**3GPP TSG-RAN WG2 Meeting #124 R2-231xxxx**

**Chicago, USA, 13th Nov. – 17th Nov. 2023**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| *CR-Form-v12.2* | | | | | | | | |
| **CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **38.322** | **CR** | **0053** | **rev** | **1** | **Current version:** | **17.3.0** |  |
|  | | | | | | | | |
| *For* [***HELP***](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:*** | Introduction of XR Enhancements | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | vivo | | | | | | | | | |
| ***Source to TSG:*** | R2 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | NR\_XR\_enh-Core | | | | |  | ***Date:*** | | | 2023-11-22 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **B** |  | | | | | ***Release:*** | | | Rel-18 |
|  | *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-16 (Release 16) Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)* | |
|  |  | | | | | | | | | |
| ***Reason for change:*** | | In Rel-18, new functionalities were agreed for NR to provide enhanced support of XR services, which require RLC protocol modifications.  RAN2 has agreed to report DSR including the burrfer status associated with the remaining time. Thus,   1. Delay critical RLC SDU should be added. 2. The abbreviation for DSR should be added. 3. The data volume calculation for DSR should be added. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Summary of change:*** | | 1. In 3.1, add the definition for delay-critical RLC SDU 2. In 3.2, add the abbreviation for DSR 3. In 5.5, add the data volume calculation for DSR | | | | | | | | |
|  | |  | | | | | | | | |
| ***Consequences if not approved:*** | | NR enhancements related to XR services for DSR cannot be supported in Rel-18. | | | | | | | | |
|  | |  | | | | | | | | |
| ***Clauses affected:*** | | 3.1, 3.2, 5.5 | | | | | | | | |
|  | |  | | | | | | | | |
|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | | **X** |  | Other core specifications | | | | TS/TR 38.300 CR 0724  TS/TR 38.306 CR TBD  TS/TR 38.321 CR 1698  TS/TR 38.323 CR 0128 | | |
| ***affected:*** | |  | **X** | Test specifications | | | | TS/TR 38.331 CR 4436  TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **X** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | | This is the updated version of running CR for TS 38.322 for XR WI. | | | | | | | | |

Start of change

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 38.300: "NR Overall Description; Stage 2".

[3] 3GPP TS 38.321: "NR MAC protocol specification".

[4] 3GPP TS 38.323: "NR PDCP specification".

[5] 3GPP TS 38.331: "NR RRC Protocol specification".

[6] 3GPP TS 23.287: "Architecture enhancements for 5G System (5GS) to support Vehicle-to-Everything (V2X) services".

[7] 3GPP TS 38.340: "NR; Backhaul Adaptation Protocol (BAP) specification".

[8] 3GPP TS 23.304: "Proximity based Services (ProSe) in the 5G System (5GS)".

[9] 3GPP TS 38.351: "NR; Sidelink Relay Adaptation Protocol (SRAP) Specification".

Next change

# 3 Definitions, symbols and abbreviations

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

**Data field element:** An RLC SDU or an RLC SDU segment that is mapped to the Data field.

**Delay-critical RLC SDU:** the RLC SDU indicated from upper layer (e.g. PDCP) which is delay critical.

**NR sidelink communication**: AS functionality enabling at least V2X Communication as defined in TS 23.287 [6] and ProSe communication (including ProSe non-Relay and UE-to-Network Relay communication) as defined in TS 23.304 [8], between two or more nearby UEs, using NR technology but not traversing any network node.

**NR sidelink discovery**: AS functionality enabling ProSe non-Relay Discovery and ProSe UE-to-Network Relay discovery for Proximity based Services as defined in TS 23.304 [8] between two or more nearby UEs, using NR technology but not traversing any network node.

**RLC data volume:** The amount of data available for transmission in an RLC entity.

**RLC SDU segment:** A segment of an RLC SDU.

## 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

AM Acknowledged Mode

AMD AM Data

ARQ Automatic Repeat request

DSR Delay Status Report

gNB NR Node B

MBS Multicast/Broadcast Services

MCCH MBS Control Channel

MTCH MBS Traffic Channel

PDU Protocol Data Unit

RLC Radio Link Control

SBCCH Sidelink Broadcast Control Channel

SCCH Sidelink Control Channel

SDU Service Data Unit

SN Sequence Number

STCH Sidelink Traffic Channel

TB Transport Block

TM Transparent Mode

TMD TM Data

UE User Equipment

UM Unacknowledged Mode

UMD UM Data

Next change

5.5 Data volume calculation

For the purpose of MAC buffer status reporting, the UE shall consider the following as RLC data volume:

- RLC SDUs and RLC SDU segments that have not yet been included in an RLC data PDU;

- RLC data PDUs that are pending for initial transmission;

- RLC data PDUs that are pending for retransmission (RLC AM).

For the purpose of MAC delay status reporting, the UE shall consider the following as delay-critical RLC data volume:

- delay-critical RLC SDUs and delay-critical RLC SDU segments that have not yet been included in an RLC data PDU;

- RLC data PDUs that contain the delay-critical RLC SDUs or delay-critical RLC SDU segments, and are pending for initial transmission;

- RLC data PDUs that contain the delay-critical RLC SDUs or delay-critical RLC SDU segments, and are pending for retransmission (RLC AM).

NOTE X: RLC data PDUs that contain delay-critical RLC SDUs or segments(s) of delay-critical RLC SDU indicated from upper layer (e.g. PDCP) whose *discardTimer* expired, but has not been discarded, should be considered as delay-critical RLC data volume.

In addition, if a STATUS PDU has been triggered and *t-StatusProhibit* is not running or has expired, the UE shall estimate the size of the STATUS PDU that will be transmitted in the next transmission opportunity, and consider this as part of RLC data volume for MAC buffer status reporting and MAC delay status reporting.

End of change

Annex A– RAN2 agreements related to RLC

|  |  |  |
| --- | --- | --- |
| **RAN2 agreements** | **Impacted specification** | **Comments, if any** |
| **RAN2#121** | | |
| 5. Introduce UL PDU Set Importance. How UE derives this will be handled in UE implementation.  Can indicate that in RAN2 considers PDU set concept applicable to both UL and DL in LS to SA2. | No impact |  |
|  |  |  |
| **RAN2#121bis-e** | | |
| N/A |  |  |
|  |  |  |
| **RAN2#122** | | |
| **1: UE calculates the remaining time based on the PDCP discard timer value.** FFS if UE reports one or multiple values. FFS how this is modelled in PDCP specification. FFS which UEs support this.  When/if UE reports remaining time, the reference time for the remaining time is determined from the point of the first transmission of the information. FFS if intra-UE prioritization can impact this. | Partially captured in 5.5 |  |
|  |  |  |
| **RAN2#123** | | |
| Network can configure the UE whether to trigger delay status reporting. FFS if we have some thresholds per LCG. | No impact |  |
| When UE triggers reporting delay information for a LCG, and **UE also reports the buffer status associated with the remaining time.** | Captured in 5.5 in brackets. |  |
| Working assumption: Define a new separate MAC CE for DSR (remaining delay and associated data volume) reporting, e.g. DSR reporting is not coupled with BSR reporting. Detailed Definition of associated data volume is FFS.  **Support threshold based DSR reporting, e.g. DSR reporting is triggered when remaining delay of a PDU/PDU set is below a NW configured threshold.** The threshold is configured per LCG. FFS whether configuring multiple thresholds for a LCG is supported. Definition of remaining time is FFS. | Captured in 5.5 in brackets. |  |
| **RAN2#123bis** | | |
| 1. For triggering DSR, the shortest remaining-time left for the buffered data in UL is smaller than a configured threshold is used, if there is no pending DSR associated for that LCG. | Captured in 5.5 |  |
| 2. One threshold per LCG for triggering purposes is enough for delay status report | No impact |  |
| 3. The data volume calculation to be reported in the DSR will consider the at size of the full remaining PDUs in the PDU set (if any PDU within the PDU set is with remaining time below the threshold), if the PDU set discard is configured. FFS what to report for the case of not PDU set discard configured | Captured in 5.5 |  |
| 4. Support single delay information per LCG as baseline for Rel-18 DSR. The remaining time (the shortest remaining time in the LCG) will be explicitly repo rted in the DSR. | No impact |  |
| **RAN2#124** | | |
| 1. Delay-critical data in RLC is determined by the indication from PDCP layer.  2. RLC data PDU(s) pending for RLC AM retransmission shall be included in the data volume calculation in RLC for DSR.  3. The PDU (s) stored in RLC with discardTimer expired, but has not been discarded, should be calculated in the data volume in RLC for DSR  4. RLC Control PDU shall be included in the data volume calculation in RLC for DSR | Captured in 5.5 |  |
|  |  |  |