

Variant FCC Test Report

Report No.: RF140530C09F

FCC ID: MSQ-T100TAF

Test Model: T100TAF / H100TAF / Y100TAF / R104TAF

Received Date: May 04, 2016

Test Date: May 09, 2016 ~ May 16, 2016

Issued Date: May 20, 2016

Applicant: ASUSTeK COMPUTER INC.

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

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Release Control Record

Issue No.	Description	Date Issued
RF140530C09F	Original Release	May 20, 2016

1 Certificate of Conformity

Product: ASUS Tablet

Brand: ASUS

Test Model: T100TAF / H100TAF / Y100TAF / R104TAF

Sample Status: Identical Prototype

Applicant: ASUSTeK COMPUTER INC.

Test Date: May 09, 2016 ~ May 16, 2016

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 : Gina Liu, **Date:** May 20, 2016
Gina Liu / Specialist

Approved by : Stanley Wu, **Date:** May 20, 2016
Stanley Wu / Assistant Manager

2 Summary of Test Results

47 CFR FCC Part 15, Subpart E (Section 15.407)			
FCC Clause	Test Item	Result	Remarks
15.407(b)(6)	AC Power Conducted Emissions	Pass	Meet the requirement of limit. Minimum passing margin is -15.59 dB at 0.15 MHz.
15.407(b) (1/2/3/4/6)	Radiated Emissions & Band Edge Measurement	Pass	Meet the requirement of limit. Minimum passing margin is -7.92 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.

2.1 Measurement Uncertainty

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

Measurement	Frequency	Expanded Uncertainty (k=2) ($\pm$)
Conducted Emissions at mains ports	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	ASUS Tablet
Brand	ASUS
Test Model	T100TAF / H100TAF / Y100TAF / R104TAF
Status of EUT	Identical Prototype
Power Supply Rating	3.85Vdc (Battery) 9 Vdc / 5Vdc (Adapter or host equipment)
Modulation Type	64QAM, 16QAM, QPSK, BPSK
Modulation Technology	OFDM
Transfer Rate	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps 802.11n: up to MCS7
Operating Frequency	5180 ~ 5240 MHz, 5745 ~ 5825 MHz
Number of Channel	5180 ~ 5240 MHz: 4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) 5745 ~ 5825 MHz: 5 for 802.11a, 802.11n (HT20) 2 for 802.11n (HT40)
Output Power	11.78 mW for 5180 ~ 5240 MHz 11.95 mW for 5745 ~ 5825 MHz
Antenna Type	PIFA antenna with 2.46 dBi gain (5180 ~ 5240 MHz) PIFA antenna with 1.98 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. This report is issued as a supplementary report to BV ADT report no. 140530C09-2. The difference compared with original report is update B1, B4 & C2PC; therefore the EUT is re-tested in this report.
2. All models are listed as below.

Brand	Model	Difference
ASUS	T100TAF	All models are electrically identical, different model names are for marketing purpose.
	H100TAF	
	Y100TAF	
	R104TAF	

3. The following accessories are support units only.

Product	Brand	Model	Description
Mobile Dock	Asus	T100T Mobile Dock2, H100T Mobile Dock2, Y100T Mobile Dock2, R104T Mobile Dock2	All models are electrically identical, different model names are for marketing purpose.
HDD 1 for Mobile Dock	HGST	HTS545050A7E680	SATA3, 500G, 5400R
HDD 2 for Mobile Dock	WD	WD5000LPVX	SATA3, 500G, 5400R
HDD 3 for Mobile Dock	TOSHIBA	MQ01ABF050	SATA3, 500G, 5400R

4. The EUT contains following accessory devices.

Product	Brand	Model	Description
Adapter 1	ASUS	AD2022320	I/P: 100-240Vac, 50/60Hz, 0.5A O/P: 5Vdc, 2A or 9Vdc, 2A
Adapter 2	ASUS	AD2022M20	I/P: 100-240Vac, 50/60Hz, 0.5A O/P: 9Vdc, 2A
Adapter 3	ASUS	W12-010N3A	I/P: 100-240Vac, 50/60Hz, 0.3A O/P: 5Vdc, 2A
Adapter 4	ASUS	AD897320	I/P: 100-240Vac, 50/60Hz, 0.3A O/P: 5Vdc, 2A
Adapter 5	ASUS	AD835M1	I/P: 100-240Vac, 50/60Hz, 0.3A O/P: 5Vdc, 2A
Battery 1	ASUS	C12N1320	3.85Vdc, 31Wh Manufacturer: CELXPART ENERGY CORP
Battery 2	ASUS	C12N1320	3.85Vdc, 31Wh Manufacturer: SIMPLO TECHNOLOGY CO LTD
Battery 3	ASUS	C12N1320	3.8Vdc, 31Wh Manufacturer: LG CHEMICAL LTD
USB Cable	ASUS	L65U2009-CS-B	0.85m shielded cable w/o core
CPU	Intel	Z3735F/G	1.3G, FCBGA (592Pin)
eMMC 1	HYNIX	H26M52103FMR	16G FBGA153
eMMC 2	HYNIX	H26M64103EMR	32G FBGA153
eMMC 3	HYNIX	H26M78103CCR	64G FBGA153
LCD Panel	AUO	B101XAN02.1	TFT10.1' HD GLARE SL-B LED
Front Camera (2M)	LITEON	4SF211N2	--
Rear Camera (5M)	CHICONY	CJAD53320003871LH	--
MainBoard	ASUS	T100TAF MAIN BOARD	--
WLAN + BT Module	AMPAK	AP6234ANS	Chip factory: BROADCOM / BCM43340XKUBC
GPS Module	BROADCOM	BCM4752IFBG	--

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

3.2 Description of Test Modes

FOR 5180 ~ 5240 MHz

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

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

2 channels are provided for 802.11n (HT40):

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

1 channel is provided for 802.11ac (VHT80):

Channel	Frequency (MHz)
42	5210

FOR 5745 ~ 5825 MHz:

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

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

2 channels are provided for 802.11n (HT40):

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

3.2.1 Test Mode Applicability and Tested Channel Detail

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

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

RE<1G: Radiated Emission below 1 GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

NOTE:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane** for 5180 ~ 5240MHz and **Y-plane** for 5745 ~ 5825 MHz.

2. "-" means no effect.

Radiated Emission Test (Above 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5180-5240	802.11a	36 to 48	36, 44, 48	OFDM	BPSK	6.0
-		802.11n (HT20)	36 to 48	36, 44, 48	OFDM	BPSK	MCS0
-		802.11n (HT40)	38 to 46	38, 46	OFDM	BPSK	MCS0
-	5745-5825	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-		802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	MCS0
-		802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	MCS0

Radiated Emission Test (Below 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5745-5825	802.11n (HT20)	149 to 165	149	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)
-	5745-5825	802.11n (HT20)	149 to 165	149	OFDM	BPSK	MCS0

Antenna Port Conducted Measurement:

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

EUT Configure Mode	Frequency Band (MHz)	Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
-	5180-5240	802.11a	36 to 48	36, 44, 48	OFDM	BPSK	6.0
-		802.11n (HT20)	36 to 48	36, 44, 48	OFDM	BPSK	MCS0
-		802.11n (HT40)	38 to 46	38, 46	OFDM	BPSK	MCS0
-	5745-5825	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-		802.11n (HT20)	149 to 165	149, 157, 165	OFDM	BPSK	MCS0
-		802.11n (HT40)	151 to 159	151, 159	OFDM	BPSK	MCS0

Test Condition:

Applicable To	Environmental Conditions	Input Power	Tested by
RE $\geq$ 1G	25 deg. C, 65 % RH	120 Vac, 60 Hz	Harry Hsueh, 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	Toby Tian
APCM	25 deg. C, 65 % RH	120 Vac, 60 Hz	Luke Chen

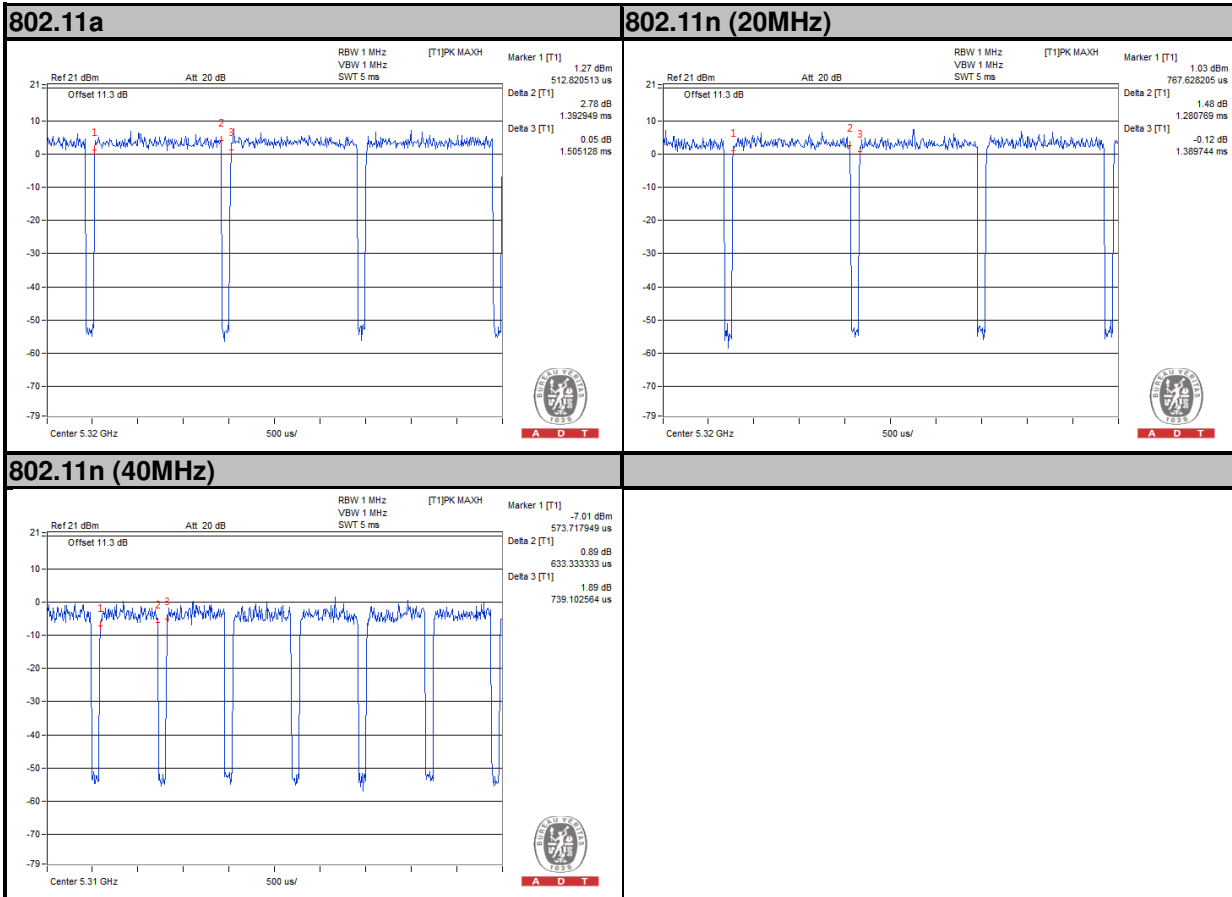
3.3 Duty Cycle of Test Signal

MODULATION TYPE: BPSK

802.11a: Duty cycle = $1.392/1.505 = 0.925$, Duty factor = $10 * \log(1/0.925) = 0.34$

802.11n (20MHz): Duty cycle = $1.28/1.389 = 0.922$, Duty factor = $10 * \log(1/0.922) = 0.35$

802.11n (40MHz): Duty cycle = $633/739 = 0.857$, Duty factor = $10 * \log(1/0.857) = 0.67$



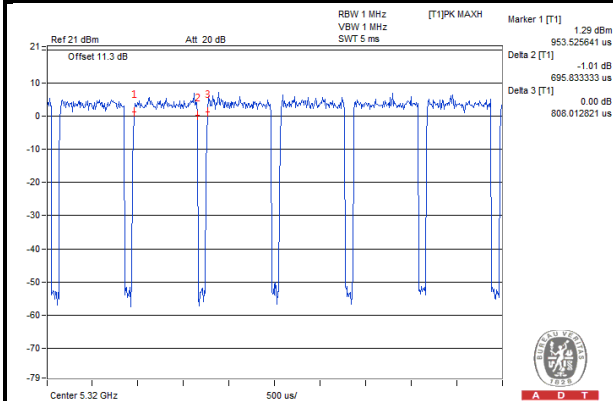
MODULATION TYPE: QPSK

802.11a: Duty cycle = $695/808 = 0.86$, Duty factor = $10 * \log(1/0.86) = 0.66$

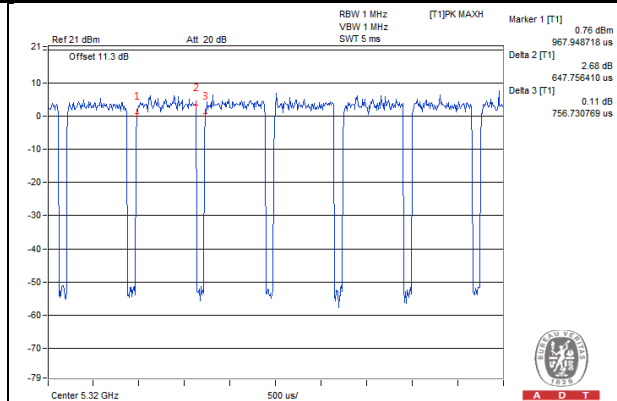
802.11n (20MHz): Duty cycle = $647/756 = 0.856$, Duty factor = $10 * \log(1/0.856) = 0.68$

802.11n (40MHz): Duty cycle = $322/431 = 0.747$, Duty factor = $10 * \log(1/0.747) = 1.27$

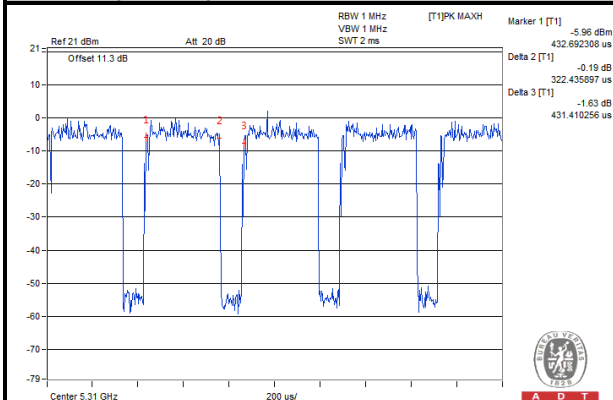
802.11a



802.11n (20MHz)



802.11n (40MHz)

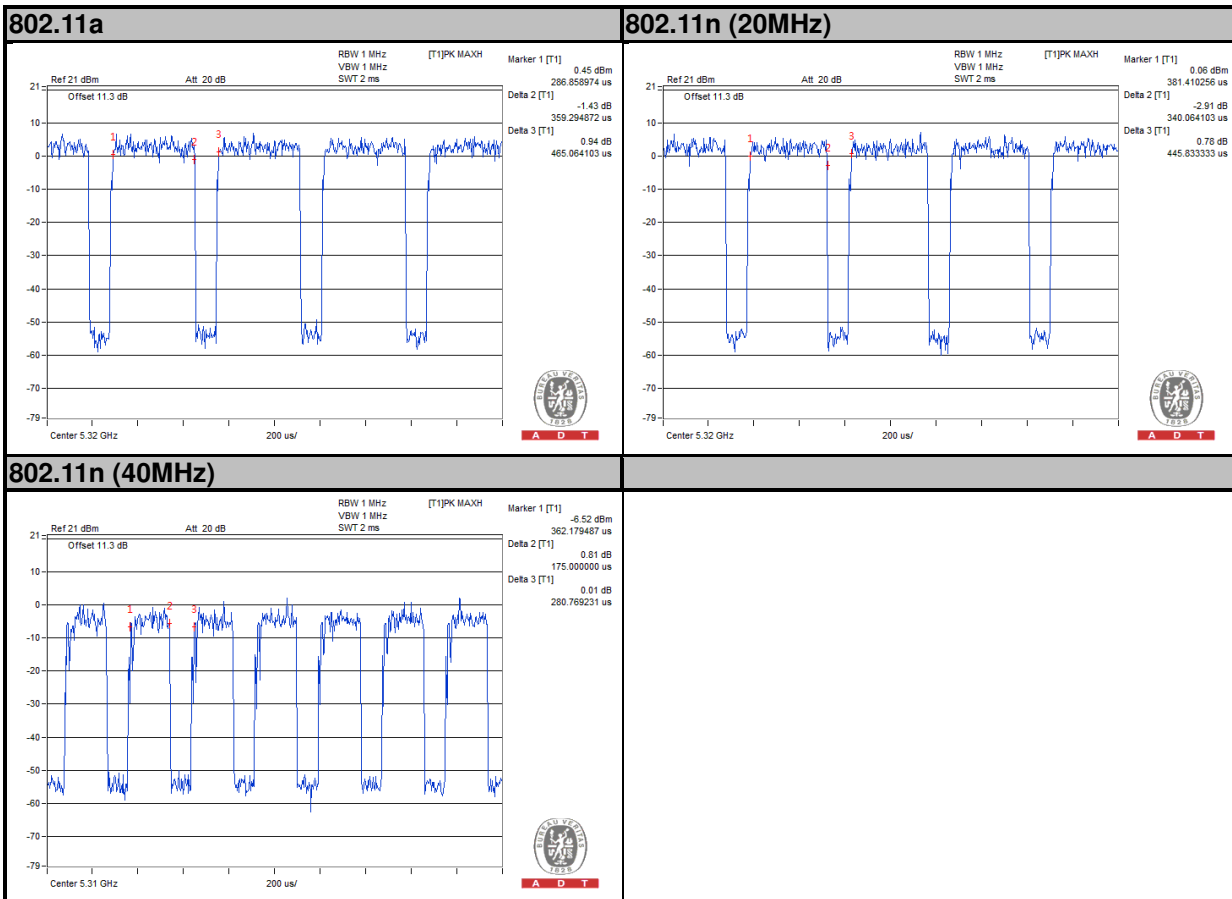


MODULATION TYPE: 16QAM

802.11a: Duty cycle = $359/465 = 0.772$, Duty factor = $10 * \log(1/0.772) = 1.12$

802.11n (20MHz): Duty cycle = $340/445 = 0.764$, Duty factor = $10 * \log(1/0.764) = 1.17$

802.11n (40MHz): Duty cycle = $175/280 = 0.625$, Duty factor = $10 * \log(1/0.625) = 2.04$



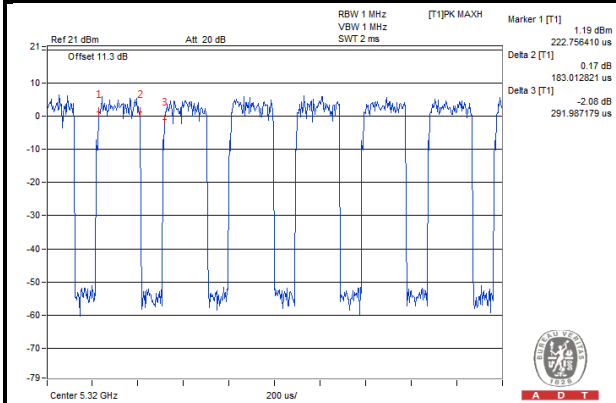
MODULATION TYPE: 64QAM

802.11a: Duty cycle = $183/291 = 0.629$, Duty factor = $10 * \log(1/0.629) = 2.01$

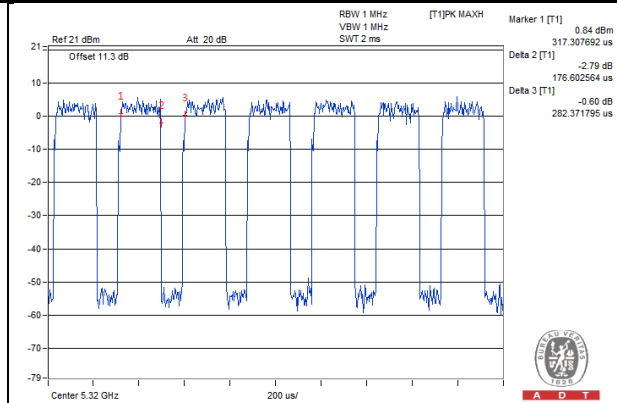
802.11n (20MHz): Duty cycle = $176/282 = 0.624$, Duty factor = $10 * \log(1/0.624) = 2.05$

802.11n (40MHz): Duty cycle = $98/203 = 0.483$, Duty factor = $10 * \log(1/0.483) = 3.16$

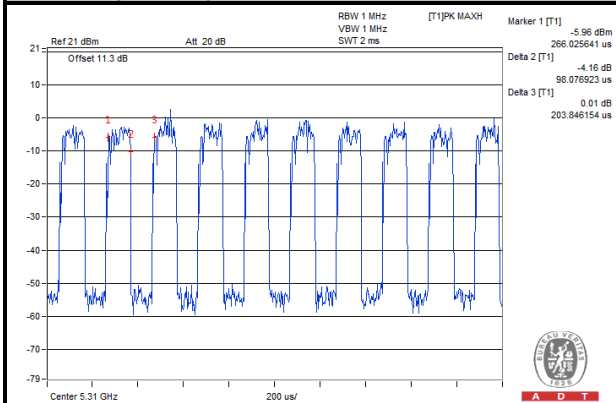
802.11a



802.11n (20MHz)



802.11n (40MHz)



3.4 Description of Support Units

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

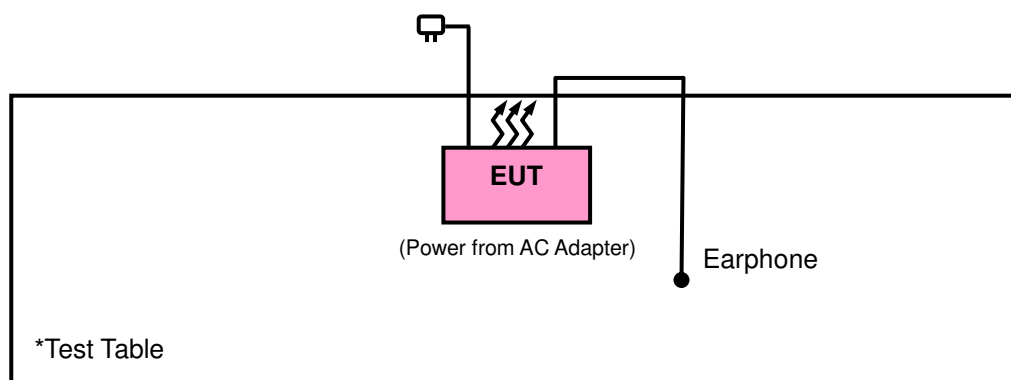
No.	Product	Brand	Model No.	Serial No.	FCC ID
1.	Earphone	N/A	N/A	N/A	N/A

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

Note:

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

3.4.1 Configuration of System under Test



3.5 General Description of Applied Standards

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

FCC Part 15, Subpart E (15.407)

789033 D02 General UNII Test Procedures New Rules v01r02

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:

- The lower limit shall apply at the transition frequencies.
- Emission level (dBuV/m) = 20 log Emission level (uV/m).
- 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 v01r02	Field Strength at 3 m	
	PK: 74 (dBμV/m)	AV: 54 (dBμV/m)
Applicable To	EIRP Limit	Equivalent Field Strength at 3 m
15.407(b)(1)	PK: -27 (dBm/MHz)	PK: 68.2 (dBμV/m)
15.407(b)(2)		
15.407(b)(3)		
15.407(b)(4)	PK: -27 (dBm/MHz) ^{*1} PK: -17 (dBm/MHz) ^{*2}	PK: 68.2 (dBμV/m) ^{*1} PK: 78.2 (dBμV/m) ^{*2}

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

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

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

4.1.3 Test Instruments

Description & Manufacturer	Model No.	Serial No.	Date of Calibration	Due Date of Calibration
Test Receiver Agilent	N9038A	MY51210203	Jan. 21, 2016	Jan. 20, 2017
Spectrum Analyzer Agilent	N9010A	MY52220314	Sep. 03, 2015	Sep. 02, 2016
Spectrum Analyzer ROHDE & SCHWARZ	FSU43	101261	Dec. 17, 2015	Dec. 16, 2016
BILOG Antenna SCHWARZBECK	VULB9168	9168-472	Jan. 07, 2016	Jan. 06, 2017
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-969	Jan. 04, 2016	Jan. 03, 2017
Double Ridge Guide Horn Antenna EMCO	3115	5619	Jan. 04, 2016	Jan. 03, 2017
BILOG Antenna SCHWARZBECK	VULB 9168	9168-153	Jan. 07, 2016	Jan. 06, 2017
HORN Antenna SCHWARZBECK	BBHA 9170	9170-480	Jan. 08, 2016	Jan. 07, 2017
Loop Antenna	EM-6879	269	Jul. 31, 2015	Jul. 30, 2016
Bluetooth Tester	CBT	100980	Apr. 27, 2015	Apr. 26, 2017
Agilent Communications Tester-Wireless	8960 Series 10	MY53201073	Jul. 03, 2015	Jul. 02, 2017
Preamplifier EMCI	EMC 012645	980115	Dec. 21, 2015	Dec. 20, 2016
Preamplifier EMCI	EMC 184045	980116	Dec. 21, 2015	Dec. 20, 2016
Preamplifier EMCI	EMC 330H	980112	Dec. 28, 2015	Dec. 27, 2016
Power Meter Anritsu	ML2495A	1232002	Sep. 21, 2015	Sep. 20, 2016
Power Sensor Anritsu	MA2411B	1207325	Sep. 21, 2015	Sep. 20, 2016
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309219/4 2950114	Oct. 12, 2015	Oct. 11, 2016
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250130/4	Oct. 12, 2015	Oct. 11, 2016
RF Coaxial Cable Worken	8D-FB	Cable-Ch10-01	Oct. 12, 2015	Oct. 11, 2016
Software BV ADT	E3 6.120103	NA	NA	NA
Antenna Tower MF	MFA-440H	NA	NA	NA
Turn Table MF	MFT-201SS	NA	NA	NA
Antenna Tower & Turn Table Controller MF	MF-7802	NA	NA	NA

- Note: 1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 10.
3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
4. The FCC 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:

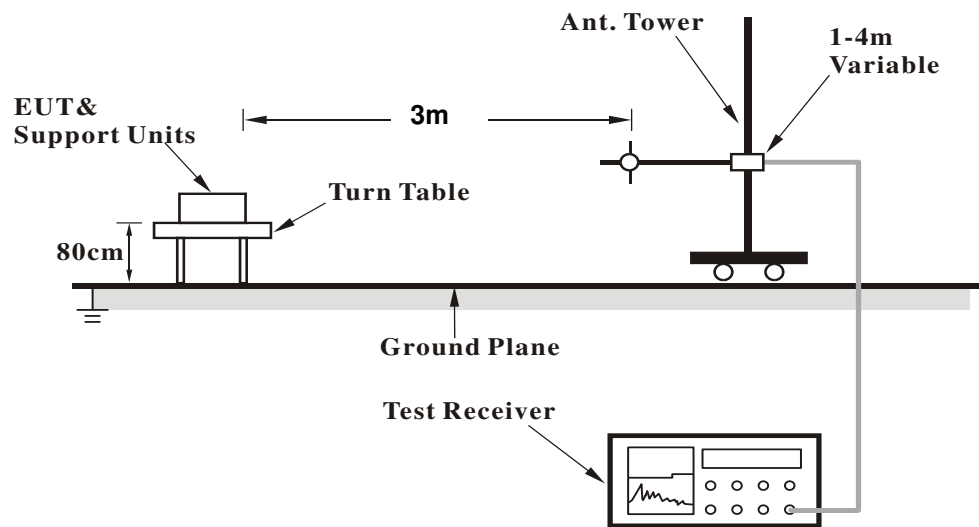
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.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

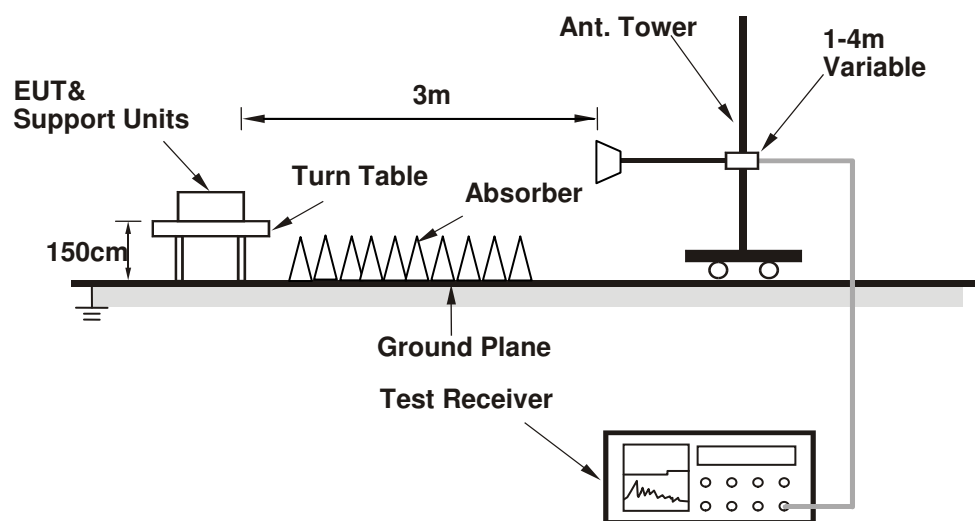
No deviation.

4.1.6 Test Set Up

<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	Harry Hsueh

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	46.81	38.56	54	-7.19	34.12	8.13	34	123	160	Average
5150	65.38	57.13	74	-8.62	34.12	8.13	34	123	160	Peak
5180	95.3	86.99			34.15	8.16	34	123	160	Average
5180	103.01	94.7			34.15	8.16	34	123	160	Peak
5420	42.83	34.06	54	-11.17	34.33	8.48	34.04	123	160	Average
5420	58.41	49.64	74	-15.59	34.33	8.48	34.04	123	160	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	48.36	40.11	54	-5.64	34.12	8.13	34	100	145	Average
5144	68.11	59.86	74	-5.89	34.12	8.13	34	100	145	Peak
5180	96.86	88.55			34.15	8.16	34	100	145	Average
5180	104.01	95.7			34.15	8.16	34	100	145	Peak
5358	42.87	34.24	54	-11.13	34.28	8.38	34.03	100	145	Average
5358	57.01	48.38	74	-16.99	34.28	8.38	34.03	100	145	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5180 MHz: Fundamental Frequency

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	Harry Hsueh

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	42.79	34.63	54	-11.21	34.08	8.07	33.99	133	162	Average
5096	57.84	49.68	74	-16.16	34.08	8.07	33.99	133	162	Peak
5220	95.08	86.69			34.17	8.22	34	133	162	Average
5220	102.98	94.59			34.17	8.22	34	133	162	Peak
5376	42.79	34.13	54	-11.21	34.29	8.41	34.04	133	162	Average
5376	57.38	48.72	74	-16.62	34.29	8.41	34.04	133	162	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
5016	42.95	34.94	54	-11.05	34.01	7.97	33.97	108	142	Average
5016	57.35	49.34	74	-16.65	34.01	7.97	33.97	108	142	Peak
5220	96.43	88.04			34.17	8.22	34	108	142	Average
5220	103.88	95.49			34.17	8.22	34	108	142	Peak
5442	42.95	34.16	54	-11.05	34.35	8.48	34.04	108	142	Average
5442	57.6	48.81	74	-16.4	34.35	8.48	34.04	108	142	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5220 MHz: Fundamental Frequency

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	Harry Hsueh

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
5118	42.66	34.46	54	-11.34	34.09	8.1	33.99	133	161	Average
5118	57.6	49.4	74	-16.4	34.09	8.1	33.99	133	161	Peak
5240	94.55	86.11			34.19	8.26	34.01	133	161	Average
5240	102.31	93.87			34.19	8.26	34.01	133	161	Peak
5422	43.16	34.39	54	-10.84	34.33	8.48	34.04	133	161	Average
5422	57.84	49.07	74	-16.16	34.33	8.48	34.04	133	161	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	42.58	34.48	54	-11.42	34.05	8.03	33.98	107	151	Average
5064	57.19	49.09	74	-16.81	34.05	8.03	33.98	107	151	Peak
5240	96.28	87.84			34.19	8.26	34.01	107	151	Average
5240	103.41	94.97			34.19	8.26	34.01	107	151	Peak
5458	43.11	34.29	54	-10.89	34.36	8.51	34.05	107	151	Average
5458	58.81	49.99	74	-15.19	34.36	8.51	34.05	107	151	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5240 MHz: Fundamental Frequency

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

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
*5714	61.38	60.19	68.2	-6.82	31.93	6.69	37.43	150	329	Peak
*5725	65.71	64.43	78.2	-12.49	31.96	6.75	37.43	150	329	Peak
5745	91.08	89.81			31.99	6.75	37.47	150	329	Average
5745	100.8	99.53			31.99	6.75	37.47	150	329	Peak
*5850	60.13	58.61	78.2	-18.07	32.15	6.88	37.51	150	329	Peak
*5861	59.88	58.25	68.2	-8.32	32.18	6.95	37.5	150	329	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
*5714	60.55	59.36	68.2	-7.65	31.93	6.69	37.43	194	157	Peak
*5725	64.95	63.67	78.2	-13.25	31.96	6.75	37.43	194	157	Peak
5745	88.17	86.9			31.99	6.75	37.47	194	157	Average
5745	97.6	96.33			31.99	6.75	37.47	194	157	Peak
*5850	60.71	59.19	78.2	-17.49	32.15	6.88	37.51	194	157	Peak
*5861	60.33	58.7	68.2	-7.87	32.18	6.95	37.5	194	157	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

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
*5714	60.35	59.16	68.2	-7.85	31.93	6.69	37.43	155	310	Peak
*5725	59.81	58.53	78.2	-18.39	31.96	6.75	37.43	155	310	Peak
5785	91.02	89.7			32.04	6.82	37.54	155	310	Average
5785	100.35	99.03			32.04	6.82	37.54	155	310	Peak
*5850	60.5	58.98	78.2	-17.7	32.15	6.88	37.51	155	310	Peak
*5861	60.7	59.07	68.2	-7.5	32.18	6.95	37.5	155	310	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
*5714	59.18	57.99	68.2	-9.02	31.93	6.69	37.43	178	157	Peak
*5725	60.77	59.49	78.2	-17.43	31.96	6.75	37.43	178	157	Peak
5785	88.17	86.85			32.04	6.82	37.54	178	157	Average
5785	97.33	96.01			32.04	6.82	37.54	178	157	Peak
*5850	59.85	58.33	78.2	-18.35	32.15	6.88	37.51	178	157	Peak
*5861	60.2	58.57	68.2	-8	32.18	6.95	37.5	178	157	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

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
5714	57.94	56.75	68.2	-10.26	31.93	6.69	37.43	152	312	Peak
5725	59.24	57.96	78.2	-18.96	31.96	6.75	37.43	152	312	Peak
5825	91.05	89.58			32.12	6.88	37.53	152	312	Average
5825	100.33	98.86			32.12	6.88	37.53	152	312	Peak
5850	61.52	60	78.2	-16.68	32.15	6.88	37.51	152	312	Peak
5861	59.07	57.44	68.2	-9.13	32.18	6.95	37.5	152	312	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
5714	60.37	59.18	68.2	-7.83	31.93	6.69	37.43	208	95	Peak
5725	58.88	57.6	78.2	-19.32	31.96	6.75	37.43	208	95	Peak
5825	86.67	85.2			32.12	6.88	37.53	208	95	Average
5825	96.37	94.9			32.12	6.88	37.53	208	95	Peak
5850	59.11	57.59	78.2	-19.09	32.15	6.88	37.51	208	95	Peak
5861	60.54	58.91	68.2	-7.66	32.18	6.95	37.5	208	95	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

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	Harry Hsueh

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
5142	44.4	36.14	54	-9.6	34.12	8.13	33.99	122	162	Average
5142	56.96	48.7	74	-17.04	34.12	8.13	33.99	122	162	Peak
5180	94.88	86.57			34.15	8.16	34	122	162	Average
5180	101.42	93.11			34.15	8.16	34	122	162	Peak
5396	42.83	34.11	54	-11.17	34.32	8.44	34.04	122	162	Average
5396	57.69	48.97	74	-16.31	34.32	8.44	34.04	122	162	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	46.1	37.84	54	-7.9	34.12	8.13	33.99	100	144	Average
5140	63.13	54.87	74	-10.87	34.12	8.13	33.99	100	144	Peak
5180	96.37	88.06			34.15	8.16	34	100	144	Average
5180	102.61	94.3			34.15	8.16	34	100	144	Peak
5428	42.9	34.13	54	-11.1	34.33	8.48	34.04	100	144	Average
5428	57.49	48.72	74	-16.51	34.33	8.48	34.04	100	144	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5180 MHz: Fundamental Frequency

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	Harry Hsueh

Antenna Polarity & Test Distance: Horizontal at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5146	43.02	34.77	54	-10.98	34.12	8.13	34	134	161	Average
5146	56.85	48.6	74	-17.15	34.12	8.13	34	134	161	Peak
5220	94.72	86.33			34.17	8.22	34	134	161	Average
5220	102.06	93.67			34.17	8.22	34	134	161	Peak
5452	43.05	34.23	54	-10.95	34.36	8.51	34.05	134	161	Average
5452	57.94	49.12	74	-16.06	34.36	8.51	34.05	134	161	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
5058	43.09	34.99	54	-10.91	34.05	8.03	33.98	108	142	Average
5058	57.14	49.04	74	-16.86	34.05	8.03	33.98	108	142	Peak
5220	95.27	86.88			34.17	8.22	34	108	142	Average
5220	102.89	94.5			34.17	8.22	34	108	142	Peak
5448	43.01	34.18	54	-10.99	34.36	8.51	34.04	108	142	Average
5448	57.3	48.47	74	-16.7	34.36	8.51	34.04	108	142	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5220 MHz: Fundamental Frequency

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	Harry Hsueh

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	42.46	34.4	54	-11.54	34.04	8	33.98	132	161	Average
5044	57.84	49.78	74	-16.16	34.04	8	33.98	132	161	Peak
5240	94.49	86.05			34.19	8.26	34.01	132	161	Average
5240	101.68	93.24			34.19	8.26	34.01	132	161	Peak
5444	43.21	34.42	54	-10.79	34.35	8.48	34.04	132	161	Average
5444	58.34	49.55	74	-15.66	34.35	8.48	34.04	132	161	Peak
Antenna Polarity & Test Distance: Vertical at 3 m										
Frequency (MHz)	Emission Level (dBuV/m)	Read Level (dBuV)	Limit (dBuV/m)	Margin (dB)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5142	42.74	34.48	54	-11.26	34.12	8.13	33.99	105	157	Average
5142	57.75	49.49	74	-16.25	34.12	8.13	33.99	105	157	Peak
5240	96.11	87.67			34.19	8.26	34.01	105	157	Average
5240	102.59	94.15			34.19	8.26	34.01	105	157	Peak
5372	43.53	34.86	54	-10.47	34.29	8.41	34.03	105	157	Average
5372	57.31	48.64	74	-16.69	34.29	8.41	34.03	105	157	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5240 MHz: Fundamental Frequency

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

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
*5714	61.9	60.71	68.2	-6.3	31.93	6.69	37.43	160	312	Peak
*5725	66.08	64.8	78.2	-12.12	31.96	6.75	37.43	160	312	Peak
5745	91.59	90.32			31.99	6.75	37.47	160	312	Average
5745	100.31	99.04			31.99	6.75	37.47	160	312	Peak
*5850	59.19	57.67	78.2	-19.01	32.15	6.88	37.51	160	312	Peak
*5861	59.23	57.6	68.2	-8.97	32.18	6.95	37.5	160	312	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
*5714	59.89	58.7	68.2	-8.31	31.93	6.69	37.43	227	96	Peak
*5725	60.42	59.14	78.2	-17.78	31.96	6.75	37.43	227	96	Peak
5745	86.8	85.53			31.99	6.75	37.47	227	96	Average
5745	96.01	94.74			31.99	6.75	37.47	227	96	Peak
*5850	58.88	57.36	78.2	-19.32	32.15	6.88	37.51	227	96	Peak
*5861	59.93	58.3	68.2	-8.27	32.18	6.95	37.5	227	96	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

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
*5714	59.77	58.58	68.2	-8.43	31.93	6.69	37.43	159	314	Peak
*5725	59.88	58.6	78.2	-18.32	31.96	6.75	37.43	159	314	Peak
5785	90.96	89.64			32.04	6.82	37.54	159	314	Average
5785	100.9	99.58			32.04	6.82	37.54	159	314	Peak
*5850	59.93	58.41	78.2	-18.27	32.15	6.88	37.51	159	314	Peak
*5861	59.02	57.39	68.2	-9.18	32.18	6.95	37.5	159	314	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
*5714	59.84	58.65	68.2	-8.36	31.93	6.69	37.43	196	97	Peak
*5725	59.85	58.57	78.2	-18.35	31.96	6.75	37.43	196	97	Peak
5785	87.12	85.8			32.04	6.82	37.54	196	97	Average
5785	97.72	96.4			32.04	6.82	37.54	196	97	Peak
*5850	60.37	58.85	78.2	-17.83	32.15	6.88	37.51	196	97	Peak
*5861	60.08	58.45	68.2	-8.12	32.18	6.95	37.5	196	97	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

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
*5714	58.96	57.77	68.2	-9.24	31.93	6.69	37.43	180	314	Peak
*5725	59.97	58.69	78.2	-18.23	31.96	6.75	37.43	180	314	Peak
5825	90.96	89.49			32.12	6.88	37.53	180	314	Average
5825	100.52	99.05			32.12	6.88	37.53	180	314	Peak
*5850	63.35	61.83	78.2	-14.85	32.15	6.88	37.51	180	314	Peak
*5861	60.22	58.59	68.2	-7.98	32.18	6.95	37.5	180	314	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
*5714	58.69	57.5	68.2	-9.51	31.93	6.69	37.43	205	94	Peak
*5725	59.25	57.97	78.2	-18.95	31.96	6.75	37.43	205	94	Peak
5825	88.63	87.16			32.12	6.88	37.53	205	94	Average
5825	97.44	95.97			32.12	6.88	37.53	205	94	Peak
*5850	61.01	59.49	78.2	-17.19	32.15	6.88	37.51	205	94	Peak
*5861	59.22	57.59	68.2	-8.98	32.18	6.95	37.5	205	94	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

802.11n (HT40)

EUT Test Condition		Measurement Detail	
Channel	Channel 38	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Harry Hsueh

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)	Preamplifier Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5150	46.1	37.85	54	-7.9	34.12	8.13	34	122	160	Average
5150	58.12	49.87	74	-15.88	34.12	8.13	34	122	160	Peak
5190	91.74	83.4			34.15	8.19	34	122	160	Average
5190	99.1	90.76			34.15	8.19	34	122	160	Peak
5460	43.34	34.52	54	-10.66	34.36	8.51	34.05	122	160	Average
5460	57.4	48.58	74	-16.6	34.36	8.51	34.05	122	160	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)	Preamplifier Factor (dB)	Antenna Height (cm)	Table Angle (Degree)	Remark
5150	48.85	40.6	54	-5.15	34.12	8.13	34	100	144	Average
5150	59.68	51.43	74	-14.32	34.12	8.13	34	100	144	Peak
5190	93.05	84.71			34.15	8.19	34	100	144	Average
5190	100.42	92.08			34.15	8.19	34	100	144	Peak
5452	43.51	34.69	54	-10.49	34.36	8.51	34.05	100	144	Average
5452	57.45	48.63	74	-16.55	34.36	8.51	34.05	100	144	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamplifier Factor
Margin value = Emission level – Limit value
- 5190 MHz: Fundamental Frequency

EUT Test Condition		Measurement Detail	
Channel	Channel 46	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Harry Hsueh

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
5140	43.45	35.19	54	-10.55	34.12	8.13	33.99	134	161	Average
5140	56.76	48.5	74	-17.24	34.12	8.13	33.99	134	161	Peak
5230	91.56	83.16			34.19	8.22	34.01	134	161	Average
5230	98.24	89.84			34.19	8.22	34.01	134	161	Peak
5368	43.47	34.8	54	-10.53	34.29	8.41	34.03	134	161	Average
5368	57.51	48.84	74	-16.49	34.29	8.41	34.03	134	161	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
5022	43.21	35.18	54	-10.79	34.03	7.97	33.97	106	156	Average
5022	57.11	49.08	74	-16.89	34.03	7.97	33.97	106	156	Peak
5230	93.57	85.17			34.19	8.22	34.01	106	156	Average
5230	100.4	92			34.19	8.22	34.01	106	156	Peak
5424	43.74	34.97	54	-10.26	34.33	8.48	34.04	106	156	Average
5424	57.86	49.09	74	-16.14	34.33	8.48	34.04	106	156	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5230 MHz: Fundamental Frequency

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

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
5128	43.01	34.79	54	-10.99	34.11	8.1	33.99	167	86	Average
5128	56.25	48.03	74	-17.75	34.11	8.1	33.99	167	86	Peak
5270	95.94	87.45			34.21	8.29	34.01	167	86	Average
5270	102.52	94.03			34.21	8.29	34.01	167	86	Peak
5366	47.5	38.86	54	-6.5	34.29	8.38	34.03	167	86	Average
5366	59.39	50.75	74	-14.61	34.29	8.38	34.03	167	86	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
5042	42.75	34.69	54	-11.25	34.04	8	33.98	114	318	Average
5042	57.37	49.31	74	-16.63	34.04	8	33.98	114	318	Peak
5270	89.4	80.91			34.21	8.29	34.01	114	318	Average
5270	97.35	88.86			34.21	8.29	34.01	114	318	Peak
5436	43.58	34.79	54	-10.42	34.35	8.48	34.04	114	318	Average
5436	57.82	49.03	74	-16.18	34.35	8.48	34.04	114	318	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5270 MHz: Fundamental Frequency

EUT Test Condition		Measurement Detail	
Channel	Channel 151	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Gavin Wu

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
*5714	59.77	58.58	68.2	-8.43	31.93	6.69	37.43	156	313	Peak
*5725	61.86	60.58	78.2	-16.34	31.96	6.75	37.43	156	313	Peak
5755	87	85.71			32.01	6.75	37.47	156	313	Average
5755	97.08	95.79			32.01	6.75	37.47	156	313	Peak
*5850	59.06	57.54	78.2	-19.14	32.15	6.88	37.51	156	313	Peak
*5861	59.56	57.93	68.2	-8.64	32.18	6.95	37.5	156	313	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
*5714	59.5	58.31	68.2	-8.7	31.93	6.69	37.43	173	161	Peak
*5725	61.06	59.78	78.2	-17.14	31.96	6.75	37.43	173	161	Peak
5755	84.35	83.06			32.01	6.75	37.47	173	161	Average
5755	94.36	93.07			32.01	6.75	37.47	173	161	Peak
*5850	59.68	58.16	78.2	-18.52	32.15	6.88	37.51	173	161	Peak
*5861	59.76	58.13	68.2	-8.44	32.18	6.95	37.5	173	161	Peak

Remarks:

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

EUT Test Condition		Measurement Detail	
Channel	Channel 159	Frequency Range	1 GHz ~ 40 GHz
Input Power	120 Vac, 60 Hz	Detector Function	Peak (PK) Average (AV)
Environmental Conditions	25 deg. C, 65 % RH	Tested By	Gavin Wu

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
5714	59.77	58.58	68.2	-8.43	31.93	6.69	37.43	150	312	Peak
5725	61.47	60.19	78.2	-16.73	31.96	6.75	37.43	150	312	Peak
5795	87.24	85.89			32.07	6.82	37.54	150	312	Average
5795	97.3	95.95			32.07	6.82	37.54	150	312	Peak
5850	59.53	58.01	78.2	-18.67	32.15	6.88	37.51	150	312	Peak
5861	60.73	59.1	68.2	-7.47	32.18	6.95	37.5	150	312	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
5714	60.09	58.9	68.2	-8.11	31.93	6.69	37.43	176	157	Peak
5725	59.81	58.53	78.2	-18.39	31.96	6.75	37.43	176	157	Peak
5795	84.84	83.49			32.07	6.82	37.54	176	157	Average
5795	94.08	92.73			32.07	6.82	37.54	176	157	Peak
5850	59.62	58.1	78.2	-18.58	32.15	6.88	37.51	176	157	Peak
5861	60.56	58.93	68.2	-7.64	32.18	6.95	37.5	176	157	Peak

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5795 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:

802.11n (HT20)

EUT Test Condition		Measurement Detail	
Channel	Channel 149	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
30.97	25.49	43.88	40	-14.51	12.14	0.59	31.12	104	164	Peak
166.77	22.13	40.72	43.5	-21.37	12.05	1.13	31.77	115	175	Peak
239.52	28.68	47.98	46	-17.32	11.03	1.45	31.78	130	351	Peak
532.46	22.05	33.54	46	-23.95	18.06	2.15	31.7	134	349	Peak
591.63	23.56	34.07	46	-22.44	19.41	2.24	32.16	132	319	Peak
676.99	24.05	32.93	46	-21.95	20.54	2.41	31.83	132	177	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
30.97	35.74	54.13	40	-4.26	12.14	0.59	31.12	132	319	Peak
40.67	31.8	48.62	40	-8.2	13.55	0.65	31.02	132	177	Peak
79.47	21.72	44	40	-18.28	8.37	0.89	31.54	116	59	Peak
239.52	23.91	43.21	46	-22.09	11.03	1.45	31.78	138	351	Peak
589.69	23.93	34.46	46	-22.07	19.37	2.24	32.14	121	99	Peak
742.95	25.24	32.72	46	-20.76	21.42	2.53	31.43	114	156	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. 16, 2015	Nov. 15, 2016
RF signal cable (with 10dB PAD) Woken	5D-FB	Cable-cond1-01	Dec. 26, 2015	Dec. 25, 2016
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 26, 2016	Feb. 25, 2017
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 24, 2015	Jul. 23, 2016
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

- Note:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Shielded Room 1.
 3. The VCCI Site Registration No. is C-2040.

4.2.3 Test Procedures

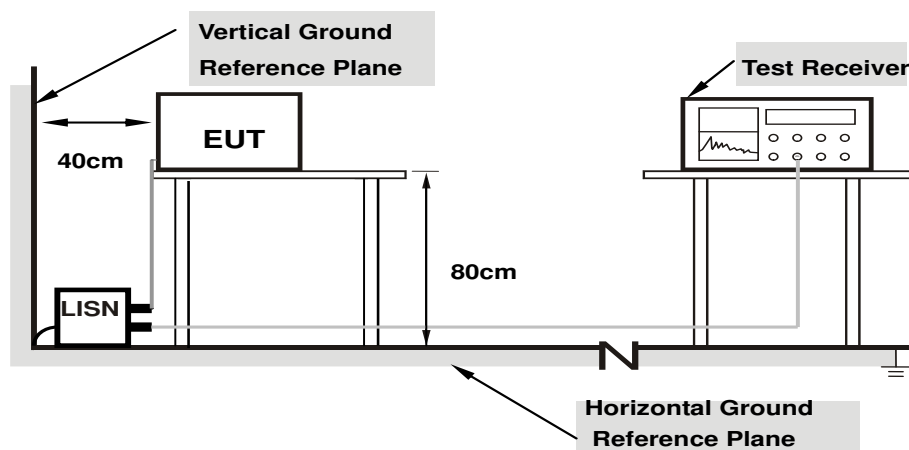
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

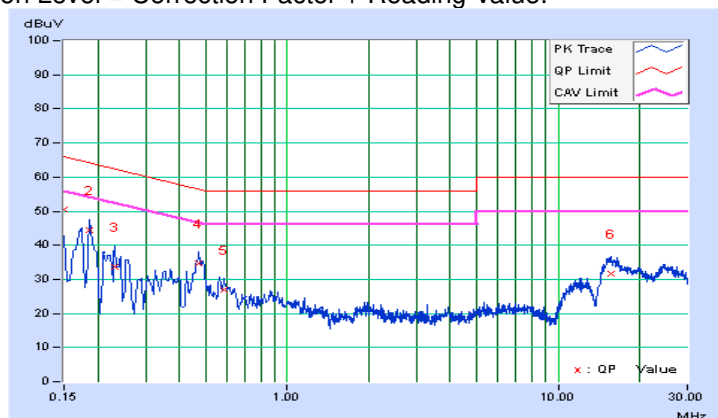
4.2.7 Test Results

Phase	Line (L)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr. Factor	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.07	40.34	24.97	50.41	35.04	66.00	56.00	-15.59	-20.96
2	0.18600	10.08	34.29	19.59	44.37	29.67	64.21	54.21	-19.84	-24.54
3	0.23000	10.09	23.55	8.93	33.64	19.02	62.45	52.45	-28.81	-33.43
4	0.47000	10.18	24.52	17.41	34.70	27.59	56.51	46.51	-21.81	-18.92
5	0.58200	10.21	16.87	9.87	27.08	20.08	56.00	46.00	-28.92	-25.92
6	15.66200	11.11	20.48	15.24	31.59	26.35	60.00	50.00	-28.41	-23.65

REMARKS:

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

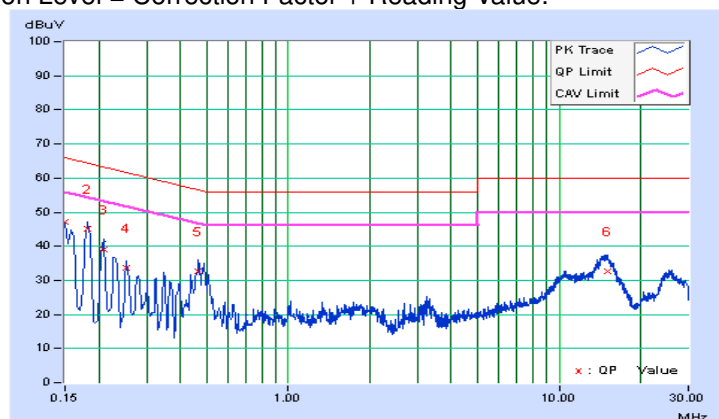


Phase	Neutral (N)	Detector Function	Quasi-Peak (QP) / Average (AV)
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	10.08	36.91	24.61	46.99	34.69	66.00	56.00	-19.01	-21.31
2	0.18200	10.08	35.07	22.00	45.15	32.08	64.39	54.39	-19.24	-22.31
3	0.20905	10.09	29.02	14.52	39.11	24.61	63.24	53.24	-24.14	-28.64
4	0.25400	10.12	23.55	10.61	33.67	20.73	61.63	51.63	-27.95	-30.89
5	0.46600	10.25	22.47	13.93	32.72	24.18	56.58	46.58	-23.87	-22.41
6	15.08200	11.19	21.33	16.06	32.52	27.25	60.00	50.00	-27.48	-22.75

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 $N_{ANT} \leq 4$;

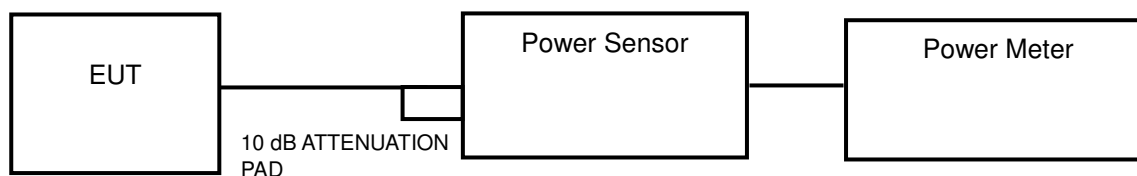
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

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

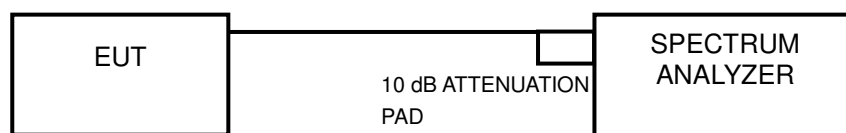
For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

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

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

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

26 dB Bandwidth

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

4.3.5 Deviation 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	15.03	11.77	24	Pass
44	5220	14.96	11.75	24	Pass
48	5240	15.07	11.78	24	Pass
149	5745	15.67	11.95	30	Pass
157	5785	15.38	11.87	30	Pass
165	5825	15.21	11.82	30	Pass

802.11n (HT20)

Channel	Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
36	5180	14.59	11.64	24	Pass
44	5220	14.89	11.73	24	Pass
48	5240	14.83	11.71	24	Pass
149	5745	15.45	11.89	30	Pass
157	5785	14.93	11.74	30	Pass
165	5825	15.24	11.83	30	Pass

802.11n (HT40)

Channel	Frequency (MHz)	Maximum Conducted Power (mW)	Maximum Conducted Power (dBm)	Power Limit (dBm)	Pass / Fail
38	5190	12.27	10.89	24	Pass
46	5230	12.22	10.87	24	Pass
151	5755	12.74	11.05	30	Pass
159	5795	12.39	10.93	30	Pass

26 dB Bandwidth:

802.11a

Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)
36	5180	19.15
44	5220	19.15
48	5240	19.15

802.11n (HT20)

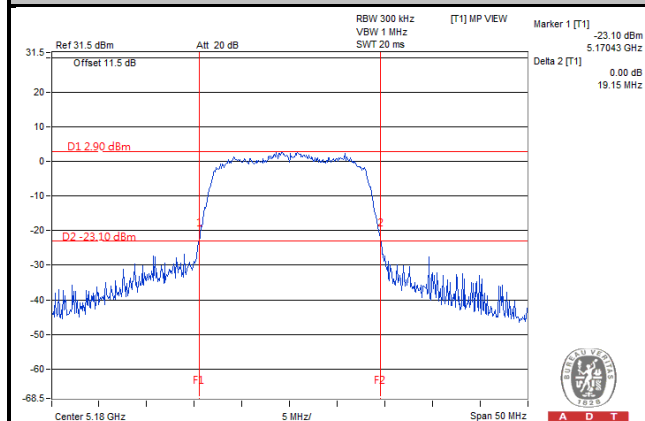
Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)
36	5180	19.56
44	5220	19.46
48	5240	19.55

802.11n (HT40)

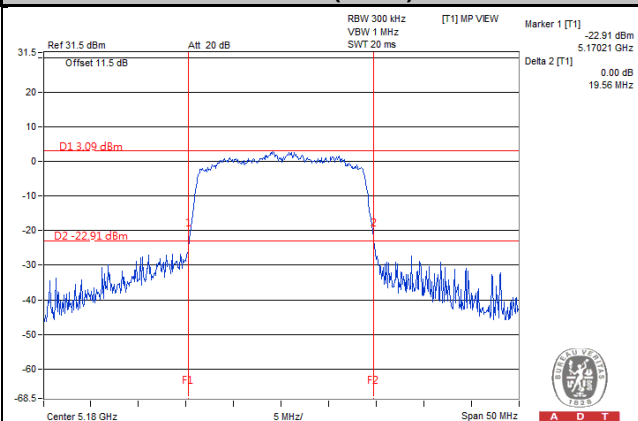
Channel	Frequency (MHz)	26 dBc Bandwidth (MHz)
38	5190	40.99
46	5230	40.91

Spectrum Plot of Worst Value

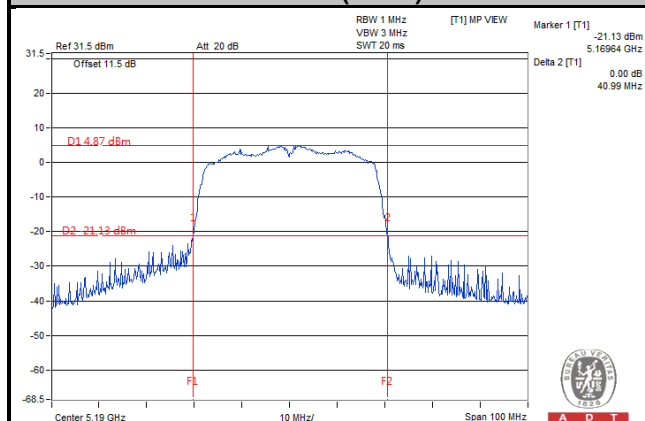
802.11a



802.11n (HT20)



802.11n (HT40)

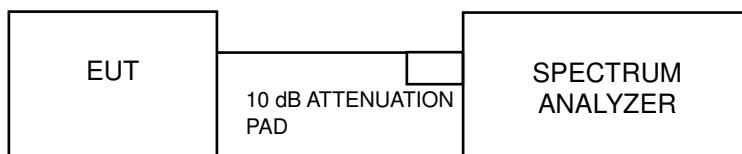


4.4 Peak Power Spectral Density Measurement

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

802.11a

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm)	Duty Factor	PSD with Duty Factor (dBm)	Maximum Limit (dBm)	Pass / Fail
36	5180	-0.48	0.34	-0.14	11	Pass
44	5220	-0.33	0.34	0.01	11	Pass
48	5240	-0.32	0.34	0.02	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)	Duty Factor	PSD with Duty Factor (dBm)	Maximum Limit (dBm)	Pass / Fail
36	5180	-0.80	0.35	-0.45	11	Pass
44	5220	-0.57	0.35	-0.22	11	Pass
48	5240	-0.52	0.35	-0.17	11	Pass

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

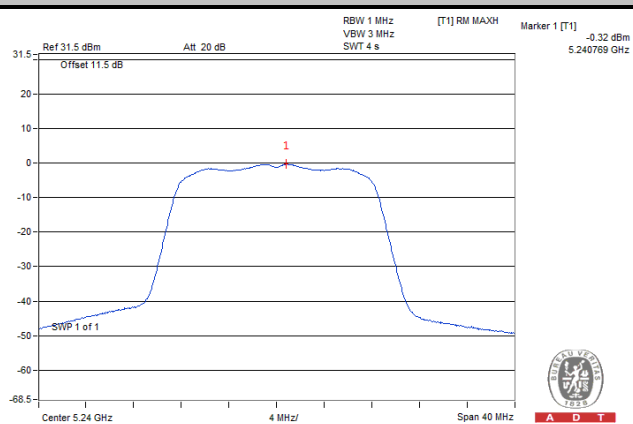
802.11n (HT40)

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm)	Duty Factor	PSD with Duty Factor (dBm)	Maximum Limit (dBm)	Pass / Fail
38	5190	-4.45	0.67	-3.78	11	Pass
46	5230	-4.26	0.67	-3.59	11	Pass

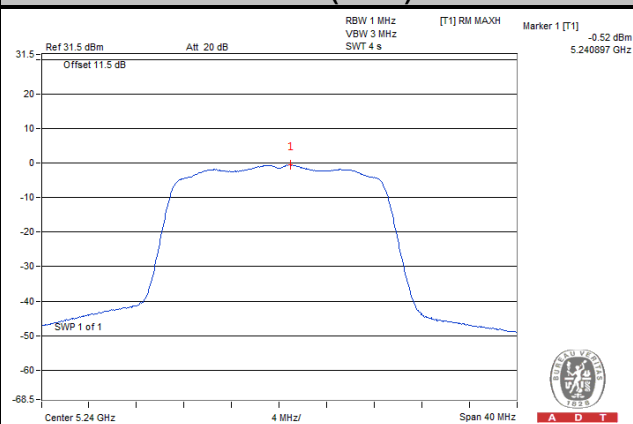
Note: Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

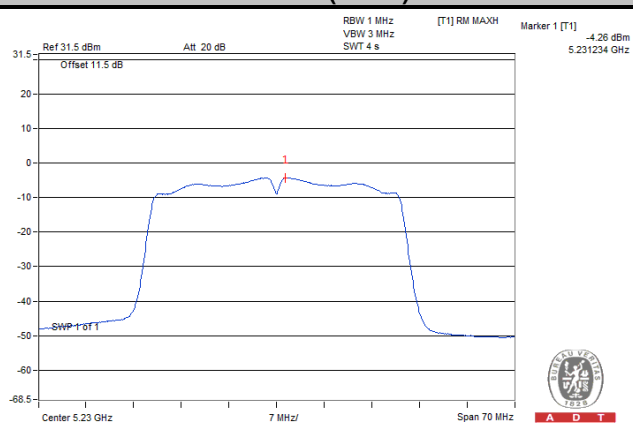
802.11a



802.11n (HT20)



802.11n (HT40)



For U-NII-3 Band

802.11a

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm)	Duty Factor	PSD with Duty Factor (dBm)	Limit (dBm/500 kHz)	Pass / Fail
149	5745	-3.19	0.34	-2.85	30	Pass
157	5785	-3.06	0.34	-2.72	30	Pass
165	5825	-2.55	0.34	-2.21	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)	Duty Factor	PSD with Duty Factor (dBm)	Limit (dBm/500 kHz)	Pass / Fail
149	5745	-3.47	0.35	-3.12	30	Pass
157	5785	-3.45	0.35	-3.10	30	Pass
165	5825	-3.04	0.35	-2.69	30	Pass

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

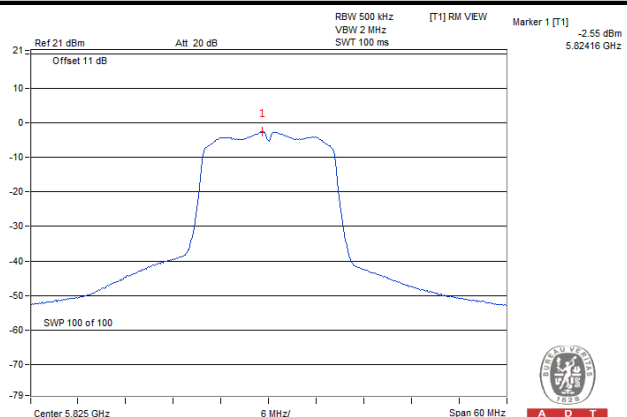
802.11n (HT40)

Channel	Frequency (MHz)	PSD w/o Duty Factor (dBm)	Duty Factor	PSD with Duty Factor (dBm)	Limit (dBm/500 kHz)	Pass / Fail
151	5755	-8.54	0.67	-7.87	30	Pass
159	5795	-8.30	0.67	-7.63	30	Pass

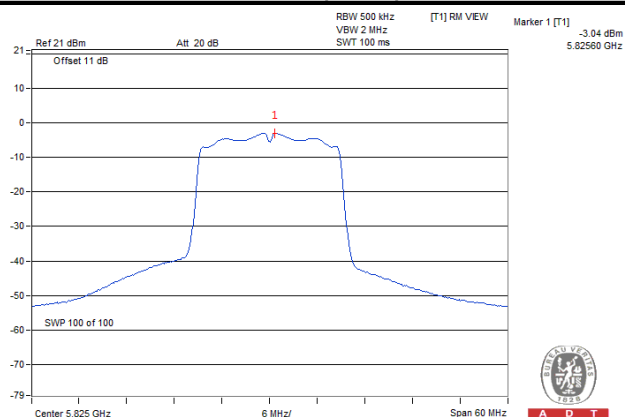
Note: Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

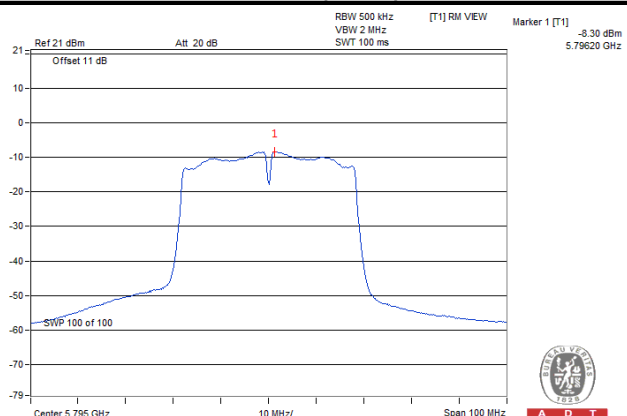
802.11a



802.11n (HT20)



802.11n (HT40)

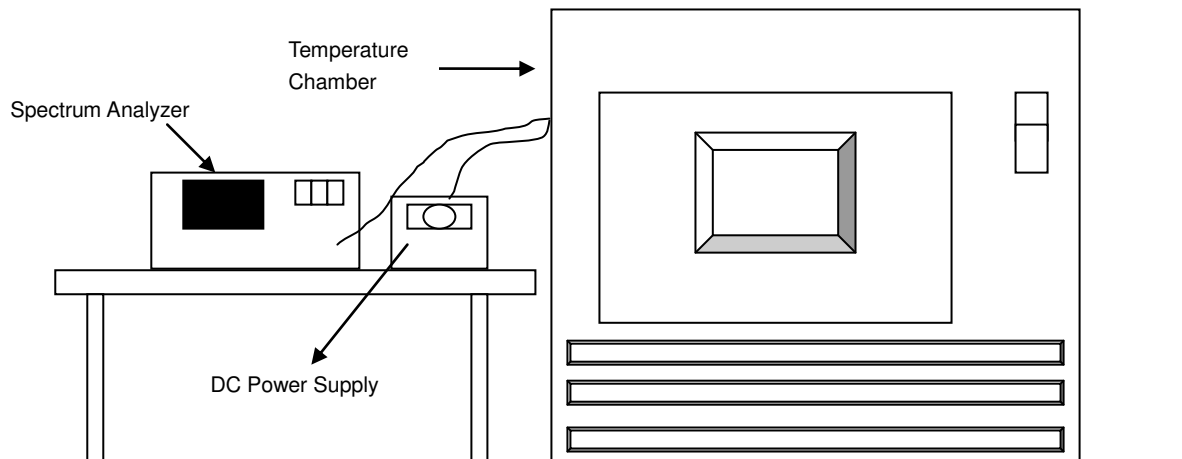


4.5 Frequency Stability

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	3.85	5180.035224	6.800	5180.035015	6.760	5180.034861	6.730	5180.034868	6.731
40	3.85	5180.034631	6.686	5180.035187	6.793	5180.034548	6.669	5180.035108	6.778
30	3.85	5180.036628	7.071	5180.036469	7.040	5180.036281	7.004	5180.036278	7.003
20	3.85	5180.037345	7.209	5180.036755	7.096	5180.037171	7.176	5180.036603	7.066
10	3.85	5180.038706	7.472	5180.038493	7.431	5180.038469	7.426	5180.038115	7.358
0	3.85	5180.037535	7.246	5180.037334	7.207	5180.037110	7.164	5180.036969	7.137
-10	3.85	5180.035837	6.918	5180.035627	6.878	5180.035498	6.853	5180.035548	6.863
-20	3.85	5180.034678	6.695	5180.035139	6.784	5180.035313	6.817	5180.035009	6.758

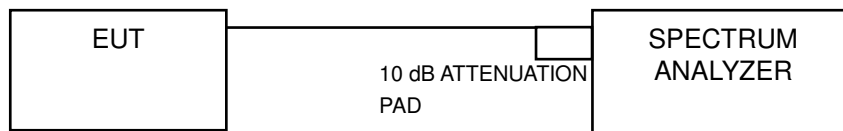
Frequency Stability Versus Temp.									
Operating Frequency: 5180 MHz									
Temp. (°C)	Power Supply (Vdc)	0 Minute		2 Minute		5 Minute		10 Minute	
		Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)	Measured Frequency (MHz)	Frequency Drift (ppm)
20	3.6	5180.038681	7.467	5180.038874	7.505	5180.038766	7.484	5180.038534	7.439
	3.85	5180.037345	7.209	5180.036755	7.096	5180.037171	7.176	5180.036603	7.066
	4.35	5180.040678	7.853	5180.040501	7.819	5180.040575	7.833	5180.040416	7.802

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	15.16	0.5	Pass
157	5785	15.16	0.5	Pass
165	5825	15.16	0.5	Pass

802.11n (HT20)

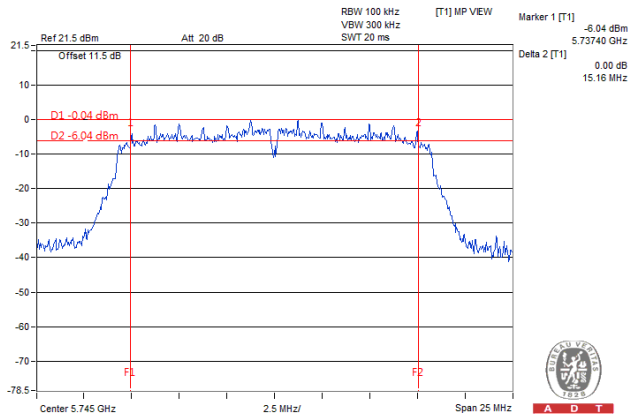
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
149	5745	15.16	0.5	Pass
157	5785	15.16	0.5	Pass
165	5825	15.16	0.5	Pass

802.11n (HT40)

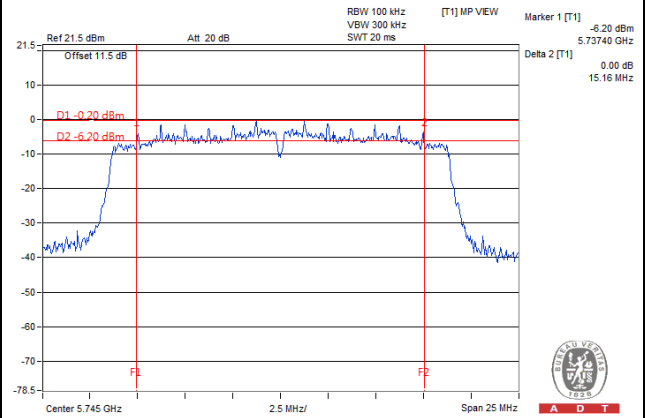
Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)	Pass / Fail
151	5755	35.18	0.5	Pass
159	5795	35.14	0.5	Pass

Spectrum Plot of Worst Value

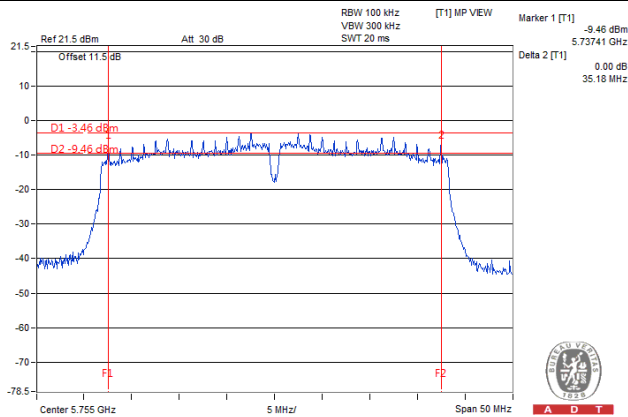
802.11a



802.11n (HT20)



802.11n (HT40)



5 Pictures of Test Arrangements

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

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:

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Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

Tel: 886-3-6668565

Fax: 886-3-6668323

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Email: service.adt@tw.bureauveritas.com

Web Site: www.bureauveritas-adt.com

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

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