**3GPP TSG RAN WG1 Meeting #105-e R1-210xxxx**

**May 10th – May 27th, 2020**

**Agenda item: 7.2.2**

**Source: Moderator (Qualcomm Incorporated)**

**Title: Preparation phase email discussion for NR-U**

**Document for: Discussion and Decision**

# Introduction

The paper summarizes the preparation phase email discussion for contribution submitted to 7.2.2 on NR-U CR.

# Issues identified

## 2.1 Initial access signals and channels

## 2.2 DL signals and channels

For DL signals and channels [2], the following issues have been identified

|  |  |  |
| --- | --- | --- |
| Issue # | Issue summary | # Contributions |
| DL-A1 | Correction on joint search space set group switching across multiple cells | 1 |
| DL-B1 | Action time when UE receive MAC CE for (de)activation of Scell/CSI-RS/TCI state/SRS | 1 |
| DL-B2 | Measurement during SCell activation | RAN4 LS |
| DL-C1 | Front-loaded/Additional DMRS symbols for PDSCH mapping type B when collide with CORESET | 1 |
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|  |  |  |
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|  |  |  |

FL recommendations:

## 2.3 UL signals and channels

For UL signals and channels [3], the following issues have been identified

|  |  |  |
| --- | --- | --- |
| **Issue #** | **Issue summary** | **# Contribution(s)** |
| UL-01 | Clarification of size of initial UL BWP | 1 |
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|  |  |  |
|  |  |  |

FL recommendations (see further details in [3]): Already discussed multiple times and no consensus to change.

## 2.4 Channel access

For channel access [4], the following issues have been identified

|  |  |  |
| --- | --- | --- |
| Issue # | Issue summary | # Contributions |
| CA-1 | China-specific aspects related to CCA time and gaps | 2 |
|  |  |  |

FL recommendations:

## 2.5 Initial access procedures

For initial access procedures [5], the following issues have been identified

|  |  |  |
| --- | --- | --- |
| Issue # | Issue summary | # Contributions |
| IA 2-1 | Corrections for SS/PBCH block | 1 |
| IA 3-1 | Corrections for RACH | 1 |
| IA 4-1 | Corrections for RRM/RLM | 3 |

## 2.6 HARQ enhancements

For HARQ enhancements [6], the following issues have been identified

|  |  |  |
| --- | --- | --- |
| Issue # | Issue summary | # Contributions |
| HARQ-1 | text in TS38.300 limits re-transmission of HARQ-ACK feedback with enhanced type-2 codebook and type-3 codebook to shared spectrum access, whereas FGs 10-15/10-16 are applicable to licensed bands as well | 1 |
| HARQ-2 | enhanced dynamic HARQ-ACK codebook cannot be configured by pdsch-HARQ-ACK-Codebook-secondaryPUCCHgroup-r16 | 1 |
| HARQ-3 | potential inconsistency between RAN1 and RAN2 specifications about when a UE is expected to monitor a DCI scheduling re-transmission for a PDSCH that was scheduled with a NNK1 value | 2 |
| HARQ-4 | Enhanced dynamic codebook issues | 1 |
| HARQ-5 | correct the use of a RRC parameter in TS38.212 | 1 |
| HARQ-6 | correct the use of a RRC parameter in in TS38.213 | 1 |

FL recommendations:

## 2.7 CG enhancements

For CG enhancements [7], the following issues have been identified

|  |  |  |
| --- | --- | --- |
| Issue # | Issue summary | # Contributions |
| CG-1 | Frequency hopping for NR-U CG | 1 |
|  |  |  |
|  |  |  |
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|  |  |  |

FL recommendations:

## 2.8 Wideband operation

On wideband operation enhancements, no issue identified.

# Preparation phase discussion

We have identified many issues and we have limited email thread to discuss them. In the next tables, please provide your view on issues with the following notations

* “Y” if you believe the issue is important and needs email discussion
* “E” if you believe the issue is agreeable but editorial in nature. Potentially we can take all the editorial issues out for a separate fast track email approval.
* Empty if you believe the issue is not necessary to fix or low priority

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Company | DL-A1 | DL-B1 | DL-B2 | DL-C1 | UL-01 | CA-1 | IA 2-1 | IA 3-1 | IA 4-1 |
| Sharp |  |  |  |  | Y |  |  | Y | Y |
| ZTE, Sanechips |  |  | Y |  | Y | Y |  |  | Y |
| Ericsson |  |  | Do not agree to discuss in NR-U (see comment) |  | Y |  |  |  | Y |
| Samsung |  |  | Y |  |  | Y?(see comment) |  |  | Y(see comment) |
| Huawei, HiSilicon |  | Y | Y | Y | E | YPlease see note |  |  | Y |
| Nokia, NSB |  |  | Y |  | Y | see comment |  |  | Y |
| OPPO |  |  |  |  | Y |  |  |  |  |
| LG |  |  | Y |  | Y |  |  |  | Y |
| Intel |  |  | Y |  | Y | See comment |  |  | Y |
| Lenovo, Motorola Mobility |  |  |  |  | Y | See comment |  |  |  |
| Spreadtrum |  |  |  |  | Y |  |  |  | Y |
| vivo |  |  | Y |  | Y | YSee comment |  |  | Y |
| ITRI |  |  |  |  | Y |  |  |  | Y |
| Qualcomm |  |  |  | Y | Y |  | Y (see comment) |  | Y |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Company | HARQ-1 | HARQ-2 | HARQ-3 | HARQ-4 | HARQ-5 | HARQ-6 | CG-1 |
| Sharp | E |  |  |  | E | E |  |
| ZTE, Sanechips | E |  |  |  | E | E |  |
| Samsung | E | Y |  |  | E | E |  |
| Huawei, HiSilicon | Y | Y | Y |  |  |  |  |
| Nokia, NSB | E | Y |  |  | E | E |  |
| OPPO |  |  | Y |  |  |  |  |
| LG | E |  |  |  | E | E |  |
| Intel | E | Y |  |  | E | E |  |
| Lenovo, Motorola Mobility | E | Y |  |  | E | E |  |
| Spreadtrum | E | Y |  |  | E | E |  |
| vivo | E |  | Y |  | E | E | Y |
| ITRI | E |  |  |  | E | E |  |
| Qualcomm | E |  | Y |  | Y | Y |  |
|  |  |  |  |  |  |  |  |

Please provide additional company views below

|  |  |
| --- | --- |
| **Company** | **View** |
| Sharp | **UL01**We are fine to discuss FL’s modified proposal, although the original proposal in the draft CR should be well aligned with the agreement.**IA3-1**Although we believe the CR is not necessary, companies understanding seemed divergent at the last meeting. Therefore, we think it should be discussed. |
| ZTE, Sanechips | **For DL-B2,** if there is still no any consensus or progress at this meeting, we hope to have at least a clear guidance on how to deal with this issue in the future.**For UL-01,** we agree to clarify this issue but specific wording used for CR can be further discussed and polished.**For CA-1,** we think regional limitation on channel access for China should be also considered to be reflected in the existing spec, just like Japan’s regional limitation on channel occupancy time that have been captured in TS 37.213. |
| Ericsson | **For DL-B2**, this issue has been extensively discussed in the last 2 meetings. Consensus has not been achieved due to differing views on some fundamental aspects of UE behavior that touch on Rel-15 carrier aggregation implementations. It is very hard to make progress in NR-U until these are resolved. As we indicated in the last meeting, the fundamental UE behavior aspects need to be discussed in Rel-15 maintenance first. Once discussion has occured there, then further progress can be made in NR-U. Unless/until that discussion happens in Rel-15 maintenance, we will object to sending an LS reply back to RAN4 as we did in the last meeting. |
| Samsung | For **CA-1**, our understanding is the China regulation is still under review for approving, and we are supportive of the CR after the regulation is formally approved. So the discussion can be delayed. For **IA 4-1**, there are also contributions under agenda 5, and chairman has already planned a separate email discussion for it, hence, there is no need to count it for one email thread of this agenda. We also suggest to include the proposals from the following contributions (including ours) submitted in agenda 5, when the email discussion officially starts. * R1-2104459 Discussion on LS from RAN2 on random value generation for RMTC-SubframeOffset Ericsson
* R1-2104838 Draft reply LS on RMTC-subframeoffset ZTE, Sanechips
* R1-2104839 Discussion on the random value generation for RMTC-subframeoffset ZTE, Sanechips
* R1-2105271 Discussion on RAN2 LS on random value generation for RMTC-SubframeOffset Nokia, Nokia Shanghai Bell
* R1-2105279 Discussion on the random value generation for RMTC-SubframeOffset Samsung
* R1-2105414 Discussion on RAN2 LS on random value generation for RMTC-SubframeOffset LG Electronics
* R1-2105450 Draft Reply LS on random value generation for RMTC-SubframeOffset vivo
* R1-2105933 Discussion on random value generation for rmtc-SubframeOffset Huawei, HiSilicon
 |
| Huawei, HiSilicon | For **IA 4-1**, we had submission R1-2105933.**HARQ3**: it is unclear whether there is an inconsistency between RAN1 and RAN2 specifications, thus some discussion would be useful to get clarity.**HARQ4** was discussed in the past and de-prioritized due to lack of consensus on solution and on the criticality of the issue, so it may be treated with lower priority if time allows.**HARQ5** and HARQ6: the use of an RRC parameter name including the value of the RRC parameter is not an issue and is not incorrect. Even though the issue looks editorial, we think that nothing needs to be fixed as nothing is broken.**CA-1**: It should be discussed. Current specifications define the minimum required sensing durations for an LBE/FBE device and meant to comply with ETSI BRAN regulations. However, an LBE/FBE device that adheres to these minimum sensing durations wouldn’t fulfil the more stringent requirements for operating in China. Therefore, the specifications should provide other values for these minimum sensing durations that allow for compliance to the Chinese regulations. It is understood that if some regional regulations have looser requirements on the minimum sensing durations than ETSI BRAN, e.g. 20us instead of 25us, these requirements would be already fulfilled by the current spec and no need to capture them. |
| Nokia, NSB | **CA-1**: our understanding is that the final regulation has not been released yet and changes are in principle possible. Out preference is to postpone the discussion until the regulation is fully settled. |
| OPPO | UL-1: we are fine to discuss this, it needs to be clarified in the specification about the initial UL BWP.HARQ-3: RAN1 and RAN2 specs seem to have contradiction for scheduling expectation for NNK1 case. This needs to be clarified in RAN1.  |
| LG | **IA 3-1**: We think it is not necessary to discuss.First of all, regarding the RAR window extension case, the operation with shared spectrum channel access can be restricted in DL carrier, based on the description of the parameter “***ra-ResponseWindow***” in 38.331 as follows:

|  |
| --- |
| ***ra-ResponseWindow***Msg2 (RAR) window length in number of slots. The network configures a value lower than or equal to 10 ms when Msg2 is transmitted in licensed spectrum and a value lower than or equal to 40 ms when Msg2 is transmitted with shared spectrum channel access (see TS 38.321 [3], clause 5.1.4). UE ignores the field if included in *SCellConfig*. If *ra-ResponseWindow-v1610* is signalled, UE shall ignore the *ra-ResponseWindow* (without suffix). |

Moreover, regarding the RAR UL grant field, the operation with shared spectrum channel access can be restricted in UL carrier, based on the definition of the “ChannelAccess-CPext” field in RAR UL grant, which is defined in Table 7.3.1.1.1-4 in 38.212 as follows:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Table 7.3.1.1.1-4: Channel access type & CP extension for DCI format 0\_0 and DCI format 1\_0**

|  |  |  |
| --- | --- | --- |
| **Bit field mapped to index** | **Channel Access Type**  | **The CP extension T\_"ext" index defined in Clause 5.3.1 of [4, TS 38.211]** |
| 0 | Type2C-ULChannelAccess defined in [clause 4.2.1.2.3 in 37.213] | 2 |
| 1 | Type2A-ULChannelAccess defined in [clause 4.2.1.2.1 in 37.213] | 3 |
| 2 | Type2A-ULChannelAccess defined in [clause 4.2.1.2.1 in 37.213] | 1 |
| 3 | Type1-ULChannelAccess defined in [clause 4.2.1.1 in 37.213] | 0 |

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| Intel | CA-1: We share same view as Nokia, and we would prefer to wait until the requirements are in a stable phase. |
| Lenovo, Motorola Mobility | Regarding CA-1, we share same view as Nokia and Intel, and prefer to postpone this discussion until regulation requirements are stable. |
| vivo | **CA-1:** We support to discuss it according to regulation updates in China. Fine with that it is discussed when the final regulation update is approved.**HARQ-3:** it needs to be discussed to make RAN1 and RAN2 understanding on this aligned. |
| Qualcomm | For IA 2-1, out proposal is to capture the conclusion explicitly. Obviously other companies are not interested to do that. In this case, we will go ahead to implement the UE according to our understanding, which will not be following the spec. Hope it will be fine in the IoT tests |

Summary of the discussion

* As pointed out by multiple companies, IA 4-1 already has an email thread assigned in the LS agenda item, and will be handled in 7.2.2
* There are relatively strong support to discuss DL-B2, UL-01, CA-1, HARQ-1, HARQ-2, HARQ-3, HARQ-5, HARQ-6.
	+ Email thread 1: DL-B2
		- This has been discussed for multiple meetings without consensus already. Not likely we can reach an agreement in this meeting as well
	+ Email thread 2: UL-01
	+ Email thread 3: CA-1
		- There are comments that that China specific regulation is not yet finalized. Might be better to wait for the final version in regulation before we start discussion
	+ Email thread 4: HARQ
		- HARQ-1, HARQ-5, HARQ-6: Editorial with universal support to discuss
		- HARQ-2 and HARQ-3: 6 and 4 companies (out of 13) support the discussion of these respectively.

# Reference

[1]. Reserved

[2]. R1-20xxxxx, FL summary for DL signals and channels, Lenovo

[3]. R1-20xxxxx, FL summary for UL signals and channels, Ericsson

[4]. R1-20xxxxx, FL summary for channel access procedures for NR-U, Nokia

[5]. R1-20xxxxx, FL summary for initial access procedure enhancements, Charter Communications

[6]. R1-20xxxxx, FL summary on NR-U HARQ maintenance, Huawei

[7]. R1-20xxxxx, FL summary for on NRU configured grant enhancement, Vivo

[8]. Reserved