



Emergency Services Support

- [Summary Data, on page 1](#)
- [Revision History, on page 1](#)
- [Feature Description, on page 1](#)
- [How it Works, on page 2](#)
- [Configuring Emergency Service Support, on page 4](#)
- [OAM Support for SMF Emergency Services, on page 6](#)

Summary Data

Applicable Product(s) or Functional Area	SMF
Applicable Platform(s)	SMI
Feature Default Setting	Enabled – Always-on
Related Changes in this Release	Not Applicable
Related Documentation	Not Applicable

Revision History

Table 1: Revision History

Revision Details	Release
First introduced.	2020.02.5.t1

Feature Description

"Emergency Services" refers to functionalities provided by the serving network when the network is configured to support Emergency Services. Emergency Services are provided to support IMS emergency sessions.

To implement IMS emergency services in 4G and 5G, the SMF performs the following functions:.

- Identifies 5G emergency session based on Request Type in SmContextCreate message or emergency configuration in DNN.
- Identifies 4G emergency session based on emergency configuration in DNN.
- Interacts with UDM if SUPI/IMSI is authenticated and “authorize local” is not set. Else, skips the interaction with UDM.
- Enables PDU session establishment for Emergency Services with PEI or IMEI.
- A new configuration to classify DNN as an Emergency DNN.
- Configures P-CSCF profile for Emergency Services
- Configures UPF for Emergency Services
- Configures default QoS profile for Emergency Services and flow only timer used during tear down of dedicated bearer from PCF.

How it Works

Identification of Emergency Service Sessions

5G

SMF identifies the Emergency Session based on request type “Initial Emergency Request” or “Existing Emergency PDU Session” received in SmContextCreate Message from AMF or if the DNN is configured as an Emergency DNN.

4G

SMF identifies the emergency session based on the authentication status of IMSI. If the IMSI is unauthenticated (UIMSI is set to 1), the session is considered as an emergency session.

If IMSI is authenticated (UIMSI is set to 0), and DNN is configured as an emergency DNN (using new CLI) in SMF, the session is identified as an emergency session.

- For non-emergency session, SUPI/IMSI is mandatory.
- For emergency session:
 - For an authenticated SUPI/IMSI, SUPI or IMSI is used as the session-key as per the current implementation.
 - For an unauthenticated SUPI or IMSI, PEI or IMEI is always used as the session-key, If PEI or IMEI is not present, then the call is rejected.

UDM Interaction for Emergency Sessions

1. SMF skips UDM interaction if SUPI or IMSI is unauthenticated.
2. SMF skips UDM interaction if SUPI/IMSI is authenticated and if “authorization” in DNN configuration is set to “local”.

3. SMF interacts with UDM if SUPI or IMSI is authenticated and if “authorization” in DNN configuration is not set to local.
 - If UDM rejects, then the call will be rejected.
 - If UDM exchanges fail, further handling is done as per UDM FH template provisioning.

**Important**

SMF does not consider whether “authorization local” is configured in DNN profile or not.

Configuring Emergency Sessions

1. Existing DNN, P-CSCF, UPF, and QoS Profile configuration works for emergency sessions.
2. Use CLI classify a DNN as Emergency DNN.
3. If "**authorization**" is set (using CLI) to local under DNN, UDM interaction is not required.
4. Use default Flow Only timer configuration to retain the default bearer to enable PSAP Callback session.

Support for Emergency Services if Request Type is “Existing Emergency PDU Session”

1. If the request type indicates "Existing Emergency PDU Session", the SMF determines that the request is HO from EPS (4G and WiFi). Current implementation supports emergency sessions mobility in WIFI to 5G HO using request type as “Existing Emergency PDU Session” and in 4G to 5G HO using N26 interface.
2. The SMF identifies the existing PDU session based on the PDU Session ID.
3. SMF updates the existing SM context to provide the representation of the updated SM context to the AMF in the response instead of creating new SM, which is equivalent to handling of “Existing PDU Session”.

Default Flow Only Timer for an Emergency Service (Dedicated Bearer)

At reception of an HTTP POST message that removes one or several PCC Rules from a PDU Session restricted to emergency services:

- When all PCC Rules bound to a QoS flow are removed, SMF initiates a QoS flow termination procedure.
- When not all PCC Rules bound to a QoS flow are removed, SMF initiates an QoS flow modification procedure.

In addition, the SMF initiates a default flow only timer if all PCC Rules with a 5QI other than the 5QI of the default QoS flow or the 5QI used for IMS signalling are removed from the PDU session restricted to Emergency Services (e.g., to enable PSAP Callback session). When the default flow only timer expires, the SMF initiates a PDU session termination procedure.

1. Default flow only timer is started when a PCF initiated modify procedure removes a dedicated bearer(voice/video). The main intension of this timer is to hold the emergency session for some more time to facilitate a PSAP callback.
2. When default flow only timer expires, the PCEF initiates a PDU session termination of the IMS Emergency session.
3. Default flow only timer is stopped on getting a PCF initiated modify for creating a new bearer.

EPS FB

If gNB rejects the QFI and EPS FB is armed. SMf performs the EPS fallback as it is done for a normal non-emergency session.

Use of PEI as Session Key

SMF uses PEI as session key if SUPI is not present or is not authenticated. Following conditions must be met for PduContext on SMF:

1. REST-EP, when the message is received, checks affinity based on SUPI and PEI. First lookup will be done with SUPI. If it fails, checks with the PEI.
Or
Both keys SUPI and PEI can be looked up.
2. When Smf-Service chooses PEI as key, it sets affinity in cache-pod using PEI.
3. When Smf-Service inserts CDL record using PEI as key, PEI will be added as Primary Key type. Either Primary key is SUPI+PduSessionid or PEI+PduSessionID.
4. After first transaction, CDL lookup will happen both with SUPI or PEI as per the availability.
5. SEID is generated using PEI hashing.

Configuring Emergency Service Support

This section describes how to configure Emergency Service Support.

Configuring Default Flow Only Timer in DNN Profile

Use the following configuration to configure Default Flow Only Timer.

```
configure
timeout default-flow-only flow_only_timer
end
```

NOTES:

- **timeout default-flow-only *flow_only_timer*** : Maximum allowed idle duration for a PDU/PDN session before system automatically terminates it. *flow_only_timer* Must be an integer between and 0 and 2147483647 seconds. Default is 0, which indicates the function is disabled.

Configuring Emergency DNN

Use the following configuration to configure Default Flow Only Timer.

```
configure
emergency { false | true }
end
```

NOTES:

- **emergency** { *false* / *true* }: Enables for emergency session only. *false* / *true* is followed by emergency indicating default flow only timer as emergency or not.

Verifying Emergency DNN

Use the following show command to verify Emergency DNN configuration:

```

show subscriber all

subscriber-details
{
  "subResponses": [
    [
      "supi:imsi-123456789012345",
      "gpsi:msisdn-9999988888",
      "pei:imei-123456786666660",
      "psid:5",
      "dnn:intershat",
      "emergency:false",
      "rat:nr",
      "access:3gpp access",
      "connectivity:5g",
      "udm-uecm:10.84.17.161",
      "udm-sdm:10.84.17.161",
      "pcfGroupId:PCF-dnn=",
      "pcf:10.84.17.161",
      "policy:2",
      "upf:10.84.17.161",
      "upfEpKey:10.84.17.161:10.84.17.160",
      "ipv4-addr:poolv4/12.0.0.1",
      "ipv4-pool:poolv4",
      "ipv4-range:poolv4/12.0.0.1",
      "ipv4-startrange:poolv4/12.0.0.1",
      "amf:10.84.17.161",
      "peerGtpuEpKey:10.84.17.161:10.106.183.198"
    ],
    [
      "gpsi:msisdn-9999988888",
      "pei:imei-352099001761480",
      "psid:6",
      "dnn:intershat",
      "emergency:true",
      "rat:nr",
      "access:3gpp access",
      "connectivity:5g",
      "pcfGroupId:PCF-dnn=",
      "pcf:10.84.17.161",
      "policy:2",
      "upf:10.84.17.161",
      "upfEpKey:10.84.17.161:10.84.17.160",
      "ipv4-addr:poolv4/12.0.4.0",
      "ipv4-pool:poolv4",
      "ipv4-range:poolv4/12.0.0.1",
      "ipv4-startrange:poolv4/12.0.4.0",
      "amf:10.84.17.161",
      "peerGtpuEpKey:10.84.17.161:10.106.183.198"
    ]
  ]
}

```

OAM Support for SMF Emergency Services

This section describes operations, administration, and maintenance information for this feature.

Statistics

The following are the enhanced statistics for the SMF Emergency Services Support:

Table 2: Bulk statistics for SMF Emergency Services Support

Bulk Statistics	Description
smf_session_counters	Indicates that the gauge updated to show the number of active always-on pdu sessions.
smf_service_stats	This counter increments with every query made to the smf-service.
resource_mgmt_stats	This counter increments for every IP address dynamic/static allocation/release queries made to the node-mngr in smf-service.