FCC Test Report

Report No.:	RF170818C25-2
FCC ID:	2ADWC-AI7697HD
Test Model:	AI7697HD
Received Date:	Aug. 18, 2017
Test Date:	Jun. 01, 2017 ~ Sep. 18, 2017
Issued Date:	Oct. 06, 2017
Applicant:	AcSiP Technology Corporation
Address:	3F.-1, No.207, Fusing Rd., Taoyuan Dist., Taoyuan County 330, Taiwan (R.O.C.)
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C)
Test Location:	No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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Release Control Record

Issue No.	Description	Date Issued
RF170818C25-2	Original Release	Oct. 06, 2017

1 Certificate of Conformity

Product:	802.11 IoT Module
Brand:	AcSiP
Test Model:	AI7697HD
Sample Status:	Production Unit
Applicant:	AcSiP Technology Corporation
Test Date:	Jun. 01, 2017 ~ Sep. 18, 2017
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 EMC characteristics under the conditions specified in this report.

Prepared by : Evonne Liu , **Date:** Oct. 06, 2017

Evonne Liu / Specialist

Approved by : David Huang , **Date:** Oct. 06, 2017

David Huang / 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 -19.34 dB at 0.15000 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 -1.39 dB at 5148.8 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	Pass	Meet the requirement of limit. (U-NII-3 Band only)
15.407(g)	Frequency Stability	Pass	Meet the requirement of limit.
15.203	Antenna Requirement	Pass	No antenna connector is used.

*For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOBE test plots were recorded in Annex A.

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	Expended Uncertainty (k=2) (±)
Conducted Emissions at mains ports	150 kHz ~ 30 MHz	2.44 dB
Radiated Emissions up to 1 GHz	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

Product	802.11 IoT Module
Brand	AcSiP
Test Model	AI7697HD
Status of EUT	Production Unit
Power Supply Rating	5.0 Vdc (host equipment)
Modulation Type	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/ 6.0 Mbps 802.11n: up to MCS7
Operating Frequency	5180 ~ 5240 MHz, 5745 ~ 5825 MHz
Number of Channel	5180 ~ 5240 MHz: 4 for 802.11a, 802.11n (HT20) 2 for 802.11n (HT40) 5745 ~ 5825 MHz: 5 for 802.11a, 802.11n (HT20) 2 for 802.11n (HT40)
Output Power	26.122 mW for 5180 ~ 5240 MHz 27.227 mW for 5745 ~ 5825 MHz
Antenna Type	PIFA antenna with 1.44 dBi gain (5180 ~ 5240 MHz) PIFA antenna with 1.44 dBi gain (5745 ~ 5825 MHz)
Antenna Connector	N/A
Accessory Device	N/A
Data Cable Supplied	N/A

Note:

1. 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 ~ 5240 MHz

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

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

2 channels are provided for 802.11n (HT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
38	5190	46	5230

For 5745 ~ 5825 MHz:

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

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

2 channels are provided for 802.11n (HT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)
151	5755	159	5795

3.2.1 Test Mode Applicability and Tested Channel Detail

EUT Configure Mode	Applicable To				Description
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE≥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 **Y-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)
-	5180-5240	802.11a	36 to 48	36, 44, 48	OFDM	BPSK	6.0
-		802.11n (HT20)	36 to 48	36, 44, 48	OFDM	BPSK	MCS0
-		802.11n (HT40)	38 to 46	38, 46	OFDM	BPSK	MCS0
-	5745-5825	802.11a	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

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)
-	5180-5240	802.11n (HT40)	36 to 48	38	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	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5180-5320	802.11a	36 to 64	62	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)
-	5180-5240	802.11a	36 to 48	36, 44, 48	OFDM	BPSK	6.0
-		802.11n (HT20)	36 to 48	36, 44, 48	OFDM	BPSK	MCS0
-		802.11n (HT40)	38 to 46	38, 46	OFDM	BPSK	MCS0
-	5745-5825	802.11a	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

Test Condition:

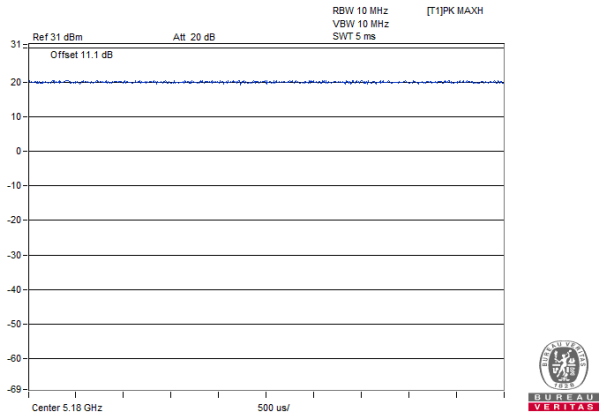
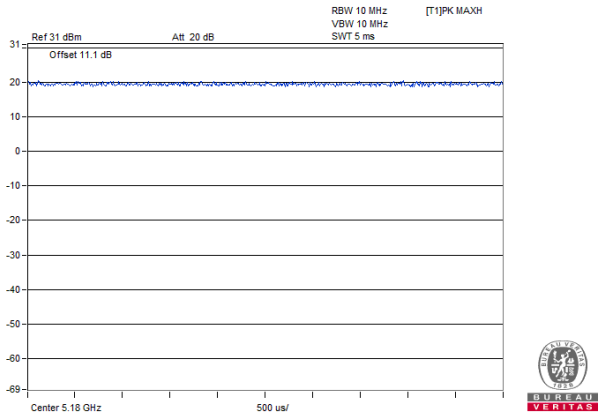
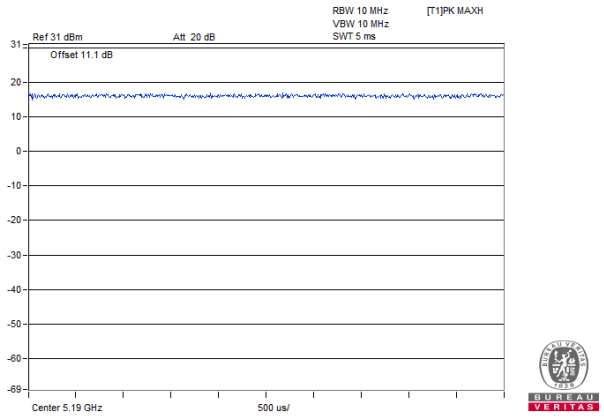
Applicable To	Environmental Conditions	Input Power	Tested by
RE≥1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Gavin Wu
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Gavin Wu
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Getaz Yang
APCM	25 deg. C, 65 % RH	120 Vac, 60 Hz	Carlos Chen

3.3 Duty Cycle of Test Signal

MODULATION TYPE: BPSK

802.11a / 802.11n (HT20) / 802.11n (HT40):

Duty cycle of test signal is 100 %, duty factor is not required.

802.11a	802.11n (HT20)
	
802.11n (HT40)	
	

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.

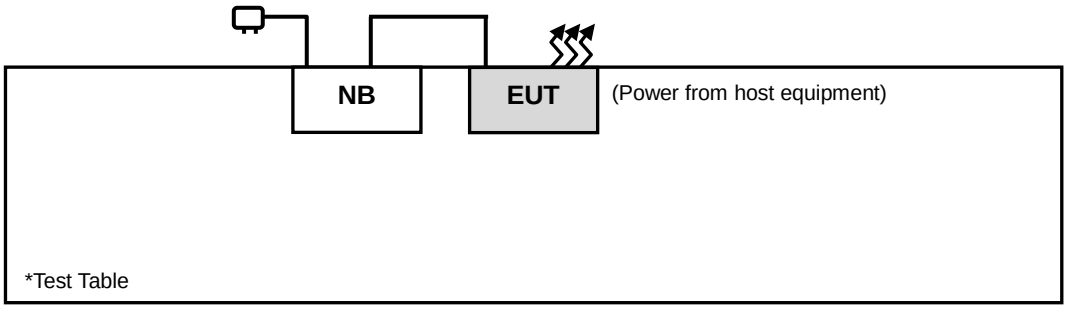
No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	NB	N/A	N/A	N/A	N/A

No.	Signal Cable Description Of The Above Support Units
1.	N/A
2.	

Note:

1. All power cords of the above support units are non-shielded (1.8m).

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)
789033 D02 General UNII Test Procedures New Rules v01r04
ANSI C63.10-2013

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 20 dB 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 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 v01r04		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	15.407(b)(4)(i)	PK:-27 (dBm/MHz) *1 PK:10 (dBm/MHz) *2 PK:15.6 (dBm/MHz) *3 PK:27 (dBm/MHz) *4	PK: 68.2 (dBμV/m) *1 PK:105.2 (dBμV/m) *2 PK: 110.8 (dBμV/m) *3 PK:122.2 (dBμV/m) *4
	15.407(b)(4)(ii)	Emission limits in section 15.247(d)	

*1 beyond 75 MHz or more above of the band edge.

*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

*4 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:

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

4.1.3 Test Instruments

Description & Manaufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Feb. 17, 2017	Feb. 16, 2018
Spectrum Analyzer Agilent	N9010A	MY52220314	Dec. 16, 2016	Dec. 15, 2017
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 13, 2016	Dec. 12, 2017
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Dec. 26, 2016	Dec. 27, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Dec. 12, 2016	Dec. 13, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Dec. 14, 2016	Dec. 13, 2017
Fixed Attenuator Mini-Circuits	MDCS18N-10	MDCS18N-10-01	Apr. 17, 2017	Apr. 16, 2018
Loop Antenna	HLA 6121	45745	May 19, 2017	May 18, 2018
Preamplifier EMCI	EMC001340	980201	Nov. 02, 2016	Nov. 01, 2017
Bluetooth Tester	CBT	100946	Jul. 29, 2016	Jul. 28, 2018
Preamplifier EMCI	EMC 012645	980115	Oct. 21, 2016	Oct. 20, 2017
Preamplifier EMCI	EMC 184045	980116	Oct. 21, 2016	Oct. 20, 2017
Preamplifier EMCI	EMC 330H	980112	Oct. 21, 2016	Oct. 20, 2017
Power Meter Anritsu	ML2495A	1145013	Mar. 07, 2017	Mar. 06, 2018
Power Sensor Anritsu	MA2411B	1126085	Mar. 07, 2017	Mar. 06, 2018
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 21, 2016	Oct. 20, 2017
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 21, 2016	Oct. 20, 2017
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 21, 2016	Oct. 20, 2017
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 / 24 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 preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.

4. The FCC Designation Number is TW0003. The number will be varied with the Lab location and scope as attached.

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 (for below 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:

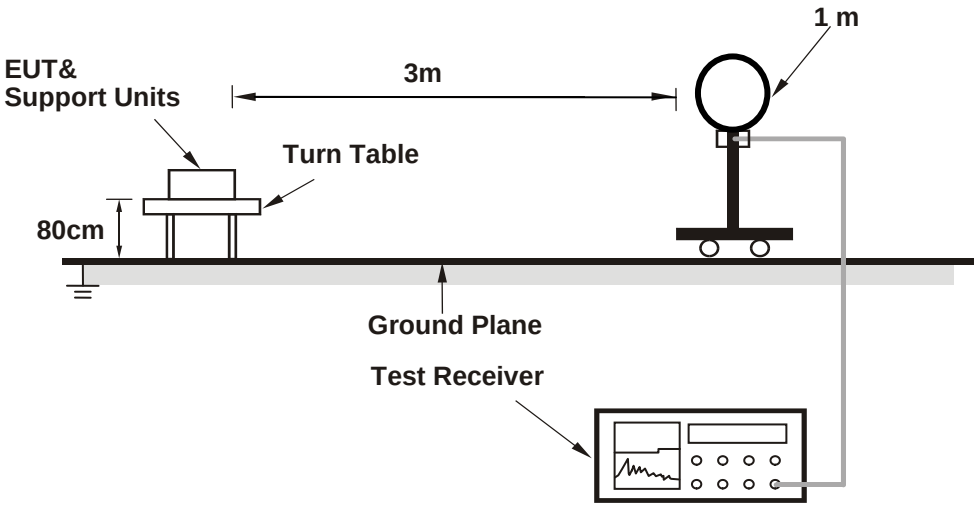
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz & 360 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1/T for Average (Duty cycle < 98 %) detection at frequency above 1 GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz.
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

<Radiated emission below 30 MHz>



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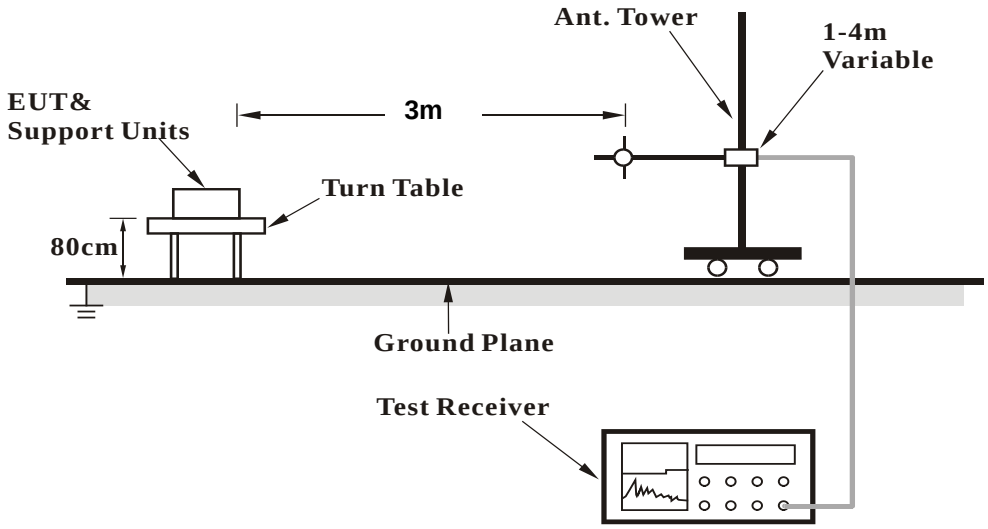
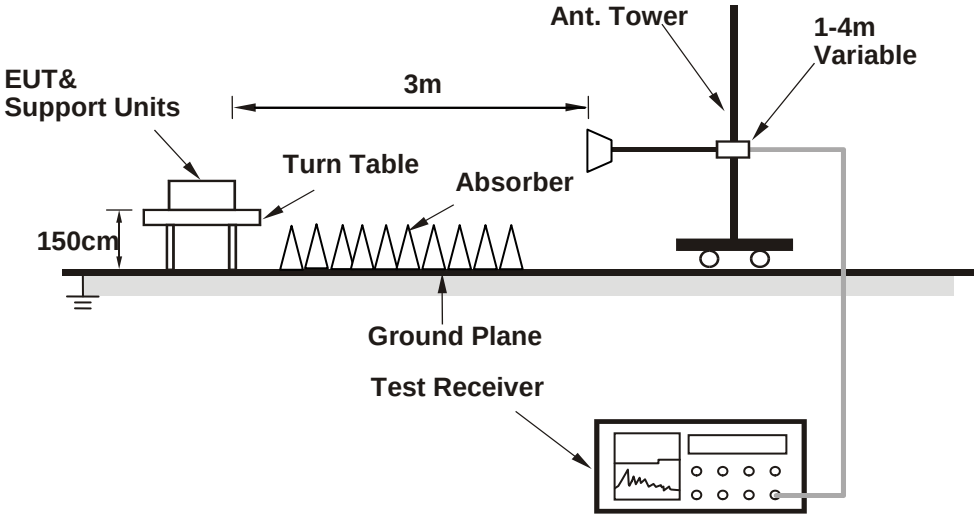


<Frequency Range above 1 GHz>



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 36	**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**	Gavin Wu

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5146.1	43.66	58.31	54	-10.34	31.32	7.04	53.01	128	3	Average
5146.1	55.6	55.26	74	-18.4	31.32	6.34	37.32	128	3	Peak
5180	96.46	96.08			31.35	6.37	37.34	128	3	Average
5180	105.13	104.75			31.35	6.37	37.34	128	3	Peak
*10360	56.89	59.94	68.2	-11.31	39.19	10.21	52.45	115	212	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5148.5	40.77	55.19	54	-13.23	31.32	7.04	52.78	240	53	Average
5148.5	54.65	54.31	74	-19.35	31.32	6.34	37.32	240	53	Peak
5180	93.34	92.96			31.35	6.37	37.34	240	53	Average
5180	102.35	101.97			31.35	6.37	37.34	240	53	Peak
*10360	56.23	58.97	68.2	-11.97	39.19	10.21	52.14	100	108	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5180 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 44	**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**	Gavin Wu

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5137.7	42.11	56.8	54	-11.89	31.31	7.03	53.03	140	3	Average
5137.7	53.44	53.1	74	-20.56	31.31	6.33	37.3	140	3	Peak
5220	96.35	95.94			31.37	6.4	37.36	140	3	Average
5220	105.13	104.72			31.37	6.4	37.36	140	3	Peak
5392.13	39.65	53.75	54	-14.35	31.51	7.17	52.78	140	3	Average
5392.13	51.77	50.97	74	-22.23	31.51	6.47	37.18	140	3	Peak
*10440	56.8	59.82	68.2	-11.4	39.29	10.21	52.52	115	212	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5105.6	39.86	54.43	54	-14.14	31.29	7	52.86	233	69	Average
5105.6	52.14	51.83	74	-21.86	31.29	6.3	37.28	233	69	Peak
5220	93.09	92.68			31.37	6.4	37.36	233	69	Average
5220	102	101.59			31.37	6.4	37.36	233	69	Peak
5445.48	38.86	52.69	54	-15.14	31.55	7.21	52.59	233	69	Average
5445.48	51.32	50.4	74	-22.68	31.55	6.5	37.13	233	69	Peak
*10440	55.25	58.23	68.2	-12.95	39.29	10.21	52.48	100	108	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5220 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 48	**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**	Gavin Wu

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5135.75	40.63	55.32	54	-13.37	31.31	7.03	53.03	117	4	Average
5135.75	52.1	51.76	74	-21.9	31.31	6.33	37.3	117	4	Peak
5240	96.75	96.26			31.39	6.42	37.32	117	4	Average
5240	105.84	105.35			31.39	6.42	37.32	117	4	Peak
5360.89	39.4	53.56	54	-14.6	31.49	7.18	52.83	117	4	Average
5360.89	51.49	50.71	74	-22.51	31.49	6.47	37.18	117	4	Peak
*10480	57.11	60.18	68.2	-11.09	39.37	10.22	52.66	115	212	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5148.5	39.43	53.85	54	-14.57	31.32	7.04	52.78	232	62	Average
5148.5	52	51.66	74	-22	31.32	6.34	37.32	232	62	Peak
5240	92.89	92.4			31.39	6.42	37.32	232	62	Average
5240	102.07	101.58			31.39	6.42	37.32	232	62	Peak
5354.95	39.08	53.16	54	-14.92	31.48	7.18	52.74	232	62	Average
5354.95	51.63	50.86	74	-22.37	31.48	6.47	37.18	232	62	Peak
*10480	56.01	59.13	68.2	-12.19	39.37	10.22	52.71	100	108	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5240 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 149	**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**	Gavin Wu

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5745	96.86	95.56			31.99	6.78	37.47	148	350	Average
5745	105.52	104.22			31.99	6.78	37.47	148	350	Peak
11490	48.6	50.81	54	-5.4	39.91	10.66	52.78	100	353	Average
11490	59.87	62.08	74	-14.13	39.91	10.66	52.78	100	353	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5745	95.44	94.17			31.99	6.75	37.47	222	42	Average
5745	104.38	103.11			31.99	6.75	37.47	222	42	Peak
11490	46.42	48.63	54	-7.58	39.91	10.66	52.78	172	25	Average
11490	56.88	59.09	74	-17.12	39.91	10.66	52.78	172	25	Peak

<Out of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5624.1	55.06	53.93	68.2	-13.14	31.79	6.56	37.22	148	350	Peak
5652.6	53.33	52.14	70.13	-16.8	31.85	6.62	37.28	148	350	Peak
5921.925	49.42	47.62	70.47	-21.05	32.29	7.01	37.5	148	350	Peak
5949.475	53.49	51.59	68.2	-14.71	32.32	7.08	37.5	148	350	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5637.875	53.37	52.27	68.2	-14.83	31.82	6.56	37.28	222	42	Peak
5653.075	50.97	49.78	70.49	-19.52	31.85	6.62	37.28	222	42	Peak
5921.925	49.86	48.06	70.47	-20.61	32.29	7.01	37.5	222	42	Peak
6002.2	52.87	50.84	68.2	-15.33	32.4	7.14	37.51	222	42	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5745 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 157	**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**	Gavin Wu

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5785	97.11	95.79			32.04	6.82	37.54	150	349	Average
5785	105.86	104.54			32.04	6.82	37.54	150	349	Peak
11570	47.05	49.52	54	-6.95	39.78	10.76	53.01	100	355	Average
11570	58.51	60.98	74	-15.49	39.78	10.76	53.01	100	355	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5785	95.15	93.83			32.04	6.82	37.54	227	81	Average
5785	103.68	102.36			32.04	6.82	37.54	227	81	Peak
11570	47	49.47	54	-7	39.78	10.76	53.01	172	64	Average
11570	57.13	59.6	74	-16.87	39.78	10.76	53.01	172	64	Peak

<Out of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5635.5	54.95	53.85	68.2	-13.25	31.82	6.56	37.28	150	349	Peak
5651.65	53.73	52.54	69.43	-15.7	31.85	6.62	37.28	150	349	Peak
5921.45	52.95	51.18	70.82	-17.87	32.26	7.01	37.5	150	349	Peak
5959.45	53.07	51.15	68.2	-15.13	32.34	7.08	37.5	150	349	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5639.3	53.91	52.81	68.2	-14.29	31.82	6.56	37.28	227	81	Peak
5653.075	52.75	51.56	70.49	-17.74	31.85	6.62	37.28	227	81	Peak
5921.925	51.6	49.8	70.47	-18.87	32.29	7.01	37.5	227	81	Peak
5984.15	52.55	50.55	68.2	-15.65	32.37	7.14	37.51	227	81	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5785 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 165	**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**	Gavin Wu

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5825	97.08	95.61			32.12	6.88	37.53	135	348	Average
5825	105.93	104.46			32.12	6.88	37.53	135	348	Peak
11650	48.29	50.98	54	-5.71	39.65	10.8	53.14	102	59	Average
11650	59.44	62.13	74	-14.56	39.65	10.8	53.14	102	59	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5825	95.05	93.58			32.12	6.88	37.53	226	67	Average
5825	104.08	102.61			32.12	6.88	37.53	226	67	Peak
11650	46.22	49.12	54	-7.78	39.65	10.8	53.35	152	249	Average
11650	56.63	59.53	74	-17.37	39.65	10.8	53.35	152	249	Peak

<Out of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5621.725	53.95	52.82	68.2	-14.25	31.79	6.56	37.22	135	348	Peak
5655.45	53.45	52.32	72.25	-18.8	31.85	6.62	37.34	135	348	Peak
5920.5	52.83	51.06	71.52	-18.69	32.26	7.01	37.5	135	348	Peak
5938.55	53.23	51.4	68.2	-14.97	32.32	7.01	37.5	135	348	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5640.725	52.39	51.29	68.2	-15.81	31.82	6.56	37.28	226	67	Peak
5651.65	51.62	50.43	69.43	-17.81	31.85	6.62	37.28	226	67	Peak
5923.35	52.15	50.35	69.42	-17.27	32.29	7.01	37.5	226	67	Peak
5955.65	52.81	50.89	68.2	-15.39	32.34	7.08	37.5	226	67	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5825 MHz: Fundamental Frequency
3. *: Out of Restricted Band

802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 36	**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**	Gavin Wu

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5147.75	41.95	56.6	54	-12.05	31.32	7.04	53.01	130	4	Average
5147.75	56.27	55.93	74	-17.73	31.32	6.34	37.32	130	4	Peak
5180	89.5	89.12			31.35	6.37	37.34	130	4	Average
5180	104.28	103.9			31.35	6.37	37.34	130	4	Peak
*10360	56.14	59.19	68.2	-12.06	39.19	10.21	52.45	115	221	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5142.35	39.97	54.44	54	-14.03	31.32	7.03	52.82	205	59	Average
5142.35	52.85	52.5	74	-21.15	31.32	6.33	37.3	205	59	Peak
5180	93.29	92.91			31.35	6.37	37.34	205	59	Average
5180	102.08	101.7			31.35	6.37	37.34	205	59	Peak
*10360	56.82	59.56	68.2	-11.38	39.19	10.21	52.14	100	112	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5180 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 44	**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**	Gavin Wu

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5120.15	40.78	55.51	54	-13.22	31.29	7.01	53.03	139	4	Average
5120.15	53.6	53.3	74	-20.4	31.29	6.31	37.3	139	4	Peak
5220	95.28	94.87			31.37	6.4	37.36	139	4	Average
5220	104.12	103.71			31.37	6.4	37.36	139	4	Peak
5353.96	39.34	53.51	54	-14.66	31.48	7.18	52.83	139	4	Average
5353.96	51.73	50.96	74	-22.27	31.48	6.47	37.18	139	4	Peak
*10440	54.57	57.59	68.2	-13.63	39.29	10.21	52.52	116	241	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5013.95	39.2	54.12	54	-14.8	31.21	6.92	53.05	225	55	Average
5013.95	51.05	50.85	74	-22.95	31.21	6.22	37.23	225	55	Peak
5220	93.79	93.38			31.37	6.4	37.36	225	55	Average
5220	102.63	102.22			31.37	6.4	37.36	225	55	Peak
5372.77	38.92	52.99	54	-15.08	31.49	7.18	52.74	225	55	Average
5372.77	51.1	50.32	74	-22.9	31.49	6.47	37.18	225	55	Peak
*10440	53.69	56.67	68.2	-14.51	39.29	10.21	52.48	100	54	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5220 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 48	**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**	Gavin Wu

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5139.35	40.56	55.25	54	-13.44	31.31	7.03	53.03	135	2	Average
5139.35	53.12	52.78	74	-20.88	31.31	6.33	37.3	135	2	Peak
5240	95.54	95.05			31.39	6.42	37.32	135	2	Average
5240	104.49	104			31.39	6.42	37.32	135	2	Peak
5393.01	39.57	53.67	54	-14.43	31.51	7.17	52.78	135	2	Average
5393.01	51.77	50.97	74	-22.23	31.51	6.47	37.18	135	2	Peak
*10480	55.02	58.09	68.2	-13.18	39.37	10.22	52.66	116	238	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5133.05	39.16	53.65	54	-14.84	31.31	7.02	52.82	224	54	Average
5133.05	50.83	50.5	74	-23.17	31.31	6.32	37.3	224	54	Peak
5240	93.79	93.3			31.39	6.42	37.32	224	54	Average
5240	102.33	101.84			31.39	6.42	37.32	224	54	Peak
5405.11	38.96	52.97	54	-15.04	31.52	7.17	52.7	224	54	Average
5405.11	51.39	50.58	74	-22.61	31.52	6.47	37.18	224	54	Peak
*10480	54.86	57.98	68.2	-13.34	39.37	10.22	52.71	101	77	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5240 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 149	**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**	Gavin Wu

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5745	95.53	94.26			31.99	6.75	37.47	149	346	Average
5745	104.77	103.5			31.99	6.75	37.47	149	346	Peak
11490	47.9	50.11	54	-6.1	39.91	10.66	52.78	154	265	Average
11490	55.48	57.69	74	-18.52	39.91	10.66	52.78	154	265	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5745	93.41	92.14			31.99	6.75	37.47	221	84	Average
5745	102.36	101.09			31.99	6.75	37.47	221	84	Peak
11490	46.52	48.78	54	-7.48	39.91	10.66	52.83	144	261	Average
11490	56.95	59.21	74	-17.05	39.91	10.66	52.83	144	261	Peak

<Out of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5594.175	54.33	53.26	68.2	-13.87	31.74	6.49	37.16	149	346	Peak
5653.075	51.6	50.41	70.49	-18.89	31.85	6.62	37.28	149	346	Peak
5921.925	50.67	48.87	70.47	-19.8	32.29	7.01	37.5	149	346	Peak
5994.125	52.99	50.96	68.2	-15.21	32.4	7.14	37.51	149	346	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5625.525	53.88	52.75	68.2	-14.32	31.79	6.56	37.22	221	84	Peak
5652.6	52.47	51.28	70.13	-17.66	31.85	6.62	37.28	221	84	Peak
5921.45	50.17	48.4	70.82	-20.65	32.26	7.01	37.5	221	84	Peak
5982.725	52.32	50.38	68.2	-15.88	32.37	7.08	37.51	221	84	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5745 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 157	**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**	Gavin Wu

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5785	95.64	94.32			32.04	6.82	37.54	147	349	Average
5785	104.27	102.95			32.04	6.82	37.54	147	349	Peak
11570	47.42	49.89	54	-6.58	39.78	10.76	53.01	101	164	Average
11570	54.72	57.19	74	-19.28	39.78	10.76	53.01	101	164	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5785	93.5	92.18			32.04	6.82	37.54	222	82	Average
5785	102.2	100.88			32.04	6.82	37.54	222	82	Peak
11570	46.01	48.8	54	-7.99	39.78	10.76	53.33	147	258	Average
11570	54.44	57.23	74	-19.56	39.78	10.76	53.33	147	258	Peak

<Out of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5605.1	55.08	53.97	68.2	-13.12	31.77	6.56	37.22	147	349	Peak
5653.075	53.17	51.98	70.49	-17.32	31.85	6.62	37.28	147	349	Peak
5921.925	50.71	48.91	70.47	-19.76	32.29	7.01	37.5	147	349	Peak
5938.075	53.16	51.36	68.2	-15.04	32.29	7.01	37.5	147	349	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5643.1	54	52.84	68.2	-14.2	31.82	6.62	37.28	222	82	Peak
5653.075	50.95	49.76	70.49	-19.54	31.85	6.62	37.28	222	82	Peak
5922.875	51.15	49.35	69.77	-18.62	32.29	7.01	37.5	222	82	Peak
5992.225	52.35	50.32	68.2	-15.85	32.4	7.14	37.51	222	82	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5785 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 165	**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**	Gavin Wu

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5825	96.22	94.75			32.12	6.88	37.53	115	348	Average
5825	104.85	103.38			32.12	6.88	37.53	115	348	Peak
11653	46.93	49.65	54	-7.07	39.62	10.8	53.14	100	165	Average
11653	55.39	58.11	74	-18.61	39.62	10.8	53.14	100	165	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5825	92.76	91.29			32.12	6.88	37.53	219	92	Average
5825	102.09	100.62			32.12	6.88	37.53	219	92	Peak
11650	45.94	48.84	54	-8.06	39.65	10.8	53.35	124	255	Average
11650	54.09	56.99	74	-19.91	39.65	10.8	53.35	124	255	Peak

<Out of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5639.775	54.02	52.92	68.2	-14.18	31.82	6.56	37.28	115	348	Peak
5652.6	52.74	51.55	70.13	-17.39	31.85	6.62	37.28	115	348	Peak
5922.4	51.11	49.31	70.12	-19.01	32.29	7.01	37.5	115	348	Peak
5974.175	53.08	51.14	68.2	-15.12	32.37	7.08	37.51	115	348	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5640.725	53.14	52.04	68.2	-15.06	31.82	6.56	37.28	219	92	Peak
5652.6	50.39	49.2	70.13	-19.74	31.85	6.62	37.28	219	92	Peak
5921.45	51.23	49.46	70.82	-19.59	32.26	7.01	37.5	219	92	Peak
5958.975	52.8	50.88	68.2	-15.4	32.34	7.08	37.5	219	92	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5825 MHz: Fundamental Frequency
3. *: Out of Restricted Band

802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 38	**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**	Gavin Wu

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5148.8	52.61	67.26	54	-1.39	31.32	7.04	53.01	109	5	Average
5148.8	64.87	64.53	74	-9.13	31.32	6.34	37.32	109	5	Peak
5190	96.32	95.93			31.35	6.38	37.34	109	5	Average
5190	104.89	104.5			31.35	6.38	37.34	109	5	Peak
5372.55	39.82	53.98	54	-14.18	31.49	7.18	52.83	109	5	Average
5372.55	51.21	50.43	74	-22.79	31.49	6.47	37.18	109	5	Peak
*10380	54.25	57.28	68.2	-13.95	39.21	10.21	52.45	112	256	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5149.25	48.14	47.8	54	-5.86	31.32	6.34	37.32	227	58	Average
5149.25	64.71	64.37	74	-9.29	31.32	6.34	37.32	227	58	Peak
5190	93.12	92.73			31.35	6.38	37.34	227	58	Average
5190	101.41	101.02			31.35	6.38	37.34	227	58	Peak
5457.69	39.56	53.27	54	-14.44	31.56	7.22	52.49	227	58	Average
5457.69	51.37	50.38	74	-22.63	31.56	6.51	37.08	227	58	Peak
*10380	56.6	59.43	68.2	-11.6	39.21	10.21	52.25	102	59	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5190 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 46	**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**	Gavin Wu

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5134.25	41.57	56.27	54	-12.43	31.31	7.02	53.03	118	5	Average
5134.25	53.42	53.09	74	-20.58	31.31	6.32	37.3	118	5	Peak
5230	94.98	94.5			31.39	6.41	37.32	118	5	Average
5230	103.78	103.3			31.39	6.41	37.32	118	5	Peak
5362.87	39.89	54.05	54	-14.11	31.49	7.18	52.83	118	5	Average
5362.87	51.31	50.53	74	-22.69	31.49	6.47	37.18	118	5	Peak
10460	54.82	57.87	68.2	-13.38	39.32	10.22	52.59	118	271	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5118.5	40.1	54.62	54	-13.9	31.29	7.01	52.82	220	59	Average
5118.5	51.64	51.34	74	-22.36	31.29	6.31	37.3	220	59	Peak
5230	92.71	92.23			31.39	6.41	37.32	220	59	Average
5230	101.42	100.94			31.39	6.41	37.32	220	59	Peak
5379.59	39.66	53.7	54	-14.34	31.51	7.17	52.72	220	59	Average
5379.59	51.29	50.49	74	-22.71	31.51	6.47	37.18	220	59	Peak
10460	55.42	58.48	68.2	-12.78	39.32	10.22	52.6	100	49	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5230 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 151	**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**	Gavin Wu

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5755	96.55	95.26			32.01	6.75	37.47	134	350	Average
5755	104.73	103.44			32.01	6.75	37.47	134	350	Peak
11510	47.53	49.75	54	-6.47	39.9	10.69	52.81	100	174	Average
11510	55.85	58.07	74	-18.15	39.9	10.69	52.81	100	174	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5755	94.92	93.63			32.01	6.75	37.47	221	96	Average
5755	103.74	102.45			32.01	6.75	37.47	221	96	Peak
11510	46.27	48.75	54	-7.73	39.9	10.69	53.07	114	254	Average
11510	56.25	58.73	74	-17.75	39.9	10.69	53.07	114	254	Peak

<Out of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5627.425	55.58	54.45	68.2	-12.62	31.79	6.56	37.22	134	350	Peak
5652.125	53.33	52.14	69.78	-16.45	31.85	6.62	37.28	134	350	Peak
5923.35	50.85	49.05	69.42	-18.57	32.29	7.01	37.5	134	350	Peak
5996.5	52.82	50.79	68.2	-15.38	32.4	7.14	37.51	134	350	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5594.175	55.01	53.94	68.2	-13.19	31.74	6.49	37.16	221	96	Peak
5652.125	52.35	51.16	69.78	-17.43	31.85	6.62	37.28	221	96	Peak
5921.925	50.17	48.37	70.47	-20.3	32.29	7.01	37.5	221	96	Peak
5964.2	52.03	50.12	68.2	-16.17	32.34	7.08	37.51	221	96	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5755 MHz: Fundamental Frequency
3. *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 159	**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**	Gavin Wu

<Spurious Emission>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5795	96.15	94.8			32.07	6.82	37.54	130	348	Average
5795	104.79	103.44			32.07	6.82	37.54	130	348	Peak
11590	46.74	49.23	54	-7.26	39.74	10.78	53.01	100	334	Average
11590	54.54	57.03	74	-19.46	39.74	10.78	53.01	100	334	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5795	93.55	92.2			32.07	6.82	37.54	221	93	Average
5795	102.46	101.11			32.07	6.82	37.54	221	93	Peak
11590	46.25	48.74	54	-7.75	39.74	10.78	53.01	137	298	Average
11590	54.75	57.24	74	-19.25	39.74	10.78	53.01	137	298	Peak

<Out of Band Emission (OOBE)>

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
5612.7	54.83	53.72	68.2	-13.37	31.77	6.56	37.22	130	348	Peak
5652.6	53.74	52.55	70.13	-16.39	31.85	6.62	37.28	130	348	Peak
5921.925	49.78	47.98	70.47	-20.69	32.29	7.01	37.5	130	348	Peak
5928.1	52.59	50.79	68.2	-15.61	32.29	7.01	37.5	130	348	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
5636.45	54.23	53.13	68.2	-13.97	31.82	6.56	37.28	221	93	Peak
5652.6	52.92	51.73	70.13	-17.21	31.85	6.62	37.28	221	93	Peak
5923.825	52.62	50.82	69.07	-16.45	32.29	7.01	37.5	221	93	Peak
5955.175	52.44	50.54	68.2	-15.76	32.32	7.08	37.5	221	93	Peak

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
   Margin value = Emission level – Limit value
2. 5795 MHz: Fundamental Frequency
3. *: Out of Restricted Band

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:

802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 38	**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**	Gavin Wu

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (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**
99.84	23.92	46.07	43.5	-19.58	9.06	0.75	31.96	130	65	Peak
167.74	30.55	49.29	43.5	-12.95	11.96	1.06	31.76	112	354	Peak
237.58	31.43	50.85	46	-14.57	10.95	1.43	31.8	116	329	Peak
321	26.98	43.66	46	-19.02	13.45	1.75	31.88	138	302	Peak
444.19	24.78	38.3	46	-21.22	16.21	2.26	31.99	135	338	Peak
803.09	28.88	34.37	46	-17.12	22.27	3.68	31.44	125	103	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (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**
47.46	28.82	46.24	40	-11.18	13.28	0.52	31.22	106	34	Peak
69.77	32.18	52.59	40	-7.82	10.77	0.64	31.82	130	317	Peak
170.65	28.1	47.1	43.5	-15.4	11.67	1.07	31.74	114	358	Peak
229.82	26.62	46.48	46	-19.38	10.62	1.38	31.86	101	296	Peak
444.19	26.76	40.28	46	-19.24	16.21	2.26	31.99	136	296	Peak
757.5	27.21	33.46	46	-18.79	21.63	3.53	31.41	121	147	Peak

Remarks:

1. 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 0.50 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	Nov. 21, 2016	Nov. 20, 2017
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Sep. 05, 2017	Sep. 04, 2018
LISN/AMN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 10, 2017	Mar. 09, 2018
LISN/AMN ROHDE & SCHWARZ (Peripheral)	ENV216	101196	Apr. 20, 2017	Apr. 19, 2018
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

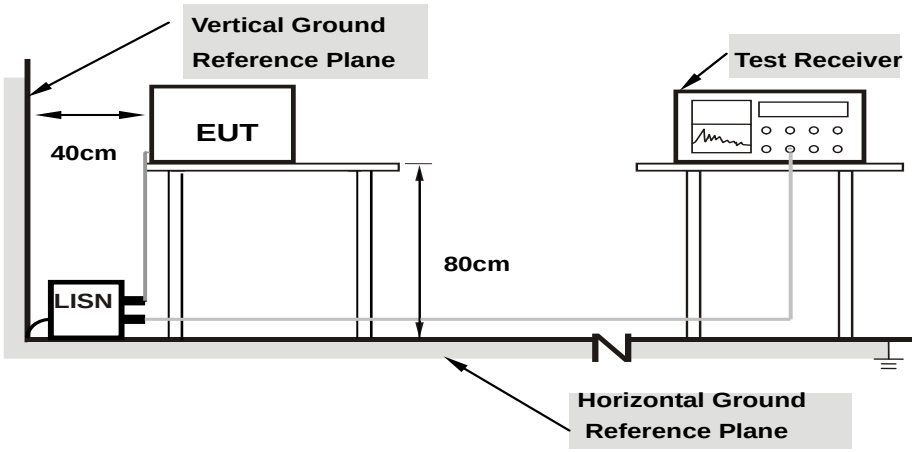
a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling 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 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.

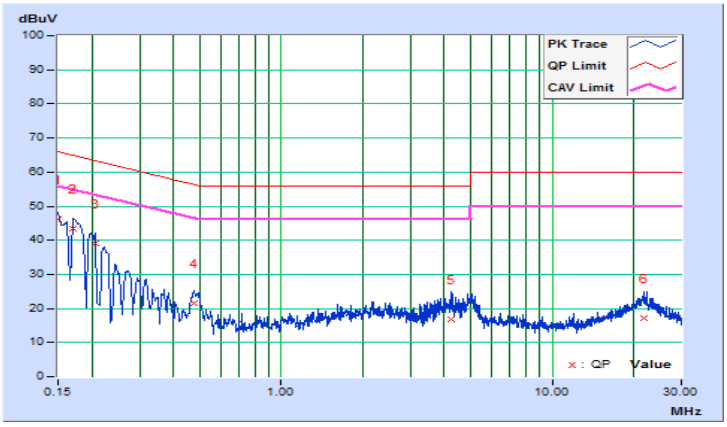
4.2.7 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
Tested by	Getaz Yang	Test Date	2017/9/19

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	0.15000	10.39	35.62	20.83	46.01	31.22	66.00	56.00	-19.99	-24.78
2	0.17022	10.39	32.88	18.14	43.27	28.53	64.95	54.95	-21.68	-26.42
3	0.20600	10.39	28.51	14.00	38.90	24.39	63.37	53.37	-24.47	-28.98
4	0.47559	10.41	11.15	6.53	21.56	16.94	56.42	46.42	-34.86	-29.48
5	4.25788	10.57	6.33	-0.95	16.90	9.62	56.00	46.00	-39.10	-36.38
6	21.71800	11.42	5.81	0.56	17.23	11.98	60.00	50.00	-42.77	-38.02

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

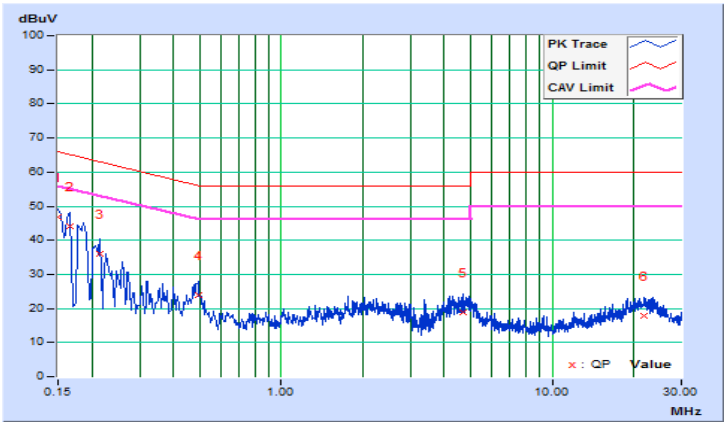


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25℃, 65%RH
Tested by	Getaz Yang	Test Date	2017/9/19

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.
1	**0.15000**	**10.15**	**36.51**	**21.72**	**46.66**	**31.87**	**66.00**	**56.00**	**-19.34**	**-24.13**
2	0.16579	10.16	34.09	19.63	44.25	29.79	65.17	55.17	-20.92	-25.38
3	0.21400	10.16	25.78	12.56	35.94	22.72	63.05	53.05	-27.11	-30.33
4	0.49346	10.17	13.60	9.24	23.77	19.41	56.11	46.11	-32.34	-26.70
5	4.68200	10.35	8.61	2.28	18.96	12.63	56.00	46.00	-37.04	-33.37
6	21.86200	11.01	6.86	1.28	17.87	12.29	60.00	50.00	-42.13	-37.71

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 Measurment

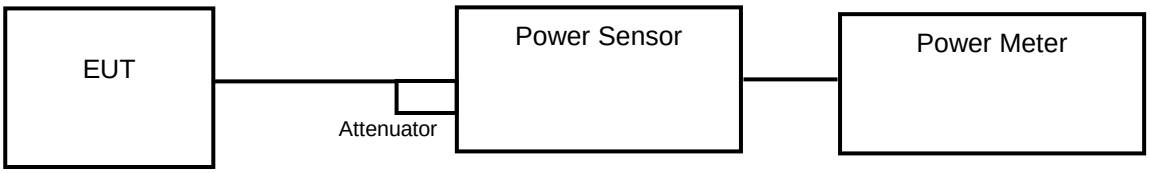
4.3.1 Limits of Transmit Power Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	1 Watt (30 dBm) (Max. e.i.r.p ≦ 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)

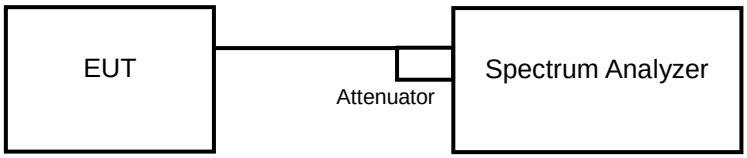
*B is the 26 dB emission bandwidth in megahertz

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

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 fromTest 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

Channel	Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	25.293	14.03	24	Pass
44	5220	26.122	14.17	24	Pass
48	5240	25.41	14.05	24	Pass
149	5745	26.062	14.16	30	Pass
157	5785	27.227	14.35	30	Pass
165	5825	25.293	14.03	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	21.429	13.31	24	Pass
44	5220	21.878	13.40	24	Pass
48	5240	21.627	13.35	24	Pass
149	5745	20.091	13.03	30	Pass
157	5785	21.827	13.39	30	Pass
165	5825	20.184	13.05	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
38	5190	21.281	13.28	24	Pass
46	5230	21.038	13.23	24	Pass
151	5755	21.038	13.23	30	Pass
159	5795	20.37	13.09	30	Pass

26 dB Bandwidth:

802.11a

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)
36	5180	20.14
44	5220	20.10
48	5240	20.25

802.11n (HT20)

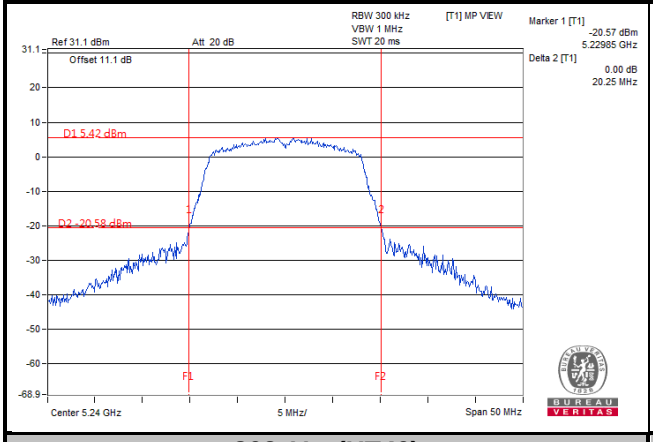
Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)
36	5180	20.60
44	5220	20.56
48	5240	20.58

802.11n (HT40)

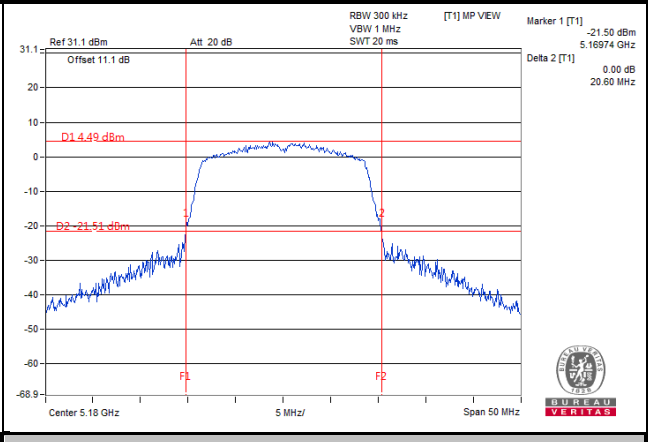
Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)
38	5190	41.70
46	5230	42.04

Spectrum Plot of Worst Value

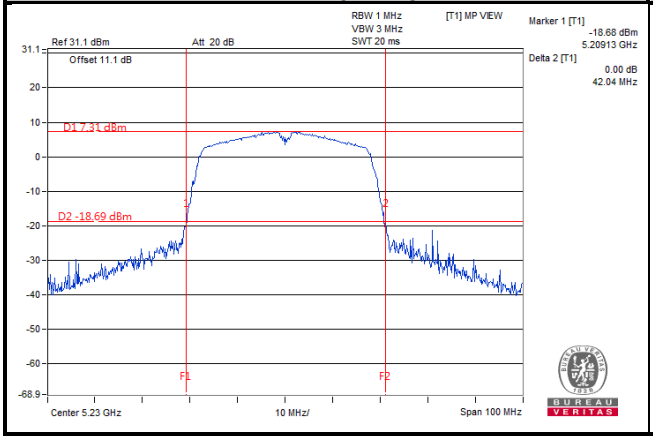
802.11a



802.11n (HT20)

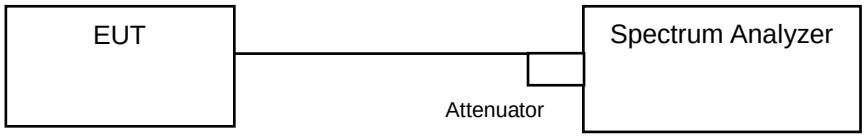


802.11n (HT40)



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)
36	5180	16.73
40	5200	16.68
48	5240	16.73
149	5745	16.53
157	5785	16.55
165	5825	16.50

802.11n (HT20)

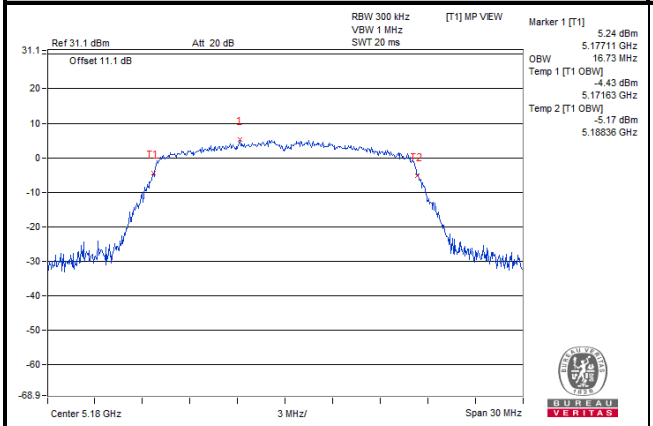
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
36	5180	17.74
40	5200	17.69
48	5240	17.74
149	5745	17.64
157	5785	17.60
165	5825	17.65

802.11n (HT40)

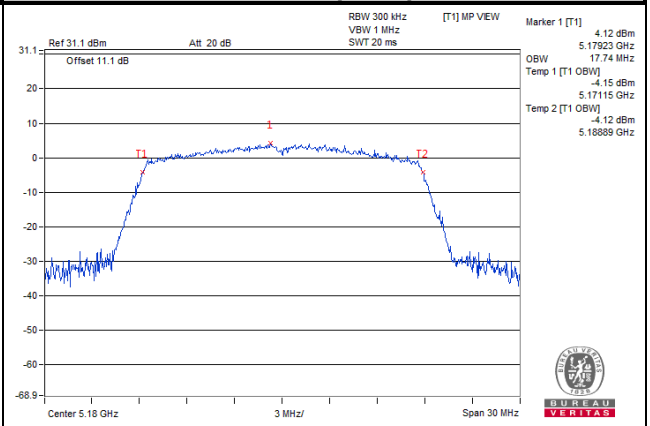
Channel	Channel Frequency (MHz)	Occupied Bandwidth (MHz)
38	5190	36.53
46	5230	36.41
151	5755	36.21
159	5795	36.16

Spectrum Plot of Worst Value

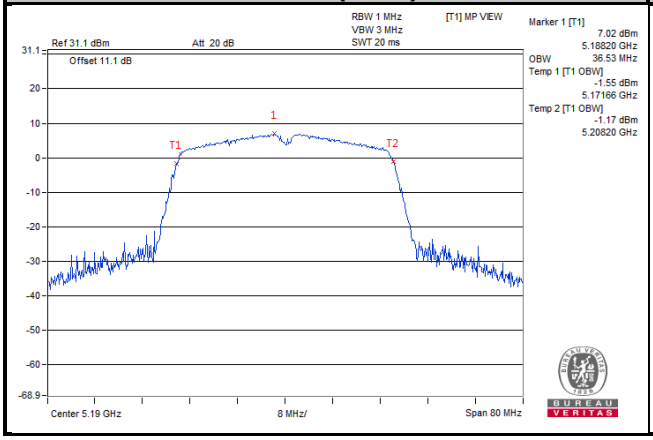
802.11a



802.11n (HT20)



802.11n (HT40)

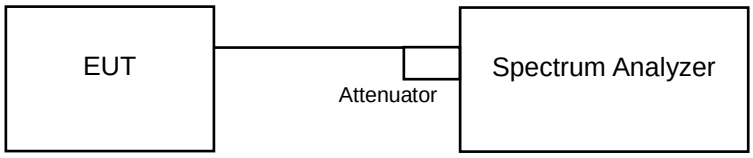


4.5 Peak Power Spectral Density Measurement

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

For U-NII-1, U-NII-2A, U-NII-2C band:

Using method SA-1

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, 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

※For U-NII-3:

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. Use the peak marker function to determine the maximum power level in any 500 kHz band segment within the fundamental EBW.
4. Sweep time = auto, trigger set to “free run”.
5. Trace average at least 100 traces in power averaging mode.
6. Record the max value

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

For U-NII-1, U-NII-2A, U-NII-2C Band

802.11a

Channel	Frequency (MHz)	PSD (dBm/MHz)	Maximum Limit (dBm/MHz)	Pass / Fail
36	5180	2.19	11	Pass
44	5220	2.22	11	Pass
48	5240	2.53	11	Pass

802.11n (HT20)

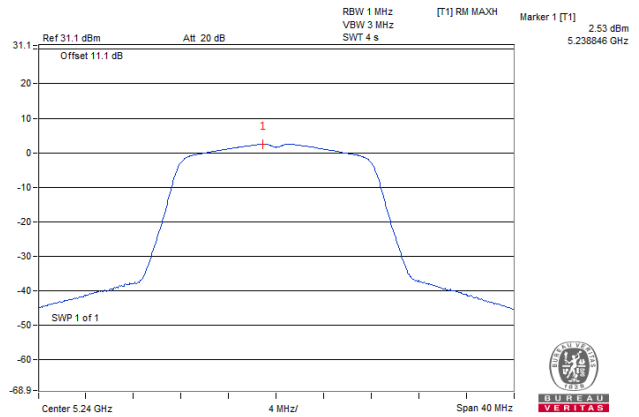
Channel	Frequency (MHz)	PSD (dBm/MHz)	Maximum Limit (dBm/MHz)	Pass / Fail
36	5180	1.20	11	Pass
44	5220	1.53	11	Pass
48	5240	1.82	11	Pass

802.11n (HT40)

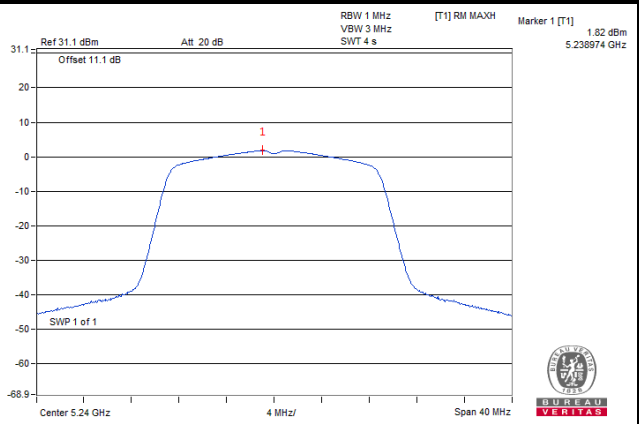
Channel	Frequency (MHz)	PSD (dBm/MHz)	Maximum Limit (dBm/MHz)	Pass / Fail
38	5190	-1.79	11	Pass
46	5230	-1.57	11	Pass

Spectrum Plot of Worst Value

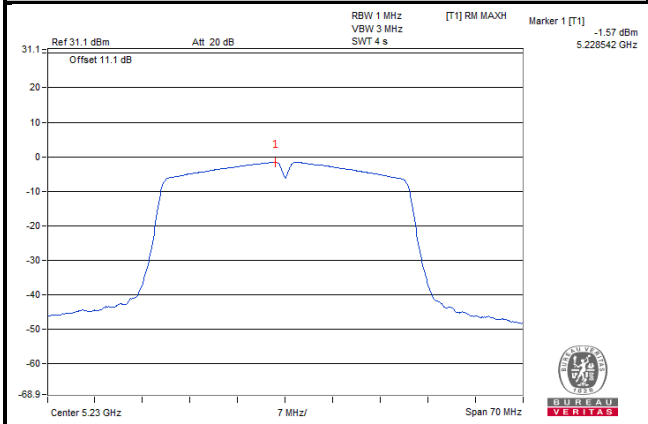
802.11a



802.11n (HT20)



802.11n (HT40)



For U-NII-3 Band

802.11a

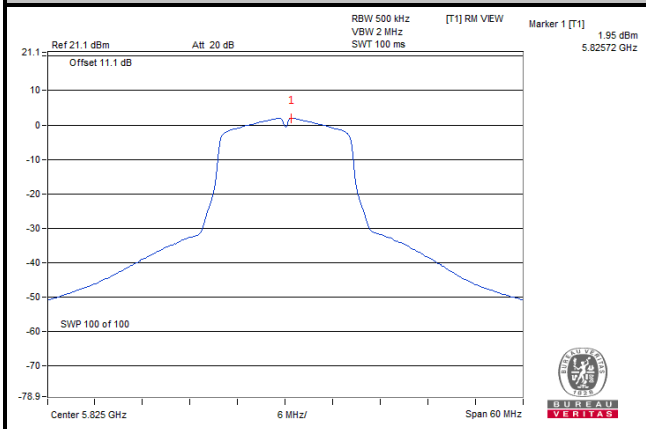
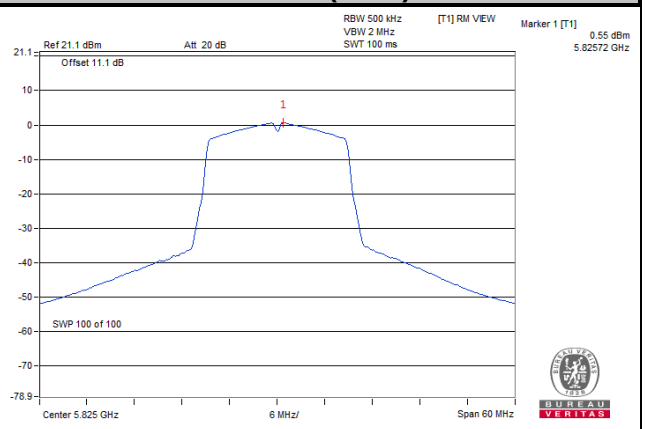
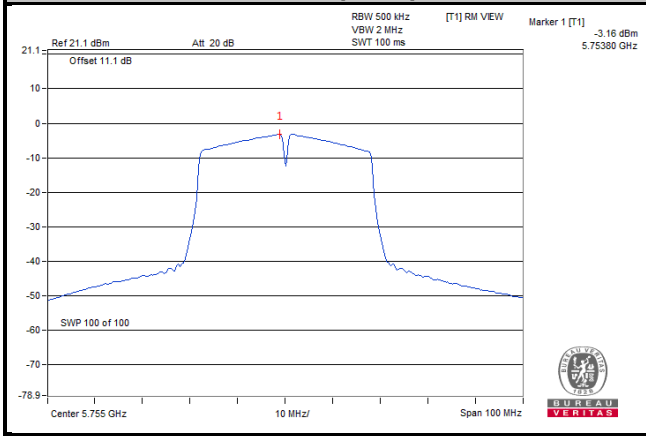
Channel	Freq. (MHz)	PSD (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
149	5745	1.03	30	Pass
157	5785	1.30	30	Pass
165	5825	1.95	30	Pass

802.11n (HT20)

Channel	Freq. (MHz)	PSD (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
149	5745	-0.53	30	Pass
157	5785	-0.36	30	Pass
165	5825	0.55	30	Pass

802.11n (HT40)

Channel	Freq. (MHz)	PSD (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
151	5755	-3.16	30	Pass
159	5795	-3.23	30	Pass

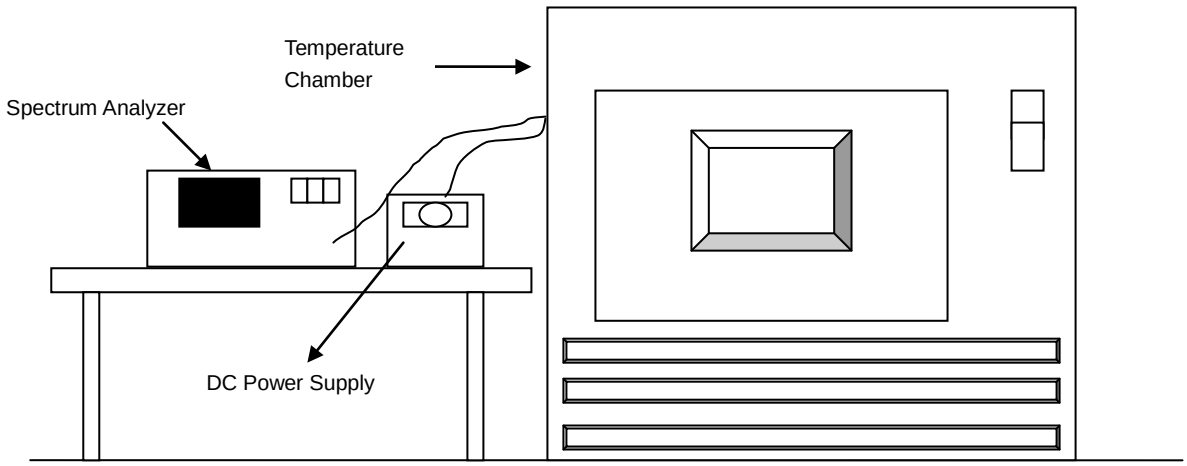
Spectrum Plot of Worst Value	
802.11a	802.11n (HT20)
	
802.11n (HT40)	
	

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

a. To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
b. The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10 dB lower than the measured peak value.
c. The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

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: 5180 MHz									
Temp. (℃)	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	5179.9744	-4.94000	5179.9779	-4.27000	5179.9753	-4.77000	5179.9748	-4.86000
80	3.3	5180.0044	0.85000	5180.0036	0.69000	5180.0068	1.31000	5180.006	1.16000
70	3.3	5179.9928	-1.39000	5179.9921	-1.53000	5179.9946	-1.04000	5179.9931	-1.33000
60	3.3	5179.9844	-3.01000	5179.9854	-2.82000	5179.9856	-2.78000	5179.9848	-2.93000
50	3.3	5180.0104	2.01000	5180.0132	2.55000	5180.01	1.93000	5180.0092	1.78000
40	3.3	5180.01	1.93000	5180.0072	1.39000	5180.0074	1.43000	5180.0068	1.31000
30	3.3	5180.0261	5.04000	5180.0264	5.10000	5180.0219	4.23000	5180.0226	4.36000
20	3.3	5179.9733	-5.15000	5179.9763	-4.58000	5179.9771	-4.42000	5179.9753	-4.77000
10	3.3	5179.9819	-3.49000	5179.9816	-3.55000	5179.9823	-3.42000	5179.981	-3.67000
0	3.3	5180.0136	0.00026	5180.0167	0.00032	5180.0175	0.00034	5180.0172	0.00033
-10	3.3	5179.9778	-0.00043	5179.9805	-0.00038	5179.9798	-0.00039	5179.9778	-0.00043
-20	3.3	5179.9896	-0.00020	5179.988	-0.00023	5179.9891	-0.00021	5179.9898	-0.00020
-30	3.3	5179.9823	-0.00034	5179.9811	-0.00036	5179.9852	-0.00029	5179.9813	-0.00036
-40	3.3	5180.0081	0.00016	5180.0046	0.00009	5180.0074	0.00014	5180.0078	0.00015

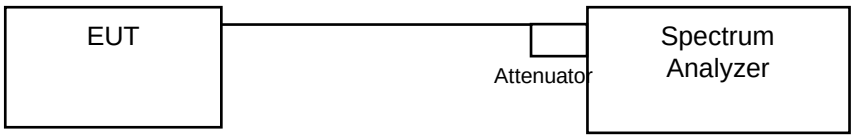
Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
Temp. (℃)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
20	3.45	5179.974	-5.02000	5179.9758	-4.67000	5179.9779	-4.27000	5179.9754	-4.75000
	3.3	5179.9733	-5.15000	5179.9763	-4.58000	5179.9771	-4.42000	5179.9753	-4.77000
	3.15	5179.9726	-5.29000	5179.9753	-4.77000	5179.9772	-4.40000	5179.9759	-4.65000

4.7 6 dB Bandwidth Measurment

4.7.1 Limits of 6 dB Bandwidth Measurement

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

a. Set resolution bandwidth (RBW) = 100 kHz
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. 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

4.7.5 Deviation from Test Standard

No deviation.

4.7.6 EUT Operating Condition

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

4.7.7 Test Results

802.11a

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	16.35	0.5	Pass
157	5785	16.35	0.5	Pass
165	5825	16.35	0.5	Pass

802.11n (HT20)

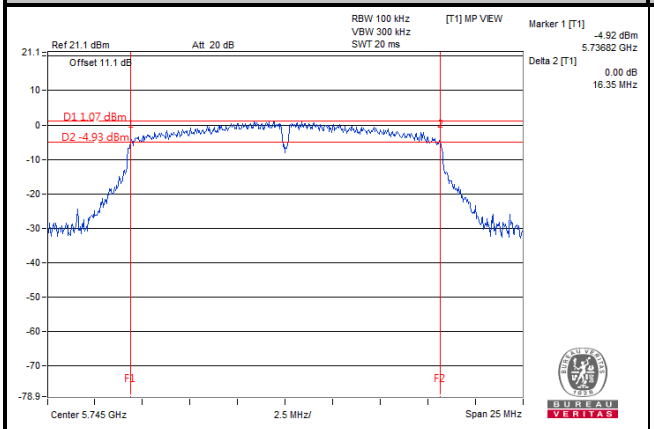
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	17.60	0.5	Pass
157	5785	17.59	0.5	Pass
165	5825	17.32	0.5	Pass

802.11n (HT40)

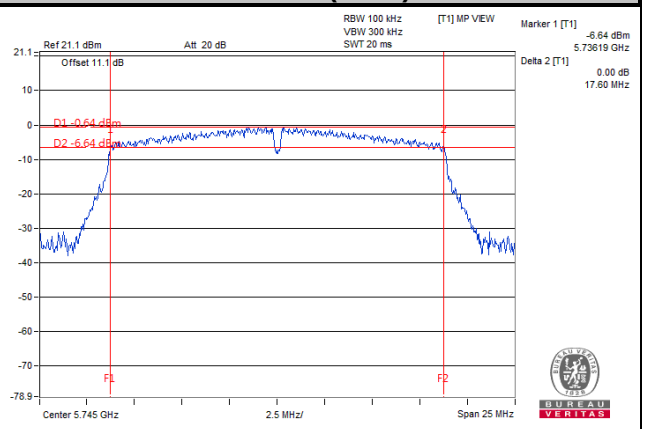
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
151	5755	35.83	0.5	Pass
159	5795	35.89	0.5	Pass

Spectrum Plot of Worst Value

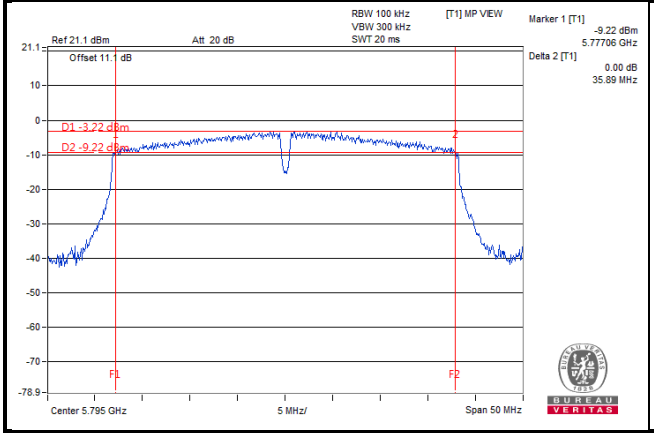
802.11a



802.11n (HT20)



802.11n (HT40)



5 Pictures of Test Arrangements

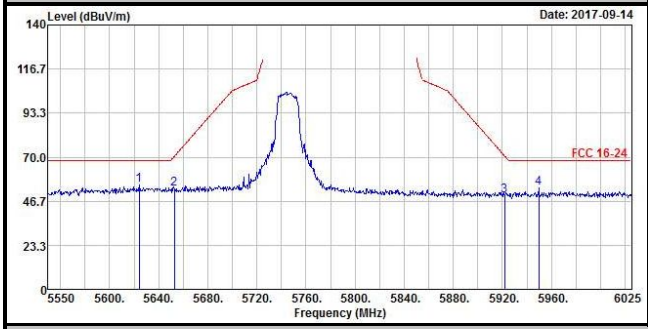
Please refer to the attached file (Test Setup Photo).

Annex A- Radiated Out of Band Emisison (OOBE) Measurement (For U-NII-3 band)

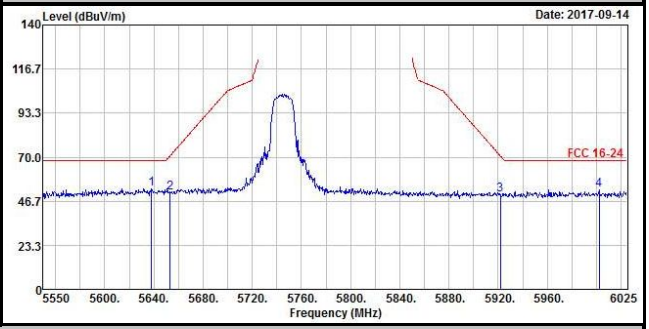
802.11a

Ch 149

Horizontal

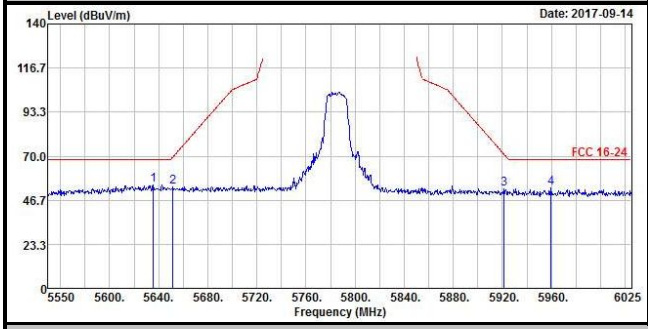


Vertical

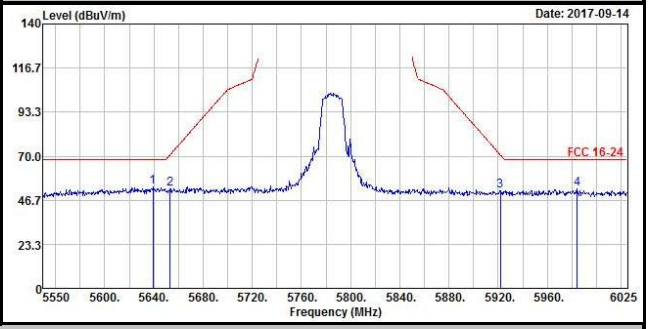


Ch 157

Horizontal

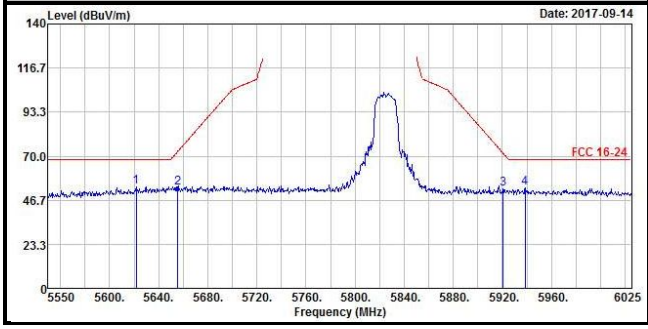


Vertical

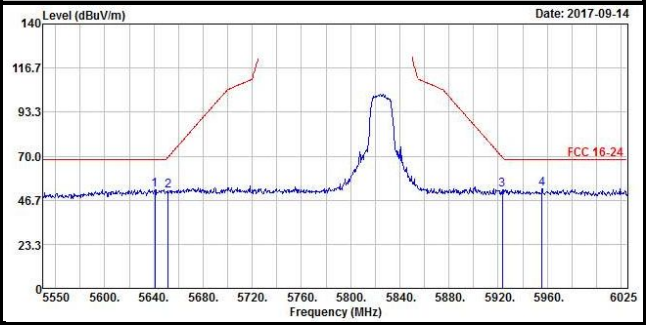


Ch 165

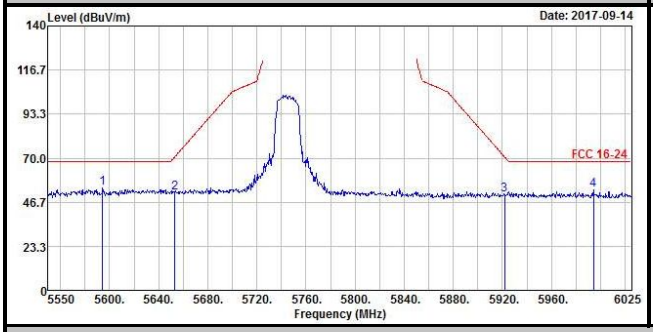
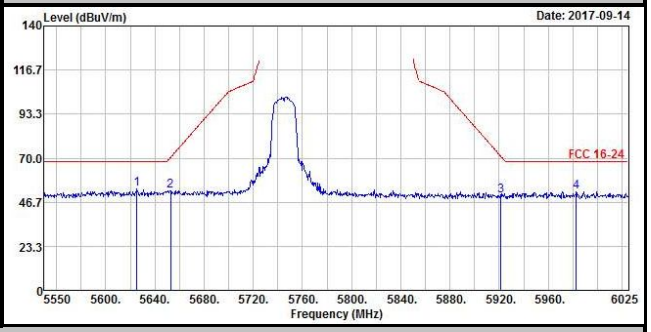
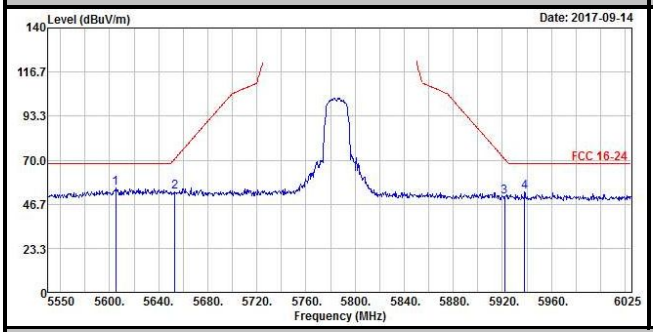
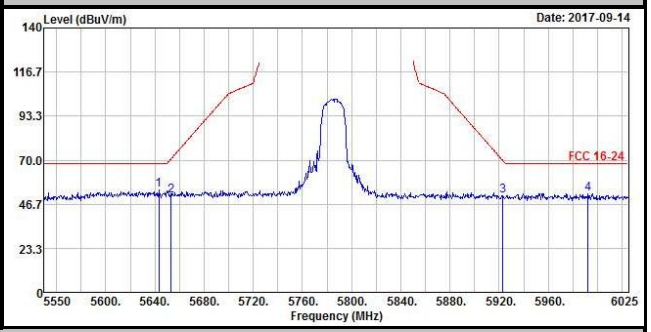
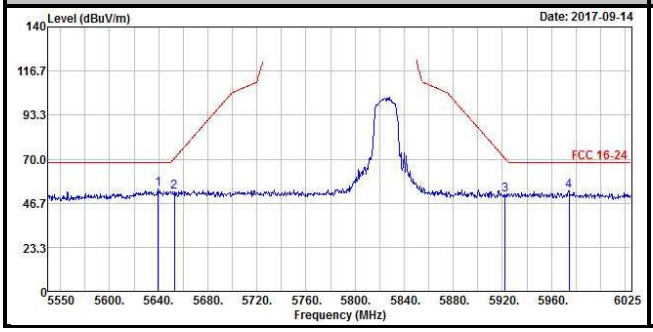
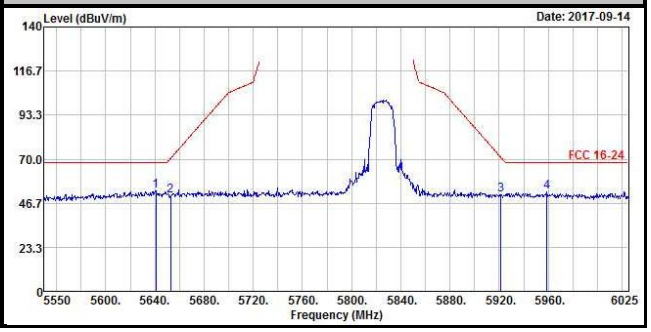
Horizontal



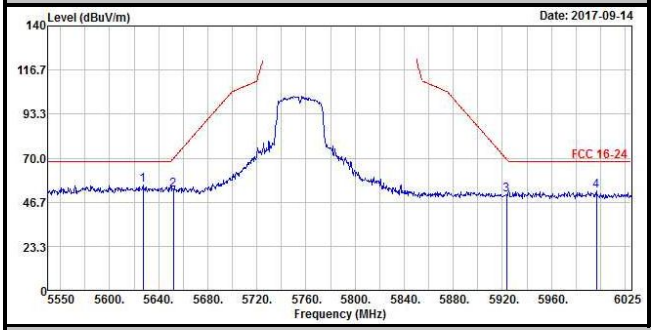
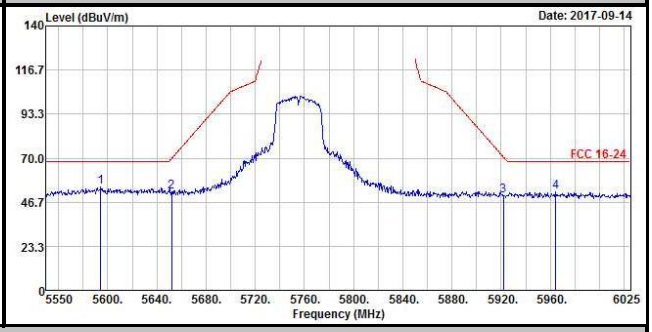
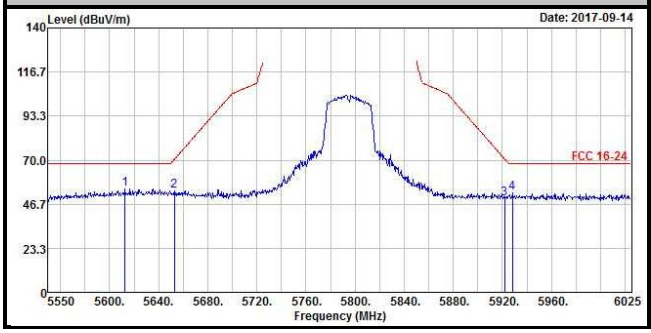
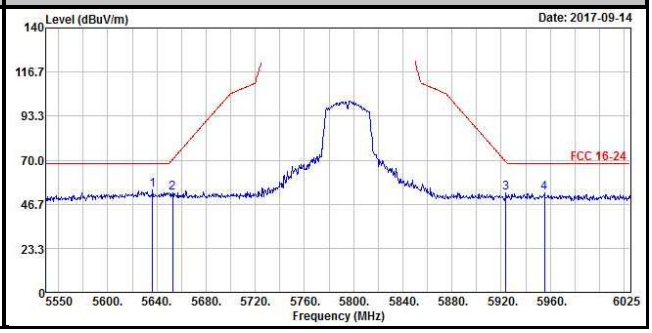
Vertical



802.11n (HT20)

Ch 149	
Horizontal	Vertical
	
Ch 157	
Horizontal	Vertical
	
Ch 165	
Horizontal	Vertical
	

802.11n (HT40)

Ch 151	
Horizontal	Vertical
	
Ch 159	
Horizontal	Vertical
	

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 FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

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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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