**TSG SA Rel-18 Prioritization Workshop SP-211168**

**9-10 December 2021, Electronic meeting**

**3GPP TSG-WG SA2 Meeting #148E e-meeting *S2-2109362***

**Elbonia, November 15 – 22, 2021 (revision of S2-210*8671*)**

**Source: Huawei, CBN**

**Title: New SID: Architectural enhancements for 5G multicast-broadcast services Phase 2**

**Document for: Approval**

**Agenda Item: 9.1.3**

**Work Item / Release: {FS\_5MBS\_Ph2} / Rel-18**

3GPP™ Work Item Description

For guidance, see [3GPP Working Procedures](http://www.3gpp.org/About/WP.htm), article 39; and [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm).
Comprehensive instructions can be found at <http://www.3gpp.org/Work-Items>

Title: Study on architectural enhancements for 5G multicast-broadcast services Phase 2

Acronym: FS\_5MBS\_Ph2

Unique identifier

1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Affects:** | **UICC apps** | **ME** | **AN** | **CN** | **Others (specify)** |
| **Yes** |  | X | X | X |  |
| **No** |  |  |  |  |  |
| **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** |
|  | **Building Block** |
|  | *Work Task* |
| X | **Study Item** |

2.2 Parent and child Work Items

|  |
| --- |
| **Parent and child Work Items**  |
| **Unique ID** | **Title** | **Nature of relationship** |
| N/A | N/A |  |

2.3 Other related Work Items and dependencies

|  |
| --- |
| **Other related Work Items (if any)** |
| **Unique ID** | **Title** | **Nature of relationship** |
| 830030 | Study on Architectural enhancements for 5G multicast-broadcast services | Antecedent study item (TR 23.757) |
| 900009 | Architectural enhancements for 5G multicast-broadcast services | Antecedent work item (TS 23.247) |

3 Justification

The architectural enhancements for 5G multicast-broadcast services defined in Rel-17 enable PLMN operators deploys multicast and broadcast services. The work is based on requirements in clause 6.13 of TS 22.261, TS 22.146, TS 22.246 and clause 32 of TS 22.101. Specifically, distribution to indicated location areas, mobility, MBS session management, QoS, as well as interworking with EPC based eMBMS for Public Safety were studied in TR 23.757 and specified in TS 23.247.

However, during Rel-17 normative work it was not possible to address some aspects of the overall system that were excluded by RAN WGs from Rel-17 work. One aspect was enabling UEs to receive Multicast MBS Session data in RRC Inactive state, which would be beneficial for cases where power efficiency and serving large number of UEs in a geographical area have to be considered. Besides that, other potential enhancements in Rel-18 by the RAN WGs (e.g., SFN enhancement) may enhance new MBS features. Thus, a feasibility study is needed to ensure the corresponding capabilities are addressed accordingly in Rel-18.

For services shared by a group of users, e.g., background audio/video streams, status/warning update during the game, shared streaming of collaborative interactive application, enabling temporary multicast group for the service would be beneficial for operators to be more flexible to provide services with resource efficiency, i.e., dynamically creating multicast session when required by the service, and releasing them when not required. While the basic related capabilities are available in Rel-17, potential enhancements will be studied.

Moreover, in Rel-17 some issues were not handled due to time constraints, e.g., roaming and limited SMF serving area. Failing to provide support for some of these unaddressed aspects in the MBS system may lead to the system failing to provision related features correctly.

TS 22.261 also mentions IoT applications as important broadcast/multicast applications. eMBMS supported group message delivery for IoT devices, but the defined 5G multicast-broadcast service does not yet provide this capability. Also, power saving may prevent IoT devices from receiving MBS content at coordinated times.

This feasibility study aims to identify the gaps that need to be filled to support the above-mentioned requirements, to study suitable solution to address these gaps. The study may also address the issues identified by RAN WGs.

4 Objective

The goal of this Study Item is to identify and evaluate further enhancements to the 5G Multicast/Broadcast Architecture in order to provide a wider usage for Multicast/Broadcast services. The following aspects are the objectives of the study based on the architecture and call-flow defined in Rel-17:

Study possible further enhancement of end-to-end procedures/functionalities and architecture of Multicast/Broadcast services for:

WT#1. How to enable support for and enhancement related to end-to-end MBS traffic delivery for, including large number of UEs:

WT#1.1 Enabling UE's receiving Multicast MBS Session data in RRC states in RRC Inactive state;

NOTE 1: support of RRC Idle depends on RAN WGs. RRC Inactive state support requires collaboration with RAN WGs.

WT#1.2 Study feasible and efficient resource utilization for the same broadcast content to be provided to 5G MOCN network sharing scenarios (i.e., multiple CNs are connected to the same NG-RAN);

NOTE 2: The NG-RAN is assumed not to be aware of the same content via the application layer information detection.

NOTE 3: Collaboration with RAN WGs is needed.

WT#2. Study whether and how to support on demand multicast MBS session triggered by AF, and efficient resource utilization via 5GC choosing multicast and/or unicast delivery for a certain service.

NOTE 5: Collaboration with SA4 is needed.

WT#3. Study whether and how to support group message delivery for capability-limited devices, including NEF enhancement, coexistence of existing power saving mechanisms and MBS.

NOTE 6: Coordination with SA4 and RAN WGs is needed.

NOTE 7: Control plane cell broadcast is not included in this WT.

WT#4. Void.

WT#5. Study whether there are any identified performance issues for high number of public safety UEs, and if yes study necessary enhancements to 5MBS for that scenario.

Work in Rel-18 shall be based on the Rel-17 defined architecture and enable UEs with Rel-17 MBS capability to still receive MBS data from Rel-18 architecture.

The NR is considered as wireless access technology.

Each of the above objectives can conclude independently from the other, and the impact on RAN is to be analysed by and coordinated with the relevant RAN WGs

This study may also include the potential enhancements identified by other WGs or other SIDs (e.g., FS\_ 5GSAT\_ARCH\_Ph2) in their MBS work that need SA2 cooperation.

## TU estimates and dependencies

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Work Task ID** | **TU Estimate****(Study)** | **TU Estimate****(Normative)** | **RAN Dependency****(Yes/No/Maybe)**  | **Inter Work Tasks Dependency**  |
| **WT#1** | 2 | 1.5 |  |  |
| WT#1.1 | 1 | 1 | Yes (RAN leading) | WT#1.1 is self-contained. |
| WT#1.2 | 1 | 0.5 | Yes (SA leading) | WT#1.2 is self-contained. |
| **WT#2** | 2 | 1 | NO | WT#2 is self-contained |
| **WT#3** | 2 | 1 | Maybe (SA leading) | WT#3 is self-contained |
| **WT#4** | N/A | N/A |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| **WT#5** | 1.5 | 1 | Yes (Parallel) | WT#5 is self-contained. |

**Total TU estimates for the study phase: 7.5;**

**Total TU estimates for the normative phase: 4.5;**

**Total TU estimates: 7.5 + 4.5 = 12.**

5 Expected Output and Time scale

|  |
| --- |
| **New specifications** |
| Type  | Series | Title | For info at TSG#  | For approval at TSG# | Remarks |
| New TR | 23.xxx | Study on architectural enhancements for 5G multicast-broadcast services Phase 2 | TBD | TBD |  |

|  |
| --- |
| **Impacted existing TS/TR** |
| TS/TR No. | Description of change  | Target completion plenary# |
|  |  |  |

6 Work item Rapporteur(s)

Meng Li, Huawei, raymond.limeng@huawei.com

7 Work item leadership

SA2

8 Aspects that involve other WGs

Security aspects should be analysed by the SA3 WG.

The impact on the service layer is to be analysed by and coordinated with SA4.

9 Supporting Individual Members

|  |
| --- |
| **Supporting IM name** |
| Huawei |
| HiSilicon |
| CBN |
| Samsung |
| Vivo |
| OPPO |
| ZTE |
| China Unicom |
| CATT |
| KPN |
| Nokia |
| Nokia Shanghai Bell |
| AT&T |
| Ericsson |
| LG Electronics |
| FirstNet |
| CMCC |
| Spreadtrum |
| ABS |
| TD Tech |
| China Telecom |
| TNO |
| Shanghai Jiao Tong University |
|  |