**3GPP TSG-CT WG1 Meeting #131-eC1-21xxxx**

**Electronic meeting, 19-27 August 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **24.501** | **CR** | **3504** | **rev** | **1** | **Current version:** | **17.3.1** |  |
|  |
| *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:***  | Maximum number of S-NSSAIs in an NSSAI |
|  |  |
| ***Source to WG:*** | Nokia, Nokia Shanghai Bell |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | 5GProtoc17 |  | ***Date:*** | 2021-08-22 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***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:*** | For each of the NSSAIs, the TS specifies:1. the maximum number of S-NSSAIs which can be included in the NSSAI in a note; and
2. what the recipient should do if more S-NSSAIs are included in the NSSAI.

This can lead to a wrong implementation by the sender because the TS implies that:1. sending more S-NSSAIs is not prohibited; and
2. even if more S-NSSAIs are sent, the recipient can handle it which creates unnecessary burden to the recipient.

The right direction should be to put a normative requirement on the maximum number of S-NSSAIs in the NSSAI. |
|  |  |
| ***Summary of change:*** | Normative requirements are specified on the maximum number of S-NSSAIs in each of the NSSAIs. |
|  |  |
| ***Consequences if not approved:*** | The sender of an NSSAI can include more S-NSSAIs in an NSSAI exceeding the limit. |
|  |  |
| ***Clauses affected:*** | 9.11.3.37, 9.11.3.46, 9.11.3.75 |
|  |  |
|  | **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:*** |  |

#### 9.11.3.37 NSSAI

The purpose of the NSSAI information element is to identify a collection of S-NSSAIs

The NSSAI information element is coded as shown in figure 9.11.3.37.1 and table 9.11.3.37.1.

The NSSAI is a type 4 information element with a minimum length of 4 octets and a maximum length of 146 octets.

NOTE: More than one S-NSSAIs in an NSSAI can have the same SST values, and optionally same SD values, which are associated with different mapped HPLMN SST values and optionally mapped HPLMN SD values.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| NSSAI IEI | octet 1 |
| Length of NSSAI contents | octet 2 |
| S-NSSAI value 1 | octet 3octet m  |
| S-NSSAI value 2 | octet m+1\*octet n\* |
| … | octet n+1\*octet u\* |
| S-NSSAI value n | octet u+1\*octet v\* |

Figure 9.11.3.37.1: NSSAI information element

Table 9.11.3.37.1: NSSAI information element

|  |
| --- |
| Value part of the NSSAI information element (octet 3 to v)The value part of the NSSAI information element consists of one or more S-NSSAI values. Each S-NSSAI value consists of one S-NSSAI and optionally one mapped S-NSSAI.The recipient of this information element shall store the complete list received (NOTE 1, NOTE 2, NOTE 3). If the NSSAI information element conveys an allowed NSSAI and more than 8 S-NSSAI values are included in this information element, the UE shall store the first 8 S-NSSAI values and ignore the remaining octets of the information element. If the NSSAI information element conveys a configured NSSAI or pending NSSAI and more than 16 S-NSSAI values are included in this information element, the UE shall store the first 16 S-NSSAI values and ignore the remaining octets of the information element.S-NSSAI value:S-NSSAI value is coded as the length and value part of S-NSSAI information element as specified in subclause 9.11.2.8 starting with the second octet. |
| NOTE 1: The total number of S-NSSAI values in a requested NSSAI shall not exceed eight.NOTE 2: The number of S-NSSAI values in an allowed NSSAI shall not exceed eight.NOTE 3: The number of S-NSSAI values in a configured NSSAI or pending NSSAI shall not exceed sixteen. |

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

#### 9.11.3.46 Rejected NSSAI

The purpose of the Rejected NSSAI information element is to identify a collection of rejected S-NSSAIs.

The Rejected NSSAI information element is coded as shown in figure 9.11.3.46.1, figure 9.11.3.46.2 and table 9.11.3.46.1.

The Rejected NSSAI is a type 4 information element with a minimum length of 4 octets and a maximum length of 42 octets.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Rejected NSSAI IEI | octet 1 |
| Length of Rejected NSSAI contents | octet 2 |
| Rejected S-NSSAI 1 | octet 3octet m  |
| Rejected S-NSSAI 2 | octet m+1\*octet n\* |
| … | octet n+1\*octet u\* |
| Rejected S-NSSAI n | octet u+1\*octet v\* |

Figure 9.11.3.46.1: Rejected NSSAI information element

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of rejected S-NSSAI | Cause value | octet 3 |
| SST | octet 4 |
| SD | octet 5\*octet 7\* |

Figure 9.11.3.46.2: Rejected S-NSSAI

Table 9.11.3.46.1: Rejected NSSAI information element

|  |
| --- |
| Value part of the Rejected NSSAI information element (octet 3 to v) |
|  |
| The value part of the Rejected NSSAI information element consists of one or more rejected S-NSSAIs. Each rejected S-NSSAI consists of one S-NSSAI and an associated cause value. The length of each rejected S-NSSAI can be determined by the 'length of rejected S-NSSAI' field in the first octet of the rejected S-NSSAI. |
| The UE shall store the complete list received (NOTE 0). If more than 8 rejected S-NSSAIs are included in this information element, the UE shall store the first 8 rejected S-NSSAIs and ignore the remaining octets of the information element. |
|  |
| Rejected S-NSSAI: |
|  |
| Cause value (octet 3) |
| Bits |
| 4 | 3 | 2 | 1 |  |  |
| 0 | 0 | 0 | 0 |  | S-NSSAI not available in the current PLMN or SNPN |
| 0 | 0 | 0 | 1 |  | S-NSSAI not available in the current registration area |
| 0 | 0 | 1 | 0 |  | S-NSSAI not available due to the failed or revoked network slice-specific authentication and authorization. |
| All other values are reserved. |
|  |
| Slice/service type (SST) (octet 4) |
| This field contains the 8 bit SST value. The coding of the SST value part is defined in 3GPP TS 23.003 [4]. (NOTE 2) |
|  |
| Slice differentiator (SD) (octet 5 to octet 7) |
| This field contains the 24 bit SD value. The coding of the SD value part is defined in 3GPP TS 23.003 [4]. (NOTE 3) |
| NOTE 0: The number of rejected S-NSSAI(s) shall not exceed eight.NOTE 1: If octet 5 is included, then octet 6 and octet 7 shall be included. NOTE 2: If the Cause value is “S-NSSAI not available due to the failed or revoked network slice-specific authentication and authorization”, this field shall contain the 8 bit SST value of an S-NSSAI in the S-NSSAI(s) of the HPLMN.NOTE 3: If the Cause value is “S-NSSAI not available due to the failed or revoked network slice-specific authentication and authorization”, this field shall contain the 24 bit SD value of an S-NSSAI in the S-NSSAI(s) of the HPLMN. |

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

#### 9.11.3.75 Extended rejected NSSAI

The purpose of the Extended rejected NSSAI information element is to identify a collection of rejected S-NSSAIs if UE supports extended rejected NSSAI.

The Extended rejected NSSAI information element is coded as shown in figure 9.11.3.75.1, figure 9.11.3.75.2 and table 9.11.3.75.1.

The Extended rejected NSSAI is a type 4 information element with a minimum length of 4 octets and a maximum length of 74 octets.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Extended rejected NSSAI IEI | octet 1 |
| Length of Extended rejected NSSAI contents | octet 2 |
| Partial extended rejected NSSAI list 1 | octet 3octet m  |
| Partial extended rejected NSSAI list 2 | octet m+1\*octet n\* |
| … | octet n+1\*octet u\* |
| Partial extended rejected NSSAI list n | octet u+1\*octet v\* |

Figure 9.11.3.75.1: Extended rejected NSSAI information element

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| spare | Type of list | Number of elements | octet 3 |
| Rejected S-NSSAI 1 | octet 4octet j |
| Rejected S-NSSAI 2 | octet j+1\*octet k\* |
| … | octet k+1octet p\* |
| Rejected S-NSSAI n | octet p+1\*octet m\* |

Figure 9.11.3.75.2: Partial extended rejected NSSAI list – type of list = 000

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| spare | Type of list | Number of elements | octet 3 |
| Back-off timer value | octet 4 |
| Rejected S-NSSAI 1 | octet 5octet j |
| Rejected S-NSSAI 2 | octet j+1\*octet k\* |
| … | octet k+1\*octet p\* |
| Rejected S-NSSAI n | octet p+1\*octet m\* |

Figure 9.11.3.75.3: Partial extended rejected NSSAI list – type of list = 001

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Length of rejected S-NSSAI | Cause value | octet 4 |
| SST | octet 5 |
| SD | octet 6\*octet 8\* |
| Mapped HPLMN SST | octet 9\* |
| Mapped HPLMN SD | octet 10\*octet 12\* |

Figure 9.11.3.75.4: Rejected S-NSSAI

Table 9.11.3.75.1: Extended rejected NSSAI information element

|  |
| --- |
| Value part of the Extended rejected NSSAI information element (octet 3 to v) |
|  |
| The value part of the Extended rejected NSSAI information element consists of one or more partial extended rejected NSSAI lists. The length of each partial extended rejected NSSAI list can be determined from the 'type of list' field and the 'number of elements' field in the first octet of the partial extended rejected NSSAI list.Each rejected S-NSSAI consists of one S-NSSAI and an associated cause value. Each rejected S-NSSAI also includes the mapped HPLMN S-NSSAI if available. The length of each rejected S-NSSAI can be determined by the 'length of rejected S-NSSAI' field in the first octet of the rejected S-NSSAI. |
| The UE shall store the complete list received (NOTE 0). If more than 8 rejected S-NSSAIs are included in this information element, the UE shall store the first 8 rejected S-NSSAIs and ignore the remaining octets of the information element. |
|  |
| Partial extended rejected NSSAI list: |
|  |
| Number of elements (octet 3, bits 1 to 4) |
| Bits |
| 4 | 3 | 2 | 1 |  |
| 0 | 0 | 0 | 0 | 1 element |
| 0 | 0 | 1 | 0 | 2 element |
|  |  | … |  |  |
| 0 | 1 | 1 | 0 | 7 element |
| 0 | 1 | 1 | 1 | 8 element |
|  |
| All other values are unused and shall be interpreted as 8, if received by the UE. |
|  |
| Type of list (octet 3, bits 5 to 7) (NOTE 7) |
| Bits |
| 7 | 6 | 5 |  |  |
| 0 | 0 | 0 |  | list of S-NSSAIs without any associated back-off timer value |
| 0 | 0 | 1 |  | list of S-NSSAIs with one associated back-off timer value that applies to all S-NSSAIs in the list |
|  |
| All other values are reserved. |
|  |
| Bit 8 of octet 3 is spare and shall be coded as zero. |
|  |
| Back-off timer value (octet 4): |
|  |
| Back-off timer value is coded as the value part of GPRS timer 3 in subclause 10.5.7.4a in 3GPP TS 24.008 [12]. |
|  |
| Rejected S-NSSAI: |
|  |
| Cause value (octet 4) |
| Bits |
| 4 | 3 | 2 | 1 |  |  |
| 0 | 0 | 0 | 0 |  | S-NSSAI not available in the current PLMN or SNPN |
| 0 | 0 | 0 | 1 |  | S-NSSAI not available in the current registration area |
| 0 | 0 | 1 | 0 |  | S-NSSAI not available due to the failed or revoked network slice-specific authentication and authorization |
| 0 | 0 | 1 | 1 |  | S-NSSAI not available due to maximum number of UEs reached |
| All other values are reserved. |
|  |
| Slice/service type (SST) (octet 5) |
| This field contains the 8 bit SST value. The coding of the SST value part is defined in 3GPP TS 23.003 [4]. (NOTE 5) |
|  |
| Slice differentiator (SD) (octet 6 to octet 8) |
| This field contains the 24 bit SD value. The coding of the SD value part is defined in 3GPP TS 23.003 [4]. (NOTE 6)If the SST encoded in octet 4 is not associated with a valid SD value, and the sender needs to include a mapped HPLMN SST (octet 8) and a mapped HPLMN SD (octets 9 to 11), then the sender shall set the SD value (octets 5 to 7) to "no SD value associated with the SST".mapped HPLMN Slice/service type (SST) (octet 9)This field contains the 8 bit SST value of an S-NSSAI in the S-NSSAI(s) of the HPLMN to which the SST value is mapped. The coding of the SST value part is defined in 3GPP TS 23.003 [4].mapped HPLMN Slice differentiator (SD) (octet 10 to octet 12)This field contains the 24 bit SD value of an S-NSSAI in the S-NSSAI(s) of the HPLMN to which the SD value is mapped. The coding of the SD value part is defined in 3GPP TS 23.003 [4]. |
| NOTE 0: The number of rejected S-NSSAI(s) shall not exceed eight.NOTE 1: Octet 4 and octet 5 shall always be included.NOTE 2: If the octet 6 is included, then octet 7 and octet 8 shall be included.NOTE 3: If the octet 9 is included, then octets 10, 11, and 12 may be included.NOTE 4: If the octet 10 is included, then octet 11 and octet 12 shall be included.NOTE 5: If the Cause value is "S-NSSAI not available due to the failed or revoked network slice-specific authentication and authorization", this field shall contain the 8 bit SST value of an S-NSSAI in the S-NSSAI(s) of the HPLMN and octets 9, 10, 11, and 12 shall not be included.NOTE 6: If the Cause value is "S-NSSAI not available due to the failed or revoked network slice-specific authentication and authorization", this field shall contain the 24 bit SD value of an S-NSSAI in the S-NSSAI(s) of the HPLMN and octets 9, 10, 11, and 12 shall not be included.NOTE 7: The partial extended rejected NSSAI with type of list = 001 shall only be used for rejected S-NSSAI(s) with the rejection cause "S-NSSAI not available due to maximum number of UEs reached". |
|  |