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# FCC TEST REPORT (15.247)

**REPORT NO.:** RF120312C40

**MODEL NO.:** WLAN AP 8120-O

(Refer to item 3.1 for the more details)

**FCC ID:** U2M-AP8120-O

**RECEIVED:** Jan. 31, 2012

**TESTED:** Jan. 31 ~ Mar. 13, 2012

**ISSUED:** Mar. 15, 2012

**APPLICANT:** Senao Networks, Inc.

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

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**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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# TABLE OF CONTENTS

RELEASE CONTROL RECORD .....	5
1. CERTIFICATION .....	6
2. SUMMARY OF TEST RESULTS .....	7
2.1 MEASUREMENT UNCERTAINTY .....	7
3. GENERAL INFORMATION .....	8
3.1 GENERAL DESCRIPTION OF EUT .....	8
3.2 DESCRIPTION OF TEST MODES .....	10
3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL .....	11
3.3 DESCRIPTION OF SUPPORT UNITS .....	15
3.3.1 CONFIGURATION OF SYSTEM UNDER TEST .....	15
3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS .....	16
4. TEST TYPES AND RESULTS (FOR 2.4GHz BAND) .....	17
4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT .....	17
4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT .....	17
4.1.2 TEST INSTRUMENTS .....	18
4.1.3 TEST PROCEDURES .....	19
4.1.4 DEVIATION FROM TEST STANDARD .....	19
4.1.5 TEST SETUP .....	20
4.1.6 EUT OPERATING CONDITIONS .....	20
4.1.7 TEST RESULTS .....	21
4.2 CONDUCTED EMISSION MEASUREMENT .....	34
4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	34
4.2.2 TEST INSTRUMENTS .....	34
4.2.3 TEST PROCEDURES .....	35
4.2.4 DEVIATION FROM TEST STANDARD .....	35
4.2.5 TEST SETUP .....	35
4.2.6 EUT OPERATING CONDITIONS .....	35
4.2.7 TEST RESULTS .....	36
4.3 6dB BANDWIDTH MEASUREMENT .....	38
4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT .....	38
4.3.2 TEST SETUP .....	38
4.3.3 TEST INSTRUMENTS .....	38
4.3.4 TEST PROCEDURE .....	38
4.3.5 DEVIATION FROM TEST STANDARD .....	38
4.3.6 EUT OPERATING CONDITIONS .....	38
4.3.7 TEST RESULTS .....	39
4.4 CONDUCTED OUTPUT POWER .....	40
4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT .....	40
4.4.2 TEST SETUP .....	40
4.4.3 TEST INSTRUMENTS .....	40
4.4.4 TEST PROCEDURES .....	40
4.4.5 DEVIATION FROM TEST STANDARD .....	40
4.4.6 EUT OPERATING CONDITIONS .....	40
4.4.7 TEST RESULTS .....	41
4.5 POWER SPECTRAL DENSITY MEASUREMENT .....	42
4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT .....	42



4.5.2	TEST SETUP .....	42
4.5.3	TEST INSTRUMENTS .....	42
4.5.4	TEST PROCEDURE .....	42
4.5.5	DEVIATION FROM TEST STANDARD .....	42
4.5.6	EUT OPERATING CONDITION.....	42
4.5.7	TEST RESULTS .....	43
4.6	CONDUCTED OUT OF BAND EMISSION MEASUREMENT .....	45
4.6.1	LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT .....	45
4.6.2	TEST SETUP .....	45
4.6.3	TEST INSTRUMENTS .....	45
4.6.4	TEST PROCEDURE .....	45
4.6.5	DEVIATION FROM TEST STANDARD .....	46
4.6.6	EUT OPERATING CONDITION.....	46
4.6.7	TEST RESULTS .....	46
4.6.8	TEST RESULTS .....	47
5.	TEST TYPES AND RESULTS (FOR 5.0GHz BAND).....	51
5.1	RADIATED EMISSION MEASUREMENT .....	51
5.1.1	LIMITS OF RADIATED EMISSION MEASUREMENT .....	51
5.1.2	TEST INSTRUMENTS .....	52
5.1.3	TEST PROCEDURES .....	52
5.1.4	DEVIATION FROM TEST STANDARD .....	52
5.1.5	TEST SETUP .....	52
5.1.6	EUT OPERATING CONDITIONS .....	52
5.1.7	TEST RESULTS .....	53
5.2	CONDUCTED EMISSION MEASUREMENT .....	62
5.2.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	62
5.2.2	TEST INSTRUMENTS .....	62
5.2.3	TEST PROCEDURES .....	62
5.2.4	DEVIATION FROM TEST STANDARD .....	62
5.2.5	TEST SETUP .....	62
5.2.6	EUT OPERATING CONDITIONS .....	62
5.2.7	TEST RESULTS .....	63
5.3	6dB BANDWIDTH MEASUREMENT.....	65
5.3.1	LIMITS OF 6dB BANDWIDTH MEASUREMENT .....	65
5.3.2	TEST SETUP .....	65
5.3.3	TEST INSTRUMENTS .....	65
5.3.4	TEST PROCEDURE .....	65
5.3.5	DEVIATION FROM TEST STANDARD .....	65
5.3.6	EUT OPERATING CONDITIONS .....	65
5.3.7	TEST RESULTS .....	66
5.4	CONDUCTED OUTPUT POWER .....	67
5.4.1	LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT.....	67
5.4.2	TEST SETUP .....	67
5.4.3	INSTRUMENTS .....	67
5.4.4	TEST PROCEDURES .....	67
5.4.5	DEVIATION FROM TEST STANDARD .....	67
5.4.6	EUT OPERATING CONDITIONS .....	67
5.4.7	TEST RESULTS .....	68
5.5	POWER SPECTRAL DENSITY MEASUREMENT.....	69



**A D T**

5.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT .....	69
5.5.2	TEST SETUP .....	69
5.5.3	TEST INSTRUMENTS .....	69
5.5.4	TEST PROCEDURE .....	69
5.5.5	DEVIATION FROM TEST STANDARD .....	69
5.5.6	EUT OPERATING CONDITION .....	69
5.5.7	TEST RESULTS .....	70
5.6	CONDUCTED OUT OF BAND EMISSION MEASUREMENT .....	71
5.6.1	LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT .....	71
5.6.2	TEST SETUP .....	71
5.6.3	TEST INSTRUMENTS .....	71
5.6.4	TEST PROCEDURE .....	71
5.6.5	DEVIATION FROM TEST STANDARD .....	71
5.6.6	EUT OPERATING CONDITION .....	71
5.6.7	TEST RESULTS .....	71
6.	PHOTOGRAPHS OF THE TEST CONFIGURATION .....	75
7.	INFORMATION ON THE TESTING LABORATORIES .....	76
8.	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB .....	77



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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
RF120312C40	Original release	Mar. 15, 2012



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## 1. CERTIFICATION

**PRODUCT:** Wireless Access Point  
**MODEL NO.:** WLAN AP 8120-O (Refer to item 3.1 for the more details)  
**BRAND:** AVAYA (Refer to item 3.1 for the more details)  
**APPLICANT:** Senao Networks, Inc.  
**TESTED:** Jan. 31 ~ Mar. 13, 2012  
**TEST SAMPLE:** ENGINEERING SAMPLE  
**STANDARDS:** **FCC Part 15, Subpart C (Section 15.247)**  
ANSI C63.10-2009

The above equipment (model: WLAN AP 8120-O) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY :  , DATE : Mar. 15, 2012  
Pettie Chen / Specialist

APPROVED BY :  , DATE : Mar. 15, 2012  
Gary Chang / Technical Manager



## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247)			
STANDARD SECTION	TEST TYPE	RESULT	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -2.38dB at 14.08594 MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.0dB at 599.58, 2390.00MHz.
15.247(d)	Band Edge Measurement	PASS	Meet the requirement of limit.
15.247(a)(2)	6dB bandwidth	PASS	Meet the requirement of limit.
15.247(b)	Conducted power	PASS	Meet the requirement of limit.
15.247(e)	Power Spectral Density	PASS	Meet the requirement of limit.
15.203	Antenna Requirement	PASS	Antenna connector is N-Type. (The device is professionally installed.)

### 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>	Wireless Access Point
<b>MODEL NO.</b>	WLAN AP 8120-O (Refer to NOTE for the more details)
<b>POWER SUPPLY</b>	48Vdc (PoE)
<b>MODULATION TYPE</b>	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
<b>MODULATION TECHNOLOGY</b>	DSSS, OFDM
<b>TRANSFER RATE</b>	802.11b: 11.0/ 5.5/ 2.0/ 1.0Mbps 802.11g: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps 802.11n: up to 300.0Mbps
<b>OPERATING FREQUENCY</b>	<b>2.4GHz:</b> 2412 ~ 2462MHz <b>5.0GHz:</b> 5745 ~ 5825MHz
<b>NUMBER OF CHANNEL</b>	<b>2.4GHz:</b> 11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz) <b>5.0GHz:</b> 5 for 802.11a, 802.11n (20MHz) 2 for 802.11n (40MHz)
<b>OUTPUT POWER</b>	941.146mW for 2412 ~ 2462MHz 529.975mW for 5745 ~ 5825MHz
<b>ANTENNA TYPE</b>	2.4GHz: Dipole antenna with 5dBi gain 5.0GHz: Dipole antenna with 7dBi gain
<b>ANTENNA CONNECTOR</b>	N-Type (The device is professionally installed)
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	RJ45
<b>ACCESSORY DEVICES</b>	NA

**NOTE:**

1. The models as below are identical to each other, except for their model designation due to marketing requirement.

Brand	Model Name
AVAYA	WLAN AP 8120-O
Senao Networks	OAP4200AG





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2. The frequency bands used in this EUT are listed as follows:

Frequency Band (MHz)	2412~2462	5180~5240	5745~5825
802.11b	√		
802.11g	√		
802.11a		√	√
802.11n (20MHz)	√	√	√
802.11n (40MHz)	√	√	√

3. 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

4. The EUT was powered by the following POE:

**POE:**

BRAND	EnGenius
MODEL	EPE-48GR
OUTPUT	48V, 0.8A 38.4W Max

**Adapter for POE:**

BRAND	Powertron
MODEL	PA1040-480IB080
INPUT POWER	100-240Vac, 50-60Hz, 1.5A
OUTPUT POWER	48V, 0.8A 38.4W Max
POEWR LINE	1.5m non-shielded cable with one core

\*\*The POE & POE's adapter are for optional accessories only.

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

### 3.2 DESCRIPTION OF TEST MODES

#### FOR 2.4GHz:

11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz):

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2412MHz	7	2442MHz
2	2417MHz	8	2447MHz
3	2422MHz	9	2452MHz
4	2427MHz	10	2457MHz
5	2432MHz	11	2462MHz
6	2437MHz		

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
1	2422MHz	5	2442MHz
2	2427MHz	6	2447MHz
3	2432MHz	7	2452MHz
4	2437MHz		

#### FOR 5.0GHz (5745 ~ 5825MHz):

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
149	5745MHz	161	5805MHz
153	5765MHz	165	5825MHz
157	5785MHz		

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

CHANNEL	FREQUENCY	CHANNEL	FREQUENCY
151	5755MHz	159	5795MHz



### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

#### FOR 2.4GHz:

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE≥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 **Z-plane**.

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

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
-	802.11n (40MHz)	1 to 7	1, 4, 7	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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (20MHz)	1 to 11	6	OFDM	BPSK	7.2

#### POWER LINE CONDUCTED EMISSION TEST:

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (20MHz)	1 to 11	6	OFDM	BPSK	7.2



**BANDEDGE MEASUREMENT:**

- 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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 11	OFDM	BPSK	7.2
-	802.11n (40MHz)	1 to 7	1, 7	OFDM	BPSK	15.0

**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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	7.2
-	802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	15.0

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE $\geq$ 1G	25deg. C, 65%RH	120Vac, 60Hz	Aska Huang
RE $<$ 1G	25deg. C, 65%RH	120Vac, 60Hz	Haru Yang
PLC	22deg. C, 65%RH	120Vac, 60Hz	Daniel Lin
APCM	25deg. C, 68%RH	120Vac, 60Hz	Brad Wu



**FOR 5.0GHz (5745 ~ 5825MHz):**

EUT CONFIGURE MODE	APPLICABLE TO				DESCRIPTION
	RE≥1G	RE<1G	PLC	APCM	
-	√	√	√	√	-

Where **RE≥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 **Z-plane**.

**RADIATED EMISSION TEST (ABOVE 1GHz):**

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (40MHz)	151 to 159	151	OFDM	BPSK	15.0

**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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11n (40MHz)	151 to 159	151	OFDM	BPSK	15.0



**BANDEDGE MEASUREMENT:**

- 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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0

**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	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a	149 to 165	149, 157, 165	OFDM	BPSK	6.0
-	802.11n (20MHz)	149 to 165	149, 157, 165	OFDM	BPSK	7.2
-	802.11n (40MHz)	151 to 159	151, 159	OFDM	BPSK	15.0

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Aska Huang
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Haru Yang
PLC	22deg. C, 65%RH	120Vac, 60Hz	Daniel Lin
APCM	25deg. C, 68%RH	120Vac, 60Hz	Brad Wu

### 3.3 DESCRIPTION OF SUPPORT UNITS

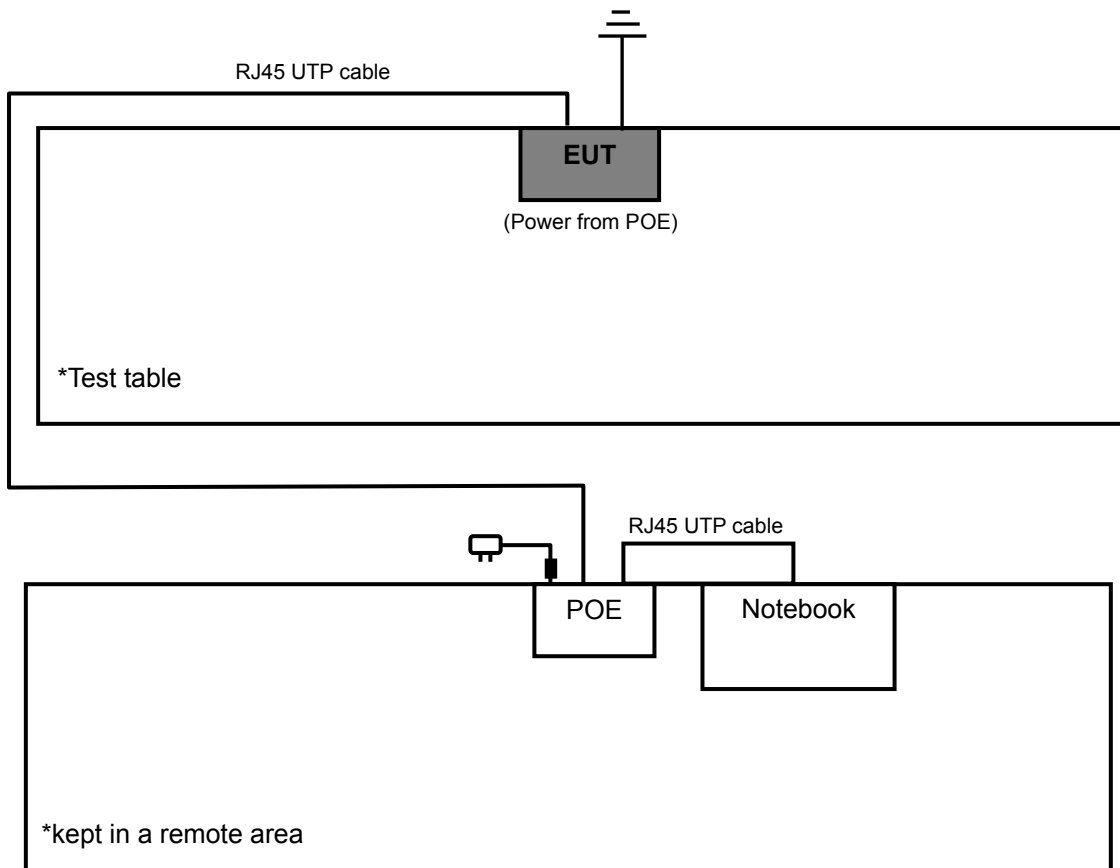
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK	DELL	E5420	33MKMQ1	FCC DoC Approved

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	1.8m RJ45 UTP cable

**NOTE:** 1. All power cords of the above support units are non shielded (1.8m).  
 2. Item 1 acts as a communication partner to transfer data.

#### 3.3.1 CONFIGURATION OF SYSTEM UNDER TEST





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### **3.4 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 C (15.247)**

ANSI C63.10-2009

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





## 4. TEST TYPES AND RESULTS (FOR 2.4GHz BAND)

### 4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

#### 4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

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

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 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.



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#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESIB7	100212	Aug. 02, 2011	Aug. 01, 2012
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100041	Jul. 21, 2011	Jul. 20, 2012
BILOG Antenna SCHWARZBECK	VULB9168	9168-160	Apr. 13, 2011	Apr. 12, 2012
HORN Antenna SCHWARZBECK	9120D	209	Aug. 25, 2011	Aug. 24, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	148	Jul. 20, 2011	Jul. 19, 2012
Preamplifier Agilent	8447D	2944A10633	Oct. 29, 2011	Oct. 28, 2012
Preamplifier Agilent	8449B	3008A01964	Oct. 29, 2011	Oct. 28, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250723/4	Aug. 30, 2011	Aug. 29, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 106	12738/6+309224/ 4	Aug. 30, 2011	Aug. 29, 2012
Software ADT.	ADT_Radiated_ V7.6.15.9.2	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 ADT.	TT100	TT93021703	NA	NA
Turn Table Controller ADT.	SC100	SC93021703	NA	NA
26GHz ~ 40GHz Amplifier	EM26400	815221	Oct. 29, 2011	Oct. 28, 2012
High Speed Peak Power Meter	ML2495A	0842014	Apr. 26, 2011	Apr. 25, 2012
Power Sensor	MA2411B	0738404	Apr. 26, 2011	Apr. 25, 2012

- 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.



#### 4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters 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 lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

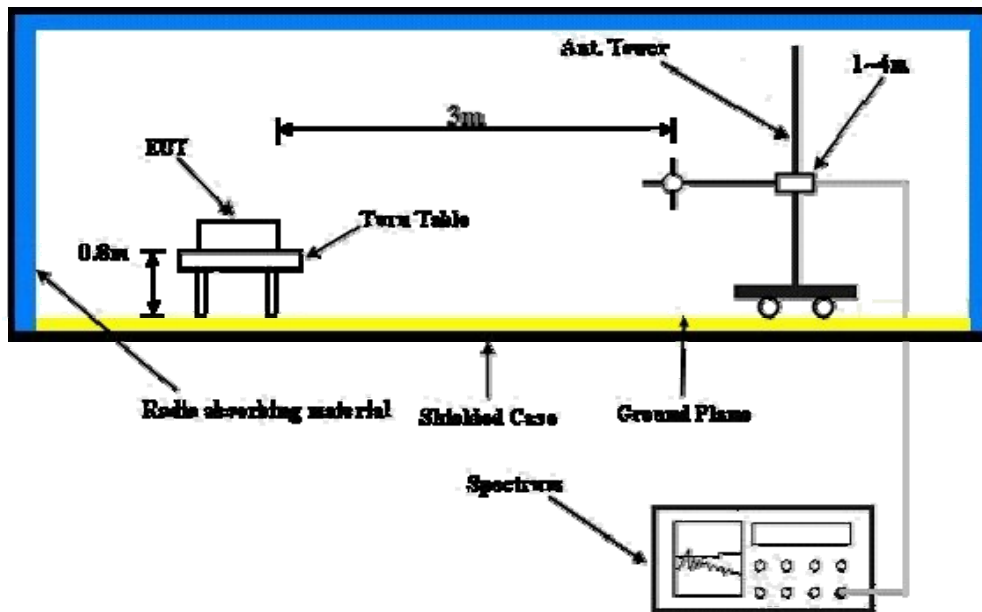
**NOTE:**

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 100kHz and video bandwidth is 300kHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 1kHz for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.1.5 TEST SETUP



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

#### 4.1.6 EUT OPERATING CONDITIONS

- Placed the EUT on the testing table.
- Prepared notebook system to act as communication partners and placed them outside of testing area.
- The communication partner connected with EUT via a RJ45 cable and run a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.



### 4.1.7 TEST RESULTS

#### 802.11b

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Aska Huang

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	2386.00	54.7 PK	74.0	-19.3	1.00 H	306	23.40	31.30
2	2386.00	44.0 AV	54.0	-10.0	1.00 H	306	12.70	31.30
3	*2412.00	98.9 PK			1.00 H	306	67.50	31.40
4	*2412.00	94.4 AV			1.00 H	306	63.00	31.40
5	4824.00	51.6 PK	74.0	-22.4	1.00 H	144	14.30	37.30
6	4824.00	48.7 AV	54.0	-5.3	1.00 H	144	11.40	37.30
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	2386.00	60.0 PK	74.0	-14.0	1.29 V	85	28.70	31.30
2	2386.00	52.9 AV	54.0	-1.1	1.29 V	85	21.60	31.30
3	*2412.00	113.5 PK			1.61 V	254	82.10	31.40
4	*2412.00	108.7 AV			1.61 V	254	77.30	31.40
5	4824.00	54.1 PK	74.0	-19.9	1.18 V	153	16.80	37.30
6	4824.00	51.4 AV	54.0	-2.6	1.18 V	153	14.10	37.30

- 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).
  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 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Aska Huang

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	*2437.00	99.3 PK			1.11 H	202	67.80	31.50
2	*2437.00	94.9 AV			1.11 H	202	63.40	31.50
3	4874.00	53.2 PK	74.0	-20.8	1.08 H	141	15.80	37.40
4	4874.00	50.3 AV	54.0	-3.7	1.08 H	141	12.90	37.40
5	7311.00	50.7 PK	74.0	-23.3	1.00 H	218	7.10	43.60
6	7311.00	37.9 AV	54.0	-16.1	1.00 H	218	-5.70	43.60
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	*2437.00	114.0 PK			1.41 V	6	82.50	31.50
2	*2437.00	109.5 AV			1.41 V	6	78.00	31.50
3	4874.00	55.7 PK	74.0	-18.3	1.47 V	160	18.30	37.40
4	4874.00	52.9 AV	54.0	-1.1	1.47 V	160	15.50	37.40
5	7311.00	50.0 PK	74.0	-24.0	1.00 V	126	6.40	43.60
6	7311.00	38.2 AV	54.0	-15.8	1.00 V	126	-5.40	43.60

- 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).
  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 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Aska Huang

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	*2462.00	95.1 PK			1.00 H	301	63.50	31.60
2	*2462.00	90.1 AV			1.00 H	301	58.50	31.60
3	2483.50	54.9 PK	74.0	-19.1	1.00 H	301	23.20	31.70
4	2483.50	41.7 AV	54.0	-12.3	1.00 H	301	10.00	31.70
5	4924.00	47.5 PK	74.0	-26.5	1.00 H	136	10.00	37.50
6	4924.00	44.5 AV	54.0	-9.5	1.00 H	136	7.00	37.50
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	*2462.00	111.4 PK			1.42 V	304	79.80	31.60
2	*2462.00	105.8 AV			1.42 V	304	74.20	31.60
3	2487.00	61.2 PK	74.0	-12.8	1.07 V	5	29.50	31.70
4	2487.00	52.9 AV	54.0	-1.1	1.07 V	5	21.20	31.70
5	4924.00	51.8 PK	74.0	-22.2	1.64 V	150	14.30	37.50
6	4924.00	48.9 AV	54.0	-5.1	1.64 V	150	11.40	37.50

- 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).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. “ \* “: Fundamental frequency.



802.11g

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Aska Huang

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	2390.00	55.2 PK	74.0	-18.8	1.00 H	305	23.80	31.40
2	2390.00	44.2 AV	54.0	-9.8	1.00 H	305	12.80	31.40
3	*2412.00	99.1 PK			1.00 H	305	67.70	31.40
4	*2412.00	86.8 AV			1.00 H	305	55.40	31.40
5	4824.00	46.4 PK	74.0	-27.6	1.00 H	145	9.10	37.30
6	4824.00	33.6 AV	54.0	-20.4	1.00 H	145	-3.70	37.30
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	2390.00	70.0 PK	74.0	-4.0	1.29 V	58	38.60	31.40
2	2390.00	52.9 AV	54.0	-1.1	1.29 V	58	21.50	31.40
3	*2412.00	113.4 PK			1.26 V	247	82.00	31.40
4	*2412.00	101.2 AV			1.26 V	247	69.80	31.40
5	4824.00	48.7 PK	74.0	-25.3	1.00 V	181	11.40	37.30
6	4824.00	36.4 AV	54.0	-17.6	1.00 V	181	-0.90	37.30

- 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).
  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 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Aska Huang

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	*2437.00	101.5 PK			1.13 H	205	70.00	31.50
2	*2437.00	89.8 AV			1.13 H	205	58.30	31.50
3	4874.00	46.4 PK	74.0	-27.6	1.00 H	150	9.00	37.40
4	4874.00	34.2 AV	54.0	-19.8	1.00 H	150	-3.20	37.40
5	7311.00	52.0 PK	74.0	-22.0	1.00 H	276	8.40	43.60
6	7311.00	38.5 AV	54.0	-15.5	1.00 H	276	-5.10	43.60
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	*2437.00	116.6 PK			1.32 V	147	85.10	31.50
2	*2437.00	104.4 AV			1.32 V	147	72.90	31.50
3	4874.00	51.0 PK	74.0	-23.0	1.00 V	160	13.60	37.40
4	4874.00	38.4 AV	54.0	-15.6	1.00 V	160	1.00	37.40
5	7311.00	51.0 PK	74.0	-23.0	1.00 V	123	7.40	43.60
6	7311.00	38.7 AV	54.0	-15.3	1.00 V	123	-4.90	43.60

- 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).
  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 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Aska Huang

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	*2462.00	99.7 PK			1.00 H	298	68.10	31.60
2	*2462.00	87.9 AV			1.00 H	298	56.30	31.60
3	2483.50	54.2 PK	74.0	-19.8	1.00 H	298	22.50	31.70
4	2483.50	41.6 AV	54.0	-12.4	1.00 H	298	9.90	31.70
5	4924.00	45.7 PK	74.0	-28.3	1.00 H	139	8.20	37.50
6	4924.00	33.2 AV	54.0	-20.8	1.00 H	139	-4.30	37.50
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	*2462.00	113.0 PK			1.32 V	16	81.40	31.60
2	*2462.00	100.1 AV			1.32 V	16	68.50	31.60
3	2483.50	71.3 PK	74.0	-2.7	1.05 V	327	39.60	31.70
4	2483.50	52.9 AV	54.0	-1.1	1.05 V	327	21.20	31.70
5	4924.00	47.6 PK	74.0	-26.4	1.00 V	156	10.10	37.50
6	4924.00	34.0 AV	54.0	-20.0	1.00 V	156	-3.50	37.50

- 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).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. “ \* “: Fundamental frequency.



802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Aska Huang

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	2390.00	54.9 PK	74.0	-19.1	1.00 H	298	23.50	31.40
2	2390.00	44.1 AV	54.0	-9.9	1.00 H	298	12.70	31.40
3	*2412.00	99.2 PK			1.00 H	298	67.80	31.40
4	*2412.00	88.1 AV			1.00 H	298	56.70	31.40
5	4824.00	47.3 PK	74.0	-26.7	1.00 H	148	10.00	37.30
6	4824.00	34.7 AV	54.0	-19.3	1.00 H	148	-2.60	37.30
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	2390.00	72.1 PK	74.0	-1.9	1.42 V	279	40.70	31.40
2	2390.00	53.0 AV	54.0	-1.0	1.42 V	279	21.60	31.40
3	*2412.00	113.0 PK			1.29 V	280	81.60	31.40
4	*2412.00	100.2 AV			1.29 V	280	68.80	31.40
5	4824.00	46.3 PK	74.0	-27.7	1.00 V	185	9.00	37.30
6	4824.00	34.5 AV	54.0	-19.5	1.00 V	185	-2.80	37.30

- 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).
  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 6	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Aska Huang

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	2390.00	55.1 PK	74.0	-18.9	1.08 H	198	23.70	31.40
2	2390.00	44.7 AV	54.0	-9.3	1.08 H	198	13.30	31.40
3	*2437.00	102.7 PK			1.08 H	198	71.20	31.50
4	*2437.00	91.3 AV			1.08 H	198	59.80	31.50
5	4874.00	50.6 PK	74.0	-23.4	1.00 H	143	13.20	37.40
6	4874.00	38.6 AV	54.0	-15.4	1.00 H	143	1.20	37.40
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	2390.00	57.7 PK	74.0	-16.3	1.00 V	137	26.30	31.40
2	2390.00	46.5 AV	54.0	-7.5	1.00 V	137	15.10	31.40
3	*2437.00	117.4 PK			1.00 V	137	85.90	31.50
4	*2437.00	104.9 AV			1.00 V	137	73.40	31.50
5	4874.00	56.0 PK	74.0	-18.0	1.37 V	162	18.60	37.40
6	4874.00	42.1 AV	54.0	-11.9	1.37 V	162	4.70	37.40

- 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).
  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 11	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Aska Huang

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	*2462.00	98.6 PK			1.00 H	279	67.00	31.60
2	*2462.00	87.0 AV			1.00 H	279	55.40	31.60
3	2483.50	67.7 PK	74.0	-6.3	1.00 H	279	36.00	31.70
4	2483.50	47.9 AV	54.0	-6.1	1.00 H	279	16.20	31.70
5	4924.00	45.5 PK	74.0	-28.5	1.00 H	139	8.00	37.50
6	4924.00	32.7 AV	54.0	-21.3	1.00 H	139	-4.80	37.50
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	*2462.00	111.7 PK			1.34 V	322	80.10	31.60
2	*2462.00	99.2 AV			1.34 V	322	67.60	31.60
3	2483.50	68.3 PK	74.0	-5.7	1.34 V	322	36.60	31.70
4	2483.50	52.9 AV	54.0	-1.1	1.34 V	322	21.20	31.70
5	4924.00	45.9 PK	74.0	-28.1	1.00 V	148	8.40	37.50
6	4924.00	33.2 AV	54.0	-20.8	1.00 V	148	-4.30	37.50

- 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).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. “ \* “: Fundamental frequency.



A D T

802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Aska Huang

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	2390.00	56.2 PK	74.0	-17.8	1.31 H	197	24.80	31.40
2	2390.00	45.0 AV	54.0	-9.0	1.31 H	197	13.60	31.40
3	*2422.00	93.5 PK			1.31 H	197	62.00	31.50
4	*2422.00	79.8 AV			1.31 H	197	48.30	31.50
5	4844.00	45.5 PK	74.0	-28.5	1.00 H	185	8.20	37.30
6	4844.00	32.9 AV	54.0	-21.1	1.00 H	185	-4.40	37.30
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	2390.00	70.5 PK	74.0	-3.5	1.41 V	350	39.10	31.40
2	2390.00	52.8 AV	54.0	-1.2	1.41 V	350	21.40	31.40
3	*2422.00	104.9 PK			1.00 V	135	73.40	31.50
4	*2422.00	92.1 AV			1.00 V	135	60.60	31.50
5	4844.00	45.3 PK	74.0	-28.7	1.00 V	156	8.00	37.30
6	4844.00	33.0 AV	54.0	-21.0	1.00 V	156	-4.30	37.30

- 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).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. “ \* “: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Aska Huang

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	2390.00	55.1 PK	74.0	-18.9	1.00 H	213	23.70	31.40
2	2390.00	43.3 AV	54.0	-10.7	1.00 H	213	11.90	31.40
3	*2437.00	96.1 PK			1.00 H	213	64.60	31.50
4	*2437.00	82.9 AV			1.00 H	213	51.40	31.50
5	4874.00	45.6 PK	74.0	-28.4	1.00 H	189	8.20	37.40
6	4874.00	33.8 AV	54.0	-20.2	1.00 H	189	-3.60	37.40
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	2390.00	69.6 PK	74.0	-4.4	1.36 V	55	38.20	31.40
2	2390.00	52.7 AV	54.0	-1.3	1.36 V	55	21.30	31.40
3	*2437.00	110.0 PK			1.38 V	78	78.50	31.50
4	*2437.00	97.1 AV			1.38 V	78	65.60	31.50
5	4874.00	46.8 PK	74.0	-27.2	1.00 V	158	9.40	37.40
6	4874.00	35.2 AV	54.0	-18.8	1.00 V	158	-2.20	37.40

- 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).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. “ \* “: Fundamental frequency.



A D T

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 7	FREQUENCY RANGE	1 ~ 25GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Aska Huang

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	*2452.00	94.8 PK			1.27 H	185	63.20	31.60
2	*2452.00	81.2 AV			1.27 H	185	49.60	31.60
3	2483.50	56.2 PK	74.0	-17.8	1.27 H	185	24.50	31.70
4	2483.50	45.5 AV	54.0	-8.5	1.27 H	185	13.80	31.70
5	4904.00	45.8 PK	74.0	-28.2	1.00 H	199	8.40	37.40
6	4904.00	32.7 AV	54.0	-21.3	1.00 H	199	-4.70	37.40
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	*2452.00	106.3 PK			1.33 V	322	74.70	31.60
2	*2452.00	93.5 AV			1.33 V	322	61.90	31.60
3	2483.50	68.7 PK	74.0	-5.3	1.33 V	322	37.00	31.70
4	2483.50	52.8 AV	54.0	-1.2	1.33 V	322	21.10	31.70
5	4904.00	45.4 PK	74.0	-28.6	1.00 V	144	8.00	37.40
6	4904.00	33.0 AV	54.0	-21.0	1.00 V	144	-4.40	37.40

- 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).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. “ \* “: Fundamental frequency.





A D T

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

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	94.06	36.9 QP	43.5	-6.6	2.00 H	94	28.10	8.80
2	103.78	40.0 QP	43.5	-3.5	1.75 H	40	30.10	9.90
3	601.52	41.1 QP	46.0	-4.9	1.75 H	280	18.90	22.20
4	624.85	40.5 QP	46.0	-5.5	1.50 H	46	18.10	22.40
5	667.63	44.2 QP	46.0	-1.8	2.00 H	37	21.40	22.80
6	875.67	38.8 QP	46.0	-7.2	1.75 H	343	12.20	26.60
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	31.80	38.6 QP	40.0	-1.4	1.02 V	8	26.00	12.60
2	70.73	34.1 QP	40.0	-5.9	1.00 V	106	21.90	12.20
3	177.67	32.4 QP	43.5	-11.1	1.00 V	232	19.50	12.90
4	249.60	40.3 QP	46.0	-5.7	1.25 V	319	27.20	13.10
5	599.58	39.4 QP	46.0	-6.6	1.25 V	163	17.20	22.20
6	667.63	40.1 QP	46.0	-5.9	1.25 V	268	17.30	22.80

- 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).
  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. 19, 2011	Nov. 18, 2012
RF signal cable Woken	5D-FB	Cable-HYCO2-01	Dec. 22, 2011	Dec. 21, 2012
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Dec. 30, 2011	Dec. 29, 2012
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Jul. 07, 2011	Jul. 06, 2012
V-LISN SCHWARZBECK	NNBL 8226-2	8226-142	Jun. 30, 2011	Jun. 29, 2012
LISN ROHDE & SCHWARZ	ENV216	100072	Jun. 10, 2011	Jun. 09, 2012
Software ADT	ADT_Cond_ V7.3.7	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 2.
3. The VCCI Site Registration No. is C-2047.

#### 4.2.3 TEST PROCEDURES

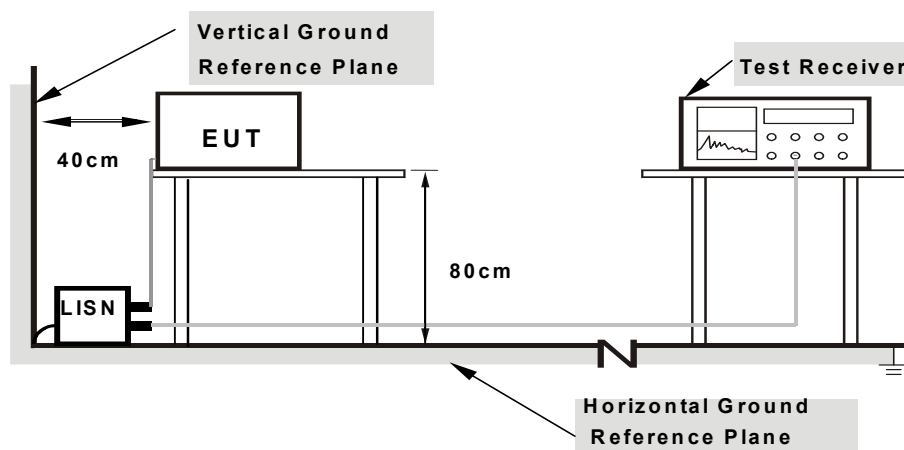
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

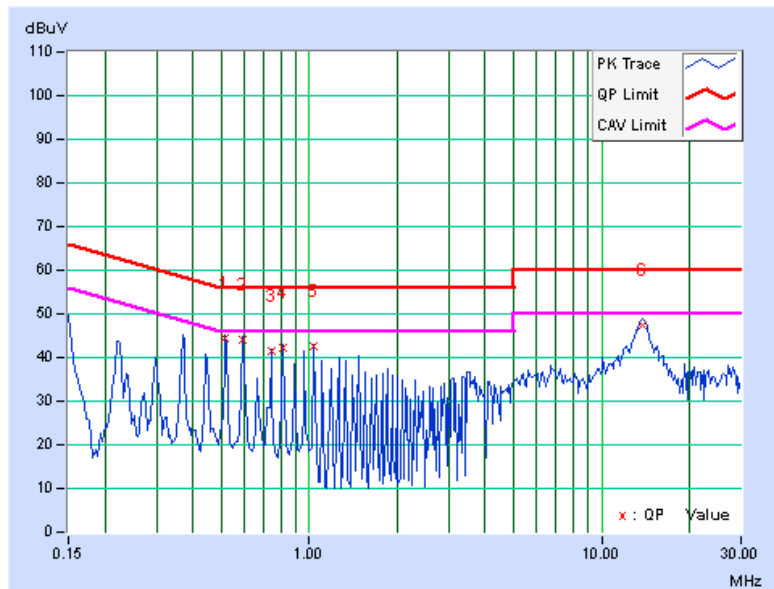
### 4.2.7 TEST RESULTS

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

<b>PHASE</b>	Line 1	<b>6dB BANDWIDTH</b>	9kHz
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.51719	0.21	44.26	39.66	44.47	39.87	56.00	46.00	-11.53	-6.13
2	0.59141	0.21	43.92	39.77	44.13	39.98	56.00	46.00	-11.87	-6.02
3	0.73984	0.22	41.24	36.42	41.46	36.64	56.00	46.00	-14.54	-9.36
4	0.81406	0.22	41.95	37.61	42.17	37.83	56.00	46.00	-13.83	-8.17
5	1.03516	0.23	42.29	37.10	42.52	37.33	56.00	46.00	-13.48	-8.67
6	13.77344	0.57	46.85	45.08	47.42	45.65	60.00	50.00	-12.58	-4.35

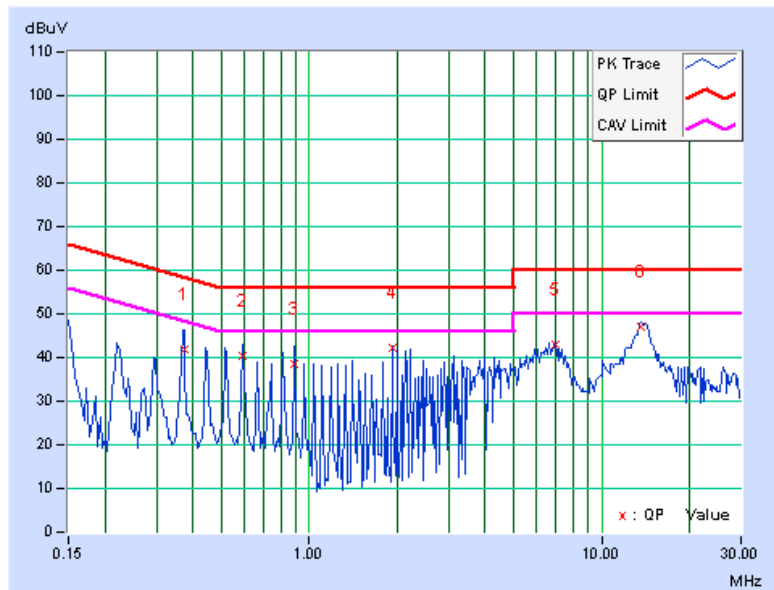
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = Emission level - Limit value
  5. Correction factor = Insertion loss + Cable loss
  6. 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	0.37266	0.16	41.75	40.09	41.91	40.25	58.44	48.44	-16.53	-8.19
2	0.59141	0.17	40.14	38.41	40.31	38.58	56.00	46.00	-15.69	-7.42
3	0.88828	0.18	38.35	34.77	38.53	34.95	56.00	46.00	-17.47	-11.05
4	1.92578	0.25	41.89	36.85	42.14	37.10	56.00	46.00	-13.86	-8.90
5	6.96094	0.41	42.37	40.34	42.78	40.75	60.00	50.00	-17.22	-9.25
6	13.62500	0.57	46.62	44.41	47.19	44.98	60.00	50.00	-12.81	-5.02

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

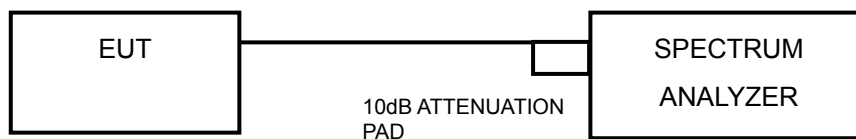


### 4.3 6dB BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 TEST SETUP



#### 4.3.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 TEST PROCEDURE

- a. Set resolution bandwidth (RBW) = approximately 1% of the emission bandwidth
- b. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
- c. Trace mode = max hold.
- d. Sweep = auto couple.
- e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

#### 4.3.5 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.3.6 EUT OPERATING CONDITIONS

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



### 4.3.7 TEST RESULTS

#### 802.11b

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	12.24	12.27	0.5	PASS
6	2437	12.21	12.27	0.5	PASS
11	2462	12.26	12.66	0.5	PASS

#### 802.11g

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	16.52	16.58	0.5	PASS
6	2437	16.62	16.61	0.5	PASS
11	2462	16.59	16.60	0.5	PASS

#### 802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2412	17.81	17.81	0.5	PASS
6	2437	17.81	17.85	0.5	PASS
11	2462	17.78	17.85	0.5	PASS

#### 802.11n (40MHz)

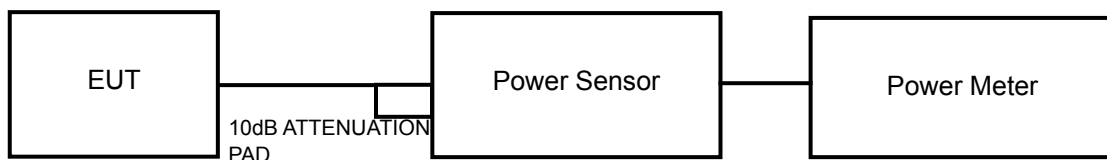
CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
1	2422	36.84	36.49	0.5	PASS
4	2437	36.79	36.94	0.5	PASS
7	2452	37.06	36.90	0.5	PASS

## 4.4 CONDUCTED OUTPUT POWER

### 4.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

### 4.4.2 TEST SETUP



### 4.4.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.4.4 TEST PROCEDURES

A peak power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak power sensor. Record the peak power level.

### 4.4.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6.





#### 4.4.7 TEST RESULTS

##### 802.11b

CHAN.	FREQUE NCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	19.09	19.23	164.849	22.17	28	PASS
6	2437	19.65	19.32	177.764	22.50	28	PASS
11	2462	17.92	17.62	119.754	20.78	28	PASS

**NOTE:** Directional gain = 5dBi + 10log(2) = 8dBi > 6dBi, so the conducted power limit shall be reduced to 30-(8-6) = 28dBm.

##### 802.11g

CHAN.	FREQUE NCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	23.61	24.07	484.885	26.86	28	PASS
6	2437	24.41	24.83	580.146	27.64	28	PASS
11	2462	23.41	22.85	412.033	26.15	28	PASS

**NOTE:** Directional gain = 5dBi + 10log(2) = 8dBi > 6dBi, so the conducted power limit shall be reduced to 30-(8-6) = 28dBm.

##### 802.11n (20MHz)

CHAN.	FREQUE NCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2412	23.31	23.47	436.620	26.40	30	PASS
6	2437	26.62	26.83	<b>941.146</b>	29.74	30	PASS
11	2462	21.93	22.49	333.374	25.23	30	PASS

##### 802.11n (40MHz)

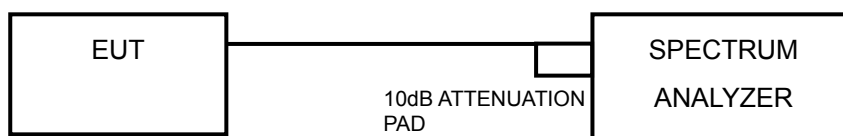
CHAN.	FREQUE NCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
1	2422	19.12	19.53	171.401	22.34	30	PASS
4	2437	23.92	23.51	470.992	26.73	30	PASS
7	2452	19.83	19.79	191.441	22.82	30	PASS

## 4.5 POWER SPECTRAL DENSITY MEASUREMENT

### 4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 4.5.2 TEST SETUP



### 4.5.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.5.4 TEST PROCEDURE

- Set the RBW = 100 kHz, VBW = 300 kHz, Detector = peak.
- Sweep time = auto couple, Trace mode = max hold, allow trace to fully stabilize.
- Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.
- Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where  $BWCF = 10\log(3 \text{ kHz}/100\text{kHz})$

### 4.5.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6



## 4.5.7 TEST RESULTS

### 802.11b

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	6.70	-8.53	3.01	-5.52	6	PASS
	6	2437	7.36	-7.87	3.01	-4.86	6	PASS
	11	2462	5.67	-9.56	3.01	-6.55	6	PASS
1	1	2412	6.10	-9.13	3.01	-6.12	6	PASS
	6	2437	6.30	-8.93	3.01	-5.92	6	PASS
	11	2462	4.48	-10.75	3.01	-7.74	6	PASS

**NOTE:** Directional gain =  $5\text{dBi} + 10\log(2) = 8\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $8-(8-6) = 6\text{dBm}$ .

### 802.11g

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	3.20	-12.03	3.01	-9.02	6	PASS
	6	2437	5.00	-10.23	3.01	-7.22	6	PASS
	11	2462	3.18	-12.05	3.01	-9.04	6	PASS
1	1	2412	3.89	-11.34	3.01	-8.33	6	PASS
	6	2437	5.75	-9.48	3.01	-6.47	6	PASS
	11	2462	2.87	-12.36	3.01	-9.35	6	PASS

**NOTE:** Directional gain =  $5\text{dBi} + 10\log(2) = 8\text{dBi} > 6\text{dBi}$ , so the power density limit shall be reduced to  $8-(8-6) = 6\text{dBm}$ .



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### 802.11n (20MHz)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2412	2.84	-12.39	3.01	-9.38	8	PASS
	6	2437	6.01	-9.22	3.01	-6.21	8	PASS
	11	2462	1.66	-13.57	3.01	-10.56	8	PASS
1	1	2412	3.98	-11.25	3.01	-8.24	8	PASS
	6	2437	7.28	-7.95	3.01	-4.94	8	PASS
	11	2462	3.12	-12.11	3.01	-9.10	8	PASS

### 802.11n (40MHz)

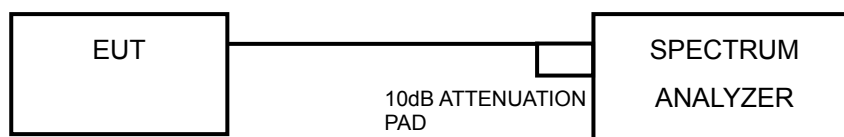
TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	1	2422	-4.29	-19.52	3.01	-16.51	8	PASS
	4	2437	0.47	-14.76	3.01	-11.75	8	PASS
	7	2452	-3.44	-18.67	3.01	-15.66	8	PASS
1	1	2422	-3.74	-18.97	3.01	-15.96	8	PASS
	4	2437	0.45	-14.78	3.01	-11.77	8	PASS
	7	2452	-3.28	-18.51	3.01	-15.50	8	PASS

## 4.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT

### 4.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT

Below  $-20\text{dB}$  of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 4.6.2 TEST SETUP



### 4.6.3 TEST INSTRUMENTS

Refer to section 4.1.2 to get information of above instrument.

### 4.6.4 TEST PROCEDURE

#### MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW  $\geq$  300 kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.



## MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW  $\geq$  300 kHz.
3. Set span to encompass the spectrum to be examined.
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.

### 4.6.5 DEVIATION FROM TEST STANDARD

No deviation.

### 4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

### 4.6.7 TEST RESULTS

The conducted emission test is performed on each TX port of operating mode without summing or adding  $10\log(N)$  since the limit is relative emission limit. Only worst data of each operating mode is presented.

The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

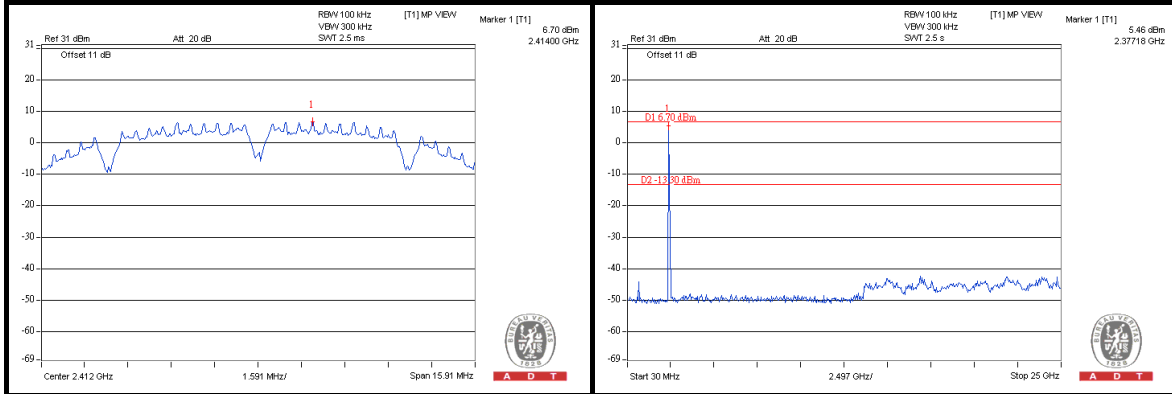


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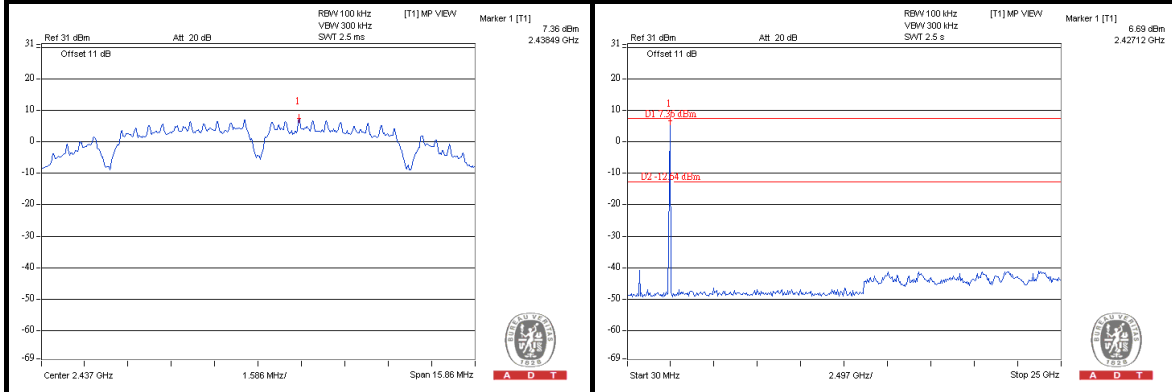
## 4.6.8 TEST RESULTS

### 802.11b

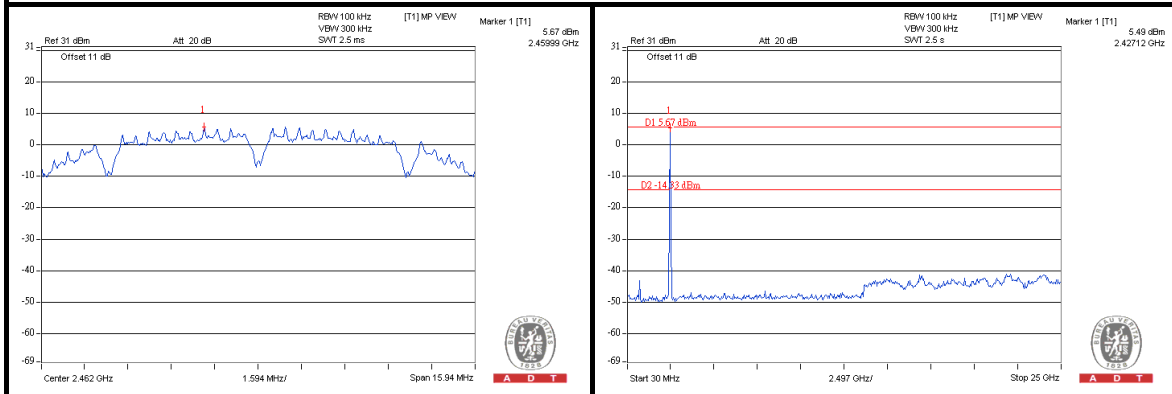
#### CH 1



#### CH 6

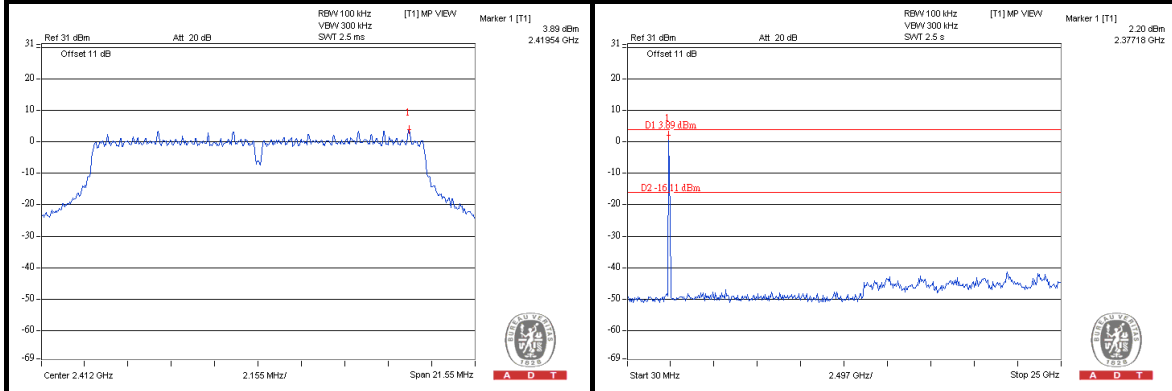


#### CH 11

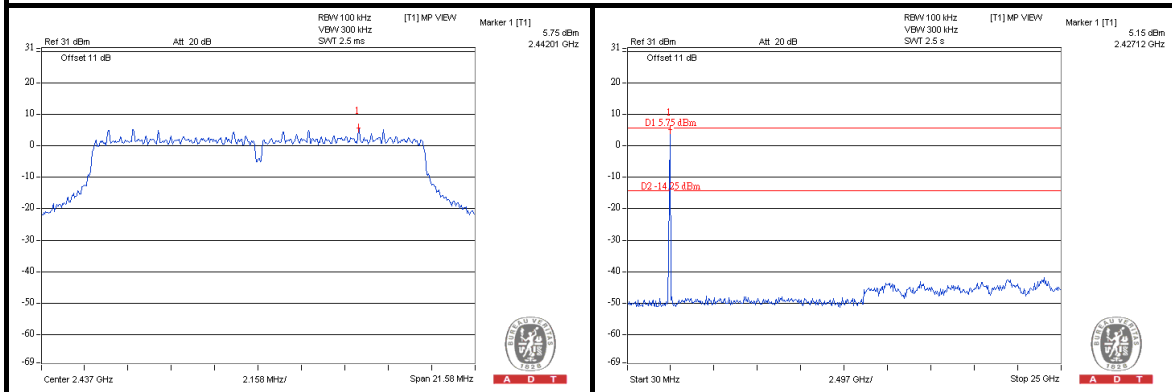


### 802.11g

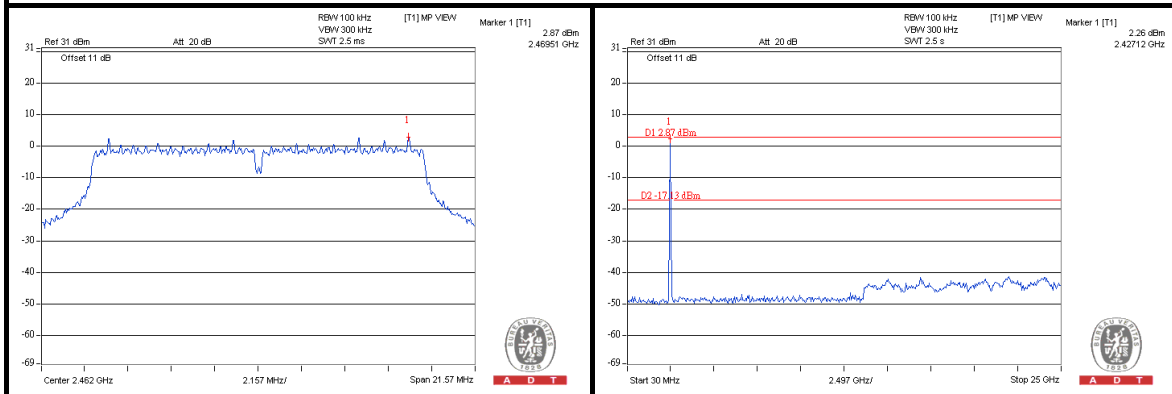
#### CH 1



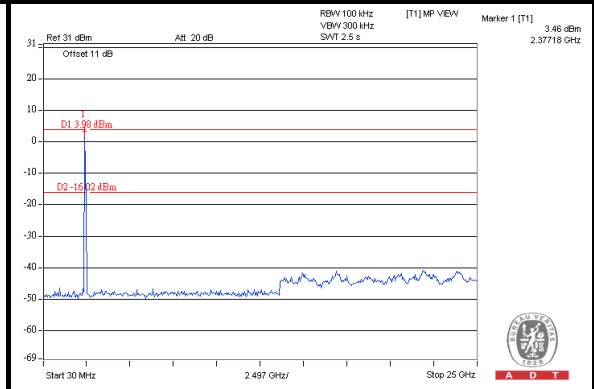
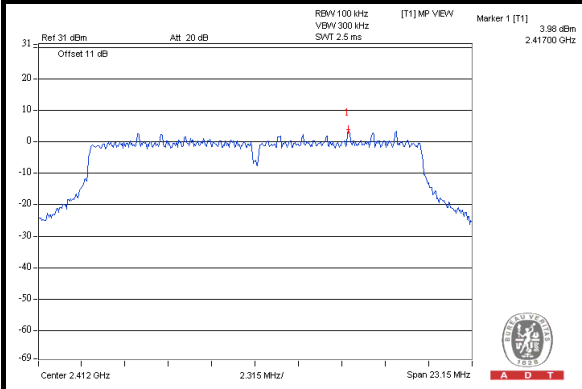
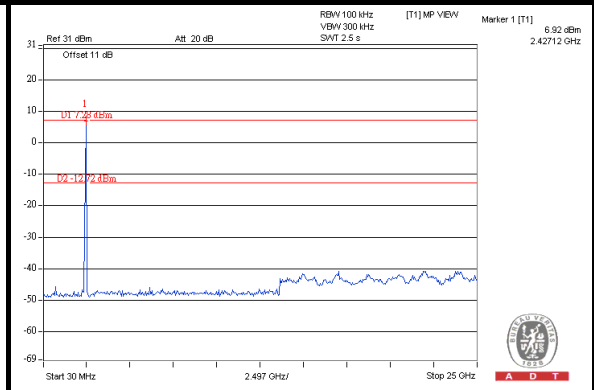
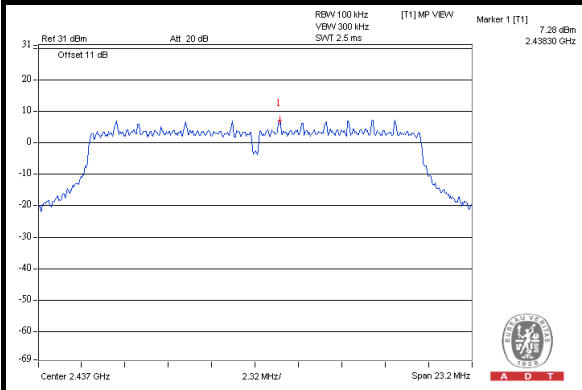
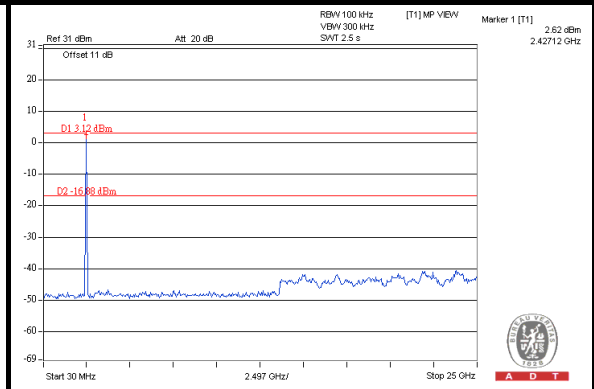
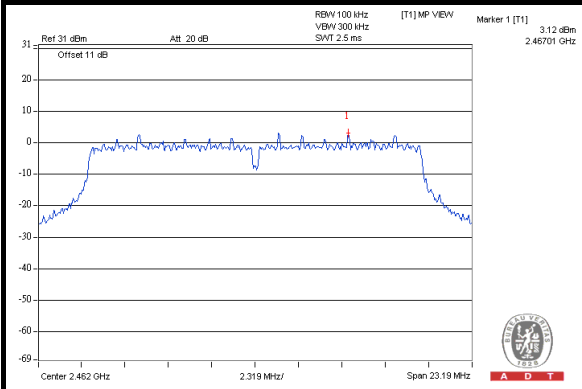
#### CH 6



#### CH 11





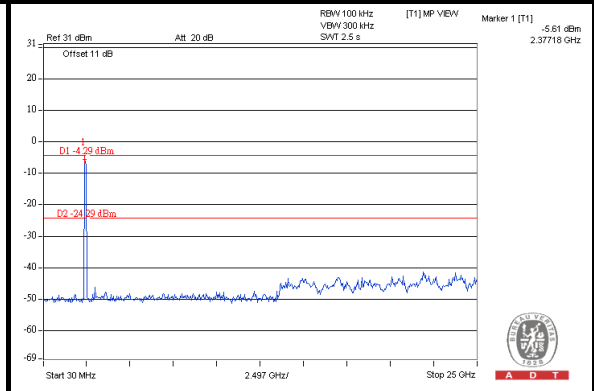
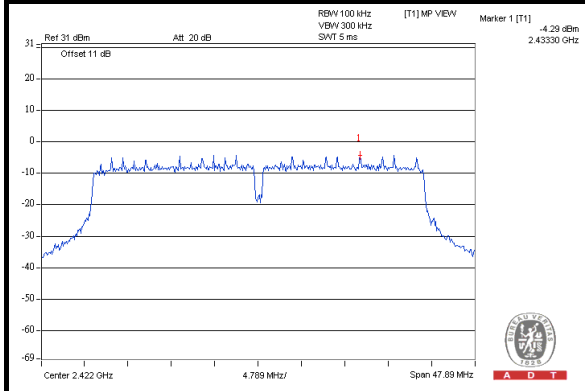
**802.11n (20MHz)****CH 1****CH 6****CH 11**



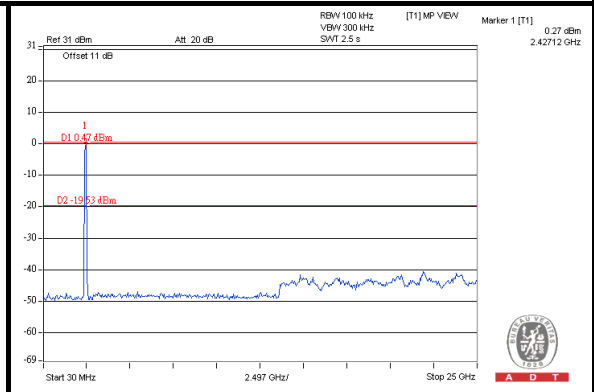
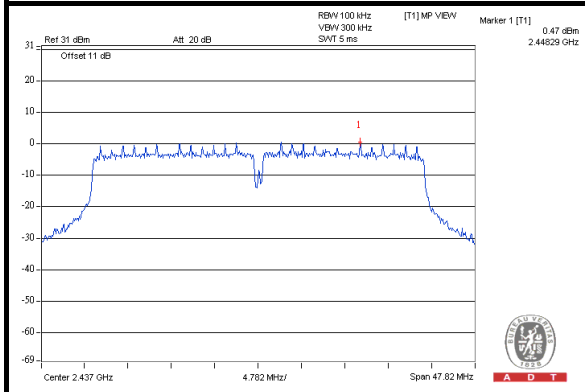
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### 802.11n (40MHz)

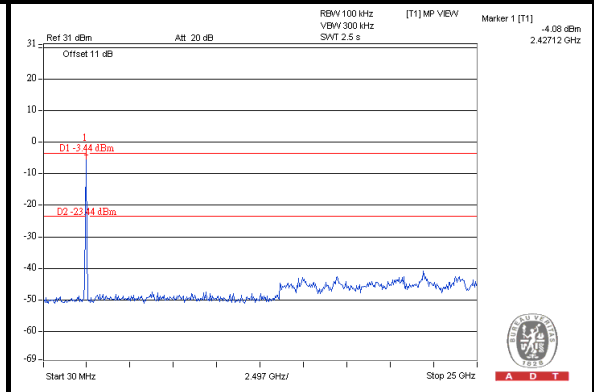
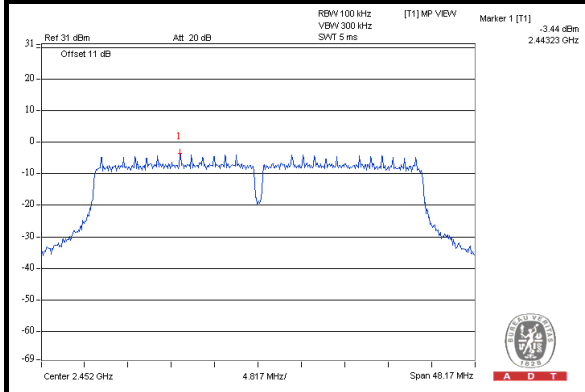
#### CH 1



#### CH 4



#### CH 7





## 5. TEST TYPES AND RESULTS (FOR 5.0GHz BAND)

### 5.1 RADIATED EMISSION MEASUREMENT

#### 5.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

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

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 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.



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#### 5.1.2 TEST INSTRUMENTS

Same as item 4.1.2.

#### 5.1.3 TEST PROCEDURES

Same as item 4.1.3.

#### 5.1.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 5.1.5 TEST SETUP

Same as item 4.1.5.

#### 5.1.6 EUT OPERATING CONDITIONS

Same as 4.1.6.



### 5.1.7 TEST RESULTS

#### 802.11a

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Aska Huang

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	#5725.00	51.8 PK	74.2	-22.4	1.12 H	123	13.00	38.80
2	#5725.00	38.3 AV	62.3	-24.0	1.12 H	123	-0.50	38.80
3	*5745.00	94.2 PK			1.12 H	123	55.40	38.80
4	*5745.00	82.3 AV			1.12 H	123	43.50	38.80
5	11490.00	59.9 PK	74.0	-14.1	1.00 H	99	9.80	50.10
6	11490.00	47.8 AV	54.0	-6.2	1.00 H	99	-2.30	50.10
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	#5725.00	71.5 PK	90.8	-19.3	1.63 V	116	32.70	38.80
2	#5725.00	54.7 AV	78.9	-24.2	1.63 V	116	15.90	38.80
3	*5745.00	110.8 PK			1.60 V	41	72.00	38.80
4	*5745.00	98.9 AV			1.60 V	41	60.10	38.80
5	11490.00	59.5 PK	74.0	-14.5	1.00 V	263	9.40	50.10
6	11490.00	47.6 AV	54.0	-6.4	1.00 V	263	-2.50	50.10

- 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).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. “ \* “: Fundamental frequency.
  6. The limit value is defined as per 15.247.
  7. "#":The radiated frequency is out the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Aska Huang

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	*5785.00	94.6 PK			1.00 H	131	55.70	38.90
2	*5785.00	82.4 AV			1.00 H	131	43.50	38.90
3	11570.00	59.4 PK	74.0	-14.6	1.00 H	312	9.40	50.00
4	11570.00	46.2 AV	54.0	-7.8	1.00 H	312	-3.80	50.00
5	#17355.00	65.0 PK	74.6	-9.6	1.00 H	121	11.80	53.20
6	#17355.00	51.6 AV	62.4	-10.8	1.00 H	121	-1.60	53.20
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	*5785.00	112.7 PK			1.73 V	220	73.80	38.90
2	*5785.00	100.9 AV			1.73 V	220	62.00	38.90
3	11570.00	58.7 PK	74.0	-15.3	1.00 V	236	8.70	50.00
4	11570.00	46.4 AV	54.0	-7.6	1.00 V	236	-3.60	50.00
5	#17355.00	64.2 PK	92.7	-28.5	1.00 V	58	11.00	53.20
6	#17355.00	51.7 AV	80.9	-29.2	1.00 V	58	-1.50	53.20

- 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).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. “ \* “: Fundamental frequency.
  6. The limit value is defined as per 15.247.
  7. “#”:The radiated frequency is out the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Aska Huang

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	*5825.00	95.0 PK			1.00 H	132	56.00	39.00
2	*5825.00	83.6 AV			1.00 H	132	44.60	39.00
3	#5850.00	47.6 PK	75.0	-27.4	1.00 H	132	8.60	39.00
4	#5850.00	34.8 AV	63.6	-28.8	1.00 H	132	-4.20	39.00
5	11650.00	58.7 PK	74.0	-15.3	1.00 H	136	8.70	50.00
6	11650.00	45.9 AV	54.0	-8.1	1.00 H	136	-4.10	50.00
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	*5825.00	112.3 PK			1.72 V	216	73.30	39.00
2	*5825.00	100.3 AV			1.72 V	216	61.30	39.00
3	#5850.00	63.1 PK	92.3	-29.2	1.65 V	212	24.10	39.00
4	#5850.00	51.3 AV	80.3	-29.0	1.65 V	212	12.30	39.00
5	11650.00	58.4 PK	74.0	-15.6	1.00 V	256	8.40	50.00
6	11650.00	45.9 AV	54.0	-8.1	1.00 V	256	-4.10	50.00

- 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).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. “ \* “: Fundamental frequency.
  6. The limit value is defined as per 15.247.
  7. "#":The radiated frequency is out the restricted band.



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802.11n (20MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 149	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Aska Huang

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	#5725.00	58.6 PK	75.7	-17.1	1.15 H	124	19.80	38.80
2	#5725.00	44.3 AV	64.3	-20.0	1.15 H	124	5.50	38.80
3	*5745.00	95.7 PK			1.15 H	124	56.90	38.80
4	*5745.00	84.3 AV			1.15 H	124	45.50	38.80
5	11490.00	58.7 PK	74.0	-15.3	1.00 H	183	8.60	50.10
6	11490.00	47.0 AV	54.0	-7.0	1.00 H	183	-3.10	50.10
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	#5725.00	77.8 PK	90.6	-12.8	1.74 V	113	39.00	38.80
2	#5725.00	62.8 AV	78.7	-15.9	1.74 V	113	24.00	38.80
3	*5745.00	110.6 PK			1.65 V	91	71.80	38.80
4	*5745.00	98.7 AV			1.65 V	91	59.90	38.80
5	11490.00	59.5 PK	74.0	-14.5	1.00 V	55	9.40	50.10
6	11490.00	47.3 AV	54.0	-6.7	1.00 V	55	-2.80	50.10

- 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).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. “ \* “: Fundamental frequency.
  6. The limit value is defined as per 15.247.
  7. "#":The radiated frequency is out the restricted band.





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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 157	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Aska Huang

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	*5785.00	95.2 PK			1.00 H	132	56.30	38.90
2	*5785.00	83.3 AV			1.00 H	132	44.40	38.90
3	11570.00	59.2 PK	74.0	-14.8	1.00 H	169	9.20	50.00
4	11570.00	45.8 AV	54.0	-8.2	1.00 H	169	-4.20	50.00
5	#17355.00	64.2 PK	75.2	-11.0	1.00 H	136	11.00	53.20
6	#17355.00	51.2 AV	63.3	-12.1	1.00 H	136	-2.00	53.20
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	*5785.00	112.0 PK			1.84 V	42	73.10	38.90
2	*5785.00	100.2 AV			1.84 V	42	61.30	38.90
3	11570.00	58.6 PK	74.0	-15.4	1.00 V	138	8.60	50.00
4	11570.00	46.6 AV	54.0	-7.4	1.00 V	138	-3.40	50.00
5	#17355.00	64.7 PK	92.0	-27.3	1.00 V	56	11.50	53.20
6	#17355.00	51.2 AV	80.2	-29.0	1.00 V	56	-2.00	53.20

- 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).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. “ \* “: Fundamental frequency.
  6. The limit value is defined as per 15.247.
  7. “#”:The radiated frequency is out the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 165	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Aska Huang

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	*5825.00	94.9 PK			1.00 H	132	55.90	39.00
2	*5825.00	82.9 AV			1.00 H	132	43.90	39.00
3	#5850.00	47.1 PK	74.9	-27.8	1.00 H	132	8.10	39.00
4	#5850.00	36.1 AV	62.9	-26.8	1.00 H	132	-2.90	39.00
5	11650.00	58.7 PK	74.0	-15.3	1.00 H	126	8.70	50.00
6	11650.00	45.6 AV	54.0	-8.4	1.00 H	126	-4.40	50.00
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	*5825.00	112.4 PK			1.86 V	219	73.40	39.00
2	*5825.00	100.3 AV			1.86 V	219	61.30	39.00
3	#5850.00	66.1 PK	92.4	-26.3	1.58 V	224	27.10	39.00
4	#5850.00	52.8 AV	80.3	-27.5	1.58 V	224	13.80	39.00
5	11650.00	58.6 PK	74.0	-15.4	1.00 V	83	8.60	50.00
6	11650.00	46.0 AV	54.0	-8.0	1.00 V	83	-4.00	50.00

- 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).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. “ \* “: Fundamental frequency.
  6. The limit value is defined as per 15.247.
  7. “#”:The radiated frequency is out the restricted band.



802.11n (40MHz)

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 151	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Aska Huang

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	#5725.00	61.4 PK	74.7	-13.3	1.00 H	126	22.60	38.80
2	#5725.00	47.0 AV	61.9	-14.9	1.00 H	126	8.20	38.80
3	*5755.00	94.7 PK			1.00 H	126	55.80	38.90
4	*5755.00	81.9 AV			1.00 H	126	43.00	38.90
5	11510.00	58.5 PK	74.0	-15.5	1.00 H	128	8.40	50.10
6	11510.00	46.4 AV	54.0	-7.6	1.00 H	128	-3.70	50.10
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	#5725.00	80.8 PK	90.7	-9.9	1.72 V	40	42.00	38.80
2	#5725.00	66.5 AV	77.4	-10.9	1.72 V	40	27.70	38.80
3	*5755.00	110.7 PK			1.84 V	46	71.80	38.90
4	*5755.00	97.4 AV			1.84 V	46	58.50	38.90
5	11510.00	58.7 PK	74.0	-15.3	1.00 V	55	8.60	50.10
6	11510.00	46.2 AV	54.0	-7.8	1.00 V	55	-3.90	50.10

- 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).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. “ \* “: Fundamental frequency.
  6. The limit value is defined as per 15.247.
  7. "#":The radiated frequency is out the restricted band.



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EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 159	FREQUENCY RANGE	1 ~ 40GHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Peak (PK) Average (AV)
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Aska Huang

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	*5795.00	94.1 PK			1.00 H	123	55.20	38.90
2	*5795.00	80.1 AV			1.00 H	123	41.20	38.90
3	#5850.00	46.2 PK	74.1	-27.9	1.00 H	123	7.20	39.00
4	#5850.00	35.2 AV	60.1	-24.9	1.00 H	123	-3.80	39.00
5	11590.00	58.8 PK	74.0	-15.2	1.00 H	236	8.80	50.00
6	11590.00	46.5 AV	54.0	-7.5	1.00 H	236	-3.50	50.00
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	*5795.00	110.8 PK			1.68 V	220	71.90	38.90
2	*5795.00	97.8 AV			1.68 V	220	58.90	38.90
3	#5850.00	62.8 PK	90.8	-28.0	1.89 V	222	23.80	39.00
4	#5850.00	50.6 AV	77.8	-27.2	1.89 V	222	11.60	39.00
5	11590.00	59.3 PK	74.0	-14.7	1.00 V	156	9.30	50.00
6	11590.00	46.1 AV	54.0	-7.9	1.00 V	156	-3.90	50.00

- 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).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. “ \* “: Fundamental frequency.
  6. The limit value is defined as per 15.247.
  7. "#":The radiated frequency is out the restricted band.



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**BELOW 1GHz WORST-CASE DATA : 802.11n(40MHz)**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 151	FREQUENCY RANGE	Below 1000MHz
INPUT POWER (SYSTEM)	120Vac, 60 Hz	DETECTOR FUNCTION	Quasi-Peak
ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH	TESTED BY	Haru Yang

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	94.06	40.2 QP	43.5	-3.3	1.75 H	262	31.40	8.80
2	286.55	32.0 QP	46.0	-14.0	1.25 H	88	17.50	14.50
3	533.47	34.3 QP	46.0	-11.7	1.25 H	184	13.60	20.70
4	<b>599.58</b>	<b>45.0 QP</b>	<b>46.0</b>	<b>-1.0</b>	<b>1.25 H</b>	<b>130</b>	<b>22.80</b>	<b>22.20</b>
5	624.85	42.1 QP	46.0	-3.9	1.25 H	118	19.70	22.40
6	667.63	41.8 QP	46.0	-4.2	1.00 H	214	19.00	22.80
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	31.26	38.6 QP	40.0	-1.4	1.25 V	306	26.10	12.50
2	101.84	33.5 QP	43.5	-10.0	1.00 V	244	23.80	9.70
3	333.21	33.5 QP	46.0	-12.5	1.50 V	10	17.60	15.90
4	599.58	40.4 QP	46.0	-5.6	1.25 V	10	18.20	22.20
5	624.85	40.3 QP	46.0	-5.7	1.00 V	205	17.90	22.40
6	665.68	42.6 QP	46.0	-3.4	1.25 V	10	19.90	22.70

- 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).
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.



## 5.2 CONDUCTED EMISSION MEASUREMENT

### 5.2.1 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.

### 5.2.2 TEST INSTRUMENTS

Same as item 4.2.2.

### 5.2.3 TEST PROCEDURES

Same as item 4.2.3.

### 5.2.4 DEVIATION FROM TEST STANDARD

No deviation.

### 5.2.5 TEST SETUP

Same as item 4.2.5.

### 5.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

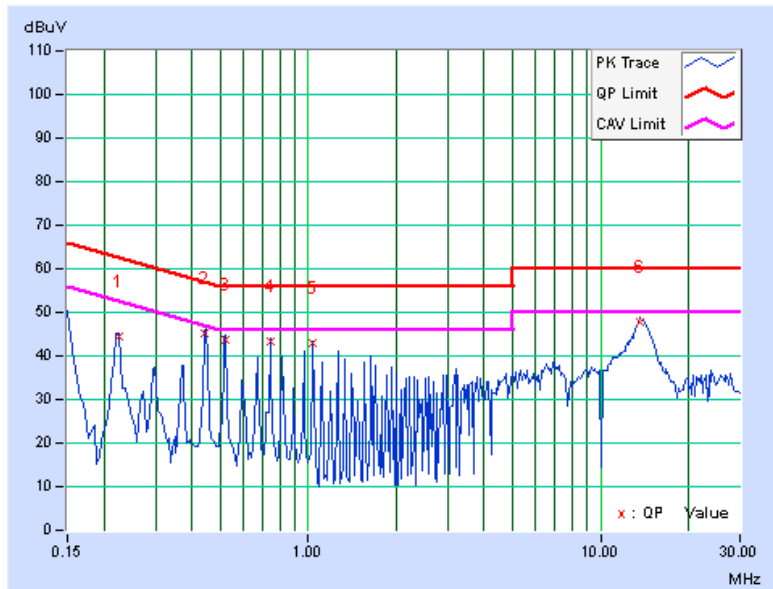
### 5.2.7 TEST RESULTS

**CONDUCTED WORST-CASE DATA : 802.11n(40MHz)**

<b>PHASE</b>	Line 1	<b>6dB BANDWIDTH</b>	9kHz
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.15	50.11	41.70	50.26	41.85	66.00	56.00	-15.74	-14.15
2	0.59141	0.18	44.49	40.76	44.67	40.94	56.00	46.00	-11.33	-5.06
3	0.73984	0.18	41.82	35.67	42.00	35.85	56.00	46.00	-14.00	-10.15
4	0.81406	0.18	43.02	38.82	43.20	39.00	56.00	46.00	-12.80	-7.00
5	0.96250	0.19	40.19	33.57	40.38	33.76	56.00	46.00	-15.62	-12.24
6	14.08594	0.51	48.23	47.11	48.74	47.62	60.00	50.00	-11.26	-2.38

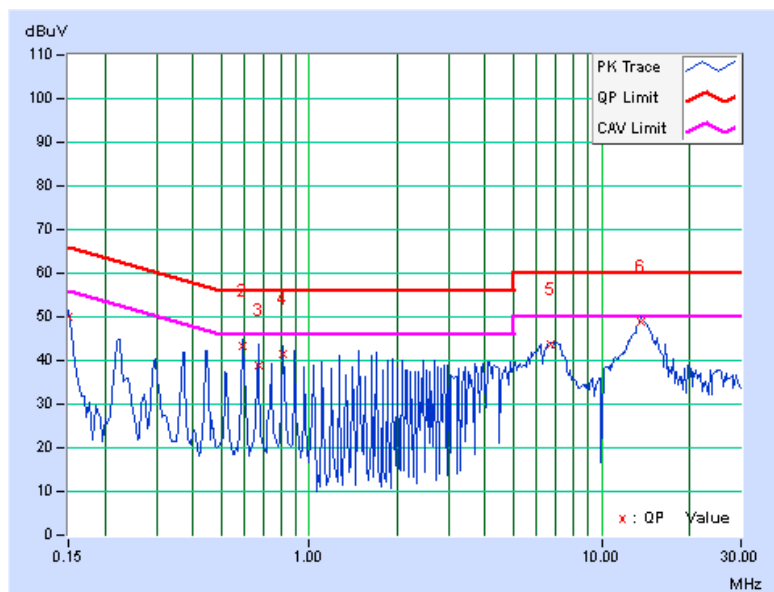
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



PHASE	Line 2	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.15000	0.13	49.70	43.22	49.83	43.35	66.00	56.00	-16.17	-12.65
2	0.59396	0.17	43.25	40.24	43.42	40.41	56.00	46.00	-12.58	-5.59
3	0.66805	0.17	38.88	33.45	39.05	33.62	56.00	46.00	-16.95	-12.38
4	0.81406	0.18	41.20	38.38	41.38	38.56	56.00	46.00	-14.62	-7.44
5	6.67188	0.41	43.29	42.34	43.70	42.75	60.00	50.00	-16.30	-7.25
6	13.71875	0.57	48.16	46.96	48.73	47.53	60.00	50.00	-11.27	-2.47

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







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### **5.3 6dB BANDWIDTH MEASUREMENT**

#### **5.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT**

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

#### **5.3.2 TEST SETUP**

Same as item 4.3.2.

#### **5.3.3 TEST INSTRUMENTS**

Refer to section 4.1.2 to get information of above instrument.

#### **5.3.4 TEST PROCEDURE**

Same as item 4.3.4.

#### **5.3.5 DEVIATION FROM TEST STANDARD**

No deviation.

#### **5.3.6 EUT OPERATING CONDITIONS**

Same as item 4.3.6.



### 5.3.7 TEST RESULTS

#### 802.11a

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	16.66	16.61	0.5	PASS
157	5785	16.69	16.58	0.5	PASS
165	5825	16.67	16.63	0.5	PASS

#### 802.11n (20MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
149	5745	17.84	17.90	0.5	PASS
157	5785	17.82	17.86	0.5	PASS
165	5825	17.86	17.89	0.5	PASS

#### 802.11n (40MHz)

CHANNEL	FREQUENCY (MHz)	6dB BANDWIDTH (MHz)		MINIMUM LIMIT (MHz)	PASS / FAIL
		CHAIN 0	CHAIN 1		
151	5755	37.08	36.66	0.5	PASS
159	5795	36.94	36.66	0.5	PASS



## **5.4 CONDUCTED OUTPUT POWER**

### **5.4.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT**

For systems using digital modulation in the 5725 –5850 MHz bands: 1 Watt (30dBm)

### **5.4.2 TEST SETUP**

Same as Item 4.4.2.

### **5.4.3 INSTRUMENTS**

Refer to section 4.1.2 to get information of above instrument.

### **5.4.4 TEST PROCEDURES**

Same as Item 4.4.4.

### **5.4.5 DEVIATION FROM TEST STANDARD**

No deviation.

### **5.4.6 EUT OPERATING CONDITIONS**

Same as Item 4.3.6.



## 5.4.7 TEST RESULTS

## 802.11a

CHAN.	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
149	5745	20.83	20.71	238.820	23.78	26	PASS
157	5785	22.29	22.97	367.586	25.65	26	PASS
165	5825	22.06	23.19	369.143	25.67	26	PASS

**NOTE:** Directional gain = 7dBi + 10log(2) = 10dBi > 6dBi, so the conducted power limit shall be reduced to 30-(10-6) = 26dBm.

## 802.11n (20MHz)

CHAN.	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
149	5745	23.55	23.70	460.887	26.64	29	PASS
157	5785	23.17	22.97	405.644	26.08	29	PASS
165	5825	22.82	23.36	408.196	26.11	29	PASS

**NOTE:** Gain = 7dBi > 6dBi, so the conducted power limit shall be reduced to 30-(7-6) = 29dBm.

## 802.11n (40MHz)

CHAN.	FREQUENCY (MHz)	PEAK POWER (dBm)		TOTAL POWER (mW)	TOTAL POWER (dBm)	LIMIT (dBm)	PASS / FAIL
		CHAIN 0	CHAIN 1				
151	5755	24.09	24.37	<b>529.975</b>	27.24	29	PASS
159	5795	23.59	23.98	478.594	26.80	29	PASS

**NOTE:** Gain = 7dBi > 6dBi, so the conducted power limit shall be reduced to 30-(7-6) = 29dBm.



## **5.5 POWER SPECTRAL DENSITY MEASUREMENT**

### **5.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT**

The Maximum of Power Spectral Density Measurement is 8dBm.

### **5.5.2 TEST SETUP**

Same as item 4.5.2.

### **5.5.3 TEST INSTRUMENTS**

Refer to section 4.1.2 to get information of above instrument.

### **5.5.4 TEST PROCEDURE.**

Same as item 4.5.4.

### **5.5.5 DEVIATION FROM TEST STANDARD**

No deviation.

### **5.5.6 EUT OPERATING CONDITION**

Same as item 4.3.6.



## 5.5.7 TEST RESULTS

### 802.11a

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	1.66	-13.57	3.01	-10.56	4	PASS
	157	5785	3.80	-11.43	3.01	-8.42	4	PASS
	165	5825	3.47	-11.76	3.01	-8.75	4	PASS
1	149	5745	0.48	-14.75	3.01	-11.74	4	PASS
	157	5785	3.54	-11.69	3.01	-8.68	4	PASS
	165	5825	3.58	-11.65	3.01	-8.64	4	PASS

**NOTE:** Directional gain = 7dBi + 10log(2) = 10dBi > 6dBi, so the power density limit shall be reduced to 8-(10-6) = 4dBm.

### 802.11n (20MHz)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	149	5745	4.54	-10.69	3.01	-7.68	7	PASS
	157	5785	4.10	-11.13	3.01	-8.12	7	PASS
	165	5825	3.56	-11.67	3.01	-8.66	7	PASS
1	149	5745	3.62	-11.61	3.01	-8.60	7	PASS
	157	5785	3.01	-12.22	3.01	-9.21	7	PASS
	165	5825	3.45	-11.78	3.01	-8.77	7	PASS

**NOTE:** Gain = 7dBi > 6dBi, so the power density limit shall be reduced to 8-(7-6) = 7dBm.

### 802.11n (40MHz)

TX chain	Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	10 log (N=2) dB	Total PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
0	151	5755	1.65	-13.58	3.01	-10.57	7	PASS
	159	5795	1.03	-14.20	3.01	-11.19	7	PASS
1	151	5755	1.83	-13.40	3.01	-10.39	7	PASS
	159	5795	1.37	-13.86	3.01	-10.85	7	PASS

**NOTE:** Gain = 7dBi > 6dBi, so the power density limit shall be reduced to 8-(7-6) = 7dBm.



## **5.6 CONDUCTED OUT OF BAND EMISSION MEASUREMENT**

### **5.6.1 LIMITS OF CONDUCTED OUT OF BAND EMISSION MEASUREMENT**

Below  $-20\text{dB}$  of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### **5.6.2 TEST SETUP**

Same as Item 4.6.2

### **5.6.3 TEST INSTRUMENTS**

Refer to section 4.1.2 to get information of above instrument.

### **5.6.4 TEST PROCEDURE**

Same as Item 4.6.4

### **5.6.5 DEVIATION FROM TEST STANDARD**

No deviation.

### **5.6.6 EUT OPERATING CONDITION**

Same as Item 4.3.6

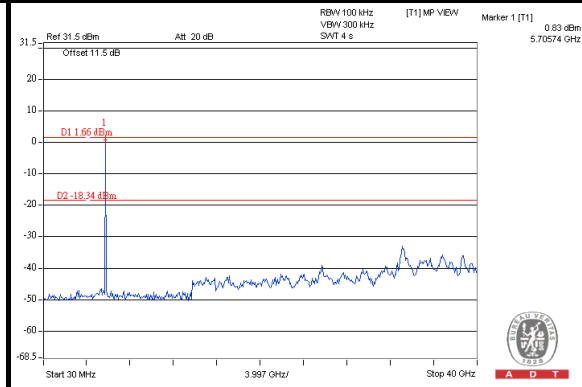
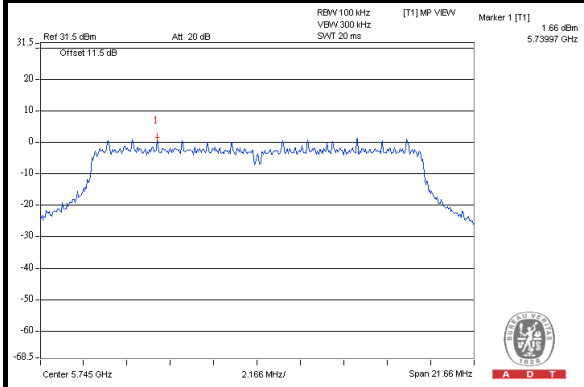
### **5.6.7 TEST RESULTS**

The conducted emission test is performed on each TX port of operating mode without summing or adding  $10\log(N)$  since the limit is relative emission limit. Only worst data of each operating mode is presented.

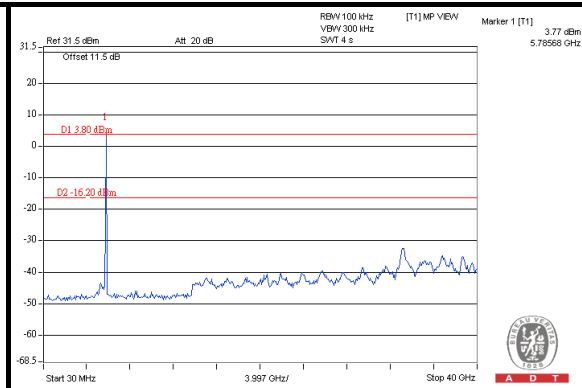
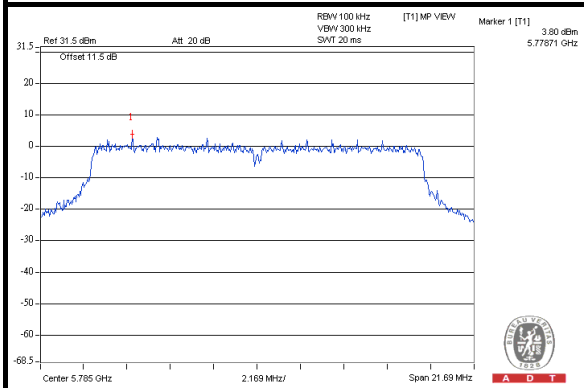
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement.

802.11a

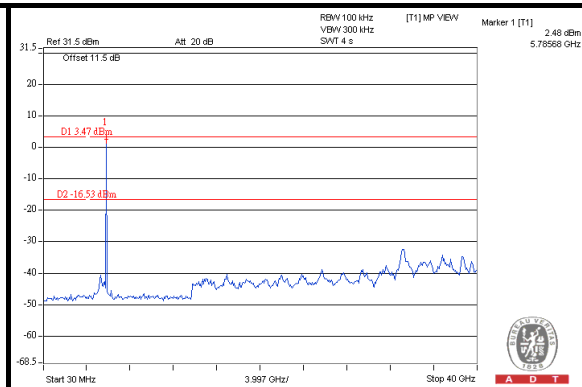
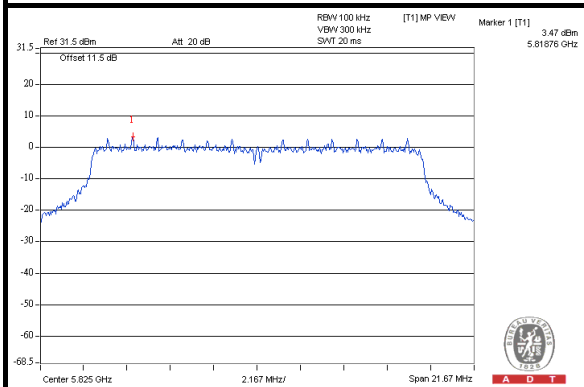
CH 149



CH 157



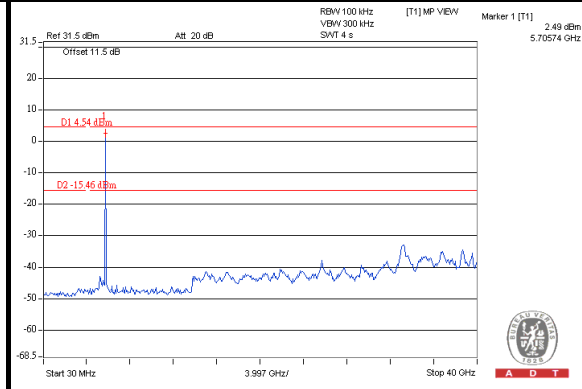
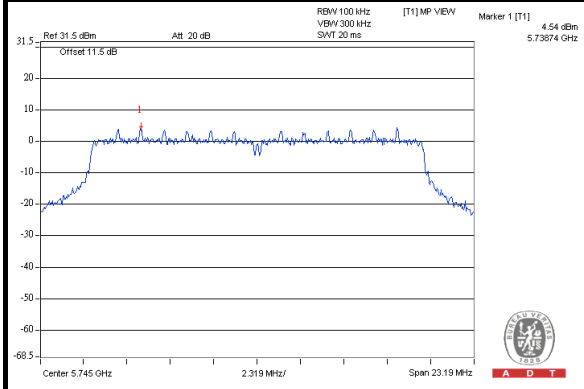
CH 165



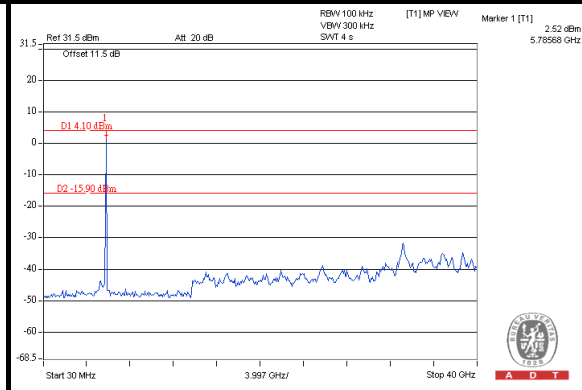
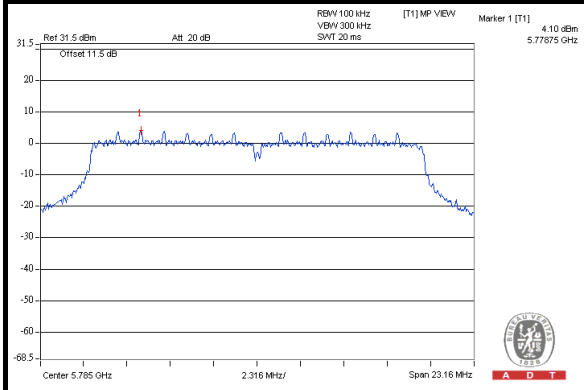


802.11n (20MHz)

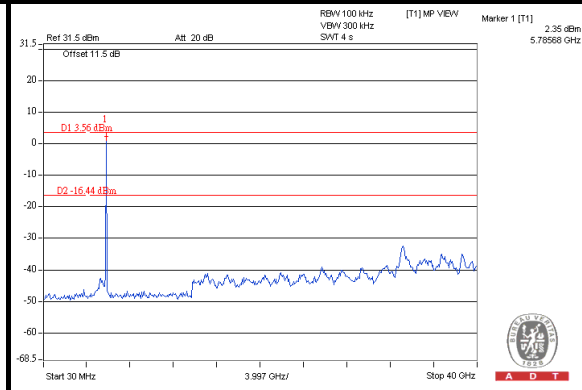
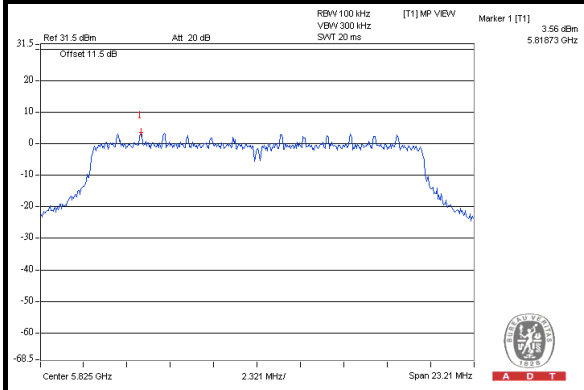
CH 149



CH 157

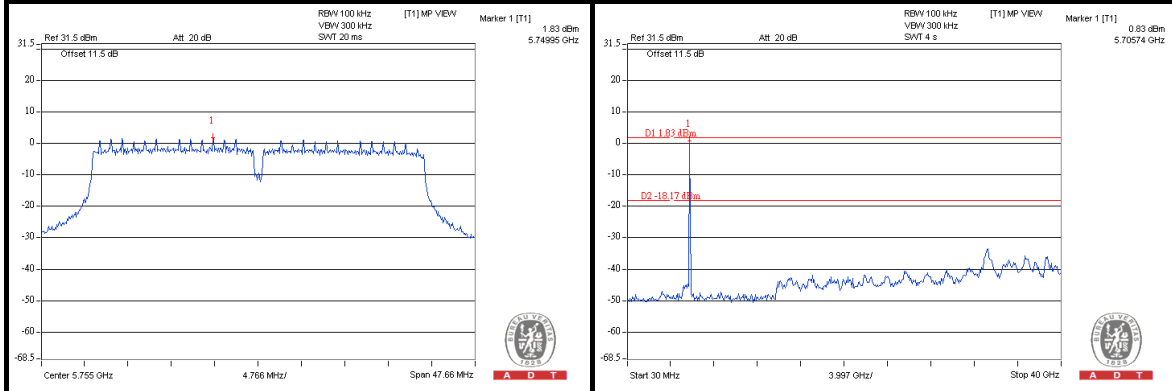


CH 165

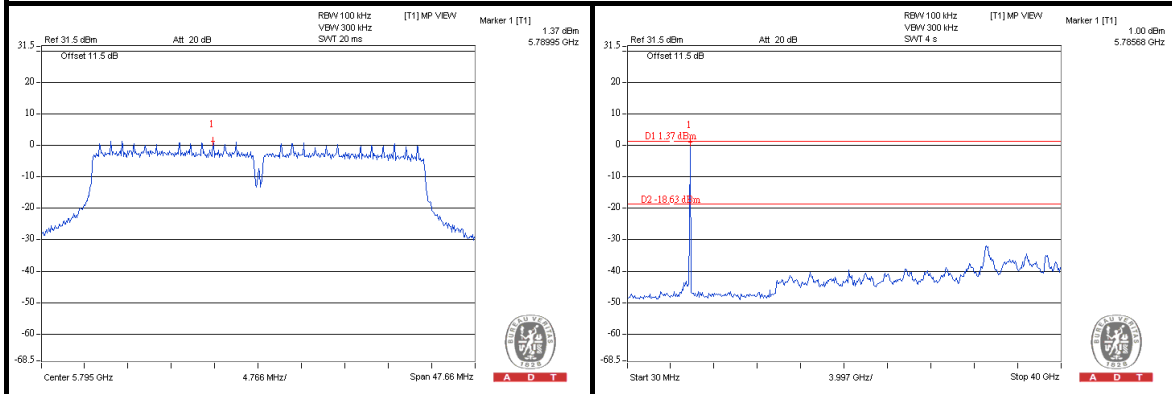


### 802.11n (40MHz)

#### CH 151



#### CH 159





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## 6. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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## 7. 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.

Copies of accreditation and authorization certificates of our laboratories obtained from approval agencies can be downloaded from our web site: [www.adt.com.tw/index.5.phtml](http://www.adt.com.tw/index.5.phtml).

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

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**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)

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



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## **8. 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---**