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User Equipment (UE) policies for 5G System (5GS);  
 Stage 3

(Release 16)



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Contents

Foreword 5

1 Scope 6

2 References 6

3 Definitions, symbols and abbreviations 7

3.1 Definitions 7

3.2 Abbreviations 7

4 Descriptions of UE policies for 5GS 8

4.1 Overview 8

4.2 UE route selection policy (URSP) 8

4.2.1 General 8

4.2.2 Association between an application and either a PDU session or non-seamless non-3GPP offload 9

4.2.2.1 General 9

4.2.2.2 Association between an application and either a PDU session or non-seamless non-3GPP offload by a UE 9

4.2.2.3 Association between an application and a PDU session by a 5G-RG or a W-AGF acting on behalf of FN-RG 13

4.2.3 Unknown or unexpected URSP rules 16

4.3 Access network discovery and selection policy (ANDSP) 16

4.3.1 Overview 16

4.3.2 WLAN selection policy (WLANSP) 16

4.3.2.1 General 16

4.3.2.2 WLAN access selection 18

4.3.3 N3AN node configuration information 18

4.3.3.1 General 18

4.3.3.2 N3AN node selection 18

4.4 Interworking with EPC 18

4.4.1 Precedence between URSP, ANDSP, ANDSF and RAN rules 18

4.4.2 Use of URSP in EPS 19

5 Encoding of UE policies 21

5.1 Overview 21

5.2 Encoding of UE policy part type URSP 22

5.3 Encoding of UE policy part type ANDSP 30

5.3.1 General 30

5.3.2 Encoding of WLANSP 31

5.3.3 Encoding of N3AN node configuration information 46

5.3.3.1 General 46

5.3.3.2 N3AN node selection information 47

5.3.3.3 Home N3IWF identifier configuration 49

5.3.3.4 Home ePDG identifier configuration 50

Annex A (informative): Change history 52

# 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:

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x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

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

[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".

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

# 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].

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**

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**

## 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

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

S-NSSAI Single Network Slice Selection Assistance Information

SSC Session and Service Continuity

SUPI Subscriber Permanent Identifier

SUPL Secure User Plane Location

URSP UE Route Selection Policy

USIM User Services Identity Module

V-PCF A PCF in the VPLMN

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); and

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

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.

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

## 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) 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 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

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;

C) one or more DNNs;

D) Void;

E) preferred access type;

F) multi-access preference;

G) a time window; and

H) location criteria; or

2) non-seamless non-3GPP 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.

If one or more DNNs are included in the traffic descriptor of a URSP rule, the route selection descriptor of the URSP rule shall not include any DNN.

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 and either a PDU session or non-seamless non-3GPP offload

#### 4.2.2.1 General

Association between an application and either a PDU session or non-seamless non-3GPP 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 either a PDU session or non-seamless non-3GPP offload by a UE

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. 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 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 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 UE finds the traffic descriptor in a non-default URSP rule matching the application information, and:

I) if there is one or more PDU sessions:

1) matching 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 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, and 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; and

2) 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:

i) the preferred access type;

ii) the multi-access preference; and

iii) the DNN, if one or more DNNs are included in the traffic descriptor, and the DNN provided by the application is the same as the DNN requested by the UE during the PDU session establishment.

the UE shall provide information on the PDU session that matches the route selection descriptor of the lowest precedence value to the upper layers;

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.

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 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 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 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 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 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 4); or

vi) the selected route selection descriptor does not contain a non-seamless non-3GPP 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. If none of the S-NSSAI(s) in the route selection descriptor is in the allowed NSSAI, the UE shall proceed to step 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 there is no DNN in the matched traffic 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 of a URSP rule and one or more DNNs are included in the route selection descriptor, the route selection descriptor is ignored and the UE proceeds to step 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 is no DNN in the traffic descriptor and 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; and

NOTE 6: If a preferred access type or a multi-access preference is included in the traffic 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.

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. The UE shall stop selecting a route selection descriptor matching the application information. If the PDU session establishment is unsuccessful, the UE 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 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 2), otherwise the UE shall proceed to step 4); and

4) if there is any route selection descriptor which has not yet been evaluated, the UE 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 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 is available, the UE shall perform the association of the application 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.

NOTE 7: 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.

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 or to non-seamless non-3GPP 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 8: If one or more DNNs are included in the route selection descriptor of the default URSP rule and a DNN was provided by the application, 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 and no DNN is provided by the application, 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, or may provide URSP to the UE by signalling as described in annex D of 3GPP TS 24.501 [11]. The pre-configured URSP in the ME and the signalled URSP shall be stored in a non-volatile memory in the ME together with the SUPI from the USIM. If the UE has both pre-configured URSP(s) and signalled URSP, the UE shall only use the signalled URSP. If the UE has no signalled URSP, and the UE has pre-configured URSPs configured in both the USIM and the ME, then the UE shall use the pre-configured URSP in the USIM. The pre-configured URSP in the ME shall be stored until a new URSP is configured by HPLMN or the USIM is removed.

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.

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

NOTE 9: 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 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 is changed; or

h) the LADN information is changed.

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

NOTE 10: The time when the UE enforces the change of the association of an application 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 and a PDU session by a 5G-RG or a W-AGF acting on behalf of FN-RG

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. 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, and:

I) if there is one or more PDU sessions:

1) matching 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 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, and 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; 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;

NOTE 1: 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.

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 3);

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 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. 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 3: 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 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 3A: 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 4: If one or more DNNs are included in the traffic descriptor of a URSP rule, the existing DNNs in the route selection descriptor for the application are ignored.

NOTE 5: If there is no DNN in the traffic descriptor and 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; and

NOTE 6: If a preferred access type or a multi-access preference is included in the traffic 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 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. 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 7: 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); or

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); 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; or

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.

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, the URSP can only be used if the SUPI from the USIM matches the SUPI stored in the non-volatile memory of the ME. In the 5G-RG, 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 to a PDU session is needed, when:

NOTE 8: 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 is changed; or

g) the LADN information is changed for the 5G-RG.

If the re-evaluation leads to a change of the association of an application 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 9: 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, such URSP rules are unknown or unexpected to the UE. In this case:

- the UE shall ignore the unknown or unexpected URSP rules when evaluating the URSP rules to associate an application either with a PDU session or with non-seamless non-3GPP offload; and

- the 5G-RG or the W-AGF acting on behalf of an FN-RG shall ignore the unknown or unexpected URSP rules when evaluating the URSP rules to associate an application with a PDU session.

## 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; and

- preferred SSID 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.

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 consists of:

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

- optionally, home ePDG identifier configuration; and

- optionally, home N3IWF identifier configuration.

#### 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 the N3IWF;

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 either a PDN connection or non-seamless non-3GPP 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 either a PDN connection or non-seamless non-3GPP 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 1  Not 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 | |
| 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. | | 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 | |

# 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 include URSP or ANDSP.

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.

## 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 5.2.4 and table 5.2.1.

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

Figure 5.2.2: URSP rule

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

Figure 5.2.4: Route selection descriptor

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. | |
| 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 identifier  Bits 8 7 6 5 4 3 2 1  0 0 0 0 0 0 0 1 Match-all type 0 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 type 0 0 1 0 0 0 0 1 IPv6 remote address/prefix length type 0 0 1 1 0 0 0 0 Protocol identifier/next header type 0 1 0 1 0 0 0 0 Single remote port type  0 1 0 1 0 0 0 1 Remote port range type 0 1 0 1 0 0 1 0 IP 3 tuple type 0 1 1 0 0 0 0 0 Security parameter index type 0 1 1 1 0 0 0 0 Type of service/traffic class type 1 0 0 0 0 0 0 0 Flow label type  1 0 0 0 0 0 0 1 Destination MAC address type 1 0 0 0 0 0 1 1 802.1Q C-TAG VID type 1 0 0 0 0 1 0 0 802.1Q S-TAG VID type 1 0 0 0 0 1 0 1 802.1Q C-TAG PCP/DEI type 1 0 0 0 0 1 1 0 802.1Q S-TAG PCP/DEI type 1 0 0 0 0 1 1 1 Ethertype type  1 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  1 0 0 1 0 0 1 0 Regular expression 1 0 1 0 0 0 0 0 OS App Id type (NOTE 3) 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). 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). 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. 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. 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 network 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  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 IETF RFC 1035 [12].  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. | |
| 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 identifier  Bits 8 7 6 5 4 3 2 1  0 0 0 0 0 0 0 1 SSC mode type 0 0 0 0 0 0 1 0 S-NSSAI type 0 0 0 0 0 1 0 0 DNN type 0 0 0 0 1 0 0 0 PDU session type type 0 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 0 1 0 0 0 0 0 0 Location criteria type 1 0 0 0 0 0 0 0 Time window type All 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]. | |
| 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 filed is the same as the Starttime field. | |
|  | |
|  | |
| 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. | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of location criteria  Location area 1 | | | | | | | | octet d  octet 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+2  octet e+8 |
| E-UTRA cell id 2 | | | | | | | | octet e+9  octet e+15 |
| … | | | | | | | | octet e+16  octet 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+2  octet e+9 |
| NR cell id 2 | | | | | | | | octet e+10  octet e+17 |
| … | | | | | | | | octet e+18  octet 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+2  octet e+8 |
| Global gNB id 2 | | | | | | | | octet e+9  octet e+15 |
| … | | | | | | | | octet e+16  octet 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 filed 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 5.2.8. 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]. | | | | | | | | | |
|  | | | | | | | | | |
| 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]. | | | | | | | | | |
|  | | | | | | | | | |

## 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 1  octet 2 |
| 0 | 0 | 0 | 0 | UE policy part type={ANDSP} | | | | octet 3 |
| Spare | | | |
| UE policy part contents={ANDSP contents} | | | | | | | | octet 4  octet 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 4  octet a |
| ANDSP info #2 | | | | | | | | octet a+1  octet b |
| … | | | | | | | | octet b+1  octet w |
| ANDSP info #n | | | | | | | | octet w+1  octet 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+1  octet k+2 |
| ANDSP info contents | | | | | | | | octet k+3  octet 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 5.3.2.20 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 2  octet 3 |
| ANDSP info contents={WLANSP contents } | | | | | | | | octet 4  octet x |

Figure 5.3.2.1: ANDSP Info = {WLANSP}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| WLANSP rule 1 | | | | | | | | octet 4  octet 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 4  octet 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 | 0  spare | 0  spare | octet 8 |
| Selection criteria | | | | | | | | octet 9  octet 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 9  octet 10 |
| number of selection criteria entries | | | | | | | | octet 11 |
| Selection criteria entry 1 | | | | | | | | octet 12  octet 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 12  octet 13 |
| Spare | | MaxBSSload ind | | Home network ind | | Criteria priority | | | | | octet 14 |
| Maximum BSS load value | | | | | | | | | | | octet 15  octet 16 |
| Selection criteria set 1 | | | | | | | | | | | octet 17  octet 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 17  octet 18 |
| Selection criteria set type  {preferred SSID list,  preferred roaming partner list,  required protocol port tuple,  SP exclusion list,  minimum backhaul threshold} | | | | | Number of sub entries | | | | octet 19 |
| Sub entry 1 | | | | | | | | | octet 20  octet aa |
| … | | | | | | | | | octet aa+1  octet bb |
| Sub entry n | | | | | | | | | octet cc+1  octet 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 |
| 0  Spare | | | | | | | 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 23  octet ee\* |
| Country length | | | | | | | | octet ee+1 |
| Country | | | | | | | | octet ee+2  octet 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 23  octet 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 21  octet 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 21  octet 24 |
| Uplink bandwidth | | | | | | | | | | | octet 25  octet 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 validity area | | | | | | | | octet r+1  octet r+2 |
| number of location entries | | | | | | | | octet r+3 |
| location entry 1 | | | | | | | | octet r+4  octet 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+7  octet 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+7  octet 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+7  octet 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+7  octet 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+7  octet 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+15  octet 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+15  octet 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+12  octet 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+12  octet 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+12  octet 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+1  octet s+2 |
| number of time of day entries | | | | | | | | octet s+3 |
| Time of day entry 1 | | | | | | | | octet s+4  octet 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+4  octet s+5 |
| number of sub fields | | | | | | | | octet s+6\* |
| ToD sub field 1 | | | | | | | | octet s+7  octet 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+9  octet 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+9  octet 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+9  octet 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"}

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 present  1 maximum BSS load value (octets 15 to 16) present  Maximum 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 tuple  0 1 0 0 SP exclusion list  0 1 0 1 minimum backhaul threshold  All 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 home  0 1 roaming  All 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 location 1 0 WLAN location 1 1 Geo location All 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, or  Location field type (octet r+11) when entry type is WLAN location.  This field indicates the type of location field.  Bits 8 7 6 5 4 3 2 1  0 0 0 0 0 0 0 1 TAC 0 0 0 0 0 0 1 0 EUTRA CI 0 0 0 0 0 1 0 0 NR CI 1 0 0 0 0 0 0 1 HESSID 1 0 0 0 0 0 1 0 SSID 1 0 0 0 0 1 0 0 BSSID All 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].  When 3GPP location field type is set to "EUTRA CI", the EUTRA CI field is set to the cell identity part of the Evolved Cell Global Identifier, as described in 3GPP TS 36.331 [6].  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].  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)  Bits 8 7 6 5 4 3 2 1  0 0 0 0 0 0 0 1 time start 0 0 0 0 0 0 1 0 time stop 0 0 0 0 0 1 0 0 date start 0 0 0 0 1 0 0 0 date stop 0 0 0 1 0 0 0 0 day of the week  All 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. | | | | | | | | |
|  | | | | | | |
| 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+1  octet x+2 |
| ANDSP info contents={N3AN node configuration information contents} | | | | | | | | octet x+3  octet 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+3  octet x+4 |
| Content of N3AN node selection information | | | | | | | | octet x+5  octet v |
| 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 |

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 |
| 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. | | | | | | | | | |
|  | | | | | | | | | |
| 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. | | | | | | | | | |
|  | | | | | | | | | |

#### 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+1  octet t |
| … | | | | | | | |  |
| N3AN node selection information entry n | | | | | | | | octet u  octet 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) field shall be set to zero if it indicates "any\_PLMN". Otherwise, | | |
|  | | |
| 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) 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. | | |
|  | | |
| Preference (bit 6 of octet x+9) 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) 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, table 5.3.3.3.1, figure 5.3.3.3.3 and table 5.3.3.3.2.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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+1  octet 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 (= IP address type) | | | | | | | | octet 1 |
| Home N3IWF IP addresses | | | | | | | | octet 2  octet z |

Figure 5.3.3.3.2: Home N3IWF identifier entry (type = IP address type)

Table 5.3.3.3.1: Home N3IWF identifier entry (type = IP address type)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Home N3IWF identifier type (octet 1) 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 |  | IPv4IPv6 |
|  | | | | | | | | | |
| If the home N3IWF identifier type indicates IPv4, then the home N3IWF IP addresses field contains an IPv4 address in octet 2 to octet 5. | | | | | | | | | |
|  | | | | | | | | | |
| If the home N3IWF identifier type indicates IPv6, then the home N3IWF IP addresses field contains an IPv6 address in octet 2 to octet 17. | | | | | | | | | |
|  | | | | | | | | | |
| If the home N3IWF identifier type indicates IPv4IPv6, then the home N3IWF IP addresses field contains two IP addresses. The first IP address is an IPv4 address in octet 2 to octet 5. The second IP address is an IPv6 address in octet 6 to octet 21. | | | | | | | | | |
|  | | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Home N3IWF identifier type (= FQDN) | | | | | | | | octet 1 |
| Length of home N3IWF FQDN | | | | | | | | octet 2 |
| Home N3IWF FQDN | | | | | | | | octet 3  octet m |

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

Table 5.3.3.3.2: Home N3IWF identifier entry (type = FQDN)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Home N3IWF identifier type (octet 1) is set as follows when the type is FQDN. | | | | | | | | | |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |  |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |  | FQDN |
|  | | | | | | | | | |
| Length of home N3IWF FQDN field (octet 2) indicates the length of home N3IWF FQDN. | | | | | | | | | |
|  | | | | | | | | | |
| Home N3IWF FQDN field (octet 3 to octet m) is encoded as defined in IETF RFC 1035 [12]. | | | | | | | | | |
|  | | | | | | | | | |

#### 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, table 5.3.3.4.1, figure 5.3.3.4.3 and table 5.3.3.4.2.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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+1  octet 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 (= IP address type) | | | | | | | | octet 1 |
| Home ePDG IP addresses | | | | | | | | octet 2  octet e |

Figure 5.3.3.4.2: Home ePDG identifier entry (type = IP address type)

Table 5.3.3.4.1: Home ePDG identifier entry (type = IP address type)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Home ePDG identifier type (octet 1) 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 |  | IPv4IPv6 |
|  | | | | | | | | | |
| If the home ePDG identifier type indicates IPv4, then the home ePDG IP addresses field contains an IPv4 address in octet 2 to octet 5. | | | | | | | | | |
|  | | | | | | | | | |
| If the home ePDG identifier type indicates IPv6, then the home ePDG IP addresses field contains an IPv6 address in octet 2 to octet 17. | | | | | | | | | |
|  | | | | | | | | | |
| If the home ePDG identifier type indicates IPv4IPv6, then the home ePDG IP addresses field contains two IP addresses. The first IP address is an IPv4 address in octet 2 to octet 5. The second IP address is an IPv6 address in octet 6 to octet 21. | | | | | | | | | |
|  | | | | | | | | | |

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

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

Table 5.3.3.4.2: Home ePDG identifier entry (type = FQDN)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Home ePDG identifier type (octet 1) is set as follows when the type is FQDN. | | | | | | | | | |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |  |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |  | FQDN |
|  | | | | | | | | | |
| Length of home ePDG FQDN field (octet 2) indicates the length of home ePDG FQDN. | | | | | | | | | |
|  | | | | | | | | | |
| Home ePDG FQDN field (octet 3 to octet f) is encoded as defined in IETF RFC 1035 [12]. | | | | | | | | | |
|  | | | | | | | | | |

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 |
| 2020-12 | CT-90e | CP-203177 | 0090 |  | F | Correction on association between an application and a PDU session for RG | 16.6.0 |
| 2020-12 | CT-90e | CP-203167 | 0093 | 1 | F | EN resolution on domain descriptors in URSP | 16.6.0 |
| 2020-12 | CT-90e | CP-203176 | 0099 | 1 | F | Lack of bit encoding of the location entry type in the WLANSP IE | 16.6.0 |
| 2021-03 | CT-91e | CP-210243 | 0114 | 2 | F | Encoding of Location Criteria Type | 16.7.0 |
| 2022-06 | CT-96 | CP-221196 | 0144 | 1 | F | SSC mode support | 16.8.0 |