

## TEST REPORT

**Report No.: 20080597HKG-002R1**

Lenbrook Industries Limited

Application for Original Grant of 47 CFR Part 15 Certification

New Family of RSS-247 Issue 2 Equipment

This report contains the data of 5GHz WLAN (WiFi) portion only

**FCC ID: Q20-PSUBPBSW150**

**IC: 152B-PSUBPBSW150**

This report supersedes previous report with report number 20080597HKG-002 dated November 16, 2020.

Please refer ICT-S20-0021 Letter issued on December 17, 2020 for amendment/ supersede notification.

**Prepared and Checked by:**

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Signed On File  
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Date: December 17, 2020

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## TEST REPORT

### GENERAL INFORMATION

<b>Applicant Name:</b>	Lenbrook Industries Limited
<b>Applicant Address:</b>	633 Granite Court, Pickering, ON Canada L1W 3K1
<b>FCC Specification Standard:</b>	FCC Part 15, October 1, 2019 Edition
<b>FCC ID:</b>	Q2O-PSUBPBSW150
<b>FCC Model(s):</b>	PULSE SUB+, BSW150
<b>IC Specification Standard:</b>	RSS-247 Issue 2, February 2017 RSS-Gen Issue 5 Amendment 1, March 2019
<b>IC:</b>	152B-PSUBPBSW150
<b>PMN:</b>	PULSE SUB+, BSW150
<b>HVIN:</b>	PULSE SUB+, BSW150
<b>Type of EUT:</b>	Spread Spectrum Transmitter
<b>Description of EUT:</b>	WIRELESS POWERED SUBWOOFER (PULSE SUB+), NETWORK POWERED SUBWOOFER (BSW150)
<b>Serial Number:</b>	N/A
<b>Sample Receipt Date:</b>	October 01, 2020
<b>Date of Test:</b>	October 01, 2020 to November 16, 2020
<b>Report Date:</b>	December 17, 2020
<b>Environmental Conditions:</b>	Temperature: +10 to 40°C Humidity: 10 to 90%
<b>Conclusion:</b>	Test was conducted by client submitted sample. The submitted sample as received complied with the 47 CFR Part 15 / RSS-247 Issue 2 Certification.

## TEST REPORT

### AMENDMENT HISTORY

Report No.	Issued Date	Content
20080597HKG-002	November 16, 2020	Original Report
20080597HKG-002R1	December 17, 2020	P.26-44: update data

**TEST REPORT**

**TABLE OF CONTENTS**

**1.0 Test Results Summary & Statement of Compliance ..... 5**

    1.1 Summary of Test Results..... 5

    1.2 Statement of Compliance ..... 5

**2.0 General Description ..... 6**

    2.1 Product Description..... 6

    2.2 Test Methodology ..... 8

    2.3 Test Facility ..... 8

    2.4 Related Submittal(s) Grants..... 8

**3.0 System Test Configuration..... 9**

    3.1 Justification ..... 9

    3.2 EUT Exercising Software ..... 10

    3.3 Details of EUT and Description of Accessories ..... 11

    3.4 Measurement Uncertainty ..... 11

**4.0 Test Results ..... 12**

    4.1 Maximum Conducted Output Power at Antenna Terminals..... 12

    4.2 Minimum 6dB RF Bandwidth..... 17

    4.3 26 dB Bandwidth & Occupied Bandwidth ..... 19

    4.4 Maximum Power Spectral Density..... 21

    4.5 Field Strength Calculation..... 25

    4.6 Transmitter Radiated Emissions in Restricted Bands and Spurious Emissions ..... 26

        4.6.1 Radiated Emission Configuration Photograph..... 26

        4.6.2 Radiated Emission Data ..... 26

        4.6.3 Radiated Emission Test Setup ..... 46

    4.7 AC Power Line Conducted Emission..... 47

        4.7.1 AC Power Line Conducted Emission Configuration Photograph ..... 47

        4.7.2 AC Power Line Conducted Emission Data..... 47

        4.7.3 Conducted Emission Test Setup..... 50

**5.0 Equipment List ..... 51**

## 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
26 dB emission bandwidth	15.407(a)	Pass	4.3
Occupied Bandwidth	N/A	Pass	4.3
Max. Power Density (average)	15.407(a)	Pass	4.4
Radiated Emission in Restricted Bands and Spurious Emissions	15.407(b), 15.209 & 15.109	Pass	4.5
AC Power Line Conducted Emission	15.207 & 15.107	Pass	4.7
Dynamic Frequency Selection(DFS)	15.407	Pass	4.8

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 standard:

FCC Part 15, October 1, 2019 Edition  
RSS-247 Issue 2, February 2017  
RSS-Gen Issue 5 Amendment 1, March 2019

## TEST REPORT

### 2.0 GENERAL DESCRIPTION

#### 2.1 Product Description

The Equipment Under Test (EUT) is WIRELESS POWERED SUBWOOFER (Model/HVIN: PULSE SUB+) which contains a WLAN (WiFi) module for networking and control. The EUT has internal power amplifiers and loudspeaker.

#### For 2.4 GHz ISM Band:

- For 802.11b mode, it operates at frequency range of 2.412 GHz to 2.462 GHz with 11 Channels. It transmits via DQPSK, DBPSK and CCK. Maximum bit rate can be up to 11Mbps.
- For 802.11g mode, it operates at frequency range of 2.412 GHz to 2.462 GHz with 11 Channels. It transmits via OFDM/64-QAM, 16-QAM, QPSK and BPSK. Maximum bit rate can be up to 54Mbps.
- For 802.11n mode (With 20MHz Bandwidth), it operates at frequency range of 2.412 GHz to 2.462 GHz with 11 Channels. It transmits via OFDM/64-QAM, 16-QAM, QPSK and BPSK. Maximum bit rate can be up to MCS7 65Mbps.
- For 802.11n mode (With 40MHz Bandwidth), it operates at frequency range of 2.422 GHz to 2.452 GHz with 9 Channels. Maximum bit rate can be up to MCS7 150Mbps

#### For 5.15GHz to 5.24GHz Band:

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

- For 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 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 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 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 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 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 390 Mbps.

## TEST REPORT

### For 5.725GHz to 5.85GHz Band:

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

- For 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 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 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 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 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 162 Mbps.
- For 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 390 Mbps.

### Antenna Information:

- PCB Antenna
- WLAN 802.11 a/b/g/n/ac
- For operating frequency of 2.4GHz, antenna has maximum gain of 2 dBi
- For operating frequency of 5GHz, antenna has maximum gain of 2 dBi

For FCC & IC, the Model/HVIN(s): BSW150 (NETWORK POWERED SUBWOOFER) is the same as the Model/HVIN: PULSE SUB+ (WIRELESS POWERED SUBWOOFER) in electronics/electrical designs including software & firmware, PCB layout and construction design/physical design/enclosure as declared by client. The only differences between these models are model number and brand name to be sold for marketing purpose as declared by client.

The EUT is power by 120VAC.

The antenna(s) used in the EUT is integral, and the test sample is a prototype.

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

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

## TEST REPORT

### 2.2 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.789033 D02 v01r04 (02-May-2017) All other measurements were made in accordance with the procedures in 47 CFR Part 2.

### 2.3 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 and Industry Canada No.: 2042H.

### 2.4 Related Submittal(s) Grants

This is a single application for certification of a transceiver (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 EUT is power by 120VAC.

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.

Different data rates have been tested. Worst case is reported only.

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

All data rates were tested under normal mode of WiFi. Only the worst-case data is shown in the report for OFDM.

### 3.2 EUT Exercising Software

The EUT exercise program (if any) 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:

- (1) The EUT is powered by 120VAC

Description of Accessories:

- 1 X Power Cable of 2-meter-long  
(Provided by Intertek)

### 3.4 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:

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

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.

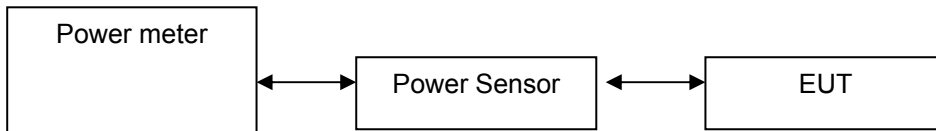
**TEST REPORT**

**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 = 2 dBi

Frequency (MHz)	Conducted output power in dBm	Conducted output power in mWatt
5180	6.8	4.8
5200	5.4	3.5
5240	5.3	3.4
5745	7.0	5.0
5785	5.3	3.4
5825	4.4	2.8

**TEST REPORT**

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

Frequency (MHz)	Conducted output power in dBm	Conducted output power in mWatt
5190	1.6	1.4
5230	0.4	1.1
5755	2.0	1.6
5795	1.6	1.4

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

Frequency (MHz)	Conducted output power in dBm	Conducted output power in mWatt
5210	7.2	5.2
5775	5.3	3.4

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

Frequency (MHz)	Conducted output power in dBm	Conducted output power in mWatt
5180	8.9	7.8
5200	7.8	6.0
5240	7.6	5.8
5745	9.2	8.3
5785	7.3	5.4
5825	8.1	6.5

**TEST REPORT**

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

Frequency (MHz)	Conducted output power in dBm	Conducted output power in mWatt
5180	7.8	6.0
5200	7.8	6.0
5240	7.4	5.5
5745	7.0	5.0
5785	5.3	3.4
5825	5.2	3.3

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

Frequency (MHz)	Conducted output power in dBm	Conducted output power in mWatt
5190	6.2	4.2
5230	4.8	3.0
5755	6.4	4.4
5795	5.6	3.6

**For maximum e.i.r.p.**

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

Frequency (MHz)	Conducted output power in dBm	EIRP in dBm	EIRP in mWatt
5180	6.8	8.8	7.6
5220	5.4	7.4	5.5
5240	5.3	7.3	5.4

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

Frequency (MHz)	Conducted output power in dBm	EIRP in dBm	EIRP in mWatt
5190	1.6	3.6	2.3
5230	0.4	2.4	1.7

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

Frequency (MHz)	Conducted output power in dBm	EIRP in dBm	EIRP in mWatt
5210	7.2	9.2	8.3

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

Frequency (MHz)	Conducted output power in dBm	EIRP in dBm	EIRP in mWatt
5180	8.9	10.9	12.3
5220	7.8	9.8	9.5
5240	7.6	9.6	9.1

**TEST REPORT**

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

Frequency (MHz)	Conducted output power in dBm	EIRP in dBm	EIRP in mWatt
5180	7.8	9.8	9.5
5220	7.8	9.8	9.5
5240	7.4	9.4	8.7

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

Frequency (MHz)	Conducted output power in dBm	EIRP in dBm	EIRP in mWatt
5190	6.2	8.2	6.6
5230	4.8	6.8	4.8

Cable loss : 1.02 dB External Attenuation : 10 dB

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

IEEE 802.11ac (20MHz) (OFDM, MCS0)  
max. conducted output level = 7.0 dBm

IEEE 802.11ac (40MHz) (OFDM, MCS0)  
max. conducted output level = 2.0 dBm

IEEE 802.11ac (80MHz) (OFDM, MCS0)  
max. conducted output level = 7.2 dBm

IEEE 802.11a (20MHz) (OFDM, 6 Mbps)  
max. conducted output level = 9.2 dBm

IEEE 802.11n (20MHz) (OFDM, MCS0)  
max. conducted output level = 7.8 dBm

IEEE 802.11n (40MHz) (OFDM, MCS0)  
max. conducted output level = 6.4 dBm

## TEST REPORT

Remark:

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

5150-5250MHz:

250mW (24dBm) for antennas with gains of 6dBi or less. (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)
5745	15.3	17.4
5785	15.7	17.4
5825	15.3	17.4

IEEE 802.11ac (40MHz) (MCS0)

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
5755	36.6	36.6
5795	36.6	36.6

IEEE 802.11ac (80MHz) (MCS0)

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
5775	75.2	75

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

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
5745	15.3	16.4
5785	15.5	16.4
5825	15.3	16.4

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

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
5755	35.3	36.0
5795	35.3	36.0

**TEST REPORT**

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

Frequency (MHz)	6dB Bandwidth (MHz)	99% Bandwidth (MHz)
5745	15.3	17.4
5785	15.3	17.4
5825	15.3	17.4

Limits:

For 5725-5850MHz:

6 db bandwidth shall be at least 500kHz

The plots of 6db RF bandwidth and occupied bandwidth are saved with filename: UNII-1 test data.pdf, UNII-3 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)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
5180	20.4	17.4
5200	20.4	17.4
5240	20.4	17.4
5745	20.6	17.4
5785	20.6	17.4
5825	20.6	17.4

IEEE 802.11ac (40MHz) (MCS0)

Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
5190	45.8	36.6
5230	43.7	36.6
5755	45.2	36.6
5795	45.2	36.6

IEEE 802.11ac (80MHz) (MCS0)

Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
5210	86.1	75.5
5775	86.1	75.0

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

Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
5180	20.0	16.2
5200	20.4	16.4
5240	20.4	16.2
5745	20.2	16.4
5785	20.0	16.4
5825	20.0	16.4

**TEST REPORT**

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

Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
5180	20.6	17.4
5200	20.2	17.4
5240	20.4	17.4
5745	20.4	17.4
5785	20.4	17.4
5825	20.2	17.4

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

Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
5190	42.2	36.0
5230	41.0	36.0
5755	41.0	36.0
5795	41.0	36.0

**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.

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

Frequency (MHz)	Conducted PSD in 1MHz (dBm)
5180	-1.646
5200	-2.486
5240	-2.962

Frequency (MHz)	Conducted PSD in 500kHz (dBm)
5745	-4.186
5785	-5.983
5825	-5.514

**TEST REPORT**

IEEE 802.11ac (20MHz) (MCS0)

Frequency (MHz)	Conducted PSD in 1MHz (dBm)
5180	-3.965
5200	-4.868
5240	-5.267
Frequency (MHz)	Conducted PSD in 500kHz (dBm)
5745	-6.484
5785	-8.345
5825	-7.820

IEEE 802.11ac (40MHz) (MCS0)

Frequency (MHz)	Conducted PSD in 1MHz (dBm)
5190	-8.971
5230	-10.391
Frequency (MHz)	Conducted PSD in 500kHz (dBm)
5755	-11.144
5795	-12.476

IEEE 802.11ac (80MHz) (MCS0)

Frequency (MHz)	Conducted PSD in 1MHz (dBm)
5210	-9.202
Frequency (MHz)	Conducted PSD in 500kHz (dBm)
5775	-11.781

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

Frequency (MHz)	Conducted PSD in 1MHz (dBm)
5180	-3.199
5200	-3.260
5240	-3.605
Frequency (MHz)	Conducted PSD in 500kHz (dBm)
5745	-2.564
5785	-2.947
5825	-4.298

**TEST REPORT**

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

Frequency (MHz)	Conducted PSD in 1MHz (dBm)
5190	-6.863
5230	-8.360

Frequency (MHz)	Conducted PSD in 500kHz (dBm)
5755	-9.716
5795	-10.975

**For maximum e.i.r.p.**

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

Frequency (MHz)	EIRP PSD in 1MHz (dBm)
5180	0.892
5220	0.805
5240	0.884

IEEE 802.11ac (20MHz) (MCS0)

Frequency (MHz)	EIRP PSD in 1MHz (dBm)
5180	0.727
5220	0.72
5240	0.797

IEEE 802.11ac (40MHz) (MCS0)

Frequency (MHz)	EIRP PSD in 1MHz (dBm)
5190	0.351
5230	0.431

IEEE 802.11ac (80MHz) (MCS0)

Frequency (MHz)	EIRP PSD in 1MHz (dBm)
5210	0.219

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

Frequency (MHz)	EIRP PSD in 1MHz (dBm)
5180	0.624
5220	0.692
5240	0.755

**TEST REPORT**

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

Frequency (MHz)	EIRP PSD in 1MHz (dBm)
5190	0.344
5230	0.408

Remark:

1. Cable Loss: 1.02 dB
2. e.i.r.p. spectral density = Power spectral density + Duty Cycle Factor + Antenna Gain
3. Power spectral density = Conducted power spectral density + Duty Cycle Factor
4. Duty cycle= On Time/ Period;  
Duty Cycle factor =  $10 * \log(1/ \text{Duty cycle})$ ;  
Average factor =  $20 \log_{10} \text{Duty Cycle}$ .
5. Limit:

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:

- FCC:  
30dBm/500kHz.
- RSS:  
30dBm/500kHz.

The test data are saved with filename: UNII-1 test data.pdf, UNII-3 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 dB $\mu$ V/m

RA = Receiver Amplitude (including preamplifier) in dB $\mu$ V

CF = Cable Attenuation Factor in dB

AF = Antenna Factor in dB

AG = Amplifier Gain in dB

PD = Pulse Desensitization in dB

AV = Average Factor in -dB

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

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

#### Example

Assume a receiver reading of 62.0 dB $\mu$ V 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 dB $\mu$ V/m. This value in dB $\mu$ V/m is converted to its corresponding level in  $\mu$ V/m.

$$RA = 62.0 \text{ dB}\mu\text{V}$$

$$AF = 7.4 \text{ dB}$$

$$CF = 1.6 \text{ dB}$$

$$AG = 29.0 \text{ dB}$$

$$PD = 0.0 \text{ dB}$$

$$AV = -10 \text{ dB}$$

$$FS = 62.0 + 7.4 + 1.6 - 29.0 + 0.0 + (-10.0) = 32.0 \text{ dB}\mu\text{V/m}$$

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

## TEST REPORT

### 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

5150 MHz

The worst case radiated emission configuration photographs are saved with filename: Radiated Photo.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 0.1 dB margin

**TEST REPORT**

Table 1  
IEEE 802.11A (20MHz) (OFDM,6MBs)

**Radiated Emission Data**

5180MHz

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5150.000	26.5	33	35.7	48.8	0	48.8	54.0	-5.2
H	10360.000	32.7	33	40.5	42.4	0	42.4	54.0	-11.7
V	15540.000	28.0	33	37.7	34.5	0	34.5	54.0	-19.5
H	20720.000	26.5	33	37.7	38.2	0	38.2	54.0	-15.8
H	25900.000	32.7	33	39.3	37.7	0	37.7	54.0	-16.3
H	31080.000	28.0	33	42.1	43.3	0	43.3	54.0	-10.7

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	5150.000	52.7	33	35.7	68.1	68.2	-0.1
H	10360.000	65.8	33	40.5	58.1	68.2	-10.1
V	15540.000	60.6	33	37.7	52.9	68.2	-15.3
H	20720.000	47.1	33	37.7	45.4	68.2	-22.8
H	25900.000	39.3	33	39.3	42.0	68.2	-26.2
H	31080.000	32.8	33	42.1	50.5	68.2	-17.7

5240MHz

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	10480.000	30.6	33	40.5	38.1	0	38.1	54.0	-15.9
V	15720.000	28.8	33	37.7	33.5	0	33.5	54.0	-20.5
H	20960.000	35.2	33	37.7	39.9	0	39.9	54.0	-14.1
V	26200.000	35.6	33	39.2	41.8	0	41.8	54.0	-12.2
H	31440.000	34.8	33	42.1	43.9	0	43.9	54.0	-10.1
H	36680.000	39.0	33	41.7	47.7	0	47.7	54.0	-6.3

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	10480.000	50.6	33	40.5	48.1	68.2	-20.1
V	15720.000	46.7	33	37.7	51.4	68.2	-16.8
H	20960.000	63.4	33	37.7	51.3	68.2	-16.9
V	26200.000	49.7	33	39.2	48.1	68.2	-20.1
H	31440.000	44.3	33	42.1	44.2	68.2	-24.0
H	36680.000	43.7	33	41.7	50.8	68.2	-17.4

**TEST REPORT**

**5200MHz**

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	10400.000	30.4	33	40.5	37.9	0	37.9	54.0	-16.1
H	15600.000	28.5	33	37.7	33.2	0	33.2	54.0	-20.8
V	20800.000	29.8	33	37.7	34.5	0	34.5	54.0	-19.5
H	26000.000	29.7	33	39.2	35.9	0	35.9	54.0	-18.1
V	31200.000	33.6	33	42.1	42.7	0	42.7	54.0	-11.3
H	36400.000	39.5	33	41.7	48.2	0	48.2	54.0	-5.8

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	10400.000	40.4	33	40.5	47.9	68.2	-20.3
H	15600.000	45.9	33	37.7	50.6	68.2	-17.6
V	20800.000	45.1	33	37.7	49.8	68.2	-18.4
H	26000.000	38.1	33	39.2	44.3	68.2	-23.9
V	31200.000	34.6	33	42.1	43.7	68.2	-24.5
H	36400.000	41.9	33	41.7	50.6	68.2	-17.6

**5745MHz**

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5725.000	50.3	33	36.6	53.9	0	53.9	54.0	-0.1
H	11490.000	31.2	33	40.8	39.0	0	39.0	54.0	-15.0
V	17235.000	35.7	33	37.6	40.3	0	40.3	54.0	-13.7
V	22980.000	33.3	33	38.3	38.6	0	38.6	54.0	-15.4
H	28725.000	35.7	33	40.1	42.8	0	42.8	54.0	-11.2
H	34470.000	38.6	33	41.1	46.7	0	46.7	54.0	-7.3

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	5725.000	64.4	33	36.6	68.0	122.2	-54.2
H	11490.000	50.3	33	40.8	58.1	68.2	-10.1
V	17235.000	49.3	33	37.6	53.9	68.2	-14.3
V	22980.000	37.9	33	38.3	43.2	68.2	-25.0
H	28725.000	39.1	33	40.1	46.2	68.2	-22.0
H	34470.000	44.0	33	41.1	52.1	68.2	-16.1

## TEST REPORT

5785MHz

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Factor (dB)	Calculated at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	11570.000	31.5	33	40.5	39.0	0	39.0	54.0	-15.0
H	17355.000	39.3	33	37.6	43.9	0	43.9	54.0	-10.1
V	23140.000	39.5	33	38.6	45.1	0	45.1	54.0	-8.9
H	28925.000	40.5	33	40.1	47.6	0	47.6	54.0	-6.4
H	34710.000	44.3	33	41.3	52.6	0	52.6	54.0	-1.4

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	11570.000	44.9	33	40.5	52.4	68.2	-15.8
H	17355.000	44.8	33	37.6	49.4	68.2	-18.8
V	23140.000	39.7	33	38.6	45.3	68.2	-22.9
H	28925.000	40.9	33	40.1	48.0	68.2	-20.2
H	34710.000	44.5	33	41.3	52.8	68.2	-15.4

**TEST REPORT**

5825MHz

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	5850.000	50.2	33	36.6	53.8	0	50.3	54.0	-3.7
H	11650.000	31.7	33	40.5	39.2	0	39.2	54.0	-14.8
H	17475.000	31.0	33	37.6	35.6	0	35.6	54.0	-18.4
V	23300.000	31.1	33	38.6	36.7	0	36.7	54.0	-17.3
H	29125.000	40.5	33	40.0	47.5	0	47.5	54.0	-6.5
H	34950.000	42.1	33	41.3	50.4	0	50.4	54.0	-3.6

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	5850.000	47.6	33	36.6	51.2	68.2	-17.0
H	11650.000	43.6	33	40.5	51.1	68.2	-17.1
H	17475.000	47.5	33	37.6	52.1	68.2	-16.1
V	23300.000	39.1	33	38.6	44.7	68.2	-23.5
H	29125.000	40.9	33	40.0	47.9	68.2	-20.3
H	34950.000	45.1	33	41.3	53.4	68.2	-14.8

- NOTES:
1. Peak detector is used for the emission measurement.
  2. Average detector is used for the average data of emission measurement
  3. All measurements were made at 3 meters.
  4. Value in the margin column shows emission below limit.
  5. Horn antenna is used for the emission over 1000MHz.
  6. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
  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**

Table 2  
IEEE 802.11N (HT20MHz) (MCS0)

**Radiated Emission Data**

5180MHz

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Factor (dB)	Calculated at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	5150.000	49.7	33	35.7	52.4	0	52.4	54.0	-1.7
H	10360.000	33.0	33	40.5	40.5	0	40.5	54.0	-13.5
H	15540.000	38.7	33	37.7	43.4	0	43.4	54.0	-10.6
H	20720.000	36.5	33	37.7	41.2	0	41.2	54.0	-12.8
H	25900.000	33.1	33	39.3	39.4	0	39.4	54.0	-14.6
V	31080.000	36.0	33	42.1	45.1	0	45.1	54.0	-8.9

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	5150.000	64.9	33	35.7	67.6	68.2	-0.6
H	10360.000	45.6	33	40.5	53.1	68.2	-15.1
H	15540.000	44.5	33	37.7	49.2	68.2	-19.0
H	20720.000	38.8	33	37.7	43.5	68.2	-24.7
H	25900.000	35.5	33	39.3	41.8	68.2	-26.4
V	31080.000	38.6	33	42.1	47.7	68.2	-20.5

5240MHz

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Factor (dB)	Calculated at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
H	10480.000	29.1	33	40.5	36.6	0	36.6	54.0	-17.4
V	15720.000	25.6	33	37.7	30.3	0	30.3	54.0	-23.7
H	20960.000	28.7	33	37.7	33.4	0	33.4	54.0	-20.6
H	26200.000	27.6	33	39.2	33.8	0	33.8	54.0	-20.2
V	31440.000	30.0	33	42.1	39.1	0	39.1	54.0	-14.9
H	36680.000	36.5	33	41.7	45.2	0	45.2	54.0	-8.8

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
H	10480.000	40.2	33	40.5	47.7	68.2	-20.5
V	15720.000	40.4	33	37.7	45.1	68.2	-23.1
H	20960.000	38.5	33	37.7	43.2	68.2	-25.0
H	26200.000	37.3	33	39.2	43.5	68.2	-24.7
V	31440.000	36.7	33	42.1	45.8	68.2	-22.4
H	36680.000	41.2	33	41.7	49.9	68.2	-18.3

**TEST REPORT**

**5200MHz**

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	10400.000	35.5	33	40.5	43.0	0	43.0	54.0	-11.0
H	15600.000	31.6	33	37.7	36.3	0	36.3	54.0	-17.7
V	20800.000	31.1	33	37.7	35.8	0	35.8	54.0	-18.2
H	26000.000	33.0	33	39.2	39.2	0	39.2	54.0	-14.8
H	31200.000	30.4	33	42.1	39.5	0	39.5	54.0	-14.5
H	36400.000	38.8	33	41.7	47.5	0	47.5	54.0	-6.5

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	10400.000	46.3	33	40.5	53.8	68.2	-14.4
H	15600.000	47.0	33	37.7	51.7	68.2	-16.5
V	20800.000	47.7	33	37.7	52.4	68.2	-15.8
H	26000.000	37.2	33	39.2	43.4	68.2	-24.8
H	31200.000	33.4	33	42.1	42.5	68.2	-25.7
H	36400.000	42.1	33	41.7	50.8	68.2	-17.4

**5745MHz**

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5725.000	50.4	33	36.6	54.0	0	52.1	54.0	-1.9
H	11490.000	32.4	33	40.8	40.2	0	40.2	54.0	-13.8
H	17235.000	32.7	33	37.6	37.3	0	37.3	54.0	-16.7
H	22980.000	33.1	33	38.3	38.4	0	38.4	54.0	-15.6
H	28725.000	36.2	33	40.1	43.3	0	43.3	54.0	-10.7
H	34470.000	37.1	33	41.1	45.2	0	45.2	54.0	-8.8

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	5725.000	64.4	33	36.6	68.0	122.2	-54.2
H	11490.000	45.9	33	40.8	53.7	68.2	-14.5
H	17235.000	36.7	33	37.6	41.3	68.2	-26.9
H	22980.000	39.2	33	38.3	44.5	68.2	-23.7
H	28725.000	40.6	33	40.1	47.7	68.2	-20.5
H	34470.000	42.8	33	41.1	50.9	68.2	-17.3



**TEST REPORT**

5785MHz

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB $\mu$ V/m)	Average Factor (dB)	Calculated at 3m (dB $\mu$ V/m)	Average Limit at 3m (dB $\mu$ V/m)	Margin (dB)
H	11570.000	32.3	33	40.5	39.8	0	39.8	54.0	-14.2
V	17355.000	32.8	33	37.6	37.4	0	37.4	54.0	-16.6
V	23140.000	35.0	33	38.6	40.6	0	40.6	54.0	-13.4
H	28925.000	36.2	33	40.1	43.3	0	43.3	54.0	-10.7
H	34710.000	38.9	33	41.3	47.2	0	47.2	54.0	-6.8

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB $\mu$ V/m)	Peak Limit at 3m (dB $\mu$ V/m)	Margin (dB)
H	11570.000	44.8	33	40.5	52.3	68.2	-15.9
V	17355.000	43.9	33	37.6	48.5	68.2	-19.7
V	23140.000	38.6	33	38.6	44.2	68.2	-24.0
H	28925.000	37.6	33	40.1	44.7	68.2	-23.5
H	34710.000	41.0	33	41.3	49.3	68.2	-18.9

**TEST REPORT**

5825MHz

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Factor (dB)	Calculated at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
V	5850.000	50.1	33	36.6	53.7	0	50.1	54.0	-3.9
H	11650.000	32.6	33	40.5	40.1	0	40.1	54.0	-13.9
V	17475.000	32.9	33	37.6	37.5	0	37.5	54.0	-16.5
H	23300.000	32.2	33	38.6	37.8	0	37.8	54.0	-16.2
H	29125.000	35.1	33	40.0	42.1	0	42.1	54.0	-11.9
H	34950.000	36.9	33	41.3	45.2	0	45.2	54.0	-8.8

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
V	5850.000	48.5	33	36.6	52.1	68.2	-16.1
H	11650.000	44.8	33	40.5	52.3	68.2	-15.9
V	17475.000	46.5	33	37.6	51.1	68.2	-17.1
H	23300.000	38.6	33	38.6	44.2	68.2	-24.0
H	29125.000	43.5	33	40.0	50.5	68.2	-17.7
H	34950.000	45.5	33	41.3	53.8	68.2	-14.4

- NOTES:
1. Peak detector is used for the emission measurement.
  2. Average detector is used for the average data of emission measurement
  3. All measurements were made at 3 meters.
  4. Value in the margin column shows emission below limit.
  5. Horn antenna is used for the emission over 1000MHz.
  6. Emission (the row indicated by bold italic) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
  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**

Table 3  
IEEE 802.11n (40MHz) (MCS0)

**Radiated Emission Data**

5190MHz

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5150.000	30.6	33	35.7	33.3	0	33.3	54.0	-20.7
H	10380.000	31.7	33	40.5	39.2	0	39.2	54.0	-14.8
H	15570.000	31.2	33	37.7	35.9	0	35.9	54.0	-18.1
V	20760.000	32.7	33	37.7	37.4	0	37.4	54.0	-16.6
H	25950.000	36.2	33	39.3	42.5	0	42.5	54.0	-11.5
H	31140.000	37.2	33	42.1	46.3	0	46.3	54.0	-7.7

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	5150.000	48.3	33	35.7	51.0	68.2	-17.2
H	10380.000	45.0	33	40.5	52.5	68.2	-15.7
H	15570.000	45.8	33	37.7	50.5	68.2	-17.7
V	20760.000	40.2	33	37.7	44.9	68.2	-23.3
H	25950.000	38.4	33	39.3	44.7	68.2	-23.5
H	31140.000	39.4	33	42.1	48.5	68.2	-19.7

5230MHz

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	10460.000	32.2	33	40.5	39.7	0	39.7	54.0	-14.3
H	15690.000	28.1	33	37.7	32.8	0	32.8	54.0	-21.2
H	20920.000	31.8	33	37.7	36.5	0	36.5	54.0	-17.5
V	26150.000	34.2	33	39.2	40.4	0	40.4	68.0	-27.6
H	31380.000	33.7	33	42.1	42.8	0	42.8	54.0	-11.2
H	36610.000	38.5	33	41.7	47.2	0	47.2	54.0	-6.8

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	10460.000	46.0	33	40.5	53.5	68.2	-14.7
H	15690.000	48.5	33	37.7	53.2	68.2	-15.0
H	20920.000	37.0	33	37.7	41.7	68.2	-26.6
V	26150.000	43.6	33	39.2	49.8	68.2	-18.4
H	31380.000	36.1	33	42.1	45.2	68.2	-23.0
H	36610.000	39.8	33	41.7	48.5	68.2	-19.8

## TEST REPORT

5755MHz

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB $\mu$ V/m)	Average Factor (dB)	Calculated at 3m (dB $\mu$ V/m)	Average Limit at 3m (dB $\mu$ V/m)	Margin (dB)
V	5725.000	30.2	33	36.6	33.8	0	33.8	54.0	-20.2
H	11510.000	28.3	33	40.5	35.8	0	35.8	54.0	-18.2
V	17265.000	32.1	33	37.6	36.7	0	36.7	54.0	-17.3
V	23020.000	35.8	33	38.6	41.4	0	41.4	54.0	-12.6
V	28775.000	35.7	33	40.1	42.8	0	42.8	54.0	-11.2
H	34530.000	40.2	33	41.3	48.5	0	48.5	54.0	-5.5

Polarization	Frequency (MHz)	Reading (dB $\mu$ V)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dB $\mu$ V/m)	Peak Limit at 3m (dB $\mu$ V/m)	Margin (dB)
V	5725.000	47.2	33	36.6	50.8	68.2	-17.4
H	11510.000	38.7	33	40.5	46.2	68.2	-22.0
V	17265.000	36.8	33	37.6	41.4	68.2	-26.8
V	23020.000	38.2	33	38.6	43.8	68.2	-24.4
V	28775.000	38.2	33	40.1	45.3	68.2	-22.9
H	34530.000	42.6	33	41.3	50.9	68.2	-17.4

**TEST REPORT**

5795MHz

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
H	5850.000	28.9	33	36.6	32.5	0	32.5	54.0	-21.5
H	11590.000	32.3	33	40.5	39.8	0	39.8	54.0	-14.2
H	17385.000	31.2	33	37.6	35.8	0	35.8	54.0	-18.2
V	23180.000	34.8	33	38.6	40.4	0	40.4	54.0	-13.6
H	28975.000	36.6	33	40.1	43.7	0	43.7	54.0	-10.3
H	34770.000	39.3	33	41.3	47.6	0	47.6	54.0	-6.4

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
H	5850.000	51.9	33	36.6	55.5	68.2	-12.7
H	11590.000	35.4	33	40.5	42.9	68.2	-25.3
H	17385.000	39.0	33	37.6	43.6	68.2	-24.6
V	23180.000	37.5	33	38.6	43.1	68.2	-25.1
H	28975.000	37.6	33	40.1	44.7	68.2	-23.5
H	34770.000	42.0	33	41.3	50.3	68.2	-17.9

- NOTES:
1. Peak detector is used for the emission measurement.
  2. Average detector is used for the average data of emission measurement
  3. All measurements were made at 3 meters.
  4. Value in the margin column shows emission below limit.
  5. Horn antenna is used for the emission over 1000MHz.
  6. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
  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**

Ac mode 20MHz

Table 4  
IEEE 802.11ac (20MHz) (MCS0)

**Radiated Emission Data**

5180MHz

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5150.000	30.4	33	35.7	33.1	0	33.1	54.0	-20.9
H	10360.000	29.5	33	40.5	37.0	0	37.0	54.0	-17.0
H	15540.000	31.5	33	37.7	36.2	0	36.2	54.0	-17.8
H	20720.000	35.1	33	37.7	39.8	0	39.8	54.0	-14.2
V	25900.000	35.4	33	39.3	41.7	0	41.7	54.0	-12.3
H	31080.000	37.0	33	42.1	46.1	0	46.1	54.0	-7.9

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	5150.000	49.5	33	35.7	52.2	68.2	-16.0
H	10360.000	47.5	33	40.5	55.0	68.2	-13.2
H	15540.000	48.3	33	37.7	53.0	68.2	-15.2
H	20720.000	40.4	33	37.7	45.1	68.2	-23.1
V	25900.000	38.5	33	39.3	44.8	68.2	-23.4
H	31080.000	41.9	33	42.1	51.0	68.2	-17.3

5240MHz

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	10480.000	25.8	33	40.5	33.3	0	33.3	54.0	-20.7
H	15720.000	35.0	33	37.7	39.7	0	39.7	54.0	-14.3
H	20960.000	30.5	33	37.7	35.2	0	35.2	54.0	-18.8
H	26200.000	33.3	33	39.2	39.5	0	39.5	54.0	-14.5
V	31440.000	33.5	33	42.1	42.6	0	42.6	54.0	-11.4
H	36680.000	38.8	33	41.7	47.5	0	47.5	54.0	-6.5

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	10480.000	44.8	33	40.5	52.3	68.2	-15.9
H	15720.000	48.3	33	37.7	53.0	68.2	-15.2
H	20960.000	44.5	33	37.7	49.2	68.2	-19.0
H	26200.000	38.8	33	39.2	45.0	68.2	-23.2
V	31440.000	34.2	33	42.1	43.3	68.2	-24.9
H	36680.000	41.5	33	41.7	50.2	68.2	-18.0

**TEST REPORT**

5200MHz

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	10400.000	31.6	33	40.5	39.1	0	39.1	54.0	-14.9
H	15600.000	30.4	33	37.7	35.1	0	35.1	54.0	-19.0
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	33.3	33	42.1	42.4	0	42.4	54.0	-11.6
H	36400.000	39.9	33	41.7	48.6	0	48.6	54.0	-5.4

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	10400.000	60.3	33	40.5	67.8	68.2	-0.4
H	15600.000	44.0	33	37.7	48.7	68.2	-19.5
V	20800.000	45.0	33	37.7	49.7	68.2	-18.5
H	26000.000	37.6	33	39.2	43.8	68.2	-24.4
H	31200.000	35.4	33	42.1	44.5	68.2	-23.7
H	36400.000	40.8	33	41.7	49.5	68.2	-18.7

5745MHz

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5725.000	30.7	33	36.6	34.3	0	34.3	54.0	-19.7
H	11490.000	31.1	33	40.8	38.9	0	38.9	54.0	-15.1
H	17235.000	31.7	33	37.6	36.3	0	36.3	54.0	-17.7
H	22980.000	33.5	33	38.3	38.8	0	38.8	54.0	-15.2
H	28725.000	35.0	33	40.1	42.1	0	42.1	54.0	-11.9
H	34470.000	39.5	33	41.1	47.6	0	47.6	54.0	-6.4

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	5725.000	48.3	33	36.6	51.9	68.2	-16.3
H	11490.000	45.2	33	40.8	53.0	68.2	-15.2
H	17235.000	49.3	33	37.6	53.9	68.2	-14.3
H	22980.000	37.7	33	38.3	43.0	68.2	-25.2
H	28725.000	39.1	33	40.1	46.2	68.2	-22.0
H	34470.000	43.9	33	41.1	52.0	68.2	-16.2

**TEST REPORT**

5785MHz

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Factor (dB)	Calculated at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
V	5725.000	31.1	33	36.6	34.7	0	34.7	54.0	-19.3
H	11570.000	31.5	33	40.5	39.0	0	39.0	54.0	-15.0
H	17355.000	32.0	33	37.6	36.6	0	36.6	54.0	-17.4
V	23140.000	33.9	33	38.6	39.5	0	39.5	54.0	-14.5
H	28925.000	36.1	33	40.1	43.2	0	43.2	54.0	-10.8
H	34710.000	37.9	33	41.3	46.2	0	46.2	54.0	-7.8

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
V	5725.000	48.6	33	36.6	52.2	68.2	-16.0
H	11570.000	44.9	33	40.5	52.4	68.2	-15.8
H	17355.000	44.9	33	37.6	49.5	68.2	-18.7
V	23140.000	38.5	33	38.6	44.1	68.2	-24.2
H	28925.000	38.9	33	40.1	46.0	68.2	-22.2
H	34710.000	45.5	33	41.3	53.8	68.2	-14.4

5825MHz

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Factor (dB)	Calculated at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
V	5850.000	32.0	33	36.6	35.6	0	35.6	54.0	-18.4
H	11650.000	30.5	33	40.5	38.0	0	38.0	54.0	-16.0
H	17475.000	30.6	33	37.6	35.2	0	35.2	54.0	-18.8
H	23300.000	32.3	33	38.6	37.9	0	37.9	54.0	-16.1
V	29125.000	36.0	33	40.0	43.0	0	43.0	54.0	-11.0
H	34950.000	37.5	33	41.3	45.8	0	45.8	54.0	-8.2

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
V	5850.000	49.3	33	36.6	52.9	68.2	-15.3
H	11650.000	43.4	33	40.5	50.9	68.2	-17.3
H	17475.000	46.6	33	37.6	51.2	68.2	-17.0
H	23300.000	39.1	33	38.6	44.7	68.2	-23.5
V	29125.000	35.7	33	40.0	42.7	68.2	-25.5
H	34950.000	42.9	33	41.3	51.2	68.2	-17.1



**TEST REPORT**

Ac mode 40MHz

Table 5  
IEEE 802.11ac (40MHz) (MCS0)

**Radiated Emission Data**

5190MHz

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5150.000	28.5	33	35.7	31.2	0	31.2	54.0	-22.8
H	10380.000	32.0	33	40.5	39.5	0	39.5	54.0	-14.6
V	15570.000	31.0	33	37.7	35.7	0	35.7	54.0	-18.3
H	20760.000	32.1	33	37.7	36.8	0	36.8	54.0	-17.2
H	25950.000	35.7	33	39.3	42.0	0	42.0	54.0	-12.0
H	31140.000	38.0	33	42.1	47.1	0	47.1	54.0	-6.9

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	5150.000	65.2	33	35.7	67.9	68.2	-0.3
H	10380.000	46.0	33	40.5	53.5	68.2	-14.7
V	15570.000	45.6	33	37.7	50.3	68.2	-17.9
H	20760.000	41.1	33	37.7	45.8	68.2	-22.5
H	25950.000	39.5	33	39.3	45.8	68.2	-22.4
H	31140.000	42.2	33	42.1	51.3	68.2	-16.9

5230MHz

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	10460.000	29.6	33	40.5	37.1	0	37.1	54.0	-16.9
H	15690.000	29.8	33	37.7	34.5	0	34.5	54.0	-19.5
H	20920.000	30.7	33	37.7	35.4	0	35.4	54.0	-18.6
V	26150.000	31.2	33	39.2	37.4	0	37.4	54.0	-16.6
H	31380.000	31.5	33	42.1	40.6	0	40.6	54.0	-13.4
H	36610.000	38.1	33	41.7	46.8	0	46.8	54.0	-7.2

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	10460.000	43.8	33	40.5	51.3	68.2	-16.9
H	15690.000	46.6	33	37.7	51.3	68.2	-16.9
H	20920.000	44.7	33	37.7	49.4	68.2	-18.8
V	26150.000	38.5	33	39.2	44.7	68.2	-23.5
H	31380.000	32.5	33	42.1	41.6	68.2	-26.6
H	36610.000	39.9	33	41.7	48.6	68.2	-19.6

**TEST REPORT**

5755MHz

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (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	34.6	54.0	-19.4
H	11510.000	32.4	33	40.5	39.9	0	39.9	54.0	-14.1
V	17265.000	32.3	33	37.6	36.9	0	36.9	54.0	-17.1
V	23020.000	31.9	33	38.6	37.5	0	37.5	54.0	-16.5
V	28775.000	35.7	33	40.1	42.8	0	42.8	54.0	-11.2
H	34530.000	40.0	33	41.3	48.3	0	48.3	54.0	-5.7

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	5725.000	48.5	33	36.6	52.1	122.2	-70.1
H	11510.000	46.4	33	40.5	53.9	68.2	-14.3
V	17265.000	46.5	33	37.6	51.1	68.2	-17.1
V	23020.000	38.4	33	38.6	44.0	68.2	-24.2
V	28775.000	39.0	33	40.1	46.1	68.2	-22.1
H	34530.000	43.2	33	41.3	51.5	68.2	-16.7

5795MHz

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Average Factor (dB)	Calculated at 3m (dBµV/m)	Average Limit at 3m (dBµV/m)	Margin (dB)
V	5850.000	30.3	33	36.6	33.9	0	33.9	54.0	-20.1
H	11590.000	31.3	33	40.5	38.8	0	38.8	54.0	-15.2
V	17385.000	31.2	33	37.6	35.8	0	35.8	54.0	-18.2
H	23180.000	34.8	33	38.6	40.4	0	40.4	54.0	-13.6
H	28975.000	35.2	33	40.1	42.3	0	42.3	54.0	-11.7
V	34770.000	40.5	33	41.3	48.8	0	48.8	54.0	-5.2

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	5850.000	47.6	33	36.6	51.2	122.2	-71.0
H	11590.000	44.4	33	40.5	51.9	68.2	-16.3
V	17385.000	40.5	33	37.6	45.1	68.2	-23.1
V	23180.000	41.5	33	38.6	47.1	68.2	-21.1
V	28975.000	37.5	33	40.1	44.6	68.2	-23.6
H	34770.000	42.1	33	41.3	50.4	68.2	-17.8

**TEST REPORT**

Ac mode 80MHz

Table 6  
IEEE 802.11ac (80MHz) (MCS0)

**Radiated Emission Data**

5210MHz

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Average Factor (dB)	Calculated at 3m (dBμV/m)	Average Limit at 3m (dBμV/m)	Margin (dB)
V	5150.000	31.0	33	35.7	33.7	0	33.7	54.0	-20.3
H	10360.000	29.6	33	40.5	37.1	0	37.1	54.0	-16.9
H	15540.000	30.4	33	37.7	35.1	0	35.1	54.0	-18.9
H	20720.000	33.1	33	37.7	37.8	0	37.8	54.0	-16.2
V	25900.000	33.3	33	39.3	39.6	0	39.6	54.0	-14.4
H	31080.000	32.3	33	42.1	41.4	0	41.4	54.0	-12.6

Polarization	Frequency (MHz)	Reading (dBμV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBμV/m)	Peak Limit at 3m (dBμV/m)	Margin (dB)
V	5150.000	50.3	33	35.7	53.0	68.2	-15.2
H	10360.000	42.6	33	40.5	50.1	68.2	-18.1
H	15540.000	46.7	33	37.7	51.4	68.2	-16.8
H	20720.000	39.4	33	37.7	44.1	68.2	-24.2
V	25900.000	35.3	33	39.3	41.6	68.2	-26.6
H	31080.000	36.0	33	42.1	45.1	68.2	-23.1

**TEST REPORT**

5775MHz

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (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	32.3	54.0	-21.7
V	5850.000	32.8	33	36.6	36.4	0	36.4	54.0	-17.6
V	11550.000	27.8	33	40.5	35.3	0	35.3	54.0	-18.7
V	17325.000	33.1	33	37.6	37.7	0	37.7	54.0	-16.3
H	23100.000	34.5	33	38.6	40.1	0	40.1	54.0	-13.9
H	28875.000	40.2	33	40.1	47.3	0	47.3	54.0	-6.7

Polarization	Frequency (MHz)	Reading (dBµV)	Pre-Amp Gain (dB)	Antenna Factor (dB)	Net at 3m - Peak (dBµV/m)	Peak Limit at 3m (dBµV/m)	Margin (dB)
V	5725.000	61.8	33	36.6	65.4	122.2	-56.9
V	5850.000	45.9	33	36.6	49.5	68.2	-18.7
V	11550.000	36.4	33	40.5	43.9	68.2	-24.3
V	17325.000	46.9	33	37.6	51.5	68.2	-16.7
H	23100.000	40.6	33	38.6	46.2	68.2	-22.1
H	28875.000	42.5	33	40.1	49.6	68.2	-18.6

- NOTES:
1. Peak detector is used for the emission measurement.
  2. Average detector is used for the average data of emission measurement
  3. All measurements were made at 3 meters.
  4. Value in the margin column shows emission below limit.
  5. Horn antenna is used for the emission over 1000MHz.
  6. Emission (the row indicated by ***bold italic***) within the restricted band meets the requirement of FCC Part 15 Section 15.205.
  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**

Mode: WIFI Operating and Audio Playing

Table 7  
**Radiated Emission Data**

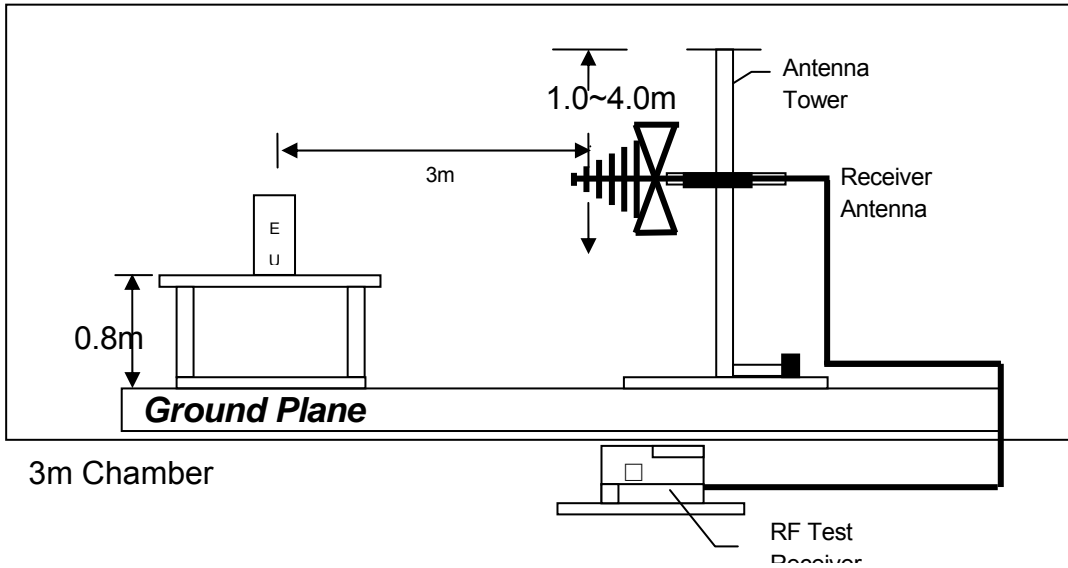
Polarization	Frequency (MHz)	Reading (dBµV)	Pre-amp (dB)	Antenna Factor (dB)	Net at 3m (dBµV/m)	Limit at 3m (dBµV/m)	Margin (dB)
<b>V</b>	<b>131.763</b>	<b>28.8</b>	<b>16</b>	<b>14.0</b>	<b>26.8</b>	<b>43.5</b>	<b>-16.7</b>
H	211.956	30.7	16	17.0	31.7	43.5	-11.8
<b>H</b>	<b>249.981</b>	<b>30.1</b>	<b>16</b>	<b>20.0</b>	<b>34.1</b>	<b>46.0</b>	<b>-12.0</b>
H	445.469	25.7	16	26.0	35.7	46.0	-10.3
H	499.947	25.0	16	26.0	35.0	46.0	-11.0
H	750.034	22.5	16	30.0	36.5	46.0	-9.5

- NOTES:
1. Quasi-Peak detector is used for the emission measurement.
  2. All measurements were made at 3 meters.
  3. Value in the margin column shows emission below limit.
  4. Emission (the row indicated by **bold italic**) within the restricted band meets the requirement of FCC Part 15 Section 15.205 / RSS-Gen Section 8.10.

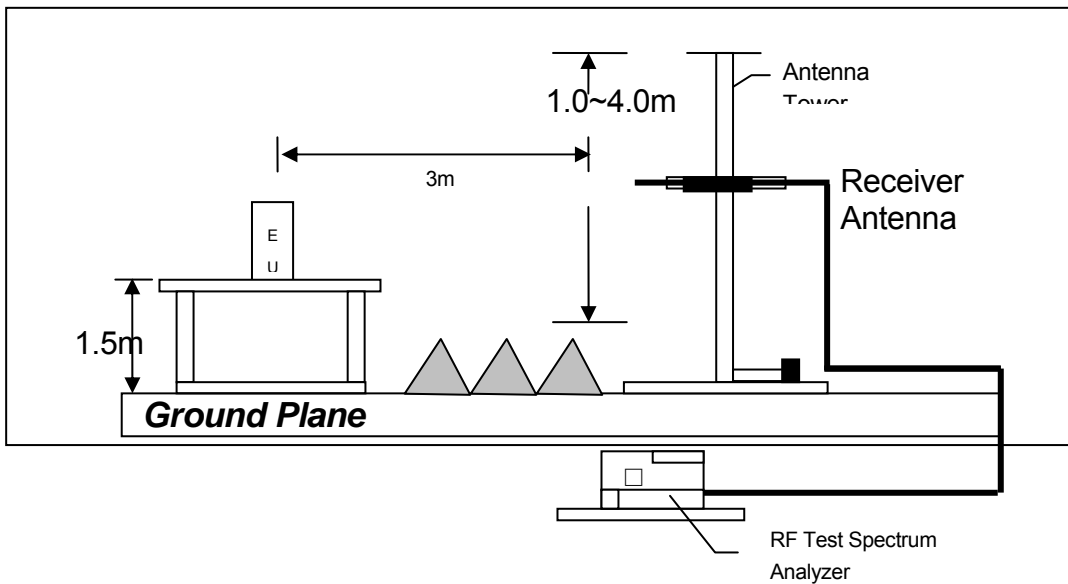
**TEST REPORT**

4.5.3 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

### 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

0.582 MHz

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

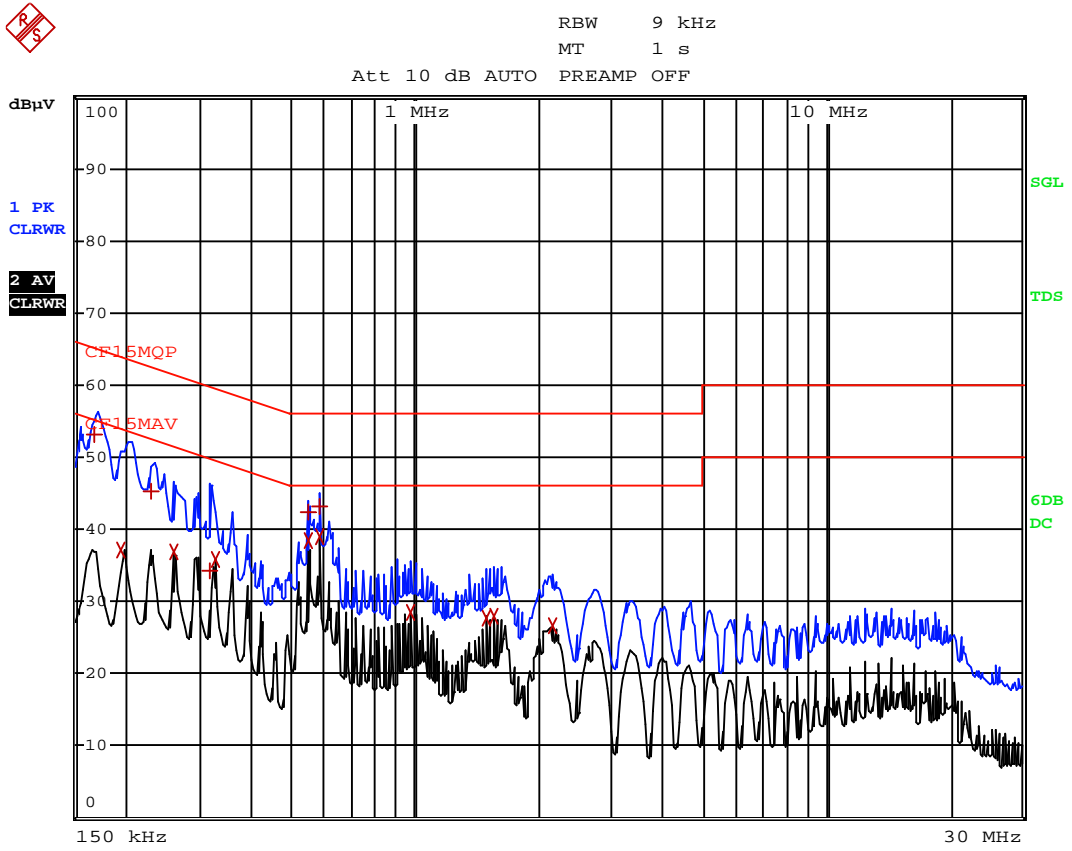
#### 4.7.2 AC Power Line Conducted Emission Data

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

Passed by 7.0 dB margin

**TEST REPORT**

Worst Case: WIFI Operating and Audio Playing





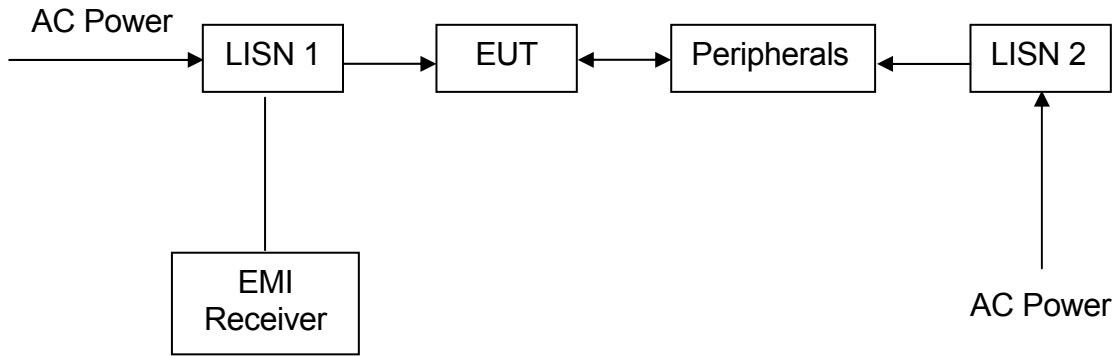
**TEST REPORT**

Worst Case: WIFI Operating and Audio Playing

EDIT PEAK LIST (Final Measurement Results)					
Trace1:	CF15MQP				
Trace2:	CF15MAV				
Trace3:	---				
	TRACE	FREQUENCY	LEVEL	dB $\mu$ V	DELTA LIMIT dB
1	Quasi Peak	168 kHz	53.12	N	-11.93
2	CISPR Average	195 kHz	37.22	N	-16.60
1	Quasi Peak	231 kHz	45.40	N	-17.01
2	CISPR Average	258 kHz	36.99	N	-14.50
1	Quasi Peak	316.5 kHz	34.14	L1	-25.65
2	CISPR Average	325.5 kHz	35.86	L1	-13.70
1	Quasi Peak	550.5 kHz	42.39	N	-13.60
2	CISPR Average	550.5 kHz	38.44	N	-7.55
1	Quasi Peak	582 kHz	43.10	N	-12.89
2	CISPR Average	582 kHz	39.04	N	-6.95
2	CISPR Average	973.5 kHz	28.60	N	-17.39
2	CISPR Average	1.491 MHz	27.63	L1	-18.36
2	CISPR Average	1.554 MHz	27.85	N	-18.14
2	CISPR Average	2.1705 MHz	26.62	L1	-19.38

## TEST REPORT

### 4.7.3 Conducted Emission Test Setup



## TEST REPORT

### 5.0 EQUIPMENT LIST

#### 1) Radiated Emissions Test

Equipment	EMI Test Receiver (9kHz to 3GHz)	Spectrum Analyzer	Biconical Antenna
Registration No.	EW-2500	EW-2253	EW-0571
Manufacturer	ROHDESCHWARZ	ROHDESCHWARZ	EMCO
Model No.	ESCI	FSP40	3104C
Calibration Date	January 09, 2020	November 18, 2019	July 23, 2019
Calibration Due Date	January 09, 2021	November 18, 2020	January 23, 2021

Equipment	Log Periodic Antenna	Double Ridged Guide Antenna	RF Cable 14m (1GHz to 26.5GHz)
Registration No.	EW-0447	EW-1015	EW-3151
Manufacturer	EMCO	EMCO	GREATBILLION
Model No.	3146	3115	SMA m/SHF5MPU /SMA m ra14m,26G
Calibration Date	September 25, 2019	May 16, 2019	March 04, 2020
Calibration Due Date	March 25, 2021	November 16, 2020	March 04, 2021

Equipment	Active Loop H-field (9kHz to 30MHz)	RF Preamp (9kHz to 6000MHz)	2.4GHz Notch Filter
Registration No.	EW-2313	EW-3006b	EW-3435
Manufacturer	ELECTROMETRI	SCHWARZBECK	MICROWAVE
Model No.	EM-6876	BBV9718	N0324413
Calibration Date	December 17, 2019	November 25, 2019	November 16, 2019
Calibration Due Date	June 17, 2021	November 25, 2020	November 16, 2020

Equipment	14m Double Shield RF Cable (20MHz To 6GHz)	Pyramidal Horn Antenna
Registration No.	EW-2074	EW-0905
Manufacturer	RADIALL	EMCO
Model No.	nm / RG142 / sma 14m	3160-09
Calibration Date	August 29, 2020	July 23, 2019
Calibration Due Date	August 29, 2021	January 23, 2021

## TEST REPORT

### 2) Conducted Emissions Test

Equipment	RF Cable 80cm (RG142) (9kHz to 30MHz)	Artificial Mains Network	EMI Test Receiver (9kHz to 3GHz)
Registration No.	EW-2451	EW-2501	EW-2500
Manufacturer	RADIALL	ROHDESCHWARZ	ROHDESCHWARZ
Model No.	RF Cable 80cm (RG142) (9kHz to 30MHz)	ENV-216	ESCI
Calibration Date	December 08, 2019	September 15, 2020	January 09, 2020
Calibration Due Date	December 08, 2020	September 15, 2021	January 09, 2021

### 3) Conductive Measurement Test

Equipment	Spectrum Analyzer	Digital Power Meter	RF Cable (up to 40GHz) 1.5m length
Registration No.	EW-2253	EW-2293	EW-2774
Manufacturer	R&S	YOKOGAWA	N/A
Model No.	FSP40	WT210	SMA-M to SMA-M
Calibration Date	November 18, 2019	May 15, 2019	September 12, 2020
Calibration Due Date	November 18, 2020	December 14, 2020	September 12, 2021

### 4) Bandwidth/Bandedge Measurement Test

Equipment	Spectrum Analyzer	RF Cable (up to 40GHz) 1.5m length
Registration No.	EW-2253	EW-2774
Manufacturer	R&S	N/A
Model No.	FSP40	SMA-M to SMA-M
Calibration Date	November 18, 2019	September 12, 2020
Calibration Due Date	November 18, 2020	September 12, 2021