**3GPP TSG-CT3 Meeting #130C3-234298**

**Xiamen, China, 9 - 13 October, 2023 (Revision of C3-233222)**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **29.122** | **CR** | **0733** | **rev** | **1** | **Current version:** | **18.3.0** |  |
|  | | | | | | | | |
| *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 |  | Radio Access Network |  | Core Network | **X** |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Corrections to user plane events descriptions | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Ericsson, Nokia, Nokia Shanghai Bell | | | | | | | | | |
| ***Source to TSG:*** | CT3 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NBI18 | | | | |  | ***Date:*** | | | 2023-08-01 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *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 can be 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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | "enNB" feature explicit event subscription procedures descriptions on USAGE\_REPORT event without usage threshold will arouse not workable problems in ChargeableParty API and AsSessionWithQoS API.  Hence the USAGE\_REPORT related error handling . | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | In clause 4.4.4 and clause 4.4.13:   * Adding procedures description for usage report error handling. * Adding feature and application errors for usage report error handling. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | Not aligned "enNB" feature explicit event subscription procedures descriptions on USAGE\_REPORT event, arouse wrong implementation. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 4.4.4, 4.4.13, 5.5.4, 5.5.5.3, 5.14.4, 5.14.5.3 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 does not impact the OpenAPI file. | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | Revision to C3-233222:  Updated as adding Usage Report Error handling. | | | | | | | | |

**Additional discussion(if needed):**

**Proposed changes:**

\*\*\* 1st Change \*\*\*

### 4.4.4 Procedures for changing the chargeable party at session set up or during the session

This procedure is used by an SCS/AS to either request to sponsor the traffic from the beginning or to request becoming the chargeable party at a later point in time via the T8 interface.

When setting up the connection between the AS and the UE via the SCEF, the SCS/AS shall send an HTTP POST request to the SCEF, targeting the "Chargeable Party Transactions" resource, to become the chargeable party for the session to be set up. The body of the HTTP POST message shall include the SCS/AS Identifier, UE IP address, IP Flow description, Sponsor ID, ASP ID, Sponsoring Status, notification destination URI identifying the recipient of notifications within the "notificationDestination" attribute and may include the time period and/or traffic volume used for sponsoring. The SCS/AS may also request to activate a previously selected policy of background data transfer by including the associated Reference ID in the body of the HTTP POST message. If the feature AppId is supported, either the Flow description or an external Application Identifier shall be included.

After receiving the HTTP POST request, if the authorization performed by the SCEF is successful, the SCEF shall act as an AF and interact with the PCRF via the Rx interface, as defined in 3GPP TS 29.214 [10] or 3GPP TS 29.201 [13], to trigger a PCRF initiated IP-CAN Session Modification. The SCEF may map the SCS/AS Identifier to AF Application Identifier if the external Application Identifier is not provided and only one AF Application Identifier is mapped and may request to be notified about the traffic plane status based on local configuration. If the time period and/or traffic volume are received from the SCS/AS, the SCEF should subscribe with the PCRF to the USAGE\_REPORT event.

If the "enNB" feature is supported, the SCEF may explicitly receive a list of event(s) that the SCS/AS requests to subscribe to. The SCEF shall subscribe to the corresponding PCRF event(s) (e.g. INDICATION\_OF\_SUCCESSFUL\_RESOURCE\_ALLOCATION) for the received event(s) (e.g. SUCCESSFUL\_RESOURCES\_ALLOCATION) except for SESSION\_TERMINATION event.

NOTE 1: PCRF does not need explicit subscription in order to notify Rx session termination.

If the the "UsageReportErrors" feature is supported and the SCEF receives an SCS/AS explicitly subscribed event "USAGE\_REPORT" while not providing the corresponding sponsor data quota of time period and/or traffic volume in the "usageThreshold" attribute, the SCEF shall reject the request by sending an HTTP "403 Forbidden" HTTP error response including the "USAGE\_REPORT\_MISSING\_QUOTA" application error within the "cause" attribute of the "ProblemDetails" structure.

After receiving a successful response from the PCRF, the SCEF shall create a new "Individual Chargeable Party Transaction" resource, which represents the chargeable party transaction, addressed by a URI that contains the SCS/AS identity and an SCEF-created transaction identifier, and shall respond to the SCS/AS with a 201 Created status code, including a Location header field containing the URI of the created resource. The SCS/AS shall use the URI received in the Location header in subsequent requests to the SCEF to refer to this chargeable party transaction. If the SCEF receives a response with an error code from the PCRF, the SCEF shall not create a resource and respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

In order to update the sponsoring status of an established AS session, the SCS/AS shall send an HTTP PATCH message to the SCEF targeting the associated "Individual Chargeable Party Transaction" resource requesting to partial update a chargeable party transaction resource (e.g. change the Sponsoring Status, update the list of event(s) if the "enNB" feature is supported). When receiving the HTTP PATCH message, the SCEF shall make the change and interact with the PCRF to modify the Rx session as defined in 3GPP TS 29.214 [10] or 3GPP TS 29.201 [13]. After receiving a response with successful result code from the PCRF, the SCEF shall send an HTTP response to the SCS/AS with a "200 OK" status code and the result if any in the body of the HTTP response or a "204 No Content" status code. The accumulated usage received from the PCRF shall be included in the HTTP response with the "200 OK" status code if the SCS/AS requested to disable the sponsoring. If the SCEF receives a response with an error code from the PCRF, the SCEF shall not update the resource and respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

NOTE 2: The SCS/AS can assume a successful resource allocation upon receipt of the POST/PATCH response until the FAILED\_RESOURCES\_ALLOCATION event is received.

NOTE 3: The SCS/AS can update the list of user plane event(s) only for one time specific events, i.e. INDICATION\_OF\_SUCCESSFUL\_RESOURCES\_ALLOCATION, INDICATION\_OF\_FAILED\_RESOURCES\_ALLOCATION and USAGE\_REPORT events, as specified in clause 5.3.13 of 3GPP TS 29.214 [10].

If the SCEF receives a traffic plane notification (e.g. the usage threshold is reached or transmission resource lost) or gets informed that the Rx session is terminated (e.g. due to the release of PDN connection), the SCEF shall send an HTTP POST message including the notified event (e.g. session terminated) and the accumulated usage to the SCS/AS identified by the notification destination URI received during session set up. The SCS/AS shall respond with an HTTP response to confirm the received notification.

In order to remove an established AS session, the SCS/AS shall send an HTTP DELETE message to the SCEF targeting the associated "Individual Chargeable Party Transaction" resource. After receiving the HTTP DELETE message, the SCEF shall remove all properties of the resource and interact with the PCRF to terminate the Rx session (as defined in 3GPP TS 29.214 [10] or 3GPP TS 29.201 [13]). After receiving the response from the PCRF, the SCEF shall send an HTTP response to the SCS/AS with a corresponding status code and the accumulated usage (if received from the PCRF).

\*\*\* 2nd Change \*\*\*

### 4.4.13 Procedures for setting up an AS session with required QoS

This procedure is used to set up an AS session with required QoS for the service as defined in 3GPP TS 23.682 [2].

For initial AS session creation, the SCS/AS shall send an HTTP POST message to the SCEF for the "AS Session with Required QoS Subscriptions" resource. The body of HTTP POST message shall include SCS/AS Identifier, UE IP address, IP Flow description, QoS reference and notification destination address. And it may also include time period and/or traffic volume for sponsored data connectivity purpose. If the feature AppId is supported, either the Flow description or an external Application Identifier shall be included.

After receiving the HTTP POST message, the SCEF shall authorize the request and may check if the total number of requested QoS reference has exceeded the limit for the SCS/AS. If the authorization is successful, the SCEF shall map the SCS/AS Identifier to AF Application Identifier if the external Application Identifier is not provided and only one AF Application Identifier is mapped, and if required, map the SCS/AS Identifier to ASP Identity and Sponsor Identity.

NOTE 1: Before the QoS reference is mapped to Rx parameters, the SCEF can perform a mapping from the name space of the 3rd party SCS/AS to the name space of the operator.

NOTE 2: The QoS reference referring to pre-defined QoS information in the SCEF can be mapped to media component descriptions (e.g. bandwidth, media type) according to SLA.

If the authorization performed by the SCEF is successful, then the SCEF shall act as an AF to interact with the PCRF via the Rx interface as defined in 3GPP TS 29.214 [10] or 3GPP TS 29.201 [13] and trigger a PCRF initiated IP-CAN Session Modification. Based on local configuration, the SCEF may also request to be notified about the transmission resource status, i.e. INDICATION\_OF\_SUCCESSFUL\_RESOURCES\_ALLOCATION, INDICATION\_OF\_RELEASE\_OF\_BEARER, INDICATION\_OF\_FAILED\_RESOURCES\_ALLOCATION, and optionally INDICATION\_OF\_LOSS\_OF\_BEARER and INDICATION\_OF\_RECOVERY\_OF\_BEARER. If the time period and/or traffic volume are received from the AF, the SCEF should subscribe to the PCRF on the USAGE\_REPORT event.

If the "enNB" feature is supported, the SCEF may explicitly receive a list of user plane event(s) that the SCS/AS requests to subscribe to. The SCEF shall subscribe to the corresponding PCRF event(s) (e.g. INDICATION\_OF\_SUCCESSFUL\_RESOURCE\_ALLOCATION) for the received event(s) (e.g. SUCCESSFUL\_RESOURCES\_ALLOCATION), except for the SESSION\_TERMINATION event.

NOTE 3: The PCRF does not need explicit subscription in order to notify Rx session termination.

If the the "UsageReportErrors" feature is supported and the SCEF receives an SCS/AS explicitly subscribed event "USAGE\_REPORT" while not providing the corresponding sponsor data quota of time period and/or traffic volume in the "usageThreshold" attribute, the SCEF shall reject the request by sending an HTTP "403 Forbidden" HTTP error response including the "USAGE\_REPORT\_MISSING\_QUOTA" application error within the "cause" attribute of the "ProblemDetails" structure.

The SCEF, after receiving the AAA message or HTTP 201 Created message over the Rx interface from the PCRF with successful result code, shall create a resource "Individual AS Session with Required QoS Subscription" which represents AS session, addressed by a URI that contains the SCS/AS identity and an SCEF-created AS session identifier, and shall respond to the SCS/AS with a 201 Created message, including the result in the body of the HTTP response and a Location header field containing the URI for the created resource. The SCS/AS shall use the URI received in the Location header in subsequent requests to the SCEF to refer to this AS session. Otherwise, the SCEF shall send an HTTP response to the SCS/AS with a corresponding status code and include the result in the body of the HTTP response. If the SCEF receives a response with an error code from the PCRF, the SCEF shall not create the resource and respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

In order to update the established AS session, the SCS/AS may send an HTTP PUT message to the SCEF for the "Individual AS Session with Required QoS Subscription" resource requesting to replace all properties (e.g. new usage threshold, Flow Description or external Application Identifier) in the existing resource, addressed by the URI received in the response to the request that has created the resource. The UE IP or MAC address shall remain unchanged from previously provided values. After receiving such message, the SCEF shall make the change (e.g. if the usage threshold within the "usageThreshold" attribute is included in the HTTP PUT request and the accumulated usage report for the previously provided usage threshold is not received yet, the SCEF shall completely replace the previously provided one), and interact with the PCRF to modify the Rx session (as defined in 3GPP TS 29.214 [10] or 3GPP TS 29.201 [13]). After receiving the response with successful result code from the PCRF, the SCEF shall replace all properties of the existing resource, send an HTTP response to the SCS/AS with a "200 OK"status code, and include the result in the body of the HTTP response or a "204 No Content" status code. If the SCEF receives a response with an error code from the PCRF, the SCEF shall not update the resource and respond to the SCS/AS with a corresponding failure code as described in clause 5.2.6.

The SCS/AS may also send an HTTP PATCH message to the SCEF for the "Individual AS Session with Required QoS Subscription" resource requesting to change some created properties (e.g. new usage threshold, Flow Description or external Application Identifier, updated list of user plane event(s) if the "enNB" feature is supported). After receiving the HTTP PATCH message, the SCEF shall make the change (e.g. if the usage threshold within the "usageThreshold" attribute is included in the HTTP PATCH request and the accumulated usage report for the previously provided usage threshold is not received yet, the SCEF shall completely replace the previously provided one), and interact with the PCRF to modify the Rx session (as defined in 3GPP TS 29.214 [10] or 3GPP TS 29.201 [13]). After receiving the response from the PCRF, the SCEF shall send an HTTP response to the SCS/AS with a "200 OK"status code and include the result in the body of the HTTP response, or a "204 No Content" status code.

NOTE 4: The SCS/AS can assume a successful resource allocation upon receipt of the POST/PUT/PATCH response, until the FAILED\_RESOURCES\_ALLOCATION event is received.

NOTE 5: The SCS/AS can update the list of user plane event(s) only for one time specific events, i.e. INDICATION\_OF\_SUCCESSFUL\_RESOURCES\_ALLOCATION, INDICATION\_OF\_FAILED\_RESOURCES\_ALLOCATION and USAGE\_REPORT events, as specified in clause 5.3.13 of 3GPP TS 29.214 [10].

If the SCEF receives a traffic plane notification (e.g. the usage threshold is reached or transmission resource lost), or if the SCEF gets informed that the Rx session is terminated (e.g. due to a release of PDN connection), the SCEF shall send an HTTP POST message including the notified event (e.g. session terminated) and the accumulated usage (if received from the PCRF) to the callback URI "notificationUri" provided by the SCS/AS during the creation of individual AS Session with Required QoS Subscription. The SCS/AS shall respond with an HTTP response to confirm the received notification.

In order to remove the established AS session, the SCS/AS shall send an HTTP DELETE message to the SCEF for the "Individual AS Session with Required QoS Subscription" resource. After receiving the HTTP DELETE message, the SCEF shall remove all properties and interact with the PCRF to terminate the Rx session (as defined in 3GPP TS 29.214 [10] or 3GPP TS 29.201 [13]). After receiving the response from the PCRF, the SCEF shall send an HTTP response to the SCS/AS with a corresponding status code and include the accumulated usage (if received from the PCRF).

\*\*\* 3rd Change \*\*\*

### 5.5.4 Used Features

The table below defines the features applicable to the ChargeableParty API. Those features are negotiated as described in clause 5.2.7.

Table 5.5.4-1: Features used by ChargeableParty API

|  |  |  |
| --- | --- | --- |
| Feature Number | Feature | Description |
| 1 | Notification\_websocket | The delivery of notifications over Websocket is supported according to clause 5.2.5.4. This feature requires that the Notification\_test\_event feature is also supported. |
| 2 | Notification\_test\_event | The testing of notification connection is supported according to clause 5.2.5.3. |
| 3 | EthChgParty\_5G | Chargeable Party for Ethernet UE. This feature may only be supported in 5G. |
| 4 | MacAddressRange\_5G | Indicates the support of a set of MAC addresses with a specific range in the traffic filter. This feature may only be supported in 5G. |
| 5 | AppId | Indicates the support of dynamically providing the Application Identifier via the API. |
| 6 | enNB | Indicates the support of enhancements to the northbound interfaces, e.g. enable an SCS/AS to explicitly indicate the event(s) that it would like to subscribe to. |
| 7 | ToSTC\_5G | Indicates the support of Type of Service or Traffic Class. This feature may only be supported in 5G. |
| 8 | UsageReportErrors | Indicates the support of Usage Report Errors handling. |
| Feature: A short name that can be used to refer to the bit and to the feature, e.g. "Notification".  Description: A clear textual description of the feature. | | |

\*\*\* 4th Change \*\*\*

#### 5.5.5.3 Application Errors

The application errors defined for ChargeableParty API are listed in table 5.5.5.3-1.

Table 5.5.5.3-1: Application errors

|  |  |  |  |
| --- | --- | --- | --- |
| Application Error | HTTP status code | Description | Applicability |
| USAGE\_REPORT\_MISSING\_QUOTA | 403 Forbidden | The quota of the sponsored data connectivity is not provided. | UsageReportErrors |

\*\*\* 5th Change \*\*\*

### 5.14.4 Used Features

The table below defines the features applicable to the AsSessionWithQoS API. Those features are negotiated as described in subclause 5.2.7.

**Table 5.14.4-1: Features used by AsSessionWithQoS API**

|  |  |  |
| --- | --- | --- |
| **Feature Number** | **Feature** | **Description** |
| 1 | Notification\_websocket | The delivery of notifications over Websocket is supported according to clause 5.2.5.4. This feature requires that the Notification\_test\_event featute is also supported. |
| 2 | Notification\_test\_event | The testing of notifications connections is supported according to clause 5.2.5.3. |
| 3 | EthAsSessionQoS\_5G | Setting up required QoS for Ethernet UE. This feature may only be supported in 5G. |
| 4 | MacAddressRange\_5G | Indicates the support of a set of MAC addresses with a specific range in the traffic filter. This feature may only be supported in 5G. |
| 5 | AlternativeQoS\_5G | Indicates the support of alternative QoS requirements and the QoS notification (i.e. whether the QoS targets for SDF(s) are not guaranteed or guaranteed again). This feature may only be supported in 5G. |
| 6 | QoSMonitoring\_5G | Indicates the support of QoS Monitoring functionality and the report for packet delay monitoring. This feature may only be supported in 5G. |
| 7 | DisableUENotification\_5G | Indicates the support of disabling QoS flow parameters signalling to the UE when the SMF is notified by the NG-RAN of changes in the fulfilled QoS situation. This feature may only be supported in 5G. This feature requires that the AlternativeQoS\_5G feature is also supported. |
| 8 | TSC\_5G | Indicates the support of Time Sensitive Communication. This feature may only be supported in 5G. |
| 9 | AppId | Indicates the support of dynamically providing the Application Identifier via the API. |
| 10 | ExposureToEAS | This feature indicates the support of direct notification in 5GC. This feature requires that the QoSMonitoring\_5G feature is also supported. |
| 11 | enNB | Indicates the support of enhancements to the northbound interfaces. |
| 12 | AltQosWithIndParams\_5G | This feature indicates the support of provisioning Alternative Service Requirements with individual QoS parameters. This feature requires that the AlternativeQoS\_5G feature is also supported. |
| 13 | EnEthAsSessionQoS\_5G | Indicates the support of required QoS for Ethernet UE, allowing to indicate separately different UL and/or DL Ethernet flows. This feature may only be supported in 5G. |
| 14 | enNB\_5G | Indicates the support of enhancements to the northbound interfaces and only applicable to 5G. |
| 15 | PacketDelayFailureReport | Indicates the support of packet delay failure report as part of QoS Monitoring procedures. This feature requires that QoSMonitoring\_5G is supported. This feature may only be supported in 5G. |
| 16 | ToSTC\_5G | Indicates the support of Type of Service or Traffic Class. This feature may only be supported in 5G. |
| 17 | EnTSCAC | Indicates the support of extensions to TSCAC and the RAN feedback for BAT offset and adjusted periodicity.  This feature may only be supported in 5G, and requires that the TSC\_5G feature is also supported. |
| 18 | AltQoSProfilesSupportReport | This feature indicates the support of the report of whether Alternative QoS parameters are supported by the access network. This feature requires that AlternativeQoS\_5G and/or AltQosWithIndParams\_5G features are also supported. |
| 19 | ExtQoS\_5G | This feature indicates the support of extended QoS parameters. This feature may only be supported in 5G. |
| 20 | XRM\_5G | Indicates the support of Extended reality feature which allows for multi-modal flows for single UE and multiple UE. This feature may only be supported in 5G.  Editor’s Note: Feature name and granartulity is FFS |
| 21 | ExtErrors | Indicates the support of additional application errors related to authorization or PDU Session availability. |
| 22 | QoSTiming\_5G | This feature indicates the support of QoS timing information for the transfer and support of data transmission (e.g., AI/ML transmission). This feature may only be supported in 5G. |
| 23 | ListUE\_5G | Indicates the support for the list of UEs This feature may only be supported in 5G. |
| 24 | GMEC\_5G | This feature indicates the support of Generic Group Management Exposure and Communication related enhancements.  The following functionalities are supported:  - Support AF requested QoS for a UE or group of UE(s) not identified by the UE address.  This feature may only be supported in 5G. |
| 25 | UsageReportErrors | Indicates the support of Usage Report Errors handling. |
| Feature: A short name that can be used to refer to the bit and to the feature, e.g. "Notification".  Description: A clear textual description of the feature. | | |

Editor's note: Whether an independent feature for PDU set qos is needed is FFS.

Editor's note: Whether an independent feature for RT latency is needed is FFS.

\*\*\* 6th Change \*\*\*

#### 5.14.5.3 Application Errors

The application errors defined for AsSessionWithQoS API are listed in table 5.14.5.3-1.

**Table 5.14.5.3-1: Application errors**

|  |  |  |  |
| --- | --- | --- | --- |
| **Application Error** | **HTTP status code** | **Description** | **Applicability** |
| REQUESTED\_SERVICE\_NOT\_AUTHORIZED | 403 Forbidden | The service information provided in the request is rejected. | ExtErrors |
| REQUESTED\_SERVICE\_TEMPORARILY\_NOT\_AUTHORIZED | 403 Forbidden | The service information provided in the request is temporarily rejected. | ExtErrors |
| UNAUTHORIZED\_SPONSORED\_DATA\_CONNECTIVITY | 403 Forbidden | The request for sponsored data connectivity is not authorized. | ExtErrors |
| USAGE\_REPORT\_MISSING\_QUOTA | 403 Forbidden | The quota of the sponsored data connectivity is not provided. | UsageReportErrors |
| PDU\_SESSION\_NOT\_AVAILABLE | 500 Internal Server Error | The PDU session is not found for the provided UE address. | ExtErrors |
| INVALID\_SESSION\_UPDATE | 403 Forbidden | Indicates that the session is not allowed to be updated since one or more of the received parameters can not be served in current session. The AF can retry with a new session. | TSC\_5G |

\*\*\* End of Changes \*\*\*