3GPP TSG-RAN WG2 Meeting #118 electronic R

Online, May 9 – 20, 2022

Agenda Item: 6.17.3.1

Source: Ericsson

Title: Post 118 review comments

Document for: Discussion, Decision

# Introduction

* [Post118-e][076][feMIMO] RRC (Ericsson)

      Scope: RRC CR.

      Intended outcome: Agreed RRC CR

      Deadline: Short

# Contact Information

Respondents to the email discussion are kindly asked to fill in the following table.

|  |  |  |
| --- | --- | --- |
| Company | Name | Email Address |
| Ericsson | Helka-Liina Määttänen | Helka-liina.maattanen@ericsson.com |
| Huawei, HiSilicon | David Lecompte | david.lecompte@huawei.com |
| Samsung | Seungri Jin | seungri.jin@samsung.com |
| ZTE | Fei Dong | Dong.fei@zte.com.cn |
|  |  |  |
|  |  |  |

# Comments from Samsung

1. Add the new RadioLinkMonitoringRS-r17 IE to introduce the new radioLinkMonitoringRS-r17 which have maximum 64 index. FYI, MAC CE use 6 bits for this ID.

* Current RadioLinkMonitoringRS-Id (without suffix) only allows the maximum 10 index but Rel-17 needs at most 64 index for MAC CE.
  + if UE does not support new MAC CE for BFD RS set activation: Network will configure upto 2 BFD RSs in each BFD RS set.
  + if UE support new MAC CE for BFD RS set activation: Network will configure upto 64 BFD RSs in each BFD RS set.
* Alternative option is to add only the radioLinkMonitoringRS-Id-r17 in RadioLinkMonitoringRS IE as a NCE (after ellipsis marker) but this way requires the additional field description such as “if radioLinkMonitoringRS-r17 is indicated, the UE ignores the radioLinkMonitoringRS (without suffix).”

#### –     *RadioLinkMonitoringConfig*

The IE *RadioLinkMonitoringConfig* is used to configure radio link monitoring for detection of beam- and/or cell radio link failure. See also TS 38.321 [3], clause 5.1.1.

*RadioLinkMonitoringConfig* information element

-- ASN1START

-- TAG-RADIOLINKMONITORINGCONFIG-START

RadioLinkMonitoringConfig ::=       SEQUENCE {

    failureDetectionResourcesToAddModList   SEQUENCE (SIZE(1..maxNrofFailureDetectionResources)) OF RadioLinkMonitoringRS

                                                                                                                  OPTIONAL, -- Need N

    failureDetectionResourcesToReleaseList  SEQUENCE (SIZE(1..maxNrofFailureDetectionResources)) OF RadioLinkMonitoringRS-Id

                                                                                                                  OPTIONAL, -- Need N

    beamFailureInstanceMaxCount             ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10}                          OPTIONAL, -- Need R

    beamFailureDetectionTimer               ENUMERATED {pbfd1, pbfd2, pbfd3, pbfd4, pbfd5, pbfd6, pbfd8, pbfd10}  OPTIONAL, -- Need R

    ...,

    [[

    failureDetectionSet1-r17                BeamFailureDetectionSet-r17                                           OPTIONAL, -- Need R

    failureDetectionSet2-r17                BeamFailureDetectionSet-r17                                           OPTIONAL,  -- Need R

    additionalPCI-r17                             AdditionalPCIIndex-r17                                                OPTIONAL   -- Need R

    ]]

}

RadioLinkMonitoringRS ::=           SEQUENCE {

    radioLinkMonitoringRS-Id            RadioLinkMonitoringRS-Id,

    purpose                             ENUMERATED {beamFailure, rlf, both},

    detectionResource                   CHOICE {

        ssb-Index                           SSB-Index,

        csi-RS-Index                        NZP-CSI-RS-ResourceId

    },

    ...

}

RadioLinkMonitoringRS-r17 ::=           SEQUENCE {

    radioLinkMonitoringRS-Id-r17            RadioLinkMonitoringRS-Id-r17,

    purpose-r17                             ENUMERATED {beamFailure, rlf, both},

    detectionResource-r17                   CHOICE {

        ssb-Index                           SSB-Index,

        csi-RS-Index                        NZP-CSI-RS-ResourceId

    },

    ...

}

BeamFailureDetectionSet-r17  ::=    SEQUENCE {

    bfdResourcesToAddModList-r17        SEQUENCE (SIZE(1..maxNrofBFDResourcePerSet-r17)) OF RadioLinkMonitoringRS-r17

                                                                                                                  OPTIONAL, -- Need N

    bfdResourcesToReleaseList-r17       SEQUENCE (SIZE(1..maxNrofBFDResourcePerSet-r17)) OF RadioLinkMonitoringRS-Id-r17

                                                                                                                  OPTIONAL, -- Need N

    beamFailureInstanceMaxCount-r17     ENUMERATED {n1, n2, n3, n4, n5, n6, n8, n10}                              OPTIONAL, -- Need R

    beamFailureDetectionTimer-r17       ENUMERATED {pbfd1, pbfd2, pbfd3, pbfd4, pbfd5, pbfd6, pbfd8, pbfd10}      OPTIONAL, -- Need R

    ...

}

#### –     *RadioLinkMonitoringRS-Id*

The IE *RadioLinkMonitoringRS-Id* is used to identify one *RadioLinkMonitoringRS*.

*RadioLinkMonitoringRS-Id* information element

-- ASN1START

-- TAG-RADIOLINKMONITORINGRS-ID-START

RadioLinkMonitoringRS-Id ::=            INTEGER (0..maxNrofFailureDetectionResources-1)

RadioLinkMonitoringRS-Id-r17 ::=        INTEGER (0..maxNrofFailureDetectionResources-1-r17)

-- TAG-RADIOLINKMONITORINGRS-ID-STOP

-- ASN1STOP

maxNrofFailureDetectionResources        INTEGER ::= 10      -- Maximum number of failure detection resources

maxNrofFailureDetectionResources-1      INTEGER ::= 9       -- Maximum number of failure detection resources minus 1

maxNrofFailureDetectionResources-r17    INTEGER ::= 64      -- Maximum number of the enhanced failure detection resources

maxNrofFailureDetectionResources-1-r17  INTEGER ::= 63      -- Maximum number of the enhanced failure detection resources minus 1

1. Need to signal the inter-node message to implement the below agreements

* gNB knows how many PH values are present in serving cell(s) in case of DC by being informed of configuration by inter-node message.

CG-Config-v1700-IEs ::=             SEQUENCE {

candidateCellInfoListCPC-r17        CandidateCellInfoListCPC-r17                    OPTIONAL,

twoPHRModeSCG-r17                      ENUMERATED {enabled}                            OPTIONAL,

    nonCriticalExtension                SEQUENCE {}                                     OPTIONAL

}

CG-Config-v1540-IEs ::=             SEQUENCE {

    pSCellFrequency                     ARFCN-ValueNR                                   OPTIONAL,

    reportCGI-RequestNR                 SEQUENCE {

        requestedCellInfo                   SEQUENCE {

            ssbFrequency                        ARFCN-ValueNR,

            cellForWhichToReportCGI             PhysCellId

        }                                                                               OPTIONAL

    }                                                                                   OPTIONAL,

    ph-InfoSCG                          PH-TypeListSCG                                  OPTIONAL,

    nonCriticalExtension                CG-Config-v1560-IEs                             OPTIONAL

}

PH-TypeListSCG ::=                  SEQUENCE (SIZE (1..maxNrofServingCells)) OF PH-InfoSCG

PH-InfoSCG ::=                      SEQUENCE {

    servCellIndex                       ServCellIndex,

    ph-Uplink                           PH-UplinkCarrierSCG,

    ph-SupplementaryUplink              PH-UplinkCarrierSCG                             OPTIONAL,

...,

[[  mTRP-PUSCH-Repetition-r17        ENUMERATED {enabled}                            OPTIONAL

]]

}

PH-UplinkCarrierSCG ::=             SEQUENCE{

    ph-Type1or3                         ENUMERATED {type1, type3},

    ...

}

|  |
| --- |
| ***measuredFrequenciesSN***  Used by SN to indicate a list of frequencies measured by the UE. |
| ***mTRP-PUSCH-Repetition***  Indicates whether the indicated serving cell is configured for PUSCH repetition using multiple TRPs. |
| ***needForGaps***  In NE-DC, indicates whether the SN requests gNB to configure measurements gaps. |

|  |
| --- |
| ***transmissionBandwidth-EUTRA***  Indicates the transmission bandwidth on an E-UTRA carrier frequency as defined by the parameter Transmission Bandwidth Configuration "NRB" TS 36.104 [33]. The values rb6, rb15, rb25, rb50, rb75, rb100 indicate 6, 15, 25, 50, 75 and 100 resource blocks respectively. |
| ***twoPHRModeSCG***  Indicates if the power headroom for SCG shall be reported as two PHRs (each PHR associated with a SRS resource set) is enabled or not. |
| ***ueAssistanceInformationSCG***  Includes for each UE assistance feature associated with the SCG, the information last reported by the UE in the NR *UEAssistanceInformation* message for the SCG, if any. |

CG-ConfigInfo-v1700-IEs ::=             SEQUENCE {

candidateCellListCPC-r17                CandidateCellListCPC-r17                     OPTIONAL,

twoPHRModeMCG-r17                      ENUMERATED {enabled}                            OPTIONAL,

    nonCriticalExtension                    SEQUENCE {}                                  OPTIONAL

}

CG-ConfigInfo-v1540-IEs ::=     SEQUENCE {

    ph-InfoMCG                      PH-TypeListMCG                                                    OPTIONAL,

    measResultReportCGI             SEQUENCE {

        ssbFrequency                    ARFCN-ValueNR,

        cellForWhichToReportCGI         PhysCellId,

        cgi-Info                        CGI-InfoNR

    }                                                                                                 OPTIONAL,

    nonCriticalExtension            CG-ConfigInfo-v1560-IEs                                           OPTIONAL

}

PH-TypeListMCG ::=              SEQUENCE (SIZE (1..maxNrofServingCells)) OF PH-InfoMCG

PH-InfoMCG ::=                  SEQUENCE {

    servCellIndex                       ServCellIndex,

    ph-Uplink                           PH-UplinkCarrierMCG,

    ph-SupplementaryUplink              PH-UplinkCarrierMCG                                           OPTIONAL,

...,

[[  mTRP-PUSCH-Repetition-r17        ENUMERATED {enabled}                            OPTIONAL

]]

}

PH-UplinkCarrierMCG ::=         SEQUENCE{

    ph-Type1or3                         ENUMERATED {type1, type3},

    ...

}

|  |
| --- |
| ***mrdc-AssistanceInfo***  Contains the IDC assistance information for MR-DC reported by the UE (see TS 36.331 [10]). |
| ***mTRP-PUSCH-Repetition***  Indicates whether the indicated serving cell is configured for PUSCH repetition using multiple TRPs. |
| ***nrdc-PC-mode-FR1***  Indicates the uplink power sharing mode that the UE uses in NR-DC FR1 (see TS 38.213 [13], clause 7.6). |

|  |
| --- |
| ***sourceConfigSCG-EUTRA***  Includes the E-UTRA *RRCConnectionReconfiguration* message as specified in TS 36.331 [10]. In this version of the specification, the E-UTRA RRC message can only include the field *scg-Configuration.* In this version of the specification, this field is absent when master gNB uses full configuration option. This field is only used in NE-DC. |
| ***twoPHRModeMCG***  Indicates if the power headroom for MCG shall be reported as two PHRs (each PHR associated with a SRS resource set) is enabled or not. |
| ***ueAssistanceInformationSourceSCG***  Includes for each UE assistance feature associated with the SCG, the information last reported by the UE in the NR *UEAssistanceInformation* message for the source SCG, if any. |

# Comments from Huawei

1) maxNrofCandidateBeams-r17 is defined to have the same value like maxNrofCandidateBeams-r16, there is no reason not to use the existing constant.

2) There is no clear reason to define BeamFailureRecoverySetConfig while extensions can be added in BeamFailureRecoverySCellConfig, which can be renamed

#### *–                      BeamFailureRecovery~~SCell~~Config*

The IE *BeamFailureRecovery~~SCell~~Config* is used to configure the UE with candidate beams for beam failure recovery in case of beam failure detection ~~in SCell~~. See also TS 38.321 [3], clause 5.17.

BeamFailureRecovery~~SCell~~Config-r16 ::= SEQUENCE {

    rsrp-ThresholdBFR-r16                  RSRP-Range                                                               OPTIONAL, -- Need M

    candidateBeamRS~~SCell~~List-r16           SEQUENCE (SIZE(1..maxNrofCandidateBeams-r16)) OF CandidateBeamRS-r16     OPTIONAL, -- Need M

    ...

    [[

    candidateBeamRSList2-r17          SEQUENCE (SIZE(1..maxNrofCandidateBeams-r16)) OF CandidateBeamRS-r16          OPTIONAL, -- Need R

    additionalPCI-r17                 AdditionalPCIIndex-r17                                                        OPTIONAL, -- Need R

    ]]

}

|  |
| --- |
| *BeamFailureRecovery~~SCell~~Config* field descriptions |
| ***additionalPCI***  Indicates the physical cell IDs (PCI) of the SSBs in the *candidateBeamRSList2*. |
| ***candidateBeamRSSCellList***  A list of reference signals (CSI-RS and/or SSB) identifying the candidate beams for recovery. The network always configures this parameter in every instance of this IE. |
| ***candidateBeamRSSCellList2***  A list of reference signals (CSI-RS and/or SSB) identifying the candidate beams for recovery. |
| ***rsrp-ThresholdBFR***  L1-RSRP threshold used for determining whether a candidate beam may be included by the UE in BFR MAC CE (see TS 38.213 [13], clause 6). The network always configures this parameter in every instance of this IE. |

If we create BeamFailureRecoverySetConfig, for any extension that applies to one BFD RS set and two BFD RS sets, we need to extend two IEs with the same fields.

The change shown here has no impact to field names in BWP-DownlinkDedicated, so there is no reason not to do it.

3) Why do we have the "additionalPCI" here **and** in RadioLinkMonitoringConfig, with

|  |
| --- |
| *RadioLinkMonitoringConfig* field descriptions |
| ***additionalPCI***  Indicates the physical cell IDs (PCI) of the SSBs in the *failureDetectionSet2*. Same value is configured as in *additionalPCI* in IE *BeamfailureSetConfig*. |

? BFR is only possible if BFD is configured, which requires RadioLinkMonitoringConfig, then if we have the additionalPCI in RadioLinkMonitoringConfig, what is the point of repeating it in BeamFailiureRecoveryConfig?

4) With the above change 2, we should use the new field only for SpCell:

BWP-DownlinkDedicated ::=           SEQUENCE {

    pdcch-Config                        SetupRelease { PDCCH-Config }                                     OPTIONAL,   -- Need M

    pdsch-Config                        SetupRelease { PDSCH-Config }                                     OPTIONAL,   -- Need M

    sps-Config                          SetupRelease { SPS-Config }                                       OPTIONAL,   -- Need M

    radioLinkMonitoringConfig           SetupRelease { RadioLinkMonitoringConfig }                        OPTIONAL,   -- Need M

    ...,

    [[

    sps-ConfigToAddModList-r16          SPS-ConfigToAddModList-r16                                        OPTIONAL,   -- Need N

    sps-ConfigToReleaseList-r16         SPS-ConfigToReleaseList-r16                                       OPTIONAL,   -- Need N

    sps-ConfigDeactivationStateList-r16 SPS-ConfigDeactivationStateList-r16                               OPTIONAL,   -- Need R

    beamFailureRecoverySCellConfig-r16  SetupRelease {BeamFailureRecovery~~SCell~~Config-r16}                 OPTIONAL,   -- Cond SCellOnly

    sl-PDCCH-Config-r16                 SetupRelease { PDCCH-Config }                                     OPTIONAL,   -- Need M

    sl-V2X-PDCCH-Config-r16             SetupRelease { PDCCH-Config }                                     OPTIONAL    -- Need M

    ]],

    [[

    deactivatedMeasGapList-r17          SEQUENCE (SIZE (1..maxNrofGapId-r17)) OF MeasGapId-r17            OPTIONAL,   -- Cond PreConfigMG

    beamFailureRecoveryS~~erving~~pCellConfig-r17  SetupRelease { BeamFailureRecovery~~ServingCell~~Config-r1~~67~~}    OPTIONAL,   -- ~~Need M~~ Cond SCellOnly

    harq-FeedbackEnablingforSPSactive-r17 BOOLEAN                                                         OPTIONAL,   -- Need R

    cfr-ConfigMulticast-r17             SetupRelease { CFR-ConfigMulticast-r17 }                          OPTIONAL,   -- Need M

    dl-PRS-ProcessingWindowPreConfigAddModList-r17  DL-PRS-ProcessingWindowPreConfigAddModList-r17        OPTIONAL,   -- Need N

    dl-PRS-ProcessingWindowPreConfigReleaseList-r17 DL-PRS-ProcessingWindowPreConfigReleaseList-r17       OPTIONAL,   -- Need N

    nonCellDefiningSSB-r17              NonCellDefiningSSB-r17                                            OPTIONAL    -- Need R

    ]]

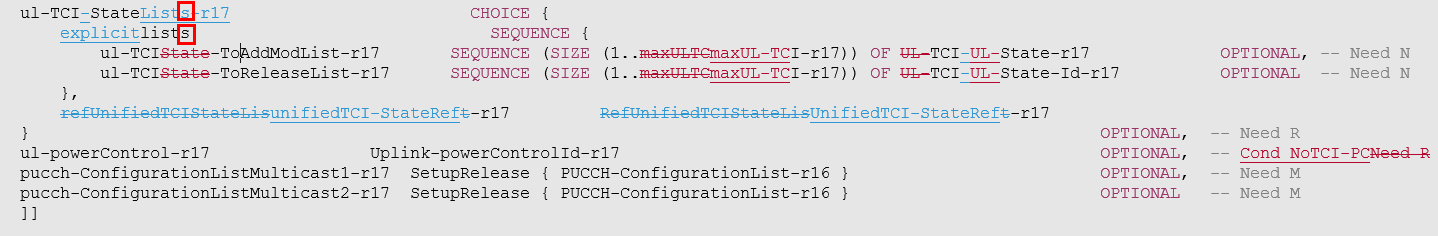
    -- Editor Note: It is FFS whether the deactivated MG list configured in BWP or SCell could be configured with size zero.

}

|  |
| --- |
| ***beamFailureRecoverySCellConfig***  Configuration of candidate RS for beam failure recovery in SCells. |
| ***beamFailureRecoverySpCellConfig***  Configuration of candidate RS sets for beam failure recovery for an SpCell. |

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *PreConfigMG* | The field is optionally present, Need R, if there is at least one per UE gap configured with *preConfigInd* or there is at least one per FR gap of the same FR which the BWP belongs to and configured with *preConfigInd*. It is absent otherwise. |
| *ScellOnly* | The field is optionally present, Need M, in the *BWP-DownlinkDedicated* of an Scell. It is absent otherwise. |
| *SpCellOnly* | The field is optionally present, Need M, in the *BWP-DownlinkDedicated* of an SpCell. It is absent otherwise. |

5) In BWP-UplinkDedicated, respectively in PDSCH-Config, there can only be a single list of UL TCI states, respectively of DL or joint TCI states, then it is unclear why there is an "s" at the end of "List" in field names, it should rather be removed:



I do not include a similar picture for PDSCH-Config, but it is exactly similar.

6) In PDCCH-Config, UnifiedTCI-StateRef is also used in BWP-UplinkDedicated, so an IE should be created instead, e.g.

#### *–                      ServingCellAndBWP-Id*

The IE *ServingCellAndBWP-Id* is used to indicate a serving cell and an uplink or a downlink BWP.

-- ASN1START

-- TAG-SERVINGCELLANDBWP-ID-START

ServingCellAndBWP-Id-r17 ::= SEQUENCE {

    servingcell-r17                 ServCellIndex,

    bwp-r17                         BWP-Id

}

-- TAG-SERVINGCELLANDBWP-ID-STOP

-- ASN1STOP

The fields need no description because they are IEs.

7) In BWP-UplinkDedicated:

    ul-powerControl-r17                Uplink-powerControlId-r17                                                OPTIONAL,  -- Cond NoTCI-PC

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *SpCellOnly* | The field is optionally present, Need M, in the *BWP-UplinkDedicated* of an SpCell. It is absent otherwise. |
| *NoTCI-PC* | The field is optionally present, Need R, for a UL TCI state or Joint TCI state. It is absent, Need R, if UL power control is configured for any UL TCI state or Joint TCI state. It is absent otherwise. |

The condition NoTCI-PC is really confusing:

- "for a UL TCI state or Joint TCI state" seems to mean that this field would be per TCI state but it is not

- The first sentence seems to have no "if …", then it basically allows the field to be present even when the second sentence seems to disallow it

Does it expect to say "The field is optionally present, Need R, if *unifiedtci-StateType* is configured for this serving cell and ul-powerControl is not configured for any UL TCI state or joint TCI state of this serving cell. Otherwise it is absent, Need R."?

8) In BWP-UplinkDedicated, there is no field description for *ul-TCI-StateList*, while some of the text for *ul-TCI-ToAddModList* actually seems applicable to it. In addition, the field description of *unifiedTCI-StateRef* isn't a meaningful English sentence. This could be fixed as follows:

|  |
| --- |
| ***unifiedTCI-StateRef***  Provides the serving cell and uplink BWP where the applicable UL TCI states applicable to this UL BWP are defined.~~configuration of ul-TCI-ToAddModList-r17 and ul-TCI-ToReleaseList-r17 for this BWP~~ |
| ***ul-TCI-StateList***  Indicate the applicable UL TCI states for PUCCH, PUSCH and SRS for this BWP when the UE is configured with *unifiedtci-StateType* for this serving cell. |
| ***ul-TCI-ToAddModList***  Indicates a list~~s~~ of UL TCI states ~~for PUCCH, PUSCH and SRS when UE is configured with~~ *~~unifiedtci-StateType~~* ~~for this serving cell~~. |

9) In BWP-UplinkDedicated, suggest removing from the fiedd description of ul-powerControl what the presence condition already enforces.

|  |
| --- |
| ***ul-powerControl***  Configures power control parameters for PUCCH, PUSCH and SRS ~~when UE is configured with~~ *~~unifiedtci-StateType~~* ~~for this serving cell.The field is present here only if~~ *~~ul-powerControl~~* ~~is not configured in~~ *~~ul-TCI-ToAddModList~~* ~~and in~~ *~~dl-orJoint-TCI-ToAddModList~~*~~.~~ -. |

10) In CellGroupConfig, there is duplicate word "only" (remove one of the two)

|  |
| --- |
| ***simultaneousU-TCI-UpdateList1, simultaneousU-TCI-UpdateList2, simultaneousU-TCI-UpdateList3, simultaneousU-TCI-UpdateList4***  List of serving cells for which unified TCI state ID can be updated or activated simultaneously The different lists shall not contain same serving cells. Network only configures in these lists only serving cells that are configured with *unifiedtci-StateType*. |

By the way, nothing prevents the network from including multiple MAC CEs in a MAC PDU, so "unified TCI state ID can be updated or activated simultaneously" for any serving cell no matter whether it is in any of these lists. Perhaps a more accurate description would be:

|  |
| --- |
| ***simultaneousU-TCI-UpdateList1, simultaneousU-TCI-UpdateList2, simultaneousU-TCI-UpdateList3, simultaneousU-TCI-UpdateList4***  List of serving cells for which the Unified TCI States Activation/Deactivation MAC CE applies simultaneously, as specified in TS 38.321 [3] clause 6.1.3.47.~~unified TCI state ID can be updated or activated simultaneously~~ The different lists shall not contain same serving cells. Network only configures in these lists only serving cells that are configured with *unifiedtci-StateType*. |

11) In ConfiguredGrantConfig and in PUSCH-Config, the new condition is missing "Otherwise it is absent, Need R"

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *SRSsets* | This field is mandatory present when UE is configured with two SRS sets with usage codebook or non-codebook. |

12) In CSI-AperiodicTriggerStateList, the condition NoUnifiedTCI is a bit unclear:

- there is no field called "unifiedTCI-State"

- "the serving cell where this NZP CSI-RS resource is used" but the condition  applies to resourcesForChannel2, which can also be a csi-SSB-ResourceSet, and the meaning of "is used" is unclear.

Possible clarification:

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *NoUnifiedTCI* | This field is absent, Need R, if unifiedTCI-StateType is configured for the serving cell in which the *CSI-AperiodicTriggerStateList* is included~~.where this NZP CSI-RS resource is used~~. It is optionally present, Need R, otherwise. |

13) In CSI-ResourceConfig, small things to fix:

|  |
| --- |
| ***csi-SSB-ResourceSetList, csi-SSB-ResourceSetListExt***  List of references to SSB resources used for CSI measurement and reporting in a CSI-RS resource set (see TS 38.214 [19], clause 5.2.1.2). If *groupBasedBeamReporting-v1710* is configured in the IE *CSI-ReportConfig* that indicates this *CSI-ResourceConfig* as *resourceForChannelMeasurement*, the network configures 2 resource sets, which may be two NZP CSI-RS resource sets, two CSI SSB resource sets or one NZP CSI-RS resource set and one CSI-SSB resource set (see TS 38.214 [19], clause 5.2.1.2 and 5.2.1.4.2). In this case, in TS 38.212~~1~~ [17] Table 6.3.1.1.2-8B:  - if the list has one CSI-SSB resource set, this resource set is indicated by a resource set indicator set to 1, while the resource set indicator of the *NZP CSI-RS resource* set is 0;  - if the list has two CSI-SSB resource sets, the first resource set is indicated by a resource set indicator set to 0 and the second resource set by a resource set indicator set to 1. |
| ***nzp-CSI-RS-ResourceSetList***  List of references to NZP CSI-RS resources used for beam measurement and reporting in a CSI-RS resource set. Contains up to *maxNrofNZP-CSI-RS-ResourceSetsPerConfig* resource sets if *resourceType* is 'aperiodic'. Otherwise, contains  1 resource set when *groupBasedBeamReporting-v1710*is not configured in IE *CSI-ReportConfig*. If *groupBasedBeamReporting-v1710*is configured and *resourceType* is set to 'periodic' or 'semipersistent', then the network configures 2 resource sets, which may be two NZP CSI-RS resource sets, two CSI SSB resource sets or one NZP CSI-RS resource set and one CSI-SSB resource set (see TS 38.214 [19], clause 5.2.1.2 and 5.2.1.4.2). In this case, in ~~:~~TS 38.212~~1~~ [17] Table 6.3.1.1.2-8B:  - if the list has one NZP CSI-RS resource set, this resource set is indicated by a resource set indicator set to 0;  - if the list has two NZP CSI-RS resource sets, the first resource set is indicated by a resource set indicator set to 0 and the second resource set by a resource set indicator set to 1. |

14) In CSI-SSB-Resource-Set, a "." should be removed (after csi-SSB-ResourceList), a ";" replaced with ":" (after "entry") and italics fully applied to all field names:

|  |
| --- |
| *CSI-SSB-ResourceSet* field descriptions |
| ***servingAdditionalPCIList***  Indicates the physical cell IDs (PCI) of the SSBs in the csi-SSB-ResourceList. If present, the list has the same number of entries as *csi-SSB-ResourceList*~~.~~ and the first entry of this list indicates the value of the PCI for the first entry of *csi-SSB-ResourceList*, the second entry of this list indicates the value of the PCI for the second entry of *csi-SSB-ResourceList*, and so on. For each entry:~~;~~  - if the value is zero, the PCI is the PCI of the serving cell in which this *CSI-SSB-ResourceSet* is defined;  - otherwise, the value is *additionalPCIIndex-r17* of an *SSB-MTC-AdditionalPCI-r17* in the *additionalPCIList-r17* in *ServingCellConfig*, and the PCI is the *additionalPCI-r17* in this *SSB-MTC-AdditionalPCI-r17*. |

15) In NZP-CSI-RS-Resource field descriptions, the sentence without the change seems correct, both from English perspective and technical perspective, while the modified sentence is incorrect from English perspective. So I'd suggest undoing the change.

16) In N*ZP-CSI-RS-ResourceSet* field descriptions, the following clarifications are needed to properly match with 38.214:

|  |
| --- |
| ***cmrGroupingAndPairing***  Configures CMR groups and pairs. The first *nrofResourcesGroup1* resources in the NZP-CSI-RS resource set belong to Group 1 and the remaining  resources in the NZP-CSI-RS resource set belong to Group 2. ~~The~~ *nrofResourcesGroup1* is ~~corresponds to~~ *~~k1~~* and the number of remaining resources in the NZP-CSI-RS resource set (i.e. belonging to Group 2) is ~~correspond to~~ *~~k2~~* as specified in TS 38.214 clause 5.2.1.4.1. ~~The mM~~aximum total number in Group 1 and Group 2 is 8 (see TS 38.214 [19], clauses 5.2.1.4.1 and 5.2.1.4.2). |

(there is no "correspondence", K1 and K2 are the numbers, with capital K).

17) In PUCCH-Config, "if the UE is configured with ul-PowerControl" looks like it is a per UE field, but it is a per UL BWP field, so suggest rewording:

|  |
| --- |
| ***pucch-PowerControl***  Configures power control parameters PUCCH transmission. This field is not configured if ~~UE is configured with~~ *ul-powerControl* is configured in the *BWP-UplinkDedicated* in which the *PUCCH-Config* is included. |
| ***powerControlSetInfoToAddModList***  Configures power control sets for repetition of a PUCCH transmission in FR1. This field is not configured if ~~UE is configured with~~ *ul-powerControl* is configured in the *BWP-UplinkDedicated* in which the *PUCCH-Config* is included.. |

18) In PUSCH-Config, same like 16

|  |
| --- |
| ***pusch-PowerControl***  Configures power control parameters PUSCH transmission. This field is not configured if ~~UE is configured with~~ *ul-powerControl* is configured in the *BWP-UplinkDedicated* in which the *PUSCH-Config* is included. |
| ***ul-FullPowerTransmission***  Configures the UE with UL full power transmission mode as specified in TS 38.213. This field is not configured if ~~UE is configured with~~ *ul-powerControl* is configured in the *BWP-UplinkDedicated* in which the *PUSCH-Config* is included. |

19) In PUSCH-PowerControl

PUSCH-PathlossReferenceRS-v17xy ::=   SEQUENCE {

     additionalPCI-r17                             AdditionalPCIIndex-r17  OPTIONAL  -- Need R

}

additionalPCI-r17 should be optional because the number of entries of  pathlossReferenceRSToAddModListExt-v17xy needs to be exactly the number of entries of pathlossReferenceRSToAddModList + the number of entry of pathlossReferenceRSToReleaseListSizeExt-v1610, so the only way to ensure that " Network configures the *additionalPCI* only when reference signal is SSB" is to have this field optional.

In addition, this should be captured in the field description:

|  |
| --- |
| ***pathlossReferenceRSToAddModList, pathlossReferenceRSToAddModListSizeExt, pathlossReferenceRSToAddModListExt***  A set of Reference Signals (e.g. a CSI-RS config or a SS block) to be used for PUSCH path loss estimation. The set consists of Reference Signals configured using *pathLossReferenceRSToAddModList* and *Reference* Signals configured using *pathlossReferenceRSToAddModListSizeExt*. Up to *maxNrofPUSCH-PathlossReferenceRSs* may be configured (see TS 38.213 [13], clause 7.1). When *pathlossReferenceRSToAddModListExt* is included, its number of entries is the number of entries of *pathlossReferenceRSToAddModList* plus the number of entries of *pathlossReferenceRSToAddModListSizeExt-v1610* and its n-th entry corresponds to the n-th entry of the concatenated list made of *pathlossReferenceRSToAddModList* and *pathlossReferenceRSToAddModListSizeExt-v1610*. Network configures the *additionalPCI* only when reference signal is SSB. |

19) In RadioLinkMonitoringConfig

|  |
| --- |
| ***failureDetectionSet1, failureDetectionSet2***  Configures parameters for beamfailure detection towards beam failure detection resources configured in the set. The failureDetectionSet1, failureDetectionSet2 and configured togegher and not more than two reference signals are configured in one set for a UE does not support the MAC CE based BFD-RS activation. If *additionalPCIList* is configured for the serving cell, each RS in one set can be associted only to one PCI. |

Does the new sentence (highlighted in yellow) have any meaning? Is it expected to mean something like: "If the UE does not support MAC CE-based BFD-RS activation, the network configures at most two BFD-RS resources in a *RadioLinkMonitoringConfig*, i.e. including resources configured in *failureDetectionSet1* and in *failureDetectionSet2*"?

Or perhaps the intention is actually to say that this also includes resources in *failureDetectionResourcesToAddModList* with purpose set to *beamFailure* or *both*?

But since we are there, can *failureDetectionResourcesToAddModList* include entries with purpose set to *beamFailure* or *both* if *failureDetectionSet1* or *failureDetectionSet2* is configured?

If there are so many open questions, perhaps it makes little sense to add a sentence in the field description of failureDetectionSet1/2 now.

20) In ServingCellConfig

|  |
| --- |
| ***additionalPCIList***  List of information for the additional SSB with different PCI than serving cell PCI. The additional SSBs with different PCIs are not used for measurement event evaluation. |

This sentence proposed to be added seems to mean that, when evaluating events, neighbour cells with PCIs listed here cannot trigger events. I don't recall this was ever discussed and I see no reason for this. So this should not be added.

21) In SRS-Config

The IE *SRS-Config* is used to configure sounding reference signal transmissions. The configuration defines a list of SRS-Resources, a list of SRS-PosResources, a list of SRS-PosResourceSets and a list of SRS-ResourceSets. Each resource set defines a set of SRS-Resources or SRS-PosResources. The network triggers the transmission of the set of SRS-Resources or SRS-PosResources using a configured aperiodicSRS-ResourceTrigger (L1 DCI). The network shall not configure SRS specific power control parameters, *alpha, p0* or *pathlossReferenceRS* if *ul-powerControl* is configured for the UE.

Is that talking about ul-powerControl in BWP-UplinkDedicated/TCI-State/TCI-UL-State (then what is the meaning of "for the UE") or about uplink-PowerControlToAddModList in ServingCellConfig? This should be captured, otherwise this is unclear.

Besides, "shall" should be replaced with "does" (unless for very specific cases, e.g. security requirements, "the network shall" is not used in TS 38.331).

22) In PDSCH-Config, why do we have

dl-orJoint-TCI-State-ToAddModList-r17         SEQUENCE (SIZE (1.. maxNrofTCI-States)) OF TCI-State

                                                                                                                OPTIONAL,   -- Need N

            dl-orJoint-TCI-State-ToReleaseList-r17        SEQUENCE (SIZE (1.. maxNrofTCI-States)) OF TCI-StateId

                                                                                                                OPTIONAL    -- Need N

while this is identical to

    tci-StatesToAddModList                  SEQUENCE (SIZE(1..maxNrofTCI-States)) OF TCI-State                  OPTIONAL,   -- Need N

    tci-StatesToReleaseList                 SEQUENCE (SIZE(1..maxNrofTCI-States)) OF TCI-StateId                OPTIONAL,   -- Need N

?

Could the UE be configured with the legacy list and the new list? If not, there is no reason to add a new list:

    dl-OrJoint-TCIStateLists-r17                          CHOICE {

~~explicitlists                                        SEQUENCE {~~

~~dl-orJoint-TCI-State-ToAddModList-r17         SEQUENCE (SIZE (1.. maxNrofTCI-States)) OF TCI-State~~

~~OPTIONAL,   -- Need N~~

~~dl-orJoint-TCI-State-ToReleaseList-r17        SEQUENCE (SIZE (1.. maxNrofTCI-States)) OF TCI-StateId~~

~~OPTIONAL    -- Need N~~

~~},~~

        unifiedTCI-StateRef-r17                   UnifiedTCI-StateRef-r17

    }                                                                                                           OPTIONAL,   -- Need R

23) In TCI-State

|  |  |
| --- | --- |
| Conditional Presence | Explanation |
| *CSI-RS-Indicated* | This field is mandatory present if *csi-rs* is included, absent otherwise |
| *JointTCI* | This field is optionally present, Need R, if for in *dl-orJoint-TCI-State-ToAddModList*. It is absent, Need R, otherwise. |

If we have a single list, perhaps JointTCI could be replaced with "Need R"?

24) In TCI-State

|  |
| --- |
| ***ul-PowerControl***  Configures power control parameters for PUCCH, PUSCH and SRS for this TCI state. The field is present here only if *ul-powerControl* is not configured in *IE BWP-UL-Dedicated*. |

a) Is that expected to say "is always present if" or "may be present if"?

b) This is a DL, or a DL or joint TCI state, i.e. defined in PDSCH-Config, so it is a bit unclear which BWP-UplinkDedicated (this is the correct name) this refers to. I suppose this field is only relevant if the TCI state is used for UL, i.e. as a joint TCI state, and then it probably shouldn't be configured for any UL BWP of the serving cell.

If this is already captured for ul-powerControl in BWP-UplinkDedicated, do we need to repeat that here?

25) In TCI-UL-State

|  |
| --- |
| ***ul-powerControl***  Configures power control parameters for PUCCH, PUSCH and SRS for this TCI state. The field is present here only if *ul-powerControl* is not configured in the *~~IE~~ BWP-Uplink~~L~~-Dedicated* in which the *TCI-UL-State* is included. |

Same comment on "is present". Does that mean it must be present?

# Comments from ZTE

#### **– *RadioLinkMonitoringConfig***

RadioLinkMonitoringRS ::= SEQUENCE {

radioLinkMonitoringRS-Id RadioLinkMonitoringRS-Id,

purpose ENUMERATED {beamFailure, rlf, both},

detectionResource CHOICE {

ssb-Index SSB-Index,

csi-RS-Index NZP-CSI-RS-ResourceId

},

...

}

|  |
| --- |
| ***failureDetectionResourcesToAddModList***  A list of reference signals for detecting beam failure and/or cell level radio link failure (RLF). The limits of the reference signals that the network can configure are specified in TS 38.213 [13], table 5-1. The network configures at most two detectionResources per BWP for the purpose *beamFailure* or *both*. If no RSs are provided for the purpose of beam failure detection, the UE performs beam monitoring based on the activated *TCI-State* for PDCCH as described in TS 38.213 [13], clause 6. If no RSs are provided in this list for the purpose of RLF detection, the UE performs Cell-RLM based on the activated *TCI-State* of PDCCH as described in TS 38.213 [13], clause 5. The network ensures that the UE has a suitable set of reference signals for performing cell-RLM. If failureDetctionSet 1 or failureDectionSet 2 is present, the purpose of this field only can be set *rlf.* |
| ***failureDetectionSet1, failureDetectionSet2***  Configures parameters for beamfailure detection towards beam failure detection resources configured in the set. The failureDetectionSet1, failureDetectionSet2 and configured togegher and not more than two reference signals are configured in one set for a UE does not support the MAC CE based BFD-RS activation. If *additionalPCIList* is configured for the serving cell, each RS in one set can be associted only to one PCI. The purpose in this field only can be set to ‘beamFailure’ |

#### **– *PUSCH-Config***

MPE-Resource-r17 ::= SEQUENCE {

mpe-ResourceId-r17 INTEGER (1..maxMPE-Resources-r17),

cell ServCellIndex OPTIONAL, -- Need R

additionalPCI-r17 AdditionalPCIIndex-r17 OPTIONAL, -- Need R

mpe-ReferenceSignal-r17 CHOICE {

csi-RS-Resource-r17 NZP-CSI-RS-ResourceId,

ssb-Resource-r17 SSB-Index

}

}

***mpe-ResourcePoolToAddModList***

List of SSB/CSI-RS resources for P-MPR reporting. Each resource can be configured with serving cell index where the resource is configured for the UE. The additionalPCI is configured only if the resource is SSB. For each resource, the *cell* shall not be present if *additionalPCI* is configured, the *addtionalPCI* should not be present if cell is configured, If both *cell* and *additionalPCI* are absent, the SSB/CSI-RS resource is from

the serving cell where the *PUSCH-Config* is.

#### **– *SRS-Config***

[[

spatialRelationInfo-PDC-r17 SetupRelease { SpatialRelationInfo-PDC-r17 } OPTIONAL, -- Need M

resourceMapping-r17 SEQUENCE {

startPosition-r17 INTEGER (0..13),

nrofSymbols-r17 ENUMERATED {n1, n2, n4, n8, n10, n12, n14},

repetitionFactor-r17 ENUMERATED {n1, n2, n4, n5, n6, n7, n8, n10, n12, n14}

},

partialFreqSounding-r17 SEQUENCE {

startRBIndexFScaling-r17 CHOICE{

startRBIndexAndFreqScalingFactor2-r17 INTEGER (0..1),

startRBIndexAndFreqScalingFactor4-r17 INTEGER (0..3)

},

enableStartRBHopping-r17 ENUMERATED {enable} OPTIONAL -- Need R

} OPTIONAL, -- Need R

transmissionComb-n8-r17 SEQUENCE {

combOffset-n8-r17 INTEGER (0..7),

cyclicShift-n8-r17 INTEGER (0..5)

} OPTIONAL, -- Need R

srs-TCIState-r17 CHOICE {

srs-UL-TCIState-r17 TCI-UL-State-id-r17,

srs-DLorJoint-TCIState-r17 TCI-StateId

} OPTIONAL -- Need R

* Editor’s note: It is FFS to determine whether to introduce serving cell ID and/or BWP ID to be associated with srs-UL-TCIState-r17 or srs-DLorJoint-TCIState-r17.

]]

}

# BFD/BFR

LS R1-2205168

**Issue 7: Max values FFS in Rel-17 TS 38.331**

Some maximum values are still missing from RRC configuration and RAN2 needs those for ASN.1 freezing.

**Question 8:** Please provide value for maxNrofCandidateBeams-r17 and maxNrofBFDResourcePerSet-r17.

**Answer 8**:

* maxNrofCandidateBeams-r17 is 64 per set per CC according to the latest LS reply
* Regarding maxNrofBFDResourcePerSet-r17, RAN1 has agreed to introduce MAC-CE for BFD-RS activation (in addition to RRC configuration):
  + If UE supports MAC-CE based BFD RS activation, maxNrofBFDResourcePerSet-r17 is 64
    - The intended operation is for MAC-CE to activate 1 or 2 out of the (maximum of) 64 configured BFD-RS resources from the set
  + Otherwise, maxNrofBFDResourcePerSet-r17 is 2

**Issue 8: Possibilities for BFD-RS configuration**

The existing RRC signalling for BFD-RS configuration allows the following possibilities:

* Alt.1: Two explicit BFD-RS sets: e.g. failureDetectionSet1-r17 and failureDetectionSet2-r17 with respective bfdRSSetId-r17
* Alt.2: Only one explicit BFD-RS set: e.g. failureDetectionSet1-r17 or failureDetectionSet2-r17 with bfdRSSetId-r17. It requires that the UE determines BFD-RS for the other BFD-RS set, e.g. according to TCI state(s) for PDCCH reception and the corresponding coreset pool index.
* Alt.3: BFD-RS without explicit BFD-RS set: e.g. failureDetectionSet1-r17 or failureDetectionSet2-r17 without bfdRSSetId-r17. It requires that the UE determines the BFD-RS set which each BFD-RS belongs to.

RAN2 thinks that at least Alt.1 is possible, but would like to understand whether RAN1 specifications support Alt.2 or Alt.3.

**Question 9:** Please confirm whether Alt.2 and Alt.3 are allowed configurations according to the existing RAN1 specifications, or whether RRC signalling for BFD-RS configuration should exclude Alt.2 and Alt.3.

**Answer 9**: Based on RAN1 agreements and Rel-17 RAN1 specification,

* Alt1 is allowed.
* Alt2 is excluded.
* The current formulation of Alt3 in the LS is unclear. If the only difference between Alt1 and Alt3 is that Alt1 includes an explicit bfdRSSetId parameter in BeamFailureDetectionSet-r17 IE whereas Alt3 doesn’t, Alt3 is excluded.
* [AT118-e][075][feMIMO] BFD Resource Handling (Apple)

Scope: Applies to MAC and RRC. Await info from RAN1. Take into account incoming LSes (or RAN1 decisions) when applicable/available. Address Open issues. Attempt to converge, Identify agreements and discussion points. The discussion should assume that R2 will follow R1 requests.

Intended outcome: Report for CB (maybe multiple revisions, as it may need to be updated multiple times dep on R1 progress).

Deadline: Set by rapporteur, for CB W2 any day (notify Chair).

[R2-2206577](file:///C:\Users\mtk65284\Documents\3GPP\tsg_ran\WG2_RL2\TSGR2_118-e\Docs\R2-2206577.zip) Summary of [AT118-e][075][feMIMO] BFD Resource Handling (Apple) Apple

DISCUSSION

RRC

1a

* OPPO would like to keep the Id. Apple think we can refer to set1 set2 instead, no need for an ID. Xiaomi agrees and think this is sufficient.

P2 and P4a

* LGE wonder for P2, during the gap between RRC and MAC CE there is no resource? Apple confirms.
* Samsung think that if RRC configures then UE shall perform BFD, MAC CE shall just update the resource. Apple think R1 didn’t describe it this way in their LS.
* ZTE think RRC message can be sent with MAC CE (same TB) and there is no issue.
* Intel think bec RRC processing delay gNB would send MAC CEs after RRC. Think in any case there is no issue.
* P1, P1a, P3, P6 are agreed

< RRC related proposals >

**Proposal 1 (for agreement): For BFD-RS set configuration, the two sets (i.e. *failureDetectionSet1-r17 and failureDetectionSet2-r17*) are always provided together.**

**Proposal 1a (for discussion): For BFD-RS set configuration, *bfdRSSetId-r17*** **is removed from *BeamFailureDetectionSet-r17*.**

**Proposal 3 (for agreement): Set *maxNrofBFDResourcePerSet-r17*** **to 64 in RRC.**

maxNrofBFDResourcePerSet-r17 INTEGER ::= 64

**Proposal 6 (for agreement): Capture the configuration restriction on the max BFD-RS resources per set for the UE who doesnot support the MAC CE based activation in the RRC field description.**

|  |
| --- |
| ***failureDetectionSet1, failureDetectionSet2***  Configures parameters for beamfailure detection towards beam failure detection resources configured in the set. If additionalPCIList is configured for the serving cell, each RS in one set can be associted only to one PCI.  NW doesnot configure more than 2 RS in one set for the UE who can not support the MAC CE based BFD-RS activation. |

Older LS responses:

**LS: R2-2203893**

**Question 2.4:** Please inform how to implement beam failure detection RS sets for mTRP. Also what is the maximum number of detection resources to be configured per UE per cell or per TRP? What is the maximum number of recovery resources to be configured per UE per cell or per TRP?

**Answer 2.4:**

RAN1 agreed to support both explicit and implicit beam failure detection (BFD) RS sets configurations for mTRP, and the implicit BFD RS sets can only be configured for mDCI based mTRP (i.e., when PDCCH-Config contains two different values of coresetPoolIndex). The two beam failure detection RS sets are to be configured per DL BWP (BWP-DonwlinkDedicated).

For implicit configuration, the UE determines the two BFD RS sets including periodic CSI-RS resource configuration indexes having the same values as the source RS indexes in the TCI states for the CORESETs associated with respective pool indexes 0 and 1.

Details on explicit configuration (RRC, MAC-CE or RRC+MAC-CE) are still under discussion in RAN1. RAN1 will notify RAN2 after RAN1 reach any consensus.

The maximum number of detection resources per set per CC is 64, which is subject to UE capability.

**LS: R2-2204120**

**Question 3.1.** Is the new per-TRP BFR per TRP operation applicable for inter-cell BM? If yes, please explain how it works e.g.

* Is there is any relation between a BFD RS set and a PCI (e.g. one set associated with RS of this serving cell and another associated with RS associated with the additional PCI)?
* Is there any impact to BFD/BFR with two BFD sets if switching towards beams associated with different PCI occurs?

**Answer 3.1.** RAN1 is still discussing the applicability of two BFD RS sets for inter-cell beam management which uses the Rel-17 unified TCI framework. For inter-cell BM, only single BFD RS set is currently supported.

\_\*\*\_

**Question 3.2.** When a serving cell is configured with inter-cell BM operation (i.e. UE is configured with an additional PCI ) and includes only a single BFD RS set, can the BFD RS set include both 1) RS of the serving cell and 2) RS associated with the additional PCI?

**Answer 3.2.** RAN1 is still discussing this issue.

\_\*\*\_

**Question 3.3.** When a serving cell use inter-cell mTRP, can the UE be configured with two BFD RS sets? If yes, please explain if there is any relation between a BFD RS set and a PCI (e.g. one set associated with RS of this serving cell and another associated with RS associated with an additional PCI).

**Answer 3.3.** RAN1 is still discussing whether per-TRP BFR is applicable for inter-cell mTRP

**LS:R2-2204429**

In RAN1 #107e meeting, the following agreement on the answer to question 3.3 in R2-2203876 has been reached.

**Agreement**

**For Question 3.3 from RAN2, RAN1 response is as follows:**

**Question 3.3**: When a serving cell use inter-cell mTRP, can the UE be configured with two BFD RS sets? If yes, please explain if there is any relation between a BFD RS set and a PCI (e.g. one set associated with RS of this serving cell and another associated with RS associated with an additional PCI).

**Answer**: Yes, when a serving cell is configured with inter-cell mTRP, the UE can also be configured with two BFD RS sets, each associated with one different PCI. ~~Periodic CSI-RS which is QCLed with an SSB associated with additional PCI can be configured as BFD RS associated with an additional PCI~~