3GPP TSG-RAN WG2 Meeting #119-e R2-22xxxxx

Electronic, 17th – 29th August, 2022

Source: Qualcomm Incorporated (Rapporteur)

Title:  [AT119-e][241][Slicing] Cell reselection corrections to RAN slicing

Document for: Discussion and Decision

# 1 Introduction

This document aims at gathering and summarizing companies views for the following offline discussion:

* [AT119-e][241][Slicing] Cell reselection corrections to RAN slicing (Qualcomm)

      Scope: Discuss cell reselection aspects for RAN slicing marked for this discussion and attempt to provide 38.304 CR if corrections are required.

Intended outcome: Report in in [R2-2208773](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2208773.zip). Merged 38.304 CR in [R2-2208774](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2208774.zip).

Deadline: Deadline 1 (report) / Deadline 2 (final CRs)

The following contributions are considered in this email discussion according to Chair indication.

By Email [241] (13)

[R2-2207678](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207678.zip) Miscellaneous corrections to slice-specific cell reselection Spreadtrum Communications discussion Rel-17

RAN sharing and equal priorities:

[R2-2208003](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2208003.zip) Support of RAN sharing and equivalent PLMNs with slice specific cell reselection Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_slice-Core

[R2-2208446](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2208446.zip) Correction on the rules in equal priority case for slice-based cell reselection CMCC, OPPO, Huawei, HiSilicon CR Rel-17 38.304 17.1.0 0279 - F NR\_slice-Core

[R2-2208519](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2208519.zip) Issues with slice specific cell reselection Samsung R&D Institute India discussion

[R2-2207952](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207952.zip) Discussion on the details of slice specific cell reselection Huawei, HiSilicon discussion Rel-17 NR\_slice-Core

[R2-2208143](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2208143.zip) Corrections on slice-based cell re-selection in TS 38.304 Ericsson discussion Rel-17 NR\_slice-Core

[R2-2207934](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207934.zip) CR to cleanup slice specific cell reselection Apple CR Rel-17 38.304 17.1.0 0268 - F NR\_slice-Core

[R2-2207953](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207953.zip) Corrections on TS 38.304 for RAN Slicing Huawei, HiSilicon CR Rel-17 38.304 17.1.0 0269 - F NR\_slice-Core

[R2-2208517](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2208517.zip) Correction on per-TA NSAG for slice specific cell reselection Qualcomm Incorporated CR Rel-17 38.304 17.1.0 0280 - F NR\_slice-Core

[R2-2208607](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2208607.zip) 38.304 CR Corrections on slice-based cell reselection Xiaomi, OPPO, CMCC draftCR Rel-17 38.304 17.1.0 F NR\_slice-Core

[R2-2208296](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2208296.zip) Possible configuration mismatch in slice specific cell reselection Kyocera discussion

[R2-2207337](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207337.zip) Correction for cell reselection Lenovo discussion NR\_slice-Core Late

[R2-2207338](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207338.zip) CR for Correction for cell reselection Lenovo CR Rel-17 38.304 17.1.0 0259 - F NR\_slice-Core Late

# 2 Company contact details

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# 3 Discussion

**Issue 1: Slice cell list related issues**

Contribution R2-2208519 and R2-2208143 discuss slice cell list related issue, and they have proposals in the following table. Rapporteur also provides initial view in the table for discussion reference.

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| Contribution | Proposal | Rapporteur’s view |
| R2-2208519 Samsung R&D Institute India | (Issue 1-1) Proposal 7: RAN2 to discuss whether gNB can avoid duplication of the sliceCellListNR for multiple NSAGs associated with the same TAC.  (Issue 1-2) Proposal 8: If the above duplication can be avoided, when the UE receives sliceCellListNR for one NSAG associated with a TAC, it may use the same sliceCellListNR for other NSAGs associated with the same TAC. |  |
| R2-2208143 Ericsson | - if sliceCellListNR is provided for the frequency, the cell is either listed in sliceAllowedCellListNR or not listed in sliceExcludedCellListNR  (Issue 1-3) Proposal 1 The section on the sliceCellListNR is corrected as described above  (Issue 1-4) Proposal 2 If the UE have recently received slice support information from a Target cell, or another cell in same TA, and it is not the same as indicated by the cell list, the UE may use the slice support information received from the cell to update the cell re-selection priorities. | Rapporteur understands network should ensure correct and complete cell list configuration to UE. The scenario mentioned in the contribution should be a rare case. |

Companies please to provide view on each sub-issue (Issue1-x) for Issue 1 in the above table.

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| Company | View or comment on each sub-issue |
| Apple | Issue 1-1/1-2: Though it is reasonable that for the same TAC, the cell list should be the same. But at this late stage, do we really need to optimize ASN.1?  Issue 1-3: P1 is editorial change, no strong view.  Issue 1-4: P2 is pure UE implementation, should have no impact to spec. |
| Nokia | **Issue 1-1/1-2:** Optimization: reasonable but may be too late  **Issue 1-3:** Disagree. The proposed text requires a cell to be in one of the lists which should be left to network decision. We prefer to keep the current text  **Issue 1-4:** Disagree. We do not think that the UE can override the information received from network (e.g., network reconfiguration may have happened, or at least UE cannot know which information is correct) |
| Lenovo | Issue 1-1/1-2: Some signalling optimization would be possible but at this late stage, we aren’t sure if RAN2 wants to do that.  Issue 1-3: We find the current text to be readable and accurate and therefore do not see any necessity to change anything.  Issue 1-4: Not sure why specification needs to take care of network erroneous behaviour. |
| Samsung | Issue 1-1/1-2: Proponent. Current signalling structure is too far inefficient in the sense that gNB has to broadcast the same date four times in the SIB. We prefer to fix such signalling overhead considering that we just update the field description accordingly. But we also acknowledge that this may be regarded as optimization at this late stage so we are OK to follow majority view for the progress as a compromise.  Issue 1-3: Disagree. As others commented, we also think that current text is more readable and accurate.  Issue 1-4: Disagree. It is not clear to us why UE needs to take care NW's misconfiguration, which looks like tiny optimization. |
| Spreadtrum | Issue 1-1 and 1-2: Disagree. The motivation is to reduce the size of slice info. However, it is still confusing to decide which set of cell list should be refer to, when there have two NSAGs using the same TAC but configured with different sets of cell list. Maybe the extra NSAG association should also be provided to solve this issue but it will make things more complexity. Thus we prefer to use current structure to keep it easy to understand.  Issue 1-3: Disagree. Current description is clear.  Issue 1-4: Disagree. Network should be responsible for the alignment of slice info. |
| Huawei, HiSilicon | Issue 1-1/1-2: No need to clarify it in the spec. Whether to use TAC, the cell list, or TAC plus the cell list to make the UE be aware of NSAG(s) supported by neighbour cells can be handled via network implementation. And the relevant proposals will bring extra complexity of UE implementation.  Issue 1-3: No strong view.  Issue 1-4: Share the same view with the Rapporteur. |
| NEC | Issue1-1/1-2, disagree. The associated TAC is the TAC where the NSAG and its associated NSSAIs is valid, even if two NSAG(s) are valid in the same TA, it does not mean it is supported on the same cell set.  Issue 1-3, we are fine with the rewording  Issue 1-4, we prefer network/OAM to make sure the configuration. |
| Intel | Issue1-2/1-2: I am a bit confused by proposal 7 as the TP does not seem to have any changes. Proposal 8 is also not entirely clear if it will work properly when the NSAGs supported by different TACs are different and hence the cell list could be different. We are open to consider it if it is certain that it works and is not complex.  Issue 1-3: No strong view. The new proposed wording is shorter but perhaps not as easy to understand as the previous one.  Issue 1-4: If I am understanding the proposal correctly, this can happen at TA border and the different will be apparent to the UE only after UE has read the TA of the new cell (after reselecting it). But it is not clear to me what is the real reason for this mismatch and how frequently it will happen. Hence we don’t support it at this time. |

**Issue 2: Serving cell support for NSAG**

Contribution R2-2207952 clarifies how to indicate the NSAG for serving cell and also frequency priority for serving frequency as follow, Rapporteur also provides initial view in the table for discussion reference.

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| Contribution | Proposal | Rapporteur’s view |
| R2-2207952 Huawei, HiSilicon | (Issue 2-1) Proposal 1: It is proposed that RAN2 agree to indicate the serving cell by using sliceAllowedCellListNR or sliceExcludedCellListNR.  (Issue 2-2) Proposal 2: It is proposed that RAN2 agree the following:  Frequencies that support at least one NSAG provided by NAS are prioritised in the order of the NAS-provided priority:  - for the NSAG with highest priority supported on the frequency for the non-serving frequencies  - for the NSAG with highest priority supported on the serving cell for the serving frequency | P1: Rapporteur understands slice specific cell reselection is not applied to intra-frequency and seems the NSAG indicated in dl-ImplicitCarrierFreq-r17 for serving frequency should be supported by serving cell. Maybe the proponent need to clarity in which case the indicated NSAG for serving frequency is not supported by serving cell. |

Companies please to provide view on each sub-issue (Issue2-x) for Issue 2 in the above table.

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| Company | View or comment on each sub-issue |
| Apple | Issue 2-1: Agree. We have the same proposal in R2-2207932/R2-2207933. Regarding rapporteur’s question, it is possible if serving cell is at the border of the TA then serving cell can still configure the NSAG available in neighbour cells which belong to another TA. And again, slice specific related frequency configuration is critical to serving frequency and serving cell for UE to determine other frequencies’ priority. Note that the higher priority and lower priority of inter-frequencies are determined based on serving frequency’s priority.  Issue 2-2: Do not agree. We are afraid something is missing here. There may be a case where intra-freq cell reselection criteria is met but the best cell (which is not current camping cell) does not support the NSAG. Then serving frequency's priority would be deprioritized. In this scenario, serving frequency's priority is not determined by serving cell but by the best cell on this frequency. |
| Nokia | **Issue 2-1:** Disagree. The UE knows that the current cell supports the allowed slices, and the band priorities are valid for the band of the serving cell. Note that slice-based cell reselection information is not targeting to provide complete slice availability information: a band/cell may support slices of an NSAG even if it is not prioritized for that NSAG.  **Issue 2-2:** Disagree |
| Lenovo | Issue 2-1: Do not agree – We think that ‘*dl-ImplicitCarrierFreq-r17*’ for index value 0 corresponds to the serving frequency and therefore, the included cell lists in the corresponding *sliceInfoList* can of course have serving cell Id. Then based on this the UE can “analyse” cell lists for all the slices included for the serving frequency and find out which NSAGs are supported in the serving cell.  Issue 2-2: Do not agree – Changing the age old principle that if a serving cell quality is above a certain threshold (e.g., SnonIntraSearchP), UE does not perform Inter Frequency measurement – violating this and still doing measurements can be harmful for UE battery. |
| Samsung | Issue 2-1**:** Disagree.UE already gets this information from RA, no need to broadcast again. Further SIB 16 contains configurations of slice specific cell reselection information. Thus, it is strange to signal serving cell information in SIB16, which is irrelevant of cell reselection  Issue 2-2:Disagree. It actually changes existing measurement principle so we should not pursue this optimization at this late stage. |
| Spreadtrum | Issue 2-1: Agree. Share similar view with Apple. And the same issue is also discussed in [240] email discussion.  Issue 2-2: Disagree. The serving cell may not be the strongest cell on the serving frequency. |
| Huawei, HiSilicon | Issue 2-1: Proponent. We have the similar view as Apple, and we think the issue here is that the UE can not get slice specific frequency priority information for the serving cell.  Issue 2-2: Proponent. We also agree that Re-sorting should be applicable for this rule. |
| NEC | Issue 2-1, we should first discuss whether and how to use the information (issue 2-2 and there are other proposals), then we can agree to indicate serving cell in cell lists  Issue 2-2, we have sympathy on this proposal. Serving cell can be understood as the best cell on serving frequency, as same as for other frequency, if the best cell on a frequency does not support the highest prioritized NSAG, the frequency priority should be rederived based on the highest NSAG supported on best ranked cell. on the other hand, alternatively we just need to make it clear that re-sorting text in the specification is applicable to the serving frequency as well. |
| Intel | Issue 2-1: Disagree. In our understanding the cell list is an exception list for neighbour cells if it supports a different set of slices from the current cell. The slices supported by the frequency list should provide the current cell slice list. There are different ways to provide this information and perhaps the proponent companies have a different view.  Issue 2-2: Do not agree. While we understand there may be some corner cases (based on unequal cell coverage) where UE may not reselect F1 cell 2, we think the cell list can address most of these cases. |

**Issue 3: Dedicated slice specific cell reselection related**

The following contributions proposes changes or clarifications related to dedicated slice specific cell reselection. Rapporteur provides initial view for the some proposals for reference.

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| Contribution | Proposal | Rapporteur’s initial view |
| R2-2208519 Samsung R&D Institute India | (Issue 3-1) Proposal 1: The UE doesn’t perform slice based cell reselection if SIB16 is not broadcasted even if it has dedicated slice information available.  (Issue 3-2) Proposal 2: If a frequency is present in received FreqPriorityListDedicatedSlicing and not in FreqPriorityListSlicng in SIB16, the UE considers none of the (priortised) NSAGs are available for this frequency.  (Issue 3-3) Proposal 3: If an nsag-id in the FreqPriorityListDedicatedSlicing is not present in the FreqPriorityListSlicing in SIB16, the UE considers this (prioritised) NSAG is not supported by the frequency. | P1: The intention of dedicated NSAG based cell reselection is to provide the UE the configuration which is not included in SIB. For the issues the contribution mentioned, rapporteur understands it should rely on RAN implementation to guarantee the dedicated slice frequency priority is valid, i.e. it only configure for the frequencies with all cells deployed NSAG. otherwise, RAN should broadcast the cell list in SIB.  P3: SliceInfoListDedicated-r17 may need to be changed to mandatory as proposed in R2-2207818. |
| [R2-2207934](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207934.zip)/ R2-2207932 Apple | (Issue 3-4) 5) Clarify that UE shall only perform slice specific cell reselection evaluation for NR frequencies supporting the NSAG(s) and associated valid TAI(s) as received in *RRCRelease* message that are also given in system information of the camping cell. |  |
| R2-2208296 Kyocera | (Issue 3-5) Proposal 1 RAN2 should discuss how to avoid the inconsistent configurations by the AMF and the gNB, especially in case the UE has not received any NSAG priority information from the AMF and it received RRC Release containing only nsag-CellReselectionPriority from the gNB, i.e., the UE could not apply any cell reselection priorities.  (Issue 3-6) Proposal 2 RAN2 should agree that the UE does not ignore cellReselectionPriority in SIB, in case it has not received NSAG priority from the AMF and RRC Release contains only nsag-CellReselectionPriority.  Proposal 3 RAN2 should agree the text proposal for TS 38.304 as above. | Rapporteur understands that this issue was discussed in the last meeting, and was agreed RAN should provide both of dedicated cell reselection priority and dedicated slice specific cell reselection priority if the RAN wants the UE to perform legacy cell reselection. if the legacy cell reselection priority is absent in release message, that means NW does not require UE to perform legacy cell reselection. |

Companies please to provide view on each sub-issue (Issue 3-x) for Issue 3 in the above table.

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| Company | View or comment on each sub-issue |
| Apple | Issue 3-1/3-2/3-3: We agree with P1-P3 in contribution 8519.  Issue 3-4: proponent.  Issue 3-5: Since RAN node has no knowledge whether AMF configures UE with NSAG priority, we do feel the problematic scenario may happen. But we would like to discuss if NW specific solution should be considered to avoid this mismatch, e.g, some signaling from AMF to RAN about NSAG priority configuration. |
| Nokia | **Issue 3-1/3-2/3-3/3-4:** Disagree. The dedicated signalling can contain information about more NSAGs than information in SIBs. We should not fix wrong network implementation.  **Issue 3-5:** Disagree. We should not specify how to handle network misconfiguration. The current specification is clear that if there is no NSAG information from NAS, the UE does not perform slice specific cell reselection.  **Issue 3-6:** Not needed. We think this has been clarified. |
| Lenovo | (Issue 3-1) Proposal 1: Agree. Every cell can control if it wants slice based cell reselection to be used by camping UEs.  (Issue 3-2) Proposal 2: Do not agree. Dedicated information for a frequency/ NSAG could be UE specific, applicable in a different location/ geography. If the SIB16 does not contain a frequency then UE does not expect neighboring cells on the said frequency.  (Issue 3-3) Proposal 3: Do not agree. Dedicated information for a frequency/ NSAG could be UE specific, applicable in a different location/ geography. If the SIB16 does not contain a NSAG (for a frequency) then UE does not expect neighboring cells on the said frequency supporting the said NSAG.  (Issue 3-4): Nothing needs to be done. The UE respects/ trusts the neighbour cell slice information provided in SIB16. If SIB16 does not have a certain frequency listed then neighbour cells in this frequency are not available in the neighbourhood, even if the dedicated list has this frequency included.  (Issue 3-5): Not AS responsibility do anything about it, can be taken care if NAS. Therefore, “in case the UE has not received any NSAG priority information from the AMF and it received RRC Release containing only *nsag*-*CellReselectionPriority* from the gNB”, NAS needs to resolve this and provide some default NSAG with corresponding priority. In the first place this should not happen since AMF knows UE’s location on cell/ TA level and also knows its capability.  (Issue 3-6): Perhaps: If SA2/ CT1 do not have a solution for the case where AMF does not provide NSAG list, then UE should not resort to slice based cell reselection. We need to confirm this with SA2/ CT1. |
| Samsung | Issue 3-1/3-2/3-3/3-4: Proponent of 3-1/3-2/3-3 and 3-4 is similar to 3-1.  Though the dedicated information can contain information about more NSAGs than in the SIBs, UE doesn’t know whether they are actually supported by the cell unless it is present in SIB.  It is not clear in the spec how the UE should behave. So we have two choices  1. Follow the dedicated information irrespective of the presence of availability indication. Even if NSAGs are not present in the CellListNR,they will be considered for slice based cell reselection.  2. Consider NSAGs based on both dedicated and system information. NSAGs need to be present in both CellListNR in system information and dedicated slice information, to be considered as available  In any case, we need to clarify this behaviour in the spec (either option 1 or option 2) as dedicated information can contain information about more NSAGs than in the SIBs .Otherwise different UEs may have different behaviour with respect to slice specific cell reselection and this undefined behaviour is not desirable.  We think option two is more reasonable and proposal 3-1/3-2/3-3 clarifies this.  Issue 3-5/3-6: Not needed, current text already clarifies it. |
| Spreadtrum | Issue 3-1: Disagree. It should be RAN responsibility to guarantee the alignment. The gNB should confirm that SIB16 had been broadcast firstly then RRCRelease can be indicated to UE. Otherwise, we prefer the solution to include the related slice info (PCI list) in RRCRelease if the mentioned issue exists.  Issue 3-2: Disagree. Need to be confirmed by operator. If the frequency is useless, why configure such kind of frequency in RRCRelease.  Issue 3-3: Disagree. Need to be confirmed by operator. And if it is a valid case, according to current specification description, we should consider that the nsag-id is support on the frequency because this case equals to the case that neither sliceAllowedCellListNR nor sliceExcludedCellListNR is configured for the nsag-id.  Issue 3-4: Disagree. Same as issue 3-1/3-2/3-3.  Issue 3-5: Disagree. This misalignment should not be addressed in RAN2. The enhancement to NG signalling can be considered.  Issue 3-6: Disagree. Prefer not to change the override principle and issue should be addressed by SA2. |
| Huawei, HiSilicon | Issue 3-5/3-6: We think this issue is a rare scenario and should be checked by SA2/CT1 whether and how it will happen. If the UE has not received any NSAG priority information from the AMF, it also can trigger RAU to require the NSAG priority information. |
| NEC | For all above issues: we prefer to not address these inconsistence issues or comer cases, and rely on network implementation, after all, slice specific cell reselection feature is to make UE camp on better frequency and cell with best effort. |
| Intel | Issue 3-1/2/4: Agree. Though this can be left to RAN implementation, it should be made clear to the RAN implementor that they have to always provide SIB16.  Issue 3-5/6: Disagree. We don’t need to have normative UE behaviour captured for bad network implementation. |

**Issue 4: Re-deriving reselection priority**

The following contributions propose changes or clarifications related to re-derive reselection priority. Rapporteur provides initial view for the some proposals for reference.

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| Contribution | Proposal | Rapporteur’s view |
| R2-2208519 Samsung R&D Institute India | (Issue 4-1) Proposal 4: Clarify that UE behavior of re-deriving reselection priority specified in clause 5.2.4.5 is also applicable to the highest ranked cell.  (Issue 4-2) Proposal 5: If the best cell or highest ranked cell in a frequency doesn’t support any prioritized NSAG, UE shall re-derive a re-selection priority of the frequency as if none of the NSAG(s) provided by NAS are supported according to clause 5.2.4.11. |  |
| [R2-2207934](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207934.zip) Apple | (Issue 4-3) 3) The frequency priority re-sorting when the best cell does not support the highest priority NSAG of the frequency should be applied to all frequencies. | Rapporteur clarifies that slice specific cell reselection is not applied for intra-frequency and equal priority inter-frequency cell reselection. The frequency priority re-sorting for serving cell or neighbouring frequencies is used for UE to compare frequency priority for different frequencies. |
| R2-2208607 Xiaomi, OPPO, CMCC | (Issue 4-4) Unify the UE behaviour on the priority re-derivation for inter-frequency and intra-frequency reselection |
| R2-2207337/R2-2207338 Lenovo | (Issue 4-5) RAN2 kindly discuss how NSAG derivation of a cell can be accomplished.(please see Approach A and Approach B in the contribution. Approach B is proposed in the CR R2-2207338). |  |

Companies please to provide view on each sub-issue (Issue 4-x) for Issue 4 in the above table.

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| Company | View or comment on each sub-issue |
| Apple | Proponent. And it seems Issue 4-1/4-2/4-3/4-4 are talking about the same thing.  First, we would like to respond to rapporteur’s comment. RAN2 has never agreed that intra-freq and inter-freq with equal priority would not perform priority re-sorting. To us, the priority re-sorting is an operation applicable to all frequencies. And contributions 8519/7934/8607 are proposing the same thing.  Issue 4-5: it might be too detailed to describe how UE figures it out. |
| Nokia | **Issue 4-1/4-2:** Our understanding is that these are valid enhancements that better express the original intentions.  **Issue 4-3/4-4:** We think that 4-1/4-2 cover them  **Issue 4-5:** Not needed. |
| Lenovo | (Issue 4-1) Proposal 4: Agree  (Issue 4-2) Proposal 5: Agree  (Issue 4-3): Do not agree. How will this work? For the case where the highest priority cell of a (selected) frequency does not support the *selected* NSAG, there “is” a cell that becomes the basis for re-sorting for this frequency. For rest of the frequencies, this ***cell/ basis is not yet*** available.  (Issue 4-4): Do not agree. Don’t understand what changes are meant.  (Issue 4-5): Agree. It is only an assumption that UE knows the NSAG support of the highest priority cell of a (selected) frequency that does not support the *selected* NSAG based on **Clause 5.2.4.11, which indeed provides no information on the slice group(s) supported by a cell,** unlike what maybe a common understanding. |
| Samsung | Issue 4-1/ Issue 4-2: Proponent.  As Nokia pointed out, we think that the intention of issues 4-3/4-4 are covered by 4-1/4-2.For equal priority and intrafrequency cell reselection, we consider highest ranked cell rather than the best cell (as even when the best cell is a neighbor cell,highest ranked cell may be serving cell due to application of hysteresis/offset) and hence the CRs in 4-3/4-4 are not completely correct.  Issue 4-5:Not needed. The current text is clear. |
| Spreadtrum | Issue 4-1/4-2/4-3/4-4: Agree.  Issue 4-5: Disagree. It may part of UE implementation based on received SIB16/RRCRelease. |
| Huawei, HiSilicon | Issue 4-1 to 4-4: Agree.  Issue 4-5: No strong view. |
| NEC | Issue 4-1/4-1: agree  Issue 4-3/4-4. Agree. It can be understood that the current re-sorting text is already applicable to serving frequency, maybe we only need to move to other section  Issue 4-5: we think it is clear without any change, but to make it crystal clear, we suggest following change:  The UE considers a cell on an NR frequency to support an NSAG and all slices of the NSAG if |
| Intel | Issue 4-1-4: OK  Issue 4-5: No strong view. |

**Issue 5: NSAG information related**

The following contributions propose changes or clarifications related to NSAG information. Rapporteur provides initial view for the some proposals for reference.

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| Contribution | Proposal | Rapporteur’s view |
| R2-2207952 Huawei, HiSilicon | (Issue 5-1) Proposal 3: When the UE NAS sends the new NSAG priorities to the UE AS, the UE should update the slice specific cell reselection priorities and re-start the procedure of cell reselection based on this updated information. |  |
| [R2-2207934](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207934.zip) Apple | (Issue 5-2) 1) The associated valid TAI should be maintained in NAS and informed to AS layer.  (Issue 5-3) 2) Made it clear that UE should consider the NSAG+TAI pair for all serving and neighboring cell, not limited to current TAI. | For Issue 5-2, can indicate whether the change is needed and which option is preferred.  For Issue 5-3, can indicate whether the change is needed and what type of change is preferred. |
| R2-2207953 Huawei, HiSilicon | (Issue 5-2) 1) The description “NSAG and their priorities” is changed into “the NSAG information (as specified in TS 24.501 [14])”  (Issue 5-3) 2) In the description “the corresponding nsag-ID is indicated for the NR frequency and valid for current TA.”, the current TA is changed into the associated TA |
| R2-2208517 Qualcomm | (Issue 5-2 and Issue 5-3) Correct slice specific cell reselection to take per-TA NSAG into account |
| R2-2207678 Spreadtrum Communications | (Issue 5-3) Proposal 1: When check whether the cell support the slices of an NSAG, the condition of "the corresponding nsag-ID is indicated for the NR frequency and valid for current TA" should be replaced to "the corresponding nsag-ID and TAC (if configured) are indicated for the NR frequency". |  |

Companies please to provide view on each sub-issue (Issue 5-x) for Issue 5 in the above table.

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| --- | --- |
| Company | View or comment on each sub-issue |
| Apple | Issue 5-1: It’s true but we don’t need to capture it as it is already the case.  Issue 5-2: Proponent. It’s preferred a bit to explicitly indicate the NSAG ID + TAC in spec.  Issue 5-3: It’s preferred a bit to explicitly indicate the NSAG ID + TAC pair to AS layer. |
| Nokia | **Issue 5-1:** Not needed. This has been already covered, e.g. " or until new information of NSAG(s) and their priorities are received from NAS".  A bit unclear what belongs to 5-2 and 5-3  **Issue 5-2:** Our understanding is that this is about what is maintained and provided by NAS. As this is related to CT1 LS, this should be postponed.  **Issue 5-3:** Our understanding that this about the correction in 5.2.4.11 (e.g., "current TA" to "associated TA")  We think that this is an issue to be corrected, we prefer TP from 8517. |
| Lenovo | (Issue 5-1) Proposal 3: Agree  (Issue 5-2): Agree but we do not see need for any explicit indication (bit), the intention can be clarified in normative text.  (Issue 5-3): Agree but we do not see need for any explicit indication (bit), the intention can be clarified in normative text. |
| Samsung | Issue 5-1: Not needed. As pointed out by Nokia,this is already covered.  Issue 5-2: There is no need for explicit clarification.  Issue 5-3: Agree. We may consider TP from 8517. |
| Spreadtrum | Issue 5-1: Agree but it has already been captured.  Issue 5-2: Basically agree but it relates to CT1 LS. And the explicitly indication of TAC may be not needed for the NSAG of current TA.  Issue 5-3: Agree. The correction allows UE to consider the cell in another TA during slice based cell reselection. The modification proposed in “7678” or “7953” is preferred. |
| Huawei, HiSilicon | Issue 5-1: Proponent.  Issue 5-2/5-3: We suggest to align with the CT1 definition because each NSAG entry in NSGA information already includes NSAG identifier, S-NSSAI list of the NSAG, NSAG priority, and TAI list. |
| NEC | Issue 5-1, no needed. Same view as Nokia this has been covered  Issue 5-2/5-3, we are confused now how trackingAreaCode-r17 IE can be used. It is true that UE should consider NSAG ID +TAC pair for potential neighbour cells in another TA, on the other hand, if we change it into “ associated/concern TA” like the TP in R2-2208517:  “the corresponding nsag-ID is indicated for the NR frequency and valid for the concerned TA (current TA or indicated by trackingAreaCode-r17)”  the condition in red part seems always true, which is meaningless . |
| Intel | Issue 5-1: Agree with intent but it is already the expected behaviour whenever any information changes.  Issue 5-3: Agree with making it more explicitly clear/correct. Slightly prefer the suggestion in R2-2207953. |

**Issue 6: Deriving re-selection priorities related**

The following contributions propose changes or clarifications related to reselection priorities deriving. Rapporteur provides initial view for the some proposals for reference.

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| --- | --- | --- |
| Contribution | Proposal | Rapporteur’s view |
| R2-2208143 Ericsson | (Issue 6-1) Proposal 3 Replace all instances of ‘NSAG’s received from NAS’ and similar wordings with the text ‘for the NSAG(s) provided by NAS‘ in the first sentence of the discussed text section.  (Issue 6-2) Proposal 4 Change second and third bullet so that the wordings are similar.  (Issue 6-3) Proposal 5 Clarify that the third bulled covers two cases.  (Issue 6-4) Proposal 6 Add text to the third bullet and remove the fourth bullet to clarify how to prioritize frequencies with no nsag-CellReselectionPriority for the highest prioritized NSAG.  Proposal 7 Accept the changes in Annex for 38.304 | Rapporteur thinks existing description is clear and capture rules for various cases, no much motivation to improve the wording. |
| R2-2208446 CMCC, OPPO, Huawei, HiSilicon | (Issue 6-5) Correction in clause 5.2.4.11 to reflect the agreements that the highest slice specific cell reselection priority is applied to this frequency in the case of a frequency with different slice specific frequency priorities in multiple slices/slice groups with the same slice group priority. |  |

Companies please to provide view on each sub-issue (Issue 6-x) for Issue 6 in the above table.

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| --- | --- |
| Company | View or comment on each sub-issue |
| Apple | Issue 6-1: fine.  Issue 6-2: fine.  Issue 6-3: fine  Issue 6-4: no need.  Issue 6-5: can merge with the proposal of 6-2/6-3. |
| Nokia | **Issue 6-1:** As this is related to CT1 LS, this should be postponed  **Issue 6-2, 6-3, 6-4:** Disagree. We think that the current wording is better.  **Issue 6-5:** OK, as this removes some ambiguity. |
| Lenovo | (Issue 6-1): Agree  (Issue 6-2) and (Issue 6-3): Do not agree. The current bullet 3 is clear enough and it covers both cases (indeed the proposed change may be wrong if the same NSAG is the highest prioritized NSAG on two different frequencies but has the priority value different)  (Issue 6-4): Agree with removing the fourth bullet and replacing the added text in third bullet "If no nsag-CellReselectionPriority is given for a NSAG at a frequency, the value -1 is used." by "If no nsag-CellReselectionPriority is given for a NSAG at a frequency, the lowest priority value is used (i.e. lower than any of the network configured values)." in line with what 38.304 already has at multiple places.  (Issue 6-5): Do not agree. The adjective “highest” is not required, the meaning is already coming from “prioritized **in the order of** their nsag-CellReselectionPriority given for these NSAG(s)”. If really required, “starting with the highest priority” can be added at the end of the sentence. |
| Samsung | Issue 6-1 to 6-4: We think the current wording is fine.  Issue 6-5:Agree. This is more clear. |
| Spreadtrum | Issue 6-1/6-2/6-3/6-4: Not needed. Agree with rapporteur, current description is fine.  Issue 6-5: Agree. It makes the rule clearer. |
| Huawei, HiSilicon | Issue 6-1~6-4: Agree with Rapporteur, i.e. no much motivation to improve the wording.  Issue 6-5: Support. |
| NEC | Issue 6-1 fine  Issue 6-2, 6-3,6-4, we prefer current wording  Issue 6-5: ok |
| Intel | Issue 6-1: Postpone for CT1 input  Issue 6-2-4: No strong view. Current text already looks OK. |

**Issue 7: Support RAN sharing**

The following contribution proposes to add PLMN index to the NSAG-IdentityInfo in SIB16 to support RAN sharing.

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| --- | --- | --- |
| Contribution | Proposal | Rapporteur’s view |
| [R2-2208003](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2208003.zip) Nokia, Nokia Shanghai Bell | Proposal 1: The PLMN index is added to the NSAG-IdentityInfo in SIB16 as an optional element to make simpler the use of slice-based cell reselection in case of RAN sharing. (See TP in Annex.)  Proposal 2.1: Add a clarification to 38.331 that the UE should interpret the NSAG identities in slice-based cell reselection information as NSAG identities of the serving PLMN. (See TP in Annex.)  Proposal 2.2: RAN2 agrees that there is no need to change anything in slice-based cell selection to support ePLMNs. | Rapporteur understands there were discussion in last RAN2 meeting for RAN sharing supporting, and RAN2 assumed RAN sharing can be implemented by OAM configuration and dedicated slice specific frequency priority as follow. Companies please provides view whether to stick to the RAN2 assumption in the last meeting or add PLMN index to the *NSAG-IdentityInfo* in SIB16.  **=> RAN2 assumes RAN sharing works so that networks coordinate the NSAG identifiers, or via network providing dedicated priorities to UE.** |

Companies please provides view whether to stick to the RAN2 assumption in the last meeting or add PLMN index to the *NSAG-IdentityInfo* in SIB16.

|  |  |
| --- | --- |
| Company | View or comment |
| Apple | We do not have a strong opinion but just feel it might be too late to re-open the discussion. |
| Nokia | **Proponent:** we think that the use of SIB16 in shared cell is not really possible without this extension, as assuming coordination of NSAG allocation among operators is not realistic. |
| Lenovo | Agree with Rapporteur’s views. |
| Samsung | Agree with Rapporteur. |
| Spreadtrum | Prefer to stick to RAN2 assumption. |
| Huawei, HiSilicon | Agree with Rapporteur. |
| Intel | No strong view. We can accept the proposal though we understand this is not fully aligned with the previous agreement. |

**Issue 8: Other clarification or correction**

The following contributions propose various clarification or correction. Rapporteur provides initial view for the some proposals for reference.

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| Contribution | Proposal | Rapporteur’s view |
| R2-2208519 Samsung R&D Institute India | (Issue 8-1) Proposal 6: UE needs to consider nsag-CellReselectionSubPriority (or cellReselectionSubPriority) also for deriving/comparing re-selection priorities for slice-based cell reselection in clause 5.2.4.11. | Rapporteur understands the proposal is the common understanding, do we need to clarify something? |
| [R2-2207934](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207934.zip) Apple | (Issue 8-2) 4) Clarify that HSDN and slice capable UE in high speed mode prioritizes the HSDN cell during cell reselection. | Rapporteur understands HSDN cell should have higher priority based current specification, can check whether change is needed. |
| R2-2208495 Samsung | (Issue 8-3) Proposal 3: Update TS38.304 to specify that if UE receives *RRCRelease* with *cellReselectionPriorities*, the UE shall ignore all the priorities provided in system information |  |

Companies please to provide view on each sub-issue (Issue 8-x) for Issue 8 in the above table.

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| --- | --- |
| Company | View or comment on each sub-issue |
| Apple | Issue 8-1: Agree with rapporteur this should be the common understanding.  Issue 8-2: Proponent. If companies feel it is already the common understanding, we are fine to capture it in Chair notes without changing spec.  Issue 8-3: We tend to agree with Observation 3 in 8495. But this somehow intertwines with Issue 3-5. |
| Nokia | **Issue 8-1:** Agree with rapporteur, nothing to clarify here.  **Issue 8-2:** Disagree. There is a Nokia paper that provides general solution for this: R2-2207554: "Clarified that only slice based reselection priorities are used if UE has received NSAG(s) and their priorities from NAS and UE will not modify reselection priorities due to other causes e.g. MBS/HSDN etc. Also a NOTE is added where it is clarified that it is up to NW to ensure proper prioritization via NSAG/priorities in case slice based reselection is applied".  **Issue 8-3:** Disagree. We think that current wording is OK, no change is needed |
| Lenovo | Issue 8-1 and Issue 8-2: Agree with Rapporteur’s views.  Issue 8-3: Seems to us we already discussed this, but some further discussion could be good. In our view, dedicated legacy priorities overwrite the broadcasted legacy priorities only; and dedicated slice based priorities overwrite the broadcasted slice based priorities only. |
| Samsung | Issue 8-1:Proponent, Current text doesn’t capture the subpriorities. If it is common understanding we think this needs to be specified clearly, otherwise it will be confusing to anybody who implements or tests our specification.  Issue 8-2: Agree with Rapporteur  Issue 8-3: Proponent. We already allow configuration of NSAGs without nsag-CellReselectionPriority in both dedicated slice information and SIB16.We even have a rule for handling them (Frequencies that support a NSAG provided by NAS and that indicate *nsag-CellReselectionPriority* for the NSAG have higher re-selection priority than frequencies that support this prioritized NSAG without indicating *nsag-CellReselectionPriority* for the NSAG.).Hencethe text*“any fields with* *cellReselectionPriority and nsag-CellReselectionPriority”* will not work. i.e. Dedicated slice information will not overwrite broadcasted slice information when NSAG is configured without nsag-cellreselection priority as there will not be any fields in dedicated slice information with nsag-CellReselectionPriority. |
| Spreadtrum | Issue 8-1: Agree with rapporteur.  Issue 8-2: Disagree. The similar conflict exists among HSDN, MBS, V2X etc. In fact, this conflict issue can also backtracking to RAN2#88 meeting where we discussed the reselection conflicting between MBMS and Prose. The agreement is :  “Prioritization between conflicting interests (MBMS, ProSe, …) can be left to UE implementation”.  The subsequent conflicts are all left to UE implementations. Also there is one note in TS 38.304 to handle conflict:  “NOTE 0c: The prioritization among the frequencies which UE considers to be the highest priority frequency is left to UE implementation.”  From our view, the previous conflict resolution should be followed. The conflict should also be left to UE implementation.  Issue 8-3: Disagree. Prefer current wording and do not change the override principle. And the proposed solution does not capture the case that RRCRelease with nsag-cellReselectionPriorities. |
| Huawei, HiSilicon | Issue 8-1: No need to clarify.  Issue 8-2: In our understanding, this combination was not discussed in the past, and we are open for clarifying it.  Issue 8-3: Disagree. In TS 38.304, the following text has been specified so that it should be clear.  *If any fields with cellReselectionPriority or nsag-CellReselectionPriority are provided in dedicated signalling, the UE shall ignore any fields with cellReselectionPriority and nsag-CellReselectionPriority provided in system information.* |
| NEC | Issue 8-1: we are fine if we keep the change minimum i.e., the IE should not be added everywhere.  Issue 8-3: ok for us. |
| Intel | Issue 8-1: Agree with rapporteur  Issue 8-2: We don’t’ think this was discussed previously and we are open to discuss this further.  Issue 8-3: Tend to disagree. We understand Samsung point that it is not essential to provide *nsag-CellReselectionPriority* but the issue mentioned by Samsung will apply only if this not provided for any NSAGs. We are not sure if this is a realistic scenario. |

# 4 Conclusion

# 5 References

[R2-2207678](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207678.zip) Miscellaneous corrections to slice-specific cell reselection Spreadtrum Communications discussion Rel-17

RAN sharing and equal priorities:

[R2-2208003](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2208003.zip) Support of RAN sharing and equivalent PLMNs with slice specific cell reselection Nokia, Nokia Shanghai Bell discussion Rel-17 NR\_slice-Core

[R2-2208446](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2208446.zip) Correction on the rules in equal priority case for slice-based cell reselection CMCC, OPPO, Huawei, HiSilicon CR Rel-17 38.304 17.1.0 0279 - F NR\_slice-Core

[R2-2208519](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2208519.zip) Issues with slice specific cell reselection Samsung R&D Institute India discussion

[R2-2207952](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207952.zip) Discussion on the details of slice specific cell reselection Huawei, HiSilicon discussion Rel-17 NR\_slice-Core

[R2-2208143](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2208143.zip) Corrections on slice-based cell re-selection in TS 38.304 Ericsson discussion Rel-17 NR\_slice-Core

[R2-2207934](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207934.zip) CR to cleanup slice specific cell reselection Apple CR Rel-17 38.304 17.1.0 0268 - F NR\_slice-Core

[R2-2207953](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207953.zip) Corrections on TS 38.304 for RAN Slicing Huawei, HiSilicon CR Rel-17 38.304 17.1.0 0269 - F NR\_slice-Core

[R2-2208517](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2208517.zip) Correction on per-TA NSAG for slice specific cell reselection Qualcomm Incorporated CR Rel-17 38.304 17.1.0 0280 - F NR\_slice-Core

[R2-2208607](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2208607.zip) 38.304 CR Corrections on slice-based cell reselection Xiaomi, OPPO, CMCC draftCR Rel-17 38.304 17.1.0 F NR\_slice-Core

[R2-2208296](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2208296.zip) Possible configuration mismatch in slice specific cell reselection Kyocera discussion

[R2-2207337](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207337.zip) Correction for cell reselection Lenovo discussion NR\_slice-Core Late

[R2-2207338](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_119-e/Docs/R2-2207338.zip) CR for Correction for cell reselection Lenovo CR Rel-17 38.304 17.1.0 0259 - F NR\_slice-Core Late