3GPP TSG RAN WG1 #105-e R1-210xxxx

e-Meeting, May 19 - 27, 2021

**Agenda item: 7.2.10**

**Source: Moderator (Nokia)**

**Title:** **[105-e-NR-MRDC-CA-01] Moderator summary**

**WI: LTE\_NR\_DC\_CA\_enh-Core**

**Document for: Discussion and Decision**

# 1 Introduction

The pre-RAN1#105 discussion summarized in [R1-2105684] resulted with one email thread for the meeting:

[105-e-NR-MRDC-CA-01] Email discussion/approval on the following until May-25 – Karri (Nokia)

* 1Tx: Discuss the changes proposed in [R1-2104324](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_105-e/Docs/R1-2104324.zip) to LTE 36.212/213
* PC1: Discuss the proposed changes in [R1-2104475](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_105-e/Docs/R1-2104475.zip) and if agreed, introduce them together with another change to 38.213, or include in the editor’s alignment CR
* UA: Discuss the proposed changes in [R1-2105375](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_105-e/Docs/R1-2105375.zip) to TS38.214
* XCC: Discuss the proposed change in [R1-2105918](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_105-e/Docs/R1-2105918.zip) and if agreed, could also be taken together with another change to 38.214 or include in the editor’s alignment CR

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| **TDoc** | **Title** | **Source** |
| [R1-2104324](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_105-e/Docs/R1-2104324.zip) | Remaing issues for Rel-16 single uplink Tx | ZTE |
| [R1-2104475](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_105-e/Docs/R1-2104475.zip) | Correction for power control of NR-DC | CATT |
| [R1-2105375](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_105-e/Docs/R1-2105375.zip) | Remaining issues on Rel-16 carrier aggregation | MediaTek Inc. |
| [R1-2105918](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_105-e/Docs/R1-2105918.zip" \t "_parent) | Corrections on CCS with different subcarrier spacings for PDCCH and PDSCH in TS 38.214 | Huawei, HiSilicon |

# 2 Round 1 of discussion

## 2.1 1Tx: Proposed changes in R1-2104324 to LTE 36.212/213

Alignment of the RRC parameter names used for singe UL Tx operation in the TS36.212/213, in numerous places in TS36.212 and TS36.213, the following two changes are introduced:

* *subframeAssignment-r15* is replaced with *tdm-PatternConfig/tdm-PatternConfigNE-DC*
* *subframeAssignment-r16* is replaced with *tdm-PatternConfig2*

**Moderator proposal:** Agree to the proposed changes and introduce them in TS36.212 and TS36.213

Please provide your comments to the table below

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| **Company** | **Comment** |
| Huawei, HiSilicon | The CR has impacts on Rel-15 spec as well because it changes the text associated with *subframeAssignment-r15*, e.g. the following changes for S5 of TS 36.213    Therefore, the CR is supposed to start with a Rel-15 CR instead of Rel-16 one.  Additionally, such correction of RRC names for tdm-PatternConfig (issue#21) has been concluded to be resolved as editorial/alignment CR in [105-e-Prep-NR-7.1CRs] this meeting.  Therefore, suggest to discuss the CR as an editorial CR first under [105-e-NR-7.1CRs-14]. |
| MTK | This issue arises due to the new functionality of single UL EN-DC introduced in R16. Hence, we are fine to adopt moderator proposals for R16 spec. We are also fine with HW’s suggestion if most companies prefer to start with a Rel-15 CR instead of Rel-16 one. |
| ZTE | Since “*subframeAssignment-r15*” is a sub-IE of “*tdm-PatternConfig/tdm-PatternConfigNE-DC*”, the current Rel-15 spec is Ok without any issue. From our perspective, we only need to update Rel-16 spec.  But if majority companies prefer to start with Rel-15 spec to have a consistent description for both Rel-15 and Rel-16, we can prepare a Rel-15 CR in next meeting to address this issue. |
| Intel | We support the FL proposal. If majority companies wants a CR for Rel-15, we are fine with it too. |
| vivo | We are fine with a Rel-16 CR, but we don’t think a Rel-15 CR is needed – Rel-16 WI maintenance should not have Rel-15 spec impact. |
| CATT | We are OK with moderator’s proposal |
| Qualcomm | We are OK with moderator’s proposal |

## 2.2 PC1: Proposed changes in R1-2104475 to 38.213

Alignment of the order of SCG and MCG in the section 7.6.2 of TS38.213 as below:

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| If a UE is provided *semi-static-mode2* for *nrdc-PCmode-FR1* or for *nrdc-PCmode-FR2*  - if the UE is not provided *tdd-UL-DL-ConfigurationCommon* for the MCG or SCG, the UE determines a transmission power for the MCG or for the SCG as described in Clauses 7.1 through 7.5 using or as the maximum transmission power, respectively  - if at least one symbol of slot of the MCG or of the SCG that is indicated as uplink or flexible to a UE by *tdd-UL-DL-ConfigurationCommon* and *tdd*-*UL-DL-ConfigurationDedicated*, if provided, overlaps with a symbol for any ongoing transmission overlapping with slot of the SCG or of the MCG, respectively, the UE determines a power for the transmission on the SCG or the MCG overlapping with slot as described in Clauses 7.1 through 7.5 using or , respectively, as the maximum transmission power  - otherwise, the UE determines a power for the transmission on SCG or the MCG overlapping with slot , as described in [8-3, TS 38.101-3] and in Clauses 7.1 through 7.5 without considering or , respectively |

**Moderator proposal:** Agree to the proposed changes and introduce them in the 38.213 editor’s alignment CR in thread 105-e-NR-AlignmentCRs-38213].

Please provide your comments to the table below

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| **Company** | **Comment** |
| Huawei, HiSilicon | OK. |
| MTK | Support |
| ZTE | OK with the moderator proposal. |
| Intel | Support |
| vivo | OK |
| CATT | Support |
| Qualcomm | OK |

## 2.3 UA: Proposed changes in R1-2105375 to TS38.214

Five different change proposals to TS38.214 are made:

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| **Proposal 3: Adopt the following text in 38.214 5.2.1.5.1 “Aperiodic CSI Reporting/Aperiodic CSI-RS when the triggering PDCCH and the CSI-RS have the same numerology”:**   * The aperiodic CSI-RS is transmitted in a slot ,   **Proposal 4: Adopt the following text in 38.214 5.2.2.5 “CSI reference resource definition”:**   * In the time domain, the CSI reference resource for a CSI reporting in uplink slot *n’* is defined by a single downlink slot *n*-*nCSI\_ref*,   - where  **Proposal 5:** **Add the following text to the beginning of Chapter 5, 6, 8, of 38.214**  The term “in the same slot” in this clause refers to the absolute timing duration of that slot on the designated cell according to the context.  **Proposal 6: Add the following text to the starting paragraph of 38.214 5.1**  If the frame boundaries of the scheduled and scheduling cell are not aligned, and the SCS of scheduling cell is smaller than or equal to the SCS of scheduled cell, the UE does not expect that the beginning of the slot containing a PDSCH is before the beginning of the slot carrying its scheduling DCI.  **Proposal 7:** **Add the following text to the starting paragraph of 38.214 5.2.1.5.1**  If the frame boundaries of the triggered and triggering cell are not aligned, and the SCS of triggering cell is smaller than or equal to the SCS of triggered cell, the UE does not expect that the beginning of the slot containing an aperiodic CSI-RS is before the beginning of the slot carrying its triggering DCI. |

**Moderator proposal:** Discuss the five change proposals and if agreeable adopt them to TS382.214

Please provide your comments to the table below

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| **Company** | **Comment** |
| MTK | Support.   * Proposal 3 and Proposal 4 are straightforward formula corrections considering the R16 feature “CA with non-aligned frame boundaries”, just like how we add slot offsets for PDSCH scheduling, aperiodic CSI report, and aperiodic SRS before. * Proposal 5 is to clarify the definition of ”**in the same slot**” (which appeared 8 times in 38.214) when “CA with non-aligned frame boundaries” comes into play. * Proposal 6 and Proposal 7 are intended to avoid the scenario shown in the figure below which makes the slot based CSI processing complicated (especially for the Ues only capable of processing DCIs in the first 3 symbols of a slot) and consumes more UE power and buffering. |
| ZTE | Ok with Proposal 3 and Proposal 4. If they are agreed, we need to add some explanations for these notations during TP discussion.  For Proposal 5, it seems most of the “in the same slot” is straightforward. Take the example in proponent’s contribution, it should be “in the ~~same~~PDSCH slot”. But we are not convinced that we need a TP to capture this in spec if all companies share the same understanding.  For Proposal 6 and proposal 7, before discussing whether the TP is needed or not, we would like to understand the issue better.  There is no issue for self-scheduling; there is no issue for cross-carrier scheduling with different numerologies as a large PDCCH processing time is required between PDCCH and PDSCH. The issue only exists with cross-carrier scheduling with the same SCS.  For type B PDSCH scheduling, the UE is required to handle the case that PDSCH can start from any symbol as long as the PDSCH is after PDCCH. It seems the issue here is similar as type B PDSCH scheduling. If UE supports type B PDSCH scheduling, the scenario mentioned in MTK’s figure is not an issue.  Then, the only issue seems to be the case of cross-carrier scheduling with the same SCS with type A PDSCH scheduling, is this the common understanding? |
| Intel | We are supportive to Proposal 3 and 4.  For proposal 5, it the sentence to enforce the same SCS, same start timing for the multiple slots in same or different serving cells?  For proposal 6 and 7, not sure about the benefit of such restriction. If there is enough scheduling delay, it seems a PDCCH can be valid to carry a trigger. In articular, for CCS with different SCSs, a minimum scheduling delay is introduced for MR-DC. Then, a trigger can be considered if it has enough scheduling delay before the A-CSI-RS. |
| Huawei, HiSilicon | Ok with P3, P4.  For P5, it is still not so clear what is the designated cell.  For P6 and P7, sharing the feeling as Intel – a similar issue was discussed for DCI triggering SRS wherein a minimum triggering delay is defined. However, this might require new UE capabilities which is also not desirable. Perhaps it is acceptable for R16 to do some network restriction as the proposals stand. |
| Vivo | Fine with P3 and P4.  P5 seems not essential, and the TP does not serve the purpose well.  P6 and P7 seems not to resolve an issue, but to introduce additional scheduling restriction. Although we are fine to have processing relax for UE in general, we are not sure it is an essential fix in Rel-16. |
| CATT | We are OK with Proposals 3 and 4.  We are not clear if Proposal 5 would further clarify any behavior since “in the same slot” itself is not clear for cells with different numerology.  We don’t see the benefit of introducing Proposals 6 and 7. |
| Ericsson | P3 : OK in principle, however TP needs updating. Align to the if-then-else formulation for ca-slotOffset related text (…is given by A if ca-Slot offset is configured, else B…) in other parts (like in 5.1.2.1, 5.2.5.1.a)  P4 : TP needs revision. The new variables introduced in the formula must be defined and align to the if-then-else formulation. |
| Qualcomm | We are fine with P3 and P4.  For P5, the same issue exists in general for all cross-carrier scheduling/triggering relationship restrictions, e.g., for PDSCH mapping type B where the first symbol of the scheduling PDCCH is not expected to be after the first symbol of the scheduled PDSCH. Therefore, we think it is technically very hard to clarify this UA related issue everywhere in the spec. In the meanwhile, we understood that these timing relationship restrictions should take the UA condition into account.  For P6 and P7, we are supportive of the proposals. |
| MTK2 | For proposal 5, it seems the wording is not convincing enough for companies, while we are not able to come out with a better wording for now. Thus, maybe it can be revisited in the future if other companies also feel the need to clarify this or we got a good inspiration.  For Proposal 6 and 7, we agree with ZTE that a large PDCCH processing time is required between PDCCH and PDSCH for cross-carrier scheduling/triggering-ACSI with different numerologies. However, our intention is to **avoid the scenario** shown in figure below **which consumes additional UE power and buffering with a very late PDSCH/ACSI-RS triggered by a very close DCI in another carrier**.    To make possible progress, we can accept to narrow down the scenario to same SCS by the following Proposal 6’ and 7’:  **Proposal 6’: Add the following text to the starting paragraph of 38.214 5.1**  If the frame boundaries of the scheduled and scheduling cell are not aligned, and the SCS of scheduling cell is equal to the SCS of scheduled cell, the UE does not expect that the beginning of the slot containing a PDSCH is before the beginning of the slot carrying its scheduling DCI.  **Proposal 7’:** **Add the following text to the starting paragraph of 38.214 5.2.1.5.1**  If the frame boundaries of the triggered and triggering cell are not aligned, and the SCS of triggering cell is equal to the SCS of triggered cell, the UE does not expect that the beginning of the slot containing an aperiodic CSI-RS is before the beginning of the slot carrying its triggering DCI. |

## 2.4 XCC: Proposed changes in R1-2105918 to 38.214

Correction of the subscript when referencing the SCS of a PDSCH in the section 5.5 of TS38.214 as below:

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| This clause applies only if the PDCCH carrying the scheduling DCI is received on one carrier with one OFDM subcarrier spacing (µPDCCH), and the PDSCH scheduled to be received by the DCI is on another carrier with another OFDM subcarrier spacing (µPDSCH). |

**Moderator proposal:** Agree to the proposed changes and introduce them in the 38.214 editor’s alignment CR in thread 105-e-NR-AlignmentCRs-38214].

Please provide your comments to the table below

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| **Company** | **Comment** |
| MTK | Support |
| ZTE | Ok with the moderator proposal. |
| Intel | Support |
| Huawei, HiSilicon | Y |
| vivo | Support |
| CATT | Support |
| Ericsson | OK |
| Qualcomm | Support |

## 2.5 Summary of round 1

**Tx Moderator proposal:** Agree to the proposed changes in R1-2104324 and introduce them in TS36.212 and TS36.213

* Wide support for the changes.
* The change of *subframeAssignment-r15* to *tdm-PatternConfig* in 38.212 subclauses 5.2.2.6, 5.2.3.1 and several of its subclauses and in 38.213 sections 5.1, 6, 8, 8.3, 9 and 10 for EN-DC is a change that would be needed in Rel-15 as well.

**PC1 Moderator proposal:** Agree to the proposed changes in R1-2104475 to 38.213 subclause 7.6.2 and introduce them in the 38.213 editor’s alignment CR in thread 105-e-NR-AlignmentCRs-38213].

* Unanimously agreed

**UA Moderator proposal:** Discuss the five change proposals R1-2105375 to TS38.214 and if agreeable adopt them to TS382.214

* **P3/P4:** Agree in principle, some TP revisions suggested, to be taken up in round#2
* **P5:** The need for this was not shared by anyone but the proponent. will not take up in Round#2
* **P6/P7:** Discuss further the updated proposals in MTK2 comment.

**XCC Moderator proposal:** Agree to the proposed changes R1-2105918 to 38.214 subclause 5.5 and introduce them in the 38.214 editor’s alignment CR in thread 105-e-NR-AlignmentCRs-38214].

* Unanimously agreed

# 3 Round 2 of discussion

## 3.1 1Tx: Proposed changes in R1-2104324 to LTE 36.212/213

In the 1st round there was quite a good support for the changes, but it was also noted that the update of the *subframeAssignment-r15* to *tdm-PatternConfig* in EN-DC impacting parts of the spec and should be taken from Rel-15 onwards.

**Tx Moderator proposal v2:** Agree to the proposed changes in R1-2104324 and introduce them in Rel-16 TS36.212 and Rel-16 TS36.213. Request the 38.212 and 3.213 spec editors to take the *subframeAssignment-r15* to *tdm-r15* change to Rel-15

Please provide your comments on the proposal to the table below

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| **Company** | **Comment** |
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## 3.2 Void

## 3.3 UA: Proposed changes in R1-2105375 to TS38.214

**UA Moderator proposal v2:** Discuss the updated TPs of P3/P4/P6/P7 of R1-2105375 to TS38.214 and if agreeable adopt them to TS382.214

* **P3/P4:** Agree in principle, some TP revisions suggested, to be taken up in round#2
  + Ericsson suggests revisiting the current structure so that these descriptions are better aligned with the descriptions elsewhere in the specs (like in 5.1.2.1, 5.2.5.1a).

🡺 Moderator proposal: Do not do that as the structure alignment would lead to more intrusive spec change

* + Introduced a reference to the offset definitions to P3 and P4 as suggested by Ericsson
* **P6/P7:** Discuss further the updated proposals in MTK2 comment.

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| **Proposal 3: Adopt the following text in 38.214 5.2.1.5.1 “Aperiodic CSI Reporting/Aperiodic CSI-RS when the triggering PDCCH and the CSI-RS have the same numerology”:**  The aperiodic CSI-RS is transmitted in a slot , , if UE is configured with *ca-SlotOffset* for at least one of the triggered and triggering cell, and in slot , otherwise, and where  *- n* is the slot containing the triggering DCI, *X* is the CSI-RS triggering offset according to the higher layer parameter *aperiodicTriggeringOffset* or *aperiodicTriggeringOffset-r16*,  *-* and are the and the which are determined by higher-layer configured *ca-SlotOffset* for the cell receiving the PDCCH, and are the and the which are determined by higher-layer configured *ca-SlotOffset* for the cell transmitting the CSI-RS respectively, as defined in [4, TS 38.211] clause 4.5.  **Proposal 4: Adopt the following text in 38.214 5.2.2.5 “CSI reference resource definition”:**   * In the time domain, the CSI reference resource for a CSI reporting in uplink slot *n’* is defined by a single downlink slot *n*-*nCSI\_ref*,   - where  and and  are the subcarrier spacing configurations for DL and UL, respectively, and the and the are determined by higher-layer configured *ca-SlotOffset* for the cells transmitting the uplink and downlink, as defined in clause 4.5 of [4, TS 38.211]  **Proposal 6’: Add the following text to the starting paragraph of 38.214 5.1**  If the frame boundaries of the scheduled and scheduling cell are not aligned, and the SCS of scheduling cell is equal to the SCS of scheduled cell, the UE does not expect that the beginning of the slot containing a PDSCH is before the beginning of the slot carrying its scheduling DCI.  **Proposal 7’:** **Add the following text to the starting paragraph of 38.214 5.2.1.5.1**  If the frame boundaries of the triggered and triggering cell are not aligned, and the SCS of triggering cell is equal to the SCS of triggered cell, the UE does not expect that the beginning of the slot containing an aperiodic CSI-RS is before the beginning of the slot carrying its triggering DCI. |

Please provide your comments on the proposaled 4 TPs to the table below

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| **Company** | **Comment** |
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## 3.4 Void

## 3.5 Summary of round 2