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Proximity based Services (ProSe) in the 5G System (5GS)
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Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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Version x.y.z

where:

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  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

In the present document, modal verbs have the following meanings:

shall indicates a mandatory requirement to do something

shall not indicates an interdiction (prohibition) to do something

The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

should indicates a recommendation to do something

should not indicates a recommendation not to do something

may indicates permission to do something

need not indicates permission not to do something

The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

can indicates that something is possible

cannot indicates that something is impossible

The constructions "can" and "cannot" are not substitutes for "may" and "need not".

will indicates that something is certain or expected to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

will not indicates that something is certain or expected not to happen as a result of action taken by an agency the behaviour of which is outside the scope of the present document

might indicates a likelihood that something will happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

might not indicates a likelihood that something will not happen as a result of action taken by some agency the behaviour of which is outside the scope of the present document

In addition:

is (or any other verb in the indicative mood) indicates a statement of fact

is not (or any other negative verb in the indicative mood) indicates a statement of fact

The constructions "is" and "is not" do not indicate requirements.

1 Scope

The present document specifies the Stage 2 of the Proximity based Services (ProSe) features in 5GS. 5G ProSe features consist of: 5G ProSe Direct Discovery, 5G ProSe Direct Communication and 5G ProSe UE-to-Network Relay.

5G ProSe Direct Discovery identifies that 5G ProSe-enabled UEs are in proximity using NR.

5G ProSe Direct Communication enables establishment of communication paths between two or more 5G ProSe-enabled UEs that are in direct communication range using NR.

5G ProSe UE-to-Network Relay enables indirect communication between the 5G network and UEs (e.g. for UEs that are out of coverage of the network).

Security aspects of ProSe in 5GS are defined in TS 33.503 [29].

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 23.287: "Architecture enhancements for 5G System (5GS) to support Vehicle-to-Everything (V2X) services".

[3] 3GPP TS 23.303: "Proximity-based services (ProSe); Stage 2".

[4] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[5] 3GPP TS 23.502: "Procedures for the 5G System (5GS); Stage 2".

[6] 3GPP TS 22.261: "Service requirements for next generation new services and markets; Stage 1".

[7] 3GPP TS 22.278: "Service requirements for the Evolved Packet System (EPS)".

[8] 3GPP TS 23.288: "Architecture enhancements for 5G System (5GS) to support network data analytics services".

[9] 3GPP TS 23.503: "Policy and Charging Control Framework for the 5G System".

[10] Void.

[11] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2".

[12] 3GPP TS 38.300: "NR; NR and NG-RAN Overall Description; Stage 2".

[13] 3GPP TS 38.304: "NR; User Equipment (UE) procedures in idle mode".

[14] 3GPP TS 23.122: "Non-Access-Stratum (NAS) functions related to Mobile Station in idle mode".

[15] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC); Protocol specification".

[16] 3GPP TS 38.331: "NR; Radio Resource Control (RRC); Protocol Specification".

[17] IETF RFC 4862: "IPv6 Stateless Address Autoconfiguration".

[18] IETF RFC 3927: "Dynamic Configuration of IPv4 Link-Local Addresses".

[19] IETF RFC 826: "An Ethernet Address Resolution Protocol".

[20] Void.

[21] 3GPP TR 23.752: "Study on system enhancement for Proximity based Services (ProSe) in the 5G System (5GS)".

[22] 3GPP TS 32.277: "Proximity-based Services (ProSe) charging".

[23] 3GPP TS 24.554: "Proximity-services (ProSe) in 5G System (5GS) protocol aspects; Stage 3".

[24] IETF RFC 2131: "Dynamic Host Configuration Protocol".

[25] IETF RFC 4039: "Rapid Commit Option for the Dynamic Host Configuration Protocol version 4 (DHCPv4)".

[26] IETF RFC 6603: "Prefix Exclude Option for DHCPv6-based Prefix Delegation".

[27] IETF RFC 8415: "Dynamic Host Configuration Protocol for IPv6 (DHCPv6)".

[28] 3GPP TS 38.351: "NR; Sidelink Adaptation Layer Protocol".

[29] 3GPP TS 33.503: "Security Aspects of Proximity based Services (ProSe) in the 5G System (5GS)".

[30] 3GPP TS 29.500: "5G System; Technical Realization of Service Based Architecture; Stage 3".

3 Definitions of terms and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

5G ProSe-enabled UE: A UE that supports 5G ProSe requirements and associated procedures.

5G ProSe Direct Discovery: A procedure employed by a 5G ProSe-enabled UE to discover other 5G ProSe-enabled UEs in its vicinity based on direct radio transmissions between the two UEs with NR technology.

5G ProSe Direct Communication: A communication between two or more UEs in proximity that are 5G ProSe-enabled, by means of user plane transmission using NR technology via a path not traversing any network node.

5G ProSe UE-to-Network Relay: A 5G ProSe-enabled UE that provides functionality to support connectivity to the network for 5G ProSe Remote UE(s).

5G ProSe Remote UE: A 5G ProSe-enabled UE that communicates with a DN via a 5G ProSe UE-to-Network Relay.

Application Layer ID: An identifier identifying a 5G ProSe-enabled UE within the context of a specific application. The format of this identifier is outside the scope of 3GPP.

Direct Network Communication: One mode of network communication, where there is no 5G ProSe UE-to-Network Relay between a UE and the 5G network.

Indirect Network Communication: One mode of network communication, where there is a 5G ProSe UE-to-Network Relay between a UE and the 5G network.

Member ID: An identifier uniquely identifying a member in the Application Layer managed group and that is managed by the ProSe application layer.

Mode of communication: Mode of communication to be used by the 5G ProSe-enabled UE over PC5 reference point, i.e. broadcast mode, groupcast mode or unicast mode.

Open ProSe Discovery: ProSe Direct Discovery without explicit permission from the 5G ProSe-enabled UE being discovered, according to TS 22.278 [7].

ProSe identifier: A globally unique identifier used to identify the ProSe Application associated with the ProSe operation in 5G ProSe Direct Discovery and 5G ProSe Direct Communication. In this Release, the "Application ID" defined in TS 23.303 [3] can be used as the ProSe identifier in 5G ProSe Direct Discovery and in a consequent 5G ProSe Direct Communication.

Restricted ProSe Discovery: ProSe Direct Discovery that only takes place with explicit permission from the 5G ProSe-enabled UE being discovered, according to TS 22.278 [7].

User Info ID: The User Info ID is configured for Model A or Model B Group Member Discovery and 5G ProSe UE-to-Network Relay Discovery either for public safety or commercial applications based on the policy of the HPLMN or via the ProSe application server that allocates it. The definition of values of User Info ID is out of scope of this specification.

For the purposes of the present document, the following term and definition given in TS 23.303 [3] apply:

Application Layer Group ID
Destination Layer-2 ID
Discovery Entry ID
Discovery Filter
Discovery Query Filter
Discovery Response Filter
Geographical Area
Local PLMN
Model A
Model B
Metadata Index Mask
ProSe Application ID
ProSe Application Code
ProSe Application Mask
ProSe Query Code
ProSe Response Code
ProSe Restricted Code
ProSe Restricted Code Prefix
ProSe Restricted Code Suffix
ProSe Discovery UE ID
ProSe Layer-2 Group ID
Restricted ProSe Application User ID
Source Layer-2 ID

For the purposes of the present document, the following term and definition given in TS 23.287 [2] apply:

NR Tx Profile

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

5G DDNMF	5G Direct Discovery Name Management Function
AS layer	Access Stratum layer
NCGI	NR Cell Global ID
PDUID	ProSe Discovery UE ID
PFI	PC5 QoS Flow Identifier
PQI	PC5 5QI
ProSe	Proximity based Services

RPAUID	Restricted ProSe Application User ID
RSC	Relay Service Code
RSD	Rule Selection Descriptor
TAI	Tracking Area Identity

4 Architecture model and concepts

4.1 General concept

Proximity based Services (ProSe) are services that can be provided by the 5GS based on UEs being in proximity to each other.

The 5GS enablers for ProSe include the following functions:

- 5G ProSe Direct Discovery;
- 5G ProSe Direct Communication;
- 5G ProSe UE-to-Network Relay.

4.2 Architectural reference model

4.2.1 Non-roaming reference architecture

Figure 4.2.1-1 shows the high-level view of the non-roaming 5G System architecture for Proximity-based Services (ProSe) with service-based interfaces within the Control Plane. In this figure, UE A and UE B use a subscription of the same PLMN.

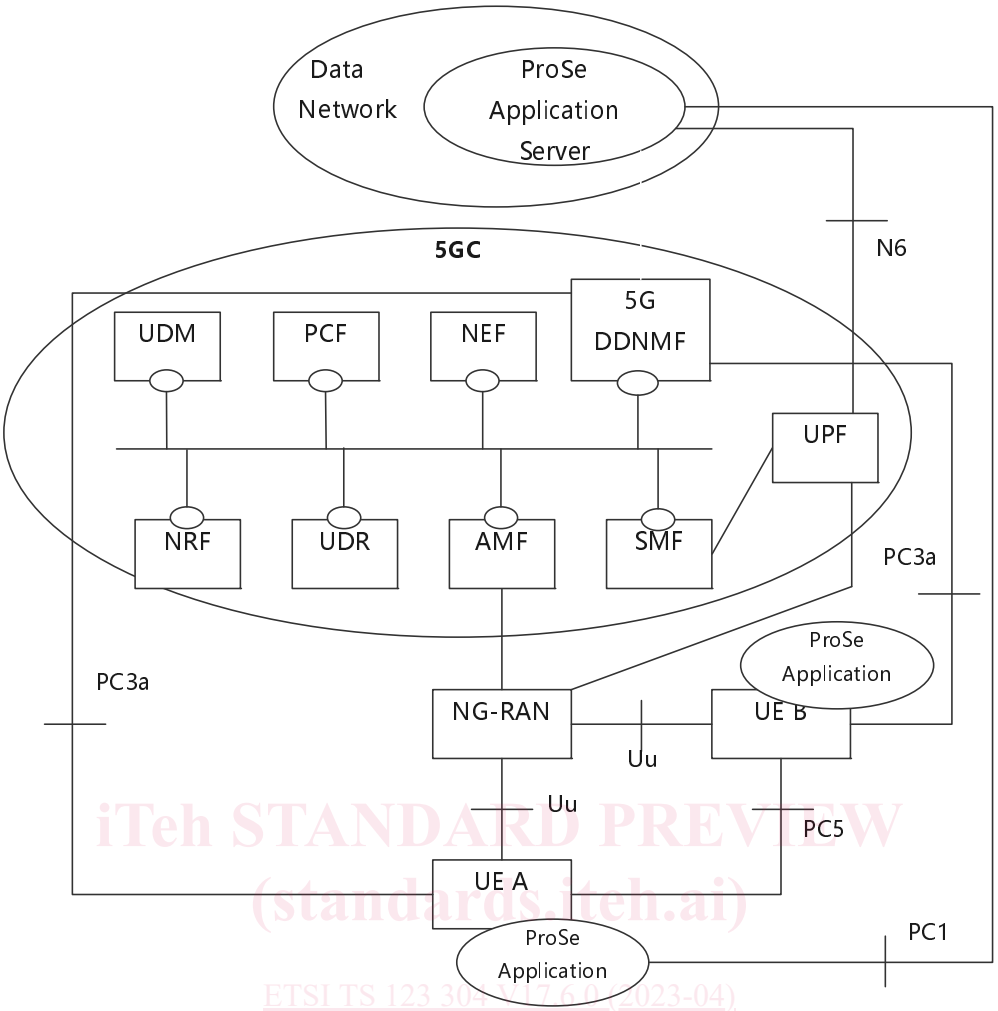

Figure 4.2.1-1: Non-roaming 5G System architecture for Proximity-based Services

Figure 4.2.1-2 shows the high-level view of the non-roaming 5G System architecture for Proximity-based Services (ProSe) in reference point representation. In this figure, UE A and UE B use a subscription of the same PLMN.

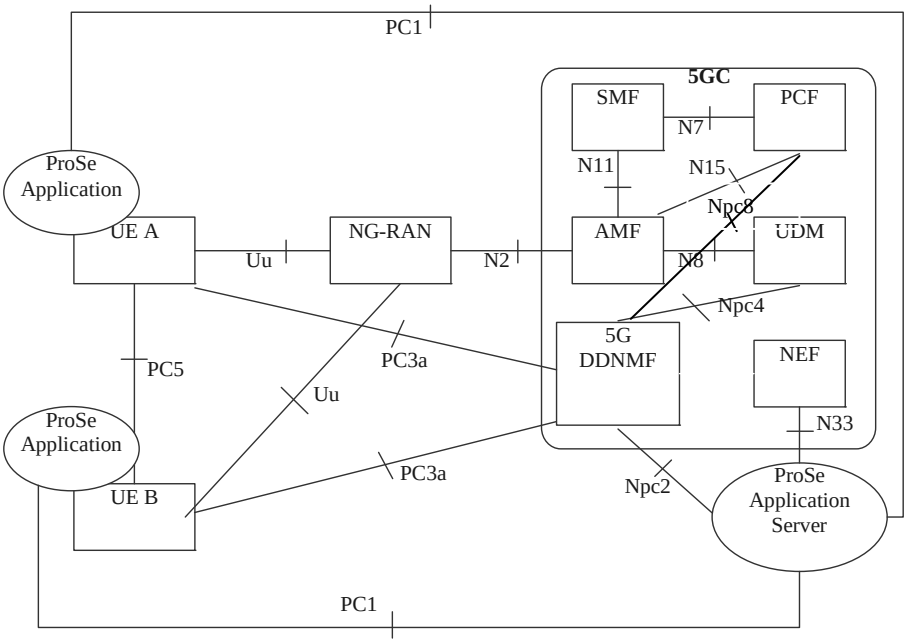

Figure 4.2.1-2: Non-roaming 5G System architecture for Proximity-based Services in reference point representation

4.2.2 Roaming reference architecture

Figure 4.2.2-1 shows the high-level view of the roaming 5G System architecture for Proximity-based Services (ProSe) with service-based interfaces within the Control Plane. In the figure, UE A uses a subscription of HPLMN.