

FCC TEST REPORT (15.407)

REPORT NO.: RF131223C35-1

MODEL NO.: XR600

FCC ID: SK6-XR620

RECEIVED: Dec. 12, 2013

TESTED: Dec. 18, 2013 ~ Jan. 08, 2014

ISSUED: Jan. 09, 2013

APPLICANT: Xirrus, INC.

ADDRESS: 2101 Corporate Center Driver Thousand Oaks,
California 91320

ISSUED BY: Bureau Veritas Consumer Products Services
(H.K.) Ltd., Taoyuan Branch

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Vil., Lin Kou Dist.,
New Taipei City, Taiwan, R.O.C.

TEST LOCATION: No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei
Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF131223C35-1	Original release	Jan. 09, 2013

1. CERTIFICATION

PRODUCT: 802.11ac 2x2 AP

MODEL: XR600

BRAND: Xirrus

APPLICANT: Xirrus, INC.

TESTED: Dec. 18, 2013 ~ Jan. 08, 2014

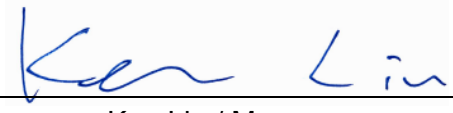
TEST SAMPLE: ENGINEERING SAMPLE

STANDARDS: FCC Part 15, Subpart E (Section 15.407)

ANSI C63.10-2009

The above equipment (model: XR600) 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 :  , **DATE :** Jan. 09, 2013
Ivy Lin / Specialist

APPROVED BY :  , **DATE :** Jan. 09, 2013
Ken Liu / Manager

2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.407(b)(6)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -23.81dB at 0.29819MHz.
15.407(b)(1/2/3)(b)(6)	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.9dB at 549.82MHz.
15.407(a)(1/2)	Max Average Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit.
15.407(a)(1/2)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is I-PEX not a standard connector.

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	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.19 dB
	200MHz ~1000MHz	3.21 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k = 2$.

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

EUT	802.11ac 2x2 AP
MODEL NO.	XR600
POWER SUPPLY	55Vdc (POE)
MODULATION TYPE	256QAM, 64QAM, 16QAM, QPSK, BPSK
MODULATION TECHNOLOGY	OFDM
TRANSFER RATE	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300.0Mbps 802.11ac: up to 867.0Mbps
OPERATING FREQUENCY	5180 ~ 5240MHz
NUMBER OF CHANNEL	802.11a, 802.11n (20MHz): 4 802.11n (40MHz): 2 802.11ac (80MHz): 1
OUTPUT POWER	49.913mW
ANTENNA TYPE	Monopole antenna with 5.16dBi gain
ANTENNA CONNECTOR	I-PEX
DATA CABLE	N/A
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	N/A

NOTE:

1. The EUT is collocated two dual band RF modules (Radio 1, Radio 2), can not transmit simultaneously.
2. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

MODULATION MODE	TX FUNCTION
802.11b	2TX
802.11g	2TX
802.11a	2TX
802.11n (20MHz) (MCS 8 ~ 15)	2TX
802.11n (40MHz) (MCS 8 ~ 15)	2TX
802.11ac (VHT80)	2TX

3. The EUT was powered by the following POE (provided as a support unit only).

BRAND	PowerDsine
MODEL	PD9001G
INPUT POWER	100-250Vac, 50/60Hz, 0.8A
OUTPUT POWER	55Vdc, 0.60A

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

3.2 DESCRIPTION OF TEST MODES

4 channels are provided for 802.11a, 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
36	5180 MHz	44	5220 MHz
40	5200 MHz	48	5240 MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
38	5190 MHz	46	5230 MHz

1 channel is provided for 802.11ac (80MHz):

CHANNEL	FREQUENCY
42	5210MHz

3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	APCM	
A	√	√	√	√	Radio 1
B	√	√	√	√	Radio 2

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

NOTE:

- Radio 1:** The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Z-plane.
- Radio 2:** The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on Z-plane.

RADIATED EMISSION TEST (ABOVE 1GHz):

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A, B	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
A, B	802.11n (20MHz)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
A, B	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	15.0
A, B	802.11ac (80MHz)	5210	42	42	OFDM	BPSK	58.5

RADIATED EMISSION TEST (BELOW 1GHz):

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11n (20MHz)	5180-5240	36 to 48	40	OFDM	BPSK	7.2
B	802.11n (20MHz)	5180-5240	36 to 48	36	OFDM	BPSK	7.2

POWER LINE CONDUCTED EMISSION TEST:

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A	802.11n (20MHz)	5180-5240	36 to 48	40	OFDM	BPSK	7.2
B	802.11n (20MHz)	5180-5240	36 to 48	36	OFDM	BPSK	7.2

ANTENNA PORT CONDUCTED MEASUREMENT:

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
A, B	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
A, B	802.11n (20MHz)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
A, B	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	15.0
A, B	802.11ac (80MHz)	5210	42	42	OFDM	BPSK	58.5

TEST CONDITION:

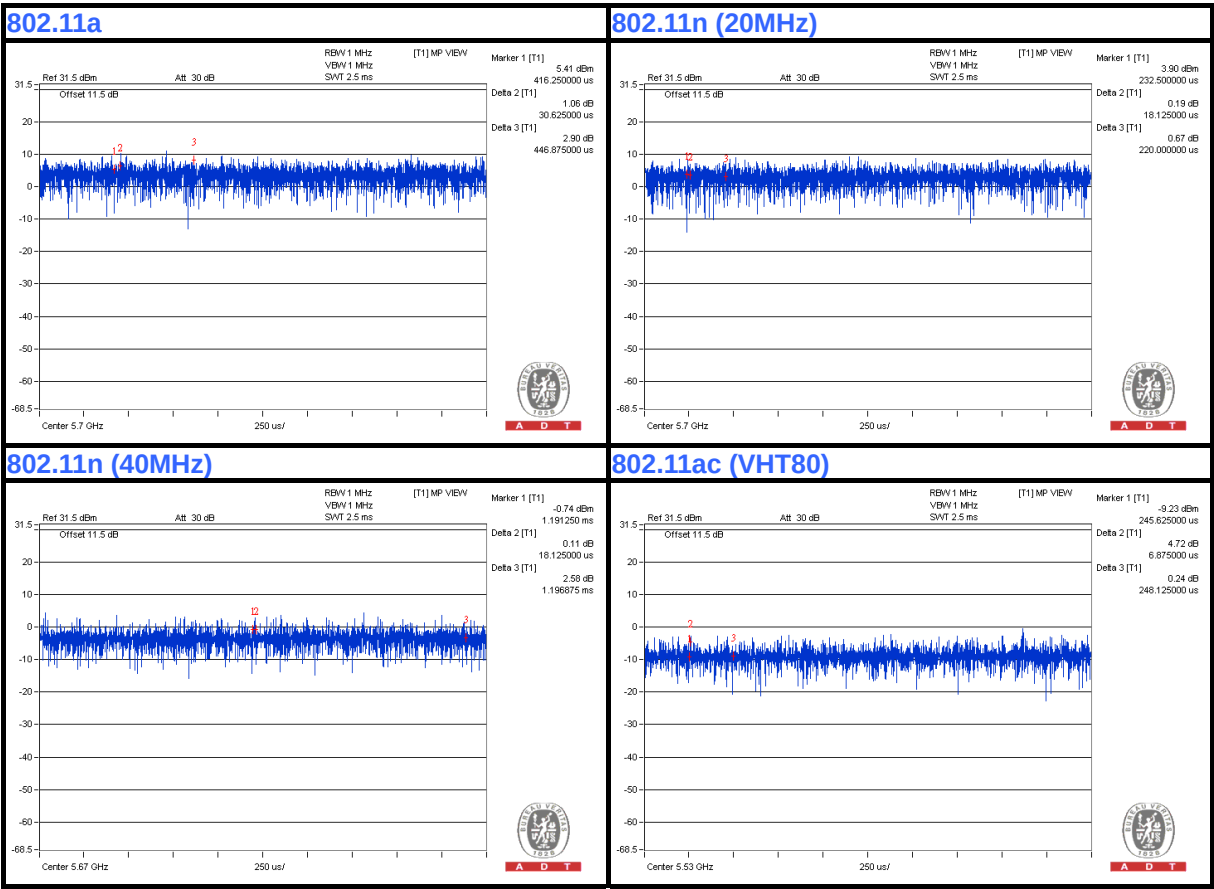
APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE $\geq$ 1G	22deg. C, 69%RH	120Vac, 60Hz	Brad Tung, Jones Chang
RE<1G	22deg. C, 69%RH	120Vac, 60Hz	Jones Chang
PLC	24deg. C, 70%RH	120Vac, 60Hz	Alan Wu
APCM	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui

3.3 DUTY CYCLE OF TEST SIGNAL

Test mode A

MODULATION TYPE: BPSK

- 02.11a: Duty cycle of test signal is > 98 %
- 802.11n (20MHz): Duty cycle of test signal is > 98 %
- 802.11n (40MHz): Duty cycle of test signal is > 98 %
- 802.11ac (VHT80): Duty cycle of test signal is > 98 %



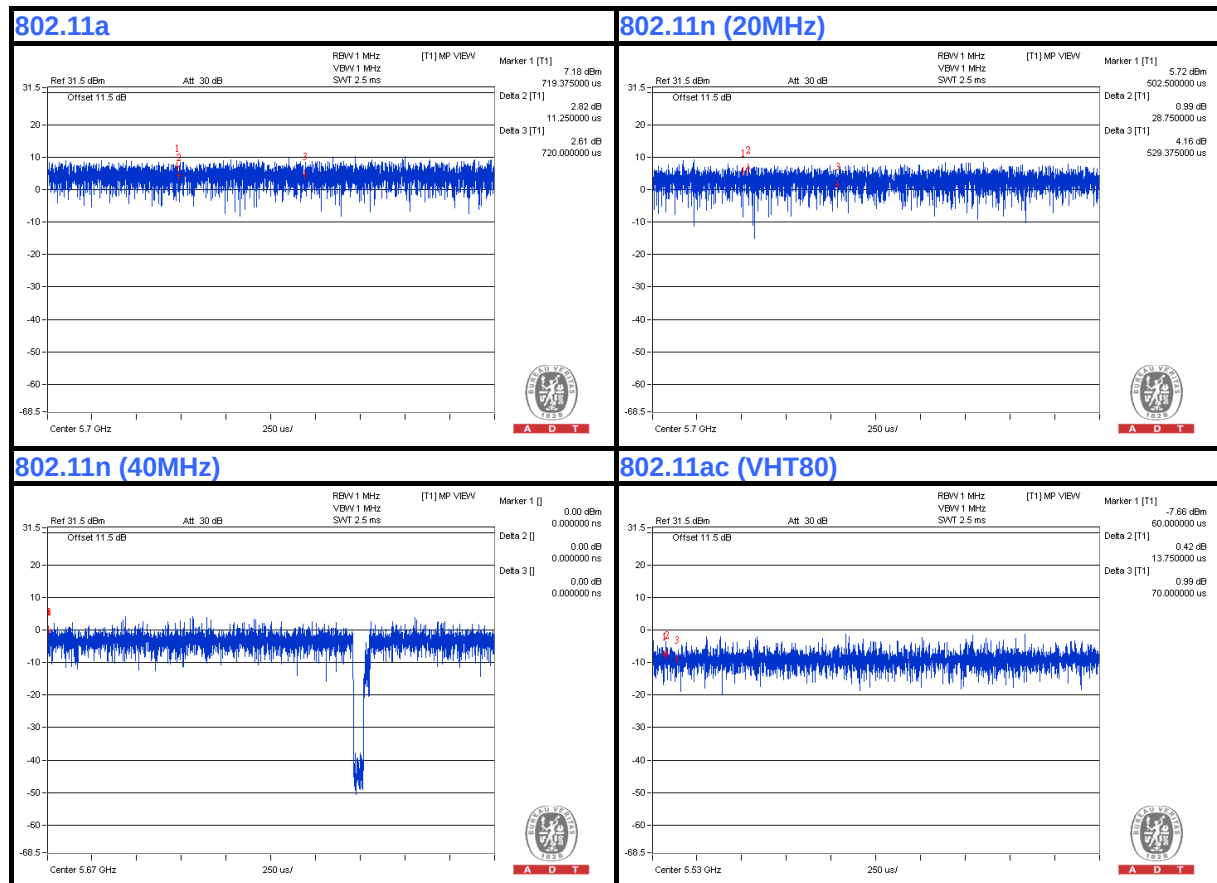
MODULATION TYPE: QPSK

02.11a: Duty cycle of test signal is > 98 %

802.11n (20MHz): Duty cycle of test signal is > 98 %

802.11n (40MHz): Duty cycle of test signal is > 98 %

802.11ac (VHT80): Duty cycle of test signal is > 98 %



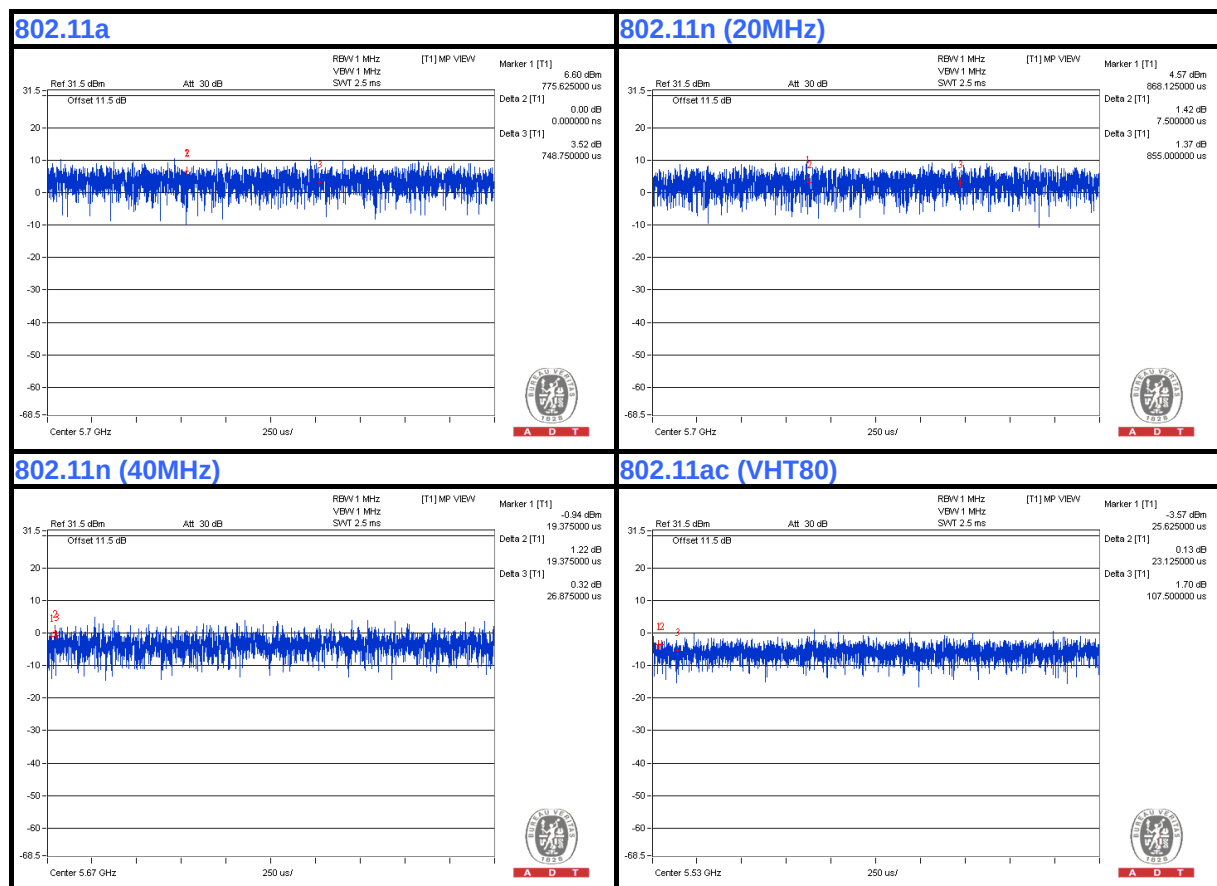
MODULATION TYPE: 16QAM

02.11a: Duty cycle of test signal is > 98 %

802.11n (20MHz): Duty cycle of test signal is > 98 %

802.11n (40MHz): Duty cycle of test signal is > 98 %

802.11ac (VHT80): Duty cycle of test signal is > 98 %



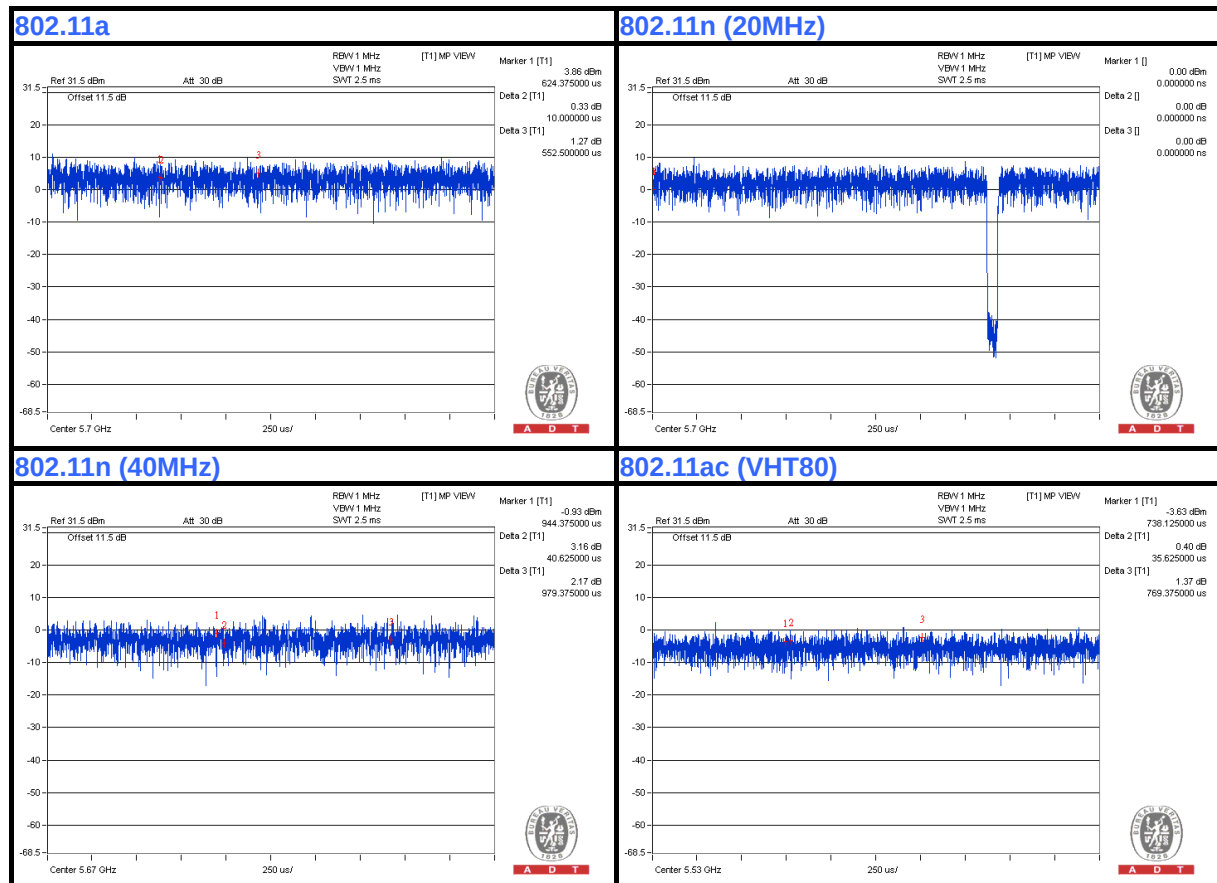
MODULATION TYPE: 64QAM

02.11a: Duty cycle of test signal is > 98 %

802.11n (20MHz): Duty cycle of test signal is > 98 %

802.11n (40MHz): Duty cycle of test signal is > 98 %

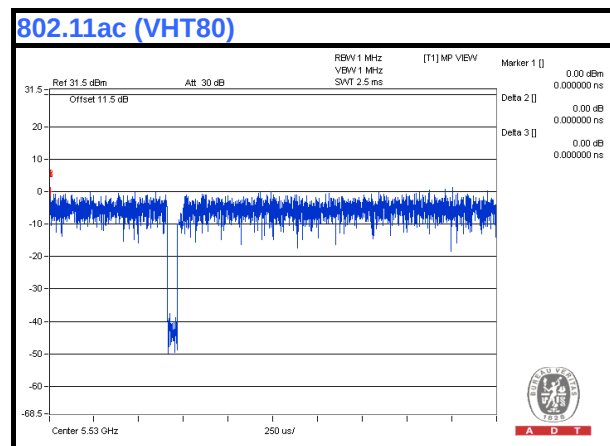
802.11ac (VHT80): Duty cycle of test signal is > 98 %



MODULATION TYPE: 256QAM

Duty cycle is < 98%, duty factor shall be considered.

802.11ac (VHT80): Duty cycle of test signal is > 98 %



3.4 DESCRIPTION OF SUPPORT UNITS

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

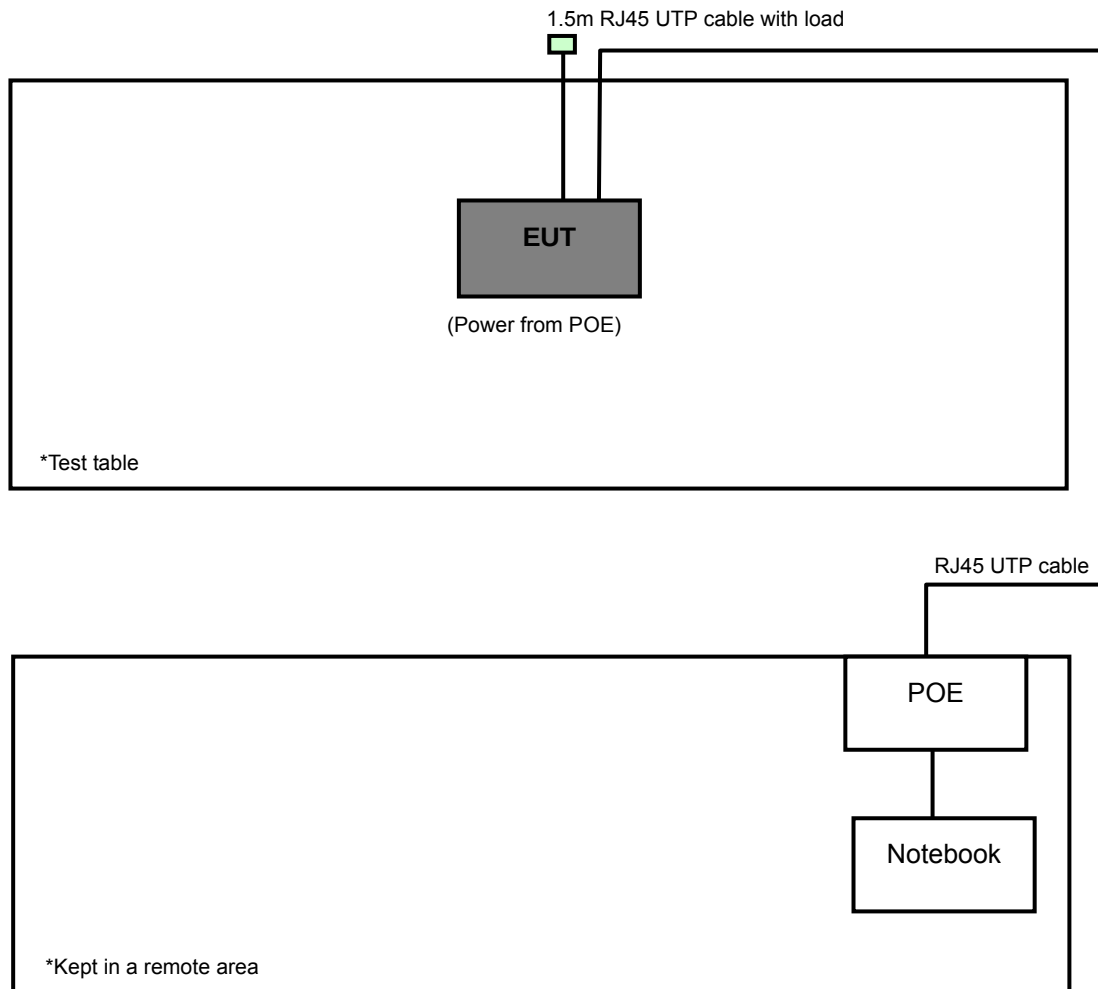
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	Notebook	DELL	D531	CN-0XM006-48643-8 1U-2973	QDS-BRCM1020
2	POE	PowerDsine	PD9001G	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	3m RJ45 UTP cable
2	1.5m RJ45 UTP cable

NOTE:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item 1 ~ 2 acted as a communication partner to transfer data.
3. Item 2 was provided by the client.

3.4.1 CONFIGURATION OF SYSTEM UNDER TEST



3.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

FCC Part 15, Subpart E (15.407)

789033 D01 General UNII Test Procedures v01 r03

662911 D01 Multiple Transmitter Output v02

ANSI C63.10-2009

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

NOTE: The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It 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:

FREQUENCIES (MHz)	FIELD STRENGTH (microvolts/meter)	MEASUREMENT DISTANCE (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

NOTE:

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

4.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

	LIMIT	
√	FIELD STRENGTH AT 3m (dBμV/m)	
	PK	AV
	74	54
	EIRP LIMIT (dBm)	EQUIVALENT FIELD STRENGTH AT 3m (dBμV/m)
	PK	PK
	-27	68.3

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

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

4.1.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCI	100424	Sep. 09, 2013	Sep. 08, 2014
Spectrum Analyzer ROHDE & SCHWARZ	FSU 43	100115	Dec. 18, 2013	Dec. 17, 2014
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Mar. 25, 2013	Mar. 24, 2014
HORN Antenna SCHWARZBECK	9120D	209	Sep. 12, 2013	Sep. 11, 2014
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 15, 2013	Jul. 14, 2014
Preamplifier Agilent	8449B	3008A01961	Oct. 28, 2013	Oct. 27, 2014
Preamplifier Agilent	8447D	2944A10738	Oct. 18, 2013	Oct. 17, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	309220/4	Aug. 26, 2013	Aug. 25, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250724/4	Aug. 26, 2013	Aug. 25, 2014
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Aug. 26, 2013	Aug. 25, 2014
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA	NA
Turn Table BV ADT	TT100.	TT93021704	NA	NA
Turn Table Controller BV ADT	SC100.	SC93021704	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 18, 2013	Oct. 17, 2014
High Speed Peak Power Meter	ML2495A	0824011	Jul. 29, 2013	Jul. 28, 2014
Power Sensor	MA2411B	0738171	Jul. 29, 2013	Jul. 28, 2014
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 10, 2013	Jun. 09, 2014

- 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 4.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 460141.
5. The IC Site Registration No. is IC7450F-4.

4.1.4 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. 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 antenna is a broadband antenna, and its height 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 Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

NOTE:

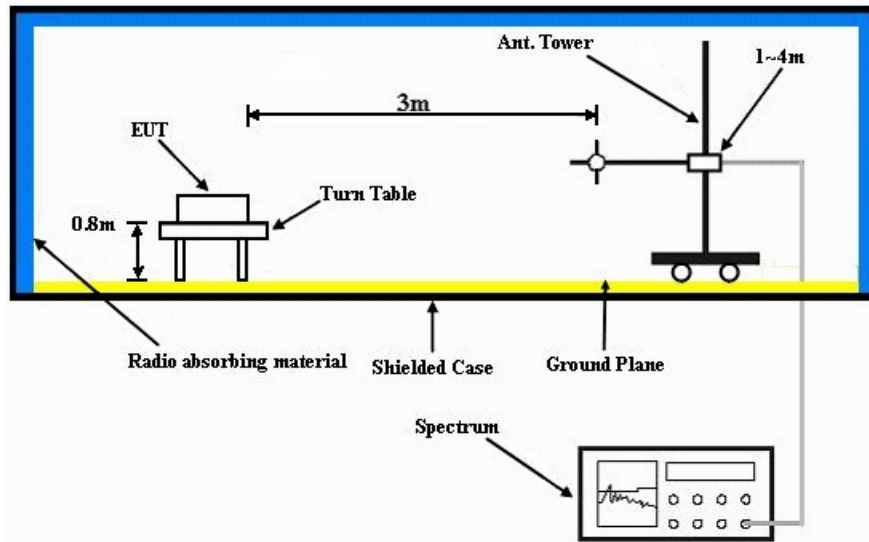
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution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

4.1.5 DEVIATION FROM TEST STANDARD

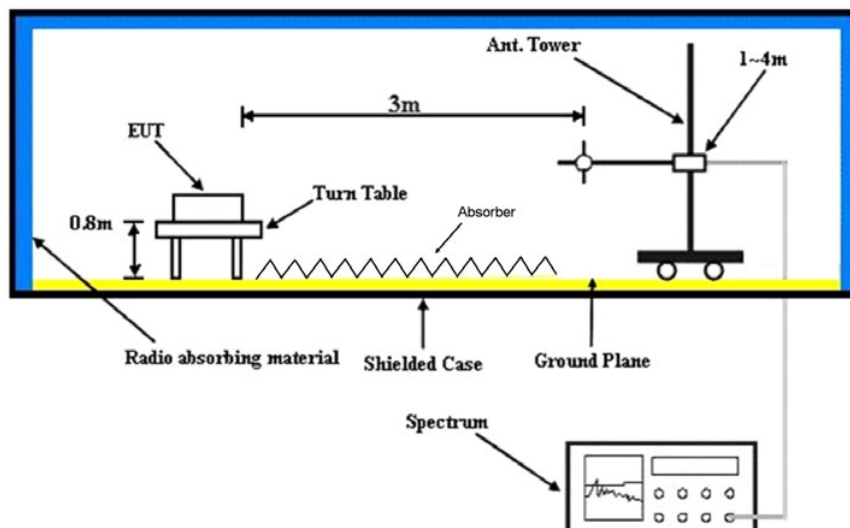
No deviation.

4.1.6 TEST SETUP

Frequency range 30MHz~1GHz



Frequency range above 1GHz



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

4.1.7 EUT OPERATING CONDITION

- a. Placed the EUT on the testing table.
- b. Prepared notebooks and POE to act as communication partner and placed it outside of testing area.
- c. The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
- d. The communication partner sent data to EUT by command "PING".

4.1.8 TEST RESULTS

TEST MODE A

ABOVE 1GHz DATA :

802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 69%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	54.2 PK	74.0	-19.8	1.35 H	285	49.00	5.20
2	5000.00	48.6 AV	54.0	-5.4	1.35 H	285	43.40	5.20
3	5150.00	57.6 PK	74.0	-16.4	1.05 H	80	52.20	5.40
4	5150.00	45.4 AV	54.0	-8.6	1.05 H	80	40.00	5.40
5	*5180.00	105.2 PK			1.05 H	80	65.90	39.30
6	*5180.00	95.3 AV			1.05 H	80	56.00	39.30
7	#10360.00	58.2 PK	74.0	-15.8	1.15 H	166	42.20	16.00
8	#10360.00	45.9 AV	54.0	-8.1	1.15 H	166	29.90	16.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	55.6 PK	74.0	-18.4	1.00 V	33	50.20	5.40
2	5150.00	43.9 AV	54.0	-10.1	1.00 V	33	38.50	5.40
3	*5180.00	100.2 PK			1.00 V	33	60.90	39.30
4	*5180.00	90.3 AV			1.00 V	33	51.00	39.30
5	#10360.00	58.0 PK	74.0	-16.0	1.05 V	217	42.00	16.00
6	#10360.00	45.8 AV	54.0	-8.2	1.05 V	217	29.80	16.00

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ * “: Fundamental frequency.
6. “#”:The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 40	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 69%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	105.3 PK			1.32 H	266	66.00	39.30
2	*5200.00	95.6 AV			1.32 H	266	56.30	39.30
3	#10400.00	58.4 PK	74.0	-15.6	1.11 H	158	42.20	16.20
4	#10400.00	46.2 AV	54.0	-7.8	1.11 H	158	30.00	16.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	100.3 PK			1.00 V	21	61.00	39.30
2	*5200.00	90.5 AV			1.00 V	21	51.20	39.30
3	#10400.00	58.2 PK	74.0	-15.8	1.13 V	200	42.00	16.20
4	#10400.00	46.0 AV	54.0	-8.0	1.13 V	200	29.80	16.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ * “: Fundamental frequency.
6. “#”:The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 69%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	105.2 PK			1.36 H	279	65.90	39.30
2	*5240.00	95.4 AV			1.36 H	279	56.10	39.30
3	#10480.00	59.0 PK	74.0	-15.0	1.24 H	169	42.20	16.80
4	#10480.00	46.8 AV	54.0	-7.2	1.24 H	169	30.00	16.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	100.1 PK			1.00 V	24	60.80	39.30
2	*5240.00	90.5 AV			1.00 V	24	51.20	39.30
3	#10480.00	58.8 PK	74.0	-15.2	1.03 V	302	42.00	16.80
4	#10480.00	46.4 AV	54.0	-7.6	1.03 V	302	29.60	16.80

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ * “: Fundamental frequency.
6. “#”:The radiated frequency is out the restricted band.

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 69%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	54.4 PK	74.0	-19.6	1.32 H	264	49.20	5.20
2	5000.00	48.7 AV	54.0	-5.3	1.32 H	264	43.50	5.20
3	5150.00	59.6 PK	74.0	-14.4	1.05 H	84	54.20	5.40
4	5150.00	47.9 AV	54.0	-6.1	1.05 H	84	42.50	5.40
5	*5180.00	109.3 PK			1.05 H	84	70.00	39.30
6	*5180.00	99.4 AV			1.05 H	84	60.10	39.30
7	#10360.00	58.3 PK	74.0	-15.7	1.07 H	215	42.30	16.00
8	#10360.00	45.9 AV	54.0	-8.1	1.07 H	215	29.90	16.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.8 PK	74.0	-15.2	1.00 V	20	53.40	5.40
2	5150.00	47.6 AV	54.0	-6.4	1.00 V	20	42.20	5.40
3	*5180.00	103.0 PK			1.00 V	20	63.70	39.30
4	*5180.00	93.5 AV			1.00 V	20	54.20	39.30
5	#10360.00	58.4 PK	74.0	-15.6	1.14 V	123	42.40	16.00
6	#10360.00	46.0 AV	54.0	-8.0	1.14 V	123	30.00	16.00

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ * ”: Fundamental frequency.
6. “#”:The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 40	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 69%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	54.5 PK	74.0	-19.5	1.38 H	280	49.30	5.20
2	5000.00	48.8 AV	54.0	-5.2	1.38 H	280	43.60	5.20
3	*5200.00	108.9 PK			1.06 H	90	69.60	39.30
4	*5200.00	99.1 AV			1.06 H	90	59.80	39.30
5	#10400.00	58.4 PK	74.0	-15.6	1.11 H	226	42.20	16.20
6	#10400.00	46.1 AV	54.0	-7.9	1.11 H	226	29.90	16.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	102.9 PK			1.00 V	16	63.60	39.30
2	*5200.00	93.3 AV			1.00 V	16	54.00	39.30
3	#10400.00	58.5 PK	74.0	-15.5	1.06 V	258	42.30	16.20
4	#10400.00	46.2 AV	54.0	-7.8	1.06 V	258	30.00	16.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ * “: Fundamental frequency.
6. “#”:The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 69%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	54.5 PK	74.0	-19.5	1.42 H	276	49.30	5.20
2	5000.00	48.8 AV	54.0	-5.2	1.42 H	276	43.60	5.20
3	*5240.00	108.8 PK			1.04 H	85	69.50	39.30
4	*5240.00	98.9 AV			1.04 H	85	59.60	39.30
5	5350.00	57.2 PK	74.0	-16.8	1.04 H	85	51.70	5.50
6	5350.00	46.3 AV	54.0	-7.7	1.04 H	85	40.80	5.50
7	#10480.00	58.9 PK	74.0	-15.1	1.10 H	310	42.10	16.80
8	#10480.00	46.5 AV	54.0	-7.5	1.10 H	310	29.70	16.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	102.8 PK			1.00 V	19	63.50	39.30
2	*5240.00	93.4 AV			1.00 V	19	54.10	39.30
3	5350.00	56.9 PK	74.0	-17.1	1.00 V	19	51.40	5.50
4	5350.00	45.9 AV	54.0	-8.1	1.00 V	19	40.40	5.50
5	#10480.00	58.8 PK	74.0	-15.2	1.30 V	152	42.00	16.80
6	#10480.00	46.3 AV	54.0	-7.7	1.30 V	152	29.50	16.80

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ * “: Fundamental frequency.
6. “#”:The radiated frequency is out the restricted band.

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 38	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 69%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	54.7 PK	74.0	-19.3	1.37 H	275	49.50	5.20
2	5000.00	48.4 AV	54.0	-5.6	1.37 H	275	43.20	5.20
3	5150.00	59.8 PK	74.0	-14.2	1.46 H	99	54.40	5.40
4	5150.00	47.3 AV	54.0	-6.7	1.46 H	99	41.90	5.40
5	*5190.00	103.7 PK			1.46 H	99	64.40	39.30
6	*5190.00	94.1 AV			1.46 H	99	54.80	39.30
7	#10380.00	58.6 PK	74.0	-15.4	1.15 H	196	42.50	16.10
8	#10380.00	46.2 AV	54.0	-7.8	1.15 H	196	30.10	16.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	59.4 PK	74.0	-14.6	1.00 V	25	54.00	5.40
2	5150.00	46.4 AV	54.0	-7.6	1.00 V	25	41.00	5.40
3	*5190.00	99.1 PK			1.00 V	25	59.80	39.30
4	*5190.00	89.5 AV			1.00 V	25	50.20	39.30
5	#10380.00	58.5 PK	74.0	-15.5	1.28 V	54	42.40	16.10
6	#10380.00	46.1 AV	54.0	-7.9	1.28 V	54	30.00	16.10

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ * ”: Fundamental frequency.
6. “#”:The radiated frequency is out the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 46	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 69%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	54.8 PK	74.0	-19.2	1.39 H	286	49.60	5.20
2	5000.00	48.6 AV	54.0	-5.4	1.39 H	286	43.40	5.20
3	*5230.00	103.9 PK			1.40 H	120	64.60	39.30
4	*5230.00	94.0 AV			1.40 H	120	54.70	39.30
5	#10460.00	59.0 PK	74.0	-15.0	1.27 H	30	42.40	16.60
6	#10460.00	46.8 AV	54.0	-7.2	1.27 H	30	30.20	16.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	99.3 PK			1.00 V	33	60.00	39.30
2	*5230.00	89.7 AV			1.00 V	33	50.40	39.30
3	#10460.00	58.9 PK	74.0	-15.1	1.16 V	42	42.30	16.60
4	#10460.00	46.6 AV	54.0	-7.4	1.16 V	42	30.00	16.60

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ * “: Fundamental frequency.
6. “#”:The radiated frequency is out the restricted band.

802.11ac (VHT80)

EUT TEST CONDITION		MEBSUREMENT DETBIL	
CHBNNEL	Channel 42	FREQUENCY RBNGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTBL CONDITIONS	22deg. C, 69%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	53.8 PK	74.0	-20.2	1.22 H	296	48.60	5.20
2	5000.00	48.1 AV	54.0	-5.9	1.22 H	296	42.90	5.20
3	5150.00	58.8 PK	74.0	-15.2	1.12 H	74	53.40	5.40
4	5150.00	46.9 AV	54.0	-7.1	1.12 H	74	41.50	5.40
5	*5210.00	98.5 PK			1.12 H	74	59.20	39.30
6	*5210.00	88.2 AV			1.12 H	74	48.90	39.30
7	#10420.00	58.6 PK	74.0	-15.4	1.10 H	144	42.20	16.40
8	#10420.00	46.2 AV	54.0	-7.8	1.10 H	144	29.80	16.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.8 PK	74.0	-15.2	1.00 V	21	53.40	5.40
2	5150.00	45.6 AV	54.0	-8.4	1.00 V	21	40.20	5.40
3	*5210.00	93.5 PK			1.00 V	21	54.20	39.30
4	*5210.00	83.9 AV			1.00 V	21	44.60	39.30
5	#10420.00	58.4 PK	74.0	-15.6	1.06 V	38	42.00	16.40
6	#10420.00	46.0 AV	54.0	-8.0	1.06 V	38	29.60	16.40

REMARKS:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value
- " * ": Fundamental frequency.
- "#":The radiated frequency is out the restricted band.

TEST MODE B

ABOVE 1GHz DATA :

802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 69%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	54.0 PK	74.0	-20.0	1.33 H	256	48.80	5.20
2	5000.00	49.4 AV	54.0	-4.6	1.33 H	256	44.20	5.20
3	5150.00	61.4 PK	74.0	-12.6	1.61 H	275	56.00	5.40
4	5150.00	47.1 AV	54.0	-6.9	1.61 H	275	41.70	5.40
5	*5180.00	106.7 PK			1.61 H	275	67.40	39.30
6	*5180.00	97.2 AV			1.61 H	275	57.90	39.30
7	#10360.00	59.0 PK	74.0	-15.0	1.16 H	24	43.00	16.00
8	#10360.00	46.5 AV	54.0	-7.5	1.16 H	24	30.50	16.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.6 PK	74.0	-17.4	1.00 V	15	51.20	5.40
2	5150.00	45.0 AV	54.0	-9.0	1.00 V	15	39.60	5.40
3	*5180.00	102.8 PK			1.00 V	15	63.50	39.30
4	*5180.00	94.3 AV			1.00 V	15	55.00	39.30
5	#10360.00	58.8 PK	74.0	-15.2	1.09 V	130	42.80	16.00
6	#10360.00	46.3 AV	54.0	-7.7	1.09 V	130	30.30	16.00

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. "#":The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 40	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 69%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	53.7 PK	74.0	-20.3	1.45 H	284	48.50	5.20
2	5000.00	49.2 AV	54.0	-4.8	1.45 H	284	44.00	5.20
3	*5200.00	106.9 PK			1.58 H	264	67.60	39.30
4	*5200.00	97.4 AV			1.58 H	264	58.10	39.30
5	#10400.00	59.2 PK	74.0	-14.8	1.26 H	15	43.00	16.20
6	#10400.00	46.7 AV	54.0	-7.3	1.26 H	15	30.50	16.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	102.9 PK			1.00 V	24	63.60	39.30
2	*5200.00	94.5 AV			1.00 V	24	55.20	39.30
3	#10400.00	59.1 PK	74.0	-14.9	1.11 V	135	42.90	16.20
4	#10400.00	46.5 AV	54.0	-7.5	1.11 V	135	30.30	16.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ * “: Fundamental frequency.
6. “#”:The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 69%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	53.5 PK	74.0	-20.5	1.39 H	299	48.30	5.20
2	5000.00	48.9 AV	54.0	-5.1	1.39 H	299	43.70	5.20
3	*5240.00	107.0 PK			1.60 H	270	67.70	39.30
4	*5240.00	97.5 AV			1.60 H	270	58.20	39.30
5	#10480.00	59.9 PK	74.0	-14.1	1.15 H	35	43.10	16.80
6	#10480.00	47.4 AV	54.0	-6.6	1.15 H	35	30.60	16.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	102.8 PK			1.00 V	21	63.50	39.30
2	*5240.00	94.5 AV			1.00 V	21	55.20	39.30
3	#10480.00	59.8 PK	74.0	-14.2	1.13 V	140	43.00	16.80
4	#10480.00	47.1 AV	54.0	-6.9	1.13 V	140	30.30	16.80

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ * “: Fundamental frequency.
6. “#”:The radiated frequency is out the restricted band.

802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 69%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	53.8 PK	74.0	-20.2	1.31 H	260	48.60	5.20
2	5000.00	48.4 AV	54.0	-5.6	1.31 H	260	43.20	5.20
3	5150.00	57.9 PK	74.0	-16.1	1.04 H	281	52.50	5.40
4	5150.00	45.9 AV	54.0	-8.1	1.04 H	281	40.50	5.40
5	*5180.00	106.7 PK			1.04 H	281	67.40	39.30
6	*5180.00	97.3 AV			1.04 H	281	58.00	39.30
7	#10360.00	59.1 PK	74.0	-14.9	1.09 H	15	43.10	16.00
8	#10360.00	46.4 AV	54.0	-7.6	1.09 H	15	30.40	16.00
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.6 PK	74.0	-17.4	1.00 V	23	51.20	5.40
2	5150.00	44.6 AV	54.0	-9.4	1.00 V	23	39.20	5.40
3	*5180.00	102.7 PK			1.00 V	23	63.40	39.30
4	*5180.00	93.3 AV			1.00 V	23	54.00	39.30
5	#10360.00	59.0 PK	74.0	-15.0	1.18 V	90	43.00	16.00
6	#10360.00	46.2 AV	54.0	-7.8	1.18 V	90	30.20	16.00

REMARKS:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value
- " * ": Fundamental frequency.
- "#": The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 40	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 69%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	53.6 PK	74.0	-20.4	1.35 H	257	48.40	5.20
2	5000.00	48.3 AV	54.0	-5.7	1.35 H	257	43.10	5.20
3	*5200.00	106.5 PK			1.06 H	285	67.20	39.30
4	*5200.00	97.1 AV			1.06 H	285	57.80	39.30
5	#10400.00	59.2 PK	74.0	-14.8	1.12 H	23	43.00	16.20
6	#10400.00	46.4 AV	54.0	-7.6	1.12 H	23	30.20	16.20
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5200.00	102.5 PK			1.00 V	30	63.20	39.30
2	*5200.00	93.1 AV			1.00 V	30	53.80	39.30
3	#10400.00	59.0 PK	74.0	-15.0	1.23 V	60	42.80	16.20
4	#10400.00	46.2 AV	54.0	-7.8	1.23 V	60	30.00	16.20

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ * “: Fundamental frequency.
6. “#”:The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 69%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	53.7 PK	74.0	-20.3	1.28 H	249	48.50	5.20
2	5000.00	48.4 AV	54.0	-5.6	1.28 H	249	43.20	5.20
3	*5240.00	106.7 PK			1.00 H	17	67.40	39.30
4	*5240.00	97.2 AV			1.00 H	17	57.90	39.30
5	#10480.00	59.5 PK	74.0	-14.5	1.20 H	57	42.70	16.80
6	#10480.00	47.1 AV	54.0	-6.9	1.20 H	57	30.30	16.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5240.00	102.7 PK			1.00 V	17	63.40	39.30
2	*5240.00	93.3 AV			1.00 V	17	54.00	39.30
3	#10480.00	59.4 PK	74.0	-14.6	1.20 V	57	42.60	16.80
4	#10480.00	46.9 AV	54.0	-7.1	1.20 V	57	30.10	16.80

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ * “: Fundamental frequency.
6. “#”:The radiated frequency is out the restricted band.

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 38	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 69%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	52.8 PK	74.0	-21.2	1.48 H	275	47.60	5.20
2	5000.00	48.2 AV	54.0	-5.8	1.48 H	275	43.00	5.20
3	5150.00	62.6 PK	74.0	-11.4	1.04 H	288	57.20	5.40
4	5150.00	49.6 AV	54.0	-4.4	1.04 H	288	44.20	5.40
5	*5190.00	103.5 PK			1.04 H	288	64.20	39.30
6	*5190.00	93.6 AV			1.04 H	288	54.30	39.30
7	#10380.00	58.6 PK	74.0	-15.4	1.15 H	9	42.50	16.10
8	#10380.00	46.2 AV	54.0	-7.8	1.15 H	9	30.10	16.10
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	58.8 PK	74.0	-15.2	1.57 V	13	53.40	5.40
2	5150.00	45.5 AV	54.0	-8.5	1.57 V	13	40.10	5.40
3	*5190.00	99.1 PK			1.57 V	13	59.80	39.30
4	*5190.00	89.2 AV			1.57 V	13	49.90	39.30
5	#10380.00	58.4 PK	74.0	-15.6	1.06 V	311	42.30	16.10
6	#10380.00	46.1 AV	54.0	-7.9	1.06 V	311	30.00	16.10

REMARKS:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value
- " * ": Fundamental frequency.
- "#": The radiated frequency is out the restricted band.

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 46	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	22deg. C, 69%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	52.7 PK	74.0	-21.3	1.53 H	271	47.50	5.20
2	5000.00	48.1 AV	54.0	-5.9	1.53 H	271	42.90	5.20
3	*5230.00	103.0 PK			1.06 H	275	63.70	39.30
4	*5230.00	93.1 AV			1.06 H	275	53.80	39.30
5	#10460.00	58.7 PK	74.0	-15.3	1.26 H	3	42.10	16.60
6	#10460.00	46.7 AV	54.0	-7.3	1.26 H	3	30.10	16.60
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*5230.00	98.9 PK			1.50 V	12	59.60	39.30
2	*5230.00	88.9 AV			1.50 V	12	49.60	39.30
3	#10460.00	58.6 PK	74.0	-15.4	1.05 V	325	42.00	16.60
4	#10460.00	46.6 AV	54.0	-7.4	1.05 V	325	30.00	16.60

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. “ * “: Fundamental frequency.
6. “#”:The radiated frequency is out the restricted band.

802.11ac (VHT80)

EUT TEST CONDITION		MEBSUREMENT DETBIL	
CHBNNEL	Channel 42	FREQUENCY RBNGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTBL CONDITIONS	22deg. C, 69%RH	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5000.00	52.6 PK	74.0	-21.4	1.45 H	277	47.40	5.20
2	5000.00	48.3 AV	54.0	-5.7	1.45 H	277	43.10	5.20
3	5150.00	60.3 PK	74.0	-13.7	1.04 H	290	54.90	5.40
4	5150.00	46.7 AV	54.0	-7.3	1.04 H	290	41.30	5.40
5	*5210.00	97.3 PK			1.04 H	290	58.00	39.30
6	*5210.00	87.5 AV			1.04 H	290	48.20	39.30
7	#10420.00	58.5 PK	74.0	-15.5	1.15 H	18	42.10	16.40
8	#10420.00	46.3 AV	54.0	-7.7	1.15 H	18	29.90	16.40
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	5150.00	56.8 PK	74.0	-17.2	1.19 V	13	51.40	5.40
2	5150.00	45.9 AV	54.0	-8.1	1.19 V	13	40.50	5.40
3	*5210.00	92.3 PK			1.19 V	13	53.00	39.30
4	*5210.00	82.5 AV			1.19 V	13	43.20	39.30
5	#10420.00	58.4 PK	74.0	-15.6	1.06 V	326	42.00	16.40
6	#10420.00	46.0 AV	54.0	-8.0	1.06 V	326	29.60	16.40

REMARKS:

- Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
- Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor(dB)
- The other emission levels were very low against the limit.
- Margin value = Emission Level – Limit value
- " * ": Fundamental frequency.
- "#":The radiated frequency is out the restricted band.

TEST MODE A

BELOW 1GHz WORST-CASE DATA : 802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 40	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	22deg. C, 69%RH	TESTED BY	Jones Chang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	249.08	36.1 QP	46.0	-9.9	1.75 H	281	50.60	-14.50
2	374.71	35.8 QP	46.0	-10.2	1.00 H	358	47.00	-11.20
3	549.82	43.6 QP	46.0	-2.4	1.50 H	159	51.90	-8.30
4	600.31	42.5 QP	46.0	-3.5	1.25 H	170	49.50	-7.00
5	650.81	40.8 QP	46.0	-5.2	1.25 H	138	46.90	-6.10
6	749.66	36.4 QP	46.0	-9.6	1.00 H	202	40.30	-3.90
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	55.64	35.0 QP	40.0	-5.0	1.24 V	355	49.30	-14.30
2	374.71	36.4 QP	46.0	-9.6	2.00 V	264	47.60	-11.20
3	449.96	38.0 QP	46.0	-8.0	1.24 V	358	47.70	-9.70
4	549.82	39.5 QP	46.0	-6.5	1.00 V	348	47.80	-8.30
5	600.31	37.4 QP	46.0	-8.6	1.50 V	352	44.40	-7.00
6	650.81	42.4 QP	46.0	-3.6	1.00 V	300	48.50	-6.10

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

TEST MODE B

BELOW 1GHz WORST-CASE DATA : 802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	22deg. C, 69%RH	TESTED BY	Jones Chang

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	125.07	30.3 QP	43.5	-13.2	1.75 H	260	46.00	-15.70
2	249.08	36.2 QP	46.0	-9.8	1.00 H	208	50.70	-14.50
3	549.82	44.1 QP	46.0	-1.9	1.49 H	351	52.40	-8.30
4	600.31	41.6 QP	46.0	-4.4	1.49 H	184	48.60	-7.00
5	650.81	40.5 QP	46.0	-5.5	1.25 H	21	46.60	-6.10
6	750.80	36.2 QP	46.0	-9.8	1.00 H	200	40.00	-3.80
ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	39.50	36.4 QP	40.0	-3.6	1.50 V	309	51.50	-15.10
2	450.96	37.6 QP	46.0	-8.4	1.25 V	354	47.30	-9.70
3	549.82	37.4 QP	46.0	-8.6	3.00 V	77	45.70	-8.30
4	600.31	39.4 QP	46.0	-6.6	1.00 V	60	46.40	-7.00
5	650.81	42.0 QP	46.0	-4.0	1.00 V	54	48.10	-6.10
6	749.66	34.6 QP	46.0	-11.4	1.50 V	305	38.50	-3.90

REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB)
– Pre-Amplifier Factor (dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

4.2 CONDUCTED EMISSION MEASUREMENT

4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dBμV)	
	Quasi-peak	Average
0.15 ~ 0.5	66 to 56	56 to 46
0.5 ~ 5	56	46
5 ~ 30	60	50

- NOTE:** 1. The lower limit shall apply at the transition frequencies.
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100289	Nov. 29, 2013	Nov. 28, 2014
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 27, 2013	Dec. 26, 2014
LISN ROHDE & SCHWARZ (Peripheral)	ESH3-Z5	100311	Jul. 17, 2013	Jul. 16, 2014
LISN ROHDE & SCHWARZ (EUT)	ESH3-Z5	835239/001	Feb. 04, 2013	Feb. 03, 2014
Software ADT	BV ADT_Cond_ V7.3.7.3	NA	NA	NA

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

4.2.3 TEST PROCEDURES

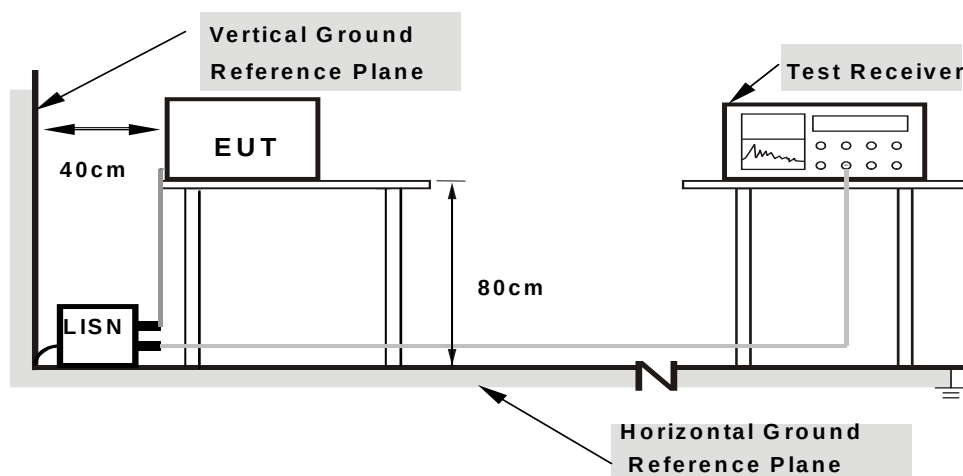
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

4.2.5 TEST SETUP



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

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

4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

4.2.7 TEST RESULTS

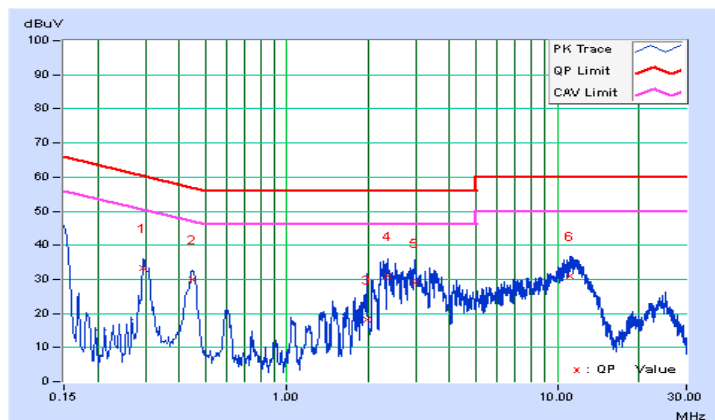
TEST MODE A

CONDUCTED WORST-CASE DATA : 802.11n (20MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.29467	0.11	33.21	20.20	33.32	20.31	60.39	50.39	-27.07	-30.08
2	0.44624	0.12	29.71	19.75	29.83	19.87	56.94	46.94	-27.11	-27.07
3	1.97597	0.17	18.07	6.84	18.24	7.01	56.00	46.00	-37.76	-38.99
4	2.35524	0.18	30.86	15.26	31.04	15.44	56.00	46.00	-24.96	-30.56
5	2.97693	0.20	28.80	16.01	29.00	16.21	56.00	46.00	-27.00	-29.79
6	11.20357	0.54	30.44	19.38	30.98	19.92	60.00	50.00	-29.02	-30.08

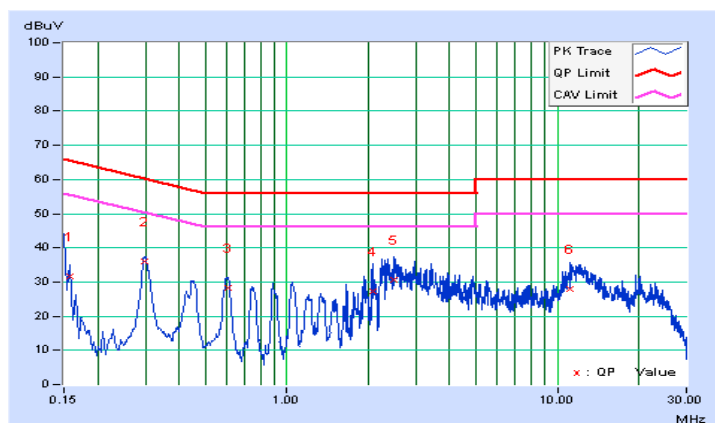
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. The emission levels of other frequencies were very low against the limit.
 3. Margin value = Emission level - Limit value
 4. Correction factor = Insertion loss + Cable loss
 5. Emission Level = Correction Factor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



PHASE	Line 2	6dB BANDWIDTH	9kHz
-------	--------	---------------	------

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15782	0.11	31.42	18.42	31.53	18.53	65.58	55.58	-34.05	-37.05
2	0.29819	0.12	35.91	26.36	36.03	26.48	60.29	50.29	-24.26	-23.81
3	0.60737	0.13	28.19	17.27	28.32	17.40	56.00	46.00	-27.68	-28.60
4	2.06981	0.16	27.07	13.35	27.23	13.51	56.00	46.00	-28.77	-32.49
5	2.49991	0.17	30.47	15.14	30.64	15.31	56.00	46.00	-25.36	-30.69
6	11.17620	0.40	27.69	16.03	28.09	16.43	60.00	50.00	-31.91	-33.57

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.



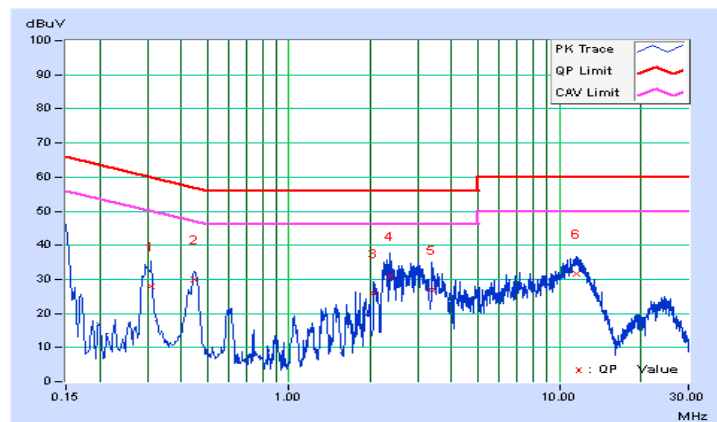
TEST MODE B

CONDUCTED WORST-CASE DATA : 802.11n (20MHz)

PHASE	Line 1	6dB BANDWIDTH	9kHz
-------	--------	---------------	------

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.31031	0.11	27.92	15.94	28.03	16.05	59.96	49.96	-31.93	-33.91
2	0.44716	0.12	29.90	20.21	30.02	20.33	56.93	46.93	-26.91	-26.60
3	2.06590	0.17	25.84	12.58	26.01	12.75	56.00	46.00	-29.99	-33.25
4	2.36306	0.18	30.66	15.89	30.84	16.07	56.00	46.00	-25.16	-29.93
5	3.37575	0.21	26.81	12.67	27.02	12.88	56.00	46.00	-28.98	-33.12
6	11.50073	0.55	31.06	20.35	31.61	20.90	60.00	50.00	-28.39	-29.10

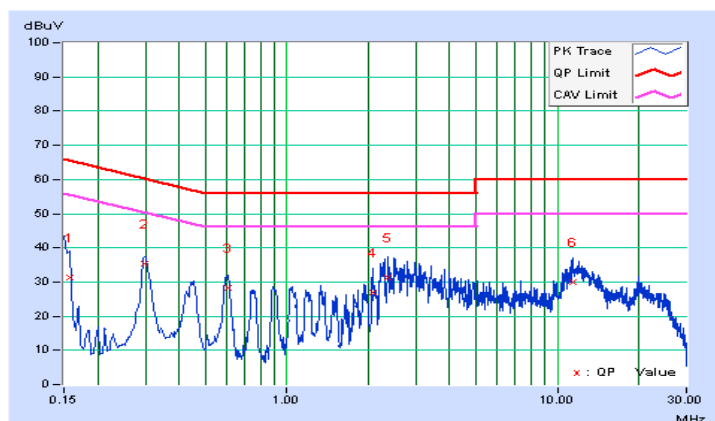
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
 2. The emission levels of other frequencies were very low against the limit.
 3. Margin value = Emission level - Limit value
 4. Correction factor = Insertion loss + Cable loss
 5. Emission Level = Correction Factor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



PHASE	Line 2	6dB BANDWIDTH	9kHz
-------	--------	---------------	------

No	Freq.	Corr. Factor	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15782	0.11	31.24	18.42	31.35	18.53	65.58	55.58	-34.23	-37.05
2	0.29662	0.12	35.38	25.36	35.50	25.48	60.34	50.34	-24.84	-24.86
3	0.60737	0.13	28.14	17.21	28.27	17.34	56.00	46.00	-27.73	-28.66
4	2.07372	0.16	26.93	13.08	27.09	13.24	56.00	46.00	-28.91	-32.76
5	2.37479	0.17	30.99	16.22	31.16	16.39	56.00	46.00	-24.84	-29.61
6	11.36779	0.40	29.65	18.68	30.05	19.08	60.00	50.00	-29.95	-30.92

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 PEAK TRANSMIT POWER MEASUREMENT

4.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

FREQUENCY BAND	LIMIT
5.150 ~ 5.250GHz	The lesser of 50mW (17dBm) or 4dBm + 10logB
5.250 ~ 5.350GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB
5.470 ~ 5.725GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB

NOTE: Where B is the 26dB emission bandwidth in MHz.

Per KDB 662911 D01 Multiple Transmitter Output v02 Method of conducted output power measurement on IEEE 802.11 devices,

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

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

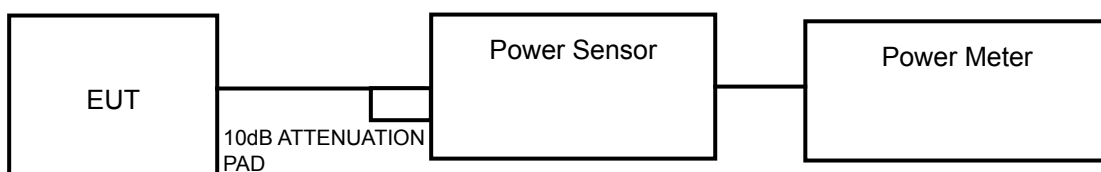
Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less for 20-MHz channel widths with $N_{ANT} \geq 5$.

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

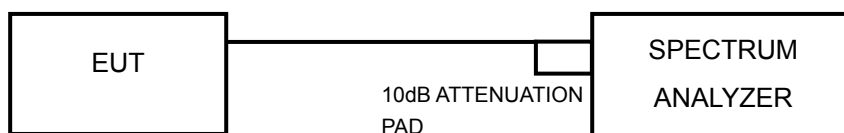
4.3.2 TEST SETUP

FOR POWER OUTPUT MEASUREMENT

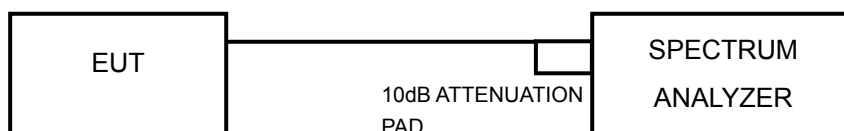
For 802.11a, 802.11n (20MHz), 802.11n (40MHz)



For 802.11ac (80MHz)



FOR 26dB BANDWIDTH



4.3.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.3.4 TEST PROCEDURE

FOR AVERAGE POWER MEASUREMENT

For 802.11a, 802.11n (20MHz), 802.11n (40MHz)

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

For 802.11ac (80MHz)

Method SA-1

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 1 MHz.
- 3) Set VBW $\geq$ 3 MHz.
- 4) Number of points in sweep $\geq$ 2 Span / RBW.
- 5) Sweep time = auto.
- 6) Set trigger to free run (duty cycle $\geq$ 98 percent); Set video trigger (duty cycle $<$ 98 percent)
- 7) Detector = RMS.
- 8) Trace average at least 100 traces in power averaging mode
- 9) Compute power by integrating the spectrum across the 26 dB EBW of the signal.

FOR 26dB BANDWIDTH

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

4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

4.3.7 TEST RESULTS

TEST MODE A

POWER OUTPUT:

802.11a

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	10.75	10.89	24.159	13.83	17	PASS
40	5200	11.01	10.94	25.035	13.99	17	PASS
48	5240	11.22	10.71	25.019	13.98	17	PASS

NOTE:

CHAIN 0

1. $4\text{dBm} + 10\log(22.26) = 17.48 \text{ dBm} > 17\text{dBm}$
2. $4\text{dBm} + 10\log(22.62) = 17.54 \text{ dBm} > 17\text{dBm}$
3. $4\text{dBm} + 10\log(22.82) = 17.58 \text{ dBm} > 17\text{dBm}$

CHAIN 1

1. $4\text{dBm} + 10\log(22.45) = 17.51 \text{ dBm} > 17\text{dBm}$
2. $4\text{dBm} + 10\log(22.47) = 17.52 \text{ dBm} > 17\text{dBm}$
3. $4\text{dBm} + 10\log(23.07) = 17.63 \text{ dBm} > 17\text{dBm}$

802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	13.43	13.45	44.160	16.45	17	PASS
40	5200	13.53	13.62	45.556	16.59	17	PASS
48	5240	13.23	13.47	43.271	16.36	17	PASS

NOTE:

CHAIN 0

1. $4\text{dBm} + 10\log(23.69) = 17.75 \text{ dBm} > 17\text{dBm}$
2. $4\text{dBm} + 10\log(23.89) = 17.78 \text{ dBm} > 17\text{dBm}$
3. $4\text{dBm} + 10\log(24.85) = 17.95 \text{ dBm} > 17\text{dBm}$

CHAIN 1

1. $4\text{dBm} + 10\log(24.14) = 17.83 \text{ dBm} > 17\text{dBm}$
2. $4\text{dBm} + 10\log(24.36) = 17.87 \text{ dBm} > 17\text{dBm}$
3. $4\text{dBm} + 10\log(24.96) = 17.97 \text{ dBm} > 17\text{dBm}$

802.11n (40MHz)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
38	5190	13.99	13.71	48.557	16.86	17	PASS
46	5230	14.21	13.72	49.913	16.98	17	PASS

NOTE:

CHAIN 0

1. $4\text{dBm} + 10\log(48.34) = 20.84 \text{ dBm} > 17\text{dBm}$

2. $4\text{dBm} + 10\log(49.00) = 20.90 \text{ dBm} > 17\text{dBm}$

CHAIN 1

1. $4\text{dBm} + 10\log(46.06) = 20.63 \text{ dBm} > 17\text{dBm}$

2. $4\text{dBm} + 10\log(47.17) = 20.74 \text{ dBm} > 17\text{dBm}$

802.11ac (VHT80)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
42	5210	11.21	11.17	26.305	14.20	16.94	PASS

NOTE:

CHAIN 0

1. $4\text{dBm} + 10\log(91.74) = 16.94 \text{ dBm} < 17\text{dBm}$

CHAIN 1

1. $4\text{dBm} + 10\log(93.06) = 17.01 \text{ dBm} > 17\text{dBm}$

TEST MODE B

POWER OUTPUT:

802.11a

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	11.09	10.36	23.717	13.75	17	PASS
40	5200	11.11	10.54	24.236	13.84	17	PASS
48	5240	10.82	10.44	23.144	13.64	17	PASS

NOTE:

CHAIN 0

1. $4\text{dBm} + 10\log(25.63) = 18.09\text{ dBm} > 17\text{dBm}$
2. $4\text{dBm} + 10\log(22.91) = 17.60\text{ dBm} > 17\text{dBm}$
3. $4\text{dBm} + 10\log(22.57) = 17.54\text{ dBm} > 17\text{dBm}$

CHAIN 1

1. $4\text{dBm} + 10\log(22.59) = 17.54\text{ dBm} > 17\text{dBm}$
2. $4\text{dBm} + 10\log(22.64) = 17.55\text{ dBm} > 17\text{dBm}$
3. $4\text{dBm} + 10\log(22.82) = 17.58\text{ dBm} > 17\text{dBm}$

802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
36	5180	13.87	12.97	44.193	16.45	17	PASS
40	5200	13.79	12.74	42.726	16.31	17	PASS
48	5240	13.73	13.03	43.696	16.40	17	PASS

NOTE:

CHAIN 0

1. $4\text{dBm} + 10\log(23.50) = 17.71\text{ dBm} > 17\text{dBm}$
2. $4\text{dBm} + 10\log(23.79) = 17.76\text{ dBm} > 17\text{dBm}$
3. $4\text{dBm} + 10\log(23.57) = 17.72\text{ dBm} > 17\text{dBm}$

CHAIN 1

1. $4\text{dBm} + 10\log(23.42) = 17.70\text{ dBm} > 17\text{dBm}$
2. $4\text{dBm} + 10\log(23.67) = 17.74\text{ dBm} > 17\text{dBm}$
3. $4\text{dBm} + 10\log(23.77) = 17.76\text{ dBm} > 17\text{dBm}$

802.11n (40MHz)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
38	5190	14.22	13.62	49.438	16.94	17	PASS
46	5230	14.02	13.34	46.812	16.70	17	PASS

NOTE:

CHAIN 0

1. $4\text{dBm} + 10\log(47.75) = 20.79\text{ dBm} > 17\text{dBm}$

2. $4\text{dBm} + 10\log(46.95) = 20.72\text{ dBm} > 17\text{dBm}$

CHAIN 1

1. $4\text{dBm} + 10\log(46.85) = 20.71\text{ dBm} > 17\text{dBm}$

2. $4\text{dBm} + 10\log(46.93) = 20.71\text{ dBm} > 17\text{dBm}$

802.11ac (VHT80)

CHAN.	CHAN. FREQ. (MHz)	AVERAGE POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	POWER LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
42	5210	11.26	11.11	26.278	14.20	17	PASS

NOTE:

CHAIN 0

1. $4\text{dBm} + 10\log(94.01) = 23.73\text{ dBm} > 17\text{dBm}$

CHAIN 1

1. $4\text{dBm} + 10\log(89.79) = 23.53\text{ dBm} > 17\text{dBm}$

26dB BANDWIDTH:

TEST MODE A

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	22.26	22.45	PASS
40	5200	22.62	22.47	PASS
48	5240	22.82	23.07	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	23.69	24.14	PASS
40	5200	23.89	24.36	PASS
48	5240	24.85	24.96	PASS

802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
38	5190	48.34	46.06	PASS
46	5230	49.00	47.17	PASS

802.11ac (VHT80)

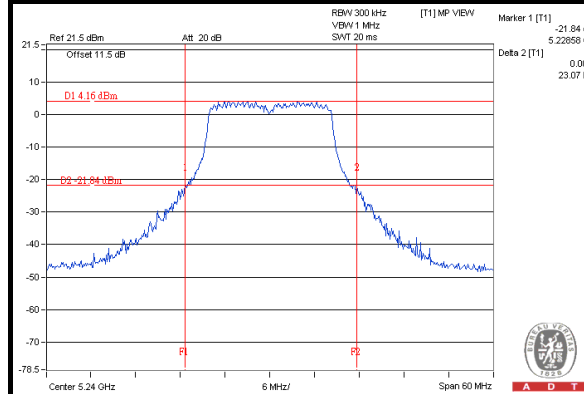
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
42	5210	91.74	93.06	PASS



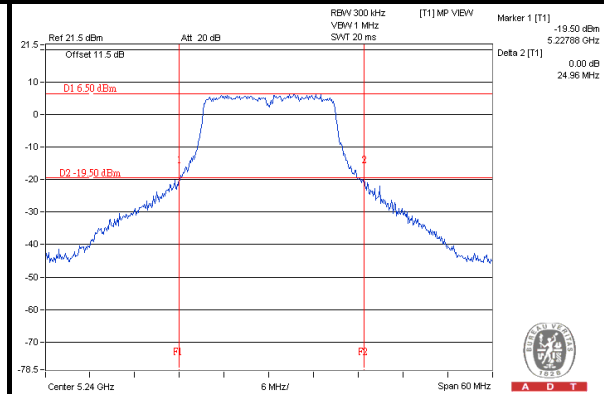
A D T

SPECTRUM PLOT OF WORST VALUE

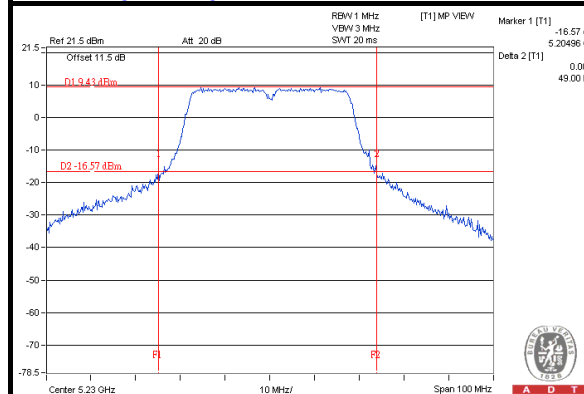
802.11a



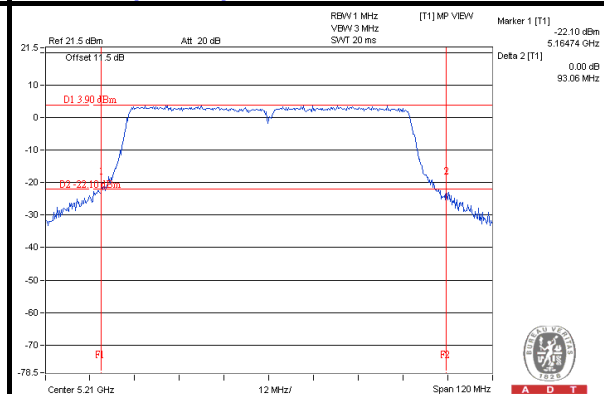
802.11n (20MHz)



802.11n (40MHz)



802.11ac (VHT80)



TEST MODE B

802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	25.63	22.59	PASS
40	5200	22.91	22.64	PASS
48	5240	22.57	22.82	PASS

802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	23.50	23.42	PASS
40	5200	23.79	23.67	PASS
48	5240	23.57	23.77	PASS

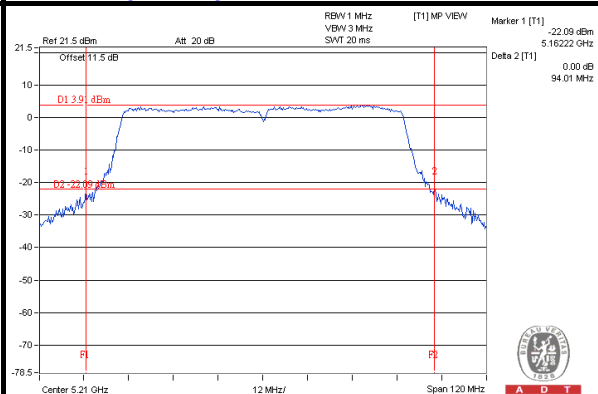
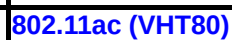
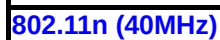
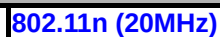
802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
38	5190	47.75	46.85	PASS
46	5230	46.95	46.93	PASS

802.11ac (VHT80)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
42	5210	94.01	89.79	PASS

802.11a

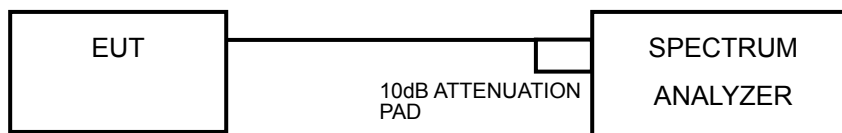


4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

4.4.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

FREQUENCY BAND	LIMIT
5.150 ~ 5.250GHz	4dBm

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

Using method SA-1

- 1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
- 2) Set RBW = 30 KHz, Set VBW $\geq$ 1 MHz, Detector = RMS
- 3) Set Channel power measure = 1MHz
- 4) Sweep time = auto, trigger set to "free run".
- 5) Trace average at least 100 traces in power averaging mode.
- 6) Record the max value

4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

4.4.6 EUT OPERATING CONDITIONS

Same as 4.3.6.

4.4.7 TEST RESULTS

TEST MODE A

802.11a

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
36	5180	-2.61	-1.78	0.84	1.8	PASS
40	5200	-2.31	-1.76	0.98	1.8	PASS
48	5240	-2.26	-1.79	0.99	1.8	PASS

- NOTE:** 1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $5.16\text{dBi} + 10\log(2) = 8.2\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $4 - (8.2 - 6) = 1.8\text{dBm}$.

802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
36	5180	0.84	1.02	3.94	4	PASS
40	5200	0.56	1.26	3.93	4	PASS
48	5240	0.70	1.07	3.90	4	PASS

NOTE:

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- IEEE 802.11n, MCS = 8-15, NSS = 2,
Directional gain = $5.16\text{dBi} + 10\log(2/2) = 5.16\text{dBi} < 6\text{dBi}$, so the limit no need to reduced.

802.11n (40MHz)

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
38	5190	-2.63	-1.82	0.80	4	PASS
46	5230	-1.82	-1.27	1.47	4	PASS

NOTE:

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- IEEE 802.11n, MCS = 8-15, NSS = 2,
Directional gain = $5.16\text{dBi} + 10\log(2/2) = 5.16\text{dBi} < 6\text{dBi}$, so the limit no need to reduced.

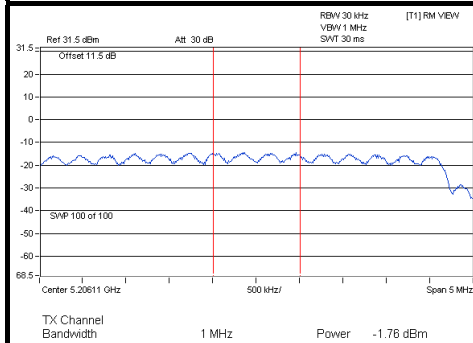
802.11ac (VHT80)

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
42	5210	-8.00	-6.43	-4.13	1.8	PASS

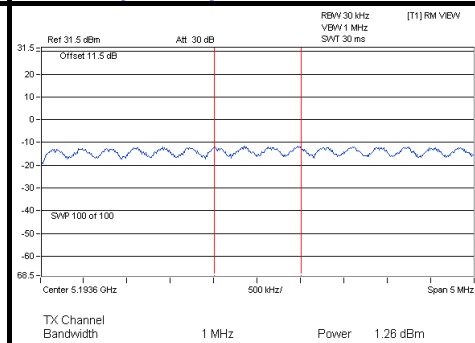
- NOTE:**
- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
 - Directional gain = $5.16\text{dBi} + 10\log(2) = 8.2\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $4-(8.2-6) = 1.8\text{dBm}$.

SPECTRUM PLOT OF WORST VALUE

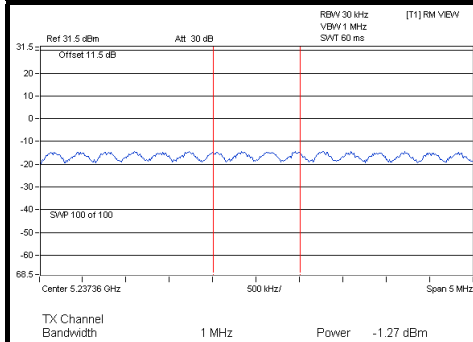
802.11a



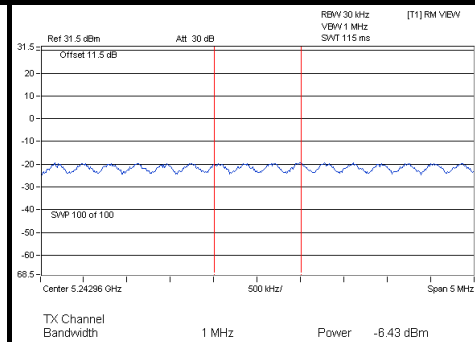
802.11n (20MHz)



802.11n (40MHz)



802.11ac (VHT80)



TEST MODE B

802.11a

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
36	5180	-2.01	-2.10	0.96	1.8	PASS
40	5200	-2.11	-2.02	0.95	1.8	PASS
48	5240	-2.12	-1.94	0.98	1.8	PASS

NOTE: 1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. Directional gain = $5.16\text{dBi} + 10\log(2) = 8.2\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $4 - (8.2 - 6) = 1.8\text{dBm}$.

802.11n (20MHz)

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
36	5180	0.93	0.21	3.60	4	PASS
40	5200	1.09	0.14	3.65	4	PASS
48	5240	1.23	0.28	3.79	4	PASS

NOTE:

1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.

2. IEEE 802.11n, MCS = 8-15, NSS = 2,

Directional gain = $5.16\text{dBi} + 10\log(2/2) = 5.16\text{dBi} < 6\text{dBi}$, so the limit no need to reduced.

802.11n (40MHz)

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
38	5190	-1.30	-2.06	1.35	4	PASS
46	5230	-1.61	-2.53	0.96	4	PASS

NOTE:

- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- IEEE 802.11n, MCS = 8-15, NSS = 2,
Directional gain = $5.16\text{dBi} + 10\log(2/2) = 5.16\text{dBi} < 6\text{dBi}$, so the limit no need to reduced.

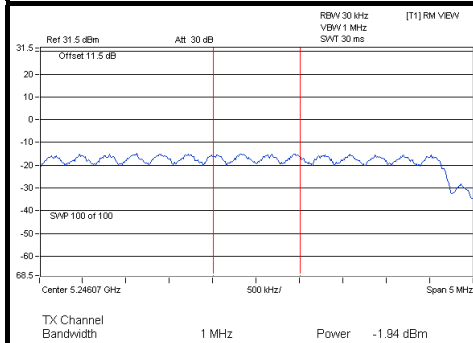
802.11ac (VHT80)

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
42	5210	-6.95	-7.22	-4.07	1.8	PASS

- NOTE:** 1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = $5.16\text{dBi} + 10\log(2) = 8.2\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $4 - (8.2 - 6) = 1.8\text{dBm}$.

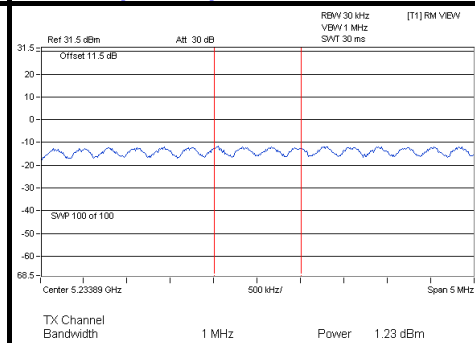
SPECTRUM PLOT OF WORST VALUE

802.11a



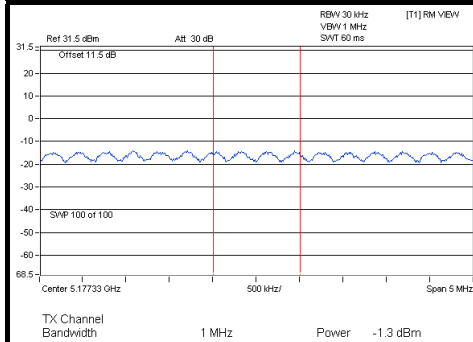
A D T

802.11n (20MHz)



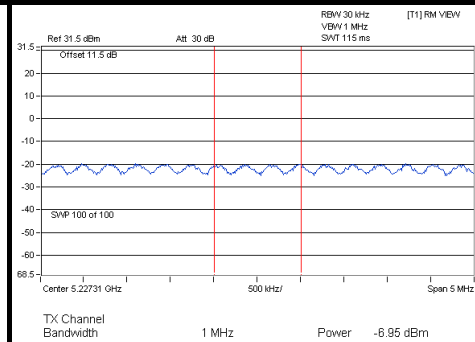
A D T

802.11n (40MHz)



A D T

802.11ac (VHT80)



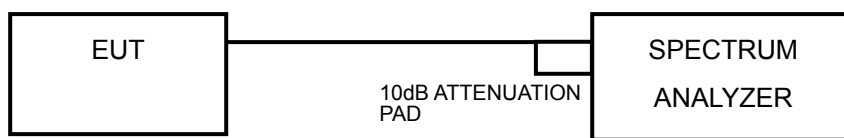
A D T

4.5 PEAK POWER EXCURSION MEASUREMENT

4.5.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

Shall not exceed 13 dB.

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

- 1) Set RBW = 1 MHz, VBW $\geq$ 3 MHz, Detector = peak.
- 2) Trace mode = max-hold. Allow the sweeps to continue until the trace stabilizes.
- 3) Use the peak search function to find the peak of the spectrum.
- 4) Measure the PPSD.
- 5) Compute the ratio of the maximum of the peak-max-hold spectrum to the PPSD.
Find the worst channel and modulation mode as above test procedure, and follow KDB 789033 D01 General UNII Test Procedures v01r03 and repeat step 1 to 5 for final testing of each modulation mode on a single channel (all modulation types) in a single operating band to compliance with the peak excursion requirement.

4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

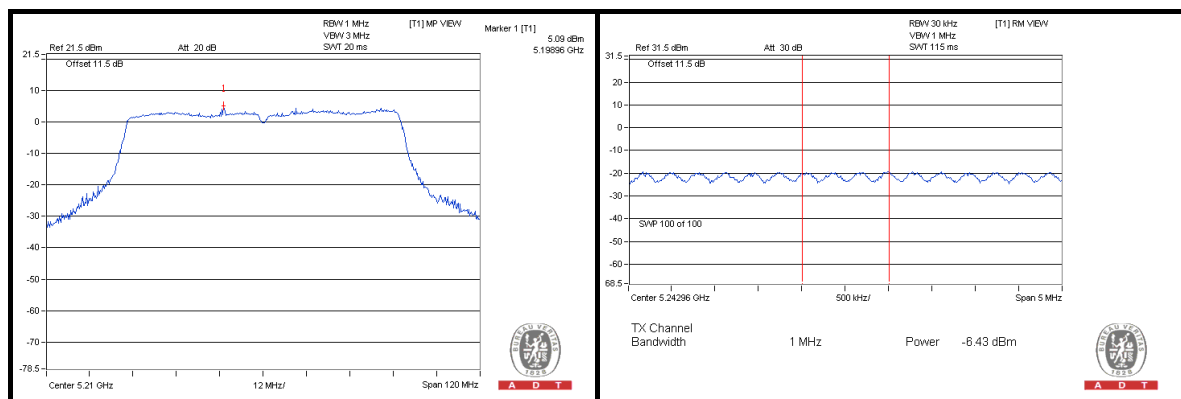
4.5.6 EUT OPERATING CONDITIONS

Same as 4.2.6

4.5.7 TEST RESULTS

TEST MODE A

MODULATION MODE	MODULATION TYPE	CHANNEL FREQUENCY (MHz)	PEAK VALUE (dBm)	PPSD (dBm)	PEAK EXCURSION (dB)	LIMIT (dB)	PASS/ FAIL
802.11a	BPSK	5240	8.59	-1.79	10.38	13	PASS
	QPSK		6.98	-1.84	8.82	13	PASS
	16QAM		7.98	-1.73	9.71	13	PASS
	64QAM		8.59	-1.58	10.17	13	PASS
802.11n (20MHz)	BPSK	5240	11.7	1.07	10.63	13	PASS
	QPSK		9.74	1.03	8.71	13	PASS
	16QAM		9.94	1.11	8.83	13	PASS
	64QAM		10.37	1.02	9.35	13	PASS
802.11n (40MHz)	BPSK	5240	9.03	-1.27	10.3	13	PASS
	QPSK		9.21	-1.33	10.54	13	PASS
	16QAM		9.89	-1.16	11.05	13	PASS
	64QAM		9.45	-1.19	10.64	13	PASS
802.11ac (80MHz)	BPSK	5210	5.09	-6.43	11.52	13	PASS
	QPSK		3.09	-6.24	9.33	13	PASS
	16QAM		2.86	-6.93	9.79	13	PASS
	64QAM		2.95	-6.59	9.54	13	PASS
	256QAM		3.16	-6.33	9.49	13	PASS

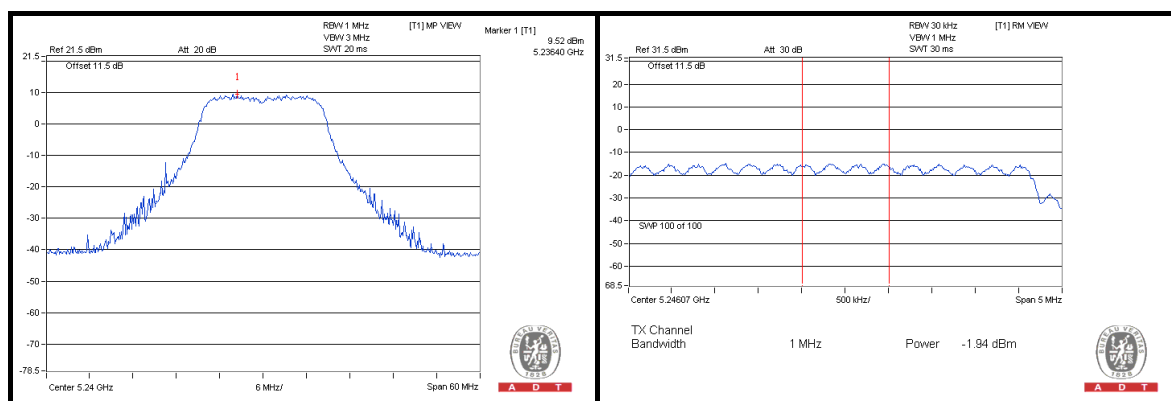




A D T

TEST MODE B

MODULATION MODE	MODULATION TYPE	CHANNEL FREQUENCY (MHz)	PEAK VALUE (dBm)	PPSD (dBm)	PEAK EXCURSION (dB)	LIMIT (dB)	PASS/ FAIL
802.11a	BPSK	5240	9.52	-1.94	11.46	13	PASS
	QPSK		6.83	-1.44	8.27	13	PASS
	16QAM		7.43	-1.37	8.8	13	PASS
	64QAM		8.04	-1.40	9.44	13	PASS
802.11n (20MHz)	BPSK	5240	11.59	1.23	10.36	13	PASS
	QPSK		10.55	1.45	9.10	13	PASS
	16QAM		11.28	1.54	9.74	13	PASS
	64QAM		10.87	1.26	9.61	13	PASS
802.11n (40MHz)	BPSK	5240	8.87	-1.61	10.48	13	PASS
	QPSK		6.77	-1.83	8.60	13	PASS
	16QAM		8.39	-1.5	9.89	13	PASS
	64QAM		7.77	-1.36	9.13	13	PASS
802.11ac (80MHz)	BPSK	5210	4.36	-6.95	11.31	13	PASS
	QPSK		2.63	-6.62	9.25	13	PASS
	16QAM		3.45	-6.67	10.12	13	PASS
	64QAM		3.35	-6.91	10.26	13	PASS
	256QAM		2.61	-6.93	9.54	13	PASS

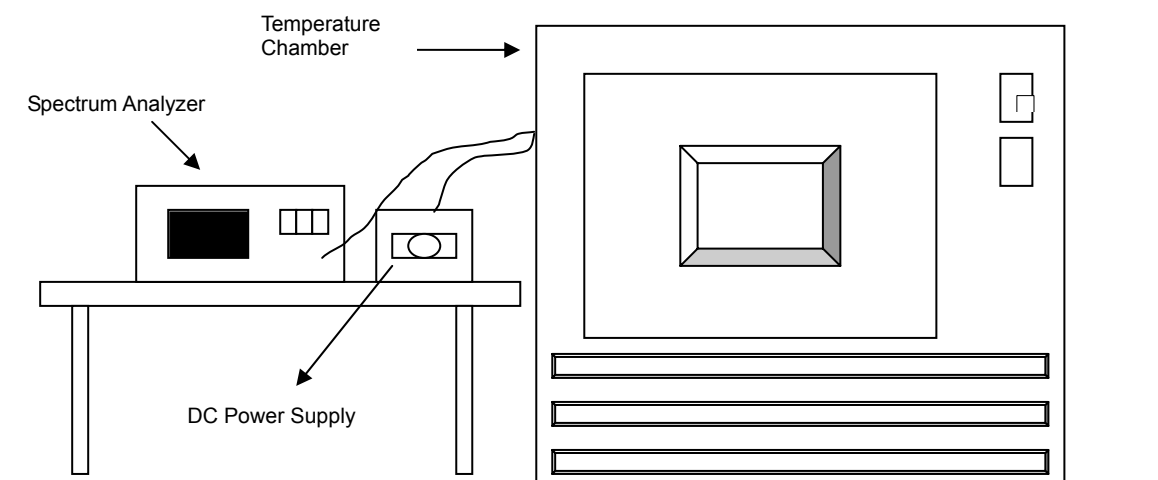


4.6 FREQUENCY STABILITY

4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

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

4.6.2 TEST SETUP



4.6.3 TEST INSTRUMENTS

Refer to section 4.1.3 to get information of above instrument.

4.6.4 TEST PROCEDURE

- a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
- b. Turn the EUT on and couple its output to a spectrum analyzer.
- c. Turn the EUT off and set the chamber to the highest temperature specified.
- d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
- e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

4.6.6 EUT OPERATING CONDITION

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

4.6.7 TEST RESULTS

TEST MODE A

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5240MHz									
TEMP. (°C)	POWER SUPPLY (Vdc)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
50	120	5239.9871	-0.00025	5239.9868	-0.00025	5239.9922	-0.00015	5239.9908	-0.00018
40	120	5239.9973	-0.00005	5239.9919	-0.00015	5240.0001	0.00000	5240.0009	0.00002
30	120	5240.0036	0.00007	5239.9996	-0.00001	5239.9993	-0.00001	5239.997	-0.00006
20	120	5239.9843	-0.00030	5239.9839	-0.00031	5239.9778	-0.00042	5239.9838	-0.00031
10	120	5239.9953	-0.00009	5239.9904	-0.00018	5239.9913	-0.00017	5239.9877	-0.00023
0	120	5239.9737	-0.00050	5239.9815	-0.00035	5239.975	-0.00048	5239.9787	-0.00041
-10	120	5239.9793	-0.00040	5239.9742	-0.00049	5239.9804	-0.00037	5239.9788	-0.00040
-20	120	5239.9966	-0.00006	5240.0054	0.00010	5240.0057	0.00011	5240.0055	0.00010
-30	120	5239.9989	-0.00002	5240.0057	0.00011	5239.9996	-0.00001	5239.9977	-0.00004

FREQUENCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5240MHz									
TEMP. (°C)	POWER SUPPLY (Vdc)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5239.9836	-0.00031	5239.984	-0.00031	5239.978	-0.00042	5239.9848	-0.00029
	120	5239.9843	-0.00030	5239.9839	-0.00031	5239.9778	-0.00042	5239.9838	-0.00031
	102	5239.9848	-0.00029	5239.9834	-0.00032	5239.9772	-0.00044	5239.984	-0.00031

TEST MODE B

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5240MHz									
TEMP. (°C)	POWER SUPPLY (Vdc)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
50	120	5240.0255	0.00049	5240.0269	0.00051	5240.0267	0.00051	5240.0261	0.00050
40	120	5239.984	-0.00031	5239.9794	-0.00039	5239.981	-0.00036	5239.9777	-0.00043
30	120	5239.9832	-0.00032	5239.988	-0.00023	5239.9905	-0.00018	5239.9834	-0.00032
20	120	5239.9832	-0.00032	5239.9862	-0.00026	5239.9896	-0.00020	5239.9795	-0.00039
10	120	5239.9881	-0.00023	5239.9819	-0.00035	5239.9846	-0.00029	5239.9834	-0.00032
0	120	5240.0175	0.00033	5240.019	0.00036	5240.0154	0.00029	5240.0207	0.00040
-10	120	5239.9785	-0.00041	5239.9859	-0.00027	5239.9804	-0.00037	5239.9816	-0.00035
-20	120	5240.0165	0.00031	5240.0156	0.00030	5240.0128	0.00024	5240.0138	0.00026
-30	120	5239.9948	-0.00010	5239.9905	-0.00018	5239.9899	-0.00019	5239.9877	-0.00023

FREQUENCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5240MHz									
TEMP. (°C)	POWER SUPPLY (Vdc)	0 MINUTE		2 MINUTE		5 MINUTE		10 MINUTE	
		Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)	Measured Frequency (MHz)	Frequency Drift (%)
20	138	5239.9825	-0.00033	5239.9864	-0.00026	5239.989	-0.00021	5239.9785	-0.00041
	120	5239.9832	-0.00032	5239.9862	-0.00026	5239.9896	-0.00020	5239.9795	-0.00039
	102	5239.9833	-0.00032	5239.9864	-0.00026	5239.9895	-0.00020	5239.9791	-0.00040

5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

6. INFORMATION ON THE TESTING LABORATORIES

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

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

Linko EMC/RF Lab:

Tel: 886-2-26052180

Fax: 886-2-26051924

Hsin Chu EMC/RF Lab:

Tel: 886-3-5935343

Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety Telecom Lab:

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.

7. APPENDIX A – MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No modifications were made to the EUT by the lab during the test.

---END---