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TEST REPORT

Report No.: 22061212HKG-003

Qmax Systems India Private Limited

Application For Original Grant of 47 CFR Part 15 Certification

Android OTT BOX

FCC ID: 2APD6TEKTDD001

Transceiver – 2.4GHz Wi-Fi

This report contains the data of 2.4GHz Wi-Fi portion only.

Prepared and Checked by:	**Approved by:**
Signed on File Leung Chun Ning, Peter Assistant Engineer	Digitally signed by Kenneth Wong Location: Intertek Testing Services Hong Kong Limited Wong Kwok Yeung, Kenneth Assistant Supervisor Date: March 10, 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:	2APD6TEKTDD001
FCC Model(s):	TDD001
Type of EUT:	Spread Spectrum Transmitter
Description of EUT:	Android OTT BOX
Brand Name:	Tekion – Display Device
Serial Number:	N/A
Sample Receipt Date:	February 10, 2023
Date of Test:	February 15, 2023 to March 03, 2023
Report Date:	March 10, 2023
Environmental Conditions:	Temperature: +10 to 40°C Relative 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

SUMMARY OF TEST RESULT

Test Items	FCC Part 15 Section	Results
Antenna Requirement	15.203	Complied
Max. Conducted Output Power (Peak)	15.247(b)(3)&(4)	Complied
Min. 6dB RF Bandwidth	15.247(a)(2)	Complied
Max. Power Density (Average)	15.247(e)	Complied
Out of Band Antenna Conducted Emission	15.247(d)	Complied
Radiated Emission in Restricted Bands and Spurious Emissions	15.247(d), 15.209 & 15.109	Complied
AC Power Line Conducted Emission	15.207 & 15.107	Complied

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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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) Wi-Fi 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 IEEE 802.11b mode, it operates at frequency range of 2412.000MHz to 2462.000MHz with 11 channels. It transmits via Direct-sequence spread spectrum (DSSS) modulation. Maximum bit rate can be up to 11Mbps.

For IEEE 802.11g mode, it operates at frequency range of 2412.000MHz to 2462.000MHz with 11 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation. Maximum bit rate can be up to 54Mbps.

For IEEE 802.11n (with 20MHz bandwidth) mode, it operates at frequency range of 2412.000MHz to 2462.000MHz with 11 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation. Maximum bit rate can support up to 65Mbps.

For IEEE 802.11n (with 40MHz bandwidth) mode, it operates at frequency range of 2422.000MHz to 2452.000MHz with 9 channels. It transmits via Orthogonal Frequency Division Multiplexing (OFDM) modulation. Maximum bit rate can support up to 150Mbps.

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

This report contains the data of 2.4GHz WiFi portion only.

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 (2.4GHz Wi-Fi portion).

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.

TEST REPORT

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 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

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.

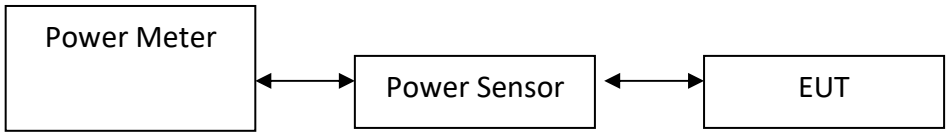
TEST REPORT

EXHIBIT 3 TEST RESULTS

3.1 Maximum Conducted (Peak) 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 8.3.2.3 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 802.11b (DSSS, 1 Mbps) Antenna Gain = 5 dBi (Antenna 1 / Antenna 2)

Frequency (MHz)		Output in dBm	Output in mWatt
Low Channel:	2412	13.115	20.488
Middle Channel:	2437	13.089	20.366
High Channel:	2462	13.546	22.626

IEEE 802.11g (OFDM, 6 Mbps) Antenna Gain = 5 dBi (Antenna 1 / Antenna 2)

Frequency (MHz)		Output in dBm	Output in mWatt
Low Channel:	2412	7.506	5.631
Middle Channel:	2437	7.648	5.818
High Channel:	2462	7.942	6.226

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna Gain = 5 dBi (Antenna 1)

Frequency (MHz)		Output in dBm	Output in mWatt
Low Channel:	2412	7.449	5.558
Middle Channel:	2437	7.453	5.563
High Channel:	2462	7.883	6.142

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna Gain = 5 dBi (Antenna 1)

Frequency (MHz)		Output in dBm	Output in mWatt
Low Channel:	2412	7.879	6.136
Middle Channel:	2437	7.809	6.038
High Channel:	2462	7.993	6.299

TEST REPORT

3.1 Maximum Conducted (Peak) 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;

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna Gain = 5 dBi (Antenna 1)

Frequency (MHz)		Output in dBm	Output in mWatt
Low Channel:	2412	7.449	5.558
Middle Channel:	2437	7.453	5.563
High Channel:	2462	7.883	6.142

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna Gain = 5 dBi (Antenna 2)

Frequency (MHz)		Output in dBm	Output in mWatt
Low Channel:	2412	6.998	5.010
Middle Channel:	2437	6.842	4.833
High Channel:	2462	7.155	5.194

In-Band Power Measurements
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 as below;

IEEE 802.11n (20MHz) (OFDM, MCS0) Antenna Gain = 5 dBi (Antenna 1 + Antenna 2)

Frequency (MHz)		Antenna 1 Conducted Output Power in dBm	Antenna 2 Conducted Output Power in dBm	Antenna 1 + Antenna 2 Total Conducted Output Power in dBm	Output in mWatt
Low Channel:	2412	7.449	6.998	10.100	10.233
Middle Channel:	2437	7.453	6.842	10.169	10.396
High Channel:	2462	7.883	7.155	10.545	11.336

TEST REPORT

3.1 Maximum Conducted (Peak) 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;

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna Gain = 5 dBi (Antenna 1)

Frequency (MHz)		Output in dBm	Output in mWatt
Low Channel:	2422	7.879	6.136
Middle Channel:	2437	7.809	6.038
High Channel:	2452	7.993	6.299

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna Gain = 5 dBi (Antenna 2)

Frequency (MHz)		Output in dBm	Output in mWatt
Low Channel:	2412	7.039	5.057
Middle Channel:	2437	6.956	4.961
High Channel:	2452	7.140	5.176

In-Band Power Measurements
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 as below;

IEEE 802.11n (40MHz) (OFDM, MCS0) Antenna Gain = 5 dBi (Antenna 1 + Antenna 2)

Frequency (MHz)		Antenna 1 Conducted Output Power in dBm	Antenna 2 Conducted Output Power in dBm	Antenna 1 + Antenna 2 Total Conducted Output Power in dBm	Output in mWatt
Low Channel:	2412	7.879	7.039	10.490	11.193
Middle Channel:	2437	7.809	6.956	10.414	10.999
High Channel:	2452	7.993	7.140	10.598	11.475

TEST REPORT

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

Cable loss: 0.5dB External Attenuation: 0dB

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

IEEE 802.11b (DSSS, 1 Mbps)
Max. Conducted (Peak) Output Level = 13.5dBm

IEEE 802.11g (OFDM, 9 Mbps)
Max. Conducted (Peak) Output Level = 7.9dBm

IEEE 802.11n (20MHz) (OFDM, MCS0)
Max. Conducted (Peak) Output Level = 10.5dBm

IEEE 802.11n (40MHz) (OFDM, MCS0)
Max. Conducted (Peak) Output Level = 10.6dBm

Limits:

☐ 1W (30dBm) for antennas with gains of 6dBi or less.

Directional Gain Calculations for In-Band Measurements as described in section F)2)a)i) of KDB 662911 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 + 3dBi = 8dBi

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.

☒ 0.63W (28dBm) for antennas with gains more than 6dBi.

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 802.11b (DSSS, 1 Mbps) (Antenna 1)

Frequency (MHz)		**6dB Bandwidth (MHz)**
Low Channel:	2412	9.20
Middle Channel:	2437	8.50
High Channel:	2462	9.20

IEEE 802.11g (OFDM, 6 Mbps) (Antenna 1)

Frequency (MHz)		**6dB Bandwidth (MHz)**
Low Channel:	2412	16.80
Middle Channel:	2437	16.80
High Channel:	2462	16.70

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

Frequency (MHz)		**6dB Bandwidth (MHz)**
Low Channel:	2412	17.80
Middle Channel:	2437	17.90
High Channel:	2462	17.80

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

Frequency (MHz)		**6dB Bandwidth (MHz)**
Low Channel:	2422	36.50
Middle Channel:	2437	36.50
High Channel:	2452	36.60

Limits:

6dB bandwidth shall be at least 500kHz.

The plots of 6dB RF bandwidth are saved with filename: Test data 07.pdf, Test data 08.pdf, Test data 09.pdf and Test data 10.pdf

TEST REPORT

3.3 Minimum Power Spectral Density

Antenna output of the EUT was coupled directly to spectrum analyzer. The measurement procedure 10.2 PKPSD was used. If an external attenuator and/or cable was used, these losses are compensated for using the OFFSET function of the analyser.

IEEE 802.11b (DSSS, 1 Mbps) (Antenna 1)

Frequency (MHz)		PSD in 100kHz (dBm)
Low Channel:	2412	3.13
Middle Channel:	2437	2.71
High Channel:	2462	3.28

IEEE 802.11g (OFDM, 6 Mbps) (Antenna 1)

Frequency (MHz)		PSD in 100kHz (dBm)
Low Channel:	2412	-5.25
Middle Channel:	2437	-5.07
High Channel:	2462	-4.21

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

Frequency (MHz)		PSD in 100kHz (dBm)
Low Channel:	2412	-4.75
Middle Channel:	2437	-5.15
High Channel:	2462	-4.58

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

Frequency (MHz)		PSD in 100kHz (dBm)
Low Channel:	2422	-6.76
Middle Channel:	2437	-6.75
High Channel:	2452	-6.39

Cable Loss: 0.5dB

Limit: 8dBm

The plots of Minimum Power Spectral Density are saved with filename: Test data 07.pdf, Test data 08.pdf, Test data 09.pdf and Test data 10.pdf

TEST REPORT

3.3 Minimum Power Spectral Density (Cont'd)

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

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

Frequency (MHz)		PSD in 100kHz (dBm)
Low Channel:	2412	-4.75
Middle Channel:	2437	-5.15
High Channel:	2462	-4.58

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

Frequency (MHz)		PSD in 100kHz (dBm)
Low Channel:	2412	-5.29
Middle Channel:	2437	-5.76
High Channel:	2462	-4.91

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 as below;

IEEE 802.11n (20MHz) (OFDM, MCS0) (Antenna 1 + Antenna 2)

Frequency (MHz)		PSD in 100kHz (dBm)
Low Channel:	2412	-1.999
Middle Channel:	2437	-2.433
High Channel:	2462	-1.734

Cable Loss: 0.5dB

Directional Gain Calculations for In-Band Measurements as described in section F)2)a)i) of KDB 662911 D01 v02r01

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

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

Direction gain = 5 + 3dBi = 8dBi

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: (8.0dBm – 2dB) = 6dBm

The plots of Minimum Power Spectral Density are saved with filename: Test data 07.pdf, Test data 08.pdf, Test data 09.pdf and Test data 10.pdf

TEST REPORT

3.3 Minimum Power Spectral Density (Cont'd)

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

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

Frequency (MHz)		PSD in 100kHz (dBm)
Low Channel:	2422	-6.76
Middle Channel:	2437	-6.75
High Channel:	2452	-6.39

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

Frequency (MHz)		PSD in 100kHz (dBm)
Low Channel:	2422	-7.71
Middle Channel:	2437	-8.30
High Channel:	2452	-8.03

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 as below;

IEEE 802.11n (40MHz) (OFDM, MCS0) (Antenna 1 + Antenna 2)

Frequency (MHz)		PSD in 100kHz (dBm)
Low Channel:	2422	-4.198
Middle Channel:	2437	-4.445
High Channel:	2452	-4.122

Cable Loss: 0.5dB

Directional Gain Calculations for In-Band Measurements as described in section F)2)a)i) of KDB 662911 D01 v02r01

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

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

Direction gain = 5 + 3dBi = 8dBi

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: (8.0dBm – 2dB) = 6dBm

The plots of Minimum Power Spectral Density are saved with filename: Test data 07.pdf, Test data 08.pdf, Test data 09.pdf and Test data 10.pdf

TEST REPORT

3.4 Out of Band Conducted Emissions

For IEEE 802.11b/g/n20/n40MHz, the maximum conducted (peak) output power was used to demonstrate compliance as described in 9.1. Then the display line (in red) shown in the following plots denotes the limit at 20dB below maximum measured in-band peak PSD level in 100 KHz bandwidth for IEEE 802.11b/g/n20/n40MHz.

The measurement procedures under sections 11 of KDB558074 D01 v05r02 (April 2, 2019) were used.

Furthermore, delta measurement technique for measuring bandedge emissions was incorporated in the test of the edge at 2483.5MHz.

Limits:

All spurious emission and up to the tenth harmonic was measured and they were found to be at least for 20dB below the maximum measured in-band peak PSD level.

The plots of Out of Band Conducted Emissions are saved with filename: Test data 07.pdf, Test Data 08.pdf, Test data 09.pdf and Test data 10.pdf

TEST REPORT

Occupied Bandwidth Results: (IEEE 802.11b)

(IEEE 802.11b)		Occupied Bandwidth (MHz)
Low Channel:	2412	13.25
Middle Channel:	2437	13.20
High Channel:	2462	13.15

Occupied Bandwidth Results: (IEEE 802.11g)

(IEEE 802.11g)		Occupied Bandwidth (MHz)
Low Channel:	2412	19.85
Middle Channel:	2437	19.45
High Channel:	2462	19.15

Occupied Bandwidth Results: (IEEE 802.11n (20MHz))

(IEEE 802.11n (20MHz))		Occupied Bandwidth (MHz)
Low Channel:	2412	19.40
Middle Channel:	2437	19.15
High Channel:	2462	20.10

Occupied Bandwidth Results: (IEEE 802.11n (40MHz))

(IEEE 802.11n (40MHz))		Occupied Bandwidth (MHz)
Low Channel:	2422	37.65
Middle Channel:	2437	37.75
High Channel:	2452	37.85

The plots of occupied bandwidth results are saved with filename: Test data 07.pdf, Test Data 08.pdf, Test data 09.pdf and Test data 10.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 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 = 29.0 dB
PD = 0.0 dB
AV = -10.0 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

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 624.996 MHz.

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

3.6.2 Radiated Emission Data

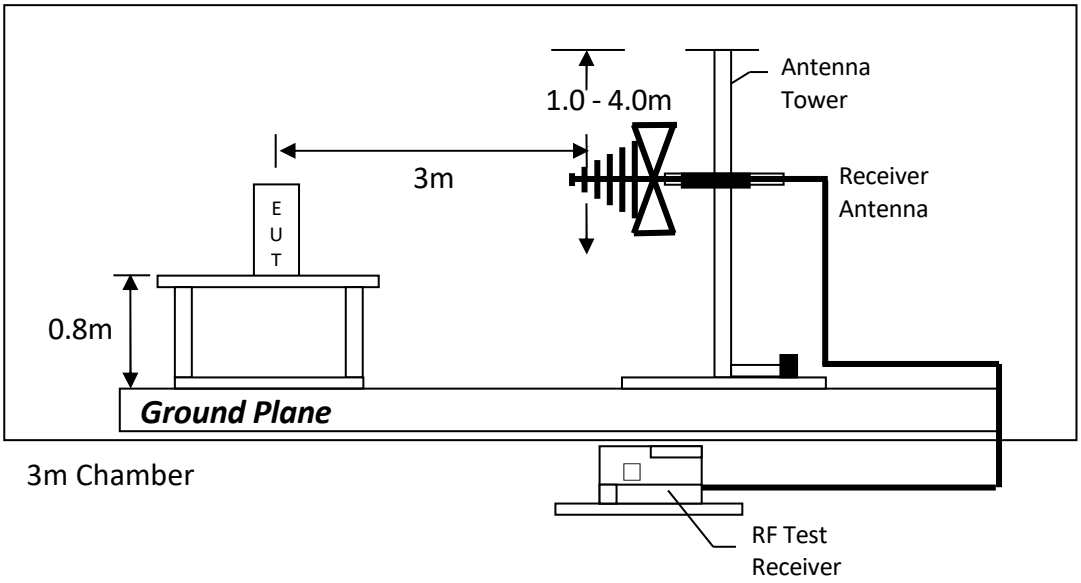
The data in tables 1-13 list the significant emission frequencies, the limit and the margin of compliance.

Judgement – Passed by 0.5 dB margin

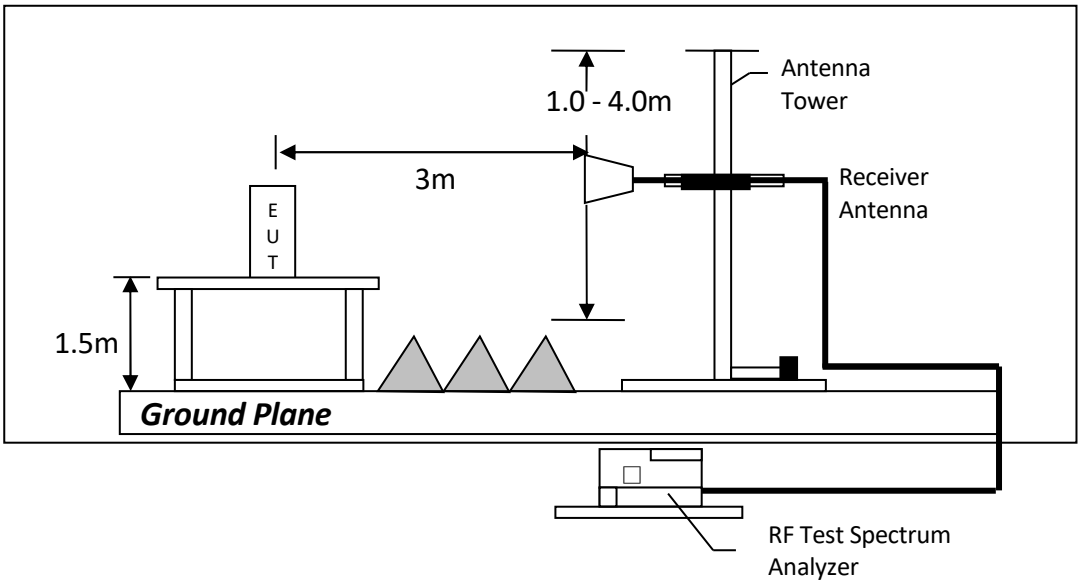
TEST REPORT

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

Mode: TX-Channel 01

Table 1, IEEE 802.11b DSSS 1Mbps

Polari-zation	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	2390.000	55.1	33	29.4	51.5	54.0	-2.5
V	4824.000	49.0	33	34.9	50.9	54.0	-3.1
H	7236.000	28.6	33	37.9	33.5	54.0	-20.5
V	9648.000	28.2	33	40.4	35.6	54.0	-18.4
H	12060.000	30.8	33	40.5	38.3	54.0	-15.7
H	14472.000	35.1	33	40.0	42.1	54.0	-11.9

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	2390.000	65.3	33	29.4	61.7	74.0	-12.3
V	4824.000	52.2	33	34.9	54.1	74.0	-19.9
H	7236.000	41.6	33	37.9	46.5	74.0	-27.5
V	9648.000	42.1	33	40.4	49.5	74.0	-24.5
H	12060.000	43.8	33	40.5	51.3	74.0	-22.7
H	14472.000	48.6	33	40.0	55.6	74.0	-18.4

Notes:
1. Peak detector is used for the emission measurement.
2. Average detector is used according to ANSI C63.10 for the average measurement.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSION DATA

Mode: TX-Channel 06

Table 2, IEEE 802.11b DSSS 1Mbps

Polari-zation	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	4874.000	40.3	33	34.9	42.2	54.0	-11.8
V	7311.000	29.7	33	37.9	34.6	54.0	-19.4
V	9748.000	29.6	33	40.4	37.0	54.0	-17.0
H	12185.000	32.7	33	40.5	40.2	54.0	-13.8
V	14622.000	41.1	33	38.4	46.5	54.0	-7.5

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	4874.000	48.4	33	34.9	50.3	74.0	-23.7
V	7311.000	43.1	33	37.9	48.0	74.0	-26.0
V	9748.000	43.0	33	40.4	50.4	74.0	-23.6
H	12185.000	46.0	33	40.5	53.5	74.0	-20.5
V	14622.000	49.5	33	38.4	54.9	74.0	-19.1

Notes:
1. Peak detector is used for the emission measurement.
2. Average detector is used according to ANSI C63.10 for the average measurement.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSION DATA

Mode: TX-Channel 11

Table 3, IEEE 802.11b DSSS 1Mbps

Polari-zation	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	2483.500	57.0	33	29.4	53.4	54.0	-0.6
H	4924.000	41.4	33	34.9	43.3	54.0	-10.7
V	7386.000	39.7	33	37.9	44.6	54.0	-9.4
V	9848.000	28.5	33	40.4	35.9	54.0	-18.1
H	12310.000	30.3	33	40.5	37.8	54.0	-16.2
H	14772.000	33.5	33	38.4	38.9	54.0	-15.1

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)
V	2483.500	65.2	33	29.4	61.6	74.0	-12.4
H	4924.000	49.9	33	34.9	51.8	74.0	-22.2
V	7386.000	47.8	33	37.9	52.7	74.0	-21.3
V	9848.000	41.5	33	40.4	48.9	74.0	-25.1
H	12310.000	43.6	33	40.5	51.1	74.0	-22.9
H	14772.000	47.2	33	38.4	52.6	74.0	-21.4

Notes:
1. Peak detector is used for the emission measurement.
2. Average detector is used according to ANSI C63.10 for the average measurement.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSION DATA

Mode: TX-Channel 01

Table 4, IEEE 802.11g OFDM, 6 Mbps

Polari-zation	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	2390.000	48.8	33	29.4	45.2	54.0	-8.8
V	4824.000	28.1	33	34.9	30.0	54.0	-24.0
V	7236.000	28.5	33	37.9	33.4	54.0	-20.6
H	9648.000	28.2	33	40.4	35.6	54.0	-18.4
V	12060.000	30.7	33	40.5	38.2	54.0	-15.8
H	14472.000	35.0	33	40.0	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	2390.000	62.9	33	29.4	59.3	74.0	-14.7
V	4824.000	41.3	33	34.9	43.2	74.0	-30.8
V	7236.000	42.1	33	37.9	47.0	74.0	-27.0
H	9648.000	41.1	33	40.4	48.5	74.0	-25.5
V	12060.000	44.1	33	40.5	51.6	74.0	-22.4
H	14472.000	48.7	33	40.0	55.7	74.0	-18.3

Notes:
1. Peak detector is used for the emission measurement.
2. Average detector is used according to ANSI C63.10 for the average measurement.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSION DATA

Mode: TX-Channel 06

Table 5, IEEE 802.11g OFDM, 6 Mbps

Polari-zation	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	4874.000	35.7	33	34.9	37.6	54.0	-16.4
H	7311.000	26.8	33	37.9	31.7	54.0	-22.3
V	9748.000	27.1	33	40.4	34.5	54.0	-19.5
V	12185.000	29.4	33	40.5	36.9	54.0	-17.1
H	14622.000	36.3	33	38.4	41.7	54.0	-12.3

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	4874.000	49.4	33	34.9	51.3	74.0	-22.7
H	7311.000	40.2	33	37.9	45.1	74.0	-28.9
V	9748.000	40.4	33	40.4	47.8	74.0	-26.2
V	12185.000	42.6	33	40.5	50.1	74.0	-23.9
H	14622.000	50.1	33	38.4	55.5	74.0	-18.5

Notes:
1. Peak detector is used for the emission measurement.
2. Average detector is used according to ANSI C63.10 for the average measurement.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSION DATA

Mode: TX-Channel 11

Table 6, IEEE 802.11g OFDM, 6 Mbps

Polari-zation	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	2483.500	47.6	33	29.4	44.0	54.0	-10.0
V	4924.000	37.4	33	34.9	39.3	54.0	-14.7
H	7386.000	35.5	33	37.9	40.4	54.0	-13.6
V	9848.000	25.4	33	40.4	32.8	54.0	-21.2
V	12310.000	26.6	33	40.5	34.1	54.0	-19.9
H	14772.000	30.4	33	38.4	35.8	54.0	-18.2

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	2483.500	62.0	33	29.4	58.4	74.0	-15.6
V	4924.000	51.3	33	34.9	53.2	74.0	-20.8
H	7386.000	49.0	33	37.9	53.9	74.0	-20.1
V	9848.000	38.5	33	40.4	45.9	74.0	-28.1
V	12310.000	39.9	33	40.5	47.4	74.0	-26.6
H	14772.000	43.9	33	38.4	49.3	74.0	-24.7

Notes:
1. Peak detector is used for the emission measurement.
2. Average detector is used according to ANSI C63.10 for the average measurement.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSION DATA

Mode: TX-Channel 01

Table 7, IEEE 802.11n (20MHz) OFDM, MCS0 - Both Antennas

Polari-zation	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	2390.000	50.3	33	29.4	46.7	54.0	-7.3
H	4824.000	28.2	33	34.9	30.1	54.0	-23.9
H	7236.000	28.5	33	37.9	33.4	54.0	-20.6
H	9648.000	28.1	33	40.4	35.5	54.0	-18.5
V	12060.000	30.7	33	40.5	38.2	54.0	-15.8
V	14472.000	35.0	33	40.0	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	2390.000	66.9	33	29.4	63.3	74.0	-10.7
H	4824.000	41.4	33	34.9	43.3	74.0	-30.7
H	7236.000	41.7	33	37.9	46.6	74.0	-27.4
H	9648.000	41.6	33	40.4	49.0	74.0	-25.0
V	12060.000	44.2	33	40.5	51.7	74.0	-22.3
V	14472.000	48.2	33	40.0	55.2	74.0	-18.8

Notes:
1. Peak detector is used for the emission measurement.
2. Average detector is used according to ANSI C63.10 for the average measurement.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSION DATA

Mode: TX-Channel 06

Table 8, IEEE 802.11n (20MHz) OFDM, MCS0 - Both Antennas

Polari-zation	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	4874.000	29.9	33	34.9	31.8	54.0	-22.2
V	7311.000	29.6	33	37.9	34.5	54.0	-19.5
H	9748.000	29.5	33	40.4	36.9	54.0	-17.1
H	12185.000	32.6	33	40.5	40.1	54.0	-13.9
V	14622.000	30.7	33	38.4	36.1	54.0	-17.9

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	4874.000	43.1	33	34.9	45.0	74.0	-29.0
V	7311.000	42.9	33	37.9	47.8	74.0	-26.2
H	9748.000	43.0	33	40.4	50.4	74.0	-23.6
H	12185.000	46.0	33	40.5	53.5	74.0	-20.5
V	14622.000	43.9	33	38.4	49.3	74.0	-24.7

Notes:
1. Peak detector is used for the emission measurement.
2. Average detector is used according to ANSI C63.10 for the average measurement.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSION DATA

Mode: TX-Channel 11

Table 9, IEEE 802.11n (20MHz) OFDM, MCS0 - Both Antennas

Polari-zation	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	2483.500	49.7	33	29.4	46.1	54.0	-7.9
H	4924.000	30.9	33	34.9	32.8	54.0	-21.2
V	7386.000	29.3	33	37.9	34.2	54.0	-19.8
H	9848.000	28.4	33	40.4	35.8	54.0	-18.2
V	12310.000	30.2	33	40.5	37.7	54.0	-16.3
H	14772.000	33.4	33	38.4	38.8	54.0	-15.2

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	2483.500	64.8	33	29.4	61.2	74.0	-12.8
H	4924.000	44.3	33	34.9	46.2	74.0	-27.8
V	7386.000	42.6	33	37.9	47.5	74.0	-26.5
H	9848.000	41.8	33	40.4	49.2	74.0	-24.8
V	12310.000	43.4	33	40.5	50.9	74.0	-23.1
H	14772.000	46.7	33	38.4	52.1	74.0	-21.9

Notes:
1. Peak detector is used for the emission measurement.
2. Average detector is used according to ANSI C63.10 for the average measurement.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSION DATA

Mode: TX-Channel 3

Table 10, IEEE 802.11n (40MHz) OFDM, MCS0 - Both Antennas

Polari-zation	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	2390.000	54.6	33	29.4	51.0	54.0	-3.0
H	4844.000	28.0	33	34.9	29.9	54.0	-24.1
H	7266.000	28.6	33	37.9	33.5	54.0	-20.5
V	9688.000	28.6	33	40.4	36.0	54.0	-18.0
H	12110.000	30.8	33	40.5	38.3	54.0	-15.7
V	14532.000	36.6	33	38.4	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	2390.000	69.1	33	29.4	65.5	74.0	-8.5
H	4844.000	41.0	33	34.9	42.9	74.0	-31.1
H	7266.000	41.9	33	37.9	46.8	74.0	-27.2
V	9688.000	41.8	33	40.4	49.2	74.0	-24.8
H	12110.000	44.6	33	40.5	52.1	74.0	-21.9
V	14532.000	49.5	33	38.4	54.9	74.0	-19.1

Notes:
1. Peak detector is used for the emission measurement.
2. Average detector is used according to ANSI C63.10 for the average measurement.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSION DATA

Mode: TX-Channel 6

Table 11, IEEE 802.11n (40MHz) OFDM, MCS0 - Both Antennas

Polari-zation	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	4874.000	29.8	33	34.9	31.7	54.0	-22.3
V	7311.000	29.9	33	37.9	34.8	54.0	-19.2
H	9748.000	29.8	33	40.4	37.2	54.0	-16.8
H	12185.000	32.7	33	40.5	40.2	54.0	-13.8
V	14622.000	30.6	33	38.4	36.0	54.0	-18.0

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)
H	4874.000	43.0	33	34.9	44.9	74.0	-29.1
V	7311.000	43.1	33	37.9	48.0	74.0	-26.0
H	9748.000	43.3	33	40.4	50.7	74.0	-23.3
H	12185.000	46.0	33	40.5	53.5	74.0	-20.5
V	14622.000	43.5	33	38.4	48.9	74.0	-25.1

Notes:
1. Peak detector is used for the emission measurement.
2. Average detector is used according to ANSI C63.10 for the average measurement.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSION DATA

Mode: TX-Channel 9

Table 12, IEEE 802.11n (40MHz) OFDM, MCS0 - Both Antennas

Polari-zation	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	2483.500	51.9	33	29.4	48.3	54.0	-5.7
V	4904.000	31.1	33	34.9	33.0	54.0	-21.0
V	7356.000	29.2	33	37.9	34.1	54.0	-19.9
H	9808.000	28.5	33	40.4	35.9	54.0	-18.1
V	12260.000	30.3	33	40.5	37.8	54.0	-16.2
H	14712.000	33.6	33	38.4	39.0	54.0	-15.0

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	2483.500	65.9	33	29.4	62.3	74.0	-11.7
V	4904.000	44.2	33	34.9	46.1	74.0	-27.9
V	7356.000	42.6	33	37.9	47.5	74.0	-26.5
H	9808.000	42.1	33	40.4	49.5	74.0	-24.5
V	12260.000	43.4	33	40.5	50.9	74.0	-23.1
H	14712.000	46.7	33	38.4	52.1	74.0	-21.9

Notes:
1. Peak detector is used for the emission measurement.
2. Average detector is used according to ANSI C63.10 for the average measurement.
3. All measurements were made at 3 meters.
4. Negative value in the margin column shows emission below limit.
5. Horn antenna is used for the emission over 1000MHz.
6. Emissions within the restricted band meets the requirement of FCC Part 15 Section 15.205.
7. Measurement Uncertainty is ±5.3dB at a level of confidence of 95%.

TEST REPORT

RADIATED EMISSION DATA

Mode: Transmitting

Table 13

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
V	249.999	39.7	16	20.0	43.7	46.0	-2.3
H	371.247	28.9	16	24.0	36.9	46.0	-9.1
H	593.996	28.2	16	29.0	41.2	46.0	-4.8
V	624.996	32.5	16	29.0	45.5	46.0	-0.5
V	749.995	30.8	16	30.0	44.8	46.0	-1.2
H	874.994	27.8	16	32.0	43.8	46.0	-2.2

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. 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

3.7 Transmitter Duty Cycle Calculation

Not Applicable – No average factor is required

3.8 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.

3.8.1 AC Power Line Conducted Emission Configuration Photograph

Worst Case Line-Conducted Configuration at 0.474 MHz.

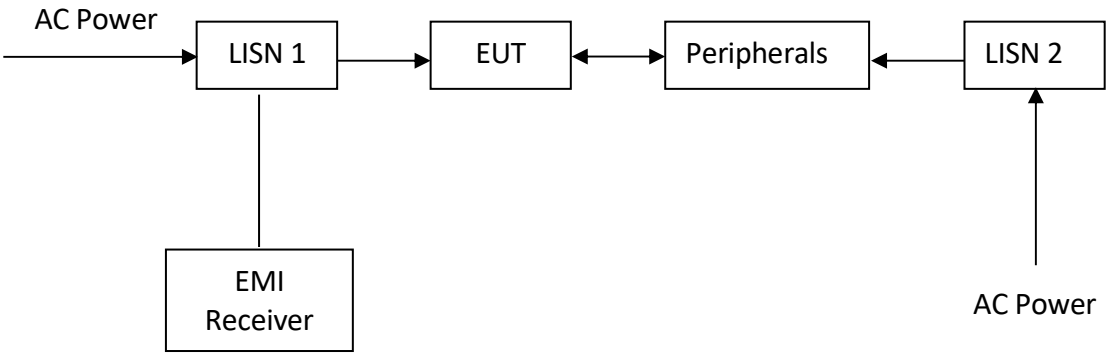
The worst case line conducted configuration photographs are attached in the Appendix and saved with filename: config photos.pdf.

3.8.2 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 9.34 dB margin compare with Quasi-peak limit.

3.8.3 Conducted Emission Test Setup



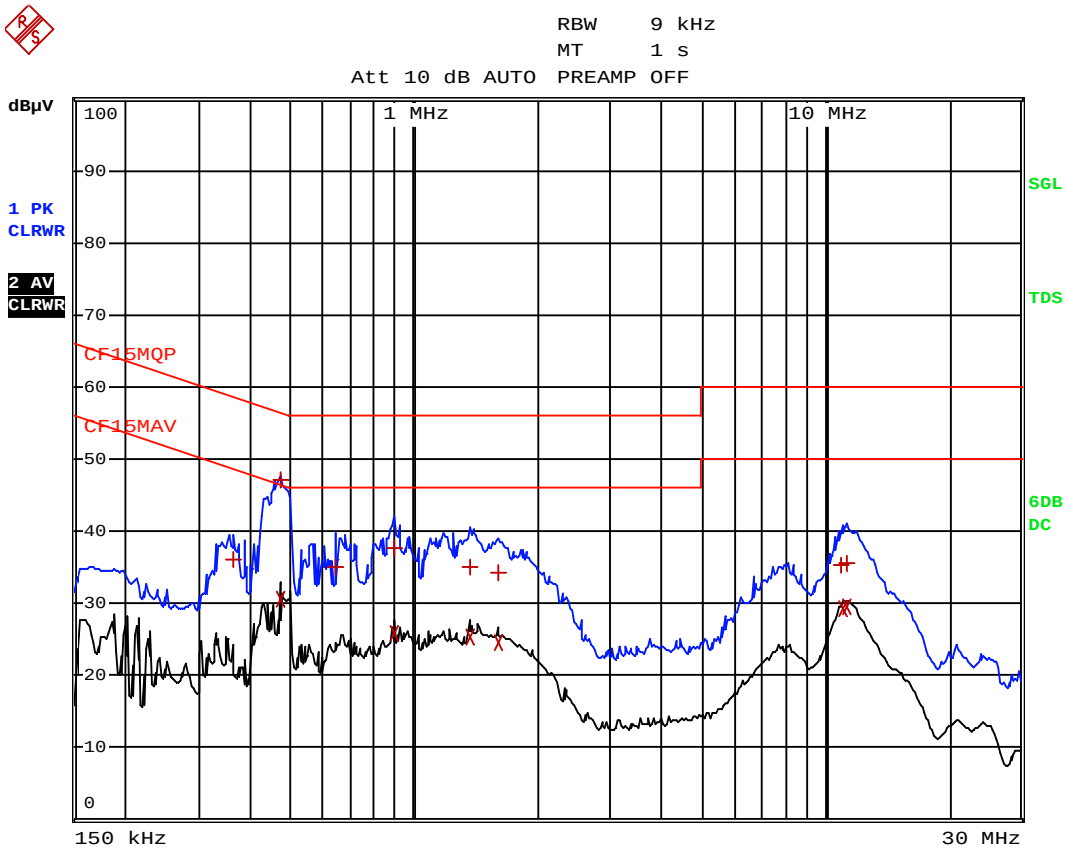
The EUT along with its peripherals were placed on a 1.0m(W)×1.5m(L) and 0.8m in height wooden table and the EUT was adjusted to maintain a 0.4 meter space from a vertical reference plane. The EUT was connected to power mains through a line impedance stabilization network (LISN), which provided 50 ohm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



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	361.5 kHz	36.20	L1	-22.49
1	Quasi Peak	474 kHz	47.09	N	-9.34
2	CISPR Average	474 kHz	30.45	L1	-15.99
1	Quasi Peak	640.5 kHz	35.11	L1	-20.88
1	Quasi Peak	897 kHz	37.71	L1	-18.28
2	CISPR Average	897 kHz	25.97	N	-20.02
1	Quasi Peak	1.3695 MHz	35.01	L1	-20.98
2	CISPR Average	1.374 MHz	25.27	L1	-20.72
1	Quasi Peak	1.6035 MHz	34.19	L1	-21.80
2	CISPR Average	1.6035 MHz	24.45	L1	-21.54
1	Quasi Peak	11.04 MHz	35.30	L1	-24.70
2	CISPR Average	11.04 MHz	29.30	L1	-20.69
1	Quasi Peak	11.274 MHz	35.58	L1	-24.41
2	CISPR Average	11.3685 MHz	29.60	L1	-20.40

TEST REPORT

EXHIBIT 4 EQUIPMENT LIST

1) Radiated Emissions Test

Equipment	Spectrum Analyzer (10Hz to 40GHz)	Biconical Antenna (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 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	March 30, 2023	May 26, 2023	June 13, 2023

Equipment	RF Preamplifier (9kHz to 6000MHz)	2.4GHz Notch Filter	14m Double Shield RF Cable (9kHz - 6GHz)
Registration No.	EW-3006b	EW-3435	EW-2376
Manufacturer	SCHWARZBECK	MICROWAVE	RADIALL
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 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 (RG142) (9kHz to 30MHz)	Artificial Mains Network	EMI Test Receiver (9kHz to 26.5GHz)
Registration No.	EW-2451	EW-2501	EW-3156
Manufacturer	RADIALL	ROHDESCHWARZ	ROHDESCHWARZ
Model No.	bnc m st / 142 / bnc m 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 (9kHz to 26.5GHz)	5m RF Cable (40GHz)
Registration No.	EW-3156	EW-2701
Manufacturer	ROHDESCHWARZ	RADIALL
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 Power Sensor (NRP-Z81)	EMI Test Receiver (9kHz to 26.5GHz)
Registration No.	EW-3271	EW-3309	EW-3156
Manufacturer	GREATBILLION	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	May 24, 2023	March 01, 2023	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	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