**3GPP TSG-CT WG1 Meeting #123-eC1-20xxxx**

**Electronic meeting, 16-24 April 2020 was C1-2002183**

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| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **24.587** | **CR** | **0015** | **rev** | **1** | **Current version:** | **16.0.0** |  |
|  | | | | | | | | |
| *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 |  |

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|  | | | | | | | | | | |
| ***Title:*** | ENs resolving in modification pocedure | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | vivo | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eV2XARC | | | | |  | ***Date:*** | | | 2020-04-10 |
|  |  | | | |  | |  | | |  |
| ***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 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)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | 1. Due to the introduction of the link modification operation code, the operation of each link modification can only be one of the five operations. Therefore a DIRECT LINK MODIFICATION REQUEST message cannot contain multiple modification operations. Thus the following EN could be removed directly.   *Editor's note: It is FFS whether a DIRECT LINK MODIFICATION REQUEST message can contain multiple modification operations.*   1. All behavior of the timer T5001 has been defined, which is captured in clause *10.3 Timers of provisioning of parameters for V2X configuration procedures*, therefore the following EN can be removed directly.   *Editor’s note: The details of the timer T5001 are FFS.*   1. The following EN needs to be resolved.   *Editor’s note: The details about the PC5 unicast link modification procedure not accepted by the target UE are FFS*  The following are some reasons that cause target UE cannot accept the PC5 unicast link modification request.   * required service not allowed, which means the V2X service to be added is not allowed according to the operator policy or service authorisation provisioning. * lack of resources for proposed link, which means the target UE has no enough resources for the V2X service or PC5 QoS flows to be added. * protocol error, unspecified, other reasons that causing the failure of link modification. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. remove the following 2 ENs   *Editor's note: It is FFS whether a DIRECT LINK MODIFICATION REQUEST message can contain multiple modification operations.*  *Editor’s note: The details of the timer T5001 are FFS.*   1. Resolve the following EN and specify the details about the PC5 unicast link modification procedure not accepted by the target UE.   *Editor’s note: The details about the PC5 unicast link modification procedure not accepted by the target UE are FFS* | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | ENs still need to be resloved. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.1.2.3.2, 6.1.2.3.5, 8.4.9 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 \* \* \* \*

##### 6.1.2.3.2 PC5 unicast link modification procedure initiated by initiating UE

The initiating UE shall meet the following pre-conditions before initiating this procedure for adding a new V2X service to the existing PC5 unicast link:

a) there is a PC5 unicast link between the initiating UE and the target UE; and

b) the pair of application layer IDs and the network layer protocol of this PC5 unicast link are identical to those required by the application layer in the initiating UE for this V2X service.

If the PC5 unicast link modification procedure is to add a new V2X service to the existing PC5 unicast link, the initiating UE shall create a DIRECT LINK MODIFICATION REQUEST message. In this message, the initiating UE:

a) shall include the V2X service identifier received from upper layer;

b) shall include the PQFI and the corresponding PC5 QoS parameters; and

c) shall include the link modification operation code set to "add new V2X service".

If the PC5 unicast link modification procedure is to remove an existing V2X service from the existing PC5 unicast link, the initiating UE shall create a DIRECT LINK MODIFICATION REQUEST message. In this message, the initiating UE:

a) shall include the V2X service identifier received from upper layer; and

b) shall include the link modification operation code set to "remove existing V2X service".

If the PC5 unicast link modification procedure is to add new PC5 QoS flow(s) to the existing PC5 unicast link, the initiating UE shall create a DIRECT LINK MODIFICATION REQUEST message. In this message, initiating UE:

a) shall include the V2X service identifier received from upper layer;

b) shall include the PQFI(s) and the corresponding PC5 QoS parameters; and

c) shall include the link modification operation code set to "add new PC5 QoS flow(s)".

If the PC5 unicast link modification procedure is to modify any PC5 QoS flow(s) in the existing PC5 unicast link, the initiating UE shall create a DIRECT LINK MODIFICATION REQUEST message. In this message, the initiating UE:

a) shall include the PQFI(s) and the corresponding PC5 QoS parameters; and

b) shall include the link modification operation code set to "modify existing PC5 QoS flow(s)".

If the PC5 unicast link modification procedure is to remove any PC5 QoS flow(s) from the existing PC5 unicast link, the initiating UE shall create a DIRECT LINK MODIFICATION REQUEST message. In this message, the initiating UE:

a) shall include the PQFI(s); and

b) shall include the link modification operation code set to "remove existing PC5 QoS flow(s)".

After the DIRECT LINK MODIFICATION REQUEST message is generated, the initiating UE shall pass this message to the lower layers for transmission along with the initiating UE's layer 2 ID for unicast communication and the target UE’s layer-2 ID for unicast communication, and start timer T5001. The UE shall not send a new DIRECT LINK MODIFICATION REQUEST message to the same target UE while timer T5001 is running.



Figure 6.1.2.3.2: PC5 unicast link modification procedure

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

##### 6.1.2.3.5 PC5 unicast link modification procedure not accepted by the target UE

If the PC5 unicast link modification request cannot be accepted, the target UE shall send a DIRECT LINK MODIFICATION REJECT message. The DIRECT LINK MODIFICATION REJECT message contains a PC5 signalling protocol cause IE set to one of the following cause values:

#5 lack of resources for proposed link;

#X required service not allowed; or

#111 protocol error, unspecified.

If the target UE is not allowed to accept this request, .e.g. because the V2X service to be added is not allowed per the operator policy or configuration parameters for V2X communication over PC5 as specified in clause 5.2.3, the target UE shall send a DIRECT LINK MODIFICATION REJECT message with PC5 signalling protocol cause value #X "required service not allowed".

If the PC5 unicast link modification fails due to the congestion problems or other temporary lower layer problems causing resource constraints, the target UE shall send a DIRECT LINK MODIFICATION REJECT message with PC5 signalling protocol cause value #5 "lack of resources for proposed link".

For other reasons causing the failure of link modification, the target UE shall send a DIRECT LINK MODIFICATION REJECT message with PC5 signalling protocol cause value #111 "protocol error, unspecified".

Upon receipt of the DIRECT LINK MODIFICATION REJECT message, the initiating UE shall stop timer T5001 and abort the PC5 unicast link modification procedure. If the PC5 signalling protocol cause value in the DIRECT LINK MODIFICATION REJECT message is #X "required service not allowed" or #5 "lack of resources for proposed link", then the initiating UE shall not attempt to start PC5 unicast link modification with the same target UE to add the same V2X service, or to add or modify the same PC5 QoS flow(s) at least for a time period T.

NOTE: The length of time period T is UE implementation specific and can be different for the case when the UE receives PC5 signalling protocol cause value #X "required service not allowed" or when the UE receives PC5 signalling protocol cause value #5 "lack of resources for proposed link". The length of time period T is not less than 30 minutes.

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

### 8.4.9 PC5 signalling protocol cause

The purpose of the PC5 signalling protocol cause information element is to indicate the cause used in the PC5 signalling protocol procedures.

The PC5 signalling protocol cause is a type 3 information element with a length of 2 octets.

The PC5 signalling protocol cause information element is coded as shown in figure 8.4.9.1 and table 8.4.9.1.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| PC5 signalling protocol cause IEI | | | | | | | | octet 1 |
| PC5 signalling cause value | | | | | | | | octet 2 |

Figure 8.4.9.1: PC5 signalling protocol cause information element

Table 8.4.9.1: PC5 signalling protocol cause information element

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| PC5 signalling cause value (octet 2) | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | |
| Bits | | | | | | | | | | | | | | |
| 8 | 7 | 6 | 5 | 4 | 3 | | 2 | | 1 | |  | |  | |
| 0 | 0 | 0 | 0 | 0 | | 0 | | 0 | | 1 | |  | | Direct communication to the target UE not allowed | |
| 0 | 0 | 0 | 0 | 0 | 0 | | 1 | | 0 | |  | | Direct communication to the target UE no longer needed | |
| 0 | 0 | 0 | 0 | 0 | | 0 | | 1 | | 1 | |  | | Conflict of Layer 2 ID for unicast communication is detected | |
| 0 | 0 | 0 | 0 | 0 | 1 | | 0 | | 0 | |  | | Direct connection is not available anymore | |
| 0 | 0 | 0 | 0 | 0 | | 1 | | 0 | | 1 | |  | | Lack of resources for proposed link | |
| A | A | A | A | A | | A | | A | | A | |  | | Required service not allowed | |
| 0 | 1 | 1 | 0 | 1 | | 1 | | 1 | | 1 | |  | | Protocol error, unspecified | |
|  |  |  |  |  | |  | |  | |  | |  | |  | |
| Any other value received by the UE shall be treated as 0110 1111, "protocol error, unspecified". | | | | | | | | | | | | | | | |

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