**3GPP TSG-S4 Meeting #122 *S4-230040***

**Athens, Greece, 20th–24th February 2023** revision of S4aI230039

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **26.502** | **CR** | **0009** | **rev** | **2** | **Current version:** | **17.3.0** |  |
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| *For* [***HE******LP***](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 | **X** | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** |  | | | | | | | | |
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| ***Source to WG:*** | BBC | | | | | | | | |
| ***Source to TSG:*** | S4 | | | | | | | | |
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| ***Work item code:*** | 5MBUSA | | | | |  | ***Date:*** | | 2023-02-09 |
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| ***Category:*** | **F** |  | | | | | ***Release:*** | | Rel-17 |
|  |  | | | | | | | | |
| ***Reason for change:*** | | Modifications to reference architecture to allow scalable serving of unicast Service Announcements from a new MBS AF, and user authentication credentials from MBS AS in addition to unicast object repair. | | | | | | | |
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| ***Summary of change:*** | | * Revised network architecture and reference architecture figures. * MBS‑3 reference point defined for configuring the MBS AF (but declared out of scope in this release). * MBS-9 reference point defined for configuring the MBS AS (but declared out of scope in this release). * MBS-10 reference point defined for User Plane security procedure with MBS Security Function (MBSSF). * Adjustment of text describing role assignment to Network Functions. | | | | | | | |
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| ***Consequences if not approved:*** | | SA4 cannot complete addition of user plane security in a manner compatible with SA2 architecture for MBS. | | | | | | | |
| ***Q*** | |  | | | | | | | |
| ***Clauses affected:*** | | 2, 4.2.2, 4.2.4, 4.3.1, 4.3.2, 4.3.4, 4.3.5, 4.4 | | | | | | | |
|  | |  | | | | | | | |
|  | | **Y** | **N** |  | | | |  | |
| ***Other specs*** | |  | **X** | Other core specifications | | | |  | |
| ***affected:*** | |  | **X** | Test specifications | | | |  | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | |  | |
|  | |  | | | | | | | |
| ***Other comments:*** | | **At SA2#154 Toulouse (November 2022):**  **S2-2211044** (TS 23.247 CR01390) Updating clause 6.13 (MBS Security function) -> **TS 23.247 V17.5.0**   * The suggestion from SA4 to connect the MBSF to the UPF was not implemented by SA2 in favour of improving the definition of the MBS Security Function in clause 6.13. * The MBS Security Function is not depicted in the reference architecture (figure 5.1-2) and no reference points between it and the MBSF or MBSTF are defined by SA2. * Clause 6.13 defines high-level control plane procedures for distributing the MSK and MTK from the MBSF to the MB-SMF to the SMF to the UE (in the N1 SM container). * Clause 6.13 states in NOTE 2 that interaction between MBSF and MBSTF is defined in TS 33.501 and TS 26.502. * Clause 6.13 delegates specification of user plane security procedures to TS 33.501. * The procedures in clauses 7.1.1.2 (MBS Session creation without PCC), 7.1.1.6 (MBS Session update without PCC) and 7.2.6 (Multicast session update procedure) are amended to state that the multicast session security context is provided by the MBSF when it acts as the MBS Security Function. * Minor modification to clause 7.2.1.3 (Multicast session join and session establishment procedure) to include multicast session context in various interactions relating to the control plane security procedures. * Clause 9.1.3 (Nmbsmf\_MBSSession service) amended to convey multicast session security context for control plane security.   **At SA3#109 Toulouse (November 2022):**  **S3-223919** (LS reply to S3-223164|S2-2207390, copied to SA4 in S4-230013) confirms that SA3 has amended TS 33.501 according to recommendations from SA2 to describe the user plane security procedure in neutral terms that do not involve any user plane interactions between the UE and the MBSTF since these are not part of the SA2 reference architecture.  **S3-223920** (TS 33.501 CR1500) -> **TS 33.501 V17.8.0**  Clause W.4.1.3 (User Plane procedure) is amended:   * MBS Security Function (MBSSF) takes on the security role of the BM-SC in MBMS. * MBSSF may be co-located with the MBSF or with the MBSTF. No specific reference points between the MBSSF and these other functions are defiend by SA2 or by SA3.   + This contribution does not define these reference points either. * The UE communicates with the MBSSF via the User Plane (although this is not explicitly stated, it is implicit). * User Plane authorisation of UEs by the MBSSF is according to local configuration, which may be preconfigured by an AF northbound of the MBSF.   **At SA2#154 ad hoc (January 2023):**  **S2-2300328** (LS reply to S2-2300071|S3-223919) requesting a subtle change to TS 33.501 W.4.1.3 (User Plane Procedure) NOTE 1 regarding the interfaces between MBSF, MBSTF and MBSSF, depending on the deployment choice for the MBSSF. | | | | | | | |
|  | |  | | | | | | | |
| ***This CR's revision history:*** | | S4-221264 -> S4aI230039 | | | | | | | |

FIRST CHANGE

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.501: "System architecture for the 5G System (5GS)".

[3] 3GPP TS 23.502: "Procedures for the 5G System (5GS)".

[4] 3GPP TS 23.503: "Policy and charging control framework for the 5G System (5GS); Stage 2".

[5] 3GPP TS 23.247: "Architectural enhancements for 5G multicast-broadcast services; Stage 2".

[6] 3GPP TS 26.348: "Northbound Application Programming Interface (API) for Multimedia Broadcast/Multicast Service (MBMS) at the xMB reference point".

[7] 3GPP TS 26.501: "5G Media Streaming (5GMS); General description and architecture".

[8] IETF RFC 3550: "RTP: A Transport Protocol for Real-Time Applications".

[9] IETF RFC 2250: "RTP Payload Format for MPEG1/MPEG2 Video".

[10] 3GPP TS 26.247: "Transparent end-to-end Packet-switched Streaming Service (PSS); Progressive Download and Dynamic Adaptive Streaming over HTTP (3GP-DASH)".

[11] 3GPP TS 26.531: "Data Collection and Reporting; General Description and Architecture".

[12] 3GPP TS 23.468: "Group Communication System Enablers for LTE (GCSE\_LTE)".

[13] 3GPP TS 26.517: " 5G Multicast–Broadcast User Services; Protocols and Formats".

[14] 3GPP TS 23.468: "Group Communication System Enablers for LTE (GCSE\_LTE)".

[15] 3GPP TS 29.522: "5G System; Network Exposure Function Northbound APIs; Stage 3".

[18] 3GPP TS 33.501: "Security architecture and procedures for 5G system".

NEXT CHANGE

### 4.2.2 User Services network architecture

MBS User Services enable high-level applications to make use of the low-level features of the MBS System. An MBS User Service is provided by the MBSF and MBSTF working in combination to support configuration option 2 and configuration option 3 defined in annex A of TS 23.247 [5]. In addition to the Network Functions defined in [5]:

- The MBS AF provides unicast User Service Announcement in the user plane.

- The MBS AS provides unicast services such as Object Repair.

- The MBSSF supports User Plane authentication of encrypted MBS User Services according to clause W.4.1.3 of TS 33.501 [18].

Together, these functions enable a complete service offering to an end-user, via a set of APIs that allows the MBS Client to activate or deactivate reception of MBS User Services.

The MBS User Services architecture depicted in figure 4.2.2-1 shows the MBS-related entities involved in providing MBS User Services delivery and control. These are described in the following clauses. The MBS Application Provider plays the role of the AF/AS.



Figure 4.2.2-1: MBS User Services network architecture

NEXT CHANGE

### 4.2.4 User Service Announcement

The User Service Announcement provides service access information needed by the MBS Client to discover and activate the reception of one or more MBS User Services. User Service Announcements may be delivered via MBS Distribution Sessions (either in the same MBS Distribution Session as the advertised content, or else via a dedicated MBS Distribution Session called the *MBS User Service Announcement Channel*) at reference point MBS‑4‑MC or via a regular unicast PDU Session at reference point MBS‑5.

The baseline information conveyed in User Service Announcements is defined in clause 4.5.7.

NEXT CHANGE

### 4.3.1 General

The MBSF and MBSTF offer service layer functionality for sending data via MBS Sessions. The MBSF (clause 4.3.2) offers control plane functionality while the MBSTF (clause 4.3.3) offers user plane functionality. The MBSTF acts as a User Plane anchor when it sources IP multicast traffic. Reference point Nmb2 provides the means for the MBSF to configure the delivery methods in the MBSTF.

Figure 4.3.1-1 shows the complete set of functional entities involved in supporting MBS User Services when the MBS Application Provider is deployed in the Trusted DN, including client functions in the UE.



NOTE: When the MBS Application Provider is deployed outside the Trusted DN, it interacts with the MBSF via the NEF at reference point N33, as shown in figure 4.2.2‑1, instead of via Nmb10.

Figure 4.3.1-1 MBS User Service reference architecture

In the above architecture, MBS-specific functions such as the MBS AS and MBSF are shown as independent and standalone. In deployments, they may be co-located on physical devices with other functions. As an example, the MBS AS may be hosted in the MBS Application Provider domain, or it may be hosted in a 5GMS AS.

NEXT CHANGE

### 4.3.2 MBSF

The functionality of the MBSF is defined in clause 5.3.2.11 of TS 23.247 [5]. It receives provisioning and control commands either directly at reference point Nmb10 or at reference point Nmb5 (via the NEF). The MBSF invokes MBS Session operations on the MB‑SMF at reference point Nmb1. The MBSF configures the MBSTF at reference point Nmb2.

The User Service Announcement function of the MBSF provides session access information which is consumed by the MBS Client and subsequently used to discover and initiate the reception of one or multiple MBS User Services. The session access information may contain information for presentation to the end-user, as well as application parameters used in generating service content for consumption by the MBS Client.

The present document defines additional Control Plane functionalities of the MBSF to support MBS User Services including:

1. Generating the User Service Announcement for each MBS Session.

2. Managing User Service Announcement updates.

3. Providing the User Service Announcement information to the MBS Client in a timely manner using one or more of the following mechanisms:

a) Unicast User Service Announcement delivered by the MBS AF via reference point MBS-5, including the possible use of push- or notification-based update mechanisms.

b) User Service Announcement via an MBS Distribution Session delivered by the MBSTF at reference point MBS-4-MC, optionally in the same MBS Distribution Session as the content it is advertising.

c) User Service Announcement via application-private means at reference point MBS-8.

NEXT CHANGE (New clause)

### 4.3.3A MBS AF

The MBS AF is an optional entity that performs the following functions to support MBS User Services:

- Delivering unicast User Service Announcements to the MBSF Client via reference point MBS‑5.

The MBS AF is configured by the MBSF at reference point MBS‑3. This interaction is not further defined by the present document.

The MBS AF may be deployed as a standalone entity, or its functions may be co-located with other Network Functions such as the MBSF (see clause 4.3.2), or the 5GMS AF defined in TS 26.501 [7].

NEXT CHANGE

### 4.3.4 MBS AS

The MBS AS is an optional entity that performs the following functions to support MBS User Services:

- Providing a byte-range file repair service to the MBSTF Client (via reference point MBS‑4‑UC) for use with the Object Distribution Method.

The MBS AS is configured by the MBSF at reference point MBS‑9. The MBS AS may acquire content from the MBSTF. These interactions are not further defined by the present document.

The MBS AS may be deployed as a standalone entity, or its functions may be co-located with other Network Functions such as the MBSTF (see clause 4.3.3) or the 5GMS AS defined in TS 26.501 [7].

NEXT CHANGE (New clause)

### 4.3.4A MBSSF

The MBS Security Function (MBSSF) is an optional entity defined in clause 6.13 of TS 23.247 [5] that performs the following functions to support MBS User Services:

- Providing a security anchor to the MBSTF Client (see clause 4.3.5) via reference point MBS‑10, realising the User Plane security procedure defined in clause W.4.1.3 of TS 33.501 [18].

In deployment, the MBSSF may be co-located with the MBSF or with the MBSTF, as described in clause 6.13 of TS 23.247 [5]. Interactions and procedures between these three functions are not defined in the present document.

NEXT CHANGE

### 4.3.5 MBS Client

The MBS Client function is part of the UE. The functionality of the UE is defined in clause 5.3.2.8 of TS 23.247 [5].

The MBS Client is further divided into the following subfunctions:

- *MBSF Client:* Communicates with the MBS AF at reference point MBS‑5 on MBS User Service control aspects. Communicates with the MBSSF at reference point MBS‑10 to authenticate access to security-protected MBS data (see clause W.4 of TS 33.501 [18]) that it has received from reference point MBS‑4‑MC.

- *MBSTF Client:* Communicates with the MBSTF at reference point MBS‑4‑MC and/or with the MBS AS at reference point MBS‑4‑UC in order to provide an MBS Application Data Session to the MBS-Aware Application.

The MBS Client performs the following functions to support MBS User Services:

- Acquisition of MBSF-compiled User Service Announcements from the MBS AF at reference point MBS‑5 and/or from the MBSTF at reference point MBS-4-MC.

- Authorisation of access to security-protected MBS data by invoking the User Plane security procedure defined in clause W.4.1.3 of TS 33.501 [18] at reference point MBS‑10.

- Reception of MBS data via reference point MBS‑4‑MC from either a Multicast MBS Session or a Broadcast MBS Session.

- Exposure of MBS Application Data Sessions towards an MBS-Aware Application.

- Using AL-FEC to recover packets or objects, if this optional feature is provisioned for the MBS Session.

- Unicast recovery via reference point MBS‑4‑UC of the application payload data carried in multicast/broadcast packets that are not successfully received via MBS-4-MC, if unicast repair is provisioned for the MBS Session.

NOTE: Roaming of the MBS Client is for further study.

NEXT CHANGE

## 4.4 Reference points and interfaces

### 4.4.1 Overview

The following reference points defined in clause 5.1 of TS 23.247 [5] are relevant to MBS User Services architecture: Nmb1, Nmb2, Nmb5, Nmb8, Nmb9, Nmb10 and Nmb12.

The following additional reference points are defined by the present document:

**- MBS-3:** Used by the MBSF to configure the MBS AF and to publish User Service Announcements to it. This reference point is not described further in the present document.

**- MBS-4-MC:** Unidirectional multicast distribution of content from the MBSTF to the MBS Client.

**- MBS-4-UC:** User Plane interactions between the MBSTF Client and the MBS AS for the purpose of file-based unicast repair.

**- MBS-5:** User Plane interactions between the MBSF Client and the MBS AF for the purpose of MBS control plane and service handling.

**- MBS-6:** API exposed by the MBSF Client and used by the MBS-Aware Application to manage and control MBS User Services.

**- MBS-7:** API exposed by the MBSTF Client and used by the MBS-Aware Application to receive user data information distributed using MBS User Services.

**- MBS-8:** Announcement of MBS User Services to the MBS-Aware Application by the MBS Application Provider. The procedures at this reference point are beyond the scope of 3GPP specification.

**- MBS-9:** Used by the MBSF to configure the MBS AS. This reference point is not described further in the present document.

**- MBS-10:** User Plane interactions between the MBSF Client and the MBSSF for the purpose of authorising access to security-protected MBS data by means of the User Plane security procedure specified in clause W.4.1.3 of TS 33.501 [18].

In addition, the following reference points are defined inside the MBS Client function:

- **MBS‑6′:** API exposed by the MBSTF Client and used by the MBSF Client to (de)activate reception of an MBS Session by the MBSTF. The reception parameters are supplied by the MBSF Client.

This reference point is outside the scope of MBS User Services and is not described further in the present document.

- **MBS‑7′:** API exposed by the MSTF Client and used by the MBSTF to supply MBS Session configuration information that has been received from reference point MBS‑4‑MC.

This reference point is outside the scope of MBS User Services and is not described further in the present document.

END OF CHANGES