

CR-Formv7

CHANGE REQUEST

✂ **23.060 CR 418** ✂ rev **-1** ✂ Current version: **5.4.0** ✂

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:	✂ SMS over PS in lu mode ✂		
Source:	✂ MCC ✂		
Work item code:	✂ TEI-5 ✂	Date:	✂ 18/03/2003 ✂
Category:	✂ F ✂	Release:	✂ Rel-5 ✂
	Use <u>one</u> of the following categories:		Use <u>one</u> of the following releases:
	F (correction)	2	(GSM Phase 2)
	A (corresponds to a correction in an earlier release)	R96	(Release 1996)
	B (addition of feature),	R97	(Release 1997)
	C (functional modification of feature)	R98	(Release 1998)
	D (editorial modification)	R99	(Release 1999)
	Detailed explanations of the above categories can be found in 3GPP TR 21.900 .	Rel-4	(Release 4)
		Rel-5	(Release 5)
		Rel-6	(Release 6)


Reason for change:	✂ NOTE: This CR is the revision of CR418 (S2-023321) which was already approved at SA#18 but has not been implemented in TS23.060v5.4.0 by mistake. In section 16.1, the Point-to-point Short Message Service is described in some detail for the A/Gb mode but only refers to 23.040 in lu mode. However, only 23.060 shows the CAMEL procedure calls, while 23.040 does not describe any CAMEL interaction at all. As a result, the standards are currently ambiguous regarding the implementation of the CAMEL procedure calls associated with the SMS procedures over the PS domain in lu mode. Since the SMS support over the PS domain is very similar in lu and A/Gb mode, and 23.060 already describes the CAMEL procedure calls in A/Gb mode, this CR generalises the description in section 16.1 to also cover the lu mode to the same level of detail.
Summary of change:	✂ Subclause 16.1 is generalised to cover both the lu and A/Gb mode in its description of the Point-to-Point Short Message Service over the PS domain. Further, a reference to 24.011 is added in clause 2.
Consequences if not approved:	✂ The CAMEL procedure calls for SMS over the PS domain in lu mode will not be described anywhere, making their implementation ambiguous.

Clauses affected:	✂ 2, 16.1 ✂								
Other specs affected:	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="text-align: center;">Y</td> <td style="text-align: center;">N</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> </tr> </table>	Y	N	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Other core specifications	✂
Y	N								
<input type="checkbox"/>	<input checked="" type="checkbox"/>								
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		Test 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] GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".
- [2] GSM 01.61: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); GPRS ciphering algorithm requirements".
- [3] 3GPP TS 22.060: "General Packet Radio Service (GPRS); Service description; Stage 1".
- [4] 3GPP TS 23.003: "Numbering, addressing and identification".
- [5] 3GPP TS 23.007: "Restoration procedures".
- [5b] 3GPP TS 23.016: "Subscriber data management; Stage 2".
- [6] GSM 03.20: "Digital cellular telecommunications system (Phase 2+); Security related network functions".
- [7] GSM 03.22: "Digital cellular telecommunications system (Phase 2+); Functions related to Mobile Station (MS) in idle mode and group receive mode".
- [7b] 3GPP TS 23.122: "Non-Access Stratum functions related to Mobile Station (MS) in idle mode".
- [8] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS)".
- [8b] 3GPP TS 23.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 3 - Stage 2".
- [9] 3GPP TS 21.905: "Vocabulary for 3GPP Specifications", (Release 4).
- [10] Void.
- [11] GSM 03.64: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Overall description of the GPRS radio interface; Stage 2".
- [12] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".
- [13] 3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols; Stage 3".
- [13b] [3GPP TS 24.011: "Point to Point \(PP\) Short Message Service \(SMS\) support on mobile radio interface"](#).
- [14] GSM 04.60: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station (MS) - Base Station System (BSS) interface; Radio Link Control/Medium Access Control (RLC/MAC) protocol".
- [15] GSM 04.64: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station – Serving GPRS Support Node (MS-SGSN) Logical Link Control (LLC) layer specification".

- [16] GSM 04.65: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Mobile Station (MS) – Serving GPRS Support Node (SGSN); Subnetwork Dependent Convergence Protocol (SNDCP)".
- [16b] GSM 05.08: "Digital cellular telecommunications system (Phase 2+); Radio subsystem link control".
- [17] 3GPP TS 27.060: "Packet Domain; Mobile Station (MS) supporting Packet Switched services".
- [18] GSM 08.08: "Digital cellular telecommunications system (Phase 2+); Mobile-services Switching Centre - Base Station System (MSC-BSS) interface; Layer 3 specification".
- [19] GSM 08.14: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN) interface; Gb interface layer 1".
- [20] GSM 08.16: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN) interface; Network Service".
- [21] GSM 08.18: "Digital cellular telecommunications system (Phase 2+); General Packet Radio Service (GPRS); Base Station System (BSS) - Serving GPRS Support Node (SGSN); BSS GPRS Protocol (BSSGP)".
- [22] GSM 08.60: "Digital cellular telecommunications system (Phase 2+); In-band control of remote transcoders and rate adaptors for Enhanced Full Rate (EFR) and full rate traffic channels".
- [23] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".
- [24] 3GPP TS 29.016: "General Packet Radio Service (GPRS); Serving GPRS Support Node (SGSN) - Visitors Location Register (VLR); Gs interface network service specification".
- [25] 3GPP TS 29.018: "General Packet Radio Service (GPRS); Serving GPRS Support Node (SGSN) - Visitors Location Register (VLR); Gs interface layer 3 specification".
- [26] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".
- [27] 3GPP TS 29.061: "Interworking between the Public Land Mobile Network (PLMN) supporting Packet Based services and Packet Data Networks (PDN)".
- [27b] 3GPP TS 29.078: "Customised Applications for Mobile network Enhanced Logic (CAMEL) Phase 3; CAMEL Application Part (CAP) Specification".
- [28] GSM 11.11: "Digital cellular telecommunications system (Phase 2+); Specification of the Subscriber Identity Module - Mobile Equipment (SIM-ME) interface".
- [29] ITU-T Recommendations I.130: "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".
- [30] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".
- [31] ITU-T Recommendation Q.65: "The unified functional methodology for the characterization of services and network capabilities".
- [32] ITU-T Recommendation V.42bis: "Data compression procedures for data circuit-terminating equipment (DCE) using error correction procedures".
- [33] ITU-T Recommendation X.3: "Packet assembly/disassembly facility (PAD) in a public data network".
- [34] ITU-T Recommendation X.25: "Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit".
- [39] RFC 768 (1980): "User Datagram Protocol" (STD 6).

- [40] RFC 791 (1981): "Internet Protocol" (STD 5).
- [41] RFC 792 (1981): "Internet Control Message Protocol" (STD 5).
- [42] RFC 793 (1981): "Transmission Control Protocol" (STD 7).
- [43] RFC 1034 (1987): "Domain names – concepts and facilities" (STD 13).
- [44] RFC 1661 (1994): "The Point-to-Point Protocol (PPP)" (STD 51).
- [45] RFC 1542 (1993): "Clarifications and Extensions for the Bootstrap Protocol".
- [46] RFC 2002 (1996): "IP Mobility Support".
- [47] RFC 2131 (1997): "Dynamic Host Configuration Protocol".
- [48] RFC 2460 (1998): "Internet Protocol, Version 6 (IPv6) Specification".
- [49] TIA/EIA-136 (1999): "TDMA Cellular/ PCS"; Arlington: Telecommunications Industry Association.
- [50] 3GPP TS 25.301: "Radio Interface Protocol Architecture".
- [51] 3GPP TS 25.303: "Interlayer procedures in Connected Mode".
- [51b] 3GPP TS 25.304: "UE Procedures in Idle Mode and Procedures for Call Reselection in Connected Mode".
- [52] 3GPP TS 25.331: "RRC Protocol Specification".
- [53] 3GPP TS 25.401: "UTRAN Overall Description".
- [54] 3GPP TS 23.121: "Architectural Requirements for Release 1999".
- [55] 3GPP TS 25.322: "RLC protocol specification".
- [56] 3GPP TS 25.412: "UTRAN Iu Interface Signalling Transport".
- [56b] 3GPP TS 25.413: "UTRAN Iu Interface RANAP Signalling".
- [57] 3GPP TS 25.323: "Packet Data Convergence Protocol (PDCP) specification".
- [58] 3GPP TS 23.107: "Quality of Service (QoS) concept and architecture".
- [59] ITU-T Recommendation I.361: "B-ISDN ATM layer specification".
- [60] 3GPP TS 25.321: "Medium Access Control (MAC) protocol specification".
- [61] 3GPP TS 33.102: "3G Security; Security architecture".
- [62] 3GPP TS 22.002: "Circuit Bearer Services (CS) supported by a Public Land Mobile Network (PLMN)".
- [63] 3GPP TS 25.411: "UTRAN Iu interface Layer 1".

- [64] 3GPP TS 25.414: "UTRAN Iu interface data transport & transport signalling".
- [65] 3GPP TS 23.271: "Functional stage 2 description of LCS".
- [66] 3GPP TS 23.015: "Technical realization of Operator Determined Barring (ODB)".
- [67] ITU-T Recommendation I.363.5: "B-ISDN ATM Adaptation Layer (AAL) specification: Type 5 AAL".
- [68] RFC 2373 (1998): "IP Version 6 Addressing Architecture".
- [69] RFC 2462 (1998): "IPv6 Stateless Address Autoconfiguration".
- [70] 3GPP TS 32.215: "3G Telecom Management; Charging management; Charging data description for the Packet Switched (PS) domain".
- [71] RFC 2461 (1998): "Neighbor Discovery for IP Version 6 (IPv6)".
- [72] 3GPP TS 29.202: "Signalling System No. 7 (SS7) signalling transport in core network; Stage 3".
- [73] 3GPP TS 23.236: "Intra Domain Connection of RAN Nodes to Multiple CN Nodes".
- [74] 3GPP TS 43.051: "Radio Access Network; Overall description – Stage 2".
- [75] 3GPP TS 24.229: IP Multimedia Call Control Protocol based on SIP and SDP.

Next modified section

16.1 Point-to-point Short Message Service

~~16.1.1 Point-to-point Short Message Service (A/Gb mode)~~

It shall be possible for a GPRS-attached MS to send and receive short messages over ~~GPRS radio channels~~ [the PS domain](#). An MS that is GPRS-attached and not IMSI-attached shall transfer SMs over ~~GPRS channels~~ [the PS domain](#). MSs that are both GPRS-attached and IMSI-attached shall transfer SMs over ~~GPRS channels~~ [the PS domain](#) or over ~~non-GPRS control channels~~ [the CS domain](#) (if ~~non-GPRS control channels are~~ [the CS domain is](#) used, then paging for MT SMS may go through the SGSN).

The following two clauses define the operation of mobile-terminated and mobile-originated SMS routing and transfer over ~~GPRS radio channels~~ [the PS domain](#). More detailed definitions are contained in ~~GSM 03.40~~ [3G TS 23.040](#) [8].

16.1.1.4 Mobile-terminated SMS Transfer

Figure 96 and the description below show an example of a successful delivery of an SM to an MS over a ~~GPRS radio channel~~ the PS domain.

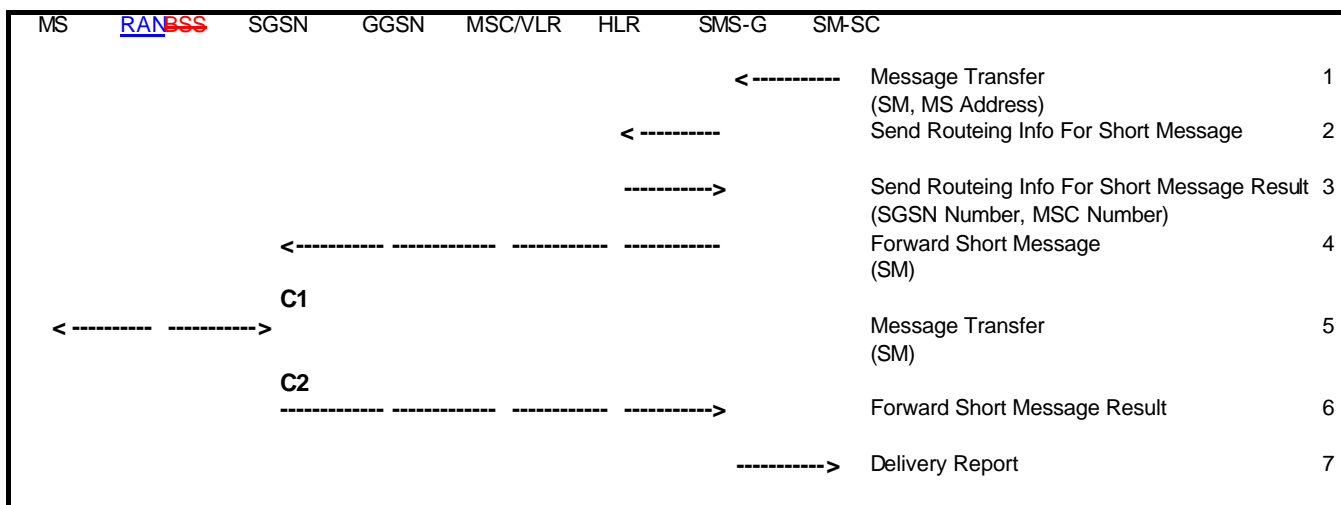


Figure 96: MT SMS Transfer, Successful

- 1) The short message service centre determines it shall send an SM to an MS. SM-SC forwards the SM to an SMS gateway MSC (SMS-GMSC).
- 2) SMS-GMSC examines the destination MS Address, and sends a Send Routeing Info For Short Message message to the relevant HLR.
- 3) HLR returns a Send Routeing Info For Short Message Result message to the SMS-GMSC. The result may contain the MS's current SGSN Number, the MSC Number, or both. If the result does not contain an SGSN Number (i.e., the HLR knows that the MS is not reachable via an SGSN), and if the result does contain an MSC Number, non-GPRS SMS delivery procedures are followed. If the result contains an SGSN Number, the SMS transfer proceeds according to the following events.

NOTE: SMS delivery via the SGSN is normally more radio resource efficient than SMS delivery via the MSC/VLR. The preferred delivery path is selected by SMS-GMSC operator-specific action.

- 4) SMS-GMSC forwards the SM to the SGSN.
- 5) SGSN transfers the SM to the MS on the ~~RP, and CP, LLC~~ and CP, LLC layers, as defined in 3G TS 24.011 ~~GSM-04.11 and GSM-04.64~~.
- 6) SGSN returns a Forward Short Message Result message to the SMS-GMSC indicating successful delivery of the SM.
- 7) SMS-GMSC returns a Delivery Report to the SM-SC indicating successful delivery of the SM.

CAMEL procedure calls shall be performed, see referenced procedures in 3G TS 23.078:

C1) CAMEL_T_SMS_INIT.

The procedure returns as result "Continue".

C2) CAMEL_T_SMS_DELIVERED.

This procedure does not return a result.

16.1.1.1.4 Unsuccessful Mobile-terminated SMS Transfer

The SGSN may not be able to deliver the SM to the MS. This may for example happen when the MS is not attached to GPRS, or when the radio channel conditions are bad.

When the SGSN cannot deliver the SM to the MS, the SGSN sets the Mobile station Not Reachable for GPRS flag (MNRG), and returns a failure report to the SMS-GMSC. Based on the routing information received from the HLR, the SMS-GMSC shall do one of the following:

- If an MSC/VLR is available for the MS, the SM is forwarded to the MS via the MSC/VLR. A successful delivery report shall be returned to the SM-SC.
- If an MSC/VLR is not available for the MS, the Message Waiting Indication information in the HLR shall be updated and an unsuccessful delivery report shall be returned to the SM-SC.

Figure 97 illustrates one possible traffic scenario when neither the SGSN nor the MSC is able to deliver the SM.

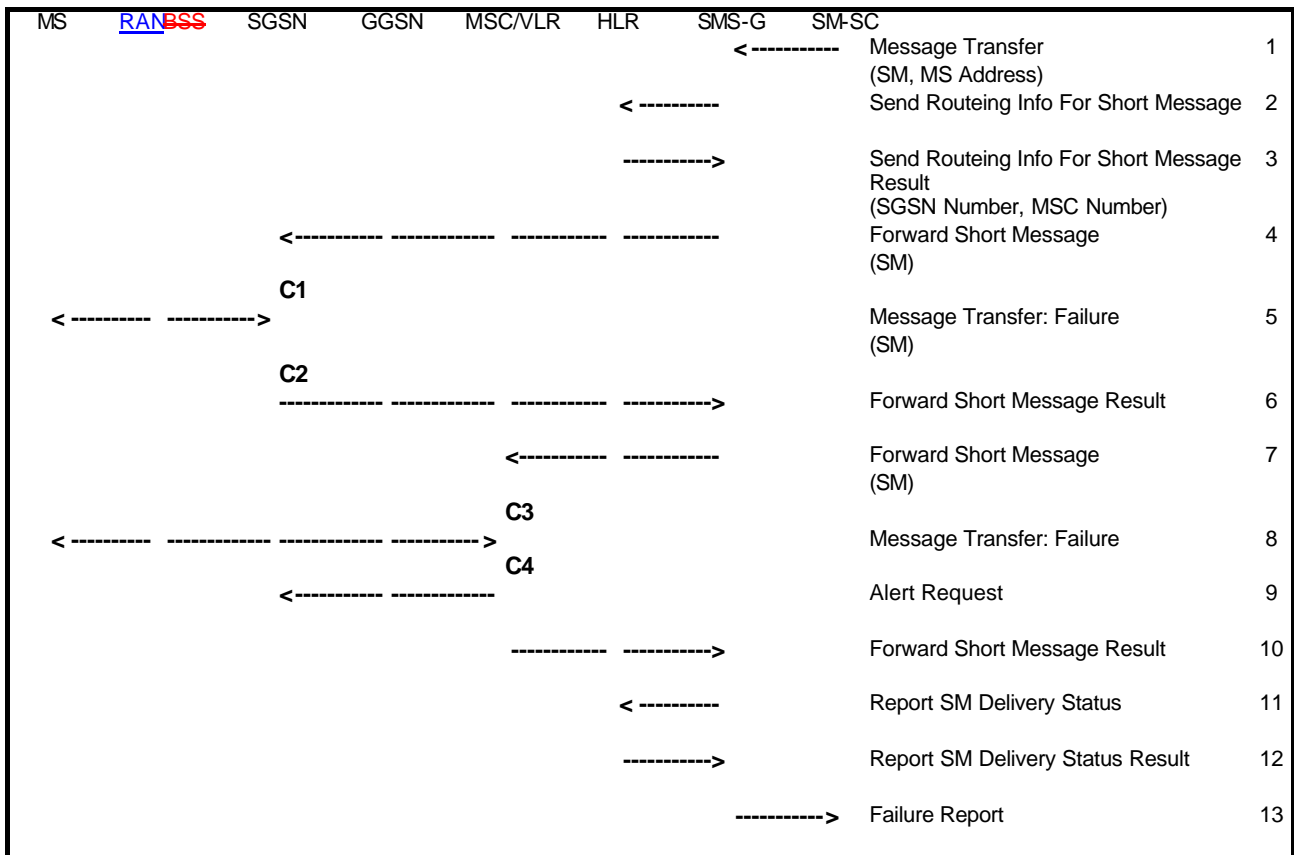


Figure 97: MT SMS Transfer, Unsuccessful

- 1) The short message service centre determines it shall send an SM to an MS. SM-SC forwards the SM to a SMS-GMSC.
- 2) SMS-GMSC examines the destination MS Address, and sends a Send Routing Info For Short Message message to the relevant HLR.
- 3) HLR returns a Send Routing Info For Short Message Result message to the SMS-GMSC. The Result contains an SGSN Number and an MSC Number.
- 4) SMS-GMSC forwards the SM to the SGSN.
- 5) SGSN attempts to transfer the SM to the MS, but fails.
- 6) SGSN sets MNRG and returns a Forward Short Message Result message to SMS-GMSC indicating unsuccessful delivery of the SM.
- 7) SMS-GMSC selects an alternative route for the SMS, and forwards the SM to the MSC/VLR.
- 8) MSC/VLR attempts to transfer the SM to the MS, but fails.

- 9) The MSC/VLR requests the setting of the NGAF at the SGSN.
- 10) VLR sets MNRF and returns a Forward Short Message Result message to the SMS-GMSC indicating unsuccessful delivery of the SM.
- 11) SMS-GMSC sends a Report SM Delivery message to the HLR.
- 12) HLR updates its Message Waiting Indication fields and returns a Report SM Delivery Result message to the SMS-GMSC.
- 13) SMS-GMSC returns a Failure Report to the SM-SC indicating unsuccessful delivery of the SM.

CAMEL procedure calls shall be performed, see referenced procedures in 3G TS 23.078:

C1) CAMEL_T_SMS_INIT.

The procedure returns as result "Continue".

C2) CAMEL_T_SMS_FAILURE.

This procedure does not return a result.

C3) CAMEL_T_SMS_INIT.

The procedure returns as result "Continue".

C4) CAMEL_T_SMS_FAILURE.

This procedure does not return a result.

Figure 69 shows that the SGSN sends a Ready for SM (MS Reachable) message to the HLR when the MS becomes reachable and MNRF is set in the SGSN. The SGSN indicates also to the MSC/VLR when the MS becomes reachable and NGAF is set in the SGSN. If the MNRF is set at the MSC/VLR, the MSC/VLR sends a Ready for SM (MS Reachable) message to the HLR. Reception of a Ready for SM message or Update Location message when MNRF is set in the HLR shall trigger the SMS alert procedure as defined in [GSM 03.40/3G TS 23.040](#).

MNRF remains set in the SGSN independently of whether the MSC/VLR was successful in delivering the SM or not. This means that the SGSN in certain cases sends a Ready for SM message to the HLR when an MS becomes reachable via the SGSN, even if no SM is waiting. This causes a small amount of duplicate signalling between the SGSN and the HLR only.

16.1.4-2 Mobile-originated SMS Transfer

Figure 98 and the description below explain the steps involved in sending an SM from an MS over ~~a GPRS radio channel~~ the PS domain.

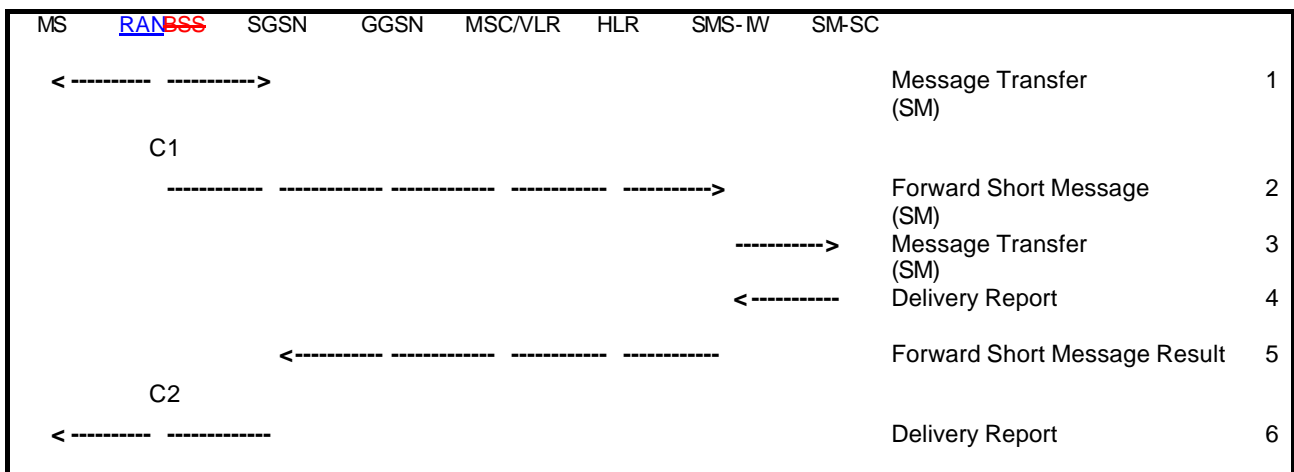


Figure 98: MO SMS Transfer, Successful

- 1) The MS has an SM to send, and transfers the SM to the SGSN via RP, ~~and CP, and LLC.~~
- 2) SGSN checks the MS subscription data, and determines that the MS is allowed to originate the SMS. SGSN forwards the SM to a SMS interworking MSC (SMS-IWMSC).
- 3) SMS-IWMSC passes the SM to the addressed SM-SC.
- 4) SM-SC returns a Delivery Report to the SMS-IWMSC indicating successful delivery of the SM.
- 5) SMS-IWMSC returns a Forward Short Message Result message to the SGSN indicating successful delivery of the SM.
- 6) SGSN returns a Delivery Report to the MS indicating successful delivery of the SM.

CAMEL procedure calls shall be performed, see referenced procedures in 3G TS 23.078.

C1) CAMEL_O_SMS_INIT.

The procedure returns as result "Continue".

C2) CAMEL_O_SMS_SUBMITTED

This procedure does not return a result.

~~16.1.2 Point to point Short Message Service (Iu mode)~~

~~SMS shall be supported via the control plane in the packet domain. The Iu mode SMS service is described in 3GPP TS 23.040.~~