**3GPP TSG-WG SA2 Meeting # 166 *S2-2411577rev-1***

**Orlando, FL, USA, 18 - 22 November 2024**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **23.501** | **CR** | **5834** | **rev** | **-** | **Current version:** | **19.1.0** |  |
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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 |  | Radio Access Network |  | Core Network | **X** |

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| ***Title:*** | MPS for Messaging RAN Paging for SMS over NAS | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Peraton Labs, CISA ECD, Nokia, AT&T, Verizon, TMUS | | | | | | | | | |
| ***Source to TSG:*** | SA2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | MPS4msg | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***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-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | Add support of RAN paging priority for MPS for Messaging for SMS over NAS, in the case where the MT UE is in RRC\_INACTIVE state. | | | | | | | | |
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| ***Summary of changes:*** | | First changes (clause 5.22.2):   * UDM also sends MPS for Messaging indication to AMF * IMS signalling attribute can be either FALSE or TRUE, as per TS 29.519, changed “is set” to “may be set”. * Modify that the IMS Signaling Priority attribute is not in the UDM, but in the UDR * Add text describing how the AMF uses MPS for Messaging indication to determine “RAN Paging Priority” IE for Downlink NAS Transport. * Add text describing how the RAN uses the “RAN Paging Priority” IE in the Downlink NAS Transport to trigger priority handling in the RAN at times of congestion at the RAN.   Second change (clause 5.22.3):   * Changing (R)AN to RAN which supports “Paging” mechanism. | | | | | | | | |
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| ***Consequences if not approved:*** | | UE with MPS for Messaging set (enabled) and in RRC\_INACTIVE state will not be paged with priority. | | | | | | | | |
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| ***Clauses affected:*** | | 5.22.2, 5.22.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 \* \* \* \*

### 5.22.2 Subscription-related Priority Mechanisms

Subscription-related mechanisms which are always applied:

- **(R)AN:** During initial Access Network Connection Establishment, the Establishment Cause is set to indicate that special treatment is to be applied by the (R)AN in the radio resource allocation as specified in clause 5.2 for 3GPP access.

- **UDM:** As defined in clause 5.2.3 of TS 23.502 [3], the UE subscription data in the UDM contains an MPS subscription indication (i.e. MPS priority indication and optionally MPS for Messaging indication) and an MCX subscription indication (i.e. MCX priority) for the UE that has subscription to MPS and MCX, respectively. The MPS priority, MPS for Messaging indication and the MCX priority, if available, are provided to the AMF via the Registration or the UE Configuration Update procedure as defined in clause 4.2 of TS 23.502 [3]. The MPS for Messaging indication sets(enables)/clears(disables) the MPS priority treatment of Messaging service (i.e. SMS over NAS, SMS over IP and messaging over IMS are all controlled by one indication) for an MPS-subscribed UE. The MPS for Messaging indication is used in communications between NFs and network entities in the CN. The MPS for Messaging indication is not delivered to UE. The MPS for Messaging indication parameter may be provisioned by an AF via NEF as described in clause 4.15.6 of TS 23.502 [3].

- **AMF:** Following Access Network Connection Establishment, the receipt of the designated Establishment Cause (i.e. high priority access) by the AMF will result in priority handling of the "Initial UE Message" received as part of the Registration procedures of clause 4.2.2 of TS 23.502 [3]. If the AMF did not receive a designated Establishment Cause (i.e. high priority access), but when the AMF determines that there is a MPS priority (or MCX priority) in the UDM for that UE, the AMF shall provide priority handling for that UE at that time and shall provide the MPS priority (or MCX priority) to the UE via the Registration or the UE Configuration Update procedure, as defined in clause 4.2 of TS 23.502 [3]. In addition, certain exemptions to Control Plane Congestion and Overload Control are provided as specified in clause 5.19. For the MPS for Messaging indication, the AMF uses the parameter to determine the Message priority header related to SMS delivery and as described in clause 4.13 of TS 23.502 [3].

Subscription-related mechanisms which are conditionally applied:

- **UE:** When barring control parameters are broadcast by the RAN, access barring based on Access Identity(es) configured in the USIM and/or an Access Category is applied prior to an initial upstream transmission for the UE which provides a mechanism to limit transmissions from UEs categorized as non-prioritized, while allowing transmissions from UEs categorized as prioritized (such as MPS subscribed UEs), during the RRC Connection Establishment procedure as specified in clause 5.2.

- **UDM:** One or more ARP priority levels are assigned for prioritized or critical services. The ARP of the prioritized QoS Flows for each DN is set to an appropriate ARP priority level. The 5QI is from the standard value range as specified in clause 5.7.2.7. In addition, Priority Level may be configured for the standardized 5QIs, and if configured, it overwrites the default value specified in the QoS characteristics Table 5.7.4-1.

- **PCF:** If the "IMS Signalling Priority" information is set for the subscriber in the UDR, the PCF modifies the ARP of the QoS Flow used for IMS signalling, for each DN which supports prioritized services leveraging on IMS signalling, to an appropriate ARP priority level assigned for that service.

- **SMF/AMF:** Based on the QoS parameters (e.g. ARPs, 5QI) of a PDU Session, the SMF may provide a PDU Session Priority to the AMF. The AMF stores the information for further PDU Session related priority handling (i.e. for determination of Message Priority header of subsequent message related to the PDU Session).

NOTE: For a UE with MPS subscription, the MPS priority per DN can be different (e.g. only certain specific DNs has MPS priority while other DNs have no MPS priority).

- **AMF:** Upon receiving an MT-SMS from the SMSF, and either having received an indication that MPS for Messaging is enabled for the UE in the UDM/UDR, or having received a Message Priority header value used for MPS for Messaging, the AMF

- handles the request with priority and includes the "Paging Priority" IE in the N2 "Paging" message set to a value appropriate for MPS, when the UE is CM-IDLE; or

- determines the service priority ("RAN Paging Priority" IE as specified in TS 38.413 [34]) with a value appropriate for MPS for Messaging, and sends the service priority in the Downlink NAS Transport message to the NG-RAN, when the UE is CM-CONNECTED.

- **RAN:** For a UE in RRC\_INACTIVE state, inclusion of the service priority ("RAN Paging Priority" IE as specified in TS 38.413 [34]) in the N2 "Downlink NAS Transport" message triggers priority handling of RAN paging, including over Xn as specified in clause 4.13.3 of TS 23.502 [3].

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

### 5.22.3 Invocation-related Priority Mechanisms

The generic mechanisms used based on invocation-related Priority Mechanisms for prioritised services are based an interaction with an Application Function and between the Application Function and the PCF over Rx/N5 interface.

These mechanisms apply to mobile originated as well as mobile terminated SIP call/sessions (clause 5.21 of TS 23.228 [15]) and Priority PDU connectivity services including MPS for Data Transport Service.

NOTE 1: Clause 5.21 of TS 23.228 [15] is applicable to 5GS, with the understanding that the term PCRF corresponds to PCF in the 5GS.

Invocation-related mechanisms for Mobile Originations e.g. via SIP/IMS:

- **PCF:** When an indication for a session arrives over the Rx/N5 Interface and the UE does not have priority for the signalling QoS Flow, the PCF derives the ARP and 5QI parameters, plus associated QoS characteristics as appropriate, of the QoS Flow for Signalling as per Service Provider policy as specified in clause 6.1.3.11 of TS 23.503 [45].

- **PCF:** For sessions such as MPS, when establishing or modifying a QoS Flow for media as part of the session origination procedure, the PCF selects the ARP and 5QI parameters, plus associated QoS characteristics as appropriate, to provide priority treatment to the QoS Flow(s).

- **PCF:** When all active sessions to a particular DN are released, and the UE is not configured for priority treatment to that particular PDU Session for a DN, the PCF will downgrade the IMS Signalling QoS Flows from appropriate settings of the ARP and 5QI parameters, plus associated QoS characteristics as appropriate, to those entitled by the UE based on subscription.

- **SMF/AMF:** Based on the QoS parameters (e.g. ARP, 5QI) of a PDU Session, the SMF may provide a PDU Session Priority to the AMF. The AMF stores the information for further PDU Session related priority handling (i.e. for determination of Message Priority header of subsequent message related to the PDU Session).

Invocation-related mechanisms for Mobile Terminations e.g. via SIP/IMS:

- **PCF:** When an indication for a session arrives over the Rx/N5 Interface, mechanisms as described above for Mobile Originations are applied.

- **UPF:** If an IP packet arrives at the UPF for a UE that is CM-IDLE, the UPF sends a "Data Notification" including the information to identify the QoS Flow for the DL data packet to the SMF, as specified in clause 4.2.3.3 of TS 23.502 [3].

- **SMF:** If a " Data Notification" message arrives at the SMF for a QoS Flow associated with an ARP priority level value that is entitled for priority use, delivery of priority indication during the Paging procedure is provided by inclusion of the ARP in the N11 interface "N1N2MessageTransfer" message, as specified in clause 4.2.3.3 of TS 23.502 [3]. Based on the QoS parameters (e.g. ARP, 5QI) of a PDU Session, the SMF may also provide a PDU Session Priority to the AMF.

- **AMF:** If an "N1N2MessageTransfer" message arrives at the AMF containing an ARP priority level value that is entitled for priority use, the AMF handles the request with priority and includes the "Paging Priority" IE in the N2 "Paging" message set to a value assigned to indicate that there is an IP packet at the UPF entitled to priority treatment, as specified in clause 4.2.3.3 of TS 23.502 [3]. If a PDU Session Priority is provided by the SMF, the AMF stores the information for further PDU Session related priority handling (i.e. for determination of Message Priority header of subsequent message related to the PDU Session).

- **SMF:** For a UE that is not configured for priority treatment, upon receiving the "N7 Session Management Policy Modification" message from the PCF with an ARP priority level that is entitled for priority use, the SMF sends an "N1N2MessageTransfer" to update the ARP for the Signalling QoS Flows, as specified in clause 4.3.3.2 of TS 23.502 [3]. Based on the QoS parameters (e.g. ARP, 5QI) of a PDU Session, the SMF may also provide a PDU Session Priority to the AMF.

- **AMF:** Upon receiving the "N1N2MessageTransfer" message from the SMF with an ARP priority level that is entitled for priority use, the AMF updates the ARP for the Signalling QoS Flows, as specified in clause 4.3.3.2 of TS 23.502 [3].

- **RAN:** Inclusion of the "Paging Priority" in the N2 "Paging" message triggers priority handling of paging in times of congestion at the RAN as specified in clause 4.2.3.3 of TS 23.502 [3].

Invocation-related mechanisms for the Priority PDU connectivity services:

- **PCF:** If the state of the Priority PDU connectivity services is modified from disabled to enabled, the QoS Flow(s) controlled by the Priority PDU connectivity services are established/modified to have the service appropriate settings of the ARP and 5QI parameters, plus associated QoS characteristics as appropriate, using the PDU Session Modification procedure as specified in clause 4.3.3 of TS 23.502 [3].

- **PCF:** If the state of Priority PDU connectivity services is modified from enabled to disabled, the QoS Flow(s) controlled by the Priority PDU connectivity services are modified from Priority PDU connectivity service appropriate settings of the ARP and 5QI parameters, plus associated QoS characteristics as appropriate, to those entitled by the UE as per subscription, using the PDU Session Modification procedure as specified in clause 4.3.3 of TS 23.502 [3].

- **SMF/AMF:** Based on the QoS parameters (e.g. ARP, 5QI) of a PDU Session, the SMF may provide a PDU Session Priority to the AMF. The AMF stores the information for further PDU Session related priority handling (i.e. for determination of Message Priority header of subsequent message related to the PDU Session).

Invocation-related mechanisms for MPS for Data Transport Service:

- MPS for Data Transport Service follows the same steps as those for Priority PDU connectivity services. The QoS Flows that will be subject to MPS for Data Transport Service are based on operator policy and regulations by means of local PCF configuration.

NOTE 2: If no configuration is provided, MPS for Data Transport Service applies to the QoS Flow associated with the default QoS rule.

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