**3GPP TSG-RAN Meeting #90-e *RP-202677***

**Online, , December 7 - 11, 2020**

**Source:** T-Mobile USA, Ericsson, ZTE

**Title:** Proposal for handling BCS4 for already requested Band Combinations

**Agenda item:** 9.1.4

**Document for:** Approval

1 Introduction

At RAN4#97e a Way Forward was approved for an alternative to creating new BCSs, which included to the creation of BCS4 [1]. The Way Forward included 7 proposals but didn’t explicitly cover how to handle BCSs for already requested band combinations. This document attempts to clarify the situation with already requested band combinations.

2 Discussion

At RAN4#97e a proposal for an alternative to creating new BCSs was discussed [2]. It was a refinement of a proposal from RAN4#96e [3]. BCS4 is basically a bandwidth combination set that includes all of the bandwidths for each band in the combination. In addition to the BCS(s) that that the UE supports which are indicated in the UE capabilities, the UE capabilities also include the channel BWs the UE supports for each band, and the maximum channel BW the UE supports for each band in a band combination. The idea behind BCS4 is that new BCSs wouldn’t be needed in order to enable new channel bandwidths that have been added for bands or will be added for bands to be used in band combinations, and thus reducing the future workload in RAN4.

The Way Forward on alternative to creating new BCSs that was approved at RAN4#97 [1] included the following proposals:

* Proposal 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.
* Proposal 2: New BCS4 WID to be proposed to 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)
* Proposal 3: As one of the objectives of the WID, 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 signaling, and the other is BCS4 with UE signaling multiple feature sets with different maximum and minimum channel bandwidth supporting on each CC for the same band combination.
* Proposal 4: For new 3 band or less band combinations, MSD analysis will need to include every bandwidth of each band in the combination
* Proposal 5: When new channel BWs are added to a band, the proponent needs to identify all band combinations (with up to 3 bands) with that band and ensure MSD is analyzed for each case. Update the detailed process in the “Adding channel bandwidth support to existing NR bands” to include the necessary steps.
* Proposal 6: 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.
* Proposal 7: For 35 and 45 MHz, the WID should be updated so that MSD analysis is performed for all of the band combinations for each band that 35 and/or 45 MHz are added to.

Since BCS4 would apply to all band combinations, it was decided that a new WID was needed to ensure that all of the MSD analysis was performed in this BCS4 WID scope for the new channel BWs that BCS4 would be adding to existing band combinations. Proposal 4 clarified that for all new band combinations MSD analysis would need to be included in TPs and CRs in basket WID scope so that BCS4 could be used with new band combinations. However, the Way Forward was not explicit on what should happen with already requested band combinations, where TPs and draft CRs have not yet been approved or endorsed by RAN4. Since BCS4 will apply to all NR CA and NR DC band combinations, it is important that the MSD analysis is performed for all NR CA and NR DC band combinations that have already been requested.

**Proposal 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.**

Until BCS4 CR(s) are agreed, TPs and Draft CRs should include the BCSs that were requested for already requested band combinations in the corresponding basket WIDs, which means the information in the TPs and draft CRs need to be kept consistent with the basket WID. After BCS4 CR(s) are agreed, it should be up to the requesting company whether to include both BCS4 and the originally requested BCS for the band combination in the TPs and draft CRs, or if they prefer to only include BCS4. If BCS4 is preferred, then the inconsistent information between the basket WID and the TPs and draft CRs may happen, i.e. originally requested BCSs are used for the band combinations in basket WIDs but BCS4 is used in the TPs and draft CRs. In this case, there is no need to update the basket WID with BCS4 replaced with the originally requested BCSs, meanwhile in order to further implement BCS4 and further reduce the workload, it is acceptable for this exceptional case. In addition, as long as the BCS4 band combination is approved, then all of the band combination with different originally reques

ted BCSs can be treated as completed in a package.

Moreover, it is encouraged that companies request their combinations with BCS4 in future meetings. Also if BCS4 is requested for a certain band combination, there is no need to include bandwidth information for this band combination in their EXCEL file for future proofing purpose also avoiding possible overlapping works since BCS4 band combinations support all of the CBWs of each constitute band by default.

**Proposal 2: Until BCS4 CR(s) are agreed, TPs and Draft CRs should include the BCSs that were requested for already requested band combinations. After BCS4 CR(s) are agreed, it should be up to each proponent whether TPs and draft CRs include the BCS(s) that were requested and recorded in the WID, or if the TPs and draft CRs only include BCS4. If BCS4 is preferred, the exceptional case of inconsistent information between the basket WID and the TPs/draft CRs is acceptable.**

3 Conclusions

**Proposal 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.**

**Proposal 2: Until BCS4 CR(s) are agreed, TPs and Draft CRs should include the BCSs that were requested for already requested band combinations.** **After BCS4 CR(s) are agreed, it should be up to the proponents whether TPs and draft CRs include the BCS(s) that were requested and recorded in the WID, or if the TPs and draft CRs only include BCS4. If BCS4 is preferred, the exceptional case of inconsistent information between the basket WID and the TPs/draft CRs is acceptable.**

4 References

1. R4-2017843, “WF on alternative to creating new BCSs,” T-Mobile USA, Deutsche Telekom, AT&T, TELUS, Bell Mobility, Telstra, Telecom Italia, Vodafone, Rogers, Verizon, Ericsson, Nokia, Nokia Shanghai Bell
2. R4-2016453, “An alternative to creating new BCSs,” T-Mobile USA, Deutsche Telekom, AT&T, TELUS, Bell Mobility, Rogers Communications, Telstra, Telecom Italia, KDDI, Vodafone, BT plc, Ericsson
3. R4-20100623, “An alternative to creating new BCSs,” T-Mobile USA, Deutsche Telekom, AT&T, Telus, Bell Canada, Telstra, Telecom Italia, Ericsson