**3GPP TSG-SA WG6 Meeting #49-e S6-221213**

**e-meeting, 16th – 25th May 2022 (revision of S6-22xxxx)**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  | **23.289** | **CR** | **0075** | **rev** | **-** | **Current version:** | **18.1.0** |  |
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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:***  | Clarification on GC1 in clause 4.7 |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | S6 |
|  |  |
| ***Work item code:*** | MCOver5MBS |  | ***Date:*** | 2022-04-30 |
|  |  |  |  |  |
| ***Category:*** | F |  | ***Release:*** | Rel-18 |
|  | *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:*** | The GC1 is used in clause 4.7 in 5G MBS context, however GC1 is defined in TS 23.468 which is dedicated for LTE/eMBMS and has its specific meanings.Moreover, the interactions between the MC client and MC server over 5G MBS is a bit of different from the one over LTE eMBMS. Using the same reference point name may cause confusion.The EN in clause 5.4.1 is invalid as the figures are already aligned.In addition, the NOTE in clause 4.7.2 refers to a wrong clause for N5 with MBS usage. |
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| ***Summary of change:*** | (1) Rename the ‘GC1” in clause 4.7 to ‘5G-GC1’;(2) Remove the reference to 3GPP TS 23.468 in clause 4.7.2;(3) Add description of the the implementation of ‘5G-GC1’ in MCPTT-1, MCVideo-1, MCData-1.(4) Update the NOTE 2 in clause 4.7.2(5) Update the clause 5.3.3.3.2 to support 5G-GC1 accordingly.(6) Remove the EN in claue 5.4.1. |
|  |  |
| ***Consequences if not approved:*** |  May cause misunderstandings and confusions to readers. |
|  |  |
| ***Clauses affected:*** | 4.7.2, 4.7.3.1, 4.7.3.2, 4.7.3.3, 4.7.4, 4.7.5, 5.3.3.3.2, 5.4.1, 5.5.1, 5.6.1 |
|  |  |
|  | **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:*** |  |

\* \* \* First Change \* \* \* \*

4.7.2 General on-network architecture for use of MBS by MC services

Figure 4.7.2-1 presents a high-level architectural view of mission critical services when using MBS. The shown architecture is consistent with 3GPP TS 23.501 [7] and 3GPP TS 23.247 [15].

MCX services use MBS control plane capabilities by initiating access via Nmb13, Nmb10 or N33. MBS user plane capabilities can be accessed via N6mb or Nmb8. MCX servers can initiate access to MBS PCC capabilities supported by PCF via N5 or N33. If the MCX server and the 5GS are in different trust domains with respect to MBS, N33 needs to be used to gain access to the MBS control plane capabilities and the PCC capabilities.

The 5G-GC1 reference point, which exists between the MCX client and the MCX server, is used for application layer signalling for the control of mission critical service delivery over MBS session. The functions of this reference point are defined in clause 7.3.

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**Figure 4.7.2-1: Architectural view of a mission critical system when using MBS**

NOTE 1: Support of interfaces associated to 5GS optional entities (e.g. MBSF, MBSTF, NEF) is necessary only if features enabled by these entities are supported.

NOTE 2: When the MCX server uses MBS, the N5 reference point is used as described in the present document.

### 4.7.3 Specific instantiations of on-network architecture for use of MBS by MC services

#### 4.7.3.1 Instantiation without optional entities and associated interfaces

Figure 4.7.3.1-1 presents a high-level architectural view of mission critical services when using MBS without the presence or use of the optional entities (MBSF, MBSTF and NEF) and their associated interfaces. The shown architecture is a particularization of the general architecture shown in figure 4.7.3.1-1.

MCX services use MBS control plane capabilities by initiating access via Nmb13. MBS user plane capabilities can be accessed via N6mb. MCX servers can initiate access to MBS PCC capabilities supported by PCF via N5.



Figure 4.7.3.1-1: Architectural view of a mission critical system when using MBS without optional MBS interfaces

#### 4.7.3.2 Instantiation without MBSF / MBSTF and associated interfaces

Figure 4.7.3.2-1 presents a high-level architectural view of mission critical services when using MBS without the presence or use of the optional entities MBSF and MBSTF and their associated interfaces. The shown architecture is a particularization of the general architecture shown in figure 4.7.2-1.

MCX services use MBS control plane capabilities by initiating access via Nmb13 or N33. MBS user plane capabilities can be accessed via N6mb. MCX servers can initiate access to MBS PCC capabilities supported by PCF via N5 or N33. If the MCX server and the 5GS are in different trust domains with respect to MBS, N33 needs to be used to gain access to the MBS control plane capabilities and the PCC capabilities.



Figure 4.7.3.2-1: Architectural view of a mission critical system when using MBS without optional MBSF/MBSTF entities and their associated interfaces

#### 4.7.3.3 Instantiation without NEF and associated interfaces

Figure 4.7.3.3-1 presents a high-level architectural view of mission critical services when using MBS without the presence or use of the optional entity NEF and its associated interfaces. The shown architecture is a particularization of the general architecture shown in figure 4.7.2-1.

MCX services use MBS control plane capabilities by initiating access via Nmb13 or Nmb10. MBS user plane capabilities can be accessed via N6mb or Nmb8. MCX servers can initiate access to MBS PCC capabililities supported by PCF via N5.



Figure 4.7.3.3-1: Architectural view of a mission critical system when using MBS without optional NEF entity and its associated interfaces

### 4.7.4 Service layer‑based interworking between eMBMS and MBS

Figure 4.7.4-1 presents a high-level architectural view of mission critical services interworking between eMBMS and MBS at the service layer. The shown architecture is consistent with 3GPP TS 23.247 [15], subclauses 5.2, 6.8 and configurations 2 and 3 in Annex A.

The interworking between eMBMS and MBS for mission critical operation is enabled by the Joint BM-SC, MBSF and MBSTF functional entity. MCX services can use control plane capabilities by accessing the Joint entity directly via MB2-C or Nmb10 or indirectly (using NEF) via N33+Nmb5. User plane traffic delivery is supported via MB2-U or Nmb8. If the MCX server and the 5GS are in different trust domains with respect to MBS, N33 needs to be used to gain access to the MBS PCC capabilities.



Figure 4.7.4-1: Service layer‑based mission critical interworking between eMBMS and MBS

NOTE: Support of interfaces associated to 5GS optional entities (e.g., NEF) is necessary only if features enabled by these entities are supported.

### 4.7.5 Application layer based interworking between eMBMS and MBS

Figure 4.7.5-1 presents a high-level architectural view of mission critical services interworking between eMBMS and MBS at the application layer. The shown architecture does not use the MBSF/MBSTF entities defined in 3GPP TS 23.247 [15] and is inclusive of configuration 1 in Annex A of 3GPP TS 23.247 [15].

MCX services initiate access to control plane capabilities via MB2-C (for eMBMS) and via Nmb13 or N33 (for MBS). User plane capabilities can be accessed via MB2-U (for eMBMS) and via N6mb (for MBS). MCX servers can initiate access to PCC capabilities via the Rx interface (for the PCRF in the EPS) and via the N5 or N33 interfaces (for the PCF in the 5GS). If the MCX server and the 5GS are in different trust domains with respect to MBS, N33 needs to be used to gain access to the MBS control plane capabilities and the PCC capabilities.



 Figure 4.7.5-1: Application layer‑based mission critical interworking between eMBMS and MBS

NOTE: Support of interfaces associated to 5GS optional entities (e.g., NEF) is necessary only if features enabled by these entities are supported.

\* \* \* Next Change \* \* \* \*

##### 5.3.3.3.2 Reference point SIP-1(between the signalling user agent and the SIP core)

The SIP-1 reference point, which exists between the signalling user agent and the SIP core for establishing a session in support of MC service, shall use the Gm reference point as defined in 3GPP TS 23.002 [8] (with necessary enhancements to support MC service requirements and profiled to meet the minimum requirements for support of MC services). The SIP-1 reference point fulfils the requirements of the 5G-GC1 reference point, and is used for:

- SIP registration (including UE's RAT capabilities for example MBMS capable RAT or MBS capable RAT);

- authentication and security to the service layer;

- event subscription and event notification;

- overload control;

- MBS session management; e.g., MBS session annoucement and de-annoucement; and

- media negotiation.

NOTE: the reference point 5G-GC1 is defined within SA6, and outside of SA2 scope.

\* \* \* Next Change \* \* \* \*

## 5.4 MCPTT functional model description

### 5.4.1 On-network functional model

Figure 5.4.1-1 shows the functional model for the application plane for an MCPTT system using the 5GS.



Figure 5.4.1-1: MCPTT functional model for application plane

In the functional model shown in figure 5.4.1-1, the following is considered:

- The description of the corresponding functional entities and reference points in 3GPP TS 23.379 [6] applies.

- MCPTT-1, uses the 5G-GC1 reference point as described in clause 4.7 and fulfils the requirements of the 5G-GC1 reference point for MCPTT.

- The description of the MCPTT-4 and MCPTT-7 reference points in 3GPP TS 23.379 [6] applies considering that it utilizes the N6 reference point defined in 3GPP TS 23.501 [7].

- The description of the MCPTT-5 reference point in 3GPP TS 23.379 [6] applies considering that it exists between the MCPTT server and the 5GS. It is used for resource management of MCPTT sessions, e.g. QoS control, and utilizes the N5 reference point or the Rx reference point or the N33 reference point as defined in 3GPP TS 23.501 [7], 3GPP TS 23.502 [10] and 3GPP TS 23.503 [9].

- MCPTT-5, utilizing Rx reference point or N5 reference point, may be used when the MCPTT service provider directly interacts with operator's relevant 5GS network function for QoS control for both unicast PDU sessions and MBS sessions (if dynamic PCC is applicable).

- MCPTT-5, utilizing N33 reference point, may be used when the MCPTT service provider is limited by the operational agreement, i.e., indirect interaction with operator's 5GS network functions for QoS control.

- The MCPTT-6 reference point, which exists between the MCPTT server and the 5GS, is used to create an MBS session obtaining multicast or broadcast resources for MCPTT application usage.

- The MCPTT-6 reference point utilizes Nmb13 reference point when the MCPTT service provider and the PLMN operator have an operational agreement where QoS control is provided directly from the MCPTT service provider domain.

- The MCPTT-6 reference point utilizes Nmb10 reference point when MBSF is used.

- The MCPTT-6 reference point utilizes N33 reference point when the MCPTT service provider is limited by the operational agreement for QoS control, i.e. indirect interaction with operator's 5GS network functions for QoS control is only allowed.

- The MCPTT-6 reference point utilizes Nmb6 reference point when MCPTT service provider interacts with the Joint BM-SC, MBSF and MBSTF entity to facilitate interworking with LTE.

- For MCPTT-8 reference point, the reference point definition in 3GPP TS 23.379 [6] applies. The MCPTT-8 reference point utilizes the N6mb reference point according to 3GPP TS 23.247 [15].

- The MCPTT-8 reference point utilizes the Nmb8 reference point according to 3GPP TS 23.247 [15] when MBSTF is used.

- For interworking with LTE via Joint BM-SC, MBSF and MBSTF entity, the MCPTT-8 reference point utilizes the Nmb4 reference point according to 3GPP TS 23.247 [15].

- For MCPTT-9 reference point, the reference point definition in 3GPP TS 23.379 [6] applies. The MCPTT-9 reference point utilizes the N6mb reference point according to 3GPP TS 23.247 [15].

- The MCPTT-9 reference point utilizes the Nmb8 reference point according to 3GPP TS 23.247 [15] when MBSTF is used.

- For interworking with LTE via Joint BM-SC, MBSF and MBSTF entity, the MCPTT-9 reference point utilizes the Nmb4 reference point according to 3GPP TS 23.247 [15].

## 5.5 MCVideo functional model description

### 5.5.1 On-network functional model

Figure 5.5.1-1 shows the functional model for the application plane for an MCVideo system using the 5GS.



Figure 5.5.1-1: MCVideo functional model for application plane

In the functional model shown in figure 5.5.1-1, the following is considered:

- The description of the corresponding functional entities and reference points in 3GPP TS 23.281 [4] applies.

- MCVideo-1, uses the 5G-GC1 reference point as described in clause 4.7 and fulfils the requirements of the 5G-GC1 reference point for MCVideo.

- The description of the MCVideo-4 and MCVideo-7 reference points in 3GPP TS 23.281 [4] applies considering that it utilizes the N6 reference point defined in 3GPP TS 23.501 [7].

- The description of the MCVideo-5 reference point in 3GPP TS 23.281 [4] applies considering that it exists between the MCVideo server and the 5GS. It is used for resource management of MCVideo sessions, e.g. QoS control, and utilizes the N5 reference point or the Rx reference point or the N33 reference point as defined in 3GPP TS 23.501 [7], 3GPP TS 23.502 [10] and 3GPP TS 23.503 [9].

- MCVideo-5, utilizing Rx reference point or N5 reference point, may be used when the MCVideo service provider directly interacts with operator's relevant 5GS network function for QoS control for both unicast PDU sessions and MBS sessions (if dynamic PCC is applicable).

- MCVideo-5, utilizing N33 reference point, may be used when the MCVideo service provider is limited by the operational agreement, i.e., indirect interaction with operator's 5GS network functions for QoS control.

- The MCVideo-6 reference point, which exists between the MCVideo server and the 5GS, is used to create an MBS session obtaining multicast or broadcast resources for MCVideo application usage.

- The MCVideo-6 reference point utilizes Nmb13 reference point when the MCVideo service provider and the PLMN operator have an operational agreement where QoS control is provided directly from the MCVideo service provider domain.

- The MCVideo-6 reference point utilizes Nmb10 reference point when MBSF is used.

- The MCVideo-6 reference point utilizes N33 reference point when the MCVideo service provider is limited by the operational agreement for QoS control, i.e. indirect interaction with operator's 5GS network functions for QoS control is only allowed.

- The MCVideo-6 reference point utilizes Nmb6 reference point when MCVideo service provider interacts with the Joint BM-SC, MBSF and MBSTF entity to facilitate interworking with LTE.

- For MCVideo-8 reference point, the reference point definition in 3GPP TS 23.281 [4] applies. The MCVideo-8 reference point utilizes the N6mb reference point according to 3GPP TS 23.247 [15].

- The MCVideo-8 reference point utilizes the Nmb8 reference point according to 3GPP TS 23.247 [15] when MBSTF is used.

- For interworking with LTE via Joint BM-SC, MBSF and MBSTF entity, the MCVideo-8 reference point utilizes the Nmb4 reference point according to 3GPP TS 23.247 [15].

- For MCVideo-9 reference point, the reference point definition in 3GPP TS 23.281 [4] applies. The MCVideo-9 reference point utilizes the N6mb reference point according to 3GPP TS 23.247 [15].

- The MCVideo-9 reference point utilizes the Nmb8 reference point according to 3GPP TS 23.247 [15] when MBSTF is used.

- For interworking with LTE via Joint BM-SC, MBSF and MBSTF entity, the MCVideo-9 reference point utilizes the Nmb4 reference point according to 3GPP TS 23.247 [15].

## 5.6 MCData functional model description

### 5.6.1 On-network functional model

Figure 5.6.1-1 shows the generic functional model for the application plane for an MCData system using the 5GS.



Figure 5.6.1-1: Generic MCData functional model for application plane

In the functional model shown in figure 5.6.1-1, the following is considered:

- The description of the corresponding functional entities and reference points in 3GPP TS 23.282 [5] applies.

- MCData-cap-1, uses the 5G-GC1 reference point as described in clause 4.7 and fulfils the requirements of the 5G-GC1 reference point for MCData.

- The description of the MCData-5 reference point in 3GPP TS 23.282 [6] applies considering that it exists between the MCData server and the 5GS. It is used for resource management of MCData sessions, e.g. QoS control, and utilizes the N5 reference point or the Rx reference point or the N33 reference point as defined in 3GPP TS 23.501 [7], 3GPP TS 23.502 [10] and 3GPP TS 23.503 [9].

- MCData-5, utilizing Rx reference point or N5 reference point, may be used when the MCData service provider directly interacts with operator's relevant 5GS network function for QoS control for both unicast PDU sessions and MBS sessions (if dynamic PCC is applicable).

- MCData-5, utilizing N33 reference point, may be used when the MCData service provider is limited by the operational agreement, i.e., indirect interaction with operator's 5GS network functions for QoS control.

- The respective functional models supporting MCData capabilities (e.g., SDS, FD, DS, IPcon) over unicast transmissions along with the corresponding reference points (i.e., MCData-cap-1 to MCData-cap-n) described in 3GPP TS 23.282 [5] also apply when the 5G system is used.

- The MCData-6 reference point, which exists between the MCData server and the 5GS, is used to create an MBS session obtaining multicast or broadcast resources for MCData application usage.

- The MCData-6 reference point utilizes Nmb13 reference point when the MCData service provider and the PLMN operator have an operational agreement where QoS control is provided directly from the MCData service provider domain.

- The MCData-6 reference point utilizes Nmb10 reference point when MBSF is used.

- The MCData-6 reference point utilizes N33 reference point when the MCData service provider is limited by the operational agreement for QoS control, i.e. indirect interaction with operator's 5GS network functions for QoS control is only allowed.

- The MCData-6 reference point utilizes Nmb6 reference point when MCData service provider interacts with the Joint BM-SC, MBSF and MBSTF entity to facilitate interworking with LTE.

- The MCData-6 reference point utilizes the Nmb8 reference point according to 3GPP TS 23.247 [15] when MBSTF is used.

- For interworking with LTE via Joint BM-SC, MBSF and MBSTF entity, the MCData-6 reference point utilizes the Nmb4 reference point according to 3GPP TS 23.247 [15].

- The respective functional models supporting MCData capabilities (e.g., SDS, FD, DS, IPcon) over MBMS transmissions along with the corresponding reference points (i.e., MCData-cap-1 to MCData-cap-n) described in 3GPP TS 23.282 [5] also apply when the 5G MBS is used.

\* \* \* End of Change \* \* \* \*