**3GPP TSG-SA WG6 Meeting #42-bis-e S6-211069**

**e-meeting, 12th – 20th April 2021 (was S6-210864, S6-210595)**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
|  |
|  | **23.434** | **CR** | **043** | **rev** | **3** | **Current version:** | **17.1.0** |  |
|  |
| *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 | **x** | Radio Access Network |  | Core Network | **x** |

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|  |
| ***Title:***  | Off-network location management |
|  |  |
| ***Source to WG:*** | Samsung |
| ***Source to TSG:*** | S6 |
|  |  |
| ***Work item code:*** | eSEAL |  | ***Date:*** | 2021-04-05 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***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:*** | Clasue 9.2.3 of TS 23.434 provides off-network functional model description for location management service, however the procedures for the off-network location management is not specified yet.Also, there are requirements and usecases as follows:***3GPP TS 22.185******Clause 4.1.2    Vehicle-to-Vehicle (V2V) application***V2V applications expect UEs that are in proximity of each other to exchange V2V application information. …The UE supporting V2V applications transmits messages containing V2V application information (e.g. location, dynamics, and attributes).**3GPP TR 22.886** ***Clause 5.2.1.1***All the platoon members can obtain information through two ways. One is within platoon through V2V. Another is come from RSU which based on the platoon manager relay. All the information obtains will be used to build high-precision dynamic driving maps.***Clause 5.5.1.1***Reliable wireless communications are required among the vehicles in a cooperative group. Messages are exchanged between the leading vehicles and all cooperating vehicles in order to execute control actions at the same time. CoSdG may not only be operated by vehicle-to-vehicle communication, but may also be vehicle-to-infrastructure and vehicle-to-backend communication to ensure most efficient utilisation of available resources and the required reliability.***Clause 5.23.1.3***Vehicle A moves into the selected lane by continually transmitting periodically its trajectory plan to other involved vehicles via the 3GPP communication service. The trajectory plan is updated based on the evolution of the manoeuvre and the locations of Vehicles B and C.Further as specified in **TS 23.286**,, **clause** **9.12** Dynamic group management“Some of the V2X scenarios require group-based communication (e.g. platooning). Unlike V2X communication for safety scenarios where all V2X UEs in the communication range receive broadcasted communication, the group-based communication is expected to be received only by the V2X UEs of the members of that group.”- During platoon operations – Ues arequired to communicte with each other to share informations.It is required to provide procedures for off-network location management. |
|  |  |
| ***Summary of change:*** | New procedures added for off-network location management - Location reporting trigger configuration, location reporting, Location reporting trigger cancel and on-demand location reporting. |
|  |  |
| ***Consequences if not approved:*** | Off-network location management feature will not be supported in Rel-17. |
|  |  |
| ***Clauses affected:*** | 9.x (New), 9.x.1 (New), 9.x.2 (New), 9.x.2.1 (New), 9.x.2.2 (New), 9.x.2.3 (New), 9.x.2.4 (New), 9.x.2.5 (New), 9.x.2.6 (New), 9.x.2.7 (New), 9.x.2.8 (New), 9.x.3 (New), 9.x.3.1 (New), 9.x.3.2 (New), 9.x.3.3 (New), 9.x.4 (New), |
|  |  |
|  | **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 \* \* \* \*

## 9.x Procedures and information flows for Location management (Off-network)

### 9.x.1 General

Location information of VAL service user shall be provided by the location management client of one UE to the location management client of another UE. The location information reporting triggers are based on the location reporting configuration. Different type of location information can be provided e.g. retrieved from non-3GPP source.

NOTE: VAL clients sharing location information directly at vertical enabler layer is outside the scope of this specification.

Editor's note: Adding architecture requirement(s) for off-network location management is FFS.

Editor's note: Charging aspects for off-network location management is FFS.

### 9.x.2 Information flows for off network location management

#### 9.x.2.1 Off-network location reporting trigger configuration

Table 9.x.2.1-1 describes the information flow from the location management client-1 to the location management client-2 for the off-network location reporting configuration.

Table 9.x.2.1-1: Off-network location reporting trigger configuration

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| Identity | M | Identity of the VAL user to which the location reporting configuration is targeted or identity of the VAL UE. |
| Requested location information | M | Identifies what location information is requested |
| List of triggering criteria(s) | M | One or more triggering criteria that identifies when the location management client will send the location report. Each triggering criteria is identified by trigger-id. |
| Minimum time between consecutive reports | O | Defaults to 0 if absent otherwise indicates the time interval between consecutive reports |
| Life Time of the configuration | O | Time till when location report configurations are valid. |

#### 9.x.2.2 Off-network location reporting trigger configuration response

Table 9.x.2.2-1 describes the information flow from the location management client-2 to the location management client-1 for the off-network location reporting configuration response. The Off-network location reporting trigger configuration response acts as an acknowledgement to the location management client-1.

Table 9.x.2.2-1: Off-network location reporting trigger configuration response

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| Result | M | Indicates the success or failure for the operation |
| Cause | O | Provides reason for the failure. |

#### 9.x.2.3 Off-network location management ack

The Off-network location management ack message is sent from the message receiver location management client-2 to message originator location management client-1.

#### 9.x.2.4 Off-network location report

Table 9.x.2.4-1 describes the information flow from the location management client-2 to the location management client-1 for the off-network location report.

Table 9.x.2.4-1: Off-network location report

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| Triggering event | M | Identity of the event that triggered the sending of the report |
| Location Information | M | Location information shared by VAL client e.g. retrieved from non-3GPP source |
| Acknowledgement Required | O | If present, indicate the recipient of the message to acknowledge the message. |

#### 9.x.2.5 Off-network location reporting trigger cancel

Table 9.x.2.5-1 describes the information flow from the location management client-1 to the location management client-2 for the off-network location reporting trigger cancel.

Table 9.x.2.5-1: Off-network location reporting trigger cancels

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| Identity | M | Identity of the VAL user to which the location reporting trigger cancel is targeted or identity of the VAL UE. |

#### 9.x.2.6 Off-network location reporting trigger cancel response

Table 9.x.2.6-1 describes the information flow from the location management client-2 to the location management client-1 for the off-network location reporting cancel response. The Off-network location reporting trigger cancel response acts as an acknowledgement to the location management client-1.

Table 9.x.2.6-1: Off-network location reporting trigger cancel response

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| Result | M | Indicates the success or failure for the operation |

#### 9.x.2.7 Off-network location request

Table 9.x.2.7-1 describes the information flow from the location management client-1 to the location management client-2 for the off-network location request.

Table 9.x.2.7-1: Off-network location request

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| Identity | M | Identity of the VAL user to which the location request is targeted or identity of the VAL UE. |
| Requested location information | M | Identifies what location information is requested |

#### 9.x.2.8 Off-network location response

Table 9.x.2.8-1 describes the information flow from the location management client-2 to the location management client-1 for the off-network location response. The Off-network location response acts as an acknowledgement to the location management client-1.

Table 9.x.2.8-1: Off-network location response

|  |  |  |
| --- | --- | --- |
| Information element | Status | Description |
| Result | M | Indicates the success or failure for the operation |
| Location Information | M | Location information shared by VAL client e.g. retrieved from non-3GPP source |

\* \* \* Next Change \* \* \* \*

### 9.x.3 Event-triggered location reporting procedure

#### 9.x.3.1 Location reporting trigger configuration

Figure 9.x.3.1-1 illustrates the procedure for configuring location reporting triggers from the location management client-1 residing in UE-1 to the location management client-2 residing in UE-2.

Pre-condition:

- The UE-1 and UE-2 are within PC5 communication range of each other, and aware of Layer-2 ID of each other.

- The VAL service user in UE-1 is authorized to configure location reporting trigger to the UE-2.

- The VAL service user in UE-1 requests to configure location reporting triggers to the UE-2.

 

Figure 9.x.3.1-1: Location reporting trigger configuration

1. The location management client-1 in UE-1 sends off network location reporting trigger configuration message to the location management client-2 in UE-2 containing the initial location reporting event triggers configuration (or a subsequent update) for reporting the location of the VAL UE. The message includes information elements as specified in Table 9.x.2.1-1.

2. The location management client-2 stores the location reporting configuration, and sends off network location reporting trigger configuration response to the location management client-1. The message includes information elements as specified in Table 9.x.2.2-1.

3. Upon receiving the off network location reporting trigger configuration response message, the location management client-1 sends off-network location management ack messages. The message includes information elements as specified in Table 9.x.2.3-1.

\* \* \* Next Change \* \* \* \*

#### 9.x.3.2 Location reporting

Figure 9.x.3.2-1 illustrates the procedure for sending off-network location report from the location management client-2 residing in UE-2 to the location management client-1 residing in UE-1.

Pre-condition:

- The UE-1 and UE-2 are within PC5 communication range of each other, and aware of Layer-2 ID of each other.

- The location management client-1 has previously configured off-network location reporting triggers to the location management client-2 as specified in clause 9.x.3.1.



Figure 9.x.3.2-1: Location reporting

1. The location management client-2 is monitoring the location reporting triggers and one of the event is triggered.

2. The location management client-2 sends the off-network location report message. The message includes information elements as specified in Table 9.x.2.x-1.

3. Upon receiving the off network location report message, the location management client-1 sends the off-network location management ack message if requested in the received message. The message includes information elements as specified in Table 9.x.2.3-1.

\* \* \* Next Change \* \* \* \*

#### 9.x.3.3 Location reporting trigger cancel

Figure 9.x.3.3-1 illustrates the procedure for sending off-network location reporting trigger cancel from the location management client-1 residing in UE-1 to the location management client-2 residing in UE-2.

Pre-condition:

- The UE-1 and UE-2 are within PC5 communication range of each other, and aware of Layer-2 ID of each other.

- The location management client-1 has previously configured location reporting triggers to the location management client-2 as specified in clause 9.x.3.1.

 

Figure 9.x.3.3-1: Location reporting trigger cancel

1. The location management client-1 in UE-1 sends off network location reporting trigger cancel message to the location management client-2 in UE-2 to cancel the location reporting trigger configuration. The message includes information elements as specified in Table 9.x.2.5-1.

2. The location management client-2 clears the location reporting configuration, and sends off network location reporting trigger cancel response to the location management client-1. The message includes information elements as specified in Table 9.x.2.6-1.

3. Upon receiving the off network location reporting trigger configuration response message, the location management client-1 sends off-network location management ack message. The message includes information elements as specified in Table 9.x.2.3-1.

\* \* \* Next Change \* \* \* \*

### 9.x.4 On-demand location reporting procedure

Figure 9.x.4-1 illustrates the procedure for on-demand location report from the location management client-1 residing in UE-1 to the location management client-2 residing in UE-2.

Pre-condition:

- The UE-1 and UE-2 are within PC5 communication range of each other, and aware of Layer-2 ID of each other.

- The VAL service user in UE-1 is authorized to request location report from the UE-2.

- The VAL service user in UE-1 requests immediate location reporting to the UE-2.

 

Figure 9.x.4-1: Location reporting trigger cancel

1. Based on configurations such as periodical location information timer the location management client-1 initiates the immediately request location information from the location management client-2. The location management client sends an off-network location request to the location management client-2. The message includes information elements as specified in Table 9.x.2.7-1.

2. VAL user or VAL UE is notified and asked about the permission to share its location. VAL user can accept or deny the request

3. The location management client-2 immediately responds to the location management client-1. If permission is received from the VAL user, the location management client-2 includes a report containing location information identified by the location management client-1 and available to the location management client-2. The message includes information elements as specified in Table 9.x.2.8-1.

4. Upon receiving the off network location reporting trigger configuration response message, the location management client-1 sends off-network location management ack message. The message includes information elements as specified in Table 9.x.2.3-1

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