**3GPP TSG-CT WG1 Meeting #123-eC1-202xxx**

**Electronic meeting, 16-24 April 2020**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
|  |
|  | **24.587** | **CR** | **0017** | **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:***  | Correction of the timers of link identifier update procedure |
|  |  |
| ***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 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)* |
|  |  |
| ***Reason for change:*** | Since the T5003 and T5004 are applied to keep-alive procedure, so it is proposed to correct the T5003 and T5004 used in PC5 unicast link identifier update procedure. |
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| ***Summary of change:*** | Correct the T5003 and T5004 used in PC5 unicast link identifier update procedure.Add timer description in timer table. |
|  |  |
| ***Consequences if not approved:*** | The timers in PC5 unicast link identifier update procedure are not correct. |
|  |  |
| ***Clauses affected:*** | 6.1.2.5.2, 6.1.2.5.3, 6.1.2.5.4, 6.1.2.5.5, 6.1.2.5.7.1, 6.1.2.5.7.2, 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 \* \* \* \*

##### 6.1.2.5.2 PC5 unicast link identifier update procedure initiation by initiating UE

The initiating UE shall initiate the procedure if:

a) the initiating UE receives a request from upper layers to change the Application Layer ID and there is an existing PC5 unicast link associated with this Application Layer ID; or

b) the privacy timer of the initiating UE's layer 2 ID expires for an existing PC5 unicast link.

Editor’s note: The details about the privacy timer of layer 2 ID are FFS.

If the PC5 unicast link identifier update procedure is triggered by a change of the initiating UE’s application layer ID, the initiating UE shall create a DIRECT LINK IDENTIFIER UPDATE REQUEST message. In this message, the initiating UE

a) shall include the initiating UE’s new application layer ID received from upper layer;

b) shall include the initiating UE’s new layer 2 ID assigned by itself;

c) shall include the new security information; and

d) may include the new IP address/prefix if IP communication is used.

If the PC5 unicast link identifier update procedure is triggered by the expiry of the initiating UE's privacy timer as specified in clause 5.2.3, the initiating UE shall create a DIRECT LINK IDENTIFIER UPDATE REQUEST message. In this message, the initiating UE

a) shall include the initiating UE’s new layer 2 ID assigned by itself;

b) shall include the new security information;

c) may include the initiating UE’s new application layer ID received from upper layer; and

d) may include the new IP address/prefix if IP communication is used.

Editor’s note: The details about security information defined by SA3 are FFS.

After the DIRECT LINK IDENTIFIER UPDATE REQUEST message is generated, the initiating UE shall pass this message to the lower layers for transmission along with the initiating UE's old Layer 2 ID and the target UE's Layer 2 ID, and start timer Txxxx. The UE shall not send a new DIRECT LINK IDENTIFIER UPDATE REQUEST message to the same target UE while timer Txxxx is running.



Figure 6.1.2.5.2.1: PC5 unicast link identifier update procedure

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

##### 6.1.2.5.3 PC5 unicast link identifier update procedure accepted by the target UE

Upon receipt of a DIRECT LINK IDENTIFIER UPDATE REQUEST message, if the target UE determines:

a) the PC5 unicast link associated with this request message is still valid; and

b) the timer Tyyyy for the PC5 unicast link identified by this request message is not running,

then the target UE accepts this request and responds with a DIRECT LINK IDENTIFIER UPDATE ACCEPT message.

If the target UE has the privacy configuration as specified in clause 5.2.3 and decides to change its identifier, the target UE shall create the DIRECT LINK IDENTIFIER UPDATE ACCEPT message. In this message, the target UE:

a) shall include the target UE’s new layer 2 ID assigned by itself;

b) shall include the new security information;

c) may include the target UE’s new application layer ID received from upper layer; and

d) may include the new IP address/prefix if IP communication is used.

After the DIRECT LINK IDENTIFIER UPDATE ACCEPT message is generated, the target UE shall pass this message to the lower layers for transmission along with the initiating UE's old Layer 2 ID and the target UE's old Layer 2 ID, and start timer Tyyyy. The UE shall not send a new DIRECT LINK IDENTIFIER UPDATE ACCEPT message to the same initiating UE while timer Tyyyy is running.

Before target UE receives the traffic using the new layer-2 IDs, the target UE shall continue to receive the traffic with the old layer-2 IDs (i.e. initiating UE’s old layer-2 ID and target UE’s old layer-2 ID) from initiating UE.

Before target UE receives the DIRECT LINK IDENTIFIER UPDATE ACK message from initiating UE, the target UE shall keep sending traffic to the initiating UE using the old layer-2 IDs (i.e. initiating UE’s old layer-2 ID and target UE’s old layer-2 ID).

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

##### 6.1.2.5.4 PC5 unicast link identifier update procedure acknowledged by the initiating UE

Upon receipt of the DIRECT LINK IDENTIFIER UPDATE ACCEPT message, the initiating UE shall stop timer Txxxx and respond with a DIRECT LINK IDENTIFIER UPDATE ACK message. In this message, the initiating UE:

a) shall include the target UE’s new layer 2 ID, if received;

b) shall include the target UE’s new security information, if received;

c) may include the target UE’s new application layer ID, if received; and

d) may include the new IP address/prefix, if received.

Upon receipt of the DIRECT LINK IDENTIFIER UPDATE ACCEPT message. the initiating UE shall update the associated PC5 unicast link context with the new identifiers, and pass the initiating UE’s new Layer 2 ID and the target UE’s new Layer 2 ID down to the lower layer.

After the DIRECT LINK IDENTIFIER UPDATE ACK message is generated, the initiating UE shall pass this message to the lower layers for transmission along with the initiating UE's old Layer 2 ID and the target UE's old Layer 2 ID.

The initiating UE shall continue to receive traffic with the old layer-2 IDs (i.e. initiating UE’s old layer-2 ID and target UE’s old layer-2 ID) from the target UE until it receives traffic with the new layer-2 IDs (i.e. initiating UE’s new layer-2 ID and target UE’s new layer-2 ID) from the target UE.

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

##### 6.1.2.5.5 PC5 unicast link identifier update procedure completion by the target UE

Upon receipt of the DIRECT LINK IDENTIFIER UPDATE ACK message, the target UE shall update the associated PC5 unicast link context with the new identifiers, pass the new initiating UE’s Layer 2 ID and the new target UE’s Layer 2 ID down to the lower layer and stop timer Tyyyy.

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

###### 6.1.2.5.7.1 Abnormal cases at the initiating UE

The following abnormal cases can be identified:

a) If timer Txxxx expires, the initiating UE shall retransmit the DIRECT LINK IDENTIFIER UPDATE REQUEST message and restart timer Txxxx. After reaching the maximum number of allowed retransmissions, the initiating UE shall abort the PC5 unicast link update procedure and may notify the upper layer that the target UE is unreachable.

NOTE 1: The maximum number of allowed retransmissions is UE implementation specific.

NOTE 2: After reaching the maximum number of allowed retransmissions, whether the initiating UE releases this PC5 unicast link depends on its implementation.

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

###### 6.1.2.5.7.2 Abnormal cases at the target UE

The following abnormal cases can be identified:

a) If timer Tyyyy expires, the target UE shall retransmit the DIRECT LINK IDENTIFIER UPDATE ACCEPT message and restart timer Tyyyy. After reaching the maximum number of allowed retransmissions, the target UE shall abort the PC5 unicast link update procedure and may notify the upper layer that the initiating UE is unreachable.

NOTE 1: The maximum number of allowed retransmissions is UE implementation specific.

NOTE 2: After reaching the maximum number of allowed retransmissions, whether the target UE releases this PC5 unicast link depends on its implementation.

Editor's note: It is FFS how to handle the collision of initiating UE-requested PC5 unicast link identifier update procedure and target UE-requested PC5 unicast link identifier update procedure for the same PC5 unicast link.

\* \* Next 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 |  | 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 |  | 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 |  | 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 |  | 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 |  | 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 |  | 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 |
| Txxxx |  | 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 |
| Tyyyy |  | 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  |

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