**SA WG2 Meeting #162S2-240xxxx**

**Changsha China, April 15th–April 19th, 2024 (revision of S2-2400764)**

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| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
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|  | **23.502** | **CR** |  | **rev** |  | **Current version:** | **18.5.0** |  |
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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:*** | RVAS - Support of Welcome SMS | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Nokia, Ericsson | | | | | | | | | |
| ***Source to TSG:*** | SA2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | TEI19\_RVAS | | | | |  | ***Date:*** | | | 2024-04-05 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | ***B*** |  | | | | | ***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)* | |
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| ***Reason for change:*** | | The 5GC of the HPLMN may upon subscription provide event report that also includes the equipment identifier (PEI) and subscription identifiers (GPSI), which can be used by AF for certain actions, for e.g send Welcome SMS, etc; when the UE successfully registers in a VPLMN. | | | | | | | | |
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| ***Summary of change:*** | | Enhance Monitoring Events section pertaining to Roaming status, indicating that PEI and subscription identifiers may also be included as part of event report. | | | | | | | | |
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| ***Consequences if not approved:*** | | CSPs will not be able to consider selective actions based on subscriber equipment identifiers / subscriptoin identifiers used during registration. | | | | | | | | |
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| ***Clauses affected:*** | | 4.15.3.1 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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:*** | |  | | | | | | | | |

\* \* \* \* First change \* \* \* \*

#### 4.15.3.1 Monitoring Events

The Monitoring Events feature is intended for monitoring of specific events in 3GPP system and making such monitoring events information reported via the NEF. It is comprised of means that allow NFs in 5GS for configuring the specific events, the event detection and the event reporting to the requested party.

To support monitoring features in roaming scenarios, a roaming agreement needs to be made between the HPLMN and the VPLMN. If the AMF/SMF in the VPLMN determine that normalisation of an event report is required, the AMF/SMF normalises the event report before sending it to the NEF.

The set of capabilities required for monitoring shall be accessible via NEF to NFs in 5GS. Monitoring Events via the UDM, the AMF, the SMF, the NSACF and the GMLC enables NEF to configure a given Monitor Event at UDM, AMF, SMF, NSACF or GMLC and reporting of the event via UDM and/or AMF, SMF, NSACF or GMLC. Depending on the specific monitoring event or information, it is the AMF, GMLC, NSACF or the UDM that is aware of the monitoring event or information and makes it reported via the NEF.

The following table enumerates the monitoring events and their detection criteria:

Table 4.15.3.1-1: List of events for monitoring capability

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| --- | --- | --- |
| Event | Detection criteria | Which NF detects the event |
| Loss of Connectivity | Network detects that the UE is no longer reachable for either signalling or user plane communication (see NOTE 4).  The AF may provide a Maximum Detection Time, which indicates the maximum period of time without any communication with the UE after which the AF is to be informed that the UE is considered to be unreachable (see NOTE 7).  If Unavailability Period Duration has been provided by the UE, the AMF uses the remaining value of it to determine the foreseen Loss of Connectivity time as described in clause 5.4.1.4 of TS 23.501 [2]. | AMF |
| UE reachability | Detected when the UE transitions to CM-CONNECTED state or when the UE will become reachable for paging, e.g. Periodic Registration Update timer. It indicates when the UE becomes reachable for sending downlink data to the UE.  The AF may provide the following parameters:  1) Maximum Latency;  2) Maximum Response Time;  3) Suggested number of downlink packets. (see NOTE 5 and NOTE 7).  This event requires the Reachability Filter set to UE reachable for DL traffic" (see clause 5.2.2.3.1-1). For the usage of this event, see clauses 4.2.5.2 and 4.2.5.3.  When requesting UE reachability monitoring, the AF may in addition request Idle Status Indication to be included in the UE reachability event reporting. | AMF, UDM |
| Location Reporting | This event is detected based on the Event Reporting Information Parameters that were received in the Monitoring Request (one-time reporting, maximum number of reports, maximum duration of reporting, periodicity, etc. as specified in clause 4.15.1).  It reports either the Current Location or the Last Known Location of a UE.  When AMF is the detecting NF:  One-time and Continuous Location Reporting are supported. For Continuous Location Reporting the serving node(s) sends a notification every time it becomes aware of a location change, with the granularity depending on the accepted accuracy of location (see NOTE 1).  For One-time Reporting with immediate reporting flag set, AMF reports the Last Known Location immediately.  When AMF is the detecting NF:  If the immediate reporting flag is not set, the AMF reports the UE Current Location (In case the AMF does not have the UE current location in the granularity as requested by the location report, the AMF retrieves the information via NG-RAN Location reporting procedure as defined in clause 4.10).  When GMLC is the detecting NF:  Immediate and Deferred Location Reporting is supported. For Deferred Location Reporting the event types UE availability, Area, Periodic Location and Motion are supported. | AMF, GMLC |
| Change of SUPI-PEI association | This event is detected when the association between PEI and subscription (SUPI) changes (USIM change). | UDM |
| Roaming status | This event is detected based on the UE's current roaming status (the serving PLMN and/or whether the UE is in its HPLMN) and notification is sent when that status changes. (see NOTE 2).  If the UE is registered via both 3GPP and N3GPP Access Type, then both instances of Roaming status are included. | UDM |
| Communication failure | This event is detected when RAN or NAS level failure is detected based on connection release and it identifies RAN/NAS release code. | AMF |
| Availability after Downlink Data Notification failure | This event is detected when the UE becomes reachable again after downlink data delivery failure.  When requesting Availability after Downlink Data Notification failure monitoring, the AF may in addition request Idle Status Indication to be included in the UE reachability event reporting. | AMF |
| PDU Session Status | This event is detected when PDU session is established or released. (see NOTE 6) | SMF |
| Number of UEs present in a geographical area | This event is detected based on the Event Reporting Information Parameters that were received in the Monitoring Request (Level of aggregation, Sampling ratio, see clause 4.15.1).  It indicates the number of UEs that are in the geographical area described by the AF. The AF may ask for the UEs that the system knows by its normal operation to be within the area (Last Known Location) or the AF may request the system to also actively look for the UEs within the area (Current Location). | AMF |
| CN Type change | The event is detected when the UE moves between EPC and 5GC. It indicates the current CN type for a UE or a group of UEs when detecting that the UE switches between being served by a MME and an AMF or when accepting the event subscription. (see NOTE 3) | UDM |
| Downlink data delivery status | It indicates the downlink data delivery status in the core network. Events are reported at the first occurrence of packets being buffered, transmitted or discarded, including:  - Downlink data in extended buffering, including:  - First data packet buffered event  - Estimated buffering time, as per clause 4.2.3.3  - First downlink data transmitted event  - First downlink data discarded event | SMF |
| UE reachability for SMS delivery | For SMS over NAS, this event is detected when an SMSF is registered for a UE and the UE is reachable as determined by the AMF and the UDM.  For SMS over IP, the event is detected when the UE is reachable as determined by the AMF and the UDM regardless of an SMSF being registered.  This enables the UE to receive an SMS. See clauses 4.2.5.2 and 4.2.5.3 (see NOTE 8). | UDM |
| UE memory available for SMS | This event is detected when the UDM receives UE memory available for SMS indication from the SMSF as part of Alert procedure as specified in clause 5.1.8 of TS 23.540 [84] | UDM |
| Number of registered UEs or established PDU Sessions | It indicates the current number of registered UEs or established PDU Sessions for a network slice that is subject to NSAC.  For One-time Reporting with Immediate Reporting Flag set, NSACF reports the number of registered UEs or established PDU Sessions immediately. | NSACF |
| Area Of Interest | It indicates change of the UE presence in the Area Of Interest. | AMF, GMLC |
| Group Member List Change | It indicates the changes on the members of the group.  This event apply to a group of UEs (identified by an External Group ID), such as 5G VN group (see NOTE 9) or other groups. | UDM |
| Session inactivity time | This event is detected by the SMF when the PDU Session has no data transfer for a period specified by the Inactivity Timer. via the User plane status information event, see clause 5.2.8.3.1. | SMF |
| Traffic volume | This event measures the traffic volume (UL and DL) aggregated for the PDU Session (NOTE 10). | UPF |
| UL/DL data rate | This event measures the data rate (UL and DL) aggregated for the PDU Session (NOTE 10). | UPF |
| Application Detection | Detection of application start or stop  (See NOTE 11), as described in clause 6.1.3.18 of TS 23.503 [20]. | PCF |
| NOTE 1: Location granularity for event request, or event report, or both could be at cell level (Cell ID) or TA level. The granularity can also be expressed by other formats such as geodetic uncertainty shapes (e.g. polygons, circles, etc.) or civic addresses (e.g. streets, districts, etc.) which can be mapped by NEF to AMF specific granularity levels.  NOTE 2: Roaming status means whether the UE is in HPLMN or VPLMN based on the most recently received registration state in the UDM. Following parameters may be included as part of event report:   1. Equipment identifier (PEI) 2. Subscription identifiers (e.g., GPSI)   This event may be consumed by AF to implement certain capabilities, for e.g., send welcome SMS to subscriber, etc.  NOTE 3: CN type of CN Type change event is defined in clause 5.17.5.1 of TS 23.501 [2].  NOTE 4: In the case of UDM service operation information flow, the UDM should set the subscribed periodic registration timer to a smaller value than the value of Maximum Detection Time, since the value of the mobile reachable timer is larger than the value of the periodic registration timer.  NOTE 5: Maximum Latency, Maximum Response Time and Suggested number of downlink packets are defined in clause 4.15.6.3a.  NOTE 6: The NEF makes a mapping between the 5GS internal event "PDU Session Status" and the T8 API event "PDN Connectivity Status".  NOTE 7: The preferred method for provisioning Network Configuration Parameters is External Parameter Provisioning specified in clause 4.15.6.3a. Provisioning event specific parameters as part of Monitoring Request is expected to be used only by the AF that does not support Parameter Provisioning procedure specified in clause 4.15.6.3a.  NOTE 8: The NEF maps between the T8 API event "UE reachability" with reachability type SMS and the 5GS internal event "UE reachability for SMS delivery" for SMS over NAS.  The event "UE reachability for SMS delivery" for SMS over IP is used by HSS as described in clause 5.5.6.3 of TS 23.632 [68].  NOTE 9: 5G VN group management is defined in the clause 5.29.2 of TS 23.501 [2].  NOTE 10: NEF subscribes to the UPF event applicable for a PDU session via SMF and the result is exposed to NEF by UPF directly. The corresponding procedure for NEF to trigger the UPF event can be found in clause 4.15.3.2.3.  NOTE 11: This event uses bulk subscription/notification, which may impact the PCF/SMF/UPF performance. | | |

\* \* \* \* End of changes \* \* \* \*