**3GPP TSG-RAN WG2 Meeting #109bis-e R2-2003912**

**Electronic, 20 – 30 April 2020**

**Agenda item: 6.18.3**

**Source: Qualcomm (38.304 Rapporteur)**

**Title: Offline discussion 107: PRN 38.304 CR**

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

**Document for: Discussion and Decision**

# 1 Introduction

This document is the report about the the following email discussion

* [AT109bis-e][107][PRN] 38.304 CR (Qualcomm)

Scope: Update the 38.304 CR, based on the progress on the remaining open issues

Intended outcome: In-principle agreed 38.304 CR

Deadline for companies' feedback: Wednesday 2020-04-29 10:00 UTC

Deadline for rapporteur's version for agreement: Thursday 2020-04-30 10:00 UTC

Status: Ongoing

To implement the agreements into 38.304, some aspects are straightforward, while others need input on the specific text to be used.

A draft CR is provided in the email discussion folder, and this document asks specific questions with respect to changes in the draft CR.

The following agreements are included in the discussion.

It was agreed via email discussion for 109-bis-e meeting that

(Proposal 7 from R2-2002659): The PRN rapporteur of 38.304 will create a documentation proposal for 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.” as a part of the running CR.

It was agreed in the online session for 109-bis-e meeting that

* A Non-NPN-capable Rel-16 UE treats a cell with cellReservedForOtherUse=true as barred cell

It was agreed in the email discussion for 109-bis-e meeting that

* A Follow the NR-U agreement in unlicensed on the use of the IFRI flag (agreement is to be captured in TS 38.304):

- For the SNPN case, UE only follows the IFRI in MIB of a barred cell if the cell belongs to a SNPN which matches the registered SNPN of the UE. Otherwise the UE may select other cell in the same frequency

- For the CAG (PNI-NPN) case, there is no change to the existing NR-U behaviour: UE only follows the IFRI in MIB of a barred cell if the cell belongs to a registered/selected (e)PLMN. Otherwise the UE may select other cell in the same frequency.

Following was agreed in the email discussion for 10-bis-e meeting, but specific text for this agreement is excluded from discussion, as there is zero ambiguity on 38.304 implementation.

* “Remove the 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” from Table 4.2-1 of 38.304.”

Further agreements made on April 27 in RAN2 109bis-e are discussed in Section 3.

# 2 Main issue needing discussion (please comment)

## 2.1 Agreement on non-NPN-capable UEs to treat cell with cellReservedForOtherUse=true as barred cell

### 2.1.1 Issue 1 (Documentation of agreement)

It was agreed in the online session for 109-bis-e meeting that

* A Non-NPN-capable Rel-16 UE treats a cell with cellReservedForOtherUse=true as barred cell

Previously in 109-e, it has also been agreed that

* When a cell broadcasts any CAG IDs or NIDs, NPN-capable Rel-16 UE can treat the cell with cellReservedForOtherUse = true as a candidate during cell selection and cell reselection.

The current language in 38.304 relating to these issues is as follows:

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| When cell broadcasts any CAG IDs or NIDs and the cell status is indicated as "not barred" and "not reserved" for operator use and "true" for other use, and *cellReservedForFutureUse* IEis not indicated as "*true"*:  - All UEs in SNPN AM or with non-empty Allowed CAG list shall treat this cell as candidate during the cell selection and cell reselection procedures.  Editor's note: The applicability of above behaviour for non-NPN capable UE is FFS.  When cell status is indicated as "true" for other use, and either cell does not broadcast any CAG-IDs or NIDs or does not broadcast any CAG-IDs and the UE is not operating in SNPN Access Mode,  - The UE shall treat this cell as if cell status is "barred". |

Two options are given below

**Option 1 (direct translation of WG agreement)**

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| When cell broadcasts any CAG IDs or NIDs and the cell status is indicated as "not barred" and "not reserved" for operator use and "true" for other use, and *cellReservedForFutureUse* IEis not indicated as "*true"*:  - All UEs in SNPN AM or with non-empty Allowed CAG list shall treat this cell as candidate during the cell selection and cell reselection procedures.  When the cell status is indicated as "not barred" and "not reserved" for operator use and "true" for other use, and *cellReservedForFutureUse* IEis not indicated as "*true"*:   * All UEs that are not capable of NPN functionality shall treat this cell as if cell status is "barred".   Editor’s note: The terminology “not capable of NPN functionality” needs further refinement, e.g. via UE capability, linkage to SNPN mode or other approach.  When cell status is indicated as "true" for other use, and either cell does not broadcast any CAG-IDs or NIDs or does not broadcast any CAG-IDs and the UE is not operating in SNPN Access Mode,  - The UE shall treat this cell as if cell status is "barred". |

**Option 2 (more consistent with 38.304 existing text)**

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| When cell broadcasts any CAG IDs or NIDs and the cell status is indicated as "not barred" and "not reserved" for operator use and "true" for other use, and *cellReservedForFutureUse* IEis not indicated as "*true"*:  - All UEs in SNPN AM or with non-empty Allowed CAG list shall treat this cell as candidate during the cell selection and cell reselection procedures.  When the cell status is indicated as "not barred" and "not reserved" for operator use and "true" for other use, and *cellReservedForFutureUse* IEis not indicated as "*true"*:   * All UEs that are not in SNPN AM and not capable of CAG functionality shall treat this cell as if cell status is "barred".   Editor’s note: The definition of “not capable of CAG functionality” is FFS, e.g. via UE capability or via another approach.  When cell status is indicated as "true" for other use, and either cell does not broadcast any CAG-IDs or NIDs or does not broadcast any CAG-IDs and the UE is not operating in SNPN Access Mode,  - The UE shall treat this cell as if cell status is "barred". |

**Question 1: Which approach for 38.304 do you prefer to capture the agreement on emergency calls for non-NPN-capable UEs**

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| **Company** | **Preferred (1/2/Neutral/other)** | **Comment (please provide if selecting other)** |
| Huawei | Other | This is related to Issue 2.  As indicated in Issue 2, “UE that is CAG capable but has empty allowed CAG list” should also be considered.  We think in this context, the following UEs behave the same:   1. UEs not capable of CAG functionality 2. CAG capable UEs with empty Allowed CAG list   Therefore, apart from what has already been captured (UEs in SNPN AM or with non-empty Allowed CAG list), all other UEs (not in SNPN AM and not CAG-capable, or, not in SNPN AM and with an empty Allowed CAG list) shall consider the cell as “barred”.  We suggest to capture it as follows:  When cell broadcasts any CAG IDs or NIDs and the cell status is indicated as "not barred" and "not reserved" for operator use and "true" for other use, and *cellReservedForFutureUse* IEis not indicated as "*true"*:  - All UEs in SNPN AM or with non-empty Allowed CAG list shall treat this cell as candidate during the cell selection and cell reselection procedures, other UEs shall treat this cell as if cell status is "barred".  ~~Editor's note: The applicability of above behaviour for non-NPN capable UE is FFS.~~  Update: It’s ok for us to accept the majority view. The text proposed by Samsung looks good. |
| ZTE | Option 1 | 1. In general, we think option 1 is more consistent with the agreement. 2. For UE capable of CAG but has empty allowed CAG list, we think it can behave as other CAG capable UEs with non-empty allowed CAG list to override the “cellReservedForOtherse = true” since it can still read the CAG list and find out it can only camp on a CAG only cell for limited service. And we would suggest not to divide UE into too many categories to make the discussion more complicated. 3. Another option can also be considered to simplify the description a little bit. The agreements related to UE interpretation of *cellReservedForOtherUse* have been summarized below:    * *cellReservedForOtherUse is used to prevent Rel-15 UEs to access the cell.*    * *A Non-NPN-capable Rel-16 UE treats a cell with cellReservedForOtherUse=true as barred cell*    * *For CAG-capable Rel-16 UE, emergency calls in a CAG-only cell can be supported by setting cellReservedForOtherUse=true and allowing the Rel-16 UEs to ignore this flag and access the PLMNs in the NPN list in limited service state.*   In our understanding, if network would like to allow emergency call for R15 UEs in a CAG only cell, network has to set the “*cellReservedForOtherUse= not true*” and all types of UE can get access at least for limited services.  If network would like to bar all the other UEs and only allow the CAG member UEs to access, network can set the *cellReservedForOtherUse=true* and the R15 UE and R16 non-NPN capable UE will be barred according to the existing agreement. The only exception is the CAG capable UE who is not a member of the camped CAG cell(including a CAG capable UE with empty allowed CAG list), is still allowed to override the *cellReservedForOtherUse=true* and camp on a CAG only cell for limited service, based on the agreements we made so far.  I think such concern has been raised also by QC in the email discussion109e#43 that category (a) and category (b) UE will have different behaviors based on the existing agreements.   1. Rel-16 non-CAG-capable UE 2. Rel-16 CAG capable UE that is not a member of the CAG broadcast by CAG-only cell.   One proposed way forward is to revise the agreements we made for the R16 UEs into the following:  *If UE is member of a NPN cell, it shall ignore the cellReservedForOtherUse=true. Otherwise, UE shall treat this cell as barred.*  => Actually I think the above sentence cover all the R15 and R16 UEs. But we will not change the agreed behavior of the R15 UE and R16 non-NPN capable UE since they will never be a NPN member. The above sentence will only change the agreed behavior of R16 CAG capable UE who is not a CAG member (including a CAG capable UE with empty allowed CAG list).  => In this way, the *cellReservedForOtherUse=true* can be used to bar all the non-CAG member UEs while still allow CAG member UE to camp on a CAG only cell for either limited service or normal service so that the service for a CAG member UE can be guaranteed to the most extent.  => UE’s understanding on the *cellReservedForOtherUse=true* depends on whether it is a member of the concerned NPN cell rather than whether it can read NPN list or not.  If we go for this simplified solution, we will capture the following:  *When the cell status is indicated as "not barred" and "not reserved" for operator use and "true" for other use, and cellReservedForFutureUse IE is not indicated as "true":*  *-All UEs that are not NPN member shall treat this cell as if cell status is "barred".* |
| Samsung | Other | As pointed out by Huawei the remaining issue is how to treat CAG capable UEs with empty allowed CAG list. When the CAG capable UE performs registration for first time then it gets configured with allowed CAG list. So CAG capable UE with empty allowed CAG list should not bar the cell when the cellreservedforotheruse is set true.  In our view we need definition for CAG capable UE but this can be simply refer to SA2 specs. There is no need to change any previous agreements. We prefer the Huawei approach for normative text but accommodating the CAG capable UE regardless of empty/non-empty allowed CAG list  When cell broadcasts any CAG IDs or NIDs and the cell status is indicated as "not barred" and "not reserved" for operator use and "true" for other use, and *cellReservedForFutureUse* IEis not indicated as "*true"*:  - All UEs in SNPN AM or CAG capable UEs shall treat this cell as candidate during the cell selection and cell reselection procedures, other UEs shall treat this cell as if cell status is "barred". |
| CATT | Option 1 | CAG capable UEs with empty Allowed CAG list should override the “*cellReservedForOtherUse” as* overriding the “*cellReservedForOtherUse” is applicable to all REL16 UEs according to RAN2 agreement.* |
| Nokia | Samsung’s wording (But option 1 and 2 are also acceptable) | Samsung’s wording proposal  (“All UEs in SNPN AM or CAG capable UEs shall treat this cell as candidate during the cell selection and cell reselection procedures, other UEs shall treat this cell as if cell status is "barred".”) seems to us the cleanest way forward, it also solves issue 2 below.  We think that option 2 is slightly better than option 1, but both are acceptable. |
| Intel | Other (Samsung’s proposed wording) | We agree with Huawei that we need to consider CAG capable UEs with empty allowed list and the proposal from Samsung seems to cover all cases:  When cell broadcasts any CAG IDs or NIDs and the cell status is indicated as "not barred" and "not reserved" for operator use and "true" for other use, and *cellReservedForFutureUse* IEis not indicated as "*true"*:  - All UEs in SNPN AM or CAG capable UEs shall treat this cell as candidate during the cell selection and cell reselection procedures, other UEs shall treat this cell as if cell status is "barred". |
| Ericsson | Other | The existing text is very difficult to read due to the many different cases. To improve readability, I think we can structure the text using if-else statements like this:  \*\*\*\*\*\*\*\*  When cell status is indicated as "not barred" and "not reserved" for operator use and not "true" for other use and *cellReservedForFutureUse* IE is not indicated as"true",  - All UEs shall treat this cell as candidate during the cell selection and cell reselection procedures.  When ~~cell broadcasts any CAG IDs or NIDs and~~ the cell status is indicated as "not barred" and "not reserved" for operator use and "true" for other use, and *cellReservedForFutureUse* IE is not indicated as "true":  - if the UE is operating in SNPN Access mode and the cell is broadcasting at least one NID; or  - if the UE capable of CAG functionality and the is broadcasting at least one CAG ID:  - The UE shall treat this cell as candidate during the cell selection and cell reselection procedures.  - else:  - the UE shall treat this cell as if cell status is "barred".  ~~- All UEs in SNPN AM or with non-empty Allowed CAG list shall treat this cell as candidate during the cell selection and cell reselection procedures.~~  ~~Editor's note: The applicability of above behaviour for non-NPN capable UE is FFS.~~  ~~When cell status is indicated as "true" for other use, and either cell does not broadcast any CAG-IDs or NIDs or does not broadcast any CAG-IDs and the UE is not operating in SNPN Access Mode,~~  ~~- The UE shall treat this cell as if cell status is "barred".~~  When *cellReservedForFutureUse* IEis indicated as "*true"*,  - The UE shall treat this cell as if cell status is "barred".  \*\*\*\*\*\*  I also think we should write “cell reserved for future use” instead of “*cellReservedForFutureUse* IE is not indicated as *"true"”* to be consistent with the rest of the text. |
| China Telecom | Slightly Option1 | We do not want to have too many UE categories for distinction, which makes this issue complicate. |
| Sony |  | We also share the view that it is related to issue 2 below and we are fine with the Samsung’s proposed wording. |

**Summary: Text proposed by Samsung had the most support, to capture the agreements in a concise way. Moderator proposes to adopt Samsung proposal into CR.**

**Ericsson proposed text that is potentially more precise in covering certain scenarios, but it needs to be seen if such degree of precision is required. Moderator proposes to continue via email discussion to see if support can be built around the Ericsson proposal.**

**ZTE proposed a way-forward that solves the problem cleanly, but it deviates somewhat from the agreements. Moderator proposal is to not consider this way-forward.**

### 2.1.2 Issue 2 (Need for further clarification)

The behaviour of in one specific case seems not yet covered by the existing 38.304 text and the text proposals above.

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| When cell status is indicated as "not barred" and "not reserved" for operator use and not "true" for other use and *cellReservedForFutureUse* IE is not indicated as"true",  - All UEs shall treat this cell as candidate during the cell selection and cell reselection procedures.  When cell broadcasts any CAG IDs or NIDs and the cell status is indicated as "not barred" and "not reserved" for operator use and "true" for other use, and *cellReservedForFutureUse* IEis not indicated as "*true"*:  - All UEs in SNPN AM or with non-empty Allowed CAG list shall treat this cell as candidate during the cell selection and cell reselection procedures.  Editor's note: The applicability of above behaviour for non-NPN capable UE is FFS. |

*Question: In the scenario above, what is the requirement for a UE that is CAG capable but has empty Allowed CAG list?*

Rapporteur observation: The agreements in RAN2 suggest that the clause above should also include “UE that is CAG capable but has empty allowed CAG list”

**Question 2**

**2a: Do you agree with the rapporteur observation for the Case above?**

**2b: Do you see need for 38.304 changes? One example of change is to replace “with non-empty Allowed CAG list” as “capable of CAG functionality”, but specific text can be discussed separately.**

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| **Company** | **3a (yes/no)** | **3b**  **(yes/no)** | **Comment (please provide if selecting other)** |
| Huawei | No | No | Agree to consider this case, but do not agree with the suggested change.  We think in this context, the following UEs behave the same:   1. UEs not capable of CAG functionality 2. CAG capable UEs with empty Allowed CAG list   Our suggested text is provided in Question 1.  Update: It’s ok for us to accept the majority view. The text proposed by Samsung looks good. |
| ZTE | Yes | Yes | 1. Based on the existing agreement, CAG capable UE with empty allowed CAG list should still be considered as a CAG capable UE and the expected behavior is that UE override the “cellReservedForOtherse = true” since it can still read the CAG list and find out it can only camp on a CAG only cell for limited service. 2. As we mentioned under issue 1. Another simplified solution can also be considered with minor change to our agreements. |
| Samsung | Yes | Yes | See response to Q1.  BTW, we raised in R2-2003558 an issue about text ambiguity w.r.t following text in TS 38.304  When cell status is indicated as "true" for other use, and either cell does not broadcast any CAG-IDs or NIDs or does not broadcast any CAG-IDs and the UE is not operating in SNPN Access Mode,  - The UE shall treat this cell as if cell status is "barred".  Do you plan to discuss the issue in the email discussion?  In our view the above text refers to the case where cell does not broadcast NPN info and “cellReservedForOtherse = true”, then all UEs shall treat the cell as barred. If this is common understanding, then the existing text is ambiguous. |
| CATT | Yes | Yes | Same comments as question 1,  CAG capable UEs with empty Allowed CAG list should override the “*cellReservedForOtherUse” as* overriding the “*cellReservedForOtherUse” is applicable to all REL16 UEs according to RAN2 agreement.* |
| Qualcomm (moderator) |  |  | Samsung raises a good point about ambiguity. Suggest to discuss in email following this meeting. |
| Nokia | Yes | Yes | We think that Samsung’s wording proposal for Q1 solves the issue.  We do not see the problem raised by Samsung in their comment. |
| Intel | Yes | Yes | As per our response to Q1 |
| Ericsson | Yes | Yes | See comment to previous question. |
| China Telecom | Yes | Yes | We think CAG capable UE with empty Allowed CAG list is still NPN capable. |
| Sony | Yes | Yes |  |
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**Summary: All responding companies agreed that for barring behavior, CAG-capable UEs with empty or non-empty Allowed CAG List should have the same behavior.**

**Issue raised by Samsung about potential redundancy in the cell barring rule for cells that don’t broadcast NPN information can be discussed further in subsequent meeting.**

# 3. Minor documentation issues (Reply optional)

## 3.1 Agreement on CAG and unlicensed spectrum

(Proposal 7 from R2-2002659): The PRN rapporteur of 38.304 will create a documentation proposal for 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.” as a part of the running CR.

Following change in 38.304 is proposed (same as was proposed in the first version of PRN 38.304 running CR R2-2003421).

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| 5.2.4.4 Cells with cell reservations, access restrictions or unsuitable for normal camping For the highest ranked cell (including serving cell) according to cell reselection criteria specified in clause 5.2.4.6, for the best cell according to absolute priority reselection criteria specified in clause 5.2.4.5, the UE shall check if the access is restricted according to the rules in clause 5.3.1.  If that cell and other cells have to be excluded from the candidate list, as stated in clause 5.3.1, the UE shall not consider these as candidates for cell reselection. This limitation shall be removed when the highest ranked cell changes.  If the highest ranked cell or best cell according to absolute priority reselection rules is an intra-frequency or inter-frequency cell which is not suitable due to 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, as candidates for reselection for a maximum of 300 seconds. If this cell belongs to a PLMN which is not indicated as being equivalent to the registered PLMN, the UE shall not consider this cell and, for operation in licensed spectrum, other cells on the same frequency as candidates for reselection for a maximum of 300 seconds. 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. If the UE enters into state *any cell selection*, any limitation shall be removed. If the UE is redirected under NR control to a frequency for which the timer is running, any limitation on that frequency shall be removed. For a UE operating in SNPN AM and in shared spectrum channel access, 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.  Editor's Note: The UE behaviour in SNPN AM in licensed bands 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 is FFS.  If the highest ranked cell or best cell according to absolute priority reselection rules is an inter-RAT cell which is not suitable due to being part of the "list of forbidden TAs for roaming" or belonging to a PLMN which is not indicated as being equivalent to the registered PLMN, the UE shall not consider this cell and other cells on the same frequency, as candidates for reselection for a maximum of 300 seconds. If the UE enters into state *any cell selection*, any limitation shall be removed. If the UE is redirected under NR control to a frequency for which the timer is running, any limitation on that frequency shall be removed. |

**Question 3: Do you agree with the deletion of Editor’s note to reflect the agreement on Proposal 7.**

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| **Company** | **Yes/No** | **Comments (please provide if answering no)** |
| Huawei | Yes |  |
| ZTE | Yes |  |
| Samsung | Yes |  |
| CATT | Yes | We have an additional comment on another agreement reached in RAN2#109bis-e,  For the UE behaviour in SNPN AM in licensed bands,the following agreement has already been reached in RAN2#109bis-e   1. 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 and, for operation in licensed spectrum, other cells on the same frequency as candidates for reselection for a maximum of 300 seconds.   this agreement may also need to be reflected in 38.304,such as,  “If this cell belongs to a PLMN or SNPN which is not indicated as being equivalent to the registered PLMN or the registered SNPN, the UE shall not consider this cell and, for operation in licensed spectrum, other cells on the same frequency as candidates for reselection for a maximum of 300 seconds.” |
| Qualcomm (Moderator) |  | CATT’s point about SNPN has been added in Section 3. |
| Nokia | Yes |  |
| Intel | Yes |  |
| Ericsson | Yes |  |
| China Telecom | Yes |  |
| Sony | Yes |  |

**Summary: There was consensus. Moderator to adopt the proposal into CR.**

## 3.2 Agreement on IFRI flag

It was agreed in the online session for 109-bis-e meeting that

* A Follow the NR-U agreement in unlicensed on the use of the IFRI flag (agreement is to be captured in TS 38.304):

- For the SNPN case, UE only follows the IFRI in MIB of a barred cell if the cell belongs to a SNPN which matches the registered SNPN of the UE. Otherwise the UE may select other cell in the same frequency

- For the CAG (PNI-NPN) case, there is no change to the existing NR-U behaviour: UE only follows the IFRI in MIB of a barred cell if the cell belongs to a registered/selected (e)PLMN. Otherwise the UE may select other cell in the same frequency.

The following text change is proposed

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| When cell status "barred" is indicated or to be treated as if the cell status is "barred",  - The UE is not permitted to select/reselect this cell, not even for emergency calls.  - The UE shall select another cell according to the following rule:  - If the cell is to be treated as if the cell status is "barred" due to being unable to acquire the *MIB*:  - the UE may exclude the barred cell as a candidate for cell selection/reselection for up to 300 seconds.  - the UE may select another cell on the same frequency if the selection criteria are fulfilled.  - else:  - If the cell is to be treated as if the cell status is "barred" due to being unable to acquire the *SIB1* or due to *trackingAreaCode* being absent in *SIB1* as specified in TS 38.331 [3]:  - The UE may exclude the barred cell as a candidate for cell selection/reselection for up to 300 seconds.  - If the field *intraFreqReselection* in *MIB* message is set to "allowed", the UE may select another cell on the same frequency if re-selection criteria are fulfilled;  - The UE shall exclude the barred cell as a candidate for cell selection/reselection for 300 seconds.  - If the field *intraFreqReselection* in *MIB* message is set to "not allowed":  - If the cell operates in licensed spectrum or if this cell belongs to a PLMN which is indicated as being equivalent to the registered PLMN or if this cell belongs to the registered SNPN of the UE:  - the UE shall not re-select a cell on the same frequency as the barred cell;  - else:  - the UE may select to another cell on the same frequency if reselection criteria are fulfilled.  - The UE shall exclude the barred cell and, if the cell operates in licensed spectrum or if this cell belongs to a PLMN which is indicated as being equivalent to the registered PLMN, also the cells on the same frequency as a candidate for cell selection/reselection for 300 seconds. |

**Question 4: Do you agree with the text change above?**

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| **Company** | **Yes/No** | **Comments (please provide if answering no)** |
| Huawei | Yes |  |
| ZTE | Yes |  |
| Samsung | Yes |  |
| CATT | Yes |  |
| Nokia | Yes |  |
| Intel | Yes |  |
| Ericsson | Yes |  |
| China Telecom | Yes |  |
| Sony | Yes |  |

**Summary: There was consensus. Moderator to adopt the proposal into running CR.**

# 3 New agreements

## 3.1 Agreements regarding case with strongest cell not suitable

* (April 27, 109-be): Follow the NR-U behaviour when the highest ranked cell or best cell is not suitable due to belonging to the correct operator, but it is not a CAG member cell: (In unlicensed band when the highest ranked cell or best cell is not suitable due to belonging to the correct operator, but it is not a CAG member cell, the UE shall not consider this cell as candidate for reselection for a maximum of 300 seconds. If the second highest ranked cell on this frequency is not suitable due to belonging to the correct operator, but it is not a CAG member cell, the UE may consider this frequency to be the lowest priority for a maximum of 300 seconds.)
* (April 27, 109-be): The UE behaviour in licensed band when the cell belongs to the correct operator but either it’s not a CAG member cell or the cell is a public cell and the CAG-only indicator in the UE is set to true: the UE shall not consider this cell and other cells on the same frequency, as candidates for reselection for a maximum of 300 seconds.
* (Agreement from first week of 109-be, not yet captured in CR): 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 and, for operation in licensed spectrum, other cells on the same frequency as candidates for reselection for a maximum of 300 seconds.

Three options are presented for implementation of the above agreements, and Option 3 is captured in the draft CR (tentatively).

### Option 1: direct implementation of agreement

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| 5.2.4.4 Cells with cell reservations, access restrictions or unsuitable for normal camping For the highest ranked cell (including serving cell) according to cell reselection criteria specified in clause 5.2.4.6, for the best cell according to absolute priority reselection criteria specified in clause 5.2.4.5, the UE shall check if the access is restricted according to the rules in clause 5.3.1.  If that cell and other cells have to be excluded from the candidate list, as stated in clause 5.3.1, the UE shall not consider these as candidates for cell reselection. This limitation shall be removed when the highest ranked cell changes.  If the highest ranked cell or best cell according to absolute priority reselection rules is an intra-frequency or inter-frequency cell which is not suitable due to 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, as candidates for reselection for a maximum of 300 seconds. If this cell belongs to a PLMN which is not indicated as being equivalent to the registered PLMN, or if the cell is a CAG cell that belongs to a PLMN which is equivalent to the registered PLMN but is not suitable due to being absent in the UE’s allowed CAG list, or if the cell is not a CAG cell and not suitable because the CAG-only indication in the UE is set, or if the cell is a SNPN cell that belongs to a SNMN that is not equal to the registered SNPN for a UE in SNPN access mode, the UE shall not consider this cell and, for operation in licensed spectrum, other cells on the same frequency as candidates for reselection for a maximum of 300 seconds. 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, or belongs to a PLMN that is equivalent to the registered PLMN but is not suitable due to being absent in the UE’s allowed CAG list, or is not suitable because the CAG-only indication in the UE is set, or if the cell is a SNPN cell that belongs to a SNMN that is not equal to the registered SNPN for a UE in SNPN access mode, the UE may consider this frequency to be the lowest priority for a maximum of 300 seconds. If the UE enters into state *any cell selection*, any limitation shall be removed. If the UE is redirected under NR control to a frequency for which the timer is running, any limitation on that frequency shall be removed. For a UE operating in SNPN AM and in shared spectrum channel access, 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.  If the highest ranked cell or best cell according to absolute priority reselection rules is an inter-RAT cell which is not suitable due to being part of the "list of forbidden TAs for roaming" or belonging to a PLMN which is not indicated as being equivalent to the registered PLMN, the UE shall not consider this cell and other cells on the same frequency, as candidates for reselection for a maximum of 300 seconds. If the UE enters into state *any cell selection*, any limitation shall be removed. If the UE is redirected under NR control to a frequency for which the timer is running, any limitation on that frequency shall be removed. |

### Option 2: Structuring the section for improved readability.

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| 5.2.4.4 Cells with cell reservations, access restrictions or unsuitable for normal camping For the highest ranked cell (including serving cell) according to cell reselection criteria specified in clause 5.2.4.6, for the best cell according to absolute priority reselection criteria specified in clause 5.2.4.5, the UE shall check if the access is restricted according to the rules in clause 5.3.1.  If that cell and other cells have to be excluded from the candidate list, as stated in clause 5.3.1, the UE shall not consider these as candidates for cell reselection. This limitation shall be removed when the highest ranked cell changes.  If the highest ranked cell or best cell according to absolute priority reselection rules is an intra-frequency or inter-frequency cell which is not suitable due to one or more of the following reasons:   * this cell being part of the "list of 5GS forbidden TAs for roaming", * this cell belongs to a PLMN which is not indicated as being equivalent to the registered PLMN * this cell is a CAG cell that belongs to a PLMN which is equivalent to the registered PLMN but with CAG ID that is not present in the UE’s allowed CAG list * this cell is not a CAG cell and the CAG-only indication in the UE is set * this cell is a SNPN cell that belongs to a SNMN that is not equal to the registered SNPN of the UE in SNPN access mode,   the UE shall not consider this cell and, for operation in licensed spectrum, other cells on the same frequency as candidates for reselection for a maximum of 300 seconds.  For operation with shared spectrum channel access, when the highest ranked cell or best cell is not a candidate for reselection per the previous clause, if thesecond highest ranked cell on this frequency is not suitable for one or more of the following reasons,   * does not have a PLMN being equivalent to the registered PLMN, * belongs to a PLMN that is equivalent to the registered PLMN but is not suitable due to being absent in the UE’s allowed CAG list, * the cell is not a CAG cell and the CAG-only indication in the UE is set, * the cell is a SNPN cell that belongs SNMN that is not equal to the registered SNPN of the UE in SNPN access mode   the UE may consider this frequency to be the lowest priority for a maximum of 300 seconds.  If the UE enters into state *any cell selection*, any limitation shall be removed. If the UE is redirected under NR control to a frequency for which the timer is running, any limitation on that frequency shall be removed. For a UE operating in SNPN AM and in shared spectrum channel access, 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.  If the highest ranked cell or best cell according to absolute priority reselection rules is an inter-RAT cell which is not suitable due to being part of the "list of forbidden TAs for roaming" or belonging to a PLMN which is not indicated as being equivalent to the registered PLMN, the UE shall not consider this cell and other cells on the same frequency, as candidates for reselection for a maximum of 300 seconds. If the UE enters into state *any cell selection*, any limitation shall be removed. If the UE is redirected under NR control to a frequency for which the timer is running, any limitation on that frequency shall be removed. |

### Option 3: further simplification

Given the uniformity in RAN2 agreements for treating cells that are not allowed for any reason, with the uniformity applicable to both licensed and unlicensed cases, a further simplification of the text can be considered.

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| 5.2.4.4 Cells with cell reservations, access restrictions or unsuitable for normal camping For the highest ranked cell (including serving cell) according to cell reselection criteria specified in clause 5.2.4.6, for the best cell according to absolute priority reselection criteria specified in clause 5.2.4.5, the UE shall check if the access is restricted according to the rules in clause 5.3.1.  If that cell and other cells have to be excluded from the candidate list, as stated in clause 5.3.1, the UE shall not consider these as candidates for cell reselection. This limitation shall be removed when the highest ranked cell changes.  If the highest ranked cell or best cell according to absolute priority reselection rules is an intra-frequency or inter-frequency cell which is not suitable based on the definition of suitable cell in clause 4.5the UE shall not consider this cell and, for operation in licensed spectrum, other cells on the same frequency as candidates for reselection for a maximum of 300 seconds. For operation with shared spectrum channel access, if the second highest ranked cell on this frequency also is not suitable based on the definition of suitable cell in clause 4.5, the UE may consider this frequency to be the lowest priority for a maximum of 300 seconds. If the UE enters into state *any cell selection*, any limitation shall be removed. If the UE is redirected under NR control to a frequency for which the timer is running, any limitation on that frequency shall be removed. For a UE operating in SNPN AM and in shared spectrum channel access, 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.  If the highest ranked cell or best cell according to absolute priority reselection rules is an inter-RAT cell which is not suitable due to being part of the "list of forbidden TAs for roaming" or belonging to a PLMN which is not indicated as being equivalent to the registered PLMN, the UE shall not consider this cell and other cells on the same frequency, as candidates for reselection for a maximum of 300 seconds. If the UE enters into state *any cell selection*, any limitation shall be removed. If the UE is redirected under NR control to a frequency for which the timer is running, any limitation on that frequency shall be removed. |

**Question 5: Please provide your comments on the approaches proposed by the rapporteur, or if you believe more time is needed to decide the best approach for documentation.**

|  |  |  |
| --- | --- | --- |
| **Company** | **Option 1/ Option 2/ Option 3/ More time needed/ Other** | **Comments** |
| Nokia | Option 2 or Option 1 | It is easier to read/understand Option 2, but Option 1 is also acceptable. We are not convinced that option 3 will not cause any problems. |
| Intel | More time or Option 1 (keep to the existing structure) | For Option 2 and 3, we need more time to check whether it covers all the cases. Typos in Option 1, ‘SNMN’ should be ‘SNPN’ |
| Samsung | Option 2 | Readability of Option2 is better |
| CATT | Option 1 | It is better to add description related to NPN with keeping the original text unchanged as it is also used by other features. |
| Ericsson | Option 2 | Same comment as Nokia. |
| China Telecom | Option 2 | We think Option 2 captures the agreements and is more readable. |
| Sony | Option 2 |  |
| Huawei | Option 1 or 2 |  |

**Summary: Option 3 had no support, and there was doubt whether such extent of simplification can maintain correctness.**

**Option 2 had more support due to being easier to read, except two companies. One needed more time to check, and other wanted to ensure no impact to non-NPN features. Moderator proposal is to progress with option 2 and give companies 1-week for more checking in email discussion.**

## 3.2 Agreements on PCI range

The following agreement was made on Apr 27 in RAN2-109-be

* The PCI range(s) can be optionally signalled per PLMN and per frequency when the CAG cell is shared among different PLMNs.

From rapporteur’s reading of 36.304, the PCI range in LTE was not captured in the idle mode specification. Also, there seem several open issues regarding the PCI range that need to be resolved, before stage 3 impact can be properly progressed.

Rapporteur proposal: Impact of PCI range to 38.304 can be assessed in future meeting or future email discussion.

**Question 6: Do you agree that impact of PCI range to 38.304 can be assessed in future meeting or future email discussion, and need not be part of this current CR?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments (please proposed impact if answering No)** |
| Nokia | Yes |  |
| Intel | No | We do not think there should be any impact to TS38.304 as per Rel-15 neighbour cell list. |
| Samsung | No | Same view as Intel |
| CATT | Yes | It seems that PCIs for what kind of cells will be contained in PCI range is not clear yet. It could be PCIs for CAG cells or PCIs for CAG only cells. The UE behaviour will be different depend on what is in the PCI range. We may need to clarify it further. |
| Ericsson | Yes |  |
| China Telecom | Yes |  |
| Sony | Yes |  |
| Huawei | Yes |  |

**Summary: There was consensus that 38.304 impact due to CAG PCI range should not be part of running CR at R2-109bis-e. Moderator will not included any related material in the CR.**

# 4 Conclusions (to prepare CR for 1-week email disc)

**Non-NPN Capable UE and cell barring**

Summary: Text proposed by Samsung had the most support, to capture the agreements in a concise way. Moderator proposes to adopt Samsung proposal into CR.

Ericsson proposed text that is potentially more precise in covering certain scenarios, but it needs to be seen if such degree of precision is required. Moderator proposes to continue via email discussion to see if support can be built around the Ericsson proposal.

ZTE proposed a way-forward that solves the problem cleanly, but it deviates somewhat from the agreements. Moderator proposal is to not consider this way-forward.

**Potential difference in barring behaviors of CAG-capable UEs depending on whitelist empty/non-empty**

Summary: All responding companies agreed that for barring behavior, CAG-capable UEs with empty or non-empty Allowed CAG List should have the same behavior.

Issue raised by Samsung about potential redundancy in the cell barring rule for cells that don’t broadcast NPN information can be discussed further in subsequent meeting.

**Minor documentation issues on CAG in unlicensed and IFRI**

The moderator proposed text was agreeable to all companies and will be incorporated in the CR.

**Agreements regarding handling of strongest cell not allowed**

Summary: Option 3 had no support, and there was doubt whether such extent of simplification can maintain correctness.

Option 2 had more support due to being easier to read, except two companies. One needed more time to check, and other wanted to ensure no impact to non-NPN features. Moderator proposal is to progress with option 2 and give companies 1-week for more checking in email discussion.

**Agreements regarding CAG PCI range**

There was consensus that 38.304 impact due to CAG PCI range should not be part of running CR at R2-109bis-e. Moderator will not include any related material in the CR.