**3GPP TSG RAN WG1 Meeting #106-e** **R1-210xxxx**

**August 16th – August 27th, 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 |
| vivo | For the Subcarrierspacing, there are two methods to introduce new SCS 480K and 960KHz:Alt. 1: Introduce new parameter SubcarrierSpacing-r17 Alt. 2: Use spare entry in legacy parameter SubcarrierSpacing as mentioned in the comment part. If Alt. 1 is adopted as proposed in the Excel, new r17 parameters need to be introduced for all IEs corresponding to legacy SubcarrierSpacing besides current listed subcarrierSpacing-r17 in BWP and msg1-SubcarrierSpacing-r17 in RACH-ConfigCommon. There are many places which need to be updated, e.g. msg1-SubcarrierSpacing in *BeamFailureRecoveryConfig,* subcarrierSpacing in *CSI-RS-ResourceConfigMobility* and etc.If Alt. 2 is adopted, there is no need to introduce new parameter for most of the IEs.For msg1-SubcarrierSpacing in RACH-configCommon, it is conditional mandatory when L=139 (otherwise absent) as shown below. For L=571/1151, a new IE is needed to indicate PRACH SCS.msg1-SubcarrierSpacing SubcarrierSpacing OPTIONAL, -- Cond L139 Our preference is Alt. 2 for simplicity. We are also fine to let RAN2 decide on this. For msg1-SubcarrierSpacing-r17, we agree to list it here since it is needed for both Alt. 1 or Alt. 2. For subcarrierSpacing-r17 in BWP, we think there is no need to list here since it is anyway not the complete list for Alt. 1 and not needed for Alt. 2 |
| ZTE, Sanechips | For new SCS, we are fine to introduce new RRC parameters for FR2-2 but there are same concerns as vivo mentioned above. In order to avoid unnecessary changes for RAN2, we tend to reuse existing “SubcarrierSpacing” IE, that is, add new SCS (480kHz, 960kHz) in this IE by using spare entry.Besides, If the method of supporting the introduction of new parameter is eventually adopted (Alt.1 raised by vivo), then for RACH related parameter, we think it is necessary to add a new“msgA-SubcarrierSpacing-r17” in RACH-ConfigCommonTwoStepRA-r16/17 IE considering that there is no distinguish between 2-step RACH and 4-step RACH when RACH related discussions and conclusions are reached. |
| Samsung | Maybe “ssbSubcarrierSpacing” should also be listed for further discussion. Since we have agreed the SCS of SSB may subject to further UE capability to take values from 480 and 960, it may not be directly taking from “SubcarrierSpacing”.  |

## PDCCH monitoring enhancements

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## Enhancements for PUCCH formats 0/1/4

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| Company | View |
| Ericsson | For the number of RBs, rather than listing 3 specific parameters (nrofPRBs-PF0-r17, nrofPRBs-PF1-r17, nrofPRBs-PF4-r17) it would be better to give RAN2 a little more freedom in how to specify the number of RBs (potentially differently) for each of PF0, 1, and 4. For example, in Rel-15, there is a single parameter nrofPRBs in each of PUCCH-format2 and PUCCH-format3, which still allows the number of RBs to be configured differently for each PUCCH format.We could always add an extra note to inform RAN2 that however they choose to specify it, it must be possible to configure the number of RBs differently for each PUCCH format.  |
| vivo | We think current RRC signalling design exactly reflects the agreement below:Agreement:• Support an RRC parameter to configure the number of RBs for a PUCCH resource for each of enhanced PUCCH formats 0, 1, and 4• The parameter is provided by dedicated signaling (per UE) per BWPBesides, we are also fine to put nrofPRBs inside each format following the way forlegacy format 2 and 3 as Ericsson indicates. In this case, it is configured per PUCCH resource to provide more flexibility. |
| ZTE, Sanechips | For us, we are fine with the configuration position of the number of RBs listed in the current excel sheet and the way to add the the number of RBs into each format as mentioned by Ericssion. But even so, we still think that the location or IE in which the number of RBs is configured should be eventually determined by RAN2. |
| Nokia, NSB | We agree with Ericsson that RAN1 does not need to attempt to do RRC design on RAN2’s behalf. It should be enough just to state that the number of RBs in PUCCH-Config is RRC configured separately for each PUCCH format, and the configuration is UE specific. RAN2 can decide on how to exactly implement this. |

## Beam management for new SCSs

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| Company | View |
| Ericsson | For maxNumberRxTxBeamSwitchDLThe value range should be changed as follows since 2 has been agreed and 4 is common to both Alt-1 and Alt-2 in the agreement). 120KHz: No change480KHz: 2, 4, 7960KHz: ~~FFS~~ 2, 4FFS: additional value(s) for 960 kHz |
| ZTE, Sanechips | We agree with Ericsson’s modification for 960KHz SCS. In our view, the value 4for 960KHz SCS must be supported for maxNumberRxTxBeamSwitchDL regardless of which of the following two alternatives is finally selected.  For 960 kHz, support one of the following alternatives* Alt-1: Support 1, 4 and [7] as candidate values for 960 kHz in addition to the agreed candidate values 2
* Alt-2: Support 4 as a candidate value for 960 kHz in addition to the agreed candidate values 2
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## PDSCH/PUSCH enhancements

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| Company | View |
| DOCOMO | We think the intention of describing the two parameters below only is not very clear:

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| PDSCH-TimeDomainResourceAllocation-r17 |
| PUSCH-TimeDomainResourceAllocationList-r17 |

In 38.331, there are quite some parameters which relate to PDSCH/PUSCH resources per release and per functionality. If we need to describe more precisely, perhaps the following should be described:* For multi-PUSCH scheduling,
	+ pusch-TimeDomainAllocationList-r17
	+ PUSCH-TimeDomainResourceAllocationList-r17
	+ PUSCH-TimeDomainResourceAllocation-r17
	+ PUSCH-Allocation-r17
* For multi-PDSCH scheduling,
	+ pdsch-TimeDomainAllocationList-r17
	+ PDSCH-TimeDomainResourceAllocationList-r17
	+ PDSCH-TimeDomainResourceAllocation-r17
	+ PDSCH-Allocation-r17 (if we follow multi-PUSCH scheduling framework but no agreement implying this clearly so far?)

However, we think the aspects above may relate each other. So it may not essential to describe all of them. We would be open to discuss on this.  |
| Ericsson | Should it be the following instead? PUSCH-TimeDomainResourceAllocationList-r17PDSCH-TimeDomainResourceAllocationList-r17 |
| LG Electronics | We can add the following agreement in comment column for multi-PDSCH/PUSCH grant.Agreement:For TDRA in a DCI that can schedule multiple PDSCHs (or PUSCHs),* A row of the TDRA table can indicate PDSCHs (or PUSCHs) that are in consecutive or non-consecutive slots, by configuring {SLIV, mapping type, scheduling offset K0 (or K2)} for each PDSCH (or PUSCH) in the row of TDRA table.
* Note: Whether and how to reduce RRC overhead is left to RAN2.
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| vivo | Agree with Docomo that all related IEs need to be considered. |
| ZTE, Sanechips | we think that RAN1 only needs to list the following two parameters, while other related specific parameters and overhead issue should be considered by RAN2.* PUSCH-TimeDomainResourceAllocationList-r17
* PDSCH-TimeDomainResourceAllocationList-r17

Besides, we share the same view with LG on adding agreement in comment column to let RAN2 know that K0/K2 can be configured for each PDSCH/PUSCH for multi-PDSCH/PUSCH scheduled by a DCI case. |
| Nokia, NSB | Agree with Ericsson’s modification.Agree with LGE and ZTE that adding the related agreements in the comment column makes sense. The following agreement could be added as well.Agreement:* The maximum number of PDSCHs/PUSCHs that can be scheduled with a single DCI in Rel-17 is 8 for SCS of 120, 480 and 960 kHz.
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## Channel access mechanism

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| Company | View |
| Lenovo, Motorola Mobility | For the parameter “LBT-Mode”, should we have two parameters already? For cell-specific and for UE-specific? We are open either way.Also, could just add it as “New” parameter” and add description “To switch between LBT and no-LBT mode”  |
| Samsung | For Row 23, i.e., “LBT-mode”, we may need to * add “New” in column H,
* split into two rows: one for “cell-specific” in column N and one for “UE-specific” in column N
* leave column K as FFS, since the details of indication content is not finalized in the meeting (still have FFS on whether per-beam indication is supported and FFS on whether gNB and UE can have different modes)
 |
| Nokia, NSB | We are ok with the description as is. Since the agreement is already listed in the comment field, RAN2 should be able to do the rest and specify support for both cell – and UE-specific signalling. |

## Others

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