**3GPP TSG-RAN WG4 Meeting # 104-e R4-2214261**

**Electronic Meeting, 15 – 26 August, 2022**

**Agenda item:** 9.8.3

**Source:** Moderator (vivo)

**Title:** Email discussion summary for [104-e][209] NR\_RRM\_enh2\_2

**Document for:** Information

# Introduction

This email discussion summary covers agendas 9.8.1.2 for core requirement maintenance and 9.8.2.2 for performance requirements for topic HO with PSCell under FeRRM WI.

It is appreciated that the delegates for this topic put their contact information in the table below.

Contact information

|  |  |  |
| --- | --- | --- |
| **Company** | **Name** | **Email address** |
| Apple | Jie Cui | Jie\_cui@apple.com |
| Huawei | Zhongyi Shen | shenzhongyi3@huawei.com |
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| Ericsson | Venkat | Venkatarao.gonuguntla@ericsson.com |
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| vivo | Yanliang SUN | Yanliang.sun@vivo.com |
| MTK | Ogeen Toma | Ogeen.hanna@mediatek.com |

Note:

1. Please add your contact information in above table once you make comments on this email thread.
2. If multiple delegates from the same company make comments on single email thread, please add you name as suffix after company name when make comments i.e. Company A (XX, XX)

# Topic #1: HO with PSCell core requirement maintenance

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2213948 | Ericsson | In this CR, we provide correction for fine timing for HO with PSCell when PSCell is on CCA in EN-DC to EN-DC scenario |
| R4-2213949 | Ericsson | In this CR, we provide correction for fine timing for HO with PSCell when PSCell is on CCA in NR SA to EN-DC scenario |

## Open issues summary

Comments are provided to CRs directly. No specific open issue to be discussed.

## Companies views’ collection for 1st round

### Open issues

No open issues in the 1st round.

### CRs/TPs comments collection

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| --- | --- |
| **CR/TP number** | **Comments collection** |
| XXX | Company A |
| Company B |
|  |
| R4-2213948Ericsson | Apple: fine with CR |
| QC : We agree with the idea to handle LBT failure of SSB. However, we think the upper limit of the number for unavailable SMTC occasion should be defined. And the upper limit value is FFS. |
| Nokia: In generally the change is fine. The requirement for fine timing is same as 7.31A.2. we would suggest to just refer the existing requirement to keep one definition which would be easy for tracing and maintenance in future. |
| R4-2213949Ericsson | Apple: fine with CR |
| Same comment for R4-2213948.  |
| Nokia: Same comments as R4-2213948 |

## Summary for 1st round

### Open issues

No open issues in the 1st round.

### CRs/TPs

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

*Note: The tdoc decisions shall be provided in Section 3 and this table is optional in case moderators would like to provide additional information.*

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| --- | --- |
| **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”* |
| R4-2213948 | *to be revised* |
| R4-2213949 | *to be revised* |

## Discussion on 2nd round (if applicable)

# Topic #2: HO with PSCell test cases

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

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2211619 | Qualcomm Incorporated | Observation: FR2 testability issue is understood. However, it does not mean test case cannot be introduced in R17. It is much beneficial for UE and infra vender to define test case and maintain it in the future release when testability issue is resolved. If RAN4 do not introduce FR1+FR2 testcase in R17, it will require more efforts to define R17 test case in future release. Proposal: Introduce the test case and define the applicability. |
| R4-2211633 | CATT | Proposal 1: The design for FR1+FR2 test cases should be delayed until testability issues are solved. |
| R4-2211634 | CATT | Draft CR: Test case of handover with PSCell from EN-DC to EN-DC with known target PSCell in FR1 |
| R4-2211842 | Apple | Proposal 1:FR1+FR2 test cases for HO with PSCell shall be delayed until testability issues are solved, including:• FR1+FR2 NR-DC to FR1+FR2 NR-DC• EN-DC with FR1 PSCell to EN-DC with FR2 PSCell• EN-DC with FR2 PSCell to EN-DC with FR1 PSCell• EN-DC with FR2 PSCell to EN-DC with FR2 PSCell• NR-SA FR2 to EN-DC with FR1 PSCell • NR-SA FR2 to EN-DC with FR2 PSCell • NR-SA FR1 to EN-DC with FR2 PSCell |
| R4-2211843 | Apple | Draft CR on TC for HO with PSCell from NR-SA to EN-DC with parallel processing and known FR2 PSCell in TS38.133 R17 |
| R4-2211956 | Xiaomi | CR on test case for handover with PSCell from NR SA to EN-DC with sequential processing |
| R4-2212033 | OPPO | draft CR on TC2 for HO with PSCell from NR SA to EN-DC with parallel processing |
| R4-2212129 | Intel Corporation | DraftCR to TS 38.133: Handover with PSCell from NR-DC to NR-DC with sequential processing |
| R4-2212660 | vivo | draft CR on test cases for Handover with PSCell from NE-DC to NE-DC with known target PSCell |
| R4-2212860 | Nokia, Nokia Shanghai Bell | DraftCR for Correction on test cases for Handover with PSCell from NE-DC to NE-DC  |
| R4-2212953 | Huawei, HiSilicon | Draft CR on TC for HO with PSCell from NR SA to EN-DC |
| R4-2213747 | MediaTek inc. | Proposal 1: For FR1+FR2 test cases, the test case design is delayed until testability issues are solved. |
| R4-2213952 | Ericsson | Draft CR: TC for EN-DC to EN-DC Handover with PSCell using CCA with known target PSCell |
| R4-2213953 | Ericsson | Draft CR: TC for NR SA to EN-DC Handover with PSCell using CCA with known target PSCell |

## 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 2-1: FR1+FR2 test cases

*Sub-topic description:*

**Issue 2-1-1: Test cases design principle - FR1+FR2 test cases**

* Proposals
	+ Option 1 (CATT, Apple, MTK): Test case design is delayed until testability issues are solved
	+ Option 2 (Qualcomm): Introduce the test case in R17 and define applicability
* Recommended WF
	+ Companies are encouraged to provide views on the two options for FR1+FR2 test cases design. Other options are not precluded in the 1st round.
* 1st round Comment collection:

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| **Company** | **Comments** |
| Apple | Support option 1 based on the previous agreed WF R4-2115240. |
| Intel | Support option 1. |
| Huawei | First, we don’t think a test case has testability issue as long as the test including FR1/LTE and FR2 cells. Whether there is testability issue shall be based on principles as agreed in WF R4-2115240.For HO with PSCell involving FR1+FR2, some of them may not be able to be tested (e.g. based on PCell’s timing for sequential processing case). Other can be tested only the performance in FR1 cannot be verified.For above options on how to treat FR1+FR2 test cases, we prefer option 2. |
| CATT | Support option 1.  |
| OPPO | Support option 1. |
| Ericsson | We support option 2. It may be easy to define the test cases when the WI is ongoing rather than comeback and define the test cases at a later stage when the testability issue is resolved.  |
| Qualcomm | We support option 2. We understand the testability issue for FR2. However, it is much beneficial to UE and NW to define the test case in R17 and maintain it in future release. It will require much effort to define entire R17 FR2 related test requirements in the future release |
| Nokia | We would prefer option 2. If RAN4 apply option 1 we believe RAN4 will introduce a kind of a chicken and egg problem. Hence, RAN4 does not introduce these tests until testability issue is solved while there is no real reason to address the testability because there are no RAN4 tests.In that sense we can support option 2.This issue is also happened in some WIs’ performance part. RAN4 should have a general rule for the principle for FR1+FR2 test cases. Ericsson paper [R4-2213937](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_104-e/Docs/R4-2213937.zip) in TEI17 raised this issue and it is discussed in sub-topic 3-1 in 202 email thread. We can follow the conclusion of the discussion in 202 email thread. |
| vivo | No strong view. Fine with either option.Without addressing testability issues at this moment, RAN4 may any how need to come back to those test cases when testability issues are solved. Therefore, either specifying test cases at that time or specify some raw examples at this time are both fine for us. |
| MTK | Support option 1. |

**Issue 2-1-2: Test cases list for FR1+FR2 test cases**

* Proposals
	+ FR1+FR2 NR-DC to FR1+FR2 NR-DC
	+ EN-DC with FR1 PSCell to EN-DC with FR2 PSCell
	+ EN-DC with FR2 PSCell to EN-DC with FR1 PSCell
	+ EN-DC with FR2 PSCell to EN-DC with FR2 PSCell
	+ NR-SA FR2 to EN-DC with FR1 PSCell
	+ NR-SA FR2 to EN-DC with FR2 PSCell
	+ NR-SA FR1 to EN-DC with FR2 PSCell
* Recommended WF
	+ Interested companies are encouraged to share views on potential FR1+FR2 test cases, regardless of whether it will be introduced in Rel-17.
* 1st round Comment collection:

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| --- | --- |
| **Company** | **Comments** |
| Apple | We think all of them are not needed at this stage for testing, but those scenarios in requirement are valid. |
| Intel | Same view as Apple. Don’t need to consider the testcase until the testability issue is solved. |
| CATT | The list is OK if FR1+FR2 tests are considered. But as commented in issue 2-1-1, we think these tests are not needed at this stage.  |
| Ericsson | We are fine with the above mentioned test cases. |
| Qualcomm | We are fine with proposal and we have similar view as Apple comments.  |
| Nokia | This issue will depend on the conclusion of issue 2-1-1. According to the test cases for FR1+FR2, since the agreed test cases list and the existing HO test cases and PSCell addition/change test cases already covered some part of the requirements, we do not need to introduce all the cases, hence we would suggest to minimize the test cases to cover the requirements as below:* + FR1+FR2 NR-DC to FR1+FR2 NR-DC
	+ EN-DC with FR1 PSCell to EN-DC with FR2 PSCell
	+ NR-SA FR1 to EN-DC with FR2 PSCell
 |
| vivo | The list can be reduced. We are open to discuss how to reduce the total number of test cases. |
| MTK | Same view as Apple. Test cases can be introduced based on the conclusion of Issue 2-1-1. |
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## Companies views’ collection for 1st round

### Open issues

Comments are collected in section 2.2.1

### CRs/TPs comments collection

*Companies are encouraged to provide comments in the 1st round since the draft CRs will be endorsed in the meeting for finalization of performance work of FeRRM WI.*

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| **CR/TP number** | **Comments collection** |
| XXX | Company A |
| Company B |
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| R4-2211634CATT | Nokia: CR is agreeable. |
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| R4-2211843Apple | CATT: 1) The test is included in issue 2-1-2, whether to introduce is under discussion. 2) “The test consists of four successive time periods with duration of T1, T2, and T3.” 3) Target PSCell is missing in configuration 2 in Table A.7.3.1.x2.1-1 |
| Nokia: This test case is not in the agreed list in 103e meeting. For NR SA to EN-DC, only TC#1 & TC#2 is agreed and the draftCR were endorsed in last meeting (R4-2211007 & R4-2211009). Need more discussion, it will depend on the discussion on issue 2-1-1 and issue 2-1-2. |
|  |
| R4-2211956Xiaomi | CATT: 1) The test is included in issue 2-1-2, whether to introduce is under discussion. 2) There should be three carriers in the test. 3) The delay requirements for PRACH transmission on LTE Cell should also be included in test requirements. |
| Nokia: This test case is not in the agreed list in 103e meeting. For NR SA to EN-DC, only TC#1 & TC#2 is agreed and the draftCR were endorsed in last meeting (R4-2211007 & R4-2211009). Need more discussion, it will depend on the discussion on issue 2-1-1 and issue 2-1-2. |
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| R4-2212033OPPO | CATT: 1) “duration T1, the UE does not have any timing information of Cell 2 and Cell 3”. Cell 3 is missing. 2) the command for Handover with PSCell is one RRC message, and should not be separated to Handover command and PSCell Addition command. 3) there is no need to differentiate T1, T2, T3 and T1', T2', T3', T4', and should be unified as T1, T2, T3 in which T3>T3'+T4'. |
| OPPO: To CATT, ok with 1) and 2). For 3), it is hard to define the end of PCell PRACH as end of T3. We are ok to align the start of T3 and T3’, but slightly prefer to leave T3 for PCell PRACH and T3’+T4’ for PSCell addition where T3’ is for PSCell PRACH and T4’ is for CSI reporting for PSCell. |
| Nokia: Is it the same as R4-2211007 endorsed in 103e meeting? |
| R4-2212129Intel | CATT: 1) The test is included in issue 2-1-2, whether to introduce is under discussion. 2) “The test scenario comprises four NR cells, source PCell(Cell 1) and source PSCell(Cell 2), target PCell(Cell 3), target PSCell(Cell 4).” is not aligned with the sentence “Cell 1 and Cell 2 are on radio channel 1 in FR1.Cell 3 and Cell 4 are on radio channel 2 in FR2.” And also not aligned with Table A.7.3.1.x4.1-13) Table A.7.3.1.x4.1-2 is not correct. |
| Nokia: This test case is not in the agreed list in 103e meeting. Need more discussion, it will depend on the discussion on issue 2-1-1 and issue 2-1-2. |
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| R4-2212660vivo | CATT: 1) “The test consists of five time periods with duration of T1, T2, T3 and T4 respectively. ”[vivo]OK2) “There are two carriers each with one cell.” Should be two cells on each carrier? [vivo] OK3) Measurement gap and T4 are not needed. [vivo]Measurement gap is removed. OK to remove T4 related description in A.4A.1.X1.1.Oure understanding is that T3 and T4 can be separately tested for the parallel processing. However, if companies can agree on the testing these two in one period T3, then we are also fine with it.4) T3 should not be ended at the point in time at which the UE has sent PRACH. The sentence is not needed and T3 is defined as a constant in the table which is a little longer than the requirements.[vivo]OK to remove T3 related description in A.4A.1.X1.1. |
| Nokia: Is it same as R4-2211010 endorsed in 103e meeting?[vivo] Yes |
|  |
| R4-2212860Nokia | CATT: 1) for change #1, same comments as that for R4-2212660. 2) for change #2, “Starting of T1, Cell 2 becomes detectable and known to UE for entire T1 duration.” is not correct. Cell 2 is turned on at T2. 3) since this is unknown case, UE doesn’t need to report event A3 during T2 and the RRC command should be sent before T2. 4) T3 is not needed. |
| Nokia: To CATT, thanks for your comments. We will correct in revision.  |
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| R4-2212953Huawei | CATT: in Table A.6.3.1.x1-5, Noc, Io during T1 are valid and should not be defined as N/A. |
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| R4-2213952Ericsson | Nokia: This CR is fine in generally. Some comments as below: 1. In Table A.4.3.x1.1-5, it should be Cell 3 & Cell 4 for NR CCA cell. 2. In Table A.4.3.x1.1-5, only given 1 configuration, however this test case includes 2 test configurations. |
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| R4-2213953Ericsson | Huawei: The title seems not correct. And test cases related to CCA (3952/3953) shall be included in dedicated clause (e.g. A.10/A.11) |
| Ericsson: Thank you Huawei for the comment. We will correct them in revision. |
| Nokia: This CR is fine in generally. Some comments as below: 1. section title for this test case says " from EN-DC to EN-DC" is wrong 2. 2 test configurations given in Table A.6.3.1.xn.1-1, but there have 6 configurations in the table -3 & -4. 3. wrong time duration in table -4. The time duration for PSCell addition is T1’, T2’, T3’and T4’ |

## 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.*

**Sub-topic 2-1: FR1+FR2 test cases**

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|  | **Status summary**  |
| **Issue 2-1-1: Test cases design principle - FR1+FR2 test cases** | *Tentative agreements:**None.* *Candidate options:***Issue 2-1-1: Test cases design principle - FR1+FR2 test cases*** Proposals
	+ Option 1 (CATT, Apple, MTK, OPPO, Intel, MTK): Test case design is delayed until testability issues are solved
	+ Option 2 (Qualcomm, Huawei, Ericsson, Nokia): Introduce the test case in R17 and define applicability

*Recommendations for 2nd round:*Should be treated in GTW if possible. |
| **Issue 2-1-2: Test cases list for FR1+FR2 test cases** | *Tentative agreements:**None.**Candidate options:***Issue 2-1-2: Test cases list for FR1+FR2 test cases*** Proposals
	+ Option 1:
		- FR1+FR2 NR-DC to FR1+FR2 NR-DC
		- EN-DC with FR1 PSCell to EN-DC with FR2 PSCell
		- EN-DC with FR2 PSCell to EN-DC with FR1 PSCell
		- EN-DC with FR2 PSCell to EN-DC with FR2 PSCell
		- NR-SA FR2 to EN-DC with FR1 PSCell
		- NR-SA FR2 to EN-DC with FR2 PSCell
		- NR-SA FR1 to EN-DC with FR2 PSCell
	+ Option 2:
		- FR1+FR2 NR-DC to FR1+FR2 NR-DC
		- EN-DC with FR1 PSCell to EN-DC with FR2 PSCell
		- NR-SA FR1 to EN-DC with FR2 PSCell

*Recommendations for 2nd round:**Reach agreements on list of FR1+FR2 test cases, if option 2 for Issue 2-1-1 is agreeable.* |

### CRs/TPs

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

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| **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”* |
| R4-2211634 | *agreeable* |
| R4-2211843 | *to be revised* |
| R4-2211956 | *to be revised* |
| R4-2212033 | *to be revised* |
| R4-2212129 | *to be revised* |
| R4-2212660 | *to be revised* |
| R4-2212860 | *to be revised* |
| R4-2212953 | *to be revised* |
| R4-2213952 | *to be revised* |
| R4-2213953 | *to be revised* |

## Discussion on 2nd round

**Issue 2-1-1: Test cases design principle - FR1+FR2 test cases**

* Proposals
	+ Option 1 (CATT, Apple, MTK, OPPO, Intel, MTK): Test case design is delayed until testability issues are solved
	+ Option 2 (Qualcomm, Huawei, Ericsson, Nokia): Introduce the test case in R17 and define applicability
* Recommended WF
	+ Discuss and reach agreements during GTW.

**Issue 2-1-2: Test cases list for FR1+FR2 test cases**

* Proposals
	+ Option 1:
		- FR1+FR2 NR-DC to FR1+FR2 NR-DC
		- EN-DC with FR1 PSCell to EN-DC with FR2 PSCell
		- EN-DC with FR2 PSCell to EN-DC with FR1 PSCell
		- EN-DC with FR2 PSCell to EN-DC with FR2 PSCell
		- NR-SA FR2 to EN-DC with FR1 PSCell
		- NR-SA FR2 to EN-DC with FR2 PSCell
		- NR-SA FR1 to EN-DC with FR2 PSCell
	+ Option 2:
		- FR1+FR2 NR-DC to FR1+FR2 NR-DC
		- EN-DC with FR1 PSCell to EN-DC with FR2 PSCell
		- NR-SA FR1 to EN-DC with FR2 PSCell
* Recommended WF
	+ Depending on issue 2-1-1. If FR1+FR2 test cases are to be introduced in R18, views on the test cases list are encouraged.
* 2nd round Comment collection:

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| **Company** | **Comments** |
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# Recommendations for Tdocs

## 1st round

**New tdocs**

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| --- | --- | --- | --- |
| **New Tdoc number** | **Title** | **Source** | **Comments** |
|  | WF on FR1+FR2 test cases for HO with PSCell | vivo | Depending on progress, it may not be needed. |
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**Existing tdocs**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tdoc number** | **Revised to** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-22xxxxx |  | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-2213948 |  | CR on correction of fine timing for HO with PSCell when PSCell is on CCA in EN-DC to EN-DC scenario | Ericsson | Revised |  |
| R4-2213949 |  | CR on correction of fine timing for HO with PSCell when PSCell is on CCA in NR SA to EN-DC scenario | Ericsson | Revised |  |
| R4-2211619 |  | RRM performance requirements for HO with PSCELL | Qualcomm Incorporated | Noted |  |
| R4-2211633 |  | Discussion on test case for handover with PSCell | CATT | Noted |  |
| R4-2211634 |  | Test case of handover with PSCell from EN-DC to EN-DC with known target PSCell in FR1 | CATT | Agreeable |  |
| R4-2211842 |  | On testing configuration for HO with PSCell | Apple | Noted |  |
| R4-2211843 |  | Draft CR on TC for HO with PSCell from NR-SA to EN-DC with parallel processing and known FR2 PSCell in TS38.133 R17 | Apple | Revised |  |
| R4-2211956 |  | CR on test case for Handover with PSCell from NR SA to EN-DC with sequential processing | Xiaomi | Revised |  |
| R4-2212033 |  | draft CR on TC2 for HO with PSCell from NR SA to EN-DC with parallel processing | OPPO | Revised |  |
| R4-2212129 |  | DraftCR to TS 38.133: Handover with PSCell from NR-DC to NR-DC with sequential processing | Intel Corporation | Revised |  |
| R4-2212660 |  | draft CR on test cases for Handover with PSCell from NE-DC to NE-DC with known target PSCell | vivo | Revised |  |
| R4-2212860 |  | Correction on HO with PSCell test cases | Nokia, Nokia Shanghai Bell | Revised |  |
| R4-2212953 |  | Draft CR on TC for HO with PSCell from NR SA to EN-DC | Huawei, HiSilicon | Revised |  |
| R4-2213747 |  | Discussion on the testability of FR1+FR2 TCs for HO with PSCell | MediaTek inc. | Revised |  |
| R4-2213952 |  | TC for EN-DC to EN-DC Handover with PSCell using CCA with known target PSCell | Ericsson | Revised |  |
| R4-2213953 |  | TC for NR SA to EN-DC Handover with PSCell using CCA with known target PSCell | Ericsson | Revised |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics incl. existing and new tdocs.
2. For the Recommendation column please include one of the following:
	1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
	2. Other documents: Agreeable, Revised, Noted
3. For new LS documents, please include information on To/Cc WGs in the comments column
4. Do not include hyper-links in the documents

## 2nd round

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Tdoc number** | **Revised to** | **Title** | **Source** | **Recommendation**  | **Comments** |
| R4-22xxxxx |  | CR on … | XXX | Agreeable, Revised, Merged, Postponed, Not Pursued |  |
| R4-22xxxxx |  | WF on … | YYY | Agreeable, Revised, Noted |  |
| R4-22xxxxx |  | LS on … | ZZZ | Agreeable, Revised, Noted |  |
|  |  |  |  |  |  |

Notes:

1. Please include the summary of recommendations for all tdocs across all sub-topics.
2. For the Recommendation column please include one of the following:
	1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
	2. Other documents: Agreeable, Revised, Noted
3. Do not include hyper-links in the documents