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| Technical Specification |
| 3rd Generation Partnership Project;Technical Specification Group Core Network and Terminals;User Equipment (UE) policies for 5G System (5GS);Stage 3(Release 18) |
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# Foreword

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

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

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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.

# 1 Scope

The present document defines UE policies for 5G System (5GS) as specified in 3GPP TS 23.503 [2] including:

- UE route selection policy; and

- Access network discovery and selection policy.

# 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 23.503: " Policy and Charging Control Framework for the 5G System; Stage 2".

[3] 3GPP TS 24.502: "Access to the 3GPP 5G Core Network (5GCN) via Non-3GPP Access Networks (N3AN); Stage 3".

[4] 3GPP TS 23.003: "Numbering, addressing and identification".

[5] 3GPP TS 25.331: "Radio Resource Control (RRC); Protocol Specification".

[6] Void

[6A] 3GPP TS 36.413: "Evolved Universal Terrestrial Radio Access (E-UTRA); S1 Application Protocol (S1AP)".

[7] 3GPP TS 23.032: "Universal Geographical Area Description (GAD)".

[8] IEEE Std 802.11™-2016: "Information Technology- Telecommunications and information exchange between systems-Local and metropolitan area networks-Specific requirements-Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications".

[9] Wi-Fi Alliance: "Hotspot 2.0 (Release 2) Technical Specification, version 1.0.0", 2014-08-08.

[10] ITU-T Recommendation E.212: "The international identification plan for public networks and subscriptions", 2016-09-23.

[11] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".

[12] IETF RFC 1035: "Domain names - implementation and specification".

[13] ISO 8601:2004: "Data elements and interchange formats -- Information interchange -- Representation of dates and times".

[14] 3GPP TS 38.413: "NG-RAN; NG Application Protocol (NGAP)".

[15] 3GPP TS 23.501: "System Architecture for the 5G System; Stage 2".

[16] IETF RFC 4122: "A Universally Unique IDentifier (UUID) URN Namespace".

[17] IETF RFC 5905: "Network Time Protocol Version 4: Protocol and Algorithms Specification".

[18] 3GPP TS 24.588: "Vehicle-to-Everything (V2X) services in 5G System (5GS); User Equipment (UE) policies; Stage 3".

[18A] 3GPP TS 24.555: "Proximity-services (ProSe) in 5G System (5GS); User Equipment (UE) policies; Stage 3".

[19] IEEE 1003.1-2004, Part 1: Base Definitions.

[20] IEEE Std 802.1Q-2018: "IEEE Standard for Local and metropolitan area networks--Bridges and Bridged Networks".

[21] 3GPP TS 24.554: "Proximity-services (ProSe) in 5G System (5GS) protocol aspects; Stage 3".

[22] 3GPP TS 24.193: "Access Traffic Steering, Switching and Splitting; Stage 3".

[23] 3GPP TS 24.514: "Ranging based services and sidelink positioning in 5G system(5GS); Stage 3".

[24] 3GPP TS 24.578: "Aircraft-to-Everything (A2X) services in 5G System (5GS); UE policies".

[25] 3GPP TS 23.316: "Wireless and wireline convergence access support for the 5G System (5GS)".

[26] GSMA PRD NG.135, version 3.0: "E2E Network Slicing Requirements".

# 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] 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].

**Non-subscribed SNPN signalled URSP:** URSP rules signalled by a non-subscribed SNPN according to annex D of 3GPP TS 24.501 [11].

**PLMN generic (PG) URSP:** URSP rules applicable in any PLMN, and determined according to annex D of 3GPP TS 24.501 [11].

**VPLMN specific (VPS) URSP:** URSP rules applicable when the RPLMN or an equivalent PLMN is a VPLMN, and determined according to annex D of 3GPP TS 24.501 [11].

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.501 [15] apply:

**non-seamless non-3GPP offload**

**PIN**

**PINE**

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.503 [2] apply:

**UE local configuration**

**User preferences on non-3GPP access selection**

For the purposes of the present document, the following terms and definitions given in 3GPP TS 24.501 [11] apply:

**5GMM-IDLE mode**

**PDU session for LADN**

**SNPN access operation mode**

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.316 [25] apply:

**Authenticable Non-3GPP device (AUN3)**

**Non-Authenticable Non-3GPP device (NAUN3)**

## 3.2 Abbreviations

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

5GCN 5G Core Network

5GS 5G System

A2XP A2X Policy

ANDSP Access Network Discovery and Selection Policy

DNN Data Network Name

ePDG evolved Packet Data Gateway

FQDN Fully Qualified Domain Name

H-PCF A PCF in the HPLMN

IMS IP Multimedia Subsystem

LADN Local Area Data Network

MCC Mobile Country Code

ME Mobile Equipment

MMS Multimedia Messaging Service

MNC Mobile Network Code

N3AN Non-3GPP Access Network

N3IWF Non-3GPP InterWorking Function

OS Operating System

PCF Policy Control Function

PIN Personal IoT Network

PINE PIN Element

ProSeP 5G ProSe Policy

RSLPP Ranging and Sidelink Positioning Policy

RSN Redundancy Sequence Number

S-NSSAI Single Network Slice Selection Assistance Information

SSC Session and Service Continuity

SUPI Subscriber Permanent Identifier

SUPL Secure User Plane Location

TNAN Trusted Non-3GPP Access Network

TNGF Trusted Non-3GPP Gateway Function

URSP UE Route Selection Policy

USIM User Services Identity Module

V-PCF A PCF in the VPLMN

V2XP V2X Policy

WLANSP WLAN Selection Policy

# 4 Descriptions of UE policies for 5GS

## 4.1 Overview

The UE policies for 5GS include:

- UE route selection policy (URSP)(see clause 4.2);

- Access network discovery and selection policy (ANDSP)(see clause 4.3);

- V2X policy (V2XP);

- 5G ProSe policy (ProSeP);

- Ranging and sidelink positioning policy (RSLPP); and

- A2X policy (A2XP).

The UE policies can be delivered from the PCF to the UE. The UE policy delivery procedure is specified in 3GPP TS 24.501 [11].

The UE policies can also be pre-configured in the UE. The pre-configured policy shall be applied by the UE only when the UE has not received the same type of policy from the PCF. The implementation of pre-configured UE policies is out of scope of this specification.

The UE policies can be delivered from the PCF to the 5G-RG or a W-AGF acting on behalf of the FN-RG. The UE policy delivery service is specified in 3GPP TS 24.501 [11]. These UE policies include the UE route selection policy (URSP) (see clause 4.2).

The UE policies can also be pre-configured in the 5G-RG or a W-AGF acting on behalf of the FN-RG. The pre-configured policy shall be applied by the 5G-RG or a W-AGF acting on behalf of the FN-RG only when the 5G-RG or a W-AGF acting on behalf of the FN-RG has not received the same type of policy from the PCF. The implementation of pre-configured UE policies is out of scope of this specification.

NOTE: In this specification, the UE policies can be delivered to a 5G-RG that is acting as a UE, a 5G-RG that is acting on behalf of AUN3 device, a 5G-RG that is acting on behalf of NAUN3 device.

The UE policies for V2X (V2XP) are specified in 3GPP TS 24.588 [18].

The UE policies for 5G ProSe policy (ProSeP) are specified in 3GPP TS 24.555 [18A].

The UE policies for A2X (A2XP) are specified in 3GPP TS 24.578 [24].

The UE policies for ranging and sidelink positioning (RSLPP) are specified in 3GPP TS 24.514 [23].

## 4.2 UE route selection policy (URSP)

### 4.2.1 General

The URSP is defined in 3GPP TS 23.503 [2] and is a set of one or more URSP rules, where a URSP rule is composed of:

a) a precedence value of the URSP rule identifying the precedence of the URSP rule among all the existing URSP rules;

b) if the traffic is not applicable for PINE nor NAUN3 device behind 5G-RG, a traffic descriptor, including either:

1) match-all traffic descriptor; or

2) at least one of the following components:

A) one or more application identifiers;

B) one or more IP descriptors, each consists of a set of IP 3 tuples as defined in 3GPP TS 23.503 [2] i.e. the destination IP address, the destination port number, and the protocol in use above the IP;

C) one or more non-IP descriptors, i.e. destination information of non-IP traffic;

D) one or more DNNs;

E) one or more connection capabilities; and

F) one or more domain descriptors, i.e. destination FQDN(s) or a regular expression as a domain name matching criteria; and

b1) if the traffic is applicable for PINE, a traffic descriptor, including PIN ID;

b2) if the traffic is applicable for NAUN3 device behind 5G-RG, a traffic descriptor, including one or more connectivity group IDs, and may additionally include one or more of the following components:

1) one or more IP 3 tuples as defined in 3GPP TS 23.503 [2] i.e. the destination IP address, the destination port number, and the protocol in use above the IP; or

2) one or more non-IP descriptors, i.e. destination information of non-IP traffic; and

c) one or more route selection descriptors each consisting of a precedence value of the route selection descriptor and either

1) one PDU session type and, optionally, one or more of the followings:

A) SSC mode;

B) one or more S-NSSAIs. If the URSP rule is a part of a non-subscribed SNPN signalled URSP, the S-NSSAI is of the non-subscribed SNPN otherwise the S-NSSAI is of the HPLMN or the subscribed SNPN. Mapped HPLMN SST and mapped HPLMN SD are not included in the S-NSSAI;

C) one or more DNNs;

D) Void;

E) preferred access type;

F) multi-access preference;

G) a time window;

H) location criteria;

I) PDU session pair ID;

J) RSN; and

K) 5G ProSe multi-path preference;

2) non-seamless non-3GPP offload indication; or

3) 5G ProSe layer-3 UE-to-network relay offload indication.

Only one URSP rule in the URSP can be a default URSP rule and the default URSP rule shall contain a match all traffic descriptor. If a default URSP rule and one or more non-default URSP rules are included in the URSP, any non-default URSP rule shall have lower precedence value than (i.e. shall be prioritised over) the default URSP rule.

If a traffic descriptor lists one or more application identifiers together with one or more connection capabilities, the UE shall consider that the application identifiers identify the applications requesting access to the connection capabilities.

NOTE 1: The connection capabilities requested by the applications are OS dependent. The connection capability identifiers defined in table 5.2.1 are OS independent. It is based on the UE implementation how the UE matches the connection capabilities requested by the applications to the connection capability identifiers in table 5.2.1.

NOTE 2: If the UE has multiple concurrently active OS, the traffic descriptor can list as many multiple OS Ids.

NOTE 3: It is recommended to avoid the combination of more than two components in the traffic descriptor.

### 4.2.2 Association between an application, an AUN3 device, a connectivity group or a PIN and a PDU session, non-seamless non-3GPP offload or 5G ProSe layer-3 UE-to-network relay offload

#### 4.2.2.1 General

Association between an application, an AUN3 device, a connectivity group or a PIN and a PDU session, non-seamless non-3GPP offload or 5G ProSe Layer-3 UE-to-network relay offload is described separately for a UE and for a 5G-RG or a W-AGF acting on behalf of an FN-RG. Clause 4.2.2.2 is not applicable for the 5G-RG or the W-AGF acting on behalf of the FN-RG.

#### 4.2.2.2 Association between an application and a PDU session, non-seamless non-3GPP offload or 5G ProSe layer-3 UE-to-network relay offload by a UE

In order to send a PDU of an application or a PIN, the upper layers require information on the PDU session (e.g. PDU address) via which to send a PDU of an application or a PIN.

NOTE 0: If PAP/CHAP is used, it is recommended that the request from the upper layers includes a DNN.

When the upper layers request information of the PDU session via which to send a PDU of an application;

- information on the non-3GPP access outside of a PDU session shall be provided to the upper layers, without evaluating the URSP rules, if due to UE local configuration non-seamless non-3GPP offload is requested; or

- information on the 5G ProSe layer-3 UE-to-network relay shall be provided to the upper layers, without evaluating the URSP rules, if due to UE local configuration 5G ProSe layer-3 UE-to-network relay offload is requested;

otherwise, the UE shall proceed in the following order:

a) the UE shall evaluate the URSP rules, except the default URSP rule, with a traffic descriptor matching the application information or the information configured for a PIN in increasing order of their precedence values, if any. If the traffic descriptor contains more than one traffic descriptor component type, each of a different type, all of them shall be matched. If the traffic descriptor contains more than one traffic descriptor component of the same traffic descriptor component type, at least one of the traffic descriptor components of the same traffic descriptor component type shall be matched with the application information. A URSP rule is determined not to be applicable when for any given component in the traffic descriptor no corresponding information from the application or no corresponding information for a PIN is available or the corresponding information from the application or no corresponding information for a PIN does not match any of the values in the traffic descriptor component as specified in clause 6.6.2.1 of 3GPP TS 23.503 [2].

 If the UE finds the traffic descriptor in a non-default URSP rule matching the application information or the information for a PIN, and:

I) if there is an established connection to non-3GPP access, an established connection with a 5G ProSe layer-3 UE-to-network relay UE, or one or more established PDU sessions or any combinations of these, the UE shall evaluate the route selection descriptors of the URSP rule in increasing order as followings:

 if:

1) the route selection descriptor of the URSP rule contains a non-seamless non-3GPP offload indication and the information on the non-3GPP access outside of a PDU session is available;

 the UE shall provide information on the non-3GPP access outside of a PDU session to the upper layers;

1a) the route selection descriptor of the URSP rule contains a 5G ProSe layer-3 UE-to-network relay offload indication or a 5G ProSe multi-path preference and the information on 5G ProSe layer-3 UE-to-network relay is available;

 the UE shall provide information on the 5G ProSe layer-3 UE-to-network relay and the 5G ProSe multi-path preference if included in the route selection descriptor to the upper layers; and

2) there is one or more PDU sessions:

i) for which the parameters associated with the PDU session, the parameters requested by the UE during the PDU session establishment procedure or the mapped parameters from the parameters requested by the UE during the UE requested PDN connectivity procedure to establish a PDN connection as a user-plane resource of an MA PDU session as specified in clause 5.3.1 of 3GPP TS 24.193 [22] match the route selection descriptors of the URSP rule except the preferred access type and the multi-access preference, if any, wherein:

- a route selection descriptor with PDU session type IPv4v6 matches also with PDU session type IPv4 if the network has sent 5GSM cause value #50 "PDU session type IPv4 only allowed" in the PDU SESSION ESTABLISHMENT ACCEPT message or matches also with PDN type IPv4 if the network has sent ESM cause is #50 "PDN type IPv4 only allowed" in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message of the PDN connectivity procedure to establish a PDN connection as a user-plane resource of an MA PDU session as specified in clause 5.3.1 of 3GPP TS 24.193 [22];

- the route selection descriptor with PDU session type IPv4v6 matches also with PDU session type IPv6 if the network has sent 5GSM cause value #51 "PDU session type IPv6 only allowed" in the PDU SESSION ESTABLISHMENT ACCEPT message or matches also with PDN type IPv6 if the network has sent ESM cause is #51 "PDN type IPv6 only allowed" in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message of the PDN connectivity procedure to establish a PDN connection as a user-plane resource of an MA PDU session as specified in clause 5.3.1 of 3GPP TS 24.193 [22];

- the route selection descriptor with PDU session type IPv4v6 matches also with PDU session type IPv6 or IPv4 if the UE requested the PDU session type IPv4v6 but the selected PDU session type is set to IPv4 or IPv6 in the PDU SESSION ESTABLISHMENT ACCEPT message or if the UE requested the PDN type IPv4v6 but the network allocates a PDN address of a PDN type IPv4 or IPv6 in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message of the PDN connectivity procedure to establish a PDN connection as a user-plane resource of an MA PDU session as specified in clause 5.3.1 of 3GPP TS 24.193 [22]; and

- if the UE is in a non-subscribed SNPN and the URSP rule is a part of the non-subscribed SNPN signalled URSP, or is in the HPLMN or the subscribed SNPN, then a route selection descriptor with an S-NSSAI matches the S-NSSAI of the PDU session, otherwise a route selection descriptor with an S-NSSAI matches the mapped S-NSSAI of the PDU session; and

ii) established without requesting any parameter for which the matching route selection descriptor of the URSP rule does not provide a route selection descriptor component, except:

A) the preferred access type;

B) the multi-access preference;

C) the DNN, if no DNN is included in the route selection descriptor component and the DNN provided by the application is the same as the DNN requested by the UE during the PDU session establishment or the same as the DNN mapped from the APN requested by the UE during the PDN connectivity procedure to establish a PDN connection as a user-plane resource of an MA PDU session as specified in clause 5.3.1 of 3GPP TS 24.193 [22]; and

D) the S-NSSAI, if the UE has only one S-NSSAI in the allowed NSSAI.

 the UE shall provide information on the PDU session that matches the route selection and the 5G ProSe multi-path preference if included in the route selection descriptor to the upper layers; and

 if the UE supports reporting of URSP rule enforcement and:

i) the UE has URSP rule enforcement report indication;

ii) one or more connection capabilities are included in the traffic descriptor; and

iii) the connection capabilities provided by the application are not included in the connection capabilities sent to the network by the UE in the latest URSP rule enforcement report, if available, during the PDU session establishment or modification procedure,

 then the URSP handling layer requests the UE NAS layer to send a URSP rule enforcement report with the connection capabilities provided by the application including the connection capabilities of the previous URSP rule enforcement report, if available, to the network using the PDU session modification procedure;

NOTE 1: It is up to the UE implementation which PDU session to select if there exist multiple PDU sessions matching the same route selection descriptor of the lowest precedence value.

II) otherwise:

1) the UE shall select a route selection descriptor with the next smallest precedence value which has not yet been evaluated;

2) if:

i) the selected route selection descriptor contains a non-seamless non-3GPP offload indication:

A) if the information on the non-3GPP access outside of a PDU session is available, it shall be provided to the upper layers and the UE shall stop selecting a route selection descriptor matching the application information; or

B) if the information about the non-3GPP access outside of a PDU session is not available, or non-3GPP access is not available, the UE shall proceed to step II) 4);

ia) the selected route selection descriptor contains a 5G ProSe layer-3 UE-to-network relay offload indication:

A) if the information on the 5G ProSe layer-3 UE-to-network relay is available and the UE supports acting as a 5G ProSe layer-3 remote UE as specified in 3GPP TS 24.554 [21], it shall be provided to the upper layers and the UE shall stop selecting a route selection descriptor matching the application information; or

B) if the information about the 5G ProSe layer-3 UE-to-network relay is not available, the UE may initiate a UE-to-network relay discovery over PC5 interface as specified in clause 8.2.1 of 3GPP TS 24.554 [21] if the UE supports acting as a 5G ProSe layer-3 remote UE as specified in 3GPP TS 24.554 [21]. If the connection with a 5G ProSe layer-3 UE-to-network relay UE has been successfully established, the UE shall provide information on the 5G ProSe layer-3 UE-to-network relay to the upper layers and the UE shall stop selecting a route selection descriptor matching the application information. If the connection with a 5G ProSe layer-3 UE-to-network relay UE has not been successfully established or the UE does not support acting as a 5G ProSe layer-3 remote UE as specified in 3GPP TS 24.554 [21], the UE shall proceed to step II) 4);

ib) the selected route selection descriptor includes the 5G ProSe multi-path preference but the UE does not support acting as a 5G ProSe layer-3 remote UE as specified in 3GPP TS 24.554 [21], the UE shall proceed to step II) 4);

ii) the selected route selection descriptor includes a PDU session type or an SSC mode which is not supported by the UE (SSC mode 2 or 3), the UE shall proceed to step II) 4);

iii) the selected route selection descriptor contains a time window but the time does not match the time window, the UE shall proceed to step II) 4);

iv) the selected route selection descriptor contains location criteria but the UE location does not match the location criteria, the UE shall proceed to step II) 4);

v) the selected route selection descriptor includes the multi-access preference but the UE does not support ATSSS, the UE shall proceed to step II) 4);

va) the selected route selection descriptor includes an SSC mode which either has been rejected by the network with 5GSM cause value #68 "not supported SSC mode" for the same DNN (or no DNN, if no DNN was indicated by the UE) and the same S-NSSAI associated with (if available in roaming scenarios) a mapped S-NSSAI (or no S-NSSAI, if no S-NSSAI was indicated by the UE) or was not included in the Allowed SSC mode IE following a rejection with 5GSM cause value #68 "not supported SSC mode" for the same DNN (or no DNN, if no DNN was indicated by the UE) and the same S-NSSAI associated with (if available in roaming scenarios) a mapped S-NSSAI (or no S-NSSAI, if no S-NSSAI was indicated by the UE), the UE shall proceed to step II) 4); or

vi) the selected route selection descriptor does not contain a non-seamless non-3GPP offload indication nor a 5G ProSe layer-3 UE-to-network relay offload indication, the URSP handling layer requests the UE NAS layer to establish a PDU session providing the following PDU session attributes based on the selected route selection descriptor:

A) SSC mode if there is a SSC mode in the route selection descriptor;

NOTE 2: The SSC mode 3 is only used when the PDU session type is IPv4, IPv6 or IPv4v6.

B) one S-NSSAI if the S-NSSAI is in the route selection descriptor; and the S-NSSAI is in the allowed NSSAI. Additionally, if the UE supports LADN per DNN and S-NSSAI, the request is for a PDU session for LADN, the extended LADN information is available for that LADN and the S-NSSAI is associated with that LADN in the service area of that LADN. If none of the S-NSSAI(s) in the route selection descriptor is in the allowed NSSAI, the UE shall proceed to step II) 4);

NOTE 3: If there are multiple S-NSSAIs in the route selection descriptor, an S-NSSAI is chosen among the S-NSSAIs based on UE implementation.

C) one DNN, if the DNN is in the route selection descriptor; and if the DNN is an LADN DNN and the UE is in the service area of that LADN;

NOTE 4: If one or more DNNs are included in the traffic descriptor and no DNN is included in the route selection descriptor, the DNN provided by the application is selected as one of the PDU session attributes by the URSP handling layer to request the UE NAS layer.

NOTE 5: If there are multiple DNNs in the route selection descriptor, a DNN is chosen based on UE implementation.

D) the PDU session type of the route selection descriptor;

E) preferred access type or multi-access preference, if the preferred access type or the multi-access preference is in the route selection descriptor;

NOTE 6: If a preferred access type or a multi-access preference is included in the route selection descriptor of a URSP rule, it is recommended that the UE establishes a PDU session based on the preferred access type or the multi-access preference.

NOTE 7: If a preferred access type is included in the route selection descriptor of a URSP rule and the preferred access type is 3GPP access, the UE is allowed to discover a 5G ProSe layer-2 UE-to-network relay UE as specified in clause 8.2.1 of 3GPP TS 24.554 [21] to establish a PDU session if the UE is configured with the corresponding ProSe policy as specified in clause 5.2.5 of 3GPP TS 24.554 [21].

NOTE 8: If a preferred access type is included in the route selection descriptor of a URSP rule and the preferred access type is non-3GPP access, the UE is allowed to discover a 5G ProSe layer-3 UE-to-network relay UE with N3IWF support as specified in clause 8.2.7 of 3GPP TS 24.554 [21] to establish a PDU session if the UE is configured with the corresponding ProSe policy as specified in clause 5.2.5 of 3GPP TS 24.554 [21].

F) PDU session pair ID if there is a PDU session pair ID in the route selection descriptor; and

G) RSN if there is an RSN in the route selection descriptor, and

 if the UE supports reporting of URSP rule enforcement and:

A) the UE has URSP rule enforcement report indication; and

B) one or more connection capabilities are included in the traffic descriptor,

 then the URSP handling layer requests the UE NAS layer to send a URSP rule enforcement report with the connection capabilities provided by the application to the network during PDU session establishment;

 The UE NAS layer indicates the result of the PDU session establishment. Upon successful completion of the PDU session establishment, the UE NAS layer shall additionally indicate the attributes of the established PDU session (e.g. PDU session identity, SSC mode, S-NSSAI, DNN, PDU session type, access type, PDU address) to the URSP handling layer, and shall provide information (e.g. PDU address) of the successfully established PDU session to the upper layers.

 If the PDU session establishment is successful, the 5G ProSe multi-path preference is included in the route selection descriptor, and:

A) the information on the 5G ProSe layer-3 UE-to-network relay is available and the UE supports acting as a 5G ProSe layer-3 remote UE as specified in 3GPP TS 24.554 [21], the UE shall provide the information on the 5G ProSe layer-3 UE-to-network relay and the 5G ProSe multi-path preference to the upper layers; or

B) the information on the 5G ProSe layer-3 UE-to-network relay is not available, the UE may proceed as in step II) 2) ia) B), i.e., the UE may discover and establish a connection with a 5G ProSe layer-3 UE-to-network relay UE and, if the connection with a 5G ProSe layer-3 UE-to-network relay UE has been successfully established, the UE shall provide the information on the 5G ProSe layer-3 UE-to-network relay and the 5G ProSe multi-path preference to the upper layers.

 The UE shall stop selecting a route selection descriptor matching the application information or the information for a PIN. If the PDU session establishment is unsuccessful, the UE shall proceed to step II) 3);

3) Based on the rejection cause and if there is another value which can be used for the rejected component in the same route selection descriptor, the UE shall select another combination of values in the currently selected route selection descriptor by using this value of the rejected component and proceed to step II) 2), otherwise the UE shall proceed to step II) 4); and

4) if there is any route selection descriptor which has not yet been evaluated, the UE shall proceed to step II) 1). If all route selection descriptors for the matching non-default URSP rule have been evaluated and there is one or more non-default matching URSP rule which has not yet been evaluated, the UE shall proceed to step a). If all non-default matching URSP rules have been evaluated, the UE shall inform the upper layers of the failure.

b) if no non-default matching URSP rule can be found and if UE local configuration for the application or the PIN is available, the UE shall perform the association of the application or the PIN to a PDU session accordingly. If no matching PDU session exists, the UE NAS layer shall attempt to establish a PDU session using UE local configuration; and

NOTE 9: Any missing information in the UE local configuration needed to build the PDU session establishment request can be the appropriate corresponding component from the default URSP rule with the "match-all" traffic descriptor.

NOTE 10: If a DNN was provided by the application and no DNN is included in the UE local configuration, the DNN provided by the application is selected as one of the PDU session attributes by the URSP handling layer to request the UE NAS layer.

NOTE 11: If there are multiple DNNs in the UE local configuration, a DNN is chosen based on UE implementation.

 If the PDU session establishment is successful, the UE NAS layer shall provide information (e.g. PDU address) of the successfully established PDU session to the upper layers. Otherwise, the UE shall go to step c);

c) if no non-default matching URSP rule can be found and if either UE local configuration for the application is not available or the PDU session establishment based on UE local configuration for the application was unsuccessful, the UE shall perform the association of the application to a PDU session, to non-seamless non-3GPP offload or to 5G ProSe layer-3 UE-to-network relay offload according to the default URSP rule with the "match-all" traffic descriptor, if any. If the association is unsuccessful, the UE shall inform the upper layers of the failure.

NOTE 12: If a DNN was provided by the application and no DNN is included in the route selection descriptor of the default URSP rule, the DNN provided by the application is selected as one of the PDU session attributes by the URSP handling layer to request the UE NAS layer. If one or more DNNs are included in the route selection descriptor of the default URSP rule, the DNN in the route selection descriptor is selected as one of the PDU session attributes by the URSP handling layer to request the UE NAS layer. When there are multiple DNNs in the route selection descriptor, the DNN is selected based on UE implementation.

The HPLMN may pre-configure the UE with URSP in the ME or in the USIM and the subscribed SNPN(s) may pre-configure the UE with URSP in the corresponding entry of the "list of subscriber data" stored in ME. The HPLMN or subscribed SNPN may pre-configure URSP(s) in the ME for non-subscribed SNPN(s) and associate the URSP(s) with the entry of the subscribed SNPN of the "list of subscriber data" or associate the URSP(s) with the corresponding PLMN subscription of the HPLMN. It is up to implementation how many pre-configured URSP(s) for non-subscribed SNPN(s) per entry of the "list of subscriber data" or per PLMN subscription can be stored in the ME.The HPLMN, the subscribed SNPN(s) and the non-subscribed SNPN(s) may provide URSP to the UE by signalling as described in annex D of 3GPP TS 24.501 [11]. The HPLMN pre-configured URSP in the ME and the HPLMN signalled URSP shall be stored in a non-volatile memory in the ME together with the SUPI from the USIM. The subscribed SNPN(s) signalled URSP shall be stored per SNPN in a non-volatile memory in the ME together with the subscriber identifier and the associated SNPN identity of the SNPN in the "list of subscriber data" configured in the ME. If the UE accepts URSP rules signalled by a non-subscribed SNPN that the UE accesses using credentials from a credential holder (see 3GPP TS 24.501 [11] clause C.2 and D.2), the non-subscribed SNPN(s) signalled URSP shall be stored per non-subscribed SNPN and associated with the selected entry of the "list of subscriber data" or the selected PLMN subscription. It is up to implementation how many signalled URSP(s) for non-subscribed SNPN(s) per entry of the "list of subscriber data" or per PLMN subscription can be stored in the ME. Only the subscribed SNPN(s) pre-configured URSP and the subscribed SNPN(s) signalled URSP shall be used when the selected SNPN identity matches the associated subscribed SNPN identity.

If the UE registered to a subscribed SNPN or a PLMN, has both pre-configured URSP(s) and signalled URSP, the UE shall only use the signalled URSP.

For a UE not operating in SNPN access operation mode, if the UE supports VPS URSP and has signalled URSP, when the upper layers request information of the PDU session via which to send a PDU of an application or the PIN as described above, the UE shall evaluate URSP rules, if available, in accordance with the following order until a matching URSP rule is found:

1) if the RPLMN is a VPLMN, non-default URSP rules in the VPS URSP using steps in bullet a) above;

2) non-default URSP rules in the VPS URSP of the equivalent PLMN of the RPLMN using steps in bullet a) above;

3) non-default URSP rules in the PG URSP using steps in bullet a) above;

4) UE local configuration for the application or the PIN using steps in bullet b) above;

5) if the RPLMN is a VPLMN, default URSP rule in the VPS URSP using steps in bullet c) above;

6) default URSP rules in the VPS URSP of the equivalent PLMN of the RPLMN using steps in bullet c) above; and

7) default URSP rule in the PG URSP using steps in bullet c) above.

For a UE not operating in SNPN access operation mode, if the UE has no signalled URSP, when the upper layers request information of the PDU session via which to send a PDU of an application as described above, the UE shall evaluate URSP rules, if available, in accordance with the following order until a matching URSP rule is found:

1) if there are pre-configured URSP rules of the HPLMN in the USIM;

i) non-default URSP rules in the pre-configured URSP rules of the HPLMN in the USIM using steps in bullet a) above;

ii) UE local configuration for the application using steps in bullet b) above;

iii) default URSP rule in the pre-configured URSP rules of the HPLMN in the USIM using steps in bullet c) above; and

iv) shall ignore URSP rules of other PLMN(s) in the USIM; or

2) otherwise, if the UE has pre-configured URSP in the ME then:

i) non-default URSP rules in the pre-configured URSP rules in the ME using steps in bullet a) above;

ii) UE local configuration for the application using steps in bullet b) above; and

iii) default URSP rule in the pre-configured URSP rules in the ME using steps in bullet c) above.

When the UE is registered to a non-subscribed SNPN using credentials from a credentials holder then when the upper layers request information of the PDU session via which to send a PDU of an application as described above:

1) if the UE has the non-subscribed SNPN signalled URSP associated with the selected entry of the "list of subscriber data" or the selected PLMN subscription, or the subscribed SNPN signalled URSP when the credentials holder is an SNPN or the HPLMN signalled URSP when the credentials holder is a PLMN, the UE shall evaluate URSP rules, if available, in accordance with the following order until a matching URSP rule is found:

i) the non-subscribed SNPN signalled non-default URSP rules associated with the selected entry of the "list of subscriber data" or the selected PLMN subscription stored in the ME using steps in bullet a) above;

ii) if the credentials holder is:

- an SNPN, the subscribed SNPN signalled non-default URSP rules stored in the ME using steps in bullet a) above; or

- a PLMN, the HPLMN signalled non-default URSP rules stored in the ME using steps in bullet a) above;

iii) UE local configuration for the application using steps in bullet b) above;;

iv) the non-subscribed SNPN signalled default URSP rule associated with the selected entry of the "list of subscriber data" or the selected PLMN subscription stored in the ME using steps in bullet c) above; or

v) if the credentials holder is:

- an SNPN, the subscribed SNPN signalled default URSP rule stored in the ME using steps in bullet c) above; or

- a PLMN, the HPLMN signalled default URSP rule stored in the ME using steps in bullet c) above;

NOTE 13: If no matching URSP rule is found, the UE informs the upper layers of the failure.

2) otherwise, if the UE has

i) URSP pre-configured for the non-subscribed SNPN associated with the selected entry of the "list of subscriber data" or the selected PLMN subscription;

ii) URSP pre-configured for the subscribed SNPN when the credentials holder is an SNPN or for the HPLMN when the credentials holder is a PLMN; or

iii) UE local configuration for the application;

 then the UE shall evaluate URSP rules, if available, in accordance with the following order until a matching URSP rule is found:

i) the non-default URSP rules pre-configured for the non-subscribed SNPN and associated with the selected entry of the "list of subscriber data" or the selected PLMN subscription stored in the ME using steps in bullet a) above;

ii) if the credentials holder is:

A) an SNPN, the subscribed SNPN pre-configured non-default URSP rules stored in the ME using steps in bullet a) above; or

B) a PLMN:

- the HPLMN pre-configured non-default URSP rules stored in the in USIM using steps in bullet a) above; or

- the HPLMN pre-configured non-default URSP rules stored in the in ME using steps in bullet a) above;

iii) UE local configuration for the application using steps in bullet b) above;

iv) the default URSP rule pre-configured for the non-subscribed SNPN and associated with the selected entry of the "list of subscriber data" or the selected PLMN subscription stored in the ME using steps in bullet c) above; or

v) if the credentials holder is:

A) an SNPN, the subscribed SNPN pre-configured default URSP rule stored in the ME using steps in bullet c) above; or

B) a PLMN:

- the HPLMN pre-configured default URSP rule stored in the in USIM using steps in bullet c) above; or

- the HPLMN pre-configured default URSP rule stored in the in ME using steps in bullet c) above.

NOTE 14: If no matching URSP rule is found, the UE informs the upper layers of the failure.

The HPLMN pre-configured URSP in the ME shall be stored until a new URSP is configured by HPLMN or the USIM is removed.

For a UE not operating in SNPN access operation mode, the signalled URSP may be modified by the procedures defined in annex D of 3GPP TS 24.501 [11] and shall be stored until USIM is removed. The URSP can only be used if the SUPI from the USIM matches the SUPI stored in the non-volatile memory of the ME. If the SUPI from the USIM does not match the SUPI stored in the non-volatile memory of the ME, the UE shall delete the URSP.

For a UE operating in SNPN access operation mode and registered to a subscribed SNPN, the subscribed SNPN signalled URSP may be modified by the procedures defined in annex D of 3GPP TS 24.501 [11] and shall be stored until the entry of the "list of subscriber data" with the corresponding SNPN identity is updated or considered as "invalid".

For a UE operating in SNPN access operation mode and registered to a non-subscribed SNPN, the non-subscribed SNPN signalled URSP may be modified by the procedures defined in annex D of 3GPP TS 24.501 [11].

The UE may re-evaluate the URSP rules, to check if the change of the association of an application or a PIN to a PDU session is needed, when:

NOTE 15: The time when the UE performs the re-evaluation is up to UE implementation. It is recommended that the UE performs the re-evaluation in a timely manner.

a) the UE performs periodic URSP rules re-evaluation based on UE implementation;

b) the UE NAS layer indicates that an existing PDU session used for routing traffic of an application or a PIN based on a URSP rule is released;

c) the URSP is updated by the PCF;

d) the UE NAS layer indicates that the UE performs inter-system change from S1 mode to N1 mode;

e) the UE NAS layer indicates that the UE is successfully registered in N1 mode over 3GPP access or non-3GPP access;

f) the UE establishes or releases a connection to a WLAN access and transmission of a PDU of the application via non-3GPP access outside of a PDU session becomes available/unavailable;

g) the allowed NSSAI, the partially allowed NSSA or the configured NSSAI is changed;

h) the LADN information or the extended LADN information is changed;

i) the UE NAS layer indicates that back-off timer T3396, T3584 or T3585 (see 3GPP TS 24.501 [11] clause 6.2.7 and clause 6.2.8) is stopped or expired; or

j) the UE NAS layer indicates the successful change of the PLMN.

If the re-evaluation leads to a change of the association of an application or a PIN to a PDU session, the UE may enforce such change immediately or when UE returns to 5GMM-IDLE mode.

NOTE 16: The time when the UE enforces the change of the association of an application or a PIN to a PDU Session is up to UE implementation. It is recommended that the UE performs the enforcement in a timely manner.

The URSP handling layer may request the UE NAS layer to release an existing PDU session after the re-evaluation.

#### 4.2.2.3 Association between an application or a device behind 5G-RG and a PDU session by a 5G-RG or a W-AGF acting on behalf of FN-RG

In order to send a PDU of an application, the upper layers require information on the PDU session (e.g. PDU address) via which to send a PDU of an application.

In order to send a PDU of an AUN3 device behind 5G-RG, the 5G-RG requires information on the PDU session (e.g. PDU address) via which to send a PDU of an AUN3 device behind 5G-RG.

In order to send a PDU of a connectivity group consisting of one or more NAUN3 devices, the 5G-RG requires information on the PDU session (e.g. PDU address) via which to send a PDU of a connectivity group.

NOTE 1: If PAP/CHAP is used, it is recommended that the request from the upper layers includes a DNN.

The 5G-RG or the W-AGF acting on behalf of the FN-RG shall proceed in the following order:

a) the 5G-RG or the W-AGF acting on behalf of the FN-RG shall evaluate the URSP rules, except the default URSP rule, with a traffic descriptor matching the application information in increasing order of their precedence values, if any. If the traffic descriptor contains more than one traffic descriptor component type, each of a different type, all of them shall be matched. If the traffic descriptor contains more than one traffic descriptor component of the same traffic descriptor component type, at least one of the traffic descriptor components of the same traffic descriptor component type shall be matched with the application information.

For NAUN3 devices connected to 5G-RG:

- IP descriptors are matched against header information contained in IP packets sent by NAUN3 devices; IP descriptors are only applicable for traffic from NAUN3 devices if network address translation (NAT) is performed for that traffic;

- non-IP descriptors are matched against header information contained in Ethernet frames sent by NAUN3 devices; and

- connectivity group ID in the traffic descriptor in the URSP rule is matched against the Connectivity Group ID that the NAUN3 device is associated with.

A URSP rule is determined not to be applicable when for any given component in the traffic descriptor no corresponding information from the application is available or the corresponding information from the application does not match any of the values in the traffic descriptor component as specified in clause 6.6.2.1 of 3GPP TS 23.503 [2].

 If the 5G-RG or the W-AGF acting on behalf of the FN-RG finds the traffic descriptor in a non-default URSP rule matching the application information or the information for the AUN3 device or connectivity group, and:

I) if there is one or more PDU sessions:

1) for which the parameters associated with the PDU session, the parameters requested by the UE during the PDU session establishment procedure or the mapped parameters from the parameters requested by the UE during the UE requested PDN connectivity procedure to establish a PDN connection as a user-plane resource of an MA PDU session as specified in clause 5.3.1 of 3GPP TS 24.193 [22] match at least one of the route selection descriptors of the URSP rule except the preferred access type and the multi-access preference, if any, wherein:

A) a route selection descriptor with PDU session type IPv4v6 matches also with PDU session type IPv4 if the network has sent 5GSM cause value #50 "PDU session type IPv4 only allowed" in the PDU SESSION ESTABLISHMENT ACCEPT message or matches also with PDN type IPv4 if the network has sent ESM cause is #50 "PDN type IPv4 only allowed" in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message of the PDN connectivity procedure to establish a PDN connection as a user-plane resource of an MA PDU session as specified in clause 5.3.1 of 3GPP TS 24.193 [22];

B) a route selection descriptor with PDU session type IPv4v6 matches also with PDU session type IPv6 if the network has sent 5GSM cause value #51 "PDU session type IPv6 only allowed" in the PDU SESSION ESTABLISHMENT ACCEPT message or matches also with PDN type IPv6 if the network has sent ESM cause is #51 "PDN type IPv6 only allowed" in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message of the PDN connectivity procedure to establish a PDN connection as a user-plane resource of an MA PDU session as specified in clause 5.3.1 of 3GPP TS 24.193 [22];

C) a route selection descriptor with PDU session type IPv4v6 matches also with PDU session type IPv6 or IPv4 if the UE requested the PDU session type IPv4v6 but the selected PDU session type is set to IPv4 or IPv6 in the PDU SESSION ESTABLISHMENT ACCEPT message or if the UE requested the PDN type IPv4v6 but the network allocates a PDN address of a PDN type IPv4 or IPv6 in the ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST message of the PDN connectivity procedure to establish a PDN connection as a user-plane resource of an MA PDU session as specified in clause 5.3.1 of 3GPP TS 24.193 [22];

D) if the 5G-RG is in the HPLMN, then a route selection descriptor with an S-NSSAI matches the S-NSSAI of the PDU session, otherwise a route selection descriptor with an S-NSSAI matches the mapped S-NSSAI of the PDU session; and

E) if the W-AGF acts on behalf of the FN-RG, a route selection descriptor with an S-NSSAI matches the S-NSSAI of the PDU session; and

2) established without requesting any parameter, except the preferred access type and the multi-access preference, for which the matching route selection descriptor of the URSP rule does not provide a route selection descriptor component,

 the 5G-RG or the W-AGF acting on behalf of the FN-RG shall provide information on the PDU session that matches the route selection descriptor of the lowest precedence value to the upper layers; and

NOTE 2: It is up to the 5G-RG or the W-AGF acting on behalf of the FN-RG implementation which PDU session to select if there exist multiple PDU sessions matching the same route selection descriptor of the lowest precedence value.

if the 5G-RG or the W-AGF acting on behalf of the FN-RG supports reporting of URSP rule enforcement and:

1) the 5G-RG or the W-AGF acting on behalf of the FN-RG has URSP rule enforcement report indication;

2) one or more connection capabilities are included in the traffic descriptor; and

3) the connection capabilities provided by the application are not included in the connection capabilities sent to the network by the 5G-RG or the W-AGF acting on behalf of the FN-RG in the latest URSP rule enforcement report, if available, during the PDU session establishment or modification procedure,

 then the URSP handling layer requests the UE NAS layer of the 5G-RG or the W-AGF acting on behalf of the FN-RG to send a URSP rule enforcement report with the connection capabilities provided by the application including the connection capabilities of the previous URSP rule enforcement report, if available, to the network using the PDU session modification procedure;

II) otherwise:

1) the 5G-RG or the W-AGF acting on behalf of the FN-RG shall select a route selection descriptor with the next smallest precedence value which has not yet been evaluated;

2) if:

i) the selected route selection descriptor contains a non-seamless non-3GPP offload indication, the 5G-RG or the W-AGF acting on behalf of the FN-RG shall proceed to step 4);

ii) the selected route selection descriptor includes a PDU session type which is not supported by the 5G-RG or the W-AGF acting on behalf of the FN-RG, the 5G-RG or the W-AGF acting on behalf of the FN-RG shall proceed to step 4);

iii) the selected route selection descriptor contains a time window but the time does not match the time window, the 5G-RG or the W-AGF acting on behalf of the FN-RG shall proceed to step 4);

iv) the selected route selection descriptor contains location criteria but location of the 5G-RG or the W-AGF acting on behalf of the FN-RG does not match the location criteria, the 5G-RG or the W-AGF acting on behalf of the FN-RG shall proceed to step 4);

v) the selected route selection descriptor includes the multi-access preference but the 5G-RG or the W-AGF acting on behalf of the FN-RG does not support ATSSS, the 5G-RG or the W-AGF acting on behalf of the FN-RG shall proceed to step 4);

va) the selected route selection descriptor includes an SSC mode which either has been rejected by the network with 5GSM cause value #68 "not supported SSC mode" for the same DNN (or no DNN, if no DNN was indicated by the 5G-RG or the W-AGF acting on behalf of the FN-RG) and the same S-NSSAI associated with (if available in roaming scenarios) a mapped S-NSSAI (or no S-NSSAI, if no S-NSSAI was indicated by the 5G-RG or the W-AGF acting on behalf of the FN-RG) or was not included in the Allowed SSC mode IE following a rejection with 5GSM cause value #68 "not supported SSC mode" for the same DNN (or no DNN, if no DNN was indicated by the 5G-RG or the W-AGF acting on behalf of the FN-RG) and the same S-NSSAI associated with (if available in roaming scenarios) a mapped S-NSSAI (or no S-NSSAI, if no S-NSSAI was indicated by the 5G-RG or the W-AGF acting on behalf of the FN-RG), the 5G-RG or the W-AGF acting on behalf of the FN-RG shall proceed to step 4); or

vi) the URSP handling layer requests NAS layer of the 5G-RG or the W-AGF acting on behalf of the FN-RG to establish a PDU session providing at least one of the following PDU session attributes:

A) SSC mode if there is a SSC mode in the route selection descriptor;

NOTE 3: The SSC mode 3 is only used when the PDU session type is IPv4, IPv6 or IPv4v6.

B) one S-NSSAI if the S-NSSAI is in the route selection descriptor; and the S-NSSAI is in the allowed NSSAI. Additionally, if the UE supports LADN per DNN and S-NSSAI, the request is for a PDU session for LADN, the extended LADN information is available for that LADN and the S-NSSAI is associated with that LADN in the service area of that LADN. If none of the S-NSSAI(s) in the route selection descriptor is in the allowed NSSAI, the 5G-RG or the W-AGF acting on behalf of the FN-RG shall proceed to step 4);

NOTE 4: If there are multiple S-NSSAIs in the route selection descriptor, an S-NSSAI is chosen among the S-NSSAIs based on implementation of the 5G-RG or the W-AGF acting on behalf of the FN-RG.

C) one DNN, if the DNN is in the route selection descriptor; and if the DNN is an LADN DNN and the 5G-RG is in the service area of that LADN;

NOTE 5: The LADN service does not apply for either 5G-RG connected to 5GC via wireline access or the W-AGF acting on behalf of the FN-RG.

NOTE 6: If one or more DNNs are included in the traffic descriptor of a URSP rule and no DNN is included in the route selection descriptor, the DNN provided by the application is selected as one of the PDU session attributes by the URSP handling layer to request the UE NAS layer.

NOTE 7: If there are multiple DNNs in the route selection descriptor, a DNN is chosen based on implementation of the 5G-RG or the W-AGF acting on behalf of the FN-RG.

D) the PDU session type of the route selection descriptor;

E) preferred access type or multi-access preference, if the preferred access type or the multi-access preference is in the route selection descriptor;

NOTE 8: If a preferred access type or a multi-access preference is included in the route selection descriptor of a URSP rule, it is recommended that the 5G-RG or the W-AGF acting on behalf of the FN-RG establishes a PDU session based on the preferred access type or the multi-access preference. The preferred access type or the multi-access preference does not apply to the AUN3 device or connectivity group.

F) PDU session pair ID if there is a PDU session pair ID in the route selection descriptor; and

G) RSN if there is an RSN in the route selection descriptor, and

 if the 5G-RG or the W-AGF acting on behalf of the FN-RG supports reporting of URSP rule enforcement and:

A) the 5G-RG or the W-AGF acting on behalf of the FN-RG has URSP rule enforcement report indication; and

B) one or more connection capabilities are included in the traffic descriptor,

 then the URSP handling layer requests the UE NAS layer of the 5G-RG or the W-AGF acting on behalf of the FN-RG to send a URSP rule enforcement report with the connection capabilities provided by the application to the network during PDU session establishment;

 The NAS layer of the 5G-RG or the W-AGF acting on behalf of the FN-RG indicates the result of the PDU session establishment. Upon successful completion of the PDU session establishment, the NAS layer of the 5G-RG or the W-AGF acting on behalf of the FN-RG shall additionally indicate the attributes of the established PDU session (e.g. PDU session identity, SSC mode, S-NSSAI, DNN, PDU session type, access type, PDU address) to the URSP handling layer, and shall provide information (e.g. PDU address) of the successfully established PDU session to the upper layers. The 5G-RG or the W-AGF acting on behalf of the FN-RG shall stop selecting a route selection descriptor matching the application information or information of the AUN3 device or connectivity group. If the PDU session establishment is unsuccessful, the 5G-RG or the W-AGF acting on behalf of the FN-RG shall proceed to step 3);

3) Based on the rejection cause and if there is another value which can be used for the rejected component in the same route selection descriptor, the 5G-RG or the W-AGF acting on behalf of the FN-RG shall select another combination of values in the currently selected route selection descriptor by using this value of the rejected component and proceed to step 2), otherwise the 5G-RG or the W-AGF acting on behalf of the FN-RG shall proceed to step 4); and

4) if there is any route selection descriptor which has not yet been evaluated, the 5G-RG or the W-AGF acting on behalf of the FN-RG shall proceed to step 1). If all route selection descriptors for the matching non-default URSP rule have been evaluated and there is one or more non-default matching URSP rule which has not yet been evaluated, the 5G-RG or the W-AGF acting on behalf of the FN-RG shall proceed to step a). If all non-default matching URSP rules have been evaluated, the 5G-RG or the W-AGF acting on behalf of the FN-RG shall inform the upper layers of the failure.

b) if no non-default matching URSP rule can be found:

1) by the 5G-RG and local configuration of the 5G-RG for the application is available, the 5G-RG shall perform the association of the application to a PDU session accordingly. If no matching PDU session exists, the NAS layer of the 5G-RG shall attempt to establish a PDU session using local configuration of the 5G-RG.

NOTE 9: Any missing information in local configuration of the 5G-RG needed to build the PDU session establishment request can be the appropriate corresponding component from the default URSP rule with the "match-all" traffic descriptor.

 If the PDU session establishment is successful, the NAS layer of the 5G-RG shall provide information (e.g. PDU address) of the successfully established PDU session to the upper layers. Otherwise, the 5G-RG shall go to step c);

2) by the W-AGF acting on behalf of the FN-RG, the W-AGF acting on behalf of the FN-RG shall go to step c); or

3) by the 5G-RG acting on behalf of the AUN3 device or connectivity group shall go to step c); and

c) if no non-default matching URSP rule can be found:

1) by the 5G-RG and if either local configuration of the 5G-RG for the application is not available or the PDU session establishment based on local configuration of the 5G-RG for the application was unsuccessful, the 5G-RG shall perform the association of the application to a PDU session according to the default URSP rule with the "match-all" traffic descriptor, if any. If the association is unsuccessful, the 5G-RG shall inform the upper layers of the failure;

2) by the W-AGF acting on behalf of the FN-RG, the W-AGF acting on behalf of the FN-RG shall perform the association of the application to a PDU session according to the default URSP rule with the "match-all" traffic descriptor, if any. If the association is unsuccessful, and local configuration of the W-AGF acting on behalf of the FN-RG for the application is available, the W-AGF acting on behalf of the FN-RG shall perform the association of the application to a PDU session accordingly. If no matching PDU session exists, the NAS layer of the W-AGF acting on behalf of the FN-RG shall attempt to establish a PDU session using local configuration of the W-AGF acting on behalf of the FN-RG. If the PDU session establishment is successful, the NAS layer of the W-AGF acting on behalf of the FN-RG shall provide information (e.g. PDU address) of the successfully established PDU session to the upper layers. Otherwise, the W-AGF acting on behalf of the FN-RG shall inform the upper layers of the failure; or

3) by the 5G-RG acting on behalf of the AUN3 device or connectivity group, the 5G-RG acting on behalf of the AUN3 device or connectivity group shall perform the association of the AUN3 device or connectivity group to a PDU session according to the default URSP rule with the "match-all" traffic descriptor, if any. If the association is unsuccessful, and local configuration of the 5G-RG acting on behalf of the AUN3 device or connectivity group is available, the 5G-RG acting on behalf of the AUN3 device or connectivity group shall perform the association of the AUN3 device or connectivity group to a PDU session accordingly. If no matching PDU session exists, the NAS layer of the 5G-RG acting on behalf of the AUN3 device or connectivity group shall attempt to establish a PDU session using local configuration of the 5G-RG acting on behalf of the AUN3 device or connectivity group. If the PDU session establishment is successful, the NAS layer of the 5G-RG acting on behalf of the AUN3 device or connectivity group shall provide information (e.g. PDU address) of the successfully established PDU session to the upper layers. Otherwise, the 5G-RG acting on behalf of the AUN3 device or connectivity group shall inform the upper layers of the failure.

For a 5G-RG not operating in SNPN access operation mode, if the 5G-RG supports VPS URSP and has signalled URSP, when the upper layers request information of the PDU session via which to send a PDU of an application, an AUN3 device, or a connectivity group as described above, the 5G-RG shall evaluate URSP rules, if available, in accordance with the following order until a matching URSP rule is found:

1) if the RPLMN is a VPLMN, non-default URSP rules in the VPS URSP using steps in bullet a) above;

2) non-default URSP rules in the VPS URSP of the equivalent PLMN of the RPLMN using steps in bullet a) above;

3) non-default URSP rules in the PG URSP using steps in bullet a) above;

4) if local configuration of the 5G-RG for the application, an AUN3 device, or a connectivity group is available, local configuration of the 5G-RG for the application, an AUN3 device, or a connectivity group using steps in bullet b) above;

5) if the RPLMN is a VPLMN, default URSP rule in the VPS URSP using steps in bullet c) above;

6) default URSP rules in the VPS URSP of the equivalent PLMN of the RPLMN using steps in bullet c) above; and

7) default URSP rule in the PG URSP using steps in bullet c) above.

The HPLMN may pre-configure the 5G-RG or the W-AGF acting on behalf of the FN-RG with URSP or may provide URSP to the 5G-RG or the W-AGF acting on behalf of the FN-RG by signalling as described in annex D of 3GPP TS 24.501 [11]. In the 5G-RG, the pre-configured URSP and the signalled URSP shall be stored in a non-volatile memory in the ME together with the SUPI from the USIM. If the 5G-RG or the W-AGF acting on behalf of the FN-RG has both pre-configured URSP and signalled URSP, the 5G-RG or the W-AGF acting on behalf of the FN-RG shall only use the signalled URSP. The pre-configured URSP shall be stored until a new URSP is configured by HPLMN or the USIM is removed from the 5G-RG. The signalled URSP may be modified by the procedures defined in annex D of 3GPP TS 24.501 [11] and shall be stored until USIM is removed from the 5G-RG or until W-AGF acting on behalf of the FN-RG deregisters on behalf of the FN-RG. In the 5G-RG,

- when the 5G-RG acts on behalf of the AUN3 device, the URSP for the AUN3 device can be used if 5G-RG is registered on behalf of the AUN3 device;

- when the 5G-RG acting on cases other than AUN3 device, the URSP can only be used if the SUPI from the USIM matches the SUPI stored in the non-volatile memory of the ME, if the SUPI from the USIM does not match the SUPI stored in the non-volatile memory of the ME, the 5G-RG shall delete the URSP.

The 5G-RG or the W-AGF acting on behalf of the FN-RG may re-evaluate the URSP rules, to check if the change of the association of an application, an AUN3 device or a connectivity group to a PDU session is needed, when:

NOTE 10: The time when the 5G-RG or the W-AGF acting on behalf of the FN-RG performs the re-evaluation is up to implementation of the 5G-RG or the W-AGF acting on behalf of the FN-RG. It is recommended that the 5G-RG or the W-AGF acting on behalf of the FN-RG performs the re-evaluation in a timely manner.

a) the 5G-RG or the W-AGF acting on behalf of the FN-RG performs periodic URSP rules re-evaluation based on implementation of the 5G-RG or the W-AGF acting on behalf of the FN-RG;

b) the NAS layer of the 5G-RG or the W-AGF acting on behalf of the FN-RG indicates that an existing PDU session used for routing traffic of an application based on a URSP rule is released;

c) the URSP is updated by the PCF;

d) the NAS layer of the 5G-RG indicates that the 5G-RG performs inter-system change from S1 mode to N1 mode;

e) the NAS layer of the 5G-RG indicates that the 5G-RG is successfully registered in N1 mode over 3GPP access;

f) the allowed NSSAI or the configured NSSAI is changed;

g) the LADN information or the extended LADN information is changed for the 5G-RG; or

h) the NAS layer of the 5G-RG indicates the successful change of the PLMN.

If the re-evaluation leads to a change of the association of an application, an AUN3 device or a connectivity group to a PDU session, the 5G-RG or the W-AGF acting on behalf of the FN-RG may enforce such change immediately or when the 5G-RG or the W-AGF acting on behalf of the FN-RG returns to 5GMM-IDLE mode.

NOTE 11: The time when the 5G-RG or the W-AGF acting on behalf of the FN-RG enforces the change of the association of an application to a PDU Session is up to implementation of the 5G-RG or the W-AGF acting on behalf of the FN-RG. It is recommended that the 5G-RG or the W-AGF acting on behalf of the FN-RG performs the enforcement in a timely manner.

The URSP handling layer may request the NAS layer of the 5G-RG or the W-AGF acting on behalf of the FN-RG to release an existing PDU session after the re-evaluation.

### 4.2.3 Unknown or unexpected URSP rules

If the network provides URSP rules including any new component in the traffic descriptor or in the route selection descriptor which is not recognized by the UE, the 5G-RG or the W-AGF acting on behalf of an FN-RG, such URSP rules are unknown or unexpected to the UE, the 5G-RG or the W-AGF acting on behalf of an FN-RG. In this case:

- if the traffic descriptor of this URSP rule includes any component which is not recognized by the UE, the UE shall skip this URSP rule when evaluating the URSP rules to associate an application with a PDU session, with non-seamless non-3GPP offload or with 5G ProSe layer-3 UE-to-network relay offload;

- if the traffic descriptor of this URSP rule includes any component which is not recognized by the 5G-RG or the W-AGF acting on behalf of an FN-RG, the 5G-RG or the W-AGF acting on behalf of an FN-RG shall skip this URSP rule when evaluating the URSP rules to associate an application, an AUN3 device or a connectivity group with a PDU session; or

- if the route selection descriptor of this URSP rule includes any component which is not recognized by the UE, the 5G-RG or the W-AGF acting on behalf of an FN-RG, the UE, the 5G-RG or the W-AGF acting on behalf of an FN-RG shall skip this route selection descriptor and handle this URSP rule with the remaining route selection descriptors.

If the UE, the 5G-RG or the W-AGF acting on behalf of an FN-RG receives any unknown value within a known traffic descriptor or route selection descriptor component, the value shall be still used to identify a match with the application information, the AUN3 device information or the connectivity group information, when the same unknown value is provided by upper layers. The same handling shall be applied to operator-specific values.

### 4.2.4 Reporting of URSP rule enforcement

URSP rule enforcement for a specific application and a specific URSP rule can be reported to the network.

The URSP rule needs to be reported after enforcement if the URSP rule includes URSP rule enforcement report indication and if it contains the connection capabilities in the traffic descriptors. A rule with the "match-all" traffic descriptor cannot contain connection capabilities in the traffic descriptor.

URSP rule enforcement report includes the connection capabilities contained in the traffic descriptor of the associated URSP rule. If more than one connection capabilities are contained in the traffic descriptor of the associated URSP rule, and not all match the application, the UE only includes those matching the application. If several URSP rules for multiple applications are enforced, and these multiple applications' traffic are all associated to a PDU session, more than one URSP rule enforcement can be reported at the same time.

If the UE supports reporting of URSP rule enforcement, the URSP rule matching the application contains the connection capabilities in the traffic descriptor and a URSP rule enforcement report indication, the URSP rule enforcement report indication is set to "URSP rule enforcement report is required", and

- the traffic descriptor of the URSP rule matches the application information of a newly detected application and associates the application with a new PDU Session; or

- the traffic descriptor of the URSP rule matches the application information of a newly detected application and associates the application with an existing PDU Session;

the UE shall send URSP rule enforcement report including the connection capabilities provided by the associated application (i.e. only the matched connection capabilities in traffic descriptor), to the network according to 3GPP TS 24.501 [11].

## 4.3 Access network discovery and selection policy (ANDSP)

### 4.3.1 Overview

The ANDSP is used to control the UE behaviour related to access network discovery and selection over non-3GPP access network.

The ANDSP consists of:

- WLAN Selection Policy (WLANSP) which is described in clause 4.3.2; and

- non-3GPP access network (N3AN) node configuration information which is described in clause 4.3.3.

The 5G-RG or a W-AGF acting on behalf of the FN-RG shall ignore any ANDSP information, if received.

### 4.3.2 WLAN selection policy (WLANSP)

#### 4.3.2.1 General

The WLANSP is used to control UE behaviour related to selection and reselection of a WLAN.

The WLANSP consists of zero or more WLANSP rules.

Each WLANSP rule consists of:

- rule identifier;

- one or more groups of WLAN selection criteria;

- validity area;

- zero or more time of day;

- rule priority;

- roaming.

Each group of WLAN selection criteria contains:

- criteria priority;

- home network indication;

- preferred roaming partner list;

- min backhaul threshold;

- maximum BSS load value;

- required proto port tuple;

- SP exclusion list;

- preferred SSID list; and

- slice-based TNAN list.

The priority of a selection criteria is encoded in the criteria priority field. The WLAN priority defined in the preferred SSID list (see figure 5.3.2.4c) represents the priority of the WLAN matching the selection criteria.

The validity of the WLANSP rule can be restricted by validity conditions. The validity of the WLANSP rule takes into account validity area, roaming, and time of day where each condition shall match in order to make the WLANSP rule valid.

Each validity area consists of:

- 3GPP location;

- WLAN location; and

- Geo location.

Each time of day consists of:

- time start;

- time stop;

- date start;

- date stop; and

- day of week.

When the selection criteria is for slice-based TNAN list, the selection criteria sub entry consists of:

- TNGF ID;

- S-NSSAI list; and

- SSID list.

The S-NSSAI list indicates the list of S-NSSAI(s) that are supported by the indicated TNGF. The SSID list indicates the list of SSID(s) through which the indicated TNGF can be reached.

The WLANSP rule is considered valid if none of the validity conditions exist or all validity conditions match.

There can be multiple valid WLANSP rules at the same time. In addition to validity conditions and selection criteria, there is a rule priority that shall be set for each WLANSP rule. The rule priority is encoded in the rule priority field, and it enables the UE to determine which WLANSP rule, out of potentially several valid WLANSP rules, it should consider as active. A WLANSP rule is active if it is valid and has highest rule priority out of the valid WLANSP rules. At any point in time, there shall be at most one active WLANSP rule. A WLAN that matches a selection criteria of the active WLANSP rule is considered as matching the selection criteria.

If the UE is roaming and WLANSP rules from both HPLMN and VPLMN are available, visited WLANSP rules shall take precedence.

#### 4.3.2.2 WLAN access selection

The procedure of UE selecting WLAN access network based on WLAN selection policy is specified in 3GPP TS 24.502 [3].

The 5G-RG and the W-AGF acting on behalf of an FN-RG shall ignore the WLAN selection policy, if received.

### 4.3.3 N3AN node configuration information

#### 4.3.3.1 General

Non-3GPP access network (N3AN) node configuration information is used to control UE behaviour related to selection of either N3IWF or ePDG for accessing 5GCN or EPC respectively via non-3GPP access.

The non-3GPP access network (N3AN) node configuration information provisioned by the HPLMN consists of:

a) Non-3GPP access network (N3AN) node selection information;

b) optionally, home ePDG identifier configuration;

c) optionally, home N3IWF identifier configuration;

d) optionally, extended home N3IWF identifier configuration; and

e) optionally, slice-specific N3IWF prefix configuration.

The non-3GPP access network (N3AN) node configuration information provisioned by a VPLMN consists of:

a) slice-specific N3IWF prefix configuration.

NOTE: As an implementation option, the UE can store slice-specific N3IWF prefix configuration provisioned by a PLMN for later use.

#### 4.3.3.2 N3AN node selection

The procedure of UE selecting an N3AN node based on N3AN node configuration information is specified in 3GPP TS 24.502 [3].

## 4.4 Interworking with EPC

### 4.4.1 Precedence between URSP, ANDSP, ANDSF and RAN rules

If the UE supports both S1 mode and N1 mode:

- the UE shall always use the ANDSP information and applicable user preferences on non-3GPP access selection, if available at the UE, for non-3GPP access node selection;

NOTE: This includes the case when the UE is registered to the 5GCN via 3GPP access, the case when the UE is registered to the EPC via 3GPP access, and the case when the UE is not registered to any CN via 3GPP access.

- if the UE is:

a) registered to the 5GCN via 3GPP access and not registered to any CN via non-3GPP access; or

b) registered to the 5GCN via 3GPP access and registered to the 5GCN via non-3GPP access,

 the UE shall apply URSP rules and applicable UE local configuration, if available at the UE, to all uplink user data;

- if the UE is registered to the 5GCN via 3GPP access and registered to the EPC via non-3GPP access, the UE shall:

a) use the ANDSF rules and RAN rules, if available at the UE, for uplink user data sent via the ePDG; and

b) apply URSP rules and applicable UE local configuration, if available at the UE, to all other uplink user data;

- if the UE is:

a) registered to the EPC via 3GPP access and not registered to any CN via non-3GPP access; or

b) registered to the EPC via 3GPP access and registered to the EPC via non-3GPP access,

 the UE:

a) shall use the ANDSF rules and RAN rules, if available at the UE, for all uplink user data for which there is one or more applicable ANDSF rule or RAN rule, except for the rules and parameters related to non-3GPP access node selection; and

b) should use the URSP rules, if available at the UE, to derive the parameters to be used in EPS as specified in clause 4.4.2 for all uplink user data for which there is no applicable ANDSF rule or RAN rule except for the rules and parameters related to non-3GPP access node selection and there is no applicable UE local configuration; and

- if the UE is registered to the EPC via 3GPP access and registered to the 5GCN via non-3GPP access, the UE:

a) shall apply URSP rules and applicable UE local configuration, if available at the UE, to uplink user data sent via non-3GPP access;

b) shall use the ANDSF rules and RAN rules, if available at the UE, for all other uplink user data for which there is one or more applicable ANDSF rule or RAN rule, except for the rules and parameters related to non-3GPP access node selection; and

c) should use the URSP rules, if available at the UE, to derive the parameters to be used in EPS as specified in clause 4.4.2 for all uplink user data for which there is no applicable ANDSF rule or RAN rule except for the rules and parameters related to non-3GPP access node selection. and there is no applicable UE local configuration

### 4.4.2 Use of URSP in EPS

If the UE:

- supports both S1 mode and N1 mode;

- does not have preconfigured rules for associating an application to a PDN connection, a non-seamless non-3GPP offload or a 5G ProSe layer-3 UE-to-network relay offload (i.e. there are no rules in UE local configuration and no ANDSF rules applicable for the application); and

- is provisioned with URSP,

when in S1 mode, the UE should use a matching URSP rule, if available, to derive the parameters, e.g. APN, using the mapping between the parameters in the URSP rules and the parameters used for PDN connection establishment specified in table 4.4.2.1 and table 4.4.2.2. The URSP rule with the derived EPS parameters are used for associating the application to a PDN connection, non-seamless non-3GPP offload or a 5G ProSe layer-3 UE-to-network relay offload, as specified in clause 4.2.2. The precedence of URSP rule is reused in EPS.

If a route selection descriptor for the matching URSP rule includes:

- at least one parameter not applicable in EPS, the UE shall not use the route selection descriptor and shall proceed to evaluate the route selection descriptor with the next lowest precedence value; and

- one or more parameters ignored in EPS, the UE shall evaluate the route selection descriptor without considering the one or more parameters ignored in EPS.

Table 4.4.2.1: Mapping table for traffic descriptor parameters

|  |  |  |
| --- | --- | --- |
| Traffic descriptor parameter name | Description | Mapped EPS parameter description |
| Application descriptors | It consists of OSId and OSAppId(s) | OSId and OSAppId(s) |
| IP descriptors | Destination IP 3 tuple(s) (IP address or IPv6 network prefix, port number, protocol ID of the protocol above IP) | Destination IP 3 tuple(s) (IP address or IPv6 network prefix, port number, protocol ID of the protocol above IP) |
| Domain descriptors | Destination FQDN(s) or a regular expression as a domain name matching criteria | Destination FQDN(s) or a regular expression as a domain name matching criteria |
| Non-IP descriptors | Descriptor(s) for destination information of non-IP traffic | Descriptor(s) for destination information of non-IP traffic |
| DNN | This is matched against the DNN information provided by the application | APN |
| Connection Capabilities | This is matched against the information provided by a UE application when it requests a network connection with certain capabilities | This is matched against the information provided by a UE application when it requests a network connection with certain capabilities |

Table 4.4.2.2: Mapping table for route selection descriptor parameters

|  |  |  |
| --- | --- | --- |
| Route selection descriptor parameter name | Description | Mapped EPS parameter description |
| Route selection descriptor precedence | Determines the order in which the route selection descriptors are to be applied | Determines the order in which the route selection descriptors are to be applied |
| SSC Mode Selection | One single value of SSC mode | Ignored in EPS if set to SSC mode 1Not applicable in EPS if set to SSC mode 2 or 3 |
| Network Slice Selection | Either a single value or a list of values of S-NSSAI(s) | Not applicable in EPS |
| DNN Selection | Either a single value or a list of values of DNN(s) | Either a single value or a list of values of APN(s).Not applicable in EPS if it contains at least one LADN DNN |
| PDU Session Type Selection | One single value of PDU Session Type | PDN type:- PDU session type "Unstructured" is mapped to PDN type "non-IP".- PDU session type "Ethernet" is mapped to PDN type "Ethernet", if supported by the UE. Otherwise PDU session type "Ethernet" is mapped to PDN type "non-IP" |
| Non-Seamless Offload indication | Indicates if the traffic of the matching application is to be offloaded to non-3GPP access outside of a PDU session | Indicates if the traffic of the matching application is to be offloaded to non-3GPP access outside of a PDN connection |
| 5G ProSe layer-3 UE-to-network relay offload indication | Indicates if the traffic of the matching application is to be offloaded to 5G ProSe layer-3 UE-to-network relay outside of a PDU session | Not applicable in EPS |
| Access Type preference | Indicates the preferred Access Type (3GPP or non-3GPP) when the UE establishes a PDU Session for the matching application | preferred Access Type (3GPP or non-3GPP) |
| Multi-Access preference | Indicates that the PDU session should be established as a multi-access PDU session, using both 3GPP access and non-3GPP access.  | Indicates that the PDN connection should be established as a user-plane resource of a multi-access PDU session, if the UE supports MA PDU session and procedures for PDN connection establishment.Otherwise, not applicable in EPS |
| Time window | The time window when the matching traffic is allowed. | Not applicable in EPS |
| Location criteria | The UE location where the matching traffic is allowed. | Not applicable in EPS |
| PDU session pair ID | One single value of PDU session pair ID for redundant PDU session establishment. | Ignored in EPS |
| RSN | One single value of RSN for redundant PDU session establishment. | Ignored in EPS |
| 5G ProSe multi-path preference | Indicates if the traffic of the matching application is preferred to be sent via a PDU Session over the Uu reference point and a 5G ProSe layer-3 UE-to-network relay outside of a PDU session. | Not applicable in EPS |

# 5 Encoding of UE policies

## 5.1 Overview

The content of UE policies is included in the UE policy part contents defined in annex D.6.2 of 3GPP TS 24.501 [11].

The UE policy part contents includes URSP, ANDSP, V2XP, ProSeP, A2XP or RSLPP.

For URSP definition, the encoding is defined in clause 5.2.

For ANDSP definition, it includes encoding of WLANSP and encoding of N3AN node configuration information. The encoding of WLANSP is defined in clause 5.3.2. The encoding of N3AN node configuration information is defined in clause 5.3.3.

For V2XP definition, the coding is specified in 3GPP TS 24.588 [18].

For ProSeP definition, the coding is specified in 3GPP TS 24.555 [18A].

For A2XP definition, the coding is specified in 3GPP TS 24.578 [24].

For RSLPP definition, the coding is specified in 3GPP TS 24.514 [23].

## 5.2 Encoding of UE policy part type URSP

The UE policy part type URSP contains one or more URSP rules which may be included in the UE policy part contents as defined in annex D.6.2 of 3GPP TS 24.501 [11].

If the UE policy part contents includes one or more URSP rules (i.e. the UE policy part type field is set to "URSP"), the UE policy part contents including URSP rules is encoded as shown in figures 5.2.1 to 5.2.4A and table 5.2.1.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| URSP rule 1 | octet q+3octet s |
| URSP rule 2 | octet s+1\*octet t\* |
| … | octet t+1\*octet u\* |
| URSP rule n | octet u+1\*octet r\* |

Figure 5.2.1: UE policy part contents including one or more URSP rules

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of URSP rule | octet voctet v+1 |
| Precedence value of URSP rule | octet v+2 |
| Length of traffic descriptor | octet v+3octet v+4 |
| Traffic descriptor | octet v+5octet w |
| Length of route selection descriptor list | octet w+1octet w+2 |
| Route selection descriptor list | octet w+3octet x |
| Additional indications | octet x+1\* |

Figure 5.2.2: URSP rule

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Route selection descriptor 1 | octet w+3octet y |
| Route selection descriptor 2 | octet y+1\*octet z\* |
| … | octet z+1\*octet a\* |
| Route selection descriptor m | octet a+1\*octet x\* |

Figure 5.2.3: Route selection descriptor list

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of route selection descriptor | octet boctet b+1 |
| Precedence value of route selection descriptor | octet b+2 |
| Length of route selection descriptor contents | octet b+3octet b+4 |
| Route selection descriptor contents | octet b+5octet c |

Figure 5.2.4: Route selection descripto

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| 0Spare | 0Spare | 0Spare | 0Spare | 0Spare | 0Spare | 0Spare | URERI | octet x+1 |

Figure 5.2.4A: Additional indications

Table 5.2.1: UE policy part contents including a URSP rule

|  |
| --- |
| Precedence value of URSP rule (octet v+2)The precedence value of URSP rule field is used to specify the precedence of the URSP rule among all URSP rules in the URSP. This field includes the binary encoded value of the precedence value in the range from 0 to 255 (decimal). The higher the value of the precedence value field, the lower the precedence of the URP rule is. Multiple URSP rules in the URSP shall not have the same precedence value (NOTE 10). |
| Traffic descriptor (octets v+5 to w)The traffic descriptor field is of variable size and contains a variable number (at least one) of traffic descriptor components. Each traffic descriptor component shall be encoded as a sequence of one octet traffic descriptor component type identifier and a traffic descriptor component value field. The traffic descriptor component type identifier shall be transmitted first. |
| Traffic descriptor component type identifierBits8 7 6 5 4 3 2 10 0 0 0 0 0 0 1 Match-all type0 0 0 0 1 0 0 0 OS Id + OS App Id type (NOTE 1)(NOTE 3)0 0 0 1 0 0 0 0 IPv4 remote address type0 0 1 0 0 0 0 1 IPv6 remote address/prefix length type0 0 1 1 0 0 0 0 Protocol identifier/next header type0 1 0 1 0 0 0 0 Single remote port type (NOTE 6)0 1 0 1 0 0 0 1 Remote port range type (NOTE 6)0 1 0 1 0 0 1 0 IP 3 tuple type0 1 1 0 0 0 0 0 Security parameter index type0 1 1 1 0 0 0 0 Type of service/traffic class type1 0 0 0 0 0 0 0 Flow label type1 0 0 0 0 0 0 1 Destination MAC address type (NOTE 7)1 0 0 0 0 0 1 1 802.1Q C-TAG VID type (NOTE 4)1 0 0 0 0 1 0 0 802.1Q S-TAG VID type (NOTE 4)1 0 0 0 0 1 0 1 802.1Q C-TAG PCP/DEI type (NOTE 4)1 0 0 0 0 1 1 0 802.1Q S-TAG PCP/DEI type (NOTE 4)1 0 0 0 0 1 1 1 Ethertype type1 0 0 0 1 0 0 0 DNN type (NOTE 3)1 0 0 1 0 0 0 0 Connection capabilities type (NOTE 3)1 0 0 1 0 0 0 1 Destination FQDN type1 0 0 1 0 0 1 0 Regular expression type1 0 1 0 0 0 0 0 OS App Id type (NOTE 3)1 0 1 0 0 0 0 1 Destination MAC address range type (NOTE 7)1 0 1 0 0 0 1 0 PIN ID type (NOTE 8)1 0 1 0 0 0 1 1 Connectivity group ID type (NOTE 13)All other values are spare. If received they shall be interpreted as unknown. |
| For "match-all type", the traffic descriptor component shall not include the traffic descriptor component value field. The "match-all type" traffic descriptor component shall not appear more than once among all traffic descriptors of the whole URSP rules in the URSP. If the "match-all type" traffic descriptor component is included in a traffic descriptor, there shall be no traffic descriptor component with a type other than "match-all type" in the traffic descriptor. |
| For "OS Id + OS App Id type", the traffic descriptor component value field shall be encoded as a sequence of a sixteen octet OS Id field, a one octet OS App Id length field, and an OS App Id field. The OS Id field shall be transmitted first. The OS Id field contains a Universally Unique IDentifier (UUID) as specified in IETF RFC 4122 [16]. |
| For "IPv4 remote address type", the traffic descriptor component value field shall be encoded as a sequence of a four octet IPv4 address field and a four octet IPv4 address mask field. The IPv4 address field shall be transmitted first. |
| For "IPv6 remote address/prefix length type", the traffic descriptor component value field shall be encoded as a sequence of a sixteen octet IPv6 address field and one octet prefix length field. The IPv6 address field shall be transmitted first. |
|  |
| For "protocol identifier/next header type", the traffic descriptor component value field shall be encoded as one octet which specifies the IPv4 protocol identifier or IPv6 next header. |
| For "single remote port type", the traffic descriptor component value field shall be encoded as two octets which specify a port number. |
| For "remote port range type", the traffic descriptor component value field shall be encoded as a sequence of a two octet port range low limit field and a two octet port range high limit field. The port range low limit field shall be transmitted first. |
| For "IP 3 tuple type", the traffic descriptor component value field shall be encoded as a sequence of a one octet IP 3 tuple information bitmap field where:- bit 1 set to zero indicates that the IPv4 address field is absent; - bit 1 set to one indicates that the IPv4 address field is present;- bit 2 set to zero indicates that the IPv6 remote address/prefix length field is absent; - bit 2 set to one indicates that the IPv6 remote address/prefix length field is present;- bit 3 set to zero indicates that the protocol identifier/next header field is absent; - bit 3 set to one indicates that the protocol identifier/next header field is present;- bit 4 set to zero indicates that the single remote port field is absent; - bit 4 set to one indicates that the single remote port field is present;- bit 5 set to zero indicates that the remote port range field is absent; - bit 5 set to one indicates that the remote port range field is present; and- bits 6,7, and 8 are spare bits;followed by a four octet IPv4 address field and a four octet IPv4 address mask field, if the IPv4 address field is present;followed by a sixteen octet IPv6 address field and one octet prefix length field, if the IPv6 remote address/prefix length field is present;followed by one octet which specifies the IPv4 protocol identifier or IPv6 next header, if the protocol identifier/next header field is present;followed by two octets which specify a port number, if the single remote port field is present;followed by a two octet port range low limit field and a two octet port range high limit field, if the remote port range field is present.The IP 3 tuple information bitmap field shall be transmitted first.The traffic descriptor component value field shall not contain both the IPv4 address field and the IPv6 remote address/prefix length field. If the traffic descriptor component value field contains both the IPv4 address field and the IPv6 remote address/prefix length field, the receiving entity shall ignore the URSP rule.The traffic descriptor component value field shall not contain both the single remote port field and the remote port range field. If the traffic descriptor component value field contains both the single remote port field and the remote port range field, the receiving entity shall ignore the URSP rule.The traffic descriptor component value field shall contain at least one of the IPv4 address field, IPv6 remote address/prefix length field, the protocol identifier/next header field, the single remote port field and the remote port range field, otherwise the receiving entity shall ignore the URSP rule. |
| For "security parameter index type", the traffic descriptor component value field shall be encoded as four octets which specify the IPsec security parameter index. |
| For "type of service/traffic class type", the traffic descriptor component value field shall be encoded as a sequence of a one octet type-of-service/traffic class field and a one octet type-of-service/traffic class mask field. The type-of-service/traffic class field shall be transmitted first. |
| For "flow label type", the traffic descriptor component value field shall be encoded as three octets which specify the IPv6 flow label. The bits 8 through 5 of the first octet shall be spare whereas the remaining 20 bits shall contain the IPv6 flow label. |
| For "destination MAC address type", the traffic descriptor component value field shall be encoded as 6 octets which specify a MAC address. |
| For "802.1Q C-TAG VID type", the traffic descriptor component value field shall be encoded as two octets which specify the VID of the customer-VLAN tag (C-TAG) as specified in IEEE Std 802.1Q-2018 [20]. The bits 8 through 5 of the first octet shall be spare whereas the remaining 12 bits shall contain the VID. |
| For "802.1Q S-TAG VID type", the traffic descriptor component value field shall be encoded as two octets which specify the VID of the service-VLAN tag (S-TAG) as specified in IEEE Std 802.1Q-2018 [20]. The bits 8 through 5 of the first octet shall be spare whereas the remaining 12 bits shall contain the VID. |
| For "802.1Q C-TAG PCP/DEI type", the traffic descriptor component value field shall be encoded as one octet which specifies the 802.1Q C-TAG PCP and DEI as specified in IEEE Std 802.1Q-2018 [20]. The bits 8 through 5 of the octet shall be spare, and the bits 4 through 2 contain the PCP and bit 1 contains the DEI. |
| For "802.1Q S-TAG PCP/DEI type", the traffic descriptor component value field shall be encoded as one octet which specifies the 802.1Q S-TAG PCP as specified in IEEE Std 802.1Q-2018 [20]. The bits 8 through 5 of the octet shall be spare, and the bits 4 through 2 contain the PCP and bit 1 contains the DEI. |
| For "ethertype type", the traffic descriptor component value field shall be encoded as two octets which specify an ethertype. |
| For "DNN type", the traffic descriptor component value field shall be encoded as a sequence of a one octet DNN length field and a DNN value field of a variable size. The DNN value contains an APN as defined in 3GPP TS 23.003 [4]. |
| For "connection capabilities type”, the traffic descriptor component value field shall be encoded as a sequence of one octet for number of connection capabilities followed by one or more octets, each containing a connection capability identifier encoded as follows: |
| Bits |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |  | IMS |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |  | MMS |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |  | SUPL |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |  | Internet |
| 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |  |  |
| to |  | Operator specific connection capabilities (NOTE 15) |
|  |  |  |
| 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |  |  |
| 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |  | IoT delay-tolerant (NOTE 14) |
| 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |  | IoT non-delay-tolerant (NOTE 14) |
| 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 |  | Downlink streaming (NOTE 14) |
| 1 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |  | Uplink streaming (NOTE 14) |
| 1 | 0 | 1 | 0 | 0 | 1 | 0 | 1 |  | Vehicular communications (NOTE 14) |
| 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 |  | Real time interactive (NOTE 14) |
| 1 | 0 | 1 | 0 | 0 | 1 | 1 | 1 |  | Unified communications (NOTE 14) |
| 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |  | Background (NOTE 14) |
| 1 | 0 | 1 | 0 | 1 | 0 | 0 | 1 |  | Mission critical communications (NOTE 14) |
| 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 |  | Time critical communications (NOTE 14) |
| 1 | 0 | 1 | 0 | 1 | 0 | 1 | 1 |  | Low latency loss tolerant communications in un-acknowledged mode (NOTE 14) |
|  |  |  |  |  |  |  |  |  |  |
| All other values are spare. If received, they shall be interpreted as unknown. |
|  |
| For "destination FQDN type”, the traffic descriptor component value field shall be encoded as a sequence of one octet destination FQDN length field and a destination FQDN value of variable size. The destination FQDN value field shall be encoded as defined in clause 28.3.2.1 in 3GPP TS 23.003 [4]. For "regular expression type”, the traffic descriptor component value field shall be encoded as a sequence of one octet regular expression length field and a regular expression value of variable size. The regular expression value field shall take the form of Extended Regular Expressions (ERE) as defined in chapter 9 in IEEE 1003.1-2004 Part 1 [19]. |
| For "OS App Id type", the traffic descriptor component value field shall be encoded as a one octet OS App Id length field and an OS App Id field.For "destination MAC address range type", the traffic descriptor component value field shall be encoded as a sequence of a 6 octet destination MAC address range low limit field and a 6 octet destination MAC address range high limit field. The destination MAC address range low limit field shall be transmitted first.For "PIN ID type", the traffic descriptor component value field shall be encoded as a sequence of a one octet PIN ID value length field and a PIN ID value field of a variable size.For "connectivity group ID type", the traffic descriptor component value field shall be encoded as a sequence of one octet connectivity group ID length field and a connectivity group ID value field of a variable size which represents a specific connectivity group configured in the 5G-RG. |
| Precedence value of route selection descriptor (octet b+2)The precedence value of route selection descriptor field is used to specify the precedence of the route selection descriptor among all route selection descriptors in the URSP rule. This field includes the binary encoded value of the precedence value in the range from 0 to 255 (decimal). The higher the value of the precedence value field, the lower the precedence of the route selection descriptor is. |
| Route selection descriptor contents (octets b+5 to c)The route selection descriptor contents field is of variable size and contains a variable number (at least one) of route selection descriptor components. Each route selection descriptor component shall be encoded as a sequence of a one octet route selection descriptor component type identifier and a route selection descriptor component value field. The route selection descriptor component type identifier shall be transmitted first. |
| Route selection descriptor component type identifierBits8 7 6 5 4 3 2 10 0 0 0 0 0 0 1 SSC mode type0 0 0 0 0 0 1 0 S-NSSAI type0 0 0 0 0 1 0 0 DNN type0 0 0 0 1 0 0 0 PDU session type type0 0 0 1 0 0 0 0 Preferred access type type (NOTE 2)0 0 0 1 0 0 0 1 Multi-access preference type (NOTE 2)0 0 1 0 0 0 0 0 Non-seamless non-3GPP offload indication type (NOTE 9)0 1 0 0 0 0 0 0 Location criteria type1 0 0 0 0 0 0 0 Time window type1 0 0 0 0 0 0 1 5G ProSe layer-3 UE-to-network relay offload indication type (NOTE 9)1 0 0 0 0 0 1 0 PDU session pair ID type (NOTE 5, NOTE 9)1 0 0 0 0 0 1 1 RSN type (NOTE 5, NOTE 9)1 0 0 0 0 1 0 0 5G ProSe multi-path preference typeAll other values are spare. If received they shall be interpreted as unknown. |
| For "SSC mode type", the route selection descriptor component value field shall be encoded as a one octet SSC mode field. The bits 8 through 4 of the octet shall be spare, and the bits 3 through 1 shall be encoded as the value part of the SSC mode information element defined in clause 9.11.4.16 of 3GPP TS 24.501 [11]. The "SSC mode type" route selection descriptor component shall not appear more than once in the route selection descriptor. |
| For "S-NSSAI type", the route selection descriptor component value field shall be encoded as a sequence of a one octet S-NSSAI length field and an S-NSSAI value field of a variable size. The S-NSSAI value shall be encoded as the value part of the S-NSSAI information element defined in clause 9.11.2.8 of 3GPP TS 24.501 [11], without the mapped HPLMN SST field and without the mapped HPLMN SD field. |
| For "DNN type", the route selection descriptor component value field shall be encoded as a sequence of a one octet DNN length field and a DNN value field of a variable size. The DNN value contains an APN as defined in 3GPP TS 23.003 [4]. |
| For "PDU session type type", the route selection descriptor component value field shall be encoded as a one octet PDU session type field. The bits 8 through 4 of the octet shall be spare, and the bits 3 through 1 shall be encoded as the value part of the PDU session type information element defined in clause 9.11.4.11 of 3GPP TS 24.501 [11]. The "PDU session type type" route selection descriptor component shall not appear more than once in the route selection descriptor. |
| For "preferred access type type", the route selection descriptor component value field shall be encoded as a one octet preferred access type field. The bits 8 through 3 shall be spare, and the bits 2 and 1 shall be encoded as the value part of the access type information element defined in clause 9.11.2.1A of 3GPP TS 24.501 [11]. The "preferred access type type" route selection descriptor component shall not appear more than once in the route selection descriptor. |
| For "multi-access preference type", the route selection descriptor component value field shall be of zero length. The "multi-access preference type" route selection descriptor component shall not appear more than once in the route selection descriptor. The "multi-access preference type" route selection descriptor component in the route selection descriptor indicates the multi-access preference. |
| For "non-seamless non-3GPP offload indication type", the route selection descriptor component shall not include the route selection descriptor component value field. The "non-seamless non-3GPP offload indication type" route selection descriptor component shall not appear more than once in the route selection descriptor. If the "non-seamless non-3GPP offload indication type" route selection descriptor component is included in a route selection descriptor, there shall be no route selection descriptor component with a type other than "non-seamless non-3GPP offload indication type" in the route selection descriptor. |
|  |
| For "location criteria type", the route selection descriptor component value field may contain one or more types of location area and is encoded as shown in Figure 5.2.5 and Table 5.2.2. |
| For "time window type", the route selection descriptor component value field shall be encoded as a sequence of a Starttime field and a Stoptime field. The Starttime field is represented by the number of seconds since 00:00:00 on 1 January 1970 and is encoded as the 64-bit NTP timestamp format defined in IETF RFC 5905 [17], where binary encoding of the integer part is in the first 32 bits and binary encoding of the fraction part in the last 32 bits. The encoding of the Stoptime field is the same as the Starttime field. |
|  |
| For "5G ProSe layer-3 UE-to-network relay offload indication type", the route selection descriptor component shall not include the route selection descriptor component value field. The "5G ProSe layer-3 UE-to-network relay offload indication type" route selection descriptor component shall not appear more than once in the route selection descriptor. If the "5G ProSe layer-3 UE-to-network relay offload indication type" route selection descriptor component is included in a route selection descriptor, there shall be no route selection descriptor component with a type other than "5G ProSe layer-3 UE-to-network relay offload indication type" in the route selection descriptor. If neither "5G ProSe layer-3 UE-to-network relay offload indication type" nor "5G ProSe multi-path preference” is present, the traffic shall not be routed via a 5G ProSe layer-3 UE-to-network relay outside of a PDU Session. |
| For "PDU session pair ID type", the route selection descriptor component value field shall be encoded as a one octet PDU session pair ID field. The PDU session pair ID value shall be encoded as defined in clause 9.11.4.32 of 3GPP TS 24.501 [11]. |
| For "RSN type", the route selection descriptor component value field shall be encoded as a one octet RSN field. The RSN value shall be encoded as the value part of the RSN information element defined in clause 9.11.4.33 of 3GPP TS 24.501 [11].For "5G ProSe multi-path preference type", the route selection descriptor component shall not include the route selection descriptor component value field. The "5G ProSe multi-path preference" route selection descriptor component shall not appear more than once in the route selection descriptor. If the "5G ProSe multi-path preference" route selection descriptor component is included in a route selection descriptor, there shall be no route selection descriptor component with type "5G ProSe layer-3 UE-to-network relay offload indication type" in the route selection descriptor. If neither "5G ProSe layer-3 UE-to-network relay offload indication type" nor "5G ProSe multi-path preference type” is present, the traffic shall not be routed via a 5G ProSe layer-3 UE-to-network relay outside of a PDU Session.Additional indications (octet x+1) (NOTE Y)Additional indications field is used to indicate additional indications related to the URSP rule, and is encoded as shown in Figure 5.2.4A..URSP rule enforcement report indication (URERI) (bit 1 of octet x+1)URSP rule enforcement report indication indicates whether to report the URSP rule enforcement for the associated URSP rule according to clause 4.2.4 (NOTE Z). Bit**1**0 URSP rule enforcement report is not required1 URSP rule enforcement report is requiredBits 2 to 8 of octet x+1 are spare and shall be encoded as zero. If received they shall be interpreted as unknown. |
| NOTE 1: For "OS Id + OS App Id type", the traffic descriptor component value field does not specify the OS version number or the version number of the application.NOTE 2: The PCF does not include both the "preferred access type type" and the "multi-access preference type" route selection descriptor components in a single route selection descriptor. If there are both "preferred access type type" and "multi-access preference type" route selection descriptor components in a single route selection descriptor, the UE ignores the "preferred access type type" route selection descriptor component.NOTE 3: The W-AGF acting on behalf of the FN-RG shall interpret the value as unknown. NOTE 4: The traffic descriptor of a URSP rule cannot include more than one instance of this traffic component type.NOTE 5: Redundant PDU session is not applicable over non-3GPP access. The UE ignores any route selection descriptor which includes "PDU session pair ID type" or "RSN type" route selection descriptor component and also includes a "preferred access type type" route selection descriptor component set to "non-3GPP access" or a "multi-access preference type" route selection descriptor component.NOTE 6: The traffic descriptor of a URSP rule shall not contain both the “Single remote port type” and the “Remote port range type” traffic descriptor components. If the traffic descriptor of a URSP rule contains both the “Single remote port type” and the “Remote port range type” traffic descriptor components, the receiving entity shall ignore the URSP rule.NOTE 7: The traffic descriptor of a URSP rule shall not contain both the “Destination MAC address type” and the “Destination MAC address range type” traffic descriptor components. If the traffic descriptor of a URSP rule contains both the “Destination MAC address type” and the “Destination MAC address range type” traffic descriptor components, the receiving entity shall ignore the URSP rule.NOTE 8: The traffic descriptor component type "PIN ID type" shall be mutually exclusive to the other traffic descriptor components, i.e., if the traffic descriptor of the URSP rule contains both PIN ID and the other traffic descriptor components, the UE shall ignore the other traffic descriptor component and shall use the PIN ID.NOTE 9: Not applicable for PIN traffic.NOTE 10: The precedence value of a URSP rule in a UE policy section associated with network descriptor entry type "one or more VPLMNs" in VPS URSP configuration should be lower than the precedence value of a URSP rule in a UE policy section associated with network descriptor entry type "one or more MCCs" or "any VPLMN" in VPS URSP configuration.NOTE 11: Additional indications field is included when the URSP rule includes an octet following octet x.NOTE 12: A URSP rule can contain this indication only if the URSP rule includes one or more connection capabilities in traffic descriptor component.NOTE 13: The traffic descriptor component type "connectivity group ID" can only be combined with IP descriptors, non-IP descriptors, or both, in the same URSP rule. if the traffic descriptor of the URSP rule contains connectivity group ID and any other traffic descriptor components other than IP descriptors or non-IP descriptors, the receiving entity shall ignore the other traffic descriptor component.NOTE 14: These connection capabilities are traffic categories specified in GSMA PRD NG.135 [GSMA135V3].NOTE 15: The operator specific connection capability identifier can match against a operator specific traffic category as specified in 3GPP TS 23.503 [2]. |

Editor’s Note: (CR0184, PIN) PIN ID format is FFS.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of location criteriaLocation area 1 | octet doctet e=(d+1)octet f |
| Location area 2 | octet f+1\*octet g\* |
| … | octet g+1\*octet h\* |
| Location area m | octet h+1\*octet i\* |

Figure 5.2.5: Location criteria

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Type of location area | octet e |
| Location area contents | octet e+1\*octet f\* |

Figure 5.2.6: Location area

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Number of E-UTRA cell identities | octet e+1 |
| E-UTRA cell id 1 | octet e+2octet e+8 |
| E-UTRA cell id 2 | octet e+9octet e+15 |
| … | octet e+16octet j-1\* |
| E-UTRA cell id n | octet j\*octet f=(j+6)\* |

Figure 5.2.7: Location area contents {Type of location area = E-UTRA cell identities list}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Number of NR cell identities | octet e+1 |
| NR cell id 1 | octet e+2octet e+9 |
| NR cell id 2 | octet e+10octet e+17 |
| … | octet e+18octet k-1\* |
| NR cell id n | octet k\*octet f=(k+7)\* |

Figure 5.2.8: Location area contents {Type of location area = NR cell identities list}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Number of Global gNB identities | octet e+1 |
| Global gNB id 1 | octet e+2octet e+8 |
| Global gNB id 2 | octet e+9octet e+15 |
| … | octet e+16octet l-1\* |
| Global gNB id n | octet l\*octet f=(l+6)\* |

Figure 5.2.9: Location area contents {Type of location area = Global RAN node identities list}

Table 5.2.2: Location criteria

|  |
| --- |
| Length of location criteria (octect d)This field indicates the length of the included Location criteria contents.Type of location area is coded as follows. |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |  | E-UTRA cell identities list |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |  | NR cell identities list |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |  | Global RAN node identities list |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |  | TAI list |
| All other values are spare. |
|  |
| When the type of location area is "E-UTRA cell identities list", the location area contents shall be encoded as in Figure 5.2.7. Each E-UTRA cell id field is of 7 octet size and shall be encoded as specified in clause 9.3.1.9 of 3GPP TS 38.413 [14]. |
|  |
| When the type of location area is "NR cell identities list", the location area contents shall be encoded as in Figure 5.2.8. Each NR cell id field is of 8 octet size shall be encoded as specified in clause 9.3.1.7 of 3GPP TS 38.413 [14]. |
|  |
| When the type of location area is "Global RAN node identities list", the location area contents shall be encoded as in Figure 5.2.9. Each Global gNB id field is of 7 octet size shall be encoded as specified in clause 9.3.1.6 of 3GPP TS 38.413 [14]. (NOTE 1) |
|  |
| When the type of location area is "TAI list", the location area contents shall be encoded as the 5GS tracking area identity list information element (starting with octet 2) defined in clause 9.11.3.9 of 3GPP TS 24.501 [11]. |
|  |
| NOTE 1: If the Global gNB id field includes a gNB id with a length of less than 32 bits, the most significant bits of the 4 octets field containing the gNB id are padded with zeros. |

## 5.3 Encoding of UE policy part type ANDSP

### 5.3.1 General

The purpose of the ANDSP is to indicate the WLAN Selection Policy (WLANSP) and non-3GPP access network (N3AN) node configuration information related to access network discovery and selection and N3AN node selection for non-3GPP access network.

The ANDSP is encoded as shown in figures 5.3.1.1 to 5.3.1.3 and table 5.3.1.1 according to UE policy part top level format (see Annex D of 3GPP TS 24.501 [11]).

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| UE policy part contents length | octet 1octet 2 |
| 0 | 0 | 0 | 0 | UE policy part type={ANDSP} | octet 3 |
| Spare |
| UE policy part contents={ANDSP contents} | octet 4octet x |

Figure 5.3.1.1: UE policy part when UE policy part type = {ANDSP}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| ANDSP info #1 | octet 4octet a |
| ANDSP info #2 | octet a+1octet b |
| … | octet b+1octet w |
| ANDSP info #n | octet w+1octet x |

Figure 5.3.1.2: ANDSP contents

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| 0 | 0 | 0 | 0 | ANDSP Info type | octet k |
| Spare |
| Length of ANDSP info contents | octet k+1octet k+2 |
| ANDSP info contents | octet k+3octet l |

Figure 5.3.1.3: ANDSP Info

Table 5.3.1.1: ANDSP information format

|  |
| --- |
| UE policy part type field is set to '00000010' (=ANDSP) as specified in 3GPP TS 24.501 [4] Annex D. |
|  |
| UE policy part contents length field indicate the length of the ANDSP contents in octets. |
| ANDSP contents (octets 4 to x) |
|  |
| ANDSP contents consist of 1 or more ANDSP info (see figure 5.3.1.2). |
|  |
| ANDSP Info type (bit 1 to 4 of octet k) shall be set according to the following: |
| Bits |
| 4 | 3 | 2 | 1 |  |
| 0 | 0 | 0 | 0 | Reserved |
| 0 | 0 | 0 | 1 | WLANSP |
| 0 | 0 | 1 | 0 | N3AN node configuration information |
| All other values are reserved. |
|  |
| Bits 8 to 5 of octet k are spare and shall be encoded as zero. |
|  |
| Length of ANDSP info contents (octets k+1 to k+2) indicates the length of the ANDSP info contents field. |
|  |
| ANDSP info contents (octets k+3 to l) can be WLANSP (see clause 5.3.2) or N3AN node configuration information (see clause 5.3.3). |

### 5.3.2 Encoding of WLANSP

The purpose of the WLANSP field is to indicate the rules related to selection and reselection of a WLAN.

The WLANSP field is encoded as shown in figures 5.3.2.1 to 5.3.2.21 and table 5.3.2.1.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| 0 | 0 | 0 | 0 | ANDSP Info type={WLANSP} | octet 1 |
| Spare |
| Length of ANDSP info contents | octet 2octet 3 |
| ANDSP info contents={WLANSP contents } | octet 4octet x |

Figure 5.3.2.1: ANDSP Info = {WLANSP}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| WLANSP rule 1 | octet 4octet u |
| WLANSP rule 2 | octet u+1\*octet v\* |
| … | octet v+1\*octet w\* |
| WLANSP rule n | octet w+1\*octet x\* |

Figure 5.3.2.2: WLANSP contents

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of WLANSP rule | octet 4octet 5 |
| Rule identifier | octet 6 |
| Rule priority | octet 7 |
| Roaming | validity area ind | 3GPP loc ind | WLAN loc ind | Geo loc ind | time of day ind | 0spare | 0spare | octet 8 |
| Selection criteria | octet 9octet r |
| Validity area | octet r+1\*octet s\* |
| Time of day | octet s+1\*octet u\* |

Figure 5.3.2.3: WLANSP rule

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of selection criteria | octet 9octet 10 |
| number of selection criteria entries | octet 11 |
| Selection criteria entry 1 | octet 12octet a |
| Selection criteria entry 2 | octet a+1\*octet b\* |
| … | octet b+1\*octet c\* |
| Selection criteria entry n | octet c+1\*octet r\* |

Figure 5.3.2.4: Selection criteria

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of selection criteria entry | octet 12octet 13 |
| Spare | MaxBSSload ind | Home network ind | Criteria priority | octet 14 |
| Maximum BSS load value | octet 15octet 16 |
| Selection criteria set 1 | octet 17octet t\* |
| … | octet t+1\*octet y\* |
| Selection criteria set n (n <= 5) | octet y+1\*octet a\* |

Figure 5.3.2.4a: Selection criteria entry

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of selection criteria set | octet 17octet 18 |
| Selection criteria set type{preferred SSID list,preferred roaming partner list,required protocol port tuple,SP exclusion list,minimum backhaul threshold, slice-based TNAN list } | Number of sub entries | octet 19 |
| Sub entry 1 | octet 20octet aa |
| … | octet aa+1octet bb |
| Sub entry n | octet cc+1octet dd |

Figure 5.3.2.4b: Selection criteria set

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of sub entry {set type = preferred SSID list} | octet 20 |
| WLAN priority | octet 21 |
| 0Spare | HESSID ind | SSID ind | octet 22 |
| SSID length | octet 23\* |
| SSID | octet 24\*octet ee\* |
| HESSID | octet ee+1\*octet ee+6\* |

Figure 5.3.2.4c: Selection criteria sub entry {selection criteria set type = preferred SSID list}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of sub entry {set type = preferred roaming partner list} | octet 20 |
| Priority | octet 21 |
| FQDN\_Match length | octet 22 |
| FQDN\_Match | octet 23octet ee\* |
| Country length | octet ee+1 |
| Country | octet ee+2octet ff\* |

Figure 5.3.2.4d: Selection criteria sub entry {selection criteria set type = preferred roaming partner list}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of sub entry {set type = required protocol port tuple} | octet 20 |
| IP protocol | octet 21 |
| Length of port number | octet 22 |
| Port number | octet 23octet ff |

Figure 5.3.2.4e: Selection criteria sub entry {selection criteria set type = required protocol port tuple}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of sub entry {set type = SP exclusion list} | octet 20 |
| SSID | octet 21octet ff\* |

Figure 5.3.2.4f: Selection criteria sub entry {selection criteria set type = SP exclusion list}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Spare | ULBI | DLBI | Network type | octet 20 |
| Downlink bandwidth | octet 21octet 24 |
| Uplink bandwidth | octet 25octet 28 |

Figure 5.3.2.4g: Selection criteria sub entry {selection criteria set type = minimum backhaul threshold}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of sub entry {set type = slice-based TNAN list} | octet 20 |
| TNGF ID length | octet 21 |
| TNGF ID | octet 22octet ss |
| S-NSSAI list | octet ss+1octet kk |
| SSID list | octet kk+1octet rr |

|  |  |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

Figure 5.3.2.4h:Selection criteria sub entry {selection criteria set type = slice-based TNAN list}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| length of validity area | octet r+1octet r+2 |
| number of location entries | octet r+3 |
| location entry 1 | octet r+4octet d |
| …. | octet d+1\*octet e\* |
| location entry m | octet e+1\*octet s\* |

Figure 5.3.2.5: Validity area

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of location entry | octet r+4\*octet r+5\* |
| entry type {3GPP, WLAN, Geo} | number of sub entries | octet r+6\* |
| sub entry contents | octet r+7\*octet d\* |

Figure 5.3.2.6: Location entry

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of location entry | octet r+4\*octet r+5\* |
| entry type= {3GPP location} | number of sub entries | octet r+6\* |
| 3GPP location sub entry 1 | octet r+7octet f |
| 3GPP location sub entry 2 | octet f+1\*octet g\* |
| … | octet g+1\*octet h\* |
| 3GPP location sub entry o | octet h+1\*octet d\* |

Figure 5.3.2.7: Location entry {entry type =3GPP location}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of location entry | octet r+4\*octet r+5\* |
| entry type= {WLAN location } | number of sub entries | octet r+6\* |
| WLAN location sub entry 1 | octet r+7octet f |
| WLAN location sub entry 2 | octet f+1\*octet g\* |
| … | octet g+1\*octet h\* |
| WLAN location sub entry p | octet h+1\*octet d\* |

Figure 5.3.2.8: Location entry {entry type =WLAN location}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of location entry | octet r+4\*octet r+5\* |
| entry type= {Geo location } | number of sub entries | octet r+6\* |
| Geo location sub entry 1 | octet r+7octet f |
| Geo location sub entry 2 | octet f+1\*octet g\* |
| … | octet g+1\*octet h\* |
| Geo location sub entry q | octet h+1\*octet d\* |

Figure 5.3.2.9: Location entry {entry type =Geo location}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of 3GPP location sub entry | octet r+7octet r+8 |
| MCC digit 2 | MCC digit 1 | octet r+9 |
| MNC digit 3 | MCC digit 3 | octet r+10 |
| MNC digit 2 | MNC digit 1 | octet r+11 |
| number of location fields  | octet r+12\* |
| 3GPP location field 1 | octet r+13\*octet l\* |
| … | octet l+1\*octet m\* |
| 3GPP location field n | octet m+1\*octet f\* |

Figure 5.3.2.10: Location sub entry {entry type= 3GPP location}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of location sub entry | octet r+7octet r+8 |
| number of location fields  | octet r+9\* |
| WLAN or Geo location field 1 | octet r+10\*octet l\* |
| … | octet l+1\*octet m\* |
| WLAN or Geo location field n | octet m+1\*octet f\* |

Figure 5.3.2.10a: Location sub entry {entry type= WLAN location or Geo location}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Anchor latitude | octet r+10\*octet r+13\* |
| Anchor longitude | octet r+14\*octet r+17\* |
| Radius | octet r+18\*octet r+19\* |

Figure 5.3.2.11a: Location field {entry type= Geo location}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of 3GPP location field | octet r+13\* |
| 3GPP location field type  | octet r+14 |
| 3GPP location field contents | octet r+15\*octet l\* |

Figure 5.3.2.11b: Location field {entry type= 3GPP location}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of WLAN location field | octet r+10 |
| WLAN location field type  | octet r+11 |
| WLAN location field contents | octet r+12\*octet l\* |

Figure 5.3.2.11c: Location field {entry type= WLAN location}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of 3GPP location field | octet r+13\* |
| field type = {TAC} | octet r+14 |
| TAC | octet r+15 |

Figure 5.3.2.12: 3GPP location field {field type = TAC}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of 3GPP location field | octet r+13\* |
| field type = {EUTRA CI} | octet r+14 |
| EUTRA CI | octet r+15octet r+16 |

Figure 5.3.2.13: 3GPP location field {field type = EUTRA CI}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of 3GPP location field | octet r+13\* |
| field type = {NR CI} | octet r+14 |
| NR CI | octet r+15octet r+17 |

Figure 5.3.2.14: 3GPP location field {field type = NR CI}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of WLAN location field | octet r+10\* |
| field type = {HESSID} | octet r+11 |
| HESSID | octet r+12octet r+17 |

Figure 5.3.2.14a: WLAN location field {field type = HESSID}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of WLAN location field | octet r+10\* |
| field type = {SSID} | octet r+11 |
| SSID | octet r+12octet l\* |

Figure 5.3.2.14b: WLAN location field {field type = SSID}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of WLAN location field | octet r+10\* |
| field type = {BSSID} | octet r+11 |
| BSSID | octet r+12octet r+17 |

Figure 5.3.2.14c: WLAN location field {field type = BSSID}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of time of day | octet s+1octet s+2 |
| number of time of day entries | octet s+3 |
| Time of day entry 1 | octet s+4octet n1 |
| Time of day entry 2 | octet n1+1\*octet n2\* |
| … | octet n2+1\*octet n3\* |
| Time of day entry n | octet n3+1\*octet u\* |

Figure 5.3.2.15: Time of day

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of time of day entry | octet s+4octet s+5 |
| number of sub fields | octet s+6\* |
| ToD sub field 1 | octet s+7octet z1 |
| ToD sub field 2 | octet z1+1\*octet z2\* |
| … | octet z2+1\*octet z3\* |
| ToD sub field y | octet z3+1\*octet n1\* |

Figure 5.3.2.16: Time of day sub field

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of ToD sub field | octet s+7\* |
| ToD sub field type | octet s+8\* |
| ToD sub field contents | octet s+9octet f |

Figure 5.3.2.17: ToD sub field

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of ToD sub field | octet s+7\* |
| ToD sub field type ={time start, time stop} | octet s+8\* |
| ToD sub field contents  | octet s+9octet f |

Figure 5.3.2.18: ToD sub field {field type = "time start" or "time stop"}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of ToD sub field | octet s+7\* |
| ToD sub field type ={ date start, date stop } | octet s+8\* |
| ToD sub field contents | octet s+9octet f |

Figure 5.3.2.19: ToD sub field {field type = "date start" or "date stop"}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of ToD sub field | octet s+7\* |
| ToD sub field type ={ day of week} | octet s+8\* |
| 1 | Mon | Tue | Wed | Thu | Fri | Sat | Sun | octet s+9 |

Figure 5.3.2.20: ToD sub field {field type = "day of the week"}

|  |  |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Number of SSIDs | octet kk+1 |
| Length of SSID 1 | octet kk+2 |
| SSID 1 | octet kk+3octet ii |
| Length of SSID 2 | octet ii+1\* |
| SSID 2 | octet ii+2\*octet ji\* |
| … | octet jj+1\*octet nn\* |
| Length of SSID n | octet nn+1\* |
| SSID n | octet nn+2\*octet uu\* |

Figure 5.3.2.21: SSID list

Table 5.3.2.1: WLANSP information element

|  |
| --- |
| Value part of the WLANSP information element (octets 4 to x) |
|  |
| ANDSP Info type (bit 1 to 4 of octet 1) shall be set to "0001" (WLANSP) |
|  |
| Bits 8 to 5 of octet 1 are spare and shall be encoded as zero. |
|  |
| Length of WLANSP contents (octets 2 to 3) |
|  |
| Length of WLANSP rule (octets 4 to 5) |
|  |
| Rule Identifier (octet 6) |
|  |
| This field contains the binary encoding of the WLANSP rule identifier |
|  |
| Rule priority (octet 7) |
|  |
| This field contains the binary encoding of the WLANSP rule priority |
|  |
| Spare bits and shall be encoded as zero (bits 1 to 2 of octet 8) |
|  |
| Time of day index (bit 3 of octet 8) |
| Bit |
|

|  |  |  |
| --- | --- | --- |
| 3 |  |  |
| 0 |  | WLANSP rule does not include time of day information |
| 1 |  | WLANSP rule includes time of day information |

 |
|  |
| Geo location index (bit 4 of octet 8) |
| Bit |
|

|  |  |  |
| --- | --- | --- |
| 4 |  |  |
| 0 |  | WLANSP rule does not include Geo location information |
| 1 |  | WLANSP rule includes Geo location information |

 |
|  |
| WLAN location index (bit 5 of octet 8) |
| Bit |
|

|  |  |  |
| --- | --- | --- |
| 5 |  |  |
| 0 |  | WLANSP rule is not for WLAN location |
| 1 |  | WLANSP rule is for WLAN location |

 |
|  |
| 3GPP location index (bit 6 of octet 8) |
| Bit |
|

|  |  |  |
| --- | --- | --- |
| 6 |  |  |
| 0 |  | WLANSP rule is not for 3GPP location |
| 1 |  | WLANSP rule is for 3GPP location |

 |
|  |
| Validity area index (bit 7 of octet 8) |
| Bit |
|

|  |  |  |
| --- | --- | --- |
| 7 |  |  |
| 0 |  | WLANSP rule is not for validity area |
| 1 |  | WLANSP rule is for validity area |

 |
|  |
|  |
| Roaming (bit 8 of octet 8) (NOTE 1) |
| Bit |
| 8 |  |  |
| 0 |  | WLANSP rule is only valid when the UE is not roaming |
| 1 |  | WLANSP rule is only valid when the UE is roaming |
|  |
| Selection criteria (octets 9 to r) |
|  |
| This field contains the binary encoding of the selection criteria for a particular WLANSP rule.  |
|  |
| Selection criteria entry (octets 12 to a) (NOTE 2)Length of selection criteria entry (octets 12 to 13) indicates length of subsequent fields in the selection criteria entry.Criteria priority (bits 1-5 of octet 14): the lower value indicates the selection criteria having the higher priority among the selection criteria in the WLANSP rule.Home network ind (bit 6 of octet 14): (NOTE 3)Bit**6**0 all WLANs could match this selection criteria entry.1 only the WLANs that are operated by the home operator could match this selection criteria entry.MaxBSSload ind (bit 7 of octet 14):Bit**7**0 maximum BSS load value (octets 15 to 16) not present1 maximum BSS load value (octets 15 to 16) presentMaximum BSS load value (octets 15 to 16) is as the node PerProviderSubscription/<X+>/Policy/MaximumBSSLoadValue defined in Hotspot 2.0 (Release 2) Technical Specification [9]. |
|  |
| Selection criteria set (octets 17 to dd) contains the contents of a specific criteria set. In this release of specification there can be 5 types of criteria sets.Selection criteria set type (bits 5-8 of octet 19) is coded as follows.Bits**8 7 6 5**0 0 0 1 preferred SSID list (NOTE 4)0 0 1 0 preferred roaming partner list (NOTE 5)0 0 1 1 required protocol port tuple0 1 0 0 SP exclusion list0 1 0 1 minimum backhaul thresholdAll other values are reserved. |
| Selection criteria sub entry (octets 20 to ee+6) when set type is "*preferred SSID list*" is coded as follows.Length of sub entry (octet 20) indicates length of subsequent fields in the selection criteria sub entry.WLAN priority (octet 21): the lower WLAN priority value indicates the WLAN having the higher priority among the WLANs in the preferred SSID list.SSID ind (bit 1 of octet 22):Bit**5**0 SSID field (octets 24 to ee) is not present.1 SSID field (octets 24 to ee) is present.HESSID ind (bit 2 of octet 22):Bit**6**0 HESSID field (octets ee+1 to ee+6) is not present.1 HESSID field (octet ee+1 to ee+6) is present.SSID length (octet 23) indicates the length of the SSID field.SSID field (octets 24 to ee) is an Octet String which shall have a maximum length of 32 octets (see IEEE Std 802.11 [8]).HESSID field (octets ee+1 to ee+6) is a 6 octet MAC address that identifies the homogeneous ESS (see IEEE Std 802.11 [8]). |
| Selection criteria sub entry (octets 20 to ff) when set type is "*preferred roaming partner list*" is coded as follows.Length of sub entry (octet 20) indicates length of subsequent fields in the selection criteria sub entry.Priority (octet 21): the lower priority value indicates the higher priority in the preferred roaming partner list.FQDN\_Match length (octet 22) indicates the length of the FQDN\_Match field.FQDN\_Match field (octets 23 to ee) is as the node PerProviderSubscription/<X+>/Policy/PreferredRoamingPartnerList/<X+>/FQDN\_Match defined in Hotspot 2.0 (Release 2) Technical Specification [9].Country length (octet ee+1) indicates the length of the country field.Country field (octets ee+2 to ff) is as the node PerProviderSubscription/<X+>/Policy/PreferredRoamingPartnerList/<X+>/Country defined in Hotspot 2.0 (Release 2) Technical Specification [9].Selection criteria sub entry (octets 20 to ff) when set type is "*required protocol port tuple*" is coded as follows.Length of sub entry (octet 20) indicates length of subsequent fields in the selection criteria sub entry.IP protocol field (octet 21) shall be present in the sub entry and refers to IP protocol field in IPv4 packets or the next header field in IPv6 packets. It is required by operator-supported application(s) on UE as specified in Hotspot 2.0 (Release 2) Technical Specification [9].Length of port number (octet 22) indicates the length of port number field.Port number field (octets 23 to ff) is as the node PerProviderSubscription/<X+>/Policy/RequiredProtoPortTuple/<X+>/PortNumber defined in Hotspot 2.0 (Release 2) Technical Specification [9]. |
| Selection criteria sub entry (octets 20 to ff) when set type is "*SP exclusion list*" is coded as follows.Length of sub entry (octet 20) indicates length of subsequent fields in the selection criteria sub entry, i.e. the length of SSID field.SSID field (octets 21 to ff) is as the node PerProviderSubscription/<X+>/Policy/SPExclusionList/<X+>SSID defined in Hotspot 2.0 (Release 2) Technical Specification [9]. |
| Selection criteria sub entry (octets 20 to 28) when set type is "*minmum backhaul threshold*" is coded as follows.Network type (bit 1-2 of octet 20) is coded as follows according to the definition of the node PerProviderSubscription/<X+>/Policy/MinBackhaulThreshold/<X+>/NetworkType in Hotspot 2.0 (Release 2) Technical Specification [9].Bits**2 1**0 0 home0 1 roamingAll other values are reserved.DLBI (bit 3 of octet 20):Bit**3**0 Downlink bandwidth field (octets 21 to 24) is not present.1 Downlink bandwidth field (octets 21 to 24) is present.ULBI (bit 4 of octet 20):Bit**4**0 Uplink bandwidth field (octets 25 to 28) is not present.1 Uplink bandwidth field (octets 25 to 28) is present. |
| Downlink bandwidth field (octets 21 to 24) is as the node PerProviderSubscription/<X+>/Policy/MinBackhaulThreshold/<X+>/DLBandwidth defined in Hotspot 2.0 (Release 2) Technical Specification [9].Uplink bandwidth field (octets 25 to 28) is as the node PerProviderSubscription/<X+>/Policy/MinBackhaulThreshold/<X+>/ULBandwidth defined in Hotspot 2.0 (Release 2) Technical Specification [9]. |
| Validity area (octets r+1 to s) |
|  |
| This field contains the binary encoding of the validity area for a particular WLANSP rule.  |
|  |
|  |
|  |
|  |
|  |
| Entry type (bits 7-8 of octet r+6) is coded as follows:Bits**8 7**0 1 3GPP location1 0 WLAN location1 1 Geo locationAll other values are reserved. |
| Length of 3GPP location sub entry (octets r+7 to r+8) |
|  |
| This field contains the length of the location entry when the WLANSP rule is for validity area of a 3GPP location. |
|  |
| MCC, Mobile country code (octet r+9, and bits 4 to 1 of octet r+10) |
|  |
| The MCC field is coded as in ITU-T Recommendation E.212 [10], annex A. |
|  |
| MNC, Mobile network code (bits 8 to 5 of octet r+10, and octet r+11) |
|  |
| The encoding of this field is the responsibility of each administrationbutBCDencodingshall be used. The MNC shall consist of 2 or 3 digits. If a network operator may decide to use only two digits in the MNC over the radio interface, MNC digit 3 shall be encoded as "1111". |
|  |
| When the location entry type is "geo location", the location field in this entry has fixed length as shown in figure 5.3.2.11a.Anchor latitude (octets r+10 to r+13) is defined in clause 6.1 of 3GPP TS 23.032 [7].Anchor longitude (octets r+14 to r+17) is defined in clause 6.1 of 3GPP TS 23.032 [7].Radius (octets r+18 to r+19) is given in meters and is defined in clause 6.6 of 3GPP TS 23.032 [7]. |
|  |
| Location field type (octet r+14) when entry type is 3GPP location, orLocation field type (octet r+11) when entry type is WLAN location.This field indicates the type of location field.Bits8 7 6 5 4 3 2 10 0 0 0 0 0 0 1 TAC0 0 0 0 0 0 1 0 EUTRA CI0 0 0 0 0 1 0 0 NR CI1 0 0 0 0 0 0 1 HESSID1 0 0 0 0 0 1 0 SSID1 0 0 0 0 1 0 0 BSSIDAll other values are reserved. |
|  |
| When 3GPP location field type is set to "TAC", the TAC field is as defined in 3GPP TS 23.003 [4]. TAC has a length of 3 octets.When 3GPP location field type is set to "EUTRA CI", the EUTRA CI field is set to the E-UTRAN cell identity part of the E-UTRAN Cell Global Identifier, as defined in 3GPP TS 36.413 [6A]. E-UTRAN cell identity has a length of 28 bits and is represented by 4 octets by zero-padding the most 4 significant bits of the 4th octet.When 3GPP location field type is set to "NRCI", the NR CI field is set to the NR cell identity part of the NR Cell Global Identifier as defined in 3GPP TS 38.413 [14]. NR cell identity has a length 36 bits and is represented by 5 octets by zero-padding the most 4 significant bits of the 5th octet.When WLAN location field type is set to "HESSID", the HESSID field is set to a 6 octet MAC address that identifies the homogeneous ESS (see IEEE Std 802.11 [8]).When WLAN location field type is set to "SSID", the SSID field is set to an Octet String which shall have a maximum length of 32 octets (see IEEE Std 802.11 [8]).When WLAN location field type is set to "BSSID", the BSSID field is set to an Octet String which shall be 6 octets long (see IEEE Std 802.11 [8]). |
| Time of day (octets s+1 to u) |
|  |
| This field contains the binary encoding of the time of day condition for a particular WLANSP rule.  |
|  |
| ToD sub field type ={time start, time stop, date start, date stop, day of week} (octet s+8)Bits8 7 6 5 4 3 2 10 0 0 0 0 0 0 1 time start0 0 0 0 0 0 1 0 time stop0 0 0 0 0 1 0 0 date start0 0 0 0 1 0 0 0 date stop0 0 0 1 0 0 0 0 day of the weekAll other values are reserved.when field type is set to "time start" or "time stop", the value of this ToD sub field contents is time of the day represented in string format, as defined in ISO 8601:2004 [13]When field type is set to "date start" or "date stop", the value of this ToD sub field contents is a date represented in string format, as defined in ISO 8601:2004 [13].When field type is set to "day of the week", the value of this ToD sub field contents is an 8-bit integer formatted as a bitmap representing days of the week. The most significant bit is set to one. The remaining bits represent days of the week. |
|  |
|  |
| TNGF ID length (octet 21) indicates the length of the TNGF ID field. |
| TNGF ID (octets 22 to ss) |
| The TNGF ID field is an octet string that indicates the TNGF ID. |
|  |
| S-NSSAI list (octets ss+1 to kk) |
| The S-NSSAI list indicates the list of S-NSSAI(s) that are supported by the indicated TNGF. The content of each S-NSSAI list is coded as the NSSAI IE in 3GPP TS 24.501 [11] starting from octet 2 |
|  |
| Number of SSIDs (octet kk+1) |
| The Number of SSIDs indicates the numbers of SSID entries, where each SSID entry consists of a Length of SSID field and an SSID field. |
|  |
| Length of SSID (octet kk+2) indicates the length of the SSID field. |
| SSID (octets kk+3 to ii) |
| The SSID field is an octet string which shall have a maximum length of 32 octets (see IEEE Std 802.11 [8]). |
|  |
| NOTE 1: The value of roaming is valid only if the WLANSP rule is provided by the H-PCF.NOTE 2: The group of selection criteria as described in clause 4.3.2.1 is encoded as selection criteria entry.NOTE 3: The home network indication shall not be set by V-PCF.NOTE 4: If the home network indication bit is set to "1", the preferred SSID list shall not be present.NOTE 5: If the home network indication bit is set to "1", the preferred roaming partner list shall not be present. The preferred roaming partner list is provided by H-PCF only. |

### 5.3.3 Encoding of N3AN node configuration information

#### 5.3.3.1 General

The purpose of the N3AN node configuration information is to indicate the non-3GPP access network (N3AN) node configuration information to the UE for selection of either N3IWF or ePDG for accessing 5GCN or EPC respectively via non-3GPP access.

The N3AN node configuration information is encoded as shown in figure 5.3.3.1.1, table 5.3.3.1.1, figure 5.3.3.1.2, table 5.3.3.1.2.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| 0 | 0 | 0 | 0 | ANDSP Info type={N3AN-node-configuration-information} | octet x |
| Spare |
| Length of ANDSP info contents | octet x+1octet x+2 |
| ANDSP info contents={N3AN node configuration information contents} | octet x+3octet z |

Figure 5.3.3.1.1: ANDSP info containing N3AN node configuration information, where x=k

Table 5.3.3.1.1: N3AN node configuration information

|  |
| --- |
| ANDSP Info type (bit 1 to 4 of octet x) shall be set to "0010" (N3AN node configuration information) |
|  |
| Bits 8 to 5 of octet x are spare and shall be encoded as zero. |
|  |
| Length of ANDSP info contents (octets x+1 to x+2) indicates the length of the N3AN node configuration information contents. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of N3AN node selection information | octet x+3octet x+4 (see NOTE) |
| Content of N3AN node selection information | octet (x+5)\*octet (v)\*(see NOTE) |
| N3AN node configuration information type(type = home N3IWF identifier configuration) | octet v+1\* |
| Length of home N3IWF identifier configuration  | octet v+2\*octet v+3\* |
| Content of home N3IWF identifier configuration | octet v+4\*octet w\* |
| N3AN node configuration information type(type = home ePDG identifier configuration) | octet w+1\* |
| Length of home ePDG identifier configuration  | octet w+2\*octet w+3\* |
| Content of home ePDG identifier configuration | octet w+4\*octet z\* |
| N3AN node configuration information type(type = extended home N3IWF identifier configuration) | octet z+1\* |
| Length of extended home N3IWF identifier configuration | octet z+2\*octet z+3\* |
| Content of extended home N3IWF identifier configuration | octet z+4\*octet y\* |
| N3AN node configuration information type(type = slice-specific N3IWF prefix configuration) | octet y+1\* |
| Length of slice-specific N3IWF prefix configuration | octet y+2\*octet y+3\* |
| Content of slice-specific N3IWF prefix configuration | octet y+4\*octet t\* |

Figure 5.3.3.1.2: N3AN node configuration information contents

Table 5.3.3.1.2: Content of N3AN node configuration information

|  |
| --- |
| N3AN node configuration information type is coded as follows. |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |  | Home N3IWF identifier configuration |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |  | Home ePDG identifier configuration |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |  | Extended home N3IWF identifier configuration |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |  | Slice-specific N3IWF prefix configuration |
| All other values are reserved. |
|  |
| N3AN node selection information field (octet x+5 to v) shall be present and the content is as encoded in clause 5.3.3.2 (NOTE). |
|  |
| Home N3IWF identifier configuration field (octet v+1 to w) may be present and the content is as encoded in clause 5.3.3.3. |
|  |
| Home ePDG identifier configuration field (octet w+1 to z) may be present and the content is is as encoded in clause 5.3.3.4. |
|  |
| Extended home N3IWF identifier configuration field (octet z+1 to y) may be present and the content is as encoded in clause 5.3.3.5. |
|  |
| Slice-specific N3IWF prefix configuration field (octet y+1 to t) may be present and the content is as encoded in clause 5.3.3.6. |
|  |
| NOTE: If the N3AN node configuration information is provided by VPLMN, then length of N3AN node selection information field shall be set to zero. If the N3AN node configuration information is provided by HPLMN, then length of N3AN node selection information field shall be set to non-zero.  |

#### 5.3.3.2 N3AN node selection information

The content of N3AN node selection information contains a sequence of the N3AN node selection information entries. Each N3AN node selection information entry contains a PLMN ID and information for the PLMN ID. The content of N3AN node selection information contains at least an N3AN node selection information entry with information for the HPLMN and an N3AN node selection information entry for "any\_PLMN".

NOTE: If N3AN node selection information does not contain at least:

 - an N3AN node selection information entry with information for the HPLMN; and

 - an N3AN node selection information entry for "any\_PLMN";

 the N3AN node selection information is handled as a syntactically incorrect IE according to 3GPP TS 24.501 [11].

The content is encoded according to figure 5.3.3.2.1, figure 5.3.3.2.2 and table 5.3.3.2.1.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| N3AN node selection information entry 1 | octet x+5 |
| octet y |
| N3AN node selection information entry 2 | octet y+1octet t |
| … |  |
| N3AN node selection information entry n | octet uoctet v |

Figure 5.3.3.2.1: Content of N3AN node selection information

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of N3AN node selection information entry | octet x+5 |
| MCC digit 2 | MCC digit 1 | octet x+6 |
| MNC digit 3 | MCC digit 3 | octet x+7 |
| MNC digit 2 | MNC digit 1 | octet x+8 |
| FQDN format | Preference | Priority | octet x+9 |

Figure 5.3.3.2.2: N3AN node selection information entry

Table 5.3.3.2.1: N3AN node selection information

|  |
| --- |
| Length of N3AN node selection information entry (octet x+5) contains length of subsequent fields in the N3AN node selection information entry. |
| PLMN ID (octet x+6 to x+8)The PLMN ID field shall be set to zero if it indicates "any\_PLMN".  |
|  |
| MCC, Mobile country code (octet x+6, and bits 4 to 1 of octet x+7) |
| The MCC field is encoded as in ITU-T Recommendation E.212 [10], annex A. |
|  |
| MNC, Mobile network code (bits 8 to 5 of octet x+7, and octet x+8) |
| The encoding of this field is the responsibility of each administration but BCD coding shall be used. The MNC shall consist of 2 or 3 digits. If a network operator decides to use only two digits in the MNC, MNC digit 3 shall be encoded as "1111". |
|  |
| Priority (bits 5 to 1 of octet x+9)The priority field indicates the preference order given to N3AN nodes of a PLMN. The lower value indicates higher priority. If the PLMN is the UE's HPLMN or the PLMN ID indicates "any\_PLMN", this priority filed shall be ignored by the receiving entity. |
|  |
| Preference (bit 6 of octet x+9)The preference field indicates which N3AN node type is preferred in this PLMN and is encoded as follows. |
| **6** |  |
| 0 | N3IWF is preferred |
| 1 | ePDG is preferred |
|  |
| FQDN format (bits 8 to 7 of octet x+9)The FQDN format indicates format to be used when the FQDN is constructed by the UE. This field is encoded as follows. |
| **8** | **7** |  |
| 0 | 0 | Operator identifier based ePDG FQDN format or operator identifier based N3IWF FQDN. |
| 0 | 1 | Tracking/location area identity based ePDG FQDN format or tracking area identity based N3IWF FQDN format. |
| All other values are reserved. |
|  |

#### 5.3.3.3 Home N3IWF identifier configuration

The content of home N3IWF identifier configuration contains a list of home N3IWF identifier entries.

The content of home N3IWF identifier configuration is encoded according to figure 5.3.3.3.1.

The content of each home N3IWF identifier entry is coded according to figure 5.3.3.3.2, figure 5.3.3.3.3 and table 5.3.3.3.1.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Home N3IWF identifier entry 1 | octet v+4 |
| octet u |
| Home N3IWF identifier entry 2 | octet u+1octet m |
| … |  |
| Home N3IWF identifier entry n | octet w |

Figure 5.3.3.3.1: Content of home N3IWF identifier configuration

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Home N3IWF identifier type | octet v+4 |
| Home N3IWF IP addresses | octet v+5octet x |

Figure 5.3.3.3.2: Home N3IWF identifier entry (Home N3IWF identifier type = "IPv4", "IPv6" or "IPv4v6")

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Home N3IWF identifier type | octet v+4 |
| Length of home N3IWF FQDN | octet v+5 |
| Home N3IWF FQDN | octet v+6octet x |

Figure 5.3.3.3.3: Home N3IWF identifier entry (Home N3IWF identifier type = "FQDN")

Table 5.3.3.3.1: Home N3IWF identifier entry

|  |
| --- |
| Home N3IWF identifier type (octet v+4) is set as follows: |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |  | IPv4 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |  | IPv6 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |  | IPv4v6 |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |  | FQDN |
| All other values are reserved. |
|  |
| If the home N3IWF identifier type indicates IPv4, then the home N3IWF IP addresses field in figure 5.3.3.3.2 contains an IPv4 address in octet v+5 to octet v+8. |
|  |
| If the home N3IWF identifier type indicates IPv6, then the home N3IWF IP addresses field in figure 5.3.3.3.2 contains an IPv6 address in octet v+5 to octet v+20. |
|  |
| If the home N3IWF identifier type indicates IPv4v6, then the home N3IWF IP addresses field in figure 5.3.3.3.2 contains two IP addresses. The first IP address is an IPv4 address in octet v+5 to octet v+8. The second IP address is an IPv6 address in octet v+9) to octet v+24. |
|  |
| If the home N3IWF identifier type indicates FQDN, the length of the home N3IWF FQDN field (octet v+5) in figure 5.3.3.3.3 indicates the length of home N3IWF FQDN. |
|  |
| Home N3IWF FQDN field (octet v+6 to octet x) is encoded as defined in clause 28.3.2.2.2 in 3GPP TS 23.003 [4]. |
|  |

Table 5.3.3.3.2: Void

#### 5.3.3.4 Home ePDG identifier configuration

The content of home ePDG identifier configuration contains a list of home ePDG identifier entries.

The content of home ePDG identifier configuration is encoded according to figure 5.3.3.4.1.

The content of each home ePDG identifier entry is encoded according to figure 5.3.3.4.2, figure 5.3.3.4.3 and table 5.3.3.4.1.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Home ePDG identifier entry 1 | octet w+4 |
| octet u |
| Home ePDG identifier entry 2 | octet u+1octet m |
| … |  |
| Home ePDG identifier entry n | octet p |

Figure 5.3.3.4.1: Content of home ePDG identifier configuration

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Home ePDG identifier type | octet w+4 |
| Home ePDG IP addresses | octet w+5octet e |

Figure 5.3.3.4.2: Home ePDG identifier entry (Home ePDG identifier type = "IPv4", "IPv6" or "IPv4v6")

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Home ePDG identifier type | octet w+4 |
| Length of home ePDG FQDN | octet w+5 |
| Home ePDG FQDN | octet w+6octet f |

Figure 5.3.3.4.3: Home ePDG identifier entry (Home ePDG identifier type = "FQDN")

Table 5.3.3.4.1: Home ePDG identifier entry

|  |
| --- |
| Home ePDG identifier type (octet w+4) is set as follows when the type is IP address. |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |  | IPv4 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |  | IPv6 |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |  | IPv4v6 |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |  | FQDN |
| All other values are reserved. |
|  |
| If the home ePDG identifier type indicates IPv4, then the home ePDG IP addresses field in figure 5.3.3.4.2 contains an IPv4 address in octet w+5 to octet w+8. |
|  |
| If the home ePDG identifier type indicates IPv6, then the home ePDG IP addresses field in figure 5.3.3.4.2 contains an IPv6 address in octet w+5 to octet w+20. |
|  |
| If the home ePDG identifier type indicates IPv4v6, then the home ePDG IP addresses field in figure 5.3.3.4.2 contains two IP addresses. The first IP address is an IPv4 address in octet w+5 to octet w+8. The second IP address is an IPv6 address in octet w+9 to octet w+24. |
|  |
| If the home ePDG identifier type indicates FQDN, the length of home ePDG FQDN field (octet w+5) in figure 5.3.3.4.3 indicates the length of home ePDG FQDN. |
|  |
| Home ePDG FQDN field (octet w+6 to octet f) is encoded as defined in clause 19.4.2.9.2 in 3GPP TS 23.003 [4]. |
|  |

Table 5.3.3.4.2: Void

#### 5.3.3.5 Extended home N3IWF identifier configuration

The content of extended home N3IWF identifier configuration contains a list of extended home N3IWF identifier entries. The content of the extended home N3IWF identifier configuration is encoded according to figure 5.3.3.5.1.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Extended home N3IWF identifier entry 1 | octet z+4 |
| octet h |
| Extended home N3IWF identifier entry 2 | octet h+1\*octet i\* |
| … |  |
| Extended home N3IWF identifier entry n | octet y\* |

Figure 5.3.3.5.1: Content of extended home N3IWF identifier configuration

The content of each extended home N3IWF identifier entry is coded according to figure 5.3.3.5.2.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Home N3IWF identifier entry | octet z+4octet m |
| S-NSSAI list | octet m+1octet n |

Figure 5.3.3.5.2: Extended home N3IWF identifier entry

The content of each home N3IWF identifier entry is coded according to figure 5.3.3.3.2, figure 5.3.3.3.3 and table 5.3.3.3.1. The S-NSSAI list is the list of one or more S-NSSAIs subscribed by the UE and supported by the N3IWF. The content of each S-NSSAI list is coded as the NSSAI IE in 3GPP TS 24.501 [11], starting from octet 2.

#### 5.3.3.6 Slice-specific N3IWF prefix configuration

The content of slice-specific N3IWF prefix configuration contains a list of slice-specific N3IWF prefix entries. The content of the slice-specific N3IWF prefix configuration is encoded according to figure 5.3.3.6.1.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Slice-specific N3IWF prefix entry 1 | octet y+4 |
| octet u |
| Slice-specific N3IWF prefix entry 2 | octet u+1octet m |
| … |  |
| Slice-specific N3IWF prefix entry n | octet t |

Figure 5.3.3.6.1: Content of slice-specific N3IWF prefix configuration

The content of each slice-specific N3IWF prefix entry is encoded according to figure 5.3.3.6.2 and table 5.3.3.6.1.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Slice-specific N3IWF prefix | octet v+4octet s |
| S-NSSAI list | octet s+1octet k |

Figure 5.3.3.6.2: slice-specific N3IWF prefix entry

Table 5.3.3.6.1: slice-specific N3IWF prefix entry

|  |
| --- |
| Slice-specific N3IWF prefix (octets v+4 through octet s) indicates the prefix to be added to the existing tracking area (TA) or operator identifier (OI) FQDNs, as described in 3GPP TS 23.003 [4]. It has an encoding of an FQDN label, which is specified in 3GPP TS 23.003 [4] clause 19.4.2 and in IETF RFC 1035 [12]. |
|  |
| S-NSSAI list is the list of one or more S-NSSAIs subscribed by UE and indicates the list of one or more S-NSSAI(s) that the prefix is associated with. The content of each S-NSSAI list is coded as the NSSAI IE in 3GPP TS 24.501 [11] starting from octet 2. |
|  |

Annex A (informative):
Change history

|  |
| --- |
| **Change history** |
| **Date** | **Meeting** | **TDoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2018-04 | CT1#110 |  |  |  |  | TS skeleton is provided by C1-182823.C1-182793, C1-182795, C1-182798, C1-182821, C1-182822 are implemented as Annex A. | 0.0.0 |
| 2018-05 | CT1#111 |  |  |  |  | Includes the following contributions agreed by CT1 at CT#111: C1-183550, C1-183551, C1-183552, C1-183553, C1-183555, C1-183556, C1-183862, C1-183863. | 0.1.0 |
| 2018-06 | CT-80 |  |  |  |  | version 1.0.0 created for presentation for information | 1.0.0 |
| 2018-07 | CT1#111bis |  |  |  |  | Includes the following contributions agreed by CT1 at CT#111bis: C1-184345, C1-184627, C1-184691, C1-184859, C1-184927, C1-184945, C1-184948. | 1.1.0 |
| 2018-08 | CT1#112 |  |  |  |  | Includes the following contributions agreed by CT1 at CT#112: C1-185149, C1-185630, C1-185636, C1-185641, C1-185679. | 1.2.0 |
| 2018-09 | CT-81 | CP-182112 |  |  |  | version 2.0.0 created for presentation for approval | 2.0.0 |
| 2018-09 | CT-81 |  |  |  |  | version 15.0.0 created after approval | 15.0.0 |
| 2018-12 | CT-82 | CP-183043 | 0001 | 2 | F | Modifications to ANDSP | 15.1.0 |
| 2018-12 | CT-82 | CP-183043 | 0002 | 2 | F | Aligning the clauses and correcting the reference and requirements | 15.1.0 |
| 2018-12 | CT-82 | CP-183043 | 0003 | 2 | B | Adding connection capabilities in URSP rules | 15.1.0 |
| 2018-12 | CT-82 | CP-183043 | 0004 | 2 | F | Editorial and other changes | 15.1.0 |
| 2018-12 | CT-82 | CP-183043 | 0005 | 1 | B | Coding of WLAN selection criteria entry | 15.1.0 |
| 2018-12 | CT-82 | CP-183043 | 0006 | 2 | B | Complete location entry definition | 15.1.0 |
| 2018-12 | CT-82 | CP-183043 | 0011 | 2 | F | Clarification on PDU session selection | 15.1.0 |
| 2018-12 | CT-82 | CP-183043 | 0013 | 2 | F | Clarification on URSP traffic descriptor and SSC mode | 15.1.0 |
| 2018-12 | CT-82 | CP-183043 | 0015 | 2 | F | OS App Id with a variable length | 15.1.0 |
| 2019-03 | CT-83 | CP-190090 | 0012 | 7 | F | Clarification on UE local configuration and URSP preference | 15.2.0 |
| 2019-03 | CT-83 | CP-190210 | 0016 | 6 | F | PCF does not send OS Id to UE | 15.2.0 |
| 2019-03 | CT-83 | CP-190090 | 0017 | 1 | F | The formats of OS Id | 15.2.0 |
| 2019-03 | CT-83 | CP-190090 | 0018 | 2 | F | Add destination FQDN as additional traffic descriptor | 15.2.0 |
| 2019-03 | CT-83 | CP-190090 | 0019 | 1 | D | Update abbreviations | 15.2.0 |
| 2019-03 | CT-83 | CP-190090 | 0020 | 3 | F | Correcting the name of ITU-T Recommendation E.212 | 15.2.0 |
| 2019-03 | CT-83 | CP-190090 | 0021 | 2 | F | Correction on WLANSP rules description | 15.2.0 |
| 2019-03 | CT-83 | CP-190090 | 0022 | 2 | F | Correction to Length of URSP rule and Length of route selection descriptor | 15.2.0 |
| 2019-03 | CT-83 | CP-190090 | 0024 | 1 | F | Clarification on OS Id + OS App Id field of URSP | 15.2.0 |
| 2019-03 | CT-83 | CP-190211 | 0026 | 2 | F | UE with multiple OS Ids | 15.2.0 |
| 2019-03 | CT-83 | CP-190090 | 0027 | 1 | F | Correction to length of location sub entry in WLANSP rule | 15.2.0 |
| 2019-03 | CT-83 | CP-190090 | 0028 | 2 | F | Unknown or unexpected URSP rules | 15.2.0 |
| 2019-06 | CT-84 | CP-191125 | 0030 |  | F | Update of association between application and existing PDU session | 15.3.0 |
| 2019-06 | CT-84 | CP-191125 | 0034 | 2 | F | Correction to Encoding of WLANSP  | 15.3.0 |
| 2019-06 | CT-84 | CP-191125 | 0039 | 2 | F | Correction to UE Policy evaluation | 15.3.0 |
| 2019-06 | CT-84 | CP-191138 | 0029 | 1 | B | Multi-access access type preference | 16.0.0 |
| 2019-06 | CT-84 | CP-191131 | 0031 |  | F | Handling of unsupported PDU session type in route selection descriptor | 16.0.0 |
| 2019-06 | CT-84 | CP-191131 | 0032 | 1 | F | Changing "user preferences" to "UE local configuration" | 16.0.0 |
| 2019-06 | CT-84 | CP-191131 | 0033 | 1 | F | Handling of PDU session type | 16.0.0 |
| 2019-06 | CT-84 | CP-191131 | 0036 | 2 | F | Correction on coding of "all other values are spare" | 16.0.0 |
| 2019-06 | CT-84 | CP-191136 | 0037 | 1 | F | Correction to Encoding of WLANSP  | 16.0.0 |
| 2019-06 | CT-84 | CP-191136 | 0038 | 2 | F | Reference to IEEE Std 802.11 | 16.0.0 |
| 2019-06 | CT-84 | CP-191131 | 0041 | 1 | D | Correction on the route selection descriptor component type identifier of URSP | 16.0.0 |
| 2019-09 | CT-85 | CP-192059 | 0042 | 1 |  | 5G-RG usage of ANDSP | 16.1.0 |
| 2019-09 | CT-85 | CP-192074 | 0043 | 1 | B | Introduction of background data transfer policy information in URSP | 16.1.0 |
| 2019-09 | CT-85 | CP-192055 | 0045 |  | F | Clarification on application information matching | 16.1.0 |
| 2019-09 | CT-85 | CP-192055 | 0046 | 1 | F | Clarification on PDU session association | 16.1.0 |
| 2019-09 | CT-85 | CP-192071 | 0047 | 3 | F | Use of the URSP rules in EPS | 16.1.0 |
| 2019-09 | CT-85 | CP-192059 | 0051 | 2 | F | URSP and ANDP information for wireline 5G access network  | 16.1.0 |
| 2019-09 | CT-85 | CP-192063 | 0052 | 1 | B | Specifying and adding reference for V2X Policy | 16.1.0 |
| 2019-09 | CT-85 | CP-192060 | 0053 | 1 | F | Usage of access type preference | 16.1.0 |
| 2019-09 | CT-85 | CP-192060 | 0054 | 1 | F | Occurrence of Preferred access type and Multi-access preference | 16.1.0 |
| 2019-09 | CT-85 | CP-192055 | 0055 |  | F | Handling of S-NSSAI in RSD descriptor but not in the allowed NSSAI | 16.1.0 |
| 2019-12 | CT-86 | CP-193092 | 0056 | 1 | F | Handling of unsupported SSC mode in route selection descriptor | 16.2.0 |
| 2019-12 | CT-86 | CP-193092 | 0057 | 1 | F | Clarification on the DNN in the route selection descriptor | 16.2.0 |
| 2019-12 | CT-86 | CP-193092 | 0058 | 2 | F | Correction on using URSP in EPS | 16.2.0 |
| 2019-12 | CT-86 | CP-193092 | 0059 | 3 | F | Clarification for URSP evaluation | 16.2.0 |
| 2019-12 | CT-86 | CP-193092 | 0061 | 1 | F | Correction to association between an application and an existing PDU session | 16.2.0 |
| 2019-12 | CT-86 | CP-193101 | 0063 |  | F | Correct the reference of access type IE | 16.2.0 |
| 2019-12 | CT-86 | CP-193100 | 0065 | 1 | B | 5G-RG and W-AGF acting on behalf of FN-RG usage of URSP | 16.2.0 |
| 2019-12 | CT-86 | CP-193092 | 0066 |  | F | Correction to S-NSSAI RSD component encoding | 16.2.0 |
| 2019-12 | CT-86 | CP-193092 | 0067 | 1 | F | Pre-configured URSP rules in USIM | 16.2.0 |
| 2020-03 | CT-87e | CP-200110 | 0069 | 1 | F | Matching of SSC mode for association between an application and a PDU session | 16.3.0 |
| 2020-03 | CT-87e | CP-200113 | 0070 |  | F | LADN service does not apply for RG connected to 5GC via wireline access | 16.3.0 |
| 2020-06 | CT-88e | CP-201101 | 0071 |  | F | Reference correction in URSP encoding | 16.4.0 |
| 2020-06 | CT-88e | CP-201101 | 0073 | 1 | F | Clarification on URSP in EPS | 16.4.0 |
| 2020-06 | CT-88e | CP-201101 | 0075 | 1 | F | Allowed SSC mode for association between an application and a PDU session | 16.4.0 |
| 2020-06 | CT-88e | CP-201101 | 0077 | 1 | F | Correction to the URSP encoding | 16.4.0 |
| 2020-06 | CT-88e | CP-201101 | 0079 | 2 | F | Specify UE behavior when pre-configured policy is syntactically incorrect | 16.4.0 |
| 2020-06 | CT-88e | CP-201101 | 0081 | 1 | F | Domain descriptors in URSP | 16.4.0 |
| 2020-06 | CT-88e | CP-201108 | 0082 | 1 | D | URSP for RGs editorial fix | 16.4.0 |
| 2020-06 | CT-88e | CP-201101 | 0084 | 1 | F | Corrections to UE policies specification | 16.4.0 |
| 2020-09 | CT-89e | CP-202149 | 0087r1 | 1 | F | Removal of Editor's Notes for URSP related capability indications | 16.5.0 |
| 2020-09 | CT-89e | CP-202174 | 0085r1 | 1 | F | Optimization of handling unknown or unexpected URSP rules | 17.0.0 |
| 2020-12 | CT-90e | CP-203177 | 0091 |  | A | Correction on association between an application and a PDU session for RG | 17.1.0 |
| 2020-12 | CT-90e | CP-203175 | 0092 | 1 | F | Clarification on traffic descriptor component type of VLAN tag control information | 17.1.0 |
| 2020-12 | CT-90e | CP-203167 | 0094 | 1 | A | EN resolution on domain descriptors in URSP | 17.1.0 |
| 2020-12 | CT-90e | CP-203175 | 0095 | 1 | F | The correction on the process of URSP handling | 17.1.0 |
| 2020-12 | CT-90e | CP-203175 | 0097 | 1 | F | Optional fields of N3AN node configuration information | 17.1.0 |
| 2020-12 | CT-90e | CP-203176 | 0100 | 1 | A | Lack of bit encoding of the location entry type in the WLANSP IE | 17.1.0 |
| 2020-12 | CT-90e | CP-203175 | 0102 | 1 | F | UE behaviour on SNPN URSP stored in ME | 17.1.0 |
| 2020-12 | CT-90e | CP-203205 | 0103 | 1 | F | DNN setting in the upper layers for PAP/CHAP | 17.1.0 |
| 2020-12 | CT-90e | CP-203175 | 0105 | 1 | F | Referring to TS 23.003 for FQDN format | 17.1.0 |
| 2021-03 | CT-91e | CP-210116 | 0108 | 1 | F | Re-use of existing connection to WLAN access when applying URSP | 17.2.0 |
| 2021-03 | CT-91e | CP-210116 | 0110 |  | F | Avoid unnecessary new PDU session with the same attributes | 17.2.0 |
| 2021-03 | CT-91e | CP-210244 | 0111 | 3 | A | Encoding of Location Criteria Type | 17.2.0 |
| 2021-03 | CT-91e | CP-210116 | 0112 | 1 | F | Clarifications on PLMN and SNPN URSP storage - 24.526 part | 17.2.0 |
| 2021-03 | CT-91e | CP-210116 | 0113 | 1 | F | Clarifications on PLMN URSP stored in USIM | 17.2.0 |
| 2021-06 | CT-92e | CP-211142 | 0115 | 2 | B | UE policies for 5G ProSe policy | 17.3.0 |
| 2021-06 | CT-92e | CP-211145 | 0118 | - | F | Correction on term SNPN access mode | 17.3.0 |
| 2021-06 | CT-92e | CP-211145 | 0120 | - | F | URSP evaluation upon configured NSSAI update  | 17.3.0 |
| 2021-06 | CT-92e | CP-211146 | 0117 | 1 | F | PDU session type for URSP association | 17.3.0 |
| 2021-09 | CT-93e | CP-212154 | 0121 | 1 | F | Introduction of MAC address range traffic descriptor component type in URSP rule | 17.4.0 |
| 2021-09 | CT-93e | CP-212134 | 0122 | 2 | B | Adding the 5G ProSe UE-to-network relay support to the URSP | 17.4.0 |
| 2021-09 | CT-93e | CP-212134 | 0123 | 1 | B | Mapping of 5G ProSe Layer-3 UE-to-Network Relay offload when moving from N1 mode to S1 mode | 17.4.0 |
| 2021-12 | CT-94e | CP-213045 | 0128 | 1 | F | 5G ProSe Layer-3 UE-to-Network Relay Offload indication for the UEs capable to act as Remote UEs | 17.5.0 |
| 2021-12 | CT-94e | CP-213048 | 0131 | 1 | F | DNN in URSP traffic descriptor and route selection descriptor | 17.5.0 |
| 2021-12 | CT-94e | CP-213054 | 0127 | 1 | B | URSP amendment for redundant PDU session | 17.5.0 |
| 2022-03 | CT-95e | CP-220245 | 0136 | 1 | F | Alignment of ProSe Policy and V2X Policy | 17.6.0 |
| 2022-03 | CT-95e | CP-220247 | 0137 | - | F | Correction on description of preferred access type and multi-access preference | 17.6.0 |
| 2022-03 | CT-95e | CP-220249 | 0139 | 1 | F | Add support of operator-specific connection capabilities | 17.6.0 |
| 2022-03 | CT-95e | CP-220258 | 0133 | - | F | Inclusion of PDU session pair ID and/or RSN in PDU session establishment request | 17.6.0 |
| 2022-03 | CT-95e | CP-220258 | 0138 | - | D | Referenced clause numbers for PDU session pair and RSN | 17.6.0 |
| 2022-06 | CT-96 | CP-221196 | 0145 | 1 | A | SSC mode support | 17.7.0 |
| 2022-06 | CT-96 | CP-221203 | 0142 | 1 | F | S-NSSAI when URSP rule matches against existing PDU sessions | 17.7.0 |
| 2022-06 | CT-96 | CP-221203 | 0140 | 3 | B | URSPs for Non-Subscribed SNPN 24526 Part | 17.7.0 |
| 2022-06 | CT-96 | CP-221210 | 0141 | 3 | F | Corrections on handling of the RSDs matching the existing connection | 17.7.0 |
| 2022-06 | CT-96 | CP-221211 | 0146 | - | D | Correction of the octet number in home ePDG identifier entry figure | 17.7.0 |
| 2022-06 | CT-96 | CP-221211 | 0147 | - | F | Destination MAC address range type | 17.7.0 |
| 2022-06 | CT-96 | CP-221213 | 0149 | 1 | F | URSP rule matching with existing PDU sessions | 17.7.0 |
| 2022-06 | CT-96 | CP-221213 | 0150 | 1 | F | Correction on unknown connection capabilities | 17.7.0 |
| 2022-09 | CT-97e | CP-222170 | 0151 | 1 | F  | URSP re-evaluation after backoff timer expiry | 18.0.0 |
| 2022-09 | CT-97e | CP-222170 | 0152 | 1 | F | Clarification on MAC address range type in URSP | 18.0.0 |
| 2022-12 | CT-98e | CP-223148 | 0154 | 1 | A | Triggering U2N Relay discovery when the UE matches the RSD containing 5G ProSe Layer-3 UE-to-Network Relay Offload indication | 18.1.0 |
| 2022-12 | CT-98e | CP-223148 | 0156 | 1 | A | Timing of attempting 5G ProSe L2 U2N relay and L3 U2N relay with N3IWF support when evaluating URSP rules | 18.1.0 |
| 2022-12 | CT-98e | CP-223118 | 0157 | 3 | B | Extended Home N3IWF identifier configuration | 18.1.0 |
| 2022-12 | CT-98e | CP-223157 | 0158 | 2 | F | Added reserved values | 18.1.0 |
| 2022-12 | CT-98e | CP-223157 | 0162 | 1 | F | Clarification of applicability of URSP rule for establishing PDN leg of an MA PDU session | 18.1.0 |
| 2023-03 | CT-99 | [CP-230285](https://portal.3gpp.org/ngppapp/CreateTdoc.aspx?mode=view&contributionUid=CP-230285) | 0164 | - | F | Correction on the name of timer regarding re-evaluation of URSP rules | 18.2.0 |
| 2023-03 | CT-99 | [CP-230222](https://portal.3gpp.org/ngppapp/CreateTdoc.aspx?mode=view&contributionUid=CP-230222) | 0166 | - | F | Update the condition description on URSP applicable for interworking with EPC | 18.2.0 |
| 2023-03 | CT-99 | [CP-230260](https://portal.3gpp.org/ngppapp/CreateTdoc.aspx?mode=view&contributionUid=CP-230260) | 0167 | - | B | URSP updates for LADN per DNN & S-NSSAI | 18.2.0 |
| 2023-03 | CT-99 | [CP-230217](https://portal.3gpp.org/ngppapp/CreateTdoc.aspx?mode=view&contributionUid=CP-230217) | 0171 | 1 | F | PLMN ID in Extended Home N3IWF identifier configuration | 18.2.0 |
| 2023-03 | CT-99 | [CP-230217](https://portal.3gpp.org/ngppapp/CreateTdoc.aspx?mode=view&contributionUid=CP-230217) | 0175 | 2 | B | Introducing the Extended WLANSP in the ANDSP | 18.2.0 |
| 2023-03 | CT-99 | [CP-230217](https://portal.3gpp.org/ngppapp/CreateTdoc.aspx?mode=view&contributionUid=CP-230217) | 0172 | 1 | F | Extended Home N3IWF identifier configuration and/or Slice-specific N3IWF Prefix Configuration to the UE | 18.2.0 |
| 2023-03 | CT-99 | [CP-230217](https://portal.3gpp.org/ngppapp/CreateTdoc.aspx?mode=view&contributionUid=CP-230217) | 0168 | 2 | F | Correction to ANDSP | 18.2.0 |
| 2023-03 | CT-99 | [CP-230285](https://portal.3gpp.org/ngppapp/CreateTdoc.aspx?mode=view&contributionUid=CP-230285) | 0169 | - | F | Correcting reference and text | 18.2.0 |
| 2023-06 | CT-100 | CP-231238 | 0183 | - | F | Term reference for SNPN access operation mode | 18.3.0 |
| 2023-06 | CT-100 | CP-231223 | 0186 | - | F | Correction to the figure of the Content of slice-specific N3IWF prefix configuration | 18.3.0 |
| 2023-06 | CT-100 | CP-231265 | 0181 | 1 | B | Specifying and adding reference for Ranging/SL Positioning Policy | 18.3.0 |
| 2023-06 | CT-100 | CP-231243 | 0177 | 3 | B | URSP Re-evaluation Upon PLMN Change | 18.3.0 |
| 2023-06 | CT-100 | CP-231264 | 0184 | 1 | B | New traffic descriptor component for PIN | 18.3.0 |
| 2023-06 | CT-100 | CP-231211 | 0179 | 1 | B | Addition of ProSe Multi-path Preference | 18.3.0 |
| 2023-06 | CT-100 | CP-231277 | 0180 | 2 | B | Specifying and adding reference for A2X Policy | 18.3.0 |
| 2023-06 | CT-100 | CP-231219 | 0191 | - | F | Correction to N3AN node selection | 18.3.0 |
| 2023-06 | CT-100 | CP-231217 | 0192 | - | F | Correction to UE policies | 18.3.0 |
| 2023-06 | CT-100 | CP-231243 | 0188 | 1 | B | UE reporting of URSP rule enforcement in TS 24.526 | 18.3.0 |
| 2023-06 | CT-100 | CP-231243 | 0176 | 3 | B | VPLMN specific URSP enforcement | 18.3.0 |
| 2023-06 | CT-100 | CP-231223 | 0194 | 1 | B | URSP update for AUN3/NAUN3 device behind 5G-RG | 18.3.0 |
| 2023-06 | CT-100 | CP-231219 | 0193 | 1 | F | Clarification to route selection descriptor for W-AGF acts on behalf of the FN-RG | 18.3.0 |
| 2023-06 | CT-100 | CP-231243 | 0195 | 2 | B | Support for UE reporting of URSP rule enforcement | 18.3.0 |
| 2023-09 | CT-101 | CP-232190 | 0209 | - | F | Correction on subject of 4.2.2 and other small fixes | 18.4.0 |
| 2023-09 | CT-101 | CP-232237 | 0210 | - | F | Correction to UE policies on RSLPP and A2XP | 18.4.0 |
| 2023-09 | CT-101 | CP-232189 | 0223 | 1 | F | Fix errors in Encoding of UE policy part type URSP | 18.4.0 |
| 2023-09 | CT-101 | CP-232200 | 0197 | 1 | F | 5G-RG and VPLMN specific URSP usage | 18.4.0 |
| 2023-09 | CT-101 | CP-232190 | 0200 | 1 | F | Adding bit numbers | 18.4.0 |
| 2023-09 | CT-101 | CP-232266 | 0201 | 1 | B | Support for connectivity group ID in the traffic descriptor of the URSP rule | 18.4.0 |
| 2023-09 | CT-101 | CP-232193 | 0218 | 1 | B | Resolving the ENs related to the impact of 5G ProSe multi-path preference to the URSP handling | 18.4.0 |
| 2023-09 | CT-101 | CP-232204 | 0212 | 1 | F | Clarification on URSP for PIN | 18.4.0 |
| 2023-09 | CT-101 | CP-232195 | 0217 | 1 | F | Clarifications related to the URSP rules evaluation | 18.4.0 |
| 2023-09 | CT-101 | CP-232189 | 0198 | 1 | F | URSP usage clean up | 18.4.0 |
| 2023-09 | CT-101 | CP-232266 | 0207 | 1 | F | Unknown or unexpected URSP for AUN3/NAUN3 device behind 5G-RG | 18.4.0 |
| 2023-09 | CT-101 | CP-232200 | 0211 | 1 | F | Matching EVPLMN URSP rule | 18.4.0 |
| 2023-09 | CT-101 | CP-232200 | 0213 | 1 | F | Prioritization within VPS URSP | 18.4.0 |
| 2023-09 | CT-101 | CP-232200 | 0206 | 1 | B | Indication for reporting URSP rule enforcement | 18.4.0 |
| 2023-09 | CT-101 | CP-232200 | 0220 | 1 | B | Update operator-specific connection capabilities in URSP | 18.4.0 |
| 2023-09 | CT-101 | CP-232188 | 0215 | 1 | B | URSP re-evaluation upon partially S-NSSAI change | 18.4.0 |
| 2023-09 | CT-101 | CP-232190 | 0202 | 2 | F | Correction of the Global gNB ID field length in Table 5.2.2 | 18.4.0 |
| 2023-09 | CT-101 | CP-232266 | 0208 | 2 | F | Resolve EN on URSP for NAUN3 device behind 5G-RG | 18.4.0 |
| 2023-09 | CT-101 | CP-232200 | 0170 | 4 | B  | Standardized traffic categories in URSP | 18.4.0 |