**3GPP TSG-CT WG1 Meeting #125-eC1-204762**

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

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **24.587** | **CR** | **0087** | **rev** | **-** | **Current version:** | **16.1.1** |  |
|  |
| *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:***  | Updates to the link release |
|  |  |
| ***Source to WG:*** | vivo |
| ***Source to TSG:*** | C1 |
|  |  |
| ***Work item code:*** | eV2XARC |  | ***Date:*** | 2020-08-08 |
|  |  |  |  |  |
| ***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)Rel-17 (Release 17)* |
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| ***Reason for change:*** | 1. If no response from target UE, the initiating UE may initiate the PC5 unicast link release procedure, rather than having to initiate it, so current pre-conditions of initiating the link release procedure are not accurate.
2. Once the target UE receives the DIRECT LINK RELEASE REQUEST message, the target UE shall stop all the running timer. Current timers listed in clause 6.1.2.4.3 are not complete and the Table 10.3.1 also needs to be updated.
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| ***Summary of change:*** | * Specify the initiating UE may initiate the PC5 unicast link release procedure, rather than having to initiate it, if no response received from target UE.
* After receiving the DIRECT LINK RELEASE REQUEST message, the target UE shall stop all the running timer for an existing unicast link.
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| ***Consequences if not approved:*** | 1. The UE is mandatory to initiate the PC5 unicast link release procedure if no response received from target UE, which doesn't aligin with current conclusions.
2. Some timers are still running after the link release.
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| ***Clauses affected:*** | 6.1.2.4.2, 6.1.3.2.4, 10.3 |
|  |  |
|  | **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 \* \* \* \*

##### 6.1.2.4.2 PC5 unicast link release procedure initiation by initiating UE

The initiating UE shall initiate the procedure if a request from upper layers to release a PC5 unicast link with the target UE which uses a known layer-2 ID (for unicast communication) is received and there is an existing PC5 unicast link between these two UEs.

The initiating UE may initiate the procedure if the target UE has been non-responsive, e.g. no response in the PC5 unicast link modification procedure, PC5 unicast link identifier update procedure, PC5 unicast link re-keying procedure or PC5 unicast link keep-alive procedure.

The initiating UE may initiate the procedure to release an established PC5 unicast link if the UE has reached the maximum number of established PC5 unicast links and there is a need to establish a new PC5 unicast link. In this case, which PC5 unicast link is to be released is up to UE implementation.

In order to initiate the PC5 unicast link release procedure, the initiating UE shall create a DIRECT LINK RELEASE REQUEST message with a PC5 signalling protocol cause IE indicating one of the following cause values:

#1 direct communication with the target UE not allowed;

#2 direct communication to the target UE no longer needed;

#4 direct connection is not available anymore;

#5 lack of resources for PC5 unicast link; or

#111 protocol error, unspecified.

The initiating UE shall include the new MSB of KNRP ID in the DIRECT LINK RELEASE REQUEST message.

After the DIRECT LINK RELEASE 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 and the target UE's layer-2 ID. The initiating UE shall release the direct link locally if the release reason is #4 "direct connection is not available anymore". Otherwise, the initiating UE shall start timer T5002.



Figure 6.1.2.4.2.1: PC5 unicast link release procedure

\* \* \* Second Change \* \* \* \*

##### 6.1.2.4.3 PC5 unicast link release procedure accepted by the target UE

Upon receiving a DIRECT LINK RELEASE REQUEST message, the target UE shall stop all running timers for this PC5 unicast link and abort any other ongoing PC5 signalling protocol procedures on this PC5 unicast link. The target UE shall respond with a DIRECT LINK RELEASE ACCEPT message. The target UE shall include the new LSB of KNRP ID in the DIRECT LINK RELEASE ACCEPT message. After the message is sent, the target UE shall release the PC5 unicast link by performing the following behaviors:

a) inform the lower layer along with the PC5 link identifier that the PC5 unicast link has been released; and

b) delete the PC5 unicast link context of the PC5 unicast link after an implementation specific time.

The target UE shall form the new KNPR ID from the new MSB of KNPR ID received in the DIRECT LINK RELEASE REQUEST message and the new LSB of KNPR ID included in the DIRECT LINK RELEASE ACCEPT message. The target UE shall replace the existing KNPR ID with the new KNPR ID. The target UE may include the new KNPR ID in DIRECT LINK ESTABLISHMENT REQUEST message with the initiating UE as specified in clause 6.1.2.2.2.

\* \* \* Third Change \* \* \* \*

10.3 Timers of PC5 unicast link management procedures

**Table 10.3.1: PC5 unicast link management timers**

| **TIMER NUM.** | **TIMER VALUE** | **CAUSE OF START** | **NORMAL STOP** | **ON EXPIRY** |
| --- | --- | --- | --- | --- |
| T5000 | 8s | Upon sending a DIRECT LINK ESTABLISHMENT REQUEST message | Upon receiving a DIRECT LINK ESTABLISHMENT ACCEPT or DIRECT LINK ESTABLISHMENT REJECT message from the target UE | Retransmission of DIRECT LINK ESTABLISHMENT REQUEST message |
| T5001 | 5s | Upon sending a DIRECT LINK MODIFICATION REQUEST message | Upon receiving a DIRECT LINK MODIFICATION ACCEPT or DIRECT LINK MODIFICATION REJECT or DIRECT LINK RELEASE REQUEST message from the target UE | Retransmission of DIRECT LINK MODIFICATION REQUEST message |
| T5002 | 5s | Upon sending a DIRECT LINK RELEASE REQUEST message | Upon receiving a DIRECT LINK RELEASE ACCEPT message from the target UE | Retransmission of DIRECT LINK RELEASE REQUEST message |
| T5003 | 5s | Upon receiving a PC5 signalling message or PC5 user plane data | Upon PC5 unicast link release or upon initiating the PC5 unicast link keep-alive procedure | Initiate the PC5 unicast link keep-alive procedure |
| T5004 | 5s | Upon sending a DIRECT LINK KEEPALIVE REQUEST message | Upon receiving a PC5 signalling message or PC5 user plane data | Retransmission of the DIRECT LINK KEEPALIVE REQUEST message |
| T5005 | Default 10mNOTE 1 | Upon receiving a Maximum inactivity period in a DIRECT LINK KEEPALIVE REQUEST message, receiving a PC5 signalling message or receiving PC5 user plane data | Upon receiving a PC5 signalling message or PC5 user plane data | Either initiate the PC5 unicast link keep-alive procedure or the PC5 unicast link release procedure |
| T5006 | 5s | Upon sending a DIRECT LINK AUTHENTICATION REQUEST message | Upon receiving a DIRECT LINK AUTHENTICATION RESPONSE or DIRECT LINK AUTHENTICATION REJECT message from the target UE | Retransmission of DIRECT LINK AUTHENTICATION REQUEST message |
| T5007 | 5s | Upon sending a DIRECT LINK SECURITY MODE COMMAND message | Upon receiving a DIRECT LINK SECURITY MODE COMPLETE or DIRECT LINK SECURITY MODE REJECT message from the target UE | Retransmission of DIRECT LINK SECURITY MODE COMMAND message |
| T5008 | 15s | Upon sending a DIRECT LINK REKEYING REQUEST message | Upon receiving a DIRECT LINK REKEYING RESPONSE message or DIRECT LINK RELEASE REQUEST message from the target UE | Retransmission of DIRECT LINK REKEYING REQUEST message |
| T5009 |  | Upon sending a DIRECT LINK IDENTIFIER UPDATE REQUEST message | Upon receiving a DIRECT LINK IDENTIFIER UPDATE ACCEPT or DIRECT LINK ESTABLISHMENT REJECT or DIRECT LINK RELEASE REQUEST message from the target UE | Retransmission of the DIRECT LINK IDENTIFIER UPDATE REQUEST message |
| T5010 |  | Upon sending a DIRECT LINK IDENTIFIER UPDATE ACCEPT message | Upon receiving a DIRECT LINK IDENTIFIER UPDATE ACK message or DIRECT LINK RELEASE REQUEST message from the initiating UE | Retransmission of the DIRECT LINK IDENTIFIER UPDATE ACCEPT message  |
| NOTE 1 The default value of this timer is used if the DIRECT LINK KEEPALIVE REQUEST message does not provide a timer value in the Maximum inactivity period IE, |

\* \* \* End of Change \* \* \* \*