**3GPP TSG RAN WG1 Meeting #106bis-e R1-** **211xxxx**

**e-Meeting, October 11th – 19th, 2021**

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**Source:** Moderator (LG Electronics)

**Title:** Feature lead summary for AI 8.11.1.2 Inter-UE coordination for Mode 2 enhancements

**Document for:** Discussion and information

1. **Draft proposals for Tuesday’s GTW (October 12th)**

The delegates in Asia would be difficult to have sufficient time to provide inputs on the questions related to the draft proposals in Section 1 before the start of Tuesday’s GTW session (i.e., October 12th 03:00am UTC), but if companies provide their views as much as they can **2 hours before the start of Tuesday’s GTW session**, I will update the draft proposals accordingly. To prepare/make more stable draft proposals for Tuesday’s GTW session, it would be highly appreciated if companies make comments as soon as possible. Also to make progress more efficiently, **I would like to encourage companies to directly provide “revised wording” or “new wording needed to be added”**. Note that further email discussion will be triggered for draft proposals that are not agreed in Tuesday’s GTW session by using the updated version of FL’s summary that reflects comments received during the GTW session.

* 1. **Scheme 1**

After reviewing contributions, for Condition 1-A-1 of Scheme 1, the following draft proposal is made on how to determine the preferred resource set when the inter-UE coordination information transmission is triggered by UE-B’s explicit request.

**Draft proposal 1**:

* *For Condition 1-A-1 of Scheme 1, the set of resources preferred for UE-B’s transmission is a form of candidate single-slot resource as specified in Rel-16 TS 38.214 Section 8.1.4*
  + *When the inter-UE coordination information transmission is triggered by UE-B’s explicit request, the candidate single-slot resource(s) are determined in the same way according to Rel-16 TS 38.214 Section 8.1.4 with at least following parameters provided by UE-B’s explicit request*
    - *Priority value to be used for PSCCH/PSSCH transmission* 
      * *It replaces prio\_TX*
    - *Number of sub-channels to be used for PSSCH/PSCCH transmission in a slot*
      * *It replaces L\_subCH*
    - *Starting/ending time location of resource selection window*
      * *It replaces n+T\_1/n+T\_2*
    - *Resource reservation interval* 
      * *It replaces P\_rsvp\_TX*

**Question 1-1**: Do you agree Draft Proposal 1?

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| **Company** | **Yes or no** | **Comment** |
| Ericsson | Yes, with minor changes | In general, we are fine with the proposal from FL. However, we suggest removing “explicit request” right before the list of bullets. We need further discussion on the container/signalling before deciding the specific type of information that is contained in the request.  **Draft proposal 1**:   * *For Condition 1-A-1 of Scheme 1, the set of resources preferred for UE-B’s transmission is a form of candidate single-slot resource as specified in Rel-16 TS 38.214 Section 8.1.4*   + *When the inter-UE coordination information transmission is triggered by UE-B’s explicit request, the candidate single-slot resource(s) are determined in the same way according to Rel-16 TS 38.214 Section 8.1.4 with at least following parameters provided by UE-B~~’s explicit request~~*     - *Priority value to be used for PSCCH/PSSCH transmission*        * *It replaces prio\_TX*     - *Number of sub-channels to be used for PSSCH/PSCCH transmission in a slot*       * *It replaces L\_subCH*     - *Starting/ending time location of resource selection window*       * *It replaces n+T\_1/n+T\_2*     - *Resource reservation interval*        * *It replaces P\_rsvp\_TX* |
| Fraunhofer | Yes | We are supportive of the FL’s proposal.  The parameters listed in the proposal would provide UE-A with the adequate information to determine the candidate resource set relevant for UE-B’s transmission.  We are also fine with Ericsson’s proposed text change. |
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When UE-B receives the preferred resource set from UE-A, the following draft proposal is made on how to consider it in its resource (re-)selection.

**Draft proposal 2**:

* *For Option A of Scheme 1,*
  + *If the number of candidate single-slot resources belonging to the intersection between the preferred resource set and S\_A obtained after Step 7) of Rel-16 TS 38.214 Section 8.1.4 is larger than or equal to a threshold, UE-B uses candidate single-slot resource(s) belonging to the intersection in its resource (re-)selection*
  + *Otherwise, UE-B uses S\_A obtained after Step 7) of Rel-16 TS 38.214 Section 8.1.4 in its resource (re-)selection*
  + *FFS: value of the threshold*

**Question 1-2**: Do you agree Draft Proposal 2?

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| **Company** | **Yes or no** | **Comment** |
| Ericsson | Yes | We are supportive of this proposal. |
| Fraunhofer | Yes, with comment | We are supportive of the first sub-bullet, but do not agree with the second one.  If we understand the second bullet correctly, and please correct us if wrong, the UE will discard the preferred resource set entirely and use only the S\_A. We think that discarding a set of resources that have been corroborated to be collision free by UE-A is wasteful, and would rather work towards a solution that could use the intersection set and the remaining resources from S\_A. |
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As majority companies support Condition 1-A-2 for demining the preferred resource set, the the following draft proposal is made.

**Draft proposal 3**:

* *For Scheme 1 with preferred resource set, support following condition:*
  + *Condition 1-A-2:*
    - *Resource(s) excluding slot(s) where UE-A, when it is intended receiver of UE-B, does not expect to perform SL reception from UE-B*
      * *FFS: Other details (if any)*

**Question 1-3**: Do you agree Draft Proposal 3?

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| **Company** | **Yes or no** | **Comment** |
| Ericsson | No | For this proposal, we would like to get more clarification on the actual intention of “expect to perform SL reception from UE-B”. Is it due to UE-A’s/UE-B’s SL-DRX or due to its own transmission or any other restriction? |
| Fraunhofer | Yes | We are supportive of the FL’s proposal. |
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Since companies’ views are divided on how to determine the non-preferred resource set, I list two options in the following draft proposal and suggest that RAN1 decides which option(s) are supported during RAN1#106bis-e meeting.

**Draft proposal 4**:

* *For Condition 1-B-1 of Scheme 1, RAN1 decides which option(s) are supported during RAN1#106bis-e meeting:*
  + *Option 1: Reserved resource(s) of other UE identified by UE-A whose RSRP measurement is larger than a RSRP threshold which is determined by at least priority value indicated by SCI of the UE*
  + *Option 2: Reserved resource(s) of other UE identified by UE-A whose RSRP measurement is smaller than a RSRP threshold which is determined by at least priority value indicated by SCI of the UE when UE-A is a destination of a TB transmitted by the UE*

**Question 1-4**: Do you agree Draft Proposal 4?

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| **Company** | **Yes or no** | **Comment** |
| Ericsson | No | We propose to add a third option which can work as the combination of both options and is the simplest format to facilitate TX UE behaviour.  **Draft proposal 4**:   * *For Condition 1-B-1 of Scheme 1, ~~RAN1 decides which option(s) are supported during RAN1#106bis-e meeting:~~*   + *~~Option 1: Reserved resource(s) of other UE identified by UE-A whose RSRP measurement is larger than a RSRP threshold which is determined by at least priority value indicated by SCI of the UE~~*   + *~~Option 2: Reserved resource(s) of other UE identified by UE-A whose RSRP measurement is smaller than a RSRP threshold which is determined by at least priority value indicated by SCI of the UE when UE-A is a destination of a TB transmitted by the UE~~*   + Option 3: Indicate in the IUC message the RSRP level and the case (i.e., destination/not destination of the TB). |
| Fraunhofer | Option 1 | We support option 1 because the selecting of non-preferred resources should not be restricted only when UE-A is the destination UE. Based on received SCIs from UE-B and another UE-C, it is possible for UE-A to detect that UE-B has indicated a resource for a future transmission that could collide with UE-C’s indicated resource. |
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Since companies’ views are divided on how/when UE-B excludes resource(s) overlapping with the non-preferred resource set in its resource (re-)selection, I list two options in the following draft proposal and suggest that RAN1 down-selects one of options during RAN1#106bis-e meeting.

**Draft proposal 5**:

* *For Scheme 1 with non-preferred resource set, RAN1 down-selects one of following options during RAN1#106bis-e meeting:* 
  + *Option 1: UE-B excludes in its resource (re-)selection, candidate single-slot resource(s) obtained after Step 7) of Rel-16 TS 38.214 Section 8.1.4 overlapping with the non-preferred resource set*
  + *Option 2: UE-B excludes in its resource (re-)selection, candidate single-slot resource(s) obtained after Step 6) of Rel-16 TS 38.214 Section 8.1.4 overlapping with the non-preferred resource set*

**Question 1-5**: Do you agree Draft Proposal 5?

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| **Company** | **Yes or no** | **Comment** |
| Ericsson | See comment | In our view, Option 2 from the proposal is the best option to exclude resources during the re-selection.  We do not see much point on agreeing to the proposal as it is and instead prefer to agree directly on Option 2. However, if the group is fine with the current proposal and in order to make some progress, we can accept this proposal as intermediate step. |
| Fraunhofer | Option 2 | We prefer option 2 because the exclusion of non-preferred resources after step 6 would provide the UE with the opportunity to check whether the new candidate resource set is of the required size. If the exclusion is done after step 7, there is the possibility of the new candidate resource set being too small for resource selection. |
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As majority companies support Condition 1-B-2 for demining the non-preferred resource set, the the following draft proposal is made.

**Draft proposal 6**:

* *For Scheme 1 with non-preferred resource set, support following condition:*
  + *Condition 1-B-2:*
    - *Resource(s) (e.g., slot(s)) where UE-A, when it is intended receiver of UE-B, does not expect to perform SL reception from UE-B*
      * *FFS: Other details (if any)*

**Question 1-6**: Do you agree Draft Proposal 6?

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| **Company** | **Yes or no** | **Comment** |
| Ericsson | No | We have a similar comment as in Proposal 3. For this proposal, we would like to get more clarification on the actual intention of “expect to perform SL reception from UE-B”. |
| Fraunhofer | Yes | We are supportive of the FL’s proposal. |
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* 1. **Scheme 2**

After reviewing contributions, I observed that for Condition 2-A-1 of Scheme 2, majority companies support defining at least additional criteria to check whether RSRP measurement on other UE’s reserved resource(s) fully/partially overlapping with resource(s) indicated by UE-B’s SCI is larger than a RSRP threshold. So, the following draft proposal is made.

**Draft proposal 7**:

* *For Condition 2-A-1 of Scheme 2, at least following additional criteria to determine resource(s) where expected/potential resource conflict occurs is supported*
  + *The resource(s) are fully/partially overlapping with other UE’s reserved resource(s) whose RSRP measurement is larger than a RSRP threshold determined in the same way according to Rel-16 TS 38.214 Section 8.1.4 with following modifications:*
    - *prio\_TX is the priority value indicated by SCI for a TB having UE-A as its destination UE*
    - *prio\_RX is the priority value indicated by SCI for the conflicting TB other than the TB associated with prio\_TX*

**Question 2-1**: Do you agree Draft Proposal 7?

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| **Company** | **Yes or no** | **Comment** |
| Ericsson | Yes, with minor edits | We are in general OK with this proposal, but we would like to get the following clarifications:   * Regarding the parameter prio\_TX, we suggest simplifying and saying prior\_TX is as indicated in UE-B’s SCI * We also think that it is good to clarify that this is no additional criteria (as stated in the main bullet) but clarification of the details of Condition 2-A-1. |
| Fraunhofer | Yes | We are supportive of the FL’s proposal. |
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For a container in which inter-UE coordination information is transmitted in Scheme 2, I observed that majority companies support using PSFCH format 0. So, the following draft proposal is made.

**Draft proposal 8**:

* *For Scheme 2, PSFCH format 0 is used to convey the presence of expected/potential resource conflict on reserved resource(s) indicated by UE-B’s SCI*
  + *Set of PRBs for PSFCH transmission and reception (sl-PSFCH-RB-Set), period of PSFCH resources (sl-PSFCH-Period), number of cyclic shift pairs used for a PSFCH transmission that can be multiplexed in a PRB (sl-NumMuxCS-Pair), number of PSFCH resources available for multiplexing information in a PSFCH transmission (sl-PSFCH-CandidateResourceType) and Scrambling ID for sequence hopping of PSFCH (sl-PSFCH-HopID) are separately (pre)configured*
    - *UE expects that sl-PSFCH-Period for inter-UE coordination information is not smaller than sl-PSFCH-Period for SL HARQ-ACK feedback in the same resource pool*
  + *UE-A transmits the PSFCH in a latest slot that includes PSFCH resources for inter-UE coordination information and is at least X slots of the resource pool before the PSSCH resource indicated by UE-B’s SCI in which expected/potential resource conflict occurs*
    - *FFS: value of X*
  + *UE-A determines an index of a PSFCH resource for a PSFCH transmission in the same way according to Rel-16 TS 38.213 Section 16.3 with at least following modifications:*
    - *PSSCH reception is replaced with the PSSCH resource indicated by UE-B’s SCI in which expected/potential resource conflict occurs*
    - *M\_ID = 0*
    - *P\_ID is L1-source ID indicated by UE-B’s SCI*
  + *The following values of m\_cs are used to indicate expected/potential resource conflicts that satisfy different conditions*
    - *0: Condition 2-A-1*
    - *6: Condition 2-A-2*

**Question 2-2**: Do you agree Draft Proposal 8?

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| **Company** | **Yes or no** | **Comment** |
| Ericsson | See comment | We propose the following modifications to this proposal:   * We propose to delete the second sub-bullet “UE-A transmits the PSFCH in a latest slot that includes PSFCH resources for inter-UE coordination information and is at least X slots of the resource pool before the PSSCH resource indicated by UE-B’s SCI in which expected/potential resource conflict occurs”   + In our view, this mechanism adds unnecessary extra signaling and wasted transmission of collision avoidance since it signals to UE-B even in cases where the pre-emption mechanism as defined in Rel-16 can solve the potential collision. Moreover, this approach tries to solve a corner case situation and the added signaling overhead does not justify the change in the procedure. * We also propose to remove the last sub-bullet “The following values of m\_cs are used to indicate expected/potential resource conflicts that satisfy different conditions”   + There is no need to differentiate between the different conditions for the expected/potential resource conflicts since the UE behavior will be the same regardless of the condition that trigger the signaling.   Therefore, we propose to have the following:  **Draft proposal 8**:   * *For Scheme 2, PSFCH format 0 is used to convey the presence of expected/potential resource conflict on reserved resource(s) indicated by UE-B’s SCI*   + *Set of PRBs for PSFCH transmission and reception (sl-PSFCH-RB-Set), period of PSFCH resources (sl-PSFCH-Period), number of cyclic shift pairs used for a PSFCH transmission that can be multiplexed in a PRB (sl-NumMuxCS-Pair), number of PSFCH resources available for multiplexing information in a PSFCH transmission (sl-PSFCH-CandidateResourceType) and Scrambling ID for sequence hopping of PSFCH (sl-PSFCH-HopID) are separately (pre)configured*     - *UE expects that sl-PSFCH-Period for inter-UE coordination information is not smaller than sl-PSFCH-Period for SL HARQ-ACK feedback in the same resource pool*   + *~~UE-A transmits the PSFCH in a latest slot that includes PSFCH resources for inter-UE coordination information and is at least X slots of the resource pool before the PSSCH resource indicated by UE-B’s SCI in which expected/potential resource conflict occurs~~*     - *~~FFS: value of X~~*   + *UE-A determines an index of a PSFCH resource for a PSFCH transmission in the same way according to Rel-16 TS 38.213 Section 16.3 with at least following modifications:*     - *PSSCH reception is replaced with the PSSCH resource indicated by UE-B’s SCI in which expected/potential resource conflict occurs*     - *M\_ID = 0*     - *P\_ID is L1-source ID indicated by UE-B’s SCI*   + *~~The following values of m\_cs are used to indicate expected/potential resource conflicts that satisfy different conditions~~*     - *~~0: Condition 2-A-1~~*     - *~~6: Condition 2-A-2~~* |
| Fraunhofer | Yes | We are supportive of the FL’s proposal. |
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1. **1st round of** **email discussion**

I ask companies to provide inputs on the questions in Section 2. The deadline for companies to provide inputs is **October 12th 11:59am UTC**. To prepare/make more stable draft proposals before the start of the next GTW session, it would be highly appreciated if companies make comments as soon as possible. Also to make progress more efficiently, **I would like to encourage companies to directly provide “revised wording” or “new wording needed to be added”**.

* 1. **Scheme 1**
     1. **Details on condition(s) of being UE-A and/or UE-B**

**Question 1-1**: For inter-UE coordination information triggered by UE-B’s explicit request in Scheme 1, if UE-A is a destination UE of a TB transmitted by UE-B, what is the cast type of the explicit request signaling from UE-B to UE-A. Please provide rationales for your answer.

* Option 1: Unicast
* Option 2: Groupcast
* Option 3: Broadcast
* Option 4: Same cast type of TB transmission from UE-B to UE-A

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| **Company** | **Option(s)** | **Comment** |
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**Question 1-2**: For inter-UE coordination information triggered by UE-B’s explicit request in Scheme 1, if UE-A is a destination UE of a TB transmitted by UE-B, what is the cast type of the inter-UE coordination information signaling from UE-A to UE-B. Please provide rationales for your answer.

* Option 1: Unicast
* Option 2: Groupcast
* Option 3: Broadcast
* Option 4: Same cast type of the corresponding explicit request signaling
* Option 5: Same cast type of TB transmission from UE-B to UE-A

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| **Company** | **Option(s)** | **Comment** |
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**Question 1-3**: For inter-UE coordination information triggered by UE-B’s explicit request in Scheme 1, what is condition(s) to trigger a transmission of the explicit request to UE-A? Please provide rationales for your answer.

* Option 1: When UE-B decide to trigger resource (re)selection for PSCCH/PSSCH transmission to UE-A
* Option 2: Up to UE implementation
* Option 3: Other (please specify it)

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| **Company** | **Option(s)** | **Comment** |
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**Question 1-4**: For inter-UE coordination information triggered by UE-B’s explicit request in Scheme 1, is there a possibility of that UE-A does not transmit the inter-UE coordination information even though it received the explicit request? Please provide rationales for your answer.

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| **Company** | **Yes or no** | **Comment** |
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**Question 1-5**: In Scheme 1, do you agree to confirm the following working assumption? Please provide rationales for your answer.

* *Agreement:*
  + *In scheme 1, the following is supported for UE(s) to be UE-A(s)/UE-B(s) in the inter-UE coordination information transmission triggered by an explicit request in Mode 2:*
    - *A UE that sends an explicit request for inter-UE coordination information can be UE-B*
    - *A UE that received an explicit request from UE-B and sends inter-UE coordination information to the UE-B can be UE-A*
    - *(Working assumption) At least a destination UE of a TB transmitted by UE-B can be UE A*
    - *The above feature can be enabled or disabled or controlled by (pre-)configuration*
      * *FFS: Details on how to support this, including (pre-)configuration signaling granularity*
    - *FFS: Additional details and conditions on UE-A and UE-B*

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| **Company** | **Yes or no** | **Comment** |
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**Question 1-6**: For inter-UE coordination information triggered by a condition other than explicit request reception in Scheme 1, what is the relationship between UE-A and UE-B? Please provide rationales for your answer.

* Option 1: UE-A is an only destination UE of a TB transmitted by UE-B
* Option 2: UE-A and UE-B is determined by higher layer
* Option 3: Others (please specify it)

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| **Company** | **Option(s)** | **Comment** |
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**Question 1-7**: For inter-UE coordination information triggered by a condition other than explicit request reception in Scheme 1, what is the cast type of the inter-UE coordination information signaling from UE-A to UE-B. Please provide rationales for your answer.

* Option 1: Unicast
* Option 2: Groupcast
* Option 3: Broadcast
* Option 4: Other (please specify it)

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| **Company** | **Option(s)** | **Comment** |
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**Question 1-8**: For inter-UE coordination information triggered by a condition other than explicit request reception in Scheme 1, what is condition(s) to trigger a transmission of UE-A’s inter-UE coordination information to UE-B? Please provide rationales for your answer.

* Option 1: When UE-A identifies that UE-B’s reserved resource(s) are overlapping with the non-preferred resource set
* Option 2: Up to UE implementation
* Option 3: When contents of the inter-UE coordination information are changed
* Option 4: When UE-A receives a TB from its intended transmitter
* Option 5: When the number of failure of TB decoding at UE-A side is larger than a threshold
* Option 6: Other (please specify it)

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| **Company** | **Option(s)** | **Comment** |
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**Question 1-9**: In Scheme 1, do you agree to confirm the following working assumption? Please provide rationales for your answer.

* *(Working Assumption) In scheme 1, the following is supported for UE(s) to be UE-A(s)/UE-B(s) in the inter-UE coordination information transmission triggered by a condition other than explicit request reception in Mode 2:*
  + *A UE that satisfies the condition mentioned in the main bullet and sends inter-UE coordination information is UE-A*
  + *A UE that received inter-UE coordination information from UE-A and uses it for resource (re-)selection is UE-B*
  + *The above feature can be enabled or disabled or controlled by (pre-)configuration*
    - *FFS: Details on how to support this, including (pre-)configuration signaling granularity*
  + *FFS: Additional details and conditions on UE-A and UE-B*

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| **Company** | **Yes or no** | **Comment** |
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* + 1. **Details on condition(s) to determine inter-UE coordination information**

**Question 1-10**: In Condition 1-A-1, for inter-UE coordination information transmission triggered by a condition other than explicit request reception, how UE-A determines the RSRP threshold? Please provide rationales for your answer.

* Option 1: Reuse RSRP threshold as specified in Rel-16 TS 38.214 Section 8.1.4 which is determined by prio\_TX and prio\_RX. prio\_RX is indicated by other UE’s SCI.
  + Option 1-1: prio\_TX is (pre)configured.
  + Option 1-2: prio\_TX is PC5-RRC signaled
  + Option 1-3: prio\_TX is indicated by UE-B’s prior SCI
* Option 2: RSRP threshold is separately (pre)configured.
  + Option 2-1: RSRP threshold can be different depending on prio\_RX indicated by other UE’s SCI.
  + Option 2-2: RSRP threshold is the same across different prio\_RX indicated by other UEs’ SCI.
* Option 3: Other (please specify it)

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| **Company** | **Option(s)** | **Comment** |
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**Question 1-11**: In Condition 1-A-1, for inter-UE coordination information triggered by a condition other than explicit request reception, please provide your views on whether/how to set each of following parameters.

* Priority value to be used for PSCCH/PSSCH transmission
* Number of sub-channels to be used for PSSCH/PSCCH transmission in a slot
* Starting/ending time location of resource selection window
* Resource reservation interval
* Other parameters (please specify it)

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| **Company** | **Comment** |
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**Question 1-12**: For the set of resources non-preferred for UE-B’s transmission, what is a form of the resource(s)? Please provide rationales for your answer.

* Option 1: Set of sub-channels indicated by other UE’s SCI
* Option 2: Set of candidate single-slot resources overlapping with sub-channel(s) indicated by other UE’s SCI as specified in Rel-16 TS 38.214 Section 8.1.4
* Option 3: Other (please specify it)

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| **Company** | **Option(s)** | **Comment** |
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**Question 1-13**: For Condition 1-B-1, if inter-UE coordination information is triggered by an explicit request, please provide your views on whether each of following parameters is provided by the explicit request.

* Priority value to be used for PSCCH/PSSCH transmission
* Number of sub-channels to be used for PSSCH/PSCCH transmission
* Starting/ending time location of resource selection window
* Resource reservation interval
* Other parameters (please specify it)

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**Question 1-14**: For Condition 1-B-1, if inter-UE coordination information is triggered by a condition other than explicit request reception, please provide your views on whether/how to set each of following parameters.

* Priority value to be used for PSCCH/PSSCH transmission
* Number of sub-channels to be used for PSSCH/PSCCH transmission
* Starting/ending time location of resource selection window
* Resource reservation interval
* Other parameters (please specify it)

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| **Company** | **Comment** |
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**Question 1-15**: In Condition 1-B-1, if RSRP threshold is introduced to determine whether other UE’s reserved resource(s) are included in the non-preferred resource set or not, please provide your views on whether it is associated with parameter(s) other than the priority value indicated by other UE’s SCI. Please provide rationales for your answer.

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* + 1. **Details on indication mechanism for the set of resources**

**Question 1-16**: For the set of resources in Scheme 1, which option is supported for its indication mechanism? Please provide further details on the preferred option(s) if necessary.

* Option 1: Reuse a single or multiple combinations of TRIV, FRIV, resource reservation period as specified in Rel-16 TS 38.214 Section 8.1.5 with following modification [27][33]:
  + First resource location of each TRIV is separately indicated by the inter-UE coordination information
  + For each pair of TRIV and FRIV, up to 2 additional resources can be indicated
* Option 2: Reuse a single combination of TRIV and FRIV as specified in Rel-16 TS 38.214 Section 8.1.5 with following modification [3]:
  + For TRIV, window size of 32 slots is replaced with a larger value
  + For FRIV, only combinations of starting sub-channels are indicated
  + For a pair of TRIV and FRIV, more than 2 additional resources can be indicated
* Option 3: 2-dimensional resource bitmap [1][30]
  + Each bit indicates whether a pair of sub-channel(s) and slot(s) is included in inter-UE coordination information
* Option 4: 2-dimensional resource indicator value [3]
  + Each value is associated with a pair of sub-channel(s) and slot(s) is included in inter-UE coordination information
* Option 5: Others (please specify)

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| **Company** | **Option(s)** | **Comment** |
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**Question 1-17**: For Scheme 1, what parameter(s) other than indication of the set of resources as in Q1-16 are included in the inter-UE coordination information? Please provide rationales for your answer.

* Option 1: Type of resource set
* Option 2: Identifier to identify a UE transmitting/receiving this coordination information
* Option 3: Other (please specify it)

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| **Company** | **Option(s)** | **Comment** |
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* + 1. **Details on timeline for inter-UE coordination information**

**Question 1-18**: In Condition 1-A-1/1-B-1, when UE-A receives an explicit request from UE-B in slot n or determines that a condition to trigger inter-UE coordination information transmission is met in slot n, please provide your views on whether/how to define time window where UE-A monitors other UE’s SCI for determining the set of resources. Please provide rationales for your answer.

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**Question 1-19**: In Condition 1-A-1/1-B-1, when UE-A receives an explicit request from UE-B in slot n or determines that a condition to trigger inter-UE coordination information transmission is met in slot n, please provide your views on what is the earliest timing when UE-A can transmit inter-UE coordination information. Please provide rationales for your answer.

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**Question 1-20**: In Condition 1-A-1/1-B-1, if UE-B receives inter-UE coordination information in slot n, what is the earliest timing when UE-B can use it in its resource (re)selection. Please provide rationales for your answer.

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| **Company** | **Comment** |
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* + 1. **Details on container(s) of the inter-UE coordination information and its explicit request**

[To be discussed after stabilizing contents of the inter-UE coordination information and its explicit request and condition(s) for determining the inter-UE coordination information]

* 1. **Scheme 2**
     1. **Details on condition(s) of being UE-A and/or UE-B**

**Question 2-1**: For Scheme 2, if UE-A is a destination UE of a TB transmitted by UE-B, what is the cast type of TB transmission from UE-B to UE-A. Please provide rationales for your answer.

* Option 1: Unicast
* Option 2: Groupcast
* Option 3: Broadcast

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| **Company** | **Option(s)** | **Comment** |
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**Question 2-2**: For Scheme 2, if UE-A is a non-destination UE of TB transmitted by UE-B, what is the cast type of TB transmission from UE-B. Please provide rationales for your answer.

* Option 1: Unicast
* Option 2: Groupcast
* Option 3: Broadcast

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| **Company** | **Option(s)** | **Comment** |
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**Question 2-3**: In Scheme 2, whether/how UE-A knows that UE-B is capable of receiving inter-UE coordination information and taking into account it in its resource re-selection? Please provide further details if necessary and rationales for your answer.

* Option 1: UE-B’s SCI indicates whether UE-B has such a capability or not.
* Option 2: UE-A is provided with whether UE-B has such a capability or not via PC5-RRC signaling.
* Option 3: Other (please specify it)

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| **Company** | **Option(s)** | **Comment** |
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**Question 2-4**: In Scheme 2, do you agree to confirm the following working assumption? Please provide rationales for your answer.

* *Agreement:*
  + *In scheme 2, at least the following is supported for UE(s) to be UE-A(s)/UE-B(s) in the inter-UE coordination transmission triggered by a detection of expected/potential resource conflict(s) in Mode 2:*
    - *A UE that transmitted PSCCH/PSSCH with SCI indicating reserved resource(s) to be used for its transmission, received inter-UE coordination information from UE-A indicating expected/potential resource conflict(s) for the reserved resource(s), and uses it to determine resource re-selection is UE-B*
    - *A UE that detects expected/potential resource conflict(s) on resource(s) indicated by UE-B’s SCI sends inter-UE coordination information to UE-B, subject to satisfy one of the following conditions, is UE-A*
      * *(Working assumption) At least a destination UE of one of the conflicting TBs, i.e., TBs to be transmitted in the expected/potential conflicting resource(s)*
        + *Whether a non-destination UE of a TB transmitted by UE-B can be UE-A is (pre-)configured*
      * *FFS: Additional details and condition(s) on UE-A and UE-B*
    - *The above feature can be enabled or disabled or controlled by (pre-)configuration*
      * *FFS: Details on how to support this, including (pre-)configuration signaling granularity*
    - *FFS: Definition of expected/potential resource conflict(s) and other details (if any)*

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| **Company** | **Yes or no** | **Comment** |
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**Question 2-5**: For Scheme 2, is there a possibility of that UE-A does not transmit the inter-UE coordination information even though it detects expected/potential resource conflict(s) on resource(s) indicated by UE-B’s SCI? Please provide rationales for your answer.

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| **Company** | **Yes or no** | **Comment** |
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* + 1. **Details on condition(s) to determine inter-UE coordination information**

**Question 2-6**: In Condition 2-A-2, is it necessary to specify further detailed case(s) when UE-A does not expect to perform SL reception from UE-B due to half duplex operation? Please provide rationales for your answer.

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| **Company** | **Yes or no** | **Comment** |
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**Question 2-7**: In Scheme 2, do you agree to confirm the following working assumption? Please provide rationales for your answer.

* *Agreement:*
  + *In scheme 2, at least the following is supported to determine inter-UE coordination information:*
    - *Among resource(s) indicated by UE-B’s SCI, UE-A considers that expected/potential resource conflict occurs on the resource(s) satisfying at least one of the following condition(s):* 
      * *Condition 2-A-1:*
        + *Other UE’s reserved resource(s) identified by UE-A are fully/partially overlapping with resource(s) indicated by UE-B’s SCI in time-and-frequency*
        + *FFS: Other details (if any)*
        + *FFS: Whether/how to specify additional criteria and other details (if any) including signaling details of conflict indication*
      * *(Working Assumption) Condition 2-A-2:* 
        + *Resource(s) (e.g., slot(s)) where UE-A, when it is intended receiver of UE-B, does not expect to perform SL reception from UE-B due to half duplex operation*

*FFS: Other details (if any)*

* + - * *FFS: Other condition(s)*
    - *FFS: Other details (if any)*

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| **Company** | **Yes or no** | **Comment** |
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* + 1. **Details on timeline for inter-UE coordination information**

**Question 2-8**: In Condition 2-A-1/2-A-2, for inter-UE coordination information transmitted in slot n, please provide your views on whether/how to define time window where UE-A monitors other UE’s SCI to detect expected/potential resource conflict(s) on resource(s) indicated by UE-B’s SCI or identifies resource(s) where it does not expect to perform SL reception from UE-B due to half duplex operation. Please provide rationales for your answer.

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| **Company** | **Comment** |
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* 1. **Signaling granularity of (pre)configuration to enable, disable, or control features of inter-UE coordination information**

**Question 3-1**: What combinations of following features are supported for the signaling granularity of (pre)configuration to enable/disable/control features of inter-UE coordination information?

* Scheme type (scheme 1 or scheme 2)
* Resource set type (preferred set or non-preferred set)
* Triggering type (explicit request-based or a condition-based)

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| **Company** | **Combination(s)** | **Comment** |
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1. **Summary of contributions**

* Details on supported conditions (i.e. Condition 1-A-1/1-B-1/2-A-1/2-A-2) to determine inter-UE coordination information
  + Condition 1-A-1
    - RSRP threshold
      * If inter-UE coordination information is triggered by an explicit request
        + Determined by RX priority indicated by the received SCI and TX priority indicated by UE-B’s request

Supported by [Huawei,1] [Fujitsu,6] [LGE,27] [InterDigital,28] (5)

* + - * + Indicated by UE-B’s request

Supported by [ZTE,26]

* + - * + Indicated by a separate (pre)configuration

Supported by [Intel,21]

* + - * If inter-UE coordination information is triggered without an explicit request
        + Determined by RX priority indicated by the received SCI and TX priority indicated by a (pre)configuration

Supported by [LGE,27]

* + - * + Indicated by a separate (pre)configuration

Supported by [Intel,21]

* + - * + Determined by RX priority indicated by the received SCI and TX priority indicated by a PC5-RRC signaling

Supported by [Huawei,1]

* + - * + Determined by RX priority indicated by the received SCI and TX priority indicated by UE-B’s prior SCI

Supported by [InterDigital,28]

* + - * Whether or not to boost up the RSRP threshold
        + Fixed [Intel,21]
        + Can be boosted up
    - SINR estimated by UE-A is used [Fujitsu,6]
    - UE-A uses SCIs received before n-(T\_proc,0+T\_proc,1) for generating inter-UE coordination information transmitted in slot n [LGE,27]
  + Condition 1-B-1
    - When RSRP measurement is higher than a threshold
      * Supported by [Intel,21] [LGE,27] [Apple,30] (3)
      * Objected by [Qualcomm,33]
      * Details on RSRP threshold
        + If inter-UE coordination information is triggered by an explicit request

Determined by RX priority indicated by the received SCI and TX priority indicated by UE-B’s request

Supported by [Huawei,1] [CATT,10] [LGE,27] [InterDigital,28] [Apple,30] (5)

Indicated by UE-B’s request

Supported by [CATT,10] [ZTE,26] [Apple,30] (3)

Indicated by a separate (pre)configuration

Supported by [Intel,21]

* + - * + If inter-UE coordination information is triggered without an explicit request

Determined by RX priority indicated by the received SCI and TX priority indicated by a (pre)configuration

Supported by [LGE,27] [Apple,30] (2)

Indicated by a separate (pre)configuration

Supported by [Intel,21] [Apple,30] (2)

Determined by RX priority indicated by the received SCI and TX priority indicated by a PC5-RRC signaling

Supported by [Huawei,1]

Determined by RX priority indicated by the received SCI and TX priority indicated by UE-B’s prior SCI

Supported by [InterDigital,28]

* + - * + Whether or not to boost up the RSRP threshold

Fixed [Intel,21]

Can be boosted up

* + - When UE-A is a destination of other UE’s reserved resource and when its RSRP measurement is smaller than a threshold
      * Supported by [CATT,10] [Qualcomm,33] (2)
    - When RSRP measurement is within (pre)configured SL-RSRP range and priority of reserved resources of other UE is belonging to (pre)configured set of priority levels
      * Supported by [Intel,21]
    - SINR estimated by UE-A is used
      * Supported by [Fujitsu,6]
    - UE-A uses SCIs received before n-(T\_proc,0+T\_proc,1) for generating inter-UE coordination information transmitted in slot n [LGE,27]
  + Condition 2-A-1
    - Which SCI(s) are used to determine resource conflict
      * Transmitted in slot(s) containing UE-B’s SCI with Scheme 2 enabled
        + Supported by [CATT,10] [CAICT,13] [Intel,21] [DCM,22] [InterDigital,28] [Apple,30] (6)
      * Transmitted in non-monitored slot of UE-B
        + Supported by [Huawei,1]
      * Time gap between detected SCIs is smaller than the processing delay
        + Supported by [Lenovo,19]
      * Transmitted in slot(s) belonging to UE-A’s TX resource pool
        + Supported by [LGE,27]
    - Additional condition
      * RSRP measurement of other-UE’s reserved resource is higher than a threshold [Huawei,1] [vivo,5] [CATT,10] [Lenovo,19] [MediaTek,20] [DCM,22] [LGE,27] [Apple,30] [BOSCH,34] (9)
        + RSRP threshold is determined based on UE-B’s priority as TX priority and other UE’s priority as RX priority [LGE,27]
      * Distance between UE-A and UE-B is smaller than a (pre)configured distance range [CATT,10] [Fraunhofer,15] [Intel,21] [Qualcomm,33] (4)
      * RSRP measurement of UE-B’s transmission is higher than a threshold [Intel,21] [DCM,22] [LGE,27] (3)
      * UE-A does not successfully decode UE-B’s transmission when UE-A is a destination of UE-B’s transmission [Huawei,1] [Fujitsu,6] (2)
      * Distance between UEs with conflicting TB is within a (pre)configured range [Intel,21] [BOSCH,34] (2)
      * RSRP measurement difference between conflicting TBs is smaller than a (pre)configured threshold [Nokia,3] [Qualcomm,33] (2)
      * UE-A determines that UE-B needs to perform pre-emption operation [ZTE,26] [LGE,27] (2)
      * The portion of RBs/sub-channels shared by different PSSCHs is larger than a (pre)configured threshold [Fujitsu,6] [LGE,27] (2)
      * UE-A judges that UE-B determines NACK for the TB for the resource reserved by UE-B [vivo,5]
      * Priority of UE-B’s transmission is smaller than a threshold [Spreadtrum,4]
      * Priority of UE-B’s transmission is higher than a threshold [BOSCH,34]
      * CBR is higher than a threshold [BOSCH,34]
  + Condition 2-A-2
    - Which SCI(s) are used to determine resource conflict
      * Transmitted in slot(s) containing UE-B’s SCI with Scheme 2 enabled
        + Supported by [CATT,10] [CAICT,13] [Intel,21] [DCM,22] [InterDigital,28] [Apple,30] (6)
      * Transmitted in non-monitored slot of UE-B
        + Supported by [Huawei,1]
      * Time gap between detected SCIs is smaller than the processing delay
        + Supported by [Lenovo,19]
      * Transmitted in slot(s) belonging to UE-A’s TX resource pool
        + Supported by [LGE,27]
    - Confirm the working assumption to support Condition 2-A-2
      * Supported by [Futurewei,2] [Spreadtrum,4] [Mitsubishi,9] [CATT,10] [Fraunhofer,15] [Samsung,18] [DCM,22] [Panasonic,23] [ETRI,25] [ZTE,26] [InterDigital,28] [Apple,30] (12)
      * Further clarification on when UE-A does not expect to perform SL reception from UE-B [vivo,5] [DCM,22] [Apple,30] (3)
    - Additional condition
      * Distance between UE-A and UE-B is smaller than a (pre)configured distance range [Intel,21] [LGE,27] [BOSCH,34] (3)
      * UE-A does not successfully decode UE-B’s transmission when UE-A is a destination of UE-B’s transmission [Huawei,1] [Fujitsu,6] (2)
      * Priority of UE-A’s is higher than priority of UE-B’s transmission [Nokia,3]
      * RSRP measurement of UE-B’s transmission is within (pre)configured RSRP range [Intel,21]
      * Distance between UEs with conflicting TB is within a (pre)configured range [Intel,21]
* Contents of inter-UE coordination information and its request
  + Contents of the inter-UE coordination information in Scheme 1
    - Set of resources
      * Form of the set of resources
        + Set of sub-channel(s) [Intel,21] [LGE,27] (2)

If inter-UE coordination is triggered by UE-B’s request

Number of sub-channels

1 [Intel,21]

(pre)configured value [Intel,21]

Indicated by UE-B’s request [LGE,27](for preferred resource)

Indicated by other UE’s SCI [LGE,27](for non-preferred resource)

Resource reservation period

0 [Intel,21] [LGE,27] (for non-preferred resource)

(Pre)configured value [Intel,21]

Indicated by UE-B’s request [LGE,27](for preferred resource)

Resource reselection counter

0 [LGE,27] (for non-preferred resource)

Indicated by UE-B’s request [LGE,27](for preferred resource)

If inter-UE coordination is triggered without UE-B’s request

Number of sub-channel

1 [Intel,21]

(pre)configured value [Intel,21] [LGE,27](for preferred resource)

Indicated by other UE’s SCI [LGE,27](for non-preferred resource)

Resource reservation period

0 [Intel,21] [LGE,27] (for non-preferred resource)

(Pre)configured value [Intel,21] [LGE,27](for preferred resource)

Resource reselection counter

(Pre)configured value [LGE,27](for preferred resource)

* + - * + Set of candidate single-slot resources for UE-B’s transmission [Huawei,1] [Fujitsu,6] [OPPO,7] [ZTE,26] [InterDigital,28] (4)

If inter-UE coordination is triggered without UE-B’s request, relevant information is

Indicated by PC5-RRC [Huawei,1]

Indicated by UE-B’s prior SCI [InterDigital,28]

* + - * + Resource map [Apple,30]
      * Indication mechanism
        + TRIV with extended window and FRIV without indication of sub-channel size [Nokai,3]
        + TRIV with extended window and Rel-16 FRIV [Nokia,3]
        + Resource indicator value to indicate 2-demension resources with same or different sub-channel size [Nokia,3]
        + Start time of resource selection window for the inter-UE coordination information [Intel,21]
        + End time of resource selection window for the inter-UE coordination information [Intel,21]
        + Set(s) of Rel-16 TRIV, FRIV, resource reservation period, reference starting position of TRIV [Qualcomm,33] [LGE,27]
    - Resource set type [Huawei,1] [OPPO,7] [Fraunhofer,15] [Zhejiang Lab,16] [Hyundai,17] [Samsung,18] [ETRI,25] (7)
    - Identifier to identify a UE receiving this coordination information [Huawei,1] [Fujitsu,6] [Fraunhofer,15] [Samsung,18] [Intel,21] [LGE,27] (6)
    - TX Priority [Huawei,1] [NEC,8] [Apple,30] [ASUSTeK,32] (4)
    - RSRP of reserved resources [Fujitsu,6] [Apple,30] [ASUSTeK,32] (3)
    - Resource reservation period [Huawei,1]
    - Identifier to identify a UE transmitting this coordination information [Huawei,1] [Samsung,18] (2)
    - Target destination ID to be used for UE-B’s transmission [Fujitsu,6] [LGE,27] (2)
    - Zone ID and communication range requirement [Samsung,18]
    - Source ID of other UE’s reserved resources [Intel,21]
    - Feedback timestamp [Intel,21]
    - Indicator to indicate whether coordination information is assistance type or scheduling type [Convida,31]
  + Contents of the explicit request in Scheme 1
    - TX parameters associated with UE-B’s transmission
      * TX priority [Huawei,1] [Futurewei,2] [Fujitsu,6] [OPPO,7] [NEC,8] [CATT,10] [CMCC,11] [CEWiT,12] [Xiaomi,14] [Fraunhofer,15] [Zhejiang Lab,16] [Samsung,18] [Lenovo,19] [ZTE,26] [LGE,27] [InterDigital,28] [Apple,30] (17)
      * Resource reservation period [Huawei,1] [Futurewei,2] [OPPO,7] [CATT,10] [CMCC,11] [LGE,27] [Apple,30] (7)
      * Resource selection window [Huawei,1] [Futurewei,2] [CATT,10] [CMCC,11] [Xiaomi,14] [Lenovo,19] [LGE,27] (7)
      * Number of sub-channel(s) [Huawei,1] [Futurewei,2] [OPPO,7] [NEC,8] [CATT,10] (5)
      * TX resource pool [OPPO,7] [NEC,8] [Lenovo,19] [ZTE,26] (4)
      * Resource reselection counter [CATT,10] [LGE,27] (2)
      * Number of (re)transmissions [Apple,30]
      * TBS [Nokia,3]
    - Remaining packet PDB [Futurewei,2] [OPPO,7] [CMCC,11] [CEWiT,12] [Xiaomi,14] [Fraunhofer,15] [Zhejiang Lab,16] [Samsung,18] [ZTE,26] [InterDigital,28] [Apple,30] (11)
    - Indicator to indicate resource set type (preferred or non-preferred set) [Nokia,3] [CATT,10] [Samsung,18] [Lenovo,19] [ZTE,26] [InterDigital,28] [Apple,30] (7)
    - Identifier to identify a UE transmitting this request [Huawei,1] [CMCC,11] [Samsung,18] [LGE,27] (4)
    - Identifier to identify a UE receiving this request [Huawei,1] [CMCC,11] [Samsung,18] [LGE,27] (4)
    - Number of resources to be reported in UE-A’s inter-UE coordination information [Nokia,3] [Fujitsu,6] [Xiaomi,14] [Lenovo,19] (4)
    - Resources reserved for UE-A’s inter-UE coordination information transmission [Nokia,3] [Fujitsu,6] (2)
    - Zone ID and communication range requirement [Samsung,18] [InterDigital,28] (2)
    - Latency bound of inter-UE coordination information [Futurewei,2] [LGE,27] (2)
    - Traffic type [Futurewei,2]
    - Set of resources for UE-B’s transmission determined by UE-B [Nokia,3]
  + Contents of the inter-UE coordination in Scheme 2
    - Location of resource(s) indicated by UE-B’s SCI with resource conflict [Huawei,1] [Zhejiang Lab,16] [Qualcomm,33] (3)
    - Indicator to indicate either Condition 2-A-1 or Condition 2-A-2 [Nokia,3] [Intel,21] [LGE,27] (3)
    - Indicator to indicate whether there is periodic reservation from other UEs on non-monitored slots of UE-B [Huawei,1]
* Container of inter-UE coordination information and its request
  + Container of the inter-UE coordination information in Scheme 1
    - SCI format 1-A [Futurewei,2] [Nokia,3] [vivo,5](for non-preferred resource) [Fujitsu,6] [CMCC,11] [CAICT,13] [Hyundai,17] [MediaTek,20](for non-preferred resource) [Sharp,29] (9)
      * Stand-alone PSCCH [Futurewei,2] [Nokia,3]
    - New 2nd-stage SCI format [Huawei,1] [vivo,5](for preferred resource) [OPPO,7] [Mitsubishi,9] [CATT,10] [CMCC,11] [CEWiT,12] [Xiaomi,14] [Fraunhofer,15] [Zhejiang Lab,16] [Samsung,18] [MediaTek,20](for preferred resource) [Sony,24] [Apple,30](for preferred resource) [Qualcomm,33](for preferred resource) [BOSCH,34] (16)
      * Possibility of having 2nd SCI without TB scheduling [Huawei,1] [Futurewei,2] [Xiaomi,14] [Fraunhofer,15] [Samsung,18] [Sony,24] (6)
      * with scheduling TB containing remaining L2 source/destination ID [LGE,27]
      * Keep Rel-16 SCI format size budget [LGE,27]
    - MAC CE [vivo,5] (for preferred resource) [Fujitsu,6] [Mitsubishi,9] [CEWiT,12] [Intel,21] [DCM,22] [Panasonic,23] [ZTE,26] [LGE,27] [InterDigital,28] [Apple,30](for non-preferred resource) [Qualcomm,33](for non-preferred resource) [BOSCH,34] (13)
      * With the possibility of multiplexing with other data [Intel,21] [Qualcomm,33] [LGE,27] (3)
        + Destination ID are always the same [LGE,27]
        + Destination ID can be different [Intel,21]
      * Without multiplexing with other data [Futurewei,2]
    - PC5-RRC [CEWiT,12] [ZTE,26] [InterDigital,28] [Ericsson,35] (4)
    - Other details
      * Cast type of the signaling
        + Unicast [Huawei,1]
        + Groupcast [Nokia,3]
      * Source ID setting
        + Inter-UE coordination triggered by UE-B’s request

Destination ID of UE-B’s request [LGE,27]

* + - * + Inter-UE coordination triggered without UE-B’s request

Target destination ID to be used for UE-B’s transmission [LGE,27]

* + - * + Request

Source ID to be used for UE-B’s transmission [LGE,27]

* + - * Destination ID setting
        + Inter-UE coordination triggered by UE-B’s request

Broadcast destination ID [Intel,21]

Source ID of UE-B’s request [Intel,21] [LGE,27]

Groupcast destination ID of UE-B [Intel,21]

* + - * + Inter-UE coordination triggered without UE-B’s request

Broadcast destination ID [Intel,21]

(pre)configured ID [LGE,27]

* + - * + Request

Destination ID to be used for UE-B’s transmission [LGE,27]

* + - * Priority value setting
        + Inter-UE coordination triggered by UE-B’s request

Priority value of UE-B’s transmission [Intel,21]

(pre)configured priority value [LGE,27]

* + - * + Inter-UE coordination triggered without UE-B’s request

(pre)configured priority value [Intel,21] [LGE,27]

Highest priority value [Intel,21]

* + - * + Request

(pre)configured priority value [LGE,27]

* + Container of the explicit request in Scheme 1
    - New 2nd-stage SCI format [Huawei,1] [Futurewei,2] [Nokia,3] [vivo,5] [Fujitsu,6] [CATT,10] [CMCC,11] [CAICT,13] [Zhejiang Lab,16] [Samsung,18] [Lenovo,19] [Sony,24] [Apple,30] (13)
      * without TB scheduling [Huawei,1] [Samsung,18]
    - MAC CE [Spreadtrum,4] [vivo,5] [Fujitsu,6] [Fraunhofer,15] [Lenovo,19] [Intel,21] [Panasonic,23] [Sony,24] [ZTE,26] [Apple,30] (10)
      * With the possibility of multiplexing with data [Intel,21]
        + Destination ID are always the same
        + Destination ID can be different [Intel,21]
    - PC5-RRC [CAICT,13] [ZTE,26] [Qualcomm,33] (3)
    - PSFCH [MediaTek,20]
    - Cast type of the signaling
      * Unicast [Huawei,1] [Spreadtrum,4] [Intel,21]
      * Groupcast [Nokia,3]
  + Container of the inter-UE coordination in Scheme 2
    - PSFCH [Huawei,1] [Futurewei,2] [Nokia,3] [vivo,5] [Fujitsu,6] [OPPO,7] [NEC,8] [CATT,10] [CAICT,13] [Xiaomi,14] [Fraunhofer,15] [Zhejiang Lab,16] [Hyundai,17] [Samsung,18] [Lenovo,19] [Intel,21] [DCM,22] [Panasonic,23] [Sony,24] [LGE,27] [InterDigital,28] [Sharp,29] [Apple,30] [ASUSTeK,32] [Qualcomm,33] [Ericsson,35] (26)
      * Set of PSFCH resources
        + Indicated by a separate (pre)configuration

Supported by [vivo,5] [Intel,21] [Ericsson,35] [LGE,27] [Apple,30] [ASUSTeK,32] (6)

* + - * + Unused PSFCH resources with the 0 in the bit string by sl-PSFCH-RB-Set

Supported by [Huawei,1] [Lenovo,19] [Sharp,29] [Qualcomm,33] (4)

* + - * + Different PSFCH resource offset

Supported by [Futurewei,2] [Samsung,18] [Sharp,29] (3)

* + - * + Unused PSFCH resources for SL groupcast HARQ feedback Option 2

Supported by [Nokia,3]

* + - * Base sequence
        + Indicated by a separate (pre)configuration

Supported by [Intel,21]

* + - * + Same as that of SL HARQ-ACK feedback

Supported by [Qualcomm,33]

* + - * Prioritization rule
        + PSFCH TX/TX and TX/RX prioritization rule

Based on priority values of conflicting TBs [Fujitsu,6] [Lenovo,19] [LGE,27] (3)

Rel-16 PSFCH is prioritized over Rel-17 PSFCH [vivo,5]

Based on priority value indicated by UE-B’s SCI and conflict type [Intel,21]

* + - * + PSFCH and UL/LTE SL prioritization rule

Based on priority values of conflicting TBs [Fujitsu,6] [Lenovo,19] [LGE,27] (3)

Reuse the existing prioritization rule [vivo,5]

Based on priority value indicated by UE-B’s SCI and conflict type [Intel,21]

* + - * PSFCH resource determination
        + Timing of the PSFCH transmission

With respect to the time location of the potential conflicted PSSCH resource

Supported by [Futurewei,2] [Spreadtrum,4] [vivo,5] [Intel,21] [DCM,22] [LGE,27] [InterDigital,28] [ASUSTeK,32] (8)

Latest PSFCH slot for Scheme 2 T\_proc,x slots before the resource with resource conflict [Intel,21] [DCM,22] [LGE,27] [ASUSTeK,32] (4)

T\_proc,x is a function of T\_3 and/or T\_prep [Intel,21] [LGE,27]

With respect to the time location of a SCI indicating PSSCH resource with potential resource conflict

Supported by [CATT,10] [Lenovo,19] [Ericsson,35] (3)

* + - * + Frequency and code domain resources derived by

PSCCH/PSSCH resource (sub-channel(s) and slot)

PSCCH/PSSCH resources with resource conflict

Supported by [vivo,5] [Intel,21] [LGE,27] (3)

PSCCH/PSSCH indicated by UE-B’s SCI conveying resource reservation with resource conflict

Supported by [CATT,10] [Lenovo,19] [Ericsson,35] (3)

Source ID of UE-B’s transmission

Supported by [Futurewei,2] [Lenovo,19] [Intel,21] [LGE,27] [Ericsson,35] (5)

Resource conflict type

Supported by [Nokia,3] [Intel,21] [LGE,27] (3)

Priority indicated by UE-B’s SCI

Supported by [ASUSTeK,32]

* + Latency bound for the inter-UE coordination information transmission in Scheme 1
    - PC5-RRC configured [Huawei,1]
    - Pre-determined in higher layer [vivo,5]
    - Indicated by UE-B’s request [LGE,27]
    - UE-B decides whether or not to use inter-UE coordination information based on the aging time [Intel,21]
  + Dedicated resource pool is (pre)configured for inter-UE coordination information transmission in Scheme 1
    - Supported by [Nokia,3] [Qualcomm,33]
* Details on how UE-B uses or skip the received inter-UE coordination in its resource (re)selection
  + Scheme 1 with preferred resource set Option A
    - In resource (re)selection procedure, in which step UE-B uses the inter-UE coordination information
      * After Step 7) (i.e. based on S\_A to be reported to a higher layer in Rel-16 mode 2 RA)
        + Supported by [Huawei,1] [vivo,5] [OPPO,7] [Xiaomi,14] [Fraunhofer,15] [Intel,21] [DCM,22] [LGE,27] [Apple,30] [Ericsson,35] (10)
      * In Step 4) (i.e. based on initial S\_A before applying sensing results)
        + Supported by [CATT,10]
      * In MAC layer procedure
        + Supported by [ZTE,26]
    - Condition when UE-B can use resources not belonging to the preferred resource set
      * The number of resources belonging to the intersection set is smaller than a threshold [Huawei,1] [Fraunhofer,15] [Intel,21] [DCM,22] [LGE,27] [Ericsson,35] (6)
      * The number of preferred resources within UE-B’s resource selection window is smaller than a threshold [LGE,27]
    - UE-B performs resource re-evaluation/pre-emption operation based on the preferred resource set
      * Supported by [Ericsson,35]
    - Skip Step 5) if UE-A has sensing results for non-monitored slots of UE-B [Fujitsu,6] [LGE,27]
  + Scheme 1 with preferred resource set Option B
    - It is applied if UE-B’s transmission is on a TX resource pool (pre)configured with random selection only
      * Supported by [OPPO,7] [DCM,22] [LGE,27] (3)
    - It is applied if UE-B is not capable of performing sensing
      * Supported by [Mitsubishi,9] [DCM,22] [Ericsson,35] (3)
    - It is applied up to UE-B’s implementation [Lenovo,19]
    - UE-B can use resources not belonging to the preferred resource set when a condition is met
      * Supported by [Intel,21] [Apple,30]
      * Details on the condition
        + The number of resources derived by the preferred resource set is smaller than a threshold [Intel,21] [Apple,30]
    - UE-B performs resource re-evaluation/pre-emption operation based on the preferred resource set
      * Supported by [Ericsson,35]
  + Scheme 1 with non-preferred resource set
    - In resource (re)selection procedure, in which step UE-B uses the inter-UE coordination information
      * After Step 7) (i.e. based on S\_A to be reported to a higher layer in Rel-16 Mode 2 RA)
        + Supported by [Huawei,1] [Xiaomi,14] [Intel,21] [DCM,22] [LGE,27] [Apple,30] (6)
      * Before Step 7)
        + Supported by [vivo,5] [OPPO,7] [CATT,10] [CMCC,11] (4)

In Step 6) [vivo,5] [OPPO,7] [CMCC,11]

In Step 4) [CATT,10]

* + - * In MAC layer procedure
        + Supported by [ZTE,26]
    - UE-B can use resources belonging to the non-preferred resource set when a condition is met
      * Supported by [Huawei,1] [Intel,21] [ETRI,25] [Apple,30] (4)
      * Details on the condition
        + The number of final candidate resources is smaller than a threshold [Huawei,1] [Intel,21] [ETRI,25] [Apple,30]
    - UE-B performs resource re-evaluation/pre-emption operation based on the non-preferred resource set
      * Supported by [vivo,5] [Intel,21] [ETRI,25] [Ericsson,35] (4)
  + Validity check for Scheme 1
    - SL-RSRP measurement based on the inter-UE coordination information transmission is larger than a threshold [Fraunhofer,15] [Samsung,18] [Intel,21] [LGE,27] (4)
    - UE-B receives the inter-UE coordination information within latency bound [Samsung,18] [Intel,21] [Apple,30] (3)
    - Destination ID to be used for UE-B’s transmission is matched with source ID of UE-A provided by the inter-UE coordination information [Fraunhofer,15] [Samsung,18] [LGE,27] (3)
    - Distance between UE-A and UE-B is smaller than a threshold [Fraunhofer,15] [Samsung,18] [Intel,21] (3)
    - Minimum time gap between any two selected resources is ensured for a resource pool with PSFCH resource [OPPO,7]
    - Retransmission resource can be indicated by TRIV of a prior SCI [OPPO,7]
    - Source ID of the inter-UE coordination information is matched with UE-B’s request [Intel,21]
    - Priority value used to generate inter-UE coordination information is smaller than that of UE-B’s transmission [Intel,21]
  + Scheme 2
    - Condition when UE-B does not perform re-selection upon the reception of the inter-UE coordination
      * Remaining PDB of UE-B’s transmission is smaller than a threshold [Nokia,3] [Ericsson,35] (2)
      * Priority of UE-B’s transmission is high [Nokia,3]
      * PSFCH resource is not associated with UE-B’s source ID [LGE,27]
      * For Condition 2-A-2, the destination of a PSCCH/PSSCH to be transmitted by UE-B is not UE-A [LGE,27]
    - Skip Step 5) if UE-A informs that there is periodic reservation from other UEs on non-monitored slots of UE-B [Huawei,1]
    - UE-B avoids whole resources in a slot associated with resource conflict [Huawei,1] [vivo,5] [LGE,27] (3)
      * if UE-A informs that resource conflict is determined based on Condition 2-A-2 [Huawei,1] [LGE,27]
    - UE-B avoids resources indicated by its SCI when the resources are associated with resource conflict [vivo,5] [LGE,27] (2)
      * if UE-A informs that resource conflict is determined based on Condition 2-A-1 [LGE,27]
* Details on a (pre)configuration to enable or disable or control feature of the inter-UE coordination
  + (pre)configuration enables or disables Scheme 1 with preferred resource indication, Scheme 1 with non-preferred resource indication, and Scheme 2 in a resource pool independently [Fujitsu,6] [ETRI,25] [ZTE,26] [LGE,27] [Qualcomm,33] (5)
  + (pre)configuration for Scheme 1 indicates whether inter-UE coordination is triggered by an explicit request or without an explicit request in a resource pool [vivo,5] [LGE,27] (2)
  + (pre)configuration indicates priority value(s) of UE-B’s transmission to use Scheme 1 [Lenovo,19] [InterDigital,28] (2)
  + (pre-)configuring which UEs send/receive coordination/trigger information [Huawei,1]
  + (pre)configuration indicates whether UEs request inter-UE coordination information before its transmission or it is up to their decision in a resource pool [Nokia,3]
  + (pre)configuration enables or disables combination(s) of features for inter-UE coordination in a resource pool [Intel,21]
  + (pre)configuration for each scheme enables or disables condition type (e.g. Condition 1-A-1/1-B-1/2-A-1/2-A-2) for generating inter-UE coordination information [LGE,27]
* Details on a condition to trigger inter-UE coordination information in Scheme 1
  + Condition(s) when UE-A transmits the inter-UE coordination information to UE-B
    - Potential/expected resource conflict is detected on the resources reserved by UE-B [OPPO,7] [NEC,8] [Xiaomi,14] [Fraunhofer,15] [Ericsson,35] (6)
    - Up to UE’s decision in higher layer [Futurewei,2] [LGE,27] [Apple,30] (3)
    - Change in resource to be sent via inter-UE coordination [Nokia,3] [MediaTek,20] (2)
    - Reception at an intended destination UE of an SCI indicating reserved resources for its reception [Nokia,3] [Qualcomm,33] (2)
    - Number of failure of TB decoding at UE-A side is larger than a threshold [Lenovo,19] [Sony,24] (2)
    - UE-A completes its resource selection to reserve its initial transmission before indicating it [Qualcomm,33] [Ericsson,35] (2)
    - UE-A transmits CSI request and wait UE-B’s response [Nokia,3]
    - RSRP measurement of the received SCI is higher than a threshold [CMCC,11]
    - Distance between UE-A and other UE is smaller than a threshold and the distance between UE-B and other UE is higher than a threshold [CMCC,11]
    - Distance between UE-A and UE-B is smaller than a threshold [Xiaomi,14]
    - Distance between UE-A and UE-B is larger than a threshold [Xiaomi,14]
    - Feedback was not transmitted for a certain amount of time [Intel,21]
    - UE has data for intended sidelink transmission which is multiplexed with feedback payload [Intel,21]
    - CBR is higher than a threshold [Apple,30]
    - Periodic timer expires at UE-A side [Ericsson,35]
  + Condition(s) when UE-B transmits the request for the inter-UE coordination information
    - Resource re-selection is triggered [OPPO,7] [Xiaomi,14] [Intel,21] (3)
    - Up to UE’s decision in higher layer [ZTE,26] [LGE,27] (2)
    - TB arrives at UE-B side [vivo,5]
    - Number of NACK received by UE-B is higher than a threshold [NEC,8]
    - UE-B has data/TB for transmission that can be multiplexed with request [Intel,21]
    - UE-B does not have valid inter-UE coordination information [Intel,21]
    - Elapsed time from the previous inter-UE coordination feedback request exceeds pre-configured value [Intel,21]
    - Re-selection counter is equal to zero [Ericsson,35]
* Condition(s)/scenario(s) under which each information is enabled to be sent by UE-A and used by UE-B
  + Further restriction on combination(s) of features of the inter-UE coordination
    - Preferred resource set + triggered by an explicit request [Fujitsu,6] [Xiaomi,14] [Fraunhofer,15] [Zhejiang Lab,16] [Samsung,18] [DCM,22] [ZTE,26] [LGE,27] [Intel,21] [Apple,30] (10)
    - Non-preferred resource set + triggered without an explicit request [Fujitsu,6] [Xiaomi,14] [Fraunhofer,15] [DCM,22] [LGE,27] [Apple,30] (6)
    - Non-preferred resource set + triggered by an explicit request [Xiaomi,14] [Fraunhofer,15] [Samsung,18] [ZTE,26] [Intel,21] [Apple,30] (6)
    - All combinations [Futurewei,2] [Sony,24] [Sharp,29] (3)
  + UE-A determines whether to transmit preferred resource set or non-preferred resource set based on CBR measured in UE-A [Nokia,3]
* Additional condition(s) on being UE-A and UE-B
  + Inter-UE coordination information triggered by an explicit request in Scheme 1
    - UE-A is an only destination of a TB transmitted by UE-B
      * Supported by [CATT,10] [Samsung,18] [DCM,22] [ETRI,25] [InterDigital,28] [Qualcomm,33](for preferred resource set) [Ericsson,35] (7)
    - A non-destination UE of a TB transmitted by UE-B can be UE-A
      * Supported by [Huawei,1] [Spreadtrum,4] [Lenovo,19] [Sony,24] (4)
    - Pre-determined by higher layer
      * Supported by [Huawei,1] [vivo,5] [Fraunhofer,15] (3)
    - Priority of UE-B’s transmission is smaller than a threshold
      * Supported by [OPPO,7]
    - Remaining PDB of UE-B’s transmission is larger than a threshold
      * Supported by [OPPO,7]
    - Distance between UE-A and UE-B is within a range [Mitsubishi,9]
  + Inter-UE coordination information triggered without an explicit request in Scheme 1
    - UE-A is an only destination of a TB transmitted by UE-B
      * Supported by [Mitsubishi,9] [CATT,10] [Samsung,18] [ETRI,25] [InterDigital,28] [Ericsson,35] (6)
    - Pre-determined by higher layer
      * Supported by [Huawei,1] [vivo,5] [Fraunhofer,15] (3)
    - Any UE performing resource reservation can be UE-A, and any UE performing unicast transmission to UE-A can be UE-B
      * Supported by [vivo,5]
    - Priority of UE-B’s transmission is smaller than a threshold
      * Supported by [OPPO,7]
    - Remaining PDB of UE-B’s transmission is larger than a threshold
      * Supported by [OPPO,7]
    - Distance between UE-A and UE-B is within a range
      * Supported by [Mitsubishi,9]
  + Scheme 2
    - UE-B is a UE transiting a TB with lower or equal priority value among the conflicting TBs
      * Supported by [Intel,21] [DCM,22] [InterDigital,28] [Qualcomm,33] (4)
    - UE-A is an only destination of a TB transmitted by UE-B
      * Supported by [vivo,5] [Samsung,18] [ZTE,26] (3)
    - Any UE that detects the corresponding triggering condition (i.e., an expected/potential conflict) transmits the coordination message and is a UE-A
      * Supported by [Fraunhofer,15] [Ericsson,35] (2)
    - If UE-A is not a destination of TB transmitted by UE-B, a (pre)configuration indicates density and/or distance dependent probability to be UE-A
      * Supported by [Nokia,3]
* Additional feature
  + Presence of detected resource conflict on resource(s) indicated by UE-B’s SCI
    - Supported by [Nokia,3] [Fujitsu,6] [Fraunhofer,15] [Lenovo,19] [Intel,21] [ETRI,25] [BOSCH,34] (7)
    - Objected by [Huawei,1] [Mitsubishi,9] [CATT,10] [CMCC,11] [Samsung,18] [InterDigital,28] [Sharp,29] (7)
* Additional condition(s) to determine inter-UE coordination information
  + Condition 1-A-2
    - Supported by [Huawei,1] [Futurewei,2] [Spreadtrum,4] [OPPO,7] [Mitsubishi,9] [Fraunhofer,15] [Samsung,18] [Lenovo,19] [Intel,21] [DCM,22] [Panasonic,23] [ETRI,25] (12)
  + Condition 1-A-3
    - Supported by [OPPO,7] [Samsung,18] [Spreadtrum,4] [CMCC,11] [Fraunhofer,15] (5)
  + Condition 1-B-2
    - Supported by [Huawei,1] [Futurewei,2] [Spreadtrum,4] [vivo,5] [OPPO,7] [Mitsubishi,9] [CATT,10] [CMCC,11] [Fraunhofer,15] [Samsung,18] [Lenovo,19] [Intel,21] [DCM,22] [Panasonic,23] [ETRI,25] [LGE,27] [Apple,30] (17)
  + Condition 1-B-3: Resources for a selected but not reserved transmission of UE-A
    - Supported by [Fujitsu,6] [Qualcomm,33] (2)
  + Condition 1-A-4: Resources excluding those overlapping with preferred resources from other UE-A
    - Supported by [Nokia,3]
  + Condition 1-A-5: Resource(s) excluding slot(s) where UE-A cannot monitor
    - Supported by [Spreadtrum,4]
  + Condition 2-A-3: UE-A identifies that both source and destination UEs have transmitted in the same slot on non-overlapped frequency resources
    - Supported by [Intel,21]
  + Condition 2-A-4: UE-A identifies that both source and destination UEs have reserved resource on non-overlapped frequency resources
    - Supported by [Intel,21]
* Others
  + Further consideration on how to handle resource conflict on reserved resources of multiple UE-Bs [vivo,5] [OPPO,7] (2)
  + Further consideration on how to handle the case when UE-B receives inter-UE coordination information from multiple UE-As [Fujitsu,6] [Samsung,18] (2)
  + Further consideration of indication to UE-A of ID(s) used by UE-B and the intended receiver(s) of UE-B’s transmission [Nokia,3]
  + Further consideration on how to select resource for coordination information transmission, i.e., jointly with the recommended resources, or independently [vivo,5]
  + Further consideration on a single signaling to transmit one or multiple set of resources is transmitted by UE-A to multiple UE-Bs [OPPO,7]
  + Further consideration on how to use different type of resource set in resource (re)selection procedure [Intel,21]
  + Further consideration on the possibility of that UE with and without inter-UE coordination coexist in the same resource pool [Panasonic,23]
  + Further consideration of repetition of inter-UE coordination information transmission [BOSCH,34]
  + Further consideration on a single signaling to transmit the sets of preferred, non-preferred and remaining resources using different RSRP thresholds [Ericsson,35]
  + Further consideration on the possibility of that UE performs sensing for retransmission when initial transmission derived by Option B frame work is not successful [Ericsson,35]
  + Further consideration on that Scheme 2 is supported for UE with no sensing [Ericsson,35]

1. **Reference**
2. R1-2108764 Inter-UE coordination in sidelink resource allocation Huawei, HiSilicon
3. R1-2108801 Discussion on techniques for inter-UE coordination FUTUREWEI
4. R1-2108819 Inter-UE coordination for Mode 2 enhancements Nokia, Nokia Shanghai Bell
5. R1-2108925 Discussion on inter-UE coordination in sidelink resource allocation Spreadtrum Communications
6. R1-2108999 Discussion on mode-2 enhancements vivo
7. R1-2109037 Considerations on inter-UE coordination for mode 2 enhancements Fujitsu
8. R1-2109060 Inter-UE coordination in mode 2 of NR sidelink OPPO
9. R1-2109130 Discussion on mode 2 enhancements NEC
10. R1-2109142 Inter-UE coordination for enhanced resource allocation Mitsubishi Electric RCE
11. R1-2109192 Discussion on Inter-UE coordination for Mode 2 enhancements CATT, GOHIGH
12. R1-2109301 Discussion on inter-UE coordination for mode 2 enhancement CMCC
13. R1-2109341 Feasibility and benefits for NR Sidelink mode 2 enhancements CEWiT
14. R1-2109349 Considerations on mode 2 enhancements CAICT
15. R1-2109385 Discussion on inter-UE coordination Xiaomi
16. R1-2109431 Resource Allocation Enhancements for Mode 2 Fraunhofer HHI, Fraunhofer IIS
17. R1-2109449 Discussion on inter-UE coordination for mode 2 enhancements Zhejiang Lab
18. R1-2109450 Discussion on inter-UE coordination for Mode 2 enhancements Hyundai Motors
19. R1-2109513 On Inter-UE Coordination for Mode2 Enhancements Samsung
20. R1-2109542 Inter-UE coordination for Mode 2 enhancements Lenovo, Motorola Mobility
21. R1-2109586 Discussion on Mode 2 enhancements MediaTek Inc.
22. R1-2109632 Solutions for sidelink communication with inter-UE coordination feedback Intel Corporation
23. R1-2109700 Resource allocation for reliability and latency enhancements NTT DOCOMO, INC.
24. R1-2109758 Inter-UE coordination for Mode 2 enhancements Panasonic Corporation
25. R1-2109801 Discussion on inter-UE coordination for Mode 2 enhancements Sony
26. R1-2109819 Discussion on inter-UE coordination for Mode 2 enhancements ETRI
27. R1-2109852 Discussion on inter-UE coordination ZTE
28. R1-2109861 Discussion on inter-UE coordination for Mode 2 enhancements LG Electronics
29. R1-2109884 On inter-UE coordination for Mode 2 enhancement InterDigital, Inc.
30. R1-2110006 Discussion on inter-UE coordination for mode 2 enhancements Sharp
31. R1-2110054 On Inter-UE Coordination Apple
32. R1-2110117 Discussion on Inter-UE Coordination for NR SL Mode 2 Enhancement Convida Wireless
33. R1-2110132 Discussion on V2X mode 2 enhancements ASUSTeK
34. R1-2110209 Reliability and Latency Enhancements for Mode 2 Qualcomm Incorporated
35. R1-2110306 Support of inter-UE coordination scheme 1 and scheme 2 ROBERT BOSCH GmbH
36. R1-2110340 Details on mode 2 enhancements for inter-UE coordination Ericsson
37. **Appendix**

**5.1 Conclusions made in RAN1#103-e meeting**

* ***Conclusion****:*
  + *The schemes of inter-UE coordination in Mode 2 are categorized as being based on the following types of “A set of resources” sent by UE-A to UE-B:*
    - *UE-A sends to UE-B the set of resources preferred for UE-B’s transmission*
      * + *e.g., based on its sensing result*
    - *UE-A sends to UE-B the set of resources not preferred for UE-B’s transmission*
      * + *e.g., based on its sensing result and/or expected/potential resource conflict*
    - *UE-A sends to UE-B the set of resource where the resource conflict is detected*
    - *FFS: details of resource conflict, e.g., including type of resource conflict*
    - *FFS: details of sensing operation at UE-A side*
    - *FFS: which type(s) of resource set information is(are) beneficial/feasible to which cast type(s)*
    - *Note: these different types may be used in combination with each other*
  + *From RAN1 perspective, further study on the feasibility/benefit of inter-UE coordination is required*
  + *Send an LS to RAN plenary*
    - *Final LS in R1-2009841*
* ***Conclusion****:*
  + *For the schemes of inter-UE coordination identified as feasible/beneficial, at least the following aspects are further discussed.*
    - *How/when UE-A determines the contents of ”A set of resources”, including consideration of UL scheduling*
    - *When UE-A sends ”A set of resources” to UE-B, including which UE(s) sends it*
    - *How UE-A and UE-B are determined*
    - *How UE-A sends ”A set of resources” to UE-B, including container used for carrying it, implicitly or explicitly or both*
    - *How/when/whether UE-B receives “A set of resources” and takes it into account in the resource selection for its own transmission*
    - *How/whether to define the relationship between support/signaling of inter-UE coordination and cast type*

**5.2 Conclusions made in RAN1#104-e meeting**

* ***Conclusion****:*
  + *RAN1 concludes that the inter-UE coordination in Mode 2 is feasible, and is beneficial (e.g., reliability, etc.) compared to Rel-16 Mode 2 RA, and thus recommends specification of the feature.*
    - *The detailed observations can be found in the attachment of the LS*
* *Draft LS in R1-2102165, along with the attachment R1-2102166, is approved (with a typo fix)* 
  + *Final LS in R1-2102168*

**5.3 Agreements made in RAN1#104bis-e meeting**

* *Agreement:*
  + *Support the following schemes of inter-UE coordination in Mode 2:*
    - *Inter-UE Coordination Scheme 1:* 
      * *The coordination information sent from UE-A to UE-B is the set of resources preferred and/or non-preferred for UE-B’s transmission*
        + *FFS details including a possibility of down-selection between the preferred resource set and the non-preferred resource set, whether or not to include any additional information other than indicating time/frequency of the resources within the set in the coordination information*
      * *FFS condition(s) in which Scheme 1 is used*
    - *Inter-UE Coordination Scheme 2:* 
      * *The coordination information sent from UE-A to UE-B is the presence of expected/potential and/or detected resource conflict on the resources indicated by UE-B’s SCI*
        + *FFS details including a possibility of down-selection between the expected/potential conflict and the detected resource conflict*
      * *FFS condition(s) in which Scheme 2 is used*
* *Agreement:*
  + *Study further to determine the conditions for UEs to be UE-A(s)/UE-B(s) for inter-UE coordination:*
    - *Details include applicable scenario(s)/inter-UE coordination scheme(s)*
    - *E.g., only UE(s) among the intended receiver(s) of UE-B can be a UE-A, any UE can be a UE-A, high-layer configured, etc.*
      * *Including the possibility of being subject to certain conditions and/or capability*
* *Agreement:*
  + *When UE-B receives the inter-UE coordination information from UE-A, consider at least one of the following options (with details FFS including possibly down-selecting/merging one or more of the options below, applicable scenario(s)/condition(s) for each option, UE behavior) for UE-B’s to take it into account in the resource (re)-selection for its own transmission*
    - *For scheme 1:*
      * *Option 1-1: UE-B’s resource(s) to be used for its transmission resource (re)-selection is based on both UE-B’s sensing result (if available) and the received coordination information*
      * *Option 1-2: UE-B’s resource(s) to be used for its transmission resource (re)-selection is based only on the received coordination information*
      * *Option 1-3: UE-B’s resource(s) to be re-selected based on the received coordination information*
      * *Option 1-4: UE-B’s resource(s) to be used for its transmission resource (re)-selection is based on the received coordination information*
    - *For scheme 2:*
      * *Option 2-1: UE-B can determine resource(s) to be re-selected based on the received coordination information*
      * *Option 2-2: UE-B can determine a necessity of retransmission based on the received coordination information*

**5.4 Agreements made in RAN1#106-e meeting**

* *Agreement:*
  + *For scheme 1, the following inter-UE coordination information signalling from UE-A is supported. FFS details including condition(s)/scenario(s) under which each information is enabled to be sent by UE-A and used by UE-B.*
    - *Set of resources preferred for UE-B’s transmission*
    - *Set of resources non-preferred for UE-B’s transmission*
* *Agreement:*
  + *For scheme 2, the following inter-UE coordination information signalling from UE-A is supported. FFS details including condition(s)/scenario(s) under which each information is enabled to be sent by UE-A and used by UE-B*
    - *Presence of expected/potential resource conflict on the resources indicated by UE-B’s SCI*
      * *FFS: UE behaviour when the presence of expected/potential resource conflict is detected by the transmitter*
    - *FFS: Whether to additionally support the presence of detected resource conflict on the resources indicated by UE-B’s SCI*
* *Agreement:*
  + *In scheme 1, the following is supported for UE(s) to be UE-A(s)/UE-B(s) in the inter-UE coordination information transmission triggered by an explicit request in Mode 2:*
    - *A UE that sends an explicit request for inter-UE coordination information can be UE-B*
    - *A UE that received an explicit request from UE-B and sends inter-UE coordination information to the UE-B can be UE-A*
    - *(Working assumption) At least a destination UE of a TB transmitted by UE-B can be UE A*
    - *The above feature can be enabled or disabled or controlled by (pre-)configuration*
      * *FFS: Details on how to support this, including (pre-)configuration signaling granularity*
    - *FFS: Additional details and conditions on UE-A and UE-B*
  + *(Working Assumption) In scheme 1, the following is supported for UE(s) to be UE-A(s)/UE-B(s) in the inter-UE coordination information transmission triggered by a condition other than explicit request reception in Mode 2:*
    - *A UE that satisfies the condition mentioned in the main bullet and sends inter-UE coordination information is UE-A*
    - *A UE that received inter-UE coordination information from UE-A and uses it for resource (re-)selection is UE-B*
    - *The above feature can be enabled or disabled or controlled by (pre-)configuration*
      * *FFS: Details on how to support this, including (pre-)configuration signaling granularity*
    - *FFS: Additional details and conditions on UE-A and UE-B*
* *Agreement:*
  + *In scheme 2, at least the following is supported for UE(s) to be UE-A(s)/UE-B(s) in the inter-UE coordination transmission triggered by a detection of expected/potential resource conflict(s) in Mode 2:*
    - *A UE that transmitted PSCCH/PSSCH with SCI indicating reserved resource(s) to be used for its transmission, received inter-UE coordination information from UE-A indicating expected/potential resource conflict(s) for the reserved resource(s), and uses it to determine resource re-selection is UE-B*
    - *A UE that detects expected/potential resource conflict(s) on resource(s) indicated by UE-B’s SCI sends inter-UE coordination information to UE-B, subject to satisfy one of the following conditions, is UE-A*
      * *(Working assumption) At least a destination UE of one of the conflicting TBs, i.e., TBs to be transmitted in the expected/potential conflicting resource(s)*
        + *Whether a non-destination UE of a TB transmitted by UE-B can be UE-A is (pre-)configured*
      * *FFS: Additional details and condition(s) on UE-A and UE-B*
    - *The above feature can be enabled or disabled or controlled by (pre-)configuration*
      * *FFS: Details on how to support this, including (pre-)configuration signaling granularity*
    - *FFS: Definition of expected/potential resource conflict(s) and other details (if any)*
* *Agreement:*
  + *In scheme 2, the following UE-B’s behavior in its resource (re)selection is supported when it receives inter-UE coordination information from UE-A:*
    - *UE-B can determine resource(s) to be re-selected based on the received coordination information*
      * *UE-B can reselect resource(s) reserved for its transmission when expected/potential resource conflict on the resource(s) is indicated*
        + *FFS: Other details (if any)*
* *Agreement:*
  + *In scheme 1, at least following UE-B’s behavior in its resource (re-)selection is supported when it receives inter-UE coordination information from UE-A:*
    - *For preferred resource set, the following two options are supported:*
      * *Option A): UE-B’s resource(s) to be used for its transmission resource (re-)selection is based on both UE-B’s sensing result (if available) and the received coordination information*
        + *UE-B uses in its resource (re-)selection, resource(s) belonging to the preferred resource set in combination with its own sensing result*

*UE-B uses in its resource (re-)selection, resource(s) not belonging to the preferred resource set when condition(s) are met*

*FFS: Details of condition(s)*

*This option is supported when UE-B performs sensing/resource exclusion*

*FFS: Other details (if any)*

* + - * *Option B): UE-B’s resource(s) to be used for its transmission resource (re-)selection is based only on the received coordination information*
        + *UE-B uses in its resource (re-)selection, resource(s) belonging to the preferred resource set*

*This option is supported at least when UE-B does not support sensing/resource exclusion*

*FFS: Whether the support is conditional or UE capability*

*FFS: Other details (if any)*

* + - * *FFS: Other option(s), and other details (if any)*
    - *For non-preferred resource set,* 
      * *UE-B’s resource(s) to be used for its transmission resource (re-)selection is based on both UE-B’s sensing result (if available) and the received coordination information* 
        + *UE-B excludes in its resource (re-)selection, resource(s) overlapping with the non-preferred resource set*

*FFS: Details including*

*Whether/how UE-B can use in its resource (re-)selection, resource(s) overlapping with the non-preferred resource set, definition of the overlap, and other details (if any)*

*When UE-B excludes in its resource (re-)selection, resource(s) overlapping with the non-preferred resource set*

* + - * + *FFS: UE-B reselects in its resource (re-)selection, resource(s) to be used for its transmission when the resource(s) are fully/partially overlapping with the non-preferred resource set*
      * *FFS: Other option(s), and other details (if any)*
* *Agreement:*
  + *In scheme 2, at least the following is supported to determine inter-UE coordination information:*
    - *Among resource(s) indicated by UE-B’s SCI, UE-A considers that expected/potential resource conflict occurs on the resource(s) satisfying at least one of the following condition(s):* 
      * *Condition 2-A-1:*
        + *Other UE’s reserved resource(s) identified by UE-A are fully/partially overlapping with resource(s) indicated by UE-B’s SCI in time-and-frequency*
        + *FFS: Other details (if any)*
        + *FFS: Whether/how to specify additional criteria and other details (if any) including signaling details of conflict indication*
      * *(Working Assumption) Condition 2-A-2:* 
        + *Resource(s) (e.g., slot(s)) where UE-A, when it is intended receiver of UE-B, does not expect to perform SL reception from UE-B due to half duplex operation*

*FFS: Other details (if any)*

* + - * *FFS: Other condition(s)*
    - *FFS: Other details (if any)*
* *Agreement:*
  + *In scheme 1, at least the following is supported to determine inter-UE coordination information of preferred resource set:*
    - *UE-A considers any resource(s) satisfying all the following condition(s) as set of resource(s) preferred for UE-B’s transmission*
      * *Condition 1-A-1:*
        + *Resource(s) excluding those overlapping with reserved resource(s) of other UE identified by UE-A whose RSRP measurement is larger than a RSRP threshold*

*FFS: Other details (if any)*

* + - * *FFS: Condition 1-A-2:*
        + *Resource(s) excluding slot(s) where UE-A, when it is intended receiver of UE-B, does not expect to perform SL reception from UE-B*

*FFS: Other details (if any)*

* + - * *FFS: Condition 1-A-3:*
        + *Resource(s) satisfying UE-B’s traffic requirement (if available)*

*FFS: Other details (if any)*

* + - * *FFS: Other condition(s)*
    - *FFS: Other details (if any)*
* *Agreement:* 
  + *In scheme 1, at least the following is supported to determine inter-UE coordination information of non-preferred resource set:*
    - *UE-A considers any resource(s) satisfying at least one of the following condition(s) as set of resource(s) non-preferred for UE-B’s transmission*
      * *Condition 1-B-1:*
        + *Reserved resource(s) of other UE identified by UE-A from other UEs’ SCI (including priority field) and RSRP measurement*

*FFS: Other details (if any)*

* + - * *FFS: Condition 1-B-2:*
        + *Resource(s) (e.g., slot(s)) where UE-A, when it is intended receiver of UE-B, does not expect to perform SL reception from UE-B*

*FFS: Other details (if any)*

* + - * *FFS: Other condition(s)*
    - *FFS: Other details (if any)*