**3GPP TSG-RAN WG2 Meeting #110-e draft\_R2-20xxxxx**

**Electronic, 1-12 June 2020**

**Agenda item: 6.18.3**

**Source: Qualcomm (38.304 Rapporteur)**

**Title: Offline discussion 105: PRN - 38304 CR finalization**

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

**Document for: Discussion and Decision**

# 1 Introduction

This document serves two purposes:

* **[AT110e][105][PRN] 38.304 CR (Qualcomm)**
* Final scope:  update the 38.304 CR with all meeting agreements and taking into account the LS from SA1 in [R2-2005739](file:///C:\Data\3GPP\RAN2\Docs\R2-2005739.zip).
* Final intended outcome: Agreed 38.304 CR
* Deadline for companies' feedback on the revised CR:  Thursday 2020-06-11 10:00 UTC
* Deadline for final version of the 38.304 CR in R2-2005798:  Friday 2020-06-12 10:00 UTC

The following agreements were made in R2-110e that impact the running PRN 38.304 CR, and the CR changes are summarized. The draft CR is available in the folder for [105][PRN] offline discussion.

Agreements via email (from [105][PRN]):

1. No change is needed for inter-RAT case with selection to CAG cells on NR. 🡨 No action
2. Change “registered SNPN” to “registered or selected SNPN” in the case of highest ranked cell or best not allowed. 🡨 Refer Section 5.2.4.4
3. Change “cellReservedForFutureUse IE is not indicated as “true” ” to “not “true” for future use” in Section 5.3.1. 🡨 Refer Section 5.3.1
4. 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. 🡨 Used text from section 5.1.1.2 and repeated it in Section 5.1.2.2.

Agreements online:

1. Keep SNPN in 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].” 🡨 No action
2. Current 38.304 text (“PLMN is broadcast by the cell with no associated CAG-IDs…” in suitable cell definition) is sufficiently clear and no need for change. 🡨 No action
3. There is no need to add a definition of NPN-capable, and current text is adequate. 🡨 No action
4. No change needed to existing text regarding emergency calling restrictions for UEs that are not NPN-capable. 🡨 No action
5. 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). 🡨 Refer Sections 4.2 and 5.1.1.2.
6. For the case of shared spectrum and forbidden TA, UE follows the behaviour in 38.304v16.0.0 🡨 Refer Section 5.2.4.4

Agreements online:

1. RAN2 assumes that the manually selected CAG ID has no impact to cell reselection. (This requires no change in the existing draft CRs.)
2. RAN2 assumes that the UE shall select a cell supporting the manually selected CAG ID provided by NAS for initial cell selection. The relevant changes should be added to the running 38.304 CR. 🡨 Rapporteur view is that no action is needed in 38.304
3. RAN2 assumes that the CAG ID is never added to the RRCResumeComplete. (This assumption is to be captured in the running RRC CR.)
4. No additional specification is needed for SIB10.
5. On demand SI in connected is not supported for SIB10
6. Use the changes in Proposal 7 in R2-2005794 to address Z102 (TP from QC)
7. Not agree in the proposal of RIL B200.
8. Only cells supporting CAG(s), including CAG only cells and shared CAG cells, may be listed in the new CAG PCI lists (can come back to this if we find some issues)
9. Include SIB10 in SI-SchedulingInfo using valueTags as for any other SIB (except SIB6,7,8) as proposed in Annex 2 of R2-2004690

# 2 Comments on implementation of changes

## 2.1 Operator policy indicator (Agreement Online-5)

In AS procedures for Table 4.2-1, the following change is proposed

|  |
| --- |
| **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 manual CAG selection allowed indicator, HRNN and PLMNto 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) |

In Section 5.1.1.2, the following change is proposed

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| --- |
| To support manual CAG selection, the UE shall upon request by NAS report available CAG ID(s) together with their manual CAG selection allowed indicator, 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. |

**Q2.1 Please provide any concerns on the above proposal:**

|  |  |  |
| --- | --- | --- |
| **Company** | **Concerns** | **Alternate proposal** |
| Qualcomm | No |  |
| Intel | No |  |
| Ericsson | Yes | We miss the word "allowed" here. The RRC parameter is named "manualCAGselectionAllowed".  Perhaps we could directly refer to the RRC parameter and write as follows?  "together with their *manualCAGselectionAllowed* indicator, "  Or if you don’t want to refer to the name explicitly, at least we can write like this:  "together with their manual CAG selection allowed indicator,, " |
| Nokia | No |  |
| CATT | No |  |
| Huawei | No |  |

## 2.2 Camping decision following manual selection

For the following RAN2 decision, the rapporteur understanding is that 38.304 changes are not needed.

* RAN2 assumes that the UE shall select a cell supporting the manually selected CAG ID provided by NAS for initial cell selection. The relevant changes should be added to the running 38.304 CR.

Please see the following language about this in Table 4.2-1

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| **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) |

In Section 5.1.1.2, it describes:

|  |
| --- |
| 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. |

Rapporteur view:

The text highlighted above captures the UE behaviour. Given that some time may elapse between the user being presented with the CAG list on the phone screen and the user making a selection, it is hard to guarantee that the “UE shall select a cell supporting the manually selected CAG ID”.

**Q2.2 Please provide company views on need for 38.304 text change to capture the RAN2 agreement “RAN2 assumes that the UE shall select a cell supporting the manually selected CAG ID provided by NAS for initial cell selection.” (Rapporteur understanding is that changes are not needed).**

|  |  |  |
| --- | --- | --- |
| **Company** | **38.304 change needed** | **Text proposal (if answering yes).** |
| Qualcomm | No |  |
| Intel | No |  |
| Ericsson | No |  |
| Nokia | No |  |
| CATT | No |  |
| Huawei | No |  |

## 2.3 Comments on other changes

Please comment below on any other changes in the running CR.

|  |  |  |
| --- | --- | --- |
| **Company** | **Change of interest** | **Comment** |
| Huawei | 5.1.1.2 (editorial) | 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)..  Duplicated periods |
| Huawei | 5.2.4.4 (editorial) | If the highest ranked cell or best cell according to absolute priority reselection rules is an inter-frequency or inter-frequency cell which is not suitable due to being part of the "list of 5GS forbidden TAs for roaming", the UE shall not consider this cell and other cells on the same frequency cas candidates for reselection for a maximum of 300 seconds.  Typo |

# 3. SA1 LS on PWS in SNPN

SA1 says in LS R2-2005739 that:

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| SA1 thanks RAN2 for the LS on CMAS/ETWS and emergency services for SNPNs. In response to the questions from RAN2, SA1 provides the following:  - There are no SA1 service requirements related to the support of PWS by SNPNs in Rel-16.  - SA1 plans to further discuss adding service requirements for the support of PWS by SNPNs from Rel-17 onward. |

It should also be noted that it is already agreed that SNPNs do not provide emergency call support (S2-2000066)

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| --- |
| **RAN2 question:** RAN2 respectfully asks SA2 to confirm that, for Rel-16, emergency services are not supported in SNPNs.  **SA2 reply:** SA2 confirms that in Rel-16 emergency services are not supported in SNPNs. |

From the above two inputs (SA1/SA2), it can be concluded that SNPN cells do not offer emergency calling or CMAS/ETWS support. Rapporteur analysis of the existing specification is provided in Section 3.1.

Companies are requested to review the moderator analysis and answer the following questions.

**Question 3a: Do you agree that SNPN-only cells do not offer emergency calling or CMAS/ETWS support in Rel-16 ?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree** | **Comments** |
| Qualcomm | Yes |  |
| Intel | Yes |  |
| Ericsson | Yes |  |
| Nokia | YES for emergency NO for CMAS/ETWS | Our view is that SA1 LS does no exclude that a SNPN cell provides CMAS/ETWS for UEs camping on that cell. Forbidding CMAS/ETWS in SNPN cells will be an artificial restriction, and it will require additional specification work in 38.331 to introduce this restriction. We think that the consequence of the SA1 LS is that a UE shall not select an SNPN-only cell as an acceptable cell. This should be specified in 38.304 (see 3c). |
| CATT | Yes |  |
| Huawei | Yes |  |

**Question 3b: Is there a need to capture any restriction in 38.304 regarding SNPN support for emergency calling and CMAS/ETWS?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree** | **Comments** |
| Qualcomm | Soft yes | Will be good to capture a restriction on SNPNs |
| Intel | Yes | For emergency services in limited service, there is already a IMS flag to prevent the UE to camp on an acceptable cell for emergency services. Hence there is no need for this purpose.  For CMAS/ETWS, the acceptable cell definition needs to change to prevent a UE camping on an acceptable cell for CMAS/ETWS |
| Ericsson | No strong view | We understand the question as: "should we clarify in 304 that emergency/PWS is not supported in SNPNs?" We don’t have a strong view on this. Perhaps this could be captured in 300. |
| Nokia | Yes | Agree with QC |
| CATT |  | Agree with Ericsson, capture it in 38.300 will be more appropriate |
| Huawei | No | Agree with Ericsson/CATT to capture it in 38.300.  Currently there is “Emergency services are not supported in SNPN.” in 38.300, and CMAS/ETWS can be captured alongside.  With that, we think it is clear that SNPN cells cannot be viewed as acceptable cell according to the definition in 38.304.  **acceptable cell:**  An "acceptable cell" is a cell on which the UE may camp to obtain limited service (originate emergency calls and receive ETWS and CMAS notifications). |

**Question 3c: If yes for 2.3b, should the definition of acceptable cell be modified to exclude SNPN-only cells?**

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| --- | --- | --- |
| **Company** | **Agree** | **If not agreeing, please provide alternative changes (i.e. other than modifying definition of acceptable cell, what spec change should be considered)** |
| Qualcomm | Soft yes |  |
| Intel | Yes | Agree with the rapporteur. Just need to change the acceptable cell definition to exclude SNPN for PWS |
| Ericsson | No | It seems we are here trying to ensure that an SNPN-UE does not get stuck on a SNPN cell which is only "acceptable" for this UE, e.g. the UE does not have access to that SNPN?  We assume it would be pretty bad if the UE finds an acceptable cell, which normally is for the purpose of at least getting emergency call support/PWS, but when the SNPN-cells do not even support those services.  If our understanding is correct, we think the easiest is if the UE just changes access mode to normal access mode (instead of SNPN-access mode) and in our understanding, the UE will then end up selecting an non-SNPN cell where at least emergency call and PWS is supported.  An alternative way to avoid that UE get stuck on an SNPN cell which is only acceptable (and without emergency or PWS) is to allow that while in SNPN access mode, when no normal SNPN service is available the access mode (SNPN AM) allows that UE search for and camp on an acceptable PLMN cell to obtain limited service only. This could also apply, irrespective of if emergency calls and/or PWS are introduced/supported in SNPNs in the future. Drawback is that it would involve more WGs though. |
| Nokia | Yes |  |
| CATT |  | We think reply LS from SA1 has no impact to the definition of acceptable cell, but it will impact the behaviour of UE in SNPN access mode, UE in SNPN access mode should not try to search for an acceptable cell and not try to enter any cell state , because no any limited services provided in SNPN and it is not allowed for UE in SNPN access mode to select a PLMN cell. As Quoted from 23.501,clause 5.30.2.3,  “When the UE is set to operate in SNPN access mode the UE only selects and registers with SNPNs over Uu as described in clause 5.30.2.4.” |

**Question 3d: Is there a need to inform CT1 of the changes in RAN2 spec**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree** | **Comments** |
| Qualcomm | Yes | If RAN2 changes the definition of acceptable cell, it is good to inform CT1. |
| Intel | No | The SA1 LS is sent to CT1 (in the cc.) as well. If there is any CT1 specification needed, they can do so themselves without a RAN2 LS to them. |
| Ericsson | - | We need to sort out if/how we address this before we decide on what LSs to send. |
| Nokia | No | Same view as Intel |
| CATT | Yes | If we can agree that UE in SNPN access mode should not enter any cell state, we may need to inform CT1, as CT1 has specified that UE in SNPN access mode may enter a limited service state. The following sentences in 23.122 may need to modify to align with RAN2.  “If there were one or more SNPNs which were available, allowable, and identified by an SNPN identity in an entry of the "list of subscriber data" in the ME but an LR failure made registration on those SNPNs unsuccessful, the MS selects one of those SNPNs again and enters a limited service state.” |
| Huawei | No |  |

### 3.1 Background information and rapporteur proposal.

Please see the following four quotations from 38.304 and 23.122, which lead to the following conclusions

1. Acceptable cell definition does not exclude SNPNs
2. Any cell selection state only mentions PLMNs (i.e. it excludes SNPNs)
3. CT1 spec mentioned the possibility of UE in SNPN AM camping on an acceptable cell

To improve specification, clarify, rapporteur proposal is to:

* Modify the acceptable cell definition to exclude SNPN-only cells
* Inform CT1 that camping in limited service state should not be considered for SNPNs

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| **(38.304) acceptable cell:**  An "acceptable cell" is a cell on which the UE may camp to obtain limited service (originate emergency calls and receive ETWS and CMAS notifications). Such a cell shall fulfil the following requirements, which is the minimum set of requirements to initiate an emergency call and to receive ETWS and CMAS notification in an NR network:  - The cell is not barred, see clause 5.3.1;  - The cell selection criteria are fulfilled, see clause 5.2.3.2. |

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| 5.2.7 (38.304) Any Cell Selection state This state is applicable for RRC\_IDLE and RRC\_INACTIVE state. In this state, the UE shall perform cell selection process to find a suitable cell. If the cell selection process fails to find a suitable cell after a complete scan of all RATs and all frequency bands supported by the UE, the UE shall attempt to find an acceptable cell of any PLMN to camp on, trying all RATs that are supported by the UE and searching first for a high-quality cell, as defined in clause 5.1.1.2.  The UE, which is not camped on any cell, shall stay in this state. |

|  |
| --- |
| 4.9.3.1.1 (23.122) Automatic SNPN selection mode procedure The MS selects another SNPN, if available, allowable, and identified by an SNPN identity in an entry of the "list of subscriber data" in the ME. If more than one SNPN are available, allowable, and each of them is identified by an SNPN identity in an entry of the "list of subscriber data" in the ME, the MS shall select one of those SNPNs in MS implementation specific order.  The MS shall limit its search for the SNPN to the NG-RAN access technology.  Once the MS selects the SNPN, the MS attempts registrations on the selected SNPN using the NG-RAN access technology, the subscriber identifier and the credentials from an entry of the "list of subscriber data" with the SNPN identity matching the selected SNPN.  If successful registration is achieved, the MS indicates the selected SNPN.  If registration cannot be achieved because no SNPNs are available, allowable, and identified by an SNPN identity in an entry of the "list of subscriber data" in the ME, the MS indicates "no service" to the user, waits until a new SNPN is available, allowable, and identified by an SNPN identity in an entry of the "list of subscriber data" in the ME and then repeats the procedure.  If there were one or more SNPNs which were available, allowable, and identified by an SNPN identity in an entry of the "list of subscriber data" in the ME but an LR failure made registration on those SNPNs unsuccessful, the MS selects one of those SNPNs again and enters a limited service state. |

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| 4.9.3.1.2 Manual SNPN selection mode procedure The MS indicates to the user one or more SNPNs, which are available and each of them is identified by an SNPN identity in an entry of the "list of subscriber data" in the ME. Additionally, for each of the indicated SNPNs, the MS may optionally display a human readable name for the SNPN. This includes SNPNs in the list of "permanently forbidden SNPNs", and the list of "temporarily forbidden SNPNs". The order in which those SNPNs are indicated is MS implementation specific.  Editor's note [Vertical\_LAN; CR#0503]: Obtaining human-readable name for SNPN is FFS  The MS shall limit its search for the SNPN to the NG-RAN access technology.  The user may select his desired SNPN and the MS then initiates registration on this SNPN using the NG-RAN access technology, the subscriber identifier and the credentials from an entry of the "list of subscriber data", with the SNPN identity matching the selected SNPN (this may take place at any time during the presentation of SNPNs).  Once the MS has registered on an SNPN selected by the user, the MS shall not automatically register on a different SNPN unless the user selects automatic SNPN selection mode.  NOTE: Emergency services are not supported in SNPN access mode.  If the user does not select an SNPN, the selected SNPN shall be the one that was selected before the SNPN selection procedure started. If no such SNPN was selected or that SNPN is no longer available, then the MS shall attempt to camp on any acceptable cell and enter the limited service state. |

# 4. Open issues from previous email discussion

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

The paper from CATT (R2-2004522) raises the following issue of need for changes in 38.304 and CT1 specificaitons.

*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.*

In the online session, RAN2 decided the following, which suggests that there is no need to create different modes in AS for manual selection.

* RAN2 assumes that the manually selected CAG ID has no impact to cell reselection. (This requires no change in the existing draft CRs.)

**Question 4: Is any change to 38.304 needed to capture the exchange of HRNN between AS and NAS, or to define manual/automatic selection modes in AS? If yes, please provide area of change and if possible a text proposal.**

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| --- | --- | --- |
| **Company** | **Change needed?** | **Comments** |
| Qualcomm | No | Please refer to the text quoted in Section 2.1 of this document. It is already clear that during manual selection the UE can provide HRNN to NAS. Outside of manual selection, there is no requirement in the spec to provide HRNN from AS to NAS. |
| Intel | No |  |
| Ericsson | Not to 304, but to 331? | .. we would assume that AS should read the HRNN SIB only when NAS needs them (which would likely happen only rarely). Hence a NAS-> indication could be good for when NAS needs the HRNN.  This is however to reduce UE power consumption and something we would expect that UE vendors would want to have. If UE vendors are not interested in this, we are OK to live without such an indication. |
| Nokia | No |  |
| CATT | Yes | Clause 4.2(Table 4.2-1) in 38.304 has specified the behaviour of NAS for PLMN slection, such as” Maintain a list of equivalent PLMN identities”, and “To support manual CAG selection, provide request to search for available CAGs” .But it does not specify any information will be provided by NAS to enable AS to report HRNN only in manual CAG/SNPN selection mode. from our view it should be reflected in Table 4.2-1  But we also share the same view as Ericsson, If UE vendors are not interested in this, we are also OK to live without such an indication |
| Huawei | No |  |

**Comments from first round of email discussion provided below for reference:**

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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. |