**3GPP TSG-RAN WG2 Meeting #110e R2-20xxxxx**

**Elbonia, 01 – 11 June 2020**

**Agenda item: 6.18.2**

**Source: Nokia (Rapporteur)**

**Title: Report from email discussion [Post109bis-e][934][PRN] Remaining open issues**

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

**Document for: Discussion and Decision**

# 1 Introduction

This document is the report about the following email discussion

* [Post109bis-e][934][PRN] Remaining Open Issues (Nokia)

Scope: Discuss and resolve the remaining PRN open issues.

 Intended outcome: Report, possibly TP

      Deadline: Wednesday May 20th 23.59 PST

# 2 Discussion of the open issues

## 2.1 Issue 1: 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

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

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?
	+ CT1 answer in [C1-202846](https://www.3gpp.org/ftp/tsg_ct/WG1_mm-cc-sm_ex-CN1/TSGC1_123e/Docs/C1-202846.zip)/R2-200????: No
* 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?
	+ CT1 answer in [C1-202846](https://www.3gpp.org/ftp/tsg_ct/WG1_mm-cc-sm_ex-CN1/TSGC1_123e/Docs/C1-202846.zip)/R2-200????: Manually selected CAG ID will be provided as a separate element. Please find the attached CR with the solution. (C1-202912)

**Question 1a: Based on the received answers do you agree that the manually selected CAG ID has no impact to cell reselection?**

**Question 1b: Based on the received answers do you agree that the UE shall select a cell supporting the manually selected CAG ID provided by NAS for initial cell selection?**

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| **Company** | **Answer to Q1a** | **Answer to Q1b** | **Comment** |
| Qualcomm | Yes | Yes |  |
| Nokia | Yes | Yes |  |
| Vodafone | Yes | Yes  |  |
| Ericsson | Yes | See comment | We believe the responses point in the direction indicated by Q1a/b. However, we don’t see the reason why the UE shall select a cell supporting a manually selected CAG ID. It would be good if this can be better explained, as it may create situations when UE is forced to select a bad cell to access a PLMN, when it equally well could have selected a good cell. Note that a CAG ID is an access parameter, not a network ID. |
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## 2.2 Issue 2: 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 be 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;*

The email discussion [Post109e#18][PRN] [R2-2002659] on this this issue had the following conclusion:

* No case has been identified to include SNPN ID to the *RRCResumeComplete* message.
* Companies identified two cases when PNI-NPN ID should be included in *RRCResumeComplete* message:
1. When a UE moves between ePLMNs. In this case the PLMN ID should be indicated to the network in the *RRCResumeComplete*.
2. In case of manual CAG ID selection, the CAG ID may be needed in the *RRCResumeComplete* depending on the reply LS from SA2/CT1.
* The discussion was postponed until responses are received from other WGs as the decision on whether the selected PLMN-Identity can refer to a PNI-NPN in *RRCResumeComplete* message depends on issue 1.

An LS in [R2-2002417](http://3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109_e/Docs/R2-2002417.zip) was sent on manual CAG ID selection and CT1 answers are in [C1-202846](https://www.3gpp.org/ftp/tsg_ct/WG1_mm-cc-sm_ex-CN1/TSGC1_123e/Docs/C1-202846.zip)/R2-200???? (see details in issue 1).

**Question 2a: Do you agree that the SNPN ID is never added to the *RRCResumeComplete*?**

**Question 2b: Based on the received answers in** [**C1-202846**](https://www.3gpp.org/ftp/tsg_ct/WG1_mm-cc-sm_ex-CN1/TSGC1_123e/Docs/C1-202846.zip) **do you agree that the CAG ID is never added to the *RRCResumeComplete*?**

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| **Company** | **Answer to Q2a** | **Answer to Q2b** | **Comment** |
| Qualcomm | Yes | Yes |  |
| Nokia | Yes | Yes |  |
| Vodafone | Yes | Yes  |  |
| Ericsson | Yes | Yes |  |
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## 2.3 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?

* CT1 answer in [C1-202846](https://www.3gpp.org/ftp/tsg_ct/WG1_mm-cc-sm_ex-CN1/TSGC1_123e/Docs/C1-202846.zip)/R2-200????: As this question is dependent on service requirements which do not exist yet, this question can be answered only if and when the service requirements are specified by SA1.

**No discussion is possible before other WGs provide answers.**

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| **Company** | **Comment** |
| Ericsson | Our interpretation is that there exist no requirements on per-CAG UAC-parameters. In absence of such we assume RAN2 should have as working assumption that this is not needed.  |
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## 2.4 Issue 4: 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.

The email discussion [Post109e#18][PRN] [R2-2002659] on this this issue concluded to postpone the discussion/decision of this issue after there is a decision for issue 4.

**Question 4a: Do you agree if it is required to enable the broadcast of CAG ID specific configuration of UAC parameters, then All PNI-NPNs have its own index value?**

**Question 4b: Do you agree if it is not required to enable the broadcast of CAG ID specific configuration of UAC parameters, then PNI-NPNs belonging to the same PLMN have a common index value?**

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| **Company** | **Answer to Q4a** | **Answer to Q4b** | **Comment** |
| Qualcomm | No | Yes | Q4a: Even if UAC is different per CAG ID, the network has access to the UE’s allowed CAG list and can determine if the UE performed access within the UAC configuration, OR if the UE misbehaved. |
| Nokia | Yes | No, see comment | Q4a: If CAG ID specific UAC parameters may be needed then a separate network indexes are needed for all CAG IDs as PLMN index is used in *UAC-BarringPerPLMN*:UAC-BarringPerPLMN ::= SEQUENCE { plmn-IdentityIndex INTEGER (1..maxPLMN), uac-ACBarringListType CHOICE{ uac-ImplicitACBarringList SEQUENCE (SIZE(maxAccessCat-1)) OF UAC-BarringInfoSetIndex, uac-ExplicitACBarringList UAC-BarringPerCatList } OPTIONAL -- Need S}Q4b: CAG ID specific network indexing enables possible future CAG ID specific feature extension. However, PLMN specific network indexing is also acceptable, as at the moment there is no features that mandates CAG ID specific network indexing. |
| Vodafone  | Yes | No  | Q4a: Yes, all PNI-NPN should have their own configuration Q4b: No, this approach is confusing and does not give the operator sufficient graduality or selection of various integrated private networks  |
| Ericsson | - | Yes | As indicated above, our understanding is that, until requirements are added, we can proceed assuming no specific configuration per CAG ID. CT1 response also indicated no such requirement exist. |
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## 2.5 Issue 5: Manual CAG selection indication

**Open issue description:** RAN2 received a LS from CT1 in [R2-2004178](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_109bis-e/Docs/R2-2004178.zip)/C1-202927 asking if a RAN can specify the broadcast of a new indication that the PLMN allows a user to manually select a CAG-ID supported by the CAG cell.

At RAN2#109bis-e a reply LS was sent in R2-2003870 asking guidance from SA1 whether per PLMN or per CAG ID indication is needed.

During the email discussion there was a proposal to use the following ASN.1 encoding if per PLMN indication is needed:

**SOLUTION A**

NPN-Identity-r16 ::= CHOICE {

 pni-npn-r16 SEQUENCE {

 plmn-Identity-r16 PLMN-Identity,

 manualCAGselectionAllowed-r16 BOOLEAN,

 cag-IdentityList-r16 SEQUENCE (SIZE (1..maxNPN-r16)) OF CAG-Identity-r16

 },

 snpn-r16 SEQUENCE {

 plmn-Identity PLMN-Identity,

 nid-List-r16 SEQUENCE (SIZE (1..maxNPN-r16)) OF NID-r16

 }

}

In case of per CAG ID indication is needed the following extension can be used:

**SOLUTION B**

NPN-Identity-r16 ::= CHOICE {

 pni-npn-r16 SEQUENCE {

 plmn-Identity-r16 PLMN-Identity,

 cag-IdentityList-r16 SEQUENCE (SIZE (1..maxNPN-r16)) OF CAG-IdentityInfo-r16

 },

 snpn-r16 SEQUENCE {

 plmn-Identity PLMN-Identity,

 nid-List-r16 SEQUENCE (SIZE (1..maxNPN-r16)) OF NID-r16

 }

}

CAG-IdentityInfo-r16 ::= SEQUENCE {

 CAG-Identity-r16 BIT STRING (SIZE (32)),

 manualCAGselectionAllowed-r16 BOOLEAN

}

**Question 5a: Do you agree with Solution A if per PLMN indication is needed?**

**Question 5b: Do you agree with Solution B if per CAG ID indication is needed?**

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| **Company** | **Answer to Q5a** | **Answer to Q5b** | **Comment** |
| Qualcomm | Yes | Yes | Note that in we need to ensure in field description that UE considers this to apply only to the CAGs outside UE’s allowed list. |
| Nokia | Yes | Yes | Agree with QC |
| Vodafone | Yes | Yes | Agree with QC comments, (unless there is a special arrangement) network decides the allowed CAG list  |
| Ericsson | Yes | Yes | The above ASN.1 needs some modifications though:1. " manualCAGselectionAllowed " -> " manualCAG-selectionAllowed"
2. Instead of "BOOLEAN" for the field manualCAGselectionAllowed we think a "ENUMERATED{true} OPTIONAL" is more in-line with how we usually write this. See for example field " ims-EmergencySupport " in SIB1.

The first field in the IE CAG-IdentityInfo-r16 should be "cag-Identity-r16" instead of "CAG-Identity-r16" |
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## 2.6 Issue 6 (RIL Q006): NEED code for SIB10

**Open issue description (SIB10 in 6.3.1):**

SIB10-r16 ::= SEQUENCE {

 hrnn-List-r16 HRNN-List-r16 OPTIONAL, -- Need R

 lateNonCriticalExtension OCTET STRING OPTIONAL,

 ...

}

**Question 6: Which solution do you think is appropriate for the comment?**

* **Option A:** Use “NEED S” and specify UE behaviour it in 5.2.2.4.11
* **Option B:** No change is needed
* **Option C:** Other (please provide description)

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| **Company** | **Answer** | **Comment** |
| Qualcomm | B (soft) | Need R looks okay. However, we are fine with Option A also. |
| Nokia | B | Option A is acceptable, but not necessary |
| Vodafone | B |  |
| Ericsson | A | The HRNN is only used for Manual selection, hence must not be acquired unless a manual selection procedure is initiated by higher layers. UEs can instead save power. Need S makes sense, and to describe this.  |
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## 2.7 Issue 7 (RIL Z102): Definition of selected PNI-NPN

**Open issue description:** There is the following open RIL in 5.2.2.4.2 Actions upon reception of the SIB1:

1> if the cell is not an NPN-only cell and the *cellAccessRelatedInfo* contains an entry with the *PLMN-Identity* of the selected PLMN:

2> in the remainder of the procedures use *plmn-IdentityList*, *trackingAreaCode*, and *cellIdentity* for the cell as received in the corresponding *PLMN-IdentityInfo* containing the selected PLMN;

1> if the *cellAccessRelatedInfo* contains an entry with the *NPN-Identity* of the selected NPN:

2> in the remainder of the procedures use *npn-IdentityList*, *trackingAreaCode*, and *cellIdentity* for the cell as received in the corresponding *NPN-IdentityInfo* containing the selected NPN;

**Question 7: Which solution do you think is appropriate for the comment?**

* **Option A:** Create a definition for the selected PNI-NPN as proposed (alternative wording proposals are welcome)
* **Option B:** Other (please provide description)

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| **Company** | **Answer** | **Comment** |
| Qualcomm | B | The term “containing the selected SNPN or PLMN” should be used. Given the tranckingAreaCode and cellIdentity are PLMN specific rather than CAG specific, there is no need to define a selected PNI-NPN in this procedure. |
| Nokia | B | The comment is valid, current text is not correct for PNI-NPNs. The problem of option A is that in case of automatic network selection any CAG ID that supported by the cell and is in the allowed CAG ID list can be considered “selected PNI-NPN”.  |
| Vodafone  | B | Agree with Nokia’s comment, there is a room for error in the definition of the PNI-NPN and differentiation should be made between CAG cells, within a PLMN |
| Ericsson | B | Agree with Qualcomm. |
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## 2.8 Issue 8 (RIL Z103): Definition of registered PNI-NPN

**Open issue description:** There is the following open RIL in 5.2.2.4.2 Actions upon reception of the SIB1:

3> if *trackingAreaCode* is not provided for the selected PLMN nor the registered PLMN nor PLMN of the equivalent PLMN list nor the selected NPN nor the registered NPN:

At RAN2#109-e it was agreed that TAC is mandatory for NPN cells:

4. (Proposal 14 from R2-2002659): TAC is “mandatory” within NPN-IdentityInfoList. To be captured into ASN.1 review file as RIL comment (by the rapporteur).

**Question 8: Which solution do you think is appropriate for the comment?**

* **Option A:** Create a definition for the Registered NPN as proposed (alternative wording proposals are welcome)
* **Option B:** Remove the NPN from this bullet point as TAC is mandatory for NPN cells:

3> if trackingAreaCode is not provided for the selected PLMN nor the registered PLMN nor PLMN of the equivalent PLMN list:

* **Option C:** Other (please provide description)

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| **Company** | **Answer** | **Comment** |
| Qualcomm | B |  |
| Nokia | B |  |
| Vodafone | B |  |
| Ericsson | B |  |
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## 2.9 Issue 9 (RIL I902 and I903): Selected PLMN ID in *RRCSetupComplete*

**Open issue description:** There are the following open RIL in 5.3.3.4 Reception of the RRCSetup by the UE:

2> if upper layers selected a PLMN or an SNPN (TS 24.501 [23]):

3> set the *selectedPLMN-Identity* to the PLMN or SNPN selected by upper layers (TS 24.501 [23]) from the PLMN(s) included in the *plmn-IdentityList* or npn-IdentityInfoList in *SIB1*;

Editor's Note: It is FFS how to set the the *selectedPLMN-Identity* when a PNI-NPN is selected.

The following agreement was made at RAN2#109e:

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.

**Question 9a: Which solution do you think is appropriate for the comment?**

* **Option A:** Follow the proposal of the RIL comments:

2> set the *selectedPLMN-Identity* to the PLMN or SNPN selected by upper layers (TS 24.501 [23]) from the PLMN(s) included in the *plmn-IdentityList* or the PLMN(s) or SNPN(s) included in the *npn-IdentityInfoList* in *SIB1*;

* **Option B:** Other (please provide description)

**Question 9b: Do you agree that the Editor’s Note “It is FFS how to set the the selectedPLMN-Identity when a PNI-NPN is selected” can be removed after finding a solution in Question 9a?**

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| **Company** | **Answer to Q9a** | **Answer to Q9b** | **Comment** |
| Qualcomm | A | Yes |  |
| Nokia | A | Yes |  |
| Vodafone  | A | Yes |  |
| Ericsson | A | Yes | Unclear what is meant by “can be removed after finding a solution in Question 9b”…should be 9a? . In any event, if Option A is selected in 9a, we don’t think the FFS is needed. |
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# 3 Conclusions

## 3.1 The following proposals are proposed to be agreed without further discussion:

## 3.2 The following issues are proposed to be discussed further