**3GPP TSG-CT WG1 Meeting #124-eC1-204103**

**Electronic meeting, 2-10 June 202 (was C1-203291)**

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| *CR-Form-v12.0* |
| **CHANGE REQUEST** |
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|  | **24.587** | **CR** | **0023** | **rev** | **4** | **Current version:** | **16.0.0** |  |
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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 |  |

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| ***Title:***  | Timer values for timers of PC5 unicast link management procedures |
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| ***Source to WG:*** | Huawei, HiSilicon |
| ***Source to TSG:*** | C1 |
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| ***Work item code:*** | eV2XARC |  | ***Date:*** | 2020-06-09 |
|  |  |  |  |  |
| ***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:*** | The specification provides the timers of PC5 unicast link management procedures under the clause 10.3.However, the timer values are not defined yet. Not possible to implement the timer of PC5 unicast link management as the values are not defined.The timer value should be long enough to avoid unnecessary re-transmissions but short enough to not impact user experience of the V2X services. Also, there is need to consider how the PC5 unicast link management messages are transported by lower layers and that there is no message transfer between network entities but only UEs. All this means that we need to see how things work in the UE when PCT5 unicast link management procedures are involved.The V2X application(s) handles messages (decentralized enviroment notification message aka DENM) at a transmission frequency which can be, e.g., 10 Hz (it handles 10 messages per second), thus it is safe to assume that the application layer does not take more than 1s to handle a primitive request from 3GPP layer.Note that the maximum packet delay buget (PDB) for a V2X packet defined in TS 23.287 subclause 5.4.4 is 500ms, and that HARQ mechanism defined by RAN2 for the PC5 radio interface tries at most 500ms to transfer the PC5 data packet.Since there is no HARQ mechanism for the V2X NAS messages (PC5 unicast link management defined by TS 24.587) if a V2X NAS message fails to be sent, then NAS retransmission is used based on the NAS timers, e.g., T5000, T5001.Thus, it is safe to assume that lower layers will take no more than 500ms to transfer a V2X NAS message, plus the possible application delay/involvement for PC5 unicast link management (e.g. the target UE shall include the source user info set to the target UE’s application layer ID received from upper layers). All in all, it is then proposed a value of 5s which is long enough for lower layer to transfer the PC5 unicast link management message without impacting user experience.Note that the case of T5000 or T5005 is different. T5005 controls the PC5 unicast link establishment procedure and note that this procedure, the UE may have to perform one or more PC5 unicast link authentication procedure(s) followed by one PC5 unicast link security mode control procedure. All this means that T5000 needs to be larger than the sum of the timers which control the PC5 unicast link authentication procedure and the PC5 unicast link security mode control procedure. As for T5005, as it is a keepalive timer, and also the timer value can be received in the DIRECT LINK KEEPALIVE REQUEST message (in the Maximum inactivity period IE). If not received, there is need of have a default value. |
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| ***Summary of change:*** | The timer values of PC5 unicast link management procedures under the clause 10.3 are defined. |
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| ***Consequences if not approved:*** | Not possible to implement the timers of PC5 unicast link management as the values are not defined. |
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| ***Clauses affected:*** | 10.3 |
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|  | **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 ...  |
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| ***Other comments:*** |  |
|  |  |
| ***This CR's revision history:*** | Revision 4 (CT1#124-e):The only change as compared to the version agreed at CT1#123-e is to update the reason for change and increase the value of T5000 to 8s (it was set to 5 sec in the agreed version). This is due to T5000 needs to be larger than the sum of the timers which control the PC5 unicast link authentication procedure timer and the PC5 unicast link security mode control procedure. It is considered that the new timers for the PC5 unicast link authentication procedure timer and the PC5 unicast link security mode control procedure are of a max. value of 2s. |

\* \* \* First 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 |
| 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 \* \* \* \*