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

**Electronic Meeting, December 7-11, 2020**

**Agenda item:** 9.1.4

**Source:** Moderator (Ericsson)

**Title:** Email discussion summary for [90E][13][BCS4]

**Document for:** Information

# Introduction

The documents intent to capture companies’ comments on documents related to the WID on Introduction of BCS4 [1-3]. This is spectrum related WI proposal.

# Comments on Introduction of BCS4

## Topics for discussion

* Sub-topic 1-1: Objectives of WID ([**RP-202256**](https://www.3gpp.org/ftp/TSG_RAN/TSG_RAN/TSGR_90e/Docs/RP-202256.zip))
* Sub-topic 1-2: Proposed recommendation to basket WIs
* Sub-topic 1-3: Timeline e.g. number of meetings
* Sub-topic 1-4: Any other issue

## Companies’ views collected

### Sub-topic 1-1: Objectives of WID ([RP-202256](https://www.3gpp.org/ftp/TSG_RAN/TSG_RAN/TSGR_90e/Docs/RP-202256.zip))

Please provide comments, if any, on the following WID objectives:

1. Introduce BCS 4 for inter-band and intra-band NR-CA, which shall indicate that for the band combination the UE supports all of the possible combinations of bandwidths based on the bandwidths the UE supports for each band as indicated in the UE capabilities and restricted by the notes in Table 5.3.5-1 in 38-101-1, and the maximum bandwidth for the band in the band combination as indicated in the UE capabilities. The BCS table does not need to fill in the channel bandwidths for BCS4 for new band combinations.
2. Ensure that all required analysis including MSD, MPR/A-MPR, etc. be performed for BCS4 for every existing band combination configuration (up to 3 bands)
3. Technically confirm what each of the following two enhancements can realize and compare the cost versus the benefits and discuss its necessity. The candidate methods are the original BCS4, two enhanced BCS4 methods are: One is BCS4 with additional minimum channel bandwidth for each CC in NR band within a band combination via UE capability signalling, and the other is BCS4 with UE signalling multiple feature sets with different maximum and minimum channel bandwidth supporting on each CC for the same band combination.
4. To ease the concerns of vendors concerned that IoDT will increase with BCS4, RAN4 shall allow new BCSs to be created as requested for band combinations, but BCSs will not be required for new band combinations.
5. Future band combinations may include BCSs, but they will not be required to have any other than BCS4.

Note: Please indicate objective number (e.g. 1) for which comments are provided.

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| **Company** | **Comments** |
| Apple | We have the following questions for clarifications:   1. Is the BCS4 WID intended to handle the missing MSD and A-MPR requirements for all channel BWs supported by its constituent bands for the existing band combinations? 2. Was there an estimation on how much work is expected to complete the missing MSD and A-MPR requirements for the existing band combinations? 3. How to divide the above work among companies if the workload is expected to be heavy? 4. If BCS4 is agreed, is it the only BCS for any new combination, or it would be the default BCS and smaller subsets such as BCS0 can still be proposed? 5. Will the 35MHz and 45MHz requirements in the combinations be handled in the BCS4 WID (if approved) or in the existing NR\_bands\_R17\_BWs WID? |
| Samsung | As the email discussion during RAN4 97e, we’d like to clarify to come to the consensus that BCS4 doesn't implicit any BW mandatory or optional in the set. Instead of that, it depends on UE's capability and RAN4’s relative existed or future specs. |
| Intel | Support of BCS4 may have impact on UE baseband capabilities. Support of all possible CBW combinations may not always be possible from BB perspective. Recommend to rephrase objective 3 as follows: *Study and define UE capabilities signalling framework for BCS4 to address UE RF and baseband implementation constraints.*  Also, just a recommendation that BCS4 is more like a RAN4 acronym. For the WI it could be more clear to call it differently (e.g. support of full or extended bandwidth combination set) |
| ZTE | 1. Clarification : is BCS4 only intended for NR CA and NR DC band combos, not for SUL band combos? 2. Furthermore, if it happens in the middle of a release, e.g., that a new channel bandwidth Q for operating band X in Rel-A.(a+1), while BCS4 is already defined for all of band combos consisting of band X, then how to differentiate Rel-A.a UE and Rel-A.(a+1) UE regarding the support of channel bandwidth Q for operating band X? 3. The variant of “Enhanced BCS4” #2 introduces multiple feature set with different max. and min. channel bandwidth, and actually it looks like another “high-order” BCS concept. Might need further discussion. 4. For the bullet 1): “The BCS table does not need to fill in the channel bandwidths for BCS4 for new band combinations.”, a question for clarification, what does “new band combination” refer to? In our understanding, currently BCS4 have not been introduced into the spec, which means the original BCSs should be used untill the BCS4 have been introduced. During this period, there will be lots of new rquested band combiantion in the WID, and also lots of TPs/draft CRs to introduce new band combiantion into the spec (Comparing with the existing band combinations in the spec, these band combinations are new.). Therefore, a time threshold may be needed for the “new band combiantion”. 5. For bullet 2), We understand this sentence “Ensure that all required analysis including MSD, MPR/A-MPR, etc. be performed for BCS4 for every existing band combination configuration (up to 3 bands)” is based on the agreements in the last meeting, but could it possible make it more general to capture all the existing NR CA basket WID, i.e. up to 5 bands? 6. For bullet 4) and 5), although we prefer to use BCS4 for combinations requesting in future meetings, it seems either BCS4 or original BCSs are allowed, pending on the proponent according to the e-mail dicussion in the last meeting. |
| Qualcomm | For the third bullet of objective, the current version is to compare the cost versus the benefits and discuss its necessity for two enhanced methods which is not in line with the agreed RAN4 WF of R4-2017843. We should technically confirm and compare three methods including original BCS4, and two enhanced methods. With that, we prefer to use the wording in the agreed RAN4 WF, i.e., “Technically confirm what each of the following three methods can realize and compare the cost versus the benefits. The candidate methods are the original BCS4, two enhanced BCS4 methods: One is BCS4 with additional minimum channel bandwidth for each NR band within a band combination via UE capability signalling, and the other is BCS4 with UE signalling multiple feature sets with different maximum and minimum channel bandwidth supporting on each CC for the same band combination.”  How to ensure if MSD is proper to specify when a new CBW is added in a band is missing in the WID. If it is not to be solved in this WI, the guidance from RAN is also needed when this WI got approved. |
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### Sub-topic 1-2: Proposed recommendation to basket WIs ([RP-202256](https://www.3gpp.org/ftp/TSG_RAN/TSG_RAN/TSGR_90e/Docs/RP-202256.zip))

Please provide comments if any on the proposed recommendation to the basket WIs in the WID:

1. In order to ensure that MSD analysis is complete for BCS4 for NR CA and NR DC band combinations that have already been requested but CRs have not yet been agreed by RAN4, the TPs and draft CRs and CRs with those band combinations shall include MSD analysis for all channel bandwidths for each band in the band combination.
2. Since BCS4 was not agreed to when already requested NR CA and NR DC band combinations were requested, it should be up to the proponents for whether TPs and draft CRs include the BCS(s) that were requested and recorded in the WID, or if the TPSs and draft CRs only include BCS4.

Note: Please indicate the recommendation number (e.g. 1) for which comments are provided.

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| **Company** | **Comments** |
| T-Mobile USA | We had some offline discussions with ZTE and Ericsson, and as a result have a draft revisions updated RP-202677 in the [90E][13][BCS4] to address the combinations that have already been requested, but do not yet have TPs or draft CRs or real CRs. |
| Bell Mobility | Support T-Mobile, ZTE and Ericsson proposal on RP-202677 |
| ZTE | 1. Since BCS4 indicates the support of all possible channel bandwidth combinations for a band combo, if adding a new channel bandwidth to an existing band with the support of BCS4 already, then MSD analysis should be done for any band combos including the band with the new channel bandwidth, this should be stated in the WID clearly. 2. It seems there exits a bit discrepance between bullet 1) and 2). In our understanding, only the original BCSs should be used untill the BCS4 is agreed in the specification, which means the original ways should be used where the MSD analysis for the requested channel bandwidths, not for all channel bandwidths. The bullet 1) is valid after the BCS4 is agreed in the specification. Also it should clearly differentate the MSD work between BCS4 WID and basket WID to avoid possible overlapping work. |
| Qualcomm | Clarifications on P2 in draft revisions: RAN4 need to solve all the issues and finalize the WI before to agree BCS4 CR(s). |
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### Sub-topic 1-3: Timeline e.g. number of meetings

Please provide comments on the proposed time i.e. target completion date (RAN4#93).

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| **Company** | **Comments** |
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### Sub-topic 1-4: Any other issue

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| **Company** | **Comments** |
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## Initial summary of discussion

*To be filled in by moderator*

# References

1. RP-202255 Motivation for WID on BCS4 Ericsson
2. RP-202256 WID for introduction of BCS4 Ericsson
3. RP-202677 Proposal for handling BCS4 for already requested Band Combinations T-Mobile USA, Ericsson