

## FCC Test Report

**Report No.:** RF190710C11B

**FCC ID:** WS2-WG7833B0

**Test Model:** WG7833-B0

**Received Date:** Jul. 10, 2019

**Test Date:** Aug. 12 ~ Aug. 20, 2019

**Issued Date:** Oct. 18, 2019

**Applicant:** Jorjin Technologies Inc.

**Address:** 17F., No. 239, Sec. 1, Datong Rd., Xizhi Dist., New Taipei City 22161, Taiwan

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Lin Kou Laboratories

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

**Test Location:** No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City  
33383, Taiwan

**FCC Registration /  
Designation Number:** 788550 / TW0003



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

## Table of Contents

<b>Release Control Record</b> .....	<b>4</b>
<b>1 Certificate of Conformity</b> .....	<b>5</b>
<b>2 Summary of Test Results</b> .....	<b>6</b>
2.1 Measurement Uncertainty .....	6
2.2 Modification Record .....	6
<b>3 General Information</b> .....	<b>7</b>
3.1 General Description of EUT .....	7
3.2 Description of Test Modes .....	8
3.2.1 Test Mode Applicability and Tested Channel Detail .....	9
3.3 Duty Cycle of Test Signal .....	11
3.4 Description of Support Units .....	12
3.4.1 Configuration of System under Test .....	12
3.5 General Description of Applied Standards .....	12
<b>4 Test Types and Results</b> .....	<b>13</b>
4.1 Radiated Emission and Bandedge Measurement .....	13
4.1.1 Limits of Radiated Emission and Bandedge Measurement .....	13
4.1.2 Limits of Unwanted Emission Out of the Restricted Bands .....	14
4.1.3 Test Instruments .....	15
4.1.4 Test Procedures .....	16
4.1.5 Deviation from Test Standard .....	16
4.1.6 Test Setup .....	17
4.1.7 EUT Operating Conditions .....	18
4.1.8 Test Results .....	19
4.2 Conducted Emission Measurement .....	38
4.2.1 Limits of Conducted Emission Measurement .....	38
4.2.2 Test Instruments .....	38
4.2.3 Test Procedures .....	39
4.2.4 Deviation from Test Standard .....	39
4.2.5 Test Setup .....	39
4.2.6 EUT Operating Conditions .....	39
4.2.7 Test Results .....	40
4.3 Transmit Power Measurement .....	42
4.3.1 Limits of Transmit Power Measurement .....	42
4.3.2 Test Setup .....	42
4.3.3 Test Instruments .....	43
4.3.4 Test Procedure .....	43
4.3.5 Deviation from Test Standard .....	43
4.3.6 EUT Operating Conditions .....	43
4.3.7 Test Results .....	44
4.4 Occupied Bandwidth Measurement .....	48
4.4.1 Test Setup .....	48
4.4.2 Test Instruments .....	48
4.4.3 Test Procedure .....	48
4.4.4 Test Results .....	49
4.5 Peak Power Spectral Density Measurement .....	51
4.5.1 Limits of Peak Power Spectral Density Measurement .....	51
4.5.2 Test Setup .....	51
4.5.3 Test Instruments .....	51
4.5.4 Test Procedures .....	51
4.5.5 Deviation from Test Standard .....	51
4.5.6 EUT Operating Conditions .....	51
4.5.7 Test Results .....	52
4.6 Frequency Stability .....	54

4.6.1	Limit of Frequency Stability Measurement .....	54
4.6.2	Test Setup .....	54
4.6.3	Test Instruments .....	54
4.6.4	Test Procedure .....	54
4.6.5	Deviation from Test Standard .....	54
4.6.6	EUT Operating Condition .....	54
4.6.7	Test Results .....	55
<b>5</b>	<b>Pictures of Test Arrangements.....</b>	<b>56</b>
	<b>Appendix – Information of the Testing Laboratories .....</b>	<b>57</b>

### Release Control Record

Issue No.	Description	Date Issued
RF190710C11B	Original Release	Oct. 18, 2019

## 1 Certificate of Conformity

**Product:** Wireless module

**Brand:** Jorjin

**Test Model:** WG7833-B0

**Sample Status:** Engineering Sample

**Applicant:** Jorjin Technologies Inc.

**Test Date:** Aug. 12 ~ Aug. 20, 2019

**Standards:** 47 CFR FCC Part 15, Subpart E (Section 15.407)  
ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

**Prepared by :**



**Date:**

Oct. 18, 2019

Gina Liu / Specialist

**Approved by :**



**Date:**

Oct. 18, 2019

Dylan Chiou / Project Engineer

## 2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -17.86 dB at 0.20084 MHz.
15.407(b) (1/2/3/4(i/ii)/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -0.13 dB at 5470 MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit.
---	Occupied Bandwidth Measurement	-	Reference only
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit.
15.407(e)	6 dB Bandwidth	N/A	Not applicable
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

Note:

- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

### 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

Measurement	Frequency	Expanded Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.94 dB
Radiated Emissions up to 1 GHz	9 kHz ~ 30 MHz	3.04 dB
	30 MHz ~ 200 MHz	2.93 dB
	200 MHz ~ 1000 MHz	2.95 dB
Radiated Emissions above 1 GHz	1 GHz ~ 18 GHz	2.26 dB
	18 GHz ~ 40 GHz	1.94 dB

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

<b>Product</b>	Wireless module
<b>Brand</b>	Jorjin
<b>Test Model</b>	WG7833-B0
<b>Status of EUT</b>	Engineering Sample
<b>Power Supply Rating</b>	3.3 Vdc (host equipment)
<b>Modulation Type</b>	64QAM, 16QAM, QPSK, BPSK
<b>Modulation Technology</b>	OFDM
<b>Transfer Rate</b>	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps 802.11n: up to 150.0 Mbps
<b>Operating Frequency</b>	5260 ~ 5320 MHz, 5500 ~ 5700 MHz
<b>Number of Channel</b>	5260 ~ 5320 MHz: 4 for 802.11a, 802.11n (HT20) 2 for 802.11n (HT40) 5500 ~ 5700 MHz: 11 for 802.11a, 802.11n (HT20) 5 for 802.11n (HT40)
<b>Output Power</b>	48.865 mW for 5260 ~ 5320 MHz 50.35 mW for 5500 ~ 5700 MHz
<b>Antenna Type</b>	Refer to Note as below
<b>Antenna Connector</b>	N/A
<b>Accessory Device</b>	Refer to Note as below
<b>Data Cable Supplied</b>	Refer to Note as below

**Note:**

1. This report is prepared for FCC class II permissive change. This report is issued as a supplementary report to BTL INC. report no. BTL-FCCP-4-1806T107A. The difference is adding 5260~5320MHz and 5500~5700MHz band. Therefore, all tests had been tested.
2. The EUT incorporates a SISO function. Physically, the EUT provides one completed transmitter and one receiver.

Modulation Mode	Tx Function
802.11a	1TX
802.11n (HT20)	1TX
802.11n (HT40)	1TX

3. The antenna information is listed as below.

Antenna Type	Brand	Parts Number	Antenna Gain (dBi)	
			WLAN 5.26~5.32 GHz	WLAN 5.50~5.70 GHz
PCB	Unictron	H2B1BB1A1Q0100 (AA272)	3.65	2.87

4. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

### 3.2 Description of Test Modes

#### For 5260 ~ 5320 MHz

4 channels are provided for 802.11a, 802.11n (HT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	60	5300
56	5280	64	5320

2 channels are provided for 802.11n (HT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
54	5270	62	5310

#### For 5500 ~ 5700 MHz

11 channels are provided for 802.11a, 802.11n (HT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
100	5500	124	5620
104	5520	128	5640
108	5540	132	5660
112	5560	136	5680
116	5580	140	5700
120	5600		

5 channels are provided for 802.11n (HT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
102	5510	126	5630
110	5550	134	5670
118	5590		



### 3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE $\geq$ 1G	RE $<$ 1G	PLC	APCM	
-	√	√	√	√	-

Where **RE $\geq$ 1G**: Radiated Emission above 1 GHz      **RE $<$ 1G**: Radiated Emission below 1 GHz  
**PLC**: Power Line Conducted Emission      **APCM**: Antenna Port Conducted Measurement

**Note:**

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.
2. "-" means no effect.

#### **Radiated Emission Test (Above 1 GHz):**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5260-5320	802.11a	52 to 64	52, 60, 64	OFDM	BPSK	6.0
-		802.11n (HT20)	52 to 64	52, 60, 64	OFDM	BPSK	6.5
-		802.11n (HT40)	54 to 62	54, 62	54, 62	OFDM	BPSK
-	5500-5700	802.11a	100 to 140	100, 116, 140	OFDM	BPSK	6.0
-		802.11n (HT20)	100 to 140	100, 116, 140	OFDM	BPSK	6.5
-		802.11n (HT40)	102 to 134	102, 110, 134	102, 110, 134	OFDM	BPSK

#### **Radiated Emission Test (Below 1 GHz):**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5500-5700	802.11a	100 to 140	100	OFDM	BPSK	6.0

#### **Power Line Conducted Emission Test:**

- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5500-5700	802.11a	100 to 140	100	OFDM	BPSK	6.0

### Antenna Port Conducted Measurement:

- This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5260-5320	802.11a	52 to 64	52, 60, 64	OFDM	BPSK	6.0
-		802.11n (HT20)	52 to 64	52, 60, 64	OFDM	BPSK	6.5
-		802.11n (HT40)	54 to 62	54, 62	OFDM	BPSK	13.5
-	5500-5700	802.11a	100 to 140	100, 116, 140	OFDM	BPSK	6.0
-		802.11n (HT20)	100 to 140	100, 116, 140	OFDM	BPSK	6.5
-		802.11n (HT40)	102 to 134	102, 110, 134	OFDM	BPSK	13.5

### Test Condition:

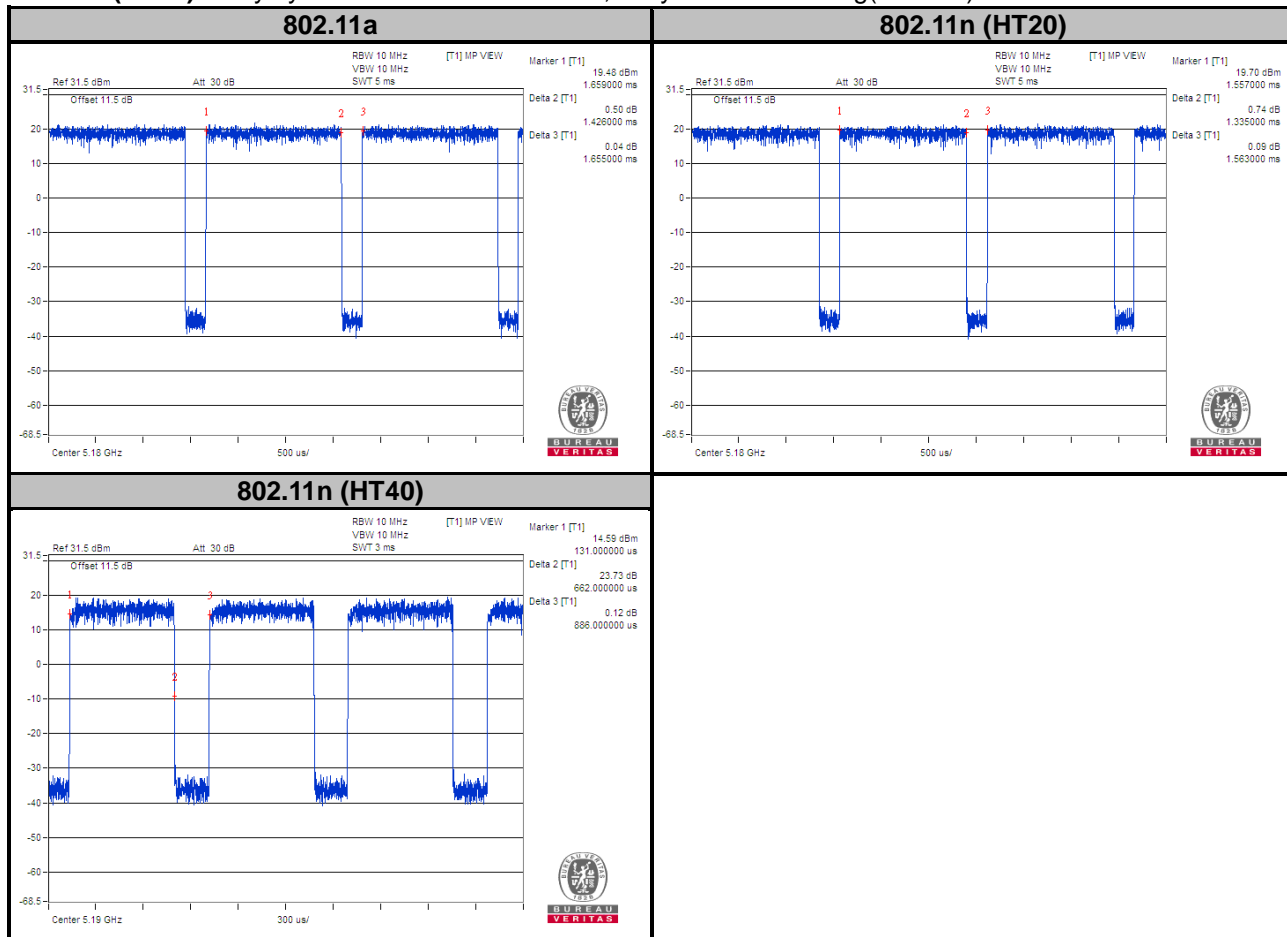
Applicable To	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Thomas Wei, Tim Chen
RE $<$ 1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Thomas Wei
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Thomas Wei
APCM	25 deg. C, 65 % RH	3.3 Vdc	Gavin Wu

### 3.3 Duty Cycle of Test Signal

**802.11a:** Duty cycle =  $1.426/1.655 = 0.862$ , Duty factor =  $10 * \log(1/0.862) = 0.65$

**802.11n (HT20):** Duty cycle =  $1.335/1.563 = 0.854$ , Duty factor =  $10 * \log(1/0.854) = 0.68$

**802.11n (HT40):** Duty cycle =  $0.662/0.886 = 0.747$ , Duty factor =  $10 * \log(1/0.747) = 1.27$



### 3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

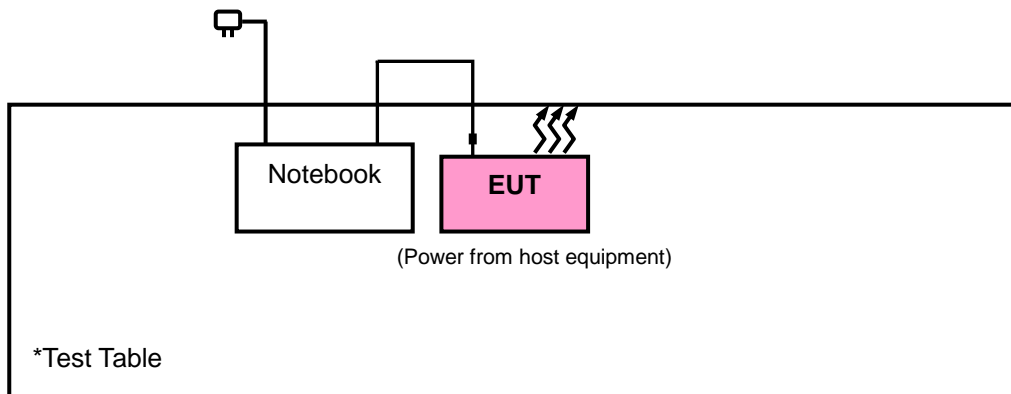
No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Notebook	ASUS	B43S	N/A	N/A

No.	Signal Cable Description Of The Above Support Units
1.	USB cable 1.8 m, 1 core

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item 1 was provided by client.

#### 3.4.1 Configuration of System under Test



### 3.5 General Description of Applied Standards

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 15, Subpart E (15.407)**

**KDB 789033 D02 General UNII Test Procedures New Rules v02r01**

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

#### 4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F (kHz)	300
0.490 ~ 1.705	24000/F (kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

**Note:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

## 4.1.2 Limits of Unwanted Emission Out of the Restricted Bands

Applicable To		Limit	
789033 D02 General UNII Test Procedures New Rules v02r01		Field Strength at 3 m	
		PK: 74 (dBµV/m)	AV: 54 (dBµV/m)
Frequency Band	Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
5150~5250 MHz	15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2 (dBµV/m)
5250~5350 MHz	15.407(b)(2)		
5470~5725 MHz	15.407(b)(3)		
5725~5850 MHz	<input checked="" type="checkbox"/> 15.407(b)(4)(i)	PK:-27 (dBm/MHz) <sup>*1</sup> PK:10 (dBm/MHz) <sup>*2</sup> PK:15.6 (dBm/MHz) <sup>*3</sup> PK:27 (dBm/MHz) <sup>*4</sup>	PK: 68.2 (dBµV/m) <sup>*1</sup> PK:105.2 (dBµV/m) <sup>*2</sup> PK: 110.8 (dBµV/m) <sup>*3</sup> PK:122.2 (dBµV/m) <sup>*4</sup>
	<input type="checkbox"/> 15.407(b)(4)(ii)	Emission limits in section 15.247(d)	

<sup>\*1</sup> beyond 75 MHz or more above of the band edge.  
<sup>\*2</sup> below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.  
<sup>\*3</sup> below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.  
<sup>\*4</sup> from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

**Note:**

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where } P \text{ is the eirp (Watts).}$$

#### 4.1.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Mar. 18, 2019	Mar. 17, 2020
Spectrum Analyzer Agilent	N9010A	MY52220314	Dec. 13, 2018	Dec. 12, 2019
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Apr. 15, 2019	Apr. 14, 2020
Broadband Horn Antenna SCHWARZBECK	BBHA 9170	148	Nov. 25, 2018	Nov. 24, 2019
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-969	Nov. 25, 2018	Nov. 24, 2019
BILOG Antenna SCHWARZBECK	VULB 9168	9168-472	Nov. 23, 2018	Nov. 22, 2019
Fixed Attenuator WOKEN	MDCS18N-10	MDCS18N-10-01	Apr. 15, 2019	Apr. 14, 2020
Loop Antenna	EM-6879	269	Sep. 07, 2018	Sep. 06, 2019
Preamplifier EMCI	EMC001340	980201	Oct. 12, 2018	Oct. 11, 2019
Preamplifier EMCI	EMC 012645	980115	Oct. 12, 2018	Oct. 11, 2019
Preamplifier EMCI	EMC 184045	980116	Oct. 12, 2018	Oct. 11, 2019
Preamplifier EMCI	EMC 330H	980112	Oct. 12, 2018	Oct. 11, 2019
Power Meter Anritsu	ML2495A	1012010	Sep. 05, 2018	Sep. 04, 2019
Power Sensor Anritsu	MA2411B	1315050	Sep. 05, 2018	Sep. 04, 2019
RF Coaxial Cable HUBER+SUHNNER	EMC104-SM-SM-8000 &3000	140811+170717	Oct. 12, 2018	Oct. 11, 2019
RF Coaxial Cable HUBER+SUHNNER	SUCOFLEX 104	EMC104-SM-SM-10 00(140807)	Oct. 12, 2018	Oct. 11, 2019
RF Coaxial Cable WOKEN	8D-FB	Cable-Ch10-01	Oct. 12, 2018	Oct. 11, 2019
Boresight Antenna Fixture	FBA-01	FBA-SIP01	NA	NA
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA
High Speed Power Supply KEITHLEY	2303	1341402	Oct. 18, 2018	Oct. 17, 2019
Temperature & Humidity Chamber	GTH-120-40-CP-AR	MAA1306-019	Sep. 05, 2018	Sep. 04, 2019

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 10.

#### 4.1.4 Test Procedures

##### **For Radiated Emission below 30 MHz**

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

##### **Note:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.

##### **For Radiated Emission above 30 MHz**

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

##### **Note:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle < 98 %) or 10 Hz (Duty cycle  $\geq 98$  %) for Average detection (AV) at frequency above 1 GHz.  
(11a: RBW = 1 MHz, VBW = 1 kHz ; 11n (HT20): RBW = 1 MHz, VBW = 1 kHz ;  
11n (HT40): RBW = 1 MHz, VBW = 3 kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

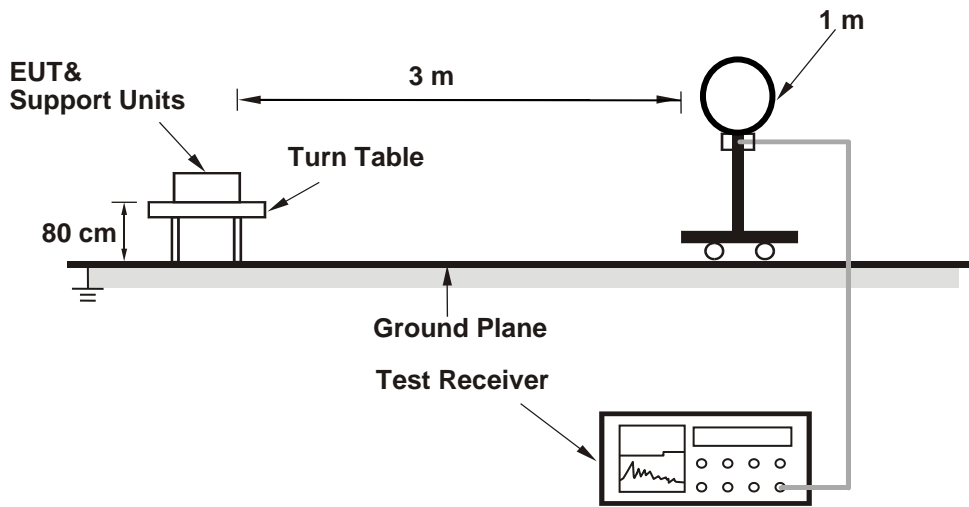
#### 4.1.5 Deviation from Test Standard

No deviation.

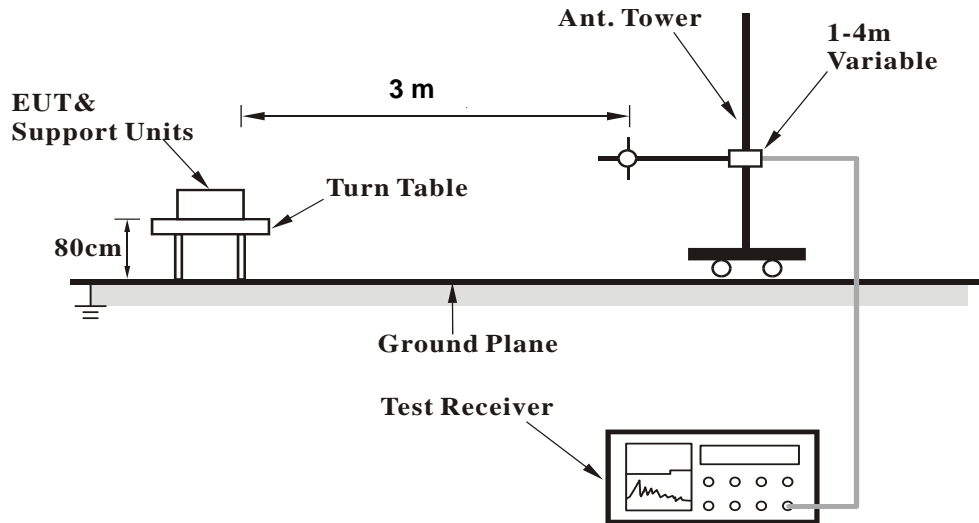


4.1.6 Test Setup

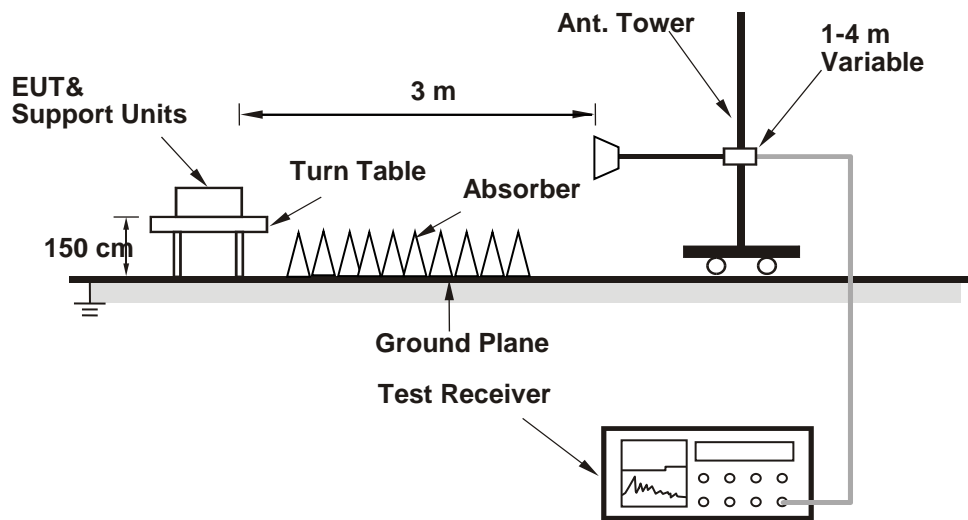
<Radiated Emission below 30 MHz>



<Radiated Emission 30 MHz to 1 GHz>



**<Radiated Emission above 1 GHz>**



For the actual test configuration, please refer to the attached file (Test Setup Photo).

**4.1.7 EUT Operating Conditions**

- a. Placed the EUT on a testing table.
- b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

4.1.8 Test Results  
 Above 1 GHz Data :  
 802.11a

EUT Test Condition		Measurement Detail	
Channel	Channel 52	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Tim Chen

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5149.76	42.03	40.5	1.53	54	-11.97	150	61	Average
5149.76	50.65	49.12	1.53	74	-23.35	150	61	Peak
5260	99.01	97.7	1.31			150	61	Average
5260	105.62	104.31	1.31			150	61	Peak
5367.49	42.04	40.51	1.53	54	-11.96	150	61	Average
5367.49	51.12	49.59	1.53	74	-22.88	150	61	Peak
*10520	55.28	58	-2.72	68.2	-12.92	176	81	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5144.9	40.86	39.33	1.53	54	-13.14	100	316	Average
5144.9	50.33	48.8	1.53	74	-23.67	100	316	Peak
5260	86.49	85.18	1.31			100	316	Average
5260	92.92	91.61	1.31			100	316	Peak
5418.75	40.9	39.19	1.71	54	-13.1	100	316	Average
5418.75	50.68	48.97	1.71	74	-23.32	100	316	Peak
*10520	55.29	58.01	-2.72	68.2	-12.91	107	336	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 5260 MHz: Fundamental Frequency
- \*: Out of Restricted Band
- The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 60	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Tim Chen

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5029.7	42.49	40.98	1.51	54	-11.51	100	21	Average
5029.7	52.29	50.78	1.51	74	-21.71	100	21	Peak
5300	98.44	97.13	1.31			100	21	Average
5300	104.88	103.57	1.31			100	21	Peak
5350	43.74	42.28	1.46	54	-10.26	100	21	Average
5350	56.34	54.88	1.46	74	-17.66	100	21	Peak
10600	45	47.91	-2.91	54	-9	183	241	Average
10600	55.51	58.42	-2.91	74	-18.49	183	241	Peak

Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5030.96	41.7	40.19	1.51	54	-12.3	122	241	Average
5030.96	50.88	49.37	1.51	74	-23.12	122	241	Peak
5300	92	90.69	1.31			122	241	Average
5300	99.07	97.76	1.31			122	241	Peak
5350	40.89	39.43	1.46	54	-13.11	122	241	Average
5350	51.42	49.96	1.46	74	-22.58	122	241	Peak
10600	45.32	48.23	-2.91	54	-8.68	153	229	Average
10600	56.25	59.16	-2.91	74	-17.75	153	229	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 5300 MHz: Fundamental Frequency
- \*: Out of Restricted Band
- The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 64	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Tim Chen

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5320	99.62	98.26	1.36			145	60	Average
5320	105.98	104.62	1.36			145	60	Peak
5350	53.66	52.2	1.46	54	-0.34	145	60	Average
5350	67.02	65.56	1.46	74	-6.98	145	60	Peak
10640	44.77	47.66	-2.89	54	-9.23	192	303	Average
10640	55.6	58.49	-2.89	74	-18.4	192	303	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5320	87.79	86.43	1.36			297	346	Average
5320	94.37	93.01	1.36			297	346	Peak
5350.33	45.52	44.06	1.46	54	-8.48	297	346	Average
5350.33	56.42	54.96	1.46	74	-17.58	297	346	Peak
10640	45.23	48.12	-2.89	54	-8.77	121	116	Average
10640	56.31	59.2	-2.89	74	-17.69	121	116	Peak

Remarks:

1. Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
2. 5320 MHz: Fundamental Frequency
3. \*: Out of Restricted Band
4. The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 100	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Thomas Wei

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5459.92	48.36	46.49	1.87	54	-5.64	144	68	Average
5459.92	60.59	58.72	1.87	74	-13.41	144	68	Peak
*5470	68.07	66.21	1.86	68.2	-0.13	144	68	Peak
5500	99.93	98.06	1.87			144	68	Average
5500	106.29	104.42	1.87			144	68	Peak
*5725	50.51	48.75	1.76	68.2	-17.69	144	68	Peak
11000	47.55	49.86	-2.31	54	-6.45	100	288	Average
11000	57.82	60.13	-2.31	74	-16.18	100	288	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5460	42.14	40.27	1.87	54	-11.86	236	333	Average
5460	51.07	49.2	1.87	74	-22.93	236	333	Peak
*5470	59.24	57.38	1.86	68.2	-8.96	236	333	Peak
5500	91.8	89.93	1.87			236	333	Average
5500	97.94	96.07	1.87			236	333	Peak
*5725	50.25	48.49	1.76	68.2	-17.95	236	333	Peak
11000	47.87	50.18	-2.31	54	-6.13	255	202	Average
11000	56.84	59.15	-2.31	74	-17.16	255	202	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 5500 MHz: Fundamental Frequency
- \*: Out of Restricted Band
- The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 116	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Thomas Wei

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5459.12	41.05	39.18	1.87	54	-12.95	119	66	Average
5459.12	50.45	48.58	1.87	74	-23.55	119	66	Peak
*5470	51.15	49.29	1.86	68.2	-17.05	119	66	Peak
5580	104.3	102.48	1.82			119	66	Average
5580	111.01	109.19	1.82			119	66	Peak
*5725	50.52	48.76	1.76	68.2	-17.68	119	66	Peak
11160	48.7	51.25	-2.55	54	-5.3	100	295	Average
11160	57.97	60.52	-2.55	74	-16.03	100	295	Peak

Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5426.96	40.78	39.02	1.76	54	-13.22	298	336	Average
5426.96	50.1	48.34	1.76	74	-23.9	298	336	Peak
*5470	49.42	47.56	1.86	68.2	-18.78	298	336	Peak
5580	94.86	93.04	1.82			298	336	Average
5580	102.2	100.38	1.82			298	336	Peak
*5725	49.37	47.61	1.76	68.2	-18.83	298	336	Peak
11160	49.65	52.2	-2.55	54	-4.35	269	189	Average
11160	56.77	59.32	-2.55	74	-17.23	269	189	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 5580 MHz: Fundamental Frequency
- \*: Out of Restricted Band
- The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 140	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Thomas Wei

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5460	40.75	38.88	1.87	54	-13.25	113	65	Average
5460	50.5	48.63	1.87	74	-23.5	113	65	Peak
*5470	50.05	48.19	1.86	68.2	-18.15	113	65	Peak
5700	100.72	99.13	1.59			113	65	Average
5700	107.45	105.86	1.59			113	65	Peak
*5725	67.98	66.22	1.76	68.2	-0.22	113	65	Peak
11400	47.51	49.74	-2.23	54	-6.49	100	281	Average
11400	56.34	58.57	-2.23	74	-17.66	100	281	Peak

Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5426.64	40.76	39	1.76	54	-13.24	100	57	Average
5426.64	50.65	48.89	1.76	74	-23.35	100	57	Peak
*5470	49.12	47.26	1.86	68.2	-19.08	100	57	Peak
5700	88.03	86.44	1.59			100	57	Average
5700	94.75	93.16	1.59			100	57	Peak
*5725	56.6	54.84	1.76	68.2	-11.6	100	57	Peak
11400	48.13	50.36	-2.23	54	-5.87	238	176	Average
11400	56.88	59.11	-2.23	74	-17.12	238	176	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 5700 MHz: Fundamental Frequency
- \*: Out of Restricted Band
- The emission levels of other frequencies were very low against the limit



### 802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 52	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Tim Chen

#### Antenna Polarity & Test Distance: Horizontal at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5150	41.13	39.6	1.53	54	-12.87	364	327	Average
5150	50.65	49.12	1.53	74	-23.35	364	327	Peak
5260	95.48	94.17	1.31			364	327	Average
5260	102.26	100.95	1.31			364	327	Peak
5350	40.89	39.43	1.46	54	-13.11	364	327	Average
5350	50.95	49.49	1.46	74	-23.05	364	327	Peak
*10520	54.96	57.68	-2.72	68.2	-13.24	211	173	Peak

#### Antenna Polarity & Test Distance: Vertical at 3 m

Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5150	40.88	39.35	1.53	54	-13.12	383	101	Average
5150	50.75	49.22	1.53	74	-23.25	383	101	Peak
5260	90.26	88.95	1.31			383	101	Average
5260	97.09	95.78	1.31			383	101	Peak
5350	41.04	39.58	1.46	54	-12.96	383	101	Average
5350	50.84	49.38	1.46	74	-23.16	383	101	Peak
*10520	55.14	57.86	-2.72	68.2	-13.06	133	291	Peak

#### Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 5260 MHz: Fundamental Frequency
- \*: Out of Restricted Band
- The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 60	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Tim Chen

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5150	41.41	39.88	1.53	54	-12.59	103	13	Average
5150	50.51	48.98	1.53	74	-23.49	103	13	Peak
5300	96.29	94.98	1.31			103	13	Average
5300	103.25	101.94	1.31			103	13	Peak
5350	42.33	40.87	1.46	54	-11.67	103	13	Average
5350	53.93	52.47	1.46	74	-20.07	103	13	Peak
10600	44.62	47.53	-2.91	54	-9.38	135	107	Average
10600	55.66	58.57	-2.91	74	-18.34	135	107	Peak

Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5150	40.9	39.37	1.53	54	-13.1	103	112	Average
5150	51.68	50.15	1.53	74	-22.32	103	112	Peak
5300	90.78	89.47	1.31			103	112	Average
5300	98.89	97.58	1.31			103	112	Peak
5350	41.1	39.64	1.46	54	-12.9	103	112	Average
5350	50.32	48.86	1.46	74	-23.68	103	112	Peak
10600	45.34	48.25	-2.91	54	-8.66	109	301	Average
10600	56.15	59.06	-2.91	74	-17.85	109	301	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 5300 MHz: Fundamental Frequency
- \*: Out of Restricted Band
- The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 64	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Tim Chen

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5320	97.21	95.85	1.36			116	62	Average
5320	104.03	102.67	1.36			116	62	Peak
5350	50.12	48.66	1.46	54	-3.88	116	62	Average
5350	61.41	59.95	1.46	74	-12.59	116	62	Peak
10640	45.31	48.2	-2.89	54	-8.69	135	297	Average
10640	56.67	59.56	-2.89	74	-17.33	135	297	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5320	91.51	90.15	1.36			100	113	Average
5320	98.35	96.99	1.36			100	113	Peak
5350	46.15	44.69	1.46	54	-7.85	100	113	Average
5350	57.38	55.92	1.46	74	-16.62	100	113	Peak
10640	44.1	46.99	-2.89	54	-9.9	103	331	Average
10640	55.83	58.72	-2.89	74	-18.17	103	331	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 5320 MHz: Fundamental Frequency
- \*: Out of Restricted Band
- The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 100	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Thomas Wei

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5459.6	49.63	47.76	1.87	54	-4.37	140	67	Average
5459.6	63.06	61.19	1.87	74	-10.94	140	67	Peak
*5470	67.76	65.9	1.86	68.2	-0.44	140	67	Peak
5500	101.36	99.49	1.87			140	67	Average
5500	107.84	105.97	1.87			140	67	Peak
*5725	49.62	47.86	1.76	68.2	-18.58	140	67	Peak
11000	47.37	49.68	-2.31	54	-6.63	100	290	Average
11000	56.81	59.12	-2.31	74	-17.19	100	290	Peak

Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5460	42.41	40.54	1.87	54	-11.59	163	338	Average
5460	52.61	50.74	1.87	74	-21.39	163	338	Peak
*5470	60.13	58.27	1.86	68.2	-8.07	163	338	Peak
5500	92.57	90.7	1.87			163	338	Average
5500	98.9	97.03	1.87			163	338	Peak
*5725	49.71	47.95	1.76	68.2	-18.49	163	338	Peak
11000	47.8	50.11	-2.31	54	-6.2	105	188	Average
11000	56.42	58.73	-2.31	74	-17.58	105	188	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 5500 MHz: Fundamental Frequency
- \*: Out of Restricted Band
- The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 116	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Thomas Wei

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5460	41.17	39.3	1.87	54	-12.83	118	67	Average
5460	50.3	48.43	1.87	74	-23.7	118	67	Peak
*5470	50.58	48.72	1.86	68.2	-17.62	118	67	Peak
5580	104.05	102.23	1.82			118	67	Average
5580	110.38	108.56	1.82			118	67	Peak
*5725	50.29	48.53	1.76	68.2	-17.91	118	67	Peak
11160	48.37	50.92	-2.55	54	-5.63	100	296	Average
11160	58.79	61.34	-2.55	74	-15.21	100	296	Peak

Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5438.8	40.7	38.92	1.78	54	-13.3	287	337	Average
5438.8	50.51	48.73	1.78	74	-23.49	287	337	Peak
*5470	48.85	46.99	1.86	68.2	-19.35	287	337	Peak
5580	94.78	92.96	1.82			287	337	Average
5580	101.4	99.58	1.82			287	337	Peak
*5725	49.72	47.96	1.76	68.2	-18.48	287	337	Peak
11160	49.2	51.75	-2.55	54	-4.8	100	201	Average
11160	58.55	61.1	-2.55	74	-15.45	100	201	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 5580 MHz: Fundamental Frequency
- \*: Out of Restricted Band
- The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 140	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Thomas Wei

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5446.48	40.66	38.84	1.82	54	-13.34	113	65	Average
5446.48	50.27	48.45	1.82	74	-23.73	113	65	Peak
*5470	49.61	47.75	1.86	68.2	-18.59	113	65	Peak
5700	100.57	98.98	1.59			113	65	Average
5700	106.55	104.96	1.59			113	65	Peak
*5725	67.88	66.12	1.76	68.2	-0.32	113	65	Peak
11400	47.49	49.72	-2.23	54	-6.51	113	311	Average
11400	56.38	58.61	-2.23	74	-17.62	113	311	Peak

Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5452.88	40.74	38.87	1.87	54	-13.26	291	339	Average
5452.88	51.88	50.01	1.87	74	-22.12	291	339	Peak
*5470	49.5	47.64	1.86	68.2	-18.7	291	339	Peak
5700	91.7	90.11	1.59			291	339	Average
5700	98.65	97.06	1.59			291	339	Peak
*5725	61.22	59.46	1.76	68.2	-6.98	291	339	Peak
11400	48.32	50.55	-2.23	54	-5.68	108	184	Average
11400	56.09	58.32	-2.23	74	-17.91	108	184	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 5700 MHz: Fundamental Frequency
- \*: Out of Restricted Band
- The emission levels of other frequencies were very low against the limit

802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 54	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Tim Chen

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5150	41.53	40	1.53	54	-12.47	117	63	Average
5150	50.24	48.71	1.53	74	-23.76	117	63	Peak
5270	93.07	91.76	1.31			117	63	Average
5270	100.14	98.83	1.31			117	63	Peak
5350	42.63	41.17	1.46	54	-11.37	117	63	Average
5350	51.27	49.81	1.46	74	-22.73	117	63	Peak
*10540	55.93	58.7	-2.77	68.2	-12.27	194	122	Peak

Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5150	40.96	39.43	1.53	54	-13.04	363	100	Average
5150	51.06	49.53	1.53	74	-22.94	363	100	Peak
5270	87.68	86.37	1.31			363	100	Average
5270	94.37	93.06	1.31			363	100	Peak
5350	41	39.54	1.46	54	-13	363	100	Average
5350	50.85	49.39	1.46	74	-23.15	363	100	Peak
*10540	54.97	57.74	-2.77	68.2	-13.23	134	229	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 5270 MHz: Fundamental Frequency
- \*: Out of Restricted Band
- The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 62	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Tim Chen

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5150	41.48	39.95	1.53	54	-12.52	280	13	Average
5150	50.73	49.2	1.53	74	-23.27	280	13	Peak
5310	92.89	91.53	1.36			280	13	Average
5310	99.53	98.17	1.36			280	13	Peak
5350	53.34	51.88	1.46	54	-0.66	280	13	Average
5350	64.32	62.86	1.46	74	-9.68	280	13	Peak
10620	44.21	47.1	-2.89	54	-9.79	185	152	Average
10620	55.31	58.2	-2.89	74	-18.69	185	152	Peak

Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5150	41.51	39.98	1.53	54	-12.49	377	99	Average
5150	50.89	49.36	1.53	74	-23.11	377	99	Peak
5310	87.62	86.26	1.36			377	99	Average
5310	94.29	92.93	1.36			377	99	Peak
5350	45.78	44.32	1.46	54	-8.22	377	99	Average
5350	56.73	55.27	1.46	74	-17.27	377	99	Peak
10620	45.37	48.26	-2.89	54	-8.63	103	219	Average
10620	55.61	58.5	-2.89	74	-18.39	103	219	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 5310 MHz: Fundamental Frequency
- \*: Out of Restricted Band
- The emission levels of other frequencies were very low against the limit



EUT Test Condition		Measurement Detail	
Channel	Channel 102	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Thomas Wei

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5459.76	48.49	46.62	1.87	54	-5.51	142	67	Average
5459.76	61.38	59.51	1.87	74	-12.62	142	67	Peak
*5470	67.65	65.79	1.86	68.2	-0.55	142	67	Peak
5510	95.75	93.91	1.84			142	67	Average
5510	102.24	100.4	1.84			142	67	Peak
*5725	49.72	47.96	1.76	68.2	-18.48	142	67	Peak
11020	47.18	49.52	-2.34	54	-6.82	104	308	Average
11020	56.2	58.54	-2.34	74	-17.8	104	308	Peak

Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5457.36	41.85	39.98	1.87	54	-12.15	246	332	Average
5457.36	50.88	49.01	1.87	74	-23.12	246	332	Peak
*5470	55.92	54.06	1.86	68.2	-12.28	246	332	Peak
5510	86.23	84.39	1.84			246	332	Average
5510	92.8	90.96	1.84			246	332	Peak
*5725	50.11	48.35	1.76	68.2	-18.09	246	332	Peak
11020	47.79	50.13	-2.34	54	-6.21	116	193	Average
11020	56.67	59.01	-2.34	74	-17.33	116	193	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 5510 MHz: Fundamental Frequency
- \*: Out of Restricted Band
- The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 110	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Thomas Wei

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5459.76	50.59	48.72	1.87	54	-3.41	139	68	Average
5459.76	61.91	60.04	1.87	74	-12.09	139	68	Peak
*5470	65.6	63.74	1.86	68.2	-2.6	139	68	Peak
5550	100.65	98.82	1.83			139	68	Average
5550	106.85	105.02	1.83			139	68	Peak
*5725	49.17	47.41	1.76	68.2	-19.03	139	68	Peak
11100	47.48	49.94	-2.46	54	-6.52	106	277	Average
11100	56.35	58.81	-2.46	74	-17.65	106	277	Peak

Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5458.8	41.93	40.06	1.87	54	-12.07	100	168	Average
5458.8	51.04	49.17	1.87	74	-22.96	100	168	Peak
*5470	52.52	50.66	1.86	68.2	-15.68	100	168	Peak
5550	88.89	87.06	1.83			100	168	Average
5550	95.14	93.31	1.83			100	168	Peak
*5725	49.92	48.16	1.76	68.2	-18.28	100	168	Peak
11100	47.97	50.43	-2.46	54	-6.03	118	203	Average
11100	58.02	60.48	-2.46	74	-15.98	118	203	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 5550 MHz: Fundamental Frequency
- \*: Out of Restricted Band
- The emission levels of other frequencies were very low against the limit

EUT Test Condition		Measurement Detail	
Channel	Channel 134	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Thomas Wei

Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5454.16	41.22	39.35	1.87	54	-12.78	130	64	Average
5454.16	50.12	48.25	1.87	74	-23.88	130	64	Peak
*5470	50.31	48.45	1.86	68.2	-17.89	130	64	Peak
5670	97.71	95.95	1.76			130	64	Average
5670	104.22	102.46	1.76			130	64	Peak
*5725	67.88	66.12	1.76	68.2	-0.32	130	64	Peak
11340	47.22	49.58	-2.36	54	-6.78	100	277	Average
11340	56.95	59.31	-2.36	74	-17.05	100	277	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5429.52	41.05	39.27	1.78	54	-12.95	294	345	Average
5429.52	50.55	48.77	1.78	74	-23.45	294	345	Peak
*5470	48.88	47.02	1.86	68.2	-19.32	294	345	Peak
5670	89.49	87.73	1.76			294	345	Average
5670	95.61	93.85	1.76			294	345	Peak
*5725	54.58	52.82	1.76	68.2	-13.62	294	345	Peak
11340	48.01	50.37	-2.36	54	-5.99	118	209	Average
11340	57.34	59.7	-2.36	74	-16.66	118	209	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- 5670 MHz: Fundamental Frequency
- \*: Out of Restricted Band
- The emission levels of other frequencies were very low against the limit

**9 kHz ~ 30 MHz Data:**

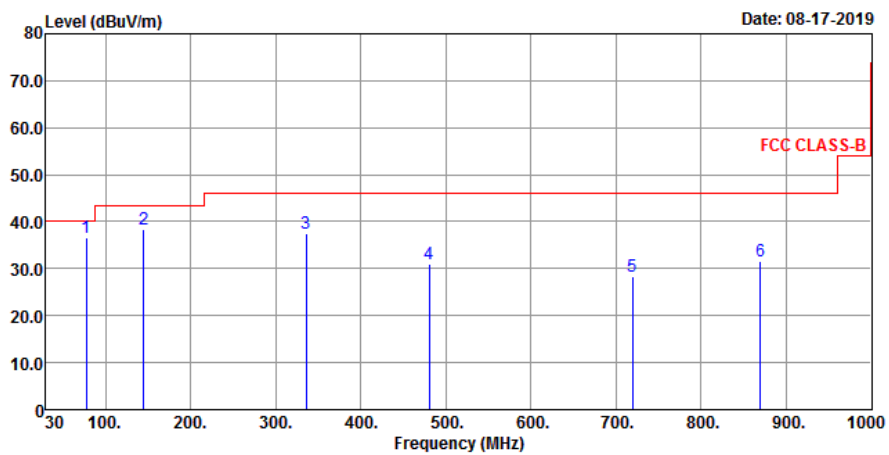
The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

**30 MHz ~ 1 GHz Worst-Case Data:**

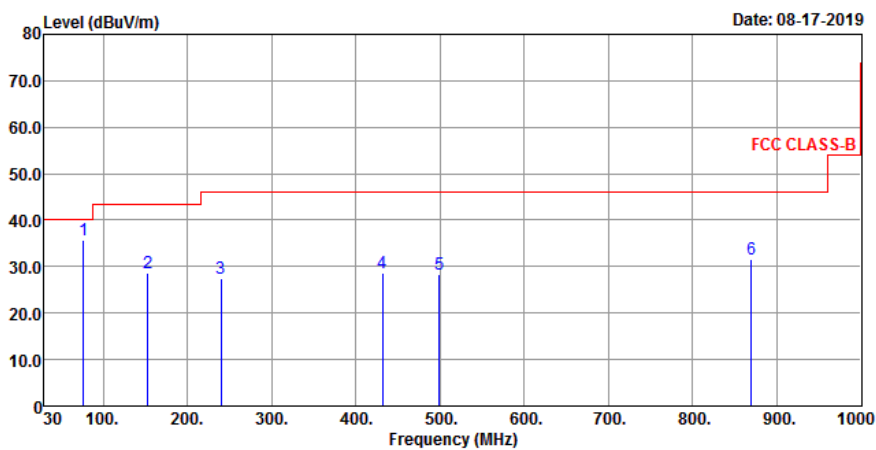
**802.11a**

EUT Test Condition		Measurement Detail	
Channel	Channel 100	Frequency Range	30 MHz ~ 1 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Quasi-peak (QP)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Thomas Wei

**Horizontal**



**Vertical**



Antenna Polarity & Test Distance: Horizontal at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
77.53	36.48	57.72	-21.24	40	-3.52	135	142	Peak
144.46	38.42	55.95	-17.53	43.5	-5.08	156	167	Peak
335.55	37.6	52.6	-15	46	-8.4	198	206	Peak
480.08	30.9	42.78	-11.88	46	-15.1	237	246	Peak
719.67	28.26	35.26	-7	46	-17.74	265	274	Peak
870.02	31.6	35.91	-4.31	46	-14.4	298	315	Peak
Antenna Polarity & Test Distance: Vertical at 3 m								
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
76.56	35.78	56.86	-21.08	40	-4.22	133	146	Peak
153.19	28.74	46.09	-17.35	43.5	-14.76	155	162	Peak
239.52	27.39	45.55	-18.16	46	-18.61	199	215	Peak
431.58	28.6	40.87	-12.27	46	-17.4	236	248	Peak
499.48	28.21	38.78	-10.57	46	-17.79	261	273	Peak
870.02	31.6	35.91	-4.31	46	-14.4	315	337	Peak

Remarks:

- Emission Level = Read Level + Factor  
Margin value = Emission level – Limit value
- The emission levels of other frequencies were very low against the limit

## 4.2 Conducted Emission Measurement

### 4.2.1 Limits of Conducted Emission Measurement

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 - 0.5	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30.0	60	50

- Note: 1. The lower limit shall apply at the transition frequencies.  
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

### 4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Dec. 10, 2018	Dec. 09, 2019
RF signal cable Woken	5D-FB	Cable-cond1-01	Sep. 05, 2018	Sep. 04, 2019
LISN/AMN ROHDE & SCHWARZ (EUT)	ENV216	101826	Feb. 21, 2019	Feb. 20, 2020
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100312	Aug. 13, 2019	Aug. 12, 2020
Software ADT	BV ADT_Cond_ V7.3.7.4	NA	NA	NA

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
 2. The test was performed in HwaYa Shielded Room 1.  
 3. The VCCI Site Registration No. is C-12040.

#### 4.2.3 Test Procedures

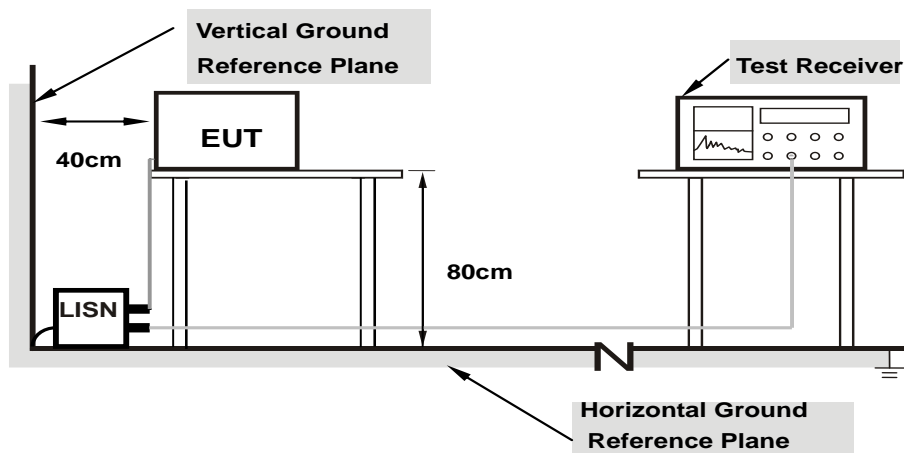
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit -20 dB) was not recorded.

**Note:** All modes of operation were investigated and the worst-case emissions are reported.

#### 4.2.4 Deviation from Test Standard

No deviation.

#### 4.2.5 Test Setup



- Note:**
1. Support units were connected to second LISN.
  2. Both of LISNs (AMN) are 80 cm from EUT and at least 80 cm from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.2.6 EUT Operating Conditions

- a. Placed the EUT on a testing table.
- b. Use the software to control the EUT under transmission condition continuously at specific channel frequency.

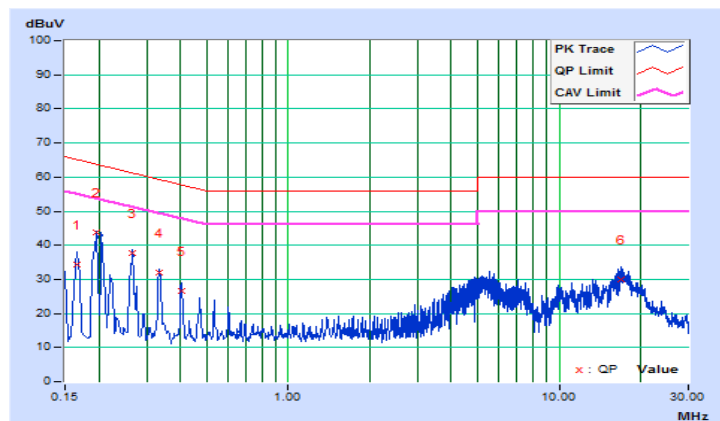
#### 4.2.7 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Thomas Wei	Test Date	2019/8/20

Phase Of Power : Line (L)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.16564	9.84	24.56	15.33	34.40	25.17	65.18	55.18	-30.78	-30.01
2	0.19692	9.85	33.84	22.41	43.69	32.26	63.74	53.74	-20.05	-21.48
3	0.26730	9.86	28.01	16.75	37.87	26.61	61.20	51.20	-23.33	-24.59
4	0.33396	9.87	22.16	12.38	32.03	22.25	59.35	49.35	-27.32	-27.10
5	0.40415	9.88	16.86	6.38	26.74	16.26	57.77	47.77	-31.03	-31.51
6	16.83397	10.22	19.71	11.90	29.93	22.12	60.00	50.00	-30.07	-27.88

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



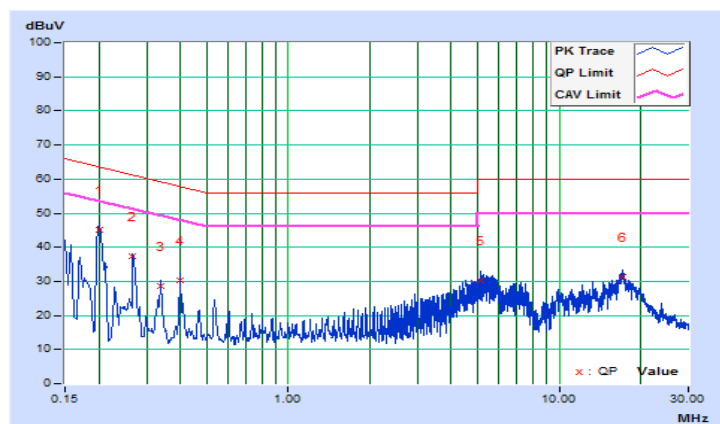


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Thomas Wei	Test Date	2019/8/20

Phase Of Power : Neutral (N)										
No	Frequency (MHz)	Correction Factor (dB)	Reading Value (dBuV)		Emission Level (dBuV)		Limit (dBuV)		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
<b>1</b>	<b>0.20084</b>	<b>9.84</b>	<b>35.22</b>	<b>25.88</b>	<b>45.06</b>	<b>35.72</b>	<b>63.58</b>	<b>53.58</b>	<b>-18.52</b>	<b>-17.86</b>
2	0.26730	9.85	27.57	17.29	37.42	27.14	61.20	51.20	-23.78	-24.06
3	0.33768	9.86	18.84	9.35	28.70	19.21	59.26	49.26	-30.56	-30.05
4	0.40024	9.87	20.28	10.84	30.15	20.71	57.85	47.85	-27.70	-27.14
5	5.14698	10.03	20.15	13.28	30.18	23.31	60.00	50.00	-29.82	-26.69
6	17.10376	10.27	21.06	14.09	31.33	24.36	60.00	50.00	-28.67	-25.64

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



### 4.3 Transmit Power Measurement

#### 4.3.1 Limits of Transmit Power Measurement

Operation Band	EUT Category	Limit
U-NII-1	Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p $\leq$ 125 mW (21 dBm) at any elevation angle above 30 degrees as measured from the horizon)
	Fixed point-to-point Access Point	1 Watt (30 dBm)
	Indoor Access Point	1 Watt (30 dBm)
	Mobile and Portable client device	250 mW (24 dBm)
U-NII-2A	√	250 mW (24 dBm) or 11 dBm + 10 log B*
U-NII-2C	√	250 mW (24 dBm) or 11 dBm + 10 log B*
U-NII-3		1 Watt (30 dBm)

\*B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for  $N_{ANT} \leq 4$ ;

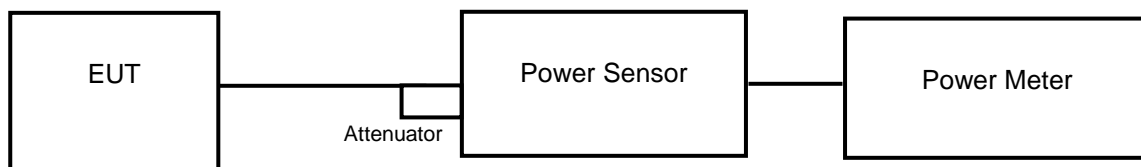
Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq 40$  MHz for any  $N_{ANT}$ ;

Array Gain =  $5 \log(N_{ANT}/N_{SS})$  dB or 3 dB, whichever is less for 20 MHz channel widths with  $N_{ANT} \geq 5$ .

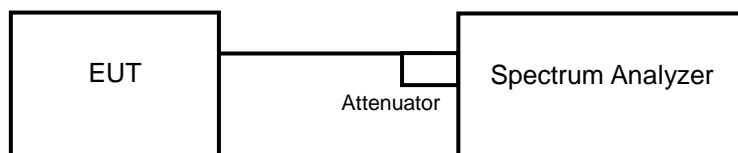
For power measurements on all other devices: Array Gain =  $10 \log(N_{ANT}/N_{SS})$  dB.

#### 4.3.2 Test Setup

##### <Power Output Measurement>



##### <26 dB Bandwidth>



#### 4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 Test Procedure

##### **Average Power Measurement**

<802.11a, 802.11n (HT20), 802.11n (HT40)>

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

##### **26 dB Bandwidth**

- a. Set RBW = approximately 1 % of the emission bandwidth.
- b. Set the VBW > RBW.
- c. Detector = Peak.
- d. Trace mode = max hold.
- e. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1 %.

#### 4.3.5 Deviation from Test Standard

No deviation.

#### 4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

#### 4.3.7 Test Results

##### Power Output:

##### 802.11a

Channel	Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
52	5260	48.865	16.89	24	Pass
60	5300	48.306	16.84	24	Pass
64	5320	48.753	16.88	24	Pass
100	5500	50.35	17.02	24	Pass
116	5580	48.417	16.85	24	Pass
140	5700	38.107	15.81	24	Pass

##### Note:

##### For U-NII-2A, U-NII-2C Band:

1.  $11 \text{ dBm} + 10\log(30.86) = 25.89 \text{ dBm} > 24 \text{ dBm}$ .
2.  $11 \text{ dBm} + 10\log(31.98) = 26.05 \text{ dBm} > 24 \text{ dBm}$ .
3.  $11 \text{ dBm} + 10\log(31.30) = 25.96 \text{ dBm} > 24 \text{ dBm}$ .
4.  $11 \text{ dBm} + 10\log(29.27) = 25.66 \text{ dBm} > 24 \text{ dBm}$ .
5.  $11 \text{ dBm} + 10\log(37.55) = 26.75 \text{ dBm} > 24 \text{ dBm}$ .
6.  $11 \text{ dBm} + 10\log(28.20) = 25.50 \text{ dBm} > 24 \text{ dBm}$ .

##### 802.11n (HT20)

Channel	Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
52	5260	43.853	16.42	24	Pass
60	5300	44.259	16.46	24	Pass
64	5320	44.157	16.45	24	Pass
100	5500	40.926	16.12	24	Pass
116	5580	44.566	16.49	24	Pass
140	5700	38.282	15.83	24	Pass

##### Note:

##### For U-NII-2A, U-NII-2C Band:

1.  $11 \text{ dBm} + 10\log(28.25) = 25.51 \text{ dBm} > 24 \text{ dBm}$ .
2.  $11 \text{ dBm} + 10\log(30.88) = 25.90 \text{ dBm} > 24 \text{ dBm}$ .
3.  $11 \text{ dBm} + 10\log(30.13) = 25.79 \text{ dBm} > 24 \text{ dBm}$ .
4.  $11 \text{ dBm} + 10\log(31.04) = 25.92 \text{ dBm} > 24 \text{ dBm}$ .
5.  $11 \text{ dBm} + 10\log(35.88) = 26.55 \text{ dBm} > 24 \text{ dBm}$ .
6.  $11 \text{ dBm} + 10\log(29.23) = 25.66 \text{ dBm} > 24 \text{ dBm}$ .

### 802.11n (HT40)

Channel	Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
54	5270	39.628	15.98	24	Pass
62	5310	36.058	15.57	24	Pass
102	5510	22.439	13.51	24	Pass
110	5550	39.446	15.96	24	Pass
134	5670	36.475	15.62	24	Pass

**Note:**

**For U-NII-2A, U-NII-2C Band:**

1.  $11 \text{ dBm} + 10\log (57.70) = 28.61 \text{ dBm} > 24 \text{ dBm}$ .
2.  $11 \text{ dBm} + 10\log (51.98) = 28.16 \text{ dBm} > 24 \text{ dBm}$ .
3.  $11 \text{ dBm} + 10\log (49.20) = 27.92 \text{ dBm} > 24 \text{ dBm}$ .
4.  $11 \text{ dBm} + 10\log (70.55) = 29.48 \text{ dBm} > 24 \text{ dBm}$ .
5.  $11 \text{ dBm} + 10\log (55.11) = 28.41 \text{ dBm} > 24 \text{ dBm}$ .
6.  $11 \text{ dBm} + 10\log (57.70) = 28.61 \text{ dBm} > 24 \text{ dBm}$ .

**26 dB Bandwidth:**

**802.11a**

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)
52	5260	30.86
60	5300	31.98
64	5320	31.30
100	5500	29.27
116	5580	37.55
140	5700	28.20

**802.11n (HT20)**

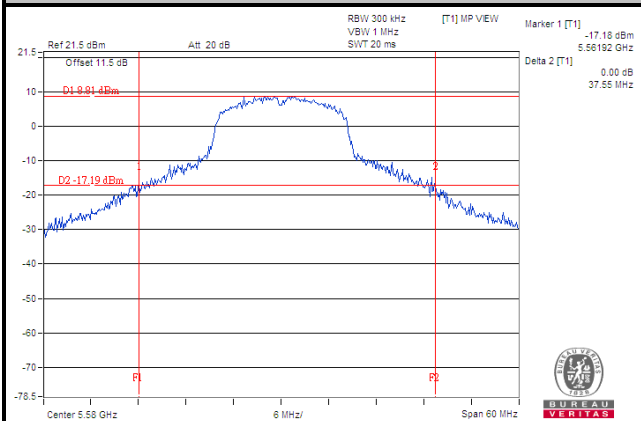
Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)
52	5260	28.25
60	5300	30.88
64	5320	30.13
100	5500	31.04
116	5580	35.88
140	5700	29.23

**802.11n (HT40)**

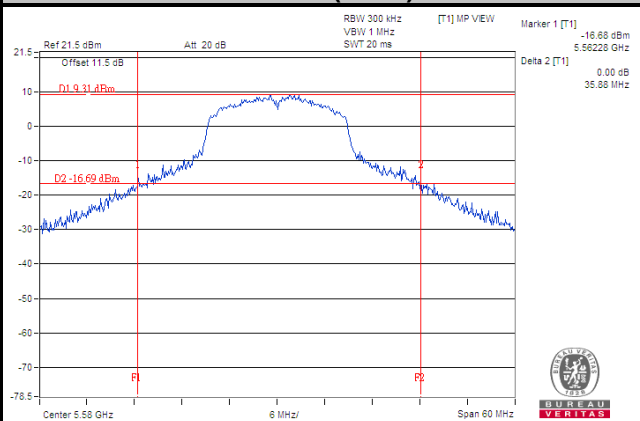
Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)
54	5270	57.70
62	5310	51.98
102	5510	49.20
110	5550	70.55
134	5670	55.11

### Spectrum Plot of Worst Value

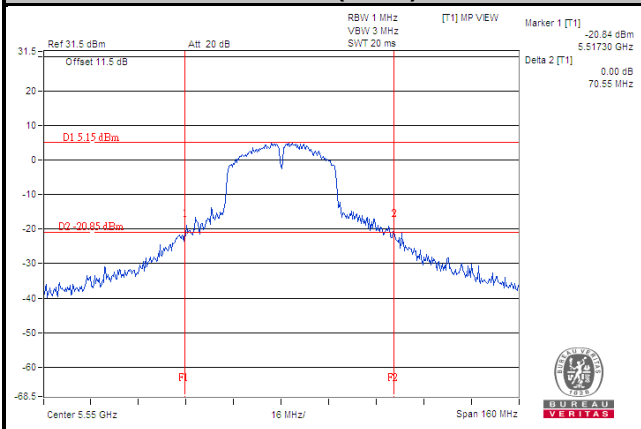
#### 802.11a



#### 802.11n (HT20)

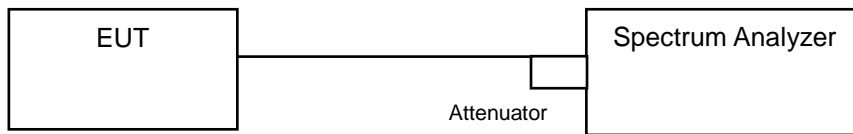


#### 802.11n (HT40)



## 4.4 Occupied Bandwidth Measurement

### 4.4.1 Test Setup



### 4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.4.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1 % to 5 % of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to SAMPLE. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 % of the total mean power of a given emission.



#### 4.4.4 Test Results

##### 802.11a

Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
52	5260	16.80
60	5300	16.92
64	5320	17.28
100	5500	17.04
116	5580	19.56
140	5700	16.80

##### 802.11n (HT20)

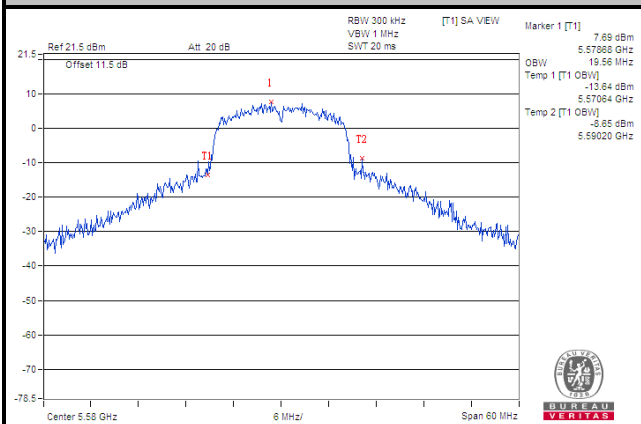
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
52	5260	17.88
60	5300	17.88
64	5320	18.00
100	5500	18.00
116	5580	19.20
140	5700	17.88

##### 802.11n (HT40)

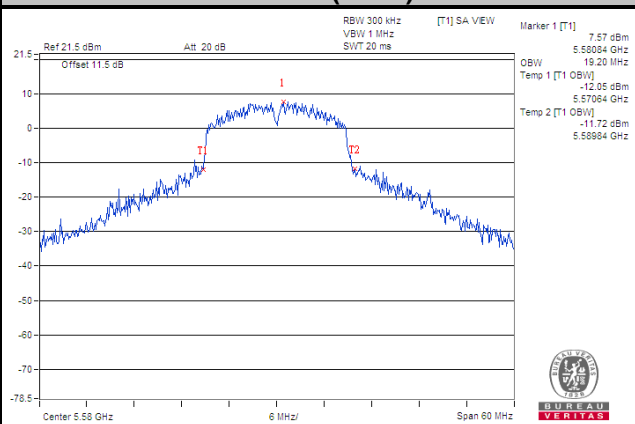
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
54	5270	36.00
62	5310	35.88
102	5510	36.00
110	5550	36.60
134	5670	36.00

### Spectrum Plot of Worst Value

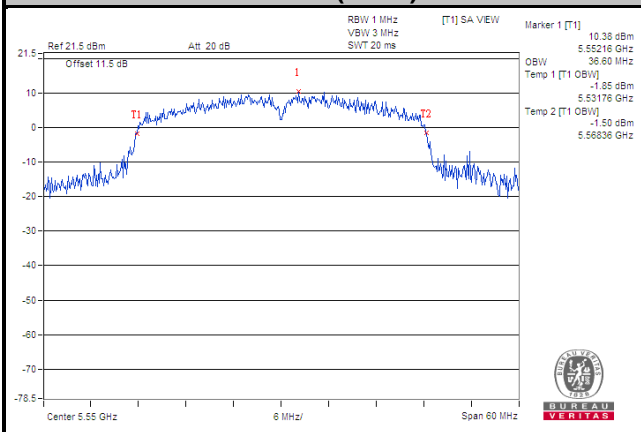
#### 802.11a



#### 802.11n (HT20)



#### 802.11n (HT40)

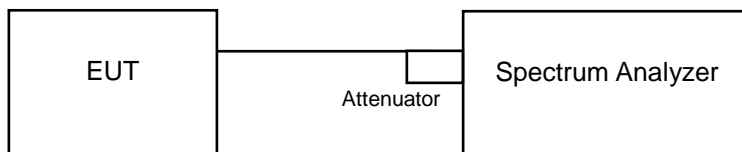


## 4.5 Peak Power Spectral Density Measurement

### 4.5.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	17 dBm/MHz
		Fixed point-to-point Access Point	
		Indoor Access Point	
		Mobile and Portable client device	11 dBm/MHz
U-NII-2A		√	11 dBm/MHz
U-NII-2C		√	11 dBm/MHz
U-NII-3			30 dBm/500 kHz

### 4.5.2 Test Setup



### 4.5.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

### 4.5.4 Test Procedures

Using method SA-2 Duty cycle <98%

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

### 4.5.5 Deviation from Test Standard

No deviation.

### 4.5.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

#### 4.5.7 Test Results

##### 802.11a

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD with Duty Factor (dBm/MHz)	Maximum Limit (dBm/MHz)	Pass / Fail
52	5260	1.68	0.65	2.33	11	Pass
60	5300	2.04	0.65	2.69	11	Pass
64	5320	2.08	0.65	2.73	11	Pass
100	5500	1.18	0.65	1.83	11	Pass
116	5580	2.14	0.65	2.79	11	Pass
140	5700	0.71	0.65	1.36	11	Pass

**Note:** Refer to section 3.3 for duty cycle spectrum plot.

##### 802.11n (HT20)

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD with Duty Factor (dBm/MHz)	Maximum Limit (dBm/MHz)	Pass / Fail
52	5260	0.86	0.68	1.54	11	Pass
60	5300	1.26	0.68	1.94	11	Pass
64	5320	1.02	0.68	1.70	11	Pass
100	5500	0.89	0.68	1.57	11	Pass
116	5580	1.14	0.68	1.83	11	Pass
140	5700	0.51	0.68	1.19	11	Pass

**Note:** Refer to section 3.3 for duty cycle spectrum plot.

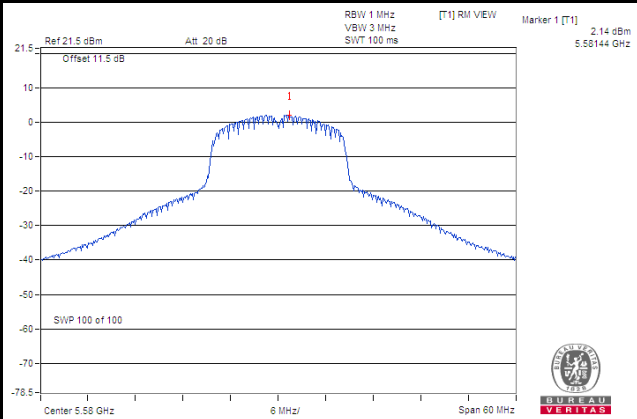
##### 802.11n (HT40)

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD with Duty Factor (dBm/MHz)	Maximum Limit (dBm/MHz)	Pass / Fail
54	5270	-2.64	1.27	-1.37	11	Pass
62	5310	-3.13	1.27	-1.86	11	Pass
102	5510	-4.68	1.27	-3.41	11	Pass
110	5550	-2.04	1.27	-0.77	11	Pass
134	5670	-2.24	1.27	-0.97	11	Pass

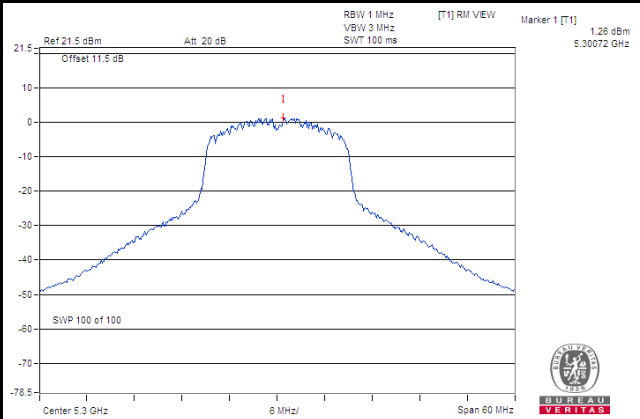
**Note:** Refer to section 3.3 for duty cycle spectrum plot.

### Spectrum Plot of Worst Value

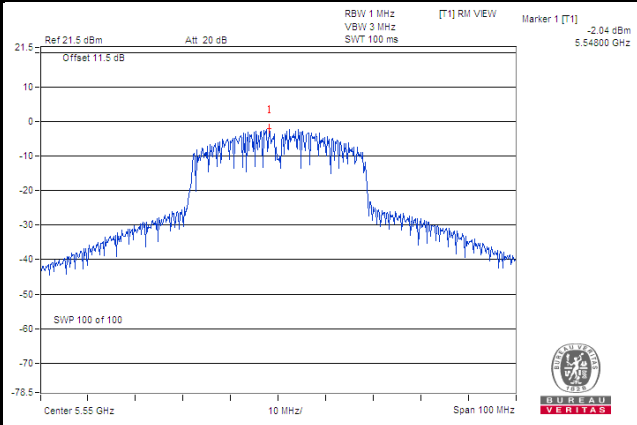
#### 802.11a



#### 802.11n (HT20)



#### 802.11n (HT40)

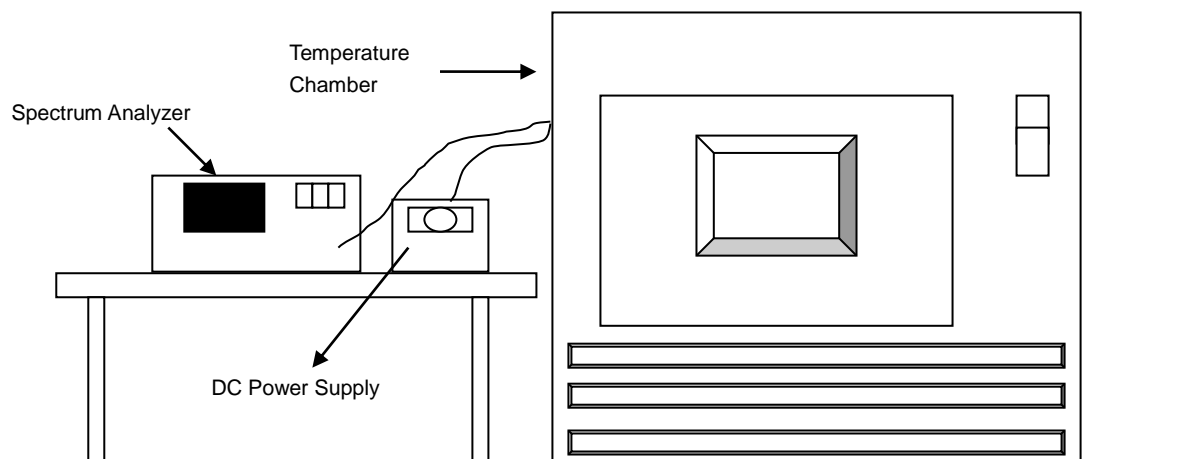


## 4.6 Frequency Stability

### 4.6.1 Limit of Frequency Stability Measurement

The frequency of the carrier signal shall be maintained within band of operation.

### 4.6.2 Test Setup



### 4.6.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

### 4.6.4 Test Procedure

- The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
- Turn the EUT on and couple its output to a spectrum analyzer.
- Turn the EUT off and set the chamber to the highest temperature specified.
- Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 Minutes.
- Repeat step c and d with every 10 degrees reduction until the lowest temperature achieved.
- The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 Minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

### 4.6.5 Deviation from Test Standard

No deviation.

### 4.6.6 EUT Operating Condition

Set the EUT transmit at un-modulation mode to test frequency stability.

#### 4.6.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5260 MHz									
Temp. (°C)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
85	3.3	5260.0032	PASS	5260.0047	PASS	5260.0078	PASS	5260.0051	5260.0032
80	3.3	5259.9815	PASS	5259.9811	PASS	5259.9792	PASS	5259.9778	5259.9815
70	3.3	5259.9775	PASS	5259.9792	PASS	5259.9788	PASS	5259.9775	5259.9775
60	3.3	5260.022	PASS	5260.0239	PASS	5260.0213	PASS	5260.0221	5260.022
50	3.3	5260.0143	PASS	5260.0131	PASS	5260.0115	PASS	5260.0143	5260.0143
40	3.3	5259.9926	PASS	5259.992	PASS	5259.993	PASS	5259.9925	5259.9926
30	3.3	5260.0176	PASS	5260.0171	PASS	5260.0202	PASS	5260.0173	5260.0176
20	3.3	5260.0037	PASS	5260.0002	PASS	5260.0016	PASS	5260.0011	5260.0037
10	3.3	5259.9859	PASS	5259.981	PASS	5259.9851	PASS	5259.9816	5259.9859
0	3.3	5259.9729	PASS	5259.9768	PASS	5259.9739	PASS	5259.9765	5259.9729
-10	3.3	5259.9743	PASS	5259.9755	PASS	5259.9773	PASS	5259.9775	5259.9743
-20	3.3	5260.0138	PASS	5260.0116	PASS	5260.0118	PASS	5260.012	5260.0138
-30	3.3	5260.0123	PASS	5260.0163	PASS	5260.0157	PASS	5260.0135	5260.0123
-40	3.3	5260.0044	PASS	5260.0028	PASS	5260.0067	PASS	5260.0028	5260.0044

Frequency Stability Versus Voltage									
Operating Frequency: 5260 MHz									
Temp. (°C)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
20	4.8	5260.0027	PASS	5260.0009	PASS	5260.0016	PASS	5260.0014	PASS
	3.3	5260.0037	PASS	5260.0002	PASS	5260.0016	PASS	5260.0011	PASS
	2.9	5260.0036	PASS	5260	PASS	5260.0011	PASS	5260.0007	PASS

## 5 Pictures of Test Arrangements

Please refer to the attached file (Test Setup Photo).



## Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

**Lin Kou EMC/RF Lab**

Tel: 886-2-26052180

Fax: 886-2-26051924

**Hsin Chu EMC/RF/Telecom Lab**

Tel: 886-3-6668565

Fax: 886-3-6668323

**Hwa Ya EMC/RF/Safety Lab**

Tel: 886-3-3183232

Fax: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

The address and road map of all our labs can be found in our web site also.

--- END ---