (CUG) supplementary service Digital Subscriber Signalling System No.one (DSS1) protocol".

[65] ETS 300 287: "Integrated Services Digital Network (ISDN); Signalling System No.7; Transaction Capabilities (TC) version 2".

[66] ETR 060: "Signalling Protocols and Switching (SPS); Guide-lines for using Abstract Syntax Notation One (ASN.1) in telecommunication application protocols".

[66b] ETR 091: "ETSI object identifier tree; Common domain Mobile domain"

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

[68] ITU-T Recommendation E.212: " The international identification plan for mobile terminals and mobile users".

[69] ITU-T Recommendation E.213: " Telephone and ISDN numbering plan for land mobile stations in public land mobile networks (PLMN) ".

[70] ITU-T Recommendation E.214: " Structure of the land mobile global title for the signalling connection control part (SCCP) ".

[71] ITU-T Recommendation Q.699: " Interworking between ISDN access and non-ISDN access over ISDN User Part of Signalling System No. 7 ".

[72] ITU-T Recommendation Q.711: "Specifications of Signalling System No.7; Functional description of the Signalling Connection Control Part".

[73] ITU-T Recommendation Q.712: "Definition and function of SCCP messages".

[74] ITU-T Recommendation Q.713: "Specifications of Signalling System No.7; SCCP formats and codes".

[75] ITU-T Recommendation Q.714: "Specifications of Signalling System No.7; Signalling Connection Control Part procedures".

[76] ITU-T Recommendation Q.716: "Specifications of Signalling System No.7; Signalling connection control part (SCCP) performances".

[77] ITU-T Recommendation Q.721 (1988): "Specifications of Signalling System No.7; Functional description of the Signalling System No.7 Telephone user part".

[78] ITU-T Recommendation Q.722 (1988): "Specifications of Signalling System No.7; General function of Telephone messages and signals".

[79] ITU-T Recommendation Q.723 (1988): "Specifications of Signalling System No.7; Formats and codes".

[80] ITU-T Recommendation Q.724 (1988): "Specifications of Signalling System No.7; Signalling procedures".

[81] ITU-T Recommendation Q.725 (1988): "Specifications of Signalling System No.7; Signalling performance in the telephone application".

[82] ITU-T Recommendation Q.761 (1988): "Specifications of Signalling System No.7; Functional description of the ISDN user part of Signalling System No.7".

[83] ITU-T Recommendation Q.762 (1988): "Specifications of Signalling System No.7; General function of messages and signals".

[84] ITU-T Recommendation Q.763 (1988): "Specifications of Signalling System No.7; Formats and codes".

[85] ITU-T Recommendation Q.764 (1988): "Specifications of Signalling System No.7; Signalling procedures".

[86] ITU-T Recommendation Q.767: "Specifications of Signalling System No.7; Application of the ISDN user part of CCITT signalling System No.7 for international ISDN interconnections".

[87] ITU-T Recommendation Q.771: "Specifications of Signalling System No.7; Functional description of transaction capabilities".

[88] ITU-T Recommendation Q.772: "Specifications of Signalling System No.7; Transaction capabilities information element definitions".

[89] ITU-T Recommendation Q.773: "Specifications of Signalling System No.7; Transaction capabilities formats and encoding".

[90] ITU-T Recommendation Q.774: "Specifications of Signalling System No.7; Transaction capabilities procedures".

[91] ITU-T Recommendation Q.775: "Specifications of Signalling System No.7; Guide-lines for using transaction capabilities".

[92] ITU-T Recommendation X.200: "Reference Model of Open systems interconnection for CCITT Applications".

[93] ITU-T Recommendation X.680: "Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation".

[93b] ITU-T Recommendation X.681: "Information technology – Abstract Syntax Notation One (ASN.1): Information object specification"

[94] ITU-T Recommendation X.690: "Information technology – ASN.1 encoding rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)".

[95] ITU-T Recommendation X.210: "Open systems interconnection layer service definition conventions".

[97] 3GPP TS 23.018: "Basic Call Handling".

[98] 3GPP TS 23.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 4 - Stage 2".

[99] 3GPP TS 23.079: "Support of Optimal Routeing (SOR) - Stage 2".

[100] 3GPP TS 43.068: "Voice Group Call Service (VGCS) - Stage 2".

[101] 3GPP TS 43.069: "Voice Broadcast service (VBS) - Stage 2".

[102] ANSI T1.113: "Signaling System No. 7 (SS7) - ISDN User Part".

[103] Void

[104] 3GPP TS 23.060: "General Packet Radio Service (GPRS) Description; Stage 2".

[105] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".

[106] 3GPP TS 29.018: "General Packet Radio Service (GPRS); Serving GPRS Support Node (SGSN) - Visitors Location Register (VLR); Gs interface layer 3 specification".

[107] 3GPP TS 23.093: "Technical Realization of Completion of Calls to Busy Subscriber (CCBS); Stage 2".

[108] 3GPP TS 23.066: "Support of Mobile Number Portability (MNP); Technical Realisation Stage 2".

[109] ANSI T1.112 (1996): "Telecommunication – Signalling No. 7 - Signaling Connection Control Part (SCCP)".

[110] 3GPP TS 23.116: "Super-Charger Technical Realisation; Stage 2."

[111] Void.

[112] Void

[113] Void

[114] Void

[115] Void

[116] ITU-T Recommendation Q.850 (May 1998): "Usage of cause and location in the Digital Subscriber Signalling System No. 1 and the Signalling System No. 7 ISDN User Part".

[117] 3GPP TS 22.135: "Multicall; Service description; Stage 1".

[118] 3GPP TS 23.135: "Multicall supplementary service; Stage 2".

[119] 3GPP TS 24.135: "Multicall supplementary service; Stage 3".

[120] 3GPP TS 25.413: "UTRAN Iu Interface RANAP Signalling".

[121] 3GPP TS 29.202: "SS7 signalling transport in core network"

[122] 3GPP TS 23.032: "Universal Geographical Area Description (GAD)"

[123] 3GPP TS 22.071: " Location Services (LCS); Service description, Stage 1"

[124] ITU-T Recommendation X.880: "Data networks and open system communication - Open System Interconnection - Service definitions - Remote operations: Concepts, model and notation".

[125] 3GPP TS 23.278: “Customised Applications for Mobile Network Enhanced Logic (CAMEL) Phase 4 – Stage 2 IM CN Interworking (Rel-5)”

[126] 3GPP TS 23.172: "Technical realization of Circuit Switched (CS) multimedia service; UDI/RDI fallback and service modification"

[127] 3GPP TS 26.103: "Speech codec list for GSM and UMTS".

[128] 3GPP TS 23.141: "Presence Service; Architecture and Functional Description"

[129] 3GPP TS 23.094: "Follow Me (FM) – Stage 2"

[xx1] 3GPP TS 32.421: "Subscriber and equipment trace: Trace concepts and requirements".

[xx2] 3GPP TS 32.422: "Subscriber and equipment trace; Trace control and Configuration Management".

****** NEXT MODIFIED SECTION ******

7.6.10 System operations parameters

7.6.10.1 Network resources

This parameter refers to a class or type of network resource:

- PLMN;
- HLR;
- VLR (current or previous);
- MSC (controlling or current);
- EIR;
- radio sub-system.

7.6.10.2 Trace reference

This parameter represents a reference associated with a GSM only tracing request as defined in 3GPP TS 52.008 [61]. The parameter is managed by OMC/EM.

7.6.10.2A Trace reference 2

This parameter represents a reference associated with a tracing request as defined in 3GPP TS 32.421 [xx1] and 3GPP TS 32.422 [xx2]. The parameter is managed by EM.

7.6.10.3 Trace type

This parameter identifies the type of trace for GSM only tracing request. Trace types are fully defined in ~~GSM~~3GPP TS ~~1~~52.008 [61]. If the activation of the tracing is requested only for UMTS, then this parameter shall contain value "No MSC Trace" for MSC Record Type and value "No BSS Trace" for BSS Record Type.

7.6.10.4 Additional network resources

This parameter refers to a class or type of network resource:

- SGSN;
- GGSN;
- GMLC;
- gsmSCF;
- NPLR;
- AuC.

7.6.10.X Trace depth list

This parameter identifies the list of depths of trace per network element. See 3GPP TS 32.422 [xx2].

7.6.10.X Trace NE type list

This parameter identifies the list of network elements to be traced. See 3GPP TS 32.422 [xx2].

7.6.10.X Trace interface list

This parameter identifies the list of interfaces or protocols per network element to be traced. See 3GPP TS 32.422 [xx2].

7.6.10.X Trace event list

This parameter identifies the list of events per network element, which trigger a Trace Recording Session. See 3GPP TS 32.422 [xx2].

7.6.10.X Trace support indicator

This parameter indicates that UMTS trace parameters are supported in the VLR or in the SGSN.

****** NEXT MODIFIED SECTION ******

9.1.1 MAP-ACTIVATE-TRACE-MODE service

9.1.1.1 Definition

This service is used between the HLR and the VLR to activate subscriber tracing in the VLR.

Also this service is used between the HLR and the SGSN to activate subscriber tracing in the SGSN.

The MAP-ACTIVATE-TRACE-MODE service is a confirmed service using the primitives from table 9.1/1.

9.1.1.2 Service primitives

Table 9.1/1: MAP-ACTIVATE-TRACE-MODE

Parameter name	Request	Indication	Response	Confirm
Invoke id	M	M(=)	M(=)	M(=)
IMSI	C	C(=)		
Trace reference	M	M(=)		
Trace type	M	M(=)		
Trace reference 2	C	C(=)		
Trace depth list	C	C(=)		
Trace NE type list	C	C(=)		
Trace interface list	C	C(=)		
Trace event list	C	C(=)		
Trace support indicator			C	C(=)
OMC Id	U	C(=)		
User error			C	C(=)
Provider error				O

9.1.1.3 Parameter use

Invoke id

See definition in clause 7.6.1.

IMSI

See definition in clause 7.6.2. The IMSI is a mandatory parameter in a stand-alone operation.

Trace reference

See definition in clause 7.6.10. This parameter contains trace reference for GSM only tracing request.

Trace type

See definition in clause 7.6.10. This parameter contains trace type for GSM only tracing request.

OMC Id

See definition in clause 7.6.2. The use of this parameter is an operator option.

Trace reference 2

See definition in clause 7.6.10. This parameter shall be used for UMTS trace activation.

Trace depth list

See definition in clause 7.6.10. This parameter shall be used for UMTS trace activation.

Trace NE type list

See definition in clause 7.6.10. This parameter shall be used for UMTS trace activation.

Trace interface list

See definition in clause 7.6.10. This parameter shall be used for UMTS trace activation.

Trace event list

See definition in clause 7.6.10. This parameter shall be used for UMTS trace activation.

Trace support indicator

See definition in clause 7.6.10. This parameter shall be used for UMTS trace activation.

User error

The following errors defined in clause 7.6.1 may be used, depending on the nature of the fault:

- Unidentified Subscriber;
- Facility Not Supported;
- Tracing Buffer Full;
- System Failure;
- Unexpected Data Value;
- Data missing.

Provider error

For definition of provider errors see clause 7.6.1.

****** NEXT MODIFIED SECTION ******

9.1.2 MAP-DEACTIVATE-TRACE-MODE service

9.1.2.1 Definition

This service is used between the VLR and the HLR for deactivating subscriber tracing in the VLR.

Also this service is used between the SGSN and the HLR for deactivating subscriber tracing in the SGSN.

The MAP-DEACTIVATE-TRACE-MODE service is a confirmed service using the primitives from table 9.1/2.

9.1.2.2 Service primitives

Table 9.1/2: MAP-DEACTIVATE-TRACE-MODE

Parameter name	Request	Indication	Response	Confirm
Invoke id	M	M(=)	M(=)	M(=)
IMSI	C	C(=)		
Trace reference	M	M(=)		
Trace reference 2	C	C(=)		
User error			C	C(=)
Provider error				O

9.1.2.3 Parameter use

Invoke id

See definition in clause 7.6.1.

IMSI

See definition in clause 7.6.2. The IMSI is a mandatory parameter in a stand-alone operation.

Trace reference

See definition in clause 7.6.10.

Trace reference 2

See definition in clause 7.6.10. This parameter shall be used for UMTS trace activation.

User error

The following errors defined in clause 7.6.1 may be used, depending on the nature of the fault:

- Unidentified Subscriber;
- Facility Not Supported;
- System Failure;
- Unexpected Data Value;
- Data missing.

Provider error

For definition of provider errors see clause 7.6.1.

****** NEXT MODIFIED SECTION ******

17.7.2 Operation and maintenance data types

```
MAP-OM-DataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-OM-DataTypes (12) version9 (9)}

DEFINITIONS

IMPLICIT TAGS

::=

BEGIN

EXPORTS
   ActivateTraceModeArg,
   ActivateTraceModeRes,
   DeactivateTraceModeArg,
   DeactivateTraceModeRes
;

IMPORTS
   AddressString,
   IMSI
FROM MAP-CommonDataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-CommonDataTypes (18) version9 (9)}

   ExtensionContainer
FROM MAP-ExtensionDataTypes {
   itu-t identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-ExtensionDataTypes (21) version9 (9)}

;

ActivateTraceModeArg ::= SEQUENCE {
     imsi                                [0] IMSI                                OPTIONAL,
     traceReference                      [1] TraceReference,
     traceType                           [2] TraceType,
     omc-Id                              [3] AddressString                       OPTIONAL,
     extensionContainer                  [4] ExtensionContainer                  OPTIONAL,
     ...,
     traceReference2                     [x] TraceReference2                     OPTIONAL,
     traceDepthList                      [x] TraceDepthList                      OPTIONAL,
     traceNE-TypeList                    [x] TraceNE-TypeList                    OPTIONAL,
     traceInterfaceList                  [x] TraceInterfaceList                  OPTIONAL,
     traceEventList                      [x] TraceEventList                      OPTIONAL
     }

TraceReference ::= OCTET STRING (SIZE (1..2))

TraceReference2 ::= OCTET STRING (SIZE (3))

TraceType ::= INTEGER
     (0..255)
     -- Trace types are fully defined in 3GPP TS GSM 152.008 [61].

TraceDepthList ::= SEQUENCE {
     msc-s-TraceDepth                    [0] TraceDepth                          OPTIONAL,
     mgw-TraceDepth                      [1] TraceDepth                          OPTIONAL,
     sgsn-TraceDepth                     [2] TraceDepth                          OPTIONAL,
     ggsn-TraceDepth                     [3] TraceDepth                          OPTIONAL,
     rnc-TraceDepth                      [4] TraceDepth                          OPTIONAL,
     ...}

TraceDepth ::= ENUMERATED {
     minimum (0),
     medium (1),
     maximum (2),
     ...}
-- The value medium is applicable only for RNC. For other network elements, if value medium
-- is received, value minimum shall be applied.
```

```
TraceNE-TypeList ::= BIT STRING {
     msc-s (0),
     mgw (1),
     sgsn (2),
     ggsn (3),
     rnc (4)} (SIZE (5..16))
-- Other bits than listed above shall be discarded.
```

```
TraceInterfaceList ::= SEQUENCE {
     msc-s-List                          [0] MSC-S-InterfaceList          OPTIONAL,
     mgw-List                            [1] MGW-InterfaceList            OPTIONAL,
     sgsn-List                           [2] SGSN-InterfaceList           OPTIONAL,
     ggsn-List                           [3] GGSN-InterfaceList           OPTIONAL,
     rnc-List                            [4] RNC-InterfaceList            OPTIONAL,
     ...}
```

```
MSC-S-InterfaceList ::= BIT STRING {
     a (0),
     iu (1),
     mc (2),
     map-g (3),
     map-b (4),
     map-e (5),
     map-f (6),
     cap (7),
     map-d (8),
     map-c (9)} (SIZE (10..16))
-- Other bits than listed above shall be discarded.
```

```
MGW-InterfaceList ::= BIT STRING {
     mc (0),
     nb-up (1),
     iu-up (2)} (SIZE (3..8))
-- Other bits than listed above shall be discarded.
```

```
SGSN-InterfaceList ::= BIT STRING {
     gb (0),
     iu (1),
     gn (2),
     map-gr (3),
     map-gd (4),
     map-gf (5),
     gs (6),
     ge (7)} (SIZE (8..16))
-- Other bits than listed above shall be discarded.
```

```
GGSN-InterfaceList ::= BIT STRING {
     gn (0),
     gi (1)} (SIZE (2..8))
-- Other bits than listed above shall be discarded.
```

```
RNC-InterfaceList ::= BIT STRING {
     iu (0),
     iur (1),
     iub (2),
     uu (3)} (SIZE (4..8))
-- Other bits than listed above shall be discarded.
```

```
TraceEventList ::= SEQUENCE {
     msc-s-List                          [0] MSC-S-EventList              OPTIONAL,
     mgw-List                            [1] MGW-EventList                OPTIONAL,
     sgsn-List                           [2] SGSN-EventList               OPTIONAL,
     ggsn-List                           [3] GGSN-EventList               OPTIONAL,
     ...}
```

```
MSC-S-EventList ::= BIT STRING {
     mo-mtCall (0),
     mo-mt-sms (1),
     lu-imsiAttach-imsiDetach (2),
     handovers (3),
     ss (4)} (SIZE (5..16))
-- Other bits than listed above shall be discarded.
```

```
MGW-EventList ::= BIT STRING {
     context (0)} (SIZE (1..8))
-- Other bits than listed above shall be discarded.
```

```
SGSN-EventList ::= BIT STRING {
     pdpContext (0),
     mo-mt-sms (1),
     rau-gprsAttach-gprsDetach (2)} (SIZE (3..16))
-- Other bits than listed above shall be discarded.
```

```
GGSN-EventList ::= BIT STRING {
     pdpContext (0)} (SIZE (1..8))
-- Other bits than listed above shall be discarded.
```

```
ActivateTraceModeRes ::= SEQUENCE {
     extensionContainer                  [0] ExtensionContainer            OPTIONAL,
     ...,
     traceSupportIndicator               [x]  NULL                         OPTIONAL
     }
```

```
DeactivateTraceModeArg ::= SEQUENCE {
     imsi                                [0] IMSI                          OPTIONAL,
     traceReference                      [1] TraceReference,
     extensionContainer                  [2] ExtensionContainer            OPTIONAL,
     ...,
     traceReference2                     [x] TraceReference2               OPTIONAL
     }
```

```
DeactivateTraceModeRes ::= SEQUENCE {
     extensionContainer                  [0] ExtensionContainer            OPTIONAL,
     ...}
```

```
END
```