**3GPP TSG-CT WG1 Meeting #130-eC1-213541**

**E-meeting, 20-28 May 2021**

**Source: Huawei, HiSilicon**

**Title: New WID on CT aspects of the architectural enhancements for 5G multicast-broadcast services**

**Document for: Endorsement**

**Agenda Item: 17.1.1**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

# Title: CT aspects of the architectural enhancements for 5G multicast-broadcast services

## Acronym: 5MBS

## Unique identifier: *{A number to be provided by MCC at the plenary}*

Potential target Release: Rel-17

Note that this field above indicates the proposed Release at the time of submission of the WID to TSG approval. It can later be changed without a need to revise the WID. The updated target Release is indicated in the Work Plan.

## 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Affects:** | UICC apps | ME | AN | CN | Others (specify) |
| **Yes** |  | X |  | X |  |
| **No** |  |  | X |  |  |
| **Don't know** | X |  |  |  | X |

## 2 Classification of the Work Item and linked work items

### 2.1 Primary classification

This work item is a

|  |  |
| --- | --- |
|  | Feature |
| X | Building Block |
|  | *Work Task* |
|  | Study Item |

### 2.2 Parent Work Item

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| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| 5MBS | SA2 | 900038 | Architectural enhancements for 5G multicast-broadcast services (5MBS) |

### 2.3 Other related Work Items and dependencies

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| Other related Work Items (if any) |
| Unique ID | Title | Nature of relationship |
|  |  | *{optional free text}*  |

**Dependency on non-3GPP (draft) specification**: none.

## 3 Justification

3GPP TS 23.247 "Architectural enhancements for 5G multicast-broadcast services" specifies stage 2 requirements for the SA2 5MBS WID (900038). 5MBS work will likely impact foundation of the stage 2 specifications – 3GPP TS 23.501, 3GPP TS 23.502 and 3GPP TS 23.503.

5MBS need to support interworking with EPC/eMBMS for Public Safety.

Between 5GC and NG-RAN, there are two possible delivery methods to transmit the MBS data:

- 5GC Individual MBS traffic delivery method: This method is only applied for Multicast MBS session. 5GC receives a single copy of MBS data packets and delivers separate copies of those MBS data packets to individual UEs via per-UE PDU sessions, hence for each such UE one PDU session is required to be associated with a multicast session.

- 5GC Shared MBS traffic delivery method: This method is applied for both Broadcast and Multicast MBS session. 5GC receives a single copy of MBS data packets and delivers a single copy of those MBS packets packet to a RAN node, which then delivers them to one or multiple UEs

Between NG-RAN and UE, two delivery methods are available for the transmission of MBS packet flows over radio:

- Point-to-Point (PTP) delivery method: a RAN node delivers separate copies of MBS data packet over radio to individual UE.

- Point-to-Multipoint (PTM) delivery method: a RAN node delivers a single copy of MBS data packets over radio to a set of UEs.

A RAN node may use a combination of PTP/PTM to deliver an MBS packet to UEs.

## 4 Objective

The objective of this work item is to specify protocol enhancements for 5G multicast-broadcast services based on the provisions in 3GPP TS 23.247 (see also 3GPP TR 23.757, clause 8 and Annex A.3).

3GPP TS 23.247 v0.2.0 specifies the following producer – consumer relations:

- NRF remains a producer (http server) for all NFs (http clients). CT4 scope.

- MB-SMF is a producer (http server) for SMF, AMF, AF, NEF, MBSF (http clients) and also for MB-UPF. CT4 scope.

- NEF is a producer (http server) for AS (http client). CT3 scope.

- MBSF is a producer (http server) for AS (http client). CT3 scope.

- PCF is a producer (http server) for MB-SMF (http client). CT3 scope.

The following impacts on 3GPP CT working groups are identified.

**CT1**

- Adding new, 5MBS specific features to the existing 3GPP TS 24.501. The existing reference points of N1 needs to be enhanced to support 5MBS (e.g., establishing a PDU Session associated with multicast sessions, responding to paging with MBS session ID). Support of signalling for joining and leaving multicast session needs to be added.

**CT3**

- Impacts to the PCC framework to support 5G MB session and QoS management.

- Potential impacts to the SM Policy Association service of the PCF to support 5G MBS.

- Potential enhancements to the BSF services to support 5G MB session binding.

- Impacts to the UDR services to support 5G MB Session configuration and management procedures.

- Impacts to the northbound interfaces to support 5G MB Session configuration and management by an AF (e.g. service provisioning, MB session and QoS management, etc.).

- Potential impacts to the NEF services or definition of new a NEF service to support TMGI allocation/de-allocation.

- Enhancements to the NEF or definition of new a NEF service to support MB session management procedures (e.g. MBS session start/stop).

- Enhancements to the NEF event exposure to support MBS Session Delivery Status Indication for Broadcast.

- Impacts to support the management of UE authorization information for 5G MB sessions.

- Potential new 5MBS specific interfaces, as follows:

- N7mb between PCF and MB-SMF: Potential new PCF service to support MB Policy Association management and MBS QoS control procedures.

- N6mb between MB-UPF and AF/AS: Potential impacts to the N6 interface defined in 3GPP TS 29.561.

- Nmb3 between NEF and MBSF: Support TMGI allocation and MBS session configuration and management procedures (e.g. MB session start).

- Nmb4 between AF/AS and MBSTF.

- Nmb5 between MB-UPF and MBSTF.

- Nmb7 between PCF and MBSF.

- N29mb between MB-SMF and NEF: Potential enhancements to the SMF event exposure service or definition of a new MB-SMF event exposure service to support MBS Session Delivery Status Indication for Broadcast.

- N30 interface: Potential new PCF service to support MB Session management.

**CT4**

- New 3GPP TS for MB-SMF provided services for the new 5BMS features required across the following interfaces:

- Nmb1 between MB-SMF and MBSF/AF.

- N11mb between MB-SMF and AMF.

- N16mb between MB-SMF and SMF.

- N29mb between MB-SMF and NEF (MB-SMF Event Exposure service however is addressed by CT3).

- Adding new, 5MBS specific features to the existing 3GPP TSes (for anticipated impacts see table "Impacted existing TS/TR" in clause 5):

- Enhancements to 3GPP TS 23.003, 3GPP TS 29.500, 3GPP TS 29.502, 3GPP TS 29.503, 3GPP TS 29.510, 3GPP TS 29.518, 3GPP TS 29.571.

- Enhancements to 3GPP TS 29.244 to support N4mb interface between MB-SMF and MB-UPF.

- Enhancements to 3GPP TS 29.281 to support N3mb interface between MB-UPF and NG-RAN and N19mb interface between MB-UPF and UPF.

Editor's note: SA2 will define stage 2 for Nmb2 interface between MBSF and MBSTF. It is FFS if SA4 will also define stage 3 in coordination with CT3, CT4 and CT6, or if SA4 will delegate stage 3 work to a CT WG.

## 5 Expected Output and Time scale

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| **New specifications** *{One line per specification. Create/delete lines as needed}* |
| Type  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Rapporteur |
| TS | 29.xxx | 5G System; 5G Multicast-Broadcast Session Management Services; Stage 3 | TSG#94 (2021-12) | TSG#96 (2022-06) | Gulbani, Giorgi, Huawei, giorgi.gulbani@huawei.com |

|  |
| --- |
| **Impacted existing TS/TR** *{One line per specification. Create/delete lines as needed}* |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| TS 24.501 | Impacted. For example, UE sends NAS message to the AMF that indicates establishing a PDU Session associated with multicast session(s); to join the multicast group, the UE sends the PDU Session Modification Request (MBS Session ID), etc. | TSG#96 (2022-06) | CT1 |
| TS 23.003 | Impacted. For example, MBS Session ID needs to be defined. | TSG#96 (2022-06) | CT4 |
| TS 29.244 | Impacted. Implications of N4mb interface between MB-SMF and MB-UPF. Also, e.g. SMF configures the UPF to start/stop receiving multicast data from the MB-UPF, etc. | TSG#96 (2022-06) | CT4 |
| TS 29.281 | Impacted. Implications of N3mb (MB-UPF and NG-RAN) and N19mb (MB-UPF and UPF) interfaces. | TSG#96 (2022-06) | CT4 |
| TS 29.500 | Impacted. For example, AMF needs to request the SCP to select an SMF capable of handling multicast sessions, etc. | TSG#96 (2022-06) | CT4 |
| TS 29.502  | Impacted. For example, AMF invokes Nsmf\_PDUSession\_UpdateSMContext to SMF with the MBS session leaving information (i.e. leave indication, MBS session ID), etc. | TSG#96 (2022-06) | CT4 |
| TS 29.503  | Impacted. For example, MBS subscription data is provided by the UDM to the SMF during PDU session establishment by using Nudm\_SDM service for Subscription data type "UE context in SMF data", etc. | TSG#96 (2022-06) | CT4 |
| TS 29.508 | Possible impacts to SMF event exposure to support MBS Session Delivery Status Indication for Broadcast. | TSG#96 (2022-06) | CT3 |
| TS 29.510 | Impacted. For example, to enable exchanging 5MBS specific information, e.g. MBS Session ID, AF Identifier, QoS requirements, to support registration, discovery and selections of MB-SMF, MB-UPF, etc. | TSG#96 (2022-06) | CT4 |
| TS 29.512 | Possible impacts to support 5G MBS session and QoS management. | TSG#96 (2022-06) | CT3 |
| TS 29.513 | Possible impacts to support 5G MBS session and QoS management procedures. | TSG#96 (2022-06) | CT3 |
| TS 29.514 | Possible impacts to support 5G MBS Session configuration and management by an AF/NEF/MBSF. | TSG#96 (2022-06) | CT3 |
| TS 29.518 | Impacted. For example, enhancements to Namf service over N11 to support transfer of SM PDUs from MB-SMF for broadcast services; inter-AMF mobility of UEs with multicast sessions, etc. | TSG#96 (2022-06) | CT4 |
| TS 29.519 | Possible impacts to support 5G MBS (e.g. management of UE authorization information for multicast session). | TSG#96 (2022-06) | CT3 |
| TS 29.520 | Possible impacts to support 5G MBS. | TSG#96 (2022-06) | CT3 |
| TS 29.521 | Possible impacts to support 5G MB session binding. | TSG#96 (2022-06) | CT3 |
| TS 29.522 | Possible impacts to support 5G MBS Session configuration and management by an AF (e.g. service provisioning, MBS session and QoS management, etc.). | TSG#96 (2022-06) | CT3 |
| TS 29.525 | Possible impacts to UE policy management to support 5MBS. | TSG#96 (2022-06) | CT3 |
| TS 29.561 | Possible impacts to support 5G MBS. | TSG#96 (2022-06) | CT3 |
| TS 29.571 | Impacted. New, 5MBS specific data types need to be defined. For example, MBS Session ID, etc. | TSG#96 (2022-06) | CT4 |

## 6 Work item Rapporteur(s)

Gulbani, Giorgi, Huawei, giorgi.gulbani@huawei.com

## 7 Work item leadership

CT4.

## 8 Aspects that involve other WGs

SA3 (security), SA5 (charging), SA4 (stage 2 for Nmb2).

## 9 Supporting Individual Members

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| Supporting IM name |
| Huawei |
| HiSilicon |
| one2many |
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