**3GPP TSG-RAN WG4 Meeting # 96e R4-200XXXX**

**Electronic Meeting, 17 – 28 Aug., 2020**

**Agenda item:** 17.2.2

**Source:** Moderator (Huawei, HiSilicon)

**Title:** Email discussion summary for Rel-17 RF FR1 working area

**Document for:** Discussion

# Introduction

In RAN#88e meeting the work areas of RAN4 R17 non-spectrum related WI/SIs was endorsed in [1]. One of working areas is for RF FR1 enhancement. This contribution provides summarized the proposals based on the related contributions in RAN#88e [2~5].

The following proposals are included in this summary:

* Topic#1: Tx switching enhancement, i.e., enabling Tx switching between 2Tx@carrier#1 and 2Tx@carrier#2 based on SUL and NR uplink CA
* Topic#2: 2Tx RF requirement and testing enhancement
* Topic#3: Optimizations on power class fall back
* Topic#4: 26dBm HPUE for TDD intra-band contiguous UL CA
* Topic#5: Efficient utilization of spectrum which is not aligned with existing NR channel bandwidths
* Topic#6: Support overlapping CA for LTE

Companies are welcome to provide the comments. Based on the comments and responses, the topics will be further discussed during RAN4 August meeting and RAN plenary in September.

# Topic #1: Tx switching enhancement

*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** | **Proposed objective(s)** |
| RP-200614 (with modification) | Huawei, HiSilicon | * UE requirements to enable Tx switching between 2Tx@carrier#1 and 2Tx@carrier#2 based on SUL and NR uplink CA   + Specify UE time mask requirements for UL Tx switching between 2Tx@carrier#1 and 2Tx@carrier#2     - UE switches Tx-s with both SUL and NR uplink CA configurations, under the condition that there are only 2 simultaneous Tx at maximum     - Strive to reuse RAN1 mechanism for Tx switching between case 1 and case 2 in Rel-16     - Strive to reuse RAN2 signaling for Tx switching between case 1 and case 2 in Rel-16   + Enable more SUL/TDD/FDD bands to support 2Tx     - Specify the necessary Tx requirements     - Specify the necessary Rx requirements     - Remove RAN2 restrictions on SUL band UL-MIMO configuration     - PC2 HPUE can be considered for FDD and SUL bands after related study is complete   + Specify the DL interruption RRM requirements, if needed   Note 1: Only addressing the case of co-located and synchronized network deployment for the two UL carriers  Note 2: Only addressing the case of single TAG for the two UL carriers for SUL and for UL CA  Note 3: The UE is configured with two different uplink carrier frequencies. |

## Open issues summary

The motivation for this proposed objective is as follows [2].

In Rel-16 the mechanism and RAN4 requirements are specified for Tx switching between case 1 and case 2. The motivation is to select the better uplink carrier and better transmission mode in a given slot for transmission assuming that there are only two con-current transmitters. In Rel-16 it is assumed that only one transmitter can be supported on one carrier and two transmitters can be supported on the other carrier. But recently two transmitters are enabled for more NR bands. Thus it would be possible for UE to support two transmitter on both carriers. In this case, the Tx switching would be conducted between two carriers which are both capable of 2Tx transmissions. The uplink throughput could be further improved. In the meanwhile, UL-MIMO requirements for interested SUL/TDD/FDD bands are to be further specified to enable UE 2Tx transmissions on both carriers when configured switching with SUL or UL-CA band combinations.

### Sub-topic 1-1

*Sub-topic description:*

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

**Issue 1-1: Specify UE requirements to enable Tx switching between 2Tx@carrier#1 and 2Tx@carrier#2**

* Sub-objective#1: Specify UE time mask requirements for UL Tx switching between 2Tx@carrier#1 and 2Tx@carrier#2
  + UE switches Tx-s with both SUL and NR uplink CA configurations, under the condition that there are only 2 simultaneous Tx at maximum
  + Strive to reuse RAN1 mechanism for Tx switching between case 1 and case 2 in Rel-16
  + Strive to reuse RAN2 signalling for Tx switching between case 1 and case 2 in Rel-16
* Sub-objective#2: Specify the DL interruption RRM requirements, if needed
* NOTEs for above sub-objectives
  + Note 1: Only addressing the case of co-located and synchronized network deployment for the two UL carriers
  + Note 2: Only addressing the case of single TAG for the two UL carriers for SUL and for UL CA
  + Note 3: The UE is configured with two different uplink carrier frequencies.

### Sub-topic 1-2

*Sub-topic description*

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

**Issue 1-2: Enable more SUL/TDD/FDD bands to support 2Tx**

* Sub-objective#1: Add more SUL/TDD/FDD bands to support 2Tx
  + Specify the necessary Tx requirements
  + Specify the necessary Rx requirements
* Sub-objective#2: Remove RAN2 restrictions on SUL band UL-MIMO configuration
* For above two sub-objectives, PC2 HPUE can be considered for certain bands after related study is completed.

## Companies views’ collection for 1st round

### Open issues

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| **Company** | **Comments** |
| XXX | Sub topic 1-1:  Sub topic 1-2:  ….  Others: |
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## Summary for 1st round (by August RAN4 meeting)

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

## Discussion on 2nd round (before September RAN plenary)

## Summary on 2nd round (before September RAN plenary)

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

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

# Topic #2: 2Tx RF requirement and testing enhancement

*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** | **Proposed objective(s)** |
| RP-200614 | Huawei, HiSilicon | * Enhance the 2Tx RF requirements   + MPR enhancement for power class 3 TDD intra-band contiguous and non-contiguous UL CA     - Contiguous CA: MPR enhancement for 2Tx architecture when aggregated channel bandwidth>100MHz     - Non-contiguous CA: MPR definition for 1Tx architecture if there are other deployment scenarios   + Investigate the impact of power imbalance between Tx antennas for UL-MIMO, and enhance the RF requirements, e.g., EVM and MOP, and the test method   Note: Tx diversity scheme may be concluded in Rel-16, remaining issues can be discussed in TEI16   * + Investigate impact of RIMD on MPR, and enhance 2Tx RF measurement for UL CA and EN-DC testing     - 2Tx Antenna isolation assumption for RF requirement measurement: 10dB     - Study the measurement method enhancement: e.g. How to injecting interference into the antenna connector |

## Open issues summary

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

The motivations were provided in [2], which are copied below.

Regarding Rel-16 leftover topics, some enhancements for 2Tx UE requirements based on the previous discussion in RAN4 were identified. Those topics need extensive discussions and cannot be finalized within one or two quarters/meetings, including per-layer EVM requirements for UL-MIMO, impacts of power imbalance on the RF requirements, 2Tx RF requirement enhancement for EN-DC and UL CA.

### Sub-topic 2-1

*Sub-topic description:*

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

**Issue 2-1: MPR enhancement for power class 3 TDD intra-band contiguous and non-contiguous UL CA**

* Contiguous CA: MPR enhancement for 2Tx architecture when aggregated channel bandwidth>100MHz
* Non-contiguous CA: MPR definition for 1Tx architecture if there are other deployment scenarios

### Sub-topic 2-2

*Sub-topic description*

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

**Issue 2-2: Investigate the impact of power imbalance between Tx antennas for UL-MIMO, and enhance the RF requirements, e.g., EVM and MOP, and the test method**

Note: Tx diversity scheme may be concluded in Rel-16, remaining issues can be discussed in TEI16

### Sub-topic 2-3

*Sub-topic description:*

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

**Issue 2-3: Investigate impact of RIMD on MPR, and enhance 2Tx RF measurement for UL CA and EN-DC testing**

* 2Tx Antenna isolation assumption for RF requirement measurement: 10dB
* Study the measurement method enhancement: e.g. How to injecting interference into the antenna connector

## Companies views’ collection for 1st round

### Open issues

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| **Company** | **Comments** |
| XXX | Sub topic 2-1:  Sub topic 2-2:  Sub topic 2-3:  ….  Others: |
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## Summary for 1st round (by August RAN4 meeting)

### 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#2-1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic#2-2** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic#2-3** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

## Discussion on 2nd round (before September RAN plenary)

## Summary on 2nd round (before September RAN plenary)

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

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|  | **Status summary** |
| **Sub-topic#2-1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic#2-2** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic#2-3** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

# Topic #3: Optimizations on power class fall back

*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** | **Proposed objective(s)** |
| RP-200945 | Vivo, China Unicom | The objective of the study item is to study the optimized power class fall back mechanisms for HPUE when network scheduling UL traffic duty exceeds UE capability, i.e. enhanced schemes instead of falling back to lower PC class in R15/R16 specifications. Detailed work tasks include:   * Study the schemes with finer relationship between UL duty and back off power instead of ΔPPowerClass =3dB sharp, e.g. linear, step function etc. * Study the schemes by reducing the power on one or multiple cell groups in case of MR-DC, e.g. reduced LTE power (PLTE) and use of the common UL-DL patterns on the TDD CG for FDD+TDD EN-DC etc. * Other schemes are not precluded. * Optimization for different operation modes can be considered, including SA, TDD+TDD MR-DC and FDD+TDD MR-DC etc. * Power class 1.5 can be considered * UE test effort needs to be considered * Release independency can be considered depending on outcome of the study. |

## Open issues summary

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

The motivations were provided in [3], which are copied below.

For UE which support a higher power class than default, certain conditions need to be satisfied to have a controlled emission. The UL/DL configuration had been used in LTE phase and duty cycle based approach was introduced in NR. In case the condition cannot be satisified, e.g. uplink transmission ratio is higher than a threshold, there would be fallback of the maximum output power of this UE. The default method is to fallback to default power class, which was used for LTE and introduced in NR since Rel-15. However, there is concern that fallback to default power class is too conservative and there were multiple proposals to introduce different fallback schemes, such as linear, step function etc, in Rel-16 time frame, but no conclusion was reached.

In addition, in FDD-TDD EN-DC SI and WI phase, multiple behaviours and schemes were discussed but not included yet, such as by reducing LTE power (PLTE) and use of the common UL-DL patterns on the TDD CG for FDD+TDD EN-DC etc. Further enhancement on the performance might be possible.

There are also other HPUE related topics that may also have fall back problems that worthy of study.

### Sub-topic 3-1

*Sub-topic description:*

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

**Issue 3-1: Study the schemes with finer relationship between UL duty and back off power instead of ΔPPowerClass =3dB sharp, e.g. linear, step function etc.**

* Other schemes are not precluded
* Optimization for different operation modes can be considered, including SA, TDD+TDD MR-DC and FDD+TDD MR-DC etc.
* Power class 1.5 can be considered
* UE test effort needs to be considered
* Release independency can be considered depending on outcome of the study.

### Sub-topic 3-2

*Sub-topic description*

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

**Issue 3-2: Study the schemes by reducing the power on one or multiple cell groups in case of MR-DC, e.g. reduced LTE power (PLTE) and use of the common UL-DL patterns on the TDD CG for FDD+TDD EN-DC etc.**

* Other schemes are not precluded
* Optimization for different operation modes can be considered, including SA, TDD+TDD MR-DC and FDD+TDD MR-DC etc.
* Power class 1.5 can be considered
* UE test effort needs to be considered
* Release independency can be considered depending on outcome of the study.

## Companies views’ collection for 1st round

### Open issues

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| **Company** | **Comments** |
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## Summary for 1st round (by August RAN4 meeting)

### 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#3-1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic#3-2** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

## Discussion on 2nd round (before September RAN plenary)

## Summary on 2nd round (before September RAN plenary)

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

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|  | **Status summary** |
| **Sub-topic#3-1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic#3-2** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

# Topic #4: HPUE for TDD intra-band contiguous CA

*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** | **Proposed objective(s)** |
| RP-200614 | Huawei, HiSilicon | * HPUE for TDD intra-band contiguous UL CA   + Study the impact of different UE architectures on the requirements     - Power class Relation between single CC and intra-band contiguous CA on HPUE band can be studied in this phase(TBD)   + Specify the mechanism to meet SAR requirements     - Mechanism for HPUE on single carrier can be a start point considering the same UL-DL configuration assumption     - Power class fallback enhancement is specified for TDD intra-band contiguous UL CA   + Specify MPR requirements   + Specify the RF requirements for an example band (n41)     - A-MPR requirement |

## Open issues summary

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

The motivations were provided in [1], which are copied below.

The second topic is to support 26dBm high power UE for intra-band contiguous UL CA. The motivation is quite straightforward. But more study would be needed. Because the much wider channel bandwidth for NR is supported compared to LTE. It would be non-trivial to investigate the UE architecture, e.g., 23dBm+23dBm PA and 23dBm+26dBm PA, to support high power as well as the large aggregated channel bandwidth. And the supported channel bandwidth for PA also needs be studied. If the supported channel bandwidth of a single PA is less than the available channel bandwidth, then some tradeoff among the supported channel bandwidth, supported antenna ports per CC and achievable uplink power per CC should be considered. Based on the outcome of discussion on UE architecture, the RF requirements can be specified.

### Sub-topic 4-1

*Sub-topic description:*

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

**Issue 4-1: Specify the mechanism to meet SAR requirements**

* Mechanism for HPUE on single carrier can be a start point considering the same UL-DL configuration assumption
* Power class fallback enhancement is specified for TDD intra-band contiguous UL CA

### Sub-topic 4-2

*Sub-topic description*

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

**Issue 4-2: Study and specify 26dBm HPUE RF requirements for TDD intra-band contiguous CA**

* Study the impact of different UE architectures on the requirements
  + Power class Relation between single CC and intra-band contiguous CA on HPUE band can be studied in this phase(TBD)
* Specify MPR requirements
* Specify the RF requirements for an example band (n41)
  + A-MPR requirement

## Companies views’ collection for 1st round

### Open issues

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| **Company** | **Comments** |
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## Summary for 1st round (by August RAN4 meeting)

### 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#4-1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic#4-2** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

## Discussion on 2nd round (before September RAN plenary)

## Summary on 2nd round (before September RAN plenary)

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

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|  | **Status summary** |
| **Sub-topic#4-1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic#4-2** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

# Topic #5: Efficient utilization of spectrum which is not aligned with existing NR channel bandwidths

*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** | **Proposed objective(s)** |
| RP-200610 | Huawei, HiSilicon | * For requests of available spectrum with bandwidths which is not multiple of 5MHz   + Study the approach for efficient utilization of spectrum allocations that are not aligned with existing NR channel bandwidth and the relevant requirements including spectrum utilization, channel arrangement, and emission requirement, with the assumption that UEs not supporting such available spectrum with new bandwidth can still access the network.   + The following cases will be examples in this WI:     - Efficient use of an available 7 MHz NR allocation bandwidth for in n26     - Efficient use of an available 13 MHz NR allocation bandwidth for n28 |
| RP-201352 | T-Mobile USA | The objectives of this study item are:   1. Identify operator licensed channel bandwidths that do not align with existing NR channel bandwidths. 2. Evaluate the potential use of larger channel bandwidths than operator licensed bandwidth, including the impacts on regulatory emission requirements and UE blocking impacts. 3. Study the use of overlapping UE channel bandwidths to cover operator’s license spectrum, and if new gNB channel bandwidths are needed.   NOTE: From a UE perspective Channel Bandwidths in multiple of 5MHz are assumed as the baseline for this work   1. Identify operator licensed bandwidths that are not compatible with the use of techniques like intra-band CA or overlapping UE channel bandwidths. 2. Study the complexity and efficiency of adding new channel bandwidths vs. using existing techniques like intra-band CA. 3. Other solutions are not precluded. 4. Generic and future proof solution(s) should be intended, with priority should be given to approaches that avoid the introduction of new channel BWs on the UE side 5. Impact on RAN1 and RAN2 should be considered and minimized |

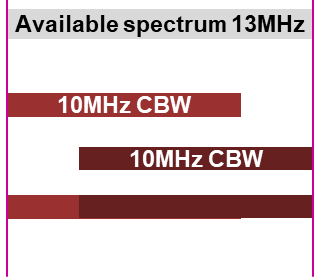
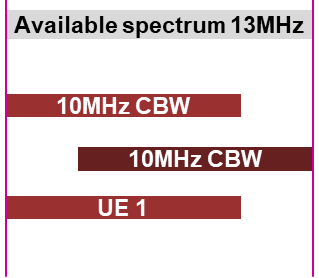
## Open issues summary

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

The topic was discussed extensively in RAN#88e. The main intention of this work is to fully utilize the available spectrum for operators, e.g., 7MHz, 13MHz and etc. The main debate is whether the use of overlapping UE channel bandwidths from UE perspective should be included in the SI.

In [6] the concepts of proposed solutions were provided. We represent them below. Maybe at the end of the day more than one solution would be chosen as general solutions.

* Approach#1: Use of overlapping UE channel bandwidth from UE perspective (Both BS and UE support the aggregated overlapping UE channel bandwidth, say, intra-band contiguous overlapping CA in [4, 5]);
* Approach#2: Use of overlapping UE channel bandwidth from network perspective (BS supports the aggregated overlapping UE channel bandwidth, say, intra-band contiguous overlapping CA in [4, 5], while UEs only supports the existing channel bandwidth)
* Approach#3: Use of larger channel bandwidths than operator licensed bandwidth
* Approach#4: Intra-band CA

Approach#1 Approach#2 Approach#3 Approach#4

Figure: 5.2-1 Candidate solutions to support irregular channel bandwidths

### Sub-topic 5-1

*Sub-topic description:*

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

**Issue 5-1: Should the use of overlapping UE channel bandwidth from UE perspective be included in the SID?**

Companies are encouraged to provide the detailed reasons.

### Sub-topic 5-2

*Sub-topic description*

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

**Issue 5-2: Comments for the other part of scope in RP-201352**

## Companies views’ collection for 1st round

### Open issues

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| **Company** | **Comments** |
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## Summary for 1st round (by August RAN4 meeting)

### 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#5-1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic#5-2** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

## Discussion on 2nd round (before September RAN plenary)

## Summary on 2nd round (before September RAN plenary)

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

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|  | **Status summary** |
| **Sub-topic#5-1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic#5-2** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

# Topic #6: Support overlapping CA for LTE

*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** | **Proposed objective(s)** |
| RP-200612 | Huawei, HiSilicon | The objectives of the core part of WI are as follows:   * Downlink overlapping intra-band contiguous CA is considered * Study and address the potential issues for RF/RRM when there is CRS/PDCCH overlapping * Specify the necessary UE RF requirements, e.g., channel arrangement and emission requirements * Specify the necessary signaling to support it   The objective of performance part of WI is as follows   * Specify the necessary UE demodulation performance requirements |

## Open issues summary

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

The motivations were provided in [7], which are copied below.

Six channel bandwidths are specified for LTE. But the available spectrum for operator quite diverse, which may not be aligned with the specified LTE channel bandwidths or aggregated channel bandwidths.

For LTE non-CA deployment, there is gap between two adjacent CCs serving as the guard band, which is the sum of guard bands of two adjacent CCs. For LTE CA deployment, the nominal spacing is usually applied between two adjacent CCs. For example, for the above two scenarios, more than 1.4MHz spectrum exists between two 20MHz CCs, which cannot be utilized.

If the two adjacent CCs are allowed to be overlapped with each other, there would be two benefits:

* The spectrum which is not aligned with LTE bandwidths can be fully utilized with a certain overlapping area between two CCs
* The guard band(s) between two adjacent CCs can be saved.

### Sub-topic 6-1

*Sub-topic description:*

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

**Issue 6-1: Study and address the potential issues for RF/RRM when there is CRS/PDCCH overlapping in order to support intra-band DL overlapping CA for LTE**

### Sub-topic 6-2

*Sub-topic description*

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

**Issue 6-2: Specify the necessary RAN4 requirements and signalling**

* Specify the necessary UE RF requirements, e.g., channel arrangement and emission requirements
* Specify the necessary signaling to support it
* Specify the necessary UE demodulation performance requirements

## Companies views’ collection for 1st round

### Open issues

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| **Company** | **Comments** |
| XXX | Sub topic 6-1:  Sub topic 6-2:  ….  Others: |
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## Summary for 1st round (by August RAN4 meeting)

### 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#6-1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic#6-2** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

## Discussion on 2nd round (before September RAN plenary)

## Summary on 2nd round (before September RAN plenary)

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

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|  | **Status summary** |
| **Sub-topic#6-1** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |
| **Sub-topic#6-2** | *Tentative agreements:*  *Candidate options:*  *Recommendations for 2nd round:* |

# References

[1] RAN4 Chairman (Futurewei), RP-201331, “Work areas of RAN4 R17 non-spectrum related WI/SIs”, RAN#88e.

[2] Huawei, HiSilicon, RP-200614, “New WID proposal: RF requirements enhancement for NR frequency range 1 (FR1) in Rel-17”, RAN#88e.

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