3GPP TSG-RAN WG2 Meeting #111e Tdoc draft R2-200xxxx

**17-28 August 2020**

**Source: Ericsson (Email discussion rapporteur)**

**Title: [POST111e][112][eMIMO] RRC Corrections (Ericsson)**

**Agenda Item: 6.13.2**

**Document for: Discussion**

# 1 Introduction

This discussion is for RRC corrections for eMIMO WI:

* [POST111e][112][eMIMO] RRC Corrections (Ericsson)

Scope: 1. Continue the discussion on the CRs to correct the number of CORESETs per BWP and check if a LS to RAN1 is needed. 2. Discuss the late incoming LS in [R2-2008609](file:///C%3A%5CData%5C3GPP%5CRAN2%5CInbox%5CR2-2008609.zip), attempt to draft a reply LS and check if a CR is needed in RAN2

Intended outcome: Agreeable CRs and (reply) LS(s) to RAN1

Deadline: 1-week

The discussion is organized as follows. In Section 2 Part 1 and in Section 3 Part 2.

# 2 Part 1: Number of coresets per UE

Rel-16 UE capabilities are currently discussed in [Post111-e][015][NR16] UE Capabilities (Intel, NTT Docomo), where the below is in the draft of R2-2008119 (TS 38.306) and draft of R2-2008118 (TS 38.331):

| **Definitions for parameters** | **Per** | **M** | **FDD-TDD****DIFF** | **FR1-FR2****DIFF** |
| --- | --- | --- | --- | --- |
|  |  |  |  |  |
|  |  |  |  |  |
| ***multiDCI-MultiTRP-r16***Indicates whether the UE supports multi-DCI based multi-TRP and support of fully/partially overlapping PDSCHs in time and non-overlapping in frequency. The capability signalling contains the following:* *maxNumberCORESET-r16* indicates maximum number of CORESETs configured per BWP per cell in addition to CORESET 0.
* *maxNumberCORESETPerPoolIndex-r16* indicates maximum number of CORESETs configured per CORESETPoolIndex per BWP per cell in addition to CORESET 0.
* *maxNumberUnicastPDSCH-PerPool-r16* indicates maximum number of unicast PDSCHs per CORESETPoolIndex per slot.

Note: A UE may assume that its maximum receive timing difference between the DL transmissions from two TRPs is within a CPNote: Processing capability 2 is not supported in any CC if at least one CC is configured with two values of CORESETPoolIndex | FSPC | No | N/A | N/A |

#### FeatureSetDownlinkPerCC

The IE *FeatureSetDownlinkPerCC* indicates a set of features that the UE supports on the corresponding carrier of one band entry of a band combination.

*FeatureSetDownlinkPerCC* information element

-- ASN1START

-- TAG-FEATURESETDOWNLINKPERCC-START

FeatureSetDownlinkPerCC ::= SEQUENCE {

 supportedSubcarrierSpacingDL SubcarrierSpacing,

 supportedBandwidthDL SupportedBandwidth,

 channelBW-90mhz ENUMERATED {supported} OPTIONAL,

 maxNumberMIMO-LayersPDSCH MIMO-LayersDL OPTIONAL,

 supportedModulationOrderDL ModulationOrder OPTIONAL

}

FeatureSetDownlinkPerCC-16xy ::= SEQUENCE {

 -- R1 16-2a: Mulit-DCI based multi-TRP

 multiDCI-MultiTRP-r16 MultiDCI-MultiTRP-r16 OPTIONAL,

 -- R1 16-2b-3: Support of single-DCI based FDMSchemeB

 supportFDM-SchemeB-r16 ENUMERATED {supported} OPTIONAL

}

MultiDCI-MultiTRP-r16 ::= SEQUENCE {

 maxNumberCORESET-r16 ENUMERATED {n2, n3, n4, n5} OPTIONAL,

 maxNumberCORESETPerPoolIndex-r16 INTEGER {1..3}, OPTIONAL,

 maxNumberUnicastPDSCH-PerPool-r16 SEQUENCE {

 scs-15kHz ENUMERATED {n1, n2, n3, n4, n7} OPTIONAL,

 scs-30kHz ENUMERATED {n1, n2, n3, n4, n7} OPTIONAL,

 scs-60kHz ENUMERATED {n1, n2, n3, n4, n7} OPTIONAL,

 scs-120kHz ENUMERATED {n1, n2, n3, n4, n7} OPTIONAL

 }

}

-- TAG-FEATURESETDOWNLINKPERCC-STOP

-- ASN1STOP

Points raised during the RAN2#111 discussions:

1)

The CORESET ID space in 6.1.3.15 TCI State Indication for UE-specific PDCCH MAC CE limits the total number of CORESETs to 16:

- CORESET ID: This field indicates a Control Resource Set identified with *ControlResourceSetId* as specified in TS 38.331 [5], for which the TCI State is being indicated. In case the value of the field is 0, the field refers to the Control Resource Set configured by *controlResourceSetZero* as specified in TS 38.331 [5]. The length of the field is 4 bits;

Thus the question raises that is there a need to state this limit in 38.331 or 38.306.

*Q1 How to limit the total number of CORESETs per UE as the MAC CE supports only 16 and 5 CORESETs per BWP can be up to 20 CORESET per UE?*

|  |  |
| --- | --- |
| Company | **Answer, also note if you suggest the change to be agreed now or discussed in next meeting** |
| Ericsson | ***multiDCI-MultiTRP-r16***Indicates whether the UE supports multi-DCI based multi-TRP and support of fully/partially overlapping PDSCHs in time and non-overlapping in frequency. The capability signalling contains the following:* *maxNumberCORESET-r16* indicates maximum number of CORESETs configured per BWP per cell in addition to CORESET 0. Total number of CORESETs per cell is 16.
* *maxNumberCORESETPerPoolIndex-r16* indicates maximum number of CORESETs configured per CORESETPoolIndex per BWP per cell in addition to CORESET 0.
* *maxNumberUnicastPDSCH-PerPool-r16* indicates maximum number of unicast PDSCHs per CORESETPoolIndex per slot.

Note: A UE may assume that its maximum receive timing difference between the DL transmissions from two TRPs is within a CPNote: Processing capability 2 is not supported in any CC if at least one CC is configured with two values of CORESETPoolIndexOk to agree now. |
| Huawei | We are not sure what the intention of this sentence is.The definition of ControlResourceSetId includes the following sentence: "The ID space is used across the BWPs of a Serving Cell." This implies that the value range of ControlResourceSetId already limits the number of CORESETs per serving cell. That value range is 0 t 11 in Rel-15 and 0 to 15 Rel-16, so there is a limit of 16 CORESETs per serving cell already in TS 38.331 and there is no need to replicate that limit in 38.306.So this sentence seems unnecessary, unless there is another motivation? |
| Samsung | We tend to agree the Huawei’s comment that the restriction of the maximum number of CORESETs is the area of configuration and it is already defined in the current specification. For capability aspect, this restriction seems not needed. |
| ZTE | Share the same view with HW and Samsung. |
| Qualcomm | Same view with Huawei. It is already in 38331. So, un-necessary to add it in capability spec. |
| Nokia, Nokia Shanghai Bell | No strong view – we think the text is correct as such, as UEs are required to support the 16 CORESETs per cell, but the language is perhaps not the clearest. |
| OPPO | Agree with Huawei. It is already clear in TS 38.331. |

Companies view is that "The ID space is used across the BWPs of a Serving Cell." already implies that the value range of ControlResourceSetId already limits the number of CORESETs per serving cell and no further specification change is needed.

Conclusion from 1) is **no further action is needed.**

2)

Whether the values in multiDCI-MultiTRP-r16 could apply to a BWP where multi DCI multi TRP transmission is not configured. However, in principle capability is what UE promises to support and we can explicitly tie that support to what is configured.

*Q2 Companies view on whether and how to limit the values in multiDCI-MultiTRP-r16 only to BWPs where mTRP is configured?*

|  |  |
| --- | --- |
| Company | **Answer, also note if you suggest the change to be agreed now or discussed in next meeting** |
| Ericsson | ***multiDCI-MultiTRP-r16***Indicates whether the UE supports multi-DCI based multi-TRP and support of fully/partially overlapping PDSCHs in time and non-overlapping in frequency. The capability signalling contains the following:* *maxNumberCORESET-r16* indicates maximum number of CORESETs configured per BWP per cell in addition to CORESET 0.
* *maxNumberCORESETPerPoolIndex-r16* indicates maximum number of CORESETs configured per CORESETPoolIndex per BWP per cell in addition to CORESET 0.
* *maxNumberUnicastPDSCH-PerPool-r16* indicates maximum number of unicast PDSCHs per CORESETPoolIndex per slot.

Note: A UE may assume that its maximum receive timing difference between the DL transmissions from two TRPs is within a CPNote: Processing capability 2 is not supported in any CC if at least one CC is configured with two values of CORESETPoolIndexNote: multiDCI-MultiTRP-r16 values apply only to BWPs where two values of CORESETPoolIndex is configured.Ok to agree now. |
| Huawei | Ok to agree now but remove “Note:” and change “is” to “are” |
| Samsung | We are fine for the intention of this change and suggested change by Huawei is also ok. |
| ZTE | OK with the suggestion from HW |
| Intel | Ok with the change.  |
| Qualcomm | OK to agree now. |
| Nokia, Nokia Shanghai Bell | Ok to agree this part, and agree with Huawei that “Note:” can be removed from the text, so the added text would be:“The *multiDCI-MultiTRP-r16* values apply only to BWPs where two values of CORESETPoolIndex are configured.” |
| OPPO | OK with the change. |

Companies view is to add “The multiDCI-MultiTRP-r16 values apply only to BWPs where two values of CORESETPoolIndex are configured.” For multiDCI-MultiTRP-r16 field description in 38.306. However, as the baseline assumed in this email discussion is actually a drfta phase CR in parallel email discussion 015, it is not possible to have a CR. Thus, suggestion is to capture this as RAN2 conclusion from this email discussion and treat as input in capability discussion in RAN2#112.

Conclusion from 2) is

RAN2 to include “The multiDCI-MultiTRP-r16 values apply only to BWPs where two values of CORESETPoolIndex are configured.” For multiDCI-MultiTRP-r16 field description in 38.306.

3)

Whether there is any requirement for the UE in how to (not) include multipleCORESET and (the contents of) multiDCI-MultiTRP-r16.

*Q3 Companies view on whether and how to limit UE to not to include multipleCORESET and the multiDCI-MultiTRP-r16?*

|  |  |
| --- | --- |
| Company | **Answer, also note if you suggest the change to be agreed now or discussed in next meeting**. |
| Ericsson | ***multiDCI-MultiTRP-r16***Indicates whether the UE supports multi-DCI based multi-TRP and support of fully/partially overlapping PDSCHs in time and non-overlapping in frequency. The capability signalling contains the following:* *maxNumberCORESET-r16* indicates maximum number of CORESETs configured per BWP per cell in addition to CORESET 0.
* *maxNumberCORESETPerPoolIndex-r16* indicates maximum number of CORESETs configured per CORESETPoolIndex per BWP per cell in addition to CORESET 0.
* *maxNumberUnicastPDSCH-PerPool-r16* indicates maximum number of unicast PDSCHs per CORESETPoolIndex per slot.

UE does not report multipleCORESET if multiDCI-MultiTRP-r16 reported.Note: A UE may assume that its maximum receive timing difference between the DL transmissions from two TRPs is within a CPNote: Processing capability 2 is not supported in any CC if at least one CC is configured with two values of CORESETPoolIndexOk to agree now. |
| Huawei | Ericsson's proposal implies that a UE that supports multiDCI-MultiTRP-r16 can only be configured with a single CORESET when multi TRP transmission is not used, so support of this feature would degrade UE capability in a Rel-15 network. Of course we should not do that.We think that a UE which indicates a value of maxNumberCORESET-r16 greater than or equal to 3 should indicate support of multipleCORESET.Other than that, we don't see any constraint, the two capabilities are independent. |
| Samsung | We share the view from Huawei, this restriction seems not needed.How about change the code points of maxNumberCORESET-r16 as below? maxNumberCORESET-r16 ENUMERATED {~~n2, n3,~~ n4, n5} OPTIONAL,From our understanding the legacy Rel-15 capability (i.e. multipleCORESET) is intended to the signal the maximum number of CORESETs up to 3. Then we can jointly use these two capabilities in Rel-16. [SAM2] After checking our RAN1, the legacy multipleCORESET can indicate the support of 3 CORESETs per BWP, so some further restrictions are needed if we use the current ASN.1 for maxNumberCORESET-r16 (i.e. not removing n2, n3).Alt1: NOTE: if multipleCORESET is present UE don’t report value “n2” for maxNumberCORESET-r16.Alt2: Just removing “n2” from this field. |
| ZTE | We also share the same view with HW, the two capabilities are independent. |
| Intel | We also have same understanding as HW i.e. two capabilities are independent. Regarding Samsung’s suggestion, we are not sure if we can remove candidate values without consulting with RAN1.  |
| Qualcomm | We don’t think this change is needed. The FG 16-2a (multi-DCI based mTRP) is per FSPC while Rel. 15 FG 3-3 (multipleCORESET) is per UE. So, Rel. 15 FG 3-3 should still be reported for CCs that UE does not indicate the support of multi-DCI. |
| Nokia, Nokia Shanghai Bell | Agree with Huawei that this change is not needed since it would not even be compatible with Rel-15. Normally a later release capability never “degrades” earlier release capability indicates to ensure that e.g. a gNB only utilizing Rel-15 features need not comprehend Rel-16 capabilities.As for Samsung proposal on removing possible values from the field, since this is coming very suddenly during post-meeting email discussion, we cannot agree to such change now. Better come back in the next meeting with proper contribution and discuss how to handle this issue. Generally, we agree with Intel that voiding values (even via field description) requires RAN1 LS. |
| OPPO | Same view with Huawei. There is no need to bundling the two capabilities.  |

4) It was pointed out that RAN1 is still discussing the below item:

 (C&P from RAN1 Session Notes of AI 7.2.11)

Note**:** RAN1 will continue discussing how the network will interpret the signaled maximum number of CORESETs in components (1) and (2) (i.e., candidate value 5 for component (1) and candidate value 3 for component (2)) of FG 16-2a, e.g., when CORESET #0 is not configured

To us this discussion point looks like it is limited to the case when CORESET #0 is not configured and that the case when CORESET#0 is configured is stable. Given the above, we would like to ask companies views on the wording for below TP.

-------------------------------------------------start TP 38.306------------------------------------------------------------------------------------------------------------

| multipleCORESETIndicates whether the UE supports configuration of up to three PDCCH CORESET per BWP in addition to the CORESET with CORESET-ID 0 in the BWP, see also TS 38.213 [13]. It is mandatory with capability ignalling for FR2 and optional for FR1. | UE | CY | No | **Yes** |
| --- | --- | --- | --- | --- |

-------------------------------------------------end TP 38.306------------------------------------------------------------------------------------------------------------

*Q4 Companies view on the above TP for Rel 16 or for Rel 15 ?*

|  |  |
| --- | --- |
| Company | Answer |
| Ericsson | Ok to agree now with the above TP for both releases. |
| Huawei | The quoted discussion is for the new Rel-16 UE capability, it is unrelated to the legacy capability and it is not clear to us why any such change would be needed. |
| Samsung | The current text is not enough if we introduce Rel-16 capability (i.e. multiDCI-MultiTRP-r16), so it would be better to clarify the clear description on this capability. We are fine for the suggested change from Ericsson, this text can be applied all cases.[SAM2] After checking with our RAN1, if this capability is set, it means UE support total 3 CORESETs per BWP including CORESET#0. So we additionally suggest to remove “in addition to the CORESET with CORESET-ID 0 in the BWP” . |
| ZTE | OK with the suggested change from Ericsson |
| Intel | Ok to agree for now.  |
| Qualcomm | Same view with Huawei. We don’t think this Rel-15 change is needed. If we do change this way, it seems there would be no UE Rel-15 capability for supporting 2 CORESETs in addition to CORESET 0. Whether should introduce another new FG for Rel-15, so that up to 2 vs up to 3 can be distinguished, should be discussed in RAN1.• FG 3-1 (which is mandatory w/o capability ignalling) requires “One configured CORESET per BWP per cell in addition to CORESET0”• FG 3-3 (multipleCORESET) becomes up to 3 CORESETs in addition to CORESET0In our view, it is different from the Rel-16 multi-DCI based Mtrp, there is no issue as UE indicates the number as part of UE capability for Rel-16 multiDCI-MultiTRP-r16. But Rel-15 legacy FG 3-1, 3-2 cannot do the same way.1. The maximum number of CORESETs configured per BWP per cell in addition to CORESET 0

Component 1: Candidate values {2, 3,4,5} |
| Nokia, Nokia Shanghai Bell | Postpone: We are OK with the Ericsson change, but we understand the concerns from Huawei and QC about Rel-15 capability being affected. Hence, perhaps it would be wisest to postpone this topic? |
| OPPO | We share same view as Huawei and QC. And it seems companies have different views on whether the maximal number of coresets can be configured per BWP is **4** (3 CORESETs per BWP excluding coreset#0) or **3** (3 CORESETs per BWP including coreset#0). We may need further input from RAN1. |

5) LS to RAN1

*Q2 Is there a need for LS to RAN1 about the number discussion points of Part 1?*

|  |  |
| --- | --- |
| Company | Answer |
| Ericsson | Not identified so far |
| Huawei | If there are divergent opinions on Q2 and Q3, we may need to ask RAN1 for advice but let's what others say ☺ |
| Samsung | No need to send LS from our understanding. |
| ZTE | No LS |
| Intel | No LS |
| Qualcomm | See our comments in Q4. If companies have different understanding on whether the max 3 CORESETs include or in addition to CORESET ID 0 for the Rel-15 legacy capability, LS to RAN1 is needed. |
| Nokia, Nokia Shanghai Bell | Not yet (but maybe in the next meeting): It seems all the RAN1-related topics could be postponed to next meeting to allow time for further checking (since there may be even Rel-15 impacts). |
| OPPO | LS is needed for clarification. |

# 3 Part 2: Discuss the late incoming LS in [R2-2008609](file:///C%3A%5CData%5C3GPP%5CRAN2%5CInbox%5CR2-2008609.zip)

The LS in R2-2008609 contains the following question:

In RAN1#102-e meeting, RAN1 discussed on whether/how to support the feature of multi-CC simultaneous TCI activation for PDSCH with the two features specified for multi-TRP/panel transmission, i.e. single DCI based and multi-DCI based multi-TRP/panel transmission, respectively. In the case of multi-DCI, a sentence ‘Network should not configure serving cells that are configured with CORESETPoolID=1 in these lists.’ is found from *CellGroupConfig* IE in TS38.331 and made a following conclusion accordingly.

|  |
| --- |
| **Conclusion (RAN1#102-e)**- By RRC configuration, each CC list cannot include a CC/BWP in which two CORESET pools are configured. |

In the case of single DCI based multi-TRP/panel transmission, companies think that clarification from RAN2 is needed on whether/how this can be operated together with the feature of multi-CC simultaneous TCI activation. Switching between single DCI based multi-TRP/panel and single TRP/panel is controlled by MAC-CE, not by RRC. From RRC configuration perspective, therefore, it seems possible to include a CC/BWP being operated with single DCI based multi-TRP/panel in the CC list, and it seems that the new MAC-CE introduced for supporting single DCI based multi-TRP/panel, i.e. Enhanced TCI States Activation/Deactivation for UE-specific PDSCH MAC CE, applies to one specific CC/BWP even in the case when the CC/BWP is included in the CC list by RRC configuration.

**Question:** Is the following understanding is correct?

* By current RAN2 specification, it is not precluded to enable single DCI based multi-TRP/panel operation in one or more CC(s)/BWP(s) included in *simultaneousTCI-UpdateList1* or *simultaneousTCI-UpdateList2* by using Enhanced TCI States Activation/Deactivation for UE-specific PDSCH MAC CE.

The LS refers to these lists:

|  |
| --- |
| ***simultaneousTCI-UpdateList1, simultaneousTCI-UpdateList2***List of serving cells which can be updated simultaneously for TCI relation with a MAC CE. The *simultaneousTCI-UpdateList1* and *simultaneousTCI-UpdateList2* shall not contain same serving cells. Network should not configure serving cells that are configured with CORESETPoolID=1 in these lists. |
| ***simultaneousSpatial-UpdatedList1, simultaneousSpatial-UpdatedList2***List of serving cells which can be updated simultaneously for spatial relation with a MAC CE. The *simultaneousSpatial-UpdatedList1* and *simultaneousSpatial-UpdatedList2* shall not contain same serving cells. Network should not configure serving cells that are configured with CORESETPoolID=1 in these lists. |

In RAN2#109 RAN2 concluded:

Agreements:

1. UE is configured with CORESETPoolIndex only if it support (assumed) mPDCCH mTRP capability
2. rephrase the existing condition into  "If the field is absent, the UE applies the value 0." in the CORESETPoolIndex field description
3. Agree on the TP in Appendix A for the dmrs-Downlink and dmrs-Uplink field descriptions
4. lte-CRS-PatternList-r16 and lte-CRS-PatternListSecond-r16 should be placed under ServingCellConfig
5. Agree with the proposed change

      a) Change the signalling of maxNrofPorts from ENUMERATED {n2} to ENUMERATED {n1,  n2}

      b) add the condition when n2 can be selected in the field description: 2 PT-RS ports can only be configured for single-PDCCH based multi-TRP operation.

1. Agree with the proposed change for slotBased: "Configures UE with slot-based repetition scheme. Network always configures this field when the parameter repetitionNumber is present in IE PDSCH-TimeDomainResourceAllocationList"
2. If nrofReportedRSForSINR is used only with quantityConfig-r16, RAN2 to agree as baseline the REVISED TP in Appendix A for the nrofReportedRS-ForSINR in CSI-ReportConfig.
3. Agree proposals 9 and10 in the report (i.e. not to change anything based on the issues raised)

However, seems RAN1 specified in 38.213 that CORESETPoolIndex can be configured for mTRP sPDCCH and to have mTRP mPDCCH the CORESETPoolIndex should have two different values

For each DL BWP configured to a UE in a serving cell, the UE can be provided by higher layer signalling with

-    $P\leq 3$ CORESETs if *CORESETPoolIndex* is not provided, or if a value of *CORESETPoolIndex* is same for all CORESETs if *CORESETPoolIndex* is provided

-    $P\leq 5$ CORESETs if *CORESETPoolIndex* is not provided for a first CORESET, or is provided and has a value 0 for a first CORESET, and is provided and has a value 1 for a second CORESET

As RAN2 would follow RAN1 intention for these lists of serving cell it is suggested to change the wording according to below TP and to inform RAN1 about the change.

-------------------------------------------------start TP 38.331------------------------------------------------------------------------------------------------------------

|  |
| --- |
| ***simultaneousTCI-UpdateList1, simultaneousTCI-UpdateList2***List of serving cells which can be updated simultaneously for TCI relation with a MAC CE. The *simultaneousTCI-UpdateList1* and *simultaneousTCI-UpdateList2* shall not contain same serving cells. Network should not configure serving cells that are configured with a BWP with two different values for the CORESETPoolID in these lists. |
| ***simultaneousSpatial-UpdatedList1, simultaneousSpatial-UpdatedList2***List of serving cells which can be updated simultaneously for spatial relation with a MAC CE. The *simultaneousSpatial-UpdatedList1* and *simultaneousSpatial-UpdatedList2* shall not contain same serving cells. Network should not configure serving cells that are configured with a BWP with two different values for the CORESETPoolID in these lists. |

-------------------------------------------------end TP 38.331------------------------------------------------------------------------------------------------------------

**Proposal 1 Agree to refer to above TP and reply RAN1 with the change made and that with the change, TS38.331 seems aligned with RAN1 conclusions.**

*Q6 Please indicate if you support proposal1*

|  |  |
| --- | --- |
| Company | Answer |
| Ericsson | yes |
| Huawei | The proposed change is desirable to align 38.331 with 38.213 with respect to characterization of multi-DCI multi-TRP transmission but does not address the point raised by RAN1.In our understanding, the switch between single DCI based multi-TRP/panel and single TRP/panel is not directly controlled by MAC CE, it is controlled by the DCI Transmission Configuration Indication field, whose values may correspond to either one TCI state or two TCI states.Update of the mapping of 1 or 2 TCI states with each value of the DCI Transmission Configuration Indication field (for which 38.321 uses the pedantic word "codepoint") can only be done using the "Enhanced TCI States Activation/Deactivation for UE-specific PDSCH MAC CE" for which simultaneousTCI-UpdateList1/2 is not applicable according to 38.321 clauses 5.8.14 and 6.1.3.24.If a cell for which that MAC CE is used is listed in simultaneousTCI-UpdateList1/2, receiving the "TCI States Activation/Deactivation for UE-specific PDSCH MAC CE" addressed to the first serving cell in the same list will map all values of the DCI Transmission Configuration Indication field to a single DCI field, i.e. the transmission can only be single TRP from then on.Then, if the network wishes to use multi TRP transmission again, it needs to use the "Enhanced TCI States Activation/Deactivation for UE-specific PDSCH MAC CE" for that cell, and also for any cell that wants to use multi-TRP transmission, in order to map certain values of the DCI Transmission Configuration Indication field to 2 TCI states.In that sense, it is indeed not precluded to use the "Enhanced TCI States Activation/Deactivation for UE-specific PDSCH MAC CE" for a cell included in simultaneousTCI-UpdateList1/2.A sentence such as "The Enhanced TCI States Activation/Deactivation for UE-specific PDSCH MAC CE can be used with cells included in simultaneousTCI-UpdateList1/2" could be added but it seems to fit better in 38.321, e.g. clause 5.8.14 or 6.1.3.24. |
| Samsung | We also think the main question from RAN1 is whether the current specification supports simultaneous CC activation in case of single-PDCCH based mTRP. However, RAN2 has not discussed this issue and it is not supported now according to the current specification.The easiest way is adding the sentence in 38.321 e.g. clause 5.8.4 or 6.1.3.24 as Huawei suggested. |
| ZTE | Firstly, we are fine with Ericsson on the correction of 38.331.Secondly,regarding the suggestion from huawei, we think the HuaWei’s understanding on the intention from RAN1 is correct. However, based on the current spec, there is no any clues from which the case a serving cell supports the feature of single PDCCH mTRP also can be included in one serving cell list (i.e TCI-UpdateList1/2) is precluded . In our understanding, we may not have this sentence in 38.321 suggested from HW, we just confirm the understanding from RAN 1 is correct and do the correction on 38.331 suggested from Ericsson. |
| Qualcomm | The change from Ericsson seems not related to the questions in RAN1 LS directly.Regarding the proposed change from Ericsson, we agree the intention. But the change does not cover the ‘if *CORESETPoolIndex* is not provided case’. The TP only introduces ‘two different values for the CORESETPoolID’. It is better the text can be refined.Regarding the questions in RAN1 LS, based on RAN2 #109e agreements,1. If the CC indicated in the MAC CE is configured as part of a CC-list, this MAC CE applies to all the CCs in the CC list; otherwise, the MAC CE applies to single CC.
2. Multiple TRP case is not considered for MAC CEs regarding multiple CCs/BWPs, i.e. TCI States Activation/Deactivation for UE-specific PDSCH MAC CE and TCI State Indication for UE-specific PDCCH MAC CE.

If we strictly follow the RAN2 agreements, if the serving cell ID indicated in the Enhanced TCI States Activation/Deactivation for UE-specific PDSCH MAC CE is in one cc-list, we should discuss more what is the UE behaviour. If UE applies this MAC CE only for the indicated serving cell ID, it conflicts the agreement 1 above (because agreement 1 said ‘this MAC CE applies to all the CCs in the CC list’). If UE applies this MAC CE for all the CCs in the cc-list, it seems to conflict the agreement 2 above (because agreement 2 said ‘Multiple TRP case is not considered for MAC CEs regarding multiple CCs/BWPs).We believe more discussions are needed from RAN2 perspective and RAN2 spec needs clarification indeed. Since it somehow conflicts RAN2 agreements before (in our view), we suggest discussing it in the next RAN2 meeting.  |
| Nokia, Nokia Shanghai Bell | **Postpone to next meeting**: The question is quite complex, so while it’s fine to process simple questions even in post-meeting email discussions, but this one clearly requires some more RAN2 (online) discussion so we think this should be postponed to next meeting (i.e. no immediate LS reply to be sent). |
| OPPO | We are OK with the TP of TS 38.331, while we think the TP does not address the issue in LS form RAN1. We think more discussion is needed in RAN2 on how to capture the RAN1 conclusion.  |

# Summary

Part 1: Number of coresets per UE

1)

Companies view is that "The ID space is used across the BWPs of a Serving Cell." already implies that the value range of ControlResourceSetId already limits the number of CORESETs per serving cell and no further specification change is needed.

Conclusion from 1) is no further action is needed.

2)

Companies view is to add “The multiDCI-MultiTRP-r16 values apply only to BWPs where two values of CORESETPoolIndex are configured.” For multiDCI-MultiTRP-r16 field description in 38.306. However, as the baseline assumed in this email discussion is actually a draft phase CR in parallel email discussion 015, it is not possible to have a CR. Thus, suggestion is to capture this as RAN2 conclusion from this email discussion and treat as input in capability discussion in RAN2#112.

Conclusion from 2) is

RAN2 to include “The multiDCI-MultiTRP-r16 values apply only to BWPs where two values of CORESETPoolIndex are configured.” For multiDCI-MultiTRP-r16 field description in 38.306.

3)

Companies views and understanding on whether and how to limit UE to not to include multipleCORESET and the multiDCI-MultiTRP-r16 are quite diversing. Hence, it does not seem to be possible to agree anything in this 1-week email discussion.

Conclusion from 3) is to companies to consider the aspect and come back in next meeting whether a change or clarification is needed.

4) There is support to express the exact number of supported coresets in relation to capability signalling in TS 36.306 instead of relying other field description in TS 38.331 or description in TS 38.213. Exact change is not agreeable and input from RAN1 seems needed.

Part 2: Discuss the late incoming LS in [R2-2008609](file:///C%3A%5C%5CData%5C%5C3GPP%5C%5CRAN2%5C%5CInbox%5C%5CR2-2008609.zip%22%20%5Co%20%22C%3AData3GPPRAN2InboxR2-2008609.zip)

Some companies agree with the change in TS 38.331 to align with TS 38213 about the configuration of mTRP mPDCCH. For this a CR draft is provided. Further companies discuss that RAN2 has not discussed/concluded whether mTRP sPDCCH should be supported with these CC lists. However, here, RAN2 intention has been to align with RAN1 intention for the functionality. Suggestion is to explain that RAN2 will adopt the text to RAN1 functionality and ask RAN1 to confirm whether they intend to support mTRP sPDCCH.

**Overall outcome and suggested agreement:**

Agree to include “The multiDCI-MultiTRP-r16 values apply only to BWPs where two values of CORESETPoolIndex are configured.” For multiDCI-MultiTRP-r16 field description in 38.306. CR to be provided in next meeting in order to have baseline specification from next RAN meeting.

Agree with the draft CR to align with TS 38213 about the configuration of mTRP mPDCCH for the CC list as this is clear intention from RAN1.

Agree with LS to

* ask RAN1 the intention of mTRP and sPDCCH for the CC list
* ask RAN1 whether the max 3 CORESETs include or in addition to CORESET ID 0 for the Rel-15 legacy capability