**3GPP TSG-RAN WG2 Meeting #109bis-e *draftR2-2004056***

**Online, 20th – 30th April 2020**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.0* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **36.322** | **CR** | **0145** | **rev** | **1** | **Current version:** | **15.3.0** |  |
|  | | | | | | | | |
| *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)*.* | | | | | | | | |
|  | | | | | | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***Proposed change affects:*** | UICC apps |  | ME | **X** | Radio Access Network | **X** | Core Network |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | | |
| ***Title:*** | Clarification on RLC UM SN size for NB-IoT | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, HiSilicon | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NB\_IOTenh2-Core | | | | |  | ***Date:*** | | | 2020-04-29 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **F** |  | | | | | ***Release:*** | | | Rel-15 |
|  | *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:*** | | RLC UM for DRB was introduced as part of Further NB-IoT enhancements in Rel-15.  At RAN2#101bis, it was agreed:   |  | | --- | | Agreements:   * RLC SN is 5 bits. * No change to PDCP SN, but applicability should be clarified to also apply to UM. * Allow the option of configure RLC UM to be unidirectional (or bidirectional). * RLC UM is not supported for SRB in Rel-15. |      * Can capture above agreements in running CRs   However, the size of the RLC SN for RLC UM for DRB is not captured in the specification. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | Capture in section 6.2.1.3, that, for NB-IoT, a UM SN field size of 5 bits is used.  In section 6.2.1.3 and 7.2, change ‘configured’ to ‘used’ to take into account that the UM SN size is not configured by RRC in NB-IoT.  **Impact analysis**  Impacted functionality:  RLC UM for DRB  Inter-operability:  If the UE is implemented according to the CR and the NW is not, then the RLC PDU will not be decoded properly and the data will not be received correctly.  If the NW is implemented according to the CR and the UE is not, then the RLC PDU will not be received correctly. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | The RLC SN field size is not specified for RLC UM in NB-IoT leading to data loss. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 6.2.1.3, 7.2 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **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 |

#### 6.2.1.3 UMD PDU

UMD PDU consists of a Data field and an UMD PDU header.

UMD PDU header consists of a fixed part (fields that are present for every UMD PDU) and an extension part (fields that are present for an UMD PDU when necessary). The fixed part of the UMD PDU header itself is byte aligned and consists of a FI, an E and a SN. The extension part of the UMD PDU header itself is byte aligned and consists of E(s) and LI(s).

Except for NB-IoT, an UM RLC entity is configured by RRC to use either a 5 bit SN or a 10 bit SN. For NB-IoT, an UM RLC entity uses a 5 bit SN. When the 5 bit SN is used, the length of the fixed part of the UMD PDU header is one byte. When the 10 bit SN is used, the fixed part of the UMD PDU header is identical to the fixed part of the AMD PDU header, except for D/C, RF and P fields all being replaced with R1 fields. The extension part of the UMD PDU header is identical to the extension part of the AMD PDU header (regardless of the configured SN size).

An UMD PDU header consists of an extension part only when more than one Data field elements are present in the UMD PDU, in which case an E and a LI are present for every Data field element except the last. Furthermore, when an UMD PDU header consists of an odd number of LI(s), four padding bits follow after the last LI.



Figure 6.2.1.3-1: UMD PDU with 5 bit SN (No LI)



Figure 6.2.1.3-2: UMD PDU with 10 bit SN (No LI)



Figure 6.2.1.3-3: UMD PDU with 5 bit SN (Odd number of LIs, i.e. K = 1, 3, 5, …)



Figure 6.2.1.3-4: UMD PDU with 5 bit SN (Even number of LIs, i.e. K = 2, 4, 6, …)



Figure 6.2.1.3-5: UMD PDU with 10 bit SN (Odd number of LIs, i.e. K = 1, 3, 5, …)



Figure 6.2.1.3-6: UMD PDU with 10 bit SN (Even number of LIs, i.e. K = 2, 4, 6, …)

|  |
| --- |
| Next change |

## 7.2 Constants

a) AM\_Window\_Size

This constant is used by both the transmitting side and the receiving side of each AM RLC entity to calculate VT(MS) from VT(A), and VR(MR) from VR(R). AM\_Window\_Size = 512 when a 10 bit SN is used, AM\_Window\_Size = 32768 when a 16 bit SN is used.

b) UM\_Window\_Size

This constant is used by the receiving UM RLC entity to define SNs of those UMD PDUs that can be received without causing an advancement of the receiving window. UM\_Window\_Size = 16 when a 5 bit SN is used, UM\_Window\_Size = 512 when a 10 bit SN is used and UM\_Window\_Size = 0 when the receiving UM RLC entity is configured for MCCH, MTCH, SC-MCCH, SC-MTCH or STCH for sidelink communication.