**3GPP TSG- Meeting #**

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Title: WF on 7 MHz channel BW

Agenda item: 7.4.1

Source: Ericsson

Document for: Approval

# 1- General

## Minimum / Maximum channel BW

**Agreement:**

* In single carrier, 7 MHz can’t be the lowest channel BW in a band.
* In CA, 7MHz can be min/max CBW of one band in the combination supporting BCS5.
* In MSD, 7MHz cannot be a minimum channel BW in CA

# 2- BS RF

## 2.1 EVM window length for 7 MHz channel BW

**Agreement:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channelbandwidth (MHz) | FFT size | CP length for symbols 1‑6 and 8-13 in FFT samples | EVM window length *W* | Ratio of *W* to total CP length for symbols 1‑6 and 8-13 (Note) (%) |
| 7 | 512 | 36 | 14 | 40 |

# 3- UE A-MPR

## 3.1 UE RF A-MPR tables

**Agreement:**

* Remove the texts “Outer/Inner”, “Outer” and “Edge/Inner” from the NS\_12, NS\_13, NS\_14 and NS\_15 A-MPR tables
* RAN4 can further discuss on the clarification on the general statement on RB allocation for the aforementioned NS values.

## 3.2 NS\_12: A-MPR for PC3

**Agreement**: The following NS\_12 A-MPR regions definition was agreed.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel BW | Carrier Frequency, Fc, MHz | RBStart\*12\*SCS (MHz) | LCRB\*12\*SCS (MHz) | A-MPR  |
| 7MHz | 817.5 ≤ Fc ≤ 820.5 | ≤1.8 | ≤0.72 | A3 |
|  |  | ≤1.8 | >0.72 | A4 |
|  |  | >1.8 | >1.44 | A5 |

|  |  |  |  |
| --- | --- | --- | --- |
| Modulation/Waveform | A3 | A4 | A5 |
| DFT-s-OFDM PI/2 BPSK | ≤ 3.5 | ≤ 4.5 | 4 |
| DFT-s-OFDM QPSK | ≤ 4 | ≤ 4.5 | 4 |
| DFT-s-OFDM 16 QAM | ≤ 4 | ≤ 5 | 4.5 |
| DFT-s-OFDM 64 QAM | ≤ 4.5 | ≤ 5 | 5 |
| DFT-s-OFDM 256 QAM | ≤ 5 | ≤ 5.5 | 5.5 |
| CP-OFDM QPSK | ≤ 5.5 | ≤ 6.5 | 6.5 |
| CP-OFDM 16 QAM | ≤ 5.5 | ≤ 6.5 | 6.5 |
| CP-OFDM 64 QAM | ≤ 6 | ≤ 7 | 6.5 |
| CP-OFDM 256 QAM |  | ≤ 7 | 6.5 |

## 3.3 NS\_13: A-MPR for PC3

**Agreement**: The following NS\_13 A-MPR regions definition was agreed.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel BW | Carrier Frequency, Fc, MHz | RBStart\*12\*SCS (MHz) | LCRB\*12\*SCS (MHz) | A-MPR |
| 7MHz |  | ≤1.8 | <1.44 | A5 |
|  | 820.5 = Fc | ≤1.8 | ≥1.44 | A6 |
|  |  | >1.8 | ≥1.8 | A7 |

|  |  |  |  |
| --- | --- | --- | --- |
| Modulation/Waveform | A5 | A6 | A7 |
| DFT-s-OFDM PI/2 BPSK | ≤ 3.5 | ≤ 4 | ≤ 3 |
| DFT-s-OFDM QPSK | ≤ 3.5 | ≤ 4 | ≤ 3 |
| DFT-s-OFDM 16 QAM | ≤ 3.5 | ≤ 4.5 | ≤ 3.5 |
| DFT-s-OFDM 64 QAM | ≤ 4.5 | ≤ 4.5 | ≤ 4 |
| DFT-s-OFDM 256 QAM | ≤ 5 | ≤ 6 | ≤ 4.5 |
| CP-OFDM QPSK | ≤ 5.5 | ≤ 6 | ≤ 4.5 |
| CP-OFDM 16 QAM | ≤ 5.5 | ≤ 6 | ≤ 4.5 |
| CP-OFDM 64 QAM | ≤ 6 | ≤ 6 | ≤ 5 |
| CP-OFDM 256 QAM | ≤ 8 | ≤ 8 | ≤ 6.5 |

## 3.4 NS\_15: A-MPR for PC3

**Agreement**: The following NS\_15 A-MPR regions definition was agreed.

| Channel BW | Carrier Frequency, Fc, MHz | RBend\*12\*SCS (MHz) | LCRB\*12\*SCS (MHz) | A-MPR |
| --- | --- | --- | --- | --- |
| 7 MHz | 841.5 < Fc ≤ 845.5 | ≥ 4.5 | > 0 | A7 |
| < 4.5, ≥ 2.16 | ≥ 1.8 | A2 |
| ≤ 1.44 | ≤ 0.36 | A8 |
| 838 < Fc ≤ 841.5 | > 0 | > 2.7 | A9 |
| ≥ 5.94 | ≤ 2.7 | A10 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Modulation/Waveform | A7 | A2 | A8 | A9 | A10 |
| DFT-s-OFDM PI/2 BPSK | ≤ 8.5 | ≤ 5 | ≤ 5 | ≤ 4 | ≤ 2 |
| DFT-s-OFDM QPSK | ≤ 10 | ≤ 5 | ≤ 6.5 | ≤ 4.5 | ≤ 2 |
| DFT-s-OFDM 16 QAM | ≤ 10 | ≤ 5 | ≤ 6.5 | ≤ 4.5 | ≤ 2.5 |
| DFT-s-OFDM 64 QAM | ≤ 10 | ≤ 5 | ≤ 6.5 | ≤ 4.5 | ≤ 2.5 |
| DFT-s-OFDM 256 QAM | ≤ 10 | ≤ 5 | ≤ 9 | ≤ 5 | ≤ 3.5 |
| CP-OFDM QPSK | ≤ 11 | ≤ 6.5 | ≤ 6.5 | ≤ 6 | ≤ 3 |
| CP-OFDM 16 QAM | ≤ 11 | ≤ 6.5 | ≤ 6.5 | ≤ 6 | ≤ 3 |
| CP-OFDM 64 QAM | ≤ 11 | ≤ 6.5 | ≤ 6.5 | ≤ 6 | ≤ 4 |
| CP-OFDM 256 QAM | ≤ 11 | ≤ 6.5 | ≤ 9.5 | ≤ 6.5 | ≤ 5 |

## 3.5 NS\_12: A-MPR for PC2

**Agreement**: The following PC2 NS\_12 A-MPR regions definition was agreed.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel BW | Carrier Frequency, Fc, MHz | RBStart\*12\*SCS (MHz) | LCRB\*12\*SCS (MHz) | A-MPR  |
| 7MHz | 817.5 ≤ Fc < 820.5 | ≤1.8 | ≤0.72 | A4 |
|  |  | ≤1.8 | >0.72 | A5 |
|  |  | >1.8 | >1.44 | A6 |

Table 3: A-MPR for NS\_12 (PC2), from [3]

|  |  |  |  |
| --- | --- | --- | --- |
| Modulation/Waveform | A4 | A5 | A6 |
|  |
| DFT-s-OFDM PI/2 BPSK | ≤ 4 | ≤ 6 | ≤ 5 |
| DFT-s-OFDM QPSK | ≤ 4.5 | ≤ 6 | ≤ 5 |
| DFT-s-OFDM 16 QAM | ≤ 4.5 | ≤ 6.5 | ≤ 5 |
| DFT-s-OFDM 64 QAM | ≤ 5 | ≤ 6.5 | ≤ 5 |
| DFT-s-OFDM 256 QAM | ≤ 5.5 | ≤ 7.5 | ≤ 6.5 |
| CP-OFDM QPSK | ≤ 6 | ≤ 7.5 | ≤ 6.5 |
| CP-OFDM 16 QAM | ≤ 6 | ≤ 7.5 | ≤ 6.5 |
| CP-OFDM 64 QAM | ≤ 6 | ≤ 7.5 | ≤ 6.5 |
| CP-OFDM 256 QAM | ≤ 7 | ≤ 8 | ≤ 7.5 |

## 3.6 NS\_13: A-MPR for PC2

**Agreement**: The following PC2 NS\_13 A-MPR regions definition was agreed.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Channel BW | Carrier Frequency, Fc, MHz | RBStart\*12\*SCS (MHz) | LCRB\*12\*SCS (MHz) | A-MPR |
| 7MHz |  | ≤1.8 | <1.44 | A5 |
|  | 820.5 ≤ Fc | ≤1.8 | ≥1.44 | A6 |
|  |  | >1.8 | ≥1.8 | A7 |

Table 6: A-MPR for NS\_13 (Power Class 2), from [3]

|  |  |  |  |
| --- | --- | --- | --- |
| Modulation/Waveform | A1 | A2 | A3 |
|  |
| DFT-s-OFDM PI/2 BPSK | ≤ 3.5 | ≤ 4 | ≤ 3 |
| DFT-s-OFDM QPSK | ≤ 3.5 | ≤ 4 | ≤ 3 |
| DFT-s-OFDM 16 QAM | ≤ 3.5 | ≤ 4.5 | ≤ 3.5 |
| DFT-s-OFDM 64 QAM | ≤ 4.5 | ≤ 4.5 | ≤ 4 |
| DFT-s-OFDM 256 QAM | ≤ 5 | ≤ 6 | ≤ 4.5 |
| CP-OFDM QPSK | ≤ 5.5 | ≤ 6 | ≤ 4.5 |
| CP-OFDM 16 QAM | ≤ 5.5 | ≤ 6 | ≤ 4.5 |
| CP-OFDM 64 QAM | ≤ 6 | ≤ 6 | ≤ 5 |
| CP-OFDM 256 QAM | ≤ 8 | ≤ 8 | ≤ 6.5 |

## 3.7 NS\_15: A-MPR for PC2

**Agreement**: The following PC2 NS\_15 A-MPR regions definition was agreed.

| Channel BW | Carrier Frequency, Fc, MHz | RBend\*12\*SCS (MHz) | LCRB\*12\*SCS (MHz) | A-MPR |
| --- | --- | --- | --- | --- |
| 7MHz | 841.5 < Fc ≤ 845.5 | ≥ 4.5 | > 0 | A7 |
|  |  | < 4.5, ≥ 2.16 | ≥ 1.8 | A8 |
|  |  | < 4.5, ≥ 2.16 | <1,8 ≥1.44 | A9 |
|  |  | ≤ 1.44 | ≤ 0.36 | A10 |
|  | 837 < Fc ≤ 841.5 | > 0 | > 2.7 | A11 |
|  |  | ≥ 5.94 | ≤ 2.7 | A12 |

Table 10: A-MPR for NS\_15 (Power Class 2), from [3]

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Modulation/Waveform | A7 | A8 | A9 | A10 | A11 | A12 |
|  |
| DFT-s-OFDM PI/2 BPSK | ≤ 11 | ≤ 6 | ≤ 4.5 | ≤ 7.5 | ≤ 5.5 | ≤ 3 |
| DFT-s-OFDM QPSK | ≤ 11.5 | ≤ 6.5 | ≤ 4.5 | ≤ 7.5 | ≤ 5.5 | ≤ 3 |
| DFT-s-OFDM 16 QAM | ≤ 11.5 | ≤ 6.5 | ≤ 4.5 | ≤ 8 | ≤ 5.5 | ≤ 3.5 |
| DFT-s-OFDM 64 QAM | ≤ 11.5 | ≤ 6.5 | ≤ 4.5 | ≤ 8 | ≤ 5.5 | ≤ 4 |
| DFT-s-OFDM 256 QAM | ≤ 12.5 | ≤ 6.5 | ≤ 5 | ≤ 9 | ≤ 5.5 | ≤ 5.5 |
| CP-OFDM QPSK | ≤ 13 | ≤ 8 | ≤ 5.5 | ≤ 10 | ≤ 7 | ≤ 4.5 |
| CP-OFDM 16 QAM | ≤ 13 | ≤ 8.5 | ≤ 5.5 | ≤ 10 | ≤ 7 | ≤ 4.5 |
| CP-OFDM 64 QAM | ≤ 13 | ≤ 8.5 | ≤ 5.5 | ≤ 10 | ≤ 7 | ≤ 5 |
| CP-OFDM 256 QAM | ≤ 13.5 | ≤ 8.5 | ≤ 7 | ≤ 10.5 | ≤ 7.5 | ≤ 7 |