TSG-RAN Meeting #25
Palm Springs, USA, 07-09 April 2004

RP-040340
Agenda item 8.4 (MBMS)

Source: **TSG-RAN WG2.**

Title: **CRs to 25.346 Rel-6**

The following CRs are in RP-040340:

Spec	CR	Rev	Phase	Subject	Cat	Version-Current	Version-New	Workitem	Doc-2nd-Level
25.346	003	-	Rel-6	Introduction of MBMS Change Information and Removal of usage of the secondary notification indicators	F	6.1.0	6.2.0	MBMS-RAN	R2-041904
25.346	004	-	Rel-6	Clarifications to Frequency Layer Convergence and UE behaviour at return on Service	F	6.1.0	6.2.0	MBMS-RAN	R2-041905
25.346	005	-	Rel-6	Iur Linking for URA_PCH UEs and MBMS Session Start Request corrections for TS25.346 from RAN3#43	F	6.1.0	6.2.0	MBMS-RAN	R2-041906

3GPP TSG-RAN2 Meeting #43
Prague, Czech, 16th-20th of August

Tdoc ⌘R2-041904

CR-Form-v7.1

CHANGE REQUEST

⌘ **25.346** **CR** **003** ⌘ **rev** **-** ⌘ Current version: **6.1.0** ⌘

*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:	⌘	Introduction of MBMS Change Information and Removal of usage of the secondary notification indicators
Source:	⌘	RAN WG2
Work item code:	⌘	MBMS-RAN
Date:	⌘	19/08/2004
Category:	⌘	**F**
Release:	⌘	Rel-6

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

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

Reason for change: ⌘

Decisions made in Release 6 ad-hoc meeting in Cannes concerning that no secondary notification indicators are introduced for UE that are receiving MTCH.

It was decide that UE receiving MBMS shall read MCCH in beginning of each modification period where short information/message is transmitted containing MBMS service Id of those MBMS services whose MCCH information is changed in that modification period. In RAN2 #43 this was further discussed and agreed that change information is transmitted at least in each modification period

The usage of notification indicators in recounting or session stop is removed in section 8.1.3 and 8.1.4, as UEs receiving MBMS on MTCH will read MCCH periodically. Thus in these procedure the setting MICH bits on is not necessary.

It was decided that MBMS NEIGHBOURING CELL INFORMATION in normal cell reselection case is not to be used.

Currently the section 8.1 MBMS High Level Signalling Scenarios does not contain possibility that UTRAN decides not to transmit MBMS at all. Modification was agreed in Release 6 ad-hoc meeting to modify this based on proposal in R2-041277

Summary of change: ⌘

The all marks to Secondary notification indicators are removed.
The periodic reading of MCCH at the beginning of each modification period while receiving MTCH is introduced.

		Short “value tag” type information flow is introduced and it is named as MBMS Change Information signalling flow, which is included in section 8.3.8. Sections 5.2.3 and 5.2.4 including figure 2, 3 and 4 are modified to include the MBMS Change Information signalling flow. General check through the Section 8.1 MBMS High Level Signalling Scenarios to update the section to reflect all decisions. The option to use MBMS NEIGHBOURING CELL INFORMATION in normal cell reselection case is removed from the TS. The modification proposed in R2-041277 introduced in the CR.
Consequences if not approved:	⌘	Decision made in Release-6 ad-hoc are not reflected to the MBMS Stage-2 specifications

Clauses affected:	⌘	3.3, 5.2.3, 5.2.4, 6.2.1.1, 8.1 and 8.3			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

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

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

***** First modified section *****

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

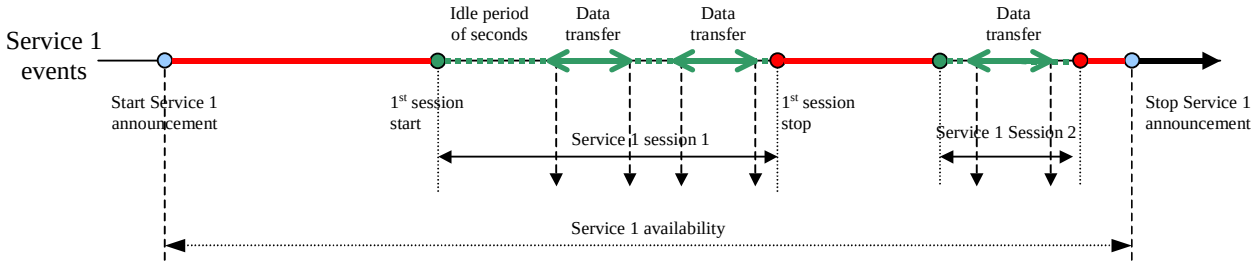

Figure 1: MBMS Timeline, based on [4].

MBMS session start is the point at which the BM-SC is ready to send data.

MBMS notification informs the UEs about forthcoming and about ongoing MBMS data transfer.

MBMS Cell Group is a group of multiple cells belonging to one RNS and sharing one PDCP and RLC entity to utilize p-t-m transmission of the MBMS Service

MBMS session stop is the point at which the BM-SC determines that there will be no more data to send for some period of time.

Data transfer is the phase when MBMS data are transferred to the UEs.

MBMS service availability is the phase between start of service announcement and the end of the last session or stop of service announcement.

MBMS Iu data bearer denotes the data bearer established between SGSN and RNC to transport MBMS data

MBMS radio bearer denotes the data bearer established between RNC and UE(s) to transport MBMS data

MBMS RAB denotes both, the MBMS Iu data bearer and the MBMS radio bearer

MBMS Service Context contains the necessary information for the UTRAN to control the MBMS Service in UTRAN.

MBMS Iu signalling connection denotes the signalling connection established between the RNC and the CN node to serve one MBMS Service Context.

MBMS Service Announcement: Mechanism to allow users to be informed about the MBMS services available [4]

Pool area: see definition in ref.[6]

MBMS Multicast Service Activation: see description in ref.[4]

Critical Information: MBMS Neighbouring Cell Information, MBMS Radio Bearer Information and MBMS Service Information sent on MCCH.

Non-critical information: MBMS Access Information sent on MCCH.

MBMS Service Area: The area in which a specific MBMS Bearer Service is available. It is defined individually per MBMS Bearer Service. [4]

3.2 Symbols

(void)

3.3 Abbreviations

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

CELL_DCH	
CELL_FACH	
CG-Id	Cell Group Identifier
CRNC-Id	CRNC Identifier
FFS	For Further Study
MBMS	Multimedia Broadcast Multicast Service
MBMS service ID	Multimedia Broadcast Multicast Service service Identity
MBMS CG-Id	MBMS Cell Group Identifier
MBMS UCG-Id	MBMS UTRAN Cell Group Identifier
MCCH	MBMS point-to-multipoint Control Channel
MICH	MBMS notification Indicator Channel
MTCH	MBMS point-to-multipoint Traffic Channel
NI	Notification Indicator
p-t-p	Point-to-Point
p-t-m	Point-to-Multipoint
PF	Probability Factor
~~SNI~~	~~Secondary Notification Indicator~~

***** Next modified section *****

5.2.3 MCCH Information Scheduling

The MCCH information will be transmitted based on a fixed schedule. This schedule will identify the TTI containing the beginning of the MCCH information. The transmission of this information may take a variable number of TTIs and the UE will keep receiving the S-CCPCH until:

- It receives all of the MCCH information, or
- It receives a TTI that does not include any MCCH data, or
- The information contents indicate that further reception is not required (e.g. no modification to the desired service information).

Based on this behaviour, the UTRAN may repeat the MCCH information following a scheduled transmission in order to improve reliability. The MCCH schedule will be common for all services.

The entire MCCH information will be transmitted periodically based on a "repetition period". The "modification period" will be defined as an integer multiple of the repetition period. The MBMS ACCESS INFORMATION may be transmitted periodically based on an "access info period". This period will be an integer divider of the "repetition period".

MCCH information is split into critical and non-critical information. The critical information is made up of the MBMS NEIGHBOURING CELL INFORMATION, MBMS SERVICE INFORMATION and MBMS RADIO BEARER INFORMATION. The non-critical information corresponds to the MBMS ACCESS INFORMATION. Changes to critical information will only be applied at the first MCCH transmission of a modification period and in the beginning of each modification period UTRAN transmits the MBMS CHANGE INFORMATION including MBMS services ids whose MCCH information is modified at that modification period. MBMS CHANGE INFORMATION is repeated at least once in each repetition period of that modification period. Changes to non-critical information could take place at any time.

The Figure 2 below illustrates the schedule with which the MBMS SERVICE INFORMATION and RADIO BEARER INFORMATION would be transmitted. Different colours indicate potentially different MCCH content.

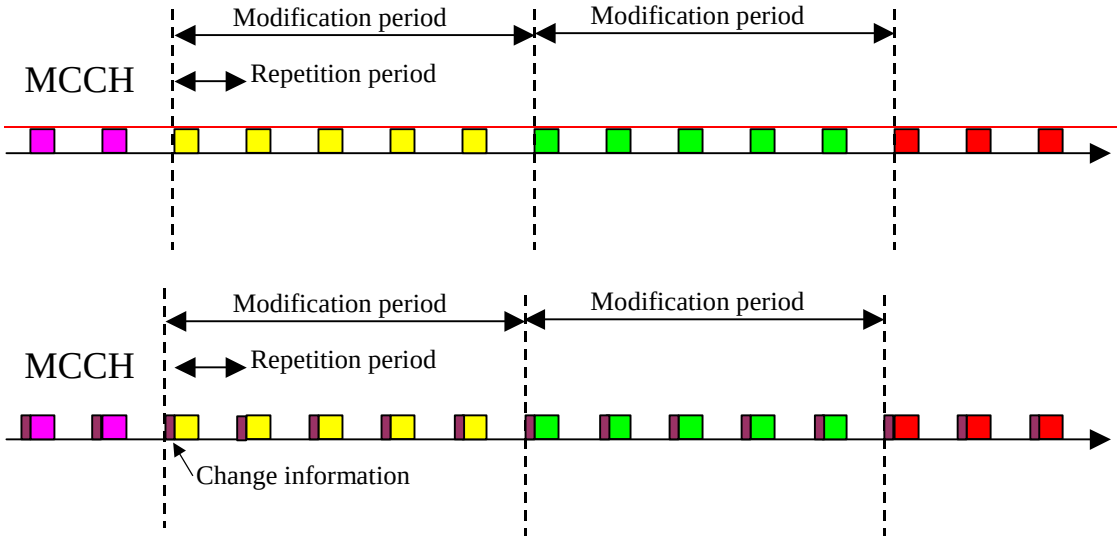

Figure 2: MCCH Information Schedule

5.2.4 MBMS Notification

~~NOTE: This section describes only the case that the MBMS notification indicators are sent on MICH.~~

~~An MBMS notification may also be sent on the S-CCPCH carrying the MTCH or even on the S-CCPCH carrying the MCCH. Thus UTRAN may use in-band notification instead of the MICH to notify users receiving MTCH. [FFS based on decision on SNI].~~

The MBMS notification mechanism is used to inform UEs of an upcoming change in critical MCCH information. Notifications are based on service groups. The mapping between service IDs and service groups will be based on a hashing mechanism. The exact details of this mechanism will be defined in the Stage 3 specifications.

The MBMS notification indicators will be sent on an MBMS specific PICH, called the MICH. A single MICH frame will be able to carry indications for every service-group.

Critical MCCH information can only be changed at the beginning of a modification period as described in Section 5.2.3. The MBMS notification indicator corresponding to the service group of every affected service shall be set continuously during the entire modification period preceding the first change in MCCH information related to a given service. Subsequent changes in the MCCH information in the next modification period related to the same service can be signalled on the MCCH.

UEs which are not any receiving MBMS service on MTCH or p-t-p channel are free to read the MBMS notification at any time; however the modification interval shall be long enough so that UEs are able to reliably detect it even if they only receive the MICH during their regular Release 99 paging occasions. The need to limit particularly long DRX cycles (e.g. 5 sec) due to MBMS reception is defined in Stage 3.

Upon detecting the MBMS notification indication for a service group, UEs interested in a service corresponding to this group shall start reading the MCCH at the beginning of the next modification period. The UE shall read at least MBMS CHANGE INFORMATION.

The Figure 3 below illustrates the timing relation between the setting of the MICH and the first MCCH critical information change. The green colour for the MICH indicates when the NI is set for the service. For the MCCH, different colours indicate MCCH content related to the notification of different services.

UEs, which are receiving MBMS service(s) on MTCH in idle mode or URA_PCH, CELL_PCH, or CELL_FACH state shall read the MCCH at the beginning of the each modification period to receive the MBMS CHANGE INFORMATION, which will indicate MBMS service Ids whose MCCH information is modified at that modification period. If MBMS service Id, which UE has activated, is indicated in MBMS CHANGE INFORMATION the UE shall read the rest of the MCCH information.

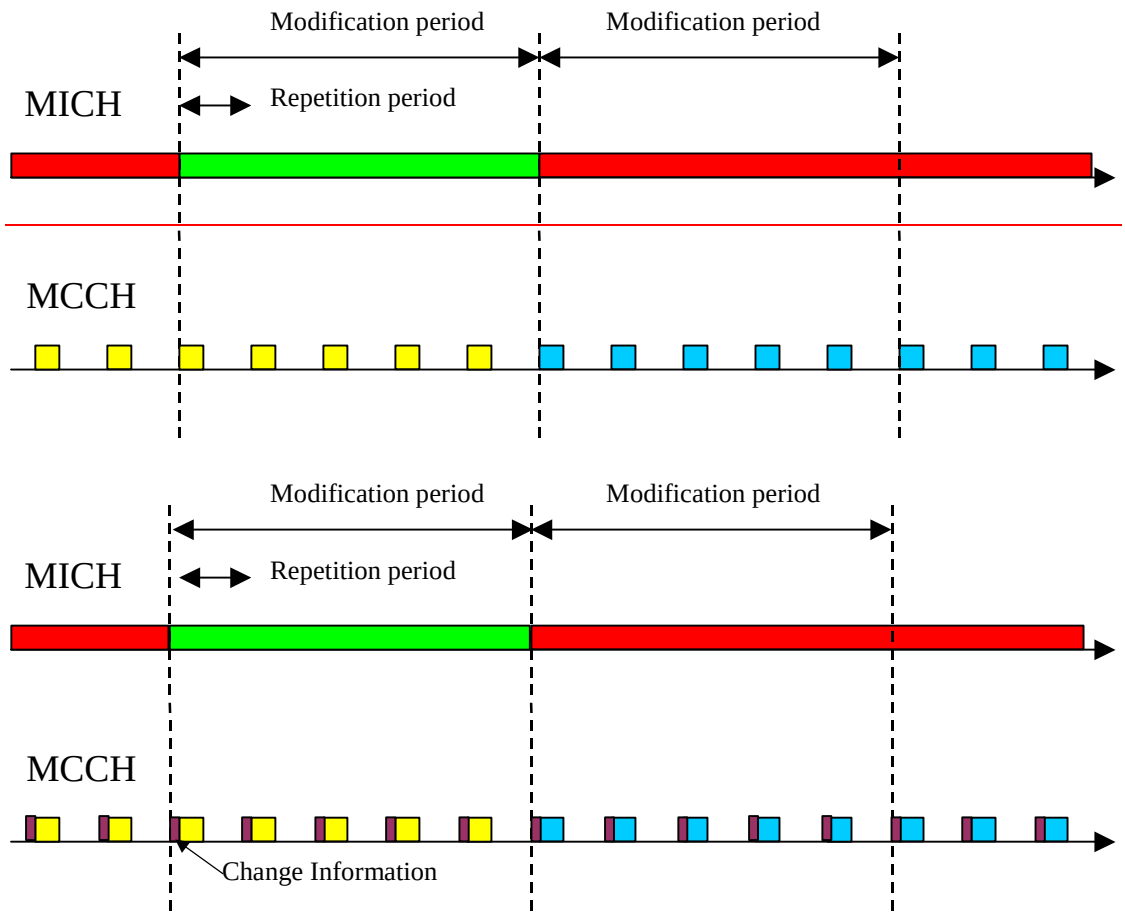

Figure 3: Illustration of MICH timing relative to Modification period

5.2.5 MBMS Counting

MBMS Counting is used to determine the optimum transmission mechanism for a given service.

1. The need for counting is indicated in the notification, and achieved by requesting UEs, belonging to the same MBMS service group, to establish an RRC connection.
2. The exact number of UEs that need to be brought to RRC connected mode is an RRM issue.
3. Since it is desirable in a specific cell, to avoid bringing a large number of UEs for counting purposes to RRC connected mode at the same time (RACH load, etc), RRM may control the load due to the RRC connection establishment requests, by setting an access "probability factor".
4. Following counting, the number of subscribers that need to be maintained in RRC connected mode or for which the RNC releases their connection, is also an RRM issue.
5. For a given MBMS service, the counting indication in the notification may be switched on and off, on per-cell basis.
6. The RNC may use notification to indicate counting during an ongoing MBMS session (term used is re-counting).
7. The RNC receives via Iu from CN information (MBMS service ID) about UEs who are in RRC Connected mode, and have joined the MBMS service. This information may be used for counting purposes.

The MBMS counting function includes a mechanism by which the UTRAN can prompt users interested in a given service to become RRC connected. This procedure is only applicable for UEs in idle mode and relies on the MBMS ACCESS INFORMATION transmitted on the MCCH. The probability factor indicates the probability with which UEs need to attempt an RRC connection procedure.

In order to trigger counting for a given service, the UTRAN may use the regular MBMS notification mechanism outlined in section 5.2.4 to force UEs interested in the service to read the MCCH information.

Once a UE detects that the counting procedure is on-going for the specific service it wants to receive, it will attempt to set up an RRC connection based on the probability factor included in the MCCH. [The details of this mechanism will be defined in the Stage 3 specifications].

A UE in URA_PCH state which is notified on the MCCH shall initiate a cell update procedure with a specific cause based upon the information provided in the MBMS ACCESS INFORMATION.

Also, the UE will keep receiving the MBMS ACCESS INFORMATION at every access info period until UE becomes RRC connected or counting is no longer required. Whenever it receives new MBMS ACCESS INFORMATION the UE will update its probability factor with the new value.

The Figure 4 below illustrates this mechanism. The green colour for the MICH indicates when the NI is set for the service. The green colour for the MBMS ACCESS INFORMATION indicates that the counting procedure is on-going and that UEs need to establish an RRC connection based on the included probability factor (PF). For the critical MCCH info, different colours indicate potentially different content.

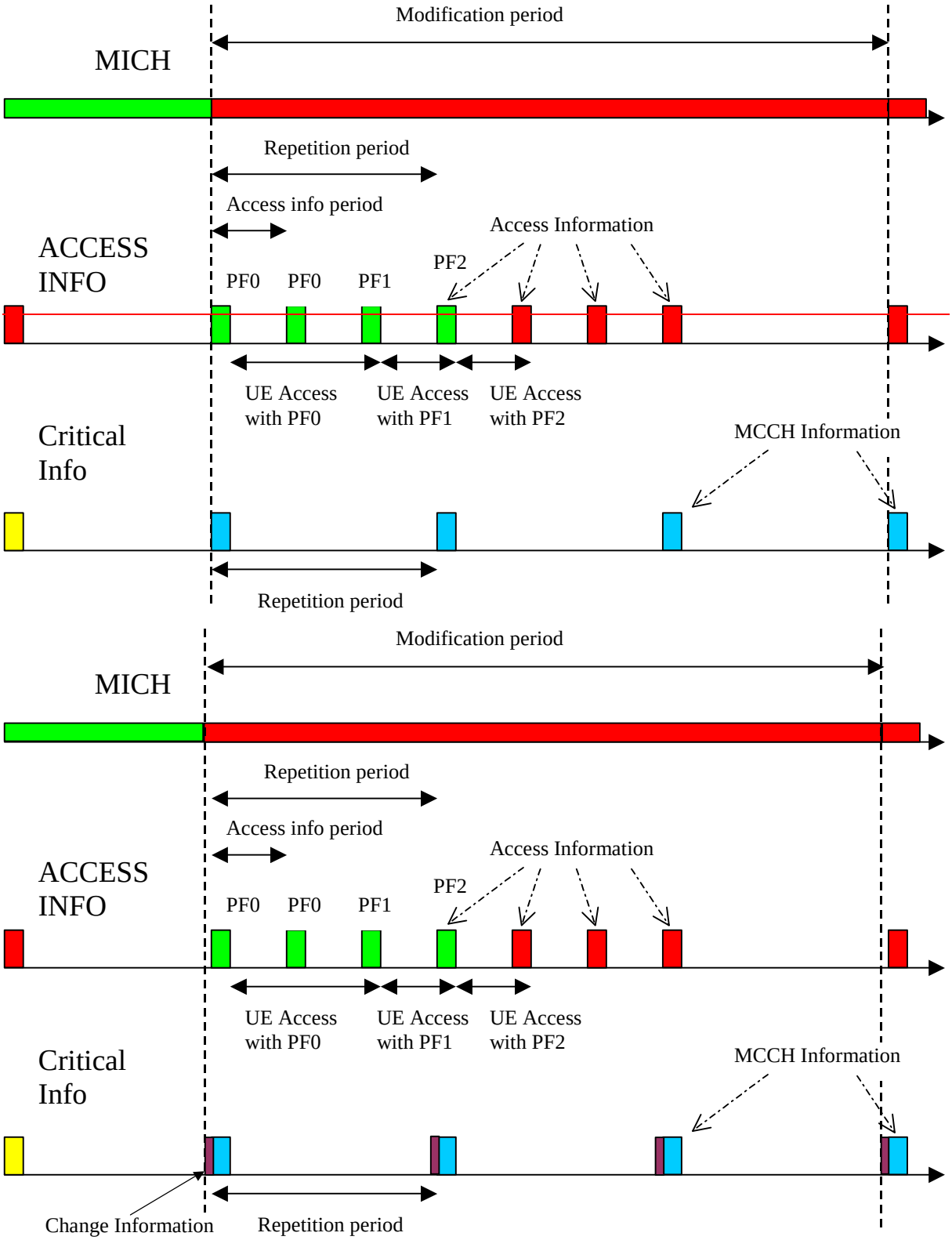

Figure 4: Illustration of Access Info period during MBMS counting

For every UE brought to RRC connected state for the purpose of counting, UTRAN will initiate the PMM Connection establishment procedure and will obtain from CN the set of MBMS services these users have joined.

Counting for on-going services (re-counting) will rely on the same scheduling of the MCCH information. ~~The only difference is that UTRAN may use in-band notification instead of the MICH to notify users [FFS based on decision on SNI].~~

***** Next modified section *****

6 MBMS Channel Structure

There exists two transmission modes to provide the MBMS service:

- Point-to-point transmission (p-t-p)
- Point-to-multipoint transmission (p-t-m)

6.1 Point-to-Point Transmission

Point-to-point transmission is used to transfer MBMS specific control/user plane information as well as dedicated control/user plane information between the network and one UE in RRC Connected Mode. It is used only for the multicast mode of MBMS.

For a UE in CELL_FACH and Cell_DCH, DCCH or DTCH is used, allowing all existing mappings to transport channels.

A detailed description of channels used for point-to-point transmission is given in [8].

6.2 Point-to-multipoint Transmission

Point-to-multipoint transmission is used to transfer MBMS specific control/user plane information between the network and several UEs in RRC Connected or Idle Mode. It is used for broadcast or multicast mode of MBMS.

6.2.1 Logical Channels

6.2.1.1 MBMS point-to-multipoint Control Channel (MCCH)

This logical channel is used for a p-t-m downlink transmission of control plane information between network and UEs in RRC Connected or Idle Mode. The control plane information on MCCH is MBMS specific and is sent to UEs in a cell with an activated (joined) MBMS service. MCCH can be sent in S-CCPCH carrying the DCCH of the UEs in CELL_FACH state, or in standalone S-CCPCH, or in same S-CCPCH with MTCH. ~~Short indication is always given to UE to when to read MCCH. UTRAN may use in-band notification instead of the MICH to notify users receiving MTCH. [FFS based on decision on SNI].~~

Reception of paging has priority over reception of MCCH for Idle mode and URA/CELL_PCH UEs.

6.2.1.2 MBMS point-to-multipoint Traffic Channel (MTCH)

This logical channel is used for a p-t-m downlink transmission of user plane information between network and UEs in RRC Connected or Idle Mode. The user plane information on MTCH is MBMS Service specific and is sent to UEs in a cell with an activated MBMS service.

6.2.2 Transport Channel

FACH is used as a transport channel for MTCH and MCCH.

6.2.3 Physical Channel

SCCPCH is used as a physical channel for FACH carrying MTCH or MCCH.

6.2.4 Mapping between channels

Only in downlink, the following connections between logical channels and transport channels exist:

- MCCH can be mapped to FACH
- MTCH can be mapped to FACH

The mappings as seen from the UE and UTRAN sides are shown in Figure 5 and Figure 6 respectively.

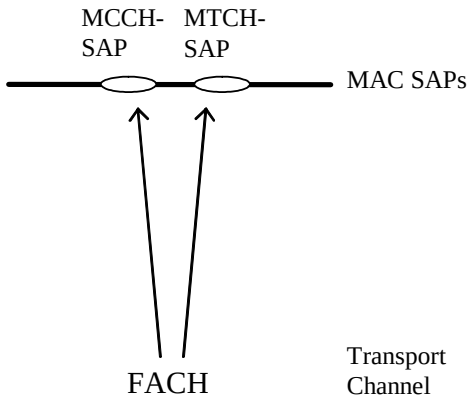

Figure 5: Logical channels mapped onto transport channel, seen from the UE side

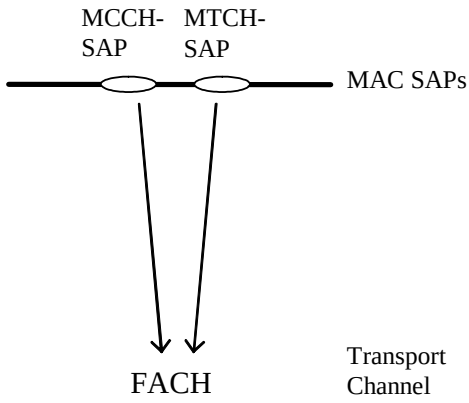

Figure 6: Logical channels mapped onto transport channel, seen from the UTRAN side

6.2.5 Data Flows through Layer 2

6.2.5.1 Data flow for MCCH mapped to FACH

For MCCH, the RLC mode to be employed is UM-RLC, with required enhancements to support out of sequence SDU delivery. A MAC header is used for logical channel type identification.

6.2.5.2 Data flow for MTCH mapped to FACH

For MTCH, the RLC mode to be employed is UM-RLC, with required enhancements to support selective combining. Quick repeat may be used in RLC-UM. A MAC header is used for logical channel type identification and MBMS service identification.

6.3. MBMS Notification Indicator Channel

MBMS notification utilizes a new MBMS specific PICH called MBMS Notification Indicator Channel (MICH) in cell. The exact coding is defined in Stage-3 physical layer specifications.

***** next modified section *****

8 UTRAN Signalling Flows for MBMS

8.1 MBMS High Level Signalling Scenarios

~~*This subclause includes descriptions for a number of aspects for which the solution has not been agreed. This relates at least to the following open issues that are not agreed:*~~

- ~~*Use of notification indicators for cases other than session start [This open issue is marked also in Chapters 5.2.4 MBMS Notification and 5.2.5 MBMS Counting]*~~
- ~~*The use of the Secondary Notification Indicator (SNI), including its contents and its mapping [This open issue relates to previous one and is marked also in Chapters 5.2.4 MBMS Notification and 5.2.5 MBMS Counting]*~~

~~*Even when not explicitly marked as FFS, the descriptions included in this subclause relating to the issues listed above should be considered as just one possible approach.*~~

8.1.1 Session start

Upon receiving a session start indication from CN, UTRAN initiates the session start sequence to allocate radio resources to UEs for receiving the MBMS content. As part of this sequence, UTRAN may apply the counting procedure (counting the number of idle mode UEs) to decide whether to use the p-t-m or p-t-p transfer mode.

The Figure 7 shows an example of a possible session start sequence.

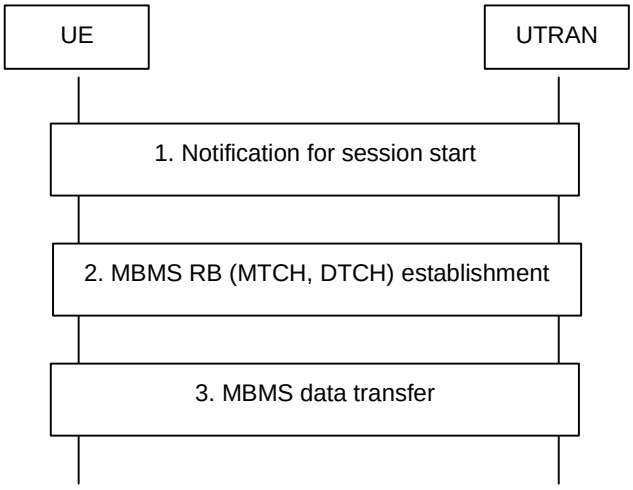

Figure 7: Session start

In general, the session start sequence involves the following steps:

- In case UTRAN applies counting to determine the most optimal transfer mode~~, it may first apply conventional paging to move UEs in URA_PCH to CELL_PCH state~~. ~~Next,~~ the following steps are performed:
  - UTRAN sets the correct MBMS Notification Indicator (NI) and sends the MBMS CHANGE INFORMATION and the MBMS ACCESS INFORMATION including service ID, and access probability on MCCH.
  - Upon DRX wakeup, UEs in idle mode as well as UEs in CELL_PCH, URA_PCH and CELL _FACH not receiving an MBMS service provided in p-t-m transfer mode evaluate the MBMS NI and if set, read the MBMS CHANGE INFORMATION from MCCH at ~~the pre- defined time(s)~~beginning of the modification period. UEs in idle mode as well as UEs in CELL_PCH, URA_PCH and CELL _FACH receiving an MBMS service provided in p-t-m transfer mode read the MBMS CHANGE INFORMATION directly. If

service Id of activated MBMS service is indicated in MBMS CHANGE INFORMATION UEs continue reading the rest of MCCH information. Upon receiving the MBMS ACCESS INFORMATION including access probability, UEs in idle mode or URA_PCH state for which the probability check passes, initiate RRC connection establishment to move to PMM CONNECTED or perform cell update procedure respectively. ~~RRC Connected mode~~ UEs in CELL_PCH or CELL_FACH state ignore the MBMS ACCESS INFORMATION. UTRAN counts the UEs interested in the MBMS service using UE linking from CN

- RRC Connected mode In the case that no UE is counted as present in the cell then UTRAN may decide not to provide any RB for the service in the cell.

- In case a pre- defined threshold is reached, UTRAN applies the p-t-m RB establishment procedure specified below. Otherwise, UTRAN may repeat the MBMS ACCESS INFORMATION a number of times, using different probability values. If the threshold is not reached, UTRAN applies the p-t-p RB establishment procedure

~~NOTE: The NIs are evaluated by UEs in CELL_PCH, URA_PCH and CELL_FACH that are not receiving an MBMS service that is provided using p-t-m transfer mode. In this section these UEs are referred to as 'NI-detecting connected mode UEs'. The UEs in CELL_PCH, URA_PCH, CELL_FACH and CELL_DCH that are receiving an MBMS service that is provided using p-t-m transfer mode receive the Secondary Notification Indicator (SNI) instead. The latter UEs are referred to as 'SNI detecting connected mode UEs'.~~

- In case UTRAN selects the p-t-m RB establishment procedure:
  - UTRAN configures MTCH and updates MCCH (MBMS SERVICE INFORMATION and MBMS RADIO BEARER INFORMATION) by including the service ID and p-t-m RB information for the concerned MBMS service
  - In case p-t-m RB establishment is not preceded by counting, UTRAN sets the correct MBMS Notification Indicator (NI) and sends MBMS CHANGE INFORMATION. ~~Regardless of counting, UTRAN also provides the Secondary Notification Indicator.~~
  - UTRAN sends the MBMS dedicated notification message including the service ID and cause= session start on DCCH to inform UEs in CELL_DCH that are not receiving an MBMS service provided using p-t-m transfer mode
  - In case p-t-m RB establishment is preceded by counting, UEs ~~in idle mode as well as NI-detecting connected mode UEs~~ read MCCH at the pre- defined time(s) to acquire the MBMS SERVICE INFORMATION and MBMS RADIO BEARER INFORMATION
  - In case p-t-m RB establishment is not preceded by counting, Upon DRX wakeup, UEs not receiving MTCH ~~in idle mode as well as NI-detecting connected mode UEs~~ evaluate the MBMS NI and if set, read MCCH at ~~the pre-defined time(s)to~~ beginning of modification period to acquire MBMS CHANGE INFORMATION. UEs in in idle mode as well as UEs in CELL_PCH, URA_PCH and CELL_FACH receiving an MBMS service provided in p-t-m transfer mode read the MBMS CHANGE INFORMATION directly. If service Id of activated MBMS service is indicated in MBMS CHANGE INFORMATION UEs continue reading the rest of MCCH information to acquire the MBMS SERVICE INFORMATION and MBMS RADIO BEARER INFORMATION
  - ~~Upon detecting the MBMS SNI, SNI-detecting connected mode UEs read MCCH at the pre-defined time(s) to acquire the MBMS SERVICE INFORMATION and MBMS RADIO BEARER INFORMATION.~~ UEs that are incapable of receiving the MTCH for the session that is started in parallel to the existing activity notify the user. This enables the user to choose between the ongoing activity and the new MBMS service
  - Upon receiving MBMS dedicated notification with cause= session start, UEs in CELL_DCH that are incapable of receiving the MCCH and the corresponding MTCH in parallel to the existing activity notify the user. This enables the user to choose between the ongoing activity and the new MBMS service. If the user decides to receive the new MBMS service, the UE shall read MCCH ~~at the pre-defined time(s)~~ to acquire the MBMS SERVICE INFORMATION and MBMS RADIO BEARER INFORMATION.

- Upon receiving the MBMS SERVICE INFORMATION and the MBMS RB INFORMATION including the p-t-m RB information for the concerned MBMS service, the UE starts receiving the p-t-m radio bearers

- In case UTRAN selects the p-t-p RB establishment procedure:
  - UTRAN applies conventional paging to trigger UEs in CELL_PCH to perform cell update. Furthermore, UTRAN establishes the p-t-p RB by means of appropriate RRC procedures eg. the RB setup procedure
  - UEs establish the p-t-p radio bearers by means of the RRC procedure selected by UTRAN eg. the RB setup procedure
  - UTRAN updates MCCH (MBMS SERVICE INFO) to inform UEs joining or entering the cell at a later point in time.

8.1.2 Joining (during a session)

In case the user wants to join an MBMS service (before or during a session), the UE initiates NAS procedures (e.g. MBMS service activation).

If no session is ongoing upon completion of the joining procedure, the joining procedure is transparent to the AS.

In case a session using p-t-m transfer mode is ongoing upon completion of the joining procedure, the UE may initiate reception of the p-t-m radio bearers. In case the ongoing session applies p-t-p transfer mode, UTRAN may establish the p-t-p radio bearers. UTRAN would do this upon receiving a UE linking indication from CN, which normally follows the joining. As a result of the UE linking, UTRAN may decide to change the transfer mode from p-t-p to p-t-m. This change of transfer mode is out of the scope of this sequence (to be covered by a separate sequence).

The Figure 8 shows an example of a possible joining sequence.

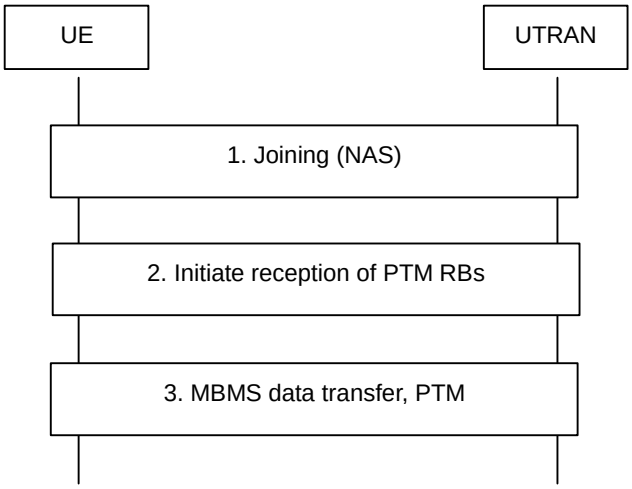

Figure 8: Joining with continuation of p-t-m

In general, the joining sequence involves the following steps:

- UEs in idle mode first perform RRC connection establishment, while UEs in CELL_PCH and URA_PCH first perform cell update
- UEs initiate the joining procedure (NAS)
- In case UTRAN continues to use the p-t-m transfer mode:
  - UTRAN sends the MBMS dedicated notification message on DCCH including the service ID and cause= session ongoing to inform UEs in CELL_DCH
  - Upon receiving MBMS dedicated notification with cause= session ongoing, UEs in CELL_DCH that are incapable of receiving the MCCH and the corresponding MTCH in parallel to the existing activity notify the upper layer. This enables the user to choose between the ongoing activity and the new MBMS service.

If the user chooses to receive the new MBMS service or if the UE in Cell_DCH is capable of receiving MCCH and MTCH in parallel to the existing activity, the UE shall read MCCH at ~~the pre- defined time(s)~~ to acquire the MBMS SERVICE INFORMATION and MBMS RADIO BEARER INFORMATION from MCCH.

- Upon acquiring the MBMS SERVICE INFORMATION and the MBMS RADIO BEARER INFORMATION including the p-t-m RB information for the concerned MBMS service, the UE starts receiving the p-t-m radio bearers

- In case UTRAN continues using the p-t-p transfer mode:
  - UTRAN establishes the p-t-p RB by means of appropriate RRC procedures eg. the RB setup procedure
  - UEs establish the p-t-p radio bearers by means of the RRC procedure selected by UTRAN eg. the RB setup procedure.

8.1.3 Recounting

During a p-t-m MBMS session, UTRAN may perform re- counting to verify if p-t-m is still the optimal transfer mode. The purpose of the re- counting procedure is to count the number of idle mode UEs that have joined a specific service. As a result of this procedure, UTRAN may decide to change the transfer mode from p-t-m to p-t-p. This change of transfer mode is outside the scope of this sequence (to be covered by a separate sequence).

The Figure 9 shows an example of a possible recounting sequence.

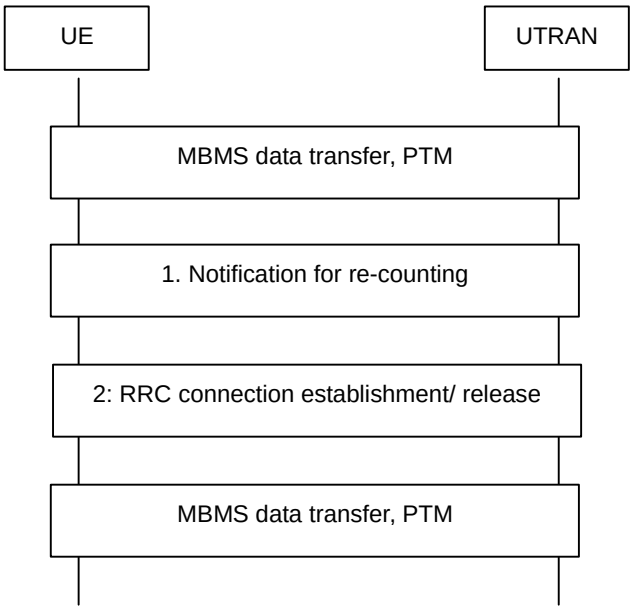

Figure 9: Recounting with continuation of p-t-m

In case UTRAN applies re- counting to determine the most optimal transfer mode, the following steps are performed:

- UTRAN ~~sets the correct MBMS NI and~~ sends the MBMS CHANGE INFORMATION and the MBMS ACCESS INFORMATION including service ID, and access probability on MCCH

- UEs in idle mode as well as UEs in CELL_PCH, URA_PCH and CELL _FACH receiving an MBMS service provided in p-t-m transfer mode read the MBMS CHANGE INFORMATION at the beginning of the each modification period. If service Id of activated MBMS service is indicated in MBMS CHANGE INFORMATION UEs continue reading the rest of MCCH information.

- ~~Upon DRX wakeup, UEs in idle mode as well as NI- detecting connected mode UEs evaluate the MBMS NI and if set, read MCCH at the pre- defined time(s).~~ Upon receiving the MBMS ACCESS INFORMATION including access probability, UEs in idle mode or URA_PCH state for which the probability check passes, initiate RRC connection establishment or cell update procedure respectively. ~~Connected mode~~ UEs in CELL_PCH or CELL_FACH state ignore the MBMS ACCESS INFORMATION.

- UTRAN counts the UEs interested in the MBMS service using UE linking from CN
- In the case that no UE is counted as present in the cell then UTRAN may decide not to provide any RB for the service in the cell.
- In case a pre- defined threshold is reached, UTRAN continues using the p-t-m transfer mode. Otherwise, UTRAN may repeat the MBMS ACCESS INFORMATION a number of times, using different probability values. If the threshold is not reached, UTRAN switches transfer mode from p-t-m to p-t-p
- In case UTRAN continues using the p-t-m transfer mode, it may return UEs that responded to counting back to idle mode by releasing the RRC connection.

8.1.4 Session stop

UTRAN may apply the session stop procedure to inform UEs that the end of MTCH transmission concerns the end of a session rather than just an idle period. The purpose of the procedure is to reduce the UE power consumption.

The Figure 10 shows an example of a possible session stop sequence.

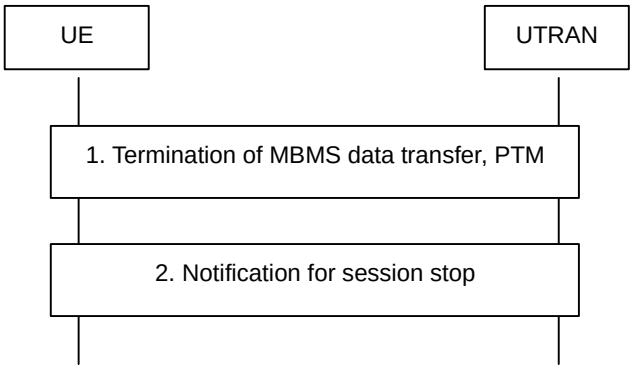

Figure 10: Session stop

In case UTRAN provides the service p-t-m, the session stop sequence involves the following steps:

- UTRAN ~~sets the correct MBMS NI and provides the SNI~~ sends the MBMS CHANGE INFORMATION and the MBMS RADIO BEARER INFORMATION including service ID and radio bearer release indicator. UTRAN updates MCCH (MBMS SERVICE INFORMATION) to inform UEs joining or entering the cell in a later point of time.
- UEs in idle mode as well as UEs in CELL_PCH, URA_PCH and CELL_FACH receiving an MBMS service provided in p-t-m transfer mode read the MBMS CHANGE INFORMATION at the beginning of the each modification period. If service Id of activated MBMS service is indicated in MBMS CHANGE INFORMATION UEs continue reading the rest of MCCH information.
- ~~Upon DRX wakeup, UEs in idle mode as well as NI detecting connected mode UEsevaluate the MBMS NI and if set, read MCCH at the pre- defined time(s) to acquire the required MCCH information.~~ Upon receiving this information the UE stops receiving the MTCH
- ~~Upon detecting the MBMS SNI, SNI- detecting connected mode UEs read MCCH at the pre- defined time(s) to acquire the required MCCH information. Upon receiving this information the UE stops receiving the MTCH~~

In case UTRAN provides the service p-t-p, the session stop sequence involves the following steps:

- UTRAN releases the p-t-p radio bearers and updates MCCH (MBMS SERVICE INFO) to inform UEs joining or entering the cell at a later point in time.

***** next modified section *****

8.3 MBMS Uu Signalling Flows

8.3.1 Broadcast of MBMS System Information

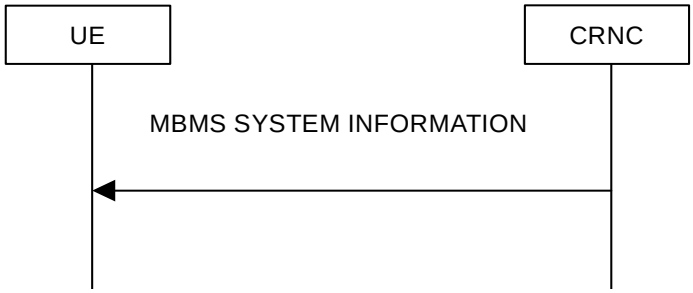

Figure 11: Broadcast of MBMS system information.

This signalling flow is applicable for handling MBMS to UEs in PMM IDLE and PMM-CONNECTED mode.

The purpose of the signalling flow is for UTRAN to broadcast MBMS system information to UEs using the BCCH. The MBMS SYSTEM INFORMATION shall be repeatedly transmitted after its first transmission. Upon receiving the first MBMS SYSTEM INFORMATION, the UE shall establish the radio bearer carrying an MCCH.

The MBMS SYSTEM INFORMATION includes:

- MCCH schedule information (access info, repetition and modification periods)
- Configuration of a radio bearer carrying an MCCH

More information may be included in the MBMS SYSTEM INFORMATION.

8.3.2 MBMS Service Information

Figure 12: MBMS service information signalling flow

This signalling flow is applicable for handling MBMS to UEs in PMM IDLE and PMM-CONNECTED mode.

The purpose of the signalling flow is for RNC to inform UEs of all of MBMS services available in one cell. The MBMS SERVICE INFORMATION shall be transmitted periodically to support mobility in the MBMS service.

The MBMS SERVICE INFORMATION contains MBMS service ids and p-t-m indication. The MBMS service ids indicate the MBMS services which are being served in the cell or the MBMS services which can be served if the UE requests it. P-t-m indication indicates that the MBMS service is on p-t-m in the cell, thus it informs the UE of the need of reception of the MBMS RADIO BEARER INFORMATION. More information may be included in the MBMS SERVICE INFORMATION.

8.3.3 MBMS Radio Bearer Information

Figure 13: MBMS radio bearer information signalling flow

This signalling flow is applicable for handling MBMS to UEs in IDLE and PMM-CONNECTED mode.

The purpose of the signalling flow is for the RNC to inform UE(s) regarding the MTCH radio bearer information. MBMS RADIO BEARER INFORMATION is only available for p-t-m transmission. MBMS RADIO BEARER INFORMATION includes MBMS Service Id, MBMS UTRAN Cell Group Identifier, logical channel, transport channel and physical channel information per MBMS service. An MBMS UTRAN Cell Group Identifier is used to indicate to UEs which MBMS Cell Group the cell pertains to. More information may be included in MBMS RADIO BEARER INFORMATION.

8.3.4 MBMS Access Information

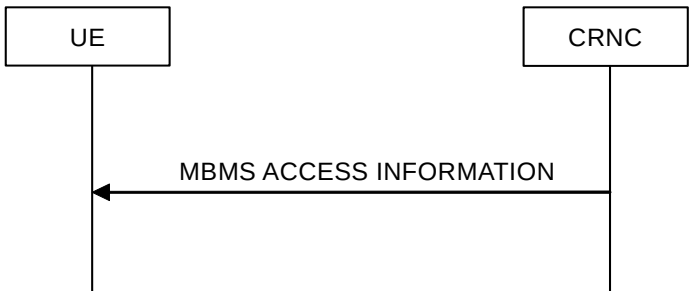

Figure 14: MBMS Access Information signalling flow

This signalling flow is applicable for handling MBMS UEs in IDLE mode.

The purpose of the signalling flow is for the RNC to inform UE(s) interested in a particular service of the potential need to establish an RRC connection. The MBMS ACCESS INFORMATION includes MBMS service id for each service for which counting is required and the associated access "probability factor". More information may be included in MBMS ACCESS INFORMATION.

8.3.5 MBMS Neighbouring Cell Information

Figure 15: MBMS Neighbouring Cell Information signalling flow

This signalling flow is applicable for handling MBMS to UEs in PMM IDLE and CONNECTED mode.

The purpose of the MBMS NEIGHBOURING CELL INFORMATION signalling flow is for the UTRAN to inform to UEs of the MTCH configuration of the neighbouring cells which are available for selective combining. With MBMS NEIGHBOURING CELL INFORMATION the UE is able to receive MTCH transmission from neighbouring cell without reception of the MCCH of that cell. The MBMS NEIGHBOURING CELL INFORMATION shall be repeatedly transmitted on MCCH when selective combining is utilized in the MBMS p-t-m transmission in the given cell group.

~~The usage of MBMS NEIGHBOURING CELL INFORMATION in normal cell reselection case is FFS.~~

8.3.6 MBMS Joined Indication

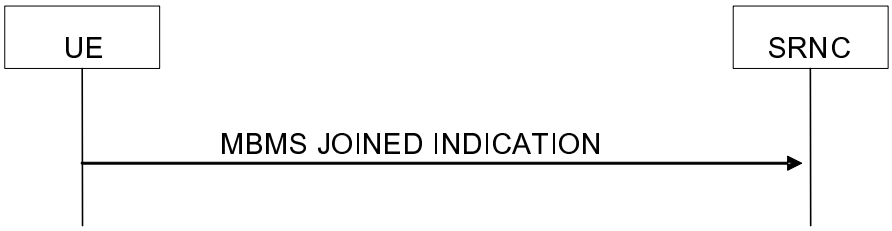

Figure 16: MBMS joined indication signalling flow

This signalling flow is applicable for handling MBMS to UEs in RRC-Connected, PMM-IDLE state. The MBMS JOINED INDICATION is sent over the DCCH.

The signalling flow is initiated by the UE after entering RRC-Connected, PMM-IDLE state. The purpose of the signalling flow is to enable the UE to inform the SRNC that the user has joined at least one MBMS service. The SRNC requests the MBMS services the UE has joined from the SGSN as defined in 8.2.10.

In SRNC relocation this information is transmitted from source RNC to target RNC. Note: If SRNC has valid linking information the complete service list of activated services is also transmitted from source RNC to target RNC in SRNC relocation.

8.3.7 MTCH Scheduling Information

Figure 17: MTCH scheduling information.

This signalling flow is applicable for handling MBMS to UEs in PMM IDLE and CONNECTED mode.

1. The purpose of the signalling flow is to enable UEs to perform discontinuous reception of MTCH. The UE may discontinuously receive MTCH based on scheduling information indicated by the MTCH SCHEDULING INFORMATION. This signalling is transmitted on SCCPCH carrying MTCH. The MTCH SCHEDULING INFORMATION is signalled at predetermined intervals. The scheduling information allows to cover different periods for different MBMS services.

The MTCH SCHEDULING INFORMATION includes:

- The beginning and duration for possible MBMS service transmissions on this SCCPCH.

8.3.8 MBMS Change Information

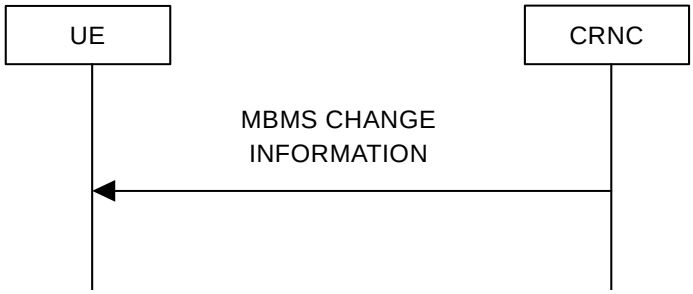

Figure 18: MBMS change information.

This signalling flow is applicable for handling MBMS to UEs in PMM IDLE and CONNECTED mode. UTRAN should transmit this signalling flow in beginning of each modification period and repeat it at least in every repetition period of that modification period. UE shall read this information flow when detecting that MICH bits set for a service that UE has activated, or periodically at the begin of each modification period when receiving MTCH.

The purpose of the signalling flow is to indicate MBMS services whose MCCH information is changed in that modification period. The content of MBMS CHANGE INFORMATIO shall be minimized, so that the MCCH reading time for the UEs, activated MBMS service whose MCCH information is not modified on that modification period, is minimized.

The MBMS CHANGE INFORMATION includes:

- The MBMS service Ids which MCCH information is modified on that modification period.

3GPP TSG-RAN2 Meeting #43
Prague, Czech, 16th-20th of August

Tdoc ⌘R2-041905

CR-Form-v7.1

CHANGE REQUEST

⌘ **25.346** **CR** **004** ⌘ **rev** **-** ⌘ Current version **6.1.0** ⌘

*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 [ ]

Title:	⌘	Clarifications to Frequency Layer Convergence and UE behaviour at return on Service
Source:	⌘	RAN WG2
Work item code:	⌘	MBMS-RAN
Date:	⌘	11/08/2004
Category:	⌘	**F**
Release:	⌘	Rel-6

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

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

Reason for change: ⌘ Decisions made in Release 6 ad-hoc meeting in Cannes concerning frequency layer convergence and out of service behaviour of the UE. FLC section enhanced by agreements in MBMS session in RAN2 #43

Summary of change: ⌘ It is clarified that in Frequency layer convergence based on R2-041326
1) Preferred layer is indicated per MBMS service and UTRAN can consist of multiple preferred layers.
2) The offset is the same for all MBMS services on a given preferred layer
3) The preferred layer (PL) for an MBMS service will be decided by RRM. The PL for an MBMS service might be different in different parts of the service area
4) UTRAN can indicate FLC information on the MCCH from when it receives the session start over the Iu interface, until it receives the session stop.
5) The UEs shall take the FLC information into account whenever it is signalled on the MCCH in Idle mode, URA_PCH, Cell_PCH and in Cell_FACH state
6) It is an RRM issue whether an MBMS service is provided in non Preferred layer or not (ptp and ptm can be utilized)
7) The UE shall ignore Sintersearch only for the potential preferred layers. On a preferred layer UE applies the Sintersearch parameter

It is clarified that FLC mechanism does not effect UEs in Cell_DCH sate as FLC is affection only cell reselection of the UE.

It is clarified that UE acquires the MCCH information when returning from out of service to on service.

It is clarified that if the UE has joined multiple services and they have different frequencies as Preferred layer, the UE should apply the FLC applicable for the

		highest priority MBMS service it has activated.
Consequences if not approved:	⌘	Frequency Layer convergence remains unclear, UE behaviour after returning to the service from out of service remains unclear and decision made in Release-6 ad-hoc are not reflected to the MBMS Stage-2 specifications

Clauses affected:	⌘	10.2, 11,2			
Other specs affected:	⌘	**Y**	**N**		⌘
			X	Other core specifications	
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

How to create CRs using this form:

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

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.
2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.
3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

*** First modified section ***

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

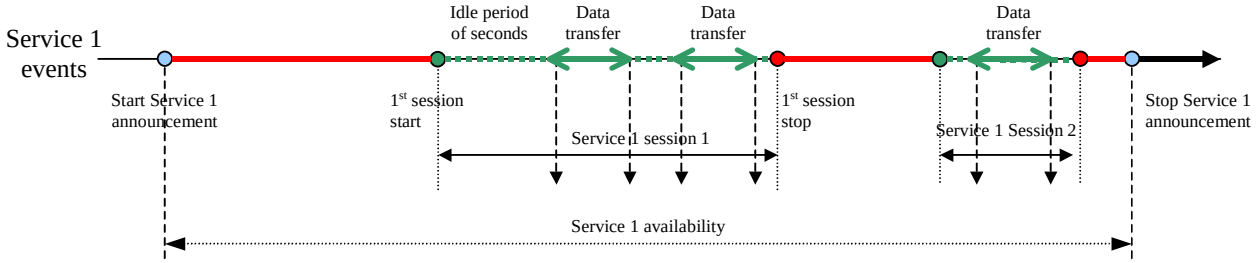

Figure 1: MBMS Timeline, based on [4].

MBMS session start is the point at which the BM-SC is ready to send data.

MBMS notification informs the UEs about forthcoming and about ongoing MBMS data transfer.

MBMS Cell Group is a group of multiple cells belonging to one RNS and sharing one PDCP and RLC entity to utilize p-t-m transmission of the MBMS Service

MBMS session stop is the point at which the BM-SC determines that there will be no more data to send for some period of time.

Data transfer is the phase when MBMS data are transferred to the UEs.

MBMS service availability is the phase between start of service announcement and the end of the last session or stop of service announcement.

MBMS Iu data bearer denotes the data bearer established between SGSN and RNC to transport MBMS data

MBMS radio bearer denotes the data bearer established between RNC and UE(s) to transport MBMS data

MBMS RAB denotes both, the MBMS Iu data bearer and the MBMS radio bearer

MBMS Service Context contains the necessary information for the UTRAN to control the MBMS Service in UTRAN.

MBMS Iu signalling connection denotes the signalling connection established between the RNC and the CN node to serve one MBMS Service Context.

MBMS Service Announcement: Mechanism to allow users to be informed about the MBMS services available [4]

Pool area: see definition in ref.[6]

MBMS Multicast Service Activation: see description in ref.[4]

Critical Information: MBMS Neighbouring Cell Information, MBMS Radio Bearer Information and MBMS Service Information sent on MCCH.

Non-critical information: MBMS Access Information sent on MCCH.

MBMS Service Area: The area in which a specific MBMS Bearer Service is available. It is defined individually per MBMS Bearer Service. [4]

3.2 Symbols

(void)

3.3 Abbreviations

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

CELL_DCH	
CELL_FACH	
CG-Id	Cell Group Identifier
CRNC-Id	CRNC Identifier
FFS	For Further Study
FLC	Frequency Layer Convergence
LCI	Layer Convergence Information
MBMS	Multimedia Broadcast Multicast Service
MBMS service ID	Multimedia Broadcast Multicast Service service Identity
MBMS CG-Id	MBMS Cell Group Identifier
MBMS UCG-Id	MBMS UTRAN Cell Group Identifier
MCCH	MBMS point-to-multipoint Control Channel
MICH	MBMS notification Indicator Channel
MTCH	MBMS point-to-multipoint Traffic Channel
NI	Notification Indicator
PL	Preferred Layer
p-t-p	Point-to-Point
p-t-m	Point-to-Multipoint
PF	Probability Factor
SNI	Secondary Notification Indicator

*** Next modified section ***

10 Mobility Procedures for MBMS

One of the requirements in [5] is: "Data loss during cell change should be minimal". Therefore, when the UE receiving an MBMS session in idle mode or connected mode (not including CELL_DCH) re-selects between cells, it should be possible to provide service continuity to this UE.

The following mechanism has been identified to minimise the data loss on cell change. Additional mechanisms allowing to send the MBMS bearer type notification when new mobiles arrive or leave a cell are [FFS].

10.1 Use of Periodical MBMS Channel Type Notification

In this mechanism, the cell periodically transmits an MBMS Channel Type Notification from the UTRAN, informing all MBMS subscribers if it is currently configured for p-t-m transmission or p-t-p transmission. If it is configured for p-t-m transmission, the channel may also contain the Radio Bearer parameters corresponding to the TMGI of each service. Thus no UE signalling would be required towards the UTRAN.

[However, if it is necessary for the UE to instead initiate reception of the RB parameters, such a mechanism similar to the Cell Update procedure may be more suitable.]

If the cell is configured for p-t-p transmission, then the UE would perform a normal RRC connection establishment.

Additionally, the UE in a cell receiving MBMS p-t-m, could be periodically checking the MBMS Channel Type Notification in neighbour MBMS cells to acquire information about whether p-t-m or p-t-p transmission is required if it accesses that cell.

10.2 UE Actions for Mobility

The UE mobility between intra frequency cells is not affected by the MBMS reception. The mobility between different frequency layers is affected by the Frequency Layer Convergence process as defined in 11.2, if used by the network.

In CELL_FACH and in CELL_DCH state the RRC operation has priority over MBMS reception, thus UE performs the inter frequency and inter RAT measurements as configured by the SRNC. UTRAN should utilize different periodicities

between MCCH transmissions and CELL_FACH state measurement occasion, such that CELL_FACH state measurements and MCCH transmissions are not constantly overlapping for some UE.

In Idle mode and in CELL_PCH, URA_PCH states the measurements are performed as configured by the network based on the Release 5. The MBMS specific measurement occasions to S-CCPCH for UEs in idle mode and in CELL_PCH, URA_PCH states are not introduced and measurements have priority over MBMS reception. The usage of channel protection (channel coding) to recover some of the lost transport blocks is to be checked with RAN1.

UEs may have DRx occasions for specific MBMS service when UE can stop decoding S-CCPCH and perform measurements. DRx occasion are based on scheduling information. UE may also have possibility to skip the complete MCCH transmission based on e.g. "value tag".

R99 standards have some means to reduce need for number of measurements, which can be utilized for MBMS.

When the UE reselects the cell due to the mobility or returns to on service from out of service, the UE shall~~ould check~~acquire the MCCH information if the interested MBMS service is available in the ~~new~~ selected cell for the reception of the service. The service is available when the session has been already started and the service is being served on p-t-p/p-t-m in the cell, or the service can be served in the cell if the UE requests it.

If the MBMS service is available in the cell, the UE will perform an action for the service reception in the cell. For example, if the service is on p-t-p, the idle mode UE will initiate RRC connection establishment procedure. Otherwise, the UE does not need to perform such an action in the cell. The UE, which moves to the new cell, will operate according to the RRC state/mode as follows.

Whenever the UE moves between p-t-m cells, UE shall receive an MBMS UCG-Id, which is included in the MBMS RADIO BEARER INFORMATION. If the MBMS UCG-Id received in a new cell is the same as the MBMS UCG-Id received in an old cell, then the UE receives MTCH without re-establishment of its PDCP as the new cell is processed by the same PDCP entity as the old cell. If the MBMS UCG-Ids differs between old on new cell, the UE re-establishes its PDCP entity according to the RADIO BEARER INFORMATION. In case that RLC entity is shared in CRNC between old and new cell, the UE receives MTCH without re-establishment of its RLC, If old and new cell does not share RLC entity in CRNC the UE shall re-establish its RLC. UE shall re-establish MAC and physical layer protocol entities upon cell change.

10.2.1 RRC idle mode

Idle mode UE shall:

- if BCCH contains information regarding the MCCH in the new cell:
  - listen to the MCCH and receive the MBMS SERVICE INFORMATION;
  - if the MBMS SERVICE INFORMATION contains the interested MBMS service–id:
    - if MBMS SERVICE INFORMATION indicates that the service is on p-t-m:
      - receive the MBMS RADIO BEARER INFORMATION and listen to the MTCH;
    - else:
      - initiate RRC connection establishment procedure;
  - if the UE receive the MBMS RADIO BEARER INFORMATION before the MBMS SERVICE INFORMATION and;
  - if MBMS RADIO BEARER INFORMATION contains the interested MBMS service id:
    - listen to the MTCH without the need of receiving the MBMS SERVICE INFORMATION.

10.2.2 URA_PCH State

URA_PCH state UE shall:

- perform URA update procedure if needed;
- if BCCH contains information regarding the MCCH in the new cell:

- listen to the MCCH and receive the MBMS SERVICE INFORMATION;
- if MBMS SERVICE INFORMATION contains the interested MBMS service id:
  - if MBMS SERVICE INFORMATION indicates that the service is on p-t-m:
    - receive the MBMS RADIO BEARER INFORMATION and listen to the MTCH;
  - else:
    - initiate cell update procedure
- if the UE receive the MBMS RADIO BEARER INFORMATION before MBMS SERVICE INFORMATION message and;
- if MBMS RADIO BEARER INFORMATION contains the interested MBMS service id:
  - listen to the MTCH without the need of receiving the MBMS SERVICE INFORMATION.

10.2.3 CELL_PCH

CELL_PCH state UE shall:

- perform cell update procedure;
- if cell update confirm message contains MBMS radio bearer information:
  - listen to the MBMS radio bearer;
- else:
  - if BCCH contains information regarding the MCCH in the new cell:
    - listen to the MCCH and receive the MBMS SERVICE INFORMATION;
    - if MBMS SERVICE INFORMATION contains the interested MBMS service id and;
      - if MBMS SERVICE INFORMATION indicates that the service is on p-t-m:
        - receive the MBMS RADIO BEARER INFORMATION message and listen to the MTCH
    - if the UE receive the MBMS RADIO BEARER INFORMATION before the MBMS SERVICE INFORMATION and;
    - if MBMS RADIO BEARER INFORMATION contains the interested MBMS service id:
      - listen to the MTCH without the need of receiving the MBMS SERVICE INFORMATION.

10.2.4 CELL_FACH

CELL_FACH state UE shall, depending on UE capability:

- perform cell update procedure
- if cell update confirm message contains MBMS radio bearer information:
  - listen to the MBMS radio bearer;
- else:
  - if BCCH contains information regarding the MCCH in the new cell:
    - listen to the MCCH and receive the MBMS SERVICE INFORMATION;
    - if MBMS SERVICE INFORMATION contains the interested MBMS service id and;
      - if MBMS SERVICE INFORMATION indicates that the service is on p-t-m:

- receive the MBMS RADIO BEARER INFORMATION and listen to the MTCH;

- if the UE receive the MBMS RADIO BEARER INFORMATION before the MBMS SERVICE INFORMATION and;

- if MBMS RADIO BEARER INFORMATION contains the interested MBMS service id:

  - listen to the MTCH without the need of receiving the MBMS SERVICE INFORMATION.

10.2.5 CELL_DCH State

CELL_DCH state UE shall:

- act on the RRC message received on DCCH in handover.

11 Resource Management for MBMS

11.1 MBMS Access Control Procedure

MCCH messages initiating counting or recounting cause multiple responses from UEs within a cell. This may result in RACH congestion if number of UEs is high in a cell. To avoid this, CRNC may perform MBMS access control procedure during counting or recounting procedure. MBMS access control procedure is described in Figure 2.

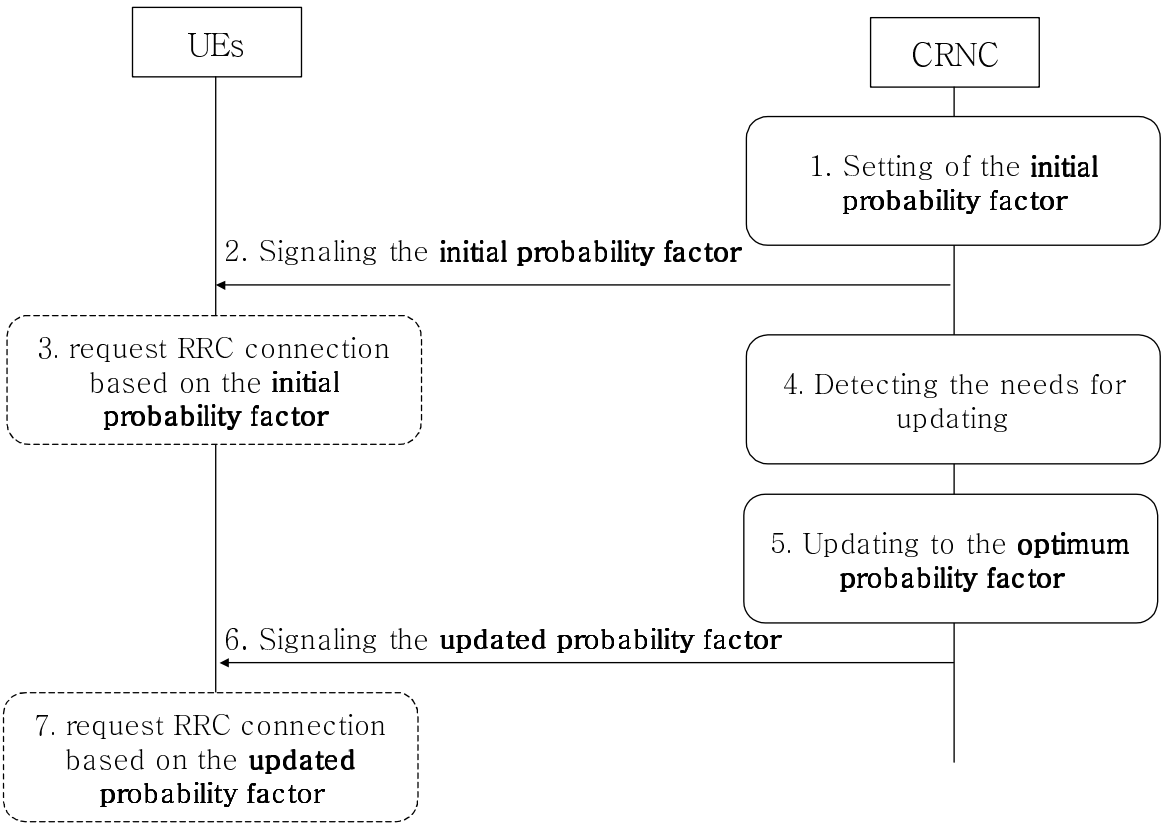

Figure 2: MBMS Access Control Procedure

1. CRNC calculates an initial probability factor for a MBMS service when a MCCH message causing counting or recounting is about to be sent.

2. CRNC includes the probability factor into the MCCH message and sends it to UEs. This can be done in MBMS Group Notification.
3. UEs perform RRC connection request procedure using the probability factor received in step 2. UEs keep listening to MCCH to get updated probability factor until they succeed to establish RRC connection.
4. CRNC detects the probability factor needs to be updated. Detecting mechanism is not to be standardized.
5. CRNC recalculates the probability factor. The way of calculating new probability factor is not to be standardized.
6. CRNC includes the updated probability factor into the MCCH message and sends it to UEs.
7. UEs perform RRC connection request procedure using the new probability factor. UEs keep listening to MCCH to get updated probability factor until they succeed to establish RRC connection.

CRNC and UEs who are still trying to perform the RRC connection request procedure repeat step 3 ~ step 7 until e.g. counting or recounting procedure ends.

11.2 Frequency layer Convergence

Frequency Layer Convergence denotes the process where the UTRAN requests UEs to preferentially re-select to the frequency layer on which the MBMS service is intended to be transmitted. This layer preference could be done by an additional MBMS session related Layer Convergence Information (LCI) such as offset and target frequency. The FLC is supported by specifications for both networks utilizing HCS and for networks not utilizing HCS.

The preferred layer (PL) is indicated per MBMS service and the LCI (offset) is the same for all MBMS services on a given preferred layer. UTRAN can consist of multiple preferred layers and the PL for given services is decided by RRM. Thus the PL for an MBMS service might be different in different parts of the service area. Network co-ordination between RNCs may be added for the Rel-7

The LCI ~~se kinds of information could~~ can be ~~given~~ signalled to UEs by the CRNC after the~~t~~ session start is received over Iu interface until reception of the ~~and during the whole~~ session stop. The UEs shall take LCI into account ~~, and will be applied during the entire session~~whenever it is signalled on the MCCH in Idle mode and URA_PCH, CELL_PCH and in CELL_FACH states. The FLC is not applicable in CELL_DCH state, as it is only effecting UEs cell re-selection procedure.

The UE shall ignore Sintersearch parameter only for the potential preferred layers when LCI is signalled and on preferred layer the UE shall apply the Sintersearch parameter. In case of UE is in CELL_FACH state without measurement occasions, the UE may not be able to measure cells on preferred layers.

In the case that the UE has joined multiple services and they have different frequencies as preferred layer, the UE should apply the FLC applicable for the highest priority MBMS service, which it has activated. The priority setting of different MBMS services is decided by NAS.

Based on RRM decision, a given MBMS service can be provided on non-preferred layer by p-t-p or p-t-m transfer mode.

~~More than one offset may be required to support multiple frequencies, but it is assumed that the same LCI information will apply to all the services on the same frequencies.~~

The details of the mechanism are defined in state 3.

3GPP TSG-RAN2 Meeting #43 ***Tdoc ⌘R2-041906***
Prague, Czech Republic, 16th – 20th August 2004

CR-Form-v7.1

CHANGE REQUEST

⌘ **25.346** **CR** **005** ⌘ **rev** **-** ⌘ Current version: **6.1.0** ⌘

*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:	⌘	Iur Linking for URA_PCH UEs and MBMS Session Start Request corrections for TS25.346 from RAN3#43
Source:	⌘	RAN WG2
Work item code:	⌘	MBMS-RAN
Date:	⌘	18/08/2004
Category:	⌘	**F**
Release:	⌘	Rel-6

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

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

Reason for change: ⌘

During RAN3#43 the following contributions proposing updates to 25.346 were agreed:

R3-041026: The text for MBMS Session Start Request message does not reflect the fact that the SGSN distributes this message to all connected RNCs and not to RNCs that host at least one UE that has joined the MBMS Service.

R3-041027: The text for MBMS Session Start Request message does not reflect the fact that Tracking/Counting information is not provided by the SGSN and that it is an internal RAN issue.

R3-041028: For cases where the UE is in URA_PCH and Iur is involved the text does not reflect that:

- The triggering of Iur Linking is related to whether a URA contains cells that are controlled by a DRNC (and not necessarily the location of the UE within the URA)
- In cases where it is known that a URA spans more than 1 DRNC, the SRNC should invoke Iur Linking towards all applicable RNCs
- It is only necessary for the SRNC to invoke Iur Linking for the first UE entering a URA and the last UE leaving a URA that contains cells that are under the control of a DRNC

R3-041031: The text for MBMS Session Start Request does not reflect the fact that the MBMS Service Type (i.e. Multicast or Broadcast) will be included in the message.

	R3-041104: The text for MBMS Channel Type Reconfiguration Indication does not reflect a recent RAN3 decision that (as there are cases where the SRNC should be informed of a PTM bearer type over Iur) the message MBMS Channel Type Reconfiguration Indication should now allow the inclusion of PTM indication.
Summary of change: ⌘	R3-041026: In Section 8.2.1 the text relating to the CN node sending the MBMS Session Start Request to only RNCs that are hosting at least one UE that has joined the MBMS service is changed to state that the message is sent to ALL connected RNCs. R3-041027: In Section 8.2.1 the text relating to the MBMS Service Area Information containing areas where the UEs have to be tracked (counted) is removed. R3-041028: In Section 5.1.6 an outline of the URA_PCH over Iur changes are as follows: ▪ The text 'consumes radio resources from a drift RNC' is removed as it is not appropriate for UEs in CELL_PCH and URA_PCH ▪ 4a. and 4b. are clarified to state that Iur Linking is only necessary for the first UE entering a URA (with DRNC cells). Also in cases where URAs span multiple RNCs, Iur Linking is necessary towards all involved DRNCs ▪ 7. is clarified to state that only when the last UE leaves a URA (with DRNC cells) is Iur De-Linking required. R3-041031: In Sections 5.1.2 and 8.2.1, in relation to the content of MBMS Session Start Request, text is added to reflect that the MBMS bearer service type is added in the message. R3-041104: In Section 8.2.12 the FFS statement regarding the initiation of the MBMS Channel Type Reconfiguration Indication message for p-t-m is now removed.
Consequences if not approved: ⌘	The decisions in RAN3#43 are not captured in TS25.346.

Clauses affected:	⌘	5.1.2, 5.1.6, 8.2.1 and 8.2.12			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

How to create CRs using this form:

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

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

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

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

<<< Start of Change 1 >>>

5.1.2 MBMS Session start and MBMS Session Stop

At MBMS Session Start and MBMS Session Stop the RNC receives a respective request from the CN. The MBMS Session Start Request shall contain the MBMS Service Id, MBMS Bearer Service Type and MBMS Session Attributes (MBMS Service Area Information, QoS parameters, …). The MBMS Session Start Request triggers the RNC to notify UEs, which have activated the MBMS Service of the MBMS Session Start. The MBMS Session Stop Request may trigger the RNC to notify UEs, which have activated the MBMS Service of the MBMS Session Stop.

The MBMS Session Start and Session Stop procedures provide the setup and release of the MBMS RAB in the following way:

The MBMS Session Start Request shall contain all information necessary to setup an MBMS RAB. When the RNC receives an MBMS Session Start Request, it typically executes MBMS Iu data bearer set up and shall inform the sending CN node, of the outcome in the MBMS Session Start response message

The RNC may not execute the MBMS Iu data bearer setup for a given Iu interface in case of Iu-flex. In those cases the CN node shall be informed accordingly.

In case of Iu-flex, the RNC might receive more than one MBMS Session Start Request for an MBMS Service and shall not set up more than one MBMS Iu bearer for a certain MBMS Service towards a pool area.

When the RNC receives an MBMS Session Stop Request it shall release the associated MBMS RAB resources.

The MBMS Session Start and Session Stop procedures serve to establish and release the MBMS Iu signalling connection.

<<< End of Change 1 >>>

<<< Start of Change 2 >>>

5.1.6 UE Linking

UE Linking denotes the process where a UE, which has joined the MBMS service, is linked to an MBMS service context in the RNC.

MBMS UE linking procedure in the SRNC is performed in following cases.

1. When the UE, which has joined the MBMS service, is moved to PMM-CONNECTED and sets up a PS RAB This may happen at any point in time during the whole MBMS service availability (i.e. before, during and between MBMS sessions).

2. When the UE joins the MBMS service and is in PMM-CONNECTED due to an existing PS RAB. This may happen at any point in time during the whole MBMS service availability (i.e. before, during and between MBMS sessions).

3. When the UE is moved to PMM-CONNECTED only for MBMS purpose, e.g. to respond to counting/recounting indication or respond to p-t-p bearer indication from RNC. This may happen at any point in time during MBMS sessions.

Keeping UEs in PMM-CONNECTED only for MBMS between sessions is implementation specific. The UE linking in the SRNC is performed via UE dedicated Iu procedures. An entry for the UE is added to the MBMS service context in the SRNC. If the MBMS service context doesn't exist yet it needs to be created.

In cases where a~~the~~ UE is present in a cell ~~consumes radio resources from~~ under the control of a drift RNC, or a UE in URA_PCH state is present within a URA containing one or more cells that are controlled by one or more drift RNCs, the UE Linking is performed via Iur in the following way.

1. When the UE, which has activated one or several MBMS services, is in CELL_DCH or CELL_FACH state and starts to consume radio resources from one or several cells controlled by the DRNC, MBMS UE Linking in the DRNC is performed via UE dedicated Iur procedures.

2. If the UE is in CELL_DCH and CELL_FACH state and there is no dedicated RNL signalling activity ongoing for this UE and UE Linking is performed in the SRNC for an MBMS Service, MBMS UE Linking in the DRNC is performed via the MBMS Attach procedure.

3. If the UE is in CELL_PCH and moves to a cell controlled by the DRNC, the MBMS UE Linking in the DRNC is performed. The cell the UE moved to is indicated to the DRNC. After that the MBMS Service context in the DRNC needs to be updated at every intra-DRNC cell change.

4a. If the UE is in URA_PCH, having activated one or more MBMS services, is the first UE for the particular MBMS service to ~~and~~ move~~s~~ to a URA which contains one or more cell~~(s)~~ that are controlled by one or more ~~the~~ DRNCs the UE is linked to the MBMS Service context in each applicable~~the~~ DRNC. The URA the UE moved to will be indicated. The MBMS Service context in each applicable~~the~~ DRNC needs to be updated at every intra-DRNC URA change.

4b. As long as the SRNC serves UEs in URA_PCH in URAs containing cells controlled by one or more~~another~~ DRNCs, the SRNC shall keep the~~is~~ other RNCs informed about every URA in which UEs having activated certain MBMS services have to be notified. This is done when the first UE enters the URA, by indicating to the other RNCs a list of URAs and the corresponding MBMS Services.

~~NOTE1: Whether the SRNC shall link all UEs in URA_PCH to the MBMS Service context in the DRNC for counting on URA basis is FFS.~~

NOTE2: Bullet points 4a and 4b above may be merged in a future version of this document.

5. If the UE is in CELL_PCH or URA_PCH and there is no mobility related signalling activity ongoing for this UE and UE Linking is performed in the SRNC for an MBMS Service, MBMS UE Linking in the DRNC is performed via the MBMS Attach procedure.

6. If the UE is in CELL_PCH and leaves a cell controlled by the DRNC the UE is unlinked from the MBMS Service context in the DRNC via the MBMS Detach procedure.

7. If the UE is in URA_PCH and, for the particular MBMS service, is the last UE to leave~~s~~ a URA which contains~~ing~~ one or more cell~~(s)~~ controlled by one or more~~the~~ DRNCs the UE is unlinked from the MBMS Service context in each applicable~~the~~ DRNC via the MBMS Detach procedure.

8. If the UE is in RRC connected mode and UE Linking is performed in the SRNC for an MBMS Service and a session of this MBMS Service is ongoing UE Linking in the DRNC needs to be performed immediately.

At MBMS UE linking in the DRNC the MBMS service context in the DRNC needs to be updated. If an MBMS service context does not exist yet then it shall be created.

<<< End of Change 2 >>>

<<< Start of Change 3 >>>

8.2.1 MBMS Session Start procedure

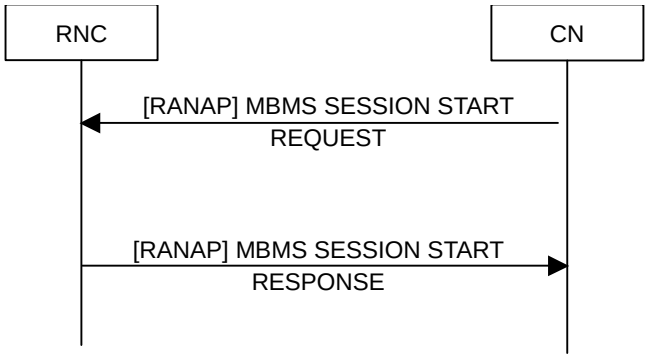

Figure 17: MBMS Session Start procedure. Successful operation.

The MBMS Session Start procedure is initiated by the CN when an MBMS Session is started. ~~-~~The MBMS SESSION START REQUEST is ~~typically~~ sent ~~by a CN node~~ to each RNC~~s~~ that is connected to the CN ~~hosting at least one UE that has joined the MBMS Service~~ (in case of Iu-flex the RNC may receive more than one MBMS SESSION START REQUEST message).

The MBMS SESSION START REQUEST contains the MBMS Service Id, MBMS Bearer Service Type and the MBMS Session Attributes (MBMS Service Area Information, QoS parameters…) It may also include a list of RAs which lists each RA that contains at least one PMM-IDLE UE that has activated the service. ~~The MBMS Service Area Information could include MBMS Service Areas where UEs have to be tracked (counted), and/or a MBMS Service Areas where this is not required.~~

MBMS Session Start procedure also provides the MBMS Iu Data Bearer Establishment functionality. If the RNC cannot provide resources at all the RNC shall inform the CN accordingly. In case of Iu-flex the RNC shall not establish more than one MBMS Iu bearer for a certain service towards a pool area and shall inform the respective CN nodes accordingly.

<<< End of Change 3 >>>

<<< Start of Change 4 >>>

8.2.12 MBMS Channel Type Reconfiguration over Iur

These signalling flows need further study.

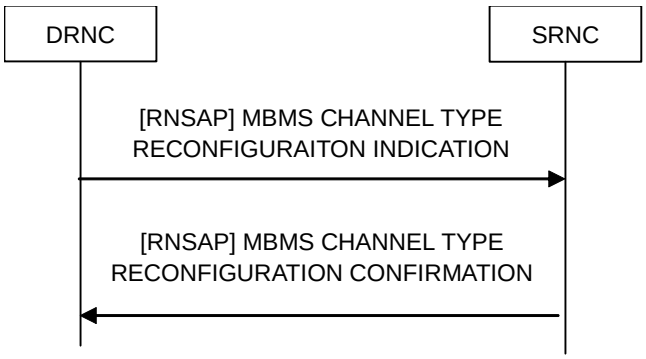

Figure 2: Channel Type Reconfiguration signalling flow: Successful Operation.

This signalling flow is only applicable for handling MBMS UEs in RRC connected mode.

The purpose of this signalling flow is that the CRNC informs the selected channel type to the SRNCs used in a cell under the CRNC. The MBMS CHANNEL TYPE RECONFIGURATION INDICATION contains a list of U-RNTI, Channel type and MBMS Service Id corresponding to the UEs connected to the SRNC. ~~It is FFS whether the MBMS CHANNEL TYPE RECONFIGURATION INDICATION is initiated when the indicated MBMS Services are delivered in p-t-m in CRNC in the session start.~~

<<< End of Change 4 >>>