Technical Specification Group Services and System Aspects Meeting #25, Palm Springs, USA

TSGS#25(04)0488

TSG-SA WG1 #25 **S1-040632**
Montreal, Canada, 28 June - 02 July 2004 **Agenda Item: 6.6**

Title: LS on Mobile Broadcast Services
Response to: LS (S1-040622) on "Liaison Statement on Mobile Broadcast Services to 3GPP and 3GPP2" from OMA BAC
Release:
Work Item: MBMS

Source: **SA1**
To: OMA BAC
Cc: SA, SA2, SA4

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Attachments: 3GPP TS 22.146: "Multimedia Broadcast/Multicast Service".
3GPP TS 22.246: "Multimedia Broadcast/Multicast Service (MBMS) User Services".

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1. Overall Description:

3GPP TSG SA WG1 would like to thank OMA BAC for their LS informing us on their new work item "Mobile Broadcast Service", for which work had recently started in the BAC-BCAST sub working group.
We appreciate the intention of BAC-BCAST to start information exchange between OMA and 3GPP/3GPP2 to better understand possible synergies in the area of mobile multicasting/broadcasting as we believe this will be beneficial for all concerned groups.

SA1 is happy to provide the following information as requested by BAC-BCAST:

- Scope of the work on mobile multicast/broadcast enablers and services being undertaken
- Status and schedule of the work on mobile multicast/broadcast
- Both high-level as well as detailed requirements related to work areas in mobile multicast/broadcast

Scope of the work on mobile multicast/broadcast enablers and services being undertaken in 3GPP:

In 3GPP Release 6 the "Multimedia Broadcast/Multicast Service" (MBMS) is specified. The requirements for this service can be found in TS 22.146.

Short overview of MBMS:

MBMS is an unidirectional point to multipoint bearer service in which data is transmitted from a single source entity to multiple recipients. It is anticipated that other services (e.g. MBMS User Services) will use these bearer capabilities.
3GPP has defined two modes of operation:

- the broadcast mode
- the multicast mode.

The **broadcast mode** is a unidirectional point-to-multipoint transmission of multimedia data (e.g. text, audio, picture, video) from a single source entity to all users in a broadcast service area as defined by the network (Home environment).

The broadcast mode differs from the multicast mode in that there is no specific requirement to activate or subscribe to the MBMS in broadcast mode.
It is expected that charging data for the end user will not be generated for this mode. The reception of the traffic in the broadcast mode is not guaranteed. The receiver may be able to recognize data loss.
An example of a service using the broadcast mode could be advertising or a welcome message to the network.

MBMS **multicast mode** additionally permits the possibility for the network to selectively transmit to cells within the multicast service area which contain members of a multicast group.
Unlike the broadcast mode, the multicast mode generally requires a subscription to the multicast subscription group and then the user joining the corresponding multicast group. The subscription and group joining may be made by the PLMN operator, the user or a third party on their behalf (e.g. company). Unlike the broadcast mode, it is expected that charging data for the end user will be generated for this mode.
Reception of multicast services cannot be guaranteed over the access network. For many applications and services guaranteed data reception may be carried out by higher layer services or applications which make use of MBMS.
An example of a service using the multicast mode could be a football results service for which a subscription is required.

In addition to, and on top of MBMS the "MBMS User Services" have been specified. The requirements for this service can be found in TS 22.246.

Short overview of MBMS User Services:

MBMS User Services use the capabilities of MBMS. Service related information is defined to specify requirements in terms of data rates, quality of service requirements, typical volumes of data etc.
MBMS user services are services an operator may provide to subscribers. The operator may provide such services on his own or in collaboration with third party service providers. In addition, an MBMS user service may be provided to the operator's own subscribers and/or to inbound roaming subscribers from other operators

There are three types of MBMS User Service defined: Streaming services, File download services and Carousel services. MBMS User Services support the following media types: Text, Still Images, Video, Speech, Mono/Stereo Audio
For some MBMS user services it is required that the operator can verify that the content conveyed by the service has been received by the UE. For such services delivery verification, transmitted over a point-to-point connection to the home/visited network, is foreseen.
Maximum Application bit rates for MBMS User Services vary from 10 kbps (e.g. for text distribution) to 384 kbps (e.g. for video streaming)

Status and schedule of the work on mobile multicast/broadcast:

MBMS and MBMS User Services are expected to be finalized in 3GPP Release 6.

High-level as well as detailed requirements related to work areas in mobile multicast/broadcast

A short over view of MBMS and MBMS User Services has been given above, detailed requirements can be found in the requirements specifications, which are attached to this LS.

2. Actions:

To OMA BAC.

ACTION: SA1 kindly asks OMA BAC to keep SA1 informed on their work on "Mobile Broadcast Service".

3. Date of Next TSG-SA1 Meetings:

SA1#26	11 – 15 October 2004, Sophia Antipolis, FR	European friends of 3GPP

3GPP TS 22.146 V6.5.0 (2004-06)

Technical Specification

3rd Generation Partnership Project;
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Stage 1
(Release 6)

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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
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- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

Introduction

Broadcast and Multicast are methods for transmitting data-grams from a single source to several destinations (point-to-multipoint). To date, release-4 and release-99 define two services in this respect:

A cell broadcast service (CBS) allowing for low bit-rate data to be transmitted to all subscribers in a set of given cells over a shared broadcast channel. This service offers a message-based service [5,6]

An IP-Multicast service allowing for mobile subscribers to receive multicast traffic. This service does not allow for multiple subscribers to share radio or core network resources and as such does not offer any advantages as far as resource utilization within the PLMN and over the radio access network. [3,4]

It is envisaged that for some applications, multiple users can receive the same data at the same time. The benefit of multicast and broadcast in the network is that the data is sent once on each link. For example, an SGSN will send data once to an RNC regardless of the number of Node Bs and UEs that wish to receive it. The benefit of multicast and broadcast on the air interface is that many users can receive the same data on a common channel, thus not clogging up the air interface with multiple transmissions of the same data.

With increasing use of high bandwidth applications in third generation mobile systems, especially with a large number of users receiving the same high data rate services, efficient information distribution is essential. Thus, broadcast and multicast are techniques to decrease the amount of data within the network and use resources more efficiently

1 Scope

This Technical specification defines the stage one description of the Broadcast and Multicast Services for the 3GPP System (UTRAN and GERAN). Stage one is the set of requirements which shall be supported for the provision of Broadcast and Multicast services, seen primarily from the subscriber's and service providers' points of view.

This TS includes information applicable to network operators, content providers, and terminal and network manufacturers.

This TS contains the core requirements for Multicast and Broadcast Services, which are sufficient to provide a complete service.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document.*

[1] 3GPP TR 21.905: " Vocabulary for 3GPP Specifications ".

[2] RFC 1112: "Host extensions for IP multicasting", RFC 1920:" Internet official protocol standards", RFC 1458: "Requirements for multicast protocols", RFC 1301: "Multicast transport protocol"

[3] 3GPP TS 22.060: "General Packet Radio Service (GPRS); Service description; Stage 1".

[4] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2".

[5] 3GPP TS 25.324: "Broadcast/Multicast Control BMC"

[6] 3GPP TS 23.041: "Technical Realization of Cell Broadcast Service (CBS)"

[7] 3GPP TS 22.246: "MBMS User Services".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the definitions in 3GPP TR 21.905 [1] as well as the following definitions apply.

Broadcast service area: The area in which a specific broadcast service is available. It is defined individually per broadcast service. The broadcast service area may represent the coverage area of the entire PLMN, or part(s) of the PLMN's coverage area. The broadcast service area is the sum of all local broadcast areas offering the same service.

Local Broadcast Area: The area of a broadcast service, where the service content is the same. One broadcast service may have different content in different local broadcast areas.

Broadcast mode: The part of MBMS that supports broadcast services.

Broadcast service: A unidirectional point-to-multipoint service in which data is efficiently transmitted from a single source to multiple UEs in the associated broadcast service area. Broadcast services may be received by all users who have enabled the specific broadcast service locally on their UE and who are in the broadcast area defined for the service.

Broadcast session: A continuous and time-bounded reception of a broadcast service by the UE. A single broadcast service can only have one broadcast session at any time. A broadcast service may consist of multiple successive broadcast sessions.

Mobile Station (MS): Defined in 3GPP TS 24.002. (The abbreviation "UE" in this specification refers both to MS and User Equipment.)

Multicast transmission activation: The process by which the network activates the transmission of Multicast data.

Multicast service area: The area in which a specific multicast service is available. It is defined individually per multicast service. The multicast service area may represent the coverage area of an entire PLMN, or part(s) of the PLMN's coverage area. The multicast service area is the sum of all local multicast areas offering the same service.

Local multicast area: The area of a multicast service, where the service content is the same. One multicast service may have different content in different local multicast areas.

Multicast mode: The part of MBMS that supports multicast services.

Multicast joining: The process by which a user joins a multicast group.

Multicast session: A continuous and time-bounded reception of a multicast service by the UE. A single multicast service can only have one multicast session at any time. A multicast service may consist of multiple successive multicast sessions.

Multimedia Broadcast/Multicast Service (MBMS): A unidirectional point-to-multipoint service in which data is transmitted from a single source entity to a group of users in a specific area. The MBMS has two modes: Broadcast mode and Multicast mode.

Multicast group: A group of users that have an activated MBMS in multicast mode and therefore are ready to or are receiving data transmitted by this service. The multicast group is a subset of the **Multicast subscription group**. Multicast subscription group members may join the corresponding multicast group.

Multicast service: A unidirectional point-to-multipoint service in which data is efficiently transmitted from a single source to a multicast group in the associated multicast service area. Multicast services can only be received by such users that are subscribed to the specific multicast service and have joined the multicast group associated with the specific service.

Multicast subscription: The process by which a user subscribes or is subscribed to a multicast subscription group and thereby is authorised to join certain multicast services. Multicast subscription is performed either upon user selection or due to home environment initiation.

Multicast Subscription Group: A group of users who are subscribed to a certain MBMS in multicast mode and therefore authorised to join and receive multicast services associated with this group.

User Equipment: defined in TS 21.905. An occurrence of a User Equipment is an MS for GSM as defined in TS 24.002.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

MBMS	Multimedia Broadcast/Multicast Service
MS	Mobile Station
UE	User Equipment

4 General description of a multimedia broadcast/multicast service (MBMS)

Point to multipoint services exist today which allow data from a single source entity to be transmitted to multiple endpoints. These services are expected to be used extensively over wireless networks, hence there is a need for a capability in the PLMN to efficiently support them. The Multimedia Broadcast/Multicast Service (MBMS) will provide this capability for such broadcast/multicast services provided by the home environment and other VASPs.

The MBMS is an unidirectional point to multipoint bearer service in which data is transmitted from a single source entity to multiple recipients. It is anticipated that other services will use these bearer capabilities.

3GPP has defined two modes of operation:

- the broadcast mode

- the multicast mode.

4.1 MBMS broadcast mode

The broadcast mode is a unidirectional point-to-multipoint transmission of multimedia data (e.g. text, audio, picture, video) from a single source entity to all users in a broadcast service area. The broadcast mode is intended to efficiently use radio/network resources e.g. data is transmitted over a common radio channel. Data is transmitted in the broadcast service area as defined by the network (Home environment).

MBMS data transmission should adapt to different RAN capabilities or different radio resource availability, e.g. by reducing the bitrate of the MBMS data. The selection and description of an appropriate mechanism is subject to MBMS stage 2.

Figure 1 gives an example of how a network can be configured to broadcast a variety of high bit rate services to users within the associated broadcast service area.

A broadcast service received by the UE, involves one or more successive broadcast sessions. A broadcast service might, for example, consist of a single on-going session (e.g. a media stream) or may involve several intermittent sessions over an extended period of time (e.g. messages).

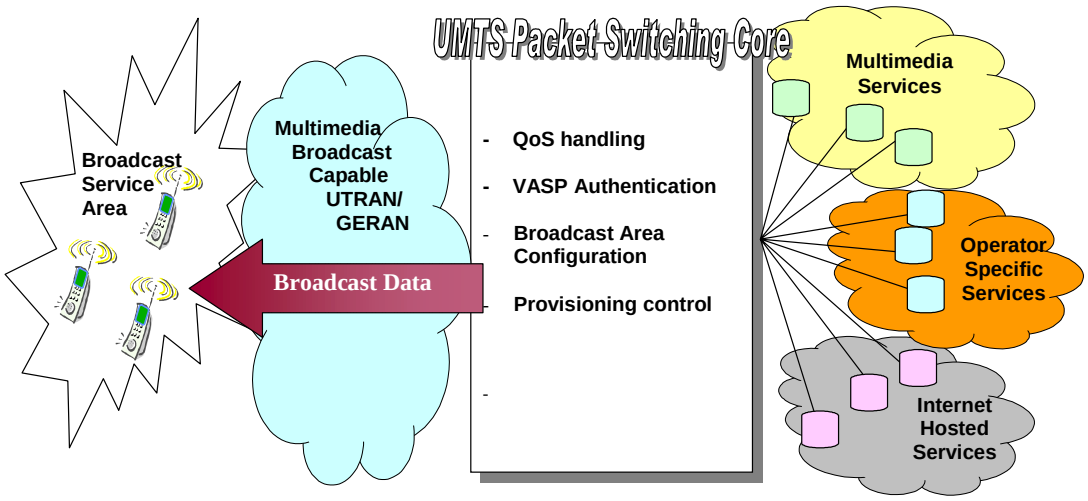

Figure 1: Example of Multicast Broadcast Mode Network

The broadcast mode should not be confused with the existing Cell Broadcast service (CBS) which is currently used for low bit rate services (messaging) whilst the broadcast mode enables the broadcast of multimedia services (Audio, Video etc).

An example of a service using the broadcast mode could be advertising or a welcome message to the network. As not all users attached to the network may wish to receive these messages then the user shall be able to enable/disable the reception of these broadcast service on his UE.

The broadcast mode differs from the multicast mode in that there is no specific requirement to activate or subscribe to the MBMS in broadcast mode.

The broadcast mode should allow terminals to minimise their power consumption.

It is expected that charging data for the end user will not be generated for this mode. The reception of the traffic in the broadcast mode is not guaranteed. The receiver may be able to recognize data loss.

4.2 MBMS multicast mode

The multicast mode allows the unidirectional point-to-multipoint transmission of multimedia data (e.g. text, audio, picture, video) from a single source point to a multicast group in a multicast service area. The multicast mode is intended to efficiently use radio/network resources e.g. data is transmitted over a common radio channel. Data is transmitted in the multicast service area as defined by the network (Home environment). In the multicast mode there is the possibility for the network to selectively transmit to cells within the multicast service area which contain members of a multicast group.

MBMS data transmission should adapt to different RAN capabilities or different radio resource availability, e.g. by reducing the bitrate of the MBMS data. The selection and description of an appropriate mechanism is subject to MBMS stage 2.

A multicast service received by the UE, involves one or more successive multicast sessions. A multicast service might, for example, consist of a single on-going session (e.g. a multimedia stream) or may involve several intermittent multicast sessions over an extended period of time (e.g. messages).

An example of a service using the multicast mode could be a football results service for which a subscription is required.

Unlike the broadcast mode, the multicast mode generally requires a subscription to the multicast subscription group and then the user joining the corresponding multicast group. The subscription and group joining may be made by the PLMN operator, the user or a third party on their behalf (e.g. company). Unlike the broadcast mode, it is expected that charging data for the end user will be generated for this mode.

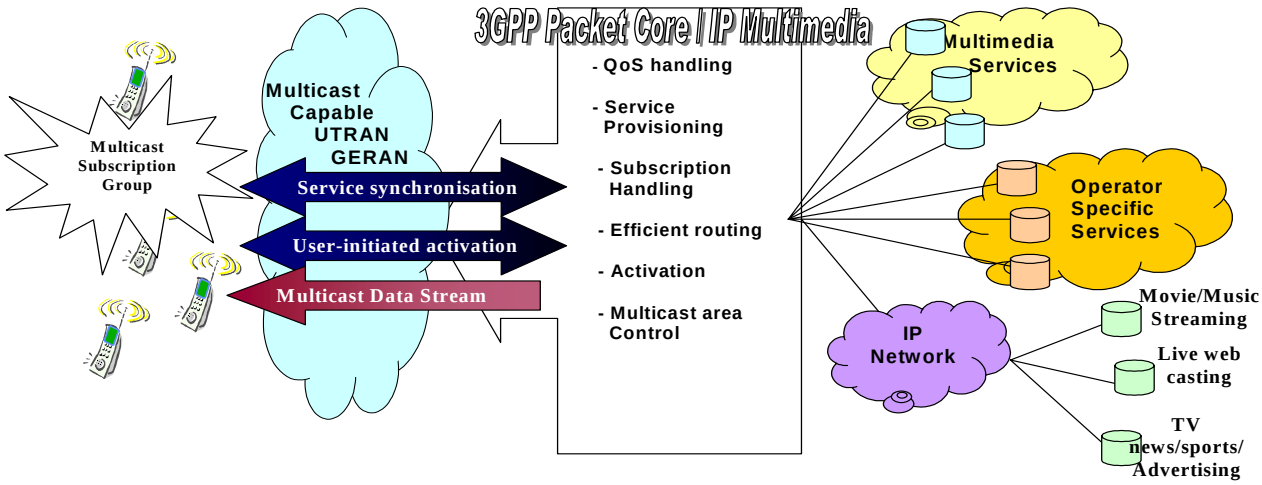

Figure 2: Example of Multicast Mode Network

Reception of multicast services cannot be guaranteed over the access network. For many applications and services guaranteed data reception may be carried out by higher layer services or applications which make use of MBMS.

Multicast mode should allow terminals to minimise their power consumption.

The multicast mode defined in this specification should not be confused with IP Multicast (RFC s 1112, 1301, 1458, 1920 [2]). There are similarities between these two services and such similarities may be exploited in 3GPP networks given that 3GPP multicast mode has been defined with consideration to maximizing efficiency on the radio interface and of network resources.

Multicast mode shall be inter-operable with IETF IP Multicast. This could allow the best use of IP service platforms to help maximize the availability of applications and content so that current and future services can be delivered in a more resource efficient manner. Figure 2 above shows a general high level overview of multicast mode network.

4.2.1 Multicast subscription and reception

The following is the expected sequence for the user to be able to access the MBMS multicast mode:

1 The user subscribes or is subscribed to a multicast subscription group which is uniquely identified and thereby becomes a member of that group. The subscription may be continuous (e.g. as defined by the subscriber's contract), time-limited, or generated by the subscriber on a one-time basis. The subscription to multicast services shall not be further standardized.

2 The user discovers, or becomes aware (e.g. via service announcements), that there are multicast services currently active, or multicast services that will become active at some time later, at the user's current location.

3a) The user selects a multicast service and hence the user joins the corresponding multicast group. The user should be able to join a multicast service as soon as possible after announcement of the service.

3b) As an alternative, the Home Environment can join the user to the selected multicast group on behalf of the user, that has previously subscribed to this multicast group.

Signalling exchange between the UE and the network might not be necessary in some cases, e.g. in the case of network congestion.

4 If the transmission is not already in progress the network starts transmitting the corresponding multicast content. Alternatively, the transmission may start at a later time.

5 The network may optionally select to set up unicast (point to point) connections to some users e.g. if there are insufficient users to justify multicasting

6 The UE starts receiving the multicast data associated with the multicast group(s) it has joined

7 The user may choose to stop receiving a selected multicast service and thereby leaves the multicast group. The user may also select to continue (or not) to receive service announcements for this multicast subscription group.

8 The user may unsubscribe or be unsubscribed from the multicast subscription group and stop receiving both the multicast data and future service announcements for this multicast subscription group.

The home environment shall be able to remove a user from a multicast group (deactivation) and if required remove the subscriber from the multicast subscription group (un-subscription). This is required to allow the operator to bar service.

4.3 Discovery and announcement of MBMS services

The user shall be able to find out or be informed about MBMS services available in the network. The network shall support service announcements both for the broadcast and multicast mode of MBMS in order to enable the user to be informed about the MBMS services available currently, or some time later.. Users should also be able to discover and monitor MBMS service availability e.g. using a URL.

5 High level requirements

5.1 Broadcast mode

5.1.1 Home environment requirements

- Broadcast services

  The PLMN operator shall be able to provision one or more broadcast services within his PLMN.

  The operators sharing a network shall be able to provide one or more broadcast services for their own subscribers and inbound roamers from roaming partners only. This shall be applicable for sharing of radio network and for sharing of radio network and the core network entities connected to the radio network.

  A broadcast area is configured individually for each broadcast service. Broadcast areas associated with different broadcast services are independent of each other and may overlap.

  A broadcast service shall be able to distribute different content data to different locations, i.e. local broadcast areas, within the broadcast service area as shown in figure 3. This allows the user to receive broadcast data depending on his location (e.g. a "nationwide traffic service" with localized traffic reports) Only one location specific version of content data is distributed to each of the individual local broadcast areas, i.e. in any location a user will never receive different content data from a single broadcast service.

  It shall be possible to define a broadcast service for only the subscribers and inbound roamers of one of the operators sharing network. The broadcast services transmitted in a broadcast service area of operator A shall only be available to the subscribers and inbound roamers of operator A. The broadcast areas of different sharing operators may cover the same geographical area. This shall be applicable for sharing of radio network and for sharing of radio network and the core network entities connected to the radio network.

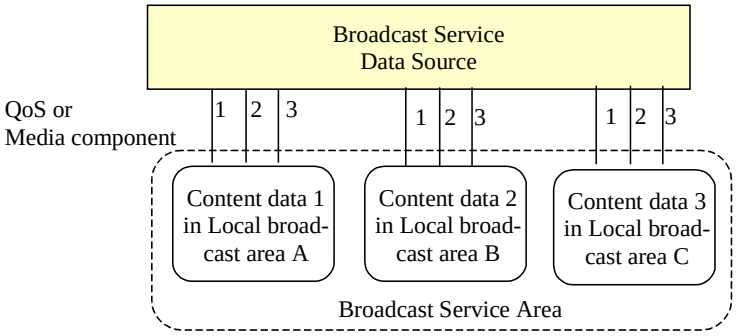

Figure 3 Broadcast Service with different content data for different locations

- Quality of service

  The PLMN operator shall be able to configure the quality of service for each individual broadcast service. It should be possible to adapt the MBMS data transmission to different RAN capabilities or different radio resource availability.

  The home environment shall be able to set priority to select which simultaneous broadcast services are supported when there is a limit on the resources available.-

- Network and radio efficiency

  The PLMN operator shall be able to use network and radio resources in an efficient manner.

NOTE: Allocation of resources based on actual need in the broadcast service area is not applicable for the broadcast mode.

The operator shall be able to schedule a certain broadcast service at pre-determined times.

- Types of data services

  MBMS in The broadcast mode shall be transparent for the transferred data packets independent of the type of service being transmitted, will support a number of services, and permit support of and therefore transfer all data types e.g. Audio, Data, Video or combinations thereof. A minimum number of data types may need to be identified to enable interoperability.

- Sources of data services

  In addition to supporting their own broadcast services the PLMN shall as well support broadcast services from third parties (i.e. HE-VASPs or VASPs)

- Broadcast service announcements

  The PLMN operator shall be able to provide service announcements for a broadcast service within and outside of the broadcast area defined for the service.

5.1.2 User requirements for MBMS

- User mobility

  The user shall be able to continue receiving broadcast services throughout the broadcast service area. For example, in case of handover and presuming that a certain broadcast service is offered in the target cell, it should be possible for the user to continue receiving the service in the target cell.

- User selectivity

  The user shall be able to discover what broadcast services are available at the user's current location and outside of the current location.

  The user shall be able to enable/disable the reception of specific broadcast services and can receive simultaneously more than one MBMS service.

  The user may be able to define service preference for reception. A priority procedure may be implemented to allow the user to select between simultaneous broadcast services e.g. while receiving commercial broadcast service a new multicast service may interrupt this.

  While receiving one or more broadcast services, it shall be possible for the user to be informed about incoming voice calls or the availability of other MBMS services.

  Dependent on terminal capabilities, it shall be possible for the user to participate in other services, while simultaneously participating in MBMS services. For example the user can originate or receive a call or send and receive messages whilst receiving advertisements.

5.2 Multicast mode

5.2.1 Home environment requirements

- Multicast services

  The PLMN operator shall be able to provision one or more multicast services. A multicast area is configured individually for each multicast service. Multicast areas associated with different multicast services are independent of each other and may overlap.

  Multicast service areas may cover part(s) of one or more PLMNs.

  A multicast service shall be able to distribute different content data to different locations, i.e. local multicast areas, within the multicast service area as shown in figure 4. This allows the user to receive multicast data depending on his location (e.g. a “nationwide traffic service” with localized traffic reports) Only one version of location specific content data is distributed to each of the individual local multicast areas, i.e. in any location a user will never receive different content data from a single multicast service.

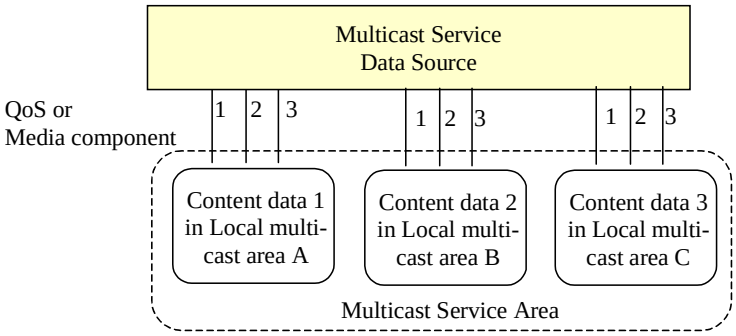

Figure 4 Multicast Service with different content data for different locations

- Multicast subscription groups and multicast groups

  The PLMN operator shall be able to provision one or more multicast subscription groups. The home environment shall be able to make a user a member of a multicast subscription group (subscription).

  On receipt of a request to join a multicast group, the PLMN shall check that the user is a member of the applicable multicast subscription group. The home environment shall be able to join users to the multicast group e.g. at the request of the subscriber.

- Quality of service

  The PLMN operator shall be able to configure the quality of service for individual multicast services. It should be possible to adapt the MBMS data transmission to different RAN capabilities or different radio resource availability.

  As part of the same service, it should be possible for the operator to provide the UEs with multiple successive sessions with different quality-of-service for each session.

  The home environment shall be able to set priority to select which simultaneous multicast services are supported when there is a limit on the resources available.

- Network and radio efficiency

  The PLMN operator shall be able to use network and radio resources in an efficient manner.

  Within the multicast service area, the network may distribute the data across the whole multicast service area or parts of the area. The decision to distribute to only parts of the multicast service area may be based on: a) multicast group members are present in a given part of the multicast area b) resources are not available in parts of the multicast service area.

  The operator shall be able to schedule a certain multicast service at pre-determined times.

- Types of services

  The multicast mode shall be independent of the type of service being transmitted, will support a number of services, and permit support of all data types e.g. Audio, Data, Video or combinations thereof. A minimum number of data types may need to be identified to enable interoperability

- Sources of services

  In addition to supporting their own multicast services the PLMN shall as well support multicast services by third parties (i.e. HE-VASPs or VASPs).

- Multicast service announcements

  The PLMN operator shall be able to provide service announcements for a multicast service within and outside of the multicast area defined for the service.

5.2.2 User requirements for MBMS

- User mobility

  The user shall be able to continue receiving multicast services throughout the multicast service area in which the service is provided. For example, in case of handover and presuming that a certain multicast service is offered in the target cell, it should be possible for the user to continue the session in the target cell. It is possible that data loss will occur due to user mobility.

- User selectivity

  The user shall be able to discover what multicast services are available at the user's current location and outside of the current location. The user shall be able to select between different multicast services provided to the user and can receive simultaneously more than one MBMS service.

  The user may be able to define service preference for reception. A priority procedure may be implemented to allow the user to select between simultaneous broadcast/multicast services e.g. while receiving commercial broadcast service a new multicast service may interrupt this.

  While receiving PS or CS services it shall be possible for the user to receive notification of MBMS multicast sessions.

  While receiving one or more multicast services it shall be possible for the user to be informed about incoming voice calls or the availability of other MBMS services.

  Dependent on terminal capabilities, it shall be possible for the user to participate in other services, while simultaneously participating in MBMS services. For example the user can originate or receive a call or send and receive messages whilst receiving MBMS video content.

- Multicast subscription groups and multicast groups

  The subscriber shall be able to subscribe to or unsubscribe from a multicast subscription group. (The subscription mechanism is outside the scope of this TS.)

  The user shall be able to join a multicast group only if he is a member of the applicable multicast subscription group. The user shall be able to leave a multicast group if he is a member of that group.

5.3 Availability

MBMS in multicast or broadcast mode shall be available to all users that are registered/attached to a PLMN, in case of non-shared network.

In the case of two or more operators sharing infrastructure (e.g. parts of the radio network or sharing of radio network and the core network entities connected to the radio network), it shall be possible for a sharing operator offering MBMS in multicast or broadcast mode to prevent access to these MBMS services by subscribers and inbound roamers of the other operator(s) sharing the same infrastructure.

Within the broadcast or multicast service area, it shall be possible to inform users of up-coming MBMS sessions which they may receive. This may be useful e.g. to initiate UE processes for the reception of MBMS data.

In case of roaming a user should also be able to subscribe and join Multicast Services that are provided locally in the visited network, as allowed by the user's home environment.

6 Security

In multicast mode it shall be possible to ensure that only those users who are entitled to receive a specific multicast service may do so. It should be possible to choose whether a given multicast service is to be delivered with or without ensured group privacy.

7 Charging

7.1 Broadcast mode

It shall be possible to collect charging information for the transmission of broadcast services to enable billing of broadcast services providers e.g. billing 3rd parties for advertising.

Examples of the type of the charging information that could be collected include:

- usage duration
- volume of contents

The above list of possible charging mechanisms is neither complete nor exhaustive.

7.2 Multicast mode

It shall be possible to collect charging information for the transmission of multicast services to enable billing of multicast services providers e.g. billing 3rd parties for advertising.

It shall be possible to collect subscriber charging information (including roaming) for the use of the multicast mode (e.g. to enable billing to multicast services providers), as well as for the receipt of multicast data (e.g. users), on a per multicast service basis. On-line charging for multicast services should be possible as well.

Examples of the type of the charging information that could be collected include:

- multicast session duration
- time when joining and leaving a multicast subscription group, duration of membership to a multicast subscription group
- time when joining and leaving a multicast group, duration of membership to a multicast group
- multicast session volume of contents

The above list of possible charging mechanisms is neither complete nor exhaustive.

Billing issues are out of scope of this TS.

Annex A (informative): MBMS Bit Rates

Application bit rates for user services provided over MBMS are detailed within the stage 1 specification for 3GPP TS 22.246 "MBMS User Services" [7].

Annex B (informative): Change history

Change history											
TSG SA#	SA Doc.	SA1 Doc	Spec	CR	Rev	Rel	Cat	Subject/Comment	Old	New	WI
	SA1#13		22.146					Creation of TS		0.1.0	MBMS
	SA1#13		22.146					Output version from SA1 #13	0.1.0	1.0.0	MBMS
	SA1 #13		22.146					Raised to version 2.0.0 for approval at SA #13	1.0.0	2.0.0	MBMS
SP-13	SP-010443	S1-010858	22.146					Approved at SA #13	2.0.0	5.0.0	MBMS
SP-14	SP-010678	1077	22.146	002	2	Rel-5	F	Proposed CR on changes to definitions in 22.146	5.0.0	5.1.0	MBMS
SP-14	SP-010678	1305	22.146	003	3	Rel-5	B	Proposed CR on clarification of reliable transmission	5.0.0	5.1.0	MBMS
SP-14	SP-010678	1075	22.146	005	1	Rel-5	F	Proposed CR on clarifications of the availability of MBMS	5.0.0	5.1.0	MBMS
SP-14	SP-010678	1303	22.146	006	2	Rel-5	F	Proposed CR on Clarification on MBMS applicability in Gb mode	5.0.0	5.1.0	MBMS
SP-14	SP-010678	1306	22.146	009	2	Rel-5	F	Proposed CR on data loss during handover	5.0.0	5.1.0	MBMS
SP-14	SP-010678	1076	22.146	011	1	Rel-5	C	Proposed CR on optional privacy assurance for Multicast services	5.0.0	5.1.0	MBMS
SP-14	SP-010678	1304	22.146	018	2	Rel-5	F	Proposed CR to 22.146: High level Diagrams of MBMS	5.0.0	5.1.0	MBMS
SP-14	SP-010678	1065	22.146	019		Rel-5	F	CR Clarifying Service Requirements on Multicast and Broadcast Areas	5.0.0	5.1.0	MBMS
SP-14	SP-010678	1326	22.146	020	2	Rel-5	F	Proposed CR to 22.146 MBMS	5.0.0	5.1.0	MBMS
SP-14	SP-010678	1225	22.146	021		Rel-5	B	Multiple Areas for Multicast and Broadcast Services	5.0.0	5.1.0	MBMS
SP-14	SP-010678	1309	22.146	022	1	Rel-5	F	MBMS service discovery	5.0.0	5.1.0	MBMS
SP-14	SP-010678	1020	22.146	023		Rel-5	F	CR to 22.146 (MBMS) UE and MS definition	5.0.0	5.1.0	MBMS
SP-15	SP-020057	S1-020125	22.146	024		Rel-5	F	CR 22.146 Rel. 5 F Area Specific QoS for Broadcast and Multicast Services	5.1.0	5.2.0	MBMS
SP-15	SP-020057	S1-020128	22.146	025		Rel-5	F	CR 22.146 Rel. 5 F Clause 4.2 Multicast mode	5.1.0	5.2.0	MBMS
SP-15	SP-020057	S1-020133	22.146	026		Rel-5	F	CR 22.146 Rel. 5 F Addition of MBMS multicast mode and broadcast mode definitions	5.1.0	5.2.0	MBMS
SP-15	SP-020057	S1-020563	22.146	027		Rel-5	B	Proposed CR on MBMS Broadcast and Multicast Sessions	5.1.0	5.2.0	MBMS
SP-15	SP-020057	S1-020565	22.146	028		Rel-5	B	Power consumption minimisation for MBMS	5.1.0	5.2.0	MBMS
SP-15	SP-020057	S1-020646	22.146	029		Rel-5	F	CR to 22.146 (MBMS stage 1) 'Editorial Change'	5.1.0	5.2.0	MBMS
SP-15	SP-020045	S1-020457	22.146	030	-	Rel-5	F	Editorial CR to correct terms and references	5.1.0	5.2.0	CORRECT
SP-16	SP-020257	S1-020892	22.146	031		Rel-6	C	Proposed CR on Multicast Joining Outside the Multicast Area	5.2.0	6.0.0	MBMS
SP-16	SP-020257	S1-021180	22.146	032		Rel-6	F	CR to 22.146: Clarification of requirement related to paging messages	5.2.0	6.0.0	MBMS
SP-17	SP-020561	S1-021473	22.146	033		Rel-6	B	Support of simultaneous services in MBMS	6.0.0	6.1.0	MBMS
SP-17	SP-020561	S1-021472	22.146	034		Rel-6	F	Proposal for Amalgamation of 1279, 1334, 1291	6.0.0	6.1.0	MBMS
SP-17	SP-020561	S1-021471	22.146	035		Rel-6	B	Proposed CR to 22.146: addition of QoS information	6.0.0	6.1.0	MBMS
SP-17	SP-020561	S1-021469	22.146	036		Rel-6	F	MBMS Editorial CR	6.0.0	6.1.0	MBMS

SP-17	SP-020561	S1-021483	22.146	037		Rel-6	F	Proposed CR 22.146 on MBMS Availability	6.0.0	6.1.0	MBMS
SP-17	SP-020561	S1-021481	22.146	038		Rel-6	C	Proposed CR to 22.146: Multicast service discovery	6.0.0	6.1.0	MBMS
SP-17	SP-020561	S1-021475	22.146	039		Rel-6	B	CR to 22.146 on MBMS Charging	6.0.0	6.1.0	MBMS
SP-19	SP-030026	S1-030154	22.146	040	-	Rel-6	C	CR to 22.146 - MBMS Cell broadcast in shared network	6.1.0	6.2.0	MBMS
SP-22	SP-030705	S1-031010	22.146	041	-	Rel-6	F	Alignment of MBMS use cases and bit rates	6.2.0	6.3.0	MBMS
SP-23	SP-040094	S1-040225	22.146	042	-	Rel-6	F	Clarification on user requirements for notification of multicast sessions	6.3.0	6.4.0	MBMS
SP-24	SP-040291	S1-040518	22.146	043	-	Rel-6	F	Addition of a concept regarding UE joining time	6.4.0	6.5.0	MBMS

3GPP TS 22.246 V6.1.0 (2004-03)

Technical Specification

3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Multimedia Broadcast/Multicast Service (MBMS) user services; Stage 1 (Release 6)

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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

Introduction

TS 22.146 [2] specifies the multimedia broadcast and multicast service (MBMS) application independent transport service and includes some guidance on application services and bit rates. The present specification defines MBMS User Services that use the capabilities of MBMS. Service related information is defined in this specification to specify requirements in terms of data rates, quality of service requirements, typical volumes of data etc.

MBMS User Services may be delivered to a user at different bit rates and quality of service depending on radio networks and conditions. This technical specification describes service scenarios for MBMS User Services.

In addition scenarios related to security and charging are described providing information for detailed MBMS User Services security and charging mechanisms to be specified. The service scenarios described in this specification are not exhaustive, it is possible that MBMS may be used for services that are not included in this specification. The present specification describes the minimal requirements for interoperability for MBMS based services. This specification establishes a basis which can also be used for future services.

1 Scope

The present document describes MBMS User Services that use the capabilities of MBMS. Application scenarios including charging, QoS aspects and related service requirements derived from them are described. These scenarios and service requirements can be used as guidance for the design of codecs and bearers for both UTRAN and GERAN.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP specifications".

[2] 3GPP TS 22.146: "Multimedia Broadcast/Multicast Service".

[3] 3GPP TS 26.140: "Multimedia Messaging Service (MMS): Media formats and Codecs".

[4] 3GPP TS 26.134: "Transparent end-to-end Packet-switched Streaming Service (PSS) Protocols and codecs".

[5] 3GPP TS 22.240 “Service requirement for the 3GPP Generic User Profile (GUP)".

[6] 3GPP TS 22.242: "Digital Rights Management".

[7] 3GPP TS 24.002: "GSM-UMTS Public Land Mobile Network (PLMN) Access Reference Configuration".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the definitions in 3GPP TR 21.905 [1] as well as the following definitions apply.

Broadcast service area: see TS 22.146: "Multimedia Broadcast/Multicast Service" [2].

Local Broadcast Area: see TS 22.146: "Multimedia Broadcast/Multicast Service" [2].

Broadcast mode: see TS 22.146: "Multimedia Broadcast/Multicast Service" [2].

Broadcast service: see TS 22.146: "Multimedia Broadcast/Multicast Service" [2].

Broadcast session: see TS 22.146: "Multimedia Broadcast/Multicast Service" [2].

MBMS transport service: A MBMS transport service is either a broadcast service or a multicast service as defined in TS 22.146 [2].

MBMS User Services: Services that are intended to be delivered to multiple users simultaneously. MBMS User Services use the capabilities of the MBMS application independent transport.

Media types: a media type refers to one form of presenting information to a user, e.g. voice or fax.

Mobile Station (MS): see TS 22.146: "Multimedia Broadcast/Multicast Service" [2].

Multicast transmission activation: see TS 22.146: "Multimedia Broadcast/Multicast Service" [2].

Multicast service area: see TS 22.146: "Multimedia Broadcast/Multicast Service" [2].

Local multicast area: see TS 22.146: "Multimedia Broadcast/Multicast Service" [2].

Multicast mode: see TS 22.146: "Multimedia Broadcast/Multicast Service" [2].

Multicast joining: see TS 22.146: "Multimedia Broadcast/Multicast Service" [2].

Multicast session: see TS 22.146: "Multimedia Broadcast/Multicast Service" [2].

Multimedia Broadcast/Multicast Service (MBMS): see TS 22.146: "Multimedia Broadcast/Multicast Service" [2].

Multicast group: see TS 22.146: "Multimedia Broadcast/Multicast Service" [2].

Multicast service: see TS 22.146: "Multimedia Broadcast/Multicast Service" [2].

Multicast subscription: see TS 22.146: "Multimedia Broadcast/Multicast Service" [2].

Multicast Subscription Group: see TS 22.146: "Multimedia Broadcast/Multicast Service" [2].

User Equipment: defined in TS 21.905. An occurrence of a User Equipment is an MS for GSM as defined in TS 24.002 [7].

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

MBMS	Multimedia Broadcast/Multicast Service
MS	Mobile Station
PSS	Packet-switched Streaming Service
UE	User Equipment

4 Classification of MBMS User Services

There exist many services and applications that can be provided over the application independent MBMS transport [2]. It is not necessary to standardise specific end user services because the deployment of particular applications and services over the capabilities provided by the 3GPP system is operator specific and outside the scope of standardisation. However, it is possible to classify MBMS User Services according to the method used to distribute these services.

There are three types of MBMS User Service considered within this specification.

- Streaming services

  A continuous data flow providing a stream of continuous media (i.e. audio and video) is a basic MBMS User Service. Like digital video broadcasting, supplementary information of text and/or still images (static media) is also important. For example, if text includes URLs of some content on the Internet, a user can easily access the content without entering the URL for herself. Still images may also be used for banner images that advertise some product or service. These static media need to be synchronized and displayed with audio/video streams.

Note: Streaming in the context of MBMS User Services may not be the same as that described e.g. within PSS [4].

- File download services

  This service delivers binary data (file data) over an MBMS bearer. An MBMS client (i.e. UE) activates an appropriate application, and utilises the delivered data. The most important functionality for this service is reliability. In other words, it is necessary that the user receive all the data sent in order to experience the service.

- Carousel services

  Carousel is a service that combines aspects of both the Streaming and File download services described above. Similar to the streaming service this service includes time synchronisation. However, the target media of this service is only static media (e.g. text and/or still images). Time synchronization with other media is also required. For example, text objects are delivered and updated from time to time. Still images may also be collated to display low frame-rate video. In common with the download service this service also includes reliability (typically 100% reliability is not always necessary). The benefit of this service is that it is possible over a low bit-rate bearer.

  An example of an application utilising the Carousel service is a 'ticker-tape' type service in which the data is provided to the user repetitively and updated at certain times to reflect changing circumstances.

5 High level requirements

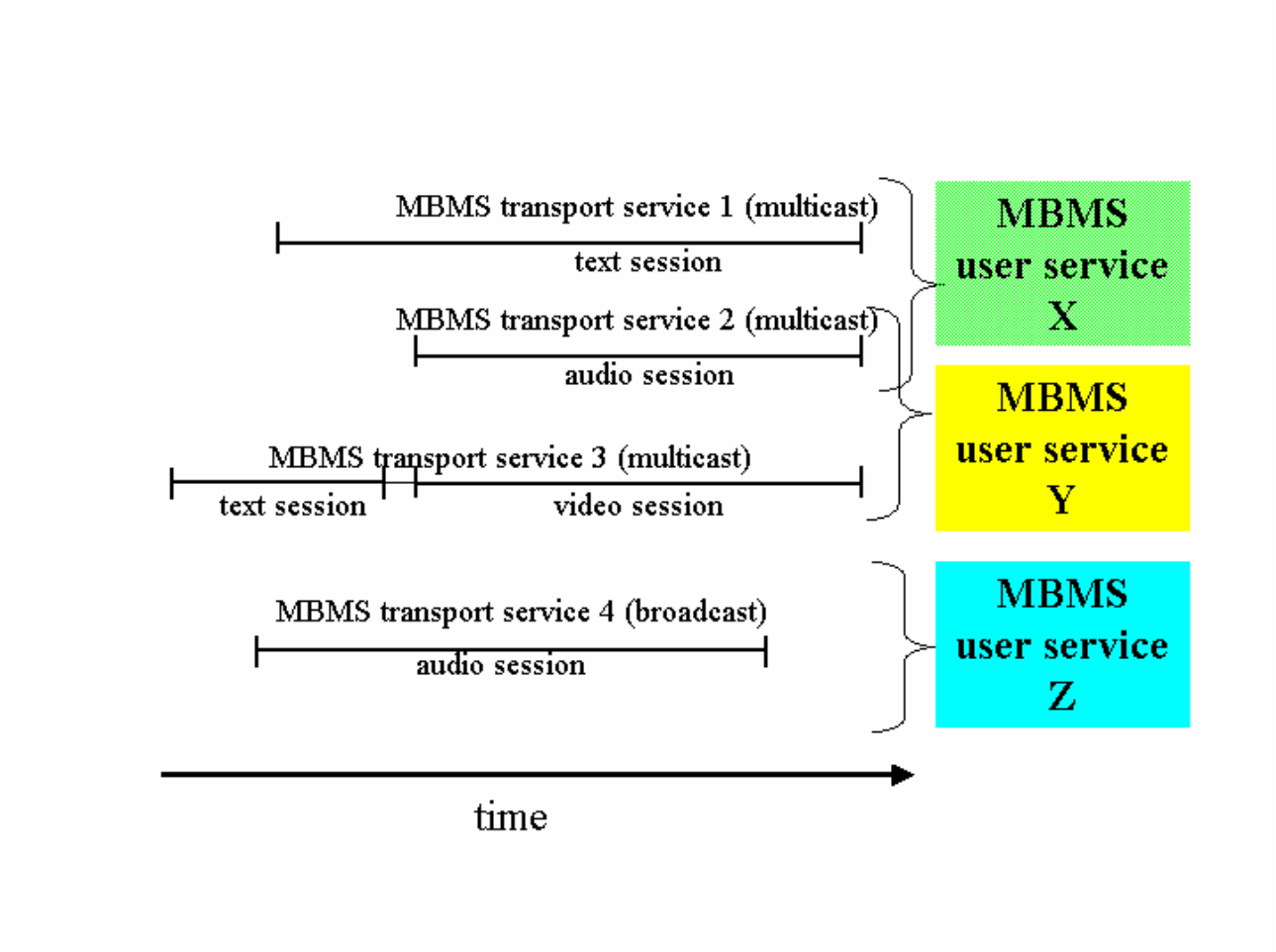
MBMS user services are services an operator may provide to subscribers. MBMS user services use the capabilities of MBMS. The operator may provide such services on his own or in collaboration with third party service providers. In addition, an MBMS user service may be provided to the operator's own subscribers and/or to inbound roaming subscribers from other operators.

MBMS User Services

MBMS user services are based on broadcast- or multicast services, which are defined in TS 22.146 [2].
An MBMS user service may use one or more broadcast- or multicast services at a time.

Note 1: A single broadcast- or multicast service can only have one broadcast- or multicast session at any time. A broadcast- or multicast service may consist of multiple successive broadcast- or multicast sessions. (see TS 22.146 [2])

Note 2: As part of the same multicast service, it should be possible for the operator to provide the UEs with multiple successive sessions with different quality-of-service for each session. (see TS 22.146 [2])



It shall be possible for an MBMS user service to make use of different application independent MBMS transport services at different times or in parallel. The MBMS transport services used may vary for instance in QoS parameters or target broadcast or multicast area.

It shall be possible for one application independent MBMS transport service to be used by more than one MBMS user service at a time.

If an MBMS user service makes use of several application independent MBMS transport services then these may only consist of either broadcast or multicast services, but not of a combination of both.

Note: The combination of broadcast- or multicast services in future releases is FFS

When necessary, within a single MBMS user service, it shall be possible to synchronize the media sessions.

NOTE: For different application independent MBMS transport services to support a single MBMS user service it may be necessary to logically link the transport services to each other, as illustrated in the figure for the audio- and video session of MBMS user service X.

The UTRAN and GERAN shall provide protection against normal transmission errors (eg interference not related to cell changes and handovers).

The BM-SC is responsible for providing protection e.g. FEC, long interleaving and/or point to point repairing the transmission, against errors (eg those caused by cell changes and longer breaks in transmission).

Service examples

MBMS user services may be classified according to table XXX into several service examples, which are characterized by

- Their predominant broadcast- or multicast service, that constitutes this MBMS user service together with its reliability (QoS) and data transfer rate requirements
- Media types that are transmitted via this broadcast- or multicast service
- Type of the service, which implies handling of the distributed media by the UE (e.g. download for subsequent presentation, streaming for instant presentation or carousel downloading)
- Charging characteristics
- A potential requirement for point-to-point delivery verification for delivered content.

To express the requirements for standardised service types are one objective of the present specification.

Service classes

MBMS user services may be provided for many purposes to the user and may convey information of various kinds. E.g. some services may be used for traffic information, others for entertainment or for news services. Service classes denote a classification of MBMS user services according to their usage. However, service classes are not in the scope of 3GPP standardisation but may be subject of inter-operator service arrangements.

5.1 Common requirements to broadcast and multicast

The following list describes requirements on an application level:

Service classes
A user subscribed to a service class in the HPLMN shall be able to enjoy equivalent services in the same service class as provided by a visited PLMN without explicit subscription in the VPLMN.

Note : This requirement enables roaming capabilities to be provided without the need for the user to resubscribe to the same or equivalent services in a VPLMN. The details of how MBMS User Services are offered to roaming users are beyond the scope of this specification.

Service Interworking
The user shall be able to manipulate content delivered over MBMS and forward it using other services (e.g. MMS, Speech Call- and IMS signalling, Hyperlinks, ….). Care should be taken in order to fulfil requirements concerning DRM and respective barring and charging capabilities.

When interacting with user profiles, MBMS User Services shall use the mechanisms described in [5] TS 22.240 (Generic User Profile).

Content storage in the UE
It shall be possible for the UE to store content delivered to it over MBMS and provide it to the user at a later time. Care should be taken in order to fulfil requirements concerning DRM and respective charging capabilities.

Data formats and types
Media types shall be supported independent of specific data types and formats behind..

As a minimum MBMS User Services shall support the following media types:

- Text

  It shall be possible to embed hyperlinks and to decorate text within content provided by MBMS User Services.

- Still Images
- Video
- Speech

- Mono/Stereo Audio

Data format and data types as being used by other multimedia services shall be supported for interoperability reasons.

Note : It is not intended to constrain MBMS to existing codec technologies. The intention is to maintain consistency with other multimedia services whilst also allowing for adoption of new codec technologies as appropriate.

Digital Rights Management
The MBMS User Service shall be able to control content distribution as defined in 3GPP TS 22.242 [6]. MBMS content providers shall be able to invoke DRM to prevent unauthorized copying and forwarding of content.

Notification of required capabilities
The capabilities (e.g. memory size) required to receive a particular transmission shall be notified in advance by the network or service centre.

5.2 Interoperability

MBMS User Services shall ensure service interoperability with respect to media formats and codecs, at the same time being able to re-use existing multimedia capabilities in the UE as far as possible.

Therefore MBMS User Services shall support a minimum set of media formats and codecs. This minimum set should be aligned with the set of media formats and codecs required for MMS [3] and PSS [4].

5.3 Delivery verification

For some MBMS user services it is required that the operator can verify that the content conveyed by the service has been received by the UE.

The UE shall provide a secure means to provide such delivery verification transmitted over a point-to-point connection to the home/visited network. This delivery verification may be relayed to the service provider.

Note: Delivery verification by point-to-point mechanisms partially reduces the resource-efficiency of the underlying broadcast services. Sacrificing resource-efficiency due to requirements of UE reporting may be necessary but should be kept as minimal as possible to minimize congestion.

6 MBMS User Service requirements

6.1 Charging

The MBMS User Service shall support standardized mechanisms to transfer charging related information. in-between

It shall be possible to charge for MBMS content the user receives while roaming in a VPLMN.

As indicated in Annex A some services will require an indication that MBMS content has been received. Therefore it shall be possible for the UE to provide such an indication.

The MBMS User Service shall support the following charging mechanisms :

- Charging on a subscription basis
- Charging for keys that that allow the user access to the data

6.2 Security

The following security aspects shall be taken into account:

Any user modifiable MBMS service data (e.g. storage of deliveries in the UE, data type and format specific behaviours etc) shall only be modified by the authenticated user (see also 4.1.1 above).

6.3 Privacy

Third parties and VASP should not be aware about user IDs for MBMS subscriptions unless explicitly allowed by the operator.

6.4 Quality of service

It should be possible for the operator to collect statistical data such as lost frames, assigned resources, bit-rates achieved etc.

6.5 Subscription

During the lifetime of subscription to a Multicast Service it shall be possible for the user to declare the service preferences. It shall be possible for the network to store the user settings e.g. using GUP.

Annex A (informative): Use Cases

Service Example	Media	Distribution Scope	MBMS User Service Classification	Application Bit rate Note 1	Delivery Verification Required Note 3	User Charging Note 4
Reliable text distribution (eg Local news)	Text	Multicast	Download	Up to 10 kbps	Yes	Event
Unverified text distribution	Text	Multicast, Broadcast	Carousel, download	Up to 10 kbps	No	-
Text distribution with still images and/or low quality video	Text, Still images, Video (e.g. 3fps)	Multicast, Broadcast	Carousel, download	Up to 32 kbps	Service dependent	User service dependent Note 2
Audio streaming	Stereo Audio	Multicast	Streaming	Up to 48kbps	Service dependent	-
Audio streaming	Stereo Audio	Broadcast	Streaming	Up to 48kbps	No	-
Audio download	Stereo Audio	Broadcast	Download	Up to 48kbps	Service dependent	-
Audio download	Stereo Audio	Multicast	Download	Up to 48kbps	Yes	Event
Audio distribution with low quality video	Stereo Audio, Video (e.g. 3fps)	Broadcast	Streaming	Up to 128kbps Note 7	No	-
Audio distribution with low quality video	Stereo Audio, Video (e.g. 3fps)	Multicast	Streaming	Up to 128kbps Note 5	Service dependent	-
Audio distribution with low quality video	Stereo Audio, Video (e.g. 3fps)	Broadcast	Download	Up to 128kbps Note 5	Service dependent	-
Audio distribution with low quality video	Stereo Audio, Video (e.g. 3fps)	Multicast	Download	Up to 128kbps Note 5	Yes	Event
Video streaming	Video & supplementary data (e.g. text, still images)	Broadcast	Streaming	Up to 384 kbps Note 5	No	-
Video streaming	Video & supplementary data (e.g. text, still images)	Multicast	Streaming	Up to 384 kbps Note 5	Service dependent	-
Video distribution	Video & supplementary data (e.g. text, still images)	Broadcast	Download	Up to 384 kbps Note 5	Service dependent	-
Video distribution	Video & supplementary data (e.g. text, still images)	Multicast	Download	Up to 384 kbps Note 5	Yes	Event
General Content Distribution	Video, Audio, File Data (binary data)	Broadcast	Carousel, download	Up to 384 kbps Note 5	Service dependent	-
General Content Distribution	Video, Audio, File Data (binary data)	Multicast	Carousel, download	Up to 384 kbps Note 5	Yes	Event
Secure data download	File; eg UE type specific and/or application	Multicast	Carousel, download	Up to 10kbps	-	-

	specific software					

Notes :

1. Bit rate of the user data at the application layer.
2. If User Charging is Event based then Delivery Verification is required
3. Delivery Verification relates only to verification itself. Quality assessments may be required in addition.
4. DRM may be applicable to User Charging.
5. For GERAN lower bandwidth availability may constrain some applications. In such cases it may be possible to provide the same content via different delivery methods.
6. The ' - ' mark indicates that no applicable information has been identified.

Annex B (informative): Example service scenarios

This annex provides a non-exhaustive list of potential service scenarios for MBMS User Services.

B.1 Text notification service

Media: Text

Precondition: The user is a member of a MBMS Multicast group supplying text alerts.

Actions: At an appropriate time an alert is sent to the user's mobile handset using the MBMS Multicast service.

Post condition: The user receives the alert using her mobile handset and takes appropriate action.

B.2 Local Area Information distribution (Case A)

Media: Text & Text with low quality video

Precondition: The user is a registered with an MBMS Broadcast service providing information to the local area such as local news and weather reports.

Actions: Information in the form of text & text with low quality video is distributed to the user's mobile handset by the MBMS Broadcast service. The text may be scrolled on the mobile handset. The information distributed by the MBMS Broadcast Service may be repeated periodically and updated at appropriate intervals.

Post condition: The user is aware of events that have taken place within the local area and can view appropriate images.

B.3 Local Area Information distribution (Case B)

Media: Video & Audio

Precondition: The user is a registered with an MBMS Broadcast service providing streaming audio and/or visual content related to a local area, such as audio and visual guides to local attractions, traffic reports etc…

Actions: Audio and/or visual information is distributed to the user's mobile handset by the MBMS Broadcast service. The user is able experience the content on her mobile device. The user is able to receive the MBMS broadcast service continuously throughout the local area. At some points the user is able to interact with the content of the MBMS Broadcast service in order to access specific information regarding items being presented within the content. The user is able to activate/deactivate reception of the MBMS service at any time.

Post condition: The user experiences and interacts with the content provided and is therefore able to obtain information regarding the local area and act accordingly.

B.4 Multicast distribution

Media: Text & Text with still images

Precondition: The user is a member if a MBMS multicast group providing personally tailored content such as targeted advertising etc…

Actions: Information is provided by the MBMS Multicast service in the form of text & text with still images, to the user's mobile handset based on her subscription to the Multicast group and current location.

Post condition: The user receives tailored content and is able to utilize this as appropriate.

B.5 Audio Distribution

Media: Stereo Audio

Precondition: The user is registered with an MBMS Broadcast service providing stereo quality streaming audio content.

Actions: Audio content is distributed to the user's mobile handset by the MBMS Broadcast service. Whilst listening to the audio content the user is able to interact with the service using the capabilities of the mobile handset (e.g. messaging).

Post condition: The user is able to enjoy the stereo quality audio content and interacts with the service as appropriate.

B.6 General Content Distribution

Media: Video, Audio & File Data

Precondition: The user is registered with a MBMS Broadcast service providing a variety of content.

Actions: Content is periodically distributed to a particular area by the MBMS Broadcast service. When the user activates reception of the MBMS Broadcast service she is able to receive the content being distributed at that time.

Post condition: The user is able to receive and enjoy the content being distributed.

B.7 Software Download

Media : File

Preconditions :Need to update/download software in UE, the User is subscribed to MBMS User Service, OTA download is supported in UE

Actions: The operator compiles a list of affected users and sends them a text message (using MBMS) explaining the problem and that the user should select the MBMS application on their handset. The user sees a message inviting her to activate the Enable Upgrade, selects 'yes' and the software patch transferred by the MBMS User Service, including verification parameters.

Postcondition : The software once installed allows the user to view the MMs that she couldn't see before.

Annex C (informative): Change history

Change history											
TSG SA#	**SA Doc.**	**SA1 Doc**	**Spec**	**CR**	**Rev**	**Rel**	**Cat**	**Subject/Comment**	**Old**	**New**	**WI**
Jun 2003			22.246					Initial draft presented	0.0.0	0.1.0	MBMS
Aug 2003			22.246					Output from MBMS adhoc Staines	0.1.0	0.2.0	MBMS
Sep 2003			22.246					Approved in SA1 for presentation to SA #21	0.2.0	1.0.0	MBMS
Oct 2003			22.246			Rel-6		Raised to version 2.0.0 for approval at SA #22	1.0.0	2.0.0	MBMS
SP-22	SP-030708	S1-031003	22.246			Rel-6		Approved at SA #22	2.0.0	6.0.0	MBMS
SP-23	SP-040204		22.246	001	1	Rel-6	B	CR on advertising of capabilities required to receive a particular transmission	6.0.0	6.1.0	MBMS
SP-23	SP-040204	S1-040226	22.246	002	-	Rel-6	F	Addition of “MBMS transport service” definition	6.0.0	6.1.0	MBMS
SP-23	SP-040204	S1-040227	22.246	003	-	Rel-6	F	Clarification on delivery verification for MBMS user services	6.0.0	6.1.0	MBMS
SP-23	SP-040204		22.246	004	1	Rel-6	C	Using a single MBMS transport service for multiple MBMS user services	6.0.0	6.1.0	MBMS