

FCC Test Report

Report No.: RF170601C08-1

FCC ID: 2AH2Q-DREEM

Test Model: DREEM

Received Date: Jun. 01, 2017

Test Date: Jun. 28, 2017 ~ Jul. 04, 2017

Issued Date: Jul. 19, 2017

Applicant: Rythm

Address: 5 Rue Scribe, 75009 Paris, France

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 Vil, Kwei Shan Dist., Taoyuan City
33383, Taiwan (R.O.C)



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

Table of Contents

Release Control Record	4
1 Certificate of Conformity	5
2 Summary of Test Results.....	6
2.1 Measurement Uncertainty.....	6
2.2 Modification Record	6
3 General Information	7
3.1 General Description of EUT	7
3.2 Description of Test Modes.....	8
3.2.1 Test Mode Applicability and Tested Channel Detail.....	9
3.3 Duty Cycle of Test Signal	11
3.4 Description of Support Units	11
3.4.1 Configuration of System under Test	11
3.5 General Description of Applied Standards.....	12
4 Test Types and Results	13
4.1 Radiated Emission and Bandedge Measurement	13
4.1.1 Limits of Radiated Emission and Bandedge Measurement	13
4.1.2 Limits of Unwanted Emission Out of the Restricted Bands	14
4.1.3 Test Instruments	15
4.1.4 Test Procedures.....	16
4.1.5 Deviation from Test Standard	16
4.1.6 Test Set Up	17
4.1.7 EUT Operating Conditions.....	18
4.1.8 Test Results	19
4.2 Conducted Emission Measurement.....	47
4.2.1 Limits of Conducted Emission Measurement	47
4.2.2 Test Instruments	47
4.2.3 Test Procedures.....	48
4.2.4 Deviation from Test Standard	48
4.2.5 Test Setup.....	48
4.2.6 EUT Operating Conditions.....	48
4.2.7 Test Results	49
4.3 Transmit Power Measurement.....	51
4.3.1 Limits of Transmit Power Measurement	51
4.3.2 Test Setup.....	51
4.3.3 Test Instruments	52
4.3.4 Test Procedure	52
4.3.5 Deviation from Test Standard	52
4.3.6 EUT Operating Conditions.....	52
4.3.7 Test Result	53
4.4 Peak Power Spectral Density Measurement	56
4.4.1 Limits of Peak Power Spectral Density Measurement	56
4.4.2 Test Setup.....	56
4.4.3 Test Instruments	56
4.4.4 Test Procedures.....	56
4.4.5 Deviation from Test Standard	57
4.4.6 EUT Operating Conditions.....	57
4.4.7 Test Results	58
4.5 Frequency Stability	61
4.5.1 Limit of Frequency Stability Measurement	61
4.5.2 Test Setup.....	61
4.5.3 Test Instruments	61
4.5.4 Test Procedure	61
4.5.5 Deviation from Test Standard	61

4.5.6 EUT Operating Condition	61
4.5.7 Test Results	62
4.6 6 dB Bandwidth Measurement.....	63
4.6.1 Limits of 6 dB Bandwidth Measurement.....	63
4.6.2 Test Setup.....	63
4.6.3 Test Instruments	63
4.6.4 Test Procedure	63
4.6.5 Deviation from Test Standard	63
4.6.6 EUT Operating Condition	63
4.6.7 Test Results	64
5 Pictures of Test Arrangements.....	65
Annex A- Radiated Out of Band Emisison (OOBE) Measurement (For U-NII-3 band)	66
Appendix – Information on the Testing Laboratories	68

Release Control Record

Issue No.	Description	Date Issued
RF170601C08-1	Original Release	Jul. 19, 2017

1 Certificate of Conformity

Product: Sleep tracking device

Brand: RYTHM

Test Model: DREEM

Sample Status: Production Unit

Applicant: Rythm

Test Date: Jun. 28, 2017 ~ Jul. 04, 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 : Rona Chen , **Date:** Jul. 19, 2017
Rona Chen / Specialist

Approved by : David Huang , **Date:** Jul. 19, 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 -8.79 dB at 0.35800 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 -4.3 dB at 5725 MHz.
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)	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 OOB 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	Expanded 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	Sleep tracking device
Brand	RYTHM
Test Model	DREEM
Status of EUT	Production Unit
Power Supply Rating	5.0 Vdc (adapter or host equipment) 3.7 Vdc (Li-ion battery)
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, 5260 ~ 5320 MHz, 5500 ~ 5700 MHz, 5745 ~ 5825 MHz
Number of Channel	5180 ~ 5240 MHz: 4 for 802.11a, 802.11n (HT20) 5260 ~ 5320 MHz: 4 for 802.11a, 802.11n (HT20) 5500 ~ 5700 MHz: 11 for 802.11a, 802.11n (HT20) 5745 ~ 5825 MHz: 5 for 802.11a, 802.11n (HT20)
Output Power	27.353 mW for 5180 ~ 5240 MHz 27.04 mW for 5260 ~ 5320 MHz 26.363 mW for 5500 ~ 5700 MHz 30.13 mW for 5745 ~ 5825 MHz
Antenna Type	Chip antenna with -1.49 dBi gain (5180 ~ 5240 MHz) Chip antenna with -1.49 dBi gain (5260 ~ 5320 MHz) Chip antenna with -1.77 dBi gain (5500 ~ 5700 MHz) Chip antenna with -1.83 dBi gain (5745 ~ 5825 MHz)
Antenna Connector	N/A
Accessory Device	Refer to Note as below
Data Cable Supplied	Refer to Note as below

Note:

1. Physically, the EUT provides 1 completed transmitter and 1 receiver.

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

2. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter	Unifive	UBX305-0510	I/P: 100-240 Vac, 50/60 Hz, 150 mA O/P: 5 Vdc, 1 A
Battery	JS Power	AL653450	3.7 Vdc, 1200 mAh

3. 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

For 5260 ~ 5320 MHz

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

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

For 5500 ~ 5700 MHz

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

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

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		

3.2.1 Test Mode Applicability and Tested Channel Detail

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

Where **RE $\geq$ 1G**: Radiated Emission above 1 GHz

RE<1G: Radiated Emission below 1 GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

Note:

- The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane** for U-NII-1 and U-NII-2A, **X-plane** for U-NII-2C and U-NII-3.

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
-	5260-5320	802.11a	52 to 64	52, 60, 64	OFDM	BPSK	6.0
-		802.11n (HT20)	52 to 64	52, 60, 64	OFDM	BPSK	MCS0
-	5500-5700	802.11a	100 to 140	100, 116, 140	OFDM	BPSK	6.0
-		802.11n (HT20)	100 to 140	100, 116, 140	OFDM	BPSK	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

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	802.11a	36 to 48	36	OFDM	BPSK	6.0
-	5260-5320	802.11a	52 to 64	64	OFDM	BPSK	6.0
-	5500-5700	802.11a	100 to 140	140	OFDM	BPSK	6.0
-	5745-5825	802.11n (HT20)	149 to 165	157	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)
-	5180-5240	802.11a	100 to 140	140	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
-	5260-5320	802.11a	52 to 64	52, 60, 64	OFDM	BPSK	6.0
-		802.11n (HT20)	52 to 64	52, 60, 64	OFDM	BPSK	MCS0
-	5500-5700	802.11a	100 to 140	100, 116, 140	OFDM	BPSK	6.0
-		802.11n (HT20)	100 to 140	100, 116, 140	OFDM	BPSK	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

Test Condition:

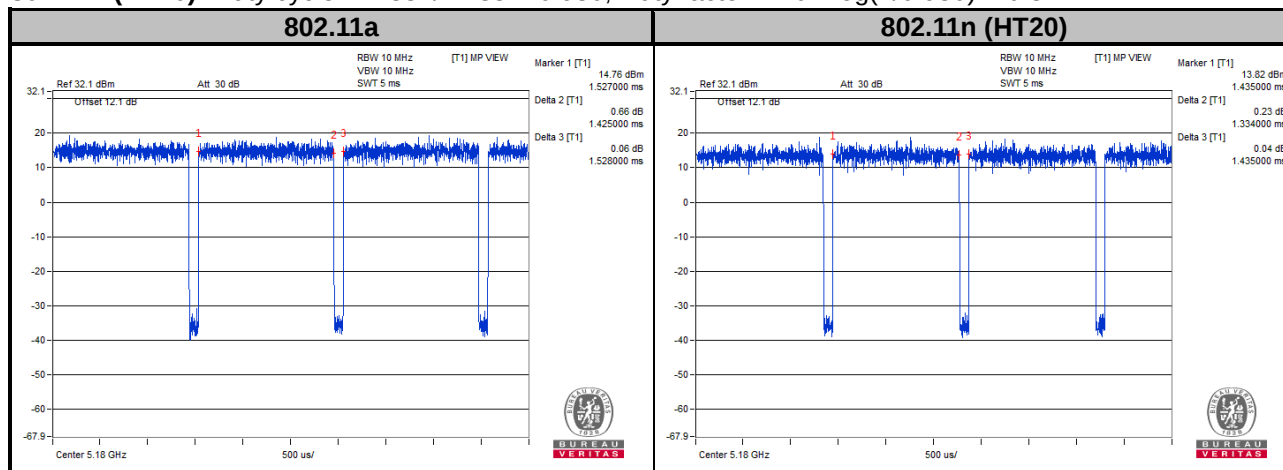
Applicable To	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Gavin Wu
RE<1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Gavin Wu
PLC	25 deg. C, 65 % RH	120 Vac, 60 Hz	Getaz Yang
APCM	25 deg. C, 65 % RH	3.7 Vdc	Carlos Chen

3.3 Duty Cycle of Test Signal

MODULATION TYPE: BPSK

802.11a: Duty cycle = $1.425/1.528 = 0.933$, Duty factor = $10 * \log(1/0.933) = 0.30$

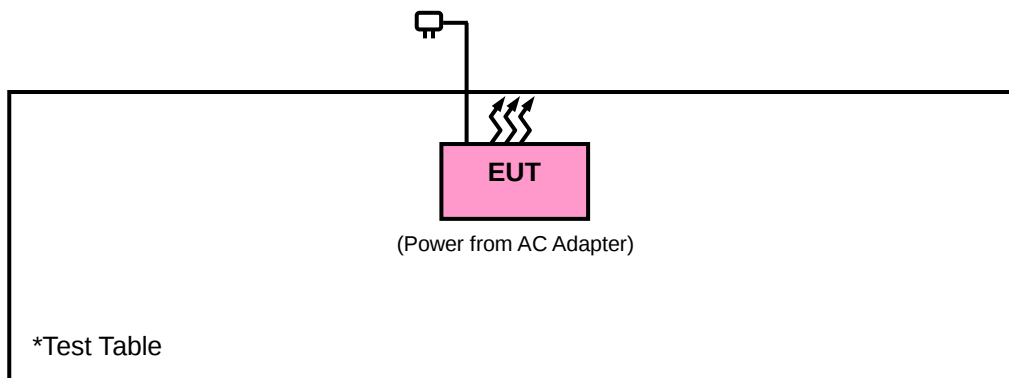
802.11n (HT20): Duty cycle = $1.334/1.435 = 0.930$, Duty factor = $10 * \log(1/0.930) = 0.32$



3.4 Description of Support Units

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

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:

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

4.1.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	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	BW-N10W5+	NA	Jul. 08, 2016	Jul. 07, 2017
Loop Antenna	EM-6879	269	Aug. 11, 2016	Aug. 10, 2017
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	1232002	Sep. 08, 2016	Sep. 07, 2017
Power Sensor Anritsu	MA2411B	1207325	Sep. 08, 2016	Sep. 07, 2017
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
Temperature & Humidity Chamber	GTH-120-40-CP-AR	MAA1306-019	Sep. 02, 2016	Sep. 01, 2017
DC Power Supply Topward	33010D	807748	Oct. 27, 2014	Oct. 26, 2016
Digital Multimeter Fluke	87-III	70360742	Jul. 01, 2016	Jun. 30, 2017
			Jun. 30, 2017	Jun. 29, 2018

- 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 preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz 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 (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:

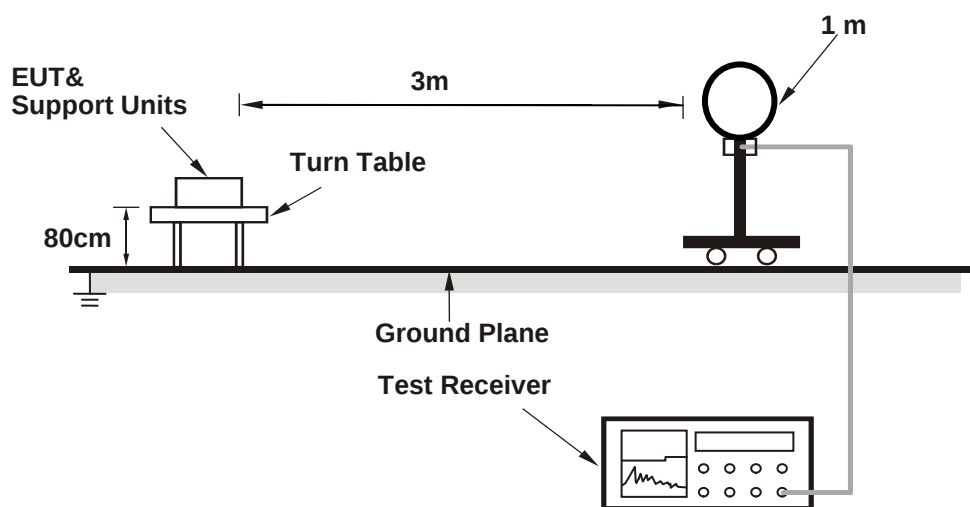
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz & 360 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency 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

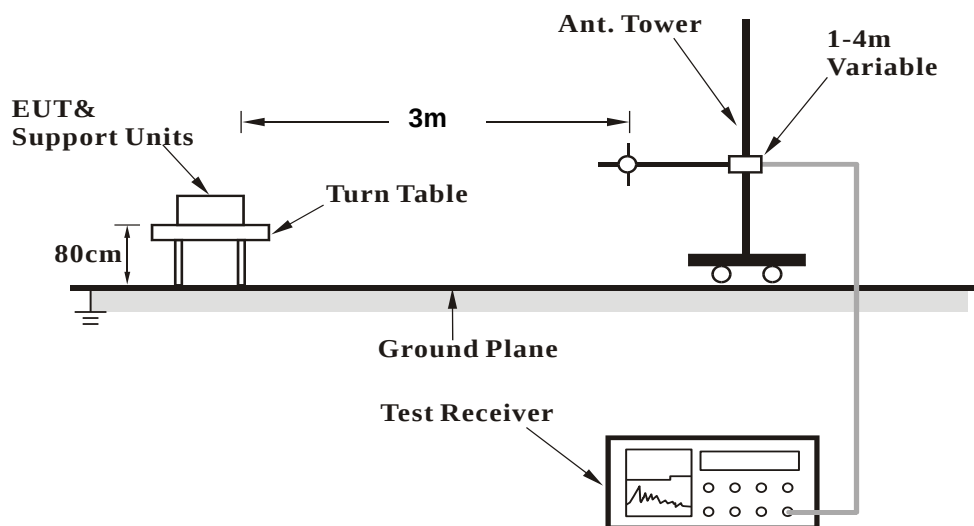
No deviation.

4.1.6 Test Set Up

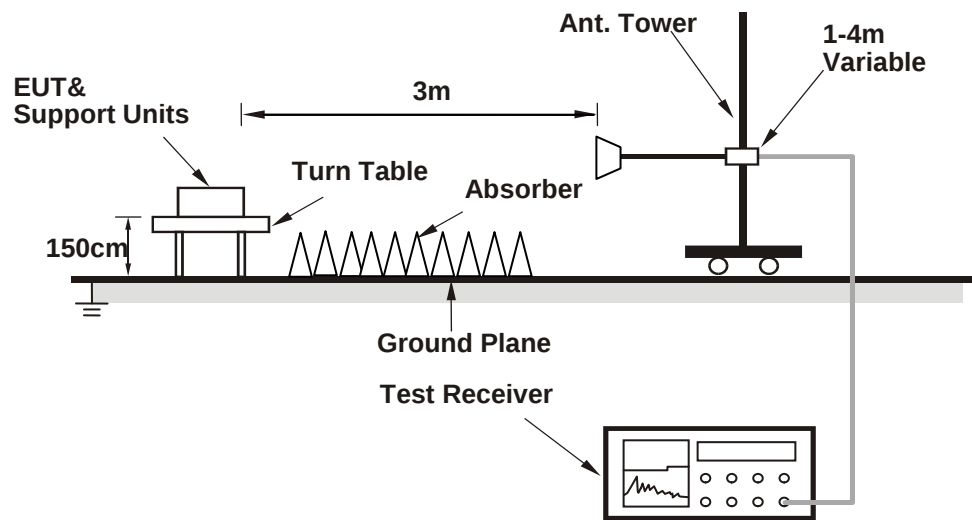
<Radiated emission below 30MHz>



<Frequency Range below 1 GHz>



<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

- Placed the EUT on a testing table.
- 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
5150	46.43	46.23	54	-7.57	31.32	6.2	37.32	190	39	Average
5150	64.47	64.27	74	-9.53	31.32	6.2	37.32	190	39	Peak
5180	88.71	88.48			31.35	6.22	37.34	190	39	Average
5180	98	97.77			31.35	6.22	37.34	190	39	Peak
*10360	53.85	57.75	68.2	-14.35	39.19	9.05	52.14	103	111	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
5134	43.74	43.53	54	-10.26	31.31	6.2	37.3	173	268	Average
5134	60.62	60.41	74	-13.38	31.31	6.2	37.3	173	268	Peak
5180	86.37	86.14			31.35	6.22	37.34	173	268	Average
5180	95.29	95.06			31.35	6.22	37.34	173	268	Peak
*10360	53.5	57.4	68.2	-14.7	39.19	9.05	52.14	100	128	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5180 MHz: Fundamental Frequency
- *: 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	38.26	38.08	54	-15.74	31.29	6.19	37.3	193	39	Average
5120	59.41	59.23	74	-14.59	31.29	6.19	37.3	193	39	Peak
5220	90.33	90.08			31.37	6.24	37.36	193	39	Average
5220	98.4	98.15			31.37	6.24	37.36	193	39	Peak
5414	38.28	37.61	54	-15.72	31.53	6.32	37.18	193	39	Average
5414	60.33	59.66	74	-13.67	31.53	6.32	37.18	193	39	Peak
*10440	54.04	58.14	68.2	-14.16	39.29	9.09	52.48	100	125	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
5080	38.11	37.94	54	-15.89	31.27	6.17	37.27	178	270	Average
5080	59.52	59.35	74	-14.48	31.27	6.17	37.27	178	270	Peak
5220	88.41	88.16			31.37	6.24	37.36	178	270	Average
5220	96.46	96.21			31.37	6.24	37.36	178	270	Peak
5410	38.4	37.74	54	-15.6	31.52	6.32	37.18	178	270	Average
5410	59.95	59.29	74	-14.05	31.52	6.32	37.18	178	270	Peak
*10440	54.52	58.62	68.2	-13.68	39.29	9.09	52.48	107	148	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5220 MHz: Fundamental Frequency
- *: 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
5020	38.07	37.95	54	-15.93	31.21	6.15	37.24	195	38	Average
5020	61.12	61	74	-12.88	31.21	6.15	37.24	195	38	Peak
5240	88.65	88.33			31.39	6.25	37.32	195	38	Average
5240	98.65	98.33			31.39	6.25	37.32	195	38	Peak
5390	38.4	37.76	54	-15.6	31.51	6.31	37.18	195	38	Average
5390	60.23	59.59	74	-13.77	31.51	6.31	37.18	195	38	Peak
*10480	54.39	58.64	68.2	-13.81	39.37	9.09	52.71	107	44	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
5106	38.08	37.88	54	-15.92	31.29	6.19	37.28	173	271	Average
5106	59.03	58.83	74	-14.97	31.29	6.19	37.28	173	271	Peak
5240	87.74	87.42			31.39	6.25	37.32	173	271	Average
5240	96.99	96.67			31.39	6.25	37.32	173	271	Peak
5362	38.38	37.76	54	-15.62	31.49	6.31	37.18	173	271	Average
5362	60.06	59.44	74	-13.94	31.49	6.31	37.18	173	271	Peak
*10480	54.65	58.9	68.2	-13.55	39.37	9.09	52.71	101	195	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 52	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	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
5038	37.93	37.78	54	-16.07	31.24	6.15	37.24	174	321	Average
5038	60.29	60.14	74	-13.71	31.24	6.15	37.24	174	321	Peak
5260	90.03	89.64			31.41	6.25	37.27	174	321	Average
5260	98.89	98.5			31.41	6.25	37.27	174	321	Peak
5400	38.36	37.7	54	-15.64	31.52	6.32	37.18	174	321	Average
5400	59.42	58.76	74	-14.58	31.52	6.32	37.18	174	321	Peak
*10520	54.59	58.87	68.2	-13.61	39.43	9.12	52.83	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
5140	38.05	37.83	54	-15.95	31.32	6.2	37.3	185	59	Average
5140	59.89	59.67	74	-14.11	31.32	6.2	37.3	185	59	Peak
5260	85.85	85.46			31.41	6.25	37.27	185	59	Average
5260	95.05	94.66			31.41	6.25	37.27	185	59	Peak
5386	38.15	37.51	54	-15.85	31.51	6.31	37.18	185	59	Average
5386	59.37	58.73	74	-14.63	31.51	6.31	37.18	185	59	Peak
*10520	54.16	58.44	68.2	-14.04	39.43	9.12	52.83	105	122	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5260 MHz: Fundamental Frequency
- *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 60	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	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
5054	37.8	37.64	54	-16.2	31.24	6.17	37.25	174	320	Average
5054	58.84	58.68	74	-15.16	31.24	6.17	37.25	174	320	Peak
5300	90.72	90.2			31.44	6.27	37.19	174	320	Average
5300	98.97	98.45			31.44	6.27	37.19	174	320	Peak
5364	39.87	39.25	54	-14.13	31.49	6.31	37.18	174	320	Average
5364	59.98	59.36	74	-14.02	31.49	6.31	37.18	174	320	Peak
10600	44.73	48.41	54	-9.27	39.57	9.16	52.41	100	199	Average
10600	56	59.68	74	-18	39.57	9.16	52.41	100	199	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
5092	38.97	38.77	54	-15.03	31.28	6.19	37.27	185	59	Average
5092	59.35	59.15	74	-14.65	31.28	6.19	37.27	185	59	Peak
5300	86.33	85.81			31.44	6.27	37.19	185	59	Average
5300	95.14	94.62			31.44	6.27	37.19	185	59	Peak
5418	38.92	38.25	54	-15.08	31.53	6.32	37.18	185	59	Average
5418	58.95	58.28	74	-15.05	31.53	6.32	37.18	185	59	Peak
10600	44.16	47.84	54	-9.84	39.57	9.16	52.41	106	119	Average
10600	54.97	58.65	74	-19.03	39.57	9.16	52.41	106	119	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5300 MHz: Fundamental Frequency
- *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 64	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	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
5320	89.96	89.41			31.45	6.29	37.19	189	340	Average
5320	98.88	98.33			31.45	6.29	37.19	189	340	Peak
5350	46.17	45.58	54	-7.83	31.48	6.29	37.18	189	340	Average
5350	63.18	62.59	74	-10.82	31.48	6.29	37.18	189	340	Peak
10640	45.47	48.92	54	-8.53	39.62	9.2	52.27	100	154	Average
10640	57.04	60.49	74	-16.96	39.62	9.2	52.27	100	154	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
5320	87.26	86.71			31.45	6.29	37.19	180	54	Average
5320	95.77	95.22			31.45	6.29	37.19	180	54	Peak
5350	45.09	44.5	54	-8.91	31.48	6.29	37.18	180	54	Average
5350	62.88	62.29	74	-11.12	31.48	6.29	37.18	180	54	Peak
10640	44.58	48.03	54	-9.42	39.62	9.2	52.27	103	127	Average
10640	56.29	59.74	74	-17.71	39.62	9.2	52.27	103	127	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5320 MHz: Fundamental Frequency
- *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 100	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	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
5370	40.08	39.46	54	-13.92	31.49	6.31	37.18	206	312	Average
5370	60.92	60.3	74	-13.08	31.49	6.31	37.18	206	312	Peak
*5470	59.54	58.71	68.2	-8.66	31.57	6.34	37.08	206	312	Peak
5500	83.28	82.35			31.6	6.36	37.03	206	312	Average
5500	100.1	99.17			31.6	6.36	37.03	206	312	Peak
*5725	59.42	58.14	68.2	-8.78	31.96	6.75	37.43	206	312	Peak
11000	44.52	48.42	54	-9.48	40.2	9.35	53.45	178	40	Average
11000	53.43	57.33	74	-20.57	40.2	9.35	53.45	178	40	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
5450	39.07	38.25	54	-14.93	31.56	6.34	37.08	223	317	Average
5450	60.35	59.53	74	-13.65	31.56	6.34	37.08	223	317	Peak
*5470	57.33	56.5	68.2	-10.87	31.57	6.34	37.08	223	317	Peak
5500	79.51	78.58			31.6	6.36	37.03	223	317	Average
5500	95.35	94.42			31.6	6.36	37.03	223	317	Peak
*5725	59.45	58.17	68.2	-8.75	31.96	6.75	37.43	223	317	Peak
11000	44.32	48.22	54	-9.68	40.2	9.35	53.45	200	117	Average
11000	54.43	58.33	74	-19.57	40.2	9.35	53.45	200	117	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5500 MHz: Fundamental Frequency
- *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 116	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	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
5396	38.52	37.87	54	-15.48	31.52	6.31	37.18	210	311	Average
5396	59.64	58.99	74	-14.36	31.52	6.31	37.18	210	311	Peak
*5470	59.35	58.52	68.2	-8.85	31.57	6.34	37.08	210	311	Peak
5580	84.97	83.93			31.71	6.49	37.16	210	311	Average
5580	100.1	99.06			31.71	6.49	37.16	210	311	Peak
*5725	59	57.72	68.2	-9.2	31.96	6.75	37.43	210	311	Peak
11600	45.13	48.74	54	-8.87	39.71	10.09	53.41	179	35	Average
11600	54.04	57.65	74	-19.96	39.71	10.09	53.41	179	35	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
5382	38.49	37.85	54	-15.51	31.51	6.31	37.18	222	320	Average
5382	61.07	60.43	74	-12.93	31.51	6.31	37.18	222	320	Peak
*5470	58.7	57.87	68.2	-9.5	31.57	6.34	37.08	222	320	Peak
5580	80.91	79.87			31.71	6.49	37.16	222	320	Average
5580	97.35	96.31			31.71	6.49	37.16	222	320	Peak
*5725	59.79	58.51	68.2	-8.41	31.96	6.75	37.43	222	320	Peak
11600	44.73	48.34	54	-9.27	39.71	10.09	53.41	205	117	Average
11600	52.32	55.93	74	-21.68	39.71	10.09	53.41	205	117	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5580 MHz: Fundamental Frequency
- *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 140	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	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
5454	38.37	37.55	54	-15.63	31.56	6.34	37.08	205	317	Average
5454	61.14	60.32	74	-12.86	31.56	6.34	37.08	205	317	Peak
*5470	57.68	56.85	68.2	-10.52	31.57	6.34	37.08	205	317	Peak
5700	84.42	83.23			31.9	6.69	37.4	205	317	Average
5700	100.97	99.78			31.9	6.69	37.4	205	317	Peak
*5725	63.9	62.62	68.2	-4.3	31.96	6.75	37.43	205	317	Peak
11400	46.29	48.55	54	-7.71	39.96	9.91	52.13	177	38	Average
11400	57.38	59.64	74	-16.62	39.96	9.91	52.13	177	38	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
5408	38.57	37.91	54	-15.43	31.52	6.32	37.18	220	333	Average
5408	60.25	59.59	74	-13.75	31.52	6.32	37.18	220	333	Peak
*5470	58.52	57.69	68.2	-9.68	31.57	6.34	37.08	220	333	Peak
5700	80.87	79.68			31.9	6.69	37.4	220	333	Average
5700	95.59	94.4			31.9	6.69	37.4	220	333	Peak
*5725	59.37	58.09	68.2	-8.83	31.96	6.75	37.43	220	333	Peak
11400	45.85	48.11	54	-8.15	39.96	9.91	52.13	201	115	Average
11400	57.87	60.13	74	-16.13	39.96	9.91	52.13	201	115	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5700 MHz: Fundamental Frequency
- *: 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	95.12	93.85			31.99	6.75	37.47	200	316	Average
5745	103.63	102.36			31.99	6.75	37.47	200	316	Peak
11490	43.34	46.23	54	-10.66	39.91	10.03	52.83	100	99	Average
11490	53.86	56.75	74	-20.14	39.91	10.03	52.83	100	99	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	89.51	88.24			31.99	6.75	37.47	122	245	Average
5745	98.97	97.7			31.99	6.75	37.47	122	245	Peak
11490	43.21	46.1	54	-10.79	39.91	10.03	52.83	100	177	Average
11490	54.92	57.81	74	-19.08	39.91	10.03	52.83	100	177	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
5597.975	51.99	50.92	68.2	-16.21	31.74	6.49	37.16	200	316	Peak
5653.075	50.75	49.56	70.49	-19.74	31.85	6.62	37.28	200	316	Peak
5923.35	49.9	48.1	69.42	-19.52	32.29	7.01	37.5	200	316	Peak
5977.5	52.05	50.11	68.2	-16.15	32.37	7.08	37.51	200	316	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
5621.25	50.56	49.43	68.2	-17.64	31.79	6.56	37.22	122	245	Peak
5653.55	48.38	47.19	70.84	-22.46	31.85	6.62	37.28	122	245	Peak
5923.35	49.15	47.35	69.42	-20.27	32.29	7.01	37.5	122	245	Peak
5974.175	51.72	49.78	68.2	-16.48	32.37	7.08	37.51	122	245	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5745 MHz: Fundamental Frequency
- *: 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	95.25	93.93			32.04	6.82	37.54	200	314	Average
5785	104.14	102.82			32.04	6.82	37.54	200	314	Peak
11570	43.47	46.93	54	-10.53	39.78	10.09	53.33	100	92	Average
11570	56.38	59.84	74	-17.62	39.78	10.09	53.33	100	92	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	88.78	87.46			32.04	6.82	37.54	122	247	Average
5785	98.02	96.7			32.04	6.82	37.54	122	247	Peak
11570	43.16	46.62	54	-10.84	39.78	10.09	53.33	100	174	Average
11570	55.5	58.96	74	-18.5	39.78	10.09	53.33	100	174	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	51.45	50.34	68.2	-16.75	31.77	6.56	37.22	200	316	Peak
5653.075	49.55	48.36	70.49	-20.94	31.85	6.62	37.28	200	316	Peak
5924.3	50.48	48.68	68.72	-18.24	32.29	7.01	37.5	200	316	Peak
6003.625	52.68	50.65	68.2	-15.52	32.4	7.14	37.51	200	316	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	51.36	50.23	68.2	-16.84	31.79	6.56	37.22	126	254	Peak
5654.025	48.32	47.19	71.19	-22.87	31.85	6.62	37.34	126	254	Peak
5920.975	48.57	46.8	71.17	-22.6	32.26	7.01	37.5	126	254	Peak
6013.125	51.22	49.13	68.2	-16.98	32.45	7.14	37.5	126	254	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5785 MHz: Fundamental Frequency
- *: 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	95.08	93.61			32.12	6.88	37.53	201	315	Average
5825	103.13	101.66			32.12	6.88	37.53	201	315	Peak
11650	43.2	46.75	54	-10.8	39.65	10.15	53.35	101	99	Average
11650	52.21	55.76	74	-21.79	39.65	10.15	53.35	101	99	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	88.74	87.27			32.12	6.88	37.53	125	247	Average
5825	97.53	96.06			32.12	6.88	37.53	125	247	Peak
11650	43.19	46.74	54	-10.81	39.65	10.15	53.35	100	179	Average
11650	51.02	54.57	74	-22.98	39.65	10.15	53.35	100	179	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
5640.725	51.6	50.5	68.2	-16.6	31.82	6.56	37.28	201	315	Peak
5653.55	48.99	47.8	70.84	-21.85	31.85	6.62	37.28	201	315	Peak
5922.4	49.96	48.16	70.12	-20.16	32.29	7.01	37.5	201	315	Peak
6022.625	51.73	49.64	68.2	-16.47	32.45	7.14	37.5	201	315	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
5622.675	50.61	49.48	68.2	-17.59	31.79	6.56	37.22	125	247	Peak
5653.075	49.12	47.93	70.49	-21.37	31.85	6.62	37.28	125	247	Peak
5920.975	50.22	48.45	71.17	-20.95	32.26	7.01	37.5	125	247	Peak
5947.575	52.02	50.12	68.2	-16.18	32.32	7.08	37.5	125	247	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
5112	39.41	39.21	54	-14.59	31.29	6.19	37.28	172	40	Average
5112	60.52	60.32	74	-13.48	31.29	6.19	37.28	172	40	Peak
5180	87.89	87.66			31.35	6.22	37.34	172	40	Average
5180	97.85	97.62			31.35	6.22	37.34	172	40	Peak
*10360	54.37	58.27	68.2	-13.83	39.19	9.05	52.14	100	155	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
5086	39.57	39.4	54	-14.43	31.27	6.17	37.27	175	271	Average
5086	59.35	59.18	74	-14.65	31.27	6.17	37.27	175	271	Peak
5180	86.47	86.24			31.35	6.22	37.34	175	271	Average
5180	95.3	95.07			31.35	6.22	37.34	175	271	Peak
*10360	53.81	57.71	68.2	-14.39	39.19	9.05	52.14	100	167	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5180 MHz: Fundamental Frequency
- *: 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
5096	38.18	37.99	54	-15.82	31.28	6.19	37.28	172	40	Average
5096	59.22	59.03	74	-14.78	31.28	6.19	37.28	172	40	Peak
5220	87.85	87.6			31.37	6.24	37.36	172	40	Average
5220	96.9	96.65			31.37	6.24	37.36	172	40	Peak
5368	38.25	37.63	54	-15.75	31.49	6.31	37.18	172	40	Average
5368	59.66	59.04	74	-14.34	31.49	6.31	37.18	172	40	Peak
*10440	55.04	59.14	68.2	-13.16	39.29	9.09	52.48	100	184	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
5116	38.03	37.83	54	-15.97	31.29	6.19	37.28	169	271	Average
5116	60	59.8	74	-14	31.29	6.19	37.28	169	271	Peak
5220	86.04	85.79			31.37	6.24	37.36	169	271	Average
5220	94.98	94.73			31.37	6.24	37.36	169	271	Peak
5456	38.44	37.62	54	-15.56	31.56	6.34	37.08	169	271	Average
5456	60.62	59.8	74	-13.38	31.56	6.34	37.08	169	271	Peak
*10440	54.12	58.22	68.2	-14.08	39.29	9.09	52.48	100	162	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5220 MHz: Fundamental Frequency
- *: 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
5012	38.12	38.01	54	-15.88	31.21	6.13	37.23	164	39	Average
5012	59.58	59.47	74	-14.42	31.21	6.13	37.23	164	39	Peak
5240	87.99	87.67			31.39	6.25	37.32	164	39	Average
5240	97.94	97.62			31.39	6.25	37.32	164	39	Peak
5408	38.37	37.71	54	-15.63	31.52	6.32	37.18	164	39	Average
5408	59.77	59.11	74	-14.23	31.52	6.32	37.18	164	39	Peak
*10480	54.79	59.04	68.2	-13.41	39.37	9.09	52.71	104	115	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
5144	38.06	37.86	54	-15.94	31.32	6.2	37.32	170	271	Average
5144	59.23	59.03	74	-14.77	31.32	6.2	37.32	170	271	Peak
5240	86.76	86.44			31.39	6.25	37.32	170	271	Average
5240	95.99	95.67			31.39	6.25	37.32	170	271	Peak
5350	38.28	37.69	54	-15.72	31.48	6.29	37.18	170	271	Average
5350	60.31	59.72	74	-13.69	31.48	6.29	37.18	170	271	Peak
*10480	54.15	58.4	68.2	-14.05	39.37	9.09	52.71	106	132	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 52	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	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
5058	38	37.83	54	-16	31.25	6.17	37.25	184	318	Average
5058	60.44	60.27	74	-13.56	31.25	6.17	37.25	184	318	Peak
5260	88.81	88.42			31.41	6.25	37.27	184	318	Average
5260	97.16	96.77			31.41	6.25	37.27	184	318	Peak
5448	38.35	37.58	54	-15.65	31.56	6.34	37.13	184	318	Average
5448	60.03	59.26	74	-13.97	31.56	6.34	37.13	184	318	Peak
*10520	55.3	59.58	68.2	-12.9	39.43	9.12	52.83	104	119	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
5030	37.87	37.73	54	-16.13	31.23	6.15	37.24	191	57	Average
5030	60.13	59.99	74	-13.87	31.23	6.15	37.24	191	57	Peak
5260	85.78	85.39			31.41	6.25	37.27	191	57	Average
5260	94.84	94.45			31.41	6.25	37.27	191	57	Peak
5414	38.21	37.54	54	-15.79	31.53	6.32	37.18	191	57	Average
5414	59.83	59.16	74	-14.17	31.53	6.32	37.18	191	57	Peak
*10520	54.73	59.01	68.2	-13.47	39.43	9.12	52.83	110	125	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5260 MHz: Fundamental Frequency
- *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 60	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	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
5044	37.88	37.74	54	-16.12	31.24	6.15	37.25	184	317	Average
5044	59.72	59.58	74	-14.28	31.24	6.15	37.25	184	317	Peak
5300	88.06	87.54			31.44	6.27	37.19	184	317	Average
5300	97.18	96.66			31.44	6.27	37.19	184	317	Peak
5368	39.46	38.84	54	-14.54	31.49	6.31	37.18	184	317	Average
5368	59.79	59.17	74	-14.21	31.49	6.31	37.18	184	317	Peak
10600	44.96	48.64	54	-9.04	39.57	9.16	52.41	108	145	Average
10600	55.58	59.26	74	-18.42	39.57	9.16	52.41	108	145	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
5064	37.96	37.79	54	-16.04	31.25	6.17	37.25	185	56	Average
5064	60.24	60.07	74	-13.76	31.25	6.17	37.25	185	56	Peak
5300	85.95	85.43			31.44	6.27	37.19	185	56	Average
5300	94.58	94.06			31.44	6.27	37.19	185	56	Peak
5454	38.97	38.15	54	-15.03	31.56	6.34	37.08	185	56	Average
5454	60.21	59.39	74	-13.79	31.56	6.34	37.08	185	56	Peak
10600	44.17	47.85	54	-9.83	39.57	9.16	52.41	100	142	Average
10600	55.3	58.98	74	-18.7	39.57	9.16	52.41	100	142	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5300 MHz: Fundamental Frequency
- *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 64	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	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
5320	88.12	87.57			31.45	6.29	37.19	183	316	Average
5320	97.47	96.92			31.45	6.29	37.19	183	316	Peak
5386	39.98	39.34	54	-14.02	31.51	6.31	37.18	183	316	Average
5386	61.08	60.44	74	-12.92	31.51	6.31	37.18	183	316	Peak
10640	45.13	48.58	54	-8.87	39.62	9.2	52.27	100	136	Average
10640	56.88	60.33	74	-17.12	39.62	9.2	52.27	100	136	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
5320	86.1	85.55			31.45	6.29	37.19	184	55	Average
5320	94.45	93.9			31.45	6.29	37.19	184	55	Peak
5424	39.83	39.16	54	-14.17	31.53	6.32	37.18	184	55	Average
5424	59.88	59.21	74	-14.12	31.53	6.32	37.18	184	55	Peak
10640	44.47	47.92	54	-9.53	39.62	9.2	52.27	100	158	Average
10640	56.18	59.63	74	-17.82	39.62	9.2	52.27	100	158	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5320 MHz: Fundamental Frequency
- *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 100	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	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
5406	40.15	39.49	54	-13.85	31.52	6.32	37.18	205	316	Average
5406	59.9	59.24	74	-14.1	31.52	6.32	37.18	205	316	Peak
*5470	59.34	58.51	68.2	-8.86	31.57	6.34	37.08	205	316	Peak
5500	82.11	81.18			31.6	6.36	37.03	205	316	Average
5500	99.89	98.96			31.6	6.36	37.03	205	316	Peak
*5725	58.28	57	68.2	-9.92	31.96	6.75	37.43	205	316	Peak
11000	44.75	48.65	54	-9.25	40.2	9.35	53.45	178	41	Average
11000	53.69	57.59	74	-20.31	40.2	9.35	53.45	178	41	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
5354	39.15	38.56	54	-14.85	31.48	6.29	37.18	224	317	Average
5354	61.53	60.94	74	-12.47	31.48	6.29	37.18	224	317	Peak
*5470	59.46	58.63	68.2	-8.74	31.57	6.34	37.08	224	317	Peak
5500	77.33	76.4			31.6	6.36	37.03	224	317	Average
5500	94.09	93.16			31.6	6.36	37.03	224	317	Peak
*5725	59.56	58.28	68.2	-8.64	31.96	6.75	37.43	224	317	Peak
11000	44.34	48.24	54	-9.66	40.2	9.35	53.45	199	109	Average
11000	54.89	58.79	74	-19.11	40.2	9.35	53.45	199	109	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5500 MHz: Fundamental Frequency
- *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 116	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	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
5370	38.48	37.86	54	-15.52	31.49	6.31	37.18	205	314	Average
5370	61.55	60.93	74	-12.45	31.49	6.31	37.18	205	314	Peak
*5470	58.28	57.45	68.2	-9.92	31.57	6.34	37.08	205	314	Peak
5580	84.3	83.26			31.71	6.49	37.16	205	314	Average
5580	100.89	99.85			31.71	6.49	37.16	205	314	Peak
*5725	58.03	56.75	68.2	-10.17	31.96	6.75	37.43	205	314	Peak
11600	45.13	48.74	54	-8.87	39.71	10.09	53.41	179	45	Average
11600	53.94	57.55	74	-20.06	39.71	10.09	53.41	179	45	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
5434	38.46	37.72	54	-15.54	31.55	6.32	37.13	226	316	Average
5434	60.77	60.03	74	-13.23	31.55	6.32	37.13	226	316	Peak
*5470	58.55	57.72	68.2	-9.65	31.57	6.34	37.08	226	316	Peak
5580	78.22	77.18			31.71	6.49	37.16	226	316	Average
5580	94.79	93.75			31.71	6.49	37.16	226	316	Peak
*5725	60.32	59.04	68.2	-7.88	31.96	6.75	37.43	226	316	Peak
11600	44.6	48.21	54	-9.4	39.71	10.09	53.41	205	117	Average
11600	53.44	57.05	74	-20.56	39.71	10.09	53.41	205	117	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5580 MHz: Fundamental Frequency
- *: Out of Restricted Band

EUT Test Condition		Measurement Detail	
Channel	Channel 140	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	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
5436	38.39	37.65	54	-15.61	31.55	6.32	37.13	205	314	Average
5436	59.74	59	74	-14.26	31.55	6.32	37.13	205	314	Peak
*5470	58.08	57.25	68.2	-10.12	31.57	6.34	37.08	205	314	Peak
5700	84.08	82.89			31.9	6.69	37.4	205	314	Average
5700	100.7	99.51			31.9	6.69	37.4	205	314	Peak
*5725	62.71	61.43	68.2	-5.49	31.96	6.75	37.43	205	314	Peak
11400	45.86	48.12	54	-8.14	39.96	9.91	52.13	178	39	Average
11400	55.69	57.95	74	-18.31	39.96	9.91	52.13	178	39	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
5384	38.4	37.76	54	-15.6	31.51	6.31	37.18	189	317	Average
5384	60.63	59.99	74	-13.37	31.51	6.31	37.18	189	317	Peak
*5470	56.48	55.65	68.2	-11.72	31.57	6.34	37.08	189	317	Peak
5700	78.85	77.66			31.9	6.69	37.4	189	317	Average
5700	94.71	93.52			31.9	6.69	37.4	189	317	Peak
*5725	58.36	57.08	68.2	-9.84	31.96	6.75	37.43	189	317	Peak
11400	45.84	48.1	54	-8.16	39.96	9.91	52.13	202	116	Average
11400	57.43	59.69	74	-16.57	39.96	9.91	52.13	202	116	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5700 MHz: Fundamental Frequency
- *: 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	91.8	90.53			31.99	6.75	37.47	231	319	Average
5745	101.35	100.08			31.99	6.75	37.47	231	319	Peak
11490	43.84	46.73	54	-10.16	39.91	10.03	52.83	100	93	Average
11490	54.15	57.04	74	-19.85	39.91	10.03	52.83	100	93	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	87.63	86.36			31.99	6.75	37.47	232	326	Average
5745	97.27	96			31.99	6.75	37.47	232	326	Peak
11490	43.51	46.4	54	-10.49	39.91	10.03	52.83	100	175	Average
11490	54.33	57.22	74	-19.67	39.91	10.03	52.83	100	175	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
5645	47.53	46.37	68.2	-20.67	31.82	6.62	37.28	231	319	Peak
5653.075	48.04	46.85	70.49	-22.45	31.85	6.62	37.28	231	319	Peak
5917.175	48.19	46.42	73.97	-25.78	32.26	7.01	37.5	231	319	Peak
5930.95	48.77	46.97	68.2	-19.43	32.29	7.01	37.5	231	319	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
5645.95	47.44	46.28	68.2	-20.76	31.82	6.62	37.28	232	326	Peak
5655.45	47.27	46.14	72.25	-24.98	31.85	6.62	37.34	232	326	Peak
5920.5	46.82	45.05	71.52	-24.7	32.26	7.01	37.5	232	326	Peak
5930.475	48.21	46.41	68.2	-19.99	32.29	7.01	37.5	232	326	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5745 MHz: Fundamental Frequency
- *: 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	84.51	83.19			32.04	6.82	37.54	200	316	Average
5785	101.59	100.27			32.04	6.82	37.54	200	316	Peak
11570	43.89	47.35	54	-10.11	39.78	10.09	53.33	100	94	Average
11570	53.44	56.9	74	-20.56	39.78	10.09	53.33	100	94	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	80.93	79.61			32.04	6.82	37.54	126	254	Average
5785	97.44	96.12			32.04	6.82	37.54	126	254	Peak
11570	43.49	46.95	54	-10.51	39.78	10.09	53.33	101	178	Average
11570	53.86	57.32	74	-20.14	39.78	10.09	53.33	101	178	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	51.45	50.34	68.2	-16.75	31.77	6.56	37.22	200	316	Peak
5653.075	49.55	48.36	70.49	-20.94	31.85	6.62	37.28	200	316	Peak
5924.3	50.48	48.68	68.72	-18.24	32.29	7.01	37.5	200	316	Peak
6003.625	52.68	50.65	68.2	-15.52	32.4	7.14	37.51	200	316	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	51.36	50.23	68.2	-16.84	31.79	6.56	37.22	126	254	Peak
5654.025	48.32	47.19	71.19	-22.87	31.85	6.62	37.34	126	254	Peak
5920.975	48.57	46.8	71.17	-22.6	32.26	7.01	37.5	126	254	Peak
6013.125	51.22	49.13	68.2	-16.98	32.45	7.14	37.5	126	254	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5785 MHz: Fundamental Frequency
- *: 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	91.45	89.98			32.12	6.88	37.53	237	320	Average
5825	101.2	99.73			32.12	6.88	37.53	237	320	Peak
11650	43.4	46.95	54	-10.6	39.65	10.15	53.35	101	98	Average
11650	51.76	55.31	74	-22.24	39.65	10.15	53.35	101	98	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	87.54	86.07			32.12	6.88	37.53	257	325	Average
5825	97.59	96.12			32.12	6.88	37.53	257	325	Peak
11650	43.02	46.57	54	-10.98	39.65	10.15	53.35	105	169	Average
11650	52.52	56.07	74	-21.48	39.65	10.15	53.35	105	169	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
5645.475	48.06	46.9	68.2	-20.14	31.82	6.62	37.28	237	320	Peak
5656.4	48.25	47.12	72.95	-24.7	31.85	6.62	37.34	237	320	Peak
5914.325	50.62	48.85	76.07	-25.45	32.26	7.01	37.5	237	320	Peak
5926.675	49.58	47.78	68.2	-18.62	32.29	7.01	37.5	237	320	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
5645.95	49.3	48.14	68.2	-18.9	31.82	6.62	37.28	257	325	Peak
5659.25	46.08	44.95	75.07	-28.99	31.85	6.62	37.34	257	325	Peak
5917.65	49.15	47.38	73.62	-24.47	32.26	7.01	37.5	257	325	Peak
5925.725	48.56	46.76	68.2	-19.64	32.29	7.01	37.5	257	325	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5825 MHz: Fundamental Frequency
- *: 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:

802.11a

EUT Test Condition		Measurement Detail	
Channel	Channel 36	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
177.44	31.12	50.73	43.5	-12.38	11.01	1.19	31.81	118	152	Peak
197.81	38.39	59.36	43.5	-5.11	9.5	1.28	31.75	125	352	Peak
214.3	23.83	44.15	43.5	-19.67	9.97	1.35	31.64	138	251	Peak
494.63	28.7	41.11	46	-17.3	17.21	2.08	31.7	109	11	Peak
576.11	28.07	38.89	46	-17.93	19.06	2.22	32.1	132	67	Peak
652.74	26.43	35.83	46	-19.57	20.24	2.36	32	101	320	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
90.14	24.02	46.71	43.5	-19.48	8.3	0.97	31.96	118	122	Peak
166.77	25.25	43.84	43.5	-18.25	12.05	1.13	31.77	116	95	Peak
197.81	27.8	48.77	43.5	-15.7	9.5	1.28	31.75	140	55	Peak
494.63	26.89	39.3	46	-19.11	17.21	2.08	31.7	111	63	Peak
576.11	27.47	38.29	46	-18.53	19.06	2.22	32.1	119	199	Peak
709.97	27.27	35.58	46	-18.73	20.96	2.47	31.74	110	334	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 64	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
160.95	27.42	45.5	43.5	-16.08	12.63	1.15	31.86	138	305	Peak
197.81	39.08	60.05	43.5	-4.42	9.5	1.28	31.75	116	298	Peak
288.02	25.71	43.21	46	-20.29	12.6	1.6	31.7	118	113	Peak
422.85	20.07	34.38	46	-25.93	15.79	1.94	32.04	111	39	Peak
480.08	25.9	38.77	46	-20.1	16.93	2.05	31.85	133	34	Peak
576.11	28.75	39.57	46	-17.25	19.06	2.22	32.1	134	51	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
89.17	25.71	48.38	43.5	-17.79	8.28	0.96	31.91	105	56	Peak
197.81	27.7	48.67	43.5	-15.8	9.5	1.28	31.75	101	200	Peak
480.08	24.57	37.44	46	-21.43	16.93	2.05	31.85	123	350	Peak
527.61	24.02	35.6	46	-21.98	17.95	2.14	31.67	135	338	Peak
576.11	26.79	37.61	46	-19.21	19.06	2.22	32.1	133	179	Peak
672.14	25.27	34.21	46	-20.73	20.48	2.4	31.82	140	9	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 140	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
197.81	38.52	59.49	43.5	-4.98	9.5	1.28	31.75	104	263	Peak
288.02	25.96	43.46	46	-20.04	12.6	1.6	31.7	112	164	Peak
422.85	19.97	34.28	46	-26.03	15.79	1.94	32.04	119	66	Peak
517.91	26.29	38.01	46	-19.71	17.73	2.12	31.57	113	88	Peak
576.11	29	39.82	46	-17	19.06	2.22	32.1	105	144	Peak
672.14	26.74	35.68	46	-19.26	20.48	2.4	31.82	120	275	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
42.61	27.98	44.82	40	-12.02	13.58	0.66	31.08	106	329	Peak
88.2	26.29	48.94	43.5	-17.21	8.27	0.95	31.87	122	45	Peak
197.81	29.92	50.89	43.5	-13.58	9.5	1.28	31.75	140	40	Peak
480.08	24.91	37.78	46	-21.09	16.93	2.05	31.85	122	249	Peak
576.11	26.49	37.31	46	-19.51	19.06	2.22	32.1	133	355	Peak
623.64	25.9	35.87	46	-20.1	19.89	2.3	32.16	103	18	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value

802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 157	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
168.71	30.31	49.03	43.5	-13.19	11.86	1.16	31.74	108	158	Peak
197.81	38.62	59.59	43.5	-4.88	9.5	1.28	31.75	128	205	Peak
288.02	26.31	43.81	46	-19.69	12.6	1.6	31.7	106	37	Peak
441.28	23.83	37.7	46	-22.17	16.16	1.97	32	103	119	Peak
494.63	28.61	41.02	46	-17.39	17.21	2.08	31.7	138	175	Peak
576.11	27.68	38.5	46	-18.32	19.06	2.22	32.1	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
197.81	27.54	48.51	43.5	-15.96	9.5	1.28	31.75	123	152	Peak
364.65	20.45	36.1	46	-25.55	14.49	1.81	31.95	138	30	Peak
480.08	25.31	38.18	46	-20.69	16.93	2.05	31.85	122	155	Peak
576.11	26.49	37.31	46	-19.51	19.06	2.22	32.1	136	352	Peak
623.64	26.35	36.32	46	-19.65	19.89	2.3	32.16	113	34	Peak
748.77	29.52	36.81	46	-16.48	21.5	2.53	31.32	136	227	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 0.50 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 Woken	5D-FB	Cable-cond1-01	Dec. 22, 2016	Dec. 21, 2017
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Mar. 10, 2017	Mar. 09, 2018
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 28, 2016	Jul. 27, 2017
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

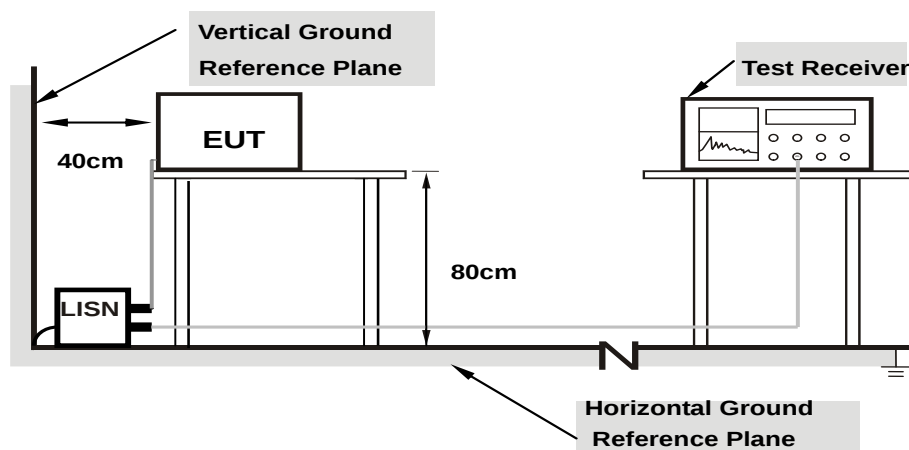
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

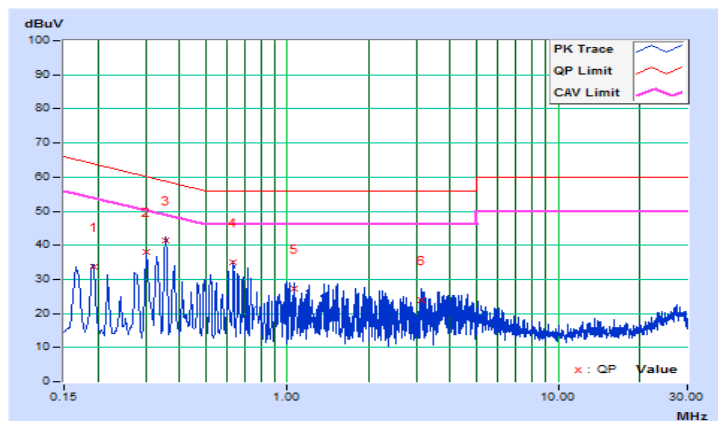
4.2.7 Test Results

Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Getaz Yang	Test Date	2017/7/4

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	0.19265	10.37	23.37	13.57	33.74	23.94	63.92	53.92	-30.18	-29.98
2	0.30200	10.39	27.58	22.57	37.97	32.96	60.19	50.19	-22.22	-17.23
3	0.35782	10.39	31.05	25.97	41.44	36.36	58.78	48.78	-17.34	-12.42
4	0.63400	10.40	24.74	18.70	35.14	29.10	56.00	46.00	-20.86	-16.90
5	1.06600	10.40	16.96	6.27	27.36	16.67	56.00	46.00	-28.64	-29.33
6	3.13400	10.52	13.38	4.95	23.90	15.47	56.00	46.00	-32.10	-30.53

Remarks:

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

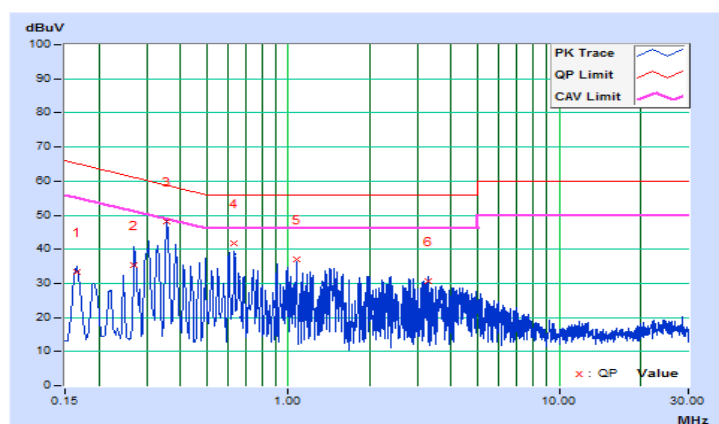


Frequency Range	150kHz ~ 30MHz	Detector Function & Resolution Bandwidth	Quasi-Peak (QP) / Average (AV), 9kHz
Input Power	120Vac, 60Hz	Environmental Conditions	25°C, 65%RH
Tested by	Getaz Yang	Test Date	2017/7/4

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	0.16600	10.12	23.23	16.99	33.35	27.11	65.16	55.16	-31.81	-28.05
2	0.27000	10.15	25.19	16.07	35.34	26.22	61.12	51.12	-25.78	-24.90
3	0.35800	10.16	37.90	29.82	48.06	39.98	58.77	48.77	-10.71	-8.79
4	0.63400	10.16	31.73	22.59	41.89	32.75	56.00	46.00	-14.11	-13.25
5	1.07346	10.17	26.95	18.56	37.12	28.73	56.00	46.00	-18.88	-17.27
6	3.27400	10.30	20.35	11.75	30.65	22.05	56.00	46.00	-25.35	-23.95

Remarks:

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



4.3 Transmit Power Measurement

4.3.1 Limits of Transmit Power Measurement

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

*B is the 26 dB emission bandwidth in megahertz

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

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

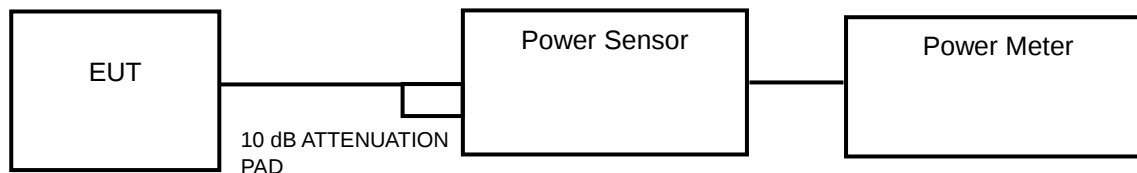
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

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

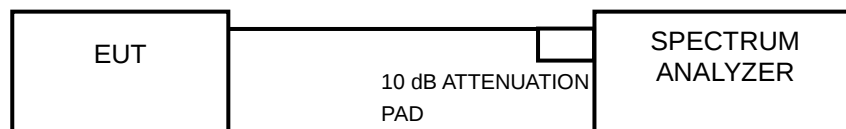
For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

4.3.2 Test Setup

<Power Output Measurement>



<26 dB Bandwidth>



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

Average Power Measurement

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 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

Channel	Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	27.353	14.37	24	Pass
44	5220	26.485	14.23	24	Pass
48	5240	26.853	14.29	24	Pass
52	5260	27.04	14.32	24	Pass
60	5300	26.792	14.28	24	Pass
64	5320	26.977	14.31	24	Pass
100	5500	22.751	13.57	24	Pass
116	5580	26.303	14.20	24	Pass
140	5700	26.363	14.21	24	Pass
149	5745	29.58	14.71	30	Pass
157	5785	30.13	14.79	30	Pass
165	5825	28.973	14.62	30	Pass

Note:

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

1. $11 \text{ dBm} + 10\log(20.61) = 24.14 \text{ dBm} > 24 \text{ dBm}$.
2. $11 \text{ dBm} + 10\log(23.15) = 24.65 \text{ dBm} > 24 \text{ dBm}$.
3. $11 \text{ dBm} + 10\log(21.86) = 24.40 \text{ dBm} > 24 \text{ dBm}$.
4. $11 \text{ dBm} + 10\log(20.22) = 24.06 \text{ dBm} > 24 \text{ dBm}$.
5. $11 \text{ dBm} + 10\log(21.98) = 24.42 \text{ dBm} > 24 \text{ dBm}$.
6. $11 \text{ dBm} + 10\log(22.98) = 24.61 \text{ dBm} > 24 \text{ dBm}$.

802.11n (HT20)

Channel	Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	21.928	13.41	24	Pass
44	5220	21.478	13.32	24	Pass
48	5240	22.439	13.51	24	Pass
52	5260	17.742	12.49	23.90	Pass
60	5300	17.906	12.53	23.90	Pass
64	5320	17.701	12.48	23.91	Pass
100	5500	18.408	12.65	23.89	Pass
116	5580	22.699	13.56	24	Pass
140	5700	22.439	13.51	24	Pass
149	5745	20.941	13.21	30	Pass
157	5785	24.604	13.91	30	Pass
165	5825	25.119	14.00	30	Pass

Note:

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

1. $11 \text{ dBm} + 10\log(19.48) = 23.90 \text{ dBm} < 24 \text{ dBm}$.
2. $11 \text{ dBm} + 10\log(19.49) = 23.90 \text{ dBm} < 24 \text{ dBm}$.
3. $11 \text{ dBm} + 10\log(19.56) = 23.91 \text{ dBm} < 24 \text{ dBm}$.
4. $11 \text{ dBm} + 10\log(19.45) = 23.89 \text{ dBm} < 24 \text{ dBm}$.
5. $11 \text{ dBm} + 10\log(21.46) = 24.32 \text{ dBm} > 24 \text{ dBm}$.
6. $11 \text{ dBm} + 10\log(22.14) = 24.45 \text{ dBm} > 24 \text{ dBm}$.

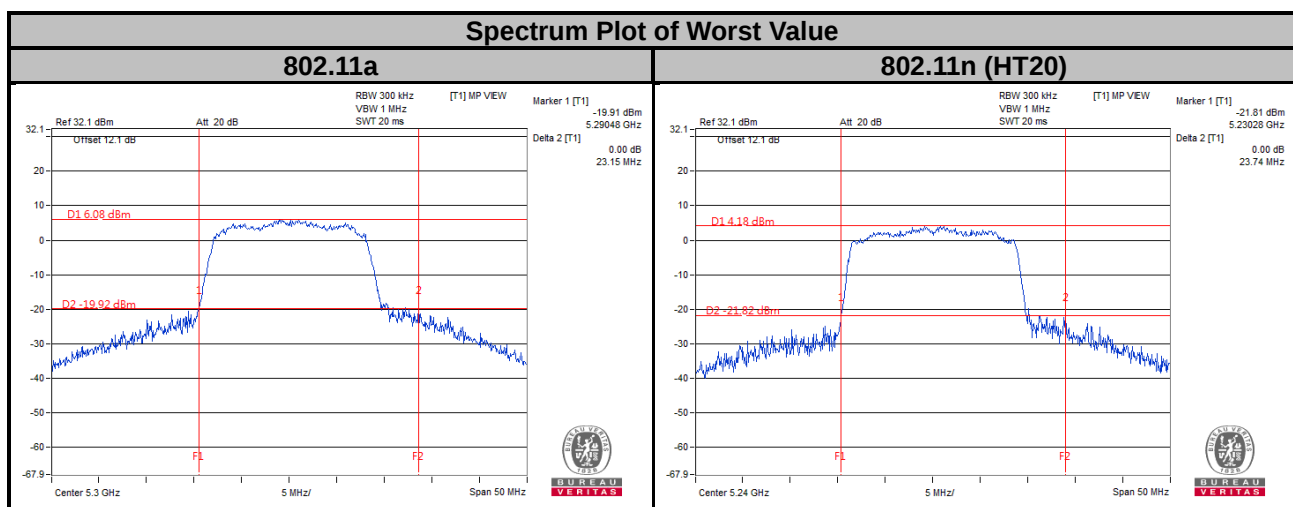
26 dB Bandwidth:

802.11a

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)
36	5180	21.13
44	5220	21.75
48	5240	21.97
52	5260	20.61
60	5300	23.15
64	5320	21.86
100	5500	20.22
116	5580	21.98
140	5700	22.98

802.11n (HT20)

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)
36	5180	19.93
44	5220	21.37
48	5240	23.74
52	5260	19.48
60	5300	19.49
64	5320	19.56
100	5500	19.45
116	5580	21.46
140	5700	22.14

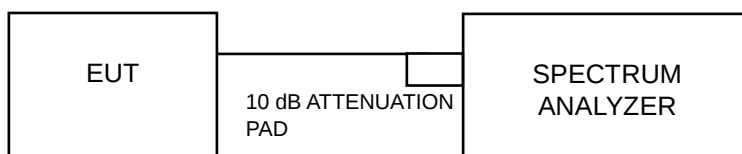


4.4 Peak Power Spectral Density Measurement

4.4.1 Limits of Peak Power Spectral Density Measurement

Operation Band	EUT Category		Limit
U-NII-1		Outdoor Access Point	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

4.4.2 Test Setup



4.4.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.4.4 Test Procedures

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

Using method SA-2

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

※For U-NII-3:

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 500 kHz, Set VBW $\geq$ 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 and add 10 log (1/duty cycle)

4.4.5 Deviation from Test Standard

No deviation.

4.4.6 EUT Operating Conditions

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

4.4.7 Test Results

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

802.11a

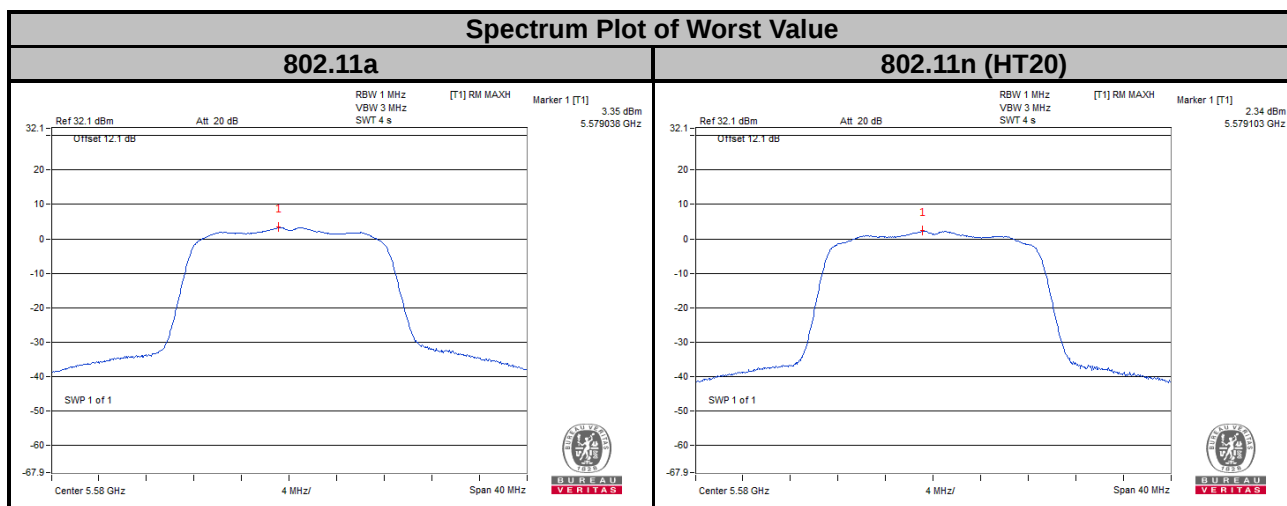
Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD with Duty Factor (dBm/MHz)	Maximum Limit (dBm/MHz)	Pass / Fail
36	5180	1.93	0.30	2.23	11	Pass
44	5220	1.94	0.30	2.24	11	Pass
48	5240	2.10	0.30	2.40	11	Pass
52	5260	2.27	0.30	2.57	11	Pass
60	5300	2.76	0.30	3.06	11	Pass
64	5320	2.90	0.30	3.20	11	Pass
100	5500	2.96	0.30	3.26	11	Pass
116	5580	3.35	0.30	3.65	11	Pass
140	5700	1.77	0.30	2.07	11	Pass

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

802.11n (HT20)

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/MHz)	Duty Factor (dB)	PSD with Duty Factor (dBm/MHz)	Maximum Limit (dBm/MHz)	Pass / Fail
36	5180	0.80	0.32	1.12	11	Pass
44	5220	0.95	0.32	1.27	11	Pass
48	5240	0.85	0.32	1.17	11	Pass
52	5260	0.39	0.32	0.71	11	Pass
60	5300	0.81	0.32	1.13	11	Pass
64	5320	0.82	0.32	1.14	11	Pass
100	5500	1.97	0.32	2.29	11	Pass
116	5580	2.34	0.32	2.66	11	Pass
140	5700	0.81	0.32	1.13	11	Pass

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



For U-NII-3 Band

802.11a

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/500 kHz)	Duty Factor (dB)	PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
149	5745	-0.86	0.30	-0.56	30	Pass
157	5785	-0.52	0.30	-0.22	30	Pass
165	5825	-0.41	0.30	-0.11	30	Pass

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

802.11n (HT20)

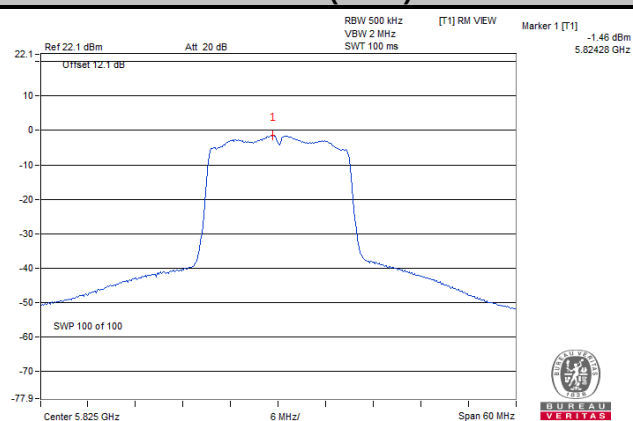
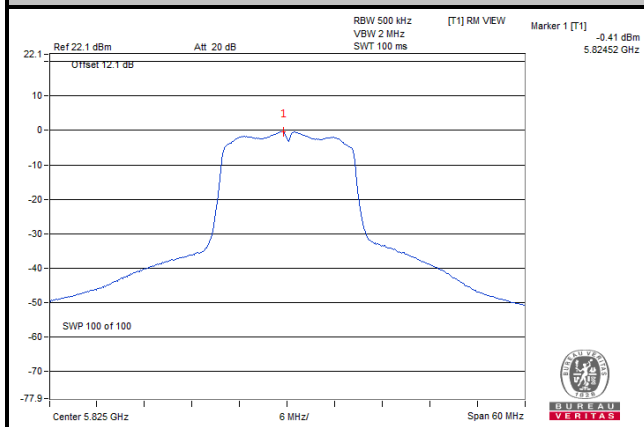
Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm/500 kHz)	Duty Factor (dB)	PSD with Duty Factor (dBm/500 kHz)	Limit (dBm/500 kHz)	Pass / Fail
149	5745	-2.82	0.32	-2.50	30	Pass
157	5785	-1.61	0.32	-1.29	30	Pass
165	5825	-1.46	0.32	-1.14	30	Pass

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

Spectrum Plot of Worst Value

802.11a

802.11n (HT20)

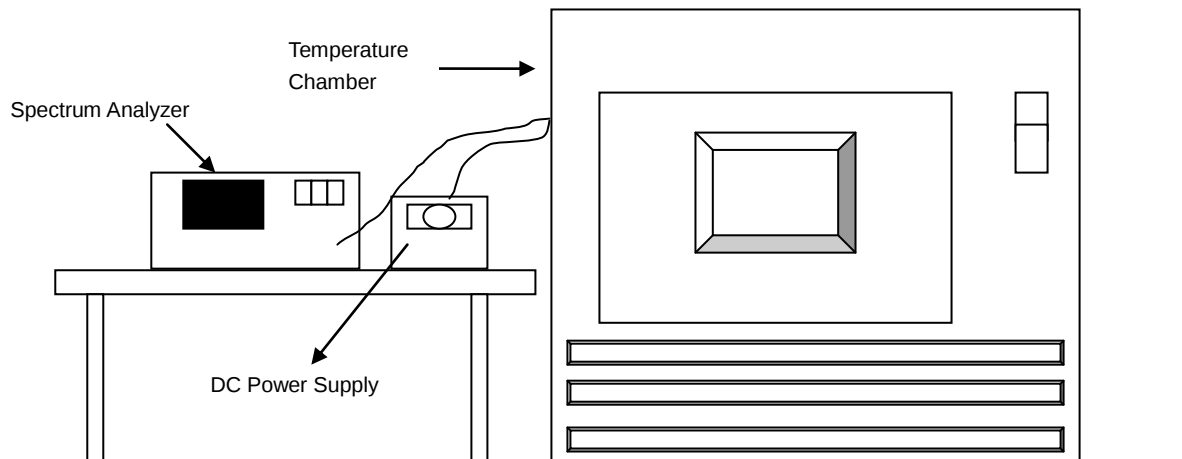


4.5 Frequency Stability

4.5.1 Limit of Frequency Stability Measurement

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

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

- 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.
- 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.
- 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.

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Condition

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

4.5.7 Test Results

Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
Temp. (°C)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
50	3.7	5180.0173	3.34000	5180.0148	2.86000	5180.0167	3.22000	5180.0161	3.11000
40	3.7	5180.0137	2.64000	5180.0147	2.84000	5180.0123	2.37000	5180.0123	2.37000
30	3.7	5180.0029	0.56000	5180.0032	0.62000	5180.0067	1.29000	5180.005	0.97000
20	3.7	5180.0142	2.74000	5180.0155	2.99000	5180.0154	2.97000	5180.0166	3.20000
10	3.7	5179.9875	-2.41000	5179.985	-2.90000	5179.9847	-2.95000	5179.987	-2.51000
0	3.7	5179.9959	-0.79000	5179.9953	-0.91000	5179.9946	-1.04000	5179.9937	-1.22000
-10	3.7	5180.0019	0.37000	5179.9991	-0.17000	5179.9984	-0.31000	5179.9977	-0.44000
-20	3.7	5180.0031	0.60000	5180.0048	0.93000	5180.0069	1.33000	5180.0066	1.27000
-30	3.7	5179.9914	-1.66000	5179.9934	-1.27000	5179.9946	-1.04000	5179.9931	-1.33000

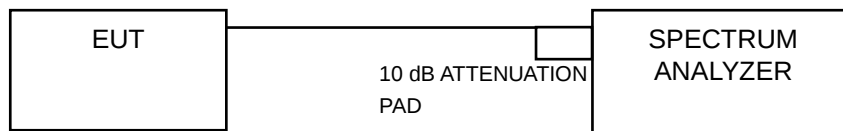
Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
Temp. (°C)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
20	4.255	5180.0134	2.59000	5180.0165	3.19000	5180.0153	2.95000	5180.0171	3.30000
	3.7	5180.0142	2.74000	5180.0155	2.99000	5180.0154	2.97000	5180.0166	3.20000
	3.145	5180.0133	2.57000	5180.0157	3.03000	5180.016	3.09000	5180.0173	3.34000

4.6 6 dB Bandwidth Measurement

4.6.1 Limits of 6 dB Bandwidth Measurement

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

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

MEASUREMENT PROCEDURE REF

- Set resolution bandwidth (RBW) = 100 kHz
- 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

4.6.5 Deviation from Test Standard

No deviation.

4.6.6 EUT Operating Condition

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

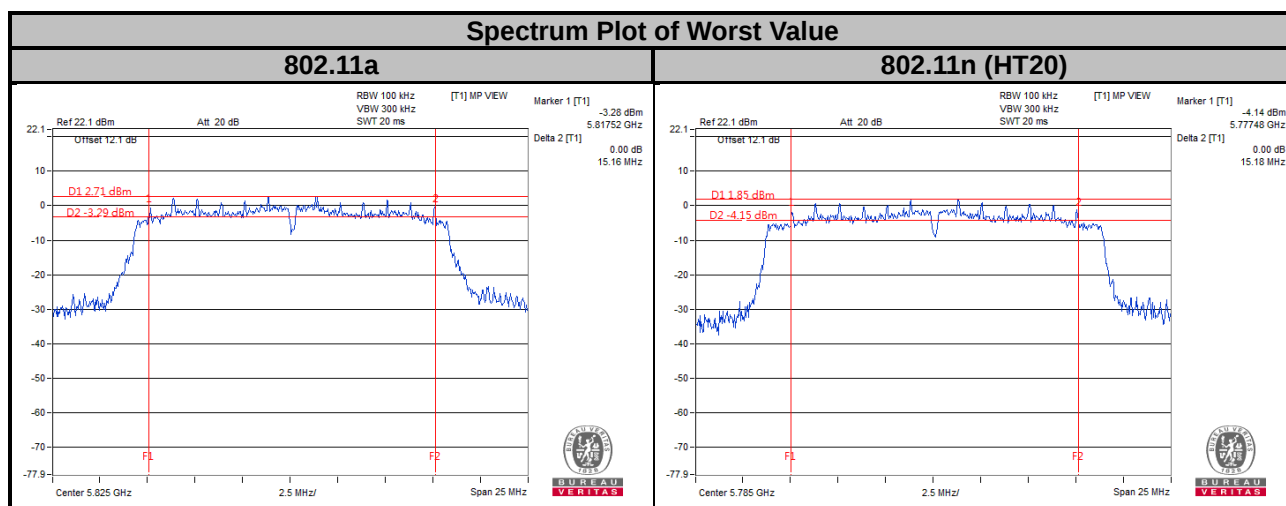
4.6.7 Test Results

802.11a

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	15.15	0.5	Pass
157	5785	15.16	0.5	Pass
165	5825	15.16	0.5	Pass

802.11n (HT20)

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	15.17	0.5	Pass
157	5785	15.18	0.5	Pass
165	5825	15.13	0.5	Pass

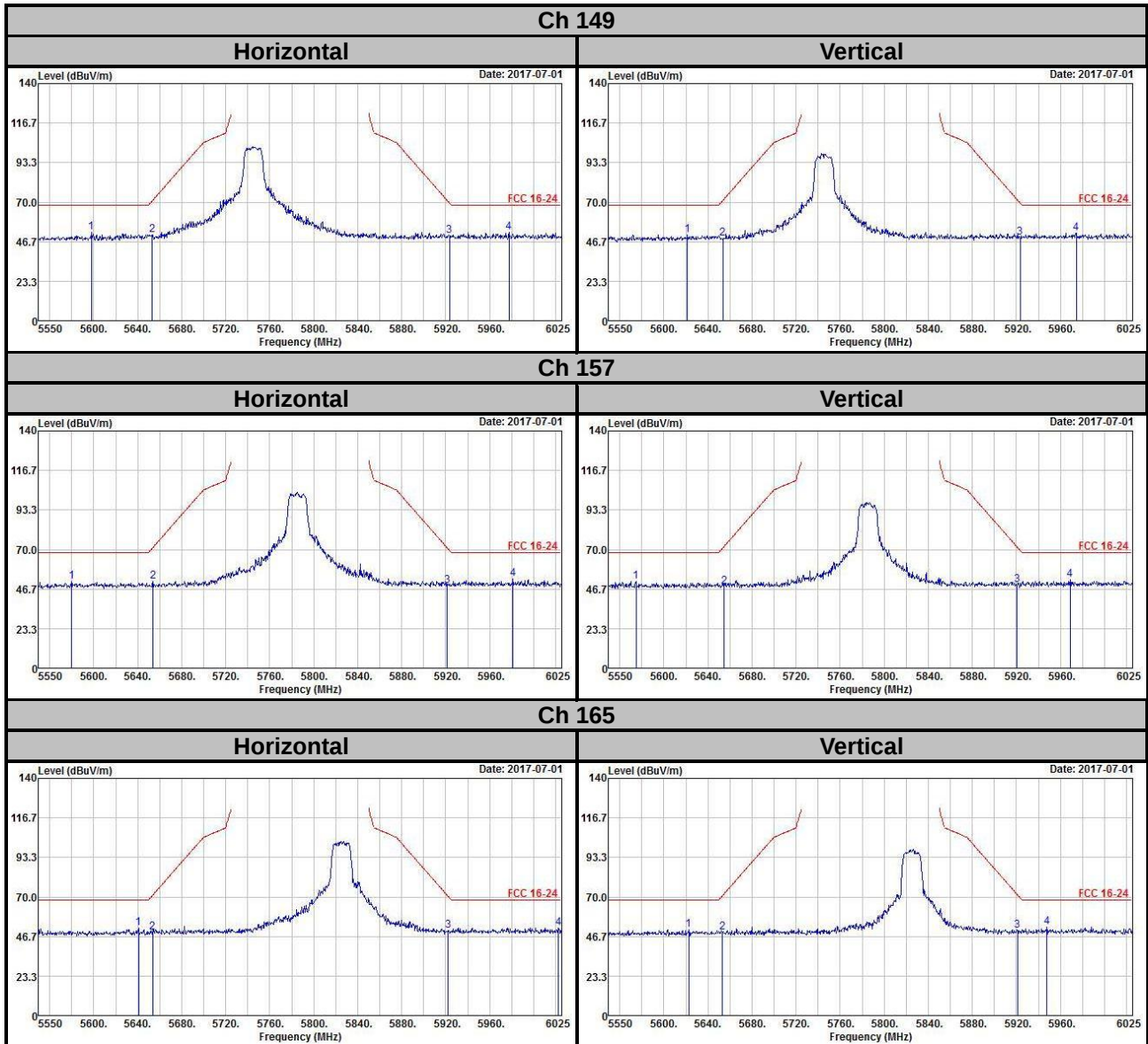


5 Pictures of Test Arrangements

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

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

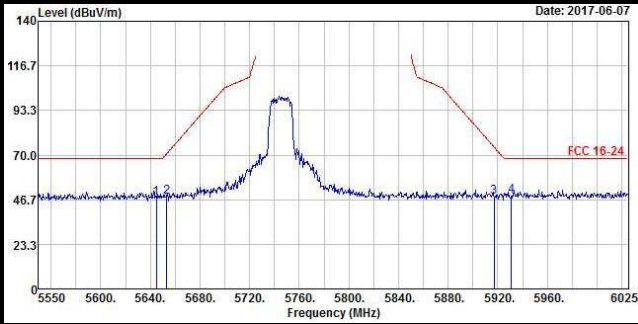
802.11a



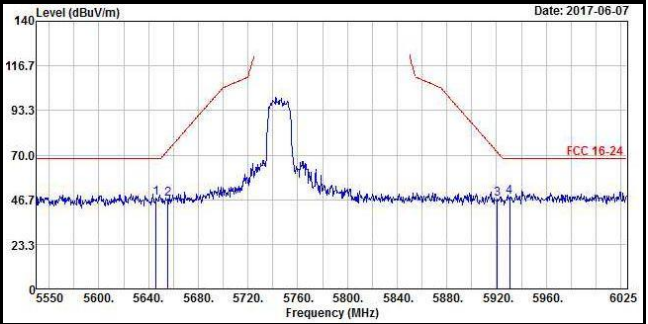
802.11n (HT20)

Ch 149

Horizontal

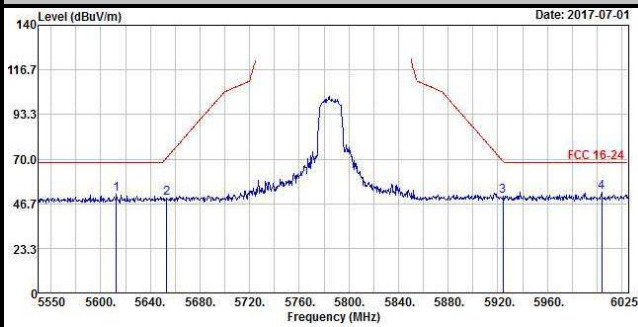


Vertical

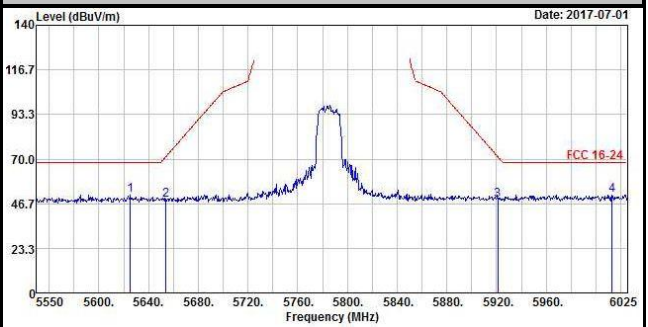


Ch 157

Horizontal

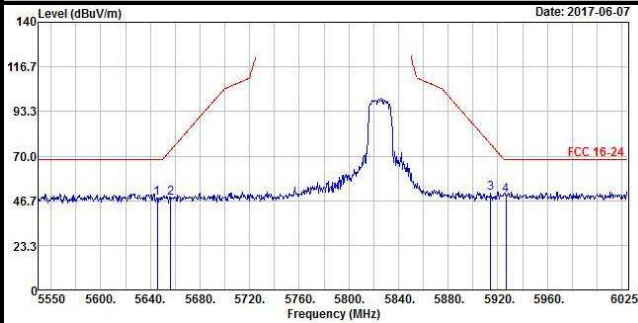


Vertical

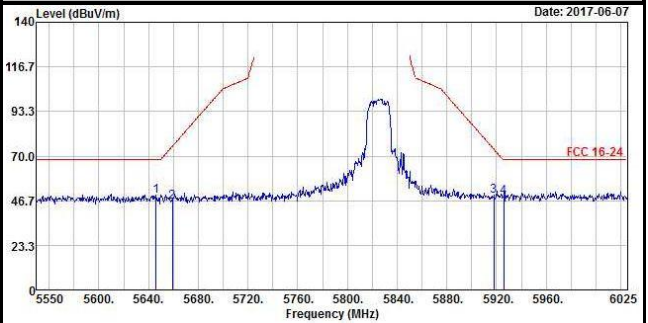


Ch 165

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 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/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

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.

--- END ---