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
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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)**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. |
| Ericsson | We are **not supporting** the Updated NCR-Proposal 1 v2 above but instead support Option-1 from the previous discussion. The content of the aperiodic indication will vary widely among slots (that’s why it is dynamic), depending on what the slots are used for. For that reason, we think that an explicit indication included in the DCI is advantageous. The alternative would be for the gNB to indicate an erroneous beam in unused fields which is not a prudent specification procedure, in our view. If companies’ are concerned of overhead, this is clearly more so than [4] additional bits for a proper indication. Additionally, we think that the maximum number of beam indications in DCI should be 32 and not 16.Additionally, we have the following comments related to other rows in the RRC table:**13:** We have previously proposed to use both both slots and ms. We do not think this row can be considered as stable since there is no agreement about it.**29:** It would be clearer if we define the range from (0..*maxSlotOffsetAperiodic*) instead of as now, subtracting 1 and increasing *maxSlotOffsetAperiodic* by 1. This is also aligned with made agreements.**43:** Same comment as for 13. |
| ZTE (as rapporteur) | @EricssonAs replied over the reflector, 1. Regarding the updated NCR-proposal 1v2, it seems that the main point from your side is to indicate the actual number of beam via DCI right?". I noticed that some companies thoughts such indication is more for optimization of DCI and require more efforts. Let's try to resolve it in maintenance phase later if supported by majority.  To address your concerns and focus on the RRC relevant discussion, let's go with following updated version, which is aligned with current RRC list.

**Updated NCR-Proposal 1 v3:**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] or [32].~~o   Note: The time resource and beam indication by the corresponding Tmax fields are valid in this DCI.~~1. For the Row#13 and Row#43, i have marked it as stable since no comments have been received in previous round discussion via both email or FL summary.

I understand that your preference, but technically, i'm a bit confused that is there any specific reason to support two set of parameters with different unit to indicate the periodicity. Eventually, this parameter is configured by gNB and the transition between two unit will be implemented.1. For the Row#29, Do you mean that we need to update it as INTEGER(0..maxSlotOffsetAperiodic), with maxSlotOffsetAperiodic = 14?  But as the traditional way in RRC parameter list (38.331), we usually define a maximum value and take maxSlotOffsetAperiodic-1 for the definition of value range. Anyway, if you really have strong preference on this part, we can go with the change.
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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. |
| Samsung | OK to introduce an RRC parameter to enable eDSS with the default being disabled (i.e. Rel-17) if the parameter is not provided.There is no agreement or need requiring introduction of other RRC parameters for eDSS. |
| Vivo2 | @ rapporteur, thank you for the updates. We support to add a new parameter for enabling eDSS but we have a different preference on the parameter value. We think CE option should be provided by the indicator as well. It is also observed that some other companies e.g., Huawei, have a different preference on the values of the enabling indciator. Overall, there are three optionsAlt1.ENUMERATED {'enabled'}: Qualcomm, ZTE, Samsung, [spreadtrum]Alt2.ENUMERATED {‘legacy CE: based on all DMRS symbols’, ‘based on clean symbol only’}: vivo, DCM, [spreadtrum] Alt3. ENUMERATED {‘[PDCCH reception with or without non-overlapping symbol],‘PDCCH reception with at least one non-overlapping symbol only’}: Huawei, HisiliconAs this indicator is also related to the on-going discussion on UE capability reporting, may I suggest including these alternatives as FFS in the list for further discussion at the next meeting? For example:

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| NR\_DSS\_enh | Reception of NR PDCCH candidates overlapping with LTE CRS REs | pdcchCandidateReception-WithCRSOverlap | When configured, UE is required to monitor PDCCH candidates that overlap with LTE CRS RE(s) | ~~ENUMERATED {'enabled'}~~FFS [Alt1.ENUMERATED {'enabled'}: Alt2.ENUMERATED {‘legacy CE: based on all DMRS symbols’, ‘based on clean symbol only’} Alt3. ENUMERATED {‘[PDCCH reception with or without non-overlapping symbol],‘PDCCH reception with at least one non-overlapping symbol only’}] |

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| WI Rapporteur (Ericsson) | Thanks for the comments. It appears that row4 needs more discussion. It is kept as 'unstable' with yellow highlight for now. So, no updates made to v001 of the eDSS RRC parameter draft spreadsheet, and we can continue discussion in next meeting. |

### 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.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 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.  |
| ZTE | Row 2Our proposal is to put the set of the configuration in the parameter *PhysicalCellGroupConfig* since it is includes the configuration for more than one cell. In this case, the serving cell for each set should be configured. However, we understand that there is no need to configures scheduling cell since the scheduling cell is the cell including the configuration of the set. So we are fine with the current structure.Multiple set is configured by means of add and release list. It seems release list is not included and should be added. Row 4It should be kept. It is used to identify a set when a DCI can schedule more than one set or when the gNB release configured set.Row 5We can accept 0...7.Row 6/7We think the current structure is fine. Serving cell index is always used to identify a serving cell. Regarding the size of the list, we think at least two cells should be included since it is for multi-cell scheduling. For the serving cell index order, we think it is an implementation. There may be no need to clarify this in the RRC list. However, we are also fine with the updates since we share the same view that the cell should be configured in the ascending order of the serving cell index.Row 29-46Since the current TDRA table is per BWP, then it should also be per BWP configuration for multi-cell scheduling.For the first question from LG, we think the method is only applied to Type 1B.For the second question from LG, we think the active BWP is always referred to for the cell not configured with dynamic BWP indicator. Row29/31We prefer the number is 16 for downlink and 64 for uplink to improve flexibility. 64 is the maximum rows for uplink in current spec. Row 30/32We also think it should be *maxNrofUL-Allocations-r16*. since it can be configured on top of Rel-16 configuration.We are fine with the changing from 1 to 2 to align with the number of cells in the set that can be configured.Row 36/38I guess there is no difference between bitstring and integer. Anyway, we just needs two bits and how to interpret the two bit refers to the legacy. Our first preference is integer.Row 40/44It should be 2 bits for each cell.Row 47-48Prefer to keep the original wording since it is per cell configuration. Row 49-56Prefer to keep the original wording since it is per cell configuration.Row 49-50They should be kept to indicate the granularity. And the corresponding description is in 38.214.Row 54/54We agree that it is based on DCI 1\_1/0\_1. However, there are two configuration for 1 bit of RV for DCI 0\_1/1\_1. There is no reason to rule out either one. Both should be taken. It should be noted, it does not increase the signaling overhead.Other commentsWe also think a field for indicating presence of dynamic waveform should be included. However, this can be added after the field type for dynamic waveform indication is clarified. |
| LGE | * **Row 5**: Regarding the n\_CI value range, we are fine with {0…7}, and also fine with {0…3} since separate SS sets are configured between DCI 0\_3/1\_3 and legacy DCIs.
* **Row 6/7**: Regarding the ordering of cells in the lists, we are fine with the QC’s updated version.
* **Row 25/27**: Regarding the number of co-scheduled cell combinations, we prefer keeping current SIZE(1…16) considering the case where a set of cells consists of two cells.
* **Row 29-46**: Regarding joint table for type-1B fields, firstly, considering the cell operating with (inactivity) timer based BWP switching, Alt 2 may need to be updated. For example, cells 1/2/3 are with 4 BWPs by DCI based switching and cell 4 is with 2 BWPs by timer based switching, then total 8 tables are to be configured (for 8 combinations of BWPs across cells). With the above update, we prefer Alt 2 or Alt 1 but not Alt 3 since it seems to be Type-1A field where the table is configured per cell and the DCI code-point is interpreted per cell. Regarding QC’s question on Alt 2 “how the UE identifies the parameters of Type-1B fields of the MC-DCI for the set” in above, it may not be an issue since the UE can interpret the table based on the BWP index indicated by the DCI 0\_3/1\_3.
* **Other potential RRC parameters**: Regarding VRB-to-PRB mapping, PRB bundling size and Frequency hopping flag, we share the same view with Nokia and Huwei that reuse of the parameters for DCI 0\_1/1\_1 would be enough. In addition, regarding the dynamic waveform switching, it can be classified as Type-1A field.
 |
| Samsung (for MC-DCI) | [Most of the following comments were included in our input in v023, but lost in the next versions. Submitted again with some updates.]* **Row 2**

Prefer to keep this parameter under *ServingCellConfig* of the scheduling cell as suggested by the Modertaor. If it is moved to *PhysicalCellGroupConfig*, will need an additional parameter *schedulingCellId* (as in *CrossCarrierSchedulingConfig*) to indicate the scheduling cell for each set of cells, or additional specification to clarify the assocaition of search space sets with the sets of cells. Also, suggest to clarify column J as: "Total number of sets of cells configured for a UE is up to 4 per PUCCH group."Regarding the initial comment from Nokia, not clear why there could be an issue for configuring separate search space sets for different sets of cells. The scheduling cell can include configuration for up 8 search spaces sets for monitroing MC-DCI (up to 4 USS sets for DCI 0\_3, one for each set of cells, and up to 4 USS sets for DCI 1\_3, one for each set of cells), and the association is based on search space linking rules agreed in RAN1#111.* **Row 5**

Prefer the original proposal from Moderator for n\_CI value up to 11, according to the following agreement. Since the UE can already use n\_CI values 0-7 for scheduled cells with single-cell scheduling, having unique n\_CI value for each set of cells requires additional values 8-11 to accomodate the up to 4 sets of cells.Agreement (RAN1#112)* Up to N sets of cells can be configured and respectively scheduled by DCI format 0\_X/1\_X from a same scheduling cell.
	+ The value of N is reported as UE capability.
	+ An indicator is included in the DCI to indicate the scheduled set of cells,
		- The size of the indicator is equal to ceil(log2(N)), where N is the number of sets of cells.
	+ Unique n\_CI value is configured for each set of cells.
* **Row 6/7 and Rows 25/26/27**

Several comments:1. **Row 7** **is not needed.** The intended information in rows 6/7 is a list of elements/cells in the set of cells. Per the following agreement, that list of cells is not separate for DL and UL – there is simply a single list of cells in the set of cells applicable for DCI 0\_3 and 1\_3, so row 6 should be updated as *ScheduledCell-ListDCI-0-3-1-3* (or simply *ScheduledCell-List~~DCI-0-3~~*), and row 7 should be removed.

**Agreement (RAN1#112)**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: ... This is already implied by a single row 26 for cell combination that is used for both rows 25 and 27 (list of DL/UL cell combinations) – the indexes 0 to 3 defined as *INTEGER (0..3)* in row 26 refer to the cells defined in row 6 (please see a related comment in bullet 4 below); otherwise two copies of row 26 would have been needed (one for DL and one for UL, i.e., undelete row 28), which is not needed, as proposed in the current RRC list. In fact, if there is an intention to keep row 7, there would be little difference compared to separately configuring DL/UL sets of cells and RAN1 should reconsider the above agreement as separate configuration of DL/UL sets of cells is a cleaner approach. 1. **Potential new parameter (related to rows 6/7):** The Modeartor has included the following agreement as the supporting agreement for rows 6/7. It does not appear that rows 6/7 can capture the intention of this agreement. So, wondering if there is a need to include additional RRC paramters for the maximum number of cells that can be co-scheduled by a DCI format 0\_3/1\_3 from a set of cells.

**Agreement (RAN1#109)*** For a UE, the maximum number of cells scheduled by a DCI format 0\_X can be same or different to the maximum number of cells scheduled by a DCI format 1\_X.
1. **In rows 6/7,** for the size of set of cells, prefer to keep as is, i.e., *SEQUENCE (SIZE (2..4)) OF ServCellIndex* (i.e., not start from value 1). The RAN1 agreement that allows for using DCI 0\_3/1\_3 for single cell scheduling is still valid, since the DCI 0\_3/1\_3 can indicate a cell combination that has only one cell, or FDRA can indicates only one non-resvered value for only one cell from the set of cells. But, having a set of cells with only one cell is redundant, as the legacy SC-DCI can be used for such case.
2. **In rows 26,** the value range for the cell combination is defined as *SEQUENCE (SIZE (1..4)) OF INTEGER (0..3)*. However, it is not clarified that the part *INTEGER (0..3)* refers to the description in Column J of row 6 "*where the order of cells in the list configured based on serving cell index order is used to index cells in the set {0, 1, 2, 3}.*" This should be clarified, for example, by replacing *INTEGER (0..3)* with some explicit IE related to "cell ID in the set" (which may be implied by the word 'configured') or by adding a note/description in row 26 to explain what metric the value *INTEGER (0..3)* rerfers to (or by any other RAN2 signaling techniques to indicate such information). Otherwise, there is no linkage between row 26 and row 6.
3. **For rows 25/27,** regarding QC‘s comment on *SEQUENCE (SIZE (1..16)) OF ScheduledCellCombo* or *SEQUENCE (SIZE (2..16)) OF ScheduledCellCombo*, agree with Nokia that only one cell combination for a set of cells should be supported.
4. **Row 27 Column L:** The DL cell combinations can be the default and re-used for DCI format 0\_3, when necessary. That is, **when row 27 / *ScheduledCellCombo-ListDCI-0-3* is not configrued, the UE can re-use row 25 / *ScheduledCellCombo-ListDCI-1-3* for DCI format 0\_3**. Such description will make sure there is no need for duplicate RRC parameters when same cell combinations apply to both DL and UL.
5. **An editorial suggestion** to move up rows 25-27 next to rows 6-7, for better readability of the RRC list, since the collection of those rows provide a full picture of sceheduling framework for DCI format 0\_3/1\_3 (assuming RAN2 will implement paramerters in the same order as in the RAN1 list).
* **For Row 29-46**

Regarding the three suggested methods/options, Alt-1 seems to be closer to the existing RAN1 agreement. However, it may need further clarification in terms of BWP-specific configurations, e.g., whether it is possible that the table includes "out-of-range" values that are not configured for at least one BWP of a cell from the set of cells. For example, whether it is possible that an entry of the joint TDRA table indicates a row index 19 for cell#1, while the UE is configured a TDRA table with only 16 rows in the active/target BWP of cell#1. If such event is possible, clarification is needed on how the UE interprets / operates based on the provided index. We have raised the issue in our comments for 212/214 CR, and think a RAN1 decision is needed to resolve that issue if above situation is possible. Alt-2/3 consider the BWP-specific aspects to some extent, but seem to be somewhat different from the existing RAN1 agreement, so additional discussion (and new agreement?) may be needed. Also, more clarification may be also needed, at least for Alt-2 (e.g., per BWP-ID in RRC, or per BWP indicator field in DCI). * **Column K in Rows 30/32/34/36/38/40/42**

All these rows include *SEQUENCE (SIZE (1..4)) OF XYZ* or *SEQUENCE (SIZE (2..4)) OF XYZ* as the value. However, this is not consisent with the agreement below, which requires each row to include one value for each cell in the set of cells. With current description, it is possible that some rows include less than (or greater than) the number of cells in the set of cells. This should be replaced with the number/indexes of cells in the set of cells, per row 6. Agreement (RAN1#112)* 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.
* **Rows 29-32**

Agree with Nokia that Type-1B design already provides sufficient compression for TDRA, and further size reduction will be limting for the gNB. So, 5-7 bits can be considered for bit-width of TDRA field. * **Rows 36**

Slightly prefer Nokia’s suggestion to have the value based on codepoints (bitstring of size 2), since it will conform to the current spec for DCI 1\_1 in 38.214, including the case of codepoint '00' for no ZP-CSI trigger. If the integer values *INTEGER (0..3)* is to be kept, need a clarification that value 0 corresponds to no ZP-CSI trigger.[From 38.214]: "*Each non-zero codepoint of 'ZP CSI-RS' trigger in DCI format 1\_1 triggers one aperiodic 'ZP-CSI-RS-ResourceSet' in the list aperiodic-ZP-CSI-RS-ResourceSetsToAddModList by indicating the aperiodic ZP CSI-RS resource set ID. The DCI codepoint '01' triggers the resource set with 'ZP-CSI-RS-ResourceSetId' set to '1', the DCI codepoint '10' triggers the resource set with 'ZP-CSI-RS-ResourceSetId' set to '2', and the DCI codepoint '11' triggers the resource set with 'ZP-CSI-RS-ResourceSetId' set to '3'. Codepoint '00' is reserved for not triggering aperiodic ZP CSI-RS.*"* **Rows 38**

For TCI state, the situation appears to be somewhat different from ZP-CSI trigger, since per descriptions in 38.321, the codepoint refers to the ordinal position of activated TCI states in the MAC-CE command, so *INTEGER (0..7)* appears to be slihgtly more suitable. [From 38.321]: "*The codepoint to which the TCI State is mapped is determined by its ordinal position among all the TCI States with Ti field set to 1, i.e. the first TCI State with Ti field set to 1 shall be mapped to the codepoint value 0, second TCI State with Ti field set to 1 shall be mapped to the codepoint value 1 and so on.*"[From 38.214]: "The UE receives an activation command, as described in clause 6.1.3.14 of [10, TS 38.321] or 6.1.3.47 of [10, TS 38.321], used to map up to 8 TCI states and/or pairs of TCI states, with one TCI state for DL channels/signals and/or one TCI state for UL channels/signals to the codepoints of the DCI field 'Transmission Configuration Indication' for one or for a set of CCs/DL BWPs, and if applicable, for one or for a set of CCs/UL BWPs."* **Rows 43/45**

If row 44 is to be removed, then Column K of row 43 can be updated as follows: "*SEQUENCE (SIZE (1..16)) OF SRS-RequestDCI-1-3-0-3*". Similar, if row 46 is to be removed, then Column K of row 45 can be updated as follows: "*SEQUENCE (SIZE (1..8)) OF SRS-OffsetDCI-1-3-0-3*".* **Rows 47-56**

Agree with QC that the changes suggested by Vivo are not needed. The fields are Type-2 and corresponding configurations are separately provided per BWP per cell, so there is no confusion about "the cell".* **Rows 53/54**

Similar to Nokia/HW/QC, do not agree with values 1-bit-rv02, 1-bit-rv03. Using 1 bit for RV is specifed in legacy and no new spec or RRC values are needed.[From 38.212]: "1 bit according to Table 7.3.1.2.3-1."* **Rows 57**

Suggest to add a note that, per agreement in RAN1#112, this search space set cannot include DCI formats other than DCI format 0\_3/1\_3.* **Other suggested RRC parameters**

New RRC parameters for VRB-to-PRB mapping, PRB bundling size, and Frequency hopping flag appear unnecessary, and the ones for DCI 0\_1/1\_1 can be resued. For dynamic waveform switching, we don’t agree to introduce new features that were not discussed during the WI, especially non-essential ones that are outside the scope/purpose of the WI.  |
| NTT DOCOMO (as MCE WI rapporteur) | Thanks again for further reviewing and feedbacks!* **Row 2**: It seems all companies are fine with current structure, and there is a suggestion from Samsung as "Total number of sets of cells configured for a UE is up to 4 per PUCCH group.". Actually, this part intends max number of sets in total, but it is still under discussion in UE features list. So, we can remove this sentence and still there is a part in previous sentence that “up to 4 sets of cells can be configured per PUCCH group”. I’d like to ask companies to check if it is acceptable.
* **Row 4**: Although Huawei commented that current 38.212 CR does not refer this parameter, there are comments from Spreadtrum and ZTE that 38.212 should refer this parameter. We can add 38.212 and corresponding section once 38.212 CR refers this parameter. As there has been no concern on the necessity and structure of this parameter, we can keep this parameter as stable.
* **Row 5**: Regarding n\_CI value range, in addition to Qualcomm, vivo, Huawei and Ericsson in previous round, Spreadtrum, ZTE and LGE commented that 0...7 is preferred or acceptable. On the other hand, Samsung commented that n\_CI value up to 11 is preferable to configure unique n\_CI value for each set of cells even in case that 0-7 are already used for single cell scheduling. LGE commented that 0…3 is also fine as separate SS sets are configured between MC-DCI and legacy DCIs. It seems this point should be kept as FFS (adding bracket) for further discussion in next meeting.
* **Row 6/7**: Regarding whether size of the lists can include 1 or not, vivo and several other companies confirmed that 1 is not necessary. So, we can keep the size 2…4.

Regarding the ordering of cells in the lists, Qualcomm kindly provided updated texts based on LGE’s version, and it seems ok for LGE and other companies as well. So, following update is applied.**Configure the list of possible co-scheduled cells in the set for DL scheduling via DCI format 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}~~**There are some comments from Samsung, the first one is row 7 is not necessary and the second comment is potential new parameter for following agreement.**Agreement (RAN1#109)*** For a UE, the maximum number of cells scheduled by a DCI format 0\_X can be same or different to the maximum number of cells scheduled by a DCI format 1\_X.

Actually, the motivation to have row 7 in addition to row 6 is above agreement. Having separate lists of potentially co-scheduled cells for DL and UL in the same set of cells is aligned with above agreement and other agreement also referred by Samsung. So, row 7 should be kept and no new parameter is necessary for above agreement. I’d like to ask Samsung (and other companies) to check whether above clarification addresses your comments.* **Row 10**: There has been no comment/concern on the change on parameter name, it seems fine for all and this row can be considered as stable.
* **Row 25-27/39,40,43/41,42,45**: There was 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 similar change can be applied to row 39-45. Spreadtrum and vivo confirmed the changes are ok. This point can be considered as stable.
* **Row 25-27**: Qualcomm suggested that size of DL/UL scheduled cell combinations table (row 25/27) should be 2…16, while Nokia/LGE/Samsung suggested to keep the current size as 1…16. It is rapporteur’s understanding that configuring only one row for the DL/UL scheduled cell combinations table would not be a typical case, but it may be related to on-going UE feature discussion on whether FDRA based and/or scheduled cell combinations table based co-scheduled cell indication methods is/are supported as part of basic feature of MC scheduling. So, it seems this point should be kept as FFS (adding bracket) for further discussion in next meeting.

There are some comments from Samsung. The first one is about linkage between row 26 and row 6/7. There is already text in row 26 that “where index of co-scheduled cell refers ScheduledCell-ListDCI-1-3 for DL and ScheduledCell-ListDCI-0-3 for UL”, so the linkage should be clear. The second one is about the case when row 27 is not configured but row 25 is configured. Actually, the proposal from Samsung (reusing row 25 for UL as well) would contradict to the RAN1 agreement that when the scheduled cell combination table is not configured, FDRA based co-scheduled cell indication method is applied. Therefore, the proposal from Samsung cannot be applied. The third one is about moving rows 25-27 next to rows 6-7 for readability. It can be done when we will endorse the list, while we should keep current row order for now as we are discussing issues based on row number. I’d like to ask Samsung and other companies to check whether row 26 can be considered as stable (since there has been no comment/concern from other companies).* **Row 29-46**: Regarding joint table for type-1B fields, there are still multiple different views on potential approaches below. It seems this point should be kept as FFS (by capturing alternatives in column J with bracket) for further discussion in next meeting.
	+ Alt.1: Single joint table (entries are interpreted based on current active BWPs per cell)
		- Alt.1a: single joint table with increased table size
	+ Alt.2: Configure up to [4] joint tables (each of the tables is associated with BWP ID or BWP indicator value)
	+ Alt.3: Configure each column in each BWP of each cell, and DCI codepoint is interpreted per cell

Regarding LGE’s clarification questions, vivo and ZTE provided their understandings that seem to be reasonable.* **Row 29/31**: Regarding the size of joint TDRA table, as commented in previous round, further discussion on this point is necessary with considering above alternatives.

There is a suggestion from Nokia to update the parameter name and field description to clarify the table does not configure the SLIVs but it configures “TDRA field values” in DCI formats 0\_3/1\_3. I’d like to ask companies to check if it is acceptable although rows are kept as unstable anyway.* **Row 30/32**: Regarding the size 2…4 instead of 1…4, it should be fine to be aligned with row 6/7.

Regarding the value range, although we may need to keep the bracket, maxNrofUL-Allocations within the bracket can be replaced by maxNrofUL-Allocations-r16 according to the comments from Nokia/ZTE.In addition, Nokia’s suggestion for row 29/31 can also be applied to row 30/32. I’d like to ask companies to check if it is acceptable although rows are kept as unstable anyway.* **Row 34/36/38/40**: Regarding vivo’s suggestions on the size and description, vivo kindly provided additional explanation and several other companies agree on it. Although Qualcomm may have different understanding according to their comment on row 30/32, the agreement referred by vivo describes that “RRC-configured table with each row containing multiple indexes for all cells within the set of cells”. Therefore, vivo’s suggested changes are applied to row 34/36/38/40 and other type-1B field (row 42) as vivo originally commented that same changes can be applied to all type-1B fields. However, there is a comment from Spreadtrum that such change should not be applied to the field with bitstring. So, it can be kept as FFS point for those fields (row 34/40). I’d like to ask companies to check if it is acceptable although rows are kept as unstable anyway.
* **Row 36/38**: Regarding whether it should be integer or bitstring, it seems we should keep the brackets for further discussion in next meeting.
* **Row 40**: Regarding the size of SRS request per cell, ZTE commented that it should be 2 bits for each cell although other companies seem to be fine with Huawei’s previous suggestion 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

We should keep this point as FFS (within brackets) for further discussion in next meeting.* **Row 47-56**: Regarding vivo’s suggested wording modification, Qualcomm/ZTE/Samsung commented that the change is not necessary and the original wording should be kept. So, I’d like to ask vivo (and other companies) to check whether original wording is acceptable given comments from above companies.
* **Row 53/54**: Regarding ZTE’s previous comment on RV size, further discussion on this point is necessary, and it can be kept as FFS (with adding bracket on original value range).
* **Row 57**: There is a suggestion from Samsung to add a note “this search space set cannot include DCI formats other than DCI format 0\_3/1\_3”. Maybe we can use the wording from agreement that “Separate search space sets for DCI format 0\_3/1\_3 and legacy DCI formats are independently configured”. I’d like to ask companies to check if it is acceptable.
* **Other potential RRC parameters for MC scheduling**: Further discussion is necessary, and let’s discuss further in next meeting.
 |
| Qualcomm | **Rows 25-27:**As we have commented, the agreement clearly excludes the case where the combinations table (row 25/27) includes only single entry. We should be consistent with the agreement. Further, we do not see any issue to excludes single cell case – we have not seen any valid/necessary use-cases of single entry from proponents. Unless there is a critical issue, RAN1 should not revert the agreement.**Rows 29-46:**We are OK to keep them FFS. As we commented, Alt.1 and Alt.2 changes the UE behaviors of BWP switching using legacy DCI format, which requires functional changes (and corresponding UE capabilities).**Rows 29/31:**Regarding the number of rows, we are OK to keep FFS for further discussion for UL. For DL, we are not sure why *maxNrofDL-Allocations* is not sufficient. For MC-DCI, all the scheduled cells have the same SCS and carrier type. Although we understand that we need to discuss whether to follow r15 or r16 for *maxNrofUL-Allocations*, we are not sure the issue for *maxNrofDL-Allocations*.**Rows 30/32:**Regarding Alt.1 vs 2 vs 3, we disagree with the statement that the RRC configurable table was agreed. During the WI phase, we have confirmed with FL that “RRC configured table” does not necessarily mean a big RRC configurable table has to be defined. This is why we have accepted the agreement. If it actually meant RAN1 will define big RRC configurable table, we would have objected.We already have the RRC structure based on per BWP per serving cell, in order to enable BWP switch. It must be not a good exercise to define another bucket for parameters for BWP switch. This makes future maintenance/enhancements being difficult.**Rows 49-56:**We think “for the cell” in the rows are even unnecessary. These parameters are already per BWP per cell.**Row 57:**Current Moderator’s text is OK. It is already obvious from column K – no clarification is also fine. |
| Vivo4 | **@ rapporteur, thank youfor the updates and nice summary!*** **Rows 25-27:** ok with current version as it may be related to UE feature discussion
* **Row 47-56:** we can live with it if other companies think the changes are not necessary, also ok with QC’s proposal to remove ‘the cell in’
 |
| Nokia/NSB | **Also from our side, very many thanks for the good updates and detailed comments from rapporteur side, that make the discussions for the delegates much easier!*** **Rows 6/7:** thanks for the good updates, just a minor editorial wording suggestion there (align structure & wording of 2nd and 3rd half sentence and shorten): *Configure the list of possible co-scheduled cells in the set for DL scheduling via DCI format 1\_3, where the ~~order of~~ serving cells in the list are in ~~is~~ ascending order of serving cell indexes~~,~~ and ~~the serving cells in the list~~ are mapped to index {0, 1, 2, 3} in the set*
* **Row 26:** we are fine to mark it as stable
* **Rows 25 / 27:** If QC could point us to where we agreed the table needs to have more than one row entry, this would be appreciated – as we don’t see that we agreed to have at least two entries in the table (we only agreed the maximum of 16).

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| --- |
| **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
	+ ....
 |

* **Rows 29-32:** No request for change (as this seems to stay the status here) – but just to repeat our arguments there (a) Alt. 1 is based on the agreement and (b) we should not limit the gNB scheduling by not allowing larger list especially for TDRA (saving here, whereas we had been rather generous with larger Type 1B tables for other fields)
* **Rows 34 / 36 / 38 / 40 / 42 – brackets or not:** If we want to clarify the number of rows, the we either have it in brackets for all of them – or all of them without brackets (we should be just consistent). Rows 34 & 40 have the brackets, the others don’t
* **Row 40:** we think it should be 2 bits only, i.e. X=2 (forgot to comment in the previous round)
* **Rows 47-56:** These configurations are in pdsch-config or pusch-config (per BWP per cell), so the configuration is BWP specific. For rows 47 & 49, there is not even the mentioning of the ‘cell or BWP’, and in 49-56 we talk about ‘cell’ and not BWP. So we **either remove** **(as we agree with QC that it is clear already that this is configured per BWP, our first preference)** – or **we need to be specific** here (and consistent) and use the following**For DL - rows 47, 49, 51, 53, 55:** *Configure .... for the DL BWP ~~cell~~ in DCI format 1\_3* **For UL – rows 48, 50, 52, 54, 56***Configure .... for the UL BWP ~~cell~~ in DCI format 0\_3*
 |
| ZTE | Currently, we have only addmod list. The release list should also be added to release one or more set. For example, MC-DCI-SetofCellsToReleaseList with the value range of SEQUENCE (SIZE (1..4)) OF SetofCellsId. |
| Qualcomm | @ NokiaIt is captured as: *The size of the indicator is equal to ceil(log2(N)), where N is the number of row****s*** *in the table.*I wish you remember, that in Athens, we had offline discussion on whether/how to support two ways – FDRA based and co-scheduled cell indicator based. We (QC) come up with a unified solution – if the table has one entry, it is based on FDRA; otherwise it is based on the > 0 bit field. However, Samsung objected this – they said we should distinguish these two explicitly. Then, the agreement was like the current form. Although the form is not our original preference, we accepted that. We should stick with the discussion and agreement, i.e., to distinguish (1) configuring a table with more than one entry, and (2) FDRA based without table.  |
| Samsung2  | **Thanks to the Moderator for detailed responses to our suggestions.****Here are some follow-up comments:*** **Interaction of lists in Row 6/7**

Although the agreement support for Row 7 is still not clear to us, for progress, we can accept to keep Row 7 with some modifications/clarifications based on the following RAN1 agreement:* **Relation between Rows 6 and 7**: in the current form, the two lists can be flexibily and independently configured, each as a list of up to 4 cell indexes. In our view, the two lists should be either identical or the UL list should be a subset of the DL list. For example, we notice the following example from Nokia in the discussion of 212 CR: " if UE is configured with *ScheduledCell-ListDCI-1-3 ={Cell A, B, C}* and *ScheduledCell-ListDCI-0-3 ={Cell C,D}*, *the set of cells would be cell A to D*". We think such examples should not be supported (i.e, a cell in the UL list that is not included in the DL list – here, *cell D*). Also, can clarify in Column L of Row 7 that *ScheduledCell-ListDCI-1-3* is the default value to be applied for DCI format 0\_3 when *ScheduledCell-ListDCI-1-3* is not configured; otherwise the UL list will be undefined.
* **Add FFS on restriction for number of co-scheduled cells in a DCI**: We are still not sure that the lists in Row 6 and 7 fully capture the below aregeement. Espeically, there can be UE capability restrictions involved that may restrict the applicable UL cell combinations, e.g., even if *ScheduledCell-ListDCI-0-3* includes 4 UL cells, a DCI format 0\_3 may only schedule up to 2 UL cells, so RRC configuration should be accordingly provided (for both the scheduled cell indicator method or for the FDRA method) 🡺 Suggest to add in Column J of Row 7 an "FFS whether a DCI format 0\_3 can schedule any arbitrary cell combination from *ScheduledCell-ListDCI-0-3* or whether to configure a separate RRC parameter on the maximum number of cells that can be co-scheduled by a DCI format 0\_3";
	+ Also, similar suggestion to add in Column J of Row 6: "FFS whether a DCI format 1\_3 can schedule any arbitrary cell combination from *ScheduledCell-ListDCI-1-3* or whether to configure a separate RRC parameter on the maximum number of cells that can be co-scheduled by a DCI format 1\_3".

**Agreement (RAN1#109)*** For a UE, the maximum number of cells scheduled by a DCI format 0\_X can be same or different to the maximum number of cells scheduled by a DCI format 1\_X.
* **Add FFS on restriction for UL cell combinations (row 25/27)**: Since reusing *ScheduledCellCombo-ListDCI-1-3*as default for UL DCI format 0\_3 is not being considered for now, we think it is reasonable to at least include a restriction that an UL DCI format 0\_3 cannot indicate (by FDRA method) a cell combination that is not supported for DL. 🡺 So, suggest to add a "Note: when *ScheduledCellCombo-ListDCI-1-3*is configured, and *ScheduledCellCombo-ListDCI-0-3*is not configured, FDRA field in DCI format 0\_3 cannot indicate a cell combination that is not inclued in *ScheduledCellCombo-ListDCI-1-3*."
* **Editorial:** Row 7 column J should say “for UL scheduling” (it is DL now).
* **Indexing issues**
* **Indexing of DL/UL cell combinations in Row 26**: Thanks for pointing out the Note under Rows 26 for linkage with rows 6/7. For clarification, we suggest a small change: “where index with value INTEGER (0..3) of co-scheduled cell refers to ScheduledCell-ListDCI-1-3 for DL and ScheduledCell-ListDCI-0-3 for UL”.

In addition, since the two DL and UL lists are separately indexed, a cell combination in Row 26 may not indicate the same cell combination for DL and UL. For example, if *ScheduledCell-ListDCI-1-3* includes {cell 2, cell 5, cell 9, cell 11}, and *ScheduledCell-ListDCI-0-3* includes {cell 2, cell 9}, then the cell combination (0,1) indicates {cell 2, cell 5} for the DL DCI format 1\_3, but indicate {cell 2, cell 9} for the UL DCI format 0\_3. 🡺 In order to avoid such issues, suggest to have the mapping with {0, 1, 2, 3} as auxiliary RRC parameter, e.g., "index-in-DL-list" or "index-in-UL-list" and then cell combinations in row 26 and/or list of cell combinations in rows 25/27 are defined in terms of such "index-in-DL-list" or "index-in-UL-list" for each cell.This can be done in RAN1, or OK to leave a note in the RRC list and indicate that RAN2 needs to replace the hard-coded indexes with the auxiliary parameters such as "index-in-DL-list" or "index-in-UL-list".* **Limits of indexes based on auxiliary parameters rather than absolute numbers**: In various rows, the max values are hardcoded into the RRC message, such as SIZE (1..4) or SIZE ([1]..16), and so on. Common practice in RRC is to use 'max' parameters and define, e.g., SIZE (1..maxNrofXYZ). 🡺 Can be done in RAN1, or OK to include a note in the RRC list and indicate that RAN2 needs to replace such absolute numbers with appropriate parameters.
* **Indexing for Rows 30/32/34/36/38/40/42**

The new note (based on Vivo’s input) in abovementioned rows, to ensure the same number of entries for Type-1B fields as the number of cells in the set of cells, is in a good direction and should be kept. In addition, we suggest to check if the signaling message itself can be updated to capture this constraint in a self-evident manner. For example, it may/should be possible to replace *SEQUENCE (SIZE (1..4)) OF XYZ* with a quantity in terms of the number of cells in *ScheduledCell-ListDCI-1-3*, e.g. replace with *SEQUENCE (SIZE (ScheduledCell-ListDCI-1-3)) OF XYZ* or something along those lines.This can be done in RAN1, or OK to include a note for RAN2 to consider such update.* **BWP operation in Rows 29-46**

We understand details of configuration for Type-1B fields in Rows 29-46 are left to the next meeting, but would like to mention another option to be captured among the alternatives for further consideration: 🡺 **Alt-1b:** single table provided for all BWPs of all cells, and values in each row of the table can be size-matched for the active/target BWP of the corresponding cells (similar to Clause 12 of TS 38.213). BTW, we understand Alt-1/2/3 as listed by Moderator apply to all Type-1B fields, not only the TDRA field; is that correct understanding?Regarding QC’s comment “*Alt.1 and Alt.2 changes the UE behaviors of BWP switching using legacy DCI format,*” we are not clear why dynamic BWP switching can be an issue for Alt-1, especially with the update in **Alt-1b** outlined above?* **Search space configuration in Rows 57**

Fine with the Moderator’s suggestion to copy the RAN1 agreement. Since the RRC parameter in row 57 is only a parameter for monitored DCI format within the search space configuration, such clarification is necessary, otherwise RAN2 may include this DCI parameter inside the search space configuration along with other DCI formats (similar to DCI formats for SL, MBS, etc.). |
| LGE | **@Moderator, Thanks for your efforts to provide the update.****Rows 6/7:**Regarding the order of cells in the list, we are also fine with the wording suggestion from Nokia.**Rows 25/27:**We have same understanding with Nokia that there is no restriction like “at least two rows” or “more than one row” in the agreement, and we don’t see the “s” in the wording “N is the number of rows” implies such restriction. Moreover, we think the table consisting of a single row is different from FDRA based cell indication where a subset of cells can also be scheduled.**Rows 29-46:**Keeping the Alt 1/2/3 as FFS seems to be the only way at this stage, but as commented earlier, we think the Alt 3 is to be classified as Type 1A (interpreting DCI code-point per cell based on single-cell table) rather than Type 1B (configuring joint table across multiple cells).**Rows 40:**We are OK with 2-bit by omitting NUL/SUL flag, but as commented earlier, it seems necessary to clarify to which carrier (between NUL and SUL) the 2-bit is applied for the cell configured with SUL. |
| Qualcomm | @ SamsungAlt-1b for BWP operationNot sure if I understand the Alt-1b – how to determine the size to be matched with the activated BWP? It seems this option disables switching parameters according to BWP switch. For a given cell, a number of entries are provided by each row and is referred whichever BWP is active. Valid entries in the row depends on which BWP is active. We are open to include Alt-1b as a potential resolution but not sure how/whether it works for the moment.Agree with Samsung that the above discussion would impact on all Type-1B fields.Note that we think parameters for Type-2 fields should be per BWP per cell, as already captured in rows 47-51.@ LGEOn rows 25/27, please see our reply to Nokia. Our understanding is that the agreement intends to support the table with more than one rows.On rows 29-46, Alt.3 is different from Type 1A. Alt.3 enables parameter configurations for each BWP of each serving cell.On row 40, agree with you. |
| Huawei, HiSilicon (updated)  | * **Rows 6/7:** Fine with the editorial suggestion from Nokia.
* **Rows 34/36/38/40/42:** We also prefer to either leave bracket for all or remove it for all, regarding the SEQUENCE (SIZE (2..4).
* **Row 40:** The size of bit string should be either 2 bits or 3 bits as we commented before, to exactly reflect the current agreements. We think use size(x) in column K while put some note in column P to inform RAN2 when x=2 and when x=3 is the right way to go, as what the rapporteur did in the previous round. According to the RAN1 agreement, type 1B is adopted for SRS request. For type 1B, different “SRS request” index will be used for the indication for different cells. Then for a cell configured with SUL, for sure it should be 3 bits following the existing mechanism. We failed to see any problem to exactly reflect the agreement here.
 |
| Nokia/NSB2 | * **Rows 6/7 reply on Samsung comments:**

We don’t see an issue here. The current RRC structure of rows 6 & 7 nicely enables to have the DCI size as compact as possible for the supported possible scheduled also for the FDRA field based scheduling cell indication. And this allows fully flexible (and independent) UL / DL scheduling operation for a set of cells, where the set of cells is the defined as {*ScheduledCell-ListDCI-0-3, ScheduledCell-ListDCI-1-3}.*We also don’t see any issues with indexing, as the indexing again, between UL & DL can be fully independent (no need to have any common indexing here, as also the scheduling is supposed to be fully independent). * **Type 1 B fields:** it seems the number of options seem to be increasing over time. As said, we think that even for Alt. 1 there is sufficient flexibility for the gNB to operate.
* **Row 40:** we agree with LG & QC on the 2bits only.
 |
| NTT DOCOMO (as MCE WI rapporteur) | Thank you very much again for further reviewing and feedbacks!* **General**: There is a general comment from ZTE that we should add “release lists” (e.g., MC-DCI-SetofCellsToReleaseList corresponding to row 2). Although it is of course necessary, it can be discussed in next meeting considering that this meeting is approaching to the end.

There is another general comment from Samsung that max values should be defined as parameter rather than hardcoded value. I think it can be done in RAN2 as in previous releases. If necessary, it can be noted in the LS body text to be sent after RAN1#113 with RRC parameters list.* **Row 6/7**: Regarding the ordering of cells in the lists, there is wording suggestion from Nokia and other companies are fine with it. So, following update is applied.

*Configure the list of possible co-scheduled cells in the set for DL scheduling via DCI format 1\_3, where the ~~order of~~ serving cells in the list are in ~~is~~ ascending order of serving cell indexes~~,~~ and ~~the serving cells in the list~~ are mapped to index {0, 1, 2, 3} in the set*In addition, an editorial correction (DL 🡪 UL in row 7 column J) pointed by Samsung is also applied.There are two more suggestions from Samsung, the first one is to clarify that cells in *ScheduledCell-ListDCI-0-3* should be subset of cells in *ScheduledCell-ListDCI-1-3*. The second one is to add FFS on potential restriction for number of actual co-scheduled cells in a DCI based on UE capability. Both points can be discussed in next meeting. So, row 6/7 can be kept as “unstable”.* **Row 25-27**: For row 25/27, whether the case with only single row in the table is allowed or not can be further discussed in next meeting as I commented in previous round. Regarding Samsung’s comment on reusing *ScheduledCellCombo-ListDCI-1-3*as default for UL DCI format 0\_3 when *ScheduledCellCombo-ListDCI-0-3*is not configured, as I explained in previous round, it would not be aligned with the RAN1 agreement on FDRA-based co-scheduled cell indication. But it can be noted as FFS so that we can continue discussion on row 25/27 with both of above FFS points.

For row 26, the small change suggested by Samsung below should be fine. *where index with value INTEGER (0..3) of co-scheduled cell refers to ScheduledCell-ListDCI-1-3 for DL and ScheduledCell-ListDCI-0-3 for UL*Regarding Samsung’s other comments on row 26, I think there should be no issue as contents of *ScheduledCellCombo* to be included in DL list and in UL list can be different anyway. In Samsung’s example where *ScheduledCell-ListDCI-1-3* includes {cell 2, cell 5, cell 9, cell 11} and *ScheduledCell-ListDCI-0-3* includes {cell 2, cell 9}, *ScheduledCellCombo-ListDCI-1-3* would include {(2), (5), (9), (11), (2,5), (5,9), (9,11), (2,5,9), …, (2,5,9,11)} by using multiple *ScheduledCellCombo* with different contents and *ScheduledCellCombo-ListDCI-0-3* would include {(2), (9), (2, 9)} by using multiple *ScheduledCellCombo* with different contents as well. As DCI 0\_3 indicates co-scheduled cells based on *ScheduledCellCombo-ListDCI-0-3* while DCI 1\_3 indicates co-scheduled cells based on *ScheduledCellCombo-ListDCI-1-3*, I don’t see any issue. Nokia would have same understanding with me. But we can keep the row 26 as unstable for now.In the updated version, row 25-28 are moved next to row 6/7 according to Samsung’s previous comment.* **Row 29-46**: Regarding joint table for all type-1B fields (not only TDRA), let’s discuss further in next meeting based on following alternatives and provided views from companies as I commented in previous round.
	+ Alt.1: Single joint table (entries are interpreted based on current active BWPs per cell)
		- Alt.1a: single joint table with increased table size
		- Alt.1b: single table provided for all BWPs of all cells (each row can be size-matched for the active/target BWP of corresponding cells)
	+ Alt.2: Configure up to [4] joint tables (each of the tables is associated with BWP ID or BWP indicator value)
	+ Alt.3: Configure each column in each BWP of each cell, and DCI codepoint is interpreted per cell
* **Row 29/31**: It seems the suggestion from Nokia to update the parameter name and field description is acceptable to all. Anyway, these rows are kept as unstable to discuss further on above alternatives and maximum size of the lists in next meeting.
* **Row 30/32**: It seems the suggestion from Nokia to update the parameter name and field description is acceptable to all. Anyway, these rows are kept as unstable to discuss further on maximum size of each row for the TDRA field index lists in next meeting.
* **Row 30/32/34/36/38/40/42**: Regarding vivo’s suggestions on the size, there are comments from Nokia/Huawei that either leave bracket for all or remove it for all for consistency, instead of having bracket only for row 34/40. So, brackets are added for rows 30/32/34/36/38/40/42.
* **Row 36/38**: Regarding whether it should be integer or bitstring, it seems we should keep the brackets for further discussion in next meeting.
* **Row 40**: Regarding the size of SRS request per cell, let’s discuss further in next meeting as I commented in previous round.
* **Row 47-56**: there is a suggestion from Qualcomm/vivo/Nokia to remove “for the cell” or “the cell in” while another suggestion from Nokia is to change “cell” to “DL(UL) BWP” as anyway parameters are per BWP per cell. As all suggestions intend same thing, the suggestion from vivo (as simplest text) is reflected. As there has been no other comments, these rows can be marked as stable except for row 53/54 due to FFS on value range for RV size.
* **Row 57**: It seems all companies are fine with current version, and hence it can be kept as stable.
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### 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.
 |
| ZTE | RAN2 and RAN3 actually discussed the issues during this meeting, and they had agreed some CRs  in principle until yesterday where some new RRC parameters have been inserted in the CRs .  However, RAN2 is not sure whether to change 38.331, may send LS to us after RAN1#112bis meeting based on their conclusion. That is, the first three rows we listed in the excel [v002.xlsx](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-%20v002.xlsx) have been agreed in RAN2, but the last two rows are not sure from RAN2 perspective. So I think it is still helpful to check the parameters especially on the last two in RAN1. If you have concern, please share your views. |
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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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## 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:

|  |
| --- |
| * **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.