3GPP TSG-RAN WG1 Meeting #112bis-e Tdoc R1- 23xxxxx

E-meeting, April 17th – 26th, 2023

Agenda Item: 9.18

Source: Moderator (Ericsson)

Title: Summary of Email discussion on Rel-18 RRC parameters for LS to RAN2/RAN3

Document for: Discussion, Decision

# 1 Introduction

This document summarizes the discussions in input contributions and during RAN1#112bis-e under the following email thread assigned by RAN1 Chair:

[112bis-e-R18-RRC-01] Email discussion on RRC signalling by April 26 – Sorour (Ericsson)

* For eDSS, NCR, MC-Enh, BWP without restriction (details in RP-230805), and endorsed TEI proposals

The WoW described in Appendix is used for coordinating the activities under this email discussion. Companies are encouraged to follow the WoW for discussion and exchanging views.

# 2 Discussion

## 2.1 RRC parameter lists of Rel-18 WIs

The sub-sections below are organized for collection of comments on RRC parameters per WI. Please provide you comments, if any, for the input RRC list of a WI in the corresponding sub-section using the **latest version of Excelsheet** available at folder [Collection of RRC parameters](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_112b-e/Inbox/drafts/9.18%28Other%29/%5B112b-e-R18-RRC%5D/Collection%20of%20RRC%20parameters/draft_Rel-18_higher_layers_parameters_list%20-%20v000.xlsx).

Please note that the grayed-out sub-sections are not activated for discussion at this meeting.

### 2.1.1 NCR (WI code: NR\_netcon\_repeater-Core)

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| **Please see [1] for information provided by Rapporteur/Moderator of this WI.** **If you have any comment for a row in the Sheet corresponding to this WI, please provide your comment below by indicating the Row number.**  |
| **Company** | **Comment** |
| NTT DOCOMO  | **Row 54 “maxNumberOfFields”:** We suggest modification on the description as below. It should be the “number of time resource fields” indicated in DCI rather than “maximum number”.* Indicates the ~~maximum~~ number of time resource fields in one DCI carrying aperiodic beam indication.
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| Huawei, HiSilicon | Firstly, for aperiodic indication, at least the row #31, #27, and #54 should be revised. Based on the agreements, the required number of {slot offset, starting symbol, duration} is very large, e.g., 1575 for a duration of 14 OFDM symbols, and 6090 for a duration of 28 OFDM symbols, which are much larger than the agreed maximum list size of 112. The current agreed numbers will pose strong constraints on the configuration and indication of gNB, and make aperiodic beam indication hard to be used in practice. Thus, we propose the following revisions: ***Row#27, Column #K***: SEQUENCE{ ~~ncr-AperiodicFwdTimeResourceId,~~SIZE (1.. maxSlotOffsetAperiodic) of slotOffsetAperiodic, SIZE (1..maxNrofAperiodicFwdTimeResource)) OF {symbolOffset, durationInSymbols} }***Row#31, Column #K***: INTEGER(1..~~28~~ 14)***Row#54***: the newly added field “maxNumberOfFields” can be deleted since it is duplicated with the revised Row#27.Secondly, the parameters for periodic and semi-persistent can be configured in a unified way since the fields are almost the same.  |
| Intel  | **For row 54,** we share similar view with Docomo that this parameter is to indicate the number of time resource fields in a DCI, so we can delete ‘maximum’. For value range of this parameter, up to 16 can be considered, e.g., assuming maximum DCI size with 4 bits for time domain resource and 4 bits for beam index.  |
| LG | **Row #54**: Unlike other comments from companies, we think it should be kept as it is since it is clearly stated by agreement that “Tmax” is “RRC configurable”. |
| ZTE | We have the following comments:1. For **Row#27**, we disagree with Huawei on the modification. According to the agreement below, it clearly says that **a list of time resource** is pre-defined by RRC and **each time resource** is defined by {**slot offset, symbol offset, duration**}, Huawei’s revision obviously contradicts with the agreement. In addition, this row has been stable and sent to RAN2 in last meeting, there is no additional change in this meeting, so there is no reason to reopen the discussion on this row.

AgreementFor each aperiodic beam indication for access link, one DCI is used with the information defined by Option-1: * $L\_{max}$ fields are used to indicate the beam information and each field refers to one beam index ;
	+ Note: The bitwidth of this field is determined by the number of beams used for access link.
* $T\_{max}$ fields to indicate the time resource;
	+ Note: A list of time resource is pre-defined by RRC signalling. The bitwidth of this field for time resource indication is determined by the length of list.
* FFS: The value of $T\_{max}$
	+ Down-select between $T\_{max}=1 $or $T\_{max}=L\_{max}$.
* FFS: How to define the association between time indication and beam indication

Each time resource is defined by {Starting slot defined as the slot offset, starting symbol defined by symbol offset within the slot, duration defined by the number of symbols} with dedicated field.1. For **Row#31**, our preference is to keep the Column#K as it is, since repetition is beneficial for the UEs in poor coverage area served by NCR, and the beam of the multiple successive slots is the same for repetitions, the overall DCI overhead can be reduced with the multi-slot scheduling for beam indication.
2. For **Row#54**, we share similar view as LG that this row should be kept as it is. According to the agreement below, Tmax refers to the maximum number of time resource fields in DCI and this value is RRC configurable as an explicit RRC parameter.

Regarding the actual number of fields in DCI as mentioned by DCM and Intel, it’s not reasonable to configure it in RRC because it would result in the consequence that in a long time the DCI always has to indicate N beams no matter what is the actual traffic. We should notice that DCI is used to serve the dynamic traffic, so it should be flexibly configured according to the on-demand UE’s traffic, in our view it can be either determined implicitly by valid time resource value, e.g. time resources with duration larger than 0, or determined by an explicit field in DCI.**Agreement**For each aperiodic beam indication for access link via DCI, Tmax = Lmax is supported.* The time indication and beam indication is sequentially associated with one to one mapping.
	+ The value of Tmax is RRC configurable
 |
| Moderator | **Latest update of RRC list: V002 in** [**Collection of RRC parameters**](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_112b-e/Inbox/drafts/9.18%28Other%29/%5B112b-e-R18-RRC%5D/Collection%20of%20RRC%20parameters/draft_Rel-18_higher_layers_parameters_list%20-%20v001.xlsx)**Status report from Rapporteure:**@All: All other parameters are considered to be stable except for the following two:1. For Row#31, Column #K: INTEGER(1..28);
2. For Row#54, the current draft is based on the option-4 in following proposal as mentioned in previous email;

**Updated NCR-Proposal 1 v2:**For the aperiodic beam indication via DCI 5-0, ~~one of~~the following option~~s~~ is supported:·       Option-4:-        The DCI size of DCI Format 5-0 is implicitly determined by the RRC configuration with the maximum value as 128.-        The ~~maximum~~ number of fields for time resource indication (Tmax) is explicitly configured by dedicated RRC parameter with the maximum value ~~as [14] or~~ [16].o   Note: The time resource and beam indication by the corresponding Tmax fields are valid in this DCI. |
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### 2.1.2 eDSS (WI code: NR\_DSS\_enh)

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| **Please see [2] for information provided by Rapporteur/Moderator of this WI.** **If you have any comment for a row in the Sheet corresponding to this WI, please provide your comment below by indicating the Row number.**  |
| **Company** | **Comment** |
| vivo | A new RRC parameter for enaling the feature of PDCCH reception on symbol with CRS is needed. According to RAN2 LS R2-2002378:

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| **5 Avoid defining functionality that has no RRC configuration but is dependent on capability bits.**The specification should not be written so that the network determines what configuration it can use for a UE implicitly by the reported UE capabilities. Instead, the gNB should always configure the UE explicitly by DL RRC signalling, respecting the reported capabilities. A problematic case in Rel-15 was the UL/DL MIMO layers, which resulted in a late-stage introduction of explicit MIMO signalling support by RAN2 (maxLayersMIMO-Indication).  |

Moreover, according to the previous discussion in the UE feature, the performance of PDCCH decoding depends on the receiver type and CE as well as the ratio of PSD of CRS and PDCCH. When the ratio is high, legacy receivers show a significant deterioration in PDCCH performance, and CE based on the clean symbol PDCCH-DMRS is preferred. when CRS PSD is low, legacy receivers have better performance. As UE has no idea of TX scheme, UE may support both CE options, and NW further indicates which one to use based on its deployment. The enabling of the R18 eDSS feature and the RRC CE indication can be grouped into a single RRC parameter, an example is as below. * If this parameter is not provided, it is considered that R18 eDSS is not enabled and UE follows legacy behavior, i.e. UE is not required to monitor the PDCCH candidate(s) overlapping with CRS.
* If this parameter is provided, it indicates that UE shall monitor the PDCCH candidate(s) overlapping with CRS, and in addition, which CE option to use. The parent IE could be PDCCH-Config.

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| pdcchOnSymbolWithLTE-CRS | UE monitor PDCCH on symbol with LTE CRS | ENUMERATED {‘legacy CE: based on all DMRS symbols’, ‘based on clean symbol only’}  | N/A | per cell | UE-specific |

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| NTT DOCOMO | * **Row 2 (lte-CRS-PatternList3) and 3 (lte-CRS-PatternList4)**: We are basically fine with row 2 and 3.

We propose to discuss RRC configuration(s) for PDCCH reception in symbols with LTE-CRS. For UE’s possible CE options (legacy CE and CE on clean symbol(s) only), gNB should inform gNB’s transmission scheme (such as puncturing or super-position transmission on REs overlapping with LTE-CRS RE) to UE so that the UE can use appropriate CE option (in case of puncturing, CE on clean symbol(s) only should be applied, while in case of super-position transmission, legacy CE could provide better performance). There is similar discussion for UE capability reporting on supported CE option(s), and even if the reporting on supported CE option(s) is not supported, gNB configuration of gNB transmission scheme or UE’s CE option (or some other form if any) can be discussed. |
| Huawei, Hisilicon | We agree with vivo that an RRC configuration is needed for configuring the feature of receiving PDCCH on the symbol of CRS to UE, after the corresponding UE capability is reported. Otherwise, if such RRC configuration is not introduced, for the legacy gNB which does not support transmitting NR PDCCH in symbols with LTE CRS REs, the UE has to receive NR PDCCH in symbols with LTE CRS REs by default after reporting the capability; as a result, the false alarm probability of PDCCH will increase.But as the legacy CE is still hanging in the air, we recommend to add a square bracket on the legacy CE.In addition, the CE is not explicitly configured by gNB, so it is changed to a kind of PDCCH reception pattern.Changes on top of vivo’s version.

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| pdcchOnSymbolWithLTE-CRS | UE monitor PDCCH on symbol with LTE CRS | ENUMERATED {‘[PDCCH reception with or without non-overlapping symbol],‘PDCCH reception with at least one non-overlapping symbol only’} | N/A | per cell | UE-specific |

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| ZTE | **Row 2 and Row 3:** Support. Note that RAN1 has already sent RAN2 LS in R1-2208194 about the two RRC parameters and related RAN1 agreements. For PDCCH reception in symbols with LTE-CRS, we are open to discuss whether an enabling RRC is needed. But we don’t think indicating the CE methods to UE is needed and this also depends on the on-going discussion on UE capability reporting for CE methods.  |
| Spreadtrum | We share the similar view with vivo and HW. It is necessary to introduce a new RRC parameter to enable reception of NR PDCCH candidates overlapped with LTE CRS REs.In addition, if both legacy CE and CE on clean symbol are supported, which CE method is used should be determined. The CE method indicated by gNB is the most direct and simplest method. Network can have full knowledge about the situation of LTE deployment and its interference level to NR side. Thus, it is suitable for network to control the whole DSS transmission including UE channel estimation method, which will potentially achieve the best NR-PDCCH performance. For example, a new RRC parameter (i.e., PDCCH-DMRS-ChannelEstimation) in ServingCellConfig can be introduced to indicate the channel estimation method.

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| pdcchOnSymbolWithLTE-CRS | UE monitor PDCCH on symbol with LTE CRS | ENUMERATED{enabled, disabled} | N/A | ServingCellConfig | UE-specific |
| PDCCH-DMRS-ChannelEstimation | UE perform channel eatimation based on CE method indicated by gNB | ENUMERATED {‘legacy CE: based on all DMRS symbols’, ‘based on clean symbol only’}  | N/A | ServingCellConfig | UE-specific |

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| **Moderator** | **Latest update of RRC list: V002 in** [**Collection of RRC parameters**](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_112b-e/Inbox/drafts/9.18%28Other%29/%5B112b-e-R18-RRC%5D/Collection%20of%20RRC%20parameters/draft_Rel-18_higher_layers_parameters_list%20-%20v001.xlsx) **IS NOT updated for eDSS. The List will be updated accordingly in the next round based on the received comments and Rapporteur’s input.** |
| Qualcomm | We are fine to introduce an RRC parmeter that enables PDCCH reception overlapping with LTE-CRS. However, we do not think the signalling needs to indicate a specific CE scheme (or its implication). We think the signalling should be just “ENUMERATED {enabled}”. |
| WI Rapporteur (Ericsson) | Added row4 to RRC parameters for eDSS. The parameter is for explicit gNB configuration to enable monitoring of PDCCH candidates that overlap with LTE CRS RE(s) and is added based on discussions in this meetingUpdated eDSS draft spreadsheet is in – [draft\_Rel-18\_higher\_layers\_parameters\_list\_eDSS - v001](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_112b-e/Inbox/drafts/9.18%28Other%29/%5B112b-e-R18-RRC%5D/ForRapporteursUseOnly/%5B112b-e-R18-RRC-eDSS%5D/draft_Rel-18_higher_layers_parameters_list_eDSS%20-%20v001.zip)Please check and provide any comments. |

### 2.1.3 MCE (WI code: NR\_MC\_enh)

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| **Please see [3] for information provided by Rapporteur/Moderator of this WI.** **If you have any comment for a row in the Sheet corresponding to this WI, please provide your comment below by indicating the Row number.**  |
| **Company** | **Comment** |
| NTT DOCOMO (as MCE WI rapporteur) | In addition to your comment/feedback (if any) on rows in rapporteur’s initial version of RRC parameter list, please also provide your comment/feedback on companies’ proposals on other additional RRC parameters in their contributions (e.g., configurations on VRB-to-PRB mapping, PRB bundling size indicator, Frequency hopping flag, Rel-18 dynamic waveform switching, etc. for multi-cell scheduling).Based on your feedbacks by 19th UTC 9:00, I will update the RRC parameter list for MCE and upload it to [ForRapporteursUseOnly/[112b-e-R18-RRC-MCE]](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_112b-e/Inbox/drafts/9.18%28Other%29/%5B112b-e-R18-RRC%5D/ForRapporteursUseOnly/%5B112b-e-R18-RRC-MCE%5D).If there has been no comment/feedback on a row in rapporteur’s version of RRC parameter list by the deadline, I will propose to mark it as “stable”. |
| ZTE | **Issue#1:**One question for clarification regarding the following value range for BandPriority. Since both “INTEGER (0..3)” and “[TBD in RAN2]” are provided in the column, does it mean that the “INTEGER (0..3)” is just example value range and it should be decided by RAN2 in the end?If yes, we propose something like “TBD in RAN2, one example is: INTEGER (0..3)”.

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| INTEGER (0..3) [TBD in RAN2] |

Similar comments for value range for uplinkTxSwitchingOption-bandPair.**Issue#2:** It seems that at least for uplinkTxSwitchingOption-bandPair and associatedBand, RAN2 has already started their work to define the corresponding RRC signalling. Not sure whether we need to send this two in the RRC list to RAN2.We don’t have a strong view on this. If companies can reach common understanding on these two rows, we are happy to include them. However, if companies can not reach common understanding quickly, we propose to leave it to RAN2 anyway. |
| Nokia / NSB(MC-DCI only) | * **row 1** / List of set of cells:
	+ column E: The cell set list is fine, but we actually think it to be better to configure this in *PhysicalCellGroupConfig* as this
		- when configured in ServingCellConfig, there based on the current RRC parameter structure there is no option to configure separate search spaces for different set of cells scheduled by the same scheduling cell. But this is against the following agreement according to our understanding: *search space configuration of DCI format 0\_X/1\_X is independently configured for each set of cells*
		- resulting in lower RRC overhead to our understanding, as only configured once in a PUCCH cell group and not for each scheduling cell separately and no need to mention the restriction of 4 across all scheduling cells within a PUCCH cell group.
		- But this may be a bit a matter of taste here...
	+ column J: The number of set of cells could be up to 8 (for the primary and secondary PUCCH group – the limit of 4 sets is per PUCCH group to our understanding)
* **row 2 / column J**: This for a single set of cells only – i.e. should be: *Configurations ~~of~~ for a set~~(s)~~ of cells for multi-cell PDSCH/PUSCH scheduling*
* **row 5 / column K:** we thought the n\_CI could be only between 0..7. A different value range would need to be agreed or at least motivated.
* **Overall configuration for DCI format 0\_3 and 1\_3**:
	+ Clearly we don’t need to configure both of them within a set of cells. So we would be proposing some IE DCI-0-3 and DCI-1-3, where all the parameters for DCI format 0\_3 and DCI format 1\_3 would be included (so all DCI 0\_3 related RRC parameters would have DCI-0-3 as RAN2 parent IE, and DCI-0\_3 and DCI-1-3 with MC-DCI-SetofCells). But clearly, may be a matter of taste
* **row 6 & 7**: Another operation would be to have the set of cells configured (i.e. all cells applicable either for UL & DL) , and then have rows 6 & 7 to indicate (through a bitmap) which cells are then the scheduled cell set for UL & DL. But again, may be a matter of taste
* **rows 29 & 31** / column K: we have not agreed yet the table size for TDRA. We would be supporting a size of up to 8 bits.
* **For all Type 1 C** RRC parameters / 2nd line (rows 30, 32, 34, ...46)
	+ The number of cells for 0\_3 or 1\_3 goes from 2...4 cells (no support for ONLY single cell scheduling)
	+ Therefore, the value range should be *SEQUENCE (SIZE (2~~1~~..4)) OF XXX* for
* **row 30** / column K: value range should be number options -1, i.e. *SEQUENCE (SIZE (1..4)) OF INTEGER (0..maxNrofDL-Allocations - 1)*
* **row 32** / column K: same value range issues as for row 30, and should use the R16 parameter of the larger list there, i.e. *SEQUENCE (SIZE (1..4)) OF INTEGER (0..maxNrofUL-Allocations-r16 - 1)*
* **row 33** / column K: table size is 4bit 🡪 16 entries, or is there any reason to only configure 15?*SEQUENCE (SIZE (1..16~~5~~)) OF rateMatchDCI-1-3*
* **Row 35 /** column K**:** Same here up to 3bit = 8 entries – should be (1...8)
* **Row 36** / column K: the ZP-CSI triggering in 5.1.4.2 of TS 38.214 is defined as codepoint '00/01/10/11' (and not as value 0...3) and therefore a bitstring of size 2 is needed
* **Row 37 /** column K: we agreed up to 4bits – size should be (1...16)
* **Row 38** / column K: Note. In 5.1.5 of 38.214 there is a discussion about 'codepoints' so better to use a bitstring of size 3 instead of Integer (0...7)

We did not identify any missing RRC parameters (except maybe the limitations given by the configuration as part of the serving cell config commented for row 1). In general, we think we should apply the RRC parameters applicable for 0\_1 / 1\_1 as much as possible as both target eMBB operation. We don’t see a need for additional flexibility here.  |
| LGE | **Row 5:** We have similar view with Nokia that the n\_CI could be from 0 to 7. (since separate SS sets would be configured between DCI format 0\_X/1\_X and legacy DCI formats)In addition, unique n\_CI value is required only for multiple sets from a same scheduling cell. (i.e., n\_CI value can be independent (e.g. same or different) for multiple sets from different scheduling cells)**Row 6/7:** The order of cells in the list “ScheduledCell-ListDCI-1-3” and “ScheduledCell-ListDCI-0-3” is to be based on serving cell index, considering that the list is referred in 212 spec (where serving cell index order is already assumed for ordering of the DCI fields in DCI 0\_X/1\_X) as well as in 213 spec (where serving cell index based HARQ-ACK bit ordering is required as per relevant RAN1#110 agreement below).***Agreement****HARQ-ACK information bits for co-scheduled PDSCHs by a DCI format 1\_X is ordered based on serving cell indices associated with co-scheduled PDSCHs.***Row 8/9/10/11:**It is better to revise the wording “common information” as “common code-point” in case when type 1a is configured.**Row 40/44:**It is necessary to clarify whether the NUL/SUL flag is omitted (and how to assume the NUL/SUL flag if omitted). |
| Qualcomm | Below, we avoid repeating the same comments already provided from the other companies.**Row 6/7:**On column K “SEQUENCE (SIZE (2..4)) OF ServCellIndex”, does this mean a DCI 1\_3/0\_3 cannot schedule only one serving cell from the set of cells? We thought the spec allows single-cell scheduling by DCI 1\_3/0\_3.**Row 8/9/10/11:**On column J, perhaps better to just refer 38.212, rather than describing what type1a and type2 mean in the RRC parameter description.**Row 25/26/27/28:**On column P, better to capture the “otherwise” part of the agreement, so that RAN2 can understand these parameters are optional for the case when co-scheduled cell(s) is identified based on the co-scheduled cell indicator field.**Row 50:**‘config1’ seems missing in column K. |
| vivo | **MC****Issue#1: column5 nCI-Value**

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| Configure n\_CI value used for the set of cells, where unique n\_CI value is configured for each set of cells | INTEGER (1..[11])  |

As RAN1 agreed that up to 4 cell sets can be configured, it seems values 0-3 would be sufficient for nCI-Value for cell sets. In our understanding, Mc-DCI(multi-cell scheduling DCI) and sc-DCI(single-cell scheduling DCI) on the same resources must have different payload sizes. This is also reflected by the below green text in the draft CR 38.212 for MCE with the editor note(Editor’s note: There is no agreement for the following bullets, but should be straightforward to include). The reason is that, if a configuration leads to a case that mc-DCI and sc-DCI share a same size and same resource, the UE is not able to differentiate mc-DCI and sc-DCI. Either different CCEs or different payload sizes for mc-DCI and sc-DCI should be guaranteed, and thus there is no need to ensure non-overlapped n\_CI values for cell set of MCE and legacy single cell scheduling.The UE is not expected to handle a configuration that, after applying the above steps, results in …..omitted…..- the size of DCI format 0\_0 in a UE-specific search space is equal to DCI format 0\_3 in another UE-specific search space when at least one pair of the corresponding PDCCH candidates of DCI formats 0\_0 and 0\_3 are mapped to the same resource; or- the size of DCI format 1\_0 in a UE-specific search space is equal to DCI format 1\_3 in another UE-specific search space when at least one pair of the corresponding PDCCH candidates of DCI formats 1\_0 and 1\_3 are mapped to the same resource; or- the size of DCI format 0\_1 in a UE-specific search space is equal to DCI format 0\_3 in another UE-specific search space when at least one pair of the corresponding PDCCH candidates of DCI formats 0\_1 and 0\_3 are mapped to the same resource; or- the size of DCI format 1\_1 in a UE-specific search space is equal to DCI format 1\_3 in another UE-specific search space when at least one pair of the corresponding PDCCH candidates of DCI formats 1\_1 and 1\_3 are mapped to the same resource.- the size of DCI format 0\_2 in a UE-specific search space is equal to DCI format 0\_3 in another UE-specific search space when at least one pair of the corresponding PDCCH candidates of DCI formats 0\_2 and 0\_3 are mapped to the same resource; or- the size of DCI format 1\_2 in a UE-specific search space is equal to DCI format 1\_3 in another UE-specific search space when at least one pair of the corresponding PDCCH candidates of DCI formats 1\_2 and 1\_3 are mapped to the same resource.**Issue#2: DWS**We support dynamic waveform switching for multi-cell PUSCH-scheduling. Dynamic waveform switching is agreed to be carried by UL DCI for single-cell scheduling for CovEnh. And the inclusion of this field in mc-DCI can be supported and configurable. An example of the new RRC parameter indicating the presence of this field in DCI-0-3 is as below. Regarding the corresponding field type, at least for inter-band CA, a separate indication (Type2) should be supported. The details of corresponding per-serving cell IE for dynamic waveform switching are up to CovEnh.

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| dynamicWaveFormSwitchingDCI-0-3 | Configure the presence of dynamic WaveForm Switching indicator field in DCI format 0\_3 | ENUMERATED {enabled}  | N/A | per set of cells | UE-specific |

**Issue#3:** **VRB-to-PRB mapping, PRB bundling size indicator, Frequency hopping flag**All these three fields are Type1A fields that are common for all co-scheduled cells. Either reusing legacy parameters (e.g., *vrb-ToPRB-Interleaver, prb-BundlingType, frequencyHopping*) or introducing new parameters is feasible. For clarity and flexibility, new parameters are slightly preferred.**TX switching****Issue#1:** **uplinkTxSwitching-DualUL-TxState**RAN1 made some agreements on resolving the TX states ambiguity through uplinkTxSwitching-DualUL-TxState. But this parameter is not in the Excel, we are not sure if the rapporteur intended to reuse the legacy uplinkTxSwitching-DualUL-TxState, which is per CG configured, or to leave this to the RAN2 decision. |
| Xiaomi | For row 5, we agree with Nokia and LGE that 0-7 is sufficient for n\_CI because there are at most 4 sets of cells for co-scheduling. Even as mentioned by Nokia that at most 8 cell sets can be configured across different PUCCH cell groups(although we think the current description for row#2 is OK as it is from scheduling cell point of view), 0-7 is sufficient.On column K for row6/7, we share same view with Qualcomm. Although there is no agreement to support such kind of scheduling, there is no agreement to preclude it either. It seems that a MC DCI scheduling single serving cell is automatically supported. |
| Apple | **Multi-cell Scheduling****Row 6**: Similar understanding as QC that also 1 cell can be scheduled with DCI format 1\_3. Column K shall be updated as: SEQUENCE (SIZE (~~2~~1..4)) OF ServCellIndex**Row 7**: Similar understanding as QC that also 1 cell can be scheduled with DCI format 0\_3. Column K shall be updated as: SEQUENCE (SIZE (~~2~~1..4)) OF ServCellIndex**UL Tx Switching****Row 71**: A clarification whether the dynamic UL Tx switching options should include “both” also as an option. At least for Rel-16/17, for a band combination, we have switchedUL, dualUL, both as options |
| NTT DOCOMO | * **Row 5 (nCI-Value)**: In our understanding, for nCI value in search space equation, at most 8 values are configured for CCS by legacy DCI and at most 4 values are configured for multi-cell scheduling since at most 4 sets of cells can be configured for a same scheduling cell. Considering that nCI value for legacy CCS and multi-cell scheduling may not be overlapped, the possible value range on nCI value for multi-cell scheduling can be from 1 to 12.
* **Row 36/38 (ZP-CSI-DCI-1-3/ TCI-DCI-1-3)**: The definition of value range may need the discussion for clarification between integer or bitstring. In our understanding, the value range should be defined with integer since they indicate the values which is configured with integer value by higher layer (ZP-CSI-RS-ResourceSetId (INTEGER)/TCI-StateId (INTEGER)).
* **Row 40/44 (SRS-RequestDCI-1-3/** **SRS-RequestDCI-0-3)**: In our view, according to the agreement at the last RAN plenary meeting, UL/SUL indicator is omitted from MC DCI and hence UL/SUL flag is omitted as well. Therefore, the number of bits for SRS request for each cell can be assumed as 2 bits.
* **Additional RRC parameters for MC scheduling**: In our view, as captured in the current RRC parameter list, new RRC parameters, e.g., pdsch-HARQ-ACK-OneShotFeedbackDCI-1-3, pdsch-HARQ-ACK-enhType3DCI-1-3etc., can be introdused specific to DCI format 0\_3/1\_3 wihch enable the independent configuration from legacy DCI format. In addition to the current parameter list, vrb-ToPRB-InterleaverDCI-1-3 (which is referred in draft CR for 38.211), prb-BundlingTypeDCI-1-3, frequencyHoppingDCI-1-3 can be introduced as well.

In additon, new RRC parameters for dynamic waveform switching indicator can be further discussed after the clarification on whether to support the indicator in DCI format 0\_3.* **Row 69 (BandPriority)**: we are fine with ZTE’s suggestion or just describe “TBD in RAN2” for the value range. Anyway, the rapporteur’s intention to capture this row as well as other rows is to inform RAN1 intention to RAN2 since RAN1 made agreements to have such RRC parameters (although RAN2 already started the discussion on some details for the parameters based on RAN1 agreements).
* **Row 70 (associatedBand) and Row 71 (uplinkTxSwitchingOption-bandPair)**: As commented above, the rapporteur’s intention to capture these rows is to inform RAN1 intention to RAN2 since RAN1 made agreements to have such RRC parameters. Although RAN2 already started the discussion on some details for the parameters, it would be good to capture those RRC parameters as long as they are to be introduced based on RAN1 agreements.
 |
| OPPO | **Multi-cell Scheduling*** **Row 33**

On column K, table size is 4bit , so 16 entries can be configured, i.e.*SEQUENCE (SIZE (1..16~~5~~)) OF rateMatchDCI-1-3.** **Row 6/7:**

On column J, “Type 2” is just a naming for discussion. It’s better to align with description38.212. |
| LG3 | **Multi-carrier UL Tx switching*** **Row 70**

In RAN1 and RAN2 agreement in Comment column, a certain condition is assumed for this RRC parameter* RAN1 agreement
	+ In Case#2 where two Tx chains are currently associated with band A and B, and next transmission is 1 port transmission on band C, if oneT is indicated via uplinkTxSwitching-DualUL-TxState, one Tx chain is switched to band C and associated band for another Tx chain is determined by new RRC parameter
* RAN2 agreement
	+ For RRC configuration to clarify ambiguous Tx state, RAN2 should introduce an RRC configuration that associates a band to another band which the unused Tx chain is switched to when the switch is from concurrent transmission on two bands to 1 Tx transmission on another band.

Therefore, Description should be amended as follows* Indicate an associated band for the band so that another Tx chain is associated with the configured associated band when two Tx chains are currently associated with two separate bands and oneT is indicated via uplinkTxSwitching-DualUL-TxState and one of two Tx chains is switched to the band for 1 port transmission.[Details up to RAN2]
 |
| ZTE | In row 5, the bracket can be removed considering that there may be at most 8 serving cell in the legacy cross cell scheduling and at most 4 sets for multi-cell scheduling for the same scheduling cell. The value ‘0’ can also be configured if the scheduling cell is included in the set. So we think it should be INTEGER (0..11).In row 28, the parameter ScheduledCellComboDCI-0-3 is not needed because the value range is the same as the parameter ScheduledCellComboDCI-1-3 in row 26. We can just keep only one of them and change the name to ScheduledCellComboDCI-X-3 to be applied to both downlink and uplink.For the parameters in row 29-46, the related parameters are BWP-specific. It means that the number of entries for a configuration (e.g., PDSCH TDRA table) may be different for different BWPs. The related configuration for multi-cell scheduling should also be BWP specific for flexibility considering that BWP indicator is Type 1A. With the current spec, there is only one table for the set of scheduled cells. It is difficult for the gNB to configure a table to cater for all the configuration in each BWP of the corresponding cells. Therefore, we suggest that the gNB can configure at most 4 tables with one per BWP. An example is shown below and more details can be found in our Tdoc R1-2303404. { *DownlinkSchedulingToAddModlist-r18 SEQUENCE (SIZE (1..maxNrofBWPs)) OF DownlinkScheduling-r18* *DownlinkSchedulingToAddModlist-r18 SEQUENCE (SIZE (1..maxNrofBWPs)) OF DownlinkSchedulingId-r18* *UplinkSchedulingToAddModlist-r18 SEQUENCE (SIZE (1..maxNrofBWPs)) OF UplinkScheduling-r18* *DownlinkSchedulingToAddModlist-r18 SEQUENCE (SIZE (1..maxNrofBWPs)) OF UplinkSchedulingId-r18*}*DownlinkScheduling ::= SEQUENCE {* *DownlinkSchedulingId-r18 INTEGER (0.. 3)* *pdsch-TimeDomainList SEQUENCE (SIZE (1..32)) OF pdsch-TimeDomain* *rateMatchIndicatorState-1-X-r18 SEQUENCE (SIZE (1..16)) OF rateMatchIndicator* *ZPCSI-RSTriggerState-r18 SEQUENCE (SIZE (1..8)) OF ZPCSI-RSTrigger* *TCIStateList-r18 SEQUENCE (SIZE (1..16)) OF TCIState* *SRSRequestState-r18 SEQUENCE (SIZE (1..16)) OF SRSRequest* *SRSOffsetIndicatorState-r18 SEQUENCE (SIZE (1..16)) OF SRSOffsetIndicator**}**UplinkScheduling ::= SEQUENCE {* *UplinkSchedulingId-r18 INTEGER (0.. 3)* *pusch-TimeDomainList SEQUENCE (SIZE (1..63)) OF pusch-TimeDomain* *SRSRequestState-r18 SEQUENCE (SIZE (1..16)) OF SRSRequest* *SRSOffsetIndicatorState-r18 SEQUENCE (SIZE (1..16)) OF SRSOffsetIndicator**}*In row 33, the value range should be SEQUENCE (SIZE (1..16)) OF rateMatchDCI-1-3In row 35, the value range should be SEQUENCE (SIZE (1..8)) OF ZP-CSI-DCI-1-3In row 37, the value range should be SEQUENCE (SIZE (1..16)) OF TCI-DCI-1-3 instead of SEQUENCE (SIZE (1..7)) OF TCI-DCI-1-3.The parameter in row 40 and row 44 can be merged as SRS-RequestDCI-x-3 due to the same value range and the order of SRS request index in each row refers the order of cells in ScheduledCell-ListDCI-0-3.The parameter in row 42 and row 46 can be merged as SRS-OffsetDCI-x-3 due to the same value range and the order of SRS request index in each row refers the order of cells in ScheduledCell-ListDCI-0-3.For the parameter in row 53 and 54, we prefer the value range is ENUMERATED {0-bit, 1-bit-rv02, 1-bit-rv03, 2-bit}without increasing the RRC overhead compared with the currenet value range, because, in current spec, there are two RV configurations for the case of 1 bit RV, i.e., RV 0, 2 and RV 0, 3. We think they all can be used for multi-cell scheduling. |
| NTT DOCOMO (as MCE WI rapporteur) | Thanks for the reviewing and feedbacks!* **Row 2**: for the list of set of cells, there are comments from Nokia/NSB that it should be configured in *PhysicalCellGroupConfig* and in such case up to 8 sets can be configured in the list. As Nokia/NSB also commented, it may be a matter of taste as current proposed structure would also work. Since only Nokia/NSB commented on this row, I’d like to keep as it is with yellow color at this moment and would like to hear other companies’ views if any.
* **Row 3**: for the configuration of set of cells, Nokia/NSB suggested a revision which should be reasonable and ok for all. As there has been no other comment, I’d like to make it as stable with reflecting suggested revision from Nokia/NSB.
* **Row 4**: for index of the set of cells, as there has been no comment, I’d like to make it as stable.
* **Row 5**: for n\_CI value, there are comments from multiple companies as below. We need further discussion with more companies’ views.
	+ Value range should be 0…7: Nokia/NSB, LGE, Xiaomi
	+ Value range should be 0…11: DCM, ZTE
	+ Value range should be 0…3: vivo
* **Row 6/7**: for the list of possible co-scheduled cells for DL and UL, there are comments from multiple companies as below. Nokia/NSB’s suggestion is a matter of taste as they said. LGE’s suggestion is valid and 38.212 CR already describes that “*the blocks are placed according to an ascending order of a serving cell index*”. Regarding comments/suggestion from QCM/Xiaomi/Apple, the single cell scheduling via DCI 0\_3/1\_3 is of course possible by using FDRA field based co-scheduled cell indication or row 25/26/27/28 based co-scheduled cell indication (as long as a single cell is configured in the table as one of candidate combinations of co-scheduled cell(s)) with current size of the list (2…4). Adding size 1 means DCI format 0\_3/1\_3 can be configured for scheduling only one cell in a set. I’d like to hear more companies’ views on this point.
	+ Having a list including all cells applicable either for UL or DL and change row 6/7 to bitmap to indicate which cell is for UL and for DL: Nokia/NSB
	+ Order of cells in the list should be based on serving cell indicies: LGE
	+ Size of the list should include 1: QCM, Xiaomi, Apple
* **Row 8/9/10/11**: for indication type for antenna ports, precoding information and number of layers and SRS resource indicator, there are comments from LGE and Qualcomm that it is better to just refer 38.212 or use some general wording. As there has been no other comment, I’d like to make them as stable with reflecting suggestion from Qualcomm.
* **Row 12~24**: as there has been no comment, I’d like to make them as stable.
* **Row 25/26/27/28**: for the table for combination of co-scheduled cells, there is a comment from Qualcomm that it is better to capture the “otherwise“ part of the agreement, and it should be fine for all. For the each row of the table for combination of co-scheduled cells, there is a comment from ZTE that row 26 and 28 can be merged as they have same value range. I think it is also fine for all. As there has been no other comment, I’d like to make them as stable with reflecting suggestions from Qualcomm/ZTE.
* **Row 29-46**: There is a suggestion from ZTE that the gNB can configure at most 4 tables with one per BWP for those BWP-specific parameters. I’d like to hear other companies‘ views on this proposal.
* **Row 29/31**: for joint TDRA table, there is a comment from Nokia/NSB that size of the table should be up to 8 instead of 16. Current maximum size of the table is same as existing TDRA table for single cell scheduling and hence it may be reasonable although there is no agreement on the maximum size of the TDRA table for multi-cell scheduling. I’d like to hear other companies‘ views on this point.
* **Row 30/32**: for each row of the joint TDRA table, there is a comment from Nokia/NSB that “-1“ for value range is missing and maxNrofUL-Allocations-r16 should be used instead of maxNrofUL-Allocations. The first comment should be fine for all as it is correcting error, while I’m not sure the second comment is fine for all. Therefore, I’d like to hear other companies‘ views on this point.
* **Row 33**: for joint rate matching indication table, there are comments from Nokia/NSB/OPPO/ZTE that size of the table should be 1...16 as field size is 4 bits. It should be fine for all as it is correcting error.
* **Row 35**: for joint ZP-CSI-RS trigger table, there are comments from Nokia/NSB/ZTE that size of the table should be 1..8 as field size is 3 bits. It should be fine for all as it is correcting error.
* **Row 37**: for joint ZP-CSI-RS trigger table, there are comments from Nokia/NSB/ZTE that size of the table should be 1..8 as field size is 3 bits. It should be fine for all as it is correcting error.
* **Row 36/38**: for each row of joint ZP-CSI-RS trigger table and joint TCI table, there is a comment from Nokia that it should be bitstring instead of integer, while there is another comment from DCM that it should be integer. I’d like to hear other companies‘ views on this point.
* **Row 40/44**: for SRS request, there is a comment from LGE that whether UL/SUL flag is omitted should be clarified, and there is a comment from DCM that it is omitted and hence the size for each cell is 2 bits. There is another comment from ZTE that row 40 and 44 can be merged similar to row 26 and 28.
* **Row 42/46**: for SRS offset, there is a comment from ZTE that row 42 and 46 can be merged similar to row 40 and 44.
* **Row 47-49**: as there has been no comment, I’d like to make them as stable.
* **Row 50**: for RBG size for RA type 0 for DCI format 0\_3, there is a comment from Qualcomm that “config1“ is missing. It was because rbg-Size for PUSCH has only “config2“ as candidate value and config1 is applied when rbg-Size is absent. But it should be ok to have config1 in candidate value set. As there has been no comment, I’d like to make it as stable with addressing the comment from Qualcomm.
* **Row 51-52**: as there has been no comment, I’d like to make them as stable.
* **Row 53/54**: for size of RV, there is a comment from ZTE that the value range should be {0-bit, 1-bit-rv02, 1-bit-rv03, 2-bit } instead of {0...2} as there are two cases of 1 bit RV. I’d like to ask companies to check if it is ok.
* **Row 55-57:** as there has been no comment, I’d like to make them as stable.
* **Other potential RRC parameters for multi-cell scheduling**: There are following comments for potential other RRC parameters. I’d like to hear more views from other companies.
	+ No need additional parameters: Nokia
	+ New parameter for presence of dynamic wavefrom switching field: vivo, [DCM]
	+ New parameter for VRB-to-PRB mapping: vivo, DCM
	+ New parameter for PRB bundling size indicator: vivo, DCM
	+ New parameter for Frequency hopping flag: vivo, DCM
* **Row 69**: for band priority, there is a suggestion from ZTE that value range should be described as “TBD in RAN2, one example is: INTEGER (0..3)” and DCM agrees with ZTE’s suggestion. I’d like to ask companies to check if it is ok.
* **Row 70**: for associated band, there is a suggestion from LGE that “when two Tx chains are currently associated with two separate bands and“ should be added according to the agreements in RAN1/2. It should be ok for all. Although there is another comment from ZTE that whether we need to have this row as RAN2 has already started discussion on this parameter, the rapporteur clarified the intention. As there has been no comment, I’d like to make it as stable with addressing the comment from LGE.
* **Row 71**: for switching option indication, there is a comment from Apple that the candidate value set should include “both“. However, it would be misunderstanding that “both“ is supported for UE capability reporting but not supported for RRC configuration as indicating “both“ to UE is unclear. Although there is another comment from ZTE that whether we need to have this row as RAN2 has already started discussion on this parameter, the rapporteur clarified the intention. As there has been no comment, I’d like to make it as stable with reflecting similar change as for Row 69 based on ZTE’s suggestion.
* **Other potential RRC parameters for UL Tx switching**: There is a comment from vivo on uplinkTxSwitching-DualUL-TxState. It is rapporteur’s understanding that RAN1 has no agreement on introducing new parameter for this, while for Row 69/70/71 RAN1 made agreement to have new parameters. So, the rapporteur thinks we should leave it to RAN2. I’d like to hear other companies‘ views.
 |
| LGE | @ Rapporteur: Thank you for the efforts to update the list.**Row 36/38:** Regarding each row in ZP-CSI-RS table and TCI table, we also think it is to be integer (rather than bitstring).**Row 40:**Regarding this SRS request, if NUL/SUL flag is omitted in DCI 0\_3/1\_3 as DCM clarified, the question from our side is, to which carrier the 2-bit is applied for the cell configured with SUL (it seems to need clarification in the specification). |
| Nokia / NSB(MC-DCI updates only) | Hiroki many thanks for the updates in v002 (in the MCE folder). I guess some of the updates (and marking the related rows as stable) seems to be a bit premature, considering that some of the comments (e.g. by ZTE) seem to have appeared less than 5hrs before the updates (and marking them as stable). Anyhow, see the overall comments below. **Row 1:** not repeating from our side, let’s hear more views from other companies**Rows 6 / 7:** the bitmap (as mentioned) may be a matter of taste. We are fine with the ordering proposed by LG – but would like to hear more explanation on the motivation to to support DCI 0\_3 / 1\_3 with a single ‘scheduable cell’ only (as this can be done with the single cell DCI) from QC, Apple & Xiaomi. Or is the motivation to overcome the ‘single cell scheduling limitation’ (e.g. for UL without UL CA) and using 0\_3 then instead? **Row 25 - 28:** we are fine with removing 28, but then think that it would be better to name row 26 parameter as *ScheduledCellCombo* only (without the DCI1-3-0-3), as the parameter defines this only for one of them and not both (which the name may imply). So although this very recent suggested change (<5h before the update) has been marked as stable, we think this needs to be still addressed!**Type 1 B comments by ZTE (per BWP):** We don’t think that this will be needed. The gNB has the full control of the operation and this would revert the earlier agreement. **Row 29:** With a max of 16 TDRA rows for single cell operation, having also only the possibility for 16 rows to indicate up to 4 cells seem to be rather restrictive to us. We are therefore suggesting 64 rows for DL TDRA joint indication. **Row 31:** We support dynamic repetition indication since Rel-16 – and also the DCI format 0\_1 supports a size of up to the 64 values (given by *maxNrofUL-Allocations-r16*). As we refer to the TDRA table for DCI format 0\_1, we think the same range should still be supported. **Row 30:** Based the two comments above, we also think that more rows will be needed as the stand-alone single cell table for 0\_3 (limited to 64 entries since R16). So we are suggesting 128 here. Clearly just 16 entries for the joint indication is less than what the single cell scheduling supports.**Rows 36 / 38:** as pointed out earlier (above), 38.214 talks about ‘codepoint’ which to our understanding a integer is not providing and a bit-string would be needed. But would be good if other companies would check as well!* Row 36: the ZP-CSI triggering in 5.1.4.2 of TS 38.214 is defined as codepoint '00/01/10/11' (and not as value 0...3). I hope we don’t need to change 38.214 specifically for this case just because we define this as integer...
* Row 38: In 5.1.5 of 38.214 there is a discussion about 'codepoints' so better to use a bitstring of size 3 instead of Integer (0...7). I hope we don’t need to change 38.214 specifically for this case just because we define this as integer...

**Rows 53/54:** the proposed change by ZTE implemented in v002 is not OK for us. We only agreed to make the size of the field configurable (as we did for 0\_2/1\_2, 0..2bits) but not to enable certain mapping for 1bit. So, we prefer the same definition as given for 0\_2/1\_2 since Rel-16. Finally, on additional RRC parameters for DCI format, we would like to hear the motivation from vivo & DCM on the motivation to require / have specific parameters for VRB-to-PRB mapping, PRB bundling size and FH flag. On the dynamic waveform switching – if this would be supported: would the field apply for all the cells or would this be Type 2 (if present). Maybe a clarification from vivo would be good here.  |
| Qualcomm | Thanks for the update v002. Follow-up comments from our side:**Row 2**: Indeed, it is a matter of taste. We slightly prefer the current Rapporteur’s formulation – our impression is that confining parameters related to multi-cell scheduling from a scheuling cell into the schgeduling cell configuration looks intuitive.**Row 5**: We prefer 0…7. **Row 6/7**: Sorry, our comment on the value 1 was wrong.. Agree, it is not necessary to have 1 in this parameter. Please forget about it. Regarding LGE’s comment and the text update “the order of the cells in the list based on serving cell index is used to index cells in the set {0, 1, 2, 3}”, it is a bit unclear how to interpret. If the list of serving cell indexes is {10, 5, 4, 8} for example, does it mean {0, 1, 2, 3} are mapped to {cell index 4, cell index 5, cell index 8, cell index 10}, or {cell index 10, cell index 5, cell index 4, cell index 8}? We think it should be latter – no need for receiver to reshuffle the entries of the list based on the values of serving cell indexes to map to {0, 1, 2, 3}.**Row 8/9/10/11**: Looks good, thanks.**Row 29-46**: We agree with ZTE. We thought most of BWP-specific parameters should still be defined per BWP per cell in a set, and some minimum set of parameters are defined per set of cells that point to the parameters in each BWP in each cell. This enables BWP-switch as legacy case. So, during WI, we have commented that “joint table” does not necessarily mean really joint configurable table for multiple cells. However, this is also a matter of taste. If not too late, we would suggest to consider that, instead of configuring 2D big table, configure each column in each BWP of each cell, and define minimum parameters that is per set of cells. For example, take the rate-matching indication as example. For each BWP of each cell, configure SEQUENCE (SIZE (1..16)) OF BIT STRING (SIZE(1..2)). Then, per set of cells, an RRC parameter enables RM indicator field in DCI 1\_3. The UE look at each SEQUENCE in each BWP of each cell and identify the size of the RM indicator field in the DCI 1\_3.**Row 29/30/31/32**: We prefer to keep the existing TDRA table size as for single cell scheduling and using NrofUL-Allocations. For extended range, we are open if it is based on an optional UE capability (same as for single-cell scheduling).**Row 36/38**: No strong opinion. Even if this is an integer, 331 can simply clarify “the integer value is mapped to the codepoint as defined in 214”?**Row 50**: Thanks, now understand the intention. We are OK to delete config1 – probably RAN2 can work the optimization as ASN.1 construction later.**Row 53/54**: We consider these should be the same as numberOfBitsForRV-DCI-1-2-r16 = INTEGER (0..2) as originally Rapporteur proposed. |
| Apple | @Rapporteur: Thanks for your updates and responses. We are fine with the clarification related to some of our comments.**Regarding row 6/7**: As we have not specifically preculed scheduling of 1 cell with DCI format 0\_3/1\_3 and we don’t see any additional burden by supporting such case, we think it is reasonable to include this. However, if there are concerns on this, we can live without 1 in the value range.  |
| LGE | **Regarding the QC’s question on Row 6/7**:Our comment is not intended to reshuffle the entries of the list based on serving cell index, but to configure the entries of the list based on the order of serving cell index. Therefore, in your above example, the list of serving cell indexes would be configured as {4, 5, 8, 10} initially, then {0, 1, 2, 3} are mapped to {cell index 4, cell index 5, cell index 8, cell index 10}. To be clear, the text can be updated as “the order of the cells in the list configured based on serving cell index order is used to index cells in the set {0, 1, 2, 3}”.As already mentioned, this is to consider that the above list is referred in 212 spec (where serving cell index order is already assumed for ordering of the DCI fields in DCI 0\_3/1\_3) as well as in 213 spec (where serving cell index order based HARQ-ACK bit ordering is required as per the agreement). |
| Vivo2 | @Rapporteur: Thanks for your quick updates and kind explanation. Please check the following replies and additional comments.* **Row 5**: for n\_CI value,
	+ if up to 8 sets can be supported for two PUCCH group, the value range should be changed to 0-7.
* **Row 6/7**: we are ok with including 1 cell in the list.
* **Row 29-46**: We are ok with introducing more tables to increase scheduling flexibility, but as there is no DCI field to indicate which table is used, our understanding is that each DownlinkScheduling or UplinkScheduling in ZTE’s proposal is linked with a corresponding BWP ID or BWP indicator value by configuration. Another solution is to increase the size of the TDRA table to allow more TDRA combinations.
* **Other potential RRC parameters for UL Tx switching**: RAN2 just agreed to reuse uplinkTxSwitching-DualUL-TxState in R17. We don’t need to discuss this in RAN1 anymore.

RAN2#121bis-eP2: RAN2 reuse *uplinkTxSwitching-DualUL-TxState-r17* to indicate the state of Tx chains for dualUL mode.* **Some additional comments**
	+ **Row 47-48:** Suggest modifying the wording ‘Configure the FDRA type for DCI format 1\_3’ and ‘Configure the FDRA type for DCI format 0\_3’ in description part to ‘Configure the FDRA type for a co-scheduled cell that can be scheduled by DCI format 1\_3’ and ‘Configure the FDRA type for a co-scheduled cell that can be scheduled by DCI format 0\_3’ to improve clarity.
	+ **Row 49-56:** The current phrasing is somewhat unclear as to which cell is being referred to by the term 'the cell'. We suggest modifying the wording ‘Configure xxxxxx for the cell in DCI format 1\_3’ and ‘Configure xxxxxx for the cell in DCI format 0\_3’ in FD part of row 49-56 to ‘Configure xxxxxx for ~~the~~ a co-scheduled cell in DCI format 1\_3’ and ‘Configure xxxxxx for ~~the~~ a co-scheduled cell in DCI format 0\_3’.
	+ **Row 30, 32, 34, 36, 38, 40:** According to the agreement, the number of columns of the joint TDRA table is the number cells in the cell set. As the size of a cell set should be no smaller than 2, ‘SEQUENCE (SIZE (1..4))’ for the joint TDRA table pdsch-TimeDomainResourceAllocationDCI-1-3 should be changed to ‘SEQUENCE (SIZE (2..4))’. Moreover, some clarifications, e.g., ‘the number of TDRA index in a row of pdsch-TimeDomainResourceAllocationDCI-1-3 should be the same as the number of cells included in ScheduledCell-ListDCI-1-3’, can be added in the description part to improve the clarity. Similar changes should be made to all Type1B field (row 30, 32, 34, 36, 38, 40).

**Agreement**For a set of cells which is configured for multi-cell scheduling using DCI format 0\_X/1\_X, a joint TDRA table is configured by RRC signaling for the set of cells with each row in the table containing TDRA indexes for all cells within the set of cells. |
| Huawei, HiSilicon (for single DCI) | * **Row 2**:
	+ Indeed, it is a matter of taste. We are fine with the current Rapporteur’s formulation. If it is configured in *PhysicalCellGroupConfig*, it seems we might need more IEs, e.g. we need to indicate what the scheduling cells are in the group, the corresponding cell sets for a scheduling cell, etc.
	+ For the parameter name, we kind of feel using “*DCI-0-3-And-1-3*” as the suffix is clearer than “MC-DCI”, but we are fine with the current name. RAN2 anyway may come up with other name also.
* **Row 4**: We can remove 38.212 from column C. At least for now 212 is ok without this parameter.
* **Row 5**: Regarding the value range, we slightly prefer 0…7, which should be sufficient for typical case.
* **Row 6/7**:
	+ Regarding whether to add value 1, we don’t see the motivation for it for now. Proponents can clarify more on the motivation.
	+ Regarding the ordering of the cells, if I understand the comment from LG correctly, it means the cells are ordered according to an ascending order of a serving cell index. We are fine to go with this way. Of course, the ordering here would not have impact on TS 38.212, no matter what the order is here, 212 will always order those blocks according to the serving cell index.
* **Row 10**: For the name of “PrecodingDCI0-3”, it seems “TPMI-DCI0-3” is better, since TMPI is used to represent precoding information and number of layers in 212 also.
* **Row 25 - 28:** Fine with the suggestion from Nokia above.
* **Row 29-46**:
	+ Regarding the type 1B comments by ZTE (per BWP), we don’t think this is needed, single table for all BWPs would be sufficient with approprirate gNB configuration and it would be much simpler.
	+ **Row 29 & 31:** We also prefer larger value than 16, at least 64 should be supported.
* **Rows 36 / 38:** TS 38.212 refers 38.214, and the current description is more aligned with codepoint as mentioned by Nokia above.
* **Row 40:** “SEQUENCE (SIZE (1..4)) OF BIT STRING (SIZE(2))” shall be revised to “SEQUENCE (SIZE (1..4)) OF BIT STRING (SIZE(x))”, with a note as below to clarify to RAN2 on the value of x:

*Note: x is equal to 2 for a cell not configured with supplementaryUplink in ServingCellConfig, and x is equal to 3 for a cell configured with supplementaryUplink in ServingCellConfig.* There is comment from other companies to say it should be always 2 bits since UL/SUL indicator is not supported for DCI format 0\_3/1\_3, however the field of SRS request is not really relvant to the field of UL/SUL indicator per the agreement from Rel-15, you can find that DL DCI format doesn’t have UL/SUL indicator field, but it still has the field of SRS request. In addition, according to the agreement, type 1B is adopted for SRS request. For type 1B, different “SRS request” index will be used for the indication for different cells. For example, for the case of “cell 1 with NUL” + “cell 2 with NUL+SUL”, the “SRS request” index for cell 2 should be 3 bits, while 2 bits for cell 1. * **Rows 49 & 50:** 38.212 can be removed from column J and D, since 212 doesn’t need to utilize these paramters and just directly refer to 214.
* **Rows 53 & 54:** We share similar as Nokia, the definition given for 0\_2/1\_2 can be reused directly.
* Regarding VRB-to-PRB mapping, PRB bundling size and FH flag, we also don’t see the motivation to introduce new parameter, we can just reuse the one for DCI format 0\_1/1\_1.
 |
| Ericsson1 (for MC-DCI) | Below are our comments for some of the fields. * Row 2 : we prefer Rapporteur version (i.e. having it within ServingCellConfig) – it makes the association between sets and scheduling cell straightforward.
* Row 5 : We prefer 0..7.
* Row 53/54 : We are OK with updated moderator version to include both rv03 and rv02. For single RV bit, (RV0,RV2) typically provides better IR gains while (RV0,RV3) has better self-decodability which suits DCI 0\_2/1\_2 designed for URLLC – we prefer to support both.
* Row 29-46: We share similar view as ZTE and Qualcomm and prefer the configuring of the needed information (that is looked up based on the joint index) in the respective BWP of respective cell – this would be aligned with current RRC framework and avoids unnecessary cross-referencing of IEs for MC-DCI.
 |
| LGE | **Regarding the table for Type 1B fields:**If I understand correctly, the methods being proposed from the companies are below.* Method 1 (by ZTE): configure up to 4 multi-cell joint tables according to possible combinations of active BWPs across cells in a set.
* Method 2 (by QC): configure single-cell colmun per BWP per cell, and the indicated DCI code-point is interpreted per cell.
* Method 3 (by HW): configure only one multi-cell joint table, and the entries within the table are interpreted based on current active BWPs per cell

We are open to discuss the methods, but would like to clarify:* Whether the method is distinguished from Type 1A field interpretation
* How to handle the cell(s) not configured with dynamic BWP indicator
 |
| NTT DOCOMO (as MCE WI rapporteur) | Thanks again for further reviewing and feedbacks!I’m sorry that I should not make a row as stable before your checking on updates. For next version v003, only rows with no comments (or only OK comments) and/or with error correction (e.g., removing unnecessary RAN1 spec) are to be marked as stable.* **Row 2**: Regarding Nokia’s previous comment that this parameter should be configured in *PhysicalCellGroupConfig* and in such case up to 8 sets can be configured in the list, there are comments from Qualcomm, Huawei and Ericsson that the current structure (this parameter is in *ServingCellConfig* of scheduling cell) is preferred. So, I’d like to ask Nokia (and other companies) to check if current structure is acceptable.
* **Row 4**: Huawei kindly pointed that current 38.212 CR does not refer this parameter and hence it can be removed.
* **Row 5**: Regarding n\_CI value range, Qualcomm, vivo, Huawei and Ericsson commented that 0...7 is preferred. I’d like to ask companies to check if it is acceptable.
* **Row 6/7**: Regarding whether size of the lists can include 1 or not, Nokia, Qualcomm and Huawei commented it would not be necessary, while Apple and vivo commented that 1 can be included (Apple also commented they can live without 1, and vivo actually commented for row 30/32 that “the size of a cell set should be no smaller than 2“). Based on the feedbacks so far, it seems there is no strong need to have 1 and hence I’d like to ask vivo (and other companies) to check if current size (2...4) is acceptable. Regarding the LGE’s suggestion on ordering of cells in the lists, LGE kindly provided updated texts to address Qualcomm’s question, and Huawei agrees with LGE’s updated texts. Regarding Nokia’s previous comment on potential another structure based on bitmap, there has been no comment from other companies i.e., no concern on current structure. So, I’d like to ask Qualcomm/Nokia (and other companies) to check if updated rows 6/7 are acceptable.
* **Row 10**: There is a suggestion from Huawei that the parameter name should be “TPMI-DCI0-3“ as TPMI is used in 38.212. I’d like to ask companies to check if it is acceptable.
* **Row 25-27/39,40,43/41,42,45**: There is a suggestion from Nokia that the parameter name for row 26 should be “ScheduledCellCombo“ as parameter may be used for only one of DCI formats 0\_3/1\_3, and Huawei agrees with Nokia’s suggestion. Probably similar change can be applied to row 39-45. I’d like to ask companies to check if it is acceptable.
* **Row 29-46**: Regarding joint table for type-1B fields, there are multiple different views with some potential approaches as below.
	+ Alt.1: Single joint table (entries are interpreted based on current active BWPs per cell): Nokia, Huawei
		- Alt.1a: single joint table with increased table size: vivo
	+ Alt.2: Configure up to 4 joint tables (each of the tables is associated with BWP ID or BWP indicator value): ZTE, [Qualcomm], vivo, Ericsson
	+ Alt.3: Configure each column in each BWP of each cell, and DCI codepoint is interpreted per cell: Qualcomm

LGE also commented that clarifications on following points would be necessary.* + Whether the method is distinguished from Type 1A field interpretation
	+ How to handle the cell(s) not configured with dynamic BWP indicator

It seems further discussion on this point is necessary, and hence your further feedbacks on above alternatives and questions will be appreciated.* **Row 29/31**: Regarding the size of joint TDRA table, Nokia and Huawei commented that 64 rows are necessary,while Qualcomm commented that it is preferred to keep the existing TDRA table size. Further discussion on this point is necessary.
* **Row 30/32**: Regarding the value range of entries in joint TDRA table, Nokia suggested 128, while Qualcomm commented that they are open if such extended range support is optional UE capability (same as single-cell scheduling). Further discussion on this point is necessary.

Regarding the size of entry in joint TDRA table, vivo pointed that the size should be 2...4 as the size of cell set should be no smaller than 2 (which is aligned with row 6/7). In addition, vivo suggested a clarification that “the number of TDRA index in a row of pdsch-TimeDomainResourceAllocationDCI-1-3 should be the same as the number of cells included in ScheduledCell-ListDCI-1-3“ for row 30 and similar changes for row 32. Both of suggested changes would be fine. I’d like to ask companies to check if they are acceptable.* **Row 34/36/38/40**: vivo suggested similar changes as for row 30/32. But different from TDRA table, size of entry in joint table for row 34/36/38 may not be same as number of cells in the set (e.g., if one or some cell in the set is not configured with *RateMatchPattern*). I’d like to ask companies’s views on this point.
* **Row 36/38**: Regarding whether it should be integer or bitstring, LGE commented that it should be integer while Nokia and Huawei commented it should be bitstring. Qualcomm suggested that 38.331 can clarify the integer value is mapped to the codepoint as defined in 38.214 but no strong opinion. It seems further discussion on this point is necessary, and more feedback from companies will be appreciated.
* **Row 40**: Regarding the size of SRS request per cell, LGE asked question that if NUL/SUL flag is omitted, to which carrier the 2-bit is applied for the cell configured with SUL. Huawei suggested that the size should be X and following note should be added.
	+ Note: x is equal to 2 for a cell not configured with supplementaryUplink in ServingCellConfig, and x is equal to 3 for a cell configured with supplementaryUplink in ServingCellConfig

I’d like to ask companies to check if it is acceptable.**Row 47-48**: vivo suggested wording modification that ‘Configure the FDRA type for a co-scheduled cell that can be scheduled by DCI format 1\_3’ and ‘Configure the FDRA type for a co-scheduled cell that can be scheduled by DCI format 0\_3’ to improve clarity. I’d like to ask companies to check if it is acceptable.* **Row 49-56**: vivo suggested wording modification that ‘Configure xxxxxx for ~~the~~ a co-scheduled cell in DCI format 1\_3’ and ‘Configure xxxxxx for ~~the~~ a co-scheduled cell in DCI format 0\_3’. I’d like to ask companies to check if it is acceptable.
* **Row 49/50**: Huawei kindly pointed that current 38.212 CR does not refer this parameter and hence it can be removed.
* **Row 50**: QCM commented that it is OK to delete config1 from the candate value set.
* **Row 53/54**: Regarding ZTE’s previous comment on RV size, Nokia, Qualcomm and Huawei commented that ZTE’s suggested change is not ok and original version (integer (0...2)) is preferred, while Ericsson is ok with ZTE’s suggested change. Further discussion on this point is necessary, and more feedback from companies will be appreciated.
* **Other potential RRC parameters for MC scheduling**: For VRB-to-PRB mapping, PRB bundling size and Frequency hopping flag, Nokia and Huawei commented that motivation to have new RRC parameters is not clear and reusing parameters for DCI format 0\_1/1\_1 would be enough. Nokia also commented for dynamic waveform switching that whether it is type 2 or type 1a. Further discussion is necessary, and more feedback from companies will be appreciated.
* **Row 69**: as there has been no comment, I’d like to make it as stable.
* **Other potential RRC parameters for UL Tx switching**: vivo kindly confirmed that no need to have a row for uplinkTxSwitching-DualUL-TxState in RAN1 RRC parameter list.
 |
| Moderator | **Latest update of RRC list: V002 in** [**Collection of RRC parameters**](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_112b-e/Inbox/drafts/9.18%28Other%29/%5B112b-e-R18-RRC%5D/Collection%20of%20RRC%20parameters/draft_Rel-18_higher_layers_parameters_list%20-%20v001.xlsx)**Status report from Rapporteure:*** See comments above from Rapporteure(DCM) for continuation of discussions.
 |
| Spreadtrum | * **Row 2**: this parameter in the current structure (this parameter is in *ServingCellConfig* of scheduling cell) is preferred, to avoid the additonal association/configuration of the scheduling cell. Up to 4 sets can be configured in the list.
* **Row 4**: Keep it. 212 should add this parameter.
* **Row 5**: 0...7 is preferred
* **Row 6/7**: Not include 1. According to ordering, we agree with LG that cells are ordered according to an ascending order of a serving cell index.
* **Row 25-27/39,40,43/41,42,45**: Fine with Nokia’s suggestion
* **Row 29-46**: For the number of TDRA table, Alt 3 has the most flexibility. But Rel-18 only support same BWP ID across all co-scheudled cells, Alt 2 seems enough, due to there are no different BWP combinations, the benifit of Alt3 seems not so much. We are fine with Alt 1 or Alt 2. If Alt 1 applies, 64 rows is preferred to give TDRA flexiblity for scheduling.
* **Row 30/32/34/36/38/40**: According to the size of entry in a Type-1B joint table row, same as number of cells in the set or can be less than the number of cells in the set, we prefer same configuration applied for each Type-1B field. Actually, the Time domain resource assignment can be 0 when there is only one row in the legacy TDRA table, in this case, no need to have separate entry for this cell. The other fields also face the same situation, as vivo commented. The difference is a list/code point is used for TDRA table which can have a value configured for the cell, but rate matching is bitmap which does not have any valid value. Thus “the order of xxx in each row refers the order of cells in ScheduledCell-ListDCI-x-3” can only applies to list/code point configuration, such as TDRA, ZP-CSI-RS trigger, etc. but it cannot apply to bitmap configuration, such as rate matching. An easy way is to have a “the order of xxx in each row refers the order of cells in ScheduledCell-ListDCI-x-3 which have Rate matching indicator field”
* **Row 36/38**: Both can work, integer or bitstring.
* **Row 49/50**: New parameter, they are needed.
* **Row 53/54**: We support original version.
* **Other potential RRC parameters for MC scheduling**: We also think new RRC parameters for VRB-to-PRB mapping, PRB bundling size and Frequency hopping flag do not neccesary. Dynamic waveform switching also does not need.
 |
| Qualcomm | Thanks, Moderator for the update. Here are a couple of additional comments.**Comment 1: Row 6/7 vs row 25/26:**Sorry for causing the confusion on inclusion of ‘1’. Our intention was following:* The number of entries in the table size for co-scheduled cells indicator should be more than 1. So, 1 should not be included.
* An entry of the table for co-scheduled cells indicator should be able to be 1. So, 1 should be included.

The reason of the above 1st bullet is the following highlight in the RAN1 agreement. Indeed, we do not see a rationale of enabling the table with one entry. We have commented the same point to 212 draft CR discussion.

|  |
| --- |
| **Agreement**For a set of cells which is configured for multi-cell scheduling using DCI format 0\_X and DCI format 1\_X, support the following: * If table defining combinations of co-scheduled cells for the set of cells is configured,
	+ an indicator in the DCI is included and points to one row of the table.
	+ The table is configured by RRC signaling for the set of cells.
		- Separate tables are configured for downlink scheduling and uplink scheduling
	+ The size of the indicator is equal to ceil(log2(N)), where N is the number of rows in the table.
	+ The max number of rows in the table is 16
 |

Our suggestion should be following (sorry for confusion by the previous comments)* **Row 25/26: SEQUENCE (SIZE (2~~1~~..16)) OF SchedulledCellCombo**

**Comment 2: Row 5/6 descriptions**Agree with Huawei that of course the order in 212 is ascending order according to the serving cell indexes. We prefer the same here in Row 5/6, which is not clear from LGE’s text. Probably we can do following:* **Configure the list of possible co-scheduled cells in the set for DL scheduling via DCI fomat 1\_3, where the order of cells in the list is ascending order of ~~configured based on~~ serving cell indexes, and the serving cells in the list are mapped ~~order is used~~ to index {0, 1, 2, 3} ~~cells~~ in the set ~~{0, 1, 2, 3}~~**

**Comment 3: Row 29-46 structure**Many companies (in UE feature discussion) mentioned that multi-cell scheduling should not be worse than single-cell scheduling. Alt.1 clearly degrades the flexibility of multi-cell scheduling compared to single-cell scheduling and hence should not be taken. For Alt.2, it is quite unclear how the UE behavior should look like, and clarification from proponent is appreciated. Consider a UE is configured with two BWPs in each of the four cells in a set. If the BWP switch is indicated by the MC-DCI, the UE switches active BWP of all the 4 cells. This is OK. But if the UE monitors MC-DCI for the set and also SC-DCIs for each cell of the set, and if a SC-DCI indicate BWP switch of one cell in the set, how the UE identifies the parameters of Type-1B fields of the MC-DCI for the set? Simple approach could be, a SC-DCI indicating BWP switch of one cell in the set triggers BWP switch of all the cells in the set. However, this is not just RRC parameter issue – would require RAN1 spec change.Alt.3 surely works and is the same as legacy RRC configuration structure. However, this requires a bit larger changes in the excel sheet. We are open to the other options as long as feasible, but at least, we do not think Alt.1 should be taken and are not sure how Alt.2 works.**Comment 4: Row 29-32 TDRA table size/range**Since there has been no associated agreement, TDRA table size/range for single-cell scheduling must be the baseline. We are open to discuss potential extension with associated optional UE capability in the maintenance phase.**Comment 5: Row 30-31 number of TDRA indexes in a row vs number of cells in a set**Regarding the update (suggested by vivo), we consider this is not necessary. For example, a set has cell-1 and cell-2. For a MC-DCI that schedules only cell-1, it does not need to point a valid TDRA index for cell-2. Therefore, the number of TDRA indexes in each row can be different. When a cell is scheduled by a MC-DCI (indicated by co-scheduled cell indicator or FDRA), the field shall point to an entry having valid TDRA index.With this, we suggest to update as follows.* **~~.. and the number of TDRA index in a row of pdsch-TimeDomainResourceAllocationDCI-1-3 should be the same as the number of cells included in ScheduledCell-ListDCI-1-3.~~ An entry of a row corresponding to a cell that is actually (co-)scheduled by a DCI format 1\_3 should have a valid TDRA index.**

**Comment 6: Row 47-48, 49-56**The parameters are for DCI 1\_3/0\_3, not for each cell that can be scheduled by DCI 1\_3/0\_3. Anyway all these parameters are under BWP configuration of each cell. So, we think the previous wording is correct. |
| Vivo3 | * **Row 6/7:** current size (2...4) is acceptable to us.
* **Row 25-27/39,40,43/41,42,45:** the latest changes are ok
* **Row 29-46**: Alt3 seems to go against the following agreements.

**Agreement**For a set of cells configured for multi-cell scheduling using DCI format 0\_X/1\_X, * the size of a Type-1A field in the DCI format 0\_X/1\_X is determined as maximum field size of active BWP among all cells within the set of cells.
* the size of a Type-1B field in the DCI format 0\_X/1\_X is equal to ceiling(log2(N)), where N is the number of rows in RRC-configured table with each row containing multiple indexes for all cells within the set of cells.
	+ The Type-1B field indicates one row of the configured table
	+ The Type-1B index for a cell points to a corresponding index in a RRC configured table applicable for DCI format 0\_1/1\_1 or MAC CE activated values.
* the size of a per cell Type-2 field in the DCI format 0\_X/1\_X is determined based on active BWP for each cell.

Regarding the two questions from LG* Whether the method is distinguished from Type 1A field interpretation
	+ As the current concerns mainly revolve around the flexibility of Type 1B (joint indication), we believe that this method is only applicable to Type 1B. Type1A is used for the parameters without flexibility concerns.
* How to handle the cell(s) not configured with dynamic BWP indicator
	+ For a cell configured with initial BWP only or configured without the BWP corresponding to the value indicated by the dynamic BWP indicator, the understanding is that the dynamic BWP indicator is not applied/ignored. Alt2 may need to be revised as: configure up to 5 joint tables (each of the tables is associated with BWP ID ~~or BWP indicator value~~) as a separate table for initial BWP with BWP-ID=0 is needed. When mc-DCI indicates BWP with BWP-ID=2, for the cell without a BWP with BWP-ID=2, the table associated with the current active BWP is used.
* Alt.1: Single joint table (entries are interpreted based on current active BWPs per cell): Nokia, Huawei
	+ Alt.1a: single joint table with increased table size: vivo
* Alt.2: Configure up to 5 joint tables (each of the tables is associated with BWP ID ~~or BWP indicator value~~): ZTE, [Qualcomm], vivo, Ericsson
* Alt.3: Configure each column in each BWP of each cell, and DCI codepoint is interpreted per cell: Qualcomm
* Alt3 may have the largest overhead
* **Row 34/36/38/40, change [1..4] to [2...4], and** **clarifications, e.g., ‘the number of xxxx in a row of xxxx should be the same as the number of cells included in ScheduledCell-ListDCI-1-3’:** Thanks rapporteur for the reply. The configurations of these Type1B fields are per BWP provided, according to the below agreement ‘each row containing multiple indexes for all cells’ for type1B, the number of columns of the joint table is the same as the cell size so that the mapping order between cells and the columns in the table does not change with BWP switching. We think the rapporteur ‘s explanation also makes sense, the number of columns can be set to the maximum number of active BWPs with the corresponding parameters configurations among all cell combinations in the cell of sets, which can be 1 if there is up to only one cell configured with these fields on its active BWP. However, if we adopt this approach, the mapping order between cells and columns could potentially change after BWP switching. e.g., the table has two columns, switches from cell#1 BWP1(has rate matching config)+cell2 BWP #1(no rate matching config)+cell#3 BWP 1(has rate matching config)-> cell#1 BWP 2(has rate matching config)+ cell#2 BWP 2(has rate matching config)+ cell#3 BWP 2(no rate matching config). It works but we would like to align the field design with the existing agreements. A similar change is also necessary for the row42 SRS offset, which falls under Type 1B

**Agreement**For a set of cells configured for multi-cell scheduling using DCI format 0\_X/1\_X, * the size of a Type-1A field in the DCI format 0\_X/1\_X is determined as maximum field size of active BWP among all cells within the set of cells.
* the size of a Type-1B field in the DCI format 0\_X/1\_X is equal to ceiling(log2(N)), where N is the number of rows in RRC-configured table with each row containing multiple indexes for all cells within the set of cells.
	+ The Type-1B field indicates one row of the configured table
	+ The Type-1B index for a cell points to a corresponding index in a RRC configured table applicable for DCI format 0\_1/1\_1 or MAC CE activated values.
* the size of a per cell Type-2 field in the DCI format 0\_X/1\_X is determined based on active BWP for each cell.
* **Dynamic waveform indication**
	+ **@Nokia, NSB:** thank you for the comments, we think if dynamic waveform indication is agreed to be present in DCI format 0-3, it can be either type2 or configurable between (type1A and type2). Our first preference is type-2, as there is no need to restrict all the co-scheduled cells to using the same waveform. But if companies have concerns about the signalling overhead for type-2, we think it can be configurable between type-2 and type-1A. For example, for inter-band CA, it can be type2, while for intra-band CA where the CCs are likely to be continuous on frequency domain or share similar channel conditions, it can be type1A.
	+ **@ Spreadtrum:** thank you for your comments. We would like to explain that the discussion on RRC parameters for dynamic waveform switching here is distinct from the question of whether to introduce the new parameters for VRB-to-PRB mapping, PRB bundling size, and Frequency hopping flag. Our proposal is to support switching the waveform of co-scheduled cells dynamically by DCI format 0-3 and introduces a parameter to configure the presence of a dynamic waveform indicator in DCI format 0-3. In our understanding, this field can be type-2. In terms of configuring the dynamic waveform indicator on a per-cell basis (e.g., whether a cell supports dynamic waveform switching or not), we suggest reusing the corresponding RRC design in CovEhn, and the per-cell PHR reporting is reused and does not need to be changed.

**Proposal 1. The inclusion of dynamic waveform indication in DCI format 0\_X is supported and can be configurable**.**Proposal 2. For dynamic waveform indication(if supported)in DCI format 0\_X , it is Type-2.**If companies have concerns about the type, the field can be configurable between type-2(at least for inter-band CA) and type-1A. |
| Ericsson2 (for MC-DCI) | We have one comment related to row 29-46:* Row 29-46: As per our earlier comment (“*configuring of the needed information (that is looked up based on the joint index) in the respective BWP of respective cell*”), our preference is towards Option 3- apologies if that was not clear.
 |
| Nokia / NSB(for MC-DCI) | Many thanks for the further good updates by the MCE moderator**rows 25 / 27**: In contrast to QC, we are fine with the current value size of the ‘scheduled cell indicator table’ ranging from {1...16}. There could be just a single entry (e.g. for 2 CA, where always both cells are scheduled, and legacy /SC-DCI used for single cell scheduling.**Rows 29-32 – TDRA RRC parameter names & description**: Looking the 38.212 & 38.214 disussions, there seems to be some confusion on the applicable TDRA table and how this is defined. Some of the confusion may be coming from the fact, that actually we say here the TDRA table is configured here, which is actually not true as we don’t configure the SLIVs there but only the list of ‘TDRA field values” in DCI formats 0\_3 and 1\_3. So maybe we should not talk about pusch/pdsch time domain resource allocation, but about ‘TDRA field values here instead’. Example shown for 1\_3 below (same could be applied for 0\_3).

|  |  |
| --- | --- |
| ~~pdsch-TimeDomainResourceAllocation~~TDRAfieldindexListDCI-1-3 | Configure joint TDRA field table for DL scheduling via DCI format 1\_3 |
| ~~pdsch-TimeDomainResourceAllocatio~~nTDRAfieldindexDCI-1-3 | Configure each row of the joint TDRA field table for DL scheduling via DCI format 1\_3 containing the applicable TDRA field indexes for multiple cells, where the TDRA index for a cell points to a corresponding TDRA in the TDRA table applicable for DCI format 1-1, the order of TDRA index in each row refers the order of cells in ScheduledCell-ListDCI-1-3 (i.e., first TDRA index is for the first cell in ScheduledCell-ListDCI-1-3 and so on), and the number of TDRA index in a row of pdsch-TimeDomainResourceAllocationDCI-1-3 should be the same as the number of cells included in ScheduledCell-ListDCI-1-3 |

**Rows 29-32 – TDRA list size & value range** * Rows 32 value range: As commented earlier, on the value range for 0\_3 TDRA values, we think the value range supported in Rel-16 (i.e. *maxNrofUL-Allocations-r16*) should be supported. We support for all the other RRC parameters also the R16 or even R17 value ranges (e.g. number of HARQ processes) – so think also here the R16 value range of up to 64 instead of up to 16 should be supported. If we don’t do this here, we would like to also question why we then support the 5bit HPN field size which is not there in R15 either...
* Rows 29 & 31 – list size: For the other ‘Type 1B’ fields we support larger table size compared to the value range (e.g. rate-match: up to 16 entries – with value range 0...3, ...) and especially the TDRA (which we see the most critical of the Type 1B fields) we would not have more rows than the value range for a single cell. We think this should be increased correspondingly:
	+ For 1\_3/PDSCH: 64 rows (for the value range 0...15)
	+ For 0\_3/PUSCH: 128 or 256 rows (for the value range of 0...63)
* BWP specific entries: as said before, we don’t think that this will be needed here (and has not been agreed).

**Rows 34 / 36 / 38 / 40 / 42 – number of cells should start from 2 (as also vivo commented)*** As it seems to be now more stable that the list of cells would at least contain 2 cells, the same change (as done for TDRA) should also be done here: *SEQUENCE (SIZE (2~~1~~..4)) OF ...*

**Rows 53 / 54 – only field size configurable:** As commented already earlier, we think only the number of bits is to be configured (as for 0\_2/1\_2) as we only agreed to configure the size of the bit field only (but not any new mapping procedure). Therefore, this should be {0,1,2} bit only. Having any additional functionality would require some separate agreement – which we clearly would not support here.  |

### 2.1.4 MIMO (WI code: NR\_MIMO\_evo\_DL\_UL)

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| **If you have any comment for a row in the Sheet corresponding to this WI, please provide your comment below by indicating the Row number.**  |
| **Company** | **Comment** |
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### 2.1.5 SL (WI code: NR\_SL\_enh2)

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| **If you have any comment for a row in the Sheet corresponding to this WI, please provide your comment below by indicating the Row number.**  |
| **Company** | **Comment** |
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### 2.1.6 POS (WI code: NR\_pos\_enh2)

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| **If you have any comment for a row in the Sheet corresponding to this WI, please provide your comment below by indicating the Row number.**  |
| **Company** | **Comment** |
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### 2.1.7 RedCap (WI code: NR\_redcap\_enh)

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| **If you have any comment for a row in the Sheet corresponding to this WI, please provide your comment below by indicating the Row number.**  |
| **Company** | **Comment** |
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### 2.1.8 NES (WI code: Netw\_Energy\_NR)

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| **If you have any comment for a row in the Sheet corresponding to this WI, please provide your comment below by indicating the Row number.**  |
| **Company** | **Comment** |
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### 2.1.9 CovEnh (WI code: NR\_cov\_enh2)

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| **If you have any comment for a row in the Sheet corresponding to this WI, please provide your comment below by indicating the Row number.**  |
| **Company** | **Comment** |
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### 2.1.10 UAV (WI code:NR\_UAV)

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| **If you have any comment for a row in the Sheet corresponding to this WI, please provide your comment below by indicating the Row number.**  |
| **Company** | **Comment** |
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### 2.1.11 XR (WI code: NR\_XR\_enh-Core)

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| **If you have any comment for a row in the Sheet corresponding to this WI, please provide your comment below by indicating the Row number.**  |
| **Company** | **Comment** |
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### 2.1.12 Mobility (WI code: NR\_Mob\_enh2)

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| **If you have any comment for a row in the Sheet corresponding to this WI, please provide your comment below by indicating the Row number.**  |
| **Company** | **Comment** |
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### 2.1.13 FR1<5MHz (WI code: NR\_FR1\_lessthan\_5MHz\_BW)

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| **If you have any comment for a row in the Sheet corresponding to this WI, please provide your comment below by indicating the Row number.**  |
| **Company** | **Comment** |
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### 2.1.14 BWP w/out Restriction (WI code: BWP\_wor)

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| **Please see [4] for information provided by Rapporteur/Moderator of this WI.** **If you have any comment for a row in the Sheet corresponding to this WI, please provide your comment below by indicating the Row number.**  |
| **Company** | **Comment** |
| vivo | In the current excel sheet, only one RRC parameter which is related to Option C (i.e. NCD-SSB based measurement) is provided. We would like to raise the issue how the other two options (Option B-1-1 and B-1-2) are enabled for Rel-18 UEs. It also has dependency on the UE feature design, for example if it is allowed for a Rel-18 UE to indicate support for both Option B-1-1 and B-1-2, an explicit RRC configuration to selet between the two options will be needed. Even if the UE feature session decides to not allow a Rel-18 UE to indicate support for both Option B-1-1 and B-1-2, it would be good to reach common understanding on how to enable Option B-1-1 or B-1-2 for a given UE, and whether implicit manner would be sufficient. As one example, if a UE is capable of B-1-1 or B-1-2, if no SSB is provided in the active BWP, the UE assumes the network intention is to enable B-1-1 or B-1-2. This might work but such implicit metiond is not aligned with the RAN2 principle as expressed in their previous LS to RAN1 (R2-2002378) which discourage to design such implicit method.

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|  **5 Avoid defining functionality that has no RRC configuration but is dependent on capability bits.**The specification should not be written so that the network determines what configuration it can use for a UE implicitly by the reported UE capabilities. Instead, the gNB should always configure the UE explicitly by DL RRC signalling, respecting the reported capabilities. A problematic case in Rel-15 was the UL/DL MIMO layers, which resulted in a late-stage introduction of explicit MIMO signalling support by RAN2 (maxLayersMIMO-Indication).  |

Furthermore, similar discussion is now happening [112bis-e-AI7.1-10] to address the problem due to no explicit enable/disable of “receiving more than one PDSCH per slot” for UE.We would like to hear companies view on the above raised issues. Thanks.  |
| NTT DOCOMO | **Row 2 (nonCellDefiningSSB)**: We are fine to keep it as it also describes that “up to RAN2 to decide whether to reuse existing parameter”. |
| Intel | We share the view from vivo that for the other two features (FG 53-1 and 53-2 correspondig to Options B-1-1 and B-1-2 respectively), there should be higher layer parameters to enable it from the perspective of the gNB. This is in context of prior guidance received from RAN2 during Rel-15 late drop and is necessary regardless of whether a UE may report support of only one or both of FG 53-1 and 53-2. Thus, in addition to the higher layer parameter for NCD-SSB **in Row 2,** we would like to suggest adding two more higher layer UE-specific parameters to enable Options B-1-1 and B-1-2 on a per BWP basis. |
| Vodafone | Thank you all for your feedback.From the comments that were received, it seems that the first row is stable (related to Option C in the WID), and there were two comments from vivo and Intel suggesting to include two additional parameters for Options B-1-1 and B-1-2 to align with a RAN2 principle.I have uploaded a v002 document on the Rapporteur folder with the following updates:* Updating Row 2 “Status” Column from “Unstable” to “Stable”
* Adding Row 3 (Option B-1-1) and Row 4 (Option B-1-2) for further discussion

Please continue the discussion based on the updated list. |
| Vodafone | No comments were received during this round. I have uploaded v003 on the Rapporteur folder with the following update* Updating Row 3 and Row 4 “Status” Columns from “Unstable” to “Stable”
 |
| Moderator | **Latest update of RRC list: V002 in** [**Collection of RRC parameters**](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_112b-e/Inbox/drafts/9.18%28Other%29/%5B112b-e-R18-RRC%5D/Collection%20of%20RRC%20parameters/draft_Rel-18_higher_layers_parameters_list%20-%20v001.xlsx)**Status report from Rapporteure:**No comments were received during this round. I have uploaded v003 on the Rapporteur folder with the following update* Updating Row 3 and Row 4 “Status” Columns from “Unstable” to “Stable”
 |
| Qualcomm | Thanks moderator for the updates. Sorry for the late response to the updated sheet.On Row 3 and Row 4, it is a bit unclear whether they are really necessary. Everything for Option B-1-1 or B-1-2 (e.g., RLM, BM, BFD, BWP configurations) is based on the corresponding RRC configurations. Based on the UE reported capability signalling, the network configures these parameters accordingly. So, it is not clear what/how the Row 3/4 helps. |
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### 2.1.15 NR-NTN (WI code: NR\_NTN\_enh)

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| **If you have any comment for a row in the Sheet corresponding to this WI, please provide your comment below by indicating the Row number.**  |
| **Company** | **Comment** |
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### 2.1.16 IoT-NTN (WI code: IoT\_NTN\_enh)

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| **If you have any comment for a row in the Sheet corresponding to this WI, please provide your comment below by indicating the Row number.**  |
| **Company** | **Comment** |
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### 2.1.17 TEI (WI code: TEI18)

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| **Please see [5] for information provided by Moderator of this TEI.** **If you have any comment for a row in the Sheet corresponding to this WI, please provide your comment below by indicating the Row number.**  |
| **Company** | **Comment** |
| Moderator | **Status and comment from TEI Moderator (Chuangxin -ZTE):*** Regarding RRC parameter on TEI for 1-symbol PRS ,so far it seems no comments from companies. However, I noticed RAN2/RAN3 will discuss their draft CRs with those RRC parameters, it is expected RAN3 CRs will be approved very soon. So, I think we can postpone the discussion this week and see if RAN2/RAN3 can have the conclusions.
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## 2.2 Draft LS to RAN2 on RRC parameters

A draft for LS to RAN2 is provided and available at folder [Draft LS](https://www.3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_112b-e/Inbox/drafts/9.18%28Other%29/%5B112b-e-R18-RRC%5D/Draft%20LS). Please provide your comments, if any, on the **latest version of draft LS**.

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| **Company** | **Comment** |
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## 2.3 Improve RRC parameters preparation activity

Please consider this section to share your questions, comments and suggestions that could help to further improve our WoW within RAN1, as well as inter-action with RAN2 with respect to RRC parameter preparation. The more we know, the more we can improve. Thank You!

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| **Company** | **Comment** |
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# 3 Conclusion

TBD

# 4 References

1. R1-2303292 Discussion on the higher layer parameters for NCR; Rapporteur (ZTE)
2. R1-2303765 Initial higher layer parameter list for Rel18 DSS Enhancements WI; WI Rapporteur (Ericsson)
3. R1-2303739 Draft RAN1 higher layer parameters list for Rel-18 Multi-carrier enhancements for NR; NTT DOCOMO, INC.
4. R1-2303383 Preliminary Higher Layer Parameters list for BWP Without Restriction for Rel-18 NR; Vodafone Italia SpA, vivo
5. R1-2303284 On the agreed TEI proposal of 1-symbol PRS; ZTE
6. R1-2202913 Recommendations for RAN1 RRC Parameter Preparation; Moderator (Ericsson)

# 5 Appendix

The following WoW is based on the approach used in Rel-17 for coordination to prepare the RRC parameter list. The examples below are based on activities during **RAN1#112bis-e.** The same approach is going to be used in RAN1 meetings in Rel-18.

The description below is structured as the following:

* First, the structure of the folders are explained.
* Then, WoW procedures are explained in three steps.
* Finally, the instructions for updating the list at each step are explained at the end.

## 5.1 Folders Structure

The following folders are created under draft folder created in RAN1#112bis-e:

|  |
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| * **9.18 (Other)**
	+ **[112b-e-R18-RRC]**
		- **Information and Instructions**
		- **Collection of RRC parameters**
		- **Draft LS**
		- **Final output**
		- **ForRapporteursUseOnly**
			* **[112b-e-R18-RRC-NCR]**
			* **[112b-e-R18-RRC-eDSS]**
			* **[112b-e-R18-RRC-MCE]**
			* **[112b-e-R18-RRC-BWPwoRestriction]**
			* **[112b-e-R18-RRC-TEI]**
 |

The following folders are updated only by Over-all Rel-18 RRC moderator (e.g., [112bis-e-R18-RRC-01] (Ericsson (Sorour)).

* **Information and Instructions**
	+ This folder includes this document. As well as information about WI and Rapporteurs, and the template for RRC list.
* **Collection of RRC parameters**
	+ This folder is used to update and share the updated overall RRC parameter list.
* **Draft LS**
	+ This folder is used for sharing and reviewing the draft LS.
* **Final output**
	+ This folder is used to share the submitted tdocs as the outcome for this meeting.

The following folder is updated **only** by WI Rapporteur/Moderator for updating the RRC parameter list. A folder is dedicated to each WI Rapporteur/Moderator.

* **ForRapporteursUseOnly**
	+ **[112b-e-R18-RRC-NCR]**
	+ **[112b-e-R18-RRC-eDSS]**
	+ **[112b-e-R18-RRC-MCE]**
	+ **[112b-e-R18-RRC-BWPwoRestriction]**
	+ **[112b-e-R18-RRC-TEI]**
	+ **….**

The Main folder will be used for delegates’ review of the Consolidated higher layer parameters.

* **[112b-e-R18-RRC]**
	+ The Summary document for review will be provided **in this folder** to facilitate exchange views and discussions.

## 5.2 Procedures for updating the RRC list

The procedures include three steps as explained below, using the instructions for marking stable/unstable and using color-coding in the next section.

### 5.2.1 Initial step (Initial RRC list to kick-out activity):

* An Excel sheet with v000 in Collection of RRC parameters is provided by Sorour.
	+ For example: draft\_Rel-18\_higher\_layer\_parameters\_list\_v000.xls
	+ Note: In case of revision, Sorour announces the latest version to be used.
* The WI Rapporteur uses V000 (or later revision if announced) and applies the updates in the RRC parameter list, if any.
* The WI Rapporteur uses the updated RRC parameter list for submission to the meeting.
* The WI Rapporteur uploads the submitted RRC parameter list in the respective WI RRC folder as V000.
* For convenience, please include the corresponding label for the WI in Excel sheet.
	+ For example: higher\_layer\_parameters\_NCR\_v000.xls in folder [112b-e-R18-RRC-NCR]
* Note: Please see the instructions in section 5.3 for how to mark stable/unstable and use color-coding.

### 5.2.2 Intermediate step (Update and review process of RRC list):

* Review per WI phase:
	+ The WI Rapporteur has full freedom to use the dedicated WI folder for any update of the corresponding RRC parameter list based on the discussion during the meeting.
* Over-all review phase:
	+ The WI Rapporteur informs Sorour the files that Sorour can use to update the existing file in Collection of RRC parameters to the next version.
		- For example: higher\_layer\_parameters\_NCR\_v015.xls
	+ Sorour updates the overall RRC parameter list with the updates received from the WI Rapporteurs and kicks off the over-all RRC list review.
		- For example: draft\_higher\_layer\_parameters\_v001.xls
* All delegates can review and further updates are applied to the list, if needed using [112b-e-R18-RRC] folder.
	+ The WI Rapporteur can provide additional updates if needed during this step, for example based on the comments received during the review process.
		- The WI Rapporteur can use the dedicated folder, similarly to Intermediate Step, and inform Sorour on the needed updates. The best way is to create a new version that can REPLACE the old version.
		- Note: It is crucial that Sorour and WI Rapporteurs coordinate tightly to remain in sync and avoid any inconsistently in the list.
	+ Note: Sorour consults WI Rapporteur to apply technical changes.
* Note: Please see the instructions in section 5.3 for how to mark stable/unstable and use color-coding.

### 5.2.3 Final step (LS and backlog RRC list):

* When the review is completed, Sorour uses the latest version in Collection of RRC parameters.
	+ For example: draft\_higher\_layer\_parameters\_v005.xls
* Sorour provides two files of the latest RRC parameter list:
	+ **Backlog-list:**
		- This list, includes the entries in ALL rows and will be submitted to RAN1 as backlog.
		- For example: Backlog-list = draft\_higher\_layer\_parameters\_v005.xls
	+ **Output-list:**
		- This list, includes only entries in rows that are STABLE and can be sent to RAN2/RAN3. If this list is endorsed by Chair, a draft LS in Draft LS folder is prepared by Sorour to be reviewed for sending the RRC list to RAN2/RAN3.
	+ Note: Output-list is sub-set of Backlog-list. Output-list is RAN1 official output. Backlog-list is RAN1 backlog for continuation of work, if needed.
* **Sorour submits the following from Final Output folder:**
	+ LS including Output-list (Official output to RAN2/RAN3)
	+ Backlog-list (For RAN1 use only)
	+ Summary of discussion (For information)
* This Backlog-list is used in the next meeting as “The Excel sheet with v000 in Collection of RRC parameters to be provided by Sorour” for the Initial Step.
* Note: Please see the instructions in section 5.3 for how to mark stable/unstable and use color-coding.

## 5.3 Instructions for updating the entries in the RRC list:

The description below is based on the approach used in Rel-17 is used for coordination and regular update of RRC parameter list:

**Important note:** Please consider the Recommendation guidelines provided in [R1-2202913](http://3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_108-e/Docs/R1-2202913.zip).

It is beneficial to consider only stable (not necessarily complete) RRC parameters in the LS to RAN2/RAN3 (please see motivations in [R1-2202913](http://3gpp.org/ftp/tsg_ran/WG1_RL1/TSGR1_108-e/Docs/R1-2202913.zip)). The remaining RRC parameters can be discussed further in RAN1 at the next meetings to be included in the earliest LS to RAN2/RAN3, when identified as stable.

**Hence, the following stable/unstable marking approach is used similarly to Rel-17:**

### 5.3.1 How to mark Stable/Unstable

* For each sheet dedicated to a WI RRC parameter list, a column at the end of the list is included for “Status”. This column is used to identify whether the content of a row in the list is stable or not by using {stable, unstable}, respectively.
	+ This column is for RAN1 information only and will not be included in the Output-list for LS to RAN2/RAN3.
* The Output-list for LS to RAN2/RAN3 includes Only the rows that are indicated as “stable”.
* The Backlog-list contains all rows and columns, including Rows indicated as unstable and the Status column, for discussion in next RAN1 meeting.
	+ The unstable rows will be discussed further in RAN1 at the next meetings to be included in the earliest LS to RAN2/RAN3 when stable.

**Important note:** Proper color-coding is crucial to properly indicate to RAN2/RAN3 the changes in the list as compared to previous version. The basic principle is as the following:

When an LS is sent to RAN2/RAN3 using the Output-list:

* The updates in the Output-list as compared to the previous lists sent to RAN2/RAN3 are shown with **blue**.
* The unchanged part of the Output-list as compared to the previous lists sent to RAN2/RAN3 are shown with **black**.

**Hence, the following color-coding approach is used similarly to Rel-17:**

### 5.3.2 How to use color coding

* **In Initial step:**
	+ Sorour: draft\_higher\_layer\_parameters\_v000.xls is based on Backlog-list from previous meeting, if any. Note that Backlog-list includes Output-list, if any.
		- All rows corresponding to Output-list in the previous LS if any, are shown in **black.**
		- The remaining rows are highlighted in yellow in **a colored font** (preferably **blue**). Note that **black is NOT** used.
	+ WI Rapporteur (e.g. NCR): higher\_layer\_parameters\_NCR\_v000.xls
		- All rows corresponding to Output-list in the previous LS are shown in **black.**
		- The remaining rows are highlighted in yellow in **a colored font** (preferably **blue**). Note that **black is NOT** used.
* **In Intermediate step:**
	+ Any text that was in Initial Step **black** and **remains unchanged**, is shown in **black.**
	+ The remaining texts are shown in **a colored font** (preferably **blue**). Note that **black is NOT** used.
* **In Final Step:**
	+ In Backlog-list, rows identified as stable, use only **black** and **blue** colors without yellow highlight.
		- Any font color except **black** is changed to **blue**.
	+ Then, Output-list is prepared using only stable rows of Backlog-list, with removing the status column.