



# SMF Capabilities to Support 4G and 5G Devices

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## Feature Summary and Revision History

### Summary Data

**Table 1: Summary Data**

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

### Revision History

**Table 2: Revision History**

Revision Details	Release
Periodic Secondary RAT Usage Data Report is supported from MME over S5/S8 interface in the Modify-Bearer-Request, Delete-Session-Request, Delete-Bearer-Response, and Change-Notification-Request	2023.04.0

Revision Details	Release
Added the extended QoS support for SMF with the legacy interfaces.	2023.02.0
<p>The Phase-2 support for 4G-UE and Option-3x feature includes:</p> <ul style="list-style-type: none"> <li>• DCNR based UPF selection</li> <li>• Handling Secondary RAT Data Usage Report from S-GW/MME and relaying it to CHF</li> <li>• UE Presence Reporting</li> <li>• Handling GTPV1 messages for 4G to 3G handover</li> <li>• SUPI+IP session and affinity key for 4G and WiFi handover</li> <li>• Avoiding sending of 5G QoS for 4G-only UE</li> <li>• Handling 5GCNRS and 5GCNRI indication flags from S-GW/MME</li> </ul>	2021.01.0
First introduced.	2020.03.0

## Feature Description



**Important** The PGW-C term used in this chapter denotes the EPS interworking functionality supported by SMF and must not be assumed as a standalone P-GW that is used in the LTE network.

The dual connectivity enabled UEs support 4G LTE and 5G NR. Such UEs send a signal to the 4G Core Network, indicating that it's a dual connectivity-enabled device.

When the Dual Connectivity New Radio (DCNR)-capable UE attempts to register in an MME, the MME sets the "UP Function Selection Indication Flags" IE with the DCNR flag set to 1 in the Create Session Request message. After the S-GW receives this IE over S11, it sends the IE over S5 to PGW-C. This IE transmission helps the SGW-C and PGW-C to select SGW-U and UPF, which supports dual connectivity with NR.

The SMF and PGW-C support Packet Data Unit (PDU) sessions from both the 4G-only capable device and the Option 3x capable device (NR and LTE radio connected to the EPC).

The SMF supports the following features and functionality:

- [DCNR-based UPF Selection, on page 3](#)
- [Secondary RAT Data Usage Report, on page 3](#)
- [#unique\\_2030 unique\\_2030\\_Connect\\_42\\_section\\_adw\\_rlv\\_5pb](#)
- [4G to 2G or 3G Handover, on page 3](#)

- [Extended QoS Support with Legacy Interfaces](#)
- SUPI+IP session and affinity key for 4G to Wi-Fi handover
- Avoiding sending of 5G QoS for 4G-only UE (QoS Rules and QoS Flow Description)
- Handling 5GCNRS and 5GCNRI indication flags from S-GW and MME

### DCNR-based UPF Selection

The SMF selects DCNR supported UPF for DCNR enabled session if DCNR is configured under query parameters. DCNR isn't a mandatory query parameter for UPF selection. You can configure DCNR under the UPF Group profile.

For more information, refer to the *UPF Node Selection* section in the *Policy and User Plane Management* feature chapter.

### Secondary RAT Data Usage Report

The SMF and UPF track the usage on eNB to differentiate the NR or LTE usage for NSA devices. SMF receives usage data ports on the S5 interface in various messages and reports the usage towards CHF.

The SMF handles the periodic Secondary RAT Usage Data Report from MME over the S5 or S8 interface in the Modify Bearer Request, Delete Session Request, Delete Bearer Response, and Delete Bearer Command based on the Intended Receiver PGW-C (IRPGW) flag. SMF retains the Usage-Report if IRPGW = 1.

The SMF supports multiple instances of Secondary RAT Usage Data Report IEs. It stores reports until they are sent out to CHF based on the triggers. SMF sends out the stored secondary RAT usage data report through gtp-ep endpoint when any of the charging triggers are met. You can configure the maximum number of stored secondary RAT usage reports under Charging Profile. SMF sends the stored secondary RAT usage data report along with offline usage report when CDR is closed due to offline usage report.

### Presence Reporting Area

Presence Reporting Area (PRA) is an area defined within the 3GPP packet domain for reporting UE presence within that area due to policy control and/or charging reasons. For E-UTRAN, a PRA consists of a set of neighbor or non-neighbors tracking areas, eNBs and/or cells. You can enable the PRA functionality under the DNN profile.

The two types of Presence Reporting Areas that apply to an MME pool are UE-dedicated Presence Reporting Areas and Core Network preconfigured Presence Reporting Areas. SMF supports Core Network preconfigured PRAs.

### 4G to 2G or 3G Handover

During 4G to 2G or 3G handover, the SMF rejects the GTPv1 message request and reattaches with 2G or 3G for nondisrupted service continuity. If SMF drops the request, it delays the handover failure and subsequent attach to 2G or 3G.

### Extended QoS Support with Legacy Interfaces

When the DCNR-enabled 4G devices connect to the SMF with the legacy interfaces and the Extended-BW-NR feature is negotiated with PCRF, the SMF sends the APN-AMBR values that are greater than 4.2 Gbps towards PCRF in the extended Bit-rates AVP.

If the SMF receives APN-AMBR values greater than 4.2 Gbps in the GTP-v2 messages from S-GW and the DCNR feature isn't enabled, then the SMF limits the APN-AMBR value to 4.2 Gbps.

If the SMF receives extended QoS values from PCRF and the session isn't DCNR-enabled, then the SMF limits the APN-AMBR value to 4.2 Gbps.

## How it Works

The SMF generates a PDU session ID (pdu-session-id) upon receiving a Create Session Request from the 4G-only UE. The SMF validates if the request has the EPS interworking indication without the PDU session ID in the Protocol Configuration Option. The UDM provides the interworking indication to the SMF per DNN. The SMF does not use this indication for deciding whether the UE is 5G capable.

The SMF generates a pdu-session-id based on Linked EPS Bearer Identity (LBI). For the 4G sessions, the pdu-session-id is LBI+64 and for the Wi-Fi sessions, the pdu-session-id is LBI+80.

The SMF allows you to configure the default NSSAI under the profile DNN. The NSSAI is part of sliceInfo IE sent in the Policy Create Request to the PCF during session creation from 4G-only UEs. If the default slice is not configured, then SMF selects one of the configured slices.

When the UE is DCNR capable, and the DCNR is enabled for the session, the SMF considers that the UE is capable of supporting dual connectivity. You can configure DCNR per DNN and other NFs, such as UPF. The S-GW notifies the DCNR support to PGW-C through the UPF Selection Indication Flags IE.

## Standards Compliance

The Option 3x and 4G-Only Device feature complies with the following standards:

- 3GPP TS 23.003 [2]
- 3GPP TS 24.301 [23]
- 3GPP TS 29.272 [70]
- 3GPP TS 29.274
- 3GPP TS 29.212

## Limitations

This feature has the following limitations:

- Ultra low latency QCI are not supported.
- PRA:
  - PRA is supported only towards PCF and not CHF.
  - PRA is applied only based on RAT type of the connecting device and not based on the device type. It is applied to both 4G and 5G devices when connected from LTE.
  - A maximum of four PRA-IDs are processed in a single PCF update message. If a PCF update has more than four PRA-IDs, then the other PRA-IDs are ignored.

- Only the PRA-ID will be sent in the "Presence Reporting Area Action" IE on S5 interface. User location information will not be sent.
- Only the PRA-ID will be sent in the "repPraInfos" IE on N7 interface. User location information will not be sent.
- PRA Set is not supported due to which "Additional PRA Information" is not supported on S5 and N7 interfaces.
- Secondary RAT Data Usage Report:
  - Supports only Option 3 and Option 3x (NR Secondary RAT) UEs on S5 interface.
  - Does not support E-UTRAN Secondary RAT on N2 interface.

## Configuring Parameters to Support 4G and 5G Devices

This section describes how to configure the SMF with the capabilities to support 4G and 5G devices.

Configuring this feature involves the following steps:

- [Configuring the NSSAI, on page 5](#)
- [Enabling DCNR in DNN Profile, on page 6](#)
- [Configuring UPF Selection, on page 6](#)
- [Configuring Secondary RAT Usage Report, on page 7](#)
- [Configuring Presence Reporting, on page 8](#)

### Configuring the NSSAI

This section describes how to configure the default NSSAI in SMF, which it includes in sliceInfo IE in the Policy Create Request message. The SMF sends this message towards the PCF during the session creation from 4G-only UEs.

Use the following sample configuration to configure the default NSSAI in the SMF:

```
config
  profile dnn profile_name
    nssai { sd sd_value | sst sst_value }
  exit
```

#### NOTES:

- **profile dnn *profile\_name***: Specify the DNN profile name. *profile\_name* must be an alphanumeric string.
- **nssai { sd *sd\_value* | sst *sst\_value* }**: Configure the default NSSAI.
  - **sd *sd\_value***: Specify the slice descriptor (sd). *sd\_value* must be a 6-digit hex string ([0-9a-fA-F]{6} - 000000 – fffff). For example, 1A2B3c.
  - **sst *sst\_value***: Specify the slice type (sst) value. *sd\_value* must be an integer in the range of 0–255.

## Enabling DCNR in DNN Profile

To enable SMF to support the DCNR capability for the sessions handled using the DNN profile, use the following sample configuration:

```
config
  profile dnn profile_name
    dcnr { false | true }
  exit
```

### NOTES:

- **profile dnn *profile\_name***: Specify the DNN profile name. *profile\_name* must be an alphanumeric string.
- **dcnr { false | true }**:
  - **false**: Configure the DNN profile to have DCNR flag set to false. The DCNR configuration is disabled by default.
  - **true**: Configure the DNN profile to have DCNR flag set to true.

This configuration enables the SMF to support DCNR capability. When the DCNR capability is enabled, the UE sends the DCNR flag to indicate that it supports dual connectivity.

## Configuring UPF Selection

This section describes how to enable the DCNR flag and configure the appropriate precedence for DCNR.

### Defining the UPF Group

Use the following sample configuration to configure the UPF group and define DCNR in the UPF Group profile.

```
config
  profile upf-group profile_name
    dcnr { false | true }
  exit
```

### NOTES:

- **profile upf-group *profile\_name***: Specify the UPF group name that must be associated to the specified UPF network configuration. *profile\_name* must be an alphanumeric string.
- **dcnr { false | true }**: Configure the DCNR capability.
  - **false**: Disable support for DCNR. This is the default setting.
  - **true**: Enable support for DCNR.

### Associating UPF Selection Query Parameters

Use the following sample configuration to associate the defined UPF group with the UPF network element in the DNN profile.

```

config
  profile dnn profile_name
    upf-selection-policy upfpolicy_name
  exit

```

**NOTES:**

- **policy dnn** *profile\_name*: Enter the DNN Profile configuration mode. *profile\_name* must be an alphanumeric string.
- **upf-selection-policy** *upfpolicy\_name*: Specify the name of the UPF selection policy that must be associated to the DNN profile. *upfpolicy\_name* must be an alphanumeric string.

**Configuring Precedence for DCNR**

Use the following sample configuration to configure the appropriate precedence for DCNR in the UPF Selection Policy profile.

```

config
  policy upf-selection upf_name
    precedence precedence_num
    dcnr
  exit
exit

```

**NOTES:**

- **policy upf-selection** *upf\_name*: Specify the UPF policy name that must be associated with the DNN profile. *upf\_name* must be an alphanumeric string.
- **precedence** *precedence\_num*: Assign the precedence value to the UPF policy. *precedence\_num* must be an integer in the range of 1–4.
- **dcnr**: Configure the DCNR capability.

## Configuring Secondary RAT Usage Report

Use the following sample configuration to configure secondary RAT usage reports before being sent to CHF.

```

config
  profile charging profile_name
    max-secondary-rat-reports report_range
  exit

```

**NOTES:**

- **profile charging** *profile\_name*: Enter the Charging Profile configuration mode.
- **max-secondary-rat-reports** *report\_range*: Configure the maximum number of secondary RAT usage reports to trigger GTPP (Gz) or CHF update. *report\_range* must be an integer in the range of 0–50. Default value: 0.

## Configuring Presence Reporting

Use the following sample configuration to configure presence reporting.

```
config
  profile dnn dnnprofile_name
    presence-reporting { false | true }
  exit
```

### NOTES:

- **profile dnn *dnnprofile\_name***: Enter the DNN Profile Configuration mode.
- **presence-reporting { false | true }**: Configure presence reporting for the DNN.
  - **false**: Disable presence reporting. This is the default setting.
  - **true**: Enable presence reporting.

## Configuration Verification

To verify the configuration, use the following command:

```
show subscriber supi supi_id nf-service smf
```

In the output of the preceding show command, check the value associated with the field "dncr". This field displays one of the following values:

- Enabled
- None
- UE Requested and Enabled

If the feature is configured, then the "dncr" field displays "Enabled".

The following configuration is an example output of the **show subscriber supinf-service smf** command:

```
unknown] smf# show subscriber supi imsi-123456789012345 nf-service smf
subscriber-details
{
  "subResponses": [
    {
      "status": true,
      "genericInfo": {
        .....
      },
      "sScMode": 1,
      "chargEnabled": true,
      "uetimeZone": "+00:15+1",
      "allocatedIp": "209.165.201.12",
      "eUtranLocation": {
        "ecgi": {
          "mcc": "123",
          "mnc": "456",
          "eutraCellId": "1234567"
        },
        "tai": {
          "mcc": "123",
          "mnc": "456",
```



```

"tac": "1820"
}
},
"alwaysOn": "None",
"dcnr": "Enabled",
.....
"policySubData": {
  "TotalDynamicRules": 3,
  .....
  Presence Information: "Enabled",
  "praIdList": [ -> list of all enabled PRA IDs
    "8388608", Status = IN
    "8388618" Status = OUT
  ]
},

```

## OAM Support

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

## Statistics Support

The SMF uses the "dcnr" label in the session gauge "smf\_session\_counter" and "smf\_service\_stats" for collecting the DCNR session count. When the SMF session is DCNR supported, the "dcnr" label value is enabled. The label does not support non-DCNR sessions.

The following is a sample query to count the active DCNR SMF sessions:

```

nts{action_type="rejected",app_name="smf",cluster="smf",data_center="unknown",
failure_type="hdr_decode_failure",hdr_decode_fail_reason="",instance_id="0",interface_type="
",message_type="",reject_cause="",service_name="gtpc-ep"} 2

smf_session_counter: sum (smf_session_counters{dcnr_on="enable"}) by (dcnr)
smf_service_stats: sum (smf_session_stats{dcnr_on="enable"}) by (dcnr, status, reason)
smf_session_counters{ presence-reporting ="enable"}) by (presence-reporting)

```

### DCNR Session Count

For DCNR, Session Count supports the "dcnr" label in the existing session gauge "smf\_session\_counter". If the SMF session is a DCNR session, then the "dcnr" label value is "enable", otherwise it is "disable" for DCNR session.

The following is a sample query to count the DCNR active SMF sessions:

```
sum (smf_session_counters{dcnr_on="enable"}) by (dcnr)
```

For DCNR statistics, the existing "smf\_service\_stats" counter supports the "dcnr" label. For DCNR sessions, this counter pegs the following labels and values:

- Attempt Statistics – dcnr= "enable" and status= "attempted"
- Success Statistics – dcnr= "enable" and status= "success"
- Failure Statistics – dcnr= "enable" and status= "failures"

The following is a sample query for DCNR statistics:

```
sum (smf_session_stats{dcnr_on="enable"}) by (dcnr, status, reason)
```

### Secondary RAT Data Usage Reports

The Secondary-Rat-Data-Usage-Reports support the "smf\_secondary\_rat\_usage\_report\_stats" counter. Labels for these statistics include ebi, qfi, rat\_type, reason, service\_name, and status. This counter pegs with the following labels and values:

- ebi=ebi-val
- qfi=qfi-val
- rat\_type=NR
- reason=success/failure
- service\_name=smf-service
- status=ReceivedFromSgw/SentToChf

The following is a sample query for DCNR statistics:

```
sum (smf_secondary_rat_usage_report_stats") by (qfi, status, reason)
```

### Presence Reporting

For Presence Reporting, Session Count supports the "pra" label in the existing session gauge "smf\_session\_counter". If the SMF session has presence reporting enabled, then the "presence-reporting" label value is "enable" else it is "none" if presence reporting is not enabled.

The following is a sample query to count the DCNR active SMF sessions:

```
sum (smf_session_counters{ pra ="enable"}) by (pra)
```

For Presence Reporting, statistics support the "presence-reporting" label in the existing counter "smf\_service\_stats". For presence-reporting session, this counter pegs the following labels and values:

- Attempt Statistics – pra = "enable" and status= "attempted"
- Success Statistics – pra = "enable" and status= "success"
- Failure Statistics – pra = "enable" and status= "failures"

The following is a sample query for DCNR statistics:

```
sum (smf_session_stats{ pra ="enable"}) by (pra, status, reason)
```

## Bulk Statistics

The Option 3x and 4G-Only Device feature supports the following bulk statistics in SMF schema:

Bulk Statistics Name	Statistics Type	Trigger	Description
smf_session_counters	Gauge	Increments or decrements for session attach or detach.	Indicates the total number of currently active SMF sessions. You can filter the active session using labels, such as "dcnr=enable" for the DCNR session count.

Bulk Statistics Name	Statistics Type	Trigger	Description
smf_session_stats	Counter	Increments for success or failures of the call flow.	Indicates the statistics for call flow states such as attempted, success, and failures. You can filter the statistics using labels, such as “dcnr=enable” for only DCNR statistics.
The Secondary RAT Data Usage Report functionality supports the following bulk statistics:			
smf_secondary_rat_usage_report_stats	Counter	Increments for the status of the secondaryRatDataUsage Report processing.	Displays the statistics for secondaryRatUsageReports processing for call flow status such as "ReceivedFromSgw" and "SentToCHF". You can filter the statistics using labels, such as reason and QFI.
OFCS_CDR_MESSAGE_STATS	Counter		A new label "Trigger Type" captures the event when a configured Secondary RAT usage limit is reached. The trigger type label contains <del>SECONDARYRATUSAGELIMITREACHED</del> value.
The PRA functionality supports the following bulk statistics:			
smf_session_counters	Gauge	Increments or decrements for session attach or detach.	Indicates the total number of current active SMF sessions. You can filter the session using labels, such as "pra=enable" for the presence reporting enabled session count.
smf_session_stats	Counter	Increments for success or failures of the call flow.	Indicates the statistics for call flow states such as attempted, success, and failures. You can filter the statistics using labels, such as “pra=enable” for only presence-reporting statistics.

## Troubleshooting Information

This section provides information on using the command line interface (CLI) commands, alerts, logs, and metrics for troubleshooting issues that may arise during system operation.

## Subscriber Details with DCNR and Presence Reporting Enabled

The `show subscriber nf-service smf supi supi_id full` CLI command displays the DCNR active session with presence reporting enabled for the Option-3x feature.



**Note** In 2021.02 and later releases, the `namespace` keyword is deprecated and replaced with the `nf-service` keyword.

```
[unknown] smf# show subscriber nf-service smf supi imsi-310260789012345 full
```

```
subscriber-details
{
  "subResponses": [
    {
      "status": true,
      "genericInfo": {
        "supi": "imsi-310260789012345",
        "pei": "imei-123456786666660",
        "pduSessionId": 5,
        "pduSesstype": "Ipv4PduSession",
        "accessType": "3GPP_ACCESS",
        "dnn": "fast.t-mobile.com",
        "plmnId": {
          "mcc": "123",
          "mnc": "456"
        },
        ...
        "alwaysOn": "None",
        "dcnr": "Enabled",
        "wps": "Non-Wps Session",
        "ratType": "EUTRA",
        "ueType": "NR Capable UE",
        "iwkEpsInd": true,
        "sessTimeStamp": "2021-01-12 12:40:39.931012285 +0000 UTC",
        "callDuration": "4m25.36784895s",
        "ipPool": "poolv4",
        "commonId": 16777223,
        "linkedEbi": 5,
        "smfIwkEpsInd": true,
        "snssai": {
          "sd": "Abf123",
          "sst": 1
        },
        "authStatus": "Unauthenticated",
        "roamingStatus": "Roamer",
        "uePlmnId": {
          "mcc": "310",
          "mnc": "260"
        }
      },
      "policySubData": {
        "TotalDynamicRules": 2,
        "TotalFlowCount": 2,
        "TotalNonGBRFlows": 1,
        "TotalGBRFlows": 1,
        ...
        "presenceReporting": "Enabled",
        "praList": [
          {
            "praId": "0x80000b",
            "presenceState": "Inactive"
          }
        ]
      }
    }
  ]
}
```

```

    },
    {
      "praId": "0x800000",
      "presenceState": "InArea"
    },
    {
      "praId": "0x80000a",
      "presenceState": "OutOfArea"
    }
  ]
},
...
}
]
}

```

## Option-3x: DCNR Enabled UE Alerts

This section describes the alerts supported for DCNR enabled UEs with presence-reporting enabled. You can enhance these alerts as per 4G procedure or as per the intent of the end user.

Examples of DCNR statistics or gauges are `pdn_sess_create`, `pdn_inter_sgw_handover`, `pdn_mbr`, `pcf_req_ded_brr_mod`, `pcf_req_ded_brr_create`, `pcf_req_ded_brr_delete`, `delete_session_request`, `smf_initiated_pdn_detach`, `ue_req_pdn_sess_rel`, and so on.

### DCNR UE Attach Failure Threshold Alert

Use the following example to configure alerts related to DCNR UE Attach Failure Threshold.

```

alerts rules group DCNRUEs
  rule DCNR_UE_SR
    expression "sum by (namespace) (increase(smf_service_stats{app_name=\"smf\",
dcnr=\"enable\", rat_type!=\"EUTRA\", status=\"success\",
procedure_type=\"pdn_sess_create\"}[5m])) / sum by (namespace)
(increase(smf_service_stats{app_name=\"smf\", dcnr =\"enable\", rat_type!=\"EUTRA\",
status=\"attempted\", procedure_type=\"pdn_sess_create\"}[5m])) < 0.10"
    severity major
    type "Communications Alarm"
    annotation summary
    value "This alert is fired when attach success rate of DCNR enabled UE lesser than
threshold"
    exit
  exit

```

### DCNR UE Attach Failure Threshold Alert with Presence Reporting

Use the following example to configure alerts related to DCNR UE Attach Failure Threshold with presence reporting enabled.

```

rule DCNR_UE_PRA_ENABLE_SR
  expression "sum by (namespace) (increase(smf_service_stats{app_name=\"smf\",
dcnr=\"enable\", rat_type!=\"EUTRA\", status=\"success\", procedure_type=\"pdn_sess_create\",
pra=\"enable\"}[5m])) / sum by (namespace) (increase(smf_service_stats{app_name=\"smf\",
dcnr =\"enable\", rat_type!=\"EUTRA\", status=\"attempted\",
procedure_type=\"pdn_sess_create\", pra=\"enable\"}[5m])) < 0.10"
  severity major
  type "Communications Alarm"
  annotation summary
  value "This alert is fired when attach success rate of DCNR enabled UE and presence

```

```
reporting enabled lesser than threshold "
  exit
exit
```

## DCNR UE Bulk Statistics

Use the following SMF service bulk statistics to monitor the failures or issues associated with DCNR UEs.

**Table 3: DCNR UE**

Bulk Statistics Name	Query	Description
4G_DCNRUE_Attempted	bulk-stats query 4G_DCNRUE_Attempted expression "sum(smf_service_stats {dcnr='enable',status='attempted', rat_type='EUTRA'}) by (namespace)" exit	
4G_DCNRUE_Success	bulk-stats query 4G_DCNRUE_Success expression "sum(smf_service_stats {dcnr='enable',status='success', rat_type='EUTRA'}) by (namespace)" exit	
4G_PRA_ENABLE_Attempted	bulk-stats query 4G_PRA_ENABLE_Attempted expression "sum(smf_service_stats {pra='enable',status='attempted', rat_type='EUTRA', procedure_type!='create_session_request'}) by (namespace)" exit	
4G_PRA_ENABLE_Success	bulk-stats query 4G_PRA_ENABLE_Success expression "sum(smf_service_stats {pra='enable',status='success', rat_type='EUTRA', procedure_type!='create_session_request'}) by (namespace)" exit	

## Option-3x Device Specific Error Logs

This section provides the basic error conditions and logs that are captured to debug the failures for the Option-3x feature.

### DCNR Disabled UE or 4G capable UE only

The following example displays the error log for DCNR disabled UE or 4G capable UE only.

```
2021/01/24 10:11:22.648 smf-service [ERROR] [GenericGtpMsg.go:1811] [smf-service.smf-app.sgw]
  secRatUsageRpt recvd wrongly for DNCR disbled UE, ignoring report
```

```
2020/12/19 13:17:17.834 smf-service [ERROR] [GenericGtpMsg.go:1834] [smf-service.smf-app.sgw]
  secRatUsageRpt recvd wrongly for 4gOnly UE, ignoring report
```

### Secondary RAT Usage with invalid EBI

The following example displays the error log for secondary RAT usage with invalid EBI.

```
2021/01/24 11:38:18.917 smf-service [DEBUG] [GenericGtpMsg.go:1824] [smf-service.smf-app.sgw]
  Secondary Rat Data Usage Report Recvd
2021/01/24 11:38:18.917 smf-service [WARN] [IntMethods.go:137] [smf-service.Policy.gen] Qos
  Flow not found with EBI [8]
2021/01/24 11:38:18.917 smf-service [ERROR] [GenericGtpMsg.go:1853] [smf-service.smf-app.sgw]
  Qfi invalid in secRatUsageRpt
```

### Secondary RAT Usage invalid RAT Type

The following example displays the error log for secondary RAT usage with invalid RAT type.

```
2021/01/24 11:42:21.474 smf-service [DEBUG] [GenericGtpMsg.go:1824] [smf-service.smf-app.sgw]
  Secondary Rat Data Usage Report Recvd
2021/01/24 11:42:21.474 smf-service [ERROR] [GenericGtpMsg.go:1861] [smf-service.smf-app.sgw]
  Rat type invalid in secRatUsageRpt
```

### Secondary RAT Usage with intended PGW set to zero

The following example displays the error log for secondary RAT usage with intended P-GW set to zero (IRPGW:0).

```
2021/01/24 11:33:10.390 smf-service [DEBUG] [GenericGtpMsg.go:1824] [smf-service.smf-app.sgw]
  Secondary Rat Data Usage Report Recvd
2021/01/24 11:33:10.390 smf-service [ERROR] [GenericGtpMsg.go:1865] [smf-service.smf-app.sgw]
  secRatUsageRpt.IRPGW is false
```

### PRA ID received greater than four

The following example displays the error log when PRA ID received is greater than four.

```
2021/01/24 14:48:26.085 smf-service [DEBUG] [policy_types.go:659] [smf-service.Policy.gen]
  praConfig:true for dnn:fast.t-mobile.com
2021/01/24 14:48:26.085 smf-service [DEBUG] [policy_pcf.go:1939] [smf-service.Policy.gen]
  Added PRA ID: 9388618
2021/01/24 14:48:26.085 smf-service [DEBUG] [policy_pcf.go:1939] [smf-service.Policy.gen]
  Added PRA ID: 9388608
2021/01/24 14:48:26.085 smf-service [DEBUG] [policy_pcf.go:1939] [smf-service.Policy.gen]
  Added PRA ID: 8388618
2021/01/24 14:48:26.085 smf-service [DEBUG] [policy_pcf.go:1939] [smf-service.Policy.gen]
  Added PRA ID: 9388619
2021/01/24 14:48:26.085 smf-service [WARN] [policy_pcf.go:1934] [smf-service.Policy.gen]
  Max 4 PRAs allowed, ignoring the PRA-ID (8388608) from PCF
2021/01/24 14:48:26.085 smf-service [WARN] [policy_pcf.go:1934] [smf-service.Policy.gen]
  Max 4 PRAs allowed, ignoring the PRA-ID (8388619) from PCF
```

