

Annex D (normative): UE policy delivery service

D.1 General

D.1.1 Overview

The UE provides the PCF with a list of one or more stored UE policy section identifiers (UPSIs) during the UE-initiated UE state indication procedure. The UPSI is composed of two parts:

- a) a PLMN ID part containing:
 - 1) the PLMN ID for the PLMN; or
 - 2) the PLMN ID part of the SNPN identity for the SNPN;of the PCF which provides the UE policies; and
- b) a UE policy section code (UPSC) containing a value assigned by the PCF.

During the UE-initiated UE state indication procedure, the UE also provides the PCF with the UE policy related capabilities such as the UE's support for ANDSP, the UE's support for URSP provisioning in EPS, and the UE's OS Id.

During the network-requested UE policy management procedure, the PCF provides the UE with one or more UE policy sections containing UE policies. The UE processes the received UE policy sections, each identified by the UPSI, received from the PCF and informs the PCF of the result.

In the present annex, the condition that the PLMN ID part of the UPSI is referring to the HPLMN shall be considered as fulfilled only if the PLMN ID is equal to the HPLMN code derived from the IMSI.

NOTE: This is also applicable if the UE has a non-empty EHPLMN list, even if the EHPLMN list does not include the PLMN ID derived from the IMSI.

The UE can also request the PCF to provide V2XP as specified in 3GPP TS 24.587 [19B].

The UE can also request the PCF to provide ProSeP as specified in 3GPP TS 24.554 [19E].

The UE can also request the PCF to provide A2XP as specified in 3GPP TS 24.577 [60].

The UE can also request the PCF to provide RSLPP as specified in 3GPP TS 24.514 [62].

D.1.2 Principles of PTI handling for UE policy delivery service procedures

When the PCF or the UE initiates a procedure, it shall include a valid PTI value in the message header of the command message or the request message. When the UE initiates a procedure, the UE shall use a PTI value in range between 01H and 77H. When the PCF initiates a procedure, the PCF shall use a PTI value in range between 80H and FEH.

When the PCF initiates a transaction related procedure (i.e. a procedure consisting of more than one message and the messages are related), it shall include a valid PTI value in the message header of the command message.

If a response message is sent as result of a received command or request message, the UE or the PCF shall include in the response message the PTI value received within the received command or request message (see examples in figure D.1.2.1, figure D.1.2.2 and figure D.1.2.3).

If a command message is sent as result of a received request message, the PCF shall include in the command message the PTI value received with the request message (see examples in figure D.1.2.3).

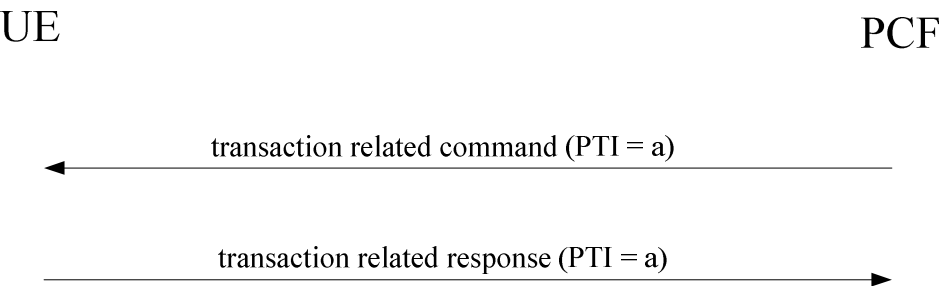


Figure D.1.2.1: Network-requested transaction related procedure

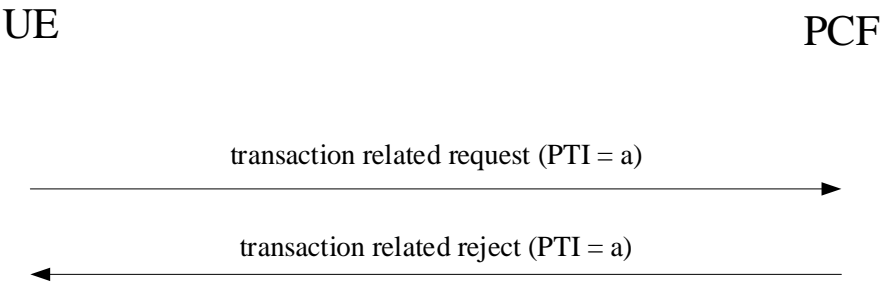


Figure D.1.2.2: UE-requested transaction related procedure rejected by the network

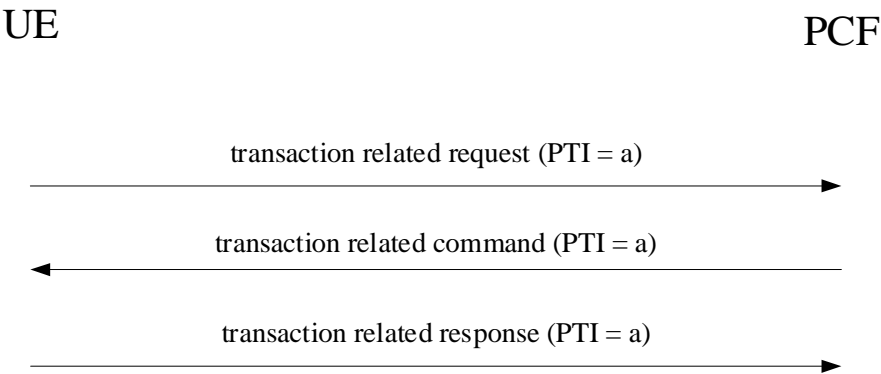


Figure D.1.2.3: UE-requested transaction related procedure triggering a network-requested transaction related procedure

NOTE: In earlier versions of this protocol, the UE can include in the response message a PTI value which is not the same as the one received within the command message, and therefore the PCF could not associate the response message from the UE to the command message sent.

D.2 Procedures

D.2.1 Network-requested UE policy management procedure

D.2.1.1 General

The purpose of the network-requested UE policy management procedure is to enable the network to:

- a) add one or more new UE policy sections to the UE;
- b) modify one or more UE policy sections stored at the UE; or
- c) delete one or more UE policy sections stored at the UE;

and optionally to enable the HPLMN or the subscribed SNPN to provide a UE accessing the subscribed SNPN or the HPLMN with a non-subscribed SNPN signalled URSP handling indication indicating whether the UE is allowed to accept URSP signalled by non-subscribed SNPNs.

D.2.1.2 Network-requested UE policy management procedure initiation

In order to initiate the network-requested UE policy management procedure, the PCF shall:

- a) if the network-requested UE policy management procedure is triggered by the UE-requested V2X policy provisioning procedure as specified in 3GPP TS 24.587 [19B], the UE-requested ProSe policy provisioning procedure as specified in 3GPP TS 24.554 [19E] or the UE-requested A2X policy provisioning procedure as specified in 3GPP TS 24.577 [60], then set the PTI IE to the PTI value of the received UE POLICY PROVISIONING REQUEST message of the UE-requested V2X policy provisioning procedure, the UE-requested ProSe policy provisioning procedure or the UE-requested A2X policy provisioning procedure, otherwise allocate a PTI value currently not used and set the PTI IE to the allocated PTI value;
- b) encode the information about the UE policy sections to be added, modified or deleted in a UE policy section management list IE as specified in subclause D.6.2 and include it in a MANAGE UE POLICY COMMAND message;
- c) if the PCF is a PCF of the HPLMN or the subscribed SNPN, optionally include the UE policy network classmark IE in a MANAGE UE POLICY COMMAND message and set the non-subscribed SNPN signalled URSP handling indication of the UE policy network classmark IE to "UE is not allowed to accept URSP signalled by non-subscribed SNPNs", or "UE is allowed to accept URSP signalled by non-subscribed SNPNs";
- c1) if the UE supports VPS URSP, optionally encode the information about entries of VPS URSP configuration to be added, modified or deleted in the VPS URSP configuration IE as specified in subclause D.6.8 and include it in a MANAGE UE POLICY COMMAND message;
- d) send the MANAGE UE POLICY COMMAND message to the UE via the AMF as specified in 3GPP TS 23.502 [9]; and
- e) start timer T3501 (see example in figure D.2.1.2.1).

NOTE: The PCF starts a different timer T3501 for each PTI value.

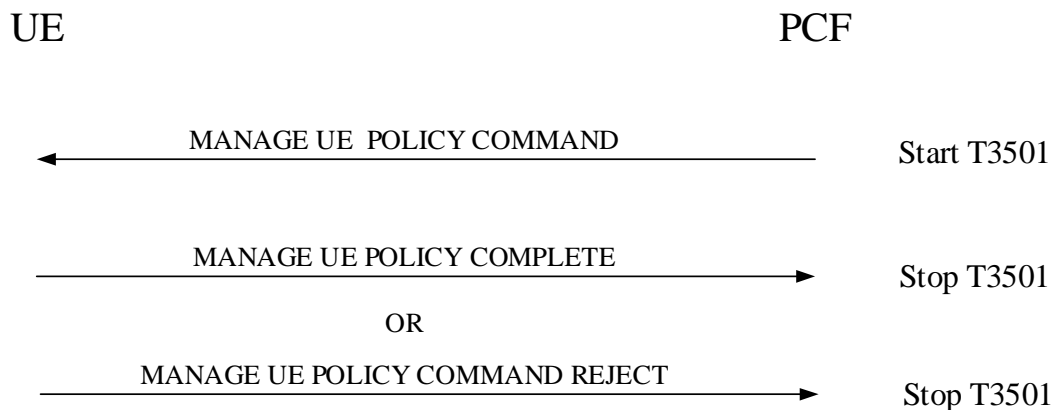


Figure D.2.1.2.1: Network-requested UE policy management procedure

Upon receipt of the MANAGE UE POLICY COMMAND message with a PTI value currently not used by a network-requested UE policy management procedure, for each instruction included in the UE policy section management list IE, the UE shall:

- store the received UE policy section of the instruction, if the UE has no stored UE policy section associated with the same UPSI as the UPSI associated with the instruction;
- replace the stored UE policy section with the received UE policy section of the instruction, if the UE has a stored UE policy section associated with the same UPSI as the UPSI associated with the instruction; or
- delete the stored UE policy section, if the UE has a stored UE policy section associated with the same UPSI as the UPSI associated with the instruction and the UE policy section of the instruction is empty;

additionally, if the UE policy network classmark IE is included in the MANAGE UE POLICY COMMAND message, and

- the UE has an empty EHPLMN list or the EHPLMN list is not present, and the UE's RPLMN is the HPLMN;
- the UE has a non-empty EHPLMN list, and the UE's RPLMN is an EHPLMN; or
- the UE's RSNPN is the subscribed SNPN,

the UE shall delete the non-subscribed SNPN signalled URSP handling indication stored for the selected entry of "list of subscriber data" or the selected PLMN subscription, if any, and store the non-subscribed SNPN signalled URSP handling indication received in the UE policy network classmark IE, for the selected entry of "list of subscriber data" or the selected PLMN subscription.

If the UE supports the VPS URSP, and the VPS URSP configuration is included in the MANAGE UE POLICY COMMAND message:

- if the replacement type field of the received VPS URSP configuration indicates "full list of tuples", the UE shall delete the stored VPS URSP configuration, if any; and
- if the received VPS URSP configuration contains one or more tuples:
 - if the UE does not have the stored VPS URSP configuration, the UE shall store the received VPS URSP configuration except zero or more tuples with no UPSCs; or
 - otherwise:
 - for each tuple with a tuple ID in the stored VPS URSP configuration:
 - if a tuple with the tuple ID is in the received VPS URSP configuration and contains:

- no UPSCs, the UE shall delete the tuple with the tuple ID from the stored VPS URSP configuration; or
 - one or more UPSCs, the UE shall replace the tuple with the tuple ID in the stored VPS URSP configuration with the tuple with the tuple ID from the received VPS URSP configuration; or
- B) if no tuple with the tuple ID is in the received VPS URSP configuration, the UE shall keep the tuple with the tuple ID in the stored VPS URSP configuration; and
- ii) for each tuple with a tuple ID in the received VPS URSP configuration, if no tuple with the tuple ID is in the stored VPS URSP configuration and:
- A) the tuple with the tuple ID in the received VPS URSP configuration contains no UPSCs, the UE shall ignore the tuple with the tuple ID in the received VPS URSP configuration; or
 - B) the tuple with the tuple ID in the received VPS URSP configuration contains one or more UPSCs, the UE shall add the tuple with the tuple ID from the received VPS URSP configuration to the stored VPS URSP configuration.

The UE may continue storing a received UE policy section for a PLMN or SNPN when the UE registers in another PLMN or SNPN. If necessary, the UE may delete UE policy sections stored for a PLMN other than the RPLMN and the HPLMN or for an SNPN other than the registered SNPN and the subscribed SNPN, before storing the new received UE policy sections.

When storing a UE policy section received from an SNPN, the UE shall associate the NID of that SNPN with the UPSI of the stored UE policy section.

NOTE: The maximum number of UE policy sections for PLMNs or SNPNs other than the HPLMN and the RPLMN or the registered SNPN and the subscribed SNPN that the UE can store and how the UE selects the UE policy sections to be deleted are up to the UE implementation.

D.2.1.3 Network-requested UE policy management procedure accepted by the UE

If all instructions included in the UE policy section management list IE were executed successfully by the UE, the UE shall:

- a) create a MANAGE UE POLICY COMPLETE message including the PTI value received within the MANAGE UE POLICY COMMAND message; and
- b) transport the MANAGE UE POLICY COMPLETE message using the NAS transport procedure as specified in subclause 5.4.5.

Upon receipt of the MANAGE UE POLICY COMPLETE message, the PCF shall stop timer T3501. The PCF should ensure that the PTI value assigned to this procedure is not released immediately.

NOTE: The way to achieve this is implementation dependent. For example, the PCF can ensure that the PTI value assigned to this procedure is not released during the time equal to or greater than the default value of timer T3501.

D.2.1.4 Network-requested UE policy management procedure not accepted by the UE

If the UE could not execute all instructions included in the UE policy section management list IE successfully, the UE shall:

- a) set the PTI IE to the PTI value received within the MANAGE UE POLICY COMMAND message and encode the results by including:
 - 1) the UPSI associated with the instructions which could not be executed successfully;
 - 2) the failed instruction order set to order of the instruction in the UE policy section management sublist of the received UE policy section management list IE which could not be executed successfully; and

3) the cause of the failure,

in the UE policy section management result IE as specified in subclause D.5.3 and include it in a MANAGE UE POLICY COMMAND REJECT message, and

- b) transport the MANAGE UE POLICY COMMAND REJECT message using the NAS transport procedure as specified in subclause 5.4.5.

Upon receipt of the MANAGE UE POLICY COMMAND REJECT message, the PCF shall stop timer T3501. Any instruction that was included in the UE policy section management list IE but not indicated in the UE policy section management result IE of the received MANAGE UE POLICY COMMAND REJECT message, shall be considered as successfully executed.

The PCF should ensure that the PTI value assigned to this procedure is not released immediately.

NOTE: The way to achieve this is implementation dependent. For example, the PCF can ensure that the PTI value assigned to this procedure is not released during the time equal to or greater than the default value of timer T3501.

Upon receipt of the notification from the AMF that the UE is not reachable, the PCF shall stop the T3501.

D.2.1.5 Abnormal cases on the network side

The following abnormal cases can be identified:

- a) T3501 expired.

The PCF shall, on the first expiry of the timer T3501, retransmit the MANAGE UE POLICY COMMAND message and shall reset and start timer T3501. This retransmission is repeated four times, i.e. on the fifth expiry of timer T3501, the PCF shall abort the procedure and release the allocated PTI.

D.2.1.6 Abnormal cases in the UE

The following abnormal cases can be identified:

- a) Receipt of an instruction associated with a UPSI which has a PLMN ID part that is not equal to the PLMN ID of the UE's HPLMN and the instruction contains a UE policy part with a UE policy part type set to "URSP" for a UE not operating in SNPN access operation mode, or receipt of an instruction associated with a UPSI which has a PLMN ID part that is not equal to the PLMN ID part of the selected SNPN and the instruction contains a UE policy part with a UE policy part type set to "URSP" for a UE operating in SNPN access operation mode.

The UE shall set the UE policy delivery service cause to #111 "Protocol error, unspecified" for the instruction in the UE policy section management result IE of the MANAGE UE POLICY COMMAND REJECT message.

- b) Receipt of an instruction associated with a UPSI which has a PLMN ID part that is not equal to the PLMN ID of the UE's HPLMN or the UE's RPLMN and the instruction contains a UE policy part with a UE policy part type set to "ANDSP" for a UE not operating in SNPN access operation mode or receipt of an instruction associated with a UPSI which has a PLMN ID part that is not equal to the PLMN ID part of the subscribed SNPN or the UE's RSNPN and the instruction contains a UE policy part with a UE policy part type set to "ANDSP" for a UE operating in SNPN access operation mode.

The UE shall set the UE policy delivery service cause to #111 "Protocol error, unspecified" for the instruction in the UE policy section management result IE of the MANAGE UE POLICY COMMAND REJECT message.

- c) Transmission failure of the MANAGE UE POLICY COMPLETE message indication from lower layers.

The UE shall not diagnose an error and consider the network-requested UE policy management procedure is complete.

NOTE 1: Considering the network-requested UE policy management procedure is complete as the result of this abnormal case, does not cause the UE to revert the execution of the successfully executed instructions included in the MANAGE UE POLICY COMMAND message.

- d) Transmission failure of the MANAGE UE POLICY COMMAND REJECT message indication from lower layers.

The UE shall not diagnose an error and consider the network-requested UE policy management procedure is complete.

NOTE 2: Considering the network-requested UE policy management procedure is complete as the result of this abnormal case, does not cause the UE to revert the execution of the successfully executed instructions included in the MANAGE UE POLICY COMMAND message.

- e) Receipt of a MANAGE UE POLICY COMMAND message with a PTI set to the same value as the PTI of a previously received MANAGE UE POLICY COMMAND message.

The UE shall discard the message and retransmit the MANAGE UE POLICY COMMAND COMPLETE or MANAGE UE POLICY COMMAND REJECT message transmitted in response to the previously received MANAGE UE POLICY COMMAND message.

NOTE 3: The way to achieve this is UE implementation dependent. For example, the UE can assume that on the fifth expiry of timer T3501, the PCF will abort the procedure and that the PTI value assigned to the procedure will be released.

- f) Receipt of an instruction associated with a UPSI which has a PLMN ID part that is equal to the PLMN ID part of the selected SNPN, the instruction contains a UE policy part with a UE policy part type set to "URSP", UE's RSNPN is a non-subscribed SNPN and:

- 1) the UE has a stored non-subscribed SNPN signalled URSP handling indication for the selected entry of "list of subscriber data" or the selected PLMN subscription indicating that the UE is not allowed to accept URSP signalled by non-subscribed SNPNs; or
- 2) the UE does not have a stored non-subscribed SNPN signalled URSP handling indication for the selected entry of "list of subscriber data" or the selected PLMN subscription, and the non-subscribed SNPN signalled URSP handling indication preconfigured in the selected entry of "list of subscriber data" or the selected PLMN subscription indicates that the UE is not allowed to accept URSP signalled by non-subscribed SNPNs;

for a UE operating in SNPN access operation mode.

The UE shall set the UE policy delivery service cause to #111 "Protocol error, unspecified" for the instruction in the UE policy section management result IE of the MANAGE UE POLICY COMMAND REJECT message.

D.2.2 UE-initiated UE state indication procedure

D.2.2.1 General

The purpose of the UE-initiated UE state indication procedure is:

- a) to deliver the UPSI(s) of the UE policy section(s) which are:
 - identified by a UPSI with the PLMN ID part indicating the HPLMN or the selected PLMN, and stored in the UE, if any; or
 - identified by a UPSI with the PLMN ID part indicating the PLMN ID part of the SNPN identity of the selected SNPN and associated with the NID of the selected SNPN, and stored in the UE, if any;
- b) to indicate whether UE supports ANDSP;
- c) to indicate whether UE supports URSP provisioning in EPS;
- c1) to indicate whether UE supports VPS URSP;
- d) to indicate whether UE supports reporting URSP rule enforcement; and
- e) to deliver the UE's one or more OS IDs;

to the PCF.

D.2.2.2 UE-initiated UE state indication procedure initiation

In order to initiate the UE-initiated UE state indication procedure, the UE shall create a UE STATE INDICATION message. The UE:

- a) shall allocate a PTI value currently not used and set the PTI IE to the allocated PTI value;
- b) if not operating in SNPN access operation mode, shall include the UPSI(s) of the UE policy section(s) which are identified by a UPSI with the PLMN ID part indicating the HPLMN or the selected PLMN available in the UE in the UPSI list IE, if any;

NOTE 1: If the UE does not have any UE policy section which is identified by a UPSI with the PLMN ID part indicating the HPLMN or the selected PLMN, the UE sets the Length of UPSI list contents field in the UPSI list IE to zero.

- c) if operating in SNPN access operation mode, shall include UPSI(s) of the UE policy section(s) which are identified by a UPSI:

- with the PLMN ID part indicating the MCC and MNC of the selected SNPN; and
- associated with the NID of the selected SNPN;

available in the UE in the UPSI list IE, if any;

NOTE 2: If the UE does not have any UE policy section which is identified by a UPSI with the PLMN ID part indicating the MCC and MNC of the selected SNPN and associated with the NID of the selected SNPN, the UE sets the Length of UPSI list contents field in the UPSI list IE to zero.

- d) shall specify whether the UE supports ANDSP in the UE policy classmark IE;
- e) shall specify whether the UE supports URSP provisioning in EPS in the UE policy classmark IE;

NOTE 3: ANDSP and URSP are specified in 3GPP TS 24.526 [19].

- e1) if the UE supports VPS URSP, shall set the SVPSU bit to "VPS URSP supported by the UE" in the UE policy classmark IE;
- f) if the UE supports reporting URSP rule enforcement, shall set the SupportRURE bit to "Reporting URSP rule enforcement supported by the UE"; and
- g) may include the UE's one or more OS IDs in the UE OS Id IE.

The UE shall send the UE STATE INDICATION message (see example in figure D.2.2.2.1). The UE shall transport the created UE STATE INDICATION message using the registration procedure (see subclause 5.5.1).



Figure D.2.2.2.1: UE-initiated UE state indication procedure

D.2.2.3 UE-initiated UE state indication procedure accepted by the network

Upon receipt of the UE STATE INDICATION message, the PCF shall operate as described in 3GPP TS 23.502 [9] and 3GPP TS 29.525 [21].

D.2.2.4 Abnormal cases on the network side

Apart from the case described in subclause D.2.2.3, no abnormal cases have been identified.

D.3 UE policy re-assembly at the UE

When the UE needs to apply ANDSP as specified in 3GPP TS 24.502 [18], the UE shall consider all UE policy parts with ANDSP contents currently stored at the UE.

When the UE needs to apply URSP as specified in 3GPP TS 24.526 [19], the UE shall consider all UE policy parts with URSP contents currently stored at the UE.

a) if the UE supports VPS URSP then:

- 1) the UE shall consider as VPS URSP of the RPLMN all UE policy parts with URSP contents currently stored at the UE, which are a part of one or more UE policy sections identified by a UPSI:
 - i) with the PLMN ID part indicating the HPLMN; and
 - ii) with UPSC indicated in a tuple of the stored VPS URSP configuration, such that the tuple contains the network descriptor with a network descriptor entry containing:
 - A) the network descriptor entry type field set to "one or more VPLMNs" and the network descriptor entry value field containing PLMN ID of the RPLMN of an access, if the UE is registered via one or both accesses and the RPLMN of each access is a VPLMN;
 - B) the network descriptor entry type field set to "one or more MCCs" and the network descriptor entry value field containing MCC of the PLMN ID of the RPLMN of an access, if the UE is registered via one or both accesses and the RPLMN of each access is a VPLMN; or
 - C) the network descriptor entry type field set to "any VPLMN", if the UE is registered via one or both accesses and the RPLMN of each access is a VPLMN;
- 2) the UE shall consider as VPS URSP of the equivalent PLMN of the RPLMN all UE policy parts with URSP contents currently stored at the UE, which are a part of one or more UE policy sections identified by a UPSI:
 - i) with the PLMN ID part indicating the HPLMN; and
 - ii) with UPSC indicated in a tuple of the stored VPS URSP configuration, such that the tuple contains the network descriptor with a network descriptor entry containing:
 - A) the network descriptor entry type field set to "one or more VPLMNs" and the network descriptor entry value field containing PLMN ID of an equivalent PLMN, if the UE is registered via one or both accesses, the RPLMN of each access is a VPLMN and the equivalent PLMN is a VPLMN;
 - B) the network descriptor entry type field set to "one or more MCCs" and the network descriptor entry value field containing MCC of the PLMN ID of an equivalent PLMN, if the UE is registered via one or both accesses, the RPLMN of each access is a VPLMN and the equivalent PLMN is a VPLMN; or
 - C) the network descriptor entry type field set to "any VPLMN", if the UE is registered via one or both accesses, the RPLMN of each access is a VPLMN and an equivalent PLMN is a VPLMN; and
- 3) the UE shall consider as PG URSP all UE policy parts with URSP contents currently stored at the UE except zero or more UE policy parts, if any, which are a part of one or more UE policy sections identified by a UPSI:
 - i) with the PLMN ID part indicating the HPLMN; and
 - ii) with UPSC indicated in any tuple of the stored VPS URSP configuration; and

b) the UE shall consider all UE policy parts with URSP contents currently stored at the UE as the signalled URSP.

When the UE needs to apply V2XP as specified in 3GPP TS 24.588 [19C], the UE shall consider all UE policy parts with V2XP contents currently stored at the UE.

When the UE needs to apply ProSeP as specified in 3GPP TS 24.555 [19F], the UE shall consider all UE policy parts with ProSeP contents currently stored at the UE.

When the UE needs to apply A2XP as specified in 3GPP TS 24.578 [61], the UE shall consider all UE policy parts with A2XP contents currently stored at the UE.

When the UE needs to apply RSLPP as specified in 3GPP TS 24.514 [62], the UE shall consider all UE policy parts with RSLPP contents currently stored at the UE.

D.4
Void

D.5
Message functional definition and contents

D.5.1
Manage UE policy command

D.5.1.1
Message definition

The MANAGE UE POLICY COMMAND message is sent by the PCF to the UE to request the UE to manage UE policy sections, see table D.5.1.1.1

Message type: MANAGE UE POLICY COMMAND

Significance: dual

Direction: network to UE

Table D.5.1.1.1: MANAGE UE POLICY COMMAND message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	PTI	Procedure transaction identity 9.6	M	V	1
	MANAGE UE POLICY COMMAND message identity	UE policy delivery service message type D.6.1	M	V	1
	UE policy section management list	UE policy section management list D.6.2	M	LV-E	11-65533
42	UE policy network classmark	UE policy network classmark D.6.7	O	TLV	3-5
70	VPS URSP configuration	VPS URSP configuration D.6.8	O	TLV-E	3-65533
NOTE: The total length of the MANAGE UE POLICY COMMAND message content cannot exceed 65535 octets (see Payload container contents maximum length as specified in subclause 9.11.3.39.1).					

D.5.1.2
UE policy network classmark

The UE policy network classmark is included when the PCF of a PLMN or an SNPN intends to provide the UE with information about the policy aspects of the network.

D.5.1.3
VPS URSP configuration

The VPS URSP configuration IE is included when the PCF of a PLMN intends to provide the UE with the VPS URSP configuration.

D.5.2 Manage UE policy complete

D.5.2.1 Message definition

The MANAGE UE POLICY COMPLETE message is sent by the UE to the PCF to report that all received instructions have been successfully executed at the UE, see table D.5.2.1.1

Message type: MANAGE UE POLICY COMPLETE

Significance: dual

Direction: UE to network

Table D.5.2.1.1: MANAGE UE POLICY COMPLETE message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	PTI	Procedure transaction identity 9.6	M	V	1
	MANAGE UE POLICY COMPLETE message identity	UE policy delivery service message type D.6.1	M	V	1

D.5.3 Manage UE policy command reject

D.5.3.1 Message definition

The MANAGE UE POLICY COMMAND REJECT message is sent by the UE to the PCF to report that one or more instructions could not be successfully executed at the UE, see table D.5.3.1.1

Message type: MANAGE UE POLICY COMMAND REJECT

Significance: dual

Direction: UE to network

Table D.5.3.1.1: MANAGE UE POLICY COMMAND REJECT message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	PTI	Procedure transaction identity 9.6	M	V	1
	MANAGE UE POLICY COMMAND REJECT message identity	UE policy delivery service message type D.6.1.	M	V	1
	UE policy section management result	UE policy section management result D.6.3	M	LV-E	11-65533
NOTE: The total length of the MANAGE UE POLICY COMMAND REJECT message content cannot exceed 65535 octets (see Payload container contents maximum length as specified in subclause 9.11.3.39.1).					

D.5.4 UE state indication

D.5.4.1 Message definition

The UE STATE INDICATION message is sent by the UE to the PCF:

- to deliver the UPSI(s) of the UE policy section(s) stored in the UE;
- to indicate whether the UE supports ANDSP;

- c) to indicate whether the UE supports URSP provisioning in EPS in the UE policy classmark IE;
- c1) to indicate whether the UE supports VPS URSP;
- c2) to indicate whether the UE supports reporting URSP rule enforcement; and
- d) to deliver the UE's one or more OS IDs;

see table D.5.4.1.1.

Message type: UE STATE INDICATION

Significance: dual

Direction: UE to network

Table D.5.4.1.1: UE STATE INDICATION message content

IEI	Information Element	Type/Reference	Presence	Format	Length
	PTI	Procedure transaction identity 9.6	M	V	1
	UE STATE INDICATION message identity	UE policy delivery service message type D.6.1	M	V	1
	UPSI list	UPSI list D.6.4	M	LV-E	2-65531
	UE policy classmark	UE policy classmark D.6.5	M	LV	2-4
41	UE OS Id	OS Id D.6.6	O	TLV	18-242
NOTE: The total length of the UE STATE INDICATION message content cannot exceed 65535 octets (see Payload container contents maximum length as specified in subclause 9.11.3.39.1).					

D.6 Information elements coding

D.6.1 UE policy delivery service message type

Table D.6.1.1: UE policy delivery service message type

Bits								
8	7	6	5	4	3	2	1	
0	0	0	0	0	0	0	0	Reserved
0	0	0	0	0	0	0	1	MANAGE UE POLICY COMMAND message
0	0	0	0	0	0	1	0	MANAGE UE POLICY COMPLETE message
0	0	0	0	0	0	1	1	MANAGE UE POLICY COMMAND REJECT message
0	0	0	0	0	1	0	0	UE STATE INDICATION message
0	0	0	0	0	1	0	1	UE POLICY PROVISIONING REQUEST message (see NOTE)
0	0	0	0	0	1	1	0	UE POLICY PROVISIONING REJECT message (see NOTE)
All other values are reserved								
NOTE:								Coding of UE POLICY PROVISIONING REQUEST message and UE POLICY PROVISIONING REJECT message are specified in 3GPP TS 24.587 [19B]. Usage of UE POLICY PROVISIONING REQUEST message and UE POLICY PROVISIONING REJECT message for V2X policy is specified in 3GPP TS 24.587 [19B]. Usage of UE POLICY PROVISIONING REQUEST message and UE POLICY PROVISIONING REJECT message for ProSeP policy is specified in 3GPP TS 24.554 [19E]. Usage of UE POLICY PROVISIONING REQUEST message and UE POLICY PROVISIONING REJECT message for A2X policy is specified in 3GPP TS 24.577 [60]. Usage of UE POLICY PROVISIONING REQUEST message and UE POLICY PROVISIONING REJECT message for RSLPP policy is specified in 3GPP TS 24.514 [62].

D.6.2 UE policy section management list

The purpose of the UE policy section management list information element is to transfer from the PCF to the UE a list of instructions to be performed at the UE for management of UE policy section stored at the UE.

The UE policy section management list information element is coded as shown in figure D.6.2.1, figure D.6.2.2, figure D.6.2.3, figure D.6.2.4, figure D.6.2.5, figure D.6.2.6, figure D.6.2.7 and table D.6.2.1.

The UE policy section management list information element has a minimum length of 12 octets and a maximum length of 65534 octets.

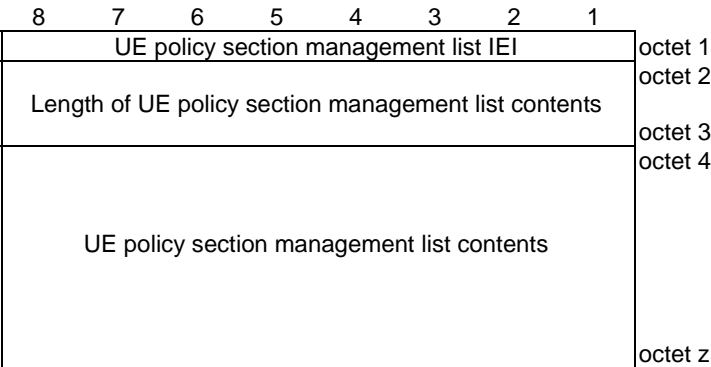


Figure D.6.2.1: UE policy section management list information element

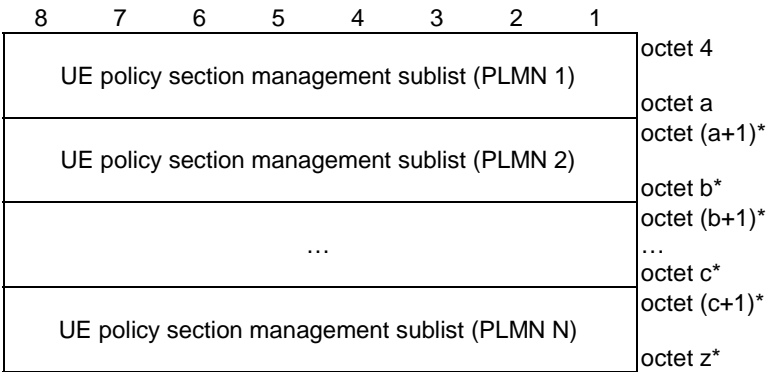


Figure D.6.2.2: UE policy section management list contents

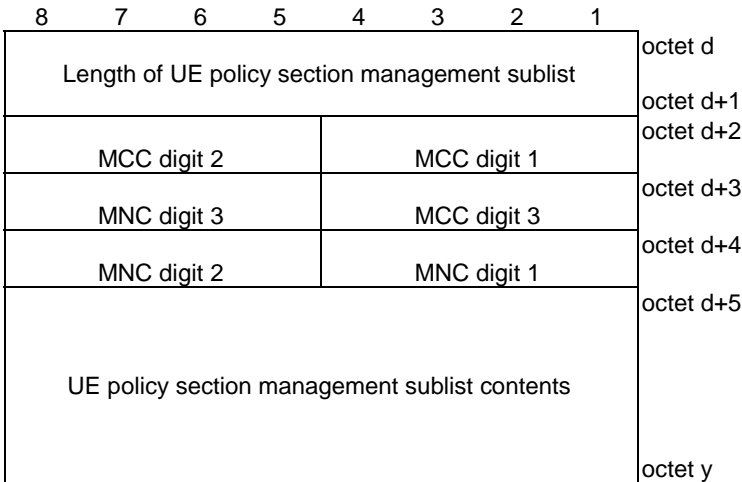


Figure D.6.2.3: UE policy section management sublist

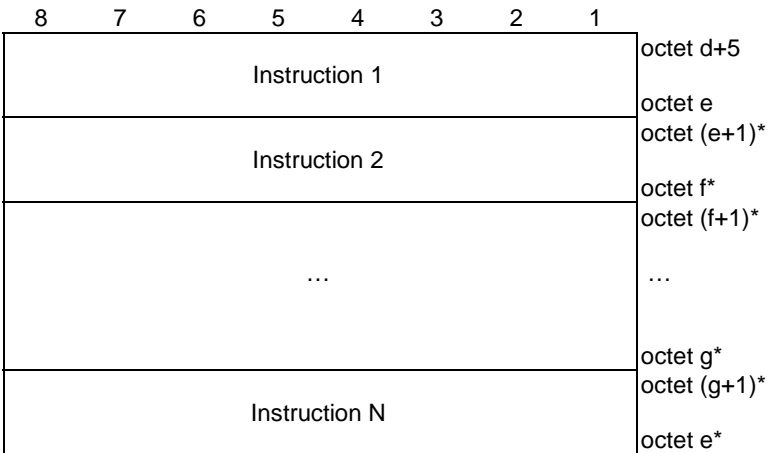


Figure D.6.2.4: UE policy section management sublist contents

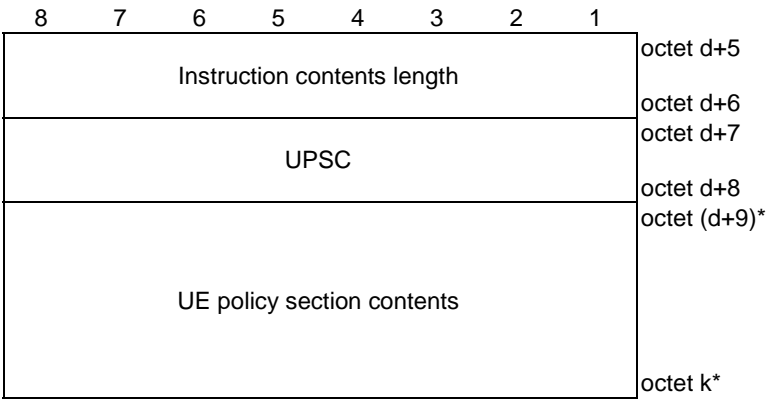


Figure D.6.2.5: Instruction

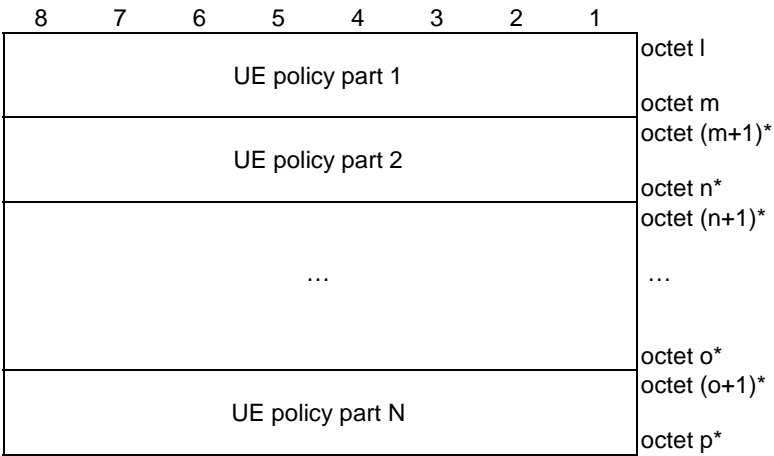


Figure D.6.2.6: UE policy section contents

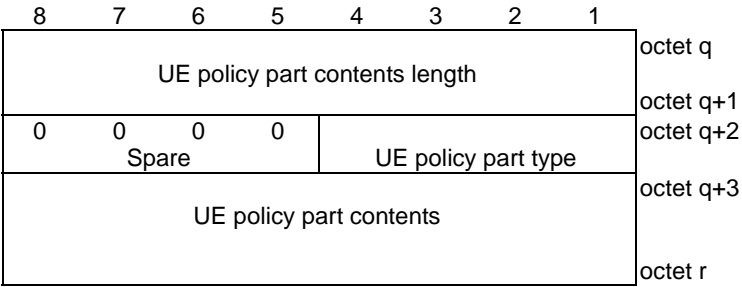


Figure D.6.2.7: UE policy part

Table D.6.2.1: UE policy section management list information element

Value part of the UE policy section management list information element (octets 4 to z)

The value part of the UE policy section management list information element consists of one or several UE policy section management sublists.

UE policy section management sublist:

Length of UE policy section management sublist (octets d to d+1)

This field contains the binary encoding of the length of the UE policy section management sublist in units of octets.

MCC, Mobile country code (octet d+2, and bits 4 to 1 of octet d+3)

The MCC field is coded as in ITU-T Recommendation E.212 [42], annex A.

MNC, Mobile network code (bits 8 to 5 of octet d+3, and octet d+4)

The coding 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 coded as "1111". (NOTE 1)

UE policy section management sublist contents (octets d+5 to y)

The UE policy section management sublist contents consist of one or several instructions.

Instruction:

Instruction contents length (octets d+5 to d+6)

This field contains the binary encoding of the instruction contents length in units of octets.

UPSC (octets d+7 to d+8)

This field contains the binary encoding of the UPSC. The value of the UPSC is set by the PCF.

UE policy section contents (octets d+9 to k)

The UE policy section contents consist of one or several UE policy parts.

UE policy part:

UE policy part contents length (octets q to q+1)

This field contains the binary encoding of the UE policy part contents length in units of octets (NOTE 2).

UE policy part type (bits 4 to 1 of octet q+2)

Bits

4	3	2	1	
0	0	0	0	Reserved
0	0	0	1	URSP
0	0	1	0	ANDSP
0	0	1	1	V2XP
0	1	0	0	ProSeP
0	1	0	1	A2XP
0	1	1	0	RSLPP

All other values are reserved.

Bits 8 to 5 of octet q+2 are spare and shall be coded as zero.

UE policy part contents (octets q+3 to r)

This field contains a UE policy part encoded as specified in 3GPP TS 24.526 [19] for the UE policy part type field set to "URSP" or "ANDSP", in 3GPP TS 24.588 [19C] for the UE policy part type field set to "V2XP", in 3GPP TS 24.555 [19F] for the UE policy part type field set to "ProSeP" and in 3GPP TS 24.514 [62] for the UE policy part type field set to "RSLPP" and in 3GPP TS 24.578 [61] for the UE policy part type field set to "A2XP" respectively.
NOTE 1: When the PCF is in an SNPN, the PCF shall include the PLMN ID part of the SNPN identity in the UE policy section management sublist.
NOTE 2: The UE policy part contents length indicates the length of the value part of the UE policy part field (i.e. octet q+2 to octet r).

D.6.3 UE policy section management result

The purpose of the UE policy section management result information element is to transfer from the UE to the PCF information about instructions for UE policy section management which the UE could not execute successfully.

The UE policy section management result information element is coded as shown in figure D.6.3.1, figure D.6.3.2, figure D.6.3.3, figure D.6.3.4, figure D.6.3.5 and table D.6.3.1.

The UE policy section management result information element has a minimum length of 12 octets and a maximum length of 65534 octets.

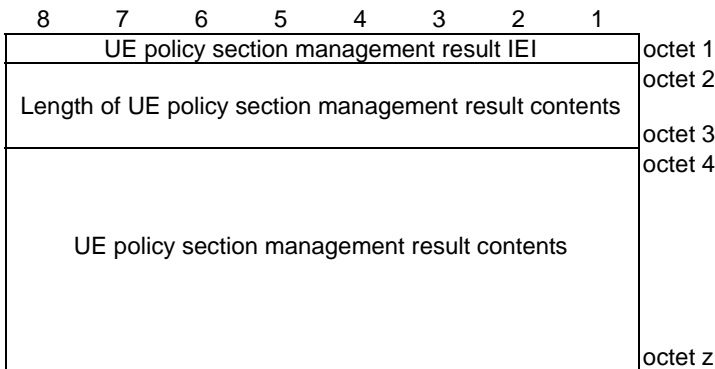


Figure D.6.3.1: UE policy section management result information element

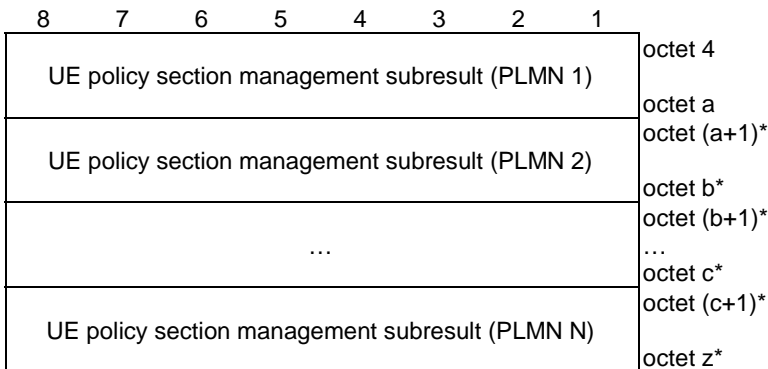


Figure D.6.3.2: UE policy section management result contents

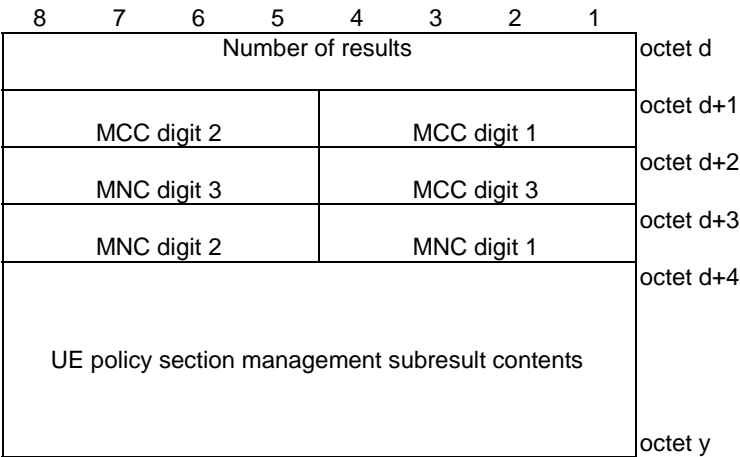


Figure D.6.3.3: UE policy section management subresult

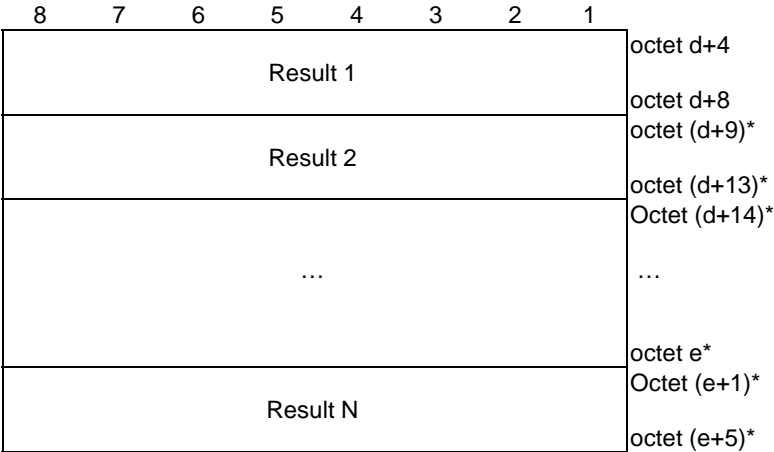


Figure D.6.3.4: UE policy section management subresult contents

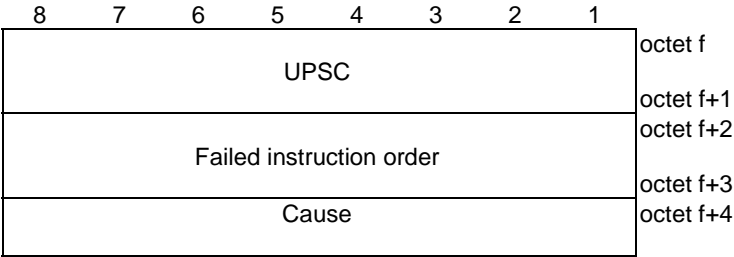


Figure D.6.3.5: Result

Table D.6.3.1: UE policy section management result information element

Value part of the UE policy section management result information element (octets 4 to z)																			
The value part of the UE policy section management result information element consists of one or several UE policy section management subresults.																			
UE policy section management subresult:																			
Number of results (octet d)																			
This field contains the binary encoding of number of results included in the UE policy section management subresult.																			
MCC, Mobile country code (octet d+1, and bits 4 to 1 of octet d+2)																			
The MCC field is coded as in ITU-T Recommendation E.212 [42], annex A.																			
MNC, Mobile network code (bits 8 to 5 of octet d+2, and octet d+3)																			
The coding 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 coded as "1111". (NOTE)																			
UE policy section management subresult contents (octets d+4 to y)																			
The UE policy section management subresult contents consist of one or several results.																			
Result (octet f to f+4)																			
UPSC (octet f to f+1)																			
This field contains the binary encoding of the UPSC. The value of the UPSC is set by the PCF																			
Failed instruction order (octets f+2 to f+3)																			
This field contains the binary encoding of the order of the instruction in the UE policy section management sublist contents as specified in Figure D.6.2.4, which could not be executed successfully. The value of failed instruction order set to one indicates that the first instruction in the UE policy section management sublist contents could not be executed successfully.																			
Cause (octet f+4)																			
Bits																			
<table><tr><td>8</td><td>7</td><td>6</td><td>5</td><td>4</td><td>3</td><td>2</td><td>1</td><td></td></tr><tr><td>0</td><td>1</td><td>1</td><td>0</td><td>1</td><td>1</td><td>1</td><td>1</td><td>Protocol error, unspecified</td></tr></table>	8	7	6	5	4	3	2	1		0	1	1	0	1	1	1	1	Protocol error, unspecified	
8	7	6	5	4	3	2	1												
0	1	1	0	1	1	1	1	Protocol error, unspecified											
The receiving entity shall treat any other value as 0110 1111, "Protocol error, unspecified".																			
NOTE:	The UE operating in the SNPN access operation mode shall include the PLMN ID part of the SNPN identity of the SNPN in the UE policy section management subresult.																		

D.6.4 UPSI list

The purpose of the UPSI list information element is to transfer from the UE to the PCF a list of UPSIs.

The UPSI list information element is coded as shown in figure D.6.4.1, figure D.6.4.2, and table D.6.4.1.

The UPSI list information element has a minimum length of 3 octets and a maximum length of 65532 octets.

NOTE: A PCF implementing a previous version of the present specification will expect the UPSI list information element to have a minimum length of 10 octets and could be unable to decode a UPSI list information element with a length of 3 octets i.e. a UPSI list information element not containing any UPSI.

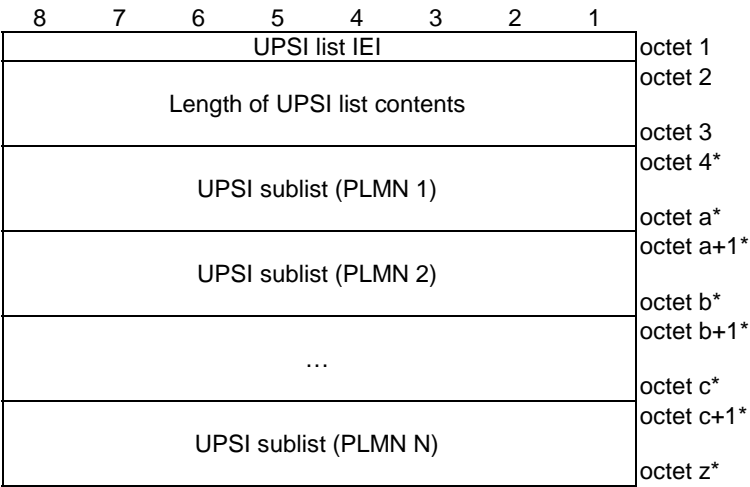


Figure D.6.4.1: UPSI list information element

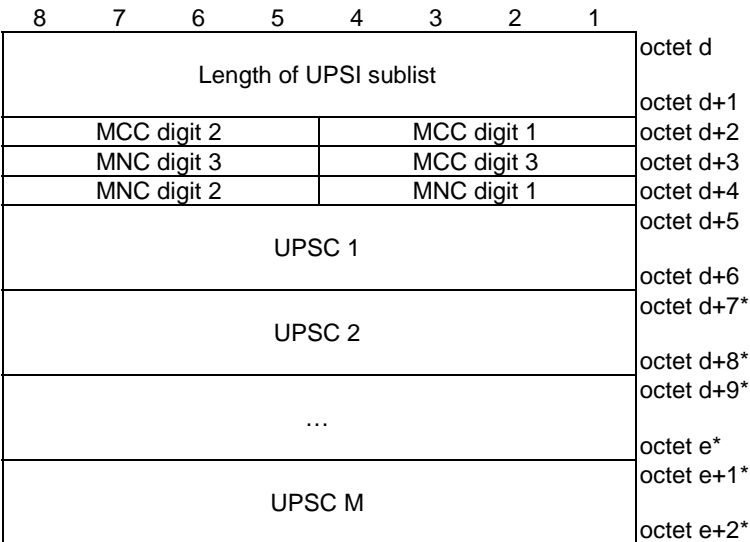


Figure D.6.4.2: UPSI sublist

Table D.6.4.1: UPSI list information element

<p>Length of UPSI list contents (octets 2 to 3)</p> <p>This field indicates the length of the UPSI list contents. If no UPSIs are included in the UPSI list, the UE shall set the length of UPSI list contents to zero.</p> <p>MCC, Mobile country code (octet d+2, and bits 4 to 1 of octet d+3)</p> <p>The MCC field is coded as in ITU-T Recommendation E.212 [42], annex A.</p> <p>MNC, Mobile network code (bits 8 to 5 of octet d+3, and octet d+4)</p> <p>The coding 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 coded as "1111".</p> <p>(NOTE)</p> <p>UPSC (octets d+5 to d+6)</p> <p>This field contains the binary encoding of the UPSC. The value of the UPSC is set by the PCF.</p> <p>NOTE: The UE operating in the SNPN access operation mode shall include the PLMN ID part of the SNPN identity in the UPSI sublist.</p>

D.6.5 UE policy classmark

The purpose of the UE policy classmark information element is to provide the network with information about the policy aspects of the UE.

The UE policy classmark information element is coded as shown in figure D.6.5.1 and table D.6.5.1.

The UE policy classmark is a type 4 information element with a minimum length of 3 octets and a maximum length of 5 octets.

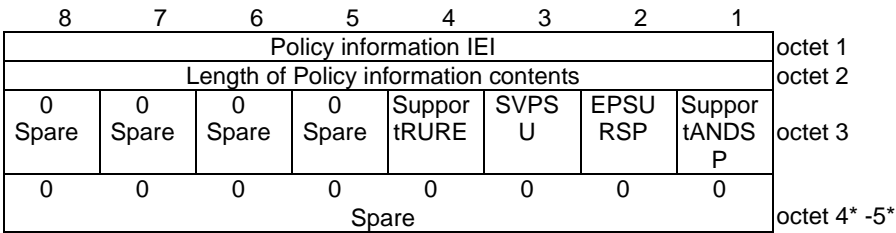


Figure D.6.5.1: UE policy classmark information element

Table D.6.5.1: UE policy classmark information element

Support of ANDSP by the UE (SupportANDSP) (octet 3, bit 1)	
Bit	
1	
0	ANDSP not supported by the UE
1	ANDSP supported by the UE
Support of URSP provisioning in EPS by the UE (EPSURSP) (octet 3, bit 2) (see NOTE)	
Bit	
2	
0	URSP provisioning in EPS not supported by the UE
1	URSP provisioning in EPS supported by the UE
Support of VPS URSP (SVPSU) (octet 3, bit 3)	
Bit	
3	
0	VPS URSP not supported by the UE
1	VPS URSP supported by the UE
Support of Reporting URSP Rule Enforcement by the UE (SupportRURE) (octet 3, bit 4)	
Bit	
4	
0	Reporting URSP rule enforcement not supported by the UE
1	Reporting URSP rule enforcement supported by the UE
All other bits in octet 3 to 5 are spare and shall be coded as zero, if the respective octet is included in the information element.	
NOTE: This indicator shall be ignored by an EPS receiving entity as the UE in EPS providing UE STATE INDICATION message, supports URSP provisioning in EPS.	

D.6.6 UE OS Id

The purpose of the UE OS Id information element is to provide the network with information about the OS of the UE.

The UE OS Id information element is coded as shown in figure D.6.6.1 and table D.6.6.1.

The UE OS Id is a type 4 information element with a minimum length of 18 octet and a maximum length of 242 octets.

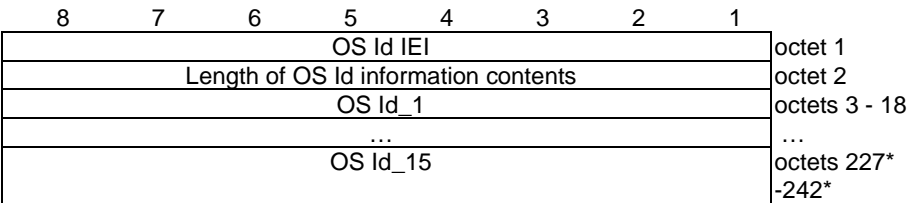


Figure D.6.6.1: UE OS Id information element

Table D.6.6.1: UE OS Id information element

OS Id:
The OS Id is coded as a sequence of a sixteen octet OS Id value field. The OS Id value field is defined as Universally Unique IDentifier (UUID) as specified in IETF RFC 4122 [35A].

D.6.7 UE policy network classmark

The purpose of the UE policy network classmark information element is to provide the UE with information about the policy aspects of the network.

The UE policy network classmark information element is coded as shown in figure D.6.7.1 and table D.6.7.1.

The UE policy network classmark is a type 4 information element with a minimum length of 3 octets and a maximum length of 5 octets.

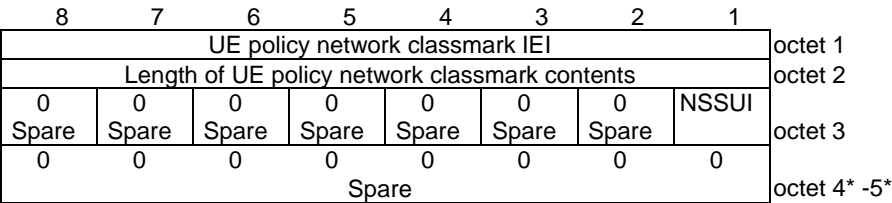


Figure D.6.7.1: UE policy network classmark information element

Table D.6.7.1: UE policy network classmark information element

Non-subscribed SNPN signalled URSP handling indication (NSSUI) (octet 3, bit 1) (see NOTE)	
Bits	
1	
0	UE is allowed to accept URSP signalled by non-subscribed SNPNs
1	UE is not allowed to accept URSP signalled by non-subscribed SNPNs
All other bits in octet 3 to 5 are spare and shall be coded as zero, if the respective octet is included in the information element.	
NOTE: Receiving UE shall ignore this bit, if i) UE has an empty or non-present EHPLMN list and the bit is received from the RPLMN which is not the HPLMN, ii) UE has non-empty EHPLMN list and the bit is received from the RPLMN which is not an EHPLMN or iii) the bit is received from the RSNPN which is not the subscribed SNPN.	

D.6.8 VPS URSP configuration

The purpose of the VPS URSP configuration information element is to transfer the VPS URSP configuration from the PCF to the UE. The VPS URSP configuration contains zero or more tuples. Each tuple contains the tuple ID identifying the tuple, the network descriptor identifying one or more VPLMNs, and zero or more UPSCs of HPLMN's UE policy sections which contain solely one or more UE policy parts with the UE policy part type set to "URSP", such that the URSP rules in those one or more UE policy parts are applicable to the VPLMN and its equivalent PLMN.

The VPS URSP configuration information element is coded as shown in figure D.6.8.1, figure D.6.8.2, figure D.6.8.3, figure D.6.8.4, figure D.6.8.5, figure D.6.8.6, figure D.6.8.7, figure D.6.8.8, figure D.6.8.9, and table D.6.8.1.

The VPS URSP configuration is type 6 information element with a minimum length of 3 octets and a maximum length of 65533 octets.

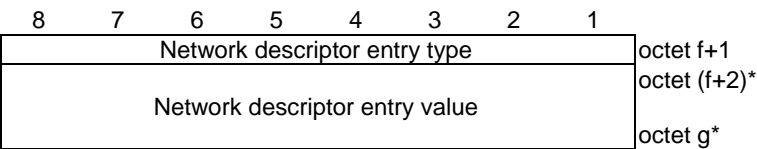


Figure D.6.8.4: Network descriptor entry

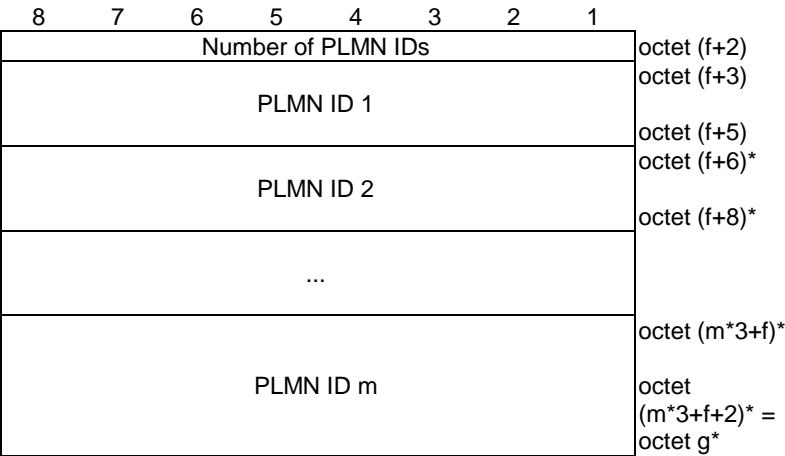


Figure D.6.8.5: Network descriptor entry value for network descriptor entry type set to "one or more VPLMNs"



Figure D.6.8.6: PLMN ID

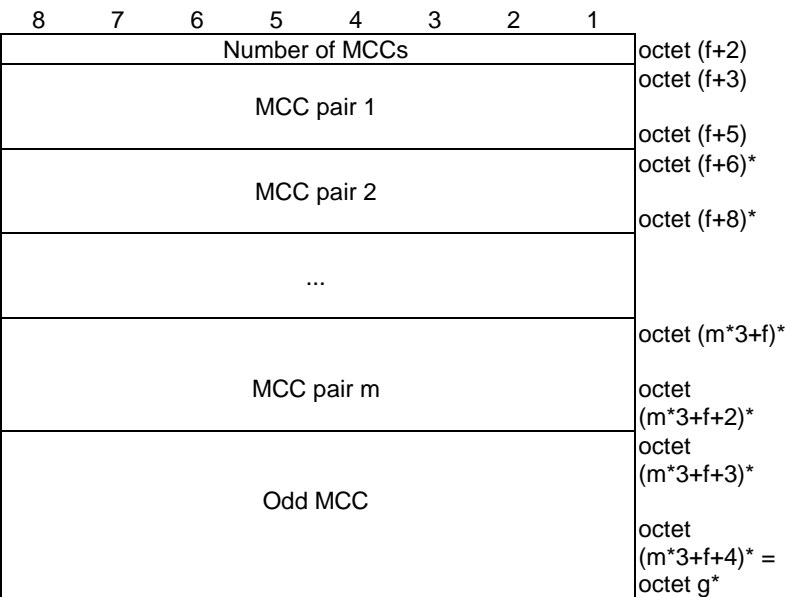


Figure D.6.8.7: Network descriptor entry value for network descriptor entry type set to "one or more MCCs"

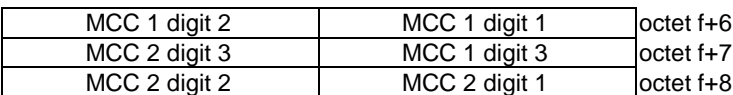


Figure D.6.8.8: MCC pair

MCC digit 2				MCC digit 1	octet (m*3+f+3)
0	0	0	0	MCC digit 3	octet (m*3+f+4) = octet g
Spare	Spare	Spare	Spare		

Figure D.6.8.9: Odd MCC

Table D.6.8.1: VPS URSP configuration information element

Replacement type (octet 4, bits 1 and 2)								
Bits								
2	1							
0	1	per-tuple replacement						
1	0	full list of tuples						
All other values are reserved.								
Tuple ID (octet a+3)								
This field contains the binary encoding of the tuple ID. The value of the tuple ID is set by the PCF.								
Network descriptor entry type (octet f+1)								
Bits								
8	7	6	5	4	3	2	1	
0	0	0	0	0	0	0	1	one or more VPLMNs
0	0	0	0	0	0	1	0	one or more MCCs
0	0	0	0	0	0	1	1	any VPLMN
All other values are reserved.								
If the network descriptor entry type field is set to "one or more VPLMNs" or "one or more MCCs", then the network descriptor entry value field is present. If the network descriptor entry type field is set to "any VPLMN", then the network descriptor entry value field is absent.								
Number of PLMN IDs (octet (f+2) of the network descriptor entry value for network descriptor entry type set to "one or more VPLMNs")								
The number of PLMN IDs field indicates the number of the PLMN IDs in the network descriptor entry value field.								
MCC, Mobile country code (octet f+6 and bits 4 to 1 of octet f+7 of the PLMN ID, octet f+6 and bits 4 to 1 of octet f+7 of the MCC pair, and octet f+8 and bits 8 to 5 of octet f+7 of the MCC pair, octet m*3+f+3 and bits 4 to 1 of m*3+f+4 of the odd MCC)								
The MCC field is coded as in ITU-T Recommendation E.212 [42], annex A.								
MNC, Mobile network code (bits 8 to 5 of octet f+7, and octet f+8)								
The coding 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 coded as "1111".								
Number of MCCs (octet (f+2) of the network descriptor entry value for network descriptor entry type set to "one or more MCCs")								
The number of MCCs field indicates the number of the MCCs in the network descriptor entry value field. If the number of MCCs field is an odd value, then the odd MCC field is present otherwise the odd MCC field is absent.								
UPSC (octets e+3 to e+4)								
This field contains the binary encoding of the UPSC of an UPSI of a UE policy section of the HPLMN (see NOTE), which contains solely one or more UE policy parts with the UE policy part type set to "URSP", such that the URSP rules in those one or more UE policy parts are applicable to the VPLMN and its equivalent PLMN.								
NOTE: PLMN ID of the UPSI is not indicated.								

D.7 Timers of UE policy delivery service

Timers of UE policy delivery service are shown in table D.7.1.

Table D.7.1: Timers of UE policy delivery service – PCF side

TIMER NUM.	TIMER VALUE	CAUSE OF START	NORMAL STOP	ON THE 1 st , 2 nd , 3 rd , 4 th EXPIRY
T3501	NOTE 1	Transmission of MANAGE UE POLICY COMMAND	MANAGE UE POLICY COMMAND COMPLETE or MANAGE UE POLICY COMMAND REJECT message received	Retransmission of MANAGE UE POLICY COMMAND message
NOTE 1: The value of this timer is network dependent.				

D.8 Handling of unknown, unforeseen, and erroneous UPDS data

D.8.1 General

The procedures specified in the subclause apply to those messages which pass the checks described in this subclause.

This subclause also specifies procedures for the handling of unknown, unforeseen, and erroneous UPDS data by the receiving entity. These procedures are called "error handling procedures", but in addition to providing recovery mechanisms for error situations they define a compatibility mechanism for future extensions of the UPDS.

Subclauses D.8.1 to D.8.8 shall be applied in order of precedence.

Detailed error handling procedures in the network are implementation dependent and may vary from PLMN to PLMN. However, when extensions of UPDS are developed, networks are assumed to have the error handling which is indicated in this subclause as mandatory ("shall") and that is indicated as strongly recommended ("should").

Also, the error handling of the network is only considered as mandatory or strongly recommended when certain thresholds for errors are not reached during a dedicated connection.

For definition of semantical and syntactical errors see 3GPP TS 24.007 [11], subclause 11.4.2.

D.8.2 Message too short or too long

D.8.2.1 Message too short

When a message is received that is too short to contain a complete message type information element, that message shall be ignored, c.f. 3GPP TS 24.007 [11].

D.8.2.2 Message too long

The maximum size of a UE policy delivery service message is 65535 octets.

D.8.3 Unknown or unforeseen procedure transaction identity

D.8.3.1 Procedure transaction identity

The following network procedures shall apply for handling an unknown, erroneous, or unforeseen PTI received in a UPDS message:

- a) In case the network receives a MANAGE UE POLICY COMPLETE message or MANAGE UE POLICY COMMAND REJECT message in which the PTI value is an assigned or unassigned value that does not match any PTI in use, the network shall ignore the UPDS message.
- b) In case the network receives a UPDS message in which the PTI value is a reserved value, the network shall ignore the UPDS message.

The following UE procedures shall apply for handling an unknown, erroneous, or unforeseen PTI received in a UPDS message:

- a) In case the UE receives a UPDS message in which the PTI value is a reserved value, the UE shall ignore the UPDS message.

D.8.4 Unknown or unforeseen message type

If the UE or the network receives a UPDS message with message type not defined for the UPDS or not implemented by the receiver, it shall ignore the UPDS message.

NOTE: A message type not defined for the UPDS in the given direction is regarded by the receiver as a message type not defined for the UPDS, see 3GPP TS 24.007 [11].

If the UE receives a message not compatible with the UPDS state, the UE shall ignore the UPDS message.

If the network receives a message not compatible with the UPDS state, the network actions are implementation dependent.

D.8.5 Non-semantical mandatory information element errors

D.8.5.1 Common procedures

When on receipt of a message,

- a) an "imperative message part" error; or
- b) a "missing mandatory IE" error

is diagnosed or when a message containing:

- a) a syntactically incorrect mandatory IE;
- b) an IE with an IEI unknown in the message, but encoded as "comprehension required" (see 3GPP TS 24.007 [11]); or
- c) an out of sequence IE encoded as "comprehension required" (see 3GPP TS 24.007 [11]) is received,

the UE shall ignore the UPDS message;

the network shall proceed as follows:

the network shall:

- 1) try to treat the message (the exact further actions are implementation dependent); or
- 2) ignore the message.

D.8.6 Unknown and unforeseen IEs in the non-imperative message part

D.8.6.1 IEs unknown in the message

The UE shall ignore all IEs unknown in a message which are not encoded as "comprehension required" (see 3GPP TS 24.007 [11]).

The network shall take the same approach.

D.8.6.2 Out of sequence IEs

The UE shall ignore all out of sequence IEs in a message which are not encoded as "comprehension required" (see 3GPP TS 24.007 [11]).

The network should take the same approach.

D.8.6.3 Repeated IEs

If an information element with format T, TV, TLV, or TLV-E is repeated in a message in which repetition of the information element is not specified in subclause D.5, the UE shall handle only the contents of the information element appearing first and shall ignore all subsequent repetitions of the information element. When repetition of information elements is specified, the UE shall handle only the contents of specified repeated information elements. If the limit on repetition of information elements is exceeded, the UE shall handle the contents of information elements appearing first up to the limit of repetitions and shall ignore all subsequent repetitions of the information element.

The network should follow the same procedures.

D.8.7 Non-imperative message part errors

This category includes:

- a) syntactically incorrect optional IEs; and
- b) conditional IE errors.

D.8.7.1 Syntactically incorrect optional IEs

The UE shall treat all optional IEs that are syntactically incorrect in a message as not present in the message.

The network shall take the same approach.

D.8.7.2 Conditional IE errors

When upon receipt of a UPDS message the UE diagnoses a "missing conditional IE" error or an "unexpected conditional IE" error, or when it receives a UPDS message containing at least one syntactically incorrect conditional IE, the UE shall ignore the message.

When the network receives a message and diagnoses a "missing conditional IE" error or an "unexpected conditional IE" error or when it receives a message containing at least one syntactically incorrect conditional IE, the network shall either:

- a) try to treat the message (the exact further actions are implementation dependent); or
- b) ignore the message.

D.8.8 Messages with semantically incorrect contents

When a message with semantically incorrect contents is received, the UE shall perform the foreseen reactions of the procedural part of subclauses D.2. If, however no such reactions are specified, the UE shall ignore the message.

The network should follow the same procedure.