IEEE P802.11
Wireless LANs

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| Annex B - PICS |
| Date: 2018-03-30 |
| Author(s): |
| Name | Affiliation | Address | Phone | email |
| Carlos Cordeiro  | Intel  |  |  | carlos.cordeiro@intel.com  |
| Martin Lorenz | Intel |  |  | Martin.Lorenz@Intel.com |
| Anuj Batra | Apple | One Apple Park Way, Cupertino, CA  95014 |  |  |
| SK Yong | Apple |  |  | skyong@apple.com |
| Oren Kedem | Intel |  |  | Oren.Kedem@intel.com |

Abstract

This submission proposes resolutions to CIDs 1388, 1423, 1047, 1673, 1247, 1432, 1561, 1630, 2228, 1833, 1881, 1988, 1824, 1679, 1922, 2220, 1086, 1736, 1558, 1176, 1638

**B.4 PICS proforma**

**B.4.3 IUT configuration**

*Change the table as follows (note that the entire table is not shown)*

| **Item** | **IUT configuration** | **References** | **Status** | **Support** |
| --- | --- | --- | --- | --- |
| … |  |  |  |  |
| \* CFPBSS | Operation in a PBSS | 4.3.3 | CFIndepSTAANDCFDMG:MCFDMG:O.7CFEDMG:M |  |
| .. |  |  |  |  |
| \*CFInfraSTA | Infrastructure mode | 4.3.4 | CFAP ORCFSTAofAP:MCFDMG:O.7CFEDMG:M | Yes  No  |
| … |  |  |  |  |
| \*CFDMG | Directional multi-gigabit (DMG) PHY | 9.4.2.127 (DMG Capabilities elemnent) | O.2CFDMG:MCFEDMG:MCFTDD:M | Yes  No  |
| … |  |  |  |  |
| \*CFEDMG | Enhanced directional multi-gigabit (EDMG) PHY | 9.4.2.250 (EDMG Capabilities element) | CFEDMG: M | Yes  No  |
| \*CFTDD | Time division duplex (TDD) features | 9.4.2.127 (DMG Capabilities elemnent) | CFDMG:OCFEDMG:O | Yes  No  |

**B.4.4 MAC protocol**

**B.4.4.2 MAC frames**

*Change the table as follows (note that the entire table is not shown)*

| **Item** | **MAC frame** | **References** | **Status** | **Support** |
| --- | --- | --- | --- | --- |
| … |  |  |  |  |
| FT51 | Sector Ack | Clause 9 | EDMG-M17.4:M | Yes  No  |
| FT52 | Block Ack Schedule | Clause 9 | EDMG-M9.2:M | Yes  No  |
| FT53 | TDD Beamforming | Clause 9 | CFTDD:M | Yes  No  |
| .. |  |  |  |  |
| FR52 | Sector Ack | Clause 9 | EDMG-M17.4:M | Yes  No  |
| FR53 | Block Ack Schedule | Clause 9 | EDMG-M9.2:M | Yes  No  |
| FR54 | TDD Beamforming | Clause 9 | CFTDD:M | Yes  No  |
| … |  |  |  |  |

**B.4.12 QoS base functionality**

*Change the table as follows (note that the entire table is not shown)*

| **Item** | **MAC frame** | **References** | **Status** | **Support** |
| --- | --- | --- | --- | --- |
| … |  |  |  |  |
| QB4.3.3 | EDMG Compressed Block Ack | 9.3.1.9.7 | CFEDMG:M | Yes  No  N/A  |
| QB4.4 | Multi-TID Block Ack | ~~9.3.1.8.3~~ | ~~CFQoS:O~~~~CFHT OR CFTVHT:M~~ | ~~Yes  No  N/A ~~ |
| QB4.4.1 | Multi-TID Block Ack | 9.3.1.8.3 | CFQoS:OCFHT OR CFTVHT:M | Yes  No  N/A  |
| QB4.4.2 | EDMG Multi-TID Block Ack | 9.3.1.9.8, 10.63 | CFEDMG:O | Yes  No  N/A  |
| … |  |  |  |  |

*Insert the following subclauses*

**B.4.31 Enhanced directional multi-gigabit (EDMG) features**

**B.4.31.1 EDMG MAC features**

| **Item** | **Protocol capabilities** | **References** | **Status** | **Support** |
| --- | --- | --- | --- | --- |
|  | Are the following MAC protocol features supported? |  |  |  |
| EDMG-M1 | EDMG capabilities signaling |  |  |  |
| EDMG-M1.1 | EDMG Capabilities element | 9.4.2.250 | CFEDMG:M | Yes  No  N/A  |
| EDMG-M1.2 | Signaling of STA capabilities in Probe Request, (Re)Association Request frames | 9.3.3.6, 9.3.3.8, 9.3.3.10, 9.4.2.250 | (CFEDMG AND(CFSTAofAPOR CFIBSSORCFPBSSnotPCP)):M | Yes  No  N/A  |
| EDMG-M1.3 | Signaling of STA capabilities in Probe Response, (Re)Association Response frames | 9.3.3.7, 9.3.3.9, 9.3.3.11, 9.4.2.250 | (CFEDMG AND(CFAP ORCFPCP)):M | Yes  No  N/A  |
| EDMG-M.2 | Signaling of EDMG Capabilities, EDMG Operation | 9.4.2.250, 9.4.2.251 | (CFEDMG AND(CFAP ORCFPCP)):M | Yes  No  N/A  |
| EDMG-M3 | MPDU aggregation |  |  |  |
| EDMG-M3.1 | Maximum A-MPDU Length Exponent | 9.4.2.250.1 | CFEDMG: M | Yes  No  N/A  |
| EDMG-M3.2 | Negotiation of window sizes: 64; 128; 256; 512; 1024 | 9.4.2.250.1 | CFEDMG: M | Yes  No  N/A  |
| EDMG-M4 | EDMG flow control |  |  |  |
| EDMG-M4.1 | Flow control operation | 10.25 | CFEMDG:M | Yes  No  N/A  |
| EDMG-M4.2 | EDMG Flow Control Extension Configuration element |  |  |  |
| EDMG-M4.2.1 | RBUFCAP values: 0, FF | 9.4.2.263 | CFEDMG: M | Yes  No  N/A  |
| EDMG-M4.2.2 | RBUFCAP values: 1 – FE | 9.4.2.263 | CFEDMG: O | Yes  No  N/A  |
| EDMG-M4.2.3 | EDMG Flow Control Capabilities subelement | 9.4.2.263 | CFEMDG:O | Yes  No  N/A  |
| EDMG-M4.2.4 | Recipient Memory Configuration subelement | 9.4.2.263 | CFEMDG:O | Yes  No  N/A  |
| EDMG-M4.2.5 | Advanced Recipient Memory Length Exponent | 9.4.2.263 | CFEMDG:O | Yes  No  N/A  |
| EDMG-M5 | Unsolicited block ack  | 9.4.2.265, 10.25.12 | CFEDMG: O | Yes  No  N/A  |
| EDMG-M6 | EDMG segmentation and reassembly | 9.4.2.250.7, 10.62 | CFEDMG: O | Yes  No  N/A  |
| EDMG-M7 | EDMG AP or PCP distributed scheduling | 10.61 | CFEDMG:O | Yes  No  N/A  |
| EDMG-M8 | Use of multiple channels  |   |   |  |
| EDMG-M8.1 | CCA on the primary, secondary channels | 8.3.5.12  | CFEDMG: M | Yes  No  N/A  |
| EDMG-M8.2 | CCA on secondary1, secondary2 channels | 8.3.5.12  | CFEDMG: O | Yes  No  N/A  |
| EDMG-M8.3 | RTS, DMG CTS, DMG DTS, Ack, Block Ack duplicate transmission  | 10.3.2 | CFEDMG: M | Yes  No  N/A  |
| EDMG-M8.4 | RTS, DMG CTS, DMG DTS bandwidth signaling | 10.3.2, 10.37.11.2 | CFEDMG: M | Yes  No  N/A  |
| EDMG-M9 | MIMO |  |  |  |
| \*EDMG-M9.1 | SU-MIMO capable | 9.4.2.250.2 | CFEDMG: O | Yes  No  N/A  |
| \*EDMG-M9.2 | MU-MIMO capable | 9.4.2.250.2 | CFEDMG: O | Yes  No  N/A  |
| EDMG-M9.3 | SU-MIMO channel access | 10.37.11.4.2, 10.37.11.4.3 | EDMG-M9.1:M | Yes  No  N/A  |
| EDMG-M9.4 | MU-MIMO channel access | 10.37.11.4.2, 10.37.11.4.4  | EDMG-M9.2:M | Yes  No  N/A  |
| EDMG-M10 | EDMG A-PPDU format | 10.14, 30.3.2.2 | CFEDMG: O | Yes  No  N/A  |
| EDMG-M11 | EDMG fast authentication and association | 4.5.4.2, 12.13 | CFEDMG: O | Yes  No  N/A  |
| EDMG-M12 | Unsolicited RSS | 10.39.6.2 | CFEDMG: O | Yes  No  N/A  |
| EDMG-M13 | EDMG Extended Schedule element | 9.4.2.252  | (CFEDMG AND(CFSTAofAPOR CFIBSSORCFPBSSnotPCP)):M | Yes  No  N/A  |
| EDMG-M14 | Directional allocation | 10.37.11.3 | CFEDMG: OEDMG-M17.4:M | Yes  No  N/A  |
| EDMG-M15 | EDMG power save enhancements |  |  |  |
| EDMG-M15.1 | QoS Triggered unscheduled (QoS-TU) power save  | 9.4.2.264, 11.2.7.2  | (CFEDMG AND(CFAP ORCFPCP)):M | Yes  No  N/A  |
| EDMG-M15.2 | Spatial multiplexing power save | 11.2.7.2  | EDMG-M9.1: M | Yes  No  N/A  |
| EDMG-M15.3 | MU-MIMO power save  | 11.2.7.5 | EDMG-M9.2: M | Yes  No  N/A  |
| EDMG-M16 | Reverse direction protocol |  |  |  |
| EDMG-M16.1 | Reverse direction for SU-SISO | 10.29 | CFEDMG AND (NOT CFTDD): M | Yes  No  N/A  |
| EDMG-M16.2 | Reverse direction for SU-MIMO | 10.29 | EDMG-M9.1 AND (NOT CFTDD): M | Yes  No  N/A  |
| EDMG-M16.3 | Reverse direction for MU-MIMO | 10.29.5 | EDMG-M9.2 AND (NOT CFTDD): M | Yes  No  N/A  |
| EDMG-M17 | EDMG beamforming |  |  |  |
| EDMG-M17.1 | SU-MIMO beamforming | 10.39.9.2.2 | EDMG-M9.1: M | Yes  No  N/A  |
| EDMG-M17.2 | MU-MIMO beamforming | 10.39.9.2.3 | EDMG-M9.2: M | Yes  No  N/A  |
| EDMG-M17.3 | Hybrid beamforming | 10.39.9.2.4 | CFEDMG:O | Yes  No  N/A  |
| \*EDMG-M17.4 | Beamforming for asymmetric links | 10.39.9.3 | CFEDMG:O | Yes  No  N/A  |
| EDMG-M17.5 | Group beamforming | 10.39.9.4 | CFEDMG:O | Yes  No  N/A  |
| EDMG-M17.6 | BRP transmit sector sweep | 10.39.9.5 | CFEDMG:M | Yes  No  N/A  |
| EDMG-M17.7 | First path beamforming | 10.39.9.6 | CFEDMG:O | Yes  No  N/A  |
| EDMG-M17.8 | Partial sector level sweep | 10.39.6.4, 11.27.1 | CFEDMG:O | Yes  No  N/A  |
| EDMG-M18 | EDMG phase hopping | 10.60 | CFEDMG:O | Yes  No  N/A  |

**B.4.31.2 EDMG PHY features**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item** | **Protocol capabilities** | **References** | **Status** | **Support** |
|  | Are the following PHY protocol features supported? |  |  |  |
| EDMG-P1 | PHY operating modes |  |  |  |
| EDMG-P1.1 | Operation according to Clause 30 | 30 | CFEDMG:M | Yes  No  N/A  |
| EDMG-P2 | Channel bandwidth |  |  |  |
| EDMG-P2.1 | 2.16 GHz | 30.3.4 | CFEDMG:M | Yes  No  N/A  |
| EDMG-P2.2 | 4.32 GHz | 30.3.4 | CFEDMG:M | Yes  No  N/A  |
| EDMG-P2.3 | 6.48 GHz | 30.3.4 | CFEDMG:O | Yes  No  N/A  |
| EDMG-P2.4 | 8.64 GHz | 30.3.4 | CFEDMG:O | Yes  No  N/A  |
| EDMG-P2.5 | 2.16 GHz + 2.16 GHz | 30.3.4 | CFEDMG:O | Yes  No  N/A  |
| EDMG-P2.6 | 4.32 GHz + 4.32 GHz | 30.3.4 | CFEDMG:O | Yes  No  N/A  |
| EDMG-P3 | Channelization |  |  |  |
| EDMG-P3.1 | Channels 2 and 10 | 30.3.4 | CFEDMG:M | Yes  No  N/A  |
| EDMG-P3.2 | Other channels | 30.3.4 | CFEDMG:O | Yes  No  N/A  |
| EDMG-P4 | PHY capabilities |  |  |  |
| EDMG-P4.1 | SU-SISO |  | CFEDMG:M | Yes  No  N/A  |
| EDMG-P4.2 | SU-MIMO |  | EDMG-M9.1:M | Yes  No  N/A  |
| EDMG-P4.3 | MU-MIMO |  | EDMG-M9.2:M | Yes  No  N/A  |
| EDMG-P4.4 | Support of one spatial streams (transmit and receive) in all supported channel bandwidth configurations |  | CFEDMG:M | Yes  No  N/A  |
| EDMG-P4.5 | Support of 2 through 8 spatial streams (transmit and receive) in all supported channel bandwidth configurations |  | CFEDMG:O | Yes  No  N/A  |
| EDMG-P5 | PHY frame format |  |  |  |
| EDMG-P5.1 | EDMG preamble | 30.3.3 |  |  |
| EDMG-P5.1.1 | Non-EDMG portion of EDMG preamble | 30.3.3.2 |  |  |
| EDMG-P5.1.1.1 | L-STF | 30.3.3.2.2 | CFEDMG:M | Yes  No  N/A  |
| EDMG-P5.1.1.2 | L-CEF | 30.3.3.2.3 | CFEDMG:M | Yes  No  N/A  |
| EDMG-P5.1.1.3 | L-Header | 30.3.3.2.4 | CFEDMG:M | Yes  No  N/A  |
| EDMG-P5.1.2 | EDMG portion of EDMG preamble | 30.3.3.3 |  |  |
| EDMG-P5.1.2.1 | EDMG-Header-A | 30.3.3.3.2 | CFEDMG:M | Yes  No  N/A  |
| EDMG-P5.1.2.2 | EDMG-STF | 30.3.3.3.3 | EDMG-P2.2 OR EDMG-P2.3 OR EDMG-P2.4 OR EDMG-P2.6:M | Yes  No  N/A  |
| EDMG-P5.1.2.3 | EDMG-CEF | 30.3.3.3.4 | EDMG-P2.2 OR EDMG-P2.3 OR EDMG-P2.4 OR EDMG-P2.6:M | Yes  No  N/A  |
| EDMG-P5.1.2.4 | EDMG-Header-B | 30.3.3.3.5 | EDMG-P4.3:M | Yes  No  N/A  |
| EDMG-P5.2 | EDMG control mode PPDU |  |  |  |
| EDMG-P5.2.1 | MCS 0 | 30.4 | CFEDMG:M | Yes  No  N/A  |
| EDMG-P5.2.2 | Non-EDMG duplicate MCS 0 | 30.4.6.2 | EDMG-P2.2 OR EDMG-P2.3 OR EDMG-P2.4 OR EDMG-P2.5 OR EDMG-P2.6:M | Yes  No  N/A  |
| EDMG-P5.2.3 | Control mode | 30.3.3.2.4 |  |  |
| EDMG-P5.2.3.1 | Control trailer | 30.3.7, 10.37.11.5 | CFEDMG:O(EDMG-M9.1 OR EDMG-M9.2):M | Yes  No  N/A  |
| EDMG-P5.2.3.2 | EDMG-Header-A, MCS 0 | 30.3.3.3 | CFEDMG:M | Yes  No  N/A  |
| EDMG-P5.2.3.3 | Channel bandwidth signaling in L-Header | 30.3.3.2.4 | CFEDMG:M | Yes  No  N/A  |
| EDMG-P5.3 | EDMG SC mode PPDU | 30.5 |  |  |
| EDMG-P5.3.1 | MCSs | 30.5.8 |  |  |
| EDMG-P5.3.1.1 | MCS 1-5, 7-10 |  | CFEDMG:M | Yes  No  N/A  |
| EDMG-P5.3.1.1 | MCS 6, 11-21 |  | CFEDMG:O | Yes  No  N/A  |
| EDMG-P5.3.1.2 | 𝜋/2-8-PSK MCS 12, 13 |  | CFEDMG:O | Yes  No  N/A  |
| EDMG-P5.3.1.3 | NUC 𝜋/2-64-QAM MCS 17-21 |  | CFEDMG:O | Yes  No  N/A  |
| EDMG-P5.3.2 | Non-EDMG duplicate MCS | 30.5.10.3 |  |  |
| EDMG-P5.3.2.1 | MCS 1-4 |  | CFEDMG:M | Yes  No  N/A  |
| EDMG-P5.3.2.2 | Other MCSs |  | CFEDMG:O | Yes  No  N/A  |
| EDMG-P5.3.3 | Guard interval | 30.5.9 |  |  |
| EDMG-P5.3.3.1 | Short |  | CFEDMG:O | Yes  No  N/A  |
| EDMG-P5.3.3.2 | Normal |  | CFEDMG:M | Yes  No  N/A  |
| EDMG-P5.3.3.3 | Long |  | CFEDMG:O | Yes  No  N/A  |
| EDMG-P5.3.4 | STBC | 30.5.9.5.3 | CFEDMG:O | Yes  No  N/A  |
| EDMG-P5.4 | EDMG OFDM mode PPDU | 30.6 | EDMG-P1.1:O | Yes  No  N/A  |
| EDMG-P5.4.1 | MCSs |  |  |  |
| EDMG-P5.4.1.1 | MCS 1-20 |  | EDMG-P5.4:O | Yes  No  N/A  |
| EDMG-P5.4.2 | Guard Interval | 30.6.1.2 |  |  |
| EDMG-P5.4.2.1 | Short |  | EDMG-P5.4:O | Yes  No  N/A  |
| EDMG-P5.4.2.2 | Normal |  | EDMG-P5.4:M | Yes  No  N/A  |
| EDMG-P5.4.2.3 | Long |  | EDMG-P5.4:O | Yes  No  N/A  |
| EDMG-P5.4.3 | Tone pairing | 30.6.8.3.8 |  |  |
| EDMG-P5.4.3.1 | Static tone pairing |  | EDMG-P5.4:M | Yes  No  N/A  |
| EDMG-P5.4.3.2 | Dynamic tone pairing |  | EDMG-P5.4:O | Yes  No  N/A  |
| EDMG-P5.4.4 | STBC | 30.6.8.3.10 | EDMG-P5.4:O | Yes  No  N/A  |
| EDMG-P5.4.5 | Phase hopping | 30.6.8.3.11 |  |  |
| EDMG-P5.4.5.1 | Open Loop Spatial Multiplexing |  | EDMG-P5.4:O | Yes  No  N/A  |
| EDMG-P5.4.5.2 | Phase hopping |  | EDMG-P5.4:O | Yes  No  N/A  |
| EDMG-P 5.5 | EDMG A-PPDU | 30.3.2.2 | EDMG-P5.3:OEDMG-P5.4:O | Yes  No  N/A  |
| EDMG-P6 | EDMG beamforming | 30.9 |  |  |
| EDMG-P6.1 | Short SSW | 30.9.1 | CFEDMG:M | Yes  No  N/A  |
| EDMG-P6.2 | Beam refinement | 30.9.2 |  |  |
| EDMG-P6.2.1 | EDMG BRP packet (TRN fields) | 30.9.2.2 |  |  |
| EDMG-P6.2.1.1 | TRN P / TRN M / TRN N | 30.9.2.2.3 |  |  |
| EDMG-P6.2.1.1.1 | P=2, M=5, N=2 |  | CFEDMG:M | Yes  No  N/A  |
| EDMG-P6.2.1.1.2 | P=2, M=7, N=0 |  | CFEDMG:M | Yes  No  N/A  |
| EDMG-P6.2.1.1.3 | P=0, M=2/5/8/11, N=2 |  | CFEDMG:M | Yes  No  N/A  |
| EDMG-P6.2.1.1.4 | P=0, M=0-15, N=0 |  | CFEDMG:M | Yes  No  N/A  |
| EDMG-P6.2.1.1.5 | All other valid combinations of P, M, N |  | CFEDMG:O | Yes  No  N/A  |
| EDMG-P6.2.1.2 | TRN Subfield Sequence | 30.3.3.2.4 |  |  |
| EDMG-P6.2.1.2.1 | 0 = 128×NCB |  |  |  |
| EDMG-P6.2.1.2.1.1 | NCB = 1 or 2 |  | CFEDMG:M | Yes  No  N/A  |
| EDMG-P6.2.1.2.1.2 | NCB = 3 or 4 |  | CFEDMG:O | Yes  No  N/A  |
| EDMG-P6.2.1.2.2 | 1 = 256×NCB |  | CFEDMG:O | Yes  No  N/A  |
| EDMG-P6.2.1.2.3 | 2 = 64×NCB |  | CFEDMG:O | Yes  No  N/A  |
| EDMG-P6.2.2 | Channel measurement | 30.9.2.2.7 | CFEDMG:O | Yes  No  N/A  |
| EDMG-P6.2.3 | DMG TRN support over 2.16 GHz channel |  |  |  |
| EDMG-P6.2.3.1 | Transmision | 20.10.2.2.2 | CFEDMG:M | Yes  No  N/A  |
| EDMG-P6.2.3.2 | Reception | 20.10.2.2.2 | CFEDMG:O | Yes  No  N/A  |
| EDMG-P7 | LDPC |  |  |  |
| EDMG-P7.1 | Codeword = 672, R = 1/2, 5/8, 3/4, 13/16 | 20.3.8 | EDMG-P5.3 OR EDMG-P5.4:M | Yes  No  N/A  |
| EDMG-P7.2 | Codeword = 624, R = 7/8 punctured | 30.5.9.4.3, 30.6.8.2.3 | EDMG-P5.3 OR EDMG-P5.4:O | Yes  No  N/A  |
| EDMG-P7.3 | Codeword = 672, R = 7/8 superimposed | 30.3.6 | EDMG-P5.3 OR EDMG-P5.4:O | Yes  No  N/A  |
| EDMG-P7.4 | Codeword = 1344, R = 1/2, 5/8, 3/4, 13/16 | 30.3.6 | EDMG-P5.3 OR EDMG-P5.4:O | Yes  No  N/A  |
| EDMG-P7.5 | Codeword = 1248, R = 7/8 punctured | 30.5.9.4.3, 30.6.8.2.3 | EDMG-P5.3 OR EDMG-P5.4:O | Yes  No  N/A  |
| EDMG-P7.6 | Codeword = 1344, R = 7/8 superimposed | 30.3.6 | EDMG-P5.3 OR EDMG-P5.4:O | Yes  No  N/A  |

**B.4.32 Time division duplex (TDD) features**

| **Item** | **Protocol capabilities** | **References** | **Status** | **Support** |
| --- | --- | --- | --- | --- |
|  | Are the following TDD protocol features supported? |  |  |  |
| TDD-M1 | TDD capabilities signaling |  |  |  |
| TDD-M1.1 | DMG Capabilities element | 9.4.2.127 | CFTDD:M | Yes  No  N/A  |
| TDD-M1.2 | Signaling of STA capabilities in Probe Request, (Re)Association Request frames | 9.3.3.6, 9.3.3.8, 9.3.3.10, 9.4.2.127 | (CFTDD AND(CFSTAofAPOR CFIBSSORCFPBSSnotPCP)):M | Yes  No  N/A  |
| TDD-M1.3 | Signaling of STA capabilities in Probe Response, (Re)Association Response frames | 9.3.3.7, 9.3.3.9, 9.3.3.11, 9.4.2.127 | (CFTDD AND(CFAP ORCFPCP)):M | Yes  No  N/A  |
| TDD-M.2 | TDD channel access | 10.37.6.2.2 | (CFTDD AND(CFAP ORCFPCP)):M | Yes  No  N/A  |
| TDD-M4 | MIMO |  |  |  |
| \*TDD-M4.1 | SU-MIMO capable | 9.4.2.250.2 | CFTDD: O | Yes  No  N/A  |
| TDD-M4.2 | SU-MIMO channel access | 10.37.11.4.2, 10.37.11.4.3 | TDD-M4.1:M | Yes  No  N/A  |
| TDD-M5 | TDD beamforming features |  |  |  |
| TDD-M5.1 | TDD beamforming | 10.39.10 | CFTDD:M | Yes  No  N/A  |
| TDD-M5.2 | SU-MIMO beamforming | 10.39.9.2.2.1 | CFTDD:O | Yes  No  N/A  |