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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **22.261** | **CR** | **0805** | **rev** | **2** | **Current version:** | **19.7.0** |  |
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| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network | **x** |

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| ***Title:*** | Clarifying the support of eRG without a USIM | | | | | | | | | |
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| ***Source to WG:*** | China Unicom, Huawei, InterDigital, ICS, China Mobile, Futurewei, KPN? | | | | | | | | | |
| ***Source to TSG:*** | SA1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | DUMMY | | | | |  | ***Date:*** | | | 2024-08-22 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-20 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
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| ***Reason for change:*** | | The trend towards Wireline / Wireless Convergence has already recognised in 3GPP. As part of release 18 5G\_Resident study followed by the corresponding normative work PiRates, SA1 has examined use cases in residential environments (e.g. homes and small offices) and defined service requirements mainly for the 5G system to support UEs/devices behind an eRG. Nonetheless, there are still gaps to be addressed, e.g.:  - PRAS cannot always be assumed in some markets for various reasons;  - The service requirements for the 5G system to support eRG are limited.  - Limited discussion on the practical issues, e.g. how a residential gateway (typically with no USIM) can access 5G core network via non-3GPP access. | | | | | | | | |
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| ***Summary of change:*** | | To address the gaps identified above, the following changes are included:  - updated the description for CPN;  - added an eRG (without USIM) specific requirement;  - updated the requirement to provision an eRG (without USIM). | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | It is ambiguous if an eRG without USIM is also covered. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.38.1, 6.38.2.2, 6.38.2.9 | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **x** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
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| ***This CR's revision history:*** | |  | | | | | | | | |

FIRST CHANGE

# 3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP 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 3GPP TR 21.905 [1].

**5G enhanced positioning area:** a subset of the 5G positioning service area that is assumed to be provided with additional infrastructure or deploy a particular set of positioning technologies to enhance positioning services.

NOTE 1: The enhanced positioning service area represents for example a factory plant, a dense urban area, an area along a road or railway track, a tunnel and covers both indoor and outdoor environments.

**5G LAN-type service**: a service over the 5G system offering private communication using IP and/or non-, i.e. UEs that are members of the same 5G LAN-VN IP type communications.

**5G LAN-virtual network**: a virtual network capable of supporting 5G LAN-type service.

**5G satellite access network**: 5G access network using at least one satellite.

**5G positioning service area:** a service area where positioning services would solely rely on infrastructures and positioning technologies that can be assumed to be present anywhere where 5G is present (e.g. a country-wide operator-supplied 5G network, GNSS, position/motion sensors).

NOTE 2: This includes both indoor and any outdoor environments.

**active communication:** a UE is in active communication when it has one or more connections established. A UE may have any combination of PS connections (e.g. PDP contexts, active PDN connections).

**activity factor:** percentage value of the amount of simultaneous active UEs to the total number of UEs where active means the UEs are exchanging data with the network.

**Ambient IoT device**: An ambient power-enabled Internet of Things device is an IoT device powered by energy harvesting, being either battery-less or with limited energy storage capability (e.g., using a capacitor).

**aggregated QoS:** QoS requirement(s) that apply to the traffic of a group of UEs.

**area traffic capacity:** total traffic throughput served per geographic area.

**authorised administrator:** a user or other entity authorised to partially configure and manage a network node in a CPN (e.g. a PRAS, or eRG) or a PIN element in a PIN.

**carbon emission:** quantity of equivalent carbon dioxide emitted (e.g. kg of CO2 equivalent).

**communication service availability**: percentage value of the amount of time the end-to-end communication service is delivered according to a specified QoS, divided by the amount of time the system is expected to deliver the end-to-end service.

NOTE 3: The end point in "end-to-end" is the communication service interface.

NOTE 4: The communication service is considered unavailable if it does not meet the pertinent QoS requirements. For example, the communication service is unavailable if a message is not correctly received within a specified time, which is the sum of maximum allowed end-to-end latency and survival time.

**Customer Premises Network:** a network located within a premise (e.g. a residence, office or shop), which is owned, installed and/or (at least partially) configured by the customer of a public network operator.

**direct device connection:** the connection between two UEs without any network entity in the middle.

**direct network connection:** one mode of network connection, where there is no relay UE between a UE and the 5G network.

**Disaster Condition:** This is the condition that a government decides when to initiate and terminate, e.g. a natural disaster. When this condition applies, users may have the opportunity to mitigate service interruptions and failures.

**Disaster Inbound Roamer:** A user that (a) cannot get service from the PLMN it would normally be served by, due to failure of service during a Disaster Condition, and (b) is able to register with other PLMNs.

**Disaster Roaming:** This is the special roaming policy that applies during a Disaster Condition.

**DualSteer device:** A device supporting traffic steering and switching of user data (for different services) across two 3GPP access networks; it can be a single UE, in case of non-simultaneous data transmission over the two networks, or two separate UEs in case of simultaneous data transmission over the two networks.

**end-to-end latency:** the time that it takes to transfer a given piece of information from a source to a destination, measured at the communication interface, from the moment it is transmitted by the source to the moment it is successfully received at the destination.

**energy charging rate**: a means of determining the energy consumption consequence (use of energy credit) associated with charging events.

**energy credit**: a quantity of energy credit associated with the subscriber that can be used for credit control by the 5G system.

**energy state:** state of a cell, a network element and/or a network function with respect to energy, e.g. (not) energy saving states, which are defined in TS 28.310 [47].

**evolved Residential Gateway:** a gateway between the public operator network (fixed/mobile/cable) and a customer premises network.

**holdover:** A clock A, previously synchronized/syntonized to another clock B (normally a primary reference or a Master Clock) but whose frequency is determined in part using data acquired while it was synchronized/syntonized to B, is said to be in holdover or in the holdover mode as long as it is within its accuracy requirements.

NOTE 4a: holdover is defined in [31]

**Holdover time:** the time period that is available to repair the first priority timing source when it is lost (e.g., when the primary GNSS reference is lost). During this period the synchronization accuracy requirement should be guaranteed, e.g., by means of defining multiple synchronization references.

**Hosted Service:** a service containing the operator's own application(s) and/or trusted third-party application(s) in the Service Hosting Environment, which can be accessed by the user.

**Hosting NG-RAN Operator:** the operator that has operational control of a Shared NG-RAN.

NOTE 4b: Hosting NG-RAN Operator is a Hosting RAN Operator.

**Hosting RAN Operator:** as defined in 3GPP TS 22.101 [6].

**hybrid access:** access consisting of multiple different access types combined, such as fixed wireless access and wireline access.

**indirect network connection:** one mode of network connection, where there is a relay UE between a UE and the 5G network.

**Indirect Network Sharing:** a type of NG-RAN Sharing in which the communication between the Shared NG-RAN and the Participating Operator’s core network is routed through the Hosting NG-RAN Operator’s core network.

**IoT device:** a type of UE which is dedicated for a set of specific use cases or services and which is allowed to make use of certain features restricted to this type of UEs.

NOTE 5: An IoT device may be optimized for the specific needs of services and application being executed (e.g. smart home/city, smart utilities, e-Health and smart wearables). Some IoT devices are not intended for human type communications.

**maximum energy consumption**: a policy establishing an upper bound on the quantity of energy consumption [47] by the 5G system in a specific period of time, or space, e.g. energy consumption inside a given service area.

**maximum energy credit limit**: a policy establishing an upper bound on the aggregate quantity of energy consumption by the 5G system to provide services to a specific subscriber, e.g. in kilowatt hours.

NOTE: The terms maximum energy credit limit is distinct from 'maximum energy consumption' because the credit limit is a total amount of energy consumed, where maximum energy consumption is a limit to the consumption in a given interval of time.

**network slice:** a set of network functions and corresponding resources necessary to provide the required telecommunication services and network capabilities.

**NG-RAN:** a radio access network connecting to the 5G core network which uses NR, E-UTRA, or both.

**NG-RAN Sharing:** the sharing of NG-RAN among a number of operators.

**non-public network:** a network that is intended for non-public use.

**NR:** the new 5G radio access technology.

**Participating NG-RAN Operator:** authorized operator that is using Shared NG-RAN resources provided by a Hosting NG-RAN Operator.

NOTE 5a: Participating NG-RAN Operator is a Participating Operator.

**Participating Operator:** as defined in 3GPP TS 22.101 [6].

**Personal IoT Network:** A configured and managed group of at least one UE PIN Element and one or more PIN Element that communicate with each other.

**PIN Element:** UE or non-3GPP device that can communicate within a PIN.

**PIN direct connection:** the connection between two PIN Elements without any 3GPP RAN or core network entity in the middle.

NOTE 5A: A PIN direct connection could internally be relayed by other PIN Elements.

NOTE 5B: When a PIN direct connection is between two PIN Elements that are UEs this direct connection is typically known as a direct device connection.

**PIN Element with Gateway Capability:** a UE PIN Element that has the ability to provide connectivity to and from the 5G network for other PIN Elements.

NOTE 5C: A PIN Element can have both PIN management capability and Gateway Capability.

**PIN Element with Management Capability:** A PIN Element with capability to manage the PIN.

**positioning service availability:** percentage value of the amount of time the positioning service is delivering the required position-related data within the performance requirements, divided by the amount of time the system is expected to deliver the positioning service according to the specification in the targeted service area.

**proximity-based work task offloading:** a relay UE receives data from a remote UE via direct device connection and performs calculation of a work task for the remote UE. The calculation result can be further sent to network server.

**positioning service latency:** time elapsed between the event that triggers the determination of the position-related data and the availability of the position-related data at the system interface.

**Premises Radio Access Station:** a base station installed at a customer premises network.

**priority service:** a service that requires priority treatment based on regional/national or operator policies.

**private communication**: a communication between two or more UEs belonging to a restricted set of UEs**.**

**private network:** an isolated network deployment that does not interact with a public network.

**private slice:** a dedicated network slice deployment for the sole use by a specific third-party.

**ProSe UE-to-UE Relay**: a Public Safety ProSe-enabled UE that acts as a relay between two other Public Safety ProSe-enabled UEs.

**Ranging:** refers to the determination of the distance between two UEs and/or the direction of one UE from the other one via direct device connection.

**relative positioning:** relative positioning is to estimate position relatively to other network elements or relatively to other UEs.

**reliability**: in the context of network layer packet transmissions, percentage value of the packets successfully delivered to a given system entity within the time constraint required by the targeted service out of all the packets transmitted.

**renewable energy**: energy from renewable sources as energy from renewable non-fossil sources, namely wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases

NOTE 2: This definition was taken from [48].

**satellite**: a space-borne vehicle embarking a bent pipe payload or a regenerative payload telecommunication transmitter, placed into Low-Earth Orbit (LEO) typically at an altitude between 300 km to 2 000 km, Medium-Earth Orbit (MEO) typically at an altitude between 8 000 to 20 000 k m, or Geostationary satellite Earth Orbit (GEO) at 35 786 km altitude.

**satellite access:** direct connectivity between the UE and the satellite.

**satellite NG-RAN:** a NG-RAN which uses NR in providing satellite access to UEs.

**service area:** geographic region where a 3GPP communication service is accessible.

NOTE 6: The service area can be indoors.

NOTE 7: For some deployments, e.g. in process industry, the vertical dimension of the service area can be considerable.

**service continuity:** the uninterrupted user experience of a service that is using an active communication when a UE undergoes an access change without, as far as possible, the user noticing the change.

NOTE 8: In particular service continuity encompasses the possibility that after a change the user experience is maintained by a different telecommunication service (e.g. tele- or bearer service) than before the change.

NOTE 9: Examples of access changes include the following. For EPS: CS/PS domain change. For EPS and 5G: radio access change, switching between a direct network connection and an indirect network connection.

**Service Hosting Environment:** the environment, located inside of 5G network and fully controlled by the operator, where Hosted Services are offered from.

**serving satellite:** a satellite providing the satellite access to an UE. In the case of NGSO, the serving satellite is always changing due to the nature of the satellite constellation.

**Shared NG-RAN:** as defined in 3GPP TS 22.101 [6].

**Stand-alone Non-Public Network:** A non-public network not relying on network functions provided by a PLMN

**SNPN Credential Provider:** Entity within the 5G system that creates and manages identity information and provides authentication services for those identities for the purpose of accessing a SNPN

NOTE: The SNPN Credential Provider can also authorize access to a non-public network for a subscriber associated with an identity handled by this SNPN Credential Provider.

**S&F Satellite operation**: S&F (Store and Forward) Satellite operation is an operation mode of a 5G system with satellite-access where the 5G system can provide some level of service (in storing and forwarding the data) when satellite connectivity is intermittently/temporarily unavailable, e.g. to provide communication service for UEs under satellite coverage without a simultaneous active feeder link connection to the ground segment.

**S&F data retention period:** it is the data storage validity period for a 5G system with satellite access supporting store and forward operation (e.g. after which undelivered data stored is being discarded).

**synchronization threshold:** A synchronization threshold can be defined as the maximum tolerable temporal separation of the onset of two stimuli, one of which is presented to one sense and the other to another sense, such that the accompanying sensory objects are perceived as being synchronous.

NOTE 10: This definition is based on [41].

**survival time:** the time that an application consuming a communication service may continue without an anticipated message.

**Time to First Fix (TTFF):** time elapsed between the event triggering for the first time the determination of the position-related data and the availability of the position-related data at the positioning system interface.

**Traffic steering:** the procedure that selects an access network and transfers traffic over the selected access network. This can apply to traffic of one or multiple services/applications across two 3GPP access networks, including scenarios where all services use the same network connection (no simultaneous data over the two networks) or different services are steered across different networks (with simultaneous data over the two networks).

**Traffic switching:** the procedure that moves all traffic from one access network to another access network in a way that minimizes service interruption. This can apply to traffic of one or multiple services/applications across two 3GPP access networks, including scenarios where all services use the same network connection (no simultaneous data over the two networks) or different services are moved to different networks (with simultaneous data over the two networks).

**UE-Satellite-UE communication**: for a 5G system with satellite access, it refers to the communication between UEs under the coverage of one or more serving satellites, using satellite access without the user traffic going through the ground segment.

**User Equipment:** An equipment that allows a user access to network services via 3GPP and/or non-3GPP accesses.

**user experienced data rate:** the minimum data rate required to achieve a sufficient quality experience, with the exception of scenario for broadcast like services where the given value is the maximum that is needed.

**wireless backhaul:** a link which provides an interconnection between 5G network nodes and/or transport network using 5G radio access technology**.**

SECOND CHANGE

## 6.38 Personal IoT Networks and Customer Premises Networks

6.38.1 Description

Personal IoT Networks (PINs) and Customer Premises Networks (CPNs) provide local connectivity between UEs and/or non-3GPP devices. The CPN via an eRG, or PIN Elements via a PIN Element with Gateway Capability can provide access to 5G network services for the UEs and/or non-3GPP devices on the CPN or PIN. CPNs and PINs have in common that in general they are owned, installed and/or (at least partially) configured by a customer of a public network operator.

A Customer Premises Network (CPN) is a network located within a premises (e.g. a residence, office or shop). Via an evolved Residential Gateway (eRG) that can be deployed with or without a USIM, the CPN provides connectivity to the 5G network. The eRG can be connected to the 5G core network via wireline, wireless, or hybrid access. In case of wireless or hybrid access an eRG with USIM is required. A Premises Radio Access Station (PRAS) is a base station that can also be installed in a CPN. Through the PRAS, UEs can get access to the CPN and/or 5G network services. The PRAS can be configured to use licensed, unlicensed, or both frequency bands. Connectivity between the eRG and the UE, non-3GPP Device, or PRAS can use any suitable non-3GPP technology (e.g. Ethernet, optical, WLAN).

A Personal IoT Network (PIN) consists of PIN Elements that communicate using PIN Direct Connection or direct network connection and is managed locally (using a PIN Element with Management Capability). Examples of PINs include networks of wearables and smart home / smart office equipment. Via a PIN Element with Gateway Capability, PIN Elements have access to the 5G network services and can communicate with PIN Elements that are not within range to use PIN Direct Connection. A PIN includes at least one PIN Element with Gateway Capability and at least one PIN Element with Management Capability.

A PIN Element with Management Capability is a PIN Element that provides a means for an authorised administrator to configure and manage a PIN.

The requirements as described in 3GPP TS 22.101 [6] clause 26a can also apply to Personal IoT Networks and Customer Premises Networks.

6.38.2 Requirements

6.38.2.1 General

The 5G system shall support mechanisms to identify a PIN, a PIN Element, an eRG and a PRAS.

Subject to local regulations, the 5G system shall support regulatory requirements for emergency calls, PWS and eCall for UEs connected via a CPN.

NOTE: The above requirement applies to UEs connected via 3GPP access.

The 5G system shall support applications on an Application Server connected to a CPN or PIN.

The 5G system shall be able to support PINs with PIN Elements subscribed to more than one network operator (e.g., a PIN Element that is a MUSIM UE and subscribes to different operators respectively, one PIN Element subscribed to network operator A and another PIN Element subscribed to network operator B).

Subject to regulatory requirements and operator policy, the 5G system shall support an efficient data path within the CPN for intra-CPN communications.

NOTE 1: For services an operator deploys in the 5G network (i.e. not in the CPN), local data routed via eRG does not apply.

Subject to regulatory requirements and operator policy, the 5G system shall support a data path not traversing the 5G network for intra-PIN communications via direct connections.

The 5G system shall enable the network operator to provide any 5G services to any UE via a PRAS connected via an eRG.

NOTE 2: Whether the PRAS can be used by UEs from other PLMNs in the same country as the PLMN associated with the PRAS is subject to regulatory policy on national roaming.

The 5G system shall minimize service disruption for a UE that is moving between CPN access and operator provided mobile access.

NOTE 3: CPN access can imply access via a PRAS or can imply access directly via an eRG. Operator provided mobile access implies access via an operator owned base station.

The 5G system shall minimize service disruption when a CPN communication path changes between two PRASes.

The 5G system shall be able to minimize service disruption when a PIN Element changes the communication path from one PIN Element (e.g. PIN Element with Gateway Capability) to another PIN Element or operator provided mobile access. The communication path between PIN Elements may include licensed and unlicensed spectrum as well as 3GPP and non-3GPP access.

The 5G system shall be able to support PRAS sharing between multiple PLMNs.

The 5G system shall support mechanisms to aggregate, switch or split the service between non-3GPP RAT and PIN direct connections using licensed spectrum.

6.38.2.2 Gateways

Subject to operator policy, the 5G network shall support an authorised eRG (without a USIM) to access the 5G core network via non-3GPP access.

The 5G system shall be able to support access to the 5G network and its services via at least one gateway (i.e. PIN Element with Gateway Capability or eRG) for authorised UEs and authorised non-3GPP devices in a PIN or a CPN.

The 5G system shall be able to support IP traffic offload to data network for a CPN.

NOTE 1: The priority of offload can be from default configuration, network or user.

Under operator control, an eRG, shall be able to efficiently deliver 5G multicast/broadcast services to authorized UEs and non-3GPP devices in the CPN.

NOTE 2: The multicast service(s) that each of the authorized UEs and/or non-3GPP devices is allowed to receive may be different.

6.38.2.3 Operation without 5G core network connectivity

The 5G system shall allow PIN Elements to communicate when there is no connectivity between a PIN Element with Gateway Capability and a 5G network. For a Public Safety PIN licensed spectrum may be used for PIN direct communications otherwise unlicensed spectrum shall be used.

When a CPN has lost connectivity with the 5G network, the 5G system shall provide an operator-controlled mechanism to enable:

- in the default configuration, or under certain conditions configured by the operator, the PRAS radio interface shall be deactivated; and

- under certain other conditions configured by the operator, the CPN shall continue existing intra-CPN communication, as long as no interaction with the 5G network is needed (e.g. refreshing security keys).

NOTE 1: The requirement above relates to intra-CPN operations and is subject to operator policy and control, under certain situations.

NOTE 2: Setting up new intra-CPN or intra-PIN communication sessions without connection to the 5G network is only possible with non-3GPP provided credentials.

6.38.2.4 Discovery

The 5G system shall enable a UE or non-3GPP device in a CPN or PIN to discover other UEs or non-3GPP devices within the same CPN or PIN subject to acess rights.

The 5G system shall efficiently support service discovery mechanisms where a UE or non-3GPP device in a CPN or PIN can discover, subject to access rights:

- availability and reachability of other entities (e.g. other UEs or non-3GPP devices) on the CPN or PIN;

- capabilities of other entities on the CPN (e.g. PRAS, eRG) or PIN (e.g. relay UE, connection types) and/or;- services provided by other entities on the CPN or PIN (e.g. the entity is a printer).

The 5G system shall support a mechanism for an Authorised Administrator to indicate whether a PIN element is discoverable by other PIN elements of the same PIN.

The 5G system shall support a mechanism for an Authorised Administrator to indicate whether a PIN element is discoverable by UEs that are not members of the PIN.

6.38.2.5 Relay Selection

In addition to the relay selection requirements in 6.9.2.4, relay selection within a PIN is enabled for both UEs and non-3GPP device and supports the additional selection criteria:

- The 5G system shall support a mechanism for a PIN Element to select a relay for PIN direct connection that enables access to the target PIN Element.

6.38.2.6 Security

The 5G system shall provide user privacy; location privacy, identity protection and communication confidentiallity for non-3GPP devices and UEs that are using the PIN Element with Gateway Capability, eRG or PRAS.

NOTE 1: Privacy protection should not block differentiated routing and QoS for different destinations and services for the UE(s).

The 5G system shall support a mechanism to minimize the security risk of communications using an eRG.

The 5G system shall enable the network operator associated with an eRG to control the security policy of an eRG.

The 5G network shall provide support for a network operator to authenticate an eRG (without a USIM) to access the 5G core network via non-3GPP access.

The 5G system shall support a mechanism to minimize the security risk of communications via a PRAS.

The PRAS (and its associated backhaul connectivity) shall provide a level of security equivalent to regular 5G base stations.

The 5G system shall enable the network operator associated with the Premises Radio Access Station (PRAS) to control the security policy of the PRAS.

The 5G system shall support authentication of a UE with 3GPP credentials for communication with entities (UEs, non-3GPP devices) in a CPN.

NOTE 2: To support this functionality the CPN needs to be connected with the 5G core network.

The 5G system shall provide support for a network operator to authenticate a PRAS.

The 5G system shall provide support for a network operator to authorize a PRAS for its use in a CPN.

The 5G system shall support a PIN Element using non operator managed credentials (e.g. provided by a third party) for performing communications within the PIN when those communications use PIN direct connections.

The 5G system shall support a mechanism to mitigate repeated and unauthorized attempts to access PIN Elements (e.g. mitigate a malicious flood of messages).

6.38.2.7 QoS

The 5G system shall support real time E2E QoS monitoring and control for any intra-CPN data traffic to or from a UE (i.e. via eRG or via PRAS and eRG).

The 5G system shall support real time E2E QoS monitoring and control for any data traffic between a UE within a CPN and the 5G network (i.e. via eRG or via PRAS and eRG).

6.38.2.8 Charging

The 5G system shall support charging data collection for data traffic to/from individual UEs in a CPN or PIN (i.e., UEs behind the PIN Element with Gateway Capability or eRG and/or PRAS).

The 5G system shall be able to generate charging data that can differentiate between backhaul for the PRAS and other data traffic over the same access.

6.38.2.9 Creation and Management

The 5G system shall support a mechanism for the network operator to provision an eRG (with or without a USIM) with:

- policies on which transport (e.g. wireless, cable, etc.) is best suited for different negotiated QoS levels,

- authentication credentials,

- identification,

- initial OA&M information, and

- associated subscription.

The 5G system shall enable the network operator to configure a PRAS with:

- radio settings pertaining to licensed spectrum,

- authentication credentials,

- identification,

- initial OA&M information, and

- associated subscription.

Subject to operator policy, the 5G system shall enable the Authorised Administrator to provision a PRAS with UE access considerations (allowing all UEs, or allowing specific UEs only)

The 5G system shall provide a mechanism for the Authorised Administrator to trigger initial provisioning of an eRG.

The 5G system shall provide a mechanism for the Authorised Administrator to trigger initial provisioning of a PRAS.

The 5G system shall support mechanisms for a network operator or authorized 3rd party (e.g., a PIN User) to create, remove and manage a PIN, including:

- Authorizing/deauthorizing PIN Elements;

- Authorizing/deauthorizing PIN Elements with Management Capability;

- Authorizing/deauthorizing PIN Elements with Gateway Capability;

- Establishing duration of the PIN;

- Configure PIN Elements to enable service discovery of other PIN Elements;

- Authorize/deauthorise if a PIN Element can use a PIN Element with Gateway Capability to communicate with the 5GS;

- Authorize/deauthorise for a PIN Element(s):

- which other PIN Element it can communicate with,

- which applications/service or service in that PIN it can access,

- which PIN Element it can use as a relay.

- Authorize/deauthorise a UE to perform service discovery of PIN Elements over the 5G network;

- Configure a PIN Element for external connectivity e.g.via 5G system;

NOTE1: The authorization can include the consideration of the location and time validity of the PIN and its PIN elements.

The 5G system shall support a mechanism to enable a UE that is not a PIN Element of the PIN or a non-3GPP device that is not a PIN element of the PIN to request to join the PIN.

The 5G system shall support mechanisms for a network operator to configure the following policies in a PIN:

- Configure the connectivity type (e.g. licensed, unlicensed PIN direct connection) a PIN Element can use.

5G system shall be able to support mechanism to provide life span information of the PIN to the authorized 3rd party or the PIN elements when the PIN is created for limited time span.

The 5G system shall provide means to control which UEs can connect to a PRAS.

The 5G system shall support mechanisms to provision a PIN Element to use either licensed (under control of a MNO) or unlicensed spectrum (may be under the control of the MNO, or not) (e.g., when it has no connectivity to the 5G system).

END OF CHANGES