**3GPP TSG-RAN Meeting #90-e RP-20xxxx**

**Electronic Meeting, December 7th – 11th 2020**

**Agenda item:** 9.2.1

**Source:** Moderator (Qualcomm Incorporated)

**Title:** Email discussion summary for [90E][18][RAN4\_NR-U\_Leftovers] Initial round

**Document for:** Discussion/Decision

# Introduction

This document summarizes the email discussion on handling of RAN4 NR-U leftover work as documented in [1] and [2].

# Proposals

From [1], the proposals are

* Proposal 1: RAN#90e to endorse RAN4 WF in R4 2017835 for the continuation of RAN4 requirements not completed in Rel 16 in Rel 17 timeframe, i.e.,
	+ For CA and DC band combinations including n46 or n96, RAN4 recommends to cover these within the existing Rel 17 band combination basket work items
	+ For the introduction of 100MHz channel BW for n46 and/or n96, RAN4 recommends to cover this within the existing Rel 17 “adding BW to existing bands work item” (NR\_bands\_R17\_BWs)
	+ For NR U power class 3, RAN4 recommends to postpone the work until Rel 16 NR TxDiv work in TEI16 is completed.
* Proposal 2: RAN#90e to discuss and decide how to handle the following items in Rel 17
	+ NR-U power class 3
	+ UL intra-band contiguous CA

From [2], the proposals are

Proposal 1a: NR-U PC3 should leverage outcome of the NR TxD technical discussion.

Proposal 1b: Timeline for NR-U PC3 should be (re-)discussed when the NR TxD discussion is completed (whereupon it can be also discussed to which WI we add it).

Proposal 2a: Due to the sheer number of NR-U specific issues it is preferrable to handle 100MHz channel as a dedicated work package not mixing it with existing basket WIs.

Proposal 2b: TSG RAN should discuss further timeline for adding the 100MHz channel.

## Initial round discussion

Handling CA band DC band combinations within Rel-17 band combination basket work items

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| **Company** | **Comments** |
| Charter Communications, Inc | * + We agree with proposal 1, *“For CA and DC band combinations including n46 or n96, RAN4 recommends to cover these within the existing Rel 17 band combination basket work items”*
 |
| Qualcomm Incorporated | Agree |
| Intel | Agree |
| MTK | Agree |
| Ericsson | Agree |
| ZTE | Agree |
| Skyworks | Agree |
| AT&T | Agree |
| CHTTL | Note that some related combinations are already included in the Rel.17 baskets during the email approval of last RAN4 meeting, targeting approval in this meeting, not sure whether we need to confirm this proposal again, but anyway we are ok. |
| Nokia | Agree with proposal 1 from [1] |

If/how to introduce 100 MHz channel bandwidth

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| **Company** | **Comments** |
| Charter Communications, Inc | We agree with proposal 1pending clarification below, *“For the introduction of 100MHz channel BW for n46 and/or n96, RAN4 recommends to cover this within the existing Rel 17 “adding BW to existing bands work item” (NR\_bands\_R17\_BWs)”*Question for clarification. During NR-U discussion for introduction of 100 MHz channel BW, there were some channel rasters proposed that would cause potential interference with other technologies. Will this be discussed in the existing Rel 17 adding BW to existing bands work item? If so, then we agree with proposal 1. If not, we do not agree with proposal 1 |
| Qualcomm Incorporated | Agree to cover this within the NR\_bands\_R17\_BWs and also agree with Charter that issues related to coexistence and channel rasters for Band n46 and n96 should also be handled in that context.  |
| Intel | Agree with the proposal. Coex and other requirements should be discussed together.  |
| MTK | Coexistence and raster design should be considered with other requirements in the same package. |
| Ericsson | We don’t have strong view. It can either be in basket WI for BW (NR\_bands\_R17\_BWs) or separate item. |
| Apple | Issues related to co-existence and raster design shall be of course discussed for the 100MHz channel. However, accounting for the fact that there will be quite specific NR-U related topics, we could not help but wonder whether an existing basket is a right place for this kind of work. We would prefer having better traceability of the corresponding discussions and agreements. Somewhat referring forward to the UL CA feedback, it is not clear why we treat differently 100MHz and UL CA because both topics might require some NR-U specific input.  |
| ZTE | Fine to add NR-U 100MHz into NR\_bands\_R17\_BWs, however no further TU should be requested considering this work should be quite similar as NR-U 80MHz. For the coexistence issue raised for NR-U carrier placement is applied for all BWs including 20MHz,40MHz,60MHz, 80MHz, at the end , it was agreed to leave up to the BS implementation, therefore we think the same principle should be applied for 100MHz |
| Skyworks | A pre-requisite to 100MHz MPR/AMPR /REFSENS study for wideband operation is an agreement on the related spaectrum mask. It may not be feasible to cover this within the WI for new BW, but once available this should be similar work than for NR bands. |
| Nokia | We agree this should be covered within NR\_bands\_R17\_BWs. |

Power class 3 and dependency on TxDiv

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| **Company** | **Comments** |
| Charter Communications, Inc | We are ok to discuss PC3 after Rel 16 NR TxDiv work in TEI16 is completed. But we have a question for clarification. Under RAN4\_non-spectrum\_scoping thread [09], in the RAN4 TU allocation spreadsheet, it looks like there are no TU allocation for TEI discussion. Is this correct understanding? If so, what is the timing for REL 16 NR TXDiv work closure? |
| Qualcomm Incorporated | It makes sense to wait for the conclusion of TxDiv discussion so that NR-U PC3 can benefit from whatever agreements are made. However, there is also the possibility of NR-U PC3 with a single PA. That would not have any dependency on TxDiv. |
| Intel | Agree that PC3 with 2 PA can be impacted by the ongoing TxD discussion and it makes sense to wait upon outcome. However, PC3 with 1 PA can be discussed independently. However, we would like to further clarify in which WI it is planned to be handled. |
| MTK | Same question as Intel. We want to know in which WI we plan to discuss in Rel-17 or TEI-16. Note that TxDiv is already handled in TEI-16.  |
| Ericsson | Agree with the proposal in the WF in R4 2017835. |
| Apple | If we recall right the RAN4 discussion, companies were not able to agree whether NR-U PC3 should be modelled as 1 or 2 PA. That was the time when companies were also contemplating whether it can be completely transparent, but this is exactly what the NR TxD discussion is now aiming at. In that sense outcome of the NR TxD discussion could be beneficial input for NR-U. |
| ZTE | No strong opinions on that, however whether two PAs or single PA architecture for NR-U PC3, it should be discussed together. |
| Skyworks | For PC3, our preference is to use 2 PA as this is consistent with some WiFi implementations and thus hardware reuse is an option. Thus we believe that TxDiv aspects should be settled first |
| Nokia | We support starting work on PC3 as soon as possible, but are OK to wait until the TEI16 TxD work is complete.  |

Uplink intra-band contiguous CA

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| **Company** | **Comments** |
| Charter Communications, Inc. | Can Uplink intra-band contiguous CA be covered under “Rel-17 NR intra band Carrier Aggregation for xCC DL/yCC UL including contiguous and non-contiguous spectrum (x>=y)”? |
| Qualcomm Incorporated | Assigning UL CA to a basket is one possibility. However, we would like to ensure that the discussion for NR-U UL CA is not subject to bulk approval since there are new topics that might not get adequate attention. |
| Intel | We would like to further clarify in which WI it is planned to be handled? |
| MTK | We share the same view as QC that handling the requirement in basket WI may not be a good approach.  |
| Ericsson | We prefer this to be part of UL CA basket WI. Second preference is to put this in R17 RF enhancement in FR1 in case there are issues which cannot be easily addressed in basket WI. Third option is to treated UL intra-band CA together with 100 MHz channel BW in a separate item (TEI or whatever) if the latter is not in NR\_bands\_R17\_BWs. |
| Apple | For the sake of better transparency and traceability, it would be better to put NR-U related topics into a separate "basket" item that could embrace all outstanding channel and band combination issues. The amount of work we will have to do will be the same irrespective of the fact whether we use an existing WI code or add a new one. |
| ZTE | Share similar views as QC and MTK, basket WID is not appropriate agenda to discuss general RF requirements.  |
| Skyworks | We believe that intra-band UL CA work is not the same than other band combination work and especially there is a need for discussion papers and alignment so block approval cannot be assumed at least. We should also make sure that the rapporteur agrees with the additional work and a 2 week meeting scope. |
| CHTTL | Share similar views as QC and MTK. |
| Nokia | We consider this lower priority than PC3.  |

## Initial round summary

# Reference

1. RP-202752, “Addressing leftover RAN4 requirements for NR-U,” Qualcomm Incorporated
2. RP-202579, “Views on further enhancements for NR-U,” Apple Inc.