3GPP TSG-RAN WG2 Meeting #109bis R2-20xxxxx

emeeting, ??April 2020

**Agenda item: x.x.x**

**Source: Nokia (Rapporteur)**

**Title: Report from email discussion [Post109e#18][PRN] Remaining open issues**

**WID/SID: WI\_CODE - Release XX**

**Document for: Discussion and Decision**

# 1 Introduction

This document is the report about the following email discussion

* [Post109e#18][PRN] Remaining open issues (Nokia)

Intended outcome: Discuss and resolve the remaining PRN open issues (Deadline 2020-04-08 23:59 Pacific Time).

Intended outcome 2: Open Issues list with RRC impact (April 1)

Phase 1: This phase is to collect open issues (outcome 2). Deadline is April 1.

Phase 2: This phase is to conclude the discussions on the solution of the open issues. Deadline: 2020-04-08 23:59 Pacific Time

# 2 List of Open Issues

The following table lists the open issues and clarifies their impacts for RRC specifications.

The following types of handling are proposed for topics that has 38.331 impacts:

* TYPE A: No technical discussion is needed, to be handled during ASN.1 review.
* TYPE B: Work item specific technical discussion is needed to make a decision, but the actual change is small enough to be introduced during ASN.1 review.
* TYPE C: Work item specific technical discussion is needed, and the actual changes are captured in the work item specific running RRC CR.

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|  | Open Issue | Impacted spec(s) | Details on RRC impacts (if any) | type |
| **1** | Emergency sessions from CAG-only cell with non-NPN-capable Rel-16 UEs.  Whether a Non-NPN-capable Rel-16 UE treats a cell with cellReservedForOtherUse=true as acceptable cell or as barred cell. | 38.304  38.331 | Definition of NPN-only cell, and handling of NPN only cells (number of impacts) | C |
| **2** | Role of manually selected CAG ID (pending response to [R2-2002417](http://3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e/Docs/R2-2002417.zip))  FFS if the UE shall prioritize it during cell reselection  FFS if it has a role in Connected mode mobility  FFS if the UE should send it during Resume procedure | 38.304 |  |  |
| **3** | Whether it is sufficient to broadcast the Unified Access Control (UAC) parameters per PLMN (assuming that using the operator-defined access categories with access category criteria type set to the S-NSSAI used for PNI-NPN is sufficient to provide CAG specific UAC) or there is need to enable the broadcast of CAG ID specific configuration of UAC parameters? (pending response to [R2-2002417](http://3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e/Docs/R2-2002417.zip)) | 38.331  38.304? | No ASN.1 change, but changes in the description of UAC procedure | C |
| **4** | In PLMN selection in Table 4.2-1 of 38.304: 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 | 38.304 |  |  |
| **5** | In clause 4.5 of 38.304: FFS whether the above needs to be updated to consider manually selected CAG ID | 38.304 |  |  |
| **6** | The UE behaviour in SNPN AM in licensed bands is FFS when 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 | 38.304 |  |  |
| **7** | How to document the following agreement: *“For unlicensed spectrum and for a UE with non-empty allowed CAG list, 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 selected/registered/equivalent PLMN, the UE with no empty allowed CAG list shall behave according to NR-U agreement.”* | 38.304 |  |  |
| **8** | The UE behaviour in unlicensed band is FFS when the cell belongs to the correct operator but it’s not a CAG member cell. | 38.304 |  |  |
| **9** | FFS whether PCI values for CAGs are signalled per PLMN per frequency or no new ASN.1 IEs are introduced in Rel-16 for signalling of PCI values for CAGs | 38.304  38.331 | SIB extension may be needed | C |
| **10** | Whether the selected PLMN-Identity can refer to a NPN in the description of RRCResumeComplete messages and the relevant procedures | 38.331 | No ASN.1 change, but changes may be needed in the description of RRC resume | C |
| **11** | It is FFS if all Rel-16 UEs are required to be able to report the npn-IdentityInfoList | 38.331 | No ASN.1 change, but changes in description | C |
| **12** | A definition of network indexing for NPNs is FFS | 38.331 | No ASN.1 change, but changes in the description | C |
| **13** | The size of NID is to be aligned with latest CT4 agreements | 38.331 | ASN.1 impact within *NPN-Identity* definition | A |
| **14** | Whether *trackingAreaCode* is optional or mandatory within *NPN-IdentityInfoList* | 38.331 | ASN.1 impact within *NPN-IdentityInfoList* | B |
| **15** | Maximum Length of HRNNs *(maxHRNN-Len-r16* is FFS) | 38.331 | ASN.1 impact within 6.4 | B |
| **16** | UE capabilities | 38.306 |  |  |
| **17** | Manual CAG selection indication (ongoing CT1 discussion) | 38.331 | ASN.1 impact in SIB1 | C |
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# 3 Discussion of the open issues

This section is to discuss and find proposals for the open issues listed in section 2.

## 3.1 Issue 1: Emergency sessions from CAG-only cell for non-NPN Rel-16 UEs

**Open issue description:** Emergency sessions from CAG-only cell with non-NPN-capable Rel-16 UEs. Whether a Non-NPN-capable Rel-16 UE treats a cell with cellReservedForOtherUse=true as acceptable cell or as barred cell.

Earlier agreements in this area:

* At RAN2#107 as an answer to LS in S2-1906814   
  (E2: SA2 could not conclude whether Rel-16 UEs not supporting the CAG feature should be allowed to camp in a CAG cell in limited service state. There is no SA2 consensus to support this scenario.)

2 (Regarding question E2) Rel-16 UEs not supporting the CAG feature can camp on a CAG cell as an acceptable cell to obtain limited service

* At RAN#108

1. Access attempts by Rel-15 UEs for emergency services on CAG cell could be allowed based on operator's preference
2. cellReservedForOtherUse is used to prevent Rel-15 UEs to access the cell.

3 A CAG cell which is not considered as suitable can be an acceptable cell for a Rel-16 UE not in SNPN AM.

* AT RAN#109

1. Clarify in Stage 2 that a Rel-15 UE considers a CAG-only cell as acceptable cell if the cell is not barred to Rel-15 UEs, and if a PLMN ID without CAG list is broadcast and that PLMN is "not allowed" (e.g. by use of PLMN ID for which all registration attempts are rejected such that the PLMN ID becomes not allowed). Discuss wording as part of the Stage 2 discussion

At RAN2#109 there was an email ([AT109e][117][PRN] Cell Selection and selection aspects) discussion with the following question without a conclusion:

**Question 3c: For non-CAG-capable Rel-16 UE, can emergency calls in a CAG-only cell be supported by setting *cellReservedForOtherUse=true* and allowing the Rel-16 UEs to override this flag and access the PLMNs in the NPN list in limited service state?**

**Question 1:** As the decision on the above question requires technical discussion, companies are requested to provide their short technical views on this issue.

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| **Company** | **Technical view** |
| Ericsson | Disagree. We normally do not require UEs to parse and act on SI for features they do not support. So a non-CAG-capable Rel-16 UEs should behave as a Rel-15 UE wrt the *cellReservedForOtherUse* flag. |
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**Summary**

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## 3.2 Issue 2: Role of manually selected CAG ID

**Open issue description:** What is the role of the manually selected CAG ID; only used during initial cell selection or it is used later during cell reselection and connected mode mobility.

* FFS if the UE shall prioritize it during cell reselection
* FFS if it has a role in Connected mode mobility
* FFS if the UE should send it during Resume procedure

An LS in [R2-2002417](http://3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e/Docs/R2-2002417.zip) was sent with the following questions:

**Question 1.1; TO: SA2; CC: CT1:**   
If a UE performs manual CAG selection and a successful registration, then whether the UE shall stay on cells supporting the manually selected CAG ID in RRC\_CONNECTED state especially in the case when after registration the Allowed CAG List in the UE does not contain the manually selected CAG ID?

**Question 1.2; TO: SA2; CC: CT1**Shall a UE prioritize for cell reselection the cells supporting the manually selected CAG ID over other suitable cells that do not support the manually selected CAG ID after a successful registration?

**Question 1.3; TO: CT1:**It is RAN2 understanding that the UE NAS provide the manually selected CAG ID to UE AS. Is the manually selected CAG ID provided as part of the allowed CAG list, or as a separate element?

**It is proposed to postpone the discussion of this topic until responses are received from other WGs.**

## 3.3 Issue 3: Granularity of advertised UAC parameters

**Open issue description:** Whether it is sufficient to broadcast the Unified Access Control (UAC) parameters per PLMN (assuming that using the operator-defined access categories with access category criteria type set to the S-NSSAI used for PNI-NPN is sufficient to provide CAG specific UAC) or there is need to enable the broadcast of CAG ID specific configuration of UAC parameters?

An LS in [R2-2002417](http://3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e/Docs/R2-2002417.zip) was sent with the following questions:

**Question 2.1; TO: SA1:**Is there a requirement to enable PNI-NPN (CAG ID) specific access control in cells that are shared among PNI-NPNs belonging to the same PLMN?

**Question 2.2; TO: CT1, SA1:**If there is a requirement to enable PNI-NPN (CAG ID) specific access control in cells that are shared among PNI-NPNs belonging to the same PLMN, then is it sufficient to broadcast the Unified Access Control (UAC) parameters per PLMN (assuming that using the operator-defined access categories with access category criteria type set to the S-NSSAI used for PNI-NPN is sufficient to provide CAG specific UAC) or there is need to enable the broadcast of CAG ID specific configuration of UAC parameters?

**It is proposed to postpone the discussion of this topic until responses are received from other WGs.**

## 3.4 Issue 4: EN in In PLMN selection in Table 4.2-1 of 38.304

**Open issue description:** In PLMN selection in Table 4.2-1 of 38.304: 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

Table 4.2-1 of 38.304 on PLMN selection contains the followings:

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| 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)  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”  To support manual SNPN selection, report available SNPNs together with associated HRNNs (if available) to NAS on request from NAS. |

**Question 4:** Do you agree to capture the condition that the cell is “not reserved for operator use for UEs not belonging to AC 11 or 15 in the above table.

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| **Company** | **Answer** | **Comment** |
| Ericsson | No | Disagree. The text in the table says “select any acceptable or suitable cell belonging to the selected CAG”. But if   * the cell is reserved for operator use; and * the UE does not belong to AC 11 or 15   the cell would be barred according to section 5.3.1, and hence it would be neither suitable nor acceptable. So the criteria seems to already be covered by the existing text. |
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**Summary**

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## 3.5 Issue 5: Manual CAG ID considerations in 4.5 of 38.304

**Open issue description:** In clause 4.5 of 38.304: FFS whether the above needs to be updated to consider manually selected CAG ID.

**As the use of manually selected CAG ID is not clear (see issue 2), it is proposed to postpone the discussion until issue 2 is resolved.**

## 3.6 Issue 6: UE behaviour in SNPN AM in licensed bands

**Open issue description:** The UE behaviour in SNPN AM in licensed bands is FFS when 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

At RAN2#109 there was an email ([AT109e][117][PRN] Cell Selection and selection aspects) discussion with the following question without a conclusion:

**Question 4b: Do you agree with the following for licensed spectrum:**

**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 as candidate for cell reselection but should continue to consider other cells on the same frequency for cell reselection.**

**Question 6:** As the decision on the above question requires technical discussion, companies are requested to provide their short technical views on this issue.

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| **Company** | **Technical view** |
| Ericsson | Disagree. It would be better to follow the same behaviour as we have for PLMNs, i.e. the UE does not consider any cell on the frequency for 300s if the highest ranked or best cell is unsuitable. Deviating from this principle would result in that the UE camps on a non-strongest cell within a frequency which would cause inter-cell interference and a reduction in data rate for the UE. |
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**Summary**

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## 3.7 Issue 7: Documentation of NR-U agreements for CAG case

**Open issue description:** How to document the following agreement: *“For unlicensed spectrum and for a UE with non-empty allowed CAG list, 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 selected/registered/equivalent PLMN, the UE with no empty allowed CAG list shall behave according to NR-U agreement.”*

TBA when the new version of 38.304 is available

## 3.8 Issue 8: UE behaviour in unlicensed band with non-CAG member cell

**Open issue description:** The UE behaviour in unlicensed band is FFS when the cell belongs to the correct operator but it’s not a CAG member cell.

At RAN2#109 the following was agreed:

For unlicensed spectrum and for a UE with non-empty allowed CAG list, 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 selected/registered/equivalent PLMN, the UE with no empty allowed CAG list shall behave according to NR-U agreement. FFS how to handle the case when the cell belongs to the correct operator but it’s not a CAG member cell. (We might come back to this if serious concerns / problems are found with this)

The relevant NR-U agreement is captured in the following way in 38.304:

“For operation with shared spectrum channel access, if the second highest ranked cell on this frequency also does not have a PLMN being equivalent to the registered PLMN, the UE may consider this frequency to be the lowest priority for a maximum of 300 seconds.”

**Question 8:** Do you agree that in unlicensed band to handle case when the highest ranked cell or best cell is not suitable due belonging to the correct operator, but it is not a CAG member cell in the same way as the cell does not belong to the correct operator in unlicensed band?

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| **Company** | **Answer** | **Comment** |
| Ericsson | Yes | For unlicensed bands we want to ensure that the UE camps on the strongest cell among the cells that belongs to the same operator to reduce inter-cell interference. Basically, the behaviour should be the same as for licensed bands if we imagine that the cells belonging to other operators on the frequency are removed. |
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**Summary**

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## 3.9 Issue 9: PCI values for CAGs

**Open issue description:** FFS whether PCI values for CAGs are signalled per PLMN per frequency or no new ASN.1 IEs are introduced in Rel-16 for signalling of PCI values for CAGs

At RAN2#109 there was an email ([AT109e][117][PRN] Cell Selection and selection aspects) discussion with the following question without a conclusion:

**Question 1: Please indicate preferred option for signalling of PCI range for CAGs:**

1. **Signal PCI range(s) for all CAGs. Number of ranges FFS.**
2. **Signal PCI range(s) per PLMN per frequency. Number of ranges FFS.**
3. **Signal PCI range(s) per CAG ID per frequency. Number of ranges FFS.**
4. **CAG PCI range is introduced as a list of blacklisted/whitelisted cells (no changes required to ASN.1 and NR-U CRs are the baseline).**

**Question 9:** As the decision on the above options requires technical discussion, companies are requested to provide their short technical views on this issue.

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| **Company** | **Technical view** |
| Ericsson | In our view there is very limited gain of broadcasting PCI ranges so we should not introduce a complex solution. Option 4 seems to be good enough. |
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**Summary**

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## 3.10 Issue 10: Selected PLMN-Identity in RRCResumeComplete

**Open issue description:** Whether the selected PLMN-Identity can refer to a NPN in the description of RRCResumeComplete messages and the relevant procedures

According to clause 5.3.13.4 the selected PLMN-Identity may need to added into *RRCResumeComplete*

1> set the content of the of *RRCResumeComplete* message as follows:

2> if the upper layer provides NAS PDU, set the *dedicatedNAS-Message* to include the information received from upper layers;

2> if the upper layer provides a PLMN, set the *selectedPLMN-Identity* to PLMN selected by upper layers (TS 24.501 [23]) from the PLMN(s) included in the *plmn-IdentityList* in *SIB1;*

**Question 10a:** Do you see a case when the selected SNPN ID should be added to the *RRCResumeComplete* message?

**Question 10b:** Do you see a case when the selected CAG ID should be added to the *RRCResumeComplete* message?

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| **Company** | **Answer 10a** | **Answer 10b** | **Comment** |
| Ericsspn | No | Yes | For SNPN: Equivalent SNPNs not supported in Rel-16 so there is no need to indicate SNPN ID during resume.  For CAG: The UE may resume in a cell belonging to an equivalent PLMN so the PLMN ID may need to be indicated. |
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**Summary**

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## 3.11 Issue 11: Optionality to support reporting about the npn-IdentityInfoList

**Open issue description:** It is FFS if all Rel-16 are required to be able to report the *npn-IdentityInfoList*

At RAN2#109e the following was agreed

4.1: Extend the current measurement reporting procedures to include NPN information to support ANR. (It is FFS if it is mandatory for all Rel-16 UEs to support it.)

4.2: The CAG ID/SNPN NID information shall be added into the CGI-InfoNR. (It is FFS if it is mandatory for all Rel-16 UEs to support it.)

**Question 11:** Which option do you prefer?

* Option A: Reporting about the *npn-IdentityInfoList* is mandatory for all Rel-16 UEs
* Option B: Reporting about the *npn-IdentityInfoList* is mandatory for all NPN-capable UEs, but optional for non-NPN capable UEs (separate capability indication)
* Option C: Reporting about the *npn-IdentityInfoList* is mandatory for all NPN-capable UEs, and not supported by non-NPN capable UEs

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| **Company** | **Answer** | **Comment** |
| Ericsson | B or C | Same comment as for Q1 (support of emergency calls in NPN-only cells). We normally do not require UEs to parse or act on SI for features which they don’t support.  We are not sure we understand the difference between option B and C correctly. By separate capability do you mean that we will introduce a UE capability for the support of NPN (this is most likely needed) or do you mean that we will introduce a UE capability for the support of CGI reporting for NPN (this is probably not needed)? |
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**Summary**

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## 3.12 Issue 12: Network indexing for NPNs

**Open issue description:** A definition of network indexing for NPNs is FFS

In RRC signalling PLMN index is used to optimize RRC signalling. PLMN index defined in the following way:

The PLMN index is defined as *b1+b2+…+b(n-1)+i* for the PLMN included at the *n*-th entry of *PLMN-IdentityInfoList* and the *i*-th entry of its corresponding *PLMN-IdentityInfo*, where *b(j)* is the number of *PLMN-Identity* entries in each *PLMN-IdentityInfo*, respectively, the use of the PLMNs

At RAN2#190e it was agreed to introduce NPN indexing in a similar way, and the followings were agreed:

2.1 There is no need to create any order between SNPNs and PNI-NPNs during the indexing.

* 1. For cells shared between PLMNs and NPNs, NPN capable UEs use the first PLMN ID in the Rel-15 PLMN list.

3.1 The selectedPLMN-Identity can refer to a NPN (a SNPN or a PNI-NPN) or set of PNI-NPNs having the same PLMN ID (in case CAG ID is not sent in the RRC message) in the description of RRCSetupComplete message and the relevant procedures.

However, the details of NPN indexing have been left open, more specifically it is open whether PNI-NPNs belonging to the same PLMN will have separate index or not.

The current specification only contains the following:

The NPN index is defined as B+FFS, where B is the index used for the last PLMN in the *PLMNIdentittyInfoList*. In NPN-only cells B is considered 0.

**Question 12:** Which option do you prefer?

* Option A: PNI-NPNs belonging to the same PLMN have a common index value
* Option B: All PNI-NPNs have its own index value

Note that Option A makes very cumbersome the support of broadcasting UAC parameters per PNI-NPN, therefore the selection of Option A can only happen after an agreement on Issue 3.

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| **Company** | **Answer** | **Comment** |
| Ericsson | Option A | We only need to indicate the PLMN ID. As the rapporteur mentioned though the question is dependent on the outcome of issue 3. |
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**Summary**

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## 3.13 Issue 13: Size of NID

**Open issue description:** The size of NID is to be aligned with latest CT4 agreements

CT4 agreed that NID size is 44 bits ([**C4-200337**](http://www.3gpp.org/ftp/tsg_ct/WG4_protocollars_ex-CN4/TSGCT4_96e_meeting/Docs/C4-200337.zip)).

**Question 13:** Do you agree to follow CT4 agreements (NID size is 44 bits)?

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| **Company** | **Answer** | **Comment** |
| Ericsson | Yes |  |
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**Summary**

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## 3.14 Issue 14: Optionality of TAC in NPN-IdentityInfoList

**Open issue description:** Whether *trackingAreaCode* is optional or mandatory within *NPN-IdentityInfoList*

The TAC is not needed for cells that are only used as secondary cells; therefore, the TAC is optional in *PLMN-IdentityInfoList*. It was agreed that EN-DC is not supported with NPNs. It is not clear whether an optional TAC is beneficial for NR-DC that is supported with NPNs.

**Question 14:** Do you agree that *trackingAreaCode* is optional or mandatory within *NPN-IdentityInfoList*?

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| **Company** | **Answer** | **Comment** |
| Ericsson | Mandatory | Don’t see the need to have it optional considering that NSA operation (EN-DC) is not supported for NPNs. |
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**Summary**

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## 3.15 Issue 15: Maximum Length of HRNNs

**Open issue description:** Maximum Length of HRNNs *(maxHRNN-Len-r16* is FFS)

A background information is that the maximum NR SIB size is 2976 bits (31\*12 octets).

**Question 15a:** Do you agree that interpedently from the maximum size all HRNNs shall be fit in a single SIB?

**Question 15b:** Which option do you prefer as the maximum Length of HRNNs

* Option A: 24 octets
* Option B: 32 octets (maximum length of Wi-Fi SSIDs)
* Option C: 48 octets (maximum length of Home eNB name)
* Option D: Other?

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| **Company** | **Answer 15a** | **Answer 15b** | **Comment** |
| Ericsson | Yes | C |  |
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**Summary**

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## 3.16 Issue 16: UE capabilities

**Open issue description:** UE capabilities for NPN support is missing.

## 3.17 Issue 17: Manual CAG selection indication

**Open issue description:** There is an ongoing CT1 discussion that the network should indicate whether it can be selected during manual CAG selection.

**It is proposed to postpone the discussion until CT1 concludes the issue.**

## 3.1X Issue 1X:

**Open issue description:**

# 4 Conclusions