



# FCC TEST REPORT (15.407)

**REPORT NO.:** RF111011C17N-1

**MODEL NO.:** WLU5153-D81

**FCC ID:** H8N-WLU5153

**RECEIVED:** Jul. 24, 2013

**TESTED:** Jul. 26 ~ Aug. 07, 2013

**ISSUED:** Aug. 14, 2013

**APPLICANT:** Askey Computer Corp

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**ISSUED BY:** Bureau Veritas Consumer Products Services  
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A D T

## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF111011C17N-1	Original release	Aug. 14, 2013



# 1. CERTIFICATION

**PRODUCT:** Wireless Module

**MODEL:** WLU5153-D81

**BRAND:** Panasonic

**APPLICANT:** Askey Computer Corp

**TESTED:** Jul. 26 ~ Aug. 07, 2013

**TEST SAMPLE:** ENGINEERING SAMPLE

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

ANSI C63.10-2009

The above equipment (model: WLU5153-D81) 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 : Ivy Lin , DATE : Aug. 14, 2013  
Ivy Lin / Specialist

APPROVED BY : Ken Liu , DATE : Aug. 14, 2013  
Ken Liu / Senior 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 -7.85dB at 0.45859MHz.
15.407(b/1/2/3) (b)(6)	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 5470.00MHz.
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	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	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.34 dB
	200MHz ~1000MHz	3.35 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

<b>EUT</b>	Wireless Module
<b>MODEL NO.</b>	WLU5153-D81
<b>POWER SUPPLY</b>	5.0Vdc (Host equipment)
<b>MODULATION TYPE</b>	64QAM, 16QAM, QPSK, BPSK
<b>MODULATION TECHNOLOGY</b>	OFDM
<b>TRANSFER RATE</b>	802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 150.0Mbps
<b>OPERATING FREQUENCY</b>	5180 ~ 5240MHz, 5260 ~ 5320MHz & 5500 ~ 5700MHz
<b>NUMBER OF CHANNEL</b>	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) 5260 ~ 5320MHz: 4 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz) 5500 ~ 5700MHz: 8 for 802.11a, 802.11n (20MHz) 3 for 802.11n (40MHz)
<b>OUTPUT POWER</b>	42.409mW for 5180 ~ 5240MHz 74.802mW for 5260 ~ 5320MHz 80.380mW for 5500 ~ 5700MHz
<b>ANTENNA TYPE</b>	Refer to NOTE as below
<b>ANTENNA CONNECTOR</b>	N/A
<b>DATA CABLE</b>	N/A
<b>I/O PORTS</b>	Refer to user's manual
<b>ACCESSORY DEVICES</b>	N/A

**NOTE:**

1. 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)	2TX
802.11n (40MHz)	2TX

2. The following antennas provided to this EUT.

Transmitter Circuit	Band	P/N	Antenna Type	Gain (dBi)					Antenna Connector
				2.4GHz	5.18 ~ 5.25 GHz	5.25 ~ 5.35 GHz	5.50 ~ 5.70 GHz	5.745 ~ 5.825 GHz	
Ant 1 (L)	Askey	08B1-1PV1000	PCB	1.87	3.06	3.17	3.09	2.20	NA
Ant 2 (R)	Askey	08B1-1PW1000	PCB	0.96	3.21	3.31	3.48	2.81	NA

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



### 3.2 DESCRIPTION OF TEST MODES

#### FOR 5180 ~ 5240MHz

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

#### FOR 5260 ~ 5320MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
52	5260 MHz	60	5300 MHz
56	5280 MHz	64	5320 MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
54	5270 MHz	62	5310 MHz

#### FOR 5500 ~ 5700MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
100	5500 MHz	116	5580 MHz
104	5520 MHz	132	5660 MHz
108	5540 MHz	136	5680 MHz
112	5560 MHz	140	5700 MHz

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
102	5510 MHz	134	5670 MHz
110	5550 MHz		

### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE $\geq$ 1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

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

**NOTE:**  
The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **X-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)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	802.11n (20MHz)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
-	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	15.0
-	802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6.0
-	802.11n (20MHz)		52 to 64	52, 60, 64	OFDM	BPSK	7.2
-	802.11n (40MHz)		54 to 62	54, 62	OFDM	BPSK	15.0
-	802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	BPSK	6.0
-	802.11n (20MHz)		100 to 140	100, 116, 140	OFDM	BPSK	7.2
-	802.11n (40MHz)		102 to 134	102, 110, 134	OFDM	BPSK	15.0

#### RADIATED EMISSION TEST (BELOW 1GHz):

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5320	36 to 64	52	OFDM	BPSK	6.0
-	802.11a	5500-5700	100 to 140	116	OFDM	BPSK	6.0

**POWER LINE CONDUCTED EMISSION TEST:**

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5320	36 to 64	52	OFDM	BPSK	6.0
-	802.11a	5500-5700	100 to 140	116	OFDM	BPSK	6.0

**ANTENNA PORT CONDUCTED MEASUREMENT:**

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

EUT CONFIGURE MODE	MODE	FREQ. BAND (MHz)	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	5180-5240	36 to 48	36, 40, 48	OFDM	BPSK	6.0
-	802.11n (20MHz)		36 to 48	36, 40, 48	OFDM	BPSK	7.2
-	802.11n (40MHz)		38 to 46	38, 46	OFDM	BPSK	15.0
-	802.11a	5260-5320	52 to 64	52, 60, 64	OFDM	BPSK	6.0
-	802.11n (20MHz)		52 to 64	52, 60, 64	OFDM	BPSK	7.2
-	802.11n (40MHz)		54 to 62	54, 62	OFDM	BPSK	15.0
-	802.11a	5500-5700	100 to 140	100, 116, 140	OFDM	BPSK	6.0
-	802.11n (20MHz)		100 to 140	100, 116, 140	OFDM	BPSK	7.2
-	802.11n (40MHz)		102 to 134	102, 110, 134	OFDM	BPSK	15.0

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER (SYSTEM)	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Ted Chang
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Ted Chang
PLC	25deg. C, 65%RH	120Vac, 60Hz	Ted Chang
APCM	25deg. C, 60%RH	120Vac, 60Hz	Antony Lee

### 3.3 DUTY CYCLE OF TEST SIGNAL

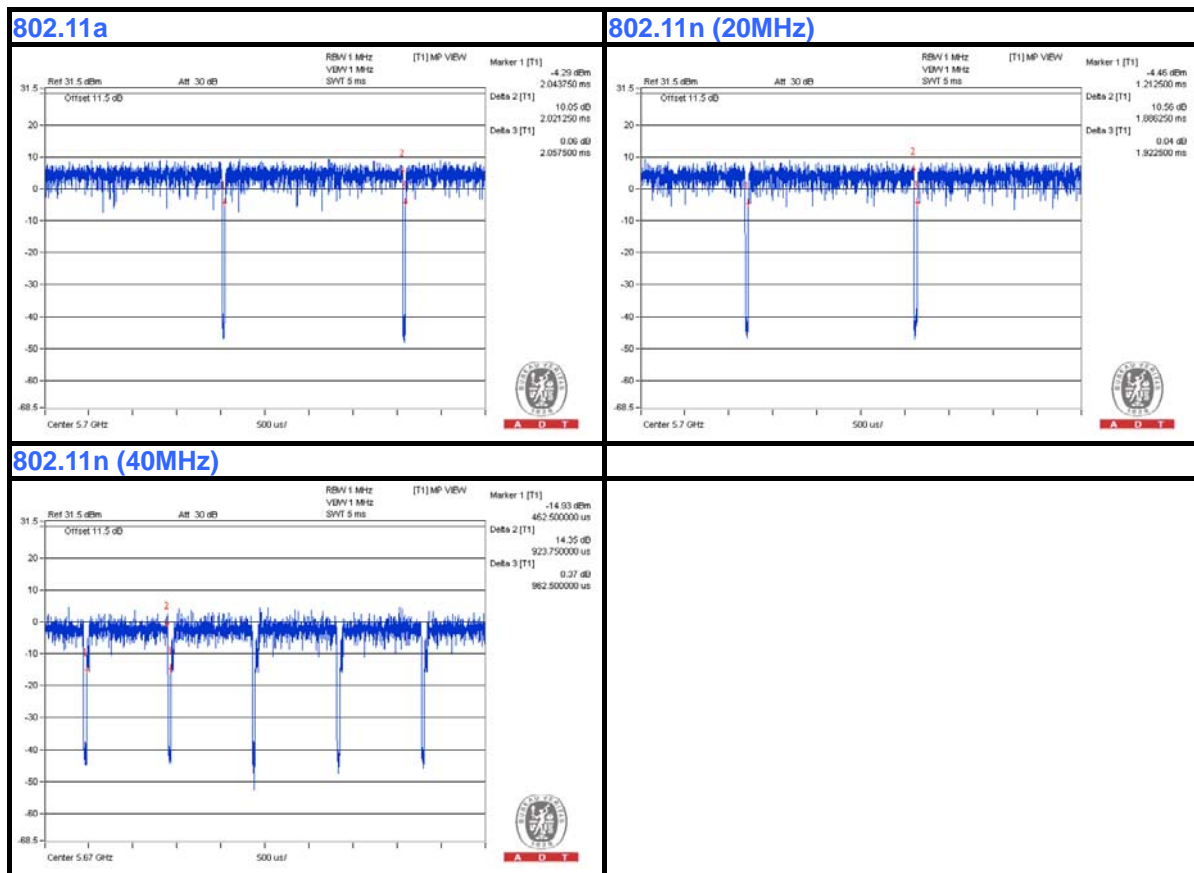
Duty cycle of test signal is > 98 %, duty factor is not required.

**802.11a:** Duty cycle =  $2.021250 / 2.057500 = 0.982$

**802.11n (20MHz):** Duty cycle =  $1.886250 / 1.922500 = 0.981$

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

**802.11n (40MHz):** Duty cycle =  $0.92375 / 0.96250 = 0.960$ , Duty factor =  $10 * \log(1/0.960) = 0.18$



### 3.4 DESCRIPTION OF SUPPORT UNITS

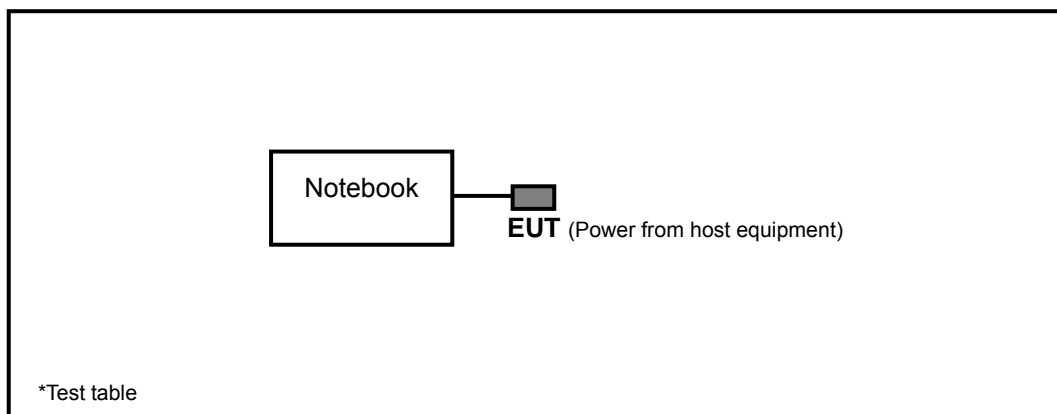
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	DELL	E5410	1HC2XM1	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	0.3m USB cable

**NOTE:** 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 D01 General UNII Test Procedures v01 r03**

**662911 D01 Multiple Transmitter Output v01 r02**

**ANSI C63.10-2009**

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

## 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

APPLICABLE TO	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	ESI7	838496/016	Dec. 25, 2012	Dec. 24, 2013
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Jan. 31, 2013	Jan. 30, 2014
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Mar. 20, 2013	Mar. 19, 2014
HORN Antenna SCHWARZBECK	9120D	209	Sep. 03, 2012	Sep. 02, 2013
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 15, 2013	Jul. 14, 2014
Preamplifier Agilent	8447D	2944A10633	Oct. 25, 2012	Oct. 24, 2013
Preamplifier Agilent	8449B	3008A01964	Oct. 25, 2012	Oct. 24, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250723/4	Aug. 28, 2012	Aug. 27, 2013
RF signal cable HUBER+SUHNNER	SUCOFLEX 106	12738/6+309224/4	Aug. 28, 2012	Aug. 27, 2013
Software BV ADT	ADT_Radiated_ V7.6.15.9.4	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA	NA
Turn Table BV ADT	TT100	TT93021703	NA	NA
Turn Table Controller BV ADT	SC100	SC93021703	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 25, 2012	Oct. 24, 2013
High Speed Peak Power Meter	ML2495A	0824012	Aug. 22, 2012	Aug. 21, 2013
Power Sensor	MA2411B	0738138	Aug. 23, 2012	Aug. 22, 2013
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 3.
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 988962.
5. The IC Site Registration No. is IC 7450F-3.



#### 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.

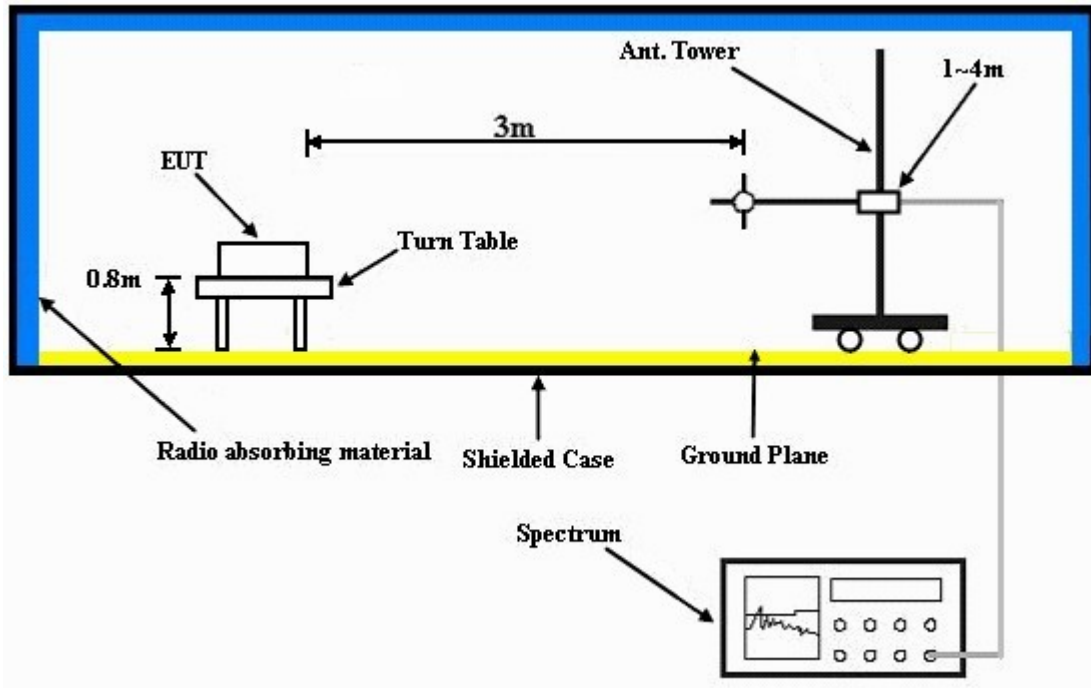
**NOTE:**

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 1kHz(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



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

#### 4.1.7 EUT OPERATING CONDITION

- a. Connected EUT to notebook system via USB cable and placed on the testing table.
- b. The notebook system ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.

#### 4.1.8 TEST RESULTS

##### ABOVE 1GHz DATA :

##### 802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted 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	5150.00	62.5 PK	74.0	-11.5	1.00 H	188	59.40	3.10
2	5150.00	44.5 AV	54.0	-9.5	1.00 H	188	41.40	3.10
3	*5180.00	107.8 PK			1.00 H	189	70.00	37.80
4	*5180.00	97.8 AV			1.00 H	189	60.00	37.80
5	#10360.00	60.1 PK	74.0	-13.9	1.03 H	61	46.10	14.00
6	#10360.00	47.2 AV	54.0	-6.8	1.03 H	61	33.20	14.00
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	64.1 PK	74.0	-9.9	1.00 V	261	61.00	3.10
2	5150.00	43.0 AV	54.0	-11.0	1.00 V	261	39.90	3.10
3	*5180.00	106.8 PK			1.00 V	262	69.00	37.80
4	*5180.00	96.0 AV			1.00 V	262	58.20	37.80
5	#10360.00	55.1 PK	74.0	-18.9	1.95 V	59	41.10	14.00
6	#10360.00	44.1 AV	54.0	-9.9	1.95 V	59	30.10	14.00

#### 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 of the restricted band.



A D T

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	25deg. C, 65%RH	TESTED BY	Ted 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	*5200.00	107.4 PK			1.00 H	53	69.60	37.80
2	*5200.00	96.3 AV			1.00 H	53	58.50	37.80
3	#10400.00	62.2 PK	74.0	-11.8	1.05 H	54	48.00	14.20
4	#10400.00	46.7 AV	54.0	-7.3	1.05 H	54	32.50	14.20
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	105.9 PK			1.01 V	257	68.10	37.80
2	*5200.00	95.9 AV			1.01 V	257	58.10	37.80
3	#10400.00	58.9 PK	74.0	-15.1	1.47 V	195	44.70	14.20
4	#10400.00	44.2 AV	54.0	-9.8	1.47 V	195	30.00	14.20

**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 of the restricted band.



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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	25deg. C, 65%RH	TESTED BY	Ted 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	*5240.00	109.5 PK			1.03 H	292	71.70	37.80
2	*5240.00	98.6 AV			1.03 H	292	60.80	37.80
3	5350.00	55.9 PK	74.0	-18.1	1.02 H	292	52.40	3.50
4	5350.00	43.8 AV	54.0	-10.2	1.02 H	292	40.30	3.50
5	#10480.00	62.7 PK	74.0	-11.3	1.01 H	149	48.40	14.30
6	#10480.00	47.7 AV	54.0	-6.3	1.01 H	149	33.40	14.30
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	106.8 PK			1.00 V	253	69.00	37.80
2	*5240.00	96.3 AV			1.00 V	253	58.50	37.80
3	5350.00	53.9 PK	74.0	-20.1	1.02 V	253	50.40	3.50
4	5350.00	42.8 AV	54.0	-11.2	1.02 V	253	39.30	3.50
5	#10480.00	59.6 PK	74.0	-14.4	1.03 V	32	45.30	14.30
6	#10480.00	44.6 AV	54.0	-9.4	1.03 V	32	30.30	14.30

**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 of the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 52	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted 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	5150.00	54.6 PK	74.0	-19.4	1.06 H	214	51.50	3.10
2	5150.00	43.6 AV	54.0	-10.4	1.06 H	214	40.50	3.10
3	*5260.00	114.0 PK			1.15 H	299	76.10	37.90
4	*5260.00	102.8 AV			1.15 H	299	64.90	37.90
5	#10520.00	62.1 PK	74.0	-11.9	1.53 H	195	47.80	14.30
6	#10520.00	48.9 AV	54.0	-5.1	1.53 H	195	34.60	14.30
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	55.1 PK	74.0	-18.9	1.00 V	253	52.00	3.10
2	5150.00	43.4 AV	54.0	-10.6	1.00 V	253	40.30	3.10
3	*5260.00	109.7 PK			1.00 V	254	71.80	37.90
4	*5260.00	98.6 AV			1.00 V	254	60.70	37.90
5	#10520.00	61.4 PK	74.0	-12.6	1.09 V	220	47.10	14.30
6	#10520.00	45.8 AV	54.0	-8.2	1.09 V	220	31.50	14.30

**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 of the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 60	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted 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	*5300.00	111.8 PK			1.00 H	39	73.90	37.90
2	*5300.00	101.2 AV			1.00 H	39	63.30	37.90
3	10600.00	63.3 PK	74.0	-10.7	1.04 H	178	48.90	14.40
4	10600.00	49.0 AV	54.0	-5.0	1.04 H	178	34.60	14.40
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	*5300.00	108.8 PK			1.00 V	253	70.90	37.90
2	*5300.00	97.7 AV			1.00 V	253	59.80	37.90
3	10600.00	60.9 PK	74.0	-13.1	1.88 V	121	46.50	14.40
4	10600.00	45.9 AV	54.0	-8.1	1.88 V	121	31.50	14.40

**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 of the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 64	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted 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	*5320.00	111.6 PK			1.00 H	298	73.60	38.00
2	*5320.00	101.5 AV			1.00 H	298	63.50	38.00
3	5350.00	72.3 PK	74.0	-1.7	1.00 H	298	68.80	3.50
4	5350.00	51.7 AV	54.0	-2.3	1.00 H	298	48.20	3.50
5	10640.00	63.3 PK	74.0	-10.7	1.06 H	55	48.70	14.60
6	10640.00	48.7 AV	54.0	-5.3	1.06 H	55	34.10	14.60
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	*5320.00	108.1 PK			1.00 V	261	70.10	38.00
2	*5320.00	97.4 AV			1.00 V	261	59.40	38.00
3	5350.00	67.8 PK	74.0	-6.2	1.00 V	262	64.30	3.50
4	5350.00	47.9 AV	54.0	-6.1	1.00 V	262	44.40	3.50
5	10640.00	60.7 PK	74.0	-13.3	1.22 V	201	46.10	14.60
6	10640.00	46.6 AV	54.0	-7.4	1.22 V	201	32.00	14.60

**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 of the restricted band.





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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 100	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Cedric 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	5460.00	59.6 PK	74.0	-14.4	1.00 H	296	56.00	3.60
2	5460.00	43.7 AV	54.0	-10.3	1.00 H	296	40.10	3.60
3	#5470.00	73.0 PK	74.0	-1.0	1.00 H	296	69.40	3.60
4	#5470.00	48.3 AV	54.0	-5.7	1.00 H	296	44.70	3.60
5	*5500.00	110.4 PK			1.21 H	32	72.10	38.30
6	*5500.00	100.5 AV			1.21 H	32	62.20	38.30
7	11000.00	64.0 PK	74.0	-10.0	1.02 H	236	48.60	15.40
8	11000.00	48.9 AV	54.0	-5.1	1.02 H	236	33.50	15.40
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	5460.00	55.8 PK	74.0	-18.2	1.02 V	182	52.20	3.60
2	5460.00	42.6 AV	54.0	-11.4	1.02 V	182	39.00	3.60
3	#5470.00	64.4 PK	74.0	-9.6	1.02 V	185	60.80	3.60
4	#5470.00	46.2 AV	54.0	-7.8	1.02 V	185	42.60	3.60
5	*5500.00	105.1 PK			1.12 V	187	66.80	38.30
6	*5500.00	94.8 AV			1.12 V	187	56.50	38.30
7	11000.00	58.6 PK	74.0	-15.4	1.54 V	169	43.20	15.40
8	11000.00	46.4 AV	54.0	-7.6	1.54 V	169	31.00	15.40

**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 of the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 116	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Cedric 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	*5580.00	111.5 PK			1.18 H	28	73.10	38.40
2	*5580.00	101.2 AV			1.18 H	28	62.80	38.40
3	11160.00	65.1 PK	74.0	-8.9	1.65 H	81	49.60	15.50
4	11160.00	49.1 AV	54.0	-4.9	1.65 H	81	33.60	15.50
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	*5580.00	107.0 PK			2.06 V	262	68.60	38.40
2	*5580.00	96.3 AV			2.06 V	262	57.90	38.40
3	11160.00	61.2 PK	74.0	-12.8	1.01 V	129	45.70	15.50
4	11160.00	47.0 AV	54.0	-7.0	1.01 V	129	31.50	15.50

**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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 140	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Cedric 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	*5700.00	109.2 PK			1.00 H	195	70.60	38.60
2	*5700.00	99.4 AV			1.00 H	195	60.80	38.60
3	#5725.00	68.5 PK	74.0	-5.5	1.00 H	10	64.50	4.00
4	#5725.00	52.7 AV	54.0	-1.3	1.00 H	10	48.70	4.00
5	11400.00	64.0 PK	74.0	-10.0	1.01 H	112	48.70	15.30
6	11400.00	49.9 AV	54.0	-4.1	1.01 H	112	34.60	15.30
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	*5700.00	105.4 PK			1.00 V	253	66.80	38.60
2	*5700.00	95.1 AV			1.00 V	253	56.50	38.60
3	#5725.00	64.6 PK	74.0	-9.4	1.00 V	154	60.60	4.00
4	#5725.00	48.3 AV	54.0	-5.7	1.00 V	154	44.30	4.00
5	11400.00	61.5 PK	74.0	-12.5	1.24 V	188	46.20	15.30
6	11400.00	46.9 AV	54.0	-7.1	1.24 V	188	31.60	15.30

**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 of 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	25deg. C, 65%RH	TESTED BY	Ted 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	5150.00	60.6 PK	74.0	-13.4	1.00 H	189	57.50	3.10
2	5150.00	43.5 AV	54.0	-10.5	1.00 H	189	40.40	3.10
3	*5180.00	107.2 PK			1.00 H	190	69.40	37.80
4	*5180.00	97.1 AV			1.00 H	190	59.30	37.80
5	#10360.00	61.6 PK	74.0	-12.4	1.01 H	149	47.60	14.00
6	#10360.00	46.6 AV	54.0	-7.4	1.01 H	149	32.60	14.00
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	61.5 PK	74.0	-12.5	1.00 V	260	58.40	3.10
2	5150.00	42.6 AV	54.0	-11.4	1.00 V	260	39.50	3.10
3	*5180.00	106.1 PK			1.00 V	261	68.30	37.80
4	*5180.00	95.2 AV			1.00 V	261	57.40	37.80
5	#10360.00	57.5 PK	74.0	-16.5	1.58 V	199	43.50	14.00
6	#10360.00	45.9 AV	54.0	-8.1	1.58 V	199	31.90	14.00

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 of the restricted band.



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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	25deg. C, 65%RH	TESTED BY	Ted 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	*5200.00	106.9 PK			1.00 H	52	69.10	37.80
2	*5200.00	95.8 AV			1.00 H	52	58.00	37.80
3	#10400.00	60.5 PK	74.0	-13.5	1.00 H	27	46.30	14.20
4	#10400.00	48.2 AV	54.0	-5.8	1.00 H	27	34.00	14.20
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	105.4 PK			1.00 V	256	67.60	37.80
2	*5200.00	95.3 AV			1.00 V	256	57.50	37.80
3	#10400.00	57.2 PK	74.0	-16.8	1.08 V	241	43.00	14.20
4	#10400.00	45.2 AV	54.0	-8.8	1.08 V	241	31.00	14.20

**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 of the restricted band.



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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	25deg. C, 65%RH	TESTED BY	Ted 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	*5240.00	109.1 PK			1.03 H	290	71.30	37.80
2	*5240.00	99.3 AV			1.03 H	290	61.50	37.80
3	5350.00	54.5 PK	74.0	-19.5	1.02 H	291	51.00	3.50
4	5350.00	43.7 AV	54.0	-10.3	1.02 H	291	40.20	3.50
5	#10480.00	58.3 PK	74.0	-15.7	1.69 H	258	44.00	14.30
6	#10480.00	45.3 AV	54.0	-8.7	1.69 H	258	31.00	14.30
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	106.4 PK			1.00 V	254	68.60	37.80
2	*5240.00	95.9 AV			1.00 V	254	58.10	37.80
3	5350.00	53.5 PK	74.0	-20.5	1.01 V	254	50.00	3.50
4	5350.00	44.5 AV	54.0	-9.5	1.01 V	254	41.00	3.50
5	#10480.00	57.8 PK	74.0	-16.2	1.57 V	159	43.50	14.30
6	#10480.00	46.4 AV	54.0	-7.6	1.57 V	159	32.10	14.30

**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 of the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 52	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted 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	5150.00	51.3 PK	74.0	-22.7	1.26 H	254	48.20	3.10
2	5150.00	42.3 AV	54.0	-11.7	1.26 H	254	39.20	3.10
3	*5260.00	112.2 PK			1.15 H	301	74.30	37.90
4	*5260.00	101.0 AV			1.15 H	301	63.10	37.90
5	#10520.00	59.9 PK	74.0	-14.1	1.03 H	225	45.60	14.30
6	#10520.00	48.9 AV	54.0	-5.1	1.03 H	225	34.60	14.30
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	49.9 PK	74.0	-24.1	1.03 V	250	46.80	3.10
2	5150.00	40.8 AV	54.0	-13.2	1.03 V	250	37.70	3.10
3	*5260.00	107.9 PK			1.00 V	255	70.00	37.90
4	*5260.00	97.8 AV			1.00 V	255	59.90	37.90
5	#10520.00	58.0 PK	74.0	-16.0	1.44 V	169	43.70	14.30
6	#10520.00	47.0 AV	54.0	-7.0	1.44 V	169	32.70	14.30

**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 of the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 60	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted 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	*5300.00	110.7 PK			1.00 H	40	72.80	37.90
2	*5300.00	100.1 AV			1.00 H	40	62.20	37.90
3	10600.00	64.5 PK	74.0	-9.5	1.02 H	299	50.10	14.40
4	10600.00	49.1 AV	54.0	-4.9	1.02 H	299	34.70	14.40
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	*5300.00	107.8 PK			1.77 V	230	69.90	37.90
2	*5300.00	106.7 AV			1.77 V	230	68.80	37.90
3	10600.00	58.9 PK	74.0	-15.1	1.42 V	207	44.50	14.40
4	10600.00	46.6 AV	54.0	-7.4	1.42 V	207	32.20	14.40

**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 of the restricted band.





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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 64	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted 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	*5320.00	111.1 PK			1.00 H	38	73.10	38.00
2	*5320.00	100.9 AV			1.00 H	38	62.90	38.00
3	5350.00	72.2 PK	74.0	-1.8	1.00 H	352	68.70	3.50
4	5350.00	51.0 AV	54.0	-3.0	1.00 H	352	47.50	3.50
5	10640.00	63.7 PK	74.0	-10.3	1.84 H	145	49.10	14.60
6	10640.00	48.6 AV	54.0	-5.4	1.84 H	145	34.00	14.60
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	*5320.00	107.6 PK			1.00 V	58	69.60	38.00
2	*5320.00	96.9 AV			1.00 V	58	58.90	38.00
3	5350.00	67.4 PK	74.0	-6.6	1.00 V	152	63.90	3.50
4	5350.00	47.7 AV	54.0	-6.3	1.00 V	152	44.20	3.50
5	10640.00	61.0 PK	74.0	-13.0	1.57 V	341	46.40	14.60
6	10640.00	46.4 AV	54.0	-7.6	1.57 V	341	31.80	14.60

**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 of the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 100	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted 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	5460.00	59.6 PK	74.0	-14.4	1.00 H	26	56.00	3.60
2	5460.00	43.9 AV	54.0	-10.1	1.00 H	26	40.30	3.60
3	#5470.00	73.0 PK	74.0	-1.0	1.00 H	26	69.40	3.60
4	#5470.00	49.9 AV	54.0	-4.1	1.00 H	26	46.30	3.60
5	*5500.00	110.3 PK			1.34 H	296	72.00	38.30
6	*5500.00	99.8 AV			1.34 H	296	61.50	38.30
7	11000.00	64.0 PK	74.0	-10.0	1.06 H	287	48.60	15.40
8	11000.00	49.9 AV	54.0	-4.1	1.06 H	287	34.50	15.40
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	5460.00	55.7 PK	74.0	-18.3	1.03 V	147	52.10	3.60
2	5460.00	42.1 AV	54.0	-11.9	1.03 V	147	38.50	3.60
3	#5470.00	63.7 PK	74.0	-10.3	1.03 V	147	60.10	3.60
4	#5470.00	45.4 AV	54.0	-8.6	1.03 V	147	41.80	3.60
5	*5500.00	105.0 PK			1.21 V	189	66.70	38.30
6	*5500.00	94.0 AV			1.21 V	189	55.70	38.30
7	11000.00	58.6 PK	74.0	-15.4	1.69 V	229	43.20	15.40
8	11000.00	47.6 AV	54.0	-6.4	1.69 V	229	32.20	15.40

**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 of the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 116	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted 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	*5580.00	110.4 PK			1.10 H	45	72.00	38.40
2	*5580.00	99.9 AV			1.10 H	45	61.50	38.40
3	11160.00	65.7 PK	74.0	-8.3	1.63 H	274	50.20	15.50
4	11160.00	48.0 AV	54.0	-6.0	1.63 H	274	32.50	15.50
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	*5580.00	106.1 PK			2.04 V	264	67.70	38.40
2	*5580.00	94.8 AV			2.04 V	264	56.40	38.40
3	11160.00	61.0 PK	74.0	-13.0	1.52 V	164	45.50	15.50
4	11160.00	46.3 AV	54.0	-7.7	1.52 V	164	30.80	15.50

**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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 140	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted 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	*5700.00	108.6 PK			1.00 H	198	70.00	38.60
2	*5700.00	98.8 AV			1.00 H	198	60.20	38.60
3	#5725.00	68.4 PK	74.0	-5.6	1.00 H	14	64.40	4.00
4	#5725.00	52.7 AV	54.0	-1.3	1.00 H	14	48.70	4.00
5	11400.00	62.5 PK	74.0	-11.5	1.94 H	241	47.20	15.30
6	11400.00	48.9 AV	54.0	-5.1	1.94 H	241	33.60	15.30
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	*5700.00	104.9 PK			1.00 V	257	66.30	38.60
2	*5700.00	94.6 AV			1.00 V	257	56.00	38.60
3	#5725.00	64.1 PK	74.0	-9.9	1.00 V	165	60.10	4.00
4	#5725.00	48.0 AV	54.0	-6.0	1.00 V	165	44.00	4.00
5	11400.00	59.2 PK	74.0	-14.8	1.95 V	354	43.90	15.30
6	11400.00	45.5 AV	54.0	-8.5	1.95 V	354	30.20	15.30

**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 of 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	25deg. C, 65%RH	TESTED BY	Ted 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	5150.00	65.3 PK	74.0	-8.7	1.07 H	172	62.20	3.10
2	5150.00	50.8 AV	54.0	-3.2	1.07 H	172	47.70	3.10
3	*5190.00	100.6 PK			1.17 H	190	62.80	37.80
4	*5190.00	91.1 AV			1.17 H	190	53.30	37.80
5	#10380.00	60.5 PK	74.0	-13.5	1.04 H	154	46.40	14.10
6	#10380.00	44.4 AV	54.0	-9.6	1.04 H	154	30.30	14.10

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	63.6 PK	74.0	-10.4	1.10 V	271	60.50	3.10
2	5150.00	49.0 AV	54.0	-5.0	1.10 V	271	45.90	3.10
3	*5190.00	99.2 PK			1.00 V	257	61.40	37.80
4	*5190.00	89.1 AV			1.00 V	257	51.30	37.80
5	#10380.00	59.8 PK	74.0	-14.2	1.02 V	224	45.70	14.10
6	#10380.00	44.4 AV	54.0	-9.6	1.02 V	224	30.30	14.10

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 of 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	25deg. C, 65%RH	TESTED BY	Ted 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	*5230.00	105.3 PK			1.00 H	190	67.50	37.80
2	*5230.00	95.2 AV			1.00 H	190	57.40	37.80
3	5350.00	58.3 PK	74.0	-15.7	1.03 H	24	54.80	3.50
4	5350.00	46.0 AV	54.0	-8.0	1.03 H	24	42.50	3.50
5	#10460.00	62.9 PK	74.0	-11.1	1.03 H	124	48.60	14.30
6	#10460.00	47.9 AV	54.0	-6.1	1.03 H	124	33.60	14.30
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	104.4 PK			1.00 V	262	66.60	37.80
2	*5230.00	94.6 AV			1.00 V	262	56.80	37.80
3	5350.00	54.7 PK	74.0	-19.3	1.02 V	114	51.20	3.50
4	5350.00	44.0 AV	54.0	-10.0	1.02 V	114	40.50	3.50
5	#10460.00	60.2 PK	74.0	-13.8	1.62 V	174	45.90	14.30
6	#10460.00	45.5 AV	54.0	-8.5	1.62 V	174	31.20	14.30

**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 of the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 54	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted 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	5150.00	57.7 PK	74.0	-16.3	1.00 H	141	54.60	3.10
2	5150.00	40.8 AV	54.0	-13.2	1.00 H	141	37.70	3.10
3	*5270.00	107.4 PK			1.14 H	38	69.50	37.90
4	*5270.00	97.1 AV			1.14 H	38	59.20	37.90
5	#10540.00	63.1 PK	74.0	-10.9	1.01 H	115	48.70	14.40
6	#10540.00	47.9 AV	54.0	-6.1	1.01 H	115	33.50	14.40
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	56.3 PK	74.0	-17.7	1.13 V	257	53.20	3.10
2	5150.00	39.6 AV	54.0	-14.4	1.13 V	257	36.50	3.10
3	*5270.00	104.5 PK			1.00 V	252	66.60	37.90
4	*5270.00	93.5 AV			1.00 V	252	55.60	37.90
5	#10460.00	60.5 PK	74.0	-13.5	1.96 V	25	46.20	14.30
6	#10460.00	44.5 AV	54.0	-9.5	1.96 V	25	30.20	14.30

**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 of the restricted band.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 62	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted 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	*5310.00	104.7 PK			1.26 H	299	66.80	37.90
2	*5310.00	94.5 AV			1.26 H	299	56.60	37.90
3	5350.00	69.7 PK	74.0	-4.3	1.00 H	32	66.20	3.50
4	5350.00	52.7 AV	54.0	-1.3	1.00 H	32	49.20	3.50
5	10620.00	62.2 PK	74.0	-11.8	1.54 H	124	47.70	14.50
6	10620.00	48.0 AV	54.0	-6.0	1.54 H	124	33.50	14.50
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	*5310.00	101.2 PK			1.00 V	254	63.30	37.90
2	*5310.00	91.1 AV			1.00 V	254	53.20	37.90
3	5350.00	66.7 PK	74.0	-7.3	1.00 V	253	63.20	3.50
4	5350.00	50.9 AV	54.0	-3.1	1.00 V	253	47.40	3.50
5	10620.00	59.0 PK	74.0	-15.0	1.01 V	147	44.50	14.50
6	10620.00	45.7 AV	54.0	-8.3	1.01 V	147	31.20	14.50

**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 of the restricted band.





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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 102	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted 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	5460.00	62.2 PK	74.0	-11.8	1.00 H	7	57.70	4.50
2	5460.00	45.3 AV	54.0	-8.7	1.00 H	7	40.80	4.50
3	#5470.00	70.1 PK	74.0	-3.9	1.00 H	7	65.70	4.40
4	#5470.00	52.9 AV	54.0	-1.1	1.00 H	7	48.50	4.40
5	*5510.00	102.5 PK			1.13 H	10	64.20	38.30
6	*5510.00	92.6 AV			1.13 H	10	54.30	38.30
7	11020.00	64.7 PK	74.0	-9.3	1.01 H	141	48.70	16.00
8	11020.00	49.5 AV	54.0	-4.5	1.01 H	141	33.50	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	5460.00	55.6 PK	74.0	-18.4	1.01 V	137	51.10	4.50
2	5460.00	42.8 AV	54.0	-11.2	1.01 V	137	38.30	4.50
3	#5470.00	61.2 PK	74.0	-12.8	1.01 V	137	56.80	4.40
4	#5470.00	45.9 AV	54.0	-8.1	1.01 V	137	41.50	4.40
5	*5510.00	95.9 PK			1.20 V	301	57.60	38.30
6	*5510.00	86.1 AV			1.20 V	301	47.80	38.30
7	11020.00	62.2 PK	74.0	-11.8	1.07 V	149	46.20	16.00
8	11020.00	46.5 AV	54.0	-7.5	1.07 V	149	30.50	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 of the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 110	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted 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	5460.00	69.3 PK	74.0	-4.7	1.00 H	9	64.80	4.50
2	5460.00	46.8 AV	54.0	-7.2	1.00 H	9	42.30	4.50
3	#5470.00	70.2 PK	74.0	-3.8	1.00 H	9	65.80	4.40
4	#5470.00	50.5 AV	54.0	-3.5	1.00 H	9	46.10	4.40
5	*5550.00	108.2 PK			1.00 H	11	69.80	38.40
6	*5550.00	98.0 AV			1.00 H	11	59.60	38.40
7	11100.00	64.6 PK	74.0	-9.4	1.47 H	21	48.60	16.00
8	11100.00	48.7 AV	54.0	-5.3	1.47 H	21	32.70	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	5460.00	60.0 PK	74.0	-14.0	1.00 V	170	55.50	4.50
2	5460.00	41.5 AV	54.0	-12.5	1.00 V	170	37.00	4.50
3	#5470.00	62.4 PK	74.0	-11.6	1.00 V	170	58.00	4.40
4	#5470.00	44.3 AV	54.0	-9.7	1.00 V	170	39.90	4.40
5	*5550.00	102.5 PK			1.87 V	322	64.10	38.40
6	*5550.00	92.1 AV			1.87 V	322	53.70	38.40
7	11100.00	61.2 PK	74.0	-12.8	1.04 V	154	45.20	16.00
8	11100.00	47.5 AV	54.0	-6.5	1.04 V	154	31.50	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 of the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 134	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted 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	*5670.00	108.0 PK			1.08 H	15	69.40	38.60
2	*5670.00	97.7 AV			1.08 H	15	59.10	38.60
3	#5725.00	68.7 PK	74.0	-5.3	1.53 H	55	63.90	4.80
4	#5725.00	52.0 AV	54.0	-2.0	1.53 H	55	47.20	4.80
5	11340.00	64.5 PK	74.0	-9.5	1.62 H	248	48.70	15.80
6	11340.00	48.2 AV	54.0	-5.8	1.62 H	248	32.40	15.80
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	*5670.00	101.2 PK			1.00 V	323	62.60	38.60
2	*5670.00	90.8 AV			1.00 V	323	52.20	38.60
3	#5725.00	60.3 PK	74.0	-13.7	1.64 V	321	55.50	4.80
4	#5725.00	46.3 AV	54.0	-7.7	1.64 V	321	41.50	4.80
5	11340.00	59.4 PK	74.0	-14.6	1.09 V	54	43.60	15.80
6	11340.00	46.3 AV	54.0	-7.7	1.09 V	54	30.50	15.80

**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 of the restricted band.



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**BELOW 1GHz WORST-CASE DATA : 802.11a**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 52	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted 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	57.12	27.4 QP	40.0	-12.6	1.50 H	322	42.00	-14.60
2	142.67	29.4 QP	43.5	-14.1	1.00 H	302	43.60	-14.20
3	199.05	35.9 QP	43.5	-7.6	1.24 H	240	52.50	-16.60
4	265.16	40.3 QP	46.0	-5.7	1.00 H	261	53.80	-13.50
5	449.87	27.0 QP	46.0	-19.0	1.24 H	313	36.20	-9.20
6	599.58	29.5 QP	46.0	-16.5	1.00 H	321	35.70	-6.20
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	30.00	30.0 QP	40.0	-10.0	1.50 V	268	45.50	-15.50
2	166.00	30.2 QP	43.5	-13.3	1.00 V	340	44.50	-14.30
3	199.05	34.8 QP	43.5	-8.7	1.00 V	46	51.40	-16.60
4	265.16	33.2 QP	46.0	-12.8	1.00 V	312	46.70	-13.50
5	449.87	29.2 QP	46.0	-16.8	1.24 V	3	38.40	-9.20
6	599.58	28.9 QP	46.0	-17.1	1.00 V	327	35.10	-6.20

**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



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 116	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Ted 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	57.12	26.9 QP	40.0	-13.1	1.24 H	231	41.50	-14.60
2	142.67	29.4 QP	43.5	-14.1	1.00 H	311	43.60	-14.20
3	265.16	40.4 QP	46.0	-5.6	1.50 H	243	53.90	-13.50
4	449.87	29.4 QP	46.0	-16.6	1.00 H	319	38.60	-9.20
5	599.58	31.7 QP	46.0	-14.3	1.99 H	319	37.90	-6.20
6	749.29	28.3 QP	46.0	-17.7	1.24 H	326	31.40	-3.10
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	47.40	28.4 QP	40.0	-11.6	1.50 V	342	42.70	-14.30
2	199.05	34.7 QP	43.5	-8.8	1.00 V	66	51.30	-16.60
3	265.16	33.2 QP	46.0	-12.8	1.50 V	318	46.70	-13.50
4	479.03	31.1 QP	46.0	-14.9	1.00 V	246	39.70	-8.60
5	527.64	28.8 QP	46.0	-17.2	1.00 V	247	36.50	-7.70
6	599.58	31.4 QP	46.0	-14.6	1.24 V	278	37.60	-6.20

**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

## 4.2 CONDUCTED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ V)	
	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. 16, 2012	Nov. 15, 2013
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 28, 2012	Dec. 27, 2013
V-LISN SCHWARZBECK (Peripheral)	NNBL 8226-2	8226-142	Jun. 27, 2013	Jun. 26, 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

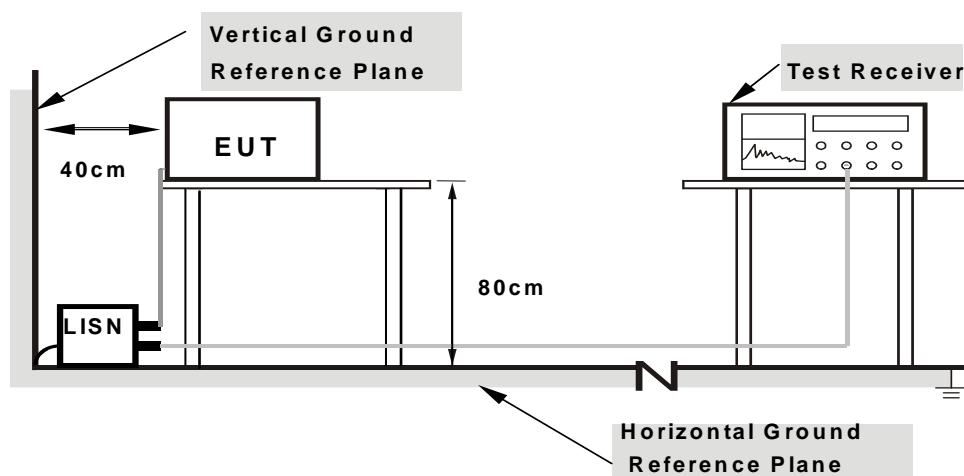
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

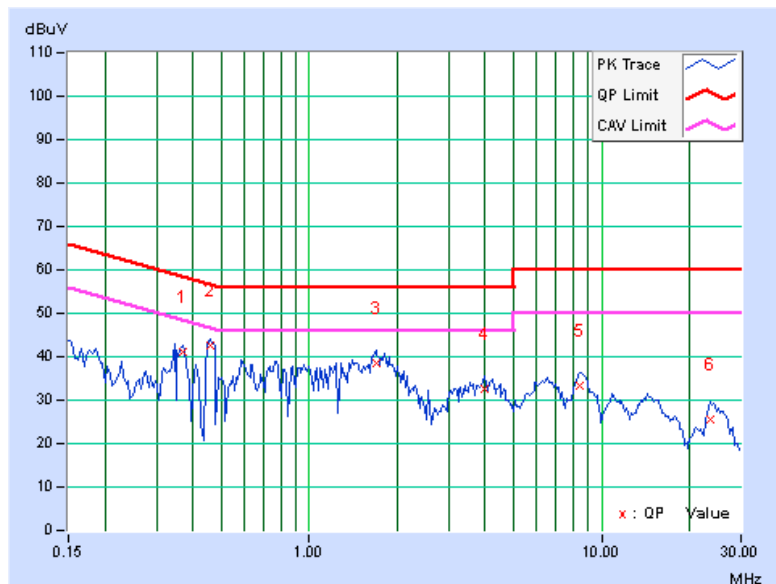
#### CONDUCTED WORST-CASE DATA : 802.11a

<b>PHASE</b>	Line 1	<b>6dB BANDWIDTH</b>	9kHz
<b>CHANNEL</b>	Channel 52		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.36875	0.22	40.98	37.34	41.20	37.56	58.53
2	0.45859	0.23	42.27	38.36	42.50	38.59	56.72	46.72	-14.22	-8.13
3	1.69141	0.28	38.14	32.46	38.42	32.74	56.00	46.00	-17.58	-13.26
4	3.98828	0.40	32.01	23.76	32.41	24.16	56.00	46.00	-23.59	-21.84
5	8.47266	0.64	32.82	24.32	33.46	24.96	60.00	50.00	-26.54	-25.04
6	23.53906	1.41	24.11	17.12	25.52	18.53	60.00	50.00	-34.48	-31.47

#### 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







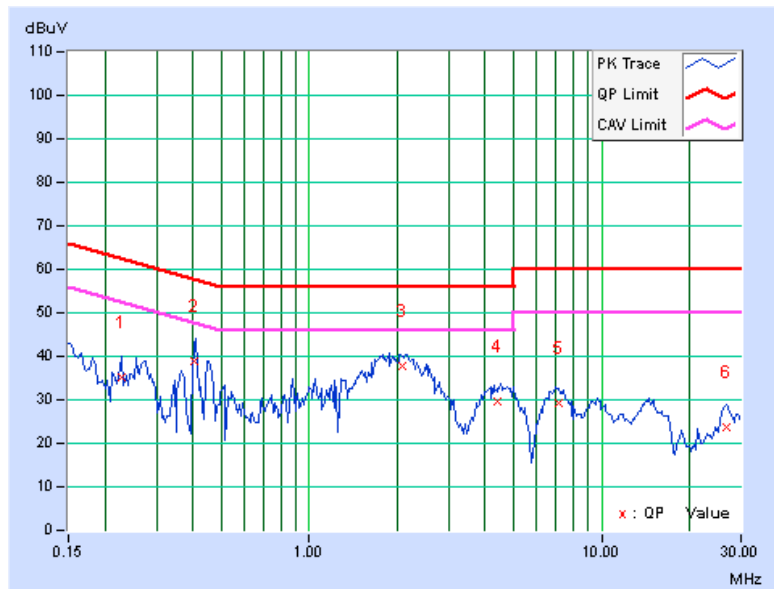
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<b>PHASE</b>	Line 2	<b>6dB BANDWIDTH</b>	9kHz
<b>CHANNEL</b>	Channel 52		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.22812	0.18	35.04	29.66	35.22	29.84	62.52
2	0.40391	0.24	38.76	30.20	39.00	30.44	57.77	47.77	-18.77	-17.33
3	2.08594	0.28	37.61	26.96	37.89	27.24	56.00	46.00	-18.11	-18.76
4	4.39063	0.39	29.33	20.46	29.72	20.85	56.00	46.00	-26.28	-25.15
5	7.10156	0.49	28.68	21.12	29.17	21.61	60.00	50.00	-30.83	-28.39
6	26.66797	1.15	22.49	16.91	23.64	18.06	60.00	50.00	-36.36	-31.94

**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

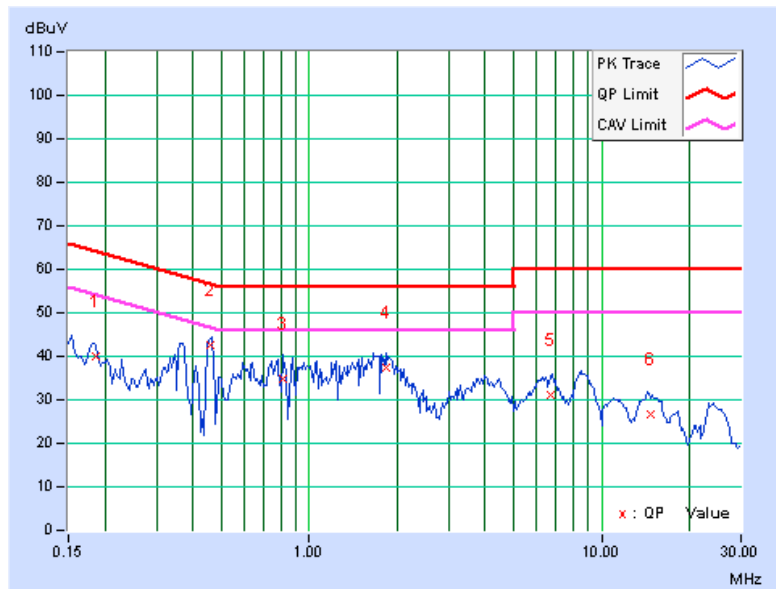


<b>PHASE</b>	Line 1	<b>6dB BANDWIDTH</b>	9kHz
<b>CHANNEL</b>	Channel 116		

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	0.18516	0.16	39.91	33.81	40.07	33.97	64.25	54.25	-24.18	-20.28
<b>2</b>	<b>0.45859</b>	<b>0.23</b>	<b>42.19</b>	<b>38.64</b>	<b>42.42</b>	<b>38.87</b>	<b>56.72</b>	<b>46.72</b>	<b>-14.30</b>	<b>-7.85</b>
3	0.81406	0.24	34.40	24.77	34.64	25.01	56.00	46.00	-21.36	-20.99
4	1.82813	0.28	37.29	30.34	37.57	30.62	56.00	46.00	-18.43	-15.38
5	6.70703	0.54	30.58	22.75	31.12	23.29	60.00	50.00	-28.88	-26.71
6	14.66797	0.95	25.57	18.58	26.52	19.53	60.00	50.00	-33.48	-30.47

**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





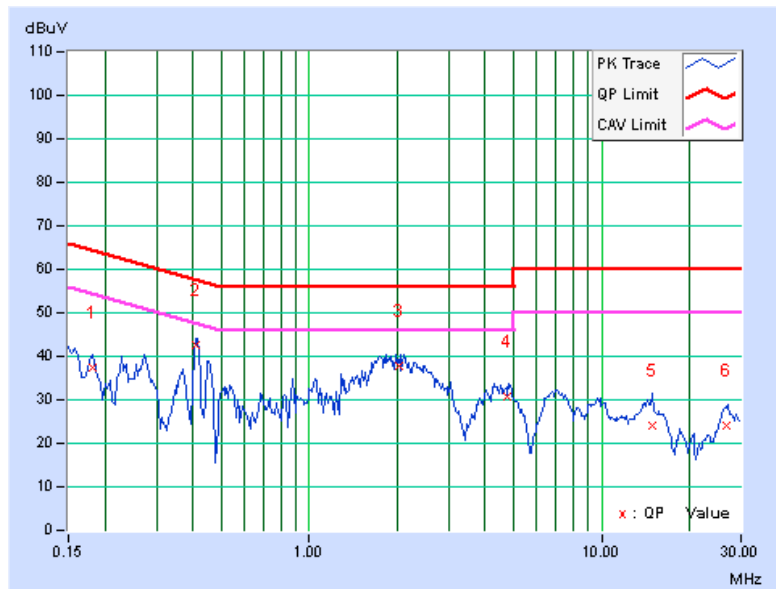
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<b>PHASE</b>	Line 2	<b>6dB BANDWIDTH</b>	9kHz
<b>CHANNEL</b>	Channel 116		

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	0.18125	0.17	37.20	30.31	37.37	30.48	64.43	54.43	-27.06	-23.95
2	0.40781	0.24	42.25	39.59	42.49	39.83	57.69	47.69	-15.20	-7.86
3	2.01953	0.28	37.55	30.01	37.83	30.29	56.00	46.00	-18.17	-15.71
4	4.73047	0.41	30.21	21.72	30.62	22.13	56.00	46.00	-25.38	-23.87
5	14.92188	0.76	23.37	16.05	24.13	16.81	60.00	50.00	-35.87	-33.19
6	26.60547	1.15	22.84	16.99	23.99	18.14	60.00	50.00	-36.01	-31.86

**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 v01r02 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for NANT ≤ 4;

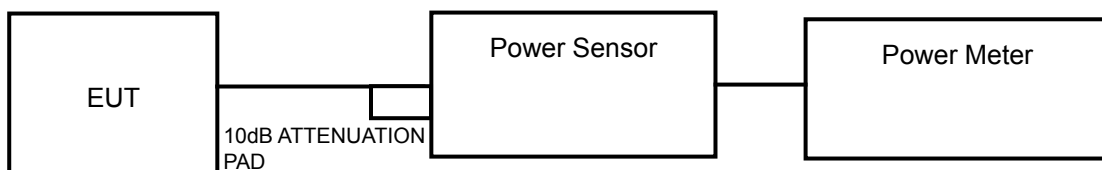
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any NANT;

Array Gain = 5 log(NANT/NSS) dB or 3 dB, whichever is less for 20-MHz channel widths with NANT ≥ 5.

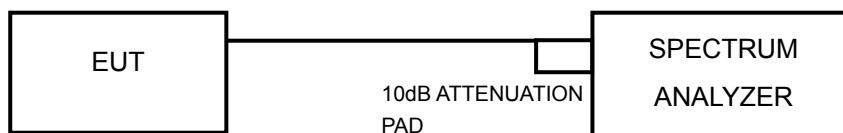
For power measurements on all other devices: Array Gain = 10 log(NANT/NSS) dB.

#### 4.3.2 TEST SETUP

##### FOR POWER OUTPUT MEASUREMENT



##### 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

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 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

#### 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	9.96	11.32	23.460	13.78	17	PASS
40	5200	10.44	11.31	24.587	13.99	17	PASS
48	5240	10.30	12.00	26.564	14.32	17	PASS
52	5260	14.82	16.48	<b>74.802</b>	18.82	24	PASS
60	5300	14.70	15.65	66.240	18.29	24	PASS
64	5320	13.63	15.10	55.426	17.52	24	PASS
100	5500	14.68	15.28	63.105	18.08	24	PASS
116	5580	15.65	16.40	<b>80.380</b>	19.13	24	PASS
140	5700	14.68	15.34	63.574	18.11	24	PASS

#### 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	11.39	11.95	29.440	14.77	17	PASS
40	5200	11.10	12.38	30.180	14.88	17	PASS
48	5240	11.13	12.61	31.211	15.02	17	PASS
52	5260	13.81	15.30	57.928	17.71	24	PASS
60	5300	13.69	14.93	54.505	17.44	24	PASS
64	5320	13.50	14.92	53.433	17.36	24	PASS
100	5500	14.95	15.33	65.380	18.23	24	PASS
116	5580	15.35	15.41	69.031	18.47	24	PASS
140	5700	14.65	15.19	62.211	18.02	24	PASS



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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	6.58	8.14	11.066	10.62	17	PASS
46	5230	12.78	13.70	<b>42.409</b>	16.45	17	PASS
54	5270	13.28	14.12	47.104	16.91	24	PASS
62	5310	9.39	10.81	20.740	13.35	24	PASS
102	5510	9.51	10.10	19.166	13.01	24	PASS
110	5550	14.37	14.91	58.327	17.84	24	PASS
134	5670	14.10	14.61	54.611	17.55	24	PASS



**26dB BANDWIDTH:**

**802.11a**

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	23.98	23.51	PASS
40	5200	24.23	25.61	PASS
48	5240	23.77	26.59	PASS
52	5260	34.95	36.57	PASS
60	5300	35.57	33.52	PASS
64	5320	30.66	30.82	PASS
100	5500	35.93	33.09	PASS
116	5580	36.90	36.58	PASS
140	5700	36.55	41.53	PASS

**802.11n (20MHz)**

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
36	5180	28.00	28.73	PASS
40	5200	24.45	28.99	PASS
48	5240	24.33	27.66	PASS
52	5260	31.35	35.40	PASS
60	5300	30.65	32.12	PASS
64	5320	29.27	32.44	PASS
100	5500	33.89	35.20	PASS
116	5580	36.21	35.73	PASS
140	5700	39.63	38.43	PASS





802.11n (40MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)		PASS / FAIL
		CHAIN 0	CHAIN 1	
38	5190	48.80	48.31	PASS
46	5230	51.45	64.31	PASS
54	5270	62.48	64.68	PASS
62	5310	50.16	48.83	PASS
102	5510	48.90	50.19	PASS
110	5550	70.01	66.02	PASS
134	5670	80.03	74.73	PASS

## EUT MAXIMUM CONDUCTED POWER

### 802.11a

FREQUENCY BAND (MHz)	MAX. POWER	
	OUTPUT POWER (mW)	OUTPUT POWER (dBm)
5250~5350	74.802	18.82
5470~5725	80.380	19.13

**NOTE:** Manufacturer provides Transmit Power Control description to meet this requirement.

### 802.11n (20MHz)

FREQUENCY BAND (MHz)	MAX. POWER	
	OUTPUT POWER (mW)	OUTPUT POWER (dBm)
5250~5350	57.928	17.71
5470~5725	69.031	18.47

**NOTE:** Manufacturer provides Transmit Power Control description to meet this requirement.

### 802.11n (40MHz)

FREQUENCY BAND (MHz)	MAX. POWER	
	OUTPUT POWER (mW)	OUTPUT POWER (dBm)
5250~5350	47.104	16.91
5470~5725	58.327	17.84

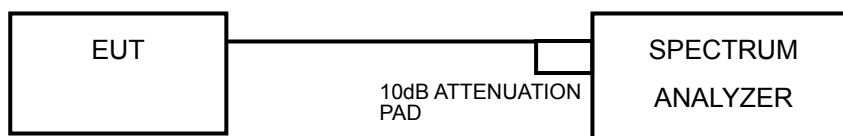
**NOTE:** Manufacturer provides Transmit Power Control description to meet this requirement.

## 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
5.250 ~ 5.350GHz	11dBm
5.470 ~ 5.725GHz	11dBm

### 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

#### 802.11a, 802.11n (20MHz):

Using method SA-1 alternative

- 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 = 0.3 second.
- 5) Perform a single sweep.
- 6) Record the max value

**802.11n (40MHz):**

Using method SA-2 alternative

- 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 = 0.6 second.
- 5) Perform a single sweep.
- 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

Same as 4.3.6.

#### 4.4.7 TEST RESULTS

##### 802.11a

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
36	5180	-5.19	-2.12	-0.38	3.85	PASS
40	5200	-5.55	-1.48	-0.04	3.85	PASS
48	5240	-4.83	-0.49	0.87	3.85	PASS
52	5260	-1.88	3.52	4.62	10.75	PASS
60	5300	-2.10	2.60	3.87	10.75	PASS
64	5320	-4.08	2.84	3.64	10.75	PASS
100	5500	1.68	3.59	5.75	10.70	PASS
116	5580	1.66	4.33	6.21	10.70	PASS
140	5700	2.51	4.33	6.52	10.70	PASS

**NOTE:**

**1. For 5180~5240MHz:**

Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 6.15\text{dBi} > 6\text{dBi}$  , so the power density limit shall be reduced to  $4 - (6.15 - 6) = 3.85\text{dBm}$ .

**2. For 5260~5320MHz:**

Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 6.25\text{dBi} > 6\text{dBi}$  , so the power density limit shall be reduced to  $11 - (6.25 - 6) = 10.75\text{dBm}$ .

**3. For 5500~5700MHz:**

Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 6.30\text{dBi} > 6\text{dBi}$  , so the power density limit shall be reduced to  $11 - (6.30 - 6) = 10.70\text{dBm}$ .

4. Refer to section 3.3 for duty cycle spectrum plot.

**802.11n (20MHz)**

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL POWER DENSITY (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1			
36	5180	-6.29	-0.16	0.79	3.85	PASS
40	5200	-7.27	-0.53	0.30	3.85	PASS
48	5240	-6.14	-0.12	0.85	3.85	PASS
52	5260	-2.94	2.13	3.31	10.75	PASS
60	5300	-3.43	2.26	3.30	10.75	PASS
64	5320	-4.09	2.31	3.21	10.75	PASS
100	5500	1.15	3.37	5.41	10.70	PASS
116	5580	0.86	4.28	5.91	10.70	PASS
140	5700	2.09	4.01	6.17	10.70	PASS

**NOTE:****1. For 5180~5240MHz:**

Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 6.15\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $4 - (6.15 - 6) = 3.85\text{dBm}$ .

**2. For 5260~5320MHz:**

Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 6.25\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $11 - (6.25 - 6) = 10.75\text{dBm}$ .

**3. For 5500~5700MHz:**

Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 6.30\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $11 - (6.30 - 6) = 10.70\text{dBm}$ .

4. Refer to section 3.3 for duty cycle spectrum plot.



**802.11n (40MHz)**

CHAN.	CHAN. FREQ. (MHz)	PSD (dBm)		TOTAL PSD W/O DUTY FACTOR (dBm)	DUTY FACTOR	TOTAL PSD WITH DUTY FACTOR (dBm)	MAX. LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1					
38	5190	-14.43	-7.45	-6.66	0.18	-6.48	3.85	PASS
46	5230	-8.13	-1.95	-1.01	0.18	-0.83	3.85	PASS
54	5270	-6.31	-1.69	-0.40	0.18	-0.22	10.75	PASS
62	5310	-10.66	-4.46	-3.53	0.18	-3.35	10.75	PASS
102	5510	-7.45	-5.10	-3.11	0.18	-2.93	10.70	PASS
110	5550	-2.88	-0.07	1.76	0.18	1.94	10.70	PASS
134	5670	-1.49	0.91	2.88	0.18	3.06	10.70	PASS

**NOTE:**

**1. For 5180~5230MHz:**

Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 6.15\text{dBi} > 6\text{dBi}$  , so the power density limit shall be reduced to  $4-(6.15-6) = 3.85\text{dBm}$ .

**2. For 5270~5310MHz:**

Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 6.25\text{dBi} > 6\text{dBi}$  , so the power density limit shall be reduced to  $11-(6.25-6) = 10.75\text{dBm}$ .

**3. For 5510~5670MHz:**

Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{ANT}] = 6.30\text{dBi} > 6\text{dBi}$  , so the power density limit shall be reduced to  $11-(6.30-6) = 10.70\text{dBm}$ .

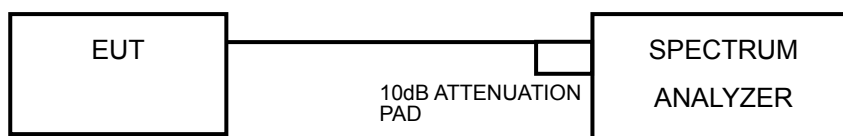
4. Refer to section 3.3 for duty cycle spectrum plot.

## 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





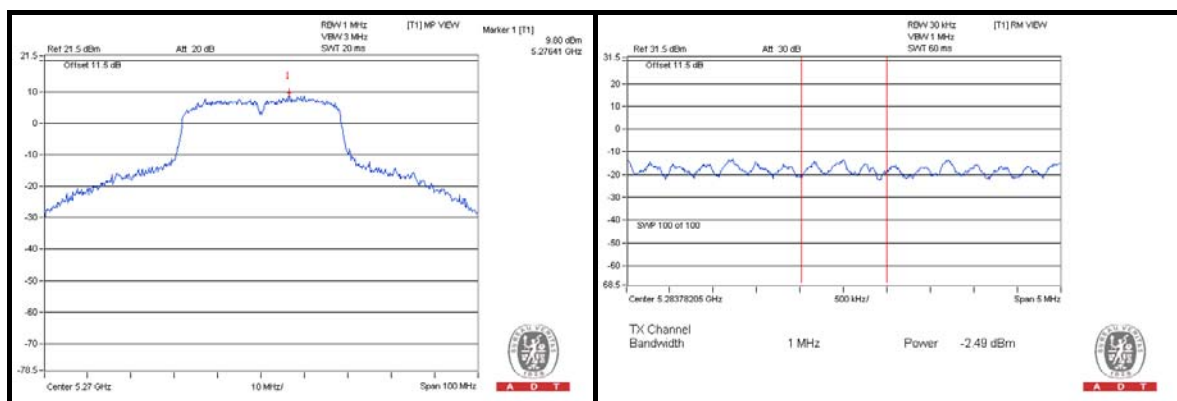
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### 4.5.7 TEST RESULTS

#### 5180 ~ 5320MHz Band

MODULATION MODE	MODULATION TYPE	CHANNEL FREQUENCY (MHz)	PEAK VALUE (dBm)	PPSD (dBm)	PEAK EXCURSION (dB)	LIMIT (dB)	PASS/ FAIL
802.11a	BPSK	5260	9.72	-1.88	11.60	13	PASS
	QPSK		12.06	2.87	9.19	13	PASS
	16QAM		13.03	2.90	10.13	13	PASS
	64QAM		13.08	2.70	10.38	13	PASS
802.11n (20MHz)	BPSK	5320	7.19	-4.09	11.28	13	PASS
	QPSK		11.40	2.04	9.36	13	PASS
	16QAM		12.56	2.02	10.54	13	PASS
	64QAM		12.15	1.41	10.74	13	PASS

MODULATION MODE	MODULATION TYPE	CHAN. FREQ. (MHz)	PEAK VALUE (dBm)	PPSD WITHOUT DUTY FACTOR (dBm)	PPSD WITH DUTY FACTOR (dBm)	PEAK EXCURSION (dB)	LIMIT (dB)	PASS /FAIL
802.11n (40MHz)	BPSK	5270	5.12	-6.31	-6.13	11.25	13	PASS
	QPSK		7.69	-2.03	-1.85	9.54	13	PASS
	16QAM		8.45	-1.98	-1.80	10.25	13	PASS
	64QAM		9.80	-2.49	-2.31	12.11	13	PASS

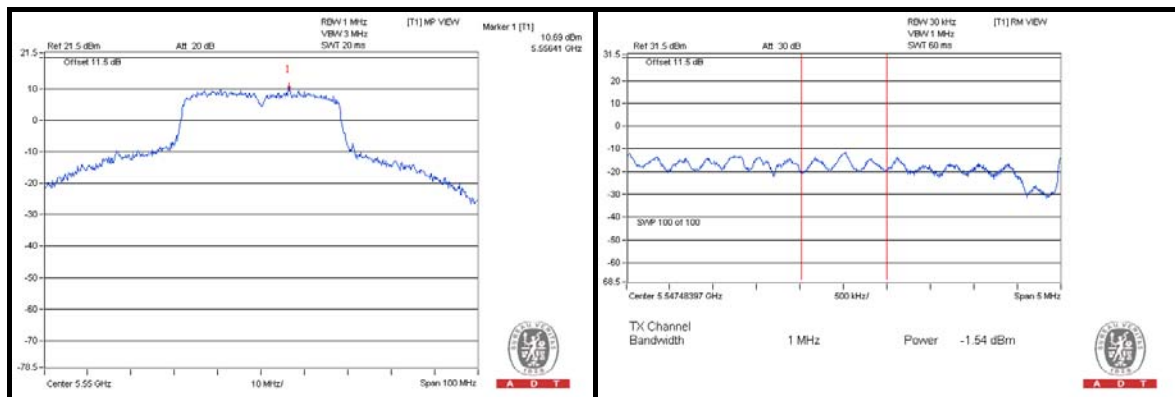




### 5500 ~ 5700MHz Band

MODULATION MODE	MODULATION TYPE	CHANNEL FREQUENCY (MHz)	PEAK VALUE (dBm)	PPSD (dBm)	PEAK EXCURSION (dB)	LIMIT (dB)	PASS/ FAIL
802.11a	BPSK	5580	12.34	1.66	10.68	13	PASS
	QPSK		13.16	4.12	9.04	13	PASS
	16QAM		14.49	3.87	10.62	13	PASS
	64QAM		14.97	4.04	10.93	13	PASS
802.11n (20MHz)	BPSK	5580	11.64	0.86	10.78	13	PASS
	QPSK		12.81	3.94	8.87	13	PASS
	16QAM		14.83	3.91	10.92	13	PASS
	64QAM		13.66	3.97	9.69	13	PASS

MODULATION MODE	MODULATION TYPE	CHAN. FREQ. (MHz)	PEAK VALUE (dBm)	PPSD WITHOUT DUTY FACTOR (dBm)	PPSD WITH DUTY FACTOR (dBm)	PEAK EXCURSION (dB)	LIMIT (dB)	PASS /FAIL
802.11n (40MHz)	BPSK	5550	8.67	-2.88	-2.70	11.37	13	PASS
	QPSK		9.23	-0.46	-0.28	9.51	13	PASS
	16QAM		9.93	-0.64	-0.46	10.39	13	PASS
	64QAM		10.69	-1.54	-1.36	12.05	13	PASS

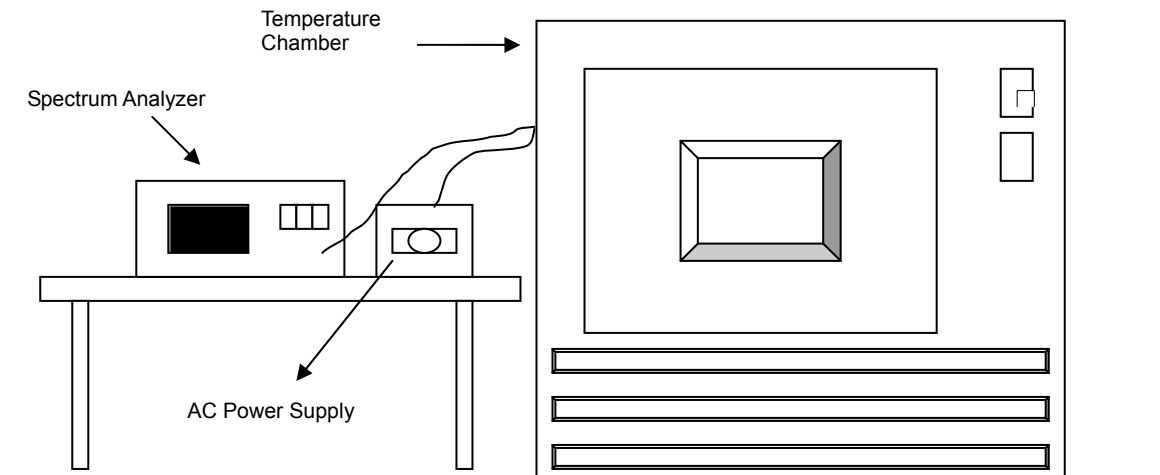


## 4.6 FREQUENCY STABILITY

### 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 AC 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

FREQUENCY STABILITY VERSUS TEMP.									
OPERATING FREQUENCY: 5320MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	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 (%)
60	120	5320.0081	0.00015	5320.0027	0.00005	5320.0022	0.00004	5320.0025	0.00005
50	120	5319.9727	-0.00051	5319.9778	-0.00042	5319.981	-0.00036	5319.9717	-0.00053
40	120	5319.9771	-0.00043	5319.9773	-0.00043	5319.9823	-0.00033	5319.9815	-0.00035
30	120	5320.0167	0.00031	5320.0196	0.00037	5320.0125	0.00023	5320.0215	0.00040
20	120	5320.0027	0.00005	5320.0026	0.00005	5320.0042	0.00008	5320.0052	0.00010
10	120	5319.9949	-0.00010	5320.0024	0.00005	5320.0023	0.00004	5319.9955	-0.00008
0	120	5320.0281	0.00053	5320.027	0.00051	5320.0242	0.00045	5320.0242	0.00045

FREQUENCY STABILITY VERSUS VOLTAGE									
OPERATING FREQUENCY: 5320MHz									
TEMP. (°C)	POWER SUPPLY (Vac)	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	5320.0174	0.00033	5320.0202	0.00038	5320.0133	0.00025	5320.0211	0.00040
	120	5320.0167	0.00031	5320.0196	0.00037	5320.0125	0.00023	5320.0215	0.00040
	102	5320.0172	0.00032	5320.0204	0.00038	5320.0116	0.00022	5320.0219	0.00041



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## 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:

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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---