**3GPP TSG-RAN WG2 Meeting #125 R2-2xxxxxx**

**Athens, Greece, Feb. 26th – Mar. 1st, 2024**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
|  |
|  | **38.300** | **CR** | **-** | **rev** | **-** | **Current version:** | **18.0.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

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| ***Title:***  | Corrections to TS 38.300 for MBS |
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| ***Source to WG:*** | CMCC  |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | NR\_MBS\_enh-Core |  | ***Date:*** | 2023-02-19 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** |  |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | 1. There’s misalignment of the terminology of the RNTI used for multicast MCCH scheduling between TS 38.300 and TS 38.331.
2. There’s no clear definition for the RNTI mentioned in (1).
3. The general description of multicast reception in RRC\_INACTIVE state is missing in Section 16.10.1.
4. A capability for broadcast reception from non-serving cell is introduced, while the current description in 16.10.6.3 collides with it.
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| ***Summary of change:*** | 1. Capture the definition of Multicast MCCH RNTI.
2. Same terminology is used in stage 2 and stage 3 spec.
3. Capture general decription of multicast reception in RRC\_INACTIVE state.
4. Remove the NOTE in 16.10.6.3.
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| ***Consequences if not approved:*** | There are still some ambiguity and editorial errors in the specification. |
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| ***Clauses affected:*** | 8.1, 16.10.1, 16.10.5.2, 16.10.5.3.5, 16.10.6.3 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS/TR ... CR ...TS/TR ... CR ... |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

*First Modified Subclause*

8 NG Identities

8.1 UE Identities

In this clause, the identities used by NR connected to 5GC are listed. For scheduling at cell level, the following identities are used:

- C-RNTI: unique UE identification used as an identifier of the RRC Connection and for scheduling;

- CG-SDT-CS-RNTI: unique UE identification used for Configured Grant-based SDT in the uplink;

- CI-RNTI: identification of cancellation in the uplink;

- CS-RNTI: unique UE identification used for Semi-Persistent Scheduling in the downlink or configured grant in the uplink;

- INT-RNTI: identification of pre-emption in the downlink;

- MCS-C-RNTI: unique UE identification used for indicating an alternative MCS table for PDSCH and PUSCH;

- P-RNTI: identification of Paging and System Information change notification in the downlink;

- SI-RNTI: identification of Broadcast and System Information in the downlink;

- SP-CSI-RNTI: unique UE identification used for semi-persistent CSI reporting on PUSCH.

For power and slot format control, the following identities are used:

- SFI-RNTI: identification of slot format;

- TPC-PUCCH-RNTI: unique UE identification to control the power of PUCCH;

- TPC-PUSCH-RNTI: unique UE identification to control the power of PUSCH;

- TPC-SRS-RNTI: unique UE identification to control the power of SRS.

During the random access procedure, the following identities are also used:

- RA-RNTI: identification of the Random Access Response in the downlink;

- MSGB-RNTI: identification of the Random Access Response for 2-step RA type in the downlink;

- Temporary C-RNTI: UE identification temporarily used for scheduling during the random access procedure;

- Random value for contention resolution: UE identification temporarily used for contention resolution purposes during the random access procedure.

For NR connected to 5GC, the following UE identity is used at NG-RAN level:

- I-RNTI: used to identify the UE context in RRC\_INACTIVE.

For UE power saving purpose, the following identities are used:

- PS-RNTI: used to determine if the UE needs to monitor PDCCH on the next occurrence of the connected mode DRX on-duration;

- PEI-RNTI: used to determine if the UE needs to monitor the associated PO.

For IAB the following identity is used:

- AI-RNTI: identification of the DCI carrying availability indication for soft symbols of an IAB-DU.

For Network-Controlled Repeater the following identity is used:

- NCR-RNTI: identification of the DCI carrying side control information.

For MBS, the following identities are used:

- G-RNTI: Identifies dynamically scheduled PTM transmissions of MTCH(s);

- G-CS-RNTI: Identifies configured scheduled PTM transmissions of MTCH(s) scheduled with configured grant;

- MCCH-RNTI: Identifies transmissions of MCCH and MCCH change notification.

- Multicast MCCH-RNTI: Identifies transmissions of MCCH and MCCH change notification for multicast reception in RRC\_INACTIVE state.

For sidelink, the following identities are used:

- SL-RNTI: unique UE identification used for NR sidelink communication scheduling;

- SL-CS-RNTI: unique UE identification used for configured sidelink grant for NR sidelink communication;

- SL Semi-Persistent Scheduling V-RNTI: unique UE identification used for semi-persistent scheduling for V2X sidelink communication;

- SL-PRS-RNTI: unique UE identification used for SL-PRS transmission scheduling on dedicated SL-PRS resource pool;

- SL-PRS-CS-RNTI: unique UE identification used for configured sidelink grant for SL-PRS transmission on dedicated SL-PRS resource pool.

*Next Modified Subclause*

16.10 Multicast and Broadcast Services

16.10.1 General

NR system enables resource efficient delivery of multicast/broadcast services (MBS).

For broadcast communication service, the same service and the same specific content data are provided simultaneously to all UEs in a geographical area (i.e., all UEs in the broadcast service area as defined in TS 23.247 [45] are authorized to receive the data). A broadcast communication service is delivered to the UEs using a broadcast session. A UE can receive a broadcast communication service in RRC\_IDLE, RRC\_INACTIVE and RRC\_CONNECTED state.

For multicast communication service, the same service and the same specific content data are provided simultaneously to a dedicated set of UEs (i.e., not all UEs in the MBS service area as defined in TS 23.247 [45] are authorized to receive the data). A multicast communication service is delivered to the UEs using a multicast session. A UE can receive a multicast communication service in RRC\_CONNECTED state with mechanisms such as PTP and/or PTM delivery in RRC\_INACTIVE state with PTM delivery, as defined in clause 16.10.5.4. HARQ feedback/retransmission can be applied to both PTP and PTM in RRC\_CONNECTED state.

*Next Modified Subclause*

16.10.5.2 Configuration

A UE can be configured to receive data of MBS multicast session only in RRC\_CONNECTED state or RRC\_INACTIVE state. To receive the multicast service, the UE needs to perform MBS Session Join procedure as specified in TS 23.247 [45]. It is up to gNB to decide whether the UE receives data of MBS multicast session in RRC\_CONNECTED state or RRC\_ INACTIVE state. The gNB moves the UE from RRC\_CONNECTED state to RRC\_INACTIVE state via *RRCRelease* message, and moves the UE from RRC\_INACTIVE state to RRC\_CONNECTED state via group notification or UE-specific paging.

If the UE which joined a multicast session is in RRC\_CONNECTED state and when the multicast session is activated, the gNB may send *RRCReconfiguration* message with relevant MBS configuration for the multicast session to the UE.

If the gNB configures the UE to receive the MBS multicast session in RRC\_INACTIVE state, the gNB may provide the PTM configuration via *RRCRelease* message for the MBS multicast session as well as information which multicast service(s) can be continued to be received in RRC\_INACTIVE state. The UE does not suspend MRBs of the multicast session indicated to be continued to be received in RRC\_INACTIVE state. Multicast MCCH is used in case a cell supports updating PTM configuration or providing PTM configuration to UEs in RRC\_INACTIVE state moved from other cells. Otherwise, multicast MCCH can be optionally present.

A notification mechanism is used to announce the change of the multicast MCCH contents due to multicast session modification or session deactivation or due to neighbouring cell information modification. The scheduling information for multicast MCCH reception is provided via *SIB24* and optionally via *RRCRelease* message.

When there is temporarily no data to be sent to the UEs for a multicast session that is active, the gNB may move the UE to RRC\_INACTIVE state. When an MBS multicast session is deactivated, the gNB may move the UE in RRC\_CONNECTED state to RRC\_IDLE or RRC\_INACTIVE state. For UEs receiving data of MBS multicast session in RRC\_INACTIVE state, the gNB notifies the UE to stop monitoring PDCCH addressed by corresponding G-RNTI via *RRCRelease message* or multicast MCCH when there is temporarily no data to be sent or when the session is deactivated. gNBs supporting MBS use a group notification mechanism to notify the UEs in RRC\_IDLE or RRC\_INACTIVE state when a multicast session has been activated by the CN. gNBs supporting MBS use a group notification mechanism to notify the UEs in RRC\_INACTIVE state when the session is already activated and the gNB has multicast session data to deliver. If the UE receiving data of MBS multicast session in RRC\_INACTIVE state in a cell is notified to stop monitoring PDCCH addressed by G-RNTI for all the joined multicast sessions, the UE does not monitor PDCCH addressed by Multicast MCCH-RNTI until the group notification is received. Upon reception of the group notification, the UEs reconnect to the network or resume the connection and transition to RRC\_CONNECTED state from either RRC\_IDLE state or RRC\_INACTIVE state. Upon reception of the group notification that indicates to allow the multicast reception in RRC\_INACTIVE state, the UE stays in RRC\_INACTIVE state and behaves as specified in TS 38.331 [12]. If the UE is notified by both group notification and the UE-specific paging, the UE follows the UE-specific paging and goes to RRC\_CONNECTED state.

The group notification is addressed with P-RNTI on PDCCH, and the paging channels are monitored by the UE as described in clause 9.2.5. Paging message for group notification contains MBS session ID which is utilized to page all UEs in RRC\_IDLE and RRC\_INACTIVE states that joined the associated MBS multicast session, i.e., UEs are not paged individually. The UE stops monitoring for group notifications related to a specific multicast session, i.e., stops checking for the MBS session ID in the Paging message, when the UE enters RRC\_CONNECTED state. The UE does not monitor for group notifications for these cases, i.e., once this UE leaves this multicast session or the network requests the UE to leave, or the network releases the multicast session.

NOTE: The gNB's decision to keep a UE in RRC\_CONNECTED (e.g., to meet latency requirements for mission critical service) or move the UE to RRC\_INACTIVE or RRC\_IDLE (e.g., when there is temporarily no data to be sent to the UE or to address congestion in the cell) may consider 5QI value(s) or other QoS parameters for mission critical and non-mission critical UEs.

If the UE in RRC\_IDLE state that joined an MBS multicast session is camping on the gNB not supporting MBS, the UE may be notified by CN-initiated paging where CN pages each UE individually due to session activation or data availability, as described in clause 9.2.5. If the UE in RRC\_INACTIVE state that joined MBS multicast session is camping on the gNB not supporting MBS, the UE may be notified individually by RAN-initiated paging due to session activation or data availability, as described in clause 9.2.5.

*Next Modified Subclause*

16.10.5.3.5 Service Continuity in RRC\_INACTIVE

Mobility procedures for multicast reception allow the UE in RRC\_INACTIVE state to continue receiving MBS service(s) when changing cells without resuming RRC connection if the PTM configuration of the new cell can be acquired by the UE from the multicast MCCH after cell reselection. During an active MBS multicast session, the UE is required to resume RRC connection to get the PTM configuration if the PTM configuration is not provided on the multicast MCCH of the new cell. Even if the UE in RRC\_INACTIVE state received indication to stop monitoring PDCCH addressed by G-RNTI for an MBS multicast session in the source cell, the UE acquires multicast MCCH in the reselected cell after cell reselection.

The gNB may indicate in the multicast MCCH the list of neighbour cells providing the same MBS multicast service(s) for UEs in RRC\_INACTIVE state as provided in the serving cell. This allows the UE, e.g., to resume RRC connection without reading *SIB24* and multicast MCCH of the neighbour cell, if the interested service which is activated is not available to the UE in RRC\_INACTIVE state.

The gNB may provide an indication on cell PDCP COUNT synchronization for an MBS session with PTM configuration in *RRCRelease* message. If indicated by the gNB, all cells within the RNA are synchronized in terms of PDCP COUNT value to the MRBs of the corresponding MBS service, and the order of MRBs within the list of multicast MRB configuration for the same MBS multicast session in the multicast MCCH message of the last serving cell and (re)selected cell within the RNA should be consistent. Upon reselection to a cell indicated as synchronized in terms of PDCP COUNT value, the UE does not initialize the PDCP state variables. Otherwise, the UE initializes the PDCP state variables as defined in TS 38.323 [8].

The UE may be configured with dedicated frequency priorities in *RRCRelease* message which the UE applies during cell reselection while receiving data of MBS multicast session in RRC\_INACTIVE state.

The UE receiving multicast session(s) in RRC\_INACTIVE state triggers RRC connection resumption if the latest measured RSRP or RSRQ of the serving cell becomes lower than the threshold configured by the network. The threshold can be configured per MBS session via *RRCRelease* message or multicast MCCH.

*Next Modified Subclause*

16.10.6.3 Support of CA

UE can be configured to receive MBS broadcast data and MCCH either from a PCell or a single SCell at a time. Meanwhile, dedicated RRC signalling is used for providing SIB20 of the SCell i.e., while in RRC\_CONNECTED state, UEs need not acquire broadcast SIB20 directly from the SCells.

End of Changes