**3GPP TSG-RAN WG2 Meeting #118 Electronic draft R2-2206185**

**09 – 20 May 2022**

**Agenda item: 6.8.1**

**Source: NEC (Rapporteur)**

**Title: Report from [AT118-e][242][Slicing] Finalizing IDLE mode for RAN slicing (NEC)**

**WID/SID: NR\_Slice -Core - Release 17**

**Document for: Discussion and Decision**

1 Introduction

This document is the report of the following email discussion:

* [AT118-e][242][Slicing] Finalizing IDLE mode for RAN slicing (NEC)

      Scope: Discuss CRs for TS38.304 and provide final CR based on meeting decisions.

Intended outcome: Discussion report [R2-2206185](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2206185.zip) and agreeable CR in [R2-2206174](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2206174.zip).

Deadline: Deadline 5

(**Deadline 5 (discussions for 2nd week Thu/Fri online):**

* **Comment deadline:** Wednesday W2, 0400 UTC (for collecting views)
* **Rapporteur proposals:** Wednesday W2, 0800 UTC (proposed resolution of issues)
* **Document deadline:** Wednesday W2, 1600 UTC (report or agreed CRs)
  + No extensions to this deadline for regular discussions. Discussions handling CRs may continue to short post-meeting email (based on chair decision).

The email discussion will be divided into two phases:

* A first phase is for collecting comments to this report, with deadline W2 Tues May 17th 1200 UTC to settle what are agreeable etc
* A second phase for collecting comment to draft CR with final deadline W2 Wed May 18th 0400 UTC to settle details of the CR.

2 Contact Points

Respondents to the email discussion are kindly asked to fill in the following table.

|  |  |  |
| --- | --- | --- |
| **Company** | **Name** | **Email Address** |
| NEC (Rapporteur) | Yuhua Chen | Yuhua.chen@emea.nec.com |
| Apple | Yuqin Chen | yuqin\_chen@apple.com |
| Nokia | Gyuri Wolfner | gyorgy.wolfner@nokia.com |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

3 Discussion

This email discussion covers the proposed changes from the following tdocs:

[R2-2205493](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205493.zip) Clarifications on slice groups and other corrections Nokia, Nokia Shanghai Bell draftCR Rel-17 38.304 17.0.0 NR\_slice-Core

[R2-2204583](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2204583.zip) Corrections on the slice based cell reselection priorites Beijing Xiaomi Software Tech draftCR Rel-17 38.304 17.0.0 F NR\_slice-Core

[R2-2204590](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2204590.zip) Corrections on slice based cell reselection configured by RRCRelease Beijing Xiaomi Software Tech draftCR Rel-17 38.304 17.0.0 F NR\_slice-Core

[R2-2205078](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205078.zip) Corrections on TS 38.304 for RAN Slicing Huawei, HiSilicon CR Rel-17 38.304 17.0.0 0241 - F NR\_slice-Core

[R2-2205467](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205467.zip) Draft CR to TS 38.304 on the remaining RRC Open issues for slicing CATT draftCR Rel-17 38.304 17.0.0 F NR\_slice-Core

[R2-2205739](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205739.zip) CR to 38.304 Clarification on slice-specific cell reselection NEC Telecom MODUS Ltd. CR Rel-17 38.304 17.0.0 0246 - F NR\_slice-Core

[R2-2205976](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205976.zip) Resolving open issues Ericsson draftCR Rel-17 38.304 17.0.0 NR\_slice-Core

However, some other discussion Tdocs relevant to proposed changes are also cited in this report.

3.1 Terminologies: Slice, Slice group and NSAG

In TS 38.304, “slice”, “slice group”, “slice or slice group” or “slice/slice group “ are used here or there. It is proposed in [R2-2205078](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205078.zip) to change the wording “slice based” into “slice group based” to align with TS38.331 definition. Furthermore, in order to align with the SA2 LS, In [R2-2205493](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205493.zip) , it is proposed to introduce NASG abbreviation in section 3.2, slice or slice group is changed everywhere into NSAG and clarify in several places that information provided from NAS is “NSAG(s) with priorities”

It seems desired to harmonize terminology in 38.304 with SA2 specification.

**Question 1**: Do you agree to use "NSAG" to replace slice or slice group everywhere in 38.304?

Please also point out if there are any exceptional cases e.g., whether “slice-group based cell reselection” should be kept or “NSAG-based cell reselection” should be used

|  |  |  |
| --- | --- | --- |
| **Company** | **YES/NO** | **Comments** |
| Apple | Yes | In general, it should be fine to use the terminology “NSAG” to replay slice-group. |
| Nokia | YES | We should use NSAG otherwise slice group remains undefined. |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

3.2 Re-derived cell reselection priority

When the selected cell does not support the intended slice group, the UE shall re-derive a re-selection priority for the frequency.

Frequency priority is used in section 5.2.4.2 for measurement rule. UE may not measure some frequencies or not depending on frequency priority. There is editor’s note:

*Editor's note: Can be re-checked if there are still problems with UE measurements.*

One contribution [R2-2205467](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205467.zip) thinks there is no measurement impact after recalculating the priority of a frequency (i.e., resorting), because when UE performs measurement, the multiple frequencies are considered together and will be measured continuously. Therefore, the Editor Notes related to whether the resorting will have impact on RRM requirements can be removed. However it pointed out in [R2-2205739](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205739.zip) , If the re-calculated priority become lower than serving frequency, UE may not measure the frequency anymore based on measurement rule and hence UE would never know the best ranked cell changed on that frequency and come back to the original frequency priority. One way to avoid this is not to apply the re-derived priority to measurement rule.

**Question 2.1**: do you agree that there may be impact on UE measurement after re-deriving priority of a frequency?

Option1: No impact on measurement, delete the editor’s note without other clarification as proposed in [R2-2205467](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205467.zip)

Option2: Yes impact, clarify not to apply the re-derived priority to measurement rule as proposed in [R2-2205739](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205739.zip)

Option 3: yes impact, but with other suggestion/solution

|  |  |  |
| --- | --- | --- |
| **Company** | **Option 1/2/3** | **Comments** |
| Apple | Option 1 | As we explained in R2-2205663, change of frequency priority is not a new procedure. It happens in legacy, such as:   * Change of camping cell * From dedicated configured frequency priority to SIB configured frequency priority * Best and 2nd best cells on shared spectrum does not support EPLMN * MBS interested UE can consider the frequencies not providing MBS service as lowest priority.   So we think UE measurement can already handle the frequency priority change from slicing framework. |
| Nokia | Comment | Option 1 is OK if our proposal for Q2.2 is accepted  Option 2 is not acceptable, as it changes the measurement rules (RAN4 impacts) |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

In section 5.2.4.5 for cell reselection criteria, existing text says the re-driven priority is used until the highest ranked cell changes on the frequency or new slice group information received from NAS. However it is proposed in [R2-2205493](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205493.zip) to clarify that the recalculated cell reselection priority for a frequency is used up-to 300 seconds or until NSAG information received from NAS is changed, otherwise it is unclear how frequently a UE should check the highest ranked cell on the frequency

**Question 2.2**: do you agree to clarify that the recalculated cell reselection priority for a frequency is used up-to 300 seconds or until NSAG information received from NAS is changed as proposed in [R2-2205493](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205493.zip)?

|  |  |  |
| --- | --- | --- |
| **Company** | **Option 1/2/3** | **Comments** |
| Apple | Open for discussion | We do have some empathy on this proposal. Current operation may lead to a sub-optimal case where the frequency is deprioritized to a level lower than serving freq. Then the RRM measurement on that frequency may not become available in time. |
| Nokia | Yes | Without this clarification it is unclear how the UE detects "the highest ranked cell changes on the frequency". If the UE has to measure a frequency that has lower priority than current frequency or no priority then it changes the measurement rules. |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

3.3 Condition for UE derive slice-based cell reselection priority

It is agreed following on Monday GTW session:

* 4: Change the condition of slice based cell reselection in TS 38.304 to “If UE supports slice-based cell reselection and UE has received slice group priority information from NAS, UE shall derive re-selection priorities according to clause 5.2.4.1.”.

Furthermore, it is proposed in [R2-2205739](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205739.zip) to clarify that UE derives slice specific cell reselection priorities only if “UE has prioritized slice group information from NAS, slice specific cell reselection information , and more important, at least one of the UE prioritized slice groups should be indicated and supported for at least one NR frequency”. in short, one additional condition is proposed for deriving slice-based cell reselection priorities:

* Cell reselection priorities for slicing provided in system information or dedicate signalling includes at least one of these prioritized slice groups from NAS.

**Question 3: do you agree to consider the additional condition of having at least one matched NSAG between NAS information and cell reselection information for going with slice-group based cell reselection?**

|  |  |  |
| --- | --- | --- |
| **Company** | **YES/NO** | **Comments** |
| Apple |  | We don’t see any difference with or without this sentence. I guess current slicing specific cell re-selection already covers this case. If SIB/RRCRelease does not provide any NSAG(s) which are configured by NAS, UE would go to legacy cell reselection. |
| Nokia | NO | Our understanding is that without this clarification the UE will use the legacy priorities based on 5.2.4.11. However, we can accept it if most of the companies support this clarification. |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

* 1. Case of no PCI lists provided

In [R2-2205739](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205739.zip), it is proposed to add text to clarify that UE consider all cells on the frequency supports the slice group if neither excluded not allowed PCI list is provided with follow text proposal:

|  |
| --- |
| The UE considers a cell on an NR frequency to support a slice group if  *-* the  *NR frequency* is included in *sliceInformation* and supports the said *slice group*; and  - the cell is either listed in the *sliceAllowCellListNR* (if provided in system information of the serving cell and/or dedicated signalling) or the cell is not listed in the *sliceExcludeCellListNR* (if provided in system information of the serving cell and/or dedicated signalling); or  - Neither *sliceAllowedCellListNR* nor *sliceExcludedCellListNR* is configured. |

**Question 4: do you agree to add the case of neither allowed nor excluded cell list is configured?**

|  |  |  |
| --- | --- | --- |
| **Company** | **YES/NO** | **Comments** |
| Apple | Yes | Agree with the intention. |
| Nokia | YES | The specification may be misinterpreted without this addition (Not necessary, but useful clarification) |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

3.5 Field/parameter name alignment

Please provide your comment on following text proposal in [R2-2205739](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205739.zip) relevant to field/parameter name alignment:

|  |
| --- |
| 5.2.4.11 Re-selection priorities for slice-based cell reselection The UE derives re-selection priorities for slice-based cell re-selection by using:  - a list of prioritized slice groups provided by NAS in priority order,  Editor's note: Details to be confirmed with SA2/CT1.  - *sliceInfoList*per frequency with *CellReselectionPriority* per slice group, if provided in system information and/or dedicated signalling,  - Non slice group specific *cellReselectionPriority* per frequency provided in system information and/or dedicated signalling.  The UE considers an NR frequency to support a slice group if  - the corresponding *sliceGroupID*is indicated for the NR frequency.  The UE considers a cell on an NR frequency to support a slice group if  *-* the corresponding *sliceGroupID is indicated for the NR frequency*; and  - the cell is either listed in the *sliceAllowedCellListNR* (if provided in system information of the serving cell and/or dedicated signalling); or  - the cell is not listed in the *sliceExcludedCellListNR* (if provided in system information of the serving cell and/or dedicated signalling).  Editor's Note: Text above and below need to be aligned with field names and ASN.1 structure in TS 38.331.  The UE shall derive re-selection priorities for slice-based cell re-selection according to the following rules:  - Frequencies that support at least one prioritized slice group received from NAS have higher re-selection priority than frequencies that support no prioritized slice groups.  - Frequencies that support at least one slice group are prioritised in the order of the NAS-provided priority for the highest prioritised slice group of the frequency.  - Among the frequencies that support the same highest prioritised slice group, the frequencies are prioritized in the order of their per slice group *CellReselectionPriority*.  - Frequencies that support a prioritized slice group and that indicate per slice group *CellReselectionPriority* have higher re-selection priority than frequencies that support this prioritized slice group without indicating per slice group *CellReselectionPriority*.  - Frequencies that support no prioritized slice group are prioritized in the order of their non slice group specific *cellReselectionPriority*;  Editor's Note: RAN2 need to verify that the rules above are consistent and results in the intended behaviour. |

**Question 5: please indicate if you agree above text proposal with intention to align the field names in 38.331 and provide any other comments if any:**

Please note that the field name may be further update along with the 38.331 updating.

|  |  |  |
| --- | --- | --- |
| **Company** | **YES/NO** | **Comments** |
| Apple | Yes | But we need to keep an eye on 331 spec update from this meeting. |
| Nokia | YES |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

3.6 Equal slice group priority handing

It is proposed in [R2-2204583](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2204583.zip) to add following NOTE in the section 5.2.4.11. The intention is to leave to UE implementation to choose one slice group for determination of the frequency priorities

|  |
| --- |
| NOTE: Frequencies that support the highest prioritised slice group(s) with the equal slice group priority are prioritised in the order of sliceSpecificCellReselectionPriority for one of the slice groups, which is up to UE implementation. |

**This issue will be discussed during online session.**

3.7 Cell reselection information provided in RRCRelease

|  |
| --- |
| Editor’s note: FFS on the details if and how information provided in RRCRelease overrides information provided in SIB. This includes slice-specific re-selection information, existing/legacy |

It has been clear that

* When legacy priorities are provided by dedicated signalling, it will override the legacy priorities provided by system information
* When slice reselection information is provided by dedicated signalling, it will override the slice reselection information broadcasted in system information

However, it is not clear yet:

* When only legacy priorities are provided by dedicated signalling and slice reselection information are broadcast, which one should take presence and whether combination of these information should be supported.
* When legacy priorities are provided by system information and only slice reselection information are configured by dedicated signalling, which one should take presence and if combination of these information should be supported.

Before Rel-17, there are already two IEs freqPriorityListEUTRA and freqPriorityListNR in RRCrelease message. And in 38.304 it says, “if priorities are provided in dedicated signalling, the UE shall ignore all the priorities provided in system information”. This means no combination of cell reselection information provided in system information and the information provided in RRCRelease.

With the slice-group based cell reselection information introduced in RRCRelease. One option is to follow legacy approach: If the RRCRelease message contains any type of cell reselection priorities then the UE should only consider the cell reselection priorities received in RRCRelease and ignore any type of cell reselection priorities received in SIB messages, this is proposed in e.g. [R2-2205495](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205495.zip), [R2-2205543](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205543.zip), [R2-2205737](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205737.zip). Please note the current specification text in 38.304 already capture this option, with only one duplicated text and editor’s notes need to be removed.

Alternatively, Slice specific re-selection information in RRC Release overrides only slice-specific re-selection information in SIB, and legacy dedicated priorities overrides only legacy priorities in SIB, this is proposed in e.g., [R2-2205974](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205974.zip). Consequently UE will combine the legacy priorities and slice-group specific priorities information provided by dedicated signalling and system information respectively in above mentioned unclear cases.

**Question 7.1: how does the cell reselection information provided in RRC release overrides the information provided in SIB?**

* **Option1: when any cell reselection priorities are provided in RRCRelease ((i.e., any of IEs freqPriorityListEUTRA, freqPriorityListNR and freqPriorityListNRSlicing-r17 appears)), the UE shall ignore all legacy and slice-specific cell reselection priorities provided in system information.**
* **Option2: Slice specific re-selection information in RRC Release overrides only slice-specific re-selection information in SIB, and legacy dedicated priorities overrides only legacy priorities in SIB. UE would combine the cell reselection priorities received from RRCRelease and system information:** 
  + When only legacy priorities are provided by dedicated signalling and slice-group based cell reselection information are broadcast, or
  + When legacy priorities are provided by system information and only slice-group based cell reselection information are configured by dedicated signalling
* **Option 3: others, please indicate**

|  |  |  |
| --- | --- | --- |
| **Company** | **YES/NO** | **Comments** |
| Apple | see comment | With current agreement where RRCReleaes only contain one config from slicing specific frequency and legacy frequency, we think Option 2 is the right one.  But mote that in RRC offline [#240], there are proposals to let RRCRelease message contain both legacy and slice specific frequency configurations. In that case, UE would no longer need to combine the config from RRCRelease and SIB. |
| Nokia | Option 1 | As the size limit of RRCRelease is much more relaxed than size of SIB messages, we see no reason why a gNB cannot provide all relevant information in RRCRelease, and why UE should combine two sets information.  Two cases can be differentiated:  1) Combining legacy reselection priorities from RRCRelease with slice specific reselection priorities from SIB.  As slice specific priorities takes precedence over legacy priorities, in this case priorities from SIB takes precedence over priorities from RRCRelease. Therefore, we think this case is not acceptable.  2) Combining slice specific reselection priorities from RRCRelease with legacy reselection priorities from SIB  As RRCRelease and SIB information may come from different gNBs, this case requires very careful configuration from operators. Therefore, we think it is not desired to support this case, as nothing prevents the gNB to include both slice specific and legacy priorities if it is needed. |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

Based on agreement made in previous meeting, following note is added in specification. However, in [R2-2205976](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205976.zip) and some other discussion contributions, it is proposed to remove this note to allow network to configure both legacy and slice specific cell reselection priorities in the RRCRelease message. This is especially useful if option1 is preferred in Q7.1

|  |
| --- |
| NOTE 6: The UE is configured with either dedicated cell reselection priorities or slice or slice group specific frequency priorities in the *RRCRelease* message. |

**Question 7.2: do you agree to remove the NOTE6 in section 5.2.4.1, to enable network to configure both legacy and slice-group specific cell reselection priority in RRCRelease message?**

|  |  |  |
| --- | --- | --- |
| **Company** | **YES/NO** | **Comments** |
| Apple | Open for discussion | Offline #240 is also discussing this issue. |
| Nokia | YES |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

It is FFS whether “PCI-lists” will be provided in RRCRelease, this issue is being discussed in [240].

4 Conclusion

TBD.