**3GPP TSG RAN WG2 #118-e R2-220xxxx**

**Online, 9th – 20th May, 2022**

**Agenda Item: 7.2.4**

**Source: InterDigital, Inc.**

**Title: [draft] Report of [AT118-e][049][IoTNTN] User Plane (Interdigital)**

**Document for: Discussion**

# Introduction

This document is the report from the following offline discussion:

[AT118-e][049][IoTNTN] User Plane (Interdigital)

 Scope: Treat R2-2205161, R2-2205328, R2-2205724, R2-2205959, R2-2205996

 Ph1 Determine agreeable parts, for Agreeable parts endorse TP/Draft CR.

 Intended outcome: Report, Endorsed TP(s).

 Deadline: Schedule 1 (CB online W2 if needed)

# Contact

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# Discussion

## Value range for sr-ProhibitTimerExt

In [1] it is proposed to udpdate the value ranges for sr-ProhobitTimerExt for eMTC and NB-IoT. Specifically, 3 proposals are made:

**Proposal 1: The 0ms offset for *sr-ProhibitTimerExt* should be allowed and it can be the default value.**

**Proposal 2: Some small values, e.g., several milliseconds, are also needed for *sr-ProhibitTimerExt*, in eMTC over NTN.**

**Proposal 3: Larger minimum value for *sr-ProhibitTimerExt* can be set in NB-IoT over NTN. Accordingly, finer granularity or more spare bits can be provided within this range.**

Question 1.1: Do you agree that 0ms offset should be the default value for sr-ProhibitTimerExt ?

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson | No | Not needed. If zero is wanted, then *sr-ProhibitTimerExt* is not configured.  |
| Huawei, HiSilicon | No | the same is achieved by not configuring *sr-ProhibitTimerExt*  |
| MediaTek | No | Not needed, as mentioned by Ericsson and Huawei |
| Qualcomm | No | We think now the name has changed to sr-ProhibitTimerOffset. Agree with Ericsson. |
| Lenovo | No | Not needed. |
| Transsion Holdings | No | Not needed. |
| OPPO | No | Not needed. |
| TTP | No |  |
| Nokia | No |  |
| GateHouse | No |  |
| Xiaomi | No | Agree with Ericsson |
| Spreadtrum | No |  |
| ZTE | No | In previous CR, the Need Code for *sr-ProhibitTimerExt* is OPTIONAL -- Need OP. And the UE behaviour on absence of this parameter is missing. We cannot assume that 0ms would be applied when *sr-ProhibitTimerExt* is not configured (it’s also possible that UE continue to use the existing value). So in the contribution, we suggest to add “If *sr-ProhibitTimerExt* is absent, the UE uses the (default) value of 0.”In the latest CR, *sr-ProhibitTimerOffset-r17* is defined with SetupRelease {} format. We think this can resolve our concern, e.g., if *sr-ProhibitTimerOffset-r17* is set to “*Release*”, no *sr-ProhibitTimerOffset-r17* would be applied. |
| InterDigital | No |  |

Question 1.2: Do you agree that some additional smaller values, e.g., several milliseconds, are needed for sr-ProhibitTimerExt, in eMTC over NTN?

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson | No | We do not see the use case.  |
| Huawei, HiSilicon | No | Same as Ericsson, we do not understand the purpose |
| MediaTek | No | Agree with Ericsson and Huawei |
| Qualcomm | No |  |
| Lenovo | No | Not needed. |
| Transsion Holdings | No |  |
| OPPO | No | Not needed. |
| TTP | No |  |
| Nokia | No |  |
| GateHouse | No |  |
| Xiaomi | No | Not needed |
| Spreadtrum | No |  |
| ZTE | Yes | We give analysis in the contribution. But it seems companies have no interests to read and give no technical reason to object.In LEO case, the RTT is 4ms. If SR period is configured with 1ms, and the legacy *sr-ProhibitTimer* is also configured with small value, e.g., 2 (that means NW don’t want too much prohibit time between two consecutive SRs), we don’t know which value can be configured for *sr-ProhibitTimerOffset?* The minimum value of 90ms? Then:The actual value of *sr-ProhibitTimer* = CEIL (*sr-ProhibitTimerOffset*/ SR period) + signalled value of *sr-ProhibitTimer =* 92. The final timer length is 92\* SR period =92msDo companies really think such large *sr-ProhibitTimer* reasonable for eMTC over LEO? We think it’s unnecessary too large. But now we have no way to configure smaller value. |
| InterDigital | No |  |

Question 1.3: Do you agree that a larger minimum value for sr-ProhibitTimerExt can be used in NB-IoT over NTN?

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson | No | We do not see the use case.  |
| Huawei, HiSilicon | No | Same as Ericsson, we do not understand the purpose |
| MediaTek | No | Not needed.  |
| Qualcomm | No |  |
| Lenovo | No | Not needed. |
| Transsion Holdings | No |  |
| OPPO | No | Not needed. |
| TTP | No |  |
| Nokia | No |  |
| GateHouse | No | Same as Ericsson |
| Xiaomi | No | Not needed |
| Spreadtrum | No |  |
| ZTE | No | We have the observation that, in legacy network, since RTT is negligible, the total length of waiting time for SR prohibit is mainly determined by the configured *sr-ProhibitTimer* value and length of SR period. But in IoT NTN, it’s obviously that the impact of RTT cannot be ignored or even dominates over other factors. It’s easy to further understand, if RTT is less than the configured SR period, RTT would cause no new impacts on the time length of several SR transmissions. But if RTT is larger than the SR period, the total time length of several SR transmissions would be mainly determined by RTT. For NB-IoT over LEO, no need of *sr-ProhibitTimerOffset.*Furthermore, per our understanding, in the large RTT cases, network cannot configure too large value for legacy *sr-ProhibitTimer* (the times for skipping interim SR transmissions). We think at most 2 for *sr-ProhibitTimer* would be enough (7 would be impractical).But for NB-IoT, in GEO case (RTT is 540ms), even *sr-ProhibitTimer* is configured with small value 2 and if SR period is configured with small value, e.g., 40ms, if 90ms is configured, the result would be:The actual value of *sr-ProhibitTimer* = CEIL (*sr-ProhibitTimerOffset*/ SR period) + signalled value of *sr-ProhibitTimer =* 5. The final timer length is 5\* SR period =200ms. Such value is much smaller than a RTT. We think such timer would take no any effect as expectation. And the larger the SR period, the less need for a small value for *sr-ProhibitTimerOffset.* And if SR period is larger than RTT, there is no need of *sr-ProhibitTimerOffset* anymore.In a summary, for NB-IoT over GEO, we think the small value, e.g., 90ms, 180ms, would never be used. Then why we need them? |
| InterDigital | No |  |

Summary: All 14 companies who responded do not think 0ms offset should be the default value for sr-ProhibitTimerExt, and do not think a larger minimum value for sr-ProhibitTimerExt can be used in NB-IoT over NTN. 13 our of 14 companies do not think some additional smaller values, e.g., several milliseconds, are needed for sr-ProhibitTimerExt in eMTC over NTN

**Proposal 1: No changes are needed to sr-ProhibitTimerExt.**

## TA Reporting

A TP including all of the proposed changes to 5.4.9 is in appendix A.

In [2] it is proposed to add the cancelling of the TA reporting procedure in the MAC reset and correct the reference number of TS 36.213.

Question 2.1: Do you agree with the changes in [R2-2205328](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2205328.zip) (cancelling of the TA reporting procedure in the MAC reset and correct the reference number of TS 36.213.)?

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson | No | The reference shall be to “TS 36.211 clause 8.1”.We agree to adding the TAR cancelling at MAC reset. |
| Huawei, HiSilicon | yes |  |
| MediaTek | Yes, but | MAC reset needs to be included, but the reference needs to be fixed. |
| Qualcomm | Yes |  |
| Lenovo | Yes | Cancelling TA reporting procedure when MAC reset is necessary. |
| Transsion Holdings | Yes |  |
| OPPO | Yes |  |
| TTP  | Yes |  |
| Nokia | Yes with comment | Fine to the modification for MAC reset part. |
| GateHouse | Yes |  |
| Xiaomi | Yes | Also agree with Ericsson comment |
| Spreadtrum | Yes |  |
| ZTE | Yes | Agree with Ericsson. |
| InterDigital | Yes | Agree with Ericsson. With the changes in [5] the reference update is no longer necessary so only the MAC reset change is needed. |

Summary: All 14 companies agree to cancel of the TA reporting procedure in the MAC reset, while it was also pointed out that the change to the reference proposed is not needed if we agree to the alternative proposed update in [5].

**Proposal 2: Add the cancelling of the TA reporting procedure in the MAC reset section.**

In [3] the second and third changes are related to TA reporting, and propose to remove “which the MAC entity is configured to transmit” in section 5.4.9 and an editorial change. NOTE: Since the first change relates to UE-eNB RTT and this is also covered in [5] we have a separate question for this.

Question 2.2: Do you agree with changes 2 and 3 in [R2-2205724](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2205724.zip) (remove “which the MAC entity is configured to transmit” in section 5.4.9 and an editorial change)?

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson | No | First change: “provided in *SystemInformationBlockType31*” shall be removed. In MAC we normally do not refer to where a RRC parameter is provided. We are fine with the other changes. Further “higher layers” is NR speak, it shall be “upper layers” in LTE… |
| Huawei, HiSilicon | yes |  |
| MediaTek | yes |  |
| Qualcomm | Yes | Reference for Kmac is also needed whether to SIB31 or to RAN1 spec.  |
| Lenovo | Yes |  |
| Transsion Holdings | Yes |  |
| OPPO | Yes |  |
| TTP | Yes |  |
| Nokia | Yes |  |
| GateHouse | Yes | Agree with Ericsson’s comments |
| Xiaomi | Yes | Also agree with Ericsson comment |
| Spreadtrum | Yes |  |
| ZTE | Yes | Agree with Ericsson. |
| InterDigital | Yes | Agree with Ericsson |

Summary: All 14 companies who responded agree with the proposed changes 2 and 3 in [3], with some minor updates.

**Proposal 3: The changes 2 and 3 in** [**R2-2205724**](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2205724.zip) **are in principle OK, with some small updates to finalise in the TP review.**

In [4] it is proposed that the TAR triggering conditions in TS 36.321 are updated to reference specific RRC procedures (as in TS 38.321).

Question 2.3: Do you agree that the TAR triggering conditions in TS 36.321 are updated to reference specific RRC procedures (as in TS 38.321)?

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson | No | MAC is not aware of RRC procedures. Better to let the RRC procedure trigger TA report, and in MAC list that a TA report is triggered on indication from upper layers… |
| Huawei, HiSilicon | No | MAC is not aware and should not be aware of RRC procedures.We also think no indication from RRC is needed, as we cannot think of any other procedures than RRCConnectionRequest , RRCConnectionResumeRequest , RRCConnectionReestablishmentRequest and Handover triggering a RACH procedure |
| MediaTek | No | Agree with Ericsson and Huawei |
| Qualcomm | No | Agree with Ericsson. |
| Lenovo | No | Agree with Ericsson |
| Transsion Holdings | No | Agree with Ericsson. |
| OPPO | No | Agree with Ericssion |
| TTP | No  | Agree with Ericsson  |
| Nokia | No | Agree with Huawei, it seems no indication from RRC is needed for IoT NTN. |
| GateHouse | No | Agree with Ericsson. |
| Xiaomi | Yes | The list of triggers in MAC can be kept for reference for readability, and also RRC sends indication to MAC to trigger TA report. |
| Spreadtrum | No | Agree with Ericsson |
| ZTE | No | Agree with Ericsson and Huawei. |
| InterDigital | No | The intention was to align with NR MAC spec. Note that the proposal in NR is now to remove updates to the specific RRC procedures, therefore aligning 38.321 towards 36.321. |

Summary: All 14 companies think that TAR triggering conditions in TS 36.321 do not need to be updated.

**Proposal 4: TAR triggering conditions in TS 36.321 are not updated.**

In [5] proposals 6 and 7 impact the TA reporting procedure in 5.4.9

1. In MAC 5.4.9 first sentence, remove the word “also” as it does not add anything and only makes the sentence less readable.
2. In MAC 5.4.9 second sentence, change to “The Timing Advance reporting procedure is used in a non-terrestrial network to provide the eNB with an estimate of the UEs Timing Advance ~~(i.e., T\_TA as defined in the UE’s TA formula)~~, see TS 36.~~213~~211 [~~6~~7] clause 8.1.

The resulting TP would be as follows:

|  |
| --- |
| The UE may be configured to report information about UE specific timing advance during a Random Access procedure and in RRC\_CONNECTED Mode.The Timing Advance reporting procedure is used in a non-terrestrial network to provide the eNB with an estimate of the Ues Timing Advance ’, see TS 36.211 [7] clause 8.1. |

Question 2.4: Do you agree with the TP above (i.e. proposals 6 and 7 in [R2-2205996](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2205996.zip))?

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson | Yes | Maybe can add TTA as in “see TTA TS 36.211 [7] clause 8.1.” to make it super clear what is reported… TTA may also be added in 6.1.3.20. |
| Huawei, HiSilicon | Yes |  |
| MediaTek | Yes |  |
| Qualcomm | Yes |  |
| Lenovo | Yes |  |
| Transsion Holdings | Yes |  |
| OPPO | Yes for proposal 6,No for proposal 7 | proposal 7 is unacceptable.Based on UE’s TA formula (i.e. $T\_{TA}=\left(N\_{TA}+N\_{TA,offset}+N\_{TA,adj}^{common}+N\_{TA,adj}^{UE}\right)T\_{s}$) defined in RAN1 spec, UE’s TA consists of multiple components. There may be different understandings for “an estimate of the UE’s Timing Advance”, e.g. it can be interpreted as UE’s full TA (i.e. 𝑇TA) or estimate of the service link’s TA (i.e. 𝑁TA). It would be not clear what “an estimate of the UE’s Timing Advance” refers to if we remove “*T\_TA as defined in the UE’s TA formula*”. So we suggest to keep the description as it is, and only correct the reference. |
| TTP | Yes |  |
| Nokia | Yes with comment | Agree with the rewording from Ericsson. |
| GateHouse | Yes |  |
| Xiaomi | Yes | Agree with other companies that $T\_{TA}$ should be kept to make it clear. |
| Spreadtrum | Yes |  |
| ZTE | Yes | Fine with the rewording from Ericsson.Moreover, we think “UEs” is typo in this change “with an estimate of the UEs Timing Advance”. It should be “the UE’s”. |
| InterDigital | Yes | Agree with Ericsson. We assume that if we include “TTA” as proposed by Ericsson this would address OPPO’s concern. |

Summary: All 14 companies agree with proposals 6 and 7 in [R2-2205996](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2205996.zip), with the exception of 1 company who think “*T\_TA as defined in the UE’s TA formula*” should not be removed, however a small modification has been proposed which could address the concern.

**Proposal 5: Proposals 6 and 7 in** [**R2-2205996**](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2205996.zip) **are agreed, with with some small updates to finalise in the TP review**

## Maintenance of UL Synchronization

In [5] the first 3 proposals are related to RRC-MAC interaction for UL synchronisation timer maintenance. The same issue is covered in offline#050 and therefore please refer to offline #050 for discussion on proposals 1-3.

## UE-eNB RTT

The first change in [3] and proposal 4 of [5] intend to update the definition of UE-eNB RTT. As a baseline, the proposal from [5] is used as a basis for the question. Please provide views and potential alternative wording if necessary.

Question 3.1: Do you agree to change the definition of UE-eNB RTT to “For non-terrestrial networks, the sum of the UE~~’~~s Timing Advance value, see TS 36.211 [7] clause 8.1, and ~~K\_mac~~*k-Mac*~~, see TS 36.213 [6] clause X.X~~.”.

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson | Yes |  |
| Huawei, HiSilicon | Yes |  |
| MediaTek | Yes |  |
| Qualcomm | Yes |  |
| Lenovo | Yes |  |
| Transsion Holdings | Yes |  |
| OPPO | Yes with comment | As we state in Q2.4, there may be different understandings for “the UE’s Timing Advance value”, e.g. it can be interpreted as UE’s full TA (i.e. 𝑇TA) or estimate of the service link’s TA (i.e. 𝑁TA). So we suggest to add “(i.e., T\_TA as defined in the UE’s TA formula)” in order to make it clear. |
| TTP | Yes  |  |
| Nokia | Yes |  |
| GateHouse | Yes | Fine with OPPO’s comment |
| Xiaomi | Yes | But keep $T\_{TA}$ |
| Spreadtrum | Yes |  |
| ZTE | Yes | To use such change “the sum of the UE~~’~~s Timing Advance value, see TTA in TS 36.211 [7] clause 8.1.” |
| InterDigital | Yes |  |

In [5] it is further proposed to update/clarify/correct the specification in places which refer to the UE-eNB RTT.

Question 3.2: Do you agree that, when referring to the UE-eNB RTT, do not use “UEs estimate of the UE-eNB RTT” nor “UE-eNB RTT subframes, as specified in TS 36.213 [6] clause X.X”, instead use “UE-eNB RTT” ?

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| Ericsson | Yes |  |
| Huawei, HiSilicon | Yes |  |
| MediaTek | Yes |  |
| Qualcomm | Ok |  |
| Lenovo | Yes |  |
| Transsion Holdings | Yes |  |
| OPPO | Yes |  |
| TTP | Yes |  |
| Nokia | Yes |  |
| GateHouse | Yes |  |
| Xiaomi | Yes |  |
| Spreadtrum | Yes |  |
| ZTE | Maybe No? | We see the suggestions in the original Tdoc R2-2205996 is to use “UE-eNB RTT subframes”, not “UE-eNB RTT”. We notice that [rapporteur](https://dict.cn/rapporteur) incorrectly copy the text from TS 38.321 (not TS 36.321) in the below Appendix A. And we further notice that in NR NTN, they generally use “UE-eNB RTT”, not “UE-eNB RTT subframes”. Maybe one thing we need to discuss is whether to further remove “subframes” from “UE-eNB RTT subframes” in TS 36.321. We learn from RAN1 that, the result of UE-eNB RTT calculation may not be an integer millisecond value. But in LTE MAC, “subframes” is generally used as it may be the smallest unit we can use. So we tend to think we’d better to use “UE-eNB RTT subframes” in TS 36.321. |
| InterDigital  | Yes with comment | We agree that the proposal 5 in R2-2205996 is not entirely consistent with the TP provided in the same TDoc, as pointed out by ZTE. We also think that keeping “subframes” as per the TP in R2-2205996 makes the sentence more accurate in this case because RA response window can start only at a subframe and not during a subframe. We think that this is anyway the intention in R2-2205996 based on the TP provided, and it is the proposal which is just slightly unclear. |

Summary: All 14 companies agree to update the definition of of UE-eNB RTT, and all 14 companies agree to update the parts of the specification which refer to this. An issue has been raised with the proposal/question as worded so it is proposed to update according to the provided TP.

**Proposal 6: Change the definition of UE-eNB RTT and update the text according to the TPs in** [**R2-2205996**](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2205996.zip)

# Conclusion

Based on company responses, the following proposals are made. The text proposal in Appendix B is removed due to proposal 1, and the text proposal in Appendix A is updated according to proposals 2-6.

**Proposal 1: No changes are needed to sr-ProhibitTimerExt.**

**Proposal 2: Add the cancelling of the TA reporting procedure in the MAC reset section.**

**Proposal 3: The changes 2 and 3 in** [**R2-2205724**](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2205724.zip) **are in principle OK, with some small updates to finalise in the TP review.**

**Proposal 4: TAR triggering conditions in TS 36.321 are not updated.**

**Proposal 5: Proposals 6 and 7 in** [**R2-2205996**](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2205996.zip) **are agreed, with with some small updates to finalise in the TP review**

**Proposal 6: Change the definition of UE-eNB RTT and update the text according to the TPs in** [**R2-2205996**](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2205996.zip)

# References

1. [R2-2205161](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2205161.zip%22%20%5Co%20%22https%3A//www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2205161.zip) "Correction on sr-ProhibitTimerExt for IoT NTN, ZTE Corporation, Sanechips

1. [R2-2205328](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2205328.zip%22%20%5Co%20%22https%3A//www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2205328.zip) “Correction on 36.321, Huawei, HiSilicon

1. [R2-2205724](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2205724.zip%22%20%5Co%20%22https%3A//www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2205724.zip) “36.321 corrections for IoT NTN, Nokia, Nokia Shanghai Bell

1. [R2-2205959](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2205959.zip%22%20%5Co%20%22https%3A//www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2205959.zip) “TA Reporting during Random Access, InterDigital

1. [R2-2205996](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2205996.zip%22%20%5Co%20%22https%3A//www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_118-e/Docs/R2-2205996.zip) “IoT NTN Uplink synchronisation and UE-eNB RTT modelling, Ericsson

# Appendix A: TP for 36.321

Start Change

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

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**Transmission using PUR:** Allows one uplink data transmission using preconfigured uplink resource from RRC\_IDLE mode as specified in TS 36.300 [9]. Transmission using PUR refers to both CP transmission using PUR and UP transmission using PUR.

**UE-eNB RTT:** For non-terrestrial networks, the sum of the UE's Timing Advance value (see TS 36.211[7] clause 8.1) and *k-Mac*

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Next Change

5.1.4 Random Access Response reception

Once the Random Access Preamble is transmitted and regardless of the possible occurrence of a measurement gap or a Sidelink Discovery Gap for Transmission or a Sidelink Discovery Gap for Reception, and regardless of the prioritization of V2X sidelink communication described in clause 5.14.1.2.2, the MAC entity shall monitor the PDCCH of the SpCell for Random Access Response(s) identified by the RA-RNTI defined below, in the RA Response window which starts at the subframe that contains the end of the preamble transmission,as specified in TS 36.211 [7], plus three subframes and has length *ra-ResponseWindowSize*.

If the UE is a BL UE or a UE in enhanced coverage:

- if the random access preamble was transmitted in a non-terrestrial network:

- RA Response window starts at the subframe that contains the end of the last preamble repetition plus 3 + UE-eNB RTT subframes, and has length *ra-ResponseWindowSize* for the corresponding enhanced coverage level;

- else:

- RA Response window starts at the subframe that contains the end of the last preamble repetition plus three subframes and has length *ra-ResponseWindowSize* for the corresponding enhanced coverage level.

If the UE is an NB-IoT UE:

- if the random access preamble was transmitted in a non-terrestrial network:

- RA Response window starts at the subframe that contains the end of the last preamble repetition plus X + UE-eNB RTT subframes, and has length *ra-ResponseWindowSize* for the corresponding enhanced coverage level, where value X is determined from Table 5.1.4-1 based on the used preamble format and the number of NPRACH repetitions;

- else:

- RA Response window starts at the subframe that contains the end of the last preamble repetition plus X subframes and has length *ra-ResponseWindowSize* for the corresponding enhanced coverage level, where value X is determined from Table 5.1.4-1 based on the used preamble format and the number of NPRACH repetitions.

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Next Change

5.1.5 Contention Resolution

Contention Resolution is based on either C-RNTI on PDCCH of the SpCell or UE Contention Resolution Identity on DL-SCH.

Once Msg3 is transmitted, the MAC entity shall:

- if the UE is an NB-IoT UE, a BL UE or a UE in enhanced coverage:

- if Msg3 is transmitted on a non-terrestrial network:

- if, for EDT, *edt-SmallTBS-Enabled* is set to *TRUE* for the corresponding PRACH resource:

- start *mac-ContentionResolutionTimer* and restart *mac-ContentionResolutionTimer* at each HARQ retransmission of the bundle in the subframe corresponding to the last subframe of a PUSCH transmission corresponding to the largest TBS indicated by the UL grant plus UE-eNB RTT subframes.

- else:

- start *mac-ContentionResolutionTimer* and restart *mac-ContentionResolutionTimer* at each HARQ retransmission of the bundle in the subframe containing the last repetition of the corresponding PUSCH transmission plus UE-eNB RTT subframes.

- else:

- if, for EDT, *edt-SmallTBS-Enabled* is set to *TRUE* for the corresponding PRACH resource:

- start *mac-ContentionResolutionTimer* and restart *mac-ContentionResolutionTimer* at each HARQ retransmission of the bundle in the subframe corresponding to the last subframe of a PUSCH transmission corresponding to the largest TBS indicated by the UL grant.

- else:

- start *mac-ContentionResolutionTimer* and restart *mac-ContentionResolutionTimer* at each HARQ retransmission of the bundle in the subframe containing the last repetition of the corresponding PUSCH transmission.

- else:

- start *mac-ContentionResolutionTimer* and restart *mac-ContentionResolutionTimer* at each HARQ retransmission.

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Next Change

5.4.9 Timing Advance Reporting

The UE may be configured to report information about UE specific timing advance during a Random Access procedure and in RRC\_CONNECTED Mode.

The Timing Advance reporting procedure is used in a non-terrestrial network to provide the eNB with an estimate of the UEs Timing Advance , see TTA in TS 36.211 [7] clause 8.1.

RRC controls Timing Advance reporting by configuring the following parameters:

- *ta-Report*;

- *offsetThresholdTA*.

If configured, Timing Advance reporting may be triggered if any of the following events occur:

- if *ta-Report* is configured, upon initiation of Random Access procedure triggered by upper layers;

- upon configuration or reconfiguration of *offsetThresholdTA* by upper layers, if the UE has not previously reported Timing Advance value to current Serving Cell;

- if the variation between current information about Timing Advance and the last successfully reported information about Timing Advance is equal to or larger than *offsetThresholdTA*, if configured.

If the Timing Advance reporting procedure determines that at least one Timing Advance Report has been triggered and not cancelled:

- if the MAC entity has UL resources allocated for new transmission for this TTI, and;

- if the allocated UL resources can accommodate the Timing Advance Report MAC CE plus its subheader, as a result of logical channel prioritization:

- instruct the Multiplexing and Assembly procedure to generate the Timing Advance report MAC control element as defined in clause 6.1.3.20.

A MAC PDU shall contain at most one Timing Advance Report MAC CE, even when multiple events have triggered a Timing Advance report.

All triggered Timing Advance reports shall be cancelled when a Timing Advance Report MAC CE is included in a MAC PDU for transmission.

Next Change

5.9 MAC Reset

If a reset of the MAC entity is requested by upper layers, the MAC entity shall:

- initialize Bj for each logical channel to zero;

- except for *pur-TimeAlignmentTimer,* if configured*,* stop (if running) all timers;

- except for *pur-TimeAlignmentTimer,* if configured*,* consider all *timeAlignmentTimer*sas expired and perform the corresponding actions in clause 5.2;

- set the NDIs for all uplink HARQ processes to the value 0;

- stop, if any, ongoing RACH procedure;

- discard explicitly signalled *ra-PreambleIndex* and *ra-PRACH-MaskIndex*, if any;

- flush Msg3 buffer;

- cancel, if any, triggered Scheduling Request procedure;

- cancel, if any, triggered Buffer Status Reporting procedure;

- cancel, if any, triggered Power Headroom Reporting procedure;

- cancel, if any, triggered Recommended bit rate query procedure;

- cancel, if any, triggered Timing Advance Reporting procedure;

- flush the soft buffers for all DL HARQ processes;

- for each DL HARQ process, consider the next received transmission for a TB as the very first transmission;

- release, if any, Temporary C-RNTI.

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