**3GPP TSG-CT WG1 Meeting #137-eC1-22xxxx**

**E-Meeting, 18th – 26th August 2022**

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| --- |
| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **24.555** | **CR** | **0014** | **rev** | **1** | **Current version:** | **17.1.0** |  |
|  |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* |
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| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network |  | Core Network | **X** |

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|  |
| ***Title:***  | Introducing the configuration parameter for 5G ProSe UE-to-network relay control plane security solution |
|  |  |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell, OPPO, CATT, InterDigital |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5G\_ProSe |  | ***Date:*** | 2022-06-28 |
|  |  |  |  |  |
| ***Category:*** | **B** |  | ***Release:*** | Rel-17 |
|  | *Use one of the following categories:****F*** *(correction)****A*** *(mirror corresponding to a change in an earlier release)****B*** *(addition of feature),* ***C*** *(functional modification of feature)****D*** *(editorial modification)*Detailed explanations of the above categories canbe found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | *Use one of the following releases:Rel-8 (Release 8)Rel-9 (Release 9)Rel-10 (Release 10)Rel-11 (Release 11)...Rel-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
|  |  |
| ***Reason for change:*** | SA plenary meeting # 96 has agreed stage-2 CR **SP-220713** (and already reflected in stage-2 spec TS 23.304 V17.3.0) which clarifies how the UE determines whether to use the control plane solution (or the user plane solution) for the security of the 5G ProSe UE-to-network relay. The following is now indicated in TS 23.304 clause 5.1.4.1:*5.1.4.1 Policy/Parameter provisioning for 5G ProSe UE-to-Network Relay**(…)**2) ProSe Relay Discovery policy/parameters for 5G ProSe UE-to-Network Relay:**(…)**- 5G ProSe UE-to-Network Relay Discovery parameters (User Info ID, Relay Service Code(s), UE-to-Network Relay Layer Indicator(s), Control Plane Security Indicator); the UE-to-Network Relay Layer Indicator indicates whether a particular RSC is offering 5G ProSe Layer-2 or Layer-3 UE-to-Network Relay service. If the Control Plane Security Indicator is provided for a particular RSC, it indicates that security procedure is performed over control plane as described in clause 5.1.4.3.2. If the Control Plane Security Indicator is not provided, security procedure is performed over user plane as described in clause 5.1.4.3.3.*And similar requirement exists for the 5G ProSe remote UE in the same clause.Hence, the encoding of the corresponding configuration for the "Control Plane Security Indicator" needs to be introduced in the ProSe configuration parameters in stage-3 spec for both relay UE and remote UE. |
|  |  |
| ***Summary of change:*** | Introducing the encoding of a new policy configuration parameter for both relay UE and remote UE that indicates the support of the security of the control plane solution (where having this parameter set to zero value indicates to the UE that it can use the user plane security solution). |
|  |  |
| ***Consequences if not approved:*** | No specification for how the UE determines which solution to use (Control plane or User plane) for UE-to-network relay security, and the security solution for UE-to-network relay stays incomplete. |
|  |  |
| ***Clauses affected:*** | 5.5.2, 5.6.2 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  | TS/TR ... CR ...  |
| ***affected:*** |  | **X** |  Test specifications | TS/TR ... CR ...  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications | TS/TR ... CR ...  |
|  |  |
| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** |  |

\*\*\*\*\* First change \*\*\*\*\*

### 5.5.2 Information elements coding

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| 0 | 0 | 0 | PAI | ProSeP info type = {UE policies for 5G ProSe UE-to-network relay UE} | octet k |
| Spare |
| Length of ProSeP info contents | octet k+1octet k+2 |
| Validity timer | octet k+3octet k+7 |
| Served by NG-RAN | octet k+8octet o1 |
| Not served by NG-RAN | octet o1+1octet o2 |
| Default destination layer-2 IDs for sending the discovery signalling for announcement and additional information and for receiving the discovery signalling for solicitation | octet o2+1octet o3 |
| User info ID for discovery | octet o3+1octet o3+6 |
| RSC info list | octet o3+7octet o4 |
| 5QI to PC5 QoS parameters mapping rules | octet o4+1octet o5 |
| ProSe identifier to ProSe application server address mapping rules | octet o5+1octet o6 |
| 5G PKMF addressing information | octet (o6+1)\*octet l-2 |
| Privacy timer | octet l-1octet l |

Figure 5.5.2.1: ProSeP Info = {UE policies for 5G ProSe UE-to-network relay UE}

Table 5.5.2.1: ProSeP Info = {UE policies for 5G ProSe UE-to-network relay UE}

|  |
| --- |
| ProSeP info type (bit 1 to 4 of octet k) shall be set to "0011" (UE policies for 5G ProSe UE-to-network relay UE) |
| PKMF address indication (PAI) (bit 5 of octet k) |
| The PAI indicates whether the 5G PKMF addressing information is included in the IE or not |
| Bit |
| **5** |
| 0 5G PKMF addressing information is not included |
| 1 5G PKMF addressing information is included |
| Length of ProSeP info contents (octets k+1 to k+2) indicates the length of ProSeP info contents. |
| Validity timer (octet k+3 to k+7):The validity timer field provides the expiration time of validity of the UE policies for 5G ProSe UE-to-network relay UE. 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). |
| Served by NG-RAN (octet k+8 to o1):The served by NG-RAN field is coded according to figure 5.5.2.2 and table 5.5.2.2, and contains configuration parameters for 5G ProSe UE-to-network relay UE when the UE is served by NG-RAN. |
| Not served by NG-RAN (octet o1+1 to o2):The not served by NG-RAN field is coded according to figure 5.5.2.5 and table 5.5.2.5, and contains configuration parameters for 5G ProSe UE-to-network relay discovery and communication when the UE is not served by NG-RAN. |
| Default destination layer-2 IDs for sending the discovery signalling for announcement and additional information and for receiving the discovery signalling for solicitation (octet o2+1 to o3):The default destination layer-2 IDs for sending the discovery signalling for announcement and additional information and for receiving the discovery signalling for solicitation is coded according to figure 5.5.2.11a and table 5.5.2.11a and contains a list of the default destination layer-2 IDs for the initial UE-to-network relay discovery signalling. |
| User info ID for discovery (octet o3+1 to o3+6):The value of the User info ID parameter is a 48-bit long bit string. The format of the User info ID parameter is out of scope of this specification. |
| RSC info list (octet o3+7 to o4):The RSC info list field is coded according to figure 5.5.2.12 and table 5.5.2.12 and contains the RSCs related paramters. |
| 5QI to PC5 QoS parameters mapping rules (octet o4+1 to o5):The 5QI to PC5 QoS parameters mapping rules field is coded according to figure 5.5.2.17 and table 5.5.2.17 and contains the 5QI to PC5 QoS parameters mapping rules. |
| ProSe identifier to ProSe application server address mapping rules (octet o5+1 to o6):The ProSe identifier to ProSe application server address mapping rules field is coded according to figure 5.5.2.19 and table 5.5.2.19 and contains the ProSe identifier to ProSe application server address mapping rules. |
| Privacy timer (octet l-1 to l):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 5G ProSe direct communication. |
| If the length of ProSeP info contents field is bigger than indicated in figure 5.5.2.1, receiving entity shall ignore any superfluous octets located at the end of the ProSeP info contents. |
| 5G PKMF addressing information (octet o6+1 to l-2)5G PKMF addressing information contains the IPv4 address(es), IPv6 address(es) and/or FQDN of the 5G PKMF and is coded according to figure 5.5.2.21, figure 5.5.2.22, figure 5.5.2.23 and table 5.5.2.21. At least one of the addressing parameters (FQDN, IPv4 address list or IPv6 address list) shall be included. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of served by NG-RAN contents | octet k+8octet k+9 |
| Authorized PLMN list for layer-3 relay UE | octet (k+10)\*octet o50\* |
| Authorized PLMN list for layer-2 relay UE | octet (o50+1)\*octet o1\* |

Figure 5.5.2.2: Served by NG-RAN

Table 5.5.2.2: Served by NG-RAN

|  |
| --- |
| Authorized PLMN list for layer-3 relay UE:The authorized PLMN list for layer-3 relay UE field is coded according to figure 5.5.2.3 and table 5.5.2.3. |
|  |
| Authorized PLMN list for layer-2 relay UE:The authorized PLMN list for layer-2 relay UE field is coded according to figure 5.5.2.3 and table 5.5.2.3. |

|  |  |
| --- | --- |
| Length of authorized PLMN list contents | octet k+10octet k+11 |
| Authorized PLMN 1 | octet (k+12)\*octet (k+14)\* |
| Authorized PLMN 2 | octet (k+15)\*octet (k+17)\* |
| ... | octet (k+18)\*octet (o50-3)\* |
| Authorized PLMN n | octet (o50-2)\*octet o50\* |

Figure 5.5.2.3: Authorized PLMN list

Table 5.5.2.3: Authorized PLMN list

|  |
| --- |
| Authorized PLMN:The authorized PLMN field is coded according to figure 5.5.2.4 and table 5.5.2.4. |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| MCC digit 2 | MCC digit 1 | octet k+15 |
| MNC digit 3 | MCC digit 3 | octet k+16 |
| MNC digit 2 | MNC digit 1 | octet k+17 |

Figure 5.5.2.4: PLMN ID

Table 5.5.2.4: PLMN ID

|  |
| --- |
| Mobile country code (MCC) (octet k+15, octet k+16 bit 1 to 4):The MCC field is coded as in ITU-T Recommendation E.212 [5], annex A. |
| Mobile network code (MNC) (octet k+16 bit 5 to 8, octet k+17):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 NG-RAN contents | octet o1+1octet o1+2 |
| NR radio parameters per geographical area list for UE-to-network relay discovery | octet o1+3octet o51 |
| NR radio parameters per geographical area list for UE-to-network relay communication | octet o51+1octet o10 |
| Default PC5 DRX configuration for layer-3 UE-to-network relay discovery | octet o10+1octet o2 |

Figure 5.5.2.5: Not served by NG-RAN

Table 5.5.2.5: Not served by NG-RAN

|  |
| --- |
| NR radio parameters per geographical area list for UE-to-network relay discovery (octet o1+3 to o51):The NR radio parameters per geographical area list for UE-to-network relay discovery field is coded according to figure 5.5.2.6 and table 5.5.2.6. |
| NR radio parameters per geographical area list for UE-to-network relay communication (octet o51+1 to o2):The NR radio parameters per geographical area list for UE-to-network relay communication field is coded according to figure 5.5.2.7 and table 5.5.2.7. |
| Default PC5 DRX configuration for layer-3 UE-to-network relay discovery (octet o10+1 to o2):The default PC5 DRX configuration for layer-3 UE-to-network relay discovery field is coded according to figure 5.5.2.11a and table 5.5.2.11a. |
| If the length of not served by NG-RAN contents field is bigger than indicated in figure 5.5.2.5, receiving entity shall ignore any superfluous octets located at the end of the not served by NG-RAN contents. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of NR radio parameters per geographical area list for UE-to-network relay discovery contents | octet o1+3octet o1+4 |
| Radio parameters per geographical area info 1 | octet o1+5octet o510 |
| Radio parameters per geographical area info 2 | octet (o510+1)\*octet o511\* |
| ... | octet (o511+1)\*octet o512\* |
| Radio parameters per geographical area info n | octet (o512+1)\*octet o51\* |

Figure 5.5.2.6: NR radio parameters per geographical area list for UE-to-network relay discovery

Table 5.5.2.6: NR radio parameters per geographical area list for UE-to-network relay discovery

|  |
| --- |
| Radio parameters per geographical area info:The radio parameters per geographical area info field is coded according to figure 5.5.2.8 and table 5.5.2.8. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of NR radio parameters per geographical area list for UE-to-network relay communication contents | octet o51+1octet o51+2 |
| Radio parameters per geographical area info 1 | octet o51+3octet o513 |
| Radio parameters per geographical area info 2 | octet (o513+1)\*octet o514\* |
| ... | octet (o514+1)\*octet o515\* |
| Radio parameters per geographical area info n | octet (o515+1)\*octet o10\* |

Figure 5.5.2.7: NR radio parameters per geographical area list for UE-to-network relay communication

Table 5.5.2.7: NR radio parameters per geographical area list for UE-to-network relay communication

|  |
| --- |
| Radio parameters per geographical area info:The radio parameters per geographical area info field is coded according to figure 5.5.2.8 and table 5.5.2.8. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of radio parameters per geographical area contents | octet o510+1octet o510+2 |
| Geographical area | octet o510+3octet o5100 |
| Radio parameters | octet o5100+1octet o511-1 |
| MI | 0Spare | 0Spare | 0Spare | 0Spare | 0Spare | 0Spare | 0Spare | octet o511 |

Figure 5.5.2.8: Radio parameters per geographical area info

Table 5.5.2.8: Radio parameters per geographical area info

|  |
| --- |
| Geographical area (octet o510+3 to o5100):The geographical area field is coded according to figure 5.5.2.9 and table 5.5.2.9. |
| Radio parameters (octet o5100+1 to o511-1):The radio parameters field is coded according to figure 5.3.2.11 and table 5.3.2.11, applicable in the geographical area indicated by the geographical area field when not served by NG-RAN. |
| Managed indicator (MI) (octet o511 bit 8):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 managed1 Operator managed |
| If the length of radio parameters per geographical area contents field is bigger than indicated in figure 5.5.2.8, receiving entity shall ignore any superfluous octets located at the end of the radio parameters per geographical area contents. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of geographical area contents | octet o510+3octet o510+4 |
| Coordinate 1 | octet (o510+5)\*octet (o510+10)\* |
| Coordinate 2 | octet (o510+11)\*octet (o510+16)\* |
| ... | octet (o510+17)\*octet (o510-2+6\*n)\* |
| Coordinate n | octet (o510-1+6\*n)\*octet (o510+4+6\*n)\* = octet o5100\* |

Figure 5.5.2.9: Geographical area

Table 5.5.2.9: Geographical area

|  |
| --- |
| Coordinate:The coordinate field is coded according to figure 5.5.2.10 and table 5.5.2.10. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Latitude | octet o510+11octet o510+13 |
| Longitude | octet o510+14octet o510+17 |

Figure 5.5.2.10: Coordinate area

Table 5.5.2.10: Coordinate area

|  |
| --- |
| Latitude (octet o510+11 to o510+13):The latitude field is coded according to clause 6.1 of 3GPP TS 23.032 [6]. |
| Longitude (octet o510+14 to o510+17):The longitude field is coded according to clause 6.1 of 3GPP TS 23.032 [6]. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of radio parameters contents | octet o5100+1octet o5100+2 |
| Radio parameters contents | octet o5100+3octet o511-1 |

Figure 5.5.2.11: Radio parameters

Table 5.5.2.11: Radio parameters

|  |
| --- |
| Radio parameters contents:Radio parameters are defined as *SL-PreconfigurationNR* in clause 9.3 of 3GPP TS 38.331 [7]. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of default PC5 DRX configuration for layer-3 UE-to-network relay discovery contents | octet o10+1octet o10+2 |
| Default PC5 DRX configuration for layer-3 UE-to-network relay discovery contents | octet o10+3octet o2 |

Figure 5.5.2.11a: Default PC5 DRX configuration for layer-3 UE-to-network relay discovery

Table 5.5.2.11a: Default PC5 DRX configuration for layer-3 UE-to-network relay discovery

|  |
| --- |
| Default PC5 DRX configuration contents for layer-3 UE-to-network relay discovery:Default PC5 DRX configuration for layer-3 UE-to-network relay discovery field is coded as *sl-DefaultDRX-GC-BC-r17* in clause 6.3.5 of 3GPP TS 38.331 [7]. |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of default destination layer-2 IDs for sending the discovery signalling for announcement and additional information and for receiving the discovery signalling for solicitation contents | octet o2+1octet o2+2 |
| Default destination layer-2 ID 1 | octet o2+3octet o2+5 |
| Default destination layer-2 ID 2 | octet (o2+6)\*octet (o2+8)\* |
| ... | octet (o2+9)\*octet (o3-3)\* |
| Default destination layer-2 ID n | octet (o3-2)\*octet o3\* |

Figure 5.5.2.11a: Default destination layer-2 IDs for sending the discovery signalling for announcement and additional information and for receiving the discovery signalling for solicitation

Table 5.5.2.11a: Default destination layer-2 IDs for sending the discovery signalling for announcement and additional information and for receiving the discovery signalling for solicitation

|  |
| --- |
| Default destination layer-2 ID (octet o2+3 to o2+5):The default destination layer-2 ID is a 24-bit long bit string. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of RSC info list contents | octet o3+7octet o3+8 |
| RSC info 1 | octet o3+9octet o52 |
| RSC info 2 | octet (o52+1)\*octet (o53)\* |
| ... | octet (o53+1)\*octet (o54)\* |
| RSC info n | octet (o54+1)\*octet o4\* |

Figure 5.5.2.12: RSC info list

Table 5.5.2.12: RSC info list

|  |
| --- |
| RSC info:The RSC info field is coded according to figure 5.5.2.13 and table 5.5.2.13. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of RSC info contents | octet o52+1octet o52+2 |
| RSC list | octet o52+3octet o520 |
| Security related parameters for discovery | octet o520+1octet o511 |
| 0Spare | 0Spare | 0Spare | 0Spare | 0Spare | CPSI | LI | octet o511+1 |
| NR-PC5 UE-to-network relay security policies | octet (o511+2)octet o530 |
| PDU session parameters for layer-3 relay UE | octet (o530+1)\*octet o53\* |

Figure 5.5.2.13: RSC info

Table 5.5.2.13: RSC info

|  |
| --- |
| RSC list (octet o52+3 to o520):The RSC list field is coded according to figure 5.5.2.14 and table 5.5.2.14. |
| Security related parameters for discovery (octet o520+1 to o511):The security related parameters for discovery field is coded according to figure 5.5.2.15 and table 5.5.2.15. |
| Layer indication (LI) (octet o511+1):Bits2 10 1 Layer 31 0 Layer 2The other values are reserved. |
|  |
| Control plane security indication (CPSI) (octet o511+1):The control plane security indication field indicates whether to use the security procedure over control plane as specified in 3GPP TS 33.503 [13] or not. |
| Bit |
| 3 |
| 0 security procedure over control plane is not used |
| 1 security procedure over control plane is used |
|  |
| If LI is set to "Layer 3", the PDU session parameters for layer-3 relay UE is included in the RSC info, otherwise the PDU session parameters for layer-3 relay UE is not included. |
| NR-PC5 UE-to-network relay security policies (octet o511+2 to o530):The NR-PC5 UE-to-network relay security policies is coded as the NR-PC5 unicast security policies defined in figure 5.4.2.34 and table 5.4.2.34. |
| PDU session parameters for layer-3 relay UE (octet o530+1 to octet o53)The PDU session parameters for layer-3 relay UE field is coded according to figure 5.5.2.16 and table 5.5.2.16. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of RSC list contents | octet o52+3octet o52+4 |
| RSC 1 | octet o52+5octet o52+7 |
| RSC 2 | octet (o52+8)\*octet (o52+10)\* |
| … | octet (o52+11)\*octet (o520-3)\* |
| RSC n | octet (o520-2)\*octet o520\* |

Figure 5.5.2.14: RSC list

Table 5.5.2.14: RSC list

|  |
| --- |
| RSC (octet o52+5 to o52+7):The RSC identifies a connectivity service the UE-to-Network relay provides. The value of the RSC is a 24-bit long bit string. The values of the RSC from "000001" to "00000F" in hexadecimal representation are spare and shall not be used in this release of specification. The UE shall ignore the spare value of the RSC in this release of specification. For all other values, the format of the RSC is out of scope of this specification. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Security related parameters validity timer | octet o520+1octet o520+5 |
| Code-sending security parameters | octet (o520+6)\*octet o524\* |
| Code-receiving security parameters | octet (o524+1)\*octet o511\* |

Figure 5.5.2.15: Security related parameters for discovery

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Spare | PDUCK | PDUIK | PDUSK | octet o520+6 |
| DUSK | octet (o520+7)\*octet o521\* |
| DUIK | octet (o521+1)\*octet o522\* |
| DUCK | octet (o522+1)\*octet o523\* |
| Encrypted bitmask | octet (o523+1)\*octet o524\* |

Figure 5.5.2.15a: Code-sending security parameters

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Spare | PDUCK | PDUIK | PDUSK | octet o524+1 |
| DUSK | octet (o524+2)\*octet o525\* |
| DUIK | octet (o525+1)\*octet o526\* |
| DUCK | octet (o526+1)\*octet o527\* |
| Encrypted bitmask | octet (o527+1)\*octet o511\* |

Figure 5.5.2.15b: Code-receiving security parameters

Table 5.5.2.15: Security related parameters for discovery

|  |
| --- |
| Security related parameters validity timer: |
| The security related parameters validity timer field provides the expiration time of validity of the security related parameters for discovery. The security related parameters 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). |
| Code-sending security parameters: |
| The code-sending security parameters field contains the security parameters needed by a sending UE to protect a 5G ProSe direct discovery message over PC5 interface as specified in 3GPP TS 33.503 [13]. |
| Code-receiving security parameters |
| The code-receiving security parameters field contains the security parameters needed by a receiving UE to process a 5G ProSe direct discovery message over PC5 interface as specified in 3GPP TS 33.503 [13]. |
| Presence of DUSK (PDUSK): |
| PDUSK indicates whether the DUSK field is present or not. |
| Bit |
| **1** |
| 0 DUSK field is not included |
| 1 DUSK field is included |
| Presence of DUIK (PDUIK): |
| PDUIK indicates whether the DUIK field is present or not. |
| Bit |
| **2** |
| 0 DUIK field is not included |
| 1 DUIK field is included |
| Presence of DUCK (PDUCK): |
| PDUCK indicates whether the DUCK field and the encrypted bitmask field are present or not. |
| Bot |
| **3** |
| 0 DUCK and encrypted bitmask fields are not included |
| 1 DUCK and encrypted bitmask fields are included |
| DUSK: |
| The DUSK field contains the value of the DUSK. The use of the DUSK is defined in 3GPP TS 33.503 [13]. |
| DUIK: |
| The DUIK field contains the value of the DUIK. The use of the DUIK is defined in 3GPP TS 33.503 [13]. |
| DUCK: |
| The DUCK field contains the value of the DUCK. The use of the DUCK is defined in 3GPP TS 33.503 [13]. |
| Encrypted bitmask: |
| The encrypted bitmask field contains the value of the encrypted bitmask, which is a 184-bit bitmask which uses bit "1" to mark the positions of the bits for which the DUCK encryption is applied. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of PDU session parameters for layer-3 relay UE contents | octet o511+2octet o511+3 |
| Spare | PATP | PSSCM | PSNSSAI | PDNN | PDU session type | octet o511+4 |
| DNN | octet (o511+5)\*octet o512\* |
| S-NSSAI | octet (o512+1)\*octet (o53-1)\* |
| Spare | Access type preference | SSC mode | octet o53\* |

Figure 5.5.2.16: PDU session parameters for layer-3 relay UE

Table 5.5.2.16: PDU session parameters for layer-3 relay UE

|  |
| --- |
| PDU session type (bits 3 to 1 of octet o511+4):The PDU session type field shall be encoded as the PDU session type value part of the PDU session type information element defined in clause 9.11.4.11 of 3GPP TS 24.501 [4]. |
| Presence of DNN (PDNN) (bit 4 of octet o511+4) |
| PDNN indicates whether the DNN field is present or not. |
| Bit |
| **4** |  |
| 0 | DNN field is not included |
| 1 | DNN field is included |
| Presence of S-NSSAI (PSNSSAI) (bit 5 of octet o511+4) |
| PSNSSAI indicates whether the S-NSSAI field is present or not. |
| Bit |
| **5** |  |
| 0 | S-NSSAI field is not included |
| 1 | S-NSSAI field is included |
| Presence of SSC mode (PSSCM) (bit 6 of octet o511+4) |
| PSSCM indicates whether the SSC mode field is present or not. |
| Bit |
| **6** |  |
| 0 | SSC mode field is not included (NOTE) |
| 1 | SSC mode field is included |
| Presence of access type preference (PATP) (bit 7 of octet o511+4) |
| PATP indicates whether the access type preference mode field is present or not. |
| Bit |
| **7** |  |
| 0 | Access type preference field is not included (NOTE) |
| 1 | Access type preference field is included |
| DNN (octet o511+5 to o512):The DNN 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 [10]. |
| S-NSSAI (octet o512+1 to o53-1):The S-NSSAI 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]. |
| SSC mode (bits 3 to 1 of octet o53):The SSC mode field 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]. |
| Access type preference (bits 5 to 4 of octet o53):The access type preference field shall be encoded as the value part of the access type information element defined in clause 9.11.2.1A of 3GPP TS 24.501 [4]. |
| NOTE: Since SSC mode field and access type preference field are coded in the same octet, this octet is not included only when both PSSCM and PATP are set to 0. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of 5QI to PC5 QoS parameters mapping rules contents | octet o4+1octet o4+2 |
| 5QI to PC5 QoS parameters mapping rule 1 | octet o4+3octet o55 |
| 5QI to PC5 QoS parameters mapping rule 2 | octet (o55+1)\*octet o56\* |
| … | octet (o56+1)\*octet o57\* |
| 5QI to PC5 QoS parameters mapping rule n | octet (o57+1)\*octet o5\* |

Figure 5.5.2.17: 5QI to PC5 QoS parameters mapping rules

Table 5.5.2.17: 5QI to PC5 QoS parameters mapping rules

|  |
| --- |
| 5QI to PC5 QoS parameters mapping rule:The 5QI to PC5 QoS parameters mapping rule field is coded according to figure 5.5.2.18 and table 5.5.2.18 and contains the 5QI to PC5 QoS parameters mapping rule. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of 5QI to PC5 QoS parameters mapping rule contents | octet o55+1octet o55+2 |
| 5QI | octet o55+3 |
| PQI | octet o55+4 |
| PDB adjustment factor | octet o55+5 |
| RSC list | octet (o55+6)\*octet o56\* |

Figure 5.5.2.18: 5QI to PC5 QoS parameters mapping rule

Table 5.5.2.18: 5QI to PC5 QoS parameters mapping rule

|  |
| --- |
| 5QI (octet o55+3):Bits**8 7 6 5 4 3 2 1**0 0 0 0 0 0 0 0 Reserved0 0 0 0 0 0 0 1 5QI 10 0 0 0 0 0 1 0 5QI 20 0 0 0 0 0 1 1 5QI 30 0 0 0 0 1 0 0 5QI 40 0 0 0 0 1 0 1 5QI 50 0 0 0 0 1 1 0 5QI 60 0 0 0 0 1 1 1 5QI 70 0 0 0 1 0 0 0 5QI 80 0 0 0 1 0 0 1 5QI 90 0 0 0 1 0 1 0 5QI 100 0 0 0 1 0 1 1 to Spare0 1 0 0 0 0 0 00 1 0 0 0 0 0 1 5QI 650 1 0 0 0 0 1 0 5QI 660 1 0 0 0 0 1 1 5QI 670 1 0 0 0 1 0 0 Spare0 1 0 0 0 1 0 1 5QI 690 1 0 0 0 1 1 0 5QI 700 1 0 0 0 1 1 1 5QI 710 1 0 0 1 0 0 0 5QI 720 1 0 0 1 0 0 1 5QI 730 1 0 0 1 0 1 0 5QI 740 1 0 0 1 0 1 1 5QI 750 1 0 0 1 1 0 0 5QI 760 1 0 0 1 1 0 1 to Spare0 1 0 0 1 1 1 00 1 0 0 1 1 1 1 5QI 790 1 0 1 0 0 0 0 5QI 800 1 0 1 0 0 0 1 Spare0 1 0 1 0 0 1 0 5QI 820 1 0 1 0 0 1 1 5QI 830 1 0 1 0 1 0 0 5QI 840 1 0 1 0 1 0 1 5QI 850 1 0 1 0 1 1 0 5QI 860 1 0 1 0 1 1 1 to Spare0 1 1 1 1 1 1 11 0 0 0 0 0 0 0 to Operator-specific 5QIs1 1 1 1 1 1 1 01 1 1 1 1 1 1 1 Reserved |
|  |
| PQI (octet o55+4):Bits**8 7 6 5 4 3 2 1**0 0 0 0 0 0 0 0 Reserved0 0 0 0 0 0 0 1 to Spare0 0 0 1 0 1 0 00 0 0 1 0 1 0 1 PQI 210 0 0 1 0 1 1 0 PQI 220 0 0 1 0 1 1 1 PQI 230 0 0 1 1 0 0 0 PQI 240 0 0 1 1 0 0 1 PQI 250 0 0 1 1 0 1 0 PQI 260 0 0 1 1 0 1 1 to Spare0 0 1 1 0 1 1 00 0 1 1 0 1 1 1 PQI 550 0 1 1 1 0 0 0 PQI 560 0 1 1 1 0 0 1 PQI 570 0 1 1 1 0 1 0 PQI 580 0 1 1 1 0 1 1 PQI 590 0 1 1 1 1 0 0 PQI 600 0 1 1 1 1 0 1 PQI 610 0 1 1 1 1 1 0 to Spare0 1 0 1 1 0 0 10 1 0 1 1 0 1 0 PQI 900 1 0 1 1 0 1 1 PQI 910 1 0 1 1 1 0 0 PQI 920 1 0 1 1 1 0 1 PQI 930 1 0 1 1 1 1 0 to Spare0 1 1 1 1 1 1 11 0 0 0 0 0 0 0 to Operator-specific PQIs1 1 1 1 1 1 1 01 1 1 1 1 1 1 1 Reserved |
| PDB adjustment factor (octet o55+5):The PDB adjustment factor field is a binary coded representation of a percentage of the standardized PDB identified by the PQI. |
| RSC list (octet o55+6 to o56):The RSC list field is coded according to figure 5.5.2.14 and table 5.5.2.14. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of ProSe identifier to ProSe application server address mapping rules contents | octet o5+1octet o5+2 |
| ProSe identifier to ProSe application server address mapping rule 1 | octet (o5+3)\*octet o150\* |
| ProSe identifier to ProSe application server address mapping rule 2 | octet (o150+1)\*octet o151\* |
| ... | octet (o151+1)\*octet o152\* |
| ProSe identifier to ProSe application server address mapping rule n | octet (o152+1)\*octet (l-2)\* |

Figure 5.5.2.19: ProSe identifier to ProSe application server address mapping rules

Table 5.5.2.19: ProSe identifier to ProSe application server address mapping rules

|  |
| --- |
| ProSe identifier to ProSe application server address mapping rule:The ProSe identifier to ProSe application server address mapping rule field is coded according to figure 5.5.2.20 and table 5.5.2.20. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of ProSe identifier to ProSe application server address mapping rule contents | octet o150+1octet o150+2 |
| ProSe identifiers | octet o150+3octet o1500 |
| 0Spare | 0Spare | 0Spare | 0Spare | 0Spare | AT | octet o1500+1 |
| ProSe application server address | octet o1500+2octet l-2 |

Figure 5.5.2.20: ProSe identifier to ProSe application server address mapping rule

Table 5.5.2.20: ProSe identifier to ProSe application server address mapping rule

|  |
| --- |
| ProSe identifiers (o150+3 to o1500):The ProSe identifiers field is coded according to figure 5.3.2.14 and table 5.3.2.14. |
| Address type (AT) (octet o1500+1 bit 1 to 3):The AT field indicates the ProSe application server address type.Bits**3 2 1**0 0 1 IPv40 1 0 IPv60 1 1 FQDNThe other values are reserved. |
| If the AT indicates IPv4, then the ProSe application server address field contains an IPv4 address in 4 octets. If the AT indicates IPv6, then the ProSe application server address field contains an IPv6 address in 16 octets.If the AT indicates FQDN, then the ProSe application server address field contains a sequence of one octet FQDN length field and a FQDN value of variable size. The FQDN value field shall be encoded as defined in clause 28.3.2.1 in 3GPP TS 23.003 [10]. |
| If the length of ProSe identifier to ProSe application server address mapping rule contents field is bigger than indicated in figure 5.5.2.19, receiving entity shall ignore any superfluous octets located at the end of the ProSe identifier to ProSe application server address mapping rule contents. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of 5G PKMF addressing information | octet o6+1octet o6+2 |
| 0Spare | octet o6+3 | 0Spare | 0Spare | 0Spare | FQDN | IPv6add | IPv4add |  |
| IPv4 address list | octet (o6+4)\*octet o160\* |
| IPv6 address list | octet (o160+1)\*octet (o161)\* |
| FQDN | octet (o161+1)\*octet (l-2)\* |

Figure 5.5.2.21: 5G PKMF addressing information

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Number of IPv4 addresses | octet o6+4 |
| IPv4 address 1 | octet o6+5octet o6+8 |
| IPv4 address 2 | octet o6+9octet o6+12 |
| … … |  |
| IPv4 address N | octet o160-3octet o160 |

Figure 5.5.2.22: IPv4 address list

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Number of IPv6 addresses | octet o160+1 |
| IPv6 address 1 | octet o160+2octet o160+17 |
| IPv6 address 2 | octet o160+18octet o160+33 |
| … … |  |
| IPv6 address N | octet o161-15octet o161 |

Figure 5.5.2.23: IPv6 address list

Table 5.5.2.21: 5G PKMF addressing information

|  |
| --- |
| IPv4 addresses (IPv4add) (o6+2 bit 1): (NOTE 1)Bit**1**0 IPv4 address list is not present1 IPv4 address list is presentIPv6 addresses (IPv6add) (octet o6+2 bit 2): (NOTE 1)Bit**2**0 IPv6 address list is not present1 IPv6 address list is presentFQDN (octet o6+3 bit 3): (NOTE 2)Bit**3**0 FQDN is not present1 FQDN is presentIPv4 address list (octet o6+4 to octet o160) |
| IPv4 address list contains the IPv4 address(es) of the 5G PKMF and shall be encoded as defined in figure 5.5.2.20.IPv6 address list (octet o160+1 to octet o161)IPv6 address list contains the IPv6 address(es) of the 5G PKMF and shall be encoded as defined in figure 5.5.2.20.FQDN (octet o161+1 to l)FQDN field contains a sequence of one octet FQDN length field and a FQDN value of variable size. The FQDN value field shall be encoded as defined in clause 28.3.2.1 in 3GPP TS 23.003 [10]. |
| NOTE 1: If multiple IPv4 addresses and/or IPv6 addresses are included, which one of these addresses is selected is implementation dependent.NOTE 2: If the 5G PKMF supports the 5G PKMF Services with "https" URI scheme (i.e. use of TLS is mandatory), then the FQDN shall be used to construct the target URI. |

\*\*\*\*\* Next change \*\*\*\*\*

### 5.6.2 Information elements coding

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| 0 | 0 | 0 | PAI | ProSeP info type = {UE policies for 5G ProSe remote UE} | octet k |
| Spare |
| Length of ProSeP info contents | octet k+1octet k+2 |
| Validity timer | octet k+3octet k+7 |
| Served by NG-RAN | octet k+8octet o1 |
| Not served by NG-RAN | octet o1+1octet o2 |
| Default destination layer-2 IDs for sending the discovery signalling for solicitation and for receiving the discovery signalling for announcement and additional information | octet o2+1octet o3 |
| User info ID for discovery | octet o3+1octet o3+6 |
| RSC info list | octet o3+7octet l |
| N3IWF selection information for 5G ProSe layer-3 remote UE | octet l+1octet m |
| Privacy timer | octet m+1octet m+2 |
| 5G PKMF addressing information | octet m+3octet p |

Figure 5.6.2.1: ProSeP Info = {UE policies for 5G ProSe remote UE}

Editor's note: How to define the security parameters used for UE-to-network relay depends on SA3 final requirements.

Table 5.6.2.1: ProSeP Info = {UE policies for 5G ProSe remote UE}

|  |
| --- |
| ProSeP info type (bit 1 to 4 of octet k) shall be set to "0100" (UE policies for 5G ProSe remote UE) |
| PKMF address indication (PAI) (bit 5 of octet k) |
| The PAI indicates whether the 5G PKMF addressing information is included in the IE or not |
| Bit |
| **5** |
| 0 5G PKMF addressing information is not included |
| 1 5G PKMF addressing information is included |
| Length of ProSeP info contents (octets k+1 to k+2) indicates the length of ProSeP info contents. |
| Validity timer (octet k+3 to k+7):The validity timer field provides the expiration time of validity of the UE policies for 5G ProSe remote UE. 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). |
|  |
| Served by NG-RAN (octet k+8 to o1):The served by NG-RAN field is coded according to figure 5.6.2.2 and table 5.6.2.2, and contains configuration parameters for 5G ProSe remote UE when the UE is served by NG-RAN. |
| Not served by NG-RAN (octet o1+1 to o2):The not served by NG-RAN field is coded according to figure 5.6.2.5 and table 5.6.2.5, and contains configuration parameters for 5G ProSe UE-to-network relay discovery and communication when the UE is not served by NG-RAN. |
|  |
| Default destination layer-2 IDs for sending the discovery signalling for solicitation and for receiving the discovery signalling for announcement and additional information (octet o2+1 to o3):The default destination layer-2 IDs for sending the discovery signalling for solicitation and for receiving the discovery signalling for announcement and additional information is coded according to figure 5.6.2.11a and table 5.6.2.11a and contains a list of the default destination layer-2 IDs for the initial UE-to-network relay discovery signalling. |
| User info ID for discovery (octet o3+1 to o3+6):The value of the User info ID parameter is a 48-bit long bit string. The format of the User info ID parameter is out of scope of this specification. |
| RSC info list (octet o3+7 to l):The RSC info list field is coded according to figure 5.6.2.12 and table 5.6.2.12 and contains the RSCs related paramters. |
| N3IWF selection information for 5G ProSe layer-3 remote UE (octet l+1 to m):The N3IWF selection information for 5G ProSe layer-3 remote UE field is coded according to figure 5.6.2.17 and table 5.6.2.17, and contains two parts: 1) N3IWF identifier configuration (either FQDN or IP address) for 5G ProSe layer-3 remote UE; 2) 5G ProSe layer-3 UE-to-network relay access node selection information. |
| Privacy timer (octet m+1 to m+2):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 5G ProSe direct communication. |
| If the length of ProSeP info contents field is bigger than indicated in figure 5.6.2.1, receiving entity shall ignore any superfluous octets located at the end of the ProSeP info contents. |
| 5G PKMF addressing information (octet m+3 to p)5G PKMF addressing information contains the IPv4 address(es), IPv6 address(es) and/or FQDN of the 5G PKMF and is coded according to figure 5.5.2.21, figure 5.5.2.22, figure 5.5.2.23 and table 5.5.2.21. At least one of the addressing parameters (FQDN, IPv4 address list or IPv6 address list) shall be included. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of served by NG-RAN contents | octet k+8octet k+9 |
| 0Spare | 0Spare | 0Spare | 0Spare | 0Spare | 0Spare | 0Spare | L3RI | octet (k+10)\* |
| Authorized PLMN list for layer-2 remote UE | octet (k+11)\*octet o1\* |

Figure 5.6.2.2: Served by NG-RAN

Table 5.6.2.2: Served by NG-RAN

|  |
| --- |
| Layer-3 remote UE authorization indication (L3RI) (octet k+10, bit 1):The layer-3 remote UE authorization indication field indicates whether the UE is authorized to act as a layer-3 remote UE.Bits10 Not authorized to act as a layer-3 remote UE1 Authorized to act as a layer-3 remote UE |
| Authorized PLMN list for layer-2 remote UE (octet k+11 to o1):The authorized PLMN list for layer-2 remote UE field is coded according to figure 5.6.2.3 and table 5.6.2.3. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of authorized PLMN list contents | octet k+11octet k+12 |
| Authorized PLMN 1 | octet (k+13)\*octet (k+15)\* |
| Authorized PLMN 2 | octet (k+16)\*octet (k+18)\* |
| ... | octet (k+19)\*octet (o50-3)\* |
| Authorized PLMN n | octet (o50-2)\*octet o50\* |

Figure 5.6.2.3: Authorized PLMN list

Table 5.6.2.3: Authorized PLMN list

|  |
| --- |
| Authorized PLMN:The authorized PLMN field is coded according to figure 5.6.2.4 and table 5.6.2.4. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| MCC digit 2 | MCC digit 1 | octet k+16 |
| MNC digit 3 | MCC digit 3 | octet k+17 |
| MNC digit 2 | MNC digit 1 | octet k+18 |

Figure 5.6.2.4: PLMN ID

Table 5.6.2.4: PLMN ID

|  |
| --- |
| Mobile country code (MCC) (octet k+16, octet k+17 bit 1 to 4):The MCC field is coded as in ITU-T Recommendation E.212 [5], annex A. |
| Mobile network code (MNC) (octet k+17 bit 5 to 8, octet k+18):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 NG-RAN contents | octet o1+1octet o1+2 |
| NR radio parameters per geographical area list for UE-to-network relay discovery | octet o1+3octet o51 |
| NR radio parameters per geographical area list for UE-to-network relay communication | octet o51+1octet o10 |
| Default PC5 DRX configuration for layer-3 UE-to-network relay discovery | octet o10+1octet o2 |

Figure 5.6.2.5: Not served by NG-RAN

Table 5.6.2.5: Not served by NG-RAN

|  |
| --- |
| NR radio parameters per geographical area list for UE-to-network relay discovery (octet o1+3 to o51):The NR radio parameters per geographical area list for UE-to-network relay discovery field is coded according to figure 5.6.2.6 and table 5.6.2.6. |
| NR radio parameters per geographical area list for UE-to-network relay communication (octet o51+1 to o2):The NR radio parameters per geographical area list for UE-to-network relay communication field is coded according to figure 5.6.2.7 and table 5.6.2.7. |
| Default PC5 DRX configuration for layer-3 UE-to-network relay discovery (octet o10+1 to o2):The default PC5 DRX configuration for layer-3 UE-to-network relay discovery field is coded according to figure 5.6.2.11a and table 5.6.2.11a. |
| If the length of not served by NG-RAN contents field is bigger than indicated in figure 5.6.2.5, receiving entity shall ignore any superfluous octets located at the end of the not served by NG-RAN contents. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of NR radio parameters per geographical area list for UE-to-network relay discovery contents | octet o1+3octet o1+4 |
| Radio parameters per geographical area info 1 | octet o1+5octet o510 |
| Radio parameters per geographical area info 2 | octet (o510+1)\*octet o511\* |
| ... | octet (o511+1)\*octet o512\* |
| Radio parameters per geographical area info n | octet (o512+1)\*octet o51\* |

Figure 5.6.2.6: NR radio parameters per geographical area list for UE-to-network relay discovery

Table 5.6.2.6: NR radio parameters per geographical area list for UE-to-network relay discovery

|  |
| --- |
| Radio parameters per geographical area info:The radio parameters per geographical area info field is coded according to figure 5.6.2.8 and table 5.6.2.8. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of NR radio parameters per geographical area list for UE-to-network relay communication contents | octet o51+1octet o51+2 |
| Radio parameters per geographical area info 1 | octet o51+3octet o513 |
| Radio parameters per geographical area info 2 | octet (o513+1)\*octet o514\* |
| ... | octet (o514+1)\*octet o515\* |
| Radio parameters per geographical area info n | octet (o515+1)\*octet o10\* |

Figure 5.6.2.7: NR radio parameters per geographical area list for UE-to-network relay communication

Table 5.6.2.7: NR radio parameters per geographical area list for UE-to-network relay communication

|  |
| --- |
| Radio parameters per geographical area info:The radio parameters per geographical area info field is coded according to figure 5.6.2.8 and table 5.6.2.8. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of radio parameters per geographical area contents | octet o510+1octet o510+2 |
| Geographical area | octet o510+3octet o5100 |
| Radio parameters | octet o5100+1octet o511-1 |
| MI | 0Spare | 0Spare | 0Spare | 0Spare | 0Spare | 0Spare | 0Spare | octet o511 |

Figure 5.6.2.8: Radio parameters per geographical area info

Table 5.6.2.8: Radio parameters per geographical area info

|  |
| --- |
| Geographical area (octet o510+3 to o5100):The geographical area field is coded according to figure 5.6.2.9 and table 5.6.2.9. |
| Radio parameters (octet o5100+1 to o511-1):The radio parameters field is coded according to figure 5.3.2.11 and table 5.3.2.11, applicable in the geographical area indicated by the geographical area field when not served by NG-RAN. |
| Managed indicator (MI) (octet o511 bit 8):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 managed1 Operator managed |
| If the length of radio parameters per geographical area contents field is bigger than indicated in figure 5.6.2.8, receiving entity shall ignore any superfluous octets located at the end of the radio parameters per geographical area contents. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of geographical area contents | octet o510+3octet o510+4 |
| Coordinate 1 | octet (o510+5)\*octet (o510+10)\* |
| Coordinate 2 | octet (o510+11)\*octet (o510+16)\* |
| ... | octet (o510+17)\*octet (o510-2+6\*n)\* |
| Coordinate n | octet (o510-1+6\*n)\*octet (o510+4+6\*n)\* = octet o5100\* |

Figure 5.6.2.9: Geographical area

Table 5.6.2.9: Geographical area

|  |
| --- |
| Coordinate:The coordinate field is coded according to figure 5.6.2.10 and table 5.6.2.10. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Latitude | octet o510+11octet o510+13 |
| Longitude | octet o510+14octet o510+17 |

Figure 5.6.2.10: Coordinate area

Table 5.6.2.10: Coordinate area

|  |
| --- |
| Latitude (octet o510+11 to o510+13):The latitude field is coded according to clause 6.1 of 3GPP TS 23.032 [6]. |
| Longitude (octet o510+14 to o510+17):The longitude field is coded according to clause 6.1 of 3GPP TS 23.032 [6]. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of radio parameters contents | octet o5100+1octet o5100+2 |
| Radio parameters contents | octet o5100+3octet o511-1 |

Figure 5.6.2.11: Radio parameters

Table 5.6.2.11: Radio parameters

|  |
| --- |
| Radio parameters contents (octet o5100+3 to o511-1):Radio parameters are defined as *SL-PreconfigurationNR* in clause 9.3 of 3GPP TS 38.331 [7]. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of default PC5 DRX configuration for layer-3 UE-to-network relay discovery contents | octet o10+1octet o10+2 |
| Default PC5 DRX configuration for layer-3 UE-to-network relay discovery contents | octet o10+3octet o2 |

Figure 5.6.2.11a: Default PC5 DRX configuration for layer-3 UE-to-network relay discovery

Table 5.6.2.11a: Default PC5 DRX configuration for layer-3 UE-to-network relay discovery

|  |
| --- |
| Default PC5 DRX configuration contents for layer-3 UE-to-network relay discovery:Default PC5 DRX configuration for layer-3 UE-to-network relay discovery field is coded as *sl-DefaultDRX-GC-BC-r17* in clause 6.3.5 of 3GPP TS 38.331 [7]. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of default destination layer-2 IDs for sending the discovery signalling for solicitation and for receiving the discovery signalling for announcement and additional information contents | octet o2+1octet o2+2 |
| Default destination layer-2 ID 1 | octet o2+3octet o2+5 |
| Default destination layer-2 ID 2 | octet (o2+6)\*octet (o2+8)\* |
| ... | octet (o2+9)\*octet (o3-3)\* |
| Default destination layer-2 ID n | octet (o3-2)\*octet o3\* |

Figure 5.6.2.11a: Default destination layer-2 IDs for sending the discovery signalling for solicitation and for receiving the discovery signalling for announcement and additional information

Table 5.6.2.11a: Default destination layer-2 IDs for sending the discovery signalling for solicitation and for receiving the discovery signalling for announcement and additional information

|  |
| --- |
| Default destination layer-2 ID (octet o2+3 to o2+5):The default destination layer-2 ID is a 24-bit long bit string. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of RSC info list contents | octet o3+7octet o3+8 |
| RSC info 1 | octet o3+9octet o52 |
| RSC info 2 | octet (o52+1)\*octet o53\* |
| ... | octet (o53+1)\*octet o54\* |
| RSC info n | octet (o54+1)\*octet o4\* |

Figure 5.6.2.12: RSC info list

Table 5.6.2.12: RSC info list

|  |
| --- |
| RSC info:The RSC info field is coded according to figure 5.6.2.13 and table 5.6.2.13. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of RSC info contents | octet o52+1octet o52+2 |
| RSC list | octet o52+3octet o520 |
| Security related parameters for discovery | octet o520+1octet o511 |
| 0Spare | 0Spare | 0Spare | 0Spare | CPSI | NSI | LI | octet o511+1 |
| NR-PC5 UE-to-network relay security policies | octet (o511+2)octet o530 |
| PDU session parameters for layer-3 remote UE | octet (o530+1)\*octet o516\* |
| Traffic descriptor | octet (o516+1)\*octet o53\* |

Figure 5.6.2.13: RSC info

Table 5.6.2.13: RSC info

|  |
| --- |
| RSC list (octet o52+3 to o520):The RSC list field is coded according to figure 5.6.2.14 and table 5.6.2.14. |
| Security related parameters for discovery (octet o520+1 to o511):The security related parameters for discovery field is coded according to figure 5.6.2.15 and table 5.6.2.15. |
| Layer indication (LI) (octet o511+1 bit 1 to 2):Bits2 10 1 Layer 31 0 Layer 2The other values are reserved. |
| If LI is set to "Layer 3", the PDU session parameters for layer-3 remote UE is included in the RSC info, otherwise the PDU session parameters for layer-3 remote UE is not included. |
| N3IWF support indication (NSI) (octet o511+1 bit 3):Bit50 Using N3IWF access for the relayed traffic is not supported1 Using N3IWF access for the relayed traffic is supportedThe NSI is set to "Using N3IWF access for the relayed traffic is supported" only when the LI is set to "Layer 3". |
| Control plane security indication (CPSI) (octet o511+1):The control plane security indication field indicates whether to use the security procedure over control plane as specified in 3GPP TS 33.503 [13] or not. |
| Bit |
| 4 |
| 0 security procedure over control plane is not used |
| 1 security procedure over control plane is used |
|  |
| NR-PC5 UE-to-network relay security policies (octet o511+2 to o530):The NR-PC5 UE-to-network relay security policies is coded as the NR-PC5 unicast security policies defined in figure 5.4.2.34 and table 5.4.2.34. |
| PDU session parameters for layer-3 remote UE (octet o530+1 to o516):The PDU session parameters for layer-3 remote UE field is coded according to figure 5.6.2.16 and table 5.6.2.16. |
| Traffic descriptor (octet o516+1 to o53):The traffic descriptor field is coded according to figure 5.6.2.16a and table 5.6.2.16a. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of RSC list contents | octet o52+3octet o52+4 |
| RSC 1 | octet o52+5octet o52+7 |
| RSC 2 | octet (o52+8)\*octet (o52+10)\* |
| … | octet (o52+11)\*octet (o520-3)\* |
| RSC n | octet (o520-2)\*octet o520\* |

Figure 5.6.2.14: RSC list

Table 5.6.2.14: RSC list

|  |
| --- |
| RSC (octet o52+5 to o52+7):The RSC identifies a connectivity service that the remote UE wants. The value of the RSC is a 24-bit long bit string. The values of the RSC from "000001" to "00000F" in hexadecimal representation are spare and shall not be used in this release of the specification. The UE shall ignore the spare value of the RSC in this release of specification. For all other values, the format of the RSC is out of scope of this specification. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Security related parameters validity timer | octet o520+1octet o520+5 |
| Code-sending security parameters | octet (o520+6)\*octet o524\* |
| Code-receiving security parameters | octet (o524+1)\*octet o511\* |

Figure 5.6.2.15: Security related parameters for discovery

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Spare | PDUCK | PDUIK | PDUSK | octet o520+6 |
| DUSK | octet (o520+7)\*octet o521\* |
| DUIK | octet (o521+1)\*octet o522\* |
| DUCK | octet (o522+1)\*octet o523\* |
| Encrypted bitmask | octet (o523+1)\*octet o524\* |

Figure 5.6.2.15a: Code-sending security parameters

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Spare | PDUCK | PDUIK | PDUSK | octet o524+1 |
| DUSK | octet (o524+2)\*octet o525\* |
| DUIK | octet (o525+1)\*octet o526\* |
| DUCK | octet (o526+1)\*octet o527\* |
| Encrypted bitmask | octet (o527+1)\*octet o511\* |

Figure 5.6.2.15b: Code-receiving security parameters

Table 5.6.2.15: Security related parameters for discovery

|  |
| --- |
| Security related parameters validity timer: |
| The security related parameters validity timer field provides the expiration time of validity of the security related parameters for discovery. The security related parameters 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). |
| Code-sending security parameters: |
| The code-sending security parameters field contains the security parameters needed by a sending UE to protect a 5G ProSe direct discovery message over PC5 interface as specified in 3GPP TS 33.503 [13]. |
| Code-receiving security parameters |
| The code-receiving security parameters field contains the security parameters needed by a receiving UE to process a 5G ProSe direct discovery message over PC5 interface as specified in 3GPP TS 33.503 [13]. |
| Presence of DUSK (PDUSK): |
| PDUSK indicates whether the DUSK field is present or not. |
| Bit |
| **1** |  |
| 0 | DUSK field is not included |
| 1 | DUSK field is included |
| Presence of DUIK (PDUIK): |
| PDUIK indicates whether the DUIK field is present or not. |
| Bit |
| **2** |  |
| 0 | DUIK field is not included |
| 1 | DUIK field is included |
| Presence of DUCK (PDUCK): |
| PDUCK indicates whether the DUCK field and the encrypted bitmask field are present or not. |
| Bit |
| **3** |  |
| 0 | DUCK and encrypted bitmask fields are not included |
| 1 | DUCK and encrypted bitmask fields are included |
| DUSK: |
| The DUSK field contains the value of the DUSK. The use of the DUSK is defined in 3GPP TS 33.503 [13]. |
| DUIK: |
| The DUIK field contains the value of the DUIK. The use of the DUIK is defined in 3GPP TS 33.503 [13]. |
| DUCK: |
| The DUCK field contains the value of the DUCK. The use of the DUCK is defined in 3GPP TS 33.503 [13]. |
| Encrypted bitmask: |
| The encrypted bitmask field contains the value of the encrypted bitmask, which is a 184-bit bitmask which uses bit "1" to mark the positions of the bits for which the DUCK encryption is applied. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of PDU session parameters for layer-3 relay contents | octet o511+2octet o511+3 |
| Spare | PATP | PSSCM | PSNSSAI | PDNN | PDU session type | octet o511+4 |
| DNN | octet (o511+5)\*octet o512\* |
| S-NSSAI | octet (o512+1)\*octet (o53-1)\* |
| Spare | Access type preference | SSC mode | octet o53\* |

Figure 5.6.2.16: PDU session parameters for layer-3 relay

Table 5.6.2.16: PDU session parameters for layer-3 relay

|  |
| --- |
| PDU session type (bits 3 to 1 of octet o511+4):The PDU session type field shall be encoded as the PDU session type value part of the PDU session type information element defined in clause 9.11.4.11 of 3GPP TS 24.501 [4]. |
| Presence of DNN (PDNN) (bit 4 of octet o511+4) |
| PDNN indicates whether the DNN field is present or not. |
| Bit |
| **4** |  |
| 0 | DNN field is not included |
| 1 | DNN field is included |
| Presence of S-NSSAI (PSNSSAI) (bit 5 of octet o511+4) |
| PSNSSAI indicates whether the S-NSSAI field is present or not. |
| Bit |
| **5** |  |
| 0 | S-NSSAI field is not included |
| 1 | S-NSSAI field is included |
| Presence of SSC mode (PSSCM) (bit 6 of octet o511+4) |
| PSSCM indicates whether the SSC mode field is present or not. |
| Bit |
| **6** |  |
| 0 | SSC mode field is not included (NOTE) |
| 1 | SSC mode field is included |
| Presence of access type preference (PATP) (bit 7 of octet o511+4) |
| PATP indicates whether the access type preference mode field is present or not. |
| Bit |
| **7** |  |
| 0 | Access type preference field is not included (NOTE) |
| 1 | Access type preference field is included |
| DNN (octet o511+5 to o512):The DNN 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 [10]. |
| S-NSSAI (octet o512+1 to o53-1):The S-NSSAI 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]. |
| SSC mode (bits 3 to 1 of octet o53):The SSC mode field 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]. |
| Access type preference (bits 5 to 4 of octet o53):The access type preference field shall be encoded as the value part of the access type information element defined in clause 9.11.2.1A of 3GPP TS 24.501 [4]. |
| NOTE: Since SSC mode field and access type preference field are coded in the same octet, this octet is not included only when both PSSCM and PATP are set to 0. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of traffic descriptor contents | octet o516+1octet o516+2 |
| Traffic descriptor | octet o516+3octet o53 |

Figure 5.6.2.16a: Traffic descriptor

Table 5.6.2.16a: Traffic descriptor

|  |
| --- |
| Traffic descriptor (octet o516+3 to o53):The traffic descriptor field is coded according to figure 5.2.2 and table 5.2.1 in clause 5.2 of 3GPP TS 24.526 [11]. |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of N3IWF selection information for 5G ProSe layer-3 remote UE | octet l+1octet l+2 |
| N3IWF identifier configuration for 5G ProSe layer-3 remote UE | octet l+3\*octet l0\* |
| 5G ProSe layer-3 UE-to-network relays access node selection information | octet l0+1\*octet m |

Figure 5.6.2.17: N3IWF selection information for 5G ProSe layer-3 remote UE

Table 5.6.2.17: N3IWF selection information for 5G ProSe layer-3 remote UE

|  |
| --- |
| N3IWF identifier configuration for 5G ProSe layer-3 remote UE (octet l+3\* to l0\*):The N3IWF identifier configuration for 5G ProSe layer-3 remote UE contains a list of home N3IWF identifier entries and is coded according to figure 5.6.2.18 and table 5.6.2.18.5G ProSe layer-3 UE-to-network relays access node selection information (octet l0+1\* to m): |
| The 5G ProSe layer-3 UE-to-network relays access node selection information contains a sequence of the N3AN node selection information entries and is coded according to figure 5.6.2.19 and table 5.6.2.19. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of N3IWF identifier configuration for 5G ProSe layer-3 remote UE | octet l+3\*octet l+4\* |
| Contents of N3IWF identifier configuration for 5G ProSe layer-3 remote UE | octet l+5\*octet l01\* |

Figure 5.6.2.18: N3IWF identifier configuration for 5G ProSe layer-3 remote UE

Table 5.6.2.18: N3IWF identifier configuration for 5G ProSe layer-3 remote UE

|  |
| --- |
| Contents of N3IWF identifier configuration for 5G ProSe layer-3 remote UE (octet l+5\* to l01\*):The contents of N3IWF identifier configuration for 5G ProSe layer-3 remote UE shall be encoded as the encoding of home N3IWF identifier configuration defined in clause 5.3.3.3 of 3GPP TS 24.526 [11]. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of 5G ProSe layer-3 UE-to-network relays access node selection information | octet l0+1\*octet l0+2\* |
| Contents of 5G ProSe layer-3 UE-to-network relays access node selection information | octet l0+3\*octet m\* |

Figure 5.6.2.19: 5G ProSe layer-3 UE-to-network relays access node selection information

Table 5.6.2.19: 5G ProSe layer-3 UE-to-network relays access node selection information

|  |
| --- |
| Contents of 5G ProSe layer-3 UE-to-network relays access node selection information (octet l0+3\* to m\*):The contents of 5G ProSe layer-3 UE-to-network relays access node selection information shall be encoded as the encoding of N3AN node selection information defined in clause 5.3.3.2 of 3GPP TS 24.526 [11]. |
| NOTE: In this release of specification, the "preference" bit (as shown in figure 5.3.3.2.2 of 3GPP TS 24.526 [11]) is always set to "0". |

\*\*\*\*\* End of changes \*\*\*\*\*