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Service Centre Specification document (for R1)

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Abstract:

The deliverable D6-6.1 describes the commercial product requirements for the BM-SC.

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EXECUTIVE SUMMARY

This document contains deliverable **D6-6.1** of the IST Integrated Project MAESTRO – Mobile Applications & sErVICES based on Satellite and Terrestrial interRwOrking (IST Integrated Project n° 507023).

MAESTRO project aims at studying technical implementations of innovative mobile satellite systems concepts targeting close integration & interworking with 3G and Beyond 3G mobile terrestrial networks.

MAESTRO aims at specifying & validating the most critical services, features, and functions of satellite system architectures, achieving the highest possible degree of integration with terrestrial infrastructures. It aims not only at assessing the satellite systems' technical and economical feasibility, but also at highlighting their competitive assets on the way they complement terrestrial solutions.

This is the seventh of eight tasks in Work Package 6 – “Architecture”.

The deliverable **D6-6.1** – “ BM-SC Specification Document ” describes the commercial product requirements for the BM-SC. No requirements are specified for the MAESTRO Release 1 test-bed as the BM-SC is not involved in this release of the test-bed.

The task is led by LogicaCMG.

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1 INTRODUCTION

1.1 Background

This document provides an initial draft of the Broadcast Multicast Service Centre (BM-SC) requirements for the commercial SDMB system. This document does not specify any requirements on the BM-SC for the Release 1 Test Bed because the BM-SC is not involved in this release of the Test Bed. Subsequent versions of this document will specify the requirements on the BM-SC for Releases 2 and 3 of the Test Bed.

The main inputs to this specification are as follows:

- SDMB System Technical Requirements (WP 6 Task 6.1 Document D6-1.1)
- SDMB System Definition File (WP 6 Task 6.2 Document D6-2.1)
- SDMB Mission Requirements (WP 1 Document D1-8)
- Network Layer Requirements (WP 4)
- Transport Layer Requirements (WP 5)
- Emerging 3GPP standards (in particular TS 22.146, TS 23.246)
- LogicaCMG's existing Multicast Service Centre platform

This specification has been produced by LogicaCMG.

1.2 Fields of application

This document is applicable to the partners involved with designing, developing, integrating, verifying, validating and maintaining the MAESTRO BM-SC platform. It will be used during the development phases for the Release 2 and Release 3 Test-Bed systems, and also during commercial deployment of the platform by a customer.

2 DOCUMENTARY REFERENCE SYSTEM

This chapter provides a list of all the applicable documents, standards and reference documents that have relate to the production of this technical specification.

2.1 Applicable documents

MAESTRO Contract, Technical annex

2.2 Applicable norms and standards

The following standards are relevant to the definition of this document:

3GPP TS 22.146, Multimedia Broadcast/Multicast Service (MBMS); Stage 1

3GPP TS 22.246, MBMS User Services

3GPP TS 23.246, MBMS Architecture and Functional Description

3GPP TS 25.346, MBMS in the Radio Access Network

3GPP TR 25.992, UTRAN/GERAN requirements

3GPP TS 29.061, PLMN and PDN interworking

3GPP TR 29.846, CN1 procedure description

3GPP TS 33.246, MBMS Security

At the time of writing it is not possible to specify in detail the exact versions of these standards that are applicable as the standardisation process is on-going.

2.3 Reference documents

The following documents that are being defined under the auspices of the MAESTRO project have been referenced in putting this document together:

D1-8 SDMB Mission Requirements, version 1.1, 27 February 2004.

D6-1.1 SDMB System Technical Requirement Document (for R1), version 2.2, 1 April 2004.

D6-2.1 SDMB System Definition File (no draft available for this version of D6-6.1)

D4-1 Network Layer Requirements (no draft available for this version of D6-6.1)

D5-1 Reliable Transport Layer Requirements, version 2.4, 22 April 2004.

2.4 Documents tree

To be added.

2.5 Order of precedence

To be agreed.

3 TERMS, DEFINITIONS, ABBREVIATED TERMS AND SYMBOLS

Please refer to Tn002.ASP.MAESTRO.V2.2 for a detailed glossary of terms as used within the context of the MAESTRO project.

3.1 Terminology and definitions

3.2 Abbreviations

4 GENERAL PRESENTATION OF THE PRODUCT

This chapter provides a high level overview of the commercial BM-SC product without specifying any detailed formal requirements. The latter are specified in detail in chapter 5.

4.1 Perspectives of the product

The BM-SC is a functional entity that will provide a range of functions related to the provision of the SDMB service. For example, the BM-SC will control user access to services, authorise and initiate bearer services within the SDMB system, and schedule and deliver transmissions over the SDMB system.

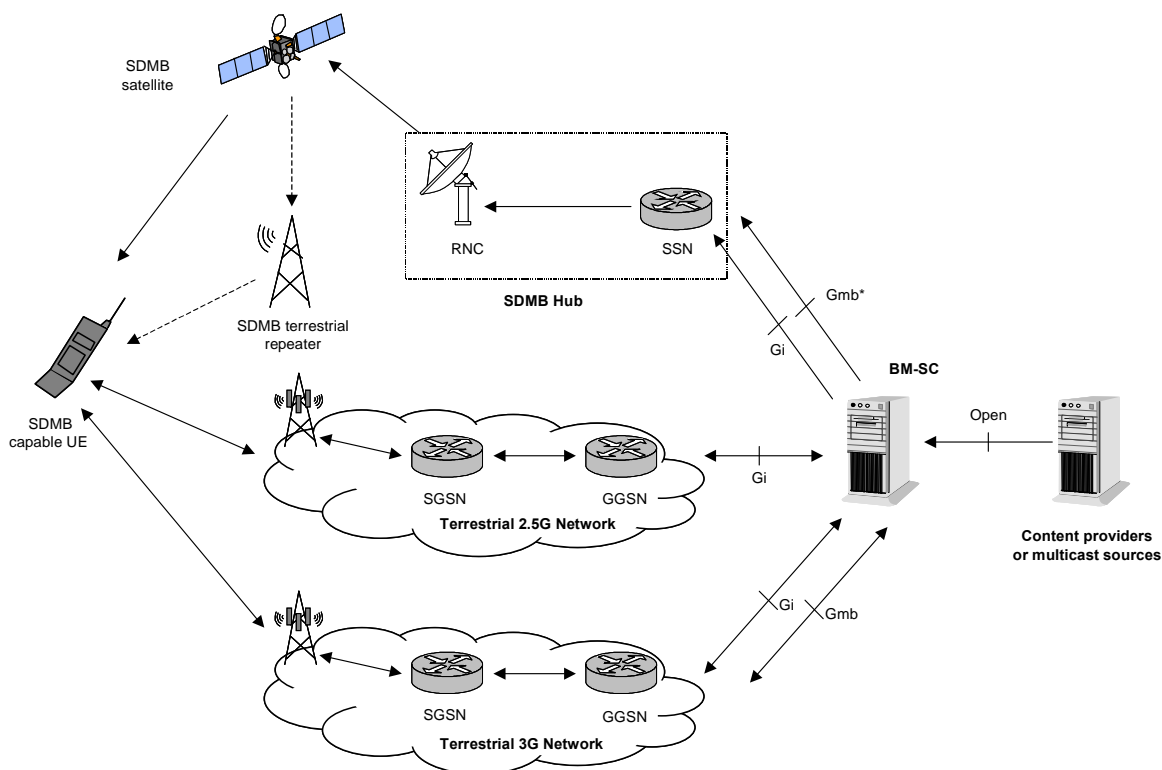


Figure 1: Context of BM-SC.

The context of the BM-SC within the SDMB System is illustrated in the figure above. The figure shows that the BM-SC will support the following interfaces:

- **Gmb*** – towards the SDMB Hub (SSN) to support signalling exchanges to control the establishment of SDMB services over the SDMB system (ie control plane functions). This interface is denoted with an asterisk to highlight the fact that the standard 3GPP Gmb interface will be tailored to suit the particular requirements of the SDMB system. For example, for the SDMB system it will only be necessary to support the MBMS Broadcast Mode as defined in the 3GPP MBMS specifications. The Gmb* interface is also internal to the SDMB system and therefore is not fully reliant on the completion of the MBMS standardisation

process (see below). However, the intention of the MAESTRO project should be to track (and adopt as appropriate) any developments within 3GPP MBMS.

- Gi – towards the SDMB Hub (SSN) to support delivery of IP multicast datagrams (ie bearer plane) to a specified Quality of Service (QoS).
- Gmb – towards the GGSN in UMTS Release 6 MBMS-capable terrestrial networks to control the establishment of broadcast and/or multicast services over terrestrial networks. It should be noted that the Gmb interface is not currently fully defined by 3GPP.
- Gi – with the GGSN in UMTS Release 6 MBMS-capable terrestrial networks to support the delivery of IP multicast datagrams with a specified QoS.
- Gi – with the GGSN in terrestrial 2.5G / 3G networks to support point-to-point connectivity with the SDMB enabled UE (e.g. to support signalling exchanges for service join, reliable transport etc.).
- Open interface(s) with external Content Providers for the provision of multimedia content for delivery over the SDMB system. The precise interfaces that will be supported by the BM-SC with Content Providers is for further study.

It is worth noting that MBMS standardisation within 3GPP is still in progress with a large number of areas still to be defined and approved. The target date for completion of this standardisation process is June 2004.

TS 23.246 defines the functional requirements for the BM-SC and the framework provided by this specification is considered sufficiently stable to be suitable for taking forward into SDMB.

The implementation of the BM-SC for SDMB will be based upon LogicaCMG's existing Multicast Service Centre platform enhanced as necessary to meet the requirements defined in this specification.

4.2 Definition of the market

To be aligned with D1-8.

4.3 Definition of the missions of the product

To be aligned with D1-8.

4.4 Category of users and associated characteristics

To be aligned with D1-8.

4.5 Operating environment

For further study.

4.6 Dimensioning

For further study.

4.7 Hypotheses

To be added.

5 COMMERCIAL PRODUCT REQUIREMENTS

This section addresses the requirements of the commercial BM-SC product, and draws upon the existing 3GPP MBMS specifications as well as a number of documents currently being generated within the MAESTRO project (see section 2.3).

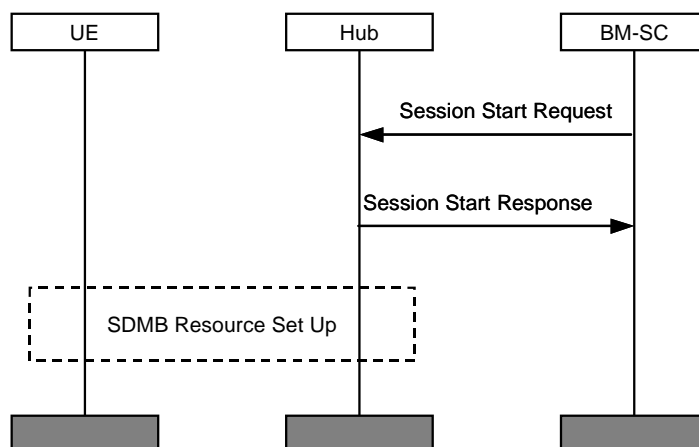
5.1 External Interface requirements

BM-SC.C.REQ.01. The BM-SC shall support the Gmb* signalling plane interface with the SDMB Hub to control the establishment (session start and session stop) of broadcast bearers over the SDMB system. This includes the means to:

- specify bearer-level QoS requirements.
- specify the geographic service area.

The MBMS Architectural and Functional Description TS 23.246, defines the following procedures to control establishment of MBMS bearer contexts within the CN and RAN:

- **Session Start** (Section 8.3 of TS 23.246) – ie a request to activate all necessary resources in the network for the transfer of IP multicast traffic and to notify UEs of imminent start of the transmission.

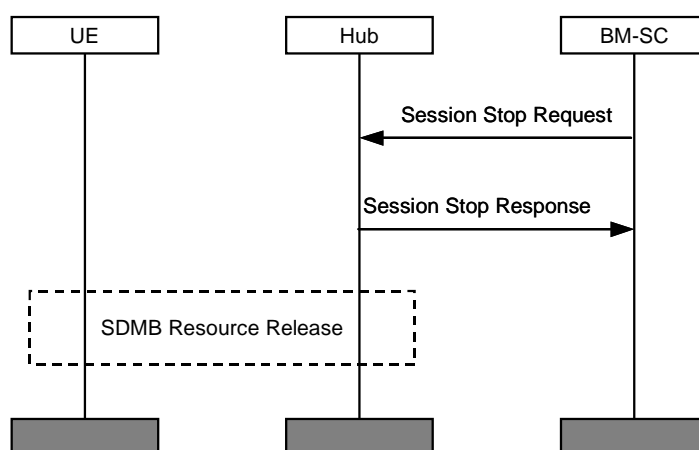


It is assumed that the Hub is not required to Register (Section 8.4 of TS 23.246) with the BM-SC prior to Session Start (i.e. the BM-SC is statically configured to always initiate sessions with the Hub if subscribers have requested to receive the service and the routing rules dictate that the service should be transmitted over the SDMB network).

At Session Start the BM-SC needs to define the characteristics of the bearer context to be set up. These have not been defined in detail by 3GPP; the following are possible:

- Bearer identifier (eg TMGI defined by 3GPP)
- Session identifier (if separate id required)

- IP multicast address
 - Source address (if Source Specific Multicast)
 - Quality of Service parameters
 - Service Area (probably related to a set of SDMB beams)
 - Expected duration of service
- **Session Stop** (Section 8.5 of TS 23.246) – ie a request to release resources where there is no more IP multicast traffic expected for a sufficiently long period (or at end of service) to justify a release of user plane resources in the network.



Similarly It is assumed that the Hub is not required to De-Register (Section 8.6 of TS 23.246) with the BM-SC.

The protocol to be used to carry the bearer control signalling has yet to be defined. It is anticipated that an IP-based signalling protocol will be used, either defined by 3GPP or adapted from an IETF standard. Because the full MBMS Gmb interface has a number of AAA requirements, use of IETF AAA signalling protocols is being considered. Of these DIAMETER (RFC 3588) appears the most appropriate as it permits true peer-to-peer signalling (as opposed to the more common RADIUS which assumes a client-server relationship). The mapping to DIAMETER has yet to be proposed.

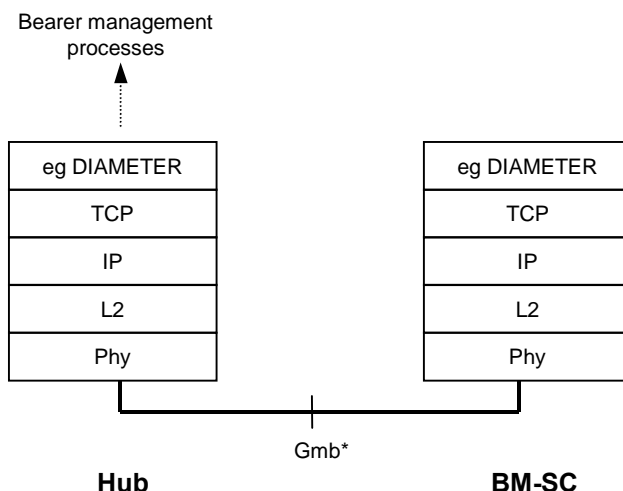


Figure 2: Gmb* bearer control signalling plane (example)

BM-SC.C.REQ.02. The BM-SC shall support the Gi interface with the SDMB Hub which may be required to perform the following functions:

- **Service announcements:** To inform the end user of forthcoming services (TBC if to be supported over SDMB or terrestrial network or both).
- **Broadcast Transmission:** User plane interface to support the transmission of IP multicast traffic from the BM-SC to the SDMB Hub and on to the SDMB enabled UE.

Once a SDMB bearer is established for a particular IP multicast address, traffic can be injected into the SDMB Hub. It is anticipated for the SDMB service that all multicast traffic will be sourced from the BM-SC, and therefore the User Plane interface needs only to be between the Hub and the BM-SC. There remains the possibility that some multicast services may be sourced other than from the BM-SC, and hence the Hub may need to interface directly with external PDNs. This is for further study.

WP4 is required to assess the means by which the BM-SC and Hub will be interconnected at the network and lower layers (eg dedicated leased lines, tunnelled over public networks, transferred via a multicast backbone etc). Part of this activity will need to determine exactly what will be required in terms of routing protocols, multicast address management etc. In all instances it is assumed that standard IETF multicast protocols will be employed on the User Plane.

It is expected that the User Plane interface to have the architecture shown below.

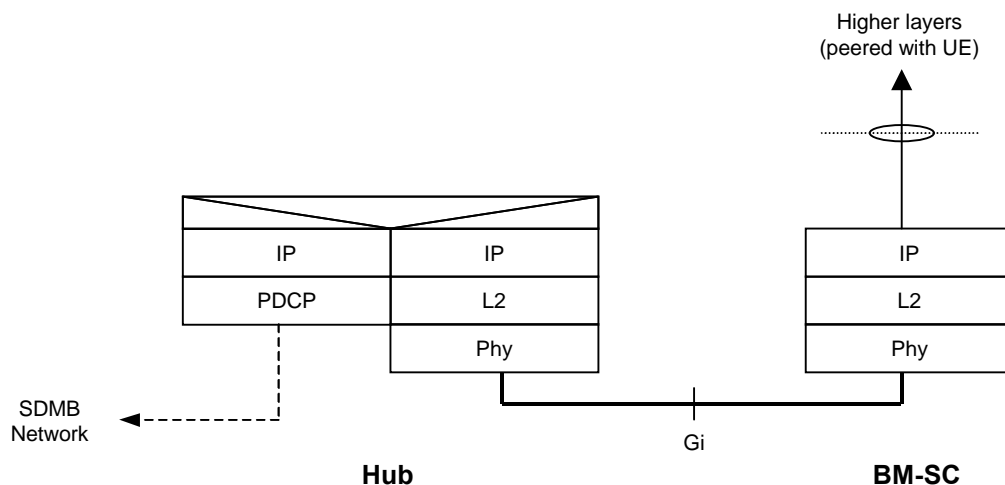


Figure 3: Gi User Plane

It is worth noting that between the BM-SC and the UE the following mechanisms may be applied:

- Security mechanisms (ie encryption)
- Reliable transport mechanisms

Because these mechanisms will be applied end-to-end, the Hub should treat these transparently. It is therefore recommended that the Hub should simply act as an IP multicast router and not have any higher layer functionality.

A number of User Plane control mechanisms are also required in order to support the multicast service:

- **Multicast routing:** Unless some simple packet forwarding mechanism is employed between the BM-SC and Hub, it is assumed that the Hub will need to join/leave the multicast group by sending routing messages upstream towards the source. Depending on the architecture this may be achieved using the host-router protocol IGMP, but more likely will be served by an inter-network routing protocol such as PIM-SM. This is for further study in WP4.

It will also be necessary when accessing through a multicast backbone to specify Source Specific Multicast (SSM) on the Gi interface in order to ensure that only traffic from the defined source will be injected into the SDMB system.

- **QoS control:** The network bearer between the BM-SC and the Hub may need to be configured to support a particular QoS, matched to the Quality of Service specified in the Bearer Control messages for setting up the radio bearer across the SDMB system. Suitable mechanisms for establishing QoS depend on the means by which the BM-SC and Hub are to be interconnected but may need to rely on pt-pt QoS mechanisms such as RSVP, Diff-Serv/MPLS, or IP over ATM.

Traffic will also need to be adequately policed at the Hub to ensure that several streams injected from different SDMB service providers are transmitted over the SDMB radio bearer to the requested Quality of Service.

BM-SC.C.REQ.03. The BM-SC shall support the 3GPP Gmb interface with UMTS Release 6 MBMS-capable terrestrial networks.

BM-SC.C.REQ.04. The BM-SC may be required to support the Gi interface with UMTS Release 6 MBMS-capable terrestrial networks to support the delivery of multicast and/or broadcast bearer transmissions to SDMB enabled UEs.

BM-SC.C.REQ.05. The BM-SC shall support a unicast point-to-point connection with the UE via the Gi interface in order to support some or all of the following functions:

- Signalling with the UE (e.g. session management, security management)
- Return channel for reliable transport layer
- Point-to-point transmissions to particular mobiles, either
 - following transmission failure over SDMB (tbc), or
 - to transmit to mobiles outside SDMB coverage (tbc), or
 - to transmit to mobiles based on other criteria (tbc)
- Feed into SDMB service from mobile (eg 'groupcast' service)

It is noted in the above that the scalability of this link will be a key issue in the context of the SDMB system.

BM-SC.C.REQ.06. The BM-SC shall support TBD interfaces (multicast, unicast or other) with external Content Providers (exact nature of interfaces tbd) to source multimedia content for delivery over the SDMB system.

5.2 Operational requirements

5.2.1 Transition between existing and new system

For further study

5.2.2 Operations preparation

5.2.2.1 Development system

To be defined

5.2.2.2 Associated validation system

To be defined

5.2.2.3 Associated maintenance system

To be defined

5.2.3 Operability

5.2.3.1 General requirements for operability

For further study

5.2.3.2 Ergonomics – human factors

For further study

5.2.3.3 Observability and Monitoring

For further study

5.2.4 Operational scenarios

The BM-SC data model and associated operation is summarised in this section. Where possible, comments are made as to the mapping from this model to the SDMB system context (ie SDMB role model). It should be noted however, that because the SDMB role model is still being defined the mapping presented below may evolve or need to be refined.

The data model consists of 3 entities as follows:

- **Users** – who have different privileges to interact with the BM-SC depending upon their status as follows:
 - Standard Users – the majority of Users are Standard Users who do not have any rights to alter the configuration of the BM-SC in any way.
 - Group Users – these Users have the right to control the status of Standard Users within the same group.
 - Root Users – who are the master Users for the system as a whole and who have (for example) the right to control the status of both Group Users and Standard Users.

In the context of the SDMB system role model, if it is assumed that the SDMB Operator hosts the BM-SC on behalf of a number of Mobile Network Operators, the Root User would map to the SDMB Operator, the Group User would map to the Mobile Network Operator and the Standard User would map to the End User.

- **Groups** – all Users belong to a Group. For example, a Group may be a corporate organisation, with the Users being employees of that organisation. Each group subscribes via the BM-SC to receive a number of the available channels.

Continuing the above mapping to the SDMB context, a Group would map to a particular Mobile Network Operator.

- **Channels** – these represent the multimedia services that are delivered by the BM-SC. These may be data, audio, video etc.

In the context of the SDMB system, channels map to SDMB services.

Root Users can administer all the available Groups and Channels and, in particular, are able to perform the following functions:

- Assign Users to Groups (each Group must have at least one User)
- Assign Channels to Groups
- Assign a User within a Group to be the Group User

The Group User is effectively the administrator for a Group and is able to see and control access to only those Channels that have been allocated to that Group. They will also be able to add Standard Users to the Group and promote Users within the Group to the level of Group User.

The operations that can be performed by the different categories of User defined above are described in more detail in the following sub-sections.

5.2.4.1 Standard User Operations

The figure below illustrates the operations that can be performed by a Standard User. The Standard User has no privileges other than to view and edit their personal details, check what channels they have been given access to, and to change the password they use to log onto the system via the web interface.

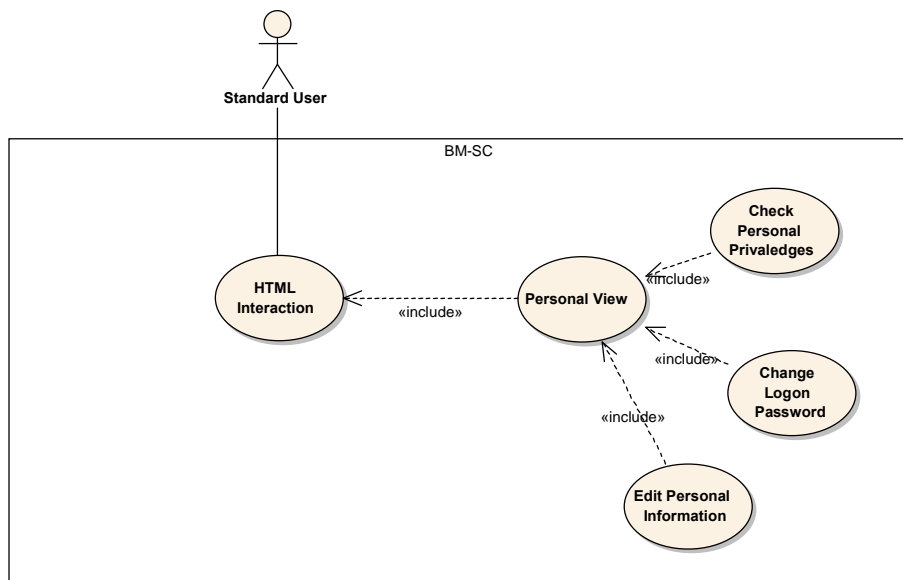


Figure 4: Standard User Operations.

Note that within the context of the SDMB system, it is unlikely that the Standard User (or End User) will be allowed to interact directly with the BM-SC to view their personal details in this way.

5.2.4.2 Group User Operations

The Group User is able to manage other Standard Users within the same Group. In this way devolved management of Groups is possible thereby offering the opportunity to lighten the load on the Root User and increase the autonomy of the Group. The Group User has the same

privileges as the Standard User (ie the ability to check their own status as the Standard User) but in addition they have the ability to:

- Add Standard Users to the Group,
- Promote a Standard User to a Group User for that group
- Edit Standard User details and privileges (eg what channels they have access to).

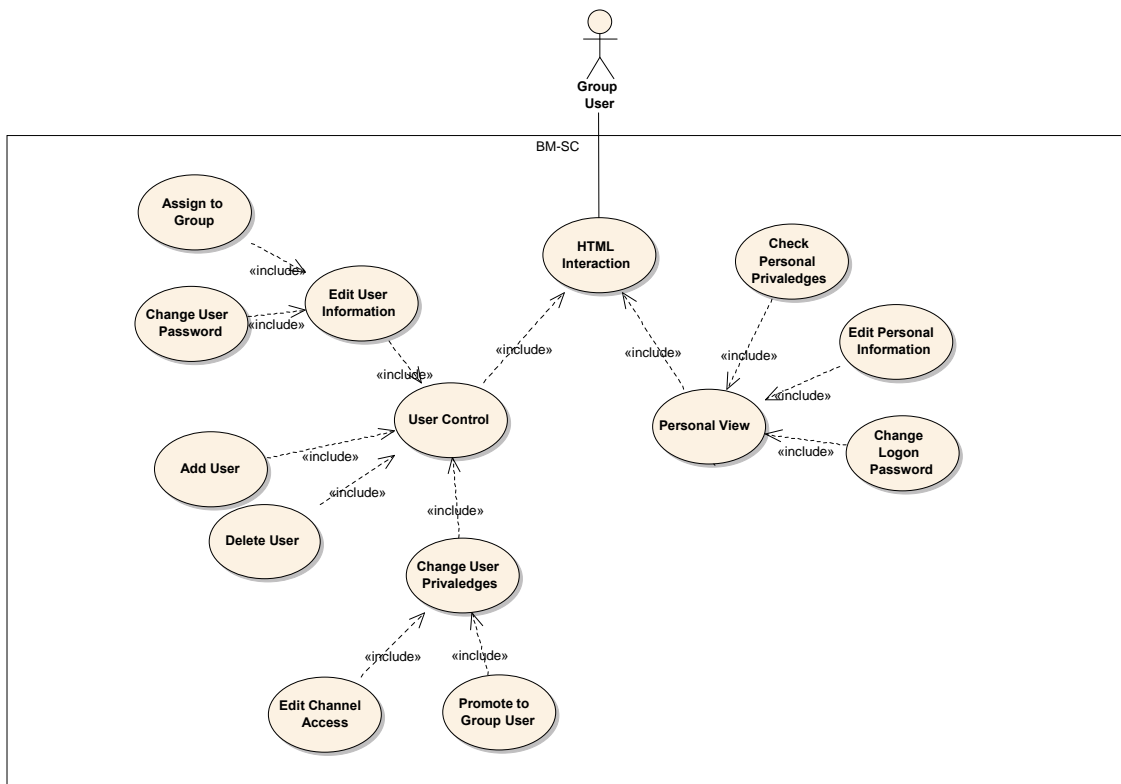


Figure 5: Group User Operations.

5.2.4.3 Root User Operations

The figure below illustrates the operations that can be performed by Root Users. As the figure illustrates, the Root User has the same privileges as the Group User but in addition they have the ability to:

- Add / create Groups
- Add Channels
- Assign Channels to Groups
- Edit User, Channel and Group data.

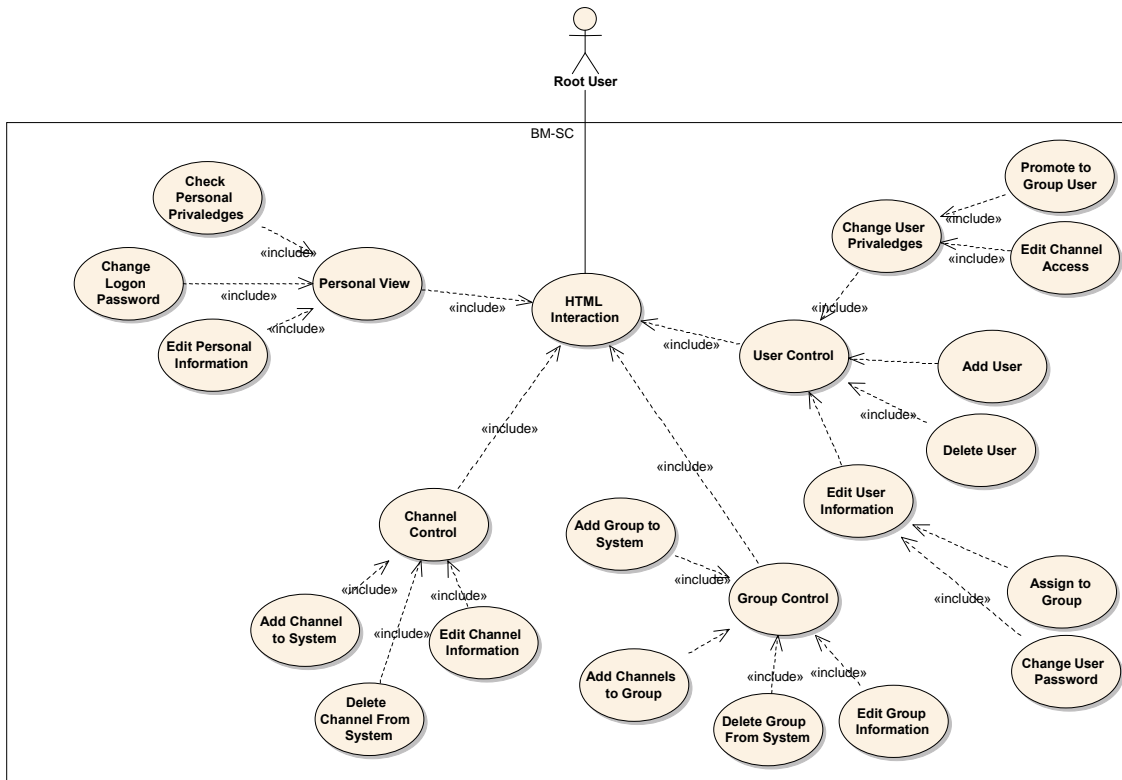


Figure 6: Root User Operations.

5.3 Functional requirements

5.3.1 Specification of the product states

For further study

5.3.2 Content Provider Authentication, Authorisation and Charging

BM-SC.C.REQ.07. The BM-SC shall be able to authenticate 3rd party content providers that provide content for SDMB transmissions.

BM-SC.C.REQ.08. The BM-SC shall be able to verify the integrity of data received from content providers.

BM-SC.C.REQ.09. The BM-SC shall be able to generate accounting records for content provider transmitted data.

5.3.3 SDMB Transport

BM-SC.C.REQ.10. The BM-SC shall be able to provide the SDMB Hub with transport associated parameters such as bearer-level QoS and the SDMB service area.

BM-SC.C.REQ.11. The BM-SC shall be able to initiate and terminate SDMB bearer resources prior to and following transmission of SDMB data.

5.3.4 SDMB Transmissions

BM-SC.C.REQ.12. The BM-SC shall be able to accept content from external sources and transmit it using error resilient schemes at the transport layer (ie layer 4). Details of these schemes are under study within WP5.

BM-SC.C.REQ.13. The BM-SC shall be able to schedule SDMB service transmissions (and re-transmissions) according to a pre-defined schedule.

BM-SC.C.REQ.14. The BM-SC shall be able to route SDMB services either via the SDMB System or via terrestrial UMTS Release 6 MBMS-capable mobile networks according to a defined routing policy.

5.3.5 Service Announcements

BM-SC.C.REQ.15. The BM-SC shall be able to provide service announcements for SDMB services providing details of how the end user should access the service (detailed mechanisms are for further study).

5.3.6 SDMB Service Delivery

BM-SC.C.REQ.16. The BM-SC shall be able to define geographical areas and associate these with particular SDMB services. (Geographic areas likely to be based upon spot beam coverages – for further study).

BM-SC.C.REQ.17. The BM-SC shall be able to define the end-to-end QoS requirements for each SDMB service.

BM-SC.C.REQ.18. The BM-SC shall be able to associate bearer-level QoS requirements with each end-to-end SDMB service.

BM-SC.C.REQ.19. The BM-SC shall be able to derive the bearer-level QoS requirements in accordance with a service level agreement (SLA) with an external service provider.

BM-SC.C.REQ.20. The BM-SC shall be able to support the following IP-based multimedia content formats:

- Audio
- Video
- Data

(Detailed formats for further study)

BM-SC.C.REQ.21. The BM-SC shall support the following proposed SDMB services:

- Streaming
- Download
- Groupcast

NB Detailed definitions of these services for the commercial system are for further study.

BM-SC.C.REQ.22. The BM-SC shall support MBMS Broadcast Mode (as defined in the 3GPP MBMS standards) towards the SDMB Hub.

BM-SC.C.REQ.23. The BM-SC may be required to support MBMS Broadcast and Multicast Modes towards terrestrial MBMS-capable mobile networks.

5.3.7 End-User Subscription Requirements

BM-SC.C.REQ.24. The BM-SC shall allow an end user to subscribe or un-subscribe to one or more SDMB services.

BM-SC.C.REQ.25. The BM-SC shall be able to store subscription details for each end user.

5.3.8 Accounting Requirements

BM-SC.C.REQ.26. The BM-SC shall be able to generate accounting records for use in billing end users for reception of each SDMB service based upon:

- The duration of the activated SDMB service
- The volume of data transmitted.

5.3.9 Security Functions

BM-SC.C.REQ.27. The BM-SC may be required to authenticate the end user before allowing access to SDMB services (for further study in WP4).

BM-SC.C.REQ.28. The BM-SC shall be able to authorise access to SDMB services based upon the end user's subscription profile (Details TBC).

BM-SC.C.REQ.29. The BM-SC may be required to authorise access to SDMB services based upon the geographical location of the UE (for further study).

BM-SC.C.REQ.30. The BM-SC shall support end-to-end encryption and associated key management mechanisms to ensure that only authorised users can access the SDMB service. (Specific security algorithms are TBC).

5.4 Performance requirements

BM-SC.C.REQ.31. The BM-SC shall be able to support one or more SDMB services simultaneously.

Additional performance requirements are for further study.

5.5 Capacity requirements

For further study

5.6 Security Requirements

For further study

5.7 Regulations requirements

For further study

5.8 RAMS requirements

5.8.1 Reliability

For further study

5.8.2 Availability and Continuity

For further study

5.8.3 Maintainability

For further study

5.8.4 Safety of means and people

Not applicable

5.8.4.1 Functions Safety requirements

Not applicable

5.8.4.2 Equipment Human Safety requirements.

Not applicable

5.9 Environment requirements

5.9.1 Mechanical Interface Requirements

Not applicable

5.9.2 Environmental Constraints

Not applicable

5.9.2.1 Mechanical environment

Not applicable

5.9.2.2 Natural environment

Not applicable

5.9.2.3 Radiation environment

Not applicable

5.9.3 Power Supply Requirements

For further study

5.10 Design and Development requirements

5.10.1 Architecture

For further study

5.10.2 Interfaces

5.10.2.1 SDMB Hub Interface

For further study

5.10.2.2 UMTS Release 6 Network Interface

For further study

5.10.2.3 Interfaces to Content Providers

For further study

5.10.3 Reusability

Not applicable

5.10.4 S/W technologies and processes

For further study

5.10.5 Particular instructions for materials and procedures

Not applicable

5.10.6 Robustness

For further study

5.10.7 Efficiency margins

Not applicable

5.10.8 Expansion capability - Potential for additional services

For further study

5.10.9 Portability

For further study

5.10.10 Mechanical design

Not applicable

5.10.11 Electrical design

Not applicable

5.10.12 Thermal design

Not applicable

5.10.13 Production

For further study

5.11 Integrated Logistic Support requirements

Not applicable

5.12 Result Assurance requirements

Not applicable

6 TEST BED R1 REQUIREMENTS

This section is not applicable as the BM-SC is not part of the Release 1 Test Bed.

7 REQUIREMENTS TRACEABILITY

7.1 Applicable 3GPP TS 23.246 Requirements

This section captures the key functional requirements from TS 23.246 (V6.2.0 Mar-04) that are applicable to the BM-SC. As the 3GPP MBMS specifications become more stable, it may be appropriate to include a more detailed compliance matrix in later versions of this specification (e.g. including compliance against the various MBMS procedures). Where possible, a reference to associated requirements within this specification is provided.

TS 23.246 REQUIREMENT	Compliance of Commercial Product	Reference
5 Functional Entities To Support MBMS		
5.1 Broadcast-Multicast Service Centre (BM-SC)		
5.1.1 Content Provider Authentication, Authorization and Charging		
The BM-SC shall be able to authenticate 3rd party content providers, providing content for MBMS transmissions.	C (for SDMB transmissions)	BM-SC.C.REQ.07
3rd party content providers may wish to initiate an MBMS transmission. In such cases, the BM-SC shall be able to authorize content providers to transmit data over MBMS bearer services depending on operator policy.	For further study	
The BM-SC shall be able to verify the integrity of data received from content providers.	C	BM-SC.C.REQ.08
The BM-SC shall be able to generate charging records for content provider transmitted data.	C	BM-SC.C.REQ.09
5.1.2 MBMS Transport		
The BM-SC shall be able to provide the GGSN with transport associated parameters such as quality-of-service and MBMS service area.	C (for SDMB Hub not GGSN)	BM-SC.C.REQ.10
The BM-SC shall be able to initiate and terminate MBMS bearer resources prior to and following transmission of MBMS data.	C (for SDMB resources)	BM-SC.C.REQ.11
5.1.3 MBMS Transmissions		
The BM-SC should be able to accept content from external sources and transmit it using error resilient schemes (e.g. specialized MBMS codecs).	C (for SDMB case)	BM-SC.C.REQ.12
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.	C (for SDMB case)	BM-SC.C.REQ.13
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. These retransmissions are transparent to the RAN and MBMS user service.	For further study	

TS 23.246 REQUIREMENT	Compliance of Commercial Product	Reference
5.1.4 Service Advertisement and Description		
The BM-SC shall be able to provide service announcements for multicast and broadcast MBMS user services.	C (for SDMB case)	BM-SC.C.REQ.15
The BM-SC 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).	C in principle but for further study	BM-SC.C.REQ.15
The BM-SC 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.)	C in principle but for further study	BM-SC.C.REQ.15
The BM-SC 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.	C in principle but for further study	BM-SC.C.REQ.15

Table 1: Compliance against applicable 3GPP TS 23.246 requirements.

7.2 Applicable D1-8 SDMB Mission Requirements

This section captures the requirements defined in D1-8 (v1.1) that are applicable to the BM-SC commercial product. Where possible, a reference to associated BM-SC requirement(s) is provided.

D1-8 REQUIREMENT	Compliance of Commercial Product	Reference
D1-8 Section 4.2 SDMB Operator		
D1-8 Section 4.2.3 Service Requirements:		
The SDMB system shall provide streaming, download as well as groupcast services.	C	BM-SC.C.REQ.21
The SDMB system shall be designed to allow third party service providers to deliver services.	Proposed service model(s) and architecture(s) require further definition.	
The system shall be able to provide localised datacast services, i.e. to datacast to a group of users in a specific area.	C	BM-SC.C.REQ.16
The system shall enable a SDMB operators to host one or more mobile portal.	C in principle – but proposed role model and architecture(s) need further definition.	
D1-8 Section 4.2.4 Billing Requirements		
It shall be possible to bill the mobile IP datacast services delivery based on volume of content transmitted per service subscribed, volume of content selected by the user equipment, volume consumed by the user or SDMB service delivery activation duration.	PC – BM-SC shall support accounting based on volume of content transmitted per service subscribed and duration. DRM related functionality is for further study.	BM-SC.C.REQ.26

D1-8 REQUIREMENT	Compliance of Commercial Product	Reference
D1-8 Section 4.2.5 Operational Requirements		
The SDMB system shall be agnostic to the type of content transmitted which can be for example audio, video, HTML, software, file data.	C	BM-SC.C.REQ.20
The SDMB system shall implement features enabling to always select most cost effective transmission media between the SDMB and 3G mobile network for the delivery of a mobile IP datacast service with respect to targeted audience, required delay.	C	BM-SC.C.REQ.14
The SDMB operator shall be able to monitor the mobile network usage.	Requirement on BM-SC for further study	
The failure of a SDMB sub-system shall not prevent to deliver some mobile IP datacast service.	Reliability requirements for further study	
The SDMB system shall be designed to support the broadcast mode defined in 3GPP in MBMS related documents.	C	BM-SC.C.REQ.22
It shall be possible to multiplex mobile IP datacast service with useful data rate ranging from 8 kbit/s to 384 kbit/s by steps of 8 kbit/s.	Requirement on BM-SC for further study	
D1-8 Section 4.5 Mobile Portal		
D1-8 Section 4.5.3 Service Requirements		
For each mobile IP datacast service to be offered to end-users, the mobile portal shall be able to select the targeted audience: targeted area, multicast group.	C	BM-SC.C.REQ.24, BM-SC.C.REQ.16
The SDMB system shall provide means to deliver mobile IP datacast services to all the users located in a spot area or to restrict the delivery only to the users that have subscribed to the service.	C	BM-SC.C.REQ.24, BM-SC.C.REQ.16
The mobile IP datacast service shall include means to provide efficient DRM functions.	DRM requirements for further study	
It shall be possible to prevent access to some pre-distributed content when a terminal goes outside of 2G and 3G mobile network coverage.	For further study	
Hosting services provided by SDMB operator shall not impact the service design and architecture.	For further study - need better understanding of meaning of 'hosting services'	
The system shall allow a service provider to select the required QoS (real time versus background, guaranteed transfer delay, content size).	C in principle – mechanisms for selection require further definition	BM-SC.C.REQ.17, BM-SC.C.REQ.19
For each mobile IP datacast service to be offered to end-users via SDMB system, the mobile portal shall be able to select the QoS: max delay delivery, error protection level and the targeted audience: targeted area, multicast group.	C in principle – but SDMB role model needs to be defined in more detail.	BM-SC.C.REQ.16, BM-SC.C.REQ.17, BM-SC.C.REQ.19
The mobile portal shall be able to deliver at least 30% of streaming service with the SDMB system.	Requirements on BM-SC for further study	
The system shall allow a mobile portal to change dynamically the QoS associated to a SDMB service.	Requirements on BM-SC for further study	

D1-8 REQUIREMENT	Compliance of Commercial Product	Reference
D1-8 Section 4.6 Public Security Service Provider		
D1-8 Section 4.6.3 Service Requirements		
Any SDMB user shall be alerted with emergency messages.	Requirements on BM-SC for further study	
The system shall be able to provide emergency services insuring that information are available to the users without any delay (resource pre-emption is required if needed).	Requirements on BM-SC for further study	

Table 2: Compliance against applicable D1-8 requirements.

7.3 Applicable D6-1.1 SDMB System Technical Requirements

This section captures the requirements defined in D6-1.1 (v2.2) that are applicable to the BM-SC commercial product. Where possible, a reference to associated BM-SC requirement(s) is provided.

D6-1.1 REQUIREMENT	Compliance of Commercial Product	Reference(s)
Section 5.1 External Interface Requirements		
MAE-D6-1-C-REQ-1 The SDMB system shall be able to interconnect to 3G packets networks via standardised interfaces.	C	BM-SC.C.REQ.03, BM-SC.C.REQ.04, BM-SC.C.REQ.05
MAE-D6-1-C-REQ-2 The SDMB system shall be able to interconnect to 2G packets networks via standardised interfaces.	C	BM-SC.C.REQ.05
Section 5.2.2.3 Observability and Monitoring		
MAE-D6-1-C-REQ-5 The indication of the availability (or not) of each SDMB service shall be available on demand on the UE.	C – detailed mechanism for further study	BM-SC.C.REQ.15
Section 5.2.3.1 Transmission Media Selection		
MAE-D6-1-C-REQ-10 The SDMB system shall implement features enabling to select most cost effective transmission media between the SDMB and terrestrial mobile network with respect to targeted audience and required QoS.	For further study	BM-SC.C.REQ.14
Section 5.2.3.2 Access to Service		
MAE-D6-1-C-REQ-12 The operational system shall allow the end-user to manually activate/de-activate mobile IP datacast service delivery.	C	BM-SC.C.REQ.24
5.2.3.3 ACCESS TO CONTENT		
MAE-D6-1-C-REQ-13 Outside of terrestrial mobile network coverage, the SDMB system shall be able to prevent the access to some pre-distributed/streamed content with respect to Mobile Portal's	DRM requirements for further study	

D6-1.1 REQUIREMENT	Compliance of Commercial Product	Reference(s)
strategy.		

D6-1.1 REQUIREMENT	Compliance of Commercial Product	Reference(s)
<p>MAE-D6-1-C-REQ-14</p> <p>The operational system shall be able to provide contents to the UE via any terrestrial mobile network coverage, but not necessarily with the same QoS, on UE demand, provided that the end-user is within his home mobile network or within the coverage of a roaming partner network.</p>	C in principle – for further study	BM-SC.C.REQ.14
5.2.3.4 Cohabitation with 2G-3G networks		
<p>MAE-D6-1-C-REQ-4</p> <p>The SDMB system shall be designed to provide a satellite based broadcast layer without real-time return link, in compliance with MBMS defined broadcast.</p>	C	BM-SC.C.REQ.22
5.3.2.1 Service types		
<p>MAE-D6-1-C-REQ-19</p> <p>The SDMB system shall provide point to multipoint services, including Download, Streaming, and Groupcast services.</p>	C	BM-SC.C.REQ.20, BM-SC.C.REQ.21
5.3.2.3 Streaming		
<p>MAE-D6-1-C-REQ-110</p> <p>The SDMB system shall be able to provide multimedia streaming service to the end-user; this service is manually activated by the end-user.</p>	C	BM-SC.C.REQ.21, BM-SC.C.REQ.24
5.3.2.4 Groupcast		
<p>MAE-D6-1-C-REQ-22</p> <p>The SDMB system shall be able to catch data sent in p-t-p by a UE through the terrestrial mobile network, then to forward these data using Download service.</p>	For further study	
<p>MAE-D6-1-C-REQ-101</p> <p>The SDMB system shall be able to catch data sent in p-t-p by a UE through the terrestrial mobile network, and to forward simultaneously these data using Streaming service.</p>	For further study	
5.3.2.5 Content filtering		
<p>MAE-D6-1-C-REQ-23</p> <p>The SDMB System shall append a Content Delivery Descriptor (CDD) to every distinct distributed content.</p>	Requirements on BM-SC for further study	
<p>MAE-D6-1-C-REQ-28</p> <p>The CDD of a content shall consist of a set of attributes aiming to characterise it; this includes its class(es), type and size, the content's time sensitive nature (real time content, or not).</p>	Requirements on BM-SC for further study	
<p>MAE-D6-1-C-REQ-29</p> <p>The format of the CDD shall be based on standards.</p>	Requirements on BM-SC for further study	
5.3.2.6 Emergency announcement		
<p>MAE-D6-1-C-REQ-90</p> <p>Emergency notification shall be implemented on the basis of the Download service, with maximum priority, carousel high speed repetition and conditional content use not applicable; Emergency notifications shall be filtered out</p>	For further study	

D6-1.1 REQUIREMENT	Compliance of Commercial Product	Reference(s)
whatever the user preference profile.		
MAE-D6-1-C-REQ-105 Processing of Emergency notifications by SDMB infrastructure shall not have any impact on 3G operations.	For further study.	
5.3.3 Transport layer		
MAE-D6-1-C-REQ-33 The SDMB System shall implement a Reliable transport function without real time return link in order to improve the transmission reliability.	C	BM-SC.C.REQ.22, BM-SC.C.REQ.12
MAE-D6-1-C-REQ-34 The Reliable transport function shall include Forward Error Correction and inter-leaving for any kinds of content and any service.	For further study in WP5.	
MAE-D6-1-C-REQ-98 The Reliable transport function shall implement a content protection for Downlink service via content repetition (carousel).	For further study in WP5.	
MAE-D6-1-C-REQ-36 In case the end-user selects an incomplete content, the UE shall fetch the selected content missing blocks using p-t-p session established via the terrestrial mobile network associated to the UE.	For further study in WP5	
MAE-D6-1-C-REQ-102 In case more than a configurable number of UE request the same content via p-t-p, the system allows the (re-) sending of such contents through SDMB infrastructure.	For further study in WP5	
MAE-D6-1-C-REQ-37 On behalf of the SDMB operator, it shall be possible to hide to the end-user the relevant contents that have more than a defined percentage of corrupted blocks. This percentage shall be configurable in function of the end-user subscribed class of service.	For further study	
MAE-D6-1-C-REQ-38 The overhead required for data protection purpose at transport level shall be minimised.	For further study in WP5	
MAE-D6-1-C-REQ-39 The Reliable transport function shall be configurable in function of the service type and required QoS, including the likelihood for the correct content reception: Variable FEC, Variable interleaving, Variable carousel.	For further study in WP5	
5.3.4 Network layer		
MAE-D6-1-C-REQ-40 The SDMB system shall provide means to broadcast information to all the end-users located in one or several Spot areas.	C	BM-SC.C.REQ.16
MAE-D6-1-C-REQ-41 The SDMB system shall provide means to broadcast protected information only to those end-users that have subscribed to the service.	C	BM-SC.C.REQ.24, BM-SC.C.REQ.28, BM-SC.C.REQ.30

D6-1.1 REQUIREMENT	Compliance of Commercial Product	Reference(s)
<p>MAE-D6-1-C-REQ-42</p> <p>The SDMB system shall be able to provide localised broadcast services, i.e. to broadcast data to a group of end-users in a specific area, subset of one or several spot areas. The broadcasting is supposed to be done toward one or several complete spots whereas each UE filters out the contents against its own location.</p>	C	BM-SC.C.REQ.16
5.3.5 Access layer		
<p>MAE-D6-1-C-REQ-43</p> <p>It shall be possible to modify the number and capacity of the transport/logical channels per spot area.</p>	Requirements on BM-SC for further study.	
<p>MAE-D6-1-C-REQ-45</p> <p>The SDMB infrastructure shall provide background as well as streaming traffic class capabilities.</p>	Service classes need to be defined in more detail	
5.3.6 Physical layer		
<p>MAE-D6-1-C-REQ-46</p> <p>The content filtering function shall be active at Physical layer (use of MBMS notification mechanism) to save UE power consumption.</p>	Requirement on BM-SC for further study	
5.3.7 Charging and billing function		
<p>MAE-D6-1-C-REQ-112</p> <p>It shall be possible to bill the mobile IP datacast services delivery based on volume of content transmitted per service subscribed, volume of content selected by the user equipment, volume consumed by the user or SDMB service delivery activation duration.</p>	PC – BM-SC shall support accounting based on volume of content transmitted per service subscribed and duration of SDMB service. DRM related requirements for further study	BM-SC.C.REQ.26
5.4 PERFORMANCE REQUIREMENTS		
5.4.1 Service and application		
<p>MAE-D6-1-C-REQ-55</p> <p>The SDMB system shall offer two delay performances to be selected by the SDMB operator for the Download service: one for Batch contents and the other one for urgent contents.</p>	For further study	
<p>MAE-D6-1-C-REQ-115</p> <p>The SDMB system shall offer two delay performances to be selected by the SDMB operator for the Download service: Batch contents shall be transmitted in less than 10[TBC] hours; this delay has to be understood as the time between the end of the last transmission at the server side and the availability of the downloaded data on the UE side.</p>	For further study	
<p>MAE-D6-1-C-REQ-114</p> <p>Urgent contents shall be transmitted in less than 5 [TBC] minutes; this delay has to be understood as the time between the end of the first transmission at the server side and the availability of the downloaded data on the UE side.</p>	For further study	

D6-1.1 REQUIREMENT	Compliance of Commercial Product	Reference(s)
<p>MAE-D6-1-C-REQ-56</p> <p>The SDMB system shall ensure that streaming contents shall be transmitted in less than 5[TBC] minutes. This delay has to be understood as the time between the beginning of the transmission at the server side and the beginning of the availability of the streamed data.</p>	For further study	
5.4.2 Transport layer		
<p>MAE-D6-1-C-REQ-57</p> <p>The Transport layer FEC shall be able to correct any terrestrial network activity in idle mode, including but not limited to SDMB signal reception interruptions due to paging and measurements of current and adjacent cells.</p>	For further study in WP5	
<p>MAE-D6-1-C-REQ-58</p> <p>The Transport layer FEC shall be able to correct the BLER as defined as Physical layer performance target.</p>	For further study in WP5	
<p>MAE-D6-1-C-REQ-59</p> <p>The Transport layer carrouseling shall be able to correct the SDMB signal reception interruptions up to TBD duration & up to a TBD percentage of time.</p>	For further study in WP5	
5.4.6 Cross-layer performances		
<p>MAE-D6-1-C-REQ-63</p> <p>The volume of data retransmitted with p-t-p session via terrestrial mobile network shall be minimised.</p>	For further study	
<p>MAE-D6-1-C-REQ-67</p> <p>The SDMB system shall be able to provide emergency services insuring that information are available to the end-users in a TBD delay.</p>	For further study	
5.6 SECURITY REQUIREMENTS		
<p>MAE-D6-1-C-REQ-75</p> <p>The system shall implement conditional access to distribute multimedia content.</p>	C	BM-SC.C.REQ.28, BM-SC.C.REQ.30
5.7 REGULATIONS REQUIREMENTS		
<p>MAE-D6-1-C-REQ-76</p> <p>The SDMB system shall be capable to provide an equitable access to its capacity to any mobile operator requesting to use the SDMB multicast capacity.</p>	For further study	
5.8 RAMS REQUIREMENTS		
5.8.2 Availability and Continuity		
<p>MAE-D6-1-C-REQ-81</p> <p>The failure of a hub or a SDMB service centre shall not interrupt SDMB broadcast service delivery (redundancy is required).</p>	For further study	

D6-1.1 REQUIREMENT	Compliance of Commercial Product	Reference(s)
5.10 DESIGN AND DEVELOPMENT REQUIREMENTS		
5.10.2 Interfaces		
MAE-D6-1-C-REQ-92 The SDMB System shall support the MBMS supported codecs.	For further study	

Table 3: Compliance against applicable D6-6.1 SDMB Technical requirements