**3GPP TSG-RAN WG2 Meeting #119bis-e R2-22xxxxx**

**Online, 10-17 October 2022**

Source: Huawei, HiSilicon

Title: [Offline-418][POS] Positioning MAC CR (Huawei)

Agenda Item: 6.11.1

Document for: Discussion and Decision

# Introduction

This document provides a summary of the following contributions submitted to AI 6.11 for MAC corrections.

## Contacts

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# Discussion

The following CR has been proposed to align with the agreement for CG-SDT on 2-step RACH.

[R2-2209427](file:///C%3A%5CUsers%5Cmtk16923%5CDocuments%5C3GPP%20Meetings%5C202210%20-%20RAN2_119bis-e%2C%20Online%5CExtracts%5CR2-2209427%20Correction%20to%20MAC%20spec%20for%20Positioning%20enhancement.docx) Correction to MAC spec for Positioning enhancement Huawei, HiSilicon CR Rel-17 38.321 17.2.0 1408 - F NR\_pos\_enh-Core

The following change has been proposed on the alignment

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| 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 *inactivePosSRS-TimeAlignmentTimer* is configured and 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. |

Rapp’s comment:

* In the discussion for R2-2209429, a general consensus has been reached that we can align with the field description for CG-SDT that when SRS transmission in RRC\_INACTIVE is configured, *inactivePosSRS-TimerAlignmentTimer* is always configured
* During the online discussion for R2-2209427
	+ Consensus has been made that we should align with CG-SDT’s agreement for 2-step RACH
	+ One concern is that if in RRC spec, we mention that “*inactivePosSRS-TimerAlignmentTimer* is always configured”, then in the MAC spec, is it still necessary to add “if inactivePosSRS-TimeAlignmentTimer is configured” as a condition.

Based on the above, the rapp thinks that it is reasonable to not to have the condition “if inactivePosSRS-TimeAlignmentTimer is configured” if inactive SRS TAT is always configured. We propose the following TP based on the above.

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| 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> ifthere 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.===TEXT OMITTED===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. |

***Question1, Do companies agree with the change above considering change in CR R2-2209427 and that inactivePosSRS-TimeAlignmenTimer is always configured?***

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| Company | Yes/No | Comments |
| CATT | Yes |  |
| vivo | Yes |  |
| Intel | Yes |  |
| Ericsson | Yes |  |
| Nokia | No | See our comment in the [410][POS] or as excerpted below:38.321, Version 17.2.0, Section 5.26.1 states “The MAC entity shall, if the TA of the configured Positioning SRS is valid according to clause 5.26.2: transmit Positioning Periodic SRS or Semi-Persistent SRS defined in TS 38.214 [7]. The aperiodic case, which does not require the inactivePosSRS-TimeAlignmentTimer, is not covered by this statement. The inactivePOSSRS-TimeAlignmentTimer is required for evaluating TA validity only for periodic and semi-persistent PRS.[HW] Aperiodic SRS is not supported in RRC\_INACTIVE. Please see the following text in 38.331***resourceType***Time domain behavior of SRS resource configuration, see TS 38.214 [19], clause 6.2.1. The network configures SRS resources in the same resource set with the same time domain behavior on periodic, aperiodic and semi-persistent SRS. The aperiodic SRS is not applicable for the UE in RRC\_INACTIVE.  |
| ZTE | Yes | Aperiodic SRS in RRC\_INACTIVE is not supported in Rel-17 anyway |
| Xiaomi | Yes |  |

Summary:

The majority of the companies agree that the condition “ if inactivePosSRS-TimeAlignmentTimer is configured” is redundant. Hence, we propose the following :

***Proposal1: Remove the condition “if inactivePosSRS-TimeAlignmentTimer is configured” for restarting TAT when TAC MAC CE is received or contention resolution is successful for 2-step RACH.***

In the following CR, a change has been proposed for the description for PPW ID in the MAC spec

R[2-2210607](file:///E%3A%5C%5CWORK%5C%5C1%203GPP%5C%5CMeeting%5C%5CRAN2%20119bis-e%5C%5C2%20During%5C%5CDocs%5C%5CR2-2210607.zip) Clarification on the PPW index vivo draftCR Rel-17 38.321 17.2.0 D NR\_pos\_enh-Core

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| 6.1.3.42 PPW Activation/Deactivation Command MAC CEThe 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 which is maintained in the UE and is ordered by the addition time 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** |

While in the RRC spec, the PPW configuration within a certain BWP is given as follows under *BWP-DownlinkDedicated*:

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| DL-PPW-PreConfigToAddModList-r17 ::= SEQUENCE (SIZE (1..maxNrofPPW-Config-r17)) OF DL-PPW-PreConfig-r17DL-PPW-PreConfigToReleaseList-r17 ::= SEQUENCE (SIZE (1..maxNrofPPW-Config-r17)) OF DL-PPW-ID-r17 |

With the maximum number of PPW that can be configured under a BWP equaling to 4

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| maxNrofPPW-Config-r17 INTEGER ::= 4 -- Maximum number of Preconfigured PRS processing windows per DL BWP |

**Rapp’s Comment:**

* The maximum number of PPW that can be configured is 4, which can be fully covered by the PPW ID field within the MAC CE, with 2 bits
* It seems better to directly map the PPW ID in the MAC spec to the *PPW-ID* field in the RRC spec:
	+ PPW ID with value 0 corresponds to the entry with *PPW-ID* set to 1 within the configured list of PPWs in TS 38.331; PPW ID with value 1 corresponds to the entry with *PPW-ID* set to 1 within the configured list of PPWs, and so on.

With the discussion above, we propose the following text proposal for the clarification of the PPW ID in the MAC spec:

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| 6.1.3.42 PPW Activation/Deactivation Command MAC CEThe 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 entry within the list of the PPW configuration(s) with the field *PPW-ID* in TS 38.331 [5] set to 1 in this BWP; index 1 corresponds to the entry in the list with the field *PPW-ID* in TS 38.331 [5] set to 2 in this BWP 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** |

***Quesiton2: Do companies agree with the change above for the clarification of PPW ID field in the MAC CE?***

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| Company | Yes/No | Comments |
| CATT | No | PPW configuration is a delta configuration to UE, so the list of the PPW configuration is maintained by UE which should be the same with gNB side. So we understood the motivation of vivo’s CR is that both UE and gNB should have the same understanding of the index of the PPW configured on active DL BWP of the Serving Cell identified by the above Serving Cell ID. However how to order the list can be clarified in TS38.331, instead of in MAC.So we prefer to delete the description of the order way as below, i.e. delete the second correction.- 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 in this BWP, index 1 corresponds to the second entry in the list and so on. The length of the field is 2 bits;On the other hand, the TP proposed by rapporteur is not supported because the ‘first’ and ‘second’ in the original version indicate the relationship with the index. No need to change the original description. |
| vivo | No | Note that the available value of DL-PPW-ID is 0 to 15, while the available value of PPW ID in MAC CE is 0 to 3. That is, the PPW ID in MAC CE is just the index of configured PPW in each BWP and does not equal DL-PPW-ID -1.DL-PPW-ID-r17 ::= INTEGER (0..maxNrofPPW-ID-1-r17)maxNrofPPW-ID-1-r17 INTEGER ::= 15The index in MAC CE can be either ordered by the time of addition/configuration or by the value of DL-PPW-ID. To CATT’s comment, the index can be transparent to the RRC layer and it’s better to clarify it in the MAC spec.By the way, it seems the name in the MAC CE caused some misunderstanding, we are wondering whether the ‘PPW ID’ in MAC CE can be renamed to ‘PPW index’. |
| Intel | No | Agree with vivo. The root problem is, we did not use the PPW ID in MAC (since PPW ID is 0-15, but PPW index is 2 bits), therefore the clarification in MAC on how to intepret PPW index is needed.  |
| Ericsson |  | One suggestion as below.PPW ID: This field indicates 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 in this BWP, index 1 corresponds to the second entry in the list and so on. The length of the field is 2 bits. First serving cell ID entry PPW ID maps to *dl-PPW-ID* 0 to 3, second serving cell ID entry PPW ID maps to *dl-PPW-ID* 4 to 7 and so on. |
| Nokia | No | Agree with vivo.There is ambiguity between the RRC spec and MAC spec about what PPW-ID (RRC) and PPW ID (MAC) mean, since the MAC version refers to the index inside the PPW-IDs configured for a BWP. The range of PPW-IDs in RRC exceeds the maximum number of entries that can be configured in the MAC CE numEntry field. The range of PPW-IDs defines the total number of PPWs that can be configured across all BWPs, which means that there are BWPs which could have PPW-IDs outside of the range 0 to 3, and there is no requirement pertaining to their order. |
| ZTE | No | We need to specify in MAC that the PPW index in MAC is not the same thing with the PPW ID in RRC.As for the spec change, we think CATT’s version looks good, that only adds ‘the index of the PPW’.  |
| Xiaomi | No | The PPW ID in the MAC spec is not the PPW ID in the RRC spec, so it needs to clarify it in the MAC spec.  |

Summary

* Vivo points out that the actual range of PPW-ID defined in TS 38.331 is 0-15, exceeding the range of PPW ID in MAC spec
* VIVO has also mentioned that the order in the list can be based on the time when it is added or the order of PPW-ID
* While during online discussion, Ericsson has also mentioned that “the time when it is added” is a bit confusing

Based on the discussion above, we propose the following

***Propsoal2: Rephrase the definition of PPW ID as “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;”***

# Conclusion

Based on the summary as above, we propose the following for discussion:

***Proposal1: Remove the condition “if inactivePosSRS-TimeAlignmentTimer is configured” for restarting TAT when TAC MAC CE is received or contention resolution is successful for 2-step RACH.***

***Propsoal2: Rephrase the definition of PPW ID as “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;”***