**3GPP TSG-RAN2 Meeting #117 *R2-220xxxx***

 **E-meeting, Feburay 2022**

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| *CR-Form-v12.2* |
| **CHANGE REQUEST** |
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|  | **38.321** | **CR** | **<CR#>** | **rev** | **-** | **Current version:** | **16.7.0** |  |
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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:***  | Draft-TP for mergerd solution |
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| ***Source to WG:*** | R2 |
| ***Source to TSG:*** | OPPO (Moderator) |
|  |  |
| ***Work item code:*** | NR\_SL\_enh-Core |  | ***Date:*** | 2022-02-17 |
|  |  |  |  |  |
| ***Category:*** | B |  | ***Release:*** | Rel-17 |
|  | *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-16 (Release 16)Rel-17 (Release 17)Rel-18 (Release 18)Rel-19 (Release 19)* |
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| ***Reason for change:*** | Draft-TP for normative-text-based approach for SL DRX active time indication to PHY and resource (re)selection in SL DRX |
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| ***Summary of change:*** | Draft-TP for SL DRX active time indication to PHY and resource (re)selection in SL DRX |
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| ***Consequences if not approved:*** |  |
|  |  |
| ***Clauses affected:*** |  |
|  |  |
|  | **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 of Change*

5.22.1.1 SL Grant reception and SCI transmission

Sidelink grant is received dynamically on the PDCCH, configured semi-persistently by RRC or autonomously selected by the MAC entity. The MAC entity shall have a sidelink grant on an active SL BWP to determine a set of PSCCH duration(s) in which transmission of SCI occurs and a set of PSSCH duration(s) in which transmission of SL-SCH associated with the SCI occurs. A sidelink grant addressed to SLCS-RNTI with NDI = 1 is considered as a dynamic sidelink grant.

If the MAC entity has been configured with Sidelink resource allocation mode 1 as indicated in TS 38.331 [5], the MAC entity shall for each PDCCH occasion and for each grant received for this PDCCH occasion:

1> if a sidelink grant has been received on the PDCCH for the MAC entity's SL-RNTI:

2> if the NDI received on the PDCCH has not been toggled compared to the value in the previously received HARQ information for the HARQ Process ID:

3> use the received sidelink grant to determine PSCCH duration(s) and PSSCH duration(s) for one or more retransmissions of a single MAC PDU for the corresponding Sidelink process according to clause 8.1.2 of TS 38.214 [7].

2> else:

3> use the received sidelink grant to determine PSCCH duration(s) and PSSCH duration(s) for initial transmission and, if available, retransmission(s) of a single MAC PDU according to clause 8.1.2 of TS 38.214 [7].

2> if a sidelink grant is available for retransmission(s) of a MAC PDU which has been positively acknowledged as specified in clause 5.22.1.3.1a:

3> clear the PSCCH duration(s) and PSSCH duration(s) corresponding to retransmission(s) of the MAC PDU from the sidelink grant.

1> else if a sidelink grant has been received on the PDCCH for the MAC entity's SLCS-RNTI:

2> if PDCCH contents indicate retransmission(s) for the identifed HARQ process ID that has been set for an activated configured sidelink grant identified by *sl-ConfigIndexCG*:

3> use the received sidelink grant to determine PSCCH duration(s) and PSSCH duration(s) for one or more retransmissions of a single MAC PDU according to clause 8.1.2 of TS 38.214 [7].

2> else if PDCCH contents indicate configured grant Type 2 deactivation for a configured sidelink grant:

3> trigger configured sidelink grant confirmation for the configured sidelink grant.

2> else if PDCCH contents indicate configured grant Type 2 activation for a configured sidelink grant:

3> trigger configured sidelink grant confirmation for the configured sidelink grant;

3> store the configured sidelink grant;

3> initialise or re-initialise the configured sidelink grant to determine the set of PSCCH durations and the set of PSSCH durations for transmissions of multiple MAC PDUs according to clause 8.1.2 of TS 38.214 [7].

If the MAC entity has been configured with Sidelink resource allocation mode 2 to transmit using pool(s) of resources in a carrier as indicated in TS 38.331 [5] or TS 36.331 [21] based on sensing or random selection, the MAC entity shall for each Sidelink process:

NOTE 1: If the MAC entity is configured with Sidelink resource allocation mode 2 to transmit using a pool of resources in a carrier as indicated in TS 38.331 [5] or TS 36.331 [21], the MAC entity can create a selected sidelink grant on the pool of resources based on random selection or sensing only after releasing configured sidelink grant(s), if any.

NOTE 2: The MAC entity expects that PSFCH is always configured by RRC for at least one pool of resources in *sl-TxPoolSelectedNormal* and for the resource pool in *sl-TxPoolExceptional* in case that at least a logical channel configured with *sl-HARQ-FeedbackEnabled* is set to *enabled*.

1> if the MAC entity has selected to create a selected sidelink grant corresponding to transmissions of multiple MAC PDUs, and SL data is available in a logical channel:

2> if the MAC entity has not selected a pool of resources allowed for the logical channel:

3> if *sl-HARQ-FeedbackEnabled* is set to *enabled* for the logical channel:

4> select any pool of resources configured with PSFCH resources among the pools of resources;

3> else:

4> select any pool of resources among the pools of resources;

2> perform the TX resource (re-)selection check on the selected pool of resources as specified in clause 5.22.1.2;

NOTE 3: The MAC entity continuously performs the TX resource (re-)selection check until the corresponding pool of resources is released by RRC or the MAC entity decides to cancel creating a selected sidelink grant corresponding to transmissions of multiple MAC PDUs.

2> if the TX resource (re-)selection is triggered as the result of the TX resource (re-)selection check:

3> if one or multiple SL DRX is configured in the destination UE(s) receiving the SL-SCH data:

4> indicate to the physical layer SL DRX active time in the destination UE(s) receiving SL-SCH data, as specified in clause 5.x.2.

3> select one of the allowed values configured by RRC in *sl-ResourceReservePeriodList* and set the resource reservation interval, $P\_{rsvp\\_TX}$, with the selected value;

NOTE 3A: The MAC entity selects a value for the resource reservation interval which is larger than the remaining PDB of SL data available in the logical channel.

3> randomly select, with equal probability, an integer value in the interval [5, 15] for the resource reservation interval higher than or equal to 100ms or in the interval $\left[5×\left⌈\frac{100}{max\left(20, P\_{rsvp\\_TX}\right)}\right⌉,15×\left⌈\frac{100}{max\left(20, P\_{rsvp\\_TX}\right)}\right⌉\right] $ for the resource reservation interval lower than 100ms and set *SL\_RESOURCE\_RESELECTION\_COUNTER* to the selected value;

3> select the number of HARQ retransmissions from the allowed numbers, if configured by RRC, in *sl-MaxTxTransNumPSSCH* included in *sl-PSSCH-TxConfigList* and, if configured by RRC, overlapped in *sl-MaxTxTransNumPSSCH* indicated in *sl-CBR-PriorityTxConfigList* for the highest priority of the logical channel(s) allowed on the carrier and the CBR measured by lower layers according to clause 5.1.27 of TS 38.215 [24] if CBR measurement results are available or the corresponding *sl-defaultTxConfigIndex* configured by RRC if CBR measurement results are not available;

3> select an amount of frequency resources within the range, if configured by RRC, between *sl-MinSubChannelNumPSSCH* and *sl-MaxSubchannelNumPSSCH* included in *sl-PSSCH-TxConfigList* and, if configured by RRC, overlapped between *MinSubChannelNumPSSCH* and *MaxSubchannelNumPSSCH* indicated in *sl-CBR-PriorityTxConfigList* for the highest priority of the logical channel(s) allowed on the carrier and the CBR measured by lower layers according to clause 5.1.27 of TS 38.215 [24] if CBR measurement results are available or the corresponding *sl-defaultTxConfigIndex* configured by RRC if CBR measurement results are not available;

3> if transmission based on random selection is configured by upper layers:

4> randomly select the time and frequency resources for one transmission opportunity from the resource pool which occur within the SL DRX active time as specified in clause 5.x.2 of the destination UE selected for indicating to the physical layer the SL DRX active time above, according to the amount of selected frequency resources and the remaining PDB of SL data available in the logical channel(s) allowed on the carrier.3> else:

4> randomly select the time and frequency resources for one transmission opportunity from the resources indicated by the physical layer as specified in clause 8.1.4 of TS 38.214 [7] which occur within the SL DRX active time as specified in clause 5.x.2 of the destination UE selected for indicating to the physical layer the SL DRX active time above, according to the amount of selected frequency resources and the remaining PDB of SL data available in the logical channel(s) allowed on the carrier.3> use the randomly selected resource to select a set of periodic resources spaced by the resource reservation interval for transmissions of PSCCH and PSSCH corresponding to the number of transmission opportunities of MAC PDUs determined in TS 38.214 [7];

3> if one or more HARQ retransmissions are selected:

4> if transmission based on sensing is configured by upper layers and there are available resources left in the resources indicated by the physical layer according to clause 8.1.4 of TS 38.214 [7] for more transmission opportunities; or

4> if transmission based on random selection is configured by upper layers and there are available resources left in the resource pool for more transmission opportunities:

5> randomly select the time and frequency resources for one or more transmission opportunities from the available resources which occur within the SL DRX active time as specified in clause 5.x.2 of the destination UE selected for indicating to the physical layer the SL DRX active time above, according to the amount of selected frequency resources, the selected number of HARQ retransmissions and the remaining PDB of SL data available in the logical channel(s) allowed on the carrier by ensuring the minimum time gap between any two selected resources in case that PSFCH is configured for this pool of resources and that a retransmission resource can be indicated by the time resource assignment of a prior SCI according to clause 8.3.1.1 of TS 38.212 [9];5> use the randomly selected resource to select a set of periodic resources spaced by the resource reservation interval for transmissions of PSCCH and PSSCH corresponding to the number of retransmission opportunities of the MAC PDUs determined in TS 38.214 [7];

5> consider the first set of transmission opportunities as the initial transmission opportunities and the other set(s) of transmission opportunities as the retransmission opportunities;

5> consider the sets of initial transmission opportunities and retransmission opportunities as the selected sidelink grant.

3> else:

4> consider the set as the selected sidelink grant.

3> use the selected sidelink grant to determine the set of PSCCH durations and the set of PSSCH durations according to TS 38.214 [7].

2> else if *SL\_RESOURCE\_RESELECTION\_COUNTER* = 0 and when *SL\_RESOURCE\_RESELECTION\_COUNTER* was equal to 1 the MAC entity randomly selected, with equal probability, a value in the interval [0, 1] which is less than or equal to the probability configured by RRC in *sl-ProbResourceKeep*:

3> clear the selected sidelink grant, if available;

3> randomly select, with equal probability, an integer value in the interval [5, 15] for the resource reservation interval higher than or equal to 100ms or in the interval $\left[5×\left⌈\frac{100}{max\left(20, P\_{rsvp\\_TX}\right)}\right⌉,15×\left⌈\frac{100}{max\left(20, P\_{rsvp\\_TX}\right)}\right⌉\right] $ for the resource reservation interval lower than 100ms and set *SL\_RESOURCE\_RESELECTION\_COUNTER* to the selected value;

3> reuse the previously selected sidelink grant for the number of transmissions of the MAC PDUs determined in TS 38.214 [7] with the resource reservation interval to determine the set of PSCCH durations and the set of PSSCH durations according to TS 38.214 [7].

1> if the MAC entity has selected to create a selected sidelink grant corresponding to transmission(s) of a single MAC PDU, and if SL data is available in a logical channel, or a SL-CSI reporting is triggered:

2> if SL data is available in the logical channel:

3> if *sl-HARQ-FeedbackEnabled* is set to *enabled* for the logical channel:

4> select any pool of resources configured with PSFCH resources among the pools of resources;

3> else:

4> select any pool of resources among the pools of resources;

2> else if a SL-CSI reporting is triggered:

3> select any pool of resources among the pools of resources.

2> perform the TX resource (re-)selection check on the selected pool of resources as specified in clause 5.22.1.2;

2> if the TX resource (re-)selection is triggered as the result of the TX resource (re-)selection check:

3> if one or multiple SL DRX is configured in the destination UE(s) receiving the SL-SCH data:

4> indicate to the physical layer SL DRX active time in the destination UE(s) receiving SL-SCH data, as specified in clause 5.x.2.

3> select the number of HARQ retransmissions from the allowed numbers, if configured by RRC, in *sl-MaxTxTransNumPSSCH* included in *sl-PSSCH-TxConfigList* and, if configured by RRC, overlapped in *sl-MaxTxTransNumPSSCH* indicated in *sl-CBR-PriorityTxConfigList* for the highest priority of the logical channel(s) allowed on the carrier and the CBR measured by lower layers according to clause 5.1.27 of TS 38.215 [24] if CBR measurement results are available or the corresponding *sl-defaultTxConfigIndex* configured by RRC if CBR measurement results are not available;

3> select an amount of frequency resources within the range, if configured by RRC, between *sl-MinSubChannelNumPSSCH* and *sl-MaxSubChannelNumPSSCH* included in *sl-PSSCH-TxConfigList* and, if configured by RRC, overlapped between *sl-MinSubChannelNumPSSCH* and *sl-MaxSubChannelNumPSSCH* indicated in *sl-CBR-PriorityTxConfigList* for the highest priority of the logical channel(s) allowed on the carrier and the CBR measured by lower layers according to clause 5.1.27 of TS 38.215 [24] if CBR measurement results are available or the corresponding *sl-defaultTxConfigIndex* configured by RRC if CBR measurement results are not available;

3> if transmission based on random selection is configured by upper layers:

4> randomly select the time and frequency resources for one transmission opportunity from the resources pool which occur within the SL DRX ative time as specified in clause 5.x.2 of the destination UE selected for indicating to the physical layer the SL DRX active time above, according to the amount of selected frequency resources and the remaining PDB of SL data available in the logical channel(s) allowed on the carrier, and the latency requirement of the triggered SL CSI reporting;

3> else:

4> randomly select the time and frequency resources for one transmission opportunity from the resources indicated by the physical layer as specified in clause 8.1.4 of TS 38.214 [7] which occur within the SL DRX ative time as specified in clause 5.x.2 of the destination UE selected for indicating to the physical layer the SL DRX active time above , according to the amount of selected frequency resources and the remaining PDB of SL data available in the logical channel(s) allowed on the carrier, and/or the latency requirement of the triggered SL-CSI reporting;

3> if one or more HARQ retransmissions are selected:

4> if transmission based on sensing is configured by upper layers and there are available resources left in the resources indicated by the physical layer according to clause 8.1.4 of TS 38.214 [7] for more transmission opportunities; or

4> if transmission based on random selection is configured by upper layers and there are available resources left in the resources pool for more transmission opportunities:

5> randomly select the time and frequency resources for one or more transmission opportunities from the available resources which occur within the SL DRX active time as specified in clause 5.x.2 of the destination UE selected for indicating to the physical layer the SL DRX active time above, according to the amount of selected frequency resources, the selected number of HARQ retransmissions and the remaining PDB of SL data available in the logical channel(s) allowed on the carrier, and/or the latency requirement of the triggered SL-CSI by ensuring the minimum time gap between any two selected resources in case that PSFCH is configured for this pool of resources, and that a retransmission resource can be indicated by the time resource assignment of a prior SCI according to clause 8.3.1.1 of TS 38.212 [9];5> consider a transmission opportunity which comes first in time as the initial transmission opportunity and other transmission opportunities as the retransmission opportunities;

5> consider all the transmission opportunities as the selected sidelink grant;

3> else:

4> consider the set as the selected sidelink grant;

3> use the selected sidelink grant to determine PSCCH duration(s) and PSSCH duration(s) according to TS 38.214 [7].

NOTE 3B: If retransmission resource(s) cannot be selected by ensuring that the resource(s) can be indicated by the time resource assignment of a prior SCI, how to select the time and frequency resources for one or more transmission opportunities from the available resources is left for UE implementation by ensuring the minimum time gap between any two selected ‎resources in case that PSFCH is configured for this pool of ‎resources.

1> if a selected sidelink grant is available for retransmission(s) of a MAC PDU which has been positively acknowledged as specified in clause 5.22.1.3.3:

2> clear the PSCCH duration(s) and PSSCH duration(s) corresponding to retransmission(s) of the MAC PDU from the selected sidelink grant.

NOTE 3C: How the MAC entity determines the remaining PDB of SL data is left to UE implementation.

For a selected sidelink grant, the minimum time gap between any two selected resources comprises:

- a time gap between the end of the last symbol of a PSSCH transmission of the first resource and the start of the first symbol of the corresponding PSFCH reception determined by *sl-MinTimeGapPSFCH* and *sl-PSFCH-Period* for the pool of resources; and

- a time required for PSFCH reception and processing plus sidelink retransmission preparation including multiplexing of necessary physical channels and any TX-RX/RX-TX switching time.

NOTE 4: How to determine the time required for PSFCH reception and processing plus sidelink retransmission preparation is left to UE implementation.

*Next Change*

5.x.2 Behaviour of UE transmitting SL-SCH Data

The UE transmitting SL-SCH Data should keep aligned with its intended UE receiving the SL-SCH Data regarding the SL DRX Active time as specified in clause 5.x.1.

Furthermore, the UE transmitting SL-SCH Data determines the SL DRX active time based on SL DRX timers that are running (e.g., *sl-drx-onDurationTimer*, *sl-drx-InactivityTimer*, *sl-drx-RetransmissionTimer*) or will be running in the future (e.g., *sl-drx-onDurationTimer,* *sl-drx-InactivityTimer*, *sl-drx-RetransmissionTimer*) at the UE(s) receiving SL-SCH data. The UE may select resource for the initial transmission of groupcast within the time when *sl-drx-onDurationTimer* or *sl-drx-InactivityTimer* of the destination is running.

NOTE: A UE may assume that a resource for retransmission is in the active time if an initial transmission causes the *sl-drx-RetransmissionTimer* to be started at the receiving UE.

*End of Change*