Technical Specification Group Services and System Aspects Meeting #27, 14 - 17 March 2005,Tokyo, Japan **TSGS#27(05)0110**

Source: **TSG SA WG2**

Title: **CR(s) to 23.246**

Agenda item: **7.2.3**

Document for: **APPROVAL**

S2 Tdoc	Title	Spec	CR	Rev	Cat	C_Ver	Rel	V
S2-050166	Alignment of BM-SC subfunctions to MBMS User Service level	23.246	138	1	F	6.5.0	Rel-6	M
S2-050487	MBMS and the use of FBC	23.246	139	1	F	6.5.0	Rel-6	M
S2-050173	Corrections to MBMS Multicast Service Deactivation Procedure	23.246	140	1	F	6.5.0	Rel-6	M
S2-050175	Providing the BM-SC with approximate UE location information at MBMS context activation	23.246	141		F	6.5.0	Rel-6	M

3GPP TSG-SA WG2 Meeting #44
Budapest, Hungary, 26th Jan - 2nd Feb 2005.

Tdoc ⌘S2-050166

CR-Form-v7

CHANGE REQUEST

⌘ **23.246** **CR** **138** ⌘ **rev** **1** ⌘ Current version: **6.5.0** ⌘

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

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

Title:	⌘	Alignment of BM-SC subfunctions to MBMS User Service level (SA4 & SA3)
Source:	⌘	3GPP TSG_SA WG2
Work item code:	⌘	MBMS
Date:	⌘	17/01/2005
Category:	⌘	**F**
Release:	⌘	Rel-6

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

Use one of the following releases:

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 SA4 MBMS specification (TS 26.346) and SA3 MBMS specification (TS 33.246) has introduced a security function. Even if the security function mainly operates on User Service level e.g. during announcement phase and during key distribution/update, the function should for consistency reasons be reflected in the description of the BM-SC function.
Summary of change:	⌘	Bullet list and figure 5a in subclause 5.1 has been updated and a new subclause 5.1.4a MBMS Security Function is added. Subclause 5.1.1 is updated to reflect the correct location of the key management.
Consequences if not approved:	⌘	Misalignment of SA2 and SA4/SA3 specifications.

Clauses affected:	⌘	5.1; 5.1.1; 5.1.4a

	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.

First Change

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 – 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.

The BM-SC consists of ~~four~~ five sub-functions:

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

This section describes BM-SC functions, which are defined for the standardised MBMS User Services.

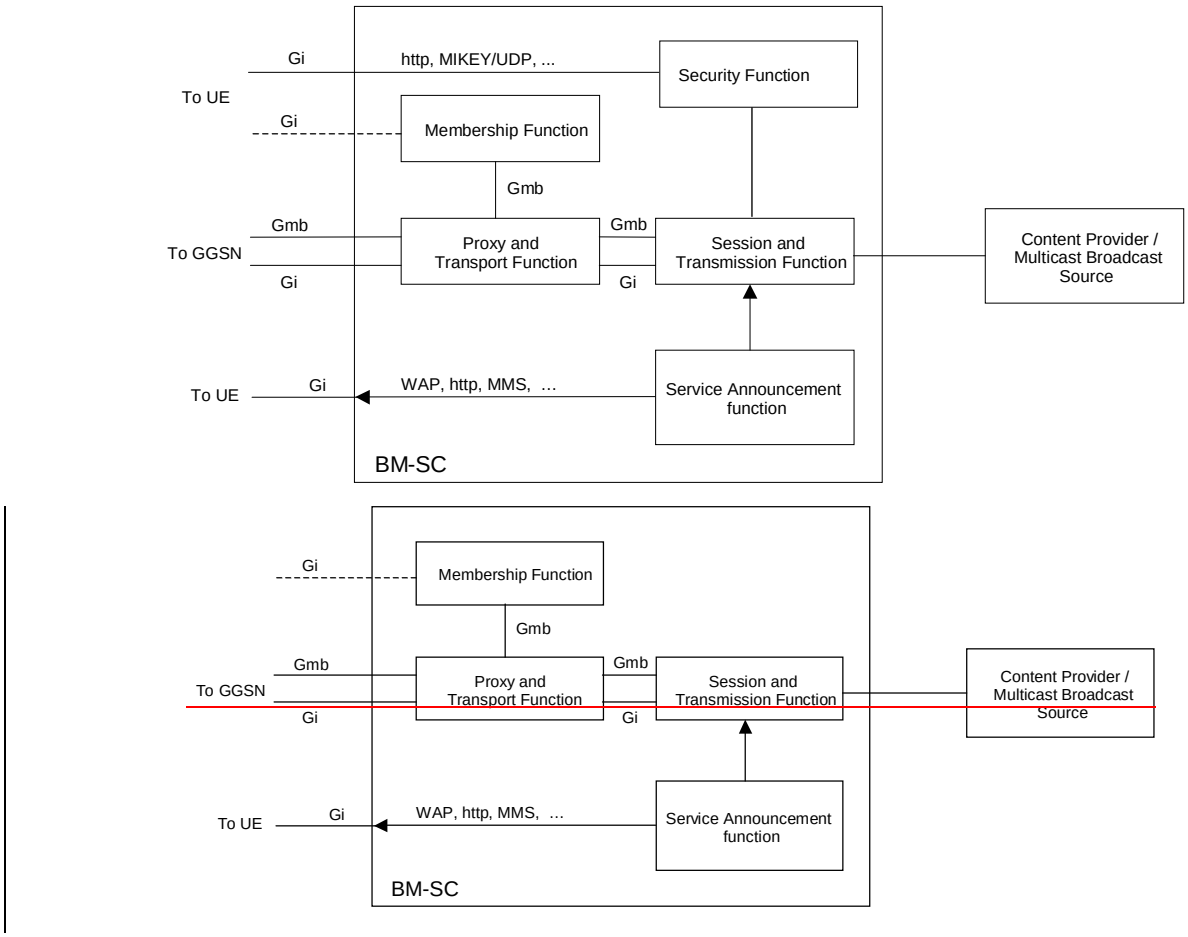

Figure 5a: BM-SC functional structure

5.1.1 Membership Function

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.

5.1.2 Session and Transmission Function

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

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 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.

5.1.4 Service Announcement Function

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 are not 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.

5.1.4a MBMS Security Function

MBMS user services may use the Security functions for integrity and/or confidentiality protection of MBMS data. The MBMS Security function is used for distributing MBMS keys (Key Distribution Function) to authorized UEs.Detailed description of the security functions is provided in [5] (TS 33.246).

End Of Changes

3GPP TSG-SA WG2 Meeting #44 ***Tdoc S2-050487***
Budapest, Hungary, 26th January – 2nd February 2005.

CR-Form-v7.1

CHANGE REQUEST

23.246	CR	139	rev	1	Current version:	6.5.0

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

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

Title:	MBMS and the use of FBC
Source:	3GPP TSG_SA WG2
Work item code:	MBMS
Date:	02/02/2005
Category:	F
Release:	Rel-6

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

Use one of the following releases:
Ph2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)
Rel-7 (Release 7)

Reason for change:	In the GPRS case FBC only operates on a per pdp context basis. TS 23.246 currently assumes that FBC can be used for MBMS charging such that the BM-SC acts as an AF towards the CRF. However TS 23.125 currently specifies that Gx has support for PDP contexts but it has not be developed to support MBMS Bearer Contexts with any relation to a particular subscriber. It is however suitable to 1) apply application level charging for MBMS in the BM-SC as already described in TS 23.246 and 2) collect statistics and charging data records on a per service basis.
Summary of change:	Clarifies that FBC may be used for collecting statistics and charging data records for the purpose of charging a 3rd party suppliers.
Consequences if not approved:	The TS is not aligned with the FBC TS and interoperability problems could occur.

Clauses affected:	10.2

	Y	N		
Other specs affected:	X		Other core specifications	TS 23.125
		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 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 for MBMS Bearer Contexts. ~~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.~~Flow Based Charging (FBC) may be used to collect charging data records for MBMS Bearer Contexts e.g. for the purpose to charge the service provider, cf. 3GPP TS 23.125 [12].

Note: Since multiple users share an MBMS bearer context FBC cannot be used for creating reports on a per user basis.

****** END OF CHANGE *******

3GPP TSG-SA WG2 Meeting #44
Budapest, Hungary. 26th Jan. - 2nd Feb. 2005.

Tdoc ⌘ S2-050173

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.246** **CR** **140** ⌘ **rev** **1** ⌘ Current version: **6.5.0** ⌘

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

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

Title:	⌘	Corrections to MBMS Multicast Service Deactivation Procedure
Source:	⌘	3GPP TSG_SA WG2
Work item code:	⌘	MBMS
Date:	⌘	27/01/2005
Category:	⌘	**F**
Release:	⌘	Rel-6

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

Use one of the following releases:
Ph2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*
Rel-7 *(Release 7)*

Reason for change:	⌘	It is unclear at which step the SGSN shall start when the PDP context linked to the MBMS UE context by the linked NSAPI is deactivated.
Summary of change:	⌘	Corrects the correct step at which the SGSN shall start in the MBMS Multicast Service Deactivation procedure in the scenario described above. Also clarifies that the UE will remove all MBMS UE Contexts locally after the Linked PDP Context was deactivated.
Consequences if not approved:	⌘	An error remains in the MBMS Multicast Service Deactivation procedure.

Clauses affected:	⌘	8.7

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

Other comments: ⌘

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

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

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

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

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), the SGSN initiated Multicast Service Deactivation starts with step 5) or 9), 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~~7).

If the PDP context linked to the MBMS UE context by the linked NSAPI is deactivated by the UE or SGSN or GGSN, then the SGSN shall perform the MBMS deactivation procedure starting ~~at~~with step ~~5) and 8~~7). The UE will remove all MBMS UE Contexts locally after the Linked PDP Context was deactivated.

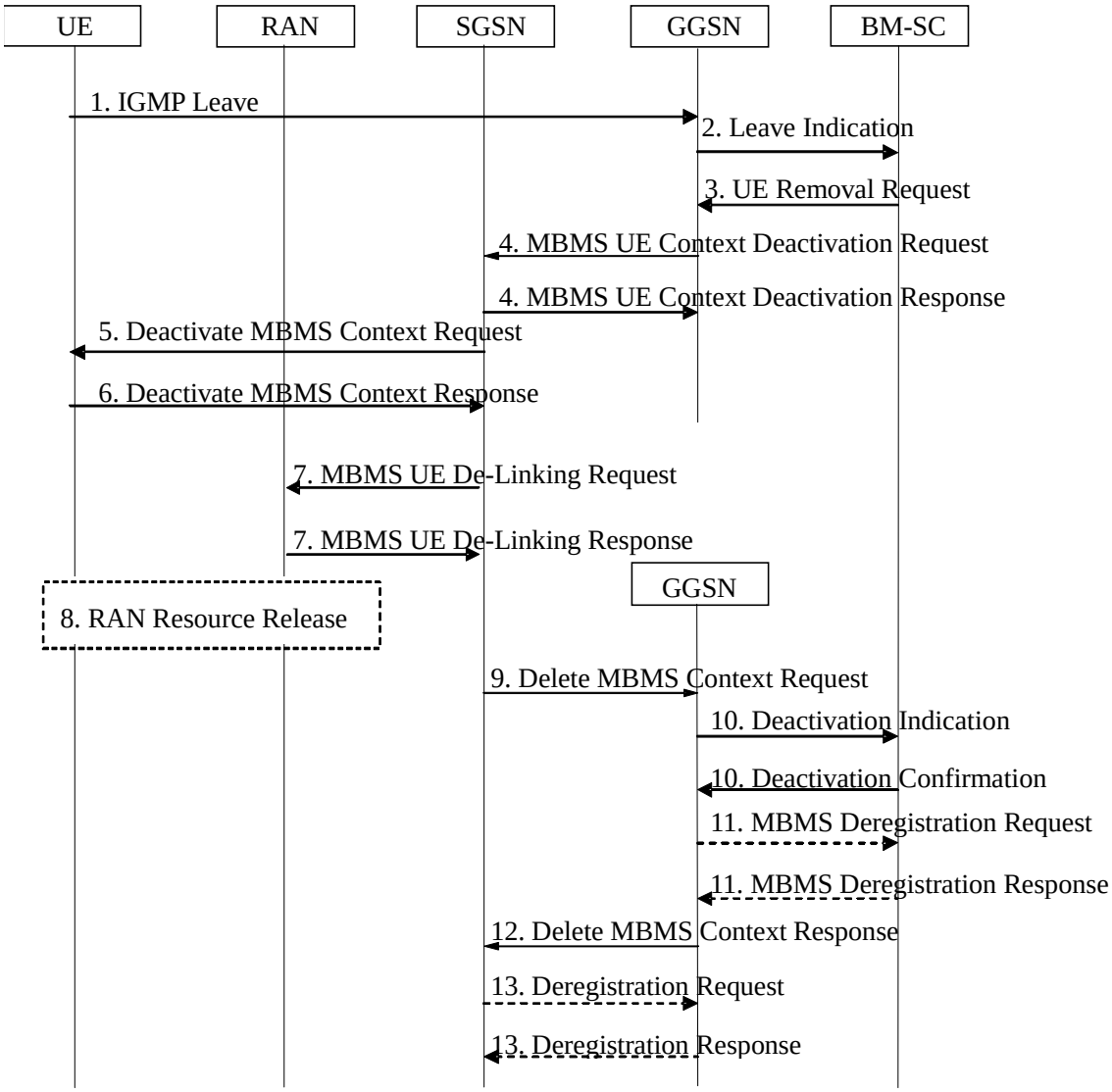

Figure 13: MBMS Multicast Service Deactivation

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 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 the UE is PMM-CONNECTED and has been already linked towards the RAN, t he 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 specified in 3GPP TS 25.346 [10] and 3GPP TS 43.246 [11].

9. 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.

10. 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 specified in 3GPP TS 29.061[4].

11. If the GGSN 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 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".

12. 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. 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-SA WG2 Meeting #44 **Tdoc ⌘S2-050175**
Budapest, Hungary, 26 January - 2 February, 2005

CR-Form-v7.1

CHANGE REQUEST

⌘ **23.246** **CR** **141** ⌘ **rev** **-** ⌘ Current version: **6.5.0** ⌘

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

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

Title:	⌘	Providing the BM-SC with approximate UE location information at MBMS context activation
Source:	⌘	3GPP TSG_SA WG2
Work item code:	⌘	MBMS ***Date:*** ⌘ 27/01/2005
Category:	⌘	**F** ***Release:*** ⌘ Rel-6

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

Use one of the following releases:
Ph2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)
Rel-7 (Release 7)

Reason for change:	⌘	There are a number of service scenarios where an operator may wish to prevent a user Activating (c.f. joining) an MBMS service when the user is a large distance outside of the MBMS service area. These scenarios will be particularly important to operators in very large countries – and many of these eg China, Australia, and probably America, have networks which use a single PLMN identity. Currently the BM-SC does not receive sufficient information from the GGSN to enable these service scenarios to be realised.
Summary of change:	⌘	At MBMS context activation the full Routeing Area Identity is provided to the BM-SC by the SGSN via the GGSN. It is noted that (eg because of the Iur/RRC connected mode), the RAI provided by the SGSN might not correspond to the cell that the mobile is currently using. It is also noted that subsequent movement of the UE is not reported to the BM-SC. Note: because the full RAI includes the MCC and MNC there is no need to separately transfer the subset of the RAI known as the “serving network identity”.
Consequences if not approved:	⌘	Network operators will be missing an important tool that can be used to optimise customer services/network entity load.

Clauses affected:	⌘	8.2

		Y	N			
Other specs affected:	⌘	X		Other core specifications	⌘	29.060, 29.061
			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 **********

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.

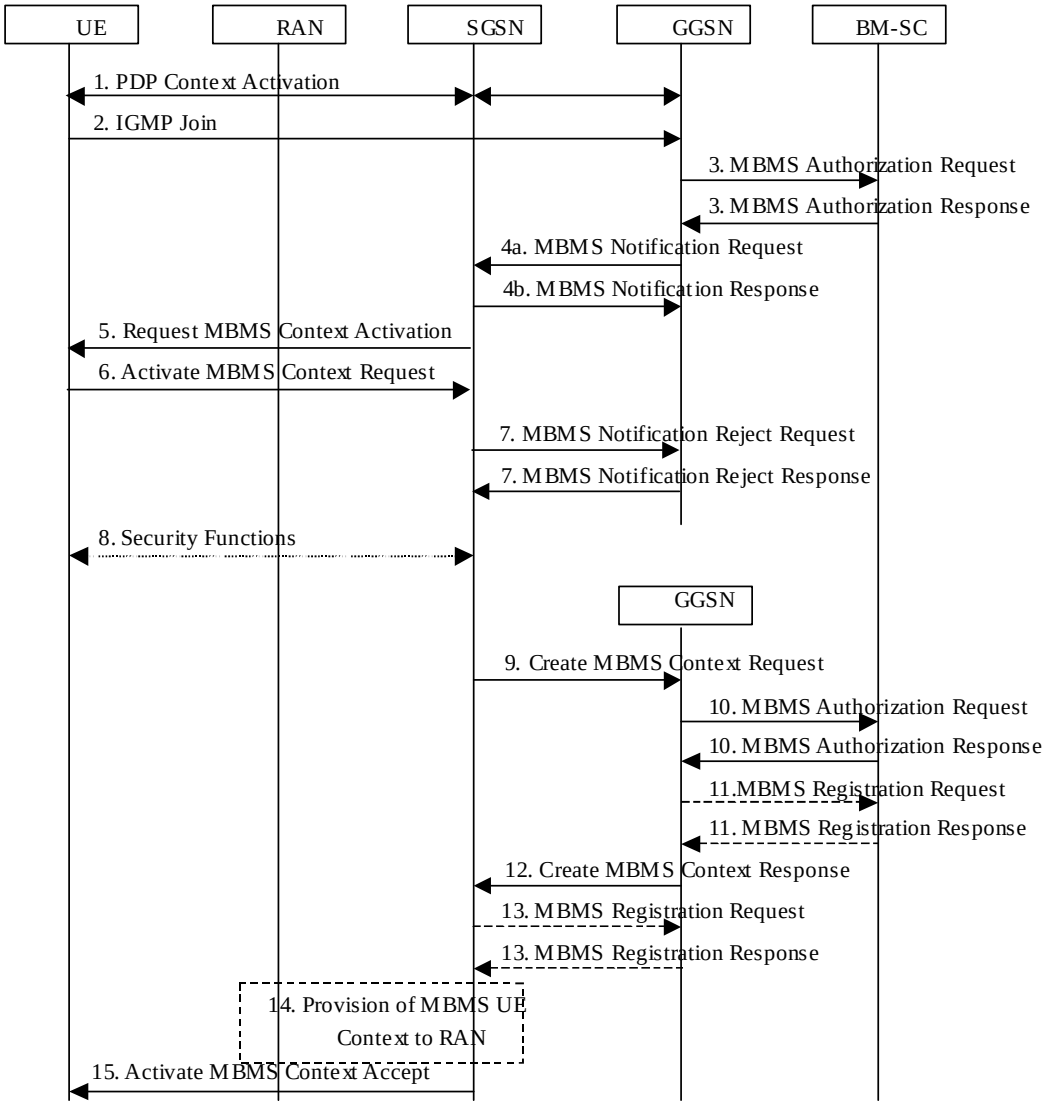

Figure 7: The activation of an MBMS multicast service

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 UE Context. 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.

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, RAI~~Serving network identity~~) to the GGSN.

10. The GGSN sends an MBMS Authorization Request (IMSI, MSISDN, ~~Serving network identity~~ RAI) 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 UE's MBMS bearer capabilities will be verified now. If the SGSN determines that the UE's 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.

**********End Change **********