Qualcomm

RWS-210015

3GPP TSG RAN Rel-18 workshop
Electronic Meeting, June 28 - July 2, 2021
Agenda Item: 4.2

On Enhancements to NR MBS for Rel-18

Qualcomm

5G

Background

- SA2 SI (SP-190625) defined architectural enhancements for 5G multicast-broadcast services, as captured in TR 23.757.
- SA6 SI on mission critical services over 5G multicast-broadcast (SP-190929) identified design goals as captured in TR 23.774.
- SA1 requirements are captured in TS 22.261 clause 6.13.2.
- Rel-17 RAN WI on NR support of Multicast and Broadcast Services (RP-193248).

- Some Rel-18 follow-up work is proposed as shown in next slides.
  - Enhancements that are beneficial but not supported in Rel-17.
  - Enhancements to be specified building upon Rel-17 foundation.
  - Overall, expect the project to be ‘small’.

Multicast Reliability

- In Rel-17, ACK/NACK-based and NACK-only based HARQ retransmission is supported for Multicast L1 reliability.

- TR 23.757 clause 8.4 indicates the 5G QoS models and parameters as defined in TS 23.501 clause 5.7 also generally apply to MBS.
  - During Rel-17 discussions, RAN2 also confirmed that RAN reliability requirements for NR MBS are derived based on QoS reliability requirements configured by 5GC MB-SMF.

- PHY reliability (HARQ) alone is not sufficient to support such Multicast QoS requirements. Application layer retransmissions are not efficient because of additional delays.

- In Rel-17, L2-based retransmissions to support reliability for multicast was discussed but not specified due to lack of time.

- Note: Workaround by L2 PTP/PTM switching is supported in Rel-17, however this may not work with HARQ NACK-only feedback.

PHY and Power Saving Enhancements

- In Rel-17, group-common PDSCH for multicast/broadcast is scheduled by group-common PDCCH in a common frequency resource.
  - Simultaneous reception of multicast group-common PDSCH and unicast PDSCH in a dedicated BWP is supported for RRC_CONNCTED UEs.

- To reduce the feedback overhead and UE power consumption:
  - Monitoring control of group-common PDCCH may be needed, especially for multiple multicast services.

- Multicast reception may not be limited to UEs in RRC_CONNECTED
  - Multicast reception in RRC_INACTIVE state can save UE power

- Rel-17 already supports intra-DU SFN. Wide Area SFN doesn’t improve efficiency in dense deployments.

Proposals

Building upon Rel-17 foundation, specify following functionalities in Rel-18 follow-up WI on “NR MBS enhancements”:

- Multicast Reliability: [RAN2/RAN1]
  - Support of L2-based retransmissions based on L2-feedback from the UE
  - Support of outer codes (L2 or L1) could be considered
- Capacity / PHY enhancements: [RAN1]
  - RV-level time-interleaving
  - HARQ-ACK codebook enhancements for limited reception
  - CSI feedback enhancement for multicast
- Power savings: [RAN2/RAN1]
  - Specify support of multicast in RRC_INACTIVE
    - including access control, potential L1 feedback by UE in RRC_INACTIVE etc.
  - Power saving techniques for multicast/broadcast monitoring
- + potential leftovers from Rel-17 (to be evaluated closer to the end of the release).

Qualcomm

Thank you

Follow us on:

For more information, visit us at:

www.qualcomm.com & www.qualcomm.com/blog

All data and information contained in or disclosed by this document is confidential and proprietary information of Qualcomm Technologies, Inc. and/or its affiliated companies and all rights therein are expressly reserved. By accepting this material the recipient agrees that this material and the information contained therein will not be used, copied, reproduced in whole or in part, nor its contents revealed in any manner to others without the express written permission of Qualcomm Technologies, Inc. Nothing in these materials is an offer to sell any of the components or devices referenced herein.

©2018-2020 Qualcomm Technologies, Inc. and/or its affiliated companies. All Rights Reserved.

Qualcomm is a trademark of Qualcomm Incorporated, registered in the United States and other countries. Other products and brand names may be trademarks or registered trademarks of their respective owners.

References in this presentation to “Qualcomm” may mean Qualcomm Incorporated, Qualcomm Technologies, Inc., and/or other subsidiaries or business units within the Qualcomm corporate structure, as applicable. Qualcomm Incorporated includes Qualcomm’s licensing business, QTL, and the vast majority of its patent portfolio. Qualcomm Technologies, Inc., a wholly-owned subsidiary of Qualcomm Incorporated, operates, along with its subsidiaries, substantially all of Qualcomm’s engineering, research and development functions, and substantially all of its product and services businesses, including its semiconductor business, QCT.