**3GPP TSG-RAN WG2 Meeting #123bis *R2-23xxxxx***

**Xiamen, China, 9 – 14 Oct, 2023**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.304** | **CR** | **-** | **rev** | **-** | **Current version:** | **17.6.0** |  |
|  |
| *For* ***[HE](http://www.3gpp.org/3G_Specs/CRs.htm%22%20%5Cl%20%22_blank)******[LP](http://www.3gpp.org/3G_Specs/CRs.htm%22%20%5Cl%20%22_blank)*** *on using this form: comprehensive instructions can be found at <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 running CR for R18 mIAB |
|  |  |
| ***Source to WG:*** | Intel Corporation |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | NR\_mobile\_IAB-Core |  | ***Date:*** | 2023-10-16 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-18 |
|  | *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)* *Rel-19 (Release 19)*  |
|  |  |
| ***Reason for change:*** | Introduction of the support of Rel-18 mobile IAB |
|  |  |
| ***Summary of change:*** | * §5.2.4.1: cell reselection freuqency priority rules for mobile IAB
 |
|  |  |
| ***Consequences if not approved:*** | Rel-18 mobile IAB feature is not completed. |
|  |  |
| ***Clauses affected:*** | 5.2.4.1 |
|  |  |
|  | **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:*** |  |

1. ***Modified secsion***

## 5.3 Cell Reservations and Access Restrictions

### 5.3.0 Introduction

There are two mechanisms which allow an operator to impose cell reservations or access restrictions. The first mechanism uses indication of cell status and special reservations for control of cell selection and reselection procedures. The second mechanism, referred to as Unified Access Control as specified in TS 38.331 [3], shall allow preventing selected access categories or access identities from sending initial access messages for load control reasons.

Unified Access Control does not apply to IAB-MTs.

### 5.3.1 Cell status and cell reservations

Cell status and cell reservations are indicated in the *MIB or SIB1* message as specified in TS 38.331 [3] by means of following fields:

- *cellBarred* (IE type: "barred" or "not barred")
Indicated in *MIB* message. In case of multiple PLMNs or NPNs indicated in *SIB1*, this field is common for all PLMNs and NPNs. This field is ignored by UEs supporting NTN while *cellBarredNTN* is included in SIB1.

- *cellBarredNTN* (IE type: "barred" or "not barred")
Indicated in SIB1 message. In case of multiple PLMNs indicated in *SIB1*, this field is common for all PLMNs. This field is ignored if the UE does not support NTN connectivity.

- *cellBarredRedCap1Rx* (IE type: "barred" or "not barred")
Indicated in *SIB1* message. In case of multiple PLMNs or NPNs indicated in *SIB1*, this field is common for all PLMNs and NPNs. This field is only applicable to RedCap UEs.

- *cellBarredRedCap2Rx* (IE type: "barred" or "not barred")
Indicated in *SIB1* message. In case of multiple PLMNs or NPNs indicated in *SIB1*, this field is common for all PLMNs and NPNs. This field is only applicable to RedCap UEs.

- *cellReservedForOperatorUse* (IE type: "reserved" or "not reserved")
Indicated in *SIB1* message*.* In case of multiple PLMNs or NPNs indicated in *SIB1*, this field is specified per PLMN or per SNPN.

- *cellReservedForOtherUse* (IE type: "true")
Indicated in *SIB1* message. In case of multiple PLMNs indicated in *SIB1*, this field is common for all PLMNs.

*- cellReservedForFutureUse* (IE type: "true")
Indicated in *SIB1* message. In case of multiple PLMNs or NPNs indicated in *SIB1*, this field is common for all PLMNs and NPNs.

NOTE 0: IAB-MT ignores the *cellBarred*, *cellReservedForOperatorUse, cellReservedForFutureUse,* and *intraFreqReselection* (i.e. treats *intraFreqReselection* as if it was set to *allowed*) as defined in TS 38.331 [3]. IAB-MT also ignores *cellReservedForOtherUse* for cell barring determination (i.e. NPN capable IAB-MT considers *cellReservedForOtherUse* for determination of an NPN-only cell) as defined in TS 38.331 [3].

- *halfDuplexRedCapAllowed* (IE type: "true")
Indicated in *SIB1* message. In case of multiple PLMNs or NPNs indicated in *SIB1*, this field is common for all PLMNs and NPNs. This field is only applicable to RedCap UEs.

- *iab-Support* (IE type: "true")
Indicated in *SIB1* message. In case of multiple PLMNs or NPNs indicated in *SIB1*, this field is specified per PLMN or per SNPN.

- *mobileIAB-Support* (IE type: “true”)

 Indicated in *SIB1* message. In case of multiple PLMNs or NPNs indicated in *SIB1*, this field is specified per PLMN or per SNPN.

When cell status is indicated as "not barred" and "not reserved" for operator use and not "true" for other use and not "true" for future use,

- UEs shall treat this cell as candidate during the cell selection and cell reselection procedures.

When cell broadcasts any CAG-IDs or NIDs and the cell status is indicated as "not barred" and "not reserved" for operator use and "true" for other use, and not "true" for future use:

- All NPN-capable UEs shall treat this cell as candidate during the cell selection and cell reselection procedures, other UEs shall treat this cell as if cell status is "barred".

When cell status is indicated as "true" for other use, and either cell does not broadcast any CAG-IDs or NIDs or does not broadcast any CAG-IDs and the UE is not operating in SNPN Access Mode,

- The UE shall treat this cell as if cell status is "barred".

When cell status is indicated as "true" for future use,

- The UE shall treat this cell as if cell status is "barred".

When *cellBarredNTN* is not broadcast in this cell,

- For NTN access, the UE shall treat this cell as if cell status is "barred".

When *halfDuplexRedCapAllowed* is not broadcast in this cell,

- The RedCap UE only capable of operating in half-duplex for FDD shall treat this cell as if cell status is "barred".

When cell status is indicated as "not barred" and "reserved" for operator use for any PLMN/SNPN and not "true" for other use and not "true" for future use,

- UEs assigned to Access Identity 11 or 15 operating in their HPLMN/EHPLMN shall treat this cell as candidate during the cell selection and reselection procedures if the field *cellReservedForOperatorUse* for that PLMN set to "reserved".

- UEs assigned to Access Identity 11 or 15 shall treat this cell as candidate during the cell selection and reselection procedures if the field *cellReservedForOperatorUse* for selected/registered SNPN is set to "reserved".

- UEs assigned to an Access Identity 0, 1, 2 and 12 to 14 shall behave as if the cell status is "barred" in case the cell is "reserved for operator use" for the registered PLMN/SNPN or the selected PLMN/SNPN.

- UEs assigned to Access Identity 3 shall behave as if the cell status is "barred" in case the cell is "reserved for operator use" for the registered PLMN or the selected PLMN.

NOTE 1: Access Identities 11, 15 are only valid for use in the HPLMN/ EHPLMN and registered/selected SNPN; Access Identities 12, 13, 14 are only valid for use in the home country and registered/selected SNPN as specified in TS 22.261 [12].

NOTE 1a: Access Identity 3 is only valid for PLMNs that indicate to potential Disaster Inbound Roamers that the UEs can access the PLMN as specified in TS 22.261 [12].

When cell status "barred" is indicated or to be treated as if the cell status is "barred",

- The UE is not permitted to select/reselect this cell, not even for emergency calls.

- The UE shall select another cell according to the following rule:

- If the cell is to be treated as if the cell status is "barred" due to being unable to acquire the *MIB*:

- the UE may exclude the barred cell as a candidate for cell selection/reselection for up to 300 seconds.

- the UE may select another cell on the same frequency if the selection criteria are fulfilled.

- else:

- If the UE is a RedCap UE, the UE shall acquire SIB1 and, in the remainder of this procedure, consider '*intraFreqReselection* in MIB' to be '*intraFreqReselectionRedCap* in SIB1', if available*.*

- If the cell is to be treated as if the cell status is "barred" due to being unable to acquire the SIB1:

- the UE may exclude the barred cell as a candidate for cell selection/reselection for up to 300 seconds.

- the UE may select another cell on the same frequency if the selection criteria are fulfilled.

- If the cell status "barred" is indicated in *MIB* but the UE is unable to acquire the SIB1; or

- If the cell is to be treated as if the cell status is "barred" due to not supporting RedCap UEs:

- the UE shall exclude the barred cell as a candidate for cell selection/reselection for 300 seconds.

- the UE may select another cell on the same frequency if re-selection criteria are fulfilled.

- If the UE is not a RedCap UE, or if the UE is a RedCap UE and *intraFreqReselectionRedCap* in SIB1 is available:

- If the field *intraFreqReselection* in *MIB* message is set to "allowed":

- the UE may select another cell on the same frequency if re-selection criteria are fulfilled;

- If the cell is to be treated as if the cell status is "barred" due to being unable to acquire the *SIB1*:

- the UE may exclude the barred cell as a candidate for cell selection/reselection for up to 300 seconds;

- else:

- the UE shall exclude the barred cell as a candidate for cell selection/reselection for 300 seconds.

- If the field *intraFreqReselection* in *MIB* message is set to "not allowed":

- If the cell is to be treated as if the cell status is "barred" due to being unable to acquire the *SIB1*:

- the UE may exclude the barred cell as a candidate for cell selection/reselection for up to 300 seconds;

- If the cell operates in licensed spectrum:

- the UE shall not re-select to another cell on the same frequency as the barred cell and exclude such cell(s) as candidate(s) for cell selection/reselection for 300 seconds;

- else:

- the UE may select to another cell on the same frequency if the reselection criteria are fulfilled.

- else:

- If the cell operates in licensed spectrum, or if this cell belongs to a PLMN which is indicated as being equivalent to the registered PLMN or the selected PLMN of the UE, or if this cell belongs to the registered SNPN or the selected SNPN of the UE:

- the UE shall not re-select to another cell on the same frequency as the barred cell and exclude such cell(s) as candidate(s) for cell selection/reselection for 300 seconds;

- else:

- the UE may select to another cell on the same frequency if the reselection criteria are fulfilled.

- the UE shall exclude the barred cell as a candidate for cell selection/reselection for 300 seconds.

The cell selection of another cell may also include a change of RAT.

NOTE 2: If barring of a cell is triggered by the condition of *trackingAreaCode* and *trackingAreaList* not being provided, as specified in TS 38.331 [3], the barring only applies to this PLMN and the UE can re-evaluate the barring condition again due to selection of another PLMN.

1. ***Modified Section***

### 5.2.4 Cell Reselection evaluation process

#### 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 the network slice(s) and NSAG information from NAS to be used for cell reselection, UE shall derive reselection priorities according to clause 5.2.4.11.

NOTE 00: UE derives reselection priorities according to clause 5.2.4.11 also in case *SIB16* (see TS 38.331 [3]) is not broadcast in the camped cell.

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.

A UE on a vehicle with a mobile IAB-cell may detect and consider the frequency for which a mobile IAB cell is the best cell as highest priority. The UE can identify a mobile IAB cell via the mIAB-cell type indicator in SIB1 and check the presence of mobile IAB cell(s) on a frequency based on assistance information if broadcasted in SIB4.

*Editor Notes: FFS if mIAB PCI list is not necessarily exclusive, i.e., the PCI list may or may not include PCIs of non-mIAB cell. FFS if mIAB PCI list is not necessarily complete, i.e., the PCI list may or may not include all possible mIAB PCIs.*

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 unless otherwise stated.

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.

NOTE 0x: The determination by the UE to be on a vehicle with a mobile IAB-cell is left up to implementation.

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.

NOTE 0i: The frequency prioritization for MBS broadcast, NR sidelink communication, or V2X sidelink communication may override the re-selection priorities for slice-based cell reselection.

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.

NOTE 1a: The UE does not consider MBS broadcast, NR sidelink communication or V2X sidelink communication functionality to replace cell reselection priorities caused by HSDN or *deprioritisationReq* functionality.

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.

***End of the modified section***

# Running CR Annex: Related Meeting Agreements

Highlighted below are the related meeting agreements that have been considered for the CR.

RAN2 #123bis meeting agreements:

* P1: mIAB PCI list is optional present (i.e., not mandatory) for indicated mIAB frequency (confirming that mIAB PCI list is introduced)
* P7: it is left to UE implementation to determine an actual prioritized frequency among frequencies that can be prioritized for mIAB cell/HSDN/MBS/SL/V2X?
* P8: Existing Note 0c in TS 38.304 is applicable for the prioritization between mIAB cell/HSDN/MBS/SL/V2X. So, no or marginal additional specification work is needed.
* FFS:

P2: To discuss further  if mIAB PCI list is not necessarily exclusive, i.e., the PCI list may or may not include PCIs of non-mIAB cell.

P3: To discuss further if mIAB PCI list is not necessarily complete, i.e., the PCI list may or may not include all possible mIAB PCIs.

* From R2 perspective It is not supported that Rel-18 mobile IAB-node concurrently operate as a Rel-16/17 IAB-node, as e.g. mobile-IAB doesn’t support child IAB nodes.
* This means that there are restrictions for the network in configuring concurrent use of R-18 mIAB feature(s) and rel-16/17 IAB features (details FFS).
* FFS if an IAB-node may send both MSG5 indications to the network, and the network decides (or if the IAB-node should decide).

RAN2 #123 meeting agreements:

* Confirm the WA for inter-frequency cell reselection (scenarios: For a UE that is “on-board”, irrespective whether it is camped on the mobile IAB cell or a stationary cell, it can prioritize another frequency for which a mobile IAB cell is the best cell).
* No enhancement is needed for intra-frequency and equal-priority cell reselection.
* The procedure that UE searches and measure for mIAB cells on different frequencies is unspecified. RAN2 assumes that As assistance information, the NW can optionally provide inter-frequency mIAB list in SIB4, details FFS.
* It is left to UE implementation to determine whether the UE is physically on a moving vehicle and when it applies mobile IAB cell reselection prioritization for agreed scenarios.

RAN2 #122 meeting agreements:

* R2 considers that UEs can use the mIAB-cell indication, to prioritize (cell and/or freq) when the UE is camped on the mIAB cell, and FFS to prioritize when the UE is not yet camped on the mIAB cell. FFS if it can be specified the detailed condition for when to apply such prioritization (for either case), RAN2 considers condition based on cell dwelling timer or Mobility state.
* R2 direction (solution agreements at later stage, no other directions will be considered):

RAN2 acknowledges following two problems to be addressed for idle/inactive UEs:

- Problem 1: For a UE that is physically on a moving vehicle but not camped on its mobile IAB-cell yet (i.e. the UE is camped on a stationary cell), how to help such UE(s) to identify a neighbour mobile IAB-cell, prioritize mobile IAB-cell (frequency and cell) and to be “pulled” into this mobile IAB-cell, especially for inter-frequency scenario where the mobile IAB-cell’s frequency priority is low.

- Problem 2: After the UE physically on a moving vehicle is camped on the mobile IAB cell, how to avoid it reselecting other non-mIAB-(stationary) cells.

- Such UE may prioritize a highest ranked cell at a frequency, if it broadcasts a mIAB-cell type indicator in SIB1 for cell reselection. UE may use the SIB4 assistance information to identify the presence of such mobile IAB-cell(s), if broadcasted. A SIB4 assistance information may include mIAB-cell frequencies. FFS on stage-2/3 to clarify the UE in problem 1 and 2.

RAN2 #120 agreements:

* R2 assumes that It is up to RAN3 or SA2 to decide whether to support early mobile IAB indication in Msg5 because it depends whether donor CU needs to select an AMF supporting mobile IAB.
* R2 assumes that Donor CU can determine mobile IAB node's moving status via legacy reporting (e.g. mobility state and UE location / velocity specified in SON/MDT), i.e. R2 assumes enhanced / new reporting is not needed.
* A mobile IAB node may camp on and connect to legacy Rel-16/Rel-17 IAB capable cell.
* R2 assumes "supporting mobile-IAB" indication is provided by Rel-18 Mobile IAB capable parent cell.
* Regarding the assumed mobile-IAB cell type indication, RAN2 assumes is may be specified if some related UE behaviour is specified.

RAN2 #119bis-e agreements:

* FFS if to Introduce that stationary network broadcasts indication of “supporting mobile-IAB” (into intended for the Mobile IAB MT)
* RAN2 assumption: For the mobile IAB cell broadcasting info:

1 bit mobile-IAB cell type indication is introduced, to assist mobility in Idle/Inactive mode for Rel-18 UEs (FFS if to assist UE to know it is onboard, if this need to be known)

FFS how this is used (might be implementation specific).

* RAN2 assume below for the UEs working in the mobile IAB cell (may be obvious):

Assumption 1: From the NW perspective of mobile-IAB cell, the principle of setting the legacy parameters (including cell (re)selection, cell reservations and access restrictions) does not change, compared to the legacy IAB cell.

Assumption 2: No spec impact to legacy UEs behaviors.

Assumption 3: Any R18 newly broadcasted info of mobile-IAB cell (if agreed) does not forbid/control the access of legacy UEs.

Assumption 4: Non-enhanced UEs (including legacy UEs and R18 UEs not supporting the enhancement) just ignore the R18 newly broadcasted info of mobile-IAB cell (if agreed).