3GPP TSG-RAN WG3 #115-e R3-222472

Online, 21st February - 3rd March 2022

Agenda Item: 22.2.4

Source: Ericsson (moderator)

Title: CB: # MBS3\_BearerMgmt - Summary of email discussion

Document for: Approval

# Introduction

from chair notes:

**CB: # MBS3\_BearerMgmt**

**- Decision making node on MRB bearer type;**

**- F1-U tunnel options for various type of MRB defined in RAN2, especially the MRB with UE specific transmission (PDCP SR, re-transmission);**

**- Flow control for MRB;**

**- F1AP detailed design (per UE or per MBS session to provide MBS configuration)**

**- E1AP detailed design for Multicast (on shared tunnel, MRB ID, PDCP variables based on RAN2 progress)**

**- MCCH signaling procedure on F1.**

**- Agreeable TPs (F1/E1, on bearer management, MBS context exchange)?**

(E/// - moderator)

Summary of offline disc [R3-222472](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Inbox/R3-222472.zip)

# For the Chairman’s Notes

## First round proposals:

Propose the following:

Re-confirm the following principles:

a) For MC, Agree on a set of non-UE associated E1 procedures to control MBS Session Resources in the gNB-CU-UP for setup, modification and release. (last meeting agreement)

b) Define separation procedures for BC and MC in E1AP and F1AP. (last meeting agreement)

Further, along feedback from last meeting and design proposals seen so far:

c) MC: F1AP follows NGAP (overwhelming feedback last meeting)

d) use MBS session associated signaling connections on F1 and E1

agree on further protocol principles:

a) an MBS Session context may comprise several MBS Area Session IDs and such information is provided on E1 and F1 to control respective MBS Session contexts.

b) control of common/shared resources via common (MBS session) specific protocol functions, for MC and BC

apply NG-RAN architecture principles to NR MBS (agreed long ago)

a) Functional split between DU and CU for NR MBS: DU is responsible for functions related to PHY/MAC/RLC, CU is responsible for functions related to PDCP/SDAP.

b) the “MRB (bearer) type” decision concerning variants of Lower Layer configurations is decided by the DU, well knowing, not disputing, acknloweding, not forgetting re-confirming that the per-UE RRC configuration is triggered by the CU, which is the place from UE is RRC configured.

Follow stage 2 description for TS 38.401 as of R3-222060 [9] for BC and MC.

concerning RLC-AM based MRB bearer types:

a) confirm that RAN2 defined that PDCP Status Report for MRBs is to be used for mobility only (i.e. for PDCP PDUs lost during RRCReconfiguration). If Rel-17 supports PDCP Status Report for MRBs, this is only in that special case which requires ptp functions on F1-U for re-transmission only.

b) it seems that RAN2 defined ptp-only only for cases where neither the UE nor the network supports ptm. This not given in supporting NG-RAN nodes it is proposed to not support ptp-only MRB bearer type in Rel-17 (basically to not specify F1/E1 protocol support at all for that MRB bearer type). This also due to the controversy around that bearer type.

c) simplicity advocates for dealing with individual re-transmission on F1-U within the shared F1-U tunnel and not to setup F1-U for the sake of retransmissions only, but to indicate UL and DL the concerned C-RNTI/DU cell index in a new UL frame (for PDCP SR) and into PDU 0 (DL).

Samsung (TS 38.425 rapporteur) to start drafting TP for CR containing a) applicability of 38.425 functions for MRBs in general sections and b) some details on how to apply DDDS for MRBs

F1AP protocol structure: agreed on an NGAP-aligned F1AP protocol structure containing:

- Multicast Context Setup/Release/Modification

- Multicast Distribution Setup/Release/Modification

E1AP protocol structure:

- Broadcast Bearer Context Setup/Modification (UP/CP triggered)/Release (UP/CP triggered)

- Multicast Bearer Context Setup/Modification (UP/CP triggered)/Release (UP/CP triggered)

# Discussion - first round

## Re-confirmation of principles

Re-confirm the following agreed principles:

a) For MC, Agree on a set of non-UE associated E1 procedures to control MBS Session Resources in the gNB-CU-UP for setup, modification and release.

b) Define separation procedures for BC and MC in E1AP and F1AP.

Further, along feedback from last meeting and design proposals seen so far:

c) MC: F1AP follows NGAP

d) use MBS session associated signaling connections on F1 and E1

Please provide your views below

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| --- | --- |
| Company | Comment |
| Ericsson | yes, sure, of course |
| ZTE | Agree |
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## Further development of principles

Given discussions partly on NG:

a) an MBS Session context may comprise several MBS Area Session IDs and such information is provided on E1 and F1 to control respective MBS Session contexts.

b) control of common/shared resources via common (MBS session) specific protocol functions, for MC and BC

Please provide your views below

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| Company | Comment |
| Ericsson | wholeheartedly OK |
| ZTE | agree |
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## NG-RAN architectural principles for BC and MC

Functional split between DU and CU was designed in Rel-15 along the responsibility for the Uu protocol stack, with DU responsible for functions related to Lower Layers (PHY, MAC, RLC) and CU responsible for functions related to Higher Layers (PDCP, SDAP). The following is easily deducible for NR MBS along the basic agreement to follow NG-RAN architecture:

a) Functional split between DU and CU for NR MBS: DU is responsible for functions related to PHY/MAC/RLC, CU is responsible for functions related to PDCP/SDAP.

b) the “MRB (bearer) type” decision concerning variants of Lower Layer configurations is decided by the DU, well knowing, not disputing, acknowledging, not forgetting re-confirming that the per-UE RRC configuration is triggered by the CU, which is the place from UE is RRC configured.

Please provide your views below

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| Company | Comment |
| Ericsson | a) and b) re-confirms Rel-15 and Rel-17 related decisions |
| ZTE | 1. agree. 2. CU might be able to propose the MRB configuration to DU, for example, suggestion split MRB or MRB with PTP only based on QoS requirement. In case of split MRB, DU choose whichever delivery method anyway. |
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## stage 2 for MC and BC

There are 3 papers dealing with stage 2 for TS 38.401: R3-222060 [9] (BC and MC), R3-222162 [15] (BC) and R3-222163 [16] (MC), whereas protocol design in [15] and [16] doesn´t follow principles agreed last meeting (a and b in 3.1). We propose to follow [9]

Please provide your views below

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| Company | Comment |
| Ericsson | following [9] provides at least some sort of consistency from last meeting. |
| ZTE | we can start the discussion/drafting based on [9] which might be a good start point. |
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## usage of RLC AM based MRB bearer types

a) confirm that RAN2 defined that PDCP Status Report for MRBs is to be used for mobility only (i.e. for PDCP PDUs lost during RRCReconfiguration). If Rel-17 supports PDCP Status Report for MRBs, this is only in that special case which requires ptp functions on F1-U for re-transmission only.

b) it seems that RAN2 defined ptp-only only for cases where neither the UE nor the network supports ptm. This not given in supporting NG-RAN nodes it is proposed to not support ptp-only MRB bearer type in Rel-17 (basically to not specify F1/E1 protocol support at all for that MRB bearer type). This also due to the controversy around that bearer type.

c) simplicity advocates for dealing with individual re-transmission on F1-U within the shared F1-U tunnel and not to setup F1-U for the sake of retransmissions only, but to indicate UL and DL the concerned C-RNTI/DU cell index in a new UL frame (for PDCP SR) and into PDU 0 (DL).

Please provide your views below:

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| Company | Comment |
| Ericsson | OK to a, b and c |
| ZTE | 1. based on RAN2 agreements in RAN2 116-e: "In order to minimize the loss during MRB bearer type change, NW may configure UE to send a PDCP status report for the MRB bearer type change;" the PDCP SR shall not be limited to mobility case but for any scenarios where MRB bearer type change is needed. As long as there is a RLC AM PTP leg after MRB reconfig, PDCP SR is possible. 2. RAN2 does not make such assumption. There is no controversy based on company inputs. 3. simplicity asks for not messing up the shared tunnel. |
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## TS 38.425 and flow control

Several papers consider flow control and general adaptations of TS 38.425. It is proposed that the TS rapporteur (Samsung) starts to collect common sense TPs (or creates new ones) that

- state applicability of 38.425 functions for MRBs in general sections

- details rules for DDDS function for MRBs

in a way that first leaves out discussions on individual F1-U bearers for RLC AM entities of an MRB.

(btw: please consider the 1:1 mapping between Radio Bearer and F1-U /NR user plane protocol instance, we shouldn’t change that principle for MRBs)

Please provide your views below:

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| Company | Comment |
| Ericsson | OK to start with drafting |
| ZTE | we didn't find any technique issue on F1-U support on various type of MBR as in R3-222322.  if companies do have concern on flow control we agree to leave out it for now and not define anything for flow control for MRB. |
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## NGAP principles applied to F1AP on procedure level

Along principles commonly agreeable at last meeting it is proposed to apply the same procedure structure for MC on F1AP as on NGAP

- Multicast Context Setup/Release/Modficiation

- Multicast Distribution Setup/Release/Modification

Please provide your views below:

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| Company | Comment |
| Ericsson | OK to start with that, including a DU initiated MC Context Release procedure. |
| ZTE | OK but, we might need a DU initiated MC Context modification too. |
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## E1AP protocol structure

Following the agreement to have non-UE associated procedures for UP context control on E1AP, separate for MC and BC the following protocol structure is proposed for E1AP

- Broadcast Bearer Context Setup/Modification (UP/CP triggered)/Release (UP/CP triggered)

- Multicast Bearer Context Setup/Modification (UP/CP triggered)/Release (UP/CP triggered)

Please provide your views below:

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| Company | Comment |
| Ericsson | yes, very fine |
| ZTE | Agree. |
|  |  |

# Conclusion, Recommendations [if needed]

If needed

# References

1. [R3-221782](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-221782.zip) MBS MCCH over F1 (NEC)
2. [R3-221783](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-221783.zip) (TP to TS 38.473 BL CR) MCCH over F1 (NEC)
3. [R3-221784](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-221784.zip) F1-U tunnel for PTP leg (NEC)
4. [R3-221785](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-221785.zip) (TP to TS 38.473 BL CR) F1-U tunnel for PTP leg (NEC)
5. [R3-221989](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-221989.zip) (TP to TS 38.463 BL CR) Bearer Management for Multicast (Lenovo, Motorola Mobility, Huawei, Qualcomm Incorporated)
6. [R3-221990](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-221990.zip) (TP to TS 38.460 BL CR) Bearer Management for Multicast (Lenovo, Motorola Mobility, Huawei, Qualcomm Incorporated)
7. [R3-221991](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-221991.zip) Configuration of initial value of HFN and reference SN over E1AP (Lenovo, Motorola Mobility)
8. [R3-221992](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-221992.zip) (TP to TS 38.425 BL CR) Remaining issues on Flow control and F1-U tunnel (Lenovo, Motorola Mobility)
9. [R3-222060](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-222060.zip) [TP for BL CR 38.401] Multicast and Broadcast F1 and E1 stage 2 (Ericsson)
10. [R3-222061](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-222061.zip) [TP for BL CR 38.463] Multicast and Broadcast E1AP functions (Ericsson)
11. [R3-222494](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Inbox/R3-222494.zip) [TP for BL CR 38.473] Multicast and Broadcast F1AP functions (Ericsson)
12. [R3-222080](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-222080.zip) (TP for 38.473) F1AP Correction for MBS Group Paging (Nokia, Nokia Shanghai Bell)
13. [R3-222081](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-222061.zip) (TP for 38.473) F1AP full UE associated Signalling solution for Multicast (Nokia, Nokia Shanghai Bell)
14. [R3-222112](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-222112.zip) Discussion on bearer management over F1/E1 for multicast (LG Electronics)
15. [R3-222162](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-222162.zip) (TPs to TS 38.401 38.470, 38.460 BL CRs) Bearer management over F1 and E1 for Broadcast (Huawei, Nokia, Nokia Shanghai Bell, CBN, China Unicom, China Telecom, CMCC)
16. [R3-222163](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-222163.zip) (TPs to TS 38.401, 470, 460 BL CRs) Bearer Management for Multicast (Huawei, Lenovo, Motorola Mobility, CBN, CMCC)
17. [R3-222164](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-222164.zip) (TP to 38.473 BL CR) Bearer Management for Multicast (Huawei, Lenovo, Motorola Mobility, CBN, CMCC)
18. [R3-222165](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-222165.zip) (TP to TS 38.425 BL CR) Flow Control for MBS (Huawei, CBN, China Unicom, China Telecom)
19. [R3-222253](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-222253.zip) (TP for TS 38.425) Discussion on flow control for MBS (CMCC)
20. [R3-222277](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-222277.zip) F1-U tunnel for MRB retransmission (Qualcomm Incorporated)
21. [R3-222291](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-222291.zip) (TP for TS38.425): Discussion on open issues in F1 for multicast (Samsung)
22. [R3-222322](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-222322.zip) Bearer management for NR MBS with TP to BL CR for TS 38.425 BL CR (ZTE)
23. [R3-222024](https://www.3gpp.org/ftp/tsg_ran/WG3_Iu/TSGR3_115-e/Docs/R3-222024.zip) Discussion on remaining issues on F1-U (CATT)