**3GPP TSG-RAN WG3 Meeting #113-e *R3-214510 was R3-213145***

**E-meeting, 16-26 Aug 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **38.401** | **CR** | **0153** | **rev** | **9** | **Current version:** | **16.6.0** |  |
|  |
| *For* [***HELP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network | **X** | Core Network | **X** |

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|  |
| ***Title:***  | Introduction of NR MBS |
|  |  |
| ***Source to WG:*** | Huawei, CMCC |
| ***Source to TSG:*** | R3 |
|  |  |
| ***Work item code:*** | NR\_MBS-Core |  | ***Date:*** | 2021-08-27 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)…Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | As per RP-193248, NR MBS (Multicast Broadcast Service for NR) is supported in release 17. |
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| ***Summary of change:*** | NR MBS is introduced. |
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| ***Consequences if not approved:*** | NR MBS not supported in case of split gNB architecture. |
|  |  |
| ***Clauses affected:*** | 3.2, 6.1.x, 7.x, 8.xx |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | Rev-1: typo: NR-MBS -> NR MBSRev-2: editorial checkingRev-3: resubmission based on latest version of specRev-4: update wordingRev-5: merge agreed TPs in R3-206384 and R3-207056Rev-7: resubmission based on latest version of specRev-8: resubmission based on latest version of specRev-9: merge agreed TPs in R3-214382 and R3-214385 |

***--------------------------------Start of the First Change-----------------------------***

## 3.2 Abbreviations

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply.
A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

5GC 5G Core Network

AMF Access and Mobility Management Function

AP Application Protocol

AS Access Stratum

BH Backhaul

CAG Closed Access Group

CHO Conditional Handover

CLI Cross-Link Interference

CM Connection Management

CMAS Commercial Mobile Alert Service

DAPS Dual Active Protocol Stack

ETWS Earthquake and Tsunami Warning System

F1-U F1 User plane interface

F1-C F1 Control plane interface

F1AP F1 Application Protocol

FDD Frequency Division Duplex

GTP-U GPRS Tunnelling Protocol

IAB Integrated Access and Backhaul

IP Internet Protocol

MBS Multicast Broadcast Service

NAS Non-Access Stratum

NID Network identifier

NPN Non-Public Network

PNI-NPN Public Network Integrated Non-Public Network

PTP Point to Point

PTM Point to Multipoint

O&M Operation and Maintenance

PWS Public Warning System

QoS Quality of Service

RET Remote Electrical Tilting

RIM Remote Interference Management

RIM-RS Remote Interference Management Reference Signal

RNL Radio Network Layer

RRC Radio Resource Control

SAP Service Access Point

SCTP Stream Control Transmission Protocol

SFN System Frame Number

SM Session Management

SMF Session Management Function

SNPN Stand-alone Non-Public Network

TDD Time Division Duplex

TDM Time Division Multiplexing

TMA Tower Mounted Amplifier

TNL Transport Network Layer

***--------------------------------Start of the Next Change-----------------------------***

## 6.1 Overview

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### 6.1.x Overall Architecture of NR MBS

The overall architecture specified in section 6.1.1 and 6.1.2 applies for NR MBS.

Editor’s Note: Applicability of specified cardinalities may need to be revisited.

Upon establishment of a MBS Session resource by the 5GC, the gNB-CU triggers the establishment of MBS radio bearers, involving the gNB-DU. If E1 is deployed, the gNB-CU-CP triggers establishment of respective MBS UP resources in the gNB-CU-UP.

The gNB-DU assigns the G-RNTI.

A shared F1-U tunnel is used between the gNB-CU and the gNB-DU for PTM transmission of a MBS radio bearer, and for the data transmission of a split MBS radio bearer. The gNB-DU assigns the DL GTP-U TEID and provides it to the gNB-CU. If E1 is deployed the gNB-CU-CP forwards it to the gNB-CU-UP.

Editor’s Note: It is FFS whether the F1-U tunnel for the PTM transmission is established per DU or per cell. The definition and usage of the term “PTM” is FFS. Also, the definition of the term “MBS radio bearer” is FFS.

Editor’s Note: for the split MBS radio bearer with common PDCP, the statement may be re-visited after further progress in RAN2 and RAN3 on the data re-transmission and forwarding.

For both broadcast and multicast, DL flow control maybe used for the shared F1-U tunnel established for the MBS radio bearer, as specified in TS 38.425 [24].

Editor’s Note: existing NR user plane protocol functions need to be reviewed for their applicability for MBS.

***--------------------------------Start of the Next Change-----------------------------***

## 6.4 UE associations in NG-RAN Node

There are several types of UE associations needed in the NG-RAN node: the "NG-RAN node UE context" used to store all information needed for a UE and the associations between the UE and the logical NG and Xn connections used for NG/XnAP UE associated messages. An "NG-RAN node UE context" exists for a UE in CM\_CONNECTED.

**Definitions:**

**NG-RAN node UE context:**

An NG-RAN node UE context is a block of information in an NG-RAN node associated to one UE. The block of information contains the necessary information required to maintain the NG-RAN services towards the active UE. An NG-RAN node UE context is established when the transition to RRC CONNECTED for a UE is completed or in the target NG-RAN node after completion of handover resource allocation during handover preparation, in which case at least UE state information, security information, UE capability information and the identities of the UE-associated logical NG-connection shall be included in the NG-RAN node UE context.

For Dual Connectivity an NG-RAN node UE context is also established in the S-NG-RAN node after completion of S-NG-RAN node Addition Preparation procedure.

If radio bearers are requested to be setup during a UE Context setup or modification procedure, the UE capabilities are signalled to the receiving node as part of the UE context setup or modification procedures.

**Bearer context:**

A bearer context is a block of information in a gNB-CU-UP node associated to one UE that is used for the sake of communication over the E1 interface. It may include the information about data radio bearers, PDU sessions and QoS-flows associated to the UE. The block of information contains the necessary information required to maintain user-plane services toward the UE.

**MBS Session context in a gNB-DU:**

The definition of an MBS Session context in a gNB-DU applicable for broadcast and multicast.

An MBS Session context in a gNB-DU

- is a block of information associated to an MBS Session, which may consist of one or several MRB Contexts;

- corresponds to either one or several F1-U tunnels.

**MRB Context in a gNB-DU:**

An MRB Context is a block of information in a gNB-CU-UP node associated to one or several MRBs (MRB “instances”). The gNB-DU sets up resources for each MRB

- based on information provided within MBS Session Context related information as received by the gNB-DU (e.g. MRB QoS, MBS service area information, etc.), and,

- for multicast, based on the UE Contexts established for RRC\_CONNECTED UEs within the gNB-DU containing joining information of the UE for the respective multicast session.

For multicast, for each MRB, the MBR specific Uu configuration is incorporated into each UE’s individual CellGroupConfig, and the gNB-DU provides such information to the gNB-CU to configure the UE.

Editor’s Note: The statement above concerning he incorporation of the MBR specific Uu configuration into the RRC *CellGroupConfig* IE needs to be checked against respective RAN2 decisions.

**UE-associated logical NG/Xn/F1/E1 -connection:**

NGAP, XnAP, F1AP and E1AP provide means to exchange control plane messages associated with the UE over the respectively NG-C, Xn-C, F1-C or E1 interface.

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# 7 NG-RAN functions description

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## 7.x Support for NR MBS

The Support of NR MBS in non-split gNB case is specified in TS 38.300 [2].

### 7.X.1 Support of dynamic PTP and PTM switching

NG-RAN supports dynamic switch between PTP and PTM for MBS as specified in TS 38.300 [2].

In case of split gNB architecture, for a split MRB bearer with common PDCP, upon receiving the MBS data from the gNB-CU via a shared F1-U tunnel, the gNB-DU makes decision of using PTP (RLC leg) or PTM (RLC leg).

Editor’s note: The above paragraph would be re-visited after there is conclusion on flow control mechanism for shared F1-U tunnel.

***--------------------------------Start of the Next Change-----------------------------***

# 8 Overall procedures in gNB-CU/gNB-DU Architecture

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## 8.2 Intra-gNB-CU Mobility

### 8.2.1 Intra-NR Mobility

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## 8.xx Overall procedures for NR MBS

The following clauses describe the overall procedures for NR MBS involving E1 and F1.

***--------------------------------End of the Changes-----------------------------***