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:\Data\3GPP\RAN2\Inbox\R2-2206191.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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# 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:\Data\3GPP\RAN2\Inbox\R2-2206194.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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| --- | --- | --- |
| Company | If not agree | Revision suggestion |
| ASUSTeK | Comment | For agreement 5, R2-2204561 captures the T319 expiry in timer table (section 7.1.1). However, it lacks the procedural text for T319 expiry. A TP is provided as below.  5.2.2.X TXXX expiry  The UE shall:  1> if in RRC\_CONNECTED:  2> inform lower layers the expiry of TXXX;  2> Re-acquire *SIB19* as defined in clause 5.2.2.3.2.  5.2.2.X TYYY expiry  The UE shall:  1> if in RRC\_CONNECTED:  2> Re-acquire *SIB19* as defined in clause 5.2.2.3.2.  5.2.2.4.2 Actions upon reception of *SIB19*  Upon receiving *SIB19*, the UE shall:  1> start or restart TXXX with the duration *ntn-UlSyncValidityDuration* from the subframe indicated by epochTime;  1> start or restart TYYY for the corresponding neighbour cell with the duration *ntn-UlSyncValidityDuration2* from the subframe indicated by *epochTime2;*  1> inform lower layers that the TXXX is restarted. |
| Ericsson |  | Agree for the procedural text by ASUTeK for Txxx but RAN2 has not yet agreed on separate TYYY |
| vivo | Comment | To respond to ASUSTek’s comments, R2-2204561 actually intends to use below highlighted descriptions (in cyan) to enable the UE re-acquisition of the SIB19:      The technical discussion here is that whether the neighbor cell validity timer(s) shall also be maintained in RRC and trigger the SIB19 re-acquisition (e.g. upon the expiry of any of them).  We don’t have a strong view on whether to use this “compact” writing style or introduce new subclauses specifically. We think the final writing style for the related procedures should also consider related UP discussion on the instruction to the lower layers about UL sync loss and UL sync restored. |
| Xiaomi | Comment | Agreement 4,5,6 has impact to RRC:  Agreement 5. A new T3XX timer is introduced in RRC specification with duration ntn-UlSyncValidityDuration. Details of timer handling to be addressed in CP discussion  Suggest implementation of above agreements is below [**R2-2206057**]:   |  | | --- | | 5.2.2.4.21 Actions upon reception of *SIB19*  Upon receiving *SIB19*, the UE shall:  1> start or restart T317 with the duration *ntn-UlSyncValidityDuration* from the subframe indicated by epochTime;  NOTE: UE should attempt to re-acquire *SIB19* before the end of the duration indicated by *ntn-UlSyncValidityDuration* and *epochTime* by UE implementation. |   Also, description should be introduced in:   |  |  |  |  |  | | --- | --- | --- | --- | --- | | 7.1.1 Timers (Informative)   |  |  |  |  | | --- | --- | --- | --- | | T317 | Start or restart from the subframe indicated by epochTime upon reception of SIB19 |  | Perform the actions as specified in 5.2.2.X. | |   Agreement 4: Upon validity timer expiry in NR NTN, UE shall suspend uplink transmission and acquire SIB-19, flushing HARQ buffers.  Agreement 6: RRC indicates to lower layers when T3XX timer has expired or is restarted.  Suggest implementation of above agreements is below [**R2-2205403**]:   |  | | --- | | 5.2.2.X T317 expiry  The UE shall:  1> if in RRC\_CONNECTED:  2> inform lower layers that the UL synchronisation is lost;  2> acquire *SIB19* as defined in clause 5.2.2.3.2;  2> upon successful acquisition of *SIB19*:  3> inform lower layers that the UL synchronisation is restored; | |
| Qualcomm | No | Already agreed TXXX is maintained in RRC and there is no TYYY.  Change in section 5.2.2.2.1 is not correct. It should be removed (as clear from field description). The change suggested by ASUSTek is fine.  See R2-2204657. The timer TXXX may never expires (i.e., lower layer is not indicated anything) if UE acquires SIB19 before expiry. On this “1> inform lower layers that the TXXX is restarted.”,  RRC has to inform MAC only when it is needed to inform. |
| Apple | Comment | We are mostly fine with the procedural text in R2-2204561 (Vivo) and the timer expiry handling proposed by ASUTek. However, we have a couple of comments.   1. We also think there is no need to introduce timer TYYY and related text. For this release, we can think of neighbor cell validity timer and epoch as “best-effort” information. RAN2 has not yet agreed to maintaining a timer like TYYY or its detailed handling, and we think it is too late to do it now. 2. There is also possibility that the UE acquires SIB19 before the validity timer expires, but the new epoch time occurs after the validity timer expiry. In this case, the UE need not acquire SIB19 again (See R2-2205651). So we think the text in ASUTek’s proposal about acquiring SIB19 can be modified as follows.   5.2.2.X TXXX expiry  The UE shall:  1> if in RRC\_CONNECTED:  2> inform lower layers the expiry of TXXX;  2> Re-acquire *SIB19*, if needed, as defined in clause 5.2.2.3.2. |
| Huawei, HiSilicon | Comment | Both validity duration and epoch time are optional, which should be taken into consideration. Besides, as agreed by RAN1, the implicit starting time should be considered for the timer, i.e. when epochTime is not included.  We suggest a TP as follows (based on R2-2206090 and the latest agreement):  Upon receiving *SIB19*, the UE shall:  1> if *ntn-UlSyncValidityDuration* is included:  12> if *epochTime* is included:  3> start or restart timer *Txxx* with the duration *ntn-UlSyncValidityDuration* from the subframe indicated by *epochTime*;  2> else:  3> start or restart timer *Txxx* with the duration *ntn-UlSyncValidityDuration* from the end of SI window where *SIB19* is scheduled;  NOTE: UE should attempt to re-acquire *SIB19* before the end of the duration indicated by *ntn-UlSyncValidityDuration* and *epochTime* or the end of SI window where *SIB19* is scheduled by UE implementation.  5.3.3 RRC connection establishment  5.3.3.x Txxx expiry  The UE shall:  1> if in RRC\_CONNECTED:  2> inform lower layers that the *Txxx* has expired;  2> acquire *SIB19* as specified in 5.2.2;  2> upon successful acquisition of *SIB19*;  3> inform lower layers that the *Txxx* is restarted;  7.1.1 Timers (Informative)   |  |  |  |  | | --- | --- | --- | --- | | Txxx | Upon acquisition of *SIB19* with *ntn-UlSyncValidityDuration* |  | In RRC\_CONNECTED mode, initiate acquisition of *SIB19* in accordance of 5.2.2 | |
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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 |
| vivo | Yes with comments | The field description of *EphemerisInfo and epochTime* should also be changed as follows:  ***EphemerisInfo***  This field provides satellite ephemeris either in format of position and velocity state vector or in format of orbital parameters. This field is excluded when determining changes in system information, i.e. the nework should neither trigger system information change notifications nor a modification of valueTag in SIB1 upon changes of *EphemerisInfo*~~changes of XXX should neither result in system information change notifications nor in a modification of valueTag in SIB1~~.  ***epochTime***  Indicate the epoch time for assistance information (i.e. Serving satellite ephemeris in IE ephemerisInfo and Common TA parameters). When explicitly provided through SIB, or through dedicated signaling, EpochTime is the starting time of a DL sub-frame, indicated by a SFN and a sub-frame number signaled together with the assistance information.The reference point for epoch time of the serving satellite ephemeris and Common TA parameters is the uplink time synchronization reference point. If this field is absent, the epoch time is the end of SI window where this SIB19 is scheduled. This field is mandatory present when provided in dedicated configuration. This field is excluded when determining changes in system information, i.e. the nework should neither trigger system information change notifications nor a modification of valueTag in SIB1 upon changes of *epochTime.* |
| Xiaomi | Yes |  |
| Apple | Yes |  |
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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 |
| vivo | See comments | See our reply in section 4.3, modified text in R2-2205621 is preferred to us. |
| Qualcomm |  | Agree but we are clear on change in field description of reportOnLeave. |
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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

|  |
| --- |
| *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. |
| Ericsson | yes |  |
| vivo | Agree |  |
| Lenovo |  | For the field description of ***trackingAreaList***, “PLMN-IdentityInfos” is not an existing IE, and “shall not” indicates a NW requirement. We suggest the last sentence as:  “Total number of different TACs in *PLMN-IdentityInfoList* does not exceed *maxTAC*.” |
| Intel | agree |  |
| Xiaomi | Yes |  |
| Qualcomm | Yes but see comments | Only part to confirm is this.  Is it possible 122 TACs may be being broadcast, i.e., 12 different TACs duplicated by each of the 12 PLMNs? Its too much overhead. |
| Apple | agree |  |
| Huawei, HiSilicon | Agree |  |
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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.

**Q5a: Please give your view whether CGI foro MNTN Rel17 should be supported**

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| --- | --- | --- |
| Company | Support CGI for NTN Rel17 yes/no | comment |
| Ericsson | no | No further optimization is needdd |
| Lenovo | no | Could be considered in further release if there is an issue. |
| Xiaomi |  | No strong view, we are fine to discuss whether there is an issue if CGI reporting is not supported. |
| Qualcomm | Yes | This is rather a simple fix. |
| Apple | Yes | But we do not have a strong view and are OK to go with majority |
| vivo | Yes | See please our detailed clarifications in later Q5b. |
| Huawei, HiSilicon | No strong view |  |
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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

**Q5b: Please give your view whether a) current specification works b) there is issue that needs to corrected.**

|  |  |  |
| --- | --- | --- |
| Company | 1. Current specification works | 1. Propose exact specification change needed (mandatory) |
| vivo |  | We are open on whether to support CGI reporting for an NTN cell in this release. But some further clarifications as follows:   * If RAN2 decides to support it, as we clarified in the 1st round discussion, only making legacy *trackingAreaCode* field absent for an NTN cell (as in above 4.1) is insufficient, as it still leads to ambiguity to the NW which cannot differentiate *whether the concerned cell is an NSA TN PScell/SCell or an NTN cell*. We are fine to follow QC’s suggestion in the 1st round that “*in NTN if trackingAreaList is present, the UE should report all tracking area codes (not just a random one). Then network should figure out what is the CGI in that region*”. We may simply let NTN-capable UEs (those indicating *nonTerrestrialNetwork*) do so w/o big spec impacts expected. * Even If RAN2 decides to not support CGI reporting specific for an NTN cell, we need to have some descriptions in the Spec to prevent the UE reporting *any* CGI related information, once the UE finds the concerned cell is an NTN cell, *not limited to only the trackingAreaCode field* as described by Rapp above. The change would be as simple as 2nd TP provided in our paper in [R2-2204560](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2204560.zip):     We are flexible on whether to support it or not, and solution to adopt. But as what Samsung commented in the 1st found discussion, a clear conclusion needs to be made first. If we do nothing to the current Spec, it is still ambiguous whether CGI reporting for NTN cell is supported or not in Rel-17, and how to overcome the above problem caused to the NW with CGI reporting having no TAC field. |
| Ericsson |  | Still unclear why the suggested change by Vivo would be needed. If cell does not broadcast trackingAreaCOde, which NTN cell would not, UE would not repirt any tracking area code and that should be ok.  [vivo] Just to further clarify: yes, the UE won’t report the trackingAreaCode of the NTN cell, but it still reports the **other** CGI reported information of the concerned cell to the serving cell (e.g. plmn related info, etc.). So, the serving cell receives the **incomplete CGI related information**, with only TAC absent, and then the serving cell cannot distinguish ***whether the concerned cell is an NSA TN PScell/Scell or an NTN cell***, because now the trackingAreaCode can be absent both for an NSA TN Pscell/Scell and for NTN cell (see the change in 4.1). This is why we proposed above, if we do not support CGI reporting for an NTN cell, then we don’t allow the UE to report any CGI related information at all, instead of reporting **incomplete** CGI related information which still makes trouble for the serving cell. |
| Lenovo | With correction in 3.1 the spec can work. |  |
| Xiaomi | Yes with the spec revision in 4.1 |  |
| Qualcomm |  | We should rather look at simple fix now. If the UE reporting CGI of a TN cell, then it is providing its rough location in accuracy of 2km.  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;  5>  include *networkType* if available;  [vivo] For simplicity and for progress, we are also fine with QC’s proposal above. |
| Huawei, HiSilicon |  | Maybe the issue is due to the current procedure not mentioning *trackingAreaList*. Can we change it as follows?  5> include the *plmn-IdentityInfoList* including *plmn-IdentityList*, *trackingAreaCode* (if available), *trackingAreaList* (if available), *ranac* (if available), *cellIdentity* and *cellReservedForOperatorUse* for each entry of the *plmn-IdentityInfoList*;  5> include *frequencyBandList* if available; |
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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. |
| Ericsson | yes |  |
| vivo | For H801, we think current specification works. | The issue described in L011 is meaningful to us. In the legacy procedure, the meaning of the leaving condition is applicable for an RSRP-based event is that the entering condition is applicable for the event first and then the leaving condition is applicable. If the measurement result of a cell is consistently less than (or larger than) the configured threshold, it does not mean that the leaving condition is satisfied. In this case, if *reportOnLeave* is set to true for the corresponding reporting configuration, UE shall not initiate the measurement reporting procedure.  For eventD1, RAN2 agreed that report on leave for event D1 is supported. So the same principle should be applied. We think introducing *cellsTriggeredList* as legacy is a straightforward way. |
| Lenovo | For H801, we think the explanation from rapporteur is reasonable and thus no need to add PCI. | For L011, we are OK to add the procedure text to include the cell meeting event D1. |
| Intel | yes |  |
| Xiaomi | yes | To vivo, in the TP of R2-2205224, UE evaluates the leaving condition just for the *VarMeasReport* within the *VarMeasReportList*. It means the entering condition is fulfilled for the event first. Otherwise, the associated *VarMeasReport* is not included within *VarMeasReportList.*  In the TP of R2-2205224  2> else if the *reportType* is set to *eventTriggered* and if the *eventId* is set to *eventD1* and if the leaving condition applicable for this event is fulfilled for the associated *VarMeasReport* within the *VarMeasReportList* for this *measId* during *timeToTrigger* defined within the *VarMeasConfig* for this event:  3> if *reportOnLeave* is set to *true* for the corresponding reporting configuration:  4> initiate the measurement reporting procedure, as specified in 5.5.5;  3> remove the measurement reporting entry within the *VarMeasReportList* for this *measId*;  3> stop the periodical reporting timer for this *measId*, if running; |
| Qualcomm | For H801 | Ok for L011. |
| Huawei, HiSilicon | Yes, but (see comments in the next column) | “ *The location based event is also primarily for fixed cells and handling moving cells-even for idle mode- is not discussed in Rel-17*” This explanation from the rapporteur is something we can buy. We think event D1 works well for fixed cells but not feasible for moving cells unless frequent reconfiguration is used.  However, we are not sure whether it is the common understanding, as in the current spec moving cells are not excluded for event D1. |
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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**

|  |  |  |
| --- | --- | --- |
| Company | Reject yes/no | Exact specification cahnge if not rejected(mandatory) |
| Ericsson | yes |  |
| vivo | Yes with comments.  We share the understanding with rapp that moving location of target cell is not discussed in Rel-17, so we propose to reject the proposal about predicting the movement of reference location. But we think there is a need to clarify that *condEventD1* can only be configured by an NTN serving cell towards an NTN candidate cell. |  |
| Lenovo | Yes |  |
| Intel | yes |  |
| Xiaomi | Yes. RAN2 has agreed same CHO trigger conditions and RRM events can be used within NTN and NTN-TN mobility provided these are supported by the UE. So, CondEvent D1 can also be used for NTN-TN mobility and whether to use it up to NW implementation. |  |
| Qualcomm | Yes, for TN cell, may be eventD1 is not so important? |  |
| Apple | Yes |  |
| Huawei, HiSilicon |  | If companies agree that event D1 and condEvent D1 are not used in moving cell scenarios, it’s ok not to mention the UE behavior of “predicting the movement of reference location”.  However, it should be made clear in the spec that “ *condEventD1* can only be configured by an NTN serving cell towards an NTN candidate cell.”  Exposing the reference location of a TN cell bring security issues. Note that this is not an enhancement for TN-NTN mobility, it is just clarifying the enhancement of condEvent D1 is not applicable to TN-NTN mobility. |
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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**

|  |  |  |
| --- | --- | --- |
| Company | Reject yes/no | Exact specification cahnge if not rejected(mandatory) |
| Ericsson | yes | RAN2 cannot decide such |
| vivo | See comments | We think this issue depends on RAN1. |
| Lenovo | Yes | Up to RAN1 |
| Intel | yes | up to RAN1 |
| Xiaomi | Yes | Up to RAN1 |
| Qualcomm | No | This is simply RAN2 signaling issue. Either make this IE mandatory or change IE to 2 bits (currently it is using 3 bits). We have two options.  Option#1: ntn-PolarizationDL-r17         ENUMERATED {rhcp,lhcp,linear, spare}                                            ~~OPTIONAL,  -- Need R~~  Option#2: ntn-PolarizationDL-r17         ENUMERATED {rhcp,lhcp~~,linear~~}                                            OPTIONAL,  -- Default linear ~~Need R~~ |
| Apple | Yes | Should be left to RAN1 |
| Huawei, HiSilicon | Yes |  |
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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.