**3GPP TSG-RAN WG4 Meeting # 109 R4-231xxxx**

**Chicago, US, November 13 – 17, 2023**

**Agenda item: 8.30.6**

**Source:** Moderator (OPPO)

**Title:** Topic summary for [109][143] NR\_SL\_enh2\_UERF\_part1

**Document for:** Information

# Introduction

This thread includes agenda item 8.30, 8.30.1, 8.30.2, 8.30.2.1 SL-U system parameter, SL-U TX requirement, SL-U RX requirement. The tdocs are separated into three parts as MPR/A-MPR; Reply LS to RAN1 on PSFCH and CR alignment.

Topic #1: General aspects and System parameters for SL-U single CC

Topic #2: MRP/A-MPR for SL-U

# Topic #1: General topics

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2318316 | CATT,CICTCI | Draft CR for 38.101-1: SL-U RB set and intra-cell guard band determination |
| R4-2318445 | Meta Ireland | Draft CR to TS38.101-1 on operating band and system parameters for SL-U features |
| R4-2318446 | Meta Ireland | Draft CR to TS38.101-1 on UE RF requirements for SL-U features |
| R4-2318995 | vivo | Maintenance TP to TR 38.786 |
| R4-2318996 | vivo | Draft CR on introduction of definitions, symbols and abbreviations for SL evolution |
| R4-2318999 | vivo | Draft CR on Rx requirements for SL-U single carrier operation |
| R4-2319926 | OPPO | DraftCR for SL-U |
| R4-2319933 | OPPO | feature list discussion for SL enhancement |

## Open issues summary

### Sub-topic 1-1 Feature list

#### Issue 1-1-1: UE feature list

* Proposals

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Features** | **Index** | **Feature group** | **Components** | **Prerequisite feature groups** | **Need for the gNB to know if the feature is supported** | **Applicable to the capability signalling exchange between UEs (V2X WI only)”.** | **Consequence if the feature is not supported by the UE** | **Type**  **(the ‘type’ definition from UE features should be based on the granularity of 1) Per UE or 2) Per Band or 3) Per BC or 4) Per FS or 5) Per FSPC)** | **Need of FDD/TDD differentiation** | **Need of FR1/FR2 differentiation** | **Capability interpretation for mixture of FDD/TDD and/or FR1/FR2** | **Note** | **Mandatory/Optional** |
| 45.  NR\_SL\_enh2 | 45-1 | SL reception in intra-carrier guard band | Capability of reception in the non-zero intra-cell guardband between contiguous RB sets in SL wideband carrier operation wider than 20MHz when LBT is successful only in a subset of RB sets |  | **Yes** | **Yes** | UE cannot receive in the intra-cell guard band specified in 38.101-1 | **Per band** | **No** | **No** |  |  | Optional with capability signalling |
| 45-2 | Power class for sidelink CA | power class the UE supports when operating according to this band combination used for sidelink. If the field is absent, the UE supports the default power class. If this power class is higher than the power class that the UE supports on the individual bands of this band combination (*ue-PowerClassSidelink-r16* in *BandNR*), the latter determines maximum TX power available in each band. The UE sets the power class parameter only in band combinations that are applicable as specified in TS 38.101-1. |  | **Yes** | **Yes** | UE cannot transmit in proper power class as specified in 38.101-1 | **Per BC** | **No** | **No** |  |  | Optional with capability signalling |

* Moderator WF:
  + To agree on the UE features

#### Issue 1-1-2: IntraCellGuardBandSL-List correction

* Proposals: (CATT)
  + For a UE supporting wideband operation, the nominal intra-cell guard bands and the corresponding sizes of the RB sets separated by the said guard bands are as specified in Table 5.3.3-2 for each UE channel bandwidth and sub-carrier spacing for the downlink, uplink and sidelink. The nominal intra-cell guard bands in Table 5.3.3-2 are applicable when the respective IE *intraCellGuardBandsUL-List,* *intraCellGuardBandsDL-List* [7] and *intraCellGuardBandsSL-List* for the uplink, downlink and sidelink are not provided, as specified in [10] clause 7.
* Moderator WF:
  + Together discuss with the *intraCellGuanrdBand* feature

### Sub-topic 1-2 CRs

* Proposals: There are currently 5 CRs from 3 companies and many of the CRs are cross overlapped.
* Moderator WF: It is proposed based on current CR submission with below work split:
  + For sub-clause 3 based on R4-2318996 to capture all the changes.
  + For sub-clause 5 and 7 based on R4-2318445 and R4-2318446 to capture all the changes.
  + For sub-clause 6 based on R4-2319926 to capture all the changes.

# Topic #2: MPR/A-MPR for SL-U

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2318879 | Xiaomi | **Proposal 1: Considering some margins, the MPR of 256QAM in single CC operation for PC5 SL-U can be:**   |  |  |  |  | | --- | --- | --- | --- | | Pre-coding | Modulation | RB Allocation | | |  |  | Full (dB) | | CP-OFDM | 256 QAM | ≤ 7 |   **Proposal 2: The wide band full operation for PC5 SL-U can use the same MPR values as single CC opearation:**   |  |  |  | | --- | --- | --- | | Pre-coding | Modulation | Wide band full operation(dB) | | CP-OFDM | QPSK | ≤ 3.5 | | 16 QAM | ≤ 4.0 | | 64 QAM | ≤ 5.5 | | 256 QAM | ≤ 7.0 | |
| R4-2319170 | LG Electronics Finland | Detail proposals are listed in following open issues  ***SL-U PSSCH/PSCCH MPR***  ***SL-U PSSCH/PSCCH A-MPR***  ***SL-U PSFCH MPR***  ***SL-U PSFCH A-MPR***  ***SL-U S-SSB MPR***  ***SL-U S-SSB A-MPR*** |
| R4-2319500 | Huawei, HiSilicon | ***Observation 1: The common interlace allocation for PSFCH is kind of equivalent to that in existing R16/17 design. And PSFCH allocation without consideration of OCB is not different from R16/17 design.***  ***Observation 2: The SCS and number of K3 dedicated RB have little impact on PSFCH MPR for common interlaced RB allocation on shared spectrum.***  ***Proposal 1: MPR for PSFCH on shared spectrum is 10dB based on common interlaced RB allocation.***  ***Proposal 2: MPR for SSB on shared spectrum is no more than 11dB.*** |
| R4-2319924 | OPPO | **Observation 1: For interlaced RB allocation starting from case 32 to 48, the MPR for all the modulation are lower than the corresponding bitmap but with full RB allocation**  **Observation 2: For full RB allocation case 18, 21, 23, 27, 30 and 31, the MPR for 256QAM are about 1dB higher than other cases for 256QAM full RB allocation.**  **Observation 3: For some companies proposed inner bitmap, the difference between full RB allocation and partial RB allocation are as large as 2.46dB while for other companies results, the difference are within 0.6dB.**  **Proposal 1: Differentiate the MPR for full RB allocation and interlaced RB allocation as NR-U has done.**  **Proposal 2: For the specific cases 18, 21, 23, 27, 30 and 31, introduce the exception bitmap as NR-U has done.**  **Proposal 3: Not to apply the differentiation of inner and outer bitmap.** |
| R4-2319925 | OPPO | In this contribution, we give initial discussion on the sidelink evolution and the observation and proposals are shown as below:  **Observation 1: The PSD requirement is loose with the MPR are less sensitive to bandwidth.**  **Proposal 1: For NS\_31, it is proposed to average the numbers of LGE outer, OPPO and Qualcomm 20MHz these three columns.**  The detail table is proposed as below:  **Table 3 NS\_31 A-MPR**   |  |  |  |  |  | | --- | --- | --- | --- | --- | | Pre-coding | Modulation | RB Allocation (Note 2) | RB Allocation (Note 3) | | |  |  | Full/Partial | Full (dB) | Partial (dB) | | CP-OFDM | QPSK | See Table 6.2F.2-1 | ≤ 5.5 | ≤ 6.5 | |  | 16 QAM | ≤ 5.5 | ≤ 7.0 | |  | 64 QAM | ≤ 5.5 | ≤ 7.0 | |  | 256 QAM | ≤ 7.5 | ≤ 7.5 |   **Proposal 2: For NS\_53, it is proposed to average the numbers of LGE and OPPO and the final result is shown in table 5.**  **Table 5 NS\_53 A-MPR**   |  |  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | | | | | 20MHz | | 40MHz | | 60MHz | | 80MHz | | 100MHz | | | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | | CP-OFDM | QPSK | ≤ 9.0 | ≤ 12.0 | ≤ 6.5 | ≤ 8.5 | ≤ 4.5 | ≤ 6.5 | ≤ 4.0 | ≤ 5.5 | ≤ 4.0 | ≤ 4.5 | | 16 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 6.5 | ≤ 8.5 | ≤ 4.5 | ≤ 6.5 | ≤ 4.0 | ≤ 5.5 | ≤ 4.0 | ≤ 4.5 | | *64 QAM* | ≤ 9.0 | ≤ 12.0 | ≤ 6.5 | ≤ 8.5 | ≤ 5.5 | ≤ 6.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | | 256 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 8.0 | ≤ 8.5 | ≤ 8.0 | ≤ 7.0 | ≤ 8.0 | ≤ 7.0 | ≤ 8.0 | ≤ 7.0 |   **Proposal 3: It is proposed the A-MPR for NS\_58 as table 7 below:**  **Table 7 A-MPR for NS\_58**   |  |  |  | | --- | --- | --- | |  | Modulation |  | | CP-OFDM  Full | QPSK | ≤ 3.5 | | 16 QAM | ≤ 4.0 | | 64 QAM | ≤ 5.5 | | 256 QAM | ≤ 8.0 | | CP-OFDM  Partial | QPSK | ≤ 4.5 | | 16 QAM | ≤ 4.5 | | 64 QAM | ≤ 5.5 | | 256 QAM | ≤ 8.0 |   **Proposal 4: it is propose to average the values and the proposed A-MPR table is shown as below:**  **Table 9 A-MPR for NS\_60**   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | | | 20 MHz | | 40 MHz | | 60 MHz | | 80 MHz | | | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | | CP-OFDM | QPSK | ≤ 6.0 | ≤ 8.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.0 | ≤ 5.5 | ≤ 4.5 | ≤ 5.5 | | 16 QAM | ≤ 6.0 | ≤ 8.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.0 | ≤ 5.5 | ≤ 4.5 | ≤ 5.5 | | 64 QAM | ≤ 6.0 | ≤ 8.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | | 256 QAM | ≤ 8.0 | ≤ 8.5 | ≤8.0 | ≤ 7.0 | ≤ 8.0 | ≤ 7.0 | ≤ 8.0 | ≤ 7.0 |   **Proposal 5: it is propose to average the values and the proposed A-MPR table is shown as below:**  **Table 11 A-MPR for NS\_60**   |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | | | 20 MHz | | 40 MHz | | 60 MHz | | 80 MHz | | | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | | CP-OFDM | QPSK | ≤ 7.5 | ≤ 10.0 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | | 16 QAM | ≤ 7.5 | ≤ 10.5 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | | 64 QAM | ≤ 7.5 | ≤ 10.5 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | | 256 QAM | ≤ 8 | ≤ 10.5 | ≤ 8 | ≤ 7.0 | ≤ 8 | ≤ 7.0 | ≤ 8 | ≤ 7.0 | |
| R4-2319236 | LG Electronics Finland | draft CR on SL-U MPR and A-MPR (alt1) |
| R4-2319237 | LG Electronics Finland | draft CR on SL-U MPR and A-MPR (alt2) |
| R4-2319503 | Huawei, HiSilicon | TP to TR38.786 updated MPR simulation assumptions for PSFCH transmission |

## Open issues summary

### Sub-topic 2-1 Simulation assumption

#### Issue 2-1-1: Simulation assumption and cases for PSFCH

* Proposals
  + Option 1: For SL-U PSFCH MPR and A-MPR, consider simulation scenarios in Table 2-22. (LGE)

Table 2.22: SL-U PSFCH MPR/A-MPR simulation scenarios

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sub-band RB sets | Scenario | Bitmap | PSFCH RB location index | SCS(kHz) |
| 1 (20MHz) | 1 | 1 | {0 10 20 30 40 50 60 70 80 90 100 104} | 15 |
| 2 | 1 | {0 5 10 15 20 25 30 35 40 45 49} | 30 |
| 2 (40MHz) | 3 | 11 | {0 10 20 30 40 50 60 70 80 90 100 104 111 121 131 141 151 161 171 181 191 201 211 215} | 15 |
| 4 | 10 | {0 10 20 30 40 50 60 70 80 90 100 104} | 15 |
| 3 (60MHz) | 5 | 111 | {0 5 10 15 20 25 30 35 40 45 49 56 61 66 71 76 81 86 91 96 101 105 112 117 122 127 132 137 142 147 152 157 161} | 30 |
| 6 | 110 | {0 5 10 15 20 25 30 35 40 45 49 56 61 66 71 76 81 86 91 96 101 105} | 30 |
| 7 | 100 | {0 5 10 15 20 25 30 35 40 45 49} | 30 |
| 8 | 010 | {56 61 66 71 76 81 86 91 96 101 105} | 30 |
| 9 | 101 | {0 5 10 15 20 25 30 35 40 45 49 112 117 122 127 132 137 142 147 152 157 161} | 30 |
| 4 (80MHz) | 10 | 1111 | { 0 5 10 15 20 25 30 35 40 45 49 56 61 66 71 76 81 86 91 96 101 105 111 116 121 126 131 136 141 146 151 156 160 167 172 177 182 187 192 197 202 207 212 216} | 30 |
| 11 | 1110 | { 0 5 10 15 20 25 30 35 40 45 49 56 61 66 71 76 81 86 91 96 101 105 111 116 121 126 131 136 141 146 151 156 160} | 30 |
| 12 | 1100 | { 0 5 10 15 20 25 30 35 40 45 49 56 61 66 71 76 81 86 91 96 101 105} | 30 |
| 13 | 1000 | { 0 5 10 15 20 25 30 35 40 45 49} | 30 |
| 14 | 0110 | { 56 61 66 71 76 81 86 91 96 101 105 111 116 121 126 131 136 141 146 151 156 160} | 30 |
| 15 | 0100 | { 56 61 66 71 76 81 86 91 96 101 105} | 30 |
| 16 | 1101 | { 0 5 10 15 20 25 30 35 40 45 49 56 61 66 71 76 81 86 91 96 101 105 167 172 177 182 187 192 197 202 207 212 216} | 30 |
| 17 | 1010 | { 0 5 10 15 20 25 30 35 40 45 49 111 116 121 126 131 136 141 146 151 156 160} | 30 |
| 18 | 1001 | { 0 5 10 15 20 25 30 35 40 45 49 167 172 177 182 187 192 197 202 207 212 216} | 30 |
| 5 (100MHz) | 19 | 11111 | { 0 5 10 15 20 25 30 35 40 45 49 56 61 66 71 76 81 86 91 96 101 105 112 117 122 127 132 137 142 147 152 157 161 167 172 177 182 187 192 197 202 207 212 216 223 228 233 238 243 248 253 258 263 268 272} | 30 |
| 20 | 11110 | { 0 5 10 15 20 25 30 35 40 45 49 56 61 66 71 76 81 86 91 96 101 105 112 117 122 127 132 137 142 147 152 157 161 167 172 177 182 187 192 197 202 207 212 216} | 30 |
| 21 | 11100 | { 0 5 10 15 20 25 30 35 40 45 49 56 61 66 71 76 81 86 91 96 101 105 112 117 122 127 132 137 142 147 152 157 161} | 30 |
| 22 | 11000 | { 0 5 10 15 20 25 30 35 40 45 49 56 61 66 71 76 81 86 91 96 101 105} | 30 |
| 23 | 10000 | { 0 5 10 15 20 25 30 35 40 45 49} | 30 |
| 24 | 01110 | { 56 61 66 71 76 81 86 91 96 101 105 112 117 122 127 132 137 142 147 152 157 161 167 172 177 182 187 192 197 202 207 212 216} | 30 |
| 25 | 01100 | { 56 61 66 71 76 81 86 91 96 101 105 112 117 122 127 132 137 142 147 152 157 161} | 30 |
| 26 | 01000 | { 56 61 66 71 76 81 86 91 96 101 105} | 30 |
| 27 | 00100 | { 112 117 122 127 132 137 142 147 152 157 161} | 30 |
| 28 | 11011 | { 0 5 10 15 20 25 30 35 40 45 49 56 61 66 71 76 81 86 91 96 101 105 167 172 177 182 187 192 197 202 207 212 216 223 228 233 238 243 248 253 258 263 268 272} | 30 |
| 29 | 11010 | { 0 5 10 15 20 25 30 35 40 45 49 56 61 66 71 76 81 86 91 96 101 105 167 172 177 182 187 192 197 202 207 212 216} | 30 |
| 30 | 11001 | { 0 5 10 15 20 25 30 35 40 45 49 56 61 66 71 76 81 86 91 96 101 105 223 228 233 238 243 248 253 258 263 268 272} | 30 |
| 31 | 10101 | { 0 5 10 15 20 25 30 35 40 45 49 112 117 122 127 132 137 142 147 152 157 161 223 228 233 238 243 248 253 258 263 268 272} | 30 |
| 32 | 10110 | { 0 5 10 15 20 25 30 35 40 45 49 112 117 122 127 132 137 142 147 152 157 161 167 172 177 182 187 192 197 202 207 212 216} | 30 |
| 33 | 10100 | { 0 5 10 15 20 25 30 35 40 45 49 112 117 122 127 132 137 142 147 152 157 161} | 30 |
| 34 | 10010 | { 0 5 10 15 20 25 30 35 40 45 49 167 172 177 182 187 192 197 202 207 212 216} | 30 |
| 35 | 10001 | { 0 5 10 15 20 25 30 35 40 45 49 223 228 233 238 243 248 253 258 263 268 272} | 30 |
| 36 | 01010 | { 56 61 66 71 76 81 86 91 96 101 105 167 172 177 182 187 192 197 202 207 212 216} | 30 |
| 37 | 11101 | { 0 5 10 15 20 25 30 35 40 45 49 56 61 66 71 76 81 86 91 96 101 105 112 117 122 127 132 137 142 147 152 157 161 223 228 233 238 243 248 253 258 263 268 272} | 30 |

* Recommended WF
  + The simulation scenarios can be captured in TR to the specific sub-clause of each company.

#### Issue 2-1-2: Simulation assumption for S-SSB

* Proposals
  + Option 1: For SL-U S-SSB MPR and A-MPR, consider simulation scenarios in Table 2-47. (LGE)

Table 2-47: SL-U S-SSB MPR/A-MPR simulation scenarios

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Sub-band RB sets | Scenario | Bitmap | S-SSB {11RBs}xN repeated RB location index | N  (Repeated#) | SCS(kHz) |
| 1 (20MHz) | 1 | 1 | {0 11 22 33 44 55 66 77 88} | 9 | 15 |
| 2 | 1 | {0 23 46 69 92} | 5 | 15 |
| 3 | 1 | {0 95} | 2 | 15 |
| 4 | 1 | {0 11 22 33} | 4 | 30 |
| 5 | 1 | {0 39} | 2 | 30 |
| 2 (40MHz) | 6 | 11 | {0 11 22 33 44 55 66 77 88 111 122 133 144 155 166 177 188 199} | 18 | 15 |
| 7 | 11 | {0 23 46 69 92 111 134 157 180 203} | 10 | 15 |
| 8 | 11 | {0 94 111 205} | 4 | 15 |
| 9 | 10 | {0 11 22 33 44 55 66 77 88} | 9 | 15 |
| 10 | 10 | {0 23 46 69 92 } | 5 | 15 |
| 11 | 10 | {0 94} | 2 | 15 |
| 3 (60MHz) | 12 | 111 | {0 11 22 33 56 67 78 89 112 123 134 145} | 12 | 30 |
| 13 | 111 | {0 38 56 94 112 150} | 6 | 30 |
| 14 | 110 | {0 11 22 33 56 67 78 89} | 8 | 30 |
| 15 | 110 | {0 38 56 94 } | 4 | 30 |
| 16 | 100 | {0 11 22 33} | 4 | 30 |
| 17 | 100 | {0 38} | 2 | 30 |
| 18 | 010 | {56 67 78 89 } | 4 | 30 |
| 19 | 010 | {56 94} | 2 | 30 |
| 20 | 101 | {0 11 22 33 112 123 134 145} | 8 | 30 |
| 21 | 101 | {0 38 112 150} | 4 | 30 |
| 4 (80MHz) | 22 | 1111 | {0 11 22 33 56 67 78 89 111 122 133 144 167 178 189 200} | 16 | 30 |
| 23 | 1111 | {0 38 56 94 111 149 167 205} | 8 | 30 |
| 24 | 1110 | {0 11 22 33 56 67 78 89 111 122 133 144} | 12 | 30 |
| 25 | 1110 | {0 38 56 94 111 149 } | 6 | 30 |
| 26 | 1100 | {0 11 22 33 56 67 78 89} | 8 | 30 |
| 27 | 1100 | {0 38 56 94} | 4 |  |
| 28 | 1000 | {0 11 22 33} | 4 | 30 |
| 29 | 1000 | {0 38} | 2 | 30 |
| 30 | 0110 | {56 67 78 89 111 122 133 144} | 8 | 30 |
| 31 | 0110 | {56 94 111 49} | 4 | 30 |
| 32 | 0100 | {56 67 78 89} | 4 | 30 |
| 33 | 0100 | {56 94} | 2 | 30 |
| 34 | 1101 | {0 11 22 33 56 67 78 89 167 178 189 200} | 12 | 30 |
| 35 | 1101 | {0 38 56 94 167 205} | 6 | 30 |
| 36 | 1010 | {0 11 22 33 111 122 133 144} | 8 | 30 |
| 37 | 1010 | {0 38 111 149} | 4 | 30 |
| 38 | 1001 | {0 11 22 33 167 178 189 200} | 8 | 30 |
| 39 | 1001 | {0 38 167 205} | 4 | 30 |
| 5 (100MHz) | 40 | 11111 | {0 11 22 33 56 67 78 89 112 123 134 145 167 178 189 200 223 234 245 256} | 20 | 30 |
| 41 | 11111 | {0 38 56 94 112 148 167 205 223 261} | 10 | 30 |
| 42 | 11110 | {0 11 22 33 56 67 78 89 112 123 134 145 167 178 189 200} | 16 | 30 |
| 43 | 11110 | {0 38 56 94 112 148 167 205} | 8 | 30 |
| 44 | 11100 | {0 11 22 33 56 67 78 89 112 123 134 145} | 12 | 30 |
| 45 | 11100 | {0 38 56 94 112 148} | 6 | 30 |
| 46 | 11000 | {0 11 22 33 56 67 78 89} | 8 | 30 |
| 47 | 11000 | {0 38 56 94} | 4 | 30 |
| 48 | 10000 | {0 11 22 33} | 4 | 30 |
| 49 | 10000 | {0 38} | 2 | 30 |
| 50 | 01110 | {56 67 78 89 112 123 134 145 167 178 189 200} | 12 | 30 |
| 51 | 01110 | {56 94 112 148 167 205} | 6 | 30 |
| 52 | 01100 | {56 67 78 89 112 123 134 145} | 8 | 30 |
| 53 | 01100 | {56 94 112 148} | 4 | 30 |
| 54 | 01000 | {56 67 78 89} | 4 | 30 |
| 55 | 01000 | {56 94} | 2 | 30 |
| 56 | 00100 | {112 123 134 145} | 4 | 30 |
| 57 | 00100 | {112 148} | 2 | 40 |
| 58 | 11011 | {0 11 22 33 56 67 78 89 167 178 189 200 223 234 245 256} | 16 | 30 |
| 59 | 11011 | {0 38 56 94 167 205 223 261} | 8 | 30 |
| 60 | 11010 | {0 11 22 33 56 67 78 89 167 178 189 200} | 12 | 30 |
| 61 | 11010 | {0 38 56 94 167 205} | 6 | 30 |
| 62 | 11001 | {0 11 22 33 56 67 78 89 223 234 245 256} | 12 | 30 |
| 63 | 11001 | {0 38 56 94 223 261} | 6 | 30 |
| 64 | 10101 | {0 11 22 33 112 123 134 145 223 234 245 256} | 12 | 30 |
| 65 | 10101 | {0 38 112 148 223 261} | 6 | 30 |
| 66 | 10110 | {0 11 22 33 112 123 134 145 167 178 189 200} | 12 | 30 |
| 67 | 10110 | {0 38 112 148 167 205} | 6 | 30 |
| 68 | 10100 | {0 11 22 33 112 123 134 145} | 8 | 30 |
| 69 | 10100 | {0 38 112 148} | 4 | 30 |
| 70 | 10010 | {0 11 22 33 167 178 189 200} | 8 | 30 |
| 71 | 10010 | {0 38 167 205} | 4 | 30 |
| 72 | 10001 | {0 11 22 33 223 234 245 256} | 8 | 30 |
| 73 | 10001 | {0 38 223 261} | 4 | 30 |
| 74 | 01010 | {56 67 78 89 167 178 189 200} | 8 | 30 |
| 75 | 01010 | {56 94 167 205} | 4 | 30 |
| 76 | 11101 | {0 11 22 33 56 67 78 89 112 123 134 145 223 234 245 256} | 16 | 30 |
| 77 | 11101 | {0 38 56 94 112 148 223 261} | 8 | 30 |

* Recommended WF
  + The simulation scenarios can be captured in TR to the specific sub-clause of each company.

### Sub-topic 2-2 MPR requirement

#### Issue 2-2-1: MPR requirement structure

* Proposals
  + Option 1: LGE
* Table: Outer/Inner sub-band configuration for SL-U wideband operation

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Wideband operation channel bandwidth (MHz) | Contiguous sub-band configuration | | Non-contiguous sub-band configuration | |
| Outer | Inner | Outer | Inner |
| 40 | 11, 10, 01 | N/A | N/A | N/A |
| 60 | 111, 110, 011, 100, 001 | 010 | 101 | N/A |
| 80 | 1111, 1110, 0111, 1100, 0011, 1000, 0001 | 0110, 0100, 0010 | 1101, 1011, 1010, 0101, 1001 | N/A |
| 100 | 11111, 11110, 01111, 11100, 00111, 11000, 00011, 10000, 00001 | 01110, 01100, 00110, 01000, 00010, 00100 | 11011, 11010, 01011, 11001, 10011, 10101, 10110, 01101, 10100, 00101, 10010, 01001, 11101, 10111, 10001 | 01010 |
| NOTE 1: The sub-band configuration is represented as a bitmap where ‘1’ indicates that a sub-band is transmitted and ‘0’ indicates a sub-band is not transmitted. The bitmap is ordered with MSB mapped to the lowest frequency sub-band and LSB mapped to highest frequency sub-band within the wideband channel. | | | | |

* + Option 2: OPPO
  + Proposal 1: Differentiate the MPR for full RB allocation and interlaced RB allocation as NR-U has done.
  + Proposal 2: For the specific cases 18, 21, 23, 27, 30 and 31, introduce the exception bitmap as NR-U has done.
  + Proposal 3: Not to apply the differentiation of inner and outer bitmap.
  + The exception bitmaps are proposed as:
* Table 7: Exception bitmap mapping

|  |  |
| --- | --- |
| Wideband operation channel bandwidth (MHz) | Sub-band configuration exceptions |
| 40 | 10, 01 |
| 60 | 110, 011 |
| 80 | 1000, 1100, 0100, 0010, 0011, 0001 |
| 100 | 10000, 11000, 11100, 01000, 01100, 00110, 00010, 00111, 00011, 00001 |

* Recommended WF
  + Firstly, the non-contiguous sub-band for PSSCH/PSCCH is not needed.
  + Secondly, currently only 3 companies have submitted simulation results for wide-band interlaced. Below table shows the results for bitmaps.
  + Further discuss the inner/outer differentiation based on the results of these 3 companies.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | LGE full | LGE Interlaced | OPPO Full | OPPO Interlaced | Qualcomm Full | Qualcomm Interlaced |
| 010 | 2.13 | 0.00 | 2.8 | 2.6 | NA | NA |
| 2.13 | 0.36 | 3.6 | 3.0 | NA | NA |
| 3.16 | 2.45 | 4.7 | 4.2 | NA | NA |
| 5.88 | 5.46 | 7.3 | 6.8 | NA | NA |
| 0110 | 2.13 | 0.00 | 2.8 | 2.7 | 1.3 | 1.6 |
| 2.13 | 0.63 | 3.5 | 3.0 | 1.3 | 1.6 |
| 3.16 | 2.46 | 4.8 | 4.1 | 3.5 | 4.0 |
| 5.88 | 5.06 | 7.6 | 6.7 | 5.9 | 6.5 |
| 0100/0010 | 2.46 | 0.00 | 2.8 | 2.6 | 1.3 | 1.4 |
| 2.46 | 0.10 | 3.5 | 2.9 | 1.3 | 1.4 |
| 3.15 | 2.12 | 5.1 | 4.1 | 3.6 | 3.8 |
| 5.46 | 5.05 | 7.4 | 6.6 | 6.0 | 6.1 |
| 01110 | 2.46 | 0.13 | 2.8 | 2.8 | 1.5 | 1.6 |
| 2.47 | 0.64 | 3.7 | 3.0 | 1.5 | 1.6 |
| 3.16 | 2.47 | 5.0 | 4.1 | 3.8 | 4.0 |
| 5.47 | 5.06 | 8.5 | 6.7 | 6.5 | 6.6 |
| 01100/00110 | 2.46 | 0.00 | 2.8 | 2.7 | 1.4 | 1.6 |
| 2.46 | 0.63 | 3.6 | 2.8 | 1.4 | 1.6 |
| 3.16 | 2.46 | 5.0 | 4.0 | 3.5 | 4.0 |
| 5.47 | 5.06 | 8.0 | 6.6 | 5.9 | 6.5 |
| 01000/00010 | 2.13 | 0.00 | 2.8 | 2.6 | NA | 1.4 |
| 2.13 | 0.35 | 3.6 | 3.0 | NA | 1.4 |
| 3.16 | 2.13 | 4.9 | 4.1 | NA | 3.8 |
| 5.47 | 5.06 | 8.0 | 6.7 | NA | 6.1 |
| 00100 | 2.13 | 0.00 | 2.8 | 2.6 | NA | NA |
| 2.13 | 0.10 | 3.5 | 2.9 | NA | NA |
| 3.15 | 2.12 | 5.1 | 4.1 | NA | NA |
| 5.46 | 5.06 | 7.5 | 6.6 | NA | NA |

#### Issue 2-2-2: MPR simulatrion results for PSSCH/PSCCH:

* Proposals:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Modulation | Huawei | Xiaomi | LGE | OPPO | Qualcomm | Average | NR-U |
| CP-OFDM  Full | QPSK | 4.1 | 3.1 | 2.8 | 2.8 | 3.6 | 3.3 | 3.5 |
| 16 QAM | 4.2 | 3.1 | 2.8 | 3.7 | 3.6 | 3.5 | 4.0 |
| 64 QAM | 6.1 | 4.1 | 3.2 | 5.2 | 3.8 | 4.6 | 5.5 |
| 256 QAM | 8.0 | 5.9 | 5.9 | 8.5 | 6.2 | 7.0 | 7.0 |
| CP-OFDM  Partial | QPSK | 4.1 | 3.1 | 2.8 | 2.7 | 3.6 | 3.3 | 3.5 |
| 16 QAM | 4.2 | 3.2 | 2.8 | 3.0 | 3.6 | 3.4 | 4.0 |
| 64 QAM | 6.1 | 4.1 | 2.8 | 4.2 | 4.1 | 4.4 | 5.5 |
| 256 QAM | 7.7 | 5.9 | 5.5 | 6.8 | 6.6 | 6.6 | 7.0 |

* Moderator note: It has been agreed to use the average method hence the numbers for all the companies are captured and the corresponding average is applied. The last column we list the NR-U requirement for reference.
* Recommended WF
  + The agreed MPR values in RAN4#108bis are kept.
  + **Table: SL-U MPR requirement**

|  |  |  |  |
| --- | --- | --- | --- |
| **Pre-coding** | **Modulation** | **RB Allocation** | |
|  |  | **Full (dB)** | **Partial (dB)** |

|  |  |  |  |
| --- | --- | --- | --- |
| **CP-OFDM** | **QPSK** | ≤ 3.5 | ≤ 3.5 |
| **16 QAM** | ≤ 4.0 | ≤ 4.0 |
| **64 QAM** | ≤ 5.5 | ≤ 5.5 |
| **256 QAM** | TBD | TBD |
| NOTE 1: The average method will be used to derive the MPR values  NOTE 2: The wide band operation MPR will be further discussed next meeting. | | | |

* + The yellow column is the results with no margin added. Hence it is proposed to at least add 0.5dB margin for the average values and hence to propose the numbers as below for outer sub-band configuration:

|  |  |  |  |
| --- | --- | --- | --- |
|  | Modulation | Average | Proposed MPR |
| CP-OFDM  Full | QPSK | 3.3 | 3.5 |
| 16 QAM | 3.5 | 4.0 |
| 64 QAM | 4.6 | 5.5 |
| 256 QAM | 7.0 | 7.5 |
| CP-OFDM  Partial | QPSK | 3.3 | 3.5 |
| 16 QAM | 3.4 | 4.0 |
| 64 QAM | 4.4 | 5.5 |
| 256 QAM | 6.6 | 7.5 |

* + Further discussion the inner/outer differentiation
    - MPR for Outer/Inner sub-band configuration

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Proposed MPR | | | |
|  |  | Outer RB set configuration5 | | Inner RB set configuration5 | |
|  |  | Full2 (dB) | Partial3 (dB) | Full2 (dB) | Partial3 (dB) |
| CP-OFDM | QPSK | ≤ 3.5 | ≤ 3.5 | ≤ 3.5 | ≤ 1.5 |
|  | 16 QAM | ≤ 4.0 | ≤ 4.0 | ≤ 4.0 | ≤ 3.0 |
|  | 64 QAM | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 |
|  | 256 QAM | ≤ 7.5 | ≤ 7.5 | ≤ 7.5 | ≤ 7.5 |

#### Issue 2-2-3: MPR simulatrion results for PSFCH:

* Proposals
  + Option 1: For SL-U PSFCH MPR, consider Table 2-25 or Table 2-26 for SL-U UE power class 5. (LGE)

Table 2-25 PSFCH MPR for SL-U UE power class 5

|  |  |  |
| --- | --- | --- |
|  | RB Allocation | |
| Outer RB set configuration2 | Inner RB set configuration2 |
| Contiguous sub-band RB sets | ≤ 4.5 | ≤ 3.5 |
| Non-contiguous sub-band RB sets | ≤ 5.0 | ≤ 4.5 |
| NOTE 1: The MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel.  NOTE 2: Outer sub-band configuration and inner sub-band configuration in Table 2-5 apply. | | |

Table 2-26 PSFCH MPR for SL-U UE power class 5

|  |  |  |
| --- | --- | --- |
|  | RB Allocation | |
| Outer RB set configuration2 | Inner RB set configuration2 |
| Contiguous/Non-contiguous sub-band RB sets | ≤ 5.0 | ≤ 4.5 |
| NOTE 1: The MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel.  NOTE 2: Outer sub-band configuration and inner sub-band configuration in Table 2-5 apply. | | |

* + Option 2: MPR for PSFCH on shared spectrum is 10dB based on common interlaced RB allocation. (Huawei).
* Recommended WF:
  + We see large gap on the proposed numbers, need to align with companies result.

#### Issue 2-2-4: MPR simulatrion results for S-SSBs:

* Proposals
  + Option 1: For SL-U S-SSB MPR, consider Table 2-50 or Table 2-51 for SL-U UE power class 5. (LGE)
* Table 2-50 : S-SSB MPR for SL-U UE power class 5

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | RB Allocation | | | |
| Outer RB set configuration | | Inner RB set configuration | |
| # of S-SSB repetition/RBset | > 2 | 2 | > 2 | 2 |
| Contiguous sub-band RB sets | ≤ 13.5 | ≤ 9.5 | ≤ 8.5 | ≤ 6.5 |
| Non-contiguous sub-band RB sets | ≤ 13.5 | ≤ 9.5 | ≤ 9.5 | ≤ 7.0 |
| NOTE 1: Outer sub-band configuration and inner sub-band configuration in Table 2-5 apply. | | | | |

* Table 2-51 : S-SSB MPR for SL-U UE power class 5

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | RB Allocation | | | |
| Outer RB set configuration | | Inner RB set configuration | |
| # of S-SSB repetition/RBset | > 2 | 2 | > 2 | 2 |
| Contiguous/Non-contiguous sub-band RB sets | ≤ 13.5 | ≤ 9.5 | ≤ 9.5 | ≤ 7.0 |
| NOTE 1: Outer sub-band configuration and inner sub-band configuration in Table 2-5 apply. | | | | |

* + Option 2: MPR for SSB on shared spectrum is no more than 11dB.
* Recommended WF:
  + Need to align the requirement format first and then further discuss the value.
  + Seems average can apply between two companies.

### Sub-topic 2-3 A-MPR

#### Issue 2-3-1: A-MPR simulatrion results for PSSCH/PSCCH:

##### Issue 2-3-1-1: NS\_31 A-MPR simulatrion results for PSSCH/PSCCH:

* Proposals

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Modulation | LGE outer | LGE  inner | OPPO | Qualcomm  20MHz | Qualcomm  >20MHz |
| CP-OFDM  Full | QPSK | ≤ 5.5 | ≤ 4.5 | ≤ 5.5 | ≤ 5.2 | ≤ 8.3 |
| 16 QAM | ≤ 5.5 | ≤ 4.5 | ≤ 5.5 | ≤ 5.6 | ≤ 8.0 |
| 64 QAM | ≤ 5.5 | ≤ 4.5 | ≤ 5.5 | ≤ 5.5 | ≤ 8.0 |
| 256 QAM | ≤ 7.0 | ≤ 7.0 | ≤ 9.0 | ≤ 5.6 | ≤ 8.0 |
| CP-OFDM  Partial | QPSK | ≤ 6.5 | ≤ 6.5 | ≤ 6.5 | ≤ 5.7 | ≤ 8.6 |
| 16 QAM | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 5.8 | ≤ 9.0 |
| 64 QAM | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 6.0 | ≤ 9.3 |
| 256 QAM | ≤ 7.0 | ≤ 7.0 | ≤ 9.0 | ≤ 5.9 | ≤ 9.5 |

* Moderator note: For Qualcomm column, the largest number of simulation result is selected.
* Recommended WF:
  + For NS\_31, it is proposed to average the numbers of LGE outer, OPPO and Qualcomm 20MHz these three columns.
  + Proposed A-MPR for NS\_31 for PSSCH/PSCCH for outer sub-band configuration:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Pre-coding** | **Modulation** | **RB Allocation (Note 2)** | **RB Allocation (Note 3)** | |
|  |  | **Full/Partial** | **Full (dB)** | **Partial (dB)** |
| CP-OFDM | QPSK | See Table 6.2F.2-1 | ≤ 5.5 | ≤ 6.5 |
|  | 16 QAM | ≤ 5.5 | ≤ 7.0 |
|  | 64 QAM | ≤ 5.5 | ≤ 7.0 |
|  | 256 QAM | ≤ 7.5 | ≤ 7.5 |

* + Further discussion the inner/outer differentiation
    - A-MPR for Outer/Inner sub-band configuration

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | RB Allocation (Note 4) | | | | RB Allocation (Note 3) |
|  |  | Outer RB set configuration5 | | Inner RB set configuration5 | |
|  |  | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full/Partial |
| CP-OFDM | QPSK | ≤ 5.5 | ≤ 6.5 | ≤ 4.5 | ≤ 6.5 | Follow SL-U MPR table |
|  | 16 QAM | ≤ 5.5 | ≤ 7.0 | ≤ 4.5 | ≤ 7.0 |
|  | 64 QAM | ≤ 5.5 | ≤ 7.0 | ≤ 4.5 | ≤ 7.0 |
|  | 256 QAM | ≤ 7.5 | ≤ 7.5 | ≤ 7.5 | ≤ 7.5 |

##### Issue 2-3-1-2: NS\_53 A-MPR simulatrion results for PSSCH/PSCCH:

* Proposals:
  + Option 1: LGE

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | | | |
| 20MHz | | 40MHz | | 60MHz | | 80MHz | | 100MHz | |
| Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| CP-OFDM | QPSK | ≤ 9.0 | ≤ 12.0 | ≤ 6.5 | ≤ 8.5 | ≤ 4.5 | ≤ 6.5 | ≤ 4.0 | ≤ 5.5 | ≤ 4.0 | ≤ 4.5 |
| 16 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 6.5 | ≤ 8.5 | ≤ 4.5 | ≤ 6.5 | ≤ 4.0 | ≤ 5.5 | ≤ 4.0 | ≤ 4.5 |
| *64 QAM* | ≤ 9.0 | ≤ 12.0 | ≤ 6.5 | ≤ 8.5 | ≤ 5.5 | ≤ 6.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 |
| 256 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 7.0 | ≤ 8.5 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously allocated in the channel.  NOTE 2: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated but when all sub-bands within the channel are transmitted. When not all sub-bands within the channel are transmitted, the A-MPR associated with the channel bandwidth according to the bandwidth of the contiguously transmitted sub-bands and according to the allocation type applies. | | | | | | | | | | | |

* + Option 2: OPPO

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | | | |
|  |  | 20 MHz | | 40 MHz | | 60 MHz | | 80 MHz | | 100MHz | |
|  |  | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| CP-OFDM | QPSK | ≤ 9.0 | ≤ 12.0 | ≤ 6.5 | ≤ 8.5 | ≤ 4.5 | ≤ 6.5 | ≤ 4.0 | ≤ 5.5 | ≤ [3.5] | ≤ [4.5] |
|  | 16 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 6.5 | ≤ 8.5 | ≤ 4.5 | ≤ 6.5 | ≤ 4.0 | ≤ 5.5 | ≤ [4.0] | ≤ [4.5] |
|  | 64 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 6.5 | ≤ 8.5 | ≤ 5.5 | ≤ 6.5 | ≤ 5.5 | ≤ 5.5 | ≤ [5.5] | ≤ [5.5] |
|  | 256 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 9.0 | ≤ 8.5 | ≤ 9.0 | ≤ 7.0 | ≤ 9.0 | ≤ 7.0 | ≤ [9.0] | ≤ [7.0] |
| NOTE 1: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated but when all sub-bands within the channel are transmitted. When not all sub-bands within the channel are transmitted, the A-MPR associated with the channel bandwidth according to the bandwidth of the contiguously transmitted sub-bands and according to the allocation type applies.  NOTE 2: Applicable to Pi/2-BPSK modulation when IE powerBoostPi2BPSK is set to 0. | | | | | | | | | | | |

* + Option 3: Qualcomm

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | 20M | 20M | 40M | 40M | 60M | 60M | 80M | 80M |
|  | Full | Partial | Full | Partial | Full | Partial | Full | Partial |
| QPSK | ≤7.5 | ≤7.6 | ≤7.0 | ≤7.3 | ≤6.7 | ≤7.4 | ≤6.4 | ≤7.4 |
| 16 QAM | ≤7.5 | ≤7.8 | ≤6.9 | ≤7.4 | ≤6.8 | ≤7.6 | ≤6.4 | ≤7.6 |
| 64 QAM | ≤7.5 | ≤8.0 | ≤7.0 | ≤7.6 | ≤6.8 | ≤7.8 | ≤6.5 | ≤7.8 |
| 256 QAM | ≤7.5 | ≤8.0 | ≤7.0 | ≤7.5 | ≤6.8 | ≤7.7 | ≤6.6 | ≤7.7 |

* Recommended WF:
  + For NS\_53, it is proposed to average the numbers of LGE and OPPO and the final result is shown in below table:
  + NS\_53 A-MPR

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Pre-coding** | **Modulation** | **Channel bandwidth (Sub-band allocation) / RB Allocation** | | | | | | | | | |
| **20MHz** | | **40MHz** | | **60MHz** | | **80MHz** | | **100MHz** | |
| **Full (dB)** | **Partial (dB)** | **Full (dB)** | **Partial (dB)** | **Full (dB)** | **Partial (dB)** | **Full (dB)** | **Partial (dB)** | **Full (dB)** | **Partial (dB)** |
| CP-OFDM | QPSK | ≤ 9.0 | ≤ 12.0 | ≤ 6.5 | ≤ 8.5 | ≤ 4.5 | ≤ 6.5 | ≤ 4.0 | ≤ 5.5 | ≤ 4.0 | ≤ 4.5 |
| 16 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 6.5 | ≤ 8.5 | ≤ 4.5 | ≤ 6.5 | ≤ 4.0 | ≤ 5.5 | ≤ 4.0 | ≤ 4.5 |
| *64 QAM* | ≤ 9.0 | ≤ 12.0 | ≤ 6.5 | ≤ 8.5 | ≤ 5.5 | ≤ 6.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 |
| 256 QAM | ≤ 9.0 | ≤ 12.0 | ≤ 8.0 | ≤ 8.5 | ≤ 8.0 | ≤ 7.0 | ≤ 8.0 | ≤ 7.0 | ≤ 8.0 | ≤ 7.0 |

##### Issue 2-3-1-3: NS\_58 A-MPR simulatrion results for PSSCH/PSCCH:

* Proposals

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| c | Modulation | LGE outer | LGE  inner | OPPO | Qualcomm |
| CP-OFDM  Full | QPSK | ≤ 3.5 | ≤ 3.5 | ≤ 3.5 | ≤5.9 |
| 16 QAM | ≤ 4.0 | ≤ 4.0 | ≤ 4.0 | ≤5.8 |
| 64 QAM | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤5.8 |
| 256 QAM | ≤ 7.0 | ≤ 7.0 | ≤ 9.0 | ≤5.8 |
| CP-OFDM  Partial | QPSK | ≤ 4.5 | ≤ 2.5 | ≤ 4.5 | ≤6.0 |
| 16 QAM | ≤ 4.5 | ≤ 3.0 | ≤ 4.5 | ≤6.2 |
| 64 QAM | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤6.2 |
| 256 QAM | ≤ 7.0 | ≤ 7.0 | ≤ 9.0 | ≤6.2 |

* Moderator note: For Qualcomm column, the largest number of simulation result is selected.
* Recommended WF:
  + it is proposed to use LGE and OPPO result average for NS\_58. The only difference is the 256QAM numbers in LGE outer and Oppo.
  + A-MPR for NS\_58 for PSSCH/PSCCH for outer sub-band configuration

|  |  |  |
| --- | --- | --- |
|  | Modulation |  |
| CP-OFDM  Full | QPSK | ≤ 3.5 |
| 16 QAM | ≤ 4.0 |
| 64 QAM | ≤ 5.5 |
| 256 QAM | ≤ 8.0 |
| CP-OFDM  Partial | QPSK | ≤ 4.5 |
| 16 QAM | ≤ 4.5 |
| 64 QAM | ≤ 5.5 |
| 256 QAM | ≤ 8.0 |

* + Further discussion the inner/outer differentiation
    - A-MPR for Outer/Inner sub-band configuration

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | RB Allocation (Note 4) | | | |
|  |  | Outer RB set configuration5 | | Inner RB set configuration5 | |
|  |  | Full (dB)2 | Partial (dB)3 | Full (dB) 2 | Partial (dB) 3 |
| CP-OFDM | QPSK | ≤ 3.5 | ≤ 4.5 | ≤ 3.5 | ≤ 2.5 |
|  | 16 QAM | ≤ 4.0 | ≤ 4.5 | ≤ 4.0 | ≤ 3.0 |
|  | 64 QAM | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 |
|  | 256 QAM | ≤ 8.0 | ≤ 8.0 | ≤ 8.0 | ≤ 8.0 |

##### Issue 2-3-1-4: NS\_60 A-MPR simulatrion results for PSSCH/PSCCH:

* Proposals:
  + Option 1: LGE

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | | | |
| 20MHz | | 40MHz | | 60MHz | | 80MHz | | 100MHz | |
| Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| CP-OFDM | QPSK | ≤ 6.0 | ≤ 8.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.0 | ≤ 5.5 | ≤ 4.5 | ≤ 5.5 | ≤ 4.5 | ≤ 5.5 |
| 16 QAM | ≤ 6.0 | ≤ 8.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.0 | ≤ 5.5 | ≤ 4.5 | ≤ 5.5 | ≤ 4.5 | ≤ 5.5 |
| *64 QAM* | ≤ 6.0 | ≤ 8.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 |
| 256 QAM | ≤ 7~~.~~0 | ≤ 8.5 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously allocated in the channel.  NOTE 2: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated but when all sub-bands within the channel are transmitted. When not all sub-bands within the channel are transmitted, the A-MPR associated with the channel bandwidth according to the bandwidth of the contiguously transmitted sub-bands and according to the allocation type applies | | | | | | | | | | | |

* + Option 2: OPPO

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | |
| 20 MHz | | 40 MHz | | 60 MHz | | 80 MHz | |
| Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| CP-OFDM | QPSK | ≤ 6.0 | ≤ 8.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.0 | ≤ 5.5 | ≤ 4.5 | ≤ 5.5 |
| 16 QAM | ≤ 6.0 | ≤ 8.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.0 | ≤ 5.5 | ≤ 4.5 | ≤ 5.5 |
| 64 QAM | ≤ 6.0 | ≤ 8.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 |
| 256 QAM | ≤ 9.0 | ≤ 8.5 | ≤9.0 | ≤ 7.0 | ≤ 9.0 | ≤ 7.0 | ≤ 9.0 | ≤ 7.0 |
| NOTE 1: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated but when all sub-bands within the channel are transmitted. When not all sub-bands within the channel are transmitted, the A-MPR associated with the channel bandwidth according to the bandwidth of the contiguously transmitted sub-bands and according to the allocation type applies  NOTE 2: Applicable to Pi/2-BPSK modulation when IE powerBoostPi2BPSK is set to 0.  NOTE 3: For larger channels than 80MHz the A-MPR is zero and MPR as specified in Table 6.2F.2-1 applies. | | | | | | | | | |

* Recommended WF:
  + LGE and OPPO numbers are only different from 256QAM, it is proposed to average the value.
  + 100MHz is not proposed in NR-U however, further discussion is needed for SL-U based on simulation result on MPR
  + A-MPR for NS\_60 for PSSCH/PSCCH

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | |
| 20 MHz | | 40 MHz | | 60 MHz | | 80 MHz | |
| Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| CP-OFDM | QPSK | ≤ 6.0 | ≤ 8.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.0 | ≤ 5.5 | ≤ 4.5 | ≤ 5.5 |
| 16 QAM | ≤ 6.0 | ≤ 8.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.0 | ≤ 5.5 | ≤ 4.5 | ≤ 5.5 |
| 64 QAM | ≤ 6.0 | ≤ 8.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 |
| 256 QAM | ≤ 8.0 | ≤ 8.5 | ≤8.0 | ≤ 7.0 | ≤ 8.0 | ≤ 7.0 | ≤ 8.0 | ≤ 7.0 |

Or

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | | | |
| 20 MHz | | 40 MHz | | 60 MHz | | 80 MHz | | 100 MHz | |
| Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| CP-OFDM | QPSK | ≤ 6.0 | ≤ 8.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.0 | ≤ 5.5 | ≤ 4.5 | ≤ 5.5 | ≤ 4.5 | ≤ 5.5 |
| 16 QAM | ≤ 6.0 | ≤ 8.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.0 | ≤ 5.5 | ≤ 4.5 | ≤ 5.5 | ≤ 4.5 | ≤ 5.5 |
| 64 QAM | ≤ 6.0 | ≤ 8.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 | ≤ 5.5 |
| 256 QAM | ≤ 8.0 | ≤ 8.5 | ≤8.0 | ≤ 7.0 | ≤ 8.0 | ≤ 7.0 | ≤ 8.0 | ≤ 7.0 | ≤ 8.0 | ≤ 7.0 |

##### Issue 2-3-1-5: NS\_61 A-MPR simulatrion results for PSSCH/PSCCH:

* Proposals:
  + Option 1: LGE

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | | | |
| 20MHz | | 40MHz | | 60MHz | | 80MHz | | 100MHz | |
| Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| CP-OFDM | QPSK | ≤ 7.5 | ≤ 10.0 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 16 QAM | ≤ 7.5 | ≤ 10.5 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| *64 QAM* | ≤ 7.5 | ≤ 10.5 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 256 QAM | ≤ 7.5 | ≤ 10.5 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 | ≤ 7.0 |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously allocated in the channel.  NOTE 2: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated but when all sub-bands within the channel are transmitted. When not all sub-bands within the channel are transmitted, the A-MPR associated with the channel bandwidth according to the bandwidth of the contiguously transmitted sub-bands and according to the allocation type applies | | | | | | | | | | | |

* + Option 2: OPPO

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | |
| 20 MHz | | 40 MHz | | 60 MHz | | 80 MHz | |
| Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| CP-OFDM | QPSK | ≤ 7.5 | ≤ 10.0 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 16 QAM | ≤ 7.5 | ≤ 10.5 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 64 QAM | ≤ 7.5 | ≤ 10.5 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 256 QAM | ≤9.0 | ≤ 10.5 | ≤ 9.0 | ≤ 9.0 | ≤ 9.0 | ≤ 7.0 | ≤ 9.0 | ≤ 7.0 |
| NOTE 1: Full allocation A-MPR applies when all RB’s in a 20 MHz channel or all RB’s in all sub-bands for wideband operation are fully allocated and all sub-bands are transmitted. Partial allocation A-MPR applies when one or more RB’s in one or more sub-bands are not allocated but when all sub-bands within the channel are transmitted. When not all sub-bands within the channel are transmitted, the A-MPR associated with the channel bandwidth according to the bandwidth of the contiguously transmitted sub-bands and according to the allocation type applies.  NOTE 2: Applicable to Pi/2-BPSK modulation when IE powerBoostPi2BPSK is set to 0. | | | | | | | | | |

* Recommended WF:
  + LGE and OPPO numbers are only different from 256QAM, it is proposed to average the value.
  + 100MHz is not proposed in NR-U, however, further discussion is needed for SL-U based on simulation result on MPR
  + A-MPR for NS\_61 for PSSCH/PSCCH

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | |
| 20 MHz | | 40 MHz | | 60 MHz | | 80 MHz | |
| Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| CP-OFDM | QPSK | ≤ 7.5 | ≤ 10.0 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 16 QAM | ≤ 7.5 | ≤ 10.5 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 64 QAM | ≤ 7.5 | ≤ 10.5 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 256 QAM | ≤ 8 | ≤ 10.5 | ≤ 8 | ≤ 7.0 | ≤ 8 | ≤ 7.0 | ≤ 8 | ≤ 7.0 |

Or

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pre-coding | Modulation | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | | | |
| 20 MHz | | 40 MHz | | 60 MHz | | 80 MHz | | 100 MHz | |
| Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) | Full (dB) | Partial (dB) |
| CP-OFDM | QPSK | ≤ 7.5 | ≤ 10.0 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 16 QAM | ≤ 7.5 | ≤ 10.5 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 64 QAM | ≤ 7.5 | ≤ 10.5 | ≤ 6.5 | ≤ 6.5 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 | ≤ 6.0 |
| 256 QAM | ≤ 8 | ≤ 10.5 | ≤ 8 | ≤ 7.0 | ≤ 8 | ≤ 7.0 | ≤ 8 | ≤ 7.0 | ≤ 8.0 | ≤ 7.0 |

#### Issue 2-3-2: A-MPR simulatrion results for PSFCH:

##### Issue 2-3-2-1: NS\_31 A-MPR simulatrion results for PSFCH:

* Proposals
  + Option 1: For SL-U NS\_31 PSFCH A-MPR, consider Table 2-29 or Table 2-30 for SL-U UE power class 5.(LGE)

Table 2-29 NS\_31 PSFCH A-MPR for SL-U UE power class 5

|  |  |  |
| --- | --- | --- |
|  | RB Allocation | |
| Outer RB set configuration2 | Inner RB set configuration2 |
| Contiguous sub-band RB sets | ≤ 7.5 | ≤ 7.5 |
| Non-contiguous sub-band RB sets | ≤ 5.5 | ≤ 5.0 |
| NOTE 1: The MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel.  NOTE 2: Outer sub-band configuration and inner sub-band configuration in Table 2-5 apply.  NOTE 3: Applicable for 20 MHz channels centered at the nearest NR-ARFCN corresponding to 5180, 5200, 5220, 5280, 5300, 5320, 5500, 5520, 5540, 5560, 5580, 5600, 5620, 5640, 5660, 5680, 5745, 5765, 5785, and 5805 MHz.  NOTE 4: Applicable for all valid channels and bandwidths other than those enumerated in NOTE 3. | | |

Table 2-30 NS\_31 PSFCH A-MPR for SL-U UE power class 5

|  |  |  |
| --- | --- | --- |
|  | RB Allocation | |
| Outer RB set configuration2 | Inner RB set configuration2 |
| Contiguous/Non-contiguous sub-band RB sets | ≤ 7.5 | ≤ 7.5 |
| NOTE 1: The MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel.  NOTE 2: Outer sub-band configuration and inner sub-band configuration in Table 2-5 apply.  NOTE 3: Applicable for 20 MHz channels centered at the nearest NR-ARFCN corresponding to 5180, 5200, 5220, 5280, 5300, 5320, 5500, 5520, 5540, 5560, 5580, 5600, 5620, 5640, 5660, 5680, 5745, 5765, 5785, and 5805 MHz.  NOTE 4: Applicable for all valid channels and bandwidths other than those enumerated in NOTE 3. | | |

* Recommended WF:
  + Use table 2-30 for PSFCH A-MPR NS\_31.

##### Issue 2-3-2-2: NS\_53 A-MPR simulatrion results for PSFCH:

* Proposals
  + Option 1: For SL-U NS\_53 PSFCH A-MPR, consider Table 2-33 or Table 2-34 for SL-U UE power class 5
* Table 2-33 NS\_53 PSFCH A-MPR for SL-U UE power class 5

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RB set configuration | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | |
| 20MHz | 40MHz | 60MHz | 80MHz | 100MHz |
| Contiguous | ≤12.5 | ≤9.5 | ≤8.0 | ≤6.5 | ≤5.5 |
| Non-contiguous | N/A | ≤9.5 | ≤8.0 | ≤6.5 | N/A |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel. | | | | | |

* Table 2-34 NS\_53 PSFCH A-MPR for SL-U UE power class 5

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RB set configuration | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | |
| 20MHz | 40MHz | 60MHz | 80MHz | 100MHz |
| Contiguous/Non-contiguous | ≤12.5 | ≤9.5 | ≤8.0 | ≤6.5 | ≤5.5 |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel. | | | | | |

* Recommended WF:
  + Use table 2-34 for PSFCH A-MPR NS\_53.

##### Issue 2-3-2-3: NS\_58 A-MPR simulatrion results for PSFCH:

* Proposals
  + Option 1: For SL-U NS\_58 PSFCH A-MPR, consider Table 2-37 or Table 2-38 for SL-U UE power class 5.
* Table 2-37 NS\_58 PSFCH A-MPR for SL-U UE power class 5

|  |  |  |
| --- | --- | --- |
|  | RB Allocation | |
| Outer RB set configuration2 | Inner RB set configuration2 |
| Contiguous sub-band RB sets | ≤ 4.5 | ≤ 2.5 |
| Non-contiguous sub-band RB sets | ≤ 4.5 | ≤ 3.0 |
| NOTE 1: The MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel.  NOTE 2: Outer sub-band configuration and inner sub-band configuration in Table 2-5 apply.  NOTE 3: The A-MPR applies instead of MPR for 20 MHz channel centered at the nearest NR-ARFCN corresponding to 5955 MHz, 40 MHz channel at the nearest NR-ARFCN corresponding to 5965 MHz, 60 MHz channel at the nearest NR-ARFCN corresponding to 5975 MHz, and 80 MHz channel at the nearest NR-ARFCN corresponding to 5985 MHz. For all other channels, A-MPR is zero and MPR applies. | | |

* Table 2-38 NS\_58 PSFCH A-MPR for SL-U UE power class 5

|  |  |  |
| --- | --- | --- |
|  | RB Allocation | |
| Outer RB set configuration2 | Inner RB set configuration2 |
| Contiguous/Non-contiguous sub-band RB sets | ≤ 4.5 | ≤ 3.0 |
| NOTE 1: The MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel.  NOTE 2: Outer sub-band configuration and inner sub-band configuration in Table 2-5 apply.  NOTE 3: The A-MPR applies instead of MPR for 20 MHz channel centered at the nearest NR-ARFCN corresponding to 5955 MHz, 40 MHz channel at the nearest NR-ARFCN corresponding to 5965 MHz, 60 MHz channel at the nearest NR-ARFCN corresponding to 5975 MHz, and 80 MHz channel at the nearest NR-ARFCN corresponding to 5985 MHz. For all other channels, A-MPR is zero and MPR applies. | | |

* Recommended WF:
  + Use table 2-38 for PSFCH A-MPR NS\_58.

##### Issue 2-3-2-4: NS\_60 A-MPR simulatrion results for PSFCH:

* Proposals
  + Option 1: For SL-U NS\_60 PSFCH A-MPR, consider Table 2-41 or Table 2-42 for SL-U UE power class 5 (LGE)
* Table 2-41 NS\_60 PSFCH A-MPR for SL-U UE power class 5

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RB set configuration | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | |
| 20MHz | 40MHz | 60MHz | 80MHz | 100MHz |
| Contiguous | ≤9.5 | ≤6.5 | ≤6.0 | ≤5.5 | ≤5.5 |
| Non-contiguous | N/A | ≤6.5 | ≤6.0 | ≤5.0 | N/A |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel. | | | | | |

* Table 2-42 NS\_60 PSFCH A-MPR for SL-U UE power class 5

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RB set configuration | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | |
| 20MHz | 40MHz | 60MHz | 80MHz | 100MHz |
| Contiguous/Non-contiguous | ≤9.5 | ≤6.5 | ≤6.0 | ≤5.5 | ≤5.5 |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel. | | | | | |

* Recommended WF:
  + Use table 2-42 for PSFCH A-MPR NS\_60.

##### Issue 2-3-2-5: NS\_61 A-MPR simulatrion results for PSFCH:

* Proposals
  + Option 1: For SL-U NS\_61 PSFCH A-MPR, consider Table 2-45 or Table 2-46 for SL-U UE power class 5
* Table 2-45 NS\_61 PSFCH A-MPR for SL-U UE power class 5

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RB set configuration | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | |
| 20MHz | 40MHz | 60MHz | 80MHz | 100MHz |
| Contiguous | ≤10.5 | ≤7.5 | ≤6.5 | ≤6.5 | ≤6.0 |
| Non-contiguous | N/A | ≤7.5 | ≤6.5 | ≤6.5 | N/A |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel. | | | | | |

* Table 2-46 NS\_61 PSFCH A-MPR for SL-U UE power class 5

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| RB set configuration | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | |
| 20MHz | 40MHz | 60MHz | 80MHz | 100MHz |
| Contiguous/Non-contiguous | ≤10.5 | ≤7.5 | ≤6.5 | ≤6.5 | ≤6.0 |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel. | | | | | |

* Recommended WF:
  + Use table 2-46 for PSFCH A-MPR NS\_61.

#### Issue 2-3-3: A-MPR simulatrion results for S-SSB:

##### Issue 2-3-3-1: NS\_31 A-MPR simulatrion results for S-SSB:

* Proposals
  + Option 1: For SL-U NS\_31 S-SSB A-MPR, consider Table 2-54 or Table 2-55 for SL-U UE power class 5
* Table 2-54: NS\_31 S-SSB A-MPR for SL-U UE power class 5

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | RB Allocation | | | |
| Outer RB set configuration | | Inner RB set configuration | |
| # of S-SSB repetition/RBset | > 2 | 2 | > 2 | 2 |
| Contiguous sub-band RB sets | ≤ 13.5 | ≤ 10.0 | ≤ 10.0 | ≤ 10.0 |
| Non-contiguous sub-band RB sets | ≤ 12.5 | ≤ 10.0 | ≤ 10.0 | ≤ 9.0 |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel.  NOTE 2: Applicable for 20 MHz channels centered at the nearest NR-ARFCN corresponding to 5180, 5200, 5220, 5280, 5300, 5320, 5500, 5520, 5540, 5560, 5580, 5600, 5620, 5640, 5660, 5680, 5745, 5765, 5785, and 5805 MHz.  NOTE 3: Applicable for all valid channels and bandwidths other than those enumerated in NOTE 2. | | | | |

* Table 2-55: NS\_31 S-SSB A-MPR for SL-U UE power class 5

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | RB Allocation | | | |
| Outer RB set configuration | | Inner RB set configuration | |
| # of S-SSB repetition/RBset | > 2 | 2 | > 2 | 2 |
| Contiguous/Non-contiguous sub-band RB sets | ≤ 13.5 | ≤ 10.0 | ≤ 10.0 | ≤ 10.0 |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel.  NOTE 2: Applicable for 20 MHz channels centered at the nearest NR-ARFCN corresponding to 5180, 5200, 5220, 5280, 5300, 5320, 5500, 5520, 5540, 5560, 5580, 5600, 5620, 5640, 5660, 5680, 5745, 5765, 5785, and 5805 MHz.  NOTE 3: Applicable for all valid channels and bandwidths other than those enumerated in NOTE 2. | | | | |

* Recommended WF:
  + Use table 2-55 for S-SSB A-MPR for NS\_31.

##### Issue 2-3-3-2: NS\_53 A-MPR simulatrion results for S-SSB:

* Proposals
  + Option 1: For SL-U NS\_53 S-SSB MPR, consider Table 2-58 or Table 2-59 for SL-U UE power class 5.
* Table 2-58: NS\_53 S-SSB A-MPR for SL-U UE power class 5

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RB set configuration | Channel bandwidth (Sub-band allocation) / RB Allocation / (dB) | | | | | | | | | |
| 20MHz | | 40MHz | | 60MHz | | 80MHz | | 100MHz | |
| # of S-SSB repetition/RBset | > 2 | 2 | > 2 | 2 | > 2 | 2 | > 2 | 2 | > 2 | 2 |
| Contiguous | ≤13.5 | ≤17.5 | ≤13.5 | ≤17.5 | ≤13.5 | ≤14.5 | ≤13.5 | ≤14.5 | ≤13.5 | ≤13.5 |
| Non-contiguous | N/A | N/A | N/A | N/A | ≤12.5 | ≤12.5 | ≤12.5 | ≤12.5 | ≤12.5 | ≤12.5 |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel. | | | | | | | | | | |

* Table 2-59: NS\_53 S-SSB A-MPR for SL-U UE power class 5

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RB set configuration | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | | | |
| 20MHz | | 40MHz | | 60MHz | | 80MHz | | 100MHz | |
| # of S-SSB repetition/RBset | > 2 | 2 | > 2 | 2 | > 2 | 2 | > 2 | 2 | > 2 | 2 |
| Contiguous/Non-contiguous | ≤13.5 | ≤17.5 | ≤13.5 | ≤17.5 | ≤13.5 | ≤14.5 | ≤13.5 | ≤14.5 | ≤13.5 | ≤13.5 |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel. | | | | | | | | | | |

* Recommended WF:
  + Use table 2-59 for S-SSB A-MPR for NS\_53.

##### Issue 2-3-3-3: NS\_58 A-MPR simulatrion results for S-SSB:

* Proposals
  + Option 1: For SL-U NS\_58 S-SSB A-MPR, consider Table 2-62 or Table 2-63 for SL-U UE power class 5.
* Table 2-62: NS\_58 S-SSB A-MPR for SL-U UE power class 5

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | RB Allocation | | | |
| Outer RB set configuration | | Inner RB set configuration | |
| # of S-SSB repetition/RBset | > 2 | 2 | > 2 | 2 |
| Contiguous sub-band RB sets | ≤ 13.5 | ≤ 9.5 | ≤ 8.5 | ≤ 6.5 |
| Non-contiguous sub-band RB sets | ≤ 12.5 | ≤ 10.0 | ≤ 9.5 | ≤ 7.5 |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel.  NOTE 2: The A-MPR applies instead of MPR for 20 MHz channel centered at the nearest NR-ARFCN corresponding to 5955 MHz, 40 MHz channel at the nearest NR-ARFCN corresponding to 5965 MHz, 60 MHz channel at the nearest NR-ARFCN corresponding to 5975 MHz, and 80 MHz channel at the nearest NR-ARFCN corresponding to 5985 MHz. For all other channels, A-MPR is zero and MPR applies. | | | | |

* Table 2-63: NS\_58 S-SSB A-MPR for SL-U UE power class 5

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | RB Allocation | | | |
| Outer RB set configuration | | Inner RB set configuration | |
| # of S-SSB repetition/RBset | > 2 | 2 | > 2 | 2 |
| Contiguous/Non-contiguous sub-band RB sets | ≤ 13.5 | ≤ 10.0 | ≤ 9.5 | ≤ 7.5 |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel.  NOTE 2: The A-MPR applies instead of MPR for 20 MHz channel centered at the nearest NR-ARFCN corresponding to 5955 MHz, 40 MHz channel at the nearest NR-ARFCN corresponding to 5965 MHz, 60 MHz channel at the nearest NR-ARFCN corresponding to 5975 MHz, and 80 MHz channel at the nearest NR-ARFCN corresponding to 5985 MHz. For all other channels, A-MPR is zero and MPR applies. | | | | |

* Recommended WF:
  + Use table 2-63 for S-SSB A-MPR for NS\_58.

##### Issue 2-3-3-4: NS\_60 A-MPR simulatrion results for S-SSB:

* Proposals
  + Option 1: For SL-U NS\_60 S-SSB A-MPR, consider Table 2-66 or Table 2-67 for SL-U UE power class 5.
* Table 2-66: NS\_60 S-SSB A-MPR for SL-U UE power class 5

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RB set configuration | Channel bandwidth (Sub-band allocation) / RB Allocation / (dB) | | | | | | | | | |
| 20MHz | | 40MHz | | 60MHz | | 80MHz | | 100MHz | |
| # of S-SSB repetition/RBset | > 2 | 2 | > 2 | 2 | > 2 | 2 | > 2 | 2 | > 2 | 2 |
| Contiguous | ≤13.5 | ≤14.5 | ≤13.5 | ≤14.5 | ≤13.5 | ≤13.5 | ≤13.5 | ≤13.5 | ≤13.5 | ≤13.5 |
| Non-contiguous | N/A | N/A | N/A | N/A | ≤10.0 | ≤9.0 | ≤11.5 | ≤9.0 | ≤13.0 | ≤10.0 |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel. | | | | | | | | | | |

* Table 2-67: NS\_60 S-SSB A-MPR for SL-U UE power class 5

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RB set configuration | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | | | |
| 20MHz | | 40MHz | | 60MHz | | 80MHz | | 100MHz | |
| # of S-SSB repetition/RBset | > 2 | 2 | > 2 | 2 | > 2 | 2 | > 2 | 2 | > 2 | 2 |
| Contiguous/Non-contiguous | ≤13.5 | ≤14.5 | ≤13.5 | ≤14.5 | ≤13.5 | ≤13.5 | ≤13.5 | ≤13.5 | ≤13.5 | ≤13.5 |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel. | | | | | | | | | | |

* Recommended WF:
  + Use table 2-67 for S-SSB A-MPR for NS\_60.

##### Issue 2-3-3-5: NS\_61 A-MPR simulatrion results for S-SSB:

* Proposals
  + Option 1: For SL-U NS\_61 S-SSB MPR, Consider Table 2-70 or Table 2-71 for SL-U UE power class 5.
* Table 2-70: NS\_61 S-SSB A-MPR for SL-U UE power class 5

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RB set configuration | Channel bandwidth (Sub-band allocation) / RB Allocation / (dB) | | | | | | | | | |
| 20MHz | | 40MHz | | 60MHz | | 80MHz | | 100MHz | |
| # of S-SSB repetition/RBset | > 2 | 2 | > 2 | 2 | > 2 | 2 | > 2 | 2 | > 2 | 2 |
| Contiguous | ≤13.5 | ≤15.5 | ≤13.5 | ≤15.5 | ≤13.5 | ≤13.5 | ≤13.5 | ≤13.5 | ≤13.5 | ≤13.5 |
| Non-contiguous | N/A | N/A | N/A | N/A | ≤11.5 | ≤11.0 | ≤12.5 | ≤11.0 | ≤13.0 | ≤11.0 |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel. | | | | | | | | | | |

* Table 2-71: NS\_61 S-SSB A-MPR for SL-U UE power class 5

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| RB set configuration | Channel bandwidth (Sub-band allocation) / RB Allocation | | | | | | | | | |
| 20MHz | | 40MHz | | 60MHz | | 80MHz | | 100MHz | |
| # of S-SSB repetition/RBset | > 2 | 2 | > 2 | 2 | > 2 | 2 | > 2 | 2 | > 2 | 2 |
| Contiguous/Non-contiguous | ≤13.5 | ≤15.5 | ≤13.5 | ≤15.5 | ≤13.5 | ≤13.5 | ≤13.5 | ≤13.5 | ≤13.5 | ≤13.5 |
| NOTE 1: The A-MPR shall apply to all SCS in all active 20 MHz sub-bands contiguously or non-contiguously allocated in the channel. | | | | | | | | | | |

* Recommended WF:
  + Use table 2-71 for S-SSB A-MPR for NS\_61.

# Topic #3: Reply LS on PSFCH power control

*Main technical topic overview. The structure can be done based on sub-agenda basis.*

## Companies’ contributions summary

|  |  |  |
| --- | --- | --- |
| **T-doc number** | **Company** | **Proposals / Observations** |
| R4-2318997 | vivo | Proposal 1: The reply LS was proposed as follows:  There is no difficulty for UE supporting the case ‘P\_common = P\_dedicated’.  For the case ‘P\_common < P\_dedicated’, it is not likely to be supported. Since UE transmits PSFCH in single PA and each PRB goes through the same PA with the same gain, P\_common is the same as P\_dedicated. |
| R4-2318998 | vivo | * P\_common = P\_dedicated   + There is no difficulty for UE supporting the case ‘P\_common = P\_dedicated’. * P\_common < P\_dedicated   + For the case ‘P\_common < P\_dedicated’, it is not likely to be supported. Since UE transmits PSFCH in single PA and each PRB goes through the same PA with the same gain, P\_common is the same as P\_dedicated. |
| R4-2319252 | LG Electronics Finland | Proposal 1: RAN4 applies same SL-U PSFCH MPR requirements for all PSFCH transmissions, i.e, Alt 1-1b, Alt 2-3a, and NR SL legacy RB allocation method.  Proposal 2: RAN4 specifies SL-U PSFCH MPR requirements only considering equal power between PSFCH transmission in Rel-18.  Proposal 3: The SL-U PSFCH MPR requirements do not limit the power control design for PSFCH transmission. It is up to RAN1.  Proposal 4: Send reply LS to RAN1 with followings.   * RAN4 applies same SL-U PSFCH MPR requirements for all PSFCH transmissions, i.e, Alt 1-1b, Alt 2-3a, and NR SL legacy RB allocation method. * RAN4 specifies SL-U PSFCH MPR requirements only considering equal power between PSFCH transmissions in Rel-18. * The SL-U PSFCH MPR requirements do not limit the power control design for PSFCH transmission. It is up to RAN1. |
| R4-2319253 | LG Electronics Finland | RAN4 agreed SL-U PSFCH MPR requirement as follows.   * RAN4 applies same SL-U PSFCH MPR requirements for all PSFCH transmissions, i.e, Alt 1-1b, Alt 2-3a, and NR SL legacy RB allocation method. * RAN4 specifies SL-U PSFCH MPR requirements only considering equal power between PSFCH transmissions in Rel-18. * The SL-U PSFCH MPR requirements do not limit the power control design for PSFCH transmission. It is up to RAN1. |
| R4-2319501 | Huawei, HiSilicon | Observation 1: P\_common = P\_dedicated is feasible.  Observation 2: When P\_common< P\_dedicated, the evaluated MPR value is no higher than that for P\_common= P\_dedicated.  Proposal 1: P\_common <= P\_dedicated is feasible. |
| R4-2319502 | Huawei, HiSilicon | RAN4 appreciate it that RAN1 sought opinions from us on PSFCH power control. RAN4 conclude that P\_common <= P\_dedicated is feasible. |
| R4-2319934 | OPPO | Observation 1: The final TX power on common interlaced RB is the sum of all the PSFCH for each RB of the common interlace.  Observation 2: The final TX power on dedicated RB is the power of each PSFCH on this specific RB.  Observation 3: For intra-band non-contiguous UL CA, the MPR and A-MPR is simulated with the assumption as equal PSD between LTE and NR.  Observation 4: For un-equal PSD, there is no conclusion within RAN4.  Proposal 1: P\_common = P\_dedicated should be current assumption and for the P\_common < P\_dedicated scenario RAN4 still need further study.  Proposal 2: To agree on the reply LS in Annex. |
| R4-2320048 | Nokia, Nokia Shanghai Bell | 1. Equal and unequal power allocation for sidelink transmission RBs has been supported, for example, in SL-U for S-SSBs in different RB-sets and in LTE Sidelink PSSCH/PSCCH power control procedures. 2. Transmissions on common interlace RBs are just for meeting regulatory requirement, so lowering common interlace RBs power and SINR does not degrade SL-U performance . 3. P\_common < P\_dedicated helps reducing the accumulated power on common interlace RBs lowering potential IBE and interference. 4. RAN4 has no concern for supporting P\_common < P\_dedicated and/or P\_common = P\_dedicated. The support is up to RAN1. |

## Open issues summary

### Sub-topic 3-1 Answer to the two question

#### Issue 3-1-1: whether there is any difficulty for supporting P\_common = P\_dedicated

* Proposals:
  + There is no difficulty to support P\_common = P\_dedicated.

#### Issue 3-1-2: whether there is any difficulty for supporting P\_common < P\_dedicated

* Proposals:
  + For the case ‘P\_common < P\_dedicated’, it is not likely to be supported. Since UE transmits PSFCH in single PA and each PRB goes through the same PA with the same gain, P\_common is the same as P\_dedicated. (VIVO)
  + The SL-U PSFCH MPR requirements do not limit the power control design for PSFCH transmission. It is up to RAN1. (LGE)
    - RAN4 applies same SL-U PSFCH MPR requirements for all PSFCH transmissions, i.e, Alt 1-1b, Alt 2-3a, and NR SL legacy RB allocation method.
    - RAN4 specifies SL-U PSFCH MPR requirements only considering equal power between PSFCH transmissions in Rel-18.
  + P\_common <= P\_dedicated is feasible.(Huawei)
  + For the P\_common < P\_dedicated scenario RAN4 still need further study. (OPPO)
  + RAN4 has no concern for supporting P\_common < P\_dedicated and/or P\_common = P\_dedicated. The support is up to RAN1. (Nokia)
* Moderator WF:
  + Two companies think there is no concern, one company thinks it is not likely to be supported and two companies think do not limit the power control design.
  + Try to agree on the feasibility of P\_common < P\_dedicated. If not try to discuss whether it will limit the RAN1 power control design.