2/F., Garment Centre,
576 Castle Peak Road, Kowloon,
Hong Kong SAR, China.

Telephone: (852) 2173 8888
Facsimile: (852) 2785 5487
www.intertek.com

TEST REPORT

Report No.: 22080534HKG-003

Qmax Systems India Private Limited

Application For Original Grant of 47 CFR Part 15 Certification

FCC ID: 2APD6TEKCCD002

OBD Diagnostics Device

Transceiver – 5GHz WLAN WiFi

This report contains the data of 5GHz WiFi portion only.

Prepared and Checked by:	**Approved by:**
Signed on File Wong Cheuk Ho, Herbert Lead Engineer	Digitally signed by Kenneth Wong Location: Intertek Testing Services Hong Kong Limited Wong Kwok Yeung, Kenneth Assistant Supervisor Date: April 13, 2023

TEST REPORT

GENERAL INFORMATION

Grantee:	Qmax Systems India Private Limited
Grantee Address:	795, Trunk Road, Poonamallee, Chennai, India.
FCC Specification Standard:	FCC Part 15, October 1, 2021 Edition
FCC ID:	2APD6TEKCCD002
FCC Model(s):	CCD-V1
Type of EUT:	Unlicensed National Information Infrastructure Transmitter
Description of EUT:	OBD Diagnostics Device
Serial Number:	N/A
Sample Receipt Date:	June 29, 2022
Date of Test:	June 29, 2022 to November 03, 2022
Report Date:	April 13, 2023
Environmental Conditions:	Temperature: +10 to 40°C Humidity: 10 to 90%
Conclusion:	Test was conducted by client submitted sample. The submitted sample as received complied with the 47 CFR Part 15 Certification.

TEST REPORT

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TEST REPORT

1.0 TEST RESULTS SUMMARY & STATEMENT OF COMPLIANCE

1.1 Summary of Test Results

Test Items	FCC Part 15 Section	Results	Details See Section
Antenna Requirement	15.407(a)	Pass	2.1
Max. Conducted Output Power (Peak)	15.407(a)	Pass	4.1
Transmit Power Control (TPC)	15.407(h)	N/A	See Remark
Min. 6dB RF Bandwidth	15.407(e)	Pass	4.2
Max. Power Density (average)	15.407(a)	Pass	4.3
Out of Band Antenna Conducted Emission	15.407(b)	Pass	4.4
Radiated Emission in Restricted Bands and Spurious Emissions	15.407(b), 15.209 & 15.109	Pass	4.6
AC Power Line Conducted Emission	15.207 & 15.107	Pass	4.7
Dynamic Frequency Selection(DFS)	15.407	N/A	4.10

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.

1.2 Statement of Compliance

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

FCC Part 15, October 1, 2021 Edition

TEST REPORT

2.0 GENERAL DESCRIPTION

2.1 Product Description

The Equipment Under Test (EUT) that is an On-Board Diagnostic system for Vehicle which enabled with IOT tracking and cloud connectivity via Bluetooth, BLE, 2.4GHz, 5GHz WiFi RF & LTE technology. The EUT is powered by vehicle's OBD port and/or 3.7VDC internal rechargeable battery. The EUT can support Bluetooth (FHSS) mode, Bluetooth 5.0 BLE mode, 2.4GHz WiFi mode and 5.1GHz & 5.8GHz WiFi mode.

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.
- For IEEE 802.11ac mode (80 MHz Bandwidth), it operates at 5.21GHz with 1 channels. It transmits via OFDM/256-QAM, OFDM/64-QAM, 16-QAM, QPSK and BPSK. Maximum bit rate can be up to MCS9 390Mbps.

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2.1 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 channels. It transmits via OFDM/256-QAM, OFDM/64-QAM, 16-QAM, QPSK and BPSK. Maximum bit rate can be up to MCS9 390Mbps.

Antenna Information:

- WLAN 802.11 a/b/g/n/ac
- For operating frequency of 2.4GHz, antenna has maximum gain of 3.0 dBi
- For operating frequency of 5GHz WiFi, antenna has maximum gain of 3.0 dBi

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

TEST REPORT

2.1 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. 789033 D02 v02r01 (December 01, 2017) All other measurements were made in accordance with the procedures in 47 CFR Part 2.

2.2 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.

2.3 Related Submittal(s) Grants

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

TEST REPORT

3.0 SYSTEM TEST CONFIGURATION

3.1 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 device was powered by vehicle's OBD port or 3.7V internal rechargeable battery and/or AC/DC USB adaptor Input: 100-240VAC 50/60Hz 0.5A; Output: 5.0VDC 2100mA.

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.

TEST REPORT

3.1 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 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.

3.2 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.

TEST REPORT

3.3 Details of EUT and Description of Accessories

Details of EUT:

The EUT is powered by 120VAC.

Description of Accessories:

(1) 1 X AC/DC USB adaptor (Input: 100-240VAC 50/60Hz 0.5A; Output: 5.0VDC 2100mA)
(2) 1 X USB Type C cable with length of 0.42 meter long
(3) 1 X OBD Emulator

All accessories are provided by Applicant.

3.4 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	±3.8 dB
2	Conducted emission 150KHz-30MHz	±3.4 dB
3	Radiated emission 9KHz-30MHz	±4.9 dB
4	Radiated emission 30MHz-1GHz	±4.7 dB
5	Radiated emission 1GHz-18GHz	±5.1 dB
6	Radiated emission 18GHz-26GHz	±5.2 dB
7	Radiated emission 26GHz-40GHz	±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 ± 5.3dB, ± 4.2dB, ±1dB, ±23Hz, 0.1µs 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.

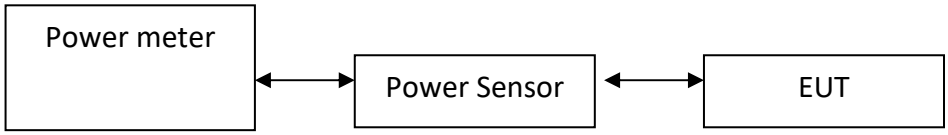
TEST REPORT

4.0 TEST RESULTS

4.1 Maximum Conducted (Avg) 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 the 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 = 3.0dBi

Frequency (MHz)	Conducted Output Power in dBm	Conducted Output Power in mWatt
5180	8.2	6.607
5200	7.4	5.495
5240	7.8	6.026
5745	5.3	3.388
5785	8.8	7.586
5825	9.1	8.128

IEEE 802.11ac (40MHz) (MCS0) Antenna Gain = 3.0dBi

Frequency (MHz)	Conducted Output Power in dBm	Conducted Output Power in mWatt
5190	7.1	5.129
5230	7.2	5.248
5755	2.6	1.820
5795	2.2	1.660

IEEE 802.11ac (80MHz) (MCS0) Antenna Gain = 3.0dBi

Frequency (MHz)	Conducted Output Power in dBm	Conducted Output Power in mWatt
5210	10.1	10.233
5775	5.9	3.890

TEST REPORT

4.1 Maximum Conducted (Avg) Output Power at Antenna Terminals (Cont'd)

IEEE 802.11a (20MHz) (OFDM, 6 Mbps) Antenna Gain = 3.0dBi

Frequency (MHz)	Conducted Output Power in dBm	Conducted Output Power in mWatt
5180	10.7	11.749
5200	9.7	9.333
5240	10.1	10.233
5745	5.4	3.467
5785	8.1	6.457
5825	9.3	8.511

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna Gain = 3.0dBi

Frequency (MHz)	Conducted Output Power in dBm	Conducted Output Power in mWatt
5180	8.1	6.457
5200	7.4	5.495
5240	7.8	6.026
5745	5.6	3.631
5785	8.8	7.586
5825	9.2	8.318

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna Gain = 2.0dBi

Frequency (MHz)	Conducted Output Power in dBm	Conducted Output Power in mWatt
5190	6.8	4.786
5230	7.2	5.248
5755	2.8	1.906
5795	3.3	2.138

TEST REPORT

4.1 Maximum Conducted (Avg) Output Power at Antenna Terminals (Cont'd)

For Maximum e.i.r.p

IEEE 802.11ac (20MHz) (MCS0) Antenna Gain = 3.0dBi

Frequency (MHz)	Conducted Output Power in dBm	EIRP in dBm	EIRP in mWatt
5180	8.1	11.1	12.882
5220	7.4	10.4	10.965
5240	7.8	10.8	12.023
5745	5.6	8.6	7.244
5785	8.8	11.8	15.136
5825	9.2	12.2	16.596

IEEE 802.11ac (40MHz) (MCS0) Antenna Gain = 3.0dBi

Frequency (MHz)	Conducted Output Power in dBm	EIRP in dBm	EIRP in mWatt
5190	7.1	10.1	10.233
5230	7.2	10.2	10.471
5755	2.6	5.6	3.631
5795	2.2	5.2	3.311

IEEE 802.11ac (80MHz) (MCS0) Antenna Gain = 3.0dBi

Frequency (MHz)	Conducted Output Power in dBm	EIRP in dBm	EIRP in mWatt
5210	10.1	13.1	20.417
5775	5.9	8.9	7.762

IEEE 802.11a (20MHz) (OFDM, 6 Mbps) Antenna Gain = 3.0dBi

Frequency (MHz)	Conducted Output Power in dBm	EIRP in dBm	EIRP in mWatt
5180	10.7	13.7	23.442
5220	9.7	12.7	18.621
5240	10.1	13.1	20.417
5745	5.4	8.4	6.918
5785	8.1	11.1	12.882
5825	9.3	12.3	16.982

TEST REPORT

4.1 Maximum Conducted (Avg) Output Power at Antenna Terminals (Cont'd)

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna Gain = 3.0dBi

Frequency (MHz)	Conducted Output Power in dBm	EIRP in dBm	EIRP in mWatt
5180	8.1	11.1	12.882
5220	7.4	10.4	10.965
5240	7.8	10.8	12.023
5745	5.6	8.6	7.244
5785	8.8	11.8	15.136
5825	9.2	12.2	16.596

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna Gain = 3.0dBi

Frequency (MHz)	Conducted Output Power in dBm	EIRP in dBm	EIRP in mWatt
5190	6.8	9.8	9.550
5230	7.2	10.2	10.471
5755	2.8	5.8	3.802
5795	3.3	6.3	4.266

Cable loss: 1.02dB External Attenuation: 10dB

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

IEEE 802.11ac (20MHz) (OFDM, MCS0)
Max. Conducted Output Level = 8.8dBm

IEEE 802.11ac (40MHz) (OFDM, MCS0)
Max. Conducted Output Level = 7.2dBm

IEEE 802.11ac (80MHz) (OFDM, MCS0)
Max. Conducted Output Level = 10.1dBm

IEEE 802.11a (20MHz) (OFDM, 6 Mbps)
Max. Conducted Output Level = 10.7dBm

IEEE 802.11n (20MHz) (OFDM, MCS0)
Max. Conducted Output Level = 9.2dBm

IEEE 802.11n (40MHz) (OFDM, MCS0)
Max. Conducted Output Level = 7.2dBm

TEST REPORT

4.1 Maximum Conducted (Avg) Output Power at Antenna Terminals (Cont'd)

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/ Duty cycle);
   Average factor = 20 log10 Duty Cycle.
4. Limits for FCC:
   5150-5250MHz: 250mW (24dBm) for antennas with gains of 6dBi or less. (Client device)
   5250-5350MHz: 250mW (24dBm)
   5470-5725MHz: 250mW (24dBm)
   5725-5850MHz: 1W (30dBm) for antennas with gains of 6dBi or less.

   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

4.2 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	17.9	17.8
5240	17.8	18.0
5745	17.9	17.8
5785	17.9	18.0
5825	17.9	17.8

IEEE 802.11ac (40MHz) (MCS0)

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
5190	36.7	36.6
5230	36.5	36.3
5755	36.6	36.6
5795	36.6	36.6

IEEE 802.11ac (80MHz) (MCS0)

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
5210	75.3	76.0
5775	75.6	76.0

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

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
5180	16.3	16.8
5200	16.2	16.6
5240	16.3	16.6
5745	16.1	16.6
5785	15.9	16.6
5825	16.1	16.6

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4.2 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	17.9	17.8
5240	17.9	18.0
5745	16.1	16.6
5785	15.9	16.6
5825	16.1	16.6

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

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

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

4.3 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)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
5180	22.0	18.0
5200	21.8	17.8
5240	21.6	18.0
5745	26.6	17.8
5785	24.2	18.0
5825	22.6	17.8

IEEE 802.11ac (40MHz) (MCS0)

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
5190	40.4	36.6
5230	39.6	36.3
5755	47.3	36.6
5795	43.4	36.6

IEEE 802.11ac (80MHz) (MCS0)

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
5210	83.0	76.0
5775	54.0	76.0

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

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
5180	21.4	16.8
5200	21.2	16.6
5240	20.8	16.6
5745	26.0	16.6
5785	23.0	16.6
5825	22.0	16.6

TEST REPORT

4.3 26 dB Bandwidth & Occupied Bandwidth (Cont'd)

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

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
5180	22.2	18.0
5200	22.0	17.8
5240	22.2	18.0
5745	26.6	16.6
5785	24.2	16.6
5825	22.6	16.6

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

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
5190	39.9	36.3
5230	39.3	36.3
5755	52.7	36.6
5795	40.4	36.3

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

4.4 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 ≥ 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 ≥ 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

4.4 Maximum Power Spectral Density (Cont'd)

IEEE 802.11ac (20MHz) (MCS0)

Frequency (MHz)	Conducted PSD in 1MHz (dBm)
5180	-2.280
5200	-3.408
5240	-3.054
Frequency (MHz)	**Conducted PSD in 500kHz (dBm)**
5745	-6.418
5785	-4.791
5825	-4.718

IEEE 802.11ac (40MHz) (MCS0)

Frequency (MHz)	Conducted PSD in 1MHz (dBm)
5190	-6.792
5230	-6.377
Frequency (MHz)	**Conducted PSD in 500kHz (dBm)**
5755	-10.554
5795	-9.734

IEEE 802.11ac (80MHz) (MCS0)

Frequency (MHz)	Conducted PSD in 1MHz (dBm)
5210	-5.942
Frequency (MHz)	**Conducted PSD in 500kHz (dBm)**
5775	-9.573

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

Frequency (MHz)	Conducted PSD in 1MHz (dBm)
5180	0.392
5200	-0.716
5240	-0.137
Frequency (MHz)	**Conducted PSD in 500kHz (dBm)**
5745	-5.874
5785	-4.388
5825	-4.178

TEST REPORT

4.4 Maximum Power Spectral Density (Cont'd)

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

Frequency (MHz)	Conducted PSD in 1MHz (dBm)
5180	-2.529
5200	-3.488
5240	-2.955
Frequency (MHz)	**Conducted PSD in 500kHz (dBm)**
5745	-5.533
5785	-4.299
5825	-4.446

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

Frequency (MHz)	Conducted PSD in 1MHz (dBm)
5190	-7.050
5230	-6.324
Frequency (MHz)	**Conducted PSD in 500kHz (dBm)**
5755	-10.550
5795	-10.032

TEST REPORT

4.4 Maximum Power Spectral Density (Cont'd)

For Maximum e.i.r.p.

IEEE 802.11ac (20MHz) (MCS0)

Frequency (MHz)	EIRP PSD in 1MHz (dBm)
5180	0.72
5200	-0.408
5240	-0.054
5745	-3.418
5786	-1.791
5825	-1.718

IEEE 802.11ac (40MHz) (MCS0)

Frequency (MHz)	EIRP PSD in 1MHz (dBm)
5190	-3.792
5230	-3.377
5755	-7.554
5795	-6.734

IEEE 802.11ac (80MHz) (MCS0)

Frequency (MHz)	EIRP PSD in 1MHz (dBm)
5210	-2.942
5775	-6.573

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

Frequency (MHz)	EIRP PSD in 1MHz (dBm)
5180	3.392
5200	2.284
5240	2.863
5745	-2.874
5786	-1.388
5825	-1.178

TEST REPORT

4.4 Maximum Power Spectral Density (Cont'd)

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

Frequency (MHz)	EIRP PSD in 1MHz (dBm)
5180	0.471
5200	-0.488
5240	0.045
5745	-2.533
5786	-1.299
5825	-1.446

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

Frequency (MHz)	EIRP PSD in 1MHz (dBm)
5190	-4.05
5230	-3.324
5755	-7.55
5795	-7.032

Remark:

1. Cable Loss: 1.02dB
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/ Duty cycle);
   Average factor = 20 log10 Duty Cycle.
5. Limits:
   For U-NII-1:
   ☒ FCC: 11dBm/MHz for mobile/portable device.
   RSS: 10dBm/MHz E.I.R.P

   For U-NII-2:
   ☒ FCC: 11dBm/MHz
   RSS: 11dBm/MHz

   For U-NII-3: in 3kHz
   ☒ FCC: 30dBm/500kHz
   RSS: 30dBm/500kHz

The test data are saved with filename: UNII-1&2 test data.pdf

TEST REPORT

4.5 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 reflects 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.

RA = 62.0 dBμV
AF = 7.4 dB
CF = 1.6 dB
AG = 29 dB
PD = 0.0 dB
AV = -10 dB
FS = 62.0 + 7.4 + 1.6 – 29.0 + 0.0 + (-10.0) = 32.0 dBμV/m

Level in μV/m = Common Antilogarithm [(32.0 dBμV/m)/20] = 39.8 μV/m

TEST REPORT

4.6 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.

4.6.1 Radiated Emission Configuration Photograph

Worst Case Restricted Band Radiated Emission

At 335.998 MHz and 335.998MHz

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

4.6.2 Radiated Emission Data

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

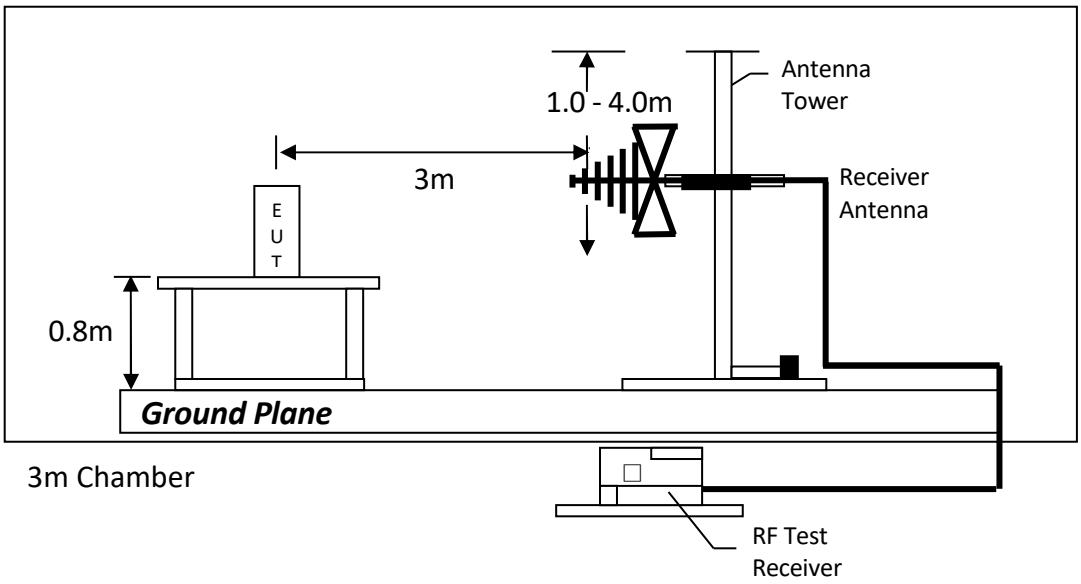
Judgement –

Passed by 1.7 dB margin

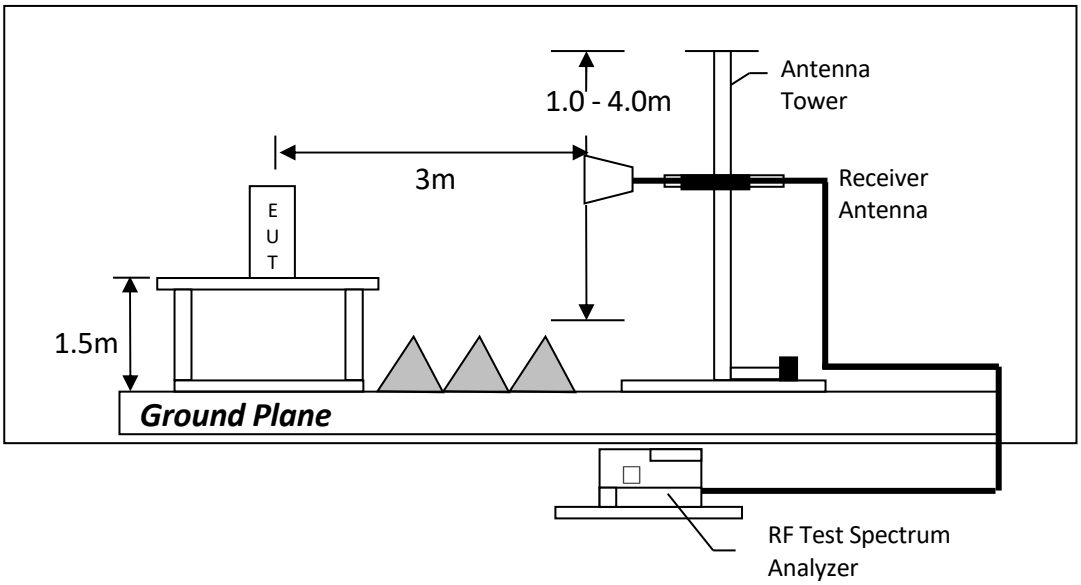
TEST REPORT

4.6.3 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

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5148.400	33.5	33	35.7	36.2	0	51.1	54.0	-2.9
V	15540.000	26.8	33	37.7	31.5	0	37.6	54.0	-16.4
V	20720.000	32.3	33	37.7	37.0	0	37.5	54.0	-16.5
V	31080.000	34.4	33	42.1	43.5	0	42.0	54.0	-12.0

Polari-zation	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	5148.400	50.6	33	35.7	69.3	74.0	-4.7
V	15540.000	46.1	33	37.7	50.8	74.0	-23.2
V	20720.000	63.4	33	37.7	51.3	74.0	-22.7
V	31080.000	49.7	33	42.1	44.1	74.0	-29.9

5240MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	15720.000	26.8	33	37.7	31.5	0	38.5	54.0	-15.5
H	20960.000	32.3	33	37.7	37.0	0	39.6	54.0	-14.4
H	31440.000	34.4	33	42.1	43.5	0	41.5	54.0	-12.5

Polari-zation	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	15720.000	45.8	33	37.7	50.5	74.0	-23.5
H	20960.000	63.4	33	37.7	51.3	74.0	-22.7
H	31440.000	44.3	33	42.1	49.8	74.0	-24.2

TEST REPORT

RADIATED EMISSION DATA (CONT'D)

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

5200MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	15600.000	28.4	33	37.7	33.1	0	35.2	54.0	-18.8
V	20800.000	27.8	33	37.7	32.5	0	35.6	54.0	-18.4
V	31200.000	31.9	33	42.1	41.0	0	41.6	54.0	-12.4

Polari-zation	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	15600.000	47.9	33	37.7	52.6	74.0	-21.4
V	20800.000	45.1	33	37.7	49.8	74.0	-24.2
V	31200.000	42.3	33	42.1	51.4	74.0	-22.6

5745MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	5725.000	30.6	33	36.6	34.2	0	34.2	54.0	-19.8
H	11490.000	27.8	33	40.8	35.6	0	32.5	54.0	-21.5
H	22980.000	31.2	33	38.3	36.5	0	44.2	54.0	-9.8

Polari-zation	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	5725.000	49.0	33	36.6	52.6	74.0	-21.4
H	11490.000	42.5	33	40.8	50.3	74.0	-23.7
H	22980.000	47.3	33	38.3	52.6	74.0	-21.4

5785MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	5725.000	30.6	33	36.6	34.2	0	36.5	54.0	-17.5
H	11570.000	28.1	33	40.5	35.6	0	34.6	54.0	-19.4
H	23140.000	30.9	33	38.6	36.5	0	38.4	54.0	-15.6

Polari-zation	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	5725.000	46.2	33	36.6	49.8	74.0	-24.2
H	11570.000	41.1	33	40.5	48.6	74.0	-25.4
H	23140.000	41.5	33	38.6	47.1	74.0	-26.9

TEST REPORT

RADIATED EMISSION DATA (CONT'D)

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

5825MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	5850.000	30.6	33	36.6	34.2	0	37.6	54.0	-16.4
H	11650.000	28.1	33	40.5	35.6	0	33.2	54.0	-20.8
V	17475.000	33.9	33	37.6	38.5	0	37.6	54.0	-16.4
V	23300.000	30.9	33	38.6	36.5	0	40.1	54.0	-13.9
H	29125.000	35.3	33	40.0	0.0	0	42.3	68.0	-25.7
H	34950.000	34.4	33	41.3	0.0	0	42.7	68.0	-25.3

Polari-zation	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	5850.000	46.2	33	36.6	49.8	74.0	-24.2
H	11650.000	41.0	33	40.5	48.5	74.0	-25.5
V	17475.000	44.6	33	37.6	49.2	74.0	-24.8
V	23300.000	43.1	33	38.6	48.7	74.0	-25.3
H	29125.000	41.9	33	40.0	48.9	74.0	-25.1
H	34950.000	42.5	33	41.3	50.8	74.0	-23.2

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.

TEST REPORT

RADIATED EMISSION DATA (CONT'D)

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

5180MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5148.690	34.8	33	35.7	37.5	0	49.1	54.0	-4.9
H	10360.000	32.3	33	40.5	39.8	0	38.6	54.0	-15.4
H	15540.000	37.9	33	37.7	42.6	0	43.5	54.0	-10.5
H	20720.000	35.9	33	37.7	40.6	0	41.2	54.0	-12.8
H	25900.000	33.9	33	39.3	40.2	0	40.3	54.0	-13.7
V	31080.000	37.6	33	42.1	46.7	0	45.6	54.0	-8.4

Polari-zation	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	5148.690	61.9	33	35.7	64.6	74.0	-9.4
H	10360.000	37.6	33	40.5	45.1	74.0	-28.9
H	15540.000	43.9	33	37.7	48.6	74.0	-25.4
H	20720.000	40.5	33	37.7	45.2	74.0	-28.8
H	25900.000	41.6	33	39.3	47.9	74.0	-26.1
V	31080.000	40.7	33	42.1	49.8	74.0	-24.2

5240MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	10480.000	27.9	33	40.5	35.4	0	32.6	54.0	-21.4
V	15720.000	25.2	33	37.7	29.9	0	34.7	54.0	-19.3
H	20960.000	23.8	33	37.7	28.5	0	38.7	54.0	-15.3
H	26200.000	26.8	33	39.2	33.0	0	33.4	54.0	-20.6
V	31440.000	30.5	33	42.1	39.6	0	38.5	54.0	-15.5
H	36680.000	35.6	33	41.7	44.3	0	43.6	54.0	-10.4

Polari-zation	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	10480.000	33.3	33	40.5	40.8	74.0	-33.2
V	15720.000	42.8	33	37.7	47.5	74.0	-26.5
H	20960.000	44.0	33	37.7	48.7	74.0	-25.3
H	26200.000	37.6	33	39.2	43.8	74.0	-30.2
V	31440.000	36.8	33	42.1	45.9	74.0	-28.1
H	36680.000	40.8	33	41.7	49.5	74.0	-24.5

TEST REPORT

RADIATED EMISSION DATA (CONT'D)

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

5200MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	10400.000	32.8	33	40.5	40.3	0	40.3	54.0	-13.7
H	15600.000	31.7	33	37.7	36.4	0	36.4	54.0	-17.6
V	20800.000	31.3	33	37.7	36.0	0	36.0	54.0	-18.0
H	26000.000	33.1	33	39.2	39.3	0	39.3	54.0	-14.7
H	31200.000	30.3	33	42.1	39.4	0	39.4	54.0	-14.6
H	36400.000	38.8	33	41.7	47.5	0	47.5	54.0	-6.5

Polari-zation	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	10400.000	41.2	33	40.5	48.7	74.0	-25.3
H	15600.000	47.3	33	37.7	52.0	74.0	-22.0
V	20800.000	47.0	33	37.7	51.7	74.0	-22.3
H	26000.000	38.0	33	39.2	44.2	74.0	-29.8
H	31200.000	35.2	33	42.1	44.3	74.0	-29.7
H	36400.000	41.7	33	41.7	50.4	74.0	-23.6

5745MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5725.000	32.3	33	36.6	35.9	0	34.8	54.0	-19.2
H	11490.000	32.5	33	40.8	40.3	0	39.7	54.0	-14.3
H	17235.000	32.7	33	37.6	37.3	0	36.9	54.0	-17.1
H	22980.000	32.6	33	38.3	37.9	0	38.7	54.0	-15.3
H	28725.000	36.6	33	40.1	43.7	0	44.1	54.0	-9.9
H	34470.000	37.1	33	41.1	45.2	0	45.0	54.0	-9.0

Polari-zation	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	5725.000	37.2	33	36.6	40.8	74.0	-33.2
H	11490.000	38.0	33	40.8	45.8	74.0	-28.2
H	17235.000	35.6	33	37.6	40.2	74.0	-33.8
H	22980.000	42.1	33	38.3	47.4	74.0	-26.6
H	28725.000	42.7	33	40.1	49.8	74.0	-24.2
H	34470.000	42.6	33	41.1	50.7	74.0	-23.3

TEST REPORT

RADIATED EMISSION DATA (CONT'D)

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

5785MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	5725.000	31.9	33	36.6	35.5	0	34.1	54.0	-19.9
H	11570.000	32.0	33	40.5	39.5	0	38.4	54.0	-15.6
V	17355.000	32.7	33	37.6	37.3	0	36.3	54.0	-17.7
V	23140.000	35.0	33	38.6	40.6	0	39.5	54.0	-14.5
H	28925.000	36.2	33	40.1	43.3	0	44.0	54.0	-10.0
H	34710.000	39.1	33	41.3	47.4	0	46.9	54.0	-7.1

Polari-zation	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	5725.000	41.6	33	36.6	45.2	74.0	-28.8
H	11570.000	36.8	33	40.5	44.3	74.0	-29.7
V	17355.000	42.3	33	37.6	46.9	74.0	-27.1
V	23140.000	36.5	33	38.6	42.1	74.0	-31.9
H	28925.000	38.8	33	40.1	45.9	74.0	-28.1
H	34710.000	42.4	33	41.3	50.7	74.0	-23.3

TEST REPORT

RADIATED EMISSION DATA (CONT'D)

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

5825MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5850.000	27.2	33	36.6	30.8	0	31.8	54.0	-22.2
H	11650.000	32.4	33	40.5	39.9	0	39.8	54.0	-14.2
V	17475.000	32.7	33	37.6	37.3	0	36.7	54.0	-17.3
H	23300.000	32.0	33	38.6	37.6	0	36.5	54.0	-17.5
H	29125.000	35.1	33	40.0	42.1	0	39.6	54.0	-14.4
H	34950.000	37.1	33	41.3	45.4	0	38.7	54.0	-15.3

Polari-zation	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	5850.000	44.4	33	36.6	48.0	74.0	-26.0
H	11650.000	37.8	33	40.5	45.3	74.0	-28.7
V	17475.000	44.1	33	37.6	48.7	74.0	-25.3
H	23300.000	39.6	33	38.6	45.2	74.0	-28.8
H	29125.000	42.7	33	40.0	49.7	74.0	-24.3
H	34950.000	42.6	33	41.3	50.9	74.0	-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 ±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.

TEST REPORT

RADIATED EMISSION DATA (CONT'D)

IEEE 802.11n (40MHz) (MCS0)

5190MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5149.935	29.9	33	35.7	32.6	0	49.5	54.0	-4.5
H	10380.000	31.1	33	40.5	38.6	0	38.7	54.0	-15.3
H	15570.000	32.0	33	37.7	36.7	0	37.8	54.0	-16.2
V	20760.000	33.5	33	37.7	38.2	0	38.6	54.0	-15.4
H	25950.000	35.2	33	39.3	41.5	0	40.8	54.0	-13.2
H	31140.000	36.8	33	42.1	45.9	0	46.0	54.0	-8.0

Polari-zation	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	5149.935	63.6	33	35.7	66.3	74.0	-7.7
H	10380.000	42.1	33	40.5	49.6	74.0	-24.4
H	15570.000	46.1	33	37.7	50.8	74.0	-23.2
V	20760.000	44.0	33	37.7	48.7	74.0	-25.3
H	25950.000	41.6	33	39.3	47.9	74.0	-26.1
H	31140.000	39.6	33	42.1	48.7	74.0	-25.3

5230MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	10460.000	29.7	33	40.5	37.2	0	36.5	54.0	-17.5
H	15690.000	28.9	33	37.7	33.6	0	33.7	54.0	-20.3
H	20920.000	32.8	33	37.7	37.5	0	37.5	54.0	-16.5
V	26150.000	34.7	33	39.2	40.9	0	41.0	68.0	-27.0
H	31380.000	32.1	33	42.1	41.2	0	40.5	54.0	-13.5
H	36610.000	37.3	33	41.7	46.0	0	40.6	54.0	-13.4

Polari-zation	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	42.1	33	40.5	49.6	74.0	-24.4
H	15690.000	45.1	33	37.7	49.8	74.0	-24.2
H	20920.000	42.8	33	37.7	47.5	74.0	-26.5
V	26150.000	36.3	33	39.2	42.5	68.0	-25.5
H	31380.000	34.5	33	42.1	43.6	74.0	-30.4
H	36610.000	39.9	33	41.7	48.6	74.0	-25.4

TEST REPORT

RADIATED EMISSION DATA (CONT'D)

IEEE 802.11n (40MHz) (MCS0)

5755MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5725.000	31.0	33	36.6	34.6	0	35.2	54.0	-18.8
H	11510.000	27.3	33	40.5	34.8	0	36.4	54.0	-17.6
V	17265.000	31.1	33	37.6	35.7	0	36.7	54.0	-17.3
V	23020.000	34.5	33	38.6	40.1	0	39.8	54.0	-14.2
V	28775.000	36.6	33	40.1	43.7	0	42.8	54.0	-11.2
H	34530.000	40.8	33	41.3	49.1	0	48.7	54.0	-5.3

Polari-zation	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	5725.000	42.6	33	36.6	46.2	74.0	-27.8
H	11510.000	39.6	33	40.5	47.1	74.0	-26.9
V	17265.000	38.9	33	37.6	43.5	74.0	-30.5
V	23020.000	43.3	33	38.6	48.9	74.0	-25.1
V	28775.000	40.5	33	40.1	47.6	74.0	-26.4
H	34530.000	44.5	33	41.3	52.8	74.0	-21.2

TEST REPORT

RADIATED EMISSION DATA (CONT'D)

IEEE 802.11n (40MHz) (MCS0)

5795MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	5850.000	27.9	33	36.6	31.5	0	36.8	54.0	-17.2
H	11590.000	30.3	33	40.5	37.8	0	36.9	54.0	-17.1
H	17385.000	32.2	33	37.6	36.8	0	40.7	54.0	-13.3
V	23180.000	34.0	33	38.6	39.6	0	38.4	54.0	-15.6
H	28975.000	33.1	33	40.1	40.2	0	39.8	54.0	-14.2
H	34770.000	42.0	33	41.3	50.3	0	39.6	54.0	-14.4

Polari-zation	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	5850.000	46.0	33	36.6	49.6	74.0	-24.4
H	11590.000	39.7	33	40.5	47.2	74.0	-26.8
H	17385.000	42.2	33	37.6	46.8	74.0	-27.2
V	23180.000	38.7	33	38.6	44.3	74.0	-29.7
H	28975.000	37.8	33	40.1	44.9	74.0	-29.1
H	34770.000	43.0	33	41.3	51.3	74.0	-22.7

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.

TEST REPORT

RADIATED EMISSION DATA (CONT'D)

IEEE 802.11ac (20MHz) (MCS0)

Mode: AC Mode 20MHz

5180MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5150.000	29.8	33	35.7	32.5	0	50.5	54.0	-3.5
V	10360.000	28.9	33	40.5	36.4	0	33.6	54.0	-20.4
V	15540.000	30.7	33	37.7	35.4	0	35.6	54.0	-18.4
H	20720.000	33.5	33	37.7	38.2	0	37.0	54.0	-17.0
V	25900.000	33.9	33	39.3	40.2	0	39.8	54.0	-14.2
H	31080.000	36.1	33	42.1	45.2	0	46.2	54.0	-7.8

Polari-zation	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	67.5	33	35.7	70.2	74.0	-3.8
V	10360.000	39.5	33	40.5	47.0	74.0	-27.0
H	15540.000	43.8	33	37.7	48.5	74.0	-25.5
H	20720.000	41.4	33	37.7	46.1	74.0	-27.9
V	25900.000	42.6	33	39.3	48.9	74.0	-25.1
H	31080.000	39.9	33	42.1	49.0	74.0	-25.0

5240MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	10480.000	25.1	33	40.5	32.6	0	35.8	54.0	-18.2
H	15720.000	33.8	33	37.7	38.5	0	36.8	54.0	-17.2
H	20960.000	32.2	33	37.7	36.9	0	35.1	54.0	-18.9
H	26200.000	32.2	33	39.2	38.4	0	38.5	54.0	-15.5
V	31440.000	32.5	33	42.1	41.6	0	42.8	54.0	-11.2
H	36680.000	37.4	33	41.7	46.1	0	46.7	54.0	-7.3

Polari-zation	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	39.3	33	40.5	46.8	74.0	-27.2
H	15720.000	41.0	33	37.7	45.7	74.0	-28.3
H	20960.000	43.2	33	37.7	47.9	74.0	-26.1
H	26200.000	41.6	33	39.2	47.8	68.0	-20.2
V	31440.000	39.9	33	42.1	49.0	74.0	-25.0
H	36680.000	44.3	33	41.7	53.0	74.0	-21.0

TEST REPORT

RADIATED EMISSION DATA (CONT'D)

IEEE 802.11ac (20MHz) (MCS0)

Mode: AC Mode 20MHz

5200MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	10400.000	30.7	33	40.5	38.2	0	36.4	54.0	-17.6
H	15600.000	29.9	33	37.7	34.6	0	35.8	54.0	-18.2
V	20800.000	32.9	33	37.7	37.6	0	36.4	54.0	-17.6
H	26000.000	31.8	33	39.2	38.0	0	37.4	54.0	-16.6
H	31200.000	22.5	33	42.1	31.6	0	36.8	54.0	-17.2
H	36400.000	40.5	33	41.7	49.2	0	47.2	54.0	-6.8

Polari-zation	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	10400.000	42.3	33	40.5	49.8	74.0	-24.2
H	15600.000	42.5	33	37.7	47.2	74.0	-26.8
V	20800.000	41.5	33	37.7	46.2	74.0	-27.8
H	26000.000	39.1	33	39.2	45.3	74.0	-28.7
H	31200.000	39.6	33	42.1	48.7	74.0	-25.3
H	36400.000	44.4	33	41.7	53.1	74.0	-20.9

5745MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5725.000	30.1	33	36.6	33.7	0	35.3	54.0	-18.7
H	11490.000	29.8	33	40.8	37.6	0	36.8	54.0	-17.2
H	17235.000	31.1	33	37.6	35.7	0	37.1	54.0	-16.9
H	22980.000	32.1	33	38.3	37.4	0	35.8	54.0	-18.2
H	28725.000	33.9	33	40.1	41.0	0	39.4	54.0	-14.6
H	34470.000	38.7	33	41.1	46.8	0	40.8	54.0	-13.2

Polari-zation	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	5725.000	47.4	33	36.6	51.0	74.0	-23.0
H	11490.000	41.6	33	40.8	49.4	74.0	-24.6
H	17235.000	43.0	33	37.6	47.6	74.0	-26.4
H	22980.000	42.8	33	38.3	48.1	74.0	-25.9
H	28725.000	42.7	33	40.1	49.8	74.0	-24.2
H	34470.000	45.5	33	41.1	53.6	74.0	-20.4

TEST REPORT

RADIATED EMISSION DATA (CONT'D)

IEEE 802.11ac (20MHz) (MCS0)

Mode: AC Mode 20MHz

5785MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5725.000	29.7	33	36.6	33.3	0	36.4	54.0	-17.6
H	11570.000	31.2	33	40.5	38.7	0	37.6	54.0	-16.4
H	17355.000	30.8	33	37.6	35.4	0	38.9	54.0	-15.1
V	23140.000	31.5	33	38.6	37.1	0	36.1	54.0	-17.9
H	28925.000	34.9	33	40.1	42.0	0	39.8	54.0	-14.2
H	34710.000	36.1	33	41.3	44.4	0	41.5	54.0	-12.5

Polari-zation	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	5725.000	43.9	33	36.6	47.5	74.0	-26.5
H	11570.000	40.7	33	40.5	48.2	74.0	-25.8
H	17355.000	42.7	33	37.6	47.3	74.0	-26.7
V	23140.000	43.3	33	38.6	48.9	74.0	-25.1
H	28925.000	41.0	33	40.1	48.1	74.0	-25.9
H	34710.000	42.9	33	41.3	51.2	74.0	-22.8

5825MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5850.000	31.0	33	36.6	34.6	0	35.5	54.0	-18.5
H	11650.000	29.5	33	40.5	37.0	0	36.9	54.0	-17.1
H	17475.000	30.0	33	37.6	34.6	0	34.7	54.0	-19.3
H	23300.000	34.0	33	38.6	39.6	0	39.8	54.0	-14.2
V	29125.000	35.0	33	40.0	42.0	0	41.0	54.0	-13.0
H	34950.000	35.4	33	41.3	43.7	0	42.7	54.0	-11.3

Polari-zation	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	5850.000	43.9	33	36.6	47.5	74.0	-26.5
H	11650.000	40.1	33	40.5	47.6	74.0	-26.4
H	17475.000	41.1	33	37.6	45.7	74.0	-28.3
H	23300.000	39.0	33	38.6	44.6	74.0	-29.4
V	29125.000	39.1	33	40.0	46.1	74.0	-27.9
H	34950.000	44.4	33	41.3	52.7	74.0	-21.3

TEST REPORT

RADIATED EMISSION DATA (CONT'D)

IEEE 802.11ac (40MHz) (MCS0)

Mode: AC Mode 40MHz

5190MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	5145.550	27.8	33	35.7	30.5	0	48.9	54.0	-5.1
H	10380.000	31.0	33	40.5	38.5	0	37.8	54.0	-16.2
V	15570.000	29.4	33	37.7	34.1	0	36.8	54.0	-17.2
H	20760.000	30.9	33	37.7	35.6	0	37.4	54.0	-16.6
H	25950.000	34.7	33	39.3	41.0	0	39.8	54.0	-14.2
H	31140.000	37.2	33	42.1	46.3	0	40.5	54.0	-13.5

Polari-zation	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	5145.500	66.2	33	35.7	68.9	74.0	-5.1
H	10380.000	38.7	33	40.5	46.2	74.0	-27.8
V	15570.000	46.7	33	37.7	51.4	74.0	-22.6
H	20760.000	39.9	33	37.7	44.6	74.0	-29.4
H	25950.000	39.9	33	39.3	46.2	74.0	-27.8
H	31140.000	42.2	33	42.1	51.3	74.0	-22.7

5230MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	10460.000	27.1	33	40.5	34.6	0	33.6	54.0	-20.4
H	15690.000	30.5	33	37.7	35.2	0	34.8	54.0	-19.2
H	20920.000	30.0	33	37.7	34.7	0	35.9	54.0	-18.1
V	26150.000	30.6	33	39.2	36.8	0	36.7	54.0	-17.3
H	31380.000	30.4	33	42.1	39.5	0	38.4	54.0	-15.6
H	36610.000	35.9	33	41.7	44.6	0	43.8	54.0	-10.2

Polari-zation	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	39.9	33	40.5	47.4	74.0	-26.6
H	15690.000	42.8	33	37.7	47.5	74.0	-26.5
H	20920.000	42.8	33	37.7	47.5	74.0	-26.5
V	26150.000	41.9	33	39.2	48.1	74.0	-25.9
H	31380.000	35.6	33	42.1	44.7	74.0	-29.3
H	36610.000	41.0	33	41.7	49.7	74.0	-24.3

TEST REPORT

RADIATED EMISSION DATA (CONT'D)

IEEE 802.11ac (40MHz) (MCS0)

Mode: AC Mode 40MHz

5755MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5725.000	32.8	33	36.6	36.4	0	35.1	54.0	-18.9
H	11510.000	30.9	33	40.5	38.4	0	37.4	54.0	-16.6
V	17265.000	32.8	33	37.6	37.4	0	37.6	54.0	-16.4
V	23020.000	30.5	33	38.6	36.1	0	35.2	54.0	-18.8
V	28775.000	33.5	33	40.1	40.6	0	41.8	54.0	-12.2
H	34530.000	39.2	33	41.3	47.5	0	42.7	54.0	-11.3

Polari-zation	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	5725.000	46.2	33	36.6	49.8	74.0	-24.2
H	11510.000	40.6	33	40.5	48.1	74.0	-25.9
V	17265.000	43.3	33	37.6	47.9	74.0	-26.1
V	23020.000	44.0	33	38.6	49.6	74.0	-24.4
V	28775.000	42.7	33	40.1	49.8	74.0	-24.2
H	34530.000	45.3	33	41.3	53.6	74.0	-20.4

5795MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5850.000	30.9	33	36.6	34.5	0	36.4	54.0	-17.6
H	11590.000	30.1	33	40.5	37.6	0	36.8	54.0	-17.2
V	17385.000	31.8	33	37.6	36.4	0	38.9	54.0	-15.1
H	23180.000	33.6	33	38.6	39.2	0	37.4	54.0	-16.6
H	28975.000	34.4	33	40.1	41.5	0	38.4	54.0	-15.6
V	34770.000	38.9	33	41.3	47.2	0	39.6	54.0	-14.4

Polari-zation	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	5850.000	43.6	33	36.6	47.2	74.0	-26.8
H	11590.000	40.6	33	40.5	48.1	74.0	-25.9
V	17385.000	42.9	33	37.6	47.5	74.0	-26.5
H	23180.000	44.0	33	38.6	49.6	74.0	-24.4
H	28975.000	40.9	33	40.1	48.0	74.0	-26.0
V	34770.000	43.1	33	41.3	51.4	74.0	-22.6

TEST REPORT

RADIATED EMISSION DATA (CONT'D)

IEEE 802.11ac (80MHz) (MCS0)

Mode: AC Mode 80MHz

5210MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5150.000	29.9	33	35.7	32.6	0	50.3	54.0	-3.7
V	10420.000	28.9	33	40.5	36.4	0	33.6	54.0	-20.4
V	15630.000	29.4	33	37.7	34.1	0	34.5	54.0	-19.5
H	20840.000	32.0	33	37.7	36.7	0	36.8	54.0	-17.2
V	26050.000	32.0	33	39.2	38.2	0	39.7	54.0	-14.3
H	31260.000	31.4	33	42.1	40.5	0	40.1	54.0	-13.9

Polari-zation	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	67.4	33	35.7	70.1	74.0	-3.9
V	10420.000	42.3	33	40.5	49.8	74.0	-24.2
V	15630.000	43.5	33	37.7	48.2	74.0	-25.8
H	20840.000	44.0	33	37.7	48.7	74.0	-25.3
V	26050.000	43.4	33	39.2	49.6	74.0	-24.4
H	31260.000	44.3	33	42.1	53.4	74.0	-20.6

TEST REPORT

RADIATED EMISSION DATA (CONT'D)

IEEE 802.11ac (80MHz) (MCS0)

Mode: AC Mode 80MHz

5775MHz

Polari-zation	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Average (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5725.000	28.7	33	36.6	32.3	0	32.6	54.0	-21.4
V	5850.000	31.1	33	36.6	34.7	0	35.9	54.0	-18.1
V	11550.000	26.7	33	40.5	34.2	0	33.4	54.0	-20.6
V	17325.000	34.0	33	37.6	38.6	0	37.4	54.0	-16.6
H	23100.000	37.1	33	38.6	42.7	0	42.3	54.0	-11.7
H	28875.000	41.0	33	40.1	48.1	0	42.7	54.0	-11.3

Polari-zation	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	5725.000	45.3	33	36.6	48.9	74.0	-25.1
V	5850.000	43.8	33	36.6	47.4	74.0	-26.6
V	11550.000	37.7	33	40.5	45.2	74.0	-28.8
V	17325.000	40.7	33	37.6	45.3	74.0	-28.7
H	23100.000	44.0	33	38.6	49.6	74.0	-24.4
H	28875.000	45.3	33	40.1	52.4	74.0	-21.6

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 ±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.

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	320.030	30.9	16	23.0	37.9	46.0	-8.1
H	335.998	36.3	16	24.0	44.3	46.0	-1.7
H	479.997	34.0	16	26.0	44.0	46.0	-2.0
H	656.256	26.9	16	29.0	39.9	46.0	-6.1
H	718.821	24.9	16	30.0	38.9	46.0	-7.1
H	840.071	24.3	16	31.0	39.3	46.0	-6.7

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 ±5.3dB at a level of confidence of 95%.

TEST REPORT

4.7 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.

4.7.1 AC Power Line Conducted Emission Configuration Photograph

Worst Case Line-Conducted Configuration

at 0.5325 MHz

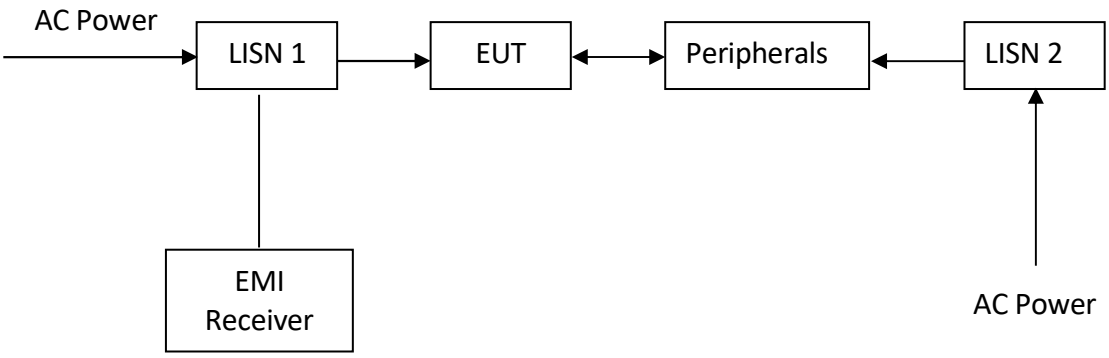
The worst case line conducted configuration photographs are attached in the Appendix and saved with filename: config photos.pdf.

4.7.2 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 14.53 dB margin compare with Quasi-peak limit

4.7.3 Conducted Emission Test Setup



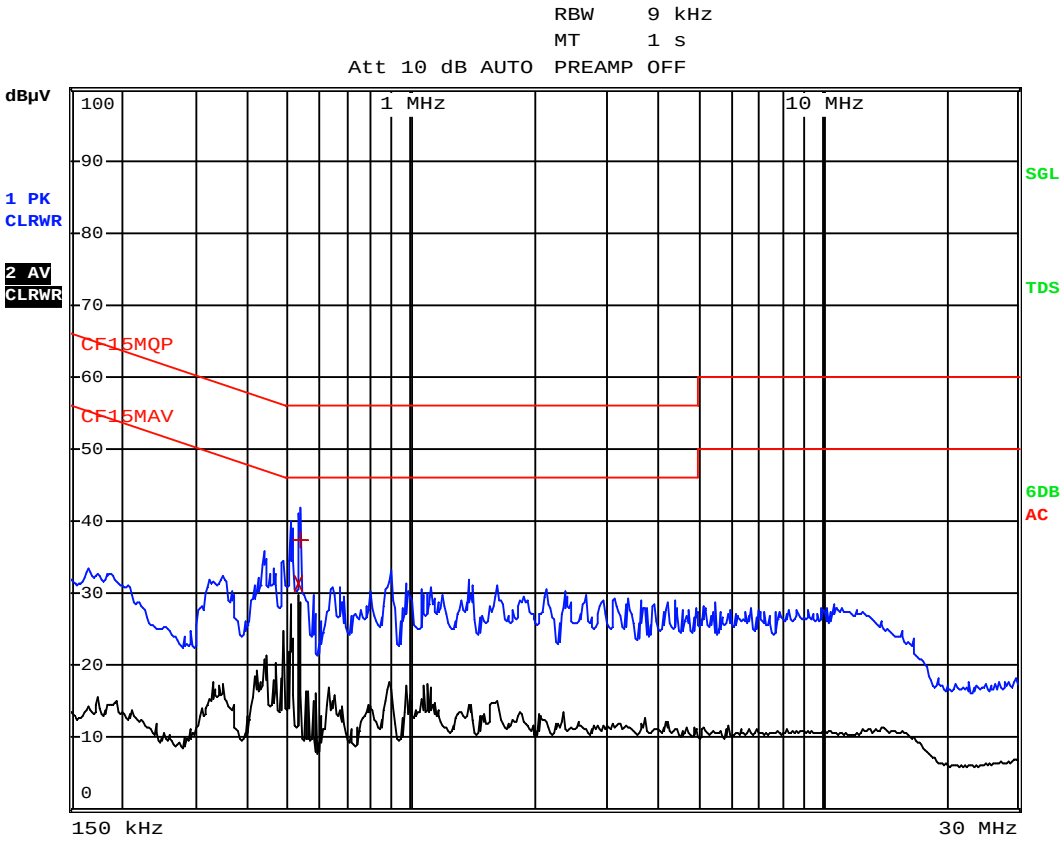
The EUT along with its peripherals were placed on a 1.0m(W)×1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50 ohm 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: Transmitting + Charging Internal Battery



TEST REPORT

AC POWER LINE CONDUCTED EMISSION (CONT'D)

Worst Case: Transmitting + Charging Internal Battery

EDIT PEAK LIST (Final Measurement Results)

Trace1:	CF15MQP
Trace2:	CF15MAV
Trace3:	---

TRACE		FREQUENCY	LEVEL dBµV		DELTA LIMIT dB
2	CISPR Average	532.5 kHz	31.47	N	-14.53
1	Quasi Peak	537 kHz	37.39	L1	-18.60

TEST REPORT

5.0 EQUIPMENT LIST

1) Radiated Emissions Test

Equipment	EMI Test Receiver (9kHz to 26.5GHz)	Biconical Antenna (30MHz to 300MHz)	EMI Test Receiver 7GHz
Registration No.	EW-3156	EW-3241	EW-3481
Manufacturer	ROHDESCHWARZ	EMCO	ROHDESCHWARZ
Model No.	ESR26	3110C	ESR7
Calibration Date	September 26, 2022	May 26, 2021	December 21, 2021
Calibration Due Date	September 26, 2023	May 26, 2023	December 21, 2022

Equipment	Log Periodic Antenna	Double Ridged Guide Antenna	Active Loop H-field (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	December 30, 2022	November 26, 2022	June 13, 2023

Equipment	RF Preamplifier (9kHz to 6000MHz)	2.4GHz Notch Filter	14m Double Shield RF Cable (20MHz to 6GHz)
Registration No.	EW-3006b	EW-3435	EW-2074
Manufacturer	SCHWARZBECK	MICROWAVE	RADIALL
Model No.	BBV9718	N0324413	N(m)-RG142-BNC(m) L=14M
Calibration Date	February 15, 2022	June 16, 2022	December 10, 2021
Calibration Due Date	February 15, 2023	June 16, 2023	December 10, 2022

Equipment	Pyramidal Horn Antenna	RF Cable 14m (1GHz to 26.5GHz)
Registration No.	EW-0905	EW-2781
Manufacturer	EMCO	GREATBILLION
Model No.	3160-09	SMA m/SHF5MPU /SMA m ra14m,26G
Calibration Date	July 20, 2021	November 24, 2020
Calibration Due Date	January 20, 2023	November 24, 2022

TEST REPORT

5.0 EQUIPMENT LIST (CONT'D)

2) Conducted Emissions Test

Equipment	RF Cable 240cm (RG142) (9kHz to 30MHz)	Artificial Mains Network	EMI Test Receiver
Registration No.	EW-2454	EW-2501	EW-3156
Manufacturer	RADIALL	ROHDESCHWARZ	R&S
Model No.	bnc m st / 142 /bnc m ra 240cm	ENV-216	ESCI7
Calibration Date	January 26, 2022	November 09, 2021	December 21, 2021
Calibration Due Date	January 26, 2023	November 09, 2022	December 21, 2022

3) Bandedge Measurement

Equipment	EMI Test Receiver 7GHz	5m RF Cable (40GHz)
Registration No.	EW-3481	EW-2107
Manufacturer	ROHDESCHWARZ	N/A
Model No.	ESR7	SMA-M to SMA-M
Calibration Date	December 21, 2021	December 11, 2021
Calibration Due Date	December 21, 2022	December 11, 2022

4) Conductive Measurement Test

Equipment	5m RF Cable (40GHz)	RF Power Meter with Power Sensor (NRP-Z81)	EMI Test Receiver (9kHz to 26.5GHz)
Registration No.	EW-2701	EW-3309	EW-3156
Manufacturer	RADIALL	ROHDESCHWARZ	ROHDESCHWARZ
Model No.	sma m-m 5m 40G	NRP-Z81	ESR26
Calibration Date	November 24, 2021	December 01, 2021	September 26, 2022
Calibration Due Date	November 24, 2022	December 01, 2022	September 26, 2023

5) Bandedge & Bandwidth Measurement

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

6) Control Software for Radiated Emission

Software Information	
Software Name	EMC32
Manufacturer	ROHDESCHWARZ
Software version	10.50.40