**3GPP TSG-RAN WG2 Meeting #109bis electronic*****draft\_*R2-2003908**

20-30 April 2020

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **38.304** | **CR** | **0156** | **rev** | **1** | **Current version:** | **16.0.0** |  |
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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:***  | PRN Running CR for TS 38.304 |
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| ***Source to WG:*** | Qualcomm (Rapporteur) |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NG\_RAN\_PRN |  | ***Date:*** | 2020-04-09 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***Release:*** | Rel-16 |
|  | *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-12 (Release 12)**Rel-13 (Release 13)Rel-14 (Release 14)Rel-15 (Release 15)Rel-16 (Release 16)* |
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| ***Reason for change:*** | 1. Agreement (R2-109e) regarding the case of unlicensed spectrum and for a UE with non-empty allowed CAG list. The agreement was captured as editor’s note in Section 5.2.4.4, but specification update was not made because unlicensed spectrum CR from NR-U work item was not available.
2. Agreement (R2-109be): Remove the Editor’s Note: “It is FFS whether the above needs to capture the condition that the cell is “not reserved for operator use for UEs not belonging to AC 11 or 15” from Table 4.2-1 of 38.304.
3. Agreement (R2-109be): A Non-NPN-capable Rel-16 UE treats a cell with cellReservedForOtherUse=true as barred cell.
4. Agreement (R2-109be): Follow the NR-U agreement in unlicensed on the use of the IFRI flag (agreement is to be captured in TS 38.304):

- For the SNPN case, UE only follows the IFRI in MIB of a barred cell if the cell belongs to a SNPN which matches the registered SNPN of the UE. Otherwise the UE may select other cell in the same frequency- For the CAG (PNI-NPN) case, there is no change to the existing NR-U behaviour: UE only follows the IFRI in MIB of a barred cell if the cell belongs to a registered/selected (e)PLMN. Otherwise the UE may select other cell in the same frequency.1. Agreement (R2-109be): Follow the NR-U behaviour when the highest ranked cell or best cell is not suitable due to belonging to the correct operator, but it is not a CAG member cell: (In unlicensed band when the highest ranked cell or best cell is not suitable due to belonging to the correct operator, but it is not a CAG member cell, the UE shall not consider this cell as candidate for reselection for a maximum of 300 seconds. If the second highest ranked cell on this frequency is not suitable due to belonging to the correct operator, but it is not a CAG member cell, the UE may consider this frequency to be the lowest priority for a maximum of 300 seconds.)
2. (Agreement 109-be): The UE behaviour in licensed band when the cell belongs to the correct operator but either it’s not a CAG member cell or the cell is a public cell and the CAG-only indicator in the UE is set to true: the UE shall not consider this cell and other cells on the same frequency, as candidates for reselection for a maximum of 300 seconds.

(Agreement 109-be): For a UE in SNPN AM, if the highest ranked cell or best cell according to absolute priority reselection rules is a cell which is not suitable due to not broadcasting the registered or selected SNPN ID, the UE shall not consider this cell and, for operation in licensed spectrum, other cells on the same frequency as candidates for reselection for a maximum of 300 seconds. |
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| ***Summary of change:*** | 1. Remove the Editor’s Note. The agreement from PRN is consistent with and already captured by NR-U changes in 38.304v16.0.0.
2. Remove the editor’s note in Table 4.2-1.
3. Add a restriction on the behavior of non-NPN-capable UE.
4. New text added for handling of *intraFreqReselection* with SNPN. For CAG, no new text was necessary.
	1. Modify handling in case of strongest cell not allowed
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| ***Consequences if not approved:*** | Agreements from R2-109-e and R2-109-bis-e will not be reflected in the specification. |
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| ***Clauses affected:*** | 4.2, 5.2.4.4, 5.3.1 |
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|  | **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 ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | - |

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*Start of this change*

## 4.2 Functional division between AS and NAS in RRC\_IDLE state and RRC\_INACTIVE state

Table 4.2-1 presents the functional division between UE non-access stratum (NAS) and UE access stratum (AS) in RRC\_IDLE state and RRC\_INACTIVE states. The NAS part is specified in TS 23.122 [9] and the AS part in the present document.

Table 4.2-1: Functional division between AS and NAS in RRC\_IDLE state and RRC\_INACTIVE state

| RRC\_IDLE and RRC\_INACTIVE state Process | UE Non-Access Stratum | UE Access Stratum |
| --- | --- | --- |
| PLMN Selection  | **For a UE not operating in SNPN access mode, perform the following:**Maintain a list of PLMNs in priority order according to TS 23.122 [9]. Select a PLMN using automatic or manual mode as specified in TS 23.122 [9] and request AS to select a cell belonging to this PLMN. For each PLMN, associated RAT(s) may be set.Evaluate reports of available PLMNs and any associated CAG-IDs from AS for PLMN selection.Maintain a list of equivalent PLMN identities.To support manual CAG selection, provide request to search for available CAGs and evaluate reports of available CAGs from AS for CAG selection.**For a UE operating in SNPN access mode, perform the following:**Maintain a list of SNPNs according to TS 23.122 [9]. Select a SNPN using automatic or manual mode as specified in TS 23.122 [9] and request AS to select a cell belonging to this SNPN.Evaluate reports of available SNPNs from AS for SNPN selection. | For a UE not operating in SNPN access mode, search for available PLMNs.If associated RAT(s) is (are) set for the PLMN, search in this (these) RAT(s) and other RAT(s) for that PLMN as specified in TS 23.122 [9].For a UE operating in SNPN access mode, search for available SNPNs only consider NR cells.Perform measurements to support PLMN/SNPN selection.Synchronise to a broadcast channel to identify found PLMNs/SNPNs.Report available PLMNs and any associated CAG-IDs with associated RAT(s) to NAS on request from NAS or autonomously.For a UE operating in SNPN access mode, report available SNPNs to NAS autonomously.**To support manual CAG selection, perform the following:**Search for cells broadcasting a CAG-ID.Read the HRNN (if broadcast) for each CAG-ID if a cell broadcasting a CAG-ID is found.Report CAG-ID(s) of found cell(s) broadcasting a CAG ID together with the associated HRNN and PLMN to NAS.On selection of a CAG by NAS, select any acceptable or suitable cell belonging to the selected CAG and give an indication to NAS that access is possible (for the registration procedure)To support manual SNPN selection, report available SNPNs together with associated HRNNs (if available) to NAS on request from NAS. |
| Cell Selection | Control cell selection for example by indicating RAT(s) associated with the selected PLMN to be used initially in the search of a cell in the cell selection.Maintain a list of "Forbidden Tracking Areas" and provide the list to AS.For a UE not operating in SNPN access mode: Maintain Allowed CAG list and optional CAG-only indication along with associated PLMN ID(s) on which the UE is allowed access and provide these lists to AS. To support manual CAG selection, select a CAG and request AS to select a cell belonging to this CAG. | Perform measurements needed to support cell selection.Detect and synchronise to a broadcast channel. Receive and handle broadcast information. Forward NAS system information to NAS.Search for a suitable cell. The cells broadcast one or more 'PLMN identity' or 'SNPN identity' (for a UE operating in SNPN access mode) in the system information. Respond to NAS whether such cell is found or not.If associated RATs is (are) set for the PLMN, perform the search in this (these) RAT(s) and other RATs for that PLMN as specified in TS 23.122 [9].If a cell is found which satisfies cell selection criteria, camp on that cell. |
| Cell Reselection | For a UE not operating in SNPN access mode,maintain a list of equivalent PLMN identities and provide the list to AS.Maintain a list of "Forbidden Tracking Areas" and provide the list to AS.For a UE not operating in SNPN access mode, maintain Allowed CAG list and optional CAG-only indication along with associated PLMN ID(s) on which the UE is allowed access and provide these lists to AS. | Perform measurements needed to support cell reselection.Detect and synchronise to a broadcast channel. Receive and handle broadcast information. Forward NAS system information to NAS.Change cell if a more suitable cell is found. |
| Location registration | Register the UE as active after power on.Register the UE's presence in a registration area, for instance regularly or when entering a new tracking area.Deregister UE when shutting down.Maintain a list of "Forbidden Tracking Areas". | Report registration area information to NAS. |
| RAN Notification Area Update | Not applicable. | Register the UE's presence in a RAN-based notification area (RNA), periodically or when entering a new RNA. |

*Start of next change*

#### 5.2.4.4 Cells with cell reservations, access restrictions or unsuitable for normal camping

For the highest ranked cell (including serving cell) according to cell reselection criteria specified in clause 5.2.4.6, for the best cell according to absolute priority reselection criteria specified in clause 5.2.4.5, the UE shall check if the access is restricted according to the rules in clause 5.3.1.

If that cell and other cells have to be excluded from the candidate list, as stated in clause 5.3.1, the UE shall not consider these as candidates for cell reselection. This limitation shall be removed when the highest ranked cell changes.

If the highest ranked cell or best cell according to absolute priority reselection rules is an intra-frequency or inter-frequency cell which is not suitable due to one or more of the following reasons:

* this cell being part of the "list of 5GS forbidden TAs for roaming", or
* this cell belongs to a PLMN which is not indicated as being equivalent to the registered PLMN, or
* this cell is a CAG cell that belongs to a PLMN which is equivalent to the registered PLMN but with CAG ID that is not present in the UE’s allowed CAG list, or
* this cell is not a CAG cell and the CAG-only indication in the UE is set, or
* this cell is a SNPN cell that belongs to a SNMN that is not equal to the registered SNPN of the UE in SNPN access mode,

the UE shall not consider this cell and, for operation in licensed spectrum, other cells on the same frequency as candidates for reselection for a maximum of 300 seconds.

For operation with shared spectrum channel access, when the highest ranked cell or best cell is not a candidate for reselection per the previous clause,if the second highest ranked cell on this frequency is not suitable for one or more of the following reasons,

* does not have a PLMN being equivalent to the registered PLMN, or
* belongs to a PLMN that is equivalent to the registered PLMN but is not suitable due to being absent in the UE’s allowed CAG list, or
* the cell is not a CAG cell and the CAG-only indication in the UE is set, or
* the cell is a SNPN cell that belongs SNMN that is not equal to the registered SNPN of the UE in SNPN access mode, or

the UE may consider this frequency to be the lowest priority for a maximum of 300 seconds.

If the UE enters into state *any cell selection*, any limitation shall be removed. If the UE is redirected under NR control to a frequency for which the timer is running, any limitation on that frequency shall be removed. For a UE operating in SNPN AM and in shared spectrum channel access, if the highest ranked cell or best cell according to absolute priority reselection rules is a cell which is not suitable due to not broadcasting the registered or selected SNPN ID, the UE shall not consider this cell as candidate for cell reselection but should continue to consider other cells on the same frequency for cell reselection.

If the highest ranked cell or best cell according to absolute priority reselection rules is an inter-RAT cell which is not suitable due to being part of the "list of forbidden TAs for roaming" or belonging to a PLMN which is not indicated as being equivalent to the registered PLMN, the UE shall not consider this cell and other cells on the same frequency, as candidates for reselection for a maximum of 300 seconds. If the UE enters into state *any cell selection*, any limitation shall be removed. If the UE is redirected under NR control to a frequency for which the timer is running, any limitation on that frequency shall be removed.

*Start of next change*

### 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

- *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: For IAB node, it ignores the *cellBarred*, *cellReservedForOperatorUse* and *cellReservedForOtherUse* as defined in TS 38.331 [3].

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

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

- All 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 *cellReservedForFutureUse* IEis not indicated as "*true"*:

- All UEs in SNPN AM or capable of CAG functionality shall treat this cell as candidate during the cell selection and cell reselection procedures.

Editor's note: The definition of “capable of CAG functionality” is FFS, e.g. via UE capability or via another approach. 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 *cellReservedForFutureUse* IEis indicated as "*true"*,

- The UE 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 *cellReservedForFutureUse* IE is not indicated as"true",

- 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.

NOTE 1: Access Identities 11, 15 are only valid for use in the HPLMN/ EHPLMN; Access Identities 12, 13, 14 are only valid for use in the home country 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 cell is to be treated as if the cell status is "barred" due to being unable to acquire the *SIB1* or due to *trackingAreaCode* being absent in *SIB1* as specified in TS 38.331 [3]:

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

- 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;

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

- the UE shall not re-select a cell on the same frequency as the barred cell;

- else:

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

- The UE shall exclude the barred cell and, 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, also the cells on the same frequency as a candidate for cell selection/reselection for 300 seconds.

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