**3GPP TSG-CT WG1 Meeting #128-eC1-XXXX**

**Electronic meeting, 25 February – 5 March 2021 *was C1-210978***

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **24.526** | **CR** | **0111** | **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 |  |

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|  |
| ***Title:***  | Encoding of Location Criteria Type |
|  |  |
| ***Source to WG:*** | Huawei, HiSilicon, Ericsson |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | TEI16 |  | ***Date:*** | 2021-02-18 |
|  |  |  |  |  |
| ***Category:*** | **A** |  | ***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 Location Criteria type route selection descriptor component contains one or more location area, as the following figure quoted from the TS 24.526 shows.There is no length/number field in the Location Criteria IE. Hence even implementers can calculate how long the 1st location area is according to the “Type of location area” and “Number of XXX identifiers” fields, the implementers do not know the bytes afterwards is the 2nd location area or belong to other new IEs.It is proposed to define the 1st Octect of the Location criteria IE as the “Length of location criteria” field. The propsed change is backward incompatible. |
|  |  |
| ***Summary of change:*** | Add the length field to the Location Criteria IE |
|  |  |
| ***Consequences if not approved:*** | Decoding failure |
|  |  |
| ***Clauses affected:*** | 5.2 |
|  |  |
|  | **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:*** |  |

\*\*\*\*\* start of change\*\*\*\*\*

## 5.2 Encoding of UE policy part type URSP

The UE policy part type URSP contains one or more URSP rules which may be included in the UE policy part contents as defined in annex D.6.2 of 3GPP TS 24.501 [11].

If the UE policy part contents includes one or more URSP rules (i.e. the UE policy part type field is set to "URSP"), the UE policy part contents including URSP rules is encoded as shown in figures 5.2.1 to 5.2.4 and table 5.2.1.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| URSP rule 1 | octet q+3octet s |
| URSP rule 2 | octet s+1\*octet t\* |
| … | octet t+1\*octet u\* |
| URSP rule n | octet u+1\*octet r\* |

Figure 5.2.1: UE policy part contents including one or more URSP rules

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

Figure 5.2.2: URSP rule

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Route selection descriptor 1 | octet w+3octet y |
| Route selection descriptor 2 | octet y+1\*octet z\* |
| … | octet z+1\*octet a\* |
| Route selection descriptor m | octet a+1\*octet x\* |

Figure 5.2.3: Route selection descriptor list

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

Figure 5.2.4: Route selection descriptor

Table 5.2.1: UE policy part contents including a URSP rule

|  |
| --- |
| Precedence value of URSP rule (octet v+2)The precedence value of URSP rule field is used to specify the precedence of the URSP rule among all URSP rules in the URSP. This field includes the binary encoded value of the precedence value in the range from 0 to 255 (decimal). The higher the value of the precedence value field, the lower the precedence of the URP rule is. Multiple URSP rules in the URSP shall not have the same precedence value. |
| Traffic descriptor (octets v+5 to w)The traffic descriptor field is of variable size and contains a variable number (at least one) of traffic descriptor components. Each traffic descriptor component shall be encoded as a sequence of one octet traffic descriptor component type identifier and a traffic descriptor component value field. The traffic descriptor component type identifier shall be transmitted first. |
| Traffic descriptor component type identifierBits8 7 6 5 4 3 2 10 0 0 0 0 0 0 1 Match-all type0 0 0 0 1 0 0 0 OS Id + OS App Id type (NOTE 1)(NOTE 3)0 0 0 1 0 0 0 0 IPv4 remote address type0 0 1 0 0 0 0 1 IPv6 remote address/prefix length type0 0 1 1 0 0 0 0 Protocol identifier/next header type0 1 0 1 0 0 0 0 Single remote port type 0 1 0 1 0 0 0 1 Remote port range type0 1 0 1 0 0 1 0 IP 3 tuple type0 1 1 0 0 0 0 0 Security parameter index type0 1 1 1 0 0 0 0 Type of service/traffic class type1 0 0 0 0 0 0 0 Flow label type1 0 0 0 0 0 0 1 Destination MAC address type1 0 0 0 0 0 1 1 802.1Q C-TAG VID type (NOTE 4)1 0 0 0 0 1 0 0 802.1Q S-TAG VID type (NOTE 4)1 0 0 0 0 1 0 1 802.1Q C-TAG PCP/DEI type (NOTE 4)1 0 0 0 0 1 1 0 802.1Q S-TAG PCP/DEI type (NOTE 4)1 0 0 0 0 1 1 1 Ethertype type1 0 0 0 1 0 0 0 DNN type (NOTE 3)1 0 0 1 0 0 0 0 Connection capabilities type (NOTE 3)1 0 0 1 0 0 0 1 Destination FQDN1 0 0 1 0 0 1 0 Regular expression1 0 1 0 0 0 0 0 OS App Id type (NOTE 3)All other values are spare. If received they shall be interpreted as unknown. |
| For "match-all type", the traffic descriptor component shall not include the traffic descriptor component value field. The "match-all type" traffic descriptor component shall not appear more than once among all traffic descriptors of the whole URSP rules in the URSP. If the "match-all type" traffic descriptor component is included in a traffic descriptor, there shall be no traffic descriptor component with a type other than "match-all type" in the traffic descriptor. |
| For "OS Id + OS App Id type", the traffic descriptor component value field shall be encoded as a sequence of a sixteen octet OS Id field, a one octet OS App Id length field, and an OS App Id field. The OS Id field shall be transmitted first. The OS Id field contains a Universally Unique IDentifier (UUID) as specified in IETF RFC 4122 [16]. |
| For "IPv4 remote address type", the traffic descriptor component value field shall be encoded as a sequence of a four octet IPv4 address field and a four octet IPv4 address mask field. The IPv4 address field shall be transmitted first. |
| For "IPv6 remote address/prefix length type", the traffic descriptor component value field shall be encoded as a sequence of a sixteen octet IPv6 address field and one octet prefix length field. The IPv6 address field shall be transmitted first. |
|  |
| For "protocol identifier/next header type", the traffic descriptor component value field shall be encoded as one octet which specifies the IPv4 protocol identifier or IPv6 next header. |
| For "single remote port type", the traffic descriptor component value field shall be encoded as two octets which specify a port number. |
| For "remote port range type", the traffic descriptor component value field shall be encoded as a sequence of a two octet port range low limit field and a two octet port range high limit field. The port range low limit field shall be transmitted first. |
| For "IP 3 tuple type", the traffic descriptor component value field shall be encoded as a sequence of a one octet IP 3 tuple information bitmap field where:- bit 1 set to zero indicates that the IPv4 address field is absent; - bit 1 set to one indicates that the IPv4 address field is present;- bit 2 set to zero indicates that the IPv6 remote address/prefix length field is absent; - bit 2 set to one indicates that the IPv6 remote address/prefix length field is present;- bit 3 set to zero indicates that the protocol identifier/next header field is absent; - bit 3 set to one indicates that the protocol identifier/next header field is present;- bit 4 set to zero indicates that the single remote port field is absent; - bit 4 set to one indicates that the single remote port field is present;- bit 5 set to zero indicates that the remote port range field is absent; - bit 5 set to one indicates that the remote port range field is present; and- bits 6,7, and 8 are spare bits;followed by a four octet IPv4 address field and a four octet IPv4 address mask field, if the IPv4 address field is present;followed by a sixteen octet IPv6 address field and one octet prefix length field, if the IPv6 remote address/prefix length field is present;followed by one octet which specifies the IPv4 protocol identifier or IPv6 next header, if the protocol identifier/next header field is present;followed by two octets which specify a port number, if the single remote port field is present;followed by a two octet port range low limit field and a two octet port range high limit field, if the remote port range field is present.The IP 3 tuple information bitmap field shall be transmitted first.The traffic descriptor component value field shall not contain both the IPv4 address field and the IPv6 remote address/prefix length field. If the traffic descriptor component value field contains both the IPv4 address field and the IPv6 remote address/prefix length field, the receiving entity shall ignore the URSP rule.The traffic descriptor component value field shall not contain both the single remote port field and the remote port range field. If the traffic descriptor component value field contains both the single remote port field and the remote port range field, the receiving entity shall ignore the URSP rule.The traffic descriptor component value field shall contain at least one of the IPv4 address field, IPv6 remote address/prefix length field, the protocol identifier/next header field, the single remote port field and the remote port range field, otherwise the receiving entity shall ignore the URSP rule. |
| For "security parameter index type", the traffic descriptor component value field shall be encoded as four octets which specify the IPsec security parameter index. |
| For "type of service/traffic class type", the traffic descriptor component value field shall be encoded as a sequence of a one octet type-of-service/traffic class field and a one octet type-of-service/traffic class mask field. The type-of-service/traffic class field shall be transmitted first. |
| For "flow label type", the traffic descriptor component value field shall be encoded as three octets which specify the IPv6 flow label. The bits 8 through 5 of the first octet shall be spare whereas the remaining 20 bits shall contain the IPv6 flow label. |
| For "destination MAC address type", the traffic descriptor component value field shall be encoded as 6 octets which specify a MAC address. |
| For "802.1Q C-TAG VID type", the traffic descriptor component value field shall be encoded as two octets which specify the VID of the customer-VLAN tag (C-TAG) as specified in IEEE Std 802.1Q-2018 [20]. The bits 8 through 5 of the first octet shall be spare whereas the remaining 12 bits shall contain the VID. |
| For "802.1Q S-TAG VID type", the traffic descriptor component value field shall be encoded as two octets which specify the VID of the service-VLAN tag (S-TAG) as specified in IEEE Std 802.1Q-2018 [20]. The bits 8 through 5 of the first octet shall be spare whereas the remaining 12 bits shall contain the VID. |
| For "802.1Q C-TAG PCP/DEI type", the traffic descriptor component value field shall be encoded as one octet which specifies the 802.1Q C-TAG PCP and DEI as specified in IEEE Std 802.1Q-2018 [20]. The bits 8 through 5 of the octet shall be spare, and the bits 4 through 2 contain the PCP and bit 1 contains the DEI. |
| For "802.1Q S-TAG PCP/DEI type", the traffic descriptor component value field shall be encoded as one octet which specifies the 802.1Q S-TAG PCP as specified in IEEE Std 802.1Q-2018 [20]. The bits 8 through 5 of the octet shall be spare, and the bits 4 through 2 contain the PCP and bit 1 contains the DEI. |
| For "ethertype type", the traffic descriptor component value field shall be encoded as two octets which specify an ethertype. |
| For "DNN type", the traffic descriptor component value field shall be encoded as a sequence of a one octet DNN length field and a DNN value field of a variable size. The DNN value contains an APN as defined in 3GPP TS 23.003 [4]. |
| For "connection capabilities” type, the traffic descriptor component value field shall be encoded as a sequence of one octet for number of network capabilities followed by one or more octets, each containing a connection capability identifier encoded as follows:Bits8 7 6 5 4 3 2 10 0 0 0 0 0 0 1 IMS0 0 0 0 0 0 1 0 MMS0 0 0 0 0 1 0 0 SUPL0 0 0 0 1 0 0 0 InternetAll other values are spare. If received they shall be interpreted as unknown. |
| For "destination FQDN" type, the traffic descriptor component value field shall be encoded as a sequence of one octet destination FQDN length field and a destination FQDN value of variable size. The destination FQDN value field shall be encoded as defined in subclause 28.3.2.1 in 3GPP TS 23.003 [4]. For "regular expression" type, the traffic descriptor component value field shall be encoded as a sequence of one octet regular expression length field and a regular expression value of variable size. The regular expression value field shall take the form of Extended Regular Expressions (ERE) as defined in chapter 9 in IEEE 1003.1-2004 Part 1 [19]. |
| For "OS App Id type", the traffic descriptor component value field shall be encoded as a one octet OS App Id length field and an OS App Id field. |
| Precedence value of route selection descriptor (octet b+2)The precedence value of route selection descriptor field is used to specify the precedence of the route selection descriptor among all route selection descriptors in the URSP rule. This field includes the binary encoded value of the precedence value in the range from 0 to 255 (decimal). The higher the value of the precedence value field, the lower the precedence of the route selection descriptor is. |
| Route selection descriptor contents (octets b+5 to c)The route selection descriptor contents field is of variable size and contains a variable number (at least one) of route selection descriptor components. Each route selection descriptor component shall be encoded as a sequence of a one octet route selection descriptor component type identifier and a route selection descriptor component value field. The route selection descriptor component type identifier shall be transmitted first. |
| Route selection descriptor component type identifierBits8 7 6 5 4 3 2 10 0 0 0 0 0 0 1 SSC mode type0 0 0 0 0 0 1 0 S-NSSAI type0 0 0 0 0 1 0 0 DNN type0 0 0 0 1 0 0 0 PDU session type type0 0 0 1 0 0 0 0 Preferred access type type (NOTE 2)0 0 0 1 0 0 0 1 Multi-access preference type (NOTE 2)0 0 1 0 0 0 0 0 Non-seamless non-3GPP offload indication type0 1 0 0 0 0 0 0 Location criteria type1 0 0 0 0 0 0 0 Time window typeAll other values are spare. If received they shall be interpreted as unknown. |
| For "SSC mode type", the route selection descriptor component value field shall be encoded as a one octet SSC mode field. The bits 8 through 4 of the octet shall be spare, and the bits 3 through 1 shall be encoded as the value part of the SSC mode information element defined in subclause 9.11.4.16 of 3GPP TS 24.501 [11]. The "SSC mode type" route selection descriptor component shall not appear more than once in the route selection descriptor. |
| For "S-NSSAI type", the route selection descriptor component value field shall be encoded as a sequence of a one octet S-NSSAI length field and an S-NSSAI value field of a variable size. The S-NSSAI value shall be encoded as the value part of the S-NSSAI information element defined in subclause 9.11.2.8 of 3GPP TS 24.501 [11]. |
| For "DNN type", the route selection descriptor component value field shall be encoded as a sequence of a one octet DNN length field and a DNN value field of a variable size. The DNN value contains an APN as defined in 3GPP TS 23.003 [4]. |
| For "PDU session type type", the route selection descriptor component value field shall be encoded as a one octet PDU session type field. The bits 8 through 4 of the octet shall be spare, and the bits 3 through 1 shall be encoded as the value part of the PDU session type information element defined in subclause 9.11.4.11 of 3GPP TS 24.501 [11]. The "PDU session type type" route selection descriptor component shall not appear more than once in the route selection descriptor. |
| For "preferred access type type", the route selection descriptor component value field shall be encoded as a one octet preferred access type field. The bits 8 through 3 shall be spare, and the bits 2 and 1 shall be encoded as the value part of the access type information element defined in subclause 9.11.2.1A of 3GPP TS 24.501 [11]. The "preferred access type type" route selection descriptor component shall not appear more than once in the route selection descriptor. |
| For "multi-access preference type", the route selection descriptor component value field shall be of zero length. The "multi-access preference type" route selection descriptor component shall not appear more than once in the route selection descriptor. The "multi-access preference type" route selection descriptor component in the route selection descriptor indicates the multi-access preference. |
| For "non-seamless non-3GPP offload indication type", the route selection descriptor component shall not include the route selection descriptor component value field. The "non-seamless non-3GPP offload indication type" route selection descriptor component shall not appear more than once in the route selection descriptor. If the "non-seamless non-3GPP offload indication type" route selection descriptor component is included in a route selection descriptor, there shall be no route selection descriptor component with a type other than "non-seamless non-3GPP offload indication type" in the route selection descriptor. |
|  |
| For "location criteria type", the route selection descriptor component value field may contain one or more types of location area and is encoded as shown in Figure 5.2.5 and Table 5.2.2. |
| For "time window type", the route selection descriptor component value field shall be encoded as a sequence of a Starttime field and a Stoptime field. The Starttime field is represented by the number of seconds since 00:00:00 on 1 January 1970 and is encoded as the 64-bit NTP timestamp format defined in IETF RFC 5905 [17], where binary encoding of the integer part is in the first 32 bits and binary encoding of the fraction part in the last 32 bits. The encoding of the Stoptime filed is the same as the Starttime field. |
|  |
|  |
| NOTE 1: For "OS Id + OS App Id type", the traffic descriptor component value field does not specify the OS version number or the version number of the application.NOTE 2: The PCF does not include both the "preferred access type type" and the "multi-access preference type" route selection descriptor components in a single route selection descriptor. If there are both "preferred access type type" and "multi-access preference type" route selection descriptor components in a single route selection descriptor, the UE ignores the "preferred access type type" route selection descriptor component.NOTE 3: The W-AGF acting on behalf of the FN-RG shall interpret the value as unknown. NOTE 4: The traffic descriptor of a URSP rule cannot include more than one instance of this traffic component type. |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of location criteriaLocation area 1 | octet doctet eoctet f |
| Location area 2 | octet f+1\*octet g\* |
| … | octet g+1\*octet h\* |
| Location area m | octet h+1\*octet i\* |

Figure 5.2.5: Location criteria

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Type of location area | octet e |
| Location area contents | octet e+1\*octet f\* |

Figure 5.2.6: Location area

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Number of E-UTRA cell identities | octet e+1 |
| E-UTRA cell id 1 | octet e+2octet e+8 |
| E-UTRA cell id 2 | octet e+9octet e+15 |
| … | octet e+16octet f-1\* |
| E-UTRA cell id n | octet f\*octet f+6\* |

Figure 5.2.7: Location area contents {Type of location area = E-UTRA cell identities list}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Number of NR cell identities | octet e+1 |
| NR cell id 1 | octet e+2octet e+9 |
| NR cell id 2 | octet e+10octet e+17 |
| … | octet e+18octet f-1\* |
| NR cell id n | octet f\*octet f+7\* |

Figure 5.2.8: Location area contents {Type of location area = NR cell identities list}

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Number of Global gNB identities | octet e+1 |
| Global gNB id 1 | octet e+2octet e+8 |
| Global gNB id 2 | octet e+9octet e+15 |
| … | octet e+16octet f-1\* |
| Global gNB id n | octet f\*octet f+6\* |

Figure 5.2.9: Location area contents {Type of location area = Global RAN node identities list}

Table 5.2.2: Location criteria

|  |
| --- |
| Length of location criteria (octect d)This filed indicates the length of the included Location criteria contents.Type of location area is coded as follows. |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |  | E-UTRA cell identities list |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |  | NR cell identities list |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |  | Global RAN node identities list |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |  | TAI list |
| All other values are spare. |
|  |
| When the type of location area is "E-UTRA cell identities list", the location area contents shall be encoded as in Figure 5.2.7. Each E-UTRA cell id field is of 7 octet size and shall be encoded as specified in subclause 9.3.1.9 of 3GPP TS 38.413 [14]. |
|  |
| When the type of location area is "NR cell identities list", the location area contents shall be encoded as in Figure 5.2.8. Each NR cell id field is of 8 octet size shall be encoded as specified in subclause 9.3.1.7 of 3GPP TS 38.413 [14]. |
|  |
| When the type of location area is "Global RAN node identities list", the location area contents shall be encoded as in Figure 5.2.8. Each Global gNB id field is of 7 octet size shall be encoded as specified in subclause 9.3.1.6 of 3GPP TS 38.413 [14]. |
|  |
| When the type of location area is "TAI list", the location area contents shall be encoded as the 5GS tracking area identity list information element (starting with octet 2) defined in subclause 9.11.3.9 of 3GPP TS 24.501 [11]. |
|  |

\*\*\*\*\*\* end of change\*\*\*\*\*\*