**3GPP TSG-RAN WG4 #95-e R4-2008803**

**Electronic Meeting, May 25th – June 5th, 2020**

**Agenda item:** 6.7.3

**Source:** MediaTek Inc.

**Title:** Simulation assumption for PDCCH-WUS test

**Document for:** Discussion

# Introduction

In this contribution, we present simulation assumptions for joint test for PDCCH-WUS in DRX OFF and PDCCH in DRX ON. Our simulation assumptions are based on the existing Rel-15 PDCCH demodulation test number 5 defined in section 5.3.3.1.1 [1].

# Simulation Assumptions

Table 1: General parameters

|  |  |
| --- | --- |
| **Parameter** | **Value** |
| Bandwidth | 10MHz |
| Channel model | TDLA30-10 |
| Subcarrier spacing | 15kHz |
| Number of BS antennas | 1Tx |
| Number of UE antennas | 2Rx, 4Rx |
| DM-RS channel estimation | Realistic |
| DRX period | 80ms |

Table 2: PDCCH and PDCCH-WUS parameters

|  |  |  |
| --- | --- | --- |
| **Parameter** | **Value** | |
|  | **PDCCH** | **PDCCH-WUS** |
| DCI format | 1\_0 | 2\_6 |
| DCI length (excluding 24bits CRC) | 39 bits | 12 bits, 36 bits  (Other options are not precluded) |
| Aggregation level | 16 | 8, 16   (Other options are not precluded) |
| CORESET symbol | 2 | 2 |
| CORESET bandwidth | 48RB | 48RB |
| Mapping type | Interleaved | Interleaved |
| REG bundle size | 6 | 6 |
| Interleaver size | 2 | 2 |

# Performance Metrics

The following performance metrics are to be provided:

* BLERPDCCH: BLER of PDCCH for the case that only PDCCH transmission
* BLERPDCCH-WUS: BLER of PDCCH-WUS for the case that only PDCCH-WUS transmission
* BLERPDCCH-JOINT: BLER of PDCCH for the case that joint transmission of PDCCH-WUS and PDCCH (UE does not wake up when missing PDCCH-WUS in DRX-OFF period)

# Reference

1. TS38.101-4-f40

Assumptions for PDCCH

|  |  |
| --- | --- |
| **Parameter** | **Value** |
| DCI length | 6bit,12 bit,24bit |
| Aggregation level | 8,16 |
| DMRS channel estimation | real |
| CORESET symbol | 2 |
| Mapping type | nonInterleaved |
| REG bundle size | 6 |
| Interleaver Size | 2 |
| Shift index | 0 |

Assumptions for PDCCH-WUS

|  |  |
| --- | --- |
| **Parameter** | **Value** |
| DCI length | 6bit,12 bit,24bit |
| Aggregation level | 8,16 |
| DMRS channel estimation | real |
| CORESET symbol | 2 |
| Mapping type | Interleaved |
| REG bundle size | 6 |
| Interleaver Size | 2 |

|  |  |
| --- | --- |
| **Parameter** | **Value** |
| Carrier Frequency | 4GHz |
| Channel Model | TDL-C 100ns |
| Subcarrier Spacing | 30kHz |
| Antenna Configuration at the TRP | (1, 1, 2) |
| Antenna Configuration at the UE | (1, 1, 2) |
| UE Speed | 3km/h |
| CORESET Bandwidth | 48RB |
| DCI length | 6bit,12 bit,24bit |
| CRC length | 24bit |
| Aggregation level | 8,16 |
| DMRS channel estimation | real |
| CORESET symbol | 2 |
| Mapping type | Interleaved |
| REG bundle size | 6 |
| Interleaver Size | 2 |

Table 1. The configurations for PDCCH DCI format 2\_6 performance test

|  |  |  |
| --- | --- | --- |
| Parameter | Unit | Value |
| UE working state |  | RRC connected DRX state |
| UE is configured with *PS-RNTI* and *dci-Format2-6* |  |  |
| DRX period | ms | 80 |
| The field of Wake-up indication in DCI format 2\_6 |  | 1 (wake up) |
| The field of SCell dormancy indication in DCI format 2\_6 |  | 0bit (no SCell is configured) |
| Normal PDCCH configurations in DRX active time |  | One configuration in normal PDCCH performance test can be reused |

Table 5.3-1: Common test Parameters

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Parameter** | | | **Unit** | **Value** |
| Carrier configuration | Offset between Point A and the lowest usable subcarrier on this carrier (Note 1) | |  | 0 |
| DL BWP configuration #1 | Cyclic prefix | |  | Normal |
| RB offset | | RBs | 0 |
| Common serving cell parameters | Physical Cell ID | |  | 0 |
| SSB position in burst | |  | 1 |
| SSB periodicity | | ms | 20 |
| PDCCH configuration | Slots for PDCCH monitoring | |  | Each slot |
| Number of PDCCH candidates | |  | 1 |
| Frequency domain resource allocation for CORESET | |  | Start from RB = 0 with contiguous RB allocation |
| TCI state | |  | TCI state #1 |
| CSI-RS for tracking | First subcarrier index in the PRB used for CSI-RS (*k0*) | |  | 0 |
| First OFDM symbol in the PRB used for CSI-RS (*l0*) | |  | CSI-RS resource 1: 4 CSI-RS resource 2: 8 CSI-RS resource 3: 4 CSI-RS resource 4: 8 |
| Number of CSI-RS ports (*X*) | |  | 1 |
| CDM Type | |  | No CDM |
| Density (*ρ*) | |  | 3 |
| CSI-RS periodicity | | Slots | 15 kHz SCS: 20  30 kHz SCS: 40 |
| CSI-RS offset | | Slots | 15 kHz SCS:  10 for CSI-RS resource 1 and 2  11 for CSI-RS resource 3 and 4  30 kHz SCS:  20 for CSI-RS resource 1 and 2  21 for CSI-RS resource 3 and 4 |
| Frequency Occupation | |  | Start PRB 0  Number of PRB = BWP size |
| QCL info | |  | TCI state #0 |
| TCI state #0 | Type 1 QCL information | SSB index |  | SSB #0 |
| QCL Type |  | Type C |
| Type 2 QCL information | SSB index |  | SSB #0 |
| QCL Type |  | Type D |
| TCI state #1 | Type 1 QCL information | CSI-RS resource |  | CSI-RS resource 1 from 'CSI-RS for tracking' configuration |
| QCL Type |  | Type A |
| Type 2 QCL information | CSI-RS resource |  | CSI-RS resource 1 from 'CSI-RS for tracking' configuration |
| QCL Type |  | Type D |
| Precoding configuration | | |  | SP Type I, Random per slot with REG bundling granularity for number of Tx larger than 1 |
| Symbols for all unused REs | | |  | OCNG in Annex A.5 |
| Note 1: Point A coincides with minimum guard band as specified in Table 5.3.3-1 from TS 38.101-1 [6] for tested channel bandwidth and subcarrier spacing. | | | | |

Table 5.3.2.1-1: Test Parameters

|  |  |  |  |
| --- | --- | --- | --- |
| **Parameter** | **Unit** | **1 Tx Antenna** | **2 Tx Antenna** |
| CCE to REG mapping type |  | nonInterleaved | |
| REG bundle size |  | 6 | |
| Shift index |  | 0 | |