Technical Specification Group Services and System Aspects
Meeting #17, Biarritz, France, 9-12 September 2002

TSGS#17(02)0561

Source: **SA1**

Title: **Release 6 CRs to 22.146 on MBMS**

Document for: **Approval**

Agenda Item: **7.1.3**

SA Doc	Spec	CR	Rev	Phase	Cat	Subject	Old Vers	New Vers	SA1 Doc
SP-020561	22.146	033		Rel-6	B	Support of simultaneous services in MBMS	6.0.0	6.1.0	S1-021473
SP-020561	22.146	034		Rel-6	F	Proposal for Amalgamation of 1279, 1334, 1291	6.0.0	6.1.0	S1-021472
SP-020561	22.146	035		Rel-6	B	Proposed CR to 22.146: addition of QoS information	6.0.0	6.1.0	S1-021471
SP-020561	22.146	036		Rel-6	F	MBMS Editorial CR	6.0.0	6.1.0	S1-021469
SP-020561	22.146	037		Rel-6	F	Proposed CR 22.146 on MBMS Availability	6.0.0	6.1.0	S1-021483
SP-020561	22.146	038		Rel-6	C	Proposed CR to 22.146: Multicast service discovery	6.0.0	6.1.0	S1-021481
SP-020561	22.146	039		Rel-6	B	CR to 22.146 on MBMS Charging	6.0.0	6.1.0	S1-021475

S1-021473

3GPP TSG-SA1MBMS SWG
Roma, Italy
08-12 July 2002

CR-Form-v7

CHANGE REQUEST

⌘ **22.146** **CR** **033** ⌘ **rev** **-** ⌘ Current version: **6.0.0** ⌘

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

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

Title:	⌘	Proposed CR to 22.146: Simultaneous Services in MBMS
Source:	⌘	SA1 (MBMS SWG)
Work item code:	⌘	MBMS
Date:	⌘	11/07/2002
Category:	⌘	**B**
Release:	⌘	Rel-6

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	Currently the stage 1 specification only discusses the support of paging whilst an MBMS session is ongoing or possibly other MBMS sessions. An interesting service capability from a user point ov view would be to discuss an ongoing MBMS transmission with a friend, or to be downloading data in the background. It is appreciated that this may be restricted to high end terminals and not all terminals will support this feature.but the network should not restrict such a service.
Summary of change:	⌘	Add text to sub-section 5.1.2 and 5.2.2
Consequences if not approved:	⌘	Operators/Users will lose a potentially useful feature within MBMS

Clauses affected:	⌘	5.1.2, 5.2.2			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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 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 operators shall be able to activate service announcements within the broadcast area about available broadcasts in the broadcast area.

5.1.2 User requirements for MBMS

- User mobility

  The user shall be able to continue receiving broadcast vices throughout the broadcast 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.
  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 areas

  The PLMN operator shall be able to provision one or more multicast areas to support multicast services. It shall be possible to provision and transmit one or more multicast services for each multicast area.

  It should be possible to deliver a multicast service across a number of multicast areas. Multicast areas may belong to several PLMNs and delivery of a multicast service across several PLMNs should be possible.

  If a multicast service is transmitted to several multicast areas, it should be possible to transmit different data to each multicast area, for the same service. (e.g. a "nationwide traffic service" with localized traffic reports or

service being delivered with different QoS levels to a UTRAN multicast area and a GERAN multicast area) If different data is transmitted for the same service, the different data transmissions shall be distinguishable by the UE.

While multicast transmissions are limited to the operator defined multicast areas, a user shall be able to join or leave a multicast group either within or outside the multicast areas designated for the service.

The size of the multicast area may be smaller than a cell.

An operator should also be able to control the size of Multicast Area e.g. according to the traffic congestion or radio resources in an individual cell, set of cells within the multicast area.

- 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. If transmitted to multiple multicast areas, a multicast service may be provided with different QoS parameters for each multicast area associated with the service.

  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 area, the network may distribute the data across the whole multicast area or parts of the area. The decision to distribute to only parts of the multicast 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 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 operators shall be able to activate service announcements within the multicast area about available multicasts in the multicast area.

5.2.2 User requirements for MBMS

- User mobility

  The user shall be able to continue receiving multicast services throughout the multicast areas 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. 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 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

In general, MBMS in multicast or broadcast mode should be available for all users that are registered in a PLMN. This should include UEs PMM in idle/connected and GPRS standby /ready modes.

Within the broadcast or multicast 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 (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.

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

TSG-SA WG1 #17 **S1-021472**
Durango, USA, 12-16th August 2002 **Agenda Item:**

CR-Form-v7

CHANGE REQUEST

⌘ **22.146** **CR** **034** ⌘ **rev** **-** ⌘ Current version: **6.0.0** ⌘

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

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

Title:	⌘	Location Specific Content and QoS
Source:	⌘	SA1 (Siemens, Nokia)
Work item code:	⌘	MBMS
Date:	⌘	15.08.2002
Category:	⌘	**F**
Release:	⌘	Rel-6

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

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

Reason for change: ⌘

Current specification calls for enabling location specific content for MBMS. Further, predefined location-specific QoS is required as well. Recent discussions at the recently held MBMS workshop indicated that the present description of these requirements is slightly confusing in regards to the function of a multicast/broadcast area and its logical relation to a multicast/broadcast service. It was pointed out that preferably a single area should be associated with a single service and that QoS degradation or location specific content would be better handled separately on a different level.

QoS degradation is also currently described as a statically configured area specific configuration. It is expected that QoS degradation could potentially be more dynamic to allow local QoS variations. It should be noted that present SA2 work has identified possible solutions to handle such requirements.

Further, 5.1.1 and 5.2.2 describe obviously a discrete number of areas in which MBMS services may be offered. This prevents the configuration of service areas individually per MBMS service. Each service has to be provided within the somehow provided broadcast/multicast areas. This is an unnecessary service limitation.

Summary of change: ⌘

Section 3.1: Clarification of definitions according to the principles described above (there is one area per broadcast/multicast area). The term “geographical” is removed, as it could easily be misinterpreted, e.g. as geographic co-ordinates. The area where a particular MBMS service is available does not necessarily relate to a closed geographical area. Such an area could be defined e.g. as a city, or part of a city, or a number of cities.

		Section 4: Editorial corrections based upon the revised definitions. Section 5.1.1: Requirements should be focused on services; the area is one parameter of the service description. QoS description is updated to reflect the requirement that there is a QoS profile for each MBMS service that can be degraded in different locations (e.g. cells) depending on available resources. Section 5.2.1: Same as for 5.1.1.
Consequences if not approved:	⌘	Confusion in the interpretation of area and service definitions and the relations between the different entities. Association with area-specific content and QoS is not clear as well.

Clauses affected:	⌘	3 to 5.3			
Other specs affected:	⌘	**Y**	**N**		⌘
				Other core specifications	
				Test specifications	
				O&M Specifications	
Other comments:	⌘				

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

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

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

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

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: ~~A geographical~~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 ~~a~~ 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 ~~one or more~~ the associated broadcast service area~~s~~. Broadcast services may be received by all users who have enabled the specific broadcast service locally on their UE and who are in ~~one of~~ the broadcast area~~s~~ 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 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: ~~A geographical~~ The area in which ~~the~~ 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 ~~may be a~~ part(s) ~~of a~~ 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 ~~one or more~~ the associated multicast service area~~s~~. Multicast services can only be received by ~~those~~ such users ~~which~~ 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 ~~or areas~~. The broadcast mode is intended to efficiently use radio/network resources e.g. data is transmitted over a common radio channel. Data is transmitted ~~to~~ in the broadcast service area~~s~~ 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 ~~a~~ 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).

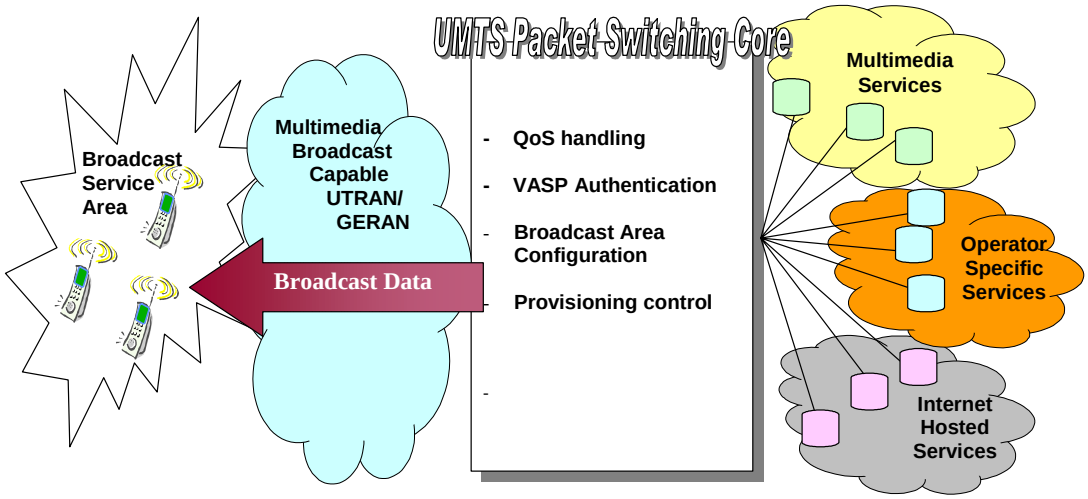

Figure 1: Example of Multicast Broadcast Mode Network

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 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 ~~to~~ in the multicast service area~~s~~ 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.

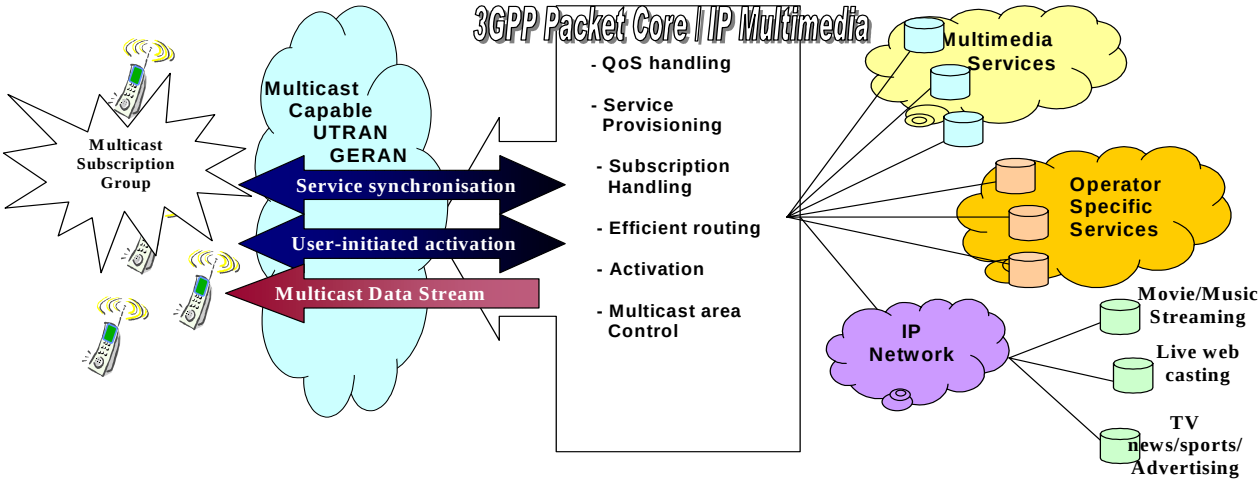

Figure 2: Example of Multicast Mode Network

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.

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 MBMS service discovery

The user should be informed that there are 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 discover that there are MBMS services available currently, or some time later, in the user's current location.

5 High level requirements

5.1 Broadcast mode

5.1.1 Home environment requirements

- Broadcast ~~areas~~services

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

  ~~It shall be possible to provision and transmit one or more broadcast services for each broadcast area.~~

  ~~It should be possible to deliver a broadcast service across a number of broadcast areas.~~ 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.

  ~~If a broadcast service is transmitted to several broadcast areas, it should be possible to transmit different data to each broadcast area, for the same service.~~ 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) ~~or a service being delivered with different QoS levels to a UTRAN broadcast area and a GERAN broadcast area) If different data is transmitted for the same service, the different data transmissions shall be distinguishable by the UE.~~ 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.

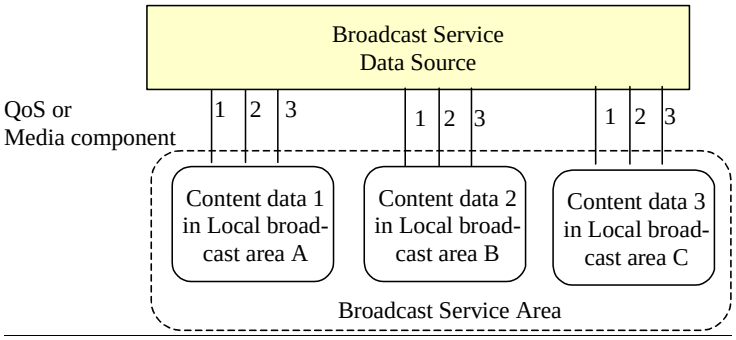

Figure 3 Broadcast Service with different content data for different locations

- Quality of service

  The PLMN operator shall be able to configure the quality of service for each individual broadcast services. ~~If transmitted to multiple broadcast areas, a broadcast service may be provided with different QoS parameters for each broadcast area associated with the 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 operators shall be able to activate service announcements within the broadcast service area about available broadcasts in the broadcast area.

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

5.2 Multicast mode

5.2.1 Home environment requirements

- Multicast ~~areas~~services

The PLMN operator shall be able to provision one or more multicast ~~areas to support 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.~~It shall be possible to provision and transmit one or more multicast services for each multicast area.~~

~~It should be possible to deliver a multicast service across a number of multicast areas.~~ Multicast service areas may cover part(s) of one or more PLMNs~~belong to several PLMNs and delivery of a multicast service across several PLMNs should be possible~~.

~~If a multicast service is transmitted to several multicast areas, it should be possible to transmit different data to each multicast area, for the same service.~~ 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 ~~or service being delivered with different QoS levels to a UTRAN multicast area and a GERAN multicast area~~) ~~If different data is transmitted for the same service, the different data transmissions shall be distinguishable by the UE.~~ 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.

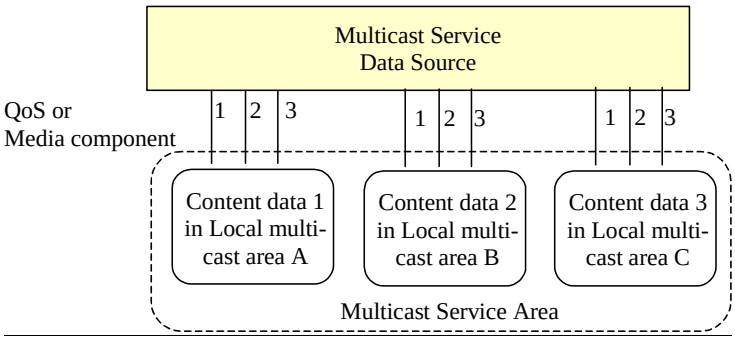

Figure 4 Multicast Service with different content data for different locations

~~While multicast transmissions are limited to the operator defined multicast areas, a user shall be able to join or leave a multicast group either within or outside the multicast areas designated for the service.~~

The size of the multicast area may be smaller than a cell.

An operator should also be able to control the size of Multicast Service Area e.g. according to the traffic congestion or radio resources in an individual cell, set of cells within the multicast service area.

- 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. ~~If transmitted to multiple multicast areas, a multicast service may be provided with different QoS parameters for each multicast area associated with the service.~~ 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 operators shall be able to activate service announcements within the multicast service area about available multicasts in the multicast service area.

5.2.2 User requirements for MBMS

- User mobility

  The user shall be able to continue receiving multicast services throughout the multicast service areas 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. The user shall be able to select between different multicast services provided to the user and can receive simultaneously more than one 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 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.

- 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

In general, MBMS in multicast or broadcast mode should be available for all users that are registered in a PLMN. This should include UEs PMM in idle/connected and GPRS standby /ready modes.

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.

3GPP TSG-SA1MBMS SWG
Roma, Italy
08-12 July 2002 ***S1-021471***

CR-Form-v7

CHANGE REQUEST

⌘ **22.146** **CR** **035** ⌘ **rev** **-** ⌘ Current version: **6.0.0** ⌘

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

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

Title:	⌘	Proposed CR on addition of QoS information
Source:	⌘	SA1 (Lucent Technologies/MBMS SA1 SWG)
Work item code:	⌘	MBMS
Date:	⌘	08/01/2002
Category:	⌘	**B**
Release:	⌘	Rel-6

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

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

Reason for change:	⌘	The current stage 1 for MBMS mentions little about the types of applications and supported data rates expected of MBMS applications. This contribution aims to help progress this open issue and proposes that the stage 1 requirements be updated with expected bit rates. It is assumed that MBMS codecs will have similar capabilities to those required to support PSS.
Summary of change:	⌘	Addition of new section on QoS and a table capturing typical bit rates that could be supported by MBMS
Consequences if not approved:	⌘	A common understanding of what types of applications and bit rates required for MBMS would not be reached.

Clauses affected:	⌘	~~New clause inserted~~ New informative annex inserted

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

Other comments:	⌘	

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

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

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

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

Annex X (informative):

MBMS Bit Rates

MBMS shall support a variety of background and streaming class applications. A particular service may be available at different bit rates depending on the radio conditions of the access network.

The following table contains a non-exhaustive list of some applications with typical bit rates that may be suitable for MBMS. (It is assumed that MBMS codecs will have similar capabilities to those required to support PSS.)

Application	**Media type(s)**	[1]**Typical Bit rate**
Traffic telematics	Text, audio, pictograms, video	8kb/s ~ 64kb/s
Weather	Text, video, pictograms	8kb/s ~ 64kb/s
Advertising	Text, video, pictograms	8kb/s ~64kb/s
News broadcast	Audio, video	8kb/s ~ 256kb/s
Music streaming, (Web radio)	Audio	8kb/s ~ 64kb/s
Video concert	Audio/Video	32kb/s ~ 256kb/s
Sports replay	Video	32kb/s ~ 256kb/s
File sharing	Binary data	8kb/s ~ 256kb/s

1. Actual bit rates are dependent on radio access technology and terminal capabilities.

~~1.~~

S1-021469

3GPP TSG-SA1MBMS SWG
Roma, Italy
08-12 July 2002

CR-Form-v7

CHANGE REQUEST

⌘ **22.146** **CR** **036** ⌘ **rev** **-** ⌘ Current version: **6.0.0** ⌘

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

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

Title:	⌘	Proposed CR to 22.146: Misc Editorial Changes
Source:	⌘	SA1 (H3G)
Work item code:	⌘	MBMS
Date:	⌘	08/07/2002
Category:	⌘	**F**
Release:	⌘	Rel-6

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	Removal of paragraph + minor editorial changes
Summary of change:	⌘	Addition of Carriage returns in definitions section 3.1 Removal of duplicated 'to' in 4.1 Deletion of 'The size of the multicast area may be smaller than a cell' Note: Should have been removed in previous CR.
Consequences if not approved:	⌘	Incorrect requirement may cause problems in other groups

Clauses affected:	⌘	3.1, 4.1, 5.2.1

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

Other comments:	⌘	

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)"

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 area: A geographical area in which a broadcast service is available. The broadcast area may represent the coverage area of the entire PLMN, or a part of the PLMN's coverage area .

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 one or more broadcast areas. Broadcast services may be received by all users who have enabled the specific broadcast service locally on their UE and are in one of the broadcast areas 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 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 area: A geographical area in which the multicast service is available. The multicast area may represent the coverage area of an entire PLMN, or may be a part of a PLMN's coverage area.

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 one or more multicast areas. Multicast services can only be received by those users which 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 area or areas. The broadcast mode is intended to efficiently use radio/network resources e.g. data is transmitted over a common radio channel. Data is transmitted to broadcast areas as defined by the network (Home environment). Figure 1 gives an example of how a network can be configured to broadcast a variety of high bit rate services to users within a broadcast 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).

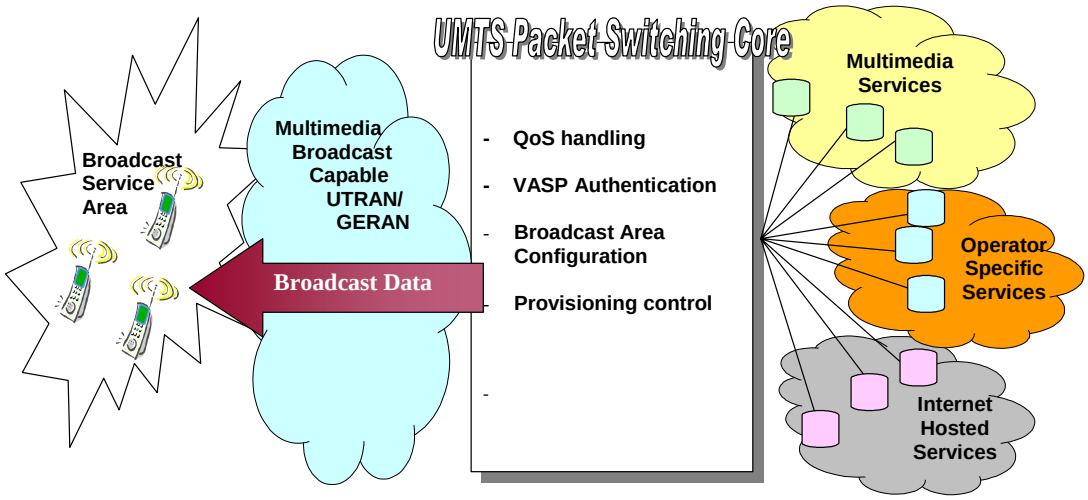

Figure 1: Example of Multicast Broadcast Mode Network

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 ~~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 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 to multicast areas 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 area which contain members of a multicast group.

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.

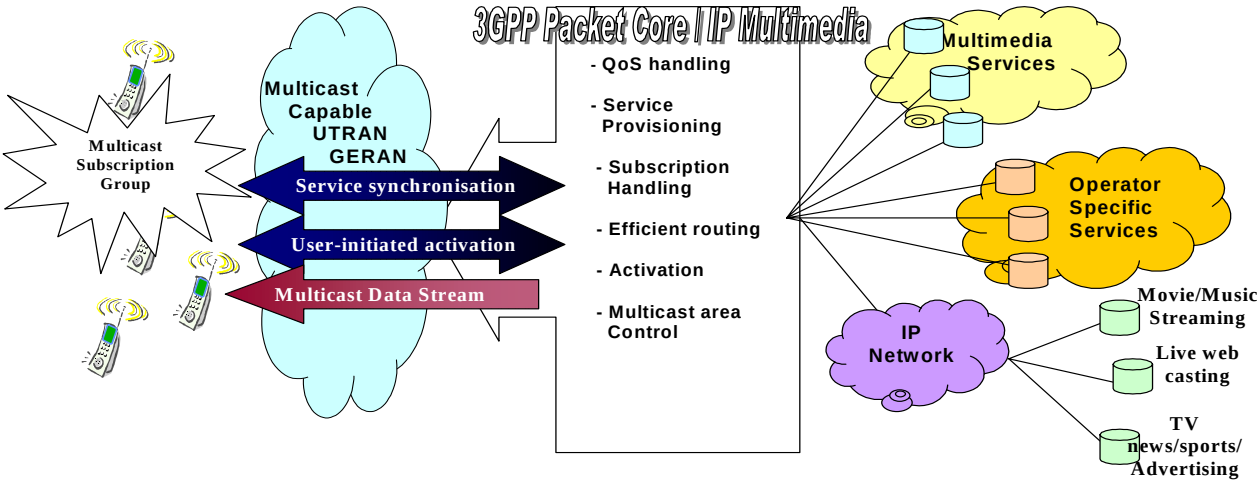

Figure 2: Example of Multicast Mode Network

. 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.

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 MBMS service discovery

The user should be informed that there are 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 discover that there are MBMS services available currently, or some time later, in the user's current location.

5 High level requirements

5.1 Broadcast mode

5.1.1 Home environment requirements

- Broadcast areas

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

  It shall be possible to provision and transmit one or more broadcast services for each broadcast area.

  It should be possible to deliver a broadcast service across a number of broadcast areas.

  If a broadcast service is transmitted to several broadcast areas, it should be possible to transmit different data to each broadcast area, for the same service. (e.g. a "nationwide traffic service" with localized traffic reports or a service being delivered with different QoS levels to a UTRAN broadcast area and a GERAN broadcast area) If different data is transmitted for the same service, the different data transmissions shall be distinguishable by the UE.

- Quality of service

  The PLMN operator shall be able to configure the quality of service for individual broadcast services. If transmitted to multiple broadcast areas, a broadcast service may be provided with different QoS parameters for each broadcast area associated with the service.

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 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 operators shall be able to activate service announcements within the broadcast area about available broadcasts in the broadcast area.

5.1.2 User requirements for MBMS

- User mobility

  The user shall be able to continue receiving broadcast vices throughout the broadcast 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.
  The user shall be able to enable/disable the reception of specific broadcast services and can receive simultaneously more than one 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.

5.2 Multicast mode

5.2.1 Home environment requirements

- Multicast areas

  The PLMN operator shall be able to provision one or more multicast areas to support multicast services. It shall be possible to provision and transmit one or more multicast services for each multicast area.

  It should be possible to deliver a multicast service across a number of multicast areas. Multicast areas may belong to several PLMNs and delivery of a multicast service across several PLMNs should be possible.

If a multicast service is transmitted to several multicast areas, it should be possible to transmit different data to each multicast area, for the same service. (e.g. a "nationwide traffic service" with localized traffic reports or service being delivered with different QoS levels to a UTRAN multicast area and a GERAN multicast area) If different data is transmitted for the same service, the different data transmissions shall be distinguishable by the UE.

While multicast transmissions are limited to the operator defined multicast areas, a user shall be able to join or leave a multicast group either within or outside the multicast areas designated for the service.

~~The size of the multicast area may be smaller than a cell.~~

~~An operator should also be able to control the size of Multicast Area e.g. according to the traffic congestion or radio resources in an individual cell, set of cells within the multicast area.~~

- 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. If transmitted to multiple multicast areas, a multicast service may be provided with different QoS parameters for each multicast area associated with the service.

  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 area, the network may distribute the data across the whole multicast area or parts of the area. The decision to distribute to only parts of the multicast 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 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 operators shall be able to activate service announcements within the multicast area about available multicasts in the multicast area.

5.2.2 User requirements for MBMS

- User mobility

The user shall be able to continue receiving multicast services throughout the multicast areas 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.

MBMS Ad-hoc **S1-021483**
Rome, Italy, July 8-12, 2002 **Agenda Item:**

CR-Form-v4

CHANGE REQUEST

⌘ **22.146** **CR** **037** ⌘ ev **-** ⌘ Current version: **6.0.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network **X**

Title:	⌘	MBMS Availability
Source:	⌘	SA1 (MBMS SWG)
Work item code:	⌘	MBMS
Date:	⌘	
Category:	⌘	**F**
Release:	⌘	REL-6

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

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

Reason for change:	⌘	Currently, TS refers to UE modes in which MBMS is to be available. It is not clear why a stage-1 requirements specification deals with specifics of UE states for MBMS reception. A more general requirement regarding service availability to all PLMN registered/attached users exists and seems to capture the required functionality as far as service requirements are concerned
Summary of change:	⌘	1. General service availability to all PLMN registered/attached users is mandatory. 2. Removal of specific UE states from stage-1
Consequences if not approved:	⌘	Wording remains unclear. Stage-1 deals with issues that are out-of-scope for service requirement.

Clauses affected:	⌘	5.3
Other specs Affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

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

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

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

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

5.3 Availability

~~In general,~~ MBMS in multicast or broadcast mode ~~should~~ shall be available to~~for~~ all users that are registered/attached to~~in~~ a PLMN.

~~This should include UEs PMM in idle/connected and GPRS standby /ready modes.~~

Within the broadcast or multicast 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.

S1-021481

3GPP TSG-SA1MBMS SWG
Roma, Italy
08-12 July 2002

CR-Form-v7

CHANGE REQUEST

⌘ **22.146** **CR** **038** ⌘ **rev** **-** ⌘ Current version: **6.0.0** ⌘

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

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

Title:	⌘	Proposed CR to 22.146: Multicast service discovery
Source:	⌘	SA1 (Lucent Technologies, Bamboo Media Casting/SA1 SWG MBMS)
Work item code:	⌘	MBMS ***Date:*** ⌘ 08/07/2002
Category:	⌘	**C** ***Release:*** ⌘ Rel-6

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	Section 4.3 on MBMS Service Discovery is not clear on what mechanisms the network could make available to the user to discover MBMS service. The term Service Announcements suggests that the network informs MBMS service availability to the user. This may be sufficient for broadcast, but may not be sufficient for multicast. The network should not preclude user interrogation to encourage subscription to multicast services available at his current location or another location. Therefore from a user perspective, information about MBMS services should be available by both push- and pull-type mechanisms.
Summary of change:	⌘	Modify text & title of sub-section 4.3. Add text to sub-section 5.1.1, 5.1.2, 5.2.1 & 5.2.2
Consequences if not approved:	⌘	Stage 1 would not be clear on the distinction of service discovery and service announcements and requirements for the mechanisms to support service discovert would not be clearly captured.

Clauses affected:	⌘	4.3 and 5.1.1, 5.1.2, 5.2.1,5.2.2

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

4.3 ~~MBMS service d~~Discovery and announcement of MBMS services

The user ~~should~~ shall be able to find out or be informed ~~that there are~~ 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 ~~discover~~ be informed about ~~that there are~~ the MBMS services available currently, or some time later.~~, in the user's current location~~. Users should also be able to discover and monitor MBMS service availability e.g. using a URL~~.~~

[…]

5.1 Broadcast mode

5.1.1 Home environment requirements

- Broadcast areas

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

  It shall be possible to provision and transmit one or more broadcast services for each broadcast area.

  It should be possible to deliver a broadcast service across a number of broadcast areas.

  If a broadcast service is transmitted to several broadcast areas, it should be possible to transmit different data to each broadcast area, for the same service. (e.g. a "nationwide traffic service" with localized traffic reports or a service being delivered with different QoS levels to a UTRAN broadcast area and a GERAN broadcast area) If different data is transmitted for the same service, the different data transmissions shall be distinguishable by the UE.

- Quality of service

  The PLMN operator shall be able to configure the quality of service for individual broadcast services. If transmitted to multiple broadcast areas, a broadcast service may be provided with different QoS parameters for each broadcast area associated with the service.

  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 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.

~~The PLMN operators shall be able to activate service announcements within the broadcast area about available broadcasts in the broadcast area.~~

5.1.2 User requirements for MBMS

- User mobility

  The user shall be able to continue receiving broadcast vices throughout the broadcast 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 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 the user shall be able to receive paging messages.

[…]

5.2 Multicast mode

5.2.1 Home environment requirements

- Multicast areas

  The PLMN operator shall be able to provision one or more multicast areas to support multicast services. It shall be possible to provision and transmit one or more multicast services for each multicast area.

  It should be possible to deliver a multicast service across a number of multicast areas. Multicast areas may belong to several PLMNs and delivery of a multicast service across several PLMNs should be possible.

  If a multicast service is transmitted to several multicast areas, it should be possible to transmit different data to each multicast area, for the same service. (e.g. a "nationwide traffic service" with localized traffic reports or service being delivered with different QoS levels to a UTRAN multicast area and a GERAN multicast area) If different data is transmitted for the same service, the different data transmissions shall be distinguishable by the UE.

  The size of the multicast area may be smaller than a cell.

  An operator should also be able to control the size of Multicast Area e.g. according to the traffic congestion or radio resources in an individual cell, set of cells within the multicast area.

- 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. If transmitted to multiple multicast areas, a multicast service may be provided with different QoS parameters for each multicast area associated with the service.

  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 area, the network may distribute the data across the whole multicast area or parts of the area. The decision to distribute to only parts of the multicast 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 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.

  ~~The PLMN operators shall be able to activate service announcements within the multicast area about available~~

5.2.2 User requirements for MBMS

- User mobility

  The user shall be able to continue receiving multicast services throughout the multicast areas 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 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 one or more multicast services the user shall be able to receive paging messages.

- 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.

MBMS Ad-hoc **S1-021475**
Rome, Italy, July 8-12, 2002 **Agenda Item:**

CR-Form-v4

CHANGE REQUEST

⌘ **22.146** **CR** **039** ⌘ ev **-** ⌘ Current version: **6.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE **X** Radio Access Network **X** Core Network **X**

Title:	⌘	MBMS Charging
Source:	⌘	SA1 (Bamboo MediaCasting)
Work item code:	⌘	MBMS
Date:	⌘	
Category:	⌘	**B**
Release:	⌘	REL-6

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

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
REL-4	*(Release 4)*
REL-5	*(Release 5)*

Reason for change:	⌘	Present SA2 output includes some charging requirements and issues that are not specifically mentioned in the stage-I. It is considered worthwhile to bring these requirements into stage-I and to update TS accordingly.
Summary of change:	⌘	Introduction and clarification of charging requirements including: 1. Explicit mention of content provider charging for multicast services. 2. Introduction of on-line charging for subscribers.
Consequences if not approved:	⌘	

Clauses affected:	⌘	7		
Other specs Affected:	⌘	☐ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	
Other comments:	⌘			

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

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

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

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

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): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
July 2001							
July 2001							

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