3GPP TSG RAN WG1 Meeting #102-e R1-200xxxx

eMeeting, August 17 – 28, 2020

Agenda Item: 7.2.4.2.1

Source: Moderator (Ericsson)

Title: Feature lead summary#1 on Resource allocation for NR sidelink Mode 1

Document for: Discussion, Decision

# 1 List of critical issues

## 1.1 Remaining issues for configured grant

1. Clarifications for the formula determining the granted slots
2. Clarifications on signalling for number of retransmissions

## 1.2 DCI aspects

1. Alignment of DCI format 3\_0 with other DCI formats
2. Cells on which the UE monitors DCI formats 3\_0 and 3\_1, including discussion on PUCCH cell.

## 1.3 HARQ reporting to gNB

1. Details in the WA from RAN#100-e for the case of reaching the maximum number of HARQ re-transmissions for a TB.
2. Other exceptional reports to the gNB (e.g., nothing to transmit for DG, etc.)
3. Corrections/clarifications for codebook configuration
4. Corrections for Type-1 codebook
5. Clarifications on reporting for PSSCH with multiple associated PSFCH

## 1.4 Processing times

1. Processing time for SL CG type-2
2. Whether the gNB needs to be aware of SL HARQ RTT (Z = a + b) or alternative assumptions or behaviour, if necessary.

## 1.5 Miscellaneous

1. TS 38.213
	* Clause 10.1
		+ Capture missing agreements
	* Clause 16.4
		+ How to set time and frequency resource assignment in DCI/SCI
			- Note: there is a similar proposal for modifying 38.214 for CGs
	* Clause 16.5
		+ Alignment of names of RRC parameters
		+ Clarifications
		+ Editorial
2. TS 38.214
	* Clause 8.1.2
		+ Whether it is necessary to clarify that only on SL transmission is scheduled at the same time in Mode 1.
	* Clause 8.1.2.1
		+ Clarification that the pool is indicated by DCI format 3\_0
		+ Editorial
3. Use of reservations in Mode 1

## Initial proposal by the feature lead

The FL proposes to discuss the following topics for each of the two threads. In addition, to reduce the backlog of issues, the FL proposes to discuss minor corrections (e.g., editorial) and clarifications for each of the topics listed below.

Thread #1:

* 1.1 Remaining issues for configured grant
	1. Whether clarifications for the formula determining the granted slots are necessary and whether the issue should be left to RAN2.
	2. Clarifications on signalling for number of retransmissions
	3. Editorial corrections and clarifications for configured grant (if any).
* 1.2 DCI aspects
	1. Alignment of DCI format 3\_0 with other DCI formats.
	2. Cells on which the UE monitors DCI formats 3\_0 and 3\_1, including discussion on PUCCH cell.
	3. Editorial corrections and clarifications for DCI (if any).

Thread #2:

* 1.3 HARQ reporting to gNB
	1. Details in the WA from RAN#100-e for the case of reaching the maximum number of HARQ re-transmissions for a TB.
	2. Whether there are other exceptional reports to the gNB (e.g., nothing to transmit for DG, etc.) and, if so, how to address them.
	3. Editorial corrections and clarifications for HARQ reporting to gNB (if any).
* 1.4 Processing times
	1. Processing time for SL CG type-2.
	2. Whether the gNB needs to be aware of SL HARQ RTT (Z = a + b) or alternative assumptions or behaviour, if necessary.
	3. Editorial corrections and clarifications for processing times (if any).

# Company views

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| **Company** | **View** |
| FUTUREWEI | Agree with FL’s proposal. From our perspective, at least some of the ‘misc.’ issues do not need an email thread, but can be addressed during the TP drafting phase  |
| LGE | Regarding Issue#1.3, we are not sure whether the following sub-issue is really critical one that shall be resolved in supporting Mode 1 operation. To be specific, the example case marked with yellow seems to be an optimization issue because a UE will perform at least one transmission in the resources of Mode 1 DG. In this sense, we prefer to remove this sub-issue.* 1.3   HARQ reporting to gNB

2. Whether there are other exceptional reports to the gNB (e.g., nothing to transmit for DG, etc.) and, if so, how to address them.In addition, we are wondering whether FL’s initial proposal covers an issue on how to handle the case when a PUCCH reporting also needs to convey SL HARQ information not satisfying the minimum PSFCH-to-PUCCH processing time (e.g., asynchronous timing between Uu and SL). Details can be found in R1-2005741. If it’s not the case, the issue needs to be included in Issue#1-3.FL reply:Regarding your first comment, this has been discussed in a few contributions. If the issue is critical, which is not clear at this point, then we will have to address it.Regarding your second issue, my intention was to consider this as part of 1.4-2. I have extended the bullet.[LGE] Regarding Issue 1.1-2, we don’t think that the clarification on signalling for number of re-TXs is necessary. This is because it is very clear that up to 3 resources can be allocated within a CG period when only using CG Type 1 configuration/Type 2 DCI. However, in case when gNB decides to assign more re-TX resources, additional re-TX resources can be allocated by using re-TX DG. Note that this operation is supported even for the case when PUCCH resource is not configured. In summary, we don’t see the value of including Issue 1.1-2, and there is no problem in Mode 1 operation even without having further clarification on it. FL reply 3:The current specification does not even describe how to set time resource assignment and frequency resource assignment fields for Mode 1 (see 38.214 clause 16.4). At least we need to fix that. |

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| NTT DOCOMO | Agree with FL’s summary.Regarding issue#1.3 (yellow part in LGE’s comment), we think it is not optimization. According to RAN2 spec., SL skip is possible; in other words, even if a UE receives a SL grant, the transmission might be skipped. This is our understanding. HARQ-ACK report to gNB for this case needs to be clarified as CG.[LGE] Different from CG case, DG resource is requested based on SR/BSR from UE when UE has data to transmit. If it’s caused by dropping due to prioritization, we already have RAN1 agreement. Can you elaborate more in which case DG transmission can be skipped except prioritization?[DCM] Thank you for kind reply! We think there is such case other than dropping due to prioritization. A UE sends SR/BSR to gNB and gNB schedules SL grant based on the reported information. BSR includes destination ID/LCG ID/Buffer size. gNB predicts how many grants are necessary. However, SL grant does not include MCS indication/MIMO/DM-RS/CSI-RS/etc. They are determined by the UE itself and actual transmitted TBS is dependent on the parameters (i.e. channel condition/UE capability/etc.). The provided SL grants may be insufficient to transmit the reported buffer or may be sufficient. If sufficient, the UE could not have any transmitted data on one or more of the provided grants. This is feasible case in our understanding. gNB does not know details of actual SL communication. (Note that even in Uu, we can see skipUplinkTxDynamic.)For issue#1.2, ‘Cells on which the UE monitors DCI formats 3\_0 and 3\_1’ is included. We believe that PUCCH-cell should be clarified at the same time. When NR-CA with PUCCH SCell or NR-DC, PUCCH-cell for SL HARQ-ACK report to gNB is unclear as well as PDCCH-cell.FL reply: I have added a point on this. |
| Intel | Agree with FL summary. Potentially the editorial corrections may be further postponed if the scope reduction is needed. |
| ETRI | Generally agree with FL summary. In addition to those, we are wondering that if resource pool index is not indicated via SCI, is it possible for RX UE to obtain the information for resource assignment without ambiguity? If I misunderstand anything, please correct me.FL reply:Resource pool index is part of DCI format 3\_0[ETRI2] Thank you for the reply. I agree that resource pool index is part of DCI format 3\_0. However, if I understand correctly, the motivation of resource pool index in DCI format 3\_0 is that overlapped resource pools in frequency domain can be configured. If so, the ambiguity in resource assignment can be still remained in SCI since a parameter for frequency resource assignment, N\_subchannel^SL, is dependent of the corresponding resource pool.FL reply3:Now I understand what you mean. This was discussed last meeting and there is common understanding that there are some restrictions regarding how the pools can be configured. What you describe would be one case. The problem is not unique for Mode 1, the same can happen with preconfiguration and Mode 2. If we were to discuss a solution, it would have to be in a different AI. |
| CATT | Agree with FL’s proposal on the threads.For Thread #1, in 1.1 issues for CG, some other issues need to be addressed for discussion and clarification:* For a TB in CG, multiple resources (e.g. 9 slots) can be configured in one CG period. CG Type-1 can only configured ‘N\_max’=1/2/3 transmissions for a TB, and how to indicate the rest resources in the period?
* For a TB in CG, the HARQ based re-transmission of this TB is scheduled by DG. Whether the DG scheduled re-Tx resources can use the CG resources in other periods? Or DG can only use DG-specific resources?
* How to avoid HPN collision? We had agreements that HPN collision issue can be handled in RAN2. However, based on the current design in RAN2, this issue can still happen in some cases, e.g. in CG case, DG schedules re-tx for a TB (HPN#2) collides with initial Tx of another TB (HPN#2) in the following CG period.

FL reply:For the first issue, this falls under 1.5-1 (Clause 16.4). Not sure if it will be treated in this meeting, but clarifications are necessary. Since the issue has been brought up in several comments, I have now added “Clarifications on signalling for number of retransmissions” for the first e-mail thread.For the second issue, what is the behaviour in Uu? I would say the same should apply here. [CATT2] For second issue, in NR Uu, DG scheduled re-tx can use any resources that gNB think it as available, including CG resources for other TB’s transmission. If it happens, DG scheduled re-tx of TB1 has higher priority than TB2 in the following period of the CG, which lead to drop/partial transmissions (e.g. only 1 of 3 transmitted) for TB2 in its CG resources. It will have HPN impact. At present, an easy way is to specify that: **DG scheduled re-tx cannot use CG resources for other TBs transmission**.For the third issue, as you say we have agreements. If the issue can still happen, RAN2 should address it or request action from our side.FL reply2:I am still not sure there is a problem. Given that no other company has expressed a concern in this regard, my proposal would be not to discuss it this meeting. Companies can think about it until next meeting and, if necessary, we can discuss it then.  |
| Ericsson | We do not see the need to discuss 1.1-1 in RAN1 nor 1.3-2. Other than this, the proposal looks fine. |
| Fraunhofer | Agree with the FL’s list of proposed topics. |
| OPPO | Agree with FL’s proposalRegarding issue# 1-3, we share similar view as CATT, some clarification for the number of re-tx using the resource of CG is needed.1. We have the following agreement. For CG, whether the configured number of transmissions of a TB using the resource of CG can across CG period? If yes, that will impact the determination of HPN of TB, which may have RAN2 impact.Agreements:* For dynamic grant, the number of retransmissions of a TB is up to the gNB.
* For configured grant, the maximum number of times that a TB can be retransmitted using the resources provided by the configured grant is configured per priority per configured grant.

2. We also have the following agreement. If re-tx resource of a TB whose initial transmission is scheduled by CG can be provided by DG, then the total number of re-tx of the TB is determined by the DG, i.e., up to gNB?Agreements:* To provide additional resources for retransmission upon receiving a SL NACK report, a dynamic grant is used.
	+ When the initial transmission of a TB is scheduled by a dynamic grant, the CRC of the DCI carrying the dynamic grant is scrambled using the SL RNTI introduced for DCI for a dynamic grant.
		- The interpretation of NDI is the same as for Uu for retransmission scheduled by DCI with CRC scrambled by C-RNTI
	+ When the initial transmission of a TB is scheduled by a configured grant (type-1 or type-2), the CRC of the DCI carrying the dynamic grant is scrambled using the SL RNTI introduced for DCI for a configured grant type-2.
		- For interpretation of NDI, the Uu behavior for retransmission scheduled by DCI with CRC scrambled by CS-RNTI is reused.
	+ (working assumption) The HARQ ID is used to identify the TB for which resources for retransmission are provided (subject to the indication of re-transmission via NDI)

FL reply:The first agreement clearly refers to “resources provided by the configured grant”. My understanding is that there is no restriction on the number of retransmissions scheduled by DG.See also my reply to CATT |
| Nokia, NSB | Agree with FL’s proposal |
| Apple | Agree with FL’s proposal.  |
| Huawei, HiSilicon | We are generally fine with FL’ proposal, however, two additional issues should be also discussed in 1.1 of Thread #1 and 1.3 of Thread #2.* As also mentioned by CATT, the current resource configuration for configured grant type 1 can only provide three resources at the most, but it is agreed up to 32 times (re-)transmission for a TB, how to support and configure the resources for a TB within a period is not specified yet. Note, the changes may have ASN.1 impact.
* A remaining WA from last meeting for PUCCH resource allocation for dynamic grant reporting SL HARQ to gNB should be further discussed as well. The sparse PUCCH resources allocation, i.e., after the each last resource in the set of resources provided by a dynamic grant, the ACK information for an early transmission cannot be reported to the gNB instantly.

Therefore, we think the two threads can be updated as following:Thread #1:* 1.1          Remaining issues for configured grant
	1. Whether clarifications for the formula determining the granted slots are necessary and whether the issue should be left to RAN2.
	2. How to support retransmission of configured grant within a period.
	3. Editorial corrections and clarifications for configured grant (if any).

…Thread #2:* 1.3          HARQ reporting to gNB
	1. Details in the WA from RAN#100-e for the case of reaching the maximum number of HARQ re-transmissions for a TB.
	2. Whether there are other exceptional reports to the gNB (e.g., nothing to transmit for DG, etc.) and, if so, how to address them.
	3. Whether to confirm the WA of PUCCH resource allocation for dynamic grant to report SL HARQ to gNB.
	4. Editorial corrections and clarifications for HARQ reporting to gNB (if any).

FL reply:Regarding the first issue, I captured your concern in my summary (1.5 - TS 38.213 Clause 16.4, in the note). I agree that this needs to be addressed and was planning to do as part of the editorial corrections and clarifications, regardless of the affected spec. See also my reply to CATTRegarding the second issue, when we made the WA we agreed on sending it to RAN2 for their inspection. Without any input from their side, I would suggest not to revisit the issue unless there is a broad agreement taht there are some fundamental, unsolvable problems. [HW, HiSi2]:For our second point, we understand the RAN1 LS is still under the processing of RAN2, but it is an essential point worth for discussion and clarification in this meeting. A working assumption needs to be tested if a company raises concerns about it, and it is not suitable to rely on confirmation by avoiding discussion of the WA. Thus, we consider it requires discussion in this meeting.As the updated point of 1.2.2, in our understanding, which cell is used/selected for PUCCH transmission depends on UE capability and gNB configuration, it is not related to which type of HARQ information, SL or UL, carried on the PUCCH, so we do not know why we need to emphasize the PUCCH cell here? For the point of 1.4.2, it is not clear what are included for the alternative assumptions. In general, we do not specify any UE behaviors if the timeline is not satisfied, gNB is aware of the timeline condition and will guarantee enough processing time left for UE. Therefore, it seems no necessity to cover it in discussion |
| Samsung | Agree with FL’s proposal. In addition, regarding the number of retx for DG and CG, we have similar view with CATT and OPPO that some clarification is needed.FL reply:See also my reply to CATT |
| vivo | We are in general fine with FL’s proposal, just have one clarification point for issue #1.3-3: “Editorial corrections and clarifications for HARQ reporting to gNB (if any)”.Our understanding is that it intends to cover the following highlighted issues, would you please confirm?1.3 HARQ reporting to gNB1. Details in the WA from RAN#100-e for the case of reaching the maximum number of HARQ re-transmissions for a TB.
2. Other exceptional reports to the gNB (e.g., nothing to transmit for DG, etc.)
3. Corrections/clarifications for codebook configuration
4. Corrections for Type-1 codebook
5. Clarifications on reporting for PSSCH with multiple associated PSFCH

FL reply:My intention is to cover as many of those issues as we can, so far as they are corrections or clarifications  |
| Qualcomm | We share the view that the discussion should be focused on essential issues:* We don’t think it’s essential to further discuss the clarifications in 1.1-1.
* We don’t think that 1.3-2 and 1.4-2 are essential to discuss and view both as potential optimizations.

FL reply:For your first point, the issue has been brought up in several contributions. If there is an issue, we will have to deal with it or RAN2 will have to.For the issue, I agree that we should focus on essential corrections only. There are, however, some contributions claiming this is essential. At least for 1.4-2, I think we need to know what the assumption is or what the UE does. See my reply to LGE.  |
| ZTE, Sanechips | We are generally fine with items listed in FL’s proposal. In addition, we raised in R1-2005317 one issue regarding to whether one UE can receives multiple SL grants pointing to the same slot for SL transmissions [in either single or multiple resource pools]. As of now the PHY procedure on power control only allows one PSSCH transmission at a time. If it is allowed for one UE to receive multiple SL grants commanding multiple SL transmissions in the same slot, some selection rules should be in place but are missing now. Therefore we would like to modify 1.1 as following:* 1.1 Remaining issues for ~~configured~~ SL grant
	1. Whether clarifications for the formula determining the ~~granted~~ slots granted by configured grants are necessary and whether the issue should be left to RAN2.
	2. Whether one UE may receive more than one SL grants that allocate the PSSCH transmissions in the same SL slot.
	3. Editorial corrections and clarifications for ~~configured~~ SL grant (if any).

FL reply:My understanding is that multiple PSSCH transmissions in one SL slot are not supported. At least, it is not listed as a possible combination in 38.202. If a clarification is needed, we can address it like other clarifications, which I have not listed explicitly.[ZTE-2]: We have the same understanding that the current spec does not support one UE to perform multiple PSSCH transmissions in a slot, even if each PSSCH belongs to different resource pool. However, this is exactly where the concern comes from. If the UE cannot transmit multiple PSSCH in a slot but on the other hand is directed by gNB(s) to do such, RAN1 may have something missing for the dropping rule. A simple fix could be letting UE not to expect it can receive multiple grants (even in case of multiple resource pools) that grant more than one PSSCH transmission occasions in a single slot. But this simple rule needs RAN1 discussion and decision. FL reply2:I have captured it in the list of Miscellaneous issues for clarification. Whether we discuss it or not will depend on progress. |
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