3GPP TSG-SA Meeting #26 **TSGS#26(04)0904**
13th ñ 16th December 2004. Athens, Greece. **Rev TSGS#26(04)0758**

Source: TSG SA WG2
Title: CRs on 23.246 (MBMS Stage 2)
Agenda item: 7.2.3
Document for: APPROVAL

The following CRs have been agreed by TSG SA WG2 and are requested to be approved by TSG SA plenary #26.

Note: *the source of all these CRs is now SA2, even if the name of the originating company(ies) is still reflected on the cover page of all the attached CRs.*

Tdoc	Title	Spec	CR	Rev	Cat	C_Ver	Rel	WI
S2-043911	MBMS Broadcast Session Stop Procedure	23.246	72	7	F	6.4.0	Rel-6	MBMS
S2-043918	Clarification of BM-SC functions	23.246	96	5	F	6.4.0	Rel-6	MBMS
S2-043392	Change between supporting and non-supporting SGSN	23.246	105	2	F	6.4.0	Rel-6	MBMS
S2-043299	Clarification of MBMS Service Area definition	23.246	108	1	F	6.4.0	Rel-6	MBMS
S2-043869	MBMS Architecture Modification - CBC Part	23.246	110	3	F	6.4.0	Rel-6	MBMS
S2-043848	How to Avoid Overloading the Central Server after Sending Service Announcement	23.246	111	3	F	6.4.0	Rel-6	MBMS
S2-043391	Correction for MBMS Multicast Deactivation Procedure	23.246	112	2	F	6.4.0	Rel-6	MBMS
S2-043393	Corrections for Inter SGSN Serving RNS Relocation & Routing Area Update Cases	23.246	115	2	F	6.4.0	Rel-6	MBMS
S2-043293	Guaranteed bitrate for Streaming MBMS	23.246	117	1	F	6.4.0	Rel-6	MBMS
S2-043394	Correction on MBMS Mulitcast Service Deactivation procedure	23.246	119	2	F	6.4.0	Rel-6	MBMS
S2-043850	MBMS Charging Related Correction	23.246	122	2	F	6.4.0	Rel-6	MBMS
S2-043797	MBMS Architecture Related Correction	23.246	123	1	F	6.4.0	Rel-6	MBMS
S2-043851	General editorial correction for MBMS	23.246	124	1	D	6.4.0	Rel-6	MBMS
S2-043867	Separate MBMS Sessions for 2G and 3G for same MBMS Bearer Service	23.246	126	2	F	6.4.0	Rel-6	MBMS
S2-043868	MBMS UE context synchronisation	23.246	129	3	F	6.4.0	Rel-6	MBMS
S2-043800	Delaying data transfer at session start	23.246	131	1	F	6.4.0	Rel-6	MBMS
S2-043866	List of number of PMM-IDLE UEs per RA parameter for RAN	23.246	133	2	F	6.4.0	Rel-6	MBMS
S2-043803	MBMS UE context via MBMS UE Linking procedure	23.246	134	1	F	6.4.0	Rel-6	MBMS
S2-043913	Clarification of MBMS UE Linking handling	23.246	135	2	F	6.4.0	Rel-6	MBMS

3GPP TSG-SA2 Meeting #42
Sophia Antipolis, France, 11-15 October 2004

Tdoc⌘S2-043293

CR-Form-v7

CHANGE REQUEST

⌘ **23.246** **CR** **117** ⌘**rev** **1** ⌘ 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 **X** Core Network **X**

Title:	⌘	Guaranteed bitrate for Streaming MBMS
Source:	⌘	Nortel Networks
Work item code:	⌘	MBMS
Date:	⌘	04/10/2004
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:

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:	⌘	Requesting a guaranteed bit rate has to be clarifiedfor MBMS (as there is no procedure to reject a Session Start in case of resource unavailability and data may not be sent if resources are not available).
Summary of change:	⌘	Clarify use of ì guaranteed bit rateî parameter for MBMS
Consequences if not approved:	⌘	User and Service Provider will expect the guaranteed bit rate requested to be supported by RAN as for normal non-MBMS RABs.

Clauses affected:	⌘	6.3			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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

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

6.3 Quality-of-Service

It shall be possible for the network to control quality-of-service parameters for sessions of multicast and broadcast MBMS bearer services. All QoS attributes related to the UMTS bearer service described in 3GPP TS 23.107 [3] are applicable to MBMS bearer services. Compared to point-to-point bearer services the following limitations exist:

- For **traffic class**, only the background and streaming classes shall be supported.
- For **SDU error ratio**, only higher values are supported, i.e. the values describing higher numbers of lost or corrupted SDUs (actual values are for the background and streaming classes are 10^{-2} and 10^{-1}).
- For **maximum bit-rate**, see the values described in 3GPP TS 22.246.
- For **Guaranteed bit rate** of the Streaming Traffic Class: depending on radio resource usage by other services, some cells of the MBMS Service Area may not have sufficient resources available for a MBMS Session. The RAN may decide not to establish RB in cells where requested resources are not available. The RAN does not reject a MBMS Session Start Request message even if one or more cells do not have enough resources to establish radio bearers.

MBMS bearer services of background class are best suited for the transport of MBMS user services such as messaging or downloading. Buffering, shaping schemes and packet dropping may be applied to the traffic flow to adapt to the available resources and changing network conditions. The total transfer time is not critical for background class bearer services since the content must normally have been received in totality and stored in the UE before the user can access it.

MBMS bearer services of streaming class are best suited for the transport of MBMS user services such as streaming. As for point-to-point bearer services, the network should minimise the packet transfer delay of streaming class bearer services as far as possible. Packet dropping should be the preferred traffic conditioning action applied to the traffic flow to adapt to the available resources.

The principle difference between background and streaming classes for MBMS is the support of a guaranteed bit-rate in the streaming case. No indication is provided to the UE in cases where the RAN cannot provide the requested QoS. As a result, some UEs may not receive the MBMS session or parts of it. For background class, the RAN may continue to distribute data in congestion conditions but at potentially high packet loss rates, therefore the MBMS user service will have to provide sufficient redundancy within the data to be able to cope with the high packet loss.

MBMS user services that would normally use MBMS bearer services of background class may however ~~need~~ decide to use a streaming class MBMS bearer service if the MBMS user service cannot cope with high packet loss. ~~This will reduce packet loss due to congestion, since a minimum bit-rate is guaranteed. Otherwise the MBMS user service will have to provide sufficient redundancy within the data to be able to cope with the high packet loss~~.

The Allocation and Retention Priority of the MBMS bearer service allows for prioritisation between MBMS bearer services and between MBMS bearer services and non MBMS bearer services.

As the MBMS bearer service transfers data to many UEs in parallel and because of the lack of feedback channel on radio level low SDU error ratios are difficult to achieve. When the resulting packet error ratio is not suitable for the MBMS user service or when prevention of data loss is required, an MBMS user service may perform retransmission of MBMS data over point-to-point PDP bearer services.

3GPP TSG-SA WG2 Meeting #42
Sophia Antipolis, France, 11-15 October 2004

Tdoc **S2-043299**
Revised S2-043191

CR-Form-v7.1

CHANGE REQUEST

⌘	**23.246**	**CR**	**108**	⌘ **rev**	**1**	⌘	Current version:	**6.4.0** ⌘

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

Title:	⌘	Clarification of MBMS Service Area definition
Source:	⌘	Huawei, China Mobile
Work item code:	⌘	MBMS
Date:	⌘	14/10/2004
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)*
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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 definition for MBMS Service Area makes incorrect references to the term ìMBMS Service Areaî in TS 22.146.
Summary of change:	⌘	Changed the definition of the MBMS Service Area to reference the proper terms in TS 22.146.
Consequences if not approved:	⌘	The reference to the term ìMBMS Service Areaî in Stage 1 remains ambiguous.

Clauses affected:	⌘	3.1			
Other specs affected:	⌘	**Y**	**N**		⌘
			X	Other core specifications	
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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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 Change **********

3.1 Definitions

For the purposes of the present document, the terms and definitions defined in 3GPP TR 21.905 [1] and 3GPP TS 22.146 [2] and the following apply:

MBMS Service Announcement: Mechanism to allow users to be informed about the MBMS user services available.

MBMS Bearer Service: the service provided by the PS Domain to MBMS User Services to deliver IP multicast datagrams to multiple receivers using minimum network and radio resources.

MBMS User Service: the MBMS service provided to the end user by means of the MBMS Bearer Service and possibly other capabilities.

MBMS Service Area: The area within which data of a specific MBMS session are sent. Each individual MBMS session of an MBMS Bearer Service may be sent to a different MBMS Service Area. This MBMS Service Area is the same or a subset of the Multicast or Broadcast ~~MBMS~~ Service Area as defined in 3GPP TS 22.146 [2]. An MBMS Service Area smaller than the Multicast or Broadcast ~~MBMS~~ Service Area ~~as defined in 3GPP TS 22.146 [2]~~ is typically used for localized services.

********** End of Changes **********

3GPP TSG-SA2 Meeting #42 *Tdoc* ⌘*S2-043391*
Sophia Antipolis, France, October 11-15, 2004 **Revised S2-043300**

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.246** **CR** **112** ⌘**rev** **2** ⌘ Current version: **6.4.0** ⌘

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

Title:	⌘	Correction for MBMS Multicast Dectivation Procedure
Source:	⌘	Vodafone
Work item code:	⌘	MBMS
Date:	⌘	06/10/2004
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:	⌘	IGMP Leave message is based on PDP context. If for some reasons, the default PDP context is deleted, the MBMS PDP context should be deleted as well. In 8.7, step 2, the APN is included in the leave indication because it is needed to identify the service. In 8.7, step 8, the example needs to be corrected to avoid an incorrect description of the periodic routeing area update functionality being contained in a 3GPP specification.
Summary of change:	⌘	a) If the PDP context linked to the MBMS UE context by the linked NSPAI TI is deactivated by the UE or SGSN or GGSN, then the SGSN shall perform the MBMS deactivation procedure starting at step 5) and 8). b) The APN is added in the leave indication because it is needed to identify the service. c) In the section 8.7, step 8, the example is modified. d) Some editorial changes and references to the correct message name for ìLeaveî in RFC 2236 for IGMP IPv4 and RFC 2710 MLD for IPv6 are added.
Consequences if not approved:	⌘	Users are not removed from MBMS at the correct time (eg when pre-pay credit expires or the HLR deletes the subscription).

Clauses affected:	⌘	8.7

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

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========= First Change ==========

8.7 MBMS Multicast Service Deactivation

The multicast service deactivation is a signalling procedure between the UE and the network. The procedure removes the MBMS UE Context from the UE, SGSN and GGSN for a particular MBMS multicast service. The multicast service deactivation can be initiated by:

- The UE;
- The GGSN;
- The BM-SC; or
- The SGSN

All these cases are contained in the procedure illustrated in figure 13. The UE initiated Multicast Service Deactivation starts with step 1), the BM-SC initiated Multicast Service Deactivation starts with step 3), the GGSN initiated Multicast Service Deactivation starts with step 4), and the SGSN initiated Multicast Service Deactivation starts with step 5) or 8).

At GPRS detach, all MBMS UE contexts of the UE are implicitly deactivated in the UE, SGSN and GGSN, i.e. the SGSN performs the deactivation procedure starting with step 8)

If the PDP context linked to the MBMS UE context by the linked NSAPI isdeactivated by the UE or SGSN or GGSN, then the SGSN shall perform the MBMS deactivation procedure starting at step 5) and 8).

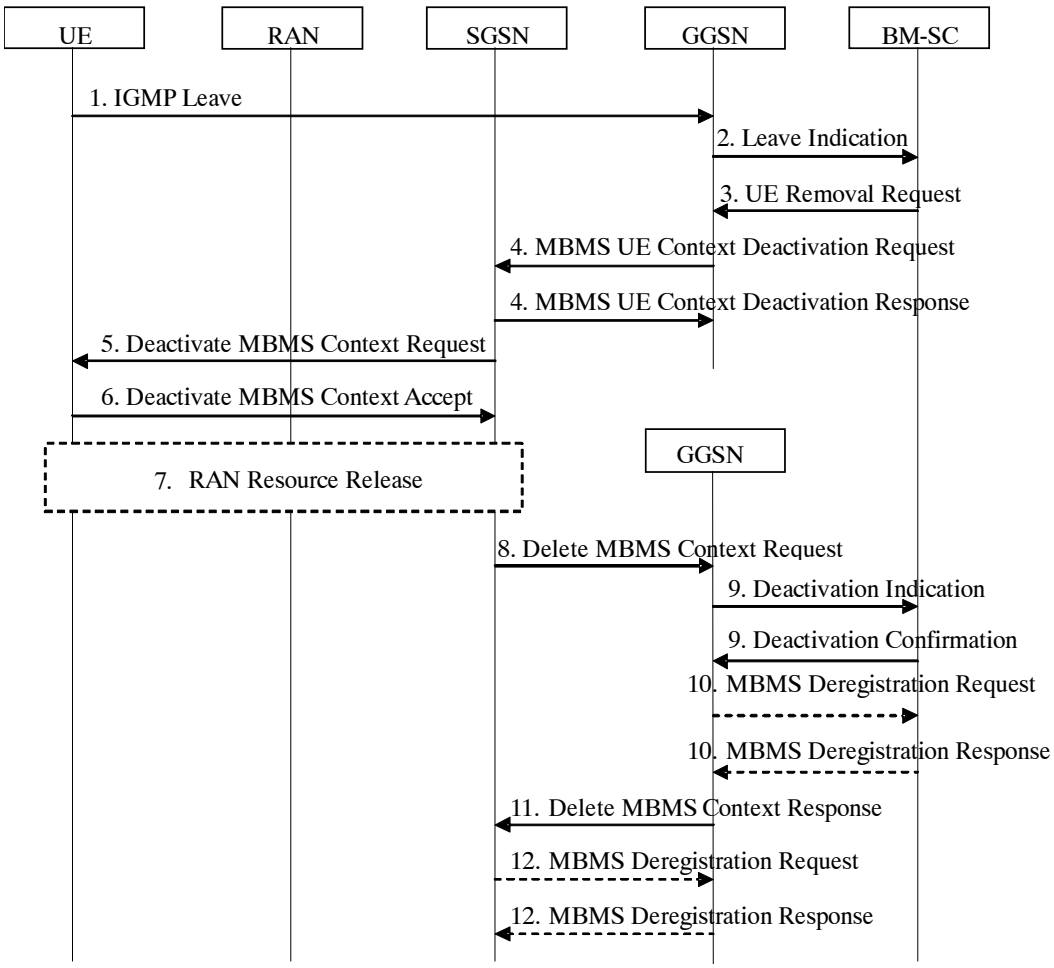

Figure 13: MBMS Multicast Service Deactivation

1. The UE sends an IGMP (IPv4) or MLD (IPv6) Leave message (here, the Leave message means Leave Group message in RFC 2236 for IGMP (IPv4) and Multicast Listener Done in RFC2710 for MLD (IPv6)) over the default PDP context to leave a particular multicast service identified by an IP multicast address.

2. The GGSN sends a Leave Indication (IP multicast address, APN, IMSI) to the BM-SC, indicating that the UE is requesting to leave the multicast service identified by the IP multicast address. The exact nature of the signalling between GGSN and BM-SC is specified in 3GPP TS 29.061[4].

3. Upon reception of the Leave Indication, the BM-SC verifies that the IP multicast address corresponds to a valid MBMS bearer service and sends a UE Removal Request (IP multicast address, APN, IMSI) to the GGSN that originated the Leave Indication. The APN shall be the same that was provided during service activation (see "MBMS Multicast Service Activation"). The exact nature of the signalling between GGSN and BM-SC is specified in 3GPP TS 29.061[4]. The BM-SC may also initiate the deactivation of an MBMS UE Context for service-specific reasons (e.g. the service is terminated but the UE has not yet left the multicast group) by directly sending a UE Removal Request message to the GGSN.

4. Upon reception of the UE Removal Request or for other reasons (e.g. Error cases), the GGSN sends an MBMS UE Context Deactivation Request (IP multicast address, APN, IMSI) to the SGSN. The IP multicast address, APN and IMSI together identify the MBMS UE Context to be deleted by the SGSN. The APN is the one received in step 3. The SGSN acknowledges reception of the MBMS UE Context Deactivation Request by sending an MBMS UE Context Deactivation Response to the GGSN.

5. Upon reception of the MBMS UE Context Deactivation Request or for other reasons (e.g. due to a change in the roaming restrictions for the user) the SGSN sends a Deactivate MBMS Context Request (TI) to the UE. The TI identifies the MBMS UE Context to be deleted by the UE.

6. The UE deletes the MBMS UE Context and sends a Deactivate MBMS Context Accept (TI) to the SGSN.

7. If dedicated radio resources are currently assigned to the UE for the reception of the MBMS data, the RAN releases these radio resources. If shared radio resources are currently assigned for the distribution of the MBMS data, the RAN may decide to move the remaining UEs to dedicated resources. The detailed procedures and conditions are ~~FFS depending on ongoing work in RAN groups.~~ specified in 3GPP TS 25.346 [10] and 3GPP TS 43.246 [11].

8. Upon reception of the Deactivate MBMS Context Accept or for other reasons (e.g. due to missing periodic routeing area updates) the SGSN sends a Delete MBMS Context Request (MBMS_NSAPI) to the GGSN that holds the MBMS UE Context. This GGSN may be different from the GGSN that receives IGMP Leave request in step 1.

9. The GGSN deletes the MBMS UE Context and sends a Deactivation Indication to the BM-SC to confirm the successful deactivation of the MBMS UE Context. The BM-SC, after receiving the Deactivation Indication, deletes the MBMS UE Context and sends a confirmation to the GGSN. The exact nature of the signalling between GGSN and BM-SC is ~~however FFS in general~~ specified in 3GPP TS 29.061[4].

10. If the GGSN does not have any more users interested in this MBMS bearer service and the "list of downstream nodes" in the corresponding ~~MBSM~~ MBMS Bearer Context is empty, the GGSN sends a MBMS De-Registration Request to the BM-SC. The BM-SC responds with a MBMS De-Registration Response and removes the identifier of the GGSN from the "list of downstream nodes" parameter in its MBMS Bearer Context. See subclause "MBMS De-Registration Procedure".

11. The GGSN confirms the deactivation of the MBMS UE Context to the SGSN by sending a Delete MBMS Context Response to the SGSN, which then deletes the MBMS UE Context.

12. If the SGSN does not have any more users interested in this MBMS bearer service and the "list of downstream nodes" in the corresponding MBMS Bearer Context is empty, the SGSN sends an MBMS De-Registration Request to the GGSN. The GGSN responds with an MBMS De-Registration Response and removes the identifier of the SGSN from the "list of downstream nodes" parameter in its MBMS Bearer Context. See subclause "MBMS De-Registration Procedure".

3GPP TSG-SA2 Meeting #42
Sophia Antipolis, France, 11th-15th October 2004

Tdoc S2-043392
rev of S2-043294

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.246** **CR** **105** ⌘ **rev** **2** ⌘ Current version: **6.4.0** ⌘

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Proposed change affects: | UICC apps⌘ ☐ ME [X] Radio Access Network ☐ Core Network [X]

Title:	⌘	Change between supporting and non-supporting SGSN
Source:	⌘	Siemens
Work item code:	⌘	MBMS
Date:	⌘	14/10/2004
Category:	⌘	**F**
Release:	⌘	Rel-6

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
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R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*
Rel-7	*(Release 7)*

Reason for change:	⌘	The MBMS bearer service handling is unspecified for the case when a UE changes between supporting and non-supporting SGSNs. Proposal: During a RAU the new SGSN indicates its MBMS support in the context request to the old SGSN. If there is no support the old SGSN deactivates the MBMS UE contexts. During a relocation the old SGSN indicates the MBMS UE contexts in the forward relocation request to the new SGSN. The new SGSN indicates MBMS support in the response. If not indicated the old SGSN deactivates the MBMS UE contexts. In both cases the UE will recognise the MBMS bearer deactivation from the routing area accept signalling. An SGSN indicates its MBMS support in the RAU accept which allows UEs to (re-)activate MBMS bearers. The SGSN MBMS support indication in the PDP update with GGSNs (as described in stage 3) can not support such changes between supporting and non-supporting SGSNs as PDP and MBMS UE contexts may be on different GGSNs.
Summary of change:	⌘	Clarifications for the SGSN change procedures.
Consequences if not approved:	⌘	Unspecified behaviour when a UE changes between supporting and non-supporting SGSNs.

Clauses affected:	⌘	8.10, 8.11			
Other specs affected:	⌘	Y	N	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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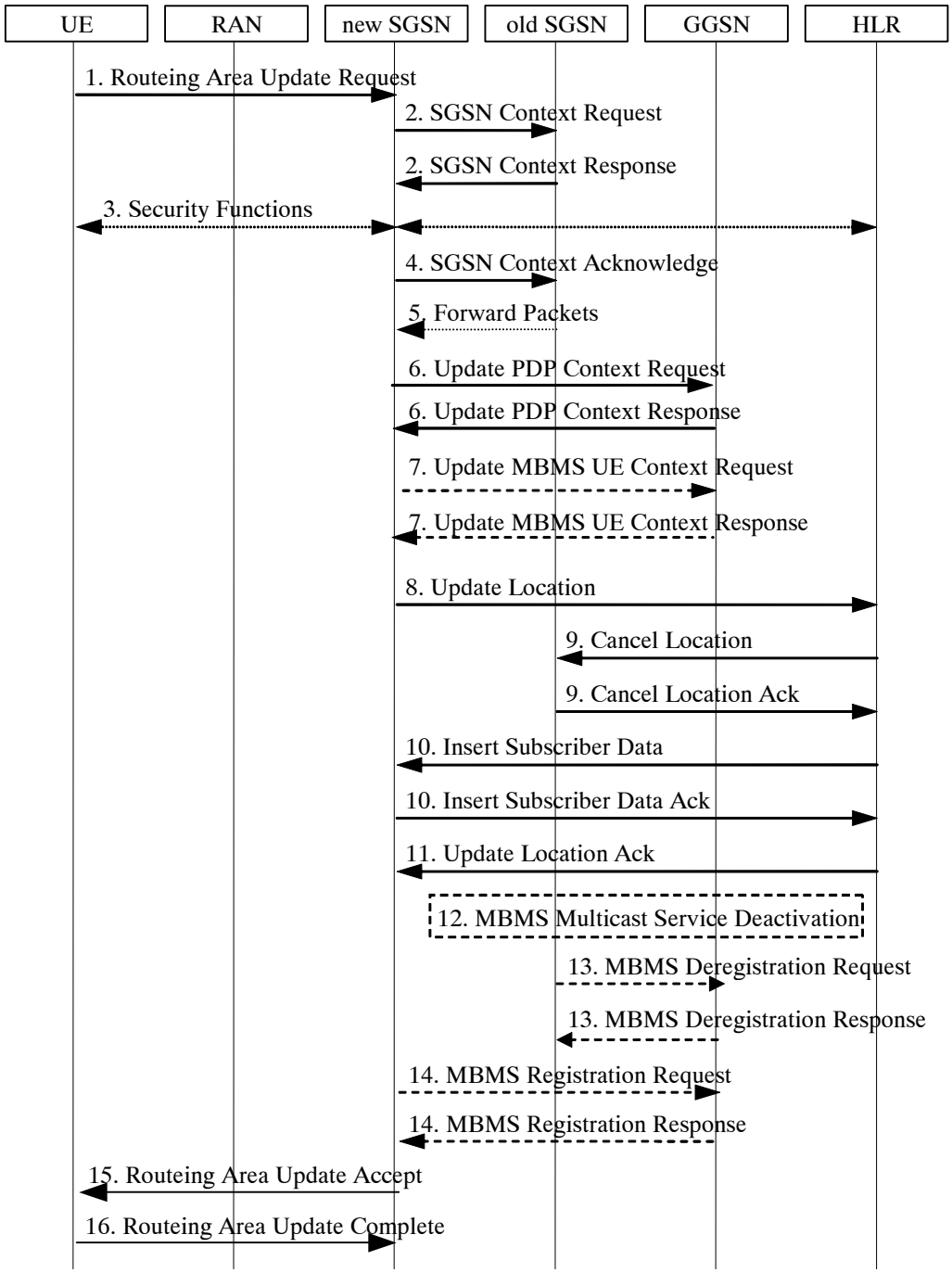
8.10 Inter SGSN Routeing Area Update

This procedure describes the handling of~~is performed when a UE with active~~ MBMS bearer services when an MBMS UE performs a Routeing Area Update and the serving SGSN changes. It bases on the Inter SGSN Routeing Area Update procedure specified in TS 23.060. The procedure is performed regardless whether MBMS sessions are ongoing or not. The handling of any PDP contexts established by the UE is not changed compared to the procedure without MBMS. The procedure described below does not show all details of the Routeing Area update procedure. Only for the MBMS specific additions the steps are described.



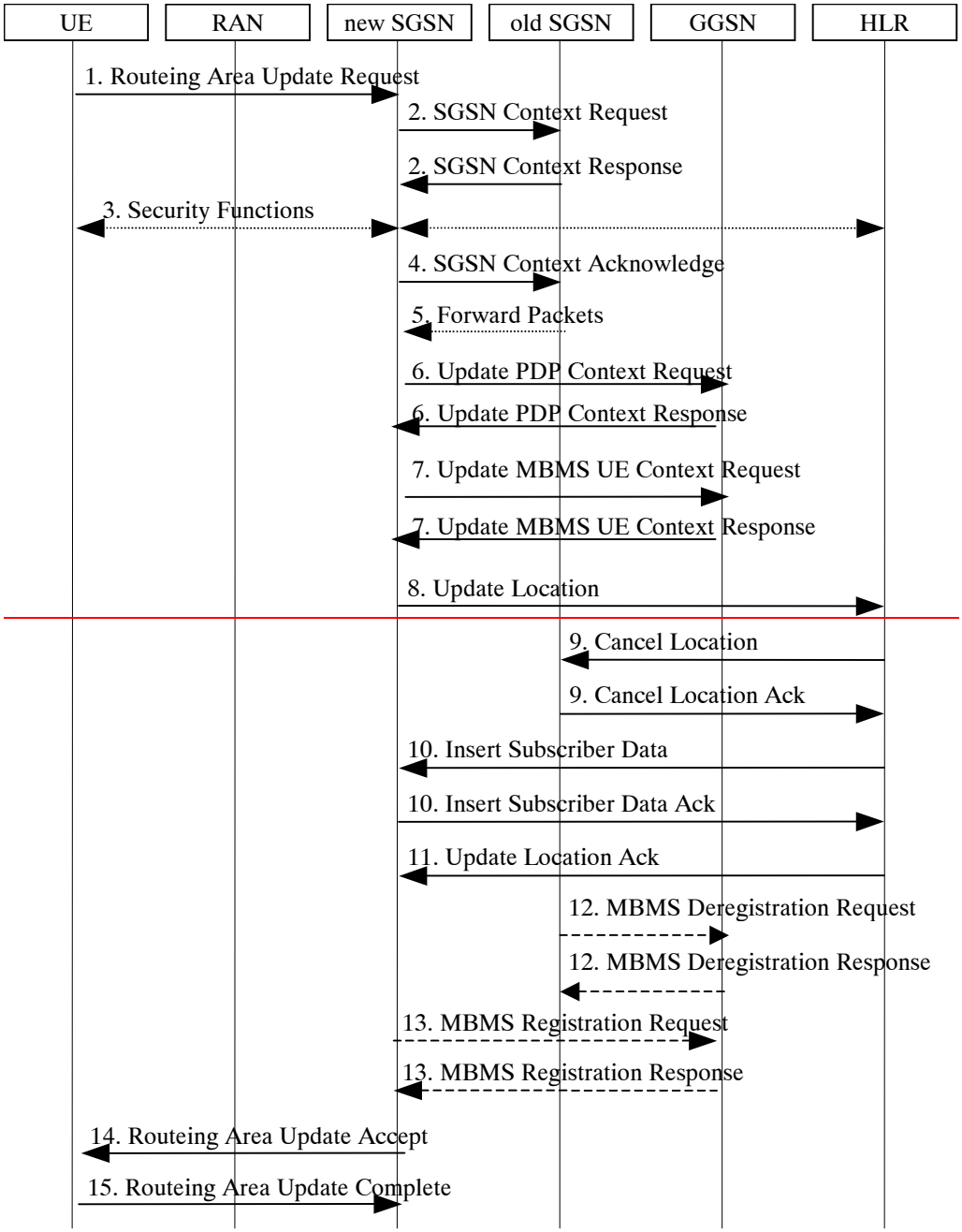


Figure 14: Inter SGSN Routeing Area Update

2) The old SGSN~~context transfer in step 2~~ includes the transfer of the MBMS UE Context(s).

7) ~~T~~For the MBMS UE context(s) received in step 2) the new SGSN sends Update MBMS UE Context Request (Serving network identity) to the GGSNs concerned. The GGSNs update their MBMS UE Context fields and return Update MBMS UE Context Response. Also, GGSN sends updated Serving network identity to the BM-SC if necessary.

12) In case the new SGSN indicated no MBMS support in step 2) the old SGSN deactivates all MBMS UE context(s) of the UE in SGSN, GGSN and BM-SC by initiating deactivation procedure(s) as described in clause ì8.7 MBMS Multicast Service Deactivationî.

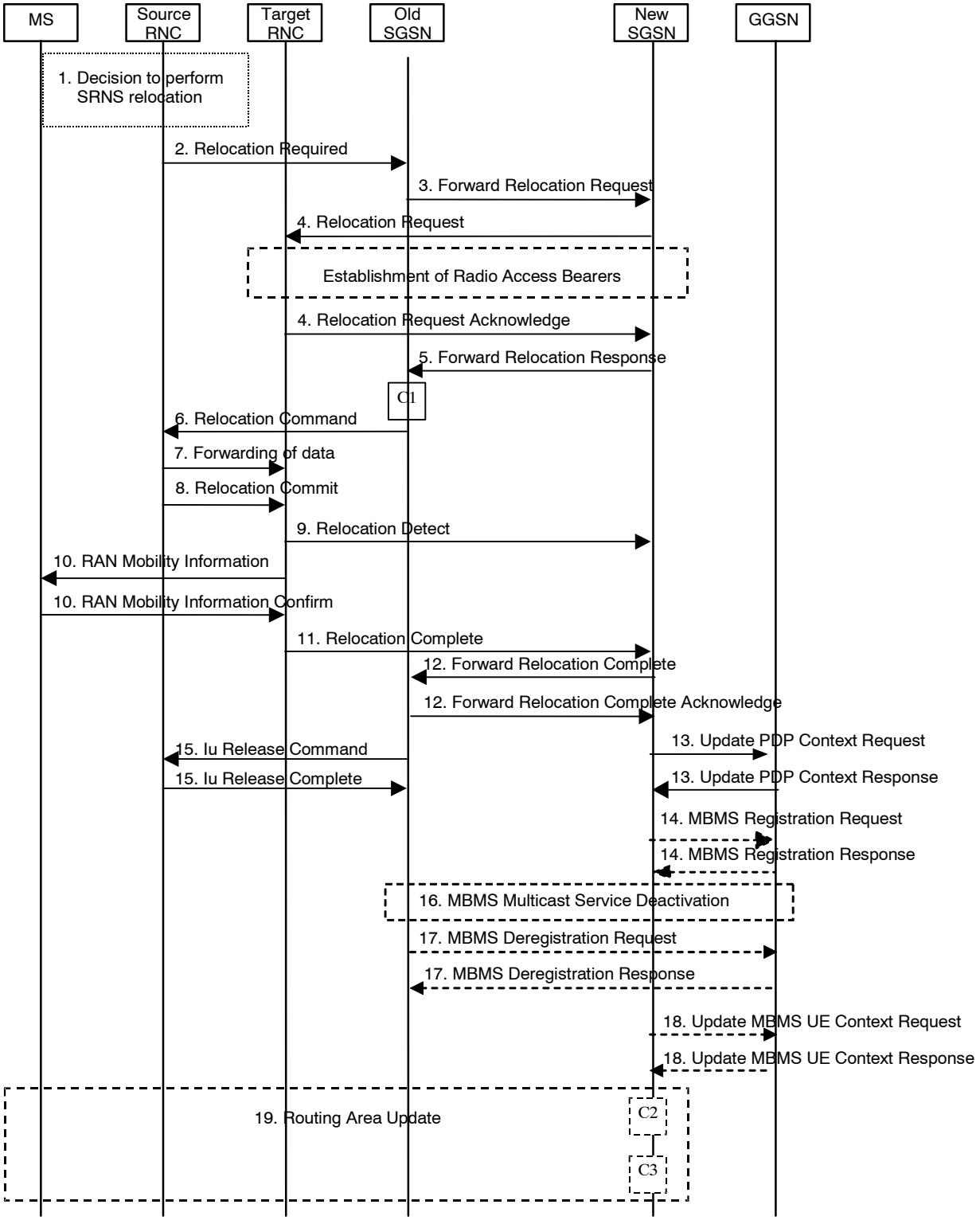
13) If the old SGSN does not have any more MBMS UE Contexts for the MBMS bearer service(s) and the "list of downstream nodes" in the corresponding MBMS Bearer Context is empty, the SGSN sends an MBMS Deregistration Request to the GGSN. The GGSN responds with an MBMS Deregistration Response and removes the identifier of the SGSN from the "list of downstream nodes" parameter in its MBMS Bearer Context. See subclause "MBMS Deregistration Procedure".

14~~3~~) The new SGSN verifies for each MBMS UE Context received whether it has a corresponding MBMS Bearer Context. For each MBMS Bearer Context the SGSN does not already have the SGSN creates an MBMS Bearer Context (in "Standby" state) and sends an MBMS Registration Request to a GGSN. This registration is described in subclause "MBMS Registration Procedure".

15) An SGSN without MBMS support does not indicate MBMS feature support in the Routing Area Update Accept message. This indicates to the UE that MBMS bearers are no longer supported, which may allow the UE to use point-to-point bearers for MBMS data transfer. The Routing Area Update Accept indicates to the UE that the network supports MBMS. The UE then knows it can continue to use already activated MBMS bearers or activate new MBMS bearers.

8.11 Inter SGSN Serving RNS Relocation Procedure

This procedure is performed when the SGSN changes due to SRNS relocation. It bases on the SRNS Relocation procedure specified in 3GPP TS 23.060. The procedure is performed regardless whether MBMS sessions are ongoing or not. The handling of any PDP contexts established by the UE is not changed compared to the procedure without MBMS. The procedure described below does not show all details of the SRNS relocation procedure. Only for the MBMS specific additions the steps are described.


MS
Source RNC
Target RNC
Old SGSN
New SGSN
GGSN
1. Decision to perform SRNS relocation
2. Relocation Required
3. Forward Relocation Request
4. Relocation Request
Establishment of Radio Access Bearers
4. Relocation Request Acknowledge
5. Forward Relocation Response
C1
6. Relocation Command
7. Forwarding of data
8. Relocation Commit
9. Relocation Detect
10. RAN Mobility Information
10. RAN Mobility Information Confirm
11. Relocation Complete
12. Forward Relocation Complete
12. Forward Relocation Complete Acknowledge
13. Update PDP Context Request
15. Iu Release Command
13. Update PDP Context Response
15. Iu Release Complete
14. MBMS Registration Request
14. MBMS Registration Response
16. MBMS Multicast Service Deactivation
17. MBMS Deregistration Request
17. MBMS Deregistration Response
18. Update MBMS UE Context Request
18. Update MBMS UE Context Response
19. Routing Area Update
C2
C3

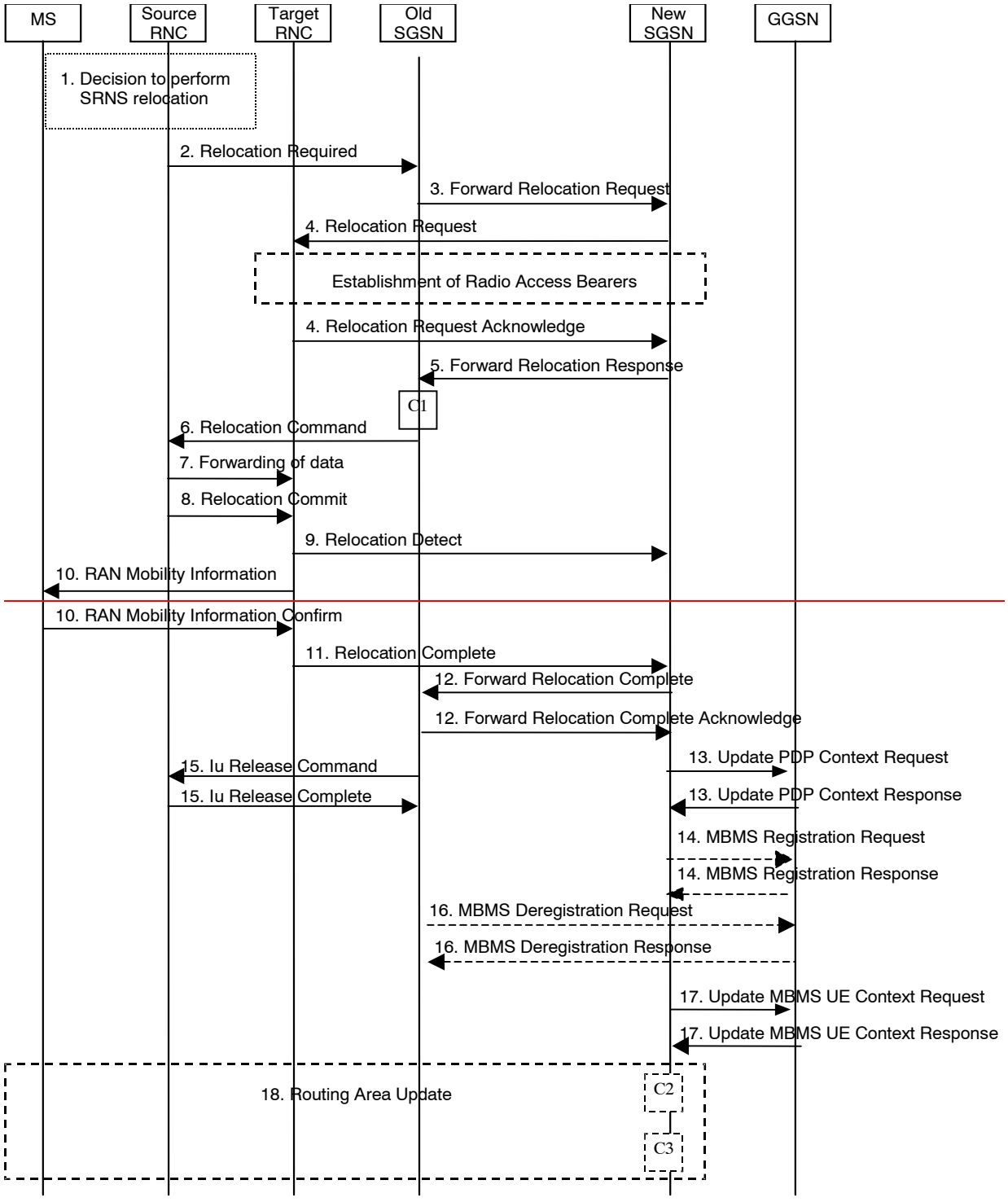


Figure 15: SRNS Relocation Procedure

3) The old SGSN ~~context transfer in step 3 includes the~~ transfers ~~of~~ the MBMS UE Context(s) in the Forward Relocation Request message to the new SGSN.

5) An MBMS supporting SGSN indicates its MBMS support in the Forward Relocation Response message.

14) ~~T~~in case the new SGSN supports MBMS it verifies for each MBMS UE Context received whether it has a corresponding MBMS Bearer Context. For each MBMS Bearer Context not yet existing in the SGSN the SGSN creates an MBMS Bearer Context (in "Standby" state) and sends an MBMS Registration Request to a GGSN. This registration is described in subclause "MBMS Registration Procedure".

16) In case the new SGSN indicated no MBMS support in step 3) the old SGSN deactivates all MBMS UE contexts of the UE in SGSN, GGSN and BMSC by initiating deactivation procedure(s) as described in clause ì8.7 MBMS Multicast Service Deactivationî .

17~~6~~) If the old SGSN does not have any more MBMS UE Contexts for this MBMS bearer service and the "list of downstream nodes" in the corresponding MBMS Bearer Context is empty, the SGSN sends an MBMS De-registration Request to the GGSN. The GGSN responds with an MBMS De-registration Response and removes the identifier of the SGSN from the "list of downstream nodes" parameter in its MBMS Bearer Context. See subclause "MBMS De-registration Procedure".

18~~7~~) ~~T~~in case the new SGSN supports MBMS it sends Update MBMS UE Context Request to the GGSNs concerned. The GGSNs update their MBMS UE Context fields and return Update MBMS UE Context Response.

19) An SGSN without MBMS support does not indicate MBMS feature support in the Routing Area Update Accept message. This indicates to the UE that MBMS bearers are no longer supported, which may allow the UE to use point-to-point bearers for MBMS data transfer. The Routing Area Update Accept indicates to the UE that the network supports MBMS. The UE then knows it can continue to use already activated MBMS bearers or activate new MBMS bearers.

3GPP TSG-SA2 Meeting #42
Sophia Antipolis, France, October 11-15, 2004

Tdoc ⌘S2-043393
Revised S2-043295

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.246** **CR** **115** ⌘ **rev** **2** ⌘ 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 [X] Radio Access Network [X] Core Network [X]

Title:	⌘	Corrections for Inter SGSN Serving RNS Relocation & Routing Area Update Cases
Source:	⌘	Vodafone
Work item code:	⌘	MBMS
Date:	⌘	15/10/2004
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:	⌘	a) In section 6.1, it is not clear how the GGSN is contacted by the new SGSN as in Step 7 of the RA update procedure in Fig.14 indicates that new SGSN sends Update MBMS UE Context request to GGSN; b) In section 8.10 and 8.11, procedures are modified for the cases when an MBMS session is ongoing.
Summary of change:	⌘	a) In the section 6.1, the GGSN address was added in the table 1: MBMS UE context. Also, the SGSN address is contained in the GGSN as well. b) In the section of 8.10, if the old SGSN does not have any more MBMS UE Contexts for the MBMS bearer service(s) and the "list of downstream nodes" in the corresponding MBMS Bearer Context is empty, the SGSN initiates the MBMS De-Registration Procedure. For each MBMS Bearer Context that the SGSN does not already have the SGSN creates an MBMS Bearer Context and intiates the MBMS Registration Procedure. c) In the section 8.11, for each MBMS Bearer Context not yet existing in the SGSN, the SGSN creates an MBMS Bearer Context and initiates the MBMS Registration Procedure. If the old SGSN does not have any more MBMS UE Contexts for this MBMS bearer service and the "list of downstream nodes" in the corresponding MBMS Bearer Context is empty, the SGSN initiates the MBMS De-Registration Procedure.
Consequence if not approved		The Inter SGSN Serving RNS Relocation & Routing Area Update procedures are not completed.

Clauses affected:	⌘	6.1; 8:10; 8.11			
		Y	**N**		
Other specs Affected:	⌘	**X**		Other core specifications	⌘ TS 25.346 and TS43.246
			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 Change ==========

6 MBMS Aattributes and Parameters

6.1 MBMS UE Context

The MBMS UE Context contains UE-specific information related to a particular MBMS bearer service that the UE has joined. An MBMS UE Context is created in the UE, SGSN,GGSN and BM-SC when the UE joins an MBMS bearer service. In the SGSN, an MBMS UE Context is also created as a result of an inter-SGSN routing area update after the transfer of the MBMS UE Context from the old SGSN.

In Iu mode, all MBMS UE Contexts of a UE are provided via MBMS UE Linking mechanism to the BSC/SRNC at least when the first PS RAB is established for the UE, or when the UE performs MBMS Multicast Service Activation. MBMS UE Contexts are provided to the Iu mode BSC/SRNC regardless whether MBMS Sessions are ongoing or not (i.e. before, between and after Sessions). In addition, all MBMS UE Contexts are provided to UE via MBMS UE Linking mechanism when a UE, which has an MBMS context active, moves to PMM-Connected state via the MBMS Service Request procedure for the purpose of MBMS.

In the UE and SGSN, the MBMS UE Context is stored as part of the MM Context for the UE. The MBMS UE Context is stored in the GGSN. There is one MBMS UE Context per MBMS bearer service that the UE has joined.

In the Iu mode BSC/RNC, the MBMS UE Contexts are stored as part of the UE Context of the BSC/RNC.

The content of the MBMS UE Context is described in Table 1.

Table 1: MBMS UE Context

Parameter	Description	UE	SGSN	GGSN	RNC	BSC	BM-SC
IP multicast address	IP multicast address identifying an MBMS bearer that the UE has joined.	X	X	X	X	Iu - X Gb - none	X
APN	Access Point Name on which this IP multicast address is defined.	X	X	X	X	Iu - X Gb ñ none	X
GGSN Address in Use	The IP address of the GGSN currently used		X				
SGSN address	The IP address of SGSN			X			
TMGI	Temporary Mobile Group Identity allocated to the MBMS bearer.	X					
Linked NSAPI	NSAPI of the PDP context used by the UE to carry IGMP/MLD signalling.	X	X				
IMSI	IMSI identifying the user.	(1)	(1)	X	(2)	Iu ñ (2) Gb ñ (3)	X
TI	Transaction Identifier	X	X				
MBMS_NSAPI	Network layer Service Access Point Identifier which identifies an MBMS UE Context.	X	X	X			

(1) In the UE and SGSN, the IMSI is available within the MM Context which contains the MBMS UE Context

(2) The IMSI is available within the UE Context which contains the MBMS UE Context.

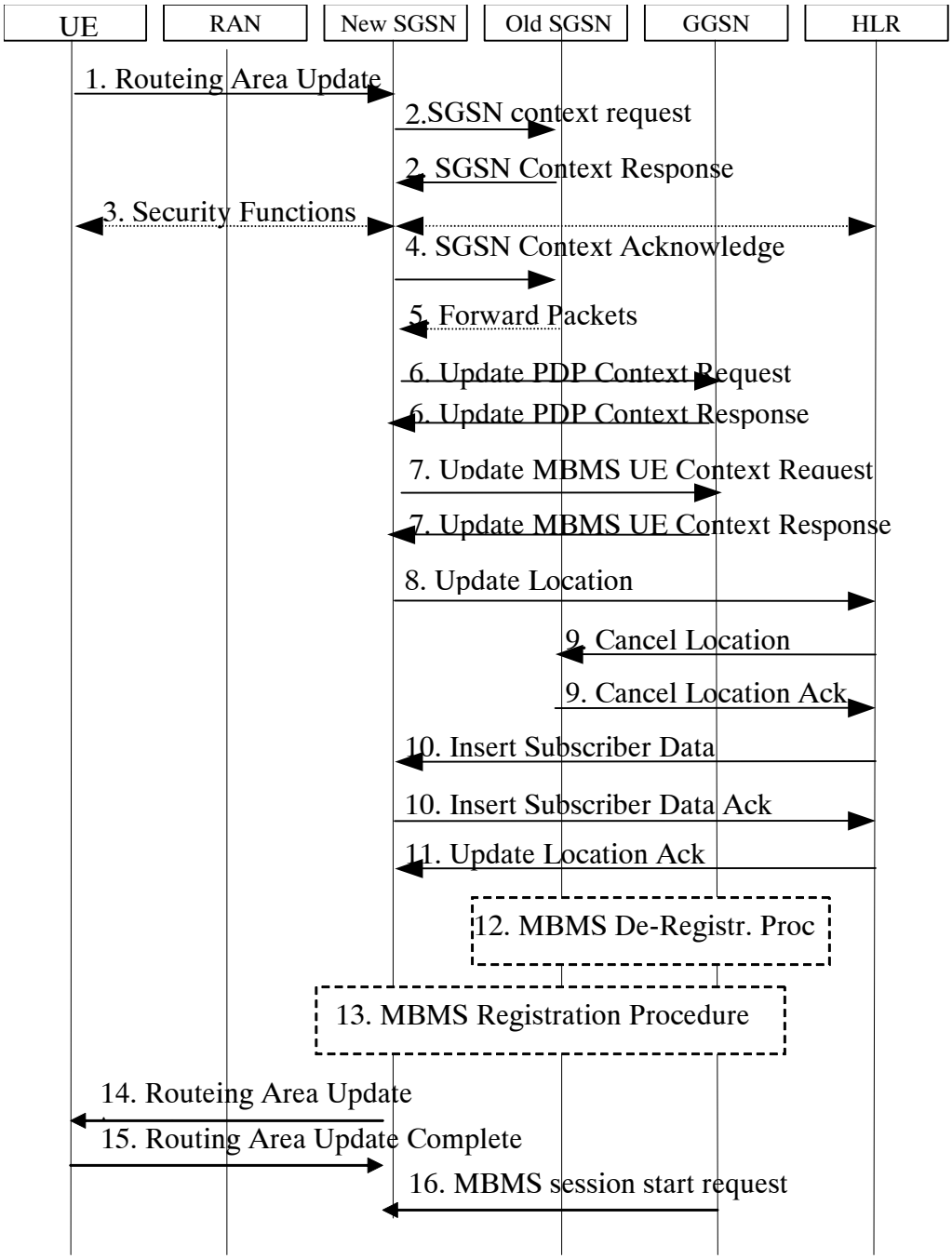
(3) IMSI availability does not depend on MBMS.

========= Second Change ==========

8.10 Inter SGSN Routeing Area Update

This procedure is performed when a UE with active MBMS bearer service performs a Routeing Area Update and the serving SGSN changes. It bases on the Inter SGSN Routeing Area Update procedure specified in TS 23.060. The procedure is performed regardless whether MBMS sessions are ongoing or not. The handling of any PDP contexts

established by the UE is not changed compared to the procedure without MBMS. The procedure described below does not show all details of the Routeing Area update procedure. Only for the MBMS specific additions the steps are described.


UE
RAN
New SGSN
Old SGSN
GGSN
HLR
1. Routeing Area Update
2.SGSN context request
2. SGSN Context Response
3. Security Functions
4. SGSN Context Acknowledge
5. Forward Packets
6. Update PDP Context Request
6. Update PDP Context Response
7. Update MBMS UE Context Request
7. Update MBMS UE Context Response
8. Update Location
9. Cancel Location
9. Cancel Location Ack
10. Insert Subscriber Data
10. Insert Subscriber Data Ack
11. Update Location Ack
12. MBMS De-Registr. Proc
13. MBMS Registration Procedure
14. Routeing Area Update
15. Routing Area Update Complete
16. MBMS session start request

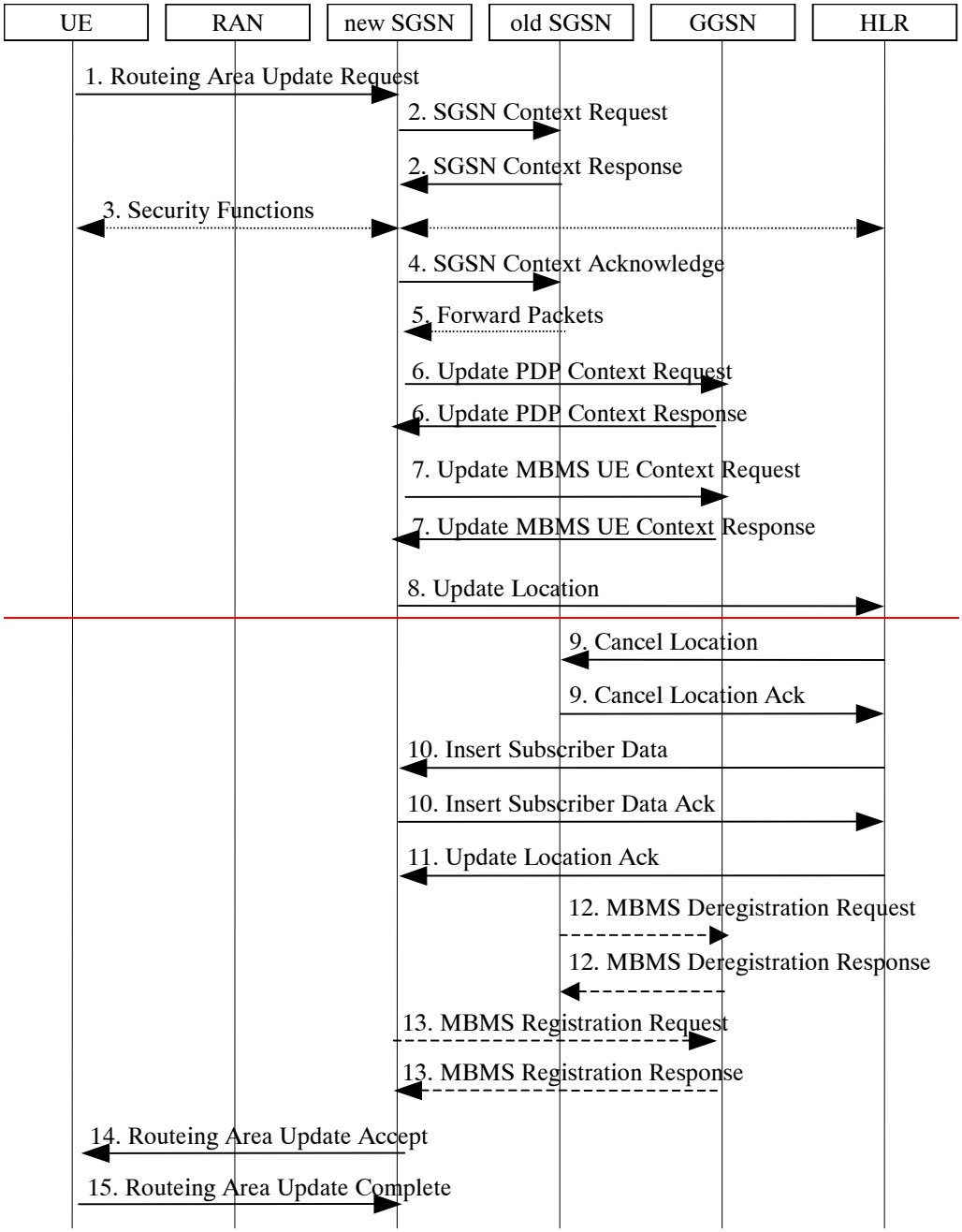


Figure 14: Inter SGSN Routeing Area Update

2) The context transfer in step 2 includes the transfer of the MBMS UE Context(s).

7) The new SGSN sends Update MBMS UE Context Request (Serving network identity) to the GGSNs concerned. The GGSNs update their MBMS UE Context fields and return Update MBMS UE Context Response. The~~Also,~~ GGSN sends updated Serving network identity to the BM-SC ~~if necessary~~.

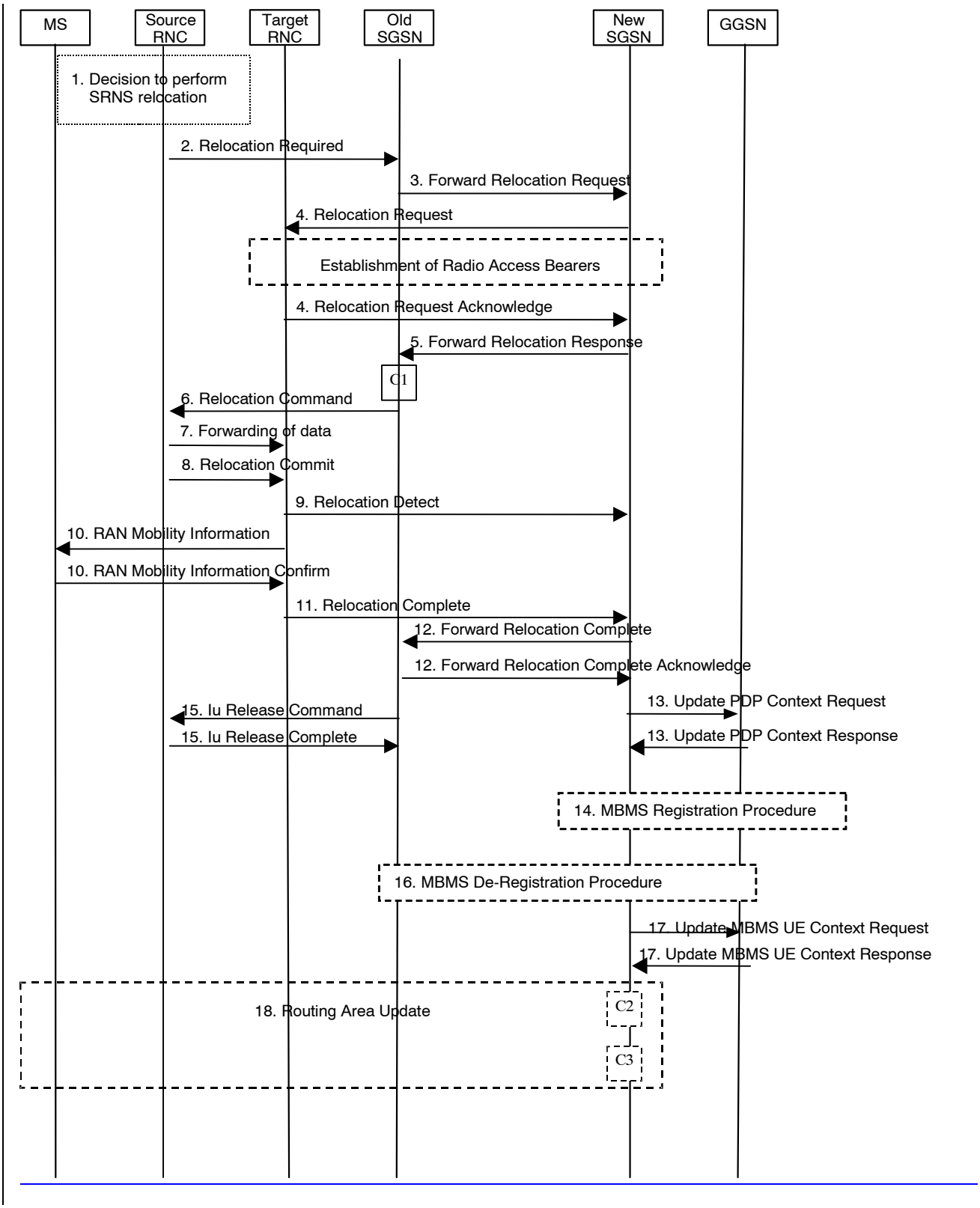
12) If the old SGSN does not have any more MBMS UE Contexts for the MBMS bearer service(s) and the "list of downstream nodes" in the corresponding MBMS Bearer Context is empty, the SGSN initiates the~~sends an~~ MBMS De-R~~r~~egistration Procedure.~~Request to the GGSN The GGSN responds with an MBMS Deregistration Response and removes the identifier of the SGSN from the "list of downstream nodes" parameter in its MBMS Bearer Context.~~ See subclause "MBMS De-~~r~~Registration Procedure".

13) The new SGSN verifies for each MBMS UE Context received whether it has a corresponding MBMS Bearer Context. For each MBMS Bearer Context that the SGSN does not already have the SGSN creates an MBMS Bearer Context (in "Standby" state) and intiates the MBMS Registration Procedure~~sends an MBMS Registration Request to a GGSN~~. ~~This registration is described in~~See subclause "MBMS Registration Procedure".

========= Third Change ==========

8.11 Inter SGSN Serving RNS Relocation Procedure

This procedure is performed when the SGSN changes due to SRNS relocation. It bases on the SRNS Relocation procedure specified in 3GPP TS 23.060. The procedure is performed regardless whether MBMS sessions are ongoing or not. The handling of any PDP contexts established by the UE is not changed compared to the procedure without MBMS. The procedure described below does not show all details of the SRNS relocation procedure. Only for the MBMS specific additions the steps are described.


MS
Source RNC
Target RNC
Old SGSN
New SGSN
GGSN
1. Decision to perform SRNS relocation
2. Relocation Required
3. Forward Relocation Request
4. Relocation Request
Establishment of Radio Access Bearers
4. Relocation Request Acknowledge
5. Forward Relocation Response
C1
6. Relocation Command
7. Forwarding of data
8. Relocation Commit
9. Relocation Detect
10. RAN Mobility Information
10. RAN Mobility Information Confirm
11. Relocation Complete
12. Forward Relocation Complete
12. Forward Relocation Complete Acknowledge
13. Update PDP Context Request
15. Iu Release Command
15. Iu Release Complete
13. Update PDP Context Response
14. MBMS Registration Procedure
16. MBMS De-Registration Procedure
17. Update MBMS UE Context Request
17. Update MBMS UE Context Response
18. Routing Area Update
C2
C3

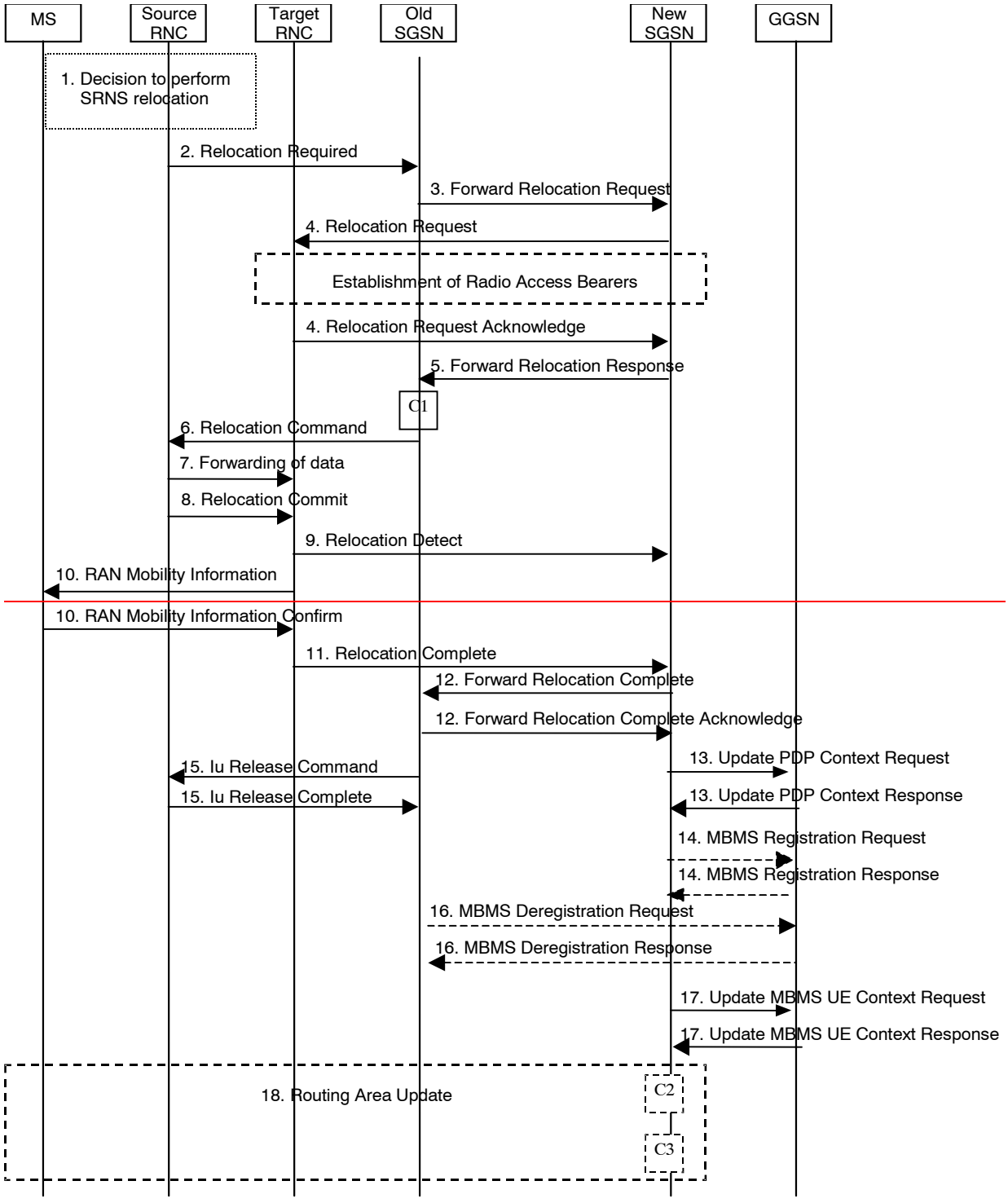


Figure 15: SRNS Relocation Procedure

3) The context transfer in step 3 includes the transfer of the MBMS UE Context(s).

14) The new SGSN verifies for each MBMS UE Context received whether it has a corresponding MBMS Bearer Context. For each MBMS Bearer Context not yet existing in the SGSN, the SGSN creates an MBMS Bearer Context (in ì Standby stateî) and initiates the~~sends an~~ MBMS Registration Procedure.~~Request to a GGSN. This registration is described in~~ See subclause "MBMS Registration Procedureî ~~and may require the GGSN to send an MBMS Registration Request to the BM-SC~~.

16) If the old SGSN does not have any more MBMS UE Contexts for this MBMS bearer service and the "list of downstream nodes" in the corresponding MBMS Bearer Context is empty, the SGSN initiates the~~sends an~~ MBMS De-~~r~~Registration Procedure~~Request to the GGSN~~. ~~The GGSN responds with an MBMS De-registration~~

~~Response and removes the identifier of the SGSN from the "list of downstream nodes" parameter in its MBMS Bearer Context.~~ See subclause "MBMS De-~~r~~Registration Procedure".

17) The new SGSN sends Update MBMS UE Context Request to the GGSNs concerned. The GGSNs update their MBMS UE Context fields and return Update MBMS UE Context Response.

3GPP TSG-SA2 Meeting #42 **S2-043394**
Sophia Antipolis, France, 11-15 October 2004

CR-Form-v7

CHANGE REQUEST

⌘	23.246	CR	119	⌘	rev	2	⌘	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 X Core Network X

Title:	⌘	Correction on MBMS Mulitcast Service Deactivation procedure
Source:	⌘	Alcatel
Work item code:	⌘	MBMS
Date:	⌘	06/10/2004
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:

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:	⌘	The removal of MBMS UE Context in RNC should be done during the MBMS Multicast Service Deactivation procedure (Section 8.7), which is not considered in current version. Indeed, after the MBMS Multicast Service Deactivation procedure, there will no trigger for the removal of MBMS UE Context in RNC because the MBMS UE Context has already been deleted both in CN and UE. UE De-Linking should be performed during the MBMS Multicast Service Deactivation procedure to accomplish the function of MBMS UE Context deletion in RNC. Furthermore, the MBMS UE De-linking procedure is not described in section 8.15.
Summary of change:	⌘	UE De-Linking procedure is added into the MBMS Multicast Service Deactivation procedure just after the operation of removal MBMS UE Context in the UE (step 7 of current sequences). MBMS UE De-linking procedure is added to section 8.15
Consequences if not approved:	⌘	The MBMS Multicast Service Deactivation procedure is defective and the MBMS UE Context in RNC for a particular MBMS Service would remain even if the MBMS UE Contexts in UE, SGSN and GGSN are all removed.

Clauses affected:	⌘	8.7, 8.15

		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.

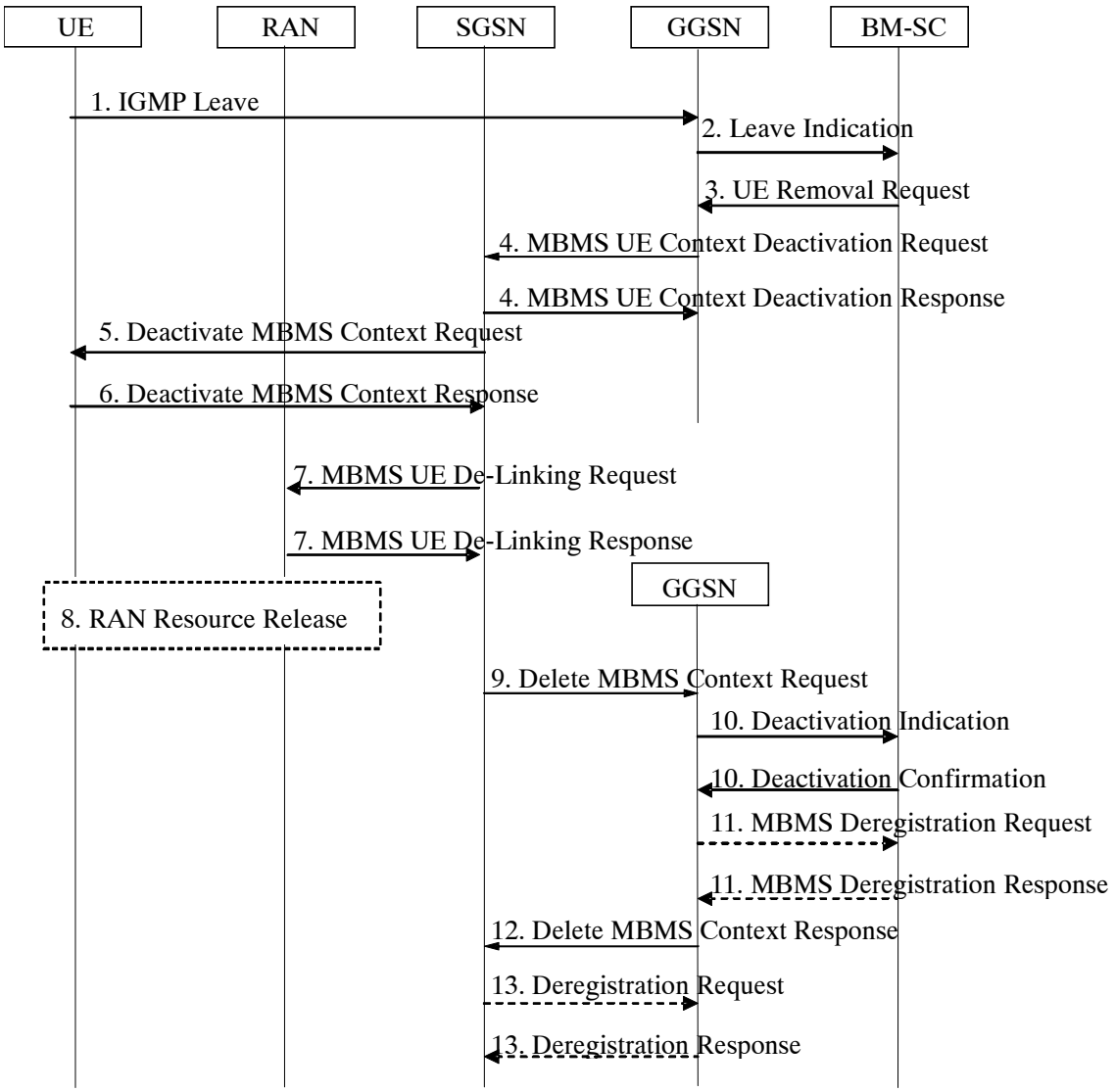
8.7 MBMS Multicast Service Deactivation

The multicast service deactivation is a signalling procedure between the UE and the network. The procedure removes the MBMS UE Context from the UE, RAN, SGSN and GGSN for a particular MBMS multicast service. The multicast service deactivation can be initiated by:

- The UE;
- The GGSN;
- The BM-SC; or
- The SGSN

All these cases are contained in the procedure illustrated in figure 13. The UE initiated Multicast Service Deactivation starts with step 1), the BM-SC initiated Multicast Service Deactivation starts with step 3), the GGSN initiated Multicast Service Deactivation starts with step 4), ~~and~~ the SGSN initiated Multicast Service Deactivation starts with step 5) or 9~~8~~), and the MBMS UE de-linking is performed at step 7).

At GPRS detach, all MBMS UE contexts of the UE are implicitly deactivated in the UE, SGSN and GGSN, i.e. the SGSN performs the deactivation procedure starting with step 9~~8~~).



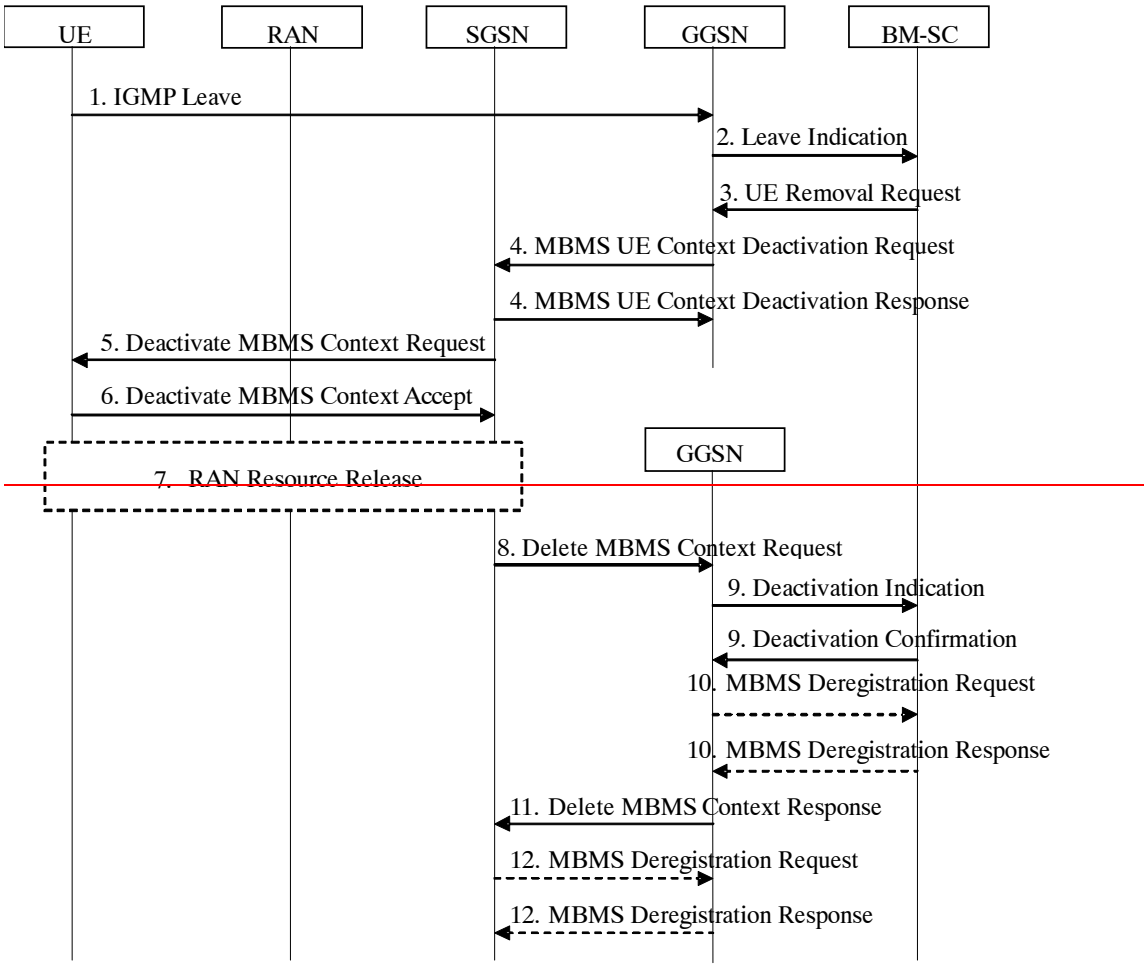


Figure 13: MBMS Multicast Service Deactivation

1. The UE sends an IGMP (IPv4) or MLD (IPv6) Leave message over the default PDP context to leave a particular multicast service identified by an IP multicast address.

2. The GGSN sends a Leave Indication (IP multicast address, IMSI) to the BM-SC, indicating that the UE is requesting to leave the multicast service identified by the IP multicast address. The exact nature of the signalling between GGSN and BM-SC is specified in 3GPP TS 29.061[4].

3. Upon reception of the Leave Indication, the BM-SC verifies that the IP multicast address corresponds to a valid MBMS bearer service and sends a UE Removal Request (IP multicast address, APN, IMSI) to the GGSN that originated the Leave Indication. The APN shall be the same that was provided during service activation (see "MBMS Multicast Service Activation"). The exact nature of the signalling between GGSN and BM-SC is specified in 3GPP TS 29.061 [4]. The BM-SC may also initiate the deactivation of an MBMS UE Context for service-specific reasons (e.g. the service is terminated but the UE has not yet left the multicast group) by directly sending a UE Removal Request message to the GGSN.

4. Upon reception of the UE Removal Request or for other reasons (e.g. Error cases), the GGSN sends an MBMS UE Context Deactivation Request (IP multicast address, APN, IMSI) to the SGSN. The IP multicast address, APN and IMSI together identify the MBMS UE Context to be deleted by the SGSN. The APN is the one received in step 3. The SGSN acknowledges reception of the MBMS UE Context Deactivation Request by sending an MBMS UE Context Deactivation Response to the GGSN.

5. Upon reception of the MBMS UE Context Deactivation Request or for other reasons (e.g. due to a change in the roaming restrictions for the user) the SGSN sends a Deactivate MBMS Context Request (TI) to the UE. The TI identifies the MBMS UE Context to be deleted by the UE.

6. The UE deletes the MBMS UE Context and sends a Deactivate MBMS Context Accept (TI) to the SGSN.

7. If the UE is PMM-CONNECTED and has been already linked towards the RAN, the SGSN sends a MBMS UE De-Linking Request to the RNC (IP multicast address, APN, TMGI). RAN deletes the MBMS UE Context and sends a MBMS UE De-Linking Response (TMGI) to the SGSN.

8. If dedicated radio resources are currently assigned to the UE for the reception of the MBMS data, the RAN releases these radio resources. If shared radio resources are currently assigned for the distribution of the MBMS data, the RAN may decide to move the remaining UEs to dedicated resources. The detailed procedures and conditions are FFS depending on ongoing work in RAN groups.

9~~8~~. Upon reception of the Deactivate MBMS Context Accept or for other reasons (e.g. due to missing periodic updates) the SGSN sends a Delete MBMS Context Request (MBMS_NSAPI) to the GGSN that holds the MBMS UE Context. This GGSN may be different from the GGSN that receives IGMP Leave request in step 1.

10~~9~~. The GGSN deletes the MBMS UE Context and sends a Deactivation Indication to the BM-SC to confirm the successful deactivation of the MBMS UE Context. The BM-SC, after receiving the Deactivation Indication, deletes the MBMS UE Context and sends a confirmation to the GGSN. The exact nature of the signalling between GGSN and BM-SC is however FFS in general.

11~~10~~. If the GGSN does not have any more users interested in this MBMS bearer service and the "list of downstream nodes" in the corresponding MBSM Bearer Context is empty, the GGSN sends a MBMS De-Registration Request to the BM-SC. The BM-SC responds with a MBMS De-Registration Response and removes the identifier of the GGSN from the "list of downstream nodes" parameter in its MBMS Bearer Context. See subclause "MBMS De-Registration Procedure".

12~~11~~. The GGSN confirms the deactivation of the MBMS UE Context to the SGSN by sending a Delete MBMS Context Response to the SGSN, which then deletes the MBMS UE Context.

13~~12~~. If the SGSN does not have any more users interested in this MBMS bearer service and the "list of downstream nodes" in the corresponding MBMS Bearer Context is empty, the SGSN sends an MBMS De-Registration Request to the GGSN. The GGSN responds with an MBMS De-Registration Response and removes the identifier of the SGSN from the "list of downstream nodes" parameter in its MBMS Bearer Context. See subclause "MBMS De-Registration Procedure".

Next change

8.15 MBMS UE Linking/De-linking mechanism

MBMS UE Linking is the process by which UE MBMS context(s) is (are) provided to RAN.

MBMS UE linking procedure is performed when the UE is PMM-CONNECTED at least in the following cases.

- When a UE which has joined MBMS is moved to the PMM CONNECTED state and sets up a PS RAB. This may happen at any point in time i.e. before, during and between Sessions.
- When a UE joins the service and is in the PMM CONNECTED state due to an existing PS RAB. This may happen at any point in time i.e. before, during and between Sessions.
- When a UE is moved to the PMM CONNECTED state only for MBMS purpose via Service Request procedure. This may happen at any point in time during a MBMS session.

The UE linking is performed to link a specific UE to an MBMS service. It provides the list of MBMS Service Ids activated by the UE to the SRNC. If no MBMS service context related to the MBMS service Id exists then SRNC creates an MBMS service context after this procedure.

MBMS UE De-Linking denotes the process where a MBMS UE context is removed from the RAN.

MBMS UE De-Linking procedure is performed if the UE is PMM-CONNECTED and has been already linked towards the RAN at least when it initiates MBMS Multicast Service Deactivation procedure. This may happen at any point in time during the whole MBMS service availability i.e. before, during and between MBMS sessions.

The UE De-Linking is performed to unlink a specific UE from a MBMS service. The entry for this UE is removed from the concerned MBMS service context(s) in the SRNC.

3GPP TSG-SA2 Meeting #42

Seoul, Korea, 15-19 Nov 2004.

Tdoc ⌘S2-043797
rev of S2-043490

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.246** **CR** **123** ⌘ **rev** **1** ⌘ 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 [X] Radio Access Network [X] Core Network [X]

Title:	⌘	MBMS Architecture Related Correction
Source:	⌘	Vodafone
Work item code:	⌘	MBMS
Date:	⌘	18/11/2004
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:	⌘	There are many incorrect references to RAN/UTRAN which also apply to Iu mode GERAN. Also there is a statement support IP multicast traffic that may be confused with existing IP multicast (from R98).
Summary of change:	⌘	Clarifications on what is meant by RAN/UTRAN to include GERAN. Clarifications on IP multicast traffic being MBMS specific as other data sources have now been removed. Also includes a general tidy up.
Consequences if not approved:	⌘	Potential ambiguity in the existing text, causing misimplementations.

Clauses affected:	⌘	4.4.2.6, 5.4, 5.5, 5.6, 6.3.1, new section 8.6.0

		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.
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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 Change ==========

4.4.2.6 Period between Session Start and Session Stop

When the BM-SC knows that there is no more data to be sent for a "long idle period", it should indicate Session Stop to the network, causing the release of bearer resources. However, if this idle period with no data is short, this may not be appropriate as it brings more signalling and processing.

There~~re is no absolute value on the~~ duration of this "long idle period" is implementation dependent. The order of magnitude ~~(i.e. is it closer to 30 seconds or 30 minutes) is to~~should be defined ~~taking~~ to take into account ~~UTRAN~~ network constraints (including UTRAN, GERAN, and CN).

If the BM-SC wants to use session repetition identification on the MBMS bearer service level, the BM-SC must stop the MBMS session before starting the next MBMS user service session for that TMGI.

========== Second Change ==========

5.4 SGSN

The SGSN role within MBMS architecture is to perform user individual MBMS bearer service control functions and to provide MBMS transmissions to UTRAN/GERAN.

The SGSN shall provide support for intra-SGSN and inter-SGSN mobility procedures. Specifically this requires the SGSN to store a user-specific MBMS UE context for each activated multicast MBMS bearer service and to pass these contexts to the new SGSN during inter-SGSN mobility procedures.

The SGSN shall be able to generate charging data per multicast MBMS bearer service for each user. Further, the SGSN may provide functions to support the charging of prepaid users.

The SGSN shall be able to establish Iu and Gn bearers shared by many users ~~on demand when data has to be transferred to the users. This shall be done~~ upon receiving a session start~~notification~~ from the GGSN. Likewise, ~~when data is no longer available~~ the SGSN shall be able to tear down these bearers upon ~~notification~~ instruction from the GGSN.

5.5 GGSN

The GGSN role within the MBMS architecture is to serve as an entry point for IP multicast traffic as MBMS data. Upon notification from the BM-SC the GGSN shall be able to request the establishment of a bearer plane for a broadcast or multicast MBMS transmission. Further, upon BM-SC notification the GGSN shall be able to tear down the established bearer plane. Bearer plane establishment for multicast services is carried out towards those SGSNs that have requested to receive transmissions for the specific multicast MBMS bearer service.

The GGSN shall be able to receive MBMS specific IP multicast traffic ~~(whether from BM-SC or other data sources)~~ and to route this data to the proper GTP tunnels set-up as part of the MBMS bearer service.

Other functions to note here that GGSN may provide in support of MBMS bearer service but not exclusive to MBMS are:

- Message Screening ~~(~~not needed if the MBMS sources are internal in the PLMN);
- Charging Data Collection;

5.6 MBMS Data Sources and Content Provider

The reference point from the content provider to the BM-SC is not standardised by 3GPP in this release of the specification.

==========Third Change ==========

6.3.1 MBMS QoS distribution tree

MBMS data will be distributed to multiple users through a MBMS distribution tree that can go through many BSCs/RNCs, many SGSNs and one or more GGSNs. Furthermore some bearer resources may be shared between many users accessing the same MBMS bearer service in order to save resources. As a result, each branch of a MBMS distribution tree shall be established with the same QoS.

MBMS distribution tree shall have the same QoS for all its branches.

When a branch of the MBMS distribution tree has been created, it is not possible for another branch (e.g. due to arrival of a new UE or change of location of a UE with removal of a branch and addition of a new one) to impact the QoS of already established branches.

There is no QoS ~~value~~ (re-)negotiation between ~~UMTS~~ network elements (e.g. between RNC and SGSN). This implies that some branches may not be established if QoS requirement cannot be accepted by the concerned network node.

~~Also in RAN there is no QoS (re-)negotiation feature for the MBMS bearer service.~~

==========Fourth Change ==========

8.6 MBMS De-Registration Procedure

8.6.0 Common MBMS De-Registration procedure

The MBMS De-Registration is the procedure by which a downstream node informs an upstream node that it does not need ~~a~~ to receive signalling, session attributes and data for a particular MBMS bearer service anymore and therefore would like to be removed from the corresponding distribution tree.

The MBMS De-registration procedure is initiated:

- By the SGSN or GGSN when the last MBMS UE Context for a particular MBMS bearer service is deleted from the node and the "list of downstream nodes" parameter in the corresponding MBMS Bearer Context is empty;
- By the SGSN or GGSN when the last node registered in the "list of downstream nodes" de-registers from an MBMS bearer service for which there is no corresponding MBMS UE Context; or
- By the DRNC that registered at an SGSN when it deletes the associated MBMS Service Context.

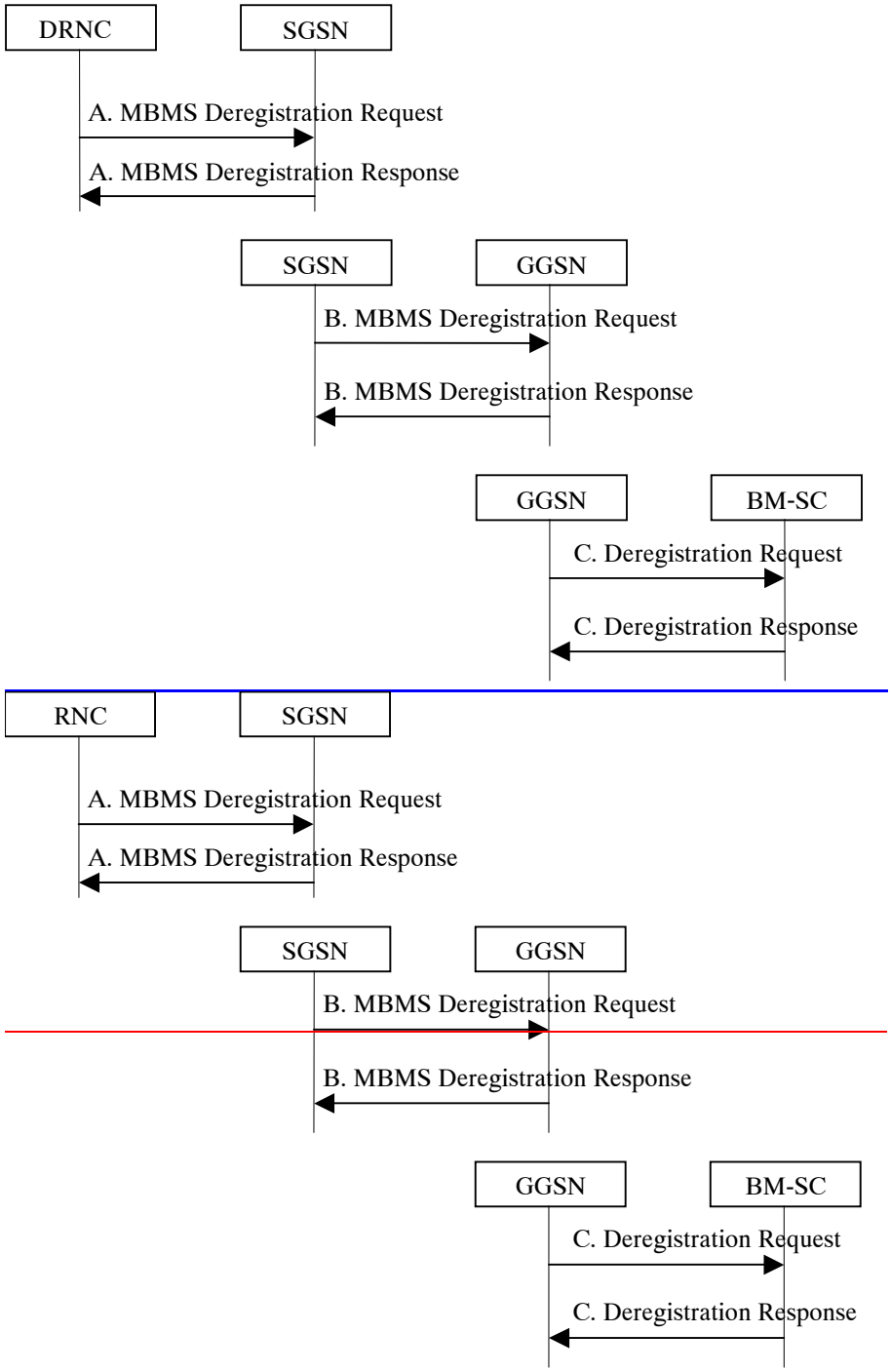

Figure 11: MBMS De-Registration Procedure

A. When the DRNC that is registered at an SGSN no longer hosts any UE interested in that MBMS bearer service, the DRNC requests the de-registration from the MBMS bearer service to its parent SGSN. As an implementation option, the DRNC may decide not to de-register from the MBMS bearer service immediately when these conditions are met, e.g. in order to avoid unnecessary signalling in the case where the RNC would again need the same MBMS bearer service shortly after.

   The SGSN removes the identifier of the RNC from the "list of downstream nodes" parameter of the affected MBMS Bearer Context and confirms the operation by sending an MBMS De-Registration Response message to the RNC. If an Iu bearer plane had been established between the DRNC and the SGSN for this MBMS bearer service, the Iu bearer plane is released.

B. When the "list of downstream nodes" of a particular MBMS Bearer Context in the SGSN becomes empty and the SGSN has no MBMS UE Contexts linked to that MBMS Bearer Context, the SGSN sends an MBMS De-Registration Request (IP multicast address, APN) message to its upstream GGSN.

   The GGSN removes the identifier of the SGSN from the "list of downstream nodes" parameter of the affected MBMS Bearer Context and confirms the operation by sending an MBMS De-Registration Response message to the SGSN. If a bearer plane had been established between the SGSN and the GGSN for this MBMS bearer service, the bearer plane is released.

C. When the "list of downstream nodes" of a particular MBMS Bearer Context in the GGSN becomes empty and the GGSN has no MBMS UE Contexts linked to that MBMS Bearer Context, the GGSN sends a De-Registration Request (IP multicast address, APN) message to the BM-SC. If a bearer plane had been established over Gi for this MBMS bearer service, the bearer plane is released.

   The BM-SC removes the identifier of the GGSN from the "list of downstream nodes" parameter of the affected MBMS Bearer Context and confirms the operation by sending a De-Registration Response message to the GGSN.

3GPP TSG-SA2 Meeting #43 **S2-043800**
Seoul, Korea, 15th-19th November 2004 **revision of S2-043615**

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.246** **CR** **131** ⌘ **rev** **1** ⌘ 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:	⌘	Delaying data transfer at session start
Source:	⌘	Siemens
Work item code:	⌘	MBMS
Date:	⌘	3/11/2004
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 delay between session start and start of MBMS data transfer as described in 4.4.1 and 4.4.2.5 may need further explanation to avoid misunderstanding.
Summary of change:	⌘	A description of the required BMSC configuration that delays start of MBMS data transfer after sending the session start message is added to the session start procedure.
Consequences if not approved:	⌘	Potential misunderstanding of the delay between session start and start of data transfer.

Clauses affected:	⌘	8.3

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:
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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.

8.3 MBMS Session Start Procedure

The BM-SC initiates the MBMS Session Start procedure when it is ready to send data. This is a request to activate all necessary bearer resources in the network for the transfer of MBMS data and to notify interested UEs of the imminent start of the transmission.

Through this procedure, MBMS session attributes such as QoS, MBMS service Area, estimated session duration if available are provided to the GGSN(s) and SGSN(s) that have previously registered for the corresponding MBMS bearer service and to all BSCs/RNCs that are connected to a registered SGSN. In addition the procedure allocates the bearer plane to all registered GGSNs and all registered SGSNs and to BSCs/RNCs that respond to the session start accordingly.

After sending the Session Start Request message the BM-SC waits for a configurable delay before sending MBMS data. This delay should be long enough to avoid buffering of MBMS data in entities other than the BM-SC, i.e. the delay should allow the network to perform all procedures required to enable MBMS data transfer before the BM-SC sends MBMS data. For example notification of UEs and radio bearer establishment should be performed before MBMS data arrive in the RAN. The delay may be in the region of multiple seconds or tens of seconds. It may be useful for the BM-SC to be able to configure different delays for MBMS bearer services on 2G and 3G, respectively.

3GPP TSG-SA2 Meeting #43
Seoul, Korea, 15th ñ 19th November 2004

Tdoc ⌘S2-043803

CR-Form-v7

CHANGE REQUEST

⌘ **23.246** **CR** **134** ⌘ **rev** **1** ⌘ 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 **X** Core Network **X**

Title:	⌘	MBMS UE context via MBMS UE Linking procedure
Source:	⌘	Samsung
Work item code:	⌘	MBMS
Date:	⌘	15/11/04
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:

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:	⌘	It is not clear what kind of information in the MBMS UE context should be tranferred to the RNC in the current specification. Since TMGI and MBMS_NSAPI are transferred to the RNC via UE linking procedure as agreed at the last RAN3#44 meeting (refer to RAN3 LS in S2-043434), it should be clarified that the MBMS UE context contains TMGI and MBMS_NSAPI as components.
Summary of change:	⌘	TMGI is added to the MBMS UE context in SGSN and RAN and MBMS_NSAPI is added to the MBMS UE context in RNC.
Consequences if not approved:	⌘	The specification is not alligned with other stage 3 specification.

Clauses affected:	⌘	6.1, 8.16
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:
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Below is a brief summary:

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

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

******* FIRST MODIFIED SECTION *******

6 MBMS attributes and Parameters

6.1 MBMS UE Context

The MBMS UE Context contains UE-specific information related to a particular MBMS bearer service that the UE has joined. An MBMS UE Context is created in the UE, SGSN,GGSN and BM-SC when the UE joins an MBMS bearer service. In the SGSN, an MBMS UE Context is also created as a result of an inter-SGSN routing area update after the transfer of the MBMS UE Context from the old SGSN.

In Iu mode, all MBMS UE Contexts of a UE are provided via MBMS UE Linking mechanism to the BSC/SRNC at least when the first PS RAB is established for the UE, or when the UE performs MBMS Multicast Service Activation. MBMS UE Contexts are provided to the Iu mode BSC/SRNC regardless whether MBMS Sessions are ongoing or not (i.e. before, between and after Sessions). In addition, all MBMS UE Contexts of a UE are provided via MBMS UE Linking mechanism when a UE, which has an MBMS context active, moves to PMM-Connected state via the MBMS Service Request procedure for the purpose of MBMS.

In the UE and SGSN, the MBMS UE Context is stored as part of the MM Context for the UE. The MBMS UE Context is stored in the GGSN. There is one MBMS UE Context per MBMS bearer service that the UE has joined.

In the Iu mode BSC/RNC, the MBMS UE Contexts are stored as part of the UE Context of the BSC/RNC.

The content of the MBMS UE Context is described in Table 1.

Table 1: MBMS UE Context

Parameter	Description	UE	SGSN	GGSN	RNC	BSC	BM-SC
IP multicast address	IP multicast address identifying an MBMS bearer that the UE has joined.	X	X	X	X	Iu - X Gb - none	X
APN	Access Point Name on which this IP multicast address is defined.	X	X	X	X	Iu - X Gb ñ none	X
TMGI	Temporary Mobile Group Identity allocated to the MBMS bearer.	X	X		X	Iu - X Gb ñ none	
Linked NSAPI	NSAPI of the PDP context used by the UE to carry IGMP/MLD signalling.	X	X				
IMSI	IMSI identifying the user.	(1)	(1)	X	(2)	Iu ñ (2) Gb ñ (3)	X
TI	Transaction Identifier	X	X				
MBMS_NSAPI	Network layer Service Access Point Identifier which identifies an MBMS UE Context.	X	X	X	X		

(1) In the UE and SGSN, the IMSI is available within the MM Context which contains the MBMS UE Context

(2) The IMSI is available within the UE Context which contains the MBMS UE Context.

(3) IMSI availability does not depend on MBMS.

******* SECOND MODIFIED SECTION *******

8.16 MBMS Service Request Procedure

For MBMS, when UTRAN wants to count the number of users that are interested in a specific MBMS service present in a cell, it will request a percentage of the interested UEs to transit to PMM-CONNECTED state. The MBMS Service Request procedure is used by a UE in PMM-IDLE state to move to PMM-CONNECTED state.

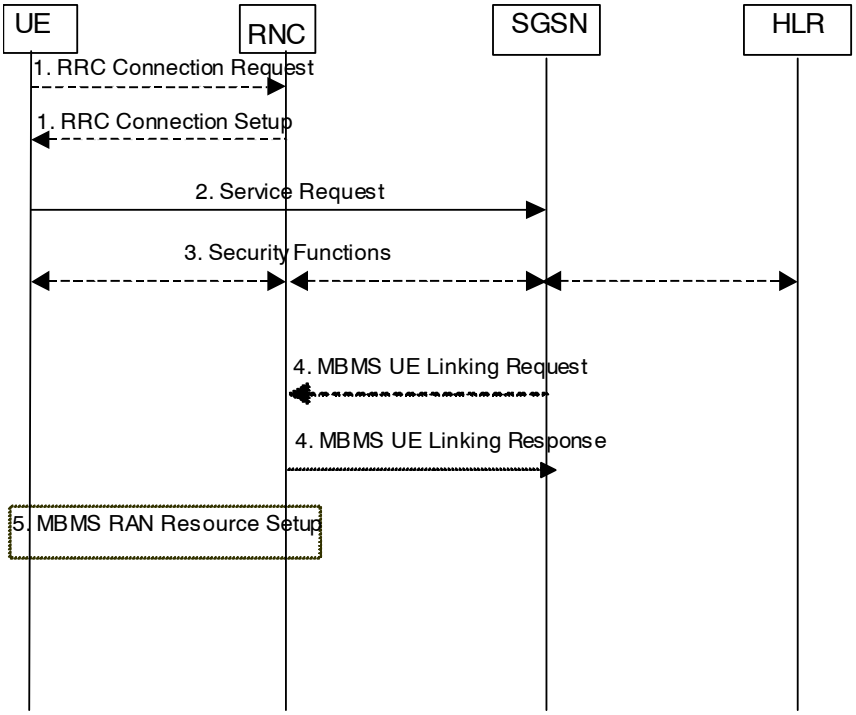

Figure 17: MBMS Service Request procedure

2) The UE sends a Service Request message to the SGSN if required to do so by the RAN after a MBMS Session Starts.

3) The SGSN may perform the security functions.

4) The SGSN provides RAN with the MBMS UE context (~~s~~IP multicast address/APN, TMGI, MBMS_NSAPI) via MBMS UE Linking procedure

5) The RNC establishes the necessary radio resources for the transfer of MBMS data to the interested UEs.

***** END OF CHANGES *****

3GPP TSG-SA2 Meeting #43
Seoul, Korea, November 15-19, 2004

Tdoc ⌘S2-043848
Rev of S2-043664

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.246** **CR** **111** ⌘ **rev** **3** ⌘ 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:	⌘	How to avoid overloading the central server after sending service announcement
Source:	⌘	Vodafone
Work item code:	⌘	MBMS
Date:	⌘	18/11/2004
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:	⌘	If the service announcement is broadcast (either CBS or MBMS) or multicast then it needs to contain parameters to help avoid the overloading of the core network entities.
Summary of change:	⌘	a) In the section 4.4.2.3, the UE must be able to use defined parameters in the service announcement to randomly select the time at which to join the service. b) Section 4.4.2.4 is updated in a similar manner. c) In the section 7.2, the parameters are added in the service announcement to randomly select the time at which to join the service.
Consequences if not approved:	⌘	The BM-SC, GGSN and SGSN can be overloaded when an MBMS service is announced.

Clauses affected:	⌘	4.4.2.3; 4.4.2.4; new section 7.2

Other specs Affected:	Y	N			
⌘	X		Other core specifications	⌘	26.346
		X	Test specifications		
		X	O&M Specifications		

Other comments:	⌘	

How to create CRs using this form:

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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 Change ==========

4.4.2.3 Period between Service Announcement and Joining

The Joining time is chosen by the user and/or UE possibly in response to a Service Announcement.

Users will typically join at the time of their choosing so that the period between announcement and joining may be very long or very short. In order to avoid overload situations being caused by many users attempting to join in a short period of time, the UE shall be able to use parameters sent by the BM-SC in the service announcement to randomise the joining time.

========= Second Change ==========

4.4.2.4 Period between Joining and Session Start

Some MBMS bearer services may be 'always on'. In this case, Joining can take place ~~starting~~ immediately after Service Announcement and possibly many hours before, or after, Session Start.

In other cases, if a Session Start time is known, Joining may take place immediately before Session Start or after Session Start. For these services, the announcement may contain some indication of a time period ~~within~~ which users and UEs should use to choose a time to Join the MBMS bearer service.

========= Third Change ==========

7 Architectural Aspects of MBMS User Services

MBMS bearers may be used in numerous ways to provide different types of applications. MBMS user services employ MBMS bearers and possibly point-to-point bearers in order to provide application data in an efficient manner. This section is used to discuss different aspects of MBMS user services that directly relate to the usage of MBMS and point-to-point bearers. This section is not intended to deal with the architecture and interfaces of MBMS user services.

7.1 Alternative User Service Support

For many MBMS services, it will be necessary to provide alternative means for the UE to access the service without using MBMS bearer capabilities. This is required, for example, after completion of the MBMS session for a file download to permit errors in the file to be corrected; to permit the network to charge for a successful download; to pass a decrypt key to the UE; etc. It may also be useful in cases where all or part of an MBMS transmission has been missed due to the UE being out of coverage, switched off etc.

Care is needed to ensure that such alternative access mechanisms do not create traffic that overloads the network (radio, RNC, BSC, SGSN, GGSN and BM-SC). In the case that such alternative access requires direct interaction between the UE and a network server, one way for this load to be distributed is for the BM-SC to distribute to each UE, at activation time, one or more server addresses (from a group of addresses), along with parameter(s) that are used to generate a random time dispersion of the requests.

7.2 Avoid overload in SGSN, GGSN and BM-SC caused by Joining

For Joining that is triggered by a service announcement (eg CBS or MBMS), then the service announcement needs to be able to contain parameters to help avoid overload in the SGSN, GGSN and BM-SC. The UE uses the defined parameters in the service announcement to randomly select the time at which to join the service. Hence the BM-SC needs to be able to generate the parameters and needs to be able to get them sent to the UE in the service announcement.

3GPP TSG-SA2 Meeting #43
Seoul, Korea 15th ñ 19th November 2004

Tdoc ⌘S2-043850

CR-Form-v7

CHANGE REQUEST

⌘ **23.246** **CR** **122** ⌘**rev** **2** ⌘ 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 **X**

Title:	⌘	Charging Related Correction for MBMS
Source:	⌘	Vodafone
Work item code:	⌘	MBMS ***Date:*** ⌘ 18/11/2004
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:

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:	⌘	The role of the Gmb interface in charging co-ordination is unclear It is also unclear what charging information the SGSN will generate.
Summary of change:	⌘	Gmb functionality is clarified. Charging related functions at the SGSN is clarified such that it does not cover the MBMS user service. Flow based charging support is added to the GGSN functionality Various editorial corrections are also made.
Consequences if not approved:	⌘	Possible ambiguity in the purpose of charging functionality and could cause misimplementation in stage 3.

Clauses affected:	⌘	4.3.1, 5.4, 5.5

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

Other comments:	⌘	

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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.

********** 1st modified section**********

4.3.1 Gmb

Signalling between GGSN and BM-SC is exchanged at Gmb reference point. ~~.~~This represents the network side boundary of the MBMS Bearer Service from a control plane perspective. This includes user specific Gmb signalling and MBMS bearer service specific signalling.

MBMS bearer service specific Gmb signalling:

- The GGSN establishes the MBMS bearer context and registers at BM-SC.
- The GGSN or the BM-SC releases the MBMS bearer context and de-registers the GGSN from the BM-SC.
- The BM-SC indicates session start and stop to the GGSN including session attributes like QoS ~~or~~ and MBMS service ~~-~~area.

User specific Gmb signalling:

- The BM-SC authorises the user specific MBMS multicast service activation (join) at the GGSN.
- The GGSN reports to the BM-SC the successful user specific MBMS multicast activation (join) to allow the BM-SC to synchronise the BM-SC ~~UE~~ MBMS UE context ~~and charging~~ with the MBMS UE contexts in the SGSN and GGSN.
- The GGSN reports to the BM-SC when a user specific MBMS multicast service is released or deactivated (e.g. ~~when the radio contact is lost~~at implicit detach). The GGSN makes this report in order to synchronise the BM-SC ~~UE~~ MBMS UE context~~s and charging~~ with the MBMS UE contexts in the SGSN and GGSN.

The BM-SC initiates the deactivation of a user specific MBMS bearer service when the MBMS user service is terminated.

BM-SC functions for different MBMS bearer services may be provided by different physical network elements. Further, MBMS bearer service specific and user specific signalling for the same MBMS bearer service may also be provided by different physical network elements. To allow this distribution of BM-SC functions, the Gmb protocol must support the use of proxies to correctly route the different signalling interactions in a manner which is transparent to the GGSN.

********** Next modified section**********

5.4 SGSN

The SGSN's role within the MBMS architecture is to perform ~~user individual~~ MBMS bearer service control functions for each individual UE and to provide MBMS transmissions to UTRAN/GERAN.

The SGSN shall provide support for intra-SGSN and inter-SGSN mobility procedures. Specifically this requires the SGSN to store a user-specific MBMS UE context for each activated multicast MBMS bearer service and to pass these contexts to the new SGSN during inter-SGSN mobility procedures.

The SGSN shall be able to generate charging data per multicast MBMS bearer service for each user. ~~Further, the SGSN may provide functions to support the charging of prepaid users.~~ The SGSN does not perform on-line charging for either the MBMS bearer service or the MBMS user service (this is handled in the BM-SC).

The SGSN shall be able to establish Iu and Gn bearers shared by many users on demand when data has to be transferred to the users. This shall be done upon notification from the GGSN. Likewise, when data is no longer available the SGSN shall be able to tear down these bearers upon notification from the GGSN.

5.5 GGSN

The GGSN role within the MBMS architecture is to serve as an entry point for IP multicast traffic as MBMS data. Upon notification from the BM-SC the GGSN shall be able to request the establishment of a bearer plane for a broadcast or

multicast MBMS transmission. Further, upon BM-SC notification the GGSN shall be able to tear down the established bearer plane. Bearer plane establishment for multicast services is carried out towards those SGSNs that have requested to receive transmissions for the specific multicast MBMS bearer service.

The GGSN shall be able to receive IP multicast traffic (whether from BM-SC or other data sources) and to route this data to the proper GTP tunnels set-up as part of the MBMS bearer service.

~~Other functions to note here that~~The GGSN may also provide features that~~in~~ support ~~of~~ the MBMS bearer service ~~but~~ that are not exclusive to MBMS. Examples are:

- Message Screening (not needed if the MBMS sources are internal in the PLMN);
- Charging Data Collection;
- Flow Based Charging (see section 10).

3GPP TSG-SA2 Meeting #43
Seoul, Korea 15th ñ 19th November 2004

Tdoc ⌘S2-043851

CR-Form-v7

CHANGE REQUEST

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

Title:	⌘	General editorial correction for MBMS
Source:	⌘	Vodafone
Work item code:	⌘	MBMS
Date:	⌘	18/11/2004
Category:	⌘	**D**
Release:	⌘	Rel-6

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Rel-6	*(Release 6)*

Reason for change:	⌘	There are missing abbreviations, references, and general editorial errors in the existing specfication
Summary of change:	⌘	Adds some definitions of abbreviations. Corrects various spelling and wording errors.
Consequences if not approved:	⌘	Missing abbreviations, Incorrect wording/spelling

Clauses affected:	⌘	3.2, 4.4.1.3, 4.4.1.4, 4.4.3.2, new section 5.0, 5.1.5, 5.2, 5.3, 6.3, 8.1.1, 8.1.2, 8.16, 8.17.4, 10.1, 10.2, 10.3, Annex A

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

Other comments:	⌘	

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********** 1st modified section**********

3.2 Abbreviations

For the purposes of the present document, the abbreviations in 3GPP TR 21.905 [1] and 3GPP TS 22.146 [2] apply.

TMGI Temporary Mobile Group Identity

TPF Traffic Plane Function

********** Next modified section**********

4.4.1.3 Joining

Joining (i.e. MBMS multicast activation by the user) is the process by which a subscriber joins (becomes a member of) a multicast group, i.e. the user indicates to the network that he/she ~~is willing~~wants to receive Multicast mode data of a specific MBMS bearer service.

********** Next modified section**********

4.4.1.4 Session Start

Session Start is the point at which the BM-SC is ready to send data. This can be identified with the start of a "Multicast session" as defined in ~~the Stage 1~~3GPP TS 22.146 [2]. Session Start occurs independently of activation of the service by the user ñ i.e. a given user may activate the service before or after Session Start. Session Start is the trigger for bearer resource establishment for MBMS data transfer.

********** Next modified section**********

4.4.3.2 Session Start

Session Start is the point at which the BM-SC is ready to send data. This can be identified with the start of a "Broadcast session" as defined in 3GPP TS 22.146 [2]~~the Stage 1~~. Session Start occurs independently of Service Activation by the user ñ i.e. a given user may activate the service before or after the start of the session. Session Start is the trigger for bearer resource establishment for MBMS data transfer.

********** Next modified section**********

5 Functional Entities To Support MBMS

5.0 General

To provide MBMS bearer services existing functional entities, GGSN, SGSN, RNC/BSC, perform several MBMS related functions and procedures, some of which are specific to MBMS. An MBMS specific functional entity ñ Broadcast Multicast Service Centre (BM-SC) supports various MBMS user service specific services such as provisioning and delivery.

5.1 Broadcast-Multicast Service Centre (BM-SC)

The BM-SC provides functions for MBMS user service provisioning and delivery. It may serve as an entry point for content provider MBMS transmissions, used to authorise and initiate MBMS Bearer Services within the PLMN and can be used to schedule and deliver MBMS transmissions.

The BM-SC is a functional entity, which must exist for each MBMS User Service.

This section describes BM-SC functions, which are defined for the standardised MBMS User Services. Which of these functions are provided as general purpose capabilities to be used by multiple MBMS User Services and which are

specific to a particular MBMS User Service is defined in conjunction with the definition of the standardised MBMS User Services.

********** Next modified section**********

5.1.5 Separate MBMS Bearer Services for 2G and 3G for the same MBMS User Service

The same MBMS user service may transfer its data on separate MBMS bearer services for 2G or 3G coverage, typically with different QoS. For this purpose two IP multicast addresses and the associated two TMGIs should be allocated for the same MBMS user service. One pair of IP multicast address and TMGI is for 2G coverage and another pair of IP multicast address and TMGI is for 3G coverage. The detailed impacts on the network nodes are listed below:

a) The service announcement instructs the UE to join two multicast MBMS bearer services (one is for 2G coverage and the other is for 3G coverage), i.e. two IP multicast addresses that are allocated in the BM-SC ~~will be~~are sent to UE within one service announcement message.

b) ~~-~~A UE that might move between 3G coverage areas and 2G coverage areas activates both MBMS bearer services.

c) The UE monitors the paging/notification channels for both TMGIs and receives MBMS data when transferred by the MBMS bearer services.

d) When the BM-SC needs to deliver the content, the BM-SC produces two sets of MBMS data from the same content and sends independent Session Start messages for both of the MBMS bearer services. The "different" 2G and 3G content streams for the same MBMS user service are sent on the different IP multicast address associated with 2G and 3G TMGIs. A 2G/3G indicator in the Session Start message (which the GGSN passes transparently to the SGSN) indicates whether the content should be delivered in 2G-only or 3G-only (or both) coverage areas.

e) The SGSN uses the 2G/3G indicator to decide whether a MBMS Session Start Request message should be sent to the BSCs and/or the RNCs.

Although this procedure mentions 2G and 3G extensively, only the BM-SC (which renders the content differently) and the SGSN have to implement functionality to deliver this. The GGSN, RNC and BSC shall all be transparent to this functionality.

********** Next modified section**********

5.2 User Equipment

The UE shall support functions for the activation/deactivation of the MBMS bearer service.

Once a particular MBMS bearer service is activated, no further explicit user request is required to receive MBMS data although the user may be notified that data transfer is about to start.

The UE shall support security functions as appropriate for MBMS.

The UE should, depending on terminal capabilities, be able to receive MBMS user service announcements, paging information (non MBMS specific) ~~or~~ and support simultaneous services (~~For~~ for example the user can originate or receive a call or send and receive messages whilst receiving MBMS video content). Reception of this paging or announcements may however, create losses in the MBMS data reception. The MBMS user service should be able to cope with such losses.

~~Some UE d~~Depending upon terminal capability, UEs may be able to store MBMS data. This may involve DRM but this is out of scope of this specification.

The MBMS Session Identifier contained in the notification to the UE shall enable the UE to decide whether it needs to ignore the forthcoming transmission of MBMS session (e.g. because the UE has already received this MBMS session).

********** Next modified section**********

5.3 UTRAN/GERAN

UTRAN/GERAN are responsible for efficiently delivering MBMS data to the designated MBMS service area.

Efficient delivery of MBMS data in multicast mode may require mechanisms in the UTRAN/GERAN, e.g. -the number of users within a cell prior to and during MBMS transmission could be used to choose an appropriate radio bearer.

MBMS transmissions may be initiated and terminated intermittently. The UTRAN/GERAN shall support the initiation and termination of MBMS transmissions by the core-network. Further, the UTRAN/GERAN shall be able to receive MBMS data from the core-network over Iu bearers shared by many UEs.

The UTRAN/GERAN shall support both intra-RNC/BSC and~~,~~ inter-RNC/BSC mobility of MBMS receivers. Mobility is expected to cause limited data loss. Therefore, MBMS user services should be able to cope with potential data loss caused by UE mobility.

The UTRAN/GERAN shall be able to transmit MBMS user service announcements, paging information (non MBMS specific) and support other services in parallel with MBMS (for example depending on terminal capabilities the user could originate or receive a call or send and receive messages whilst receiving MBMS video content).

********** Next modified section**********

6.3 Quality-of-Service

It shall be possible for the network to control quality-of-service parameters for sessions of multicast and broadcast MBMS bearer services. All QoS attributes related to the UMTS bearer service described in 3GPP TS 23.107 [3] are applicable to MBMS bearer services. Compared to point-to-point bearer services the following limitations exist:

- For **traffic class**, only the background and streaming classes shall be supported.
- For **SDU error ratio**, only higher values are supported, i.e. the values describing higher numbers of lost or corrupted SDUs (actual values are for the background and streaming classes are 10^{-2} and 10^{-1}).
- For **maximum bit-rate**, see the values described in 3GPP TS 22.246 [6].

MBMS bearer services of background class are best suited for the transport of MBMS user services such as messaging or downloading. Buffering, shaping schemes and packet dropping may be applied to the traffic flow to adapt to the available resources and changing network conditions. The total transfer time is not critical for background class bearer services since the content must normally have been received in totality and stored in the UE before the user can access it.

MBMS bearer services of streaming class are best suited for the transport of MBMS user services such as streaming. As for point-to-point bearer services, the network should minimise the packet transfer delay of streaming class bearer services as far as possible. Packet dropping should be the preferred traffic conditioning action applied to the traffic flow to adapt to the available resources.

The principle difference between background and streaming classes for MBMS is the support of a guaranteed bit-rate in the streaming case.

MBMS user services that would normally use MBMS bearer services of background class may however need to use a streaming class MBMS bearer service. This will reduce packet loss due to congestion, since a minimum bit-rate is guaranteed. Otherwise the MBMS user service will have to provide sufficient redundancy within the data to be able to cope with the high packet loss.

The Allocation and Retention Priority of the MBMS bearer service allows for prioritisation between MBMS bearer services, and, between MBMS bearer services and non MBMS bearer services.

As the MBMS bearer service transfers data to many UEs in parallel and because of the lack of feedback channel on radio level low SDU error ratios are difficult to achieve. When the resulting packet error ratio is not suitable for the MBMS user service or when prevention of data loss is required, an MBMS user service may perform retransmission of MBMS data over a point-to-point ~~PDP~~ bearer service~~s~~.

********** Next modified section**********

8.1.1 Iu mode notification (UTRAN and GERAN)

When an MBMS Session starts, UEs interested in the MBMS bearer service (PMM-CONNECTED UEs and PMM-IDLE UEs) shall be notified.

MBMS Session attributes such as Session Identifier and MBMS Service Area(s) are made available in all interested RNCs during the Session Start procedure.

For radio efficiency reasons, the UTRAN may select on a per cell basis whether to establish point-to-point or point-to-multipoint links for the distribution of MBMS data to the UEs.

In order to perform this selection, the UTRAN requests a proportion of UEs to move to PMM-CONNECTED mode by means of MBMS notification sent in the MBMS service Area.

The exact number of UEs moved to PMM-CONNECTED mode is a decision of the RAN node. It is not necessary for all UEs to move to PMM-CONNECTED mode in order for the RAN to decide to use point-to-multipoint, other UEs may remain in PMM-IDLE state. This is a UTRAN choice (based on RRM criteriaÖ).

Following the decision to set up point-to-point or point-to-multipoint links, the number of UEs that need to be maintained in PMM-CONNECTED mode or moved to PMM-IDLE mode for MBMS data reception is also a decision of the RAN node.

8.1.2 A/Gb mode notification (GERAN)

When an MBMS Session starts, UEs interested in the MBMS bearer service and that are in(READY UEs andor STANDBY states) shall be notified. The MBMS notification triggers detection or counting of UEs per cell for selection of the most appropriate MBMS radio bearer.

MBMS Session attributes such as Session Identifier, MBMS Service Area, QoS are made available in all interested BSCs that are connected to a registered SGSN by the Session Start procedure.

********** Next modified section**********

8.16 MBMS Service Request Procedure

For MBMS, when UTRAN wants to count the number of users that are interested in a specific MBMS service which are present in a cell, it will request a percentage of the interested UEs to transit to PMM-CONNECTED state. The MBMS Service Request procedure is used by a UE in the PMM-IDLE state to move to the PMM-CONNECTED state.

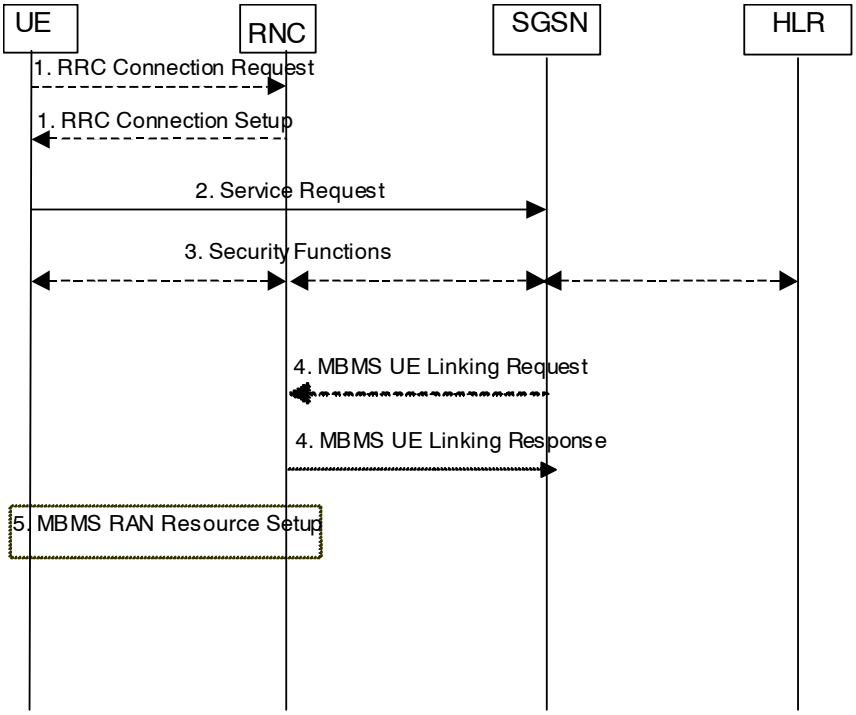

Figure 17: MBMS Service Request procedure

2) The UE sends a Service Request message to the SGSN if required to do so by the RAN after a MBMS Session Starts.

3) The SGSN may perform the security functions.

4) The SGSN provides RAN with the MBMS UE context(s) via MBMS UE Linking procedure

5) The RNC establishes the necessary radio resources for the transfer of MBMS data to the interested UEs.

********** Next modified section**********

8.17.4 Notification of MBMS session during an ongoing CS or PS domain ì"connectionî"

When the UE establishes the UTRAN RRC connection for a CS service, the UE shall send a flag indicating that it has activated at least one MBMS bearer service. The RNC requests the SGSN to send the list of MBMS bearer services that the user has activated to enable the RNC to notify the UE when MBMS session starts.

When a UE moves to PMM-connected state, the SGSN sends the list of MBMS bearer services that the user has activated to the RNC. The RNC notifies the UE when an MBMS session of the userís activated MBMS bearer services starts.

These procedures are not supported by GERAN in this version of the specification.

********** Next modified section**********

10.1 General

The MBMS architecture shall support on-line and off-line charging.

It shall be possible to collect charging information for the multicast mode. It shall also be possible to collect charging information for MBMS services in visited networks.

MBMS shall collect charging information about the transmission of MBMS broadcast or multicast data that are provided by content or service providers (e.g. 3rd parties). This shall enable billing of broadcast and multicast content or service providers.

To enable billing of broadcast and multicast content providers, data shall be collected at the BM-SC.

NOTE: SGSN, GGSN and BM-SC generate charging data for the transmitted data, always under the assumption that the UEs are within the MBMS service area. If the MBMS service area is less than the PLMN, then there is the possibility that a UE will have moved outside the MBMS service area. Charging data will still be generated for that UE causing an inaccuracy in the data. This inaccuracy increases as the size of the MBMS service area is decreased.

********** Next modified section**********

10.2 Bearer level charging for MBMS

To provide bearer level charging for MBMS, mechanisms and functional elements described in 3GPP TS 23.125 [12] are used. In case the BM-SC intends to provide input for bearer level charging, it acts as an Application Function (AF) from the perspective of the flow-based bearer charging architecture (see TS 23.125).

NOTE-i: It is expected that bearer level charging is used to zero-rate MBMS traffic at the TPF.

NOTE-ii: It is expected that the flow filters for MBMS are statically configured in the TPF, hence BM-SC input is not required for bearer level charging.

********** Next modified section**********

10.3 Application level charging for MBMS

In order to meet the MBMS charging requirements in 3GPP TS 22.146 [2] and 3GPP TS 22.246 [6], the following elements and functionalities are provided by the MBMS architecture:

a) The MSISDN and IMSI are passed to the BM-SC. This provides the operator with the ability to associate GPRS location information (i.e. serving network idenity) with a user.

b) In order to permit differential roaming tariffs, the serving network identity is provided to the BM-SC.

c) Charging for MBMS services is based on application layer mechanisms, since it is only at the application layer that security is provided which can restrict content to authorised users or confirm delivery of content to users

The following general requirements apply to charging information generated by the BM-SC:

Charging information generated for application layer charging events should include the above information provided by the GPRS network to facilitate differential roaming tariffs.

Charging information should include an indicat~~e~~ion of the point at which the user had access to the content (e.g. if and when decryption keys for encrypted content are sent to the UE.).

********** Next modified section**********

Annex A (Informative): ~~Information flows~~Void

A.1 ~~General information flow~~Void

3GPP TSG-SA WG2 Meeting #43
Seoul, Korea, 15 ñ 19 November 2004

Tdoc ⌘S2-043866

CR-Form-v7.1

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Proposed change affects: | UICC apps⌘ ☐ ME ☐ Radio Access Network ☒ Core Network ☒

Title:	⌘	List of number of PMM-IDLE UEs per RA parameter for RAN
Source:	⌘	Samsung
Work item code:	⌘	MBMS
Date:	⌘	15/11/2004
Category:	⌘	**F**
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Rel-6 (Release 6)
Rel-7 (Release 7)

Reason for change: ⌘[H15]	ìCurrently when the RAN Resources are setup, the RNC has information about the amount of PMM_CONNECTED mode Ues (by UE Linking), but the information about the amount PMM_IDLE mode Ues in RNC is not availabe. The ìList of RAsî gives RNC the information that at least one PMM_IDLE mode UE is located in RA, but not the total amount. As the SGSN already have that information, it would be beneficial to transfer it to the RAN side, with this way enables more efficient RAN Resource Setup. Within the RAN node the difference between the ìList of RAsî and ìList of number of PMM-IDLE UEs per RAî is the following: *The RA in ìthe List of RAsî when received in the RNC, is the trigger to start/stop transmitting MBMS Notifications in the RA *The number of UEs is used when RNC makes the MBMS Radio Bearer selection (ptp/ptm) and in this process, both the PMM_CONNECTED and PMM_IDLE Ues should be taken into account. The benefit ithat RAN node has the same information about the number of UEs in RA as SGSN is that it make MBMS radio bearer (ptp/ptm) selection more efficient. For example the counting could be avoided in some cases (eg. if UE density is high) . WIthin the RAN node, the ìList of RAsî and ìList of number of PMM-IDLE UEs per RAî parameters are combined, because the latter includes the first one.î The information ìList of number of PMM-IDLE UEs per RAî can be also useful to set the initial value of the probability factor which is given to UE at session start

		for the Random access.
Summary of change:	⌘	The description of the parameter ìList of number of PMM-IDLE UEs per RAî is rephrased. In the MBMS Session Start Request message, SGSN may include a list of number of PMM-IDLE UEs per RA of each RA that contains at least one PMM-IDLE UE that has activated the MBMS bearer service.
Consequences if not approved:	⌘	MBMS radio bearer selection (ptp/ptm) is less efficient and RNC does not have any information for setting the initial value of probability factor for the Random access in the case of counting.

Clauses affected:	⌘	8.3, 6.2			
Other specs affected:	⌘	**Y** / **N**	Other core specifications	⌘	25.346
		X /	Other core specifications		
		/ X	Test specifications		
		/ X	O&M Specifications		
Other comments:	⌘				

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

6.2 MBMS Bearer Context

The MBMS Bearer Context, which is referred to as MBMS Service Context in RAN, contains all information describing a particular MBMS bearer service and is created in each node involved in the delivery of the MBMS data.

An MBMS Bearer Context is created in the SGSN and GGSN when the first MBMS UE Context is created in the node or when a downstream node requests it. The MBMS Bearer Context is statically configured in the BM-SC; how this is done is out of the scope of this specification. The MBMS Bearer Context is created in the Iu mode BSC and in SRNC when a first MBMS UE Context is created in BSC/SRNC. Session Start procedure may create MBMS Bearer Context in a BSC/RNC which has no MBMS Bearer Context yet.

An MBMS Bearer Context, once created, can be in one of two states reflecting the bearer plane resource status of the corresponding MBMS bearer service.

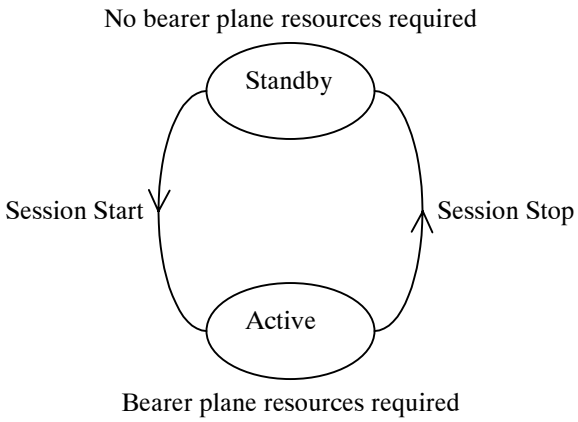

Figure 6: MBMS Bearer Context State Model

'Active' reflects the state of an MBMS Bearer Context in which bearer plane resources are required in the network for the transfer of MBMS data. This state is maintained as long as there is a corresponding MBMS session ongoing.

'Standby' reflects the state of an MBMS Bearer Context in which no bearer plane resources are required in the network for the transfer of MBMS data. This state is maintained as long as there is no corresponding MBMS session ongoing.

The content of the MBMS Bearer Context is described in Table 2.

Table 2: MBMS Bearer Context

Parameter	Description	RAN	SGSN	GGSN	BM-SC
IP multicast address	IP multicast address identifying the MBMS bearer described by this MBMS Bearer Context.	X	X	X	X
APN	Access Point Name on which this IP multicast address is defined.	X	X	X	X
TMGI	Temporary Mobile Group Identity allocated to the MBMS bearer service.	X	X	X	X
State	State of bearer plane resources (estandbyí or eactiveí)	X	X	X	X
Required MBMS Bearer Capabilities	Minimum bearer capabilities the UE needs to support		X	X	X
QoS	Quality of Service required for the MBMS bearer service.	X	X	X	X
MBMS Service Area	Area over which the MBMS bearer service has to be distributed.	X	X	X	X
List of downstream nodes	List of downstream nodes that have requested the MBMS bearer service and to which notifications and MBMS data have to be forwarded.		X	X	X
Number of UEs	Number of UEs hosted by the node that have joined the multicast MBMS bearer service.		X	X	
~~List of n~~Number of PMM-IDLE UEs per RA	~~List of N~~number of PMM-IDLE UEs that have joined the multicast MBMS bearer service in each RA~~for each RA, which contains at least one UE that has joined the MBMS service~~.		X[1)]		
List of RAs	List of RAs, each of which contains at least one UE that has joined the MBMS bearer service.	X[1)]			

Note 1: It is an optional parameter. ~~The SGSN may include a list of RAs which lists each RA that contains at least one PMM-IDLE UE that has activated the MBMS bearer service. This list may be empty.~~

8.3 MBMS Session Start Procedure

The BM-SC initiates the MBMS Session Start procedure when it is ready to send data. This is a request to activate all necessary bearer resources in the network for the transfer of MBMS data and to notify interested UEs of the imminent start of the transmission.

Through this procedure, MBMS session attributes such as QoS, MBMS service Area, estimated session duration if available are provided to the GGSN(s) and SGSN(s) that have previously registered for the corresponding MBMS bearer service and to all BSCs/RNCs that are connected to a registered SGSN. In addition the procedure allocates the bearer plane to all registered GGSNs and all registered SGSNs and to BSCs/RNCs that respond to the session start accordingly.

The overall Session Start procedure is presented in the following figure:

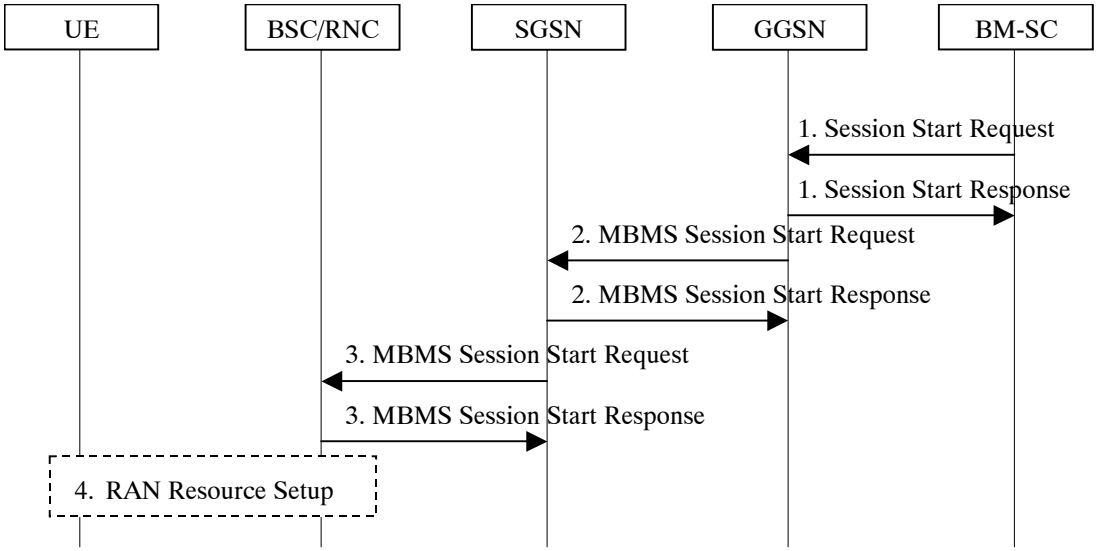

Figure 8 Session Start procedure

1. The BM-SC sends a Session Start Request message to indicate the impending start of the transmission and to provide the session attributes (QoS, MBMS service Area, estimated session durationÖ) to the GGSNs listed in the ì list of downstream nodesî parameter of the corresponding MBMS Bearer Context. The BM-SC sets the state attribute of its MBMS Bearer Context to ëActiveí. The GGSN stores the session attributes in the MBMS Bearer Context, sets the state attribute of its MBMS Bearer Context to ëActiveí and sends a Session Start Response message to the BM-SC.

2. The GGSN sends an MBMS Session Start Request message to the SGSNs listed in the ì list of downstream nodesî parameter of the corresponding MBMS Bearer Context. The SGSN stores the session attributes in the MBMS Bearer Context, sets the state attribute of its MBMS Bearer Context to ëActiveí and responds with an MBMS Session Start Response message providing the TEID for bearer plane that the GGSN shall use for forwarding the MBMS data.

3. The SGSN sends an MBMS Session Start Request message including the session attributes to each BSC/RNC that is connected to this SGSN. The SGSN may include ~~a list of RAs which lists each RA that contains at least one PMM-IDLE UE that has activated the MBMS bearer service~~the number of PMM-IDLE UEs that have joined the MBMS bearer service in each RA. ~~This list may be empty.~~ The BSC/RNC responds with an MBMS Session Start Response to the SGSN. If the BSC/RNC serves the MBMS Service Area it stores the session attributes in the MBMS Service Context, sets the state attribute of its MBMS Service Context to ëActiveí and responds with an MBMS Session Start Response message and the RNC includes the TEID in the MBMS Session Start Response message for the Iu bearer plane that the SGSN shall use for forwarding the MBMS data. An RNC receiving multiple MBMS Session Start Request messages includes Iu bearer plane parameters only into one MBMS Session Start Response message to establish only one Iu bearer plane to one SGSN.

3GPP TSG-SA WG2 Meeting #43
Seoul, Korea, 15-19 November 2004

Tdoc* ⌘*S2-043867
Revised S2-043802, S2-043511

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.246** **CR** **126** ⌘ **rev** **2** ⌘ 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 **X**

Title:	⌘	Separate MBMS Sessions for 2G and 3G for same MBMS Bearer Service
Source:	⌘	Huawei, China Mobile
Work item code:	⌘	MBMS
Date:	⌘	19/11/2004
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:	⌘	In SA2#41 the issue with separate rendering for 2G & 3G content for the same service was discussed and approved (S2-042924). In this way, the 2G and 3G content should transfer in separate MBMS Bearer services for 2G or 3G coverage. Consequently, UEs interested in the MBMS User service should join two multicast MBMS bearer services (one is for 2G coverage and the other is for 3G coverage). For some non-real time services, such as magazine download, weather forecast etc, the 2G and 3G content can be sent by separate MBMS Sessions sequentially using the same MBMS bearer service. In this way, the results are same and the effort is small.
Summary of change:	⌘	The title of 5.1.5 was changed to be more general. Two subclauses were added to 5.1.5: one with the prior information in the existing 5.1.5 and the second with the clarification that the 2G and 3G content can be sent in separate MBMS Sessions using one MBMS Bearer sequentially.
Consequences if not approved:	⌘	Separate MBMS Bearer services for 2G & 3G content for the same MBMS service may be inefficient in many cases.

Clauses affected:	⌘	5.1.5

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

Other comments: ⌘

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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 Change **********

5.1.5 ~~Separate~~ MBMS ~~Bearer Services~~Content Transfer for 2G and 3G for the same MBMS User Service

5.1.5.1 General

Although these procedures mention 2G and 3G extensively, only the BM-SC (which renders the content differently) and the SGSN have to implement functionality to deliver this. The GGSN, RNC and BSC shall all be transparent to this functionality.

5.1.5.2 Separate MBMS Bearer Services for 2G and 3G for the same MBMS User Service

The same MBMS user service may transfer its data on separate MBMS bearer services for 2G or 3G coverage, typically with different QoS. For this purpose two IP multicast addresses and the associated two TMGIs should be allocated for the same MBMS user service. One pair of IP multicast address and TMGI is for 2G coverage and another pair of IP multicast address and TMGI is for 3G coverage. The detailed impacts on the network nodes are listed below:

a) The service announcement instructs the UE to join two multicast MBMS bearer services (one is for 2G coverage and the other is for 3G coverage), i.e. two IP multicast addresses allocated in BM-SC will be sent to UE within one service announcement message.

b) A UE that might move between 3G coverage areas and 2G coverage areas activates both MBMS bearer services.

c) The UE monitors the paging/notification channels for both TMGIs and receives MBMS data when transferred by the MBMS bearer services.

d) When the BM-SC needs to deliver the content, the BM-SC produces two sets of MBMS data from the same content and sends independent Session Start messages for both of the MBMS bearer services. The "different" 2G and 3G content streams for the same MBMS user service are sent on the different IP multicast address associated with 2G and 3G TMGIs. A 2G/3G indicator in the Session Start message (which the GGSN passes transparently to the SGSN) indicates whether the content should be delivered in 2G-only or 3G-only (or both) coverage areas.

e) The SGSN uses the 2G/3G indicator to decide whether a MBMS Session Start Request message should be sent to the BSCs and/or the RNCs.

~~Although this procedure mentions 2G and 3G extensively, only the BM-SC (which renders the content differently) and the SGSN have to implement functionality to deliver this. The GGSN, RNC and BSC shall all be transparent to this functionality.~~

5.1.5.3 Same MBMS Bearer Service for 2G and 3G for the same MBMS User Service

The same MBMS user service may also transfer its data on the same MBMS bearer service for both 2G and 3G coverage. For this purpose one IP multicast addresses and the associated TMGI should be allocated for the same MBMS user service. In such application, the "different" 2G and 3G content for the same MBMS user service are sent in separate MBMS Sessions sequentially. The 2G/3G indicator in the Session Start message indicates whether the MBMS session should be delivered in 2G-only or 3G-only (or both) coverage areas. The SGSN uses the 2G/3G indicator to decide whether a MBMS Session Start Request message should be sent to the BSCs and/or the RNCs.

3GPP TSG-SA2 Meeting #43
Seoul, Korea, 15th-19th November 2004

Tdoc S2-043868
revision on S2-043805

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.246** **CR** **129** ⌘ **rev** **3** ⌘ 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:	⌘	MBMS UE context synchronisation
Source:	⌘	Siemens
Work item code:	⌘	MBMS
Date:	⌘	18/11/2004
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)*
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Detailed explanations of the above categories can be found in 3GPP TR 21.900.

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R98 *(Release 1998)*
R99 *(Release 1999)*
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Rel-6 *(Release 6)*
Rel-7 *(Release 7)*

Reason for change:	⌘	When an MBMS service is completely deactivated, i.e. deleted in the network, the UEs are not informed immediately because of the high signalling traffic. In this situation the related MBMS UE contexts are deleted in all network nodes but remain in the UEs. Furthermore error cases may result in similar situation, for example an SGSN reset may delete MBMS UE contexts in the SGSN, which are still active in the UEs. An MBMS UE context synchronisation procedure is proposed to exchange the MBMS UE status between UE and SGSN comparable to the PDP context status indication in the Routing Area Update procedure.
Summary of change:	⌘	Indication of the MBMS UE context status in the Routing Area Update procedure.
Consequences if not approved:	⌘	No mechanism for verifying MBMS UE context status between UE and network.

Clauses affected:	⌘	8.9			
Other specs affected:	⌘	**Y**	**N**		
		X		Other core specifications	⌘ TS 24.008, care is needed when stage 3 is designed to minimise number and size of signalling messages
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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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.

8.9 ~~Void~~MBMS UE Context Synchronisation Procedure

The Routing Area Update procedure transfers the MBMS UE Context status between UE and SGSN. This MBMS UE Context status identifies MBMS UE contexts, which are lost or deactivated only on one side. All MBMS UE Contexts, which are active on one side only should be deactivated locally. The UE may activate the related MBMS bearer service again. An SGSN that supports MBMS indicates that support to the UE during Routing Area Update and GPRS Attach procedures.

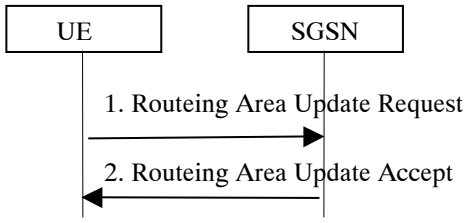

Figure x. MBMS UE Context Synchronisation procedure

1) The UE sends Routeing Area Update Request to the SGSN. It includes the MBMS UE Context status, which indicates the UEís active MBMS UE Contexts.

2) The SGSN sends Routeing Area Update Accept to the UE. It includes the MBMS UE Context status, which indicates the UEís MBMS UE Contexts that are stored in the SGSN. And, the SGSN indicates MBMS support to the UE.

3GPP TSG-SA2 Meeting #43
Seoul, Korea, November 15-19, 2004

Tdoc ⌘S2-043869
rev of S2-043665

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CHANGE REQUEST

⌘ **23.246** **CR** **110** ⌘**rev** **3** ⌘ 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 [X] Radio Access Network [X] Core Network [X]

Title:	⌘	MBMS Architecture Modification ñ CBC (cell broadcast centre) Part
Source:	⌘	Vodafone
Work item code:	⌘	MBMS
Date:	⌘	19/11/2004
Category:	⌘	**F**
Release:	⌘	Rel-6

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

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R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*
Rel-7 *(Release 7)*

Reason for change:	⌘	a) The use of Cell Broadcast is currently FFS in the stage 2. This FFS should be resolved. b) CBC shall be able to be used as part of service announcement, but does not perform any other function related to the MBMS bearer service;
Summary of change:	⌘	In the section 4.2, figure 1 is changed to only indicate nodes involved in the MBMS bearer service. A note is added to clarify this, and the CBC and its dotted lines are removed; In 4.4.1.2, some clarifications are made. In the section 5.7, the title is changed into Other Functional Elements. In section 5.7 the text changes mean that the FFS that was applied to section 5.7.2 is removed,but, the FFS applicable to OSA remains.
Consequences if not approved:	⌘	One mechanism for service announcement is forbidden and/or ambiguous.

Clauses affected:	⌘	4.2; 4.4.1.2; 5.7; 5.7.3

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

Other comments: ⌘

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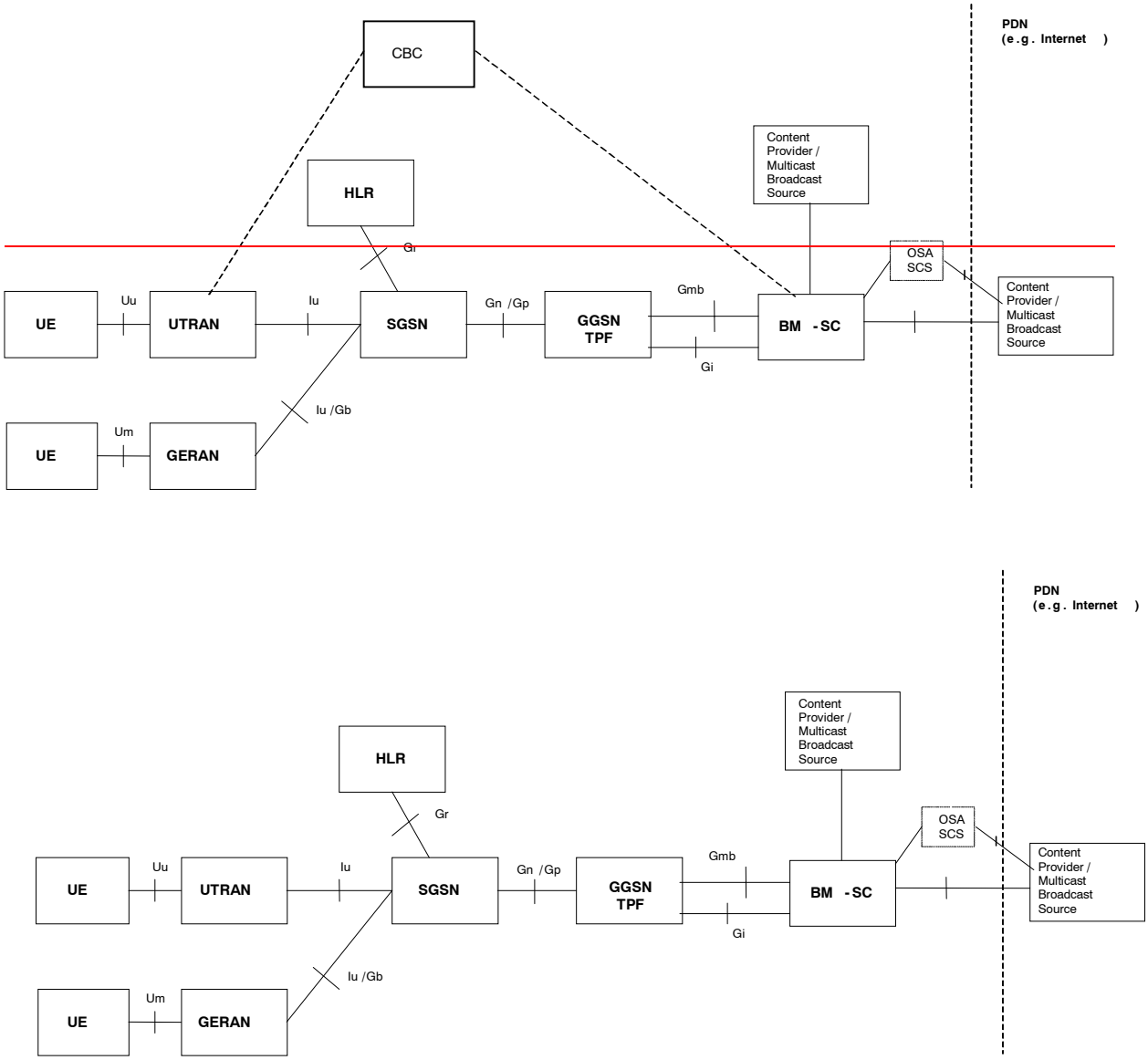
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

========= First Change ==========

4.2 Reference Architecture Model



Note 1: network entities and reference points solely used by the MBMS user service (e.g. for service announcement as described in section 4.4.1.2) are not shown in this figure.~~dotted lines means functions / reference points that are FFS.~~

Note 2: Gp applies only when SGSN and GGSN are in different PLMNs.

Figure 1: Reference architecture to support the MBMS bearer service

========= Second Change ==========

4.4.1.2 Service announcement

MBMS user service announcement/discovery mechanisms shall allow users to request or be informed about the range of MBMS user services available. This includes operator specific MBMS user services as well as services from content

providers outside of the PLMN. Service announcement is used to distribute to users information about the service, parameters required for service activation (e.g. IP multicast address) and possibly other service related parameters (e.g. service start time).

Operators/service providers may consider several service discovery mechanisms. This could include standard mechanisms such as SMS, or depending on the capability of the terminal, applications that encourage user interrogation. The method chosen to inform users about MBMS user services may have to account for the user' s location, (e.g. current cell, in the HPLMN or VPLMN). Users who have not already subscribed to a MBMS user service should also be able to discover MBMS user services.

The following could be considered useful for MBMS user service announcement mechanisms (not exhaustive): -

- ~~CBS~~ SMS Cell Broadcast to advertise MBMS Multicast and Broadcast user services
- MBMS Broadcast mode to advertise MBMS Multicast and Broadcast user Services
- MBMS Multicast mode to advertise MBMS Multicast user Services
- PUSH mechanism (WAP, SMS-PP, MMS)
- URL (HTTP, FTP)

The details of the MBMS service announcement mechanisms are ~~not specified~~out of scope of this specification, but MBMS shall allow the utilisation of solutions using IETF protocols.

Service announcement is further defined within MBMS User Service specifications 3GPP TS 26.346 [7].

========== Third Change ==========

~~5.7 Optional Functional Element~~

~~NOTE: The following are FFS.~~

5.7 Other Functional Element

5.7.1 Void

5.7.2 CBC

The Cell Broadcast Centre (CBC) may be used to announce MBMS user services to the users.

5.7.3 OSA-SCS

The BM-SC might use OSA-SCS to interact with third parties which is FFS.

3GPP TSG-SA2 Meeting #43
Seoul, Korea, 15th-19th November 2004

Tdoc S2-043911
Combined S2-043838, S2-043804

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.246** **CR** **072** ⌘ **rev** **7** ⌘ 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 [X] Core Network [X]

Title:	⌘	MBMS Broadcast Session Stop Procedure
Source:	⌘	Huawei, China Mobile, ZTE Corporation
Work item code:	⌘	MBMS
Date:	⌘	01/12/2004
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)*
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R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*
Rel-7 *(Release 7)*

Reason for change: ⌘

The MBMS session start procedure is clarified to serve multicast and broadcast bearer MBMS services. This removes ambiguities between the common and the broadcast session start procedures in TS 23.246. And it enables a common session stop procedure.

The MBMS Session Stop Procedure specified in section 8.5 of TS 23.246 is not complete for Broadcast Sessions. The Session Stop Procedure also release the MBMS Bearer Contexts in GGSN, SGSN and BSC/RNC which were created for the Broadcast Session in session start procedure.

The sending of the session start response message by BSC/RNC is described twice in step 3 of the session start procedure.

The introduction to the session stop procedure does not include Gb bearer release.

Also, in the section 5.1.1 of TS 25.346, it has mentioned that the MBMS Service Context contains a list of PMM-CONNECTED UEs which are present in one or several cells of the CRNC and which have activated an MBMS service. This list includes at least the U-RNTI of the UEs.

Summary of change: ⌘

The "list of downstream nodes" which is used in GGSN is sent from the BM-SC to the GGSN in Session Start Request for Broadcast services.

Also, align session start and stop procedures to generic procedures for broadcast and multicast.

		Finally, insertion of a new item, i.e. List of PMM-CONNECTED UEs, into the Table 2 of Section 6.2.
Consequences if not approved:	⌘	Ambiguities in session start and stop procedures. No alignment exists between TS 23.246 and TS 25.346 for the definition of MBMS Service Context.

Clauses affected:	⌘	6.2, 8.3, 8.5, 8.14			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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********** First Change **********

6.2 MBMS Bearer Context

The MBMS Bearer Context, which is referred to as MBMS Service Context in RAN, contains all information describing a particular MBMS bearer service and is created in each node involved in the delivery of the MBMS data.

An MBMS Bearer Context is created in the SGSN and GGSN when the first MBMS UE Context is created in the node or when a downstream node requests it. The MBMS Bearer Context is statically configured in the BM-SC; how this is done is out of the scope of this specification. The MBMS Bearer Context is created in the Iu mode BSC and in SRNC when a first MBMS UE Context is created in BSC/SRNC. Session Start procedure may create MBMS Bearer Context in a BSC/RNC which has no MBMS Bearer Context yet.

An MBMS Bearer Context, once created, can be in one of two states reflecting the bearer plane resource status of the corresponding MBMS bearer service.

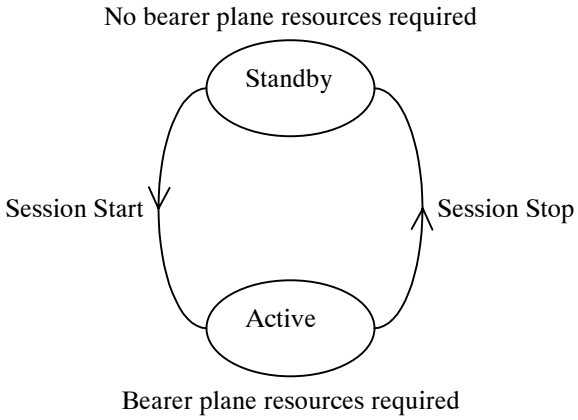

Figure 6: MBMS Bearer Context State Model

'Active' reflects the state of an MBMS Bearer Context in which bearer plane resources are required in the network for the transfer of MBMS data. This state is maintained as long as there is a corresponding MBMS session ongoing.

'Standby' reflects the state of an MBMS Bearer Context in which no bearer plane resources are required in the network for the transfer of MBMS data. This state is maintained as long as there is no corresponding MBMS session ongoing.

The content of the MBMS Bearer Context is described in Table 2.

Table 2: MBMS Bearer Context

Parameter	Description	RAN	SGSN	GGSN	BM-SC
Multicast/broadcast mode	MBMS bearer service in broadcast or multicast mode	X	X	X	X
IP multicast address (multicast mode only)	IP multicast address identifying the MBMS bearer described by this MBMS Bearer Context.	X	X	X	X
APN (multicast mode only)	Access Point Name on which this IP multicast address is defined.	X	X	X	X
TMGI	Temporary Mobile Group Identity allocated to the MBMS bearer service.	X	X	X	X
State	State of bearer plane resources (ëstandbyí or ëactiveí)	X	X	X	X
Required MBMS Bearer Capabilities (multicast mode only)	Minimum bearer capabilities the UE needs to support		X	X	X
QoS	Quality of Service required for the MBMS bearer service.	X	X	X	X
MBMS Service Area	Area over which the MBMS bearer service has to be distributed.	X	X	X	X
List of downstream nodes	List of downstream nodes that have requested the MBMS bearer service and to which notifications and MBMS data have to be forwarded.		X	X	X
Number of UEs (multicast mode only)	Number of UEs hosted by the node that have joined the multicast MBMS bearer service.		X	X	
List of PMM-CONNECTED UEs	List of PMM-CONNECTED UEs which have activated an MBMS service.	X[2)]			
List of number of PMM-IDLE UEs per RA (multicast mode only)	List of number of PMM-IDLE UEs for each RA, which contains at least one UE that has joined the MBMS service.		X[1)]		
List of RAs (multicast mode only)	List of RAs, each of which contains at least one UE that has joined the MBMS service.	X[1)]			

Note 1: It is an optional parameter. The SGSN may include a list of RAs which lists each RA that contains at least one PMM-IDLE UE that has activated the MBMS bearer service. This list may be empty.

Note 2: It is available only for UTRAN, not for GERAN.

********** Second Change **********

8.3 MBMS Session Start Procedure

The BM-SC initiates the MBMS Session Start procedure when it is ready to send data. This is a request to activate all necessary bearer resources in the network for the transfer of MBMS data and to notify interested UEs of the imminent start of the transmission.

Through this procedure, MBMS session attributes such as QoS, MBMS service Area, estimated session duration if available are provided to the GGSN(s) and SGSN(s) that have previously registered for the corresponding MBMS bearer service and to all BSCs/RNCs that are connected to a registered SGSN. In addition the procedure allocates the bearer plane to all registered GGSNs and all registered SGSNs and to BSCs/RNCs that respond to the session start accordingly.

For multicast MBMS bearer services the registration of SGSNs and GGSNs is initiated by MBMS multicast Service Activation procedures, Inter SGSN Routeing Area Update procedures, Inter SGSN Serving RNS Relocation procedure and performed by MBMS Registration procedures.

For broadcast MBMS bearer services the list of downstream nodes of BM-SC and GGSN are achieved in the following ways:

– The list of downstream nodes for GGSN will be sent from the BM-SC to the GGSN in the Session Start Request.

– Normally, the GGSN contained in the "list of downstream nodes" for BM-SC is the default GGSN (or two for resilience).

The overall Session Start procedure is presented in the following figure:

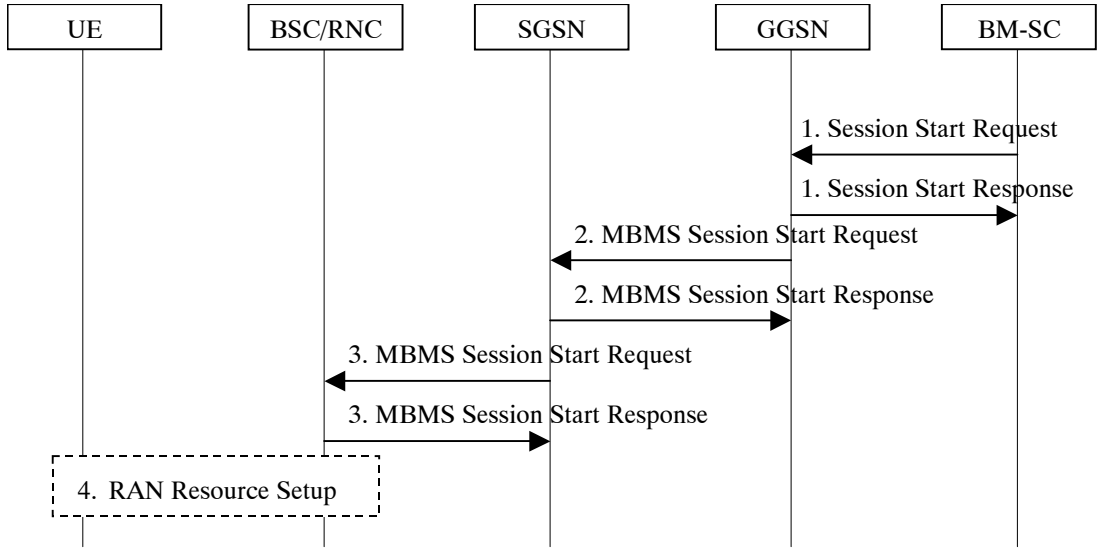

Figure 8 Session Start procedure

1. The BM-SC sends a Session Start Request message to indicate the impending start of the transmission and to provide the session attributes (TMGI, QoS, MBMS service Area, Session identifier, estimated session duration, broadcast/multicast, list of downstream nodes for GGSN (Broadcast only) Ö) and the 2G/3G indicator to the GGSNs listed in the ì list of downstream nodesî parameter of the corresponding MBMS Bearer Context. The BM-SC sets the state attribute of its MBMS Bearer Context to ëActiveí. For a broadcast MBMS bearer service the GGSN creates an MBMS bearer context. The GGSN stores the session attributes and the list of downstream nodes in the MBMS Bearer Context, sets the state attribute of its MBMS Bearer Context to ëActiveí and sends a Session Start Response message to the BM-SC.

2. The GGSN sends an MBMS Session Start Request message containing the session attributes (TMGI, QoS, MBMS service Area, Session identifier, estimated session duration, broadcast/multicast, Ö) and the 2G/3G indicator to the SGSNs listed in the ì list of downstream nodesî parameter of the corresponding MBMS Bearer Context. For a broadcast MBMS bearer service the SGSN creates an MBMS bearer context. The SGSN stores the session attributes and the 2G/3G indicator in the MBMS Bearer Context, sets the state attribute of its MBMS Bearer Context to ëActiveí and responds with an MBMS Session Start Response message providing the TEID for bearer plane that the GGSN shall use for forwarding the MBMS data. For MBMS bearer service a SGSN receiving multiple MBMS Session Start Request messages establishes only one bearer plane with one GGSN.

3. The SGSN sends an MBMS Session Start Request message including the session attributes (TMGI, QoS, MBMS service Area, Session identifier, estimated session duration, broadcast/multicast, Ö) to each BSC and/or each RNC that is connected to this SGSN. The 2G/3G indicator shall be used by the SGSN to determine whether the MBMS Session Start Request message is sent only to BSCs, or only to RNCs, or to both RNCs and BSCs. ~~T~~For a multicast MBMS bearer service the SGSN may include a list of RAs which lists each RA that contains at least one PMM-IDLE UE that has activated the MBMS bearer service. This list may be empty. ~~The BSC/RNC responds with an MBMS Session Start Response to the SGSN.~~ For a broadcast MBMS bearer service the BSC/RNC creates an MBMS Service Context. The BSC in Iu mode/RNC stores the session attributes in the MBMS Service Context, sets the state attribute of its MBMS Service Context to ëActiveí and responds with an MBMS Session Start Response message and the RNC includes the TEID in the MBMS Session Start Response message for the Iu bearer plane that the SGSN shall use for forwarding the MBMS data. A BSC in Gb mode which does not serve the MBMS Service Area may decide not to store the session attributes and not to set the state of its MBMS Service Context to ëActiveí. A BSC/RNC receiving multiple MBMS Session Start Request messages establishes only one bearer plane with one SGSN.

4. The BSC/RNC establishes the necessary radio resources for the transfer of MBMS data to the interested UEs.

Note: The upstream node normally provides the MBMS Session Start Request message once per MBMS session to a downstream node. Due to ì Intra Domain Connection of RAN Nodes to Multiple Core Network Nodesî however, a BSC/RNC may receive the MBMS Session Start Request message from several SGSNs.

********** Third Change **********

8.5 MBMS Session Stop Procedure

The BM-SC initiates the MBMS Session Stop procedure when it considers the MBMS session to be terminated. The session is typically terminated when there is no more MBMS data expected to be transmitted for a sufficiently long period of time to justify a release of bearer plane resources in the network. The procedure is propagated to all SGSNs and GGSNs that are registered for the corresponding MBMS bearer service and to BSCs/RNCs that have an established Iu bearer plane with an SGSN.

The overall MBMS Session Stop procedure is presented in the following figure:

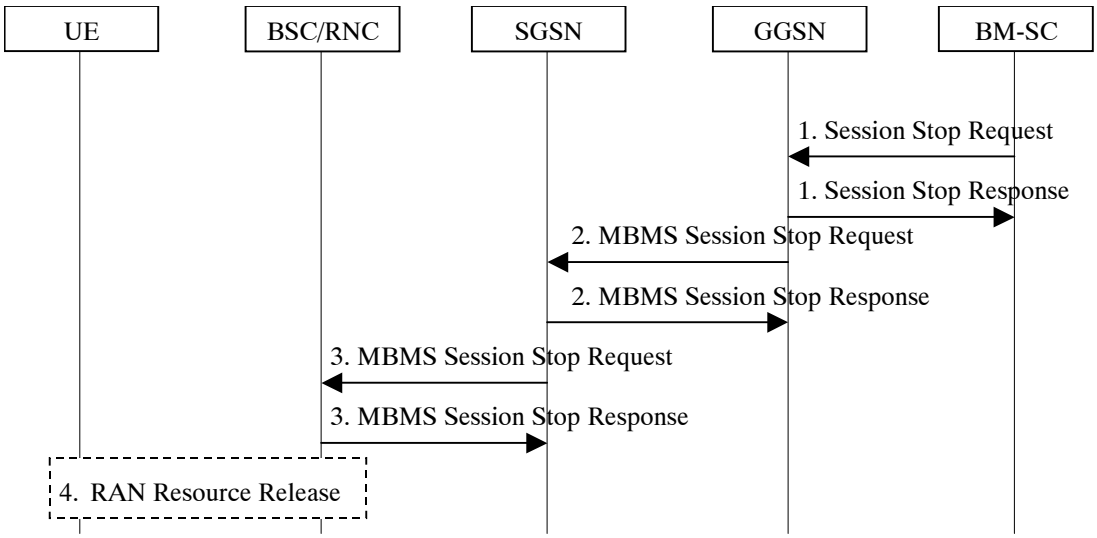

Figure 10: MBMS Session Stop procedure

1. The BM-SC sends a Session Stop Request message to all GGSNs listed in the ì list of downstream nodesî parameter of the affected MBMS Bearer Context to indicate that the MBMS session is terminated and the bearer plane resources can be released. The BM-SC sets the state attribute of its MBMS Bearer Context to ëStandbyí.

2. The GGSN sends an MBMS Session Stop Request message to all SGSNs that have a bearer plane established with the GGSN~~listed in the ì list of downstream nodesî parameter of the affected MBMS Bearer Context~~, releases the corresponding bearer plane resources towards these SGSNs and sets the state attribute of its MBMS Bearer Context to ëStandbyí. The GGSN releases the MBMS Bearer Context in case of a broadcast MBMS bearer service.

3. The SGSN releases the TEID and bearer plane resources on which it was receiving MBMS data from the GGSN for the affected MBMS bearer service and sends an MBMS Session Stop Request message to all BSCs/RNCs that have a bearer plane established with the SGSN. The SGSN releases the MBMS Bearer Context in case of a broadcast MBMS bearer service.

4. The RNC releases the affected radio and Iu resources; the BSC releases the affected radio resources. The BSC/RNC releases the MBMS Service Context in case of a broadcast MBMS bearer service.

********** Fourth Change **********

8.14 voidMBMS Broadcast Session Start Procedure

The BM-SC initiates the MBMS Session Start procedure when it is ready to send data. This is a request to activate all necessary bearer resources in the network for the transfer of MBMS data. It is also used to notify interested UEs of the start of the transmission.

Through this procedure, MBMS session attributes such as TMGI, QoS, MBMS service Area , estimated session duration if available are provided to all the GGSN(s), SGSN(s) and BSCs/RNCs. In addition the procedure allocates the bearer plane to all GGSNs and all SGSNs and to BSCs/RNCs that respond to the MBMS session start accordingly.

The overall MBMS Broadcast Session Start procedure is presented in the following figure:

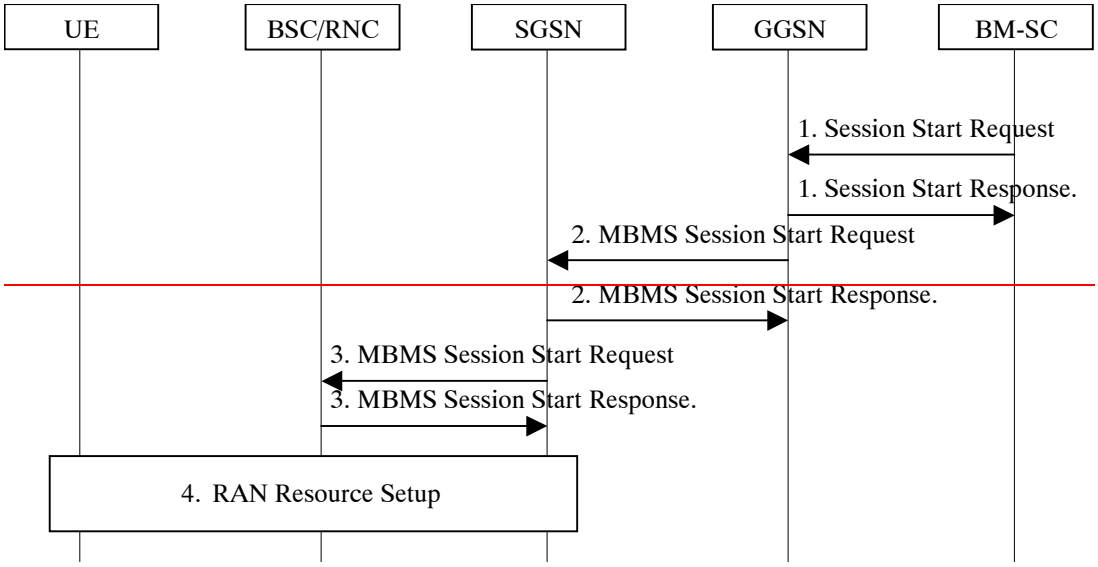

Figure 16 Session Start procedure for Broadcast MBMS Bearer Service

1) The BM-SC sends a Session Start Request message the impending start of the transmission and to provide the MBMS session attributes (TMGI, QoS, MBMS service Area, estimated session duration Ö) to a GGSN of the PLMN. The BM-SC sets the state attribute of its MBMS Bearer Context to ëActiveí. The GGSN creates a MBMS Bearer Context, stores the session attributes, sets the state attribute of this MBMS Bearer Context to ëActiveí and sends a Session Start Response message to the BM-SC.

2) The GGSN sends an MBMS Session Start Request message to all its SGSNs. The SGSN creates a MBMS Bearer Context, stores the session attributes, sets the state attribute of this MBMS Bearer Context to ëActiveí and responds with an MBMS Session Start Response message providing the TEID for bearer plane that the GGSN shall use for forwarding the MBMS data.

3) The SGSN sends an MBMS Session Start Request message including the session attributes to each BSC/RNC that is connected to this SGSN. The BSC/RNC responds with an MBMS Session Start Response message to the SGSN. If the BSC/RNC serves the MBMS service Area, it creates a MBMS Bearer Context, stores the session attributes in this MBMS Service Context, sets the state attribute of its MBMS Service Context to ëActiveí and responds with an MBMS Session Start Response message, and the Iu mode BSC/RNC includes the TEID in the MBMS Session Start Response message for the Iu bearer plane that the SGSN shall use for forwarding the MBMS data. A BSC/RNC receiving multiple MBMS Session Start Request messages from different SGSNs establishes only one bearer plane with one SGSN.

4) The BSC/RNC establishes the necessary radio resources for the transfer of MBMS data to the interested UEs.

Note: The upstream node normally provides the MBMS Session Start Request message once per MBMS session to a downstream node. Due to ìIntra Domain Connection of RAN Nodes to Multiple Core Network Nodesî however, a BSC/RNC may receive the MBMS Session Start Request message from several SGSNs.

********** End **********

3GPP TSG-SA WG2 Meeting #43 ***Tdoc ⌘ S2-043913***

Seoul, Korea, 15th - 19th November 2004. **Combined S2-043798, S2-043865**

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.246** **CR** **135** ⌘ **rev** **2** ⌘ 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 [X] Core Network [X]

Title:	⌘	Clarification of MBMS UE Linking handling
Source:	⌘	Vodafone, ZTE Corporation
Work item code:	⌘	MBMS
Date:	⌘	02/12/2004
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 existing specification is unclear on the handling of UE linking. It lacks key information needed to link an MBMS UE context associated with a particular MBMS service to an MBMS bearer context.

Use of generally defined MBMS terms such as MBMS Service Context, MBMS session Start procedure, MBMS UE Context and MBMS Session Start message.

Summary of change: ⌘ Clarification on the mechanism for UE linking to be based on TMGI + other parameters between MBMS UE contexts and MBMS bearer contexts.

Clarifies that the UE linking procedure applies only to Iu mode RAN (i.e. RNC and Iu mode BSC).

Also general editorial updates to the section

1. Use of term ìMBMS UE Contextî instead of ìMBMS Contextî in Section 6.1.
2. Use of term ìMBMS Session Start procedureî instead of ìSession Start procedureî in Section 6.2.
3. Use of term ìMBMS Multicast Service Activation procedureî instead of ìservice activation procedureî
4. Use of term ìMBMS UE Contextî instead of ìMBMS Contextî in Section 8.2.
5. Use of term ìMBMS Session Start messageî instead of ìSession Startî in Section 8.8.
6. Use of term ìMBMS bearer serviceî and ìMBMS Service Request procedureî in Section 8.15.

Consequences if not approved:	⌘	Handling of UE linking may be ambiguous No use of generally defined terms in the MBMS core specifications.

Clauses affected:	⌘	6.1, 6.2, 6.4, 8.2, 8.8, 8.15			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘	This is a merger of CR#135r1 and CR#128r2			

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

6.1 MBMS UE Context

The MBMS UE Context contains UE-specific information related to a particular MBMS bearer service that the UE has joined. An MBMS UE Context is created in the UE, SGSN,GGSN and BM-SC when the UE joins an MBMS bearer service. In the SGSN, an MBMS UE Context is also created as a result of an inter-SGSN routing area update after the transfer of the MBMS UE Context from the old SGSN.

In Iu mode, all MBMS UE Contexts of a UE are provided via MBMS UE Linking mechanism to the BSC/SRNC at least when the first PS RAB is established for the UE, or when the UE performs MBMS Multicast Service Activation. MBMS UE Contexts are provided to the Iu mode BSC/SRNC regardless whether MBMS Sessions are ongoing or not (i.e. before, between and after Sessions). In addition, all MBMS UE Contexts of a UE are provided via MBMS UE Linking mechanism when a UE, which has an MBMS UE C~~c~~ontext active, moves to PMM-Connected state via the MBMS Service Request procedure for the purpose of MBMS.

6.2 MBMS Bearer Context

The MBMS Bearer Context, which is referred to as MBMS Service Context in RAN, contains all information describing a particular MBMS bearer service and is created in each node involved in the delivery of the MBMS data.

An MBMS Bearer Context is created in the SGSN and GGSN when the first MBMS UE Context is created in the node or when a downstream node requests it. The MBMS Bearer Context is statically configured in the BM-SC; how this is done is out of the scope of this specification. The MBMS Bearer Context is created in the Iu mode BSC and in SRNC when a first MBMS UE Context is created in BSC/SRNC. MBMS Session Start procedure may create MBMS Bearer Context in a BSC/RNC which has no MBMS Bearer Context yet.

6.4 Temporary Mobile Group Identity

Temporary Mobile Group Identity (TMGI) is used for MBMS notification purpose. The BM-SC allocates a globally unique TMGI per MBMS bearer service. The TMGI contains two parts: Globally unique MCC/MNC (PLMN ID) and a local MBMS bearer service identity that is unique within the PLMN. For Multicast MBMS bearer services the TMGI will be transmitted to UE via the MBMS Multicast ~~s~~Service ~~a~~Activation procedure. For Broadcast Service the TMGI can be obtained via service announcement see ì Service Announcementî.

The TMGI is a radio resource efficient MBMS bearer service identification, which is equivalent to the MBMS bearer service identification consisting of IP multicast address and APN.

8.2 MBMS Multicast Service Activation

The MBMS multicast service activation procedure registers the user in the network to enable the reception of data from a specific multicast MBMS bearer service. The activation is a signalling procedure between the UE and the network. The procedure establishes MBMS UE contexts in UE, SGSN and GGSN and Iu mode BSC/RNC for each activated multicast MBMS bearer service comparable to regular PDP contexts.

<omitted parts>

5. The SGSN sends a Request MBMS Context Activation (IP multicast address, APN, Linked NSAPI, TI) to the UE to request it to activate an MBMS UE C~~c~~ontext. Linked NSAPI allows the UE to associate the MBMS UE Context with the PDP context over which it sent the IGMP/MLD Join message in step 2. TI was chosen by the SGSN and contains a value not used by any other activated PDP context and MBMS UE context for this UE.

8.8 MBMS Session Update procedure

If the SGSN has provided a list of RAs in the MBMS Session Start Request message (even if the list was empty) and RAs are added or removed from the list, the SGSN uses the MBMS Session Update procedure to inform the RNCs that the list has changed. The SGSN sends the Session Update message only to the RNCs that are affected by the list change. The procedure is used only during the session and when SGSN has already sent a MBMS Session Start Request message to the RNC.

The SGSN may send the Session Update to a RNC when:

- The first UE which have activated the service enters in a RA
- The last UE which have activated the service leaves from a RA

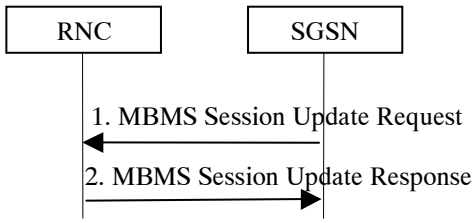

Figure 13a. Session Update procedure

1) The SGSN sends MBMS Session Update Request message to a RNC.
2) The RNC acknowledges the MBMS Session Update Request with the MBMS Session Update Response message.

8.15 MBMS UE Linking mechanism

UE Linking is the process by which UE MBMS context(s) is (are) provided to an Iu-mode RAN.

MBMS UE linking procedure is performed when the UE is PMM-CONNECTED at least in the following cases.

- When a UE which has an~~joined~~ MBMS UE context is moved to the PMM CONNECTED state and ~~sets up~~ a PS RAB is established. This may happen at any point in time e.g.~~i.e.~~ before, during and between Sessions.
- When a UE joins the MBMS bearer service and is in the PMM CONNECTED state due to an existing PS RAB. This may happen at any point in time e.g.~~i.e.~~ before, during and between Sessions.
- When a UE is moved to the PMM CONNECTED state ~~only for MBMS purpose~~ via the MBMS Service Request procedure. This may happen at any point in time during a MBMS session.

The UE linking is performed to link a specific UE to an MBMS service. It provides the SRNC/Iu-mode BSC with ~~the~~a list of MBMS ~~S~~service ~~I~~identifiers (including TMGI) for MBMS bearer services activated by the UE ~~to the SRNC~~. If no MBMS service context exists for this particular ~~related to the~~ MBMS bearer service ~~Id exists~~ then the SRNC/Iu-mode BSC creates an MBMS service context after this procedure.

Note: the MBMS Bearer Context is referred to as the MBMS Service Context in 3GPP RAN specifications

3GPP TSG-SA WG2 Meeting #42
Sofia Antipolis, France, 11th - 15th Oct 2004

Tdoc ⌘S2-043918

CR-Form-v7

CHANGE REQUEST

⌘ **23.246** **CR** **096** ⌘ **rev** **5** ⌘ 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 **X**

Title:	⌘ Clarification of BM-SC functions		
Source:	⌘ Ericsson, **3**		
Work item code:	⌘ MBMS	***Date:*** ⌘	16/11/2004
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:* *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: ⌘	The MBMS Architecture and functional description TS 23.246 should provide the architecture of the MBMS bearer service. The document should also include considerations on how the MBMS user services should make use of the MBMS bearer service. That is, the document should facilitate other specific MBMS architectures (e.g. application functions and security architecture) to be integrated smoothly with the bearer service. The goal should be that the MBMS specifications together are as coordinated and homogenous as possible. This CR proposes some enhancements to TS 23.246 that has been identified necessary to facilitate that goal. More specifically the specification of the BM-SC needs to be clarified and the more user service oriented parts (SA4) highlighted.
Summary of change: ⌘	The BM-SC in the current TS 23.246 specification, consists of mixed set of heterogenous functions. Those functions need a better structuring to provide the needful enhancement to the overall MBMS architecture. Subclause 5.1 has been restructured. It now specifies four different BM-SC sub-functions. Instead of introducing new functional entities into the MBMS architecture, this somewhat more cautions approach to keep the BM-SC and specify subfunctions inside the BM-SC has been used. This allows the term ìBM-SCî to still be used when necessary and minimizes the changes. The new subfunctions has then been introduced into the MBMS procedures in clause 8 and in clause 6.1 & 6.2.

Consequences if not approved:	⌘	Uncoordinated and fuzzy specification of the total MBMS function. This may in the end cause multi-vendor issues such as interworking problems between MBMS terminals and networks.

Clauses affected:	⌘	5.1, 6.1, 6.2, 8			
		Y	**N**		
Other specs affected:	⌘	**X**		Other core specifications	⌘ 33.246 [MBMS security], 26.346 [MBMS user service architect.]
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘	Other specs may not be directly affected by changes in this CR, but they can and should take advantage of new concepts introduced. A related 26.346 CR is submitted in S4-040497. (Only change from rev ìñî to rev ì1î of this CR is that a new supporting company has been added.) Rev 2 of this CR is identical to rev 1 except that it has been implemented on 23.246 V6.4.0 . It is re-submitted to SA2#42 since it was postponed at SA2#41. Rev 2 was agreed in principle at SA2#42 and is presented in SA2#43 for approval. Only changes in rev 3 compared to rev 2 is clarification in the header and an editorial change of figure 5a. Rev 3 was revised to Rev 4 at SA2#43 Rev 4 was revised to Rev 5 at SA#26 to ensure Cover page is correct			

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First Modification

5 Functional Entities To Support MBMS

To provide MBMS bearer services existing functional entities, GGSN, SGSN, RNC/BSC, perform several MBMS related functions and procedures, some of which are specific to MBMS. An MBMS specific functional entity ñ Broadcast Multicast Service Centre (BM-SC) supports various MBMS user service specific service provisioning and delivery.

5.1 Broadcast-Multicast Service Centre (BM-SC)

The BM-SC provides functions for MBMS user service provisioning and delivery. It may serve as an entry point for content provider MBMS transmissions, used to authorise and initiate MBMS Bearer Services within the PLMN and can be used to schedule and deliver MBMS transmissions.

The BM-SC is a functional entity, which must exist for each MBMS User Service.

The BM-SC consists of four sub-functions:

- Membership function
- Session and Transmission function
- Proxy and Transport function
- Service Announcement function

This section describes BM-SC functions, which are defined for the standardised MBMS User Services. ~~Which of these functions are provided as general purpose capabilities to be used by multiple MBMS User Services and which are specific to a particular MBMS User Service is defined in conjunction with the definition of the standardised MBMS User Services.~~

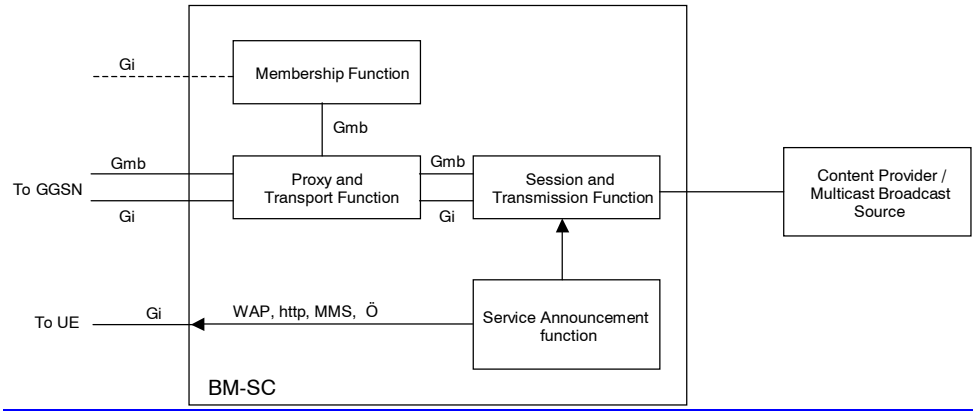

Figure 5a: BM-SC functional structure

5.1.1 Membership Function ~~Content Provider Charging~~

The BM-SC Membership function provides authorization for UEs requesting to activate an MBMS service.

The Membership function may have subscription data of MBMS service users.

The Membership Function may generate charging records for MBMS service users.

The Membership Function is an MBMS bearer service level function, but it may also provide user service level functions e.g. membership management, key management etc. In this case it does also have a Gi interface.

~~The BM-SC shall be able to generate charging records for content provider transmitted data.~~

5.1.2 Session and Transmission Function ~~MBMS Transport~~

The BM-SC Session and Transmission Function shall be able to schedule MBMS session transmissions.

The BM-SC Session and Transmission Function should be able to schedule MBMS session retransmissions, and label each MBMS session with an MBMS Session Identifier to allow the UE to distinguish the MBMS session retransmissions. The BM-SC Session and Transmission Function allocates TMGIs.

Each transmission and subsequent retransmission(s) of a specific MBMS session are identifiable by a common MBMS Session Identifier (2-3 Octets) passed at the application layer in the content, and also passed in a shortened form (i.e. the least significant octet) in the MBMS Session Start Request message to the RNCs/BSCs. The full MBMS Session Identifier should be used by the UE to identify an MBMS session when completing point-to-point repair, while the shortened MBMS Session Identifier is included by the RANs in the notification messages for MBMS

The BM-SC Session and Transmission Function shall be able to provide the GGSN with transport associated parameters such as quality-of-service and MBMS service area.

The BM-SC Session and Transmission Function shall be able to initiate and terminate MBMS bearer resources prior to and following transmission of MBMS data.

The BM-SC Session and Transmission Function should be able to send MBMS data. It could also apply favourable error resilient schemes e.g. specialized MBMS codecs or Forward Error Correction schemes.

The BM-SC Session and Transmission Function should be able to authenticate and authorize external sources and accept content from them.

The Session and Transmission Function is user service level function and it triggers bearer level functions when MBMS sessions are scheduled.

5.1.3 Proxy and Transport Function ~~MBMS Transmissions~~

The BM-SC Proxy and Transport Function is a Proxy Agent for signalling over Gmb reference point between GGSNs and other BM-SC sub-functions, e.g. the BM-SC Membership Function and the BM-SC Session and Transmission Function. Further, the BM-SC Proxy and Transport Function shall also be able to handle when BM-SC functions for different MBMS services are provided by multiple physical network elements. Routing of the different signalling interactions shall be transparent to the GGSN.

~~The BM-SC should be able to accept content from external sources and transmit it using error resilient schemes (e.g. specialized MBMS codecs).~~

The BM-SC Proxy and Transport function shall be able to generate charging records for content provider charging of transmitted data. Content provider name is provided to BM-SC Proxy and Transport function over Gmb at session start.

The BM-SC Proxy and Transport function may act as an intermediate device for the MBMS data sent from the BM-SC Session and Transmission function to the GGSN.

The Proxy and Transport Function may be divided further into a Proxy function managing the control plane (Gmb) and a Transport function managing the multicast payload.

The Proxy and Transport Function is an MBMS bearer service function.

~~Further, the BM-SC might be used to schedule MBMS session transmissions, retrieve content from external sources and provide this content using MBMS bearer services.~~

~~The BM-SC should be able to schedule MBMS session retransmissions, and label each MBMS session with an MBMS Session Identifier to allow the UE to distinguish the MBMS session retransmissions.~~

~~Each transmission and subsequent retransmission(s) of a specific MBMS session are identifiable by a common MBMS Session Identifier (2-3 Octets) passed at the application layer in the content, and also passed in a shortened form (i.e. the least significant octet) in the MBMS Session Start Request message to the RNCs/BSCs. The full MBMS Session Identifier should be used by the UE to identify an MBMS session when completing point-to-point repair, while the shortened MBMS Session Identifier is included by the RANs in the notification messages for MBMS.~~

5.1.4 Service ~~Advertisement~~Announcement Function ~~and Description~~

The BM-SC Service Announcement function shall be able to provide service announcements for multicast and broadcast MBMS user services.

The BM-SC Service Announcement function shall be able to provide the UE with media descriptions specifying the media to be delivered as part of an MBMS user service (e.g. type of video and audio encodings).

The BM-SC Service Announcement function shall be able to provide the UE with MBMS session descriptions specifying the MBMS sessions to be delivered as part of an MBMS user service (e.g. multicast service identification, addressing, time of transmission, etc.)

The BM-SC Service Announcement function shall be able to deliver media and session descriptions by means of service announcements using IETF specified protocols over MBMS multicast and broadcast bearer services.

The Service Announcement Function is a user service level function.

The following mechanisms should be supported for service announcement. Service announcements may be triggered by the BM-SC but arenít necessarily sent by the BM-SC:

- MBMS bearer capabilities to advertise MBMS user Services
- PUSH mechanism (WAP push)
- URL (WAP, HTTP)
- SMS (point-to-point)
- SMS-CB cell broadcast

Other mechanisms could be considered in future releases.

Next Modification

6 MBMS attributes and Parameters

6.1 MBMS UE Context

The MBMS UE Context contains UE-specific information related to a particular MBMS bearer service that the UE has joined. An MBMS UE Context is created in the UE, SGSN,GGSN and BM-SC Membership function when the UE joins an MBMS bearer service. In the SGSN, an MBMS UE Context is also created as a result of an inter-SGSN routing area update after the transfer of the MBMS UE Context from the old SGSN.

In Iu mode, all MBMS UE Contexts of a UE are provided via MBMS UE Linking mechanism to the BSC/SRNC at least when the first PS RAB is established for the UE, or when the UE performs MBMS Multicast Service Activation. MBMS UE Contexts are provided to the Iu mode BSC/SRNC regardless whether MBMS Sessions are ongoing or not

(i.e. before, between and after Sessions). In addition, all MBMS UE Contexts of a UE are provided via MBMS UE Linking mechanism when a UE, which has an MBMS context active, moves to PMM-Connected state via the MBMS Service Request procedure for the purpose of MBMS.

In the UE and SGSN, the MBMS UE Context is stored as part of the MM Context for the UE. The MBMS UE Context is stored in the GGSN. There is one MBMS UE Context per MBMS bearer service that the UE has joined.

In the Iu mode BSC/RNC, the MBMS UE Contexts are stored as part of the UE Context of the BSC/RNC.

The content of the MBMS UE Context is described in Table 1.

Table 1: MBMS UE Context

Parameter	Description	UE	SGSN	GGSN	RNC	BSC	BM-SC
IP multicast address	IP multicast address identifying an MBMS bearer that the UE has joined.	X	X	X	X	Iu - X Gb - none	X
APN	Access Point Name on which this IP multicast address is defined.	X	X	X	X	Iu - X Gb ñ none	X
TMGI	Temporary Mobile Group Identity allocated to the MBMS bearer.	X					
Linked NSAPI	NSAPI of the PDP context used by the UE to carry IGMP/MLD signalling.	X	X				
IMSI	IMSI identifying the user.	(1)	(1)	X	(2)	Iu ñ (2) Gb ñ (3)	X
TI	Transaction Identifier	X	X				
MBMS_NSAPI	Network layer Service Access Point Identifier which identifies an MBMS UE Context.	X	X	X			

(1) In the UE and SGSN, the IMSI is available within the MM Context which contains the MBMS UE Context

(2) The IMSI is available within the UE Context which contains the MBMS UE Context.

(3) IMSI availability does not depend on MBMS.

6.2 MBMS Bearer Context

The MBMS Bearer Context, which is referred to as MBMS Service Context in RAN, contains all information describing a particular MBMS bearer service and is created in each node involved in the delivery of the MBMS data.

An MBMS Bearer Context is created in the SGSN and GGSN when the first MBMS UE Context is created in the node or when a downstream node requests it. The MBMS Bearer Context is statically configured in the BM-SC Proxy and Transport Function;; how this is done is out of the scope of this specification. The MBMS Bearer Context is created in the Iu mode BSC and in SRNC when a first MBMS UE Context is created in BSC/SRNC. Session Start procedure may create MBMS Bearer Context in a BSC/RNC which has no MBMS Bearer Context yet.

An MBMS Bearer Context, once created, can be in one of two states reflecting the bearer plane resource status of the corresponding MBMS bearer service.

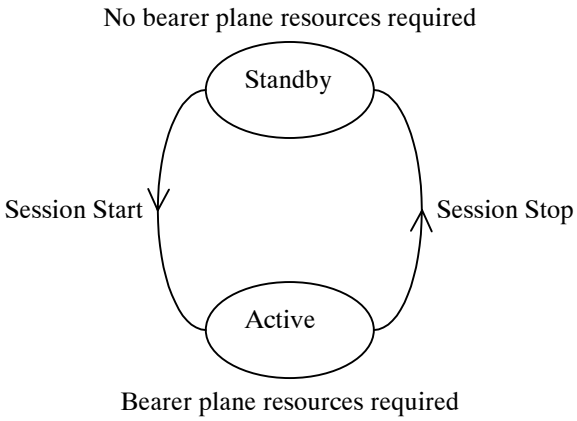

Figure 6: MBMS Bearer Context State Model

'Active' reflects the state of an MBMS Bearer Context in which bearer plane resources are required in the network for the transfer of MBMS data. This state is maintained as long as there is a corresponding MBMS session ongoing.

'Standby' reflects the state of an MBMS Bearer Context in which no bearer plane resources are required in the network for the transfer of MBMS data. This state is maintained as long as there is no corresponding MBMS session ongoing.

The content of the MBMS Bearer Context is described in Table 2.

Table 2: MBMS Bearer Context

Parameter	Description	RAN	SGSN	GGSN	BM-SC
IP multicast address	IP multicast address identifying the MBMS bearer described by this MBMS Bearer Context.	X	X	X	X
APN	Access Point Name on which this IP multicast address is defined.	X	X	X	X
TMGI	Temporary Mobile Group Identity allocated to the MBMS bearer service.	X	X	X	X
State	State of bearer plane resources (ëstandbyí or ëactiveí)	X	X	X	X
Required MBMS Bearer Capabilities	Minimum bearer capabilities the UE needs to support		X	X	X
QoS	Quality of Service required for the MBMS bearer service.	X	X	X	X
MBMS Service Area	Area over which the MBMS bearer service has to be distributed.	X	X	X	X
List of downstream nodes	List of downstream nodes that have requested the MBMS bearer service and to which notifications and MBMS data have to be forwarded.		X	X	X
Number of UEs	Number of UEs hosted by the node that have joined the multicast MBMS bearer service.		X	X	
List of number of PMM-IDLE UEs per RA	List of number of PMM-IDLE UEs for each RA, which contains at least one UE that has joined the MBMS service.		X[1)]		
List of RAs	List of RAs, each of which contains at least one UE that has joined the MBMS service.	X[1)]			

Note 1: It is an optional parameter. The SGSN may include a list of RAs which lists each RA that contains at least one PMM-IDLE UE that has activated the MBMS bearer service. This list may be empty.

Next Modification

8.2 MBMS Multicast Service Activation

The MBMS multicast service activation procedure registers the user in the network to enable the reception of data from a specific multicast MBMS bearer service. The activation is a signalling procedure between the UE and the network. The procedure establishes MBMS UE contexts in UE, SGSN and GGSN and Iu mode BSC/RNC for each activated multicast MBMS bearer service comparable to regular PDP contexts.

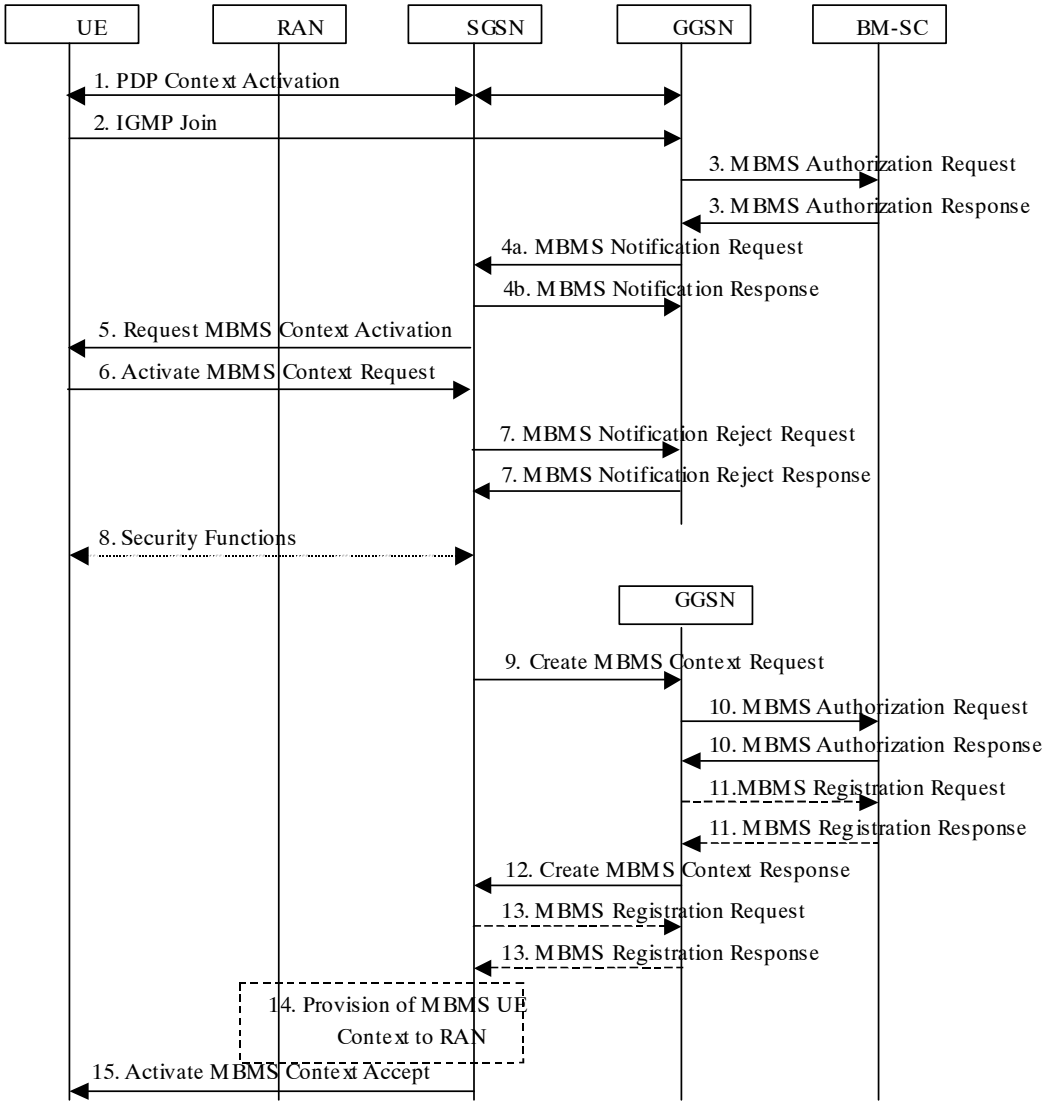

Figure 7: The activation of an MBMS multicast service

1. The UE activates a default, typically best-effort PDP context if not already established. This can be a PDP context used for basic IP services like WAP or Internet access, or it might be the signalling PDP context used for IMS access.

2. The UE sends an IGMP (IPv4) or MLD (IPv6) Join message over the default PDP context to signal its interest in receiving a particular multicast MBMS bearer service identified by an IP multicast address.

3. The GGSN sends an MBMS Authorization Request seeking authorization for the activating UE to receive data. The authorization decision, which may be based on subscription data in the BM-SC Membership function, is provided in the MBMS Authorization Response together with the APN to be used for creation of the MBMS UE context. If the MBMS Authorization Response indicates that the UE is not authorized to receive the MBMS data the process terminates with no additional message exchange.

4a. The GGSN sends an MBMS Notification Request (IP multicast address, APN, Linked NSAPI) to the SGSN. Linked NSAPI is set equal to the NSAPI of the PDP context over which the Join request was received. The IP

multicast address is the one requested by the UE in the Join request. The APN may be different from the APN to which the default PDP context has been activated. In any case, the APN may resolve to a GGSN that is different from the GGSN receiving the IGMP/MLD Join request. The GGSN starts a MBMS Activation Timer as GGSN may receive no response, e.g. in case SGSN or UE does not support MBMS.

4b. The SGSN sends a MBMS Notification Response (Cause) to the GGSN that sent the MBMS Notification Request, where Cause shall indicate whether or not the MBMS context activation will proceed. Upon reception of the response message with Cause indicating unsuccessful operation the GGSN should not send any further MBMS Notification Request messages. The procedure is then terminated.

5. The SGSN sends a Request MBMS Context Activation (IP multicast address, APN, Linked NSAPI, TI) to the UE to request it to activate an MBMS context. Linked NSAPI allows the UE to associate the MBMS Context with the PDP context over which it sent the IGMP/MLD Join message in step 2. TI was chosen by the SGSN and contains a value not used by any other activated PDP context and MBMS UE context for this UE.

6. The UE creates an MBMS UE context and sends an Activate MBMS Context Request (IP multicast address, APN, MBMS_NSAPI, MBMS bearer capabilities) to the SGSN. The IP multicast address identifies the MBMS multicast service, which the UE wants to join/activate. An APN may indicate a specific GGSN. The MBMS bearer capabilities indicate the maximum QoS the UE can handle. The MBMS_NSAPI was chosen by the UE and contains a value not used by any other activated PDP context and MBMS UE context for this UE. If the SGSN has the MBMS Bearer Context information for this MBMS bearer service, the SGSN should verify the UE's MBMS bearer capabilities. If the SGSN determines that the UE's MBMS bearer capabilities are less than the Required MBMS Bearer Capabilities, it shall reject the request for activation of an MBMS context with an appropriate cause.

7. If the MBMS UE Context was not established, the SGSN sends a MBMS Notification Reject Request (Cause) to the GGSN that sent the MBMS Notification Request, where Cause shall indicate the reason why the MBMS UE Context could not be established. The GGSN then sends a MBMS Notification Reject Response back to the SGSN. This should prevent further sending of MBMS Notification Request messages. The procedure is then terminated.

8. Security Functions may be performed, e.g. to authenticate the UE.

9. The SGSN creates an MBMS UE context and sends a Create MBMS Context Requests (IP multicast address, APN, MBMS_NSAPI, IMSI, MSISDN, Serving network identity) to the GGSN.

10. The GGSN sends an MBMS Authorization Request (IMSI, MSISDN, Serving network identity) seeking authorization for the activating UE. The authorization decision is provided in the MBMS Authorization Response. The BM-SC creates an MBMS UE Context.

11. If the GGSN does not have the MBMS Bearer Context information for this MBMS bearer service, the GGSN sends a MBMS Registration Request to the BM-SC. See subclause "MBMS Registration Procedure".

    If no TMGI has been allocated for this MBMS bearer service, the BM-SC will allocate a new TMGI. This TMGI will be passed to GGSN and SGSN via the MBMS Registration Response message and further to UE via Activate MBMS Context Accept message.

    The BM-SC responds with a MBMS Registration Response containing the MBMS Bearer Context information for this MBMS bearer service and adds the identifier of the GGSN to the "list of downstream nodes" parameter in its MBMS Bearer Context. See subclause "MBMS Registration Procedure".

12. The GGSN creates an MBMS UE context and sends a Create MBMS Context Response to the SGSN.

13. If the SGSN does not have the MBMS Bearer Context information for this MBMS bearer service, the SGSN sends a MBMS Registration Request to the GGSN. See subclause "MBMS Registration Procedure".

    The GGSN responds with a MBMS Registration Response containing the MBMS Bearer Context information for this MBMS bearer service and adds the identifier of the SGSN to the "list of downstream nodes" parameter in its MBMS Bearer Context. See subclause "MBMS Registration Procedure".

14. The SGSN provides Iu mode RAN with the MBMS UE Context(s) if at least one PS RAB is established for the UE.

15. The SGSN sends an Activate MBMS Context Accept (TMGI, MBMS bearer capabilities) to the UE. The MBMS bearer capabilities indicate the maximum QoS that is used by this MBMS bearer service and the UE may take it

into account when further MBMS bearer services are activated. If it was not possible to verify the UE's MBMS bearer capabilities in Step 6, the UEís MBMS bearer capabilities will be verified now. If the SGSN determines that the UEís MBMS bearer capabilities are lower than the Required MBMS Bearer Capabilities the SGSN rejects the request for activation of an MBMS context indicating an appropriate cause and starts the deactivation of the already established MBMS UE contexts.

8.3 MBMS Session Start Procedure

The BM-SC initiates the MBMS Session Start procedure when it is ready to send data. This is a request to activate all necessary bearer resources in the network for the transfer of MBMS data and to notify interested UEs of the imminent start of the transmission.

Through this procedure, MBMS session attributes such as QoS, MBMS service Area, estimated session duration if available are provided to the GGSN(s) and SGSN(s) that have previously registered for the corresponding MBMS bearer service and to all BSCs/RNCs that are connected to a registered SGSN. In addition the procedure allocates the bearer plane to all registered GGSNs and all registered SGSNs and to BSCs/RNCs that respond to the session start accordingly.

The overall Session Start procedure is presented in the following figure:

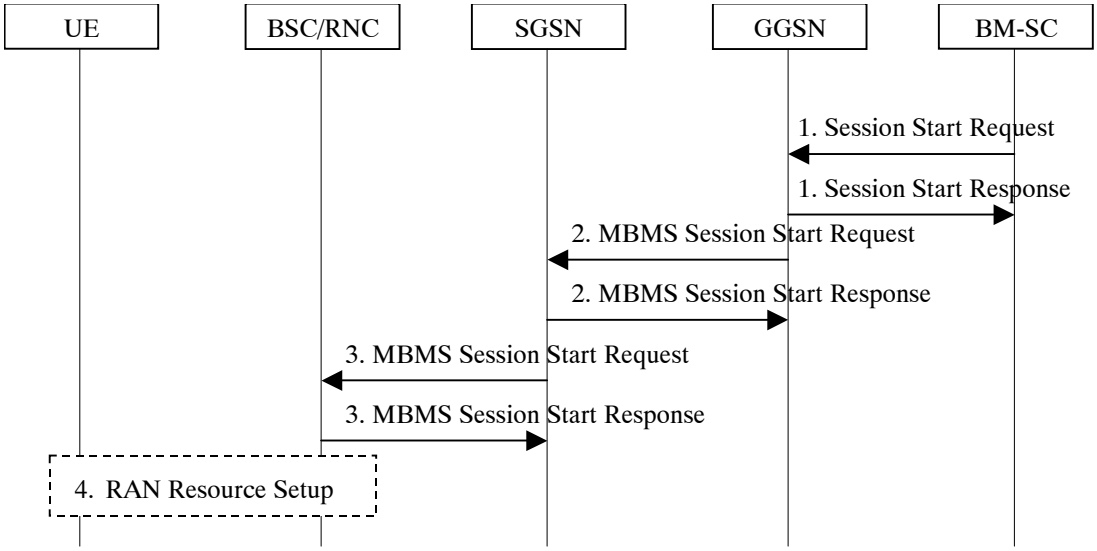

Figure 8 Session Start procedure

1. The BM-SC Session and Transmission function sends a Session Start Request message to indicate the impending start of the transmission and to provide the session attributes (TMGI, QoS, MBMS service Area, Session identifier, estimated session durationÖ) and the 2G/3G indicator. The message is sent to the BM-SC Proxy and Transport function, which then forwards it to the GGSNs listed in the ì list of downstream nodesî parameter of the corresponding MBMS Bearer Context. The BM-SC Proxy and Transport function sets the state attribute of its MBMS Bearer Context to ëActiveí. The GGSN stores the session attributes in the MBMS Bearer Context, sets the state attribute of its MBMS Bearer Context to ëActiveí and sends a Session Start Response message to the BM-SC Proxy and Transport function which forwards it to the BM-SC Session and Transmission function. The BM-SC Proxy and Transport function copies Session Start Requests to the BM-SC Membership function for charging purposes.

2. The GGSN sends an MBMS Session Start Request message containing the session attributes (TMGI, QoS, MBMS service Area, Session identifier, estimated session durationÖ) and the 2G/3G indicator to the SGSNs listed in the ì list of downstream nodesî parameter of the corresponding MBMS Bearer Context. The SGSN stores the session attributes and the 2G/3G indicator in the MBMS Bearer Context, sets the state attribute of its MBMS Bearer Context to ëActiveí and responds with an MBMS Session Start Response message providing the TEID for bearer plane that the GGSN shall use for forwarding the MBMS data.

3. The SGSN sends an MBMS Session Start Request message including the session attributes (TMGI, QoS, MBMS service Area, Session identifier, estimated session durationÖ) to each BSC and/or each RNC that is connected to this SGSN. The 2G/3G indicator shall be used by the SGSN to determine whether the MBMS Session Start

Request message is sent only to BSCs, or only to RNCs, or to both RNCs and BSCs. The SGSN may include a list of RAs which lists each RA that contains at least one PMM-IDLE UE that has activated the MBMS bearer service. This list may be empty. The BSC/RNC responds with an MBMS Session Start Response to the SGSN. The BSC in Iu mode/RNC stores the session attributes in the MBMS Service Context, sets the state attribute of its MBMS Service Context to ëActiveí and responds with an MBMS Session Start Response message and the RNC includes the TEID in the MBMS Session Start Response message for the Iu bearer plane that the SGSN shall use for forwarding the MBMS data. A BSC in Gb mode which does not serve the MBMS Service Area may decide not to store the session attributes and not to set the state of its MBMS Service Context to ëActiveí. A BSC/RNC receiving multiple MBMS Session Start Request messages establishes only one bearer plane with one SGSN.

4. The BSC/RNC establishes the necessary radio resources for the transfer of MBMS data to the interested UEs.

Note: The upstream node normally provides the MBMS Session Start Request message once per MBMS session to a downstream node. Due to ì Intra Domain Connection of RAN Nodes to Multiple Core Network Nodesî however, a BSC/RNC may receive the MBMS Session Start Request message from several SGSNs.

8.4 MBMS Registration Procedure

The MBMS Registration is the procedure by which a downstream node informs an upstream node that it would like to receive session attributes and data for a particular MBMS bearer service in order to distribute it further downstream. This procedure builds up a distribution tree for the delivery of MBMS session attributes and data from the BM-SC to the UEs interested in the service. This procedure results in the set-up of a corresponding MBMS Bearer Context in the nodes along the distribution tree, but it does not result in the establishment of bearer plane which will be established by the Session Start procedure.

The MBMS Registration procedure is initiated:

- When the first MBMS UE Context for a particular MBMS bearer service is created in the SGSN or GGSN (see subclause "MBMS UE Context") and the corresponding MBMS Bearer Context is not already established in the node;
- When an MBMS Registration Request for a particular MBMS bearer service is received from a downstream node but the corresponding MBMS Bearer Context is not established in the node; or
- When a DRNC detects that it hosts UEs interested in the MBMS bearer service.

NOTE: The terms 'downstream' and 'upstream' refer to the topological position of one node with respect to another and relative to the direction of the MBMS data flow, i.e. from BM-SC to UE.

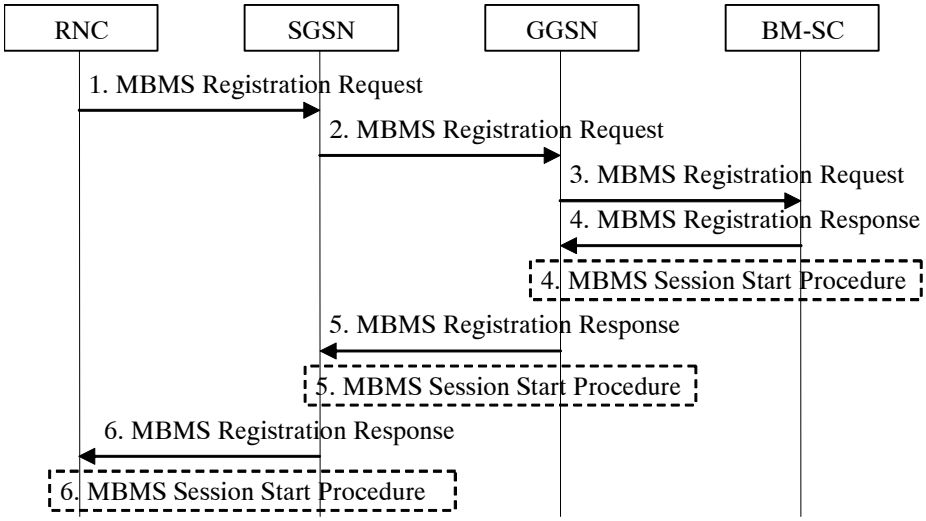

Figure 9: MBMS Registration procedure

1. When the DRNC detects that it hosts UEs interested in the MBMS bearer service, the DRNC sends a MBMS Registration Request message to its parent SGSN if not already done. How the RNC determines its parent SGSN is a matter of implementation.

2. If the SGSN has no MBMS Bearer Context for an MBMS bearer service and the SGSN receives an MBMS Registration Request from an RNC for this MBMS bearer service, or if the first MBMS UE Context is created in the SGSN for an MBMS bearer service for which the SGSN has no corresponding MBMS Bearer Context, the SGSN creates an MBMS Bearer Context (in "Standby" state) and sends an MBMS Registration request (IP multicast address, APN) message to the GGSN. How the SGSN selects a GGSN is a matter of implementation; it may for instance be based on prior signalling related to a particular UE or via APN resolution.

3. If the GGSN has no MBMS Bearer Context for an MBMS bearer service and the GGSN receives an MBMS Registration from an SGSN for this MBMS bearer service, or when the first MBMS UE Context is created in the GGSN for an MBMS bearer service for which the GGSN has no MBMS Bearer Context, the GGSN creates an MBMS Bearer Context (in "Standby" state) and sends a Registration Request (IP multicast address, APN) message to the BM-SC Proxy and Transport function. The exact nature of the signalling between GGSN and BM-SC via Gmb interface is specified in 3GPP TS 29.061 [4].

4. Upon reception of an MBMS Registration Request from a GGSN, the BM-SC Proxy and Transport function adds the identifier of the GGSN to the "list of downstream nodes" parameter in its MBMS Bearer Context and responds with a MBMS Registration Response (TMGI, Required Bearer Capabilities) message. The exact nature of the signalling between GGSN and BM-SC is however FFS in general. If the MBMS Bearer Context is in the 'Active' state, the BM-SC initiates the Session Start procedure with the GGSN, as described in clause ì MBMS Session Start Procedureî .

5. If the GGSN receives a Registration Request from the SGSN in step 2, the GGSN:

   - adds the identifier of the SGSN to the "list of downstream nodes" parameter in its MBMS Bearer Context,

   - responds with an MBMS Registration Response (TMGI, Required Bearer Capabilities) message, and

   - if the MBMS Bearer Context is in the 'Active' state, initiates the Session Start procedure with the SGSN, as described in clause ì MBMS Session Start Procedureî .

6. If the SGSN received MBMS Registration Request from the DRNC in step 1, the SGSN:

   - adds the identifier of the RNC to the "list of downstream nodes" parameter in its MBMS Bearer Context,

   - responds with an MBMS Registration Response message, and

   - if the MBMS Bearer Context is in the 'Active' state, initiates the Session Start procedure with the DRNC, as described clause ì MBMS Session Start Procedureî .

8.5 MBMS Session Stop Procedure

The BM-SC Session and Transmission function initiates the MBMS Session Stop procedure when it considers the MBMS session to be terminated. The session is typically terminated when there is no more MBMS data expected to be transmitted for a sufficiently long period of time to justify a release of bearer plane resources in the network. The procedure is propagated to all SGSNs and GGSNs that are registered for the corresponding MBMS bearer service and to BSCs/RNCs that have an established Iu bearer plane with an SGSN.

The overall MBMS Session Stop procedure is presented in the following figure:

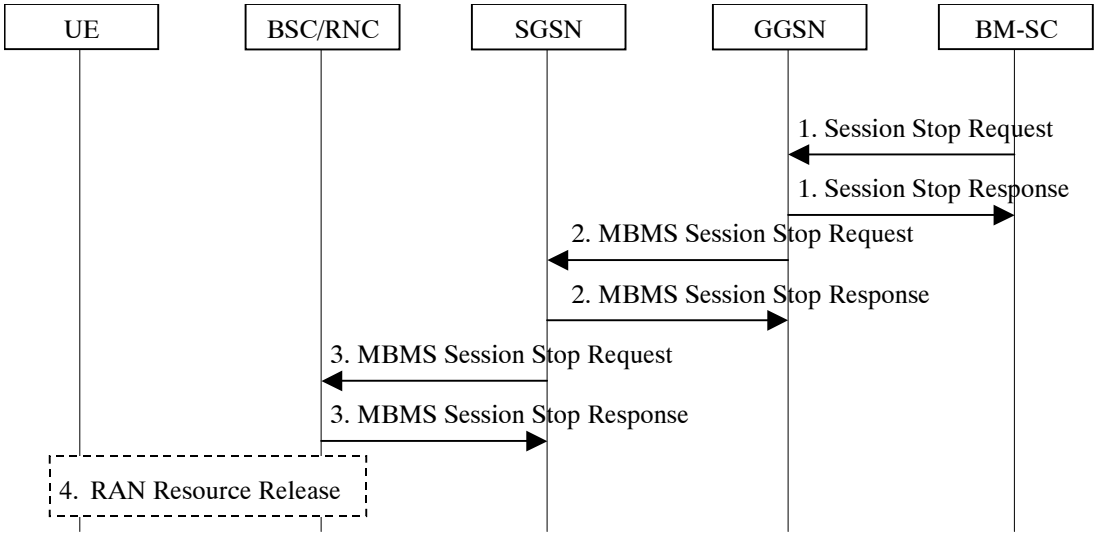

Figure 10: MBMS Session Stop procedure

1. The BM-SC Session and Transmission function sends a Session Stop Request message to the BM-SC Proxy and Transport function, which forwards it to all GGSNs listed in the ìlist of downstream nodesî parameter of the affected MBMS Bearer Context to indicate that the MBMS session is terminated and the bearer plane resources can be released. The BM-SC Proxy and Transport function sets the state attribute of its MBMS Bearer Context to ëStandbyí. The GGSN sends a Session Stop Response message to the BM-SC Proxy and Transport function, which forwards it to the BM-SC Session and Transmission function. The BM-SC Proxy and Transport function copies Session Stop Requests to the BM-SC Membership function for charging purposes.

2. The GGSN sends an MBMS Session Stop Request message to all SGSNs listed in the ìlist of downstream nodesî parameter of the affected MBMS Bearer Context, releases the corresponding bearer plane resources towards these SGSNs and sets the state attribute of its MBMS Bearer Context to ëStandbyí.

3. The SGSN releases the TEID and bearer plane resources on which it was receiving MBMS data from the GGSN for the affected MBMS bearer service and sends an MBMS Session Stop Request message to all BSCs/RNCs that have a bearer plane established with the SGSN.

4. The RNC releases the affected radio and Iu resources; the BSC releases the affected radio resources.

8.6 MBMS De-Registration Procedure

The MBMS De-Registration is the procedure by which a downstream node informs an upstream node that it does not need a to receive signalling, session attributes and data for a particular MBMS bearer service anymore and therefore would like to be removed from the corresponding distribution tree.

The MBMS De-registration procedure is initiated:

- By the SGSN or GGSN when the last MBMS UE Context for a particular MBMS bearer service is deleted from the node and the "list of downstream nodes" parameter in the corresponding MBMS Bearer Context is empty;

- By the SGSN or GGSN when the last node registered in the "list of downstream nodes" de-registers from an MBMS bearer service for which there is no corresponding MBMS UE Context; or

- By the DRNC that registered at an SGSN when it deletes the associated MBMS Service Context.

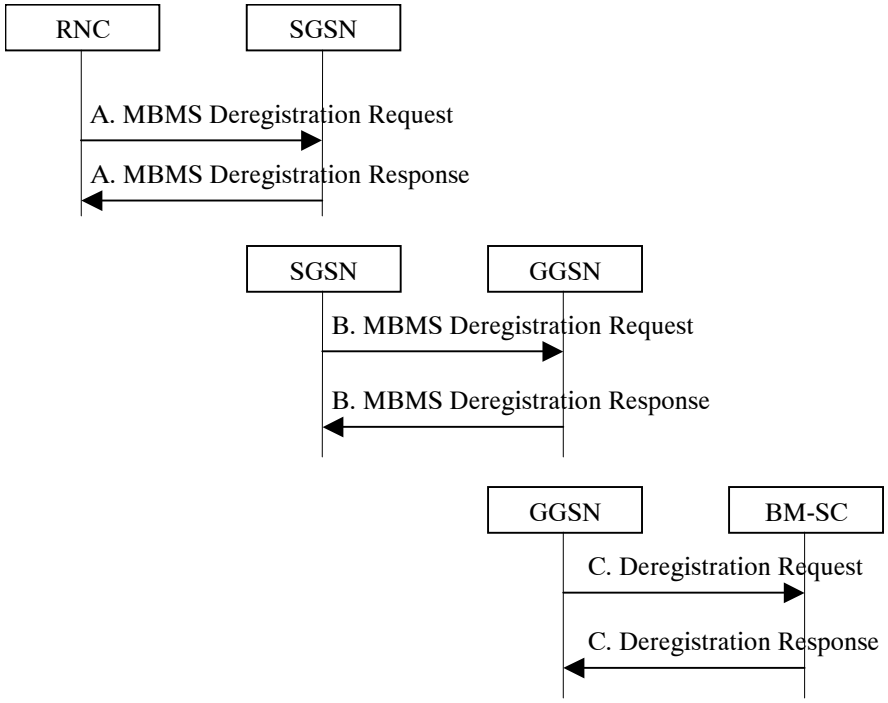

Figure 11: MBMS De-Registration Procedure

A. When the DRNC that is registered at an SGSN no longer hosts any UE interested in that MBMS bearer service, the DRNC requests the de-registration from the MBMS bearer service to its parent SGSN. As an implementation option, the RNC may decide not to de-register from the MBMS bearer service immediately when these conditions are met, e.g. in order to avoid unnecessary signalling in the case where the RNC would again need the same MBMS bearer service shortly after.

   The SGSN removes the identifier of the RNC from the "list of downstream nodes" parameter of the affected MBMS Bearer Context and confirms the operation by sending an MBMS De-Registration Response message to the RNC. If an Iu bearer plane had been established between the RNC and the SGSN for this MBMS bearer service, the Iu bearer plane is released.

B. When the "list of downstream nodes" of a particular MBMS Bearer Context in the SGSN becomes empty and the SGSN has no MBMS UE Contexts linked to that MBMS Bearer Context, the SGSN sends an MBMS De-Registration Request (IP multicast address, APN) message to its upstream GGSN.

   The GGSN removes the identifier of the SGSN from the "list of downstream nodes" parameter of the affected MBMS Bearer Context and confirms the operation by sending an MBMS De-Registration Response message to the SGSN. If a bearer plane had been established between the SGSN and the GGSN for this MBMS bearer service, the bearer plane is released.

C. When the "list of downstream nodes" of a particular MBMS Bearer Context in the GGSN becomes empty and the GGSN has no MBMS UE Contexts linked to that MBMS Bearer Context, the GGSN sends a De-Registration Request (IP multicast address, APN) message to the BM-SC Proxy and Transport function. If a bearer plane had been established over Gi for this MBMS bearer service, the bearer plane is released.

   The BM-SC removes the identifier of the GGSN from the "list of downstream nodes" parameter of the affected MBMS Bearer Context and confirms the operation by sending a De-Registration Response message to the GGSN.

8.6.1 BM-SC initiated MBMS De-Registration Procedure

This MBMS De-Registration Procedure is initiated by BM-SC when the specific MBMS bearer service is terminated. This procedure tears down the distribution tree for the delivery of session attributes and MBMS data. This procedure results in releasing of all MBMS Bearer Contexts and associated MBMS UE Contexts in the nodes along the distribution tree.

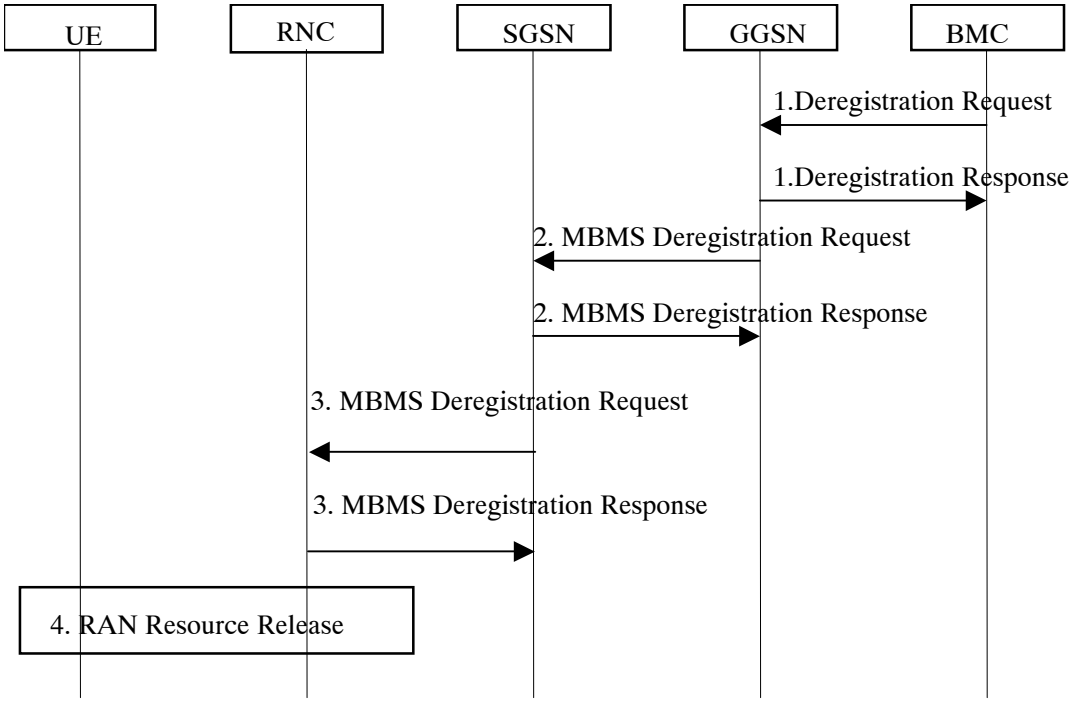

Figure 12: BM-SC initiated MBMS De-Registration Procedure

1. The BM-SC sends a De-Registration Request message to all GGSNs contained in the "list of downstream nodes" parameter of the corresponding MBMS Bearer Context to indicate the session is terminated and any related MBMS bearer resources shall be released.

   The GGSN returns a De-Registration Response message to the BM-SC. The BM-SC releases all MBMS UE Contexts and the corresponding MBMS Bearer context.

2. The GGSN sends an MBMS De-Registration Request message to all SGSNs contained in the "list of downstream nodes" parameter. of the corresponding MBMS Bearer Context. The SGSN returns an MBMS De-registration Response message to the GGSN. The GGSN releases all MBMS UE Contexts and the affected MBMS Bearer Context. If a bearer plane had been established over Gi for this MBMS bearer service, the bearer plane is released.

3. The SGSN sends an MBMS De-Registration Request message to all RNCs connected with this SGSN. The RNC returns an MBMS De-Registration Response message to the SGSN, and releases all bearer resources if the state attribute of the MBMS Service Context is ëActiveí. The SGSN releases all MBMS UE Contexts and the affected MBMS Bearer Context. If a bearer plane had been established between the SGSN and the GGSN for this MBMS bearer service, the bearer plane is released.

4. The RNC releases the affected radio resources, all MBMS UE Contexts and the MBMS Service Context. The detailed procedures are specified in 3GPP TS 25.346 [10] and 3GPP TS 43.246 [11]. RAN may notify the UEs that the MBMS Bearer service has being terminated, so that the UE can locally deactivate its MBMS UE context, detailed procedures are specified in 3GPP TS 25.346 [10] and 3GPP TS 43.246 [11].

8.7 MBMS Multicast Service Deactivation

The multicast service deactivation is a signalling procedure between the UE and the network. The procedure removes the MBMS UE Context from the UE, SGSN and GGSN for a particular MBMS multicast service. The multicast service deactivation can be initiated by:

- The UE;
- The GGSN;
- The BM-SC; or
- The SGSN

All these cases are contained in the procedure illustrated in figure 13. The UE initiated Multicast Service Deactivation starts with step 1), the BM-SC initiated Multicast Service Deactivation starts with step 3), the GGSN initiated Multicast Service Deactivation starts with step 4), and the SGSN initiated Multicast Service Deactivation starts with step 5) or 8).

At GPRS detach, all MBMS UE contexts of the UE are implicitly deactivated in the UE, SGSN and GGSN, i.e. the SGSN performs the deactivation procedure starting with step 8).

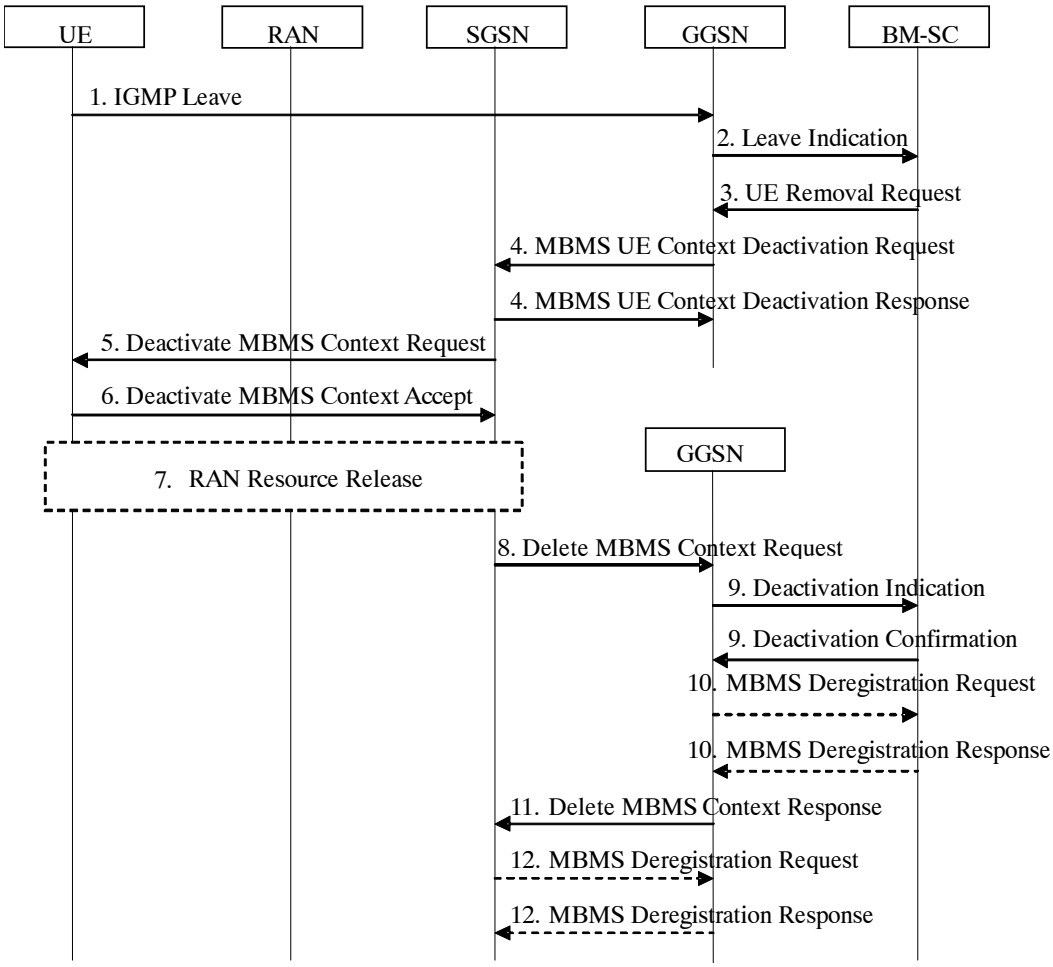

Figure 13: MBMS Multicast Service Deactivation

1. The UE sends an IGMP (IPv4) or MLD (IPv6) Leave message over the default PDP context to leave a particular multicast service identified by an IP multicast address.

2. The GGSN sends a Leave Indication (IP multicast address, IMSI) to the BM-SC Proxy and Transport function, which forwards it to the BM-SC Membership function, indicating that the UE is requesting to leave the multicast service identified by the IP multicast address. The exact nature of the signalling between GGSN and BM-SC is specified in 3GPP TS 29.061[4].

3. Upon reception of the Leave Indication, the BM-SC Membership function verifies that the IP multicast address corresponds to a valid MBMS bearer service and sends a UE Removal Request (IP multicast address, APN, IMSI) to the GGSN that originated the Leave Indication. The APN shall be the same that was provided during service activation (see "MBMS Multicast Service Activation"). The exact nature of the signalling between GGSN and BM-SC is specified in 3GPP TS 29.061 [4]. The BM-SC Membership function may also initiate the deactivation of an MBMS UE Context for service-specific reasons (e.g. the service is terminated but the UE has not yet left the multicast group) by directly sending a UE Removal Request message to the GGSN.

4. Upon reception of the UE Removal Request or for other reasons (e.g. Error cases), the GGSN sends an MBMS UE Context Deactivation Request (IP multicast address, APN, IMSI) to the SGSN. The IP multicast address, APN and IMSI together identify the MBMS UE Context to be deleted by the SGSN. The APN is the one received in step 3. The SGSN acknowledges reception of the MBMS UE Context Deactivation Request by sending an MBMS UE Context Deactivation Response to the GGSN.

5. Upon reception of the MBMS UE Context Deactivation Request or for other reasons (e.g. due to a change in the roaming restrictions for the user) the SGSN sends a Deactivate MBMS Context Request (TI) to the UE. The TI identifies the MBMS UE Context to be deleted by the UE.

6. The UE deletes the MBMS UE Context and sends a Deactivate MBMS Context Accept (TI) to the SGSN.

7. If dedicated radio resources are currently assigned to the UE for the reception of the MBMS data, the RAN releases these radio resources. If shared radio resources are currently assigned for the distribution of the MBMS data, the RAN may decide to move the remaining UEs to dedicated resources. The detailed procedures and conditions are FFS depending on ongoing work in RAN groups.

8. Upon reception of the Deactivate MBMS Context Accept or for other reasons (e.g. due to missing periodic updates) the SGSN sends a Delete MBMS Context Request (MBMS_NSAPI) to the GGSN that holds the MBMS UE Context. This GGSN may be different from the GGSN that receives IGMP Leave request in step 1.

9. The GGSN deletes the MBMS UE Context and sends a Deactivation Indication to the BM-SC to confirm the successful deactivation of the MBMS UE Context. The BM-SC, after receiving the Deactivation Indication, deletes the MBMS UE Context and sends a confirmation to the GGSN. The exact nature of the signalling between GGSN and BM-SC is however FFS in general.

10. If the GGSN does not have any more users interested in this MBMS bearer service and the "list of downstream nodes" in the corresponding ~~MBSM~~ MBMS Bearer Context is empty, the GGSN sends a MBMS De-Registration Request to the BM-SC Proxy and Transport function. The BM-SC Proxy and Transport function responds with a MBMS De-Registration Response and removes the identifier of the GGSN from the "list of downstream nodes" parameter in its MBMS Bearer Context. See subclause "MBMS De-Registration Procedure".

11. The GGSN confirms the deactivation of the MBMS UE Context to the SGSN by sending a Delete MBMS Context Response to the SGSN, which then deletes the MBMS UE Context.

12. If the SGSN does not have any more users interested in this MBMS bearer service and the "list of downstream nodes" in the corresponding MBMS Bearer Context is empty, the SGSN sends an MBMS De-Registration Request to the GGSN. The GGSN responds with an MBMS De-Registration Response and removes the identifier of the SGSN from the "list of downstream nodes" parameter in its MBMS Bearer Context. See subclause "MBMS De-Registration Procedure".

8.8 MBMS Session Update procedure

If the SGSN has provided a list of RAs in the Session Start message (even if the list was empty) and RAs are added or removed from the list, the SGSN uses the MBMS Session Update procedure to inform the RNCs that the list has changed. The SGSN sends the Session Update message only to the RNCs that are affected by the list change. The procedure is used only during the session and when SGSN has already sent a Session Start to the RNC.

The SGSN may send the Session Update to a RNC when:

- The first UE which have activated the service enters in a RA
- The last UE which have activated the service leaves from a RA

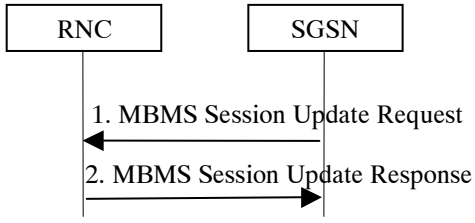

Figure 13a. Session Update procedure

1) The SGSN sends MBMS Session Update Request message to a RNC.

2) The RNC acknowledges the Session Update Request with the MBMS Session Update Response message.

8.9 Void

8.10 Inter SGSN Routeing Area Update

This procedure is performed when a UE with active MBMS bearer service performs a Routeing Area Update and the serving SGSN changes. It bases on the Inter SGSN Routeing Area Update procedure specified in TS 23.060. The procedure is performed regardless whether MBMS sessions are ongoing or not. The handling of any PDP contexts established by the UE is not changed compared to the procedure without MBMS. The procedure described below does not show all details of the Routeing Area update procedure. Only for the MBMS specific additions the steps are described.

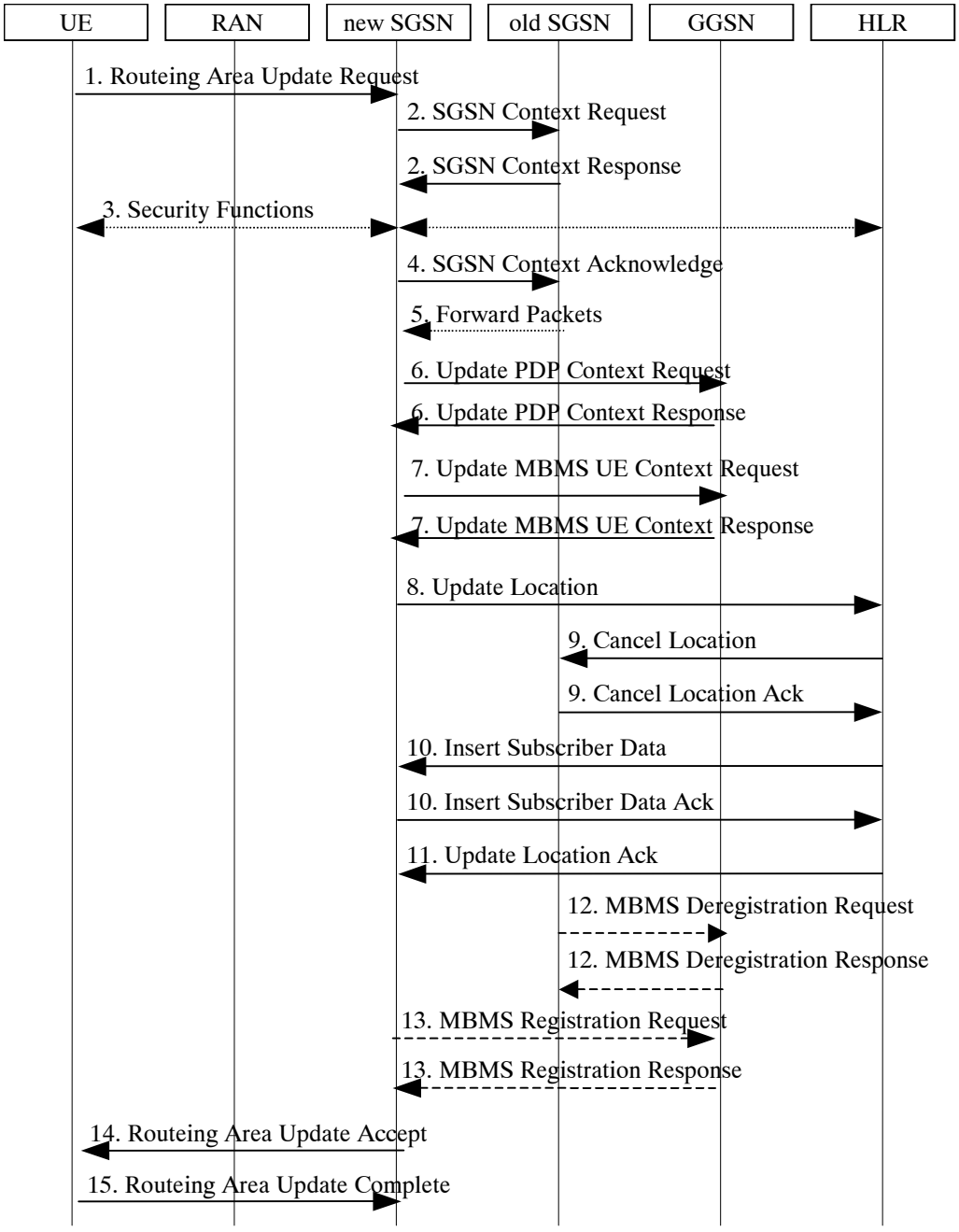

Figure 14: Inter SGSN Routeing Area Update

2) The context transfer in step 2 includes the transfer of the MBMS UE Context(s).

7) The new SGSN sends Update MBMS UE Context Request (Serving network identity) to the GGSNs concerned. The GGSNs update their MBMS UE Context fields and return Update MBMS UE Context Response. Also, GGSN sends updated Serving network identity to the BM-SC if necessary.

12) If the old SGSN does not have any more MBMS UE Contexts for the MBMS bearer service(s) and the "list of downstream nodes" in the corresponding MBMS Bearer Context is empty, the SGSN sends an MBMS Deregistration Request to the GGSN. The GGSN responds with an MBMS Deregistration Response and removes the identifier of the SGSN from the "list of downstream nodes" parameter in its MBMS Bearer Context. See subclause "MBMS Deregistration Procedure".

13) The new SGSN verifies for each MBMS UE Context received whether it has a corresponding MBMS Bearer Context. For each MBMS Bearer Context the SGSN does not already have the SGSN creates an MBMS Bearer Context (in "Standby" state) and sends an MBMS Registration Request to a GGSN. This registration is described in subclause "MBMS Registration Procedure".

8.11 Inter SGSN Serving RNS Relocation Procedure

This procedure is performed when the SGSN changes due to SRNS relocation. It bases on the SRNS Relocation procedure specified in 3GPP TS 23.060. The procedure is performed regardless whether MBMS sessions are ongoing or not. The handling of any PDP contexts established by the UE is not changed compared to the procedure without MBMS. The procedure described below does not show all details of the SRNS relocation procedure. Only for the MBMS specific additions the steps are described.

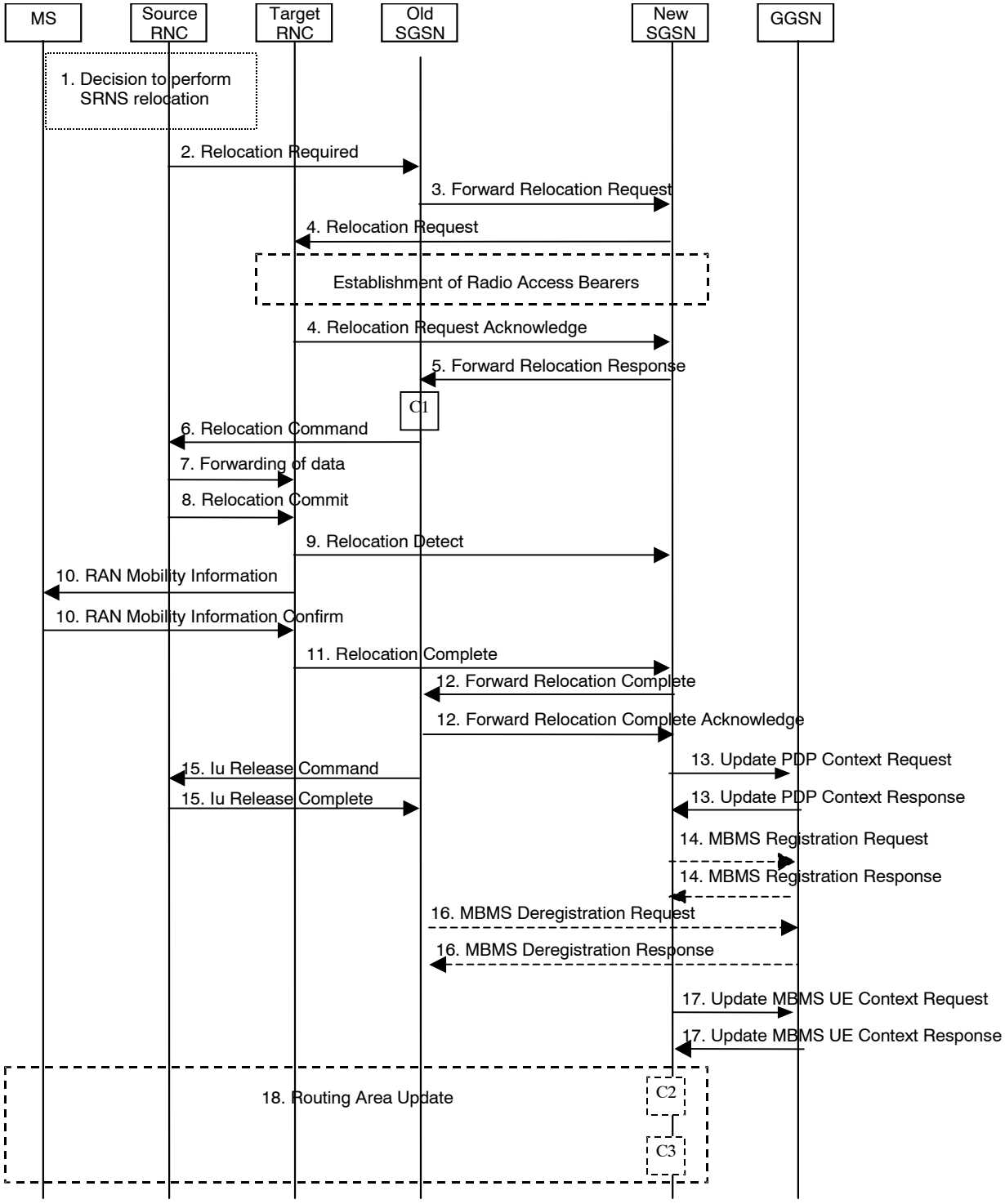

Figure 15: SRNS Relocation Procedure

3) The context transfer in step 3 includes the transfer of the MBMS UE Context(s).

14) The new SGSN verifies for each MBMS UE Context received whether it has a corresponding MBMS Bearer Context. For each MBMS Bearer Context not yet existing in the SGSN the SGSN creates an MBMS Bearer Context (in "Standby" state) and sends an MBMS Registration Request to a GGSN. This registration is described in subclause "MBMS Registration Procedure".

16) If the old SGSN does not have any more MBMS UE Contexts for this MBMS bearer service and the "list of downstream nodes" in the corresponding MBMS Bearer Context is empty, the SGSN sends an MBMS De-registration Request to the GGSN. The GGSN responds with an MBMS De-registration Response and removes the identifier of the SGSN from the "list of downstream nodes" parameter in its MBMS Bearer Context. See subclause "MBMS De-registration Procedure".

17) The new SGSN sends Update MBMS UE Context Request to the GGSNs concerned. The GGSNs update their MBMS UE Context fields and return Update MBMS UE Context Response.

8.12 MBMS Broadcast Service Activation

MBMS Broadcast service activation is the procedure by which a UE locally activates a broadcast MBMS bearer service:

- The MBMS broadcast service activation procedure does not register the user in the network. There is no MBMS bearer service specific signaling exchanged between the UE and the Network.
- The broadcast service activation procedure does not establish MBMS UE contexts in UE, SGSN and GGSN.

8.13 MBMS Broadcast service de-activation

The MBMS Broadcast service de-activation by the UE is local to the UE, i.e. without interaction with the Network.

8.14 MBMS Broadcast Session Start Procedure

The BM-SC Session and Transmission function initiates the MBMS Session Start procedure when it is ready to send data. This is a request to activate all necessary bearer resources in the network for the transfer of MBMS data. It is also used to notify interested UEs of the start of the transmission.

Through this procedure, MBMS session attributes such as TMGI, QoS, MBMS service Area , estimated session duration if available are provided to all the GGSN(s), SGSN(s) and BSCs/RNCs. In addition the procedure allocates the bearer plane to all GGSNs and all SGSNs and to BSCs/RNCs that respond to the MBMS session start accordingly.

The overall MBMS Broadcast Session Start procedure is presented in the following figure:

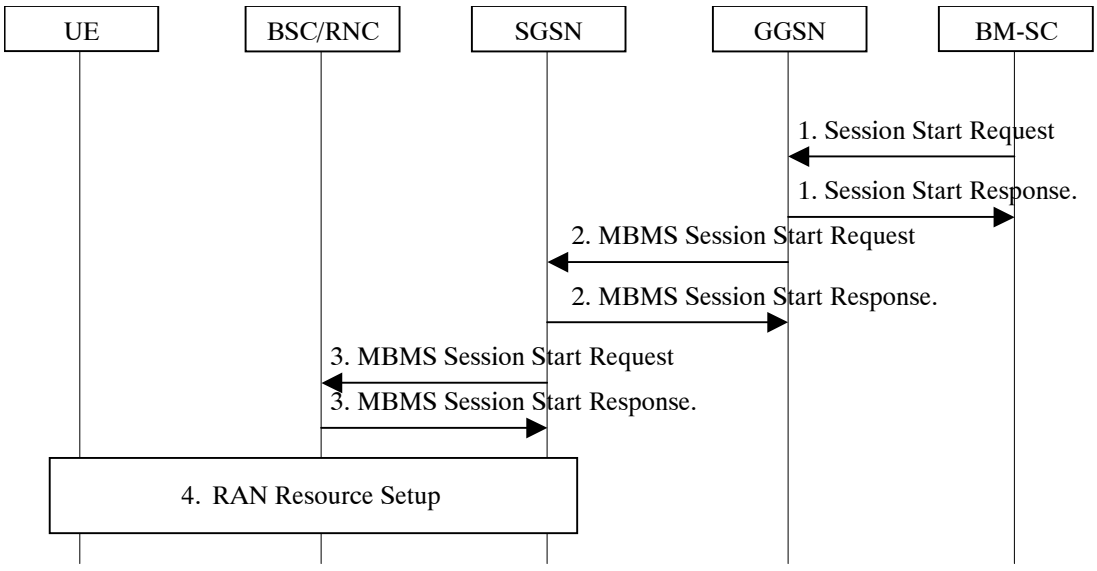

Figure 16 Session Start procedure for Broadcast MBMS Bearer Service

1) The BM-SC Session and Transmission function sends a Session Start Request message to indicate the impending start of the transmission and to provide the MBMS session attributes (TMGI, QoS, MBMS service Area, estimated session duration Ö). The message is sent to the BM-SC Proxy and Transport function, which forwards it to a GGSN of the PLMN. The BM-SC Proxy and Transport function sets the state attribute of its MBMS

Bearer Context to ëActiveí. The GGSN creates a MBMS Bearer Context, stores the session attributes, sets the state attribute of this MBMS Bearer Context to ëActiveí and sends a Session Start Response message to the BM-SC Proxy and Transport function which forwards it to the BM-SC Session and Transport function. The BM-SC Proxy and Transport function may copy Session Start Requests to the BM-SC Membership function for charging purposes.

2) The GGSN sends an MBMS Session Start Request message to all its SGSNs. The SGSN creates a MBMS Bearer Context, stores the session attributes, sets the state attribute of this MBMS Bearer Context to ëActiveí and responds with an MBMS Session Start Response message providing the TEID for bearer plane that the GGSN shall use for forwarding the MBMS data.

3) The SGSN sends an MBMS Session Start Request message including the session attributes to each BSC/RNC that is connected to this SGSN. The BSC/RNC responds with an MBMS Session Start Response message to the SGSN. If the BSC/RNC serves the MBMS service Area, it creates a MBMS Bearer Context, stores the session attributes in this MBMS Service Context, sets the state attribute of its MBMS Service Context to ëActiveí and responds with an MBMS Session Start Response message, and the Iu mode BSC/RNC includes the TEID in the MBMS Session Start Response message for the Iu bearer plane that the SGSN shall use for forwarding the MBMS data. A BSC/RNC receiving multiple MBMS Session Start Request messages from different SGSNs establishes only one bearer plane with one SGSN.

4) The BSC/RNC establishes the necessary radio resources for the transfer of MBMS data to the interested UEs.

Note: The upstream node normally provides the MBMS Session Start Request message once per MBMS session to a downstream node. Due to ì Intra Domain Connection of RAN Nodes to Multiple Core Network Nodesî however, a BSC/RNC may receive the MBMS Session Start Request message from several SGSNs.

8.15 MBMS UE Linking mechanism

UE Linking is the process by which UE MBMS context(s) is (are) provided to RAN.

MBMS UE linking procedure is performed when the UE is PMM-CONNECTED at least in the following cases.

- When a UE which has joined MBMS is moved to the PMM CONNECTED state and sets up a PS RAB. This may happen at any point in time i.e. before, during and between Sessions.
- When a UE joins the service and is in the PMM CONNECTED state due to an existing PS RAB. This may happen at any point in time i.e. before, during and between Sessions.
- When a UE is moved to the PMM CONNECTED state only for MBMS purpose via Service Request procedure. This may happen at any point in time during a MBMS session.

The UE linking is performed to link a specific UE to an MBMS service. It provides the list of MBMS Service Ids activated by the UE to the SRNC. If no MBMS service context related to the MBMS service Id exists then SRNC creates an MBMS service context after this procedure.

8.16 MBMS Service Request Procedure

For MBMS, when UTRAN wants to count the number of users that are interested in a specific MBMS service present in a cell, it will request a percentage of the interested UEs to transit to PMM-CONNECTED state. The MBMS Service Request procedure is used by a UE in PMM-IDLE state to move to PMM-CONNECTED state.

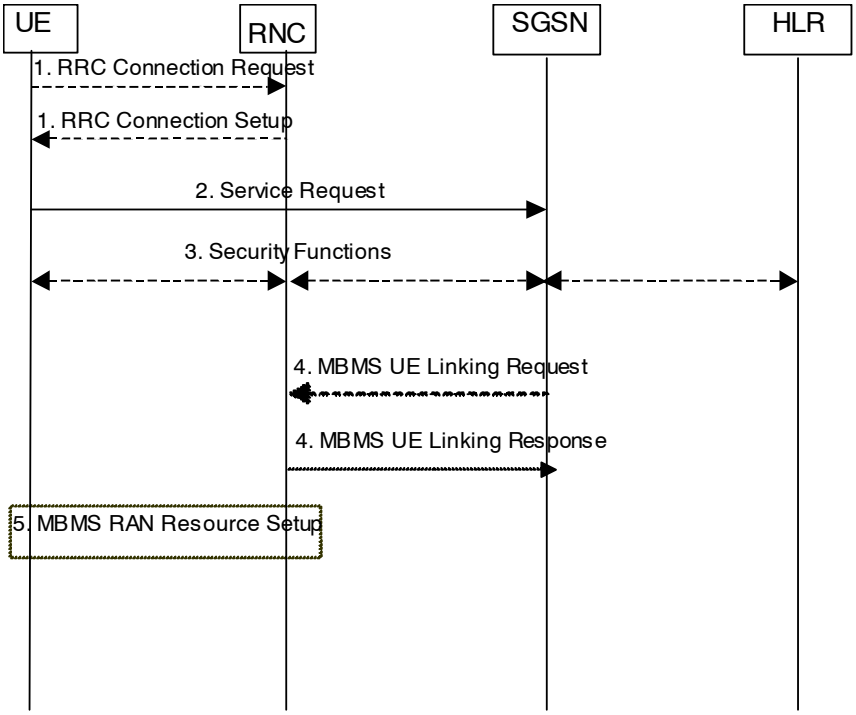

Figure 17: MBMS Service Request procedure

2) The UE sends a Service Request message to the SGSN if required to do so by the RAN after a MBMS Session Starts.

3) The SGSN may perform the security functions.

4) The SGSN provides RAN with the MBMS UE context(s) via MBMS UE Linking procedure

5) The RNC establishes the necessary radio resources for the transfer of MBMS data to the interested UEs.

8.17 Notification in case of parallel services

8.17.1 Notification of incoming CS domain call during an ongoing MBMS session

For the RRC connected mobiles in UTRAN, the RNS will have received the IMSI from the core network and hence is able to perform paging coordination. The UEs in RRC idle state in UTRAN need to perform paging coordination while receiving the MBMS sessionís user data.

In GERAN, this is achieved by the UE monitoring its paging channels while receiving the MBMS sessionís user data. If the mobile responses to the CS paging in GERAN, then the ongoing MBMS service is likely to be interrupted in the UE.

8.17.2 Notification of additional MBMS session during an ongoing MBMS session

For the RRC connected mobiles in UTRAN, the SGSN has sent the list of MBMS bearer services that the user has activated to the UTRAN. The RNS needs to notify an RRC connected UE.

For the UEs in RRC idle state, the UTRAN performs MBMS notification for the UE.

In GERAN, this is achieved by the UE monitoring its paging channel(s) where notification is sent while receiving the MBMS sessionís user data.

If the mobile accepts the new MBMS session in GERAN, then the ongoing MBMS service is likely to be interrupted in the UE.

8.17.3 Notification of Mobile Terminating PS data during an ongoing MBMS session

For the RRC connected mobiles in UTRAN, the SGSN request the establishment of a RAB which will be used to deliver the MT user data.

For the UEs in RRC idle state, the UTRAN performs paging notification for the UE.

In GERAN, this is achieved by the UE monitoring its paging channels while receiving the MBMS sessionís user data.

If the mobile responses to the PS paging in GERAN, then the ongoing MBMS service is likely to be interrupted in the UE.

8.17.4 Notification of MBMS session during an ongoing CS or PS domain ìconnectionî

When the UE establishes the UTRAN RRC connection for a CS service, the UE shall send a flag indicating that it has activated at least one MBMS bearer service.. The RNC requests the SGSN to send the list of MBMS bearer services that the user has activated to enable the RNC to notify the UE when MBMS session starts.

When a UE moves to PMM-connected state, the SGSN sends the list of MBMS bearer services that the user has activated to the RNC. The RNC notifies the UE when an MBMS session of the userís activated MBMS bearer services starts.

These procedures are not supported by GERAN in this version of the specification.