**3GPP TSG-RAN WG4 Meeting # 94-e-Bis R4-200XXXX**

**Electronic Meeting, 20 – 30 Apr., 2020**

**Agenda item:** 7.14.2.2

**Source:** Moderator (OPPO)

**Title:** Email discussion summary for [97e][222] NR\_CSIRS\_L3meas\_RRM\_2

**Document for:** Information

# Introduction

*Briefly introduce background, the scope of this email discussion and provide some guidelines for email discussion if necessary.*

Test cases for CSI-RS L3 measurements are to be discussed in this email discussion. This is the 1st meeting for performance discussion, which is aiming to decide the structure of test cases and endorse some CRs for this meeting.

* The structure of test cases
	+ event triggered reporting tests for intra-frequency measurement
	+ event triggered reporting tests for inter-frequency measurement
	+ CSI-RSRP, CSI-RSRQ, CSI-SINR accuracy requirements and related test cases
* Draft CRs for test cases (according to CR splits in the reflector)

*List of candidate target of email discussion for 1st round and 2nd round*

* 1st round: discuss the structure of test cases and comments on companies’ CRs
* 2nd round: try to agree on some CRs for test cases in this meeting, and CR split for preparation of next meeting

# Topic #1: Test cases

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| [**R4-2014699**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014699.zip) | CMCC | Proposal 1: it is proposed to define following test cases for Rel-16 CSI-RS based RRM measurement:* intra-frequency measurement without gap (event triggered reporting tests for intra-frequency measurement without gap)
* inter-frequency measurement with gap (event triggered reporting tests for inter-frequency measurement with gap)
* measurement accuracy requirements and related test cases, including CSI-RSRP, CSI-RSRQ, CSI-SINR, for both intra-frequency measurement and inter-frequency measurement

Proposal 2: both DRX and non-DRX need to be tested for CSI-RS based measurement. And for the case with DRX, both short DRX (e.g. 40 ms) and long DRX (e.g. 640 ms) are necessary to be tested.Proposal 3: for the measurement gap configuration, it is proposed to test both per-UE gap and per-FR gap. One test is provided with per-UE gap (e.g. MG pattern # 0) for UE that does not support per-FR gap, and the other test is provided with per-FR gap (e.g. MG pattern # 4 for FR1, e.g. MG pattern # 13 for FR2) for UE that supports per-FR gap. UE only need to pass one test per frequency range based on its supported gap patterns. |
|  |  |  |
| [**R4-2014189**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014189.zip) | Qualcomm  | Draft test case CR on EN-DC event triggered reporting tests without gap for NR neighbor cell in FR2 |
| [**R4-2014287**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014287.zip) | Qualcomm  | Draft test case CR on EN-DC CSI-RSRP measurement accuracy for NR neighbor cell in FR2  |
| [**R4-2014444**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014444.zip) | CATT | CR on test case for CSI-RS based L3 measurement |
| [**R4-2014626**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014626.zip) | MediaTek inc. | Introduction of CSI-SINR measurement accuracy for FR2 SA |
| [**R4-2014665**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014665.zip) | Xiaomi | RRM test cases for CSI-RS L3 intra-frequency and inter-frequency measurements |
| [**R4-2014793**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014793.zip) | OPPO | CR to TS 38.133: EN-DC event triggered reporting tests for NR neighbor cell in FR2(PScell in FR1) for CSI-RS L3 inter-frequency measurements(A.5.6.x) |
| [**R4-2014794**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014794.zip) | OPPO | CR to TS 38.133: TC for EN-DC CSI-RSRQ measurement accuracy for all NR cells in FR1(A.4.7.x) |
| [**R4-2014795**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014795.zip) | OPPO | CR to TS 38.133: TC for EN-DC CSI-RSRQ measurement accuracy for all NR cells in FR2(A.5.7.x) |
| [**R4-2014532**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014532.zip) | vivo | CR on test cases for EN-DC CSI-SINR measurement accuracy |
| [**R4-2015586**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015586.zip) | ZTE | Draft CR on test case for SA CSI-RS based measurement in FR2 and CSI-RSRQ accuracy in FR2 |
| [**R4-2015789**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015789.zip) | Huawei, HiSilicon | CR to introduce TC for CSI-SINR measurement accuracy for FR1 SA and FR2 EN-DC |
| [**R4-2016050**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016050.zip) | Nokia, Nokia Shanghai Bell | 38133 CR for test case of EN-DC event triggered reporting in FR1 |
| [**R4-2016051**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016051.zip) | Nokia, Nokia Shanghai Bell | 38133 CR for Test Case of EN-DC CSI-RSRP accuracy requirements in FR1 |
| [**R4-2014433**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014433.zip) | CATT | CR on CSI-RS configuration for mobility |
| [**R4-2014666**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014666.zip) | Xiaomi | RRM test cases for CSI-RS L3 measurement performance |
| [**R4-2015213**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015213.zip) | Xiaomi | CR on introduce the gain to CSI-RSRP measurements point in FR1 and FR2 |
| [**R4-2014288**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014288.zip) | Qualcomm  | CR on introducing CSI-RS configurations for RRM |

## Open issues summary

*Before e-Meeting, moderators shall summarize list of open issues, candidate options and possible WF (if applicable) based on companies’ contributions.*

### Sub-topic 1-1

*Sub-topic description:*

*Open issues and candidate options before e-meeting:*

**Issue 1-1: The structure of test cases**

* Proposals
	+ Option 1 (CMCC): define following test cases for Rel-16 CSI-RS based RRM measurement
	+ intra-frequency measurement without gap (event triggered reporting tests for intra-frequency measurement without gap)
	+ inter-frequency measurement with gap (event triggered reporting tests for inter-frequency measurement with gap)
	+ measurement accuracy requirements and related test cases, including CSI-RSRP, CSI-RSRQ, CSI-SINR, for both intra-frequency measurement and inter-frequency measurement
* Recommended WF
	+ Support Option 1
	+ Companies are encouraged to define test cases as the following list provided by Rapporteur in the reflector
* 1. Intra-frequency measurement

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test No. | Test | Tentative section number | Company | Note |
| TC1 | SA event triggered reporting tests without gap for NR neighbor cell in FR1 | A6.6.x | CATT | Test with non-DRX |
| TC2 | SA event triggered reporting tests without gap for NR neighbor cell in FR2 | A7.6.x | Xiaomi | Test with DRX |
| TC3 | EN-DC event triggered reporting tests without gap for NR neighbor cell in FR1 | A4.6.x | Nokia | Test with DRX |
| TC4 | EN-DC event triggered reporting tests without gap for NR neighbor cell in FR2 | A5.6.x | Qualcomm | Test with non-DRX |

* 2. Inter-frequency measurement

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Test No. | Test | Tentative section number | Company | Note |
| **TC1** | SA event triggered reporting tests with gap（all NR cells in FR1） | **A6.6.y** | **CATT** | **Test with non-DRX** |
| **TC2** | SA event triggered reporting tests with gap for NR neighbor cell in FR2（PCell in FR2） | **A7.6.y.2** | **ZTE** | **Test with DRX** |
| **TC3** | EN-DC event triggered reporting tests with gap（all NR cells in FR1） | **A4.6.y** | Xiaomi | **Test with DRX** |
| **TC4** | EN-DC event triggered reporting tests with gap for NR neighbor cell in FR2（PScell in FR1） | **A5.6.y.1** | OPPO | **Test with non-DRX** |

* 3. Measurement performance

|  |  |  |  |
| --- | --- | --- | --- |
| Test No. | Test | Tentative section number | Company |
| **TC1** | SA：CSI-RSRP measurement accuracy for（all NR cells in FR1） | A6.7.x | CATT |
| **TC2** | SA：CSI-RSRQ measurement accuracy for（all NR cells in FR1） | A6.7.y | **Xiaomi** |
| **TC3** | SA：CSI-SINR measurement accuracy for（all NR cells in FR1） | A6.7.z | **Huawei** |
| **TC4** | SA：CSI-RSRP measurement accuracy for NR neighbor cell in FR2 | A7.7.x | **Xiaomi** |
| **TC5** | SA：CSI-RSRQ measurement accuracy for NR neighbor cell in FR2 | A7.7.y | **ZTE** |
| **TC6** | SA：CSI-SINR measurement accuracy for NR neighbor cell in FR2 | A7.7.z | **MediaTek** |
| **TC7** | EN-DC：CSI-RSRP measurement accuracy for（all NR cells in FR1） | A4.7.x | Nokia |
| **TC8** | EN-DC：CSI-RSRQ measurement accuracy for（all NR cells in FR1） | A4.7.y | OPPO |
| **TC9** | EN-DC：CSI-SINR measurement accuracy for（all NR cells in FR1） | A4.7.z | vivo |
| **TC10** | EN-DC：CSI-RSRP measurement accuracy for NR neighbor cell in FR2 | A5.7.x | Qualcomm |
| **TC11** | EN-DC：CSI-RSRQ measurement accuracy for NR neighbor cell in FR2 | A5.7.y | OPPO |
| **TC12** | EN-DC：CSI-SINR measurement accuracy for NR neighbor cell in FR2 | A5.7.z | **Huawei** |
| Note: for each row in this table, two test cases, one for intra-frequency and one for inter-frequency, will be defined. |

### Sub-topic 1-2

**Issue 1-2: Whether both DRX and non-DRX need to be tested ?**

* Proposals
	+ Option 1: YES
		- Especially, for the case with DRX, both short DRX (e.g. 40 ms) and long DRX (e.g. 640 ms) are necessary to be tested.(CMCC)
	+ Option 2: NO
* Recommended WF
	+ Option 2

### Sub-topic 1-3

**Issue 1-3: Whether test cases with both per UE gap and per-FR gap need to be tested?**

* Proposals
	+ Option 1: YES
		- For the measurement gap configuration, it is proposed to test both per-UE gap and per-FR gap.
			* One test is provided with per-UE gap (e.g. MG pattern # 0) for UE that does not support per-FR gap, and the other test is provided with per-FR gap (e.g. MG pattern # 4 for FR1, e.g. MG pattern # 13 for FR2) for UE that supports per-FR gap. UE only need to pass one test per frequency range based on its supported gap patterns.(CMCC)
	+ Option 2: NO
* Recommended WF
	+ TBA

### Sub-topic 1-4

**Issue 1-4: CSI-RS configuration for RRM measurement**

[Moderator]: 4 tables for CSI-RS configuration, including

* FDD: CSI-RS configuration with SCS = 15KHz
* TDD: CSI-RS configuration with SCS=15kHz, SCS=15kHz, 120kHz
* Proposals
	+ Option 1(CATT): Based on CR R4-2014433. For example,

**Table A.3.19.1.1-1: CSI-RS for mobility for SCS=15kHz**

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Unit** | **Value** |
|  |  | **Set 1** | **Set 2** |
| Reference channel |  | CSI-RS-L3 1.1-1 FDD | CSI-RS-L3 1.1-2 FDD |
| Bandwidth |  | BW of Active BWPNote 1 |
| SCS | kHz | 15 |
| First subcarrier index in the PRB used for CSI-RS  |  | k0=0 for CSI-RS resource 1,2 |
| First OFDM symbol in the slot used for CSI-RS  |  | l0 = 5 for CSI-RS resource 1l0 = 9 for CSI-RS resource 2 |
| Number of CSI-RS ports (X) |  | 1 for CSI-RS resource 1,2 |
| CDM Type |  | ‘No CDM’ for all CSI-RS resources |
| Density (ρ) |  | 3 for CSI-RS resource 1,2 |
| CSI-RS periodicity | slots | 40 for CSI-RS resource 1,2 |
| CSI-RS offset | slots | 2 for CSI-RS resource 1,2 | 12 CSI-RS resource 1,2 |
| EPRE ratio to SSS | dB | 0Note 2 |
| Associated with SSB |  | Yes |
| QCLed with SSB |  | Yes |
| Note 1: BW of CSI-RS is configured same as the BW size of UE active BWP in the RRM test casesNote 2: Unless otherwise specified in the test case |

* + Option 2(Qualcomm): Based on CR R4-2014288. For example,

**Table A.3.X.1-1: CSI-RS RRM Reference Measurement Channels for SCS=15kHz**

|  |  |  |
| --- | --- | --- |
|  | **CSI-RS.RRM.1.1 FDD** | **CSI-RS.RRM.1.2 FDD** |
| **CSI-RS-ResourceConfigMobility** |  |  |
| subcarrierSpacing | 15 | 15 |
| **CSI-RS-CellMobility** |  |  |
| cellIdnote1 | 489 | 0 |
| nrofPRBs | 48 | 48 |
| startPRB | 0 | 0 |
| density | 3 | 3 |
| **CSI-RS-Resource-Mobility** |  |  |
| csi-RS-Index | 0 | 1 |
| slotConfig: ms20 | slot9 | slot10 |
| **associatedSSB** |  |  |
| ssb-Index | 0 | 0 |
| isQuasiColocated | True | True |
| firstOFDMSymbolInTimeDomain | 6 | 10 |
| sequenceGenerationConfig | 0 | 0 |
| Note1: cellid can be overridden by Physical cell ID in the test case |

* Recommended WF
	+ TBA

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX | Issue 1-1: The structure of test casesIssue 1-2: Whether both DRX and non-DRX need to be tested ?Issue 1-3: Whether test cases with both per UE gap and per-FR gap need to be tested? Issue 1-4: CSI-RS configuration for RRM measurementOthers: |
| YYY | Issue 1-1: The structure of test casesIssue 1-2: Whether both DRX and non-DRX need to be tested ?Issue 1-3: Whether test cases with both per UE gap and per-FR gap need to be tested? Issue 1-4: CSI-RS configuration for RRM measurement |

### CRs/TPs comments collection

*Major close-to-finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs. For Rel-16 on-going WIs, suggest to focus on open issues discussion on 1st round.*

|  |  |
| --- | --- |
| **CR/TP number** | **Comments collection** |
| [**R4-2014189**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014189.zip)Qualcomm | Draft test case CR on EN-DC event triggered reporting tests without gap for NR neighbor cell in FR2Company A:Company B: |
| **[R4-2014287](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014287.zip)** Qualcomm | Draft test case CR on EN-DC CSI-RSRP measurement accuracy for NR neighbor cell in FR2 Company A:Company B: |
| [**R4-2014444**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014444.zip)CATT | CR on test case for CSI-RS based L3 measurementCompany A:Company B: |
| [**R4-2014626**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014626.zip) MediaTek | Introduction of CSI-SINR measurement accuracy for FR2 SACompany A:Company B: |
| [**R4-2014665**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014665.zip) Xiaomi | RRM test cases for CSI-RS L3 intra-frequency and inter-frequency measurementsCompany A:Company B: |
| [**R4-2014793**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014793.zip) OPPO | CR to TS 38.133: EN-DC event triggered reporting tests for NR neighbor cell in FR2(PScell in FR1) for CSI-RS L3 inter-frequency measurements(A.5.6.x)Company A:Company B: |
| [**R4-2014794**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014794.zip) OPPO | CR to TS 38.133: TC for EN-DC CSI-RSRQ measurement accuracy for all NR cells in FR1(A.4.7.x)Company A:Company B: |
| [**R4-2014795**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014795.zip) OPPO | CR to TS 38.133: TC for EN-DC CSI-RSRQ measurement accuracy for all NR cells in FR2(A.5.7.x)Company A:Company B: |
| [**R4-2014532**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014532.zip) vivo | CR on test cases for EN-DC CSI-SINR measurement accuracyCompany A:Company B: |
| [**R4-2015586**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015586.zip)ZTE | Draft CR on test case for SA CSI-RS based measurement in FR2 and CSI-RSRQ accuracy in FR2Company A:Company B: |
| [**R4-2015789**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015789.zip)Huawei | CR to introduce TC for CSI-SINR measurement accuracy for FR1 SA and FR2 EN-DCCompany A:Company B: |
| [**R4-2016050**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016050.zip)Nokia | 38133 CR for test case of EN-DC event triggered reporting in FR1Company A:Company B: |
| [**R4-2016051**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2016051.zip) Nokia | 38133 CR for Test Case of EN-DC CSI-RSRP accuracy requirements in FR1Company A:Company B: |
| [**R4-2014288**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014288.zip)Qualcomm | CR on introducing CSI-RS configurations for RRMCompany A:Company B: |
| [**R4-2014433**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014433.zip)CATT | CR on CSI-RS configuration for mobilityCompany A:Company B: |
| [**R4-2014666**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2014666.zip)Xiaomi | RRM test cases for CSI-RS L3 measurement performanceCompany A:Company B: |
| [**R4-2015213**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_97_e/Docs/R4-2015213.zip)Xiaomi | CR on introduce the gain to CSI-RSRP measurements point in FR1 and FR2Company A:Company B: |

## Summary for 1st round

### Open issues

*Moderator tries to summarize discussion status for 1st round, list all the identified open issues and tentative agreements or candidate options and suggestion for 2nd round i.e. WF assignment.*

|  |  |
| --- | --- |
|  | **Status summary**  |
| **Sub-topic#1** | *Tentative agreements:**Candidate options:**Recommendations for 2nd round:* |

*Recommendations on WF/LS assignment*

|  |  |  |
| --- | --- | --- |
|  | **WF/LS t-doc Title**  | **Assigned Company,****WF or LS lead** |
| #1 |  |  |

### CRs/TPs

*Moderator tries to summarize discussion status for 1st round and provides recommendation on CRs/TPs Status update*

|  |  |
| --- | --- |
| **CR/TP number** | **CRs/TPs Status update recommendation**  |
| XXX | *Based on 1st round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |

## Discussion on 2nd round (if applicable)

## Summary on 2nd round (if applicable)

*Moderator tries to summarize discussion status for 2nd round and provided recommendation on CRs/TPs/WFs/LSs Status update suggestion*

|  |  |
| --- | --- |
| **CR/TP/LS/WF number** | **T-doc Status update recommendation**  |
| XXX | *Based on 2nd round of comments collection, moderator can recommend the next steps such as “agreeable”, “to be revised”* |