**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: 4CSI-RS resource 2: 8CSI-RS resource 3: 4CSI-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: 2030 kHz SCS: 40 |
| CSI-RS offset | Slots | 15 kHz SCS:10 for CSI-RS resource 1 and 211 for CSI-RS resource 3 and 430 kHz SCS:20 for CSI-RS resource 1 and 221 for CSI-RS resource 3 and 4 |
| Frequency Occupation |  | Start PRB 0Number 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 |