**3GPP TSG- Meeting #**

**, February, 2021**

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| *CR-Form-v12.1* |
| **CHANGE REQUEST** |
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|  |  | **CR** | **1187** | **rev** | **-** | **Current version:** |  |  |
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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:***  |  on UL/SL prioritization |
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| ***Source to WG:*** |  |
| ***Source to TSG:*** |  |
|  |  |
| ***Work item code:*** | 5G\_V2X\_NRSL-Core  |  | ***Date:*** | 2022-3-1 |
|  |  |  |  |  |
| ***Category:*** |  |  | ***Release:*** |  |
|  | *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-15 (Release 15)Rel-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)* |
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| ***Reason for change:*** | 1. In 5.22.1.3.1.a, it is defined that

The transmission of the MAC PDU is prioritized over uplink transmissions of the MAC entity or the other MAC entity if the following conditions are met:1> if the MAC entity is not able to perform this sidelink transmission simultaneously with all uplink transmissions at the time of the transmission, and1> if **uplink transmission is neither prioritized as specified in clause 5.4.2.2** nor prioritized by upper layer according to TS 23.287 [19]; and1> if *sl-PrioritizationThres* is configured and if the value of the highest priority of logical channel(s) or a MAC CE in the MAC PDU is lower than *sl-PrioritizationThres*.I.e., to judge “The transmission of the MAC PDU is prioritized over uplink transmissions of the MAC entity or the other MAC entity”, one has to rely on “**clause 5.4.2.2**” to judge “**uplink transmission is not prioritized**”, while on the other hand, if UE looks into the clause 5.4.2.2, 5.22.1.3.1a is referred in a circular manner, i.e., the specification finally may fail to provide the clear definition of how to define the “The transmission of the MAC PDU is prioritized over uplink transmissions of the MAC entity or the other MAC entity”, one has to rely on “**clause 5.4.2.2**”. Please note that in5.22.1.3.1a, there is already condition of “if there is a MAC PDU to be transmitted for this duration in uplink, except a MAC PDU obtained from the Msg3 buffer, the MSGA buffer, or **prioritized as specified in clause 5.4.2.2**, and the sidelink transmission is prioritized over uplink transmission” , so there is no need to include this circular reference within the definition of “The transmission of the MAC PDU is prioritized over uplink transmissions of the MAC entity or the other MAC entity”.As the intension of removing the cross-reference issue has been agreed in RAN2 #116, but with the left issue on how to polish the wording of the change in order to more aligned with previous RAN2 agreement. This CR (Option1) tries to adress this concern in the direction of of capturing our agreement regarding “SL is prioritized over UL” clearly in section 5.22.1.3.1a with adding the ul-PrioritizationThres condition. |
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| ***Summary of change:*** | 1. In 5.4.2.2, change to the plural form for LTE V2X communication considering CA in LTE-V2X;
2. In 5.4.2.2, remove the UL priority comparison condition and MAC CE condition since the condition is added in 5.22.1.3.1a;
3. In 5.22.1.3.1a, remove the “neither prioritized as specified in clause 5.4.2.2 nor” and change the sentence into “none of uplink transmission(s) is prioritized by upper layer according to TS 23.287 [19]” to remove the cross reference issue
4. In 5.22.1.3.1a, add the UL priority comparison condition and MAC CE condition for NR UL transmission.
5. Remove “prioritized as specified in clause 5.4.2.2”, as all prioritization handling between UL MAC PDU and SL MAC PDU will happen in 5.22.1.3.1a, so there is no need to refer back to clause 5.4.2.2.

**Impact analysis****Impacted functionality**UL/SL prioritization for NR sidelink communication**Inter-operability:** 1. If the network implements the change but not the UE, there is no inter-operability since it is just to fix the circular reference in the spec .
2. If the UE implements the change but not the network, there is no inter-operability since it is just to fix the circular reference in the spec.
3. If one UE implements the change but not the other UE, there is no inter-operability since it is just to fix the circular reference in the spec.
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| ***Consequences if not approved:*** | The specification includes circular reference; |
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| ***Clauses affected:*** | 5.4.2.2, 5.22.1.3.1a |
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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:*** |  |

*Start Change*

#### 5.4.2.2 HARQ process

Each HARQ process is associated with a HARQ buffer.

New transmissions are performed on the resource and with the MCS indicated on PDCCH or indicated in the Random Access Response (i.e. MAC RAR or fallbackRAR), or signalled in RRC or determined as specified in clause 5.1.2a for MSGA payload. Retransmissions are performed on the resource and, if provided, with the MCS indicated on PDCCH, or on the same resource and with the same MCS as was used for last made transmission attempt within a bundle, or on stored configured uplink grant resources and stored MCS when *cg-RetransmissionTimer* is configured. If *cg-RetransmissionTimer* is configured, retransmissions with the same HARQ process may be performed on any configured grant configuration if the configured grant configurations have the same TBS.

When *cg-RetransmissionTimer* is configured and the HARQ entity obtains a MAC PDU to transmit and LBT failure indication is received from lower layer, the corresponding HARQ process is considered to be pending. For a configured uplink grant, configured with *cg-RetransmissionTimer*, each associated HARQ process is considered as not pending when:

- a transmission is performed on that HARQ process and LBT failure indication is not received from lower layers; or

- the configured uplink grant is initialised and this HARQ process is not associated with another active configured uplink grant; or

- the HARQ buffer for this HARQ process is flushed.

If the HARQ entity requests a new transmission for a TB, the HARQ process shall:

1> store the MAC PDU in the associated HARQ buffer;

1> store the uplink grant received from the HARQ entity;

1> generate a transmission as described below.

If the HARQ entity requests a retransmission for a TB, the HARQ process shall:

1> store the uplink grant received from the HARQ entity;

1> generate a transmission as described below.

To generate a transmission for a TB, the HARQ process shall:

1> if the MAC PDU was obtained from the Msg3 buffer; or

1> if the MAC PDU was obtained from the MSGA buffer; or

1> if there is no measurement gap at the time of the transmission and, in case of retransmission, the retransmission does not collide with a transmission for a MAC PDU obtained from the Msg3 buffer or the MSGA buffer:

2> if there are neither transmission of NR sidelink communication nor transmission of V2X sidelink communication at the time of the transmission; or

2> if the transmission of the MAC PDU is prioritized over sidelink transmission or can be simultaneously performed with sidelink transmission:

3> instruct the physical layer to generate a transmission according to the stored uplink grant.

If a HARQ process receives downlink feedback information, the HARQ process shall:

1> stop the *cg-RetransmissionTimer*, if running;

1> if acknowledgement is indicated:

2> stop the *configuredGrantTimer*, if running.

If the *configuredGrantTimer* expires for a HARQ process, the HARQ process shall:

1> stop the *cg-RetransmissionTimer*, if running.

The transmission of the MAC PDU is prioritized over sidelink transmission or can be performed simultaneously with sidelink transmission if one of the following conditions is met:

- if there are both a sidelink grant for transmission of NR sidelink communication and configured grant(s) for transmission of V2X sidelink communication on SL-SCH as described in clause 5.14.1.2.2 of TS 36.321 [22] at the time of the transmission, and neither the transmission of NR sidelink communication is prioritized as described in clause 5.22.1.3.1a nor the transmission(s) of V2X sidelink communication is prioritized as described in clause 5.14.1.2.2 of TS 36.321 [22]; or

- if there are both a sidelink grant for transmission of NR sidelink communication and configured grant(s) for transmission of V2X sidelink communication on SL-SCH as described in clause 5.14.1.2.2 of TS 36.321 [22] at the time of the transmission, and the MAC entity is able to perform this UL transmission simultaneously with the transmission of NR sidelink communication and/or the transmission(s) of V2X sidelink communication; or

- if there is only configured grant(s) for transmission of V2X sidelink communication on SL-SCH as described in clause 5.14.1.2.2 of TS 36.321 [22] at the time of the transmission, and either none of the transmission(s) of V2X sidelink communication is prioritized as described in clause 5.14.1.2.2 of TS 36.321 [22] or the MAC entity is able to perform this UL transmission simultaneously with the transmission(s) of V2X sidelink communication; or

- if there is only a sidelink grant for transmission of NR sidelink communication at the time of the transmission, and if the transmission of NR sidelink communication is not prioritized as described in clause 5.22.1.3.1a, or there is a sidelink grant for transmission of NR sidelink communication at the time of the transmission and the MAC entity is able to perform this UL transmission simultaneously with the transmission of NR sidelink communication; or

- if there are both a sidelink grant for transmission of NR sidelink communication and configured grant(s) for transmission of V2X sidelink communication on SL-SCH as described in clause 5.14.1.2.2 of TS 36.321 [22] at the time of the transmission, and either only the transmission of NR sidelink communication is prioritized as described in clause 5.22.1.3.1a or only the transmission(s) of V2X sidelink communication is prioritized as described in clause 5.14.1.2.2 of TS 36.321 [22] and the MAC entity is able to perform this UL transmission simultaneously with the prioritized transmission of NR sidelink communication or V2X sidelink communication:

NOTE 1: Among the UL transmissions where the MAC entity is able to perform the transmission of NR sidelink communication prioritized simultaneously, if there are more than one UL transmission which the MAC entity is not able to perform simultaneously, it is up to UE implementation whether this UL transmission is performed.

NOTE 2: Among the UL transmissions that the MAC entity is able to perform simultaneously with all transmissions of V2X sidelink communication prioritized, if there are more than one UL transmission which the MAC entity is not able to perform simultaneously, it is up to UE implementation whether this UL transmission is performed.

NOTE 3: Among the UL transmissions where the MAC entity is able to perform the transmission of NR sidelink communication prioritized simultaneously with all transmissions of V2X sidelink communication prioritized, if there are more than one UL transmission which the MAC entity is not able to perform simultaneously, it is up to UE implementation whether this UL transmission is performed.

NOTE 4: If there is a configured grant for transmission of V2X sidelink communication on SL-SCH as described in clause 5.14.1.2.2 of TS 36.321 [22] at the time of the transmission, and the MAC entity is not able to perform this UL transmission simultaneously with the transmission of V2X sidelink communication, and prioritization-related information is not available prior to the time of the transmission due to processing time restriction, it is up to UE implementation whether this UL transmission is performed.

*Next Change*

##### 5.22.1.3.1a Sidelink process

The Sidelink process is associated with a HARQ buffer.

New transmissions and retransmissions are performed on the resource indicated in the sidelink grant as specified in clause 5.22.1.1 and with the MCS selected as specified in clause 8.1.3.1 of TS 38.214 [7] and clause 5.22.1.1.

If the Sidelink process is configured to perform transmissions of multiple MAC PDUs with Sidelink resource allocation mode 2, the process maintains a counter *SL\_RESOURCE\_RESELECTION\_COUNTER*. For other configurations of the Sidelink process, this counter is not available.

If the Sidelink HARQ Entity requests a new transmission, the Sidelink process shall:

1> store the MAC PDU in the associated HARQ buffer;

1> store the sidelink grant received from the Sidelink HARQ Entity;

1> generate a transmission as described below.

If the Sidelink HARQ Entity requests a retransmission, the Sidelink process shall:

1> store the sidelink grant received from the Sidelink HARQ Entity;

1> generate a transmission as described below.

To generate a transmission, the Sidelink process shall:

1> if there is no uplink transmission; or

1> if the MAC entity is able to simultaneously perform uplink transmission(s) and sidelink transmission at the time of the transmission; or

1> if the other MAC entity and the MAC entity are able to simultaneously perform uplink transmission(s) and sidelink transmission at the time of the transmission respectively; or

1> if there is a MAC PDU to be transmitted for this duration in uplink, except a MAC PDU obtained from the Msg3 buffer, or the MSGA buffer, and the sidelink transmission is prioritized over uplink transmission:

2> instruct the physical layer to transmit SCI according to the stored sidelink grant with the associated Sidelink transmission information;

2> instruct the physical layer to generate a transmission according to the stored sidelink grant;

2> if HARQ feedback has been enabled the MAC PDU according to clause 5.22.1.4.2:

3> instruct the physical layer to monitor PSFCH for the transmission and perform PSFCH reception as specified in clause 5.22.1.3.2.

2> if *sl-PUCCH-Config* is configured by RRC for the stored sidelink grant:

3> determine transmission of an acknowledgement on the PUCCH as specified in clause 5.22.1.3.2.

1> if this transmission corresponds to the last transmission of the MAC PDU:

2> decrement *SL\_RESOURCE\_RESELECTION\_COUNTER* by 1, if available.

NOTE 1: If the number of HARQ retransmissions selected by the MAC entity has been reached, or if a positive acknowledgement to a transmission of the MAC PDU has been received, or if a negative-only acknowledgement was enabled in the SCI and no negative acknowledgement was received for the transmission of the MAC PDU, the MAC entity determines this transmission corresponds to the last transmission of the MAC PDU for Sidelink resource allocation mode 2. How to determine the last transmission in other cases is up to UE implementation.

1> if *sl-MaxTransNum* corresponding to the highest priority of the logical channel(s) in the MAC PDU has been configured in *sl-CG-MaxTransNumList* for the sidelink grant by RRC and the number of transmissions of the MAC PDU has been reached to *sl-MaxTransNum*; or

1> if a positive acknowledgement to this transmission of the MAC PDU was received according to clause 5.22.1.3.2; or

1> if negative-only acknowledgement was enabled in the SCI and no negative acknowledgement was received for this transmission of the MAC PDU according to clause 5.22.1.3.2:

2> flush the HARQ buffer of the associated Sidelink process.

The transmission of the MAC PDU is prioritized over uplink transmission(s) of the MAC entity or the other MAC entity if the following conditions are met:

1> if the MAC entity is not able to perform this sidelink transmission simultaneously with all uplink transmission(s) at the time of the transmission, and

1. if none of uplink transmission(s) is prioritized by upper layer according to TS 23.287 [19], and
2. if none of the NR uplink MAC PDU(s) includes any MAC CE prioritized as described in clause 5.4.3.1.3; and
3. if the value of the highest priority of the logical channel(s) of all the NR uplink transmission(s) is not lower than ul-PrioritizationThres if ul-PrioritizationThres is configured; and

1> if *sl-PrioritizationThres* is configured and if the value of the highest priority of logical channel(s) or a MAC CE in the MAC PDU is lower than *sl-PrioritizationThres*.

NOTE 2: If the MAC entity is not able to perform this sidelink transmission simultaneously with all uplink transmissions as specified in clause 5.4.2.2 of TS 36.321 [22] at the time of the transmission, and prioritization-related information is not available prior to the time of this sidelink transmission due to processing time restriction, it is up to UE implementation whether this sidelink transmission is performed.

*Stop Change*