**3GPP TSG RAN meeting #99 RP-23xxxx**

**Rotterdam, Netherlands, March 20-23, 2023**

## Status Report to TSG

**Agenda item:** 9.3.2.8

|  |  |
| --- | --- |
| **WI / SI Name** | Enhancements of NR Multicast and Broadcast Services |
| included in this status report | Study Item: No | Core part: Yes | Performance part:No | Testing part:No |
| **Acronym** | NR\_MBS\_enh |
| **Unique ID** | 940099 |
| **TSG Tdoc of latest approved WI/SI description (if any)** | RP-221458 |
| **Target Completion Date****(indicate if changed)** | Study Item:  | Core part: 12/2023 | Performance part:  | Testing part:  |
| **Overall Completion level** | Study Item:  | Core part: 45% | Performance Part:  | Testing part:  |

Note: Overall completion level percentage numbers should use one of the colors below:

* xx%: Normal progress, no RAN plenary action needed
* xx%: Progress behind schedule, may need RAN plenary intervention. If so, SR should clearly define requested action
* xx%: Progress critically behind, RAN plenary shall intervene. SR should define requested action

**Source:**

|  |  |
| --- | --- |
| **Leading WG** | RAN2 |
| **Rapporteur** | **Name** | Erlin Zeng |
| **Company** | CATT |
| **Email** | erlin.zeng@catt.cn |

## 1 Work plan related evaluation

|  |  |
| --- | --- |
| **Do you want to modify the time budget for this WI/SI compared to what was endorsed at the last RAN meeting?** | No |

*If you answered No: Then please remove the Excel file from the zip file of this status report.*

*If you answered Yes: Then please fill out the attached Excel template to request a modification of the time budgets for your WI /SI. The Excel table has to be filled out for all affected RAN WGs and up to the target date of the WI/SI. The basis are the endorsed time budgets of the last RAN meeting. Please highlight all changes of the values.
 One time unit (TU) corresponds to ~ 2 hours in the meeting.
 If this status report covers a WI with Core and Performance part, then please have one line for each in the attached Excel table.
 Note: If no Excel table is attached, then this means no time budget change.*

**Additional explanations/motivations for the time budget changes in the attached Excel table:**

## 2. Detailed progress in RAN WGs since last TSG meeting (for all involved WGs)

 NOTE: Agreements and Open issues impacted cross-TSG aspects shall be explicitly highlighted

## 2.1 RAN1

#### 2.1.1 Agreements

#### 2.1.2 Remaining Open issues

## 2.2 RAN2

#### 2.2.1 Agreements in RAN2#121

**Multicast reception in RRC\_INACTIVE**

UE shall join in the multicast session before receiving multicast in RRC INACTIVE.

If network finds it useful, the PTM configuration for the (single) serving cell can be configured to UE before the session activation, and UE stores the configuration. When session is activated, UE can receive multicast in INACTIVE state by applying the configuration without going back to RRC\_CONNECTED, if not updated by MCCH after being configured.

When network configures UE to receive multicast in INACTIVE state, RRCRelease message with suspendconfig can be used to deliver the PTM configuration. Other dedicated RRC messages will not be used to provide PTM configuration for MBS multicast for INACTIVE.

We introduce a new MCCH logical channel for multicast in INACTIVE (different from broadcast MCCH)

Multicast MCCH configuration is provided via new SIB.

Optionally, Multicast MCCH configuration for the serving cell can also be provided in dedicated signalling. Understanding is we are not optimizing mobility case because of this.

Serving cell will not provide the PTM configuration of neighbour cells from other gNBs.

FFS whether the network can provide PTM configuration for intra-gNB cells.

**Shared processing for MBS broadcast and Unicast reception**

Indicate the capability of receiving MBS broadcast from a non-serving cell. FFS whether the granularity is at FeatureSetDownlink or FeatureSetDownlinkPerCC level.

FFS Whether to include additional information in MII can be controlled by the network. Should consider whether this would be two-step procedure or one-step procedure (e.g. having more info in SIB1).

#### 2.2.3 Remaining Open issues

* Specify support of multicast reception by UEs in RRC\_INACTIVE state
	+ PTM configuration for UEs receiving multicast in RRC\_INACTIVE state
	+ Study the impact of mobility and state transition for UEs receiving multicast in RRC\_INACTIVE. (Seamless/lossless mobility is not required)
* Specify Uu signalling enhancements to allow a UE to use shared processing for MBS broadcast and unicast reception, i.e., ‎including UE capability and related assistance information reporting regarding simultaneous unicast reception in RRC\_CONNECTED and MBS broadcast reception from the same or different operators

## 2.3 RAN3

#### 2.3.2 Agreements in RAN3#119

**General**

* LS to SA2 on the progress of NR\_MBS\_enh WID in RAN3.

**About RAN Sharing**

* Agree Option4 i.e. NG-RAN node implementation decision on how many NG-U tunnels to be set up to support shared NG-U tunnel.
* For MOCN, it is up to NG-RAN node implementation to decide how many NG-U tunnels to be setup.
* For MOCN, It is up to the NG-RAN node implementation on how to handle different S-NSSAI received for the same shared service from different PLMNs (i.e. same Associated Session ID).
* It is agreed to transfer the Associated Session ID together the MBS Session ID.
* WA: The Associated Session ID is per TMGI per Area Session ID. Therefore, it is transferred outside the N2 SM container.

**About Support for RRC Inactive state**

* Support a per UE per MBS session indication from CN to RAN.

#### 2.3.3 Remaining Open issues

* Specify support of multicast reception by UEs in RRC\_INACTIVE state [RAN2, RAN3]
	+ Study the impact of mobility and state transition for UEs receiving multicast in RRC\_INACTIVE. (Seamless/lossless mobility is not required) [RAN2, RAN3]
* Study and if necessary, specify enhancements to improve the resource efficiency for MBS reception in RAN sharing scenarios[RAN3]

## 2.4 RAN4

#### 2.4.1 Agreements

#### 2.4.2 Remaining Open issues

## 2.5 RAN5

#### 2.5.1 Agreements

#### 2.5.2 Remaining Open issues

#### 2.5.3 Remaining Open issues with cross-WG dependencies

## 2.6 RAN6

#### 2.6.1 Agreements

#### 2.6.2 Remaining Open issues

## 3. Detailed progress in SA/CT WGs since last TSG meeting (for all involved WGs)

NOTE: This section only needs to be filled in for WI/SIs where there is a corresponding relevant WI/SI in SA/CT.

## 3.1 SAx/CTs

#### 3.1.1 Agreements with cross-TSG impacts

#### 3.1.2 Remaining Open issues with cross-TSG impacts

NOTE: This section should also flag any critical dependencies that need TSG attention.

## 4. References

NOTE: This can be e.g. a list of all related Tdocs in the affected WGs since last TSG, references to LSs, produced TRs/TSs, the work/study item description or status reports of previous TSGs.

1. R2-2300067 Reply LS on FS\_5MBS\_Ph2 progress (S2-2211256; contact: Huawei) SA2 LS in Rel-18 FS\_5MBS\_Ph2, NR\_MBS\_enh-Core To:RAN2, RAN3 Cc:RAN1
2. R2-2301165 Discussion on the LS from SA2 Huawei, HiSilicon discussion Rel-18 NR\_MBS\_enh-Core
3. R2-2301934 LS on the open issues related to RAN WGs in 5MBS\_Ph2 (S2-2303407; contact: Huawei)
4. R2-2300286 Discuss on PTM configuration for multicast in RRC INACTIVE MediaTek inc. discussion Rel-18 NR\_MBS\_enh-Core
5. R2-2301036 PTM configuration for multicast reception in RRC\_INACTIVE LG Electronics Inc. discussion Rel-18

Service continuity

1. R2-2300242 Initial Considerations on Mixed Approach vivo Mobile Com. (Chongqing) discussion Rel-18 NR\_MBS\_enh-Core
2. R2-2301586 PTM configuration and mobility aspects on multicast reception in RRC INACTIVE Kyocera discussion Rel-18
3. R2-2300335 PTM configuration and mobility aspects for multicast reception in RRC\_INACTIVE Qualcomm
4. R2-2300178 Discussions on PTM Configuration and Mobility CATT, CBN discussion NR\_MBS\_enh-Core
5. R2-2300100 Discussion on multicast reception in RRC\_INACTIVE state OPPO discussion Rel-18 NR\_MBS\_enh-Core
6. R2-2300243 Discussion on Mixed Approach from PHY Aspect vivo Mobile Com. (Chongqing) discussion Rel-18 NR\_MBS\_enh-Core
7. R2-2300283 Analysis of MCCH for sending PTM configuration TD Tech, Chengdu TD Tech discussion Rel-18
8. R2-2300525 Discussion on PTM configuration aspects and mobility Samsung R&D Institute India discussion Rel-18
9. R2-2300666 Discussion on PTM configuration and Mobility Spreadtrum Communications discussion Rel-18
10. R2-2300672 Discussion on PTM configuration and mobility NEC Corporation discussion Rel-18 NR\_MBS\_enh-Core
11. R2-2300735 PTM Configuration and Mobility for INACTIVE Multicast Reception Apple discussion Rel-18 NR\_MBS\_enh-Core
12. R2-2300876 PTM configuration aspects and mobility Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_MBS\_enh-Core
13. R2-2300947 PTM configuration and mobility for multicast reception in RRC\_INACTIVE Lenovo discussion Rel-18
14. R2-2301162 PTM configuration and mobility for multicast reception in RRC\_INACTIVE Huawei, HiSilicon discussion Rel-18 NR\_MBS\_enh-Core
15. R2-2301206 PTM configuration aspects and mobility Ericsson discussion Rel-18 NR\_MBS\_enh-Core
16. R2-2301235 Discussion on PTM configuration and mobility CMCC discussion Rel-18 NR\_MBS\_enh-Core
17. R2-2301559 PTM configuration for multicast reception in RRC\_INACTIVE Intel Corporation discussion Rel-18 NR\_MBS\_enh-Core
18. R2-2301672 Multicast in RRC\_INACTIVE Sharp discussion
19. R2-2301691 Considerations on the PTM configuration and mobility for multicast reception in RRC\_INACTVE state Beijing Xiaomi Software Tech discussion Rel-18
20. R2-2301843 PTM Configuration delivery for multicast reception in RRC\_INACTIVE ZTE, Sanechips discussion Rel-18 NR\_MBS\_enh
21. R2-2300877 Notifications and RRC state transitions Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_MBS\_enh-Core
22. R2-2300179 Discussion on Notifications and RRC state transitions CATT, CBN discussion NR\_MBS\_enh-Core
23. R2-2300244 Discussion on (De)Activation and State Transition vivo Mobile Com. (Chongqing) discussion Rel-18 NR\_MBS\_enh-Core
24. R2-2300252 HARQ operation during RRC state transitions for multicast reception NEC discussion NR\_MBS\_enh-Core
25. R2-2300284 Common signalling for multicast reception in RRC\_INACTIVE state TD Tech, Chengdu TD Tech discussion Rel-18
26. R2-2300287 Notification and state transition for multicast in RRC INACTIVE MediaTek inc. discussion Rel-18 NR\_MBS\_enh-Core
27. R2-2300336 Notifications and RRC state transitions multicast reception in RRC\_INACTIVE Qualcomm Incorporated discussion Rel-18 NR\_MBS\_enh-Core
28. R2-2300526 Discussion on Notification and RRC state transitions Samsung R&D Institute India discussion Rel-18
29. R2-2300667 Discussion on Notification and RRC state transition Spreadtrum Communications discussion Rel-18
30. R2-2300736 Group Notification and RRC State Transition for Multicast Reception Apple discussion Rel-18 NR\_MBS\_enh-Core
31. R2-2300948 Notification and State Transmission for Multicast Reception in RRC\_INACTIVE Lenovo discussion Rel-18
32. R2-2301037 Multicast activation deactivation notification and RRC state transitions LG Electronics Inc. discussion Rel-18
33. R2-2301163 Notification and RRC state transition for multicast reception in RRC\_INACTIVE Huawei, HiSilicon discussion Rel-18 NR\_MBS\_enh-Core
34. R2-2301205 Notifications and RRC state transitions Ericsson discussion Rel-18 NR\_MBS\_enh-Core
35. R2-2301236 Discussion on notification for RRC\_INACTIVE multicast reception Ues CMCC discussion Rel-18 NR\_MBS\_enh-Core
36. R2-2301560 Notification and RRC state transition for multicast reception in RRC\_INACTIVE Intel Corporation discussion Rel-18 NR\_MBS\_enh-Core
37. R2-2301587 Notification and RRC state transition aspects on multicast reception in RRC INACTIVE Kyocera discussion Rel-18 R2-2212521
38. R2-2301594 Session state change for UEs receiving Multicast in RRC\_INACTIVE state TCL Communication Ltd. discussion
39. R2-2301674 Group Paging and Multicast session received in RRC\_INACTIVE Sharp discussion
40. R2-2301692 Considerations on the notification and RRC transitions for the multicast reception in RRC\_INACTIVE state Beijing Xiaomi Software Tech discussion Rel-18
41. R2-2301844 Multicast session status change notification ZTE, Sanechips discussion Rel-18 NR\_MBS\_enh
42. R2-2301038 Available multicast CFR in RRC\_INACTIVE LG Electronics Inc. discussion Rel-18
43. R2-2301070 Ensuring desired level of reliability for an MBS session in RRC\_INACTIVE InterDigital Inc. discussion Rel-18 NR\_MBS\_enh-Core
44. R2-2301164 Discussion on shared processing for MBS broadcast and unicast reception Huawei, HiSilicon discussion Rel-18 NR\_MBS\_enh-Core
45. R2-2300101 Discussion on support of FTA in NR OPPO discussion Rel-18 NR\_MBS\_enh-Core
46. R2-2300180 Discussion on Shared processing for MBS broadcast and Unicast reception CATT, CBN discussion NR\_MBS\_enh-Core
47. R2-2300285 Simultaneous unicast reception and MBS broadcast reception TD Tech, Chengdu TD Tech discussion Rel-18
48. R2-2300288 Discussion on broadcast coexistence and signaling enhancement MediaTek inc. discussion Rel-18 NR\_MBS\_enh-Core
49. R2-2300334 Shared processing for MBS broadcast and unicast reception Qualcomm Incorporated discussion Rel-18 NR\_MBS\_enh-Core
50. R2-2300527 Shared processing for MBS broadcast and unicast reception Samsung R&D Institute India discussion Rel-18
51. R2-2300683 Discussion on shared process for MBS broadcast and unicast NEC Corporation discussion Rel-18 NR\_MBS\_enh-Core
52. R2-2300737 Shared processing of MBS broadcast and unicast reception Apple discussion Rel-18 NR\_MBS\_enh-Core
53. R2-2301207 MBS broadcast and unicast reception with shared resources Ericsson discussion Rel-18 NR\_MBS\_enh-Core R2-2210716
54. R2-2301561 Shared processing for simultaneous MBS broadcast and Unicast reception Intel Corporation discussion Rel-18 NR\_MBS\_enh-Core
55. R2-2301581 Discussion on shared processing for MBS broadcast and Unicast reception CMCC discussion Rel-18 NR\_MBS\_enh-Core
56. R2-2301588 Shared processing for inter-PLMN MBS broadcast reception Kyocera discussion Rel-18 R2-2212522
57. R2-2301702 Remaining issues for shared processing of MBS Xiaomi discussion Rel-18 NR\_MBS\_enh-Core
58. R2-2301753 Bandwidth signalling for shared processing Nokia, Nokia Shanghai Bell discussion Rel-18 NR\_MBS\_enh-Core
59. R2-2301845 Signaling framework for broadcast and unicast shared processing ZTE, Sanechips discussion Rel-18 NR\_MBS\_enh
60. R3-230005 Reply LS on Re-establishment of the MBS context during mobility registration update or service request procedure CT4, Nokia
61. R3-230016 Reply LS on resource efficiency for MBS reception in RAN sharing scenario RAN2, CATT
62. R3-230026 Reply LS on the scope of resource efficiency for MBS reception in RAN sharing scenario SA2, Nokia
63. R3-230028 Reply LS on FS\_5MBS\_Ph2 progress SA2, Huawei
64. R3-230077 Multicast reception in RRC\_INACTIVE state TD Tech, Chengdu TD Tech
65. R3-230078 Sharing processing for both unicast reception and broadcast reception TD Tech, Chengdu TD Tech
66. R3-230081 Support of MBS in RAN sharing scenarios Qualcomm Incorporated
67. R3-230083 Enhancements to support Multicast reception by UEs in RRC\_INACTIVE state Qualcomm Incorporated
68. R3-230098 (TPs to TS 38.300, 38.410, 38.413, 38.473 BL CRs) MBS reception in RAN sharing scenario Huawei, CBN, China Unicom
69. R3-230099 (TPs to TS 38.300, 38.401, 38.413, 38.423, 38.473 BL CRs) Multicast Reception for RRC\_INACTIVE state UEs Huawei, CBN, China Unicom
70. R3-230220 (TP for TS 38.300) RAN Impacts of Rel-18 RAN Sharing Solutions Nokia, Nokia Shanghai Bell
71. R3-230221 (TP for TS 38.300) MBS Reception in RRC inactive state Nokia, Nokia Shanghai Bell
72. R3-230247 (TP for 38.413/38.423/38.473)Discussion on multicast over RRC INACTIVE CATT,CBN
73. R3-230248 (TP for 38.413/38.473)Discussion on efficient MBS reception in RAN sharing scenario CATT,CBN
74. R3-230249 Discussion on multicast over RRC INACTIVE CATT,CBN
75. R3-230256 Consideration on FS\_5MBS\_Ph2 progress Huawei, CBN, China Unicom
76. R3-230257 [Draft] Reply LS on FS\_5MBS\_Ph2 progress Huawei
77. R3-230281 MBS RAN sharing NG-U tunnel establishment NEC
78. R3-230282 MBS Inactive Reception NEC
79. R3-230346 PTM configuration and mobility for multicast reception in RRC\_INACTIVE Lenovo
80. R3-230347 Notification and State Transmission for Multicast Reception in RRC\_INACTIVE Lenovo
81. R3-230361 Support of resource efficiency for MBS reception in RAN sharing scenarios Ericsson
82. R3-230362 On multicast reception in RRC\_INACTIVE Ericsson
83. R3-230642 Discussion on MBS RAN sharing BEIJING SAMSUNG TELECOM R&D
84. R3-230643 Discussion on MBS reception by inactive state UE BEIJING SAMSUNG TELECOM R&D
85. R3-230661 Discussion on MBS reception in RAN sharing scenarios CMCC
86. R3-230662 Multicast Reception in RRC\_INACTIVE state CMCC
87. R3-230742 TP to TS 38.413 with discussion on network sharing of MBS ZTE
88. R3-230743 Multicast reception in RRC\_INACTIVE ZTE
89. R3-231031 (TP for TS 38.300) RAN Impacts of Rel-18 RAN Sharing Solutions Nokia, Nokia Shanghai Bell, Ericsson, Huawei, Qualcomm Incorporated, ZTE,CATT
90. R3-230989 (TP for TS 38.401) RAN impacts of Rel-18 RAN Sharing Solution Ericsson, Nokia, Nokia Shanghai Bell
91. R3-231030 Reply LS on FS\_5MBS\_Ph2 progress RAN3

 17.05.2021 minor adaptations for RAN #92e

 28.01.2021 minor adaptations for RAN #91e

 09.11.2020 minor adaptations for RAN #90e

 31.08.2020 minor adaptations for RAN #89e

 20.04.2020 minor adaptations for RAN #88e

 18.02.2020 minor adaptations for RAN #87e

 14.11.2019 minor adaptations for RAN #86

 18.08.2019 minor adaptations for RAN #85

 12.05.2019 minor adaptations for RAN #84

 27.02.2019 minor adaptations for RAN #83

 21.11.2018 completion levels with colours added (for RAN #82)

v04.81 31.07.2018 simplification of template and addition of cross-TSG aspects (for RAN #81)

v04.80 21.05.2018 minor adaptations for RAN #80

v04.79 26.02.2018 minor adaptations for RAN #79

v04.78 18.11.2017 minor adaptations for RAN #78

v04.77 06.08.2017 minor adaptations for RAN #77

v04.76 15.05.2017 minor adaptations for RAN #76

v04.75 31.01.2017 minor adaptations for RAN #75

v04.74 28.10.2016 minor adaptations for RAN #74

v04.73 01.09.2016 adaptations for RAN #73 (time units in extra Excel table, RAN6 reporting included)

v04.72 26.05.2016 adaptations for RAN #72 (introduction of NR & GERAN TUs)

v04.71 10.02.2016 minor adaptations for RAN #71

v04.70 30.10.2015 minor adaptations for RAN #70

v04.69 12.08.2015 minor adaptations for RAN #69

v04.68 21.05.2015 minor adaptations for RAN #68

v04.67 01.02.2015 minor adaptations for RAN #67

v04.66 16.11.2014 minor adaptations for RAN #66

v04.65 16.08.2014 minor adaptations for RAN #65

v04.64 22.05.2014 minor adaptations for RAN #64

v04.63 24.01.2014 restructuring for RAN #63 to cover Core & Perf. in one doc file

v03.62 11.11.2013 section 1.2.3 adapted for RAN #62

v03 11.08.2013 section 1.2.3 added on time budget

v02 07.05.2010 history added, some spelling corrections

v01 13.11.2009 First version of the template