**3GPP TSG-RAN WG2 Meeting #110-e R2-2005795**

**Electronic, 1-12 June 2020**

**Agenda item: 6.18.3**

**Source: Qualcomm (38.304 Rapporteur)**

**Title: Offline discussion 105: PRN - 38304 open issues - first round**

**WID/SID: NG\_RAN\_PRN-Core - Release 16**

**Document for: Discussion and Decision**

# 1 Introduction

This document covers two aspects:

At the conclusion of RAN2#109bis-e, a CR to 38.304 (R2-2003908) was agreed. Some comments were received at a somewhat late stage, resulting in Editor’s Notes in the CR. This document proposes rapporteur’s resolutions to these comments and implements the changes in accompanying draft CR.

During RAN2#110-e, a number of papers with 38.304 impact were assigned to offline discussion [105][PRN]. This document creates an offline discussion about the proposals in these papers.

[R2-2004522](file:///C%3A/Data/3GPP/RAN2/Docs/R2-2004522.zip) Remaining Issues related to 38.304 CATT discussion Rel-16 38.304 NG\_RAN\_PRN-Core

* to be discussed in offline [105]

[R2-2004603](file:///C%3A/Data/3GPP/RAN2/Docs/R2-2004603.zip) Remaining open issues in the specification of NPN Lenovo, Motorola Mobility discussion Rel-16 NG\_RAN\_PRN-Core

* proposal 1 to be discussed in offline [104]
* other can be discussed in offline [105]

[R2-2004728](file:///C%3A/Data/3GPP/RAN2/Docs/R2-2004728.zip) Remaining issues for Manual CAG selection Intel Corporation discussion Rel-16 NG\_RAN\_PRN-Core

* Generally covered by [R2-2004481](file:///C%3A/Data/3GPP/RAN2/Docs/R2-2004481.zip%22%20%5Co%20%22C%3AData3GPPRAN2DocsR2-2004481.zip) and offline [104]. Wording can be discussed in offline [105]

[R2-2004744](file:///C%3A/Data/3GPP/RAN2/Docs/R2-2004744.zip) Discussion on manual CAG selection vivo discussion

* can be discussed in offline [105]

[R2-2005364](file:///C%3A/Data/3GPP/RAN2/Docs/R2-2005364.zip) Clarification of cell reselection for NPN-capable U China Telecom discussion Rel-16

* can be discussed in offline [105]

[R2-2005680](file:///C%3A/Data/3GPP/RAN2/Docs/R2-2005680.zip) Emergency Calls in CAG Cells for UE supporting NPN-ANR QUALCOMM Europe Inc. - Italy discussion

* can be discussed in offline [105]

**In the first phase of discussion, the rapporteur hopes that the issues in section 3 can be agreed via email discussion before the online session on June 3. Please comment on whether you object to any of the rapporteur views in section 3.**

**This report (first round) is based on company inputs “CATT\_ZTE\_CTC\_NOK\_Intel\_vivo\_SAM\_E\_FW” and HW.**

# 2 Open Issues and New Issues

## 2.1 Handling of forbidden TA in shared spectrum

The restructuring of text in Section 5.2.4.4. led to an Editor’s note about UE behaviour in shared spectrum in case the strongest cell belongs to a forbidden TA.

Scenario for shared spectrum: Highest ranked cell is not suitable because it is part of the "list of 5GS forbidden TAs for roaming".

The specification should pick one of these two behaviours:

* A (per 38.304v16.0.0): UE considers frequency as barred for max of 300s
* B (per restructured text in 38.304 PRN running CR): UE considers other cells on this frequency.

Rapporteur recommendation: Pick ‘B’, and simply delete the EN in 38.304 PRN running CR.

* It is desirable to have uniform UE behaviour in all cases in shared spectrum where the UE was not eligible to access the highest ranked cell.
* There does not seem any compelling reason to make an exception for forbidden TA case
* This behaviour does not create a disconnect between legacy UE and Rel-16 UE because it is specific to shared spectrum.

Option B however does have the procedural drawback of changing a UE behaviour that is outside PRN scope.

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| --- |
| 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 that 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 no CAG ID that is present in the UE’s allowed CAG list being broadcasted, 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 SNPN 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. Editor’s Note: It is FFS if the condition for registered SNPN in the above paragraph should be extended to include selected SNPN.For operation with shared spectrum channel access, when the highest ranked cell or best cell is not a candidate for reselection per the previous paragraph, if the second highest ranked cell on this frequency is also not suitable due to one or more of the above reasons,the UE may consider this frequency to be the lowest priority for a maximum of 300 seconds. Editor’s Note: It requires confirmation whether the case of second highest ranked cell belonging to forbidden TA should be part of the conditions associated with "one or more of the above reasons".  |

**Question 2.1: Do you prefer Option A or B to resolve the Editor’s Note? If A, is your motivation procedural (i.e. this should be handled in NR-U session, or technical, or both)?**

|  |  |  |  |
| --- | --- | --- | --- |
| **Company** | **Option A or B** | **Reason for picking A (technical/procedural/both)** | **Comments** |
| CATT | Option A | It is the scope of NR-U WI.so perhaps it is better to leave it to NR-U WI to decide it.In case of NPN,We can follow the current behaviour in the spec for the time being |  |
| ZTE | B | We prefer to have uniform UE behaviour in all cases in shared spectrum where the UE was not eligible to access the highest ranked cell.  |  |
| China Telecom | B |  |  |
| Huawei | B | We believe it is just a negligence of NR-U. |  |
| Nokia | A | There was an NR-U agreement at RAN2#109: "From RAN2 point of view, there is no NR-U specific issue for the handling of forbidden TAs. No changes are introduced to the running 38.304 CR for handling of forbidden TAs"Procedural issue: changing this NR-U decision requires to involve NR-U people. Technical issue: we have not seen any new technical reasons that would make necessary to discuss this issue again.  |  |
| Intel | A | The NR-u behavior should follow the licensed behavior in this case. That is the concerned frequency should also be barred for up to 300s.  |  |
| vivo | A | In RAN2#109e meeting，NRU WI has discussed the handling of forbidden TAs in detail (which is reported in R2-2002022) and achieved the agreement that “ *From RAN2 point of view, there is no NR-U specific issue for the handling of forbidden TAs. No changes are introduced to the running 38.304 CR for handling of forbidden TAs.*”In case of NPN, we prefer to follow NRU agreements. |  |
| Samsung | A | Follow agreements from NR-U |  |
| Ericsson | A | Agree with Nokia |  |
| Futurewei | A | Better to be consistent with NR-U. |  |
| Qualcomm | B | NR-U said they don’t really see this scenario as a common case. The did not explicitly pick “A” as a desirable option and decided to leave 38.304 unchanged as the case was not strong enough to make a spec change. | B keeps the specification cleaner and keeps the UE behaviour consistent. |

## 2.2 Modelling of Manual selection

#### 2.2.1 HRNN reporting between AS and NAS and AS awareness of selection mode:

The paper from CATT (R2-2004522) raises the following issue.

As we have addressed in the contribution [2] ([R2-2002734](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2002734.zip)) to RAN2#109bis-e,to enable AS to provide HRNNs to NAS in manual CAG selection mode and manual SNPN selection mode only, interaction between NAS and AS is needed. We suggest RAN2 decides which option is applied, and the agreement should be reflected in 38.304 and CT1 specification.

Proposal 5: RAN2 decides which option to address HRNN reporting issue, then sends LS to inform the RAN2 agreement to CT1.

Option 1: To make AS aware of the automatic or manual SNPN/CAG selection mode, The SNPN/CAG selection mode is required to be sent from NAS to AS when manual SNPN/CAG selection is triggered. Then AS can determine to read HRNNs and report it together with available NPN IDs in manual SNPN or CAG selection mode.

Option 2: AS should not be aware of automatic or manual SNPN/CAG selection mode as legacy PLMN selection. AS is required to report HRNNs to NAS only when NAS request it. Then extra interaction between NAS and AS is needed for NAS to request HRNNs from AS.

Rapporteur comment: This issue is dependent on email discussion R2-2004481, and impacts to 38.304 can be discussed subsequently.

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| **Company** |  | **Comments** |
| CATT |  | We think this issue is about how will NAS request AS to report HRNN in manual CAG/SNPN selection. It will impact clause 4.2 in 38.304 and CT1 spec 23.122. It does not depend on the conclusion of email discussion R2-2004481 as email discussion only discusses the content of SIB10. |
| Nokia | Option 2 | We prefer the legacy behaviour: NAS should request HRNNs from AS whenever it is needed. Providing HRNNs and manual CAG ID selection are not the same:1. Providing HRNNs to NAS does not necessarily mean that a CAG ID will be selected manually; e.g., the user may stop the manual CAG ID selection process at any point.
2. Manual CAG ID selection may happen with HRNNs.
 |
| Intel | Neither | We think that such interaction can be left to UE implementation. There is no need to specify further. |
| Ericsson | Option 2 | We think that, as part of other AS-NAS interaction, it can also be standardized that the UE NAS provide an indication to UE AS that HRNNs are requested (if broadcast) |
| Futurewei | Neither | If present in SIB, AS should always report HRNN to NAS, and leave NAS to decide if it’d be used for manual SNPN/CAG selection. |

#### 2.2.2 Suitable cell definition

Intel (R2-2004728) argues that the definition of suitable cell, subsequent to manual CAG selection, has a gap, and the text should be amended to say “Allowed CAG list of the selected CAG ID”.

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| **suitable cell:**For UE not operating in SNPN Access Mode, a cell is considered as suitable if the following conditions are fulfilled:- The cell is part of either the selected PLMN or the registered PLMN or PLMN of the Equivalent PLMN list, and for that PLMN either:- The PLMN-ID of that PLMN is broadcast by the cell with no associated CAG-IDs and CAG-only indication in the UE for that PLMN (TS 23.501 [10]) is absent or false;- Allowed CAG list in the UE for that PLMN (TS 23.501 [10]) includes a CAG-ID broadcast by the cell for that PLMN;- The cell selection criteria are fulfilled, see clause 5.2.3.2.According to the latest information provided by NAS:- The cell is not barred, see clause 5.3.1;- The cell is part of at least one TA that is not part of the list of "Forbidden Tracking Areas" (TS 22.261 [12]), which belongs to a PLMN that fulfils the first bullet above.Editor's note: It is FFS whether the above needs to be updated to consider manually selected CAG ID.For UE operating in SNPN Access Mode, a cell is considered as suitable if the following conditions are fulfilled:- The cell is part of either the selected SNPN or the registered SNPN of the UE;- The cell selection criteria are fulfilled, see clause 5.2.3.2; |

Rapporteur comment: Section 5.1.1.2 says:

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| To support manual CAG selection, the UE shall upon request by NAS report available CAG ID(s) together with their HRNN (if broadcast) and PLMN(s) to the NAS. If NAS has selected a CAG and provided this selection to AS, the UE shall search for an acceptable or suitable cell belonging to the selected CAG to camp on. |

Given the above procedure it is possible to use the “acceptable” option and then the definition of suitable does not need to be modified to include the manually selected CAG.

**Question 2.2.2: Is there a need to modify the definition of “suitable cell” to include cells belonging to the manually selected CAG, or is it enough to model manual selection via acceptable cell.**

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| **Company** | **Need to modify suitable cell definition? (yes/no)** | **Comments** |
| CATT | Yes | We think the original intention raised by Intel is to say “Allowed CAG list or the selected CAG ID” instead “Allowed CAG list of the selected CAG ID”.I think the point is that there is no priority between manually selected CAG ID and allowed CAG list based on CT1’s response. But for the case manually selected CAG ID is not in allowed CAG list.AS could also consider it for cell selection and reselection. In other words, a cell supporting manually selected CAG ID or supporting allowed CAG list could be a suitable cell. So we think the suitable cell criteria should be modified accordingly. |
| ZTE | No, with comments | In LTE CSG, a suitable CSG cell has to be a CSG member cell (a cell broadcasting the identity of the selected PLMN, registered PLMN or equivalent PLMN and for which the CSG whitelist of the UE includes an entry comprising cell's CSG ID and the respective PLMN identity.) for UE. The same principle can be applied in NR CAG but we would like some further clarification.As mentioned in 5.11.2 that “*UE shall search for an acceptable or suitable cell belonging to the selected CAG to camp on.*” What kind of cell can be a suitable cell belonging to the selected CAG? If we stick to the existing definition for a suitable CAG cell, then a suitable cell belong to the selected CAG will be a cell broadcasting the manually selected CAGID and a CAG-ID which is included in UE’s allowed CAG list.While an acceptable cell belonging to the selected CAG will be a cell broadcasting the manually selected CAGID but not broadcasting any CAG-ID which is included in UE’s allowed CAG list. |
| China Telecom | Yes | Considering manually selected CAG as suitable cell helps UEs to access to the network when CAG allowed lists between UEs and the network.  |
| Huawei | Yes | It is reasonable to add “or the selected CAG ID” because CT1 and SA1 allow a UE to manually select a CAG ID which is not included in the allowed CAG list (i.e. excluded from the current definition of suitable cell).Our understanding is that the change only affects cell selection. For cell reselection, UE sticks to the allowed CAG list. |
| Nokia | No | Our understanding is when a CAG ID is selected manually the UE shall select a cell that supports the manually selected CAG ID at initial cell selection. When the UE's allowed CAG ID list is obsoleted and the highest ranked cell belongs to CAG ID that is on the obsoleted CAG ID list, using the allowed CAG ID list for initial cell selection after manual CAG ID selection results that the UE is not able to access the network at all. (A use-case for manual CAG ID selection is when the UE is not configured properly with allowed CAG ID list.) After the initial cell selection, the UE shall use the allowed CAG ID list for cell re-selection (using existing suitable cell definition), as during registration the UE will receive the valid allowed CAG ID list.  |
| Intel | Yes | Our understanding is that the selected CAG ID needs to be used for cell reselection. Hence it needs to work for cell reselection using the selected CAG ID as suitability check is also applied. E.g. for cell reselection, UE needs to know whether the reselected cell is suitable. |
| vivo | No | Regardless of manual CAG selection or automatic CAG selection, AMF determine whether UE can obtain normal service via a CAG cell or not by judging whether there is a overlap between the CAG allowed list of UE at NW side and the supported CAG ID(s) of this CAG cell.Based on our understanding, a CAG cell is suitable for CAG UE only when this cell broadcast CAG-ID(s) which are included in CAG allowed list of UE for that PLMN. Thus, we prefer to keep the current description of suitable cell. |
| Samsung | No | Upon manually selecting the CAG ID if the registration is successful then the allowed CAG list of the UE is updated with manually selected CAG ID and this does not impact cell reselection  |
| Ericsson | No | Should not be updated. The manually selected CAG ID may not be suitable at all, even if registration is successful. If needed, nw will update allowed CAG lists, this is enough. |
| Futurewei | No | Suitable cell should be those with CAG ID belonging to the allowed CAG list. And network can update the allowed CAG list with the manually selected CAG ID, if it wishes to. |
| Qualcomm | No | Existing text looks good. Cell reselection does not need to consider manual CAG selection, as it is used only for initial camping and connection. |

#### 2.2.3 Indication from AS to NAS of “manual selection allowed” indication

Vivo (R2-2004744) discusses the CT1 LS response (R2-2004178) and concludes that the new indicator in SIB regarding whether operator policy “allows a user to manually select a CAG-ID supported by the CAG cell but outside the UE’s allowed CAG list”.

Vivo also discusses the CT1 CR to argue that NAS needs to be aware of the operator policy broadcasted via SIB.

**Question 2.2.3: Do you agree that during manual CAG selection, along-with the PLMN-ID and associated CAG ID, the UE AS shall report operator policy indicator in the SIB, if present, to UE NAS (i.e. indicator of whether operator allows a user to manually select a CAG-ID supported by the CAG cell but outside the UE’s allowed CAG list).**

Rapporteur note: The specific text in 38.304 can be developed in the second phase of the email.

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| **Company** | **Agree? (yes/no)** | **Comments** |
| CATT | No | AS could only report CAG-IDs if the associated “Manual CAG selection indication” is true. NAS is no need to be aware of the “Manual CAG selection indication” |
| ZTE | No | Agree with CATT. |
| China Telecom | No | Agree with CATT. |
| Huawei | No | The indication agreed by CT1 is in Uu, and is used to control the behavior of UE’s manual selection (which CAGs outside of allowed CAG list can be manually selected). We think it has no impact on AS-NAS interaction. |
| Nokia | Yes | NAS should be aware if a CAG ID can be selected manually or not. Reading HRNNs may not be needed for manual CAG ID selection. As this indication is in SIB1, AS can report about it to NAS without any extra efforts. |
| Intel | No? | UE AS can just provide those CAG IDs that are allowed to the UE NAS. |
| vivo | Yes | NAS should be aware if a CAG ID can be selected manually or not. It is simple that UE AS reports all the CAG related information to NAS.  |
| Samsung | No | UE AS is aware of allowed CAG list. If manual CAG selection is forbidden by indication in SIB1 then UE AS just provides CAG IDs from SIB1 broadcast which are in the UE allowed CAG list |
| Ericsson | Yes | This indicator impact network selection and should be forwarded to NAS |
| Futurewei | No | Those CAG IDs not allowing manual selection don’t need to be reported to NAS. |
| Qualcomm | Yes | The text in CT1 seems to require NAS knowledge of the operator policy setting. |

## 2.3 Definition of NPN-Capable

### 2.3.1 Clarification of definition

China Telecom (R2-2005364) argues that the following term “NPN-Capable” needs to be defined further, and is not sufficiently clear.

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| 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". |

CT proposes that a UE should be considered NPN-capable if any of the following is true:

* UE is operating in SNPN access mode
* UE is CAG-capable

**Question 2.3.1: Is it necessary to clarify the definition of NPN-capable? (Note that this term is currently not defined in the specification).**

The specific text can be developed in next stage of email, if there is agreement to make the change.

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| --- | --- | --- | --- |
| **Company** | **Agree clarification needed? (yes/no)** | **Agree on clarification direction in CT proposal? (yes/no)** | **Comments** |
| CATT | No | No | The wording “NPN-capable” is not equal to “UE is operating in SNPN access mode and UE is CAG-capable”, SNPN capable UE but not in SNPN AM is also NPN-capable UE,actually it is changed from “All UEs in SNPN AM or CAG-capable UE” to “NPN-capable” in the last email discussion. It’s better to stick to the current wording. |
| ZTE | No | No | In our understanding, a NPN capable UE is a UE who support SNPN or PNI-NPN and thus is able to decode the corresponding ASN.1 to broadcast the NPN identity list. A NPN capable UE is able to read the NPN identity list broadcast from a neighbour cell and report to NW if configured to report CGI even it is not operating in SNPN mode.The wording “UE capable of ...” is used everywhere in the specification and we do not see the need to give a specific definition.  |
| China Telecom | Yes | Yes | We think it is necessary to achieve the same understanding of “NPN-capable UE” in order to avoid violation of our agreements before about cell selection and reselection.According to the latest stage 2 running CR, *When the UE is not set to operate in SNPN access mode, the UE performs normal PLMN selection procedures.*So it is obviously SNPN-capable UEs not in SNPN AM treat a cell with cellReservedForOtherUse=true as barred.  |
| Huawei | No | No |  |
| Nokia | No |  | No time to check with CT colleagues! |
| Intel | No strong view | No |  |
| vivo | No | No |  |
| Samsung | No |  |  |
| Ericsson | No | No | Capable should refer to what the UE can do, not necessarily what mode it is currently in. An NPN-capable UE need to decode the npn-identity list and access a PLMN cell associated to CAG ID’s or accessing an SNPN via a cell that broadcast an SNPN ID. Whether this needs to be defined in specifications, no strong view. |
| Futurewei | No | No | NPN-capable UE can still be accessing network through PLMN cell.  |
| Qualcomm | No |  |  |

### 2.3.2 Emergency call restrictions

Qualcomm (R2-2005680) argues that UEs that are capable of ANR for NPNs should not treat CAG-only cells as barred, as that places an unnecessary restriction on emergency calling, and the main reason the restriction was originally introduced was the SI reading/parsing burden of the UE.

**Question 2.3.2: Should a UE that is NPN non-capable, but sets *nr-CGI-Reporting-NPN=true* be prohibited to make emergency calls from CAG-only cells?**

The specific text can be developed in next stage of email, if there is agreement to make the change.

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| --- | --- | --- |
| **Company** | **Should UE be prohibited? (yes/no)** | **Comments** |
| CATT | Yes | According to the RAN2 agreement, non NPN capable UE should not override cellReservedForOtherUse. non NPN capable UE can not consider the NPN only cell as the cellReservedForOtherUse is ‘True’ based on the definition of NPN-only cell. |
| ZTE |  | A NPN non-capable UE will treat a cell as barred if the *cellReservedForOtherUse* is set to true, which is the agreement we made to clarify the UE’s interpretation on such a indication. And the intention is to have uniform interpretation on such a indication for Rel-15 UEs and R16 NPN non-capable UEs.We prefer to stick to the agreement made before and not get the setting of *nr-CGI-Reporting-NPN* involved. |
| China Telecom | Yes |  |
| Huawei | Yes | If the cell wants to support emergency service for as many UEs as possible, it will not set *cellReservedForOtherUse* to *true*. So we don’t think the scenario is valid. |
| Intel | Yes | We should only have one method of allowing non-CAG UE from camping in a CAG only cell for emergency call.  |
| Vivo | No strong view | As RAN2 has agreed that A Non-NPN-capable UE treats a cell with cellReservedForOtherUse=true as barred cel, we slightly prefer to stick to this agreement. |
| Samsung |  | Same view as ZTE |
| Ericsson | Yes | Agree with ZTE |
| Futurewei | Yes | Better to stick the agreement and not introduce exception. |
| Qualcomm | No | We fail to see any technical arguments for restricting the UE’s ability to make emergency calls on a cell that offers emergency calls. Sticking to a RAN2 agreement is not as important as allowing UEs to make emergency calls! |

## 2.4 Autonomous Selection to frequency of CAG cells

Lenovo and Motorola Mobility (R2-2004603) propose that.

**“**Proposal 2:Allow autonomous inter-RAT cell reselection to CAG cell irrespective of the dedicated priority settings by the inter-RAT cell.”

The motivation is that in an area with NR-CAG surrounded by LTE public cells, it can be expected that the LTE public cells rely on UE based mobility (e.g. like LTE CSG) instead of relying on the NR principle of network advertised frequency priorities.

**Question: Do you agree that inter-RAT cell reselection from non-NR RATs to NR CAG cell can be based on UE autonomously considering the frequency of the member NR CAG cell to be highest priority?**

Rapporteur note: An operator that has NR spectrum should configure LTE cells to advertise NR frequencies as highest priority, though that may have a battery life cost if the operator does so in an area without any public NR deployments.

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| **Company** | **Yes/No** | **Comments** |
| CATT | No | We do not think inter-RAT cell reselection for CAG based on autonomous search function is not in the scope of WI, so better to consider this enhancement in the later release. |
| ZTE | No | We have agreed that “If UE run autonomous cell search and at the same time have dedicated frequency priorities, the result from autonomous cell search should not go against that indicated by dedicated frequency priorities (when they are valid).” We think the same rule applies for inter-RAT cell selection case. Since CAG is not supported in LTE, only UE without CAG-only indication can perform inter-RAT selection, we cannot see specific need for UE itself to prioritize NR CAG cells and NW can perform the prioritization by setting higher reselection priority, if needed. |
| China Telecom | No |  |
| Huawei | No | No strong view. I wonder if this is agreed, where should the agreement be captured? Currently 36331/36304 does not involve CAG. |
| Nokia | No |  |
| vivo | No | We think NW can provide the appropriate dedicated frequency priority. |
| Ericsson | No |  |
| Futurewei | No |  |
| Qualcomm | No |  |

# 3 Nearly Editorial Issues

## 3.1 “Registered SNPN” or “Registered/Selected SNPN” in case of highest rank cell not allowed for the UE

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| 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 that 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 no CAG ID that is present in the UE’s allowed CAG list being broadcasted, 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 SNPN 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. Editor’s Note: It is FFS if the condition for registered SNPN in the above paragraph should be extended to include selected SNPN. |

In almost all places in 38.304, the same handling is used for registered and selected SNPN. Hence, it is proposed to delete the Editor’s note and replace “registered SNPN” by “registered or selected SNPN”.

The changes are provided in the accompanying CR.

**Question 3.1: Do you object to changing “registered SNPN” to “registered or selected SNPN” in the case of highest ranked cell or best not allowed?**

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| **Company** | **Object? Yes/No** | **Comments** |
| Rapporteur view (Qualcomm) | No |  |
| CATT | No |  |
| ZTE | No |  |
| China Telecom | No |  |
| Huawei | No |  |
| Nokia | No |  |
| Intel | No |  |
| vivo | No |  |
| Samsung | No |  |
| Ericsson | No |  |
| Futurewei | No |  |
| Qualcomm | No |  |

## 3.2 Usage of cellReservedForFutureUse IE

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| 5.3.1 Cell status and cell reservationsCell 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 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".Editor's note: The terminology *cellReservedForFutureUse* IE is not indicated as "true" should be updated to not "true" for future use for consistency with other IEs. 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]. |

For consistency in the usage of IEs and the logical values, the Editor’s note can be deleted and replaced by the changes provided in the accompanying CR.

**Question 3.2: Do you object to change “*cellReservedForFutureUse* IE is not indicated as"true" ” to “not "true" for future use” in Section 5.3.1.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Object? Yes/No** | **Comments** |
| Rapporteur view (Qualcomm) | No |  |
| CATT | No |  |
| ZTE | No |  |
| China Telecom | No |  |
| Huawei | No |  |
| Nokia | No |  |
| Intel | No |  |
| vivo | No |  |
| Samsung | No |  |
| Ericsson | No |  |
| Futurewei | No |  |
| Qualcomm | No |  |

## 3.3 SNPN selection and shared spectrum

The paper from CATT (R2-2004522) raises the following issue.

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| --- |
| 5.1.1.2 NR case [PLMN Selection]The UE shall scan all RF channels in the NR bands according to its capabilities to find available PLMNs and available CAGs. On each carrier, the UE shall search for the strongest cell and read its system information, in order to find out which PLMN(s) the cell belongs to and any associated CAG(s). For operation with shared spectrum channel access, the UE may also read the system information of multiple strongest cell(s). If the UE can read one or several PLMN identities in the strongest cell or the multiple strongest cell(s) in case of operation with shared spectrum channel access, each found PLMN (see the PLMN reading in TS 38.331 [3]) shall be reported to the NAS as a high quality PLMN (but without the RSRP value) and any associated CAG-ID, …5.1.2.2 NR case [SNPN Selection]The UE shall scan all RF channels in the NR bands according to its capabilities to find available SNPNs. On each carrier, the UE shall search for the strongest cell and read its system information, in order to find out which SNPN(s) the cell belongs to. If the UE can read one or several SNPN identities in the strongest cell, each found SNPN (see the SNPN reading in TS 38.331 [3]) shall be reported to the NAS. |

However, Section 5.1.2.2 on SNPN selection does not include the clarification about shared spectrum that is included in PLMN selection (highlighted above)

**Question 3.3: Do you object to adding a clarification about shared spectrum in SNPN case, allowing the UE to search for multiple cells on the same frequency, in section 5.1.2.2.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Object? Yes/No** | **Comments** |
| Rapporteur view (Qualcomm) | No |  |
| CATT | No |  |
| ZTE | No |  |
| China Telecom | No |  |
| Huawei | No |  |
| Nokia | No |  |
| Intel | No |  |
| vivo | No |  |
| Samsung | No |  |
| Ericsson | No |  |
| Futurewei | No |  |
| Qualcomm | No |  |

## 3.4 SNPN selection and RAT

The paper from CATT (R2-2004522) raises the following issue.

During PLMN selection, when a PLMN is selected, the associated RAT may also be selected by NAS and inform AS.in the latest 38.304, it has been added that associated RAT may also be set for the selected SNPN.

|  |
| --- |
| 4.1 OverviewWhen a UE is switched on, a public land mobile network (PLMN) or a SNPN is selected by NAS. For the selected PLMN/SNPN, associated RAT(s) may be set, as specified in TS 23.122 [9]. The NAS shall provide a list of equivalent PLMNs, if available, that the AS shall use for cell selection and cell reselection. |

**Question 3.4a: Do you agree that for SNPN there is no need for RAT to be set by NAS?
Question 3.4b: Do you object to delete “SNPN” in red quoted above?
Rapporteur note on 4b: The existing text is still technically correct because of the “may” language int the sentence.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Company** | **3.4a: Yes/No** | **3.4b: Object? Yes/No** | **Comments** |
| Rapporteur view (Qualcomm) | Yes | No |  |
| CATT | Yes | No |  |
| ZTE | No | Yes |  Since we specify that “For the selected PLMN/SNPN, associated RAT(s) may be set, as specified in TS 23.122”. We can keep as it is to make it more future proof. |
| China Telecom | Yes | No |  |
| Huawei | No | Yes | The text cited by CATT says “set” whereas the proposal2 of the paper says “send”, so the proposal is a bit confusing.Besides, even if there’s only one option, we don't think there is any problem to “set the RAT to the only one option”. The current text works well. |
| Nokia | Yes | No | The current text is also acceptable. |
| Intel | Yes | No | No change is needed as pointed out by rapportuer. |
| vivo | Yes | No | The current description is also fine to us. |
| Samsung | Yes | No |  |
| Ericsson | Yes |  | No strong view, can probably be left as is too. |
| Futurewei | Yes | No |  |
| Qualcomm | Yes | No |  |

## 3.5 Case of PLMN-ID present in both plmn-IdentityList and npn-IdentityInfoList-r16

The paper from CATT (R2-2004522) raises the following issue.

|  |
| --- |
| **suitable cell:**For UE not operating in SNPN Access Mode, a cell is considered as suitable if the following conditions are fulfilled:- The cell is part of either the selected PLMN or the registered PLMN or PLMN of the Equivalent PLMN list, and for that PLMN either:- The PLMN-ID of that PLMN is broadcast by the cell with no associated CAG-IDs and CAG-only indication in the UE for that PLMN (TS 23.501 [10]) is absent or false;- Allowed CAG list in the UE for that PLMN (TS 23.501 [10]) includes a CAG-ID broadcast by the cell for that PLMN;- The cell selection criteria are fulfilled, see clause 5.2.3.2. |

CATT Understanding: For the sentence “The PLMN-ID of that PLMN is broadcast by the cell with no associated CAG-IDs”, we understand it means there is no any CAG ID associated to the PLMN-ID in the cell, in other words, the PLMN-ID only exists in *plmn-IdentityList* in SIB1, but does not exist in *npn-IdentityInfoList-r16*. Hence, CATT view is that the case PLMN-ID present in both *plmn-IdentityList* and *npn-IdentityInfoList-r16* is currently not covered by the first bullet.

Rapporteur Comment: The CATT understanding would be valid if the text said “is **only** broadcast with by the cell with no associated CAG-ID”. But there is no only in the text, and hence the current text is valid.

**Question 3.5: Is there a need to make a change, e.g by saying “PLMN is broadcast by the cell in plmn-IdentityList in SIB1” instead of the current text “PLMN is broadcast by the cell with no associated CAG-IDs”.**

|  |  |  |  |
| --- | --- | --- | --- |
| **Company** | **Need for change: Yes/No** | **If yes, rapporteur proposed text ok?** | **Comments** |
| Rapporteur view (Qualcomm) | No | Yes |  |
| CATT | Yes | No | The original intention of the following sentence ‘The PLMN-ID of that PLMN is broadcast by the cell with no associated CAG-IDs and CAG-only indication in the UE for that PLMN (TS 23.501 [10]) is absent or false’ wants to cover two cases:Case 1: The PLMN-ID of that PLMN is broadcast by the cell, but there is no CAG-IDs associated to the corresponding PLMN-ID, and CAG-only indication in the UE for that PLMN (TS 23.501 [10]) is absent or false;Case 2: PLMN-ID of that PLMN is broadcast by the cell and one or more CAG-IDs is/are associated to the PLMN-ID, but the associated CAG ID to the PLMN ID is not included in the allowed CAG ListUnfortunately, the current text does not cover Case 2, so we propose the following:“The PLMN-ID of that PLMN is broadcast by the cell with no associated CAG-IDs matching with allowed CAG list in the UE and CAG-only indication in the UE for that PLMN (TS 23.501 [10]) is absent or false;” |
| ZTE | Yes | Yes |  |
| China Telecom | No | Yes |  |
| Huawei | No | Yes | Not needed. “The PLMN-ID of that PLMN is broadcast by the cell with no associated CAG-IDs” means the PLMN ID exists in *plmn-IdentityList*, it does not mean the PLMN ID cannot appear in *npn-IdentityInfoList-r16*. |
| Nokia | No | Yes | We think the current text is OK, but the revision proposal makes it clearer. We do no understanding case 2 of CATT: if the PLMN ID is only in the NPN list and there is no matching CAG ID of the allowed CAG list then the UE shall not select the cell. |
| Intel | No | Yes |  |
| vivo | No | Yes | we think the current text is clear. |
| Samsung | No | Yes | Current text is clear |
| Ericsson | No | Yes | We think current text is clear, but ok with update |
| Futurewei | No | Yes | The current text is clear enough, and the rapporteur’s update is also fine. |
| Qualcomm | No | Yes | Current text seems sufficiently clear. |

# 4. Issues needing no further discussion

### 4.1 Measurements and reporting of detected cells

Lenovo and Motorola Mobility (R2-2004603) propose that.

**“**Proposal 3:Confirm that no restrictions apply for the CAG UE with regards to detected cell measurements and reporting. That means, in accordance with its capabilities the CAG UE may include detected NR public cells in measurement reporting in a CAG cell, and detected CAG cells in measurement reporting in a NR public cell.”

*Rapporteur comment: The current RRC does not have any such restrictions, and such restrictions were not agreed previously. Request the proponents to highlight any gaps they see in the specification/CR text.*

# 5. Summary (first round)

## 5.1 Agreeable proposals

The following questions had no objects, and corresponding proposals are recommended for adoption:

Question (2.4): Do you agree that inter-RAT cell reselection from non-NR RATs to NR CAG cell can be based on UE autonomously considering the frequency of the member NR CAG cell to be highest priority?

Question 3.1: Do you object to changing “registered SNPN” to “registered or selected SNPN” in the case of highest ranked cell or best not allowed?

Question 3.2: Do you object to change “*cellReservedForFutureUse* IE is not indicated as“true” ” to “not “true” for future use” in Section 5.3.1.

Question 3.3: Do you object to adding a clarification about shared spectrum in SNPN case, allowing the UE to search for multiple cells on the same frequency, in section 5.1.2.2.

**Proposal 2.4: No change is needed for inter-RAT case with selection to CAG cells on NR.**

**Proposal 3.1: Change “registered SNPN” to “registered or selected SNPN” in the case of highest ranked cell or best not allowed.**

**Proposal 3.2: Change “*cellReservedForFutureUse* IE is not indicated as“true” ” to “not “true” for future use” in Section 5.3.1.**

**Proposal 3.3: Add a clarification about shared spectrum in SNPN case in Section 5.1.2.2, allowing the UE to search for multiple cells on the same frequency.**

## 5.2 Proposals that may be agreeable.

### 5.2.1 SNPN selection and RAT

Question 3.4a: Do you agree that for SNPN there is no need for RAT to be set by NAS?
Question 3.4b: Do you object to delete “SNPN” in red quoted above?
Rapporteur note on 4b: The existing text is still technically correct because of the “may” language int the sentence.

Two companies objected to delete “SNPN” with one of the arguments being improved forward compatibility.

**Proposal 3.4: Delete SNPN from the following sentence in Section 4.1 “For the selected PLMN/SNPN, associated RAT(s) may be set, as specified in TS 23.122 [9].”**

### 5.2.2 Case of PLMN-ID present in both plmn-identity list and npn-IdentityInfoList-r16

Question 3.5: Is there a need to make a change, e.g by saying “PLMN is broadcast by the cell in plmn-IdentityList in SIB1” instead of the current text “PLMN is broadcast by the cell with no associated CAG-IDs”.

Only two companies saw a need for change, and other companies felt the text is clear already.

**Proposal 3.5: Current 38.304 text is sufficiently clear and no need for change.**

### 5.2.3 Suitable cell definition

Question 2.2.2: Is there a need to modify the definition of “suitable cell” to include cells belonging to the manually selected CAG, or is it enough to model manual selection via acceptable cell.

Most companies preferred to not modify the definition of selected cell.

**Proposal 2.2.2: Current 38.304 text is sufficiently clear and no need for change to suitable cell definition considering the case of “selected CAG”.**

### 5.2.4 NPN-Capable definition

Question 2.3.1: Is it necessary to clarify the definition of NPN-capable? (Note that this term is currently not defined in the specification).

Most companies believed that the definition is clear already.

**Proposal 2.3.1: There is no need to add a definition of NPN-capable, and current text is adequate.**

### 5.2.5 Emergency call restrictions for CAG-only cells

Question 2.3.2: Should a UE that is NPN non-capable, but sets *nr-CGI-Reporting-NPN=true* be prohibited to make emergency calls from CAG-only cells?

Only one company answered ‘No.

**Proposal 2.3.2: No change needed to existing text regarding emergency calling restrictions for UEs that are not NPN-capable.**

## 5.3 Proposals needing further discussion

### 5.3.1 Indication from AS to NAS for manual selection.

**Question 2.2.3: Do you agree that during manual CAG selection, along-with the PLMN-ID and associated CAG ID, the UE AS shall report operator policy indicator in the SIB, if present, to UE NAS (i.e. indicator of whether operator allows a user to manually select a CAG-ID supported by the CAG cell but outside the UE’s allowed CAG list).**

Company views seem to be split (7 No, 4 Yes).

Rapporteur comment: Based on the CT1 text below (provided by Vivo), it looks like NAS needs to know the broadcast information. Hence, rapporteur’s recommendation is to pick “Yes”. But in any case, the behaviour is UE internal, and both specification approaches work.

|  |
| --- |
| a) the PLMN/access technology combination and a list of CAG-IDs composed of one or more CAG-IDs such that for each CAG-ID:1) there is an available CAG cell which broadcasts the CAG-ID for the PLMN; and2) the following is true:i) there exists an entry with the PLMN ID of the PLMN in the "CAG information list" and the CAG-ID is included in the "Allowed CAG list" of the entry; orii) the available CAG cell broadcasting the CAG-ID for the PLMN also broadcasts that the PLMN allows a user to manually select the CAG-ID. |

### 5.3.2 Handling of forbidden TA in shared spectrum

More companies (7 vs 4) preferred option A (i.e. keep the behaviour in baseline 38.304) over option B (uniform behaviour for all cases when a cell is not allowed).

Rapporteur comment: There does not seem any good technical justification for option A, and option B seems like a cleaner design choice.

**Proposal 2.1: For the case of shared spectrum and forbidden TA, UE follows the behaviour in 38.304v16.0.0, and the changes in the running CR is reverted.**