

**3GPP SA WG 2 Meeting#111**  
**19 – 23 October, Chengdu, China**

**S2-153166**

**Agenda item: 6.25**

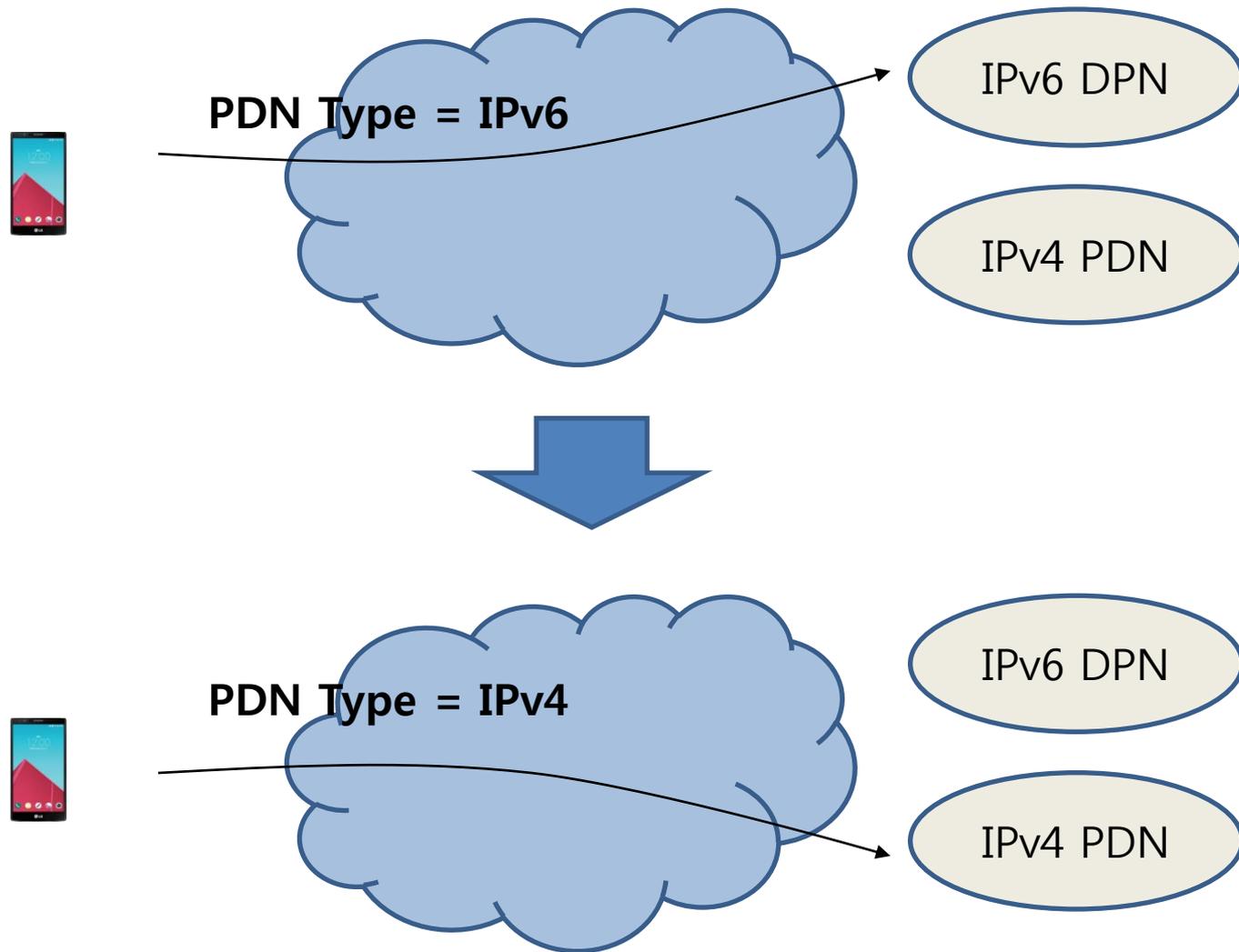
**Work Item / Release: TEI14 / Rel-14**

# **PDN type change**

**LG Electronics, LG Uplus, SK Telecom**

- IPv6 network for VoLTE service can be unstable at an initial stage of IPv6 deployment.
  - Operator determines
    - operator's manual failover is need, so IPv4 PDN should be used for VoLTE service.
    - **The IPv6 PDN connection established for VoLTE service should be changed into IPv4 PDN connection.**
  - Operator sequentially changes the PDN connections to provide VoLTE service
    - Disconnect IPv6 PDN connection and re-establish IPv4 PDN connection for VoLTE service. (i.e. including IMS re-registration)
    - **It takes a lot of time, and it is dependent on the number of subscribers connected to IPv6 PDN (e.g. some hours)**
    - **During that time, VoLTE MO/MT call on IPv6 PDN connection can still occur.**
    - **Due to unstable IPv6 PDN , the VoLTE service may be not supported.**

- Independent of the sequential PDN connection change by the operator (e.g. using detach procedure with re-attach request in TS 23.401),
  - **in case that there is the VoLTE service request (i.e. MO call or MT call), PDN connection change should be initiated first.**
    - i.e. First activation call, First PDN type change
  - It makes the service interruption be minimized.



1. How to initiate the PDN type change during MO call?
  - Which node can detect IPv6 network failure?
    - operator may manually configure the IPv6 failure indication in any network node on the MO call procedure path.
    - Per failure detection node, there may be a different procedure to initiate the PDN connection re-establishment
  
2. How to initiate the PDN type change during MT call?
  - Which node can detect IPv6 network failure?
    - operator may manually configure the IPv6 failure indication in any network node on the MT call procedure path.
    - Per failure detection node, there may be a the different procedure to initiate the PDN connection re-establishment

We propose some initial solutions

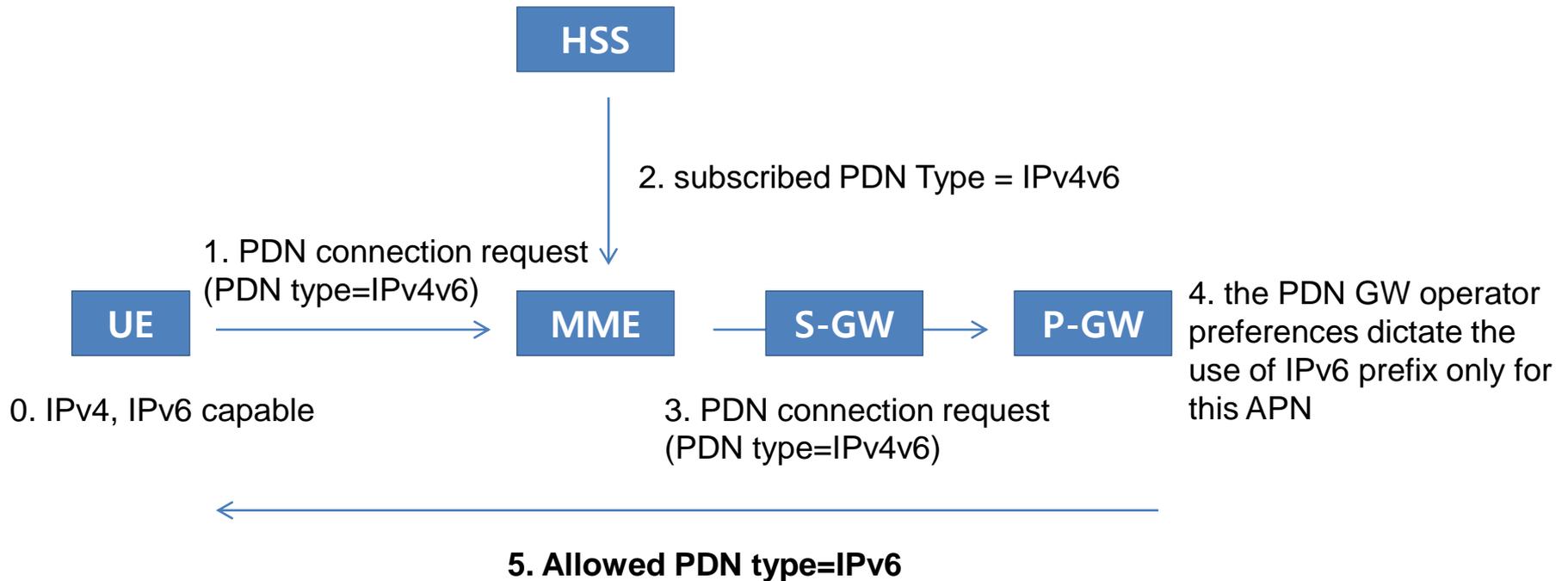
- a. MO call scenario: P-GW detects the failure and initiates IPv6 PDN release/IPv4 PDN establishment
  - b. MT call scenario:
    - b-1) IMS node (e.g. S-CSCF) detects the failure and inform EPC node (e.g. HSS, MME) and UE of it. MME and UE initiate IPv6 PDN release/IPv4 PDN establishment
    - b-2) HSS detects the failure and inform MME of it. MME initiates IPv6 PDN release/IPv4 PDN establishment
- ❖ Further other solutions could be considered or discussed, and some other potential alternatives welcome.

# MO call scenario

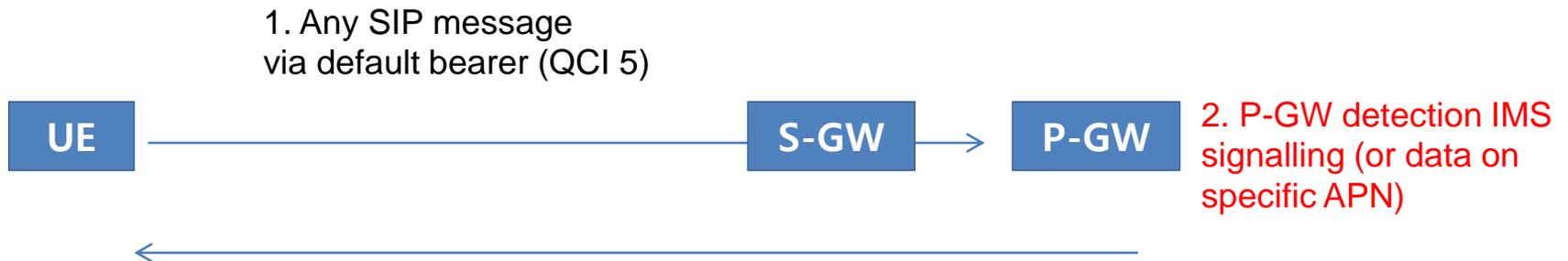
# Proposal a) P-GW detection about IPv6 network failure

# (1) Initially IPv6 PDN connection is established

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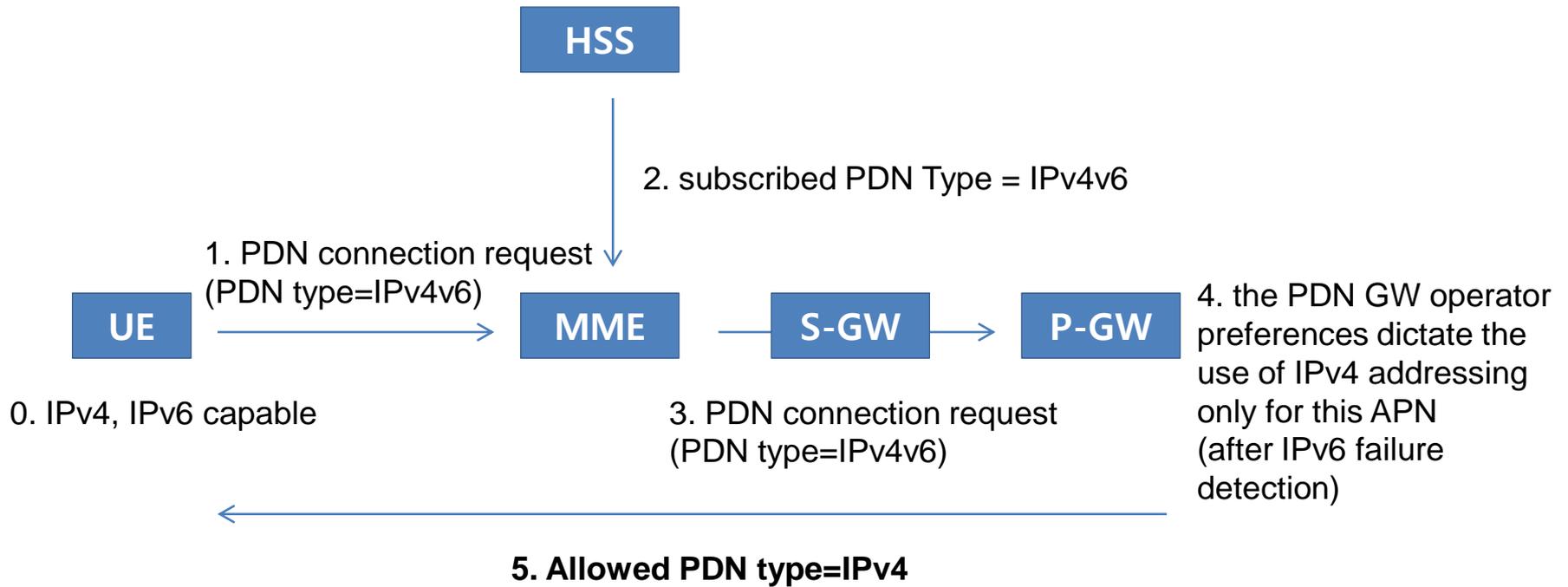
※ In case of VoLTE service via “well known” IMS APN, a default bearer with QCI 5 (IMS signalling) is setup.



3. PDN GW initiated bearer deactivation procedure according to TS 23.401 clause 5.4.4.1 with the "reactivation requested" cause value.

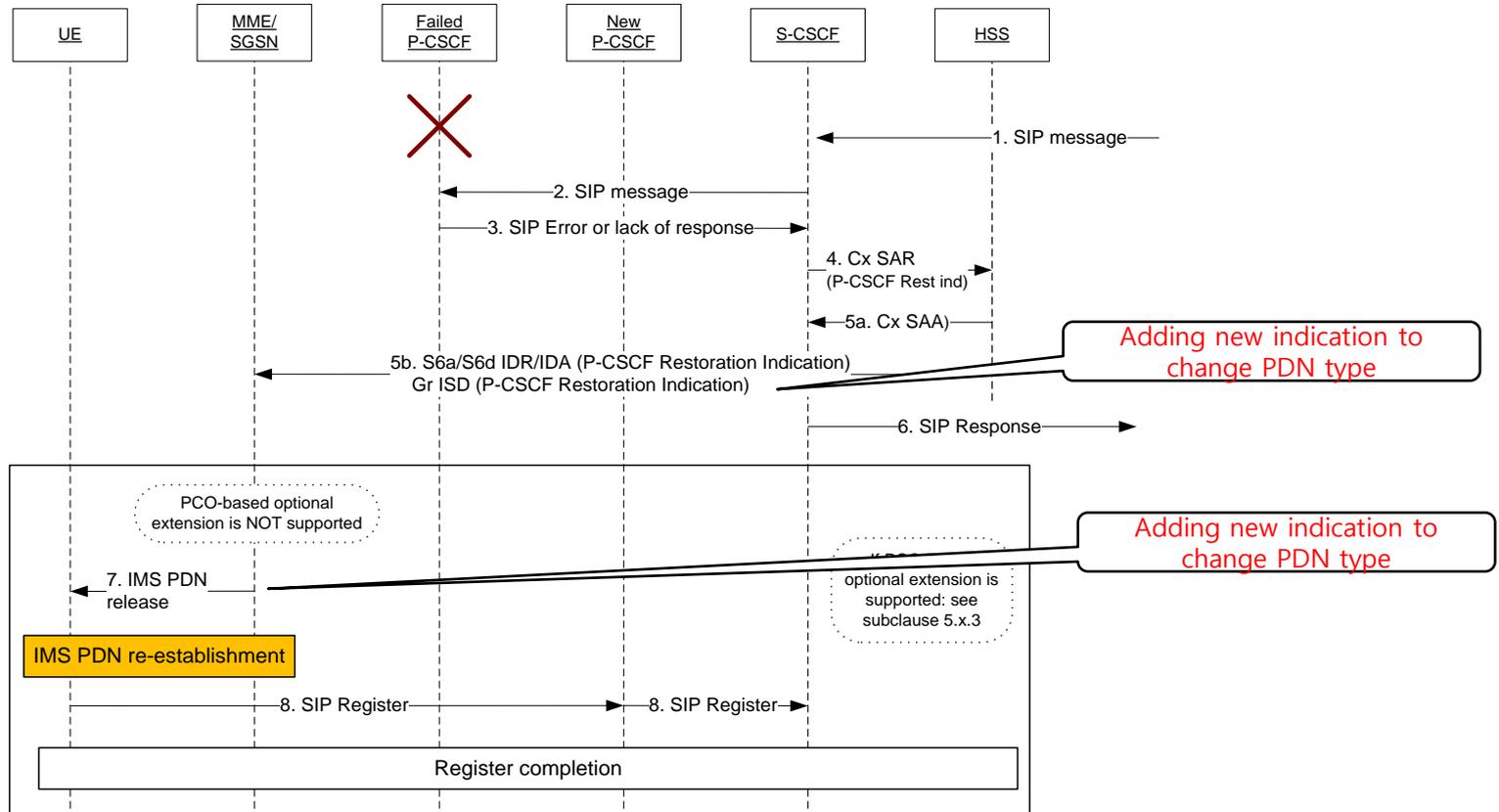
※ In order to IPv6 PDN release and IPv4 PDN establishment, P-GW should detect IMS signalling (or data for well-know IMS APN) and initiate the corresponding procedures.

❖ TS 23.401 CR: S2-153167



# MT call scenarios

[TS 23.380] Figure 5.4.2.1-1: HSS-based P-CSCF restoration

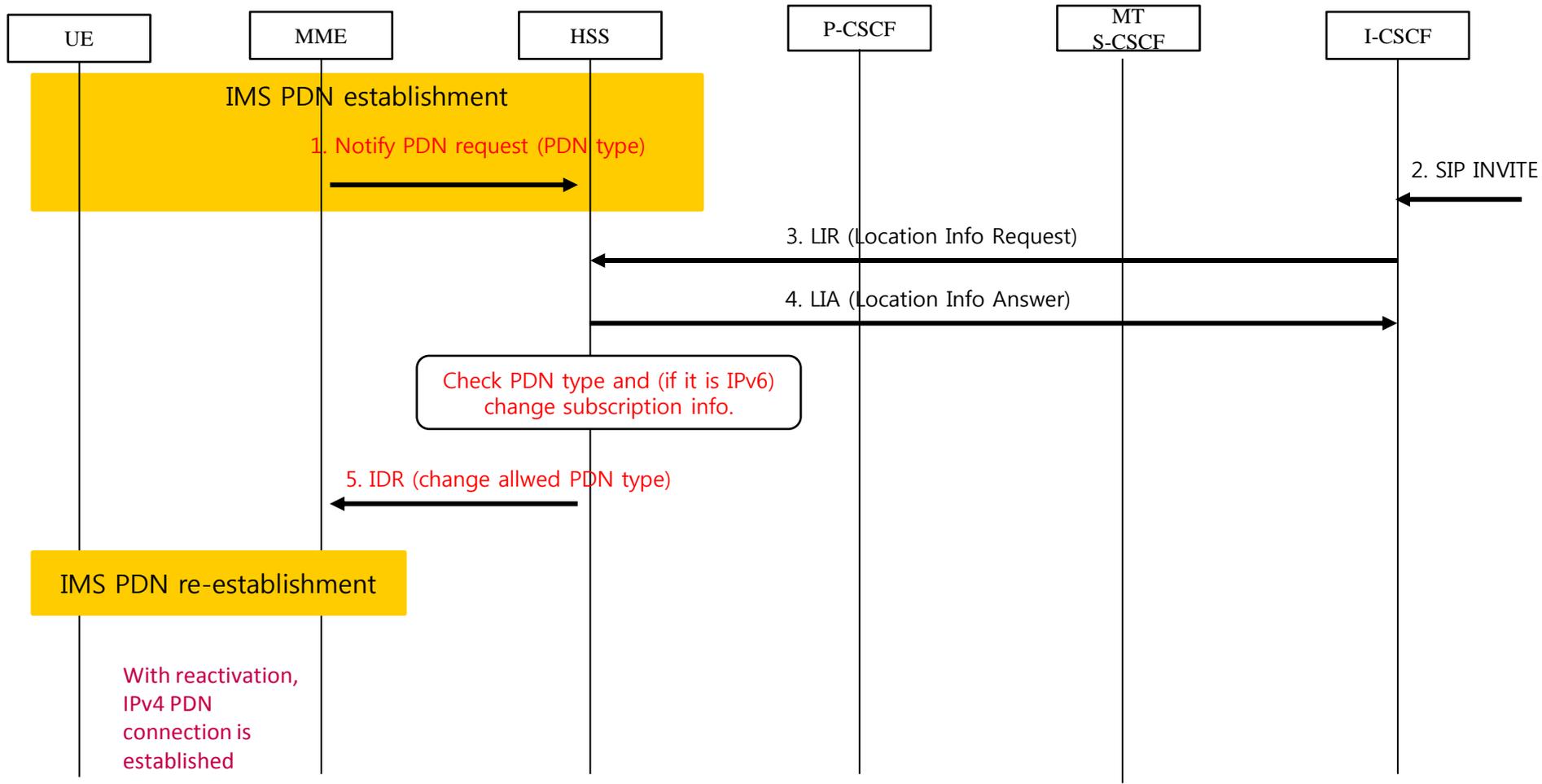


With reactivation, IPv4 PDN connection is established

✳ Assumption: the PDN GW operator preferences dictate the use of IPv4 addressing only for this APN (after IPv6 failure detection)

❖ TS 23.401 CR: S2-153168

❖ TS 23.380 CR is also expected in CT4 to implement the corresponding behavior of S-CSCF and HSS



❖ TS 23.401 CR: S2-153169