3GPP TSG RAN WG1 #101 DRAFT R1-2004638

e-Meeting, May 25th – June 5th, 2020

**Agenda item: 7.2.10.4**

**Source: Moderator (Nokia)**

**Title: FL summary on aperiodic CSI-RS triggering with different numerology between CSI-RS and triggering PDCCH**

**Document for: Discussion and Decision**

# 1 Introduction

This contribution is a pre-meeting summary of the 5 documents submitted for the AI7.2.10.4 on aperiodic CSI-RS triggering with different numerology between CSI-RS and triggering PDCCH.

**< Companies are invited to provide comments on the FL proposals to this draft in section 3 >**

# 2 Summary of issues addressed in the Tdocs

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| **Issue #** | **Description** | **Source** |
| 1 | For cross-carrier A-CSI-RS triggering with different SCS, RRC parameter [enableDefaultBeamForCCS] is used to enable the default QCL assumption. | Vivo #1 |
| 2 | **Proposal 2 (vivo):** Capture the default QCL assumption for cross-carrier A-CSI-RS triggering with same SCS when the scheduling offset is smaller than the threshold and no CORESET is configured on A-CSI-RS carrier.  **Proposal 2 (Qualcomm):** In case of same numerology A-CSI RS triggering, when the offset between A-CSI RS and triggering DCI is less than *beamSwitchTiming,* capture the default QCL agreement in specification.   * If no CORESET configured on the carrier for receiving the A-CSI RS, UE receives the A-CSI RS by applying the QCL parameters of the activated PDSCH TCI state with lowest ID. | Vivo #2  QCom #2 |
| 3 | Support to define the FG 18-5a for default QCL assumption for cross-carrier A-CSI-RS triggering. | QCom #3 |
| 4 | RRC parameter name alignment   * ~~CORESET ID~~ 🡺 controlResourceSetID * minimumSchedulingOffset 🡺 minimumSchedulingOffsetK0-r16 | Oppo |
| 5 | Correct the indentation level for three bullets for default QCL assumption determination. | Huawei,  QCom #1 |
| 6 | Introduction of a missing RRC parameter in three places   * aperiodicTriggeringOffset or aperiodicTriggeringOffsetExt-r16 | Ericsson |

# 3 Discussion on the scope of the RAN1#101

**Issue #1: [Vivo #1]**

* For cross-carrier A-CSI-RS triggering with different SCS, RRC parameter [enableDefaultBeamForCCS] is used to enable the default QCL assumption. [vivo]

**FL proposal:** Discuss the proposal in RAN1#101

Comments on the FL proposal

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| **Company** | **Comment on FL proposal wrt. issue #1** |
| MTK | We are fine to discuss the proposal.  For cross-carrier ACSI-RS triggering, according to GTW session of DC/CA UE features in RAN1 #100-bis-e, companies agreed that UE capabilities 18-6a “Default QCL assumption for cross-carrier A-CSI-RS triggering” apply to both same/different numerologies. Therefore, [enableDefaultBeamForCCS] should also apply to both same/different numerologies. |
| vivo | Support |

**Issue #2: [vivo #2, Qualcomm #2]**

**Proposal 2 [vivo]:** Capture the default QCL assumption for cross-carrier A-CSI-RS triggering with same SCS when the scheduling offset is smaller than the threshold and no CORESET is configured on A-CSI-RS carrier.

**Proposal 2 [Qualcomm]:** In case of same numerology A-CSI RS triggering, when the offset between A-CSI RS and triggering DCI is less than *beamSwitchTiming,* capture the default QCL agreement in specification.

* If no CORESET configured on the carrier for receiving the A-CSI RS, UE receives the A-CSI RS by applying the QCL parameters of the activated PDSCH TCI state with lowest ID.

**FL proposal:** Discuss the two proposals in RAN1#101

Comments on the FL proposal

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| **Company** | **Comment on FL proposal wrt. issue #2** |
| MTK | We are fine to discuss the proposal.  For cross-carrier ACSI-RS triggering, according to GTW session of DC/CA UE features in RAN1 #100-bis-e, companies agreed that UE capabilities 18-6a “Default QCL assumption for cross-carrier A-CSI-RS triggering” apply to both same/different numerologies. Therefore, [enableDefaultBeamForCCS] should also apply to both same/different numerologies. |
| vivo | Support |

**Issue #3: [Qualcomm #3]**

* Support to define the FG 18-5a for default QCL assumption for cross-carrier A-CSI-RS triggering.

**FL proposal:** Discuss the proposal in RAN1#101

Comments on the FL proposal

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| **Company** | **Comment on FL proposal wrt. issue #3** |
| MTK | This proposal seems already agreed before.  To our understanding, according to GTW session of DC/CA UE features in RAN1 #100-bis-e, companies agreed that UE capabilities 18-6a “Default QCL assumption for cross-carrier A-CSI-RS triggering” apply to both same/different numerologies. |
| vivo | Better to discuss in UE feature session. |

**Issue #4: [Oppo]**

* RRC parameter name alignment
  + ~~CORESET ID~~ 🡺 controlResourceSetID
  + minimumSchedulingOffset 🡺 minimumSchedulingOffsetK0-r16

**FL proposal:** Discuss the proposal in RAN1#101

Comments on the FL proposal

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| **Company** | **Comment on FL proposal wrt. issue #4** |
| MTK | We are fine to discuss the proposal. |
| vivo | We are fine to discuss the proposal. |

**Issue #5: [Huawei, Qualcomm #1]**

* Correct the indentation level for three bullets for default QCL assumption determination.

**FL proposal:** Discuss the proposal in RAN1#101

Comments on the FL proposal

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| **Company** | **Comment on FL proposal wrt. issue #5** |
| MTK | We are fine to discuss the proposal. |
| vivo | We are fine with the proposal. |

**Issue #6: [Ericsson]**

* Introduction of a missing RRC parameter in three places
  + aperiodicTriggeringOffset or aperiodicTriggeringOffsetExt-r16

**FL proposal:** Discuss the proposal in RAN1#101

Discussion on views wrt. issue 6:

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| **Company** | **Comment on FL proposal wrt. issue #5** |
| MTK | We are fine to discuss the proposal. |
| vivo | We are fine to discuss the proposal. |

# 4 Conclusion on the scope of the RAN1#101

To be completed

# References

1. R1-2003412 Remaining issues on aperiodic CSI-RS triggering, vivo
2. R1-2004058 Text proposals for aperiodic CSI-RS triggering with different numerologies, OPPO
3. R1-2004150 Remaining issues on the A-CSI RS triggering with different numerology, Huawei, HiSilicon
4. R1-2004204 Maintenance for cross-carrier CSI-RS triggering, Ericsson
5. R1-2004475 Remaining issues for aperiodic CSI-RS triggering with different numerology, Qualcomm Inc.

# Annex – Proposals of the submitted Tdocs

**R1-2003412 Remaining issues on aperiodic CSI-RS triggering, vivo**

**Proposal 1:**

* For cross-carrier A-CSI-RS triggering with different SCS, RRC parameter [enableDefaultBeamForCCS] is used to enable the default QCL assumption.

**TS 38.214**

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| **5.2.1.5.1a Aperiodic CSI Reporting/Aperiodic CSI-RS when the triggering PDCCH and the CSI-RS have different numerologies**  < Unchanged parts are omitted >  Beam switch timing:  - If the scheduling offset between the last symbol of the PDCCH carrying the triggering DCI and the first symbol of the aperiodic CSI-RS resources in a *NZP-CSI-RS-ResourceSet* configured without higher layer parameter *trs-Info* is smaller than the UE reported threshold *beamSwitchTiming* +  in CSI-RS symbols*,* as defined in [13, TS 38.306], when the reported value is one of the values of {14, 28, 48}, or is smaller than 48+ in CSI-RS symbolswhen the reported value of *beamSwitchTiming* is one of the values of {224, 336} and where if the µPDCCH < µCSIRS, the beam switching timing delay *d* is defined in Table 5.2.1.5.1a-1, else *d* is zero  - if one of the associated trigger states has the higher layer parameter *qcl-Type* set to 'QCL-TypeD',  - if there is any other DL signal with an indicated TCI state in the same symbols as the CSI-RS, the UE applies the QCL assumption of the other DL signal also when receiving the aperiodic CSI-RS. The other DL signal refers to PDSCH scheduled with offset larger than or equal to the threshold *timeDurationForQCL,* as defined in [13, TS 38.306], aperiodic CSI-RS scheduled with offset larger than or equal to the UE reported threshold *beamSwitchTiming* + in CSI-RS symbols when the reported value is one of the values {14,28,48}, aperiodic CSI-RS scheduled with offset larger than or equal to 48+ in CSI-RS symbols when the reported value of *beamSwitchTiming* is one of the values {224, 336}, periodic CSI-RS, semi-persistent CSI-RS;  - else,  - if at least one CORESET is configured for the BWP in which the aperiodic CSI-RS is to be received, when receiving the aperiodic CSI-RS, the UE applies the QCL assumption used for the CORESET associated with a monitored search space with the lowest *CORESET-ID* in the latest slot in which one or more CORESETs within the active BWP of the serving cell are monitored.  - else if the UE is configured with *[enableDefaultBeamForCCS]*, when receiving the aperiodic CSI-RS, the UE applies the QCL assumption of the lowest-ID activated TCI state applicable to the PDSCH within the active BWP of the cell in which the CSI-RS is to be received.  < Unchanged parts are omitted > |

**Proposal 2:**

* Capture the default QCL assumption for cross-carrier A-CSI-RS triggering with same SCS when the scheduling offset is smaller than the threshold and no CORESET is configured on A-CSI-RS carrier.
* RRC parameter [enableDefaultBeamForCCS] is used to enable the default QCL assumption for cross-carrier A-CSI-RS triggering with same SCS.

**TS 38.214**

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| **5.2.1.5.1 Aperiodic CSI Reporting/Aperiodic CSI-RS when the triggering PDCCH and the CSI-RS have the same numerology**  < Unchanged parts are omitted >  - If the scheduling offset between the last symbol of the PDCCH carrying the triggering DCI and the first symbol of the aperiodic CSI-RS resources in a *NZP-CSI-RS-ResourceSet* configured without higher layer parameter *trs-Info* is smaller than the UE reported threshold *beamSwitchTiming,* as defined in [13, TS 38.306], when the reported value is one of the values of {14, 28, 48}, or is smaller than 48 when the reported value of *beamSwitchTiming* is one of the values of {224, 336}.  - if there is any other DL signal with an indicated TCI state in the same symbols as the CSI-RS, the UE applies the QCL assumption of the other DL signal also when receiving the aperiodic CSI-RS. The other DL signal refers to PDSCH scheduled with offset larger than or equal to the threshold *timeDurationForQCL,* as defined in [13, TS 38.306], aperiodic CSI-RS scheduled with offset larger than or equal to the UE reported threshold *beamSwitchTiming* when the reported value is one of the values {14,28,48}, aperiodic CSI-RS scheduled with offset larger than or equal to 48 when the reported value of *beamSwitchTiming* is one of the values {224, 336}, periodic CSI-RS, semi-persistent CSI-RS;  - else if the UE is configured with *[enableDefaultBeamForCCS]*,  - if at least one CORESET is configured for the BWP in which the aperiodic CSI-RS is to be received, when receiving the aperiodic CSI-RS, the UE applies the QCL assumption used for the CORESET associated with a monitored search space with the lowest *controlResourceSetId* in the latest slot in which one or more CORESETs within the active BWP of the serving cell are monitored;  - else, when receiving the aperiodic CSI-RS, the UE applies the QCL assumption of the lowest-ID activated TCI state applicable to the PDSCH within the active BWP of the cell in which the CSI-RS is to be received.  - else, when receiving the aperiodic CSI-RS, the UE applies the QCL assumption used for the CORESET associated with a monitored search space with the lowest *controlResourceSetId* in the latest slot in which one or more CORESETs within the active BWP of the serving cell are monitored.  - If the scheduling offset between the last symbol of the PDCCH carrying the triggering DCI and the first symbol of the aperiodic CSI-RS resources is equal to or greater than the UE reported threshold *beamSwitchTiming* when the reported value is one of the values of {14,28,48}, or is equal to or greater than 48 when the reported value of *beamSwitchTiming* is one of the values of {224, 336}, the UE is expected to apply the QCL assumptions in the indicated TCI states for the aperiodic CSI-RS resources in the CSI triggering state indicated by the CSI trigger field in DCI.  < Unchanged parts are omitted > |

**R1-2004058 Text proposals for aperiodic CSI-RS triggering with different numerologies, OPPO**

**Text Proposal for 38.214:**

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| 5.2.1.5.1a Aperiodic CSI Reporting/Aperiodic CSI-RS when the triggering PDCCH and the CSI-RS have different numerologies  When the triggering PDCCH and the triggered aperiodic CSI-RS are of different numerologies, the behavior defined in 5.2.1.5.1 for the case where the numerologies are the same applies with the following exceptions:  Beam switch timing:  *(omitted part)*  - else,  - if at least one CORESET is configured for the BWP in which the aperiodic CSI-RS is to be received, when receiving the aperiodic CSI-RS, the UE applies the QCL assumption used for the CORESET associated with a monitored search space with the lowest *controlResourceSetId*  in the latest slot in which one or more CORESETs within the active BWP of the serving cell are monitored.  *(omitted part)*  Aperiodic CSI-RS timing:  - When the aperiodic CSI-RS is used with aperiodic CSI reporting, the CSI-RS triggering offset *X* is configured per resource set by the higher layer parameter *aperiodicTriggeringOffset,* including the case that the UE is not configured with *minimumSchedulingOffsetK0-r16* for any DL or UL BWP and all the associated trigger states do not have the higher layer parameter *qcl-Type* set to 'QCL-TypeD' in the corresponding TCI states.. The CSI-RS triggering offset has the values of {0, 1,…,31} slots when the µPDCCH < µCSIRS and {0, 1, 2, 3, 4, 16, 24} when the µPDCCH > µCSIRS.. The aperiodic CSI-RS is transmitted in a slot , if UE is configured with ca-SlotOffset for at least one of the triggered and triggering cell, and *Ks* = , otherwise, and where  *(omitted part)* |

**R1-2004150 Remaining issues on the A-CSI RS triggering with different numerology, Huawei, HiSilicon**

**Proposal 1: Adopt the following TP** **in the TS 38.214 [correcting the indentation of the else-if branch]**

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| **5.2.1.5.1a Aperiodic CSI Reporting/Aperiodic CSI-RS when the triggering PDCCH and the CSI-RS have different numerologies**  When the triggering PDCCH and the triggered aperiodic CSI-RS are of different numerologies, the behavior defined in 5.2.1.5.1 for the case where the numerologies are the same applies with the following exceptions:  Beam switch timing:  - If the scheduling offset between the last symbol of the PDCCH carrying the triggering DCI and the first symbol of the aperiodic CSI-RS resources in a *NZP-CSI-RS-ResourceSet* configured without higher layer parameter *trs-Info* is smaller than the UE reported threshold *beamSwitchTiming* + in CSI-RS symbols*,* as defined in [13, TS 38.306], when the reported value is one of the values of {14, 28, 48}, or is smaller than 48+ in CSI-RS symbolswhen the reported value of *beamSwitchTiming* is one of the values of {224, 336} and where if the µPDCCH < µCSIRS, the beam switching timing delay *d* is defined in Table 5.2.1.5.1a-1, else *d* is zero  - if one of the associated trigger states has the higher layer parameter *qcl-Type* set to 'QCL-TypeD',  - if there is any other DL signal with an indicated TCI state in the same symbols as the CSI-RS, the UE applies the QCL assumption of the other DL signal also when receiving the aperiodic CSI-RS. The other DL signal refers to PDSCH scheduled with offset larger than or equal to the threshold *timeDurationForQCL,* as defined in [13, TS 38.306], aperiodic CSI-RS scheduled with offset larger than or equal to the UE reported threshold *beamSwitchTiming* + in CSI-RS symbols when the reported value is one of the values {14,28,48}, aperiodic CSI-RS scheduled with offset larger than or equal to 48+ in CSI-RS symbols when the reported value of *beamSwitchTiming* is one of the values {224, 336}, periodic CSI-RS, semi-persistent CSI-RS;  - else,  - if at least one CORESET is configured for the BWP in which the aperiodic CSI-RS is to be received, when receiving the aperiodic CSI-RS, the UE applies the QCL assumption used for the CORESET associated with a monitored search space with the lowest *CORESET-ID* in the latest slot in which one or more CORESETs within the active BWP of the serving cell are monitored.  - else, when receiving the aperiodic CSI-RS, the UE applies the QCL assumption of the lowest-ID activated TCI state applicable to the PDSCH within the active BWP of the cell in which the CSI-RS is to be received.  - If the scheduling offset between the last symbol of the PDCCH carrying the triggering DCI and the first symbol of the aperiodic CSI-RS resources is equal to or greater than the UE reported threshold *beamSwitchTiming* + in CSI-RS symbols, when the reported value is one of the values of {14,28,48}, or is equal to or greater than 48+ in CSI-RS symbols when the reported value of *beamSwitchTiming* is one of the values of {224, 336}, the UE is expected to apply the QCL assumptions in the indicated TCI states for the aperiodic CSI-RS resources in the CSI triggering state indicated by the CSI trigger field in DCI.  <Unchanged parts omitted> |

**R1-2004204 Maintenance for cross-carrier CSI-RS triggering, Ericsson**

**Proposal: Adopt following TP (changes in blue [highlight on top of the April-agreed CR]) for 38.214.**

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| **5.2.1.5.1 Aperiodic CSI Reporting/Aperiodic CSI-RS when the triggering PDCCH and the CSI-RS have the same numerology**  <omitted text>  When aperiodic CSI-RS is used with aperiodic reporting, the CSI-RS offset is configured per resource set by the higher layer parameter *aperiodicTriggeringOffset* or *aperiodicTriggeringOffsetExt-r16*. The CSI-RS triggering offset has the values of {0, 1, 2, 3, 4, 16, 24} slots. If the UE is not configured with [*minimumSchedulingOffset*] for any DL or UL BWP and if all the associated trigger states do not have the higher layer parameter *qcl-Type* set to 'QCL-TypeD' in the corresponding TCI states , the CSI-RS triggering offset is fixed to zero. The aperiodic triggering offset of the CSI-IM follows offset of the associated NZP CSI-RS for channel measurement.  <omitted text>  **5.2.1.5.1a Aperiodic CSI Reporting/Aperiodic CSI-RS when the triggering PDCCH and the CSI-RS have different numerologies**  <omitted text>  Aperiodic CSI-RS timing:  - When the aperiodic CSI-RS is used with aperiodic CSI reporting, the CSI-RS triggering offset *X* is configured per resource set by the higher layer parameter *aperiodicTriggeringOffset* or *aperiodicTriggeringOffsetExt-r16,* including the case that the UE is not configured with [*minimumSchedulingOffset*] for any DL or UL BWP and all the associated trigger states do not have the higher layer parameter *qcl-Type* set to 'QCL-TypeD' in the corresponding TCI states.. The CSI-RS triggering offset has the values of {0, 1,…,31} slots when the µPDCCH < µCSIRS and {0, 1, 2, 3, 4, 16, 24} when the µPDCCH > µCSIRS.. The aperiodic CSI-RS is transmitted in a slot , if UE is configured with ca-SlotOffset for at least one of the triggered and triggering cell, and *Ks* = , otherwise, and where  *- n* is the slot containing the triggering DCI, *X* is the CSI-RS triggering offset in the numerology of CSI-RS according to the higher layer parameter *aperiodicTriggeringOffset* or *aperiodicTriggeringOffsetExt-r16*,  - and are the subcarrier spacing configurations for CSI-RS and PDCCH, respectively,  <omitted text> |

**R1-2004475 Remaining issues for aperiodic CSI-RS triggering with different numerology, Qualcomm Inc.**

**Proposal 1:** Adopt the proposed text proposal 1 for 5.2.1.5.1a in TS 38.214 to correct the indent level for three bullets for default QCL assumption determination.

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| **5.2.1.5.1a Aperiodic CSI Reporting/Aperiodic CSI-RS when the triggering PDCCH and the CSI-RS have different numerologies**  Beam switch timing:  - If the scheduling offset between the last symbol of the PDCCH carrying the triggering DCI and the first symbol of the aperiodic CSI-RS resources in a *NZP-CSI-RS-ResourceSet* configured without higher layer parameter *trs-Info* is smaller than the UE reported threshold *beamSwitchTiming* + *d*  in CSI-RS symbols*,* as defined in [13, TS 38.306], when the reported value is one of the values of {14, 28, 48}, or is smaller than 48+ *d* when the reported value of *beamSwitchTiming* is one of the values of {224, 336} and where if the µPDCCH < µCSIRS, the beam switching timing delay *d* is defined in Table 5.2.1.5.1a-1, else *d* is zero  - if one of the associated trigger states has the higher layer parameter *qcl-Type* set to 'QCL-TypeD',  - if there is any other DL signal with an indicated TCI state in the same symbols as the CSI-RS, the UE applies the QCL assumption of the other DL signal also when receiving the aperiodic CSI-RS. The other DL signal refers to PDSCH scheduled with offset larger than or equal to the threshold *timeDurationForQCL,* as defined in [13, TS 38.306], aperiodic CSI-RS scheduled with offset larger than or equal to the UE reported threshold *beamSwitchTiming* + *d*  in CSI-RS symbols when the reported value is one of the values {14,28,48}, aperiodic CSI-RS scheduled with offset larger than or equal to 48+ *d* when the reported value of *beamSwitchTiming* is one of the values {224, 336}, periodic CSI-RS, semi-persistent CSI-RS;  - else,  - if at least one CORESET is configured for the BWP in which the aperiodic CSI-RS is to be received, when receiving the aperiodic CSI-RS, the UE applies the QCL assumption used for the CORESET associated with a monitored search space with the lowest *CORESET-ID* in the latest slot in which one or more CORESETs within the active BWP of the serving cell are monitored.  - else, when receiving the aperiodic CSI-RS, the UE applies the QCL assumption of the lowest-ID activated TCI state applicable to the PDSCH within the active BWP of the cell in which the CSI-RS is to be received.  - If the scheduling offset between the last symbol of the PDCCH carrying the triggering DCI and the first symbol of the aperiodic CSI-RS resources is equal to or greater than the UE reported threshold *beamSwitchTiming* + *d*  in CSI-RS symbols, when the reported value is one of the values of {14,28,48}, or is equal to or greater than 48+*d* when the reported value of *beamSwitchTiming* is one of the values of {224, 336} , the UE is expected to apply the QCL assumptions in the indicated TCI states for the aperiodic CSI-RS resources in the CSI triggering state indicated by the CSI trigger field in DCI.  ----------------------------------------------------------- End of text proposal -------------------------------------------------- |

**Proposal 2:** In case of same numerology A-CSI RS triggering, when the offset between A-CSI RS and triggering DCI is less than *beamSwitchTiming,* capture the default QCL agreement in specification.

* If no CORESET configured on the carrier for receiving the A-CSI RS, UE receives the A-CSI RS by applying the QCL parameters of the activated PDSCH TCI state with lowest ID.

**Proposal 3:** Support to define the FG 18-5a for default QCL assumption for cross-carrier A-CSI-RS triggering**.**

* Adopt the proposed text proposal 2 in 5.2.1.5.1 in TS 38.214

Based on the two proposals 2 and 3 above, the corresponding text proposal is provided as follows

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| **5.2.1.5.1          Aperiodic CSI Reporting/Aperiodic CSI-RS when the triggering PDCCH and the CSI-RS have the same numerology**  >>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>> unchanged text omitted <<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<<  If the scheduling offset between the last symbol of the PDCCH carrying the triggering DCI and the first symbol of the aperiodic CSI-RS resources in a *NZP-CSI-RS-ResourceSet* configured without higher layer parameter *trs-Info* and without the higher layer parameter repetition is smaller than the UE reported threshold *beamSwitchTiming*, as defined in [13, TS 38.306], when the reported value is one of the values of {14, 28, 48}, or is smaller than 48 when the reported value of *beamSwitchTiming* is one of the values of {224, 336}.  - if there is any other DL signal with an indicated TCI state in the same symbols as the CSI-RS, the UE applies the QCL assumption of the other DL signal also when receiving the aperiodic CSI-RS. The other DL signal refers to PDSCH scheduled with offset larger than or equal to the threshold *timeDurationForQCL*, as defined in [13, TS 38.306], aperiodic CSI-RS scheduled with offset larger than or equal to the UE reported threshold *beamSwitchTiming* when the reported value is one of the values {14,28,48}, aperiodic CSI-RS scheduled with offset larger than or equal to 48 when the reported value of *beamSwitchTiming* is one of the values {224, 336}, periodic CSI-RS, semi-persistent CSI-RS;  - else if the active BWP of the serving cell for receiving the aperiodic CSI-RS has configured *ControlResourceSet*, when receiving the aperiodic CSI-RS, the UE applies the QCL assumption used for the CORESET associated with a monitored search space with the lowest *controlResourceSetId* in the latest slot in which one or more CORESETs within the active BWP of the serving cell are monitored;  - else if the UE is configured with [*enableDefaultBeamForCCS*] and when receiving the aperiodic CSI-RS, the UE applies the QCL assumption of the lowest-ID activated TCI state applicable to the PDSCH within the active BWP of the cell in which the CSI-RS is to be received. |