3GPP TSG-RAN WG4 Meeting #94-e R4-2002426

Electronic meeting, 24 February – 6 March 2020

Agenda Item: 7.10.4

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 MPDCCH/PDSCH demodulation requirements with the use of LTE control region.
* FFS to define new demodulation requirements of PUSCH with multi-TB scheduling.
* FFS to define new demodulation requirements of PDSCH with multi-TB scheduling.

# 2 Simulation assumption for MPDCCH performance improvement

Table 1 and Table 2 show the simulation assumption for MPDCCH performance improvement. Interested companies are encouraged to provide the simulation results and proposed MPDCCH repetition level in the next meeting.

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*) | |  | Option 1: 16  Option 2: 32 | Option 1: 32  Option 2: 64 |
| MPDCCH repetition number | |  | Option 1: 16  Option 2: 32 | Option 1: 32  Option 2: 64 |
| 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

Table 3 shows the simulation assumption for CSI-RS based CSI reporting test for non-BL UE. Interested companies are encouraged to provide the simulation assumption in the next meeting.

* Test metric: Throughput ratio of the follow PMI over the random PMI

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 | |  | TBD |
| 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 |

# References

1. R4-2002514, “Summary of 2nd round Email discussion summary for RAN4#94e\_#85\_LTE\_eMTC5\_Demod”, Ericsson.