**3GPP TSG SA WG5 Meeting #158 S5-246605rev1**

**Orlando, Florida, USA 18 - 22 November 2024**

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| *CR-Form-v12.3* |
| **CHANGE REQUEST** |
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|  | **32.290** | **CR** | **0232** | **rev** | **4** | **Current version:** | **19.1.0** |  |
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| *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:***  | Rel-19 CR 32.290 Clarify the handling of non-blocking mode in charging system |
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| ***Source to WG:*** | Huawei |
| ***Source to TSG:*** | S5 |
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| ***Work item code:*** | TEI18 |  | ***Date:*** | 2024-11-22 |
|  |  |  |  |  |
| ***Category:*** | **A** |  | ***Release:*** | Rel-19 |
|  | *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-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19) Rel-20 (Release 20)* |
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| ***Reason for change:*** | Though charging procedure for non-blocking mode is described in clause 5.3.2.3, the charging information does not contain an indicator of whether non-blocking mode applies. In this case, the only difference of charging procedure for non-blocking mode is how NF(CTF) handle the service differently compared to the blocking mode, i.e. the SDF in non-blocking mode is allowed to start before NF (CTF) receive the quota authorization from CHF. Yet, the charging system handles the quota management for SDF in blocking or non-blocking mode in the same way.  |
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| ***Summary of change:*** | 1. Clarify that the charging system is not aware of the non-blocking mode.2. Correction for the initial charging data request, i.e. step 3 in Figure 5.3.2.3.2 (SCUR non-blocking). It should not report used unit, keep it consistent with the charging procedure for SCUR blocking. |
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| ***Consequences if not approved:*** | The impact of applying non-blocking mode on the charging system is not specified.  |
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| ***Clauses affected:*** | 5.3.2.3 |
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|  | **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 ... |
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| ***Other comments:*** |  |
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| ***This CR's revision history:*** | Revision of S5-246604. |

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| **First change** |

#### 5.3.2.3 Session based charging

For Converged Session based Charging, the following cases are supported:

- SCUR

- ECUR

Figure 5.3.2.3.1 shows a blocking mode scenario for Session based charging (SCUR) with: Unit Reservation, Decentralized and Centralized Unit Determination, Centralized Rating configuration, user’s account deduction, where the NF (CTF) invokes a converged charging service towards the CHF.



Figure 5.3.2.3.1: SCUR - Session based charging with Decentralized and Centralized Unit Determination, Centralized Rating

**1) Request for service delivery:** A request for session establishment is received in the NF (CTF). The service is configured to be authorized by the CHF to start.

**2) Units Determination:** the NF (CTF) determines the number of units depending on the service requested by the UE in "Decentralized Units determination" scenario.

**3) Charging Data Request [Initial, Quota Requested]:** The NF (CTF) sends the request to the CHF for the service to be granted authorization to start, and to reserve the number of units if determined in item 2.

**4) Account, Rating, Reservation Control:** the CHF rates the requests either based on the number of units requested or on internal unit determination, checks if corresponding funds can be reserved on the user's account balance. If the account has sufficient funds, the CHF performs the corresponding reservations.

**5) Open CDR:** based on policies, the CHF opens a CDR related to the service.

**6) Charging Data Response [Initial, Quota Granted]:** The CHF grants authorization to NF (CTF) for the service to start, with the reserved number of units.

**7) Granted Units Supervision:** the NF (CTF) monitors the consumption of the granted units.

**8) Start of service delivery:** the NF (CTF) starts to deliver the content/service based on the reserved number of units.

**9) Usage Reporting Trigger:** the NF (CTF) generates charging data related to the service delivered that is not under quota management, based on a trigger for usage reporting is met.

**10) Charging Data Request [Update, Unit Used]:** the NF (CTF) sends the request for reporting the related charging data, including the used units, to the CHF.

**11) Account, Rating Control:** The CHF performs the reported usage process involving rating entity and user's account balance.

**12) Update CDR:** based on policies, the CHF updates the CDR with charging data related to the service.

**13) Charging Data Response [Update]:** The CHF informs the NF (CTF) on the result of the request.

**14) Quota management Trigger:** A Trigger associated to Quota management is met. Units determination is performed when applicable.

**15) Charging Data Request [Update, Unit Used, Quota Requested]:** the NF (CTF) sends the request to the CHF, for more units to be granted for the service to continue, and reporting the used units. For the same rating group, the NF (CTF) can only send the next request for units after receiving the previous response from the CHF or initiate failure handling.

**16) Account, Rating, Reservation Control:** The CHF performs the process related to the reported usage and the requested reservation, involving rating entity and user's account balance.

**17) Update CDR:** based on policies, the CHF updates the CDR with charging data related to the service.

**18) Charging Data Response [Update, Quota Granted]:** The CHF grants quota to NF (CTF) for the service to continue, with the reserved number of units.

**19) Content/Service Delivery:** the NF (CTF) delivers the content/service based on the granted quota.

**20) Session released:** the session is released.

**21) Charging Data Request [Termination,** **Unit Used]:** the NF (CTF) sends the request to the CHF, for charging data related to the service termination with the final consumed units.

**22) Account, Rating Control:** The CHF performs the service termination process involving rating entity and user's account balance.

**23) Close CDR:** based on policies, the CHF closes the CDR with charging data related to the service termination and the last reported units.

**24) Charging Data Response [Termination]:** The CHF informs the NF (CTF) on the result of the request.

Figure 5.3.2.3.2 shows a Non-blocking mode scenario for Session based charging (SCUR) with: Unit Reservation, Decentralized and Centralized Unit Determination, Centralized Rating configuration, user’s account deduction, where the NF (CTF) invokes a converged charging service towards the CHF.

NF (CTF) may use blocking mode instead when risk of quota overdraft is more important than latency. CHF is unaware of the non-blocking mode and performs the quota management in the same way as blocking mode.



Figure 5.3.2.3.2: SCUR - Session based charging with Decentralized and Centralized Unit Determination, Centralized Rating, immediate start of service delivery (Non-blocking mode)

**1) Request for service delivery and start of service delivery:** A request for session establishment is received in the NF (CTF). The NF (CTF) is configured to allow the service to be delivered.

**2) Units Determination:** the NF (CTF) determines the number of units depending on the service requested, in "Decentralized Units determination" scenario.

**3) Charging Data Request [Initial, Quota Requested]:** the NF (CTF) sends the request to the CHF to reserve the number of units for a rating group of the service if determined in step 2.

**4) Account, Rating, Reservation Control:** the CHF rates the requests either based on the number of units requested or on internal unit determination, checks if corresponding funds can be reserved on the user's account balance. If the account has sufficient funds, the CHF performs the corresponding reservation.

**5) Open CDR:** based on policies, the CHF opens a CDR related to the service.

**6) Charging Data Response [Initial, Quota Granted]:** the CHF grants the reserved number of units to NF (CTF).

**7) Granted Units Supervision:** The NF (CTF) monitors the consumption of the granted units.

**8) Service delivery ongoing:** the NF (CTF) continues to deliver the service.

**9) Usage reporting trigger:** the NF (CTF) generates charging data related to a service delivered that is not under quota management, based on that a trigger for service usage reporting is met.

**10) Charging Data Request [Update, Unit Used]:** the NF (CTF) reports the charging data related to service delivered, including the used units, to the CHF.

**11) Account, Rating Control:** the CHF uses the reported charging data to rate the usage and deduct the funds corresponding to the usage on the account balance.

**12) Update CDR:** based on policies, the CHF updates the CDR with charging data related to the service.

**13) Charging Data Response [Update]:** The CHF informs the NF (CTF) on the result of the request.

**14 ) Quota management Trigger:** A Trigger associated to Quota management is met. Units determination is performed when applicable.

**15) Charging Data Request [Update, Unit Used, Quota Requested]:** the NF (CTF) sends the request to the CHF, for more units to be granted for the service to continue, and reporting the used units.

**16) Account, Rating, Reservation Control:** same as step 4, with the option to also deduct the funds corresponding to the usage on the account balance.

**17) Update CDR:** based on policies, the CHF updates the CDR with charging data related to the service.

**18) Charging Data Response [Update, Quota Granted]:** The CHF grants quota to NF (CTF) for the service, with the reserved number of units.

**19) Service delivery ongoing:** the NF (CTF) continues to deliver the service.

**20) Service release:** the NF (CTF) is requested to end the service delivery and does this.

**21) Charging Data Request [Termination, Unit Used]:** the NF (CTF) sends the request to the CHF, for charging data related to the service termination with the final consumed units.

**22) Account, Rating Control:** the CHF performs the service termination process which involve using the reported charging data to rate the usage and deduct the funds corresponding to the usage on the account balance.

**23) Close CDR:** based on policies, the CHF closes the CDR with charging data related to the service termination and the last reported units.

**24) Charging Data Response [Termination]:** The CHF informs the NF (CTF)on the result of the request.

Figure 5.3.2.3.3 shows a scenario for Session based charging (ECUR) in Decentralized and Centralized Unit Determination, Centralized Rating configuration, where the NF (CTF) invokes a converged charging service towards the CHF, prior to service delivery if needed.



Figure 5.3.2.3.3: ECUR - Session based charging with - Decentralized and Centralized Unit Determination, Centralized Rating.

**1) Request for resource usage:** A request for session establishment is received in the NF (CTF). The service is configured to be authorized by the CHF to start.

**2) Units Determination:** the NF (CTF) determines the number of units depending on the service requested by the UE in "Decentralized Units determination" scenario.

**3) Charging Data Request [Initial, Quota Requested]:** The NF (CTF) sends the request to the CHF for the service to be granted authorization to start, and to reserve the number of units if determined in item 2.

**4) Account, Rating, Reservation Control:** the CHF rates the requests either based on the number of units requested or on internal unit determination, checks if corresponding funds can be reserved on the user's account balance. If the account has sufficient funds, the CHF performs the corresponding reservation.

**5) Open CDR:** based on policies, the CHF opens a CDR related to the service.

**6) Charging Data Response [Initial, Quota Granted]:** The CHF grants authorization to NF (CTF) for the service to start, with the reserved number of units.

**7) Granted Units Supervision:** The service starts and the NF (CTF) monitors the consumption of the granted units.

**8) Content/Service Delivery:** the NF (CTF) delivers the content/service based on the reserved number of units.

**9) Charging Data Request [Termination, Unit Used]:** the NF (CTF) sends the request to the CHF, for charging data related to the delivered service with the consumed units.

**10) Account, Rating Control:** The CHF performs the process for the delivered service involving rating entity and user's account balance.

**11) Close CDR:** based on policies, the CHF closes the CDR with charging data related to the delivered service.

**12) Charging Data Response [Termination]:** The CHF informs the NF (CTF) on the result of the request.

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| **End of change** |