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

Online Meeting, Oct 10th – 17th, 2022

Agenda Item: 6.11.1

Source: Ericsson

Title: [AT119bis-e][410][POS] Rel-17 positioning RRC CR (Ericsson)

Document for: Discussion, Decision

# Introduction

This document is to gather input for below email discussion.

* [AT119bis-e][410][POS] Rel-17 positioning RRC CR (Ericsson)

Scope: Check the rapporteur CR in R2-2210312 and update it with decisions of this meeting.

Intended outcome: Agreeable CR

Deadline: Friday 2022-10-14 1000 UTC

The below papers have been submitted for positioning correction which impacts RRC

1. [R2-2210312](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210312.zip) Miscellaneous correction for Positioning Ericsson
2. [R2-2209429](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119bis-e/Docs/R2-2209429.zip) Correction to RRC spec for RRC\_INACTIVE positioning Huawei, HiSilicon
3. [R2-2210480](https://www.3gpp.org/ftp/tsg_ran/WG2_RL2/TSGR2_119bis-e/Docs/R2-2210480.zip) Cancellation of UL MAC CE for MG activation/deactivation Samsung

# Contact Information

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# Discussion

## R2-2210312 Miscellaneous correction for Positioning

The CR in R2-2210312 provides correction for below:

### LMI correction

* For LMI, it mentions LMI use also for preconfigured gap.
* Adds the clarification based upon RAN4 input that “UE does not autonomously activate or deactivate the preconfigured measurement gap after sending *LocationMeasurementIndication*”

Please Note that RAN4 has also sent an LS to RAN2

<https://www.3gpp.org/ftp/tsg_ran/WG4_Radio/TSGR4_104-e/Docs/R4-2214335.zip>

Question 1: Do companies agree with the changes

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| --- | --- | --- |
| Company | Yes/No | Comments |
| Huawei, HiSIlicon | No | We don’t need to specify the UE behavior that is not supported. |
| Samsung | Yes | Minor comment: In the proposed correction, ‘**and** in scenario as ~~’ can be revised as ‘**or** in scenario as ~~’. |
| vivo | No | Agree with HW.  The LS intends to revert the previous agreement in RAN4. It does not imply that RAN2 shall capture the UE behavior that is not supported. |
| Nokia | No | 38.133, Version 17.7.0, Section 9.1.7.3 captures the intent of the second bullet in section 3.1.1 above. It is not an essential correction to respecify in RAN2 specification the UE behavior for autonomous and nonautonomous activation/deactivation of preconfigured positioning measurement gaps. Same comment for the CR cover description. Also, from the LMI initiation section 5.5.6.2 it is already clear that LMI is applicable for preconfigured measurement gaps |
| Intel | No | Agree with Huawei. |
| CATT | No | Agree with Huawei, no need to specify what is not supported in UE behavior. |
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### Preconfigured Measurement Gap Update to consider scheduling request config

* To include the clause that UE can request measurement gap using MAC CE only if dedicated scheduling request for positioning measurement gap activation/deactivation is configured.

However, based upon the discussion online for the same clause addition in MAC spec, it was mentioned that if UE already has configured UL grant available then it would not matter whether for positioning scheduling request for positioning measurement gap activation/deactivation is configured or not.

Based upon above conclusion; the change may not be needed.

Question 2: Do companies agree with below?

UE does not need to be configured with dedicated scheduling request for positioning measurement gap activation/deactivation in order to request for positioning measurement gap activation/deactivation using MAC CE.

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| Company | Yes/No | Comments |
| Huawei, HiSilicon | Yes |  |
| Samsung | Yes | From our understanding, the UE should be able to send the measurement gap activation/deactivation request MAC CE using any available UL grant. |
| vivo | Yes |  |
| Nokia | Yes | To achieve optimal latency, the first available scheduling opportunity should be used. |
| Intel | Yes | Same view as Samsung. |
| CATT | Yes |  |
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However, a follow up query is:

Considering it is legacy gNB which only accepts RRC LMI or NRPPa based gap activation/deactivation and do not have support for UL MAC CE handling. Is there no way the UE would understand this? The expectation of the CR was that the configuration of Scheduling SR resource can at least notify UE that gNB supports the handling otherwise there would be failure/error/exception.

Companies are requested to provide further input for the case when gNB does not support handling of MAC CE; how to indicate this to the UE so UE does not trigger SR to send UL MAC CE. Please note that this should be an OPTIONAL feature.

Question 2a: NW should indicate to the UE whether UL MAC CE is allowed to be sent.

Option1: A separate indication from NW in MAC CE Config

Option2: Dedicated SR Scheduling Request

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| Company | Yes/No (Preferred Option) | Comments |
| vivo | Not needed | If the gNB does not support pre-MG, then the gNB will not configure the pre-MG via RRC and the UE will not send the MAC CE request. |
| samsung | Yes (option 1) | We tend to agree that there can be the case where the gNB does not support handling of MAC CE for pre-MG (de)activation from the UE even when it configures the pre-MG via RRC.  For the indication, we prefer to introduce a new indicator since using the dedicated SR configuration as an implicit indicator seem misleading. |
| Nokia | Not needed | This does not seem to be a correction. It looks like additional NW control functionality that is being added. We do not support new functionality to be added to a frozen release.  The procedure outlined in 38.331, Version 17.2.0, Section 5.5.6.2, with regard to LMI, uses this UL MAC CE to initiate the measurement gap activation when configured with a preconfigured measurement gap. This implies compatibility with the MAC CE when using LMI. 38.321, Version 17.2.0, Section 6.1.3.40, defines the MAC CE for preconfigured positioning measurement gaps, and in this context, it does not refer to those preconfigured by NRPPa.  NRPPa could direct the preconfiguration of measurement gaps, and if the gNodeB does so by RRC, the use of the MAC CE should be compatible. |
| Intel | Not needed | Agree with Nokia. |
| CATT | Not needed | Please find the analysis on the Inter-operability. We did not find issues on it.   |  |  |  | | --- | --- | --- | |  | Legacy gNB | pre-CG gNB | | Legacy UE | gNB does not config pre-CG to UE | gNB will not config pre-CG to UE | | pre-CG UE | gNB does not config pre-CG to UE | UL MAC CE works | |
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### Editorial Correction

* Editorial correction of name of IE: change from PosGapConfig to PosMeasGapPreConfig
* MeasPosPreConfigGapId-r17 to PosMeasPreConfigGapId-r17

The motivation to change the 1st one is to reflect that it is preconfigured gap. The motivation for second is since we already start with “Pos” suffix for PosGapConfig then it would be good to also start with “Pos” suffix for MeasPosPreConfigGapId-r17

Question 3: Do companies agree with editorial change?

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| Company | Yes/No | Comments |
| Huawei, HiSIlicon | Yes | Agree with the editorials |
| Samsung | Yes | It seems not essential, but good to have for readability and consistency of spec. |
| vivo | Yes |  |
| Nokia | No | The field descriptions can be used to clarify the purpose of the fields. The 17.2.0 version of 38.331 is being considered the stable specification for release 17 implementation. So, changing the ASN.1 field name even though it does not alter functionality is still an ASN.1 change to a frozen release. |
| Intel | No | Based on guidance from Chair, no editorial corrections for this meeting.  Rel-17 CR  General, all correction CRs / draft CRs:  1. Rapporteurs of Rel-17 WI CRs are asked to continue their volunteer responsibility.  2. Unless otherwise explicitly agreed/indicated, max one Cat F CR per TS per WI shall be produced as outcome of the Q4 meetings. Exception: NBC aspects, if any, may need to be in a separate CR per WI (decided case by case). Note that Impact analysis is required per CR.  3. No editorial corrections for this meeting |
| CATT | No | Not essential. |
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## R2-2209429 Correction to RRC spec for RRC\_INACTIVE positioning

The CR appends the below field descriptions as below.

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| ***inactivePosSRS-TimeAlignmentTimer***  TAT value for SRS for positioning transmission during RRC\_INACTIVE State as specified in TS 38.321 [3]. The network always configures this when *SRS-PosRRC-InactiveConfig* is configured. |
| ***inactivePosSRS-RSRP-changeThreshold***  RSRP threshold for the increase/decrease of RSRP for time alignment validation as specified in TS 38.321 [3]. If this field is not configured, then the UE does not perform RSRP based TA validation. |

In MAC specification though below is captured.

The MAC entity shall consider the TA to be valid when the following condition is fulfilled:

1> compared to the stored downlink pathloss reference RSRP value, the current RSRP value of the downlink pathloss reference has not increased/decreased by more than *inactivePosSRS-RSRP-ChangeThreshold*, if configured; and

Further, in the MAC spec below procedure text is used.

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.

The above can be written as:

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.

This above change should reflect that *inactivePosSRS-TimeAlignmentTimer* would be always present when there is ongoing Positioning SRS Transmission in RRC\_INACTIVE

Companies are invited to provide comment if the updates should be reflected in the MAC procedural description or should be captured in RRC.

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| --- | --- | --- | --- |
| Company | MAC/RRC For Timer | MAC/RRC For RSRP | Comments |
| Huawei, HiSlicon | RRC | MAC | We can indicate in the RRC that the timer is always configured. Then, the condition in the MAC spec is redundant.  For RSRP, it is already in the MAC spec, no spec change is needed |
| Samsung | RRC & MAC | Not needed | Regarding the timer configuration, since it is related to the condition of the SRS-*PosRRC-InactiveConfig* configuration in RRC message, the proposed correction in RRC seems needed. We also think the correction proposed by the rapporteur in MAC spec is valid as well.  Regarding the RSRP configuration, the proposed correction is related to UE operation at MAC layer and the current MAC spec. seems enough/clear to us. Thus, there is no need of any correction for this. |
| vivo | RRC & MAC | Not needed | Agree with SS |
| Nokia | RRC (with clarification) or No change | No change | Timer: 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 is not covered by this statement. Therefore, if any change is to be made to the RRC spec regarding the timer requirement, it should clearly apply to periodic and semi-persistent SRS only.  Additionally, 38.331, Section 5.3.8.3, in the procedure for entering RRC INACTIVE, the following is already specified:  2> if srs-PosRRC-Inactive is configured:  3> apply the configuration and instruct the MAC to start the inactivePosSRS-TimeAlignmentTimer;  38.321, Version 17.2.0, Section 5.26.2, clearly requires the inactivePosSRS-TimeAlignmentTimer to be running in order to indicate a valid TA, and for the timer to be running, it must be configured.  The above imply that the timer configuration is required when srs-PosRRC-InactiveConfig is configured to transmit periodic and semi-persistent positioning SRS.  RSRP: The condition for TA validation with RSRP is already specified in MAC |
| Intel | RRC (with clarification) or No change | No change | Tend to agree with Nokia. |
| CATT | RRC & MAC | Not needed | For timer, current spec can work, but we agree it is more suitable to clarify the *inactivePosSRS-TimeAlignmentTimer* is always configured in 38.331. Then the modification raised by rapporteur is also needed.  For RSRP, no spec change is needed. |
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## R2-2210480 Cancellation of UL MAC CE for MG activation/deactivation

The CR proposes to add below missing agreement in the RRC spec whereas the other agreements have been captured in MAC.

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| Proposal 4.5: the following options to cancel a triggered UL MAC CE for MG activation and deactivation should be captured in the spec; other options can be discussed in the running CR discussion.  • When the MAC CE is transmitted  **•** When a request from upper layers to transmit a new request to gNB for a new/modified gap configuration is received  **• When an indication from upper layers that the gaps are not needed any more or a gap with a new id needs to be activated is received**  • On MAC reset |

The related changes are shown below.

1> if and only if upper layers indicate to stop performing location measurements towards E-UTRA or NR or stop subframe and slot timing detection towards E-UTRA:

2> if there is no activated preconfigured measurement gap for positioning:

3> if there is previously triggered UL MAC CE transmission for the measurement gap activation for positioning:

4> indicate lower layers to cancel the triggered UL MAC CE transmission for the measurement gap activation as specified in TS 38.321 [6].

3> else:

4> initiate the procedure to indicate stop as specified in 5.5.6.3.

2> else if there is activated preconfigured measurement gap for positioning:

3> trigger the lower layers to deactivate all the activated measurement gap(s) for positioning as specified in TS 38.321 [6].

Question 4: Do companies agree with the change?

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| --- | --- | --- |
| Company | Yes/No | Comments |
| Huawei,HiSIlicon | Yes | RRC triggers the MAC layer to cancel/activate/deactivate the MG. |
| Samsung | Yes (Proponent) | Let’s assume that the UE previously triggered UL MAC CE for pre-MG activation, but the gap is not activated yet. At this moment, if the upper layer (i.e., LPP) indicates to stop performing measurement, the RRC layer triggers the transmission of *LocationMeasurementIndication* message indicating the measurement stop as per the current RRC spec without the MAC CE cancellation operation. In this case, if the MAC CE for pre-MG activation arrives at gNB after the *LocationMeasurementIndication* message, the gNB can activate the pre-MG even though it is not needed anymore. We already agreed that UL MAC CE should be cancelled **when an indication from upper layers that the gaps are not needed any more** and this agreement is for addressing the above scenario.  Also, with the current specification, the MAC layer cancels the pending UL MAC CE for pre-MG (de)activation request only when there is another new pre-MG (de)activation request or an indication for cancellation from the upper layer (i.e., RRC). Therefore, in the case above, the MAC layer can not cancel the UL MAC CE by itself and we should specify how the RRC indicates the lower layer (i.e., MAC) to cancel the invalid UL MAC CE.  Based on the above, we believe that the proposed correction is essential to capture the previous agreement in a right way and also to prevent the improper pre-MG activation. |
| vivo | No | To our understanding, the RRC does not need to be aware of the real-time status of the MG; it can consider the MG is activated once it triggers the MAC to send the request.  That is, for the scenario raised by SS, if the UE previously triggered UL MAC CE for pre-MG activation, but the gap is not activated yet, and if the upper layer (i.e., LPP) indicates to stop performing measurement, then the RRC can just trigger the lower layers to deactivate all the measurement gap which RRC consider is activated. The behavior has been captured as follows:  2> else if there is activated preconfigured measurement gap for positioning:  3> trigger the lower layers to deactivate all the activated measurement gap(s) for positioning as specified in TS 38.321 [6].  If the MAC receives the deactivation request from RRC and the activation MAC CE has not been sent yet, it cancels the measurement gap activation MAC CE.  Besides, it’s a corner case that the RRC changes the determination in such a short time, i.e., between the MAC receiving the request and sending out the MAC CE. |
| Nokia | No | 38.321, Version 17.2.0, Section 6.1.3.40 defines the UL MAC CE for Positioning Measurement Gaps to apply to pre-configured positioning measurement gaps. The proposed change applies to non-pre-configured positioning measurement gaps. |
| Intel | Yes | RRC is the layer to be aware of whether gap is needed for positioning since so far as specified in RRC, LPP will indicate this to RRC.  MAC has no any idea about this. Therefore it should be captured in RRC, and then RRC indicates this to MAC. |
| CATT | No | This is a cornor case that RRC cancel the triggered UL MAC CE that is not activated yet. The case raised by proponet is a cornor case. |
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# Conclusion

Based on the discussion in section 2 we propose the following:

# References

[1] AI 6.11.1