

# ProSe Function Accessibility

Qualcomm Incorporated

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# ProSe Function accessibility-Way forward

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# Agenda

- LS from CT1 on ProSe Function accessibility
- Overview of PC3 interface
- Handling of IPX
- Proposed way forward

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# Problematic scenarios for ProSe Function accessibility

LS from CT1 ([C1-142124](#)) provides the following “problematic” scenarios and asks for SA2 guidance

- **Scenario 1:**

- When:
  - the UE roams;
  - the VPLMN, the HPLMN and the local PLMN are connected using IP Packet eXchange (IPX) as defined by GSMA IR.34 [1];
  - the UE uses one PDN connection with P-GW in the HPLMN to reach all ProSe Functions (i.e. the HPLMN ProSe Function, the VPLMN ProSe Function and the local PLMN ProSe Function); and
- the PDN connection does not also provide access to Internet;
- then the UE is unable to send IP packets carrying ProSe signalling to the VPLMN ProSe Function and to the local PLMN ProSe Function using the PDN connection.

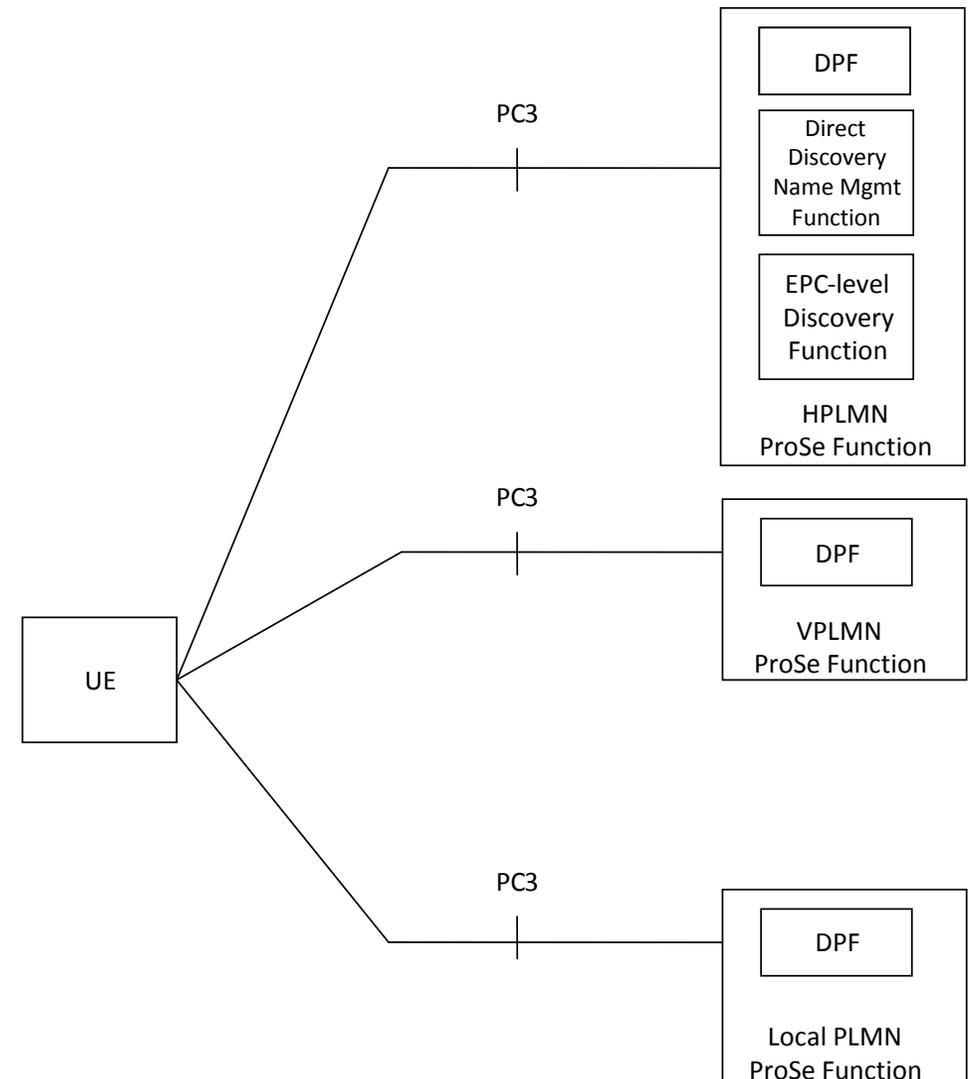
- **Scenario 2:**

- When:
  - the UE roams;
  - the VPLMN, the HPLMN and the local PLMN are connected using IP Packet eXchange (IPX) as defined by GSMA IR.34 [1];
  - the UE uses one PDN connection with P-GW in the HPLMN to reach all ProSe Functions (i.e. the HPLMN ProSe Function, the VPLMN ProSe Function and the local PLMN ProSe Function);
- the PDN connection also provides access to Internet; and
- all those ProSe Functions are reachable via Internet;
  
- then the UE is able to send IP packets carrying ProSe signalling to all those ProSe Functions using the same PDN connection but IP packets carrying ProSe signalling to the VPLMN ProSe Function and to the local PLMN ProSe Functions will pass via Internet.

- The reason for the above is that GSMA PRD IR.34, section 4.6.6 prohibits UE IP datagrams to traverse IPX without being encapsulated in tunnels established by network entities.

# Overview of PC3 interface

- Communication over PC3 includes:
  - UE <-> DPF (service authorisation)
  - UE <-> DDNMF (direct discovery)
  - UE <-> EPC-level Discovery Function (EPC-level discovery)
- SA2 decided to use OMA-DM for UE <-> DPF (TS 23.303)
- CT1 needs to decide on transport protocol for:
  - UE <-> DDNMF; and
  - UE <-> EPC-level Discovery Function
- For both UE <-> DDNMF and UE <-> EPC-level Discovery Function communications, UE only talks to ProSe Function of the HPLMN



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# Handling of IPX (for UE<->DDNMF and UE<->EPC-level ProSe Discovery)

- If UE connected to P-GW in serving PLMN needs to reach ProSe Function in another PLMN and traffic goes through IPX, there needs to be an entity (proxy) that encapsulates the traffic coming from the UE in a tunnel
- This is not an issue for UE<->DDNMF and UE<->EPC-level ProSe Discovery because:
  - UE **only talks to ProSe Function in HPLMN**
  - If UE is in HPLMN, no problem as traffic does not go through IPX
  - If UE is in VPLMN, no problem if it is ensured that traffic is home-routed (can be default APN, or dedicated APN)
    - UE connects to P-GW in HPLMN (home routed PDN connection)
- **Conclusion 1:** Thus no need for proxy for UE<->DDNMF and UE<->EPC-level ProSe Discovery communications and no impact on the stage-2 architecture and procedures for UE<->DDNMF and UE<->EPC-level ProSe Discovery interactions as long as the UE has established a home routed PDN connection

# Handling of IPX (for UE<->DPF)

- For UE-DPF communication, UE needs to talk to:
  - ProSe Function in HPLMN to get service authorisation
  - ProSe Function in VPLMN or local PLMNs if it is conditionally authorised in these PLMNs
- If UE in VPLMN needs to reach ProSe Function of VPLMN, traffic is home-routed and HPLMN and VPLMN are connected via IPX, then 3 options:
  - 1) Proxy in HPLMN
  - 2) Use of dedicated APN (LBO would be used for that APN)
    - Means UE has to maintain 2 PDN connections, one to P-GW in HPLMN (default APN, home-routed) and the other to P-GW in VPLMN (dedicated APN, LBO)
  - 3) ProSe Function of VPLMN has to be reachable via the internet (FQDN “pub.3gppnetwork.org”)
- If UE in HPLMN or VPLMN needs to reach ProSe Function of local PLMN, traffic is home-routed and HPLMN/VPLMN and local PLMN are connected via IPX, then 2 options:
  - 1) Proxy in HPLMN;
  - 2) ProSe Function of local PLMN has to be reachable via the internet (FQDN “pub.3gppnetwork.org”)
    - No proxy included in SA2 architecture -> case of local PLMN is problematic if 2) is not general case (e.g for Public Safety)
- **Conclusion 2:** All options for UE<->DPF interaction for conditional authorisation have either architecture or configuration impacts

# Way Forward

## Options to handle the issue for UE<->DPF interaction (conditional authorisation)

- Option 1
  - Modify conditional authorisation to always access the VPLMN/Local PLMN ProSe Function via the HPLMN ProSe Function
  - SA2 Action required
    - Modify procedures for conditional authorisation procedure from TS 23.303
    - Modify the architecture (no PC3 to VPLMN/Local PLMN ProSe Function)
- Option 2
  - Eliminate ProSe conditional authorisation from VPLMN/Local PLMN
  - Variant of option 1
  - SA2 Action required
    - Remove conditional authorisation procedure from TS 23.303
    - Modify the architecture (no PC3 to VPLMN/Local PLMN ProSe Function)
- Option 3
  - Allow ProSe conditional authorisation from VPLMN/Local PLMN as long as all ProSe Functions are reachable from the internet (i.e. FQDN “pub.3gppnetwork.org”)
  - SA2 Action required
    - Add a NOTE in TS 23.303 to indicate that conditional authorisation is only supported if the ProSe Functions are configured to be reachable from the Internet
- Qualcomm prefers option 2, but can live with any of the other two options
- Option 2 is proposed in S2-142540

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# Thank you

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