**3GPP TSG-RAN WG2 Meeting #119bis-eR2-22xxxxx**

**Online,** **Oct 10 – Oct19, 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **38.304** | **CR** |  | **rev** | **-** | **Current version:** | **17.2.0** |  |
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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:***  | 38.304 Corrections for MBS |
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| ***Source to WG:*** | CATT |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NR\_MBS-Core |  | ***Date:*** | 2022-10-17 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-17 |
|  | *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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | 1. UEs expecting multicast session notification for multicast data arrival in RRC\_INACTIVE also need not monitor PEI.2. Last meeting we changed wording “cell provides SIB20” to “SIB1 scheduling information includes SIB20” style. Old style is still used in one occasion 5.2.4.13. According to current TS 38.300, group notification is used to notify UEs in RRC IDLE/INACTIVE when a multicast session has been activated by the CN or the gNB has multicast session data to deliver. |
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| ***Summary of change:*** | Change(modified) from R2-22100691. Change “the UEs expecting multicast session activation notification” to “the UEs expecting MBS group notification” in section 7.2.1 of TS 38.304.Change from R2-22101312. Change “SIB20 is provided by the cell” to “SIB1 scheduling information of the cell contains SIB20” in section 5.2.4.1 of TS 38.304.Change(modified) from R2-22106833. Change “to receive notification of multicast session activation as specified in TS 23.247 [21]” to “when the UE expects MBS group notification as specified in clause 16.10.5.2 in TS 38.300 [2]” in section 6.2 of TS 38.304**Impact analysis**Impacted 5G architecture options:NR standaloneImpacted functionality:MBSInter-operability:There are no inter-operatbility issues. |
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| ***Consequences if not approved:*** | The sepcificaitons is unclear which may lead to incosistent UE behaviour. |
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| ***Clauses affected:*** | 7.2.1,5.2.4.1,6.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

*First Modified Subclause*

### 7.2.1 Paging Early Indication reception

The UE may use Paging Early Indication (PEI) in RRC\_IDLE and RRC\_INACTIVE states in order to reduce power consumption. If PEI configuration is provided in system information, the UE in RRC\_IDLE or RRC\_INACTIVE state supporting PEI (except for the UEs expecting MBS group notification) can monitor PEI using PEI parameters in system information according to the procedure described below.

If *lastUsedCellOnly* is configured in system information of a cell, the UE monitors PEI in the cell only if the UE most recently received *RRCRelease* without *noLastCellUpdate* in this cell. Otherwise (i.e., if *lastUsedCellOnly* is not configured in system information of a cell), the UE monitors PEI in the camped cell.

The UE monitors one PEI occasion per DRX cycle. A PEI occasion (PEI-O) is a set of PDCCH monitoring occasions (MOs) and can consist of multiple time slots (e.g. subframes or OFDM symbols) where PEI can be sent (TS 38.213 [4]). In multi-beam operations, the UE assumes that the same PEI is repeated in all transmitted beams and thus the selection of the beam(s) for the reception of the PEI is up to UE implementation.

The time location of PEI-O for UE's PO is determined by a reference point and an offset:

- The reference point is the start of a reference frame determined by a frame-level offset from the start of the first PF of the PF(s) associated with the PEI-O, provided by *pei-FrameOffset* in SIB1;

- The offset is a symbol-level offset from the reference point to the start of the first PDCCH MO of this PEI-O, provided by *firstPDCCH-MonitoringOccasionOfPEI-O* in SIB1.

If one PEI-O is associated with POs of two PFs, the two PFs are consecutive PFs calculated by the parameters *PF\_offset*, *T*, *Ns*, and *N*. The first PF of the PFs associated with the PEI-O is provided by (SFN for PF) - floor (*iPO*/*Ns*)\**T*/*N*, where SFN for PF is determined in clause 7.1, *iPO* is defined in clause 10.4a in TS 38.213[4], *T*, *Ns*, and *N* are determined in clause 7.1.

The PDCCH MOs for PEI are determined as specified in TS 38.213 [4] according to *pei-SearchSpace*, *pei-FrameOffset*, *firstPDCCH-MonitoringOccasionOfPEI-O* and *nrofPDCCH-MonitoringOccasionPerSSB-InPO* ifconfigured as specified in TS 38.331 [3]. When *SearchSpaceId* = 0 is configured for *pei-SearchSpace*, the PDCCH MOs for PEI are same as for RMSI as defined in clause 13 in TS 38.213 [4]. UE determines first PDCCH MO for PEI-O based on *pei-FrameOffset* and *firstPDCCH-MonitoringOccasionOfPEI-O*, as for the case with *SearchSpaceId* > 0 configured.

When *SearchSpaceId* = 0 is configured for *pei-SearchSpace*, the UE monitors the PEI-O according to *searchSpaceZero*. When *SearchSpaceId* other than 0 is configured for *pei-SearchSpace,* the UE monitors the PEI-O according to the search space of the configured *SearchSpaceId*.

A PEI occasion is a set of 'S\*X' consecutive PDCCH monitoring occasions, where 'S' is the number of actual transmitted SSBs determined according to *ssb-PositionsInBurst* in *SIB1*, and X is the *nrofPDCCH-MonitoringOccasionPerSSB-InPO* if configured or is equal to 1 otherwise. The [x\*S+K]thPDCCH MO for PEI in the PEI occasion corresponds to the Kth transmitted SSB, where x=0,1,…,X-1, K=1,2,…,S. The PDCCH MOs for PEI which do not overlap with UL symbols (determined according to *tdd-UL-DL-ConfigurationCommon*) are sequentially numbered from zero starting from the first PDCCH MO for PEI in the PEI-O. When the UE detects a PEI within its PEI-O, the UE is not required to monitor the subsequent monitoring occasion(s) associated with the same PEI-O.

If the UE detects PEI and the PEI indicates the subgroup the UE belongs to monitor its associated PO, as specified in clause 10.4a in TS 38.213 [4], the UE monitors the associated PO as specified in clause 7.1. If the UE does not detect PEI on the monitored PEI occasion or the PEI does not indicate the subgroup the UE belongs to monitor its associated PO, as specified in clause 10.4a in TS 38.213 [4], the UE is not required to monitor the associated PO as specified in clause 7.1.

If the UE is unable to monitor the PEI occasion (i.e. all valid PDCCH MO for PEI) corresponding to its PO, e.g. during cell re-selection, the UE monitors the associated PO according to clause 7.1.

In RRC\_INACTIVE state, if the UE supports *inactiveStatePO-Determination* and the network broadcasts *ranPagingInIdlePO* with value "true", the UE shall use the same *iPO* as for RRC\_IDLE state. Otherwise, the UE determines the *iPO* based on the formula defined in clause 10.4a in TS 38.213 [4].

*Next Modified Subclause*

#### 5.2.4.1 Reselection priorities handling

Absolute priorities of different NR frequencies or inter-RAT frequencies may be provided to the UE in the system information, in the *RRCRelease* message, or by inheriting from another RAT at inter-RAT cell (re)selection. In the case of system information, an NR frequency or inter-RAT frequency may be listed without providing a priority (i.e. the field *cellReselectionPriority* is absent for that frequency). If any fields with *cellReselectionPriority* or *nsag-CellReselectionPriority* are provided in dedicated signalling, the UE shall ignore any fields with *cellReselectionPriority* and *nsag-CellReselectionPriority* provided in system information.

When UE is in camped normally state, if it supports slice-based cell reselection and has received NSAG(s) and their priorities from NAS, UE shall derive re-selection priorities according to clause 5.2.4.11.

If UE is in *camped on any cell* state, UE shall only apply the priorities provided by system information from current cell, and the UE preserves priorities provided by dedicated signalling and *deprioritisationReq* received in *RRCRelease* unless specified otherwise. When the UE in camped normally state, has only dedicated priorities other than for the current frequency, the UE shall consider the current frequency to be the lowest priority frequency (i.e. lower than any of the network configured values). When the HSDN capable UE is in High-mobility state, the UE shall always consider the HSDN cells to be the highest priority (i.e., higher than any other network configured priorities). When the HSDN capable UE is not in High-mobility state, the UE shall always consider HSDN cells to be the lowest priority (i.e., lower than any other network configured priorities). If the UE is configured to perform both NR sidelink communication and V2X sidelink communication, the UE may consider the frequency providing both NR sidelink communication configuration and V2X sidelink communication configuration to be the highest priority. If the UE is configured to perform NR sidelink communication and not perform V2X communication, the UE may consider the frequency providing NR sidelink communication configuration to be the highest priority. If the UE is configured to perform V2X sidelink communication and not perform NR sidelink communication, the UE may consider the frequency providing V2X sidelink communication configuration to be the highest priority.

NOTE 0a: The frequency only providing the anchor frequency configuration should not be prioritized for V2X service during cell reselection, as specified in TS 38.331[3].

NOTE 0b: When UE is configured to perform NR sidelink communication or V2X sidelink communication performs cell reselection, it may consider the frequencies providing the intra-carrier and inter-carrier configuration have equal priority in cell reselection.

NOTE 0c: The prioritization among the frequencies which UE considers to be the highest priority frequency is left to UE implementation.

NOTE 0d: The UE is configured to perform V2X sidelink communication or NR sidelink communication, if it has the capability and is authorized for the corresponding sidelink operation.

NOTE 0e: When UE is configured to perform both NR sidelink communication and V2X sidelink communication, but cannot find a frequency which can provide both NR sidelink communication configuration and V2X sidelink communication configuration, UE may consider the frequency providing either NR sidelink communication configuration or V2X sidelink communication configuration to be the highest priority.

NOTE 0f: Void.

The UE shall only perform cell reselection evaluation for NR frequencies and inter-RAT frequencies that are given in system information and for which the UE has a priority provided.

If the MBS broadcast capable UE is receiving or interested to receive an MBS broadcast service(s) and can only receive this MBS broadcast service(s) by camping on a frequency on which it is provided, the UE may consider that frequency to be the highest priority during the MBS broadcast session as specified in TS 38.300 [2] as long as the two following conditions are fulfilled:

1) SIB1 scheduling information of the cell reselected by the UE due to frequency prioritization for MBS contains SIB20;

2) Either:

- One or more MBS FSAI(s) of that frequency is indicated in SIB21 of the serving cell and the same MBS FSAI(s) is also indicated for this MBS broadcast service in MBS User Service Description (USD) as specified in TS 26.346 [20], or

- SIB21 is not provided in the serving cell and that frequency is included in the USD of this service, or

- SIB21 is provided in the serving cell but does not provide the frequency mapping for the concerned service, and that frequency is included in the USD of this service.

NOTE 0g: It is up to UE implementation which frequency to select, when the USD provides multiple frequencies for the service the UE is interested in.

If the MBS broadcast capable UE is receiving or interested to receive an MBS broadcast service, the UE may consider cell reselection candidate frequencies at which it cannot receive the MBS broadcast service to be of the lowest priority during the MBS broadcast session as specified in TS 38.300 [2], as long as SIB1 scheduling information of the cell contains SIB20 on the MBS frequency which the UE monitors and as long as the condition 2) above is fulfilled for the serving cell.

NOTE 0h: Example scenarios in which such down-prioritisation may be needed include the cases where camping is not possible for the UE on the MBS broadcast frequency (e.g. the MBS broadcast frequency belongs to a PLMN different from UE's registered PLMN) while the UE can receive the MBS broadcast service when camped on another frequency than the MBS broadcast frequency or current frequency.

In case UE receives *RRCRelease* with *deprioritisationReq*, UE shall consider current frequency and stored frequencies due to the previously received *RRCRelease* with *deprioritisationReq* or all the frequencies of NR to be the lowest priority frequency (i.e. lower than any of the network configured values) while T325 is running irrespective of camped RAT. The UE shall delete the stored deprioritisation request(s) when a PLMN selection or SNPN selection is performed on request by NAS (TS 23.122 [9]).

NOTE 1: UE should search for a higher priority layer for cell reselection as soon as possible after the change of priority. The minimum related performance requirements specified in TS 38.133 [8] are still applicable.

The UE shall delete priorities provided by dedicated signalling when:

- the UE enters a different RRC state; or

- the optional validity time of dedicated priorities (T320) expires; or

- the UE receives an *RRCRelease* message with the field *cellReselectionPriorities* absent; or

- a PLMN selection or SNPN selection is performed on request by NAS (TS 23.122 [9]).

NOTE 2: Equal priorities between RATs are not supported.

The UE shall not consider any exclude-listed cells as candidate for cell reselection.

The UE shall consider only the allow-listed cells, if configured, as candidates for cell reselection.

The UE in RRC\_IDLE state shall inherit the priorities provided by dedicated signalling and the remaining validity time (i.e. T320 in NR and E-UTRA), if configured, at inter-RAT cell (re)selection.

NOTE 3: The network may assign dedicated cell reselection priorities for frequencies not configured by system information.

*Next Modified Subclause*

## 6.2 Reception of MBS

A UE receiving or interested to receive MBS broadcast services shall apply the MCCH information acquisition procedure as specified in TS 38.331 [3] to receive the MCCH information. A UE interested to receive MBS broadcast services identifies if a service that it is interested to receive is started or ongoing by receiving the MCCH information, and then receives a MTCH(s) configured using the Broadcast MRB establishment procedure as specified in TS 38.331 [3] and using the DL-SCH reception and MBS broadcast DRX procedure as specified in TS 38.321 [19].

UEs which have joined a multicast session(s) and are in RRC\_IDLE/RRC\_INACTIVE state shall apply the reception of the paging message procedure as specified in TS 38.331 [3] when the UE expects MBS group notification as specified in clause 16.10.5.2 in TS 38.300 [2].

*End of Modification*