**3GPP TSG-CT WG1 Meeting #124-eC1-203272**

**Electronic meeting, 2-10 June 2020 was C1-202743**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **24.587** | **CR** | **0018** | **rev** | **3** | **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:*** | Encoding of link identifier update messages and parameters | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | vivo, InterDigital, CATT | | | | | | | | | |
| ***Source to TSG:*** | C1 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | eV2XARC | | | | |  | ***Date:*** | | | 2020-05-26 |
|  |  | | | |  | |  | | |  |
| ***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:*** | | The encoding of PC5 unicast link identifier update messages and parameters is still missing.  Reason to revise the contribution after agreed in last meeting  Agreed paper S3-201344 specifies that:  *In addition to its updated identifiers, UE\_2 shall send the LSB of KNRP-sess ID to UE\_1 along with the received MSB of KNRP-sess ID and other identifiers received from UE\_1 in the Link Identifier Update Response message.*  *UE\_1 shall send the Link Identifier Update Ack message to UE\_2 including the LSB of KNRP-sess ID and other identifiers received from UE\_2.*  The highlighted part are not captured in the message definition. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Add the encoding of PC5 unicast link identifier update messages and parameters.  New changes after agreed in last meeting:  It is proposed to   1. add following optinal IEs in the DIRECT LINK IDENTIFIER UPDATE ACCEPT message content  * Source user info * Source link local IPv6 address  1. add following optinal IEs in the DIRECT LINK IDENTIFIER UPDATE ACK message content  * Target user info * Target link local IPv6 address  1. Change MSBs & LSBs to MSB/LSB 2. Remove ENs according to SA3’s progress (S3-201344, S3-201345)   NOTE: The highlighted parts are only for the purpose of distinguishing, and will be deleted after agreed. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | No encoding of PC5 unicast link identifier update messages and parameters. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 7.3.a(new), 7.3.b(new), 7.3.c(new), 7.3.d(new) 8.4.1, 8.4.x(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 \* \* \* \*

### 7.3.a Direct link identifier update request

#### 7.3.a.1 Message definition

This message is sent by a UE to another peer UE to initiate the direct link identifier procedure. See table 7.3.a.1.1.

Message type: DIRECT LINK IDENTIFIER UPDATE REQUEST

Significance: dual

Direction: UE to peer UE

Table 7.3.a.1.1: DIRECT LINK IDENTIFIER UPDATE REQUEST message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | DIRECT LINK IDENTIFIER UPDATE REQUEST message identity | PC5 signalling message type  8.4.1 | M | V | 1 |
|  | Sequence number | Sequence number  8.4.2 | M | V | 1 |
|  | MSB of KNRP-sess ID | MSB of KNRP-sess ID  8.4.y | M | V | 1 |
|  | Source layer-2 ID | Layer-2 ID  8.4.x | M | V | 3 |
| TBD | Source user info | Application layer ID  8.4.4 | O | TLV | 4-254 |
| 58 | Source link local IPv6 address | Link local IPv6 address  8.4.7 | O | TV | 17 |

#### 7.3.a.2 Source user info

This IE is included when the initiating UE receives a new application layer ID.

#### 7.3.a.3 Source link local IPv6 address

This IE is included when the link local IPv6 address changes at the initiating UE.

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

### 7.3.b Direct link identifier update accept

#### 7.3.b.1 Message definition

This message is sent by the UE to another peer UE to indicate that the link identifier update request is accepted. See table 7.3.b.1.1.

Message type: DIRECT LINK IDENTIFIER UPDATE ACCEPT

Significance: dual

Direction: UE to peer UE

Table 7.3.b.1.1: DIRECT LINK IDENTIFIER UPDATE ACCEPT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | DIRECT LINK IDENTIFIER UPDATE ACCEPT message identity | PC5 signalling message type  8.4.1 | M | V | 1 |
|  | Sequence number | Sequence number  8.4.2 | M | V | 1 |
|  | LSB of KNRP-sess ID | LSB of KNRP-sess ID  8.4.z | M | V | 1 |
|  | MSB of KNRP-sess ID | MSB of KNRP-sess ID  8.4.y | M | V | 1 |
|  | Source layer-2 ID | Layer-2 ID  8.4.x | M | V | 3 |
| TBD | Target layer-2 ID | Layer-2 ID  8.4.x | O | TV | 4 |
| 28 | Target user info | Application layer ID  8.4.4 | O | TLV | 4-254 |
| TBD | Target link local IPv6 address | Link local IPv6 address  8.4.7 | O | TV | 17 |
| TBD | Source user info | Application layer ID  8.4.4 | O | TLV | 4-254 |
| 58 | Source link local IPv6 address | Link local IPv6 address  8.4.7 | O | TV | 17 |

#### 7.3.b.2 Target user info

This IE is included when the target user info changes at the target UE.

#### 7.3.b.3 Target layer-2 ID

This IE is included when the target UE changes its layer-2 ID.

Editor's note: The inclusion of the target layer-2 ID depends on stage2’s requirement.

#### 7.3.b.4 Target link local IPv6 address

This IE is included when the link local IPv6 address changes at target UE.

#### 7.3.b.5 Source user info

This IE is included if the target UE receives the source user info in the DIRECT LINK IDENTIFIER UPDATE REQUEST message.

#### 7.3.b.6 Source link local IPv6 address

This IE is included if the target UE receives the source link local IPv6 address in the DIRECT LINK IDENTIFIER UPDATE REQUEST message.

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

### 7.3.c Direct link identifier update ack

#### 7.3.c.1 Message definition

This message is sent by the initiating UE to target UE to indicate that the initiating UE has received target UE’s accept message. See table 7.3.c.1.1.

Message type: DIRECT LINK IDENTIFIER UPDATE ACK

Significance: dual

Direction: UE to peer UE

Table 7.3.c.1.1: DIRECT LINK IDENTIFIER UPDATE ACK message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | DIRECT LINK IDENTIFIER UPDATE ACK message identity | PC5 signalling message type  8.4.1 | M | V | 1 |
|  | Sequence number | Sequence number  8.4.2 | M | V | 1 |
|  | LSB of KNRP-sess ID | LSB of KNRP-sess ID  8.4.z | M | V | 1 |
| TBD | Target layer-2 ID | Layer-2 ID  8.4.x | O | TV | 4 |
| 28 | Target user info | Application layer ID  8.4.4 | O | TLV | 4-254 |
| TBD | Target link local IPv6 address | Link local IPv6 address  8.4.7 | O | TV | 17 |

#### 7.3.c.2 Target layer-2 ID

This IE is included when the initiating UE receives the target UE’s layer-2 ID in the DIRECT LINK IDENTIFIER UPDATE ACCEPT message.

#### 7.3.c.3 Target user info

This IE is included when the initiating UE receives the target user info in the DIRECT LINK IDENTIFIER UPDATE ACCEPT message.

#### 7.3.c.4 Target link local IPv6 address

This IE is included when the initiating UE receives the target link local IPv6 address in the DIRECT LINK IDENTIFIER UPDATE ACCEPT message.

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

### 7.3.d Direct link identifier update reject

#### 7.3.d.1 Message definition

This message is sent by the target UE to initiating UE to indicate that the link identifier update request is not accepted. See table 7.3.d.1.1.

Message type: DIRECT LINK IDENTIFIER UPDATE REJECT

Significance: dual

Direction: UE to peer UE

Table 7.3.d.1.1: DIRECT LINK IDENTIFIER UPDATE REJECT message content

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| IEI | Information Element | Type/Reference | Presence | Format | Length |
|  | DIRECT LINK IDENTIFIER UPDATE REJECT message identity | PC5 signalling message type  8.4.1 | M | V | 1 |
|  | Sequence number | Sequence number  8.4.2 | M | V | 1 |
|  | PC5 signalling protocol cause | PC5 signalling protocol cause  8.4.9 | M | V | 1 |

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

### 8.4.1 PC5 signalling message type

The purpose of the PC5 signalling message type information element is to indicate the type of messages used in PC5 signalling protocol.

The value part of the PC5 signalling message type information element used in the PC5 signalling messages is coded as shown in table 8.4.1.1.

The PC5 signalling message type is a type 3 information element, with the length of 1 octet.

Table 8.4.1.1: PC5 signalling message type

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Bits | | | | | | | |  |  |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |  |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |  | DIRECT LINK ESTABLISHMENT REQUEST |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |  | DIRECT LINK ESTABLISHMENT ACCEPT |
| 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |  | DIRECT LINK ESTABLISHMENT REJECT |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |  | DIRECT LINK MODIFICATION REQUEST |
| 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |  | DIRECT LINK MODIFICATION ACCEPT |
| 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 |  | DIRECT LINK MODIFICATION REJECT |
| 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 |  | DIRECT LINK RELEASE REQUEST |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |  | DIRECT LINK RELEASE ACCEPT |
| 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |  | DIRECT LINK KEEPALIVE REQUEST |
| 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 |  | DIRECT LINK KEEPALIVE RESPONSE |
| A  B  C  D | A  B  C  D | A  B  C  D | A  B  C  D | A  B  C  D | A  B  C  D | A  B  C  D | A  B  C  D |  | DIRECT LINK IDENTIFIER UPDATE REQUEST  DIRECT LINK IDENTIFIER UPDATE ACCEPT  DIRECT LINK IDENTIFIER UPDATE ACK  DIRECT LINK IDENTIFIER UPDATE REJECT |
|  | | | | | | | | | |

Editor's note: The values of the other PC5 signalling messages are FFS.

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

### 8.4.x Layer-2 ID

The purpose of the layer-2 ID information element is to indicate the layer-2 ID that is used by UE.

The layer-2 ID is a type 3 information element with a length of 4 octets.

The layer-2 ID information element is coded as shown in figure 8.4.x.1 and table 8.4.x.1.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |  |
| Layer-2 ID IEI | | | | | | | | octet 1 |
| Layer-2 ID | | | | | | | | octet 2 |
|  | | | | | | | | octet 4 |

Figure 8.4.x.1: Layer-2 ID information element

Table 8.4.x.1: Layer-2 ID information element

|  |
| --- |
| Layer-2 ID (octet 2 to 4)  This field contains the 24-bit layer-2 ID. |

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