

**Source:** NTT DoCoMo  
**Title:** Concern for two step HLR interrogation  
**Agenda item:** 8.7  
**Document for:** Discussion and Decision

## 1. Introduction

The CRs (NP-030078 and NP-030106) for two step HLR interrogation were agreed at CN3 and CN4 in order to perform checking of subscription and forwarding options for SCUDIF calls. Considering the impact to MAP specification, the two step HLR interrogation is good procedure because only two parameters are added to MAP Send Routing Information operation. However, there is the concern that the two step HLR interrogation procedure increases the SS7 network signalling load.

## 2. Discussion

### Two Step HLR interrogation

In case of normal CS calls, the HSS determines whether the basic service deduced from the BC IE in the Send Routing Information request is allowed or not when the HSS receives the Send Routing Information request. In case of SCUDIF calls, the HSS determines whether two basic services are allowed or not. One is speech and another is multimedia (synchronous general bearer service). In the current SRI operation, the HSS can check only one basic service because the current SRI request can transport only one BC IE. Therefore, the current SRI operation needs to be enhanced in order to perform checking of subscription and forwarding options for SCUDIF calls.

During the latest CN3 and CN4 meetings, the two step HLR interrogation procedure was agreed. The figure below shows the two step HLR interrogation procedure described in NP-030078 and NP-030106.

In the two step HLR interrogation procedure, two SRI request are used to perform checking of subscription and forwarding options for a SCUDIF call. First SRI request is used to determines whether speech is allowed or not and second SRI request is used for multimedia. The two parameters are added in order to suppress the PRN for second SRI

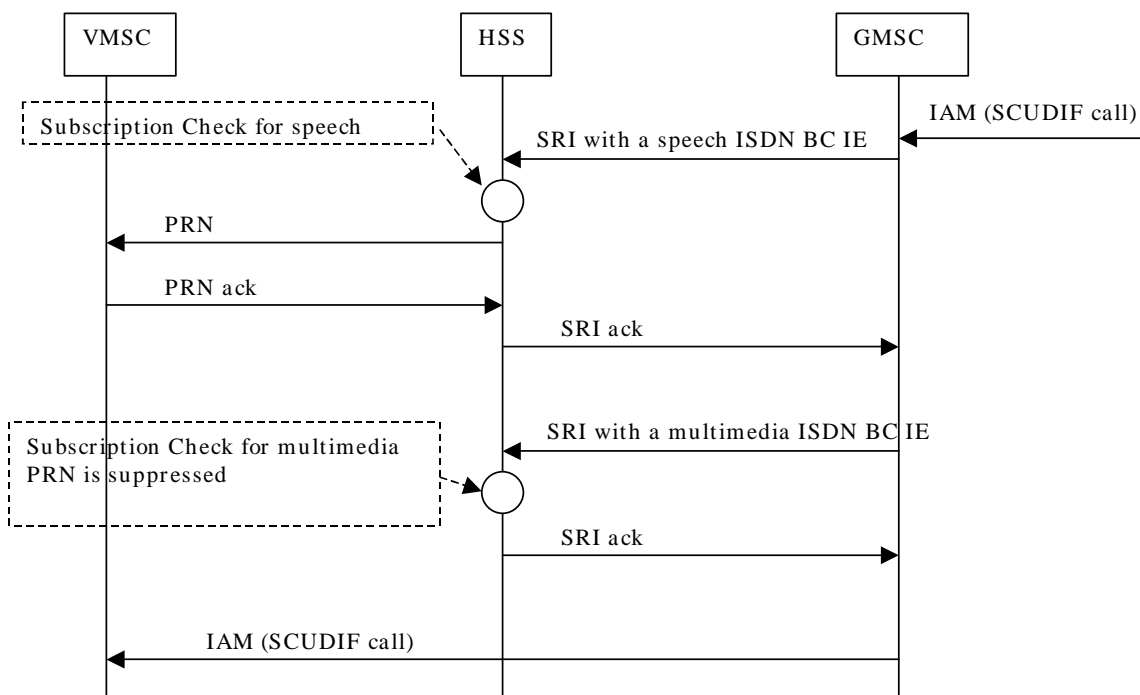


Figure 1: Successful procedure for two step HLR Interrogation

## DoCoMo's Concern and Proposal

DoCoMo is afraid that the two step HLR interrogation procedure will increase the SS7 network signalling load. If the SCUDIF calls will become very popular in the future, the signalling loads caused by two step HLR interrogation will greatly increase. Considering there is the possibility that the SCUDIF calls will become very popular in the future, we believe that the SRI needs to be enhanced for the SCUDIF calls so that the enhanced procedure does not increase the network signalling load.

Therefore, we propose one step procedure shown in the figure below instead of two step procedure. The detail procedure is described in the attached files.

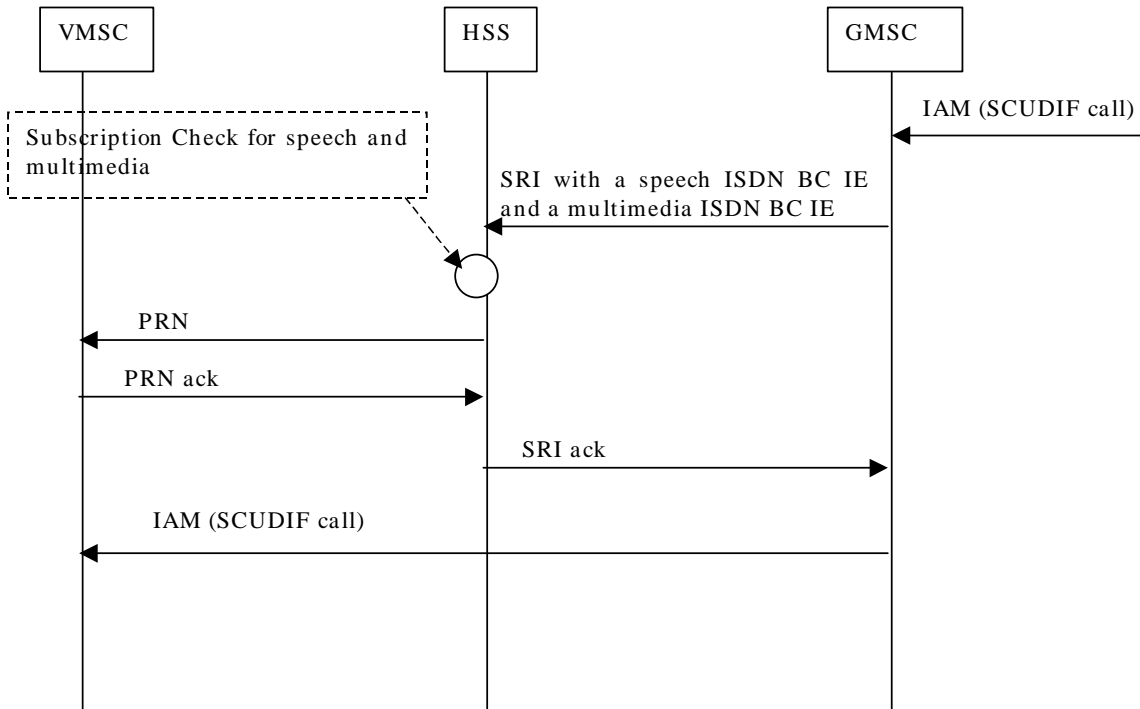


Figure 2: Successful procedure for one step HLR Interrogation

## 3. Proposal

We believe that our concern is the common concern among operators and most of operators prefer the one step HLR interrogation procedure to the two step interrogation procedure.

This document proposes

1. CN postpones the approval of the CRs for two step HLR interrogation.
2. CN asks CN3 and CN4 to take the signalling load into account and research whether the one step HLR interrogation procedure described in the attached files is feasible or not and to decide which procedure between the one step procedure and two step procedure is selected for the SCUDIF calls if the one step HLR interrogation is feasible.

CR-Form-v7
<b>CHANGE REQUEST</b>
# 23.172 CR CRNum # rev - # Current version: 5.1.0 #

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**Proposed change affects:** UICC apps#  ME  Radio Access Network  Core Network

<b>Title:</b>	# HSS interrogation for SCUDIF calls		
<b>Source:</b>	# NTT DoCoMo		
<b>Work item code:</b>	# SCUDIF <span style="float: right;"><b>Date:</b> # dd/mm/yyyy</span>		
<b>Category:</b>	# <b>F</b> <span style="float: right;"><b>Release:</b> # Rel-5</span>		
	<table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;">                     Use <u>one</u> of the following categories:  <b>F</b> (correction)  <b>A</b> (corresponds to a correction in an earlier release)  <b>B</b> (addition of feature),  <b>C</b> (functional modification of feature)  <b>D</b> (editorial modification)                      Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a>.                 </td> <td style="width: 50%; vertical-align: top;">                     Use <u>one</u> of the following releases:                      2 (GSM Phase 2)                      R96 (Release 1996)                      R97 (Release 1997)                      R98 (Release 1998)                      R99 (Release 1999)                      Rel-4 (Release 4)                      Rel-5 (Release 5)                      Rel-6 (Release 6)                 </td> </tr> </table>	Use <u>one</u> of the following categories: <b>F</b> (correction) <b>A</b> (corresponds to a correction in an earlier release) <b>B</b> (addition of feature), <b>C</b> (functional modification of feature) <b>D</b> (editorial modification) Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .	Use <u>one</u> of the following releases: 2 (GSM Phase 2) R96 (Release 1996) R97 (Release 1997) R98 (Release 1998) R99 (Release 1999) Rel-4 (Release 4) Rel-5 (Release 5) Rel-6 (Release 6)
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<b>Reason for change:</b>	# No proper checking of subscription & forwarding options are performed by the GMSC for services provided by SCUDIF (speech & multimedia)
<b>Summary of change:</b>	# The Send Routing Information Request is updated to support the transport of additional Network Signal Info and the Send Routing Information Reply is updated to support the transport fo result of subscription check for each Network Signal Info .
<b>Consequences if not approved:</b>	# The GMSC can only check a single service (either multimedia or speech), which may even not be present when the call setup signalling reaches the VMSC (due to interworking). The subscription and call forwarding state of the other service cannot be properly checked.

<b>Clauses affected:</b>	#												
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Y	N	Other core specifications	#										
		Test specifications	#										
		O&M Specifications	#										
<b>Other comments:</b>	#												

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## &lt;&lt;Fisrt Modified Section&gt;&gt;

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- [1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [2] 3GPP TS 23.153: "Out of Band Transcoder Control; Stage 2".
- [3] 3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core network protocols; Stage 3".
- [4] 3GPP TS 26.103: "Speech Codec List for GSM and UMTS".
- [5] 3GPP TS 27.001: "General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".
- [6] 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)".
- [7] 3GPP TS 29.205: "Application of Q.1900 series to bearer-independent circuit-switched core network architecture; Stage 3".
- [8] 3GPP TS 22.101: "Service aspects; Service principles".
- [9] 3GPP TS 33.106: "3GPP Security; Lawful Interception Requirements".
- [10] [3GPP TS 29.002: "Mobile Application Part \(MAP\) specification"](#).

## &lt;&lt;Next Modified Section&gt;&gt;

### 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply:

**Editor's note: To be completed.**

BC	Bearer Capability
BC1	First Bearer Capability in a message (preferred service)
BC2	Second Bearer Capability in a message (less preferred service)
BCa	Bearer Capability of the currently selected service
BCb	Bearer Capability of the service to switch to
BCmm	Bearer Capability multimedia
BCsp	Bearer Capability speech
MMI	Man-Machine Interface
<a href="#">MSRN</a>	<a href="#">Mobile Station Roaming Number</a>
O-MSC	Originating MSC
O-UE	Originating UE
RI	Repeat Indicator

SCUDIF	Service Change and UDI/RDI Fallback
T-MS	Terminating MSC
T-UE	Terminating UE

## <<Next Modified Section>>

### 4.3.3 Terminating side

#### 4.3.3.1 HSS interrogation

The GMSC sends the Send Routing Information request with the network signal information parameter and the network signal information 2 parameter, defined in TS29.002 [10]. The network signal information parameter includes the ISDN BC IE for the preferred service. The network signal information 2 parameter includes the ISDN BC IE for the less preferred service.

Depending on the result of subscription check for each network signal information parameter, the HSS does the following:

- If the network signal information parameters for both the services are allowed as the result of subscription check and the call forwarding is not applied for both the services, the HSS sends the Send Routing Information reply with MSRN and the allowed network signal information parameter including the result that both the services are allowed.
- If either network signal information parameter is allowed, other is not allowed due to call barring or any error indicating the unavailability of the service and the call forwarding is not applied for the allowed service, the HSS sends the Send Routing Information reply with MSRN and the allowed network signal information parameter including the result that only one service is allowed
- If the network signal information parameters for both the services are not allowed due to call barring or any error indicating the unavailability of the service, the HSS sends the error with the error cause for the preferred service.
- If the network signal information parameters for both the services are allowed, call forwarding is not applied for the preferred service and call forwarding is applied for the less, the HSS sends the Send Routing Information reply with the MSRN and the allowed network signal information parameter including the result that only the preferred service is allowed.
- If the network signal information parameters for both the services are allowed, call forwarding is applied for the preferred service and call forwarding is not applied for the less preferred service, the HSS sends the Send Routing Information with the forwarded to number for the preferred service and the allowed network signal information including the result that only the preferred service is allowed.
- If the network signal information parameters for both the services are allowed, the call forwarding are applied for both the services and the forwarded to number for the preferred service is same as for the less preferred service, the HSS sends the Send Routing Information with the forwarded to number and the allowed network signal information parameter including the result that both the services are allowed.
- If the network signal information parameters for both the services are allowed, call forwarding are applied for the preferred service and the less preferred service and the forwarded to Number for the preferred service is different from the less preferred service, the HSS sends the Send Routing Information reply with the forwarded to Number for the preferred service and the allowed network signal information parameter including the result that only the preferred service is allowed.

Depending on the reply from the HSS, the GMSC does the following

- If the GMSC receives the MSRN and the allowed network signal information parameter indicating both services are allowed, the GMSC shall proceed with the codec negotiation procedure to the terminating VMSC indicated by the roaming number.
- If the GMSC receives the MSRN and the allowed network signal information parameter indicating only one service is allowed, the GMSC shall fallback to the allowed service and proceed with the call setup to the terminating VMSC indicated by the roaming number.
- If the GMSC receives the forwarded to number and the allowed network signal information parameter indicating both the services are allowed, the GMSC shall proceed with the codec negotiation procedure to the terminating VMSC indicated by the roaming number.

- If the GMSC receives the forwarded to number and the allowed network signal information parameter indicating only one service is allowed, the GMSC shall fallback to the allowed service and proceed with the call setup to the destination indicated by the forwarded to number.
- If the GMSC receives the forwarded to number or the MSRN, but does not receive the allowed network signal information parameter, the GMSC shall fallback to the preferred service and proceed with the call setup to the destination indicated by the forwarded to number or the terminating VMSC indicated by the roaming number.

#### 4.3.3.2 Terminating MSC Handling

The terminating MSC receives the list of supported codec types, including the 3G-324.M codec. It shall then send a SETUP message towards the terminating UE including a Repeat Indicator with the value "service change and fallback" and two BC-IEs, according to the following rule:

- if the 3G-324.M codec is the first (preferred) codec in the list of supported codecs, then the first BC-IE in the SETUP message is the multimedia BC-IE, and the second BC-IE is the speech BC-IE (see figure 4.17);
- if the 3G-324.M codec is in the list of supported codec types, but not in the first position, then the first BC-IE in the SETUP message is the speech BC-IE, and the second BC-IE is the multimedia BC-IE (see figure 4.18).

The terminating UE answers according to its capabilities in the CALL CONFIRMED message. The terminating MSC shall determine the Selected Codec and construct the list of available codecs according to the following rules:

- if no Repeat Indicator is included, and only a speech BC-IE is received, the MSC shall choose a speech codec as the Selected Codec according to the normal mechanism, and no 3G-324.M codec shall be inserted in the list of available codecs (see figure 4.19);
- if no Repeat Indicator is included, and only a multimedia BC-IE is received, the MSC shall choose the 3G-324.M codec as the Selected Codec, and only the 3G-324.M codec shall be inserted in the list of available codecs (see figure 4.20);
- if the Repeat Indicator is included, and the speech BC-IE is the first BC-IE and the multimedia BC-IE is the second BC-IE, the MSC shall choose a speech codec as the Selected Codec according to the normal mechanism, and both the 3G-324.M codec and speech codecs shall be inserted in the list of available codecs (see figure 4.21);
- if the Repeat Indicator is included, and the multimedia BC-IE is the first BC-IE and the speech BC-IE is the second BC-IE, the Selected Codec shall be the 3G-324.M codec, and both the 3G-324.M codec and speech codecs shall be inserted in the list of available codecs (see figure 4.22).

NOTE: If the UE sends a CALL CONFIRMED message without Repeat Indicator and BCs, it indicates that it accepts the proposed settings sent in the SETUP message, which are then used by the MSC to select the relevant case.

The Selected Codec and the list of available codecs shall be sent back to the originating MSC according to the normal codec negotiation procedure.

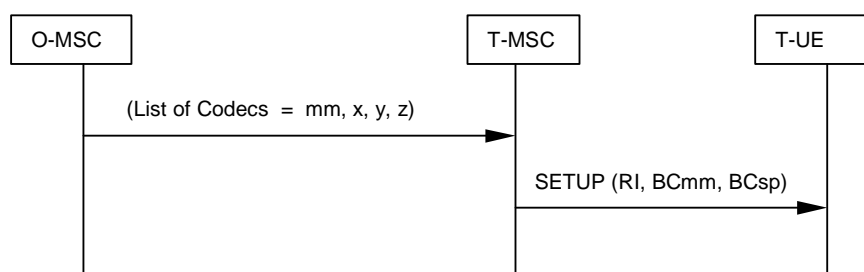
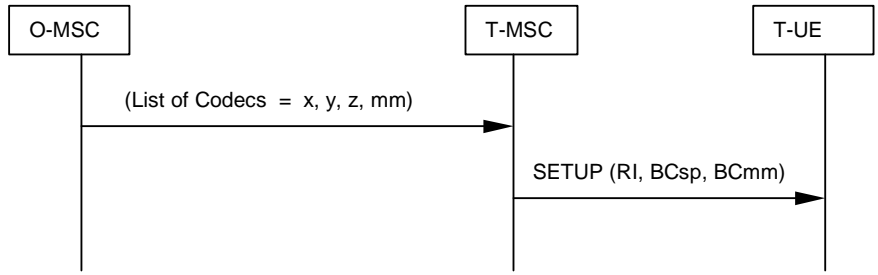
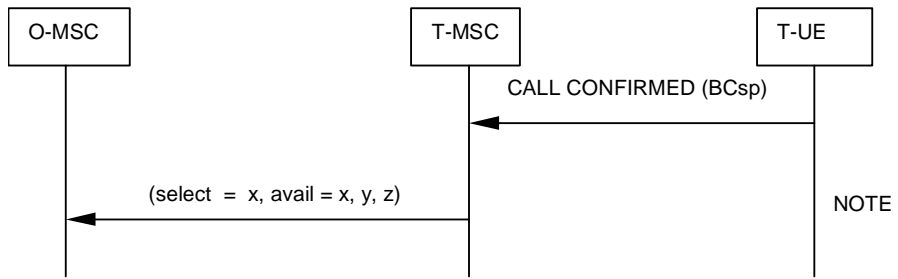


Figure 4.17: 3G-324M codec first

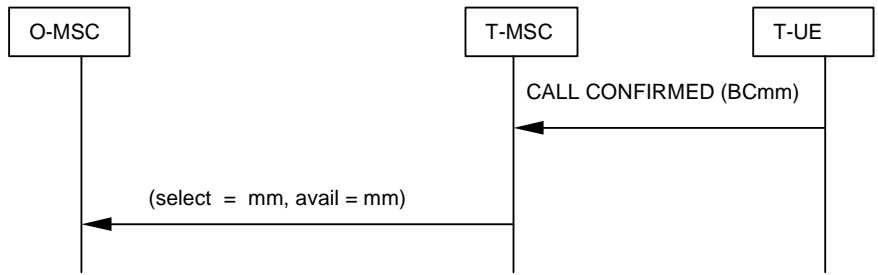


**Figure 4.18: Speech codec first**

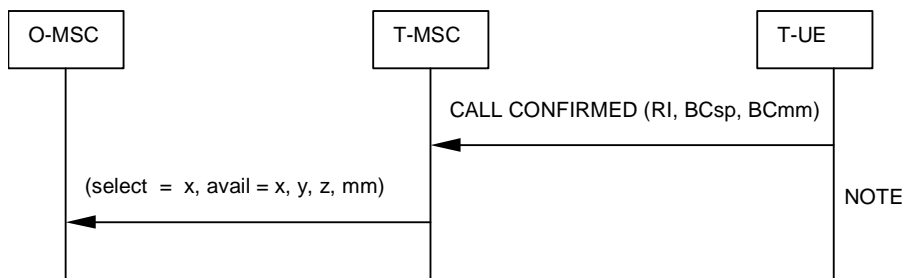


NOTE: The actual speech codec is selected according to OoBTC procedures.

**Figure 4.19: Speech only**



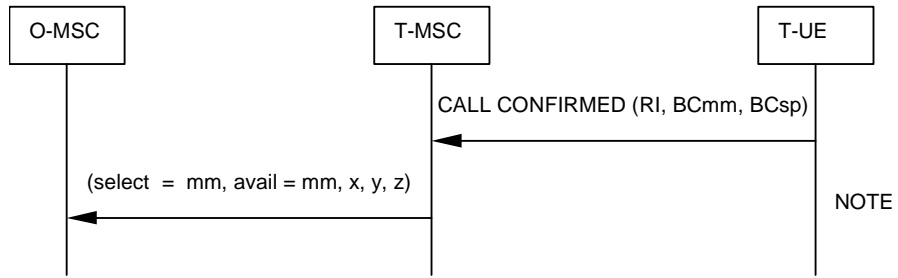
**Figure 4.20: Multimedia only**



NOTE: The actual speech codec is selected according to OoBTC procedures.

**Figure 4.21: Speech preferred**





NOTE: The actual list of speech codecs is built according to OoBTC procedures.

**Figure 4.22: Multimedia preferred**

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<b>CHANGE REQUEST</b>
# 29.002 CR CRNum # rev - # Current version: 5.4.0 #

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<b>Work item code:</b>	# SCUDIF <span style="float: right;"><b>Date:</b> # dd/mm/yyyy</span>
<b>Category:</b>	# <b>F</b> <span style="float: right;"><b>Release:</b> # Rel-5</span>
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<b>Clauses affected:</b>	# 2, 7.6, 7.6.9, 10.1.2, 17.7.3										
<b>Other specs affected:</b>	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 5px;">Y</td> <td style="padding: 2px 5px;">N</td> </tr> <tr> <td style="padding: 2px 5px;">X</td> <td style="padding: 2px 5px;"></td> </tr> <tr> <td style="padding: 2px 5px;"></td> <td style="padding: 2px 5px;">X</td> </tr> <tr> <td style="padding: 2px 5px;"></td> <td style="padding: 2px 5px;">X</td> </tr> </table>	Y	N	X			X		X	Other core specifications	# TS23.172
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- [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 registration procedures".
- [24] 3GPP TS 43.020: "Security related network functions".
- [25] 3GPP TS 23.038: "Alphabets and language".
- [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".
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- [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"](#)

## <<Next Modified Section>>

### 7.6 Definition of parameters

Following is an alphabetic list of parameters used in the common MAP-services in clause 7.3:

Application context name	7.3.1	Refuse reason	7.3.1
Destination address	7.3.1	Release method	7.3.2
Destination reference	7.3.1	Responding address	7.3.1
Diagnostic information	7.3.4	Result	7.3.1
Originating address	7.3.1	Source	7.3.5
Originating reference	7.3.1	Specific information	7.3.1/7.3.2/7.3.4
Problem diagnostic	7.3.6	User reason	7.3.4
Provider reason	7.3.5		

Following is an alphabetic list of parameters contained in this clause:

Absent Subscriber Diagnostic SM	7.6.8.9	Invoke Id	7.6.1.1
Access connection status	7.6.9.3	ISDN Bearer Capability	7.6.3.41
		IST Alert Timer	7.6.3.66
		IST Information Withdrawn	7.6.3.68
		IST Support Indicator	7.6.3.69
		LCS Codeword	7.6.11.18
		LCS Information	7.6.3.60
		LCS Service Type Id	7.6.11.15
Access signalling information	7.6.9.5	Kc	7.6.7.4
Additional Absent Subscriber Diagnostic SM	7.6.8.12	Linked Id	7.6.1.2
Additional Location Estimate	7.6.11.21	LMSI	7.6.2.16
Additional number	7.6.2.46	Location Information	7.6.2.30
		Location Information for GPRS	7.6.2.30a
Additional signal info	7.6.9.10	Location update type	7.6.9.6
Additional SM Delivery Outcome	7.6.8.11	Long Forwarded-to Number	7.6.2.22A
		Long FTN Supported	7.6.2.22B
Age Indicator	7.6.3.72	Lower Layer Compatibility	7.6.3.42
		LSA Information	7.6.3.56
		LSA Information Withdraw	7.6.3.58
Alert Reason	7.6.8.8	MC Information	7.6.4.48
Alert Reason Indicator	7.6.8.10	MC Subscription Data	7.6.4.47



Alerting Pattern	7.6.3.44	Mobile Not Reachable Reason	7.6.3.51
All GPRS Data	7.6.3.53	Modification request for CSI	7.6.3.81
All Information Sent	7.6.1.5	Modification request for SS Information	7.6.3.82
<a href="#">Allowed Network Signalling Information</a>	<a href="#">7.6.9.y</a>		
AN-apdu	7.6.9.1	More Messages To Send	7.6.8.7
APN	7.6.2.42	MS ISDN	7.6.2.17
Authentication set list	7.6.7.1	MSC number	7.6.2.11
B-subscriber Address	7.6.2.36	MSIsdn-Alert	7.6.2.29
B subscriber Number	7.6.2.48	Multicall Bearer Information	7.6.2.52
B subscriber subaddress	7.6.2.49	Multiple Bearer Requested	7.6.2.53
Basic Service Group	7.6.4.40	Multiple Bearer Not Supported	7.6.2.54
Bearer service	7.6.4.38	MWD status	7.6.8.3
BSSMAP Service Handover	7.6.6.5		
BSSMAP Service Handover List	7.6.6.5A	NbrUser	7.6.4.45
Call Barring Data	7.6.3.83	Network Access Mode	7.6.3.50
Call barring feature	7.6.4.19	Network node number	7.6.2.43
Call barring information	7.6.4.18	Network resources	7.6.10.1
Call Direction	7.6.5.8	Network signal information	7.6.9.8
Call Forwarding Data	7.6.3.84	<a href="#">Network signal information 2</a>	<a href="#">7.6.9.x</a>
		New password	7.6.4.20
Call Info	7.6.9.9	No reply condition timer	7.6.4.7
Call reference	7.6.5.1		
Call Termination Indicator	7.6.3.67	North American Equal Access	7.6.2.34
Called number	7.6.2.24	preferred Carrier Id	
		Number Portability Status	7.6.5.14
Calling number	7.6.2.25	ODB Data	7.6.3.85
CAMEL Subscription Info	7.6.3.78	ODB General Data	7.6.3.9
CAMEL Subscription Info Withdraw	7.6.3.38	ODB HPLMN Specific Data	7.6.3.10
Cancellation Type	7.6.3.52	OMC Id	7.6.2.18
Category	7.6.3.1	Originally dialled number	7.6.2.26
CCBS Feature	7.6.5.8	Originating entity number	7.6.2.10
CCBS Request State	7.6.4.49	Override Category	7.6.4.4
Channel Type	7.6.5.9	P-TMSI	7.6.2.47
Chosen Channel	7.6.5.10	PDP-Address	7.6.2.45
Chosen Radio Resource Information	7.6.6.10B	PDP-Context identifier	7.6.3.55
Ciphering mode	7.6.7.7	PDP-Type	7.6.2.44
Cksn	7.6.7.5	Pre-paging supported	7.6.5.15
CLI Restriction	7.6.4.5	Previous location area Id	7.6.2.4
CM service type	7.6.9.2	Protocol Id	7.6.9.7
Complete Data List Included	7.6.3.54	Provider error	7.6.1.3
CS Allocation Retention priority	7.6.3.87	PS LCS Not Supported by UE	7.6.11.10
CS LCS Not Supported by UE	7.6.11.9	QoS-Subscribed	7.6.3.47
CUG feature	7.6.3.26	Radio Resource Information	7.6.6.10
CUG index	7.6.3.25	Radio Resource List	7.6.6.10A
CUG info	7.6.3.22	RANAP Service Handover	7.6.6.6
		Rand	7.6.7.2
CUG interlock	7.6.3.24	LCS-Reference Number	7.6.11.23
		Regional Subscription Data	7.6.3.11
CUG Outgoing Access indicator	7.6.3.8	Regional Subscription Response	7.6.3.12
CUG subscription	7.6.3.23	Relocation Number List	7.6.2.19A
CUG Subscription Flag	7.6.3.37	Requested Info	7.6.3.31
Current location area Id	7.6.2.6	Requested Subscription Info	7.6.3.86
		Roaming number	7.6.2.19
Current password	7.6.4.21	Roaming Restricted In SGSN Due To	7.6.3.49
		Unsupported Feature	
Deferred MT-LR Data	7.6.11.3	Roaming Restriction Due To	7.6.3.13
		Unsupported Feature	
Deferred MT-LR Response Indicator	7.6.11.2	Current Security Context	7.6.7.8
eMLPP Information	7.6.4.41	Selected RAB ID	7.6.2.56
Encryption Information	7.6.6.9	Service centre address	7.6.2.27
Equipment status	7.6.3.2	Serving Cell Id	7.6.2.37
Extensible Basic Service Group	7.6.3.5	SGSN address	7.6.2.39
Extensible Bearer service	7.6.3.3	SGSN CAMEL Subscription Info	7.6.3.75
Extensible Call barring feature	7.6.3.21	SGSN number	7.6.2.38
Extensible Call barring information	7.6.3.20	SIWF Number	7.6.2.35
		SoLSA Support Indicator	7.6.3.57
Extensible Call barring information for CSE	7.6.3.79	SM Delivery Outcome	7.6.8.6

Extensible Forwarding feature	7.6.3.16	SM-RP-DA	7.6.8.1
Extensible Forwarding info	7.6.3.15	SM-RP-MTI	7.6.8.16
Extensible Forwarding information for CSE	7.6.3.80	SM-RP-OA	7.6.8.2
Extensible Forwarding Options	7.6.3.18	SM-RP-PRI	7.6.8.5
Extensible No reply condition timer	7.6.3.19	SM-RP-SMEA	7.6.8.17
Extensible QoS-Subscribed	7.6.3.74	SM-RP-UI	7.6.8.4
Extensible SS-Data	7.6.3.29	Sres	7.6.7.3
Extensible SS-Info	7.6.3.14	SS-Code	7.6.4.1
Extensible SS-Status	7.6.3.17	SS-Data	7.6.4.3
Extensible Teleservice	7.6.3.4	SS-Event	7.6.4.42
External Signal Information	7.6.9.4	SS-Event-Data	7.6.4.43
Failure Cause	7.6.7.9	SS-Info	7.6.4.24
Forwarded-to number	7.6.2.22	SS-Status	7.6.4.2
Forwarded-to subaddress	7.6.2.23	Stored location area Id	7.6.2.5
Forwarding feature	7.6.4.16	Subscriber State	7.6.3.30
Forwarding information	7.6.4.15	Subscriber Status	7.6.3.7
Forwarding Options	7.6.4.6	Super-Charger Supported in HLR	7.6.3.70
GERAN Classmark	7.6.6.4		
GGSN address	7.6.2.40	Super-Charger Supported in Serving Network Entity	7.6.3.71
		Offered Camel4 CSIs	7.6.3.36D
		Offered Camel4 CSIs in GMSC	
		Offered Camel4 CSIs in VMSC	7.6.3.36E
		Offered Camel4 CSIs in VLR	
		Offered Camel4 CSIs in SGSN	7.6.3.36F
		Offered Camel4 Functionalities	7.6.3.36B
			7.6.3.36C
			7.6.3.36G
GGSN number	7.6.2.41	Supported CAMEL Phases in VLR	7.6.3.36
GMSC CAMEL Subscription Info	7.6.3.34	Supported CAMEL Phases in SGSN	7.6.3.36A
GPRS enhancements support indicator	7.6.3.73	Supported GAD Shapes	7.6.11.20
GPRS Node Indicator	7.6.8.14	Supported LCS Capability Sets	7.6.11.17
		Suppress Incoming Call Barring	7.6.3.b
GPRS Subscription Data	7.6.3.46	Suppress T-CSI	7.6.3.33
		Suppress VT-CSI	7.6.3.a
GPRS Subscription Data Withdraw	7.6.3.45	Suppression of Announcement	7.6.3.32
GPRS Support Indicator	7.6.8.15	Target cell Id	7.6.2.8
Group Id	7.6.2.33	Target location area Id	7.6.2.7
GSM bearer capability	7.6.3.6	Target RNC Id	7.6.2.8A
gsmSCF Address	7.6.2.58		
gsmSCF Initiated Call	7.6.3.c		
Guidance information	7.6.4.22	Target MSC number	7.6.2.12
Handover number	7.6.2.21	Teleservice	7.6.4.39
High Layer Compatibility	7.6.3.43	TMSI	7.6.2.2
HLR Id	7.6.2.15	Trace reference	7.6.10.2
HLR number	7.6.2.13	Trace type	7.6.10.3
HO-Number Not Required	7.6.6.7	User error	7.6.1.4
IMEI	7.6.2.3	USSD Data Coding Scheme	7.6.4.36
IMSI	7.6.2.1	USSD String	7.6.4.37
Integrity Protection Information	7.6.6.8	UU Data	7.6.5.12
Inter CUG options	7.6.3.27	UUS CF Interaction	7.6.5.13
Intra CUG restrictions	7.6.3.28	VBS Data	7.6.3.40
		VGCS Data	7.6.3.39
		VLR CAMEL Subscription Info	7.6.3.35
		VLR number	7.6.2.14
		VPLMN address allowed	7.6.3.48
		Zone Code	7.6.2.28

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### 7.6.9.8 Network signal information

This parameter is transported as external signal information. The protocol ID shall be set to "ETS 300 102-1".

The network signal information may include the following information elements as defined in 3GPP TS 29.007 [56]:

- ISDN BC; the tag and length are defined by ETS 300 102-1.

For the content, see 3GPP TS 29.007 [56].

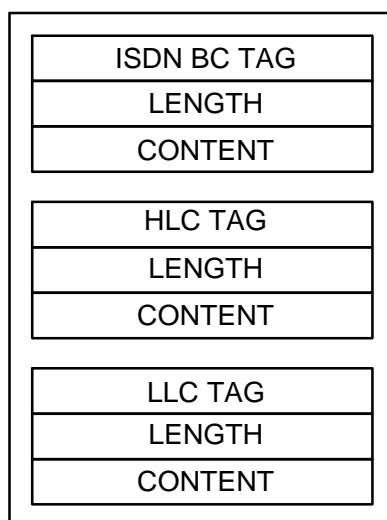
- HLC; the tag and length are defined by ETS 300 102-1.

For the content, see 3GPP TS 29.007 [56].

- LLC; the tag and length are defined by ETS 300 102-1.

For the content, see 3GPP TS 29.007 [56].

They are contained in the Signal Information parameter according to figure 7.6/1 (irrespective of the order):



**Figure 7.6/1: Network signal information parameter**

### 7.6.9.9 Call Info

This parameter is transported as external signal information. The protocol ID shall be set to "3GPP TS 24.008 [35]".

The Call Info includes the set of information elements from the original SETUP message and is imported from 3GPP TS 24.008 [35].

### 7.6.9.10 Additional signal info

This parameter is transported as external signal information. The protocol ID shall be set to "ETS 300 356".

The additional signal information may include the following information elements:

- Calling Party Number as defined by ETS 300 356.
- Generic Number as defined by ETS 300 356.

They are contained in the Signal Information parameter according to figure 7.6/2 (irrespective of the order):

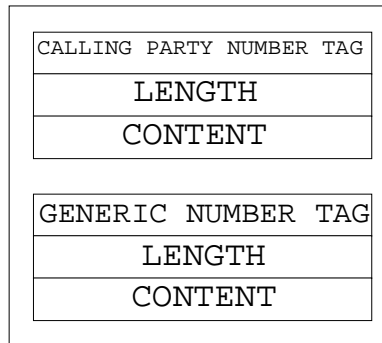


Figure 7.6/2: Additional signal information parameter

### 7.6.9.x Network signal information 2

This parameter is transported as additional external signal information for SCUDIF. The protocol ID shall be set to "ETS 300 102-1".

The network signal information 2 may include the following information elements as defined in 3GPP TS 29.007 [56] :

- ISDN BC; the tag and length are defined by ETS 300 102-1.

For the content, see 3GPP TS 29.007 [56].

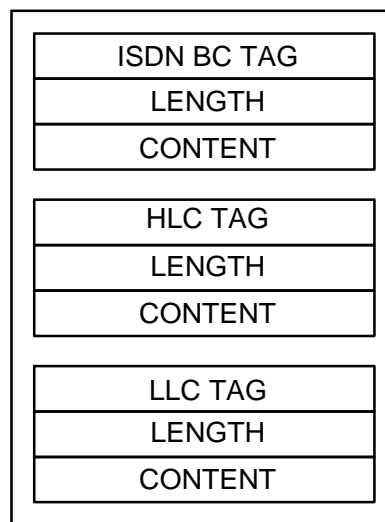
- HLC; the tag and length are defined by ETS 300 102-1.

For the content, see 3GPP TS 29.007 [56].

- LLC; the tag and length are defined by ETS 300 102-1.

For the content, see 3GPP TS 29.007 [56].

They are contained in the Signal Information parameter according to figure 7.6/1 (irrespective of the order):



**Figure 7.6/1: Network signal information 2 parameter**

### 7.6.9.y Allowed network signal information

This parameter is used for a HSS to notify a GMSC about the results of subscription check for a network signalling information and a network signalling information 2.

**<<Next Modified Section>>**

## 10.1 MAP\_SEND\_ROUTING\_INFORMATION service

### 10.1.1 Definition

This service is used between the Gateway MSC and the HLR. The service is invoked by the Gateway MSC to perform the interrogation of the HLR in order to route a call towards the called MS.

This is a confirmed service using the primitives listed in table 10.1/1.

This service is also used between the GMSC and the NPLR and between the gsmSCF and the HLR.

### 10.1.2 Service primitives

**Table 10.1/1: MAP\_SEND\_ROUTING\_INFORMATION parameters**

Parameter name	Request	Indication	Response	Confirm
Invoke Id	M	M(=)	M(=)	M(=)
Interrogation Type	M	M(=)		
GMSC or gsmSCF Address	M	M(=)		
MSISDN	M	M(=)	C	C(=)
OR Interrogation	C	C(=)		
OR Capability	C	C(=)		
CUG Interlock	C	C(=)	C	C(=)
CUG Outgoing Access	C	C(=)	C	C(=)
Number of Forwarding	C	C(=)		
Network Signal Info	C	C(=)		
Supported CAMEL Phases	C	C(=)	C	C(=)
Suppress T-CSI	C	C(=)		
Offered CAMEL 4 CSIs	C	C(=)		
Suppression of Announcement	C	C(=)		
Call Reference Number	C	C(=)		
Forwarding Reason	C	C(=)		
Basic Service Group	C	C(=)		
Alerting Pattern	C	C(=)		
CCBS Call	C	C(=)		
Supported CCBS Phase	C	C(=)		
Additional Signal Info	C	C(=)		
IST Support Indicator	C	C(=)		
Pre-paging supported	C	C(=)		
Call Diversion Treatment Indicator	C	C(=)		
Long FTN Supported	C	C(=)		
Suppress VT-CSI	C	C(=)		
Suppress Incoming Call Barring	C	C(=)		
gsmSCF Initiated Call	C	C(=)		
<a href="#">Network Signal Info 2</a>	<a href="#">C</a>	<a href="#">C(=)</a>		
IMSI			C	C(=)
MSRN			C	C(=)
Forwarding Data			C	C(=)
Forwarding Interrogation Required			C	C(=)
VMSC address			C	C(=)
GMSC Camel Subscription Info			C	C(=)
Location Information			C	C(=)
Subscriber State			C	C(=)
Basic Service Code			C	C(=)
CUG Subscription Flag			C	C(=)
North American Equal Access preferred			U	C(=)
Carrier Id				
User error			C	C(=)
SS-List			U	C(=)
CCBS Target			C	C(=)
Keep CCBS Call Indicator			C	C(=)
IST Alert Timer			C	C(=)

Parameter name	Request	Indication	Response	Confirm
Number Portability Status			U	C(=)
Supported CAMEL Phases in VMSC			C	
Offered CAMEL 4 CSIs in VMSC			C	C(=)
<a href="#">Allowed Network Signal Info</a>			<u>C</u>	<u>C(=)</u>
Provider error				O

### 10.1.3 Parameter use

See clause 7.6 for a definition of the parameters used in addition to the following. Note that:

- a conditional parameter whose use is defined only in 3GPP TS 23.078 shall be absent if the sending entity does not support CAMEL;
- a conditional parameter whose use is defined only in 3GPP TS 23.079 [99] shall be absent if the sending entity does not support optimal routing;
- a conditional parameter whose use is defined only in 3GPP TS 23.078 & 3GPP TS 23.079 [99] shall be absent if the sending entity supports neither CAMEL nor optimal routing.

#### Interrogation Type

See 3GPP TS 23.079 [99] for the use of this parameter.

#### GMSC or gsmSCF address

The E.164 address of the GMSC or the gsmSCF. This parameter contains the gsmSCF address if the gsmSCF initiated call parameter is present, otherwise it is the GMSC address.

#### MSISDN

This is the Mobile Subscriber ISDN number assigned to the called subscriber. In the Request & Indication it is the number received by the GMSC in the ISUP IAM. If the call is to be forwarded and the HLR supports determination of the redirecting number, the HLR inserts the basic MSISDN in the Response.

See 3GPP TS 23.066 [108] for the use of this parameter and the conditions for its presence in the response.

#### OR Interrogation

See 3GPP TS 23.079 [99] for the use of this parameter and the conditions for its presence.

#### OR Capability

See 3GPP TS 23.079 [99] for the use of this parameter and the conditions for its presence.

#### CUG Interlock

See 3GPP TS 23.018 [97] for the use of this parameter and the conditions for its presence.

#### CUG Outgoing Access

See 3GPP TS 23.018 [97] for the use of this parameter and the conditions for its presence.

#### Number of Forwarding

See 3GPP TS 23.018 [97] for the use of this parameter and the conditions for its presence.

#### Network Signal Info

See 3GPP TS 23.018 [97] for the conditions for the presence of the components of this parameter.

[For the SCUDIF calls, see 3GPP TS 23.271 \[126\] for the conditions for the presence of the components of this parameter](#)

#### Supported CAMEL Phases

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

#### T-CSI Suppression

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

#### Offered CAMEL 4 CSIs

This parameter indicates the CAMEL phase 4 CSIs offered in the GMSC/VLR (see clause 7.6.3.36D).

#### Suppression Of Announcement

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

#### Call Reference Number

The use of this parameter and the conditions for its presence are specified in 3GPP TS 23.078 [98] and 3GPP TS 23.079 [99].

#### Forwarding Reason

See 3GPP TS 23.079 [99] for the use of this parameter and the conditions for its presence.

#### Basic Service Group

See 3GPP TS 23.079 [99] for the use of this parameter and the conditions for its presence.

#### Alerting Pattern

See 3GPP TS 23.018 [97] and 3GPP TS 23.078 [98] for the use of this parameter and the conditions for its presence.

#### CCBS Call

See 3GPP TS 23.093 [107] for the use of this parameter and the conditions for its presence.

#### Supported CCBS Phase

This parameter indicates by its presence that CCBS is supported and the phase of CCBS which is supported.

#### Additional Signal Info

See 3GPP TS 23.081 [27] for the conditions for the presence of the components of this parameter.

#### IST Support Indicator

This parameter is used to indicate to the HLR that the GMSC supports basic IST functionality, that is, the GMSC is able to terminate the subscriber call activity that originated the IST Alert when it receives the IST Alert response indicating that the call(s) shall be terminated. If this parameter is not included in the Send Routing Information indication and the subscriber is marked as an IST subscriber, then the HLR may limit the service for the call (by barring the incoming call if it is not subject to forwarding, or suppressing Call Forwarding from the GMSC), or allow the call assuming the associated risk of not having the basic IST mechanism available.

This parameter can also indicate that the GMSC supports the IST Command, including the ability to terminate all calls being carried for the identified subscriber by using the IMSI as a key. If this additional capability is not included in the Send Routing Information indication and the subscriber is marked as an IST subscriber, then the HLR may limit the service for the subscriber (by barring the incoming calls if they are not subject to forwarding, or suppressing Call Forwarding from the GMSC), or allow the incoming calls assuming the associated risk of not having the IST Command mechanism available.

#### Pre-paging supported

See 3GPP TS 23.018 for the use of this parameter and the conditions for its presence.

#### Call Diversion Treatment Indicator

This parameter indicates whether or not call diversion is allowed.

## [Network Signal Info 2](#)

[See 3GPP TS 23.172 \[126\] for the conditions for the presence of the components of this parameter.](#)

### IMSI

See 3GPP TS 23.018 [97] and 3GPP TS 23.066 [108] for the use of this parameter and the conditions for its presence.

### MSRN

See 3GPP TS 23.018 [97], 3GPP TS 23.066 [108] and 3GPP TS 23.079 [99] for the use of this parameter and the conditions for its presence. If the NPLR returns only the MSISDN-number without Routing Number to the GMSC, the MSISDN-number shall be returned as MSRN.

### Forwarding Data

This parameter includes a number to define the forwarded-to destination, the forwarding reason and the forwarding options Notification to calling party and Redirecting presentation, and can include the forwarded-to subaddress. See 3GPP TS 23.018 [97] and 3GPP TS 23.079 [99] for the conditions for the presence of its components.

### Forwarding Interrogation Required

See 3GPP TS 23.079 [99] for the use of this parameter and the conditions for its presence.

### Long FTN Supported

This parameter indicates that the GMSC supports Long Forwarded-to Numbers.

### Suppress VT-CSI

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

### Suppress Incoming Call Barring

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

### gsmSCF Initiated Call

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

### VMSC address

See 3GPP TS 23.079 [99] and 3GPP TS 23.078 [98] for the use of this parameter and the conditions for its presence.

### GMSC CAMEL Subscription Info

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

### Location Information

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

### Subscriber State

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

### CUG Subscription Flag

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

### North American Equal Access preferred Carrier Id

This parameter is returned to indicate the preferred carrier identity to be used to set-up the call (i.e. forwarding the call or establishing the roaming leg).



### SS-List

This parameter includes SS-codes and will be returned as an operator option. The HLR shall not send PLMN-specific SS-codes across PLMN boundaries. However if the GMSC receives PLMN-specific SS-codes from a foreign PLMN's HLR the GMSC may ignore it. If the GMSC attempts to process the PLMN-specific SS-codes, this may lead to unpredictable behaviour but the GMSC shall continue call processing.

### Basic Service Code

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

If the CAMEL service is not involved, this parameter includes the basic service code and will be returned as an operator option. The HLR shall not send a PLMN-specific Basic Service Code across PLMN boundaries. However if the GMSC receives a PLMN-specific Basic Service Code from a foreign PLMN's HLR the GMSC may ignore it. If the GMSC attempts to process the PLMN-specific Basic Service codes, this may lead to unpredictable behaviour but the GMSC shall continue call processing.

### CCBS Target

See 3GPP TS 23.093 [107] for the use of this parameter and the conditions for its presence.

### Keep CCBS Call Indicator

See 3GPP TS 23.093 [107] for the use of this parameter and the conditions for its presence.

### IST Alert Timer

It includes the IST Alert timer value that must be used to inform the HLR about the call activities that the subscriber performs. This parameter is only sent to the GMSC in response to a Send Routing Information request which indicates the the GMSC supports IST.

### Number Portability Status

This parameter indicates the number portability status of the subscriber. This parameter may be present if the sender of SRIack is NPLR.

### Supported CAMEL Phases in VMSC

The use of this parameter and the requirements for its presence are specified in 3GPP TS 23.078.

### Offered CAMEL 4 CSIs in VMSC

This parameter is defined in clause 7.6.3.36F.

### Allowed Network Signal Info

[See 3GPP TS 23.172 \[126\] for the conditions for the presence of the components of this parameter.](#)

### User error

This parameter is sent by the responder when an error is detected and if present, takes one of the following values:

- Unknown Subscriber;

The diagnostic for the Unknown Subscriber error may indicate "NPDB Mismatch".

- Number changed;
- Call Barred;

This error will indicate that either incoming calls are barred for this MS or that calls are barred due to Operator Determined Barring (see 3GPP TS 22.041 [8] for a definition of this network feature);

- CUG Reject;

The value of this error cause will indicate the reason for CUG Reject;

- Bearer Service Not Provisioned;

- Teleservice Not Provisioned;

A subscription check has been performed and the call has not passed the check due to incompatibility with regard to the requested service. Depending on the nature of the incompatibility, either of these messages will be returned;

- Facility Not Supported;

- Absent Subscriber;

This indicates that the location of the MS is not known (either the station is not registered and there is no location information available or the Provide Roaming Number procedure fails due to IMSI detached flag being set), or the GMSC requested forwarding information with a forwarding reason of not reachable, and the call forwarding on MS not reachable service is not active;

- Busy Subscriber;

This indicates that Call Forwarding on Busy was not active for the specified basic service group when the GMSC requested forwarding information with a forwarding reason of busy;

The error may also indicate that the subscriber is busy due to an outstanding CCBS recall. In the error data it may then be specified that CCBS is possible for the busy encountered call;

- No Subscriber Reply;

This indicates that Call Forwarding on No Reply was not active for the specified basic service group when the GMSC requested forwarding information with a forwarding reason of no reply;

- OR Not Allowed;

This indicates that the HLR is not prepared to accept an OR interrogation from the GMSC, or that calls to the specified subscriber are not allowed to be optimally routed;

- Forwarding Violation;

- System Failure;

- Data Missing;

- Unexpected Data Value.

See clause 7.6 for a definition of these errors.

#### Provider error

These are defined in clause 7.6.

**<<Next Modified Section>>**

### 17.7.3 Call handling data types

```

MAP-CH-DataTypes {
    itu-t identified-organization (4) etsi (0) mobileDomain (0)
    gsm-Network (1) modules (3) map-CH-DataTypes (13) version8 (8)}

DEFINITIONS

IMPLICIT TAGS

 ::=

BEGIN

EXPORTS
    SendRoutingInfoArg,
    SendRoutingInfoRes,
    ProvideRoamingNumberArg,
    ProvideRoamingNumberRes,
    ResumeCallHandlingArg,
    ResumeCallHandlingRes,
    NumberOfForwarding,
    SuppressionOfAnnouncement,
    CallReferenceNumber,
    ProvideSIWFSNumberArg,
    ProvideSIWFSNumberRes,
    SIWFSSignallingModifyArg,
    SIWFSSignallingModifyRes,
    SetReportingStateArg,
    SetReportingStateRes,
    StatusReportArg,
    StatusReportRes,
    RemoteUserFreeArg,
    RemoteUserFreeRes,
    IST-AlertArg,
    IST-AlertRes,
    IST-CommandArg,
    IST-CommandRes
;

IMPORTS
    SubscriberInfo,
    SupportedCamelPhases,
    OfferedCamel4CSIs,
    CUG-Interlock,
    O-CSI,
    D-CSI,
    O-BcsmCamelTDPCriteriaList,
    T-BCSM-CAMEL-TDP-CriteriaList,
    IST-SupportIndicator,
    IST-AlertTimerValue,
    T-CSI

FROM MAP-MS-DataTypes {
    itu-t identified-organization (4) etsi (0) mobileDomain (0)
    gsm-Network (1) modules (3) map-MS-DataTypes (11) version8 (8)}

    ForwardingOptions,
    SS-List,
    CCBS-Feature
FROM MAP-SS-DataTypes {
    itu-t identified-organization (4) etsi (0) mobileDomain (0)
    gsm-Network (1) modules (3) map-SS-DataTypes (14) version8 (8)}

    ISDN-AddressString,
    ISDN-SubaddressString,
    FTN-AddressString,
    ExternalSignalInfo,
    Ext-ExternalSignalInfo,
    IMSI,
    LMSI,
    Ext-BasicServiceCode,
    AlertingPattern,
    NAEA-PreferredCI

FROM MAP-CommonDataTypes {
    itu-t identified-organization (4) etsi (0) mobileDomain (0)
    gsm-Network (1) modules (3) map-CommonDataTypes (18) version8 (8)}

```

```

ExtensionContainer
FROM MAP-ExtensionDataTypes {
  itu-t identified-organization (4) etsi (0) mobileDomain (0)
  gsm-Network (1) modules (3) map-ExtensionDataTypes (21) version8 (8)}
;

```

<b>CUG-CheckInfo ::= SEQUENCE {</b>			
cug-Interlock	CUG-Interlock,		
cug-OutgoingAccess	NULL	OPTIONAL,	
extensionContainer	ExtensionContainer	OPTIONAL,	
...}			

<b>NumberOfForwarding ::= INTEGER (1..5)</b>
--

<b>SendRoutingInfoArg ::= SEQUENCE {</b>			
msisdn	[0] ISDN-AddressString,		
cug-CheckInfo	[1] CUG-CheckInfo	OPTIONAL,	
numberOfForwarding	[2] NumberOfForwarding	OPTIONAL,	
interrogationType	[3] InterrogationType,		
or-Interrogation	[4] NULL	OPTIONAL,	
or-Capability	[5] OR-Phase	OPTIONAL,	
gsmc-OrGsmSCF-Address	[6] ISDN-AddressString,		
callReferenceNumber	[7] CallReferenceNumber	OPTIONAL,	
forwardingReason	[8] ForwardingReason	OPTIONAL,	
basicServiceGroup	[9] Ext-BasicServiceCode	OPTIONAL,	
networkSignalInfo	[10] ExternalSignalInfo	OPTIONAL,	
camelInfo	[11] CamelInfo	OPTIONAL,	
suppressionOfAnnouncement	[12] SuppressionOfAnnouncement	OPTIONAL,	
extensionContainer	[13] ExtensionContainer	OPTIONAL,	
...,			
alertingPattern	[14] AlertingPattern	OPTIONAL,	
ccbs-Call	[15] NULL	OPTIONAL,	
supportedCCBS-Phase	[16] SupportedCCBS-Phase	OPTIONAL,	
additionalSignalInfo	[17] Ext-ExternalSignalInfo	OPTIONAL,	
istSupportIndicator	[18] IST-SupportIndicator	OPTIONAL,	
pre-pagingSupported	[19] NULL	OPTIONAL,	
callDiversionTreatmentIndicator	[20] CallDiversionTreatmentIndicator	OPTIONAL,	
longFTN-Supported	[21] NULL	OPTIONAL,	
suppress-VT-CSI	[22] NULL	OPTIONAL,	
suppressIncomingCallBarring	[23] NULL	OPTIONAL,	
gsmSCF-InitiatedCall	[24] NULL	OPTIONAL,	
<u>networkSignalInfo2</u>	<u>[10] ExternalSignalInfo</u>	<u>OPTIONAL</u>	
}			

<b>SuppressionOfAnnouncement ::= NULL</b>
---

<b>InterrogationType ::= ENUMERATED {</b>	
basicCall	(0),
forwarding	(1)}

<b>OR-Phase ::= INTEGER (1..127)</b>
--------------------------------------

<b>CallReferenceNumber ::= OCTET STRING (SIZE (1..8))</b>
---

<b>ForwardingReason ::= ENUMERATED {</b>	
notReachable	(0),
busy	(1),
noReply	(2)}

<b>SupportedCCBS-Phase ::= INTEGER (1..127)</b>	
<i>-- exception handling:</i>	
<i>-- Only value 1 is used.</i>	
<i>-- Values in the ranges 2-127 are reserved for future use.</i>	
<i>-- If received values 2-127 shall be mapped on to value 1.</i>	

<b>CallDiversionTreatmentIndicator ::= OCTET STRING (SIZE(1))</b>	
<i>-- callDiversionAllowed (xxxx xx01)</i>	
<i>-- callDiversionNotAllowed (xxxx xx10)</i>	
<i>-- network default is call diversion allowed</i>	

```

SendRoutingInfoRes ::= [3] SEQUENCE {
  imsi                               [9] IMSI                               OPTIONAL,
  -- IMSI must be present if SendRoutingInfoRes is not segmented.
  -- If the TC-Result-NL segmentation option is taken the IMSI must be
  -- present in one segmented transmission of SendRoutingInfoRes.
  extendedRoutingInfo                ExtendedRoutingInfo                OPTIONAL,
  cug-CheckInfo                      [3] CUG-CheckInfo                OPTIONAL,
  cugSubscriptionFlag                [6] NULL                               OPTIONAL,
  subscriberInfo                     [7] SubscriberInfo                OPTIONAL,
  ss-List                             [1] SS-List                               OPTIONAL,
  basicService                       [5] Ext-BasicServiceCode        OPTIONAL,
  forwardingInterrogationRequired     [4] NULL                               OPTIONAL,
  vmsc-Address                       [2] ISDN-AddressString          OPTIONAL,
  extensionContainer                  [0] ExtensionContainer          OPTIONAL,
  ... ,
  naea-PreferredCI                   [10] NAEA-PreferredCI           OPTIONAL,
  -- naea-PreferredCI is included at the discretion of the HLR operator.
  ccbs-Indicators                    [11] CCBS-Indicators            OPTIONAL,
  msisdn                              [12] ISDN-AddressString          OPTIONAL,
  numberPortabilityStatus             [13] NumberPortabilityStatus    OPTIONAL,
  istAlertTimer                      [14] IST-AlertTimerValue        OPTIONAL,
  supportedCamelPhasesInVMSC         [15] SupportedCamelPhases        OPTIONAL,
  offeredCamel4CSIsInVMSC           [16] OfferedCamel4CSIs          OPTIONAL,
  allowedNetworkSignalInfo         [17] AllowedNetworkSignalInfo    OPTIONAL
}

```

```

NumberPortabilityStatus ::= ENUMERATED {
  notKnownToBePorted                (0),
  ownNumberPortedOut                 (1),
  foreignNumberPortedToForeignNetwork (2),
  ...}
  -- exception handling:
  -- reception of other values than the ones listed the receiver shall ignore the
  -- whole NumberPortabilityStatus

```

```

CCBS-Indicators ::= SEQUENCE {
  ccbs-Possible                      [0] NULL                               OPTIONAL,
  keepCCBS-CallIndicator              [1] NULL                               OPTIONAL,
  extensionContainer                  [2] ExtensionContainer          OPTIONAL,
  ...}

```

```

RoutingInfo ::= CHOICE {
  roamingNumber                      ISDN-AddressString,
  forwardingData                      ForwardingData}

```

```

ForwardingData ::= SEQUENCE {
  forwardedToNumber                   [5] ISDN-AddressString                OPTIONAL,
  -- When this datatype is sent from an HLR which supports CAMEL Phase 2
  -- to a GMSC which supports CAMEL Phase 2 the GMSC shall not check the
  -- format of the number
  forwardedToSubaddress                [4] ISDN-SubaddressString            OPTIONAL,
  forwardingOptions                    [6] ForwardingOptions                OPTIONAL,
  extensionContainer                   [7] ExtensionContainer                OPTIONAL,
  ... ,
  longForwardedToNumber                [8] FTN-AddressString                OPTIONAL}

```

```

AllowedNetworkSignalInfo ::= BIT STRING {
  ResultOfNetworkSignalInfo          (0),
  ResultOfNetworkSignalInfo2        (1), } (SIZE (2))
  -- Result of network signal info indicates whether network signal info is allowed.
  -- Result of network signal info 2 indicates whether network signal info 2 is allowed.

```