**3GPP TSG-RAN WG2 Meeting #112-e *R2-201xxxx***

**Online, 2–13 November 2020**

**Agenda item: 5.4.1.3**

**Source: ZTE Corporation, Sanechips**

**Title: Report of [AT112-e][007][NR15] System Information and Idle mode (ZTE)**

**Document for: Discussion and Agreement**

# 1 Introduction

This is to report the result of the following email discussion in RAN2#112-e Meeting [1].

* [AT112-e][007][NR15] System Information and Idle mode (ZTE)

 Treat R2-2009394, R2-2009398, R2-2010414, R2-2010436, R2-2009808- R2-2009811, R2-2009782 (from AI 5.4.4, see further below)

 Intended outcome: Intermediate: Determine agreeable parts. Final: For agreeable parts, agreed CRs.

 Deadline: Intermediate deadline(s) by Rapporteur, Final: Discussion stop at Wed Nov 11, 1200 UTC

 Phase 1: collect companies’ view, by Thursday 2020-11-05 12:00 UTC

 Phase 2: rapporteur will share summary report based on input of phase 1 for review, by Friday 2020-11-06 12:00 UTC

# 2 Contact Information

|  |  |
| --- | --- |
| Company | Contact: Name (E-mail) |
| ZTE | Yuan Gao (gao.yuan66@zte.com.cn) |
| Nokia | Amaanat Ali |
| MediaTek | Felix Tsai (Chun-Fan.Tsai@mediatek.com) |
| Ericsson (Tony) | antonino.orsino@ericsson.com |
| Ericsson (Martin) | martin.van.der.zee@ericsson.com |
| Intel (Sudeep) | Sudeep.k.palat@intel.com |
| Samsung (Anil) | anilag@samsung.com |
| Samsung (Sangyeob) | sy0123.jung@samsung.com |
| Samsung (Sangbum) | sb07.kim@samsung.com |
| NEC | hisashi.futaki [at] nec.com |
| Lenovo | Hyung-Nam Choi (hchoi5@lenovo.com) |
| Qualcomm | Mambriss@qti.qualcomm.com |
| Apple (Zhibin) | Zhibin\_wu@Apple.com |
| LG | aidoy.lee@lge.com |
| vivo | Chenli5g@vivo.com |

# 3 Discussion

## 3.1 SI mapping info

[R2-2009394](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_112-e%5CDocs%5CR2-2009394.zip) Clarification on SIB mapping to SI message MediaTek Inc.,Huawei, HiSilicon, Ericsson, Nokia, Nokia Shanghai Bell CR Rel-15 38.331 15.11.0 2065 - F NR\_newRAT-Core

[R2-2009398](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_112-e%5CDocs%5CR2-2009398.zip) Clarification on SIB mapping to SI message MediaTek Inc., Huawei, HiSilicon, Ericsson, Nokia, Nokia Shanghai Bell CR Rel-16 38.331 16.2.0 2066 - F NR\_newRAT-Core, NR\_pos-Core

**Question 1**: do you agree with the clarifications made in that paper, specifically that:

*Each SIB is contained only in a single SI message and each SIB is contained at most once in that SI message.*

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| Answers to Question 1 |
| Company | Yes/No | From which release | Technical justification |
| Nokia | Yes | Rel-15 | It is a real issue and specification needs update |
| MediaTek | Yes | Rel-15 | ProponentOne more thing to mention is that this is real issue found in the field. And we understand that it is some premature configuration in early R15 NR SA deployment. Therefore, we think that it would be good to clarify this in NR starting from Rel-15. |
| Ericsson (Martin) | Yes | Rel-15 | We do not recall why this was not interited from the LTE during the Rel-15 NR timeframe, but it seemed to be overlooked.  |
| Intel | Yes | Rel-15 | Better to clarify from the first applicable release to avoid inter-operability issue. |
| Samsung (Anil) | Yes | Rel-15 |  |
| Apple | Yes  | Rel-15 | We agree with the intention and the changes in both Rel-15/Rel-16 CRs respectively. Text suggested by Lenovo are also fine with us. |
| CATT | Yes | Rel-15 | This clarification is benefitial for network implementation and also avoid confusion from UE side. |
| ZTE | Yes | Rel-15 |  |
| NEC | Yes | Rel-15 | This is the same as LTE and missed somehow. As this is for clarification, it is fine to make this change from Rel-15. At the same time, we are also fine from Rel-16. we can go with majority |
| Lenovo | Yes | Rel-15 | This was discussed some time ago and agreement was made in RAN2#101 meeting, Feb/Mar 2018 (see agreements to R2-1803422), but for whatever reasons it was not captured in the spec. On the proposed change:* For R16 CR we suggest to add the clarification in the bullet point below to keep the context:

- The mapping of SIBs to SI messages is configured in schedulingInfoList, while the mapping of posSIBs to SI messages is configured in pos-SchedulingInfoList with restrictions that each SIB is contained only in a single SI message and each SIB and posSIB is contained at most once in that SI message;For R15 CR we suggest to add the clarification in a new bullet point:- The mapping of SIBs to SI messages is configured in schedulingInfoList with restrictions that each SIB is contained only in a single SI message and each SIB is contained at most once in that SI message; |
| Huawei, HiSilicon | Yes | Rel-15 |  |
| Qualcomm | Yes | Rel-15 |  |
| LG | Yes | Rel-15 | Necessary clarification. |
| vivo | Yes | Rel-15 |  |

**Conclusion:**

**To be added**

## 3.2 SIB acquisition

[R2-2010414](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_112-e%5CDocs%5CR2-2010414.zip) Correction on SIB acquisition Google Inc. CR Rel-15 38.331 15.11.0 2217 - F NR\_newRAT-Core

[R2-2010436](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_112-e%5CDocs%5CR2-2010436.zip) Correction on SIB acquisition Google Inc. CR Rel-16 38.331 16.2.0 2223 - F NR\_newRAT-Core

Moved from 6.16

The changes for Rel-15 and Rel-16 are slightly different as the SIB1 acquisition procedure has been slightly updated in Rel-16. Thus, two separate questions are asked for the Rel-15 CR and the Rel-16 CR.

**Question 2.1**: do you agree with the correction made in [R2-2010414](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_112-e%5CDocs%5CR2-2010414.zip) for SIB acquisition in Rel-15?

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| Answers to Question 2.1 |
| Company | Yes/No | Technical justification |
| Nokia | No | Change 1: Not OK. This is already covered in 5.2.2.3.5 for connected state UEs.Change 2: Not OK. This is already covered in 5.2.2.2.1 as part of SIB validity check. The for loop for each SIB is in that section. |
| MediaTek | No | For change 1, only SIB1 (and partial MIB) in connect mode is required in Rel-15. No need to mentioned the stored SIBs.For change 2, the original sentence already implies for each required SIB. No need to emphasize this. |
| Ericsson (Tony) | No | We have the same understanding as Nokia and MediaTek. Regarding the first change:* For Rel-15, there is no need to have the change because the UE need to have only SIB1 in connected mode.
* For Rel-16, what is proposed is already covered in section 5.2.2.3.5

Regarding the second change, this is already covered in 5.2.2.2.1 in the following action:1> for each stored version of a SIB:[…] |
| Intel | No strong view | We agree with others regarding change 1.Change 2 may be obvious from the other sentences mentioned by other companies but the current text does not seem to be exactly what is proposed - “for each SIB”. |
| Samsung (Anil) | No | Change1: In r15, other SIBs are not required in connected mode. So this change is not needed.Change 2: In our view, current text is clear. |
| Apple | No | For Rel-15, there is no need to acquire SIBs other than SIB1. So the first chage is not needed. The 2nd change is not needed as the existing text implies this is for each SIB. |
| ZTE | No | The proposed changes are mainly for text improvement. We think the existing procedure is clear enough. |
| NEC | No | In Rel-15, there is no need for the UE to acquire other SI in Connected. For example, if si-BroadcastStatus for other SI is set to notBroadcasting, there is no way to acquire (i.e. request) those SI anyway. |
| Lenovo | No | Agree with the comments from Nokia. |
| Huawei, HiSilicon | No | We agree with the comments from Nokia, the existing sections are sufficiently clear. |
| Qualcomm | No | Change is not needed |
| LG | No | In Rel-15, only SIB1 is needed to acquire in connected mode. So the first change is not needed.Second change is already clear. |
| vivo | No | We also think in Rel-15, only SIB1 is needed in connected mode. Thus, the first change is not needed. For 2nd change, the existing sections are clear. |

**Question 2.2**: do you agree with the correction made in R2-2010436 for SIB acquisition in Rel-16?

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| Answers to Question 2.2 |
| Company | Yes/No | Technical justification |
| Nokia | No | Same as above |
| MediaTek | No | Similar comment as above. We think the original text is fine, there is no need to emphasize “for each” part.  |
| Ericsson (Tony) | No | Same comments as above. |
| Intel | As above |  |
| Samsung (Anil) | No |  |
| Apple | No | Same comment as above. |
| ZTE | No | Same as above. |
| NEC | No | There is almost no ambiguity for concerned misunderstanding. |
| Lenovo | No | Same comment as for R15 CR. |
| Huawei, HiSilicon | No |  |
| Qualcomm | No |  |
| LG | No |  |
| vivo | No |  |

**Conclusion:**

**To be added**

## 3.3 UAC for AC1 in shared NW

**Rel-15 CRs**

[R2-2009808](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_112-e%5CDocs%5CR2-2009808.zip) Correction on uac-AccessCategory1-SelectionAssistanceInfo ZTE corporation, Sanechips, Nokia, Ericsson, CMCC, ChinaTelecom, CATT CR Rel-15 38.331 15.11.0 2129 - F NR\_newRAT-Core

[R2-2009810](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_112-e%5CDocs%5CR2-2009810.zip) Correction on uac-AC1-SelectAssistInfo ZTE corporation, Sanechips, Nokia, Ericsson, CMCC, ChinaTelecom, CATT CR Rel-15 36.331 15.11.0 4487 - F NR\_newRAT-Core

**Rel-16 CRs**

[R2-2009809](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_112-e%5CDocs%5CR2-2009809.zip) Correction on uac-AccessCategory1-SelectionAssistanceInfo ZTE corporation, Sanechips, Nokia, Ericsson, CMCC, ChinaTelecom, CATT CR Rel-16 38.331 16.2.0 2130 - F NR\_newRAT-Core

[R2-2009811](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_112-e%5CDocs%5CR2-2009811.zip) Correction on uac-AC1-SelectAssistInfo ZTE corporation, Sanechips, Nokia, Ericsson, CMCC, ChinaTelecom, CATT CR Rel-16 36.331 16.2.1 4488 - F NR\_newRAT-Core, NB\_IOTenh3-Core => revised in R2-2010999

[R2-2010999](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_112-e/Inbox/R2-2010999.zip) Correction on uac-AC1-SelectAssistInfo ZTE corporation, Sanechips, Nokia, Ericsson, CMCC, ChinaTelecom, CATT CR Rel-16 36.331 16.2.1 4488 1 F NR\_newRAT-Core

The Rel-15 CRs are meant to clarify the association between the PLMN and the assistance information for Access Category 1 (AC1) selection as well as the UE behavior upon receving the assistance information for AC1 selection.

The Rel-16 CRs, in addition to the similar clarifications as in Rel-15 CRs, introduce AC1 selection assistance information with value {a, b, c, notConfigured} to allow network not to configure such assistance information for a certain PLMN in RAN sharing case.

Thus, two separate questions are asked for the Rel-15 CRs and the Rel-16 CRs.

**Question 3.1**: do you agree with the changes made in [R2-2009808](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_112-e%5CDocs%5CR2-2009808.zip) and R2-2009810 for AC1 selection assistance information in Rel-15 to clarify:

1. The UE behavior upon receving the assistance information for AC1 selection
2. The association between the PLMN and the assistance information for AC1

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| Answers to Question 3.1 |
| Company | Yes/No | Technical justification |
| Nokia | Yes | Proponent |
| MediaTek | Yes |  |
| Intel | May be | Though we agree with the contents of the CR, it is reasonable implementation and there may not be much risk of inter-operability issues. |
| Samsung (Sangbum) | Yes |  |
| CATT | Yes | support |
| ZTE | Yes |  |
| NEC | Yes | one question regarding the procedure text in R2-2009808 for clarification. Is it the intention to use capital (upper case) for *UAC-AccessCategory1-SelectionAssistanceInfo*, i.e. refer to parameter value not field?  |
| Lenovo | No | If it is the intention to make the R16 changes in R2-2009809 and R2-2010999 early implementable, then there is no need for the R15 CRs. On the proposed changes:* 38.331 NR R2-2009808: We think that the change 5.2.2.4.2 is not correct as AS does not make a selection of the AC1 info but merely forward them to NAS. Furthermore, it does not match with the common PLMN case.
* 36.331 NR R2-2009810: the sentence “The corresponding UAC-AC1-SelectAssistInfo for the selected PLMN is forwarded to upper layers, if present.” in the description of uac-AC1-SelectAssistInfo is not correct for the same reason as for the 38.331 CR above.
 |
| Huawei, HiSilicon | No | We don’t see a critical need for the Rel-15 CR. Rel-16 CR would be acceptable. |
| LG | Yes | We agree that this is not a critical need but the changes are useful for clarification. |
| vivo | Yes |  |
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**Question 3.2**: do you agree with the changes made in R2-2009809 and R2-2010999 for AC1 selection assistance information in Rel-16 to address the following:

1. The UE behavior upon receving the assistance information for AC1 selection
2. The association between the PLMN and the assistance information for AC1
3. Introduce AC1 selection assistance information with value {a, b, c, notConfigured} to allow network not to configure such assistance information for a certain PLMN in RAN sharing case.

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| Answers to Question 3.2 |
| Company | Yes/No | Technical justification |
| Nokia | Yes | Proponent |
| MediaTek | Yes |  |
| Intel | Yes (with comments) | But we note that the third change is an enhancement and should not ideally have been combined with the mirror corrections of a Rel-15 CR. The following “and set to a, b, or c” was a bit confusing to understand that it has to be read with “if present and set to a, b, or c”. Don’t have any immediate better suggestion though other than point out that “*a*, *b*, or *c*” should be in italics. It is not clear to us why the magic sentence on early implementation is needed for this CR. |
| Samsung (Sangbum) | Yes |  |
| CATT | Yes | support |
| ZTE | Yes | 1. With the additional change to introduce AC1 selection assistance information with value {a, b, c, not configured}, the Rel-16 CRs are submitted as cat “F” CRs instead of cat “A” CRs to highlight that it includes not only mirror corrections of Rel-15 CRs. Otherwise, we might need four CRs in total for the Rel-16 changes (i.e. two cat “A” and two cat “F”).
2. There are two possible cases to have AC1 configured in Rel-15:

Case 1- UE is configured for NAS signalling low priority (which this is not supported in R15)Case 2 - UE is configured EAB (without EAB override). Case 2 is possible for the following scenario: If the UE support S1 mode and is configured for EAB (without “EAB override”), then, when the UE is in N1 mode (e.g., 5GS, NR/LTE connected to 5GC), the requirement (a) from 24.501 4.5.2 is met. (e.g., if the user’s subscription is “delay tolerant” in EPS, then the same subscription should be also “delay tolerant” in 5GS).Since there would be no interoperability issues and Rel-15 UE may have AC1 configured, we would like to add the magic sentence to allow Rel-15 UE to implement changes in this CR, which is similar to the handling of “*RP-200335: Correction on usage of access category 2 for UAC for RNA update*”. |
| NEC | Yes | maybe it would be better to explain “notConfigured” a bit in the field description. for example, “*notConfigured* indicates any value is not configured to the corresponding PLMN.” |
| Lenovo | Partly | On the proposed changes:* 38.331 NR R2-2009809:
	+ We think that the change 5.2.2.4.2 is not correct as AS does not make a selection of the AC1 info but merely forward them to NAS. Furthermore, it does not match with the common PLMN case.
	+ In ASN.1, to keep the context we think that uac-AC1-SelectAssistInfo-r16 should be better defined in a R16 NCE of uac-BarringInfo.
* 36.331 NR R2-2010999:
	+ In ASN.1 the suffix “-v16xy” should be “-r16”.
	+ The sentence “The corresponding UAC-AC1-SelectAssistInfo for the selected PLMN is forwarded to upper layers, if present and set to a, b or c.” in the description of uac-AC1-SelectAssistInfo is not correct for the same reason as for the 38.331 CR above.
 |
| Huawei, Hislilicon | Yes | OK to introduce the enhancement in Rel-16. |
| LG | Yes |  |
| vivo | Yes with comments | For R2-2010999, in the field description of uac-AC1-SelectAssistInfo, it said: “If *uac-AC1-SelectAssistInfo-v16xy* is present, the UE shall ignore the *uac-AC1-SelectAssistInfo* (without suffix).” The highlighted part should be uac-AC1-SelectAssistInfo-r15, i.e. remove “(without suffix)” part. |
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**Conclusion:**

**To be added**

## 3.4 Inter-RAT Cell Reselection and Mobility State

[R2-2009782](file:///D%3A%5CDocuments%5C3GPP%5Ctsg_ran%5CWG2%5CTSGR2_112-e%5CDocs%5CR2-2009782.zip) Clarifications for Inter-RAT Cell Reselection and Mobility State MediaTek Inc. discussion

In the above paper, it has been observed that:

*Observation 1: The text in idle/inactive-mode procedure specification (TS 38.304) does not specify explicitly whether inter-RAT cell reselections should be counted when determining UE mobility state based on the number of cell reselections within a given duration.*

*Observation 2: In UE conformance specification (TS 38.523), inter-RAT cell reselections are counted when determining UE mobility state based on the number of cell reselections within a given duration.*

However, as analyzed by the proponent, intra-RAT cells are geographically separated with possibly small overlaps, while the cell coverages of different RATs are likely to overlap with each other, or even the base stations are co-located. The reason why the number of cell reselections can be used to determine UE mobility is that UE can estimate the distance it has moved during a given duration based on the number of geographically separated cells it has crossed, with the assumption that average distance UE travels in a cell is similar for different deployments. Counting inter-RAT cell reselection may result in a much higher estimation of UE mobility and makes the mobility state determination more imprecise.

Also considering that the scope of a specification is limited in its own RAT as shown in “*NOTE:When the UE is camped on or searching for a cell to camp on belonging to other RATs, the UE behaviour is described in the specifications of the other RATs”* in clause 1 (Scope) of TS 38.304 [2], the following proposal is given:

**Proposal: Inter-RAT cell reselections should NOT be counted when determining UE mobility state based on the number of cell reselections within a given duration.**

**Question 4.1**: do you agree with the above proposal:

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| Answers to Question 4.1 |
| Company | Yes/No | Technical justification |
| MediaTek | Yes | (as summarized above by rapporteur) |
| Ericsson (Martin) | Maybe no | Not sure if we have a strong view, but we read 38.304 as if counting is continued (i.e. it is not explicitly excluded, only re-selections to the same cell are explicitly not counted). It is not clear to us why RAN5 added a conformance test for NR, but nof for LTE, where there is a similar issue. We understand the comment that another RAT may have different cell sizes, but the same may apply for inter-frequency NR (FR1 and FR2), i.e. mobility detection based on cell re-selection needs to be put in context. We also wonder if there are different implementation, i.e. different UE vendor views to answer yes or no.  |
| Intel | Yes | It seems reasonable to not count the inter-RAT cells as the specifications are about the current RAT by default. While counting inter-RAT cells may be useful where the NR coverage is not uniform, it should not be that common apart from initial deployment. |
| Samsung (Sangyeob) | No | It may have a similar issue for inter-frequency re-selection i.e. that other NR frequency may overlap. Reselection parameters normally make UE to stick on a frequency layer, and scaling rule can also somehow control UE's mobility state i.e. consider both intra-RAT and inter-RAT cells separately for TreselectionRAT, so we do not see any issue. Also, we would like to highlight that it indeed impacts UE conformance specification TS 38.523 and it may bring a functional change on current UE behaviour, which seems undesirable.  |
| Apple | No | We found that the mobility speed is only determined based on non-overlapping homogenous cells deployment is too restrictive. Anyway, some of the side effects of overlapping LTE/NR cells will not affect the results becaue consecutive reselection towards the same (marco-)cell is not counted according to the existing spec, as indicagted by Ericsson.We propose to remove the RAN5 test case for the inter-RAT case, and leave it to UE implementation.  |
| CATT | Maybe no | In our understanding, inter-RAT cell reselection should be counted to gurantee that UE has consistant behaviour for speed evaluation. If not counted, UE may have the risk to lose coverage due to the mismatch between the calculated mobility state and UE real speed. For instance, in the beginning, UE is in high mobility state in NR cell, and then move to a LTE cell, if the LTE cell reselection is not counted, then after a period, UE move back to NR cell again, in this case, UE’s mobility state will be changed from High to low/medium but the UE real speed is never changed, e.g. keep in high. So inter-RAT cell reselection should not be ignored.More addition, for the deployment of NR cell, we don’t think LTE cells are mostly co-located with NR cells. For NR SA, NR cells deployment should be continuous coverage, UE campping in NR should prioritise NR cells as much as possible when do cell reselection. If a inter-RAT cell is selected, that means NR cell is not available or has weak coverage of this region. In other words, only LTE cell is available for service of this area, in this case, inter-RAT cell reselection should be counted also. |
| ZTE | No strong view | We share the same understanding with Ericsson and Samsung that there is similar issue for inter-frequency cell reselection, determing mobility state based on non-overlapping homogenous cell deployment may also impact counting inter-frequency reselections. |
| NEC | Yes |  |
| Lenovo | No | We think inter-RAT cell reselections should be counted when determining UE mobility state due to the fact that mobilityStateParameters are signalled in SIB2 which contains cell re-selection information common for intra-frequency, inter-frequency and/or inter-RAT cell re-selection. |
| Huawei, HiSilicon | No | We think it may be better to inherit the reselection count form the other RAT and to clarify this way in the specification. Otherwise a “high mobility” UE will reset the count after RAT change and therefore there will be some delay before it may enter “high mobility” state again. Having said that, we think the current specification does not require this. |
| Qualcomm | No |  |
| LG | No | We think inter-RAT cell reselection should be included for mobility state estimation. It is already limitation of current mobility state estimation, which is based on number of cell reselection, that it cannot consider cell coverage size of each cell. As other companies already mentioned, it is also exist in NR between FR1 and FR2. |
| vivo | No | Agree with Ericsson and Samsung, similar issue exists in inter-freq cell re-selection procedure, i.e. different cell size on FR1/FR2 which may impact on the precise of mobility state estimation. We prefer to handle the mobility state estimation during inter-RAT and inter-freq cell re-selection in a common way. |
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**Question 4.2**: if the answer to Question 4.1 is “Yes”, how to clarify that in specs?

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| Answers to Question 4.2 |
| Company | Comments |
| MediaTek | * We may have NOTE TS 38.304 (clause 5.2.4.3.0), saying that “Inter-RAT cell reselections should not be counted when determining UE mobility state based on the number of cell reselections within a given duration.”
* We may trigger LS to RAN5. CR for RAN2 specifications is not critical if RAN2 has already common understanding.
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| Intel | Either or both of the proposals from MediaTek is OK  |
| NEC | fine with a NOTE |
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**Conclusion:**

**To be added**

# 4 Conclusion

**TBD**

# 5 References

[1] RAN2 112-e Chairman Notes 2020-11-02 1600 UTC.docx

[2] TS38.304-g20.docx