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Vehicle-to-Everything (V2X) services in 5G System (5GS);
User Equipment (UE) policies;
Stage 3
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650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - APE 7112B
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Contents

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

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

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

shall indicates a mandatory requirement to do something

shall not indicates an interdiction (prohibition) to do something

NOTE 1: The constructions "shall" and "shall not" are confined to the context of normative provisions, and do not appear in Technical Reports.

NOTE 2: The constructions "must" and "must not" are not used as substitutes for "shall" and "shall not". Their use is avoided insofar as possible, and they are not used in a normative context except in a direct citation from an external, referenced, non-3GPP document, or so as to maintain continuity of style when extending or modifying the provisions of such a referenced document.

should indicates a recommendation to do something

should not indicates a recommendation not to do something

may indicates permission to do something

need not indicates permission not to do something

NOTE 3: The construction "may not" is ambiguous and is not used in normative elements. The unambiguous constructions "might not" or "shall not" are used instead, depending upon the meaning intended.

can indicates that something is possible

cannot indicates that something is impossible

NOTE 4: The constructions "can" and "cannot" shall not to be used as substitutes for "may" and "need not".

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

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

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

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

In addition:

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

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

NOTE 5: The constructions "is" and "is not" do not indicate requirements.

1 Scope

The present document defines User Equipment (UE) policies that are used to configure the UE for Vehicle-to-Everything (V2X) services in 5G System (5GS) based on the architectural requirements defined in 3GPP TS 23.287 [2].

The protocol aspects for V2X services in 5G System (5GS) are described in 3GPP TS 24.587 [3].

2 References

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

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

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

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

[3] 3GPP TS 24.587: "Vehicle-to-Everything (V2X) services in 5G System (5GS); Stage 3".

[4] 3GPP TS 24.501: "Non-Access-Stratum (NAS) protocol for 5G System (5GS); Stage 3".

[5] ISO TS 17419 ITS-AID AssignedNumbers : http://standards.iso.org/iso/ts/17419/TS17419%20Assigned%20Numbers/TS17419_ITS-AID_AssignedNumbers.pdf

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

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

[8] IEEE 1609.3 2016: "IEEE Standard for Wireless Access in Vehicular Environments (WAVE) -- Networking Services".

[9] ISO 29281-1 2013: "Intelligent transport systems -- Communication access for land mobiles (CALM) -- Non-IP networking -- Part 1: Fast networking & transport layer protocol (FNTP)".

[10] ETSI EN 302 636-3 v1.2.1: "Intelligent Transport Systems (ITS); Vehicular Communications; GeoNetworking; Part 3: Network Architecture".

[11] 3GPP TS 24.526: "UE policies for 5G System (5GS); Stage 3".

[12] 3GPP TS 38.331: "NR; Radio Resource Control (RRC) protocol specification".

[13] 3GPP TS 36.101: "Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception".

[14] 3GPP TS 38.101-1: "NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone".

[15] 3GPP TS 38.101-2: "NR; User Equipment (UE) radio transmission and reception; Part 2: Range 2 Standalone".

[16] 3GPP TS 36.331: "Evolved Universal Terrestrial Radio Access (E-UTRA); Radio Resource Control (RRC) protocol specification".

[17] 3GPP TS 23.003: "Numbering, addressing and identification".

3 Definitions of terms and abbreviations

3.1 Terms

For the purposes of the present document, the terms given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

example: text used to clarify abstract rules by applying them literally.

For the purposes of the present document, the following terms and definitions given in 3GPP TS 24.587 [3] apply:

E-UTRA-PC5

NR-PC5

V2X service identifier

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].

V2X Vehicle-to-Everything
V2XP V2X Policy

4 Descriptions of UE policies for V2X

4.1 Overview

The V2XP in 5GS include:

- UE policies for V2X communication over PC5 (see clause 4.2); and
- UE policies for V2X communication over Uu (see clause 4.3).

The V2XP can be delivered from the PCF to the UE. The UE policy delivery procedure is specified in 3GPP TS 24.501 [4].

4.2 UE policies for V2X communication over PC5

The UE policies for V2X communication over PC5 are defined in clause 5.2.3 of 3GPP TS 24.587 [3].

NOTE: The generic description of the UE policies for V2X communication over PC5 are specified in 3GPP TS 23.287 [2].

4.3 UE policies for V2X communication over Uu

The UE policies for V2X communication over Uu are defined in clause 5.2.4 of 3GPP TS 24.587 [3].

NOTE: The generic description of the UE policies for V2X communication over Uu are specified in 3GPP TS 23.287 [2].

5 Encoding of UE policies for V2X

5.1 Overview

The UE policies for V2X are provided to the UE in a V2X policy (V2XP) UE policy part using the UE policy delivery service as specified in 3GPP TS 24.501 [4] annex D.

5.2 Encoding of V2X policy (V2XP) UE policy part

5.2.1 General

The purpose of the V2XP is to indicate UE policies for V2X communication over PC5 and UE policies for V2X communication over Uu.

The V2XP is encoded as shown in figures 5.2.1.1 to 5.2.1.3 and table 5.2.1.1 according to the UE policy part top level format (see annex D of 3GPP TS 24.501 [4]).

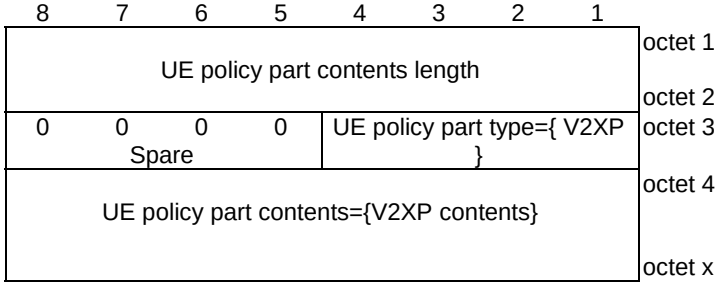


Figure 5.2.1.1: UE policy part when UE policy part type = {V2XP}

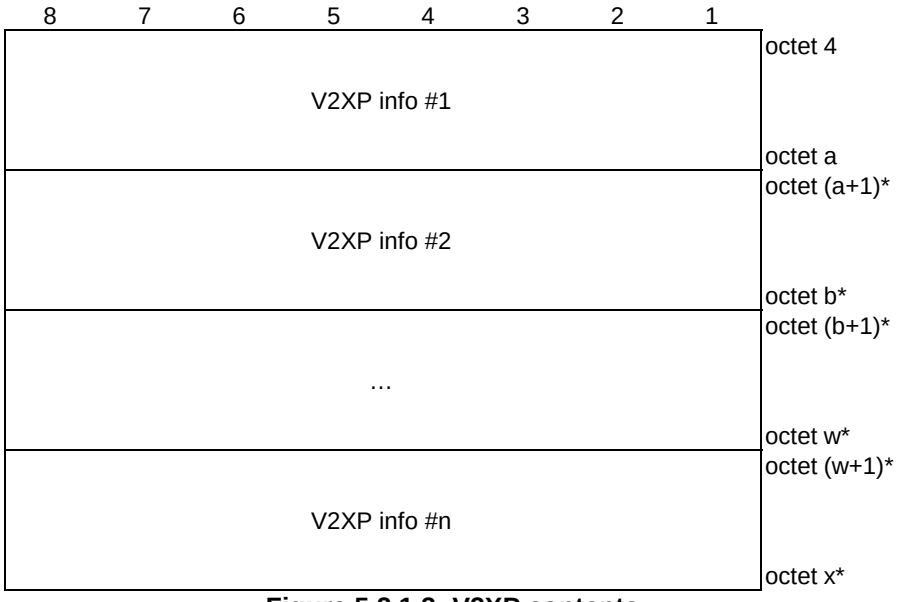


Figure 5.2.1.2: V2XP contents

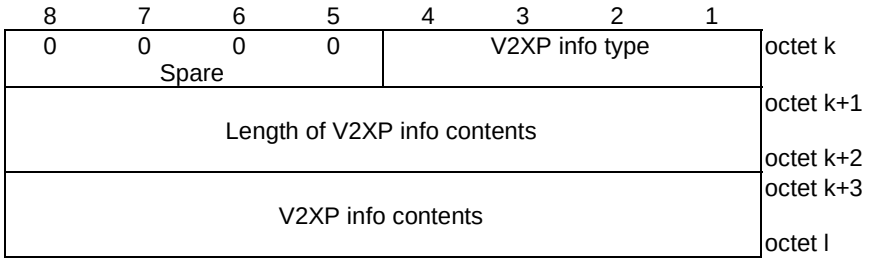


Figure 5.2.1.3: V2XP info

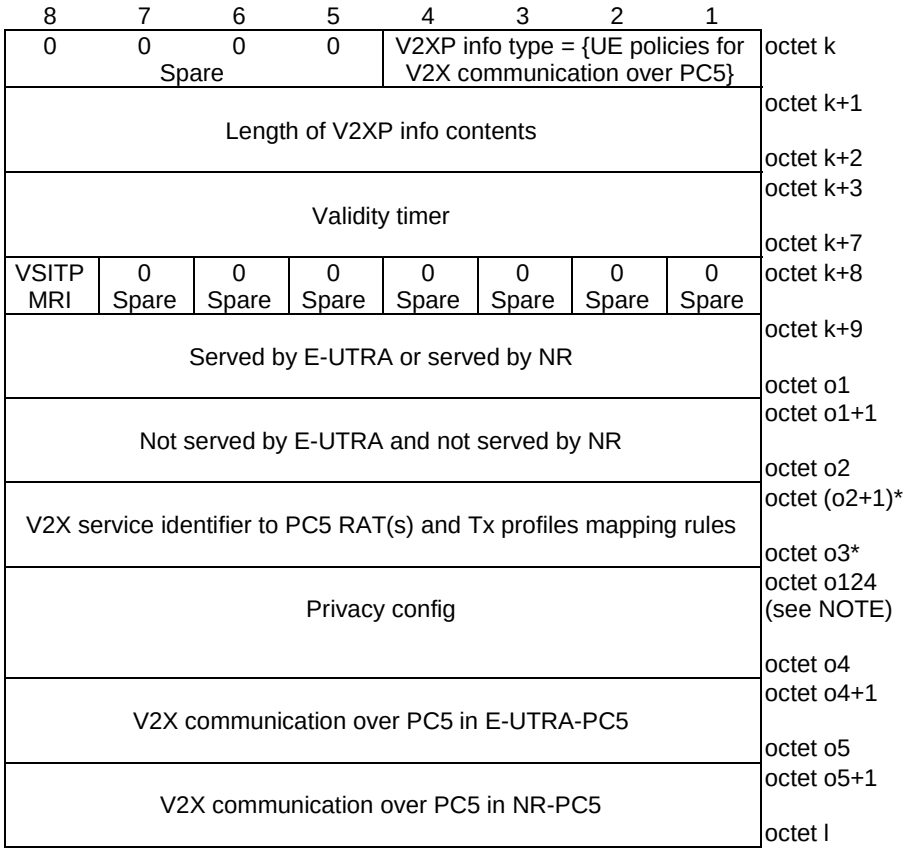
Table 5.2.1.1: V2XP information format

UE policy part type field is set to '0011' (=V2XP) as specified in 3GPP TS 24.501 [4] annex D. UE policy part contents length field indicate the length of the V2XP contents in octets. V2XP contents (octets 4 to x) V2XP contents consist of 1 or more V2XP info(s) (see figure 5.2.1.2). V2XP info type (bit 1 to 4 of octet k) shall be set according to the following: Bits **4 3 2 1** 0 0 0 1 UE policies for V2X communication over PC5 0 0 1 0 UE policies for V2X communication over Uu All other values are reserved. Bits 8 to 5 of octet k are spare and shall be encoded as zero. Length of V2XP info contents (octets k+1 to k+2) indicates the length of the V2XP info contents field. V2XP info contents (octets k+3 to l) can be UE policies for V2X communication over PC5 (see clause 5.3.1) or UE policies for V2X communication over Uu (see clause 5.4.1).

5.3 Encoding of UE policies for V2X communication over PC5

5.3.1 General

The UE policies for V2X communication over PC5 are coded as shown in figures 5.3.1.1 and table 5.3.1.1.



NOTE: The field is placed immediately after the last present preceding field.

Figure 5.3.1.1: V2XP Info = {UE policies for V2X communication over PC5}

Table 5.3.1.1: V2XP Info = {UE policies for V2X communication over PC5}

V2XP info type (bit 1 to 4 of octet k) shall be set to "0001" (UE policies for V2X communication over PC5) Length of Length of V2XP info contents (octets k+1 to k+2) indicates the length of V2XP info contents.   Validity timer: The validity timer field provides the expiration time of validity of the UE policies for V2X communication over PC5. The validity timer field is a binary coded representation of a UTC time, in seconds since midnight UTC of January 1, 1970 (not counting leap seconds). V2X service identifier to PC5 RAT(s) and Tx profiles mapping rules indicator (VSITPMRI) The VSITPMRI bit indicates presence of the V2X service identifier to PC5 RAT(s) and Tx profiles mapping rules field. Bit **8** 0 V2X service identifier to PC5 RAT(s) and Tx profiles mapping rules field is absent 1 V2X service identifier to PC5 RAT(s) and Tx profiles mapping rules field is present Served by E-UTRA or served by NR: The served by E-UTRA or served by NR field is coded according to figure 5.3.1.2 and table 5.3.1.2, and contains configuration parameters for V2X communication over PC5 when the UE is served by E-UTRA or served by NR. Not served by E-UTRA and not served by NR: The not served by E-UTRA and not served by NR field is coded according to figure 5.3.1.6 and table 5.3.1.6, and contains configuration parameters for V2X communication over PC5 when the UE is not served by E-UTRA or NR. V2X service identifier to PC5 RAT(s) and Tx profiles mapping rules: The V2X service identifier to PC5 RAT(s) and Tx profiles mapping rules field is coded according to figure 5.3.1.12 and table 5.3.1.12, and contains a list of V2X service identifier to PC5 RAT(s) and Tx profiles mapping rules. Privacy config: The Privacy config field is coded according to figure 5.3.1.15 and table 5.3.1.15, and contains configuration parameters for privacy configuration. V2X communication over PC5 in E-UTRA-PC5: The V2X communication over PC5 in E-UTRA-PC5 field is coded according to figure 5.3.1.19 and table 5.3.1.19, and contains configuration parameters for V2X communication over PC5 in E-UTRA-PC5. V2X communication over PC5 in NR-PC5: The V2X communication over PC5 in NR-PC5 field is coded according to figure 5.3.1.31 and table 5.3.1.31, and contains configuration parameters for V2X communication over PC5 in NR-PC5. If the length of V2XP info contents field indicates a length bigger than indicated in figure 5.3.1.1, receiving entity shall ignore any superfluous octets located at the end of the V2XP info contents.

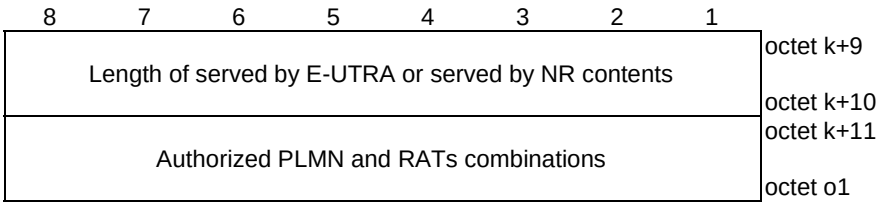


Figure 5.3.1.2: Served by E-UTRA or served by NR

Table 5.3.1.2: Served by E-UTRA or served by NR

Authorized PLMN and RATs combinations: The authorized PLMN and RATs combinations field is coded according to figure 5.3.1.3 and table 5.3.1.3. If the length of served by E-UTRA or served by NR contents field indicates a length bigger than indicated in figure 5.3.1.2, receiving entity shall ignore any superfluous octets located at the end of the served by E-UTRA or served by NR contents.

8	7	6	5	4	3	2	1	
Length of authorized PLMN and RATs combinations contents								octet k+11 octet k+12
Authorized PLMN and RATs combination 1								octet (k+13)* octet (k+16)*
Authorized PLMN and RATs combination 2								octet (k+ 17)* octet (k+20)*
...								octet (k+21)* octet (k+8+n*4)*
Authorized PLMN and RATs combination n								octet (k+9+n*4)* octet (k+12+n*4)* = octet o1*

Figure 5.3.1.3: Authorized PLMN and RATs combinations

Table 5.3.1.3: Authorized PLMN and RATs combinations

Authorized PLMN and RATs combination: The authorized PLMN and RATs combination field is coded according to figure 5.3.1.4 and table 5.3.1.4.

8	7	6	5	4	3	2	1	
PLMN ID								octet k+17 octet k+19
EPIEN	NPIEN	0 Spare	0 Spare	0 Spare	0 Spare	0 Spare	0 Spare	octet k+20

Figure 5.3.1.4: Authorized PLMN and RATs combination

Table 5.3.1.4: Authorized PLMN and RATs combination

PLMN ID: The PLMN ID field is coded according to figure 5.3.1.5 and table 5.3.1.5. E-UTRA-PC5 indicator when served by E-UTRA or served by NR (EPIEN): The EPIEN bit indicates whether the UE is authorized to use V2X communication over E-UTRA-PC5 in the PLMN indicated by the PLMN ID field when served by E-UTRA or served by NR. Bit **8** 0 Not authorized 1 Authorized NR-PC5 indicator when served by E-UTRA or served by NR (NPIEN): The NPIEN bit indicates whether the UE is authorized to use V2X communication over NR-PC5 in the PLMN indicated by the PLMN ID field when served by E-UTRA or served by NR. Bit **7** 0 Not authorized 1 Authorized

8	7	6	5	4	3	2	1	
MCC digit 2				MCC digit 1				octet k+17
MNC digit 3				MCC digit 3				octet k+18
MNC digit 2				MNC digit 1				octet k+19

Figure 5.3.1.5: PLMN ID

Table 5.3.1.5: PLMN ID

Mobile country code (MCC): The MCC field is coded as in ITU-T Recommendation E.212 [6], annex A. Mobile network code (MNC): The coding of MNC 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".

8	7	6	5	4	3	2	1	
Length of not served by E-UTRA and not served by NR contents								octet o1+1 octet o1+2
EPINE NN	NPINE NN	0 Spare	0 Spare	0 Spare	0 Spare	0 Spare	VPNEN NI	octet o1+3
E-UTRA radio parameters per geographical area list								octet (o1+4)* octet o121*
NR radio parameters per geographical area list								octet o122* (see NOTE) octect o2*

NOTE: The field is placed immediately after the last present preceding field.

Figure 5.3.1.6: Not served by E-UTRA and not served by NR

Table 5.3.1.6: Not served by E-UTRA and not served by NR

V2X communication over PC5 when not served by E-UTRA and not served by NR indicator (VPNENNI): The VPNENNI bit indicates whether the UE is authorized to use V2X communication over PC5 when not served by E-UTRA and not served by NR. Bit **1** 0 Not authorized 1 Authorized E-UTRA-PC5 indicator when not served by E-UTRA and not served by NR (PEINENN): The EPINENN bit indicates whether the UE is authorized to use V2X communication over E-UTRA-PC5 when not served by E-UTRA and not served by NR. Bit **8** 0 Not authorized 1 Authorized NR-PC5 indicator when not served by E-UTRA and not served by NR (NPINENN): The NPINENN bit indicates whether the UE is authorized to use V2X communication over NR-PC5 when not served by E-UTRA and not served by NR. Bit **7** 0 Not authorized 1 Authorized E-UTRA radio parameters per geographical area list: If EPINENN bit is set to "Authorized", the E-UTRA radio parameters per geographical area list field is present otherwise the E-UTRA radio parameters per geographical area list field is absent. It is coded according to figure 5.3.1.7 and table 5.3.1.7. NR radio parameters per geographical area list: If NPINENN bit is set to "Authorized", the NR radio parameters per geographical area list field is present otherwise the NR radio parameters per geographical area list field is absent. It is coded according to figure 5.3.1.7 and table 5.3.1.7. If the length of not served by E-UTRA and not served by NR contents field indicates a length bigger than indicated in figure 5.3.1.6, receiving entity shall ignore any superfluous octets located at the end of the not served by E-UTRA and not served by NR contents.

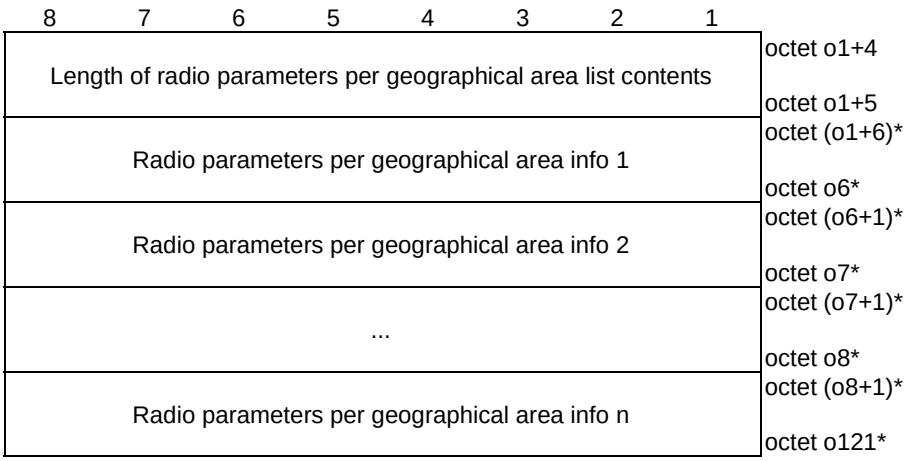


Figure 5.3.1.7: Radio parameters per geographical area list

Table 5.3.1.7: Radio parameters per geographical area list

Radio parameters per geographical area info: The radio parameters per geographical area info field is coded according to figure 5.3.1.8 and table 5.3.1.8.

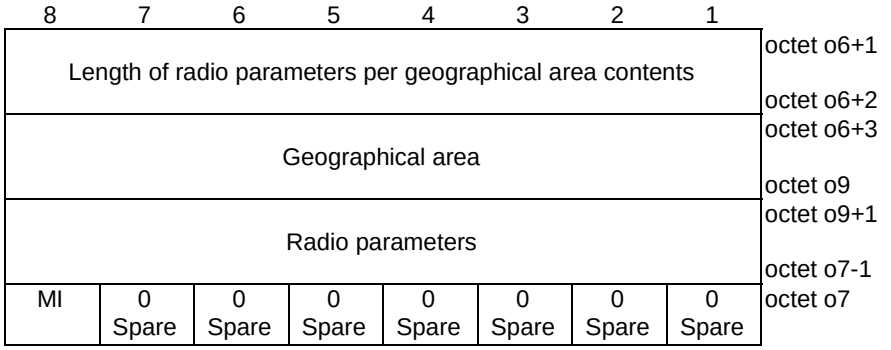


Figure 5.3.1.8: Radio parameters per geographical area info

Table 5.3.1.8: Radio parameters per geographical area info

Geographical area: The geographical area field is coded according to figure 5.3.1.9 and table 5.3.1.9. Radio parameters: The radio parameters field is coded according to figure 5.3.1.11 and table 5.3.1.11, applicable in the geographical area indicated by the geographical area field when not served by E-UTRA and not served by NR. Managed indicator (MI): The Managed indicator indicates how the radio parameters indicated in the radio parameters field in the geographical area indicated by the geographical area field are managed. Bit **8** 0 Non-operator managed 1 Operator managed If the length of radio parameters per geographical area contents field indicates a length bigger than indicated in figure 5.3.1.8, receiving entity shall ignore any superfluous octets located at the end of the radio parameters per geographical area contents.

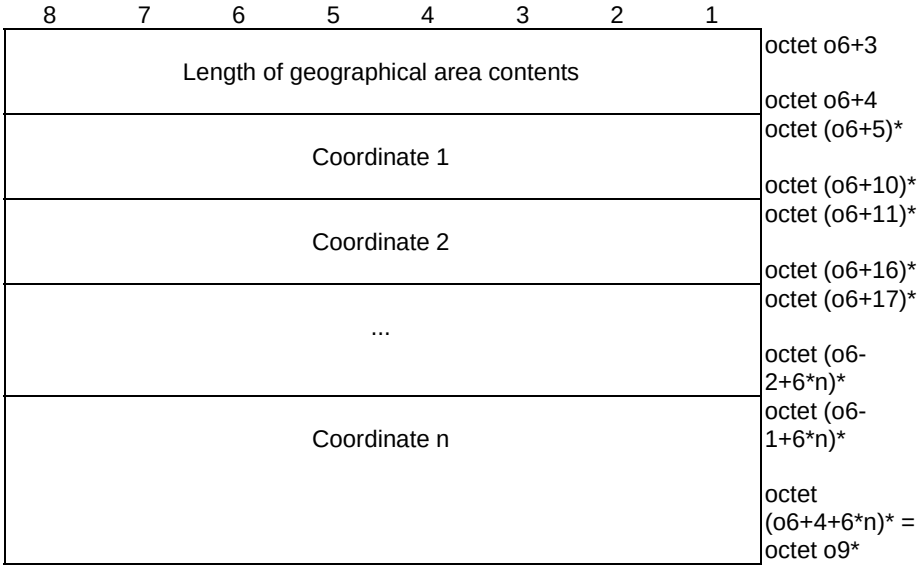


Figure 5.3.1.9: Geographical area

Table 5.3.1.9: Geographical area

Coordinate: The coordinate field is coded according to figure 5.3.1.10 and table 5.3.1.10.

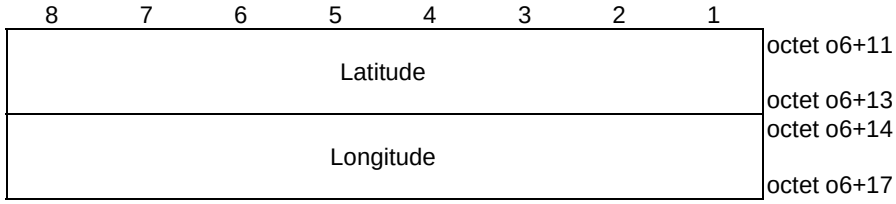


Figure 5.3.1.10: Coordinate area

Table 5.3.1.10: Coordinate area

Latitude: The latitude field is coded according to clause 6.1 of 3GPP TS 23.032 [7]. Longitude: The longitude field is coded according to clause 6.1 of 3GPP TS 23.032 [7].

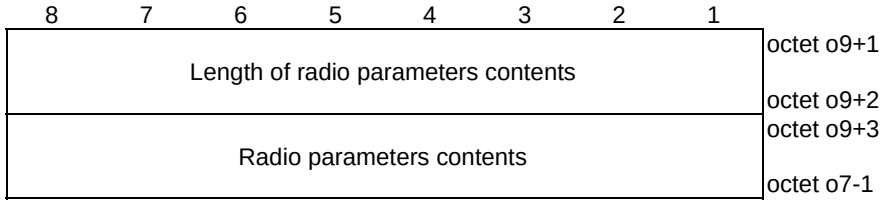


Figure 5.3.1.11: Radio parameters

Table 5.3.1.11: Radio parameters

Radio parameters contents: In E-UTRA radio parameters per geographical area list, radio parameters are defined as *SL-V2X-Preconfiguration* in clause 9 of 3GPP TS 36.331 [16]. In NR radio parameters per geographical area list, radio parameters are defined as *SL-PreconfigurationNR* in clause 9.3 of 3GPP TS 38.331 [12].

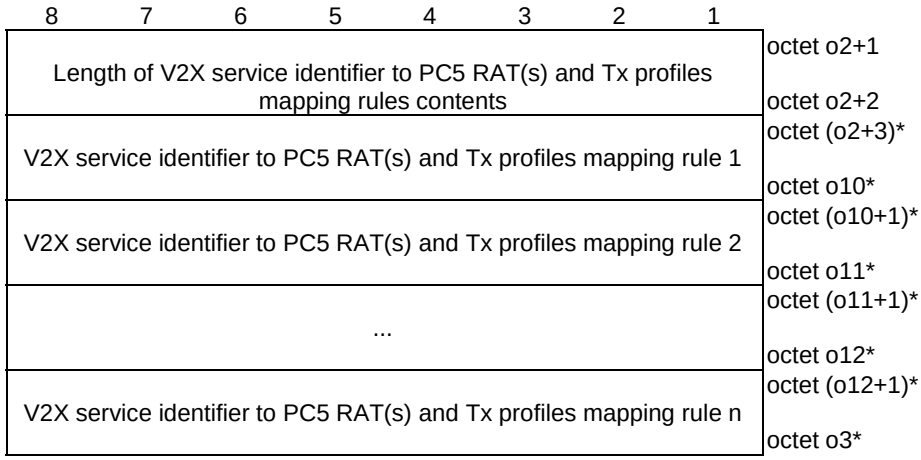


Figure 5.3.1.12: V2X service identifier to PC5 RAT(s) and Tx profiles mapping rules

Table 5.3.1.12: V2X service identifier to PC5 RAT(s) and Tx profiles mapping rules

V2X service identifier to PC5 RAT(s) and Tx profiles mapping rule: The V2X service identifier to PC5 RAT(s) and Tx profiles mapping rule field is coded according to figure 5.3.1.13 and table 5.3.1.13.

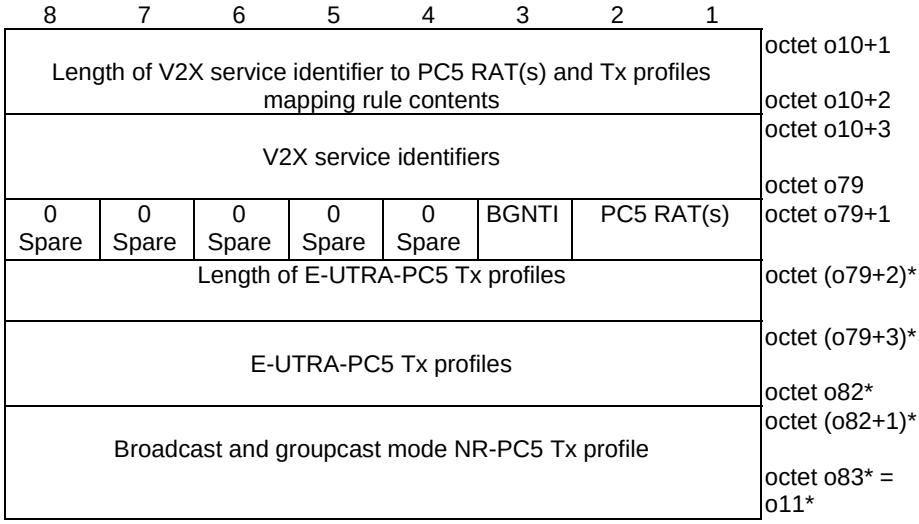


Figure 5.3.1.13: V2X service identifier to PC5 RAT(s) and Tx profiles mapping rule

Table 5.3.1.13: V2X service identifier to PC5 RAT(s) and Tx profiles mapping rule

V2X service identifiers:
The V2X service identifiers field is coded according to figure 5.3.1.14 and table 5.3.1.14.

Broadcast and groupcast mode NR-PC5 Tx profile indicator (BGNTI)
The BGNTI bit indicates presence of the broadcast and groupcast mode NR-PC5 Tx profile field.

Bit	
3	
0	broadcast and groupcast mode NR-PC5 Tx profile field is absent
1	broadcast and groupcast mode NR-PC5 Tx profile field is present

If the PC5 RAT field is set to "E-UTRA-PC5", then the BGNTI bit is set to "broadcast and groupcast mode NR-PC5 Tx profile field is absent". If the PC5 RAT field is set to "NR-PC5" or "Both E-UTRA-PC5 and NR-PC5", then the BGNTI bit can be set to "broadcast and groupcast mode NR-PC5 Tx profile field is absent" or "broadcast and groupcast mode NR-PC5 Tx profile field is present".

PC5 RAT(s):
The PC5 RAT(s) field indicates the PC5 RAT(s) mapped to the V2X service identifiers.

Bits	
2 1	
0 0	E-UTRA-PC5
0 1	NR-PC5
1 0	Both E-UTRA-PC5 and NR-PC5

All other values are spare.

If the PC5 RAT field is set to "E-UTRA-PC5" or "Both E-UTRA-PC5 and NR-PC5", the length of E-UTRA-PC5 Tx profiles field and the E-UTRA-PC5 Tx profiles field are present otherwise the length of E-UTRA-PC5 Tx profiles field and the E-UTRA-PC5 Tx profiles field are absent. If the PC5 RAT field is set to a spare value, the receiving entity shall ignore the V2X service identifier to PC5 RAT(s) and Tx profiles mapping rule.

E-UTRA-PC5 Tx profiles:
The E-UTRA-PC5 Tx profiles field is coded as *v2x-TxProfileList* in clause 9.3.2 of 3GPP TS 36.331 [16].

Broadcast and groupcast mode NR-PC5 Tx profile field:
The broadcast and groupcast mode NR-PC5 Tx profile field indicates NR Tx profile corresponding to the NR-PC5 for broadcast mode V2X communication over PC5 and groupcast mode V2X communication over PC5.

If the length of V2X service identifier to PC5 RAT(s) and Tx profiles mapping rule contents field indicates a length bigger than indicated in figure 5.3.1.13, receiving entity shall ignore any superfluous octets located at the end of the V2X service identifier to PC5 RAT(s) and Tx profiles mapping rule contents.

Editor's note: size and format of the broadcast and groupcast mode NR-PC5 Tx profile field is FFS.

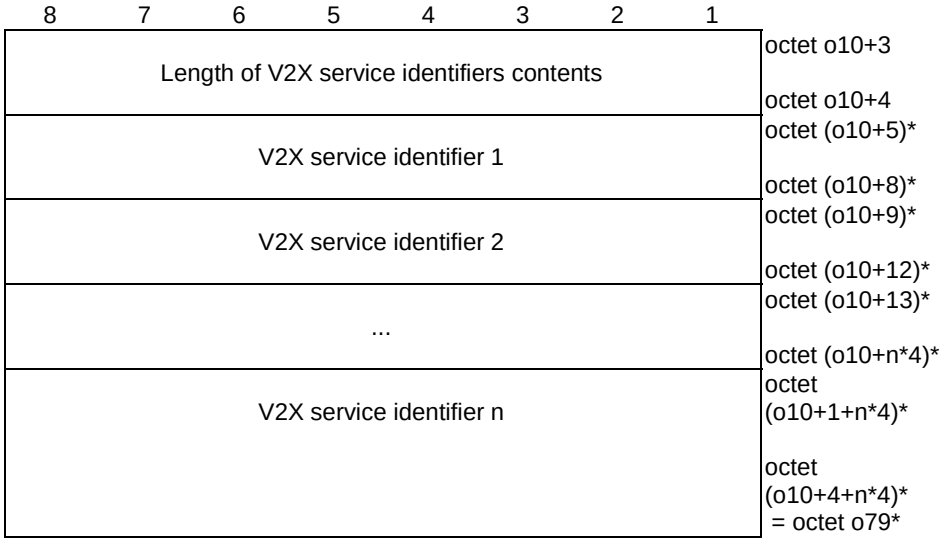


Figure 5.3.1.14: V2X service identifiers

Table 5.3.1.14: V2X service identifiers

V2X service identifier: The V2X service identifier field contains a binary coded V2X service identifier as specified in ISO TS 17419 ITS-AID AssignedNumbers [5].

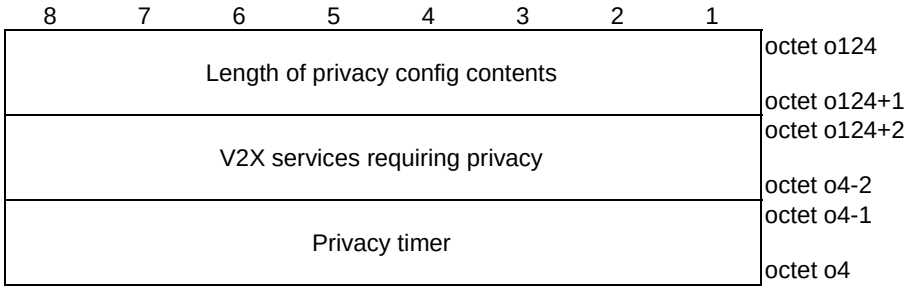


Figure 5.3.1.15: Privacy config

Table 5.3.1.15: Privacy config

V2X services requiring privacy: The V2X services requiring privacy field is coded according to figure 5.3.1.16 and table 5.3.1.16. Privacy timer: The privacy timer field contains binary encoded duration, in units of seconds, after which the UE shall change the source Layer-2 ID self-assigned by the UE while performing transmission of V2X communication over the PC5 when privacy is required. If the length of privacy config contents field indicates a length bigger than indicated in figure 5.3.1.15, receiving entity shall ignore any superfluous octets located at the end of the privacy config contents.

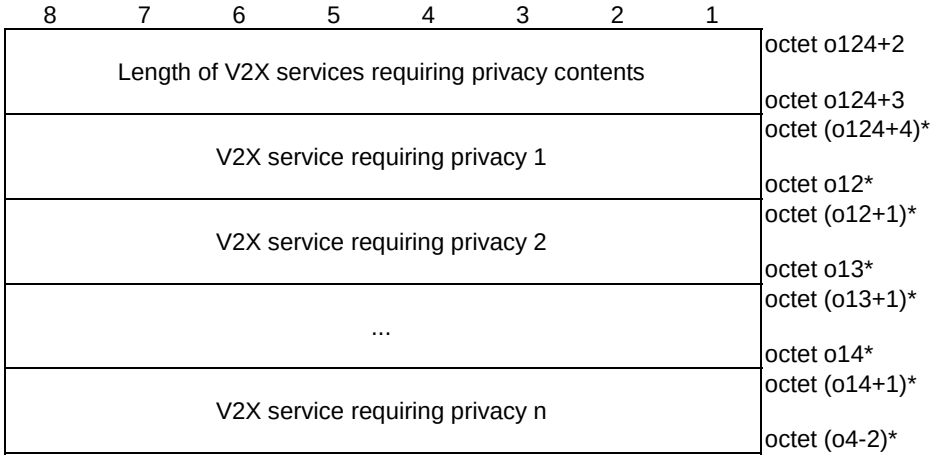


Figure 5.3.1.16: V2X services requiring privacy

Table 5.3.1.16: V2X services requiring privacy

V2X service requiring privacy: The V2X service requiring privacy field is coded according to figure 5.3.1.17 and table 5.3.1.17.

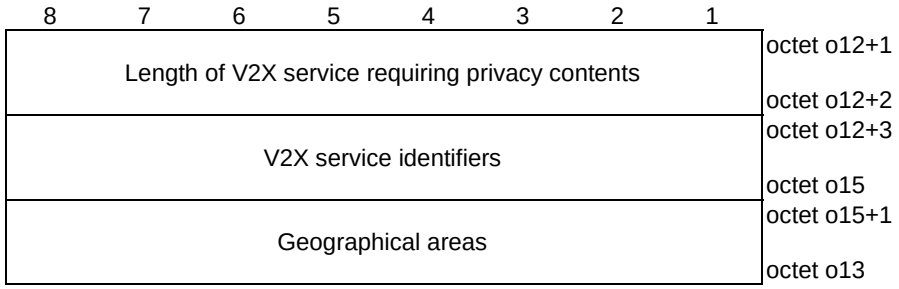


Figure 5.3.1.17: V2X service requiring privacy

Table 5.3.1.17: V2X service requiring privacy

V2X service identifiers: The V2X service identifiers field is coded according to figure 5.3.1.14 and table 5.3.1.14. Geographical areas: The geographical areas field is coded according to figure 5.3.1.18 and table 5.3.1.18. If the length of V2X service requiring privacy contents field indicates a length bigger than indicated in figure 5.3.1.17, receiving entity shall ignore any superfluous octets located at the end of the V2X service requiring privacy contents.

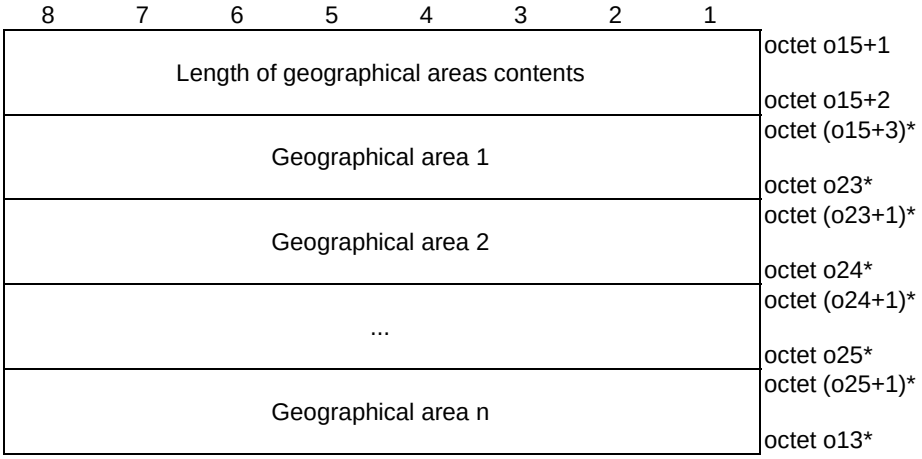
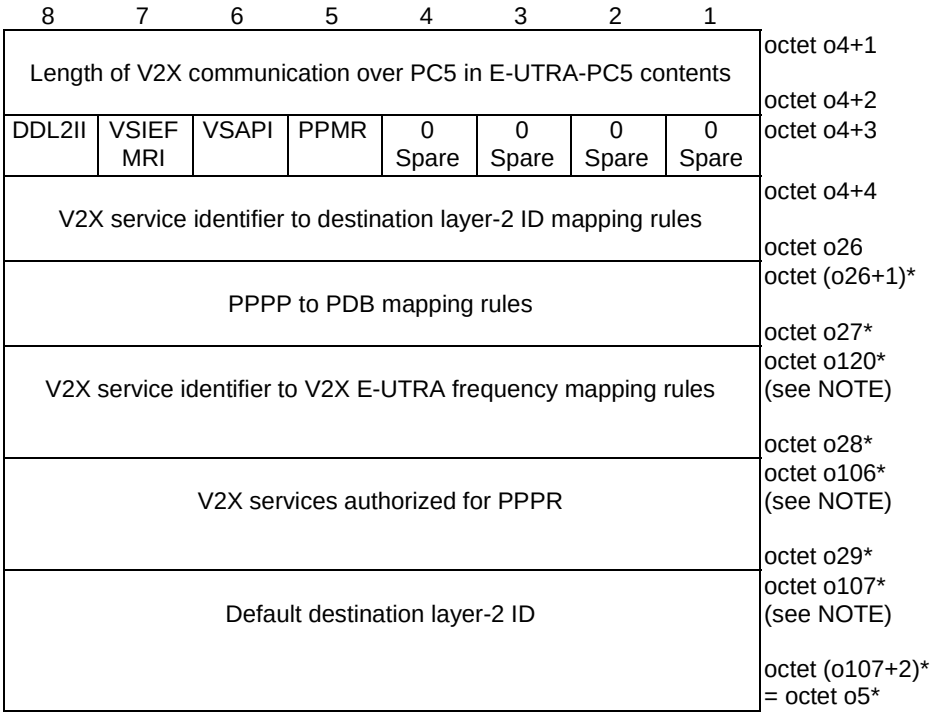


Figure 5.3.1.18: Geographical areas

Table 5.3.1.18: Geographical areas

Geographical area: The geographical area field is coded according to figure 5.3.1.9 and table 5.3.1.9.



NOTE: The field is placed immediately after the last present preceding field.

Figure 5.3.1.19: V2X communication over PC5 in E-UTRA-PC5

Table 5.3.1.19: V2X communication over PC5 in E-UTRA-PC5

Default destination layer-2 ID indicator (DDL2II):
The DDL2II bit indicates presence of the default destination layer-2 ID field.
Bit
8
0 Default destination layer-2 ID field is absent
1 Default destination layer-2 ID field is present

V2X service identifier to V2X E-UTRA frequency mapping rules indicator (VSIEFMRI):
The VSIEFMRI bit indicates presence of the V2X service identifier to V2X E-UTRA frequency mapping rules field.
Bit
7
0 V2X service identifier to V2X E-UTRA frequency mapping rules field is absent
1 V2X service identifier to V2X E-UTRA frequency mapping rules field is present

V2X services authorized for PPPR indicator (VSAPI):
The VSAPI bit indicates presence of the V2X services authorized for PPPR field.
Bit
6
0 V2X services authorized for PPPR field is absent
1 V2X services authorized for PPPR field is present

PPPP to PDB mapping rules indicator (PPMRI):
The PPMRI bit indicates presence of the PPPP to PDB mapping rules filed.
Bit
5
0 PPPP to PDB mapping rules field is absent
1 PPPP to PDB mapping rules field is present

V2X service identifier to destination layer-2 ID mapping rules:
The V2X service identifier to destination layer-2 ID mapping rules field is coded according to figure 5.3.1.20 and table 5.3.1.20.

PPPP to PDB mapping rules:
The PPPP to PDB mapping rules field is coded according to figure 5.3.1.22 and table 5.3.1.22.

V2X service identifier to V2X E-UTRA frequency mapping rules:
The V2X service identifier to V2X E-UTRA frequency mapping rules field is coded according to figure 5.3.1.24 and table 5.3.1.24.

V2X services authorized for PPPR:
The V2X services authorized for PPPR field is coded according to figure 5.3.1.29 and table 5.3.1.29.

Default destination layer-2 ID:
The default destination layer-2 ID field is a binary coded layer 2 identifier.

If the length of V2X communication over PC5 in E-UTRA-PC5 contents field indicates a length bigger than indicated in figure 5.3.1.19, receiving entity shall ignore any superfluous octets located at the end of the V2X communication over PC5 in E-UTRA-PC5contents.

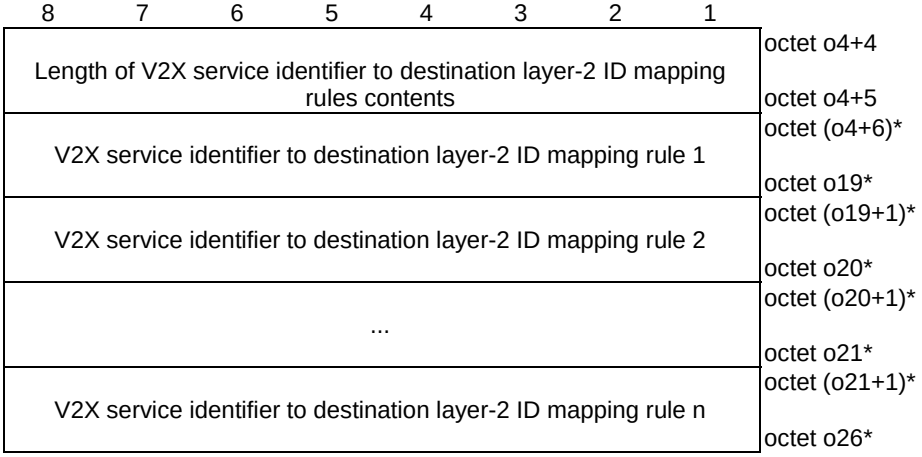


Figure 5.3.1.20: V2X service identifier to destination layer-2 ID mapping rules

Table 5.3.1.20: V2X service identifier to destination layer-2 ID mapping rules

V2X service identifier to destination layer-2 ID mapping rule: The V2X service identifier to destination layer-2 ID mapping rule field is coded according to figure 5.3.1.21 and table 5.3.1.21.

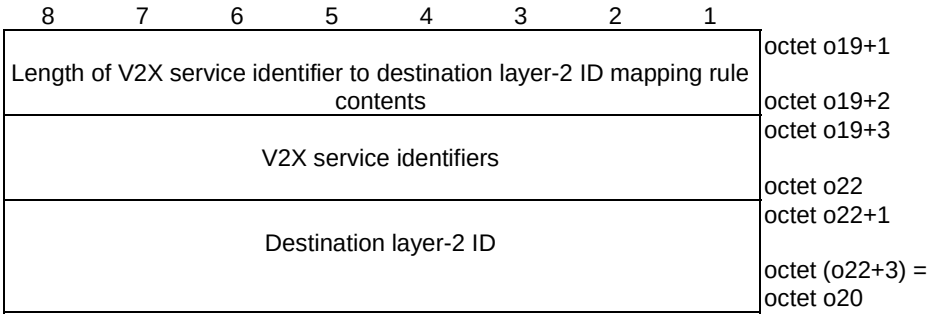


Figure 5.3.1.21: V2X service identifier to destination layer-2 ID mapping rule

Table 5.3.1.21: V2X service identifier to destination layer-2 ID mapping rule

V2X service identifiers: The V2X service identifiers field is coded according to figure 5.3.1.14 and table 5.3.1.14. Destination layer-2 ID: The destination layer-2 ID field is a binary coded layer 2 identifier. If the length of V2X service identifier to destination layer-2 ID mapping rule contents field indicates a length bigger than indicated in figure 5.3.1.21, receiving entity shall ignore any superfluous octets located at the end of the V2X service identifier to destination layer-2 ID mapping rule contents.

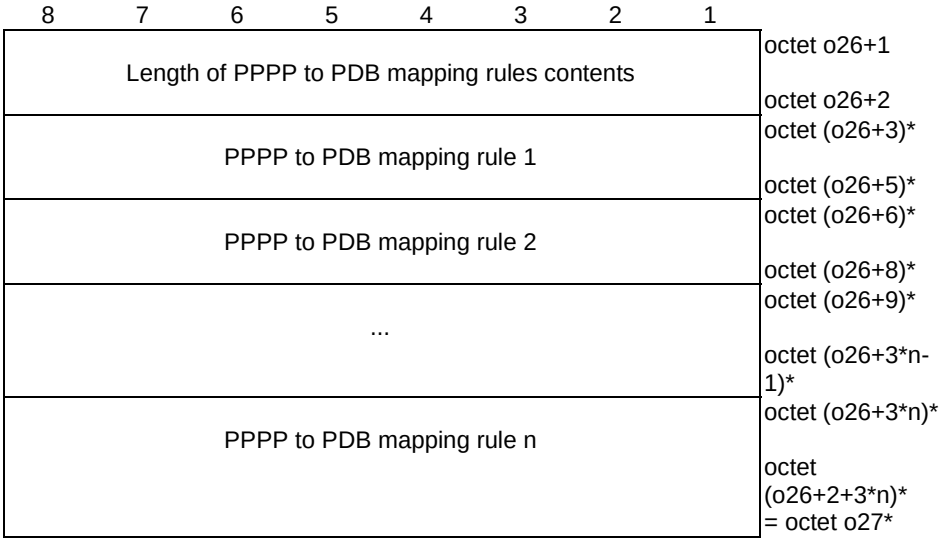


Figure 5.3.1.22: PPPP to PDB mapping rules

Table 5.3.1.22: PPPP to PDB mapping rules

PPPP to PDB mapping rule: The PPPP to PDB mapping rule field is coded according to figure 5.3.1.23 and table 5.3.1.23.

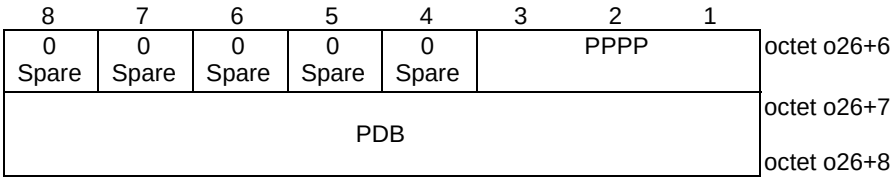


Figure 5.3.1.23: PPPP to PDB mapping rule

Table 5.3.1.23: PPPP to PDB mapping rule

ProSe per-packet priority (PPPP): The PPPP field is a ProSe per-packet priority value. Bits **3 2 1** 0 0 0 PPPP value 1 0 0 1 PPPP value 2 0 1 0 PPPP value 3 0 1 1 PPPP value 4 1 0 0 PPPP value 5 1 0 1 PPPP value 6 1 1 0 PPPP value 7 1 1 1 PPPP value 8 Packet delay budget (PDB): The PDB field indicates binary encoded the packet delay budget value in miliseconds to which the ProSe per-packet priority value indicated by the PPPP field is mapped.

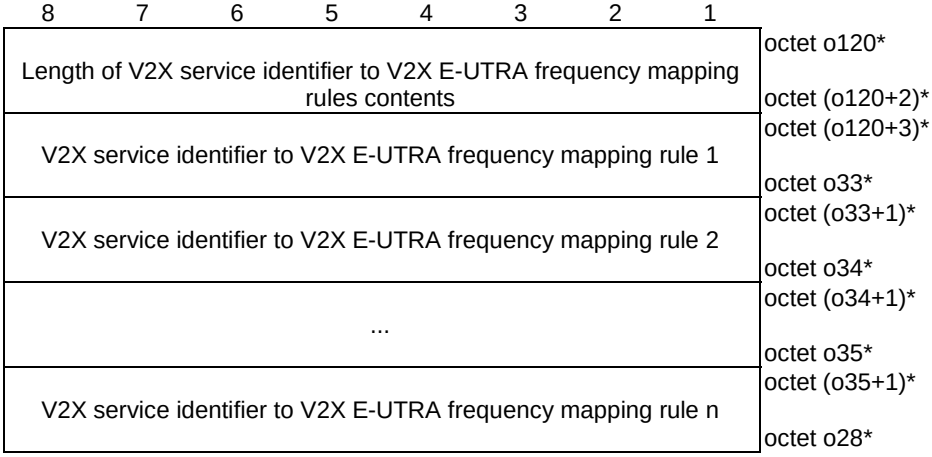


Figure 5.3.1.24: V2X service identifier to V2X E-UTRA frequency mapping rules

Table 5.3.1.24: V2X service identifier to V2X E-UTRA frequency mapping rules

V2X service identifier to V2X E-UTRA frequency mapping rule: The V2X service identifier to V2X E-UTRA frequency mapping rule is coded according to figure 5.3.1.25 and table 5.3.1.25.

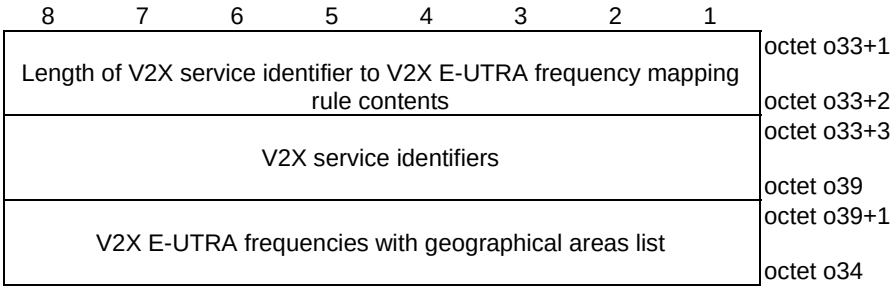


Figure 5.3.1.25: V2X service identifier to V2X E-UTRA frequency mapping rule

Table 5.3.1.25: V2X service identifier to V2X E-UTRA frequency mapping rule

V2X service identifiers: The V2X service identifiers field is coded according to figure 5.3.1.14 and table 5.3.1.14. V2X E-UTRA frequencies with geographical areas list: The V2X E-UTRA frequencies with geographical areas list field is coded according to figure 5.3.1.26 and table 5.3.1.26. If the length of V2X service identifier to V2X E-UTRA frequency mapping rule contents field indicates a length bigger than indicated in figure 5.3.1.25, receiving entity shall ignore any superfluous octets located at the end of the V2X service identifier to V2X E-UTRA frequency mapping rule contents.

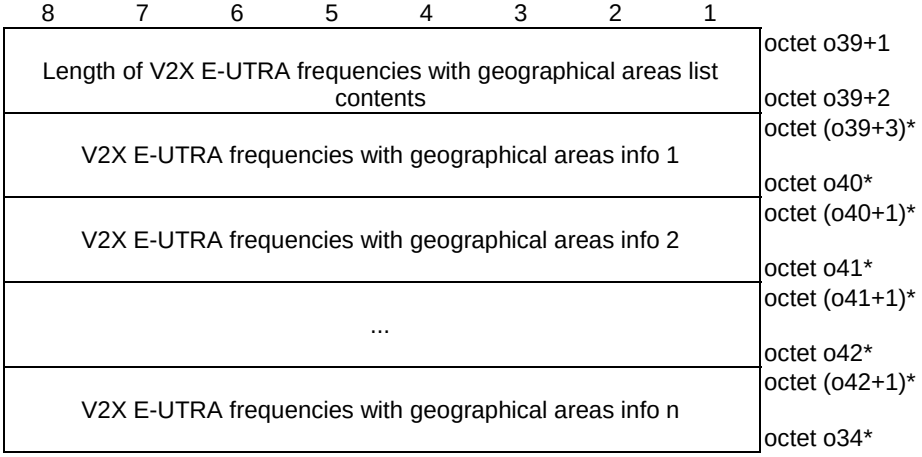


Figure 5.3.1.26: V2X E-UTRA frequencies with geographical areas list

Table 5.3.1.26: V2X E-UTRA frequencies with geographical areas list

V2X E-UTRA frequencies with geographical areas info: The V2X E-UTRA frequencies with geographical areas info field is coded according to figure 5.3.1.27 and table 5.3.1.27.

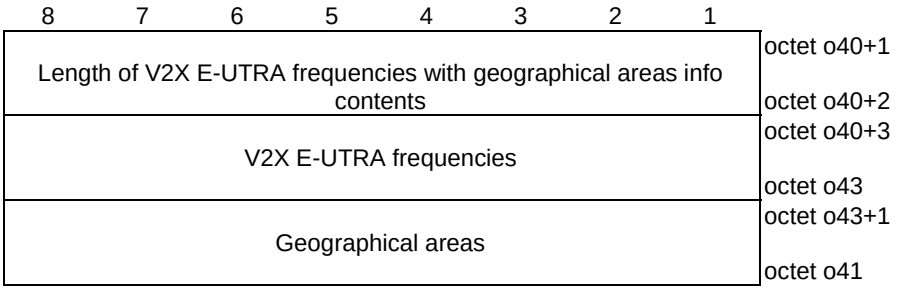


Figure 5.3.1.27: V2X E-UTRA frequencies with geographical areas info

Table 5.3.1.27: V2X E-UTRA frequencies with geographical areas info

V2X E-UTRA frequencies: The V2X E-UTRA frequencies field is coded according to figure 5.3.1.28 and table 5.3.1.28. Geographical areas: The geographical areas field is coded according to figure 5.3.1.18 and table 5.3.1.18. If the length of V2X E-UTRA frequencies with geographical areas info contents field indicates a length bigger than indicated in figure 5.3.1.27, receiving entity shall ignore any superfluous octets located at the end of the V2X E-UTRA frequencies with geographical areas info contents.

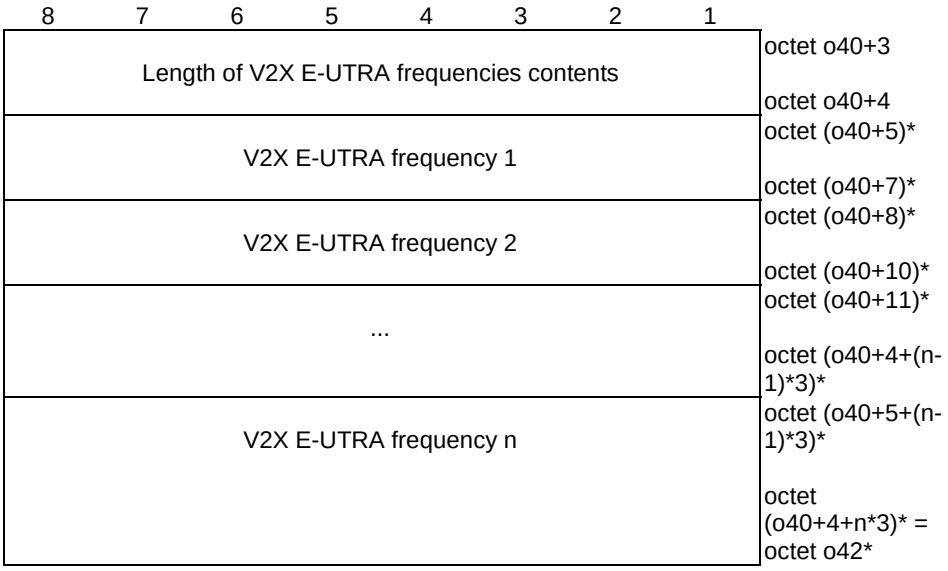


Figure 5.3.1.28: V2X E-UTRA frequencies

Table 5.3.1.28: V2X E-UTRA frequencies

V2X E-UTRA frequency: V2X E-UTRA frequency is coded according to the EARFCN value defined in 3GPP TS 36.101 [13].

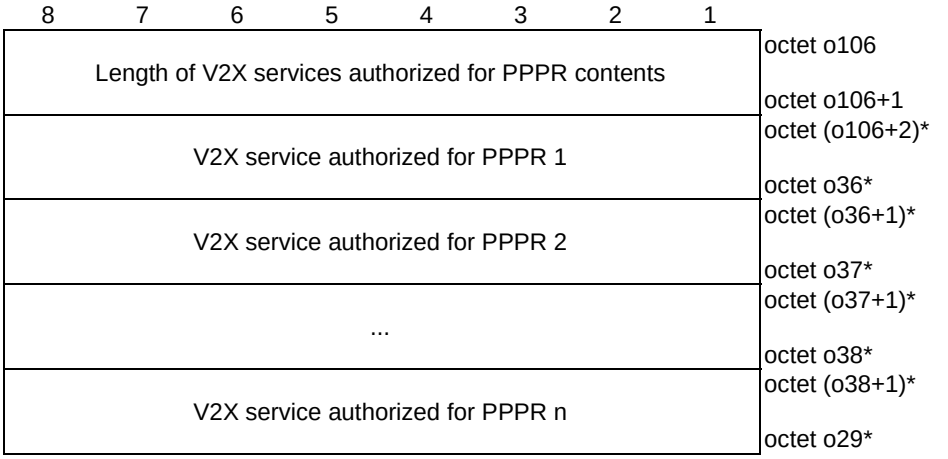


Figure 5.3.1.29: V2X services authorized for PPPR

Table 5.3.1.29: V2X services authorized for PPPR

V2X service authorized for PPPR: The V2X services authorized for PPPR field is coded according to figure 5.3.1.30 and table 5.3.1.30.

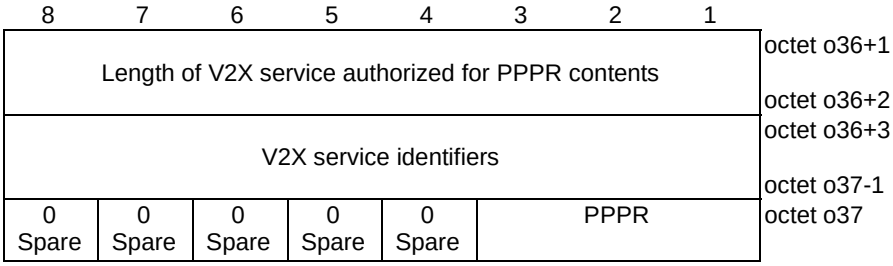


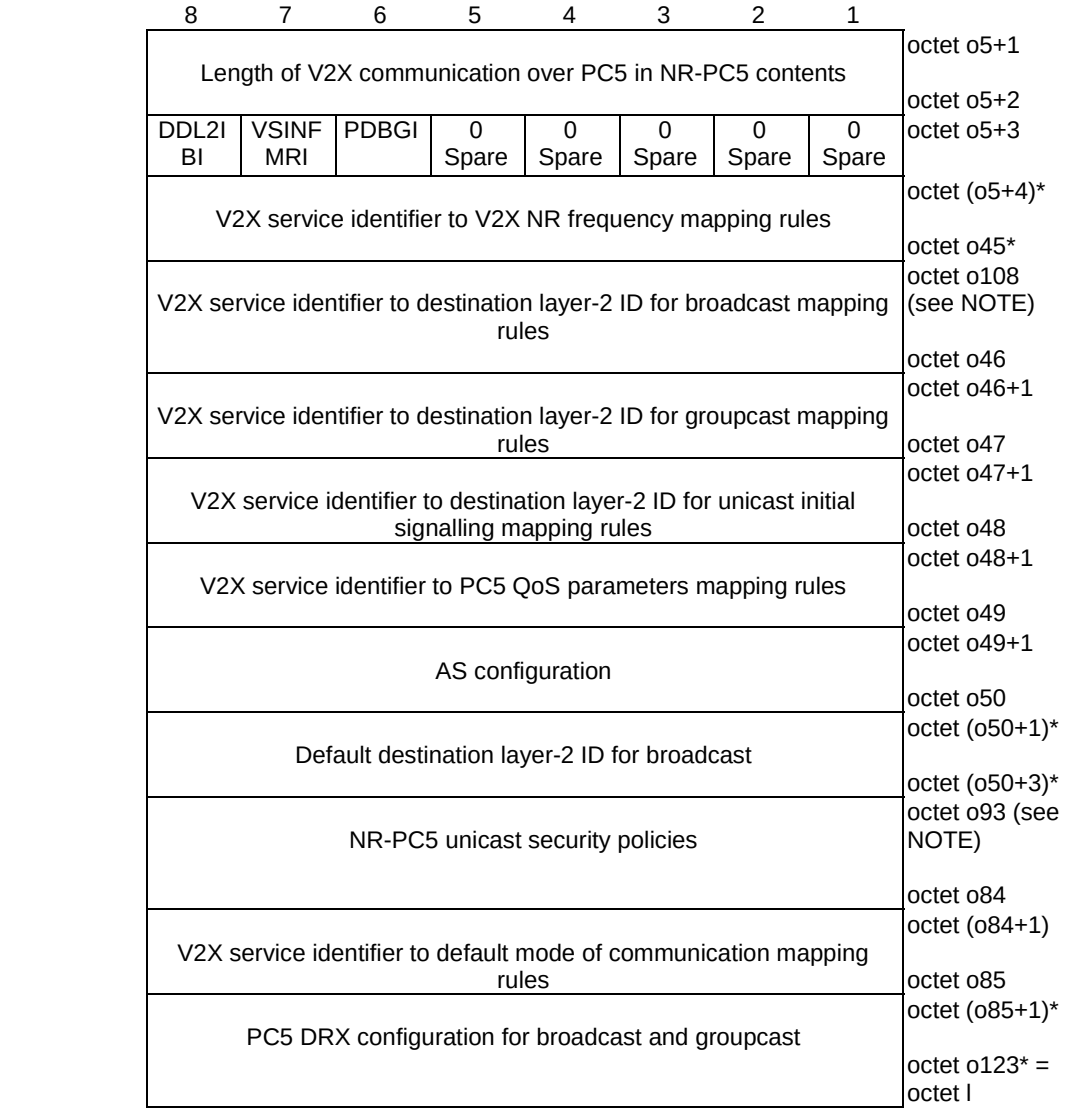
Figure 5.3.1.30: V2X service authorized for PPPR

Table 5.3.1.30: V2X service authorized for PPPR

V2X service identifiers:
The V2X service identifiers field is coded according to figure 5.3.1.14 and table 5.3.1.14.

ProSe per-packet reliability (PPPR):
The PPPR field is a ProSe per-packet reliability value.
Bits
3 2 1
0 0 0 PPPR value 1
0 0 1 PPPR value 2
0 1 0 PPPR value 3
0 1 1 PPPR value 4
1 0 0 PPPR value 5
1 0 1 PPPR value 6
1 1 0 PPPR value 7
1 1 1 PPPR value 8

If the length of V2X service authorized for PPPR contents field indicates a length bigger than indicated in figure 5.3.1.30, receiving entity shall ignore any superfluous octets located at the end of the V2X service authorized for PPPR contents.



NOTE: The field is placed immediately after the last present preceding field.

Figure 5.3.1.31: V2X communication over PC5 in NR-PC5

Table 5.3.1.31: V2X communication over PC5 in NR-PC5

Default destination layer-2 ID for broadcast indicator (DDL2IBI):
The DDL2IBI bit indicates presence of the default destination layer-2 ID for broadcast field.
Bit
8
0 Default destination layer-2 ID for broadcast field is absent
1 Default destination layer-2 ID for broadcast field is present

V2X service identifier to V2X NR frequency mapping rules indicator (VSINFMRI):
The VSINFMRI bit indicates presence of the V2X service identifier to V2X NR frequency mapping rules field.
Bit
7
0 V2X service identifier to V2X NR frequency mapping rules field is absent
1 V2X service identifier to V2X NR frequency mapping rules field is present

PC5 DRX configuration for broadcast and groupcast indicator (PDBGI):
The PDBGI bit indicates presence of the PC5 DRX configuration for broadcast and groupcast field.
Bit
6
0 PC5 DRX configuration for broadcast and groupcast field is absent
1 PC5 DRX configuration for broadcast and groupcast field is present

V2X service identifier to V2X NR frequency mapping rules:
The V2X service identifier to V2X NR frequency mapping rules field is coded according to figure 5.3.1.32 and table 5.3.1.32.

V2X service identifier to destination layer-2 ID for broadcast mapping rules:
The V2X service identifier to destination layer-2 ID for broadcast mapping rules field is coded according to figure 5.3.1.37 and table 5.3.1.37.

V2X service identifier to destination layer-2 ID for groupcast mapping rules:
The V2X service identifier to destination layer-2 ID for groupcast mapping rules field is coded according to figure 5.3.1.39 and table 5.3.1.39.

V2X service identifier to destination layer-2 ID for unicast initial signalling mapping rules:
The V2X service identifier to destination layer-2 ID for unicast initial signalling mapping rules field is coded according to figure 5.3.1.41 and table 5.3.1.41.

V2X service identifier to PC5 QoS parameters mapping rules:
The V2X service identifier to PC5 QoS parameters mapping rules field is coded according to figure 5.3.1.43 and table 5.3.1.43.

AS configuration:
The AS configuration field is coded according to figure 5.3.1.46a and table 5.3.1.46a.

Default destination layer-2 ID for broadcast:
The default destination layer-2 ID for broadcast field is a binary coded layer 2 identifier.

NR-PC5 unicast security policies:
The NR-PC5 unicast security policies field is coded according to figure 5.3.1.50 and table 5.3.1.50.

V2X service identifier to default mode of communication mapping rules:
The V2X service identifier to default mode of communication mapping rules is coded according to figure 5.3.1.53 and table 5.3.1.53.

PC5 DRX configuration for broadcast and groupcast
The PC5 DRX configuration for broadcast and groupcast field indicates the PC5 DRX configuration for broadcast and groupcast when not served by E-UTRA and not served by NR, and is coded according to figure 5.3.1.x and table 5.3.1.x.

If the length of V2X communication over PC5 in NR-PC5 contents field indicates a length bigger than indicated in figure 5.3.1.31, receiving entity shall ignore any superfluous octets located at the end of the V2X communication over PC5 in NR-PC5 contents.

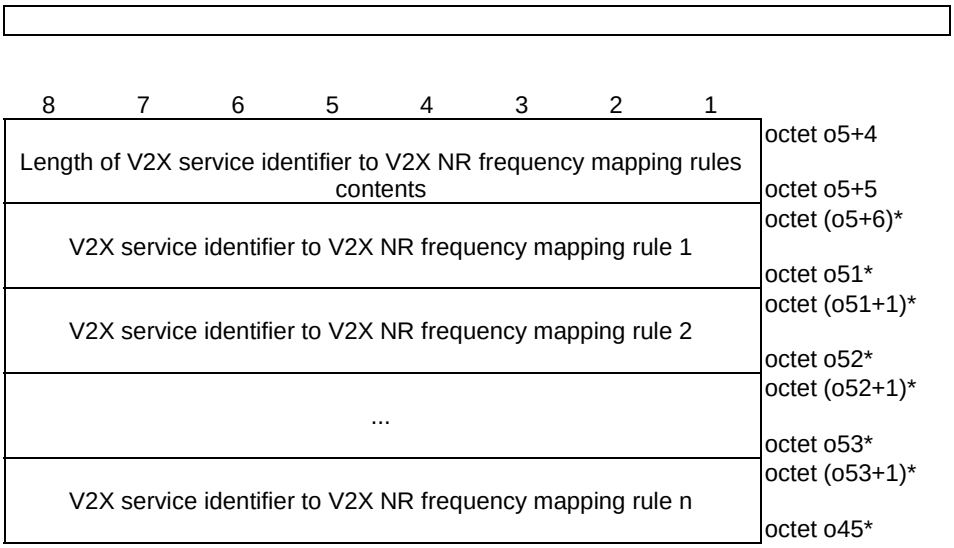


Figure 5.3.1.32: V2X service identifier to V2X NR frequency mapping rules

Table 5.3.1.32: V2X service identifier to V2X NR frequency mapping rules

V2X service identifier to V2X NR frequency mapping rule: The V2X service identifier to V2X NR frequency mapping rule is coded according to figure 5.3.1.33 and table 5.3.1.33.

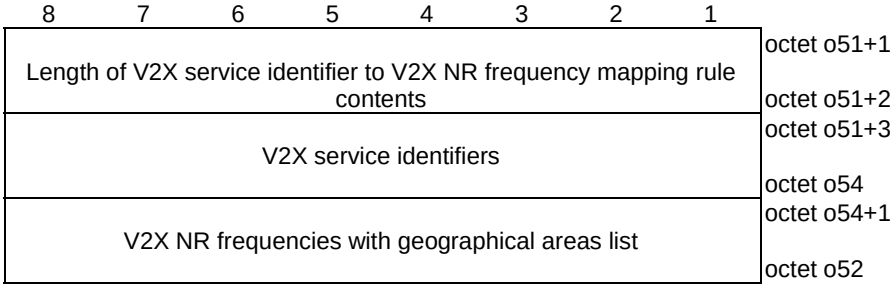


Figure 5.3.1.33: V2X service identifier to V2X NR frequency mapping rule

Table 5.3.1.33: V2X service identifier to V2X NR frequency mapping rule

V2X service identifiers: The V2X service identifiers field is coded according to figure 5.3.1.14 and table 5.3.1.14. V2X NR frequencies with geographical areas list: The V2X NR frequencies with geographical areas list field is coded according to figure 5.3.1.34 and table 5.3.1.34. If the length of V2X service identifier to V2X NR frequency mapping rule contents field indicates a length bigger than indicated in figure 5.3.1.33, receiving entity shall ignore any superfluous octets located at the end of the V2X service identifier to V2X NR frequency mapping rule contents.

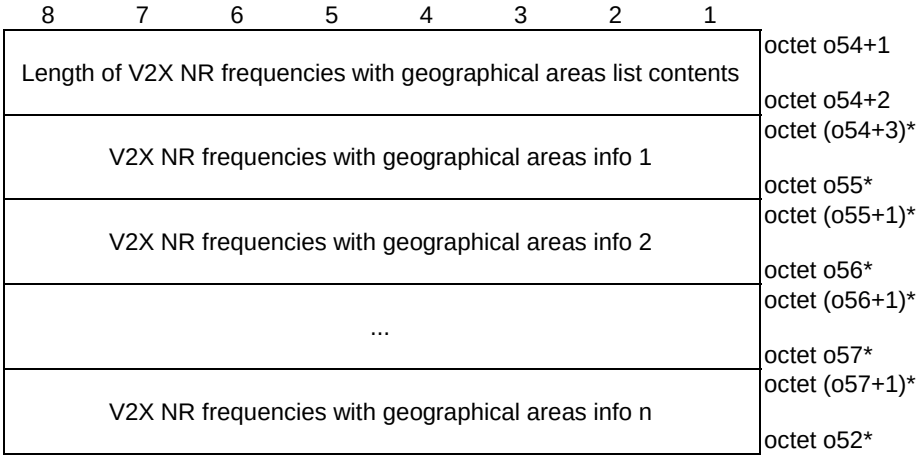


Figure 5.3.1.34: V2X NR frequencies with geographical areas list

Table 5.3.1.34: V2X NR frequencies with geographical areas list

V2X NR frequencies with geographical areas info: The V2X NR frequencies with geographical areas info field is coded according to figure 5.3.1.35 and table 5.3.1.35.

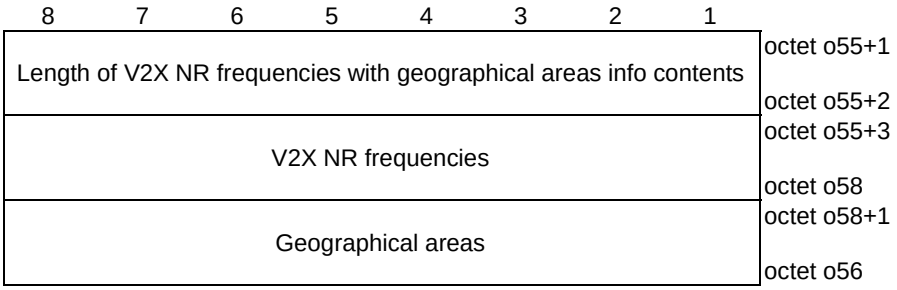


Figure 5.3.1.35: V2X NR frequencies with geographical areas info

Table 5.3.1.35: V2X NR frequencies with geographical areas info

V2X NR frequencies: The V2X NR frequencies field is coded according to figure 5.3.1.36 and table 5.3.1.36. Geographical areas: The geographical areas field is coded according to figure 5.3.1.18 and table 5.3.1.18. If the length of V2X NR frequencies with geographical areas info contents field indicates a length bigger than indicated in figure 5.3.1.35, receiving entity shall ignore any superfluous octets located at the end of the V2X NR frequencies with geographical areas info contents.

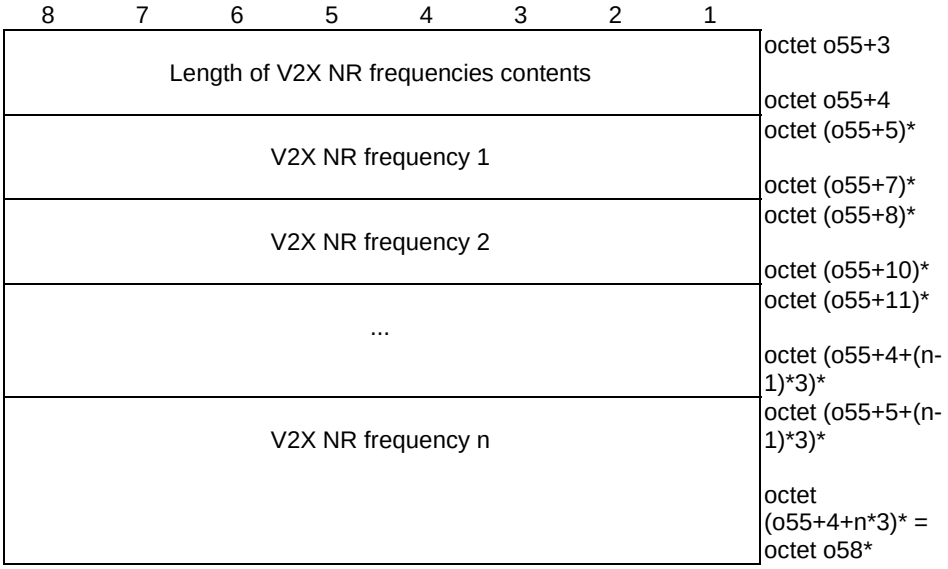


Figure 5.3.1.36: V2X NR frequencies

Table 5.3.1.36: V2X NR frequencies

V2X NR frequency: V2X NR frequency is coded according to the NR-ARFCN value defined in 3GPP TS 38.101-1 [14] and 3GPP TS 38.101-2 [15].

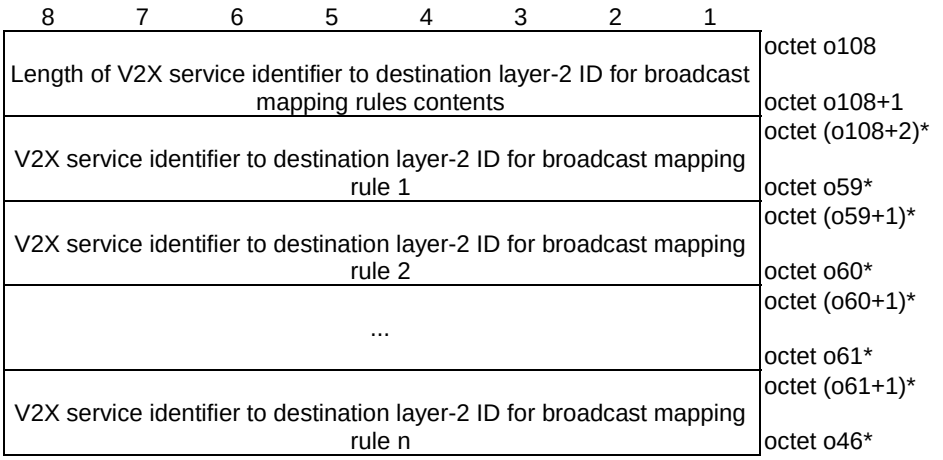


Figure 5.3.1.37: V2X service identifier to destination layer-2 ID for broadcast mapping rules

Table 5.3.1.37: V2X service identifier to destination layer-2 ID for broadcast mapping rules

V2X service identifier to destination layer-2 ID for broadcast mapping rule: The V2X service identifier to destination layer-2 ID for broadcast mapping rule field is coded according to figure 5.3.1.38 and table 5.3.1.38.

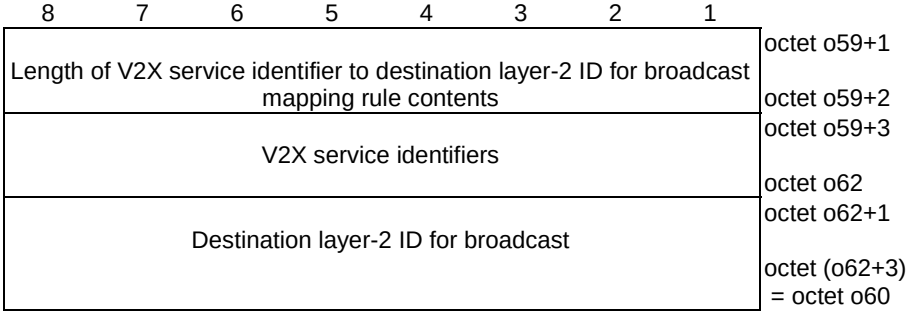


Figure 5.3.1.38: V2X service identifier to destination layer-2 ID for broadcast mapping rule

Table 5.3.1.38: V2X service identifier to destination layer-2 ID for broadcast mapping rule

V2X service identifiers: The V2X service identifiers field is coded according to figure 5.3.1.14 and table 5.3.1.14. Destination layer-2 ID for broadcast: The destination layer-2 ID for broadcast field is a binary coded layer 2 identifier. If the length of V2X service identifier to destination layer-2 ID for broadcast mapping rule contents field indicates a length bigger than indicated in figure 5.3.1.38, receiving entity shall ignore any superfluous octets located at the end of the V2X service identifier to destination layer-2 ID for broadcast mapping rule contents.

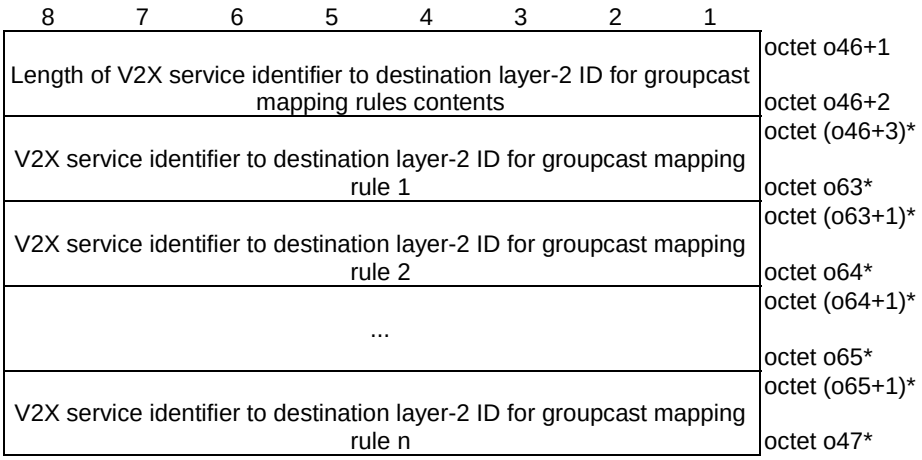


Figure 5.3.1.39: V2X service identifier to destination layer-2 ID for groupcast mapping rules

Table 5.3.1.39: V2X service identifier to destination layer-2 ID for groupcast mapping rules

V2X service identifier to destination layer-2 ID for groupcast mapping rule: The V2X service identifier to destination layer-2 ID for groupcast mapping rule field is coded according to figure 5.3.1.40 and table 5.3.1.40.

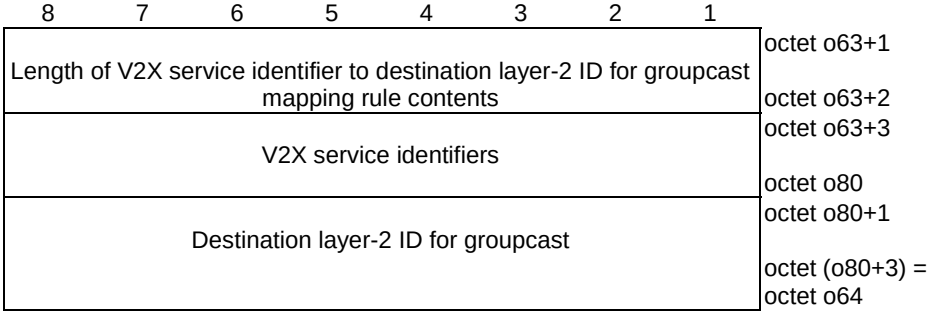


Figure 5.3.1.40: V2X service identifier to destination layer-2 ID for groupcast mapping rule

Table 5.3.1.40: V2X service identifier to destination layer-2 ID for groupcast mapping rule

V2X service identifiers: The V2X service identifiers field is coded according to figure 5.3.1.14 and table 5.3.1.14. Destination layer-2 ID for groupcast: The destination layer-2 ID for groupcast field is a binary coded layer 2 identifier. If the length of V2X service identifier to destination layer-2 ID for groupcast mapping rule contents field indicates a length bigger than indicated in figure 5.3.1.40, receiving entity shall ignore any superfluous octets located at the end of the V2X service identifier to destination layer-2 ID for groupcast mapping rule contents.

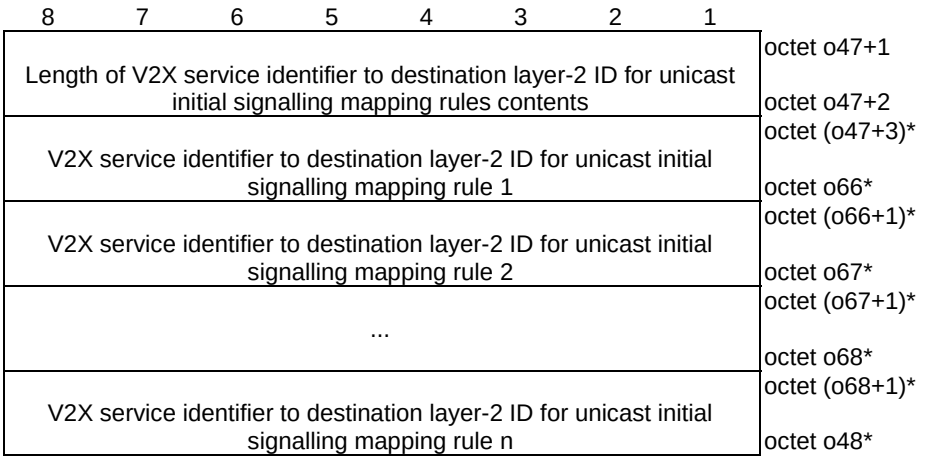


Figure 5.3.1.41: V2X service identifier to destination layer-2 ID for unicast initial signalling mapping rules

Table 5.3.1.41: V2X service identifier to destination layer-2 ID for unicast initial signalling mapping rules

V2X service identifier to destination layer-2 ID for unicast initial signalling mapping rule: The V2X service identifier to destination layer-2 ID for unicast initial signalling mapping rule field is coded according to figure 5.3.1.42 and table 5.3.1.42.

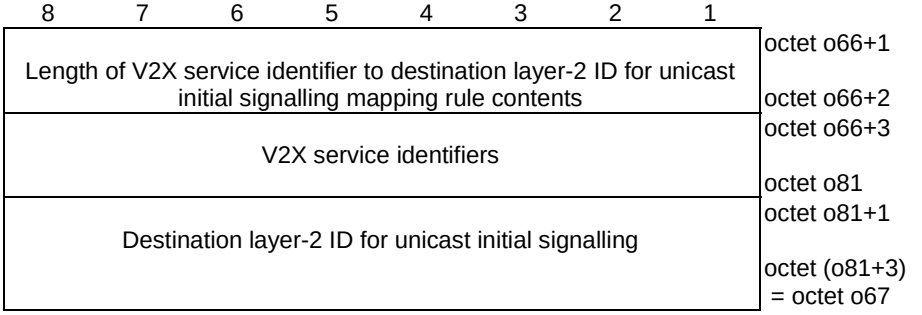


Figure 5.3.1.42: V2X service identifier to destination layer-2 ID for unicast initial signalling mapping rule

Table 5.3.1.42: V2X service identifier to destination layer-2 ID for unicast initial signalling mapping rule

V2X service identifiers: The V2X service identifiers field is coded according to figure 5.3.1.14 and table 5.3.1.14. Destination layer-2 ID for unicast initial signalling: The destination layer-2 ID for unicast initial signalling field is a binary coded layer 2 identifier. If the length of V2X service identifier to destination layer-2 ID for unicast initial signalling mapping rule contents field indicates a length bigger than indicated in figure 5.3.1.42, receiving entity shall ignore any superfluous octets located at the end of the V2X service identifier to destination layer-2 ID for unicast initial signalling mapping rule contents.

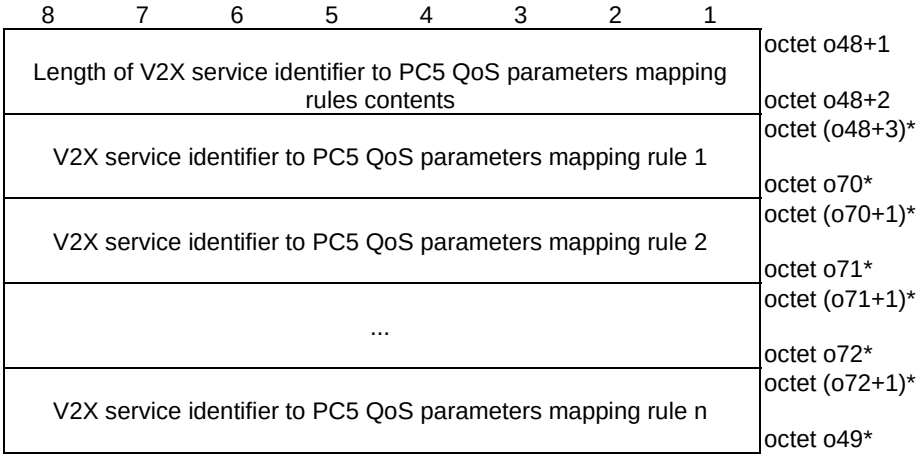


Figure 5.3.1.43: V2X service identifier to PC5 QoS parameters mapping rules

Table 5.3.1.43: V2X service identifier to PC5 QoS parameters mapping rules

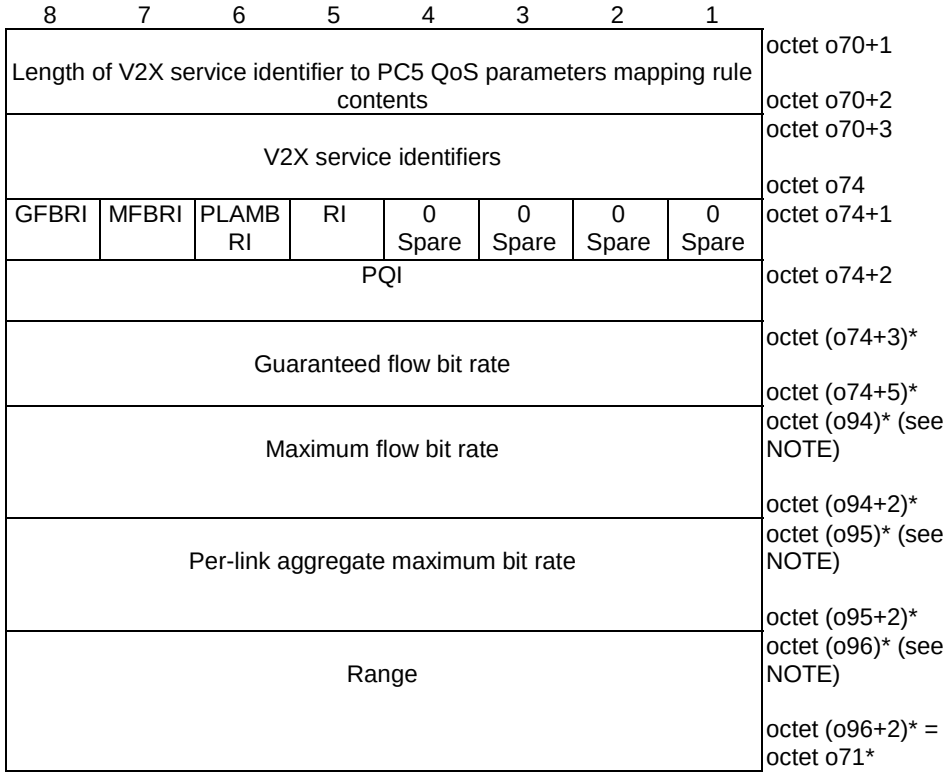
V2X service identifier to PC5 QoS parameters mapping rule: The V2X service identifier to PC5 QoS parameters mapping rule field is coded according to figure 5.3.1.46 and table 5.3.1.46.

Figure 5.3.1.44: void

Table 5.3.1.44: void

Figure 5.3.1.45: void

Table 5.3.1.45: void



NOTE: The field is placed immediately after the last present preceding field.

Figure 5.3.1.46: V2X service identifier to PC5 QoS parameters mapping rule

Table 5.3.1.46: V2X service identifier to PC5 QoS parameters mapping rule

V2X service identifiers:
The V2X service identifiers field is coded according to figure 5.3.1.14 and table 5.3.1.14.

Guaranteed flow bit rate indicator (GFBRI):
The GFBRI bit indicates presence of guaranteed flow bit rate field.
Bit
8
0 Guaranteed flow bit rate field is absent
1 Guaranteed flow bit rate field is present

Maximum flow bit rate indicator (MFBRI):
The MFBRI bit indicates presence of maximum flow bit rate field.
Bit
7
0 Maximum flow bit rate field is absent
1 Maximum flow bit rate field is present

Per-link aggregate maximum bit rate indicator (PLAMBRI):
The PLAMBRI bit indicates presence of per-link aggregate maximum bit rate field.
Bit
6
0 Per-link aggregate maximum bit rate field is absent
1 Per-link aggregate maximum bit rate field is present

Range indicator (RI):
The RI bit indicates presence of range field.
Bit
5
0 Range field is absent
1 Range field is present

PQI:
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
to Spare
0 0 0 1 0 1 0 0
0 0 0 1 0 1 0 1 PQI 21
0 0 0 1 0 1 1 0 PQI 22
0 0 0 1 0 1 1 1 PQI 23
0 0 0 1 1 0 0 0
to Spare
0 0 1 1 0 1 1 0
0 0 1 1 0 1 1 1 PQI 55
0 0 1 1 1 0 0 0 PQI 56
0 0 1 1 1 0 0 1 PQI 57
0 0 1 1 1 0 1 0 PQI 58
0 0 1 1 1 0 1 1 PQI 59
0 0 1 1 1 1 0 0
to Spare
0 1 0 1 1 0 0 1
0 1 0 1 1 0 1 0 PQI 90
0 1 0 1 1 0 1 1 PQI 91
0 1 0 1 1 1 0 0
to Spare
0 1 1 1 1 1 1 1
1 0 0 0 0 0 0 0
to Operator-specific PQIs
1 1 1 1 1 1 1 0
1 1 1 1 1 1 1 1 Reserved

If the UE receives a PQI value (excluding the reserved PQI values) that it does not understand, the UE shall choose a PQI value from the set of PQI values defined in this version of the protocol (see 3GPP TS 23.287 [2]) and associated with:

- GBR resource type, if the V2X service identifier to PC5 QoS parameters mapping rule includes the guaranteed flow bit rate field; and
- non-GBR resource type, if the V2X service identifier to PC5 QoS parameters mapping rule does not include the guaranteed flow bit rate field.

The UE shall use this chosen PQI value for internal operations only. The UE shall use the received PQI value in subsequent V2X communication over PC5 signalling procedures.

Guaranteed flow bit rate:
The guaranteed flow bit rate field indicates guaranteed flow bit rate for both sending and receiving and contains one octet indicating the unit of the guaranteed flow bit rate followed by two octets containing the value of the guaranteed flow bit rate.

Unit of the guaranteed flow bit rate:

Bits **8 7 6 5 4 3 2 1**	
0 0 0 0 0 0 0 0	value is not used
0 0 0 0 0 0 0 1	value is incremented in multiples of 1 Kbps
0 0 0 0 0 0 1 0	value is incremented in multiples of 4 Kbps
0 0 0 0 0 0 1 1	value is incremented in multiples of 16 Kbps
0 0 0 0 0 1 0 0	value is incremented in multiples of 64 Kbps
0 0 0 0 0 1 0 1	value is incremented in multiples of 256 Kbps
0 0 0 0 0 1 1 0	value is incremented in multiples of 1 Mbps
0 0 0 0 0 1 1 1	value is incremented in multiples of 4 Mbps
0 0 0 0 1 0 0 0	value is incremented in multiples of 16 Mbps
0 0 0 0 1 0 0 1	value is incremented in multiples of 64 Mbps
0 0 0 0 1 0 1 0	value is incremented in multiples of 256 Mbps
0 0 0 0 1 0 1 1	value is incremented in multiples of 1 Gbps
0 0 0 0 1 1 0 0	value is incremented in multiples of 4 Gbps
0 0 0 0 1 1 0 1	value is incremented in multiples of 16 Gbps
0 0 0 0 1 1 1 0	value is incremented in multiples of 64 Gbps
0 0 0 0 1 1 1 1	value is incremented in multiples of 256 Gbps
0 0 0 1 0 0 0 0	value is incremented in multiples of 1 Tbps
0 0 0 1 0 0 0 1	value is incremented in multiples of 4 Tbps
0 0 0 1 0 0 1 0	value is incremented in multiples of 16 Tbps
0 0 0 1 0 0 1 1	value is incremented in multiples of 64 Tbps
0 0 0 1 0 1 0 0	value is incremented in multiples of 256 Tbps
0 0 0 1 0 1 0 1	value is incremented in multiples of 1 Pbps
0 0 0 1 0 1 1 0	value is incremented in multiples of 4 Pbps
0 0 0 1 0 1 1 1	value is incremented in multiples of 16 Pbps
0 0 0 1 1 0 0 0	value is incremented in multiples of 64 Pbps
0 0 0 1 1 0 0 1	value is incremented in multiples of 256 Pbps

Other values shall be interpreted as multiples of 256 Pbps in this version of the protocol.

Value of the guaranteed flow bit rate is binary coded value of the guaranteed flow bit rate in units defined by the unit of the guaranteed flow bit rate.

Maximum flow bit rate:
The maximum flow bit rate field indicates maximum flow bit rate for both sending and receiving and contains one octet indicating the unit of the maximum flow bit rate followed by two octets containing the value of the maximum flow bit rate.

Unit of the maximum flow bit rate:

Bits **8 7 6 5 4 3 2 1**	
0 0 0 0 0 0 0 0	value is not used
0 0 0 0 0 0 0 1	value is incremented in multiples of 1 Kbps
0 0 0 0 0 0 1 0	value is incremented in multiples of 4 Kbps
0 0 0 0 0 0 1 1	value is incremented in multiples of 16 Kbps
0 0 0 0 0 1 0 0	value is incremented in multiples of 64 Kbps
0 0 0 0 0 1 0 1	value is incremented in multiples of 256 Kbps
0 0 0 0 0 1 1 0	value is incremented in multiples of 1 Mbps
0 0 0 0 0 1 1 1	value is incremented in multiples of 4 Mbps
0 0 0 0 1 0 0 0	value is incremented in multiples of 16 Mbps
0 0 0 0 1 0 0 1	value is incremented in multiples of 64 Mbps
0 0 0 0 1 0 1 0	value is incremented in multiples of 256 Mbps
0 0 0 0 1 0 1 1	value is incremented in multiples of 1 Gbps
0 0 0 0 1 1 0 0	value is incremented in multiples of 4 Gbps
0 0 0 0 1 1 0 1	value is incremented in multiples of 16 Gbps
0 0 0 0 1 1 1 0	value is incremented in multiples of 64 Gbps
0 0 0 0 1 1 1 1	value is incremented in multiples of 256 Gbps
0 0 0 1 0 0 0 0	value is incremented in multiples of 1 Tbps
0 0 0 1 0 0 0 1	value is incremented in multiples of 4 Tbps
0 0 0 1 0 0 1 0	value is incremented in multiples of 16 Tbps
0 0 0 1 0 0 1 1	value is incremented in multiples of 64 Tbps
0 0 0 1 0 1 0 0	value is incremented in multiples of 256 Tbps
0 0 0 1 0 1 0 1	value is incremented in multiples of 1 Pbps
0 0 0 1 0 1 1 0	value is incremented in multiples of 4 Pbps
0 0 0 1 0 1 1 1	value is incremented in multiples of 16 Pbps
0 0 0 1 1 0 0 0	value is incremented in multiples of 64 Pbps
0 0 0 1 1 0 0 1	value is incremented in multiples of 256 Pbps

Other values shall be interpreted as multiples of 256 Pbps in this version of the protocol.

Value of the maximum flow bit rate is binary coded value of the maximum flow bit rate in units defined by the unit of the maximum flow bit rate.

Per-link aggregate maximum bit rate:
The per-link aggregate maximum bit rate field indicates per-link aggregate maximum bit rate for both sending and receiving and contains one octet indicating the unit of the per-link aggregate maximum bit rate followed by two octets containing the value of the per-link aggregate maximum bit rate.

Unit of the per-link aggregate maximum bit rate:
Bits
8 7 6 5 4 3 2 1

0 0 0 0 0 0 0 0	value is not used
0 0 0 0 0 0 0 1	value is incremented in multiples of 1 Kbps
0 0 0 0 0 0 1 0	value is incremented in multiples of 4 Kbps
0 0 0 0 0 0 1 1	value is incremented in multiples of 16 Kbps
0 0 0 0 0 1 0 0	value is incremented in multiples of 64 Kbps
0 0 0 0 0 1 0 1	value is incremented in multiples of 256 Kbps
0 0 0 0 0 1 1 0	value is incremented in multiples of 1 Mbps
0 0 0 0 0 1 1 1	value is incremented in multiples of 4 Mbps
0 0 0 0 1 0 0 0	value is incremented in multiples of 16 Mbps
0 0 0 0 1 0 0 1	value is incremented in multiples of 64 Mbps
0 0 0 0 1 0 1 0	value is incremented in multiples of 256 Mbps
0 0 0 0 1 0 1 1	value is incremented in multiples of 1 Gbps
0 0 0 0 1 1 0 0	value is incremented in multiples of 4 Gbps
0 0 0 0 1 1 0 1	value is incremented in multiples of 16 Gbps
0 0 0 0 1 1 1 0	value is incremented in multiples of 64 Gbps
0 0 0 0 1 1 1 1	value is incremented in multiples of 256 Gbps
0 0 0 1 0 0 0 0	value is incremented in multiples of 1 Tbps
0 0 0 1 0 0 0 1	value is incremented in multiples of 4 Tbps
0 0 0 1 0 0 1 0	value is incremented in multiples of 16 Tbps
0 0 0 1 0 0 1 1	value is incremented in multiples of 64 Tbps
0 0 0 1 0 1 0 0	value is incremented in multiples of 256 Tbps
0 0 0 1 0 1 0 1	value is incremented in multiples of 1 Pbps
0 0 0 1 0 1 1 0	value is incremented in multiples of 4 Pbps
0 0 0 1 0 1 1 1	value is incremented in multiples of 16 Pbps
0 0 0 1 1 0 0 0	value is incremented in multiples of 64 Pbps
0 0 0 1 1 0 0 1	value is incremented in multiples of 256 Pbps

Other values shall be interpreted as multiples of 256 Pbps in this version of the protocol.

Value of the per-link aggregate maximum bit rate is binary coded value of the per-link aggregate maximum bit rate in units defined by the unit of the per-link aggregate maximum bit rate.

Range
The range field indicates a binary encoded value of the range in meters.

If the length of V2X service identifier to PC5 QoS parameters mapping rule contents field indicates a length bigger than indicated in figure 5.3.1.46, receiving entity shall ignore any superfluous octets located at the end of the V2X service identifier to PC5 QoS parameters mapping rule contents.

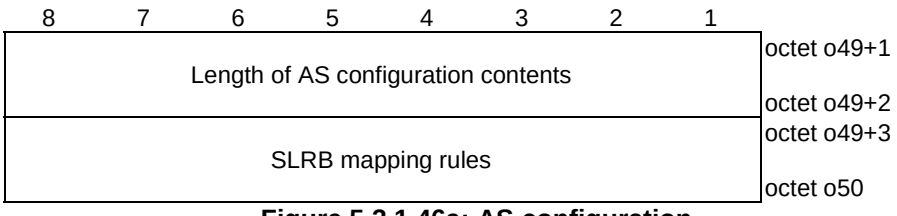


Figure 5.3.1.46a: AS configuration

Table 5.3.1.46a: AS configuration

SLRB mapping rules: The SLRB mapping rules field is coded according to figure 5.3.1.47 and table 5.3.1.47. If the length of AS configuration contents field indicates a length bigger than indicated in figure 5.3.1.46a, receiving entity shall ignore any superfluous octets located at the end of the AS configuration contents.

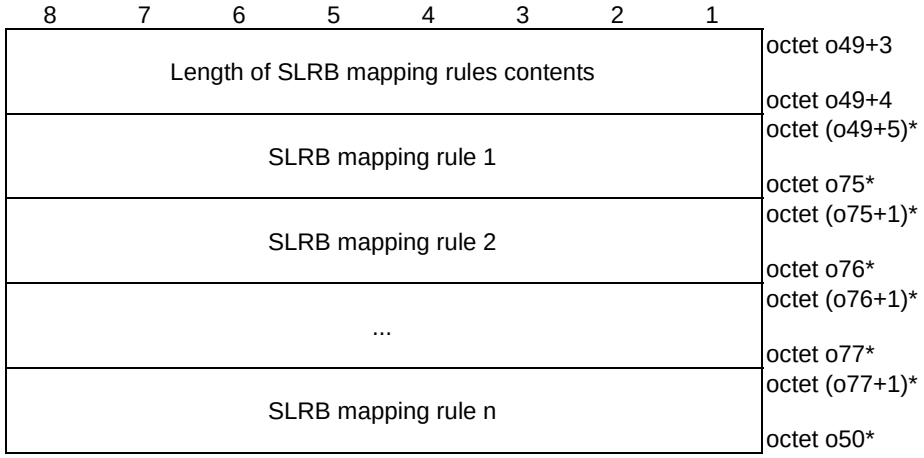


Figure 5.3.1.47: SLRB mapping rules

Table 5.3.1.47: SLRB mapping rules

SLRB mapping rule: The SLRB mapping rule field is coded according to figure 5.3.1.48 and table 5.3.1.48.

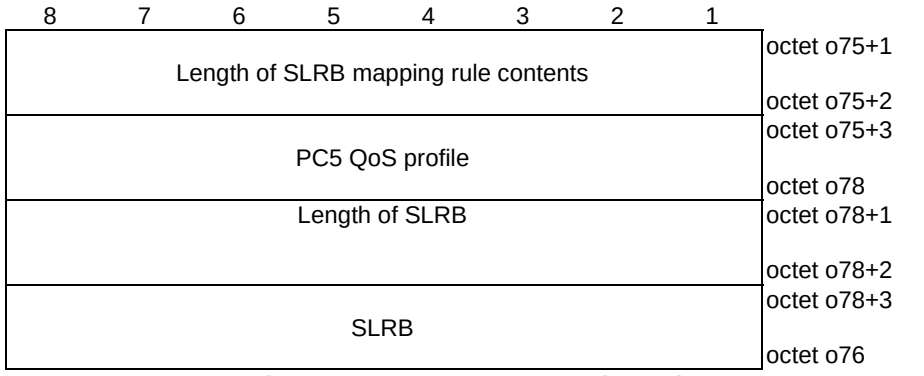
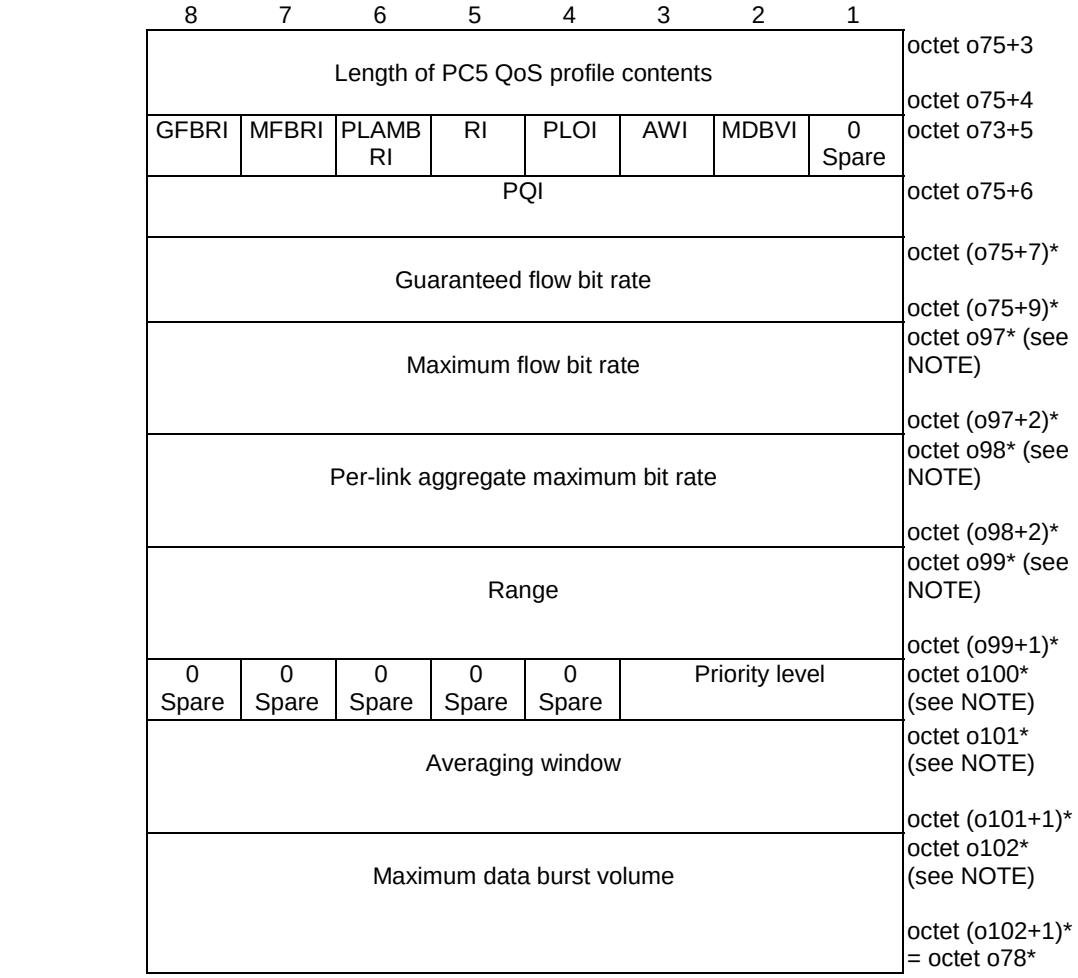


Figure 5.3.1.48: SLRB mapping rule

Table 5.3.1.48: SLRB mapping rule

PC5 QoS profile: The PC5 QoS profile field is coded according to figure 5.3.1.49 and table 5.3.1.49. SLRB SLRB is defined as *SL-PreconfigurationNR* in clause 9.3 of 3GPP TS 38.331 [12]. If the length of SLRB mapping rule contents field indicates a length bigger than indicated in figure 5.3.1.48, receiving entity shall ignore any superfluous octets located at the end of the SLRB mapping rule contents.



NOTE: The field is placed immediately after the last present preceding field.

Figure 5.3.1.49:PC5 QoS profile

Table 5.3.1.49:PC5 QoS profile

Guaranteed flow bit rate indicator (GFBRI):
The GFBRI bit indicates presence of guaranteed flow bit rate field.
Bit
8
0 Guaranteed flow bit rate field is absent
1 Guaranteed flow bit rate field is present

Maximum flow bit rate indicator (MFBRI):
The MFBRI bit indicates presence of maximum flow bit rate field.
Bit
7
0 Maximum flow bit rate field is absent
1 Maximum flow bit rate field is present

Per-link aggregate maximum bit rate indicator (PLAMBRI):
The PLAMBRI bit indicates presence of per-link aggregate maximum bit rate field.
Bit
6
0 Per-link aggregate maximum bit rate field is absent
1 Per-link aggregate maximum bit rate field is present

Range indicator (RI):
The RI bit indicates presence of range field.
Bit
5
0 Range field is absent
1 Range field is present

Priority level octet indicator (OPLI):
The OPLI bit indicates presence of the octet of the priority level field.
Bit
4
0 The octet of the priority level is absent
1 The octet of the priority level is present

Averaging window indicator (AWI):
The AWI bit indicates presence of averaging window field.
Bit
3
0 Averaging window field is absent
1 Averaging window field is present

Maximum data burst volume indicator (MDBVI):
The MDBVI bit indicates presence of maximum data burst volume field.
Bit
2
0 Maximum data burst volume field is absent
1 Maximum data burst volume field is present

PQI:
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
to Spare
0 0 0 1 0 1 0 0
0 0 0 1 0 1 0 1 PQI 21
0 0 0 1 0 1 1 0 PQI 22
0 0 0 1 0 1 1 1 PQI 23
0 0 0 1 1 0 0 0
to Spare
0 0 1 1 0 1 1 0
0 0 1 1 0 1 1 1 PQI 55
0 0 1 1 1 0 0 0 PQI 56
0 0 1 1 1 0 0 1 PQI 57
0 0 1 1 1 0 1 0 PQI 58
0 0 1 1 1 0 1 1 PQI 59
0 0 1 1 1 1 0 0
to Spare
0 1 0 1 1 0 0 1
0 1 0 1 1 0 1 0 PQI 90
0 1 0 1 1 0 1 1 PQI 91
0 1 0 1 1 1 0 0
to Spare
0 1 1 1 1 1 1 1
1 0 0 0 0 0 0 0
to Operator-specific PQIs
1 1 1 1 1 1 1 0
1 1 1 1 1 1 1 1 Reserved

If the UE receives a PQI value (excluding the reserved PQI values) that it does not understand, the UE shall choose a PQI value from the set of PQI values defined in this version of the protocol (see 3GPP TS 23.287 [2]) and associated with:

- GBR resource type, if the PC5 QoS profile includes the guaranteed flow bit rate field; and
- non-GBR resource type, if the PC5 QoS profile does not include the guaranteed flow bit rate field.

The UE shall use this chosen PQI value for internal operations only. The UE shall use the received PQI value in subsequent V2X communication over PC5 signalling procedures.

Guaranteed flow bit rate:
The guaranteed flow bit rate field indicates guaranteed flow bit rate for both sending and receiving and contains one octet indicating the unit of the guaranteed flow bit rate followed by two octets containing the value of the guaranteed flow bit rate.

Unit of the guaranteed flow bit rate:

Bits **8 7 6 5 4 3 2 1**	
0 0 0 0 0 0 0 0	value is not used
0 0 0 0 0 0 0 1	value is incremented in multiples of 1 Kbps
0 0 0 0 0 0 1 0	value is incremented in multiples of 4 Kbps
0 0 0 0 0 0 1 1	value is incremented in multiples of 16 Kbps
0 0 0 0 0 1 0 0	value is incremented in multiples of 64 Kbps
0 0 0 0 0 1 0 1	value is incremented in multiples of 256 Kbps
0 0 0 0 0 1 1 0	value is incremented in multiples of 1 Mbps
0 0 0 0 0 1 1 1	value is incremented in multiples of 4 Mbps
0 0 0 0 1 0 0 0	value is incremented in multiples of 16 Mbps
0 0 0 0 1 0 0 1	value is incremented in multiples of 64 Mbps
0 0 0 0 1 0 1 0	value is incremented in multiples of 256 Mbps
0 0 0 0 1 0 1 1	value is incremented in multiples of 1 Gbps
0 0 0 0 1 1 0 0	value is incremented in multiples of 4 Gbps
0 0 0 0 1 1 0 1	value is incremented in multiples of 16 Gbps
0 0 0 0 1 1 1 0	value is incremented in multiples of 64 Gbps
0 0 0 0 1 1 1 1	value is incremented in multiples of 256 Gbps
0 0 0 1 0 0 0 0	value is incremented in multiples of 1 Tbps
0 0 0 1 0 0 0 1	value is incremented in multiples of 4 Tbps
0 0 0 1 0 0 1 0	value is incremented in multiples of 16 Tbps
0 0 0 1 0 0 1 1	value is incremented in multiples of 64 Tbps
0 0 0 1 0 1 0 0	value is incremented in multiples of 256 Tbps
0 0 0 1 0 1 0 1	value is incremented in multiples of 1 Pbps
0 0 0 1 0 1 1 0	value is incremented in multiples of 4 Pbps
0 0 0 1 0 1 1 1	value is incremented in multiples of 16 Pbps
0 0 0 1 1 0 0 0	value is incremented in multiples of 64 Pbps
0 0 0 1 1 0 0 1	value is incremented in multiples of 256 Pbps

Other values shall be interpreted as multiples of 256 Pbps in this version of the protocol.

Value of the guaranteed flow bit rate is binary coded value of the guaranteed flow bit rate in units defined by the unit of the guaranteed flow bit rate.

Maximum flow bit rate:
The maximum flow bit rate field indicates maximum flow bit rate for both sending and receiving and contains one octet indicating the unit of the maximum flow bit rate followed by two octets containing the value of the maximum flow bit rate.

Unit of the maximum flow bit rate:

Bits **8 7 6 5 4 3 2 1**	
0 0 0 0 0 0 0 0	value is not used
0 0 0 0 0 0 0 1	value is incremented in multiples of 1 Kbps
0 0 0 0 0 0 1 0	value is incremented in multiples of 4 Kbps
0 0 0 0 0 0 1 1	value is incremented in multiples of 16 Kbps
0 0 0 0 0 1 0 0	value is incremented in multiples of 64 Kbps
0 0 0 0 0 1 0 1	value is incremented in multiples of 256 Kbps
0 0 0 0 0 1 1 0	value is incremented in multiples of 1 Mbps
0 0 0 0 0 1 1 1	value is incremented in multiples of 4 Mbps
0 0 0 0 1 0 0 0	value is incremented in multiples of 16 Mbps
0 0 0 0 1 0 0 1	value is incremented in multiples of 64 Mbps
0 0 0 0 1 0 1 0	value is incremented in multiples of 256 Mbps
0 0 0 0 1 0 1 1	value is incremented in multiples of 1 Gbps
0 0 0 0 1 1 0 0	value is incremented in multiples of 4 Gbps
0 0 0 0 1 1 0 1	value is incremented in multiples of 16 Gbps
0 0 0 0 1 1 1 0	value is incremented in multiples of 64 Gbps
0 0 0 0 1 1 1 1	value is incremented in multiples of 256 Gbps
0 0 0 1 0 0 0 0	value is incremented in multiples of 1 Tbps
0 0 0 1 0 0 0 1	value is incremented in multiples of 4 Tbps
0 0 0 1 0 0 1 0	value is incremented in multiples of 16 Tbps
0 0 0 1 0 0 1 1	value is incremented in multiples of 64 Tbps
0 0 0 1 0 1 0 0	value is incremented in multiples of 256 Tbps
0 0 0 1 0 1 0 1	value is incremented in multiples of 1 Pbps
0 0 0 1 0 1 1 0	value is incremented in multiples of 4 Pbps
0 0 0 1 0 1 1 1	value is incremented in multiples of 16 Pbps
0 0 0 1 1 0 0 0	value is incremented in multiples of 64 Pbps
0 0 0 1 1 0 0 1	value is incremented in multiples of 256 Pbps

Other values shall be interpreted as multiples of 256 Pbps in this version of the protocol.

Value of the maximum flow bit rate is binary coded value of the maximum flow bit rate in units defined by the unit of the maximum flow bit rate.

Per-link aggregate maximum bit rate:
The per-link aggregate maximum bit rate field indicates per-link aggregate maximum bit rate for both sending and receiving and contains one octet indicating the unit of the per-link aggregate maximum bit rate followed by two octets containing the value of the per-link aggregate maximum bit rate.

Unit of the per-link aggregate maximum bit rate:
Bits
8 7 6 5 4 3 2 1
0 0 0 0 0 0 0 0 value is not used
0 0 0 0 0 0 0 1 value is incremented in multiples of 1 Kbps
0 0 0 0 0 0 1 0 value is incremented in multiples of 4 Kbps
0 0 0 0 0 0 1 1 value is incremented in multiples of 16 Kbps
0 0 0 0 0 1 0 0 value is incremented in multiples of 64 Kbps
0 0 0 0 0 1 0 1 value is incremented in multiples of 256 Kbps
0 0 0 0 0 1 1 0 value is incremented in multiples of 1 Mbps
0 0 0 0 0 1 1 1 value is incremented in multiples of 4 Mbps
0 0 0 0 1 0 0 0 value is incremented in multiples of 16 Mbps
0 0 0 0 1 0 0 1 value is incremented in multiples of 64 Mbps
0 0 0 0 1 0 1 0 value is incremented in multiples of 256 Mbps
0 0 0 0 1 0 1 1 value is incremented in multiples of 1 Gbps
0 0 0 0 1 1 0 0 value is incremented in multiples of 4 Gbps
0 0 0 0 1 1 0 1 value is incremented in multiples of 16 Gbps
0 0 0 0 1 1 1 0 value is incremented in multiples of 64 Gbps
0 0 0 0 1 1 1 1 value is incremented in multiples of 256 Gbps
0 0 0 1 0 0 0 0 value is incremented in multiples of 1 Tbps
0 0 0 1 0 0 0 1 value is incremented in multiples of 4 Tbps
0 0 0 1 0 0 1 0 value is incremented in multiples of 16 Tbps
0 0 0 1 0 0 1 1 value is incremented in multiples of 64 Tbps
0 0 0 1 0 1 0 0 value is incremented in multiples of 256 Tbps
0 0 0 1 0 1 0 1 value is incremented in multiples of 1 Pbps
0 0 0 1 0 1 1 0 value is incremented in multiples of 4 Pbps
0 0 0 1 0 1 1 1 value is incremented in multiples of 16 Pbps
0 0 0 1 1 0 0 0 value is incremented in multiples of 64 Pbps
0 0 0 1 1 0 0 1 value is incremented in multiples of 256 Pbps
Other values shall be interpreted as multiples of 256 Pbps in this version of the protocol.

Value of the per-link aggregate maximum bit rate is binary coded value of the per-link aggregate maximum bit rate in units defined by the unit of the per-link aggregate maximum bit rate.

Range:
The range field indicates a binary encoded value of the range in meters.

Priority level:
The Priority level field contains a ProSe per-packet priority value.
Bits
3 2 1
0 0 0 PPPP value 1
0 0 1 PPPP value 2
0 1 0 PPPP value 3
0 1 1 PPPP value 4
1 0 0 PPPP value 5
1 0 1 PPPP value 6
1 1 0 PPPP value 7
1 1 1 PPPP value 8

Averaging window:
The averaging window field indicates a binary representation of the averaging window for both sending and receiving in milliseconds.

Maximum data burst volume:
The maximum data burst volume field indicates a binary representation of the maximum data burst volume for both sending and receiving in octets.

If the length of PC5 QoS profile contents field indicates a length bigger than indicated in figure 5.3.1.49, receiving entity shall ignore any superfluous octets located at the end of the PC5 QoS profile contents.

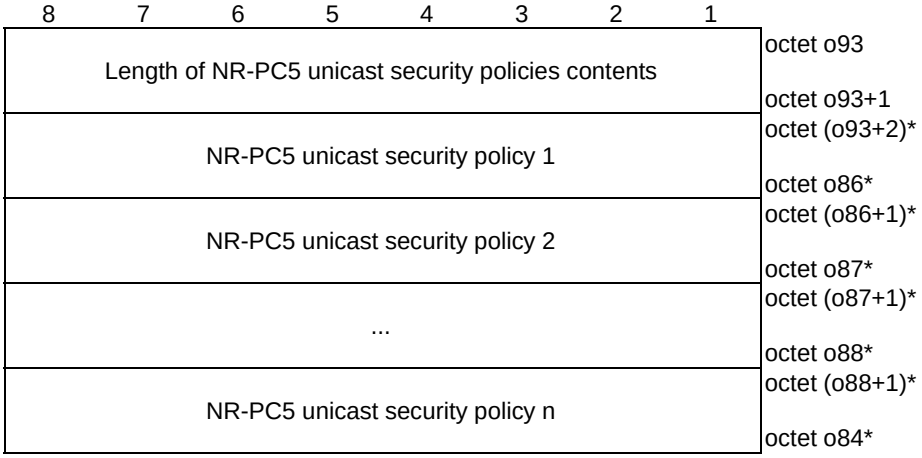


Figure 5.3.1.50: NR-PC5 unicast security policies

Table 5.3.1.50: NR-PC5 unicast security policies

NR-PC5 unicast security policy:
The NR-PC5 unicast security policy field is coded according to figure 5.3.1.51 and table 5.3.1.51.

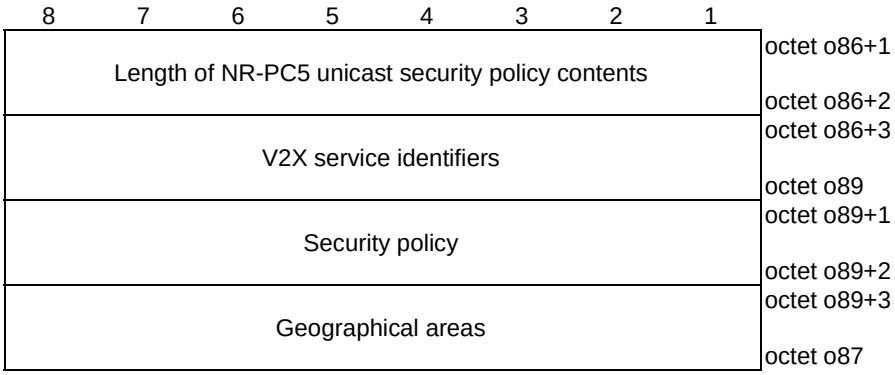


Figure 5.3.1.51: NR-PC5 unicast security policy

Table 5.3.1.51: NR-PC5 unicast security policy

V2X service identifiers:
The V2X service identifiers field is coded according to figure 5.3.1.14 and table 5.3.1.14.

Security policy:
The security policy field is coded according to figure 5.3.1.52 and table 5.3.1.52

Geographical areas:
The geographical areas field is coded according to figure 5.3.1.18 and table 5.3.1.18.

If the length of NR-PC5 unicast security policy contents field indicates a length bigger than indicated in figure 5.3.1.51, the receiving entity shall ignore any superfluous octets located at the end of the NR-PC5 unicast security policy contents.

8	7	6	5	4	3	2	1	
0 spare	Signalling ciphering policy			0 spare	Signalling integrity protection policy			octet o89+1
0 spare	User plane ciphering policy			0 spare	User plane integrity protection policy			octet o89+2

Figure 5.3.1.52: Security policy

Table 5.3.1.52: Security policy

Signalling integrity protection policy (octet o89+1, bit 1 to 3):

Bits 3	2	1	
0	0	0	Signalling integrity protection not needed
0	0	1	Signalling integrity protection preferred
0	1	0	Signalling integrity protection required
0	1	1	
	to		Spare
1	1	0	
1	1	1	Reserved

If the UE receives a signalling integrity protection policy value that the UE does not understand, the UE shall interpret the value as 010 "Signalling integrity protection required".

Signaling ciphering policy (octet o89+1, bit 5 to 7):

Bits 7	6	5	
0	0	0	Signalling ciphering not needed
0	0	1	Signalling ciphering preferred
0	1	0	Signalling ciphering required
0	1	1	
	to		Spare
1	1	0	
1	1	1	Reserved

If the UE receives a signalling ciphering policy value that the UE does not understand, the UE shall interpret the value as 010 "Signalling ciphering required".

Bit 4 and 8 of octet o89+1 are spare and shall be coded as zero.

User plane integrity protection policy (octet o89+2, bit 1 to 3):

Bits 3	2	1	
0	0	0	User plane integrity protection not needed
0	0	1	User plane integrity protection preferred
0	1	0	User plane integrity protection required
0	1	1	
	to		Spare
1	1	0	
1	1	1	Reserved

If the UE receives a user plane integrity protection policy value that the UE does not understand, the UE shall interpret the value as 010 "User plane integrity protection required".

User plane ciphering policy (octet o89+2, bit 5 to 7):

Bits 7	6	5	
0	0	0	User plane ciphering not needed
0	0	1	User plane ciphering preferred
0	1	0	User plane ciphering required
0	1	1	
	to		Spare
1	1	0	
1	1	1	Reserved

If the UE receives a user plane ciphering policy value that the UE does not understand, the UE shall interpret the value as 010 "User plane ciphering required".

Bit 4 and 8 of octet o89+2 are spare and shall be coded as zero.

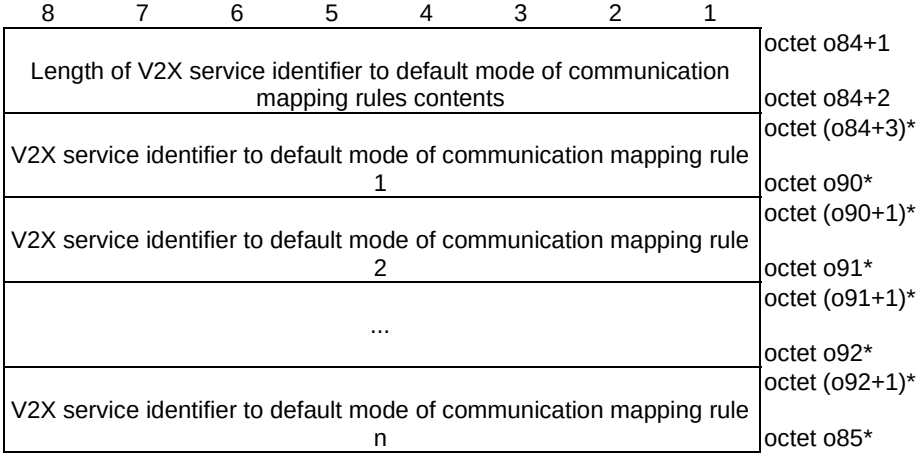


Figure 5.3.1.53: V2X service identifier to default mode of communication mapping rules

Table 5.3.1.53: V2X service identifier to default mode of communication mapping rules

V2X service identifier to default mode of communication mapping rule: The V2X service identifier to default mode of communication mapping rule field is coded according to figure 5.3.1.54 and table 5.3.1.54.

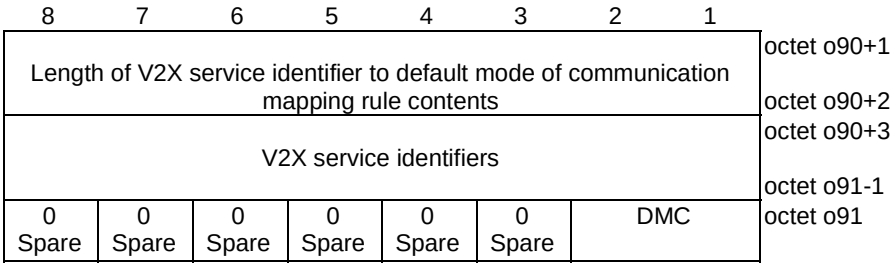


Figure 5.3.1.54: V2X service identifier to default mode of communication mapping rule

Table 5.3.1.54: V2X service identifier to default mode of communication mapping rule

V2X service identifiers: The V2X service identifiers field is coded according to figure 5.3.1.14 and table 5.3.1.14. Default mode of communication (DMC): The DMC field indicates the default mode of communication. Bits **2 1** 0 0 unicast 0 1 groupcast 1 0 broadcast 1 1 spare If the DMC field is set to a spare value, the receiving entity shall ignore the V2X service identifier to default mode of communication mapping rule. If the length of V2X service identifier to default mode of communication mapping rule contents field indicates a length bigger than indicated in figure 5.3.1.54, receiving entity shall ignore any superfluous octets located at the end of the V2X service identifier to default mode of communication mapping rule contents.

Table 5.3.1.54: V2X service identifier to default mode of communication mapping rule

V2X service identifiers: The V2X service identifiers field is coded according to figure 5.3.1.14 and table 5.3.1.14. Default mode of communication (DMC): The DMC field indicates the default mode of communication. Bits **2 1** 0 0 unicast 0 1 groupcast 1 0 broadcast 1 1 spare If the DMC field is set to a spare value, the receiving entity shall ignore the V2X service identifier to default mode of communication mapping rule. If the length of V2X service identifier to default mode of communication mapping rule contents field indicates a length bigger than indicated in figure 5.3.1.54, receiving entity shall ignore any superfluous octets located at the end of the V2X service identifier to default mode of communication mapping rule contents.

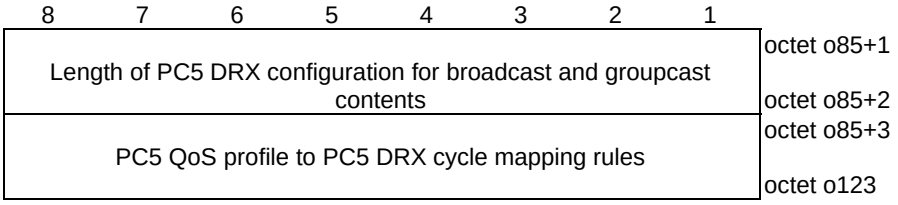


Figure 5.3.1.55: PC5 DRX configuration for broadcast and groupcast

Table 5.3.1.55: PC5 DRX configuration for broadcast and groupcast

PC5 QoS profile to PC5 DRX cycle mapping rules: The PC5 QoS profile to PC5 DRX cycle mapping rules field is coded according to figure 5.3.1.56 and table 5.3.1.56. If the length of PC5 DRX configuration for broadcast and groupcast contents field indicates a length bigger than indicated in figure 5.3.1.55, receiving entity shall ignore any superfluous octets located at the end of the PC5 DRX configuration for broadcast and groupcast contents.

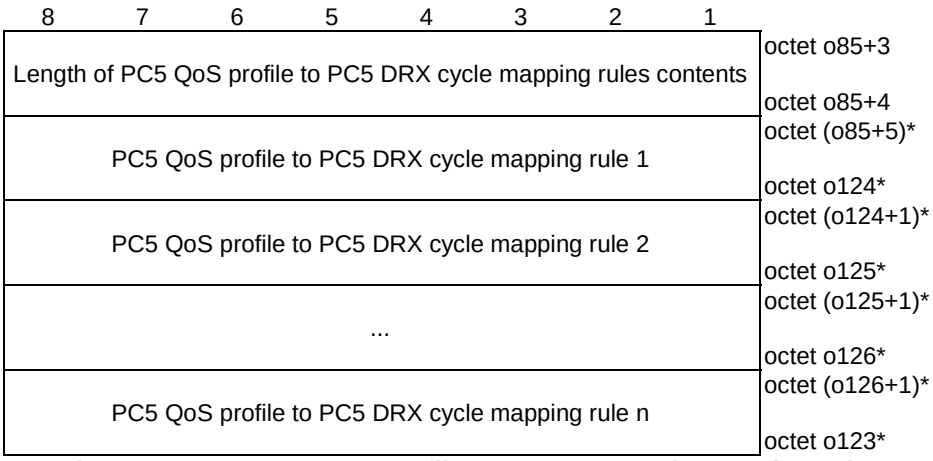


Figure 5.3.1.56: PC5 QoS profile to PC5 DRX cycle mapping rules

Table 5.3.1.56: PC5 QoS profile to PC5 DRX cycle mapping rules

PC5 QoS profile to PC5 DRX cycle mapping rule: The PC5 QoS profile to PC5 DRX cycle mapping rule field is coded according to figure 5.3.1.57 and table 5.3.1.57.

8	7	6	5	4	3	2	1	
Length of PC5 QoS profile to PC5 DRX cycle mapping rule contents								octet o124+1 octet o124+2
PC5 QoS profile								octet o124+3 octet o127
PC5 DRX cycle								octet oo127+1 octet o125

Figure 5.3.1.57: PC5 QoS profile to PC5 DRX cycle mapping rule

Table 5.3.1.57: PC5 QoS profile to PC5 DRX cycle mapping rule

PC5 QoS profile: The PC5 QoS profile field is coded according to figure 5.3.1.49 and table 5.3.1.49. PC5 DRX cycle If the length of PC5 QoS profile to PC5 DRX cycle mapping rule contents field indicates a length bigger than indicated in figure 5.3.1.z, receiving entity shall ignore any superfluous octets located at the end of the PC5 QoS profile to PC5 DRX cycle mapping rule contents.

Editor's note: Size and format of the PC5 DRX cycle is FFS.

5.4 Encoding of UE policies for V2X communication over Uu

5.4.1 General

The UE policies for V2X communication over Uu are coded as shown in figures 5.4.1.1 and table 5.4.1.1.

8	7	6	5	4	3	2	1	
0	0	0	0	V2XP info type = {UE policies for V2X communication over Uu}				octet k
Spare								
Length of V2XP info contents								octet k+1 octet k+2
Validity timer								octet k+3 octet k+7
VPSPI	PII	0 Spare	0 Spare	0 Spare	0 Spare	0 Spare	0 Spare	octet (k+8)*
V2X service identifier to PDU session parameters mapping rules								octet (k+9)* octet o1*
PLMN infos								octet o29* (see NOTE) octet l*

NOTE: The field is placed immediately after the last present preceding field.

Figure 5.4.1.1: V2XP Info = {UE policies for V2X communication over Uu}

Table 5.4.1.1: V2XP Info = {UE policies for V2X communication over Uu}

V2XP info type (bit 1 to 4 of octet k) shall be set to "0010" (UE policies for V2X communication over Uu) Length of V2XP info contents (octets k+1 to k+2) indicates the length of V2XP info contents. Validity timer The validity timer field provides the expiration time of validity of the UE policies for V2X communication over Uu. The validity timer field is a binary coded representation of a UTC time, in seconds since midnight UTC of January 1, 1970 (not counting leap seconds). V2X service identifier to PDU session parameters mapping rules indicator (VPSPI) The VPSPI bit indicates presence of the V2X service identifier to PDU session parameters mapping rules field. Bit 8 0 V2X service identifier to PDU session parameters mapping rules field is absent 1 V2X service identifier to PDU session parameters mapping rules field is present PLMN infos indicator (APII) The PII bit indicates presence of the PLMN infos field. Bit 7 0 PLMN infos field is absent 1 PLMN infos field is present V2X service identifier to PDU session parameters mapping rules The V2X service identifier to PDU session parameters mapping rules field is coded according to figure 5.4.1.17 and table 5.4.1.17. PLMN infos The PLMN infos field is coded according to the figure 5.4.1.2 and table 5.4.1.2 and contains a list of PLMNs in which the UE is configured to use V2X communication over Uu. If the length of V2XP info contents field indicates a length bigger than indicated in figure 5.4.1.1, receiving entity shall ignore any superfluous octets located at the end of the V2XP info contents.

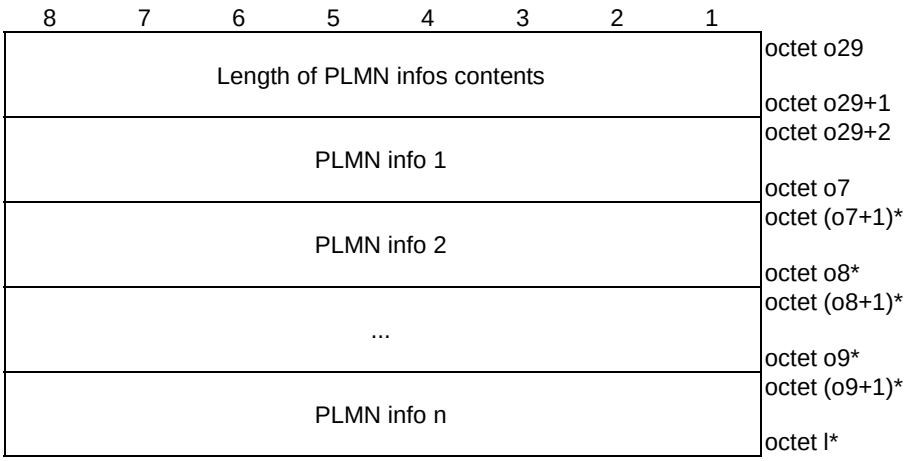
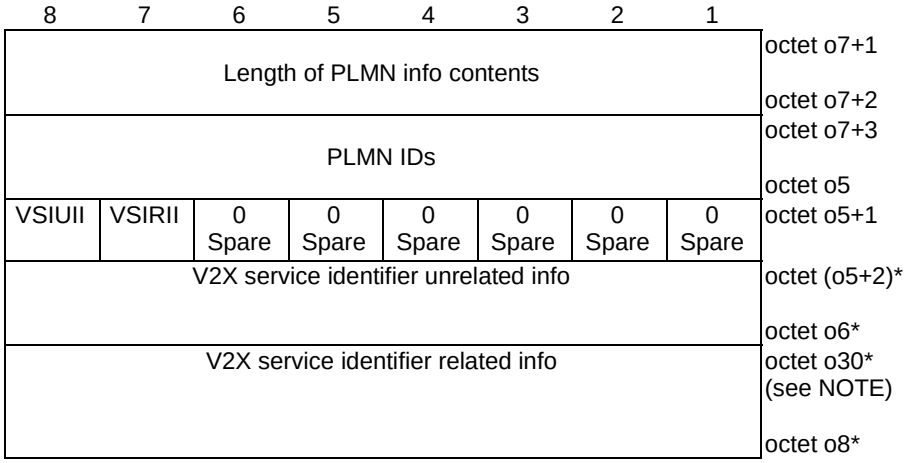


Figure 5.4.1.2: PLMN infos

Table 5.4.1.2: PLMN infos

PLMN info The PLMN info field is coded according to figure 5.4.1.3 and table 5.4.1.3.



NOTE: The field is placed immediately after the last present preceding field.

Figure 5.4.1.3: PLMN info

Table 5.4.1.3: PLMN info

PLMN IDs The PLMN IDs field is coded according to figure 5.4.1.4 and table 5.4.1.4. V2X service identifier unrelated info indicator (VSIUII) The VSIUII bit indicates presence of the V2X service identifier unrelated info field. Bit **8** 0 V2X service identifier unrelated info field is absent 1 V2X service identifier unrelated info field is present V2X service identifier related info indicator (VSIRII) The VSIRII bit indicates presence of the V2X service identifier related info field. Bit **7** 0 V2X service identifier related info field is absent 1 V2X service identifier related info field is present V2X service identifier unrelated info The V2X service identifier unrelated info field is coded according to figure 5.4.1.6 and table 5.4.1.6, and contains information for V2X services not identified by V2X service identifiers, applicable in a PLMN indicated in the PLMN IDs field. V2X service identifier related info The V2X service identifier related info field is coded according to figure 5.4.1.9 and table 5.4.1.9, and contains information for V2X services identified by V2X service identifiers, applicable in a PLMN indicated in the PLMN IDs field. If the length of PLMN info contents field indicates a length bigger than indicated in figure 5.4.1.3, receiving entity shall ignore any superfluous octets located at the end of the PLMN info contents.

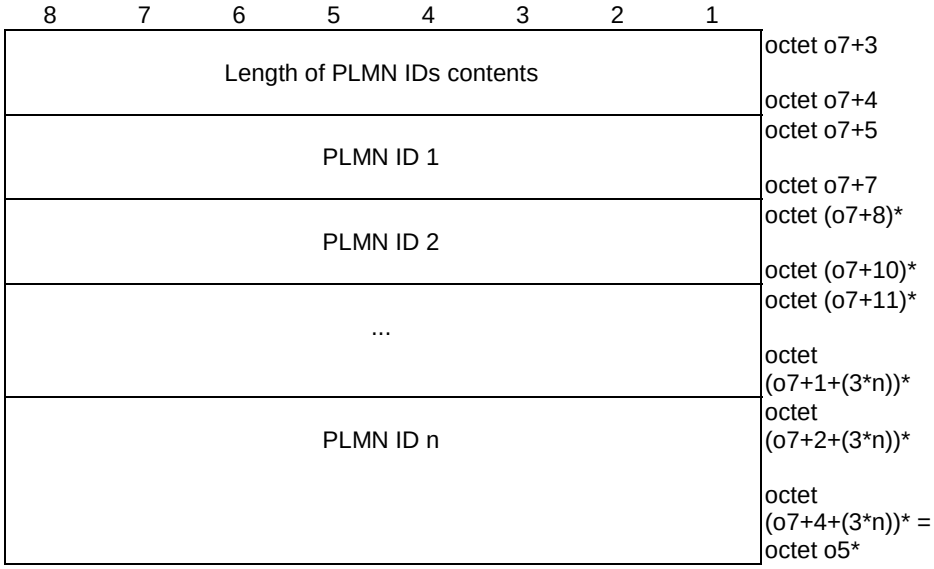


Figure 5.4.1.4: PLMN IDs

Table 5.4.1.4: PLMN IDs

PLMN ID The PLMN ID field is coded according to figure 5.4.1.5 and table 5.4.1.5.

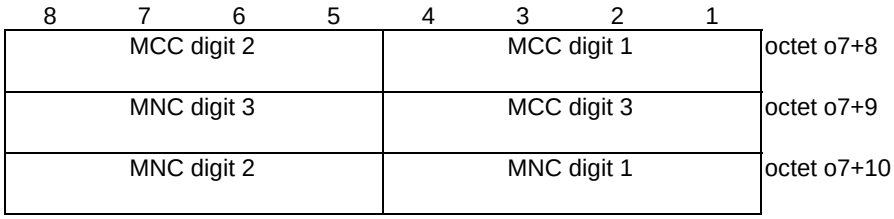


Figure 5.4.1.5: PLMN ID

Table 5.4.1.5: PLMN ID

Mobile country code (MCC) The MCC field is coded as in ITU-T Recommendation E.212 [6], annex A. Mobile network code (MNC) The coding of MNC 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".

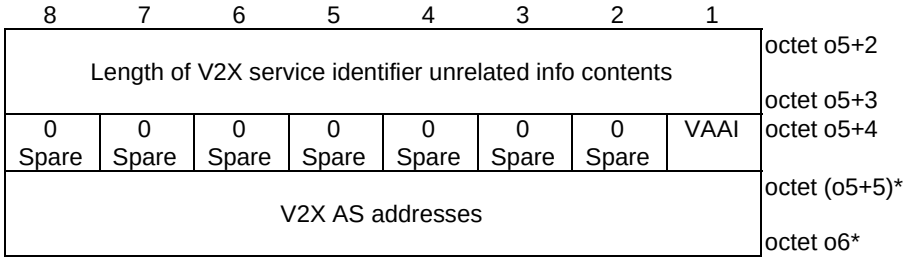


Figure 5.4.1.6: V2X service identifier unrelated info

Table 5.4.1.6: V2X service identifier unrelated info

V2X AS address indicator (VAAI) The VAAI bit indicates presence of the V2X AS address field. Bit **1** 0 V2X AS address field is absent 1 V2X AS address field is present V2X AS addresses The V2X AS addresses field is coded according to figure 5.4.1.7 and table 5.4.1.7. If the length of V2X service identifier unrelated info contents field indicates a length bigger than indicated in figure 5.4.1.6, receiving entity shall ignore any superfluous octets located at the end of the V2X service identifier unrelated info contents.

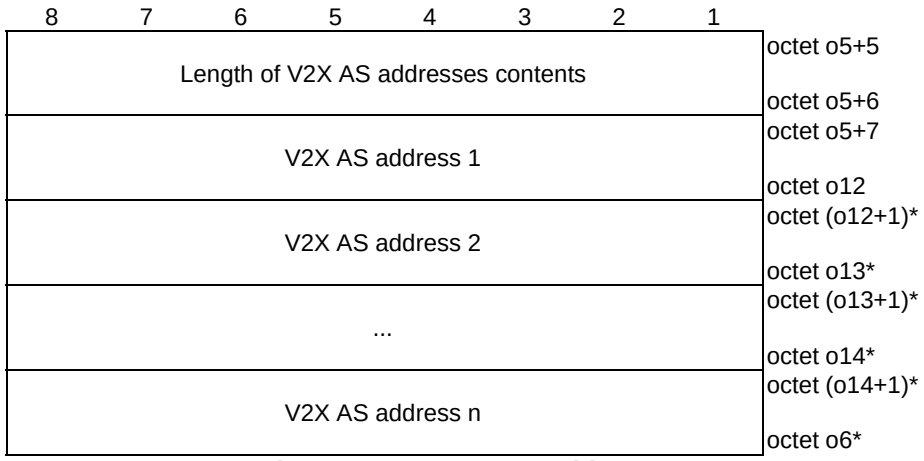
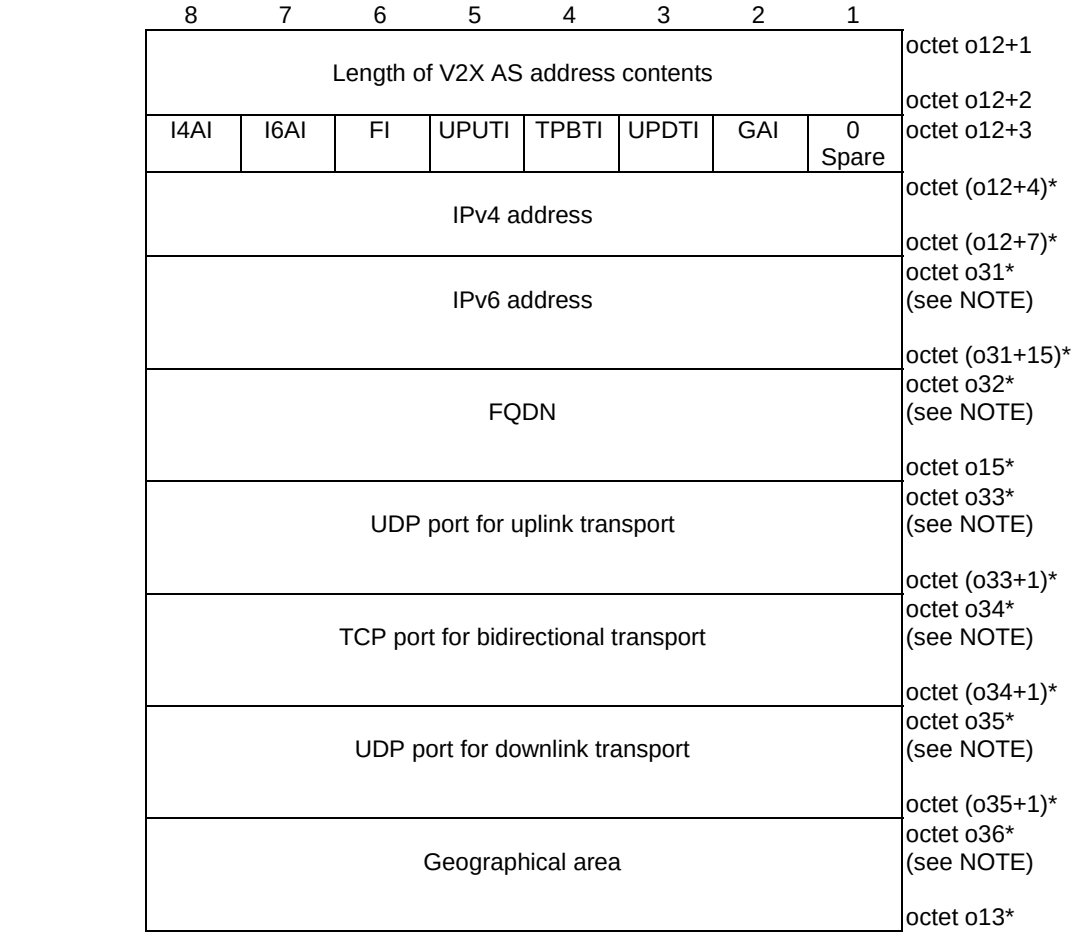


Figure 5.4.1.7: V2X AS addresses

Table 5.4.1.7: V2X AS addresses

V2X AS address The V2X AS address field is coded according to figure 5.4.1.8 and table 5.4.1.8.



NOTE: The field is placed immediately after the last present preceding field.

Figure 5.4.1.8: V2X AS address

Table 5.4.1.8: V2X AS address

IPv4 Address Indicator (I4AI)
The I4AI bit indicates presence of the IPv4 address field.
Bit
8
0 IPv4 address field is absent
1 IPv4 address field is present

IPv6 Address Indicator (I6AI)
The I6AI bit indicates presence of the IPv6 address field.
Bit
7
0 IPv6 address field is absent
1 IPv6 address field is present

FQDN Indicator (FI)
The FI bit indicates presence of the FQDN field.
Bit
6
0 FQDN field is absent
1 FQDN field is present

UDP Port for Uplink Transport Indicator (UPUTI)
The UPUI bit indicates presence of the UDP port for uplink transport field.
Bit
5
0 UDP port for uplink transport field is absent
1 UDP port for uplink transport field is present

TCP Port for Bidirectional Transport Indicator (TPBTI)
The TPBTI bit indicates presence of the TCP port for bidirectional transport field.
Bit
4
0 TCP port for bidirectional transport field is absent
1 TCP port for bidirectional transport field is present

UDP Port for Downlink Transport Indicator (UPUTI)
The UPUTI bit indicates presence of the UDP port for downlink transport field.
Bit
3
0 UDP port for downlink transport field is absent
1 UDP port for downlink transport field is present

Geographical Area Indicator (GAI)
The GAI bit indicates presence of the geographical area field.
Bit
2
0 geographical area field is absent
1 geographical area field is present

IPv4 address (NOTE 2)
The IPv4 address field contains an IPv4 address of a V2X application server.

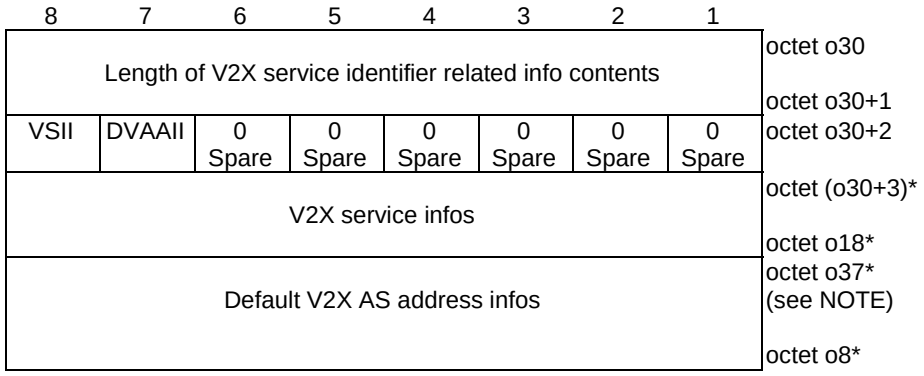
IPv6 address (NOTE 2)
The IPv6 address field contains an IPv6 address of a V2X application server.

FQDN (NOTE 2)
The FQDN field contains an FQDN of a V2X application server. The first octet of the FQDN field indicates length of the FQDN and the remaining octets of the FQDN field contain the FQDN.

UDP port for uplink transport (NOTE 1)
The UDP port for uplink transport field indicates binary coded UDP port to be used for uplink transport.

TCP port for bidirectional transport (NOTE 1)
The TCP port for bidirectional transport field indicates binary coded TCP port to be used for bidirectional transport.

UDP port for downlink transport (NOTE 1) The UDP port for downlink transport field indicates binary coded UDP port to be used for downlink transport. Geographical area The Geographical area field is coded according to figure 5.4.1.15 and table 5.4.1.15, and contains a list of points of a polygon. If the length of V2X AS address contents field indicates a length bigger than indicated in figure 5.4.1.8, receiving entity shall ignore any superfluous octets located at the end of the V2X AS address contents.
NOTE 1: The UDP port for uplink transport field, the TCP port for bidirectional transport field, and the UDP port for downlink transport field are absent when the V2X AS address is present in the V2X service identifier unrelated info. NOTE 2: One of the IPv4 address field, the IPv6 address field or the FQDN field is present.



NOTE: The field is placed immediately after the last present preceding field.

Figure 5.4.1.9: V2X service identifier related info

Table 5.4.1.9: V2X service identifier related info

V2X service infos indicator (VSII) The VSII bit indicates presence of the V2X service infos field. Bit **8** 0 V2X service infos field is absent 1 V2X service infos field is present Default V2X AS address infos indicator (DVAAII) The AVSII bit indicates presence of the default V2X AS address infos field. Bit **7** 0 Default V2X AS address infos field is absent 1 Default V2X AS address infos field is present V2X service infos The V2X service infos field is coded according to figure 5.4.1.10 and table 5.4.1.10 and indicates a list of V2X service identifier to V2X application server address mapping rules. Default V2X AS address infos The default V2X AS address infos field is coded according to figure 5.4.1.13 and table 5.4.1.13 and indicates default V2X application server addresses for the unicast V2X communication over Uu. If the length of V2X service identifier related info contents field indicates a length bigger than indicated in figure 5.4.1.9, receiving entity shall ignore any superfluous octets located at the end of the V2X service identifier related info contents.

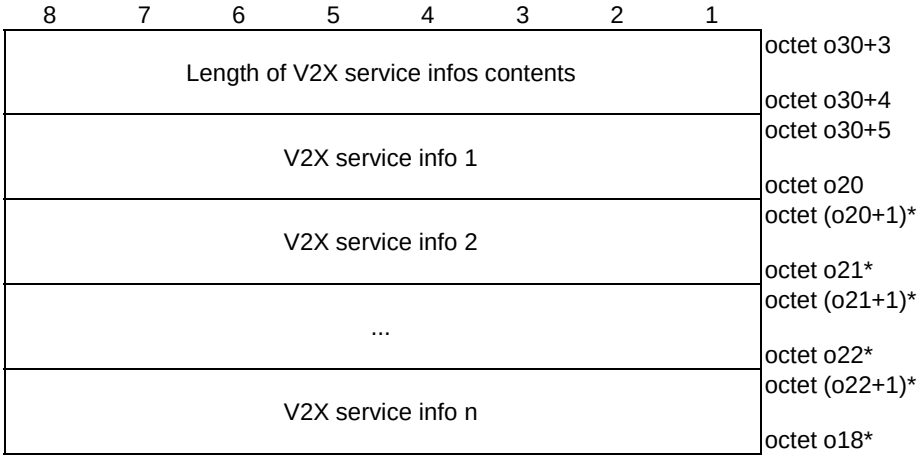


Figure 5.4.1.10: V2X service infos

Table 5.4.1.10: V2X service infos

V2X service info The V2X service info field is coded according to figure 5.4.1.11 and table 5.4.1.11.

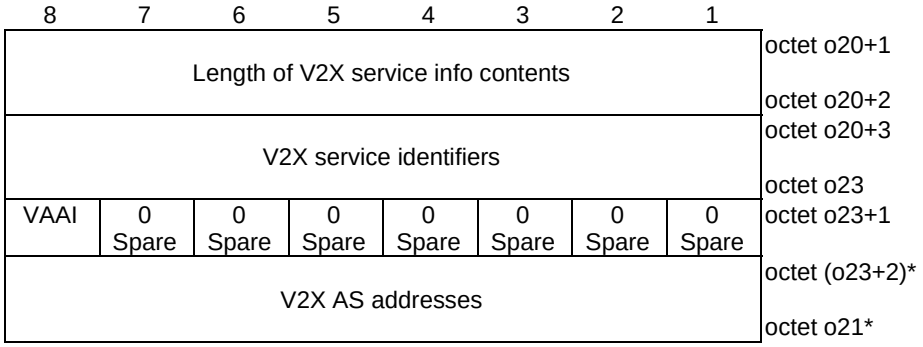


Figure 5.4.1.11: V2X service info

Table 5.4.1.11: V2X service info

V2X service identifiers The V2X service identifiers field is coded according to figure 5.4.1.12 and table 5.4.1.12 and indicates a list of V2X service identifier. V2X AS addresses indicator (VAAI) The AVSII bit indicates presence of the V2X AS addresses field. Bit **8** 0 V2X AS addresses field is absent 1 V2X AS addresses field is present V2X AS addresses The V2X AS addresses field is coded according to figure 5.4.1.7 and table 5.4.1.7 and indicates V2X application server addresses for V2X services identified by the V2X service identifiers indicated in the V2X service identifiers field. If the length of V2X service info contents field indicates a length bigger than indicated in figure 5.4.1.11, receiving entity shall ignore any superfluous octets located at the end of the V2X service info contents.

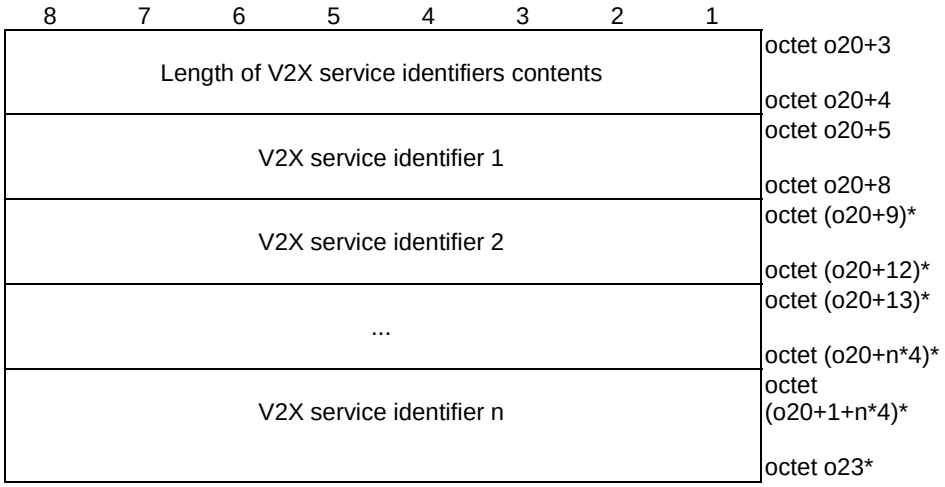


Figure 5.4.1.12: V2X service identifiers

Table 5.4.1.12: V2X service identifiers

V2X service identifier The V2X service identifier field contains a binary coded V2X service identifier as specified in ISO TS 17419 ITS-AID AssignedNumbers [5].

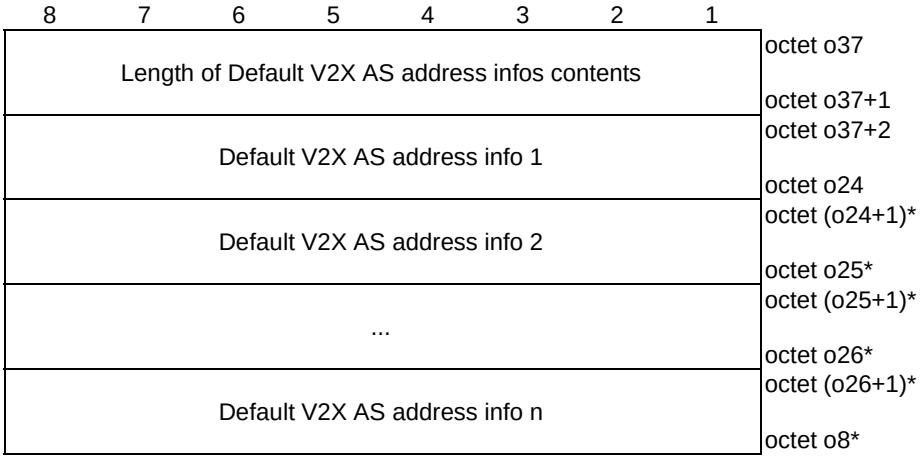
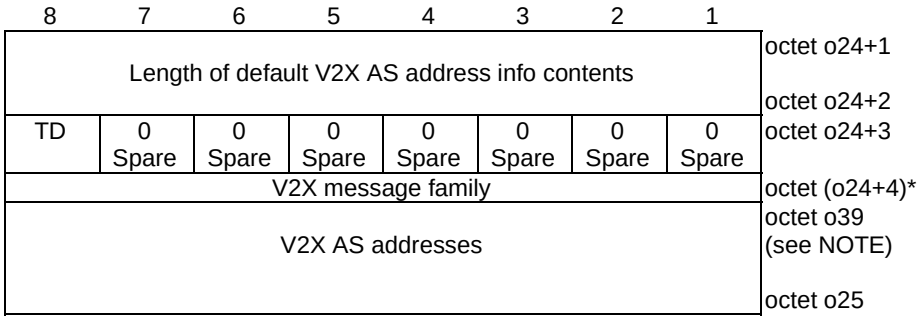


Figure 5.4.1.13: Default V2X AS address infos

Table 5.4.1.13: Default V2X AS address infos

Default V2X AS address info The default V2X AS address info field is coded according to figure 5.4.1.14 and table 5.4.1.14.



NOTE: The field is placed immediately after the last present preceding field.

Figure 5.4.1.14: Default V2X AS address info

Table 5.4.1.14: Default V2X AS address info

Type of Data (TD) The type of data bit indicates type of data. Bit **8** 0 non-IP 1 IP If the type of data bit is set to "non-IP", then the V2X message family field is present otherwise the V2X message family field is absent. V2X message family Bits 8 7 6 5 4 3 2 1 0 0 0 0 0 0 0 1 IEEE 1609, see IEEE 1609.3 [8] 0 0 0 0 0 0 1 0 ISO, see ISO 29281-1 [9] 0 0 0 0 0 0 1 1 ETSI-ITS, see ETSI EN 302 636-3 [10] All other values are spare. V2X AS addresses The V2X AS addresses field is coded according to figure 5.4.1.7 and table 5.4.1.7 and indicates V2X application server addresses for type of data identified by the TD bit and the V2X message family (if the type of data is non-IP). If the length of default V2X AS address info contents field indicates a length bigger than indicated in figure 5.4.1.14, receiving entity shall ignore any superfluous octets located at the end of the default V2X AS address info contents.

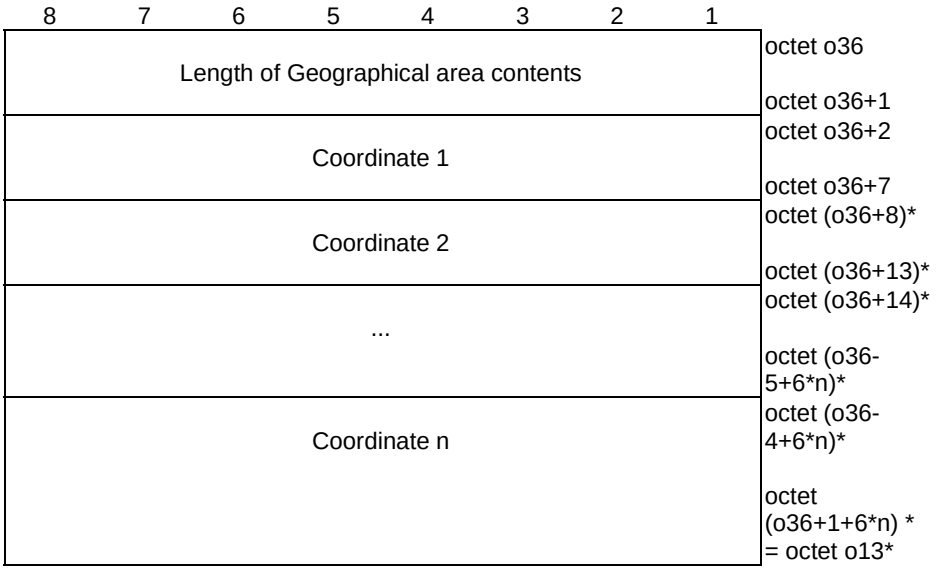


Figure 5.4.1.15: Geographical area

Table 5.4.1.15: Geographical area

Coordinate The coordinate field is coded according to figure 5.4.1.16 and table 5.4.1.16.

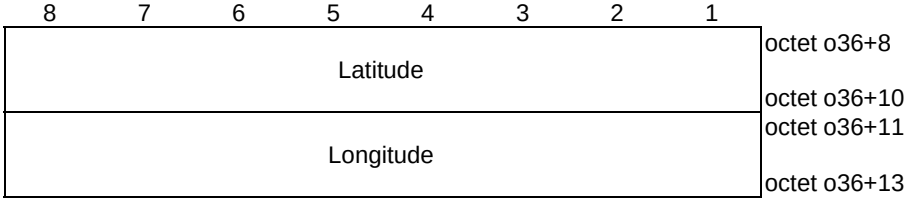


Figure 5.4.1.16: Coordinate area

Table 5.4.1.16: Coordinate area

Latitude The latitude field is coded according to clause 6.1 of 3GPP TS 23.032 [7]. Longitude The longitude field is coded according to clause 6.1 of 3GPP TS 23.032 [7].

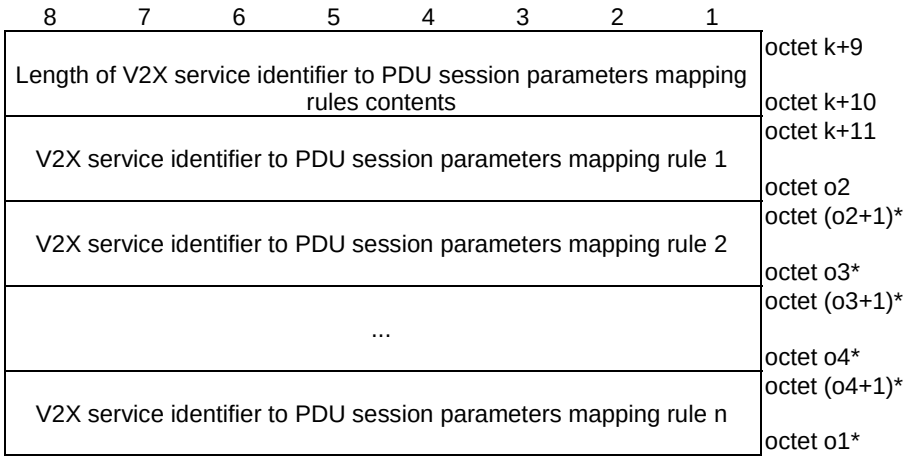


Figure 5.4.1.17: V2X service identifier to PDU session parameters mapping rules

Table 5.4.1.17: V2X service identifier to PDU session parameters mapping rules

V2X service identifier to PDU session parameters mapping rule The V2X service identifier to PDU session parameters mapping rule field is coded according to figure 5.4.1.18 and table 5.4.1.18.

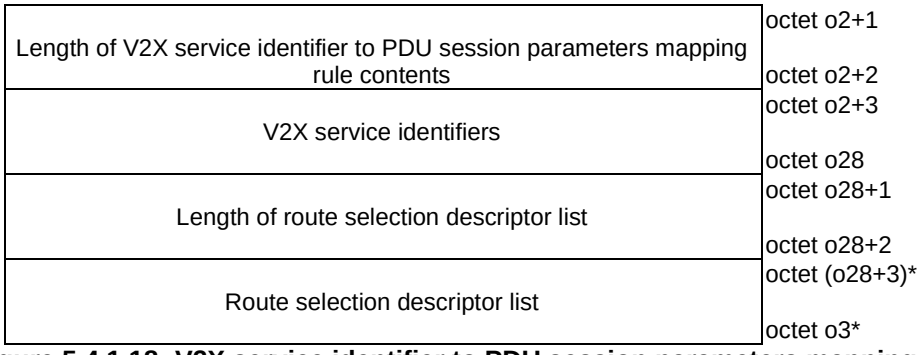


Figure 5.4.1.18: V2X service identifier to PDU session parameters mapping rule

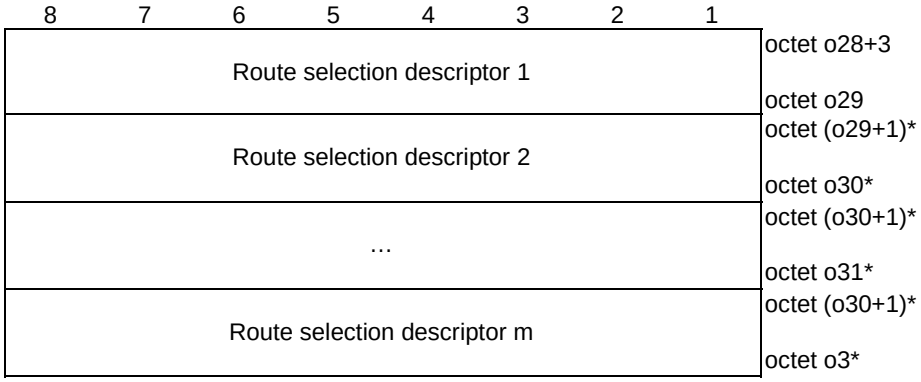


Figure 5.4.1.19: Route selection descriptor list

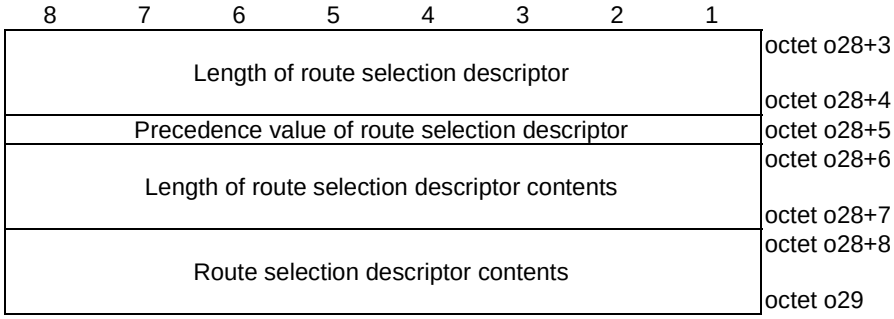


Figure 5.4.1.20: Route selection descriptor

Table 5.4.1.18: V2X service identifier to PDU session parameters mapping rule

V2X service identifiers
The V2X service identifiers field is coded according to figure 5.4.1.12 and table 5.4.1.12 and indicates a list of V2X service identifier.

Route selection descriptor contents (octets o28+8 to o29)
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 Transport layer protocol type
All other values are spare. If received, they shall be ignored.

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 [4]. 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 [4].

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 [17].

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 [4]. The "PDU session type type" route selection descriptor component shall not appear more than once in the route selection descriptor.

For "Transport layer protocol type", the route selection descriptor component value field shall be encoded as:
Bits
8 7 6 5 4 3 2 1
0 0 0 0 0 0 0 1 UDP
0 0 0 0 0 0 1 0 TCP
All other values are spared.

The "Transport layer protocol type" route selection descriptor component appears only when the "PDU session type type" appears and the PDU session type value is set to "IPv4", "IPv6" or "IPv4v6". It shall not appear more than once in the route selection descriptor.

If the length of V2X service identifier to PDU session parameters mapping rule contents field indicates a length bigger than indicated in figure 5.4.1.18, receiving entity shall ignore any superfluous octets located at the end of the V2X service identifier to PDU session parameters mapping rule contents.

Annex A (informative): Change history

Change history							
Date	**Meeting**	**TDoc**	**CR**	**Rev**	**Cat**	**Subject/Comment**	**New version**
2019-05	CT1#117	C1-193478				Draft skeleton provided in C1-193478 by the rapporteur.	0.0.0
2019-05	CT1#117					Implementing the following p-CR agreed by CT1: C1-193479	0.1.0
2019-09	CT1#119					Implementing the following p-CRs agreed by CT1: C1-194553, C1-194847, C1-194849 and C1-194850	0.2.0
2019-10	CT1#120					Implementing the following p-CRs agreed by CT1: C1-196493	0.3.0
2019-12	CT#86	CP-193157				Presentation for information at TSG CT	1.0.0
2019-12	CT#86	CP-193290				A title corrected	1.0.1
2020-03	CT1#122-e					Implementing the following p-CR agreed by CT1: C1-200652, C1-200933 and C1-200936	1.1.0
2020-03	CT-87e	CP-200174				Presentation for approval at TSG CT	2.0.0
2020-03	CT-87e					Version 16.0.0 created after approval	16.0.0
2020-06	CT-88e	CP-201116	0001	2	B	NR PC5 unicast security policy provisioning	16.1.0
2020-06	CT-88e	CP-201116	0002	1	F	Clarifications on the V2X policies regarding QoS	16.1.0
2020-06	CT-88e	CP-201116	0003	1	B	Update to the V2X policies regarding RAN parameters	16.1.0
2020-06	CT-88e	CP-201116	0004	1	C	Correction of coding of configuration of PC5 RAT selection and Tx profiles	16.1.0
2020-06	CT-88e	CP-201116	0005	1	F	Correction of coding of configuration of default mode of communication	16.1.0
2020-06	CT-88e	CP-201116	0006	1	F	Correction of PC5 RAT names	16.1.0
2020-06	CT-88e	CP-201116	0007	1	F	Correction of coding of PC5 QoS mapping configuration	16.1.0
2020-06	CT-88e	CP-201116	0008	1	F	Correction in coding of PC5 QoS profile	16.1.0
2020-06	CT-88e	CP-201116	0009	1	F	Correction of coding of validity timers	16.1.0
2020-06	CT-88e	CP-201116	0010	1	F	Remove IP address from privacy timer	16.1.0
2020-09	CT-89e	CP-202248	0013	3	F	Update configuration parameters over Uu to meet stage2 requirements	16.2.0
2020-09	CT-89e	CP-202158	0014		F	Corrections in V2XP UE policy part	16.2.0
2020-09	CT-89e	CP-202158	0017		F	Correction of V2XP statement	16.2.0
2020-09	CT-89e	CP-202158	0018		F	Removal of V2X policy for EPC interworking	16.2.0
2020-09	CT-89e	CP-202041	0019	2	F	Adding the flag indicating the optional PPPP to PDB mapping rules	16.2.0
2020-09	CT-89e	CP-202039	0020	3	F	Radio parameters for UE neither served by E-UTRA nor served by NR	16.2.0
2020-12	CT-90e	CP-203189	0015	1	F	Corrections in UE policies for V2X communication over PC5	16.3.0
2020-12	CT-90e	CP-203189	0016	1	F	Corrections in UE policies for V2X communication over Uu	16.3.0
2020-12	CT-90e	CP-203189	0021	1	F	Update RAT selection rule	16.3.0
2020-12	CT-90e	CP-203189	0022	1	F	V2X service identifier	16.3.0
2020-12	CT-90e	CP-203189	0023	1	F	Some corrections on UE policies for V2X communication over PC5	16.3.0
2021-03	CT#91e	CP-210108	0024		F	Removal of Tx Profile for NR PC5	16.4.0
2022-03	CT#95e	CP-220254	0025	1	B	NR-PC5 Tx profiles	17.0.0
2022-03	CT#95e	CP-220254	0026	-	B	Adding the PC5 DRX configuration for broadcast and groupcast to the UE policies for V2X communication over PC5	17.0.0

History

Document history		
V17.0.0	May 2022	Publication