**3GPP TSG-CT WG4 Meeting #124C4-243576**

**Maastricht, Netherlands; 19th – 23rd August 2024**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **23.540** | **CR** | **0020** | **rev** | **1** | **Current version:** | **18.4.0** |  |
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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 |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** | MPS priority for Messaging SMS over NAS SBI | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Peraton Labs, CISA ECD, AT&T, T-Mobile USA | | | | | | | | | |
| ***Source to TSG:*** | CT4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | MPS4msg | | | | |  | ***Date:*** | | | 2024-08-08 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-19 |
|  | *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 can be 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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Support MPS priority for SMS over NAS using SBI.  The CR is based on TR 23.700‑75. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | First change:  For an MT SMS, the SMS-GMSC includes a Message Priority Header based on the MPS for Messaging indication from the UDM when forwarding the SMS message.  Second change:  The UDM returns the MPS for Messaging indication to the SMS Router and the SMS-GMSC.  The SMS Router adds a Message Priority header to the Nrouter\_SMService\_RoutingInfo response if the MPS for Messaging indication is set (enabled). The SMS Router and the SMS-GMSC forward the SMS with a Message Priority header with a value appropriate for MPS if the MPS for Messaging indication is set (enabled).  Third change:  The UDM returns the MPS for Messaging indication to the IP-SM-GW and the SMS-GMSC.  The IP-SM-GW adds a Message Priority header to the Service Routing Info message if the MPS for Messaging indication is set (enabled). The IP-SM-GW and the SMS-GMSC forward the SMS with a Message Priority header with a value appropriate for MPS if the MPS for Messaging indication is set (enabled)  Fourth change:  The SMSF stores the MPS for Messaging indication from the UDM. If the indication is set (enabled), the SMSF adds the indication to the message and sets the Message Priority Header to an MPS value. The SMS-IWMSC sets the DSCP to a value for MPS if it receives the indication. | | | | | | | | |
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| ***Consequences if not approved:*** | | MPS subscribed users will not have priority for SMS over NAS when SBI is used to the SMSC. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 5.1.2, 5.1.3, 5.1.4, 5.2.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 \*\*\*\*\*

### 5.1.2 Successful Mobile Terminated short message transfer without SMS Router/ IP-SM-GW



Figure 5.1.2-1: MT SMS over NAS without SMS Router/ IP-SM-GW

1. MT SMS interaction between SC and SMS-GMSC follow the current procedure as defined in 3GPP TS 23.040 [2].

2a. SMS-GMSC invokes the Nnrf\_NFDiscovery to discover and select the UDM instance(s), supporting SMS SBI interfaces, and managing the user subscriptions of the GPSI. The SMS-GMSC may need to retrieve the PLMN ID of the recipients GPSI before the discovery of the UDM instance based on the GPSI-to-Subscription-Network resolution procedure defined in clause 5.1.7.

2b. If no UDM supporting SMS SBI could be discovered, the NRF indicates so to SMS-GMSC (by not including any UDM instance in the discovery response), and SMS-GMSC shall quit the SBI-based procedure and fallback to legacy (MAP/Diameter) protocol based procedures, as defined in TS 23.040 [2],

or if a UDM supporting SMS SBI is discovered and selected, NRF returns the IP addresses or FQDNs of the serving UDM to provide Nudm\_UECM\_SendRoutingInfoForSM service to SMS-GMSC.

3. SMS-GMSC invokes Nudm\_UECM\_SendRoutingInfoForSM (GPSI) to the UDM to get the routing information of the nodes available for MT SMS delivery, in this case the registered serving SMSF instances for all access types for the UE.

4. The UDM shall check the registration/reachability flags to determine the potential target nodes and responds to the SMS-GMSC by sending Nudm\_UECM\_SendRoutingInfoForSM response, in this procedure the SMSF instance Id and the indication for SMSF SMS\_SBI support are included in the response message. The UDM shall include the SMSF for 3GPP access and the SMSF for non-3GPP access separately, if both the SMSFs are currently known to be valid for the UE. If the MPS for Messaging indication is set (enabled) in the UDM, the UDM includes the MPS for Messaging indication in the Nudm\_UECM\_SendRoutingInfoForSM response and sets the transport priority (e.g., DSCP and the Message Priority header as specified in TS 29.500 [11]) of the response to a value appropriate for MPS and handles the response with priority.

5. The SMS-GMSC forwards the SMS message to the SMSF. If the SMS-GMSC has more than one SMSF address to use for SMS transport towards the UE, then the SMS-GMSC chooses which SMSF address to use first, based on operator local policy.

The SMS-GMSC selects protocol based on the indication for SMSF SMS\_SBI support.

If the SMSF indicates that it supports SMS\_SBI, the SMS-GMSC forwards the SMS message to the SMSF by invoking Nsmsf\_SMService\_MtForwardSm service operation. If the SMS message from the SC provides a priority indication (the priority indication is out of scope of the present document) or if the MPS for Messaging indication from the UDM is set (enabled), the SMS-GMSC sets the transport priority (e.g., DSCP and the Message Priority header) of the SMS message to a value appropriate for MPS and handles the SMS message with priority.

If the SMSF indicates that it does not support SMS\_SBI, the SMS-GMSC should forward SMS message to the SMSF using the legacy MAP/Diameter protocol. If the SMS message from the SC provides a priority indication (the priority indication is out of scope of the present document) or if the MPS for Messaging indication from the UDM is set (enabled), the SMS-GMSC sets the transport priority (e.g., DSCP and Diameter priority) of the SMS message to a value appropriate for MPS and handles the SMS message with priority. MPS for Messaging is not supported for the MAP protocol. And the following steps follow the procedures for legacy MT SMS message transfer, as illustrated in Figure 15a of TS 23.040 [2].

6. MT SMS over NAS procedure between SMSF, AMF and UE is same as the definition in step 4a to 6b of Figure 4.13.3.6-1 of 3GPP TS 23.502 [4].

7. The SMSF delivers the delivery report to SMS-GMSC by sending the Nsmsf\_SMService\_MtForwardSm response to the SMS-GMSC.

8. The SMS-GMSC updates the SM-Delivery Report Status to UDM by invoking Nudm\_SMReportStatus\_Request.

9. UDM responses Nudm\_SMReportStatus\_Request response to SMS-GMSC.

10. The SMS-GMSC delivers the delivery report to SC as defined in TS 23.040 [2].

11. MT SMS over NAS procedure between SMSF, AMF and UE is same as the definition in step 6c to 6d of Figure 4.13.3.6-1 of 3GPP TS 23.502 [4].

\*\*\*\*\* Second change \*\*\*\*\*

### 5.1.3 Successful Mobile Terminated short message transfer via SMS Router



Figure 5.1.3-1: MT SMS over NAS via SMS Router

1. MT SMS interaction between SC and SMS-GMSC follow the current procedure as defined in 3GPP TS 23.040 [2].

2a. SMS-GMSC invokes the Nnrf\_NFDiscovery to discover and select the UDM instance(s), supporting SMS SBI interfaces, and managing the user subscriptions of the GPSI. The SMS-GMSC may need to retrieve the PLMN ID of the recipients GPSI before the discovery of the UDM instance based on the GPSI-to-Subscription-Network resolution procedure defined in clause 5.1.7.

2b. If no UDM supporting SMS SBI could be discovered, the NRF indicates so to SMS-GMSC (by not including any UDM instance in the discovery response), and SMS-GMSC shall quit the SBI-based procedure and fallback to legacy (MAP/Diameter) protocol based procedures, as defined in TS 23.040 [2],

or if a UDM supporting SMS SBI is discovered and selected, NRF returns the IP addresses or FQDNs of the serving UDM to provide Nudm\_UECM\_SendRoutingInfoForSM service to SMS-GMSC.

3. SMS-GMSC invokes Nudm\_UECM\_SendRoutingInfoForSM (GPSI) to the UDM to get the serving node information for all access types for the UE.

4. The UDM shall check the registration/reachability flags to determine the potential target nodes, e.g. the SMSF. For MT SM transfer via an SMS Router, the UDM shall invoke the Nrouter\_SMService\_RoutingInfo to provide the SMSF Instance Id to the SMS Router. The address of the SMS Router to be contacted by the UDM may be configured locally.

NOTE: If the SMS Router is SBI-capable, the UDM can use normal SBI-based service discovery to consume its services.

If the MPS for Messaging indication is set (enabled) in the UDM, the UDM includes the MPS for Messaging indication in the Nrouter\_SMService\_RoutingInfo request and sets the transport priority (e.g., DSCP and the Message Priority header) of the response to a value appropriate for MPS and handles the request with priority.

5. The SMS Router shall send Nrouter\_SMService\_RoutingInfo response to the UDM. If the MPS for Messaging indication is set (enabled) from the UDM, the SMS Router sets the transport priority (e.g., DSCP and the Message Priority header) of the response to a value appropriate for MPS and handles the response with priority.

6. The UDM responds to the SMS-GMSC by sending a Nudm\_UECM\_SendRoutingInfoForSM response, including the SMS Router address, the indication for SMSF SMS\_SBI support and the indication for SMS Router SMS\_SBI support. If the MPS for Messaging indication is set (enabled) in the UDM, the UDM includes the MPS for Messaging indication in the Nudm\_UECM\_SendRoutingInfoForSM response and sets the transport priority (e.g., DSCP and the Message Priority header) of the response to a value appropriate for MPS and handles the response with priority.

7-8. The SMS-GMSC forwards the SMS message to the SMS Router, and then the SMS Router forwards the SMS message to the SMSF. If the SMS Router has more than one SMSF address to use for SMS transport towards the UE, then the SMS Router chooses which SMSF address to use first, based on operator local policy.

The SMS-GMSC selects protocol based on the indications for SMSF SMS\_SBI support and SMS Router SMS\_SBI support.

If both the SMSF and the SMS Router indicate support for SMS\_SBI, the SMS-GMSC discovers the appropriate service instance(s) of the target SMS Router and forwards the SMS message to the SMS Router by invoking the Nrouter\_SMService\_MtForwardSm service operation. And then the SMS Router forwards the SMS message to the SMSF by invoking the Nsmsf\_SMService\_MtForwardSm service operation. If the SMS message from the SC provides a priority indication (the priority indication is out of scope of the present document) or if the MPS for Messaging indication from the UDM is set (enabled), the SMS-GMSC sets the transport priority (e.g., DSCP and the Message Priority header) of the response to a value appropriate for MPS and handles the response with priority.

If the SMSF or the SMS Router indicates that it does not support SMS\_SBI, the SMS-GMSC should forward the SMS message to the SMS Router using the legacy MAP/Diameter protocol. Then SMS Router forwards the SMS message to the SMSF using the legacy MAP/Diameter protocol. If the SMS message from the SC provides a priority indication (the priority indication is out of scope of the present document) or if the MPS for Messaging indication from the UDM is set (enabled), the SMS-GMSC sets the transport priority (e.g., DSCP and Diameter priority) of the SMS message to a value appropriate for MPS and handles the response with priority. MPS for Messaging is not supported for the MAP protocol. The following steps follow the procedures for legacy MT SMS message transfer, as illustrated in Figure 15aa of TS 23.040 [2].

9. MT SMS over NAS procedure between SMSF, AMF and UE is same as the definition in step 4a to 6b of Figure 4.13.3.6-1 in 3GPP TS 23.502 [4].

10. The SMSF delivers the delivery report to SMS Router by sending the Nsmsf\_SMService\_MtForwardSm response to the SMS Router.

11. The SMS Router delivers the delivery report to SMS-GMSC by sending the Nrouter\_SMService\_MtForwardSm response to the SMS-GMSC.

12-13. The SMS-GMSC may report the SM-Delivery Status to the UDM by invoking the Nudm\_ReportSMDeliveryStatus\_Request, the UDM responds with a Nudm\_ReportSMDeliveryStatus\_Request response to the SMS-GMSC.

14. The SMS-GMSC delivers the delivery report to the SC as defined in 3GPP TS 23.040 [2].

15. The MT SMS over NAS procedure between the SMSF, the AMF and the UE is same as the definition in step 6c to 6d of Figure 4.13.3.6-1 in 3GPP TS 23.502 [4].

\*\*\*\*\* Third change \*\*\*\*\*

### 5.1.4 Successful Mobile Terminated short message transfer via IP-SM-GW



Figure 5.1.4-1: MT SMS over NAS via IP-SM-GW

1. MT SMS interaction between SC and SMS-GMSC follow the current procedure as defined in 3GPP TS 23.040 [2].

2a. SMS-GMSC invokes the Nnrf\_NFDiscovery to discover and select the UDM instance(s), supporting SMS SBI interfaces, and managing the user subscriptions of the GPSI. The SMS-GMSC may need to retrieve the PLMN ID of the recipients GPSI before the discovery of the UDM instance based on the GPSI-to-Subscription-Network resolution procedure defined in clause 5.1.7.

2b. If no UDM supporting SMS SBI could be discovered, the NRF indicates so to SMS-GMSC (by not including any UDM instance in the discovery response), and SMS-GMSC shall quit the SBI-based procedure and fallback to legacy (MAP/Diameter) protocol based procedures, as defined in TS 23.040 [2],

or if a UDM supporting SMS SBI is discovered and selected, NRF returns the IP addresses or FQDNs of the serving UDM to provide Nudm\_UECM\_SendRoutingInfoForSM service to SMS-GMSC.

3. The SMS-GMSC invokes Nudm\_UECM\_SendRoutingInfoForSM (GPSI) to the UDM to get the serving node information for all access types for the UE.

4. The UDM shall check the registration/reachability flags to determine the potential target nodes, e.g. the SMSF. For MT SM transfer via the IP-SM-GW, the UDM shall invoke the Nipsmgw\_SMService\_RoutingInfo to provide the SMSF Instance Id to the IP-SM-GW. The address of the IP-SM-GW to be contacted by the UDM may be configured locally or may be received from the HSS via the Nudm\_UECM service for IP-SM-GW registration, containing the registration data provided by the IP-SM-GW. If the MPS for Messaging indication is set (enabled) in the UDM, the UDM includes the MPS for Messaging indication in the Nipsmgw\_SMService\_RoutingInfo request and sets the transport priority (e.g., DSCP and the Message Priority header) of the response to a value appropriate for MPS and handles the request with priority.

NOTE: If the IP-SM-GW is SBI-capable, it is expected to provide its NF Instance ID during registration in HSS, so the UDM can use normal SBI-based service discovery to consume IP-SM-GW services.

5. The IP-SM-GW shall send the Nipsmgw\_SMService\_RoutingInfo response to the UDM. If the MPS for Messaging indication from the UDM is set (enabled), the IP-SM-GW includes a Message Priority header with a value appropriate for MPS. If the MPS for Messaging indication is set (enabled) from the UDM, the IP-SM-GW includes the MPS for Messaging indication in the response and sets the transport priority (e.g., DSCP and the Message Priority header) of the response to a value appropriate for MPS and handles the response with priority.

6. The UDM responds to the SMS-GMSC by sending the Nudm\_UECM\_SendRoutingInfoForSM response, including IP-SM-GW address, the indication for SMSF SMS\_SBI support and the indication for IP-SM-GW SMS\_SBI support. If the MPS for Messaging indication is set (enabled) in the UDM, the UDM includes the MPS for Messaging indication in the Nudm\_UECM\_SendRoutingInfoForSM response and sets the transport priority (e.g., DSCP and the Message Priority header) of the response to a value appropriate for MPS and handles the response with priority.

7-8. The SMS-GMSC forwards the SMS message to the IP-SM-GW, and then the IP-SM-GW performs service authorization and domain selection to determine the domain for delivery of the Short Message as defined in 3GPP TS 23.204 [15]. If the SMSF is selected, the IP-SM-GW forwards the SMS message to the SMSF. If the IP-SM-GW has more than one SMSF address to use for SMS transport towards the UE, then the IP-SM-GW chooses which SMSF address to use first based on operator local policy.

The SMS-GMSC selects protocol based on the indication for SMSF SMS\_SBI support and IP-SM-GW SBI support:

If both the SMSF and the IP-SM-GW indicate support for SMS\_SBI, the SMS-GMSC discovers the appropriate service instance(s) of the target IP-SM-GW and forwards the SMS message to the IP-SM-GW by invoking the Nipsmgw\_SMService\_MtForwardSm service operation. And then the IP-SM-GW forwards the SMS message to the SMSF by invoking the Nsmsf\_SMService\_MtForwardSm service operation. If the SMS message from the SC provides a priority indication (the priority indication is out of scope of the present document) or if the MPS for Messaging indication from the UDM is set (enabled), the SMS-GMSC sets the transport priority (e.g., DSCP and the Message Priority header) of the response to a value appropriate for MPS and handles the response with priority.

If the SMSF or the IP-SM-GW indicates that it does not support SMS\_SBI, the SMS-GMSC should forward the SMS message to the IP-SM-GW using the legacy MAP/Diameter protocol. Then the IP-SM-GW forwards the SMS message to the SMSF using the legacy MAP/Diameter protocol. If the SMS message from the SC provides a priority indication (the priority indication is out of scope of the present document) or if the MPS for Messaging indication from the UDM is set (enabled), the IP-SM-GW sets the transport priority (e.g., DSCP and Diameter priority) of the SMS message to a value appropriate for MPS and handles the response with priority. MPS for Messaging is not supported for the MAP protocol. The following steps follow the procedures for legacy MT SMS message transfer, as illustrated in Figure 15aa of TS 23.040 [2].

If the MPS for Messaging indication from the UDM is set (enabled), the IP-SM-GW includes a Message Priority header with a value appropriate for MPS when forwarding the SMS message.

9. The MT SMS over NAS procedure between the SMSF, the AMF and the UE is the same as in step 4a to 6b of Figure 4.13.3.6-1 of 3GPP TS 23.502 [4].

10. The SMSF delivers the delivery report to the IP-SM-GW by sending the Nsmsf\_SMService\_MtForwardSm response to the IP-SM-GW.

11. The IP-SM-GW delivers the delivery report to the SMS-GMSC by sending the Nipsmgw\_SMService\_MtForwardSm response to the SMS-GMSC.

12. The IP-SM-GW may report the SM-Delivery Status to the UDM by invoking the Nudm\_ReportSMDeliveryStatus\_Request.

13. The UDM responds with the Nudm\_ReportSMDeliveryStatus\_Request response to the IP-SM-GW.

14-15. The SMS-GMSC may report the SM-Delivery Status to the UDM by invoking Nudm\_ReportSMDeliveryStatus\_Request and the UDM shall ignore the information provided in this report.

16. The SMS-GMSC delivers the delivery report to the SC as defined in 3GPP TS 23.040 [2].

17. The MT SMS over NAS procedure between the SMSF, the AMF and the UE is the same as in step 6c to 6d of Figure 4.13.3.6-1 of 3GPP TS 23.502 [4].

\*\*\*\*\* Fourth change \*\*\*\*\*

### 5.2.2 Procedure for Successful Mobile Originated short message transfer



Figure 5.2.2-1: Procedures for successful SBI-based SM MO message transfer

0 The SMS-IWMSC registers with the Niwmsc\_SMService service in the NRF, during the NF registration procedure.

1 The MO SM message transfer from the UE to the SMSF through the AMF follows the current procedure as defined in 3GPP TS 23.040 [2]

2a If the SMSF knows from the local configuration that the target SMS-IWMSC does not support SBI, it shall quit the SBI-based procedure and fallback to legacy (MAP/Diameter) protocol based procedures, as defined in TS 23.040 [2],

or the SMSF invokes the Nnrf\_NFDiscovery to discover and selects the serving SMS-IWMSC with the parameters of SUPI and/or GPSI and/or location (e.g. TAIs, CGIs, etc.) and/or E.164 address of the SC.

2b If no SMS-IWMSC could be discovered, the NRF indicates so to the SMSF (by not including any SMS-IWMSC instance in the discovery response), and the SMSF shall quit the SBI-based procedure and fallback to the legacy (MAP/Diameter) protocol based procedures, as defined in TS 23.040 [2].

If an SMS-IWMSC is discovered and selected, the NRF returns the IP addresses or FQDNs of the serving SMS-IWMSC to provide the Niwmsc\_SMService service to the SMSF.

3 The SMSF sends a Niwmsc\_SMService\_MoForwardSm service request to the URI of the serving SMS-IWMSC, which is obtained in step 2b. The payload body of the request shall contain the SM record to be sent, the Service Centre address, the callbackURI for MO SMS Delivery Report, the timer for waiting the MO SMS Delivery Report, and optionally contains the Access Type. If the MPS for Messaging indication from the UDM is set (enabled), the SMSF includes the MPS for Messaging indication in the request and sets the transport priority (e.g., DSCP and Message priority header) of the request to a value appropriate for MPS and handles the request with priority.

4 The MO SMS delivery procedure between the SMS-IWMSC and the SC is the same as the definition in step 4 of Figure 4.13.3.3-1 of 3GPP TS 23.502 [4]. If the MPS for Messaging indication from the SMSF is set (enabled), the SMS-IWMSC sets the transport priority (e.g., DSCP and Diameter priority) of the request to a value appropriate for MPS and handles the request with priority.

5 The SMS-IWMSC sends the Niwmsc\_SMService\_MoForwardSm response to deliver the MO SMS delivery report to the URI of the serving SMSF, which is obtained in step 3.

6 The MO SMS delivery report procedure between the SMSF, the AMF and the UE is the same as the 3GPP TS 23.502 [4].

When no more SMS is to be sent, the procedure for the CP-ack and the SMS ack is the same as in 3GPP TS 23.502 [4].

These procedures are defined in step 6a to 6d of Figure 4.13.3.3-1 of 3GPP TS 23.502 [4].

\*\*\*\*\* End of changes \*\*\*\*