**3GPP TSG RAN WG1 Meeting #114 R1-230xxxx**

**Toulouse, France, August 21 – 25, 2023**

**Agenda item: 9.17**

**Source: Nokia, Nokia Shanghai Bell**

**Title: Summary on email discussion on Netw\_Energy\_NR**

**Document for: Discussion and Decision**

# 1 Introduction

This thread will discuss the draft CR to 38.214 for the Netw\_Energy\_NR.

First checkpoint for this discussion: **September 5th, 6:00 am UTC**!

# 2 Discussion – first round

The comments in this section are based on version 0 of the the draft CR available in the **Post RAN1#114 discussion. Version 00r01 contains some further updates!**

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| Company | Comments | Editor reply/Notes |
| Lenovo | 1. Regarding the added text in 5.1.6.1 (P3), is it possible to modify to:

“During non-active periods of cell DTX, the UE supporting cell DTX is not expected to receive the periodic CSI-RS and semi-persistent CSI-RS configured in CSI report configuration in *CSI-ReportConfig* ~~for CSI reporting~~ associated with the higher layer parameter reportQuantity comprising at least ‘RI’”In our understanding the intention of the corresponding agreement was to mute P/SP CSI-RS associated with CSI reporting (but not BM reporting). One way to differentiate between CSI and BM reporting is the presence of the ‘RI’ field in the report quantity, which is never combined with RSRP/SINR quantities. We are also unaware if “*CSI-ReoortConfig* for CSI reporting” suffices since the notion of beam/BM reporting never shows up in TS 38.214. We also welcome any other suggestions on how this is to be captured in the spec. Thank you 1. Regarding the comment on powerOffset at the end of Section 5.2.2.5 (P21), we share the same understanding as the editor that the word ‘difference’ is more precise. We also suggest to capture two other aspects in the same agreement, which are (1) “Only legacy values are applicable for the resulted power control offset values”, and (2) “Only legacy values are applicable for the resulted power control offset values”. In light of that, we suggest the following:

“if a sub-configuration indicates a power offset *[powerOffset]*,for CQI calculation, the UE shall assume the corresponding PDSCH signals transmitted on the antenna ports of a CSI-RS resource would have a ratio of EPRE to CSI-RS EPRE equal to the ~~[~~difference~~]~~ between *powerControlOffset* of the CSI-RS resource, given in Clause 5.2.2.3.1, and *[powerOffset], where* the difference between *powerControlOffset* of the CSI-RS resource *[powerOffset] is expected to take the same range of values as powerControlOffset* of the CSI-RS resource, given in Clause 5.2.2.3.1, and is also expected to take on a value that is no larger than the value of *powerControlOffset*”We would also welcome alternative wording that captures the same meaning. 1. Regarding the last paragraph in P23, Clause 5.2.3, the corresponding agreement states that “Follow legacy dropping rules for a CSI report containing multiple CSIs”. To the best of our knowledge, the only CSI report containing multiple CSIs, i.e., multiple values of the same CSI report quantity, is Rel-17 NCJT (CSI report configured with two Resource Groups and 𝑁 Resource Pairs). For Rel-17 NCJT CSI reporting, the entries in Table 5.2.3-1 are unchanged, whereas the content of each entry is captured only in TS38.212 (Clauses 6.3.1.1.2 and 6.3.2.1.2). We therefore respectfully suggest that the same styling of NCJT CSI reporting is adopted for NES.
2. For the first paragraph in Clause 5.2.4 (P25), we suggest replacing “in each corresponding reporting instance” to “in the same corresponding reporting instance”, since CSI corresponding to all reported sub-configurations is expected to be included in the same CSI report.
3. For the last paragraph in Clause 5.2.4 (P26), we suggest removing “one or more CSIs” since it is not needed. We therefore suggest the following

“For a Reporting Setting for which the *CSI-ReportConfig* contains a list of sub-configurations~~, for a given CSI report which contains one or more CSIs~~, omission of Part 2 CSI is defined in Clause 5.2.3.” | 1.considered!2. Added a shorted version of your suggested text in brackets for now. 3. Not fully sure what your suggestion is exactly here.4. The current formulation is clear in that the UE will provide CSI for all the sub-configurations in each instance. I don’t think ‘same’ would be adding more clarity as such.5. using ‘for a given CSI report n’ is more in line with legacy text. Also it’s a good clarification to have ‘contains one or more CSIs’ there. |
| **Editor 02/09** | **I have made some further updates in v00r01, please consider this version in your review! I kindly ask Lenovo colleagues to take a look also at this updated version!**  |  |
| Huawei, HiSilicon | **We have the following initial comments.****Comment#1**Generally, with introduction of “csi-ReportSubConfig” or “csi-ReportSubConfigID”, the terminology of ‘sub-configuration’ is not necessary anymore in RAN1 specifications.For example, we can simply sayand additionally one or more [*csi-ReportSubConfigID*] if configured for a *CSI-ReportConfig* ~~if multiple sub-configurations are contained in the~~ *~~CSI-ReportConfig~~*, as described in Clause 5.2.1.1or, A *CSI-ReportConfig* can contain a list of ~~sub-configurations, provided by the higher layer parameter~~ [*csi-ReportSubConfigID~~List~~]*Or,Each [*CSI-ReportSubConfig*] ~~sub-configuration~~ can be configured with an antenna port subset…**Comment#2****5.2.3/5.2.4****(Depending on discussion among editors,)** perhaps it could be aligned across specs for the CSI report containing multiple CSIs. For example, it might be easier to take each CSI as a sub-report corresponding to a sub-configuration/CSI-ReportSubConfig. This could help avoid the interpretation of “one or more CSIs” as “one or more CSI parameters” of one CSI, and “sub-configuration level” may not be very accurate for reporting omission/dropping, since omission is for report, instead of for configuration.With this, an example for omission could be:For a Reporting Setting for which the *CSI-ReportConfig* contains a list of *CSI-ReportSubConfig*(s)*,* for a corresponding CSI report which contains one or more CSI sub-report(s), omission of Part 2 CSI(s) for a given priority level of the CSI report is done at a sub-report ~~sub-configuration~~ level where a sub-report ~~sub-configuration~~ with an index, provided by [*csi-ReportSubConfigID*], with lower value has higher priority. | Comment #1: Prefer to keep ‘sub-configuration’ to be clear that ‘csi-ReportSubConfigID’ is an ID for a sub-configuration.Comment #2: Ok, will update that part, also taking into account input from other companies. Overall, no need to introduce the term ‘CSI sub-report’. |
| Apple1 | Please find our comments for the first roundComment #1 We agree with Lenovo’s comment 1 that for the text in 5.1.6.1 the intention of the corresponding agreement was to mute P/SP CSI-RS associated with CSI reporting (but not BM reporting). We suggest the following modification: Suggested Text in 5.1.6.1 (Comment #1)During non-active periods of cell DTX, the UE supporting cell DTX is not expected to receive the periodic CSI-RS and semi-persistent CSI-RS configured in CSI report configuration in CSI-*ReportConfig* ~~for CSI reporting~~ with reportQuantity including RI.Comment #2 According to our understanding, the number of sub-configurations L can still be 1, although multiple may be the more typical case. We suggest the adding “one or” to the text in 5.2.1 to also cover the single sub-configuration case. **Agreement**For a CSI report config with *L* sub-configuration(s), support a framework that enables a UE to report *N* CSI(s) in one reporting instance where the *N* CSI(s) are associated with *N* sub-configuration(s) from *L* (where ) and each CSI corresponds to one sub-configuration.Suggested Text #2 in 5.2.1 (Comment #2)and additionally one or more [*csi-ReportSubConfigID*] for a *CSI-ReportConfig* if one or multiple sub-configurations are contained in the *CSI-ReportConfig*, as described in Clause 5.2.1.1, Comment #3For the CPU counting in 5.2.1.6, for AP and SP CSI report, the current wording counts the resources from the sub-configurations from 1 to N while they may not be the actually triggered sub-configuration, therefore, we suggest the following modification to the text. Suggested Text #2 in 5.2.1.6 (Comment #3)- If a *CSI-ReportConfig* contains a list of sub-configurations, for a CSI report ~~for~~ with *N or L CSIs* ~~sub-configurations~~ out of *L* sub-configurations contained in a *CSI-ReportConfig*, where and ,- for periodic CSI report, ~~and for aperiodic and semi-persistent CSI report,~~ where is the total number of CSI-RS resources corresponding to the *i*-th sub-configuration which are in the *NZP-CSI-RS-ResourceSet* of the *CSI-ResourceConfig* for channel measurement.- for aperiodic and semi-persistent CSI report, where N is the number of indicated sub-configurations by the DCI or MAC CE, is the total number of CSI-RS resources corresponding to the *i*-th indicated sub-configuration which are in the *NZP-CSI-RS-ResourceSet* of the *CSI-ResourceConfig* for channel measurement. | Comment #1: considered Lenovo’s.Comment #2: Although we understand your comment, the case with L=1 would be nothing but legacy as such. Comment #3:OK. Updates provided also taking into account for vivo’s related comment. |
| vivo | **Comment#1:****Current CR**: - If a *CSI-ReportConfig* contains a list of sub-configurations, for a CSI report for *N* sub-configurations out of *L* sub-configurations contained in a *CSI-ReportConfig*, where and ,- for periodic CSI report, and for aperiodic and semi-persistent CSI report, where is the total number of CSI-RS resources corresponding to the *i*-th sub-configuration which are in the *NZP-CSI-RS-ResourceSet* of the *CSI-ResourceConfig* for channel measurement.**Reasons for modification**: The understanding of *i*-th sub-configuration is not clear in the CPU calculation formula.**Proposed CR**:If a *CSI-ReportConfig* contains a list of sub-configurations, ~~for a CSI report for~~ *~~N~~* ~~sub-configurations out of~~ *~~L~~* ~~sub-configurations contained in a~~ *~~CSI-ReportConfig~~*~~, where and ,~~- for periodic CSI report, ~~and for aperiodic and semi-persistent CSI report,~~ where is the total number of CSI-RS resources corresponding to the *i*-th sub-configuration from *L* configured sub-configurations ~~which are in the~~ *~~NZP-CSI-RS-ResourceSet~~* ~~of the~~ *~~CSI-ResourceConfig~~* ~~for channel measurement~~.* for aperiodic and semi-persistent CSI report, where is the total number of CSI-RS resources corresponding to the *i*-th sub-configuration from N indicated sub-configurations out of L configured sub-configurationswhere and ~~which are in the~~ *~~NZP-CSI-RS-ResourceSet~~* ~~of the~~ *~~CSI-ResourceConfig~~* ~~for channel measurement~~.

**Comment #2:****Current CR**: [For a Reporting Setting for which the *CSI-ReportConfig* contains a list of sub-configurations, CSI reporting is provided for all the sub-configurations in each corresponding reporting instance.]**Reasons for modification**: Only periodic sub-config CSI report would report all CSI sub-reports.**Proposed CR**: For a periodic Reporting Setting for which the *CSI-ReportConfig* contains a list of sub-configurations, CSI reporting is provided for all the sub-configurations in each corresponding reporting instance. | **Comment#1:**OK. Updated as suggested but without removing the clarification on CSI-RS resources.**Comment#2:**That paragraph, in legacy, is for periodic CSI reporting. So, adding ‘periodic’ would somewhat be redundant there. |
| ZTE, Sanechips |

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| comment#1For the following text, in the case the UE reports supporting cell DTX doesn’t mean NW has to configure DTX for this UE. We suggest to update “ UE supporting cell DTX/DRX” as “UE configured with cell DTX/DRX”Original text 1: During non-active periods of cell DTX, the UE supporting cell DTX is not expected to receive the periodic CSI-RS and semi-persistent CSI-RS configured in CSI report configuration in CSI-*ReportConfig* for CSI reporting.During non-active periods of cell DRX, the UE supporting cell DRX is not expected to transmit the periodic SRS, or semi-persistent SRS for channel acquisition. SRS for positioning is not impacted by cell DRX operation.Suggested text 1: During non-active periods of cell DTX, the UE configured with ~~supporting~~ cell DTX is not expected to receive the periodic CSI-RS and semi-persistent CSI-RS configured in CSI report configuration in CSI-*ReportConfig* for CSI reporting.During non-active periods of cell DRX, the UE configured with ~~supporting~~ cell DRX is not expected to transmit the periodic SRS, or semi-persistent SRS for channel acquisition. SRS for positioning is not impacted by cell DRX operation. |
| comment#2(2.1) For the following text, the configured list of CSI-RS resource, or power offset, or antenna port subset doesn’t have to be “different”. For example, in the case of joint design, the CSI report configuration can be :Sub-config-1: CSI-RS resource list 1;Sub-config-2: power offset 1;Sub-config-3: CSI-RS resource list 1+ power offset 1.In the example above, the the configured list of CSI-RS resource, or power offset, or antenna port subset can be the same in different sub-configurations. We can remove “different” to allow potential gNB implementation flexibility.(2.2 )In the following text of mixed sub-configurations, we suggest to put “s” of “sub-configurations” in the bracket to preclude the case that ONE　sub-configuration responding to type 1 SD while another ONE　sub-configuration responding to type 2 SDOriginal text #2:. A *CSI-ReportConfig* can contain a list of sub-configurations, provided by the higher layer parameter [*csi-ReportSubConfigList],* where each sub-configuration is identified by [*csi-ReportSubConfigID*] and corresponds to a different list of one or more CSI-RS resources or corresponds to a different CSI-RS antenna port subset, and/or corresponds to a different power offset for PDSCH relative to CSI-RS. A UE is not expected to be configured with a *CSI-ReportConfig* that contains a mix of sub-configurations each corresponding to a different list of one or more CSI-RS resources and some other sub-configurations each corresponding to different CSI-RS antenna port subset.Suggested text 2 : . A *CSI-ReportConfig* can contain a list of sub-configurations, provided by the higher layer parameter [*csi-ReportSubConfigList],* where each sub-configuration is identified by [*csi-ReportSubConfigID*] and corresponds to a ~~different~~ list of one or more CSI-RS resources or corresponds to a ~~different~~ CSI-RS antenna port subset, and/or corresponds to a ~~different~~ power offset for PDSCH relative to CSI-RS. A UE is not expected to be configured with a *CSI-ReportConfig* that contains a mix of sub-configuration (s) each corresponding to a ~~different~~ list of one or more CSI-RS resources and some other sub-configuration (s) each corresponding to ~~different~~ CSI-RS antenna port subset. |
| Comment #3In our understanding, the “subsets of resources” is provided by the “ a list of one or more CSI-RS resources”. So we suggest a minor update to be clear and consistent with other paragraphs.Original text #3: Different subsets of resources, where a subset contains one or more resources, of a NZP CSI-RS Resource Set for channel measurement can correspond to different sub-configurations contained in a *CSI-ReportConfig,* or all the resources of a NZP CSI-RS Resource Set for channel measurement can correspond to each of the sub-configurations contained in a *CSI-ReportConfig*, as described in Clause 5.2.1.4.2.Proposed text #3:Different subsets of resources, where a subset contains a list of one or more resources, of a NZP CSI-RS Resource Set for channel measurement can correspond to different sub-configurations contained in a *CSI-ReportConfig,* or all the resources of a NZP CSI-RS Resource Set for channel measurement can correspond to each of the sub-configurations contained in a *CSI-ReportConfig*, as described in Clause 5.2.1.4.2. |
| Comment #4We agree with the suggestion from vivo Comment#1 to make it clear. Moreover, we also prefer to use another symbolic for “N” and “L” in *N* sub-configurations out of *L* sub-configurations since “N” and “L” have different meanings in the same subclause.  |
| Comment #5Not sure why transposition operation is needed. The following update is suggested to be consistent with the previous paragraphs.Original text #5:  for CQI calculation for the sub-configuration with the antenna port subset represented by vector [3000 + *p*(*0*), …, 3000 + *p*(*P* – 1)]*T* of size *P*, the UE should assume that PDSCH signals on antenna ports in the set [1000,…, 1000+ν-1] for ν layers would result in signals equivalent to corresponding symbols transmitted on antenna ports [3000 + *p*(*0*), …, 3000 + *p*(*P* – 1)] *T*,Proposed text #5:for CQI calculation for the sub-configuration with the antenna port subset represented by ~~vector~~ [3000 + *p*(*0*), …, 3000 + *p*(*P* – 1)]*~~T~~* of size *P*, the UE should assume that PDSCH signals on antenna ports in the set [1000,…, 1000+ν-1] for ν layers would result in signals equivalent to corresponding symbols transmitted on antenna ports [3000 + *p*(*0*), …, 3000 + *p*(*P* – 1)] *~~T~~*, |

 | comment#1: done!comment#2OK to remove ‘different’. Also, OK to add ‘(s)’ to ‘sub-configuration’ to avoid any ambiguity.Comment #3Not essential as such, as that clarification is provided already under 5.2.1.1. Anyhow, text updated also considering other companies’ comments.Comment #4Please see the reply to vivo’s comment and corresponding update.Comment #5Vector and transpose are actually used in a similar way as legacy text but for (vector) x(i). Since there is no apparent issue with the current version, I will keep it as is for now.  |
| Google | It seems the following agreements are not captured correctly.**Agreement**For CSIs across multiple sub-configurations in one CSI reportConfig map different sub-configurations based on RAN1#114 agreement in 9.7.1* For Part 2 priority reporting level
	+ Option 1: for a given band type from {wideband, even subband, odd subband}, the omission order follows the priority order determined by sub-configuration index

Current CR (section 5.2.3) adds an exception to define that Table 5.2.3-1 is only for case of CSI report without >1 sub-configurations, and defines the following for CSI omission for CSI with >1 sub-configurations. However, it can be misunderstood as the CSI omission does not consider the wideband/subband operation. Therefore, we propose the following change for this sentence.For a Reporting Setting for which the *CSI-ReportConfig* contains a list of sub-configurations, for a corresponding CSI report which contains one or more CSIs, omission of Part 2 CSI is done at a sub-configuration level where a sub-configuration with an index, provided by [*csi-ReportSubConfigID*], with lower value has higher priority. Omission of Part 2 CSI is according to the priority order shown in Table 5.2.3-1 by replacing CSI report into CSI for a sub-configuration. | Text updated also considering other companies’ comments. |
| LG Electronics | Thank you so much for your efforts on the draft CRs.I have one clarification question on the implication of “different subset”Different subsets of resources, where a subset contains one or more resources, of a NZP CSI-RS Resource Set for channel measurement can correspond to different sub-configurations contained in a *CSI-ReportConfig,* or all the resources of a NZP CSI-RS Resource Set for channel measurement can correspond to each of the sub-configurations contained in a *CSI-ReportConfig*, as described in Clause 5.2.1.4.2.**Agreement@112bis-e**Support configurability of NZP CSI-RS resource(s) for channel measurement within one resource setting corresponding to more than one spatial adaptation patterns with at least one of the following* A1-1-revised: a resource set with multiple resources is configured within a resource setting, where each resource is associated with only one spatial adaptation pattern
* A1-2-revised: For a resource configured in a resource set within a resource setting, the resource can be associated with more than one spatial adaptation patterns
	+ One or more resources can be configured in the resource set for channel measurement.

If there are 4 CSI-RS resources within a set for channel measurement, my understanding of the agreement above allows Case#1 but not allows Case#2, since CSI-RS resource #3 corresponds to both of subconfig#1 and subconfig#2.<Case#1>Subconfig #1: CSI-RS resource list including CSI-RS resource indexes {#1, #2}Subconfig #2: CSI-RS resource list including CSI-RS resource indexes {#3, #4}<Case#2>Subconfig #1: CSI-RS resource list including CSI-RS resource indexes {#1, #2, #3}Subconfig #2: CSI-RS resource list including CSI-RS resource indexes {#3, #4}If the meaning of “different subsets” in the current spec is aligned with my example above, the CR is fine to me as is. Otherwise, I think some modification is needed to correctly reflect previous RAN1 agreement. | Based on the below agreement, it seems for now there is no restriction to only have case#2, so case#3 seems also possible – although case#2 would be more typical.**Agreement** (RAN1#113 Incheon)* For A1-1-revised for Type 2, one or more CSI-RS resources from a CSI-RS resource set for channel measurement can be associated with the same sub-configuration provided in a CSI report configuration
	+ Resources in the resource set for channel measurement have the same number of antenna ports
* For A1-2-revised for Type 1, all CSI-RS resource(s) (which can be one or more) in the CSI-RS resource set for channel measurement are associated with each sub-configuration provided in a CSI report configuration
	+ i.e. each CSI-RS resource is associated with all the sub-configurations
	+ Resources in the resource set for channel measurement have the same number of antenna ports
* FFS: restriction on total number of CSI-RS resources for channel measurement in a CSI-ReportConfig and/or sub-configuration.
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| Samsung | **Comment#1.** Regarding the added text in 5.1.6.1 (P3) copied below, suggest to remove.During non-active periods of cell DTX, the UE supporting cell DTX is not expected to receive the periodic CSI-RS and semi-persistent CSI-RS configured in CSI report configuration in CSI-*ReportConfig* for CSI reporting.This UE behaviour (i.e., no reception of P/SP CSI-RS) is better to be captured in 38.321, which is similar as C-DRX. Hence, it is suggested to remove the corresponding description here to avoid duplication.Same comment for the text below in 6.2.1 (P28).During non-active periods of cell DRX, the UE supporting cell DRX is not expected to transmit the periodic SRS, or semi-persistent SRS for channel acquisition. SRS for positioning is not impacted by cell DRX operation.**Comment#2.** Regarding the added text in 5.2.1.1 (P2), suggest to revise as follows.“A CSI-ReportConfig can contain a list of sub-configurations, provided by the higher layer parameter [*csi-ReportSubConfigList*], where each sub-configuration is identified by [*csi-ReportSubConfigID*] and corresponds to a ~~different~~ list of one or more CSI-RS resource(s) or corresponds to a ~~different~~ CSI-RS antenna port subset, and /or corresponds to a ~~different~~ power offset for PDSCH relative to CSI-RS. A UE is not expected to be configured with a *CSI-ReportConfig* that contains a mix of sub-configurations, where some sub-configurations each corresponds to a ~~different~~ list of one or more CSI-RS resource(s) and some other sub-configurations each corresponds to ~~different~~ CSI-RS antenna port subset.”In our view, “different” is not explicitly mentioned in any agreement. Thus, suggest to remove ‘different’. Also, some wordings are added for clarity. **Comment#3.** Regarding the added text in 5.2.1.4.1, suggest to revise as follows.“~~Different~~ A subsets of resources, where a subset contains one or more resources provided by a list of NZP CSI-RS resources by a sub-configuration, of a NZP CSI-RS Resource Set for channel measurement ~~can~~ correspond to ~~different~~ the sub-configuration~~s~~ contained in a CSI-ReportConfig, or all the resources of a NZP CSI-RS Resource Set for channel measurement ~~can~~ correspond to each of the sub-configurations contained in a CSI-ReportConfig when each of the sub-configurations are not provided with a list of NZP CSI-RS resources, as described in Clause 5.2.1.4.2.”Similar comment as for #2, “different” is not explicitly mentioned in any agreement. Thus, suggest to remove ‘different’. The association between channel measurement resources and Type 1 SD / Type 2 SD is unclear based on the current wording, some revision and conditions are provided to make the association clear.**Comment#4.** Regarding the added text in 5.2.1.4.2, suggest to revise as follows.“A sub-configuration can be configured with a list of NZP CSI-RS resources, provided by [nzp-CSI-RS-resourceList], which indicates one or more NZP CSI-RS resources corresponding to the sub-configuration, within the NZP-CSI-RS-ResourceSet contained in the CSI-ResourceConfig for channel measurement which corresponds to the CSI-ReportConfig.”The correspondence between channel measurement resources and sub-configurations for Type 2 SD is missing. Corresponding wording are added.**Comment#5.** Regarding the added text in 5.2.1.4.2, suggest to revise as follows.‘If each of one or more sub-configurations does not correspond to a list of NZP CSI-RS resources ~~corresponds to a CSI-RS antenna port subset, provided by [port-subsetIndicator], or corresponds to a power offset, provided by [powerOffset]~~, then each of this one or more sub-configurations shall be associated with all the NZP CSI-RS resources within the NZP-CSI-RS-ResourceSet contained in the CSI-ResourceConfig for channel measurement which corresponds to the CSI-ReportConfig.’If Type 2 SD adaptation and power offset are combined / are both configured, the current description for power offset does not hold. In our view, the key condition for the mapping between resources and hence, the condition that all sub-configurations that each of the sub-configuration is associated with all resources within CMR set should be “**If each of one or more sub-configurations does not correspond to a list of NZP CSI-RS resources**”.**Comment#6.** Regarding the added text in 5.2.1.4.2, suggest to revise as follows.if a sub-configuration indicates a CSI-RS antenna port subset using the higher layer bitmap parameter [*port-subsetIndicator*], as described in clause 5.2.1.4.2, for CQI calculation for the sub-configuration with the antenna port subset represented by vector [3000 + *p*(*0*), …, 3000 + *p*(*P* – 1)]*T* of size *P*, the UE should assume that [3000 + *p*(*0*), …, 3000 + *p*(*P* – 1)]*T* are one-by-one re-indexed to [3000, 3001,…, 3000 + P-1] *T* based on increasing order of port index, and PDSCH signals on antenna ports in the set [1000,…, 1000+ν-1] for ν layers would result in signals equivalent to corresponding symbols transmitted on antenna ports [3000, …, 3000 + *P -* 1] *T*, as given bywhere *p*(*j*) , *j* =0, …, *P-1*, and *T* and are as previously defined inthis Clause.In our view, the port IDs indicated by port subsets are only for the purpose of determination of the corresponding CSI-RS resource for measurement (i.e., each port ID corresponds to particular REs and cover code). For the determination of W(i), those CSI-RS ports should be re-indexed as consecutive IDs starting from 3000. This is consistent with the definition of legacy codebooks / W(i) (i.e., corresponds to a number of consecutive CSI-RS ports starting from 3000).Otherwise, the indicated port subset could be non-consecutive and the lowest ID of the port subset indication may not start from 3000. This will result in inconsistency between the given CSI-RS port subset and W(i) in the case of CQI determination. Hence, [3000 + *p*(*0*), …, 3000 + *p*(*P* – 1)] *T* need to be one-by-one re-indexed as [3000, 3001,…, 3000 + P-1] *T* for CQI calculation.**Comment#7.** Regarding the added text in 5.2.3 for CSI omission, suggest to revise as follows.“For a Reporting Setting for which the CSI-ReportConfig contains a list of sub-configurations, for a corresponding CSI report n which contains one or more CSIs, omission of Part 2 CSI is done at a sub-configuration level within the same priority level defined by Table 5.2.3-1 where a sub-configuration with an index, provided by [csi-ReportSubConfigID], with lower value has higher priority.”Based on the agreement in RAN1#114, legacy table for CSI part 2 omission is extended from report level to sub-configuration level. Also, it was agreed that the information of wideband CSI is prioritized followed by even subband CSI and odd subband CSI. Within each band type, CSI omission is performed in sub-configuration level. Hence, some texts are added to reflect the agreement. Agreement (RAN1#114)For CSIs across multiple sub-configurations in one CSI reportConfig map different sub-configurations based on RAN1#114 agreement in 9.7.1* For Part 2 priority reporting level
	+ Option 1: for a given band type from {wideband, even subband, odd subband}, the omission order follows the priority order determined by sub-configuration index
 | **Comment#1:** not sure everybody agrees, at least previous comments were positive, we can consider later if this is seen problematic/redundant.**Comment#2:**- Ok to remove ‘different’.- Not sure that ‘where some sub-configurations each’ is adding any noticeable clarification, so text is not updated.- ‘One or more CSI-RS resources’ is fine as it should be understood as: one CSI-RS resourc**e** or more than one CSI-RS resourc**es**.**Comment#3:** OK.**Comment#4:**That clarification seems not needed as anyhow the correspondence is already clear given that we say: “A sub-configuration can be configured with a list of NZP CSI-RS resources”.**Comment#5:** OK.**Comment#6:**Let’s take this point into next round.**Comment#7:** OK. |
| Ericsson | **Comment #0**We agree with the editor’s choice of the wording “A *CSI-ReportConfig* can contain a list of sub-configurations, provided by the higher layer parameter [*csi-ReportSubConfigList*]” to clearly identify NES functionality. It is good to use this consistently throughput 38.214.**Comment #1 (Section 5.2.1, 3rd paragraph)**Regarding the following:For CQI, PMI, CRI, SSBRI, LI, RI, L1-RSRP, L1-SINR, CapabilityIndex a UE is configured by higher layers with N≥1 *CSI-ReportConfig* Reporting Settings, M≥1 *CSI-ResourceConfig* Resource Settings, and one or two list(s) of trigger states (given by the higher layer parameters *CSI-AperiodicTriggerStateList* and *CSI-SemiPersistentOnPUSCH-TriggerStateList*). Each trigger state in *CSI-AperiodicTriggerStateList* contains a list of associated *CSI-ReportConfigs* indicating the Resource Set IDs, and additionally one or more [*csi-ReportSubConfigID*] for a *CSI-ReportConfig* if multiple sub-configurations are contained in the *CSI-ReportConfig*, as described in Clause 5.2.1.1, for channel and optionally for interference. Each trigger state in *CSI-SemiPersistentOnPUSCH-TriggerStateList* contains one associated *CSI-ReportConfig*, and additionally one or more [csi-ReportSubConfigID] for the associated CSI-ReportConfig if multiple sub-configurations are contained in the CSI-ReportConfig, as described in Clause 5.2.1.1.It would read better if the sentence containing the cyan and yellow highlights occurs after “for channel and optionally for interference.”Furthermore, for consistency, the yellow highlighted text should be changed to“…configured with a list of sub-configurations, provided by the higher layer parameter [*csi-ReportSubConfigList*], …”**Comment #2 (Section 5.2.1.1, 2nd paragraph)**It seems the text precludes Type 2 SD + PD adaptation which is counter to the following agreement:**Agreement**For joint operation of SD and PD, each subConfig contains corresponding parameters for an SD adaptation and/or parameters for a PD adaptationAdditionally use of the word “different” may cause confusion. For example two sub-configurations could contain different port subsets, but the same power offset. Moreover, the text is hard to read. We think the following would be cleaner and more accurate:A *CSI-ReportConfig* can contain a list of sub-configurations, provided by the higher layer parameter [*csi-ReportSubConfigList],* where each sub-configuration is identified by [*csi-ReportSubConfigID*]. A sub-configuration corresponds to one of the following:* a CSI-RS antenna port subset and/or a power offset for PDSCH relative to CSI-RS
* a list of CSI-RS resources and additionally can correspond to a power offset for PDSCH relative to CSI-RS

A UE is not expected to be configured with a *CSI-ReportConfig* that contains sub-configuration(s) corresponding to a CSI-RS antenna port subset and sub-configuration(s) corresponding to a list of CSI-RS resources.**Comment #3 (Section 5.1.2.4.1)**Again, use of the word “different” can cause confusion. For example one subset of CSI-RS resources can correspond to two different sub-configurations, e.g., if those sub-configurations correspond to different power offsets. Hence, we think the following would be cleaner and more accurate:~~Different subsets of resources, where a subset contains one or more resources, of a NZP CSI-RS Resource Set for channel measurement can correspond to different sub-configurations contained in a~~ *~~CSI-ReportConfig,~~* ~~or all the resources of a NZP CSI-RS Resource Set for channel measurement can correspond to each of the sub-configurations contained in a~~ *~~CSI-ReportConfig~~*~~, as described in Clause 5.2.1.4.2.~~Either all CSI-RS resources or a subset of CSI-RS resources of an NZP CSI-RS Resource Set for channel measurement can correspond to a sub-configuration contained in a *CSI-ReportConfig*, as described in Clause 5.2.1.4.2.**Comment #4 (Section 5.2.1.4.2)*** Recommend the changes below for accuracy.
* Regarding the highlighted text, it seems to imply that only a single CSI-RS resource set can be configured in an *CSI-ResourceConfig*. However, in the legacy spec, for aperiodic CSI triggering, the *CSI-ResourceConfig* can contain multiple sets, but a trigger state points to only one of them. We don’t think this legacy functionality should be disabled.
* We suggest to add the wording “for the purposes of CSI reporting” since the gNB still transmits on the disabled antenna ports.
* The highlighted text seems unclear. Will there be new RRC parameters, or will RAN2 reuse existing parameters? We don’t really know, so the highlighted text should be in square brackets for now.

If the UE is configured with a *CSI-ReportConfig* that contains a list of sub-configurations, provided by the higher layer parameter [*csi-ReportSubConfigList]*:- the UE expects to be configured with the higher layer parameter *codebookType* set to 'typeI-SinglePanel' or 'typeI-MultiPanel'. If the UE indicates a capability for supporting mixed codebook combination in a slot with [ABC], a ~~each~~ sub-configuration can be configured with the higher layer parameter *codebookType* set to 'typeI-SinglePanel' or 'typeI-MultiPanel'.- A ~~Each~~ sub-configuration can be configured with an antenna port subset using the higher layer bitmap parameter [*port-subsetIndicator*] which contains the bit sequence , where is the MSB and is the LSB, bit corresponds to antenna port , and is the number of ports *nrofPorts* configured for the CSI-RS resource(s) within the *NZP-CSI-RS-ResourceSet* contained in the *CSI-ResourceConfig* for channel measurement that corresponds to the *CSI-ReportConfig*. A bit value 0 in [*port-subsetIndicator*] indicates that the corresponding antenna port is disabled for the sub-configuration for the purposes of CSI reporting, whereas bit value 1 indicates that the antenna port is enabled and belongs to the antenna port subset for the sub-configuration for the purposes of CSI reporting. - If ~~one or more~~ a sub-configurations ~~are each~~ is configured with an antenna port subset, then ~~each of the one or more~~ the sub-configuration~~s~~ ~~is~~ may be configured with a RI restriction parameter and, if the number of antenna ports of the subset is ~~>~~ greater than 2, with *n1-n2* parameter if the higher layer parameter *codebookType* is set to 'typeI-SinglePanel' or with *ng*-*n1-n2* parameter if the higher layer parameter *codebookType* is set to 'typeI-MultiPanel', and, if the corresponding number of antenna ports of the subset is 2, with *twoTX-CodebookSubsetRestriction*, where the parameters RI restriction, *n1-n2,* *ng*-*n1-n2,* *twoTX-CodebookSubsetRestriction* are as described in Clauses 5.2.2.2.1 and 5.2.2.2.2.- A sub-configuration can be configured with a list of NZP CSI-RS resources, provided by [*nzp-CSI-RS-resourceList*], which indicates a subset of one or more NZP CSI-RS resources, within the *NZP-CSI-RS-ResourceSet* contained in the *CSI-ResourceConfig* for channel measurement which corresponds to the *CSI-ReportConfig.*- A sub-configuration can be configured with a power offset provided by [*powerOffse*t].- If ~~each of one or more~~ a sub-configuration~~s~~ ~~corresponds to a CSI-RS antenna port subset, provided by~~ *~~[port-subsetIndicator]~~*~~, or corresponds to a power offset, provided by~~ *~~[powerOffset],~~* ~~then each of this one or more~~ is not configured with [*nzp-CSI-RS-resourceList*] the sub-configuration~~s~~ shall be associated with all the NZP CSI-RS resources within the *NZP-CSI-RS-ResourceSet* contained in the *CSI-ResourceConfig* for channel measurement which corresponds to the *CSI-ReportConfig.*- the UE reports CSI for one or more sub-configurations according to Clauses 5.2.1.5.1, 5.2.1.5.2, 5.2.3 and 5.2.4, and according to the higher layer parameter *reportQuantity* configured for that *CSI-ReportConfig*.**Comment #5 (Section 5.2.1.5.1, 1st paragraph)**The current wording seems to imply that if multiple trigger states are configured, all of them will trigger one or more sub-configurations. This seems to preclude legacy spec behavior in which one or more trigger states could be configured for a different *CSI-ReportConfig* that does not contain sub-configurations. To clarify this, we recommend the following alternative wording:~~For a reporting setting for which the~~ *~~CSI-ReportConfig~~* ~~contains a list of sub-configurations, one or more trigger states can be configured with each indicating one or more of the sub-configurations.~~A trigger state for a reporting setting for which the *CSI-ReportConfig* contains a list of sub-configurations provided by the higher layer parameter [*csi-ReportSubConfigList*] can be configured to indicate one or more of the sub-configurations by the higher layer parameter [TBD].**Comment #6 (Section 5.2.1.5.2, 1st paragraph)**Suggest similar change as Comment #5:~~For a reporting setting for which the~~ *~~CSI-ReportConfig~~* ~~contains a list of sub-configurations, one or more trigger states can be configured with each indicating one or more of the sub-configurations.~~A trigger state for a reporting setting for which the *CSI-ReportConfig* contains a list of sub-configurations provided by the higher layer parameter [*csi-ReportSubConfigList*] can be configured to indicate one or more of the sub-configurations by the higher layer parameter [TBD].**Comment #7 (Section 5.2.1.2.5.2, 2nd paragraph)**The open issue (for RAN2 to decide) is whether it is the same activation command or a different one for selecting the sub-configurations. Hence, the following change is recommended:For semi-persistent reporting on PUCCH, the PUCCH resource used for transmitting the CSI report are configured by *reportConfigType*. Semi-persistent reporting on PUCCH is activated by an activation command as described in clause 6.1.3.16 of [10, TS 38.321], which selects one of the semi-persistent Reporting Settings for use by the UE on the PUCCH. ~~For a~~ If the selected reporting setting for which the *CSI-ReportConfig* contains a list of sub-configurations provided by the higher layer parameter [*csi-ReportSubConfigList*], [an/the] activation command can [also] select one or more sub-configurations to use by the UE as described in clause 6.1.3.X of [10, TS 38.321]. When the UE would transmit a PUCCH with HARQ-ACK information in slot *n* corresponding to the PDSCH carrying the activation command, the indicated semi-persistent Reporting Setting should be applied starting from the first slot that is after slot where ** is the SCS configuration for the PUCCH. **Comment #8 (Various sections)**In all instances of “…*CSI-ReportConfig* that contains a list of sub-configurations..”, suggest adding “provided by the higher layer parameter [*csi-ReportSubConfigList*]” to clearly indicate the parameter that indicates whether NES functionality applies or not.Comment #9 (Section 5.2.1.6)Suggest the following change since it is already specified in an earlier section that the CSI-RS resource(s) associated with a sub-configuration are either all or a subset of the CSI-RS resource set associated with the sub-configuration- If a *CSI-ReportConfig* contains a list of sub-configurations, for a CSI report for *N* sub-configurations out of *L* sub-configurations contained in a *CSI-ReportConfig*, where and ,- for periodic CSI reporting, and for aperiodic and semi-persistent CSI reporting, where is the total number of CSI-RS resources corresponding to the *i*-th sub-configuration ~~which are in the~~ *~~NZP-CSI-RS-ResourceSet~~* ~~of the~~ *~~CSI-ResourceConfig~~* ~~for channel measurement.~~**Comment #10 (Section 5.2.1.6)**Suggest the following changes since the word “times” is incorrect in the case of port counting since the formulas already include *P*. Also suggest changing “corresponds to” to “configured with” for clarity. Finally “or” should be changed to “and/or” in the 2nd sub-bullet to cover the case of Type-2 SD only, PD-only, and Type-2 SD + PD.For a CSI report configuration containing sub-configuration(s) indicated in a *CSI-ReportConfig,* if a CSI-RS resource is referred by *M* sub-configurations among *X* sub-configurations, the CSI-RS resource is counted *M* times and the CSI-RS ports within the CSI-RS resource are counted as follows:- ~~times~~ if each sub-configuration, of the *M* sub-configurations, ~~corresponds to~~ is configured with a CSI-RS antenna port subset, provided by [*port-subsetIndicator*],- *M* × *P* ~~times~~ if each sub-configuration, of the *M* sub-configurations, ~~corresponds to~~ is configured with a list of one or more CSI-RS resources, provided by [*nzp-CSI-RS-resourceList*], and/or ~~corresponds to~~ is configured with a power offset, provided by *[powerOffset]*,Where *P* is the number of ports configured by *nrofPorts* and is the number of CSI-RS ports in sub-configuration *s* derived from the corresponding antenna port subset indicator [*port-subsetIndicator*] according to clause 5.2.1.4.2.**Comment #11 (Section 5.2.2.5)*** The index *j* =0, …, *P-1* seems to be missing from the formula
* It is unclear to me how the following notation works. For a 32-port CSI-RS resource and a port subset of 16 ports, is P = 32 or is P = 16?
	+ antenna port subset represented by vector [3000 + *p*(*0*), …, 3000 + *p*(*P* – 1)]*T* of size *P*

If it is P=16, then it seems that the wording wording “W(i) are as previously defined in this Clause” is not accurate. It should be clarified that the dimension of W(i) depends on (N1,N2) for the sub-configuration which depends on the indicated port subset.**Comment #12 (Section 5.2.3)**The following new textFor a *CSI-ReportConfig* that contains a list of sub-configurations, for Type I CSI feedback for one or more of the sub-configurations, Part 1 contains corresponding RI(s) (if reported), CRI(s) (if reported), CQI(s) for the first codeword (if reported) and is zero padded to a fixed payload size (if needed). Part 2 contains the corresponding CQI(s) for the second codeword (if reported) when RI is larger than 4, LIs (if reported) and PMI(s).seems to imply that Part 1 is defined as the concatenation of Part 1’s of each of the CSIs corresponding to the sub-configurations. Our understanding of the following agreement is that Part 1 and Part 2 of each CSI is determined individually. The above wording needs adjustment to be in-line with the agreement.**Agreement**For N(>1) CSIs reporting with multiple sub-configurations without payload/complexity reduction, * Each CSI can be a single-part, or two-part CSI, and contains the same types of CSI parameters/quantities as legacy, when applicable/if reported;
* The mapping order of CSI fields of one sub-configuration is as legacy mapping order of CSI fields of one CSI report;
* Part 2 CSI priority reporting level follows wideband CSI first, then even subband CSI and odd subband CSI;

**Comment #13 (Section 5.2.3)**Regarding the following new text:For a Reporting Setting for which the *CSI-ReportConfig* contains a list of sub-configurations, for a corresponding CSI report which contains one or more CSIs, omission of Part 2 CSI is done at a sub-configuration level where a sub-configuration with an index, provided by [*csi-ReportSubConfigID*], with lower value has higher priority.Is this consistent with the CR to 38.212? Also it doesn’t seem to capture that Part 2 omission is done based on odd subbands first, then even subbands, then wideband:**Agreement**For CSIs across multiple sub-configurations in one CSI reportConfig map different sub-configurations based on RAN1#114 agreement in 9.7.1* For Part 2 priority reporting level
	+ Option 1: for a given band type from {wideband, even subband, odd subband}, the omission order follows the priority order determined by sub-configuration index

**Comment #14 (Section 5.2.4)**Regarding the following new text, we have the same comment as Comment #12:For a *CSI-ReportConfig* containing a list of sub-configurations and configured with subband reporting, for Type I CSI for one or more of the sub-configurations, Part 1 contains corresponding RI(s) (if reported), CRI(s) (if reported), CQI(s) for the first codeword (if reported) and is zero padded to a fixed payload size (if needed). Part 2 contains the corresponding CQI(s) for the second codeword (if reported) when RI is larger than 4, LIs (if reported) and PMI(s). | **Comment #1**Don’t see a strong reason to change the order of the sentence. Otherwise, sentence updated reflecting the essence of the second part of your comment. Note that no need to talk about ‘provided by the higher layer parameter [*csi-ReportSubConfigList*]’ as this is as described in 5.2.1.1.**Comment #2:**‘different’ was removed as also suggested by other companies. Otherwise, the current text is fine and understandable.**Comment #3:**Updated mostly considering Samsung’s suggestion.**Comment #4:**- Unless there is a strong concern about using ‘each’ (which is already used in several other instances in 214 etc.). Otherwise, I accounted for most of your suggested edits.- Better to avoid terms such as “for the purposes of CSI reporting”. Also, this should be clear given the context and section we have that paragraph under.- Regarding the highlighted text, this is I guess better to first fully clarify in RAN1. Let’s keep the text as is for now.- Ok to have the highlighted text in [.].**Comment #5:**In the current formulation, we use “one or more trigger states can be configured”. Also, that is specifically for the case where *CSI-ReportConfig* contains a list of sub-configurations. This should be enough to clarify.**Comment #6:**Same comment as above.**Comment #7:** OK.**Comment #8:** Fine.**Comment #9:** OK.**Comment #10:** OK in principle. Otherwise, don’t see an issue with using ’times’ there.**Comment #11:** P=16 in your example. Then, for W(i), the definition in the clause which refers to 5.2.1.4.2 seems enough. Anyhow, let’s take those points into next round.**Comment #12:** This is only describing what Part 1 and Part 2 would consist of. **Comment #13:** Subsection updated a bit also according to other companies’ comments.**Comment #14:** Same as #12. |
| Huawei, HiSilicon | **We have the following additional comments.****Comment #1:**Regarding the added text in 5.1.6.1, we agree with Lenovo and APPLE1 that the current text does not precisely reflect the corresponding agreement “… • Periodic/Semi-persistent CSI-RS configured in CSI report configuration in CSI-ReportConfig with reportQuantity including RI (for CSI reporting) …”.**Comment #2:**Regarding the text added in section 5.2.1.4.2 Report Quantity Configurations:According to the corresponding agreement UE reports multiple CSI(s)**Agreement** (RAN1#113 Incheon)For both spatial domain NES, when UE reports CSIs corresponding to one or more sub-configurations provided in a CSI report configuration, At least support baseline: Report CSI for each indicated sub-configuration, according to reportQuantity configurationHence, we propose this modification: the UE reports CSI(s) for one or more ~~sub-configurations~~ *CSI-ReportSubConfig* according to Clauses 5.2.1.5.1, 5.2.1.5.2, 5.2.3 and 5.2.4, and according to the higher layer parameter *reportQuantity* configured for that *CSI-ReportConfig*.**Comment #3:** Regarding the text added in 5.2.1.6 CSI processing criteria. We agree in principle with Apple1. Additionally, it could be miss interpreted that L does not represent the number of *all* sub-configurations in a CSI report. Hence, we propose to clarify this. We are fine also to update the naming of N and/or L. For example, our modifications on top of Apple1 proposal are in purple: If a *CSI-ReportConfig* contains a list of **L** ~~sub-configurations~~ csi-ReportSubConfigID(s), for a CSI report ~~for~~ with *N or L CSIs* ~~sub-configurations~~ out of the *L* ~~sub-configurations contained in a~~ *~~CSI-ReportConfig~~* csi-ReportSubConfig(s), where and ,- for periodic CSI report, ~~and for aperiodic and semi-persistent CSI report,~~ where is the total number of CSI-RS resources corresponding to the *i*-th csi-ReportSubConfig which are in the *NZP-CSI-RS-ResourceSet* of the *CSI-ResourceConfig* for channel measurement.- for aperiodic and semi-persistent CSI report, where N is the number of indicated sub-configurations by the DCI or MAC CE, is the total number of CSI-RS resources corresponding to the *i*-th indicated ~~sub-configuration~~ csi-ReportSubConfig which are in the *NZP-CSI-RS-ResourceSet* of the *CSI-ResourceConfig* for channel measurement.**Comment #4:** Regarding the text added in 5.2.2.3.1 NZP CSI-RS. * It seems that Type 2 is not included which could give the intuition that CQI calculation is not supported for type 2 SD. Same comment apply for type 1 SD and PD.
* *p*(*j*) exact values and how they can be obtained are not clearly defined also 32 could be replaced by P\_m which is not used although defined in section 5.2.1.4.2.
* we agree with ZTE that some of the T operations are not needed
* additional details might be misinterpreted as missing if not clarified about type 2 SD and ERPE of type 1 SD.

- For a UE configured with a *CSI-ReportConfig* that contains a list of ~~sub-configurations~~ *csi-ReportSubConfigID(s)*,- if a *csi-ReportSubConfig* indicates a CSI-RS antenna port subset using the higher layer bitmap parameter [*port-subsetIndicator*], as described in clause 5.2.1.4.2, for CQI calculation for the sub-configuration with the antenna port subset represented by vector [3000 + *p*(*0*), …, 3000 + *p*(*P* – 1)]*~~T~~*of size *P*, the UE should assume that PDSCH signals on antenna ports in the set [1000,…, 1000+ν-1] for ν layers would result in signals equivalent to corresponding symbols transmitted on antenna ports [3000 + *p*(*0*), …, 3000 + *p*(*P* – 1)] *T*, as given bywhere *p*(*j*) , *j* =0, …, *P-1*, where P\_m is defined in 5.2.1.4.2, P is the number of ones in the higher layer bitmap parameter [*port-subsetIndicator*] and *p*(*j*) is the index of jth one in higher layer bitmap parameter [*port-subsetIndicator*] , and *T* ,  *, and*  the corresponding PDSCH EPRE to CSI-RS EPRE are as previously defined in this Clause.  - if a csi-ReportSubConfig corresponds to a list of one or more CSI-RS resources, provided by [nzp-CSI-RS-resourceList], as described in clause 5.2.1.4.2, for CQI calculation for a sub report the UE apply as previously defined in this Clause. - if a ~~sub-configuration~~ *csi-ReportSubConfig* indicates a power offset *[powerOffset]*,for CQI calculation, the UE shall assume the corresponding PDSCH signals transmitted on the antenna ports of a CSI-RS resource would have a ratio of EPRE to CSI-RS EPRE equal to the [difference] between *powerControlOffset* of the CSI-RS resource, given in Clause 5.2.2.3.1, and *[powerOffset].***Comment #5:** Regarding the text added in 5.2.3 CSI reporting using PUSCH. And 5.2.4 CSI reporting using PUCCHWe agree with the comments 12 and 14 from Ericson. **Comment #6:** Regarding the text added in 5.2.3 CSI reporting using PUSCH. We would like to emphasise on our first round of comments (comment #2). With which seems that Samsung (last comment ) and (Ericson comment #13) agrees. Part 2 priority reporting level when considering the omission order based on priority order using the sub-configuration index as the corresponding agreement mentioned. If better/clearer rewording is expected, perhaps the following can be further suggested.**Agreement**(RAN1#114 Toulouse)For CSIs across multiple sub-configurations in one CSI reportConfig map different sub-configurations based on RAN1#114 agreement in 9.7.1For Part 2 priority reporting levelOption 1: for a given band type from {wideband, even subband, odd subband}, the omission order follows the priority order determined by sub-configuration index For a Reporting Setting for which the *CSI-ReportConfig* contains a list of *CSI-ReportSubConfig*(s)*,* for a corresponding CSI report which contains one or more CSI sub-report(s), for each of all Part 2 wideband CSI(s), all Part 2 even subbands CSI(s) and all Part 2 odd subbands CSI(s), a priority reporting level is firstly determined based on the Prii,CSI(*y,k,c,s*) value as defined in Clause 5.2.5, and omission of Part 2 CSI(s) for a particular priority reporting level of the CSI report is done at a sub-report ~~sub-configuration~~ level where a sub-report ~~sub-configuration~~ with an index, provided by [*csi-ReportSubConfigID*], with lower value has higher priority. | **Comment #1:** updated! Please see also Samsung’s comment!**Comment #2:** Added (s). don’t see an issue with using ‘sub-configurations’ there.**Comment #3:** Updated also considering vivo’s and other companies’ input.**Comment #4:**- Added ‘provided by the higher layer parameter [*csi-ReportSubConfigList*]’, also based on Ericsson’s suggestion. No need to remove ‘sub-configuration’ as such. - Added the following: *and*  the corresponding PDSCH EPRE to CSI-RS EPRE …- Introducing “P\_m” doesn’t seem necessary there. Added definition for P.- Added the following with a small twist: << - if a csi-ReportSubConfig corresponds to a list of one or more CSI-RS resources, provided by [nzp-CSI-RS-resourceList], as described in clause 5.2.1.4.2, for CQI calculation for a sub report the UE apply as previously defined in this Clause. >> **Comment #5:** Addressed there.**Comment #6:** I don’t think we need all the proposed text. Anyhow, text updated also considering other companies’ comments. |

# 3 Discussion – second round

The comments in this section are based on version 1 of the draft CR available in the **Post RAN1#114 discussion.**

Second checkpoint for this discussion:  **is September 6, 9.00 am UTC!**

|  |  |  |
| --- | --- | --- |
| Company | Comments | Editor reply/Notes |
| Qualcomm | **Comment 1**:* Text in 5.2.2.5: if a sub-configuration indicates a CSI-RS antenna port subset using the higher layer bitmap parameter [*port-subsetIndicator*], as described in clause 5.2.1.4.2, for CQI calculation for the sub-configuration with the antenna port subset represented by vector [3000 + *p*(*0*), …, 3000 + *p*(*P* – 1)]*T* of size *P*, where *P* corresponds to the number of bits with value 1 in the bitmap [*port-subsetIndicator*], the UE should assume that PDSCH signals on antenna ports in the set [1000,…, 1000+ν-1] for ν layers would result in signals equivalent to corresponding symbols transmitted on antenna ports [3000 + *p*(*0*), …, 3000 + *p*(*P* – 1)] *T*, as given by

where *p*(*j*) , *j* =0, …, *P-1*, and *T* ,  and the corresponding PDSCH EPRE to CSI-RS EPRE are as previously defined inthis Clause.* We’re fine with comment#6 from Samsung to be consistent with current spec principle of having consecutive port numbering. Furthermore, the equation Y = WX may not be needed if Samsung’s suggestion is adopted since it should already be captured in the previous equation.
* If we keep the current version, we should add *p*(*j*)< *p*(*j+1*) to ensure the ports are in order in the vector y.

“if a sub-configuration indicates a CSI-RS antenna port subset using the higher layer bitmap parameter [*port-subsetIndicator*], as described in clause 5.2.1.4.2, for CQI calculation for the sub-configuration with the antenna port subset represented by vector [3000 + *p*(*0*), …, 3000 + *p*(*P* – 1)]*T* of size *P*, the UE should assume that PDSCH signals on antenna ports in the set [1000,…, 1000+ν-1] for ν layers would result in signals equivalent to corresponding symbols transmitted on antenna ports [3000 + *p*(*0*), …, 3000 + *p*(*P* – 1)] *T*, as given bywhere *p*(*j*) and *p*(*j*)< *p*(*j+1*), *j* =0, …, *P-1*, and *T* and **Comment 2**:* Text in 5.2.2.5: if a sub-configuration indicates a power offset *[powerOffset]*,for CQI calculation, the UE shall assume the corresponding PDSCH signals transmitted on the antenna ports of a CSI-RS resource would have a ratio of EPRE to CSI-RS EPRE equal to the [difference] between *powerControlOffset* of the CSI-RS resource, given in Clause 5.2.2.3.1, and *[powerOffset]* [, where the differenceis expected to take the same range of values as *powerControlOffset* of the CSI-RS resource, given in Clause 5.2.2.3.1, and is also expected to take a value that is no larger than the value of *powerControlOffset*]*.*
* The range of values in the yellow text may only mean the max and min values. We suggest updating it as follows to make it clear:

*“*[, where the differenceis expected to take ~~the same range~~ one of values that can be configured for ~~as~~ *powerControlOffset* of the CSI-RS resource, given in Clause 5.2.2.3.1, and is also expected to take a value that is no larger than the value of *powerControlOffset*]*.”***Comment 3**: We agree with comments 12 and 14 from Ericsson in the first round. The current wording means that new type of Part 1/2 is generated by concatenating part 1/2 of CSIs for sub-configurations – which is not our understandings of the agreement. We suggest the following update:For a *CSI-ReportConfig* that contains a list of sub-configurations provided by the higher layer parameter [*csi-ReportSubConfigList*], for Type I CSI feedback for one or more of the sub-configurations, Part 1 for a sub-configuration contains corresponding RI~~(s)~~ (if reported), CRI~~(s)~~ (if reported), CQI~~(s)~~ for the first codeword (if reported) and is zero padded to a fixed payload size (if needed). Part 2 for a sub-configuration contains the corresponding CQI~~(s)~~ for the second codeword (if reported) when RI is larger than 4, LI~~s~~ (if reported) and PMI~~(s)~~ (if reported). |  |
| LG Electronics | Thank you very much for the updates and answer to my comment.First of all, we share the view with Qualcomm’s Comment 1 & 2.In addition, we have several comments.**<Comment#1>**In Section 5.2.1.1, previous other companies’ comments don’t seem to be fully reflected. “different” in several occasions can be removed as follows.A *CSI-ReportConfig* can contain a list of sub-configurations, provided by the higher layer parameter [*csi-ReportSubConfigList],* where each sub-configuration is identified by [*csi-ReportSubConfigID*] and corresponds to a ~~different~~ list of one or more CSI-RS resources or corresponds to a ~~different~~ CSI-RS antenna port subset, and/or corresponds to a ~~different~~ power offset for PDSCH relative to CSI-RS. A UE is not expected to be configured with a *CSI-ReportConfig* that contains a mix of sub-configurations each corresponding to a ~~different~~ list of one or more CSI-RS resources and some other sub-configurations each corresponding to ~~different~~ CSI-RS antenna port subset.**<Comment#2>**Similar to Comment#1, “different” can be removed as follows.A subset of resources, where a subset contains one or more resources provided by a list of NZP CSI-RS resources, of a NZP CSI-RS Resource Set for channel measurement corresponds to a ~~different~~ sub-configuration contained in a *CSI-ReportConfig,* or all the resources of a NZP CSI-RS Resource Set for channel measurement correspond to each of the sub-configurations contained in a *CSI-ReportConfig* when each of the sub-configurations is not provided with a list of NZP CSI-RS resources, as described in Clause 5.2.1.4.2.**<Comment#3>**Regarding below two agreements, even with the agreement made in RAN1#113, the agreement made in RAN1#112bis-e still **holds**. With the condition that a CSI-RS resource can be linked to one and only sub-configuration (according to agreement in RAN1@112bis-e), a sub-configuration can contain one or more CSI-RS resource (according to agreement in RAN1#113).**Agreement@112bis-e**Support configurability of NZP CSI-RS resource(s) for channel measurement within one resource setting corresponding to more than one spatial adaptation patterns with at least one of the following* A1-1-revised: a resource set with multiple resources is configured within a resource setting, where each resource is associated with only one spatial adaptation pattern
* A1-2-revised: For a resource configured in a resource set within a resource setting, the resource can be associated with more than one spatial adaptation patterns
	+ One or more resources can be configured in the resource set for channel measurement.

**Agreement** (RAN1#113 Incheon)* For A1-1-revised for Type 2, one or more CSI-RS resources from a CSI-RS resource set for channel measurement can be associated with the same sub-configuration provided in a CSI report configuration
	+ Resources in the resource set for channel measurement have the same number of antenna ports
* For A1-2-revised for Type 1, all CSI-RS resource(s) (which can be one or more) in the CSI-RS resource set for channel measurement are associated with each sub-configuration provided in a CSI report configuration
	+ i.e. each CSI-RS resource is associated with all the sub-configurations
	+ Resources in the resource set for channel measurement have the same number of antenna ports
* FFS: restriction on total number of CSI-RS resources for channel measurement in a CSI-ReportConfig and/or sub-configuration.

Going back to my examples, Case#1 is allowed while Case#2 is disallowed.<Case#1>Subconfig #1: CSI-RS resource list including CSI-RS resource indexes {#1, #2}Subconfig #2: CSI-RS resource list including CSI-RS resource indexes {#3, #4}<Case#2>Subconfig #1: CSI-RS resource list including CSI-RS resource indexes {#1, #2, #3}Subconfig #2: CSI-RS resource list including CSI-RS resource indexes {#3, #4}In addition, if Type 2 SD is combined with PD adaptation, the following Case#3 is also possible.<Case#3>Subconfig #1: CSI-RS resource list including CSI-RS resource indexes {#1, #2} and power offset ASubconfig #2: CSI-RS resource list including CSI-RS resource indexes {#3, #4} and power offset BSubconfig #3: CSI-RS resource list including CSI-RS resource indexes {#3, #4} and power offset CWith this understanding, I would suggest the following addition in Section 5.2.1.4.2. If it is not sufficient to have a common understanding on this addition, I’m fine with adding that sentence with the square bracket.- A sub-configuration can be configured with a list of NZP CSI-RS resources, provided by [*nzp-CSI-RS-resourceList*], which indicates one or more NZP CSI-RS resources, within the *NZP-CSI-RS-ResourceSet* contained in the *CSI-ResourceConfig* for channel measurement which corresponds to the *CSI-ReportConfig*. The list of NZP CSI-RS resources is identical to or has no intersection with a list of NZP CSI-RS resources configured for the other sub-configuration(s) within the *CSI-ReportConfig*.<**Comment#4**>This is more like clarification. In Section 5.2.2.5, the yellow-highlighted part below can be interpreted that even if Type-1 or Type-2 spatial domain adaptation is jointly configured with power domain adaptation, EPRE rule is the same as the legacy rule (not the cyan part rule). Is this correct understanding?- For a UE configured with a *CSI-ReportConfig* that contains a list of sub-configurations provided by the higher layer parameter [*csi-ReportSubConfigList*],- if a sub-configuration indicates a CSI-RS antenna port subset using the higher layer bitmap parameter [*port-subsetIndicator*], as described in clause 5.2.1.4.2, for CQI calculation for the sub-configuration with the antenna port subset represented by vector [3000 + *p*(*0*), …, 3000 + *p*(*P* – 1)]*T* of size *P*, where *P* corresponds to the number of bits with value 1 in the bitmap [*port-subsetIndicator*], the UE should assume that PDSCH signals on antenna ports in the set [1000,…, 1000+ν-1] for ν layers would result in signals equivalent to corresponding symbols transmitted on antenna ports [3000 + *p*(*0*), …, 3000 + *p*(*P* – 1)] *T*, as given bywhere *p*(*j*) , *j* =0, …, *P-1*, and *T* ,  and the corresponding PDSCH EPRE to CSI-RS EPRE are as previously defined inthis Clause.- if a sub-configuration indicates a list of NZP CSI-RS resources, provided by [*nzp-CSI-RS-resourceList*], for CQI calculation for the sub-configuration the UE follows the procedure previously described in this Clause. - if a sub-configuration indicates a power offset *[powerOffset]*,for CQI calculation, the UE shall assume the corresponding PDSCH signals transmitted on the antenna ports of a CSI-RS resource would have a ratio of EPRE to CSI-RS EPRE equal to the [difference] between *powerControlOffset* of the CSI-RS resource, given in Clause 5.2.2.3.1, and *[powerOffset]* [, where the differenceis expected to take the same range of values as *powerControlOffset* of the CSI-RS resource, given in Clause 5.2.2.3.1, and is also expected to take a value that is no larger than the value of *powerControlOffset*]*.* |  |
| Samsung | **Comment#1**We echo the comment#1 and comment#2 from LG that the redundant ‘different’ should be removed.**Comment#2**We share similar view with the comment#2 from QC. The changed provided by QC is more accurate.**Comment#3.** Regarding the added text in 5.2.2.5, suggest to revise as follows.if a sub-configuration indicates a CSI-RS antenna port subset using the higher layer bitmap parameter [*port-subsetIndicator*], as described in clause 5.2.1.4.2, for CQI calculation for the sub-configuration with the antenna port subset represented by vector [3000 + *p*(*0*), …, 3000 + *p*(*P* – 1)]*T* of size *P*, where *P* corresponds to the number of bits with value 1 in the bitmap [*port-subsetIndicator*], the UE should assume that [3000 + *p*(*0*), …, 3000 + *p*(*P* – 1)] are one-by-one re-indexed to [3000, 3001,…, 3000 + *P*-1] based on increasing order of port index, and PDSCH signals on antenna ports in the set [1000,…, 1000+ν-1] for ν layers would result in signals equivalent to corresponding symbols transmitted on antenna ports [3000, …, 3000 + *P -* 1], as given by the equation previously defined in this clause*.*~~where~~ *~~p~~*~~(~~*~~j~~*~~)~~ ~~,~~ *~~j~~* ~~=0, …,~~ *~~P-1~~*~~, and~~ *~~T~~*~~,~~ ~~are as previously defined in and the corresponding PDSCH EPRE to CSI-RS EPRE are as previously defined in this Clause.~~We prefer the change as above. Agree with QC’s comment that a cleaner revision can be provided without repeating the equation Y = WX. This updated version provided above is almost the same with the previous one except the delete of redundant part and removing the transpose notation (to make it consistent with legacy description). This version can also avoid the confusion in power domain aspect as mentioned by LG. |  |
| Ericsson | **Comment #1 (Section 5.2.1, 3rd paragraph)**Thank-you for the feedback on our Comment #1 from the 1st round; however, we still feel there is a strong need to change the order of the sentence. The yellow highlighted text belongs together. The cyan text is not related to the yellow. Furthermore, the one or more [csi-ReportSubConfigID] are only configured in a trigger state if the trigger state triggers a *CSI-ReportConfig* containing sub-configuration(s).For CQI, PMI, CRI, SSBRI, LI, RI, L1-RSRP, L1-SINR, CapabilityIndex a UE is configured by higher layers with N≥1 *CSI-ReportConfig* Reporting Settings, M≥1 *CSI-ResourceConfig* Resource Settings, and one or two list(s) of trigger states (given by the higher layer parameters *CSI-AperiodicTriggerStateList* and *CSI-SemiPersistentOnPUSCH-TriggerStateList*). Each trigger state in *CSI-AperiodicTriggerStateList* contains a list of associated *CSI-ReportConfigs* indicating the Resource Set IDs, and additionally one or more [*csi-ReportSubConfigID*] for a *CSI-ReportConfig* configured with a list of sub-configurations, as described in Clause 5.2.1.1, for channel and optionally for interference. Each trigger state in *CSI-SemiPersistentOnPUSCH-TriggerStateList* contains one associated *CSI-ReportConfig*, and additionally one or more [csi-ReportSubConfigID] for the associated CSI-ReportConfig if multiple sub-configurations are contained in the CSI-ReportConfig, as described in Clause 5.2.1.1.Suggest the following revision:… Each trigger state in *CSI-AperiodicTriggerStateList* contains a list of associated *CSI-ReportConfigs* indicating the Resource Set IDs for channel and optionally for interference, and a trigger state additionally contains one or more [*csi-ReportSubConfigID*] ~~for~~ if an associated *CSI-ReportConfig* is configured with a list of sub-configurations, as described in Clause 5.2.1.1~~, for channel and optionally for interference~~**Comment #2 (Section 5.2.1.1)**It seems our and other companies’ comment regarding the word “different” has not been addressed. We also find the wording “each” in the latter part of the paragraph confusing in the context of a “mix of sub-configurations.” Suggest the following revision to clarify:A *CSI-ReportConfig* can contain a list of sub-configurations, provided by the higher layer parameter [*csi-ReportSubConfigList],* where each sub-configuration is identified by [*csi-ReportSubConfigID*] and corresponds to a ~~different~~ list of one or more CSI-RS resources or corresponds to a ~~different~~ CSI-RS antenna port subset, and/or corresponds to a ~~different~~ power offset for PDSCH relative to CSI-RS. A UE is not expected to be configured with a *CSI-ReportConfig* that contains a mix of sub-configurations ~~each~~ with some corresponding to a ~~different~~ list of one or more CSI-RS resources and some others ~~sub-configurations each~~ corresponding to ~~different~~ a CSI-RS antenna port subset.**Comment #3 (Section 5.2.1.4.1)**The below text is not consistent with the highlighted part of the following agreement which refers to CSI-RS resource IDs and is not consistent with the wording in Section 5.2.1.1. Furthermore, the word “different” should be removed as in the above comment. Finally, the first part of the first sentence does not make sense since it doesn’t say what provides the list of NZP-CSI-RS resources.**Agreement**For the sub-configuration(s) in a CSI report configuration with L>1, * for Type 1 SD with A1-2-revised, the following is configured in each sub-configuration
	+ - codebook subset restriction,
		- rank restriction
		- N1, N2 and Ng
		- FFS: the case when the number of ports is less than 4
* for Type 2 SD adaptation with A1-1-revised, for each sub-configuration
	+ - a list of CSI-RS resource ID
		- FFS: codebookConfig (including codebookSubsetRestriction/ ri-Restriction)
		- FFS: CQI table indication
		- FFS: reportFreqConfiguration
		- FFS: report quantity

Above is agreed in addition to what was agreed in previous RAN1 agreementsSuggested revision:A subset of resources~~, where a subset contains one or more resources provided by a list of NZP CSI-RS resources,~~ of a NZP CSI-RS Resource Set for channel measurement corresponds to a ~~different~~ sub-configuration contained in a *CSI-ReportConfig~~,~~* if each of the sub-configuration(s) corresponds to a list of one or more NZP CSI-RS resources, or all the resources of a NZP CSI-RS Resource Set for channel measurement correspond to ~~each of the~~ a sub-configuration~~s~~ contained in a *CSI-ReportConfig* ~~when~~ if each of the sub-configuration(s) ~~is not provided with~~ does not correspond to a list of NZP CSI-RS resources, as described in Clause 5.2.1.4.2.**Comment #5 (Section 5.2.1.4.2)**Thank-you for adding square brackets, but we think some additional ones are needed until we see how RAN2 specifies RI restriction, N1-N2, and Ng-N1-N2 in a sub-configuration. Also, we think the wording “a subset of” is needed to be consistent with Section 5.2.1.4.1.- If a sub-configuration is configured with an antenna port subset, then the sub-configuration can be configured with a [RI restriction parameter] and, if the number of antenna ports of the subset greater than 2, with [*n1-n2* parameter] if the higher layer parameter *codebookType* is set to 'typeI-SinglePanel' or with [*ng*-*n1-n2* parameter] if the higher layer parameter *codebookType* is set to 'typeI-MultiPanel', and, if the corresponding number of antenna ports of the subset is 2, with *twoTX-CodebookSubsetRestriction*, where the parameters [RI restriction], [*n1-n2],* [*ng*-*n1-n2],* *twoTX-CodebookSubsetRestriction* are as described in Clauses 5.2.2.2.1 and 5.2.2.2.2.- A sub-configuration can be configured with a list of NZP CSI-RS resources, provided by [*nzp-CSI-RS-resourceList*], which indicates a subset of one or more NZP CSI-RS resources~~,~~ within the *NZP-CSI-RS-ResourceSet* contained in the *CSI-ResourceConfig* for channel measurement which corresponds to the *CSI-ReportConfig.***Comment #6 (Section 5.2.1.4.2)**We agree with the text suggested by LGE to capture that each subset of CSI-RS resources can be associated with only a single Type-2 SD adaptation pattern (consistent with RAN1 agreements).- A sub-configuration can be configured with a list of NZP CSI-RS resources, provided by [*nzp-CSI-RS-resourceList*], which indicates a subset of one or more NZP CSI-RS resources, within the *NZP-CSI-RS-ResourceSet* contained in the *CSI-ResourceConfig* for channel measurement which corresponds to the *CSI-ReportConfig*. The list of NZP CSI-RS resources is identical to or has no intersection with a list of NZP CSI-RS resources configured for the other sub-configuration(s) within the *CSI-ReportConfig*.**Comment #7 (Section 5.2.1.5.1 and 5.2.1.5.2)**Thank-you for the feedback for our Comments #5 and #6. Can we suggest the following to avoid the the mis-interpretation that all trigger states must indicate sub-configurations.[Section 5.2.1.5.1]For a reporting setting for which the *CSI-ReportConfig* contains a list of sub-configurations provided by the higher layer parameter [*csi-ReportSubConfigList*], one or more trigger states can be configured for triggering the *CSI-ReportConfig* with each indicating one or more of the sub-configurations.[Section 5.2.1.5.1]For a reporting setting for which the *CSI-ReportConfig* contains a list of sub-configurations, provided by the higher layer parameter [*csi-ReportSubConfigList*], one or more trigger states can be configured for triggering the *CSI-ReportConfig* with each indicating one or more of the sub-configurations.**Comment #8 (Section 5.2.1.6)**We still have a concern about using the word “times.” Consider a P = 32 port CSI-RS resource and 3 sub-configurations with P1=32, P2 = 16, and P3 = 8. The ports should be counted as 32 + 16 + 8 = 56. If the word “times” is used it can be misinterpreted that each of the 32 ports is counted 56 times, which is not correct. The total number of active ports should be counted as 56 only. … the CSI-RS ports within the CSI-RS resource are counted as follows:- ~~times~~ if each sub-configuration, of the *M* sub-configurations, is configured with a CSI-RS antenna port subset, provided by [*port-subsetIndicator*],- *M* × *P* ~~times~~ if each sub-configuration, of the *M* sub-configurations, is configured with a list of one or more CSI-RS resources, provided by [*nzp-CSI-RS-resourceList*], [and/]or is configured with a power offset, provided by *[powerOffset]*,**Comment #8 (Sections 5.2.3 and 5.2.4)**We still have the same concern expressed in our Comments #12 and 14 from the first round. It seems like Qualcomm and Huawei share the same concern.Something like the revision proposed by Qualcomm above could fix the problem. |  |
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