**3GPP TSG RAN WG1 Meeting #106bis-e** **R1-21xxxxx**

**Oct 11th – Oct 19th, 2021**

**Agenda item: 8.2**

**Source: Rapporteur (Qualcomm Incorporated)**

**Title: Comments collection for RRC parameters for extending NR to 52.6-71GHz**

**Document for: Discussion and Decision**

# Introduction

This paper is a place holder to collect comments for RRC parameters for 60GHz work item. The RRC parameters are captured in the excel sheet in the same folder.

# Comments

## Initial access aspects

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| Company | View |
| Samsung  | For SSB SCS and PRACH SCS, it would be good to clarify with RAN2 for non-initial access case the configurable value can be from {120, 480, 960} and for initial access case the configurable value can be from {120, 480}, and RAN2 can further decide how to address this in their spec. Moderator: Added in comment for ssbSbucarrierSpacing-r17 |
| ZTE, Sanechips | In RAN plenary #92 e-meeting, RAN1 has agreed only one CORESTE#0 SCS supported for each SSB SCS, i.e., (120, 120) kHz, (480, 480) kHz and (960, 960) kHz. In other words, FR2-2 only support CORESTE#0 SCS same as SSB SCS. It is not necessary to use subCarrierSpacingCommon in *MIB* to indicate the SCS of CORESET#0. Although the new function of subCarrierSpacingCommon has not been determined, it is clear that its field description should be revised for FR2-2. Thus we think the existing parameter subCarrierSpacingCommon in *MIB* should be captured into Rel-17 RRC parameter table, as it will no longer be used to indicate the SCS of CORESET#0 in FR2-2.Agreement* In addition to 120kHz, support 480 kHz SSB for initial access with support of CORESET#0/Type0-PDCCH configuration in the MIB with following constraints:
* only 480kHz CORESET#0/Type0-PDCCH SCS supported for 480 kHz SSB SCS
* Support ANR and PCI confusion detection for 120, 480 and 960kHz SCS based SSB, support CORESET#0/ Type0-PDCCH configuration in MIB of 120, 480 and 960kHz SSB
* Only 1 CORESTE#0/Type0-PDCCH SCS supported for each SSB SCS, i.e., (120, 120), (480, 480) and (960, 960).

Moderator: Good point. Will add a new row. |
| Ericsson | For *prach-RootSequenceIndex-r16* and *prach-RootSequenceIndex-r16*, these parameters already allow configuration of length 139, 571, and 1151. The only update that is needed is for RAN2 to capture the restriction that 1151 is not supported for 480/960 kHz and L = 571 is not supported for 960 kHz (and maybe also 480 kHz depending on what is agreed). There are no SCS restrictions for L = 139. Hence Column P should be updated as follows:For *prach-RootSequenceIndex-r16:*~~When configured, allows PRACH length and root index for FR2-2 when 571 or 1151 sequence used~~Field description requires updating to capture that L = 1151 is not supported for SCS 480 and 960 kHz and L = 571 is not supported for 960 [and 480] kHz. ~~May not need to change the IE, but need to add in the note on the limitation to be used with SCS~~For *prach-RootSequenceIndex:*No update required to field description~~When configured, allows PRACH length and root index for FR2-2 when 139 sequence used.~~~~May not need to change the IE, but need to add in the note on the limitation to be used with SCS~~In fact, since there are no SCS restrictions for L = 139, can we just remove the row for *prach-RootSequenceIndex*?Moderator: Updated with some changes |
| Samsung | For the parameter included in RACH-ConfigCommon, it should be cell-specific;For the parameter included in MIB, it should be cell-specific;For the remaining with multiple locations, it can be either cell-specific or UE-specific depending on the location. Moderator: Updated |
| Huawei, HiSilicon | **Row 6, Column P:**Suggest to add the following two bullets from WID to below other agreements from WID for the sake of completeness. * 960 kHz numerology for the SSB is not supported by the UE for initial access in Rel-17.
* Note: 480 kHz is an optional SSB numerology for initial access for the UE. A UE supporting a band in 52.6-71 GHz must at least support 120 kHz SCS (for initial access and after initial access)

Moderator: Added |

## PDCCH monitoring enhancements

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## Enhancements for PUCCH formats 0/1/4

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| Company | View |
| Ericsson | Comment #1In AI 8.2.3, there is consensus on supporting Proposal #2 below which should be captured in the Comments column (Column P). The key discussion was that the # of RBs should be configured per PUCCH resource. Furthermore, to enable this, there was common understanding in the discussion that the parent IE for RRC parameter for the # of RBs should be PUCCH-format0, PUCCH-format1, and PUCCH-format2 consistent with how the # of RBs is configured for PF2/3 in Rel-15:PUCCH-format2 ::= SEQUENCE { nrofPRBs INTEGER (1..16), nrofSymbols INTEGER (1..2), startingSymbolIndex INTEGER(0..13)}Hence we recommend changing the parent IE as follows:For nrofPRBs-PF0-r17: ~~PUCCH-Config~~ PUCCH-format0-r17For nrofPRBs-PF1-r17: ~~PUCCH-Config~~ PUCCH-format1-r17For nrofPRBs-PF4-r17: ~~PUCCH-Config~~ PUCCH-format4-r17**Proposal #2 (Number of RBs per PUCCH resource)*** Update the following RAN1#106-e agreement to clarfiy that the number of RBs can be configured separately per PUCCH resource

Update of RAN1#106-e Agreement:* Support an RRC parameter to configure the number of RBs ~~for a~~ per PUCCH resource for each of enhanced PUCCH formats 0, 1, and 4
* The parameter is provided by dedicated signaling (per UE) per BWP
* Update the description of the RRC parameter accordingly within the RRC parameter email thread

Moderator: Will update when the agreement is approved.Comment #2According to the guidelines for RRC parameters written by Sorour and distributed on the reflector (R1-2110415), Columns E and F should be blank. Instead, if RAN1 provides a recommendation for the parent IE, this should go in Column M.●Column E (RAN2 Parent IE): Should be left empty. Provide information on Parent IE in Column M, if needed.●Column F (RAN2 ASN.1 name): Should be left empty.This comment is relevant for all other parameters in the spreadsheet at well.Moderator: OkComment #3For Column J (Description), we think the following update is needed to be consistent with the above agreementNumber of PRB for the PF0 resource.Number of PRB for the PF1 resource.Number of PRB for the PF4 resource.Moderator: Will update when the agreement is approved.Comment #4Based on the above comments, the Notes in Column P should be removed. The 2nd note is not needed due to the above RAN1 agreement. The first note is not needed, since RAN2 always has the freedom to change where an RRC parameter is added. RAN1 only provides a recommendation, and above we recommend it goes in PUCCH-format-0/1/4.~~Note: RAN2 may need to determine eventually where this RRC parameter is added.~~~~Note: It is possible to put this in PUCCH resource, but RAN1 agreement is the # of RB is configured per format~~ |

## Beam management for new SCSs

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| Company | View |
| ZTE, Sanechips | In the ongoing RAN1#106bis e-meeting, RAN1 has agreed the following agreement and conclusion.Agreement:For maxNumberRxTxBeamSwitchDL, support 1, 4 and 7 as candidate values for 960 kHz in addition to the agreed candidate value 2.* Note: this is Alt-1 from the RAN1#106 agreement.

Conclusion:For candidate values of timeDurationForQCL, beamSwitchTiming and beamReportTiming, * No additional candidate values are supported for 120 kHz, 480 kHz and 960 kHz
* Note: this is Alt-1 from the RAN1#106 agreement.

For parameter *maxNumberRxTxBeamSwitchDL*, the value range should be updated to “960KHz: 1, 2, 4, 7~~FFS additional values~~”.In addition, above agreement and conclusion can be added/updated into the column “Comment” of the RRC parameter table.Moderator: Added |
| Ericsson | Agree with ZTE that an update is needed to be updated to capture new candidate values that have been agreed in this meetingOne question though: Is it clear already that RAN2 will add new candidate values to the existing Rel-15 capability parameters, or will RAN2 define new Rel-17 capability parameters?Moderator: That is not clear. RAN2 can decide and I guess they will.Perhaps a note should be included in Column J to this effect? |

## PDSCH/PUSCH enhancements

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| Company | View |
| Samsung | Since multi-PUSCH scheduling for 120kHz SCS is supported, “(WA)” in row 25 and column J should be removed.  |
| Ericsson | The parameter names should be changed as follows to be consistent with Rel-16:PUSCH-TimeDomainResourceAllocationListForMultiPUSCH-r17PDSCH-TimeDomainResourceAllocationListForMultiPDSCH-r17Also, according the guidelines from R1-2110415, the description in Column J should be detailed enough to serve as the field description for the parameter in 38.331:●Column J (description): Should be suitable as “field description” for the RRC specification. i.e. it should clarifywhat the UE does when the NW sets the field. Should e.g., contain the unit of the numerical values. Short andconcrete descriptions are preferred.Hence, copying from Rel-16 version of 38.331, the descriptions in Column J should be updated to something like the following:For PUSCH-TimeDomainResourceAllocationListForMultiPUSCH-r17:Configuration of the time domain resource allocation (TDRA) table for multiple PUSCH (see TS 38.214, clause X). The network configures at most [FFS: X] rows in this TDRA table in *PUSCH-TimeDomainResourceAllocationList-r17* configured by this field. This field is not configured simultaneously with *pusch-AggregationFactor*.For PDSCH-TimeDomainResourceAllocationListForMultiPDSCH-r17:Configuration of the time domain resource allocation (TDRA) table for multiple PDSCH (see TS 38.214, clause X). The network configures at most [FFS: X] rows in this TDRA table in *PDSCH-TimeDomainResourceAllocationList-r17* configured by this field. [This field is not configured simultaneously with *pdsch-AggregationFactor*.]Moderator: Adopted.Question: In column K, what is the intention of the following wording? This is pretty vague, and we suggest to remove it unless we have some idea of what other parameters are needed.FFS There may be other RRC parameters needed, left for RAN2 to decideModerator: Updated |
| vivo | Comment 1:RAN1 made the following agreements which require to define a new RRC parameter. For instance: *dmrs-FD-OCC-ForRank1PDSCH* applicable to 480 and 960 kHzAgreement:* For 480 kHz and/or 960 kHz SCS, for rank 1 PDSCH with type-1 or type-2 DMRS, support a configuration of DMRS where the UE is able to assume that FD-OCC is not applied.
* Note: “FD-OCC is not applied” refers to the UE may assume that a set of remaining orthogonal antenna ports are not associated with the PDSCH to another UE, wherein the set of remaining orthogonal antenna ports are within the same CDM group and have different FD-OCC
* Note: The same UE indication method is used for both type-1 and type-2 DMRS

Agreement:* Support an indication to the UE via RRC where the UE is able to assume that FD-OCC is not applied to all the antenna port(s) for DMRS which is(are) applicable for rank 1 PDSCH.

Comment 2:The value range of *k0-r17* inside *PDSCH-TimeDomainResourceAllocation-r17* is (0 .. 128) applicable to 480 and 960 kHzAgreement:For NR operation with 480 kHz and/or 960 kHz SCS, the value range of k0 is 0 ~ 128.Comment 3:The value range of *k2-r17* inside *PUSCH-TimeDomainResourceAllocation-r17* is (0 .. 128) applicable to 480 and 960 kHzAgreement:For NR operation with 480 kHz and/or 960 kHz SCS, the value range for k2 is 0 ~ 128.Moderator: Added |
| LG Electronics | Regarding Ericsson’s suggestion, we haven’t explicitly agreed yet whether slot aggregation and multi-PXSCH scheduling can be configured together or not. Therefore, until RAN1 agree, we suggest to remove relevant part, as follows:<Column J>For PUSCH-TimeDomainResourceAllocationListForMultiPUSCH-r17:Configuration of the time domain resource allocation (TDRA) table for multiple PUSCH (see TS 38.214, clause X). The network configures at most [FFS: N] rows in this TDRA table in PUSCH-TimeDomainResourceAllocationList-r17 configured by this field. For PDSCH-TimeDomainResourceAllocationListForMultiPDSCH-r17:Configuration of the time domain resource allocation (TDRA) table for multiple PDSCH (see TS 38.214, clause X). The network configures at most [FFS: N] rows in this TDRA table in PDSCH-TimeDomainResourceAllocationList-r17 configured by this field. Moderator: Removed |
| Ericsson2 | For PUSCH-TimeDomainResourceAllocationListForMultiPUSCH-r17 and For PDSCH-TimeDomainResourceAllocationListForMultiPdSCH-r17:Comment #1:Ee suggest to remove "in FR2-2" from the description in Column J. It has not been discussed yet whether multi-PUSCH and multi-PDSCH are applicable to FR2 in general, or to just FR2-2. This discussion will occur in the UE capability session. Hence, for now, this text should be removed or at least put in square brackets.Moderator: Added square bracketsComment #2:In Column K, I don't think we've agreed that RAN2 should decide how many rows are needed for the TDRA tables. I believe we should have that discussion in RAN1 first.Moderator: I was talking about the detailed design of the IE |
| vivo2 | Comment 1:The value range of *DL-DataToUL-ACK-r17* inside *PUCCH-Config* is (-1 .. 127) applicable to 480 and 960 kHzThe value range of *DL-DataToUL-ACK-DCI-1-2-r17* inside *PUCCH-Config* is (0 .. 127) applicable to 480 and 960 kHzAgreement:For NR operation with 480 kHz and/or 960 kHz SCS, the value range of k1 indicated in RRC is -1 ~ 127 for DCI format 1\_1 and 0 ~ 127 for DCI format 1\_2.* Note: this does not imply that DCI format 1\_2 supports multi-PDSCH scheduling

Comment 2:When the field k2 is absent, the UE applies the value 11 when PUSCH SCS is 480 kHz; and the value 21 when PUSCH SCS is 960 kHz for k2. Agreement:* For NR operation with 480 kHz and/or 960 kHz SCS, *j* = 11 for 480 kHz and *j* = 21 for 960 kHz for determination of the default PUSCH time domain resource allocation (in 38.214 Section 6.1.2.1.1).
* When the field k2 is absent in RRC, the UE applies the value 11 when PUSCH SCS is 480 kHz; and the value 21 when PUSCH SCS is 960 kHz for k2.
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## Channel access mechanism

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| Huawei, HiSilicon | **Row 28 Column J and Row 29 Column J**The naming “switch between LBT and no-LBT mode” could be confusing, as it may imply an RRC parameter that configures a dynamic switch indication in a DCI. This should just be a semi-static configuration of LTE or no-LBT mode. “switching” should only be by RRC re-configuration. So we suggest changing the description to “Configuration of LBT and no-LBT mode”Moderator: Updated |

## Others

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