3GPP TSG-RAN WG2 Meeting #118 electronic R2-2206209

Online, May 9 – 20, 2022

Agenda Item: 6.10.3.2.1

Source: Ericsson

**Title: [AT118-e][101][NTN] RRC CR (Ericsson)**

Document for: Discussion, Decision

# Introduction

* [AT118-e][101][NTN] RRC CR (Ericsson)

Initial scope: continue the discussion on the NR NTN WI-specific RILs, also considering the submitted contributions

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

* List of resolved RILs
* List of RILs for online discussion
* List of RILs for further offline discussion

Deadline (for companies' feedback): Tuesday 2022-05-10 0800 UTC

Deadline (for rapporteur's summary in [R2-2206191](file:///C%3A%5CData%5C3GPP%5CRAN2%5CInbox%5CR2-2206191.zip)): Tuesday 2022-05-10 1000 UTC

Scope: continue the discussion on the NR NTN WI-specific RILs, also considering the submitted contributions

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): Monday 2022-05-16 16:00 UTC

 Deadline (for rapporteur's summary in R2-2206209): Monday 2022-05-16 18:00 UTC

Proposals marked "for agreement" in R2-2206209 not challenged until Tuesday 2022-05-17 08:00 UTC will be declared as agreed via email by the session chair (for the rest the discussion might continue online).

This discussion addresses RILs: O350, X601, V319, L014, L015, M403, X704, E017, V320, L011, H801, H800, M413

# Contact Information

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

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| --- | --- | --- |
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# Discussion on first NTN online agreements

Agreements via email – from offline 104:

1. The text proposals from corrections 3 and 8 in [R2-2206194](file:///C%3A%5CData%5C3GPP%5CRAN2%5CInbox%5CR2-2206194.zip) are adopted and included in a TS 38.321 Rapporteur CR.

2. T\_TA shall be updated to TTA in “5.4.8 Timing Advance Reporting”.

3. Do not introduce an explicit configuration to support blind Msg3 retransmission in NTN.

4. Upon validity timer expiry in NR NTN, UE shall suspend uplink transmission and acquire SIB-19, flushing HARQ buffers.

5. A new T3XX timer is introduced in RRC specification with duration ntn-UlSyncValidityDuration. Details of timer handling to be addressed in CP discussion

6. RRC indicates to lower layers when T3XX timer has expired or is restarted.

Agreement 5 is assumed to be the only agreement from above batch that has TS 38.331 impact. The agreement targets RILs O350, X601, V319, L014, L015, M403 which are now marked as PropoAgree. The RRC implementation is based on TP in R2-2204561(Vivo).

**Proposal 1 Agree resolution of RILs O350, X601, V319, L014, L015, M403 as presented in CR3088 (\_118\_V00) based on TP in R2-2204561(Vivo)**

**Q1 Please comment in case you do not agree with proposal 1**

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**Conclusion:**

Agreements:

1. Ephemeris, common TA parameters and epoch time can be updated without invoking the SI modification procedure.
2. Remove the FFS in the field description of t-Service : FFS" This field is excluded when determining changes in system information, i.e. changes of t-Service should neither result in system information change notifications nor in a modification of valueTag in SIB1."
3. The issue of possible ambiguity of cell-specific K\_offset raised by RAN1 can be handled by gNB implementation
4. On-demand SIB19 is not supported for UEs in RRC\_IDLE/RRC\_INACTIVE state.
5. The changes to Stage 2 spec in R2-2205754 are not pursued.
6. [C216] and [C217] are rejected.

Agreement 1 may resolve RILs H029, H030, H031 O355

Agreement 2 results in PropAgree for O351, 501. (change is obvious and does not need review)

Agreement 4 results in ProReject of H803.

**Q2 Please comment in case you suggest revision to TS 38.331 based on agreement 1 and RILs H029, H030, H031 O355**

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| Company | RILs can be addressed yes/no | Revision suggestion |
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Agreements:

1. RIL V313 is rejected
2. RAN2 to conclude on the operation of triggering event D1
3. report on leave for event D1 is agreed

Here agreement 6 is the only agreement that can be implemented in TS 38.331, it corresponds to RIL X704.

**Proposal 3 Agree resolution of RILs X704 as presented in CR3088 (\_118\_V00) based on TP in R2-2205224(Xiaomi)**

**Q3 Please comment in case you do not agree with proposal 3**

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| Company | If not agree | Revision suggestion |
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Agreements:

1. During CHO recovery in NTN the UE checks if the timer T2 has not expired before it can use CHO configuration for recovery. FFS if the same principle applies to location-based CHO triggering event. FFS the stage-3 details (i.e. whether the UE releases the configuration)
2. The following IEs/parameters are broadcast per neighbour cell in NTN:

 Ephemeris,

 DL and UL polarization,

 Epoch time of assistance information

 Validity duration

 FFS how to handle the validity timer for neighbour cell. FFS if epoch time can be same or different. FFS about other parameters

Further discussion seems needed before ready for TS 38.331. E.g. is neighborcell information in SIB-19? Can TP in R2-2204561(Vivo) be adopted? It assumed this is continued in corresponding offlline.

# Phase 2 on RILs E017, V320, L011, H801

## 4.1 E017 Configuration of number of tracking area codes across PLMNs

Below is an updated suggestion for revisions for *PLMN-IdentityInfoList.*

#### – *PLMN-IdentityInfoList*

The IE *PLMN-IdentityInfoList* includes a list of PLMN identity information.

*PLMN-IdentityInfoList* information element

-- ASN1START

-- TAG-PLMN-IDENTITYINFOLIST-START

PLMN-IdentityInfoList ::= SEQUENCE (SIZE (1..maxPLMN)) OF PLMN-IdentityInfo

PLMN-IdentityInfo ::= SEQUENCE {

 plmn-IdentityList SEQUENCE (SIZE (1..maxPLMN)) OF PLMN-Identity,

 trackingAreaCode TrackingAreaCode OPTIONAL, -- Need R

 ranac RAN-AreaCode OPTIONAL, -- Need R

 cellIdentity CellIdentity,

 cellReservedForOperatorUse ENUMERATED {reserved, notReserved},

 ...,

 [[

 iab-Support-r16 ENUMERATED {true} OPTIONAL -- Need S

 ]],

 [[

 trackingAreaList-r17 SEQUENCE (SIZE (1..maxTAC-r17)) OF TrackingAreaCode OPTIONAL -- Need R

 ]]

}

-- TAG-PLMN-IDENTITYINFOLIST-STOP

-- ASN1STOP

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| --- |
| *PLMN-IdentityInfo* field descriptions |
| ***cellReservedForOperatorUse***Indicates whether the cell is reserved for operator use (per PLMN), as defined in TS 38.304 [20]. This field is ignored by IAB-MT. |
| ***iab-Support***This field combines both the support of IAB and the cell status for IAB. If the field is present, the cell supports IAB and the cell is also considered as a candidate for cell (re)selection for IAB-node; if the field is absent, the cell does not support IAB and/or the cell is barred for IAB-node. |
| ***trackingAreaCode***Indicates Tracking Area Code to which the cell indicated by *cellIdentity* field belongs. The absence of the field indicates that the cell only supports PSCell/SCell functionality (per PLMN) or is an NTN cell. |
| ***trackingAreaList***List of Tracking Areas to which the cell indicated by *cellIdentity* field belongs. If this field is present, network does not configure *trackingAreaCode*. Total number of different TACs across different PLMN-IdentityInfos shall not exceed *maxTAC*. |

**Q4: Please give your view whether a) implementation above works b) there is issue that needs to corrected(suggest exact change).**

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| Company | 1. Current CR works
 | 1. There is an issue that needs to be fixed, please explain why there is an issue and what is the resolution.
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**Conclusion:**

## 4.2 V320 CGI reporting for NTN

**[RIL]**: V320 **[Delegate]**: vivo (Xiao) **[WI]**: NR\_NTN\_enh-Core **[Class]**:1 **[Status]**: ToDo **[TDoc]**: R2-22xxxxx **[Proposed Conclusion]**: v66

**[Description]**: Erroneous CGI reporting in case *tackingAreaList* is confiugred.

**[Proposed Change]**: If the concerned cell configured for CGI reporting includes *trackingAreaList* (i.e an NTN cell), the procedure here still requires the UE to report the legacy t*rackingAreaCode*. However, in case *trackingAreaList* is configured, the field description requires the legacy *trackingAreaCode* to be ignored by the UE, which means that the *trackingAreaCode* included may be an invalid/useless one. As a result, the existing procedure would lead to incorrect CGI information reported to the network, with the serving cell unable to tell whether the *trackingAreaList* is also configured, or tell the NW type of the concenred cell. As whether ANR is invovled in NTN or between TN and NTN was not really discussed in earlier meetings, we will bring a separate Tdoc to discuss this issue.

**[Comments]**: vivo (Xiao) v66: Note that RAN4 agreed the NTN operating bands n256 and 255 (as now captured in 38.101-5) which are respectively overlapped with the the legacy TN operating bands n65 (partially) and n24. This makes it possible that the concerned cell for which CGI reporting is configured by the serving cell is either a TN or an NTN cell (at least on the above frequencies).

When reporting CGI for measurement reports we have the following procedure:

3>  if the cell indicated by *cellForWhichToReportCGI* is an NR cell:

4>  if *plmn-IdentityInfoList* of the *cgi-Info* for the concerned cell has been obtained:

5>  include the *plmn-IdentityInfoList* including *plmn-IdentityList*, *trackingAreaCode* (if available), *ranac* (if available), *cellIdentity* and *cellReservedForOperatorUse* for each entry of the *plmn-IdentityInfoList*;

5>  include *frequencyBandList* if available;

4>  if *nr-CGI-Reporting-NPN* is supported by the UE and *npn-IdentityInfoList* of the *cgi-Info* for the concerned cell has been obtained:

5>  include the *npn-IdentityInfoList* including *npn-IdentityList*, *trackingAreaCode*, *ranac* (if available), *cellIdentity* and *cellReservedForOperatorUse* for each entry of the *npn-IdentityInfoList*;

5>  include *cellReservedForOtherUse* if available;

4>  else if *MIB* indicates the *SIB1* is not broadcast:

5>  include the *noSIB1* including the *ssb-SubcarrierOffset* and *pdcch-ConfigSIB1* obtained from *MIB* of the concerned cell;

Thus, UE would anyway include trackingarea code only if it is available. For NTN cell it would not be as UE is ignoring it but it is not clear what is the actual issue. RAN2 has not agreed to support CGI reporting in NTN and it is not part of the WID either.

As the work item is closed RAN2 should not add more features, hence rapporteur proposal is to not support CGI in NTN Rel-17.

It has been pointed out thet specification change may be needed to prevent UE from reporting errourness or random CGI for NTN cell is the cell broadcasts list of tracking area codes. However, it is not clear if UE would report anything is parameter trackingAreaCode is not available. This is because UE is reporting tracking area code based on the exact field called trackingAreaCode which contain TrackingAreaCode. For NTN cell case UE has field called trackingAreaList which contains TrackingAreaCode.

With the updated explanation, please respond again to the questions

**Q5: Please give your view whether a) current specification works b) there is issue that needs to corrected.**

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| Company | 1. Current specification works
 | 1. Propose exact specification change needed (mandatory)
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**Conclusion:**

## 4.3 Location reporting event D1:L011, H801,

Couple of RILs were raised in context of D1 report

**[RIL]**: L011 **[Delegate]**: LGE(SungHoon) **[WI]**: NTN **[Class]**: 2 **[Status]**: ToDo **[TDoc]**: None **[Proposed Conclusion]**:

**[Description]**: A cell triggering event D1 is not included in the measurement report

**[Proposed Change]**: In the current formulation, MeasurementReport triggered by event D1 does not include the cell meeting event D1 and its cell. So we propose to add the procedure text to include the cell meeting event D1. There are a couple of ways to enable this, and we think it is most straightforward to include the cell in cellsTriggeredList, as similar to other event cases.

**[Comments]**:

In the event D1, there is no cell that triggers the event so it is unclear how cells could be added based on the triggering. A related RIL, acknowledges this and proposes to add PCI in the D1:

**[RIL]**: H801 **[Delegate]**: Huawei (Lili) **[WI]**: NTN **[Class]**: 1 **[Status]**: ToDo **[TDoc]**: Yes **[Proposed Conclusion]**: v167

**[Description]**: For event D1, there is a reference location of neighbour cell, but the UE does not know which neighbour cell it corresponds to.

In fixed cell scenarios, there is no problem.

However in moving cell scenarios, the UE needs to predict the trajectory of the reference location based on the ephemeris of the neighbour cell. So UE should know which cell the reference location belons to.

**[Proposed Change]**: Add a PCI in the configuration of event D1 and modify the field description accordingly.

We will submit a Tdoc addressing this issue.

However, it is unclear what is the use of the PCI here. Network knows which location it has configured as ”target cell location” and the event has measID associated. Thus, when report is sent, network knows which event triggered it. Note that it is not actually mandated that the reference location2 is associetd to any actual cell. It is just a location coordinate. Secondly, it should be further elaborated what does the UE do with the information of the PCI.

Note that WI is closed and only corrections or small additions that can be seen as FFS can be handled.

Previous round, the following comments were provided on behalf of current specification not needing any changes on this:

Current specification works. UE triggers measurement report for event D1 based on distance. So, UE can’t decide which cell can be included in the *cellsTriggeredList*. And adding the PCI to indicate the cell associated to reference location is not needed. For moving cell, NW can update the reference location in event D1

Agree, we believe there is no need to associate the reference location with any particular cell/PCI. When the location-based event will trigger, the UE will report measurements, where cell ID can be found.

Then, there has been arguments that UE would need to determine PCI related to the D1 event but there has not been any which discussion or conclusion. D1 is an coordinate on Earth and does not have to be specific to any cell. As there is no cell associated the L011 seems redundant.

Purpose of the D1 is as follows:

1. Event triggered-based UE location reporting are configured by gNB to obtain UE location update of mobile UEs in RRC\_CONNECTED

*That means it is not meant to track cells but UE location.*

The location based event is also primarily for fixed cells and handling moving cells-even for idle mode- is not discussed in Rel-17

There is also the following comment:

Firstly, we think RAN2 should first discuss whether to confirm the following working assumption at RAN2#115e.

1. Specify that measurement reports can be configured to be piggybacked with location report when location based event triggers it

If the working assumption is not confirmed, then we agree with Ericsson that we don’t see any issue here.

However, if the working assumption is confirmed, then to piggyback RSRP/RSRQ, PCI information might be needed so that UE knows for which cell it needs to include RSRP/RSRQ.

However, independent of whether this is agreed or not, there is still no need to associated PCI to the event. If UE detects a cell it uses the PSS/SSS to determine the PCI before measuring anyway.

Given the above, the same question is repeated. If a company still thinks a specification change is needed, please explain and further elaborate to revert the above explanation why rapporteur thinks both RILs can be rejected.

**Q4: Please give your view whether a) current specification works b) there is issue that needs to corrected.**

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| Company | 1. Current specification works
 | 1. There is an issue that needs to be fixed, please explain why there is an issue and what is the resolution.
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**Conclusion:**

# TN-NTN mobility H800

H800:

Mobility from NTN to TN is supported. For condEvent D1, if the candidate cell is a TN cell, there should be no reference location for it. Besides, if the candidate cell is an NTN moving cell, the reference location is moving and the UE needs to predict it. The above issues should be made clear in the spec

In RAN2#115 the following is agreed:

3. RAN2 down priorities further enhacnements for connected mode for Rel-17 for TN-NTN mobility

Further, it seems the eventD1 may be misunderstood as it is reporting based on a location, a coordinate on Earth. In addition, there is no moving location target even discussed in Rel-17. D1 and T1 even CHO events are primarly for Earth fixed cells. Hence the proposal is to reject RIL H800.

**Q4: Please give your view whether RIL H800 can be rejected**

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**Conclusion:**

# Default value for polarization M413

M413:

ntn-PolarizationDL-r17 is OPTIONAL. We should define which value should apply if the field is absent (or released), which should be ‘linear’ (confirmed by Kader).

So, we should add the highlighted text: “If the field is absent, the UE applies the value linear.”

It is unclear whether Ran2 can make such change as it seems more Ran1 change.

**Q4: Please give your view whether RIL M413 can be rejected**

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**Conclusion:**

# Conclusion

#  References

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