

## TEST REPORT

**Report No.: 22061212HKG-004**

Qmax Systems India Private Limited

Application For Original Grant of 47 CFR Part 15 Certification

Android OTT BOX

**FCC ID: 2APD6TEKTDD001**

Transceiver – 5GHz WLAN Wi-Fi

This report contains the data of 5GHz W-iFi portion only.

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## TEST REPORT

### GENERAL INFORMATION

|                                    |                                                                                                                                       |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <b>Grantee:</b>                    | Qmax Systems India Private Limited                                                                                                    |
| <b>Grantee Address:</b>            | 795, Trunk Road, Poonamallee,<br>Chennai, India.                                                                                      |
| <b>FCC Specification Standard:</b> | FCC Part 15, October 1, 2021 Edition                                                                                                  |
| <b>FCC ID:</b>                     | 2APD6TEKTDD001                                                                                                                        |
| <b>FCC Model(s):</b>               | TDD001                                                                                                                                |
| <b>Type of EUT:</b>                | Unlicensed National Information Infrastructure Transmitter                                                                            |
| <b>Description of EUT:</b>         | Android OTT BOX                                                                                                                       |
| <b>Brand Name:</b>                 | Tekion – Display Device                                                                                                               |
| <b>Serial Number:</b>              | N/A                                                                                                                                   |
| <b>Sample Receipt Date:</b>        | February 10, 2023                                                                                                                     |
| <b>Date of Test:</b>               | February 15, 2023 to March 03, 2023                                                                                                   |
| <b>Report Date:</b>                | March 10, 2023                                                                                                                        |
| <b>Environmental Conditions:</b>   | Temperature: +10 to 40°C<br>Relative Humidity: 10 to 90%                                                                              |
| <b>Conclusion:</b>                 | Test was conducted by client submitted sample.<br>The submitted sample as received complied with the 47 CFR Part 15<br>Certification. |

## TEST REPORT

### SUMMARY OF TEST RESULT

| Test Items                                                   | FCC Part 15 Section        | Results        |
|--------------------------------------------------------------|----------------------------|----------------|
| Antenna Requirement                                          | 15.203                     | Complied       |
| Max. Conducted Output Power (Average)                        | 15.407(a)                  | Complied       |
| Transmit Power Control (TPC)                                 | 15.407(h)                  | Not Applicable |
| Min. 6dB RF Bandwidth                                        | 15.407(e)                  | Complied       |
| Max. Power Density (Average)                                 | 15.407(a)                  | Complied       |
| Out of Band Antenna Conducted Emission                       | 15.407(b)                  | Complied       |
| Radiated Emission in Restricted Bands and Spurious Emissions | 15.407(b), 15.209 & 15.109 | Complied       |
| AC Power Line Conducted Emission                             | 15.207 & 15.107            | Complied       |
| Dynamic Frequency Selection (DFS)                            | 15.407                     | Not Applicable |

Remark: Not Applicable if the EUT is <500mW (27dBm)

Note: Pursuant to FCC Part 15 Section 15.215(c), the 20dB bandwidth of the emission was contained within the frequency band designated (mentioned as above) which the EUT operated. The effects, if any, from frequency sweeping, frequency hopping, other modulation techniques and frequency stability over expected variations in temperature and supply voltage were considered.

The equipment under test is found to be complying with the following standards:

FCC Part 15, October 1, 2021 Edition

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## TEST REPORT

### EXHIBIT 1 GENERAL DESCRIPTION

#### 1.1 Product Description

The Equipment Under Test (EUT) that is an Android OTT BOX which operating at 2.4GHz Bluetooth, BLE, 2.4GHz & 5GHz (UNII-1 & UNII-3) WiFi respectively. The EUT is powered by AC/DC Adaptor (Input: AC100 – 240V 50/60Hz Output: 12V 2000mA). It is used typically with TVs in the Customer Lounge of various Business to display tailored content.

For 2.4GHz ISM Band:

- For IEEE 802.11b mode, it operates at frequency range of 2.412GHz to 2.462GHz with 11 Channels. It transmits via DQPSK, DBPSK and CCK. Maximum bit rate can be up to 11Mbps.
- For IEEE 802.11g mode, it operates at frequency range of 2.412GHz to 2.462GHz with 11 Channels. It transmits via OFDM/64-QAM, 16-QAM, QPSK and BPSK. Maximum bit rate can be up to 54Mbps.
- For IEEE 802.11n mode (With 20MHz Bandwidth), it operates at frequency range of 2.412GHz to 2.462GHz with 11 Channels. It transmits via OFDM/64-QAM, 16-QAM, QPSK and BPSK. Maximum bit rate can be up to MCS7 65Mbps.

For 5.15GHz to 5.25GHz Band:

The module operates at Frequency range of 5.18GHz to 5.24GHz with 4 channels.

- For IEEE 802.11a mode, it operates at frequency range of 5.18GHz to 5.24GHz with 4 channels. It transmits via OFDM/64-QAM, 16-QAM, QPSK and BPSK. Maximum bit rate can be up to 54Mbps.
- For IEEE 802.11n mode (20 MHz Bandwidth), it operates at frequency range of 5.18GHz to 5.24GHz with 4 channels. It transmits via OFDM/64-QAM, 16-QAM, QPSK and BPSK. Maximum bit rate can be up to MCS7 65Mbps.
- For IEEE 802.11n mode (40 MHz Bandwidth), it operates at frequency range of 5.19GHz to 5.23GHz with 2 channels. It transmits via OFDM/64-QAM, 16-QAM, QPSK and BPSK. Maximum bit rate can be up to MCS7 135Mbps.
- For IEEE 802.11ac mode (20 MHz Bandwidth), it operates at frequency range of 5.18GHz to 5.24GHz with 4 channels. It transmits via OFDM/256-QAM, OFDM/64-QAM, 16-QAM, QPSK and BPSK. Maximum bit rate can be up to MCS8 78Mbps.
- For IEEE 802.11ac mode (40 MHz Bandwidth), it operates at frequency range of 5.18GHz to 5.24GHz with 2 channels. It transmits via OFDM/256-QAM, OFDM/64-QAM, 16-QAM, QPSK and BPSK. Maximum bit rate can be up to MCS9 162Mbps.

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### 1.1 Product Description (Cont'd)

For 5.725GHz to 5.85GHz Band:

The module operates at Frequency range of 5.745GHz to 5.825GHz with 4 channels.

- For IEEE 802.11a mode, it operates at frequency range of 5.745GHz to 5.825GHz with 4 channels. It transmits via OFDM/64-QAM, 16-QAM, QPSK and BPSK. Maximum bit rate can be up to 54Mbps.
- For IEEE 802.11n mode (20 MHz Bandwidth), it operates at frequency range of 5.745GHz to 5.825GHz with 4 channels. It transmits via OFDM/64-QAM, 16-QAM, QPSK and BPSK. Maximum bit rate can be up to MCS7 65Mbps.
- For IEEE 802.11n mode (40 MHz Bandwidth), it operates at frequency range of 5.755GHz to 5.795GHz with 2 channels. It transmits via OFDM/64-QAM, 16-QAM, QPSK and BPSK. Maximum bit rate can be up to MCS7 135Mbps.
- For IEEE 802.11ac mode (20 MHz Bandwidth), it operates at frequency range of 5.745GHz to 5.825GHz with 4 channels. It transmits via OFDM/256-QAM, OFDM/64-QAM, 16-QAM, QPSK and BPSK. Maximum bit rate can be up to MCS8 78Mbps.
- For IEEE 802.11ac mode (40 MHz Bandwidth), it operates at frequency range of 5.755GHz to 5.795GHz with 2 channels. It transmits via OFDM/256-QAM, OFDM/64-QAM, 16-QAM, QPSK and BPSK. Maximum bit rate can be up to MCS9 162Mbps.
- For IEEE 802.11ac mode (80 MHz Bandwidth), it operates at 5775MHz with 1 channel. It transmits via OFDM/256-QAM, OFDM/64-QAM, 16-QAM, QPSK and BPSK. Maximum bit rate can be up to MCS9 390Mbps.

The device can be transmitted in MIMO mode (2T2R) on 802.11n 20MHz & 40MHz and 802.11ac 20MHz, 40MHz & 80MHz.

Antenna Information:

WLAN 802.11 a/b/g/n/ac

For operating frequency of 2.4GHz, maximum gain of 5.0 dBi for each of Antenna

For operating frequency of 5GHz WiFi, maximum gain of 5.0 dBi for each of Antenna

2 x External dedicated detachable Antennas

The circuit description is saved with filename: descri.pdf.

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### 1.2 Test Methodology

Both AC power line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.10 (2013). Preliminary radiated scans and all radiated measurements were performed in radiated emission test sites. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "**Justification Section**" of this Application. Antenna port conducted measurements were performed according to ANSI C63.10 (2013) and KDB Publication No. 558074 D01 v05r02 (April 02, 2019) All other measurements were made in accordance with the procedures in 47 CFR Part 2.

### 1.3 Test Facility

The radiated emission test site and antenna port conducted measurement facility used to collect the radiated data and conductive data are at Workshop No. 3, G/F., World-Wide Industrial Centre, 43-47 Shan Mei Street, Fo Tan, Sha Tin, N.T., Hong Kong SAR, China. This test facility and site measurement data have been fully placed on file with the FCC.

### 1.4 Related Submittal(s) Grants

This is a single application for certification of a transceiver (5GHz Wi-Fi portion only).

## TEST REPORT

### EXHIBIT 2 SYSTEM TEST CONFIGURATION

#### 2.1 Justification

For radiated emissions testing, the equipment under test (EUT) was setup to transmit / receive continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing. During testing, all cables (if any) were manipulated to produce worst case emissions.

The EUT is powered by AC/DC Adaptor (Input: AC100 – 240V 50/60Hz Output: 12V 2000mA).

For the measurements, the EUT was attached to a plastic stand if necessary and placed on the wooden turntable. If the base unit attached to peripherals, they were connected and operational (as typical as possible).

The signal was maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization were varied during the search for maximum signal level. The antenna height was varied from 1 to 4 meters. Radiated emissions were taken at three meters unless the signal level was too low for measurement at that distance. If necessary, a pre-amplifier was used and/or the test was conducted at a closer distance.

For any intentional radiator powered by AC power line, measurements of the radiated signal level of the fundamental frequency component of the emission was performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

Radiated emission measurement for transmitter were performed from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.

Emission that are directly caused by digital circuits in the transmit path and transmitter portion were measured, and the limit are according to FCC Part 15 Section 15.209. Digital circuitries used to control additional functions other than the operation of the transmitter are subject to FCC Part 15 Section 15.109 Limits.

## TEST REPORT

### 2.1 Justification (Cont'd)

Detector function for radiated emissions was in peak mode. Average readings, when required, were taken by measuring the duty cycle of the equipment under test and subtracting the corresponding amount in dB from the measured peak readings. A detailed description for the calculation of the average factor can be found in section 4.8.3.

Determination of pulse desensitization was made according to *Hewlett Packard Application Note 150-2, Spectrum Analysis... Pulsed RF*. The effective period (Teff) was referred to Exhibit 4.8.3. With the resolution bandwidth 1MHz and spectrum analyzer IF bandwidth 3dB, the pulse desensitization factor was 0dB.

For AC power line-conducted emission test, the EUT along with its peripherals were placed on a 1.0m(W)x1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50ohm coupling impedance for measuring instrument. The LISN housing, measuring instrument case, reference ground plane, and vertical ground plane were bounded together. The excess power cable between the EUT and the LISN was bundled.

All connecting cables of EUT and peripherals were manipulated to find the maximum emission.

All relevant operation modes have been tested, and the worst case data is included in this report.

For simultaneous transmission, both WiFi and Bluetooth portions are also switched on when taking radiated emission for determining worst-case spurious emission.

The transmission of Antenna 1 and Antenna 2 are also measured and considered individually. The worse case of test data is shown on report.

### 2.2 EUT Exercising Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use.

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### 2.3 Details of EUT and Description of Accessories

Details of EUT:

The EUT is powered by AC/DC Adaptor (Input: AC100 – 240V 50/60Hz Output: 12V 2000mA).

Description of Accessories:

| Description                                                                              | Remark                |
|------------------------------------------------------------------------------------------|-----------------------|
| AC/DC USB adaptor<br>Input: 100-240VAC 50/60Hz; Output: 12.0VDC 2000mA; Model: L6R24-120 | Provided by Applicant |
| 2 x 2m length Belkin HDMI cable                                                          | Provided by Intertek  |
| 1 x IR EXT with 1.5m cable                                                               | Provided by Intertek  |
| 1 x 2m length LAN cable                                                                  | Provided by Intertek  |

### 2.4 Measurement Uncertainty

When determining of the test conclusion, the Measurement Uncertainty of test at a level of confidence of 95% has been considered. The values of the Measurement uncertainty:

| No. | Item                            | Measurement Uncertainty |
|-----|---------------------------------|-------------------------|
| 1   | Conducted emission 9KHz-150KHz  | $\pm 3.8$ dB            |
| 2   | Conducted emission 150KHz-30MHz | $\pm 3.4$ dB            |
| 3   | Radiated emission 9KHz-30MHz    | $\pm 4.9$ dB            |
| 4   | Radiated emission 30MHz-1GHz    | $\pm 4.7$ dB            |
| 5   | Radiated emission 1GHz-18GHz    | $\pm 5.1$ dB            |
| 6   | Radiated emission 18GHz-26GHz   | $\pm 5.2$ dB            |
| 7   | Radiated emission 26GHz-40GHz   | $\pm 5.2$ dB            |

Decision Rule for compliance: For FCC/IC standard, the measured value must be within the limits of applicable standard without accounting for the measurement uncertainty. For EN/IEC/HKTA/HKTC standard, conformity rules will be used as per standard directly excepted EN/IEC 61000-3-2, EN/IEC 61000-3-3, HKTA1004, HKCA1008, HKTA1019, HKTA1020, HKTA1041 and HKTA1044. For these excepted or not mentioned standards, Cl 4.2.2 of ILAC-G8:09/2019 decision rules will be reference and guard band will be equal to our measurement uncertainty with 95% confidence level ( $k=2$ ). In case, the measured value is within guard band region, undetermined decision will be used. The values of the Measurement uncertainty for radiated emission test, AC line conducted emission test and RF conducted test, frequency stability and timing jitter are  $\pm 5.3$ dB,  $\pm 4.2$ dB,  $\pm 1$ dB,  $\pm 23$ Hz,  $0.1\mu$ s respectively.

Uncertainty and Compliance - Unless the standard specifically states that measured values are to be extended by the measurement uncertainty in determining compliance, all compliance determinations are based on the actual measured value.

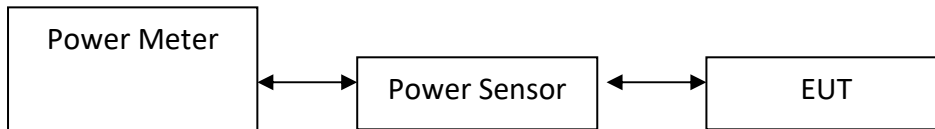
## TEST REPORT

### EXHIBIT 3 TEST RESULTS

#### 3.1 Maximum Conducted (Average) Output Power at Antenna Terminals

##### RF Conduct Measurement Test Setup

The figure below shows the test setup, which is utilized to make these measurements.



The antenna port of the EUT was connected to the input of a spectrum analyzer.

- ☒ The antenna power of the EUT was connected to the input of a power meter. Power was read directly and cable loss correction was added to the reading to obtain power at the EUT antenna terminals. The measurement procedure E.3.A (789033 D02 General UNII Test Procedures New Rules v02r01) was used.
- ☐ The EUT should be configured to transmit continuously (at a minimum duty cycle of 98%) at full power over the measurement duration. The measurement procedure AVG1 was used.

IEEE 802.11ac (20MHz) (MCS0) Antenna Gain = 5 dBi (Antenna 1)

| Frequency (MHz) | Conducted Output Power in dBm | Conducted Output Power in mWatt |
|-----------------|-------------------------------|---------------------------------|
| 5180            | 8.625                         | 7.286                           |
| 5200            | 8.342                         | 6.827                           |
| 5240            | 8.997                         | 7.938                           |
| 5745            | 6.776                         | 4.760                           |
| 5785            | 5.533                         | 3.575                           |
| 5825            | 5.845                         | 3.841                           |

IEEE 802.11ac (20MHz) (MCS0) Antenna Gain = 5 dBi (Antenna 2)

| Frequency (MHz) | Conducted Output Power in dBm | Conducted Output Power in mWatt |
|-----------------|-------------------------------|---------------------------------|
| 5180            | 7.392                         | 5.485                           |
| 5200            | 7.063                         | 5.085                           |
| 5240            | 8.290                         | 6.745                           |
| 5745            | 6.576                         | 4.546                           |
| 5785            | 7.180                         | 5.224                           |
| 5825            | 7.579                         | 5.727                           |

## TEST REPORT

### 3.1 Maximum Conducted (Average) Output Power at Antenna Terminals (Cont'd)

IEEE 802.11ac (40MHz) (MCS0) Antenna Gain = 5 dBi (Antenna 1)

| Frequency (MHz) | Conducted Output Power in dBm | Conducted Output Power in mWatt |
|-----------------|-------------------------------|---------------------------------|
| 5190            | 8.935                         | 7.825                           |
| 5230            | 9.244                         | 8.402                           |
| 5755            | 6.934                         | 4.936                           |
| 5795            | 6.076                         | 4.051                           |

IEEE 802.11ac (40MHz) (MCS0) Antenna Gain = 5 dBi (Antenna 2)

| Frequency (MHz) | Conducted Output Power in dBm | Conducted Output Power in mWatt |
|-----------------|-------------------------------|---------------------------------|
| 5190            | 7.573                         | 5.719                           |
| 5230            | 8.520                         | 7.112                           |
| 5755            | 5.422                         | 3.485                           |
| 5795            | 7.323                         | 5.399                           |

IEEE 802.11ac (80MHz) (MCS0) Antenna Gain = 5 dBi (Antenna 1)

| Frequency (MHz) | Conducted Output Power in dBm | Conducted Output Power in mWatt |
|-----------------|-------------------------------|---------------------------------|
| 5210            | 8.734                         | 7.471                           |
| 5775            | 5.894                         | 3.885                           |

IEEE 802.11ac (80MHz) (MCS0) Antenna Gain = 5 dBi (Antenna 2)

| Frequency (MHz) | Conducted Output Power in dBm | Conducted Output Power in mWatt |
|-----------------|-------------------------------|---------------------------------|
| 5210            | 7.613                         | 5.772                           |
| 5775            | 6.577                         | 4.547                           |

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### 3.1 Maximum Conducted (Average) Output Power at Antenna Terminals (Cont'd)

IEEE 802.11a (20MHz) (OFDM, 6 Mbps) Antenna Gain = 5.0dBi (Antenna 1 / Antenna 2)

| Frequency (MHz) | Conducted Output Power in dBm | Conducted Output Power in mWatt |
|-----------------|-------------------------------|---------------------------------|
| 5180            | 8.705                         | 7.422                           |
| 5200            | 8.528                         | 7.125                           |
| 5240            | 9.146                         | 8.215                           |
| 5745            | 6.780                         | 4.764                           |
| 5785            | 6.381                         | 4.346                           |
| 5825            | 6.111                         | 4.084                           |

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna Gain = 5.0dBi (Antenna 1)

| Frequency (MHz) | Conducted Output Power in dBm | Conducted Output Power in mWatt |
|-----------------|-------------------------------|---------------------------------|
| 5180            | 8.673                         | 7.367                           |
| 5200            | 8.407                         | 6.929                           |
| 5240            | 8.965                         | 7.880                           |
| 5745            | 6.807                         | 4.794                           |
| 5785            | 5.195                         | 3.308                           |
| 5825            | 5.242                         | 3.343                           |

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna Gain = 5.0dBi (Antenna 2)

| Frequency (MHz) | Conducted Output Power in dBm | Conducted Output Power in mWatt |
|-----------------|-------------------------------|---------------------------------|
| 5180            | 7.433                         | 5.537                           |
| 5200            | 7.005                         | 5.018                           |
| 5240            | 8.517                         | 7.107                           |
| 5745            | 6.774                         | 4.758                           |
| 5785            | 7.205                         | 5.254                           |
| 5825            | 7.525                         | 5.656                           |

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna Gain = 5.0dBi (Antenna 1)

| Frequency (MHz) | Conducted Output Power in dBm | Conducted Output Power in mWatt |
|-----------------|-------------------------------|---------------------------------|
| 5190            | 8.765                         | 7.525                           |
| 5230            | 9.284                         | 8.480                           |
| 5755            | 7.050                         | 5.070                           |
| 5795            | 5.803                         | 3.805                           |

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna Gain = 5.0dBi (Antenna 2)

| Frequency (MHz) | Conducted Output Power in dBm | Conducted Output Power in mWatt |
|-----------------|-------------------------------|---------------------------------|
| 5190            | 7.512                         | 5.639                           |
| 5230            | 8.760                         | 7.516                           |
| 5755            | 6.696                         | 4.673                           |
| 5795            | 7.457                         | 5.568                           |

## TEST REPORT

### 3.1 Maximum Conducted (Average) Output Power at Antenna Terminals (Cont'd)

For Maximum e.i.r.p

IEEE 802.11ac (20MHz) (MCS0) Antenna Gain = 5.0dBi (Antenna 1)

| Frequency (MHz) | Conducted Output Power in dBm | EIRP in dBm | EIRP in mWatt |
|-----------------|-------------------------------|-------------|---------------|
| 5180            | 8.625                         | 13.625      | 23.041        |
| 5220            | 8.342                         | 13.342      | 21.587        |
| 5240            | 8.997                         | 13.997      | 25.102        |
| 5745            | 6.776                         | 11.776      | 15.052        |
| 5785            | 5.533                         | 10.533      | 11.306        |
| 5825            | 5.845                         | 10.845      | 12.148        |

IEEE 802.11ac (20MHz) (MCS0) Antenna Gain = 5.0dBi (Antenna 2)

| Frequency (MHz) | Conducted Output Power in dBm | EIRP in dBm | EIRP in mWatt |
|-----------------|-------------------------------|-------------|---------------|
| 5180            | 7.392                         | 12.392      | 17.346        |
| 5220            | 7.063                         | 12.063      | 16.081        |
| 5240            | 8.290                         | 13.290      | 21.330        |
| 5745            | 6.576                         | 11.576      | 14.374        |
| 5785            | 7.180                         | 12.180      | 16.520        |
| 5825            | 7.579                         | 12.579      | 18.109        |

IEEE 802.11ac (40MHz) (MCS0) Antenna Gain = 5.0dBi (Antenna 1)

| Frequency (MHz) | Conducted Output Power in dBm | EIRP in dBm | EIRP in mWatt |
|-----------------|-------------------------------|-------------|---------------|
| 5190            | 8.935                         | 13.935      | 24.746        |
| 5230            | 9.244                         | 14.244      | 26.571        |
| 5755            | 6.934                         | 11.934      | 15.610        |
| 5795            | 6.076                         | 11.076      | 12.812        |

IEEE 802.11ac (40MHz) (MCS0) Antenna Gain = 5.0dBi (Antenna 2)

| Frequency (MHz) | Conducted Output Power in dBm | EIRP in dBm | EIRP in mWatt |
|-----------------|-------------------------------|-------------|---------------|
| 5190            | 7.573                         | 12.573      | 18.084        |
| 5230            | 8.520                         | 13.520      | 22.491        |
| 5755            | 5.422                         | 10.422      | 11.020        |
| 5795            | 7.323                         | 12.323      | 17.073        |

## TEST REPORT

### 3.1 Maximum Conducted (Average) Output Power at Antenna Terminals (Cont'd)

For Maximum e.i.r.p

IEEE 802.11ac (80MHz) (MCS0) Antenna Gain = 5.0dBi (Antenna 1)

| Frequency (MHz) | Conducted Output Power in dBm | EIRP in dBm | EIRP in mWatt |
|-----------------|-------------------------------|-------------|---------------|
| 5210            | 8.734                         | 13.734      | 23.627        |
| 5775            | 5.894                         | 10.894      | 12.286        |

IEEE 802.11ac (80MHz) (MCS0) Antenna Gain = 5.0dBi (Antenna 2)

| Frequency (MHz) | Conducted Output Power in dBm | EIRP in dBm | EIRP in mWatt |
|-----------------|-------------------------------|-------------|---------------|
| 5210            | 7.613                         | 12.613      | 18.252        |
| 5775            | 6.577                         | 11.577      | 14.378        |

IEEE 802.11a (20MHz) (OFDM, 6 Mbps) Antenna Gain = 5.0dBi (Antenna 1 / Antenna 2)

| Frequency (MHz) | Conducted Output Power in dBm | EIRP in dBm | EIRP in mWatt |
|-----------------|-------------------------------|-------------|---------------|
| 5180            | 8.705                         | 13.705      | 23.469        |
| 5220            | 8.528                         | 13.528      | 22.532        |
| 5240            | 9.146                         | 14.146      | 25.978        |
| 5745            | 6.780                         | 11.780      | 15.066        |
| 5785            | 6.381                         | 11.381      | 13.744        |
| 5825            | 6.111                         | 11.111      | 12.915        |

## TEST REPORT

### 3.1 Maximum Conducted (Average) Output Power at Antenna Terminals (Cont'd)

For Maximum e.i.r.p

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna Gain = 5.0dBi (Antenna 1)

| Frequency (MHz) | Conducted Output Power in dBm | EIRP in dBm | EIRP in mWatt |
|-----------------|-------------------------------|-------------|---------------|
| 5180            | 7.433                         | 13.673      | 23.297        |
| 5220            | 7.005                         | 13.407      | 21.913        |
| 5240            | 8.517                         | 13.965      | 24.917        |
| 5745            | 6.774                         | 11.807      | 15.160        |
| 5785            | 7.205                         | 10.195      | 10.459        |
| 5825            | 7.525                         | 10.242      | 10.573        |

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna Gain = 5.0dBi (Antenna 2)

| Frequency (MHz) | Conducted Output Power in dBm | EIRP in dBm | EIRP in mWatt |
|-----------------|-------------------------------|-------------|---------------|
| 5180            | 7.433                         | 12.433      | 17.511        |
| 5220            | 7.005                         | 12.005      | 15.867        |
| 5240            | 8.517                         | 13.517      | 22.475        |
| 5745            | 6.774                         | 11.774      | 15.045        |
| 5785            | 7.205                         | 12.205      | 16.615        |
| 5825            | 7.525                         | 12.525      | 17.885        |

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna Gain = 5.0dBi (Antenna 1)

| Frequency (MHz) | Conducted Output Power in dBm | EIRP in dBm | EIRP in mWatt |
|-----------------|-------------------------------|-------------|---------------|
| 5190            | 8.765                         | 13.765      | 23.796        |
| 5230            | 9.284                         | 14.284      | 26.816        |
| 5755            | 7.050                         | 12.050      | 16.032        |
| 5795            | 5.803                         | 10.803      | 12.031        |

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna Gain = 5.0dBi (Antenna 2)

| Frequency (MHz) | Conducted Output Power in dBm | EIRP in dBm | EIRP in mWatt |
|-----------------|-------------------------------|-------------|---------------|
| 5190            | 7.512                         | 12.512      | 17.832        |
| 5230            | 8.760                         | 13.760      | 23.768        |
| 5755            | 6.696                         | 11.696      | 14.777        |
| 5795            | 7.457                         | 12.457      | 17.608        |

## TEST REPORT

### 3.1 Maximum Conducted (Average) Output Power at Antenna Terminals (Cont'd)

Cable loss: 1.0dB External Attenuation: 10dB

Cable loss, external attenuation: ☒ included in OFFSET function  
☐ added to SA raw reading

IEEE 802.11ac (20MHz) (OFDM, MCS0)  
Max. Conducted (Average) Output Level = 8.997dBm

IEEE 802.11ac (40MHz) (OFDM, MCS0)  
Max. Conducted (Average) Output Level = 9.244dBm

IEEE 802.11ac (80MHz) (OFDM, MCS0)  
Max. Conducted (Average) Output Level = 8.734dBm

IEEE 802.11a (20MHz) (OFDM, 6 Mbps)  
Max. Conducted (Average) Output Level = 9.146dBm

IEEE 802.11n (20MHz) (OFDM, MCS0)  
Max. Conducted (Average) Output Level = 8.965dBm

IEEE 802.11n (40MHz) (OFDM, MCS0)  
Max. Conducted (Average) Output Level = 9.284dBm

#### Remark:

1. Maximum e.i.r.p = Maximum conducted output power + Duty Cycle Factor + Antenna Gain
2. Maximum conducted output power = Conducted output power + Duty Cycle Factor
3. Duty cycle= On Time/ Period;  
Duty Cycle factor =  $10 * \log(1/ \text{Duty cycle})$ ;  
Average factor =  $20 \log_{10} \text{Duty Cycle}$ .
4. Limits for FCC:
 

|               |                                                                           |
|---------------|---------------------------------------------------------------------------|
| 5150-5250MHz: | 250mW (24dBm) for antennas with gains of 6dBi or less.<br>(Client device) |
| 5250-5350MHz: | 250mW (24dBm)                                                             |
| 5470-5725MHz: | 250mW (24dBm)                                                             |
| 5725-5850MHz: | 1W (30dBm) for antennas with gains of 6dBi or less.                       |
5. Limits for RSS:
 

|               |                                                        |
|---------------|--------------------------------------------------------|
| 5150-5250MHz: | 200mW (23dBm) for antennas with gains of 6dBi or less. |
| 5250-5350MHz: | 250mW (24dBm)                                          |
| 5470-5725MHz: | 250mW (24dBm)                                          |
| 5725-5850MHz: | 1W (30dBm) for antennas with gains of 6dBi or less.    |

## TEST REPORT

### 3.1 Maximum Conducted (Average) Output Power at Antenna Terminals (Cont'd)

According to KDB 662911 D01 Multiple Transmitter Output v02r01, the MIMO transmission measurement shall be considered as below;

In-Band Power Measurements for MIMO mode

The measure-and-sum technique shall be used for measuring in-band transmit power of a device. Total power is the sum of the conducted power levels measured at the various output ports as described in section E)1) of KDB 662911 D01 v02r01

Total Conducted Power = Sum of Antenna 1 + Antenna 2. Also regarding to directional gain calculation, the following equation is used for transmit signals are correlated with each other;

$$\text{Directional Gain} = G_{\text{ANT}} + 10 \log (N_{\text{ANT}}) \text{ dBi} = 8\text{dBi}$$

IEEE 802.11ac (20MHz) (MCS0) Directional Gain = 8.0dBi (Antenna 1 + Antenna 2)

| Frequency (MHz) | Total Conducted Output Power in dBm | Total Conducted Output Power in mWatt | EIRP in dBm | EIRP in mWatt |
|-----------------|-------------------------------------|---------------------------------------|-------------|---------------|
| 5180            | 7.696                               | 5.883                                 | 15.696      | 37.121        |
| 5200            | 7.380                               | 5.470                                 | 15.380      | 34.511        |
| 5240            | 8.582                               | 7.214                                 | 16.582      | 45.519        |
| 5745            | 9.687                               | 9.306                                 | 17.687      | 58.714        |
| 5785            | 9.444                               | 8.799                                 | 17.444      | 55.519        |
| 5825            | 9.808                               | 9.568                                 | 17.808      | 60.371        |

IEEE 802.11ac (40MHz) (MCS0) Directional Gain = 8.0dBi (Antenna 1 + Antenna 2)

| Frequency (MHz) | Total Conducted Output Power in dBm | Total Conducted Output Power in mWatt | EIRP in dBm | EIRP in mWatt |
|-----------------|-------------------------------------|---------------------------------------|-------------|---------------|
| 5190            | 11.317                              | 13.544                                | 19.317      | 85.457        |
| 5230            | 11.907                              | 15.514                                | 19.907      | 97.890        |
| 5755            | 9.254                               | 8.421                                 | 17.254      | 53.135        |
| 5795            | 9.754                               | 9.450                                 | 17.754      | 59.627        |

IEEE 802.11ac (80MHz) (MCS0) Directional Gain = 8.0dBi (Antenna 1 + Antenna 2)

| Frequency (MHz) | Total Conducted Output Power in dBm | Total Conducted Output Power in mWatt | EIRP in dBm | EIRP in mWatt |
|-----------------|-------------------------------------|---------------------------------------|-------------|---------------|
| 5210            | 11.220                              | 13.243                                | 19.220      | 83.558        |
| 5775            | 9.259                               | 8.432                                 | 17.259      | 53.201        |

## TEST REPORT

### 3.1 Maximum Conducted (Average) Output Power at Antenna Terminals (Cont'd)

According to KDB 662911 D01 Multiple Transmitter Output v02r01, the MIMO transmission measurement shall be considered as below;

In-Band Power Measurements for MIMO mode

The measure-and-sum technique shall be used for measuring in-band transmit power of a device. Total power is the sum of the conducted power levels measured at the various output ports as described in section E)1) of KDB 662911 D01 v02r01

Total Conducted Power = Sum of Antenna 1 + Antenna 2. Also regarding to directional gain calculation, the following equation is used for transmit signals are correlated with each other;

$$\text{Directional Gain} = G_{\text{ANT}} + 10 \log (N_{\text{ANT}}) \text{ dBi} = 8\text{dBi}$$

IEEE 802.11n (20MHz) (OFDM, MCS0) Directional Gain = 8.0dBi (Antenna 1 + Antenna 2)

| Frequency (MHz) | Total Conducted Output Power in dBm | Total Conducted Output Power in mWatt | EIRP in dBm | EIRP in mWatt |
|-----------------|-------------------------------------|---------------------------------------|-------------|---------------|
| 5180            | 11.107                              | 12.904                                | 19.107      | 81.422        |
| 5200            | 10.773                              | 11.947                                | 18.773      | 75.381        |
| 5240            | 11.757                              | 14.987                                | 19.757      | 94.560        |
| 5745            | 9.801                               | 9.552                                 | 17.801      | 60.267        |
| 5785            | 9.326                               | 8.562                                 | 17.326      | 54.020        |
| 5825            | 9.542                               | 8.999                                 | 17.542      | 56.782        |

IEEE 802.11n (40MHz) (OFDM, MCS0) Directional Gain = 8.0dBi (Antenna 1 + Antenna 2)

| Frequency (MHz) | Total Conducted Output Power in dBm | Total Conducted Output Power in mWatt | EIRP in dBm | EIRP in mWatt |
|-----------------|-------------------------------------|---------------------------------------|-------------|---------------|
| 5190            | 11.194                              | 13.164                                | 19.194      | 83.058        |
| 5230            | 12.040                              | 15.996                                | 20.040      | 100.930       |
| 5755            | 9.887                               | 9.743                                 | 17.887      | 61.474        |
| 5795            | 9.719                               | 9.373                                 | 17.719      | 59.137        |

## TEST REPORT

### 3.1 Maximum Conducted (Average) Output Power at Antenna Terminals (Cont'd)

IEEE 802.11ac (20MHz) (OFDM, MCS0)

Max. EIRP Level = 17.808dBm

IEEE 802.11ac (40MHz) (OFDM, MCS0)

Max. EIRP Level = 19.907dBm

IEEE 802.11ac (80MHz) (OFDM, MCS0)

Max. EIRP Level = 19.220dBm

IEEE 802.11n (20MHz) (OFDM, MCS0)

Max. EIRP Level = 19.757dBm

IEEE 802.11n (40MHz) (OFDM, MCS0)

Max. EIRP Level = 20.040dBm

Directional Gain Calculations for In-Band Measurements as described in section F)2)a)i) of KDB 66291 D01 v02r01

Basic methodology with  $N_{ANT}$  transmit antennas, each with the same directional gain  $G_{ANT}$  dBi, being driven by  $N_{ANT}$  transmitter outputs of equal power. Directional gain is to be computed as follows:

transmit signals are correlated with each other, Directional gain =  $G_{ANT} + 10 \log(N_{ANT})$  dBi

Direction gain =  $5 + 3\text{dBi} = 8\text{dBi}$

Directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Limit: 5150-5250MHz: 158.489mW (22dBm) for antennas with gains more than 6dBi. (Client device)  
5725-5850MHz: 630.957mW (28dBm) for antennas with gains more than 6dBi

#### Remark:

1. Maximum e.i.r.p = Maximum conducted output power + Duty Cycle Factor + Antenna Gain
2. Maximum conducted output power = Conducted output power + Duty Cycle Factor
3. Duty cycle= On Time/ Period;  
Duty Cycle factor =  $10 * \log (1/ \text{Duty cycle});$   
Average factor =  $20 \log_{10} \text{Duty Cycle}.$

## TEST REPORT

### 3.2 Minimum 6dB RF Bandwidth

The antenna port of the EUT was connected to the input of a spectrum analyzer. The EBW measurement procedure was used. A PEAK output reading was taken, a DISPLAY line was drawn 6dB lower than PEAK level. The 6dB bandwidth was determined from where the channel output spectrum intersected the display line.

#### IEEE 802.11ac (20MHz) (MCS0)

| Frequency (MHz) | 6dB Bandwidth (MHz) | 99% Bandwidth (MHz) |
|-----------------|---------------------|---------------------|
| 5180            | 17.8                | 18.0                |
| 5200            | 17.8                | 18.0                |
| 5240            | 17.8                | 18.0                |
| 5745            | 17.8                | 18.0                |
| 5785            | 17.8                | 18.0                |
| 5825            | 17.8                | 18.0                |

#### IEEE 802.11ac (40MHz) (MCS0)

| Frequency (MHz) | 6dB Bandwidth (MHz) | 99% Bandwidth (MHz) |
|-----------------|---------------------|---------------------|
| 5190            | 36.5                | 36.3                |
| 5230            | 36.5                | 36.6                |
| 5755            | 36.5                | 36.3                |
| 5795            | 36.5                | 36.6                |

#### IEEE 802.11ac (80MHz) (MCS0)

| Frequency (MHz) | 6dB Bandwidth (MHz) | 99% Bandwidth (MHz) |
|-----------------|---------------------|---------------------|
| 5210            | 76.6                | 76.5                |
| 5775            | 75.9                | 76.0                |

#### IEEE 802.11a (20MHz) (OFDM, 6Mbps)

| Frequency (MHz) | 6dB Bandwidth (MHz) | 99% Bandwidth (MHz) |
|-----------------|---------------------|---------------------|
| 5180            | 16.5                | 16.8                |
| 5200            | 16.5                | 16.8                |
| 5240            | 16.5                | 16.8                |
| 5745            | 16.5                | 16.8                |
| 5785            | 16.5                | 16.8                |
| 5825            | 16.5                | 17.0                |

## TEST REPORT

### 3.2 Minimum 6dB RF Bandwidth (Cont'd)

#### IEEE 802.11n (20MHz) (OFDM, MCS0)

| Frequency (MHz) | 6dB Bandwidth (MHz) | 99% Bandwidth (MHz) |
|-----------------|---------------------|---------------------|
| 5180            | 17.8                | 18.0                |
| 5200            | 17.8                | 18.0                |
| 5240            | 17.8                | 18.0                |
| 5745            | 17.8                | 18.0                |
| 5785            | 17.8                | 18.0                |
| 5825            | 17.8                | 18.0                |

#### IEEE 802.11n (40MHz) (OFDM, MCS0)

| Frequency (MHz) | 6dB Bandwidth (MHz) | 99% Bandwidth (MHz) |
|-----------------|---------------------|---------------------|
| 5190            | 36.5                | 36.3                |
| 5230            | 36.2                | 36.6                |
| 5755            | 36.5                | 36.3                |
| 5795            | 36.5                | 36.6                |

Limits:

For 5725-5850MHz: 6 dB bandwidth shall be at least 500kHz

The plots of 6 dB RF bandwidth and occupied bandwidth are saved with filename:  
UNII-1&2 test data.pdf

## TEST REPORT

### 3.3 26 dB Bandwidth & Occupied Bandwidth

The antenna port of the EUT was connected to the input of a spectrum analyzer. The EBW measurement procedure was used. A PEAK output reading was taken, a DISPLAY line was drawn 26dB lower than PEAK level. The 26dB bandwidth was determined from where the channel output spectrum intersected the display line.

#### IEEE 802.11ac (20MHz) (MCS0)

| Frequency (MHz) | 26dB Bandwidth (MHz) | 99% Bandwidth (MHz) |
|-----------------|----------------------|---------------------|
| 5180            | 22.2                 | 18.0                |
| 5200            | 22.4                 | 18.0                |
| 5240            | 22.2                 | 18.0                |
| 5745            | 22.4                 | 18.0                |
| 5785            | 22.2                 | 18.0                |
| 5825            | 22.4                 | 18.0                |

#### IEEE 802.11ac (40MHz) (MCS0)

| Frequency (MHz) | 26dB Bandwidth (MHz) | 99% Bandwidth (MHz) |
|-----------------|----------------------|---------------------|
| 5190            | 41.0                 | 36.3                |
| 5230            | 40.4                 | 36.6                |
| 5755            | 40.7                 | 36.3                |
| 5795            | 40.7                 | 36.6                |

#### IEEE 802.11ac (80MHz) (MCS0)

| Frequency (MHz) | 26dB Bandwidth (MHz) | 99% Bandwidth (MHz) |
|-----------------|----------------------|---------------------|
| 5210            | 85.0                 | 76.5                |
| 5775            | 85.0                 | 76.0                |

#### IEEE 802.11a (20MHz) (OFDM, 6Mbps)

| Frequency (MHz) | 26dB Bandwidth (MHz) | 99% Bandwidth (MHz) |
|-----------------|----------------------|---------------------|
| 5180            | 21.8                 | 16.8                |
| 5200            | 22.0                 | 16.8                |
| 5240            | 22.0                 | 16.8                |
| 5745            | 22.0                 | 16.8                |
| 5785            | 22.0                 | 16.8                |
| 5825            | 22.0                 | 17.0                |

## TEST REPORT

### 3.3 26 dB Bandwidth & Occupied Bandwidth (Cont'd)

#### IEEE 802.11n (20MHz) (OFDM, MCS0)

| Frequency (MHz) | 26dB Bandwidth (MHz) | 99% Bandwidth (MHz) |
|-----------------|----------------------|---------------------|
| 5180            | 22.2                 | 18.0                |
| 5200            | 22.4                 | 18.0                |
| 5240            | 22.0                 | 18.0                |
| 5745            | 22.2                 | 18.0                |
| 5785            | 22.2                 | 18.0                |
| 5825            | 22.2                 | 18.0                |

#### IEEE 802.11n (40MHz) (OFDM, MCS0)

| Frequency (MHz) | 26dB Bandwidth (MHz) | 99% Bandwidth (MHz) |
|-----------------|----------------------|---------------------|
| 5190            | 40.7                 | 36.3                |
| 5230            | 40.1                 | 36.6                |
| 5755            | 41.0                 | 36.3                |
| 5795            | 40.4                 | 36.6                |

Limits:

For 5725-5850MHz: 6 dB bandwidth shall be at least 500kHz

The plots of 26 dB RF bandwidth and occupied bandwidth are saved with filename:  
UNII-1&2 test data.pdf

## TEST REPORT

### 3.4 Maximum Power Spectral Density

The output from the transmitter was connected to an attenuator and then to the input of the RF Spectrum Analyzer.

Spectrum analyser according to the following Settings:

For U-NII-1, U-NII-2A, U-NII-2C band:

Using method SA-2

- a) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- b) Set RBW = 1 MHz, Set VBW  $\geq$  3 RBW, Detector = RMS
- c) Sweep time = auto, trigger set to "free run".
- d) Trace average at least 100 traces in power averaging mode.
- e) Record the max value and add 10 log (1/duty cycle)

For U-NII-3 band:

- a) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- b) Set RBW = 500 kHz, Set VBW  $\geq$  3 RBW, Detector = RMS
- c) Use the peak marker function to determine the maximum power level in any 500 kHz band segment within the fundamental EBW.
- d) Sweep time = auto, trigger set to "free run".
- e) Trace average at least 100 traces in power averaging mode.
- f) Record the max value and add 10 log (1/duty cycle)

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

## TEST REPORT

### 3.4 Maximum Power Spectral Density (Cont'd)

#### IEEE 802.11ac (20MHz) (MCS0) (Antenna 1)

| Frequency (MHz) | Conducted<br>PSD in 1MHz (dBm)   | EIRP<br>PSD in 1MHz (dBm)   |
|-----------------|----------------------------------|-----------------------------|
| 5180            | -4.002                           | 0.998                       |
| 5200            | -4.150                           | 0.850                       |
| 5240            | -3.288                           | 1.712                       |
| Frequency (MHz) | Conducted<br>PSD in 500kHz (dBm) | EIRP<br>PSD in 500kHz (dBm) |
| 5745            | -8.505                           | -3.505                      |
| 5785            | -9.150                           | -4.150                      |
| 5825            | -9.581                           | -4.581                      |

#### IEEE 802.11ac (20MHz) (MCS0) (Antenna 2)

| Frequency (MHz) | Conducted<br>PSD in 1MHz (dBm)   | EIRP<br>PSD in 1MHz (dBm)   |
|-----------------|----------------------------------|-----------------------------|
| 5180            | -5.093                           | -0.093                      |
| 5200            | -5.422                           | -0.422                      |
| 5240            | -4.045                           | 0.955                       |
| Frequency (MHz) | Conducted<br>PSD in 500kHz (dBm) | EIRP<br>PSD in 500kHz (dBm) |
| 5745            | -8.515                           | -3.505                      |
| 5785            | -8.334                           | -3.334                      |
| 5825            | -8.218                           | -3.218                      |

#### IEEE 802.11ac (40MHz) (MCS0) (Antenna 1)

| Frequency (MHz) | Conducted<br>PSD in 1MHz (dBm)   | EIRP<br>PSD in 1MHz (dBm)   |
|-----------------|----------------------------------|-----------------------------|
| 5190            | -6.358                           | -1.358                      |
| 5230            | -5.929                           | -0.929                      |
| Frequency (MHz) | Conducted<br>PSD in 500kHz (dBm) | EIRP<br>PSD in 500kHz (dBm) |
| 5755            | -10.805                          | -5.805                      |
| 5795            | -11.453                          | -6.453                      |

#### IEEE 802.11ac (40MHz) (MCS0) (Antenna 2)

| Frequency (MHz) | Conducted<br>PSD in 1MHz (dBm)   | EIRP<br>PSD in 1MHz (dBm)   |
|-----------------|----------------------------------|-----------------------------|
| 5190            | -7.585                           | -2.585                      |
| 5230            | -6.807                           | -1.807                      |
| Frequency (MHz) | Conducted<br>PSD in 500kHz (dBm) | EIRP<br>PSD in 500kHz (dBm) |
| 5755            | -10.498                          | -5.498                      |
| 5795            | -11.016                          | -6.016                      |

## TEST REPORT

### 3.4 Maximum Power Spectral Density (Cont'd)

#### IEEE 802.11ac (80MHz) (MCS0) (Antenna 1)

| Frequency (MHz) | Conducted<br>PSD in 1MHz (dBm)   | EIRP<br>PSD in 1MHz (dBm)   |
|-----------------|----------------------------------|-----------------------------|
| 5210            | -9.406                           | -4.406                      |
| Frequency (MHz) | Conducted<br>PSD in 500kHz (dBm) | EIRP<br>PSD in 500kHz (dBm) |
| 5775            | -14.579                          | -9.579                      |

#### IEEE 802.11ac (80MHz) (MCS0) (Antenna 2)

| Frequency (MHz) | Conducted<br>PSD in 1MHz (dBm)   | EIRP<br>PSD in 1MHz (dBm)   |
|-----------------|----------------------------------|-----------------------------|
| 5210            | -10.9                            | -5.90                       |
| Frequency (MHz) | Conducted<br>PSD in 500kHz (dBm) | EIRP<br>PSD in 500kHz (dBm) |
| 5775            | -13.925                          | -8.925                      |

#### IEEE 802.11a (20MHz) (OFDM, 6 Mbps) (Antenna 1 / Antenna 2)

| Frequency (MHz) | Conducted<br>PSD in 1MHz (dBm)   | EIRP<br>PSD in 1MHz (dBm)   |
|-----------------|----------------------------------|-----------------------------|
| 5180            | -3.456                           | 1.544                       |
| 5200            | -3.677                           | 1.323                       |
| 5240            | -3.140                           | 1.860                       |
| Frequency (MHz) | Conducted<br>PSD in 500kHz (dBm) | EIRP<br>PSD in 500kHz (dBm) |
| 5745            | -8.173                           | 3.173                       |
| 5785            | -7.903                           | 2.903                       |
| 5825            | -7.972                           | 2.972                       |

## TEST REPORT

### 3.4 Maximum Power Spectral Density (Cont'd)

#### IEEE 802.11n (20MHz) (OFDM, MCS0) (Antenna 1)

| Frequency (MHz) | Conducted<br>PSD in 1MHz (dBm)   | EIRP<br>PSD in 1MHz (dBm)   |
|-----------------|----------------------------------|-----------------------------|
| 5180            | -1.643                           | 3.357                       |
| 5200            | -2.242                           | 2.758                       |
| 5240            | -2.115                           | 2.885                       |
| Frequency (MHz) | Conducted<br>PSD in 500kHz (dBm) | EIRP<br>PSD in 500kHz (dBm) |
| 5745            | -8.912                           | -3.912                      |
| 5785            | -9.140                           | -4.140                      |
| 5825            | -9.555                           | -4.555                      |

#### IEEE 802.11n (20MHz) (OFDM, MCS0) (Antenna 2)

| Frequency (MHz) | Conducted<br>PSD in 1MHz (dBm)   | EIRP<br>PSD in 1MHz (dBm)   |
|-----------------|----------------------------------|-----------------------------|
| 5180            | -5.082                           | -0.082                      |
| 5200            | -5.451                           | -0.451                      |
| 5240            | -3.936                           | 1.064                       |
| Frequency (MHz) | Conducted<br>PSD in 500kHz (dBm) | EIRP<br>PSD in 500kHz (dBm) |
| 5745            | -8.527                           | -3.527                      |
| 5785            | -8.248                           | -3.248                      |
| 5825            | -8.113                           | -3.113                      |

#### IEEE 802.11n (40MHz) (OFDM, MCS0) (Antenna 1)

| Frequency (MHz) | Conducted<br>PSD in 1MHz (dBm)   | EIRP<br>PSD in 1MHz (dBm)   |
|-----------------|----------------------------------|-----------------------------|
| 5190            | -6.247                           | -1.247                      |
| 5230            | -5.895                           | -0.895                      |
| Frequency (MHz) | Conducted<br>PSD in 500kHz (dBm) | EIRP<br>PSD in 500kHz (dBm) |
| 5755            | -10.96                           | -5.96                       |
| 5795            | -11.458                          | -6.458                      |

#### IEEE 802.11n (40MHz) (OFDM, MCS0) (Antenna 2)

| Frequency (MHz) | Conducted<br>PSD in 1MHz (dBm)   | EIRP<br>PSD in 1MHz (dBm)   |
|-----------------|----------------------------------|-----------------------------|
| 5190            | -7.282                           | -2.282                      |
| 5230            | -6.487                           | -1.487                      |
| Frequency (MHz) | Conducted<br>PSD in 500kHz (dBm) | EIRP<br>PSD in 500kHz (dBm) |
| 5755            | -10.285                          | -5.285                      |
| 5795            | -10.807                          | -5.807                      |

## TEST REPORT

### 3.4 Maximum Power Spectral Density (Cont'd)

According to KDB 662911 D01 Multiple Transmitter Output v02r01, the MIMO transmission measurement shall be considered as below;

In-Band Power Spectral Density (PSD) measurement as described as KDB 662911 D01 Section E) 2) a)

Total PSD = Sum of Antenna 1 + Antenna 2. Also regarding to directional gain calculation, the following equation is used for transmit signals are correlated with each other;

$$\text{Directional Gain} = G_{\text{ANT}} + 10 \log (N_{\text{ANT}}) \text{ dBi} = 8\text{dBi}$$

#### IEEE 802.11n (20MHz) (OFDM, MCS0)

| Frequency (MHz) | Antenna 1 PSD in 1MHz (dBm)   | Antenna 2 PSD in 1MHz (dBm)   | Antenna 1 + Antenna 2 PSD in 1MHz (dBm)   | EIRP PSD in 1MHz (dBm)   |
|-----------------|-------------------------------|-------------------------------|-------------------------------------------|--------------------------|
| 5180            | -1.643                        | -5.082                        | -0.020                                    | 7.980                    |
| 5200            | -2.242                        | -5.451                        | -0.546                                    | 7.454                    |
| 5240            | -2.115                        | -3.936                        | 0.080                                     | 8.080                    |
| Frequency (MHz) | Antenna 1 PSD in 500kHz (dBm) | Antenna 2 PSD in 500kHz (dBm) | Antenna 1 + Antenna 2 PSD in 500kHz (dBm) | EIRP PSD in 500kHz (dBm) |
| 5745            | -8.912                        | -8.527                        | -5.705                                    | 2.295                    |
| 5785            | -9.140                        | -8.248                        | -5.661                                    | 2.339                    |
| 5825            | -9.555                        | -8.113                        | -5.764                                    | 2.236                    |

#### IEEE 802.11n (40MHz) (OFDM, MCS0)

| Frequency (MHz) | Antenna 1 PSD in 1MHz (dBm)   | Antenna 2 PSD in 1MHz (dBm)   | Antenna 1 + Antenna 2 PSD in 1MHz (dBm)   | EIRP PSD in 1MHz (dBm)   |
|-----------------|-------------------------------|-------------------------------|-------------------------------------------|--------------------------|
| 5190            | -6.247                        | -7.282                        | -3.723                                    | 4.277                    |
| 5230            | -5.895                        | -6.487                        | -3.171                                    | 4.829                    |
| Frequency (MHz) | Antenna 1 PSD in 500kHz (dBm) | Antenna 2 PSD in 500kHz (dBm) | Antenna 1 + Antenna 2 PSD in 500kHz (dBm) | EIRP PSD in 500kHz (dBm) |
| 5755            | -10.96                        | -10.285                       | -7.599                                    | 0.401                    |
| 5795            | -11.458                       | -10.807                       | -8.110                                    | -0.110                   |

## TEST REPORT

### 3.4 Maximum Power Spectral Density (Cont'd)

#### IEEE 802.11ac (20MHz) (OFDM, MCS0)

| Frequency (MHz) | Antenna 1<br>PSD in 1MHz (dBm)   | Antenna 2<br>PSD in 1MHz (dBm)   | Antenna 1 + Antenna 2<br>PSD in 1MHz (dBm)   | EIRP<br>PSD in 1MHz (dBm)   |
|-----------------|----------------------------------|----------------------------------|----------------------------------------------|-----------------------------|
| 5180            | -4.002                           | -5.093                           | -1.503                                       | 6.497                       |
| 5200            | -4.150                           | -5.422                           | -1.729                                       | 6.271                       |
| 5240            | -3.288                           | -4.045                           | -0.640                                       | 7.360                       |
| Frequency (MHz) | Antenna 1<br>PSD in 500kHz (dBm) | Antenna 2<br>PSD in 500kHz (dBm) | Antenna 1 + Antenna 2<br>PSD in 500kHz (dBm) | EIRP<br>PSD in 500kHz (dBm) |
| 5745            | -8.505                           | -8.515                           | -5.500                                       | 2.500                       |
| 5785            | -9.150                           | -8.334                           | -5.713                                       | 2.287                       |
| 5825            | -9.581                           | -8.218                           | -5.836                                       | 2.164                       |

#### IEEE 802.11ac (40MHz) (OFDM, MCS0)

| Frequency (MHz) | Antenna 1<br>PSD in 1MHz (dBm)   | Antenna 2<br>PSD in 1MHz (dBm)   | Antenna 1 + Antenna 2<br>PSD in 1MHz (dBm)   | EIRP<br>PSD in 1MHz (dBm)   |
|-----------------|----------------------------------|----------------------------------|----------------------------------------------|-----------------------------|
| 5190            | -6.358                           | -7.585                           | -3.918                                       | 4.082                       |
| 5230            | -5.929                           | -6.807                           | -3.336                                       | 4.664                       |
| Frequency (MHz) | Antenna 1<br>PSD in 500kHz (dBm) | Antenna 2<br>PSD in 500kHz (dBm) | Antenna 1 + Antenna 2<br>PSD in 500kHz (dBm) | EIRP<br>PSD in 500kHz (dBm) |
| 5755            | -10.805                          | -10.498                          | -7.638                                       | 0.362                       |
| 5795            | -11.453                          | -11.016                          | -8.219                                       | -0.219                      |

#### IEEE 802.11ac (80MHz) (OFDM, MCS0)

| Frequency (MHz) | Antenna 1<br>PSD in 1MHz (dBm)   | Antenna 2<br>PSD in 1MHz (dBm)   | Antenna 1 + Antenna 2<br>PSD in 1MHz (dBm) | EIRP<br>PSD in 1MHz (dBm)   |
|-----------------|----------------------------------|----------------------------------|--------------------------------------------|-----------------------------|
| 5210            | -9.406                           | -10.9                            | -7.079                                     | -11.229                     |
| Frequency (MHz) | Antenna 1<br>PSD in 500kHz (dBm) | Antenna 2<br>PSD in 500kHz (dBm) | Antenna 1 + Antenna 2<br>PSD in 1MHz (dBm) | EIRP<br>PSD in 500kHz (dBm) |
| 5775            | -14.579                          | -13.925                          | 0.921                                      | -3.229                      |

## TEST REPORT

### 3.4 Maximum Power Spectral Density (Cont'd)

Directional Gain Calculations for In-Band Measurements as described in section F)2)a)i) of KDB 66291 D01 v02r01

Basic methodology with  $N_{ANT}$  transmit antennas, each with the same directional gain  $G_{ANT}$  dBi, being driven by  $N_{ANT}$  transmitter outputs of equal power. Directional gain is to be computed as follows:

transmit signals are correlated with each other, Directional gain =  $G_{ANT} + 10 \log(N_{ANT})$  dBi

Direction gain =  $5 + 3\text{dBi} = 8\text{dBi}$

Directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Thus, the Limits:

For U-NII-1:

☒ (11.0dBm -2dB) = 9dBm/MHz for mobile/portable device.

For U-NII-3: in 3kHz

☒ (30dBm – 2dB) = 28dBm/500kHz

Remark:

1. Cable Loss: 1.0dB
2. e.i.r.p. spectral density = Power spectral density + Duty Cycle Factor + Antenna Gain
3. Power spectral density = Conducted power spectral density + Duty Cycle Factor
4. Duty cycle = On Time/ Period;  
Duty Cycle factor =  $10 * \log(1/ \text{Duty cycle})$ ;  
Average factor =  $20 \log_{10} \text{Duty Cycle}$ .

The test data are saved with filename:

N20 - Test data 01.pdf

N40 – test data 02.pdf

A - Test data 03.pdf

AC20 – Test data 04.pdf

AC40 – Test data 05.pdf

AC80 – test data 06.pdf

## TEST REPORT

### 3.5 Field Strength Calculation

The field strength is calculated by adding the reading on the Spectrum Analyzer to the factors associated with preamplifiers (if any), antennas, cables, pulse desensitization and average factors (when specified limit is in average and measurements are made with peak detectors). A sample calculation is included below.

$$FS = RA + AF + CF - AG + PD + AV$$

|       |    |   |                                                     |
|-------|----|---|-----------------------------------------------------|
| Where | FS | = | Field Strength in dBμV/m                            |
|       | RA | = | Receiver Amplitude (including preamplifier) in dBμV |
|       | CF | = | Cable Attenuation Factor in dB                      |
|       | AF | = | Antenna Factor in dB                                |
|       | AG | = | Amplifier Gain in dB                                |
|       | PD | = | Pulse Desensitization in dB                         |
|       | AV | = | Average Factor in -dB                               |

In the radiated emission table which follows, the reading shown on the data table may reflect the preamplifier gain. An example of the calculations, where the reading does not reflect the preamplifier gain, follows:

$$FS = RA + AF + CF - AG + PD + AV$$

Example:

Assume a receiver reading of 62.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29.0 dB is subtracted. The pulse desensitization factor of the spectrum analyzer is 0.0 dB, and the resultant average factor is -10.0 dB. The net field strength for comparison to the appropriate emission limit is 32.0 dBμV/m. This value in dBμV/m is converted to its corresponding level in μV/m.

$$\begin{aligned}
 RA &= 62.0 \text{ dB}\mu\text{V} \\
 AF &= 7.4 \text{ dB} \\
 CF &= 1.6 \text{ dB} \\
 AG &= 29.0 \text{ dB} \\
 PD &= 0.0 \text{ dB} \\
 AV &= -10.0 \text{ dB} \\
 FS &= 62.0 + 7.4 + 1.6 - 29.0 + 0.0 + -10.0 = 32.0 \text{ dB}\mu\text{V/m}
 \end{aligned}$$

$$\text{Level in } \mu\text{V/m} = \text{Common Antilogarithm } [(32.0 \text{ dB}\mu\text{V/m})/20] = 39.8 \mu\text{V/m}$$

## TEST REPORT

### 3.6 Transmitter Radiated Emissions in Restricted Bands and Spurious Emissions

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included.

The data on the following pages list the significant emission frequencies, the limit and the margin of compliance.

#### 3.6.1 Radiated Emission Configuration Photograph

Worst Case Restricted Band Radiated Emission at 5150 MHz and 17475 MHz.

The worst case radiated emission configuration photographs are saved with filename:  
config photos.pdf

#### 3.6.2 Radiated Emission Data

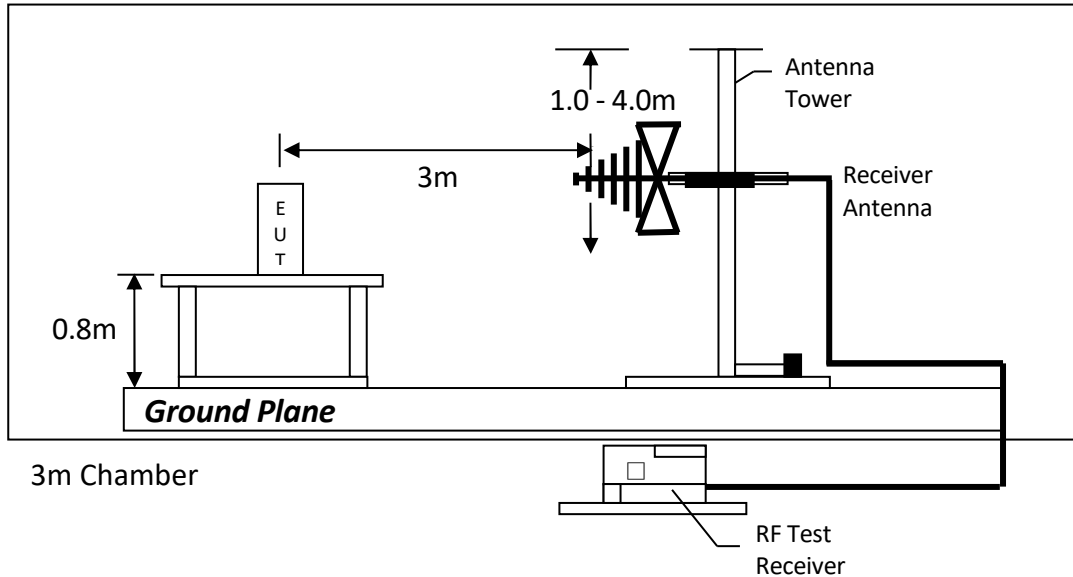
The data in below tables list the significant emission frequencies, the limit and the margin of compliance.

Judgement – Passed by 0.5 dB margin

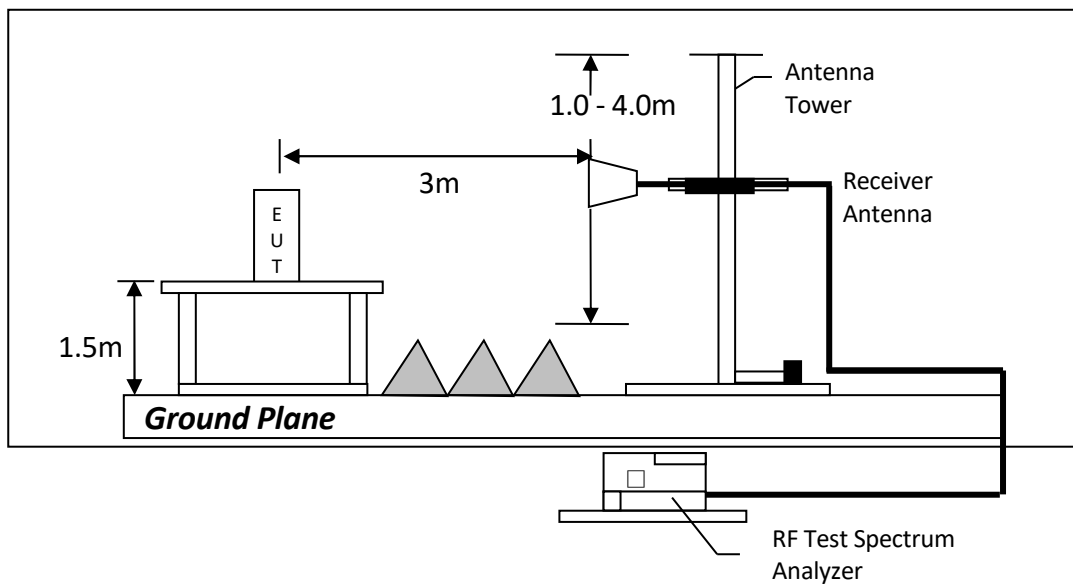
## TEST REPORT

### 3.6.3 Radiated Emission Test Setup

The figure below shows the test setup, which is utilized to make these measurements.



Test setup of radiated emissions up to 1GHz



Test setup of radiated emissions above 1GHz

## TEST REPORT

### RADIATED EMISSION DATA

IEEE 802.11a (20MHz) (OFDM, 6MBs)

5180MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| V            | 5150.000        | 26.5           | 33                | 35.7                | 53.5                         | 54.0                         | -0.5        |
| H            | 10360.000       | 32.7           | 33                | 40.5                | 36.2                         | 54.0                         | -17.8       |
| H            | 15540.000       | 28.0           | 33                | 37.7                | 45.1                         | 54.0                         | -8.9        |
| H            | 20720.000       | 26.5           | 33                | 37.7                | 38.2                         | 54.0                         | -15.8       |
| H            | 25900.000       | 32.7           | 33                | 39.3                | 37.7                         | 54.0                         | -16.3       |
| H            | 31080.000       | 28.0           | 33                | 42.1                | 43.3                         | 54.0                         | -10.7       |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| V            | 5150.000        | 52.7           | 33                | 35.7                | 68.2                      | 74.0                      | -5.8        |
| H            | 10360.000       | 65.8           | 33                | 40.5                | 49.5                      | 68.0                      | -18.5       |
| H            | 15540.000       | 60.6           | 33                | 37.7                | 58.5                      | 68.0                      | -9.5        |
| H            | 20720.000       | 47.1           | 33                | 37.7                | 45.4                      | 74.0                      | -28.6       |
| H            | 25900.000       | 39.3           | 33                | 39.3                | 42.0                      | 68.0                      | -26.0       |
| H            | 31080.000       | 32.8           | 33                | 42.1                | 50.5                      | 68.0                      | -17.5       |

5200MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| H            | 10400.000       | 33.2           | 33                | 40.5                | 40.7                         | 54.0                         | -13.3       |
| V            | 15600.000       | 44.9           | 33                | 37.7                | 49.6                         | 54.0                         | -4.4        |
| V            | 20800.000       | 29.8           | 33                | 37.7                | 34.5                         | 54.0                         | -19.5       |
| H            | 26000.000       | 29.7           | 33                | 39.2                | 35.9                         | 54.0                         | -18.1       |
| V            | 31200.000       | 34.6           | 33                | 42.1                | 43.7                         | 54.0                         | -10.3       |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| H            | 10400.000       | 46.5           | 33                | 40.5                | 54.0                      | 68.0                      | -14.0       |
| V            | 15600.000       | 58.3           | 33                | 37.7                | 63.0                      | 74.0                      | -11.0       |
| V            | 20800.000       | 45.1           | 33                | 37.7                | 49.8                      | 74.0                      | -24.2       |
| H            | 26000.000       | 38.1           | 33                | 39.2                | 44.3                      | 68.0                      | -23.7       |
| V            | 31200.000       | 34.6           | 33                | 42.1                | 43.7                      | 74.0                      | -30.3       |

## TEST REPORT

### RADIATED EMISSION DATA

IEEE 802.11a (20MHz) (OFDM, 6MBs)

5240MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| V            | 10480.000       | 30.9           | 33                | 40.5                | 38.4                         | 54.0                         | -15.6       |
| H            | 15720.000       | 42.6           | 33                | 37.7                | 47.3                         | 54.0                         | -6.7        |
| H            | 20960.000       | 35.2           | 33                | 37.7                | 39.9                         | 54.0                         | -14.1       |
| V            | 26200.000       | 35.6           | 33                | 39.2                | 41.8                         | 54.0                         | -12.2       |
| H            | 31440.000       | 34.8           | 33                | 42.1                | 43.9                         | 54.0                         | -10.1       |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| V            | 10480.000       | 50.6           | 33                | 40.5                | 51.8                      | 68.0                      | -16.2       |
| H            | 15720.000       | 56.1           | 33                | 37.7                | 60.8                      | 74.0                      | -13.2       |
| H            | 20960.000       | 63.4           | 33                | 37.7                | 51.3                      | 74.0                      | -22.7       |
| V            | 26200.000       | 49.7           | 33                | 39.2                | 48.1                      | 68.0                      | -19.9       |
| H            | 31440.000       | 44.3           | 33                | 42.1                | 44.2                      | 74.0                      | -29.8       |

5745MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| V            | 11490.000       | 35.1           | 33                | 40.8                | 42.9                         | 54.0                         | -11.1       |
| V            | 22980.000       | 33.3           | 33                | 38.3                | 38.6                         | 54.0                         | -15.4       |
| H            | 28725.000       | 35.7           | 33                | 40.1                | 42.8                         | 54.0                         | -11.2       |
| H            | 34470.000       | 38.6           | 33                | 41.1                | 46.7                         | 54.0                         | -7.3        |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| V            | 11490.000       | 48.5           | 33                | 40.8                | 56.3                      | 74.0                      | -17.7       |
| V            | 22980.000       | 37.9           | 33                | 38.3                | 43.2                      | 74.0                      | -30.8       |
| H            | 28725.000       | 39.1           | 33                | 40.1                | 46.2                      | 68.0                      | -21.8       |
| H            | 34470.000       | 44.0           | 33                | 41.1                | 52.1                      | 68.0                      | -15.9       |

## TEST REPORT

### RADIATED EMISSION DATA

IEEE 802.11a (20MHz) (OFDM, 6MBs)

5785MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| H            | 11570.000       | 33.2           | 33                | 40.5                | 40.7                         | 54.0                         | -13.3       |
| V            | 23140.000       | 39.6           | 33                | 38.6                | 45.2                         | 54.0                         | -8.8        |
| H            | 28925.000       | 40.9           | 33                | 40.1                | 48.0                         | 54.0                         | -6.0        |
| H            | 34710.000       | 39.7           | 33                | 41.3                | 48.0                         | 54.0                         | -6.0        |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| H            | 11570.000       | 46.5           | 33                | 40.5                | 54.0                      | 74.0                      | -20.0       |
| V            | 23140.000       | 39.7           | 33                | 38.6                | 45.3                      | 68.0                      | -22.7       |
| H            | 28925.000       | 40.9           | 33                | 40.1                | 48.0                      | 68.0                      | -20.0       |
| H            | 34710.000       | 44.5           | 33                | 41.3                | 52.8                      | 68.0                      | -15.2       |

5825MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| V            | 11650.000       | 37.6           | 33                | 40.5                | 45.1                         | 54.0                         | -8.9        |
| V            | 23300.000       | 31.1           | 33                | 38.6                | 36.7                         | 54.0                         | -17.3       |
| H            | 29125.000       | 40.5           | 33                | 40.0                | 47.5                         | 54.0                         | -6.5        |
| H            | 34950.000       | 42.1           | 33                | 41.3                | 50.4                         | 54.0                         | -3.6        |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| V            | 11650.000       | 51.0           | 33                | 40.5                | 58.5                      | 74.0                      | -15.5       |
| V            | 23300.000       | 39.1           | 33                | 38.6                | 44.7                      | 68.0                      | -23.3       |
| H            | 29125.000       | 40.9           | 33                | 40.0                | 47.9                      | 68.0                      | -20.1       |
| H            | 34950.000       | 45.1           | 33                | 41.3                | 53.4                      | 68.0                      | -14.6       |

- Notes:
1. Peak detector is used for the emission measurement.
  2. All measurements were made at 3 meters.
  3. Negative value in the margin column shows emission below limit.
  4. Horn antenna is used for the emission over 1000MHz.
  5. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
  6. Measurement Uncertainty is  $\pm 5.3$ dB at a level of confidence of 95%.
  7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
  8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
  9. Average detector is used according to ANSI C63.10 for average measurement.

## TEST REPORT

### RADIATED EMISSION DATA

IEEE 802.11n (20MHz) (OFDM, MCS0) – Both Antennas

5180MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| V            | 5150.000        | 26.5           | 33                | 35.7                | 53.3                         | 54.0                         | -0.7        |
| H            | 10360.000       | 32.7           | 33                | 40.5                | 36.4                         | 54.0                         | -17.6       |
| H            | 15540.000       | 28.0           | 33                | 37.7                | 45.1                         | 54.0                         | -8.9        |
| H            | 20720.000       | 26.5           | 33                | 37.7                | 38.2                         | 54.0                         | -15.8       |
| H            | 25900.000       | 32.7           | 33                | 39.3                | 37.7                         | 54.0                         | -16.3       |
| H            | 31080.000       | 28.0           | 33                | 42.1                | 43.3                         | 54.0                         | -10.7       |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| V            | 5150.000        | 52.7           | 33                | 35.7                | 69.5                      | 74.0                      | -4.5        |
| H            | 10360.000       | 65.8           | 33                | 40.5                | 50.3                      | 68.0                      | -17.7       |
| H            | 15540.000       | 60.6           | 33                | 37.7                | 58.6                      | 68.0                      | -9.4        |
| H            | 20720.000       | 47.1           | 33                | 37.7                | 45.4                      | 74.0                      | -28.6       |
| H            | 25900.000       | 39.3           | 33                | 39.3                | 42.0                      | 68.0                      | -26.0       |
| H            | 31080.000       | 32.8           | 33                | 42.1                | 50.5                      | 68.0                      | -17.5       |

5200MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| V            | 10400.000       | 33.3           | 33                | 40.5                | 40.8                         | 54.0                         | -13.2       |
| V            | 15600.000       | 44.8           | 33                | 37.7                | 49.5                         | 54.0                         | -4.5        |
| V            | 20800.000       | 29.8           | 33                | 37.7                | 34.5                         | 54.0                         | -19.5       |
| H            | 26000.000       | 29.7           | 33                | 39.2                | 35.9                         | 54.0                         | -18.1       |
| V            | 31200.000       | 34.6           | 33                | 42.1                | 43.7                         | 54.0                         | -10.3       |

## TEST REPORT

### RADIATED EMISSION DATA

IEEE 802.11n (20MHz) (OFDM, MCS0) – Both Antennas

5240MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| V            | 10480.000       | 31.1           | 33                | 40.5                | 38.6                         | 54.0                         | -15.4       |
| H            | 15720.000       | 42.6           | 33                | 37.7                | 47.3                         | 54.0                         | -6.7        |
| H            | 20960.000       | 35.2           | 33                | 37.7                | 39.9                         | 54.0                         | -14.1       |
| V            | 26200.000       | 35.6           | 33                | 39.2                | 41.8                         | 54.0                         | -12.2       |
| H            | 31440.000       | 34.8           | 33                | 42.1                | 43.9                         | 54.0                         | -10.1       |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| V            | 10480.000       | 50.6           | 33                | 40.5                | 52.4                      | 68.0                      | -15.6       |
| H            | 15720.000       | 56.0           | 33                | 37.7                | 60.7                      | 74.0                      | -13.3       |
| H            | 20960.000       | 63.4           | 33                | 37.7                | 51.3                      | 74.0                      | -22.7       |
| V            | 26200.000       | 49.7           | 33                | 39.2                | 48.1                      | 68.0                      | -19.9       |
| H            | 31440.000       | 44.3           | 33                | 42.1                | 44.2                      | 74.0                      | -29.8       |

5745MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| H            | 11490.000       | 35.1           | 33                | 40.8                | 42.9                         | 54.0                         | -11.1       |
| V            | 22980.000       | 33.3           | 33                | 38.3                | 38.6                         | 54.0                         | -15.4       |
| H            | 28725.000       | 35.7           | 33                | 40.1                | 42.8                         | 54.0                         | -11.2       |
| H            | 34470.000       | 38.6           | 33                | 41.1                | 46.7                         | 54.0                         | -7.3        |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| H            | 11490.000       | 48.7           | 33                | 40.8                | 56.5                      | 74.0                      | -17.5       |
| V            | 22980.000       | 37.9           | 33                | 38.3                | 43.2                      | 74.0                      | -30.8       |
| H            | 28725.000       | 39.1           | 33                | 40.1                | 46.2                      | 68.0                      | -21.8       |
| H            | 34470.000       | 44.0           | 33                | 41.1                | 52.1                      | 68.0                      | -15.9       |

## TEST REPORT

### RADIATED EMISSION DATA

IEEE 802.11n (20MHz) (OFDM, MCS0) – Both Antennas

5785MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| H            | 11570.000       | 33.3           | 33                | 40.5                | 40.8                         | 54.0                         | -13.2       |
| V            | 23140.000       | 39.6           | 33                | 38.6                | 45.2                         | 54.0                         | -8.8        |
| H            | 28925.000       | 40.7           | 33                | 40.1                | 47.8                         | 54.0                         | -6.2        |
| H            | 34710.000       | 39.5           | 33                | 41.3                | 47.8                         | 54.0                         | -6.2        |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| H            | 11570.000       | 47.0           | 33                | 40.5                | 54.5                      | 74.0                      | -19.5       |
| V            | 23140.000       | 39.7           | 33                | 38.6                | 45.3                      | 68.0                      | -22.7       |
| H            | 28925.000       | 40.9           | 33                | 40.1                | 48.0                      | 68.0                      | -20.0       |
| H            | 34710.000       | 44.5           | 33                | 41.3                | 52.8                      | 68.0                      | -15.2       |

5825MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| V            | 11650.000       | 37.6           | 33                | 40.5                | 45.1                         | 54.0                         | -8.9        |
| V            | 23300.000       | 31.1           | 33                | 38.6                | 36.7                         | 54.0                         | -17.3       |
| H            | 29125.000       | 40.5           | 33                | 40.0                | 47.5                         | 54.0                         | -6.5        |
| H            | 34950.000       | 39.5           | 33                | 41.3                | 47.8                         | 54.0                         | -6.2        |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| V            | 11650.000       | 51.1           | 33                | 40.5                | 58.6                      | 74.0                      | -15.4       |
| V            | 23300.000       | 39.1           | 33                | 38.6                | 44.7                      | 68.0                      | -23.3       |
| H            | 29125.000       | 40.9           | 33                | 40.0                | 47.9                      | 68.0                      | -20.1       |
| H            | 34950.000       | 45.1           | 33                | 41.3                | 53.4                      | 68.0                      | -14.6       |

- Notes:
1. Peak detector is used for the emission measurement.
  2. All measurements were made at 3 meters.
  3. Negative value in the margin column shows emission below limit.
  4. Horn antenna is used for the emission over 1000MHz.
  5. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
  6. Measurement Uncertainty is  $\pm 5.3$ dB at a level of confidence of 95%.
  7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
  8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
  9. Average detector is used according to ANSI C63.10 for average measurement.

## TEST REPORT

### RADIATED EMISSION DATA

IEEE 802.11n (40MHz) (MCS0) – Both Antennas

5190MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| V            | 5150.000        | 50.8           | 33                | 35.7                | 53.5                         | 54.0                         | -0.5        |
| H            | 10380.000       | 28.9           | 33                | 40.5                | 36.4                         | 54.0                         | -17.6       |
| H            | 15570.000       | 40.8           | 33                | 37.7                | 45.5                         | 54.0                         | -8.5        |
| V            | 20760.000       | 32.7           | 33                | 37.7                | 37.4                         | 54.0                         | -16.6       |
| H            | 25950.000       | 36.2           | 33                | 39.3                | 42.5                         | 54.0                         | -11.5       |
| H            | 31140.000       | 37.2           | 33                | 42.1                | 46.3                         | 54.0                         | -7.7        |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| V            | 5150.000        | 66.8           | 33                | 35.7                | 69.5                      | 74.0                      | -4.5        |
| H            | 10380.000       | 42.7           | 33                | 40.5                | 50.2                      | 68.0                      | -17.8       |
| H            | 15570.000       | 53.9           | 33                | 37.7                | 58.6                      | 74.0                      | -15.4       |
| V            | 20760.000       | 40.2           | 33                | 37.7                | 44.9                      | 74.0                      | -29.1       |
| H            | 25950.000       | 38.4           | 33                | 39.3                | 44.7                      | 68.0                      | -23.3       |
| H            | 31140.000       | 39.4           | 33                | 42.1                | 48.5                      | 68.0                      | -19.5       |

5230MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| H            | 10460.000       | 31.2           | 33                | 40.5                | 38.7                         | 54.0                         | -15.3       |
| V            | 15690.000       | 43.1           | 33                | 37.7                | 47.8                         | 54.0                         | -6.2        |
| H            | 20920.000       | 31.8           | 33                | 37.7                | 36.5                         | 54.0                         | -17.5       |
| V            | 26150.000       | 34.2           | 33                | 39.2                | 40.4                         | 54.0                         | -13.6       |
| H            | 31380.000       | 33.7           | 33                | 42.1                | 42.8                         | 54.0                         | -11.2       |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| H            | 10460.000       | 44.8           | 33                | 40.5                | 52.3                      | 68.0                      | -15.7       |
| V            | 15690.000       | 56.0           | 33                | 37.7                | 60.7                      | 74.0                      | -13.3       |
| H            | 20920.000       | 37.0           | 33                | 37.7                | 41.7                      | 74.0                      | -32.4       |
| V            | 26150.000       | 43.6           | 33                | 39.2                | 49.8                      | 68.0                      | -18.2       |
| H            | 31380.000       | 36.1           | 33                | 42.1                | 45.2                      | 74.0                      | -28.8       |

## TEST REPORT

### RADIATED EMISSION DATA

IEEE 802.11n (40MHz) (MCS0) – Both Antennas

5755MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| V            | 11510.000       | 35.7           | 33                | 40.5                | 43.2                         | 54.0                         | -10.8       |
| V            | 23020.000       | 35.8           | 33                | 38.6                | 41.4                         | 54.0                         | -12.6       |
| V            | 28775.000       | 35.7           | 33                | 40.1                | 42.8                         | 54.0                         | -11.2       |
| H            | 34530.000       | 40.2           | 33                | 41.3                | 48.5                         | 54.0                         | -5.5        |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| V            | 11510.000       | 49.0           | 33                | 40.5                | 56.5                      | 74.0                      | -17.5       |
| V            | 23020.000       | 38.2           | 33                | 38.6                | 43.8                      | 74.0                      | -30.2       |
| V            | 28775.000       | 38.2           | 33                | 40.1                | 45.3                      | 68.0                      | -22.7       |
| H            | 34530.000       | 42.6           | 33                | 41.3                | 50.9                      | 68.0                      | -17.2       |

5795MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| V            | 11590.000       | 33.5           | 33                | 40.5                | 41.0                         | 54.0                         | -13.0       |
| V            | 23180.000       | 34.8           | 33                | 38.6                | 40.4                         | 54.0                         | -13.6       |
| H            | 28975.000       | 36.6           | 33                | 40.1                | 43.7                         | 54.0                         | -10.3       |
| H            | 34770.000       | 39.3           | 33                | 41.3                | 47.6                         | 54.0                         | -6.4        |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| V            | 11590.000       | 46.9           | 33                | 40.5                | 54.4                      | 74.0                      | -19.6       |
| V            | 23180.000       | 37.5           | 33                | 38.6                | 43.1                      | 68.0                      | -24.9       |
| H            | 28975.000       | 37.6           | 33                | 40.1                | 44.7                      | 68.0                      | -23.3       |
| H            | 34770.000       | 42.0           | 33                | 41.3                | 50.3                      | 68.0                      | -17.7       |

- Notes:
1. Peak detector is used for the emission measurement.
  2. All measurements were made at 3 meters.
  3. Negative value in the margin column shows emission below limit.
  4. Horn antenna is used for the emission over 1000MHz.
  5. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
  6. Measurement Uncertainty is  $\pm 5.3$ dB at a level of confidence of 95%.
  7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
  8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
  9. Average detector is used according to ANSI C63.10 for average measurement.

## TEST REPORT

### RADIATED EMISSION DATA

IEEE 802.11ac (20MHz) (MCS0) – Both Antennas

5180MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| V            | 5150.000        | 26.5           | 33                | 35.7                | 52.9                         | 54.0                         | -1.1        |
| H            | 10360.000       | 32.7           | 33                | 40.5                | 36.3                         | 54.0                         | -17.7       |
| V            | 15540.000       | 28.0           | 33                | 37.7                | 45.1                         | 54.0                         | -8.9        |
| H            | 20720.000       | 26.5           | 33                | 37.7                | 38.2                         | 54.0                         | -15.8       |
| H            | 25900.000       | 32.7           | 33                | 39.3                | 37.7                         | 54.0                         | -16.3       |
| H            | 31080.000       | 28.0           | 33                | 42.1                | 43.3                         | 54.0                         | -10.7       |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| V            | 5150.000        | 52.7           | 33                | 35.7                | 71.8                      | 74.0                      | -2.2        |
| H            | 10360.000       | 65.8           | 33                | 40.5                | 49.5                      | 68.0                      | -18.5       |
| V            | 15540.000       | 60.6           | 33                | 37.7                | 58.9                      | 68.0                      | -9.1        |
| H            | 20720.000       | 47.1           | 33                | 37.7                | 45.4                      | 74.0                      | -28.6       |
| H            | 25900.000       | 39.3           | 33                | 39.3                | 42.0                      | 68.0                      | -26.0       |
| H            | 31080.000       | 32.8           | 33                | 42.1                | 50.5                      | 68.0                      | -17.5       |

5200MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| H            | 10400.000       | 33.2           | 33                | 40.5                | 40.7                         | 54.0                         | -13.3       |
| H            | 15600.000       | 44.8           | 33                | 37.7                | 49.5                         | 54.0                         | -4.5        |
| V            | 20800.000       | 29.8           | 33                | 37.7                | 34.5                         | 54.0                         | -19.5       |
| H            | 26000.000       | 29.7           | 33                | 39.2                | 35.9                         | 54.0                         | -18.1       |
| V            | 31200.000       | 34.6           | 33                | 42.1                | 43.7                         | 54.0                         | -10.3       |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| H            | 10400.000       | 46.7           | 33                | 40.5                | 54.2                      | 68.0                      | -13.8       |
| H            | 15600.000       | 58.9           | 33                | 37.7                | 63.6                      | 74.0                      | -10.4       |
| V            | 20800.000       | 45.1           | 33                | 37.7                | 49.8                      | 74.0                      | -24.2       |
| H            | 26000.000       | 38.1           | 33                | 39.2                | 44.3                      | 68.0                      | -23.7       |
| V            | 31200.000       | 34.6           | 33                | 42.1                | 43.7                      | 74.0                      | -30.3       |

## TEST REPORT

### RADIATED EMISSION DATA

IEEE 802.11ac (20MHz) (MCS0) – Both Antennas

5240MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| V            | 10480.000       | 31.0           | 33                | 40.5                | 38.5                         | 54.0                         | -15.5       |
| V            | 15720.000       | 42.6           | 33                | 37.7                | 47.3                         | 54.0                         | -6.7        |
| H            | 20960.000       | 35.2           | 33                | 37.7                | 39.9                         | 54.0                         | -14.1       |
| V            | 26200.000       | 35.6           | 33                | 39.2                | 41.8                         | 54.0                         | -12.2       |
| H            | 31440.000       | 34.8           | 33                | 42.1                | 43.9                         | 54.0                         | -10.1       |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| V            | 10480.000       | 50.6           | 33                | 40.5                | 51.9                      | 68.0                      | -16.1       |
| V            | 15720.000       | 56.6           | 33                | 37.7                | 61.3                      | 74.0                      | -12.7       |
| H            | 20960.000       | 63.4           | 33                | 37.7                | 51.3                      | 74.0                      | -22.7       |
| V            | 26200.000       | 49.7           | 33                | 39.2                | 48.1                      | 68.0                      | -19.9       |
| H            | 31440.000       | 44.3           | 33                | 42.1                | 44.2                      | 74.0                      | -29.8       |

5745MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| V            | 11490.000       | 35.1           | 33                | 40.8                | 42.9                         | 54.0                         | -11.1       |
| V            | 22980.000       | 33.3           | 33                | 38.3                | 38.6                         | 54.0                         | -15.4       |
| H            | 28725.000       | 35.7           | 33                | 40.1                | 42.8                         | 54.0                         | -11.2       |
| H            | 34470.000       | 38.6           | 33                | 41.1                | 46.7                         | 54.0                         | -7.3        |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| V            | 11490.000       | 48.8           | 33                | 40.8                | 56.6                      | 74.0                      | -17.4       |
| V            | 22980.000       | 37.9           | 33                | 38.3                | 43.2                      | 74.0                      | -30.8       |
| H            | 28725.000       | 39.1           | 33                | 40.1                | 46.2                      | 68.0                      | -21.8       |
| H            | 34470.000       | 44.0           | 33                | 41.1                | 52.1                      | 68.0                      | -15.9       |

## TEST REPORT

### RADIATED EMISSION DATA

IEEE 802.11ac (20MHz) (MCS0) – Both Antennas

5785MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| H            | 11570.000       | 33.2           | 33                | 40.5                | 40.7                         | 54.0                         | -13.3       |
| V            | 23140.000       | 39.6           | 33                | 38.6                | 45.2                         | 54.0                         | -8.8        |
| H            | 28925.000       | 39.6           | 33                | 40.1                | 46.7                         | 54.0                         | -7.3        |
| H            | 34710.000       | 39.3           | 33                | 41.3                | 47.6                         | 54.0                         | -6.4        |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| H            | 11570.000       | 46.7           | 33                | 40.5                | 54.2                      | 74.0                      | -19.8       |
| V            | 23140.000       | 39.7           | 33                | 38.6                | 45.3                      | 68.0                      | -22.7       |
| H            | 28925.000       | 40.9           | 33                | 40.1                | 48.0                      | 68.0                      | -20.0       |
| H            | 34710.000       | 44.5           | 33                | 41.3                | 52.8                      | 68.0                      | -15.2       |

5825MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| V            | 11650.000       | 37.6           | 33                | 40.5                | 45.1                         | 54.0                         | -8.9        |
| V            | 23300.000       | 31.1           | 33                | 38.6                | 36.7                         | 54.0                         | -17.3       |
| H            | 29125.000       | 40.5           | 33                | 40.0                | 47.5                         | 54.0                         | -6.5        |
| H            | 34950.000       | 39.1           | 33                | 41.3                | 47.4                         | 54.0                         | -6.6        |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| V            | 11650.000       | 51.4           | 33                | 40.5                | 58.9                      | 74.0                      | -15.1       |
| V            | 23300.000       | 39.1           | 33                | 38.6                | 44.7                      | 68.0                      | -23.3       |
| H            | 29125.000       | 40.9           | 33                | 40.0                | 47.9                      | 68.0                      | -20.1       |
| H            | 34950.000       | 45.1           | 33                | 41.3                | 53.4                      | 68.0                      | -14.6       |

- Notes:
1. Peak detector is used for the emission measurement.
  2. All measurements were made at 3 meters.
  3. Negative value in the margin column shows emission below limit.
  4. Horn antenna is used for the emission over 1000MHz.
  5. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
  6. Measurement Uncertainty is  $\pm 5.3$ dB at a level of confidence of 95%.
  7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
  8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
  9. Average detector is used according to ANSI C63.10 for average measurement.

## TEST REPORT

### RADIATED EMISSION DATA

IEEE 802.11ac (40MHz) (MCS0) – Both Antennas

5190MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| V            | 5150.000        | 50.8           | 33                | 35.7                | 53.5                         | 54.0                         | -0.5        |
| H            | 10380.000       | 28.9           | 33                | 40.5                | 36.4                         | 54.0                         | -17.6       |
| H            | 15570.000       | 40.8           | 33                | 37.7                | 45.5                         | 54.0                         | -8.5        |
| V            | 20760.000       | 32.7           | 33                | 37.7                | 37.4                         | 54.0                         | -16.6       |
| H            | 25950.000       | 36.2           | 33                | 39.3                | 42.5                         | 54.0                         | -11.5       |
| H            | 31140.000       | 37.2           | 33                | 42.1                | 46.3                         | 54.0                         | -7.7        |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| V            | 5150.000        | 66.1           | 33                | 35.7                | 68.8                      | 74.0                      | -5.2        |
| H            | 10380.000       | 42.8           | 33                | 40.5                | 50.3                      | 68.0                      | -17.7       |
| H            | 15570.000       | 54.2           | 33                | 37.7                | 58.9                      | 74.0                      | -15.1       |
| V            | 20760.000       | 40.2           | 33                | 37.7                | 44.9                      | 74.0                      | -29.1       |
| H            | 25950.000       | 38.4           | 33                | 39.3                | 44.7                      | 68.0                      | -23.3       |
| H            | 31140.000       | 39.4           | 33                | 42.1                | 48.5                      | 68.0                      | -19.5       |

5230MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| V            | 10460.000       | 31.1           | 33                | 40.5                | 38.6                         | 54.0                         | -15.4       |
| H            | 15690.000       | 42.4           | 33                | 37.7                | 47.1                         | 54.0                         | -6.9        |
| H            | 20920.000       | 31.8           | 33                | 37.7                | 36.5                         | 54.0                         | -17.5       |
| V            | 26150.000       | 34.2           | 33                | 39.2                | 40.4                         | 54.0                         | -13.6       |
| H            | 31380.000       | 33.7           | 33                | 42.1                | 42.8                         | 54.0                         | -11.2       |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| V            | 10460.000       | 45.0           | 33                | 40.5                | 52.5                      | 68.0                      | -15.5       |
| H            | 15690.000       | 56.4           | 33                | 37.7                | 61.1                      | 74.0                      | -12.9       |
| H            | 20920.000       | 37.0           | 33                | 37.7                | 41.7                      | 74.0                      | -32.4       |
| V            | 26150.000       | 43.6           | 33                | 39.2                | 49.8                      | 68.0                      | -18.2       |
| H            | 31380.000       | 36.1           | 33                | 42.1                | 45.2                      | 74.0                      | -28.8       |

## TEST REPORT

### RADIATED EMISSION DATA

IEEE 802.11ac (40MHz) (MCS0) – Both Antennas

5755MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| H            | 11510.000       | 35.4           | 33                | 40.5                | 42.9                         | 54.0                         | -11.1       |
| V            | 23020.000       | 35.8           | 33                | 38.6                | 41.4                         | 54.0                         | -12.6       |
| V            | 28775.000       | 35.7           | 33                | 40.1                | 42.8                         | 54.0                         | -11.2       |
| H            | 34530.000       | 40.2           | 33                | 41.3                | 48.5                         | 54.0                         | -5.5        |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| H            | 11510.000       | 49.3           | 33                | 40.5                | 56.8                      | 74.0                      | -17.2       |
| V            | 23020.000       | 38.2           | 33                | 38.6                | 43.8                      | 74.0                      | -30.2       |
| V            | 28775.000       | 38.2           | 33                | 40.1                | 45.3                      | 68.0                      | -22.7       |
| H            | 34530.000       | 42.6           | 33                | 41.3                | 50.9                      | 68.0                      | -17.2       |

5795MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| H            | 11590.000       | 33.3           | 33                | 40.5                | 40.8                         | 54.0                         | -13.2       |
| V            | 23180.000       | 34.8           | 33                | 38.6                | 40.4                         | 54.0                         | -13.6       |
| H            | 28975.000       | 36.6           | 33                | 40.1                | 43.7                         | 54.0                         | -10.3       |
| H            | 34770.000       | 39.3           | 33                | 41.3                | 47.6                         | 54.0                         | -6.4        |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| H            | 11590.000       | 47.1           | 33                | 40.5                | 54.6                      | 74.0                      | -19.4       |
| V            | 23180.000       | 37.5           | 33                | 38.6                | 43.1                      | 68.0                      | -24.9       |
| H            | 28975.000       | 37.6           | 33                | 40.1                | 44.7                      | 68.0                      | -23.3       |
| H            | 34770.000       | 42.0           | 33                | 41.3                | 50.3                      | 68.0                      | -17.7       |

- Notes:
1. Peak detector is used for the emission measurement.
  2. All measurements were made at 3 meters.
  3. Negative value in the margin column shows emission below limit.
  4. Horn antenna is used for the emission over 1000MHz.
  5. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
  6. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.
  7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
  8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
  9. Average detector is used according to ANSI C63.10 for average measurement.

## TEST REPORT

### RADIATED EMISSION DATA

### ADIATED EMISSION DATA (CONT'D)

IEEE 802.11ac (80MHz) (MCS0) – Both Antennas

5210MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| V            | 5150.000        | 50.8           | 33                | 35.7                | 53.5                         | 54.0                         | -0.5        |
| H            | 10420.000       | 29.1           | 33                | 40.5                | 36.6                         | 54.0                         | -17.4       |
| H            | 15630.000       | 40.8           | 33                | 37.7                | 45.5                         | 54.0                         | -8.5        |
| H            | 20840.000       | 33.1           | 33                | 37.7                | 37.8                         | 54.0                         | -16.2       |
| V            | 26050.000       | 33.4           | 33                | 39.2                | 39.6                         | 54.0                         | -14.4       |
| H            | 31260.000       | 32.3           | 33                | 42.1                | 41.4                         | 54.0                         | -12.6       |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| V            | 5150.000        | 66.2           | 33                | 35.7                | 68.9                      | 74.0                      | -5.1        |
| H            | 10420.000       | 42.1           | 33                | 40.5                | 49.6                      | 68.0                      | -18.4       |
| H            | 15630.000       | 54.7           | 33                | 37.7                | 59.4                      | 74.0                      | -14.6       |
| H            | 20840.000       | 39.4           | 33                | 37.7                | 44.1                      | 74.0                      | -30.0       |
| V            | 26050.000       | 35.4           | 33                | 39.2                | 41.6                      | 68.0                      | -26.4       |
| H            | 31260.000       | 36.0           | 33                | 42.1                | 45.1                      | 74.0                      | -28.9       |

## TEST REPORT

### RADIATED EMISSION DATA (CONT'D)

IEEE 802.11ac (80MHz) (MCS0) – Both Antennas

5775MHz

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Average (dBμV/m) | Average Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|------------------------------|------------------------------|-------------|
| H            | 11550.000       | 35.8           | 33                | 40.5                | 43.3                         | 54.0                         | -10.7       |
| H            | 23100.000       | 34.5           | 33                | 38.6                | 40.1                         | 54.0                         | -13.9       |
| H            | 28875.000       | 40.2           | 33                | 40.1                | 47.3                         | 54.0                         | -6.7        |
| V            | 34650.000       | 32.9           | 33                | 41.3                | 41.2                         | 54.0                         | -12.8       |

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-Amp Gain (dB) | Antenna Factor (dB) | Net at 3m - Peak (dBμV/m) | Peak Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|-------------------|---------------------|---------------------------|---------------------------|-------------|
| H            | 11550.000       | 49.5           | 33                | 40.5                | 57.0                      | 74.0                      | -17.0       |
| H            | 23100.000       | 40.6           | 33                | 38.6                | 46.2                      | 74.0                      | -27.9       |
| H            | 28875.000       | 42.5           | 33                | 40.1                | 49.6                      | 68.0                      | -18.4       |
| V            | 36680.000       | 36.2           | 33                | 41.7                | 44.9                      | 68.0                      | -23.1       |

- Notes:
1. Peak detector is used for the emission measurement.
  2. All measurements were made at 3 meters.
  3. Negative value in the margin column shows emission below limit.
  4. Horn antenna is used for the emission over 1000MHz.
  5. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
  6. Measurement Uncertainty is  $\pm 5.3$ dB at a level of confidence of 95%.
  7. For the measurement of radiated emission, summation method was used which numerical integrating (in terms of linear power) over the transmitter occupied bandwidth.
  8. For the linear power measurement, data in 1MHz spacing was collected by spectrum analyzer with 1MHz resolution bandwidth.
  9. Average detector is used according to ANSI C63.10 for average measurement.

## TEST REPORT

### RADIATED EMISSION DATA (CONT'D)

Worst Case: Transmitting

| Polarization | Frequency (MHz) | Reading (dBμV) | Pre-amp (dB) | Antenna Factor (dB) | Net at 3m (dBμV/m) | Limit at 3m (dBμV/m) | Margin (dB) |
|--------------|-----------------|----------------|--------------|---------------------|--------------------|----------------------|-------------|
| H            | 124.999         | 40.9           | 16           | 14.0                | 38.9               | 43.5                 | -4.6        |
| H            | 148.499         | 42.6           | 16           | 14.0                | 40.6               | 43.5                 | -2.9        |
| H            | 249.998         | 40.6           | 16           | 20.0                | 44.6               | 46.0                 | -1.4        |
| H            | 371.203         | 29.9           | 16           | 24.0                | 37.9               | 46.0                 | -8.1        |
| V            | 749.995         | 30.4           | 16           | 30.0                | 44.4               | 46.0                 | -1.6        |
| H            | 874.994         | 27.1           | 16           | 32.0                | 43.1               | 46.0                 | -2.9        |

- NOTES: 1. Peak detector is used unless otherwise stated.  
 2. All measurements were made at 3 meters.  
 3. Negative value in the margin column shows emission below limit.  
 4. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.  
 5. Measurement Uncertainty is  $\pm 5.3$ dB at a level of confidence of 95%.

## TEST REPORT

### 3.7 AC Power Line Conducted Emission

- ☐ Not Applicable – EUT is only powered by battery for operation.
- ☒ EUT connects to AC power line. Emission Data is listed in following pages.
- ☐ Base Unit connects to AC power line and has transmission. Handset connects to AC power line but has no transmission. Emission Data of Base Unit is listed in following pages.

#### 3.7.1 AC Power Line Conducted Emission Configuration Photograph

Worst Case Line-Conducted Configuration at 0.483 MHz.

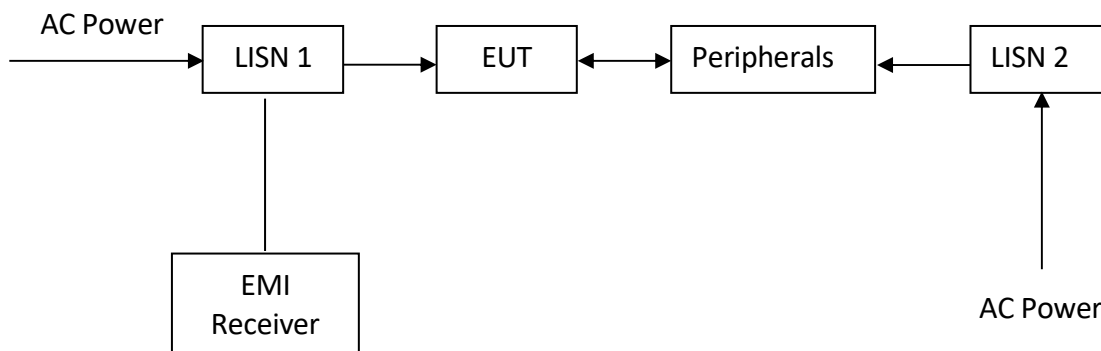
The worst case line conducted configuration photographs are attached in the Appendix and saved with filename: config photos.pdf.

#### 3.7.2 AC Power Line Conducted Emission Data

The plot(s) and data in the following pages list the significant emission frequencies, the limit and the margin of compliance.

Passed by 6.03 dB margin compare with Quasi-peak limit.

#### 3.7.3 Conducted Emission Test Setup



The EUT along with its peripherals were placed on a 1.0m(W)×1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50 ohm coupling impedance for measuring instrument and the chassis ground was bounded to the horizontal ground plane of shielded room. The excess power cable between the EUT and the LISN was bundled.

All connecting cables of EUT and peripherals were moved to find the maximum emission.

## TEST REPORT

### AC POWER LINE CONDUCTED EMISSION

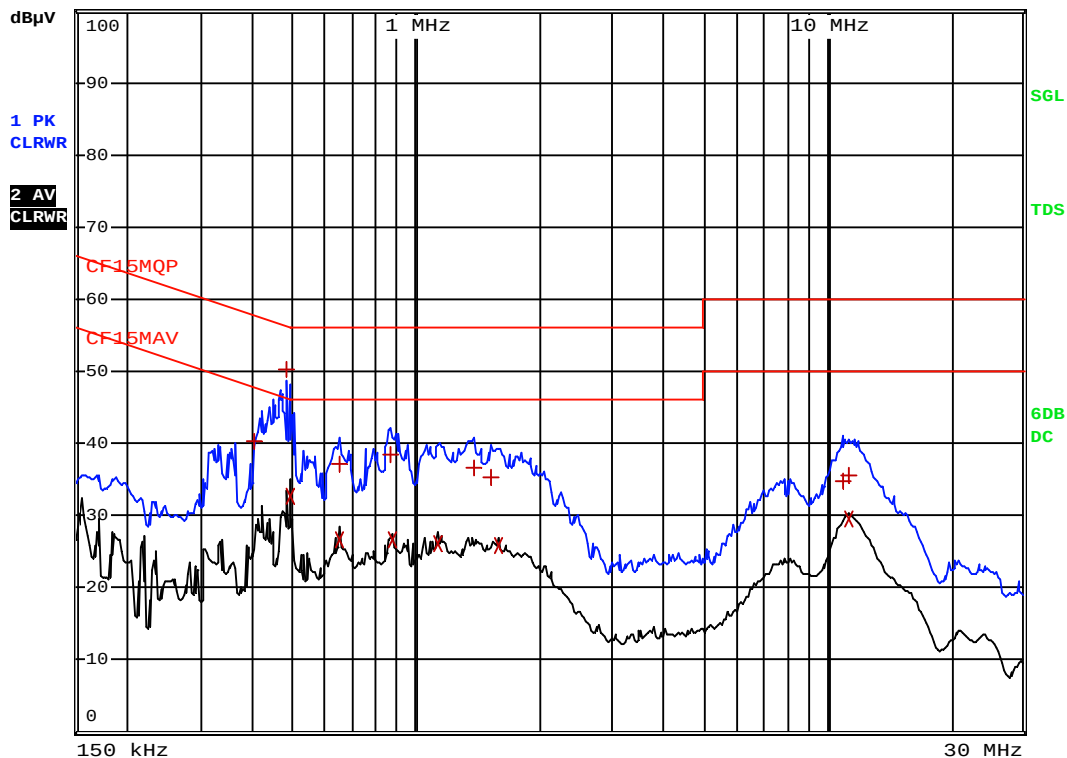
Worst Case: Operating Mode



RBW 9 kHz

MT 1 s

Att 10 dB AUTO PREAMP OFF



## TEST REPORT

### AC POWER LINE CONDUCTED EMISSION

Worst Case: Operating Mode

| EDIT PEAK LIST (Final Measurement Results) |             |            |  |                |
|--------------------------------------------|-------------|------------|--|----------------|
| Trace1:                                    | CF15MQP     |            |  |                |
| Trace2:                                    | CF15MAV     |            |  |                |
| Trace3:                                    | ---         |            |  |                |
| TRACE                                      | FREQUENCY   | LEVEL dBμV |  | DELTA LIMIT dB |
| 1 Quasi Peak                               | 402 kHz     | 40.36 N    |  | -17.44         |
| 1 Quasi Peak                               | 483 kHz     | 50.25 N    |  | -6.03          |
| 2 CISPR Average                            | 492 kHz     | 32.71 N    |  | -13.42         |
| 1 Quasi Peak                               | 649.5 kHz   | 37.26 L1   |  | -18.73         |
| 2 CISPR Average                            | 649.5 kHz   | 26.73 N    |  | -19.26         |
| 1 Quasi Peak                               | 870 kHz     | 38.44 L1   |  | -17.55         |
| 2 CISPR Average                            | 879 kHz     | 26.75 N    |  | -19.24         |
| 2 CISPR Average                            | 1.1355 MHz  | 25.99 L1   |  | -20.00         |
| 1 Quasi Peak                               | 1.383 MHz   | 36.56 L1   |  | -19.43         |
| 1 Quasi Peak                               | 1.527 MHz   | 35.38 L1   |  | -20.61         |
| 2 CISPR Average                            | 1.5945 MHz  | 25.81 L1   |  | -20.18         |
| 1 Quasi Peak                               | 10.968 MHz  | 34.74 L1   |  | -25.25         |
| 2 CISPR Average                            | 11.346 MHz  | 29.59 L1   |  | -20.40         |
| 1 Quasi Peak                               | 11.3595 MHz | 35.61 L1   |  | -24.38         |

## TEST REPORT

### EXHIBIT 4 EQUIPMENT LIST

#### 1) Radiated Emissions Test

| Equipment            | Spectrum Analyzer<br>(10Hz to 40GHz) | Biconical Antenna<br>(30MHz to 300MHz) |
|----------------------|--------------------------------------|----------------------------------------|
| Registration No.     | EW-3016                              | EW-3241                                |
| Manufacturer         | ROHDESCHWARZ                         | EMCO                                   |
| Model No.            | FSV40                                | 3110C                                  |
| Calibration Date     | December 13, 2022                    | May 26, 2021                           |
| Calibration Due Date | December 13, 2023                    | May 26, 2023                           |

| Equipment            | Log Periodic Antenna | Double Ridged Guide<br>Antenna | Active Loop H-field<br>(9kHz to 30MHz) |
|----------------------|----------------------|--------------------------------|----------------------------------------|
| Registration No.     | EW-3243              | EW-1133                        | EW-3302                                |
| Manufacturer         | EMCO                 | EMCO                           | EMCO                                   |
| Model No.            | 3148B                | 3115                           | 6502                                   |
| Calibration Date     | June 03, 2021        | May 26, 2021                   | December 13, 2021                      |
| Calibration Due Date | March 30, 2023       | May 26, 2023                   | June 13, 2023                          |

| Equipment            | RF Preamplifier<br>(9kHz to 6000MHz) | 2.4GHz Notch Filter | 14m Double Shield RF<br>Cable (9kHz - 6GHz) |
|----------------------|--------------------------------------|---------------------|---------------------------------------------|
| Registration No.     | EW-3006b                             | EW-3435             | EW-2376                                     |
| Manufacturer         | SCHWARZBECK                          | MICROWAVE           | RADIAL                                      |
| Model No.            | BBV9718                              | N0324413            | n m/br56/bnc m 14m                          |
| Calibration Date     | February 15, 2022                    | June 16, 2022       | January 26, 2022                            |
| Calibration Due Date | May 15, 2023                         | June 16, 2023       | April 26, 2023                              |

| Equipment            | Pyramidal Horn<br>Antenna |
|----------------------|---------------------------|
| Registration No.     | EW-0905                   |
| Manufacturer         | EMCO                      |
| Model No.            | 3160-09                   |
| Calibration Date     | July 20, 2021             |
| Calibration Due Date | April 20, 2023            |

## TEST REPORT

### 4.0 EQUIPMENT LIST (CONT'D)

#### 2) Conducted Emissions Test

| Equipment            | RF Cable 80cm<br>(RG142)<br>(9kHz to 30MHz) | Artificial Mains<br>Network | EMI Test Receiver<br>(9kHz to 26.5GHz) |
|----------------------|---------------------------------------------|-----------------------------|----------------------------------------|
| Registration No.     | EW-2451                                     | EW-2501                     | EW-3156                                |
| Manufacturer         | RADIAL                                      | ROHDESCHWARZ                | ROHDESCHWARZ                           |
| Model No.            | bnc m st / 142 / bnc m<br>st 80cm           | ENV-216                     | ESR26                                  |
| Calibration Date     | May 06, 2022                                | November 09, 2021           | September 26, 2022                     |
| Calibration Due Date | May 06, 2023                                | May 09, 2023                | September 26, 2023                     |

#### 3) Bandedge Measurement

| Equipment            | EMI Test Receiver<br>(9kHz to 26.5GHz) | 5m RF Cable (40GHz) |
|----------------------|----------------------------------------|---------------------|
| Registration No.     | EW-3156                                | EW-2701             |
| Manufacturer         | ROHDESCHWARZ                           | RADIAL              |
| Model No.            | ESR26                                  | Sma m-m 5m 40G      |
| Calibration Date     | September 26, 2022                     | November 24, 2021   |
| Calibration Due Date | September 26, 2023                     | May 24, 2023        |

#### 4) Conductive Measurement Test

| Equipment            | RF Cable (40GHz)  | RF Power Meter with<br>Power Sensor<br>(NRP-Z81) | Signal and Spectrum<br>Analyzer<br>(10Hz to 40GHz) |
|----------------------|-------------------|--------------------------------------------------|----------------------------------------------------|
| Registration No.     | EW-3271           | EW-3309                                          | EW-3016                                            |
| Manufacturer         | GREATBILLION      | ROHDESCHWARZ                                     | ROHDESCHWARZ                                       |
| Model No.            | sma m-m 5m 40G    | NRP-Z81                                          | FSV40                                              |
| Calibration Date     | November 24, 2021 | December 01, 2021                                | October 29, 2021                                   |
| Calibration Due Date | May 24, 2023      | March 01, 2023                                   | April 26, 2023                                     |

#### 5) Bandedge & Bandwidth Measurement

| Equipment            | 5m RF Cable (40GHz) | EMI Test Receiver<br>(9kHz to 26.5GHz) |
|----------------------|---------------------|----------------------------------------|
| Registration No.     | EW-2701             | EW-3156                                |
| Manufacturer         | RADIAL              | ROHDESCHWARZ                           |
| Model No.            | sma m-m 5m 40G      | ESR26                                  |
| Calibration Date     | November 24, 2021   | September 26, 2022                     |
| Calibration Due Date | May 24, 2023        | September 26, 2023                     |

#### 6) Control Software for Radiated Emission

| Software Information |              |
|----------------------|--------------|
| Software Name        | EMC32        |
| Manufacturer         | ROHDESCHWARZ |
| Software version     | 10.50.40     |

END OF TEST REPORT