**3GPP TSG-SA5 Meeting #131e *S5-203037r1***

**e-meeting 25th May-3rd June 2020**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  |  | **CR** |  | **rev** |  | **Current version:** |  |  |
|  | | | | | | | | |
| *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:*** | Add CHF-Controlled Quota Management functionality | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | atrixx | | | | | | | | | |
| ***Source to TSG:*** | S5 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** |  | | | | |  | ***Date:*** | | | 2020-05-15 |
|  |  | | | |  | |  | | |  |
| ***Category:*** |  |  | | | | | ***Release:*** | | |  |
|  | *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-12 (Release 12)* *Rel-13 (Release 13) Rel-14 (Release 14) Rel-15 (Release 15) Rel-16 (Release 16)* | |
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| ***Reason for change:*** | | Add the CHF controlled functionality to suspend and resume the quota management for a given rating group. | | | | | | | | |
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| ***Summary of change:*** | | The CHF can instruct NF consumer (CTF) to suspend quota management for a given Rating Group and then subsequently the CHF can instruct the NF consumer (CTF) to resume quota management for the given Rating Group with suspended quota management within the charging session by existing trigger with corresponding setting of quoto management indication.  CHFCQM will be indicated as supported feature. | | | | | | | | |
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| ***Consequences if not approved:*** | | No CHF-controlled quota management capability | | | | | | | | |
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| ***Clauses affected:*** | | 5.4.X (new), 5.3.2.X (new), 7 | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | |  | | |
| ***affected:*** | |  | **x** | Test specifications | | | |  | | |
| ***(show related CRs)*** | | **x** |  | O&M Specifications | | | | TS 32.255 CR 0233  TS 32.291 CR 0230 | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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| **1st change** |

### 5.4.X CHF-controlled quota management

CHF can instruct NF consumer (CTF) to suspend quota management for a given Rating Group and then subsequently the CHF can instruct the NF consumer (CTF) to resume quota management for the given Rating Group with suspended quota management within the charging session.

Upon receiving Charging Data Request [Initial/Update] with usage reporting for a set of rating groups, the CHF may suspend quota management for particular rating groups, by including in Charging Data Response messages for these particular rating groups:

* explicit setting of without quota management indicator or
* granted quotas with appropriate content to ensure the service to continue without further update during the quota consumption.

CHF may instruct NF consumer (CTF) to resume quota management for a given rating group for which quota management was previously suspended:

* by using Re-authorization procedure or
* in situation quota management triggers are not used, other existing active triggers of the NF consumer (CTF) are met for further usage reporting to trigger the Charging Data Request [Update].

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| **2nd change** |

5.3.2.X CHF-controlled quota management

5.3.2.X.1 Suspend quota management

Figure 5.3.2.x-1 shows a scenario for CHF suspend via Charging Data Response



Figure 5.3.2.x-1: CHF suspend the quota management

**1) Charging Data Request [Initial/Update]:** NF consumer (CTF) sends the request to the CHF for the service for to grant the authorization to start/continue, and with usage reporting without quota management for the RG.

2) **Charging Data Response**: CHF determines suspends the quota management for the RG. The CHF sends the response to the NF consumer (CTF) without the granted units for the RG or with granted units for the RG with appropriate content to ensure the service to continue without further update during the quota consumption. In the Charging Data Response message, CHF sends the NF consumer (CTF) the indication to suspend the quota management (i.e. Quota Management Indicator set to “Offline”).

5.3.2.X.2 Resume quota management

Figure 5.3.2.x-2.1 shows a scenario for CHF resume the quota management with using Charging Notify Request.



Figure 5.3.2.x-2.1: CHF resume the quota management with Re-authorization

**1) Charging Notify Request [Re-authorization]: C**HF determines resumes quota management for the RG. CHF sends the notify request to the NF consumer (CTF).

**2) Charging Notify Response [Re-authorization]:** NF consumer (CTF) acknowledges the request by sending a response.

**3) Charging Data Request [Update]:** NF consumer (CTF) sends the request to the CHF with usage reporting without quota management for the RG.

**4) Charging Data Response:** CHF determines resume the quota management for the RG and sends the response to the NF consumer (CTF) with Quota Management Indicator set to “Online” and with the granted service units for the RG.

Figure 5.3.2.x-2.2 shows a scenario for CHF resume the quota management with using Charging Data Response.



Figure 5.3.2.x-2.2: CHF resume the quota management using additional trigger

**1) Charging Data Request [Update]:** NF consumer (CTF) sends the request which is triggered by other existing active triggers for the reporting the used service units without quota management for the RG, in which the quota management is previously supended.

**2) Charging Data Response:** CHF determines resume the quota management for the RG and sends the response to the NF consumer (CTF) with Quota Management Indicator set to “Online” and with the granted service units for the RG.

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| **3th change** |

7 Message contents

Converged charging or offline only charging is performed by NF (CTF) consuming service operations exposed by CHF, achieved using Charging Data Request and Charging Data Response.

The information structure used for these services operations is composed of two parts:

- Common structures specified in the present document.

- NF (CTF) consumer specific structures specified in the middle tier TSs.

Table 7.1 describes the data structure which is common to operations in request semantics.

**Table 7.1: Common Data structure of Charging Data Request**

| **Information Element** | **Converged Charging**  **Category** | **Offline Only Charging Category** | **Description** |
| --- | --- | --- | --- |
| Session Identifier | OC | OC | This field identifies the charging session. |
| Subscriber Identifier | OM | OM | This field contains the identification of the subscriber that uses the requested service. |
| NF Consumer Identification | M | M | This is a grouped field which contains a set of information identifying the NF consumer of the charging service. |
| NF Functionality | M | M | This field contains the function of the node. |
| NF Name | OC | OC | This fields holds the name (i.e. UUID) of the NF consumer. At least one of the NF Address or NF Name shall be present. |
| NF Address | OC | OC | This field holds the address (i.e. IP address and/or FQDN) of NF consumer. At least one of the NF Address or NF Name shall be present. |
| NF PLMN ID | OC | OC | This field holds the PLMN ID of the network the NF consumer belongs to. |
| Invocation Timestamp | M | M | This field holds the timestamp of the charging service invocation by the NF consumer |
| Invocation Sequence Number | M | M | This field contains the sequence number of the charging service invocation by the NF consumer in a charging session. |
| Retransmission Indicator | OC | OC | This field indicates if included, this is a retransmitted request message. |
| One-time Event | OC | - | This field indicates, if included, that this is event based charging and whether this is a one-time event in that there will be no update or termination. |
| One-time Event Type | OC | - | This field indicated the type of the one time event, i.e. Immediate or Post event charging. |
| Notify URI | OC | - | This field contains URI to which notifications are sent by the CHF. The latest received value shall always be used at notifications. |
| Service Specification Information | OC | - | This field identifies the technical specification for the service (e.g. TS 32.255) and release version (e.g. Release 16) that applies to the request. It is for information. |
| Supported Features | - | - | This filed indicates the features supported by the NF consumer. |
| Triggers | OC | OC | This field identifies the event(s) triggering the request and is common to all Multiple Unit Usage occurrences. |
| Multiple Unit Usage | OC | OC | This field contains the parameters for the quota management request and/or usage reporting. It may have multiple occurrences. |
| Rating Group | M | M | This field holds the identifier of a rating group. |
| Quota Management Indicator | - | - | This field indicates whether the report for the rating group is with or without quota management control. |
| Requested Unit | OC | - | This field indicates, if included, that quota management is required. It may additionally contain the amount of requested service units for a particular category. |
| Time | OC | - | This field holds the amount of requested time. |
| Total Volume | OC | - | This field holds the amount of requested volume in both uplink and downlink directions. |
| Uplink Volume | OC | - | This field holds the amount of requested volume in uplink direction. |
| Downlink Volume | OC | - | This field holds the amount of requested volume in downlink direction. |
| Service Specific Units | OC | - | This field holds the amount of requested service specific units. |
| Used Unit Container | OC | OC | This field contains the amount of used non-monetary service units measured. up to the triggers and trigger timestamp. It may have multiple occurrences. |
| Service Identifier | OC | OC | This field holds the Service Identifier. |
| Quota management Indicator | OC | - | This field holds an indicator on whether the reported used units are with or without quota management control. If the field is not present, it indicates the used unit is without quota management applied. |
| Triggers | OC | Oc | This field holds reason for charging information reporting or closing for the used unit container. |
| Trigger Timestamp | OC | OC | This field holds the timestamp of the trigger. |
| Time | OC | OC | This field holds the amount of used time. |
| Total Volume | OC | OC | This field holds the amount of used volume in both uplink and downlink directions. |
| Uplink Volume | OC | OC | This field holds the amount of used volume in uplink direction. |
| Downlink Volume | OC | OC | This field holds the amount of used volume in downlink direction. |
| Service Specific Unit | OC | OC | This field holds the amount of used service specific units. |
| Event Time Stamps | OC | OC | This field holds the timestamps of the event reported in the Service Specific Units, if the reported units are event based. |
| Local Sequence Number | OM | OM | This field holds the container sequence number. |

Table 7.2 describes the data structure which is common to operations in response semantics.

**Table 7.2: Common Data structure of Charging Data Response**

| **Information Element** | **Converged Charging**  **Category** | **Offline Only Charging Category** | **Description** |
| --- | --- | --- | --- |
| Session Identifier | OC | OC | This field identifies the charging session. |
| Invocation Timestamp | M | M | This field holds the timestamp of the charging service response from the CHF. |
| Invocation Result | OC | OC | This field holds the failure handling and in case of unsuccessful result of the charging service invocation by the NF consumer the result code. |
| Invocation Result Code | OC | OC | This field contains the result code in case of failure. |
| Failed parameter | OC | OC | This field holds missing and/or unsupported parameter that caused the failure. |
| Failure Handling | OC | OC | This field holds the failure handling to be performed by the NF consumer when failure. |
| Invocation Sequence Number | M | M | This field holds the sequence number of the charging service invocation by the NF consumer. |
| Session Failover | OC | OC | This field indicates whether alternative CHF is supported for ongoing charging service failover handling by NF consumer. |
| Supported Features | OC | - | This filed indicates the features supported by the NF consumer. |
| Triggers | OC | OC | This field holds the triggers supplied from the CHF for the charging session that are independent of rating group for quota management and without quota management. |
| Multiple Unit Information | OC | - | This field holds the parameters for the quota management and/or usage reporting information. It may have multiple occurrences. |
| Result Code | OC | - | This field contains the result of the Rating Group quota allocation. |
| Rating Group | OM | - | The identifier of a rating group. |
| Quota Management Indicator | OC | - | This field indicates whether the report for the rating group is with or without quota management control. If CHFCQM is applied, this field indicates the suspend or the resume of the quota management which was previously suspended for the given rating group. |
| Granted Unit | OC | - | This field holds the granted quota. |
| Tariff Time Change | OC | - | This field contains the switch time when the tariff will be changed. |
| Time | OC | - | This field holds the amount of granted time. |
| Total Volume | OC | - | This field holds the amount of granted volume in both uplink and downlink directions. |
| Uplink Volume | OC | - | This field holds the amount of granted volume in uplink direction. |
| Downlink Volume | OC | - | This field holds the amount of granted volume in downlink direction. |
| Service Specific Units | OC | - | This field holds the amount of granted requested service specific units. |
| Validity Time | OC | - | This field defines the time in order to limit the validity of the granted quota for a given category instance. |
| Final Unit Indication | OC | - | This field indicates the granted final units for the service. |
| Time Quota Threshold | OC | - | This field indicates the threshold in seconds when the granted quota is time |
| Volume Quota Threshold | OC | - | This field indicates the threshold in octets when the granted quota is volume |
| Unit Quota Threshold | OC | - | This field indicates the threshold in service specific units, that are defined in the service specific documents, when the granted quota is service specific |
| Quota Holding Time | OC | - | This field holds the quota holding time in seconds. |
| Triggers | OC | OC | This field holds triggers for usage reporting associated to the rating group, which is supplied from the CHF. |

Editor’s Note: QMI for CHF QM is ffs.

The CTF NF consumer specific structures which are specified in the middle tier TSs, are defined as extensions of:

- common part structure of Charging Data Request and Charging Data Response.

- structure of Multiple Unit Usage.

- structure of Multiple Unit Information.

Table 7.3 describes the data structure which is common to Charging Notify Request.

**Table 7.3: Common Data structure of Charging Notify Request**

| **Information Element** | **Converged Charging**  **Category** | **Description** |
| --- | --- | --- |
| Notify URI | M | This field holds the URI previously supplied by the CHF for notifications associated to the charging session. |
| Notification type | M | This field holds the type of notification indicating re-authorization or termination, or resume quota management. |
| Reauthorization Details | OC | This field holds the details of re-authorization.  It’s only present when type of notification is re-authorization.If not present and type of notification is re-authorization, the re-authorization notification applies to all units. |
| Service Identifier | OC | This field holds the Service Identifier to which re-authorization notification applies. If present, the rating group shall also be present. If not present the re-authorization notification applies to all service identifiers. |
| Rating Group | OC | This field holds the rating group to which re-authorization notification applies. If not present the re-authorization notification applies to all rating groups. |
| Quota management Indicator | OC | This field holds an indicator on whether the re-authorization notification is for quota management control or not. If not present the re-authorization notification applies to both units with and without quota management. |

Table 7.4 describes the data structure which is common to Charging Notify Response.

**Table 7.4: Common Data structure of Charging Notify Response**

| **Information Element** | **Category** | **Description** |
| --- | --- | --- |
| Invocation Result | OC | This field holds the result code in case of unsuccessful result of the charging notify request. |
| Invocation Result Code | OC | This field contains the result code in case of failure. |
| Failed parameter | OC | This field holds missing and/or unsupported parameter that caused the failure. |

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| **End of change** |