**3GPP TSG RAN WG1 Meeting #100bis-E R1-2003036**

**e-Meeting, April 20th – 30th, 2020**

**Source: Moderator (Intel Corporation)**

**Title: Outcome of [100b-e-NR-5G\_V2X\_NRSL-Mode-2-02]**

**Agenda item: 7.2.4.2.2**

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

Introduction

This document provides discussion on issues in the second email discussion on V2X Mode-2 during RAN1#100bis-e.

[100b-e-NR-5G\_V2X\_NRSL-Mode-2-02] Email discussion/approval w.r.t. pre-emption including aspects:

* Finalization of the RRC parameter for pre-emption configuration per resource pool (still TBD in the RRC list)
* Relation of pre-emption RSRP threshold and Step 1 checking
* Which resources can be re-selected after pre-emption condition – only ones to be transmitted or to be signalled

till 4/27, with potential TPs till 4/30 (Intel, Sergey)

Outcome

Agreements:

* The procedure to check whether a reserved resource to be signaled in slot ‘m’ should be re-selected due to pre-emption:
	+ A regular Step 1 (as in 8.1.4 in 38.214) of the resource (re-)selection procedure is performed
	+ If the reserved resource is still in the identified candidate resource set after the Step 1 execution, then Step 2 for reselection of the reserved resource(s) is not triggered
	+ If the reserved resource is NOT in the identified candidate resource set after the Step 1 execution
		- If the resource is excluded by comparison with the RSRP measurement for an SCI associated with a priority which can trigger pre-emption, then Step 2 for reselection of the reserved resource(s) is triggered
		- If the resource is excluded by comparison with the RSRP measurement for an SCI associated with a priority which cannot trigger pre-emption, then Step 2 for reselection of the reserved resource(s) is not triggered

Agreements:

* Once pre-emption re-selection condition is met at the UE, re-selection is performed for all resources which satisfy the pre-emption re-selection condition
	+ A UE ensures the HARQ RTT related minimum time gap Z agreed in RAN1#100-e, between re-selected and non-preempted resources during the re-selection triggered by pre-emption
	+ FFS cases when timing restriction could not be met
	+ FFS whether/how to extend it to periodic reservations

Agreements: Finalize the RRC parameter for pre-emption activation per resource pool by

* Disabled
* Enabled. Default is without a priority level (i.e., pre-emption is applicable to all levels).
	+ Can optionally configuring a priority level p\_preemption {1…8} (the value range is a working assumption), and (as a working assumption regarding “<”) if prioRX < p\_preemption, and prioTX > prioRX, then pre-emption can be triggered
		- Note: In the inequalities it is assumed that the lowest priority value corresponds to the highest priority/importance traffic
		- prioRX is the priority associated with the resource indicated in SCI, as per 8.1.4 in 38.214
		- prioTX is L1 priority within a UE associated with the reserved resources, as per 8.1.4 in 38.214

Discussion

The first aspect relates to the open question of RRC configuration. The agreement says that pre-emption can be enabled or disabled, per resource pool, and FFS details. In the last meeting, no consensus was reached to conclude whether the activation in the pool applies to any priority level or to a sub-set of priorities.

There are different options observed in contributions:

* The per resource pool pre-emption configuration is priority unaware, i.e. it is a flag {enabled, disabled/not provided}. Companies in favour of this option usually refer to sufficiency of such configuration option and allow any higher priority transmission to pre-empt any lower priority transmission.
* The per resource pool pre-emption configuration is priority aware, a scalar priority value {0…7} controls activation of pre-emption. Companies in favour of this option refer to better controlled pre-emption rate, also can realize the scenarios where only the highest priority can pre-empt other transmissions. There are two contributions showing pre-emption SLS evaluations [13][27] motivating to introduce priority dependent activation for pre-emption rate control.

**Q1: Which of the following options is preferred?**

* Option 1
	+ Finalize the RRC parameter for pre-emption activation per resource pool by confirming that it is {enabled, disabled}, and no separate priority value provided
* Option 2
	+ Finalize the RRC parameter for pre-emption activation per resource pool by introducing a priority level p\_preemption {0…7}, and if priority p\_SCI associated with the resource indicated in SCI is higher than p\_preemption and prioTX, then pre-emption can be triggered

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| --- | --- | --- | --- |
| Source | Option | Comment |  |
| Ericsson | 2 | We think it is important to limit the use of pre-emption to those cases when it really makes sense to use it. ON/OFF configuration is not sufficient. Nonetheless, it should be possible to prevent pre-emption between some priority pairs. |  |
| Intel | 2 | Pre-emption is more important for high priority transmissions. Other mechanisms can be used for medium/low priorities |  |
| Futurewei | 2 | It is important that the highest priority traffic can always sent. |  |
| NTT DOCOMO | 1 | Traffic with higher priority should always be prioritized than the one with lower priority |  |
| Apple | 2 | Pre-emption is triggered only for very high priority traffic. This avoids the frequent pre-emption scenario in a system.  |  |
| Panasonic | 1 | Option 1 is sufficient for simplicity. |  |
| vivo | 1 | Since it can be ON/OFF, no need to further restrict the usage of pre-emption operation. |  |
| Sharp | 2 | Agree with other companies that pre-emption should not be a frequent event. |  |
| MediaTek | 2 | Unnecessary pre-emption triggering should be minimized. Option-2 provides greater configuration flexibility. |  |
| TCL | 2 | Pre-emption should be configurable per priority to avoid high priority packet loss. |  |
| NEC | 1 | Option 1 is simple. We think the associated SL-RSRP threshold in Q2 outcome will also limit the frequency of pre-emption in the case where both traffics have low priorities. |  |
| Xiaomi | 1 | If pre-emption is enabled, it should be applied to all the priorities so higher priority transmissions can be first transmitted. |  |
| Samsung | 1 | Option 1 is sufficient |  |
| Bosch | 2 | Option 2 to avoid frequent pre-emption.  |  |
| Qualcomm | 2 | Our evaluations show that excessive pre-emption degrades system performance and a finer granularity mechanism is needed to enable/disable.The behaviour when both priorities are above the threshold should also be clarified, but that a secondary detail. |  |
| Fraunhofer | 1 | If pre-emption is enabled, higher priority transmissions should always be prioritized over lower priority ones. |  |
| Huawei/HiSilicon | 1 | The basic idea of pre-emption is to guarantee the successful delivery of higher priority traffic.For Option2, we think it’s very hard to set an “accurate” threshold, and thus maybe inaccurate in some cases and impact the system performance.If pre-emption happens to be a frequent event in some cases, it actually means there are many higher priority traffic. And if Option 2 is adopted in these cases, then those higher priority traffic maybe cannot be delivered successfully due to the “inaccurate” threshold, which clearly impacts the system performance. |  |
| ZTE, Sanechips | 1 | In our view, pre-emption can be realized through normal step1 procedure. In the normal step1, * The RSRP threshold is configured based on both Tx priority and Rx priority, i.e., to judge whether a resource can be used or not, the Tx priority has already been considered.
* For each Tx priority, the resources with which priority levels should be excluded (can be preempted) can be accomplished by proper RSRP threshold configuration.

For example: If we want that a priority level a of a transmitting UE may preempt the resources whose priority of decoded SCI is b, a lower RSRP threshold for resources exclusion is configured for the priority level pair (a, b).In option 1, the flag of {enabled, disabled} is used to turn on/off re-evaluation due to preemption is allowed or not. |  |
| InterDigital | 2 | Allowing low priority transmission to pre-empt other transmission may result in too frequent pre-emption. Option 2 could control the frequent of pre-emption by using a proper preemption threshold.  |  |
| CATT | 1 | Option 1 is simple, and the higher prioritize traffic should always prioritize lower priority traffic to ensure its performance.  |  |
| OPPO | 2 | The initial intention of pre-emption is to protect high priority packets at an expense of lower priority packets. If pre-emption is allowed for all priority levels, too frequent pre-emption will lead instability of the whole system. |  |
| LG Electronics | 1 | Not clear what benefit can be achieved by Option 2 itself when considering that the main motivation of pre-emption is to protect other UE’s packet transmission with the relatively higher priority, which is not properly excluded in the sensing and resource selection procedure. One possible way to control the frequency of pre-emption occurrence could be to (pre)configure separate RSRP threshold for each combination of pi and pj, where pi - priority value indicated by other UE’s SCI and pj - priority value of TX UE’s packet. By doing so, we can achieve both “controlling the pre-emption rate (including the specific control of a certain priority)” and “reusing maximally the normal sensing/resource selection mechanism even for the pre-emption”. Note that it should be avoided that the pre-emption operation is excessively triggered. |  |
| Fujitsu | 2 | Pre-emption with setting a priority level offers more flexibility for emergent traffic, especially with the stringent requirement. |  |

Option 1: 11

Option 2: 12

It seems there is no clear majority for either option. In this situation, I would ask companies who in favour of Option 1 to fallback to a safer and more flexible option 2, which covers Option 1 as a subset.

Proposal 1

* Option 1
	+ Finalize the RRC parameter for pre-emption activation per resource pool by confirming that it is {enabled, disabled}, and no separate priority value provided
* Option 2
	+ Finalize the RRC parameter for pre-emption activation per resource pool by introducing a priority level p\_preemption {0…7}, and if priority p\_SCI associated with the resource indicated in SCI is higher than p\_preemption and prioTX, then pre-emption can be triggered

The second aspect is the open question which RSRP threshold is used to decide about pre-emption triggering when priority condition is met. There are the following alternatives:

* RSRP threshold is one the used for resource identification in Step 1 including all increments
	+ In one alternative, this is the threshold in current resource selection window when checking for pre-emption is triggered. This option is very similar to re-evaluation and can be considered with higher priority to ensure same mechanism between features.
	+ In another alternative, this is the threshold in the resource selection window when the resource was selected previously. In this case, the RSRP threshold may not reflect changed loading.
* RSRP threshold is the one configured per-priority for resource identification, before any increments during Step 1
* RSRP threshold is separately configured for pre-emption purpose, it is not subject to increments

**Q2: Which option of RSRP threshold for pre-emption checking is preferred**

* Option 1
	+ The RSRP threshold after Step 1 checking, i.e. including any 3 dB increments
		- Option 1a
			* The threshold after Step 1 checking on a current resource selection window (triggered specifically for pre-emption)
		- Option 1b
			* The threshold after Step 1 checking on the resource selection window during latest re-evaluation for this resource
* Option 2
	+ The RSRP threshold (pre-)configured for regular Step 1 checking, before any increments
* Option 3
	+ A separately configured per priority pair RSRP threshold

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| Source | Option | Comment |  |
| Ericsson | 2 | The configuration must be based on some fixed parameters. Not on something internal to the UE  |  |
| Intel | Option 1a | UE executes Step-1 and checks if pre-empted resource is within candidate resource set |  |
| Futurewei | 3 or 2 | Agree with Ericsson that a UE-internal value cannot be used. Option 3 provides a little bit more flexibility than option 2, thus is slightly preferred to 2 |  |
| NTT DOCOMO | 1a | RSRP threshold specific to pre-emption is not necessary. Similar to re-evaluation is sufficient. |  |
| Apple | Similar to Option 1a | Only configure the maximum RSRP threshold per priority pair. If the maximum RSRP threshold is reached and less than X% of candidate resources are identified, then pre-emption is triggered.  |  |
| Panasonic | 2 |  |  |
| vivo | Option 1a-like | We prefer a solution which has commonality with re-evaluation procedure, i.e., the following agreed behavior* + Step 1 of the resource (re-)selection procedure is performed at least at the moment ‘m-T3’, and if the pre-selected resource is not in the identified candidate resource set, Step 2 is triggered for reselection of the resource
 |  |
| Sharp | 2 | The RSRP threshold for regular Step 1 checking is used for exclusion of resources. If the measured RSRP is high enough according to option 1a, the resources indicated in the corresponding SCI are already excluded even without the need to check the (priority-related) pre-emption specific conditions. |  |
| MediaTek | 2 |  |  |
| TCL | 3 or 2 | Agree with Futurewei.  |  |
| NEC | 2 | The RSRP threshold including any 3dBm is used to make sure X% matters which is not proper to trigger pre-emption/re-selection  |  |
| Xiaomi | 1a | Similar behaviour as resource selection is preferred. |  |
| Samsung | 3 | Option 3 provides more flexibility than Option 2. For pre-emption purpose, RSRP threshold can be configured separately |  |
| Bosch | 1a | Option 1a is our preferred option.  |  |
| Qualcomm | 1a | This simplifies UE implementation and specification. We don’t see the benefit of forcing the UE to redo the RSRP increase process (Option 2). |  |
| Fraunhofer | 2 or 3 | The RSRP threshold used to trigger pre-emption has to be based on the priority of the TB to be transmitted and the priority of the received SCI. |  |
| Huawei/HiSilicon | Option 1a-like | Prefer to have a solution similar as re-evaluation procedure. |  |
| ZTE, Sanechips | Option 1a | During Step-1, to check if a resource is within candidate resource set, same RSRP comparing mechanism is used, including RSRP thresholds and 3 dB increments. |  |
| InterDigital | 2 | Proper fixed RSRP threshold could guarantee the low priority TB yields the resource for high priority. For Option 1, in congested scenarios, one UE may not yield the resource for high priority due to RSRP threshold increment.  |  |
| CATT | See comments | From our understanding, the above three options should provide some enhancement, otherwise it will have limit help on pre-emption operation. The resource occupation of the higher priority should be provided with the reasonable RSRP increment limit, otherwise it will impact the high priority transmissions. The maximum RSRP threshold should be configured for higher priority UEs. Meanwhile, for the lower priority UEs, the 3dB increment of RSRP threshold can be applied until the X% available candidate resource can be formed.Thus, option 1a cannot provide the reasonable RSRP increment scheme for higher priority UEs to guarantee the pre-emption. Option 1b utilize the threshold of the latest re-evaluation process and cannot reflect the changed system load.Option 2 is not clear on how to meet the %% available candidate resource if no RSRP increment. Option 3 directly use the separate RSRP threshold for pre-emption, but it is still unclear on how to how to meet the %% available candidate resource if no RSRP increment.  |  |
| OPPO | 2 | According to agreement from RAN1#98bis***Agreements (RAN1#98b):**** *Support a resource pre-emption mechanism for Mode-2*
	+ *A UE triggers reselection of already signaled resource(s) as a resource reservation in case of overlap with resource(s) of a higher priority reservation from a different UE and, SL-RSRP measurement associated with the resource reserved by that different UE is larger than an associated SL-RSRP threshold*
		- *Only the overlapped resource(s) is/are reselected*
		- *FFS*
			* *the timeline for reselection*
			* *other details*
		- *FFS whether or not to support other potential UE behaviour (e.g, power boosting/reduction)*
	+ *This mechanism can be enabled or disabled, per resource pool*
		- *FFS details*

Our understanding of the “associated RSRP threshold” is the (pre-)configured threshold, not the one that was used when the resource was previously selected by the pre-empted UE in Option 1b.As for Option 1a, there is a chicken and egg problem. According to the above agreement, resource reselection procedure is triggered when RSRP measurement is larger than the associated RSRP threshold. But this RSRP threshold according to Option 1a is to be determined after the resource reselection procedure is triggered (i.e. after Step 1).  |  |
| LG Electronics | Option 1a with some modification | We prefer to reuse the mechanism of re-evaluation procedure as much as possible. In addition, as commented in Q1, the (pre)configured separate RSRP threshold for each priority pair can be used to derive the final RSRP value (including any 3 dB increments after Step 1) for checking the pre-emption triggering. |  |
| Fujitsu | 2 | The RSRP threshold should be unified to UEs, and fixed per resource pool. |  |

Option 1a: 9

Option 2: 8 + 3(who also fine with o3)

Option 3: 1+ 3(who also fine with o2)

It seems the set of options could be reduced to 1a and 2. There is no clear winner between them, however there is some different understanding in related behavior.

There is one important note about Option 2. It can trigger unnecessary pre-emptions due to very simple example:

* Imagine in slot ‘n’, resource selection is performed. During selection, the RSRP threshold (e.g. -100 dBm) got adjusted by 3 dB at least once (e.g., becoming -94 dBm). There was one high priority resource with -96 dBm measurement, which was added to the candidate set due to 3 dB increments (i.e. -96 dBm < -94 dBm), and it was selected by the UE in Step 2. These resources are signalized in SCI.
* In the next slot ‘n+1’ a UE runs the pre-emption condition check. There was almost no change to the occupation map due to just single slot change in time. The UE takes the initial RSRP threshold of -100 dBm and compares it with the same RSRP measurement of -96 dBm, and the pre-emption is triggered. Obviously, in this case the preemption should not be triggered.
* Furthermore, when reselection is triggered, the RSRP threshold is adjusted again, and the same resource is added back to the candidate set, discarding the pre-emption triggering purpose

In FL understanding, Option 2 does not work properly due to possible 3 dB increments agreed by the procedure. It could be only avoided by applying the increments, or by configuring separate threshold which could have some margin comparing to the regular threshold.

Based on the above example, to facilitate further discussion, the options 1a and 2 are rephrased and put back on the table.

Proposal 2a (based on option 1a)

* The procedure to check whether a resource should be re-selected due to pre-emption is the following
	+ A regular Step 1 of the resource (re-)selection procedure is performed
	+ If the reserved resource is still in the identified candidate resource set, then Step 2 for reselection of the reserved resource(s) is not triggered
	+ If the reserved resource is NOT in the identified candidate resource set after the Step 1 execution
		- If the resource is excluded by comparison with the RSRP measurement for an SCI associated with a priority which can trigger pre-emption, then Step 2 for reselection of the reserved resource(s) is triggered
		- If the resource is excluded by comparison with the RSRP measurement for an SCI associated with a priority which cannot trigger pre-emption, then Step 2 for reselection of the reserved resource(s) is not triggered

Proposal 2b (based on option 2)

* The procedure to check whether a resource should be re-selected due to pre-emption is the following
	+ For any resource overlapped with a reserved resource, if the priority condition is met and the RSRP measurement is higher then the configured per priority pair RSRP threshold, then Step 1 and Step 2 are triggered for resource reselection

The third aspect in this discussion is related to the FFS whether re-selection of the already-reserved, but pre-empted resource applies only to the resource transmitted in slot ‘m’ or to other already-reserved and pre-empted resource(s) signalled in the SCI in slot ’m’ as well.

Based on the discussion, the following options were identified:

* Re-selection is performed only for the upcoming resource to be used for transmission
* Re-selection is performed for any resource to be used for transmission or signaled, if those fulfil pre-emption triggering condition
* Re-selection is performed for all resources to be used for transmission or signaled, if at least one of these resources fulfil the pre-emption triggering condition
	+ Note, this may violate prior RAN1 agreement that only overlapped resource(s) are reselected

**Q3.1: Which option for resource re-selection due to pre-emption is preferred**

* Option 1
	+ Re-selection is performed only for the upcoming resource to be used for transmission
* Option 2
	+ Re-selection is performed for any resource to be used for transmission or signaled, if those fulfil pre-emption triggering condition
* Option 3
	+ Re-selection is performed for all resources to be used for transmission or signaled, if at least one of these resources fulfil the pre-emption triggering condition

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| --- | --- | --- | --- |
| Source | Option | Comment |  |
| Ericsson | Option 2 | Option 3 unnecessarily reselects resources that have no issue. Option 1 is not justified, as it does not reselect resources for which the pre-emption condition holds, even if these are further apart in time. The earlier resources are re-selected and reserved, the better. |  |
| Intel | Option 2 is preferred | Option 3 - there may be no need to reselect all resources. Option 1 – it is better to reselect resource signalled in slot ‘m’ as well |  |
| Futurewei | 2 | Reselect only for the resource affected |  |
| NTT DOCOMO | 2 | Agree with Ericsson |  |
| Apple | Option 2  | Reselect the resources to be transmitted or to be signaled  |  |
| Panasonic | Option 2 | Option 2 is a good candidate as signalled resource could also be pre-empted, while option 1 is too limited and option 3 is too much |  |
| vivo | Option 1 | We slightly prefer option 1. For pre-emption operation, we should be carefully to avoid to trigger unnecessary re-selection. Option 2 means double check for a given transmission resource, the first check occurs at the time before it’s reserved, the second check occurs just before using the resource, the two check may incur different judgement of resource re-selection triggering, which depends on outcome of Q2. Regarding option 2, we have a question. The so-called ‘signaled resource’ include both aperiodic and periodic reserved resource, correct?.  |  |
| Sharp | Option 2 | Only affected resources should be considered. |  |
| MediaTek | Option 2 | Agree with FL’s comment that Option-3 violates prior RAN1 agreement. |  |
| TCL | Option 2 | Reselection of pre-empted resources whenever known to be pre-empted. Side question : What if a pre-empted resource can not be replaced by another one without breaking regular resource selection constrains with other ongoing reservations (e.g. inter-resource distance, HARQ…) should it be discarded or apply a limited option 3 on a need basis (which would be hard to control in Ue implementations)? |  |
| NEC | Option 1 | We think vivo's comments make sense. Besides, do we still need "<m-T3" restriction for "signaled in the SCI in slot ’m’" case? |  |
| Xiaomi | Option 2 | Only the resource that be occupied by pre-emption should be considered for re-selection.  |  |
| Samsung | Option 2 |  |  |
| Bosch | Option 2 | Only resources satisfying pre-emption conditions are reselected. |  |
| Qualcomm | Option 2 or 3 | We prefer Option 2, but RAN2 already specified Option 3 and we’d be ok with that as well. |  |
| Fraunhofer | Option 2 | Agree with Ericsson. |  |
| Huawei/HiSilicon | Option 2 | The earlier the re-selection is performed, the smaller latency can be achieved, and the more retransmission chances can be guaranteed which can ensure the successful delivery of the packet in a given PDB.So Option 2 is preferred rather than Option 1.Considering the SCI with the reservation has already been transmitted, there is no need to change the resources which are not pre-empted. So Option 3 is not necessary. |  |
| ZTE, Sanechips | Option 3 | For more flexible resource selection, it should be allowed that resource re-selection is performed for all resources. Whether to reselect all resources is up to UE implementation. |  |
| InterDigital | Option 2 | Option 3 violates previous RAN1 agreement. Option 1 results in unnecessary reservation of the resource to be pre-empted.  |  |
| CATT | Option 2 | Only the pre-empted resource is reselected, and it is better to reselect the resource earlier.  |  |
| OPPO | Option 2 | For the case of pre-emption (as oppose to re-evaluation), earlier re-selection and reservation of future resources will always perform better and thus preferred. The double-checking scenario will not happen since the pre-empted resource(s) had already been re-selected. Resource reselection procedure will not be triggered again unless there is a new pre-emption that fulfil pre-emption triggering condition.In the case of periodic reservation, newly re-selected resources also apply to periodically reserved resources, since the resource reservation period needs to be signalled in SCI. |  |
| LG Electronics | Option 3 (first), Option 2 (second) | First of all, RAN2 already concluded that if **a certain** reserved resource is pre-empted, then **all** the reserved resources are reselected. Please see the relevant contents below (marked with yellow) from MAC specification. Furthermore, when a mechanism to control the pre-emption rate is introduced, we expect that the pre-emption event will be maintained with a low probability (i.e., to avoid the degradation of system performance). In this sense, there would be no big technical problem to keep the current RAN2’s conclusion. Note that it also needs to consider the complexity of implementing MAC specification.< Contents captured from TS 36.321>1> if there is a configured sidelink grant which is not in the resources indicated by the physical layer for re-evaluation as specified in TS 38.214 [7]; or1> if a sidelink transmission is scheduled by any received SCI indicating a higher priority than the prority of the logical channel and expected to overlap with a resource of the configured sidelink grant, and a measured result on SL-RSRP associated with the sidelink transmission is higher than [threshold]:2> clear the configured sidelink grant associated to the Sidelink process, if available;2> trigger the TX resource (re-)selection. |  |
| Fujitsu | Option 2 | We believe that, re-selection should be performed only under the pre-emption triggering condition. |  |

Option 1: 2

Option 2: 17 + 2 (also fine with o3)

Option 3: 1 + 2 (also fine with o2)

There is a majority in support of Option 2. The concern about RAN2 CR may be resolved by fixing it in RAN2, since current implementation also violates previous RAN1 agreements that only overlapped resources are reselected.

There is one good point from vivo about whether the same applies to periodic reservations, which needs to be decided.

Based on this, the following is proposed:

Proposal 3-1

* Once pre-emption re-selection condition is met at the UE, re-selection is performed for all pre-empted resources
* TBD – periodic reservations
* TBD – cases when timing restriction could not be met

There is one more sub-aspect, where like re-evaluation, the reselection of a pre-empted resource may need to fulfil any introduced timing restrictions.

**Q3.2: When re-selection of the pre-empted resource(s) is performed, whether to allow violation of timing restrictions?**

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| --- | --- | --- |
| Source | Comment |  |
| Ericsson | No. Timing restrictions cannot be violated. They reflect considerations on processing times, etc. that cannot be altered. |  |
| Intel | In our view at least HARQ RTT should be ensured, while SCI chain integrity(signaling window) may not be ensured. |  |
| Futurewei | No |  |
| NTT DOCOMO | No |  |
| Apple | No. Timing restriction should be kept.  |  |
| Panasonic | No violation of timing restriction should be allowed. A UE could treat the transmission as failure if no suitable resource can be found. |  |
| vivo | No |  |
| Sharp | Similar view as Intel. “Timing restrictions” in the proposal should be clarified. |  |
| MediaTek | No |  |
| TCL | No |  |
| NEC | No. |  |
| Samsung | No |  |
| Bosch | No, in general. Any unattainable transmission needs to be declared as failure. |  |
| Qualcomm | No. Timing restrictions cannot be violated. Except for the initial transmission after pre-emption, where no timing restriction applies. |  |
| Fraunhofer | No |  |
| Huawei/HiSilicon | No.The timing restriction cannot be violated. Other UE behaviour can also be considered such as power reduction to fulfil the timing requirement. |  |
| ZTE, Sanechips | No. At least HARQ RTT should be ensured |  |
| InterDigital | No. But only HARQ RTT should be guaranteed. |  |
| CATT | No. Timing restrictions including HARQ RTT and 32 slots window should be ensured in (re-)selection. |  |
| OPPO | No |  |
| LG Electronics | Need to clarify the exact meaning of question. Also it depends on the conclusion of Q3-1. |  |
| Fujitsu | When pre-emption occurs, the reserved resource cannot be used for transmission, and naturally the chain is broken and cannot be “kept”; and a new chain should be generated during the re-selection procedure. |  |

There is a consensus that the timing restrictions have to be ensured. Since the majority in Q3-1 is for Option 2, there should be some specific handling of this.

Proposal 3-2

* A UE shall ensure timing restrictions between selected and non-preempted resources during re-selection triggered by pre-emption

Summary of proposals on the relevant issues

1. Finalization of the RRC parameter for pre-emption configuration per resource pool (still TBD in the RRC list)
	* Priority dependent configuration: [3][13][20][27]
		+ [13][27] show SLS evaluation in support of it
	* Not priority dependent configuration: [6][10][12][15][16][24]
2. Relation of pre-emption RSRP threshold and Step 1 checking
	* [13][16][27]
3. Which resources can be re-selected – only ones to be transmitted or to be signalled
	* [2][5][7][9][13][16][17][21][22]

References

1. [R1-2001552](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2001552.zip) Remaining details of sidelink resource allocation mode 2 Huawei, HiSilicon

1. [R1-2001661](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2001661.zip) Remaining issues on mode 2 resource allocation mechanism vivo

1. [R1-2001749](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2001749.zip) Discussion on remaining open issue for mode 2 OPPO

1. [R1-2001793](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2001793.zip) Remaining Issues on Sidelink Mode 2 Resource Allocation Panasonic Corporation

1. [R1-2001805](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2001805.zip) Remaining details of Resource allocation for sidelink - Mode 2 Nokia, Nokia Shanghai Bell

1. [R1-2001877](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2001877.zip) Remaining details on mode 2 resource allocation for NR V2X Fujitsu

1. [R1-2001886](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2001886.zip) Discussion on resource allocation for Mode 2 LG Electronics

1. [R1-2001896](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2001896.zip) Remaining issues of mode 2 operation on sidelink ZTE, Sanechips

1. [R1-2001907](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2001907.zip) Sidelink mode-2 resource allocation MediaTek Inc.

1. [R1-2001964](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2001964.zip) Resource allocation for NR sidelink Mode 2 TCL Communication Ltd.

1. [R1-2001969](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2001969.zip) Discussion on resource allocation for NR sidelink Mode 2 Lenovo, Motorola Mobility

1. [R1-2001978](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2001978.zip) Remaining Issues in Resource Allocation for Mode 2 NR V2X Fraunhofer HHI, Fraunhofer IIS

1. [R1-2001994](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2001994.zip) Solutions to remaining opens of resource allocation mode-2 for NR V2X sidelink design Intel Corporation
2. [R1-2002041](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_100b%5CDocs%5CR1-2002041.zip) Remianing details on mode-2 resource allocation Futurewei

1. [R1-2002078](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2002078.zip) Remaining issues on Mode 2 resource allocation in NR V2X CATT

1. [R1-2002126](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2002126.zip) On Mode 2 for NR Sidelink Samsung

1. [R1-2002234](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2002234.zip) Resource allocation Mode 2 for NR SL Ericsson

1. [R1-2002267](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2002267.zip) Remaining issues in NR sidelink mode 2 resource allocation Spreadtrum Communications

1. [R1-2002301](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2002301.zip) Remaining Issues on NR Sidelink Mode 2 Resource Allocation InterDigital, Inc.

1. [R1-2002325](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2002325.zip) On Remaining Details of Mode 2 Resource Allocation Apple

1. [R1-2002362](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2002362.zip) Remaining issues on resource allocation Mode 2 NEC

1. [R1-2002388](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2002388.zip) Remaining issues on resource allocation mode 2 for NR sidelink Sharp
2. [R1-2002402](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_100b%5CDocs%5CR1-2002402.zip) On resource reservation in Mode 2 resource allocation Xiaomi Communications

1. [R1-2002439](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2002439.zip) Remaining issues on resource allocation mechanism mode 2 NTT DOCOMO, INC.
2. [R1-2002487](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_100b%5CDocs%5CR1-2002487.zip) Remain details on mode-2 resource allocation for NR V2X ITL
3. [R1-2002489](file:///C%3A%5CUsers%5Cwanshic%5COneDrive%20-%20Qualcomm%5CDocuments%5CStandards%5C3GPP%20Standards%5CMeeting%20Documents%5CTSGR1_100b%5CDocs%5CR1-2002489.zip) Remaining issue for Mode 2 resource allocation in NR V2X ASUSTeK

1. [R1-2002539](file:///C%3A%5C%5CUsers%5C%5Cwanshic%5C%5COneDrive%20-%20Qualcomm%5C%5CDocuments%5C%5CStandards%5C%5C3GPP%20Standards%5C%5CMeeting%20Documents%5C%5CTSGR1_100b%5C%5CDocs%5C%5CR1-2002539.zip) Sidelink Resource Allocation Mechanism for NR V2X Qualcomm Incorporated