**3GPP TSG-RAN WG2 Meeting #121 *R2-2300xxx***

**Athens, Greece,** **27th Feb – 3rd Mar 2023**

**Agenda item: 6.10.1**

**Source: CATT**

**Title: Summary of** **[AT121][504][V2X/SL] R17 38.300 corrections (CATT)**

**Document for: Discussion and Decision**

# Introduction

This is the summary of the following offline discussion.

* [AT121][504][V2X/SL] R17 38.300 corrections (CATT)

 **Scope:** Discuss corrections in R2-2300894, R2-2300911, and R2-2301822. Merge agreeable corrections. Note IUC cast type related correction should wait for the related RAN2 decision.

 **Intended outcome:** 38.300 CR in R2-2302028 and discussion summary in R2-2302029 (if needed).

**Deadline:** Comeback at 3/2 CB session

# Contact Information

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# 3. Discussion

## 3.1 2nd change in [R2-2300894](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2300894.zip)

**Reason for change**: Regarding to the SL DRX configuration for GC/BC, the corresponding agreements are as below:

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| * For GC/BC, DRX cycle is configured per QoS profile.
* For GC/BC, For GC/BC, sl-drx-startoffset is set based on DST L2 ID.
* For BC/GC, the on-duration timer length and inactivity timer length (only for GC) are configured per QoS profile.
* For GC, do not pursue per-QoS or per-L2-ID configuration for RTT timer length and retransmission timer length.
* For groucast and broadcast, an equation is introduced to derive sl-drx-startoffset based on DST L2 ID.
* For groucast and broadcast, sl-drx-SlotOffset is also set based on DST L2 ID (i.e., similar to sl-drx-StartOffset).
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Based on the above agreements, it is obvious that for GC/BC, on-duration timer, inactivity timer (only for GC), DRX cycle need to be configured. But the configuration is based on QoS profile, not based on QoS profile and Destination L2 ID. For GC, two additional timers (HARQ RTT timer and retransmission timer) are needed, but it is not pursued per QoS or per L2 ID.

While in TS38.300, it stated that “For groupcast/broadcast, SL DRX is configured commonly among multiple UEs based on QoS profile and Destination L2 ID”. Hence, this sentence should be corrected.

**Change**: In subclause 16.9.6.3, correct that for GC/BC, SL DRX is configured commonly among multiple UEs based on QoS profile.

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| 16.9.6.3 Groupcast/BroadcastFor groupcast/broadcast, SL DRX is configured commonly among multiple UEs based on QoS profile. Multiple SL DRX configurations can be supported for each of groupcast/broadcast.SL on-duration timer, SL inactivity-timer, SL HARQ RTT and SL retransmission timers are supported for groupcast. Only SL on-duration timer is supported for broadcast. SL DRX cycle, SL on-duration, and SL inactivity timer (only for groupcast) are configured per QoS profile. The starting offset and slot offset of the SL DRX cycle is determined based on the destination L2 ID. The SL HARQ RTT timer (only for groupcast) and SL HARQ retransmission timer (only for groupcast) are not configured per QoS profile or per destination L2 ID. For groupcast, the RX UE maintains a SL inactivity timer for each destination L2 ID, and selects the largest SL inactivity timer value if multiple SL inactivity timer values associated with different QoS profiles are configured for that L2 ID. For groupcast and broadcast, the RX UE maintains a single SL DRX cycle (selected as the smallest SL DRX cycle of any QoS profile of that L2 ID) and single SL on-duration (selected as the largest SL on-duration of any QoS profile of that L2 ID) for each destination L2 ID when multiple QoS profiles are configured for that L2 ID.For groupcast, SL HARQ RTT timer and SL retransmission timer are maintained per SL process at the RX UE. SL HARQ RTT timer can be set to different values to support both HARQ enabled and HARQ disabled transmissions.A default SL DRX configuration, common between groupcast and broadcast, can be used for a QoS profile which is not mapped onto any non-default SL DRX configuration(s). The default SL DRX configuration for groupcast and broadcast can also be used for discovery message in sidelink discovery in clause 16.9.5 and relay discovery messages in clause 16.12.3, and for Direct Link Establishment Request message as specified in TS 24.587 [53].In-coverage TX and RX UEs in RRC\_IDLE/RRC\_INACTIVE obtain their SL DRX configuration from SIB. UEs (TX or RX) in RRC\_CONNECTED can obtain the SL DRX configuration from SIB, or from dedicated RRC signalling during handover. For the out of coverage case, the SL DRX configuration is obtained from pre-configuration.For groupcast, the TX UE restarts its timer corresponding to the SL inactivity timer for the destination L2 ID (used for determining the allowable transmission time) upon reception of new data with the same destination L2 ID.TX profile is introduced to ensure compatibility for groupcast and broadcast communication between UEs supporting/not-supporting SL DRX functionality. A TX profile is provided by upper layers to AS layer and identifies one or more sidelink feature group(s). Multiple TX profiles with the support of SL DRX and without the support of SL DRX can be associated to a destination L2 ID. For a given destination L2 ID, all TX and RX UEs should be configured with the same set of TX profile(s). A UE only assumes SL DRX for the given destination L2 ID when all the associated TX profiles correspond to support of SL DRX. A UE assumes no SL DRX for the given destination L2 ID if there is no associated TX profile. An RX UE determines that SL DRX is used if all destination L2 IDs of interest are assumed to support SL DRX. For groupcast, when the UE is in RRC\_CONNECTED and using mode 1 resource allocation, the UE reports each destination L2 ID and associated SL DRX on/off indication to the gNB supporting SL DRX. |

**Q1: Whether the 2nd change proposed in R2-**[**2300894**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2300894.zip) **is agreed or not? Please provide your companie’s view.**

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| Company | Agree/Disagree | Comments |
| Xiaomi | Disagree | The starting offset and slot offset is determined based on the L2 ID. The original text is correct.  |
| Sharp | Disagree | As mentioned by Xiaomi, sl-drx-StartOffset and sl-drx-SlotOffset are calculated by DRX cycle and destination L2 ID as follows (TS 38.321);When the cast type is groupcast or broadcast as indicated by upper layer, the *sl-drx-StartOffset* and *sl-drx-SlotOffset* are derived from the following equations: *sl-drx-StartOffset* (ms) = Destination Layer-2 ID modulo *sl-DRX-GC-BC-Cycle* (ms). *sl-drx-SlotOffset* (ms) = (Destination Layer-2 ID modulo the number of slots in one subframe) / (the number of slots in one subframe) (ms).Therefore, we think the original sentence is correct and no modification is needed. |
| Ericsson | Disagree | As xiaomi said, both L2 ID and QoS profile are used. |
| Huawei, HiSilicon | Disagree  | Both offset values are based on L2 ID so no good to remove.  |
| Intel | Disagree | Agree with companies above that QoS profile and L2 ID are both used for deriving different parameters. |
| CATT | Agree(Proponent) | See our above reason for change. |
| Lenovo | Disagree | Agree with Xiaomi’s comments |
| Qualcomm | Disagree | Different destination IDs define different SL DRX On duration starting points. |
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## 3.2 1st change in [R2-2300894](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2300894.zip) & change in [R2-2300911](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2300911.zip) & 2nd change in [R2-2300504](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2300504.zip)

**Reason for change**: According the the LS(R1-2212822) received from RAN1, as shown in following, supported cast type of IUC information needs to be clarified.

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| Agreement:* The following working assumption is confirmed as follows:
* Working Assumption (RAN1#107bis-e meeting):
* For Scheme 1, following cast type(s) are supported for inter-UE coordination information transmission triggered by a condition other than explicit request reception
* Groupcast/Broadcast for non-preferred resource set~~, FFS for preferred resource set~~
* ~~FFS: Under which conditions groupcast/broadcast can be supported~~
* Unicast for preferred resource set and non-preferred resource set
* ~~FFS: Under which conditions unicast can be supported~~
 |

In addition, during the RAN2#121 discussion, the following agreements were reached on the cast type of IUC information triggered by condition:

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| * Option 1 is agreed. IUC in GC/BC can be supported with option1.
* We will have a note in MAC. Detailed wordings be handled in MAC CR email discussion.
* Continue the discussion whether we need to capture for a case when there is data to send in GC/BC in separate in a note as part of email discussion [AT121][506].
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**Change**: Add the description of supported cast type of IUC information considering the RAN2 agreements.

Two proposed candidates from change in [R2-2300911](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2300911.zip) and yellow part in [R2-2300504](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2300504.zip) are orderly as bleow:

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| 16.9.8 Inter-UE Coordination (IUC)The SL UE can support inter-UE coordination (IUC) in Mode 2, whereby a UE-A sends information about resources to UE-B, which UE-B then uses for resource (re)selection. The following schemes of inter-UE coordination are supported:- IUC scheme 1, where the IUC information sent from a UE-A to a UE-B is the preferred or non-preferred resources for UE-B's transmission, and- IUC scheme 2, where the IUC information sent from a UE-A to a UE-B is the presence of expected/potential resource conflict on the resources indicated by UE-B's SCI.In scheme 1, the transmission of IUC information from UE-A can be triggered by an explicit request from UE-B, or by a condition at UE-A. UE-A determines the set of resources reserved by other UEs or slots where UE-A, when it is the intended receiver of UE-B, does not expect to perform SL reception from UE-B due to half-duplex operation. UE-A uses these resources as the set of non-preferred resources, or excludes these resources to determine a set of preferred resources and sends the preferred/non-preferred resources to UE-B. UE-B's resources for resource (re)selection can be based on both UE-B's sensing results (if available) and the IUC information received from UE-A, or it can be based only on IUC information received from UE-A. For scheme 1, MAC CE and second-stage SCI or MAC CE only can be used to send IUC information. For transmission of the explicit request and reporting for IUC information in unicast manner is supported. For transmission of the IUC information triggered by a condition, unicast is supported for both preferred and non-preferred resources and groupcast/broadcast is supported for non-preferred resources.In scheme 2, UE-A determines the expected/potential resource conflict within the resources indicated by UE-B's SCI as either resources reserved by other UEs and identified by UE-A as fully/partially overlapping with the resources indicated by UE-B's SCI, or as slots where UE-A is the intended receiver of UE-B and does not expect to perform SL reception on those slots due to half-duplex operation. UE-B uses the conflicting resources to determine the resources to be reselected and exclude the conflicting resources from the reselected resources. For scheme 2, PSFCH is used to send IUC information. |

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| 16.9.8 Inter-UE Coordination (IUC)The SL UE can support inter-UE coordination (IUC) in Mode 2, whereby a UE sends information about resources to a peer UE, which the peer UE then uses for resource (re)selection. The following schemes of inter-UE coordination are supported:- IUC scheme 1, where the IUC information sent from a UE to a peer UE is the preferred or non-preferred resources for the peer UE's transmission, and- IUC scheme 2, where the IUC information sent from a UE to a peer UE is the presence of expected/potential resource conflict on the resources indicated by the peer UE's SCI.In scheme 1, the transmission of IUC information from a UE can be triggered by an explicit request from a peer UE, or by a condition at the UE. The UE determines the set of resources reserved by other UEs or slots where the UE, when it is the intended receiver of a peer UE, does not expect to perform SL reception from the peer UE due to half-duplex operation. The UE uses these resources as the set of non-preferred resources, or excludes these resources to determine a set of preferred resources and sends the preferred/non-preferred resources to the peer UE. The peer UE's resources for resource (re)selection can be based on both the peer UE's sensing results (if available) and the IUC information received from the UE, or it can be based only on IUC information received from the UE. For scheme 1, MAC CE and second-stage SCI or MAC CE only can be used to send IUC information. The transmission of the explicit request and reporting for IUC information in unicast manner is supported. For IUC information triggered by a condition other than explicit request reception, IUC information indicating preferred resource set is transmitted in unicast manner, while IUC information indicating non-preferred resource set is transmitted in unicast, groupcast or broadcast manner. In scheme 2, a UE determines the expected/potential resource conflict within the resources indicated by a peer UE's SCI as either resources reserved by other UEs and identified by the UE as fully/partially overlapping with the resources indicated by the peer UE's SCI, or as slots where the UE is the intended receiver of the peer UE and does not expect to perform SL reception on those slots due to half-duplex operation. The peer UE uses the conflicting resources to determine the resources to be reselected and exclude the conflicting resources from the reselected resources. For scheme 2, PSFCH is used to send IUC information. |

**Q2: Whether the above changes regarding to the cast type of the IUC information triggered by condition is agreed or not? Please provide your company’s view or preference in the comments table.**

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| Company | Agree/Disagree | Comments |
| Xiaomi | Agree |  |
| Sharp | Agree |  |
| Ericsson | comments | Our CRR2-2300504 Correction to 38300 on IUC Ericsson CR Rel-17 38.300 17.3.0 0615 - F NR\_SL\_enh-Coreaddres the same issue, which need to be considered. |
| OPPO | Comments | It has been agreed to add a NOTE in 321 to capture this RAN1 agreement, we wonder whether there is a need to have stage-2 here. |
| Huawei, HiSilicon | Agree | should use "non preferred resource set", as in Ericsson's CR.  |
| Intel | Comments | We also think a NOTE in the MAC spec may be the better way to go. However, since this section already contains mention of cast type for IUC info, we are fine to add it here as well if majority wants to have it |
| CATT | Agree |  |
| Ericsson | agree | Both changes are somewhat identical. we can merge both changes and removal of the overlapping |
| Lenovo | Agree | Fine to merge and remove the overlapping |
| Qualcomm | agree | Both changes are somewhat identical. we can merge both changes and removal of the overlapping |
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## 3.3 Changes in [R2-2301822](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2301822.zip)

**Reason for change**: In the current specification, it is described that “Physical Sidelink Broadcast Channel (PSBCH) occupies 9 and 5 symbols for normal and extended CP cases respectively, including the associated DM-RS.”

However, according to the following description in TS38.211, the number of symbols for extended CP case is not 5 but 7.

---- TS38.211 v17.4.0

8.4.3.1 Time-frequency structure of an S-SS/PSBCH block

In the time domain, an S-SS/PSBCH block consists of $N\_{symb}^{S-SSB}$ OFDM symbols, numbered in increasing order from 0 to $N\_{symb}^{S-SSB}-1$ within the S-SS/PSBCH block, where S-PSS, S-SSS, and PSBCH with associated DM-RS are mapped to symbols as given by Table 8.4.3.1-1. The number of OFDM symbols in an S-SS/PSBCH block $N\_{symb}^{S-SSB}=13$ for normal cyclic prefix and $N\_{symb}^{S-SSB}=11$ for extended cyclic prefix. The first OFDM symbol in an S-SS/PSBCH block is the first OFDM symbol in the slot.

**Table 8.4.3.1-1: Resources within an S-SS/PSBCH block for S-PSS, S-SSS, PSBCH, and DM-RS.**

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| **Channel or signal** | **OFDM symbol number** $l$**relative to the start of an S-SS/PSBCH block** | Subcarrier number $k$relative to the start of an S-SS/PSBCH block |
| S-PSS | 1, 2 | 2, 3, …, 127, 128 |
| S-SSS | 3, 4 | 2, 3, …, 127, 128 |
| Set to zero | 1, 2, 3, 4 | 0, 1, 129, 130, 131 |
| PSBCH | 0, 5, 6, …, $N\_{symb}^{S-SSB}-1$ | 0, 1,…, 131 |

**Change**: In section 5.7.3, Change the description to “Physical Sidelink Broadcast Channel (PSBCH) occupies 9 and 7 symbols for normal and extended CP cases respectively, including the associated DM-RS.”

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| 5.5.7.3 Physical sidelink channels and signalsPhysical Sidelink Control Channel (PSCCH) indicates resource and other transmission parameters used by a UE for PSSCH. PSCCH transmission is associated with a DM-RS.Physical Sidelink Shared Channel (PSSCH) transmits the TBs of data themselves, and control information for HARQ procedures and CSI feedback triggers, etc. At least 6 OFDM symbols within a slot are used for PSSCH transmission. PSSCH transmission is associated with a DM-RS and may be associated with a PT-RS.Physical Sidelink Feedback Channel (PSFCH) carries HARQ feedback over the sidelink from a UE which is an intended recipient of a PSSCH transmission to the UE which performed the transmission. PSFCH sequence is transmitted in one PRB repeated over two OFDM symbols near the end of the sidelink resource in a slot.The Sidelink synchronization signal consists of sidelink primary and sidelink secondary synchronization signals (S-PSS, S-SSS), each occupying 2 symbols and 127 subcarriers. Physical Sidelink Broadcast Channel (PSBCH) occupies 9 and 7 symbols for normal and extended CP cases respectively, including the associated DM-RS. |

**Q3: Do you agree the change proposed in** [**R2-2301822**](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2301822.zip)**? Please provide your company’s view.**

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| Company | Agree/Disagree | Comments |
| Xiaomi | Agree |  |
| Sharp(proponent) | Agree |  |
| Ericsson | agree |  |
| OPPO | Agree |  |
| Huawei, HiSilicon | Agree |  |
| Intel | Agree |  |
| CATT | Agree |  |
| Lenovo | Agree |  |
| Qualcomm | Agree |  |
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## 3.4 1st Changes in [R2-2300504](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2300504.zip)

**Reason for change**: The two terminogies “UE-A” and “UE-B” are used in the description texts on IUC. However, the two teminlgoies are not defined, and therefore should be avoided to be used.

**Change**: Removal of terminologies “UE-A” and “UE-B”.

Note: The yellow part for IUC information cast type is not inlcueded in this change.

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| 5. 16.9.8 Inter-UE Coordination (IUC)The SL UE can support inter-UE coordination (IUC) in Mode 2, whereby a UE sends information about resources to a peer UE, which the peer UE then uses for resource (re)selection. The following schemes of inter-UE coordination are supported:- IUC scheme 1, where the IUC information sent from a UE to a peer UE is the preferred or non-preferred resources for the peer UE's transmission, and- IUC scheme 2, where the IUC information sent from a UE to a peer UE is the presence of expected/potential resource conflict on the resources indicated by the peer UE's SCI.In scheme 1, the transmission of IUC information from a UE can be triggered by an explicit request from a peer UE, or by a condition at the UE. The UE determines the set of resources reserved by other UEs or slots where the UE, when it is the intended receiver of a peer UE, does not expect to perform SL reception from the peer UE due to half-duplex operation. The UE uses these resources as the set of non-preferred resources, or excludes these resources to determine a set of preferred resources and sends the preferred/non-preferred resources to the peer UE. The peer UE's resources for resource (re)selection can be based on both the peer UE's sensing results (if available) and the IUC information received from the UE, or it can be based only on IUC information received from the UE. For scheme 1, MAC CE and second-stage SCI or MAC CE only can be used to send IUC information. The transmission of the explicit request and reporting for IUC information in unicast manner is supported. For IUC information triggered by a condition other than explicit request reception, IUC information indicating preferred resource set is transmitted in unicast manner, while IUC information indicating non-preferred resource set is transmitted in unicast, groupcast or broadcast manner. In scheme 2, a UE determines the expected/potential resource conflict within the resources indicated by a peer UE's SCI as either resources reserved by other UEs and identified by the UE as fully/partially overlapping with the resources indicated by the peer UE's SCI, or as slots where the UE is the intended receiver of the peer UE and does not expect to perform SL reception on those slots due to half-duplex operation. The peer UE uses the conflicting resources to determine the resources to be reselected and exclude the conflicting resources from the reselected resources. For scheme 2, PSFCH is used to send IUC information. |

**Q4: Do you agree the change proposed in** [R2-2300504](https://www.3gpp.org/ftp/TSG_RAN/WG2_RL2/TSGR2_121/Docs/R2-2300504.zip)**? Please provide your company’s view.**

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| Company | Agree/Disagree | Comments |
| CATT | Follow majority view. |  |
| Ericsson | Agree (Propnent) |  |
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# Conclusion