**3GPP TSG RAN WG1 Meeting #114 R1-230xxxx**

Toulouse, France, August 21 – 25, 2023

**Agenda item: 9.17**

**Source: Nokia, Nokia Shanghai Bell**

**Title: Summary on email discussion on NR\_Mob\_enh2**

**Document for: Discussion and Decision**

# 1 Introduction

This document contains company observations on the draft CR to 38.214 for the Rel18 NR\_Mob\_end2.

First checkpoint for this discussion: **September 5, 6:00am UTC**!

# 2 Discussion – first round

The comments in this section are based on the version 0 of the draft CR

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| Company | Comments | Editor reply/Notes |
| vivo | For section 5.2.1.4.2, the definition of SSBRI is based on the order of SSBs included in the *LTM-csi-SSB-ResourceList*. Therefore, SSBRI is unique value for a report. It seems “different” for SSBRI for each reported cell is not needed:If a UE is configured with a [*LTM-CSI-ReportConfig*],- the UE shall report in a single reporting instance *[noOfReportedRSPerCell] SSBRI* for each of the *[noOfReportedCells]* cells, for each report setting.- if the UE is configured with [*SpCellInclusion* set to ‘enabled’], the UE shall report in a single reporting instance [*noOfReportedRSPerCell SSBRI* for the current SpCell and each of the *nrofReportedCells -1* cells], for each report setting. - the UE shall report SSBRI, where SSBRI *k* (*k* ≥ 0) corresponds to the configured (*k*+1)-th entry of the associated [*LTM-csi-SSB-ResourceList*] in the corresponding[*LTM-CSI-SSB-ResourceSet*]*.* | The current description with “different” is consistent with other part of the section. It should not create any ambiguity in terms of the SSBRI determination. Using “different” is meant to rule out the option where the UE repeats the same beam measurement for ‘M’ times. |
| ZTE | **Clause 5.2.1.1 Reporting settings**Comments for the following paragragh are as below:

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| Each Reporting Setting [*LTM-CSI-ReportConfig]* is associated with a [*LTM-CSI-ResourceConfig*] for channel measurement and contains the parameters(s) for time-domain behavior, number of quantities to be reported by the UE such as [*noOfReportedCells*]*,* and [*noOfReportedRSPerCell*]. |

* Comment #1: It is unclear for us to wording of “number of” in sentence “number of quantities to be reported by the UE such as [*noOfReportedCells*]*,* and [*noOfReportedRSPerCell*]”. From our perspective, similar legacy wording can be used for LTM, like “.....the CSI-related quantities to be reported by the UE such as L1-RSRP, SSBRI (SSB Resource Indicator)”. As for the information on the reported content (such as noOfReportedCells, noOfReportedRSPerCell, SpCellInclusion that has been included in RRC list agreed in RAN1), it can be reflected in Clause 5.2.1.4.2 Report Quantity Configurations and 5.2.1.4.3 L1-RSRP Reporting.

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| CSI-ReportConfig | LTM-ReportContent | This IE defines the content of the LTM measurement report | SEQUENCE {noOfReportedCells, noOfReportedRSPerCell,SpCellInclusion}  |

  **Proposed change:**

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| Each Reporting Setting [*LTM-CSI-ReportConfig]* is associated with a [*LTM-CSI-ResourceConfig*] for channel measurement and contains the parameters(s) for time-domain behavior, ~~number of~~ quantities to be reported by the UE such as ~~[~~*~~noOfReportedCells~~*~~]~~*~~,~~* ~~and [~~*~~noOfReportedRSPerCell~~*~~]~~ L1-RSRP, SSBRI (SSB Resource Indicator). |

* Comment #2: In order to clarify relationship between “time-domain behavior” for the first change of current clause and “[*reportConfigType]*” for the change modified in last post-meeting and align with wording and style of other places, the following change can be considered:

  **Proposed change:**

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| The time domain behavior of  ~~[~~*~~reportConfigType]~~* ~~in~~ *[LTM-CSI-ReportConfig]* is indicated by the higher layer parameter [*reportConfigType]*  and can be set to 'aperiodic', 'semiPersistentOnPUCCH', 'semiPersistentOnPUSCH', or 'periodic'. For 'periodic' and 'semiPersistentOnPUCCH'/'semiPersistentOnPUSCH' CSI reporting, the configured periodicity and slot offset applies in the numerology of the UL BWP in which the CSI report is configured to be transmitted on. |

**Clause 5.2.1.4.2 Report Quantity Configurations**Comments for the following paragragh are as below:

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| If a UE is configured with a [*LTM-CSI-ReportConfig*],- the UE shall report in a single reporting instance *[noOfReportedRSPerCell] different SSBRI* for each of the *[noOfReportedCells]* cells, for each report setting.- if the UE is configured with [*SpCellInclusion* set to ‘enabled’], the UE shall report in a single reporting instance [*noOfReportedRSPerCell different SSBRI* for the current SpCell and each of the *nrofReportedCells -1* cells], for each report setting. - the UE shall report SSBRI, where SSBRI *k* (*k* ≥ 0) corresponds to the configured (*k*+1)-th entry of the associated [*LTM-csi-SSB-ResourceList*] in the corresponding[*LTM-CSI-SSB-ResourceSet*]*.* |

* Comment #3: Link relationship between “SSB index” given by [*LTM-csi-SSB-ResourceList*] and “PCI index” given by [*LTM-CandidateId-list*] is not reflected in the current spec since “PCI index” given by [*LTM-CandidateId-list*] may be an optional configuration.
* Comment #4: “where SSBRI *k* (*k* ≥ 0) corresponds to the configured (*k*+1)-th entry of the associated [*LTM-csi-SSB-ResourceList*] in the corresponding[*LTM-CSI-SSB-ResourceSet*]” is shared for “the UE shall report in a single reporting instance *[noOfReportedRSPerCell] different SSBRI* for each of the *[noOfReportedCells]* cells, for each report setting.” and “if the UE is configured with [*SpCellInclusion* set to ‘enabled’], the UE shall report in a single reporting instance [*noOfReportedRSPerCell different SSBRI* for the current SpCell and each of the *nrofReportedCells -1* cells], for each report setting.”

Thus, according to the above comments, the following change is proposed for reference: **Proposed change:**

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| If a UE is configured with a [*LTM-CSI-ReportConfig*],- ~~the UE shall report in a single reporting instance~~ *~~[noOfReportedRSPerCell] different SSBRI~~* ~~for each of the~~ *~~[noOfReportedCells]~~* ~~cells, for each report setting.~~- if the UE is configured with [*SpCellInclusion* set to ‘enabled’], the UE shall report in a single reporting instance [*noOfReportedRSPerCell different SSBRI* for the current SpCell and each of the *nrofReportedCells -1* cells], for each report setting.Otherwise, the UE shall report in a single reporting instance *[noOfReportedRSPerCell] different SSBRI* for each of the *[noOfReportedCells]* cells, for each report setting.- ~~the UE shall report SSBRI,~~ where SSBRI *k* (*k* ≥ 0) corresponds to the configured (*k*+1)-th entry of the associated [*LTM-csi-SSB-ResourceList*] in the corresponding[*LTM-CSI-SSB-ResourceSet*]*.*- if the UE is configured with the higher layer parameter [LTM-CandidateId-list], SSB indices given by [*LTM-csi-SSB-ResourceList*]) are associated with PCI indices referring to the PCI of the serving cell and PCI(s) different from the PCI of the serving cell within the set of PCIs configured.  |

 | #1 LTM-CSI-ReportConfig does not contain the configuration of quantities to be reported as by default its only L1-RSRP and SSBRI. Therefore, only number of quantities related configuration is mentioned in the description. #2 OK, updated. #3 The relationship between SSB index and PCI is captured in section 5.2.1.2 for the configuration details. There is no need to capture it again with report quantity related description. #4 OK, updated. |
| Huawei, HiSilicon | Thanks for the drafts. In section 5.2.1.1 paragraph 2, the time-domain bebavior may be mis-read for *LTM-CSI-ResourcConfig*. The parameter of *SpCellInclusion* is missed. Suggest following changes. Each Reporting Setting [*LTM-CSI-ReportConfig]* is associated with a [*LTM-CSI-ResourceConfig*] for channel measurement and contains the parameters(s) for time-domain behavior of *[LTM-CSI-ReportConfig]*, number of quantities to be reported by the UE such as [*noOfReportedCells*]*,* and [*noOfReportedRSPerCell*], inclusion of L1 measurement results associated with current SpCell by *SpCellInclusion*.In the last paragraph section 5.2.1.2, the parameters of frequency domain behavior can be aligned with those in RRC list we sent to RAN2. Suggest following changesFor a UE configured with the higher layer parameter [*LTM-CandidateId(s)*, each CSI Resource Setting *LTM-CSI-ResourceConfig]* contains configuration of a [*LTM-CSI-SSB-ResourceSet*] which comprises of a list of [Z ≥ 1 SS/PBCH blocks indices (given by [*LTM-csi-SSB-ResourceList*]) and a list of Z [PCI indices] (given by [*LTM-CandidateId-list*]) referring to cells associated with the SS/PBCH block indices. The time domain behavior of a SS/PBCH block is determined by *ssb-Periodicity* and *ssb-PositionsInBurst* and the frequency domain behavior of a SS/PBCH block is determined by the higher layer parameters *subcarrierspacing*, *ssbFrequency*.In section 5.2.1.4.1, we suggest to describe the RS association for AP and P/SP CSI separately similar as those for legacy release. During the RRC discussion, it is common understanding that legacy *CSI-AperiodicTriggerState* and *CSI-SemiPersistentOnPUSCH-TriggerState* will be reused. To my understanding, the *LTM-resourcesForChannelMeasurement* configured in *LTM-CSI-ReportConfig* are only for P/SP CSI report. The resource for AP CSI report should be separated configured for each *LTM-associatedReportConfigInfo* corresponding to each AP CSI trigger state. Suggest following changesFor a UE configured with aperiodic CSI in *[LTM*-*CSI-ReportConfig]*, each trigger state configured using the higher layer parameter *CSI-AperiodicTriggerState* is associated with one *[LTM-CSI-ReportConfig]* andassociated with [one Resource Setting given by [*LTM-resourcesForChannelMeasurement]* for L1-RSRP measurement. For a UE configured with semi-persistent or periodic CSI in *[LTM*-*CSI-ReportConfig],* one Resource Setting (given by higher layer parameter *LTM-resourcesForChannelMeasurement*) is configured, the Resource Setting is for channel measurement for L1-RSRP. | #1 did some rewording, in the light of what E/// also proposed. Aded the inclusion, maybe some more polishing is needed here but for now I think we have the targeted ingredients. #2 some editing in the paragraph performed!#3 Since, the RRC configuration is not finalized and there are two alternatives for CSI reporting config, we can do more relevant updates later. Your proposal is more aligned with option-2, but let’s update once we know which option is selected.  |
| Ericsson | Thanks for the draft. We agree with vivo that “different” can be removed, and with Huawei on the mentioning of “SpCellInclusion” in 5.2.1.1.5.2.1.1:The paragraph describing the content of LTM-CSI-ReportConfig could be simplified toEach Reporting Setting [*LTM-CSI-ReportConfig]* is associated with a [*LTM-CSI-ResourceConfig*] for channel measurement and contains the parameters(s) for time-domain behavior, the number of cells and the number of reference signals per cell, provided by [*noOfReportedCells*]*,* and [*noOfReportedRSPerCell*], respectively.5.2.1.2:#1: The first statement “if the UE is configured”… is not necessary.#2: It is the UE that determines the properties of the SSB. Proposed update: Each LTM CSI Resource Setting *[LTM-CSI-ResourceConfig]* contains configuration of a [*LTM-CSI-SSB-ResourceSet*] which comprises of a list of [Z ≥ 1 SS/PBCH blocks indices (given by [*LTM-csi-SSB-ResourceList*]) and a list of Z [PCI indices] (given by [*LTM-CandidateId-list*]) referring to cells associated with the SS/PBCH block indices. The UE determines the time domain behavior of a SS/PBCH block from *ssb-Periodicity* and *ssb-PositionsInBurst* and the frequency domain behavior of a SS/PBCH block from the higher layer parameters *subcarrierspacing,* , and *ssbFrequency*. | #1 did some rewording using your proposal and added the inclusion.#2 updated the text using your proposals. |
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# 3 Discussion – second round

The comments in this section are based on version 1 of the draft CR available in the **Post RAN1#114 discussion.**

Second checkpoint for this discussion:  **is September 6, 9.00 am UTC!**

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