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

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

**Agenda item:** 11.3.1, 11.3.3

**Source:** Moderator (Nokia)

**Title:** Email discussion summary for [98e][138] [98e][138] FR\_RF\_FR2\_req\_enh2\_Part\_1

**Document for:** Information

# Introduction

This email discussion if for Rel-17 NR RF requirement enhancements for frequency range 2 WI with following Ais

11.3.1 General and work plan

11.3.3 Feasibility study [NR\_RF\_FR2\_req\_enh2-Core]

11.3.3.1 Inter-band DL CA enhancements [NR\_RF\_FR2\_req\_enh2-Core]

11.3.3.1.1 Feasibility study for CA configurations within same frequency group based on IBM [NR\_RF\_FR2\_req\_enh2-Core]

11.3.3.1.2 Feasibility study for CA configurations between different frequency groups based on CBM [NR\_RF\_FR2\_req\_enh2-Core]

11.3.3.2 Inter-band UL CA [NR\_RF\_FR2\_req\_enh2-Core]

11.3.3.2.1 Feasibility study for CA configurations within same frequency group based on IBM and CBM [NR\_RF\_FR2\_req\_enh2-Core]

11.3.3.2.2 Feasibility study for CA configurations between different frequency groups based on CBM

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

1st round: TBA

2nd round: TBA

# Topic #1: General

## Companies’ contributions summary

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| **T-doc number** | **Title** | **Company** | **Proposals / Observations** |
| [**R4-2100264**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100264.zip) | Release 17 FR2 bandwidth class  | Verizon Denmark | **Proposal-1: Expand four (4) more additional 200MHz classes in the “Fallback group 2” and eight (8) more 100 MHz classes in the “Fallback group 3” in FR2 CA bandwidth classes in Table 5.3A.4-1 of 38.10-2 to meet 1.6 GHz aggregated channel bandwidth.****Proposal-2: Include this work in scope of Rel-17 FR2 enhancement Work Item and define the related requirements**  |
| [**R4-2100693**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100693.zip) | Status overview and proposals on FR2 inter-band CA discussion | MediaTek Beijing Inc. | **Proposal1: For “feasibility study stage”, RAN4 shall converge inter-band DL CA discussion firstly, before start to do inter-band UL CA feasibility study.****Proposal2: For “UE requirement discussion stage”, RAN4 shall specify exact band combination demand firstly, before start to do UE requirement discussion.** |
| [**R4-2101727**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101727.zip) | On the inter-band UL CA study and change of scope too include improved BC | Ericsson, Sony | **Proposal 1: specify further enhanced SSB-based beam correspondence tests for initial access and connected mode operation within the Rel-17 WI on NR RF Enhancements for FR2, mandatory and without beam sweeping.** **Proposal 2: remove the study part on inter-band UL CA not to increase TU for the Rel-17 WI on NR RF Enhancements for FR2.** |

## Open issues summary

### Sub-topic 1-1 New FR2 bandwidth classes

In U.S., there is a more than 1GHz contiguous FR2 spectrum available for NR operation. However, the defined aggregated bandwidth by either 4x200 or 8x100-megahertz in Rel-15/16 specs still retains partial spectrum utilization in the practical 5G commercial service, instead of entire spectrum.

**Issue 1-1-1: New FR2 bandwidth classes**

* Proposals
	+ Option 1: Add 4 new CA BW classes to FBG2 and 8 new CE BW classes to FBG3
	+ Option 2: Do not add new CA BW classes
	+ Option 3: Add new CA BW classes but differently as in option 1.
* Recommended WF
	+ TBA

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| **Company** | **Comments** |
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| YYY |  |
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### Sub-topic 1-2: Procedures for work plan

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| --- | --- | --- |
| **DL CA** | Different Frequency Group (ex: 28+39) | Same Frequency Group (ex: 28+28) |
| IBM | Type1: UE requirement discussion(# agenda 11.3.2.1.2)* n261+n260 (done)
* n257+n259 (ongoing)
* n258+n260 (ongoing)
 | Type3: feasibility study(# agenda 11.3.3.1.1) |
| CBM | Type2: feasibility study(# agenda 11.3.3.1.2) | Type4: UE requirement discussion(# agenda 11.3.2.1.3) |

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| **UL CA** | Different Frequency Group (ex: 28+39) | Same Frequency Group (ex: 28+28) |
| IBM  | Type1: UE requirement discussion(# agenda 11.3.2.2.1)* n257+n259 (ongoing)
 | Type3: feasibility study(# agenda 11.3.3.2.1) |
| CBM | Type2: feasibility study(# agenda 11.3.3.2.2) | Type4: feasibility study(# agenda 11.3.3.2.1) |

**Issue 1-2-1: Feasibility stage UL CA work flow**

* Proposals
	+ Option 1: For “feasibility study stage”, RAN4 shall converge inter-band DL CA discussion firstly, before start to do inter-band UL CA feasibility study. (NOTE: IBM requirements for CA\_n257A-n259A are excluded from this proposal)
	+ Option 2: Proposal in option1 not necessary
* Recommended WF
	+ TBA

**Issue 1-2-2: Requirement stage work flow**

* Proposals
	+ Option 1: Agree for “UE requirement discussion stage”, RAN4 shall specify exact band combination demand firstly, before start to do UE requirement discussion.
	+ Option 2: Current WID is sufficiently clear on this aspect
* Recommended WF
	+ TBA

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| **Company** | **Comments** |
| Sony | **Issue 1-2-1: Feasibility stage UL CA work flow**Agree with option 1, RAN4 shall converge inter-band DL CA discussion firstly, before start to do inter-band UL CA feasibility study.**Issue 1-2-2: Requirement stage work flow**Agree with option 1 RAN4 shall specify exact band combination demand firstly, before start to do UE requirement discussion |
| YYY |  |
| XXX |  |

### Sub-topic 1-3: Modification to the WID

Support of beam correspondence is fundamental for FR2 operation, but *not mandatory* for Rel-16 and requirements are not specified for initial access. The scope should be reduced to include only inter-band UL CA for two band with IBM capability, the study part should be postponed and replaced with the following:

* Enhancement of beam correspondence during initial access and connected mode [RAN4 RF]
	+ SSB-based without UL beam sweeping
	+ For initial access, verification of beam correspondence based on msg1 spherical coverage (at least)

**Issue 1-3-1: New objective of SSB-based beam correspondence tests for initial access**

* Proposals
	+ Option 1: Modify the WID and include objective for further enhanced SSB-based beam correspondence tests for initial access and connected mode operation, mandatory and without beam sweeping.
	+ Option 2: Do not add this new objective
	+ Option 3: Other
* Recommended WF
	+ TBA

**Issue 1-3-2: Removal of study part on inter-band UL CA objective**

* Proposals
	+ Option 1: Modify the WID and remove the study parts on inter-band UL
		- Study and if feasible define UE requirements for CBM between different freq. groups (e.g. 28GHz + 37GHz).
		- Study and if feasible define UE requirements for CBM and/or IBM CA within the same freq. group (e.g. 28GHz + 28GHz), on hold until there is operator request.
	+ Option 2: Do not remove these objectives
	+ Option 3: Other
* Recommended WF
	+ TBA

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| **Company** | **Comments** |
| Sony | **Issue 1-3-1: New objective of SSB-based beam correspondence tests for initial access**Support option 1, Modify the WID and include objective for further enhanced SSB-based beam correspondence tests for initial access and connected mode operation, mandatory and without beam sweeping.**Issue 1-3-2: Removal of study part on inter-band UL CA objective**Support option 1. Besides, we are also okay to further hold the whole UL part as proposed in issue 1-2-1 and 1-2-2.  |
| YYY |  |
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## Companies views’ collection for 1st round

### Open issues

### 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.*

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| **CR/TP number** | **Title** | **Company** | **Comments collection** |
|  |  |  | Company A |
| Company B |
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|  |  |  | Company A |
| Company B |
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## 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.*

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

*Recommendations on WF/LS assignment*

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|  | **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*

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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”* |

## 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*

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| **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”* |

# Topic #2: Feasibility study DL CA

## Companies’ contributions summary

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| --- | --- | --- | --- |
| **T-doc number** | **Title**  | **Company** | **Proposals / Observations** |
| **[R4-2100637](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100637.zip)** | Discussion on feasibility for inter-band CA configurations | LG Electronics | **IBM feasibility for DL CA between bands in the same frequency group****Proposal 1: For inter-band DL CA within same frequency group, either IBM or CBM is applicable.****Proposal 2: For IBM on inter-band DL CA within same frequency group, whether or not to reuse Rel-16 reference sensitivity relaxation and EIS spherical coverage relaxation should be investigated for corresponding band combination.****CBM for DL CA between bands in the same frequency group****Proposal 3: For CBM on inter-band DL CA within same frequency group, consider reference sensitivity relaxation similar to Rel-16 intra-band non-contiguous CA for corresponding band combination.****CBM feasibility for DL CA between bands in the same/different frequency group****Proposal 4: For CBM on inter-band DL CA, performance degradation due to Rx beam switch should be allowed if MRTD is defined that is larger than CP.****CBM/IBM vs *simultaneousRxTxInterBandCA*****Proposal 7: For CBM UE on inter-band CA within same frequency group, simultaneous Rx/Tx capability does not apply.** |
| **[R4-2102714](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2102714.zip)** | Simulation and analysis of FR2 inter-band DL CA based on CBM/IBM | vivo | **Observation 1**: For co-located deployments, in the case of the same frequency group, IBM still has fairly significant gains in some cases compared to CBM, while generally the performance is similar for more cases. **Observation 2+2a:** For co-located deployments, IBM and CBM will choose the same Rx beam in most cases, no matter same of different frequency group**Observation 3:** For co-located deployments, in the case of the different frequency group, the degradation of CBM performance is significant. **Observation 4:** For non-co-located deployments, even using wide beam cannot effectively alleviate the performance degradation of CBM.**Proposal 1: For co-located deployments, use** $σ\_{f}$ **to restrict the frequency span between two CCs to ensure the minimum performance of CBM.** **Proposal 2: RAN4 should clarify the acceptable performance degradation of CBM.****Proposal 3：For non-co-located deployment, only IBM can be used in FR2 inter-band CA.** |
| [**R4-2100893**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100893.zip) | Discussion on IBM inter-band CA within same frequency group | Samsung | Observation 1: IBM requires concurrent multi-beam antenna radiation patternObservation 2: a multi-band UE supporting IBM inter-band CA within same frequency group is more complicated than a multi-band UE supporting IBM inter-band CA across different frequency group.**Proposal 1: RAN4 discuss dual polarization assumption of inter-band CA, and if IBM architecture with CC per polarization is considered.** |
| [**R4-2101375**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101375.zip) | The IBM UE capability for inter-band CA within the same frequency group | Xiaomi | **Proposal: for inter-band CA within the same frequency group, CBM type should be default applicability, and introduce a signaling to make UE inform network whether it supports IMB type.** |
| [**R4-2100240**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100240.zip) | On the feasibility of CBM for FR2 inter-band CA cross different frequency groups | Apple | Observation 1: Substantial performance degradation is expected for CBM with FR2 inter-band CA between different frequency groups from the aspects of frequency separation and beam squint. Observation 2: When MRTD is more than CP length in CBM, one slot per Rx beam switching can be interrupted on all CCs where the symbol boundary misalignment from the reference CC is more than CP. If PDCCH is interrupted, the corresponding impacts can last multiple slots. Observation 3: When non-collocated scenario is assumed, it is infeasible to assume MRTD is less than CP length due to both TAE and propagation delay differences. The performance degradation due to Rx switch and the corresponding interruption can be quite significant. Observation 4: When MRTD>CP, parallel RRM measurement on FR2 CC becomes questionable since beam switch may happen during the symbol duration. **Proposal 1: CBM should be limited to collocated scenarios, which include the FR2 inter-band CA within the same frequency group and between different frequency groups.** **Proposal 2: No CBM based RF, RRM and demod requirements should be specified for FR2 inter-band CA between different frequency groups.** |
| **[R4-2101376](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101376.zip)** | The CBM UE capability for inter-band CA between different frequency groups | Xiaomi | **Proposal: for inter-band CA between different frequency group, IBM type should be default applicability, and introduce a signaling to make UE inform network whether it supports CMB type.** |

## Open issues summary

### Sub-topic 2-1: Beam management

**Issue 2-1-1: Beam management for CA within same frequency group**

* Proposals
	+ Option 1: For inter-band DL CA within same frequency group, either IBM or CBM is applicable (R4-2100637)
	+ Option 2: For inter-band CA within the same frequency group, CBM type should be default applicability, and introduce a signaling to make UE inform network whether it supports IBM type (R4-2101375)
	+ Option 3: CBM type should be default applicability, but no new signalling is needed.
* Recommended WF
	+ TBA

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| **Company** | **Comments** |
| Sony | Support option 1. For inter-band DL CA within the same frequency group, either IBM or CBM is applicable. From the simulation and analysis provided by companies, it can be seen that the CBM can provide similar performance to IBM within the same frequency group, especially for the co-located deployment scenario. IBM UEs can work within the same frequency group as well. Though its implementation might be more complicated, we don’t see any reason to limit it from the standard perspective. However, we don’t see a strong need to define any “default applicability”. Whether CBM or IBM is more feasible is related to the frequency bands separation and the deployment scenario. From the network aspect, it should be able to configure a UE with a supported band combination according to its advertised capabilities, including the BM capability. Suppose the advertised BM capability does not match the deployment scenario (e.g., CBM capability only for a collocation scenario). In that case, the network will simply not configure the UE with the band combination at hand.Besides, As the default capability is based on the frequency group, it may create issues if more bands are introduced in FR2 since the frequency group concept is only based on the bands defined today.  |
| YYY |  |
| XXX |  |

**Issue 2-1-2: Beam management for CA between the frequency groups**

* Proposals
	+ Option 1: No CBM based RF, RRM and demod requirements should be specified for FR2 inter-band CA between different frequency groups (R4-2100240)
	+ Option 2: For inter-band CA between different frequency group, IBM type should be default applicability, and introduce a signaling to make UE inform network whether it supports CMB type. R4-2101376
	+ Option 3: IBM type should be default applicability, but no new signalling is needed.
* Recommended WF
	+ TBA

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| **Company** | **Comments** |
| Sony | We don’t support any of the options at this moment. First, we don’t think it is needed to have any “default applicability” as stated in issue 2-1-1. In addition, we think it is too early to conclude that no CBM based requirement would be defined. Whether RRM requirements should be defined or not should be left to the RRM session. For RF requirements, we need to first converge on how RAN4 would further develop the requirement for inter-band CA before reaching such a conclusion (if the requirement should be detailed in each case of frequency groups vs deployment scenario or simply define a unified requirement agonistic for all cases).  |
| YYY |  |
| XXX |  |

### Sub-topic 2-2: Network deployment options

**Issue 2-2-1: Non-collocated/collocated deployments**

* Proposals
	+ Option 1: For non-co-located deployment, only IBM can be used in FR2 inter-band CA (R4-2102714)
	+ Option 2: CBM should be limited to collocated scenarios, which include the FR2 inter-band CA within the same frequency group and between different frequency groups (R4-2100240)
	+ Option 3: There are no deployment restrictions (Non-collocated/collocated) for network to configure CA for IBM or CBM UEs
* Recommended WF
	+ TBA

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| **Company** | **Comments** |
| Sony | Support option 3 There are no deployment restrictions (Non-collocated/collocated) for the network to configure CA for IBM or CBM UEs. Networks can configure a UE with a supported band combination according to its advertised capabilities, including the BM capability. If the advertised BM capability does not match the deployment scenario (e.g., CBM capability only for a collocation scenario), the network simply will not configure the UE with the band combination at hand. Therefore, we don’t see any reason to confine the BM type in the specification. It is also a bit strange to us why we try to limit how operators would deploy their network in 3GPP.  |
| YYY |  |
| XXX |  |

### Sub-topic 2-3: CBM Requirements

**Issue 2-3-1: CBM UE and simultaneousRxTxInterBandCA**

* Proposals
	+ Option 1: For CBM UE on inter-band CA within same frequency group, simultaneous Rx/Tx capability does not apply (R4-2100637)
	+ Option 2: No restriction is needed on simultaneous Rx/Tx.
* Recommended WF
	+ TBA

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| **Company** | **Comments** |
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| YYY |  |
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**Issue 2-3-2: CBM UE and REFSENS for CA within same frequency group**

* Proposals
	+ Option 1: Define REFSENS relaxation for CBM UE which is a function of frequency span between the CCs. (R4-2100637, R4-2102714)
	+ Option 2: Not needed.
* Recommended WF
	+ TBA

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| **Company** | **Comments** |
| Sony | Bscially fine with the idea here, but need further study what relaxation factors should be considered here and exact values.  |
| YYY |  |
| XXX |  |

### Sub-topic 2-4: Dual polarization antenna

**Issue 2-4-1:**

* Proposals
	+ Option 1: RAN4 discuss dual polarization assumption of inter-band CA, and if IBM architecture with CC per polarization is considered.
	+ Option 2: Up to UE implementation
* Recommended WF
	+ TBA

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| **Company** | **Comments** |
| Sony | Option 2: up to UE implementation, but we are okay to further discuss it.  |
| YYY |  |
| XXX |  |

## Companies views’ collection for 1st round

### Open issues

### 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** | **Title** | **Company** | **Comments collection** |
|  |  |  | Company 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.*

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

*Suggestion on WF/LS assignment*

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

### 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”* |

## 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”* |

# Topic #3: Feasibility study UL CA

## Companies’ contributions summary

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| **T-doc number** | **Title** | **Company** | **Proposals / Observations** |
| [**R4-2100637**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2100637.zip) | Discussion on feasibility for inter-band CA configurations | LG Electronics | **IBM/CBM feasibility for UL CA between bands in the same frequency group****Proposal 5: For inter-band UL CA within same frequency group, either IBM or CBM can be applicable.****CBM feasibility for UL CA between bands in the same/different frequency group****Proposal 6: For CBM on inter-band UL CA, RAN4 needs to study how to handle impact on performance due to Tx beam switching.** |
| [**R4-2102715**](file:///C%3A%5CUsers%5Cvasenkap%5CDocuments%5CTy%C3%B6t%5CRAN4%5C%2398e%5CDocs%5CR4-2102715.zip) | Discussion on FR2 inter-band UL CA | vivo | **Observation 1**: From the need of UL CA to ensure similar coverage, it may be reasonable to apply max EIRP per UE.**Observation 2**: Co-located and non-collocated deployment may be used for different rules (per-UE/per-band), but still there are some problems.**Proposal 1: The max EIRP and P-MPR may be applied per UE under co-located deployment, and be applied per band under non-co-located deployment, however, some problems still remain**.**Observation 3:** MPE measurement is quite depend on actual implementation of panels.**Observation 4:** The concept of EIRP is based on one direction and more suitable for single beam scenario, and its application is ambiguous for simultaneous multi-beam transmission. This could be one of the underlying reasons for previous standardization difficulties.**Proposal 2：It is encouraged to discuss if a new power metric for multi-beam scenario, e.g., “mEIRP”, could be helpful to counter EIRP's shortcomings.** **Proposal 3: The max TRP and min peak EIRP can be applied per band to maintain the respective system performance.** |
| [**R4-2100619**](file:///C%3A%5CUsers%5Cvasenkap%5CDocuments%5CTy%C3%B6t%5CRAN4%5C%2398e%5CDocs%5CR4-2100619.zip) | Definition of TRP and EIRP for FR2 ULCA | Qualcomm Incorporated | **Proposal 1: For non-overlapping bands it seems possible to specify TRP as per band, with max TRP of each band set to 23 dBm. The specification of TRP for overlapping bands needs to be discussed further.****Proposal 2: If there are regional requirements that require the TRP to be reduced then this can be done using an NS case or by limiting Pmax per band.****Proposal 3: For non-overlapping bands it seems possible to specify EIRP as per band, with max EIRP of each band set to 43 dBm. The specification of EIRP for overlapping bands needs to be discussed further.** |
| [**R4-2101374**](https://www.3gpp.org/ftp/TSG_RAN/WG4_Radio/TSGR4_98_e/Docs/R4-2101374.zip) | The MOP and Tx requirements for inter-band UL CA in FR2 | Xiaomi | **Observation 1:** The maximum output power can’t be defined per band basis or per UE basis purely. Some MOP requirements need define per band basis, others need define per UE basis.**Observation 2:** When the gap between 2 UL is zero or smaller than the sum of OOB range of each band, the definition of SEM/ACLR/Spurious emission for contiguous or non-contiguous intra-band CA transmissions could be used as starting point for defining such requirements for inter-band UL CA in FR2. **Observation 3:** If the gap between 2 UL is large enough, whether reuse the requirements of SEM/ACLR/Spurious emission defined for single CC operation for inter-band UL CA is up to MOP definition, i.e., whether power reduction is allowed for each band.**Proposal 1:** **For inter-band UL CA in FR2, the power class should be follow current UE types.****Proposal 2: for inter-band UL CA in FR2, the maximum output power should be specified independency with UE BM types, the relaxation values could be introduced for different BM types.****Proposal 3: for inter-band UL CA in FR2, the maximum output power could be defined as Table 2.1-2:****Table 2.1-3 The MOP requirements for inter-band UL CA**

|  |  |  |
| --- | --- | --- |
| **MOP** | **Per band or per UE** | **requirements** |
| **Min peak EIRP** | Per band | each band follow the requirement of single CC operation |
| **Minimum EIRP spherical coverage** | Per band | each band follow the requirement of single CC operation |
| **Max TRP** | Per band | each band follow the requirement of single CC operation |
| **Max EIRP** | Per UE | aggregated max EIRP keep the same requirement with single CC operation |

**Proposal 3: For inter-band UL CA in FR2, the requirements of SEM/ACLR/Spurious emission need be defined considering the different gaps between 2 UL component carriers.** |

## Open issues summary

### Sub-topic 3-1: EIRP

**Issue 3-1-1: Max EIRP**

* Proposals
	+ Option 1: The max EIRP is applied per UE under co-located deployment and per band under non-co-located deployment.
	+ Option 2: For non-overlapping bands specify EIRP as per band, with max EIRP of each band set to 43 dBm, excluding PC1.
	+ Option 3: Per UE and aggregated max EIRP keep the same requirement with single CC operation
* Recommended WF
	+ TBA

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| **Company** | **Comments** |
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| YYY |  |
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**Issue 3-1-2: Min peak EIRP**

* Proposals
	+ Option 1: Min peak EIRP is applied per band
	+ Option 2: Min peak EIRP is not applied per band
	+ Option 3: Other
* Recommended WF
	+ TBA

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| **Company** | **Comments** |
| XXX |  |
| YYY |  |
| XXX |  |

**Issue 3-1-3: Min EIRP**

* Proposals
	+ Option 1: Min peak EIRP is applied per band and each band follow the requirement of single CC operation
	+ Option 2: Needs more discussion
* Recommended WF
	+ TBA

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| YYY |  |
| XXX |  |

### Sub-topic 3-2:TRP

**Issue 3-2-1: TRP**

* Proposals
	+ Option 1: For non-overlapping bands specify TRP per band, with max TRP of each band set to 23 dBm, excluding PC1.
	+ Option 2: specify TRP per band for all CA configurations
	+ Option 3: Other
* Recommended WF
	+ TBA

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| YYY |  |
| XXX |  |

### Sub-topic 3-3: Maximum output power and Power class

**Issue 3-3-1: MOP and Power class**

* Proposals
	+ Option 1: For inter-band UL CA in FR2, the power class should be follow current UE types and is specified independently from UE BM types, the different relaxation values can be introduced for different BM types.
	+ Option 2: Needs more discussion
* Recommended WF
	+ TBA

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| YYY |  |
| XXX |  |

### Sub-topic 3-4: P-MPR

**Issue 3-4-1: P-MPR**

* Proposals
	+ Option 1: The P-MPR is applied per UE under co-located deployment and per band under non-co-located deployment.
	+ Option 2: P-MPR is not defined based on deployment scenario
	+ Option 3: Other
* Recommended WF
	+ TBA

|  |  |
| --- | --- |
| **Company** | **Comments** |
| XXX |  |
| YYY |  |
| XXX |  |

## Companies views’ collection for 1st round

### Open issues

### 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** |
| XXX | Company A |
| Company B |
|  |
| YYY | Company 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:* |

*Suggestion 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 provided recommendation on CRs/TPs Status update suggestion*

|  |  |
| --- | --- |
| **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”* |