



# 3GPP RAN/NAS Cause Codes Support

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## Feature Summary and Revision History

### Summary Data

**Table 1: Summary Data**

Applicable Product(s) or Functional Area	cnSGW-C
Applicable Platform(s)	SMI
Feature Default Setting	Enabled - Always-on
Related Documentation	Not Applicable

### Revision History

**Table 2: Revision History**

Revision Details	Release
First introduced.	2021.02.0

## Feature Description

cnSGW-C supports RAN/NAS cause codes as defined in *3GPP TS 29.274, version 15.4.0, section 8.103, RAN/NAS Cause*.

cnSGW-C transparently transmits the RAN/NAS Release Cause IE provided by the MME to the PGW for further propagation towards the PCRF.



**Note** GTP-based S5/S8 and S11 are supported.

The following table lists the RAN/NAS Cause codes.

**Table 3: RAN/NAS Cause Codes**

Octets	Bits							
	8	7	6	5	4	3	2	1
1	Type = 172 (decimal)							
2–3	Length = n							
4	Spare				Instance			
5	Protocol Type				Cause Type			
6 to m	Cause Value							
(m+1) to (n+4)	One or more octets from these octets are present, only if explicitly specified							

The Protocol Type field is encoded with the specified values for the RAN/NAS Cause as follows:

**Table 4: Protocol Type**

Protocol Type	Values (Decimal)
S1AP Cause	1
EMM Cause	2
ESM Cause	3
<spare>	4–15

The Cause Value field (and the associated RAN cause subcategory) is transferred over the S1-AP interface. The field is encoded in one octet as a binary integer.

**Table 5: Cause Type**

Cause Type	Values (Decimal)
Radio Network Layer	0
Transport Layer	1
NAS	2
Protocol	3
Miscellaneous	4

Cause Type	Values (Decimal)
<spare>	5–15

For EMM and ESM Causes, the Cause Value field contains the cause value as specified in *3GPP TS 24.301*. If the Protocol is S1AP, the cause value contains the specified value as in *3GPP TS 36.413*.

## How it Works

This section describes how this feature works.

## Call Flows

This section describes the key call flows for the RAN/NAS Cause Codes feature.

### Create Bearer Procedure Call Flow

This section describes the create bearer procedure call flow.

**Figure 1: Create Bearer Procedure Call Flow**

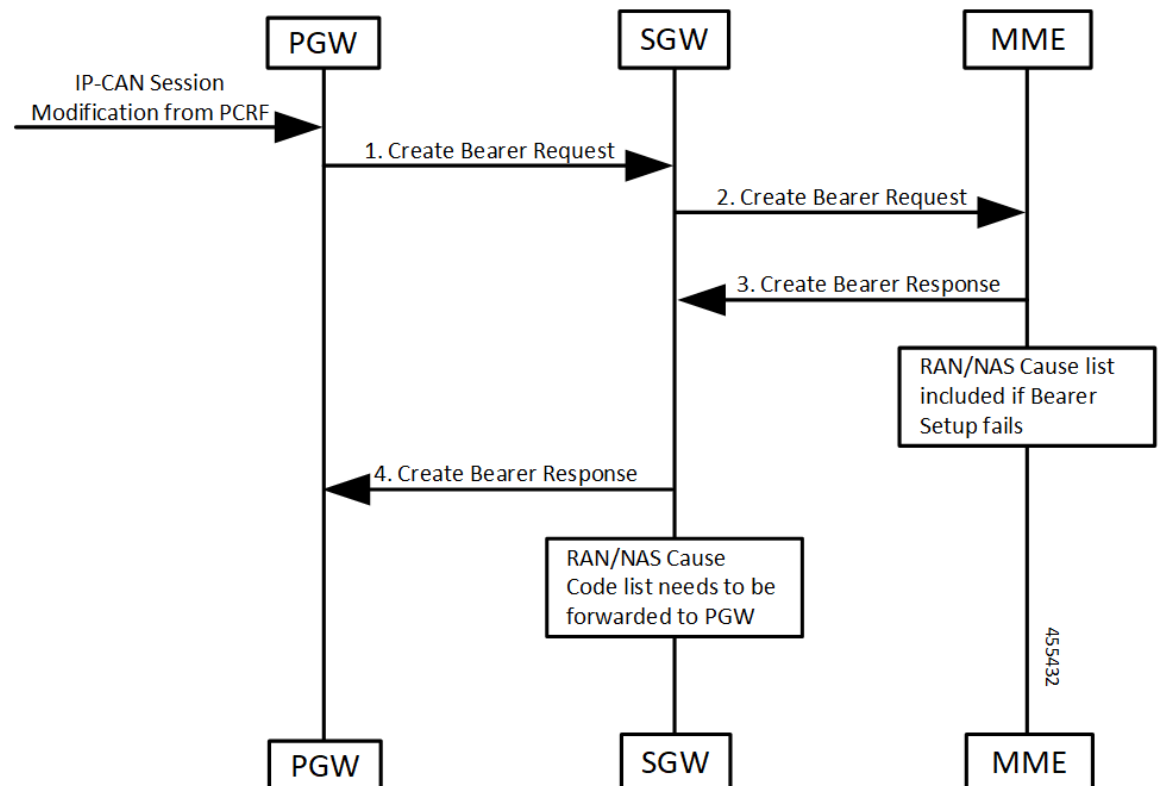


Table 6: Create Bearer Procedure Call Flow Description

Step	Description
1	PGW receives IP-CAN session modification request from PCRF. PGW creates the Create Bearer Request message and sends it to SGW (cnSGW-C).
2	SGW (cnSGW-C) forwards the Create Bearer Request message request to MME.
3	MME generates a Create Bearer Response message towards SGW (cnSGW-C). If bearer setup fails, then the RAN/Cause list included in the response.
4	SGW (cnSGW-C) forwards the Create Bearer Response message to PGW. It includes RAN/NAS Cause Code list.

## Update Bearer Procedure Call Flow

This section describes the update bearer procedure call flow.

Figure 2: Update Bearer Procedure Call Flow

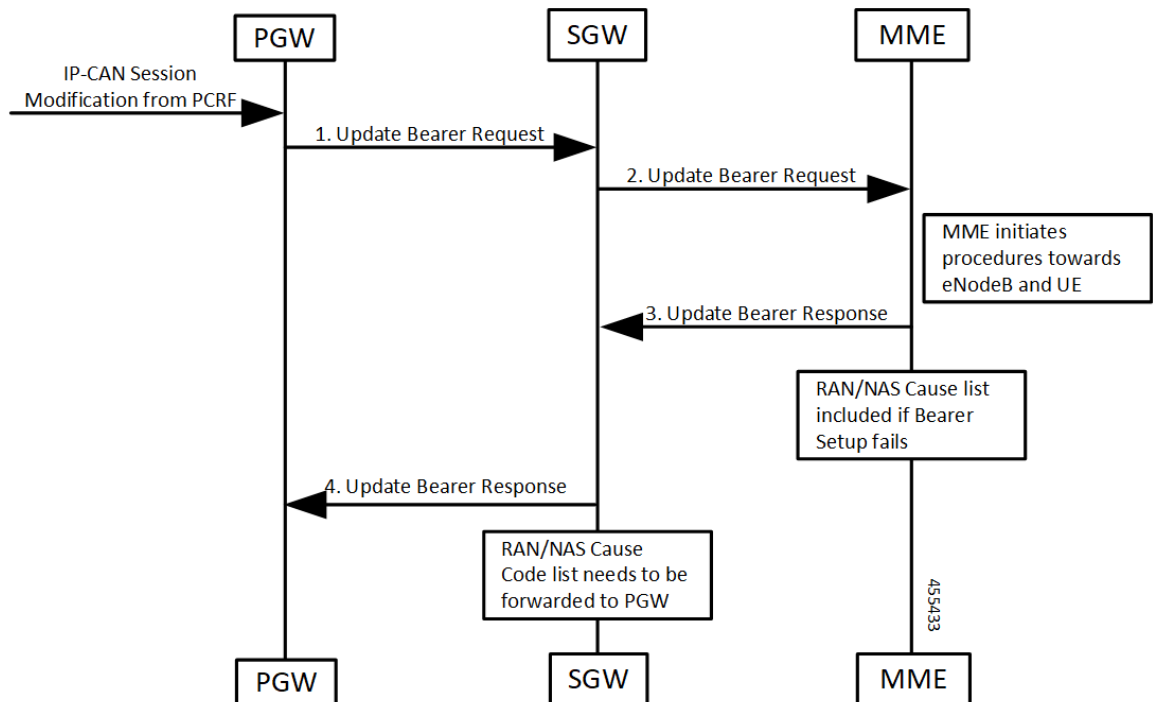


Table 7: Update Bearer Procedure Call Flow Description

Step	Description
1	PGW receives IP-CAN session modification request from PCRF. PGW creates the Update Bearer Request message to SGW (cnSGW-C).

Step	Description
2	SGW (cnSGW-C) forwards the Update Bearer Request message to MME.
3	MME generates an Update Bearer Response message towards SGW (cnSGW-C). If this bearer modification fails, then the RAN/NAS list included in the response.
4	SGW (cnSGW-C) forwards the Update Bearer Response message to PGW.

## Delete Bearer Command Procedure Call Flow

This section describes the delete bearer command procedure call flow.

Figure 3: Delete Bearer Command Procedure Call Flow

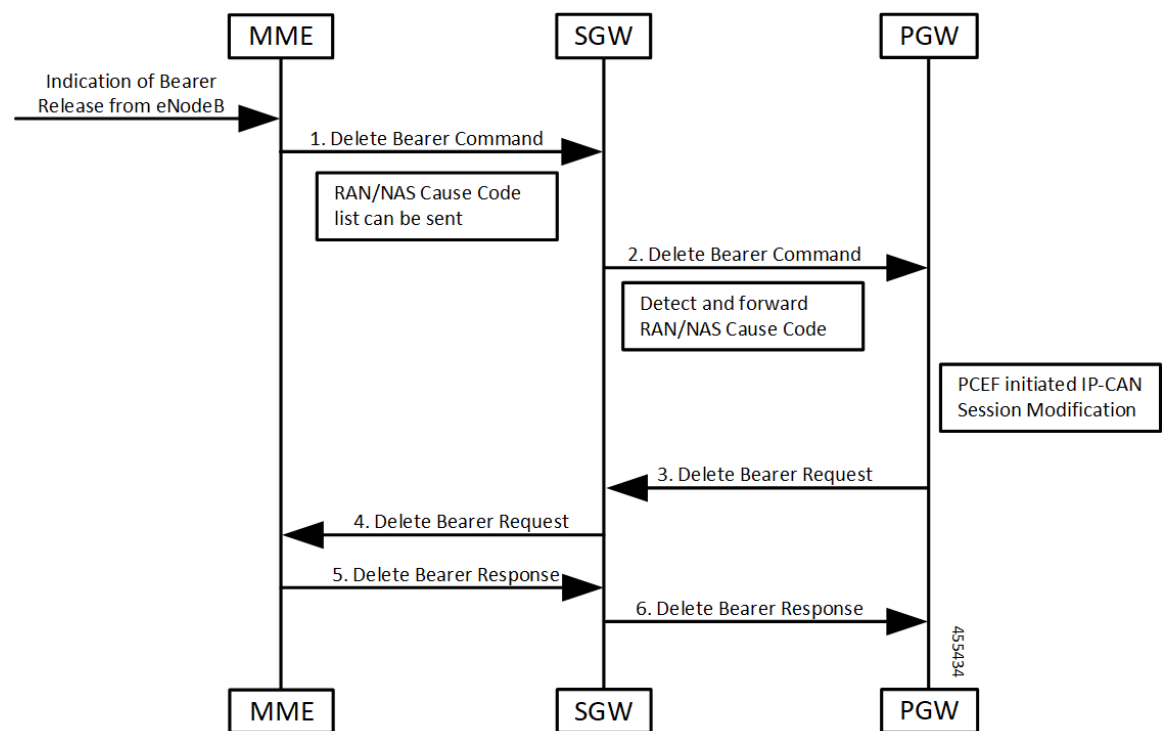


Table 8: Delete Bearer Command Procedure Call Flow Description

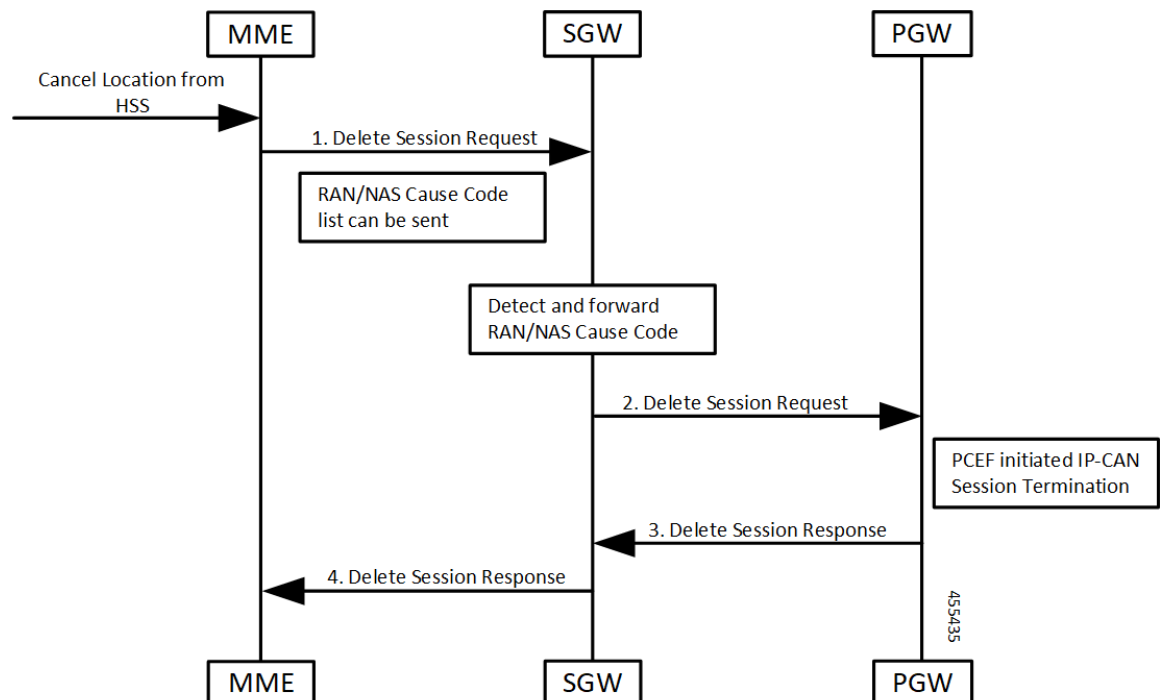
Step	Description
1	MME receives an indication of Bearer Release from eNodeB request. MME creates Delete Bearer Command message to SGW (cnSGW-C). It includes RAN/NAS cause code list.
2	SGW (cnSGW-C) forwards the Delete Bearer Command message request to PGW. It detects and forwards RAN/NAS cause code list.

Step	Description
3	PGW sends the Delete Bearer Request message to SGW (cnSGW-C). PGW receives IP-CAN session modification request from PCEF.
4	SGW (cnSGW-C) generates a Delete Bearer Request message towards MME.
5	MME generates a Delete Bearer Response message towards SGW (cnSGW-C).
6	SGW (cnSGW-C) further sends the Delete Bearer Response message to PGW.

## Delete Session Procedure Call Flow

This section describes the delete session procedure call flow.

**Figure 4: Delete Session Procedure Call Flow**



**Table 9: Delete Session Procedure Call Flow Description**

Step	Description
1	MME receives an indication of Cancel Location from HSS. MME creates Delete Session Request message to SGW (cnSGW-C). It includes RAN/NAS cause code list.
2	SGW (cnSGW-C) forwards the Delete Session Request message request to PGW. It detects and forwards RAN/NAS cause code list.

Step	Description
3	PGW sends the Delete Session Response message to SGW (cnSGW-C). PGW receives IP-CAN session modification request from PCEF.
4	SGW (cnSGW-C) generates a Delete Session Response message towards MME.

