**3GPP TSG-CT WG1 Meeting #125-eC1-204558**

**Electronic meeting, 20-28 August 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **24.587** | **CR** | **0071** | **rev** | **-** | **Current version:** | **16.1.1** |  |
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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 | **X** | Radio Access Network |  | Core Network | **X** |

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| ***Title:***  | Change configuration parameters over Uu to meet stage-2 requirements |
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| ***Source to WG:*** | OPPO |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | eV2XARC |  | ***Date:*** | 2020-7-28 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***Release:*** | Rel-16 |
|  | *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-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:*** | In subclause 5.1.3.1 in TS 23.287 16.3.0, subclause 6.1.1, there is the following description:5.1.3.1 Policy/Parameter provisioningThe following set of information may be provisioned to the UE for V2X communications over Uu reference point:1) Mapping of the V2X service types to:- PDU Session Type (i.e. IP type or Unstructured type);- Transport layer protocol (i.e. UDP or TCP, only applicable for IP PDU Session type);- SSC Mode;- S-NSSAI(s);- DNN(s).NOTE: Above listed information elements are optional and used by UE as UE Local Configuration specified in TS 23.503 [16].2) Validity timer indicating the expiration time of the V2X Policy/Parameter.The following sets of information may be provisioned to the UE and is applicable for V2X communications over both LTE-Uu and Uu reference points:1) Mapping of the V2X service types to V2X Application Server address information (consisting of IP address/FQDN and transport layer port#) for unicast.2) List of FQDNs or IP addresses of the V2X Application Servers, associated with served geographical area information and list of PLMNs that the configuration applies to.Compared to the stage 2 requirements, there are the following **issues** on the configuration parameters over Uu in subclause 5.2.4 in TS 24.587:1. The transport layer protocol is missing.
2. There is no stage 2 requirement to the following configuration:

iii) a list of V2X service identifiers of the V2X services configured for V2X communication over Uu using existing unicast routing; and |
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| ***Summary of change:*** | 1. Add transport layer protocol configuration.
2. Remove the mapping rule between V2X service and existing unicast routing.
3. Editorial changes.
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| ***Consequences if not approved:*** | Stage 2 requirements are not satisfied. |
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| ***Clauses affected:*** | 5.2.4 |
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|  | **Y** | **N** |  |  |
| ***Other specs*** | **X** |  |  Other core specifications  | TS/TR 24.588 CR 0013  |
| ***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 of change \*\*\*\*\*

### 5.2.4 Configuration parameters for V2X communication over Uu

The configuration parameters for V2X communication over Uu consist of:

a) a validity timer for the validity of the configuration parameters for V2X communication over Uu to 5GCN;

b) optionally, a list of V2X service identifier to PDU session parameters mapping rules. Each mapping rule contains one or more V2X service identifiers of a the V2X service and one or more parameters for establishment of a PDU session for V2X communication over Uu for the V2X services:

1) one of the "IPv4", "IPv6", "IPv4v6" or "Unstructured" PDU session types;

2) an SSC mode;

3) a list of zero or more S-NSSAIs;

4) a list of zero or more DNNs; and

5) one of the UDP or TCP transport layer protocol if the PDU session type is "IPv4", "IPv6" or "IPv4v6"; and

c) a list of PLMNs in which the UE is configured to use V2X communication over Uu. For each PLMN, the list contains:

1) for transfer of a V2X message of a V2X service identified by a V2X service identifier:

i) a list of V2X service identifier to V2X application server address mapping rules, applicable when the UE is registered to the PLMN. Each mapping rule contains:

A) one or more V2X service identifiers;

B) a V2X application server address for unicast consisting of:

- an FQDN, or an IP address; and

- a UDP port for uplink transport, a UDP port for downlink transport, a TCP port for bidirectional transport or any combination of them; and

C) optionally a geographical area;

ii) optionally, per type of data (IP and non-IP) and V2X message family (in case of non-IP) and optionally a geographical area, one or more default V2X application server addresses for the unicast V2X communication over Uu applicable when the UE is registered to the PLMN. Each V2X application server address consists of:

i) an FQDN, or an IP address; and

ii) a UDP port for uplink transport, a UDP port for downlink transport, a TCP port for bidirectional transport or any combination of them; and

2) for transfer of a V2X message of a V2X service not identified by a V2X service identifier:

i) a list of the V2X application servers per optional geographical area where usage of those V2X application servers applies, applicable when the UE is registered to the PLMN. Each entry of the list contains:

A) a V2X application server address consisting of an FQDN, or an IP address; and

B) optionally, a geographical area.

\*\*\*\*\* Second of change \*\*\*\*\*

### 6.2.2 Transmission of V2X communication over Uu from UE to V2X application server

The upper layers can request the UE to send a V2X message of a V2X service identified by a V2X service identifier using V2X communication over Uu. The request from the upper layers includes:

a) the V2X message;

b) the V2X service identifier of the V2X service for the V2X message;

c) the type of data in the V2X message (IP or non-IP); and

d) if the V2X message contains non-IP data, the V2X message family (see clause 7.1 of 3GPP TS 24.386 [5]) of data in the V2X message.

Upon a request from upper layers to send a V2X message of a V2X service identified by a V2X service identifier using V2X communication over Uu:

a) if the registered PLMN of the UE is not in the list of PLMNs in which the UE is configured to use V2X communication over Uu as specified in clause 5.2.4, the UE shall determine that the transmission of V2X communication over Uu from UE to V2X application server is not configured and shall not continue with the rest of the steps; and

b) if:

1) the type of data in the V2X message is non-IP; or

2) the type of data in the V2X message is IP;

 then:

1) the UE shall determine the mapping rule in the list of V2X service identifier to PDU session parameters mapping rules specified in clause 5.2.4, such that the mapping rule contains the V2X service identifier provided by upper layers;

2) the UE shall consider the PDU session type, the SSC mode (if indicated in determined mapping rule), an S-NSSAI (if indicated in determined mapping rule) and a DNN (if indicated in determined mapping rule) indicated in the determined mapping rule as the UE local configuration and request information of the PDU session via which to send a PDU according to 3GPP TS 24.526 [22];

3) if the PDU session is of "IPv4", "IPv6" or "IPv4v6" PDU session type:

i) the UE shall discover the V2X application server address for uplink transport as described in clause 6.2.6. If the V2X application server address cannot be discovered, the UE shall determine that the transmission of V2X communication over Uu from UE to V2X application server is not possible and shall not continue with the rest of the steps;

ii) if UDP is to be used for the determined V2X application server address, the UE shall generate a UDP message as described in IETF RFC 768 [14]. In the UDP message, the UE shall include the V2X message provided by upper layers in the data octets field. The UE shall send the UDP message to the determined V2X application server address; and

iii) if TCP is to be used for the determined V2X application server address:

A) if a TCP connection with the determined V2X application server address is not established yet, the UE shall establish a TCP connection with the determined V2X application server address; and

B) the UE shall create a V2X envelope specified in clause 9.2.1. In the V2X envelope, the UE shall include the V2X message and the V2X message family (if the V2X message is non-IP based) provided by upper layers. The UE shall send the V2X envelope via the TCP connection; and

4) if the PDU session is of "Unstructured" PDU session type and the type of data in the V2X message is non-IP, the UE shall create a V2X envelope specified in clause 9.2.1. In the V2X envelope, the UE shall include the V2X message and the V2X message family (if the V2X message is non-IP based) provided by upper layers. The UE shall send the V2X envelope as data of "Unstructured" PDU Session type via the PDU session.

\*\*\*\*\* Third of change \*\*\*\*\*

### 6.2.5 Reception of V2X communication over Uu from V2X application server to UE

The upper layers can request the UE to receive a V2X message of a V2X service identified by a V2X service identifier using V2X communication over Uu. The request from the upper layers includes:

a) the V2X service identifier of the V2X service for the V2X message to be received;

b) the type of data in the V2X message to be received (IP or non-IP); and

c) if the V2X message to be received contains non-IP data, the V2X message family (see clause 9.2.1) of data in the V2X message to be received.

Upon a request from upper layers to receive a V2X message of a V2X service identified by a V2X service identifier using V2X communication over Uu:

a) if the registered PLMN of the UE is not in the list of PLMNs in which the UE is configured to use V2X communication over Uu as specified in clause 5.2.4, the UE shall determine that the transmission of V2X communication over Uu from V2X application server to UE is not configured and shall not continue with the rest of the steps; and

b) if:

1) the type of data in the V2X message is non-IP; or

2) the type of data in the V2X message is IP;

 then:

1) the UE shall determine the mapping rule in the list of V2X service identifier to PDU session parameters mapping rules specified in clause 5.2.4, such that the mapping rule contains the V2X service identifier provided by upper layers;

2) the UE shall establish a PDU session with the PDU session type, the SSC mode (if indicated in determined mapping rule), an S-NSSAI (if indicated in determined mapping rule) and a DNN (if indicated in determined mapping rule) indicated in the determined mapping rule, if such PDU session does not exist yet;

3) if the PDU session is of "IPv4", "IPv6" or "IPv4v6" PDU session type:

i) the UE shall discover the V2X application server address for downlink transport as described in clause 6.2.6. If the V2X application server address cannot be discovered, the UE shall determine that the transmission of V2X communication over Uu from V2X application server to UE is not possible and shall not continue with the rest of the steps; and

ii) if UDP is to be used for the determined V2X application server address:

A) the UE shall select a local UDP port; and

B) the UE shall create a V2X envelope specified in clause 9.2.1. In the V2X envelope, the UE shall indicate subscribe request with one or more V2X service identifier(s) of the one or more V2X service(s) which the UE wants to receive on the UE's IP address and the selected local UDP port from the determined V2X application server address. The UE shall send the V2X envelope from the UE's IP address and the selected local UDP port to the determined V2X application server address.

 Upon reception of a V2X envelope indicating subscribe accept on the UE's IP address and the selected local UDP port from the determined V2X application server address, the UE shall consider that downlink transport for the V2X messages of the V2X services is possible and shall start timer Tx set to the validity time indicated in the V2X envelope.

 Upon reception of a V2X envelope indicating subscribe reject on the UE's IP address and the selected local UDP port from the determined V2X application server address, the UE shall consider that downlink transport for the V2X messages of the V2X services is not possible.

 Upon reception of a V2X envelope specified in clause 9.2.1 with a V2X message on the UE's IP address and the selected local UDP port from the determined V2X application server address, the UE shall extract a V2X message and a V2X message family (if the V2X message is non-IP based) from the received V2X envelope and provide them to the upper layers.

 Upon expiration of the timer Tx, the UE shall create a V2X envelope specified in clause 9.2.1. In the V2X envelope, the UE shall indicate subscribe request with one or more V2X service identifier(s) of the one or more V2X service(s) which the UE wants to receive via the UDP session. The UE shall send the V2X envelope from the UE's IP address and the selected local UDP port to the determined V2X application server address.

 Upon reception of a V2X envelope indicating subscribe accept on the UE's IP address and the selected local UDP port from the determined V2X application server address, the UE shall consider that downlink transport for the V2X messages of the V2X services is possible and shall start timer Tx set to the validity time indicated in the V2X envelope.

 Upon reception of a V2X envelope indicating subscribe reject on the UE's IP address and the selected local UDP port from the determined V2X application server address, the UE shall consider that downlink transport for the V2X messages of the V2X services is not possible;

ii) if TCP is to be used for the determined V2X application server address:

A) if a TCP connection with the determined V2X application server address is not established yet, the UE shall establish a TCP connection with the determined V2X application server address; and

B) the UE shall create a V2X envelope specified in clause 9.2.1. In the V2X envelope, the UE shall indicate subscribe request with one or more V2X service identifier(s) of the one or more V2X service(s) which the UE wants to receive via the TCP connection. The UE shall send the V2X envelope via the TCP connection.

 Upon reception of a V2X envelope indicating subscribe accept via the TCP connection, the UE shall consider that downlink transport for the V2X messages of the V2X services is possible.

 Upon reception of a V2X envelope indicating subscribe reject via the TCP connection, the UE shall consider that downlink transport for the V2X messages of the V2X services is not possible.

 Upon reception of a V2X envelope specified in clause 9.2.1 with a V2X message via the TCP connection, the UE shall extract a V2X message and a V2X message family (if the V2X message is non-IP based) from the received V2X envelope and provide them to the upper layers; and

4) if the PDU session is of "Unstructured" PDU session type and the type of data in the V2X message is non-IP:

i) the UE shall create a V2X envelope specified in clause 9.2.1. In the V2X envelope, the UE shall indicate subscribe request with one or more V2X service identifier(s) of the one or more V2X service(s) which the UE wants to receive via the PDU session is of "Unstructured" PDU session type. The UE shall send the V2X envelope as data of "Unstructured" PDU Session type via the PDU session.

 Upon reception of a V2X envelope indicating subscribe accept in the data of "Unstructured" PDU Session type received over the PDU session, the UE shall consider that downlink transport for the V2X messages of the V2X services is possible.

 Upon reception of a V2X envelope indicating subscribe reject in the data of "Unstructured" PDU Session type received over the PDU session, the UE shall consider that downlink transport for the V2X messages of the V2X services is not possible.

 Upon reception of a V2X envelope specified in clause 9.2.1 with a V2X message in the data of "Unstructured" PDU Session type received over the PDU session, the UE shall extract a V2X message and a V2X message family (if the V2X message is non-IP based) from the received V2X envelope and provide them to the upper layers.

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