3GPP TSG-RAN WG3 #117-e R3-224996

Online, 15th - 24th August 2022

Agenda Item: 9.2.7

Source: Ericsson (moderator)

Title: CB: # 21\_R17MBS\_XnF1E1 - Summary of email discussion

Document for: Discussion

# Introduction

This document summarizes the offline discussions on Rel-17 MBS Corrections, guided by the chair’s summary below

**CB: # 21\_R17MBS\_XnF1E1**

**- Incomplete multicast call flow and other CRs to TS 38.401**

**- Definition of MBS related contexts on NG-RAN interfaces**

**- MRB Type (with bearer type change) and RLC Mode on F1AP**

**- MRB ID range on NG-RAN interfaces, MRB ID change**

**- F1-U Tunnel establishment for the per UE data over the ptp leg (e.g., triggering, CU/DU roles)**

**- Update to F1-U Context Descriptor**

**- Data Forwarding between MBS supporting nodes (e.g., at MBS session level)**

**- Mobility between Supporting node and non-supporting node**

**- Broadcast service and Unicast service co-existence**

**- Misc (e.g., Address management for shared CU UP, codepoints update, F1/E1AP ID, IE namings on HFN/SN for PDCP initialisation, PDCP count "wrap around", MBS specific cause values on network interfaces)**

**- Capture agreements and provide CRs if agreeable, split the work**

(E/// - moderator)

Summary of offline disc R3-224996

# For the Chairman’s Notes

[to be added]

# Discussion first round

## General alignment of definitions, missing definitions, etc.

This topic is dealt with in R3-224467 [17] - R3-224473 [22], including CR for 38.401 [18], CR for XnAP [19], CR for F1AP [20], CR for E1AP [21], CR for 38.472 [22], CR for 37.482 [23].

**Q1:** Given the fact that the content of those documents were submitted to all companies participating in MBS discussions in the past begin of July, the moderator suggests to collect further comments but to assume that these changes are in general agreeable. Please provide your comments below.

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## Control of F1-U ptp retransmission tunnel resources

This topic is dealt with in R3-224475 [24] and R3-224476 [25].

**Q2:**The moderator proposes to take

(1) agree on CR for F1AP in R3-224476 [25]

(2) agree on the following parts of R3-224407 [8], CR for 38.401: section 6.1.5 and ptp retransmission parts of section 6.4. Please provide your comments below

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## Control of F1-U “catch up” tunnel resources, i.e. for ptp F1-U tunnels that provide data forwarded on Xn-U

R3-224327 [1], R3-224328 [2] and R3-224329 [3] propose to allow establishment of ptp F1-U tunnels to deliver PDCP PDUs to the DU as received via the Xn-U forwarding tunnel. Different than the re-structuring of the F1-U Context Descriptor in R3-224471 [20] and R3-224472 [21] it is proposed to keep an explicit UE reference.

**Q3:**The moderator suggest to

(1) first comment on the overall concept, scenario and requirement of this approach

(2) comment to an approach, suggested by the moderator, given (1) can be answered positively, where the F1-U Context descriptor, upon request from the CU, follows approach in in R3-224471 [20] and R3-224472 [21] and includes yet another “discriminator” for this new kind of tunnel e.g. “ptp forwarding tunnel” (with the semantics that no PDCP Status Report is configured) and including the first PDCP SN to be sent on that tunnel and by that allowing a “direct” communication between the DU and the CU-UP) w/o the necessity to “intercept” the F1-U MC Distribution Setup procedure at the CU by retrieving UE context data.

and kindly asks to provide comments below.

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## Introducing support of MBS Session level Xn-U data forwarding

Papers R3-224449 [15] (discussion) and R3-224450 [16] (XnAP CR) propose to introduce MBS Session level Xn-U data forwarding.

**Q4**: The moderator kindly asks to provide below

(1) general comments on the proposal

(2) comments on the CR, if applicable/if any

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| ZTE | tend to not. the spirit of current spec assumes if there is no PDCP SN sync (and no MRB mapping sync), then no data forwarding. |
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## Control of Xn-U forwarding tunnel resources for MC MBS traffic in E1AP

E1AP CRs in R3-224860 [39], R3-224329 [3] and R3-224648 [30] introduce missing E1AP signaling to configure Xn-U forwarding resources towards supporting and non-supporting gNBs (which requires QFI mapping information).

**Q5.1**: The moderator proposes to follow principles outlined in R3-224860 [30} and R3-224329 [3], which rather configures the MC MBS Session Context than a UE Session Context. The moderator suggests to take [R3-224860 [40] as baseline (which include the forwarding and mapping information into the existing “Setup/Modify” List IEs. Please provide your comments below:

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**Q5.2**: The moderator also proposes to discuss renaming the *MBS Initial HFN and Reference PDCP SN* IE (E1AP, see [30]) or alternatively modifying the IE semantics bearing in mind, that the value carried in this IE may be only an estimate. Corresponding proposal for XnAP in [40] to be included in the discussion.

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**Q5.3**: The moderator also proposes to discuss changes proposed in [30] regarding PDCP SN wrap around. Please provide your comments:

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**Q5.4**: And finally, sorry for that, the moderator proposes to discuss proposals regarding provision of mapping information to support duplication avoidance, as proposed in [30]. Please provide your comments:

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## Re-structuring TS 38.401 message flow for multicast

There are a couple of attempts to either correct the current version of the mc message flow in TS 38.401 in its current shape as in R3-224334 [6] or to disentangle the flow and split it up into different stages/scenarios as shown in R3-224477 [26].

**Q6:** The moderator suggests to

(1) follow the approach in R3-224477 [26] and discuss it

(2) then discuss whether and how to introduce further details as suggested in R3-224334 [6] and R3-224933 [42] and R3-224943/5040 [44].

and kindly asks to provide comments below:

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| ZTE | Related to Q9. Please kindly have a look of our paper in [42] to tackle - the mysterious admission control for a multicast flow in PDU session that shall not happen in the first place, and- unnecessary radio resources allocated for an inactive session.Therefore a re-structuring is definitely needed.And in [43] we suggested a look at the message flow for F1AP. We are aware that it might be too late to take it back. But if we take a holistic view of F1AP, one may easily find that we could have a better version of F1AP for multicast. - it takes 3 kinds of signaling to sync multicast context between CU and DU.- during session activation, the overhead is doubled or tripled.- why can not we go the CU initiated multicast context setup request way, old but good? // I fail to see our way to follow NGAP on F1AP. MB-SMF needs gNB to shout out to let MB-SMF find it, while a CU can always find its DU! |
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## Support of MRB ID Change on E1/F1

R3-224672 [35] (discussion), R3-224673 [36] (CR F1AP) and R3-224674 [37] (CR E1AP).

**Q7:** (1) The moderator understands that MRB ID change in case of inter-DU mobility is covered, while these papers propose to support MRB ID Change in case of intra-DU mobility. If this is confirmed, the moderator wonders whether this is necessary, as the scope of the MRB ID was defined to be the DU (an F1 interface instance) and we could assume that the MRB ID allocation does not need to be changed.

(2) The E1AP CR also proposes to change the semantics of the E1AP maxnoofMRBs.

The moderator kindly asks to please provide comments below.

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| ZTE | Anyone had considered having a **MRB index** per CU/DU pair, together with a per UE **MRB ID**, to help clear the mess on how MRB is managed on F1AP? [43] R3-224942 |
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## Corrections for shared NG-U termination

**Q8.1:** Documents R3-224442 [10] - R3-224444 [12] propose to correct the handling of shared NG-U terminations on E1 and NG to explicate the case where F1/NG Distribution Setup procedure instances refer to already established NG-U terminations. Please provide your comments below,

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**Q8.2:** R3-224447 [13] and R3-224448 [14] suggest introducing a third codepoint to allow a combination of the first two codepoints in one step. Please provide your comments below.

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## Corrections for MC MBS session admission control

R3-224942 [43] and R3-224943 [44] deals with admission control in general.

**Q9:** The moderator would like to take these papers to highlight that the RAN3 decision that admission control [for MRB radio resources] takes place at multicast session activation is not captured anywhere in stage 2/3. The moderator proposes to task the authors of [43] and [44] to capture that agreement in an appropriate place in 38.401 (as a first proposal). Please provide your comments below.

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| Company | Comment |
| ZTE | Proponent of [43] and [44] here.Per SA2 guidance, no radio resource shall be allocated for inactive multicast session. - current flowchart is obviously against such principle. the E1AP procedure will inevitably ask for establishing at least one MRB at UP side, which means it is not only about NG-U but real resources allocated for the radio bearer which is part of the radio resources.Re-structuring the 401 flowchart, confirming the PDU session modification immediately without admission control, is also a more consistent way. As per RAN3 agreement, the multicast flow in the PDU session will not consume any resources.This is, again, consistent with the agreement mentioned by moderator: admission control [for MRB radio resources] takes place at multicast session activation. If the session status is unknown to RAN, how can RAN allocate any resources for it? |
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## Correction to Group Paging in F1

**Q10:** R3-224669 (discussion paper in the other CB) and F1AP CR in R3-224671 [34] propose to specify the DU action in case the *UE Identity List for Paging* IE is not included. Please provide your comments below:

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## Introducing MBS cause values in E1AP and F1AP

**Q11:** Documents R3-224665 [31] - R3-224668 [32] propose including MBS specific cause values. Please provide your comments below:

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## DU and CU role for deciding the MRB bearer type applied in the UE RRC configuration

The moderator saw that there are a couple of papers (R3-224332 [4], R3-224406 [7], ff) that contain proposals that the CU ultimately determines the MRB bearer type, which on the one hand side may come from confusing the fact that the CU terminates the RRC protocol, while the DU provides, per Rel-15 agreement the lower layer configuration which is transparently incorporated in the final RRC Reconfiguration message, and partly from the fact that the CU would request the DU to setup e.g. ptp retransmission resources, however, the DU still remains in charge of determining the MRB bearer type, as it denotes lower layer configuration.

**Q12:** The moderator suggests to close the discussion with the above understanding and tasks the author of R3-224407 [8] to provide a resulting CR for TS 38.401 capturing that understanding in chapter 7.7.1 or any other suitable place. Please provide your comments below

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| ZTE | [4] R3-224332 had a good summary of the options on the table. We'd like to suggest a compromised solution for everyone:- CU to decide RLC mode, as in legacy.- DU to decide MRB type, in NR MBS.We agree with Ericsson that lower layer config shall be determined by DU. One example, how can CU decide which cell to do the PTM transmission? We doubt it is CU's duty or CU has the capability to do so.Moever, if DU is able to decide which leg to use for a split MRB, DU shall naturally know which MRB type is good for the UE. |
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## Broadcast and Unicast Co-existence correction for F1AP

**Q13:** Please provide comments to R3-224333 [5], the F1AP CR.

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| ZTE | OK with the CR. DU shall be aware of the UE interests for better scheduling. |
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## E1AP ASN.1 Correction for MCBearerContextToModify

**Q14**: Please provide comments to R3-224644 [27].

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## Exchange of ongoing broadcast service between neighbor nodes

**Q15**: Please provide comments to R3-224645 [28].

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| ZTE | If we remember correctly, we stopped the discussion on this feature meetings ago. |
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# Conclusion, Recommendations [if needed]

If needed

# References

1. R3-224327 Consideration on Multicast Data Forwarding and F1-U Tunnel aspects (Huawei, CBN, China Unicom, Nokia, Nokia Shanghai Bell), discussion
2. R3-224328 Multicast Data Forwarding and F1-U tunnel aspects (Huawei, CBN, China Unicom, Nokia, Nokia Shanghai Bell), CR0977r, TS 38.473 v17.1.0, Rel-17, Cat. F
3. R3-224329 Multicast Data Forwarding and F1-U tunnel aspects (Huawei, CBN, China Unicom, Nokia, Nokia Shanghai Bell),CR0028r, TS 37.483 v17.1.0, Rel-17, Cat. F
4. R3-224332 Other leftover issues on F1 and E1 for MBS (Huawei, CBN, Qualcomm Incorporated, Lenovo), discussion
5. R3-224333 Correction on Broadcast and Unicast co-existence (Huawei, CBN, Qualcomm Incorporated, CATT, Lenovo), CR0978r, TS 38.473 v17.1.0, Rel-17, Cat. F
6. R3-224334 Correction on Multicast Session Establishment (Huawei, CBN, Qualcomm Incorporated, Nokia, Nokia Shanghai Bell, CATT, Lenovo), CR0240r, TS 38.401 v17.1.1, Rel-17, Cat. F
7. R3-224406 F1-U tunnels related issues (Lenovo), discussion
8. R3-224407 Correction on F1-U tunnels for multicast MRB (Lenovo), CR0243r, TS 38.401 v17.1.0, Rel-17, Cat. F
9. R3-224408 Correction on F1-U tunnels for multicast MRB (Lenovo), CR0983r, TS 38.473 v17.1.0, Rel-17, Cat. F
10. R3-224442 Correction of address management for shared CU UP (Nokia, Nokia Shanghai Bell, Qualcomm Incorporated, Orange), discussion
11. R3-224443 Correction of address management for shared CU UP (Nokia, Nokia Shanghai Bell, Qualcomm Incorporated, Orange), CR0862r, TS 38.413 v17.1.1, Rel-17, Cat. F
12. R3-224444 Correction of address management for shared CU UP (Nokia, Nokia Shanghai Bell, Qualcomm Incorporated, Orange), CR0029r, TS 37.483 v17.1.0, Rel-17, Cat. F
13. R3-224447 Correction of shared CU UP codepoints (Nokia, Nokia Shanghai Bell, Ericsson, Orange), discussion
14. R3-224448 Correction of shared CU UP codepoints (Nokia, Nokia Shanghai Bell, Ericsson, Orange), CR0030r, TS 37.483 v17.1.0, Rel-17, Cat. F
15. R3-224449 Correction of MBS data forwarding (Nokia, Nokia Shanghai Bell, Huawei, Orange), discussion
16. R3-224450 Correction of MBS data forwarding (Nokia, Nokia Shanghai Bell, Huawei, Orange), CR0863r, TS 38.423 v17.1.0, Rel-17, Cat. F
17. R3-224467 General open issues - discussion (Ericsson, Qualcomm, Verizon Wireless, AT&T, China Unicom), discussion
18. R3-224468 Further Corrections for NR MBS (Ericsson, Qualcomm, Verizon Wireless, AT&T, China Unicom), CR0244r, TS 38.401 v17.1.1, Rel-17, Cat. F
19. R3-224470 Further Corrections for NR MBS (Ericsson, Nokia, Nokia Shanghai Bell, Qualcomm, Verizon Wireless, AT&T, China Unicom), CR0867r, TS 38.423 v17.1.0, Rel-17, Cat. F
20. R3-224471 Further Corrections for NR MBS (Ericsson, Nokia, Nokia Shanghai Bell, Qualcomm, Verizon Wireless, AT&T, China Unicom), CR0984r, TS 38.473 v17.1.0, Rel-17, Cat. F
21. R3-224472 Further Corrections for NR MBS (Ericsson, Nokia, Nokia Shanghai Bell, Qualcomm, Verizon Wireless, AT&T, China Unicom), CR0031r, TS 37.483 v17.1.0, Rel-17, Cat. F
22. R3-224473 Corrections for MBS-associated signalling (Ericsson, Nokia, Nokia Shanghai Bell, Qualcomm, CATT, Verizon Wireless, AT&T, China Unicom), CR0022r, TS 38.472 v17.0.0, Rel-17, Cat. F
23. R3-224474 Corrections for MBS-associated signalling (Ericsson, Nokia, Nokia Shanghai Bell, Qualcomm, CATT, Verizon Wireless, AT&T, China Unicom), CR0002r, TS 37.482 v17.1.0, Rel-17, Cat. F
24. R3-224475 Corrections for ptp retransmission topics and overall example message flow restructuring (Ericsson, Verizon Wireless, AT&T, China Unicom), discussion
25. R3-224476 Corrections for the establishment of F1-U ptp retransmission tunnels (Ericsson, Verizon Wireless, AT&T, China Unicom), CR0985r, TS 38.473 v17.1.0, Rel-17, Cat. F
26. R3-224477 Corrections to the example message flow for multicast MBS Context establishmen (Ericsson, Verizon Wireless, AT&T, China Unicom), CR0245r, TS 38.401 v17.1.1, Rel-17, Cat. F
27. R3-224644 E1AP ASN.1 correction on MCBearerContextToModify (CATT,Nokia, Nokia Shanghai Bell,Huawei,ZTE,Ericsson,Samsung,Lenovo), CR0032r, TS 37.483 v17.1.0, Rel-17, Cat. F
28. R3-224645 Introduction of ongoing broadcast service in XnAP (CATT,Nokia, Nokia Shanghai Bell), CR0878r, TS 38.423 v17.1.0, Rel-17, Cat. F
29. R3-224647 Discussion on three issues on E1AP (CATT), discussion
30. R3-224648 Correction on three issues on TS 37.483 (CATT), CR0033r, TS 37.483 v17.1.0, Rel-17, Cat. F
31. R3-224665 Introduction of MBS specific cause values (Huawei, CBN, Qualcomm Incorporated), discussion
32. R3-224667 Introduction of MBS specific cause values (Huawei, CBN, Qualcomm Incorporated), CR1000r, TS 38.473 v17.1.0, Rel-17, Cat. F
33. R3-224668 Introduction of MBS specific cause values (Huawei, CBN, Qualcomm Incorporated), CR0034r, TS 37.483 v17.1.0, Rel-17, Cat. F
34. R3-224671 Correction on Multicast Group Paging (Huawei, CBN, Qualcomm Incorporated, Nokia, Nokia Shanghai Bell, Lenovo), CR1001r, TS 38.473 v17.1.0, Rel-17, Cat. F
35. R3-224672 Multicast MRB ID change over F1 and E1 interfaces (Huawei, CBN, Qualcomm Incorporated, Lenovo), discussion
36. R3-224673 Correction on MRB ID Change (Huawei, CBN, Qualcomm Incorporated, Lenovo), CR1002r, TS 38.473 v17.1.0, Rel-17, Cat. F
37. R3-224674 Correction on MRB ID Change (Huawei, CBN, Qualcomm Incorporated, Lenovo), CR0035r, TS 37.483 v17.1.0, Rel-17, Cat. F
38. R3-224859 Discussion for the MBS open issues (Samsung), discussion
39. R3-224860 Correction for the MBS multicast data forwarding (Samsung), CR0037r, TS 37.483 v17.1.0, Rel-17, Cat. F
40. R3-224861 Correction for the MRB progress information (Samsung), CR0892r, TS 38.423 v17.1.0, Rel-17, Cat. F
41. R3-224919 Discussion on Multicast MBS Session Context Establishment (Google Inc.), discussion
42. R3-224933 Clarification to Multicast MBS Session Context Establishment (Google Inc.), CR0254r, TS 38.401 v17.1.1, Rel-17, Cat. F
43. R3-224942 Issues found in Rel-17 NR MBS with discussions and draft CR to F1AP (ZTE), other
44. R3-224943 (will be revised in R3-225040) Correction to 38.401 on admission control of multicast session for NR MBS (ZTE, CMCC, Lenovo), CR0256r, TS 38.401 v17.1.1, Rel-17, Cat. F