**3GPP TSG-RAN2 Meeting #119bis-e *R2-220***

**Electronic, 10th – 19th October, 2022**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  | **38.321** | **CR** |  | **rev** | **-** | **Current version:** | 17.2.0 |  |
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| *For* [***HELP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

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| ***Title:***  | Correction to MAC spec for positioning enhancement |
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| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | RAN2 |
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| ***Work item code:*** | NR\_pos\_enh-Core |  | ***Date:*** | 2022-10-10 |
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| ***Category:*** | **F** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | **Issue 1:** In R2#119, we have discussed on the issue of TA validation for inactive positioning SRS transmission. There are two scenarios for TA update for SRS transmission in RRC\_INACTIVE in relation with SDT transmission.In the SDT discussion in R2#119, the following has been agreed for the 2-step RACH triggered during CG-SDT procedure. 1. For msgB reception, (a) if the C-RNTI MAC CE was included in MSGA, (b) if the cg-SDT-TimeAlignmentTimer is running, and (c) if the PDCCH transmission is addressed to the C-RNTI and contains a UL grant for a new transmission, UE considers Random Access Response reception and random-access procedure successfully completed.
2. cg-SDT-TimeAlignmentTimer should be restarted at successful completion of 2-step RACH while legacy TAT should not be started/restarted when CG-SDT procedure is on-going.

Similarly, we think that when contention resolution is successful for 2-step RACH, the UE should also restart the inactivePosSRS-TimeAlignmentTimer. **Change added during R2#119bis**1/ The condition “if inactivePosSRS-TimeAlignmentTimer is configured” is removed considering that it has been clarified in the RRC spec that the timer is always configured when SRS transmission in RRC\_INACTIVE is configured. 2/ Further Clarification in the PPW ID has been added for the UL MAC CE for MG activation/deactivation request. |
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| ***Summary of change:*** | **Change1:** restart the inactivePosSRS-TimeAlignmentTimer when the timer is running and contention resolution is successful for 2-step RACH when absolute TAT MAC CE is received.**Change added during R2#119bis****Change2**: Remove the condition “if inactivePosSRS-TimeAlignmentTimer is configured”**Change3**: Revision of the explanation in PPW ID field in UL MAC CE for PPW activation/deactivation request |
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| ***Consequences if not approved:*** | **Without Change1**:UE cannot restart the inactive positioning SRS TAT when there is a SDT procedure in parallel and the UE receives a Absolute TAC MAC CE. Then, the time would expire earlier than necessary.**Without Change2**: The condition “if inactivePosSRS-TimeAlignmentTimer is configured” would be redundant**Without Change3**: The UE and the network may have confusions over the PPW ID indicated in the PPW activation/deactivation request MAC CE.**Impact analysis****Impacted 5G architecture options:**SA, NE-DC, NR-DC**Impacted functionality:**Maintenance of Uplink Time Alignment, PPW Activation/Deactivation Command MAC CE**Chagne1 Inter-operability:**If the UE is implemented according to the CR while the network is not; or if the network is implemented according to the CR while the UE is not, the network might have different understanding from the UE on whether the TAT for inactive SRS transmission is running. **Change2 Inter-operability:**There is no inter-operability issue in change2**Change3 Inter-operability:**If the UE is implemented according to the CR while the network is not; or if the network is implemented according to the CR while the UE is not, the UE and the network may have different understanding over the PPW ID indicated in the PPW activation/deactivation MAC CE. |
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| ***Clauses affected:*** | 5.2, 6.1.3.42 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ... |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

===============================CHANGE BEGINS=======================================

5.2 Maintenance of Uplink Time Alignment

RRC configures the following parameters for the maintenance of UL time alignment:

- *timeAlignmentTimer* (per TAG) which controls how long the MAC entity considers the Serving Cells belonging to the associated TAG to be uplink time aligned;

- *inactivePosSRS-TimeAlignmentTimer* which controls how long the MAC entity considers the Positioning SRS transmission in RRC\_INACTIVE in clause 5.26 to be uplink time aligned;

- *cg-SDT-TimeAlignmentTimer* which controls how long the MAC entity considers the uplink transmission for CG-SDT to be uplink time aligned.

The MAC entity shall:

1> when a Timing Advance Command MAC CE is received, and if an NTA (as defined in TS 38.211 [8]) has been maintained with the indicated TAG:

2> apply the Timing Advance Command for the indicated TAG;

2> if there is ongoing Positioning SRS Transmission in RRC\_INACTIVE as in clause 5.26:

3> start or restart the *inactivePosSRS-TimeAlignmentTimer* associated with the indicated TAG.

2> if CG-SDT procedure triggered as in clause 5.27 is ongoing:

3> start or restart the *cg-SDT-TimeAlignmentTimer* associated with the indicated TAG.

2> else:

3> start or restart the *timeAlignmentTimer* associated with the indicated TAG.

1> when a Timing Advance Command is received in a Random Access Response message for a Serving Cell belonging to a TAG or in a MSGB for an SpCell:

2> if the Random Access Preamble was not selected by the MAC entity among the contention-based Random Access Preamble:

3> apply the Timing Advance Command for this TAG;

3> start or restart the *timeAlignmentTimer* associated with this TAG

2> else if the *timeAlignmentTimer* associated with this TAG is not running:

3> apply the Timing Advance Command for this TAG;

3> start the *timeAlignmentTimer* associated with this TAG;

3> when the Contention Resolution is considered not successful as described in clause 5.1.5; or

3> when the Contention Resolution is considered successful for SI request as described in clause 5.1.5, after transmitting HARQ feedback for MAC PDU including UE Contention Resolution Identity MAC CE:

4> stop *timeAlignmentTimer* associated with this TAG.

3> when the Contention Resolution is considered not successful as described in clause 5.1.5:

4> if CG-SDT procedure triggered as in clause 5.27 is ongoing:

5> set the NTA value to the value before applying the received Timing Advance Command as in TS 38.211 [8].

3> when the Contention Resolution is considered successful for Random Access procedure while the CG-SDT procedure is ongoing:

4> stop *timeAlignmentTimer* associated with this TAG;

4> start or restart the *cg-SDT-TimeAlignmentTimer* associated with this TAG.

3> when the Contention Resolution is considered successful for Random Access procedure while SRS transmission in RRC\_INACTIVE is ongoing:

4> start or restart the *inactivePosSRS-TimeAlignmentTimer* associated with this TAG.

2> else:

3> ignore the received Timing Advance Command.

1> when an Absolute Timing Advance Command is received in response to a MSGA transmission including C-RNTI MAC CE as specified in clause 5.1.4a:

2> apply the Timing Advance Command for PTAG;

2> if there is ongoing Positioning SRS Transmission in RRC\_INACTIVE as in clause 5.26:

3> start or restart the *inactivePosSRS-TimeAlignmentTimer* associated with the indicated TAG.

2> if CG-SDT procedure is ongoing:

3> start or restart the *cg-SDT-TimeAlignmentTimer* associated with PTAG.

2> else:

3> start or restart the *timeAlignmentTimer* associated with PTAG.

1> when the indication is received from upper layer for stopping the *inactivePosSRS-TimeAlignmentTimer*:

2> stop the *inactivePosSRS-TimeAlignmentTimer*.

1> when the indication is received from upper layer for starting the *inactivePosSRS-TimeAlignmentTimer*:

2> start or restart the *inactivePosSRS-TimeAlignmentTimer*.

1> when instruction from the upper layer has been received for starting the *cg-SDT-TimeAlignmentTimer*:

2> start the *cg-SDT-TimeAlignmentTimer*.

1> when instruction from the upper layer has been received for stopping the *cg-SDT-TimeAlignmentTimer*:

2> consider the *cg-SDT-TimeAlignmentTimer* as expired.

1> when instruction from the upper layer has been received for starting the *TimeAlignmentTimer* associated with PTAG:

2> start the *TimeAlignmentTimer* associated with PTAG.

1> when a *timeAlignmentTimer* expires:

2> if the *timeAlignmentTimer* is associated with the PTAG:

3> flush all HARQ buffers for all Serving Cells;

3> notify RRC to release PUCCH for all Serving Cells, if configured;

3> notify RRC to release SRS for all Serving Cells, if configured;

3> clear any configured downlink assignments and configured uplink grants;

3> clear any PUSCH resource for semi-persistent CSI reporting;

3> consider all running *timeAlignmentTimer*s as expired;

3> maintain NTA (defined in TS 38.211 [8]) of all TAGs.

2> else if the *timeAlignmentTimer* is associated with an STAG, then for all Serving Cells belonging to this TAG:

3> flush all HARQ buffers;

3> notify RRC to release PUCCH, if configured;

3> notify RRC to release SRS, if configured;

3> clear any configured downlink assignments and configured uplink grants;

3> clear any PUSCH resource for semi-persistent CSI reporting;

3> maintain NTA (defined in TS 38.211 [8]) of this TAG.

1> when the *inactivePosSRS-TimeAlignmentTimer* expires:

2> notify RRC to release Positioning SRS for RRC\_INACTIVE configuration(s).

1> when the *cg-SDT-TimeAlignmentTimer* expires:

2> clear any configured uplink grants;

2> if a PDCCH addressed to the MAC entity's C-RNTI after initial transmission for the CG-SDT with CCCH message has not been received:

3> consider ongoing CG-SDT procedure as terminated;

3> indicate the expiry of *cg-SDT-TimeAlignmentTimer* to the upper layer.

2> flush all HARQ buffers;

2> maintain NTA (defined in TS 38.211 [8]) of this TAG.

When the MAC entity stops uplink transmissions for an SCell due to the fact that the maximum uplink transmission timing difference between TAGs of the MAC entity or the maximum uplink transmission timing difference between TAGs of any MAC entity of the UE is exceeded, the MAC entity considers the *timeAlignmentTimer* associated with the SCell as expired.

The MAC entity shall not perform any uplink transmission on a Serving Cell except the Random Access Preamble and MSGA transmission when the *timeAlignmentTimer* associated with the TAG to which this Serving Cell belongs is not running, CG-SDT procedure is not ongoing or SRS transmission in RRC\_INACTIVE as in clase 5.26 is not on-going. Furthermore, when the *timeAlignmentTimer* associated with the PTAG is not running, CG-SDT procedure is not ongoing and SRS transmission in RRC\_INACTIVE as in clause 5.26 is not ongoing, the MAC entity shall not perform any uplink transmission on any Serving Cell except the Random Access Preamble and MSGA transmission on the SpCell. The MAC entity shall not perform any uplink transmission except the Random Access Preamble and MSGA transmission when the *cg-SDT-TimeAlignmentTimer* is not running during the ongoing CG-SDT procedure as triggered in clause 5.27. The MAC entity shall not perform any uplink transmission except the Random Access Preamble and MSGA transmission when *inactivePosSRS-TimeAlignmentTimer* is not running during the procedure for SRS transmission in RRC\_INACTIVE as in clause 5.26.

=================================NEXT CHANGE=======================================

#### 6.1.3.42 PPW Activation/Deactivation Command MAC CE

The PPW Activation/Deactivation Command MAC CE is identified by MAC subheader with eLCID as specified in Table 6.2.1-1b.

It has variable size defined as follows (Figure 6.1.3.42-1):

- numEntry: This field indicates the number of entries N-1 in the MAC CE. 00 indicates that N equals to 2; 01 indicates that N equals to 3 and so on. The length of the field is 2 bits;

- Serving Cell ID: This field indicates the identity of the Serving Cell for which the MAC CE applies. The length of the field is 5 bits;

- PPW ID: This field indicates the index of the PPW configured on active DL BWP of the Serving Cell identified by the above Serving Cell ID. Index 0 corresponds to the first entry within the list of the PPW configuration by the increasing order of *PPW-ID* in TS 38.331 [5] in this BWP, index 1 corresponds to the second entry in the list and so on. The length of the field is 2 bits;

- A/D: This field indicates the activation or deactivation of the PPW. The field is set to 1 to indicate activation, otherwise it indicates deactivation. The length of the field is 1 bit;

- R: Reserved bit, set to 0.



Figure 6.1.3.42-1: PPW Activation/Deactivation Command MAC CE

=================================CHANGE ENDS=======================================