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TECHNICAL REPORT

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Universal Mobile Telecommunications System (UMTS);
Multimedia Broadcast/Multicast Service (MBMS);
UTRAN/GERAN requirements
(3GPP TR 25.992 version 17.0.0 Release 17)**

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Contents

Foreword

This Technical Report 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:

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where:

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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.

1　Scope

This document is part of the RAN WI "**Introduction of the Multimedia Broadcast Multicast Service (MBMS) in RAN**" and it is linked to 3GPP TS 22.146 "Multimedia Broadcast Multicast Service; Stage-1" [2] and the SA2 WI "Multimedia Broadcast/Multicast Service Architecture", the work of which is reflected in 3GPP TS 23.246 [3].

The purpose of the present document is to address the UTRAN and GERAN MBMS requirements in order to help the TSG RAN and TSG GERAN working groups address the changes needed to existing specifications and also identify new specifications, that are required for the introduction of the WI "**Introduction of the Multimedia Broadcast Multicast Service (MBMS) in RAN**".

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; Stage-1".

[3]　　　　3GPP TS 23.246: "Multimedia Broadcast Multicast Service; Architecture and Functional Description".

3　Definitions, symbols and abbreviations

3.1　Definitions

For the purposes of the present document, the following terms and definitions given in [1] and the following apply..

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

Counting: This is the function that UTRAN performs when it wishes to identify the number of multicast subscribers (all joined subscribers, or just above a "threshold") in a particular cell, that wish to receive a multicast session for a particular service.

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

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

MBMS broadcast activation: The process which enables the data reception from a specific broadcast mode MBMS on a UE. Thereby the user enables the reception locally on the UE.

MBMS multicast activation (Joining):. The explicit point-to-point UE to network signalling, which enables a UE to become a member of a multicast group and thus start receiving data from a specific MBMS multicast service (when data become available).

MBMS Notification: The mechanism, which informs the UEs about the availability or coming availability of a specific MBMS RAB data in one given cell.

Service Announcements/Discovery: The mechanisms should allow users to request or be informed about the range of MBMS services available Operators/service providers may consider several service discovery mechanisms. This could include standard mechanisms such as SMS, or depending on the capability of the terminal, applications that encourage user interrogation. Users who have not already subscribed to a MBMS service should also be able to discover MBMS services.

NOTE: Some of the above definitions have been taken from TS 22.146 [2].

Tracking: This is a function that allows UTRAN to follow the mobility of multicast subscribers. Inherently it can be used as a means of counting multicast subscribers.

UE: Unless otherwise stated, 'UE' is used to refer to both the UE and the MS.

3.2 Symbols

(void)

3.1 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TS 21.905 [1] and the following apply:

MBMS	Multimedia Broadcast Multicast Service
p-t-p	Point-to-point
p-t-m	Point-to-multipoint

4 Background and introduction

Following TSG RAN/SA#15, it was concluded that the service requirements [2] of MBMS are considered stable enough and the work on the architectural aspects have progressed to the extent that the work in the RAN groups could be initiated.

5 RAN MBMS requirements

Following the clarifications provided during the 3GPP MBMS workshop on stage 1 [2] and stage 2 [3], the following RAN requirements have been identified and are currently agreed within RAN WG2:

1. MBMS data transfer shall be downlink only.

2. QoS attributes shall be the same for MBMS Multicast and Broadcast modes.

3. During MBMS data transmission it shall be possible to receive paging messages, which also should contain some additional information, such as CLI.

4. Simultaneous reception of MBMS and non-MBMS services shall depend upon UE capabilities.

5. Simultaneous reception of more than one MBMS services shall depend upon UE capabilities.

6. A notification procedure shall be used to indicate the start of MBMS data transmission. This procedure shall contain MBMS RB information. The MBMS notification requirements are listed in subclause 5.1.

7. A mechanism to enable the Network to move MBMS subscribers between cells is required.

8. MBMS UE multicast activation (Joining) shall be transparent to UTRAN.

9. A mechanism is required that enables the non-transmission of MBMS multicast mode in a cell which does not contain any MBMS UEs joined to the multicast group.

10. Reception of MBMS shall not be guaranteed at RAN level. MBMS does not support individual retransmissions at the radio link layer, nor does it support retransmissions based on feedback from individual subscribers at the

radio level. This does not preclude the periodic repetitions of the MBMS content based on operator or content provider scheduling or retransmissions based on feedback at the application level.

11. MBMS shall not prevent the capability for SRNS/SBSS relocation.

12. A mechanism to provide UTRAN the received QoS per UE is not required as part of MBMS.

13. UE controlled "service based" cell selection/reselection shall not be permitted.

14. Handover and SGSN relocation shall not be affected by an active MBMS session.

15. In the case of UTRAN only, guaranteed 'QoS' linked to a certain initial downlink power setting is not required; however, the purpose and possibility of some reporting mechanism could be identified to measure the delivered QoS.

NOTE: The above requirement is not applicable in GERAN, as a p-t-m type connection will use a similar power control mechanism to a broadcast channel.

16 MBMS Multicast mode transmissions should use dedicated resources (p-t-p) or common resources (p-t-m). The selection of the connection type (p-t-p or p-t-m) is operator dependent, typically based on downlink radio resource environment such as radio resource efficiency. A "threshold" related to the number of users may be utilised, resulting in the need for a mechanism to identify the number of subscribers in a given "area".

17 MBMS solutions to be adopted should minimise the impact on the RAN physical layer and maximise reuse of existing physical layer and other RAN functionality.

18 MBMS charging should be transparent to the RAN.

19 MBMS should allow for low UE power consumption.

20 Header compression should be used.

21 MBMS should not prevent support for SGSN in pool.

22 Data loss during cell change should be minimal.

5.1 MBMS Notification Requirements

The following requirements for MBMS notification mechanism(s) have been identified and currently agreed:

1 MBMS notification shall be transmitted within the MBMS service area.

NOTE: If MBMS notification is transmitted in all cells of a corresponding MBMS service area or only in those cells where MBMS subscribers are actually located, is FFS.

2 MBMS notification shall be sent so it could be received by all UEs with an activated MBMS service, regardless of their RRC state or the lack of an RRC connection.

3 MBMS notification should maximise the reuse of existing channels.

4 MBMS notification should allow terminals to minimise their power consumption, meaning that UEs with an activated MBMS service should not listen permanently, but at regular intervals to MBMS notification.

5 Reception of MBMS notification cannot be guaranteed.

6 UEs may receive MBMS notification and simultaneously monitor other occasions, e.g. UE dedicated paging and CBS messages. The avoidance of collisions cannot be guaranteed. If collisions occur, the UE dedicated Paging has higher priority (UE requirement).

6 RAN MBMS functions

6.1 Functions list

The RAN functions identified for MBMS are:

1 Functions relating to service establishment and radio resource management and control for MBMS services:

    1.1 Admission control for MBMS services (see subclause 6.2.1).

    1.2 Identification of the number of UEs (counting) with activated MBMS service(s) within a cell (see subclause 6.2.2).

    1.3 Selection between the use of p-t-p and p-t-m radio bearers (see subclause 6.2.3).

    1.4 Assignment of resources and the selection of parameters for MBMS radio bearers (see subclause 6.2.3).

    1.5 Establishment and release of radio bearers for MBMS services (see subclause 6.2.3).

    1.6 Identifying to UEs the physical, transport and logical channel parameters with which particular MBMS services are transmitted in each cell (see subclause 6.2.4).

    1.7 Alerting UEs that MBMS data is to be transmitted (see subclause 6.2.5).

    1.8 Power Control (see subclause 6.2.6).

2 Functions relating to mobility:

    2.1 Support of cell change and minimisation of data loss (see subclause 6.2.7).

    2.2 Maintenance of the MBMS context (see subclause 6.2.8).

3 Functions relating to transmission of MBMS data:

    3.1 Replication of MBMS data streams to the cells of a multicast or broadcast area (see subclause 6.2.9).

    3.2 Transfer of MBMS data (see subclause 6.2.10).

6.2 Function descriptions

This subclause contains a brief description of the RAN MBMS function identified in subclause 6.1.

6.2.1 Admission control

The RAN shall contain functionality that enables it to determine how to respond to requests to provide radio bearers for individual MBMS services (data streams) made by the SGSN. This admission procedure may take into account the capacity required, quality of service and priority of the requested service and the resources that are available for MBMS services within the cell.

6.2.2 Identification of the number of UEs with activated MBMS service(s) in a cell

Some architectural solutions for MBMS require that the RAN can identify the number of UEs (or at least whether a minimum number of UES) that have activated particular MBMS services are present in a cell. This function may be used, in conjunction with discontinuous MBMS services, to identify whether the service should be established in the cell and whether p-t-p or p-t-m radio access bearers should be used.

6.2.3 Selection, assignment and establishment and release of radio bearers

The RAN shall assign radio resources to bearers for MBMS services within the cells of broadcast and multicast areas. RAN decides on the radio bearer configuration, it may be p-t-p or p-t-m.

6.2.4 Identification of MBMS parameters to UEs

The RAN shall provide mechanisms whereby the RAN indicates to the UE the physical, transport and logical channel parameters that are associated with radio bearers that carry specific MBMS data streams within specific cells.

6.2.5 Alerting UEs that MBMS data is to be transmitted

For discontinuous MBMS services radio bearers may be established only during those periods when there is data to be transferred. The RAN shall be required to alert the UE that the service is about to be re-established.

6.2.6 Power control

The power level shall be set for p-t-p and p-t-m bearers.

Editor's note: It is an open issue whether feedback control for p-t-m radio bearers is practical.

6.2.7 Support of cell dhange and minimization of data loss

Whilst it is accepted that MBMS data loss may occur following cell reselection or handover, procedures shall be introduced to support resynchronisation after cell change and to reduce the potential for loss in these circumstances.

6.2.8 Maintenance of MBMS context

The RAN shall maintain internal records of the MBMS services that are active in each cell. These contexts shall be dependent upon the mobility of the UEs.

6.2.9 Replication of MBMS data streams

The content of an MBMS data stream may be transmitted in several cells by RAN. The RAN replicates the data to these cells.

Editor's note: This is a working assumption and this is to be decided by TSG SA WG2.

6.2.10 Transfer of MBMS data

The RAN shall provide the layer 1 and layer 2 processes necessary for the preparation and transfer of MBMS data on the Uu and Um interfaces. This encompasses the functions of

- header compression:

- segmentation/concatenation:

- multiplexing: and

- coding.

Depending on the service characteristics and the reception capability of the UE, it has to be evaluated how several data streams are multiplexed.

6.3 Functional separation

Editor's note: This clause will introduce the functional separation between the different protocol layers.

Annex A:
Change History

Date	Version	Comment
19 Sept. 2002	1.0.0	Changes are captured in attached document
6 Nov. 2002	1.1.0	Changes captures in the attached "cover" document.
17 January 2003	1.2.0	Changes are done based on discussions during the RAN2 RAN3 MBMS AdHoc (15-16 January 2003).
20 January 2003	1.3.0	RAN requirement #7 was re-worded based on comments on the RAN2 reflector.
16 June 2003	2.0.1	The version 2.0.0 identical to version 1.3.0 was presented in TSG RAN plenary meeting for approval. The TR was not approved so drafting work will continue in 3GPP WG2/3 based on version 2.0.0. The changes in version 2.0.1 compared to 2.0.0 are in History part where rapporteur information is changed.
2 September 2003	2.0.2	Agreed editorial changes (proposed in R2-031714) from RAN WG2 #37 included. Provide to TSG-RAN #21 for approval.

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
09/2003	RP-21	RP-030426	-		Created following RAN#21. Put under change control.	2.0.2	6.0.0
06/2007	RP-36	-	-	-	Upgrade to the Releae 7 - no technical change	6.0.0	7.0.0
12/2008	RP-42	-	-	-	Upgrade to the Releae 8 - no technical change	7.0.0	8.0.0
12/2009	RP-46	-	-	-	Upgrade to the Release 9 - no technical change	8.0.0	9.0.0
03/2011	RP-51	-	-	-	Upgrade to the Release 10 - no technical change	9.0.0	10.0.0
09/2012	RP-57	-	-	-	Upgrade to the Release 11 - no technical change	10.0.0	11.0.0
09/2014	RP-65	-	-	-	Upgrade to the Release 12 - no technical change	11.0.0	12.0.0
12/2015	RP-70	-	-	-	Upgrade to the Release 13 - no technical change	12.0.0	13.0.0
03/2017	RP-75	-	-	-	Upgrade to the Release 14 - no technical change	13.0.0	14.0.0
06/2018	RP-80	-	-	-	Upgrade to the Release 15 - no technical change	14.0.0	15.0.0
07/2020	RP-88e	-	-	-	Upgrade to the Release 16 - no technical change	15.0.0	16.0.0
03/2022	RP-95e	-	-	-	Upgrade to the Release 17 - no technical change	16.0.0	17.0.0

History

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