



# FCC TEST REPORT (15.407)

**REPORT NO.:** RF131119C31-1

**MODEL NO.:** MEMORX3

**FCC ID:** U4GN030

**RECEIVED:** Dec. 03, 2013

**TESTED:** Dec. 03 ~ Dec. 21, 2013

**ISSUED:** Jan. 07, 2014

**APPLICANT:** Datalogic ADC S.r.l.

**ADDRESS:** Via S. Vitalino 13, 40012 Lippo di Calderara di Reno, Italy

**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
RF131119C31-1	Original release	Jan. 07, 2014



# 1. CERTIFICATION

**PRODUCT:** Mobile Computer

**MODEL:** MEMORX3

**BRAND:** Datalogic Memor

**APPLICANT:** Datalogic ADC S.r.l.

**TESTED:** Dec. 03 ~ Dec. 21, 2013

**TEST SAMPLE:** ENGINEERING SAMPLE

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

ANSI C63.10-2009

The above equipment (model: MEMORX3) 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 :** Polly Chien , **DATE :** Jan. 07, 2014  
Polly Chien / Specialist

**APPROVED BY :** Ken Liu , **DATE :** Jan. 07, 2014  
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 -19.06dB at 0.44410MHz.
15.407(b/1/2/3) (b)(6)	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -2.0dB at 5350.00MHz.
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	3.19 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

<b>EUT</b>	Mobile Computer
<b>MODEL NO.</b>	MEMORX3
<b>POWER SUPPLY</b>	3.7Vdc (Battery) 5.0Vdc (Adapter)
<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 72.2Mbps
<b>OPERATING FREQUENCY</b>	5180 ~ 5240MHz, 5260 ~ 5320MHz & 5500 ~ 5700MHz
<b>NUMBER OF CHANNEL</b>	5180 ~ 5240MHz: 4 for 802.11a, 802.11n (20MHz) 5260 ~ 5320MHz: 4 for 802.11a, 802.11n (20MHz) 5500 ~ 5700MHz: 8 for 802.11a, 802.11n (20MHz)
<b>OUTPUT POWER</b>	43.053mW for 5180 ~ 5240MHz 58.076mW for 5260 ~ 5320MHz 29.040mW for 5500 ~ 5700MHz
<b>ANTENNA TYPE</b>	Monopole Antenna with 2.9dBi gain
<b>ANTENNA CONNECTOR</b>	N/A
<b>I/O PORTS</b>	Refer to user's manual
<b>DATA CABLE</b>	1.2m shielded USB cable without core
<b>ACCESSORY DEVICES</b>	Refer to Note

**NOTE:**

1. The EUT provides one completed transmitter and one receiver.

MODULATION MODE	TX FUNCTION
802.11a	1TX
802.11n (20MHz)	1TX

2. The EUT contains following accessory devices.

ITEM	BRAND	MODEL	SPECIFICATION
Adapter	ADAPTER TECH.	STD-05030V	Input: 100-240Vac, 47-63Hz, 0.48A MAX Output: 5Vdc, 3A, 15W MAX Power line: 1.2m cable with 1 core attached on adapter
Battery	-	Standard, memor X3 (S/N: TW13070113)	Rating: 3.7Vdc, 1430mAh (5.29Whr) Type: Li-ion

3. The EUT has disabled the 5600-5650MHz band by S/W to avoid 5600-5650MHz.
4. There are three types of barcode scanners for the EUT: 1D, 2D & CCD. After pretesting, the 2D is the worst case for final test.

5. The above EUT information is declared by manufacturer and for more detailed feature 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

#### 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

#### 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



### 3.2.1 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	6.5
-	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	6.5
-	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	6.5

**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)
-	802.11n (20MHz)	5260-5320	52 to 64	64	OFDM	BPSK	6.5

**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)
-	802.11n (20MHz)	5260-5320	52 to 64	64	OFDM	BPSK	6.5



**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	6.5
-	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	6.5
-	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	6.5

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	23deg. C, 68%RH	120Vac, 60Hz	Brad Tung, Jones Chang
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Ted Chang
PLC	25deg. C, 68%RH	120Vac, 60Hz	Leo Tsai
APCM	24deg. C, 64%RH	120Vac, 60Hz	Match Tsui

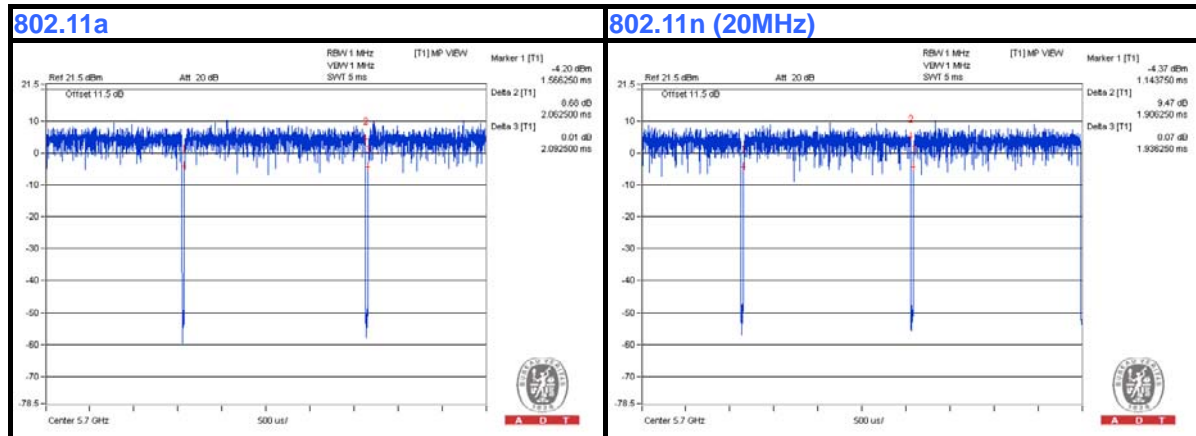
### 3.3 DUTY CYCLE OF TEST SIGNAL

#### MODULATION TYPE: BPSK

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

**802.11a:** Duty cycle =  $2.0625/2.0925 = 0.986$

**802.11n (20MHz):** Duty cycle =  $1.906/1.936 = 0.985$

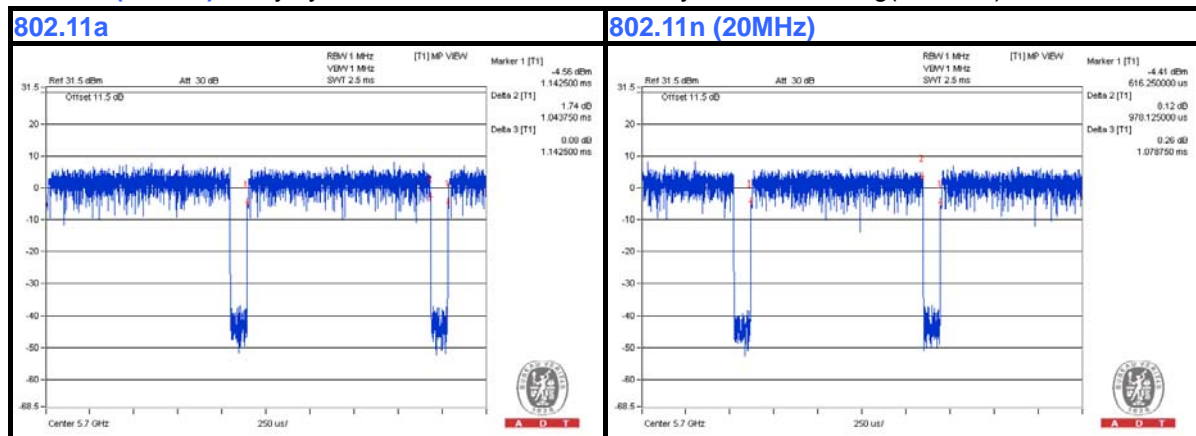


#### MODULATION TYPE: QPSK

Duty cycle of test signal is < 98 %, duty factor is required

**802.11a:** Duty cycle =  $1.044/1.143 = 0.913$ , Duty factor =  $10 * \log(1/0.913) = 0.39$

**802.11n (20MHz):** Duty cycle =  $0.978/1.079 = 0.906$ , Duty factor =  $10 * \log(1/0.906) = 0.43$

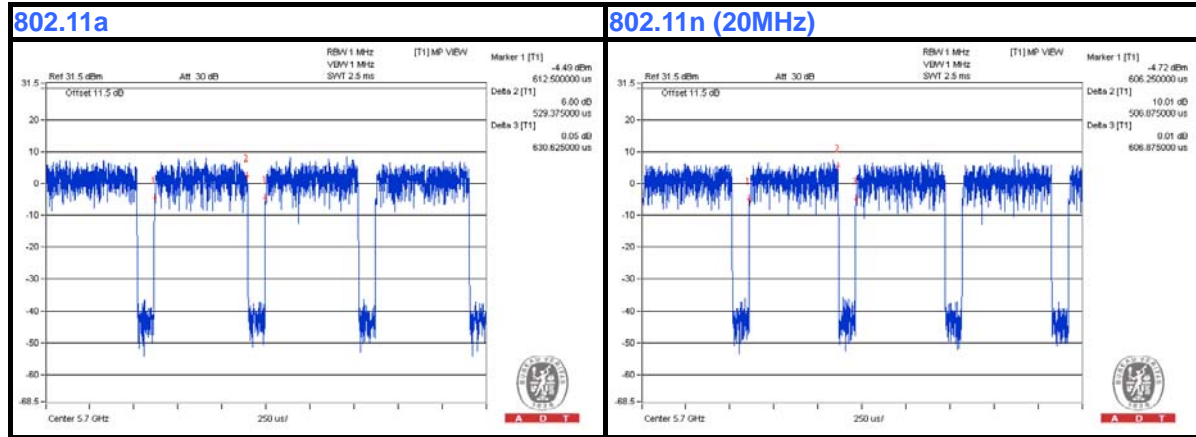


**MODULATION TYPE: 16QAM**

Duty cycle of test signal is < 98 %, duty factor is required

**802.11a:** Duty cycle = 0.529/0.631 = 0.838, Duty factor = 10 \* log( 1/0.838) = 0.77

**802.11n (20MHz):** Duty cycle = 0.507/0.607 = 0.835, Duty factor = 10 \* log( 1/0.835) = 0.78

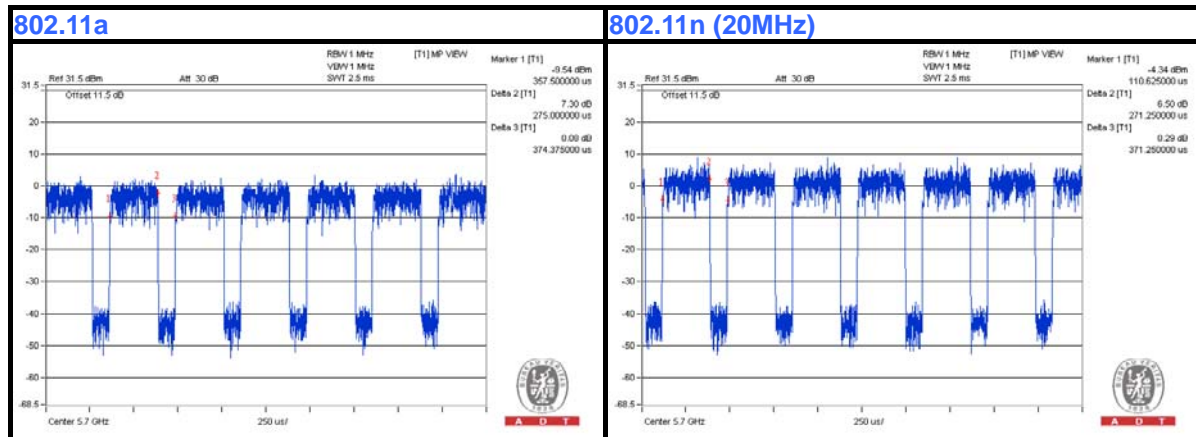


**MODULATION TYPE: 64QAM**

Duty cycle of test signal is < 98 %, duty factor is required

**802.11a:** Duty cycle = 0.275/0.374 = 0.735, Duty factor = 10 \* log( 1/0.735) = 1.34

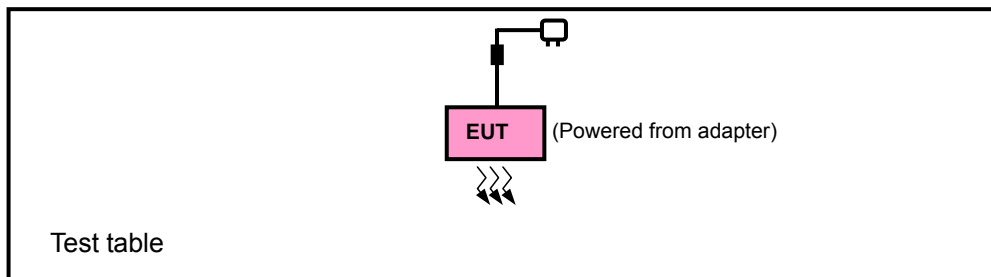
**802.11n (20MHz):** Duty cycle = 0.271/0.371 = 0.730, Duty factor = 10 \* log( 1/0.730) = 1.36



### 3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit.

#### 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**

**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

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	ESCI	100424	Sep. 09, 2013	Sep. 08, 2014
Spectrum Analyzer ROHDE & SCHWARZ	FSU 43	100115	Oct. 24, 2013	Oct. 23, 2014
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Mar. 25, 2013	Mar. 24, 2014
HORN Antenna SCHWARZBECK	BBHA 9120 D	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
High Speed Peak Power Meter	ML2495A	0824011	Jul. 30, 2013	Jul. 29, 2014
Power Sensor	MA2411B	0738171	Jul. 30, 2013	Jul. 29, 2014
WIT Standard Temperature And Humidity Chamber	TH-4S-C	W981030	Jun. 13, 2013	Jun. 12, 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.

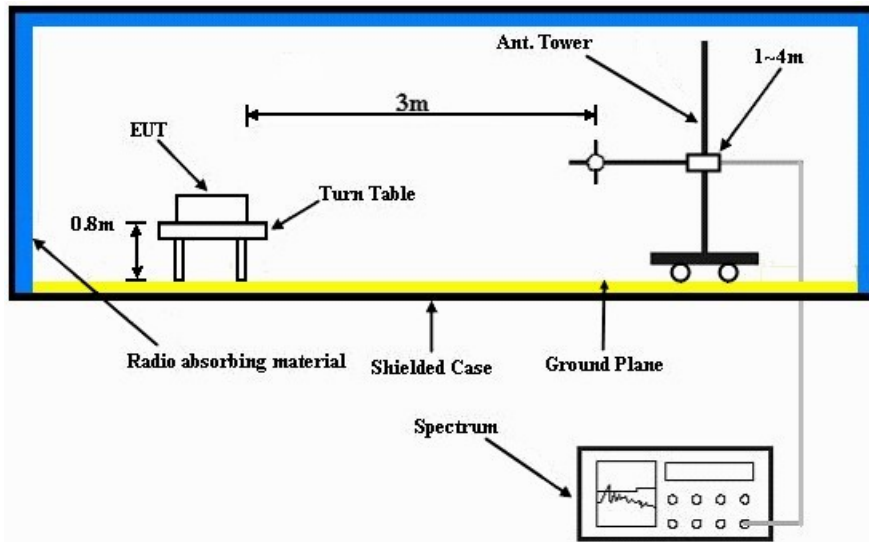
#### 4.1.5 DEVIATION FROM TEST STANDARD

No deviation.

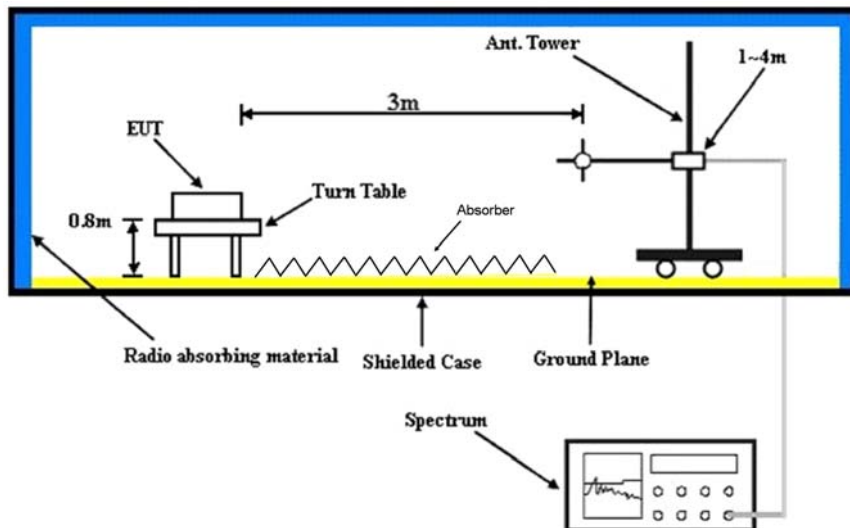


#### 4.1.6 TEST SETUP

##### 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

Set the EUT under transmission condition continuously at specific channel frequency.  
(We used WiFi antenna to test this item, please refer page 9 in the EUT photo.)

#### 4.1.8 TEST RESULTS

##### ABOVE 1GHz DATA :

##### 802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH	TESTED BY	Brad Tung

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	55.6 PK	74.0	-18.4	1.00 H	360	50.20	5.40
2	5150.00	44.1 AV	54.0	-9.9	1.00 H	360	38.70	5.40
3	*5180.00	94.3 PK			1.00 H	360	55.00	39.30
4	*5180.00	84.5 AV			1.00 H	360	45.20	39.30
5	#10360.00	58.5 PK	74.0	-15.5	1.04 H	75	42.50	16.00
6	#10360.00	46.0 AV	54.0	-8.0	1.04 H	75	30.00	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	56.9 PK	74.0	-17.1	1.73 V	43	51.50	5.40
2	5150.00	44.4 AV	54.0	-9.6	1.73 V	43	39.00	5.40
3	*5180.00	98.5 PK			1.71 V	43	59.20	39.30
4	*5180.00	88.3 AV			1.71 V	43	49.00	39.30
5	#10360.00	58.6 PK	74.0	-15.4	1.11 V	153	42.60	16.00
6	#10360.00	46.2 AV	54.0	-7.8	1.11 V	153	30.20	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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 40	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH	TESTED BY	Brad Tung

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	94.0 PK			1.00 H	0	54.70	39.30
2	*5200.00	83.6 AV			1.00 H	0	44.30	39.30
3	#10400.00	58.8 PK	74.0	-15.2	1.06 H	80	42.60	16.20
4	#10400.00	46.4 AV	54.0	-7.6	1.06 H	80	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	98.0 PK			1.02 V	60	58.70	39.30
2	*5200.00	87.6 AV			1.02 V	60	48.30	39.30
3	#10400.00	58.5 PK	74.0	-15.5	1.08 V	168	42.30	16.20
4	#10400.00	46.2 AV	54.0	-7.8	1.08 V	168	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	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH	TESTED BY	Brad Tung

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	94.3 PK			1.00 H	2	55.00	39.30
2	*5240.00	84.3 AV			1.00 H	2	45.00	39.30
3	#10480.00	59.3 PK	74.0	-14.7	1.03 H	90	42.50	16.80
4	#10480.00	46.8 AV	54.0	-7.2	1.03 H	90	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	98.6 PK			1.14 V	22	59.30	39.30
2	*5240.00	88.6 AV			1.14 V	22	49.30	39.30
3	#10480.00	58.6 PK	74.0	-15.4	1.11 V	145	41.80	16.80
4	#10480.00	46.4 AV	54.0	-7.6	1.11 V	145	29.60	16.80

**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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 52	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH	TESTED BY	Brad Tung

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	*5260.00	96.3 PK			1.00 H	2	57.00	39.30
2	*5260.00	86.4 AV			1.00 H	2	47.10	39.30
3	#10520.00	59.5 PK	74.0	-14.5	1.11 H	116	42.70	16.80
4	#10520.00	47.5 AV	54.0	-6.5	1.11 H	116	30.70	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	*5260.00	100.3 PK			1.00 V	18	61.00	39.30
2	*5260.00	90.3 AV			1.00 V	18	51.00	39.30
3	#10520.00	59.2 PK	74.0	-14.8	1.03 V	158	42.40	16.80
4	#10520.00	47.1 AV	54.0	-6.9	1.03 V	158	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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 60	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH	TESTED BY	Brad Tung

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	96.8 PK			1.00 H	12	57.40	39.40
2	*5300.00	86.5 AV			1.00 H	12	47.10	39.40
3	10600.00	59.3 PK	74.0	-14.7	1.12 H	175	42.80	16.50
4	10600.00	47.2 AV	54.0	-6.8	1.12 H	175	30.70	16.50
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	*5300.00	100.8 PK			1.00 V	30	61.40	39.40
2	*5300.00	90.5 AV			1.00 V	30	51.10	39.40
3	10600.00	59.0 PK	74.0	-15.0	1.08 V	169	42.50	16.50
4	10600.00	47.0 AV	54.0	-7.0	1.08 V	169	30.50	16.50

**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 64	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH	TESTED BY	Brad Tung

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	97.0 PK			1.00 H	5	57.60	39.40
2	*5320.00	86.6 AV			1.00 H	5	47.20	39.40
3	5350.00	60.8 PK	74.0	-13.2	1.00 H	5	55.30	5.50
4	5350.00	46.8 AV	54.0	-7.2	1.00 H	5	41.30	5.50
5	10640.00	59.8 PK	74.0	-14.2	1.07 H	105	43.00	16.80
6	10640.00	47.7 AV	54.0	-6.3	1.07 H	105	30.90	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	*5320.00	101.0 PK			1.00 V	22	61.60	39.40
2	*5320.00	90.6 AV			1.00 V	22	51.20	39.40
3	5350.00	62.0 PK	74.0	-12.0	1.00 V	22	56.50	5.50
4	5350.00	48.4 AV	54.0	-5.6	1.00 V	22	42.90	5.50
5	10640.00	59.7 PK	74.0	-14.3	1.09 V	185	42.90	16.80
6	10640.00	47.5 AV	54.0	-6.5	1.09 V	185	30.70	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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 100	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%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	5460.00	58.5 PK	74.0	-15.5	1.42 H	300	52.90	5.60
2	5460.00	45.2 AV	54.0	-8.8	1.42 H	300	39.60	5.60
3	#5470.00	62.7 PK	74.0	-11.3	1.42 H	285	57.10	5.60
4	#5470.00	45.9 AV	54.0	-8.1	1.42 H	285	40.30	5.60
5	*5500.00	103.1 PK			1.41 H	274	63.50	39.60
6	*5500.00	93.4 AV			1.41 H	274	53.80	39.60
7	11000.00	60.2 PK	74.0	-13.8	1.22 H	188	41.70	18.50
8	11000.00	50.0 AV	54.0	-4.0	1.22 H	188	31.50	18.50

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	5460.00	56.4 PK	74.0	-17.6	4.00 V	333	50.80	5.60
2	5460.00	43.8 AV	54.0	-10.2	4.00 V	333	38.20	5.60
3	#5470.00	59.0 PK	74.0	-15.0	1.00 V	325	53.40	5.60
4	#5470.00	46.1 AV	54.0	-7.9	1.00 V	325	40.50	5.60
5	*5500.00	104.0 PK			1.00 V	331	64.40	39.60
6	*5500.00	94.1 AV			1.00 V	331	54.50	39.60
7	11000.00	61.3 PK	74.0	-12.7	1.02 V	93	42.80	18.50
8	11000.00	50.5 AV	54.0	-3.5	1.02 V	93	32.00	18.50

**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 the restricted band.





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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 116	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%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	*5580.00	103.1 PK			1.39 H	291	63.30	39.80
2	*5580.00	93.7 AV			1.39 H	291	53.90	39.80
3	11160.00	59.5 PK	74.0	-14.5	1.00 H	108	41.10	18.40
4	11160.00	47.3 AV	54.0	-6.7	1.00 H	108	28.90	18.40
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	*5580.00	103.9 PK			1.06 V	313	64.10	39.80
2	*5580.00	93.6 AV			1.06 V	313	53.80	39.80
3	11160.00	61.2 PK	74.0	-12.8	1.00 V	288	42.80	18.40
4	11160.00	48.7 AV	54.0	-5.3	1.00 V	288	30.30	18.40

**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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 140	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%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	*5700.00	101.3 PK			1.46 H	288	61.20	40.10
2	*5700.00	91.5 AV			1.46 H	288	51.40	40.10
3	#5725.00	58.0 PK	74.0	-16.0	1.41 H	290	51.70	6.30
4	#5725.00	45.9 AV	54.0	-8.1	1.41 H	290	39.60	6.30
5	11400.00	59.6 PK	74.0	-14.4	1.10 H	201	41.40	18.20
6	11400.00	48.3 AV	54.0	-5.7	1.10 H	201	30.10	18.20
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	*5700.00	103.0 PK			1.05 V	314	62.90	40.10
2	*5700.00	92.0 AV			1.05 V	314	51.90	40.10
3	#5725.00	59.4 PK	74.0	-14.6	1.03 V	316	53.10	6.30
4	#5725.00	45.9 AV	54.0	-8.1	1.03 V	316	39.60	6.30
5	11400.00	61.0 PK	74.0	-13.0	1.00 V	341	42.80	18.20
6	11400.00	49.8 AV	54.0	-4.2	1.00 V	341	31.60	18.20

**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.



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## 802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 36	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH	TESTED BY	Brad Tung

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	62.9 PK	74.0	-11.1	1.37 H	275	57.50	5.40
2	5150.00	46.9 AV	54.0	-7.1	1.37 H	275	41.50	5.40
3	*5180.00	99.2 PK			1.37 H	275	59.90	39.30
4	*5180.00	88.7 AV			1.37 H	275	49.40	39.30
5	#10360.00	57.2 PK	74.0	-16.8	1.10 H	2	41.20	16.00
6	#10360.00	45.5 AV	54.0	-8.5	1.10 H	2	29.50	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	65.3 PK	74.0	-8.7	1.02 V	334	59.90	5.40
2	5150.00	47.9 AV	54.0	-6.1	1.02 V	334	42.50	5.40
3	*5180.00	101.5 PK			1.02 V	334	62.20	39.30
4	*5180.00	91.3 AV			1.02 V	334	52.00	39.30
5	#10360.00	57.5 PK	74.0	-16.5	1.03 V	231	41.50	16.00
6	#10360.00	45.8 AV	54.0	-8.2	1.03 V	231	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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 40	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH	TESTED BY	Brad Tung

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	100.3 PK			1.39 H	263	61.00	39.30
2	*5200.00	89.8 AV			1.39 H	263	50.50	39.30
3	#10400.00	57.7 PK	74.0	-16.3	1.11 H	4	41.50	16.20
4	#10400.00	46.0 AV	54.0	-8.0	1.11 H	4	29.80	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			1.05 V	343	63.20	39.30
2	*5200.00	92.3 AV			1.05 V	343	53.00	39.30
3	#10400.00	57.9 PK	74.0	-16.1	1.08 V	247	41.70	16.20
4	#10400.00	46.2 AV	54.0	-7.8	1.08 V	247	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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 48	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH	TESTED BY	Brad Tung

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	100.1 PK			1.00 H	160	60.80	39.30
2	*5240.00	89.7 AV			1.00 H	160	50.40	39.30
3	#10480.00	58.1 PK	74.0	-15.9	1.08 H	14	41.30	16.80
4	#10480.00	46.5 AV	54.0	-7.5	1.08 H	14	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	102.9 PK			1.07 V	322	63.60	39.30
2	*5240.00	92.5 AV			1.07 V	322	53.20	39.30
3	#10480.00	58.6 PK	74.0	-15.4	1.11 V	250	41.80	16.80
4	#10480.00	46.7 AV	54.0	-7.3	1.11 V	250	29.90	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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 52	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH	TESTED BY	Brad Tung

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	*5260.00	99.7 PK			1.20 H	277	60.40	39.30
2	*5260.00	89.7 AV			1.20 H	277	50.40	39.30
3	#10520.00	58.1 PK	74.0	-15.9	1.11 H	15	41.30	16.80
4	#10520.00	46.4 AV	54.0	-7.6	1.11 H	15	29.60	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	*5260.00	103.2 PK			1.26 V	334	63.90	39.30
2	*5260.00	92.8 AV			1.26 V	334	53.50	39.30
3	#10520.00	58.4 PK	74.0	-15.6	1.04 V	215	41.60	16.80
4	#10520.00	46.7 AV	54.0	-7.3	1.04 V	215	29.90	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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 60	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH	TESTED BY	Brad Tung

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	100.0 PK			1.24 H	249	60.60	39.40
2	*5300.00	90.2 AV			1.24 H	249	50.80	39.40
3	10600.00	57.9 PK	74.0	-16.1	1.08 H	30	41.40	16.50
4	10600.00	46.1 AV	54.0	-7.9	1.08 H	30	29.60	16.50
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	*5300.00	103.2 PK			1.19 V	336	63.80	39.40
2	*5300.00	93.2 AV			1.19 V	336	53.80	39.40
3	10600.00	58.1 PK	74.0	-15.9	1.08 V	201	41.60	16.50
4	10600.00	46.3 AV	54.0	-7.7	1.08 V	201	29.80	16.50

**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 64	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH	TESTED BY	Brad Tung

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	100.3 PK			1.20 H	260	60.90	39.40
2	*5320.00	90.1 AV			1.20 H	260	50.70	39.40
3	5350.00	62.5 PK	74.0	-11.5	1.20 H	260	57.00	5.50
4	5350.00	48.0 AV	54.0	-6.0	1.20 H	260	42.50	5.50
5	10640.00	58.2 PK	74.0	-15.8	1.07 H	42	41.40	16.80
6	10640.00	46.4 AV	54.0	-7.6	1.07 H	42	29.60	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	*5320.00	104.3 PK			1.13 V	335	64.90	39.40
2	*5320.00	94.2 AV			1.13 V	335	54.80	39.40
3	5350.00	65.6 PK	74.0	-8.4	1.13 V	335	60.10	5.50
4	<b>5350.00</b>	<b>52.0 AV</b>	<b>54.0</b>	<b>-2.0</b>	<b>1.13 V</b>	<b>335</b>	<b>46.50</b>	<b>5.50</b>
5	10640.00	58.5 PK	74.0	-15.5	1.15 V	135	41.70	16.80
6	10640.00	46.6 AV	54.0	-7.4	1.15 V	135	29.80	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.





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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 100	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH	TESTED BY	Brad Tung

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	55.8 PK	74.0	-18.2	1.16 H	270	50.20	5.60
2	5460.00	43.6 AV	54.0	-10.4	1.16 H	270	38.00	5.60
3	#5470.00	59.6 PK	74.0	-14.4	1.16 H	270	54.00	5.60
4	#5470.00	44.0 AV	54.0	-10.0	1.16 H	270	38.40	5.60
5	*5500.00	96.8 PK			1.16 H	270	57.20	39.60
6	*5500.00	85.7 AV			1.16 H	270	46.10	39.60
7	11000.00	60.0 PK	74.0	-14.0	1.13 H	13	41.50	18.50
8	11000.00	48.3 AV	54.0	-5.7	1.13 H	13	29.80	18.50

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	5460.00	58.1 PK	74.0	-15.9	1.32 V	316	52.50	5.60
2	5460.00	44.6 AV	54.0	-9.4	1.32 V	316	39.00	5.60
3	#5470.00	61.1 PK	74.0	-12.9	1.32 V	316	55.50	5.60
4	#5470.00	45.8 AV	54.0	-8.2	1.32 V	316	40.20	5.60
5	*5500.00	98.8 PK			1.12 V	200	59.20	39.60
6	*5500.00	88.7 AV			1.12 V	200	49.10	39.60
7	11000.00	60.2 PK	74.0	-13.8	1.08 V	228	41.70	18.50
8	11000.00	48.4 AV	54.0	-5.6	1.08 V	228	29.90	18.50

**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 the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 116	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH	TESTED BY	Brad Tung

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	96.9 PK			1.13 H	253	57.10	39.80
2	*5580.00	85.8 AV			1.13 H	253	46.00	39.80
3	11160.00	59.7 PK	74.0	-14.3	1.08 H	52	41.30	18.40
4	11160.00	47.8 AV	54.0	-6.2	1.08 H	52	29.40	18.40
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	*5580.00	99.8 PK			1.30 V	311	60.00	39.80
2	*5580.00	88.8 AV			1.30 V	311	49.00	39.80
3	11160.00	60.0 PK	74.0	-14.0	1.12 V	237	41.60	18.40
4	11160.00	48.1 AV	54.0	-5.9	1.12 V	237	29.70	18.40

**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.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 140	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER	120Vac, 60Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	23deg. C, 68%RH	TESTED BY	Brad Tung

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	96.2 PK			1.08 H	255	56.10	40.10
2	*5700.00	86.1 AV			1.08 H	255	46.00	40.10
3	#5725.00	60.3 PK	74.0	-13.7	1.08 H	255	54.00	6.30
4	#5725.00	44.2 AV	54.0	-9.8	1.08 H	255	37.90	6.30
5	11400.00	59.5 PK	74.0	-14.5	1.11 H	60	41.30	18.20
6	11400.00	47.6 AV	54.0	-6.4	1.11 H	60	29.40	18.20
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	*5700.00	98.8 PK			1.42 V	295	58.70	40.10
2	*5700.00	88.4 AV			1.42 V	295	48.30	40.10
3	#5725.00	62.8 PK	74.0	-11.2	1.42 V	295	56.50	6.30
4	#5725.00	47.2 AV	54.0	-6.8	1.42 V	295	40.90	6.30
5	11400.00	59.7 PK	74.0	-14.3	1.05 V	253	41.50	18.20
6	11400.00	48.0 AV	54.0	-6.0	1.05 V	253	29.80	18.20

**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.



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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 64	FREQUENCY RANGE	Below 1000MHz
INPUT POWER	120Vac, 60 Hz	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	57.07	28.5 QP	40.0	-11.5	1.24 H	10	43.20	-14.70
2	109.46	19.0 QP	43.5	-24.5	1.00 H	245	36.10	-17.10
3	212.30	19.3 QP	43.5	-24.2	1.00 H	260	35.70	-16.40
4	499.48	21.1 QP	46.0	-24.9	1.50 H	238	30.10	-9.00
5	676.05	24.2 QP	46.0	-21.8	1.00 H	22	29.90	-5.70
6	827.40	29.1 QP	46.0	-16.9	1.50 H	235	31.90	-2.80

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	57.07	27.1 QP	40.0	-12.9	1.99 V	193	41.80	-14.70
2	169.61	17.2 QP	43.5	-26.3	1.00 V	232	31.30	-14.10
3	313.20	19.2 QP	46.0	-26.8	1.24 V	125	31.40	-12.20
4	476.19	21.9 QP	46.0	-24.1	1.24 V	54	31.20	-9.30
5	676.05	26.1 QP	46.0	-19.9	1.00 V	273	31.80	-5.70
6	794.42	26.8 QP	46.0	-19.2	1.00 V	344	30.00	-3.20

**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. 29, 2013	Nov. 28, 2014
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 28, 2012	Dec. 27, 2013
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

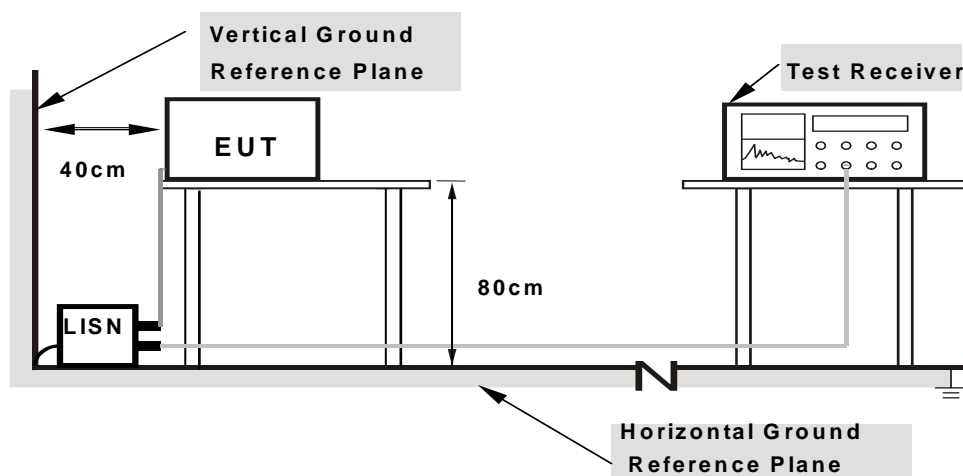
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

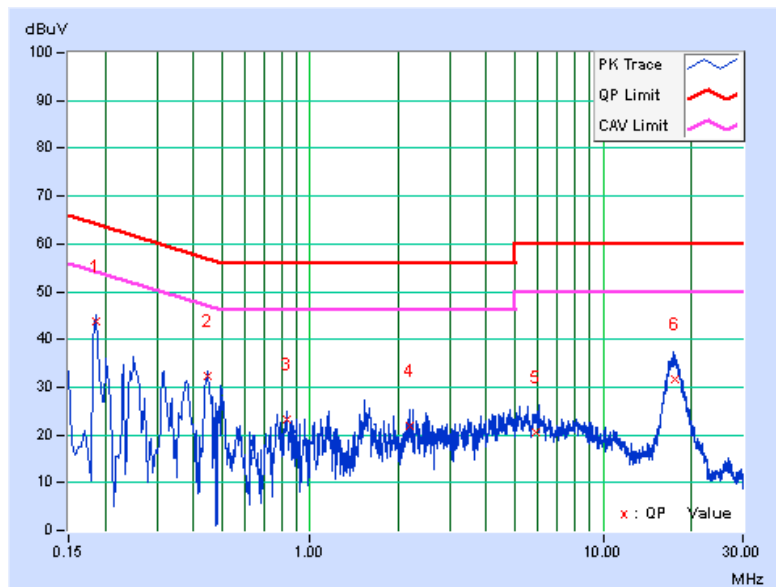
### CONDUCTED WORST-CASE DATA : 802.11n (20MHz)

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	0.18519	0.16	43.51	26.88	43.67	27.04	64.25	54.25	-20.58	-27.21
2	0.44527	0.23	31.93	27.39	32.16	27.62	56.96	46.96	-24.80	-19.34
3	0.83357	0.24	23.11	15.45	23.35	15.69	56.00	46.00	-32.65	-30.31
4	2.18057	0.30	21.61	12.98	21.91	13.28	56.00	46.00	-34.09	-32.72
5	5.87000	0.50	19.93	13.46	20.43	13.96	60.00	50.00	-39.57	-36.04
6	17.50600	1.10	30.41	24.11	31.51	25.21	60.00	50.00	-28.49	-24.79

#### 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

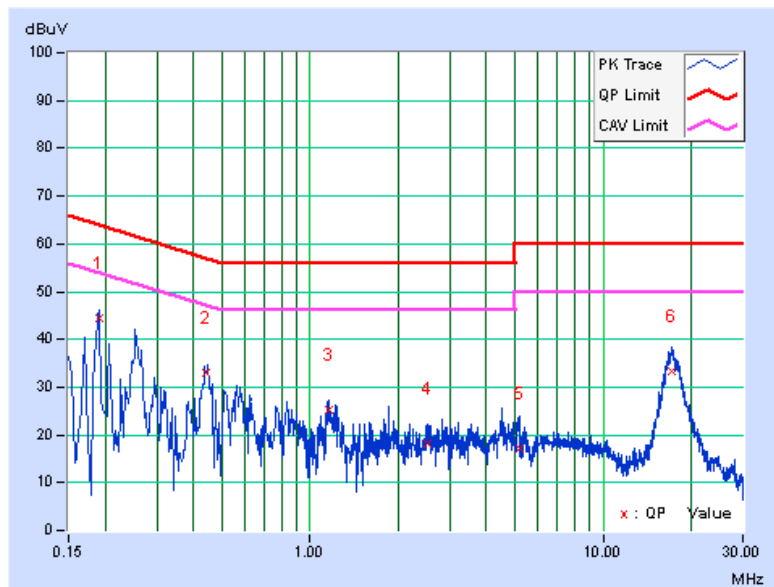


PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.19013	0.17	44.43	34.58	44.60	34.75	64.03	54.03	-19.43	-19.28
<b>2</b>	<b>0.44410</b>	<b>0.24</b>	<b>32.67</b>	<b>27.68</b>	<b>32.91</b>	<b>27.92</b>	<b>56.98</b>	<b>46.98</b>	<b>-24.07</b>	<b>-19.06</b>
3	1.15564	0.25	24.94	17.53	25.19	17.78	56.00	46.00	-30.81	-28.22
4	2.51395	0.31	17.77	9.25	18.08	9.56	56.00	46.00	-37.92	-36.44
5	5.16600	0.42	16.90	7.51	17.32	7.93	60.00	50.00	-42.68	-42.07
6	17.06200	0.83	32.47	26.36	33.30	27.19	60.00	50.00	-26.70	-22.81

**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

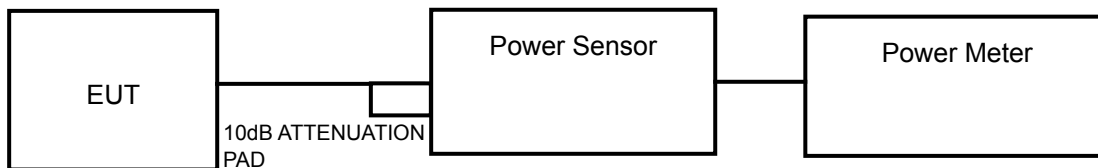
#### 4.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

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

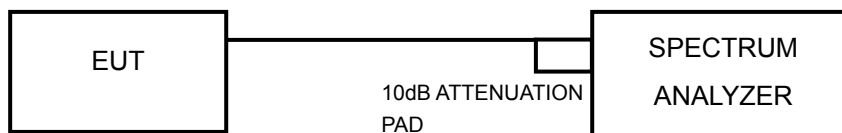
**NOTE:** Where B is the 26dB emission bandwidth in MHz.

#### 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.

(We used WiFi antenna to test this item, please refer page 9 in the EUT photo.)

### 4.3.7 TEST RESULTS

#### POWER OUTPUT:

##### 802.11a

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
36	5180	31.333	14.96	17	PASS
40	5200	33.963	15.31	17	PASS
48	5240	<b>43.053</b>	16.34	17	PASS
52	5260	46.881	16.71	24	PASS
60	5300	54.828	17.39	24	PASS
64	5320	57.810	17.62	24	PASS
100	5500	<b>29.040</b>	14.63	24	PASS
116	5580	22.699	13.56	24	PASS
140	5700	16.106	12.07	24	PASS

#### NOTE:

##### For 5180~5240MHz:

1.  $4\text{dBm} + 10\log ( 44.09 ) = 20.44 > 17\text{dBm}$
2.  $4\text{dBm} + 10\log ( 42.99 ) = 20.33 > 17\text{dBm}$
3.  $4\text{dBm} + 10\log ( 44.38 ) = 20.47 > 17\text{dBm}$

##### For 5260~5700MHz:

1.  $11\text{dBm} + 10\log ( 44.00 ) = 27.43 > 24\text{dBm}$
2.  $11\text{dBm} + 10\log ( 46.96 ) = 27.72 > 24\text{dBm}$
3.  $11\text{dBm} + 10\log ( 45.13 ) = 27.54 > 24\text{dBm}$
4.  $11\text{dBm} + 10\log ( 31.91 ) = 26.04 > 24\text{dBm}$
5.  $11\text{dBm} + 10\log ( 32.00 ) = 26.05 > 24\text{dBm}$
6.  $11\text{dBm} + 10\log ( 32.51 ) = 26.12 > 24\text{dBm}$



802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	AVERAGE POWER (mW)	AVERAGE POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
36	5180	30.620	14.86	17	PASS
40	5200	33.806	15.29	17	PASS
48	5240	42.170	16.25	17	PASS
52	5260	47.098	16.73	24	PASS
60	5300	55.976	17.48	24	PASS
64	5320	<b>58.076</b>	17.64	24	PASS
100	5500	28.708	14.58	24	PASS
116	5580	22.491	13.52	24	PASS
140	5700	14.521	11.62	24	PASS

NOTE:

For 5180~5240MHz:

1.  $4\text{dBm} + 10\log ( 46.31 ) = 20.66 > 17\text{dBm}$
2.  $4\text{dBm} + 10\log ( 49.61 ) = 20.96 > 17\text{dBm}$
3.  $4\text{dBm} + 10\log ( 47.61 ) = 20.78 > 17\text{dBm}$

For 5260~5700MHz:

1.  $11\text{dBm} + 10\log ( 47.03 ) = 27.72 > 24\text{dBm}$
2.  $11\text{dBm} + 10\log ( 49.27 ) = 27.93 > 24\text{dBm}$
3.  $11\text{dBm} + 10\log ( 48.16 ) = 27.83 > 24\text{dBm}$
4.  $11\text{dBm} + 10\log ( 34.96 ) = 26.44 > 24\text{dBm}$
5.  $11\text{dBm} + 10\log ( 34.40 ) = 26.37 > 24\text{dBm}$
6.  $11\text{dBm} + 10\log ( 34.73 ) = 26.41 > 24\text{dBm}$



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26dB BANDWIDTH:

802.11a

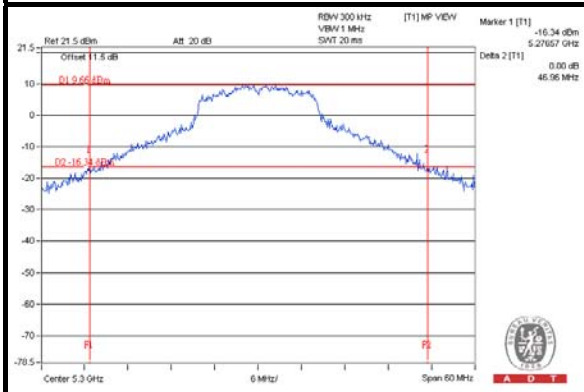
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	PASS / FAIL
36	5180	44.09	PASS
40	5200	42.99	PASS
48	5240	44.38	PASS
52	5260	44.00	PASS
60	5300	46.96	PASS
64	5320	45.13	PASS
100	5500	31.91	PASS
116	5580	32.00	PASS
140	5700	32.51	PASS

802.11n (20MHz)

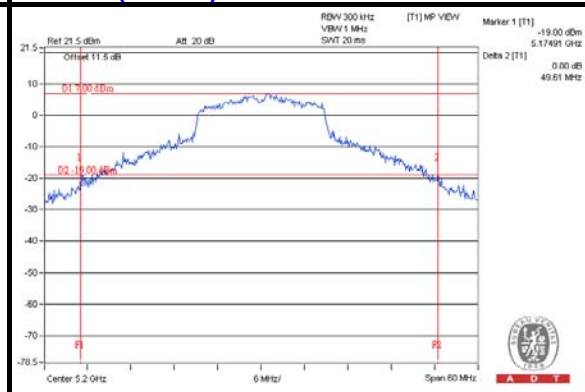
CHANNEL	CHANNEL FREQUENCY (MHz)	26dBc BANDWIDTH (MHz)	PASS / FAIL
36	5180	46.31	PASS
40	5200	49.61	PASS
48	5240	47.61	PASS
52	5260	47.03	PASS
60	5300	49.27	PASS
64	5320	48.16	PASS
100	5500	34.96	PASS
116	5580	34.40	PASS
140	5700	34.73	PASS

SPECTRUM PLOT OF WORST VALUE

802.11a



802.11n (20MHz)

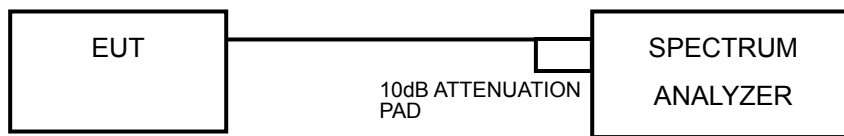


#### 4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

##### 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:

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

##### 802.11n (20MHz) and 802.11n (40MHz):

Using method SA-2

- 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 and add  $10 \log (1/\text{duty cycle})$

#### 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

CHANNEL	FREQUENCY (MHz)	PSD (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
36	5180	1.24	4	PASS
40	5200	1.66	4	PASS
48	5240	2.71	4	PASS
52	5260	2.84	11	PASS
60	5300	4.34	11	PASS
64	5320	4.81	11	PASS
100	5500	3.43	11	PASS
116	5580	1.91	11	PASS
140	5700	-0.54	11	PASS

##### 802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	PSD (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
36	5180	0.77	4	PASS
40	5200	0.99	4	PASS
48	5240	2.27	4	PASS
52	5260	2.39	11	PASS
60	5300	3.68	11	PASS
64	5320	4.43	11	PASS
100	5500	2.57	11	PASS
116	5580	1.26	11	PASS
140	5700	-0.25	11	PASS

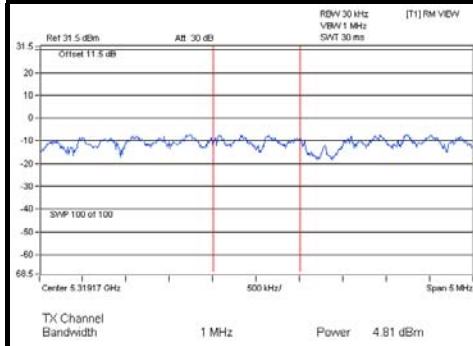




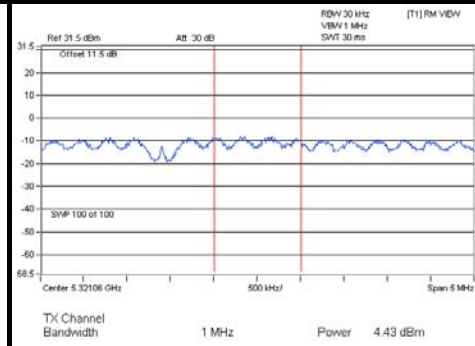
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### SPECTRUM PLOT OF WORST VALUE

802.11a



802.11n (20MHz)

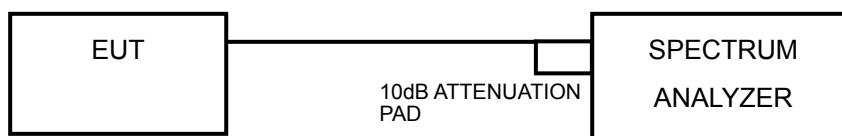


## 4.5 PEAK POWER EXCURSION MEASUREMENT

### 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

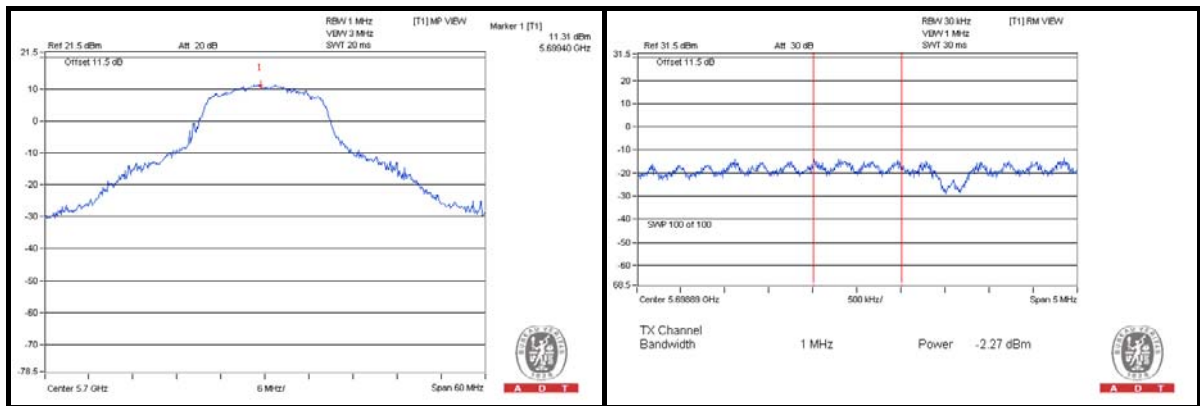
Same as 4.2.6



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### 4.5.7 TEST RESULTS

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
802.11a	BPSK	5700	11.05	-0.54	-0.54	11.59	13	PASS
	QPSK		11.48	-1.03	-0.64	12.12	13	PASS
	16QAM		11.31	-2.27	-1.50	12.81	13	PASS
	64QAM		7.50	-6.16	-4.82	12.32	13	PASS
802.11n (20MHz)	BPSK	5700	11.56	-0.25	-0.25	11.81	13	PASS
	QPSK		10.71	-1.60	-1.17	11.88	13	PASS
	16QAM		11.28	-1.92	-1.14	12.42	13	PASS
	64QAM		10.98	-2.65	-1.29	12.27	13	PASS

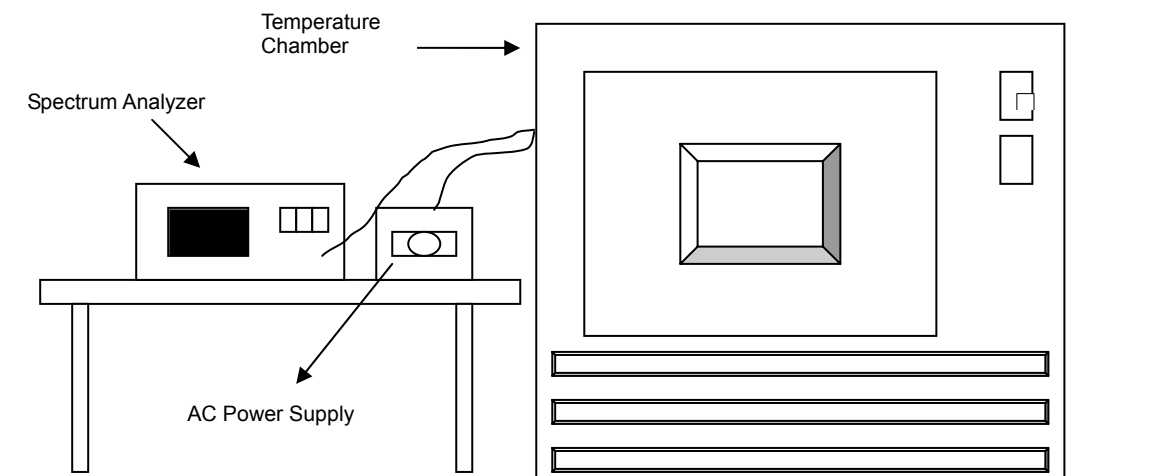


## 4.6 FREQUENCY STABILITY

### 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.

(We used WiFi antenna to test this item, please refer page 9 in the EUT photo.)

#### 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 (%)
50	120	5320.0002	0.00000	5319.9928	-0.00014	5319.9921	-0.00015	5319.9963	-0.00007
40	120	5320.0053	0.00010	5320.0058	0.00011	5320.0148	0.00028	5320.01	0.00019
30	120	5320.0165	0.00031	5320.0145	0.00027	5320.0164	0.00031	5320.0224	0.00042
20	120	5319.9755	-0.00046	5319.9763	-0.00045	5319.9746	-0.00048	5319.9753	-0.00046
10	120	5320.0128	0.00024	5320.0089	0.00017	5320.0115	0.00022	5320.0128	0.00024
0	120	5320.0101	0.00019	5320.0089	0.00017	5320.0144	0.00027	5320.0141	0.00027
-10	120	5319.9849	-0.00028	5319.9876	-0.00023	5319.9806	-0.00036	5319.9818	-0.00034
-20	120	5319.9744	-0.00048	5319.9787	-0.00040	5319.9807	-0.00036	5319.9815	-0.00035
-30	120	5319.9953	-0.00009	5320.0005	0.00001	5319.9991	-0.00002	5319.99	-0.00019

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	5319.9753	-0.00046	5319.9762	-0.00045	5319.9749	-0.00047	5319.9747	-0.00048
	120	5319.9755	-0.00046	5319.9763	-0.00045	5319.9746	-0.00048	5319.9753	-0.00046
	102	5319.975	-0.00047	5319.9757	-0.00046	5319.9741	-0.00049	5319.9757	-0.00046

## 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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**Web Site:** [www.bureauveritas-adt.com](http://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---**