**3GPP TSG RAN WG1 #118 R1-2407194**

**Maastricht, Netherlands, August 19th – 23rd, 2024**

**Source: Moderator (OPPO)**

**Title: FL summary #2 for AI 8.1: SL-U channel access and RA**

**Agenda item: 8.1**

**Document for:** **Discussion and Decision**

Introduction

This contribution provides a summary of submitted contributions, discussion topics and outcomes that are related to the channel access mechanisms for SL-U during this RAN1 meeting. Note that, all past outcomes including agreements, conclusions and working assumptions reached during this WI are captured in Section 7 (Appendix) of this document.

Collection of agreements / outcomes of RAN1#118

**Outcomes of Monday online session**

**Agreement**

**Adopt TP#8 as editorial draft CR in Section 4.8.1 of R1-2407193 for TS 37.213 Clause 4.5.3 for the spec editor’s CR.**

**Agreement**

**Adopt TP#5 in Section 4.5.1 of R1-2407193 for TS 37.213 Clause 4.5.6. Final CR in R1-24XXXXX.**

**Agreement**

**Adopt TP#6 in Section 4.6.1 of R1-2407193 for TS 38.214 Clause 8.1.4.** **Final CR in R1-24XXXXX.**

**Agreement**

**Adopt the TP below for TS 38.213 Clause 16.3.0**

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| ***Reason for change:*** | It is agreed during RRC parameters discussion and captured in TS38.331, only one CPE starting position is used before PSFCH transmission and locates with the single gap symbol, and the description field is specified as following. However, in TS38.213, the CP extension is defined to be used within first one or two symbols before PSFCH transmission, which is conflicting with RRC description and incorrect.

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| ***sl-CPE-StartingPositionPSFCH***Indicates CPE starting position within the GP symbol before PSFCH transmission. The value is an index of the set of all candidate CPE starting positions specified in Table 5.3.1-3 of [16, TS38.211] for Ci=1 and the corresponding SCS of the SL BWP. |

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| ***Summary of change:*** | Remove the case of CP extension within the two symbols before the first symbol of PSFCH transmission. |
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| ***Consequences if not approved:*** | The description of CPE usage in TS 38.213 is incorrect and conflicts with TS 38.331 definition. |

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| < Start of text proposal for TS 38.213 >16.3.0 UE procedure for transmitting PSFCH with control information< Unchanged parts are omitted >When *sl-TransmissionStructureForPSFCH* is provided, the PSFCH resources are first indexed according to an ascending order of the interlace or PRB subset index, second according to an ascending order of the RB-set index, and then according to an ascending order of the cyclic shift pair index from the cyclic shift pairs. When *sl-TransmissionStructureForPSFCH* is not provided, the PSFCH resources are first indexed according to an ascending order of the PRB index, from the PRBs, and then according to an ascending order of the cyclic shift pair index from the cyclic shift pairs. The UE applies CP extension to the first symbol of a PSFCH and within the first symbol before the first symbol of the PSFCH according to an index [4, TS 38.211] provided by *sl-CPE-StartingPositionPSFCH*.< End of text proposal for TS 37.213 > |

**Final CR in R1-24XXXXX.**

**Conclusion**

**It is** clarified that N consecutive resource(s) and M consecutive resource(s) in Option 1 for inter-UE blocking are referred to those in case of single-slot resource. For MCSt, multi-slot resources fully or partially overlapped with the N consecutive single-slot resource(s) and M consecutive single-slot resource(s) are not selected.

* Send an LS to inform RAN2 of this clarification.

Comeback for draft LS

**Outcomes of Thursday online session**

To be filled.

Topics for discussion

## [ACTIVE] Topic #1: COT Sharing

**Issue 1-1 on COT sharing flag [4]**: 1) The fields of CAPC, etc., are presented only if the 'COT sharing flag' field in SCI format 1-A is present and set to '1'. The current spec seems to imply that these fields are still present when 'COT sharing flag' field in SCI format 1-A is set to '0', which is not aligned with the RAN1 agreement.

2) Since the 'COT sharing flag' is not explicitly defined in TS 37.213, it will be confusing to say “1 bit as defined in [14, TS 37.213]”.

**Proposed change for TS 38.212:**

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| 8.3.1.1 SCI format 1-ASCI format 1-A is used for the scheduling of PSSCH and 2nd-stage-SCI on PSSCH The following information is transmitted by means of the SCI format 1-A:< Unchanged parts are omitted >- COT sharing flag – 0 or 1 bit - 1 bit if the higher layer parameter *sl-TransmissionStructureForPSCCHandPSSCH* in *SL-BWP-Config* is configured;- 0 bit otherwise.< Unchanged parts are omitted >8.4.1.1 SCI format 2-ASCI format 2-A is used for the decoding of PSSCH, with HARQ operation when HARQ-ACK information includes ACK or NACK, when HARQ-ACK information includes only NACK, or when there is no feedback of HARQ-ACK information.< Unchanged parts are omitted >If the 'COT sharing flag' field in SCI format 1-A is present and set to '1', all the remaining fields are present and set as follows:< Unchanged parts are omitted > |

**Issue 1-2 on channel occupancy sharing information [5]**: The “channel occupancy sharing information” was mistakenly written as “channel occupancy information” in clause 4.5.3 of TS 37.213.

**Proposed change for TS 37.213:**

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| 4.5.3 SL channel access procedures in a shared channel occupancy< Unchanged parts are omitted >When a UE initiates a channel occupancy to transmit SL transmission(s) within a RB set(s) and provides channel occupancy sharing information with a unicast PSCCH/PSSCH transmission within the RB set(s), another UE may transmit unicast PSCCH/PSSCH transmission(s) sharing the initiated channel occupancy within the RB set(s), if the destination and source IDs in the corresponding SL control information match the source and destination IDs, respectively, in the unicast PSCCH/PSSCH transmission carrying the channel occupancy sharing information or match a pair of additional source and destination IDs and associated cast type if provided by the channel occupancy sharing information and the corresponding COT sharing cast type indicates '10' value for unicast cast type. Another UE may transmit groupcast or broadcast PSCCH/PSSCH transmissions sharing the initiated channel occupancy within the RB set(s), if the destination ID in the corresponding SL control information matches an additional destination ID and associated cast type if provided by the channel occupancy sharing information and the corresponding COT sharing cast type indicates '01' or '00' value for groupcast or broadcast cast type, respectively.< Unchanged parts are omitted >When a UE initiates a channel occupancy to transmit SL transmission(s) within a RB set(s) and provides channel occupancy sharing information with a unicast PSCCH/PSSCH transmission within the RB set(s), for a given PSFCH transmission occasion, another UE may transmit PSFCH(s) within the RB set(s) sharing the initiated channel occupancy using the channel access procedures described in clause 4.5.2, if for at least one PSFCH in the given transmission occasion, the source and destination IDs in the corresponding unicast PSCCH/PSSCH's SL control information match the source and destination IDs, respectively, in the unicast PSCCH/PSSCH transmission carrying the channel occupancy sharing information or match a pair of additional source and destination IDs and associated cast type if provided by the channel occupancy sharing information and the corresponding COT sharing cast type indicates '10' value for unicast cast type.< Unchanged parts are omitted > |

**Issue 1-3 on indication of remaining channel occupancy duration [7]**: 1) The current description of the shared channel occupancy based on the intention of sharing from a first UE () allows to share in a region described by the boundaries . The description recites “If , the initiated channel occupancy by the UE shall not be shared for SL transmission(s) by other UE(s). Otherwise, the initiated channel occupancy by the UE can be shared for SL transmission(s) by other UE(s) within a duration starting from the end of slot and ending at slot ”. But if the behavior is unclear, e.g., if and then the shared region is [, ], which is a non-causal interval.

2) So far in the spec, there is no limitation on the duration of the remaining channel occupancy that can be indicated. Therefore, in theory, it is allowed for the COT initiator UE to indicate a value to be artificially large such that it exceeds the maximum COT duration. This would lead the responding UE to believe that it can use the shared COT for a long duration. To prevent this from happening, RAN1 have a note in the following agreement (red text) and this should be reflected in the spec.

**Agreement**

“Remaining COT duration” is expressed in physical slots and it is carried in the 2nd stage SCI. The payload size is 4 bits in 15kHz, 5 bits in 30kHz and 6 bits in 60kHz

* If the indicated remaining COT duration is 0 slot, then the COT is not shared by the initiator UE.
* The starting slot for the remaining COT duration is the slot in which the COT-SI is transmitted.
	+ Note, when the COT-SI is transmitted in slot n, and if the remaining COT duration is set to K, then the end of the COT duration to share is slot n+K.

Note: “Remaining COT duration” cannot be such that the COT exceeds the maximum COT duration.

**Proposed change for TS 37.213:**

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| < Start of change request >4.5.3 SL channel access procedures in a shared channel occupancyWhen a UE initiates a channel occupancy using the channel access procedures described in clause 4.5.1 or clause 4.5.6.3 on a channel(s) to transmit SL transmission(s) including PSCCH/PSSCH(s), the UE can provide a channel occupancy sharing information in SL control information that includes at least the Layer 1 source and destination IDs, the corresponding channel access priority class, the remaining channel occupancy duration, and the frequency domain information for the applicable RB set(s) of the channel occupancy. The channel occupancy sharing information can also include additional IDs and associated cast type. The additional IDs includes one pair of Layer 1 source and destination IDs for all cast types, where the source ID is set to the source ID of the UE initiating channel occupancy for unicast and to the reserved bits for groupcast and broadcast. The channel occupancy sharing information transmitted in slot indicates the remaining channel occupancy duration in a number of physical slot(s) . If , the initiated channel occupancy by the UE shall not be shared for SL transmission(s) by other UE(s). Otherwise, the initiated channel occupancy by the UE can be shared for SL transmission(s) by other UE(s) within a duration starting from the end of slot and ending at slot , where is not expected to be indicated and the ending slot cannot exceed the end of the initiated channel occupancy.For the case when a UE transmits SL transmission(s) in a shared channel occupancy initiated by another UE, the channel access priority class value corresponding to the SL transmission(s) is at most equal to the channel access priority class value provided by the channel access priority class in the channel occupancy sharing information.For the case when a UE receives channel occupancy sharing information, the processing time is as defined by Table 8.1.4-1 in [8, TS 38.214], and the processing time starts from the end of the slot that carries channel occupancy sharing information.< End of change request > |

### Round 1 discussion

**Question 1-1 (I): For Issue 1-1, is the proposed corrections for TS 38.212 needed?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| OPPO | No | These changes do not seem very essential. |
| CATT/CICTCI | Yes | At least the second change is essential, according to the following agreement. That is, only if the 'COT sharing flag' field in SCI format 1-A is present and set to '1', COT-SI fields are present in SCI format 2-A, otherwise, COT-SI fields are not present, i.e., original SCI format 2-A is used.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| AgreementIn SCI format 1-A, if higher layer parameter *transmissionStructureForPSCCHandPSSCH* in *SL-BWP-Config* is configured:**Table X: 2nd-stage SCI formats for SL operation in shared spectrum**

|  |  |  |
| --- | --- | --- |
| **Value of 2nd-stage SCI format field** | **1 reserved bit (1st stage SCI)** | **2nd-stage SCI format** |
| 00 | 0 | SCI format 2-A (existing) |
| 1 | SCI format 2-A (COT-SI fields are provided) |
| 01 (Reserved) | 0 | Reserved |
| 1 | Reserved |
| 10 | 0 | SCI format 2-C (existing) |
| 1 | Reserved |
| 11 (Reserved) | 0 | Reserved |
| 1 | Reserved |

Note: it is up to the TS 38.212 spec editor on how to capture the above intention. |

 |
| ZTE | No | Not essential. |
| DCM | No | Not essential.For the 2nd update, we feel that it is already clear based on the clause for SCI 2-A. |
| NEC | No | The changes seem not necessary. Current TS is not broken. |
| vivo | Yes | For companies say “not essential”, do you agree that the COT sharing fields in 2-A are not present if the 'COT sharing flag' field in SCI format 1-A is not set to '1'? If yes, could you provide the spec that defines this behaviour? |
| Huawei, HiSilicon | Yes | Ok to clarify |
| Qualcomm | No | Do not seem essential  |

**Question 1-2 (I): For Issue 1-2, is the proposed corrections for TS 37.213 needed?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| OPPO | Yes | Editorial in nature |
| CATT/CICTCI | Yes |  |
| ZTE | Yes |  |
| DCM | Yes |  |
| NEC | Yes  | Editorial correction |
| vivo | Yes |  |
| Huawei, HiSilicon | Yes |  |
| Qualcomm | Yes | editorial |

**Question 1-3 (I): For Issue 1-3, is the proposed corrections for TS 37.213 needed?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| OPPO | Yes | The error case of [, ] should be fixed and the following note should be captured in the spec.Note: “Remaining COT duration” cannot be such that the COT exceeds the maximum COT duration. |
| CATT/CICTCI | No | We share different understanding with OPPO. We don’t think the case OPPO illustrated is an error case, instead, when a responding UE receives COT-SI with a field of remaining COT duration less than , the UE can obviously know the COT is not sufficient for using. It doesn’t imply that the COT cannot be indicated by the initiating UE. No change is needed. |
| ZTE | Yes | K does not refer to a specific time, while slot K is. So, we propose the following additional modification:where is not expected to be indicated… |
| DCM | Yes |  |
| New H3C | Yes |  |
| NEC | OK | OK to support. The CR avoids the ambiguity of COT sharing. |
| vivo | No | We think CATT’s comment is reasonable. If the is indicated, the responding UE may not use the COT, but anyway this is also known (and allowed) by the initial UE. The change instead makes it an error case that. |
| Huawei, HiSilicon | No | Comments are given as follow,* For “K≤T\_(proc,0) is not expected to be indicated”, we think it is inaccurate because T\_(proc,0) is the upper bound, and UE which has higher capability can process faster than this.
* For “the ending slot n+K cannot exceed the end of the initiated channel occupancy”, we think it can be handled by UE implementation and no specification change is needed.
 |
| Qualcomm | Yes | With regards to the comment from Huawei, HiSilicon, specification text says:the initiated channel occupancy by the UE can be shared for SL transmission(s) by other UE(s) within a duration starting from the end of slot and ending at slot That is: [n+] is the interval that a UE can use. So, n+ .So, what Huawei, HiSilicon says that “T\_(proc,0) is the upper bound” is NOT true, and conflicts the agreement and the above specification. It doesn’t matter whether a UE can have higher capability or not, the available duration that can be shared by other UE is only: [n+Therefore the CR is needed to avoid any misconception of what the spec is |

### FL Proposal for Thursday online session

**Proposal 1-1 (I): Adopt TP#1 in Section 4.1.1 of R1-2407194 for TS 38.212 Clause 8.3.1.1 and 8.4.1.1**

**Proposal 1-3 (I): Adopt TP#2 in Section 4.2.1 of R1-2407194 for TS 37.213 Clause 4.5.3**

## [ACTIVE] Topic #2: Channel access procedures

**Issue 2-1 on CAPC value for PSFCH and S-SSB [8, 21]**: For SL transmissions including PSCCH/PSSCH, when Type 1 channel access is used for COT initiation, the CAPC value is determined based on PSCCH/PSSCH as defined in 38.300. For SL transmissions including PSFCH only or S-SSB only, when Type 1 channel access is used for COT initiation, the CAPC value is always ‘1’. This does not mean that PSFCH transmission itself is assocaited with CAPC value = 1 or S-SSB transmission itself is associated with CAPC value = 1. However, one more case is missing. At slot n, PSFCH is transmitted, and then S-SSB transmission is transmitted at slot n+1. There is no other following transmissions. Clear rule to initiate a COT for this case should be added in spec.



**Proposed change for TS 37.213 [8]:**

|  |
| --- |
| < Start of change request >4.5 Sidelink channel access proceduresA UE operating in sidelink resource allocation mode 1 or mode 2 and performing SL transmission(s) on channel(s) shall perform the procedures described in this clause for the UE to access the channel(s) on which the transmission(s) are performed.In this clause, transmissions from a UE are considered as separate SL transmissions, irrespective of having a gap between transmissions or not, and for sensing is adjusted as described in clause 4.5.5 when applicable.A UE can access a channel on which SL transmission(s) are performed according to one of Type 1 or Type 2 SL channel access procedures as described in clauses 4.5.1 and 4.5.2, respectively.When a UE applies Type 1 channel access procedures to transmit SL transmission(s), the applicable channel access priority class (CAPC) is defined in Table 4.5-1.When a UE applies Type 1 channel access procedures to transmit SL transmission(s) including PSSCH with user plane data and associated PSCCH, the UE determines the corresponding SL channel access priority class in Table 4.5-1 following the procedures described in Clause 16.9.9.2 in [9].When a UE applies Type 1 channel access procedures to transmit SL transmission(s) including only PSFCH and/or S-SSB transmission(s), the UE shall use the channel access priority class in Table 4.5-1.A UE shall not transmit on a channel for a *Channel Occupancy Time* that exceeds where the channel access procedure is performed based on the channel access priority class associated with the UE transmissions, as given in Table 4.5-1.< End of change request > |

**Proposed change for TS 37.213 [21]:**

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| < Start of change request >4.5 Sidelink channel access proceduresA UE operating in sidelink resource allocation mode 1 or mode 2 and performing SL transmission(s) on channel(s) shall perform the procedures described in this clause for the UE to access the channel(s) on which the transmission(s) are performed.In this clause, transmissions from a UE are considered as separate SL transmissions, irrespective of having a gap between transmissions or not, and for sensing is adjusted as described in clause 4.5.5 when applicable.A UE can access a channel on which SL transmission(s) are performed according to one of Type 1 or Type 2 SL channel access procedures as described in clauses 4.5.1 and 4.5.2, respectively.When a UE applies Type 1 channel access procedures to transmit SL transmission(s), the applicable channel access priority class (CAPC) is defined in Table 4.5-1.When a UE applies Type 1 channel access procedures to transmit SL transmission(s) including PSSCH with user plane data and associated PSCCH, the UE determines the corresponding SL channel access priority class in Table 4.5-1 following the procedures described in Clause 16.9.9.2 in [9].~~A PSFCH transmission or a S-SSB transmission is associated with the channel access priority class in Table 4.5-1.~~ When a UE applies Type 1 channel access procedures to transmit SL transmission(s) including only PSFCH or only S-SSB transmission(s), the UE shall use the channel access priority class in Table 4.5-1.< End of change request > |

### Round 1 discussion

**Question 2-1 (I): For Issue 2-1, firstly is a correction needed on determining a CAPC value for the case of PSFCH + S-SSB transmission? If yes, which of the proposed corrections from [8] and [21] do you think is correct / preferred?**

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| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| OPPO | Yes | We are OK with either TP. The TP in [8] seems to be simpler. |
| CATT/CICTCI | No | As commented many times in previous meetings, we think current spec is clear enough, as also discussed in [2]. |
| ZTE | Yes | The TP in [8] is preferred. For the TP in [21], the cases in the last sentence is not completed, if it is removed as follows, we can also accept it:A PSFCH transmission or a S-SSB transmission is associated with the channel access priority class in Table 4.5-1. ~~When a UE applies Type 1 channel access procedures to transmit SL transmission(s) including only PSFCH or only S-SSB transmission(s), the UE shall use the channel access priority class in Table 4.5-1.~~ |
| DCM | Yes | We are OK with either TP. |
| New H3C | Yes | OK |
| NEC | No | Actually, even without these two TP, current SL-U works well. In [21], we cannot understand why "P=1" is repeated. If majority want correction, we are fine with [8]. |
| vivo |  | We don’t think it is very essential, but we are OK to accept this change if the majority wants. In this case, we prefer [8]. |
| Huawei, HiSilicon | No | We think current specification is clear for how to address the channel combination case, i.e., PSFCH and S-SSB are transmitted adjacently: * UE can perform Type1 channel access procedure separately corresponding to each channel.
* UE can perform MCSt or SL burst transmission if the gap condition is satisfied.
 |
| Qualcomm | OK | TP in [8] |
| LGE | No | PSFCH and S-SSB will not be FDMed. The current specification is sufficient.  |

### FL Proposal for Thursday online session

**Proposal 2-1 (I): Adopt TP#3 in Section 4.3.1 of R1-2407194 for TS 37.213 Clause 4.5**

## [ACTIVE] Topic #3: Contention window adjustment

**Issue 3-1 on case of reference duration cannot be determined [11]**: In the current specification, the contention window adjustment procedures for SL-U are divided into two cases. One is used for SL transmission with explicit HARQ-ACK feedback including 'ACK/NACK' and the other is used for SL transmission which is not associated with explicit HARQ-ACK feedback(s). For SL transmission with explicit HARQ-ACK feedback, the CW is determined based on the HARQ feedback situation corresponding to the PSSCH transmission in the reference duration. However, when there is no reference duration for the latest channel occupancy initiated by the UE, which can be used to adjust the contention window of the current SL transmission, the CW adjustment procedure is unclear.

**Proposed change for TS 37.213 [11]:**

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| --- |
| < Start of change request >4.5.4 Contention window adjustment procedures for SL transmissionsIf a UE transmits a SL transmission(s) including at least one PSSCH enabled with explicit HARQ-ACK feedback including 'ACK/NACK' using Type 1 channel access procedures associated with the channel access priority class on a channel, the UE maintains the contention window value and adjusts before step 1 of the procedure described in clause 4.5.1 for the SL transmission(s) applying the following procedures:1) For every priority class set .2) If HARQ-ACK feedback corresponding to the PSSCH(s) for unicast SL transmission(s) in the *reference duration* for the latest channel occupancy initiated by the UE, is available:- If the HARQ-ACK feedback includes only 'ACK', go to step 1; otherwise go to step 5.3) If HARQ-ACK feedback corresponding to the PSSCH(s) for groupcast SL transmission(s) in the *reference duration* for the latest channel occupancy initiated by the UE, is available:- If *harq-ACK-FeedbackRatioforCW-AdjustmentGC-Option2-r18* is provided by higher layers:- The UE calculates the ratio between the number of received 'ACK' in the HARQ-ACK feedback and the number of UE(s) from which the corresponding 'ACK'/'NACK' in the HARQ-ACK feedback is expected. If the calculated ratio is equal to or larger than *harq-ACK-FeedbackRatioforCW-AdjustmentGC-Option2-r18*, go to step 1; otherwise go to step 5.- Otherwise:- If the HARQ-ACK feedback includes at least an 'ACK',go to step 1; otherwise go to step 5.4) If HARQ-ACK feedback corresponding to the PSSCH(s) in the *reference duration* for the latest channel occupancy initiated by the UE is not available or no reference duration can be determined for the latest channel occupancy initiated by the UE, go to step 6.5) Increase for every priority class to the next higher allowed value.6) For every priority class ,maintain as it is; go to step 2.The *reference duration* in the procedure above is defined as follows:- The *reference duration* corresponding to a channel occupancy initiated by the UE including SL transmission(s) of PSSCH(s) is defined in this clause as a duration starting from the beginning of the channel occupancy initiated by the UE including SL transmission (s) of PSSCH(s) until the end of the first slot where at least one PSSCH with HARQ-ACK feedback(s) including 'ACK'/'NACK' is transmitted. < End of change request > |

### Round 1 discussion

**Question 3-1 (I): For Issue 3-1, is the proposed corrections for TS 37.213 needed?**

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| **Company** | **Yes/No** | **Comments** |
| OPPO | Yes | Agree that the no reference duration case should be captured. |
| CATT/CICTCI | Yes | The no reference duration case is missed in the current specification, and should be added to make the procedure completed. |
| ZTE | Yes | Agree. |
| New H3C | Yes | OK |
| NEC | No  | What's the cases that "reference duration" is not determined? In the first part of this section, it's saying a condition that "If a UE transmits a SL transmission(s) including at least one PSSCH enabled with explicit HARQ-ACK feedback including 'ACK/NACK' using type 1…", can the proponent clarify more why under this condition *reference duration* is not defined?  |
| vivo | NO | Share the view with NEC. |
| Huawei, HiSilicon | No | The definition of “*reference duration*” is based on HARQ-ACK/NACK, i.e. reference duration ends at the slots of PSSCH with ACK/NACK. For the issue the modification wants to address, we think it has already been covered by following TS 37213 spec (copied below, yellow part):*“If a UE transmits a SL transmission(s) using Type 1 channel access procedures associated with the channel access priority class on a channel and the SL transmission(s) is not associated with explicit HARQ-ACK feedback(s) by the corresponding UE(s), the UE adjusts before step 1 in the procedures described in clause 4.5.1, using the latest used for any SL transmissions on the channel using Type 1 channel access procedures associated with the channel access priority class .”* |
| LGE | No | We share similar view with HW. The reference duration existence issue is not a new issue. I mean the situation is the same as NR-U, and the NR-U does not have such a description.  |

### FL Proposal for Thursday online session

**Proposal 3-1 (I): Adopt TP#4 in Section 4.4.2 of R1-2407194 for TS 37.213 Clause 4.5.4**

## [CLOSED] Topic #4: Multi-channel access procedures

**Issue 4-1 on multi-channel access vs. PSFCH prioritization [22]**: When a UE would perform multiple PSFCHs on more than one RB set, both multi-channel access and PSFCH prioritization are performed. The processing order has been described in 4.5.6 of 37.213 based on the following agreement that was reached at RAN1#115 meeting.

|  |
| --- |
| **Agreement**When UE intends to transmit PSFCH, after performing PSFCH prioritization:* if LBT fails on all RB set(s) where the UE attempts to transmit PSFCH:
	+ UE drops PSFCH transmission
		- No RAN1 specification impact
* if TypeA and TypeB LBT fails on part of RB set(s) where the UE attempts to transmit PSFCH:
	+ The UE may transmit PSFCH on RB set(s) where LBT was successful
 |

Regarding the spec descriptions in 4.5.6 of 37.213, PSFCH prioritization behavior is referred as 16.2.4.2 of 38.213, where multiple PSFCH transmissions are handled. However, ‘PSFCH prioritization’ in the agreement should mean any prioritization relevant to PSFCH transmission; otherwise, UE behavior is unclear in some cases. In the current specifications, **UL/SL prioritization handling is defined and the prioritization includes PSFCH transmission case.** Coexistense between SL-U and NR are not precluded, thus this handling must be referred for the processing order with multi-channel access.

**Proposed change for TS 37.213 [22]:**

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| --- |
| < Start of change request >4.5.6 Channel access procedures for transmission(s) on multiple channelsIf a UE - is scheduled to transmit on a set of channels *C*, and if the SL transmissions are scheduled to start transmissions at the same time on all channels in the set of channels *C*, or- intends to perform sidelink transmissions on configured resources on the set of channels *C*, and if the SL transmissions are configured to start transmissions at the same time on all channels in the set of channels *C*, or- intends to perform sidelink transmissions on selected resources on the set of channel *C*, and if SL transmissions are to start at the same time on all channels in the set of channels *C*the followings are applicable:- Type A or Type B procedures described in clause 4.5.6.1 and 4.5.6.2 can be used for accessing multiple channels only for PSFCH or S-SSB transmissions.- A UE can access multiple channels on which SL transmissions are performed, according to the procedures described in clause 4.5.6.3.When a UE performs Type A or Type B channel access procedures to transmit PSFCH transmissions on multiple channels after performing associated prioritization for the PSFCH as described in clause 16.2.4.2 and 16.2.4.3 of [7], if the channel access procedures fail on part of the channel(s) but succeed on other part of the channel(s), the UE may transmit the PSFCH transmission(s) on the part of the channel(s) where the corresponding channel access was successful.< End of change request > |

### Round 1 discussion

**Question 4-1 (I): For Issue 4-1, is the proposed corrections for TS 37.213 needed?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| OPPO | Comment | In section 16.2.3 of TS 38.213 (i.e., PSFCH power control), there is also PSFCH prioritization due to the limited total transmission power and/or the limited capability of simultaneous PSFCH transmission. Hence, Section 16.2.3 should be captured as well. |
| CATT/CICTCI | Yes | Also agree with OPPO’s change. |
| ZTE | Yes | OPPO’s suggestion is OK for us. |
| DCM | YEs | OK with OPPO’s change as well. |
| New H3C | Yes | OK |
| NEC | Yes |  |
| vivo | OK |  |
| Huawei, HiSilicon | Yes |  |
| Qualcomm | OK |  |
| LGE | OK |  |

### FL Proposal for Monday online session

**Proposal 4-1 (I): Adopt TP#5 in Section 4.5.1 of R1-2407193 for TS 37.213 Clause 4.5.6**

## [CLOSED] Topic #5: Resource allocation procedures

**Issue 5-1 on interlace-RB based transmission in partial sensing [6]**: In RAN1#117, it was already agreed to support the combination of interlace RB-based transmission and partial sensing in SL-U. However, only the correction for periodic transmission in partial sensing was implemented. The corresponding correction for aperiodic transmission in partial sensing is missing.

**Proposed change for TS 38.214 [6]:**

|  |
| --- |
| < Start of change request >8.1.4 Channel access procedures for transmission(s) on multiple channels< Unchanged parts are omitted >The UE shall assume that any set of contiguous sub-channels or contiguous sub-channels in contiguous RB sets included in the corresponding resource pool within the time interval correspond to one candidate single-slot resource or the UE shall assume that any set of contiguous sub-channels or contiguous sub-channels in contiguous RB sets in consecutive slots included in the corresponding resource pool within the time interval correspond to one candidate multi-slot resource for UE performing full sensing. The UE shall assume that any set of contiguous sub-channels or contiguous sub-channels in contiguous RB sets included in the corresponding resource pool in a set of *Y* candidate slots within the time interval correspond to one candidate single-slot resource or the UE shall assume that any set of contiguous sub-channels or contiguous sub-channels in contiguous RB sets in consecutive slots included in the corresponding resource pool in a set of *Y* candidate slots within the time interval correspond to one candidate multi-slot resource for UE performing periodic-based partial sensing together with contiguous partial sensing and resource (re)selection triggered by periodic transmission (), or the UE shall assume that any set of contiguous sub-channels or contiguous sub-channels in contiguous RB sets included in the corresponding resource pool in a set of *Y'* candidate slots within the time interval correspond to one candidate single-slot resource or the UE shall assume that any set of contiguous sub-channels or contiguous sub-channels in contiguous RB sets in consecutive slots included in the corresponding resource pool in a set of *Y'* candidate slots within the time interval correspond to one candidate multi-slot resource for UE performing at least contiguous partial sensing and resource (re)selection triggered by aperiodic transmission (), where < End of change request > |

**Issue 5-2 on resource selection in MAC layer for SL-U [24]**: In Option 1 for inter-UE blocking, N consecutive resource(s) and M consecutive resource(s) are excluded in MAC layer. For single-slot resource, naturally N consecutive resource(s) and M consecutive resource(s) mean resources of N consecutive slot(s) and M consecutive slot(s), respectively. This is described in 38.321 as below.

|  |
| --- |
| NOTE 3Ai: UE may avoid selection of N consecutive resource(s) before a reserved resource of its own, where the selection of N is up to UE implementation from {0,1,2}. UE may avoid selection of M consecutive resource(s) after a reserved resource of its own, where the selection of M is up to UE implementation (at least including 0).NOTE 3Aj: If configured, UE may avoid selection of N consecutive resource(s) before a reserved resource of other UE when the L1 SL priority value for the transmission is higher than the L1 SL priority value of the reserved resource, where the selection of N is up to UE implementation from {0,1,2}. UE may avoid selection of M consecutive resource(s) after a reserved resource of other UE when the transmitting symbols of the reserved resource overlap with LBT of its own selected resource, where the selection of M is up to UE implementation from {0,1,2}. It is up to UE implementation how the physical layer reports detected reserved resources to MAC layer. |

However, definition of N consecutive resource(s) and M consecutive resource(s) is unclear for MCSt case. When MCSt is applied, each resource is defined as multi-slot resource. Then e.g., if N\_slot,MCSt = 2, whether 1) N = 2 means resources in 4 slots or 2) still resources in 2 slots is unclear. Example with N = 2, M = 4, and N\_slot,MCSt = 2 is illustrated below.

* At the first one, N = 2 consecutive resources and M = 4 consecutive resources are resources in N = 2 consecutive slots and M = 4 consecutive slots, regardless of whether the UE applies MCSt or not. For this MCSt case, any resource including the N = 2 consecutive slots or the M = 4 consecutive slots are excluded. That is, N = 2 consecutive resources and M = 4 consecutive resources mean N = 2 adjacent multi-slot resources and M = 4 adjacent multi-slot resources.
* At the second one, N = 2 consecutive resources and M = 4 consecutive resources are resources in 4 consecutive slots and M = 8 consecutive slots, when the UE performs resource selection based on MCSt. In this interpretation, actually excluded adjacent resources are more than N = 2 or M = 4.



Fig.1: Ambiguity of N consecutive resource(s) and M consecutive resource(s) in MCSt case.

In our understanding, intention of exclusion of N consecutive resource(s) and M consecutive resource(s) is to avoid inter UE blocking due to type 1 LBT, which implies that the exclusion target (duration) is not relevant to MCSt. That is, exclusion duration for N consecutive resource(s) and M consecutive resource(s) should not be dependent on whether MCSt is used or not.

**Proposal: Clarify that N consecutive resource(s) and M consecutive resource(s) in Option 1 for inter-UE blocking are referred to those in case of single-slot resource. For MCSt, multi-slot resources fully or partially overlapped with the N consecutive single-slot resource(s) and M consecutive single-slot resource(s) are not selected.**

* **Send an LS to inform RAN2 of this clarification.**

### Round 1 discussion

**Question 5-1 (I): For Issue 5-1, is the proposed corrections for TS 38.214 needed?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| OPPO | Yes | The missing case for aperiodic transmission in partial sensing should be added. |
| CATT/CICTCI | Yes | Agree, the change align with the periodic part. |
| ZTE | Yes |  |
| DCM | Yes |  |
| New H3C | Yes | OK |
| NEC | Yes  |  |
| Huawei, HiSilicon | Yes |  |
| LGE | Yes |  |

**Question 5-2 (I): For Issue 5-2, is the proposed conclusion needed? If yes, should a corresponding LS be sent to RAN2?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| OPPO | OK | OK with the proposed conclusion and send an LS to RAN2. |
| CATT/CICTCI | Unnecessary | We think this is the common understanding both in RAN1 and RAN2, sending LS is unnecessary at this very late stage. |
| ZTE | OK | We are OK to clarify this, the first sentence in the propose is enough. How to refine the spec. of 38.321 should be up to RAN2. |
| DCM | Yes | It is noted that the current 38.321 seems not aligned with this RAN1 intention, this is why an LS to RAN2 is necessary. |
| New H3C | Yes | OK |
| NEC | Yes  |  |
| vivo | OK |  |
| Huawei, HiSilicon | Yes | We think “N consecutive resource(s) and M consecutive resource(s)” should always refer to single slot. |

### FL Proposal for Monday online session

**Proposal 5-1 (I): Adopt TP#6 in Section 4.6.1 of R1-2407193 for TS 38.214 Clause 8.1.4**

**Proposed conclusion 5-2 (I): It is clarified that N consecutive resource(s) and M consecutive resource(s) in Option 1 for inter-UE blocking are referred to those in case of single-slot resource. For MCSt, multi-slot resources fully or partially overlapped with the N consecutive single-slot resource(s) and M consecutive single-slot resource(s) are not selected.**

* **Send an LS to inform RAN2 of this clarification.**

## [CLOSED] Topic #6: CPE

**Issue 6-1 on CPE starting position for PSFCH [26]**: It is agreed during RRC parameters discussion and captured in TS38.331, only one CPE starting position is used before PSFCH transmission and locates with the single gap symbol, and the description field is specified as following. However, in TS38.213, the CP extension is defined to be used within first one or two symbols before PSFCH transmission, which is conflicting with RRC description and incorrect.

|  |
| --- |
| ***sl-CPE-StartingPositionPSFCH***Indicates CPE starting position within the GP symbol before PSFCH transmission. The value is an index of the set of all candidate CPE starting positions specified in Table 5.3.1-3 of [16, TS38.211] for Ci=1 and the corresponding SCS of the SL BWP. |

**Proposed change for TS 38.213 [26]:**

|  |
| --- |
| < Start of change request >16.3.0 UE procedure for transmitting PSFCH with control information< Unchanged parts are omitted >When *sl-TransmissionStructureForPSFCH* is provided, the PSFCH resources are first indexed according to an ascending order of the interlace or PRB subset index, second according to an ascending order of the RB-set index, and then according to an ascending order of the cyclic shift pair index from the cyclic shift pairs. When *sl-TransmissionStructureForPSFCH* is not provided, the PSFCH resources are first indexed according to an ascending order of the PRB index, from the PRBs, and then according to an ascending order of the cyclic shift pair index from the cyclic shift pairs. The UE applies CP extension to the first symbol of a PSFCH and within the first one symbol before the first symbol of the PSFCH according to an index [4, TS 38.211] provided by *sl-CPE-StartingPositionPSFCH*.< End of change request > |

### Round 1 discussion

**Question 6-1 (I): For Issue 6-1, is the proposed corrections for TS 38.213 needed?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| OPPO | OK | This was brought up in the last meeting when fixing the CPE starting position for PSCCH/PSSCH. There was a comment that RAN1 don’t need to optimize spec description everywhere. Hence, it was not pursued. We are fine to go with majority. |
| CATT/CICTCI | Comments | Our understanding is that two-symbol CPE can be supported for PSFCH. We prefer to modify the description in TS 38.331.

|  |
| --- |
| ***sl-CPE-StartingPositionPSFCH***Indicates CPE starting position ~~within the GP symbol~~ before PSFCH transmission. The value is an index of the set of all candidate CPE starting positions specified in Table 5.3.1-3 of [16, TS38.211] ~~for Ci=1~~ and the corresponding SCS of the SL BWP. |

 |
| ZTE | OK  |  |
| DCM | OK |  |
| New H3C | Yes |  |
| NEC | Yes |  |
| Huawei, HiSilicon | Yes | We think the change is essential and not an optimization, if RAN1 do not have this clarification it might mislead UE how to implement the CPE starting positions for PSFCH. For the changes from CATT, we think they violate the consensus derived from past discussion. Thus, we prefer to have this TP agreed.  |
| Qualcomm | Yes |  |
| c |  |  |
| LGE | OK |  |

### FL Proposal for Monday online session

**Proposal 6-1 (I): Adopt TP#7 in Section 4.7.1 of R1-2407193 for TS 38.213 Clause 16.3.0**

## [CLOSED] Topic #7: Editorial correction

**Issue 7-1 on COT sharing information processing delay [27]**: COT is shared after COT-SI processing delay , but the processing delay is wrongly captured as .

**Proposed change for TS 37.213 [27]:**

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| --- |
| < Start of change request >4.5.3 SL channel access procedures in a shared channel occupancyWhen a UE initiates a channel occupancy using the channel access procedures described in clause 4.5.1 or clause 4.5.6.3 on a channel(s) to transmit SL transmission(s) including PSCCH/PSSCH(s), the UE can provide a channel occupancy sharing information in SL control information that includes at least the Layer 1 source and destination IDs, the corresponding channel access priority class, the remaining channel occupancy duration, and the frequency domain information for the applicable RB set(s) of the channel occupancy. The channel occupancy sharing information can also include additional IDs and associated cast type. The additional IDs includes one pair of Layer 1 source and destination IDs for all cast types, where the source ID is set to the source ID of the UE initiating channel occupancy for unicast and to the reserved bits for groupcast and broadcast. The channel occupancy sharing information transmitted in slot indicates the remaining channel occupancy duration in a number of physical slot(s) . If , the initiated channel occupancy by the UE shall not be shared for SL transmission(s) by other UE(s). Otherwise, the initiated channel occupancy by the UE can be shared for SL transmission(s) by other UE(s) within a duration starting from the end of slot and ending at slot .< End of change request > |

### Round 1 discussion

**Question 7-1 (I): For Issue 7-1, do you agree with the editorial correction for TS 37.213?**

|  |  |  |
| --- | --- | --- |
| **Company** | **Yes/No** | **Comments** |
| OPPO | Yes |  |
| CATT/CICTCI | Yes |  |
| ZTE | Yes |  |
| DCM | Yes |  |
| New H3C | Yes |  |
| NEC | Yes  |  |
| Huawei, HiSilicon | Yes |  |

### FL Proposal for Monday online session

**Proposal 7-1 (I): Adopt TP#8 in Section 4.8.1 of R1-2407193 for TS 37.213 Clause 4.5.3**

Corresponding text proposals (TPs) - placeholder for now

## TP#1 for TS 38.212 V18.3.0: Issue 1-1

|  |  |
| --- | --- |
| ***Reason for change:*** | 1. The fields of CAPC, etc., are presented only if the 'COT sharing flag' field in SCI format 1-A is present and set to '1'. The current spec seems to imply that these fields are still present when 'COT sharing flag' field in SCI format 1-A is set to '0', which is not aligned with the RAN1 agreement.
2. Since the 'COT sharing flag' is not explicitly defined in TS 37.213, it will be confusing to say “1 bit as defined in [14, TS 37.213]”
 |
|  |  |
| ***Summary of change:*** | 1. Clarify that the fields of CAPC, COT sharing cast type, COT sharing additional ID, Remaining COT duration are present only when the 'COT sharing flag' field in SCI format 1-A is present and set to '1'.
2. Remove “as defined in [14, TS 37.213]”.
 |
|  |  |
| ***Consequences if not approved:*** | The presence of the fields of CAPC, COT sharing cast type, COT sharing additional ID, and Remaining COT duration are still present when 'COT sharing flag' field in SCI format 1-A is set to '0', which is not aligned with the RAN1 agreement. The reference to TS 37.213 for COT sharing flag leads to confusion as there is nowhere to find an explicit definition of 'COT sharing flag' in TS 37.213 |

### Proposal v1

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| --- |
| **< Start of text proposal for TS 38.212>**8.3.1.1 SCI format 1-ASCI format 1-A is used for the scheduling of PSSCH and 2nd-stage-SCI on PSSCH The following information is transmitted by means of the SCI format 1-A:**<Unchanged parts are omitted>**- COT sharing flag – 0 or 1 bit - 1 bit if the higher layer parameter *sl-TransmissionStructureForPSCCHandPSSCH* in *SL-BWP-Config* is configured;- 0 bit otherwise.**<Unchanged parts are omitted>**8.4.1.1 SCI format 2-ASCI format 2-A is used for the decoding of PSSCH, with HARQ operation when HARQ-ACK information includes ACK or NACK, when HARQ-ACK information includes only NACK, or when there is no feedback of HARQ-ACK information.**<Unchanged parts are omitted>**If the 'COT sharing flag' field in SCI format 1-A is present and set to '1', all the remaining fields are present and set as follows:**< End of text proposal >** |

## TP#2 for TS 37.213 V18.3.0: Issue 1-3

|  |  |  |
| --- | --- | --- |
| ***Reason for change:*** | 1. The current description of the shared channel occupancy based on the intention of sharing from a first UE () allows to share in a region described by the boundaries . The description recites “If , the initiated channel occupancy by the UE shall not be shared for SL transmission(s) by other UE(s). Otherwise, the initiated channel occupancy by the UE can be shared for SL transmission(s) by other UE(s) within a duration starting from the end of slot and ending at slot ”. But if the behavior is unclear, e.g., if and then the shared region is [, ], which is a non-causal interval.
2. So far in the spec, there is no limitation on the duration of the remaining channel occupancy that can be indicated. Therefore, in theory, it is allowed for the COT initiator UE to indicate a value to be artificially large such that it exceeds the maximum COT duration. This would lead the responding UE to believe that it can use the shared COT for a long duration. To prevent this from happening, RAN1 have a note in the following agreement (red text) and this should be reflected in the spec.

|  |
| --- |
| **Agreement**“Remaining COT duration” is expressed in physical slots and it is carried in the 2nd stage SCI. The payload size is 4 bits in 15kHz, 5 bits in 30kHz and 6 bits in 60kHz* If the indicated remaining COT duration is 0 slot, then the COT is not shared by the initiator UE.
* The starting slot for the remaining COT duration is the slot in which the COT-SI is transmitted.
	+ Note, when the COT-SI is transmitted in slot n, and if the remaining COT duration is set to K, then the end of the COT duration to share is slot n+K.

Note: “Remaining COT duration” cannot be such that the COT exceeds the maximum COT duration. |

 |
|  |  |
| ***Summary of change:*** | 1. Clarify that when is indicated, then is not expected to be indicated.
2. Clarify that the ending slot cannot exceed the end of the initiated channel occupancy.
 |
|  |  |
| ***Consequences if not approved:*** | The spec remains ambiguous on 1. the responding UE behavior for sharing a COT when COT-SI indicates a COT remaining duration , and
2. whether there is no limitation on the duration of the remaining channel occupancy that can be indicated.
 |

### Proposal v1

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| --- |
| **< Start of text proposal for TS 37.213 >**4.5.3 SL channel access procedures in a shared channel occupancyWhen a UE initiates a channel occupancy using the channel access procedures described in clause 4.5.1 or clause 4.5.6.3 on a channel(s) to transmit SL transmission(s) including PSCCH/PSSCH(s), the UE can provide a channel occupancy sharing information in SL control information that includes at least the Layer 1 source and destination IDs, the corresponding channel access priority class, the remaining channel occupancy duration, and the frequency domain information for the applicable RB set(s) of the channel occupancy. The channel occupancy sharing information can also include additional IDs and associated cast type. The additional IDs includes one pair of Layer 1 source and destination IDs for all cast types, where the source ID is set to the source ID of the UE initiating channel occupancy for unicast and to the reserved bits for groupcast and broadcast. The channel occupancy sharing information transmitted in slot indicates the remaining channel occupancy duration in a number of physical slot(s) . If , the initiated channel occupancy by the UE shall not be shared for SL transmission(s) by other UE(s). Otherwise, the initiated channel occupancy by the UE can be shared for SL transmission(s) by other UE(s) within a duration starting from the end of slot and ending at slot , where is not expected to be indicated and the ending slot cannot exceed the end of the initiated channel occupancy.For the case when a UE transmits SL transmission(s) in a shared channel occupancy initiated by another UE, the channel access priority class value corresponding to the SL transmission(s) is at most equal to the channel access priority class value provided by the channel access priority class in the channel occupancy sharing information.For the case when a UE receives channel occupancy sharing information, the processing time is as defined by Table 8.1.4-1 in [8, TS 38.214], and the processing time starts from the end of the slot that carries channel occupancy sharing information.**< End of text proposal >** |

### Proposal v2

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| --- |
| **< Start of text proposal for TS 37.213 >**4.5.3 SL channel access procedures in a shared channel occupancyWhen a UE initiates a channel occupancy using the channel access procedures described in clause 4.5.1 or clause 4.5.6.3 on a channel(s) to transmit SL transmission(s) including PSCCH/PSSCH(s), the UE can provide a channel occupancy sharing information in SL control information that includes at least the Layer 1 source and destination IDs, the corresponding channel access priority class, the remaining channel occupancy duration, and the frequency domain information for the applicable RB set(s) of the channel occupancy. The channel occupancy sharing information can also include additional IDs and associated cast type. The additional IDs includes one pair of Layer 1 source and destination IDs for all cast types, where the source ID is set to the source ID of the UE initiating channel occupancy for unicast and to the reserved bits for groupcast and broadcast. The channel occupancy sharing information transmitted in slot indicates the remaining channel occupancy duration in a number of physical slot(s) . If , the initiated channel occupancy by the UE shall not be shared for SL transmission(s) by other UE(s). Otherwise, the initiated channel occupancy by the UE can be shared for SL transmission(s) by other UE(s) within a duration starting from the end of slot and ending at slot , where the ending slot cannot exceed the end of the initiated channel occupancy.For the case when a UE transmits SL transmission(s) in a shared channel occupancy initiated by another UE, the channel access priority class value corresponding to the SL transmission(s) is at most equal to the channel access priority class value provided by the channel access priority class in the channel occupancy sharing information.For the case when a UE receives channel occupancy sharing information, the processing time is as defined by Table 8.1.4-1 in [8, TS 38.214], and the processing time starts from the end of the slot that carries channel occupancy sharing information.**< End of text proposal >** |

## TP#3 for TS 37.213 V18.3.0: Issue 2-1

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| ***Reason for change:*** | For SL transmissions including PSCCH/PSSCH, when Type 1 channel access is used for COT initiation, the CAPC value is determined based on PSCCH/PSSCH as defined in 38.300.For SL transmissions including PSFCH only or S-SSB only, when Type 1 channel access is used for COT initiation, the CAPC value is always ‘0’.However, one more case is missing. At slot n, PSFCH is transmitted, and then S-SSB transmission is transmitted at slot n+1. There is no other following transmissions. Clear rule to initiate a COT for this case should be added in spec. |
|  |  |
| ***Summary of change:*** | It is clarified that when a UE transmits both PSFCH and S-SSB in a same channel occupancy, CAPC value ‘0’ is to be used for initiating the channel occupancy. |
|  |  |
| ***Consequences if not approved:*** | The spec remains ambiguous on the CAPC value that should be applied in the case when a UE transmits both PSFCH and S-SSB in a same channel occupancy. |

### Proposal v1

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| --- |
| **< Start of text proposal for TS 37.213 >**4.5 Sidelink channel access proceduresA UE operating in sidelink resource allocation mode 1 or mode 2 and performing SL transmission(s) on channel(s) shall perform the procedures described in this clause for the UE to access the channel(s) on which the transmission(s) are performed.In this clause, transmissions from a UE are considered as separate SL transmissions, irrespective of having a gap between transmissions or not, and for sensing is adjusted as described in clause 4.5.5 when applicable.A UE can access a channel on which SL transmission(s) are performed according to one of Type 1 or Type 2 SL channel access procedures as described in clauses 4.5.1 and 4.5.2, respectively.When a UE applies Type 1 channel access procedures to transmit SL transmission(s), the applicable channel access priority class (CAPC) is defined in Table 4.5-1.When a UE applies Type 1 channel access procedures to transmit SL transmission(s) including PSSCH with user plane data and associated PSCCH, the UE determines the corresponding SL channel access priority class in Table 4.5-1 following the procedures described in Clause 16.9.9.2 in [9].When a UE applies Type 1 channel access procedures to transmit SL transmission(s) including only PSFCH and/or S-SSB transmission(s), the UE shall use the channel access priority class in Table 4.5-1.A UE shall not transmit on a channel for a *Channel Occupancy Time* that exceeds where the channel access procedure is performed based on the channel access priority class associated with the UE transmissions, as given in Table 4.5-1.**< End of text proposal >** |

### Proposal v2

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| --- |
| **< Start of text proposal for TS 37.213 >**4.5 Sidelink channel access proceduresA UE operating in sidelink resource allocation mode 1 or mode 2 and performing SL transmission(s) on channel(s) shall perform the procedures described in this clause for the UE to access the channel(s) on which the transmission(s) are performed.In this clause, transmissions from a UE are considered as separate SL transmissions, irrespective of having a gap between transmissions or not, and for sensing is adjusted as described in clause 4.5.5 when applicable.A UE can access a channel on which SL transmission(s) are performed according to one of Type 1 or Type 2 SL channel access procedures as described in clauses 4.5.1 and 4.5.2, respectively.When a UE applies Type 1 channel access procedures to transmit SL transmission(s), the applicable channel access priority class (CAPC) is defined in Table 4.5-1.When a UE applies Type 1 channel access procedures to transmit SL transmission(s) including PSSCH with user plane data and associated PSCCH, the UE determines the corresponding SL channel access priority class in Table 4.5-1 following the procedures described in Clause 16.9.9.2 in [9].A PSFCH transmission or a S-SSB transmission is associated with the channel access priority class in Table 4.5-1. When a UE applies Type 1 channel access procedures to transmit SL transmission(s) including only PSFCH or only S-SSB transmission(s), the UE shall use the channel access priority class in Table 4.5-1.**< End of text proposal >** |

### Proposal v3

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| --- |
| **< Start of text proposal for TS 37.213 >**4.5 Sidelink channel access proceduresA UE operating in sidelink resource allocation mode 1 or mode 2 and performing SL transmission(s) on channel(s) shall perform the procedures described in this clause for the UE to access the channel(s) on which the transmission(s) are performed.In this clause, transmissions from a UE are considered as separate SL transmissions, irrespective of having a gap between transmissions or not, and for sensing is adjusted as described in clause 4.5.5 when applicable.A UE can access a channel on which SL transmission(s) are performed according to one of Type 1 or Type 2 SL channel access procedures as described in clauses 4.5.1 and 4.5.2, respectively.When a UE applies Type 1 channel access procedures to transmit SL transmission(s), the applicable channel access priority class (CAPC) is defined in Table 4.5-1.When a UE applies Type 1 channel access procedures to transmit SL transmission(s) including PSSCH with user plane data and associated PSCCH, the UE determines the corresponding SL channel access priority class in Table 4.5-1 following the procedures described in Clause 16.9.9.2 in [9].When a UE applies Type 1 channel access procedures to transmit SL transmission(s) including PSFCH or S-SSB transmission(s), the channel access priority class corresponding to PSFCH and S-SSB is in Table 4.5-1.A UE shall not transmit on a channel for a *Channel Occupancy Time* that exceeds where the channel access procedure is performed based on the channel access priority class associated with the UE transmissions, as given in Table 4.5-1.**< End of text proposal >** |

## TP#4 for TS 37.213 V18.3.0: Issue 3-1

|  |  |
| --- | --- |
| ***Reason for change:*** | In the current specification, the contention window adjustment procedures for SL-U are divided into two cases. One is used for SL transmission with explicit HARQ-ACK feedback including 'ACK/NACK' and the other is used for SL transmission which is not associated with explicit HARQ-ACK feedback(s). For SL transmission with explicit HARQ-ACK feedback, the CW is determined based on the HARQ feedback situation corresponding to the PSSCH transmission in the reference duration. However, when there is no reference duration for the latest channel occupancy initiated by the UE, which can be used to adjust the contention window of the current SL transmission, the CW adjustment procedure is unclear. |
|  |  |
| ***Summary of change:*** | 1. In clause 4.5.4, clarify that when no reference duration can be determined for the latest channel occupancy initiated by the UE, in order to perform contention window adjustment procedures for a SL transmission(s) including at least one PSSCH enabled with explicit HARQ-ACK feedback including 'ACK/NACK', step 6 is applied, i.e., for every priority class ,maintain as it is.
2. Editorial correction: “a HARQ-ACK feedback” -> “HARQ-ACK feedback”.
 |
|  |  |
| ***Consequences if not approved:*** | 1. It is unclear how to adjust the contention window when no reference duration can be determined for the latest channel occupancy initiated by a UE, in the case that UE intends to transmit a SL transmission with explicit HARQ-ACK feedback including 'ACK/NACK'.
2. Editorial errors remains in the specification.
 |

### Proposal v1

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| **< Start of text proposal for TS 37.213 >**4.5.4 Contention window adjustment procedures for SL transmissionsIf a UE transmits a SL transmission(s) including at least one PSSCH enabled with explicit HARQ-ACK feedback including 'ACK/NACK' using Type 1 channel access procedures associated with the channel access priority class on a channel, the UE maintains the contention window value and adjusts before step 1 of the procedure described in clause 4.5.1 for the SL transmission(s) applying the following procedures:1) For every priority class set .2) If HARQ-ACK feedback corresponding to the PSSCH(s) for unicast SL transmission(s) in the *reference duration* for the latest channel occupancy initiated by the UE, is available:- If the HARQ-ACK feedback includes only 'ACK', go to step 1; otherwise go to step 5.3) If HARQ-ACK feedback corresponding to the PSSCH(s) for groupcast SL transmission(s) in the *reference duration* for the latest channel occupancy initiated by the UE, is available:- If *harq-ACK-FeedbackRatioforCW-AdjustmentGC-Option2-r18* is provided by higher layers:- The UE calculates the ratio between the number of received 'ACK' in the HARQ-ACK feedback and the number of UE(s) from which the corresponding 'ACK'/'NACK' in the HARQ-ACK feedback is expected. If the calculated ratio is equal to or larger than *harq-ACK-FeedbackRatioforCW-AdjustmentGC-Option2-r18*, go to step 1; otherwise go to step 5.- Otherwise:- If the HARQ-ACK feedback includes at least an 'ACK',go to step 1; otherwise go to step 5.4) If HARQ-ACK feedback corresponding to the PSSCH(s) in the *reference duration* for the latest channel occupancy initiated by the UE is not available or no reference duration can be determined for the latest channel occupancy initiated by the UE, go to step 6.5) Increase for every priority class to the next higher allowed value.6) For every priority class ,maintain as it is; go to step 2.The *reference duration* in the procedure above is defined as follows:- The *reference duration* corresponding to a channel occupancy initiated by the UE including SL transmission(s) of PSSCH(s) is defined in this clause as a duration starting from the beginning of the channel occupancy initiated by the UE including SL transmission (s) of PSSCH(s) until the end of the first slot where at least one PSSCH with HARQ-ACK feedback(s) including 'ACK'/'NACK' is transmitted. **< End of text proposal >** |

### Proposal v2

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| **< Start of text proposal for TS 37.213 >**4.5.4 Contention window adjustment procedures for SL transmissionsIf a UE transmits a SL transmission(s) including at least one PSSCH enabled with explicit HARQ-ACK feedback including 'ACK/NACK' using Type 1 channel access procedures associated with the channel access priority class on a channel, the UE maintains the contention window value and adjusts before step 1 of the procedure described in clause 4.5.1 for the SL transmission(s) applying the following procedures:1) For every priority class set .2) If HARQ-ACK feedback corresponding to the PSSCH(s) for unicast SL transmission(s) in the *reference duration* for the latest channel occupancy initiated by the UE, is available:- If the HARQ-ACK feedback includes only 'ACK', go to step 1; otherwise go to step 5.3) If HARQ-ACK feedback corresponding to the PSSCH(s) for groupcast SL transmission(s) in the *reference duration* for the latest channel occupancy initiated by the UE, is available:- If *harq-ACK-FeedbackRatioforCW-AdjustmentGC-Option2-r18* is provided by higher layers:- The UE calculates the ratio between the number of received 'ACK' in the HARQ-ACK feedback and the number of UE(s) from which the corresponding 'ACK'/'NACK' in the HARQ-ACK feedback is expected. If the calculated ratio is equal to or larger than *harq-ACK-FeedbackRatioforCW-AdjustmentGC-Option2-r18*, go to step 1; otherwise go to step 5.- Otherwise:- If the HARQ-ACK feedback includes at least an 'ACK',go to step 1; otherwise go to step 5.4) If HARQ-ACK feedback corresponding to the PSSCH(s) in the *reference duration* for the latest channel occupancy initiated by the UE is not available or *reference duration* for the latest channel occupancy initiated by the UE is not available, go to step 6.5) Increase for every priority class to the next higher allowed value.6) For every priority class ,maintain as it is; go to step 2.The *reference duration* in the procedure above is defined as follows:- The *reference duration* corresponding to a channel occupancy initiated by the UE including SL transmission(s) of PSSCH(s) is defined in this clause as a duration starting from the beginning of the channel occupancy initiated by the UE including SL transmission (s) of PSSCH(s) until the end of the first slot where at least one PSSCH with HARQ-ACK feedback(s) including 'ACK'/'NACK' is transmitted. **< End of text proposal >** |

## TP#5 for TS 37.213 V18.3.0: Issue 4-1

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| ***Reason for change:*** | When a UE would perform multiple PSFCHs on more than one RB set, both multi-channel access and PSFCH prioritization are performed. The processing order has been described in 4.5.6 of 37.213 based on the following agreement that was reached at RAN1#115 meeting.

|  |
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| AgreementWhen UE intends to transmit PSFCH, after performing PSFCH prioritization:* if LBT fails on all RB set(s) where the UE attempts to transmit PSFCH:
	+ UE drops PSFCH transmission
		- No RAN1 specification impact
* if TypeA and TypeB LBT fails on part of RB set(s) where the UE attempts to transmit PSFCH:
	+ The UE may transmit PSFCH on RB set(s) where LBT was successful
 |

Regarding the spec descriptions in 4.5.6 of 37.213, PSFCH prioritization behavior is referred as 16.2.4.2 of 38.213, where multiple PSFCH transmissions are handled. However, ‘PSFCH prioritization’ in the agreement should mean any prioritization relevant to PSFCH transmission; otherwise, UE behavior is unclear in some cases.In the current specifications, UL/SL prioritization handling is defined and the prioritization includes PSFCH transmission case. Coexistense between SL-U and NR are not precluded; thus, this handling must be referred for the processing order with multi-channel access. |
|  |  |
| ***Summary of change:*** | Multi-channel access for PSFCH transmissions is performed after prioritization relevant to PSFCH transmission, i.e., both 16.2.4.2 and 16.4.2.3 of 38.213. 16.2.4.3 is added for the reference of PSFCH prioritization behavior. |
|  |  |
| ***Consequences if not approved:*** | UE behavior is not defined when UE would perform multiple PSFCH transmissions on multiple RB sets and they are overlapped with UL transmission. |

### Proposal v1

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| **< Start of text proposal for TS 37.213 >**4.5.6 Channel access procedures for transmission(s) on multiple channelsIf a UE - is scheduled to transmit on a set of channels *C*, and if the SL transmissions are scheduled to start transmissions at the same time on all channels in the set of channels *C*, or- intends to perform sidelink transmissions on configured resources on the set of channels *C*, and if the SL transmissions are configured to start transmissions at the same time on all channels in the set of channels *C*, or- intends to perform sidelink transmissions on selected resources on the set of channel *C*, and if SL transmissions are to start at the same time on all channels in the set of channels *C*the followings are applicable:- Type A or Type B procedures described in clause 4.5.6.1 and 4.5.6.2 can be used for accessing multiple channels only for PSFCH or S-SSB transmissions.- A UE can access multiple channels on which SL transmissions are performed, according to the procedures described in clause 4.5.6.3.When a UE performs Type A or Type B channel access procedures to transmit PSFCH transmissions on multiple channels after performing associated prioritization for the PSFCH as described in clause 16.2.3, 16.2.4.2 and 16.2.4.3 of [7], if the channel access procedures fail on part of the channel(s) but succeed on other part of the channel(s), the UE may transmit the PSFCH transmission(s) on the part of the channel(s) where the corresponding channel access was successful.**< End of text proposal >** |

## TP#6 for TS 38.214 V18.3.0: Issue 5-1

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| ***Reason for change:*** | In RAN1#117, it was already agreed to support the combination of interlace RB-based transmission and partial sensing in SL-U. However, only the correction for periodic transmission in partial sensing was implemented. The corresponding correction for aperiodic transmission in partial sensing is missing. |
|  |  |
| ***Summary of change:*** | Add the description of candidate single-slot resource and candidate multi-slot resource for interlace RB-based transmission when UE performs aperiodic transmission in partial sensing. |
|  |  |
| ***Consequences if not approved:*** | It is unclear how to determine a candidate single-slot resource or a candidate multi-slot resource for interlace RB-based transmission when UE performs aperiodic transmission in partial sensing. |

### Proposal v1

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| **< Start of text proposal for TS 38.214>**8.1.4 Channel access procedures for transmission(s) on multiple channels< Unchanged parts are omitted >The UE shall assume that any set of contiguous sub-channels or contiguous sub-channels in contiguous RB sets included in the corresponding resource pool within the time interval correspond to one candidate single-slot resource or the UE shall assume that any set of contiguous sub-channels or contiguous sub-channels in contiguous RB sets in consecutive slots included in the corresponding resource pool within the time interval correspond to one candidate multi-slot resource for UE performing full sensing. The UE shall assume that any set of contiguous sub-channels or contiguous sub-channels in contiguous RB sets included in the corresponding resource pool in a set of *Y* candidate slots within the time interval correspond to one candidate single-slot resource or the UE shall assume that any set of contiguous sub-channels or contiguous sub-channels in contiguous RB sets in consecutive slots included in the corresponding resource pool in a set of *Y* candidate slots within the time interval correspond to one candidate multi-slot resource for UE performing periodic-based partial sensing together with contiguous partial sensing and resource (re)selection triggered by periodic transmission (), or the UE shall assume that any set of contiguous sub-channels or contiguous sub-channels in contiguous RB sets included in the corresponding resource pool in a set of *Y'* candidate slots within the time interval correspond to one candidate single-slot resource or the UE shall assume that any set of contiguous sub-channels or contiguous sub-channels in contiguous RB sets in consecutive slots included in the corresponding resource pool in a set of *Y'* candidate slots within the time interval correspond to one candidate multi-slot resource for UE performing at least contiguous partial sensing and resource (re)selection triggered by aperiodic transmission (), where**< End of text proposal >** |

## TP#7 for TS 38.213 V18.3.0: Issue 6-1

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| ***Reason for change:*** | It is agreed during RRC parameters discussion and captured in TS38.331, only one CPE starting position is used before PSFCH transmission and locates with the single gap symbol, and the description field is specified as following. However, in TS38.213, the CP extension is defined to be used within first one or two symbols before PSFCH transmission, which is conflicting with RRC description and incorrect.

|  |
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| ***sl-CPE-StartingPositionPSFCH***Indicates CPE starting position within the GP symbol before PSFCH transmission. The value is an index of the set of all candidate CPE starting positions specified in Table 5.3.1-3 of [16, TS38.211] for Ci=1 and the corresponding SCS of the SL BWP. |

 |
|  |  |
| ***Summary of change:*** | Remove the case of CP extension within the two symbols before the first symbol of PSFCH transmission. |
|  |  |
| ***Consequences if not approved:*** | The description of CPE usage in TS 38.213 is incorrect and conflicts with TS 38.331 definition. |

### Proposal v1

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| < Start of text proposal for TS 38.213 >16.3.0 UE procedure for transmitting PSFCH with control information< Unchanged parts are omitted >When *sl-TransmissionStructureForPSFCH* is provided, the PSFCH resources are first indexed according to an ascending order of the interlace or PRB subset index, second according to an ascending order of the RB-set index, and then according to an ascending order of the cyclic shift pair index from the cyclic shift pairs. When *sl-TransmissionStructureForPSFCH* is not provided, the PSFCH resources are first indexed according to an ascending order of the PRB index, from the PRBs, and then according to an ascending order of the cyclic shift pair index from the cyclic shift pairs. The UE applies CP extension to the first symbol of a PSFCH and within the first one symbol before the first symbol of the PSFCH according to an index [4, TS 38.211] provided by *sl-CPE-StartingPositionPSFCH*.< End of text proposal for TS 37.213 > |

## TP#8 for TS 37.213 V18.3.0: Issue 1-2 and 7-1 (editorial corrections)

|  |  |
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| ***Reason for change:*** | Editorial corrections |
|  |  |
| ***Summary of change:*** | In Section 4.5.3, * the notation for sidelink processing time is aligned with TS 38.214 as “”.
* Align the terminology to be “channel occupancy sharing information”
 |
|  |  |
| ***Consequences if not approved:*** | Editorial errors remain in the specification. |

### Proposal v1

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| < Start of text proposal for TS 37.213 >4.5.3 SL channel access procedures in a shared channel occupancyWhen a UE initiates a channel occupancy using the channel access procedures described in clause 4.5.1 or clause 4.5.6.3 on a channel(s) to transmit SL transmission(s) including PSCCH/PSSCH(s), the UE can provide a channel occupancy sharing information in SL control information that includes at least the Layer 1 source and destination IDs, the corresponding channel access priority class, the remaining channel occupancy duration, and the frequency domain information for the applicable RB set(s) of the channel occupancy. The channel occupancy sharing information can also include additional IDs and associated cast type. The additional IDs includes one pair of Layer 1 source and destination IDs for all cast types, where the source ID is set to the source ID of the UE initiating channel occupancy for unicast and to the reserved bits for groupcast and broadcast. The channel occupancy sharing information transmitted in slot indicates the remaining channel occupancy duration in a number of physical slot(s) . If , the initiated channel occupancy by the UE shall not be shared for SL transmission(s) by other UE(s). Otherwise, the initiated channel occupancy by the UE can be shared for SL transmission(s) by other UE(s) within a duration starting from the end of slot and ending at slot .< Unchanged parts are omitted >When a UE initiates a channel occupancy to transmit SL transmission(s) within a RB set(s) and provides channel occupancy sharing information with a unicast PSCCH/PSSCH transmission within the RB set(s), another UE may transmit unicast PSCCH/PSSCH transmission(s) sharing the initiated channel occupancy within the RB set(s), if the destination and source IDs in the corresponding SL control information match the source and destination IDs, respectively, in the unicast PSCCH/PSSCH transmission carrying the channel occupancy sharing information or match a pair of additional source and destination IDs and associated cast type if provided by the channel occupancy sharing information and the corresponding COT sharing cast type indicates '10' value for unicast cast type. Another UE may transmit groupcast or broadcast PSCCH/PSSCH transmissions sharing the initiated channel occupancy within the RB set(s), if the destination ID in the corresponding SL control information matches an additional destination ID and associated cast type if provided by the channel occupancy sharing information and the corresponding COT sharing cast type indicates '01' or '00' value for groupcast or broadcast cast type, respectively.< Unchanged parts are omitted >When a UE initiates a channel occupancy to transmit SL transmission(s) within a RB set(s) and provides channel occupancy sharing information with a unicast PSCCH/PSSCH transmission within the RB set(s), for a given PSFCH transmission occasion, another UE may transmit PSFCH(s) within the RB set(s) sharing the initiated channel occupancy using the channel access procedures described in clause 4.5.2, if for at least one PSFCH in the given transmission occasion, the source and destination IDs in the corresponding unicast PSCCH/PSSCH's SL control information match the source and destination IDs, respectively, in the unicast PSCCH/PSSCH transmission carrying the channel occupancy sharing information or match a pair of additional source and destination IDs and associated cast type if provided by the channel occupancy sharing information and the corresponding COT sharing cast type indicates '10' value for unicast cast type.< End of text proposal for TS 37.213 > |

References

1. R1-2405844 Correction on PSFCH power control Huawei, HiSilicon
2. R1-2405845 Discussions on remaining issues of R18 NR sidelink from RAN1#117 Huawei, HiSilicon
3. R1-2405864 Correction on PSSCH transmission decode behaviour in TS 38.214 Huawei, HiSilicon
4. R1-2406151 Clarification on COT sharing flag in 38.212 vivo
5. R1-2406152 Clarification on channel occupancy sharing information in 37.213 vivo
6. R1-2406213 Draft CR for correction on interlace RB-based transmission in partial sensing OPPO
7. R1-2406214 Draft CR for indication of remaining channel occupancy duration OPPO, Qualcomm
8. R1-2406215 Draft CR for correction on CAPC value for PSFCH and S-SSB OPPO
9. R1-2406216 Draft CR for correction on PSFCH power control OPPO, ZTE, Sanechips
10. R1-2406217 Draft CR for correction on PSSCH decoding behaviour OPPO
11. R1-2406336 Draft CR on the contention window adjustment procedures for SL-U CATT, CICTCI, OPPO
12. R1-2406337 Draft CR on the determination of sidelink symbol for SL-U CATT, CICTCI
13. R1-2406535 Remaining issues on PSFCH power control NEC
14. R1-2406634 Draft CR for Correcting S-SSB Transmission in Non-Anchor RB Set Samsung
15. R1-2406676 Correction on IUC in co-existence case in TS 38.214 ZTE, Sanechips
16. R1-2406677 Correction on PSFCH resource mapping for contiguous RB resource pool in TS 38.213 ZTE, Sanechips
17. R1-2406678 Correction on PSSCH transmission decode behaviour in TS 38.214 ZTE, Sanechips
18. R1-2406679 Supplementary higher layer parameter for section 8 in TS 38.214 ZTE, Sanechips
19. R1-2406680 Correction on contiguous RB based resource allocation in TS 38.214 ZTE, Sanechips
20. R1-2406681 Correction on resource allocation in frequency domain in TS 38.214 ZTE, Sanechips
21. R1-2406915 Draft CR on CAPC value for PSFCH+S-SSB for SL-U NTT DOCOMO, INC.
22. R1-2406916 Draft CR on multi-channel access vs PSFCH prioritization for SL-U NTT DOCOMO, INC.
23. R1-2406917 Draft CR on sensing with two starting symbols NTT DOCOMO, INC.
24. R1-2406918 Maintenance of resource selection in MAC layer for SL-U NTT DOCOMO, INC.
25. R1-2406987 Determination of PSFCH resources for a PSSCH Huawei, HiSilicon
26. R1-2406988 Correction on CPE starting position for PSFCH Huawei, HiSilicon
27. R1-2406997 Correction on COT sharing information processing delay Huawei, HiSilicon

Appendix (outcomes of past meetings)

## RAN1#109-e (09 – 20 May 2022)

**Agreement**

Type 1 and Type 2 (2A/2B/2C) channel access procedures, transmission gap and LBT sensing idle time requirements specified in TS37.213 for NR-U are taken as baseline for NR sidelink operation in a shared channel.

* FFS conditions for the actual channel access type(s) used for each SL channel and signal transmitted, and based on COT sharing conditions (if supported)
* FFS whether UL CAPC or DL CAPC or both should be used as the baseline,
	+ FFS how the channel access priority classes apply to each SL channel and signal
	+ FFS sidelink priority levels (PQI or L1 priority), channel and signal mapping to the 4 channel access priority classes. The discussion may involve other WGs.

**Agreement**

* UE-to-UE COT sharing is supported in NR sidelink operation in a shared channel (SL-U).
	+ FFS applicable SL channels and signals (e.g., PSCCH/PSSCH, PSFCH, S-SSB) for shared COT access and any restrictions (e.g. whether the COT can be shared with a single UE or multiple UEs)
	+ FFS all other details in compliance with the regulatory requirements
* CP extension (CPE) is supported for NR sidelink operation in a shared channel.
	+ FFS all remaining details including applicable scenarios, usage, PHY structure, etc.

**Agreement**

Channel access procedures for transmission(s) on multiple channels are supported for NR sidelink operation as defined by TS37.213 for NR-U (wherever applicable)

* FFS whether the downlink, uplink and/or semi-static multiple channel access procedure(s) (if supported) from NR-U should be used as a baseline and whether/how they are applied in SL mode 1 and mode 2 operation

**Agreement**

* The existing sidelink mode 1 RA including dynamic grant, Type 1 and Type 2 configured grants are supported as a baseline for sidelink operation in a shared carrier, subject to applicable regional regulations. At least in dynamic channel access, SL UE performs Type 1 or one of the Type 2 LBTs before SLtransmission using the allocated resource(s), in compliance with transmission gap and LBT sensing idle time requirements specified in TS37.213.
	+ FFS whether/how mode 1 resource allocation ~~selection~~ procedure needs to be updated / enhanced due to shared spectrum channel access
* The existing sidelink mode 2 RA schemes are supported as a baseline for sidelink operation in a shared carrier, subject to applicable regional regulations. At least in dynamic channel access, SL UE performs Type 1 or one of the Type 2 LBTs before SL transmission using the selected and/or reserved resources, in compliance with transmission gap and LBT sensing idle time requirements specified in TS37.213.
	+ FFS whether/how mode 2 resource selection procedure needs to be updated / enhanced due to shared spectrum channel access
* FFS whether/how multi-consecutive slots transmission can be supported for NR sidelink operation in unlicensed spectrum, including the following aspects
	+ channel access, resource allocation and PHY channel design
* FFS whether/how enhancement is needed between the end of the LBT procedure and the start of the SL transmission to retain channel access
* RAN1 to strive for a common solution for channel access for Mode 1 and Mode 2

## RAN1#110 (22 – 26 August 2022)

**Agreement**

The following evaluation scenario can be used for evaluating performance of SL-U designs, resource allocation schemes, and coexistence study with another RAT in a shared channel.

* Scenario 1 (commercial use cases) – recommended:
	+ Evaluation methodology baseline is NR-U from TR 38.889 with the following updates.
	+ Indoor layout
		- Option 1: a pairs topology for SL-U from R1-2205033 – recommended



* + - * a = 20m, b = 60m, c = 20m, d = 80 m
			* There are two operators to model two RATs at a time. The red one is SL-U UE, the blue one is Wi-Fi or NR-U.
			* For NR-U / Wi-Fi, the same number of UEs / Wi-Fi STA as the total number of SL-U devices are dropped in the area. The NR-U UE / Wi-Fi nodes are dropped uniformly per gNB/AP per 20 MHz.
				+ Companies should report if they used a different number of UEs / Wi-Fi STA as the total number of SL-U devices, as an additional evaluation scenario.
			* For evaluation of unicast traffic, the topology of SL-U is pair topology and the SL-U UEs are dropped uniformly at random in the area.
				+ Companies should report how SL-U UEs are paired
				+ 6 SL-U pairs and 4 NR-U UEs / Wi-Fi nodes per gNB/AP per 20 MHz
			* For evaluation of groupcast traffic, SL-U UEs are dropped uniformly at random in the area, SL-UEs form groupcast UE group based on TX-RX UE distancing, the distance is provided by each company.
				+ Companies should report how SL-U UEs form a group
				+ 12 SL-U UEs and 4 NR-U UEs / Wi-Fi nodes per gNB/AP per 20 MHz
			* For evaluation of broadcast traffic, SL-U UEs are dropped uniformly at random in the area.
				+ 12 SL-U UEs and 4 NR-U UEs / Wi-Fi nodes per gNB/AP per 20 MHz
		- Option 2: SL UE clusters (R1-2203146)

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* + - * Indoor layout and UE dropping model with N = 3 or 6 clusters and each with M=5 UEs
			* Each cluster is a circle, with a central point and radius Rmax = 15 or 10m and Rmin = 5 or 1m
			* No overlapping among the N clusters
			* For coexistence, there are two operators to model two RATs at a time, where the red one is Wi-Fi AP or NR-U gNB. NR-U UE / Wi-Fi STA are dropped uniformly per gNB/AP.
			* Simulation bandwidth can be larger than 20MHz (e.g., 80MHz)
	+ Channel model follows NR InH Mixed Office model used in NR-U (TR38.889)
	+ Traffic model
		- Option 1: R17 sidelink commercial traffic model with periodic model 3 with packet size reduced by a factor of (high: 1; mid: 5; low: 10)
			* FFS whether/how the PDB requirement can be captured
		- Option 2: FTP model 3 with arrival rate satisfying one of the followings:
			* BO Low load: 10%~25%
			* BO Mid load: 35%~50%
			* BO High load: above 55%
		- Option 3: XR cloud gaming model in TR38.838
			* FFS whether/how the PDB requirement can be captured
		- It is up to each company to use either Option 1 or 2 or Option 3 or mixed of them
	+ Interference model:
		- Layout option 1: Explicit modelling of NR-U / WiFi transmissions (as per TR38.889)
		- Note, for the interference traffic model:
			* The same or equivalent traffic model setting as SL-U should be used as much as possible to achieve equal load (e.g., SL-U RAT offered load equal the interfering RAT’s offered load).
			* The same number of traffic flows should be used between SL-U and the interfering RAT (e.g., 10 UEs with 10 flows, and 5 STAs with 2 flows each, one for DL and one for UL)
				+ Companies should report if they used a different assumption, as an additional evaluation scenario.
	+ Performance metric: UPT, latency, and PRR which regards the packet whose delay exceeding the remaining PDB as transmission failure.
		- FFS: UE satisfaction/system capacity as section 7.2 in TR 38.838 for XR traffic evaluation
		- FFS for groupcast and broadcast
	+ Fair coexistence criterion between SL-U and the interfering RAT (e.g., according to NR-U TR38.889)

**Agreement**

* CW adjustment
	+ NR-U DL CW adjustment mechanism is used as the baseline for SL-U when SL-HARQ feedback is enabled in SCI for unicast
		- FFS any necessary update for SL-U operation
	+ FFS: how to determine CW size when SL-HARQ feedback is disabled in SCI
	+ FFS the case of groupcast option 1 (NACK-only) and groupcast option 2

**Agreement**

* Type 2A/2B/2C SL channel access procedures
	+ Type 2A channel access procedure is applicable to the following case:
		- Transmission(s) by a UE following transmission(s) by another UE for a gap ≥ 25μs in a shared channel occupancy
		- FFS any other transmission by a UE (e.g., other than COT sharing)
		- FFS whether Type 2A is used also for the case of short control signalling transmission
	+ Type 2B channel access procedure is applicable to the following case:
		- Transmission(s) by a UE following transmission(s) by another UE at least when the gap is 16μs in a shared channel occupancy
		- FFS the case when the gap is between 16 and 25us
		- FFS any other transmission by a UE (e.g., other than COT sharing)
	+ Type 2C channel access procedure is applicable to the following case:
		- Transmission(s) by a UE following transmission(s) by another UE for a gap ≤ 16μs in a shared channel occupancy and the duration of the corresponding transmission is at most 584us.
		- FFS any other transmission by a UE (e.g., other than COT sharing)
		- FFS whether Type 2C is used also for the case of short control signalling transmission
	+ FFS under which conditions (other than the gap) UEs can apply the Type 2A/2B/2C SL channel access procedures
	+ FFS under which conditions Type 2B or Type 2C is applied in case of a gap of 16 μs

**Agreement**

Multi-consecutive slots transmission (MCSt) is supported for Mode 1 and Mode 2 resource allocation in SL-U.

* FFS details

**Agreement**

* For UE-to-UE COT sharing, continue considering the following alternatives:
	+ Alt. 1: A responding SL UE can utilize a COT shared by a COT initiating UE when the responding SL UE is a target receiver of the at least COT initiating UE’s PSSCH data transmission in the COT.
		- When the responding UE uses the shared COT for its transmission has an equal or smaller CAPC value than the CAPC value indicated in a shared COT information
		- FFS any additional conditions
	+ Alt. 2: A responding SL UE can utilize a COT shared by a COT initiating UE when the responding SL UE is a target receiver of the COT initiating UE’s transmission in the COT.
		- When the responding UE uses the shared COT for its transmission has an equal or smaller CAPC value than the CAPC value indicated in a shared COT information
		- FFS how to determine a SL UE is a target receiver
		- FFS: details of the channel type of the COT initiating UE’s transmission
		- FFS any additional conditions
	+ For Alt1 and Alt2: When a responding UE uses a shared COT for its transmission(s), the COT initiating UE is a target receiver of the responding UE’s transmission(s).
		- FFS: details of the channel type of the responding UE’s transmission(s)
* gNB relaying/forwarding a UE initiated COT to another UE is not supported in Rel-18
* FFS whether a Mode 1 UE can report a COT or related information to gNB for aiding Mode 1 RA

## RAN1#110bis-e (10 – 19 October 2022)

**Agreement**

* Type 1 SL channel access procedure is applicable to the following transmissions by a UE:
	+ PSSCH/PSCCH transmission(s) scheduled or configured by a gNB in SL Mode 1 resource allocation.
	+ PSSCH/PSCCH transmission(s) from the UE in SL Mode 2 resource allocation.
	+ Other SL transmissions including S-SSB and PSFCH transmissions from a UE
		- FFS: how to set CAPC for S-SSB and PSFCH
	+ Note: Type 1 can be used to initiate a COT
* A UE uses a channel access priority class applicable to the sidelink user plane data multiplexed in PSSCH for performing the Type 1 channel access procedures to transmit transmission(s) including PSSCH with user plane data and its associated PSCCH.
	+ Note: how to set CAPC for MAC CE multiplexed in PSSCH is up to RAN2
* A UE shall not transmit on a channel for a Channel Occupancy Time that exceeds the maximum COT duration where the channel access procedures are performed based on a channel access priority class *p* associated with the UE transmissions, as given in CAPC table for SL.

**Agreement**

On the support of MCSt operation in SL-U, following options are to be further studied and one or more of the following options will be selected in future meetings.

* When L1 is triggered for reporting a subset of candidate resources for MCSt,
	+ Option 1: Only one set of parameters (, remaining PDB, and ) is provided for the resource selection procedure in L1
		- Note, this is applicable for transmission of a single TB and multiple TBs
		- FFS: whether this is the same or different than Rel-16
	+ Option 2: one or multiple sets of parameters (, remaining PDB, and ) are provided for the resource selection procedure in L1
	+ FFS: any further information needs to be provided to L1 for MCSt
* When L1 reports a subset of candidate resources for MCSt,
	+ Option A: L1 reports candidate multi-slot resources in *SA* where a candidate multi-slot resource consists of a set of single-slot resources that are consecutive in time
		- FFS whether the set of single-slot resources within a candidate multi-slot resource can have different sizes
	+ Option B: L1 reports candidate single-slot resources in (*SA*) as in Rel-16
		- It is up to the higher (MAC) layer to select a set of single-slot resources that are consecutive in logical slots
	+ Option C: L1 reports consecutive single-slot candidate resources in *SA*
		- FFS whether the consecutive single-slot candidate resources can have different sizes
	+ FFS: any further information needs to be reported to MAC layer, provided to L1 or utilized for MCSt
	+ FFS: whether/how to consider the additional LBT time in SL resource allocation

**Agreement**

For dynamic channel access mode with multi-channel case in SL-U, NR-U UL channel access procedure is considered as baseline for transmission on multiple channels

* FFS: whether transmission of PSFCH and/or S-SSB on a subset of RB sets is supported (using the NR-U DL channel access procedure as baseline)
* FFS any necessary enhancement and modification for the SL-U operation

**Agreement**

In Type 1 SL channel access procedure, the following table is adopted for channel access priority class (CAPC) for SL.

* FFS: the applicability and usage of NOTE1 in the table
* FFS: whether ***mp****=1* can be used with ***p=1***, and applicable cases

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Channel Access Priority Class (*p*) | *mp* | *CWmin,p* | *CWmax,p* | *Tslmcot,p* | allowed *CWp* sizes |
| 1 | 2 | 3 | 7 | 2 ms | {3,7} |
| 2 | 2 | 7 | 15 | 4 ms | {7,15} |
| 3 | 3 | 15 | 1023 | 6ms [or 10 ms]  | {15,31,63,127,255,511,1023} |
| 4 | 7 | 15 | 1023 | 6ms [or 10 ms] | {15,31,63,127,255,511,1023} |
| [NOTE1:   For*p*=3,4, *Tslmcot*,*p*=10*ms* if the higher layer parameter absenceOfAnyOtherTechnology-r14 or absenceOfAnyOtherTechnology-r16 is provided, otherwise,*Tslmcot*,*p*=6*ms*.]NOTE 2:   When *Tslmcot*,*p*=6*ms* it may be increased to 8*ms* by inserting one or more gaps. The minimum duration of a gap shall be 100*μs*. The maximum duration before including any such gap shall be 6*ms*.  |

**Agreement**

* RAN1 is to study the definition of a “SL reference duration” following the NR-U principle and RAN1 is to agree on the definition before down-selection to an option for CW adjustment for SL HARQ-ACK feedback enabled/disabled and each cast type
* In Type 1 SL channel access procedure, further study the following cases and options. Other options are not precluded.
	+ CW adjustment when SL-HARQ feedback is disabled (at least if all transmissions within the latest SL reference duration have SL-HARQ feedback disabled):
		- Option 1: For every priority class ,use the latest used for any SL transmissions on the channel using Type 1 channel access procedures associated with the channel access priority class .
		- Option 2: CW is adjusted according to number blind retransmissions of the TBs within a COT.
		- Option 3: CW is adjusted according to CR/CBR measurement, if CR/CBR is supported for SL-U
		- Option 4: If a is consecutively used times for generation of , is updated for each priority class to the next higher allowed value.
		- Option 5: If a collision indicator is received, increase for every priority class to the next higher allowed value.
	+ CW adjustment for groupcast option 2 with SL-HARQ feedback enabled (~~i.e.~~, at least In case only groupcast option 2 PSSCH(s) is (are) transmitted within the latest SL reference duration):
		- Option 1: Based on a (pre-)configurable ratio of received SL HARQ-ACK feedbacks in the latest SL reference duration, is reset to for every priority class , otherwise increase for every priority class to the next higher allowed value.
			* FFS: whether the ratio of the received SL HARQ-ACK feedbacks is ‘ACK’, ‘NACK’ or ‘ACK+NACK’
			* FFS: how to calculate the ratio
			* FFS: the (pre-)configuration ratio values
		- Option 2: If at least a ‘ACK’ is received related to any transmissions within the latest SL reference duration, for each priority class ; otherwise is increased.
	+ FFS whether groupcast option 1 (NACK-only) with SL-HARQ feedback enabled can be supported for SL-U. If supported, further study the following options (at least if all transmissions within the latest SL reference duration are groupcast option 1 transmissions)
		- Option 1: For every priority class ,use the latest used for any SL transmissions on the channel using Type 1 channel access procedures associated with the channel access priority class .
		- Option 2:
			* If ‘NACK’ or a collision indicator (IUC scheme 2) is received related to any transmissions within the latest SL reference duration, increase for every priority class to the next higher allowed value.
			* When neither ‘NACK’ nor a collision indicator (IUC scheme 2) is received related to any transmissions within the latest SL reference duration,
				+ Option A: is reset to for every priority class .
				+ Option B: For every priority class ,use the latest used for any SL transmissions on the channel using Type 1 channel access procedures associated with the channel access priority class .
		- Option 3: An ACK-only procedure is used instead of a NACK-only procedure. In this case, if at least a ‘ACK’ is received related to any transmissions within the latest SL reference duration, for each priority class , otherwise is increased
		- Option 4: CW is adjusted according to CR/CBR measurement, if CR/CBR is supported for SL-U
		- Option 5 (option 3+legacy): ACK feedback is performed when a TB is successfully decoded in addition to the legacy NACK-only procedure. In this case, if ACK only is received related to any transmissions within the latest SL reference duration then ,  otherwise is increased.
	+ CW adjustment for unicast with SL-HARQ feedback enabled (at least In case only unicast PSSCH(s) is (are) transmitted within the latest SL reference duration):
		- Option 2: If at least one ‘ACK’ is received related to any transmissions within the latest SL reference duration, for each priority class ; otherwise is increased.
* FFS the case when UE is operating with different SL-HARQ feedback schemes (e.g., UE has concurrent broadcast transmission + unicast with SL-HARQ enabled, or GC option 1 + GC option 2, etc in the SL reference duration).

## RAN1#111 (14 – 18 November 2022)

**Agreement**

* Type 2A channel access procedure is applicable for S-SSB transmissions from a UE without a shared channel occupancy, when the following constraints are met:
	+ Time duration is at most 1ms per transmission
	+ The duty cycle of the S-SSB transmissions is at most 1/20
	+ FFS: details of EDT
	+ FFS: whether/how to define observation period, including whether or not observation period would be captured in the specifications if defined
* FFS: Type 2A applicability for PSFCH without a shared channel occupancy and further limitations for combined transmissions of both S-SSB and PSFCH using Type 2A channel access procedure

**Agreement**

* Performance metric, company to report which one of the following options is evaluated in their simulation results.
	+ Option 1:
		- For GC and BC, a device within the range (a, b) from the TX can be a receiver, and the UPT/latency/PRR can be calculated by average. The packet whose delay exceeding the remaining PDB as transmission failure.
	+ Option 2:
		- For GC, UPT and latency for a packet is measured from the perspective of the worst-case RX (i.e., the one with the longest transmission time).
		- For BC, UPT and latency for a packet are measured for each RX separately.
	+ Option 3:
		- For GC and BC, UPT, latency and PRR are measured from the perspective of each RX UE

**Agreement**

* For dynamic channel access mode with multi-channel case in SL-U, use NR-U DL (Type A or Type B) multi-channel access procedure as the baseline for multiple PSFCH transmissions on multiple channels, where each PSFCH transmission is confined within one LBT channel
	+ FFS: the case for S-SSB if agreed to transmit S-SSB (or S-SSB can be (pre-)configured) in more than one RB set
	+ FFS: whether type A or type B or both will be supported for this case for PSFCH
	+ FFS: whether multiple PSFCH transmissions on multiple channels after performing the multi-channel access procedure is limited to contiguous RB sets

**Agreement**

* SL reference duration is defined as a duration corresponding to a channel occupancy initiated by the UE including transmission of PSSCH(s), starting from the beginning of the channel occupancy initiated by the UE including transmission of PSSCH(s), until either (one option to be selected later):
	+ Option 1a:
		- the end of the first slot where at least one PSSCH with ACK/NACK HARQ-ACK enabled is transmitted
		- Note, SL reference duration is not used if PSSCH with ACK/NACK HARQ-ACK enabled cannot be found in the latest COT
		- FFS: Whether to support another ending timing is FFS, e.g for MCSt if needed
	+ Option 1b:
		- the end of the first slot where at least one PSSCH with HARQ-ACK enabled is transmitted
		- Note, SL reference duration is not used if PSSCH with HARQ-ACK enabled cannot be found in the latest COT
		- FFS: Whether to support another ending timing is FFS, e.g for MCSt if needed
	+ Option 2a:
		- the end of the first slot where at least one PSSCH with HARQ-ACK enabled if it is transmitted, otherwise until the end of the channel occupancy
		- FFS: Whether to support another ending timing is FFS, e.g for MCSt if needed
	+ Option 2b:
		- the end of the first slot where at least one PSSCH with HARQ-ACK enabled if it is transmitted, otherwise until the time when UE updates the CW
		- FFS: Whether to support another ending timing is FFS, e.g for MCSt if needed

**Agreement**

* A CPE is transmitted from a CPE starting position before SL transmission within a COT, select one or both of the two options:
	+ Option 1: within the symbol just before the next AGC symbol
	+ Option 2: within at most 1, 2 or 4 symbols just before the next AGC symbol for 15, 30 or 60 kHz SCS, respectively
	+ FFS: whether Option 1 and Option 2 are both applicable and the conditions (e.g., Option 1 in case of COT sharing and Option 2 in case of initiating a COT)
	+ FFS: which channel access type(s) is applicable for option 1 and option 2
	+ FFS: other details
* A single CPE starting position for PSFCH
	+ FFS CPE starting position and whether it should be (pre-)configured in each RP, pre-defined or indicated
	+ FFS other details (e.g., indication granularity)
	+ Note: value 0 is a candidate
* At least one CPE starting position for S-SSB
	+ FFS CPE starting position should be (pre-)configured, pre-defined or indicated
	+ FFS: Whether multiple CPE starting positions should be (pre-)configured, pre-defined or indicated
	+ FFS CPE starting positions for the R16 S-SSB and the additional S-SSBs
	+ Note: value 0 is a candidate
* One or multiple CPE starting positions can be (pre-)configured in each resource pool for PSSCH/PSCCH
	+ When multiple CPE starting positions are (pre-)configured,
		- FFS whether/how to define a criteria for selecting a default CPE starting position (e.g., according to partial/full RB set allocation, resource reservation information, within or outside of a COT, etc.)
		- FFS criteria for selecting one of the multiple CPE starting positions (e.g., according to priority level (e.g., CAPC or L1), selected randomly by UE from the (pre-)configured set of CPEs, selected by the UE based on channel access result, determined based on indication from the COT initiating UE, etc.)
	+ FFS other details

**Agreement**

For UE-to-UE COT sharing,

* When performing S-SSB transmission(s), a responding UE can utilize a COT shared by a COT initiating UE (using type 1 channel access) when the responding UE is intended to transmit S-SSB within RB set(s) corresponding to the shared COT.
* When performing PSFCH transmission(s), a responding UE can utilize a COT shared by a COT initiating UE at least when at least one of the responding UE’s PSFCH transmissions in a symbol/slot within RB set(s) corresponding to the shared COT is intended for the COT initiating UE.
	+ FFS: whether a responding UE can transmit PSFCH(s) to UE(s) other than the initiator
* When performing PSSCH/PSCCH transmission(s), a responding UE can utilize a COT shared by a COT initiating UE at least when the responding UE’s PSSCH/PSCCH transmission(s) within RB set(s) corresponding to the shared COT is intended for the COT initiating UE
	+ FFS whether to support the case if a responding UE transmits PSSCH/PSCCH to destination ID other than the source ID of the COT initiating transmission, where the destination ID of the responding UE’s PSSCH/PSCCH transmission(s) can be different from the source/destination IDs of COT initiating UE’s PSSCH/PSCCH transmission when sharing the COT information.
		- FFS: how to determine / what are the restrictions to the destination ID of the responding UE’s PSSCH/PSCCH transmission(s) to utilize the COT shared by the initiating UE.
		- FFS whether the responding UE can utilize the COT when at least the responding UE’s PSCCH transmission in the reserved resources within the shared COT or MCSt is intended for the COT initiating UE and what are the restrictions (e.g., priority, etc.) and indication to the responding UE.
* FFS: UE forwarding/relaying information about a COT initiated by another UE.

**Agreement**

* If , the next higher allowed value for adjusting is .
* If the is consecutively used times for generation of , is reset to only for that priority class for which is consecutively used times for generation of . is selected by UE from the set of values {1, 2, …,8} for each priority class .

## RAN1#112 (February 27th – March 03rd, 2023)

**Agreement**

The CAPC level that should be used for S-SSB transmissions:

* Option 1: CAPC value (p) should be set to 1 when UE performs Type 1 channel access procedure for S-SSB transmission

**Agreement**

The CAPC level that should be used for PSFCH transmission, CAPC value (p) should be set to 1 when UE performs Type 1 channel access procedure for PSFCH transmission

**Agreement**

The end timing for the definition of reference duration in the contention window adjustment procedure for SL-U is defined as follows:

* Option 1a
	+ the end of the first slot where at least one PSSCH with ACK/NACK HARQ-ACK enabled is transmitted
	+ Note, SL reference duration is not used if PSSCH with ACK/NACK HARQ-ACK enabled cannot be found in the latest COT
	+ FFS: Whether to support another ending timing is FFS, e.g. for MCSt if needed
	+ Whether/how to adjust CWS for groupcast option 1 NACK-only case and whether/how to define reference duration for groupcast option 1 NACK-only case can still be discussed

**Agreement**

A CPE can be transmitted from a CPE starting position before SL transmission for the following two options:

* Option 1: within the symbol just before the next AGC symbol
* Option 2:
	+ within the symbol just before the next AGC symbol for 15 kHz SCS
	+ within at most 2 symbols just before the next AGC symbol for 30 or 60 kHz SCS
* FFS applicable scenario(s), condition(s) and channel type(s) to apply Option 1 or Option 2

**Agreement**

* A responding UE over a shared COT can be:
	+ a receiving UE, which is the target of a PSCCH/PSSCH transmission of a COT initiator
		- In the case of unicast from the COT initiator, within the same COT when the source and destination IDs contained in the COT initiator’s SCI match to the corresponding destination and source IDs relating to the same unicast at the receiving UE
		- In the case of groupcast and broadcast, when the destination ID contained in the COT initiator’s SCI match to a destination ID known at the receiving UE
	+ a UE identified by ID(s), if additional IDs are supported in the COT sharing information (in addition to the source and destination IDs of the PSCCH/PSSCH transmission), when additional IDs are included in the COT sharing information from the COT initiator
		- FFS Limitations on what additional IDs may be included and how they may be indicated

**Agreement**

A responding UE’s SL transmission(s) within RB set(s) corresponding to a shared COT can be transmitted when the CAPC value(s) of the SL transmission(s) have an equal or smaller CAPC value than the CAPC value indicated in the COT sharing information.

**Agreement**

A responding UE’s PSSCH/PSCCH transmission(s) within RB set(s) corresponding to a shared COT is intended for the COT initiating UE when,

* In the case of unicast from the responding UE, when the source and destination IDs contained in the responding UE’s PSCCH/PSSCH match to the destination and source IDs from a COT initiator’s unicast transmission that included COT sharing information, or match to the additional ID(s) included in the COT sharing information (if supported)
* In the case of groupcast or broadcast from the responding UE, when the destination ID contained in the responding UE’s PSCCH/PSSCH matches to the destination ID from a COT initiator’s groupcast or broadcast transmission that included COT sharing information, or matches to the additional ID(s) included in the COT sharing information (if supported)
* FFS: all other details and additional restrictions

## RAN1#112bis-e (April 17th – 26th, 2023)

**Agreement**

The existing NR-U EDT procedures for uplink transmissions is taken as the baseline for SL-U in Rel-18.

* FFS: details for S-SSB and PSFCH transmissions (e.g., EDT determination based on PC,MAX and/or network configured EDT, value for TA), if needed

**Agreement**

For the CPE agreements reached so far in this agenda, the 1 or at most 2 symbols just before the next AGC symbol for CPE transmission is/are physical symbol(s).

**Agreement**

The container for carrying the COT sharing information from a COT initiator UE includes at least the SCI.

* FFS 1st and/or 2nd stage SCI

**Agreement**

For dynamic channel access mode with multi-channel case in SL-U, both NR-U DL Type A and Type B multi-channel access procedure are supported for multiple PSFCH transmissions on multiple channels.

* FFS: It is up to UE implementation to perform either Type A or Type B multi-channel access procedure.
* FFS: whether this can initiate a shared COT
* FFS: whether there is any special handling needed for transmission in a shared COT on one or more of the channels

**Agreement**

Channel access procedures for SL multi-channel transmission(s) include the following cases.

* If a UE is scheduled to transmit on a set of channels *C*, and if the SL transmissions are scheduled to start transmissions at the same time on all channels in the set of channels *C*, or
* If a UE intends to perform sidelink transmissions on configured resources on the set of channels *C*, and if the SL transmissions are configured to start transmissions at the same time on all channels in the set of channels *C*, or
* If a UE intends to perform sidelink transmissions on selected resources on the set of channel *C*, and if SL transmissions are to start at the same time on all channels in the set of channels *C*.

**Agreement**

The ACK/NACK HARQ-ACK feedback corresponding to the PSSCH for SL unicast in the reference duration for the latest SL channel occupancy for which ACK/NACK HARQ-ACK feedback is available is used as follows:

* If ‘ACK’ is received, for every priority class , ; otherwise is increased to the next allowed value.
* Note: this is not applied to the case that reference duration includes multiple PSSCHs with ACK/NACK HARQ-ACK enabled, if that case is supported.

**Agreement**

The ACK/NACK HARQ-ACK feedback corresponding to the PSSCH for SL groupcast option 2 in the reference duration for the latest SL channel occupancy for which ACK/NACK HARQ-ACK feedback is available is used according to Option 2 when the ratio in Option 1 is not (pre-)configured; otherwise Option 1.

* Option 1: Based on a (pre-)configurable ratio of received SL HARQ-ACK feedbacks in the latest SL reference duration, is reset to for every priority class , otherwise increase for every priority class to the next higher allowed value.
	+ FFS: whether the ratio of the received SL HARQ-ACK feedbacks is ‘ACK’, ‘NACK’ or ‘ACK+NACK’
	+ FFS: how to calculate the ratio
	+ Note: the (pre-)configuration ratio values of 100% is a valid candidate
* Option 2: If at least a ‘ACK’ is received related to any transmissions within the latest SL reference duration, for every priority class ; otherwise is increased.

**Working assumption**

When multiple CPE starting candidate positions are (pre-)configured for PSCCH/PSSCH transmission, for the case of initiating a COT

* For partial RB set resource allocation, the UE selects a CPE starting position according to one of the followings (to be down-selected) according also to reservation information
	+ A (pre-)configured default CPE starting position
	+ The highest priority among the detected and the transmitted reservations
	+ Note: the exact condition and how to use reservation information needs to be decided
	+ FFS whether the behavior should be allowed for full RB set resource allocation
	+ FFS other condition including comparison of EDT and the measured energy associated the existing reservation
	+ FFS whether the use of reservation information is conditioned on the existence of other technologies (e.g., NR-U)
* For the case of full RB set resource allocation, a CPE starting position is randomly selected among the one or multiple CPE starting candidate positions (pre-)configured per priority of the PSCCH/PSSCH transmission.
	+ FFS whether the behaviour should be allowed for partial RB set resource allocation
	+ Note: the exact condition and whether/how to use reservation information needs to be decided
	+ FFS whether the UE uses only the selected CPE starting position or a later CPE starting position(s) than the selected one (e.g., if failed or not finished) could be also used.
	+ FFS whether the use of reservation information is conditioned on the existence of other technologies (e.g., NR-U)
* FFS whether this applies only to mode 2 or including mode 1 as well

**Agreement**

For 15 kHz, 30kHz and 60kHz SCSs, a set of CPE starting candidate position(s) for PSCCH/PSSCH is (pre-)configured or pre-defined in the spec (to be down-selected) separately for transmission within COT and transmission outside COT.

* Note: It is up to the (pre-)configuration or pre-definition in the spec (to be down-selected) whether each set of CPE starting candidate position(s) associated with Option 1 (1-symbol length) for CPE window or Option 2 (2-symbol length) for CPE window and whether each set of CPE starting candidate position(s) include one or multiple starting position(s)
* FFS whether the set(s) of CPE starting positions are (pre-)configured/pre-defined per priority
* FFS values for the (pre-)configured/pre-defined CPE starting candidate position(s) (including a default value) for each set, and whether the default value is the same or different for different sets

**Agreement**

At least the following information should be used as part of COT sharing information from the COT initiator UE.

* + CAPC used for initiating the COT
	+ Existing / legacy R16/17 L1 source and destination IDs
		- FFS additional ID(s)
	+ Time domain information of the shared COT
		- FFS: starting offset, number of slots, [remaining or total] COT duration, or a combination of them
	+ Frequency domain information of the shared COT
		- FFS applicable RB set(s), FRIV, and any other(s)
	+ FFS: how each of the above is indicated.
	+ Note, other information is not precluded.

**Agreement**

Send an LS to RAN2 according to the following content for the LS:

|  |
| --- |
| RAN1 has discussed the following approaches to implement/achieve MCSt for SL-U communication. RAN1 would like to seek RAN2’s opinion on the following questions.Approach 1: “best effort for multiple TBs”* Step 1: Higher layer triggers L1 resource selection for one TB with one set of parameters (, remaining PDB, and ) - R16/17 behavior.
* Step 2: L1 report a set of candidate single-slot resource (*SA*) according to existing L1 resource allocation procedure - R16/17 behavior.
* Step 3: Higher layer selects a set of resources either randomly (R16/17 behavior) or according to a consecutive-slots criterion (new behavior) to achieve MCSt.
* Step 4: Repeat Step 1-3 for different TB if required.

Approach 2: “guarantee MCSt for single TB and best effort for multiple TBs”* Step 1: Higher layer triggers L1 resource selection for one TB with one set of parameters (, remaining PDB, and ) + “number of slots for MCSt” which could be derived based on CAPC of the logical channel/TB or other means.
* Step 2: L1 report a set of candidate multi-slot resource (*SA*) according to most of the existing L1 resource allocation procedure (FFS: RSRP calculation / threshold may need to change)
* Step 3: Higher layer selects a candidate multi-slot resource either randomly (R16/17 behavior) or according to a consecutive-slots criterion (new behavior).
* Step 4: Repeat Step 1-3 for different TB if required.

Approach 3: “guarantee MCSt for multiple TBs”* Step 1: Higher layer triggers L1 resource (re-)selection one time for one or multiple TBs with one set of parameters (, remaining PDB, and ) + “number of slots for MCSt” which could be derived based on CAPC of the multiple TBs.
* Step 2: L1 report a set of candidate multi-slot resource (*SA*) according to most of the existing L1 resource allocation procedure (FFS: RSRP calculation / threshold may need to change)
* Step 3: Higher layer selects transmission resource for the one or multiple TB(s) from the reported set of candidate multi-slot resource (*SA*).

**Question 1 (for Approach 1/ Approach 2):** feasibility of selecting the resource for a single TB in MAC layer (single-slot under Approach 1, multi-slot under Approach 2) with the principle of “concatenating” across separate resource selection triggers (across TBs)**Question 2 (for Approach 3):** feasibility of triggering the resource selection procedures for multiple SL processes at the same time**Question 3 (Approach 2/ Approach 3):** feasibility of providing a new parameter “number of slots for MCSt” to L1 when triggering resource (re-)selection for MCSt |

**Action to RAN2: RAN1 respectfully asks RAN2 to provide an answer to the questions above.**

**Agreement**

Final LS to RAN2 in [R1-2304257](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_112b-e/Inbox/R1-2304257.zip).

**Agreement**

To resolve the Type 1 LBT blocking issue, where one UE performing a Type 1 LBT procedure for using its own selected/reserved resource(s) is blocked by another UE’s SL transmission at least in a slot preceding to the selected/reserved resource and causing the LBT to fail, further study the following options in a future meeting.

* Option 1:
	+ UE avoid selection of N consecutive resource(s) before a reserved resource with high priority when the transmitting symbols of the selected resource overlap with Type 1 LBT of the reserved resource.
	+ UE avoid selection of N consecutive resource(s) after a reserved resource when the transmitting symbols of the reserved resource overlap with LBT of the selected resource.
	+ FFS: the avoidance should be performed by L1 exclusion or L2 MAC selection
	+ FFS: whether / how to achieve this in RA mode 1
	+ FFS: How to determine value of N
* Option 2:
	+ UE prioritizes/selects resource(s) for transmission in slot(s) after a reserved resource when transmission of the selected resource is able to share the initiated COT of the reserved resource (i.e., the selected resource(s) is within the COT duration of the reserved resource and the CAPC value of the selected resource(s) is equal to or higher than that of the reserved resource).
	+ UE prioritizes/selects resource(s) for transmission in slot(s) before a reserved resource when transmission of the selected resource is able to share its initiated COT with the reserved resource (i.e., the reserved resource is within the COT duration of the selected resource(s) and the CAPC value of the selected resource(s) is equal to or smaller than that of the reserved resource).
	+ FFS whether / how to achieve this in RA mode 1.
* Option 3: UE selects extra / more resources than required for transmitting a TB (i.e., overbooking) to accommodate potential Type 1 LBT failures. FFS how to determine/preconfigure the number of extra selected resources.
* Option 4: The expected LBT duration is determined firstly, then resource selection takes into account of the expected LBT duration is performed.
* Option 5: At MAC layer, selection of resource(s) among the reported set of candidate resources from L1 is up to UE implementation in mode 2 for SL-U, instead of random selection.
* Option 6: UE excludes frequency resources (if any) previously reserved via SCI by other SL UEs in the corresponding slot, when estimating the detected power within a sensing slot duration in Type 1 channel access.
* Option 7: SL UE deems channel busy only if the UE detects transmission other than SL transmission occupying the channel (e.g., exceeding the energy detection threshold), i.e., the energy detection for EDT checking in LBT procedure does not take into account the energy from SL transmissions.
* Option X: No solution is needed. To avoid inter-UE blocking from performing Type 1 LBT can be handled based on UE implementation (e.g., as the start timing to perform LBT sensing is determined by each UE).

**Agreement**

A higher layer parameter “*absenceOfAnyOtherTechnology*” is supported in Rel-18 for SL transmissions in unlicensed bands (e.g., by level of regulation).

* This is per carrier (pre-)configuration
* This parameter “*absenceOfAnyOtherTechnology*” is not expected to be provided if the SL-U carrier is overlapped with either the LTE-LAA or the NR-U carrier.

**Conclusion**

For defining the locations of CPE starting positions, RAN1 concludes that the NR-U principle for switching gaps is reused in SL-U, that is:

* The TX/RX switching gap is already included in the existing channel sensing structures
* The RX/TX switching gap is already included in the existing channel sensing structures

## RAN1#113 (May 22th – 26th, 2023)

**Agreement**

* A set of all candidate CPE starting positions for SL transmission in FR1 unlicensed spectrum is pre-defined in TS38.211 as followed.
	+ For 15kHz SCS, the set contains values {, , , , , , }
	+ For 30kHz SCS, the set of values for CPE window of one-symbol length is {, , }
	+ For 30kHz SCS, the set of values for CPE window of two-symbol length is {, , , , , , }
	+ For 60kHz SCS, the set of values for CPE window of one-symbol length is {, }
	+ For 60kHz SCS, the set of values for CPE window of two-symbol length is {, , }
	+ is the starting position of the next AGC symbol
		- Note: when the CPE starting position is , it means that the CPE length is 0
	+ is the starting position of the first symbol just before the next AGC symbol
	+ is the starting position of the second symbol just before the next AGC symbol

**Agreement**

When UE performs Type 1 channel access to initiate a COT for PSCCH/PSSCH transmission:

* Scheme 1: The UE selects the (pre-)configured default CPE starting position.
* Scheme 2: A CPE starting position is randomly selected among one or multiple CPE starting candidate positions (pre-)configured per priority of the PSCCH/PSSCH transmission
	+ The mapping one or multiple CPE starting positions per priority can be up to (pre-)configuration.
	+ FFS: whether the priority should be the L1 priority or CAPC (to be down-selected in RAN1#114)
* For partial and full RB set resource allocations
	+ If a resource reservation is transmitted or resource reservations is detected for the slot and the RB set(s) of the intended PSCCH/PSSCH transmission, Scheme 1 is applied; otherwise, Scheme 2 is applied
	+ FFS: other conditions to determine whether to use scheme 1 or scheme 2
	+ FFS: further enhancements for the full RB set case

**Agreement**

A set of one or more candidate CPE starting position(s) that can be used for PSCCH/PSSCH transmission within a COT (for the case of sharing a COT) and outside a COT (for the case of initiating a COT) is separately (pre-)configured per resource pool based on the pre-defined set of all candidate CPE starting positions.

* Note: for the case of sharing a COT, the CPE occurs after LBT gap for type 2A/2B/2C
* FFS whether a subset of candidate CPE starting position(s) that can be used for PSCCH/PSSCH transmission within a COT is indicated by SCI carrying COT sharing information
* FFS whether default starting position is included in each set

**Agreement**

For the time-domain information to be included as part of COT sharing information, at least the following is included:

* Remaining COT duration
	+ FFS it is an absolute time length in ms or in number of slots, and payload size
* FFS: how to determine the shared slots and the starting time of the shared slots, e.g. if some slots are only intended for the COT-initiating UE and not to be shared with other UEs

**Agreement**

A sidelink transmission burst is defined as a set of SL transmissions from a UE without any gaps greater than 16μs. Transmissions from a UE separated by a gap of more than 16μs are considered as separate sidelink transmission bursts. A UE can transmit SL transmission(s) after a gap of up to 16µs within a sidelink transmission burst without sensing the corresponding channel(s) for availability.

**Agreement**

Specification supports that CPE can be transmitted between any two consecutive SL transmissions by the same UE to reduce the gap between the two transmissions so that it does not exceed .

* Note: for this case, the CPE length should not be longer than up to symbols, as per previous agreements
* FFS: details if needed (e.g., considering outcome of discussion on PSFCH-like signal in PHY agenda)
* FFS whether PSSCH can be transmitted instead of or in addition to CPE
* FFS: how to determine the CPE starting position

**Working assumption**

For UE-to-UE COT sharing in SL-U, a parameter “*ue-toUE-COT-SharingED-Threshold*” is configured to be used in the energy detection threshold adaptation procedure (similar to *ul-toDL-COT-SharingED-Threshold-r16* used for UL-to-DL COT sharing in NR-U)

* FFS candidate value(s) (need to take into consideration of different UE power class) and the granularity for the configuration

**Agreement**

When UE performs Type 2 channel access to start transmitting within a shared COT (to be further studied and down-selected in RAN1#114):

* Alt. 1: Use the method for using CPE for the case when UE performs Type 1 channel access to initiate a COT for PSCCH/PSSCH transmission
* Alt. 2: Use only the (pre-)configured default CPE starting position
* Alt. 3: use CPE to make the gap smaller or equal 16us
* Alt. 4: others

**Agreement**

For the (pre-)configurable ratio of received SL HARQ-ACK feedbacks in determining the value for the case of ACK/NACK HARQ-ACK feedback corresponding to the PSSCH for SL groupcast option 2 in the reference duration for the latest SL channel occupancy for which ACK/NACK HARQ-ACK feedback is available, the ratio is calculated by M/P, where M is the number of received ‘ACK’ feedbacks and P is the number of expected HARQ-ACK feedback to be received (equal to the number of members in a group -1).

* When the calculated ratio is equal to or above the (pre-)configured ratio, is reset to for every priority class , otherwise increase for every priority class to the next higher allowed value.

**Agreement**

If UE performs SL transmission using Type 1 channel access procedures associated with the channel access priority class on a channel and the SL transmission is not associated with explicit HARQ-ACK feedback by the corresponding UE(s), the following is adopted for the CW adjustment.

* For every priority class ,use the latest used for any SL transmissions on the channel using Type 1 channel access procedures associated with the channel access priority class .
* If the same value is consecutively used for X times for generation of , is updated for every priority class to the next higher allowed value.
	+ FFS: whether this only applies to a resource pool without PSFCH configuration
	+ FFS: value of X

**Working assumption**

The required UE processing time for decoding COT-SI is the same as SCI decoding, which is as defined by Table 8.1.4-1 in TS38.214.

* The UE processing time starts from the end of slot of the SCI that carries the COT sharing information in a slot

**Working assumption**

For the case where a COT initiating UE uses Type 1 channel access procedure to initiate a SL transmission,

* it is supported that the COT initiating UE can transmit transmission(s) within the same channel occupancy that follows a COT responding UE’s SL transmission(s) according to the channel access procedures.
	+ FFS details of the SL transmission(s) from responding UE
	+ FFS whether the above should be based on NR-U DL-UL-UL (Clause 4.2.1.0.3 of TS37.213) or DL-UL-DL (Clause 4.1.3 of TS37.213) COT sharing principle and its corresponding transmission gap requirements
	+ FFS any other condition and restriction

**Agreement**

If a responding UE shares a channel occupancy initiated by a COT initiating UE using Type 1 SL channel access procedure on a channel, the responding UE may transmit a SL transmission that follows a SL transmission by the COT initiating UE after a gap as follows:

* If the gap is at least 25μs, the responding UE can transmit the SL transmission on the shared channel after performing Type 2A SL channel access procedures.
* If the gap is equal to 16μs, the responding UE can transmit the SL transmission on the shared channel after performing Type 2B SL channel access procedures.
* If the gap is up to 16μs and the transmission is limited to 584μs, the responding UE can transmit the SL transmission on the channel after performing Type 2C SL channel access.

**Working assumption**

For Type 1 LBT block issue (inter-UE case), the following option 2 and option 1 are supported separately based on UE capability

* Option 2: If transmission in slot(s) before a reserved resource is able to share its initiated COT to the reservation [with high L1 SL priority], UE may prioritize/select resource(s) in the slot(s) for transmission.
	+ FFS: details of applying this prioritization, which layer to perform above prioritization behaviour, and if the reserved resource belongs to a MCSt, the COT initiating UE should be able to share the COT to cover the whole MCSt
	+ (pre)configuring enabling/disabling option 2 is supported
* Option 1:
	+ UE may avoid selection of N consecutive resource(s) before a reserved resource with high L1 SL priority.
		- The value of N can be selected from {0, 1, 2}
		- The selection of the value of N is up to UE implementation
			* FFS: unless (pre-)configured or indicated by UE reserved resource in SCI
	+ UE may avoid selection of M consecutive resource(s) after a reserved resource when the transmitting symbols of the reserved resource overlap with LBT of the selected resource.
		- M is determined based on UE implementation (at least including 0)
	+ FFS: Which layer to perform above behaviour
	+ FFS: any restriction of M
	+ (pre)configuring enabling/disabling option 1 is supported
* FFS: Whether the above high priority is determined according to a (pre)configured threshold
* Note: both option1 and option2 are optional UE features

## RAN1#114 (August 21st – 25th, 2023)

**Working assumption**

When UE performs Type 2 channel access to transmit PSCCH/PSSCH within a COT:

* By default, only one value is (pre-)configured for the set of CPE starting position for inside COT
	+ The value is the default CPE starting position
	+ UE only use the (pre-)configured default CPE starting position
* When more than one values are (pre-)configured for the set of CPE starting position for inside COT
	+ One of these values is the default CPE starting position
	+ UE use the same method for using CPE for the case when UE performs Type 1 channel access to initiate a COT for PSCCH/PSSCH transmission
* FFS: whether to support that CPE can be transmitted between any two consecutive SL transmissions between COT initiator and responder, to reduce the gap between two transmissions so that it does not exceed 16us, the CPE is selected from the CPE(s) (pre-)configured for PSCCH/PSSCH within a COT

**Agreement**

A single CPE starting position for PSFCH transmission is (pre-)configured per resource pool and the value is from the set of all candidate CPE starting position defined in TS38.211.

**Agreement**

A single CPE starting position for S-SSB transmission is (pre-)configured for the SL BWP and the value is from the set of all candidate CPE starting position defined in TS38.211.

**Agreement**

“CAPC level of the initiated channel occupancy”, the payload size is 2 bits and it is carried in the 2nd stage SCI.

**Agreement**

The applicable RB set(s) for COT sharing is derived based on the “Frequency resource assignment” field in the 1st stage SCI corresponding to PSSCH with COT sharing.

**Working assumption**

An “Additional ID(s)” field is supported for unicast, groupcast and broadcast, and it is carried in the 2nd stage SCI.

* One pair of L1 source and destination IDs of 24 bits for all cast types + 2 bits for the cast type
	+ At least for unicast, the source ID is set to the source ID of the COT initiator corresponding to the intended destination

**Agreement**

For the case where a COT initiating UE uses Type 1 channel access procedure to initiate a SL transmission, in order to support the COT initiating UE to resume its transmission(s) within the same channel occupancy after a COT responding UE’s transmission,

* If the COT initiator UE determines the TX gap between responding UE’s SL transmission and the initiator UE’s resumed transmission,
	+ The COT initiating UE performs Type 2A, or Type 2B, or Type 2C SL channel access procedures if the gap is at least 25μs, or equal to 16μs, or up to 16μs, respectively.
* Otherwise, the COT initiating UE performs Type 2A SL channel access procedures to resume its SL transmission.

**Agreement**

A UE using a Type 1 channel access procedure to initiate a channel occupancy for SL transmission can resume its transmission(s) within the same channel occupancy, after the COT initiating UE has stopped transmitting, by performing a Type 2A SL channel access procedures, if the channel sensed by the UE is continuously idle.

**Agreement**

“Remaining COT duration” is expressed in physical slots and it is carried in the 2nd stage SCI. The payload size is 4 bits in 15kHz, 5 bits in 30kHz and 6 bits in 60kHz

* If the indicated remaining COT duration is 0 slot, then the COT is not shared by the initiator UE.
* The starting slot for the remaining COT duration is the slot in which the COT-SI is transmitted.
	+ Note, when the COT-SI is transmitted in slot n, and if the remaining COT duration is set to K, then the end of the COT duration to share is slot n+K.

Note: “Remaining COT duration” cannot be such that the COT exceeds the maximum COT duration.

**Working assumption**

When UE performs Type 1 channel access for a MCSt carrying multiple TBs, the CAPC value to be used in Type 1 channel access is the highest CAPC value (lowest CAPC level) associated with the multiple TBs.

**Agreement**

When Type 2A channel access procedures is used for transmitting S-SSB outside a shared COT, for the EDT:

* =5dB for transmission including S-SSB.

**Agreement**

For SL-U UE operates in Mode 1 resource allocation, when UE uses PSSCH resource(s) provided by a DCI format 3\_X or, for a configured grant for single TB,

* The UE generates a NACK when, due to LBT failure, the UE does not transmit a PSSCH in any of the resources provided by a DCI format 3\_X or, for a configured grant, in any of the resources provided in a single period and for which the UE is provided a PUCCH resource to report HARQ-ACK information. The priority value of the NACK is same as the priority value of the PSSCH that was not transmitted due to LBT failure.
* FFS: whether/how to support multiple TBs for a DCI format 3\_X or a configured grant.

**Working assumption**

In Mode 2 resource allocation:

* Alt. 1: (rectangular shaped)
	+ For contiguous RB based
		- A candidate multi-slots resource is defined as a set of contiguous sub-channels starting from sub-channel in consecutive slots starting from slot .
	+ For interlaced RB based
		- A candidate multi-slots resource is defined as a set of contiguous sub-channels starting from sub-channel in consecutive slots starting from slot in contiguous RB sets starting from RB set z.
		- A candidate single-slot resource is defined as a set of contiguous sub-channels starting from sub-channel in slot in contiguous RB sets starting from RB set z.
* Note, different candidate multi-slot resources can overlap in time.

**Agreement**

In Option 2, the behaviour of UE prioritization / selection of transmission resources in slot(s) before a reserved resource that is able to share UE’s initiated COT is performed at the higher layer (MAC layer).

* Note: it is up to UE implementation how the physical layer report detected reserved resources to MAC layer

**Working assumption**

In Option 1, the following UE behaviours are performed at the higher layer (MAC layer).

* UE may avoid selection of N consecutive resource(s) before a reserved resource with high L1 SL priority.
* UE may avoid selection of M consecutive resource(s) after a reserved resource when the transmitting symbols of the reserved resource overlap with LBT of the selected resource.
* Note: it is up to UE implementation how the physical layer report detected reserved resources to MAC layer

**Agreement**

In Mode 2 resource allocation,

* The higher layer can indicate a “number of consecutive slots for MCSt” () larger than 1 for L1 reporting multi-slots candidates to the higher layer. The candidate multi-slots resource definition is applied.
	+ Otherwise, the candidate single-slot resource definition is applied (same as R16/17).
* The higher layer selects resources from the reported according to one of the following based on UE implementation:
	+ Random selection as per R16/17
	+ Higher layer is not restricted to select resources at random, and can select in consecutive slots
		- It is up to RAN2 to define detailed behaviour as needed
	+ It is RAN1 intention that, once the higher layer selects a multi-slots candidate from the set , it will use all the single-slot resources of the selected multi-slots candidate for transmission. This RAN1 agreement has no intention on potential RAN2 discussion about how SL resource selection processes are defined in MCSt.
* Note, the above is intended to support Approach 1 and 2 only.
* Send an LS to RAN2 informing that it is up to RAN2 to decide in regards to the HARQ RTT timing (minimum time gap)
	+ whether a single TB transmitted over consecutive slots is supported in a resource pool configured with PSFCH resource

**Agreement**

When UE performs Type 1 channel access to initiate a COT for PSCCH/PSSCH transmission, in the agreed Scheme 2 from RAN1#113, a CPE starting position is randomly selected among one or multiple CPE starting candidate positions (pre-)configured per priority of the PSCCH/PSSCH transmission. The priority level is based on the L1 priority.

**Agreement**

For the additional ID, where one pair of L1 source and destination IDs of 24 bits for all cast types:

* For groupcast and broadcast, only L1 destination ID is provided, and source ID bits are reserved.

## RAN1#114bis (October 09th – 13th, 2023)

**Agreement**

RAN1 to provide the following response to RAN2’s questions in the received LS (R1-2308832/R2-2309157)

* *RAN1 response: SL-U RB set is indexed in the same manner as defined for NR-U in clause 7 of TS 38.214 for the purpose of C-LBT failure report, and the RB set index is unique within a SL BWP.*

**Agreement**

Update the following WA made in RAN1#113:

|  |
| --- |
| **Working assumption (RAN1#113)**For Type 1 LBT block issue (inter-UE case), the following option 2 and option 1 are supported separately based on UE capability* Option 2: If transmission in slot(s) before a reserved resource is able to share its initiated COT to the reservation [when the L1 SL priority value for the transmission is higher than the L1 SL priority value of the reserved resource] ~~[with high L1 SL priority]~~, UE may prioritize/select resource(s) in the slot(s) for transmission.
	+ FFS: details of applying this prioritization, which layer to perform above prioritization behaviour, and if the reserved resource belongs to a MCSt, the COT initiating UE should be able to share the COT to cover the whole MCSt
	+ (pre)configuring enabling/disabling option 2 is supported
* Option 1:
	+ UE may avoid selection of N consecutive resource(s) before a reserved resource when the L1 SL priority value for the transmission is higher than the L1 SL priority value of the reserved resource.
		- The value of N can be selected from {0, 1, 2}
		- The selection of the value of N is up to UE implementation
			* FFS: unless (pre-)configured or indicated by UE reserved resource in SCI
	+ UE may avoid selection of M consecutive resource(s) after a reserved resource when the transmitting symbols of the reserved resource overlap with LBT of the selected resource.
		- M is determined based on UE implementation (at least including 0)
	+ FFS: Which layer to perform above behaviour
	+ FFS: any restriction of M
	+ (pre)configuring enabling/disabling option 1 is supported
* FFS: Whether the above high priority is determined according to a (pre)configured threshold
* Note: both option1 and option2 are optional UE features
 |

**Agreement**

TP#5 in section 4.5 is endorsed for TS38.214 clause 8.1.4.

**Agreement**

Endorse the higher layer parameters below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Param Name** | **Description** | **Value range** | **Default value aspect** | **Per (UE, cell, TRP, …)** | **UE-specific or cell-specific** |
| CPEStartingPositionsPSCCH-PSSCH-InitiateCOT | A set of selected indices that correspond to multiple candidate CPE starting positions to be used for PSCCH/PSSCH transmission when UE initiating a COT. The set of selected indices can be a full set or a subset of the indices of all candidate CPE starting positions specified in Table 5.3.1-3 [16, TS38.211], according to the SCS of the SL BWP. One or multiple of the selected indices is associated per L1 priority of PSSCH. One of the selected indices or a different candidate CPE starting position index is assigned as the default CPE starting position.\* Note, it is up to RAN2 to decide on whether the same RRC parameter or a separate RRC parameter should be introduced for assigning the default CPE starting position for the case of UE initiating a COT for PSCCH/PSSCH transmission. | SEQUENCE (SIZE (1..N)) OF integer 1 to X | N/A | Per resource pool | UE-specific or Cell-specific |
| CPEStartingPositionsPSCCH-PSSCH-WithinCOT | A set of one or multiple selected indices that correspond to one or multiple candidate CPE starting positions to be used by UE for PSCCH/PSSCH transmission within a COT. By default, only one index (which is the default CPE starting position) is selected from the set of all candidate CPE starting positions specified in Table 5.3.1-3 [16, TS38.211], according to the SCS of the SL BWP. When multiple indices are selected, one or multiple of the selected indices is associated per L1 priority of PSSCH. One of the selected indices or a different candidate CPE starting position index is assigned as the default CPE starting position.\* Note, it is up to RAN2 to decide on whether the same RRC parameter or a separate RRC parameter should be introduced for assigning the default CPE starting position for the case of PSCCH/PSSCH transmission within a COT. | SEQUENCE (SIZE (1..N)) OF integer 1 to X | N/A | Per resource pool | UE-specific or Cell-specific |
| CPEStartingPositionPSFCH | A CPE starting position within the GP symbol before PSFCH transmission. The value is an index of the set of all candidate CPE starting positions specified in Table 5.3.1-3 of [16, TS38.211] for Ci=1 and the corresponding SCS of the SL BWP. | INTEGER (1..X) | N/A | Per resource pool | UE-specific or Cell-specific |
| CPEStartingPositionS-SSB | A CPE starting position within the GP symbol before S-SSB transmission. The value is an index of the set of all candidate CPE starting positions specified in Table 5.3.1-3 of [16, TS38.211] for Ci=1 and the corresponding SCS of the SL BWP. | INTEGER (1..X) | N/A | Per SL BWP | UE-specific or Cell-specific |

**Agreement**

Endorse the higher layer parameters below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Param Name** | **Description** | **Value range** | **Default value aspect** | **Per (UE, cell, TRP, …)** | **UE-specific or cell-specific** |
| type1-LBT-Blocking-Option2 | When enabled, if UE’s transmission in slot(s) before a reserved resource is able to share its initiated COT to the reservation [when the L1 SL priority value for the transmission is higher than the L1 SL priority value of the reserved resource], UE may prioritize/select resource(s) in the slot(s) for transmission. | {enabled, disabled} | N/A | Per resource pool | UE-specific or Cell-specific |
| type1-LBT-Blocking-Option1 | When enabled, UE may avoid selection of N consecutive resource(s) before a reserved resource when the L1 SL priority value for the transmission is higher than the L1 SL priority value of the reserved resource. UE may also avoid selection of M consecutive resource(s) after a reserved resource when the transmitting symbols of the reserved resource overlap with LBT of the selected resource. The selection of the value N is up to UE implementation from {0, 1, 2}. M is determined based on UE implementation (at least including 0). | {enabled, disabled} | N/A | Per resource pool | UE-specific or Cell-specific |

**Agreement**

Remove the square brackets in the following TP for TS 37.213.

|  |
| --- |
| 4.5.4 Contention window adjustment procedures for SL transmissionsIf a UE transmits a SL transmission(s) including PSSCH(s) using Type 1 channel access procedures associated with the channel access priority class on a channel and the SL transmission(s) is enabled with explicit HARQ-ACK feedback including ‘ACK’/‘NACK’, the UE maintains the contention window value and adjusts before step 1 of the procedure described in clause 4.5.1 for the SL transmission(s) applying the following procedures:1) For every priority class set .2) If a HARQ-ACK feedback corresponding to the PSSCH(s) for unicast SL transmission(s) in the reference duration for the latest channel occupancy initiated by the UE, is available:- If the HARQ-ACK feedback includes only ‘ACK’, go to step 1; otherwise go to step 4.3) If a HARQ-ACK feedback corresponding to the PSSCH(s) for groupcast SL transmission(s) in the *reference duration* for the latest channel occupancy initiated by the UE, is available:- If HARQ-ACKFeedbackRatioforContentionWindowAdjustment-GC-Option2 is provided by higher layers:- The UE calculates the ratio between the number of received ‘ACK’ in the HARQ-ACK feedback and ~~[~~the number of UE(s) from which the corresponding ‘ACK’/’NACK’ in the HARQ-ACK feedback is expected~~]~~. If the calculated ratio is equal to or larger than *HARQ-ACKFeedbackRatioforContentionWindowAdjustment-GC-Option2*, go to step 1; otherwise go to step 4.- Otherwise:- If the HARQ-ACK feedback includes at least an ‘ACK’,go to step 1; otherwise go to step 4. |

**Agreement**

In SCI format 1-A, if higher layer parameter *transmissionStructureForPSCCHandPSSCH* in *SL-BWP-Config* is configured:

Table X: 2nd-stage SCI formats for SL operation in shared spectrum

|  |  |  |
| --- | --- | --- |
| **Value of 2nd-stage SCI format field** | **1 reserved bit (1st stage SCI)** | **2nd-stage SCI format** |
| 00 | 0 | SCI format 2-A (existing) |
| 1 | SCI format 2-A (COT-SI fields are provided) |
| 01 (Reserved) | 0 | Reserved |
| 1 | Reserved |
| 10 | 0 | SCI format 2-C (existing) |
| 1 | Reserved |
| 11 (Reserved) | 0 | Reserved |
| 1 | Reserved |

Note: it is up to the TS 38.212 spec editor on how to capture the above intention.

**Agreement**

Endorse the TP below for TS37.213

|  |  |
| --- | --- |
| ***Reason for change:*** | The current specification only mandates the UE to use the highest CAPC value among the associated CAPC values with the multiple TBs for performing the Type 1 channel access procedure. This does not include the case when S-SSB / PSFCH is transmitted within the same channel occupancy. |
|  |  |
| ***Summary of change:*** | It is clarified that within a channel occupancy initiated by Type 1 channel access procedure, the highest CAPC value among the associated CAPC values with the multiple SL transmissions is used for the Type 1 channel access procedure. |
|  |  |
| ***Consequences if not approved:*** | The cases of PSFCH and S-SSB transmissions and stop-resume transmissions are not considered when determining the CAPC value for Type 1 channel access procedure. |

|  |
| --- |
| **< Start of text proposal >**4.5 Sidelink Channel access proceduresA UE operating in sidelink resource allocation mode 1 or mode 2 and performing SL transmission(s) on channel(s) shall perform the procedures described in this clause for the UE to access the channel(s) on which the transmission(s) are performed.**<Unchanged part omitted>**When a UE applies Type 1 channel access procedure to initiate a channel occupancy for multiple SL transmissions over one slot or multiple consecutive slots, the highest CAPC value among the associated CAPC values with the multiple SL transmissions is used for performing the Type 1 channel access procedure.**<End of text proposal>** |

**Agreement**

TP#3 Proposal v2 in section 4.3.2 of R1-2310292 is endorsed for TS37.213 clause 4.5.6.3

**Agreement**

After UE successfully performed a multi-channel access procedure for a set of RB sets,

* A channel occupancy is initiated for the set of RB sets and the UE can use the initiated channel occupancy for own subsequent transmissions (including all S-SSB, PSFCH, PSCCH/PSSCH) when the channel access procedures described in clause 4.5.6.3 is used.
* When a channel occupancy is initiated using the channel access procedures described in clause 4.5.6.3 to transmit SL transmission(s), the channel occupancy can be shared to other UEs when the initiating UE transmits PSCCH/PSSCH in the SL transmission(s), and the channel occupancy time of each channel is the same in this case.

**Agreement**

TP#7 in section 4.7 of R1-2310292 is endorsed for TS 38.214 clause 8.1.4.

**Agreement**

Update the WA made in RAN1#114bis as follows.

|  |
| --- |
| **Working assumption (RAN1#113)**For Type 1 LBT block issue (inter-UE case), the following option 2 and option 1 are supported separately based on UE capability* Option 2: If transmission in slot(s) before a reserved resource is able to share its initiated COT to the reservation, UE may prioritize/select resource(s) in the slot(s) for transmission.
	+ FFS: details of applying this prioritization, and if the reserved resource belongs to a MCSt, the COT initiating UE should be able to share the COT to cover the whole MCSt
* (pre)configuring enabling/disabling option 2 is supportedOption 1:
	+ UE may avoid selection of N consecutive resource(s) before a reserved resource when the L1 SL priority value for the transmission is higher than the L1 SL priority value of the reserved resource.
		- The value of N can be selected from {0, 1, 2}
		- The selection of the value of N is up to UE implementation
			* FFS: unless (pre-)configured or indicated by UE reserved resource in SCI
	+ UE may avoid selection of M consecutive resource(s) after a reserved resource when the transmitting symbols of the reserved resource overlap with LBT of the selected resource.
		- M is determined based on UE implementation (at least including 0)
	+ FFS: any restriction of M
	+ (pre)configuring enabling/disabling option 1 is supported
* FFS: Whether the above high priority is determined according to a (pre)configured threshold
* Note: both option1 and option2 are optional UE features
 |

**Agreement**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Param Name** | **Description** | **Value range** | **Default value aspect** | **Per (UE, cell, TRP, …)** | **UE-specific or cell-specific** |
| type1-LBT-Blocking-Option2 | When enabled, if UE’s transmission in slot(s) before a reserved resource is able to share its initiated COT to the reservation, UE may prioritize/select resource(s) in the slot(s) for transmission. | {enabled, disabled} | N/A | Per resource pool | UE-specific or Cell-specific |

**Agreement**

For a UE transmitting CPE between two consecutive SL transmissions by the same UE, when the gap between the two transmissions before applying CPE is one symbol in 15kHz and up to two symbol(s) in 30kHz and 60kHz,

* At least when the first of the two transmissions is PSCCH/PSSCH/PSFCH and the latter of the two transmissions is PSFCH/S-SSB, the UE follows the (pre-)configured CPE starting position for the PSFCH/S-SSB.
* When the latter of the two transmissions is PSCCH/PSSCH,
	+ the CPE starting position index from [4, TS 38.211] for the PSCCH/PSSCH transmission
		- In one symbol gap: the index is always 1
		- In two symbols gap: the index is always 3 in 30kHz and 2 in 60kHz

**Agreement**

For the autonomous update to the next higher allowed value when the same value is consecutively used for X times for generation of ,

* The (pre-)configuration provides 1 value for X among a value range of {1, 8, 16, 32, ‘infinity’}.
* This operation is restricted only to PSCCH/PSSCH transmission with HARQ feedback indicator in SCI-2 is set to disabled, regardless of PSFCH resources being configured in a resource pool.

## RAN1#115 (13 – 17 November 2023)

**Agreement**

Introduce the following new RRC parameter for the agreement on autonomous update to the next higher allowed value when the same value is consecutively used for X times for generation of .

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Param Name** | **Description** | **Value range** | **Default value aspect** | **Per (UE, cell, TRP, …)** | **UE-specific or cell-specific** |
| CWSforPsschWithoutHarqAck | The latest CW\_p is autonomously increased to the next higher allowed value for every priority class p∈{1,2,3,4} if the same CW\_p ≠ CW\_(max,p) is consecutively used for general of N\_init in SL Type 1 LBT for a number of times indicated by this parameter. This operation is restricted only to PSCCH/PSSCH transmission(s) with "HARQ feedback enabled/disabled indicator" in the 2nd stage SCI set to disabled, regardless of PSFCH resources being configured in a resource pool. | {1, 8, 16, 32, ‘infinity’} | N/A | Per SL BWP | UE-specific or Cell-specific |

**Agreement**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Param Name** | **Description** | **Value range** | **Default value aspect** | **Per (UE, cell, TRP, …)** |
| absenceOfAnyOtherTechnology | Presence of this field indicates absence on a long term basis (e.g. by level of regulation) of any other technology sharing the carrier; absence of this field indicates the potential presence of any other technology sharing the carrier, as specified in TS 37.213 [48] clauses ~~X.X.X~~ 4.5. | ENUMERATED {true} | N/A | Per cell / carrier |
| energyDetectionConfig | Indicates whether to use the maxEnergyDetectionThreshold or the energyDetectionThresholdOffset (see TS 37.213 [48], clause ~~X.X.X~~ 4.5.5). | CHOICE {maxEnergyDetectionThreshold, energyDetectionThresholdOffset} | N/A | ~~[~~Per cell / carrier~~]~~ |
| energyDetectionThresholdOffset | Indicates the offset to the default maximum energy detection threshold value. Unit in dB. Value -13 corresponds to -13dB, value -12 corresponds to -12dB, and so on (i.e. in steps of 1dB) as specified in TS 37.213 [48], clause ~~X.X.X~~ 4.5.5. | INTEGER (-13..20) | N/A | ~~[~~Per cell / carrier~~]~~ |
| maxEnergyDetectionThreshold | Indicates the absolute maximum energy detection threshold value. Unit in dBm. Value -85 corresponds to -85 dBm, value -84 corresponds to -84 dBm, and so on (i.e. in steps of 1dBm) as specified in TS 37.213 [48], clause ~~X.X.X~~ 4.5.5. | INTEGER (-85..-52) | N/A | ~~[~~Per cell / carrier~~]~~ |
| HARQ-ACKFeedbackRatioforContentionWindowAdjustment-GC-Option2 | Ratio threshold for contention window adjustment for SL groupcast option 2 as specified in TS 37.213 [48], clause ~~X.X.X~~ 4.5.4. Unit is percentage. | ~~[~~INTEGER (10..100)~~]~~ | N/A | ~~[~~Per cell / carrier~~]~~ |
| CPEStartingPositionPSFCH | A CPE starting position within the GP symbol before PSFCH transmission. The value is an index of the set of all candidate CPE starting positions specified in Table 5.3.1-3 of [16, TS38.211] for Ci=1 and the corresponding SCS of the SL BWP. | ~~[~~INTEGER (1..X)~~]~~ | N/A | Per resource pool |
| CPEStartingPositionS-SSB | A CPE starting position within the GP symbol before S-SSB transmission. The value is an index of the set of all candidate CPE starting positions specified in Table 5.3.1-3 of [16, TS38.211] for Ci=1 and the corresponding SCS of the SL BWP. | ~~[~~INTEGER (1..X)~~]~~ | N/A | Per SL BWP |

**Agreement**

Confirm the below working assumption on Type 1 LBT blocking with following modifications.

|  |
| --- |
| **Working assumption (RAN1#114bis)**For Type 1 LBT block issue (inter-UE case), the following option 2 and option 1 are supported separately based on UE capability* Option 2: If transmission in slot(s) at least before a reserved resource is able to share its initiated COT to the reservation, UE may prioritize/select resource(s) in the slot(s) for transmission.
	+ (pre)configuring enabling/disabling option 2 is supported
* Option 1:
	+ UE may avoid selection of N consecutive resource(s) before a reserved resource when the L1 SL priority value for the transmission is higher than the L1 SL priority value of the reserved resource.
		- The value of N can be selected from {0, 1, 2}
		- The selection of the value of N is up to UE implementation
	+ UE may avoid selection of M consecutive resource(s) after a reserved resource when the transmitting symbols of the reserved resource overlap with LBT of the selected resource.
		- The value of M can be selected from {0, 1, 2}
		- M is determined based on UE implementation
	+ (pre)configuring enabling/disabling option 1 is supported
* Note: both option1 and option2 are optional UE features
 |

**Agreement**

Confirm the working assumption with the following modifications

|  |
| --- |
| **Working assumption (RAN1#113)**For UE-to-UE COT sharing in SL-U, a parameter “*ue-toUE-COT-SharingED-Threshold*” is (pre-)configured per SL carrier/cell to be used in the energy detection threshold adaptation procedure* The UE that performs channel access procedures to initiate a channel occupancy to be shared to other UE(s), and another UE that shares the initiated channel occupancy shall use the (pre-)configured “*ue-toUE-COT-SharingED-Threshold*” for accessing the channel(s).
 |

**Agreement**

**Modify higher layer parameter “*ue-toUE-COT-SharingED-Threshold*” according to the following.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Param Name** | **Description** | **Value range** | **Per (UE, cell, TRP, …)** | **Required for initial access or IDLE/INACTIVE** |
| ue-toUE-COT-SharingED-Threshold | ~~Maximum~~ The energy detection threshold that ~~the~~ is to be used by a UE to initiate a channel occupancy to be shared to other UE(s), and another UE that shares the initiated channel occupancy shall use this configured parameter for accessing the channel(s) ~~with another UE for SL transmission~~ as specified in TS 37.213 [48], clause ~~X.X.X~~ 4.5.5 for sidelink channel access. Unit in dBm. Value -85 corresponds to -85 dBm, value -84 corresponds to -84 dBm, and so on (i.e. in steps of 1dBm). | ~~[~~INTEGER (-85..-52)~~]~~ | ~~[~~Per cell / carrier~~]~~ | ~~[~~UE-specific or Cell-specific~~]~~ |

**Agreement**

**The TP below for TS 37.213 is endorsed.**

|  |  |
| --- | --- |
| ***Reason for change:*** | Time required for the COT initiator to detect a responder UE’s PSFCH and S-SSB transmission(s) for resuming its own channel occupancy is expected to be longer than 1-symbol gap. In order for the initiator to resume using its own COT immediately after responder’s PSFCH and S-SSB, it is necessary to detect responder’s PSFCH and S-SSB transmissions based on an expected manner. |
|  |  |
| ***Summary of change:*** | To match the same wordings used in NR-U to resolve the “expected” behaviour. |
|  |  |
| ***Consequences if not approved:*** | The COT initiator UE cannot immediately resume transmission in its own COT using Type 2B and 2C channel access procedures after responder’s PSFCH and S-SSB transmissions. |

|  |
| --- |
| **< Start of text proposal >**4.5.3 SL channel access procedures in a shared channel occupancy**<Unchanged part omitted>**When a UE uses channel access procedures to initiate a channel occupancy to transmit SL transmission(s) and shares the corresponding channel occupancy with another UE that transmits a SL transmission(s), the UE that initiated the channel occupancy may transmit a SL transmission(s) within its channel occupancy that follows the SL transmission(s) from the other UE as the following.- If the UE determines a transmission gap from the other UE’s SL transmission(s), the followings are applicable:- If the transmission gap is at least , the UE can transmit the SL transmission on the channel after performing Type 2A channel access procedures as described in clause 4.5.2.1.- If the transmission gap is , the UE can transmit the SL transmission on the channel after performing Type 2B channel access procedures as described in clause 4.5.2.2.- If the transmission gap is up to , the UE can transmit the SL transmission on the channel after performing Type 2C channel access as described in clause 4.5.2.3.- Otherwise, the UE can transmit the SL transmission on the channel after performing Type 2A channel access procedures as described in clause 4.5.2.1.**<End of text proposal>** |

**Agreement**

**TP#7 in Section 4.7.1 of R1-2312250 for TS 38.214 is endorsed.**

**Agreement**

**Endorse the TP below for TS 37.213.**

|  |  |
| --- | --- |
| ***Reason for change:*** | Currently UE-to-UE COT sharing energy detection threshold is determined by a UE based on the UE’s transmit power. But a responder UE could use different transmit power to the power used by the COT initiator UE.  |
|  |  |
| ***Summary of change:*** | The UE-to-UE COT sharing energy detection threshold that should be used by both the initiator UE and the responder UE should be (pre-)configured per carrier/cell. A condition is added to clarify that the UE that performs channel access procedures to initiate a channel occupancy to be shared to other UE(s), and another UE that shares the initiated channel occupancy shall use the (pre-)configured “*ue-toUE-COT-SharingED-Threshold*” for accessing the channel(s). |
|  |  |
| ***Consequences if not approved:*** | The responder’s UE transmit power may not complied to the “*ue-toUE-COT-SharingED-Threshold*” calculated based on initiator’s transmit power. |

**< Start of text proposal >**

**4.5.5 Energy detection threshold adaptation procedure**

**<Unchanged part omitted>**

If the higher layer parameter *sl-absenceOfAnyOtherTechnology-r1*8is not configured to a UE,the UE that performs channel access procedures to initiate a channel occupancy to be shared to other UE(s), and another UE that shares the initiated channel occupancy as described in section 4.5.3 shall use the (pre-)configured “*ue-toUE-COT-SharingED-Threshold*” for accessing the channel(s).

For the case where a UE performs channel access procedures as described in clause 4.5.1 for SL transmission(s) and indicates channel occupancy sharing information, is set equal to the value provided by the higher layer parameter *ue-toUE-COT-SharingED-Threshold*.

**<End of text proposal>**

**Agreement**

TP#4 in Section 4.4.1 of R1-2312251 for TS 37.213 is endorsed.

**Agreement**

TP#3 in Section 4.3.1 of R1-2312251 for TS 37.213 is endorsed.

**Agreement**

TP#5 in Section 4.5.1 of R1-2312251 for TS 38.214 is endorsed.

**Agreement**

Endorse the TP below for **TS 37.213.**

|  |  |
| --- | --- |
| ***Reason for change:*** | In NR-U and LAA, channel access procedures are supported for consecutive UL transmissions and UL transmissions with multiple starting positions. Such behaviour is also a common understanding for SL-U operation. |
|  |  |
| ***Summary of change:*** | Added description to support UE performing channel access procedures for continuous SL transmissions and multiple starting positions in a slot. |
|  |  |
| ***Consequences if not approved:*** | Since the behaviour is captured for NR-U and LAA specification, if these are not captured for SL-U, it may be interpreted that these are not supported in SL-U. |

|  |
| --- |
| **< Start of text proposal >**4.5 Sidelink Channel access proceduresA UE operating in sidelink resource allocation mode 1 or mode 2 and performing SL transmission(s) on channel(s) shall perform the procedures described in this clause for the UE to access the channel(s) on which the transmission(s) are performed.**<Unchanged part omitted>**For contiguous SL transmission(s), the following are applicable:- If a UE is scheduled or autonomous selected to transmit a set of SL transmissions using one or more selected SL grant(s), and- if the UE cannot access the channel for a transmission in the set prior to the last transmission according to Type 1 or Type 2 SL channel access procedures, the UE shall attempt to transmit the next transmission according to Type 1 or Type 2 SL channel access procedures. - if the UE cannot access the channel for a transmission in the set prior to the last transmission according to Type 2B SL channel access procedure, the UE shall attempt to transmit the next transmission according to Type 2A SL channel access procedure.For SL transmission(s) with multiple starting positions in a slot, the following are applicable:- If a UE intends to transmit PSCCH/PSSCH in sidelink resource allocation mode 1 or mode 2 using a Type 1 channel access procedure, and if the UE cannot access the channel for the transmission from the 1st starting symbol of a slot, the UE shall attempt to transmit PSCCH/PSSCH from the 2nd starting symbol in the same slot according to Type 1 channel access procedure. There is no limit on the number of attempts the UE can make using Type 1 channel access procedure. - If a UE intends to transmit PSCCH/PSSCH in sidelink resource allocation mode 1 or mode 2 using a Type 2 channel access procedure, and if the UE cannot access the channel for the transmission from the 1st starting symbol of a slot, the UE may attempt to transmit PSCCH/PSSCH from the 2nd starting symbol in the same slot and according to Type 2 channel access procedure.**<End of text proposal>** |

**Agreement**

TP#2 in Section 4.2.2 of R1-2312253 for TS 37.213 is endorsed.

**Agreement**

The TP below is endorsed for TS 37.213.

|  |
| --- |
| **< Start of text proposal >**4.5.6 Channel access procedures for transmission(s) on multiple channels**<Unchanged part omitted>**the followings are applicable:- Type A or Type B procedures described in clause 4.5.6.1 and 4.5.6.2, respectively, can be used for accessing multiple channels only for PSFCH or S-SSB transmissions.- A UE can access multiple channels on which SL transmissions are performed, according to the procedures described in clause 4.5.6.3.4.5.6.1 Type A multi-channel access procedures for PSFCH or S-SSB transmissionsThe procedures described in this clause are applicable for PSFCH/S-SSB transmissions.A UE shall perform channel access on each channel , according to the procedures described in clause 4.5.1, where is a set of channels on which the UE intends to transmit, and , and is the number of channels on which the UE intends to transmit.The counter described in clause 4.5.1 is determined for each channel and is denoted as . is maintained according to clause 4.5.6.1.1 or 4.5.6.1.2.**<Unchanged part omitted>**4.5.6.2 Type B multi-channel access procedures for PSFCH or S-SSB transmissionsThe procedures described in this clause are applicable for PSFCH/S-SSB transmissions.**<Unchanged part omitted>**For the procedures in this clause, the channels of the set of channels selected by the UE for PSFCH transmissions, is a subset of the RB sets in the (pre-)configured sidelink resource pool.4.5.6.2.1 Type B1 multi-channel access procedureA single value is maintained for the set of channels .4.5.6.2.2 Type B2 multi-channel access procedureA value is maintained independently for each channel using the procedure described in clause 4.5.4.For determining for channel , value of channel is used, where is the channel with largest among all channels in set .**<End of text proposal>** |

|  |  |
| --- | --- |
| ***Reason for change:*** | Currently, the Type A and Type B multi-channel procedures are supported only for PSFCH transmissions, but not for other SL channels and signals. And the initiated channel occupancy cannot be used for any subsequent SL transmissions.  |
|  |  |
| ***Summary of change:*** | To enable the support for S-SSB transmissions using Type A and Type B multi-channel access procedures, and enabling the support for own subsequent PSFCH and S-SSB transmissions within the initiated channel occupancy. |
|  |  |
| ***Consequences if not approved:*** | Type A and Type B multi-channel procedures are not supported for S-SSB transmissions, and the initiated channel occupancy cannot be used for any subsequent SL transmissions. |

**Agreement**

The TP below is endorsed for TS38.214

**< Start of text proposal >**

**8.1.4 UE procedure for determining the subset of resources to be reported to higher layers in PSSCH resource selection in sidelink resource allocation mode 2**

In resource allocation mode 2, the higher layer can request the UE to determine a subset of resources from which the higher layer will select resources for PSSCH/PSCCH transmission. To trigger this procedure, in slot *n,* the higher layer provides the following parameters for this PSSCH/PSCCH transmission:

**<Unchanged part omitted>**

7a) If sidelink DRX active time of RX UE is provided by the higher layer and there is no candidate single-slot or multi-slot resource remained within the sidelink DRX active time in the set , the UE based on its implementation additionally selects and includes at least one candidate single-slot resource or at least one candidate multi-slot resource within the sidelink DRX active time in the set .

**<End of text proposal>**

## RAN1#116 (26 February – 01 March 2024)

**Agreement**

TP#1 (editorial corrections) in Section 4.1.1 of R1-2401529 for TS 37.213 is endorsed.

**Agreement**

TP#2 in Section 4.2.1 of R1-2401529 for TS 37.213 Clause 4.5.3 is endorsed.

**Agreement**

TP#3 in Section 4.3.1 of R1-2401529 for TS 37.213 Clause 4.5.3 is endorsed.

**Agreement**

TP#4 in Section 4.4.1 of R1-2401529 for TS 37.213 Clause 4.5.3 is endorsed.

**Agreement**

TP#5 in Section 4.5.1 of R1-2401529 for TS 37.213 Clause 4.5.6.1 is endorsed.

**Agreement**

TP#7 in Section 4.7.1 of R1-2401529 for TS 37.213 Clause 4.5.3 and 4.5.6 is endorsed.

**Agreement**

TP#17 in Section 4.17.1 of R1-2401529 for TS 38.214 Clause 8.1.2.1 is endorsed.

**Agreement**

TP#8 in Section 4.8.1 of R1-2401529 for TS 37.213 Clause 4.5.4 is endorsed.

**Agreement**

TP#12 in Section 4.12.1 of R1-2401529 for TS 37.213 Clause 4.5.5.1 is endorsed.

**Agreement**

TP#6 in Section 4.6.1 of R1-2401530 for TS 37.213 Clause 4.5.6.2 is endorsed.

**Agreement**

The TP below is endorsed for TS38.211

* Note to the editor: the bracket and the comma are also newly added (but don’t show in red in the TP below)

|  |  |
| --- | --- |
| Reason for change: | Length-zero CPE has been agreed in RAN1 and currently this is not reflected in TS 38.211. For the sidelink channels, i=0 currently results in an undefined value of T\_ext and consequently no possibility to indicate T\_ext=0 in line with the agreement. |
|  |  |
| Summary of change: | Reuse the NR-U equation for dynamically scheduled PUSCH, SRS, and PUCCH transmissions. Using index from Table 5.3.1-3 would identify a CPE with length zero. |
|  |  |
| Consequences if not approved: | The agreed length-zero CPE remains unusable in the specification. |

**< Start of text proposal >**

**5.3.1 OFDM baseband signal generation for all channels except PRACH and RIM-RS**

**<Unchanged part omitted>**

- for PSCCH/PSSCH, PSFCH, and S-SS/PSBCH block transmission

 where and are given by Table 5.3.1-3 with the index given by the procedure in [5, TS 38.213] or [6, TS 38.214].

**<End of text proposal>**

**Agreement**

TP#18 in Section 4.18.1 of R1-2401530 for TS 38.214 Clause 8.1.4 is endorsed

* Note to the editor: the text asks to start a new paragraph (not to add that text in the specs).

**Agreement**

TP#9 in Section 4.9.1 of R1-2401530 for TS 37.213 Clause 4.5 is endorsed without “, respectively”.

**Agreement**

TP#10 in Section 4.10.1 of R1-2401530 for TS 37.213 Clause 4 is endorsed.

**Agreement**

TP#11 in Section 4.11.1 of R1-2401530 for TS 37.213 Clause 4.5.1 is endorsed.

**Agreement**

TP#19 in Section 4.19.1 of R1-2401530 for TS 38.213 Clause 16.5 is endorsed.

**Conclusion**

When a UE resumes SL transmission(s) within its own COT, the CAPC value corresponding to the SL transmission(s) is at most equal to the CAPC value used to initiate the channel occupancy.

**Agreement**

* **The TP below for TS 37.213 Clause 4.5.6.3 is endorsed.**
* **Value ‘0’ is included in the RRC parameter “***intraCellGuardBandsSL-List***” with the following note to the provided as part of the update to the RRC parameter**
* **Note, the value ‘0’ is not expected to be (pre-)configured when the SL BWP is larger than UE supported RF bandwidth for SL-U operation.**

|  |  |
| --- | --- |
| Reason for change: | Currently, square brackets are still in place for a paragraph in the multi-channel access procedures for SL transmissions. |
|  |  |
| Summary of change: | Removal of the square brackets. |
|  |  |
| Consequences if not approved: | It remains unclear whether a UE can transmit on a channel within the bandwidth of a carrier if the UE fails to access any of the channels of the SL bandwidth part when no intra-cell guard band(s) is configured. |

**< Start of text proposal >**

**4.5.6.3 Multi-channel access procedures for SL transmissions**

**<Unchanged part omitted>**

- the UE may not transmit on channel within the bandwidth of a carrier, if the UE fails to access any of the channels, of the carrier bandwidth, on which the UE is scheduled or configured with or selects SL resources.

- the UE may not transmit on a channel within the bandwidth of a carrier if the UE is configured without intra-cell guard band(s) on an SL bandwidth part as described in clause 7 of [8], and the UE fails to access any of the channels of the SL bandwidth part.

**<End of text proposal>**

**Agreement**

The TP below is endorsed to clearly define the remaining COT duration that can be shared / transmitted by other UE(s).

|  |  |
| --- | --- |
| Reason for change: | It is incorrect to say the initiated channel occupancy by the UE can be shared for SL transmission(s) by other UE(s) within a duration starting from the end of slot and ending at slot . In fact, the starting slot where other UE(s) can start SL transmission(s) should take into account of the UE processing time. |
|  |  |
| Summary of change: | Refine the sentence to define the remaining channel occupancy duration is starting from the end of slot and ending at slot .orTo clearly state that the duration within which other UE(s) can use a shared channel occupancy for SL transmission(s) starts from the end of slot and ending at slot . |
|  |  |
| Consequences if not approved: | The specification remains incorrect on the initiated channel occupancy by the UE can be shared for SL transmission(s) by other UE(s) within a duration starting from the end of slot and ending at slot . |

**< Start of text proposal >**

**4.5.3 SL channel access procedures in a shared channel occupancy**

**< Unchanged parts are omitted >**

When a UE initiates a channel occupancy using the channel access procedures described in clause 4.5.1 or clause 4.5.6.3 on a channel(s) to transmit SL transmission(s), the UE can provide a channel occupancy sharing information in SL control information that includes at least the Layer 1 source and destination IDs, the corresponding channel access priority class, the remaining channel occupancy duration, and the frequency domain information for the applicable RB set(s) of the channel occupancy. The channel occupancy sharing information can also include additional IDs and associated cast type. The additional IDs includes one pair of Layer 1 source and destination IDs for all cast types, where the source ID is set to the source ID of the UE initiating channel occupancy for unicast and to the reserved bits for groupcast and broadcast. The channel occupancy sharing information transmitted in slot , can indicate the remaining channel occupancy duration in a number of slot(s) . If , the initiated channel occupancy by the UE shall not be shared for SL transmission(s) by other UE(s). Otherwise, the initiated channel occupancy by the UE can be shared for SL transmission(s) by other UE(s) within a duration starting from the end of slot and ending at slot .

**< End of text proposal >**

**Agreement**

The draft LS to RAN2 in R1-2401755 is endorsed. Final LS in R1-2401756.

**Conclusion**

**It is concluded that UE can utilize a shared COT only if its SL transmission(s) is fully inside the shared channel occupancy indicated by the RB set(s) and up to the remaining COT duration in the COT-SI, which does not require any specification change.**

* **Note: The portion of the SL transmission(s) overlapping with the shared COT can be transmitted**

**Agreement**

The TP for TS 37.213 in Proposal 3-6 (I) in (the second) section 3.3.3 in R1-2401531 is endorsed.

## RAN1#116bis (15 – 19 April 2024)

**Agreement**

Adopt editorial correction TP#1 in Section 4.1.1 of R1-2403454 for TS 38.211 v18.2.0.

**Agreement**

Adopt editorial correction TP#2 in Section 4.2.1 of R1-2403454 for TS 38.212 v18.2.0

**Agreement**

Adopt editorial correction TP#3 in Section 4.3.1 of R1-2403454 for TS 38.213 v18.2.0

**Agreement**

Adopt editorial correction TP#5 in Section 4.5.1 of R1-2403454 for TS 37.213 v18.2.0

* Except all the changes with “channel(s) including” and “channels including the”

**Conclusion**

**It is concluded that no spec change is needed for the issue of CPE determination for multiple TBs in R1-2403295.**

**Conclusion**

**It is concluded that no spec change is needed for the issue of no sensing result for CPE determination in R1-2403296.**

**Conclusion**

It is concluded that no spec change is needed for the issue of COT sharing flag in R1-2402219.

**Agreement**

Adopt TP#15 in Section 4.15.1 of R1-2403454 for TS 37.213 Clause 4.5.6.3

**Agreement**

Adopt TP#16 in Section 4.16.1 of R1-2403454 for TS 37.213 Clause 4.5.

**Agreement**

**The final LS in R1-2403578 is agreed.**

**Agreement**

Adopt TP#15 in Section 4.15.1 of R1-2403454 for TS 37.213 Clause 4.5.6.3. Final CR agreed in R1-2403580.

**Agreement**

Adopt TP#16 in Section 4.16.1 of R1-2403454 for TS 37.213 Clause 4.5. Final CR agreed in R1-2403579.

## RAN1#117 (20 – 24 May 2024)

**Agreement**

To adopt the editorial correction TP#1 in Section 4.1.1 of R1-2405353 for TS 38.214 v18.2.0.

**Agreement**

Adopt RRC parameter alignment TP#2 in Section 4.2.1 of R1-2405353 for TS 37.213 v18.2.0

Adopt RRC parameter alignment TP#3 in Section 4.3.1 of R1-2405353 for TS 38.211 v18.2.0

Adopt RRC parameter alignment TP#4 in Section 4.4.1 of R1-2405353 for TS 38.212 v18.2.0

Adopt RRC parameter alignment TP#5 in Section 4.5.1 of R1-2405353 for TS 38.213 v18.2.0

Adopt RRC parameter alignment TP#6 in Section 4.6.1 of R1-2405353 for TS 38.214 v18.2.0

Adopt RRC parameter alignment TP#7 in Section 4.7.1 of R1-2405353 for TS 38.215 v18.2.0

**Agreement**

* **Adopt TP#15 in Section 4.15.1 of R1-2405353 for TS 38.214 Clause 8.1.4**
* **In the reply LS, the following information should be provided to RAN2:**

**“***For Mode 2 resource selection procedure in TS 38.214 Section 8.1.4, RAN1 has agreed the CR in R1-240xxxx to support partial sensing operation over an unlicensed spectrum using interlace RB based transmission.***”**

**Agreement**

**Endorse the draft CR in R1-2405527** to support partial sensing operation over an unlicensed spectrum using interlace RB based transmission

* **Approve the final CR in R1-2405528**

**Agreement**

**Endorse the draft LS reply in R1-2405529 with the revision of the action:**

* To RAN2: RAN1 respectfully asks RAN2 to take the above information into account in the future work ~~(e.g., reverting agreement(s) wherever appropriate)~~.
* **Approve the final LS in R1-2405530**

**Agreement**

Endorsed the draft CR in R1-2405554 for TS 38.214 Clause 8.1.2.1

Approve the final CR in R1-2405555.

**Agreement**

Endorsed the draft CR in R1-2405663 for TS 37.213 Clause 4.5.4

Approve the final CR in R1-2405664

**Conclusion**

In Clause 4.5.3 of TS 37.213, for the “applicable RB set(s) of the channel occupancy” provided in the channel occupancy sharing information, it is concluded it refers to the RB set(s) associated with the first SL resource specified in 8.1.5 of TS 38.214.

No specification change is required for this conclusion.

## RAN1#118 (19 – 23 August 2024)

To be filled