**3GPP TSG-RAN WG4 Meeting # 97-e R4-2016970**

Electronic Meeting, 2-13 Nov., 2020

**Agenda item:** 10.25

**Source:** Moderator (Huawei)

**Title:** Email discussion summary for [97e][128] NR\_n13

**Document for:** Information

# Introduction

The scope of this email discussion is to discuss the contributions submitted at agenda 10.25 to specify a new NR FDD operating band n13.

The target of 1st round is to discuss the potential agreements on A-MPR values and comments collection for the CRs for n13.

# Topic #1: A-MPR for NS\_07

## Companies’ contributions summary

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| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2014902 | Apple Inc. | This paper presents A-MPR values for NS\_07 requirements. |
| R4-2011801(it was approved in RAN4#96-e) | Qualcomm, Huawei | The A-MPR for NS\_07 was tentatively agreed with [] for further confirmation. |

## Open issues summary

### Sub-topic 1-1

**Issue 1-1: A-MPR for NS\_07**

* Proposals
	+ Option 1: the A-MPR proposed in R4-2014902

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Waveform | Modulation | A1 | A2 | A3 | A4 |
| Outer / Inner | Outer / Inner | Outer / Inner | Outer / Inner |
| DFT-s-OFDM | PI/2 BPSK | 14 | 9 | 6 | 3 |
| QPSK | 14 | 9 | 6 | 3 |
| 16QAM | 14 | 9 | 6 | 3 |
| 64QAM | 14 | 9 | 6 | 3 |
| 256QAM | 14 | 9 | 6 | 3 |
| CP-OFDM | QPSK | 15 | 10 | 7 | 3 |
| 16QAM | 15 | 10 | 7 | 3 |
| 64QAM | 15 | 10 | 7 | 3 |
| 256QAM | 15 | 10 | 7 | 3 |

* + Option 2: the A-MPR tentatively agreed in WF R4-2011801

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Modulation/Waveform | A1 | A2 | A3 | A4 |
| Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner |
| DFT-s-OFDM PI/2 BPSK | 12 | 9 | 6 | 3 |
| DFT-s-OFDM QPSK | 12 | 9 | 6 | 3 |
| DFT-s-OFDM 16 QAM | 12 | 9 | 6 | 3 |
| DFT-s-OFDM 64 QAM | 12 | 9 | 6 | 3 |
| DFT-s-OFDM 256 QAM | 12 | 9 | 6 | 3 |
| CP-OFDM QPSK | 14 | 10 | 7 | 3 |
| CP-OFDM 16 QAM | 14 | 10 | 7 | 3 |
| CP-OFDM 64 QAM | 14 | 10 | 7 | 3 |
| CP-OFDM 256 QAM | 14 | 10 | 7 | 3 |

Note: the only difference between Option 1 and 2 is the value for A1.

* Recommended WF
	+ TBD

## Companies views’ collection for 1st round

### Open issues

|  |  |
| --- | --- |
| **Company** | **Comments** |
| Qualcomm | Option 1 is too aggressive for the amount of backoff. Based on the LTE total back-off, the DFTsOFDM waveform should have no more than 13dB. See table below:

|  |  |
| --- | --- |
| Back off of LTE Vs NR |  |
|  | MPR | AMPR | T.B.O. |
| NR | 1 | 13 | 13 |
| LTE | 1 | 12 | 13 |

This average can be obtained by taking the average of all the company's original proposal as follows:

|  |  |  |
| --- | --- | --- |
| Averaging (ceiling function) and company comparison |  |  |
|  |  |  | Apple |  |  |  |  |
|  |  | LBM | HBM | QCOM | HW | LTE (MPR+AMPR) | Avg |
| DFTS | QPSK | 11 | 14 | 12 | 12 | 13 | 13 |
| CP | QPSK | 10.5 | 15 | 13 | 14 |  | 14 |

Qualcomm's view of the back off should be as follows:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Modulation/Waveform | A1 | A2 | A3 | A4 |
| Outer/Inner | Outer/Inner | Outer/Inner | Outer/Inner |
| DFT-s-OFDM PI/2 BPSK | 13 | 9 | 6 | 3 |
| DFT-s-OFDM QPSK | 13 | 9 | 6 | 3 |
| DFT-s-OFDM 16 QAM | 13 | 9 | 6 | 3 |
| DFT-s-OFDM 64 QAM | 13 | 9 | 6 | 3 |
| DFT-s-OFDM 256 QAM | 13 | 9 | 6 | 3 |
| CP-OFDM QPSK | 14 | 10 | 7 | 3 |
| CP-OFDM 16 QAM | 14 | 10 | 7 | 3 |
| CP-OFDM 64 QAM | 14 | 10 | 7 | 3 |
| CP-OFDM 256 QAM | 14 | 10 | 7 | 3 |

. |
| Huawei | We agree with the compromised approach. The average of companies’ proposal is a good way forward. |
| Apple | We are fine with averaging the proposals and the compromised proposal from Qualcomm. |
| Verizon | We agree to use the approved R4-2011801 as the proposal. The new proposal from Apple is too aggressive.  |
| Huawei | It seems most of companies are ok with the compromised approach. Question to Verizon, is it fine to the compromised proposal from Qualcomm. |
| Verizon | To Huawei: No, we are not ok with the compromised proposal, but agree the R4-2011801 as baseline. |

## 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**  |
| Issue 1-1: A-MPR for NS\_07 | Companies made simulations for NS\_07 are fine with the results with averaging the proposals. But Verizon are not ok with the compromised proposal. The most of values for the two proposals are the same. The only difference is the A1 value for DFT-s-OFDM waveform, which is 13 dB vs 14 dB.Recommendations for 2nd round: further discussion and make a decision to finalize the WI this meeting. |
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*Recommendations on WF/LS assignment*

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| --- | --- | --- |
|  | **WF/LS t-doc Title**  | **Assigned Company,****WF or LS lead** |
| WF | WF on A-MPR for NS\_07 | Apple Inc. |

## Discussion on 2nd round (if applicable)

**R4-2016877 WF on A-MPR for NS\_07 Source: Apple**

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| --- | --- |
| **WF number** | **Comments collection** |
| Draft R4-2016877 | Qualcomm: We are ok with tentatively agreed values in R4- 2011801 or the compromised values discussed in the 1st round. |
| Huawei: We share the same view as Qualcomm.  |
| Verizon: We agreed the values in R4- 2011801 |
| Apple: After rechecking the results and possible compromises we can accept the A-MPR from R4-2011801. |
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## 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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| --- | --- |
|  | **Status summary**  |
| Issue 1-1: A-MPR for NS\_07 | After checking in 2nd round, companies all are ok with the A-MPR value in R4- 2011801 which is implemented in the 38.101-1 CR.Suggestion for R4-2016877:R4-2016877 is not uploaded and can be withdrawn |
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# Topic #2: CRs for n13 introduction

## Companies’ contributions summary

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| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2015682 | Huawei, HiSilicon | CR to TS 38.101-1: introduction of NR band n13 |
| R4-2015683 | Huawei, HiSilicon | CR to TS 38.133: introduction of NR band n13 |
| R4-2015684 | Huawei, HiSilicon | CR to TS 38.104: introduction of NR band n13 |
| R4-2015685 | Huawei, HiSilicon | CR to TS 38.141-1: introduction of NR band n13 |
| R4-2015686 | Huawei, HiSilicon | CR to TS 38.141-2: introduction of NR band n13 |
| R4-2015687 | Huawei, HiSilicon | CR to TS 36.104: introduction of NR band n13 |
| R4-2015688 | Huawei, HiSilicon | CR to TS 36.141: introduction of NR band n13 |
| R4-2015689 | Huawei, HiSilicon | CR to TS 37.104: introduction of NR band n13 |
| R4-2015690 | Huawei, HiSilicon | CR to TS 37.141: introduction of NR band n13 |
| R4-2015691 | Huawei, HiSilicon | CR to TS 37.105: introduction of NR band n13 |
| R4-2015692 | Huawei, HiSilicon | CR to TS 37.145-1: introduction of NR band n13 |
| R4-2015693 | Huawei, HiSilicon | CR to TS 37.145-2: introduction of NR band n13 |

## Companies views’ collection for 1st round

### CRs/TPs comments collection

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| **CR/TP number** | **Comments collection** |
| R4-2015682 | Huawei: it depends on the discussion of A-MPR. |
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| R4-2015683 |  |
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| R4-2015684 | Ericsson: is there a good reason why OBUE for cat B option 1 was not added?Huawei: based on our understanding, band 13 is used in American countries. Hence only cat A OBUE requirements are needed. |
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| R4-2015685 | Ericsson: is there a good reason why OBUE for cat B option 1 was not added? |
| Huawei: based on our understanding, band 13 is used in American countries. Hence only cat A OBUE requirements are needed. |
|  |
| R4-2015686 | Ericsson: is there a good reason why OBUE for cat B option 1 was not added? |
| Huawei: based on our understanding, band 13 is used in American countries. Hence only cat A OBUE requirements are needed. |
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| R4-2015687 |  |
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| R4-2015688 |  |
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| R4-2015689 |  |
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| R4-2015690 |  |
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| R4-2015691 |  |
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| R4-2015692 |  |
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| R4-2015693 |  |
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## Summary for 1st round

### 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**  |
| R4-2015682 | To be revised  |
| R4-2015683 | No comment received in 1st roundReturn to  |
| R4-2015684 | Question was clarified and need confirm from Ericsson Return to |
| R4-2015685 | Question was clarified and need confirm from Ericsson Return to |
| R4-2015686 | Question was clarified and need confirm from Ericsson Return to |
| R4-2015687 | No comment received in 1st roundReturn to |
| R4-2015688 | No comment received in 1st roundReturn to |
| R4-2015689 | No comment received in 1st roundReturn to |
| R4-2015690 | No comment received in 1st roundReturn to |
| R4-2015691 | No comment received in 1st roundReturn to |
| R4-2015692 | No comment received in 1st roundReturn to |
| R4-2015693 | No comment received in 1st roundReturn to |
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## Discussion on 2nd round (if applicable)

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| **CR/TP number** | **Comments collection** |
| Draft R4-2016878 |  |
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| R4-2015683 | Note：No comment received in 1st round |
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| R4-2015684 | Ericsson: Our comment was triggered by 36.104 which specified OBUE requirement cat B opt1 for band 13. But it’s also our understanding that this band is only deployed in America’s countries. |
| Huawei: In this case we think we can introduce cat A requirements this time and in the future we can add cat B opt1 if needed. There is other band has the same situation, e.g. n14. |
|  |
| R4-2015685 | Ericsson: Our comment was triggered by 36.104 which specified OBUE requirement cat B opt1 for band 13. But it’s also our understanding that this band is only deployed in America’s countries. |
| Huawei: In this case we think we can introduce cat A requirements this time and in the future we can add cat B opt1 if needed. There is other band has the same situation, e.g. n14. |
|  |
| R4-2015686 | Ericsson: Our comment was triggered by 36.104 which specified OBUE requirement cat B opt1 for band 13. But it’s also our understanding that this band is only deployed in America’s countries. |
| Huawei: In this case we think we can introduce cat A requirements this time and in the future we can add cat B opt1 if needed. There is other band has the same situation, e.g. n14. |
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| R4-2015687 | Note：No comment received in 1st round |
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| R4-2015688 | Note：No comment received in 1st round |
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| R4-2015689 | Note：No comment received in 1st round |
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| R4-2015690 | Note：No comment received in 1st round |
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| R4-2015691 | Note：No comment received in 1st round |
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| R4-2015692 | Note：No comment received in 1st round |
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| R4-2015693 | Note：No comment received in 1st round |
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## 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 number** | **Comments collection** |
| R4-2016878 | No comment is received in 2nd round.To be agreed |
| R4-2015683 | No comment is receivedTo be agreed |
| R4-2015684 | Question was clarified and no further comment received.To be agreed |
| R4-2015685 | Question was clarified and no further comment received.To be agreed |
| R4-2015686 | Question was clarified and no further comment received.To be agreed |
| R4-2015687 | No comment is receivedTo be agreed |
| R4-2015688 | No comment is receivedTo be agreed |
| R4-2015689 | No comment is receivedTo be agreed |
| R4-2015690 | No comment is receivedTo be agreed |
| R4-2015691 | No comment is receivedTo be agreed |
| R4-2015692 | No comment is receivedTo be agreed |
| R4-2015693 | No comment is receivedTo be agreed |