**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.

|  |  |  |
| --- | --- | --- |
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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

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| --- | --- | --- |
| **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. |
| Ericsson | Yes | OK to change slice group to NSAG in most places. But we should not use “NSAG-based cell re-selection” to denote the feature.  Earlier, we discussed to use “Slice**-aware** cell re-selection”, we think this is more understandable for a person without detailed knowledge of NSAG and slice groups, and hence preferred by us.  But “Slice**-based** cell re-selection” is also acceptable to us.  (There should be a dash, “-“ in between).  We should not use “slice-group based cell reselection”. |
| CATT | Yes | Same view as Ericsson. Using NSAG to replace slice group to align with SA2 definition in most case. We prefer to use slice-based cell re-selection. This description seems more readable. |
| NEC | Yes | We agree to use NSAG to replace “slice group” or “slice or slice group” in most places.  Moreover, for these two terms:  **1 slice-based cell reselection:** we are fine to keep as it, it is relatively short without add “group”, and it has more readability then “NSAG-based cell reselection  **2. slice reselection information:** in stage-2 spec, **Slice specific cell reselection information** is used instead, we prefer to align with stage-2 wording. We do not have strong opinion on which one , but it is necessary to be aligned |
| Samsung | Yes | Same view of Apple |
| Spreadtrum | Yes | Agree to use "NSAG" to replace slice group. And we prefer to use the term of “Slice-based cell re-selection”, because it can reflect the “slice” feature and more readable. |
| Xiaomi | Yes |  |
| Vodafone | Yes | Ok to replace Slice Group with NSAG. According to my understanding the Information about the slice (NSSAI) is not provided over the radio and it is based on NSAG, not on the slice itself. I feel it is better to align to NSAG everywhere. |
| Qualcomm | Yes | Agree to keep use NSAG to replay slice-group. And for concept related description, can use slice-based/aware/specific cell reselection. |
| Huawei, HiSilicon | Yes | Agree to use “NSAG” to be aligned with SA2. |
| Lenovo | Yes | Agree with the exceptions to NSAG usage as suggested by Ericsson and NEC. |
| Intel | Yes | Consistent terminology across all the specs. |
| OPPO | Yes | Ok to use NSAG instead of slice group. For the concept related description, we suggest to use slice-specific or slice-based cell reselection. |

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

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| **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) |
| Ericsson | 1 | We agree with Nokia. |
| CATT | Opiton1 | As we explained in R2-2205466, when the serving cell meets the condition1, i.e. Srxlev ≤ SnonIntraSearchP or Squal ≤ SnonIntraSearchQ the UE will continuously perform measurement on all the frequencies with high, equal and low priorities. When the serving cell meets the condition2 that Srxlev > SnonIntraSearchP  and Squal > SnonIntraSearchQ, the UE only considers the frequencies with higher priority.  In condition1, the re-sorting will have no impact on measurement as all frequencies will be performed measurement.  In condition2, it is possible that the re-sorting may cause some frequency’s priority lower than serving frequency. But **the UE should also continuously perform measurement on this frequency**. Because, the highest ranked cell on this frequency may changes, this frequency with temporary lower priority may have a higher priority later.  So the re-sorting should not have impact on measurement. The EN can be removed. |
| NEC | Option2 or 3 | Ai indicated by Nokia and Ericsson in Q2.2, It is a real problem case: when the measurement on a deprioritized frequencies are inhibited, UE will not know the change of the best ranked cell.  So we have to somehow let the UE still come back to measure the deprioritized frequencies. We are fine with either way:  Option2: UE kind of always measure the frequency even after being deprioritized  Option3: go as Nokia proposal for Q2.2. UE will measure the frequency every 300s till the change of the best rank cell. |
| Samsung | Option 1 (with comment) | Current text in 5.2.4.5 may cause an issue if there are two cells of a neighbour frequency that satisfy cell reselection criteria, at the same time, and the not-best cell doesn’t support some slices.  Hence we suggest to change “a cell” in 5.2.4.5 to “best cell in a frequency” as there could be multiple cells satisfying cell reselection criteria.  “For a UE performing slice-based cell reselection if the best cell in a frequency fulfils” |
| Spreadtrum | Comment | Firstly, the point we want to discuss here is whether the frequency priority used in measurement rule is from SIB/RRCRelease directly or the slice-specific frequency priority derived in clause 5.2.4.11.  If the frequency priority is provided in SIB/RRCRelease, then no measurement impact will happen, because the actual priority used for measurement doesn’t change.  If the frequency priority is derived by slice-based cell reselection rule, then it actually consider the slice group priority provided by NAS and frequency priority provided in SIB/RRCRelease. And the frequency support higher priority slice group should have higher slice-specific frequency priority.  “When the serving cell meets the condition2 that Srxlev > SnonIntraSearchP  and Squal > SnonIntraSearchQ, the UE only considers the frequencies with higher priority.”  So in above condition, if serving frequency doesn’t support any slice group, there is no impact on measurement after re-deriving priority of a frequency. (What if the highest ranked cell doesn’t support a second slice group, the re-deriving priority only consider legacy frequency priority? If it is lower than serving frequency..)  If serving frequency support slice group, its frequency priority is considered by the slice group it support and is higher than the frequency that only support the lower slice group. (One weird point here is that UE may not measure the frequencies support lower priority slice group, thus UE may not reselect to those frequencies).  And according to current re-deriving rule, if the highest ranked cell support the slice group which has lower priority than the slice group serving frequency support. After re-deriving, its slice-specific frequency priority will lower than serving frequency. Thus it may not be measured any more.  With above analysis, we suggest that maybe one clarification can be added:  “The measurement should depend on the original frequency priority regardless of the re-derived priority ” |
| Xiaomi | Option1 | If we not to apply the re-derived priority to measurement rule, a frequency which is lower than the serving frequency at first but is prioritised over the serving frequency after re-sorting may not be measured when the condition Srxlev > SnonIntraSearchP  and Squal > SnonIntraSearchQ met. In this case, how to judge whether there is a suitable cell to be reselected.  Thus, we’d like to keep the current measurement rules. |
| Qualcomm | Option 1 | Re-deriving the frequency priority based on the best ranked cell supported slice group is needed since we should always comply with the best ranked cell rule. And also agree with question 2.2, there should be some mechanism to allow UE to re-derive frequency priority if the best ranked cell changed. |
| Huawei, HiSilicon | Option 1 |  |
| Lenovo | Option 3 | We think definitely there will be some impact on UE measurements, if by “impact” it is meant that the UE will have to do something “different” because of the “new re-sorting” step e.g., change the order in which it would have measured frequencies otherwise.  A different question is if this will affect UE battery adversely if/ since new measurement rule(s) resulting into new measurements will be needed (I think companies are rather interpreting the question in this sense?), that will depend on if the “affected frequency (of the highest priority cell in question)” would need to be measured again (which may be the case depending on what the “re-sorting” produces) or worse even continuously (this is what we should address in Q2.2). |
| Intel | Option 1 | We haven’t identified any new impact from this beyond the measurements UE already is required to do during normal cell reselection, for example, if the frequency priority in SIB changes. |
| OPPO | Option 1 | We see no additional rule is needed since the change of frequency priority is not a new procedure. |

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 - 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)?

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| **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. |
| Ericsson | See comment | We agree with the comment by Nokia, on the conflict with the measurement rules. (1) If (according to the measurement rules) UE continues to measure the frequency, existing text will have better cell re-selection performance.  (2) But (according to the measurement rules) UE inhibits measurements of the frequency, we agree it is unclear that the UE detects change of best cell on the frequency. Probably (1) is the most likely case in real nw. |
| CATT | No | We prefer to stick to the existing text.  In our understanding, the resorting is introduced when the supporting highest priority slice of highest ranked cell is different with the corresponding frequency. The changed frequency priority depends on the highest ranked cell. So after the highest ranked cell changes, the changed frequency priority should not be valid. |
| NEC | Yes | See answer to Q2.1 |
| Samsung | Yes |  |
| Spreadtrum | No | Please see our answer to Q2.1. If the measurement depend on the original frequency priority regardless of the re-derived priority. The recalculated cell reselection priority may not need to maintain valid within 300s. |
| Xiaomi | Yes, and | We’d like to clarify that the NSAG information including the NASG and NASG priorities.  Besides, some other conditions also needs to be considered. E.g. the highest ranked cell changes, the supported slice of a frequency/cell changes, UE enters to any cell selection state. |
| Qualcomm | Yes | Agree with Nokia on the issue, UE should be allowed to re-derive the frequency priority if the best cell changes on that frequency. |
| Huawei, HiSilicon | Yes | In addition, in our paper R2-2205080, we propose to clarify UE behaviours in case the NAS updates the NSAG to the AS, i.e. P2 as below. In our opinion, this kind of update behaviour (initiated by NAS) may be infrequent, and if it is overlapped with an ongoing AS NSAG cell reselection procedures, it is simple to just re-start the AS procedure.  **Proposal 2: When the UE NAS sends the new slice group priorities to the UE AS, the UE should update the slice group specific cell reselection priorities and re-starts the procedure of cell reselection based on this updated information.** |
| Lenovo | Yes | The intention to not force the UE to continuously monitor the affected frequency is correct. We also agree that a max of 300 seconds are used at several places in the 38.304 in similar situations. |
| Intel | Yes | This is required to allow the UE to check if the highest ranked cell in the original highest priority frequency has changed and now supports the highest ranked cell. 300s is the value we use in 304 to allow UE to check get back to previous situation and re-evaluate if needed. |
| OPPO | Yes | There should be a way to let the UE know if the best-ranked cell changes and to avoid the continuous monitoring of the potential frequency. |

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?**

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| **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. |
| Ericsson | No | It is not needed, since legacy frequency priorities will be used if there are no slice specific priorities for a prioritized slice. |
| CATT | Yes | We have the sympathy that the sentence is to restrict that the UE should perform legacy cell reselection when SIB/RRCRelease only provides NSAG(s) which are not configured by NAS. The current 304 CR seems not cover this case. We are fine to add this sentence. |
| NEC | Yes | It looks more clean/readable to branch out from slice-based cell reselection in this case.  If majority do not want, we will be compromise to not have this since indeed the UE will still use the legacy priorities after running through the section 5.2.4.11 |
| Samsung | No | Same view expressed by some companies (above). No need to add the sentence, since it is clear that the UE will use legacy cell reselection in this case. |
| Spreadtrum | Yes | Agree with CATT and NEC, it covers the case that “UE should perform legacy cell reselection when SIB/RRCRelease only provides NSAG(s) which are not configured by NAS.” Though from our side, the above is a rare case.  And considering the condition for UE derive slice-based cell reselection priority, we also propose in R2-2204746 that if legacy dedicated priority is provided in RRCRelease and T320 timer does not expire, UE should not perform slice-based cell reselection. |
| Xiaomi |  | We are open to have this sentence as other companies indicates that UE will use the legacy priority if no slice group priorities provided. |
| Vodafone | Yes | To me, it also looks more clean if the sentence is there, but if there is no match between NAS and AS provided NSAGs, it makes probably a bit more dedicated clear, slice based reselection can not be used |
| Qualcomm | No | It is not needed. Online session agreement to add the condition “*UE has received slice group priority information from NAS*” is enough, based this condition, UE will know whether to perfomr slice based cell reselection procedure. The condition of question 3 is already covered by the defined principles in 304. |
| Huawei, HiSilicon | No | Agree with other companies that the UE will use legacy cell reselection in this case. |
| Lenovo | Yes | Absolutely. There’s a subtle difference between using this as a condition and relying on the fallback from 5.2.4.11. The former serves as a pre-requisite to trigger the slice based cell reselection, the latter works like an exit condition or a fallback and some efforts may be wasted until the UE realizes the fallback situation. |
| Intel | No | The interaction between NAS and AS is not clearly specified. There are already two scenarios mentioned in SA2 spec, including when the slices are not in the current TA and the final NAS/AS interaction is left to UE implementation. So we should not go into this aspect in the normative AS spec. |
| OPPO | No | There is not much room for misinterpretation. Even without this sentence, the UE will use the legacy cell reselection. |

* 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:

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| --- |
| 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?**

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| **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) |
| Ericsson | Yes | Ok to add this, although not strictly needed. |
| CATT | Yes |  |
| NEC | Yes | Agree with other companies’ comment |
| Samsung | Yes |  |
| Spreadtrum | Yes |  |
| Xiaomi | Yes |  |
| Vodafone | Yes | I think it is correct to add this condition |
| Qualcomm | Yes |  |
| Huawei, HiSilicon | Yes |  |
| Lenovo | Yes |  |
| Intel | May be not | We don’t see this essential – it seems already covered by the previous two bullets – which are applicable only “if provided in system information of the serving cell and/or dedicated signalling”. If neither is provided, only the first bullet applies. |
| OPPO | Yes |  |

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.

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| --- | --- | --- |
| **Company** | **YES/NO** | **Comments** |
| Apple | Yes | But we need to keep an eye on 331 spec update from this meeting. |
| Nokia | YES |  |
| Ericsson | No, but | In RIL E140, we proposed to use separate field names for clarity, both in the spec and general feature understanding. We do think this is preferred way. E.g. we would avoid phrases like “prioritized in the order of their non slice group specific cellReselectionPriority, that looks quite odd.  We will not push strongly for this, still this is our preference  [NEC: We support Ericsson’s proposal in RIL E104 to use different field names: *CellReselectionPriority* for legacy priorities configuration and *sliceSpecificCellReselectionPriority* for slice specific priorities configuration.  we could change accordingly after it is concluded on this in another email discussion.] |
| CATT | No | As the field name in 331 spec may change according to the discussion on RRCRelease. And the *SlicegroupID* may be changed to *NASGID*. In order to avoid repeating modification, we prefer that these changes can be updated after the 331 spec is finalized.  We agree with Ericsson to use separate field names for cellReselectionPriority and sliceSpecificCellReselectionPriority. |
| NEC | Yes |  |
| Samsung | Yes |  |
| Spreadtrum | Yes |  |
| Xiaomi | Yes | The changes on 331 spec in this meeting should also be captured in. |
| Qualcomm |  | The term of Slicegroup ID needs to be aligned with CT1 term. Agree with Ericsson for others. |
| Huawei, HiSilicon | Yes |  |
| Lenovo | Yes | We are generally fine with the intention but would request Rapps of both specification to closely work and inform us about any specific naming issues. |
| Intel | See comments | Agree with E/// comment. We should use different terms. non slice group specific cellReselectionPriority, does looks quite odd. |
| OPPO | See comments | Similar view as Ericsson and Intel. |

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

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| 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

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| 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**

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| --- | --- | --- |
| **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. |
| Ericsson | Option 2 | This alternative would get the wanted behaviour also in the case when there is no legacy priorities in the RRC Release, but slice specific priorities are included for a slice on a frequency that is currently out of coverage for the UE:  UE will have legacy behaviour (follow legacy priorities in SIB) as long as the slice is out of coverage. With option 1, the UE would not be able to do “fallback to legacy cell re-selection”, unless also legacy priorities are included in the RRCRelease. When legacy priorities are included, they will typically be valid in the full RA, as compared to priorities from SIB in cells (where they may change more often, per cell). |
| CATT | Option3 | If option 1 is adopted, the UE has no legacy priority information when only slice specific priority is provided in RRCRelease. This will cause the UE cannot perform leacy cell reselection when slice based cell reselection fails. So when the slice specific priority is provided in RRCRelease, the legacy priority is also required to be included simultaneously.  However, in our understanding, when UE performs slice based cell reselection based on dedicated priority, the slice related information is most important. For the legacy priority, using the information in SIB is sufficient. There is no need to add the legacy priority information in RRCRelease message all the time.  So we think we should stick to the previous agreement **that only legacy priority or slice specific priority is provided in RRCRelease**.  If only slice specific priority is provided in RRCRelease, UE shall ignore slice specific priority in SIB;  If only legacy priority is provided in RRCRelease, UE shall ignore all frequency priority in SIB. Because the NW knows UE’s capability and this means the NW don’t want configure slice specific priority for the UE. So we provided another option3 which seems more aligned with current spec.  **Option3:**  Only legacy priority or slice specific priority is provided in RRCRelease  If only slice specific priority is provided in RRCRelease, UE shall only ignore slice specific priority in SIB;  If only legacy priority is provided in RRCRelease, UE shall ignore all frequency priority in SIB. |
| NEC | Option1 | We agree with Nokia.   * Mixing RRCrelease and SIB information configured by two different gNB is not a good idea * Even in legacy case, we do not mix EUTRAN priorities and NR priorities from RRCRelease and SIB respectively. |
| Samsung | Option 1 (with comments) | We generally agree with the intention of Option 1, however, we propose to include inter-RAT configuration along with slice specific frequency configuration in *RRCRelease* message as described in [[R2-2205616](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_118-e/Docs/R2-2205616.zip)]:  **Proposal 2: Inter-RAT cell reselection priorities can be included independently from dedicated signaling of slice information.**  See also our answer to **Question 7.2**. |
| Spreadtrum | Option3 | We share similar view with CATT. |
| Xiaomi | Option 3 | Agree with CATT. |
| Vodafone | Option 1 | We agree with proponents of option 1. |
| Qualcomm | Option 4 (or Option 1 further clarification) | We have some empathy with Nokia mentioned “*As RRCRelease and SIB information may come from different gNBs*”, then the UE may mixed slice based and legacy cell reselection priorities coming from different gNBs. We are not quite understanding why we can not support full configuration-like in RRCRelease message, that means gNB should be allowed to configure both “freqPriorityListNR” and “freqPriorityListNRSlicing-r17”. With this, UE will ignore all the cell reselection priority in SIB. So we propose option 4 or make option 1 more clear:  **- gNB is allowed to include multiple types of cell reselection priorities in dedicated RRCRelease message.**  **- UE should ignore all types of cell reselection priorities in SIB16 on receiving any type of cell reselection priority in dedicated RRCRelease message.**  **- Existing t320 is applied for all types of dedicated cell reselection priority.** |
| Huawei, HiSilicon | Option 2 | We think the main benefit of option 2 is to utilize legacy cell reselection info as much as possible, so the UE could be possible to go to legacy cell reselection.  Option 3 (by CATT) is also acceptable if majority of companies prefer it. |
| Lenovo | Option 2 | First, we do not believe that a gNB shall provide all information in RRCRelease simply since it can! Signalling efficiency is always important, not just theoretically.  Second, legacy priority and slice based priority are two different things and even like apples and oranges. Say after 5 minutes of being released, some UEs may see cells supporting its desired slice (and therefore should apply slice based reselections) and others may not (and therefore these apply legacy reselection procedure). So, there can’t be a blanket overwriting.  To clarify this further, we take an example:  Freqency1-SliceA-priority1  Freqency1-SliceB-priority2  Freqency1-priorityP  If the gNB provides only priorityP for frequency 1, the slice specific priorities (Freqency1-SliceA-priority1 and Freqency1-SliceB-priority2) must not be overwritten. In fact, the over-writing must only be done SliceGroup-Frequency pair wise i.e., Freqency1-SliceA-priority1 if provided dedicatedly should not overwrite Freqency1-SliceB-priority2 received from SIB. |
| Intel | Option 1 with comments | Dedicated signalling should override broadcast; otherwise, dedicated signalling is not of much use.  Network should be able to use legacy dedicated priority based solutions even if the cell and UE supports slice based cell reselection.  Based on these, we support option 1 in general.  But UE cannot totally ignore broadcast legacy priorities as some of it still applies even with slice based cell selection. So even if the network provides slice based information in RRC Release, this legacy priority should be considered from the SIB.  We also do think we should not allow both legacy priority and slice information in RRC release at the same time. |
| OPPO | Option 3 | Similar view as CATT on the most part. As we indicated in R2-2204762, if the UE is not allowed to use the legacy priorities in SIB when no slice-supporting cell is found based on the slice information from *RRCRelease*, the UE may not find a suitable cell to camp on. We should resolve this issue. |

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

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| 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?**

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| --- | --- | --- |
| **Company** | **YES/NO** | **Comments** |
| Apple | Open for discussion | Offline #240 is also discussing this issue. |
| Nokia | YES |  |
| Ericsson | Yes | The note was added before it was agreed to use the legacy parameters as fallback. Since both set of parameters are used for slice aware cell re-selection, it should be possible to include both. |
| CATT | No | This is the previous agreement. We prefer to reserve this note to reflect the previous agreement. |
| NEC | Yes | Network should be allowed to reconfigure both legacy and slice based cell reselection information by RRCRelease.  We want to point out especially that :  If option 2 is agreed and we keep this restriction of configuring only either of two. Network will not be able to disable slice-based cell reselection by sending only legacy priority in RRCRelease, which is not acceptable.  If option1 is agreed and we keep this restriction, UE will not be able to have both slice specific and legacy priorities to be used |
| Samsung | No (see comments) | * **Note 6 is removed:** i.e., NW configures both legacy and slice specific priorities in *RRCRelease* message, then RAN2 would need to clarify UE behaviour on how to select between legacy and slice specific priorities in this case (e.g. based on UE implementation). * **Note 6 is kept:** then the question is how to handle the Inter-RAT case, this needs to be discussed in RAN2. * **Note 6 modified**: our preference is to keep Note 6, but to clarify that for the Inter-RAT case, the UE still needs to get the dedicated cell reselection priorities as in legacy but with a modification that takes into account the inclusion of slice information in NR case. So we propose the following update to Note 6:   NOTE 6: The UE is configured with either dedicated cell reselection priorities for NR or slice or slice group specific frequency priorities in the *RRCRelease* message. For Inter-RAT case, if UE is configured with slice info in *RRCRelease* message, the UE can be also configured with the EUTRA part of existing dedicated priority configuration (i.e. *freqPriorityListEUTRA*). |
| Spreadtrum | No | We prefer to keep the note to reflect the previous agreement. |
| Xiaomi | No | We prefer to stick with the previous agreement. |
| Vodafone | No | I think, a clarification similar to Samsung is needed |
| Qualcomm | Yes | As we discussed and commented in Question 7.1, it is beneficial to allow gNB providing multiple types of cell reselection priorities. For inter-RAT case, the handling should be same as legacy NR frequency. |
| Huawei, HiSilicon | No |  |
| Lenovo | Yes | We do not see one single benefit of keeping this note. The UE behaviour needs to specified as the subject matter of Q7.1 |
| Intel | No | As mentioned in our previous comment, we do not see it essential for network to provide both in the same RRC Release message. There is a corner case though, as mentioned by Samsung, that inter-RAT legacy priority that are still applicable for slice based cell reselection could be provided by RRC Release to override the ones in broadcast. |
| OPPO | No |  |

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

4 Conclusion

TBD.