**3GPP TSG RAN WG1 #112bis-e R1-230XXXX**

**e-Meeting, April 17th – April 26th, 2023**

**Title:** DRAFT LS to RAN2 on scheduling and HARQ issues for FR2-2

**Release:** Release17

**Work Item:** NR\_ext\_to\_71GHz-Core

**Source:** Moderator (LG Electronics) [to be RAN1]

**To:** TSG RAN WG2

**Cc:**

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# 1 Overall description

RAN1 identified three issues related to scheduling and HARQ for FR2-2.

First of all, RAN1 observed that according to current TS 38.331 specification, enhanced type 3 HARQ-ACK codebook supports up to 16 HARQ process numbers per serving cell since bitmap size allocated for a serving cell equals to 16 as highlighted below.

PDSCH-HARQ-ACK-EnhType3-r17 ::= SEQUENCE {

 pdsch-HARQ-ACK-EnhType3Index-r17 PDSCH-HARQ-ACK-EnhType3Index-r17,

 applicable-r17 CHOICE {

 perCC SEQUENCE (SIZE (1..maxNrofServingCells)) OF INTEGER (0..1),

 perHARQ SEQUENCE (SIZE (1..maxNrofServingCells)) OF BIT STRING (SIZE (16))

 },

 pdsch-HARQ-ACK-EnhType3NDI-r17 ENUMERATED {true} OPTIONAL, -- Need R

 pdsch-HARQ-ACK-EnhType3CBG-r17 ENUMERATED {true} OPTIONAL, -- Need S

 ...

}

However, if a UE is provided with *nrofHARQ-ProcessesForPDSCH-v1700* for a serving cell, a maximum of 32 HARQ processes for the serving cell can be used for the downlink. Therefore, RAN1 respectfully request RAN2 to update 331 specification for enhanced type 3 HARQ-ACK codebook, taking into account that up to 32 HARQ processes can be configured for a serving cell.

Secondly, RAN1 reached the following agreement regarding CBG configuration.

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| **Agreement*** It is RAN1’s understanding that if at least one DL (or UL) BWP configured in a cell has 480 or 960 kHz, the network does not configure the higher layer parameter *codeBlockGroupTransmission* for DL (or UL).
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Therefore, RAN1 respectfully request to update 331 specification based on RAN1’s understanding, if needed.

Thirdly, RAN1 made the following agreement in RAN1#104-e. As highlighted below, a UE does not expect to be configured with both *numberOfSlotsTBoMS-r17* and *pusch-TimeDomainAllocationListForMultiPUSCH-r16*.

|  |
| --- |
| Agreement: (RAN1#104-e)* For a UE and for a serving cell, scheduling multiple PDSCHs by single DL DCI and scheduling multiple PUSCHs by single UL DCI are supported.
	+ Each PDSCH or PUSCH has individual/separate TB(s) and each PDSCH/PUSCH is confined within a slot.
	+ FFS: The maximum number of PDSCHs or PUSCHs that can be scheduled with a single DCI
	+ FFS: Whether multiple PDSCH scheduling applies to 120 kHz in addition to 480 and 960 kHz
	+ At least for 120 kHz SCS, single-slot scheduling with slot-based monitoring will still be supported as specified in Rel-15/Rel-16
* The followings will not be considered in this WI.
	+ Single DCI to schedule both PDSCH(s) and PUSCH(s)
	+ Single DCI to schedule one or multiple TBs where any single TB can be mapped over multiple slots, where mapping is not by repetition
	+ Single DCI to schedule N TBs (N>1) where a TB can be repeated over multiple slots (or mini-slots)
* Note: This does not imply that existing slot aggregation and/or repetition for PDSCH and PUSCH by single DCI is precluded for the serving cell.
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Therefore, RAN1 respectfully request RAN2 to update 331 specification in line with the above RAN1 agreement.

# 2 Actions

**To TSG RAN2**

**ACTION:** RAN1 respectfully ask RAN2 to update TS 38.331 specification by taking the above information into account.

# 3 Dates of next TSG RAN WG1 meetings

RAN1#113 22 - 26 May 2023 Incheon, Korea

RAN1#114 21 - 25 Aug 2023 Toulouse, France