3GPP TSG-RAN WG4 Meeting #94-e-Bis R4-2005513

Electronic meeting, 20 – 30 April 2020

Agenda Item: 5.10.4

Source: Ericsson

Title: Way forward on UE/BS demodulation performance for additional MTC enhancements for LTE

Document for: Approval

# 1 Agreements on UE/BS demodulation requirements

* No new demodulation requirements of PUSCH with multi-TB scheduling
* No new demodulation requirements of PDSCH with multi-TB scheduling

# 2 Simulation assumption for MPDCCH performance improvement

Table 1 and Table 2 show the simulation parameters for MPDCCH performance improvement. Interested companies are encouraged to provide both alignment simulation result and impairment simulation results in RAN4#95-e.

Table Simulation parameters for MPDCCH performance improvements.

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Unit | Test 1(CE Mode A) | Test 2(CE Mode B) |
| OFDM starting symbol (startSymbolLC) | symbols | 2 | 2 |
| Unused RE-s and PRB-s |  | OCNG | OCNG |
| Cell ID |  | 0 | 0 |
| Downlink power allocation |  | dB | -3 | 0 |
|  | dB | -3 | 0 |
| σ | dB | 0 | -3 |
| δ | dB | 3 | 0 |
| at antenna port | dBm/15kHz | -98 | -98 |
| Cyclic prefix |  | Normal | Normal |
| Subframe Configuration |  | Non-MBSFN | Non-MBSFN |
| Precoder Update Granularity | PRB | N/A | See TS36.211 6.8B.5 |
| ms | N/A | See TS36.211 6.8B.5 |
| Beamforming Pre-Coder |  | See TS36.211 6.8B.5 | See TS36.211 6.8B.5 |
| Cell Specific Reference Signal |  | Port 0 and 1 | Port 0 and 1 |
| Number of PRB per MPDCCH Set |  | 4 | 2+4 |
| Transmission type |  | Distributed | Localized |
| Frequency hopping |  | Disabled | Enabled |
| Number of frequency hopping narrowbands |  | N/A | 4 |
| Frequency hopping offset  |  | N/A | 1 |
| Frequency hopping interval | ms | N/A | 16 |
| Value of G in MPDCCH start subframe (*mpdcch-startSF-UESS*) (Note 3) |  | 1.5 | 1.5 |
| Maximum number of repetitions (*mPDCCH-NumRepetition*) |  | 16 | 32 |
| MPDCCH repetition number |  | 16 | 32 |
| MPDCCH narrowband (*mpdcch-Narrowband*) |  | 1 | 7 |
| PDSCH TM |  | TM2 | TM2 |
| DCI Format |  | 6-1A | 6-1B |
| fdd-DownlinkOrTddSubframeBitmapBR |  | 1111111111 | 1111111111 |
| mpdcch-crs-config |  | Configured | Configured |
| Power offset between CRS and DMRS antenna ports of MPDCCH | dB | 0 | 0 |
| mpdcch-crs-localized-mapping-type |  | N/A | Not configured |

Table Test case list for MPDCCH performance improvements.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Test number | Bandwidth | Aggregation level | Reference Channel (TS 36.101) | Propagation condition | Antenna configuration | Pm-dsg (%) |
| 1 | 10MHz | 16 ECCE | R.82 FDD | EPA5 | 2x1 low | 1 |
| 2 | 10MHz | 24 ECCE | R.83 FDD | ETU1 | 2x1 low | 1 |

# 3 Simulation assumption for CSI-RS based CSI reporting

## 3.1 Scheduling

* Applicable Duplex mode
	+ Specify the CSI-RS based PMI reporting tests for full-duplex FDD and TDD.
* CSI-RS scheduling
	+ For full-duplex FDD, CSI-RS is scheduled in SF#1 and SF#6.

## 3.2 Parameters

Table 3 shows the simulation parameters for CSI-RS based CSI reporting test for non-BL UE, and Table 4 shows the FRC used for the test. Interested companies are encouraged to provide the simulation results to decide the SNR test point and requirements in the next meeting.

* Test metric: Throughput ratio of the follow PMI over the random PMI (γ).

Table Simulation parameters for CSI-RS based CSI reporting tests.

|  |  |  |
| --- | --- | --- |
| Parameters | Unit | Values |
| Bandwidth | MHz | 10 |
| PDSCH transmission mode |  | 9 |
| Propagation channel |  | EPA5 |
| Precoding granularity | PRB | 6 |
| Downlink power allocation | ρA | dB | 0 |
| ρB | dB | 0 |
| σ | dB | -3 |
| δ | dB | 0 |
| CRS reference signals |  | Antenna ports 0, 1 |
| CSI reference signals |  | Antenna ports 15,…,22 |
| CSI-RS periodicity and subframe offset*T*CSI-RS / *∆*CSI-RS |  | 5/1 |
| CSI reference signal configuration |  | 0 |
| Propagation condition and antenna configuration |  | High XP 8 x 2 |
| Beamforming Model |  | As specified in TS36.101 B.4.3 |
| CodeBookSubsetRestriction bitmap |  | 0x0000 0000 001F FFE0 0000 0000 FFFF |
| SNR | dB | TBD |
|  | dB[mW/15kHz] | TBD |
|  | dB[mW/15kHz] | -98 |
| Max number of HARQ transmissions |  | 4 |
| Redundancy version coding sequence |  | {0,1,2,3} |
| Reporting mode |  | PUCCH 1-1 submode1 |
| Physical channel for CQI/PMI reporting |  | PUSCH |
| PUCCH Report Type for CQI/second PMI |  | 2b |
| Reporting periodicity  | ms | 10 |
| PMI delay | ms | 10 |
| *cqi-pmi-ConfigurationIndex* |  | 12 |
| ce-csi-rs-feedback-config |  | Configured |
| Frequency hopping |  | Disabled |
| Frequency hopping inverval(interval-FDD) |  | N/A |
| Starting OFDM symbol (startSymbolBR) |  | 3 |
| PDSCH repetition level |  | 1 |
| MPDCCH repetition level |  | 1 |
| Beamforming Precoder for MPDCCH  |  | No precoding |
| Precoder update granularity for MPDCCH |  | N/A |
| BL/CE DL subframe comfiguration (fdd-DownlinkOrTddSubframeBitmapBR) |  | 1111111111 |
| PDSCH PRB size | PRB | 3 |
| PDSCH MCS |  | QPSK 1/2 |
| RI |  | 1 |

Table FRC for CSI-RS based PMI reporting test.

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Values |
| Allocated resource blocks |  | [4] |
| Modulation |  | QPSK |
| Target Coding rate |  | 1/2 |
| Information bit payload for non CSI-RS subframe | bits | [472] |
| Information bit payload for CSI-RS subframe | bits | [472] |
| Binary channel bits for non CSI-RS subframe  | bits | [896] |
| Binary channel bits for non CSI-RS subframe  | bits | [960] |

# References

1. R4-2005579, “Email discussion summary for [94e Bis][211] LTE\_eMTC5\_Demod”, Ericsson.