**3GPP TSG-WG SA2 Meeting # 164 *S2-2409067***

**Maastricht, , - (revision of S2-2408783)**

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| *CR-Form-v12.3* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** | **0975** | **rev** | **2** | **Current version:** |  |  |
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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:*** | procedure | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | , Peraton Labs, Nokia, Samsung, CISA ECD | | | | | | | | | |
| ***Source to TSG:*** |  | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** |  | | | | |  | ***Date:*** | | |  |
|  |  | | | |  | |  | | |  |
| ***Category:*** | B |  | | | | | ***Release:*** | | |  |
|  | *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:*** | | MPS support for MO and MT SMS delivery via MME based on the outcome of the study for FS\_MPS4msg. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Following clauses are updated to handling the MPS priority for SMS   1. Geneneral description in clause C.1. 2. MME functions in clause C.4.2. 3. HSS functions in clause C.4.3. 4. HSS data in clause C.7.1. 5. MME UE context data in clause C.7.2 6. SMS in MME registration procedure in clause C.8.1 | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Missing funcitons | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | C.1, C.4.2, C.4.3, C.7.1, C.7.2, C.8.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 \* \* \* \*

# C.1 General

SMS in MME is an architecture option primarily intended for networks that do not deploy GERAN or UTRAN. SMS in MME delivers SMS services over EPS NAS signalling for UE's requiring SMS services. SMS in MME architecture option enables support of SMS in the EPS via E-UTRAN without requiring deployment of 3GPP MSCs.

For SMS in MME the SMS service control is performed by the MME. The MME receives SMS subscriber data and the MME verifies whether the subscriber is permitted to obtain SMS services.

The SMS subscriber data received and used by the MME may be PS subscriber data (the MME directly obtains from HSS) or CS subscriber data (the MME obtains via an interworking function as described in clause C.5).

NOTE: The use of SMS in MME by an operator that also deploys CS service on GERAN or UTRAN may lead to increased signalling traffic to the HSS.

MPS priority treatment of SMS via MME for a UE with an MPS subscription is supported as described TS 23.401 [2].

\* \* \* \* Next change \* \* \* \*

## C.4.2 MME

The MME needs to support the following features:

- UE-MME NAS procedures for SMS over SGs.

- S6a functionality as described in clause C.3.2.

- SMS procedures between UE and MME including support for the Short Message Control (SMC) and Short Message Relay (SM-RL) functions defined in TS 24.011 [28].

- Reporting UE's availability for receiving MT SMS to the HSS.

- SMS functions including charging and Lawful Interception (LI).

- Support combined EPS/IMSI procedures for "SMS-only" and in these:

- provide a non-broadcasted LAI (not associated with any VLR); and

- if needed provide a reserved TMSI that cannot cause any ambiguities with other TMSIs (e.g. when the UE changes to an area where it needs to derive SMS services from a GERAN/UTRAN MSC); and

- indicate in the Attach/TAU Accept message that the IMSI attach is for "SMS-only"; and

- notify the HSS it is capable of SMS transfer without the need of establishing an SGs association with an MSC; and

- obtain SMS-related subscription information.

- Support the registration procedures for SMS in MME described in clause C.8.

- Support for Service Gap Control for MO SMS as specified in TS 23.401 [2], clause 4.3.17.9.

- Support MPS priority treatment (e.g. determining the DRMP value in the messages related to SMS delivery, Paging Priority setting when paging is triggered for UE in CM-IDLE mode) for SMS delivery based on MPS for Messaging indication in HSS data.

## C.4.3 HSS

When an MME registers via the S6a including a registration for SMS Request, the HSS registers the MME as an MSC for MT SMS (i.e. in response to Send Routing Information (SRI) for SM the MME identity is passed back to the SMS‑GMSC/SMS router) when the HSS supports and decides to use SMS in MME. This registration as an MSC for MT SMS causes the HSS to cancel any old registered MSC. See clause C.8 for the detailed registration procedures. If the HSS receives a SRI for other CS Services than SMS it shall treat the UE as if it was detached from the CS domain. If the UE subsequently registers with an MSC for CS services, the HSS needs to replace the MME with the new MSC as the destination for SMS (but this is not a reason to cancel the MMEs registration for EPS Services).

NOTE 1: That an HSS that supports SMS in MME registers the MME as an MSC for MT SMS does not affect how the information is stored in the HSS, however the HSS reuses the MNRF flag intended for the controlling SM delivery via the MSC, for controlling the SM delivery via MME. It only affects what serving node identities are returned in response to SRI for SM. In such cases the MME identity is passed back to the SMS-GMSC/SMS router where usually the MSC identity is sent.

NOTE 2: For the PS and SMS only service to work also for outbound roamers, the 3GPP LTE-only operator may need to configure CS subscription data for SMS services in its HSS as a visited PLMN may deploy SMS over SGs. It may also use an IWF for MAP and Diameter translation. The 3GPP 2G/3G/LTE operator may need to upgrade its HSS to ensure that its outbound roamers get SMS services as a VPLMN may deploy only SMS in MME.

An HSS allows an operator to configure a subscription, which is limited to only PS domain services and to SMS service via the CS and the PS domain. This limitation is indicated in the PS subscription data as "PS and SMS only".

NOTE 3: The limitation of a subscription to only PS and SMS services can for example be based on an operator agreement with an MTC service provider, that only PS resources shall be used whenever possible.

When an HSS supports "SMS in MME", i.e. provides all HSS functionality described for "SMS in MME", and the operator configured the HSS to apply that functionality, the HSS indicates "SMS in MME Support" in the data provided to an MME.

NOTE 4: This separate handling of SMS subscriber data in the MME is also for aligning with the deployment option of an IWF for S6a that combines PS subscriber data with SMS subscriber data from CS subscriber data, where the data part that stems from CS subscriber data may be cancelled in MME independently from PS subscriber data. When the PS subscriber data are cancelled then any UE related subscriber data are cancelled in the MME.

If the HSS determines that an MME shall be deregistered for SMS (e.g. because of a removal of SMS subscription, CS location update, etc), the HSS shall indicate to the MME that it is not registered for SMS.

The HSS data, as per clause C.7.1, may include the MPS for Messaging indication parameter if the parameter is provisioned by an AS (as specified in TS 23.682 [48]) or by an operator. The HSS provides the parameter to the MME and to the SMS-GMSC/SMS router/IP-SM-GW when the HSS responds to an SMS routing information request.

\* \* \* \* Next change \* \* \* \*

## C.7.1 HSS

The following table specifies the HSS data defined per UE to support SMS in MME.

Table C.7.1-1: HSS data

|  |  |
| --- | --- |
| Field | Description |
| SMS Subscription Parameters | SMS subscription parameters, e.g. SMS teleservice, SMS barring list. |
| Network Access Mode (NAM) | Indicates whether the subscription includes subscriber data allowing for accessing PS and or CS domain.  NOTE 2 |
| PS and SMS only | Indicates a subscription which is limited to PS domain services and to SMS service via the CS and the PS domain.  NOTE 2 |
| MME Registered for SMS | Indicates that MME has been registered for SMS in the HSS |
| MPS for Messaging | Indicates whether the user has MPS for Messaging set (enabled)/cleared (disabled) as described in clause C.1. This MPS for Messaging indication parameter is valid only when the MPS-EPS-Priority bit is set. |

NOTE 1: When the UE is not reachable in the MME, the HSS sets the MNRF in the Message Waiting Data (MWD) since the MME is registered as an MSC.

NOTE 2: If "PS and SMS only" is set for this subscriber, NAM is set to "CS+PS".

When the HSS functionality for "SMS in the MME" is enabled, the HSS will include an "SMS in MME" feature indication along with the UE subscription information to the MME.

## C.7.2 MME

The following table specifies the MME data defined per UE to support SMS in MME.

Table C.7.2-1: MME Context for SMS

|  |  |
| --- | --- |
| Field | Description |
| SMS Subscription Data | SMS subscription parameters, e.g. SMS teleservice, SMS barring list. |
| MME Registered for SMS | Indicates that MME has been registered for SMS in the HSS |
| MNRF-MME | Indicates whether activity from the UE shall be reported to the HSS. |
| Network Access Mode (NAM) | Indicates whether the subscription includes subscriber data allowing for access to PS and or CS domain.  NOTE 1 |
| PS and SMS only | Indicates a subscription which is limited to PS domain services and to SMS service via the CS and the PS domain.  NOTE 1 |
| SMS in MME Support | Capability of the HSS to support the SMS in MME feature |
| MPS for Messaging | Indicates whether the user has MPS for Messaging set (enabled)/cleared (disabled) as described in clause C.1. This MPS for Messaging indication parameter is valid only when the MPS-EPS-Priority bit is set. |

NOTE 1: If "PS and SMS only" is set for this subscriber, NAM is set to "CS+PS".

\* \* \* \* Next change \* \* \* \*

## C.8.1 Request for registration

An MME supporting SMS in MME that needs to perform a registration with HSS shall follow the following procedure to become registered by the HSS also for SMS.

The following sequence shows the request for registration with the HSS for SMS in MME.



Figure C.8.1-1: MME registration for SMS

1. The UE initiates combined attach or combined TA/LA Update to an MME. A UE that only supports NB-IoT (see TS 23.401 [2]) may issue an EPS attach or TA Update instead of a combined attach or combined TA/LA Update.

2. The MME sends a Location Update Request (SMS in MME feature flag, MME address for MT-SMS routing, RegistrationForSMSRequest, "SMS-only" Indication) message to HSS. SMS in MME feature flag indicates that the MME is capable of SMS transfer without the need of establishing an SGs association with an MSC. The "SMS-only" Indication is included if it has been included in the request from the UE. The MME includes one of the following RegistrationForSMSRequest values based on the criteria shown in Table C.8.1-1.

Table C.8.1-1: Registration For SMS Request values

|  |  |
| --- | --- |
| Value | Description |
| SMS in MME Required | - MME does not support SGs; or  - The MME can be configured to use this value when the UE indicates "SMS only" or when known that the subscription is "PS and SMS only".  NOTE 1 |
| SMS in MME Not Preferred | - The MME can be configured to use this value when the UE indicates "SMS only" or when known that the subscription is "PS and SMS only"  - The MME can be configured to use this value when the UE does not indicate "SMS only" (i.e. requests CSFB) and the MME has no subscriber data yet (when MME is configured to use SGs for "SMS and PS only" subscription).  NOTE 2 |
| No Preference for SMS in MME | - The MME has no preference configured to use SMS in MME or SGs, but both options are available from MME perspective.  NOTE 2 |

NOTE 1: If this is set the HSS cannot determine whether the SGs is available.

NOTE 2: If this value is set it means that the MME supports SGs. UE might or might not indicate "SMS-only".

3. If the HSS supports SMS in MME and the subscription includes SMS:

a) if one or more of the following is true:

- Network Access Mode is PS only; or

- the MME indicates "SMS in MME Required";

then the HSS shall register the MME for SMS;

b) if the MME indicates "No Preference for SMS in MME" and Network Access Mode is not equal to PS only but one or more of the following are true:

- the UE indicated "SMS-only";

- the subscription is limited to PS domain services and SMS service via the CS and the PS domain ("PS and SMS only");

then the HSS should register the MME for SMS;

NOTE 3: The HSS can decide not to register the MME for SMS since it knows that the MME supports SGs but the normal behaviour would be to register for SMS and avoid an SGs association.

c) if the MME indicates "SMS in MME Not Preferred" and Network Access Mode is not equal to PS only then the HSS should not register the MME for SMS;

NOTE 4: The HSS can decide to register the MME for SMS based on the "PS and SMS only" setting and also on other factors including the UE indication for "SMS-Only", it is however assumed the normal behaviour would be not to register for SMS.

d) otherwise the HSS shall not register the MME for SMS.

If HSS registered the MME for SMS, the HSS stores the MME address for MT SMS.

4. If the HSS accepts to register the MME identity as an MSC identity for terminating SMS services then the HSS cancels the MSC/VLR registration from the HSS.

5. The HSS sends a Location Update Answer (indication whether the MME has been registered for SMS, subscription data including the Network Access Mode and "PS and SMS only" indications, SMS subscription data, MPS for Messaging indication, SMS in MME feature flag) message to MME.

If the HSS does not register the MME for SMS, it shall indicate that the MME has not been registered for SMS and not include any SMS subscription data.

SMS in MME feature flag indicates that the HSS is capable of supporting the SMS in MME feature.

The MME stores the returned data and checks the result of registering the MME for SMS.

If the registration for SMS was not accepted, the MME does following:

a. For a PS-only subscription (i.e. the Network Access Mode in the subscription equals "PS-only"), the MME shall not establish any SGs association (no SMS services are provided to the UE).

b. For a "PS and SMS only" subscription where SMS can be provided over CS (i.e. the Network Access Mode equals "PS+CS" and the subscription parameter "PS and SMS only" is set), the MME tries to establish SGs for SMS.

c. For a PS and CS subscription where also other CS services are allowed (i.e. Network Access Mode equals "PS+CS" and the subscription parameter "PS and SMS only" is not set), the MME tries to establish SGs for SMS and other CS services.

If the registration for SMS was accepted:

- The HSS uses the Insert Subscriber Data procedure to inform the MME of changes in MPS for Messaging indication.

- The HSS sets Diameter priority and DSCP on responses on the S6a and S6c interfaces with values that are appropriate for MPS.

- The SMS-GMSC obtains the MPS for Messaging indication in the Send Routing Information for SM from the HSS. If the MPS for Messaging indication is set (enabled), the SMS-GMSC sets the Diameter priority and DSCP for SMS messages to values that are appropriate for MPS.

- MME and SMS-GMSC set the Diameter priority and DSCP for SMS messages on the SGd interface to values that are appropriate for MPS.

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