3GPP RAN WG2 Meeting #117-e R2-2203532

eMeeting February 21st – March 3rd, 2022

Agenda Item: 8.10.2.1.1

Source: InterDigital

Title: Report of [AT117-e][103][NTN] MAC open issues

Document for: Discussion, Decision

# Introduction

This document is intended address a subset of remaining MAC open issues as per the following email discussion guidelines:

**[AT117-e][NTN][103] MAC open issues (InterDigital)**

* **Initial scope: Discuss MAC open issues based on the report in** [**R2-2203424**](file:///C:\Data\3GPP\Extracts\R2-2203424%20Report%20of%20%5bPre117-e%5d%5b103%5d%5bNTN%5d%20MAC%20open%20issues.docx) **and other company contributions in AI 8.10.2.1.1**
* **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)**

Please note the following deadlines:

* Initial deadline (for companies' feedback): **Monday 2022-02-21 1700 UTC**
* Initial deadline (for rapporteur's summary in R2-2203532): Monday 2022-02-21 2000 UTC

Please also note the following chair guidance:

* Proposals marked "for agreement" in R2-2203532 not challenged until Tuesday 2022-02-22 1000 UTC will be declared as agreed via email by the session chair (for the rest the discussion will continue during the GTW session on Tuesday).

# Topics for agreement

Based on pre-meeting discussion and contribution input, the proposals/topics within this section are classified as likely agreeable. Considering the very limited time to gather company input to this discussion (< 24 hours) it is suggested these aspects be the focus of Round 1 discussion, with more controversial topics listed in Section 3 postponed to Round 2.

## [Pre117e] proposals

In pre-meeting discussions [25] and [26], the following proposals have in general received consensus or near consensus support:

## ***Likely Agreeable***

*Proposal 1:        During RA procedure for RRC re-establishment procedure, the UE should trigger TA report if an indication is broadcasted by the target cell’s SI. (consensus in IoT NTN discussion)*

*Proposal 2:        During RA procedure for handover, the UE should trigger TA report if the target cell indicates this in the handover command. (consensus in IoT NTN discussion)*

*Proposal 3:        Other than re-establishment and handover procedure, TA reporting in connected mode is not controlled by enabling/disabling indication in SI. (16/17 in IoT NTN discussion)*

*Proposal 7:        RAN2 understanding: UE failing to acquire sufficiently accurate UE location to be used in the calculation of the full TA should not perform any UL transmission until UE location is within accuracy limits. No RAN2 specification impact. (consensus)*

*Proposal 8:        RAN2 confirms UE-specific TA MAC CE consists of only one field with length 16 bits, which contains the UE estimate of full UE-specific TA. (19/21)*

*Proposal 9:        RAN2 confirms Differential UE-Specific K\_Offset MAC CE consists of only one field with length 8 bits, which contains the Differential UE-Specific K\_Offset. (consensus)*

*Proposal 11:      RAN2 confirms ra-ResponseWindow and msgB-ReponseWindow are not extended in NTN. (consensus)*

*Proposal 12:   UE stops ra-ContentionResolutionTimer upon receiving PDCCH indicating Msg3 retransmission and then starts ra-ContentionResolutionTimer after the end of the Msg3 retransmission plus UE-gNB RTT. Impact to coverage and possible enhancements (e.g. to support MSG3 blind retransmission) can be considered in the Rel-18 NTN coverage enhancement SI. (16/20)*

*Proposal 13: Existing parameter names are updated to: uplinkHARQ-mode, allowedHARQ-mode,  and HARQ mode A/B. (16/19)*

*Proposal 15:     uplinkHARQ-DRX-LCP-mode and allowedHARQ-DRX-LCP, if configured, also apply for SRB1 to SRB3.*

*Proposal 17:      A NOTE is added to MAC CR clarifying that prior to starting drx-HARQ-RTT-TimerUL/DL, latest UE-gNB RTT is used to set timer length.*

*Proposal 19:      MAC does not specify how UE detects a cell originates from a non-terrestrial network. (19/20)*

To avoid repeat discussion, companies are invited to comment on the above proposals *only* if there are serious technical objections. If a company does not comment on a proposal is it implicitely assumed to be acceptable.

**Question 1) If you object to one or more of the above proposal(s), please: 1) Indicate which proposal(s) is unnacceptable; 2) Provide technical justification why the above proposal is unacceptable; and 3) Suggest an alternative acceptable wording (if available).**

**Note: If a company does not comment on a proposal, it is assumed to be aggreable.**

|  |  |
| --- | --- |
| **Company** | **Comments** |
| vivo | For proposal 8, we slightly prefer to have Reserved bits in the UE specific TA MAC CE. But we can go with the majority. |
| Nokia | We don’t accept Proposal 12 since it brings restrictions to NW implementation but no gain at all.  To solve the root issue addressed by this proposal (i.e. declare unintended Contention Resolution failure during UE-gNB RTT which is the delay for new CR timer running), there are two options on table:   * ***Option1: UE stops ra-ContentionResolutionTimer upon receiving PDCCH indicating Msg3 retransmission*** (e.g. as indicated by P12) * ***Option 2: The UE does not consider the Contention Resolution not successful.***   Option1 will disable blind Msg3 retransmission which is a legacy function implemented in NW in both LTE and NR from the original release. However, blind Msg3 retransmssion is now one typical strategy for Msg3 coverage enhancement in NW implementation which can be applied to all UEs.  Option2 has no negative impact (i.e. simply capture UE does not consider the contention resolution failure in a NOTE or MAC procedure. Option2 can be illustrated in figure blow, please check details in R2-2201007).    If RAN2 want to disable a legacy function (as proposal 12 above), it is natural to show strong technical reason why this is the reasonable way-forward (and NW has to change current implementation). However, we don’t see that in this proposal.  Furthermore, as mentioned in the Pre-meeting email discussion, there is Rel-18 objective to study how to perform NTN coverage enhancement. It makes no sense to disable a legacy mechanism for coverage enhancement in Rel-17 then recover it in Rel-18. Please note that new Rel-18 enhancements would not be supported for all the NTN UEs (e.g. may need new UE capability), even for the Msg3 repetitions for coverage enhancement.  Hence, we think above Option2 is the simple and right way-forward for both Rel-17 and Rel-18 based on technical analysis. We would like to propose as below:  ***P12a: If ra-ContentionResolutionTimer expires during the UE-gNB RTT after Msg3 retransmission, the UE does not consider the Contention Resolution unsuccessful.*** |
| ZTE | We share some sympathy on Nokia’s comments on P12. And a possible compromise is to have this as configurable. If configured (e.g., in case CE is enabled) UE make an exception of such situation otherwise UE delay the start of ra-ContentionResolutionTimer by UE-gNB RTT. |
| LG | For P12, in order to reduce the specification impact, we prefer to capture it as a NOTE but it is ok to go with the majority for sake of the progress. |
| Qualcomm | P7 is not clear what is accuracy limit. On P15, it is not clear if this is also true for RRC release message. |
| Ericsson | For P7, better to replace “full TA” with a reference to the TA in RAN1 “the UE’s Timing Advance value (see TS 38.211 [Y] clause 4.3.1)”. RAN4 specifies an minimum accuracy of UE UL transmission timing error (Te) and the UE location is part of it, see for example R4-2205420 where a location inaccuracy of 50 m is used (that is from the R4 way forward).  For P8, we are fine to consider fewer bits than 16 if not all are needed.  We object to P9, we think RAN2 shall not change the RAN1 agreement to have the values 0..63, that is 6 bits, and two R bits.  **Agreement**  The value range of the differential UE specific K\_offset provided in MAC CE is 0 – 63 ms.  We agree to P12. We think that stopping the CR timer does not prohibit coverage enhancement as it is still possible to schedule a number of Msg3 retransmissions, just not blindly after each other, and possibly also utilize the Msg3 repetition feature. The Nokia proposed P12a seems to have a problem that the UE never declares the CR unsuccessful. |
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***Rapporteur’s Summary***

*Out of 6 responding companies, the following comments are noted:*

* *Proposal 7:*
  + *Qualcomm is not clear on what the “accuracy limit is”*
  + *Ericsson clarifies that RAN4 specifies a minimum accuracy of UE UL transmission timing error and UE location is part of it. Also that “full TA” should be replaced with a reference to TA in RAN1.*
* *Proposal 8:*
  + *Vivo has a preference to have Reserved bits, but can accept majority.*
  + *Ericsson is also fine to consider if not all 16 bits are needed.*
* *Proposal 9:*
  + *Ericsson thinks that to align with RAN1 agreements, the field length should be 6 bits, with 2 reserved bits.*
* *Proposal 12:*
  + *Nokia has strong concerns with P12 as it brings NW restrictions without gain as current proposal will limit blind retransmission (a legacy function). Furthermore, there is an NTN CovEnh study item in Rel-18, so it makes no sense to disable a function in Rel-17 and bring it back in Rel-18. A better option is UE does not consider the Contention Resolution unsuccessful. If ra-ContentionResolutionTimer expires during UE-gNB RTT.*
  + *ZTE has sympathy for Nokia’s comments, and think it can be compromised by making it configurable.*
  + *LG would also prefer to have this as a note, but is okay to go with majority*
  + *Ericsson doesn’t think this prohibits coverage enhancement as multiple Msg 3 retransmissions can be scheduled, just not blindly. Also Nokia’s proposal has a problem that UE never declares CR unsuccessful.*
* *Proposal 15:*
  + *QC thinks it is not clear if this is also true for RRC release message*

*Rapporteur notes that Proposals 1, 2, 3, 11, 13, 17, and 19 have not received comments, thus are assumed agreeable. For P7, the wording suggestion by Ericsson is fine and is captured in updated P7a below. For the remaining proposals it is suggested that the above comments be captured and used as baseline for online discussion.*

**Proposal 7a: RAN2 understanding: UE failing to acquire sufficiently accurate UE location to be used in the calculation of** the UE’s Timing Advance value (see TS 38.211 [Y] clause 4.3.1) **should not perform any UL transmission until UE location is within accuracy limits. No RAN2 specification impact. (consensus)**

## Relevant proposals from IoT NTN

Pre-meeting discussion [Pre117-e][011][NTN] addressed remaining User Plane open issues in IoT NTN. Based on discussion outcome, a number of “for agreement” proposals have been labelled as*“(IoT NTN/NR NTN common*)”. Although many of these proposals are to align with NR or have already been captured (i.e., Proposals 1-3 from Section 2.1), The following proposal has not been addressed in NR:

*Proposal 11a: RAN2 to clarify the previous agreement as: Upon reception of configuration or reconfiguration of TA reporting trigger event, if UE has not reported TA to current serving cell before, the UE triggers a TA reporting. (IoT NTN/NR NTN common)*

Companies are invited to comment as to whether this clarification may also apply to NR NTN.

**Question 2) Do you agree with the following proposal?**

***“Proposal: RAN2 to clarify the previous agreement as: Upon reception of configuration or reconfiguration of TA reporting trigger event, if UE has not reported TA to current serving cell before, the UE triggers a TA reporting.”***

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree/Disagree** | **Additional comments** |
| OPPO | Agree |  |
| CATT | Agree |  |
| vivo | Agree |  |
| Lenovo, Motorola Mobility | Agree |  |
| Xiaomi | Agree |  |
| Huawei，HiSilicon | Agree |  |
| Samsung | Agree |  |
| Nokia | Agree |  |
| ZTE | See comments | Can understand the intention, but another method is to assume the default value to compared with as zero when there is no previous reported TA in this cell. Assuming the threshold configured is 5 ms, and if UE’s TA is smaller than 5ms then there is no need to report TA, this can help reduce some reports. But in a another aspect, triggering TA report earlier can inform NW about the TA ASAP to allow finer scheduling. We don’t have a strong view and can go with majority. |
| LG | Agree |  |
| MediaTek | Agree |  |
| Apple | Agree |  |
| Ericsson | Disagree | We think it is better to always report a TA when (re)configuring the thresholds (simplify the existing agreement).  In the proposal (and proposal from last meeting) it is unclear what “before” means, is it since last switching from IDLE/INACTIVE to CONNECTED mode or during this connection to this serving cell or any connection to this serving cell? How will we capture “before” in the spec? |
| NEC | Agree |  |
| InterDigital | Agree |  |

***Rapporteur’s Summary:***

*Out of 15 responding companies, the following table presents a summary of responses to the above question:*

|  |  |
| --- | --- |
| ***Agree with above proposal?*** | |
| *Agree* | *Disagree* |
| *13* | *1* |

*An additional* ***1*** *company did not explicitly provide an Agree/Disagree response, but it okay to go with majority.*

*Based on near consensus it seems the proposal is acceptable, however the question from Ericsson regarding the meaning of “before” is valid and can be clarified. Rapporteur understanding is that this refers to when the UE has not previously reported TA to “during this connection to this serving cell”. The proposal is revised with this understanding below and is classified as “for online discussion” to check whether this is the general understanding.*

**Proposal 2.1: RAN2 to clarify the previous agreement as: Upon reception of configuration or reconfiguration of TA reporting trigger event, if UE has not reported TA to current serving cell during this connection before, the UE triggers a TA reporting**

## Contribution input

In [Post116bis-e][109] discussion, a number of open issues have been listed as “for contribution”. Based on company input, several of these issues seem to have aligned proposals and may be potentially agreeable.

**Note:** To improve readability, proposals relevant to each open issue have been included in an Annex.

### **OI 15:** Repetition transmission based HARQ retransmission

Open issue 15 discusses whether repetition transmission based HARQ retransmission is always allowed and is explicitly indicated via DCI or semi-statically with RRC signalling (as in legacy). This aspect was addressed via contribution, where all contributing companies [1, 9, 10, 12, 14, 17, 21] propose to revise previous agreement to include “*or semi-statically via RRC signalling*”.

**Question 3) Do you agree with the following proposal (which revises previous agreement from RAN2#114e)?**

***“Proposal: Repetition transmission based HARQ retransmission is always allowed and is explicitly indicated via DCI or semi-statically via RRC signalling (as in legacy).”***

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree/Disagree** | **Additional comments** |
| OPPO | Agree |  |
| CATT | Agree |  |
| vivo | Agree |  |
| Lenovo, Motorola Mobility | Agree |  |
| Xiaomi | Agree |  |
| Huawei，HiSilicon | Agree |  |
| Samsung | Agree |  |
| Nokia | Agree |  |
| ZTE | Agree |  |
| LG | Agree |  |
| MediaTek | Agree |  |
| Apple | Agree |  |
| Ericsson | Agree with comment | We should add “Note, this revises the agreement from RAN2#114e” at the end. |
| NEC | Agree |  |
| InterDigital | Agree |  |

***Rapporteur’s Summary:***

*Based on consensus support, the proposal seems agreeable. Additional clarification from Ericsson can also be added.*

**Proposal 2.2: Repetition transmission based HARQ retransmission is always allowed and is explicitly indicated via DCI or semi-statically via RRC signalling (as in legacy). This revises the agreement from RAN2#114e (consensus)**

### **OI 16:** Details of DRX behaviour for SR and CFRA

Open Issue 16 discusses the case that a UE sends an SR, the UE enters Active time to monitor for a response after an offset time has elapsed. This aspect was addressed via contribution, where company input may be generally classified into the following two categories:

**1) Support introduction of an offset** [1, 8, 9, 10, 14, 15, 17, 20, 21]:

Proponents of introducing an offset note that according to current specification, UE enters DRX Active time immediately upon sending an SR. Considering the large RTT in NTN, it would be reasonable to delay the start of Active time to avoid unnecessary PDCCH monitoring [14] and save UE power [1, 8, 9, 10] since the SR response will not arrive until after at least the UE-gNB RTT. [20] and [21] note this solution has already been applied to other timers such *as ra-ContentionResolutionTimer* and *msgB-ReponseWindow.*

Other comments from [10] mention that a configurable offset could be considered to balance power consumption and delay.

**2) Do not support an offset** [3, 11, 12]:

Companies which do not support an offset wonder how this offset can implemented in the specification. [11] notes that considering SR may be retransmitted, does it mean for each SR (re)transmission, the UE enters DRX Active Time after an offset time has elapsed, or the offset is only applied to the first transmission of the SR? They further state that this may be considered an optimization [11], which can be deprioritized in this release [12]. Additionally, [3] mentions that use of an offset may be dependant on HARQ state.

Rapporteur suggests that based on large majority opinion (9/12), RAN2 considers introducing an offset to Active Time after sending SR. Further details to be discussed in Stage 3.

**Question 4a) Do you agree that in NTN, UE enters DRX Active time an offset time after sending SR?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree/Disagree** | **Additional comments** |
| OPPO | Disagree | We can understand the motivation is similar to extention of *drx-HARQ-RTT-TimerUL*(*DL)*. However, it is not exactly the same. Based on the current MAC specification, when a SR is sent on PUCCH and is pending, the UE is in DRX Active Time. Since SR may be retransmitted, if introducing an offset to SR triggered DRX Active Time, does it mean for each SR (re)transmission, the UE enters DRX Active Time after an offset time has elapsed, or the offset is only applied to the first transmission of the SR? If the offset is applied for each SR (re)transmission, will the RTT duration after SR retransmssion cancel the Active Time starting from the end of the RTT duration after first SR transmission? Like the highlighted “?” part in below figure.    In any case, we think it would be complicated and have non-trivial specification impact. Moreover, unlike extention of *drx-HARQ-RTT-TimerUL*(*DL),* which is an essential feature for NTN since without this feature, *drx-RetransmissionTimerUL*(DL) needs to be extended, the enhancement to SR triggered DRX Active Time is more like an optimization because in this case DRX Active Time is not controlled by any timer. Due to the limited time left, we prefer not to consider this non-essential enhancement. |
| CATT | Disagree | Similar view with OPPO, as the current specification can work well, this optimation can be postponed. |
| vivo | Agree |  |
| Lenovo, Motorola Mobility | Open to discuss | We share the motivation of introducing the offset while as OPPO analysed, the offset may not be applied for each SR (re)transmission. We are open to follow the majority if the offset is necessary. |
| Xiaomi | Agree | In our understanding, UE will enter active time at the first SR transmission + UE-gNB RTT. The active time will continue until no pending SR. The SR retransmission has no impact on the active time. |
| Huawei，HiSilicon | Maybe no | Although we see some power saving benefit in introducing this offset, what OPPO states makes sense. Considering the potential complexity, it is better to be deprioritized in R17. |
| Samsung | Disagree | Agree with OPPO. Furthermore, we wonder whether this means after sending SR the UE enters DRX sleep state for an offset time and then enters Active time. If so, UE will cannot monitor PDCCH for other HARQ processes. If not, what would be UE behaviour during the offset time? |
| Nokia | Agree with comment | The offset should have no impact to the running of UE’s existing active time, i.e., no impact to the NW DL scheduling which can be covered by current running timers after UE sending an SR. |
| ZTE | Agree | A configurable offset with zero as a possible value can be compromise between allowing legacy behavior and reducing unnecessary PDCCH monitoring. If offset is broadcast UE delay the active time by offset value, otherwise delay it by UE-gNB RTT.  But we are also fine with no optimization if it is majority view. |
| LG | Agree | We see the power-saving benefit of introducing offset by not monitoring the PDCCH during RTT.  However, we are fine to deprioritize this enhancement in this release if it is controversial. |
| MediaTek | Agree | Same view as Xiaomi |
| Qualcomm | Open to discuss | We agree what OPPO raised makes sense, we need to look this further. |
| Apple | Agree |  |
| Ericsson | Agree | Agree with Xiaomi. |
| NEC | Disagree | This is not essential and has big impact on specification, we prefer to postpone. |
| InterDigital | Open to discuss | In general have the same understanding as Xiaomi, but should discuss further. |

***Rapporteur’s Summary:***

*Out of 16 responding companies, the following table presents a summary of responses to the above question:*

|  |  |  |
| --- | --- | --- |
| ***UE enters DRX Active time an offset time after sending SR?*** | | |
| *Agree/agree with comments* | *Disagree/maybe disagree* | *Open to discuss* |
| *8* | *6* | *3* |

*The following comments are noted:*

* *Companies which support the offset:*
  + *(3) UE will enter Active time at the first SR transmission + UE-gNB RTT. The active time will continue until no pending SR.*
    - *SR retransmission has no impact on Active Time.*
  + *(2) There is some power saving benefit*
* *Companies which do not support the offset:*
  + *(6) This is a non-essential enhancement and can be postponed*
  + *(5) Does this mean for each SR (re)transmission, the UE enters DRX Active Time after an offset time has elapsed, or that the offset is only applied to first transmission of the SR?*
    - *This may have implications e.g. cancelling Active Time from previous SR transmission, and is non-trivial.*
* *Other comments:*
  + *The UE behaviour during this offset time needs to be clarified*
    - *Offset should have no impact on running of UE’s existing Active Time.*
  + *Configurable offset with zero as possible value can be a compromise.*

*There seems to be divergent opinion on this topic, and valid points have been raised for both for and against. Rapporteur suggests it be postponed to a second phase to allow more detailed discussion.*

Furthermore, several companies note the length of this offset could be UE-gNB RTT [1, 8, 9, 10, 15, 20, 21] or be network configurable [10]:

**Question 4b) If “Agree” to Q4a), what is the preferred offset duration (for SR case)?**

* **Option 1 : UE-gNB RTT**
* **Option 2: Configurable by Network**
* **Option 3: Other, please describe**

|  |  |  |
| --- | --- | --- |
| **Company** | **Preferred option(s)** | **Additional comments** |
| vivo | Option 1 | As UE is in connected state, UE and gNB has common understanding of full TA. Thus, the offset duration can be set as the UE-gNB RTT. |
| Xiaomi | Option 1 |  |
| Nokia | Option 1 | As commented in question 4a), the offset time after sending SR should not impact current running active time but only impact UE enter active time triggered by SR. We think the UE-gNB RTT should be enough. |
| ZTE | Op2 | With zero as a possible value. |
| LG | Option 1 | Option 1 is simple |
| MediaTek | Option 1 | Same view as vivo |
| Apple | Option 1 |  |
| Ericsson | Option 1 |  |
| InterDigital | Option 1 |  |
|  |  |  |
|  |  |  |

***Rapporteur’s Summary:***

*If an offset is agreed (in SR case) there seems near consensus that it shall be the UE-gNB RTT. This can be confirmed in a second phase along with core discussion.*

Open issue 16 also discussed the case that a UE sends msg3 as response to a RAR message during CFRA, the UE enters Active time when an offset time has elapsed. This aspect was addressed via contribution, where company input may be generally classified into the following two categories:

**1) Support introduction of an offset** [8, 9, 10, 14, 15, 17, 20, 21]:

**2) Do not support an offset** [1, 3, 11, 12]:

Similar arguments are presented as in the SR case (e.g., to avoid unnecessary monitoring) however companies are encouraged to refer to referenced documents for detailed discussion (for example, at least [1] and [17] have a different analysis from SR case).

**Question 5a) Do you agree that in NTN, UE enters DRX Active time an offset time after sending Msg3 in response to RAR message during CFRA?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree/Disagree** | **Additional comments** |
| OPPO | Disagree | During CFRA, network can identify the UE via Msg1, so after sending RAR, UE has acquired its TA and network may be able to schedule the subsequent transmission for the UE any time it wants, e.g. before or after receiving Msg3, which depends on network implementation. We think UE should enter DRX Active Time after receiving RAR as legacy, in order to not miss any scheduling from network and to ease network implementation. We think there is no need to introduce an offset for this case. |
| CATT | Disagree | The active time for CFRA is until a PDCCH indicating a new transmission addressed to the C-RNTI after successful reception of a Random Access Response. The PDCCH cheduleg may occur before or after MSG3 transmission, which depends on NW implementation. If an offset is applied, the network cannot chedule before the offset time, restricting the scheduling policies on the network. Since the network may schedule the UE at any time after the RAR for CFRA, an offset should not be introduced in this scenario. |
| Vivo | Agree | Our understanding is that the msg3 is the ACK message of RAR. Thus, NW typically will not schedule UE before receiving the msg3. It is reasonable that UE delays to enters DRX active time. |
| Lenovo, Motorola Mobility | Open to discuss |  |
| Xiaomi | Disagree | Agree with OPPO’s view |
| Huawei，HiSilicon | Disagree | Agree with OPPO and CATT. |
| Samsung | Disagree | We think it’s possible that the network schedules UE after RAR and before receiving Msg3 during CFRA, if UE delays to enter active time, it will miss the PDCCH/PDSCH. |
| Nokia | Agree | Agree with vivo that the msg3 is the ACK message of RAR. Thus, NW typically will not schedule UE before receiving the msg3. We also see the point from OPPO and CATT to have a flexible NW scheduling for some time-critical service (considering the high possibility of successful RAR decoding). We think it can be addressed via configurable offset to balance UE’s power saving and scheduling delay. |
| ZTE | Agree | As commented in question 4, a configurable offset with zero as a possible value can balance between power consumption and allowing earlier termination. But still we are fine with no optimization if majority consider the power consumption is acceptable. |
| LG | Agree | We see the power-saving benefit of introducing offset by not monitoring the PDCCH during RTT.  However, we are fine to deprioritize this enhancement in this release if it is controversial. |
| MediaTek | Open to discuss |  |
| Qualcomm | Disagree  [Agree only for handover] | There is no Msg3 for CFRA.  After RAR, the UE is in RRC\_CONNECTED and it is business as usual for UE, i.e., following the current DRX state. We agree with OPPO.  But we can consider it for handover case. |
| Apple | Disagree | Same view as OPPO |
| Ericsson | Agree | Agree with vivo.  To support the use case mentioned by OPPO and CATT, it can be configurable in the CFRA config if the UE shall apply the offset or not. The network is then in full control if it want to send Msg3 retransmissions or not and may select that based on the UEs services or subscription or other reasons. |
| NEC | Disagree | Since the NW knows UE from Msg1 in CFRA, it can start scheduling resources straight away without the UE needing to use an offset before entering DRX active. |
| InterDigital | Open to discuss |  |

***Rapporteur’s Summary:***

*Out of 16 responding companies, the following table presents a summary of responses to the above question:*

|  |  |  |
| --- | --- | --- |
| ***UE enters DRX Active time an offset time after sending Msg3 in response to RAR message during CFRA?*** | | |
| *Agree/agree with comments* | *Disagree/maybe disagree* | *Open to discuss* |
| *5* | *8* | *3* |

*The following comments are noted:*

* *Companies which support proposal:*
  + *(3) Msg3 is the Ack message of RAR, so NW will typically not schedule UE before receiving Msg3.*
    - *(3) Can introduce a configurable offset to balance UE’s power saving and scheduling delay.*
  + *There is power saving benefit*
* *Companies which do not support proposal:*
  + *(8) In CFRA network can identify UE via Msg1, so may schedule UE before/after receiving Msg3*
    - *(6) UE should enter DRX Active Time after receiving RAR as legacy, in order to not miss any scheduling from network and to ease network implementation.*
  + *There is no Msg3 for CFRA*

*There seems to be divergent opinion on this topic. Rapporteur suggests it be postponed to a second phase to allow more detailed discussion.*

Several companies propose possible lengths for this offset, including UE-gNB RTT [8, 9, 10, 15, 20, 21] or being network configurable [10, 17]:

**Question 5b) If “Agree” to Q5a), what is the preferred offset duration (for CFRA case)?**

* **Option 1 : UE-gNB RTT**
* **Option 2: Configurable by Network**
* **Option 3: Other, please describe**

|  |  |  |
| --- | --- | --- |
| **Company** | **Preferred option(s)** | **Additional comments** |
| vivo | Option 1 | As UE is in connected state, UE and gNB has common understanding of full TA. Thus, the offset duration can be set as the UE-gNB RTT. |
| Nokia | Option 2 | For CFRA, UE may not in active time during Radom access procedure due to no other timer running. If option1 is adopted, it is not possible to make a UL grant between the time the RAR is received by the UE and the RTT expires. This would add additional delay to the UL scheduling.  However, network may continue schedule the UE with UL grant right after RAR e.g. for the time-critical service or to reduce the data transmission interruption caused by CFRA. Considering the high reliability to decode RAR successfully, we tend to agree Option2: introduce a network configurable offset to delay the start of the DRX active time for CFRA after UE receiving RAR, in order to balance UE’s power consumption and scheduling latency. |
| ZTE | Op2 | With zero as a possible value. |
| LG | Option 1 | Option 1 is simple |
| Ericsson | Option 1 and 2 | To address the use cases noted by OPPO and CATT, we can have the option of having an offset of zero.  Let the config of CFRA include a flag if the UE shall apply the UE-gNB RTT offset and if the flag is absent, the UE apply an offset of zero after sending the Msg3/MsgA. |
| InterDigital | Option 1 |  |
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|  |  |  |
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***Rapporteur’s Summary:***

*If an offset is agreed (in CFRA case) there seems split opinion as to whether it shall be the UE-gNB RTT or NW configurable. Discussion can continue in a second phase along with core discussion.*

### **OI 18:** DL MAC CE execution delay

Open Issue 18 discusses the need to capture the DL MAC CE execution delay by K\_MAC agreed by RAN1, and was addressed via contribution. Although one company [1] states we may need additional RAN1 input, there is a large majority among responding companies [9, 14, 15, 17, 21] that this topic does not need to be addressed in MAC specification.

Rapporteur therefore suggests that, unless explicitly requested by RAN1, DL MAC CE execution delay is not addressed in MAC specification.

**Question 6) Do you agree with that** **DL MAC CE execution delay is not treated in MAC specification?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Agree/Disagree** | **Additional comments** |
| OPPO | Agree | We see no MAC impact. |
| CATT | Agree | DL MAC CE execution delay is defined in PHY. |
| Vivo | Agree | In the legacy, the DL MAC CE execution delay is captured in RAN1 spec, which has no RAN2 impact. |
| Lenovo, Motorola Mobility | Agree |  |
| Xiaomi | Agree | For DL DRX CMD MAC CE, UE doesn’t need to delay the application of the MAC CE until gNB receives the ACK feedback for the MAC CE. UE can apply it when receiving the MAC CE, and then UE will stop monitoring PDCCH and restart *drx-ShortCycleTimer*. At gNB side, gNB will not apply the MAC CE until ACK feedback received. But no matter gNB applying the MAC CE or not, gNB will not schedule UE, i.e. the behavior is unchanged. The only thing gNB need to take care is *drx-ShortCycleTimer* .gNB can set it when received ACK, based on the timing UE receives the MAC CE. Thus, there is no issue. |
| Huawei，HiSilicon | Agree | Leave it to RAN1. |
| Samsung | Agree | As legacy DL MAC CE execution delay is not specified in MAC spec, we wonder why we need to consider it for NTN. |
| Nokia | Agree |  |
| ZTE | Agree with comments | As suggested by Rapporteur this is no needed to be discussed unless requested by RAN1. I wonder if we shall include in the end of the proposal that ‘Can be revisited if requested by RAN1?’ |
| LG | Agree |  |
| MediaTek | Agree |  |
| Qualcomm | Ok to leave to RAN1 |  |
| Apple | Agree |  |
| Ericsson | Agree |  |
| NEC | Agree |  |
| InterDigital | Agree |  |

***Rapporteur’s Summary:***

*Based on consensus support, the proposal seems agreeable.*

**Proposal 2.3: DL MAC CE execution delay is not captured in MAC specification (consensus)**

# To be postponed to [AT117e] Phase 2

The following proposals from [Pre117e][103] and via contributions were inconclusive or require further discussion. Considering the very limited time to gather company input to this discussion (< 24 hours), it is suggested that more controversial topics be postponed to a second round to allow proper evaluation.

## [Pre117e] proposals

*Proposal 4:        RAN2 to further discuss if SR can be triggered when a TA report is triggered and no UL-SCH resources are available, or if RACH can be triggered if SR is triggered but there are no available PUCCH resources.*

*Proposal 5:      “Whether both UE location and/or UE specific TA information are needed in parallel for the purposes of TA reporting” is postponed.*

*Proposal 6:      “Reuse the TA-based trigger event if reporting UE location information for TA reporting purpose in connected mode can be agreed.” is postponed.*

*Proposal 10:      RAN2 to further discuss naming of UE-specific TA MAC CE and Differential UE-Specific K\_Offset MAC CE to ensure alignment with RAN1 specification.*

*Proposal 14:     RAN2 to further discuss “HARQ process 0 carries PUSCH transmission scheduled by RAR or PUSCH payload of MsgA, configuration of HARQ mode and allowedHARQ-DRX-LCP is up to NW implementation, and UE always follows it (no specification impact).”*

*Proposal 16:      RAN2 to further discuss implementation HARQ RTT timer extension.*

*Proposal 18:      RAN2 to further discuss method of configuredGrantTimer extension.*

## Contribution input

### **OI 14:** Additional details for *drx-HARQ-RTT-TimerDL/UL*

Open issue 14 has been addressed by the below contributions, where opinion is generally split between:

1) Existing behaviour needs to be clarified [3, 11, 21]

2) No specification impact is needed [1, 8, 14, 17]

Rapporteur suggests this topic be postponed to a second phase to allow for detailed discussion. Relevant proposals are listed below:

|  |  |  |
| --- | --- | --- |
| **Contribution** | **Relevant proposal(s) – Spec change necessary** | **Company** |
| [3] [R2-2202420](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202420.zip) | **P1:** If UE receive retransmission scheduling for UL/DL HARQ state A during drx-HARQ -RTT-TimerUL/DL is running, drx-HARQ -RTT-TimerUL/DL is restarted. | Spreadtrum |
| [11] [R2-2202999](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202999.zip) | **P1:** If PDCCH indicates a UL transmission for a HARQ process when drx-HARQ-RTT-TimerUL for the corresponding HARQ process is running, UE should stop the drx-HARQ-RTT-TimerUL for the corresponding HARQ process.  **P2:** If PDCCH indicates a DL transmission for a HARQ process when drx-HARQ-RTT-TimerDL for the corresponding HARQ process is running, UE should stop the drx-HARQ-RTT-TimerDL for the corresponding HARQ process. | OPPO |
| [21] [R2-2203482](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203482.zip) | **P1:** In MAC spec, change the “start the drx-HARQ-RTT-TimerUL/DL…” to “start or restart the drx-HARQ-RTT-TimerUL/DL…”. | Ericsson |

|  |  |  |
| --- | --- | --- |
| **Contribution** | **Relevant proposal(s) – No spec change necessary** | **Company** |
| [1] [R2-2202302](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202302.zip) | **P1:** No specs change is needed for UE behaviour related to drx-HARQ-RTT-Timers when PDCCH indicates a UL/DL transmission. | Huawei, HiSilion |
| [9] [R2-2202773](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202773.zip) | **P1:** No additional RAN2 spec impact on drx-HARQ-RTT-TimerDL/UL behaviour for HARQ feedback enabled and UL HARQ state A is needed for NR NTN. | vivo |
| [14] [R2-2203165](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203165.zip) | **P1:** For Open Issue 14, no enhancement is needed for stopping drx-HARQ-RTT-TimerDL for a HARQ PID with HARQ feedback enabled when the downlink assignment for retransmission is received using the HARQ PID while the drx-HARQ-RTT-TimerDL is running.  **P2:** For Open Issue 14, no enhancement is needed for stopping drx-HARQ-RTT-TimerUL for a HARQ PID with UL HARQ state A when the UL grant for retransmission is received using the HARQ PID while the drx-HARQ-RTT-TimerUL is running. | LG |
| [17] [R2-2203256](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203256.zip) | **P1:** For HARQ feedback enabled and UL HARQ state A, it is not necessary to discuss UE DRX behaviour when PDCCH indicates a UL/DL transmission doesn’t consider the case where drx-HARQ-RTT-TimerUL/DL for the corresponding HARQ process has already been running.  **P2:** If further clarification is needed on the legacy behaviour, it should be discussed in Rel-15 as part of the maintenance session. | Nokia, Nokia Shanghai Bell |

### **OI 17:** UL synchronization failure

Open Issue 17 has been addressed by the below contributions. Although detailed procedure varies between contributions, upon validity timer expiry opinion is ***generally*** split between whether the UE should:

1) Be considered out of sync (possibly requiring RACH) [4, 8, 9, 12, 11, 15, 18]

2) Re-aquire SI (with or without flushing HARQ buffers) [1, 5, 8, 19, 20]

3) trigger RLF (immediately or subject to a timer) [7, 14, 20, 21]

Rapporteur suggests this topic be postponed to a second phase to allow for detailed discussion. Relevant proposals are listed below ( “Other” proposals addressing this topic are captured in the Annex):

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| --- | --- | --- |
| **Contribution** | **Relevant proposal(s) – Out of sync/Trigger RACH** | **Company** |
| [4] [R2-2202421](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202421.zip) | **P1:** When the validate timer expires, UE's action is similar to TAT expiry.  **P2:** When the validate timer expires, UE shall not trigger RA procedure, unless the uplink data arrives.  **P3:** when the validate timer expires, and UE triggers RA procedure in case of uplink data arrival, which SIB X applied for RA procedure is UE implementation. | Spreadtrum |
| [8] [R2-2202613](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202613.zip) | **P3:** It could be up to UE implementation to decide whether to trigger RACH procedure with the new assistance information (e.g. ephemeris, common TA parameters, etc.) carried in the latest SIB information. | CMCC |
| [9] [R2-2202773](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202773.zip) | **P4:** UE considers that it has lost uplink synchronization when the validity timer expires. UE will follow the legacy RACH trigger event to recover from the UL synchronization failure (i.e. UL data arrival when UL synchronisation status is "non-synchronised"). No new trigger for RACH is needed. | vivo |
| [10] [R2-2202972](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202972.zip) | **P3:** UE consider it is out-of-sync when validity Timer expires. | ZTE Corporation, Sanechips |
| [11] [R2-2202999](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202999.zip) | **P4:** Upon expiry of the validity timer, the UE should suspend all resource configuration including PUCCH, SRS, CG, SPS, etc and stop UL transmission.  **P5:** Upon expiry of the validity timer, UE needs to firstly acquire the serving satellite ephemeris data and common TA parameters from SIB, and then trigger a RACH. | OPPO |
| [15] [R2-2203194](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203194.zip) | **P2:** For UL synchronization failure due to the validity timer expiry, UE declares TAT expiry. The legacy behaviour upon TAT expiry is applied with the only exception that RACH procedure is not allowed either. | Xiaomi |
| [18] [R2-2203257](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203257.zip) | **P1:** Upon UL synchronization failure due to the validity timer expiry, UE flushes all HARQ buffers and releases all resource configuration. RACH procedure should be used to recover from UL synchronization loss failure if UE re-acquires the SIB for new assistance info.  **P2:** Whether UE needs to re-acquire the SIB and trigger RACH procedure after the validity timer expiry should follow a legacy RACH trigger event, i.e. DL or UL data arrival during RRC\_CONNECTED when UL synchronisation status is "non-synchronised" due to validity timer expiry. | Nokia, Nokia Shanghai Bell |

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| **Contribution** | **Relevant proposal(s) – Re-aquire SI** | **Company** |
| [1] [R2-2202302](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202302.zip) | **P5:** When SI used for UL synch (pre-compensation) is no longer valid, it is up to UE implementation to re-acquire the required SI. Nothing additional is needed. | Huawei, HiSilicon |
| [5] [R2-2202546](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202546.zip) | **P1:** No special mechanism needs to be developed to handle validity timer expiry.  **P2:** On validity timer expiry, the UE autonomously tunes away and re-acquires valid SIB information (SIBxx). | Apple |
| [8] [R2-2202613](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202613.zip) | **P2:** Upon UL synchronization failure due to the validity timer expiry, UE does not trigger RLF. UE flushes all HARQ buffers, released all resource configuration and re-acquire the SIB. | CMCC |
| [19] [R2-2203298](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203298.zip) | **P1:** When the validity timer is not running and results in the uplink synchronization failure, the MAC entity shall not perform any uplink transmission on the serving cell before UE (re)acquires the required SIB. | Samsung |
| [20] [R2-2203423](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203423.zip) | **P4:** If UE cannot re-aquire SIB prior to validity timer expiry, RAN2 to select between the following options: 1) UE triggers RLF; or 2) UE flushes all HARQ buffers, releases all resource configuration, and re-aquires updated SIB. | InterDigital |

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| **Contribution** | **Relevant proposal(s) – RLF** | **Company** |
| [7] [R2-2202563](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202563.zip) | **P1:** When the UL synchronization validity timer expires, the UE delays the triggering of RLF by a recovery period.  **P2:** RLF is NOT triggered if the UE is able to acquire ephemeris during the recovery period.  **P3:** It is up to the UE to determine the length of the recovery period. | Qualcomm |
| [14] [R2-2203165](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203165.zip) | **P6:** For Open Issue 17, the UE should perform the RLF procedure when the validity timer expires. | LG |
| [20] [R2-2203423](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203423.zip) | **P4:** If UE cannot re-aquire SIB prior to validity timer expiry, RAN2 to select between the following options: 1) UE triggers RLF; or 2) UE flushes all HARQ buffers, releases all resource configuration, and re-aquires updated SIB. | InterDigital |
| [21] [R2-2203482](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203482.zip) | **P7:** If the UEs NTN validity timer expires, the UE shall refrain from all UL transmissions and trigger RLF. | Ericsson |

### **OI 19:** UE location information for purposes of TA reporting

Open Issue 19 has been addressed by the below contributions, where opinion is split between:

1) Supporting UE location information for purposes of TA reporting [2, 17, 20]

2) Not supporting UE location information for purposes of TA reporting [6, 11]

Rapporteur suggests this topic be postponed to a second phase to allow for detailed discussion. Relevant proposals are listed below:

|  |  |  |
| --- | --- | --- |
| **Contribution** | **Relevant proposal(s) – Support location info for TA reporting** | **Company** |
| [2] [R2-2202303](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202303.zip) | **P3:** Support reporting location information for TA reporting purpose and reuse the event-trigger for TA MAC CE reporting. | Huawei, HiSilicon |
| [17] [R2-2203256](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203256.zip) | **P8:** RAN2 to continue the discussions on the open issues to enable the UE location reporting for TA purpose. | Nokia, Nokia Shanghai Bell |
| [20] [R2-2203423](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203423.zip) | **P5:** UE location information can be reported for purposes of UE-specific TA reporting. | InterDigital |

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| --- | --- | --- |
| **Contribution** | **Relevant proposal(s) – Do not support location info for TA reporting** | **Company** |
| [6] [R2-2202547](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202547.zip) | **P1:** UE location reporting in RRC\_CONNECTED for TA reporting purposes is not agreed for Release 17 NTN feature. | Apple |
| [11] [R2-2202999](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202999.zip) | **P7:** Don’t support UE location information for purpose of TA reporting | OPPO |

# Conclusions

## For email agreement

*From [Pre117-e] Discussion:*

**Proposal 1.1: During RA procedure for RRC re-establishment procedure, the UE should trigger TA report if an indication is broadcasted by the target cell’s SI.**

**Proposal 1.2:    During RA procedure for handover, the UE should trigger TA report if the target cell indicates this in the handover command.**

**Proposal 1.3:    Other than re-establishment and handover procedure, TA reporting in connected mode is not controlled by enabling/disabling indication in SI.**

**Proposal 1.11: RAN2 confirms ra-ResponseWindow and msgB-ReponseWindow are not extended in NTN.**

**Proposal 1.13: Existing parameter names are updated to: uplinkHARQ-mode, allowedHARQ-mode,  and HARQ mode A/B.**

**Proposal 1.17: A NOTE is added to MAC CR clarifying that prior to starting drx-HARQ-RTT-TimerUL/DL, latest UE-gNB RTT is used to set timer length.**

**Proposal 1.19: MAC does not specify how UE detects a cell originates from a non-terrestrial network.**

*From contributions:*

**Proposal 2.2: Repetition transmission based HARQ retransmission is always allowed and is explicitly indicated via DCI or semi-statically via RRC signalling (as in legacy). This revises the agreement from RAN2#114e (consensus)**

**Proposal 2.3: DL MAC CE execution delay is not captured in MAC specification (consensus)**

## For online discussion

*From [Pre117-e] Discussion*

**Proposal 1.7a: RAN2 understanding: UE failing to acquire sufficiently accurate UE location to be used in the calculation of** the UE’s Timing Advance value (see TS 38.211 [Y] clause 4.3.1) **should not perform any UL transmission until UE location is within accuracy limits. No RAN2 specification impact. (consensus)**

[AT117e] Discussion:

* Qualcomm is not clear on what the “accuracy limit is”
* Ericsson clarifies that RAN4 specifies a minimum accuracy of UE UL transmission timing error and UE location is part of it. Also that “full TA” should be replaced with a reference to TA in RAN1.

**Proposal 1.8: RAN2 confirms UE-specific TA MAC CE consists of only one field with length 16 bits, which contains the UE estimate of full UE-specific TA. (19/21)**

[AT117e] Discussion:

* Vivo has a preference to have Reserved bits, but can accept majority.
* Ericsson is also fine to consider if not all 16 bits are needed.

**Proposal 1.9:    RAN2 confirms Differential UE-Specific K\_Offset MAC CE consists of only one field with length 8 bits, which contains the Differential UE-Specific K\_Offset. (consensus)**

[AT117e] Discussion:

* Ericsson thinks that to align with RAN1 agreements, the field length should be 6 bits, with 2 reserved bits.

**Proposal 1.12: UE stops ra-ContentionResolutionTimer upon receiving PDCCH indicating Msg3 retransmission and then starts ra-ContentionResolutionTimer after the end of the Msg3 retransmission plus UE-gNB RTT. Impact to coverage and possible enhancements (e.g. to support MSG3 blind retransmission) can be considered in the Rel-18 NTN coverage enhancement SI.**

[AT117e] Discussion:

* Nokia has strong concerns with P12 as it brings NW restrictions without gain as current proposal will limit blind retransmission (a legacy function). Furthermore, there is an NTN CovEnh study item in Rel-18, so it makes no sense to disable a function in Rel-17 and bring it back in Rel-18. A better option is UE does not consider the Contention Resolution unsuccessful. If ra-ContentionResolutionTimer expires during UE-gNB RTT.
* ZTE has sympathy for Nokia’s comments, and think it can be compromised by making it configurable.
* LG would also prefer to have this as a note, but is okay to go with majority
* Ericsson doesn’t think this prohibits coverage enhancement as multiple Msg 3 retransmissions can be scheduled, just not blindly. Also Nokia’s proposal has a problem that UE never declares CR unsuccessful.

**Proposal 1.15: uplinkHARQ-DRX-LCP-mode and allowedHARQ-DRX-LCP, if configured, also apply for SRB1 to SRB3.**

[AT117e] Discussion:

* QC thinks it is not clear if this is also true for RRC release message

*From Contributions*

**Proposal 2.1: RAN2 to clarify the previous agreement as: Upon reception of configuration or reconfiguration of TA reporting trigger event, if UE has not reported TA to current serving cell during this connection before, the UE triggers a TA reporting**

* Rapporteur would like to confirm that “during this connection” is the correct interpretation.

## Postponed

Discussion on offset for SR and CFRA (i.e., Questions 4a, 4b, 5a, and 5b) will be continued in subsequent [AT117e] discussion phase

# References

1. [R2-2202302](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202302.zip) Discussion on MAC open issues Huawei, HiSilicon
2. [R2-2202303](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202303.zip) Discussion on remaining MAC issues Huawei, HiSilicon
3. [R2-2202420](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202420.zip) Remaining issues on HARQ process in NTN Spreadtrum Communications
4. [R2-2202421](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202421.zip) MAC operation about the validity timer expiry Spreadtrum Communications
5. [R2-2202546](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202546.zip) UL synchronization and validity timer expiry Apple
6. [R2-2202547](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202547.zip) UE location and TA reporting Apple
7. [R2-2202563](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202563.zip) UL synchronization failure in RRC\_CONNECTED Qualcomm Incorporated
8. [R2-2202613](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202613.zip) Considerations on MAC open issues CMCC
9. [R2-2202773](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202773.zip) Remaining MAC Open Issues for NR NTN vivo
10. [R2-2202972](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202972.zip) Consideration on MAC open issues ZTE Corporation, Sanechips
11. [R2-2202999](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202999.zip) Discussion on MAC open issues in NTN OPPO
12. [R2-2203076](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203076.zip) Discussion on Left Open Issues of Other MAC Aspects CATT
13. [R2-2203151](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203151.zip) Discussion on TA reporting ITL
14. [R2-2203165](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203165.zip) Discussion on open issues for MAC aspects LG Electronics Inc.
15. [R2-2203194](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203194.zip) Remaining MAC issues of NR NTN Xiaomi
16. [R2-2203203](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203203.zip) CG enhancements in NTN Sony
17. [R2-2203256](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203256.zip) On left open issues for MAC aspects Nokia, Nokia Shanghai Bell
18. [R2-2203257](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203257.zip) Discussion on Validity timer expiry and restart Nokia, Nokia Shanghai Bell
19. [R2-2203298](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203298.zip) Open issues on MAC aspects Samsung Research America
20. [R2-2203423](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203423.zip) Remaining MAC open issues in NTN InterDigital
21. [R2-2203482](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203482.zip) Remaining MAC issues in NTNs Ericsson
22. [R2-2201739](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Inbox/R2-2201739.zip) Summary of [AT116bis-e][107][NTN] Other MAC issues (InterDigital)
23. [R2-2201849](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Inbox/R2-2201849.zip) Summary of [AT116bis-e][107][NTN] Other MAC issues Phase 2 (InterDigital)
24. [R2-2201900](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_116bis-e/Inbox/R2-2201900.zip) Summary of [Post116bis-e][109][NTN] MAC running CR and list of open issues (InterDigital)
25. [R2-2203424](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203424.zip) Report of [Pre117-e][103][NTN] MAC open issues (InterDigital)
26. [R2-2203160](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203160.zip) Report of [Pre117-e][011][IoT-NTN] User plane Open Issues Input (OPPO)

# Annex: referenced contribution proposals

## Topics for agreement

### **OI 15:** Repetition transmission based HARQ retransmission

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| **Contribution** | **Relevant proposal(s) – Repetition-based HARQ retransmission** | **Company** |
| [1] [R2-2202302](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202302.zip) | **P2:** Repetition based HARQ retransmission is always allowed for both DCI indication case and RRC configuration case (as in legacy). | Huawei, HiSilicon |
| [9] [R2-2202773](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202773.zip) | **P2:** Repetition transmission based HARQ retransmission is always allowed and is explicitly indicated via DCI or semi-statically with RRC signalling (as in legacy). | vivo |
| [10] [R2-2202972](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202972.zip) | **P1:** Repetition transmission based HARQ retransmission is always allowed and is explicitly indicated via DCI or semi-statically with RRC signalling (as in legacy). | ZTE Corporation, Sanechips |
| [12] [R2-2203076](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203076.zip) | **P2:** Repetition transmission based HARQ retransmission is always allowed and is explicitly indicated per HARQ process via DCI or semi-static RRC signaling (as in legacy). | CATT |
| [14] [R2-2203165](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203165.zip) | **P3:** For Open Issue 15, repetition transmission based HARQ retransmission is always allowed and is explicitly indicated per HARQ process via DCI or semi-statically with RRC signalling (as in legacy). | LG |
| [17] [R2-2203256](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203256.zip) | **P3:** RAN2 to confirm all legacy specified retransmission schemes should be supported in NTN. | Nokia, Nokia Shanghai Bell |
| [21] [R2-2203482](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203482.zip) | **P6:** Repetition transmission based HARQ retransmission is always allowed and is explicitly indicated via DCI or semi-statically with RRC signalling (as in legacy). Note, this revises the agreement from RAN2#114e. | Ericsson |

### **OI 16:** Details of DRX behaviour for SR

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| **Contribution** | **Relevant proposal(s) – Introduction of an Offset** | **Company** |
| [1] [R2-2202302](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202302.zip) | **P3:** In NTN, after UE sends an SR, UE enters Active time after one UE-gNB RTT. | Huawei, HiSilicon |
| [8] [R2-2202613](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202613.zip) | **P1:** It is proposed that in the both cases that a UE sends an SR and a UE sends msg3 as response to a RAR message during CFRA, the UE delay entering active time to monitor for a response until an offset(e.g. one RTT at least) time has elapsed. | CMCC |
| [9] [R2-2202773](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202773.zip) | **P3:** For DRX of NTN, in the case that UE sends msg3 as a response to a RAR message during CFRA or sends an SR, UE enters Active time after an offset time has elapsed. The offset time is the UE-specific gNB-UE RTT. | vivo |
| [10] [R2-2202972](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202972.zip) | **P2:** A offset can be optional configured. If configured, it is used to delay the start of active time after sending SR/Msg3 of CFRA otherwise UE-gNB RTT is used. | ZTE Corporation, Sanechips |
| [14] [R2-2203165](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203165.zip) | **P4:** For Open Issue 16, in DRX, the UE enters the Active Time after waiting for the offset if the UE sends the SR. | LG |
| [15] [R2-2203194](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203194.zip) | **P1:** For the case that UE sends a SR and the case that UE receives RAR for CFRA, UE delays the start of active time by UE-gNB RTT. | Xiaomi |
| [17] [R2-2203256](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203256.zip) | **P4:** Offset should be applied to delay the start of the DRX active time after UE sending an SR. | Nokia, Nokia Shanghai Bell |
| [20] [R2-2203423](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203423.zip) | **P1:** In NTN, when a Scheduling Request is sent on PUCCH and is pending UE enters DRX Active Time after UE-gNB RTT. | InterDigital |
| [21] [R2-2203482](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203482.zip) | **P2:** In NTNs, in the case that a UE sends an SR, the UE do not need to enter into Active Time to monitor for a response until after an offset time of UE-gNB RTT has elapsed.  **P3:** Consider replacing “- a Scheduling Request is sent on PUCCH and is pending (as described in clause 5.4.4); or” with “- an offset time To has elapsed after a Scheduling Request is sent on PUCCH and is pending (as described in clause 5.4.4); or” and a text “The offset time To is equal zero except in NTNs where it is equal to the UE-gNB RTT.” | Ericsson |

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| **Contribution** | **Relevant proposal(s) – Do not support offset introduction** | **Company** |
| [3] [R2-2202420](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202420.zip) | **P2:** If UE sends an SR or msg3 during CFRA, and HARQ state B is configured, the UE enters Active time immediately. | Spreadtrum |
| [11] [R2-2202999](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202999.zip) | **P3:** Follow legacy DRX behaviour after sending SR and msg3 for CFRA. | OPPO |
| [12] [R2-2203076](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203076.zip) | **P3:** The enhancement for DRX active time in cases of SR spending and PDCCH schedule after CFRA should be deprioritized in Rel-17. | CATT |

### **OI 16:** Details of DRX behaviour for CFRA

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| **Contribution** | **Relevant proposal(s) – Introduction of an Offset** | **Company** |
| [8] [R2-2202613](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202613.zip) | **P1:** It is proposed that in the both cases that a UE sends an SR and a UE sends msg3 as response to a RAR message during CFRA, the UE delay entering active time to monitor for a response until an offset(e.g. one RTT at least) time has elapsed. | CMCC |
| [9] [R2-2202773](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202773.zip) | **P3:** For DRX of NTN, in the case that UE sends msg3 as a response to a RAR message during CFRA or sends an SR, UE enters Active time after an offset time has elapsed. The offset time is the UE-specific gNB-UE RTT. | vivo |
| [10] [R2-2202972](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202972.zip) | **P2:** A offset can be optional configured. If configured, it is used to delay the start of active time after sending SR/Msg3 of CFRA otherwise UE-gNB RTT is used. | ZTE Corporation, Sanechips |
| [14] [R2-2203165](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203165.zip) | **P5:** For Open Issue 16, in DRX, the UE enters the Active Time after waiting for the offset if the UE sends the Msg3. | LG |
| [15] [R2-2203194](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203194.zip) | **P1:** For the case that UE sends a SR and the case that UE receives RAR for CFRA, UE delays the start of active time by UE-gNB RTT. | Xiaomi |
| [17] [R2-2203256](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203256.zip) | **P5:** Offset should be applied to delay the start of the DRX active time for CFRA after UE receiving RAR.  **P6:** Introduce a network configurable offset to delay the start of the DRX active time for CFRA after UE receiving RAR, in order to balance UE’s power consumption and scheduling latency. | Nokia, Nokia Shanghai Bell |
| [20] [R2-2203423](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203423.zip) | **P2:** In NTN, UE enters DRX Active Time after UE-gNB RTT to monitor for a PDCCH indicating a new transmission addressed to the C-RNTI of the MAC entity after successful reception of a Random Access Response for the Random Access Preamble not selected by the MAC entity among the contention-based Random Access Preamble. | InterDigital |
| [21] [R2-2203482](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203482.zip) | **P4:** In the case that a UE sends Msg3 as response to a RAR message during CFRA, the UE enters Active Time when an offset time of UE-gNB RTT has elapsed.  **P5:** Consider replacing “- a PDCCH indicating a new transmission addressed to the C-RNTI of the MAC entity has not been received after successful reception of a Random Access Response for the Random Access Preamble not selected by the MAC entity among the contention-based Random Access Preamble (as described in clauses 5.1.4 and 5.1.4a).” with “- an offset time To has elapsed and a PDCCH indicating a new transmission addressed to the C-RNTI of the MAC entity has not been received after successful reception of a Random Access Response for the Random Access Preamble not selected by the MAC entity among the contention-based Random Access Preamble (as described in clauses 5.1.4 and 5.1.4a).” and the text indicated in Proposal 3 above. | Ericsson |

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| **Contribution** | **Relevant proposal(s) – Do not support offset introduction** | **Company** |
| [1] [R2-2202302](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202302.zip) | **P4:** In NTN, after UE successfully receives RAR during CFRA, the UE enters Active time as in legacy. | Huawei, HiSilicon |
| [3] [R2-2202420](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202420.zip) | **P2:** If UE sends an SR or msg3 during CFRA, and HARQ state B is configured, the UE enters Active time immediately. | Spreadtrum |
| [11] [R2-2202999](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202999.zip) | **P3:** Follow legacy DRX behaviour after sending SR and msg3 for CFRA | OPPO |
| [12] [R2-2203076](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203076.zip) | **P3:** The enhancement for DRX active time in cases of SR spending and PDCCH schedule after CFRA should be deprioritized in Rel-17. | CATT |

### **OI 18:** DL MAC CE execution delay

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| **Contribution** | **Relevant proposal(s) – Do not treat in MAC spec** | **Company** |
| [9] [R2-2202773](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202773.zip) | **P5:** Do not capture the DL MAC CE execution delay by K\_MAC in RAN2 Specs. | vivo |
| [14] [R2-2203165](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203165.zip) | **P7:** For Open Issue 18, no enhancement is needed for DL MAC CE execution delay. | LG |
| [15] [R2-2203194](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203194.zip) | **P4:** RAN2 to agree not to cover DL MAC CE execution delay in MAC. | Xiaomi |
| [17] [R2-2203256](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203256.zip) | **P7:** There is no need to introduce execution delay caused by K\_mac for DRX Command MAC CE. | Nokia, Nokia Shanghai Bell |
| [21] [R2-2203482](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203482.zip) | **P8:** There is no need to add the DL MAC CE execution delay in NTNs to the MAC spec. | Ericsson |

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| **Contribution** | **Relevant proposal(s) – Wait for RAN1 input** | **Company** |
| [1] [R2-2202302](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202302.zip) | **P6:** Discussion on the need of DL MAC CE execution delay requires more RAN1 input. | Huawei, HiSilicon |

## Topics to be postponed

### **OI 17:** UL synchronization failure

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| **Contribution** | **Relevant proposal(s) – Other relevant proposals** | **Company** |
| [11] [R2-2202999](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2202999.zip) | **P6:** If the UE is not configured with searchSpaceSIB1 or searchSpaceOtherSystemInformation on the active BWP, the UE should switch to initialDownlinkBWP to acquire the serving satellite ephemeris data and common TA parameters. | OPPO |
| [12] [R2-2203076](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203076.zip) | **P1:** Upon UL synchronization failure due to the validity timer expiry, UE does not: trigger RLF, flush all HARQ buffers and release all resource configurations. [ | CATT |
| [15] [R2-2203194](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203194.zip) | **P3:** RAN2 to agree the above changes to MAC for UL synchronization failure. (refer to reference contribution) | Xiaomi |
| [18] [R2-2203257](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203257.zip) | **P3:** The epoch time can be either explicitly/implicitly provided by SIB together with the associated assistance information or indicated by dedicated RRC signalling.  **P4:** RAN2 should discuss how to handle the case where the UE acquires assistance information within the validity duration but the epoch time lies after the expiration of the current validity timer. | Nokia, Nokia Shanghai Bell |
| [20] [R2-2203423](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_117-e/Docs/R2-2203423.zip) | **P3:** NR NTN UE should maintain updated SI used for UL synch throughout connection duration (i.e., UE should re-aquire SIB prior to validity timer expiry). | InterDigital |