**3GPP TSG-CT WG1 Meeting #136-eC1-22xxxx**

**E-Meeting, 12th – 20th May 2022**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **24.555** | **CR** | **0010** | **rev** | **1** | **Current version:** | **17.0.0** |  |
|  |
| *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:***  | Resolving the EN related to security parameters used for the UE-to-network relay discovery over PC5 interface |
|  |  |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5G\_ProSe |  | ***Date:*** | 2022-05-04 |
|  |  |  |  |  |
| ***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:*** | The following EN can now be resolved:Editor's note: How to define the Security related parameters for discovery is FFS and depends on SA3 final requirementssince SA3 has already indicated in TS 33.503 that the security for the UE-to-network relay discovery over PC5 interface reuses the same security mechanisms used for 5G ProSe Direct Discovery over PC5, hence the same parameters can be provisioned to the UE (DUSK, DUIK, DUCK). This can be seen in TS 33.503 clause 6.3.2 which states the following:*6.3.2 Security requirements**(…)**- For the discovery, the security requirements in subclause 6.1.2 apply.*This is also aligned with what is specified in clause 8.2.1 in TS 24.554 and its subclauses, where those keys DUSK, DUIK, DUCK are used to process the PC5 discovery messages at the Relay UE and Remote UE.Also clause 6.1.3.2.1 in TS 33.503 states the following, which indicates how the security related parameters look like:*The security parameters needed by a sending UE to protect a discovery message (i.e., in Model A the Announcing UE and in Model B the Discoverer UE sending the ProSe Query Code and the Discoveree UE sending the ProSe Response Code) are provided in the Code-Sending Security Parameters. Similarly, the security parameters needed by a UE receiving a discovery message (i.e., in Model A the Monitoring UE and in Model B the Discoverer UE receiving a ProSe Response Code and the Discoveree receiving a ProSe Query Code) are provided in the Code-Receiving Security Parameters.*Also, there shall be a validity timer that is specific for the Discovery security material. From clause 6.1.3.1 in TS 33.503:*4.         The 5G DDNMF in HPLMN of the Announcing UE returns the ProSe Application Code that the Announcing UE can announce and a Discovery Key associated with it. The 5G DDNMF stores the Discovery Key with the ProSe Application Code. In addition, the 5G DDNMF provides the UE with a CURRENT\_TIME parameter, which contains the current UTC-based time at the 5G DDNMF, a MAX\_OFFSET parameter, and a Validity Timer.*Also from clause 6.1.3.2.2.1 in TS 33.503:*11.       The UE starts announcing, if the UTC-based counter provided by the system associated with the discovery slot is within the MAX\_OFFSET of the Announcing UE's ProSe clock and if the Validity Timer has not expired.*It is worth to note that, this validity timer of the security related parameters for discovery is different than the general validity timer for the configuration parameter for 5G ProSe UE-to-network relay or remote UE, because this new timer is specific for security configuration, where it can have different duration than the general validity timer |
|  |  |
| ***Summary of change:*** | Introducing the security parameters used for the UE-to-network relay discovery over PC5 interface. |
|  |  |
| ***Consequences if not approved:*** | EN is not resolved, and the specification stays incomplete. |
|  |  |
| ***Clauses affected:*** | 2, 3.2, 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 \*\*\*\*\*

# 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 23.304: "Proximity based Services (ProSe) in the 5G System (5GS); Stage 2".

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

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

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

[6] 3GPP TS 23.032: "Universal Geographical Area Description (GAD)".

[7] 3GPP TS 38.331: "NR; Radio Resource Control (RRC) protocol specification".

[8] 3GPP TS 38.101-1: "NR; User Equipment (UE) radio transmission and reception; Part 1: Range 1 Standalone".

[9] 3GPP TS 38.101-2: "NR; User Equipment (UE) radio transmission and reception; Part 2: Range 2 Standalone".

[10] 3GPP TS 23.003: "Numbering, addressing and identification".

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

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

[abc] 3GPP TS 33.503: "Security Aspects of Proximity based Services (ProSe) in the 5G System (5GS)".

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

## 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].

5G ProSe 5G Proximity-based Services

DUCK Discovery User Confidentility Key

DUIK Discovery User Integrity Key

DUSK Discovery User Scrambling Key

ProSeP 5G ProSe Policy

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

### 5.5.2 Information elements coding

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| 0 | 0 | 0 | 0 | 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 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) |
|  |
| 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 l):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. |
|  |
| 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. |
|  |

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

|  |
| --- |
| Authorizated PLMN list for layer-3 relay UE:The authorizated PLMN list for layer-3 relay UE field is coded according to figure 5.5.2.3 and table 5.5.2.3. |
|  |
| Authorizated PLMN list for layer-2 relay UE:The authorizated 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 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. |
| 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 o2\* |

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 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 | 0Spare | Layer indication | octet o511+1 |
| PDU session parameters for layer-3 relay UE | octet (o511+2)octet o530 |
| NR-PC5 UE-to-network relay security policies | 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 (octet o511+1):Bits2 10 1 Layer 31 0 Layer 2The other values are reserved. |
|  |
| PDU session parameters for layer-3 relay UE (octet o511+2 to 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. |
|  |
| NR-PC5 UE-to-network relay security policies (octet o530+1 to octet o53)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. |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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 [abc]. |
|  |
| 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 [abc]. |
|  |
| 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 [abc]. |
|  |
| DUIK: |
| The DUIK field contains the value of the DUIK. The use of the DUIK is defined in 3GPP TS 33.503 [abc]. |
|  |
| DUCK: |
| The DUCK field contains the value of the DUCK. The use of the DUCK is defined in 3GPP TS 33.503 [abc]. |
|  |
| 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 subclause 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 subclause 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 subclause 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 subclause 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\* |

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 |

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 subclause 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. |
|  |

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

### 5.6.2 Information elements coding

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| 0 | 0 | 0 | 0 | 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 |

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) |
|  |
| 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. |
|  |
| 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. |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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 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. |
| 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 o2\* |

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 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 | 0Spare | NSI | LI | octet o511+1 |
| PDU session parameters for layer-3 remote UE | octet (o511+2)\*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. |
|  |
| 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". |
|  |
| PDU session parameters for layer-3 remote UE (octet o511+2 to o53):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. |
|  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 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 [abc]. |
|  |
| 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 [abc]. |
|  |
| 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 [abc]. |
|  |
| DUIK: |
| The DUIK field contains the value of the DUIK. The use of the DUIK is defined in 3GPP TS 33.503 [abc]. |
|  |
| DUCK: |
| The DUCK field contains the value of the DUCK. The use of the DUCK is defined in 3GPP TS 33.503 [abc]. |
|  |
| 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 subclause 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 subclause 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 subclause 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 subclause 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 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 \*\*\*\*\*