**3GPP TSG-RAN WG4 Meeting #94-e R4-20xxxxx**

**Electronic Meeting, Feb.24th – Mar.6th 2020**

**Agenda item:** 9.21

**Source:** Moderator（Huawei）

**Title:** Email discussion summary for RAN4#94e\_#33\_NR\_n66\_BW

**Document for:** Information

# Introduction

The scope of this email discussion is to discuss the contributions submitted at agenda 9.21 to specify the RF requirements for addition of channel bandwidth and asymmetric channel bandwidth set for band n66.

The target completion plenary for RAN4 core is RAN#87. Hence we need to finalize the CR for TS 38.101-1 and TS 38.104 this meeting.

The target of 1st round is to reach agreement on asymmetric channel bandwidth combination set, and based on the agreement, it might be possible to agree on the CR in the 1st round.

The target of 2nd round is to finalize the CR to 38.101-1 and 38.104 if it cannot be closed in 1st round.

# Topic #1: UE part for NR\_n66\_BW

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2000689 | Verizon | It is proposed to introduce additional FDD asymmetric UL and DL channel bandwidth combinations addition to the WID RP-192276 |
| [R4-2000828](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000828.zip) | Huawei, HiSilicon | This contribution provide discussion on the addition of symmetric/asymmetric channel bandwidth for NR band n66 |
| [R4-2000829](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000829.zip) | Huawei, HiSilicon | CR for TS 38.101: adding wider channel bandwidths for n66 |
| R4-2001953 | Huawei | LS to RAN2 on addition of asymmetric channel bandwidth for band n66 |

## Open issues summary

### Sub-topic 1-1: Asymmetric channel bandwidth combination set

* Proposals
  + Option 1: introduce also 25 MHz and 50 MHz as proposed in R4-2000689.

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| --- | --- | --- | --- |
| NR Band | Channel bandwidths for UL (MHz) | Channel bandwidths for DL (MHz) | Asymmetric channel bandwidth combination set |
| n66 | 5, 10 | 20, 40 | 0 |
| 20 | 40 |
| 5, 10 | 20, 25, 30，40, 50 | 1 |
| 20, 25, 30 | 40, 50 |

* + Option 2: follow the WID and approved WF R4-1916186,

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| --- | --- | --- | --- |
| NR Band | Channel bandwidths for UL (MHz) | Channel bandwidths for DL (MHz) | Asymmetric channel bandwidth combination set |
| n66 | 5, 10 | 20, 40 | 0 |
| 20 | 40 |
| 5, 10 | 20, 30，40 | 1 |
| 20, 30 | 40 |

* Recommended WF
  + The request from R4-2000689 will be added as new BCS (i.e. BCS2), which need to update the WID at RAN#87.

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| NR Band | Channel bandwidths for UL (MHz) | Channel bandwidths for DL (MHz) | Asymmetric channel bandwidth combination set |
| n66 | 5, 10 | 20, 40 | 0 |
| 20 | 40 |
| 5, 10 | 20, 30，40 | 1 |
| 20, 30 | 40 |
| 5, 10 | 20, 25, 30, 40, 50 | 2 |
| 20, 25, 30 | 40, 50 |

## Companies views’ collection for 1st round

### Open issues

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| **Company** | **Comments on Sub-topic 1-1:Asymmetric channel bandwidth combination set** |
| Huawei | 25 MHz and 50 MHz for asymmetric channel bandwidth combination is not in the scope of current WID RP-192276. We suggest to update the WID to add BCS 2 at RAN#87. For this meeting we focus on the completion of BCS 1, which follows current WID RP-192276 approved at RAN#86. |
| Ericsson | General comment on both Option 1 and Option 2:  Assuming this is for deployment in AWS/AWS3 and AWS4 (n66), how can all these asymmetric bandwidths be deployed given that the AWS and AWS3 are comprised of paired symmetric blocks (same UL/DL size) and thus constant TX-RX spacing? Then the only possible asymmetric channels are UL channels at the upper edge of AWS3 combined with DL channels that stretch into AWS4 (two 10 MHz blocks). This means that BW\_DL = BW\_UL + 10/20 MHz -- possibly 5 MHz granularity but used? (e.g. 10 + 15 MHz using half of AWS4/Block A but odd). How do you combine e.g. 5 MHz UL with 50 MHz DL? SUL in the leftover UL?  Is it possible to prune these sets of asymmetric bandwidth combinations?  Huawei: Option 2 do not have such issue. Compared to existing combination, option 2 only add 10 MHz UL+30 MHz DL and 30 MHz UL +40 MHz DL, based on the request from TELUS. Option 1 might have such possibility, e.g. 5 MHz UL+50 MHz DL. Could Verizon to clarify the deployment scenario?  Draft LS in R4-2001953: proposes a new capability for “asymmetric bandwidth sets”. Why is this capability needed? For a Rel-15 device to indicate support of the Rel-16 set? There are several new BWs (a separate problem), but what prevents a UE supporting set 0 also support set 1? The relative difference between the BWs is about the same for both sets (and thus the variation of the TX-RX spacing).  Huawei: The intention to introduce the capability is to distinguish between the UE only support set 0 and the UE do support also set 1, which was discussed in last RAN4 meeting and reached the agreement in WF R4-1916186. Set 0 which was defined in Rel-15 should be supported by default. It is also for future proof. E.g. depend on different operators’ requests, there may introduce two new sets in one release, which needs the signalling. |
| Dish | Since Rel-16 closes now in June, RAN#88, there is no need to introduce more than BCS=0 and BCS=1. If necessary, BCS=1 can include 25 and 50 MHz new CH BWs. This is possible even by revising the WID and introducing CRs at RAN#87 if the adding the new CH BWs for n66 are completed.  But BCS=2 is unnecessary and all new combinations should be added in BCS=1. |
| Company B |  |
| Company C |  |

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| [R4-2000829](http://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_94_e/Docs/R4-2000829.zip)  CR to TS 38.101 | Ericsson: how are the asymmetric sets of bandwidths going to be used? Is there a need for specification of all these combinations? Clarification needed before agreement of the CR. |
| DISH: See 1.3.1 and comment about the LS. |
| Huawei: see the clarification in 1.3.1 |
| Nokia: Why UL allocation of 160 RB does not have note 1? Separation is 400 MHz. We also think that introduction of asymmetric band BCS needs further discussion.  Huawei: 160 RB is the maximum RB allocation, the same for both DFT-s-OFDM and CP-OFDM. Hence the note1 is not needed. We can have further discussion on asymmetric BCS. Meanwhile we also need conclusion to complete the WI. It should be noted that we had discussed it in previous meetings and reached agreements in WF R4-1916186. |
| R4-2001953  LS to RAN2 | Ericsson: why is a new capability needed? (see also 1.3.1) |
| DISH:   * If the BCS is introduced, we need to expand the LS by applying it to all bands in this entire Asymmetric CH BW clause. -> and the CR 0829.   Huawei: yes. If I understand correctly it was already covered in the CR 0829.   * Is the intention that a Rel-15 device can support BCS=1 as optional ?   Huawei: It could be the case. But in my view it is not the intention. |
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## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

*Recommendations on WF/LS assignment*

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|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
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### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

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| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

# Topic #2: BS part for NR\_n66\_BW

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2000830 | Huawei, HiSilicon | CR for TS 38.104: adding wider channel bandwidths for n66 |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| R4-2000830  CR to 38.104 | Ericsson: OK. |
| Company B |
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## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

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|  | **Status summary** |
| **Sub-topic#1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

*Suggestion on WF/LS assignment*

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|  | **WF/LS t-doc Title** | **Assigned Company,**  **WF or LS lead** |
| #1 |  |  |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provided recommendation on CRs/TPs Status update suggestion*

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| **CR/TP number** | **CRs/TPs Status update recommendation** |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

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| **CR/TP/LS/WF number** | **T-doc Status update recommendation** |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |