**3GPP TSG RAN WG2#117-e R2-220xxxx**

**e-Meeting, February 21 – March 3, 2022**

**Title: [DRAFT]** LS on BWP operation without bandwidth restriction

**Response to:** -

**Release:** Release 16

**Work Items:** NR\_newRAT-Core, TEI16

**Source:** Qualcomm Incorporated **[To be RAN2]**

**To:** RAN WG1, RAN WG4

**CC:**

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**Attachments:** **None**

1 Overall description

**NOTE:** This LS is for pre-Release-17 behaivour, and RedCap is out of the scope.

For BM/RLM/BFD operation on DL BWPs NOT containing the SSB associated to the initial DL BWP, the following text in TS38.300 suggests that CSI-RS based measurements are used.

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| 9.2.3.1 Overview  […] SSB-based Beam Level Mobility is based on the SSB associated to the initial DL BWP and can only be configured for the initial DL BWPs and for DL BWPs containing the SSB associated to the initial DL BWP. For other DL BWPs, Beam Level Mobility can only be performed based on CSI-RS.  9.2.7 Radio Link Failure  […] SSB-based RLM is based on the SSB associated to the initial DL BWP and can only be configured for the initial DL BWP and for DL BWPs containing the SSB associated to the initial DL BWP. For other DL BWPs, RLM can only be performed based on CSI-RS.  9.2.8 Beam failure detection and recovery  […] SSB-based Beam Failure Detection is based on the SSB associated to the initial DL BWP and can only be configured for the initial DL BWPs and for DL BWPs containing the SSB associated to the initial DL BWP. For other DL BWPs, Beam Failure Detection can only be performed based on CSI-RS. |

On the other hand, the current UE capability signalling allows the UE to indicate:

* it supports BWP operation without bandwidth restriction, i.e. configured DL BWP does not contain SSB associated to the initial DL BWP; and
* it does not support CSI-RS based RLM/BFD.

(The corresponding feature group definitions inTR38.822 can be found in Annex.)

This indicates that the network may configure a DL BWP which does not contain SSB associated to the initial DL BWP, while not configuring CSI-RS for BM/RLM/BFD. For this scenario, RAN2 come to the following questions.

**Question 1:**

Whether it is a valid scenario in the standard to support the operation of BWP without SSB where the UE does not perform BM/RLM/BFD due to the lack of necessary reference signal (SSB and CSI-RS) in the active BWP.

**Question 2:**

If the answer to question 1 is that this is not valid, how should the UE perform BM/RLM/BFD when the active BWP does not contain SSB.

2 Actions

**To RAN4**

**ACTION:** RAN2 would like to ask RAN1 and RAN4 to answer the questions in this LS.

3 Dates of next TSG RAN WG2 meetings

TSG-RAN WG1 Meeting #118-e 16st – 27rd May 2022 E-meeting

TSG-RAN WG1 Meeting #119 22nd – 26th August 2022 Toulouse, France

Annex

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| **Index** | **Feature group** | **Components** | ***Field name in TS 38.331*** |
| 6-1a | BWP operation without restriction on BW of BWP(s) | BW of UE-specific RRC configured BWP may not include BW of the CORESET#0 (if CORESET#0 is present) and SSB for PCell/PSCell (if configured) and BW of the UE-specific RRC configured BWP may not include SSB for SCell | *bwp-WithoutRestriction* |
| 1-7 | CSI-RS based RLM | CSI-RS based RLM | *csi-RS-RLM* |
| 1-8 | RLM based on a mix of SS block and CSI-RS signals within active BWP | RLM based on a mix of SS block and CSI-RS signals within active BWP | *ssb-AndCSI-RS-RLM* |
| 2-31 | Beam failure recovery | 1) Maximal number of CSI-RS resources across all CCs for UE to monitor PDCCH quality  2) Maximal number of different SSBs across all CCs for UE to monitor PDCCH quality  3) Maximal number of different CSI-RS and/or SSB resources across all CCs for new beam identifications. | *1. maxNumberCSI-RS-BFD*  *2. maxNumberSSB-BFD*  *3. maxNumberCSI-RS-SSB-CBD* |