**3GPP TSG-RAN WG4 Meeting # 104-e R4-2214256**

**Electronic Meeting, Aug.15-26 , 2022**

**Agenda item:** 9.4.7

**Source:** Moderator (Nokia, Nokia Shanghai Bell)

**Title:** Email discussion summary for [104-e][204] NR\_RF\_FR2\_req\_enh2\_RRM

**Document for:** Information

# Introduction

The WID on NR RF Enhancements for FR2 RP-202107 has been approved in RAN#89e meeting. The purpose of this work item is to specify the following FR2 UE features and associated requirements including RF and RRM requirements. This email discussion is to discuss the performance requirements for inter-band UL CA in FR2 corresponding to section 9.4.5 and 9.4.6.1 in the agenda.

The tentative target of email discussion for 1st round and 2nd round is indicated below:

* 1st round: Companies are expected to provide views and/or comments on the open issue and resubmitted CR.
* 2nd round: Conclude on the RRM performance requirements.

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

Contact information

|  |  |  |
| --- | --- | --- |
| **Company** | **Name** | **Email address** |
| Nokia | Delia Chen | delia.chen@nokia-sbell.com |
| Qualcomm | CH Park | chparkqc@qti.qualcomm.com |
| apple | Yang Tang | yang.tang@apple.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: RRM performance requirement

\* Based on RAN #95e agreements in RP-220968 inter-band DL CA requirements for CBM were removed from the WI scope. Rapporteur and companies are encouraged to provide updated Big CR following the updated WI scope

## Companies’ contributions summary

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| **T-doc number** | **Company** | **Proposals / Observations** |
| [R4-2213938](file:///C:\DuLei2019\RAN4\RAN4%23104\Docs\R4-2213938.zip) | Ericsson | **CR on UL gaps for BPS** |
| [R4-2212858](file:///C:\DuLei2019\RAN4\RAN4%23104\Docs\R4-2212858.zip) | Nokia, Nokia Shanghai Bell | 1. Test case for FR2 inter-band UL CA SCell activation delay with IBM can reuse TC 1-5 and TC 1-6 for PUCCH SCell activation and deactivation delay requirements of FR2 known and unknown cell with inter-band FR2 PCell in PUCCH SCell activation in FeRRM WI directly. |
| [R4-2212859](file:///C:\DuLei2019\RAN4\RAN4%23104\Docs\R4-2212859.zip) | Nokia, Nokia Shanghai Bell | **Submit formal CR for endorsed draftCR for test case on UE UL carrier RRC reconfiguration Delay and interruption at UL carrier RRC reconfiguration for FR2 in 103-e meeting (R4-2211081)** |

Moderators’s comment: The Ericsson paper [R4-2213938](file:///C:\DuLei2019\RAN4\RAN4%23104\Docs\R4-2213938.zip) is relevant to agenda item 9.4.2, so it will not be discussed in this email thread.

## Open issues summary

**Issue 1-1 Test cases for FR2 inter-band UL CA for IBM**

*At RAN4#103e, it is FFS if additional test case is needed FR2 inter-band UL CA SCell activation.*

* *TC#2: Test case for FR2 inter-band UL CA SCell activation delay with IBM* 
  + *FFS:* 
    - *Option 1: Define a new test case for FR2 inter-band UL CA SCell activation delay with IBM*
    - *Option 2: Reuse TC5 if it is defined in PUCCH SCell activation in FeRRM WI.*
    - *Option 3: No test case is needed.*
* Proposals:
  + Option 1: Test case for FR2 inter-band UL CA SCell activation delay with IBM can reuse TC 1-5 and TC 1-6 for PUCCH SCell activation and deactivation delay requirements of FR2 known and unknown cell with inter-band FR2 PCell in PUCCH SCell activation in FeRRM WI directly (Nokia)

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| TC 1-5 | TC for PUCCH SCell activation and deactivation delay requirements of FR2 known cell with inter-band FR2 PCell | NR SA with one or more cells in FR2 | 7.5.3.x3 | Nokia |
| TC 1-6 | TC for PUCCH SCell activation and deactivation delay requirements of FR2 unknown cell with inter-band FR2 PCell | NR SA with one or more cells in FR2 | 7.5.3.x4 | CATT |

* Recommended WF:
  + Please companies comment if Option 1 is agreeable.

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| **Company** | **Comments** |
| Qualcomm | Wouldn’t Option1 be applicable only to those UEs supporting dual PUCCH group feature as well as FR2 inter-band UL CA? |
| Ericsson | May be a clarification question. What is the additional testing requirement we are testing here compared to PUCCH SCell activation test? |
| Apple | Similar comments as Qualcomm and Ericsson. Similar test cases are under discussion in R17 FeRRM WI also. |
| Nokia | We think QC has a valid point. In our view, if one of the SCell in UL CA is configured as PUCCH SCell, the TCs above can also validate the inter-band UL CA, hence no additional TCs are needed for FR2 inter-band UL CA.  But indeed there may be cases where SCell in UL CA uses PUCCH on PCell. That is, the SCell may be configured with both DL and UL, or UL with PUSCH only. We understood there is no activation delay requirement for activating an UL CC. Without core requirements, it is not possible to define the TCs. We’d like to check if companies have the same understanding, and if we need discuss the core requirement for UL CC activation.  Hope it is answered Ericsson’s question. |
| Huawei | The test purpose of SCell activation and deactivation delay test is to verify SCell activation/deactivation delay and the interruptions on PCell. For FR2 inter-band DL CA, SCell is only configured with DL. For FR2 inter-band DL+UL CA, SCell is configured with DL+UL. However, the existing test method and test configuration for FR2 inter-band CA SCell activation/deactivation delay test can be applied for both SCell with DL and SCell with DL+UL. |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

*Major close to finalize WIs and Rel-15 maintenance, comments collections can be arranged for TPs and CRs.*

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| **CR/TP number** | **Comments collection** |
| [R4-2212859](file:///C:\DuLei2019\RAN4\RAN4%23103\Docs\R4-2208992.zip) (Nokia) | Moderator: As this is a resubmission of endorsed draftCR R4-2211081, it is suggested to agree on it. |
| Ericsson: OK |
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## Summary for 1st round

*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.*

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|  | **Status summary** |
| **Topic #1** | **Issue 1-1 Test cases for FR2 inter-band UL CA for IBM**   * Proposals:   + Option 1: Test case for FR2 inter-band UL CA SCell activation delay with IBM can reuse TC 1-5 and TC 1-6 for PUCCH SCell activation and deactivation delay requirements of FR2 known and unknown cell with inter-band FR2 PCell in PUCCH SCell activation in FeRRM WI directly (Nokia)   **Moderator’s comments:** From the comments received, there seems to be two scenarios for FR2 inter-band UL CA:  Case 1: an SCell is always configured with DL+UL. This is also the understanding from RF people.  Case 2: an SCell is UL only CC. We don’t have any core requirements for this case.  I would propose taking Case 1 as assumption for FR2 inter-band UL CA. Under this assumption, can we conclude existing SCell activation TCs in FR2 inter-band scenarios can be applied? And for Case 2, it is probably too late to open the discussion in this WI. Please comment in 2nd round if you see the necessity.  *Moderator’s Proposal:*   * *In FR2 inter-band UL CA, an SCell is assumed always configured with DL+UL.* * *Existing SCell activation TCs in FR2 inter-band scenarios can be applied.*   *Recommendations for 2nd round:* Please companies to check if above proposal is agreeable. |

## Discussion on 2nd round

*Moderator can provide summary of 2nd round here. Note that recommended decisions on tdocs should be provided in the section titled ”Recommendations for Tdocs”.*

**Issue 1-1 Test cases for FR2 inter-band UL CA for IBM**

* Proposals:
  + Option 1: Test case for FR2 inter-band UL CA SCell activation delay with IBM can reuse TC 1-5 and TC 1-6 for PUCCH SCell activation and deactivation delay requirements of FR2 known and unknown cell with inter-band FR2 PCell in PUCCH SCell activation in FeRRM WI directly (Nokia)

**Moderator’s comments:** From the comments received, there seems to be two scenarios for FR2 inter-band UL CA:

Case 1: an SCell is always configured with DL+UL. This is also the understanding from RF people.

Case 2: an SCell is UL only CC. We don’t have any core requirements for this case.

I would propose taking Case 1 as assumption for FR2 inter-band UL CA. Under this assumption, can we conclude existing SCell activation TCs in FR2 inter-band scenarios can be applied? And for Case 2, it is probably too late to open the discussion in this WI. Please comment in 2nd round if you see the necessity.

*Moderator’s Proposal:*

* *In FR2 inter-band UL CA, an SCell is assumed always configured with DL+UL.*
* *Existing SCell activation TCs in FR2 inter-band scenarios can be applied.*

*Recommendations for 2nd round:* Please companies to check if above proposal is agreeable.

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| **Company** | **Comments** |
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Agreements from GTW (Aug.22):

**Agreement:**

Regarding test cases for FR2 inter-band UL CA for IBM

* In FR2 inter-band UL CA, an SCell is assumed always configured with DL+UL.
* Existing SCell activation TCs in FR2 inter-band scenarios can be applied.

# Recommendations for Tdocs

## 1st round

**New tdocs**

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| --- | --- | --- | --- |
| **New Tdoc number** | **Title** | **Source** | **Comments** |
| R4-22xxxxx | WF on RRM requirements for FR2 Inter-band DL CA and UL CA | Nokia |  |
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**Existing tdocs**

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| **Tdoc number** | **Revised to** | **Title** | **Source** | **Recommendation** | **Comments** |
| [R4-2212859](file:///C:\DuLei2019\RAN4\RAN4%23103\Docs\R4-2208992.zip) |  | CR for test case on UE UL carrier RRC reconfiguration delay for FR2 | Nokia | Agreeable | Resubmission of endorsed draftCR in RAN4#103e |
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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

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| --- | --- | --- | --- | --- | --- |
| **Tdoc number** | **Revised to** | **Title** | **Source** | **Recommendation** | **Comments** |
| R4-2214326 |  | WF on on RRM requirements for FR2 Inter-band DL CA and UL CA | Nokia, Nokia Shanghai Bell) | Agreeable |  |
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Notes:

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   1. CRs/TPs: Agreeable, Revised, Merged, Postponed, Not Pursued
   2. Other documents: Agreeable, Revised, Noted
3. Do not include hyper-links in the documents