3GPP TSG-RAN WG2 Meeting #109e R2-2001681

Elbonia, Online, 24 February – 6 March 2020

**Agenda item: 16.8.3**

**Source: Nokia (summary rapporteur)**

**Title: Report from email discussion [118][PRN] Connected mode aspects**

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

**Document for: Discussion**

# 1 Introduction

This document is the report for the following email discussion:

* [AT109e][118][PRN] Connected mode aspects (Nokia)

Scope: Continue the discussion on connected mode aspects, trying to conclude on proposals from [R2-2001674](file:///C:\Data\3GPP\Extracts\R2-2001674%20SummaryPRN-ConnectedMode-v3.docx) not concluded online.

Initial intended outcome:

* + - Initial set of proposals with full consensus (agreeable over email)

Initial intermediate deadline (for companies' feedback): Thursday 2020-02-27 23:59 CET

Initial intermediate deadline (for rapporteur's list of proposals): Friday 2020-02-28 12:00 CET

Proposed agreements not challenged until Monday 2020-03-02 12:00 CET will be declared as agreed by the session chair.

Final intended outcome: summary of the offline discussion in R2-2001681 with:

* + - (Further) set of proposals with full consensus, if any (agreeable over email)
    - Set of proposals with almost full consensus to discuss in the follow up conference call
    - Set of open issues and proposals to postpone to next meeting
    - Open issues that should no longer be pursued

Final deadline (for companies' feedback): Monday 2020-03-02 23:59 CET

Final deadline (for rapporteur's summary): Tuesday 2020-03-03 12:00 CET

# 2 Discussion

## 2.1 SIB procedure related proposals

The proposals of this section are based on the following proposals:

[**R2-2000130**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2000130.zip) **[2]**

Proposal 10: When cellReservedForOtherUse is set to true, UE shall use first network identity (PLMN, SNPN) in the npn-IdentityInfoList instead of in the PLMN-IdentityInfoList. If the first network identity is an SNPN identity, both PLMN and NID shall be used when validating stored SI.

[**R2-2000401**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2000401.zip) **[5]**

Proposal 1: For NPN-only cells the UE shall use first *NPN-Identity* in the *NPN-IdentityInfoList* to check the SIB validity in clause 5.2.2.2.1. It is proposed to adopt the corresponding text proposal of Annex A.1.

Proposal 2: The procedure of clause 5.2.2.4.2 (Actions upon reception of the SIB1) shall be extended with the use of NPN related information and selected NPN identity. It is proposed to adopt the corresponding text proposal of Annex A.2.

[**R2-2001378**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2001378.zip) **[9]**

Proposal 1: For NPN-only sharing case, the first NPN ID is used for the SIB validity check for R16 NPN UEs by default:

* the first NPN ID includes both PLMN ID and NID in case that the SNPN ID is the first one in the NPN list;
* the first NPN ID includes only PLMN ID in case that the CAG ID is the first one in the NPN list.

Proposal 2: For PN and NPN mixed cell, Rel-15 UEs and Rel-16 PN UEs use the first PLMN ID in the Rel-15 PN list for the SIB validity check.

Proposal 3: For PN and NPN mixed cell, NPN UEs can use the first PLMN ID in the Rel-15 PN list or the first NPN ID in the NPN list to perform the SIB validity check.

Proposal 4: For PN and NPN mixed cell, for area specific SIB, the new areascope-R16 is introduced.

* If the areascope-R16 is absent, both Rel-15 and Rel-16 UEs use the first PLMN ID in the Rel-15 PN list for the SIB validity check;
* If the areascope is absent and the areascope-R16 is set to “TRUE”, the Rel-16 UEs use the first NPN ID for the SIB validity check.

**During the discussion of R2-2001674 Summary of [PRN] Connected mode aspects) the following relevant agreements were made:**

* For cells shared between PLMNs and NPNs, non-NPN capable UEs use the first PLMN ID in the Rel-15 PLMN list for the SIB validity check.

### 2.1.1 Proposals to be commented

**Q1.1 Do you agree with the following proposal:**For NPN-only cells, the first NPN ID (PLMN ID and NID or PLMN ID and CAG ID) is used for the SIB validity check by NPN capable UEs.

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**Summary:** TBA

**Proposal:** TBA

**Q1.2 Which option do you prefer:**For cells shared between PLMNs and NPNs, NPN capable UEs use

* Option A: the first PLMN ID in the Rel-15 PLMN list
* Option B: the first NPN ID in the NPN list to perform the SIB validity check.

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**Summary:** TBA

**Proposal:** TBA

## 2.2 Network indexing related proposals

The proposals of this section are based on the following proposals:

[**R2-2000130**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2000130.zip) **[2]**

Proposal 2 : To index NPN’s, build on the existing plmn-IdentityIndex to avoid changes other than in SIB1.

Proposal 3 : In sharing scenarios, the order of low to high index values shall be PLMN (lowest index values)– CAG/PNI-NPN – NID/SNPN (highest index values)

Proposal 4: Agree a definition of CAG-index and NID index such that: CAG index = PLMN-index + x in the xth cag-IdentityList NID index = PLMN-index+CAG-index+ N1-N2+…+N(n-1) + p, for the NID in position p in the nth nid-List where N(s) is the number of NIDs in each nid-List respectively

Proposal 5: Add a condition that when cellReservedForOtherUse is set to true, generating an NPN-index (CAG index, NID index) shall count the PLMN-index part as zero

[**R2-2000400**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2000400.zip) **[4]**

Proposal 3.1: It is proposed to extend the PLMN indexing to NPNs and remove the following Editor’s Note:

Editor's Note: A definition of network indexing for NPNs is FFS.

Proposal 3.2: It is proposed to use the following indexing mechanism for NPNs:

The NPN index is defined as B+c1+c2+…+c(n-1)+d1+d2+…+d(m-1)+i for the NPN identity included in the n-th entry of NPN-IdentityInfoList and in the m-th entry of NPN-Identitylist within that NPN-IdentityInfoList entry, and the i-th entry of its corresponding NPN-Identity, where B is the index used for the last PLMN in the PLMNIdentittyInfoList, c(j) is the number of NPN-Identity entries in the j-th NPN-IdentityInfoList entry, and d(k) is the number NPN-Identity entries in the k-th NPN-IdentityList entry within the nth NPN-IdentityInfoList entry. In NPN-only cells B is considered 0.

**[R2-2001169](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2001169.zip) [6]**

Proposal#3: The same network indexing mechanism (i.e. the network indexing always starts from the Rel-15 list to the net list containing the CAGID and SNPNID) should be applied to selectedPLMN-Identity in the RRCSetupComplete message.

[**R2-2001376**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2001376.zip) **[7]**

Proposal 2: RAN2 to consider SNPN specific UAC scheme by extending the index of plmn-IdentityIndex IE to indicate the related PLMN ID and NID across the npn-IdentityInfoList fields included in SIB1.

**[R2-2001377](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2001377.zip) [8]**

Proposal 1: RAN2 to discuss the following network indexing mechanism:

* Option 1: CAG is considered as a separate network when indexing. When including the selected network in MSG5, UE only considers the PLMN part.
* Option 2: CAG is not considered as a separate network when indexing. The public list (legacy list) index values are reused if same PLMN occur together with CAG IDs in the NPN list. An indication is added to MSG5 to inform the gNB whether UE is accessing via PLMN or CAG.

**During the discussion of R2-2001674 Summary of [PRN] Connected mode aspects) the following relevant agreements were made:**

* To index NPNs, build on the existing plmn-IdentityIndex (to avoid ASN.1 changes other than in SIB1).
* In RAN sharing scenarios, the lowest index values belong to the PLMNs (using legacy indexing) and the highest index values belong to NPNs.
* Add a condition that NPN-only cell generating NPN-indexes (for PNI-NPNs and SNPNs) shall count the PLMN-index part as zero.
* There is no need to include CAG ID in RRCResumeComplete message for UE in automatic CAG selection mode.

### 2.2.1 Proposals to be commented

**Q2.1 Do you agree with the following proposal**There is need to create any order between SNPNs and PNI-NPNs during the indexing.

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**Summary:** TBA

**Proposal:** TBA

**Q2.2 Which option do you prefer:**PNI-NPNs having the same PLMN ID are considered

* **Option A:** separate networks when indexing (i.e. they will have their own index values).
* **Option B:** single network when indexing (i.e. they will have a common single index value).

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**Summary:** TBA

**Proposal:** TBA

## 2.3 RRC setup and RRC resume related proposals

The proposals of this section are based on the following proposals:

[**R2-2000005**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2000005.zip) **[1]**

Proposal 3: Request SA2 to clarify Whether UE in manual CAG selection mode shall only stay on cell supporting the selected CAG ID in RRC\_CONNECTED state.

Proposal 4: Based on the clarification from SA2, possible options are as following,

Option 1: If answer from SA2 is YES, NG-RAN shall make sure UE in manual CAG selection mode always stay on cell supporting the selected CAG ID. Then a new mechanism should be introduced to signal the selected CAG ID of UE in manual CAG selection mode to NG-RAN.

Option 2: If answer from SA2 is NO, NG-RAN shall make sure UE handover to a cell supporting any CAG ID belonging to the allowed CAG list.

Proposal 5: There is no need to include CAG ID in RRCResumeComplete message for UE in automatic CAG selection mode.

Proposal 6: whether to include the selected CAG ID in RRCResumeComplete message for UE in manual CAG selection mode depends on SA2 clarification requested in 2.3. It may be necessary for the UE in manual CAG selection mode to provide the selected CAG ID in RRCResumeComplete message if it is clarified by SA2 that UE can only stay on Cell supporting the selected CAG ID.

[**R2-2000401**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2000401.zip) **[5]**

Proposal 3a: Extend the procedure description in clause 5.3.3.4 that the selected network can be an NPN. It is proposed to adopt the corresponding text proposal of Annex A.3a.

Proposal 3b: Clarify in the description of *RRCSetupComplete* that the *selectedPLMN-Identity* can refer to a NPN. It is proposed to adopt the corresponding text proposal of Annex A.3b.

Proposal 3c: Extend the procedure description in clause 5.3.13.4 that the selected network can be an NPN. It is proposed to adopt the corresponding text proposal of Annex A.3c.

Proposal 3d: Clarify in the description of *RRCResumComplete* that the *selectedPLMN-Identity* can refer to a NPN. It is proposed to adopt the corresponding text proposal of Annex A.3d.

Proposal 3e: UE shall use the smallest PLMN/NPN index value that refers to PLMN or PNI-NPN that has the same PLMN identity as the selected PNI-NPN in the *RRCSetupComplete*, and *RRCResumComplete* messages interpedently from the selected CAG ID. It is proposed to adopt the corresponding text proposal of Annex A.3a and A3c.

[**R2-2001169**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2001169.zip) **[6]**

Proposal#3: The same network indexing mechanism (i.e. the network indexing always starts from the Rel-15 list to the net list containing the CAGID and SNPNID) should be applied to selectedPLMN-Identity in the RRCSetupComplete message.

[**R2-2001572**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2001572.zip) **[11]**

Proposal 1: Include the index of the selected NPN in the RRCSetupComplete message.

Proposal 2: For CAG, UE includes the index of the PLMN selected by the UE from the *plmn-IdentityList* and the *npn-IdentityInfoList* fields included in SIB1 in the RRCSetupComplete message.

Proposal 3: For SNPN, UE includes the index of the PLMN selected by the UE from the *plmn-IdentityList* and the *npn-IdentityInfoList* fields included in SIB1 and associated index of the NID selected by the UE from the *npn-IdentityInfoList* fields included in SIB1 in the RRCSetupComplete message.

**During the discussion of** [**R2-2001674**](file:///C:\Data\3GPP\Extracts\R2-2001674%20SummaryPRN-ConnectedMode-v3.docx) **(Summary of [PRN] Connected mode aspects) the following relevant agreements were made:**

* There is no need to include CAG ID in RRCResumeComplete message for UE in automatic CAG selection mode.

### 2.3.1 Proposals to be commented

**Q3.1 Do you agree with the following proposal**The *selectedPLMN-Identity* can refer to a 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 RRCResumComplete* messages and the relevant procedures. (Note this agreement is independent from the agreement whether CGA ID is sent or not sent to the network in RRC messages).

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**Summary:** TBA

**Proposal:** TBA

**Q3.2 Do you agree with the following proposal**When there is no need to send the selected CAG ID in the RRC message (this disclaimer intends to make this agreement independent from the agreement whether CGA ID is sent or not sent to the network in some RRC messages), the UE shall use the smallest PLMN/NPN index value that refers to PLMN or PNI-NPN that has the same PLMN identity as the selected PNI-NPN in the *RRCSetupComplete* and *RRCResumComplete* messages interpedently from the selected CAG ID.

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**Summary:** TBA

**Proposal:** TBA

**Q3.3 Do you agree with the following proposal**UE in manual CAG selection mode shall only stay on cell supporting the selected CAG ID in RRC\_CONNECTED state and there is no need to include CAG ID in RRCResumeComplete message for UE in manual CAG selection mode.

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**Summary:** TBA

**Proposal:** TBA

## 2.4 Measurements related proposals

The proposals of this section are based on the following proposals:

[**R2-2000358**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2000358.zip) **[3]**

Proposal 2: When execute measurement procedure configured by the *Mesconfig*, the UE shall not ignore the measurement of some cells (indicated in the *MeasObject*) based on the reserved PCI list information.

Proposal 3: The CAG ID/SNPN NID information shall be added into the *CGI-InfoNR.*

[**R2-2000401**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2000401.zip) **[5]**

Proposal 5a: Extend the procedure description in clause 5.5.5.1 that a UE may also report about *npn-IdentityInfoList* in *MeasurementReport* message. It is proposed to adopt the corresponding text proposal of Annex A.5a.

Proposal 5b: Extend the *CGI-InfoNR* information element with *npn-IdentityInfoList* to enable sending of NPN information in *MeasurementReport* message. It is proposed to adopt the corresponding text proposal of Annex A.5b.

[**R2-2001377**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2001377.zip) **[8]**

Proposal 2: ANR in the following scenarios is supported to obtain target CAG ID or NID:

* ANR towards PLMN cells configured by PNI-NPN cells.
* ANR towards PNI-NPN cells configured by PNI-NPN cells.
* ANR towards PNI-NPN cells configured by PLMN cells.
* ANR towards SNPN cells configured by cells of the same SNPN.

Proposal 3: The current measurement configuration and reporting procedures of ANR can be extended to include NPN information.

[**R2-2001430**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2001430.zip) **[10]**

Proposal 4: there is no necessary of the CAG-UE to report the MemberStatus and corresponding identity of reported cell acquired from system information in the measurement report message as what the LTE CSG-UEs execute.

Proposal 7: The additional information, i.e. NPN ID, may be provided in the HO measurement report and gNB in NPN could evaluate this assistant information before making the HO decision.

[**R2-2001573**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2001573.zip) **[12]**

Proposal: Introduce a new indicator whether to include the *npn-IdentityInfoList* in the reportCGI field.

### 2.4.1 Proposals to be commented

**Q4.1 Do you agree with the following proposal**Extend the current measurement reporting procedures to include NPN information to support ANR.

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**Summary:** TBA

**Proposal:** TBA

**Q4.2 Do you agree with the following proposal**The CAG ID/SNPN NID information shall be added into the *CGI-InfoNR*

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**Summary:** TBA

**Proposal:** TBA

**Q4.3 Do you agree with the following proposal**There is no necessary of the CAG-UE to report the MemberStatus and corresponding identity of reported cell acquired from system information in the measurement report message as what the LTE CSG-UEs execute.

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**Summary:** TBA

**Proposal:** TBA

**Q4.4: Do you agree with the following proposal**Introduce a new indicator whether to include the *npn-IdentityInfoList* in the reportCGI field.

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**Summary:** TBA

**Proposal:** TBA

## 2.5 Other proposal

The proposals of this section are based on the following proposals:

[**R2-2000358**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2000358.zip) **[3]**

Proposal 4: The NPN-only cell can’t work as SCG of EN-DC.

[**R2-2001430**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2001430.zip) **[10]**

Proposal 6: it is proposed that normal network controlled mobility procedure can apply for a UE leaving a CAG cell in connected mode.

### 2.5.1 Proposals to be commented

**Q5.1 Do you agree with the following proposal**Normal network controlled mobility procedure can apply for a UE leaving a CAG cell in connected mode.

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**Summary:** TBA

**Proposal:** TBA

# 3 Conclusions

**Proposals with full consensus**

**Proposals with almost full consensus**

**Proposals to be postponed to next meeting (no clear majority view)**

# 4 List of referenced documents

[1] [R2-2000005](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2000005.zip), “Connected Mode Open Issues for NPN” (Proposal 3, 4, 5, and 6), CATT

[2] [R2-2000130](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2000130.zip) “Remaining RRC aspects of NPN” (Proposal 2, 3, 4, 5, and 10), Ericsson

[3] [R2-2000358](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2000358.zip), “Consideration on the remaining Connected State Issues” (Proposal 2, 3, and 4), ZTE Corporation, Sanechips

[4] [R2-2000400](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2000400.zip), “Proposals on Editor’s Notes of running RRC CR” (Proposal 3.1 and 3.2), Nokia, Nokia Shanghai Bell

[5] [R2-2000401](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2000401.zip), “Proposals on open RRC issues” (Proposals 1, 2, 3a, 3b, 3c, 3d, 3e, 5a, 5b), Nokia, Nokia Shanghai Bell

[6] [R2-2001169](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2001169.zip), “Network indexing for UAC and Connection Control” (Proposal 3), Intel Corporation

[7] [R2-2001376](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2001376.zip), “General considerations on idle and inactive mode for NPN” (Proposal 2), Huawei, HiSilicon

[8] [R2-2001377](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2001377.zip), “General considerations on connected mode for NPN” (Proposal 1, 2, and 3), Huawei, HiSilicon, China Telecom

[9] [R2-2001378](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2001378.zip), “Considerations on SI Validity Checking” Huawei, HiSilicon

[10] [R2-2001430](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2001430.zip), “Access and mobility control for NPN” (Proposal 4, 6 and 7), CMCC

[11] [R2-2001572](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2001572.zip), “Transfer of NPN ID in RRC connection establishment”, Samsung Electronics Co., Ltd

[12] [R2-2001573](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_109_e/Docs/R2-2001573.zip), “Discussion on ANR for NPN”, Samsung Electronics Co., Ltd