3GPP TSG-RAN WG2 Meeting #119bis electronic R2-2210858

Online, October 2022

Agenda Item: 6.10.5.

Source: Ericsson

**Title: [offline-115] RRC corrections (Ericsson)**

Document for: Discussion, Decision

# Introduction

* [AT119bis-e][115][NR NTN] RRC corrections (Ericsson)

Initial scope: Discuss remaining RRC corrections

Initial intended outcome: Summary of the offline discussion with e.g.:

* List of proposals for agreement (if any)
* List of proposals that require online discussions
* List of proposals that should not be pursued (if any)

Deadline (for companies' feedback): Thursday 2022-10-13 18:00 UTC

Deadline (for rapporteur's summary in R2-2210858): Thursday 2022-10-13 22:00 UTC

Proposals marked "for agreement" in R2-2210858 not challenged until Friday 2022-10-14 10:00 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online).

R2-2208767 [Offline-111] RRC corrections Ericsson discussion Rel-17 NR\_NTN\_solutions-Core

# Contact Information

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

|  |  |  |
| --- | --- | --- |
| Company | Name | Email Address |
| Ericsson | Helka-Liina Määttänen | Helka-liina.maattanen@ericsson.com |
| MediaTek | Abhishek Roy | Abhishek.Roy@meidatek.com |
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# Neighbour cell list

[R2-2209526](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2209526%20-%20On%20neighbor%20cell%20SI.docx) On neighbour cell SI Ericsson discussion Rel-17

Proposal 1 RAN2 does not enhance further the release 17 neighbour cell SI broadcasting

[R2-2210663](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2210663_Further%20consideration%20on%20NTN%20neighbour%20cell%20list%20in%20SIB19.docx) Further consideration on NTN neighbour cell list in SIB19 ZTE Corporation, Sanechips discussion Rel-17

[R2-2210664](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2210664_REL-17_38.331_CR3559_Clarification%20on%20the%20NTN%20neighbour%20cell%20list%20in%20SIB19.docx) Clarification on the NTN neighbour cell list in SIB19 ZTE Corporation, Sanechips CR Rel-17 38.331 17.2.0 3559 - F NR\_NTN\_solutions-Core

| ***SIB19* field descriptions** |
| --- |
| ***ntn-NeighCellConfigList, ntn-NeighCellConfigListExt***Provides a list of NTN neighbour cells including their *ntn-Config*, carrier frequency and *PhysCellId*. This set includes all elements of *ntn-NeighCellConfigList* (without suffix) and all elements of *ntn-NeighCellConfigListExt-v1720*. If *ntn-Config* is absent for an entry in *ntn-NeighCellConfigList* or *ntn-NeighCellConfigListExt*, the *ntn-Config* provided in the previous entry in *ntn-NeighCellConfigList* or *ntn-NeighCellConfigListExt* applies. |

[R2-2210412](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2210412%20Remaining%20issues%20on%20neighbour%20cell%20ephemeris.doc) Remaining issues on neighbour cell ephemeris Huawei, HiSilicon discussion Rel-17 NR\_NTN\_solutions-Core

Proposal 1: Add the carrier frequency list and the neighbour cell list in SIB19.

Proposal 2: The neighbour cells not included in SIB19 can be neglected by UE implementation when performing measurements.

[R2-2209538](file:///C%3A%5CData%5C3GPP%5CExtracts%5C38331_CR3492_%28Rel-17%29_R2-2209538%20Correction%20on%20neighbor%20cells%E2%80%99%20satellite%20ephemeris%20information_v1.docx) Correction on neighbour cells’ satellite ephemeris information (38.331) MediaTek Inc. CR Rel-17 38.331 17.2.0 3492 - F NR\_NTN\_solutions-Core

| ***SIB19* field descriptions** |
| --- |
| ***distanceThresh***Distance from the serving cell reference location and is used in location-based measurement initiation in RRC\_IDLE and RRC\_INACTIVE, as defined in TS 38.304 [20]. Each step represents 50m. |
| ***ntn-Config***Provides parameters needed for the UE to access NR via NTN access such as Ephemeris data, common TA parameters, k\_offset, validity duration for UL sync information and epoch. |
| ***ntn-NeighCellConfigList, ntn-NeighCellConfigListExt***Provides a list of NTN neighbour cells including their *ntn-Config*, carrier frequency and *PhysCellId*. This set includes all elements of *ntn-NeighCellConfigList* (without suffix) and all elements of *ntn-NeighCellConfigListExt-v1720*. If *ntn-Config* is absent for an entry in *ntn-NeighCellConfigListExt*, the *ntn-Config* provided in the entry at the same position in *ntn-NeighCellConfigList* applies. If both *physCellId* and *carrierFreq* are configured, the corresponding *ntn-Config* is applicable to the neighbour cells listed in *SIB3/SIB4/measObjectNR* with the same *physCellId* and on the same carrier frequency as *carrierFreq*. If *physCellId* is not configured but *carrierFreq* is configured, the corresponding *ntn-Config* is applicable to the neighbour cells listed in *SIB3/SIB4/measObjectNR* on the same carrier frequency as *carrierFreq*. |

[R2-2210346](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2210346_NR%20RRC%20CR%20on%20neighbour%20cell%20ephemeris%20signalling.docx) NR RRC CR on neighbour cell ephemeris signalling Nokia, Nokia Shanghai Bell CR Rel-17 38.331 17.2.0 3539 - F NR\_NTN\_solutions-Core

The current way the SIB19 is arranged will contain the full ntn-config including full ephemeris for all neighbors, even though most of the neighboring cells will be on the same satellite, so this is creating a lot of overhead. It is becoming even worse as at RAN2-119 it was decided to support up to 8 neighbour NTN cells.

1. ntn-ConfigID is added to NTN-NeighCellConfig
2. ntn-ConfigID is included in NTN-Config

**Question 1.** **Do you support to further enhance rel-17 neighbor cell SI? If yes, please indicate which enhancement(CR) you support**

|  |  |  |
| --- | --- | --- |
| Company | Yes/no | TDOC number of supported enhancement |
| Ericsson | No  |  |
| Qualcomm | Yes | Nokia’s proposal in R2-2210346 is also ok. We should make use of such for measurement object configuration and when network requesting propagation delay difference report. For other proposals, we could use SIB4 extension to indicate up to 8 frequencies for one satellite.InterFreqCarrierFreqInfo-v1720 ::= SEQUENCE { smtc4list-r17 SSB-MTC4List-r17 OPTIONAL -- Need R}InterFreqCarrierFreqInfo-v17x0 ::= SEQUENCE { ntn-ConfigID-r17 INTEGER (1..8) OPTIONAL -- Need R} |
| MediaTek | Yes | Support [R2-2209538](file:///C%3A%5CData%5C3GPP%5CExtracts%5C38331_CR3492_%28Rel-17%29_R2-2209538%20Correction%20on%20neighbor%20cells%E2%80%99%20satellite%20ephemeris%20information_v1.docx) as it makes clear linkage between SIB3/SIB4/measObjectNR and SIB19. For example, if PCI is not configured in NTN-NeighCellConfig, how to apply the ntn-Config to the cells in SIB4? Current specification does not mention this. Regarding increasing the neighbor cells in SIB19, it can be also done not configuring PCI in NTN-NeighCellConfig but configuring multiple PCIs in SIB3/4/measObjectNR. |
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# SMTC

R2-2209505 Correction on UE behavior on SMTC in TS 38.331 vivo CR Rel-17 38.331 17.2.0 3488 - F NR\_NTN\_solutions-Core

|  |
| --- |
| ***smtc***Measurement timing configuration for intra-frequency measurement. If this field is absent, the UE assumes that SSB periodicity is 5 ms for the intra-frequnecy cells. If the field is broadcast by an NTN cell, the *offset* (derived from parameter *periodicityAndOffset*) is based on the assumption that service link propagation delay difference between the serving cell and neighbour cells equals to 0 ms, and UE can adjust the actual *offset* based on the actual propagation delay difference which can be calculated based on the ephemeris information in SIB19. |
| ***smtc2-LP***Measurement timing configuration for intra-frequency neighbour cells with a Long Periodicity (LP) indicated by periodicity in *smtc2-LP*. The timing offset and duration are equal to the offset and duration indicated in *smtc* in *intraFreqCellReselectionInfo*. The periodicity in *smtc2-LP* can only be set to a value strictly larger than the periodicity in *smtc* in *intraFreqCellReselectionInfo* (e.g. if *smtc* indicates sf20 the Long Periodicity can only be set to sf40, sf80 or sf160, if *smtc* indicates sf160, *smtc2-LP* cannot be configured). The *pci-List*, if present, includes the physical cell identities of the intra-frequency neighbour cells with Long Periodicity. If *smtc2-LP* is absent, the UE assumes that there are no intra-frequency neighbour cells with a Long Periodicity. |
| ***smtc4list***Measurement timing configuration list for NTN deployments, see clause 5.5.2.10. The offset of each SSB-MTC4 in *smtc4list* is based on the assumption that service link propagation delay difference between the serving cell and neighbour cells equals to 0 ms, and UE can adjust the actual *offset* based on the actual propagation delay difference which can be calculated based on the ephemeris information in SIB19. For a UE that supports all the SMTC configurations broadcast by the NW, the UE shall use all the SMTCs broadcast by the NW. For a UE that supports less SMTCs than what is broadcast by the NW, it is up to the UE to select which SMTCs to consider. |

**The CR proposes that 38.331 would state advice for idle mode UE on Ephemeris data usage as well as SMTC configuration usage.**

**Rapporteur thinks these are not corrections first of all and that 38.331 should not specify idle mode UE implementation.**

**Q2: Please give your view whether you support CR R2-2209505?**

|  |  |  |
| --- | --- | --- |
| Company | Ya/no | Comment |
| Ericsson | no |  |
| Qualcomm | No | We also think for IDLE mode, this is up to UE. |
| MediaTek | No |  Agree with Ericsson and Qualcom that this cannot be used in 38.331 for IDLE mode. |
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R2-2210646 Corrections to the SMTC Field Description in System Information Google Inc. CR Rel-17 38.331 17.2.0 3555 - F NR\_NTN\_solutions-Core

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| --- |
| ***smtc***Measurement timing configuration for intra-frequency measurement. If this field is absent, the UE assumes that SSB periodicity is 5 ms for the intra-frequnecy cells. If the field is broadcast by an NTN cell, the *offset* (derived from parameter *periodicityAndOffset*) is based on the assumption that service link propagation delay difference, as well as the common TA difference between the serving cell and neighbour cells equals to 0 ms, and UE can adjust the actual *offset* based on the actual service link propagation delay difference and common TA difference. |
| ***smtc2-LP***Measurement timing configuration for intra-frequency neighbour cells with a Long Periodicity (LP) indicated by periodicity in *smtc2-LP*. The timing offset and duration are equal to the offset and duration indicated in *smtc* in *intraFreqCellReselectionInfo*. The periodicity in *smtc2-LP* can only be set to a value strictly larger than the periodicity in *smtc* in *intraFreqCellReselectionInfo* (e.g. if *smtc* indicates sf20 the Long Periodicity can only be set to sf40, sf80 or sf160, if *smtc* indicates sf160, *smtc2-LP* cannot be configured). The *pci-List*, if present, includes the physical cell identities of the intra-frequency neighbour cells with Long Periodicity. If *smtc2-LP* is absent, the UE assumes that there are no intra-frequency neighbour cells with a Long Periodicity. |
| ***smtc4list***Measurement timing configuration list for NTN deployments, see clause 5.5.2.10. The offset of each SSB-MTC4 in *smtc4list* is based on the assumption that service link propagation delay difference, as well as the common TA difference between the serving cell and neighbour cells equals to 0 ms, and UE can adjust the actual *offset* based on the actual service link propagation delay difference and common TA difference. For a UE that supports less SMTCs than what is included in this list, it is up to the UE to select which SMTCs to consider. |

**These seem like needed corrections to the rapporteur.**

**Q2: Please give your view whether you support CR R2-2210646?**

|  |  |  |
| --- | --- | --- |
| Company | Ya/no | Comment |
| Ericsson | yes |  |
| Qualcomm | No | If we understand, the agreement was that network should be able to compensate the feeder link. |
| MediaTek | No |  Agree with Qualcom that network should be able to take care of feederlink and current spec is enough. |
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**Conclusion:**

# UE behaviour if not able to acquire SIB19

[R2-2210034](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2210034%20Discussion%20on%20not%20being%20able%20to%20acquire%20SIB%2019%20for%20NR%20NTN.doc) Discussion on not being able to acquire SIB 19 for NR NTN Xiaomi, CAICT discussion Rel-17

[R2-2210035](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2210035%20Correction%20on%20the%20action%20upon%20not%20being%20able%20to%20acquire%20SIB19%20for%20NR%20NTN.docx) Correction on the action upon not being able to acquire SIB19 for NR NTN Xiaomi, CAICT CR Rel-17 36.331 17.2.0 4875 - F NR\_NTN\_solutions-Core

[R2-2210484](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2210484_38.331CR3547_%28Rel-17%29_Clarification%20on%20the%20necessity%20of%20SIB19%20in%20NTN%20cell_v0.docx) Clarification on the necessity of SIB19 in NTN cell Apple CR Rel-17 38.331 17.2.0 3547 - F NR\_NTN\_solutions-Core

**The above papers suggest a note about SIB19 to Essential system information. However, SIB19 is not defined as Essential system information. Only MIB and SIB1 is.**

#### 5.2.2.5 Essential system information missing

The UE shall:

1> if in RRC\_IDLE or in RRC\_INACTIVE or in RRC\_CONNECTED while T311 is running:

2> if the UE is unable to acquire the *MIB*:

3> consider the cell as barred in accordance with TS 38.304 [20];

3> perform barring as if *intraFreqReselection* is set to allowed;

2> else if the UE is unable to acquire the *SIB1*:

3> consider the cell as barred in accordance with TS 38.304 [20];

3> if the UE is a RedCap UE:

4> peform barring as if *intraFreqReselectionRedCap* is set to allowed;

3> else:

4> perform cell re-selection to other cells on the same frequency as the barred cell as specified in TS 38.304 [20].

NOTE: For UE in RRC\_IDLE or in RRC\_INACTIVE or in RRC\_CONNECTED while T311 is running, if UE is unable to acquire SIB19, it is up to UE implementation to decide whether and when to reselect to another cell. If UE is still not be able to acquire SIB19 before establishing/reestablishing/resuming a RRC connection, UE should attempt to reselect to another cell by implementation.

**Q4: It is clear the suggested note cannot be added as SIB19 is not defined as Essential SI. Do companies prefer to have another way to clarify UE it is up to UE implementation to reselect to another cell?**

|  |  |  |
| --- | --- | --- |
| Company | Ya/no | Comment |
| Ericsson | no | This can be left to UE implementation without a note |
| Qualcomm |  | May be in the essential SIB section, we can add a note SIB19 is an essential SIB. We are not clear on the scenario in NR case if UE can read SIB1, then why it cannot read SIB19. |
| MediaTek | No |  Agree with Ericsson hat UE impmentation can take care of this and UE can try to access and read SIB 19 multiple times. |
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[R2-2210743](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2210743.docx) Discussion on leftover issues CATT discussion Rel-17 NR\_NTN\_solutions-Core Late

**The paper has one change suggested for TS 38.331 and that is adding a note:**

5.2.2.5 Essential system information missing

The UE shall:

1> if in RRC\_IDLE or in RRC\_INACTIVE or in RRC\_CONNECTED while T311 is running:

2> if the UE is unable to acquire the *MIB*:

3> consider the cell as barred in accordance with TS 38.304 [20];

3> perform barring as if *intraFreqReselection* is set to allowed;

2> else if the UE is unable to acquire the *SIB1*:

3> consider the cell as barred in accordance with TS 38.304 [20];

3> if the UE is a RedCap UE:

4> peform barring as if *intraFreqReselectionRedCap* is set to allowed;

3> else:

* 4> perform cell re-selection to other cells on the same frequency as the barred cell as specified in TS 38.304 [20].

NOTE: For NTN cell, if the UE is unable to acquire the SIB19, whether and when to consider the cell as barred is up to UE implementation. If the cell is considered as barred, perform barring in accordance with TS 38.304 [20].

**It is clear the suggested note cannot be added as SIB19 is not defined as Essential SI. Further, in previous meeting we concluded cell should not be barred if UE cannot read SIB19. Hence it is assumed this suggestion does not need to discussed further.**

# Ephemeris

[R2-2209537](file:///C%3A%5CData%5C3GPP%5CExtracts%5C38331_CR3491_%28Rel-17%29_R2-2209537%20Correction%20on%20the%20coincidence%20of%20ECI%20and%20ECEF_v1.docx) Correction on the coincidence of ECI and ECEF MediaTek Inc. CR Rel-17 38.331 17.2.0 3491 - F NR\_NTN\_solutions-Core

Add the abbreviations of ECI and ECEF.

Capture RAN1 agreement in RAN1#109 as a Note in IE description of EphemerisInfo:

“Note: The ECI and ECEF coincide at Epoch time (e.g. x,y,z axis in ECEF are aligned with x,y,z axis in ECI)”

**Q5: Please give your view whether you support CR R2-2209537?**

|  |  |  |
| --- | --- | --- |
| Company | Ya/no | Comment |
| Ericsson | No strong view |  |
| Qualcomm | Ok |  |
| MediaTek  | Yes | The alignment between ECEF and ECI shall be specified in the specifications; otherwise, it is impossible for UE to perform conversion between ECI and ECEF. |
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[R2-2209981](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2209981%20Discussion%20on%20the%20ephemeris%20information%20in%20CHO%20procedure.doc) Discussion on the ephemeris information in CHO procedure Spreadtrum Communications discussion Rel-17

**Proposal 1:** RRC dedicated message shall be applied to provide ephemeris information of neighbour cells.
**Proposal 2:** Multiple neighbor cell’s ephemeris information in CHO window could be provided to UE via one dedicated RRC message.
**Proposal 3:** The SFN and subframe of target cell shall be the reference of epoch time for target cell.

**Q5: Please give your view whether RAN2 should work further on proposals in R2-2209981?**

|  |  |  |
| --- | --- | --- |
| Company | Ya/no | Comment |
| Ericsson | No strong view | Can discuss further if companies think this is necessary correction for Rel-17 |
| Qualcomm | P1: yesP2: NoP3: yes | P1 should be clarify if SIB19 does not provide the neighbor cell information or UE is not configured with search space in active BWP where SIB19 can be read. |
| MediaTek | P1: NoP2: NoP3: No | For P1, SIB19 can be provided by dedicated signaling if UE is not configured with common search space in the active BWP. For P2, for CHO, neighbor cell’s ephemeris information in the SIB19 is enough. Network can estimate the ephemeris information to configure multiple CHO configurations. For P3, the current spec is clear. It is not clear how the proposal impacts the current spec. |
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# Measurement gap configuration

[R2-2209800](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2209800_38.331CR3508_%28Rel-17%29_Clarification%20on%20the%20concurrent%20measurement%20gap%20configuration_v0.docx) Clarification on the concurrent measurement gap configuration Apple CR Rel-17 38.331 17.2.0 3508 - F NR\_NTN\_solutions-Core

**Summary of change:** Clarify in the condition part:
Clarify that the associatedMeasGapSSB2 can be configured only when associatedMeasGapSSB is configured
Clarify that the associatedMeasGapCSIRS2 can be configured only when associatedMeasGapCSIRS is configured
**Consequences if not approved:** It’s possible that 4 measurement gap configurations are within one MO for NTN, which exceeds the NTN UE capability.

**Rapporteur view is that this is ok correction.**

**Q6: Please give your view whether you support CR R2-2209800?**

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| --- | --- | --- |
| Company | Ya/no | comment |
| Ericsson | yes |  |
| Qualcomm |  | Why would network provide configuration exceeding UE capability? |
| MediaTek | No |  This is not needed and current specs seem enough.  |
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# Coarse UE location

[R2-2209506](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2209506%20Correction%20on%20UE%20coarse%20location%20reporting%20in%20TS%2038.331.docx) Correction on UE coarse location reporting in TS 38.331 vivo CR Rel-17 38.331 17.2.0 3489 - F NR\_NTN\_solutions-Core

**The CR proposes to add an additional note for coarse location reporting:**

2> include *coarseLocationInfo,* if available;

NOTE X: It is up to UE implementation to decide whether to obtain and report its coarse location in *coarseLocationInfo*.

**Rapporteur view is that this note should not be specified as this situation does not differ from Rel-16 or LTE location reporting where “if available” means that UE implementation will decide whether it is reported or not .**

**Q7: Please give your view whether you support CR R2-2209506?**

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| --- | --- | --- |
| Company | Ya/no | comment |
| Ericsson | no | Share the Rapp view |
| Qualcomm | No | No, there is no need to bring old discussion.  |
| MediaTek | No |  Agree the reppaorteur’s view, ”if available” already means it is up to the UE. |
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# Misc corrections

[R2-2210197](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2210197%20%28R17%20NTN%206.10.4.2%29%20331%20CR%20for%20Measurement%20events.docx) Draft 331 CR – Addition of missing descriptions of Event D1 and CondEvent T1 Interdigital, Inc. draftCR Rel-17 38.331 17.2.0 NR\_NTN\_solutions-Core

*Start of changes*

#### 5.5.4.15 Event D1 (Distance between UE and referenceLocation1 is above threshold1 and distance between UE and referenceLocation2 is below threshold2)

\*\*\*\*\*\*\*omitted\*\*\*\*\*\*\*

#### 5.5.4.16 CondEvent T1 (Time measured at UE is within a threshold and duration)

\*\*\*\*\*\*\*omitted\*\*\*\*\*\*\*

**Editorial corrections which can be added. Question is whether formulation could be improved.**

**Q8: Please give any suggestions to improve the proposed text?**

|  |  |
| --- | --- |
| Company | comment |
| Qualcomm | Not essential. |
| MediaTek | We agree as it could be beneficial. The final text might need to be finalized though. |
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[R2-2210570](file:///C%3A%5CData%5C3GPP%5CExtracts%5CR2-2210570%20CR%20corrections%20for%2038331.docx) Corrections to TS 38.331 for Rel-17 NR NTN Samsung Research America CR Rel-17 38.331 17.2.0 3554 - F NR\_NTN\_solutions-Core

**Q8: Please give your view whether support CR R2-2210570?**

|  |  |  |
| --- | --- | --- |
| Company | Ya/no | comment |
| Ericsson | Yes  | Except the second change can be implemented by replacing “serving cell” with “target SpCell” |
| Qualcomm | Yes |  We don’t need to do first change. For second change, we agree with Ericsson. |
| MediaTek | Partially Yes |  Agree with Qualcomm that the first change is not needed. The original text seems better. However, the second change could be agreed with Ericsson’s suggestions. |
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**Conclusion:**

# Conclusion

TBA

#  References

1. RP-201256, “Solutions for NR to support non-terrestrial networks (NTN),” 3GPP TSG RAN #88e, June 2020.