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

**Toulouse, France, August 21st – 25th, 2023**

**Agenda item:** 9.17

**Source:** Samsung

**Title:** Summary of email discussions [114-R18-38.213-NR\_mob\_enh2]

**Document for:** Discussion and decision

# Introduction

The purpose of this document is to collect inputs/comments on the draft CR for TS 38.213 [draftCR\_38213 Mobility](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_114/Inbox/drafts/9.17(Other)/%5B38.213%20draft%20CRs%5D/NR_mob_enh2/R1-230xxxx%20draftCR_38213%20Mobility.docx) on the introduction of further mobility enhancements for NR. If a comment on a particular aspect has been made by another company, please do not repeat it until, if needed, after a response.

The first checkpoint is on September 5, UTC 13:00.

# First Round Discussion

Please provide your comments on the draft CR for TS 38.213 [draftCR\_38213 Mobility](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_114/Inbox/drafts/9.17(Other)/%5B38.213%20draft%20CRs%5D/NR_mob_enh2/R1-230xxxx%20draftCR_38213%20Mobility.docx).

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| Company | Comments |
| vivo | In RAN1#114 meeting, SSB or TRS can be configured in a TCI state for the candidate cell(s) before/during cell switch command was agreed. Therefore, TRS should be added into the TCI state activation as below:  For section 21, following parts need be revised:  A UE can be indicated, by LTM-Config, cells and SS/PBCH blocks per cell for the UE to obtain synchronization and measure corresponding L1-RSRPs [10, TS 38.133]. A MAC CE command can activate TCI states associated with SS/PBCH blocks or TRSs of corresponding cells. The UE is provided configurations by LTM-CSI-ReportConfigToAddModList for reporting L1-RSRP measurements [6, TS 38.214] that include a number of cells and a number of SS/PBCH blocks per cell from the number of cells.  [Aris]: OK, will add TRS. |
| ZTE | **Clause 21**  **Comment for the following paragragh is as below:**   |  | | --- | | A UE can be indicated, by *LTM-Config*, cells and SS/PBCH blocks per cell for the UE to obtain synchronization and measure corresponding L1-RSRPs [10, TS 38.133]. A MAC CE command can activate TCI states associated with SS/PBCH blocks of corresponding cells. The UE is provided configurations by *LTM-CSI-ReportConfigToAddModList* for reporting L1-RSRP measurements [6, TS 38.214] that include a number of cells and a number of SS/PBCH blocks per cell from the number of cells. |  * Comment #1: according to the latest agreement in RAN1#114 meeting, in addition to SSB, TRS (e.g., CSI-RS resource in a *NZP-CSI-RS-ResourceSet* configured with higher layer parameter *trs-Info*) can be used as a QCL source RS in a TCI state. For the case of TCI state before CSC, we think that such TCI state is from activated TCI state list by MAC CE. With this consideration, we propose the following change for reference:  |  | | --- | | **Agreement**  In R18 LTM, on the QCL source of the TCI state before/during the cell switch command,   * SSB or TRS can be configured in a TCI state for the candidate cell(s) before/during cell switch command   + Whether the TRS can be used for the candidate cell(s) before/during cell switch command is up to UE capability |   **Proposed change:**   |  | | --- | | A UE can be indicated, by *LTM-Config*, cells and SS/PBCH blocks per cell for the UE to obtain synchronization and measure corresponding L1-RSRPs [10, TS 38.133]. A MAC CE command can activate TCI states associated with SS/PBCH blocks or CSI-RS of corresponding cells. The UE is provided configurations by *LTM-CSI-ReportConfigToAddModList* for reporting L1-RSRP measurements [6, TS 38.214] that include a number of cells and a number of SS/PBCH blocks per cell from the number of cells. |   [Aris]: OK – I understand the CSI-RS but will use TRS to be exact with the agreement and as TRS is a used term.  **Comment for the following paragragh are as below:**   |  | | --- | | A UE can be provided configurations for PRACH transmission parameters by *EarlyUlSyncConfig* for cells. The UE can be triggered a PRACH transmission on a cell by a PDCCH order that the UE receives on a serving cell and includes an indication of the cell for the PRACH transmission [4, TS 38.212]. If the serving cell and the candidate cell operate in a same frequency range and the UE would have simultaneous transmissions on the serving cell and the candidate cell, the UE  - drops the transmissions on the serving cell when the UE does not support simultaneous transmissions on the serving cell and the candidate cell  - prioritizes power allocation to the PRACH transmission on the candidate cell when the UE supports simultaneous transmissions on the serving cell and the candidate cell, and a total UE transmit power in the frequency range would exceed |  * Comment #2: In order to avoid ambiguity and reduplication with subsequent text, the yellow highlighted part above should be removed.   [Aris]: There is no duplication – the main bullet considers that there are simultaneous transmissions and the sub-bullets consider whether or not the UE supports simultaneous transmissions.   * Comment #3: Considering whether UE supports simultaneous/parallel transmissions depends on UE capability, such information on capability should be captured in the text.  |  | | --- | | **Agreement(RAN1#113)**   * For PDCCH-order based PRACH for candidate cell, **If UE capability does not support simultaneous/parallel transmissions**, when the PRACH transmission to a candidate cell other than current serving cell(including any interruption due to processing time to build the PRACH transmission, carrier or/and BWP switching time if any, UL or DL RF retuning time if any, additional preparation time if any) happen to overlap over one or more symbols or have a time gap below a certain threshold (e.g., N symbols, FFS: the value of N) with following UL transmission to one of the serving cells * PRACH transmission * PUCCH/PUSCH transmission carrying HARQ-ACK, SR, P/SP CSI, aperiodic CSI * SRS transmission * Any other PUCCH/PUSCH transmission * Down-select the UE behavior in this case * Alt 1: Dropping rule is needed * Alt 2: up to UE implementation   **Agreement(RAN1#114)**  When the UE does not support simultaneous/parallel transmissions of PRACH in candidate cell and UL channels and signals in serving cell, support   * + serving cell UL TX is dropped.   **Agreement(RAN1#114)**  If the UE supports simultaneous/parallel transmissions of PRACH in candidate cell and UL channels and signals in serving cell in the same frequency range, support:   * A PRACH transmission to a LTM candidate cell has the highest priority for power allocation   Note: up to UE whether performs power scale-down or drop of UL transmission with lower priority when UL transmission power is insufficient. |   [Aris]: Whether or not the UE has the capability is not relevant for the referenced text. There is no reason to add every possible UE capability in corresponding text of 38.213.   * Comment #4: For the case of supporting simultaneous/parallel transmissions, RAN1 has agreed that UE can determine power allocation with highest priority for PRACH transmission for candidate cell. But these information has not been fully captured in the current spec, especially for the meaning of “highest priority”.   [Aris]: The suggested change is unnecessary – the statement is clear that the UE prioritizes power allocation to PRACH.   * Comment #5: There is no any discussion and consensus on “a total UE transmit power in the frequency range would exceed ”   [Aris]: Prioritization for power allocation throughout 38.213 is meaningful only when would be exceeded (e.g. clause 7.5 – will add the reference). Otherwise, there is no such thing as prioritization of power allocation and no need for any statement – every channel is transmitted with its nominal power.  Based on the above comments, we propose the following change for reference:  **Proposed change:**   |  | | --- | | A UE can be provided configurations for PRACH transmission parameters by *EarlyUlSyncConfig* for cells. The UE can be triggered a PRACH transmission on a cell by a PDCCH order that the UE receives on a serving cell and includes an indication of the cell for the PRACH transmission [4, TS 38.212]. If the serving cell and the candidate cell operate in a same frequency range ~~and the UE would have simultaneous transmissions on the serving cell and the candidate cell~~, the UE  - drops ~~the~~ UL transmission~~s~~ on the serving cell when the UE indicates a capability ~~does~~ not to support simultaneous transmissions on the serving cell and the candidate cell  - determines ~~prioritizes~~ power allocation with the highest priority to the PRACH transmission on the candidate cell in Clause 7.5, otherwise. ~~when the UE supports simultaneous transmissions on the serving cell and the candidate cell, and a total UE transmit power in the frequency range would exceed~~ | |
| Ericsson | Thank you for the draft CR.  **Section 21:**  The text could be made clearer if the term “candidate cell” was introduced. All the operations are provided for candidate cells.  [Aris]: Yes, agree. It has also been introduced for the power prioritization and is now a necessary update.  Note that the TCI states that are activated/applied are different from the serving cell TCI states. The RRC parameter list talks about LTM-Candidate-Tci-States and LTM-Candidate-TCI-UL-States. In the last two paragraphs, italics is used, which shows these are RRC parameters. This is somewhat misleading.  [Aris]: Agree – will capture the LTM RRC parameters.  We still think the paragraph starting with “A UE can indicated a capability..” is strange. It would be clearer to write:  If the UE is provided ueMeasuredTA for a candidate cell, the UE estimates the TA for that candidate cell, and applies the TA at the reception of the LTM cell.switch command.  [Aris]: OK – I tend to agree. It is better to base things on RRC configurations and avoid links to UE capability (that created some problems). I understand that *ueMeasuredTA* is not provided per candidate cell (it is global). I will update as follows (I don’t think a timeline for the processing of the cell switch command is relevant here):  If a UE is provided *ueMeasuredTA*, the UE estimates based on the UE implementation a timing advance to apply from a first transmission on a candidate cell after the reception of a cell switch command for the candidate cell [11, TS 38.321].  We think there is no need to mention TRS for the LTM TCI states.  [Aris]: The relevant agreement mentioned by Vivo/ZTE above was missed and need to be implemented.  The procedures related to timing adjustments would fit nicely in section 4,2:  A timing advance command [11, TS 38.321] in case of random access response or in an absolute timing advance command MAC CE, or in an LTM cell switch command  [Aris]: OK. |
| NOKIA | Thanks for the updated CR. We have the following comments:   1. Section 21: As mentioned above by vivo and ZTE, based on the latest agreements, TRS needs to be added for a TCI state’s associated RS.   [Aris]: OK – please see previous responses.   1. Section 21: For the power allocation prioritization, a reference to section 7.5 needs to be added for complete description. ZTE’s proposed change looks good.   [Aris]: A reference to clause 7.5 can be added but a statement is Clause 7.5 is also needed as otherwise there is ambiguity. Will add the following in clause 7.5.  For single cell operation with two uplink carriers or for operation with carrier aggregation, if a total UE transmit power for PUSCH or PUCCH or PRACH or SRS transmissions on serving cells in a frequency range in a respective transmission occasion would exceed , where is the linear value of in transmission occasion as defined in [8-1, TS 38.101-1] for FR1 and [8-2, TS 38.101-2] for FR2, the UE allocates power to PUSCH/PUCCH/PRACH/SRS transmissions according to the following priority order (in descending order) so that the total UE transmit power for transmissions on serving cells in the frequency range is smaller than or equal to for that frequency range in every symbol of transmission occasion .  …  - PRACH transmission on a candidate cell, if any, as described in Clause 21  - PRACH transmission on the PCell  - PUCCH or PUSCH transmissions with larger priority index   1. Section 21: As Ericsson mentioned, for the TCI states, it is better to clarify that these are associated with LTM operation. We propose the following highlighted updates:   A MAC CE command can activate TCI states associated with SS/PBCH blocks of corresponding cells given by *LTM-Candidate-TCI-State-r18* or/and *LTM-Candidate-TCI-UL-State-r18*.  ………  A UE can be provided by a MAC CE in a PDSCH reception on the serving cell [11, TS 38.321] a LTM-Candidate-TCI-State-r18 *~~TCI-State~~* in LTM-dl-OrJointTCI-StateToAddModList *~~dl-OrJointTCI-StateList~~* and/or LTM-Candidate-TCI-UL-State-r18 in LTM-ul-TCI-ToAddModList *~~TCI-UL-State~~* indicating a unified TCI state [6, TS 38.214] for applicable receptions or transmissions on a cell from the number of cells.  [Aris]: Yes, will update with LTM RRC parameters. |
| Huawei, HiSilicon | Thanks for the draft CR  In the 1st paragraph of section 21, a MAC CE can also used to activate one LTM TCI state before cell switch command. So a bracket should be added on the ‘s’ of TCI state(s) and SS/PBCH block(s). we also agreed with previous comments to add TRS. suggest following changes  A UE can be indicated, by *LTM-Config*, cells and SS/PBCH blocks per cell for the UE to obtain synchronization and measure corresponding L1-RSRPs [10, TS 38.133]. A MAC CE command can activate TCI state(s) associated with SS/PBCH block(s) and TRS(s)of corresponding cells. The UE is provided configurations by *LTM-CSI-ReportConfigToAddModList* for reporting L1-RSRP measurements [6, TS 38.214] that include a number of cells and a number of SS/PBCH blocks per cell from the number of cells.  [Aris]: It should be understood that singular/one is not precluded in the above expressions. Unfortunately, there is currently a mixture of using and not using ‘(s)’ when singular is also included. That will also be evident by the MAC CE itself in 38.321. Also, “candidate cells” will need the ‘(s)’, and that ‘(s)’ will propagate in all associated text.  In the 3rd paragraph of section 21, the definition of “simultaneous transmission” is not clear. For UE without capability of simultaneous/parallel transmission, the agreement in RAN1#113 provided the definition, similar wording from section 15 of DAPS can be reused. For example,  “a UE does not transmit PRACH/PUSCH/PUCCH/SRS to the serving cell in a slot overlapping in time with a PRACH transmission to the candidate cell or when a gap between a first or last symbol of a PRACH transmission to the candidate cell in a first slot would be separated by less than symbols from a last or first symbol, respectively, of the PRACH/PUSCH/PUCCH/SRS transmission to the serving cell in a second slot.”  [Aris]: I think the issue is whether to include the gap of *N* symbols (simultaneous can be reworded to “overlapping in time”). The RAN1#113 agreement points to that direction but it was not well/definitively stated. One issue may be the relation of power prioritization when there is no overlapping but the time separation is less than the gap – in that case, it is probably clear that power prioritization is not applicable and can keep the same expression/condition for text simplicity. Will update as follows – if any concerns, that can be discussed in maintenance.  If the serving cell and the candidate cell operate in a same frequency range and the UE would have transmissions that overlap in time or are separated by less than symbols from a last or a first symbol, where is defined in Clause 15, on the serving cell and the candidate cell, the UE  - drops the transmissions on the serving cell when the UE does not support transmissions that overlap in time or are separated by less than symbols from a last or a first symbol on the serving cell and the candidate cell  - prioritizes power allocation to the PRACH transmission on the candidate cell in clause 7.5 when the UE supports transmissions that overlap in time or are separated by less than symbols from a last or a first symbol on the serving cell and the candidate cell, and a total UE transmit power in the frequency range would exceed  For UE with capability of simultaneous/parallel transmission, the wording in 7.5 can be used as mentioned by Nokia and ZTE.  [Aris]: OK, please see previous responses. |
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# Second Round Discussion

Please provide your comments on the draft CR for TS 38.213 at [draftCR\_38213 Mobility\_v1](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_114/Inbox/drafts/9.17(Other)/%5B38.213%20draft%20CRs%5D/NR_mob_enh2/R1-230xxxx%20draftCR_38213%20Mobility_v1.docx).

The second checkpoint is on September 6, UTC 15:00.

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| Company | Comments |
| Apple | Many thanks for the great draft.  1) On the following text:   |  | | --- | | A MAC CE command can activate TCI states, provided by LTM-Candidate-TCI-State-r18 or/and LTM-Candidate-TCI-UL-State-r18, associated with SS/PBCH blocks or TRS of corresponding candidate cells. |   We share views from HW to make it clear that both ‘one or more’ are supported, instead of ‘more than one’ only is supported. The change is trival and can avoid future debating on this regard. There are simliar words (i.e., ‘one ore more’) in specificaition already. Therefore, we propose the following trival change:   |  | | --- | | A MAC CE command can activate one or more TCI state(s), provided by LTM-Candidate-TCI-State-r18 or/and LTM-Candidate-TCI-UL-State-r18, associated with SS/PBCH blocks or TRS of corresponding candidate cells. |   [Aris]: I can only repeat the previous comment. Whether a MAC CE can activate “one or more” TCI states is not controlled by 38.213. That text in 38.213 is “wrapper/introduction” for describing L1 procedures. If the MAC CE does not allow “one”, all the ‘(s)’ or “one or more” in 38.213 will not do anything, and the reverse. If “one or more” or ‘(s)’ is included for TCI states, it should be included everywhere for candidate cells, SS/PBCH blocks, … and have a text that is frustrating to read (more than it probably is already). Yes, “one or more” is used in some occasions (mostly needed in those occasions), and so is (unfortunately) the ‘(s)’. But so is the “more than one” when it needs to be said that, e.g. “TCI states”, is plural. It should be understood that abstractly saying “MAC CE can activate TCI states” includes the case of one TCI state.  2) Currently, the ‘*EarlyUlSyncConfig*’ is configured for each candidate cell within the IE of ‘LTM-Candidate-r18’. Therefore, proposing the following changes:   |  | | --- | | A UE can be provided configurations by *EarlyUlSyncConfig* for PRACH transmission parameters for a candidate cell. |   [Aris]: OK – will also modify suggested text to “for each of candidate cells” |
| NOKIA | Thanks for the updates.   1. Section 21: In the following paragraph, the highlighted part   Comment 1: on the reference for value N, we think the more suitable reference is Clause 8.1, last paragraph, where SCS of both PRACH and serving cell UL Tx are considered and more values of SCS are included.  A UE can be provided configurations for PRACH transmission parameters by *EarlyUlSyncConfig* for candidate cells. The UE can be triggered a PRACH transmission on a candidate cell by a PDCCH order that the UE receives on a serving cell and includes an indication of the candidate cell for the PRACH transmission [4, TS 38.212]. If the serving cell and the candidate cell operate in a same frequency range and the UE would have transmissions that overlap in time or are separated by less than symbols from a last or a first symbol, where is defined in Clause 15, on the serving cell and the candidate cell, the UE  [Aris]: Changed ‘15’ to ‘TBD’ as there is no apparent consensus or prior discussion.  Comment 2: Also, the current text “ symbols from a last or a first symbol” itself is not complete. Suggest to use:  ….. that overlap in time or when a gap between the first or last symbol of a PRACH transmission to the candidate cell is separated by less than 𝑁 symbols from the last or first symbol, respectively, of a UL transmission to the serving cell ~~are separated by less than symbols from a last or a first symbol,~~ where….  [Aris]: Yes, it is clearer.   1. Section 21: In the following paragraph, *TCI-State, TCI-UL-State* look RRC parameters which are not a part of the LTM RRC configuration. This may create some confusion as these terms are used for beam management. We suggest to use currently agreed RRC parameter name in the RRC list, i.e., *LTM-Candidate-TCI-States -r18* (instead of *TCI-State)*  and *LTM-Candidate-TCI-UL-State-r18* (instead of *TCI-UL-State).*   A UE can be provided by a MAC CE in a PDSCH reception on the serving cell [11, TS 38.321] a *TCI-State* and/or *TCI-UL-State* in *LTM-dl-OrJointTCI-StateToAddModList* and/or *LTM-ul-TCI-ToAddModList* indicating a unified TCI state [6, TS 38.214] for applicable receptions or transmissions on a candidate cell from the number of candidate cells.  The UE applies the *TCI-State* and/or *TCI-UL-State,* if indicated by the MAC CE, from a first slot that is after the last symbol of a PUCCH or PUSCH with HARQ-ACK information for the PDSCH providing the MAC CE, and is the SCS configuration for the TBD*.*  [Aris]: It is OK to use *TCI-State* or *TCI-UL-State* – the LTM container is stated and I doubt RAN2 will use a different name (will of course align if that happens but there is no apparent need for that). |
| Editor | A follow up on the above “Comment 2” by Nokia. A rewording for the sub-bullets is also needed – i.e as below. I plan to implement that change in the final draft CR (will also mention it over email).  If the serving cell and the candidate cell operate in a same frequency range and the UE would have transmissions that overlap in time, or when a gap between a first or last symbol of a PRACH transmission to the candidate cell is less than 𝑁 symbols from a last or first symbol, respectively, of an UL transmission to the serving cell, where is defined in Clause TBD, the UE  - drops the transmissions on the serving cell when the UE does not support transmissions that overlap in time or are separated by less than the gap  - prioritizes power allocation to the PRACH transmission on the candidate cell in clause 7.5 when the UE supports transmissions that overlap in time or are separated by less than the gap, and a total UE transmit power in the frequency range would exceed |
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