

Partial FCC Test Report

Report No.: RF160219C04-1

FCC ID: PPD-QCNFA34AC

Test Model: QCNFA34AC(QCNFA344)

Received Date: Feb. 19, 2016

Test Date: Mar. 03, 2016 ~ Mar. 08, 2016

Issued Date: Mar. 14, 2016

Applicant: Qualcomm Atheros, Inc.

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A D T

Release Control Record

Issue No.	Description	Date Issued
RF160219C04-1	Original Release	Mar. 14, 2016



1 Certificate of Conformity

Product: 802.11 a/b/g/n/ac+BT4.1 M.2 Type Card
Brand: Qualcomm Atheros
Test Model: QCNFA34AC(QCNFA344)
Sample Status: Production Unit
Applicant: Qualcomm Atheros, Inc.
Test Date: Mar. 03, 2016 ~ Mar. 08, 2016
Standards: 47 CFR FCC Part 15, Subpart E (Section 15.407)
ANSI C63.10:2009

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 EMC characteristics under the conditions specified in this report.

Prepared by : Gina Liu , **Date:** Mar. 14, 2016
Gina Liu / Specialist

Approved by : Stanley Wu , **Date:** Mar. 14, 2016
Stanley Wu / Assistant Manager

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 -17.56dB at 1.706MHz.
15.407(b)(1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	PASS	Meet the requirement of limit. Minimum passing margin is -2.94dB at 5714MHz.
15.407(a)(1/2/3)	Max Average Transmit Power	Pass	Meet the requirement of limit
15.407(a)(1/2/3)	Peak Power Spectral Density	Pass	Meet the requirement of limit
15.407(e)	6dB bandwidth	Pass	Meet the requirement of limit
15.407(g)	Frequency Stability	N/A	Refer to Note
15.203	Antenna Requirement	PASS	No antenna connector is used.

Note: Only test item of AC power Conducted Emission and Radiated Emissions by worst case were performed for this report but band 4 excluded. Other testing data please refer to BV DTA report no.: RF140313E05-1 for module (Brand: Qualcomm Atheros, Model: QCNFA34AC, FCC ID: PPD-QCNFA34AC)

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) (\pm)
Conducted Emissions at mains ports	150kHz ~ 30MHz	2.44 dB
Radiated Emissions up to 1 GHz	30MHz ~ 200MHz	2.93 dB
	200MHz ~ 1000MHz	2.95 dB
Radiated Emissions above 1 GHz	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

Product	802.11 a/b/g/n/ac+BT4.1 M.2 Type Card
Brand	Qualcomm Atheros
Test Model	QCNFA34AC(QCNFA344)
Status of EUT	Production Unit
Power Supply Rating	20.0 Vdc (adapter) 15.2 Vdc (Li-ion battery)
Modulation Type	256QAM, 64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to MCS7 802.11ac: up to V9
Operating Frequency	5180 ~ 5240MHz, 5260 ~ 5320MHz, 5500 ~ 5700MHz, 5745 ~ 5825MHz
Number of Channel	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) 1 for 802.11ac (80MHz) 5260 ~ 5320MHz: 4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) 1 for 802.11ac (80MHz) 5500 ~ 5700MHz: 8 for 802.11a, 802.11n (20MHz) 3 for 802.11n (40MHz) 1 for 802.11ac (80MHz) 5745 ~ 5825MHz: 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) 1 for 802.11ac (80MHz)
Output Power	54.937mW for 5745 ~ 5825MHz
Antenna Type	Refer to Note as below
Antenna Connector	N/A
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

- The antenna information is listed as below.

Antenna Type	Brand Name	Parts Number	Peak gain w/ cable loss (dBi)			
			2.4GHz	5.3GHz	5.6GHz	5.8GHz
PIFA	Higt-Tek	WLAN Main Antenna: DC33001RM00 WLAN Aux. Antenna: DC33001RM10	1.01	1.10	2.63	2.90
	Tongda	WLAN Main Antenna: DC33001RN00 WLAN Aux. Antenna: DC33001RN10	-1.08	1.35	1.44	1.26

2. The EUT is authorized for use in specific End-product. Please refer to below table for more details.

Item	Brand	Model
Notebook Computer	Lenovo	TP00080A

3. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter	Lenovo	ADL135NDC3A	I/P: 100-240 Vac, 50/60 Hz, 1.5 A O/P: 20 Vdc, 6.75 A
Battery	Lenovo	SB10J78988	11.1 Vdc, 3.870 Ah
WLAN Module	Qualcomm Atheros	QCNFA34AC(QCNFA344)	--

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

3.2 Description of Test Modes

FOR 5180 ~ 5240MHz

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

Channel	Frequency	Channel	Frequency
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

2 channels are provided for 802.11n (40MHz):

Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
42	5210MHz

FOR 5260 ~ 5320MHz

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

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

2 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
54	5270 MHz	62	5310 MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
58	5290MHz

FOR 5500 ~ 5700MHz

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

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

5 channels are provided for 802.11n (HT40):

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

2 channel is provided for 802.11ac (VHT80):

Channel	Frequency	Channel	Frequency
106	5530MHz	122	5610 MHz

FOR 5745 ~ 5825MHz:

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

Channel	Frequency	Channel	Frequency
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

2 channels are provided for 802.11n (HT40):

Channel	Frequency	Channel	Frequency
151	5755MHz	159	5795MHz

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency
155	5775MHz

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 1GHz **RE $<$ 1G**: Radiated Emission below 1GHz
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 **X-plane**.
2. "-" means no effect.

Radiated Emission Test (Above 1GHz):

- 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	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (HT20)	5180-5240	36 to 48	36	OFDM	BPSK	MCS0
-	802.11a	5260-5320	52 to 64	60	OFDM	BPSK	6.0
-	802.11n (HT40)	5500-5700	102 to 134	102	OFDM	BPSK	MCS0
-	802.11n	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	MCS0
-	802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	MCS0
-	802.11ac (VHT80)		155	155	OFDM	BPSK	V0

Radiated Emission Test (Below 1GHz):

- 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	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (HT20)	5180-5240	36 to 48	36	OFDM	BPSK	MCS0
-	802.11a	5260-5320	52 to 64	60	OFDM	BPSK	6.0
-	802.11n (HT40)	5500-5700	102 to 134	102	OFDM	BPSK	MCS0
-	802.11n (HT40)	5745-5825	151 to 159	151	OFDM	BPSK	MCS0

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	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (HT40)	5745-5825	151 to 159	151	OFDM	BPSK	MCS0

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	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5745-5825	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (HT20)		149 to 165	149, 157, 165	OFDM	BPSK	MCS0
-	802.11n (HT40)		151 to 159	151, 159	OFDM	BPSK	MCS0
-	802.11ac (VHT80)		155	155	OFDM	BPSK	V0

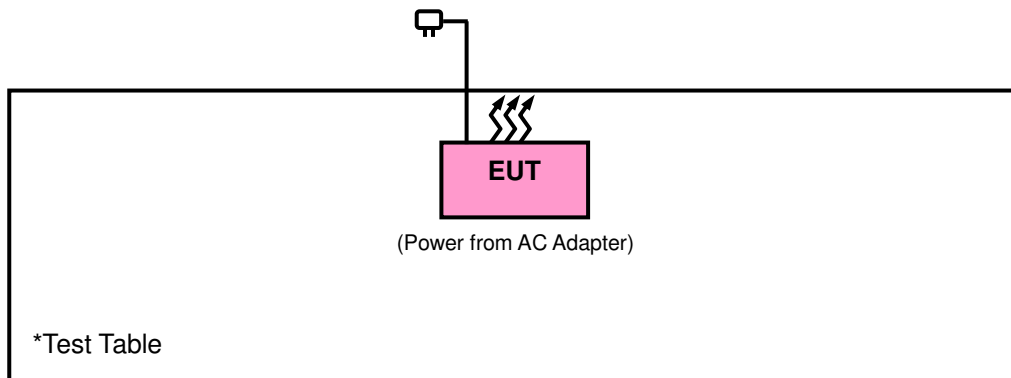
Test Condition:

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Gavin Wu
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Gavin Wu
PLC	25deg. C, 68%RH	120Vac, 60Hz	Toby Tian
APCM	21deg. C, 60%RH	15.2Vdc	Taylor Liu

3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

3.3.1 Configuration of System under Test



3.4 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)

789033 D02 General UNII Test Procedures New Rules v01

644545 D01 Guidance for IEEE 802 11ac v01r02

662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2009

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

NOTE: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC).
The test report has been issued separately.

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. Other emissions shall be at least 20dB below the highest level of the desired power:

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 1000MHz, 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 20dB 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 v01	FIELD STRENGTH AT 3m	
	PK:74 (dBμV/m)	AV:54 (dBμV/m)
APPLICABLE TO	EIRP LIMIT	EQUIVALENT FIELD STRENGTH AT 3m
15.407(b)(1)	PK:-27 (dBm/MHz)	PK:68.2(dBμV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	PK:-27 (dBm/MHz) ^{*1} PK:-17 (dBm/MHz) ^{*2}	PK: 68.2(dBμV/m) ^{*1} PK:78.2 (dBμV/m) ^{*2}

NOTE: ^{*1} beyond 10MHz of the band edge ^{*2} within 10 MHz of band edge

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

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

4.1.3 Test Instruments

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver Agilent	N9038A	MY51210203	Jan. 21, 2016	Jan. 20, 2017
Spectrum Analyzer Agilent	N9010A	MY52220314	Sep. 03, 2015	Sep. 02, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 17, 2015	Dec. 16, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Jan. 07, 2016	Jan. 06, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Jan. 04, 2016	Jan. 03, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Jan. 08, 2016	Jan. 07, 2017
Loop Antenna	EM-6879	269	Jul. 31, 2015	Jul. 30, 2016
Preamplifier EMCI	EMC 012645	980115	Dec. 21, 2015	Dec. 20, 2016
Preamplifier EMCI	EMC 184045	980116	Dec. 21, 2015	Dec. 20, 2016
Preamplifier EMCI	EMC 330H	980112	Dec. 28, 2015	Dec. 27, 2016
Power Meter Anritsu	ML2495A	1232002	Sep. 21, 2015	Sep. 20, 2016
Power Sensor Anritsu	MA2411B	1207325	Sep. 21, 2015	Sep. 20, 2016
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 12, 2015	Oct. 11, 2016
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 12, 2015	Oct. 11, 2016
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 12, 2015	Oct. 11, 2016
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

- 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.
 3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
 4. The FCC Site Registration No. is 690701.
 5. The IC Site Registration No. is IC7450F-10.

4.1.4 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters 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 detect 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:

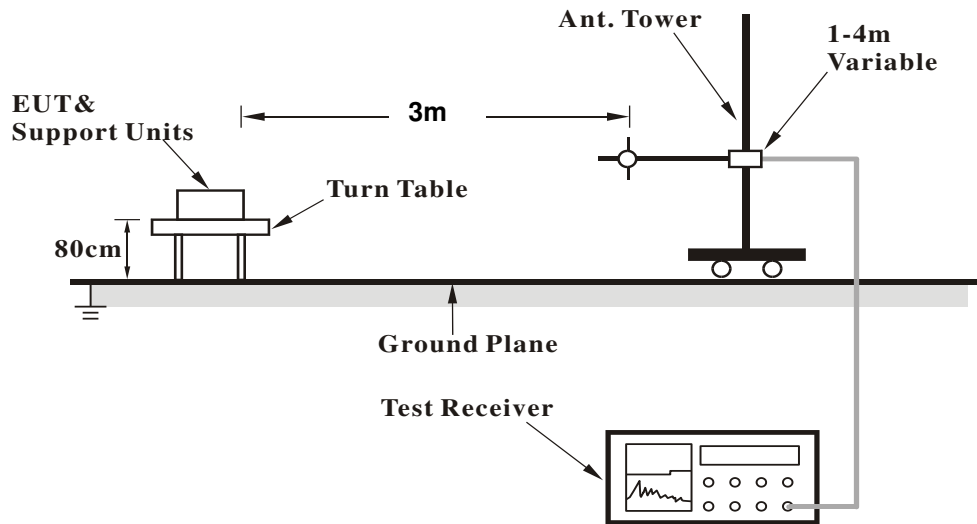
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for RMS Average (Duty cycle < 98%) for Average detection (AV) at frequency above 1GHz, then the measurement results was added to a correction factor ($10 \log(1/\text{duty cycle})$).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz (Duty cycle \geq 98%) for Average detection (AV) at frequency above 1GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.5 Deviation from Test Standard

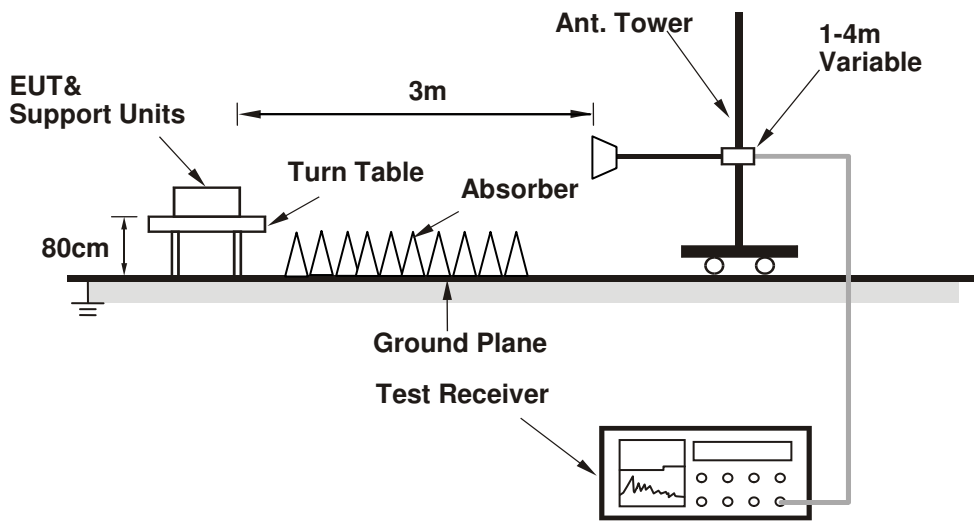
No deviation.

4.1.6 Test Set Up

<Frequency Range below 1GHz>



<Frequency Range above 1GHz>



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.

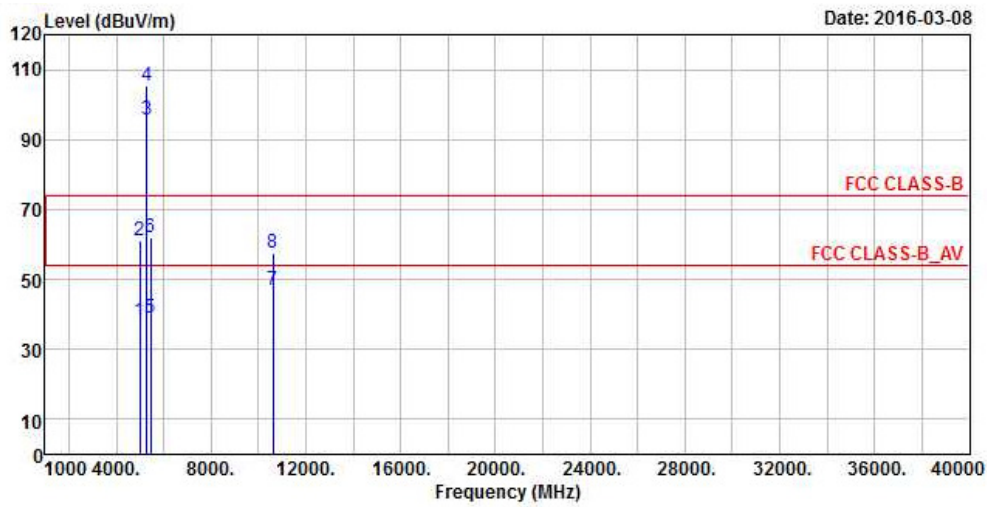
4.1.8 Test Results

ABOVE 1GHz DATA :

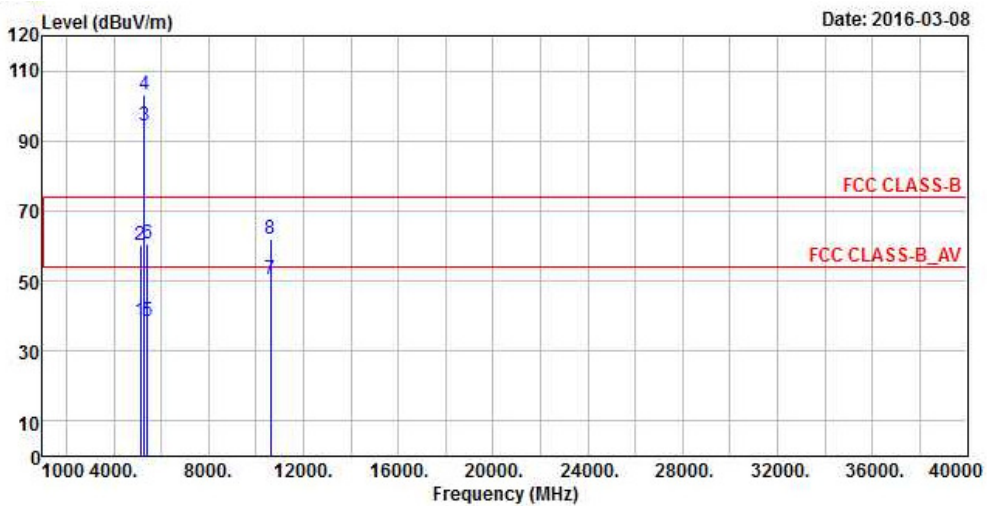
802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 60	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Gavin Wu

Horizontal



Vertical



ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5002	38.11	38.01	54	-15.89	31.2	6.13	37.23	118	169	Average
5002	61.2	61.1	74	-12.8	31.2	6.13	37.23	118	169	Peak
5300	95.65	95.13			31.44	6.27	37.19	118	169	Average
5300	105.47	104.95			31.44	6.27	37.19	118	169	Peak
5460	39.07	38.25	54	-14.93	31.56	6.34	37.08	118	169	Average
5460	61.78	60.96	74	-12.22	31.56	6.34	37.08	118	169	Peak
10600	46.73	50.41	54	-7.27	39.57	9.16	52.41	115	243	Average
10600	57.46	61.14	74	-16.54	39.57	9.16	52.41	115	243	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

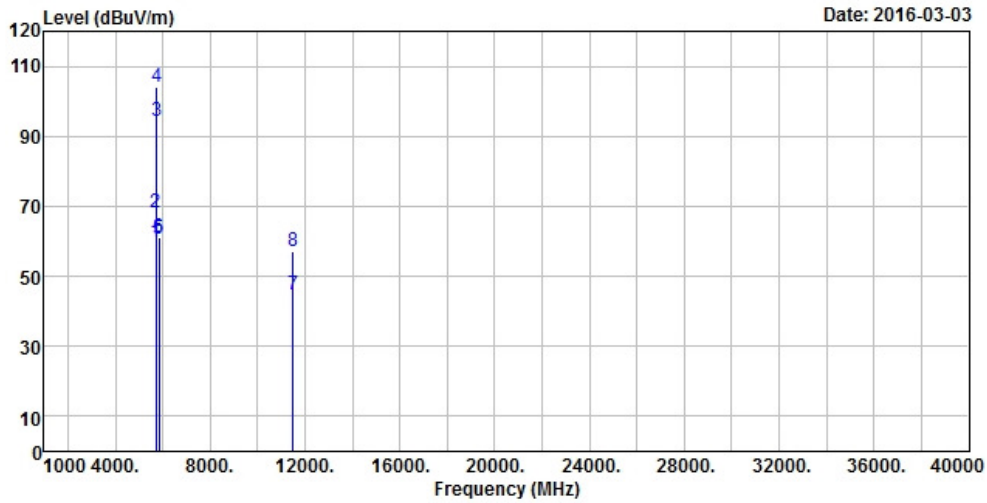
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5140	38.33	38.11	54	-15.67	31.32	6.2	37.3	170	186	Average
5140	60.19	59.97	74	-13.81	31.32	6.2	37.3	170	186	Peak
5300	94.34	93.82			31.44	6.27	37.19	170	186	Average
5300	103.35	102.83			31.44	6.27	37.19	170	186	Peak
5418	38.64	37.97	54	-15.36	31.53	6.32	37.18	170	186	Average
5418	60.55	59.88	74	-13.45	31.53	6.32	37.18	170	186	Peak
10600	50.58	54.26	54	-3.42	39.57	9.16	52.41	100	176	Average
10600	61.92	65.6	74	-12.08	39.57	9.16	52.41	100	176	Peak

REMARKS:

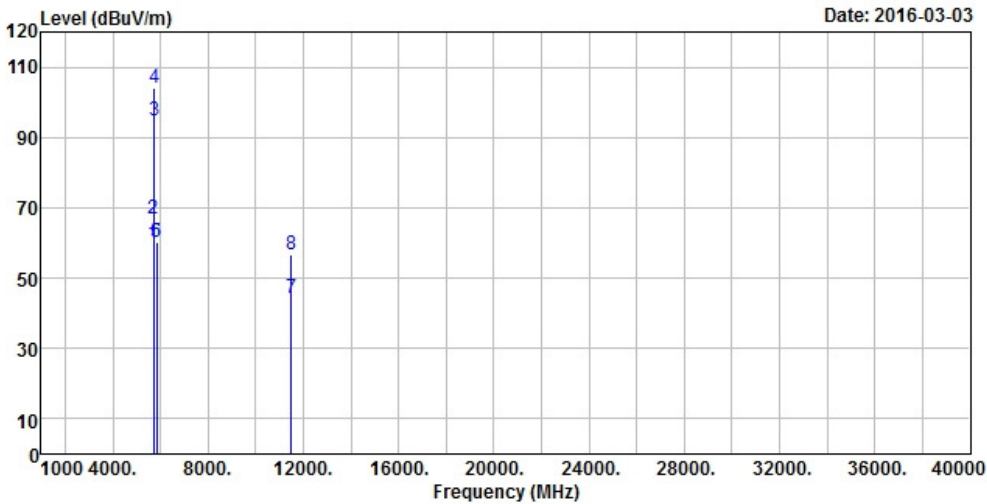
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5300MHz: Fundamental frequency.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Gavin Wu

Horizontal



Vertical





ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
*5714	59.89	58.7	68.2	-8.31	31.93	6.69	37.43	109	173	Peak
*5725	68.3	67.02	78.2	-9.9	31.96	6.75	37.43	109	173	Peak
5745	94.22	92.95			31.99	6.75	37.47	109	173	Average
5745	103.95	102.68			31.99	6.75	37.47	109	173	Peak
*5850	60.51	58.99	78.2	-17.69	32.15	6.88	37.51	109	173	Peak
*5861	60.91	59.28	68.2	-7.29	32.18	6.95	37.5	109	173	Peak
11490	44.59	47.48	54	-9.41	39.91	10.03	52.83	124	217	Average
11490	56.94	59.83	74	-17.06	39.91	10.03	52.83	124	217	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

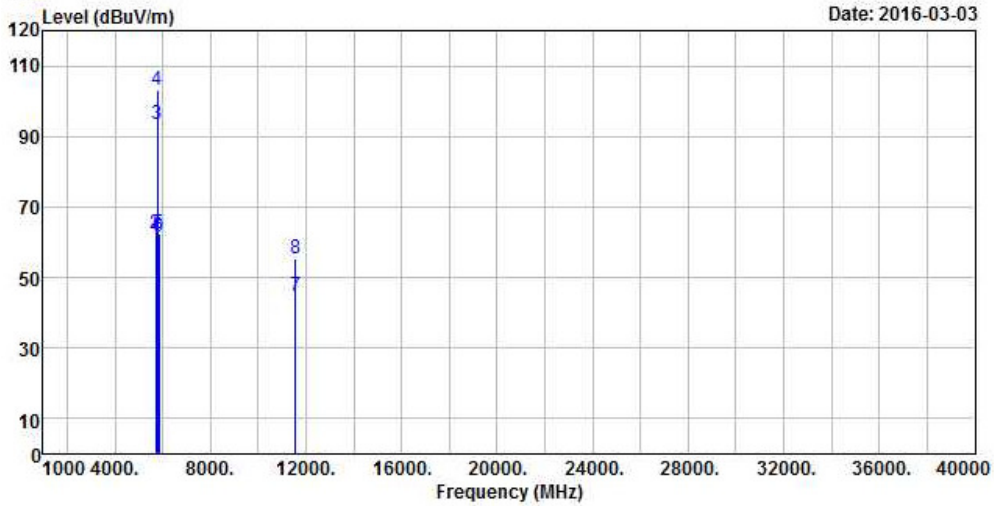
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
*5714	59.59	58.4	68.2	-8.61	31.93	6.69	37.43	102	95	Peak
*5725	66.93	65.65	78.2	-11.27	31.96	6.75	37.43	102	95	Peak
5745	94.61	93.34			31.99	6.75	37.47	102	95	Average
5745	104.18	102.91			31.99	6.75	37.47	102	95	Peak
*5850	60.14	58.62	78.2	-18.06	32.15	6.88	37.51	102	95	Peak
*5861	60.36	58.73	68.2	-7.84	32.18	6.95	37.5	102	95	Peak
11490	44.34	47.23	54	-9.66	39.91	10.03	52.83	100	303	Average
11490	56.46	59.35	74	-17.54	39.91	10.03	52.83	100	303	Peak

REMARKS:

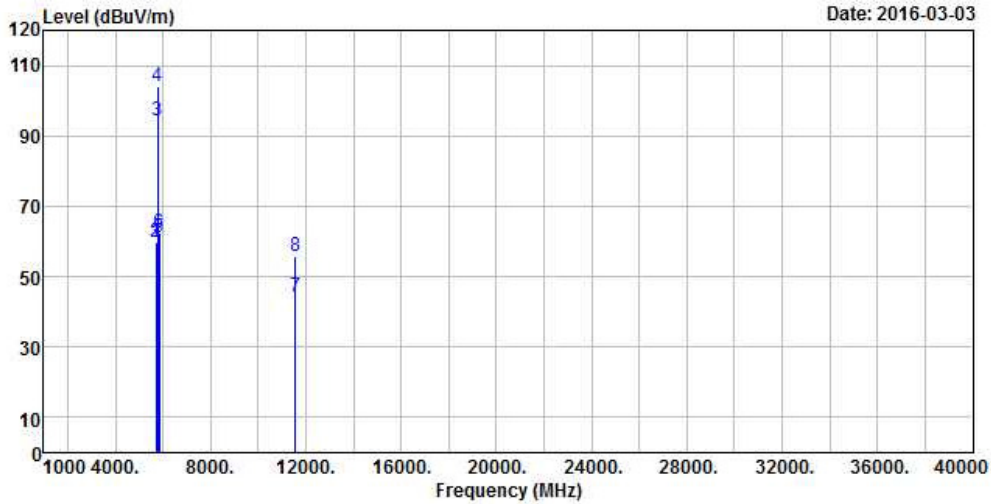
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5745MHz: Fundamental frequency.
- “*”: Out of restricted band

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Gavin Wu

Horizontal



Vertical



ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
*5714	60.57	59.38	68.2	-7.63	31.93	6.69	37.43	100	160	Peak
*5725	62.41	61.13	78.2	-15.79	31.96	6.75	37.43	100	160	Peak
5785	93.27	91.95			32.04	6.82	37.54	100	160	Average
5785	103.35	102.03			32.04	6.82	37.54	100	160	Peak
*5850	62.46	60.94	78.2	-15.74	32.15	6.88	37.51	100	160	Peak
*5861	61.6	59.97	68.2	-6.6	32.18	6.95	37.5	100	160	Peak
11570	44.66	48.12	54	-9.34	39.78	10.09	53.33	123	215	Average
11570	55.32	58.78	74	-18.68	39.78	10.09	53.33	123	215	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

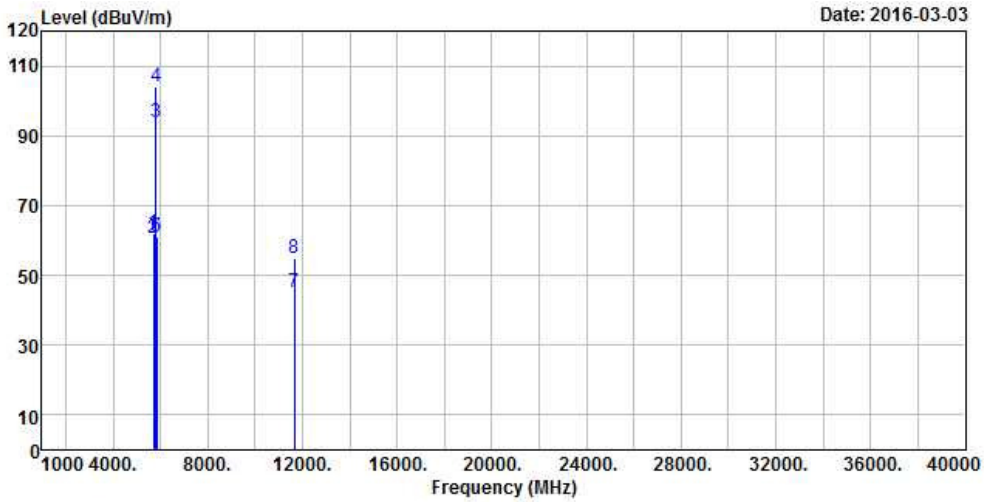
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
*5714	59.85	58.66	68.2	-8.35	31.93	6.69	37.43	101	92	Peak
*5725	59.8	58.52	78.2	-18.4	31.96	6.75	37.43	101	92	Peak
5785	94.19	92.87			32.04	6.82	37.54	101	92	Average
5785	104.04	102.72			32.04	6.82	37.54	101	92	Peak
*5850	61.01	59.49	78.2	-17.19	32.15	6.88	37.51	101	92	Peak
*5861	62.24	60.61	68.2	-5.96	32.18	6.95	37.5	101	92	Peak
11570	44.17	47.63	54	-9.83	39.78	10.09	53.33	100	300	Average
11570	55.85	59.31	74	-18.15	39.78	10.09	53.33	100	300	Peak

REMARKS:

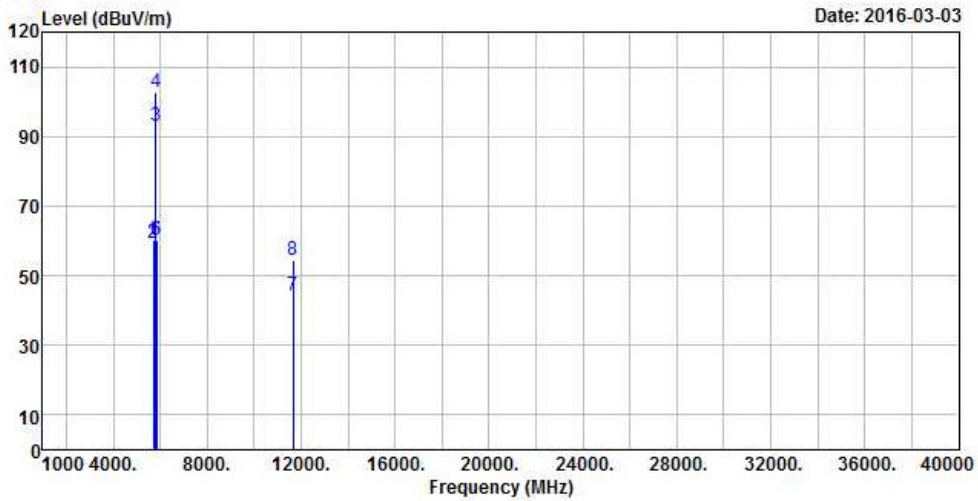
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5785MHz: Fundamental frequency.
- “*”: Out of restricted band

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Gavin Wu

Horizontal



Vertical





ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
*5714	61.92	60.73	68.2	-6.28	31.93	6.69	37.43	113	160	Peak
*5725	60.74	59.46	78.2	-17.46	31.96	6.75	37.43	113	160	Peak
5825	94.09	92.62			32.12	6.88	37.53	113	160	Average
5825	103.93	102.46			32.12	6.88	37.53	113	160	Peak
*5850	61.01	59.49	78.2	-17.19	32.15	6.88	37.51	113	160	Peak
*5861	61.16	59.53	68.2	-7.04	32.18	6.95	37.5	113	160	Peak
11650	45.07	48.62	54	-8.93	39.65	10.15	53.35	120	215	Average
11650	55.05	58.6	74	-18.95	39.65	10.15	53.35	120	215	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
*5714	60.16	58.97	68.2	-8.04	31.93	6.69	37.43	100	94	Peak
*5725	59.49	58.21	78.2	-18.71	31.96	6.75	37.43	100	94	Peak
5825	93.11	91.64			32.12	6.88	37.53	100	94	Average
5825	102.6	101.13			32.12	6.88	37.53	100	94	Peak
*5850	60.33	58.81	78.2	-17.87	32.15	6.88	37.51	100	94	Peak
*5861	60.25	58.62	68.2	-7.95	32.18	6.95	37.5	100	94	Peak
11650	44.21	47.76	54	-9.79	39.65	10.15	53.35	100	300	Average
11650	54.49	58.04	74	-19.51	39.65	10.15	53.35	100	300	Peak

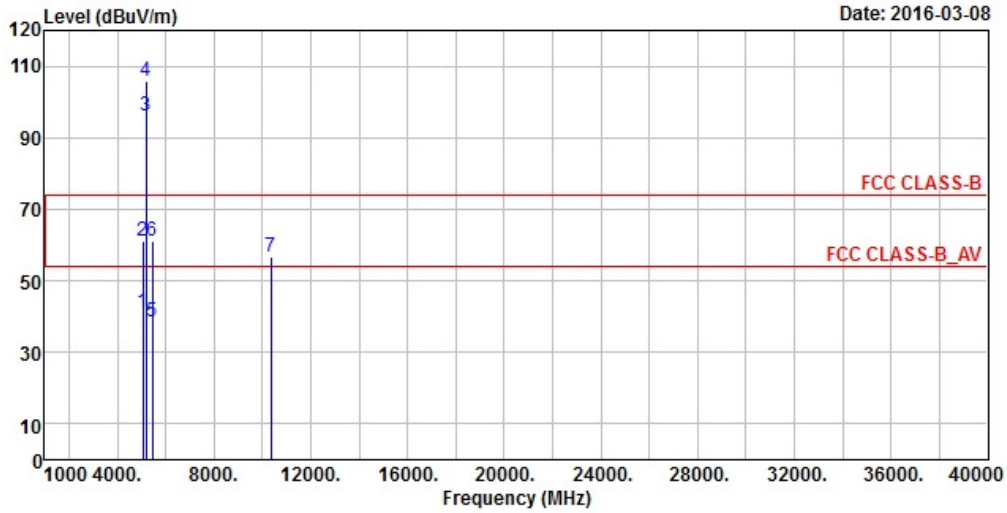
REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5825MHz: Fundamental frequency.
- “*”: Out of restricted band

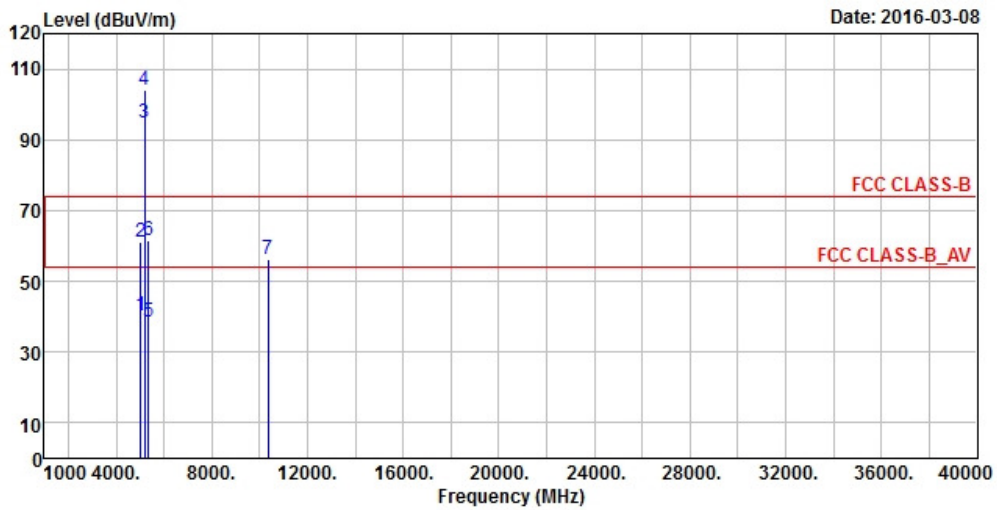
802.11n (HT20)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Gavin Wu

Horizontal



Vertical



ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5046	41.1	40.96	54	-12.9	31.24	6.15	37.25	114	167	Average
5046	61.24	61.1	74	-12.76	31.24	6.15	37.25	114	167	Peak
5180	96	95.77			31.35	6.22	37.34	114	167	Average
5180	105.64	105.41			31.35	6.22	37.34	114	167	Peak
5448	38.6	37.83	54	-15.4	31.56	6.34	37.13	114	167	Average
5448	61.32	60.55	74	-12.68	31.56	6.34	37.13	114	167	Peak
*10360	56.85	60.78	68.2	-11.35	39.16	9.05	52.14	100	138	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

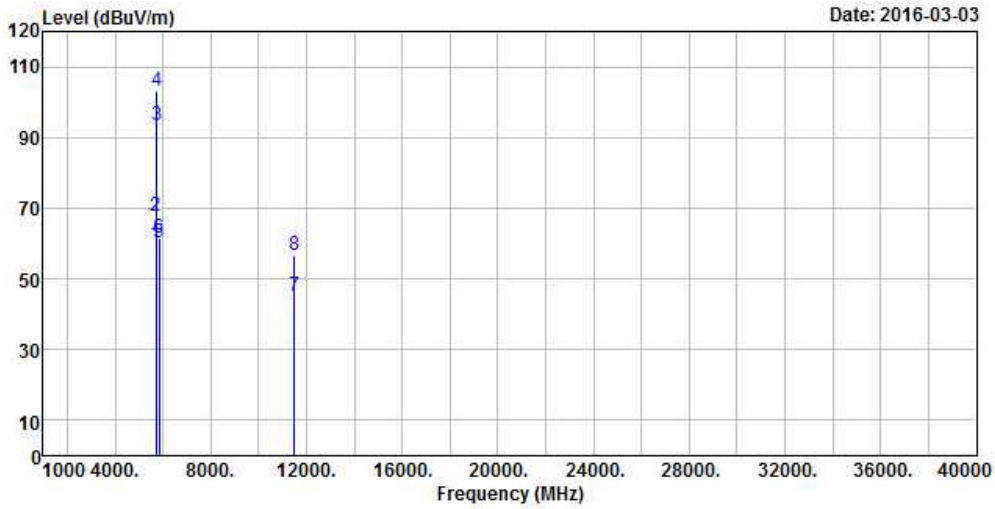
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5038	40.15	40	54	-13.85	31.24	6.15	37.24	139	81	Average
5038	60.99	60.84	74	-13.01	31.24	6.15	37.24	139	81	Peak
5180	94.63	94.4			31.35	6.22	37.34	139	81	Average
5180	103.86	103.63			31.35	6.22	37.34	139	81	Peak
5352	38.51	37.92	54	-15.49	31.48	6.29	37.18	139	81	Average
5352	61.65	61.06	74	-12.35	31.48	6.29	37.18	139	81	Peak
*10360	56.28	60.21	68.2	-11.92	39.16	9.05	52.14	100	255	Peak

REMARKS:

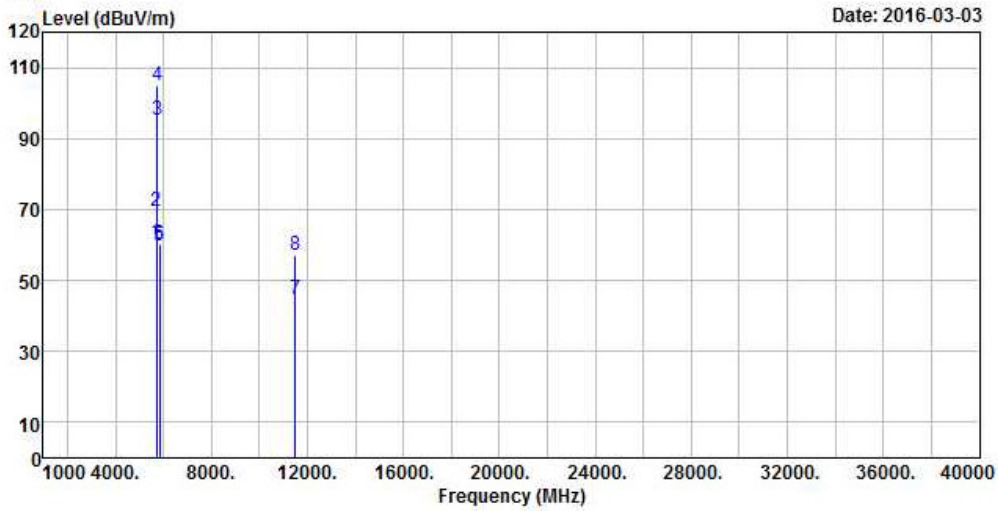
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5180MHz: Fundamental frequency.
- “*”: Out of restricted band

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Gavin Wu

Horizontal



Vertical



ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
*5714	59.84	58.65	68.2	-8.36	31.93	6.69	37.43	108	173	Peak
*5725	67.54	66.26	78.2	-10.66	31.96	6.75	37.43	108	173	Peak
5745	93.57	92.3			31.99	6.75	37.47	108	173	Average
5745	103	101.73			31.99	6.75	37.47	108	173	Peak
*5850	60.38	58.86	78.2	-17.82	32.15	6.88	37.51	108	173	Peak
*5861	61.6	59.97	68.2	-6.6	32.18	6.95	37.5	108	173	Peak
11490	45.14	48.03	54	-8.86	39.91	10.03	52.83	124	217	Average
11490	56.58	59.47	74	-17.42	39.91	10.03	52.83	124	217	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

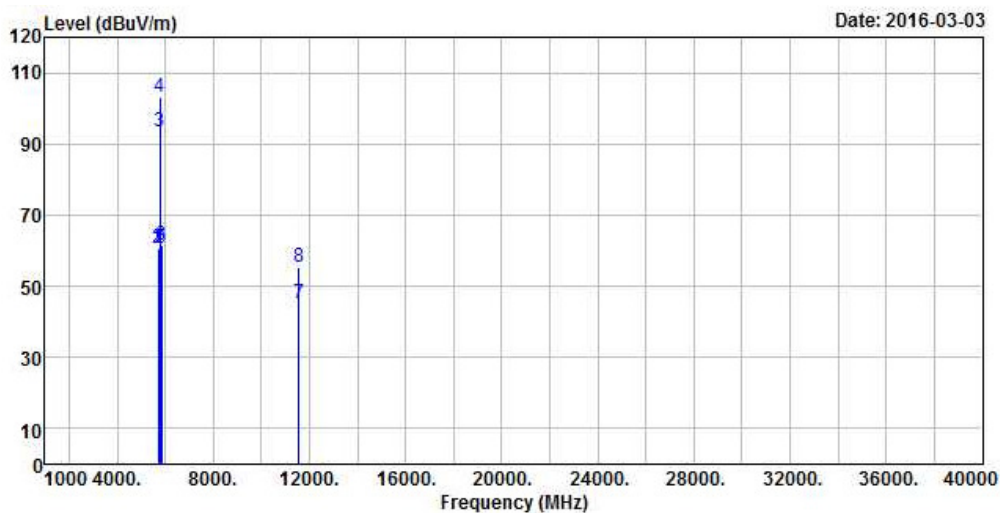
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
*5714	60.64	59.45	68.2	-7.56	31.93	6.69	37.43	101	93	Peak
*5725	69.7	68.42	78.2	-8.5	31.96	6.75	37.43	101	93	Peak
5745	95.25	93.98			31.99	6.75	37.47	101	93	Average
5745	104.99	103.72			31.99	6.75	37.47	101	93	Peak
*5850	59.83	58.31	78.2	-18.37	32.15	6.88	37.51	101	93	Peak
*5861	60.3	58.67	68.2	-7.9	32.18	6.95	37.5	101	93	Peak
11490	44.56	47.45	54	-9.44	39.91	10.03	52.83	100	302	Average
11490	57.1	59.99	74	-16.9	39.91	10.03	52.83	100	302	Peak

REMARKS:

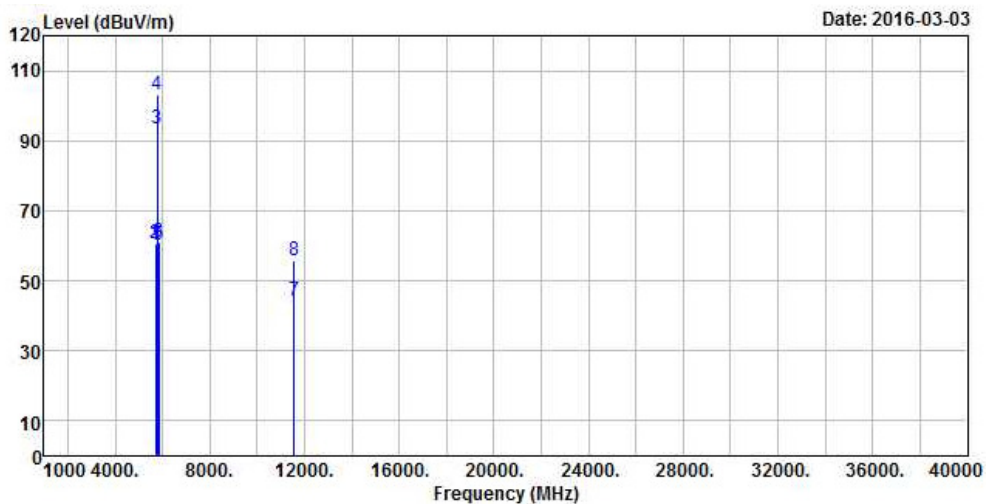
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5745MHz: Fundamental frequency.
- “*”: Out of restricted band

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Gavin Wu

Horizontal



Vertical





ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
*5714	60.59	59.4	68.2	-7.61	31.93	6.69	37.43	143	174	Peak
*5725	60.57	59.29	78.2	-17.63	31.96	6.75	37.43	143	174	Peak
5785	93.5	92.18			32.04	6.82	37.54	143	174	Average
5785	102.96	101.64			32.04	6.82	37.54	143	174	Peak
*5850	60.62	59.1	78.2	-17.58	32.15	6.88	37.51	143	174	Peak
*5861	61.43	59.8	68.2	-6.77	32.18	6.95	37.5	143	174	Peak
11565	45.19	48.53	54	-8.81	39.81	10.09	53.24	123	216	Average
11565	55.26	58.6	74	-18.74	39.81	10.09	53.24	123	216	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

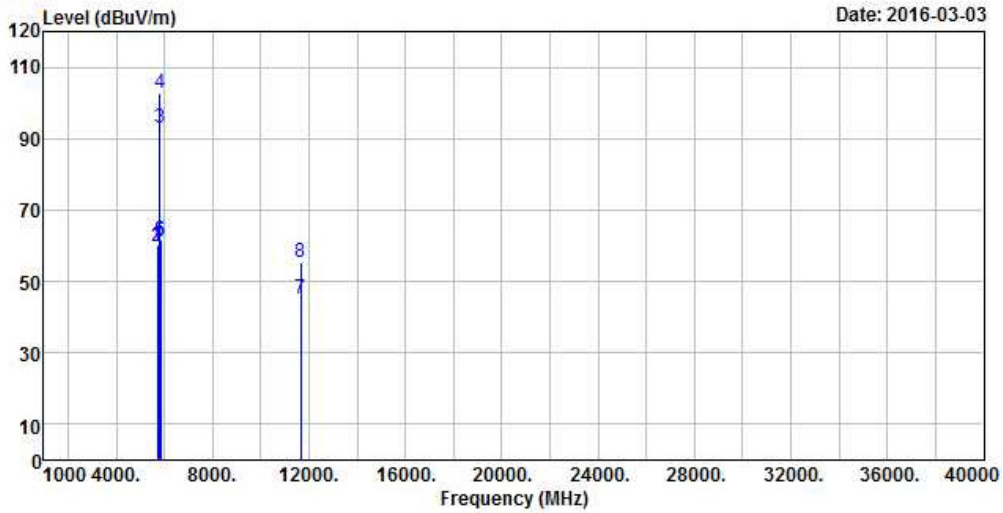
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
*5714	60.57	59.38	68.2	-7.63	31.93	6.69	37.43	100	94	Peak
*5725	60.85	59.57	78.2	-17.35	31.96	6.75	37.43	100	94	Peak
5785	93.27	91.95			32.04	6.82	37.54	100	94	Average
5785	103.13	101.81			32.04	6.82	37.54	100	94	Peak
*5850	60.27	58.75	78.2	-17.93	32.15	6.88	37.51	100	94	Peak
*5861	61.08	59.45	68.2	-7.12	32.18	6.95	37.5	100	94	Peak
11570	44.42	47.88	54	-9.58	39.78	10.09	53.33	100	305	Average
11570	55.84	59.3	74	-18.16	39.78	10.09	53.33	100	305	Peak

REMARKS:

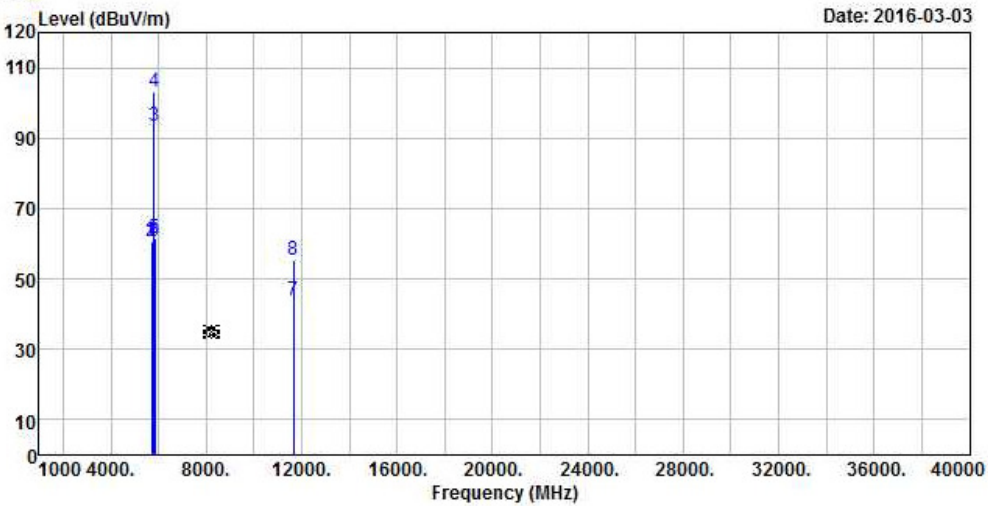
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5785MHz: Fundamental frequency.
- “*”: Out of restricted band

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Gavin Wu

Horizontal



Vertical



ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
*5714	60.25	59.06	68.2	-7.95	31.93	6.69	37.43	100	176	Peak
*5725	59.86	58.58	78.2	-18.34	31.96	6.75	37.43	100	176	Peak
5825	93.01	91.54			32.12	6.88	37.53	100	176	Average
5825	102.89	101.42			32.12	6.88	37.53	100	176	Peak
*5850	61.29	59.77	78.2	-16.91	32.15	6.88	37.51	100	176	Peak
*5861	61.34	59.71	68.2	-6.86	32.18	6.95	37.5	100	176	Peak
11650	45.08	48.63	54	-8.92	39.65	10.15	53.35	124	216	Average
11650	55.34	58.89	74	-18.66	39.65	10.15	53.35	124	216	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
*5714	60.81	59.62	68.2	-7.39	31.93	6.69	37.43	100	92	Peak
*5725	60.68	59.4	78.2	-17.52	31.96	6.75	37.43	100	92	Peak
5825	93.64	92.17			32.12	6.88	37.53	100	92	Average
5825	103.1	101.63			32.12	6.88	37.53	100	92	Peak
*5850	61.5	59.98	78.2	-16.7	32.15	6.88	37.51	100	92	Peak
*5861	60.72	59.09	68.2	-7.48	32.18	6.95	37.5	100	92	Peak
11650	44.01	47.56	54	-9.99	39.65	10.15	53.35	100	310	Average
11650	55.24	58.79	74	-18.76	39.65	10.15	53.35	100	310	Peak

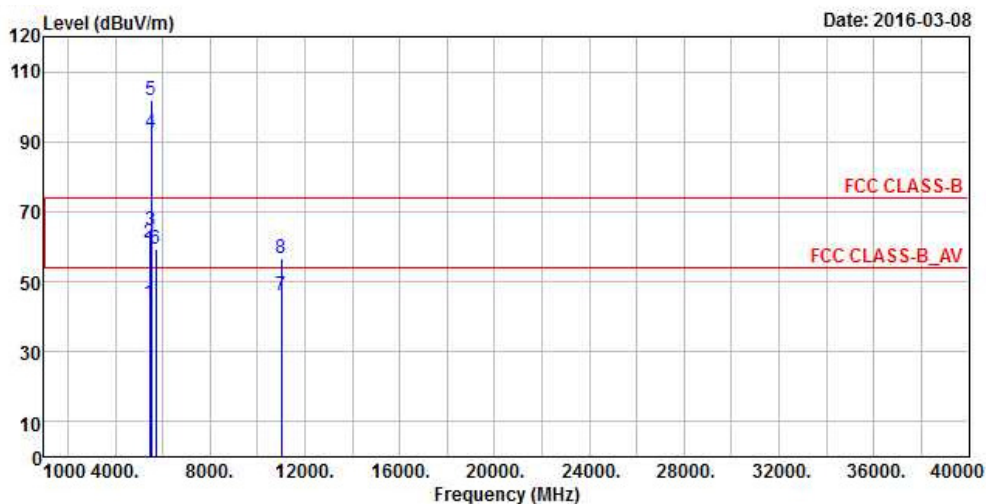
REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5825MHz: Fundamental frequency.
- “*”: Out of restricted band

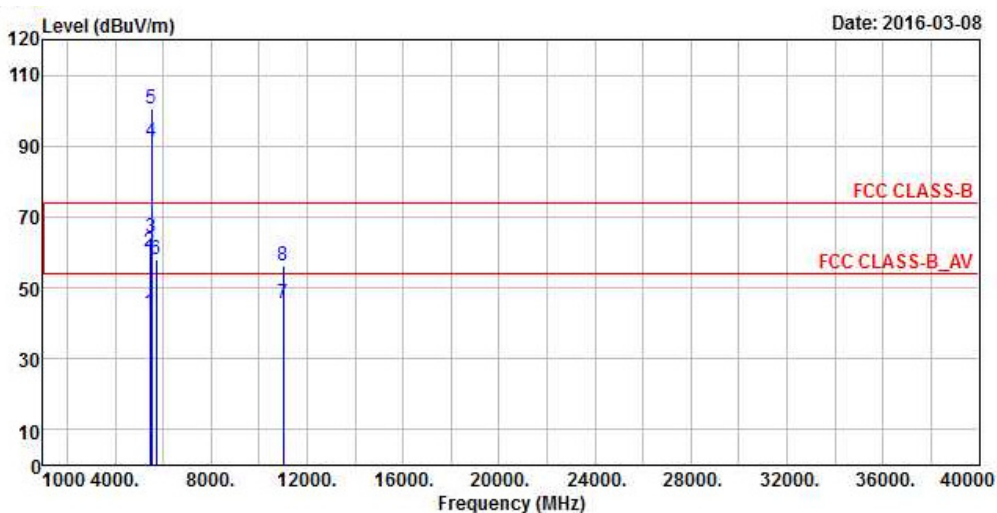
802.11n (HT40)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 102	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Gavin Wu

Horizontal



Vertical



ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5460	43.71	42.89	54	-10.29	31.56	6.34	37.08	144	172	Average
5460	61.16	60.34	74	-12.84	31.56	6.34	37.08	144	172	Peak
*5470	64.64	63.81	68.2	-3.56	31.57	6.34	37.08	144	172	Peak
5510	92.43	91.53			31.6	6.36	37.06	144	172	Average
5510	101.75	100.85			31.6	6.36	37.06	144	172	Peak
*5725	59.39	58.11	68.2	-8.81	31.96	6.75	37.43	144	172	Peak
11020	46.05	50	54	-7.95	40.19	9.35	53.49	100	209	Average
11020	56.58	60.53	74	-17.42	40.19	9.35	53.49	100	209	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

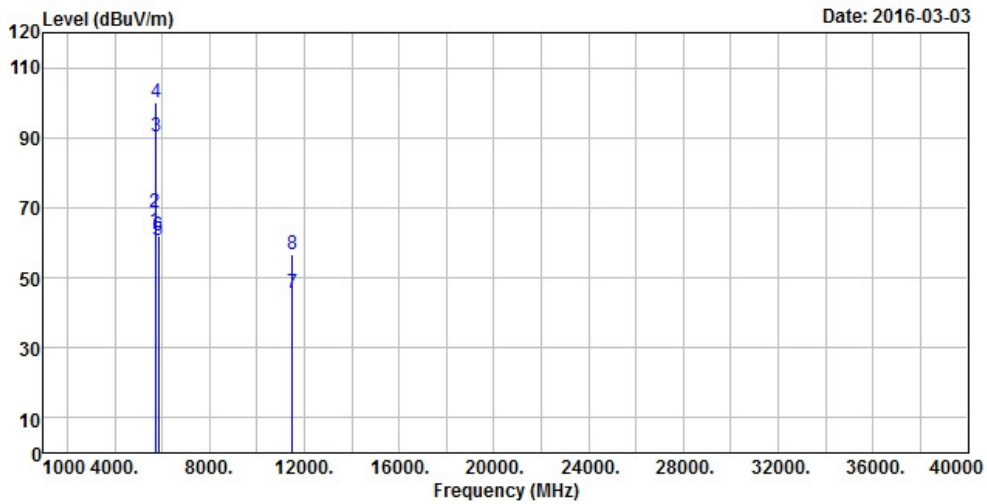
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
5458	42.84	42.02	54	-11.16	31.56	6.34	37.08	179	33	Average
5458	60.31	59.49	74	-13.69	31.56	6.34	37.08	179	33	Peak
*5470	64.02	63.19	68.2	-4.18	31.57	6.34	37.08	179	33	Peak
5510	91.28	90.38			31.6	6.36	37.06	179	33	Average
5510	100.71	99.81			31.6	6.36	37.06	179	33	Peak
*5725	58.22	56.94	68.2	-9.98	31.96	6.75	37.43	179	33	Peak
11020	45.41	49.36	54	-8.59	40.19	9.35	53.49	100	198	Average
11020	56.31	60.26	74	-17.69	40.19	9.35	53.49	100	198	Peak

REMARKS:

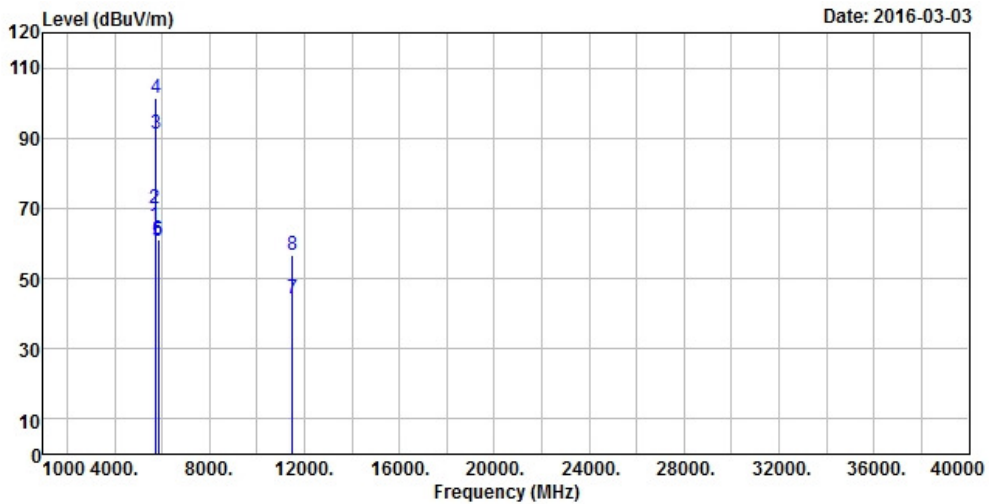
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5510MHz: Fundamental frequency.
- “*”: Out of restricted band

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 151	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Gavin Wu

Horizontal



Vertical



ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
*5714	63.3	62.11	68.2	-4.9	31.93	6.69	37.43	100	155	Peak
*5725	68.76	67.48	78.2	-9.44	31.96	6.75	37.43	100	155	Peak
5755	90.29	89			32.01	6.75	37.47	100	155	Average
*5755	100.03	98.74			32.01	6.75	37.47	100	155	Peak
*5850	60.7	59.18	78.2	-17.5	32.15	6.88	37.51	100	155	Peak
5861	61.89	60.26	68.2	-6.31	32.18	6.95	37.5	100	155	Peak
11510	45.61	48.75	54	-8.39	39.9	10.03	53.07	122	217	Average
11510	56.65	59.79	74	-17.35	39.9	10.03	53.07	122	217	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

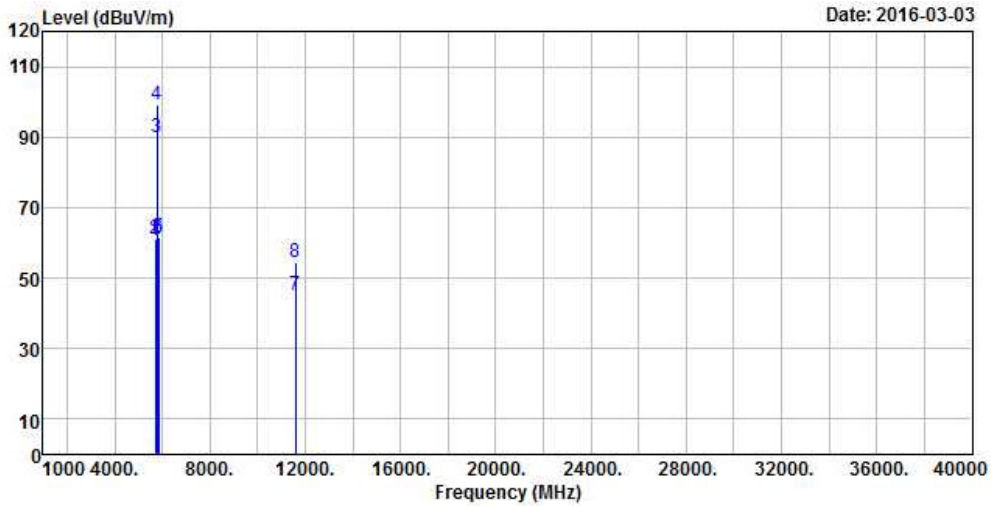
FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
*5714	65.26	64.07	68.2	-2.94	31.93	6.69	37.43	101	94	Peak
*5725	69.97	68.69	78.2	-8.23	31.96	6.75	37.43	101	94	Peak
5755	91.34	90.05			32.01	6.75	37.47	101	94	Average
5755	101.26	99.97			32.01	6.75	37.47	101	94	Peak
*5850	60.84	59.32	78.2	-17.36	32.15	6.88	37.51	101	94	Peak
*5861	61.27	59.64	68.2	-6.93	32.18	6.95	37.5	101	94	Peak
11510	44.45	47.59	54	-9.55	39.9	10.03	53.07	100	301	Average
11510	56.53	59.67	74	-17.47	39.9	10.03	53.07	100	301	Peak

REMARKS:

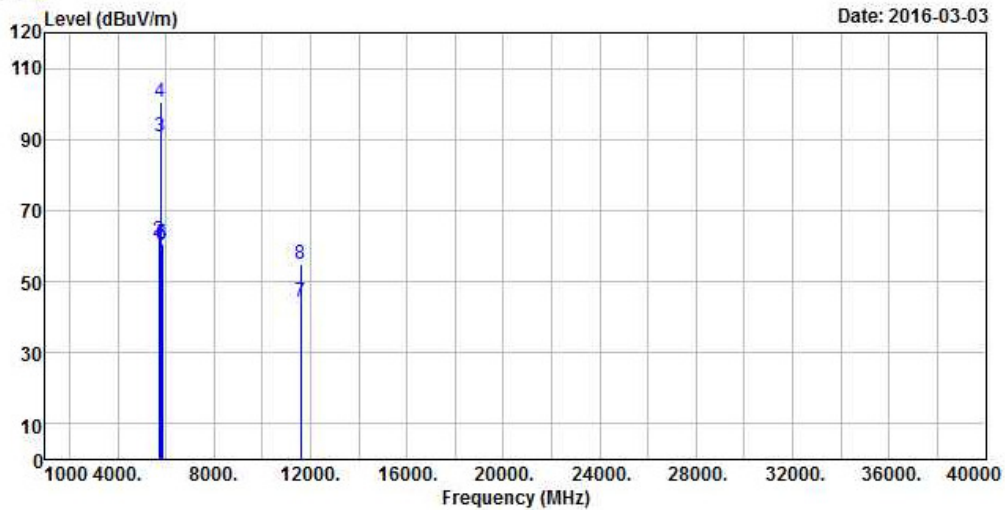
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5755MHz: Fundamental frequency.
- “*”: Out of restricted band

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 159	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Gavin Wu

Horizontal



Vertical



ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
*5714	60.62	59.43	68.2	-7.58	31.93	6.69	37.43	100	153	Peak
*5725	61.29	60.01	78.2	-16.91	31.96	6.75	37.43	100	153	Peak
5795	89.68	88.33			32.07	6.82	37.54	100	153	Average
5795	99.29	97.94			32.07	6.82	37.54	100	153	Peak
*5850	61.39	59.87	78.2	-16.81	32.15	6.88	37.51	100	153	Peak
*5861	60.95	59.32	68.2	-7.25	32.18	6.95	37.5	100	153	Peak
11590	45.12	48.62	54	-8.88	39.74	10.09	53.33	120	215	Average
11590	54.27	57.77	74	-19.73	39.74	10.09	53.33	120	215	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
*5714	59.96	58.77	68.2	-8.24	31.93	6.69	37.43	101	87	Peak
*5725	61.35	60.07	78.2	-16.85	31.96	6.75	37.43	101	87	Peak
5795	90.99	89.64			32.07	6.82	37.54	101	87	Average
5795	100.57	99.22			32.07	6.82	37.54	101	87	Peak
*5850	60.88	59.36	78.2	-17.32	32.15	6.88	37.51	101	87	Peak
*5861	60.27	58.64	68.2	-7.93	32.18	6.95	37.5	101	87	Peak
11590	44.32	47.82	54	-9.68	39.74	10.09	53.33	100	302	Average
11590	54.75	58.25	74	-19.25	39.74	10.09	53.33	100	302	Peak

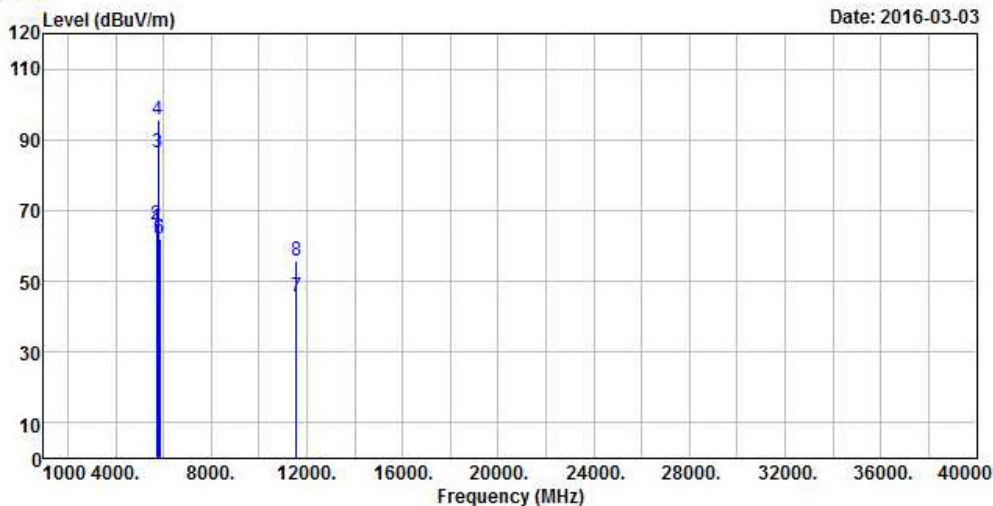
REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5795MHz: Fundamental frequency.
- “*”: Out of restricted band

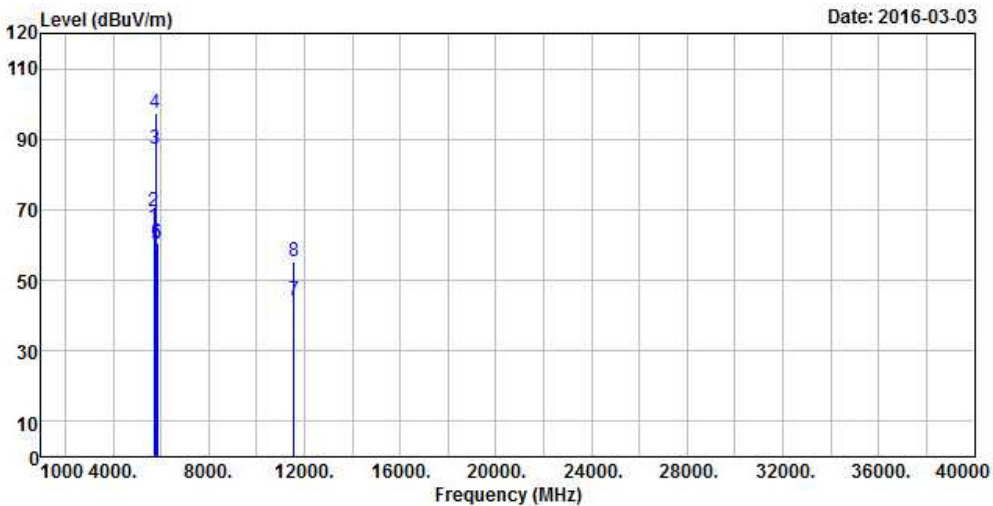
802.11ac (VHT80)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 155	FREQUENCY RANGE	1GHz ~ 40GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Gavin Wu

Horizontal



Vertical



ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
*5714	65.18	63.99	68.2	-3.02	31.93	6.69	37.43	100	154	Peak
*5725	65.95	64.67	78.2	-12.25	31.96	6.75	37.43	100	154	Peak
5775	86.29	84.93			32.04	6.82	37.5	100	154	Average
5775	95.84	94.48			32.04	6.82	37.5	100	154	Peak
*5850	62.13	60.61	78.2	-16.07	32.15	6.88	37.51	100	154	Peak
*5861	61.86	60.23	68.2	-6.34	32.18	6.95	37.5	100	154	Peak
11550	45.39	48.73	54	-8.61	39.81	10.09	53.24	118	216	Average
11550	55.85	59.19	74	-18.15	39.81	10.09	53.24	118	216	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
*5714	65.01	63.82	68.2	-3.19	31.93	6.69	37.43	102	92	Peak
*5725	69.57	68.29	78.2	-8.63	31.96	6.75	37.43	102	92	Peak
5775	87.23	85.87			32.04	6.82	37.5	102	92	Average
5775	97.57	96.21			32.04	6.82	37.5	102	92	Peak
*5850	60.43	58.91	78.2	-17.77	32.15	6.88	37.51	102	92	Peak
*5861	60.74	59.11	68.2	-7.46	32.18	6.95	37.5	102	92	Peak
11550	44.43	47.77	54	-9.57	39.81	10.09	53.24	100	305	Average
11550	55.41	58.75	74	-18.59	39.81	10.09	53.24	100	305	Peak

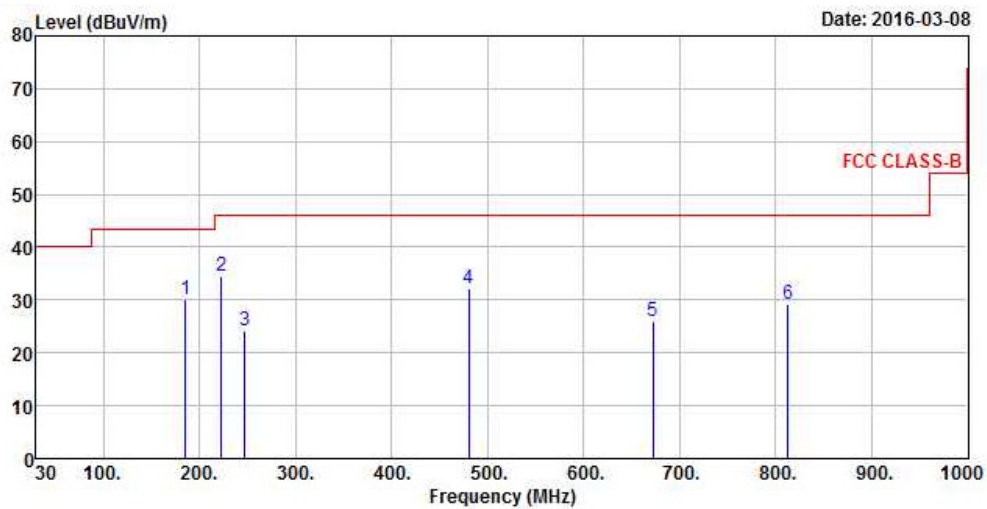
REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5775MHz: Fundamental frequency.
- “*”: Out of restricted band

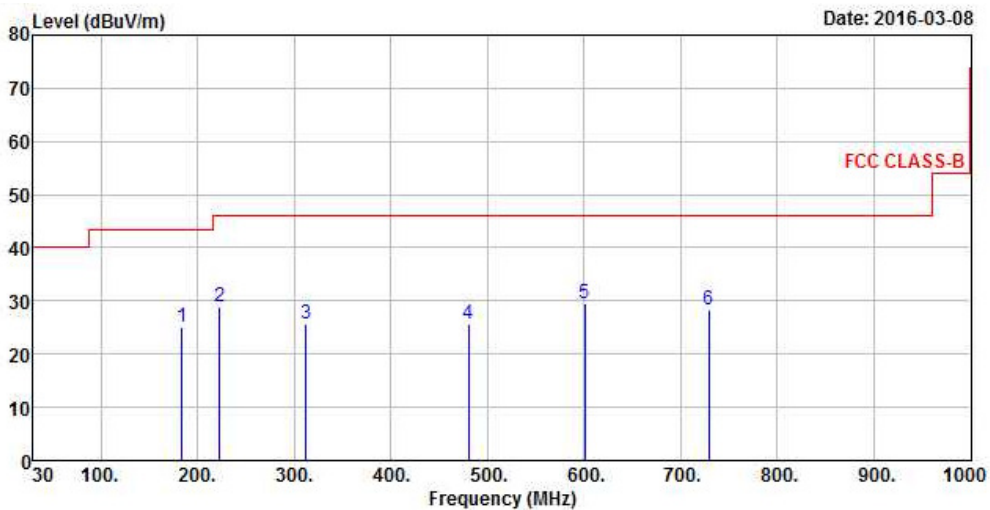
**BELOW 1GHz WORST-CASE DATA:
802.11n (HT20)**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Quasi-peak (QP)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Gavin Wu

Horizontal



Vertical



ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
185.2	29.97	50.11	43.5	-13.53	10.39	1.23	31.76	107	330	Peak
223.03	34.49	54.51	46	-11.51	10.34	1.39	31.75	114	338	Peak
247.28	24.11	43.17	46	-21.89	11.36	1.48	31.9	106	329	Peak
480.08	32.24	45.11	46	-13.76	16.93	2.05	31.85	122	131	Peak
672.14	26.04	34.98	46	-19.96	20.48	2.4	31.82	128	214	Peak
812.79	29.09	35.57	46	-16.91	22.39	2.63	31.5	120	56	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
184.23	24.95	45.03	43.5	-18.55	10.46	1.23	31.77	100	0	Peak
223.03	28.83	48.85	46	-17.17	10.34	1.39	31.75	100	0	Peak
312.27	25.79	42.82	46	-20.21	13.24	1.67	31.94	100	0	Peak
480.08	25.73	38.6	46	-20.27	16.93	2.05	31.85	100	0	Peak
600.36	29.59	39.97	46	-16.41	19.61	2.26	32.25	100	0	Peak
729.37	28.31	36.18	46	-17.69	21.23	2.5	31.6	100	0	Peak

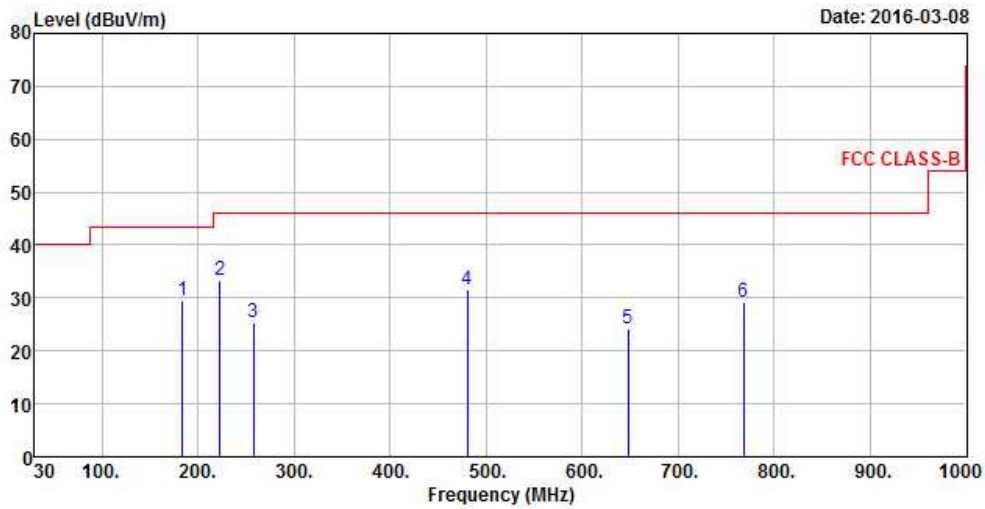
REMARKS: Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value

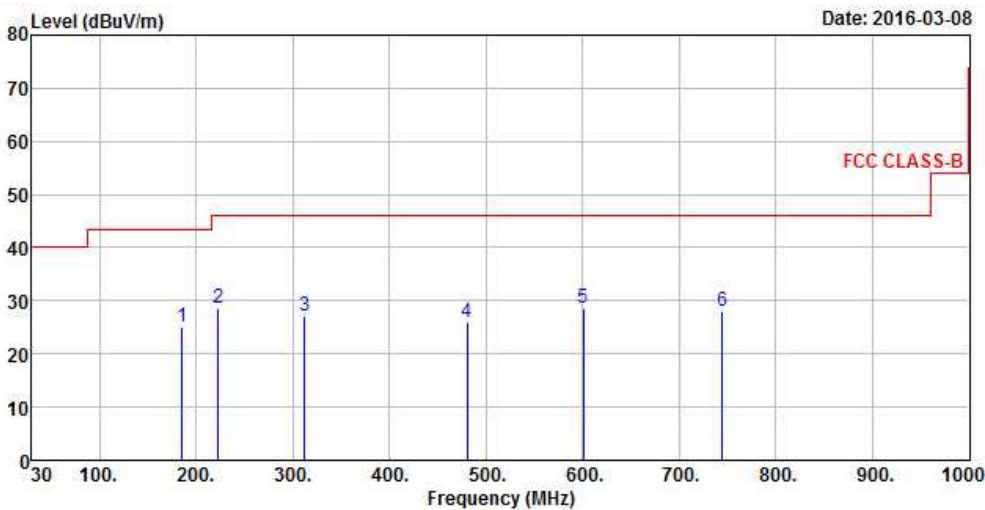
802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 60	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Quasi-peak (QP)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Gavin Wu

Horizontal



Vertical





ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
184.23	29.52	49.6	43.5	-13.98	10.46	1.23	31.77	122	13	Peak
223.03	33.27	53.29	46	-12.73	10.34	1.39	31.75	111	41	Peak
257.95	25.42	44.07	46	-20.58	11.71	1.51	31.87	104	129	Peak
480.08	31.72	44.59	46	-14.28	16.93	2.05	31.85	120	184	Peak
647.89	24.16	33.65	46	-21.84	20.19	2.35	32.03	128	60	Peak
768.17	29.21	36.2	46	-16.79	21.78	2.56	31.33	128	291	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
185.2	25.06	45.2	43.5	-18.44	10.39	1.23	31.76	131	327	Peak
223.03	28.64	48.66	46	-17.36	10.34	1.39	31.75	104	13	Peak
312.27	27.06	44.09	46	-18.94	13.24	1.67	31.94	120	305	Peak
480.08	26.09	38.96	46	-19.91	16.93	2.05	31.85	102	350	Peak
600.36	28.67	39.05	46	-17.33	19.61	2.26	32.25	110	323	Peak
744.89	28.07	35.48	46	-17.93	21.45	2.53	31.39	139	134	Peak

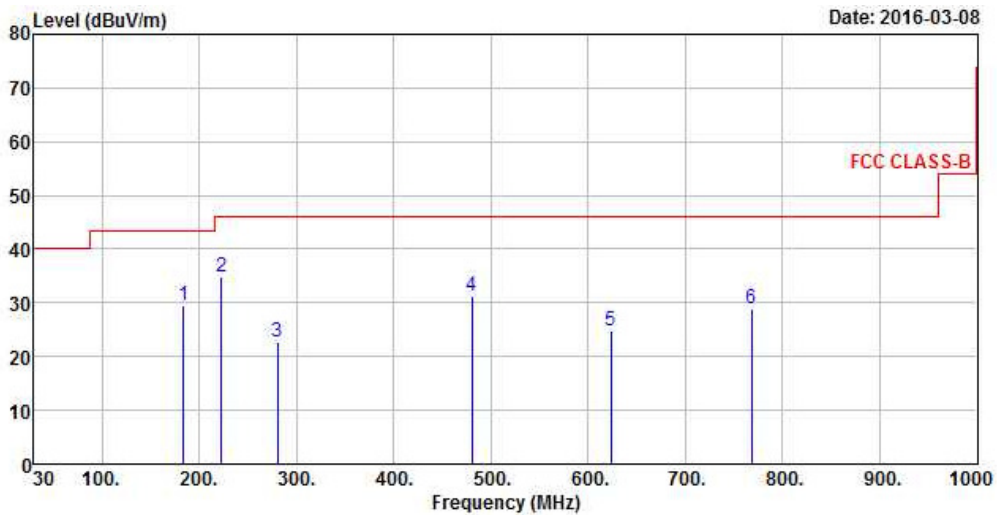
REMARKS: Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value

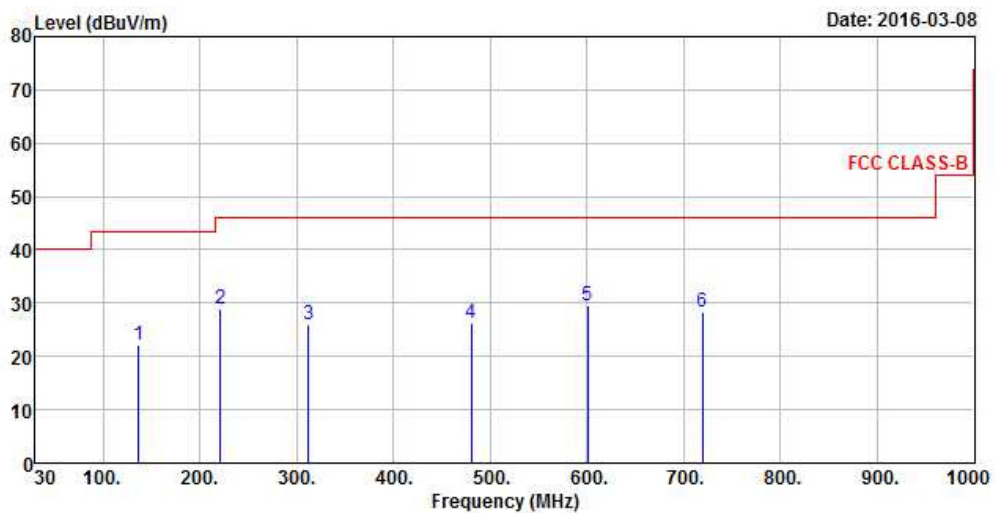
802.11n (HT40)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 102	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Quasi-peak (QP)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Gavin Wu

Horizontal



Vertical



ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
184.23	29.44	49.52	43.5	-14.06	10.46	1.23	31.77	137	280	Peak
223.03	34.95	54.97	46	-11.05	10.34	1.39	31.75	118	62	Peak
280.26	22.65	40.52	46	-23.35	12.37	1.58	31.82	137	226	Peak
480.08	31.27	44.14	46	-14.73	16.93	2.05	31.85	103	144	Peak
623.64	24.84	34.81	46	-21.16	19.89	2.3	32.16	123	191	Peak
768.17	28.98	35.97	46	-17.02	21.78	2.56	31.33	105	27	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
136.7	22.08	40.51	43.5	-21.42	12.14	1.14	31.71	129	285	Peak
221.09	28.8	48.88	46	-17.2	10.26	1.38	31.72	106	318	Peak
312.27	26.04	43.07	46	-19.96	13.24	1.67	31.94	105	310	Peak
480.08	26.14	39.01	46	-19.86	16.93	2.05	31.85	126	66	Peak
600.36	29.61	39.99	46	-16.39	19.61	2.26	32.25	119	205	Peak
719.67	28.38	36.47	46	-17.62	21.09	2.48	31.66	132	206	Peak

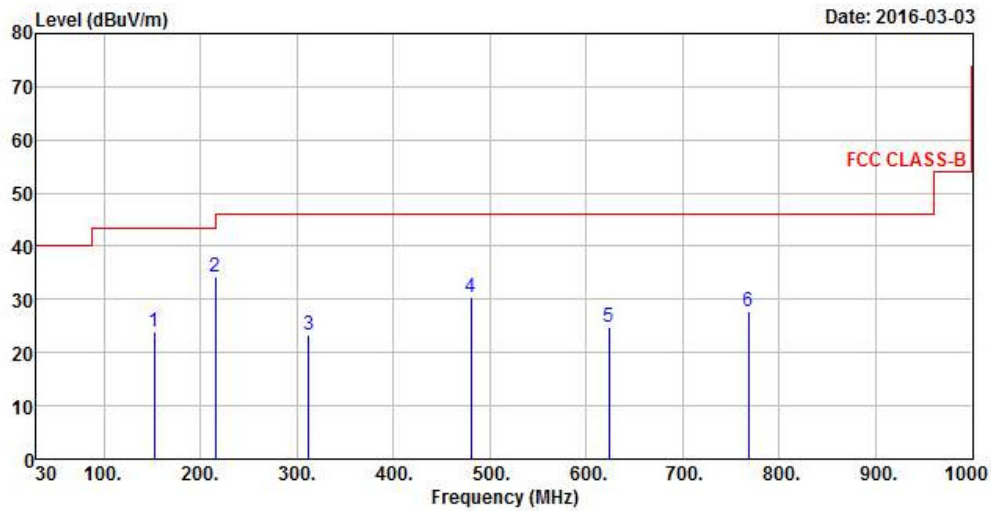
REMARKS: Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value

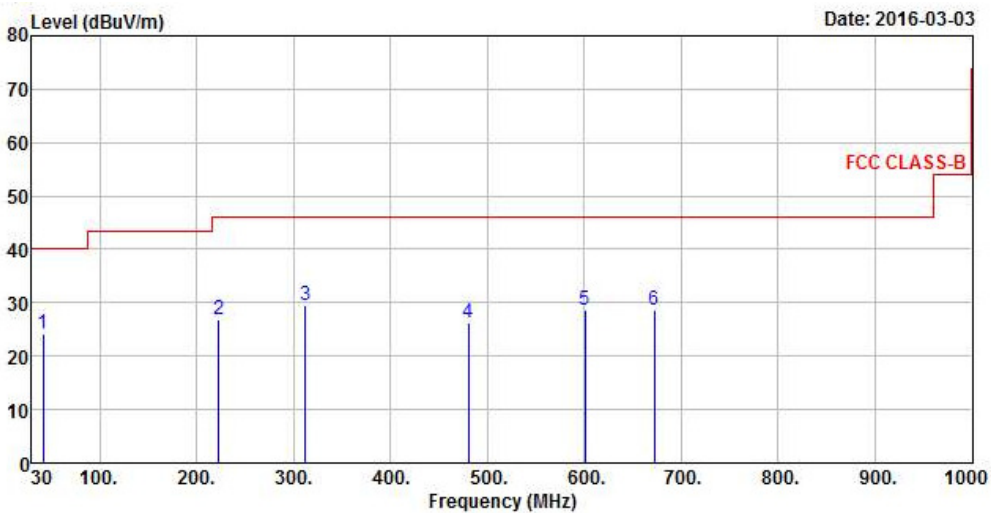
802.11n (HT40)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 151	FREQUENCY RANGE	30MHz ~ 1GHz
INPUT POWER	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Quasi-peak (QP)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Gavin Wu

Horizontal



Vertical





ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
152.22	23.92	41.75	43.5	-19.58	12.71	1.12	31.66	130	118	Peak
215.27	34.19	54.47	43.5	-9.31	10.01	1.36	31.65	112	185	Peak
312.27	23.25	40.28	46	-22.75	13.24	1.67	31.94	136	341	Peak
480.08	30.4	43.27	46	-15.6	16.93	2.05	31.85	108	193	Peak
623.64	24.69	34.66	46	-21.31	19.89	2.3	32.16	111	232	Peak
768.17	27.81	34.8	46	-18.19	21.78	2.56	31.33	100	166	Peak

ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	READ LEVEL (dBuV)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA FACTOR (dB/m)	CABLE LOSS (dB)	PREAMP FACTOR (dB)	ANTENNA HEIGHT (cm)	TABLE ANGLE (Degree)	REMARK
41.64	24.09	40.92	40	-15.91	13.56	0.66	31.05	117	224	Peak
223.03	26.83	46.85	46	-19.17	10.34	1.39	31.75	120	38	Peak
312.27	29.44	46.47	46	-16.56	13.24	1.67	31.94	123	161	Peak
480.08	26.16	39.03	46	-19.84	16.93	2.05	31.85	108	8	Peak
600.36	28.71	39.09	46	-17.29	19.61	2.26	32.25	107	53	Peak
672.14	28.53	37.47	46	-17.47	20.48	2.4	31.82	119	14	Peak

REMARKS: Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value

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 0.50MHz.

4.2.2 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date Of Calibration	Due Date Of Calibration
Test Receiver ROHDE & SCHWARZ	ESCI	100613	Nov. 16, 2015	Nov. 15, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 26, 2015	Dec. 25, 2016
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2016	Feb. 25, 2017
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 24, 2015	Jul. 23, 2016
Software ADT	BV ADT_Cond_ V7.3.7.3	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-2040.

4.2.3 Test Procedures

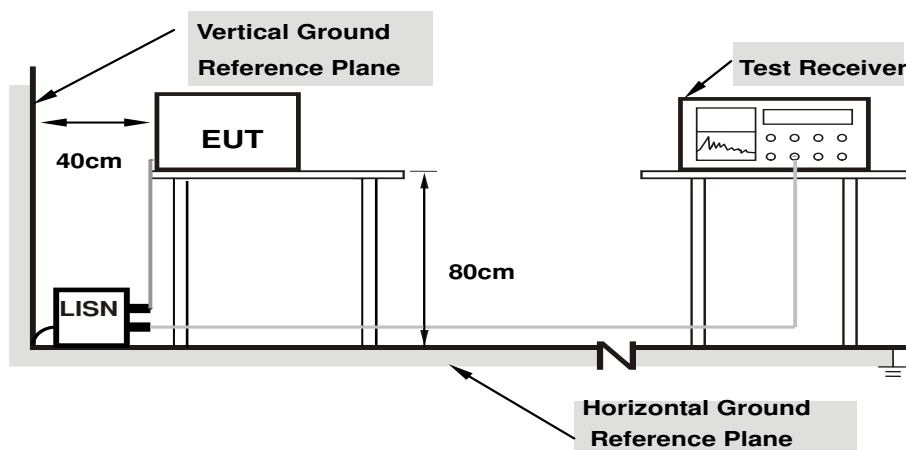
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) 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
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

Same as 4.1.6.

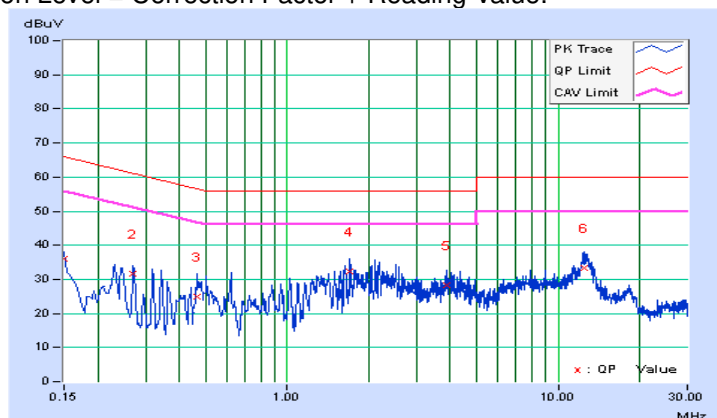
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor (dB)	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.01	26.11	20.32	36.12	30.33	66.00	56.00	-29.88	-25.67
2	0.27000	10.12	21.48	6.01	31.60	16.13	61.12	51.12	-29.51	-34.98
3	0.46600	10.15	14.71	6.01	24.86	16.16	56.58	46.58	-31.73	-30.43
4	1.70600	10.28	22.04	18.16	32.32	28.44	56.00	46.00	-23.68	-17.56
5	3.89800	10.42	17.79	11.18	28.21	21.60	56.00	46.00	-27.79	-24.40
6	12.50600	10.82	22.50	14.96	33.32	25.78	60.00	50.00	-26.68	-24.22

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.

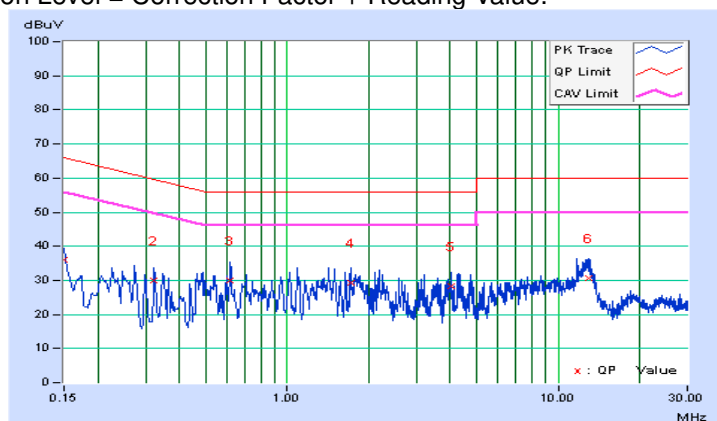


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
-------	-------------	-------------------	--------------------------------

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.00	26.05	20.41	36.05	30.41	66.00	56.00	-29.95	-25.59
2	0.32203	10.11	19.70	3.93	29.81	14.04	59.65	49.65	-29.85	-35.62
3	0.61407	10.18	19.94	14.75	30.12	24.93	56.00	46.00	-25.88	-21.07
4	1.71000	10.27	19.03	15.61	29.30	25.88	56.00	46.00	-26.70	-20.12
5	4.00600	10.45	17.89	9.81	28.34	20.26	56.00	46.00	-27.66	-25.74
6	12.90600	10.71	20.00	13.27	30.71	23.98	60.00	50.00	-29.29	-26.02

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 125mW(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	250mW (24 dBm)
U-NII-2A	---		250mW (24 dBm) or 11 dBm+10 log B*
U-NII-2C	---		250mW (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 $N_{ANT} \leq 4$;

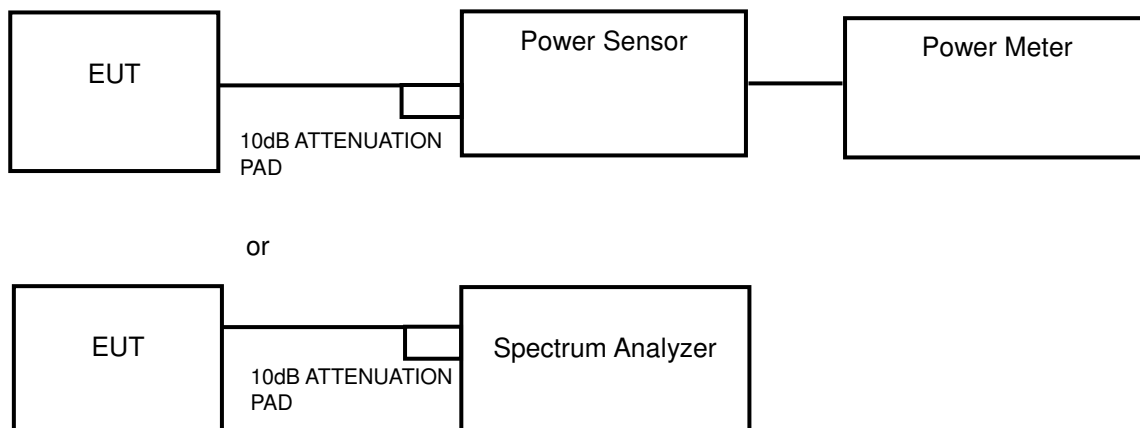
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

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

FOR POWER OUTPUT MEASUREMENT



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

FOR AVERAGE POWER MEASUREMENT

<802.11a, 802.11n (20MHz), 802.11n (40MHz)>

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.

<802.11ac (80MHz)>

Method SA-1 is used to perform output power measurement, trigger and gating function of spectrum analyzer is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

FOR 26dB BANDWIDTH

- 1) Set RBW = approximately 1% of the emission bandwidth.
- 2) Set the VBW > RBW.
- 3) Detector = Peak.
- 4) Trace mode = max hold.
- 5) 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 Result
POWER OUTPUT:
802.11a

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
149	5745	12.23	12.35	33.890	15.30	30	PASS
157	5785	14.11	14.65	54.937	17.40	30	PASS
165	5825	13.91	14.29	51.457	17.11	30	PASS

802.11n (HT20)

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
149	5745	12.27	12.17	33.347	15.23	30	PASS
157	5785	14.12	14.58	54.530	17.37	30	PASS
165	5825	13.97	14.38	52.362	17.19	30	PASS

802.11n (HT40)

CHAN.	FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
151	5755	9.08	8.86	15.782	11.98	30	PASS
159	5795	13.71	12.66	41.946	16.23	30	PASS

802.11ac (VHT80)

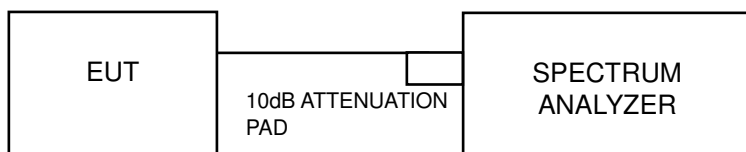
CHAN.	CHAN. FREQ. (MHz)	MAXIMUM CONDUCTED POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
155	5775	7.64	7.32	11.203	10.49	30	PASS

4.4 Peak Power Spectral Density Measurement

4.4.1 Limits of Peak Power Spectral Density Measurement

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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.4.4 Test Procedures

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 500 kHz, Set VBW ≥ 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/duty cycle)

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

4.4.7 Test Results

For U-NII-3 Band

802.11a

TX chain	Channel	Freq. (MHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	149	5745	-2.74	3.01	0.27	30	PASS
	157	5785	-0.37	3.01	2.64	30	PASS
	165	5825	-0.32	3.01	2.69	30	PASS
1	149	5745	-1.64	3.01	1.37	30	PASS
	157	5785	0.42	3.01	3.43	30	PASS
	165	5825	0.61	3.01	3.62	30	PASS

NOTE: Directional gain = $2.9\text{dBi} + 10\log(2) = 5.91 < 6\text{dBi}$, so the power density limit no need to be reduced.

802.11n (HT20)

TX chain	Channel	Freq. (MHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	149	5745	-3.22	3.01	-0.21	30	PASS
	157	5785	-0.87	3.01	2.14	30	PASS
	165	5825	-0.42	3.01	2.59	30	PASS
1	149	5745	-2.10	3.01	0.91	30	PASS
	157	5785	-0.03	3.01	2.98	30	PASS
	165	5825	0.49	3.01	3.50	30	PASS

NOTE: Directional gain = $2.9\text{dBi} + 10\log(2) = 5.91 < 6\text{dBi}$, so the power density limit no need to be reduced.

802.11n (HT40)

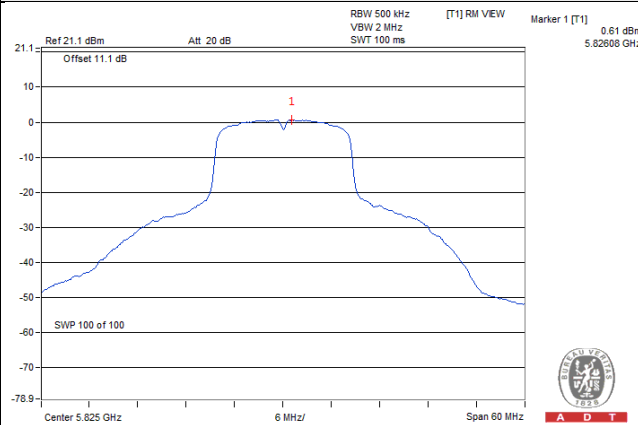
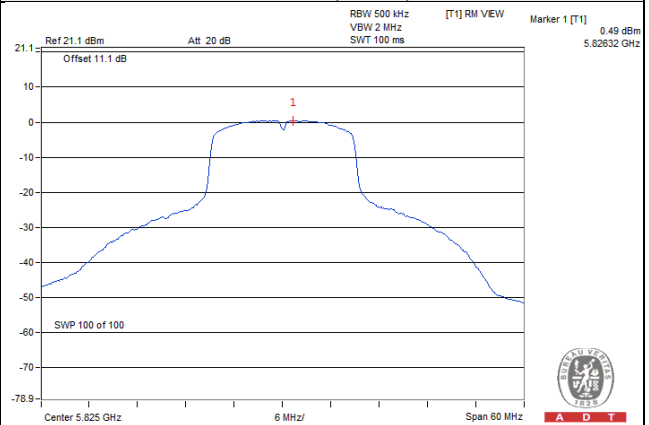
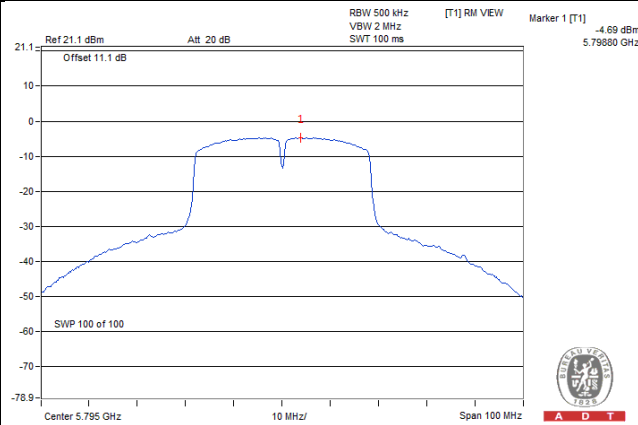
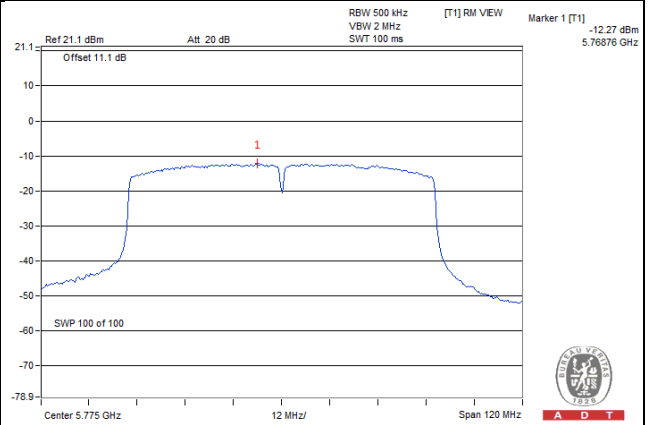
TX chain	Channel	Freq. (MHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	151	5755	-9.52	3.01	-6.51	30	PASS
	159	5795	-5.75	3.01	-2.74	30	PASS
1	151	5755	-8.26	3.01	-5.25	30	PASS
	159	5795	-4.69	3.01	-1.68	30	PASS

NOTE: Directional gain = $2.9\text{dBi} + 10\log(2) = 5.91 < 6\text{dBi}$, so the power density limit no need to be reduced.

802.11ac (VHT80)

TX chain	Channel	Freq. (MHz)	PSD (dBm/500kHz)	10 log (N=2) dB	Total PSD (dBm/500kHz)	Limit (dBm/500kHz)	PASS /FAIL
0	155	5775	-13.57	3.01	-10.56	30	PASS
1	155	5775	-12.27	3.01	-9.26	30	PASS

NOTE: Directional gain = $2.9\text{dBi} + 10\log(2) = 5.91 < 6\text{dBi}$, so the power density limit no need to be reduced.

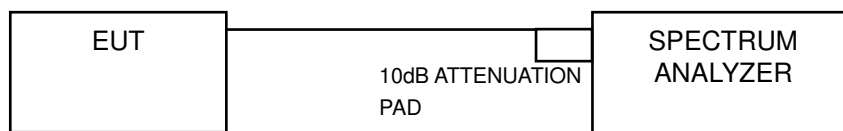
SPECTRUM PLOT OF WORST VALUE**802.11a****802.11n (HT20)****802.11n (HT40)****802.11ac (VHT80)**

4.5 6dB Bandwidth Measurement

4.5.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

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 Procedure

MEASUREMENT PROCEDURE REF

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

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)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	15.19	15.15	0.5	PASS
157	5785	15.16	15.19	0.5	PASS
165	5825	15.17	15.21	0.5	PASS

802.11n (HT20)

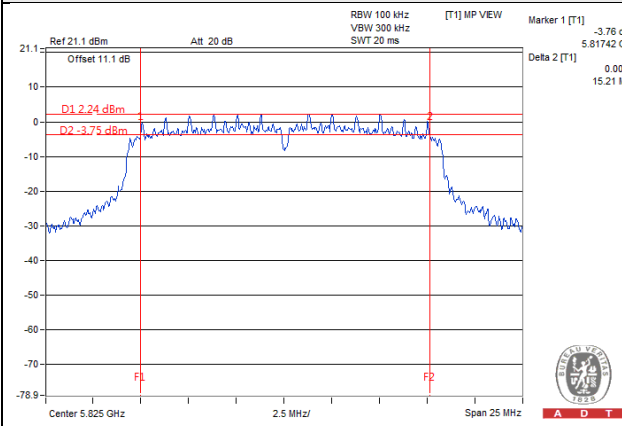
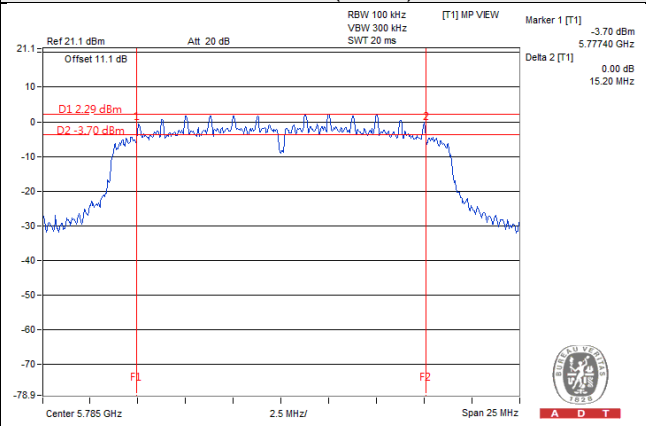
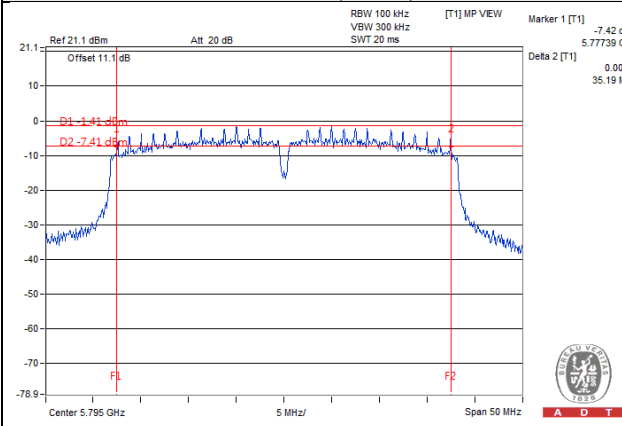
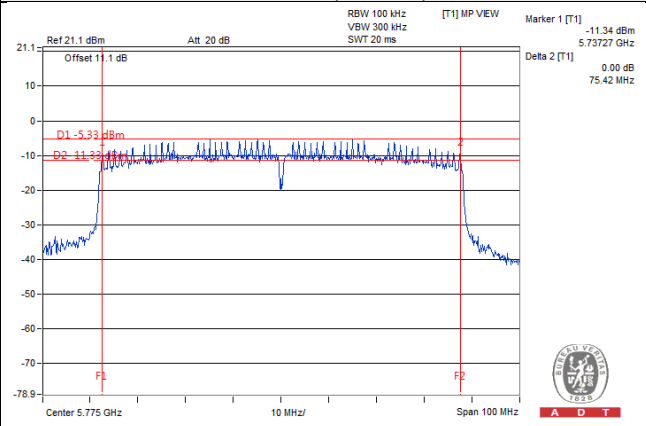
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	15.16	15.15	0.5	PASS
157	5785	15.16	15.20	0.5	PASS
165	5825	15.17	15.19	0.5	PASS

802.11n (HT40)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
151	5755	35.14	35.15	0.5	PASS
159	5795	35.16	35.19	0.5	PASS

802.11ac (VHT80)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
155	5775	75.39	75.42	0.5	PASS

SPECTRUM PLOT OF WORST VALUE**802.11a****802.11n (HT20)****802.11n (HT40)****802.11ac (VHT80)**



5 Pictures of Test Arrangements

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



A D T

Appendix – Information on 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 accredited and approved according to ISO/IEC 17025.

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

Linko EMC/RF Lab

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF Lab/Telecom Lab

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety

Tel: 886-3-3183232

Fax: 886-3-3270892

Email: service.adt@tw.bureauveritas.com**Web Site:** www.bureauveritas-adt.com

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

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