**3GPP TSG RAN WG1 #109-e R1-2205063**

**e-Meeting, 09 – 20 May, 2022**

**Source: Moderator (OPPO)**

**Title: FL summary #3 for AI 8.11.1 – Maintenance on NR sidelink resource allocation for power saving**

**Agenda item: 8.11.1**

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

Agreed maintenance issues for discussion

According to the discussion outcomes of the preparation phase for AI 8.11 and captured in the moderator’s summary in [19], the following maintenance issues for “Resource allocation for power saving” are to be address in RAN1#109-e meeting.

* [H] Issue 1-1
* [H] Issue 1-3 (not including 1-6, 1-36)
* [H] Issue 1-4
* [H] Issue 1-5 (not including 1-6, 1-49, 1-31, 1-36)
* [E] Issue 1-9 (including 1-28, 1-29)
* [H] Issue 1-32
* [E] Issue 1-24 (not including 1-36)
* [E] Issue 1-25 (not including 1-36)
* [E] Issue 1-45
* [E] Issue 1-46
* [E] Issue 1-47
* [E] Issue 1-48

[109-e-R17-Sidelink-02] Email discussion on resource allocation for power saving, for issues 1-1, 1-3, 1-4, 1-5, 1-9 (including 1-28, 1-29), 1-32, 1-24, 1-25, 1-45, 1-46, 1-47 and 1-48, as summarized in section 4 of [R1-2205117](file:///D:\Documents\3GPP%20documents\RAN1\TSGR1_109-e\Docs\R1-2205117.zip) – Kevin (OPPO)

* 1st check point: May 13 (any RRC impact by May 12)
* Final check point: May 18

## [ACTIVE] Issue #1-1: Update of Q formula in Step 6 for the 2nd most recent PSO

**Background**:

In RAN#1 108-e, the update for *Q* formula in Step 6c was discussed and the Option 2 of following proposal was nearly endorsed [20].

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| **Proposal 4-2 (IV):**  In Step 6 c) of TS38.214 Section 8.1.4, when UE is configured with partial sensing by its higher layer, adopt the following changes:   * When *additionalPeriodicSensingOccasion* is (pre-)configured,   + Option 1: *+1* if and;otherwise   + Option 2:     - Case 1: if and *;* *+1*     - Case 2:if and *;* 2     - Case 3:if and *;*     - Case 4:Otherwise   + Option 3:     - if and *,*     - else if , +*1*     - else   + Option 4: No update to the Q formula (i.e., existing R16 Q formula is reused) |

In periodic-based partial sensing, it was agreed that UE monitors the most recent PSO and the last PSO before the most recent one when *additionalPeriodicSensingOccasion* is (pre-)configured. According to the current Step 6c in TS 38.214, UE only utilizes the sensing result of the most recent PSO for resource exclusion. Therefore, the above proposal (except for Option 4) updates the formula of value *Q* such that UE can exclude the single-slot candidate resource from the selected Y/Y’ slots based on the SCI received in the additional PSO.

In [1], it states that it is necessary to update the value *Q* because the Rel-16 *Q* formula misses some resource exclusion checks when *additionalPeriodicSensingOccasion* is (pre-)configured and consequently impacts the performance for the periodic-based partial sensing. And this contribution proposes to adopt either Option 1 or Option 2 of above proposal.

In [2], it is interpreted that the determination of *Q* should be updated to allow a UE to exclude resources based on not only the most recent sensing occasion, but also the last sensing occasion prior to the most recent one. And it points out that the specification does not fully capture existing RAN1 agreement, and Rel-17 partial sensing feature is incomplete if the formula of value *Q* is not updated. Based on the TP and the illustration of this contribution, Option 2 is preferred.

Contribution [4] also thinks the value *Q* oughtto be updated for the SCI detected in the additional PSO and their provided TP is aligned with the Option 3 of above proposal.

Contribution [9] explains that Release 16 NR sidelink principle shall still work and prefer not to change the calculation of value of *Q* when additional sensing occasion is (pre-)configured. But if the majority companies prefer to change it, they can accept it.

In [11], [14] and [15], it is illustrated that the “plus 1” or “increase 1” operation should be performed for value *Q* when *additionalPeriodicSensingOccasion* is (pre-)configured and Option 2 is their preference.

**FL assessment/comments:**

* In FL’s memory, the motivation to support the higher layer parameter *additionalPeriodicSensingOccasion* is that some companies’ simulation result shows the performance gain when UE monitors the additional PSO. And the performance gain is mainly due to the UE fails to decode the SCI in the most recent PSO but utilizes the SCI in the additional PSO for resource exclusion. Therefore, it is reasonable to update the value *Q* in step 6c such that the purpose of defining the *additionalPeriodicSensingOccasion* can be achieved.
* During the last meeting, some companies didn’t support the update for value *Q* because they thought it is a rare event that UE accidently ignores SCI 1 in the most recent PSO but uses SCI 2 in the additional PSO for resource exclusion and the SCI 2 indicates the same resource reservation period with SCI 1. From the perspective of FL, the companies’ simulation result has proven that it is not a rare case, otherwise no performance gain would be observed.
* As for Option 1, Option 2 and Option 3 of Proposal 4-2 (IV) in the last meeting [20], Option 1 may cause the extra exclusion for the SCI detected in the most recent PSO. In the meanwhile, there is no difference for the performance of Option 2 and Option 3 because Option 3 is another version/format of Option 2. Based on the observation of FL in the last meeting and the contributions submitted in this meeting, the majority companies support Option 2. Furthermore, Option 2 is more straightforward because all possible cases are listed and it is easier to understand.

**FL recommendation:** adopt the following Proposal 1-1 (I).

**Proposal 1-1 (I):**

In Step 6 c) of TS38.214 Section 8.1.4, when UE is configured with partial sensing by its higher layer,

* When *additionalPeriodicSensingOccasion* is (pre-)configured,
  + Option 2:
    - Case 1: if and *;* *+1*
    - Case 2:if and *;* 2
    - Case 3:if and *;*
    - Case 4:Otherwise

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| **Company** | **Comments** |
| Futurewei | We prefer option 1 due to less logical conditions but ok with option 2 if majority supports. |
| Sharp | Not support. We don’t think FL’s observations are entirely correct. Besides the conditions as cited by FL, we argued that SCI1/2 has to be indicating the periodicity which correspond to the sensing occasion of SCI 1/2, e.g. it only works when SCI 1/2 correspond to the sensing occasions t\_(y-k\*P1) and SCI 1/2 indicate both P1. In our understanding, the latter case is essential for applying Option 1/2/3. Furthermore, we do not agree that w/o the change, the performance gain cannot be achieved. In our understanding, with more sensing occasions, for a periodicity larger than P1, the gain could also be achieved. For Option 1/2/3, we think it brings extra exclusion procedures for every case except for the one which have to satisfy 3 conditions as listed above. That is to say, it can be treated as over optimization. In that sense, we still think no updates are needed at maintenance phase, since the resource exclusion mechanism could still work without the proposed updates. |
| Apple | We support this proposal.  The Q value needs to be updated to capture the case when *additionalPeriodicSensingOccasion* is (pre-)configured.  We are also fine with Option 1 due to its simplicity. |
| CMCC | Agree.  Option 1 may lead to redundant exclusion, and option 3 may cause the second most recent sensing occasion to be meaningless, so we prefer option 2. |
| Xiaomi | Although we prefer to option 4, we can accept FL proposal. |
| Qualcomm | We think specifications work, perhaps not optimally, in their current state. However, we would be ok with the proposal if that’s the majority view. |
| NTT DOCOMO | Support. |
| CATT/GOHIGH | We would prefer no change to the current specification |
| Intel | We are fine with the spirit of the proposal. It is however important to emphasize that more clarification might be necessary as with the current wording of the proposal the update formula for Q is applicable irrespective of which resource allocation the UE actually uses as it only looks at the resource pool configuration at the parameter “additionalPeriodicSensingOccasion”. |
| MediaTek | We are supportive of the proposal. |
| Ericsson | We are supportive of the proposal. |
| Vivo | Support, agree with FL’s assessment. |
| Spreadtrum | Support |
| Samsung | As the issue was discussed during WI phase with no agreement, we think there is no need to further discuss and change the design in the maintenance phase. However, if majority consider the modification is necessary, we can accept it for progress. |
| OPPO | Support |
| Lenovo | Agree. |
| Huawei, HiSilicon | We support current FL’s proposal.  The Step 6c) should be updated accordingly, otherwise the spec will not reflect the RAN1 agreement accurately and Rel-17 partial sensing feature is incomplete.  In addition, we explain all the cases in option 2 in our contribution [R1-2203092](file:///C:\3GPP\RAN1_Meetings\Tdocs\2022\R1-2203092.zip). |
| LGE | Not support. We think that the relevant issue was extensively discussed in the past discussion but RAN1 failed to reach consensus on it. Note that even without having further modification of specification, there is no critical problem with the system working. |
| ZTE, Sanechips | We can accept the current FL proposal though our preference is not to have the entire 4 branches listed. |
| CATT/GOHIGH |  |

### Round 2 discussion

**Summary of first round:**

* Support/acceptable/OK to update the Q formula: [16]
  + Option 1: Futurewei, Apple (simplicity)
  + Option 2: Futurewei (if majority), CMCC, Xiaomi, QC, DCM, Intel (clarification needed), MediaTek, Ericsson, vivo, Spreadtrum, Samsung, OPPO, Lenovo, Huawei/HiSilicon
* Not support [4]: Sharp (technical concern), CATT/GH (not preferred), LGE (optimization)

**FL comments:**

* @Intel, I can see your point and perhaps we should clarify that the updated Q formula is only applicable when UE is configured with partial sensing by UE higher layer, as the legacy Q formula is for fully sensing UEs only.
* This should not be viewed as optimization as the current Q formula from Rel-16 cannot exclude resource that was indicated from two reservation periodicities earlier (i.e., 2\*P1 if using Sharp’s notation), which is the sole intention of introducing (pre-)configuration of “*additionalPeriodicSensingOccasion*”.
* Reasons for sensing the second most recent PSO and its performance gain can be found in R1-2104236 from Huawei/HiSilicon. It was due to their simulation results that we agreed to additionally sense one more PSO other than the default one.
* It is acknowledged the system can still work without updating the current Q formula. But the issue is about updating the spec to the agreement we made. If Q is not updated, the purpose of (pre-)configuring “*additionalPeriodicSensingOccasion*” in the system is lost, since there will be no performance difference.
* It is very clear the majority of company (16) has a view that the Q formula should be updated and 4 companies not support. From past experience, if this issue is not resolved, it will keep coming back in the following meeting and the same discussion repeats. Hence, I don’t want to re-discuss and re-iterate the same argument points that had been made in the past meetings, unless there is a new justification.
* @Sharp, CATT/GH, LGE, please consider the above points. Please indicate in the table below ONLY IF YOU OBJECT to update the Q formula according to option 2 or have concern on the red updated part in Proposal 1-1 (II) based on Intel’s comment.

**Proposal 1-1 (II):**

In Step 6 c) of TS38.214 Section 8.1.4, when UE is configured with partial sensing by its higher layer,

* When *additionalPeriodicSensingOccasion* is (pre-)configured and partial sensing is configured by higher layer in the UE,
  + Option 2:
    - Case 1: if and *;* *+1*
    - Case 2:if and *;* 2
    - Case 3:if and *;*
    - Case 4:Otherwise

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| **Company** | **Comments** |
| Sharp | We do not agree with the statement that “If Q is not updated, the purpose of (pre-)configuring “*additionalPeriodicSensingOccasion*” in the system is lost, since there will be no performance difference”, unless the simulation in R1-2104236 from Huawei already used the updated equation of Q (equation in Option 2). As previously commented, if UE senses more PSOs with the legacy equation, it still has performance gain. In the simulation of R1-2104236 from Huawei, it clearly showed the SCI received in PSO indicating P1 and the PSO is the second most recent PSO associated with the very same periodicity P1. Briefly speaking, we think Option 2 is over optimization for other cases, e.g., the SCI in the PSO associated with P2 while indicating P1.  The intention of Option 2 is clear to us only for the case when Prsvp\_RX=Preserve, thus, can we propose to go back the proposal by vivo in the last meeting as follows?  In Step 6 c) of TS38.214 Section 8.1.4, when UE is configured with partial sensing by its higher layer,   * When *additionalPeriodicSensingOccasion* is (pre-)configured and partial sensing is configured by higher layer in the UE and * If where is the periodicity corresponding to the sensing occasion ,   + Option 2:     - Case 1: if and *;* *+1*     - Case 2:if and *;* 2 * Otherwise   + - Case 3:if and *;*     - Case 4:Otherwise |
| FL | @Sharp, I cannot comment for HW on how they performed in their simulations in R1-2104236. But I assume if they support to monitor the two most recent sensing occasions, then they would have excluded all relevant reservations from all the monitored PSOs. Regarding, “if UE senses more PSOs with the legacy equation, it still has performance gain”, I believe the gain you are referring to is when the sensed PSO is the most recent PSO for P2, not P1. So, in effect, we are still excluding resources based on the most recent PSO for a particular . I think we have stuck on this point / argument for two meetings already.  Regarding the proposed change, firstly, thank you for considering a compromise way forward to consider the case of excluding resources when and the SCI is received in the second PSO. I think the intention is clear that we only want to use the updated Q formula only when in the second most recent PSO. However, if we go with this proposed new formulation for Option 2, this means if a SCI is received in the first PSO for a value and , this will also follow the update Q formula (not the legacy one), which is not what we want as the inequality equation () cannot be satisfied.  If we keep updating the proposed Option 2 with more conditions, then my worry is that the new update will become even more complicated and harder to capture/describe in the spec. I know the current Option 2 from the last meeting is not optimized for all cases as we have discussed this formulation for several rounds in the last meeting, but it works in all cases.  [Sharp\_2]: Thank you Kevin for the reply. In HW’s simulation, only P1 and P2 are configured for P\_reserve. What I mean is for a periodicity larger than P1, if SCI is received in the 2nd most recent PSO (P1) indicating P3(>P1), the resource exclusion procedures may still work. That is the performance gain I refer to. I tend to agree with you that adding more condition might introduce more complexity to the specs. While it seems the introduction of inequality equation () only applies for and the UE fails to receive the most recent PSO while receives the 2nd most recent PSO instead. |
| Huawei, HiSilicon | We support the proposal from FL.  For the discussion on the simulation from our contribution R1-2104236, we do not think it is relevant to the proposal. The point should be focused at this stage, is how to capture the agreement into the spec correctly and accurately. It makes no sense to verify the performance gain having more sensing occasions, which is already agreed. It is neither necessary to clarify Q should be updated only on P\_(rsvp\_RX)=P\_reserve, give that original agreement does not have such restriction.  Thus, we think the discussion should focus on how to capture the agreement only, and we think the FL’s proposal is clear and straightforward.  [Sharp\_2]: Thank you for the response. Regarding “The point should be focused at this stage, is how to capture the agreement into the spec correctly and accurately”, could you elaborate why the agreement of (pre-)configuration of k explicitly indicates that Q should be updated, since the comment from HW seems to imply the proposal is to capture existing agreement. While in our understanding, the proposal from FL (if agreed) is totally a new agreement and we think it is over optimization which is better to be avoided at this stage. The existing agreement only revealed additional PSO can be configured via RRC and if configured, e.g. for an SCI indicating 20ms in 2nd most recent PSO associated with 5ms, the exclusion would work to avoid future collision. That is to say, by the legacy Q and with the existing agreement, there is still performance gain compared to the case when not monitoring the additional PSO. Briefly speaking, we don’t think to reuse the legacy Q break any existing agreement. |
| Intel | We can agree to this proposal. |
| LGE | We still don’t believe that adopting Proposal 1-1 (II) is really critical in this maintenance phase. It is not always correct that the monitoring of 2nd most recent PSO is meaningless when no additional enhancement is adopted for the calculation of Q value. Also we think that having (pre)configuration of monitoring 2nd most recent PSO doesn't necessarily mean that the calculation of Q value shall be additionally enhanced. |
| Futurewei | We can accept this proposal although we prefer option 1. |
| CATT/GOHIGH | We would prefer no change to the current specification |
| Ericsson | Support the proposal |

### Proposal for week 2 first GTW session

**FL observation and comments:**

* Sharp has kindly proposed a new updated Q formula, but it does not seem to work in all cases.
* Intel, Futurewei and Ericsson can agree to Proposal 1-1 (II) in the last round, while LGE and CATT/GH preferred no change to the specification.
* For the GTW session, Proposal 1-1 (II) from the last round (copied below) is proposed from FL for further discussion and possible endorsement due to significant majority support for the original Option 2 for the Q formula.

**Proposal 1-1 (II):**

In Step 6 c) of TS38.214 Section 8.1.4, when UE is configured with partial sensing by its higher layer,

* When *additionalPeriodicSensingOccasion* is (pre-)configured and partial sensing is configured by higher layer in the UE,
  + Option 2:
    - Case 1: if and *;* *+1*
    - Case 2:if and *;* 2
    - Case 3:if and *;*
    - Case 4:Otherwise

## [ACTIVE] Issue #1-3: Conditions in which the UE performs CPS – whether UE performs or may perform CPS when all specified conditions are met

**Background (reasons for change and reason for not change from [5], [8], [11], [15], [16])**:

In RAN1#106-e, the following agreement was made on the set of conditions in which the UE performs CPS.

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| **Agreement**  Conditions in which contiguous partial sensing is performed by UE, when at least all of the followings are met:   * L1 [is expected to be or] is triggered by higher layer to report resources for resource (re-)selection in a mode 2 Tx pool * FFS: When the trigger will be received by L1 * The resource pool is (pre-)configured to enable partial sensing * Partial sensing is configured by higher layer in the UE |

In the spec (38.214) Section 8.1.4, the corresponding spec description is currently captured as:

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| When a UE is triggered by higher layer to report resources for resource (re-)selection in a mode 2 Tx pool, the resource pool is (pre-)configured with *allowedResourceSelectionConfig* including partial sensing, and partial sensing is configured by higher layer, the UE may perform contiguous partial sensing. |

In [5], it is interpreted the agreed list of conditions in which CPS is performed by UE “is only about required conditions, and is not a necessary condition”, such that the UE is not mandatory to perform CPS and whether to perform CPS can be based on other criterions. For example, if PBPS already provides enough sensing results, the UE does not need to perform CPS.

In [8], [11], [15], [16], companies think that the current spec description has wrongly captured the intention of the above agreement due to the following reasons:

* If all the conditions listed in the agreement above are satisfied, TX UE needs to perform it.
* Resource reservation for re-transmissions cannot be disabled by configuration such that UE always needs to perform CPS to monitor the reservation indicated by TRIV and FRIV of SCI format 1-A.
* The above agreement states that UE performs CPS at least the three conditions are met and RAN1 has not agreed any other conditions for UE performing CPS, which implies the above three conditions become the necessary and sufficient conditions automatically.
* It is always assumed that UE performs CPS as a pre-condition in all existing agreements and current description in TS 38.214 (e.g., for periodic/aperiodic transmission in resource (re)-selection and re-evaluation/pre-emption checking). If UE chooses to perform CPS based on its implementation, new set of agreements is needed to specify the behaviour for UE not performing CPS.
* It is not possible to introduce a new triggering condition for UE performing CPS in such a maintenance stage, therefore, although there is “at least” in the main bullet, we think UE will certainly perform CPS when all of the listed three conditions are fulfilled.
* Our understanding is that CPS shall be performed as agreed. According to the agreements so far, CPS is performed under the following conditions: Partial sensing is (pre-)configured for the resource pool; Higher layer determines to use partial sensing for TX; Higher layer requests resource candidates to PHY layer. No other rule is necessary and CPS shall be performed based on the (pre-)configured *M* value since aperiodic reservation by other UE, which is monitored by CPS, cannot be disabled.

**FL assessment/recommendation:**

* In NR sidelink, dynamic resource reservation for retransmissions of the same TB for up to 32 slots in SCI is supported in all resource pools, and hence, the introduction of CPS to detect and exclude these reservations from the candidate resource set, regardless of resource (re)selection is triggered by periodic or aperiodic transmission.
* When the agreement in question was made in RAN1#106-e, it was FL’s intention (also a common understanding) that the wording “at least” meant to leave the door open for introducing additional condition(s) in a later meeting if deemed necessary (e.g., when UE battery is below a certain level or (pre-)configuration to disabled CPS).
* Since the agreement was made, RAN1 made further agreements with conditions under which the UE does not need to perform CPS. That is, when partial sensing is disabled by (pre-)configuration during SL-DRX inactive time, setting the minimum *M* slots for CPS to zero, or when the minimum *M* slots cannot be guaranteed and UE by implementation choose to perform random selection. These conditions / UE behaviours are already captured in other parts of the spec.
* It would be a serious consequence if performing CPS is entirely up to UE implementation and the minimum *M* slots for CPS is not monitored for dynamic reservations.
* Subsequently, RAN4 would not be able to define demodulation performance requirements for partial sensing if UE behaviour is not predictable.

**FL recommendation:** adopt the following change in the spec (38.214) section 8.1.4 to align the description for CPS with the agreement made in RAN1#106-e.

“*When a UE is triggered by higher layer to report resources for resource (re-)selection in a mode 2 Tx pool, the resource pool is (pre-)configured with allowedResourceSelectionConfig including partial sensing, and partial sensing is configured by higher layer, the UE ~~may~~ performs contiguous partial sensing*.”

**Question 1-3 (I):**

Is the following spec description change in TS38.214 Section 8.1.4 acceptable to everyone?

“*When a UE is triggered by higher layer to report resources for resource (re-)selection in a mode 2 Tx pool, the resource pool is (pre-)configured with allowedResourceSelectionConfig including partial sensing, and partial sensing is configured by higher layer, the UE ~~may~~ performs contiguous partial sensing*.”

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| **Company** | **Comments** |
| Interdigital | We support the TP.  CPS is used to detect aperiodic transmission. Leave for UE’s decision whether to perform CPS can significantly degrade the performance of the system. Therefore, in our view, CPS should be mandatory when resource allocation is triggered, and the minimum CPS window is greater than zero. |
| Futurewei | We are generally ok with the change. However, it should be discussed with WA on the lower bound of min CPS window for aperiodic traffic. If CPS is mandatary when the agreed conditions are met, the lower bound should not be 0. We suggest to change it to 5. |
| Sharp | Support. |
| Apple | We are fine with the proposal.  The current specification is unclear under which conditions the CPS is triggered. At the maintenance stage, we do not think introducing additional conditions (other than the agreed conditions) for CPS triggering is needed. |
| CMCC | Agree |
| xiaomi | We are fine with FL proposal. |
| Qualcomm | Yes |
| NTT DOCOMO | Support.  Completely same view with FL. |
| Panasonic | We support FL’s proposal. |
| CATT/GOHIGH | Oppose the proposal. This is to revert pervious agreement. This is not going to happen in maintenance phase. |
| Intel | Support |
| MediaTek | Agree. |
| Ericsson | In our view, the contiguous partial sensing procedure shall always be triggered if the conditions are met. However, we have an agreement and specification text when under certain conditions the UE may not perform CPS, e.g., when setting the minimum *M* slots for CPS to zero, or when the minimum *M* slots cannot be guaranteed, therefore contiguous partial sensing might not always be performed, e.g., random resource selection is done.  If the intention of the text is to mandate the UE to trigger the contiguous partial sensing but not to perform always sensing (since we have some conditions as commented before and also pointed out by the FL), we are OK with the proposal text.  However, if that is not the intention, we propose one potential way to solve the issue: To indicate in the text that the UE triggers contiguous partial sensing procedure and the contiguous partial sensing is based on certain conditions based on the agreements. |
| vivo | Support. As aperiodic traffic is always allowed in a pool, CPS should be performed. |
| Spreadtrum | Support. |
| Samsung | Support. |
| OPPO | Yes. In current specification and existing agreements, “when UE performs CPS” is used as a pre-condition. For example:  **Agreement**  When UE performs at least contiguous partial sensing in a mode 2 Tx pool for a resource (re)selection procedure triggered by aperiodic transmission (*P*rsvp\_TX*=0*) in slot *n*,   * The UE selects a set of *Y’* candidate slots with corresponding PBPS and/or CPS results (if available) within the RSW. * …   If UE doesn’t perform CPS when the conditions are satisfied, the UE behaviour for partial sensing in aperiodic case is unclear and it is totally up to UE to report a candidate resource set. The same issue also exists in the re-evaluation/pre-emption part. |
| Lenovo | Support. |
| Huawei, HiSilicon | Agree with FL’s proposal.  If a UE is configured by its higher layer to perform partial sensing and all the other specified conditions are met, CPS should be performed by the UE to detect aperiodic reservations given that there is no configuration can disable aperiodic transmission in a resource pool. |
| LGE | Support. **This is to correctly capture the agreement made by RAN1**. |
| ZTE, Sanechips | We would rather keep the current spec. unchanged. The intention of the original spec. should be to cover the 'at least' wording per agreement. Moreover, as commented by Ericsson that CPS window size set to 0 would imply no CPS per previous RAN1 agreement, it seems the current spec. text does not need any change. |
| Qualcomm | Support |

### Round 2 discussion

**Summary of first round:**

* Support/acceptable/OK to the TP in Question 1-3 (I): [20]
  + IDC, Futurewei, Sharp, Apple, CMCC, xiaomi, Qualcomm, DOCOMO, Panasonic, Intel, MediaTek, Ericsson, vivo, Spreadtrum, Samsung, OPPO, Lenovo, Huawei/HiSilicon, LGE
* Not support [2]: CATT/GH (revert agreement)

**FL response:**

* @Futurewei, the issue with the WA on the lower bound of min CPS window was captured in Issue #1-2 during the preparation phase. It is not included as part of this discussion scope.
* @Ericsson, yes, your understanding of my intention is correct / same as mine. Those can be also viewed as exceptional cases (e.g., when the minimum *M* slots cannot be guaranteed).
* @CATT/GH, as pointed out by others, it is never the intention for the UE to choose may or may not perform CPS, since dynamic resource reservation can be made in all TX resource pool. So, it is essential that the UE should always perform CPS to detect those reservations. As commented in the first round, the wording “at least” was used in the agreement was to leave the door open for introducing additional condition(s) in a later meeting if deemed necessary. Since we didn’t make any explicit additional condition (besides those exceptional cases which are also captured in the spec), then it means the UE shall perform CPS when listed conditions in the agreement are met. Therefore, this proposed TP / correction is align with the agreement, not reverting it.
* This issue on whether or not the UE should perform CPS when the conditions are met has been discussed since RAN1#106-e. Back then, it was tied together with whether or not PBPS and CPS should always be performed together for periodic transmissions. But since there has been no other new agreement on this issue, we should align the spec with the only agreement made. Let me collect another round of comments ONLY IF YOU HAVE CONCERN with the proposed TP for correction in Question 1-3 (I).

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| **Company** | **Comments** |
| ZTE,Sanechips | As mentioned in our first round comment, we don't think CPS shall always be performed. But it seems companies' view are quite convergent in this direction, we can consider the proposed finetuning from Ericsson.  “*When a UE is triggered by higher layer to report resources for resource (re-)selection in a mode 2 Tx pool, the resource pool is (pre-)configured with allowedResourceSelectionConfig including partial sensing, and partial sensing is configured by higher layer, the UE ~~may perform~~ triggers contiguous partial sensing*.” |
| Futurewei | We can accept this proposal as long as the FL can explain what happens when the "may" is removed and the lower bound is set to zero. |
| CATT/GOHIGH | We have concern and cannot agree with the proposal. If we are not reverting previous agreement, then nothing should be changed here. The text in the current spec is aligned with the agreement. |

### Proposal for week 2 first GTW session

**FL observation and response:**

* @ZTE, Sanechips, using “triggers” instead of “performs” could be one way to go. But one concern is that the phrase “When the UE performs contiguous partial sensing … ” is always used in the section of 214. Someone can interpret “triggers” ≠ “performs”. For the exceptional case when the minimum M slots for CPS cannot be guaranteed and UE performs random selection, this has been explicitly captured in the section to handle this as “When the minimum *M* slots for CPS cannot be guaranteed and when , it is up to UE implementation to either continue with step 3) or perform random selection”. For the case when M is configured to be zero, please see my response to Futurewei in the following. But if the group is OK with “triggers”, I am not going to object.
* @Futurewei, when the “may” is removed and lower bound is set to zero, it means the UE will perform CPS for a number of slots not less than zero. The UE is allowed to choose zero for M or a larger value, since the configuration of M means it is a minimum value that the UE should satisfy. The UE can always use a larger value and sensing more slots.
* Due to the current situation with only one company do not agree with the proposal, but all other 20 companies support the change in the first round, the proposed change will be proposed to the GTW session for further discussion.

**Proposal 1-3 (I):** The following TP correction is to be made in TS38.214 Section 8.1.4.

“*When a UE is triggered by higher layer to report resources for resource (re-)selection in a mode 2 Tx pool, the resource pool is (pre-)configured with allowedResourceSelectionConfig including partial sensing, and partial sensing is configured by higher layer, the UE ~~may~~ performs contiguous partial sensing*.”

## [ACTIVE] Issue #1-4: Conditions in which the UE performs PBPS – not mandating UE always perform PBPS when there is no data and the wording “potential” is included in the agreement

**Background (existing agreement and reason for change from [8])**:

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| **Agreement (RAN1#104bis-e)**   * When periodic-based partial sensing is potentially performed by UE in a mode 2 Tx resource pool provided by higher layer, at least all of the followings are met:   + Periodic reservation for another TB (sl-MultiReserveResource) is enabled for the resource pool   + The resource pool is (pre-)configured to enable partial sensing   + Partial sensing configured by higher layer in the UE |

* According to [8], in case of PBPS, even if all the conditions listed in the agreement above are satisfied, TX UE may not perform it by the wording of “potentially” (marked with yellow). For example, this behaviour should be allowed for the case where TX UE does not have data of periodic transmission (e.g., having only data of aperiodic transmission) even when the three conditions in the agreement below are met.

**FL assessment/comments:**

* FL tend to agree with the reasoning given by [8] that a partial sensing UE does not always need to perform PBPS all the time, if it does not have any data to transmit (e.g., a pedestrian UE is located indoor or not near a road). It should be up to UE implementation to determine the timing by which the UE should start performing PBPS to ensure there are sufficient results for resource (re)selection triggered by periodic transmission.
* It is based on this flexibility and power saving reason, the word “potentially” was used in the above RAN1 agreement.

**TP version**:

* TP from [8]:

*“When periodic reservation for another TB (sl-MultiReserveResource) is enabled for the resource pool, the resource pool is (pre-)configured with allowedResourceSelectionConfig including partial sensing, and partial sensing is ~~(pre-)~~ configured ~~in the UE~~ by higher layer, the UE may perform~~s~~ periodic-based partial sensing.”*

**Question 1-4 (I):**

Is the following spec description change in TS38.214 Section 8.1.4 acceptable to everyone?

*“When periodic reservation for another TB (sl-MultiReserveResource) is enabled for the resource pool, the resource pool is (pre-)configured with allowedResourceSelectionConfig including partial sensing, and partial sensing is ~~(pre-)~~ configured ~~in the UE~~ by higher layer, the UE may perform~~s~~ periodic-based partial sensing.”*

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| **Company** | **Comments** |
| Futurewei | We are ok with the change. PBPS is not necessary when there is no periodic traffic. |
| Apple | We are fine with the principle.  For power saving purpose, UE does not have to perform PBPS when it does not have data for transmission. |
| CMCC | Not agreed.  Since we prefer to remove “may” in the last question for CPS, we think “may” should also not be needed for PBPS for the same reason, otherwise, it will make the direction of these two issues quite diverse, which is very strange. |
| Xiaomi | We support the revision. At least for resource selection triggered by aperiodic transmission only, according to the current agreement, PBPS is not always performed. |
| Qualcomm | We think this point needs further discussion. PBPS is for sensing periodic interference and not necessarily limited only to a UE’s own periodic transmissions.  The first change “*partial sensing is ~~(pre-)~~ configured ~~in the UE~~ by higher layer*” is needed. |
| NTT DOCOMO | We are not sure whether the update is aligned with the intention provided by FL.  When UE does not have periodic data, the UE can skip PBPS. We agree with this direction. But if ‘may’ is added, even if the UE has periodic data, it means that UE can skip PBPS. Whether PBPS is performed or not becomes completely up to UE implementation. It seems that this is not the intention of the TP. If this understanding is correct, just adding ‘may’ would not be OK. |
| Panasonic | We are fine with the proposal to be aligned with the agreements. |
| CATT/GOHIGH | We are OK with the change if this is the majority view. |
| Intel | We support this proposal. As aperiodic traffic is not predicable preparation of PBPS should not be required. |
| MediaTek | Support. |
| Ericsson | We are supportive of the change. |
| Vivo | Disagree  Prefer to remove ‘may’ for both CPS and PBPS. If UE only has aperiodic data to transmit, PBPS is still helpful to avoid collision with a periodic reservation from other UE. Regarding FL’s comment, why would the higher layer (i.e., MAC layer) configure partial sensing if there is no data to transmit at all? According to 321, RA scheme is determined per process or per grant, if there is no data for transmission, the higher layer would neither trigger resource reporting nor configure partial sensing to phy layer. Thus there is not need to consider this case in 214.  38.321  If the MAC entity has been configured with Sidelink resource allocation mode 2 to transmit using pool(s) of resources in a carrier as indicated in TS 38.331 [5] or TS 36.331 [21] based on full sensing, or partial sensing, or random selection or any combination(s), the MAC entity shall for each Sidelink process:  NOTE 1: If the MAC entity is configured with Sidelink resource allocation mode 2 to transmit using a pool of resources in a carrier as indicated in TS 38.331 [5] or TS 36.331 [21], the MAC entity can create a selected sidelink grant on the pool of resources based on random selection, or partial sensing, or full sensing only after releasing configured sidelink grant(s), if any. |
| Spreadtrum | We are fine with the proposal. |
| Samsung | We think the modification makes spec description more ambiguous and cannot clearly reflect the intention as FL commented. If the intention of “potential” is only when UE have no data to transmit, we prefer to follow the description in issue 1-3, e.g. as follows:  *“When a UE is triggered by higher layer to report resources for resource (re-)selection in a mode 2 Tx pool with P\_rsvp\_TX not equal to zero or not provided, and periodic reservation for another TB (sl-MultiReserveResource) is enabled for the resource pool, the resource pool is (pre-)configured with allowedResourceSelectionConfig including partial sensing, and partial sensing is ~~(pre-)~~ configured ~~in the UE~~ by higher layer, the UE performs periodic-based partial sensing.”* |
| OPPO | No. The current specification states that UE performs PBPS when the conditions are met. In our understanding, both UE always performing PBPS and UE performing PBPS intermittently are allowed by the spec. Same as the issue of CPS, UE performing PBPS is also used as a pre-condition in both initial selection and re-evaluation/pre-emption part. Therefore, our preference is to keep the current wording. Otherwise, other specification changes are needed. |
| Lenovo | We are fine with FL’s intention. But we have concern about the TP, since adding ‘may’ can be regarded as leaving the PBPS up to UE implementation. We think further discussion is needed on this issue. |
| Huawei, HiSilicon | Disagree.  If a UE is configured by its higher layer to perform partial sensing and all the other specified conditions are met, PBPS should be performed by the UE to detect periodic reservations in a resource pool enabling periodic reservation, regardless of its traffic is periodic or aperiodic. In addition, there is no agreement that PBPS can be disabled for the case that a UE is with aperiodic transmission. Thus we don't see the justification to adopt the proposed TP. |
| LGE | Support. **This is to correctly capture the agreement made by RAN1**. Also from the technical point of view, it doesn't make sense that PBPS is always forced even when UE has only aperiodic packets to be transmitted. We are fine with directly capturing the wording of “**potentially**” in the agreement (instead of “may”) for the progress. |
| ZTE,Sanechips | We support the proposal |
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### Round 2 discussion

**Summary of first round:**

* Support/acceptable/OK to the TP in Question 1-4 (I): [11]
  + Futurewei, Apple, Xiaomi, Panasonic, CATT/GH, Intel, MediaTek, Ericsson, Spreadtrum, LGE
* Not support / concern / discuss further [9]:
  + CMCC, Qualcomm, DOCOMO, vivo, Samsung, OPPO, Lenovo, Huawei/HiSilicon
  + CMCC, OPPO, if changed to “may perform”, it is completely up to UE implementation to perform PBPS. Same issue with the CPS case in Issue#1-3.
  + DCM, Samsung, the proposed TP does not reflect the intention for the change.
  + DCM, this allows the UE not to perform PBPS even when UE has periodic data.
  + QC, PBPS is for sensing periodic interference and not necessarily limited only to a UE’s own periodic transmissions.
  + vivo, RA scheme is determined per process or per grant, if there is no data for transmission, the higher layer would neither trigger resource reporting nor configure partial sensing to PHY layer.
  + HW/HiSi, when all conditions are met, the UE should perform PBPS regardless periodic or aperiodic traffic. No agreement that PBPS can be disabled with aperiodic transmission.

**FL response/comments:**

* @vivo, ALL, thank you for the cited text from TS 38.321, it is very helpful. I read the text is relevant for triggering a process to create a sidelink grant when the “MAC layer has been configured with Sidelink resource allocation mode 2 to transmit using pool(s) of resources in a carrier...”. But the text does not mention the timing for which the MAC layer will configure PHY layer with partial sensing, as this is one of the conditions whether the UE needs to perform PBPS. Most likely, the latest timing by which the MAC layer needs to configure PHY layer with partial sensing is when the MAC layer is triggered to transmit using mode 2. Then again, the spec also does not say partial sensing would not be configured to PHY layer even when there is no data to transmit. So, it seems completely up to UE implementation on the timing and if MAC layer wants to configure partial sensing to PHY layer earlier, with or without data to transmit to detect periodic reservation from others in a resource pool.
* @LGE, ALL, given the responses from others in the first round and the above explanation from the cited MAC spec text provided by vivo, is it OK / acceptable to keep the current spec description in 214?

**Conclusion 1-4 (I):**

For Issue #1-4 identified in R1-2205117, it is concluded no specification change is needed in 38.214.

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| **Company** | **Comments** |
| ZTE,Sanechips | We prefer the FL proposal in round 1.  First of all, the wording of may reflects the 'potentially' wording in the agreement made. Secondly, we feel the statement that PBPS is still performed under aperiodic traffic a bit confusing given the agreement for re-evaluation/pre-emption below for aperiodic traffic.  **Agreement**  When UE is triggered to perform re-evaluation and pre-emption checking for aperiodic transmission (*P*rsvp\_TX*=*0) in slot *n*,   * The candidate resource set (*SA*) is initialized to the remaining *Y’* candidate slots that starts from slot and ends at the last slot of the *Y’* candidate slots.   + is the first candidate slot after slot *n+T3*. * UE may perform PBPS for periodic sensing occasions after the resource (re)selection when *sl-MultiReserveResource* is enabled for the mode 2 Tx resource pool   + It is up to UE implementation * UE performs CPS starting from at least *M* consecutive logical slots earlier than to  slots earlier than .   + FFS: When the minimum *M* slots for CPS cannot be guaranteed, * All available sensing results not earlier than *n–T0* for the resource pool indicated by higher layer are applied for re-evaluation and pre-emption checking procedures |
| Xiaomi | We also prefer to the 1st version. At least the part on “(pre-)configured” needs to be revised. If it is controversial, we are fine to discuss it later, but the current conclusion is not needed. |
| Huawei, HiSilicon | Agree |
| vivo | Thanks FL for the clarification, I see your point. But I don’t think there would be a problem with the spec for empty buffer case as MAC will not trigger resource selection in this case. We also think DOCOMO made a valid point. The proposed change in round1 allows UE to not perform PBPS for periodic transmission, which is not desirable.  We are fine with latest proposal. |
| Samsung | We’re OK to keep current spec description without further update. |
| Intel | It would be preferred to use the wording discussed in round 1 as based on RAN1 agreements and our technical understanding a device configured with partial sensing should not be forced to use PBPS for an aperiodic transmission. |
| LGE | We still prefer to adopt FL's proposal in 1st round discussion, which is more aligned with the existing agreement. To be clear, we are not against performing PBPS by UE's implementation even when it only has the aperiodic packets to be transmitted. We have a concern that this kind of PBPS operation is always enforced. It is not fully convinced why the specification text shared by vivo can address this concern. Also we don’t understand why companies can't be acceptable to capture the agreement made by RAN1. |
| Qualcomm | The following change in still needed in our understanding:  *including partial sensing, and partial sensing is ~~(pre-)~~ configured ~~in the UE~~ by higher layer* |
| Futurewei | The current spec without change does not reflect the following agreement on CPS for aperiodic traffic correctly.  First, it clearly states “When UE performs *at least* contiguous partial sensing ..” in the main sentence, indicating that PBPS is not mandatary. Secondly, during the discussions (and reflected in the agreement), the Y’ candidate slots are selected with the existing PBPS and/or CPS results (if available). We did not agree that UE should also initiate a new PBPS particularly for the aperiodic traffic. Therefore, the update as in the proposal of the previous round is appropriate.  **Agreement**  When UE performs at least contiguous partial sensing in a mode 2 Tx pool for a resource (re)selection procedure triggered by aperiodic transmission (*P*rsvp\_TX*=0*) in slot *n*,   * The UE selects a set of *Y’* candidate slots with corresponding PBPS and/or CPS results (if available) within the RSW.   + If the total number of *Y’* candidate slots is less than a (pre-)configured threshold *Y’min*,     - How UE includes other candidate slots is up to UE implementation * Candidate resource set (*SA*) is initialized to the set of all single-slot candidate resources in the selected *Y’* candidate slots. * For the CPS monitoring window [*n*+*T*A, *n*+*T*B]:   + *TA* and *TB* are both selected such that UE has sensing results starting at *M* consecutive logical slots before *ty0* and ending at *Tproc,0* + *Tproc,1* slots earlier than *ty0*.     - FFS: By default, *M* is 31 unless (pre-)configured with another value, ~~or~~ where *M* is (pre-)configured based on transmission priority     - FFS: The range of (pre-)configured *M* from a TBD lowest value up to 30     - When the minimum *M* slots for CPS cannot be guaranteed, support both       * Option A, the UE ensures the *Y’min* criterion is fulfilled       * Option B: UE performs random resource selection       * When the UE performs Option A or Option B is up to UE implementation |
| CATT/GOHIGH | Strictly speaking, the previous version is aligned with the wording of the agreement |
| Ericsson | We agree with the intention of the TP that PBPS can be not performed in every scenario even if the conditions are met, e.g., as shown in the following agreement, which includes that the UE may perform PBPS:  **Agreement**  When UE is triggered to perform re-evaluation and pre-emption checking for aperiodic transmission (*P*rsvp\_TX*=*0) in slot *n*,   * The candidate resource set (*SA*) is initialized to the remaining *Y’* candidate slots that starts from slot and ends at the last slot of the *Y’* candidate slots.   + is the first candidate slot after slot *n+T3*. * UE may perform PBPS for periodic sensing occasions after the resource (re)selection when *sl-MultiReserveResource* is enabled for the mode 2 Tx resource pool   + It is up to UE implementation * UE performs CPS starting from at least *M* consecutive logical slots earlier than to  slots earlier than .   + FFS: When the minimum *M* slots for CPS cannot be guaranteed, * All available sensing results not earlier than *n–T0* for the resource pool indicated by higher layer are applied for re-evaluation and pre-emption checking procedures   We think that based on the previous agreement the wording “may” should be included in the specification and additional wording is needed to avoid having PBPS completely up to UE implementation, e.g., to avoid not doing PBPS when periodic traffic is to be transmitted or if M slot for CPS has been performed. |

## [ACTIVE] Issue #1-5: Selection of Y’ candidate slots should be based on “corresponding PBPS and/or CPS results (if available)”

**Background (existing agreement and reasons for change from [5], [8], [10], [16])**:

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| **Agreement (RAN1#107-e)**  When UE performs at least contiguous partial sensing in a mode 2 Tx pool for a resource (re)selection procedure triggered by aperiodic transmission (*P*rsvp\_TX*=0*) in slot *n*,   * The UE selects a set of *Y’* candidate slots with corresponding PBPS and/or CPS results (if available) within the RSW.   + If the total number of *Y’* candidate slots is less than a (pre-)configured threshold *Y’min*,     - How UE includes other candidate slots is up to UE implementation * … |

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| TS38.214 V17.0.1 (Section 8.1.4)  …  1) A candidate single-slot resource for transmission is defined as a set of contiguous sub-channels with sub-channel *x+j* in slot where . The UE shall assume that any set of contiguous sub-channels included in the corresponding resource pool within the time interval correspond to one candidate single-slot resource for UE performing full sensing, in a set of *Y* candidate slots within the time interval for UE performing periodic-based partial sensing correspond to one candidate single-slot resource, or in a set of *Y'* candidate slots within the time interval for UE performing contiguous partial sensing if *P*rsvp\_TX*=0*, correspond to one candidate single-slot resource, where  - selection of is up to UE implementation under , where is defined in slots in Table 8.1.4-2 where is the SCS configuration of the SL BWP;  - if is shorter than the remaining packet delay budget (in slots) then is up to UE implementation subject to remaining packet delay budget (in slots); otherwise is set to the remaining packet delay budget (in slots).  - is selected by UE where .  - is selected by UE where . When the UE performs contiguous partial sensing and if , if the number of candidate single-slot resources is smaller than , it is up to UE implementation to include other candidate slots.  The total number of candidate single-slot resources is denoted by .  … |

* The selection of *Y’* candidate slots based on “corresponding PBPS and/or CPS results (if available)” in the case of aperiodic transmission (when ) is not described in the current spec description as per RAN1 agreement.

**TP versions**:

* TP from [5]:

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| - is selected by UE where . When the UE performs contiguous partial sensing and if , the UE selects a set of  candidate slots with corresponding PBPS and/or CPS results (if available). ~~i~~If the number of candidate single-slot resources is smaller than , it is up to UE implementation to include other candidate slots. |

* TP from [8]:

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| - is selected by UE where . When the UE performs contiguous partial sensing and if , the UE selects a set of candidate single-slot resources with corresponding PBPS and/or CPS results (if available) and if the number of candidate single-slot resources is smaller than , it is up to UE implementation to include other candidate slots. |

* TP from [10]:

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| 1) A candidate single-slot resource for transmission is defined as a set of contiguous sub-channels with sub-channel *x+j* in slot where . The UE shall assume that any set of contiguous sub-channels included in the corresponding resource pool within the time interval correspond to one candidate single-slot resource for UE performing full sensing, in a set of *Y* candidate slots within the time interval for UE performing periodic-based partial sensing correspond to one candidate single-slot resource, or in a set of *Y'* candidate slots , with at least one periodic sensing occasion in step 2) and/or at least one slot in the contiguous partial sensing window in step 2) being monitored, within the time interval for UE performing contiguous partial sensing if *P*rsvp\_TX*=0*, correspond to one candidate single-slot resource, where … |

* TP from [16]:

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| - is selected by UE where . A set of candidate slots are selected such that the UE monitored slots corresponding to the set of candidate slots in periodic-based partial sensing. When the UE performs contiguous partial sensing and if , if the number of candidate single-slot resources is smaller than , it is up to UE implementation to include other candidate slots.  2) The sensing window is defined by the range of slots [), when the UE performs full sensing, where is defined above and is defined in slots in Table 8.1.4-1 where is the SCS configuration of the SL BWP. The UE shall monitor slots which belongs to a sidelink resource pool within the sensing window except for those in which its own transmissions occur. The UE shall perform the behaviour in the following steps based on PSCCH decoded and RSRP measured in these slots.  When the UE performs periodic-based partial sensing, the UE shall monitor slots at , where is a slot of the selected candidate slots. The UE shall perform the behaviour in the following steps based on PSCCH decoded and RSRP measured in these slots.  The value of corresponds to *periodicSensingOccasionReservePeriodList* if configured, otherwise, the values correspond to all periodicity from *sl-ResourceReservePeriodList.*  The UE monitors *k* sensing occasions determined by *additionalPeriodicSensingOccasion*, as previously described, and not earlier than . For a given periodicity , the values of *k* correspond to the most recent sensing occasion earlier than if *additionalPeriodicSensingOccasion* is not (pre-)configured, and additionally includes the value of *k* corresponding to the last periodic sensing occasion prior to the most recent one if *additionalPeriodicSensingOccasion* is (pre-)configured. is the first slot of the selected *Y* or *Y’* candidate slots ~~of PBPS~~.  When the UE performs periodic-based partial sensing and contiguous partial sensing with periodic reservation for another TB (*sl-MultiReserveResource*) enabled, the sensing window of CPS is defined by the range of slots . *n*+*T*A is *M* consecutive logical slots earlier than slot , and *n*+*T*B is slots earlier than , where is the first slot of the selected *Y* or *Y’* candidate slots ~~of PBPS~~, and , are in units of physical time/slots. If , the value of *M* is (pre-)configured with the *contiguousSensingWindowPeriodic*. If *contiguousSensingWindowPeriodic* is not (pre-)configured, *M* equals to 31. When the minimum *M* slots for CPS cannot be guaranteed and when , it is up to UE implementation to either continue with step 3) or perform random selection. |

**FL assessment/comments:**

* Regarding the understanding of the part “… *Y’ candidate slots with corresponding PBPS and/or CPS results (if available)* …” from the agreement, there seemed to be two different interpretations from [10] and [16].
  + In [10], it is assumed a slot within the RSW with either corresponding PBPS and/or CPS results can be selected by the UE. However, it is not restricted that the slot must have all the corresponding PSOs sensed for PBPS (when *additionalPeriodicSensingOccasion* is (pre-)configured) or the minimum *M* slots monitored for CPS. As long as there is at least one PSO is sensed and/or 1 slot is monitored for CPS, the slot can be selected by the UE for *Y’* candidate slots.
  + In [16], it is believed that the intention of the agreement is that *Y’* candidate slots are selected from only slots with corresponding PSOs already monitored.
* During the discussion when the agreement was made, the intention was that a slot can be selected (to be a part of *Y’* candidate slots) as long as it has at least the corresponding PBPS or CPS results (or both), as per understanding from at least [5] and [10]. The main intention is to minimize the amount of sensing effort that needs to be done by the UE when it is also performing partial sensing for transmission of another TB. For example,
* If PBPS is already performed by the UE (e.g., for an on-going periodic Tx) and some of the selected Y candidate slots fall within the RSW for a new aperiodic Tx, then the UE should be able to select these slots as part of the *Y’* candidate slots.
* Similarly, if CPS is already performed for transmission of another TB and the UE is triggered for a new aperiodic Tx, the UE should be able to re-utilize these CPS results for the new aperiodic Tx.
* Regarding whether a slot can be selected as part of the *Y’* candidate slots if it has corresponding sensing results for 1 or 2 PSOs (as per (pre-)configuration) or if it has monitored at least *M* corresponding logical slots, these were not discussed in detailed. Technically, it is FL’s understanding that
  + For PBPS, although the PRR performance shown in the past contributions for monitoring the most recent 2 PSOs is slightly better (not by a lot) than just the most recent PSO, the main intention is to save UE processing power. If the UE only has sensing results for the most recent PSO, it would be deemed sufficient.
  + For CPS, it is not essential that at least *M* logical slots must be monitored before a slot can be considered as part of the *Y’* candidate slots for aperiodic transmission. Since the CPS monitoring window and UE behaviour for CPS are already clearly defined for aperiodic transmission, I think this can be based on UE’s best effort.
  + Furthermore, I don’t think we need to define the behaviour in selecting the *Y’* candidate slots as detailed as proposed in [10]. Some flexibility and freedom can be given to UE implementation. It is FL’s recommendation to go with the above TP from [5].

**Question 1-5 (I):**

Is it necessary to define the corresponding PBPS and/or CPS results for *Y’* candidate slots selection in aperiodic transmission as detailed as proposed in [10] (as shown in the above), or is it sufficient to capture the existing description from the agreement in the spec as proposed in [5] (as shown in the above)?

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| **Company** | **Comments** |
| Futurewei | We prefer the detailed version as proposed in [10] for clarity purposes as there are already different interpretations on the agreement. |
| Sharp | We think it is sufficient to capture as proposed in [5]. Regarding selection of Y’ candidate slots, we share similar view as [16] (DCM) that the slot should at least have corresponding PBPS results. In our understanding, when the proposal was discussed in RAN1, companies mentioned for aperiodic transmission, there is no need to trigger a new PBPS procedure, and can use the on-going one which means Y’ is a subset (or whole set) of Y candidate slots for periodic transmission. Note that Y candidate slots all have the corresponding PBPS results. |
| Apple | We think it is sufficient to capture the existing description from the existing agreement, i.e., as proposed in [5]. |
| CMCC | Both the spec as proposed in [5] and in [10] are OK for us.  In fact, we have not found particular difference between these two descriptions. |
| Xiaomi | We support FL’s recommendation, go with TP in [5]. |
| Qualcomm | Capturing the description from the agreement is sufficient in our view. |
| NTT DOCOMO | We have same view with Sharp. In addition, basically UE shall select Y’ candidate slots to meet M slots for CPS. Only when the rule cannot be guaranteed, continuing step 3 is allowed. We do not think ‘For CPS, it is not essential...’ from FL is correct. |
| Panasonic | We prefer the TP in [5]. |
| CATT/GOHIGH | We support to capture the change, for example [5]. However, the TP referenced from [5] is not complete.  There are also another two small changes in the TP as shown below:     “if ” is needed because there is a case that UE performs PBPS (and CPS) and Prsvp\_TX=0. ‘at least ‘ is also needed since otherwise it is not aligned with the agreement: |
| Intel | It is sufficient to capture the existing description form the agreement in the specification, thus proposal [5] looks more reasonable to me. |
| MediaTek | We support TP in [5]. |
| Ericsson | In our view, it is enough to include the TP from [5] to align the specification with the agreements. |
| Vivo | Support, also fine with TP in [5] |
| Spreadtrum | We are fine with TP in [5]. |
| Samsung | Support TP [10]. Our intention is to clarify the definition of available PBPS/CPS results to avoid potential ambiguity in the future. As there already exists different understanding (e.g. in our TP [10] and in [16]), we think it’s beneficial to discuss and capture details in specification. |
| OPPO | We think the TP from [5] is sufficient. |
| Lenovo | We are fine with TP in [5]. |
| Huawei, HiSilicon | It seems sufficient to capture the existing description from the agreement in the spec as proposed in [5], and for [16], we are also fine. |
| LGE | From our perspective, TP in [5] is sufficient in terms of capturing the missing part of agreement made by RAN1. |
| ZTE,Sanechips | Support [5]. |

### Round 2 discussion

**Summary of first round:**

* Support/acceptable/OK to TP from [5]: [19]
  + Sharp, Apple, CMCC, xiaomi, Qualcomm, DCM, Panasonic, CATT/GH, Intel, MediaTek, Ericsson, vivo, Spreadtrum, OPPO, Lenovo, Huawei/HiSilicon, LGE
* Support/acceptable/OK to TP from [10]: [3]
  + Futurewei, CMCC, Samsung

**FL response/comments:**

* @CATT/GH, the two other small changes from [5] are not included because the scope of this Issue #1-5 does not include 1-6, 1-49, 1-31, 1-36 as set out in R1-2205117 and announced by the session chair.
* @ALL, given the significant majority of support for the TP from [5] to resolve the issue on selection of Y’ candidate slots should be based on “corresponding PBPS and/or CPS results (if available)”, it is proposed in the following.

**Proposal 1-5 (I):**

The following TP correction for TS38.214 is to be implemented to resolve the issue on selection of Y’ candidate slots should be based on corresponding PBPS and/or CPS results (if available).

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| - is selected by UE where . When the UE performs contiguous partial sensing and if , the UE selects a set of  candidate slots with corresponding PBPS and/or CPS results (if available). ~~i~~If the number of candidate single-slot resources is smaller than , it is up to UE implementation to include other candidate slots. |

|  |  |
| --- | --- |
| **Company** | **Comments** |
| ZTE,Sanechips | Support |
| Sharp | Support. |
| Huawei, HiSilicon | Ok |
| vivo | Support |
| Samsung | We can accept the proposal. |
| Intel | Support. |
| LGE | Support |
| Qualcomm | Support |
| Futurewei | We prefer the change in [10] but we can accept this proposal |
| CATT/GOHIGH | We think excluding 1-6/1-49 etc from the beginning is not correct.  Here’s the summary of from the preparation phase:      These two are all related to 1-5 therefore they should be discussed together. BTW, they have more supporting companies and no ‘non-essential’ vote. We never understand why they cannot be discussed together while 1-22,1-24 , and 1-25 ,which has fewer supporting companies with ‘non-essential’ votes are chosen. |
| Ericsson | Support |

### Proposal for week 2 first GTW session

**Proposal 1-5 (I):**

The following TP correction for TS38.214 is to be implemented to resolve the issue on selection of Y’ candidate slots should be based on corresponding PBPS and/or CPS results (if available).

|  |
| --- |
| - is selected by UE where . When the UE performs contiguous partial sensing and if , the UE selects a set of  candidate slots with corresponding PBPS and/or CPS results (if available). ~~i~~If the number of candidate single-slot resources is smaller than , it is up to UE implementation to include other candidate slots. |

## [ACTIVE] Issue #1-32: Clarify the value of M for CPS monitoring window is a minimum value when resource (re)selection is triggered by aperiodic Tx

**Background (existing agreement and reasons for change from [3])**:

|  |
| --- |
| **Agreement (RAN1#107-e)**  When UE performs at least contiguous partial sensing in a mode 2 Tx pool for a resource (re)selection procedure triggered by aperiodic transmission (*P*rsvp\_TX*=0*) in slot *n*,   * The UE selects a set of *Y’* candidate slots with corresponding PBPS and/or CPS results (if available) within the RSW.   + If the total number of *Y’* candidate slots is less than a (pre-)configured threshold *Y’min*,     - How UE includes other candidate slots is up to UE implementation * Candidate resource set (*SA*) is initialized to the set of all single-slot candidate resources in the selected *Y’* candidate slots. * For the CPS monitoring window [*n*+*T*A, *n*+*T*B]:   + *TA* and *TB* are both selected such that UE has sensing results starting at *M* consecutive logical slots before *ty0* and ending at *Tproc,0* + *Tproc,1* slots earlier than *ty0*.     - FFS: By default, *M* is 31 unless (pre-)configured with another value, where *M* is (pre-)configured based on transmission priority     - FFS: The range of (pre-)configured *M* from a TBD lowest value up to 30     - When the minimum *M* slots for CPS cannot be guaranteed, support both       * Option A, the UE ensures the *Y’min* criterion is fulfilled       * Option B: UE performs random resource selection       * When the UE performs Option A or Option B is up to UE implementation   **Agreement (RAN1#107bis-e)**  When UE performs at least contiguous partial sensing in a mode 2 Tx pool for a resource (re)selection procedure and re-evaluation/pre-emption checking triggered by aperiodic transmission (*P*rsvp\_TX*=0*) in slot *n*,   * For minimum size *M* of the CPS monitoring window [*n*+*T*A, *n*+*T*B]:   By default, *M* is 31 unless (pre-)configured with another value  The range of (pre-)configured *M* is from 0 (working assumption) to 30 |

|  |
| --- |
| TS38.214 V17.0.1 (Section 8.1.4)  …  2) The sensing window is defined by the range of slots [), when the UE performs full sensing, where is defined above and is defined in slots in Table 8.1.4-1 where is the SCS configuration of the SL BWP. The UE shall monitor slots which belongs to a sidelink resource pool within the sensing window except for those in which its own transmissions occur. The UE shall perform the behaviour in the following steps based on PSCCH decoded and RSRP measured in these slots.  When the UE performs periodic-based partial sensing, the UE shall monitor slots at , where is a slot of the selected candidate slots. The UE shall perform the behaviour in the following steps based on PSCCH decoded and RSRP measured in these slots.  The value of corresponds to *periodicSensingOccasionReservePeriodList* if configured, otherwise, the values correspond to all periodicity from *sl-ResourceReservePeriodList.*  The UE monitors *k* sensing occasions determined by *additionalPeriodicSensingOccasion*, as previously described, and not earlier than . For a given periodicity , the values of *k* correspond to the most recent sensing occasion earlier than if *additionalPeriodicSensingOccasion* is not (pre-)configured, and additionally includes the value of *k* corresponding to the last periodic sensing occasion prior to the most recent one if *additionalPeriodicSensingOccasion* is (pre-)configured. is the first slot of the selected *Y* candidate slots of PBPS.  When the UE performs periodic-based partial sensing and contiguous partial sensing with periodic reservation for another TB (*sl-MultiReserveResource*) enabled, the sensing window is defined by the range of slots . *n*+*T*A is *M* consecutive logical slots earlier than slot , and *n*+*T*B is slots earlier than , where is the first slot of the selected *Y* candidate slots of PBPS, and , are in units of physical time/slots. If the value of *M* is (pre-)configured with the *contiguousSensingWindowPeriodic*. If *contiguousSensingWindowPeriodic* is not (pre-)configured, *M* equals to 31. When the minimum *M* slots for CPS cannot be guaranteed and when , it is up to UE implementation to either continue with step 3) or perform random selection.  When the UE performs contiguous partial sensing with periodic reservation for another TB (*sl-MultiReserveResource*) disabled and if , the sensing window is defined by the range of slots . and are both selected such that the UE has sensing results starting at *M* consecutive logical slots before and ending at slots earlier than . The value of *M* is (pre-)configured with the *contiguousSensingWindowAperiodic*. If *contiguousSensingWindowAperiodic* is not (pre-)configured, *M* equals to 31. When the minimum *M* slots for CPS cannot be guaranteed and when , it is up to UE implementation to either continue with step 3) or perform random selection.  … |

* Based on past RAN1 agreements for a resource (re)selection procedure and re-evaluation/pre-emption checking triggered by aperiodic transmission (*P*rsvp\_TX*=0*), the *M* consecutive logical slots for the CPS monitoring window have always been referred as a minimum value. However, the spec description in 38.214 is not entirely clear that M is a minimum value. If this is not clarified, the UE is restricted to monitor only M slots for CPS, which is not aligned with the agreements and RRC parameter description.

**TP versions**:

* TP from [3]:

|  |
| --- |
| When the UE performs contiguous partial sensing with periodic reservation for another TB (*sl-MultiReserveResource*) disabled and if , the sensing window is defined by the range of slots . and are both selected such that the UE has sensing results starting at *M* consecutive logical slots before and ending at slots earlier than . The minimum value of *M* is (pre-)configured with the *contiguousSensingWindowAperiodic*. If *contiguousSensingWindowAperiodic* is not (pre-)configured, *M* equals to 31. When the minimum *M* slots for CPS cannot be guaranteed and when , it is up to UE implementation to either continue with step 3) or perform random selection. |

**FL assessment/comments:**

* Since the wording “minimum *M* slots for CPS” and “minimum size *M* of the CPS monitoring window” have always been used for aperiodic transmission in RAN1 agreements, it is best to clearly indicate this in the spec description instead of using the same description text for the *M* value in both periodic and aperiodic transmissions.
* **FL recommendation:** adopt the above both TPs in the spec (38.214) section 8.1.4 from [3].

**Question 1-32 (I):**

Is it acceptable to adopt the TPs from [3] as shown in the above?

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Interdigital | We support the TP to align with our agreements. |
| Futurewei | We support the TPs. |
| Sharp | We are fine with the TP from [3]. |
| Apple | Fine. “*contiguousSensingWindowAperiodic”* defines the minimum size of CPS window in logical slots. |
| CMCC | We support the TPs. |
| Qualcomm | We would prefer to keep M corresponding to the RRC parameter and update spec as “sensing results starting at least *M* consecutive logical slots”. That said, we’d accept the proposed text if that’s the majority preference.  We’d like to clarify what the TPs are. The “TP versions” section only includes one TP but the FL recommendation says to capture both |
| NTT DOCOMO | OK |
| Panasonic | We support the TP. |
| CATT/GOHIGH | Prefer QC’s wording. |
| Intel | Accept. |
| MediaTek | Same view as Qualcomm. |
| Ericsson | Yes, the word minimum has to be included when defining M to align the specification with the agreements. |
| vivo | No. contiguousSensingWindowAperiodic provides the value of M, however, the TP can be misinterpreted as the parameter contiguousSensingWindowAperiodic is to provide the lower boundary of M and the exact value of M can be larger than the boundary. ‘  Qualcomm’s proposal is fine |
| Spreadtrum | We support the TP. |
| Samsung | We support the TP. |
| OPPO | Support |
| Lenovo | We are supportive of the TP in [3]. |
| Huawei, HiSilicon | Agree. |
| LGE | We share the same view with Qualcomm |
| ZTE,Sanechips | See comments to 1.6.3. |

### Round 2 discussion

**Summary of first round:**

* Support/acceptable/OK to TP from [3]: [15]
  + InterDigital, Futurewei, Sharp, Apple, CMCC, DOCOMO, Panasonic, Intel, Ericsson, Spreadtrum, Samsung, OPPO, Lenovo, Huawei/HiSilicon
* Use Qualcomm’s suggestion in the comment: [6]
  + Qualcomm, CATT/GH, MediaTek, vivo, LGE

**FL response/comments:**

* I see Qualcomm’s point and I don’t see they are contradicting to each other. So why not adopt both changes.

**Proposal 1-32 (I):**

The following TP correction for TS38.214 is to be implemented to resolve the issue on the value of M for CPS monitoring window is a minimum value when resource (re)selection is triggered by aperiodic Tx.

|  |
| --- |
| When the UE performs contiguous partial sensing with periodic reservation for another TB (*sl-MultiReserveResource*) disabled and if , the sensing window is defined by the range of slots . and are both selected such that the UE has sensing results starting at least *M* consecutive logical slots before and ending at slots earlier than . The minimum value of *M* is (pre-)configured with the *contiguousSensingWindowAperiodic*. If *contiguousSensingWindowAperiodic* is not (pre-)configured, *M* equals to 31. When the minimum *M* slots for CPS cannot be guaranteed and when , it is up to UE implementation to either continue with step 3) or perform random selection. |

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Huawei, HiSilicon | Ok |
| vivo | For the first change: ok  For the 2nd change: not ok  as we commented in round1, we think this makes the spec more ambiguous. *contiguousSensingWindowAperiodic* provides the value of M instead of the minimum value of M. |
| Samsung | We are OK with the proposal. |
| Intel | We can accept this proposal. We would like to highlight that many of the discussions regarding this parameter are due to a slight discrepancy between the parameter name and its usage (same also issue #1-25). |
| LGE | Even without the 2nd change, we think that only having the 1st change is sufficient in terms of capturing the intention of agreement made by RAN1. However, for the progress, we are fine with Proposal 1-32 (I). |
| Qualcomm | We prefer to have the first change only since it captures the intention while keeping it clear that M = *contiguousSensingWindowAperiodic*. Specification text for when *contiguousSensingWindowAperiodic* is not configured says M = 31.  We note that Issue #1-25 is also about M and *contiguousSensingWindowAperiodic* where the latest proposal is that M (not the minimum) is indicated by the parameter. The description should be consistent between the two.  That said, we would accept the second change as well per our earlier comment. |
| Futurewei | We see the concern from QCom. Since M is already the minimum, the minimum value of M may cause confusion. We support the update from QCom in previous round, i.e., “sensing results starting at least M consecutive logical slots” without any additional change. |
| CATT/GOHIGH | We think to change both places is not necessary and is also misleading. ‘the minimum value of M is’ implies that larger value of M than the minimal can be used, which is problematic. |
| Ericsson | We think that the changes are redundant and could be misinterpreted. We are OK with either one of them but we do not think that both words are needed. |

### Proposal for week 2 first GTW session

**FL observation and response:**

* Since there is a strong view that changes in both places are not needed and preference to combine this issue #1-32 with #1-25, let’s do the following proposal. Also, to update the description for “*contiguousSensingWindowPeriodic*” at the same time.

**Proposal 1-32 (I):**

The following TP correction for TS38.214 is to be implemented to resolve issue #1-32 and #1-25.

|  |
| --- |
| - Optionally, indication of *M* value to determine the size in logical slots of contiguous partial sensing window as *contiguousSensingWindowPeriodic*.  Optionally, indication of *M* value to determine the size in logical slots of contiguous partial sensing window as *contiguousSensingWindowAperiodic.*  **<Unchanged parts omitted>**  When the UE performs contiguous partial sensing with periodic reservation for another TB (*sl-MultiReserveResource*) disabled and if , the sensing window is defined by the range of slots . and are both selected such that the UE has sensing results starting at least *M* consecutive logical slots before and ending at slots earlier than . The value of *M* is (pre-)configured with the *contiguousSensingWindowAperiodic*. If *contiguousSensingWindowAperiodic* is not (pre-)configured, *M* equals to 31. When the minimum *M* slots for CPS cannot be guaranteed and when , it is up to UE implementation to either continue with step 3) or perform random selection. |

## Editorial corrections

### [CLOSED] Issue #1-9/1-28/1-29: Notations for logical slots

**Background (reason for change from [10], [11], [13])**:

According to contribution [10], [11] and [13]:

* In TS 38.214, denotes the slots that may belong to a sidelink resource pool and represents the slots that belong to a resource pool.
* The selected Y/Y’ candidate slots and the corresponding sensing occasions are the slots within sidelink resource pool.
* should be converted to units of logical slot due to corresponds to the periodicity in milliseconds.

**Combined TP 1-9/28/29 (I)**:

|  |
| --- |
| **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**  **<Unchanged parts omitted>**  The following steps are used:  **<Unchanged parts omitted>**  2) The sensing window is defined by the range of slots [), when the UE performs full sensing, where is defined above and is defined in slots in Table 8.1.4-1 where is the SCS configuration of the SL BWP. The UE shall monitor slots which belongs to a sidelink resource pool within the sensing window except for those in which its own transmissions occur. The UE shall perform the behaviour in the following steps based on PSCCH decoded and RSRP measured in these slots.  When the UE performs periodic-based partial sensing, the UE shall monitor slots at , where is a slot of the selected candidate slots and is converted to units of logical slot according to clause 8.1.7. The UE shall perform the behaviour in the following steps based on PSCCH decoded and RSRP measured in these slots.  The value of corresponds to *periodicSensingOccasionReservePeriodList* if configured, otherwise, the values correspond to all periodicity from *sl-ResourceReservePeriodList.*  The UE monitors *k* sensing occasions determined by *additionalPeriodicSensingOccasion*, as previously described, and not earlier than . For a given periodicity , the values of *k* correspond to the most recent sensing occasion earlier than if *additionalPeriodicSensingOccasion* is not (pre-)configured, and additionally includes the value of *k* corresponding to the last periodic sensing occasion prior to the most recent one if *additionalPeriodicSensingOccasion* is (pre-)configured. is the first slot of the selected *Y* candidate slots of PBPS.  When the UE performs periodic-based partial sensing and contiguous partial sensing with periodic reservation for another TB (*sl-MultiReserveResource*) enabled, the sensing window is defined by the range of slots . *n*+*T*A is *M* consecutive logical slots earlier than slot , and *n*+*T*B is slots earlier than , where is the first slot of the selected *Y* candidate slots of PBPS, and , are in units of physical time/slots. If the value of *M* is (pre-)configured with the *contiguousSensingWindowPeriodic*. If *contiguousSensingWindowPeriodic* is not (pre-)configured, *M* equals to 31. When the minimum *M* slots for CPS cannot be guaranteed and when , it is up to UE implementation to either continue with step 3) or perform random selection.  When the UE performs contiguous partial sensing with periodic reservation for another TB (*sl-MultiReserveResource*) disabled and if , the sensing window is defined by the range of slots . and are both selected such that the UE has sensing results starting at *M* consecutive logical slots before and ending at slots earlier than . The value of *M* is (pre-)configured with the *contiguousSensingWindowAperiodic*. If *contiguousSensingWindowAperiodic* is not (pre-)configured, *M* equals to 31. When the minimum *M* slots for CPS cannot be guaranteed and when , it is up to UE implementation to either continue with step 3) or perform random selection.  **<Unchanged parts omitted>**  6) The UE shall exclude any candidate single-slot resource from the set if it meets all the following conditions:  **<Unchanged parts omitted>**  c) the SCI format received in slot or the same SCI format which, if and only if the '*Resource reservation period*' field is present in the received SCI format 1-A, is assumed to be received in slot(s) determines according to clause 8.1.5 the set of resource blocks and slots which overlaps with for *q*=1, 2, …, *Q* and *j=*0, 1, …, . Here, is converted to units of logical slots according to clause 8.1.7, if and , where if the UE is configured with full sensing by its higher layer, if slot *n* belongs to the set , otherwise slot is the first slot after slot *n* belonging to the set ; If UE is configured with partial sensing by its higher layer, if slot belongs to the set , otherwise, slot is the first slot after slot belonging to the set . Otherwise . If the UE is configured with full sensing by its higher layer, is set to selection window size *T2* converted to units of msec. If UE is configured with partial sensing by its higher layer, shall be converted to milliseconds, where slot is the last slot of the or candidate slots. The slot is the first slot of the selected/remaining set of or candidate slots.  **<Unchanged parts omitted>**  When the UE performs periodic-based partial sensing and contiguous partial sensing, and when the UE is triggered to perform re-evaluation and pre-emption checking, and if *P*rsvp\_TX*≠0*,  - During the *q*th reservation period (*q*=0,1,2,…, *Cresel*-1), candidate resource set (*SA*) is initialized to the remaining *Y* candidate slots starting from slot and ending at the last slot of the *Y* candidate slots, where the slot indices of the remaining *Y* candidate slots are equal to, where is a slot index of *Y* candidate slots used in the initial resource (re)selection.  - is the first candidate slot after slot *n+T3*.  - The UE performs PBPS for the remaining *Y* candidate slots according to , where is a slot belonging to the remaining *Y* candidate slots, and *k* and *Preserve* are the same as resource (re)selection, where the values of *k* correspond to the most recent sensing occasion earlier than if *additionalPeriodicSensingOccasion* is not (pre-)configured, and additionally includes the value of *k* corresponding to the last periodic sensing occasion prior to the most recent one if *additionalPeriodicSensingOccasion* is (pre-)configured.  - The UE performs CPS starting from *M* logical slots earlier than to slots earlier than .  - By default, *M* is 31 unless (pre-)configured with another value. by *contiguousSensingWindowPeriodic*.  When the UE is triggered to perform re-evaluation and pre-emption checking, and if *P*rsvp\_TX*=0*,  - Candidate resource set (*SA*) is initialized to the remaining *Y'* candidate slots starting from slot and ending at the last slot of the *Y'* candidate slots, where is the first candidate slot after slot *n+T3*.  - It is up to UE implementation that UE may perform PBPS for periodic sensing occasions after the resource (re)selection when higher layer parameter *sl-MultiReserveResource* is enabled  - UE performs CPS starting from at least *M* consecutive logical slots earlier than to slots earlier than  - For minimum size M of the CPS monitoring window *[n+TA, n+TB]*, by default, *M* is 31 unless (pre-)configured with another value, by  *contiguousSensingWindowAperiodic*.  When the minimum *M* slots for CPS cannot be guaranteed, UE senses in all available slots starting from the resource (re)selection trigger slot of the same TB to slots earlier than . The UE re-evaluation and pre-emption checking is based on all available sensing results after n-T0. |

**Question 1-9/28/29:**

Do you agree with the above combined TP for issue 1-9/28/29 (I)? Any modification is needed?

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Interdigital | Agree |
| Futurewei | We are ok with the changes. |
| Sharp | Agree |
| Apple | Agree |
| CMCC | Agree |
| Qualcomm | The modifications are not strictly needed. Specification text is generally clear and specifically states logical slots where needed. We can accept the TP if that is the prevailing preference in RAN1. |
| NTT DOCOMO | OK |
| Panasonic | Agree |
| Intel | Agree |
| MediaTek | Agree. |
| Ericsson | Agree |
| vivo | ok |
| Spreadtrum | Agree. |
| Samsung | Agree. |
| OPPO | Agree |
| Lenovo | OK |
| Huawei, HiSilicon | Agree. The conversion from physical slots to logical slots are essential. |
| ZTE,Sanechips | Agree |
|  |  |

### [CLOSED] Issue #1-24: Clarify “*contiguousSensingWindowPeriodic*” is the CPS window size for periodic transmission and “*contiguousSensingWindowAperiodic*” is for aperiodic Tx

**Background and proposed change in [18]**:

According to the latest RRA parameter list sent to RAN2 in R1-2202759:

* Description for “contiguousSensingWindowPeriodic”: *Parameter that indicates the size of contiguous partial sensing window in logical slot units when UE performs periodic-based and contiguous partial sensing for a resource (re)selection procedure triggered by periodic transmission. If not configured, the size of contiguous partial sensing window in logical slot units is 31.*
* Description for “contiguousSensingWindowAperiodic”: *Parameter that indicates the minimum size of contiguous partial sensing window in logical slot units for a resource (re)selection procedure and re-evaluation/pre-emption checking triggered by aperiodic transmission. If not configured, the size of contiguous partial sensing window in logical slot units is 31.*

It is unclear according to the current description in the spec (TS38.214) for high layer parameters “*contiguousSensingWindowPeriodic*” and “*contiguousSensingWindowAperiodic*” are related to CPS window for periodic and aperiodic transmissions, respectively.

Proposed TP in [18]:

|  |
| --- |
| 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 **<Unchanged parts omitted>**  Optionally, indication of the size in logical slots of contiguous partial sensing window for periodic transmissions as defined by the parameter *contiguousSensingWindowPeriodic*.  Optionally, indication of the size in logical slots of contiguous partial sensing window for aperiodic transmissions as defined by the parameter *contiguousSensingWindowAperiodic.*  **<Unchanged parts omitted>** |

**Question 1-24:**

Do you agree with the above proposed editorial TP in [18]? Any modification is needed?

|  |  |
| --- | --- |
| **Company** | **Comments** |
| InterDigital | We agree with the TP |
| Futurewei | We support the TP for clarity. |
| Sharp | Agree |
| Apple | Fine with the modification |
| CMCC | Agree with comments.    Maybe “periodic” and “aperiodic” can be replaced by *Ptx*=0 and *Ptx*≠0 which are more usual used in the spec. |
| Qualcomm | Ok with the proposed TP |
| NTT DOCOMO | OK |
| Panasonic | Agree |
| Intel | Agree |
| MediaTek | OK |
| Ericsson | Agree |
| vivo | ok |
| Spreadtrum | Agree. |
| Samsung | Agree. |
| OPPO | Agree |
| Lenovo | OK |
| Huawei, HiSilicon | Not strongly needed.  Current 38.331 (see quoted description for relevant parameters below) captures this and it is clear on how these parameters are used as per description. Duplication texts in specs are not needed, and the TP is not essential.   | ***sl-CPS-WindowAperiodic***  Parameter that indicates the minimum size of contiguous partial sensing window in logical slot units for a resource (re)selection procedure and re-evaluation/pre-emption checking triggered by aperiodic transmission. (see TS 38.214 [19], clause 8.1.4). If not configured, the size of contiguous partial sensing window in logical slot units is 31. | | --- | | ***sl-CPS-WindowPeriodic***  Indicates the size of contiguous partial sensing window in logical slot units when UE performs periodic-based and contiguous partial sensing for a resource (re)selection procedure triggered by periodic transmission. If not configured, the size of contiguous partial sensing window in logical slot units is 31. | |
| ZTE,Sanechips | Agree with CMCC's edits, aperiodic and periodic transmission can be reformulated as *P*rsvp\_TX*=0, P*rsvp\_TX*0* |
|  |  |

### [CLOSED] Issue #1-25: Clarify “*contiguousSensingWindowAperiodic*” is the minimum size for CPS window

**Background (existing agreement and reasons for change from [6], [11])**:

|  |
| --- |
| RRC parameter list (R1-2202759)  In Row 11 of the “Sidelink” Excel worksheet: |

Based on the description for RRC parameter “*contiguousSensingWindowAperiodic*” sent to RAN2 for a resource (re)selection procedure and re-evaluation/pre-emption checking triggered by aperiodic transmission (*P*rsvp\_TX*=0*), this parameter defines the minimum value for CPS monitoring window.

However, the spec description in 38.214 does not refer this higher layer parameter indicates the minimum value for the contiguous partial sensing window.

TP from [6] and [11]:

|  |
| --- |
| Optionally, indication of the size in logical slots of contiguous partial sensing window as *contiguousSensingWindowPeriodic*.  Optionally, indication of the minimum size in logical slots of contiguous partial sensing window as *contiguousSensingWindowAperiodic*. |

**Question 1-25 (I):**

Do you agree with the above proposed editorial TP from [6] and [11] as shown in the above?

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Interdigital | We agree with the TP. |
| Futurewei | We support the TP. |
| Sharp | Agree |
| Apple | Fine with the change.  Question: Do we have the similar change for *contiguousSensingWindowPeriodic*? |
| CMCC | Agree |
| Qualcomm | Ok with the proposed TP |
| NTT DOCOMO | Actually the RRC parameter indicates M value but M value is not CPS window size. The window size is (T\_B – T\_A + 1), but M = t\_y0 – (n+T\_A). For example, how about the following update? In addition, we have same question as Apple.  Optionally, indication of M value to determine the minimum size in logical slots of contiguous partial sensing window as *contiguousSensingWindowAperiodic*. |
| Panasonic | Agree |
| CATT/GOHIGH | It seems this is not necessary if the changes in 1-32 is agreed. |
| Intel | Agree |
| MediaTek | We prefer Docomo’s suggestion. |
| Ericsson | Agree |
| Vivo | ok |
| Spreadtrum | Agree. |
| Samsung | Agree. |
| OPPO | Agree |
| Lenovo | OK |
| Huawei, HiSilicon | Not strongly needed.  Current TS 38.331 (see quoted description for relevant parameter below) capture this and is clear on how the parameter is used per its description. Thus this TP is not essential.   | ***sl-CPS-WindowAperiodic***  Parameter that indicates the minimum size of contiguous partial sensing window in logical slot units for a resource (re)selection procedure and re-evaluation/pre-emption checking triggered by aperiodic transmission. (see TS 38.214 [19], clause 8.1.4). If not configured, the size of contiguous partial sensing window in logical slot units is 31. | | --- | |
| ZTE,Sanechips | This issue is duplicated with the discussion in 1.5. Ok with this change which makes the change to 1.5 not needed. |
| Futurewei | We prefer the previous change as “indication” already captures the meaning in the agreement and be consistent with the one for *contiguousSensingWindowPeriodic* above (just need to add the minimum) |

#### Round 2 discussion

**FL comments:**

* + - * @Apple, DOCOMO, regarding “*contiguousSensingWindowPeriodic*”, we don’t need a similar change as the *M* value for CPS in case of periodic transmission is not agreed as a minimum number of slots.
      * @DOCOMO, I see your point. Let’s see if the group is OK with your suggested change.
      * @HW, without the proposed correction TP, the current description in 38.214 for these two parameters are exactly the same. I see this could be confusing to readers who are not familiar with the topic. Since, most companies are OK/agree with the proposed correction, hope it is fine for you with the existing TP.
      * @ALL, please check the following updated TP based on DOCOMO’s suggestion. Please indicate if you have a strong concern.

**Question 1-25 (II):**

Are you OK with the suggestion from DOCOMO to update the editorial TP from [6] and [11] as shown in the following?

|  |
| --- |
| Optionally, indication of the size in logical slots of contiguous partial sensing window as *contiguousSensingWindowPeriodic*.  Optionally, indication of *M* value to determine the minimum size in logical slots of contiguous partial sensing window as *contiguousSensingWindowAperiodic*. |

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Intel | We understand the concerns of Docomo but at this stage of clausa 8.1.4 the parameter M is not defined. The parameter M is only defined in Step 2). From our perspective it is desired to avoid referencing an undefined parameter. |
| Qualcomm | Ok but then the description needs to be consistent with Issue #1-32. |
| CATT/GOHIGH | The TP is not essential since we already decide to fix #1-32. These two needs to be discussed together from the beginning to save time. |
| Ericsson | We feel that this change could be redundant if we have the change in 1-32 |

### [CLOSED] Issue #1-45: RRC parameter names alignment

**Background and proposed change in [3]**:

The following parameters in Section 8.1.4 of TS38.214 should be aligned with the latest RRC parameter names in TS 38.331 v17.0.0.

* Change *periodicSensingOccasionReservePeriodList* to *PBPS-OccasionReservePeriodList*
* Change *additionalPeriodicSensingOccasion* to *Additional-PBPS-Occasion*
* Change *contiguousSensingWindowPeriodic* to *CPS-WindowPeriodic*
* Change *contiguousSensingWindowAperiodic* to *CPS-WindowAperiodic*

Corresponding TP for the above RRC parameter name updates should be as followed (note, different from [3]).

|  |
| --- |
| 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:  …  - Optionally, sensing occasion as *PBPS-OccasionReservePeriodList,* which indicates the subset of periodicity values from *sl-ResourceReservePeriodList* used to determine periodic sensing occasions in periodic-based partial sensing. If not configured, all periodicity values from *sl-ResourceReservePeriodList* are used to determine periodic sensing occasions in periodic-based partial sensing.  - Optionally, additional sensing occasions as *Additional-PBPS-Occasion*, which indicates that UE additionally monitors periodic sensing occasions that correspond to a set of values. The possible values of the set at least includes the most recent sensing occasion before the first slot of the candidate slots for a given reservation periodicity and the last periodic sensing occasion prior to the most recent one for the given reservation periodicity. If not configured, the UE monitors the most recent sensing occasion before the first slot of the candidate slots for the given periodicity used to determine periodic sensing occasions in periodic-based partial sensing.  - Optionally, indication of the size in logical slots of contiguous partial sensing window as *CPS-WindowPeriodic*.  Optionally, indication of the size in logical slots of contiguous partial sensing window as *CPS-WindowAperiodic.*  - Optionally, indication of whether UE is required to perform SL reception of PSCCH and RSRP measurement for partial sensing on slots in SL DRX inactive time as *partialSensingInactiveTime.*  …  2) The sensing window is defined by the range of slots [), when the UE performs full sensing, where is defined above and is defined in slots in Table 8.1.4-1 where is the SCS configuration of the SL BWP. The UE shall monitor slots which belongs to a sidelink resource pool within the sensing window except for those in which its own transmissions occur. The UE shall perform the behaviour in the following steps based on PSCCH decoded and RSRP measured in these slots.  When the UE performs periodic-based partial sensing, the UE shall monitor slots at , where is a slot of the selected candidate slots. The UE shall perform the behaviour in the following steps based on PSCCH decoded and RSRP measured in these slots.  The value of corresponds to *PBPS-OccasionReservePeriodList* if configured, otherwise, the values correspond to all periodicity from *sl-ResourceReservePeriodList.*  The UE monitors *k* sensing occasions determined by *Additional-PBPS-Occasion*, as previously described, and not earlier than . For a given periodicity , the values of *k* correspond to the most recent sensing occasion earlier than if *Additional-PBPS-Occasion* is not (pre-)configured, and additionally includes the value of *k* corresponding to the last periodic sensing occasion prior to the most recent one if *Additional-PBPS-Occasion* is (pre-)configured. is the first slot of the selected *Y* candidate slots of PBPS.  When the UE performs periodic-based partial sensing and contiguous partial sensing with periodic reservation for another TB (*sl-MultiReserveResource*) enabled, the sensing window is defined by the range of slots . *n*+*T*A is *M* consecutive logical slots earlier than slot , and *n*+*T*B is slots earlier than , where is the first slot of the selected *Y* candidate slots of PBPS, and , are in units of physical time/slots. If the value of *M* is (pre-)configured with the *CPS-WindowPeriodic*. If *CPS-WindowPeriodic* is not (pre-)configured, *M* equals to 31. When the minimum *M* slots for CPS cannot be guaranteed and when , it is up to UE implementation to either continue with step 3) or perform random selection.  When the UE performs contiguous partial sensing with periodic reservation for another TB (*sl-MultiReserveResource*) disabled and if , the sensing window is defined by the range of slots . and are both selected such that the UE has sensing results starting at *M* consecutive logical slots before and ending at slots earlier than . The value of *M* is (pre-)configured with the *CPS-WindowAperiodic*. If *CPS-WindowAperiodic* is not (pre-)configured, *M* equals to 31. When the minimum *M* slots for CPS cannot be guaranteed and when , it is up to UE implementation to either continue with step 3) or perform random selection.  …  When the UE performs periodic-based partial sensing and contiguous partial sensing, and when the UE is triggered to perform re-evaluation and pre-emption checking, and if *P*rsvp\_TX*≠0*,  …  - The UE performs PBPS for the remaining *Y* candidate slots according to , where is a slot belonging to the remaining *Y* candidate slots, and *k* and *Preserve* are the same as resource (re)selection, where the values of *k* correspond to the most recent sensing occasion earlier than if *Additional-PBPS-Occasion* is not (pre-)configured, and additionally includes the value of *k* corresponding to the last periodic sensing occasion prior to the most recent one if *Additional-PBPS-Occasion* is (pre-)configured.  - The UE performs CPS starting from *M* logical slots earlier than to slots earlier than .  - By default, *M* is 31 unless (pre-)configured with another value by *CPS-WindowPeriodic*.  When the UE is triggered to perform re-evaluation and pre-emption checking, and if *P*rsvp\_TX*=0*,  …  - For minimum size M of the CPS monitoring window *[n+TA, n+TB]*, by default, *M* is 31 unless (pre-)configured with another value by *CPS-WindowAperiodic*.  When the minimum *M* slots for CPS cannot be guaranteed, UE senses in all available slots starting from the resource (re)selection trigger slot of the same TB to slots earlier than . The UE re-evaluation and pre-emption checking is based on all available sensing results after n-T0. |

**Question 1-45:**

Do you agree with the above proposed editorial TP? Any modification is needed?

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Interdigital | Agree |
| Futurewei | Ok with the changes to align them with the names of RRC parameters. |
| Sharp | Agree |
| Apple | Yes |
| CMCC | Agree. |
| Qualcomm | Ok with the proposed TP |
| NTT DOCOMO | OK |
| Panasonic | Agree |
| Intel | Agree |
| MediaTek | OK |
| Ericsson | Agree |
| vivo | ok |
| Spreadtrum | Agree. |
| Samsung | Agree. |
| OPPO | Agree |
| Lenovo | OK |
| Huawei, HiSilicon | We prefer this kind of RRC parameter alignment changes to be handled by editor in an alignment CR, otherwise, it can be predicted more RRC alignment changes will be proposed in the future.  By the way, the correct names for these parameters seem to be “*sl-PS-WindowAperiodic*”, “*sl-PS-WindowPeriodic*”,” *sl-PBPS-OccasionReservePeriodList*” , “*sl-Additional-PBPS-Occasion”* |
| ZTE,Sanechips | OK |
|  |  |

### [CLOSED] Issue #1-46: Indentation position for spec description on PBPS in Step 2)

**Background and proposed change in [5]**:

* According to [5]:
  + In TS 38.214 section 8.1.4 step 2), UE behaviours of performing sensing are specified. Currently, the behaviours of four sensing mechanisms are described respectively. For periodic-based partial sensing, two paragraphs were added to specify the sensing slots. Considering the definition of Preserve and k are juxtaposed, the indentation positions should be the same.
* Corresponding TP for fixing the indentation positions in Step 2) is shown as followed:

|  |
| --- |
| 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:  …  2) The sensing window is defined by the range of slots [), when the UE performs full sensing, where is defined above and is defined in slots in Table 8.1.4-1 where is the SCS configuration of the SL BWP. The UE shall monitor slots which belongs to a sidelink resource pool within the sensing window except for those in which its own transmissions occur. The UE shall perform the behaviour in the following steps based on PSCCH decoded and RSRP measured in these slots.  When the UE performs periodic-based partial sensing, the UE shall monitor slots at , where is a slot of the selected candidate slots. The UE shall perform the behaviour in the following steps based on PSCCH decoded and RSRP measured in these slots.  The value of corresponds to *periodicSensingOccasionReservePeriodList* if configured, otherwise, the values correspond to all periodicity from *sl-ResourceReservePeriodList.*  The UE monitors *k* sensing occasions determined by *additionalPeriodicSensingOccasion*, as previously described, and not earlier than . For a given periodicity , the values of *k* correspond to the most recent sensing occasion earlier than if *additionalPeriodicSensingOccasion* is not (pre-)configured, and additionally includes the value of *k* corresponding to the last periodic sensing occasion prior to the most recent one if *additionalPeriodicSensingOccasion* is (pre-)configured. is the first slot of the selected *Y* candidate slots of PBPS.  When the UE performs periodic-based partial sensing and contiguous partial sensing with periodic reservation for another TB (*sl-MultiReserveResource*) enabled, the sensing window is defined by the range of slots . *n*+*T*A is *M* consecutive logical slots earlier than slot , and *n*+*T*B is slots earlier than , where is the first slot of the selected *Y* candidate slots of PBPS, and , are in units of physical time/slots. If the value of *M* is (pre-)configured with the *contiguousSensingWindowPeriodic*. If *contiguousSensingWindowPeriodic* is not (pre-)configured, *M* equals to 31. When the minimum *M* slots for CPS cannot be guaranteed and when , it is up to UE implementation to either continue with step 3) or perform random selection.  When the UE performs contiguous partial sensing with periodic reservation for another TB (*sl-MultiReserveResource*) disabled and if , the sensing window is defined by the range of slots . and are both selected such that the UE has sensing results starting at *M* consecutive logical slots before and ending at slots earlier than . The value of *M* is (pre-)configured with the *contiguousSensingWindowAperiodic*. If *contiguousSensingWindowAperiodic* is not (pre-)configured, *M* equals to 31. When the minimum *M* slots for CPS cannot be guaranteed and when , it is up to UE implementation to either continue with step 3) or perform random selection.  Whether the UE is required to performs SL reception of PSCCH and RSRP measurement for partial sensing on slots in SL DRX inactive time is enabled/disabled by higher layer parameter *partialSensingInactiveTime.* When it is enabled, if UE performs periodic-based partial sensing on the slots in SL DRX inactive time for a given , UE monitors only the default periodic sensing occasions (most recent sensing occasion) from the slots; if UE performs contiguous partial sensing on the slots in SL DRX inactive time, UE monitors a minimum of *M* slots from the slots.  3) The internal parameter is set to the corresponding value of RSRP threshold indicated by the *i*-th field in *sl-Thres-RSRP-List*, where .  … |

**Question 1-46:**

Do you agree with the above proposed editorial indentation position fixes in Step 2)? Any modification is needed?

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Interdigital | Agree. |
| Futurewei | OK |
| Sharp | Agree |
| Apple | Fine with the change. |
| CMCC | Agree |
| Qualcomm | Ok with the proposed TP |
| NTT DOCOMO | OK |
| Panasonic | Agree |
| CATT/GOHIGH | Agree. |
| Intel | Agree |
| MediaTek | OK |
| Ericsson | Agree |
| vivo | ok |
| Spreadtrum | Agree |
| Samsung | Agree. |
| OPPO | Agree |
| Lenovo | OK |
| Huawei, HiSilicon | OK. |
| ZTE,Sanechips | OK |

### [CLOSED] Issue #1-47: Correction of a typo from *Prsvp\_TX* to *Preserve* when UE is enabled to perform partial sensing in SL DRX inactive time

**Background and proposed change in [15]**:

|  |
| --- |
| **Agreement (RAN1#107bis-e)**  Whether UE performs SL reception of PSCCH and RSRP measurement for partial sensing on slots in SL DRX inactive time is enabled/disabled by (pre-)configuration per resource pool when partial sensing is configured in the UE by a higher layer.   * When it is enabled,   + When UE performs periodic-based partial sensing for a given *Preserve*, UE monitors only the default periodic sensing occasion.   + When UE performs contiguous partial sensing, UE monitors a minimum of *M* slots for CPS. * Note, when it is disabled, the UE is not required to perform SL reception of PSCCH and RSRP measurement in SL DRX inactive time. * Note: no further optimization on the resource (re)selection procedure with regard to SL DRX operation is specified in Rel.17. * FFS the case when full sensing is configured in the UE by a higher layer |

* According to [15]: when a UE performs partial sensing, the sensing occasion is determined by *P*reserve, not *P*rsvp\_TX. *P*rsvp\_TX is the periodicity for the UE’s own transmission. There seems to be a typo in the current description in section 8.1.4.
* TP from [15] with a small modification from FL:

|  |
| --- |
| 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   * **<Unchanged parts omitted>**   Whether the UE is required to performs SL reception of PSCCH and RSRP measurement for partial sensing on slots in SL DRX inactive time is enabled/disabled by higher layer parameter *partialSensingInactiveTime.* When it is enabled, if UE performs periodic-based partial sensing on the slots in SL DRX inactive time for a givenperiodicity corresponding to *P*reserve, UE monitors only the default periodic sensing occasions (most recent sensing occasion) from the slots; if UE performs contiguous partial sensing on the slots in SL DRX inactive time, UE monitors a minimum of *M* slots from the slots.   * **<Unchanged parts omitted>** |

**Question 1-47:**

Do you agree with the above proposed editorial TP from [15]? Any modification is needed?

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Interdigital | Agree with the TP. |
| Futurewei | We support the TP. |
| Sharp | Agree |
| Apple | Agree |
| CMCC | Agree.  *P*tx is the periodicity for UE’s own transmission, not for sensing occasion determination. |
| Qualcomm | Ok with the proposed TP |
| NTT DOCOMO | OK |
| Panasonic | Agree |
| Intel | Agree |
| MediaTek | OK |
| Ericsson | Agree |
| vivo | ok |
| Spreadtrum | Agree |
| Samsung | Agree. |
| OPPO | Agree |
| Lenovo | OK |
| Huawei, HiSilicon | OK. |
| ZTE,Sanechips | OK |

### [CLOSED] Issue #1-48: *minNumCandidaateSlotsAperiodic*

**Background and proposed change in [18]**:

* FL proposes to correct the simple typo in a RRC parameter name only from [18].
* FL proposes a further editorial correction on the notation for to align with Step 1).
* For the other two changes from [18], FL shares a different understanding of the definition and intention of the parameters and . FL understands these parameters are not related to number of slots of candidate resources to be reported to the higher layer. They are merely used during the selection of the Y and Y’ candidate slots in Step 1) only. Furthermore, they should be related to periodic and aperiodic transmission, instead of PBPS and CPS.
* FL believes further review and discussion are needed on the current spec description in 38.214 and RRC parameter description (sent to RAN2) for these two parameters (*minNumCandidateSlotsPeriodic* and *minNumCandidateSlotsAperiodic*). This review and discussion would go beyond the scope of this editorial correction. In addition, this is related to Issue 1-22 and 1-23 as identified by [3] and [15] as summarized in [19].
* **FL recommendation:** adopt the following TP in the spec (38.214) section 8.1.4 in this meeting.

|  |
| --- |
| 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 **<Unchanged parts omitted>**  - Optionally, minimum number of *Y* slots as (*minNumCandidateSlotsPeriodic*), which indicates the minimum number of *Y* slots that are included in the resources corresponding to periodic-based partial sensing.  - Optionally, minimum number of slots as (*minNumCandidateSlotsAperiodic*), which indicates the minimum number of slots that are included in the resources corresponding to contiguous partial sensing.  **<Unchanged parts omitted>** |

**Proposal 1-48:**

Do you agree with the above proposed editorial TP? Any modification is needed?

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Interdigital | Agree |
| Futurewei | Ok |
| Sharp | Agree |
| Apple | Agree |
| CMCC | Agree |
| Qualcomm | Ok with the proposed TP |
| NTT DOCOMO | OK |
| Panasonic | Agree |
| Intel | Agree |
| MediaTek | OK |
| Ericsson | Agree |
| vivo | ok |
| Spreadtrum | Agree. |
| Samsung | Agree. |
| OPPO | Agree |
| Lenovo | OK |
| Huawei, HiSilicon | OK. |
| ZTE,Sanechips | OK |

Stable TPs for endorsement

## Editorial TPs after Round\_1

Necessary field descriptions for the CR cover sheet for TS 38.214 covering all editorial issues endorsed in this section.

|  |  |
| --- | --- |
| ***Reason for change:*** | Editorial corrections to fix mathematical notations, align specification description to RAN1 agreements, align RRC parameter names, typos and formatting issues. |
|  |  |
| ***Summary of change:*** | In clause 8.1.4,   * Corrected mathematical notation for logical slots in partial sensing, * Clarified parameter description for “*contiguousSensingWindowPeriodic*” and “*contiguousSensingWindowAperiodic*”, * Aligned parameter names for   + *sl-PBPS-OccasionReservePeriodList*   + *sl-Additional-PBPS-Occasion*   + *sl-CPS-WindowPeriodic*   + *sl-CPS-WindowAperiodic* * Corrected indentation position for the description on PBPS in Step 2) * Correction of typos from *Prsvp\_TX* to *Preserve*, from Y\_min to , and from *minNumCandidaateSlotsAperiodic to minNumCandidateSlotsAperiodic* |
|  |  |
| ***Consequences if not approved:*** | Incorrect description, maths notations, RRC parameter names, spellings, and description formatting. |

### Issue #1-9/1-28/1-29 (notations for logical slots) in Section 1.6.1, the following combined TP for TS38.214 seems stable:

|  |
| --- |
| **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**  **<Unchanged parts omitted>**  The following steps are used:  **<Unchanged parts omitted>**  2) The sensing window is defined by the range of slots [), when the UE performs full sensing, where is defined above and is defined in slots in Table 8.1.4-1 where is the SCS configuration of the SL BWP. The UE shall monitor slots which belongs to a sidelink resource pool within the sensing window except for those in which its own transmissions occur. The UE shall perform the behaviour in the following steps based on PSCCH decoded and RSRP measured in these slots.  When the UE performs periodic-based partial sensing, the UE shall monitor slots at , where is a slot of the selected candidate slots and is converted to units of logical slot according to clause 8.1.7. The UE shall perform the behaviour in the following steps based on PSCCH decoded and RSRP measured in these slots.  The value of corresponds to *periodicSensingOccasionReservePeriodList* if configured, otherwise, the values correspond to all periodicity from *sl-ResourceReservePeriodList.*  The UE monitors *k* sensing occasions determined by *additionalPeriodicSensingOccasion*, as previously described, and not earlier than . For a given periodicity , the values of *k* correspond to the most recent sensing occasion earlier than if *additionalPeriodicSensingOccasion* is not (pre-)configured, and additionally includes the value of *k* corresponding to the last periodic sensing occasion prior to the most recent one if *additionalPeriodicSensingOccasion* is (pre-)configured. is the first slot of the selected *Y* candidate slots of PBPS.  When the UE performs periodic-based partial sensing and contiguous partial sensing with periodic reservation for another TB (*sl-MultiReserveResource*) enabled, the sensing window is defined by the range of slots . *n*+*T*A is *M* consecutive logical slots earlier than slot , and *n*+*T*B is slots earlier than , where is the first slot of the selected *Y* candidate slots of PBPS, and , are in units of physical time/slots. If the value of *M* is (pre-)configured with the *contiguousSensingWindowPeriodic*. If *contiguousSensingWindowPeriodic* is not (pre-)configured, *M* equals to 31. When the minimum *M* slots for CPS cannot be guaranteed and when , it is up to UE implementation to either continue with step 3) or perform random selection.  When the UE performs contiguous partial sensing with periodic reservation for another TB (*sl-MultiReserveResource*) disabled and if , the sensing window is defined by the range of slots . and are both selected such that the UE has sensing results starting at *M* consecutive logical slots before and ending at slots earlier than . The value of *M* is (pre-)configured with the *contiguousSensingWindowAperiodic*. If *contiguousSensingWindowAperiodic* is not (pre-)configured, *M* equals to 31. When the minimum *M* slots for CPS cannot be guaranteed and when , it is up to UE implementation to either continue with step 3) or perform random selection.  **<Unchanged parts omitted>**  6) The UE shall exclude any candidate single-slot resource from the set if it meets all the following conditions:  **<Unchanged parts omitted>**  c) the SCI format received in slot or the same SCI format which, if and only if the '*Resource reservation period*' field is present in the received SCI format 1-A, is assumed to be received in slot(s) determines according to clause 8.1.5 the set of resource blocks and slots which overlaps with for *q*=1, 2, …, *Q* and *j=*0, 1, …, . Here, is converted to units of logical slots according to clause 8.1.7, if and , where if the UE is configured with full sensing by its higher layer, if slot *n* belongs to the set , otherwise slot is the first slot after slot *n* belonging to the set ; If UE is configured with partial sensing by its higher layer, if slot belongs to the set , otherwise, slot is the first slot after slot belonging to the set . Otherwise . If the UE is configured with full sensing by its higher layer, is set to selection window size *T2* converted to units of msec. If UE is configured with partial sensing by its higher layer, shall be converted to milliseconds, where slot is the last slot of the or candidate slots. The slot is the first slot of the selected/remaining set of or candidate slots.  **<Unchanged parts omitted>**  When the UE performs periodic-based partial sensing and contiguous partial sensing, and when the UE is triggered to perform re-evaluation and pre-emption checking, and if *P*rsvp\_TX*≠0*,  - During the *q*th reservation period (*q*=0,1,2,…, *Cresel*-1), candidate resource set (*SA*) is initialized to the remaining *Y* candidate slots starting from slot and ending at the last slot of the *Y* candidate slots, where the slot indices of the remaining *Y* candidate slots are equal to, where is a slot index of *Y* candidate slots used in the initial resource (re)selection.  - is the first candidate slot after slot *n+T3*.  - The UE performs PBPS for the remaining *Y* candidate slots according to , where is a slot belonging to the remaining *Y* candidate slots, and *k* and *Preserve* are the same as resource (re)selection, where the values of *k* correspond to the most recent sensing occasion earlier than if *additionalPeriodicSensingOccasion* is not (pre-)configured, and additionally includes the value of *k* corresponding to the last periodic sensing occasion prior to the most recent one if *additionalPeriodicSensingOccasion* is (pre-)configured.  - The UE performs CPS starting from *M* logical slots earlier than to slots earlier than .  - By default, *M* is 31 unless (pre-)configured with another value. by *contiguousSensingWindowPeriodic*.  When the UE is triggered to perform re-evaluation and pre-emption checking, and if *P*rsvp\_TX*=0*,  - Candidate resource set (*SA*) is initialized to the remaining *Y'* candidate slots starting from slot and ending at the last slot of the *Y'* candidate slots, where is the first candidate slot after slot *n+T3*.  - It is up to UE implementation that UE may perform PBPS for periodic sensing occasions after the resource (re)selection when higher layer parameter *sl-MultiReserveResource* is enabled  - UE performs CPS starting from at least *M* consecutive logical slots earlier than to slots earlier than  - For minimum size M of the CPS monitoring window *[n+TA, n+TB]*, by default, *M* is 31 unless (pre-)configured with another value, by  *contiguousSensingWindowAperiodic*.  When the minimum *M* slots for CPS cannot be guaranteed, UE senses in all available slots starting from the resource (re)selection trigger slot of the same TB to slots earlier than . The UE re-evaluation and pre-emption checking is based on all available sensing results after n-T0. |

### Issue #1-24 (Clarify “contiguousSensingWindowPeriodic” is the CPS window size for periodic transmission and “contiguousSensingWindowAperiodic” is for aperiodic Tx) in Section 1.6.2

**FL responses:**

@CMCC, you are not wrong. But as commented by HW/HiSi, the description for these parameters in the 38.331 uses the term “periodic transmission” and “aperiodic transmission”. I think it would be good that the description for the same parameters is aligned across different specs. Since, most companies are OK/agree with the proposed correction, hope it is fine for you with the existing TP.

@HW/HiSi, without the proposed correction TP, the current description in 38.214 for these two parameters are exactly the same. I see this could be confusing to readers who are not familiar with the topic. Since, most companies are OK/agree with the proposed correction, hope it is fine for you with the existing TP.

The following TP for TS38.214 seems acceptable to the most.

|  |
| --- |
| 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 **<Unchanged parts omitted>**  Optionally, indication of the size in logical slots of contiguous partial sensing window for periodic transmissions as defined by the parameter *contiguousSensingWindowPeriodic*.  Optionally, indication of the size in logical slots of contiguous partial sensing window for aperiodic transmissions as defined by the parameter *contiguousSensingWindowAperiodic.*  **<Unchanged parts omitted>** |

### Issue #1-45 (RRC parameter names alignment) in Section 1.6.4

**FL responses:**

@HW/HiSi, yes, once RAN2 makes more parameter name changes, we should make further corresponding changes in RAN1 spec. I agree with you that “sl-” should be placed in front of the proposed new RRC parameter names. Let me add this in the following updated TP.

@All, based on HW’s comments in Round\_1, “sl-” is added in front of the proposed new RRC parameter names as shown in the following updated TP. This is the only update from Round 1 discussion. Please indicate if you have concern with this TP.

|  |
| --- |
| 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 parts omitted>**  - Optionally, sensing occasion as *sl-PBPS-OccasionReservePeriodList,* which indicates the subset of periodicity values from *sl-ResourceReservePeriodList* used to determine periodic sensing occasions in periodic-based partial sensing. If not configured, all periodicity values from *sl-ResourceReservePeriodList* are used to determine periodic sensing occasions in periodic-based partial sensing.  - Optionally, additional sensing occasions as *sl-Additional-PBPS-Occasion*, which indicates that UE additionally monitors periodic sensing occasions that correspond to a set of values. The possible values of the set at least includes the most recent sensing occasion before the first slot of the candidate slots for a given reservation periodicity and the last periodic sensing occasion prior to the most recent one for the given reservation periodicity. If not configured, the UE monitors the most recent sensing occasion before the first slot of the candidate slots for the given periodicity used to determine periodic sensing occasions in periodic-based partial sensing.  - Optionally, indication of the size in logical slots of contiguous partial sensing window as *sl-CPS-WindowPeriodic*.  Optionally, indication of the size in logical slots of contiguous partial sensing window as *sl-CPS-WindowAperiodic.*  - Optionally, indication of whether UE is required to perform SL reception of PSCCH and RSRP measurement for partial sensing on slots in SL DRX inactive time as *partialSensingInactiveTime.*  **<Unchanged parts omitted>**  2) The sensing window is defined by the range of slots [), when the UE performs full sensing, where is defined above and is defined in slots in Table 8.1.4-1 where is the SCS configuration of the SL BWP. The UE shall monitor slots which belongs to a sidelink resource pool within the sensing window except for those in which its own transmissions occur. The UE shall perform the behaviour in the following steps based on PSCCH decoded and RSRP measured in these slots.  When the UE performs periodic-based partial sensing, the UE shall monitor slots at , where is a slot of the selected candidate slots. The UE shall perform the behaviour in the following steps based on PSCCH decoded and RSRP measured in these slots.  The value of corresponds to *sl-PBPS-OccasionReservePeriodList* if configured, otherwise, the values correspond to all periodicity from *sl-ResourceReservePeriodList.*  The UE monitors *k* sensing occasions determined by *sl-Additional-PBPS-Occasion*, as previously described, and not earlier than . For a given periodicity , the values of *k* correspond to the most recent sensing occasion earlier than if *sl-Additional-PBPS-Occasion* is not (pre-)configured, and additionally includes the value of *k* corresponding to the last periodic sensing occasion prior to the most recent one if *sl-Additional-PBPS-Occasion* is (pre-)configured. is the first slot of the selected *Y* candidate slots of PBPS.  When the UE performs periodic-based partial sensing and contiguous partial sensing with periodic reservation for another TB (*sl-MultiReserveResource*) enabled, the sensing window is defined by the range of slots . *n*+*T*A is *M* consecutive logical slots earlier than slot , and *n*+*T*B is slots earlier than , where is the first slot of the selected *Y* candidate slots of PBPS, and , are in units of physical time/slots. If the value of *M* is (pre-)configured with the *sl-CPS-WindowPeriodic*. If *sl-CPS-WindowPeriodic* is not (pre-)configured, *M* equals to 31. When the minimum *M* slots for CPS cannot be guaranteed and when , it is up to UE implementation to either continue with step 3) or perform random selection.  When the UE performs contiguous partial sensing with periodic reservation for another TB (*sl-MultiReserveResource*) disabled and if , the sensing window is defined by the range of slots . and are both selected such that the UE has sensing results starting at *M* consecutive logical slots before and ending at slots earlier than . The value of *M* is (pre-)configured with the *sl-CPS-WindowAperiodic*. If *sl-CPS-WindowAperiodic* is not (pre-)configured, *M* equals to 31. When the minimum *M* slots for CPS cannot be guaranteed and when , it is up to UE implementation to either continue with step 3) or perform random selection.  **<Unchanged parts omitted>**  When the UE performs periodic-based partial sensing and contiguous partial sensing, and when the UE is triggered to perform re-evaluation and pre-emption checking, and if *P*rsvp\_TX*≠0*,  **<Unchanged parts omitted>**  - The UE performs PBPS for the remaining *Y* candidate slots according to , where is a slot belonging to the remaining *Y* candidate slots, and *k* and *Preserve* are the same as resource (re)selection, where the values of *k* correspond to the most recent sensing occasion earlier than if *sl-Additional-PBPS-Occasion* is not (pre-)configured, and additionally includes the value of *k* corresponding to the last periodic sensing occasion prior to the most recent one if *sl-Additional-PBPS-Occasion* is (pre-)configured.  - The UE performs CPS starting from *M* logical slots earlier than to slots earlier than .  - By default, *M* is 31 unless (pre-)configured with another value by *sl-CPS-WindowPeriodic*.  When the UE is triggered to perform re-evaluation and pre-emption checking, and if *P*rsvp\_TX*=0*,  **<Unchanged parts omitted>**  - For minimum size M of the CPS monitoring window *[n+TA, n+TB]*, by default, *M* is 31 unless (pre-)configured with another value by *sl-CPS-WindowAperiodic*.  When the minimum *M* slots for CPS cannot be guaranteed, UE senses in all available slots starting from the resource (re)selection trigger slot of the same TB to slots earlier than . The UE re-evaluation and pre-emption checking is based on all available sensing results after n-T0. |

### Issue #1-46 (Indentation positions) in Section 1.6.5

Based on responses in Round\_1, the following TP for TS38.214 seems stable.

|  |
| --- |
| 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 parts omitted>**  2) The sensing window is defined by the range of slots [), when the UE performs full sensing, where is defined above and is defined in slots in Table 8.1.4-1 where is the SCS configuration of the SL BWP. The UE shall monitor slots which belongs to a sidelink resource pool within the sensing window except for those in which its own transmissions occur. The UE shall perform the behaviour in the following steps based on PSCCH decoded and RSRP measured in these slots.  When the UE performs periodic-based partial sensing, the UE shall monitor slots at , where is a slot of the selected candidate slots. The UE shall perform the behaviour in the following steps based on PSCCH decoded and RSRP measured in these slots.  The value of corresponds to *periodicSensingOccasionReservePeriodList* if configured, otherwise, the values correspond to all periodicity from *sl-ResourceReservePeriodList.*  The UE monitors *k* sensing occasions determined by *additionalPeriodicSensingOccasion*, as previously described, and not earlier than . For a given periodicity , the values of *k* correspond to the most recent sensing occasion earlier than if *additionalPeriodicSensingOccasion* is not (pre-)configured, and additionally includes the value of *k* corresponding to the last periodic sensing occasion prior to the most recent one if *additionalPeriodicSensingOccasion* is (pre-)configured. is the first slot of the selected *Y* candidate slots of PBPS.  When the UE performs periodic-based partial sensing and contiguous partial sensing with periodic reservation for another TB (*sl-MultiReserveResource*) enabled, the sensing window is defined by the range of slots . *n*+*T*A is *M* consecutive logical slots earlier than slot , and *n*+*T*B is slots earlier than , where is the first slot of the selected *Y* candidate slots of PBPS, and , are in units of physical time/slots. If the value of *M* is (pre-)configured with the *contiguousSensingWindowPeriodic*. If *contiguousSensingWindowPeriodic* is not (pre-)configured, *M* equals to 31. When the minimum *M* slots for CPS cannot be guaranteed and when , it is up to UE implementation to either continue with step 3) or perform random selection.  When the UE performs contiguous partial sensing with periodic reservation for another TB (*sl-MultiReserveResource*) disabled and if , the sensing window is defined by the range of slots . and are both selected such that the UE has sensing results starting at *M* consecutive logical slots before and ending at slots earlier than . The value of *M* is (pre-)configured with the *contiguousSensingWindowAperiodic*. If *contiguousSensingWindowAperiodic* is not (pre-)configured, *M* equals to 31. When the minimum *M* slots for CPS cannot be guaranteed and when , it is up to UE implementation to either continue with step 3) or perform random selection.  Whether the UE is required to performs SL reception of PSCCH and RSRP measurement for partial sensing on slots in SL DRX inactive time is enabled/disabled by higher layer parameter *partialSensingInactiveTime.* When it is enabled, if UE performs periodic-based partial sensing on the slots in SL DRX inactive time for a given , UE monitors only the default periodic sensing occasions (most recent sensing occasion) from the slots; if UE performs contiguous partial sensing on the slots in SL DRX inactive time, UE monitors a minimum of *M* slots from the slots.  3) The internal parameter is set to the corresponding value of RSRP threshold indicated by the *i*-th field in *sl-Thres-RSRP-List*, where .  **<Unchanged parts omitted>** |

### Issue #1-47 (Correction from *Prsvp\_TX* to *Preserve*) in Section 1.6.6

Based on responses in Round\_1, the following TP for TS38.214 seems stable.

|  |
| --- |
| 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 **<Unchanged parts omitted>**  Whether the UE is required to performs SL reception of PSCCH and RSRP measurement for partial sensing on slots in SL DRX inactive time is enabled/disabled by higher layer parameter *partialSensingInactiveTime.* When it is enabled, if UE performs periodic-based partial sensing on the slots in SL DRX inactive time for a givenperiodicity corresponding to *P*reserve, UE monitors only the default periodic sensing occasions (most recent sensing occasion) from the slots; if UE performs contiguous partial sensing on the slots in SL DRX inactive time, UE monitors a minimum of *M* slots from the slots.  **<Unchanged parts omitted>** |

### Issue #1-48 (*minNumCandida~~a~~teSlotsAperiodic*) in Section 1.6.7

Based on responses in Round\_1, the following TP for TS38.214 seems stable.

|  |
| --- |
| 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 **<Unchanged parts omitted>**  - Optionally, minimum number of *Y* slots as (*minNumCandidateSlotsPeriodic*), which indicates the minimum number of *Y* slots that are included in the resources corresponding to periodic-based partial sensing.  - Optionally, minimum number of slots as (*minNumCandidateSlotsAperiodic*), which indicates the minimum number of slots that are included in the resources corresponding to contiguous partial sensing.  **<Unchanged parts omitted>** |

Collection of all agreements / outcomes of RAN1#109-e

To be collected once agreement is reached

References

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13. [R1-2204173](file:///C:\3GPP\RAN1_Meetings\Tdocs\2022\R1-2204173.zip) Remaining issues on resource allocation for power saving Sharp
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19. [R1-2205117](file:///C:\3GPP\RAN1_Meetings\Tdocs\2022\R1-2205117.zip) Moderator Summary for preparation phase on maintenance on NR sidelink enhancement Moderator (LG Electronics)
20. [R1-2202565](file:///C:\3GPP\RAN1_Meetings\Tdocs\2022\R1-2202565.zip) FL summary for AI 8.11.1.1 – NR sidelink resource allocation for power saving (EOM) Moderator (OPPO)

Appendix (outcomes of past meetings)

## RAN1#103-e (26/Oct – 13/Nov 2020)

**Conclusion**

* SL reception Type A and Type D should be used as the reference for evaluation and designing of SL power saving features in R17.
  + Type A: UE is not capable of performing reception of any SL signals and channels, FFS with exception of performing PSFCH and S-SSB reception (aim to conclude in RAN1#104-e)
  + Type D: UE is capable of performing reception of all SL signals and channels defined in R16. It does not preclude UE to perform reception of a subset of SL signals/channels
  + If there are evaluations with assumptions other than the above reference, the detailed assumptions need to be reported
  + Note: the types and the associated capability defined here are not intended to be defined as Rel-17 UE features as is.

Agreements:

* Partial sensing based RA is supported as a power saving RA scheme
  + FFS details
* Random resource selection is supported as a power saving RA scheme
  + FFS any changes or enhancement
  + FFS on conditions to apply random resource selection

Agreements:

* In R17, a SL Mode 2 Tx resource pool can be (pre-)configured to enable full sensing only, partial sensing only, random resource selection only, or any combination(s) thereof
  + FFS details, including usage, potential restrictions, whether/how any enhancement or condition is needed for the coexistence of full sensing and power saving RA scheme(s) in a same resource pool, etc.

Agreements:

* Re-evaluation and pre-emption checking are not supported by UEs that do not perform any sensing (i.e. PSCCH reception)
* Re-evaluation and pre-emption checking are supported by UEs that perform sensing
  + FFS details and any conditions(s) in which re-evaluation and pre-emption can be performed
* FFS whether/how re-evaluation and pre-emption can be supported by UEs performing random resource selection that do perform sensing
* Note: details about sensing in this context, including when it is performed, are not decided yet.

Agreements:

* Further study congestion control based on CBR and CR for power saving RA schemes
  + Identify necessary changes from R16 CBR/CR (if any), including transmission resource selection and transmission parameters that can be adjusted and applicable to power savings RA schemes
  + Note: this is not intended to require all UEs to perform sensing for the purpose of CBR measurement

## RAN1#104-e (25/Jan – 05/Feb 2021)

Agreements**:**

* Random resource selection is applicable to both periodic and aperiodic transmissions
  + FFS conditions for random resource selection

**Conclusion:**

* PSFCH reception is not included for Type A UE
* S-SSB reception is not included for Type A UE
* SL reception Type B is additionally added
  + Type B: Same as Type A with an exception of performing PSFCH and S-SSB reception
* Note: the same conditions as in RAN1#103-e regarding the context of the discussion of Type A and Type D still apply (also applicable to type B)

Agreements**:** In a resource pool (pre-)configured with at least partial sensing, if UE performs periodic-based partial sensing, at least when the reservation for another TB (when carried in SCI) is enabled for the resource pool and resource selection/reselection is triggered at slot n, it is up to UE implementation to determine a set of Y candidate slots within a resource selection window, where

* FFS condition(s) and timing(s) for which periodic-based partial sensing is performed by UE
* The resource selection window is [n+T1, n+T2]
  + As a baseline, T1 and T2 are defined in the same way as in R16 NR-V2X according to step 1 [TS 38.214 Sec. 8.1.4]
  + Further discuss whether or not to introduce a threshold to re-define T1 and T2 such that
    - T1≥ 0 (subject to processing time constraint Tproc, 1), and T2 ≤ remaining PDB
    - T2-T1 *≤* (pre-)configured threshold
* A minimum value for Y is (pre-)configured from a range of values, FFS details
* FFS any restriction to determine Y candidate slots (including its relationship with SL-DRX)
* FFS whether the resource selection window [n+T1, n+T2] should be confined within a set of periodic set of resources and its relationship with SL-DRX
* Note: The terminology “periodic-based partial sensing” is based on the “partial sensing” used in LTE-V and it is intended to be used for the design and discussion of partial sensing in Rel-17.

Agreements**:** In a resource pool (pre-)configured with at least partial sensing, if UE performs periodic-based partial sensing, at least when the reservation for another TB (when carried in SCI) is enabled for the resource pool and resource selection/reselection is triggered at slot n, the UE monitors slots of at least one ~~a set of~~ periodic sensing occasion~~s~~, where a periodic sensing occasion is a set of slots according to 

if tvSL is included in the set of Y candidate slots.

* *P*reserve is a periodicity value from the configured set of possible resource reservation periods allowed in the resource pool (*sl-ResourceReservePeriodList*). Down select to one:
  + Option 1: *P*reserve corresponds to all values from the configured set *sl-ResourceReservePeriodList*
  + Option 2:  *P*reserve corresponds to a subset of values from the configured set *sl-ResourceReservePeriodList*
    - FFS how to determine the subset (e.g., by (pre-)configuration, UE determination)
  + Option 3:  *P*reserve is a common divisor among values in the configured set *sl-ResourceReservePeriodList*
  + Option 4: FFS others
* k ~~equals to~~is selected according to (down select to one)
  + Option 1: Only the most recent sensing occasion ~~within sensing window~~ for a given reservation periodicity before the resource (re)selection trigger or the set of Y candidate slots subject to processing time restriction
  + Option 2: The two most recent sensing occasions ~~within sensing window~~ for a given reservation periodicity before the resource (re)selection trigger or the set of Y candidate slots subject to processing time restriction
  + Option 3: All possible sensing occasions after
  + Option 4: Only one periodic sensing occasion for one reservation period. The k value is up to UE implementation. Max value for k is (pre-)configured.
  + Option 5: k is (pre-)configured, including multiple values
  + Option 6: (pre-)configuration of a bitmap, same as in LTE-V
  + Option 7: FFS others
* FFS relationship between periodic sensing occasions and SL-DRX
* FFS condition(s) and timing(s) for which periodic-based partial sensing is performed by UE
* Note: companies are encouraged to show performance data for the down selections

Agreements:

* In a resource pool (pre-)configured with at least partial sensing, if UE performs contiguous partial sensing and resource (re-)selection is triggered in slot n, support the following option:
  + Option 1: For the purpose of resource (re-)selection, the UE monitors slots between [*n*+*T*A, *n*+*T*B] and performs identification of candidate resources, in or after slot *n*+*T*B, based on all available sensing results, including periodic-based partial sensing results (if applicable).
    - FFS *T*A, *T*B (including the possibility of equal to zero, positive or negative) and remaining details (in particular, whether there should be exclusion of slots, changes in TA/TB values for different purposes, etc.)
    - FFS whether n can be replaced by e.g., index of some of Y candidate slots
  + FFS condition(s) in which contiguous partial sensing is performed by UE
  + FFS interaction with SL-DRX, if any
  + FFS interaction with periodic-based partial sensing, if any
  + Other options are not precluded
  + Note: This option is not to replace random resource selection only without sensing or re-evaluation and pre-emption checking

## RAN1#104b-e (12 – 20 April 2021)

**Conclusion:**

* In periodic-based partial sensing,
  + It is not necessary to further discuss whether or not to introduce a threshold to re-define T1 and T2.

**Agreements:**

* In periodic-based partial sensing,
* For the set of *P*reserve values, down-select to one of the following in RAN1#105-e
  + - Alt.1: *P*reserve corresponds to all values from the configured set *sl-ResourceReservePeriodList*
    - Alt.2: A set of *P*reserve values is (pre-)configured and includes up to the full set of values from the configured set *sl-ResourceReservePeriodList*
      * FFS if support multiple sets of *P*reserve values based on one or more metrics
      * FFS whether/how to restrict the set of values
* For the k value, down-selection to one of the following in RAN1#105-e (further refinement of each of the alternatives is possible)
  + - * + Alt 1: Option 1 as in RAN1#104-e
        + Alt 2: A modified Option 5 as in RAN1#104-e, where the modification is such that it also includes option 1

FFS how to (pre-)configure (e.g. including bitmap), whether a maximum number of k values is needed, and whether it can be up to UE implementation to select a k value based on the (pre-)configuration

* + - * + FFS details, e.g., sensing before the resource (re)selection trigger or the first slot of the set of Y candidate slots subject to processing time restriction, etc.
      * Note: companies are encouraged to provide more evaluations

**Agreement:**

* When periodic-based partial sensing is potentially performed by UE in a mode 2 Tx resource pool provided by higher layer, at least all of the followings are met:
  + Periodic reservation for another TB (sl-MultiReserveResource) is enabled for the resource pool
  + The resource pool is (pre-)configured to enable partial sensing
  + Partial sensing configured by higher layer in the UE

## RAN1#105-e (10 – 27 May 2021)

Agreement:

* For the set of *P*reserve values in periodic-based partial sensing,
  + If no (pre-)configuration (i.e., by default), *P*reserve corresponds to all values from the (pre-)configured set *sl-ResourceReservePeriodList*.
  + Otherwise, a single set of *P*reserve values can be (pre-)configured, where the set of P*reserve* values are restricted to a subset of the (pre-)configured set *sl-ResourceReservePeriodList*
    - This is per mode 2 Tx resource pool (pre-)configuration
    - A UE by implementation may also monitor other *sl-ResourceReservePeriodList* values not part of the restricted subset
      * In particular, the UE may additionally monitor occasions corresponding to P\_RSVP\_Tx
        + FFS whether the monitoring can be mandatory

Agreement:

* In periodic-based partial sensing for resource (re)selection, the UE at least monitors in periodic sensing occasion(s) for a given reservation periodicity before the first slot of the selected Y candidate slots subject to processing time restriction for the identification of candidate resources.

  o   The processing time restriction includes *Tproc,0SL*  and *Tproc,1SL*.

  o   Aspects relating to sensing during SL DRX are to be discussed separately

* Relationship to re-evaluation and pre-emption operation for periodic-based partial sensing to be discussed separately
  + FFS details including whether monitoring of periodic sensing occasions between triggering slot n and the first slot of the selected Y candidate slots subject to processing time restriction is performed as part of resource (re)selection or re-evaluation and pre-emption checking

Agreement:

* For the k value in periodic-based partial sensing for resource (re)selection,
  + By default, the UE monitors the most recent sensing occasion for a given reservation periodicity before the resource (re)selection trigger slot n or the first slot of the set of Y candidate slots subject to processing time restriction.
  + If (pre-)configured, UE additionally monitors periodic sensing occasions that correspond to a set of values which can be (pre-)configured with at least one value
    - (Working assumption) Possible values correspond to the most recent sensing occasion for a given reservation periodicity before the resource (re)selection trigger slot n or the first slot of the set of Y candidate slots, and the last periodic sensing occasion prior to the most recent one for the given reservation periodicity are included.
    - FFS: whether/which other values and details of the (pre-)configuration (e.g. max number of values or sensing occasions)
    - FFS: whether a value denotes a specific occasion to monitor or the earliest occasion to start the monitoring.
  + FFS relationship between periodic-based partial sensing occasions and SL-DRX
  + Note:
    - This is for the case when the resource (re)selection triggering slot n is expected by UE

Agreement:

* For random resource selection,
  + Reuse the maximum distance separation of 32 logical slots for a HARQ retransmission resource reserved by a prior SCI for the same TB, which was defined in R16 for full sensing operation.
  + SL HARQ feedback enabled transmission is supported (FFS applicable conditions if any)
    - The minimum HARQ feedback time gap (Z) shall be respected between any two selected resources of a TB where a HARQ feedback for the first of these resources is expected.
* FFS the impact of resource collision when random resource selection is performed by a UE which does not perform sensing / re-evaluation and pre-emption checking in a resource pool with mixed RA schemes (e.g. for low priority or any priority transmissions).
  + Including study potential solution(s) if the impact is not negligible (e.g. threshold based, raising priority, minimum time gap, pattern based, a priori SCI reserving initial transmissions, resource pool partitioning, and etc.).

Agreement**:** In contiguous partial sensing for resource (re)selection, *TA* and *TB* values can be zero, positive or negative

* *TA* and *TB* values or range depend on different operating scenarios or conditions (e.g., periodic/aperiodic traffic, predictability of triggering slot n, remaining PDB, re-evaluation/pre-emption checking, HARQ feedback, CBR/CR parameter, power saving, etc)
  + FFS details
* FFS: details of how periodic-based partial sensing and contiguous partial sensing are used for re-evaluation and pre-emption checking. Including how to reduce UE’s power consumption (caused by additional sensing operation of re-evaluation/pre-emption) after its resource selection, with the considerations of different operating scenarios or conditions (e.g., pre-emption enabled/disabled, HARQ-ACK enabled/disabled, etc).

## RAN1#106-e (16 – 27 August 2021)

**Agreement**

In periodic-based partial sensing, UE monitoring of periodic sensing occasions between triggering slot n and the first slot of the selected Y candidate slots subject to processing time restriction is performed as part of resource (re)selection.

**Agreement**

Conditions in which contiguous partial sensing is performed by UE, when at least all of the followings are met:

* L1 [is expected to be or] is triggered by higher layer to report resources for resource (re-)selection in a mode 2 Tx pool
  + FFS: When the trigger will be received by L1
* The resource pool is (pre-)configured to enable partial sensing
* Partial sensing is configured by higher layer in the UE

**Agreement**

For a resource pool (pre-)configured with at least partial sensing and UE is configured by its higher layer for partial sensing,

* Periodic-based partial sensing and contiguous partial sensing schemes are supported for resource re-evaluation and pre-emption checking
  + FFS details of partial sensing for re-evaluation and pre-emption checking, including any restrictions / conditions on performing PBPS and CPS, subset of resources, timing, candidate resource set (*SA*) and etc
* Same as in Rel-16, the higher layer indicates a set of resources and/or a set of resources for re-evaluation and/or pre-emption checking, respectively
  + Pre-emption checking is enabled according to the Release-16 interpretation of *sl-PreemptionEnable.*
    - FFS: If additional enhancements are needed for enabling/disabling
* The triggering of re-evaluation and pre-emption checking is as in R16.

**Agreement**

**When UE performs only contiguous partial sensing (CPS) in a mode 2 Tx pool with periodic reservation for another TB (*sl-MultiReserveResource*) disabled, and a resource (re)selection is triggered in slot n,**

* **The resource selection window (RSW) is [**n+T1**,** n+T2**] where** T2 **is defined based on step 1) of Rel-16 TS 38.214 Sec. 8.1.4**
  + FFS whether the resource selection window **[**n+T1**,** n+T2**]** should be confined within a set of periodic set of resources and its relationship with SL-DRX
* **On the sensing window [**n+TA**,** n+TB**] for CPS,**
  + Details of TA and TB values based on the agreements from previous RAN1 meetings
  + FFS whether and how to define a minimum CPS window size, including (pre-)configurability and the case when TB **-** TA **is smaller than the minimum CPS window size**
  + FFS whether and how to define a maximum value / upper bound for TB with respect at least to the minimum RSW size and the remaining PDB, including (pre-)configurability
* **FFS how a set of candidate resource (**SA**) is initialized** considering candidate single-slot resources, including
  + Whether and how to define a minimum size for the RSW (e.g., Rel-16 T2min), including (pre-)configurability
  + Whether the set SA is confined within a set of Y candidate slots within the RSW
* **UE performs resource exclusion from the set** SA **based on at least all available sensing results and based on step 6) and 7) of Rel-16 TS 38.214 Sec. 8.1.4**
* **Note, re-evaluation and pre-emption checking in a resource pool with periodic reservation for another TB (*sl-MultiReserveResource*) disabled is considered separately.**
* **FFS: Details on** T1

**Agreement**

For random resource selection in a resource pool (pre-)configured with full/partial sensing and random resource selection, down-select to one of the followings in RAN1#106bis-e

* Option 1: A priority threshold value or a range of priority levels is (pre-)configured for the resource pool, below or within which random resource selection is allowed
  + Note, lower value means higher priority
  + FFS whether resource pool partitioning can be additionally applied
* Option 2: Increase the priority for the transmission based on random selection and indicate the new priority value in the priority field in the 1st-stage SCI
  + FFS: An extra field is added in SCI for indicating the original priority value associated with QoS requirement,
  + FFS: A 1-bit field in the SCI indicates that the UE is performing random resource selection, or
  + FFS: An extra field is added in SCI for indicating the mapping to the original priority value associated with QoS requirement.
* Option 7: Exclude resources reserved by UE performing random selection without re-evaluation / pre-emption checking, regardless of their priorities. E.g. a 1-bit field in the SCI indicates that the UE is performing random resource selection and not performing re-evaluation and pre-emption checking
* Option 12: No special consideration

**Agreement**

When UE performs periodic-based and contiguous partial sensing schemes in a mode 2 Tx pool with periodic reservation for another TB (sl-MultiReserveResource) enabled,

* For a resource (re)selection procedure triggered by aperiodic transmission (Prsvp\_TX=0) in slot n,
  + The resource selection window (RSW) is [n+T1, n+T2], and T1 and T2 are defined in the same way according to step 1) of Rel-16 TS 38.214 Sec. 8.1.4
    - FFS whether UE determines a new set of Y candidate slots within the RSW and monitors corresponding periodic sensing occasions between slot n and the first slot of the new Y candidate slots subject to processing constraints
    - FFS how to initialize a set of candidate resource (SA) for the triggered resource (re)selection procedure and which partial sensing scheme(s) and results can be used for resource exclusion in the resource (re)selection procedure
    - FFS whether the resource selection window [n+T1, n+T2] should be confined within a set of periodic set of resources and its relationship with SL-DRX
* Note, re-evaluation and pre-emption checking based on periodic-based and contiguous partial sensing schemes is considered separately

**Agreement**

When UE performs periodic-based and contiguous partial sensing schemes in a mode 2 Tx pool with periodic reservation for another TB (sl-MultiReserveResource) enabled,

* For a resource (re)selection procedure triggered by periodic transmission (Prsvp\_TX≠0) in slot n
  + A set of candidate resource (SA) is initialized to the set of selected Y candidate slots of PBPS
    - UE performs contiguous partial sensing in [n+TA, n+TB] for resource exclusion from the initialized candidate resource set (SA)
      * FFS details of TA and TB based on the agreement(s) from previous RAN1 meetings
* Note, re-evaluation and pre-emption checking based on periodic-based and contiguous partial sensing schemes is considered separately

FFS: The condition under which UE performs periodic-based and contiguous partial sensing schemes in a mode 2 Tx pool with periodic reservation for another TB (sl-MultiReserveResource) enabled

## RAN1#106bis-e (11 – 19 October 2021)

**Working Assumption**

When PHY layer is indicated with an active time of RX UE from MAC layer for candidate resource selection, a restriction is applied in PHY layer so that at least a subset of candidate resources reported to MAC layer is located within the indicated active time of the RX UE. The following options will be further discussed in RAN1 to restrict resources for candidate resource selection taking into account the indicated active time from MAC layer:

* Option 1: PHY layer selects and reports candidate resources only within the indicated active time of the RX UE
* Option 2: PHY layer selects and reports candidate resources in which at least a subset of the candidate resources is within the indicated active time of the RX UE
* Option 3: PHY layer selects and reports an additional candidate resource set of candidate resources within the indicated active time of the RX UE

**Agreement**

In the agreement from RAN1#105-e, the working assumption is confirmed and the FFS bullet (in RED) is closed without any agreement.

|  |
| --- |
| Agreement from RAN1#105-e:   * For the k value in periodic-based partial sensing for resource (re)selection,   + By default, the UE monitors the most recent sensing occasion for a given reservation periodicity before the resource (re)selection trigger slot n or the first slot of the set of Y candidate slots subject to processing time restriction.   + If (pre-)configured, UE additionally monitors periodic sensing occasions that correspond to a set of values which can be (pre-)configured with at least one value     - (Working assumption) Possible values correspond to the most recent sensing occasion for a given reservation periodicity before the resource (re)selection trigger slot n or the first slot of the set of Y candidate slots, and the last periodic sensing occasion prior to the most recent one for the given reservation periodicity are included.     - FFS: whether/which other values and details of the (pre-)configuration (e.g. max number of values or sensing occasions)     - FFS: whether a value denotes a specific occasion to monitor or the earliest occasion to start the monitoring.   + FFS relationship between periodic-based partial sensing occasions and SL-DRX   + Note:     - This is for the case when the resource (re)selection triggering slot n is expected by UE |

**Agreement**

When UE performs periodic-based and contiguous partial sensing schemes in a mode 2 Tx pool with periodic reservation for another TB (*sl-MultiReserveResource*) enabled,

* For a resource (re)selection procedure triggered by periodic transmission () in slot *n*, *TA* and *TB* for the CPS monitoring window is defined according to one of the followings:
  + *n*+*T*A is *M* logical slots earlier than slot , and *n*+*T*B is slots earlier than , where is the first slot of the selected *Y* candidate slots of PBPS, and , are in units of physical time/slots.
    - By default, *M* is 31 unless (pre-)configured with another value.

**Agreement**

For the periodic sensing occasion(s) (PSO(s)) that a UE needs to additionally monitored in PBPS, it shall be (pre-)configured jointly for all *Preserve* values.

* The UE is not required to monitor PSOs earlier than *n–T0* if the UE is triggered to do resource (re)selection in slot n, where *T0* is (pre-)configured

**Agreement**

When UE performs at least contiguous partial sensing in a mode 2 Tx pool for a resource (re)selection procedure triggered by aperiodic transmission (*P*rsvp\_TX*=0*) in slot *n*, *TA* and *TB* for CPS monitoring window and a candidate resource set (*SA*) is initialized according to potentially one of the following approaches (final decision in RAN1#107-e). Other approaches are not precluded and the details in each approach can still be updated.

* Approach 1: (*SA*is initialized based on at least slots with PBPS and/or CPS results and guarantee a minimum of *M* slots for CPS)
  + The UE selects a set of *Y’* candidate slots with corresponding PBPS and/or CPS results (if available) within the RSW.
    - FFS how to handle the case if the total number of *Y’* candidate slots is less than a (pre-)configured threshold *Y’min* without dropping the aperiodic transmission
    - FFS whether the Y’ candidate slots for aperiodic transmission is the same as the Y candidate slots in PBPS for periodic transmission of another TB(s)
    - FFS whether/how to prioritize/select resources based on partial sensing results.
    - FFS: How to select Y’ in case of CPS only
  + Candidate resource set (*SA*) is initialized to the set of all single-slot candidate resources in the selected *Y’* candidate slots.
  + For the CPS monitoring window [*n*+*T*A, *n*+*T*B]:
    - *TA* and *TB* are both selected such that UE has sensing results for a minimum of *M* consecutive logical slots before *ty0*, where *ty0* is the first slot of the selected *Y’* candidate slots.
      * FFS: By default, *M* is 31 unless (pre-)configured with another value, or M is (pre-)configured based on transmission priority
      * FFS the range of (pre-)configured *M* from a TBD lowest value up to 30
      * FFS: how to handle the case when the minimum *M* slots for CPS cannot be guaranteed
  + FFS: RSW in case of CPS only
* Approach 2: (*SA* is initialized based on all candidate single-slot resources and guarantee a minimum of *M* slots for CPS)
  + Candidate resource set (*SA*) is initialized to the set of all candidate single-slot resources in [*n+TB+Tproc,0+Tproc,1*, *n+T2*], where *TB* is selected by the UE such that length of [*n+TB+Tproc,0+Tproc,1*, *n+T2*] ≥ *T2min*.
    - *Tproc,0*, *Tproc,1* are in units of physical time/slots
    - FFS whether/how to prioritize/select resources based on partial sensing results (if PBPS is performed).
  + For the CPS monitoring window [*n*+*T*A, *n*+*T*B]:
    - *T*A = X
      * FFS value X for *TA* including X=1 and negative value
    - *TB* is selected such that UE has sensing results for a minimum of *M* consecutive logical slots before the start of (*n+TB+Tproc,0+Tproc,1*).
      * FFS: By default, *M* is 31 unless (pre-)configured with another value, or M is (pre-)configured based on transmission priority
      * FFS the range of (pre-) configured *M* from a TBD lowest value up to 30
      * FFS: how to handle the case when the minimum *M* slots for CPS cannot be guaranteed
* Approach 3: (independent approach for different case)
  + When UE additionally performs periodic-based partial sensing in the resource pool, the above Approach 1 applies.
  + When UE does not perform periodic-based partial sensing in a resource pool that does not allow resource reservation for another TB, the above Approach 2 applies.

**Working Assumption**

In a resource pool (pre-)configured to enable partial sensing, when UE is configured with partial sensing by its higher layer, the resources for which the UE performs re-evaluation and/or pre-emption checking are for the initial transmission and retransmissions of every TB according to Rel-16 specification based on partial sensing results.

* Same as in Rel-16, for periodic transmission, re-evaluation check is not applied to the resources that have been signalled in current period or previous periods, except that it is up to UE implementation whether to apply re-evaluation check to the resources in non-initial reservation period that have been signalled neither in the immediate last nor in the current period.
* The resource in the main bullet is the set of resources (*r*0, *r*1, *r*2, …) and/or the set of resources (*r*0', *r*1', *r*2', …)  for re-evaluation and/or pre-emption checking, respectively, which has been agreed in RAN1 #106-e.

## RAN1#107-e (11 – 19 November 2021)

**Agreement**

When UE performs at least contiguous partial sensing in a mode 2 Tx pool for a resource (re)selection procedure triggered by aperiodic transmission (*P*rsvp\_TX*=0*) in slot *n*, the general design framework in Approach 1 from RAN1#106bis-e in below is adopted. Note that, the details can still be updated.

* Approach 1: (*SA*is initialized based on at least slots with PBPS and/or CPS results and guarantee a minimum of *M* slots for CPS)
  + The UE selects a set of *Y’* candidate slots with corresponding PBPS and/or CPS results (if available) within the RSW.
    - FFS how to handle the case if the total number of *Y’* candidate slots is less than a (pre-)configured threshold *Y’min* without dropping the aperiodic transmission
    - FFS whether the Y’ candidate slots for aperiodic transmission is the same as the Y candidate slots in PBPS for periodic transmission of another TB(s)
    - FFS whether/how to prioritize/select resources based on partial sensing results.
    - FFS: How to select Y’ in case of CPS only
  + Candidate resource set (*SA*) is initialized to the set of all single-slot candidate resources in the selected *Y’* candidate slots.
  + For the CPS monitoring window [*n*+*T*A, *n*+*T*B]:
    - *TA* and *TB* are both selected such that UE has sensing results for a minimum of *M* consecutive logical slots before *ty0*, where *ty0* is the first slot of the selected *Y’* candidate slots.
      * FFS: By default, *M* is 31 unless (pre-)configured with another value, or M is (pre-)configured based on transmission priority
      * FFS the range of (pre-)configured *M* from a TBD lowest value up to 30
      * FFS: how to handle the case when the minimum *M* slots for CPS cannot be guaranteed
  + FFS: RSW in case of CPS only

**Agreement**

When SL DRX active time of Rx-UE is provided by the higher layer for candidate resource selection (including resource (re)selection and re-evaluation/pre-emption checking), the following working assumption is confirmed with option 2 as agreement (with modification in RED)

**Working Assumption (RAN1#106bis-e)**

When PHY layer is indicated with an active time of RX UE from MAC layer for candidate resource selection, a restriction is applied in PHY layer so that at least a subset of candidate resources reported to MAC layer is located within the indicated active time of the RX UE. The following options will be further discussed in RAN1 to restrict resources for candidate resource selection taking into account the indicated active time from MAC layer:

* ~~Option 1: PHY layer selects and reports candidate resources only within the indicated active time of the RX UE~~
* Option 2: PHY layer selects and reports candidate resources in which at least a subset of the candidate resources is within the indicated active time of the RX UE
  + FFS: Details on when the number of subsets of candidate resource is less than the threshold
  + FFS: The subset of candidate resource outside of the active time should consider each inactive time period
  + FFS: UE selection of resource selection window to overlap with indicated RX UE active time
  + FFS: Whether it is up to UE implementation to report candidate resources only within the indicated active time of the RX UE
* ~~Option 3: PHY layer selects and reports an additional candidate resource set of candidate resources within the indicated active time of the RX UE~~

**Agreement**

When UE performs at least contiguous partial sensing in a mode 2 Tx pool for a resource (re)selection procedure triggered by aperiodic transmission (*P*rsvp\_TX*=0*) in slot *n*,

* The UE selects a set of *Y’* candidate slots with corresponding PBPS and/or CPS results (if available) within the RSW.
  + If the total number of *Y’* candidate slots is less than a (pre-)configured threshold *Y’min*,
    - How UE includes other candidate slots is up to UE implementation
* Candidate resource set (*SA*) is initialized to the set of all single-slot candidate resources in the selected *Y’* candidate slots.
* For the CPS monitoring window [*n*+*T*A, *n*+*T*B]:
  + *TA* and *TB* are both selected such that UE has sensing results starting at *M* consecutive logical slots before *ty0* and ending at *Tproc,0* + *Tproc,1* slots earlier than *ty0*.
    - FFS: By default, *M* is 31 unless (pre-)configured with another value, ~~or~~ where *M* is (pre-)configured based on transmission priority
    - FFS: The range of (pre-)configured *M* from a TBD lowest value up to 30
    - When the minimum *M* slots for CPS cannot be guaranteed, support both
      * Option A, the UE ensures the *Y’min* criterion is fulfilled
      * Option B: UE performs random resource selection
      * When the UE performs Option A or Option B is up to UE implementation

**Conclusion**

No additional triggering enhancement on top of existing Rel-16 mechanism in re-evaluation and pre-emption checking for partial sensing UEs in Rel-17, including enabling / disabling re-evaluation by (pre-)configuration.

* This does not restrict the triggering of re-evaluation and pre-emption checking due to inter-UE coordination message in scheme 2 (if agreed).

**Agreement**

When UE is triggered to perform re-evaluation and pre-emption checking for periodic transmission (*P*rsvp\_TX*≠0*) in slot *n*,

* During the *q*th reservation period (*q*=0,1,2,…, *Cresel*-1), candidate resource set (*SA*) is initialized to the remaining *Y* candidate slots starts from slot and ends at the last slot of the *Y* candidate slots, where the slot indices of the remaining *Y* candidate slots are equal to [*q* x *Prsvp\_Tx* + ], where is a slot index of *Y* candidate slots used in the initial resource (re)selection.
  + is the first candidate slot after slot *n+T3*.
  + FFS whether/how to handle the case when number of the remaining *Y* candidate slots is less than *Ymin*.
* Scheme 1:
  + UE performs PBPS for the remaining *Y* candidate slots according to, whereis a slot belong to the remaining *Y* candidate slots, and *k* and *Preserve* are the same as resource (re)selection.
  + UE performs CPS starts from *M* logical slots earlier than to  slots earlier than .
    - By default, *M* is 31 unless (pre-)configured with another value.

**Agreement**

When UE performs random resource selection, LTE principle is reused:

* The UE is not required to measure CBR.
* When no SL CBR measurement result is available, a (pre-)configured SL CBR value is used.

**Working assumption**

For UE performs partial sensing or random resource selection, Rel-16 SL CR evaluation is directly reused.

**Agreement**

For SL CBR measurement in partial sensing, select one option in the following:

* Option 1, 2, 3: SL RSSI is measured for slots in which the UE performs partial sensing and PSCCH/PSSCH reception over a SL CBR measurement window defined in Rel-16. The calculation of SL CBR is limited within the slots for which the SL RSSI is measured.
  + If the number of SL RSSI measurement slots is below a (pre-)configured threshold, FFS the following or other options.
* Option 1: a (pre-)configured SL CBR value is used.
* Option 2: the UE additionally measure a set of slots within the SL CBR measurement window to meet the threshold.
* Option 3: the UE measures an additional set of slots which can be extended outside the SL CBR measurement window to meet the threshold.
* FFS whether the set of slots in option 2/3 are (pre-) configured or selected by UE implementation.
  + Option 4: LTE principle is reused:
* The UE is not required to measure CBR.
* When no SL CBR measurement result is available, a (pre-)configured SL CBR value is used

## RAN1#107bis-e (17 – 25 January 2022)

**Agreement**

When UE is configured to perform partial sensing by a UE higher layer (including when SL DRX is configured), SL RSSI is measured in slots where the UE performs partial sensing and PSCCH/PSSCH reception over the SL CBR measurement window defined in Rel-16. The calculation of SL CBR is limited within the slots for which the SL RSSI is measured.

* If the number of SL RSSI measurement slots is below a (pre-)configured threshold, a (pre-)configured SL CBR value is used.

**Agreement**

When UE is triggered to perform re-evaluation and pre-emption checking for aperiodic transmission (*P*rsvp\_TX*=*0) in slot *n*,

* The candidate resource set (*SA*) is initialized to the remaining *Y’* candidate slots that starts from slot and ends at the last slot of the *Y’* candidate slots.
  + is the first candidate slot after slot *n+T3*.
* UE may perform PBPS for periodic sensing occasions after the resource (re)selection when *sl-MultiReserveResource* is enabled for the mode 2 Tx resource pool
  + It is up to UE implementation
* UE performs CPS starting from at least *M* consecutive logical slots earlier than to  slots earlier than .
  + FFS: When the minimum *M* slots for CPS cannot be guaranteed,
* All available sensing results not earlier than *n–T0* for the resource pool indicated by higher layer are applied for re-evaluation and pre-emption checking procedures

**Agreement**

When UE performs at least contiguous partial sensing in a mode 2 Tx pool for a resource (re)selection procedure and re-evaluation/pre-emption checking triggered by aperiodic transmission (*P*rsvp\_TX*=0*) in slot *n*,

* For minimum size M of the CPS monitoring window [*n*+*T*A, *n*+*T*B]:
  + By default, *M* is 31 unless (pre-)configured with another value
  + The range of (pre-)configured *M* is from 0 (working assumption) to 30

**Agreement**

**When UE performs only contiguous partial sensing (CPS) in a mode 2 Tx pool with periodic reservation for another TB (*sl-MultiReserveResource*) disabled, and a resource (re)selection is triggered in slot *n*,**

* T1 **is defined based on step 1) of Rel-16 TS 38.214 Sec. 8.1.4.**
  + No update to specification is necessary due to this agreement
* Note: The selected *Y’* slots do not overlap with the sensing window

**Agreement**

Whether UE performs SL reception of PSCCH and RSRP measurement for partial sensing on slots in SL DRX inactive time is enabled/disabled by (pre-)configuration per resource pool when partial sensing is configured in the UE by a higher layer.

* When it is enabled,
  + When UE performs periodic-based partial sensing for a given *Preserve*, UE monitors only the default periodic sensing occasion.
  + When UE performs contiguous partial sensing, UE monitors a minimum of *M* slots for CPS.
* Note, when it is disabled, the UE is not required to perform SL reception of PSCCH and RSRP measurement in SL DRX inactive time.
* Note: no further optimization on the resource (re)selection procedure with regard to SL DRX operation is specified in Rel.17.
* FFS the case when full sensing is configured in the UE by a higher layer

## RAN1#108-e (21 February – 03 March 2022)

**Agreement**

The lower bound of *M* value for CPS in the case of periodic transmission (*contiguousSensingWindowPeriodic*) for both resource (re)selection and re-evaluation / pre-emption checking is a non-zero value (lower bound for *M* is 5)

Note: CATT indicated that they do not agree to the technical benefits of this agreement

**Agreement**

When a UE is triggered to perform re-evaluation and pre-emption checking for aperiodic transmission (*P*rsvp\_TX*=*0) in slot *n* and the minimum *M* slots for CPS cannot be guaranteed,

* UE senses in all available slots starting from the resource (re)selection trigger slot of the same TB to  slots earlier than .
  + The UE re-evaluation and pre-emption checking is based on all available sensing results after n-T0

**Conclusion**

The existing Step 5 and 5a are applicable for UE configured for partial sensing by its higher layer.

**Agreement**

In Step 6 c) of TS38.214 Section 8.1.4, when UE is configured with partial sensing by its higher layer, adopt the following changes:

* if slot belongs to the set , otherwise, slot is the first slot after slot belonging to the set .
* Option D: converted to milliseconds, where slot is the last slot of the *Y* or *Y’* candidate slots.
* Slot is the first slot of the selected/remaining set of *Y* or *Y’* candidate slots.

## RAN#95-e (21 – 03 March 2022)

**Agreement (Proposal 3 of RP-220890)**

When SL DRX active time of RX UE is provided by the higher layer for candidate resource selection

* Solution 5 (up to UE implementation): If there is no candidate single-slot resource remained within the indicated SL DRX active time in the set after completing the iterations from step 4) to 7) to fulfil , the UE based on its implementation additionally selects and includes at least one candidate single-slot resources within the indicated SL DRX active time in the set .