3GPP TSG-RAN WG2 #125 R2-240xxxx

**Athens, Greece, 26 February ~ 1 March, 2024**

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| *CR-Form-v11.2* |
| **CHANGE REQUEST** |
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|  | **38.321** | **CR** | **-** | **rev** | **-** | **Current version:** | **18.0.0** |  |
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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 | **X** | Core Network |  |

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| ***Title:***  | Correction to TS 38.321 |
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| ***Source to WG:*** | Qualcomm Incorporated (rapporteur) |
| ***Source to TSG:*** | R2 |
|  |  |
| ***Work item code:*** | NR\_XR\_enh-Core |  | ***Date:*** | 2024-03 |
|  |  |  |  |  |
| ***Category:*** | **F** |  | ***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 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 following changes need to be made:1. In the availability conditions for a configured uplink grant, a ‘the’ is missing;
2. The CURRENT\_symbol for a multi-PUSCH configured grant refers to the first symbol of the first transmission occasion of the first configured uplink grant within the same periodicity. This definition is different from that of the CURRENT\_symbol of a legacy configured grant. This difference needs to be clarified.
3. The latest RAN1 spec defines conditions for a valid CG occasion instead of an invalid occasion. Hence the MAC spec should also define a valid occasion instead of an invalid occasion.
4. The following cancelation of RACH procedure currently is missing: the MAC entity may stop an ongoing Random-Access procedure due to a pending SR for DSR, if the DSR that triggered the SR has been cancelled
5. The refined buffer size table is used by both BSR and DSR. But the name of the parameter, *additionalBSR-TableAllowed*, uses “BSR table”, which may lead to the misunderstanding that this parameter is only for BSR.
6. Currently when there is only one LCG has data, a short BSR is reported even of the buffer size of that LCG exceeds the maximum buffer size of the new (refined) buffer size table. That results in a quantization error higher than necessary. Long BSR should be used instead.
7. Refined Long BSR currently can’t be included in padding.
8. When determining the smallest remaining time among PDCP discard timer, only running discard timers should be considered.
9. A SDU should not be associated with a pending DSR if it has already been transmitted in a MAC PDU.
10. The current condition for triggering a DSR is either data has not been transmitted before or has not been reported in any DSR before. But the correct condition should include both of them, not just one of them.
11. The condition that “since the last transmission of DSR MAC CE” is not needed in the DSR cancelation conditions.
12. Currently UE is mandated to include a DSR MAC CE even when the DSR cancellation conditions are met. As a result, UE needs to rebuild the MAC PDU in such a case, which can a challenge for UE implementation.
13. Current initialization procedure of DRX\_SFN\_COUNT can still result in misalignment between start times of traffic and DRX on duration timer.
14. In the activation/deactivation of PSI-based SDU discard, there is no RRC configuration explicitly defined for PSI-based SDU discard. But the presence of the RRC parameter, *discardTimerForLowImportance*, can be used for the purpose.
15. In the description of fields in the Refined Long BSR, the value of reserved bits is not defined.
16. An unnecessary ‘s’ is added to Table 6.1.3.1-1 referred in clause 6.1.3.1, which should be removed.
17. In the condition on which buffer size table to use, “an LCG” should be “the LCG”, as it refers to a specific LCG.
18. The new BSR table is used in both Refined Long BSR MAC CE and DSR MAC CE. But the current title of Table 6.1.3.1-3. mentions only Refined Long BSR.
19. The header row of the new BSR table is missing.
20. The current lower range of Table 6.1.3.1-3 creates an un-even interval between codes points received by gNB.
21. The change in #3 should be applied to the same parameter in clause 6.1.3.72 too.
22. A space is missing between “the” and “LCGi” in the last paragraph of the clause on DSR MAC CE.
23. It is not specified which LCGs should be included in the DSR MAC CE.
24. The same change in #6 should be applied to the description of field Di in PSI-Based SDU Discard Activation/Deactivation MAC CE.
25. Currently, the PSI-Based SDU Discard Activation/Deactivation MAC CE includes DRBs from both MAC entities in case of DC configuration. It does not make sense for MCG to control the activation/deactivation of DRBs associated with SCG (and vice-versa).
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| ***Summary of change:*** | 1. In clause 5.4.1, ‘the’ is added to the availability conditions of a configured uplink grant.
2. Add a clarification that the CURRENT\_symbol for a multi-PUSCH configured grant refers to the first symbol of the first transmission occasion of the first configured uplink grant within the same periodicity.
3. In clause 5.4.1, “not” is deleted, so the text defines a valid configured grant occasion instead.
4. Add in clause 5.4.4 that UE may stop an ongoing Random Access procedure due to a pending SR for DSR when a DSR MAC CE is transmitted in a MAC PDU using an UL grant, which is different than an UL grant provided by Random Access Response or determined for the transmission of the MSGA payload.
5. In clause 5.4.5, change the parameter, *additionalBSR-TableAllowed,* to *additionalBS-TableAllowed.*
6. In clause 5.4.5, allow an LCG which is configured with *additionalBSR-TableAllowed* to use long BSR when its buffer size exceeds the maximum of the new (refined) buffer size table.
7. In clause 5.4.5, adding a procedure for allowing Refined Long BSR to be included in padding.
8. In clause 5.4.9, add “running” to the set of PDCP discard timers considered in the determination of the smallest remaining time.
9. In clause 5.4.9, add the condition that a SDU has not been transmitted in a MAC PDU to the association between a SDU and a pending DSR.
10. In clause 5.4.9, “or” in the triggering condition for DSR is changed to “and”. In addition, add “has not been” to the condition that data has not been reported in DSR before.
11. In clause 5.4.9, remove “since the last tranmsission of DSR MAC CE” from the DSR cancelation conditions.
12. It is up to UE implementation whether to cancel DSR even if the MAC PDU can accommodate all the delay-critical data but is not sufficient to include the DSR MAC CE and its subheader.
13. In clause 5.7, the initial value of DRX\_SFN\_COUNTER either 0 or 1, depending on in which half frame RRC re-/configuration of DRX is recevied by UE.
14. In clause 5.18.34, replace “configured with PSI-based SDU discard” by “configured with *discardTimerForLowImportance*”.
15. In clause 6.1.3.1, add clarification that reserved bits in Refined Long BSR MAC CE has value of 0.
16. In clause 6.1.3.1, extra ‘s’ is removed from “Table~~s~~ 16.1.3.1-1”.
17. In clause 6.1.3.1, in the condition on which buffer size table to use, change “an LCG” to “the LCG”.
18. The title of Table 6.1.3.1-3 is changed to “Refined buffer size levels for 8-bit buffer size field”.
19. A head row is added to Table 6.1.3.1-3.
20. Change the low end of the first code point in Table 6.1.3.1-3 to the closest buffer size in the legacy buffer size table.
21. In clause 6.1.3.72, change the parameter, *additionalBSR-TableAllowed,* to *additionalBS-TableAllowed.*
22. In clause 6.1.3.72, a space “ “ is added between “the” and “LCGi”.
23. In clause 6.1.3.72, specify that delay information all LCGs with pending DSRs when the MAC PDU containing the DSR is to be built shall be included in the DSR MAC CE.
24. In clause 6.1.3.73, replace ““configured with PSI-based SDU discard” by “configured with *discardTimerForLowImportance*”.
25. In clause 6.1.3.73, limit the DRBs to those configured with RLC entities that are associated with this MAC entity.
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| ***Consequences if not approved:*** | Some of the XR features may not work properly.  |
|  |  |
| ***Clauses affected:*** | 5.4.1, 5.4.5, 5.4.9, 5.18.34, 6.1.3.1, 6.1.3.1, 6.1.3.72, 6.1.3.73 |
|  |  |
|  | **Y** | **N** |  |  |
| ***Other specs*** |  | **X** |  Other core specifications  |  |
| ***affected:*** |  | **X** |  Test specifications |  |
| ***(show related CRs)*** |  | **X** |  O&M Specifications |  |
|  |  |
| ***Other comments:*** |  |

----------------------------------- [Start of the 1st, 2nd and 3rd change] -----------------------------------------

### 5.4.1 UL Grant reception

(Text omitted)

For a configured uplink grant, the MAC entity shall:

1> if the configured uplink grant is associated with a multi-PUSCH configured grant:

2> if the configured uplink grant has not been indicated to the lower layers as to be unused for PUSCH transmission; and

2> if the configured uplink grant meets the validity conditions specified in the clause 6.1 in TS 38.214 [7]:

3> consider the configured uplink grant available for use;

1> else if the configured uplink grant has not been indicated to lower layers as to be unused for PUSCH transmission:

2> consider the configured uplink grant available for use.

(Text omitted)

For a multi-PUSCH configured grant (as specified in clause 5.8.2) configured with neither *harq-ProcID-Offset2* nor *cg-RetransmissionTimer*, the HARQ Process ID associated with the first symbol of a UL transmission is derived from the following equation:

HARQ Process ID = [*nrofSlotsInCG-Period*× floor (CURRENT\_symbol / *periodicity*) + ID\_OFFSET] modulo *nrofHARQ-Processes*

For a multi-PUSCH configured grant configured with *harq-ProcID-Offset2*, the HARQ Process ID associated with the first symbol of a UL transmission is derived from the following equation:

HARQ Process ID = [*nrofSlotsInCG-Period* × floor (CURRENT\_symbol / *periodicity*) + ID\_OFFSET] modulo *nrofHARQ-Processes* + *harq-ProcID-Offset2*

where CURRENT\_symbol if *cg-SDT-PeriodicityExt* (as defined in TS 38.331 [5]) is not configured = (SFN × *numberOfSlotsPerFrame* × *numberOfSymbolsPerSlot* + slot number in the frame × *numberOfSymbolsPerSlot* + symbol number in the slot), and *numberOfSlotsPerFrame* and *numberOfSymbolsPerSlot* refer to the number of consecutive slots per frame and the number of consecutive symbols per slot, respectively as specified in TS 38.211 [8]. For a multi-PUSCH configured grant, ID\_OFFSET equals 0 for the first configured uplink grant within a *periodicity* of the configuration and K for the Kth (1 ≤ K < *nrofSlotsInCG-Period*) valid configured uplink grant after the first configured uplink grant within the same *periodicity*. A configured uplink grant in a multi-PUSCH configured grant is considered valid if it satisfies the conditions specified in clause 6.1 in TS 38.214 [7].

Alternatively, if *cg-SDT-PeriodicityExt* (as defined in TS 38.331 [5]) is configured, CURRENT\_symbol = ((H-SFN × *numberOfSFNperH-SFN* + SFN) × *numberOfSlotsPerFrame* × *numberOfSymbolsPerSlot* + slot number in the frame × *numberOfSymbolsPerSlot* + symbol number in the slot), and *numberOfSFNperH-SFN*, *numberOfSlotsPerFrame* and *numberOfSymbolsPerSlot* refer to the number of consecutive frames per H-SFN, the number of consecutive slots per frame and the number of consecutive symbols per slot, respectively as specified in TS 38.211 [8].

For configured uplink grants configured with *cg-RetransmissionTimer*, the UE implementation selects an HARQ Process ID among the HARQ process IDs available for the configured grant configuration. If the MAC entity is configured with *intraCG-Prioritization*, for HARQ Process ID selection, the UE shall prioritize the HARQ Process ID with the highest priority, where the priority of HARQ process is determined by the highest priority among priorities of the logical channels that are multiplexed (i.e. the MAC PDU to transmit is already stored in the HARQ buffer) or have data available that can be multiplexed (i.e. the MAC PDU to transmit is not stored in the HARQ buffer) in the MAC PDU, according to the mapping restrictions as described in clause 5.4.3.1.2. If the MAC entity is configured with *intraCG-Prioritization*, for HARQ Process ID selection among initial transmission and retransmission with equal priority, the UE shall prioritize retransmissions before initial transmissions. The priority of a HARQ Process for which no data for logical channels is multiplexed or can be multiplexed in the MAC PDU is lower than the priority of a HARQ Process for which data for any logical channels is multiplexed or can be multiplexed in the MAC PDU. If the MAC entity is not configured with *intraCG-Prioritization*, for HARQ Process ID selection, the UE shall prioritize retransmissions before initial transmissions. The UE shall toggle the NDI in the CG-UCI for new transmissions and not toggle the NDI in the CG-UCI in retransmissions.

NOTE 1: If a configured uplink grant is associated with a multi-PUSCH configured grant, CURRENT\_symbol refers to the symbol index of the first transmission occasinon in the first configured uplink grant within the same periodicity. Otherwise, CURRENT\_symbol refers to the symbol index of the first transmission occasion of a bundle of configured uplink grant.

NOTE 2: A HARQ process is configured for a configured uplink grant where neither *harq-ProcID-Offset* nor *harq-ProcID-Offset2* is configured, if the configured uplink grant is activated and the associated HARQ process ID is less than *nrofHARQ-Processes*. A HARQ process is configured for a configured uplink grant where *harq-ProcID-Offset2* is configured, if the configured uplink grant is activated and the associated HARQ process ID is greater than or equal to *harq-ProcID-Offset2* and less than sum of *harq-ProcID-Offset2* and *nrofHARQ-Processes* for the configured grant configuration.

NOTE 3: If the MAC entity receives a grant in a Random Access Response (i.e. MAC RAR or fallbackRAR), or addressed to Temporary C-RNTI or determines a grant as specified in clause 5.1.2a for MSGA payload and if the MAC entity also receives an overlapping grant for its C-RNTI or CS-RNTI, requiring concurrent transmissions on the SpCell, the MAC entity may choose to continue with either the grant for its RA-RNTI/Temporary C-RNTI/MSGB-RNTI/the MSGA payload transmission or the grant for its C-RNTI or CS-RNTI.

NOTE 4: In case of unaligned SFN across carriers in a cell group, the SFN of the concerned Serving Cell is used to calculate the HARQ Process ID used for configured uplink grants.

NOTE 5: If *cg-RetransmissionTimer* is not configured, a HARQ process is not shared between different configured grant configurations in the same BWP.

(Text omitted)

------------------------------------ [End of the 1st, 2nd and 3rd change] -----------------------------------------

---------------------------------------- [Start of the 4th change] --------------------------------------------------

### 5.4.4 Scheduling Request

(Text omitted)

The MAC entity may stop, if any, ongoing Random Access procedure due to a pending SR for DSR, which has no valid PUCCH resources configured, if:

- the DSR that triggered the SR has been cancelled (see clause 5.4.9);

- a MAC PDU is transmitted using a UL grant other than a UL grant provided by Random Access Response or a UL grant determined as specified in clause 5.1.2a for the transmission of the MSGA payload, and this PDU includes a DSR MAC CE.

The MAC entity may stop, if any, ongoing Random Access procedure due to a pending SR for SL-PRS Resource Request, which has no valid PUCCH resources configured, if:

- a MAC PDU is transmitted using a UL grant other than a UL grant provided by Random Access Response or a UL grant determined as specified in clause 5.1.2a for the transmission of the MSGA payload, and this PDU includes a SL-PRS Resource Request MAC CE (see clause 5.22.1.12).

------------------------------------------ [End of the 4th change] -------------------------------------------------

----------------------------------- [Start of the 5th, 6th and 7th change] -----------------------------------------

### 5.4.5 Buffer Status Reporting

The Buffer Status reporting (BSR) procedure is used to provide the serving gNB with information about UL data volume in the MAC entity.

RRC configures the following parameters to control the BSR:

- *periodicBSR-Timer*;

- *retxBSR-Timer*;

- *logicalChannelSR-DelayTimerApplied*;

- *logicalChannelSR-DelayTimer*;

- *logicalChannelSR-Mask*;

- *logicalChannelGroup*, *logicalChannelGroupIAB-Ext*;

- *sdt-LogicalChannelSR-DelayTimer*;

- *additionalBS-TableAllowed*.

Each logical channel may be allocated to an LCG using the *logicalChannelGroup*. The maximum number of LCGs is eight except for IAB-MTs configured with *logicalChannelGroupIAB-Ext*, for which the maximum number of LCGs is 256.

The MAC entity determines the amount of UL data available for a logical channel according to the data volume calculation procedure in TSs 38.322 [3] and 38.323 [4].

A BSR shall be triggered if any of the following events occur for activated cell group:

- UL data, for a logical channel which belongs to an LCG, becomes available to the MAC entity; and either

- this UL data belongs to a logical channel with higher priority than the priority of any logical channel containing available UL data which belong to any LCG; or

- none of the logical channels which belong to an LCG contains any available UL data.

 in which case the BSR is referred below to as 'Regular BSR';

- UL resources are allocated and number of padding bits is equal to or larger than the size of the Buffer Status Report MAC CE plus its subheader, in which case the BSR is referred below to as 'Padding BSR';

- *retxBSR-Timer* expires, and at least one of the logical channels which belong to an LCG contains UL data, in which case the BSR is referred below to as 'Regular BSR';

- *periodicBSR-Timer* expires, in which case the BSR is referred below to as 'Periodic BSR'.

NOTE 1: When Regular BSR triggering events occur for multiple logical channels simultaneously, each logical channel triggers one separate Regular BSR.

For Regular BSR, the MAC entity shall:

1> if the BSR is triggered for a logical channel for which *logicalChannelSR-DelayTimerApplied* with value *true* is configured by upper layers and SDT procedure is not on-going according to clause 5.27:

2> start or restart the *logicalChannelSR-DelayTimer*.

1> else if BSR is triggered for a logical channel for which *logicalChannelSR-DelayTimerApplied* with value *true* is configured by upper layers and SDT procedure is on-going according to clause 5.27:

2> start or restart *logicalChannelSR-DelayTimer* with the value as configured by the *sdt-LogicalChannelSR-DelayTimer*.

1> else:

2> if running, stop the *logicalChannelSR-DelayTimer*.

For Regular and Periodic BSR, the MAC entity for which *logicalChannelGroupIAB-Ext* is not configured by upper layers shall:

1> if for at least one LCG configured with *additionalBS-TableAllowed,* the amount of UL data available for transmission is within the buffer sizes specified in Table 6.1.3.1-3:

2> report Refined Long BSR for all LCGs which have data available for transmission;

1> else:

2> if more than one LCG has data available for transmission when the MAC PDU containing the BSR is to be built:

3> report Long BSR for all LCGs which have data available for transmission.

2> else if one LCG has data available and is configured with *additionalBS-TableAllowed* and the amount of UL data available for transmission when the MAC PDU containing the BSR is to be built is greater than the largest buffer size specified in Table 6.1.3.1-3:

3> report Long BSR;

2> else:

3> report Short BSR.

For Regular and Periodic BSR, the MAC entity for which *logicalChannelGroupIAB-Ext* is configured by upper layers shall:

1> if more than one LCG has data available for transmission when the MAC PDU containing the BSR is to be built:

2> if the maximum LCG ID among the configured LCGs is 7 or lower:

3> report Long BSR for all LCGs which have data available for transmission.

2> else:

3> report Extended Long BSR for all LCGs which have data available for transmission.

1> else:

2> report Extended Short BSR.

For Padding BSR, the MAC entity for which *logicalChannelGroupIAB-Ext* is not configured by upper layers shall:

1> if the number of padding bits is equal to or larger than the size of the Short BSR plus its subheader but smaller than the size of the Long BSR plus its subheader:

2> if more than one LCG has data available for transmission when the BSR is to be built:

3> if the number of padding bits is equal to the size of the Short BSR plus its subheader:

4> report Short Truncated BSR of the LCG with the highest priority logical channel with data available for transmission.

3> else:

4> report Long Truncated BSR of the LCG(s) with the logical channels having data available for transmission following a decreasing order of the highest priority logical channel (with or without data available for transmission) in each of these LCG(s), and in case of equal priority, in increasing order of LCGID.

2> else:

3> report Short BSR.

1> else if for at least one LCG configured with *additionalBS-TableAllowed*, the amount of UL data available for transmission is within the buffer sizes specified in Table 6.1.3.1-3 and the number of padding bits is equal to or larger than the size of the Refined Long BSR plus its subheader:

2> report Refined Long BSR for all LCGs which have data available for transmission.

1> else if the number of padding bits is equal to or larger than the size of the Long BSR plus its subheader:

2> report Long BSR for all LCGs which have data available for transmission.

For Padding BSR, the MAC entity for which *logicalChannelGroupIAB-Ext* is configured by upper layers shall:

1> if the number of padding bits is equal to or larger than the size of the Extended Short BSR plus its subheader but smaller than the size of the Extended Long BSR plus its subheader:

2> if more than one LCG has data available for transmission when the BSR is to be built:

3> if the number of padding bits is smaller than the size of the Extended Long Truncated BSR with zero Buffer Size field plus its subheader:

4> report Extended Short Truncated BSR of the LCG with the highest priority logical channel with data available for transmission.

3> else:

4> report Extended Long Truncated BSR of the LCG(s) with the logical channels having data available for transmission following a decreasing order of the highest priority logical channel (with or without data available for transmission) in each of these LCG(s), and in case of equal priority, in increasing order of LCGID.

2> else:

3> report Extended Short BSR.

1> else if the number of padding bits is equal to or larger than the size of the Extended Long BSR plus its subheader:

2> report Extended Long BSR for all LCGs which have data available for transmission.

(Text omitted)

------------------------------------ [End of the 5th, 6th and 7th change] -----------------------------------------

--------------------------------------- [Start of the 8th ~ 12th change] -------------------------------------------

5.4.9 Delay status reporting

(Text omitted)

The Delay Status Reporting (DSR) procedure is used to provide the serving gNB with delay status of LCGs. This delay status for an LCG includes remaining time, which is the smallest remaining value of the running PDCP *discardTimer*s among SDUs buffered for the LCG as specified in clause 7.3 in TS 38.323 [4], and the total amount of delay-critical UL data for the LCG according to the data volume calculation procedure specified in clause 5.5 in TS 38.322 [3] and clause 5.6 in TS 38.323 [4] for the associated RLC and PDCP entities, respectively.

RRC controls the DSR procedure by configuring the following parameter:

- *remainingTimeThreshold*: the threshold on remaining time for triggering a DSR for an LCG.

If an LCG is configured for delay status reporting, the MAC entity shall:

1> if the smallest remaining value of the running PDCP *discardTimer*s among all the data buffered for the LCG that has not been transmitted in any MAC PDU and has not been reported as data volume in a DSR MAC CE becomes below *remainingTimeThreshold* of the LCG; and

1> if there is no DSR pending for the LCG:

2> trigger a DSR for the LCG.

If there is at least one DSR pending, the MAC entity shall:

1> if UL-SCH resources are available for a new transmission and the UL-SCH resources can accommodate the DSR MAC CE plus its subheader as a result of logical channel prioritization:

2> instruct the Multiplexing and Assembly procedure to generate the DSR MAC CE as specified in clause 6.1.3.72;

1> else if there is no pending SR already triggered by the DSR procedure for the same logical channel as of this DSR:

2> trigger a Scheduling Request.

NOTE: The availability of UL-SCH resources for the transmission of the DSR MAC CE follows the same critieria specified in clause 5.4.5.

An SDU is considered to be associated with a DSR if it has not been transmitted in any MAC PDU and it is associated with the LCG which triggered the DSR and the remaining value of its PDCP *discardTimer* is below *remainingTimeThreshold*.

A MAC PDU shall contain at most one DSR MAC CE. The MAC entity shall not include a DSR MAC CE in a MAC PDU if the MAC PDU can accommodate the SDUs associated with all the pending DSRs.

After a DSR is triggered, it is considered as pending until it is cancelled. The MAC entity shall cancel a pending DSR, either when all the SDUs associated with the DSR have been discarded, or when a MAC PDU is transmitted and this MAC PDU includes a DSR MAC CE that contains the delay information of all the SDUs associated with the DSR (as described in the clause 6.1.3.72). The MAC entity may cancel a pending DSR when a MAC PDU is transmitted and this MAC PDU includes all the SDUs associated with the DSR.

(Text omitted)

--------------------------------------- [End of the 8th ~ 12th change] --------------------------------------------

------------------------------------------ [Start of the 13th change] -----------------------------------------------

## 5.7 Discontinuous Reception (DRX)

The MAC entity may be configured by RRC with a DRX functionality that controls the UE's PDCCH monitoring activity for the MAC entity's C-RNTI, CI-RNTI, CS-RNTI, INT-RNTI, SFI-RNTI, SP-CSI-RNTI, TPC-PUCCH-RNTI, TPC-PUSCH-RNTI, TPC-SRS-RNTI, AI-RNTI, SL-RNTI, SL-CS-RNTI and SL Semi-Persistent Scheduling V-RNTI. When using DRX operation, the MAC entity shall also monitor PDCCH according to requirements found in other clauses of this specification. When in RRC\_CONNECTED, if DRX is configured, for all the activated Serving Cells, the MAC entity may monitor the PDCCH discontinuously using the DRX operation specified in this clause; otherwise the MAC entity shall monitor the PDCCH as specified in TS 38.213 [6].

NOTE 1: Void

RRC controls DRX operation by configuring the following parameters:

- *drx-onDurationTimer*: the duration at the beginning of a DRX cycle;

- *drx-SlotOffset*: the delay before starting the *drx-onDurationTimer*;

- *drx-InactivityTimer*: the duration after the PDCCH occasion in which a PDCCH indicates a new UL, DL or SL transmission for the MAC entity;

- *drx-RetransmissionTimerDL* (per DL HARQ process except for the broadcast process): the maximum duration until a DL retransmission is received;

- *drx-RetransmissionTimerUL* (per UL HARQ process): the maximum duration until a grant for UL retransmission is received;

- *drx-LongCycleStartOffset*: the Long DRX cycle and *drx-StartOffset* which defines the subframe where the Long and Short DRX cycle starts;

- *drx-NonIntegerLongCycleStartOffset* (optional): the Long DRX cycle and *drx-StartOffset* which defines the subframe where the Long and Short DRX cycle start, when the length of the Long DRX cycle and/or the short DRX cycle is not an integer;

- *drx-ShortCycle* (optional): the Short DRX cycle;

- *drx-NonIntegerShortCycle* (optional): the Short DRX cycle whose length is not an integer;

- *drx-ShortCycleTimer* (optional): the duration the UE shall follow the Short DRX cycle;

- *drx-HARQ-RTT-TimerDL* (per DL HARQ process except for the broadcast process): the minimum duration before a DL assignment for HARQ retransmission is expected by the MAC entity;

- *drx-HARQ-RTT-TimerUL* (per UL HARQ process): the minimum duration before a UL HARQ retransmission grant is expected by the MAC entity;

- *drx-RetransmissionTimerSL* (per sidelink process): the maximum duration until a grant for SL retransmission is received;

- *drx-HARQ-RTT-TimerSL* (per sidelink process): the minimum duration before an SL retransmission grant is expected by the MAC entity;

- *drx-LastTransmissionUL* (optional): the configuration to start *drx-HARQ-RTT-TimerUL* after the last transmission within a bundle;

- *ps-Wakeup* (optional): the configuration to start associated *drx-onDurationTimer* in case DCP is monitored but not detected;

- *ps-TransmitOtherPeriodicCSI* (optional): the configuration to report periodic CSI that is not L1-RSRP on PUCCH during the time duration indicated by *drx-onDurationTimer* in case DCP is configured but associated *drx-onDurationTimer* is not started;

- *ps-TransmitPeriodicL1-RSRP* (optional): the configuration to transmit periodic CSI that is L1-RSRP on PUCCH during the time duration indicated by *drx-onDurationTimer* in case DCP is configured but associated *drx-onDurationTimer* is not started;

- *downlinkHARQ-FeedbackDisabled* (optional): the configuration to disable HARQ feedback per DL HARQ process;

- *uplinkHARQ-Mode* (optional): the configuration to set *HARQmodeA* or *HARQmodeB* per UL HARQ process;

- *disableCG-RetransmissionMonitoring* (optional): the configuration to disable starting *drx-HARQ-RTT-TimerUL* for UL transmission over a configured uplink grant;

- *drx-TimeReferenceSFN* (optional): the reference SFN used in the initialization of *DRX\_SFN\_COUNTER* when short and/or long DRX cycle is not an integer.

The following UE variable is used for the DRX operation if *drx-NonIntegerLongCycleStartOffset* is configured:

- *DRX\_SFN\_COUNTER*: the counter that increments when SFN changes to 0. This counter can be implemented with a maximum value of 65535.

(Text omitted)

When DRX is configured, the MAC entity shall:

1> if a MAC PDU is received in a configured downlink assignment for unicast:

2> if this Serving Cell is configured with *downlinkHARQ-FeedbackDisabled*:

3> if the corresponding HARQ process is configured with HARQ feedback enabled:

4> set *HARQ-RTT-TimerDL-NTN* for the corresponding HARQ process equal to *drx-HARQ-RTT-TimerDL* plus the latest available UE-gNB RTT value;

4> start the *HARQ-RTT-TimerDL-NTN* for the corresponding HARQ process in the first symbol after the end of the corresponding transmission carrying the DL HARQ feedback.

2> else:

3> start the *drx-HARQ-RTT-TimerDL* for the corresponding HARQ process in the first symbol after the end of the corresponding transmission carrying the DL HARQ feedback.

NOTE 1a: Void.

NOTE 1b: Void.

2> stop the *drx-RetransmissionTimerDL* for the corresponding HARQ process;

2> stop the *drx-RetransmissionTimerDL-PTM* for the corresponding HARQ process.

1> if a MAC PDU is transmitted in a configured uplink grant and LBT failure indication is not received from lower layers:

2> if this Serving Cell is configured with *uplinkHARQ-Mode*:

3> if the corresponding HARQ process is configured as *HARQModeA*:

4> set *HARQ-RTT-TimerUL-NTN* for the corresponding HARQ process equal to *drx-HARQ-RTT-TimerUL* plus the latest available UE-gNB RTT value;

4> if *drx-LastTransmissionUL* is configured:

5> start the *HARQ-RTT-TimerUL-NTN* for the corresponding HARQ process in the first symbol after the end of the last transmission (within a bundle) of the corresponding PUSCH transmission.

4> else:

5> start the *HARQ-RTT-TimerUL-NTN* for the corresponding HARQ process in the first symbol after the end of the first transmission (within a bundle) of the corresponding PUSCH transmission.

2> else:

3> if *disableCG-RetransmissionMonitoring* is not configured for the configured uplink grant:

4> if *drx-LastTransmissionUL* is configured:

5> start the *drx-HARQ-RTT-TimerUL* for the corresponding HARQ process in the first symbol after the end of the last transmission (within a bundle) of the corresponding PUSCH transmission.

4> else:

5> start the *drx-HARQ-RTT-TimerUL* for the corresponding HARQ process in the first symbol after the end of the first transmission (within a bundle) of the corresponding PUSCH transmission.

2> stop the *drx-RetransmissionTimerUL* for the corresponding HARQ process at the first transmission (within a bundle) of the corresponding PUSCH transmission.

1> if a MAC PDU is transmitted in a configured sidelink grant:

2> if the PUCCH resource is configured:

3> start the *drx-HARQ-RTT-TimerSL* for the corresponding HARQ process in the first symbol after the end of the corresponding PUCCH transmission carrying the SL HARQ feedback; or

3> start the *drx-HARQ-RTT-TimerSL* for the corresponding HARQ process in the first symbol after the end of the corresponding PUCCH resource for the SL HARQ feedback when the PUCCH is not transmitted;

3> stop the *drx-RetransmissionTimerSL* for the corresponding HARQ process.

2> else:

3> start the *drx-HARQ-RTT-TimerSL* for the corresponding HARQ process at the first symbol after the end of the corresponding PSSCH transmission;

3> stop the *drx-RetransmissionTimerSL* for the corresponding HARQ process.

1> if a *drx-HARQ-RTT-TimerDL* expires:

2> if the data of the corresponding HARQ process was not successfully decoded:

3> start the *drx-RetransmissionTimerDL* for the corresponding HARQ process in the first symbol after the expiry of *drx-HARQ-RTT-TimerDL*.

1> if a *HARQ-RTT-TimerDL-NTN* expires:

2> if the data of the corresponding HARQ process was not successfully decoded:

3> start the *drx-RetransmissionTimerDL* for the corresponding HARQ process in the first symbol after the expiry of *HARQ-RTT-TimerDL-NTN*.

1> if a *drx-HARQ-RTT-TimerUL* expires:

2> start the *drx-RetransmissionTimerUL* for the corresponding HARQ process in the first symbol after the expiry of *drx-HARQ-RTT-TimerUL*.

1> if a *HARQ-RTT-TimerUL-NTN* expires:

2> start the *drx-RetransmissionTimerUL* for the corresponding HARQ process in the first symbol after the expiry of *HARQ-RTT-TimerUL-NTN*.

1> if a *drx-HARQ-RTT-TimerSL* expires:

2> if a HARQ NACK feedback for the corresponding HARQ process is transmitted on PUCCH; or

2> if a HARQ NACK feedback for the corresponding HARQ process is generated but not transmitted on PUCCH; or

2> if the PUCCH resource is not configured for the SL grant:

3> start the *drx-RetransmissionTimerSL* for the corresponding HARQ process in the first symbol after the expiry of *drx-HARQ-RTT-TimerSL*.

NOTE 1c: The UE handles the *drx-RetransmissionTimerSL* operation when *sl-PUCCH-Config* is configured by RRC but PUCCH resource is not scheduled same as when *sl-PUCCH-Config* is not configured.

1> if a DRX Command MAC CE indicated by PDCCH addressed to C-RNTI or CS-RNTI, or by a configured downlink assignment for unicast transmission or a Long DRX Command MAC CE is received:

2> stop *drx-onDurationTimer* for each DRX group;

2> stop *drx-InactivityTimer* for each DRX group.

1> if *drx-InactivityTimer* for a DRX group expires:

2> if the Short DRX cycle is configured:

3> start or restart *drx-ShortCycleTimer* for this DRX group in the first symbol after the expiry of *drx-InactivityTimer*;

3> use the Short DRX cycle for this DRX group.

2> else:

3> use the Long DRX cycle for this DRX group.

1> if a DRX Command MAC CE indicated by PDCCH addressed to C-RNTI or CS-RNTI, or by a configured downlink assignment for unicast transmission is received:

2> if the Short DRX cycle is configured:

3> start or restart *drx-ShortCycleTimer* for each DRX group in the first symbol after the end of DRX Command MAC CE reception;

3> use the Short DRX cycle for each DRX group.

2> else:

3> use the Long DRX cycle for each DRX group.

1> if *drx-ShortCycleTimer* for a DRX group expires:

2> use the Long DRX cycle for this DRX group.

1> if a Long DRX Command MAC CE is received:

2> stop *drx-ShortCycleTimer* for each DRX group;

2> use the Long DRX cycle for each DRX group.

1> if the *drx-NonIntegerLongCycleStartOffset* is configured:

2> increment *DRX\_SFN\_COUNTER* by 1 in the first symbol of a slot in which SFN changes to 0;

2> if DRX is (re-)configured by RRC:

3> if *drx-TimeReferenceSFN* is included in the RRC (re-)configuration which is completed during the first half of a hyper frame (i.e., SFN is between 0 and 511):

4> set *DRX\_SFN\_COUNTER* to 1 in the first symbol of the slot immediately after the first PUSCH transmission which contains the *RRCReconfigurationComplete* message of the RRC (re-) configuration as specified in TS 38.331 [5].

3> else:

4> set *DRX\_SFN\_COUNTER* to 0 in the first symbol of the slot immediately after the first PUSCH transmission which contains the *RRCReconfigurationComplete* message of the RRC (re-) configuration as specified in TS 38.331 [5].

1> if the Short DRX cycle is used for a DRX group and the *drx-NonIntegerShortCycle* is not configured, and [(SFN × 10) + subframe number] modulo (*drx-ShortCycle*) = (*drx-StartOffset*) modulo (*drx-ShortCycle*); or

1> if the Short DRX cycle is used for a DRX group and the *drx-NonIntegerShortCycle* is configured, and floor([(*DRX\_SFN\_COUNTER* × 10240) + (SFN × 10) + subframe number] modulo (*drx-NonIntegerShortCycle*)) = floor[(*drx-StartOffset*) modulo (*drx-NonIntegerShortCycle*)]:

2> start *drx-onDurationTimer* for this DRX group after *drx-SlotOffset* from the beginning of the subframe.

1> if the Long DRX cycle is used for a DRX group and the *drx-NonIntegerLongCycleStartOffset* is not configured, and [(SFN × 10) + subframe number] modulo (*drx-LongCycle*) = *drx-StartOffset*; or

1> if the Long DRX cycle is used for a DRX group and the *drx-NonIntegerLongCycleStartOffset* is configured, and floor([(*DRX\_SFN\_COUNTER* × 10240) + (SFN × 10) + subframe number] modulo (*drx-NonIntegerLongCycle*)) = floor[(*drx-StartOffset*) modulo (*drx-NonIntegerLongCycle*)]:

2> if DCP monitoring is configured for the active DL BWP as specified in TS 38.213 [6], clause 10.3:

3> if DCP indication associated with the current DRX cycle received from lower layer indicated to start *drx-onDurationTimer*, as specified in TS 38.213 [6]; or

3> if all DCP occasion(s) in time domain, as specified in TS 38.213 [6], associated with the current DRX cycle occurred in Active Time considering grants/assignments/DRX Command MAC CE/Long DRX Command MAC CE received and Scheduling Request sent until 4 ms prior to start of the last DCP occasion, or during a measurement gap, or when the MAC entity monitors for a PDCCH transmission on the search space indicated by *recoverySearchSpaceId* of the SpCell identified by the C-RNTI while the *ra-ResponseWindow* is running (as specified in clause 5.1.4); or

3> if *ps-Wakeup* is configured with value *true* and DCP indication associated with the current DRX cycle has not been received from lower layers:

4> start *drx-onDurationTimer* after *drx-SlotOffset* from the beginning of the subframe.

2> else:

3> start *drx-onDurationTimer* for this DRX group after *drx-SlotOffset* from the beginning of the subframe.

NOTE 2: In case of unaligned SFN across carriers in a cell group, the SFN of the SpCell is used to calculate the DRX duration.

(Text omitted)

------------------------------------------ [End of the 13th change] -----------------------------------------------

------------------------------------------ [Start of the 14th change] ----------------------------------------------

### 5.18.34 Activation/deactivation of PSI-based SDU discard

The network activates and deactivates PSI-based SDU discard by sending the PSI-Based SDU Discard Activation/Deactivation MAC CE described in clause 6.1.3.73. The PSI-based SDU discard is initially deactivated upon (re-)configuration by upper layers and after reconfiguration with sync.

The MAC entity shall for each DRB configured with *discardTimerForLowImportance*:

1> if a PSI-Based SDU Discard Activation/Deactivation MAC CE is received activating the PSI-based SDU discard for the DRB:

2> indicate the activation of the PSI-based SDU discard for the DRB to upper-layers.

1> if a PSI-Based SDU Discard Activation/Deactivation MAC CE is received deactivating the PSI-based SDU discard for the DRB:

2> indicate the deactivation of the PSI-based SDU discard for the DRB to upper-layers

------------------------------------------- [End of the 14th change] ----------------------------------------------

--------------------------------------- [Start of the 15th~20th change] -------------------------------------------

#### 6.1.3.1 Buffer Status Report MAC CEs

(Text omitted)

The fields in the BSR MAC CE are defined as follows:

- LCG ID: The Logical Channel Group ID field identifies the group of logical channel(s) whose buffer status is being reported. The length of the field is 3 bits for the case of Short BSR and Short Truncated BSR formats, and 8 bits for the case of Extended Short BSR and Extended Short Truncated BSR formats;

- LCGi: For the Long BSR format, Refined Long BSR format, Extended Long BSR format, Pre-emptive BSR format, and Extended Pre-emptive BSR format, this field indicates the presence of the Buffer Size field for the logical channel group i. The LCGi field set to 1 indicates that the Buffer Size field for the logical channel group i is reported. The LCGi field set to 0 indicates that the Buffer Size field for the logical channel group i is not reported. For the Long Truncated BSR format and the Extended Long Truncated BSR format, this field indicates whether logical channel group i has data available. The LCGi field set to 1 indicates that logical channel group i has data available. The LCGi field set to 0 indicates that logical channel group i does not have data available;

- BTi: This field is included only in the Refined Long BSR format. This field is present only if the corresponding LCGi is set to 1; otherwise, this field is reserved and set to 0. If present, this field indicates which buffer size table is used to set the Buffer Size field for the logical channel group i. The BTi field set to 1 indicates that the buffer size table specified in Table 6.1.3.1-3 is used for the logical channel group i. The BTi field set to 0 indicates that the buffer size table specified in Table 6.1.3.1-2 is used for the logical channel group i;

- Buffer Size: The Buffer Size field identifies the total amount of data available according to the data volume calculation procedure in TSs 38.322 [3] and 38.323 [4] across all logical channels of a logical channel group after the MAC PDU has been built (i.e. after the logical channel prioritization procedure, which may result the value of the Buffer Size field to zero). The amount of data is indicated in number of bytes. The size of the RLC headers and MAC subheaders are not considered in the buffer size computation. The length of this field for the Short BSR format and the Short Truncated BSR format is 5 bits. The length of this field for the Extended Short BSR format and the Extended Short Truncated BSR format is 8 bits. The length of this field for the Long BSR format, the Refined Long BSR format, the Long Truncated BSR format, the Extended Long BSR format, and the Extended Long Truncated format is 8 bits. The values for the 5-bit Buffer Size fields are shown in Table 6.1.3.1-1. The values for the 8-bit Buffer Size fields in the Long BSR format, the Long Truncated BSR format, the Extended Long BSR format, and the Extended Long Truncated format are shown in Table 6.1.3.1-2. For the Refined Long BSR format, if an LCG is configured with *additionalBS-TableAllowed* and the amount of data for the LCG is within the buffer sizes specified in Table 6.1.3.1-3, the MAC entity shall use the buffer sizes specified in Table 6.1.3.1-3 to set the value of this field; otherwise, the MAC entity shall use Table 6.1.3.1-2 instead. For the Long BSR format, the Refined Long BSR format, the Long Truncated BSR format, the Extended Long BSR format, and the Extended Long Truncated format, the Buffer Size fields are included in ascending order based on the LCGi. For the Long Truncated BSR format and the Extended Long Truncated format the number of Buffer Size fields included is maximised, while not exceeding the number of padding bits. For the Pre-emptive BSR format and the Extended Pre-emptive BSR format, the Buffer Size field identifies the total amount of the data expected to arrive at the IAB-MT of the node where the Pre-emptive BSR/Extended Pre-emptive BSR is triggered and does not include the volume of data currently available in the IAB-MT. Pre-emptive BSR format is identical to the Long BSR format. Extended Pre-emptive BSR format is identical to the Extended Long BSR format.

(Text omitted)

Table 6.1.3.1-3. Refined buffer size levels (in bytes) for 8-bit Buffer Size field

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Index** | **BS value** | **Index** | **BS value** | **Index** | **BS Value** | **Index** | **BS Value** |
| 0 | >4751 and ≤ 5000 | 64 | ≤ 17584 | 128 | ≤ 61841 | 192 | ≤ 217489 |
| 1 | ≤ 5099 | 65 | ≤ 17933 | 129 | ≤ 63069 | 193 | ≤ 221805 |
| 2 | ≤ 5200 | 66 | ≤ 18289 | 130 | ≤ 64320 | 194 | ≤ 226207 |
| 3 | ≤ 5303 | 67 | ≤ 18652 | 131 | ≤ 65596 | 195 | ≤ 230695 |
| 4 | ≤ 5408 | 68 | ≤ 19022 | 132 | ≤ 66898 | 196 | ≤ 235273 |
| 5 | ≤ 5516 | 69 | ≤ 19399 | 133 | ≤ 68226 | 197 | ≤ 239942 |
| 6 | ≤ 5625 | 70 | ≤ 19784 | 134 | ≤ 69580 | 198 | ≤ 244703 |
| 7 | ≤ 5737 | 71 | ≤ 20177 | 135 | ≤ 70960 | 199 | ≤ 249559 |
| 8 | ≤ 5851 | 72 | ≤ 20577 | 136 | ≤ 72368 | 200 | ≤ 254511 |
| 9 | ≤ 5967 | 73 | ≤ 20985 | 137 | ≤ 73804 | 201 | ≤ 259562 |
| 10 | ≤ 6085 | 74 | ≤ 21402 | 138 | ≤ 75269 | 202 | ≤ 264713 |
| 11 | ≤ 6206 | 75 | ≤ 21827 | 139 | ≤ 76763 | 203 | ≤ 269966 |
| 12 | ≤ 6329 | 76 | ≤ 22260 | 140 | ≤ 78286 | 204 | ≤ 275323 |
| 13 | ≤ 6455 | 77 | ≤ 22702 | 141 | ≤ 79839 | 205 | ≤ 280786 |
| 14 | ≤ 6583 | 78 | ≤ 23152 | 142 | ≤ 81424 | 206 | ≤ 286358 |
| 15 | ≤ 6713 | 79 | ≤ 23611 | 143 | ≤ 83040 | 207 | ≤ 292041 |
| 16 | ≤ 6847 | 80 | ≤ 24080 | 144 | ≤ 84687 | 208 | ≤ 297836 |
| 17 | ≤ 6983 | 81 | ≤ 24558 | 145 | ≤ 86368 | 209 | ≤ 303746 |
| 18 | ≤ 7121 | 82 | ≤ 25045 | 146 | ≤ 88082 | 210 | ≤ 309774 |
| 19 | ≤ 7262 | 83 | ≤ 25542 | 147 | ≤ 89830 | 211 | ≤ 315921 |
| 20 | ≤ 7407 | 84 | ≤ 26049 | 148 | ≤ 91612 | 212 | ≤ 322190 |
| 21 | ≤ 7554 | 85 | ≤ 26566 | 149 | ≤ 93430 | 213 | ≤ 328583 |
| 22 | ≤ 7703 | 86 | ≤ 27093 | 150 | ≤ 95284 | 214 | ≤ 335104 |
| 23 | ≤ 7856 | 87 | ≤ 27631 | 151 | ≤ 97175 | 215 | ≤ 341754 |
| 24 | ≤ 8012 | 88 | ≤ 28179 | 152 | ≤ 99103 | 216 | ≤ 348535 |
| 25 | ≤ 8171 | 89 | ≤ 28738 | 153 | ≤ 101070 | 217 | ≤ 355452 |
| 26 | ≤ 8333 | 90 | ≤ 29309 | 154 | ≤ 103076 | 218 | ≤ 362505 |
| 27 | ≤ 8499 | 91 | ≤ 29890 | 155 | ≤ 105121 | 219 | ≤ 369699 |
| 28 | ≤ 8667 | 92 | ≤ 30483 | 156 | ≤ 107207 | 220 | ≤ 377035 |
| 29 | ≤ 8839 | 93 | ≤ 31088 | 157 | ≤ 109335 | 221 | ≤ 384517 |
| 30 | ≤ 9015 | 94 | ≤ 31705 | 158 | ≤ 111504 | 222 | ≤ 392147 |
| 31 | ≤ 9194 | 95 | ≤ 32334 | 159 | ≤ 113717 | 223 | ≤ 399929 |
| 32 | ≤ 9376 | 96 | ≤ 32976 | 160 | ≤ 115973 | 224 | ≤ 407865 |
| 33 | ≤ 9562 | 97 | ≤ 33630 | 161 | ≤ 118275 | 225 | ≤ 415959 |
| 34 | ≤ 9752 | 98 | ≤ 34298 | 162 | ≤ 120622 | 226 | ≤ 424213 |
| 35 | ≤ 9946 | 99 | ≤ 34978 | 163 | ≤ 123016 | 227 | ≤ 432631 |
| 36 | ≤ 10143 | 100 | ≤ 35672 | 164 | ≤ 125457 | 228 | ≤ 441216 |
| 37 | ≤ 10344 | 101 | ≤ 36380 | 165 | ≤ 127946 | 229 | ≤ 449971 |
| 38 | ≤ 10549 | 102 | ≤ 37102 | 166 | ≤ 130485 | 230 | ≤ 458900 |
| 39 | ≤ 10759 | 103 | ≤ 37839 | 167 | ≤ 133074 | 231 | ≤ 468007 |
| 40 | ≤ 10972 | 104 | ≤ 38589 | 168 | ≤ 135715 | 232 | ≤ 477294 |
| 41 | ≤ 11190 | 105 | ≤ 39355 | 169 | ≤ 138408 | 233 | ≤ 486765 |
| 42 | ≤ 11412 | 106 | ≤ 40136 | 170 | ≤ 141155 | 234 | ≤ 496425 |
| 43 | ≤ 11639 | 107 | ≤ 40933 | 171 | ≤ 143956 | 235 | ≤ 506276 |
| 44 | ≤ 11870 | 108 | ≤ 41745 | 172 | ≤ 146813 | 236 | ≤ 516322 |
| 45 | ≤ 12105 | 109 | ≤ 42573 | 173 | ≤ 149726 | 237 | ≤ 526568 |
| 46 | ≤ 12345 | 110 | ≤ 43418 | 174 | ≤ 152697 | 238 | ≤ 537017 |
| 47 | ≤ 12590 | 111 | ≤ 44280 | 175 | ≤ 155727 | 239 | ≤ 547674 |
| 48 | ≤ 12840 | 112 | ≤ 45158 | 176 | ≤ 158817 | 240 | ≤ 558542 |
| 49 | ≤ 13095 | 113 | ≤ 46055 | 177 | ≤ 161969 | 241 | ≤ 569625 |
| 50 | ≤ 13355 | 114 | ≤ 46968 | 178 | ≤ 165183 | 242 | ≤ 580929 |
| 51 | ≤ 13620 | 115 | ≤ 47900 | 179 | ≤ 168461 | 243 | ≤ 592457 |
| 52 | ≤ 13890 | 116 | ≤ 48851 | 180 | ≤ 171804 | 244 | ≤ 604213 |
| 53 | ≤ 14166 | 117 | ≤ 49820 | 181 | ≤ 175213 | 245 | ≤ 616203 |
| 54 | ≤ 14447 | 118 | ≤ 50809 | 182 | ≤ 178690 | 246 | ≤ 628431 |
| 55 | ≤ 14734 | 119 | ≤ 51817 | 183 | ≤ 182236 | 247 | ≤ 640902 |
| 56 | ≤ 15026 | 120 | ≤ 52846 | 184 | ≤ 185852 | 248 | ≤ 653620 |
| 57 | ≤ 15324 | 121 | ≤ 53894 | 185 | ≤ 189540 | 249 | ≤ 666590 |
| 58 | ≤ 15628 | 122 | ≤ 54964 | 186 | ≤ 193302 | 250 | ≤ 679818 |
| 59 | ≤ 15938 | 123 | ≤ 56054 | 187 | ≤ 197137 | 251 | ≤ 693308 |
| 60 | ≤ 16255 | 124 | ≤ 57167 | 188 | ≤ 201049 | 252 | ≤ 707066 |
| 61 | ≤ 16577 | 125 | ≤ 58301 | 189 | ≤ 205039 | 253 | ≤ 721097 |
| 62 | ≤ 16906 | 126 | ≤ 59458 | 190 | ≤ 209108 | 254 | ≤ 735406 |
| 63 | ≤ 17242 | 127 | ≤ 60638 | 191 | ≤ 213257 | 255 | ≤ 750000 |

--------------------------------------- [End of the 15th~20th change] --------------------------------------------

-------------------------------------- [Start of the 21th ~ 23th change] -------------------------------------------

#### 6.1.3.72 Delay Status Report MAC CE

The Delay Status Report (DSR) MAC CE is identified by MAC subheader with an eLCID as specified in Table 6.2.1-2b.

The fields in the DSR MAC CE are defined as follows:

- LCGi: This field indicates the presence of delay information (i.e. the Remaining Time and Buffer Size fields) for the LCG i. The LCGi field set to 1 indicates that the delay information for the LCG i is reported. The LCGi field set to 0 indicates that the delay information for the LCG i is not reported;

- Remaining Time: This field indicates the shortest remaining value of PDCP *discardTimer* (described in clause 7.3 in TS 38.323 [4]) among all PDCP SDUs buffered for an LCG, at the time of the first symbol of the first PUSCH transmission that includes this DSR MAC CE. The length of this field is 6 bits. The value *r* in this field indicates a remaining time within the range of (*r*, *r* + 1] msec;

- BT: This field is present only if the corresponding LCG is configured with *additionalBS-TableAllowed*;otherwise, this field is reserved. If present, the BT field set to 1 indicates that the buffer sizes specified in Table 6.1.3.1-3 are used to set the value of the Buffer Size field, while the BT field set to 0 indicates that the buffer sizes specified in Table 6.1.3.1-2 are used instead;

- Buffer Size: The Buffer Size field indicates the total amount of delay-critical UL data for an LCG according to the data volume calculation procedure specified in clause 5.5 in TS 38.322 [3] and clause 5.6 in TS 38.323 [4] for the associated RLC and PDCP entities, respectively, after the MAC PDU has been built. If the corresponding LCG is configured with *additionalBS-TableAllowed* and the amount of delay-critical UL data for an LCG is within the buffer sizes specified in Table 6.1.3.1-3, the MAC entity shall use the buffer sizes specified in Table 6.1.3.1-3 to set the value of this field; otherwise, the MAC entity shall use Table 6.1.3.1-2 instead. This field is indicated in number of bytes. The length of this field is 8 bits.

The DSR MAC CE shall include delay information of all LCGs which have pending DSRs when the MAC PDU containing this DSR MAC CE is to be built. The Remaining Time, the BT, and the Buffer Size fields for an LCG shall be reported in two consecutive octets. These three fields for different LCGs shall be included in a DSR MAC CE in ascending order based on the LCGi.

(Text omitted)

------------------------------------- [End of the 21th ~ 23th change] -------------------------------------------

----------------------------------- [Start of the 24th and 25th change] -----------------------------------------

#### 6.1.3.73 PSI-Based SDU Discard Activation/Deactivation MAC CE

The PSI-Based SDU Discard Activation/Deactivation MAC CE is identified by MAC subheader with an one-octet eLCID as specified in Table 6.2.1-1b.

It has a fixed size and consists of one octet defined as follows (Figure 6.1.3.73-1):

- Di: This field indicates the activation/deactivation status of the PSI-based SDU discard of DRB i, where i is the ascending order of the DRB ID among the DRBs configured with *discardTimerForLowImportance* and with RLC entity(ies) associated with this MAC entity. The Di field set to 1 indicates that the PSI-based SDU discard shall be activated for DRB i. The Di field set to 0 indicates that the PSI-based SDU discard shall be deactivated for DRB i.



Figure 6.1.3.73-1: PSI-based SDU Discard Activation/Deactivation MAC CE

------------------------------------ [End of the 24th and 25th change] -------------------------------------------