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# FCC TEST REPORT

**REPORT NO.:** RF111021C19

**MODEL NO.:** F7C027

**FCC ID:** K7SF7C027

**RECEIVED:** Oct. 21, 2011

**TESTED:** Nov. 08 ~ Dec. 20, 2011

**ISSUED:** Dec. 23, 2011

**APPLICANT:** Belkin International, Inc.

**ADDRESS:** 12045 East Waterfront Drive, Playa Vista, CA 90094  
USA

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

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

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

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## TABLE OF CONTENTS

RELEASE CONTROL RECORD .....	4
1. CERTIFICATION .....	5
2. SUMMARY OF TEST RESULTS .....	6
2.1 MEASUREMENT UNCERTAINTY .....	6
3. GENERAL INFORMATION.....	7
3.1 GENERAL DESCRIPTION OF EUT.....	7
3.2 DESCRIPTION OF TEST MODES.....	8
3.2.1 CONFIGURATION OF SYSTEM UNDER TEST.....	9
3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL.....	10
3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS .....	12
3.4 DESCRIPTION OF SUPPORT UNITS .....	12
4. TEST TYPES AND RESULTS .....	13
4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT.....	13
4.1.1 LIMITS OF RADIATED EMISSION AND BANDEDGE MEASUREMENT .....	13
4.1.2 TEST INSTRUMENTS.....	14
4.1.3 TEST PROCEDURES .....	15
4.1.4 DEVIATION FROM TEST STANDARD .....	15
4.1.5 TEST SETUP.....	16
4.1.6 EUT OPERATING CONDITIONS .....	16
4.1.7 TEST RESULT.....	17
4.2 CONDUCTED EMISSION MEASUREMENT .....	30
4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT.....	30
4.2.2 TEST INSTRUMENTS.....	30
4.2.3 TEST PROCEDURES .....	31
4.2.4 DEVIATION FROM TEST STANDARD .....	31
4.2.5 TEST SETUP.....	32
4.2.6 EUT OPERATING CONDITIONS .....	32
4.2.7 TEST RESULTS .....	33
4.3 6dB BANDWIDTH MEASUREMENT .....	35
4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT .....	35
4.3.2 TEST SETUP.....	35
4.3.3 TEST INSTRUMENTS.....	35
4.3.4 TEST PROCEDURE.....	35
4.3.5 DEVIATION FROM TEST STANDARD .....	35



4.3.6	EUT OPERATING CONDITIONS .....	35
4.3.7	TEST RESULTS .....	36
4.4	CONDUCTED OUTPUT POWER .....	37
4.4.1	LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT .....	37
4.4.2	TEST SETUP .....	37
4.4.3	TEST INSTRUMENTS.....	37
4.4.4	TEST PROCEDURES .....	37
4.4.5	DEVIATION FROM TEST STANDARD .....	37
4.4.6	EUT OPERATING CONDITIONS .....	37
4.4.7	TEST RESULTS .....	38
4.5	POWER SPECTRAL DENSITY MEASUREMENT .....	39
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT .....	39
4.5.2	TEST SETUP .....	39
4.5.3	TEST INSTRUMENTS.....	39
4.5.4	TEST PROCEDURE.....	39
4.5.5	DEVIATION FROM TEST STANDARD .....	39
4.5.6	EUT OPERATING CONDITION .....	39
4.5.7	TEST RESULTS .....	40
4.6	CONDUCTED EMISSION MEASUREMENT .....	41
4.6.1	LIMITS OF BAND EDGES MEASUREMENT .....	41
4.6.2	TEST SETUP .....	41
4.6.3	TEST INSTRUMENTS.....	41
4.6.4	TEST PROCEDURE.....	41
4.6.5	DEVIATION FROM TEST STANDARD .....	42
4.6.6	EUT OPERATING CONDITION .....	42
4.6.7	TEST RESULTS .....	42
5.	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	47
6.	INFORMATION ON THE TESTING LABORATORIES .....	48
7.	APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB.....	49



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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	NA	Dec. 23, 2011



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## 1. CERTIFICATION

**PRODUCT:** WeMo Smart Switch

**MODEL:** F7C027

**BRAND:** Belkin

**APPLICANT:** Belkin International, Inc.

**TESTED:** Nov. 08 ~ Dec. 20, 2011

**TEST SAMPLE:** ENGINEERING SAMPLE

**STANDARDS:** **FCC Part 15, Subpart C (Section 15.247)**

ANSI C63.4-2003

ANSI C63.10-2009

The above equipment (Model: F7C027) 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: Dec. 23, 2011  
Pettie Chen / Specialist

APPROVED BY :  , DATE: Dec. 23, 2011  
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 -17.54dB at 0.595MHz.
15.247(d) 15.209	Radiated Emissions	PASS	Meet the requirement of limit. Minimum passing margin is -1.5dB at 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	No antenna connector is used.

### 2.1 MEASUREMENT UNCERTAINTY

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

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

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



### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>EUT</b>	WeMo Smart Switch
<b>MODEL NO.</b>	F7C027
<b>FCC ID</b>	K7SF7C027
<b>POWER SUPPLY</b>	120Vac
<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 802.11n: up to 150.0Mbps
<b>OPERATING FREQUENCY</b>	2412 ~ 2462MHz
<b>NUMBER OF CHANNEL</b>	11 for 802.11b, 802.11g, 802.11n (20MHz) 7 for 802.11n (40MHz)
<b>OUTPUT POWER</b>	338.8mW
<b>ANTENNA TYPE</b>	Printed antenna with 3.71dBi gain
<b>ANTENNA CONNECTOR</b>	NA
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	Refer to user's manual
<b>ACCESSORY DEVICES</b>	NA

**NOTE:**

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

<b>MODULATION MODE</b>	<b>TX FUNCTION</b>
<b>802.11b</b>	1TX
<b>802.11g</b>	1TX
<b>802.11n (20MHz)</b>	1TX
<b>802.11n (40MHz)</b>	1TX

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



### 3.2 DESCRIPTION OF TEST MODES

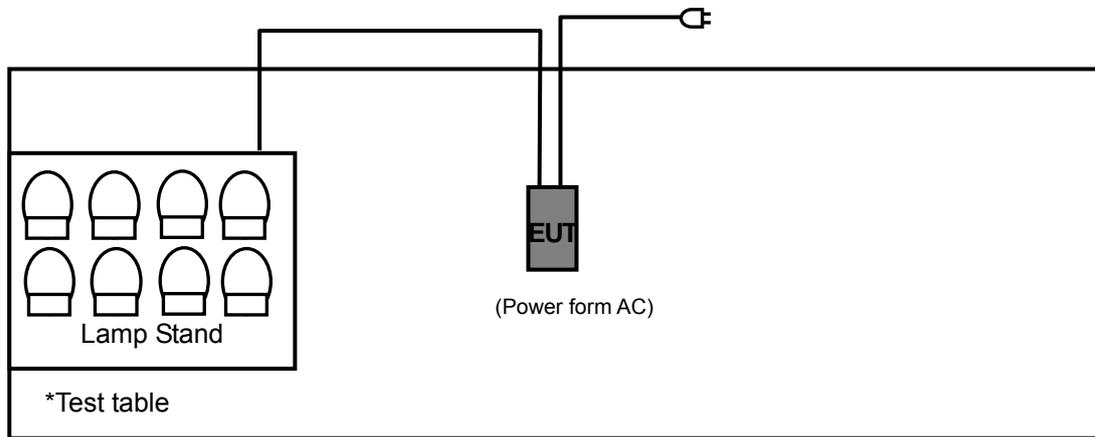
11 channels are provided for 802.11b, 802.11g and 802.11n (20MHz):

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		

### 3.2.1 CONFIGURATION OF SYSTEM UNDER TEST





### 3.2.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

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

#### 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, XYZ axis 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)	AXIS
-	802.11b	1 to 11	1, 6, 11	DSSS	DBPSK	1.0	Z
-	802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6.0	Z
-	802.11n (20MHz)	1 to 11	1, 6, 11	OFDM	BPSK	6.5	Z
-	802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	13.5	Z

#### 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, XYZ axis 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)	AXIS
-	802.11g	1 to 11	6	OFDM	BPSK	6.0	Z

#### 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)
-	802.11g	1 to 11	6	OFDM	BPSK	6.0



**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)
-	802.11b	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	6.5
-	802.11n (40MHz)	1 to 7	1, 7	OFDM	BPSK	13.5

**ANTENNA PORT CONDUCTED MEASUREMENT:**

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

EUT CONFIGURE MODE	MODE	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	6.5
-	802.11n (40MHz)	1 to 7	1, 4, 7	OFDM	BPSK	13.5

**TEST CONDITION:**

APPLICABLE TO	ENVIRONMENTAL CONDITIONS	INPUT POWER	TESTED BY
RE≥1G	25deg. C, 65%RH	120Vac, 60Hz	Antony Lee
RE<1G	25deg. C, 65%RH	120Vac, 60Hz	Antony Lee
PLC	26deg. C, 66%RH	120Vac, 60Hz	Antony Lee
APCM	25deg. C, 65%RH	120Vac, 60Hz	Antony Lee



### 3.3 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 C63.4-2003**

**ANSI C63.10-2009**

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

**NOTE:** It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (Verification). The test report has been issued separately.

### 3.4 DESCRIPTION OF SUPPORT UNITS

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

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	LAMP STAND	NA	NA	NA	NA
2	LIGHT BULB *8	NA	NA	NA	NA

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	NA

**NOTE:** All power cords of the above support units are non shielded (1.8m).



## 4. TEST TYPES AND RESULTS

### 4.1 RADIATED EMISSION AND BANDEDGE MEASUREMENT

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

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a). 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. As shown in 15.35(b), 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	ESI7	838496/016	Dec. 27, 2010	Dec. 26, 2011
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Feb. 23, 2011	Feb. 22, 2012
BILOG Antenna SCHWARZBECK	VULB9168	9168-155	Apr. 12, 2011	Apr. 11, 2012
HORN Antenna SCHWARZBECK	BBHA 9120D	9120D-408	Jan. 06, 2011	Jan. 05, 2012
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Dec. 27, 2010	Dec. 26, 2011
Preamplifier Agilent	8449B	3008A01961	Oct. 29, 2011	Oct. 28, 2012
Preamplifier Agilent	8447D	2944A10738	Oct. 29, 2011	Oct. 28, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	250792/4	Aug. 19, 2011	Aug. 18, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	283397/4	Aug. 19, 2011	Aug. 18, 2012
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	295012/4	Aug. 19, 2011	Aug. 18, 2012
Software ADT.	ADT_Radiated_ V7.6.15.9.2	NA	NA	NA
Antenna Tower inn-co GmbH	MA 4000	010303	NA	NA
Antenna Tower Controller inn-co GmbH	CO2000	019303	NA	NA
Turn Table ADT.	TT100.	TT93021704	NA	NA
Turn Table Controller ADT.	SC100.	SC93021704	NA	NA
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 4.
  3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
  4. The FCC Site Registration No. is 460141.
  5. The IC Site Registration No. is IC7450F-4.



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#### 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.

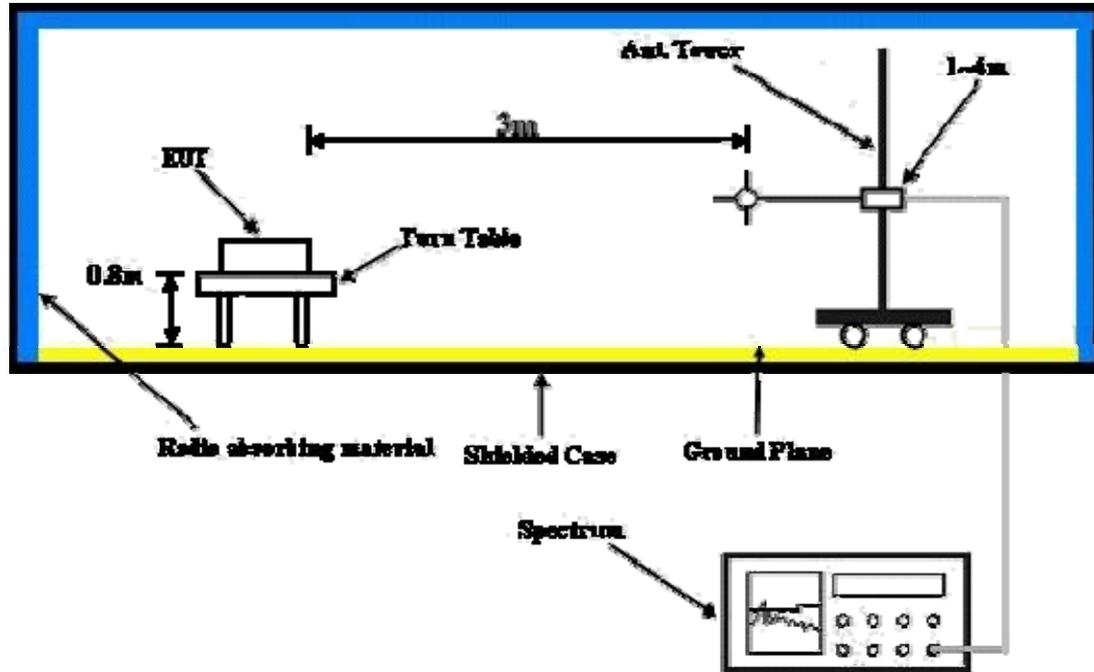
**NOTE:**

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 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10Hz 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

- a. Set the EUT under full load condition and placed them on a testing table.
- b. Set the transmitter part of EUT under transmission condition continuously at specific channel frequency.
- c. The necessary accessories enable the EUT in full functions.



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#### 4.1.7 TEST RESULT

##### 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	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	58.5 PK	74.0	-15.5	1.25 H	280	25.80	32.70
2	2390.00	48.1 AV	54.0	-5.9	1.25 H	280	15.40	32.70
3	*2412.00	106.2 PK			1.24 H	280	73.50	32.70
4	*2412.00	102.5 AV			1.24 H	280	69.80	32.70
5	4824.00	51.2 PK	74.0	-22.8	1.10 H	160	12.20	39.00
6	4824.00	46.8 AV	54.0	-7.2	1.10 H	160	7.80	39.00
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	2390.00	57.5 PK	74.0	-16.5	1.10 V	150	24.80	32.70
2	2390.00	45.4 AV	54.0	-8.6	1.10 V	150	12.70	32.70
3	*2412.00	102.1 PK			1.18 V	190	69.40	32.70
4	*2412.00	98.2 AV			1.18 V	190	65.50	32.70
5	4824.00	52.7 PK	74.0	-21.3	1.35 V	310	13.70	39.00
6	4824.00	48.6 AV	54.0	-5.4	1.35 V	310	9.60	39.00

- 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.



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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	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	105.3 PK			1.70 H	270	72.50	32.80
2	*2437.00	101.4 AV			1.70 H	270	68.60	32.80
3	#3249.00	43.1 PK	85.3	-42.2	1.00 H	285	8.00	35.10
4	#3249.00	33.2 AV	81.4	-48.2	1.00 H	285	-1.90	35.10
5	4874.00	52.4 PK	74.0	-21.6	1.50 H	40	13.30	39.10
6	4874.00	48.1 AV	54.0	-5.9	1.50 H	40	9.00	39.10
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	*2437.00	101.6 PK			1.00 V	273	68.80	32.80
2	*2437.00	97.7 AV			1.00 V	273	64.90	32.80
3	#3249.00	45.2 PK	81.6	-36.4	1.00 V	263	10.10	35.10
4	#3249.00	37.3 AV	77.7	-40.4	1.00 V	263	2.20	35.10
5	4874.00	54.1 PK	74.0	-19.9	1.20 V	14	15.00	39.10
6	4874.00	50.9 AV	54.0	-3.1	1.20 V	14	11.80	39.10

- 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 radiated frequency is out the restricted band.



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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	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	104.7 PK			1.75 H	280	71.80	32.90
2	*2462.00	101.0 AV			1.75 H	280	68.10	32.90
3	2483.50	58.7 PK	74.0	-15.3	1.75 H	280	25.70	33.00
4	2483.50	48.3 AV	54.0	-5.7	1.75 H	280	15.30	33.00
5	4924.00	51.5 PK	74.0	-22.5	1.00 H	50	12.30	39.20
6	4924.00	46.5 AV	54.0	-7.5	1.00 H	50	7.30	39.20
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	*2462.00	101.8 PK			1.35 V	180	68.90	32.90
2	*2462.00	98.2 AV			1.35 V	180	65.30	32.90
3	2483.50	55.8 PK	74.0	-18.2	1.35 V	180	22.80	33.00
4	2483.50	46.4 AV	54.0	-7.6	1.35 V	180	13.40	33.00
5	4924.00	52.9 PK	74.0	-21.1	1.25 V	40	13.70	39.20
6	4924.00	49.4 AV	54.0	-4.6	1.25 V	40	10.20	39.20

- 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.



A D T

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	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.2 PK	74.0	-4.8	1.80 H	290	36.50	32.70
2	2390.00	52.5 AV	54.0	-1.5	1.80 H	290	19.80	32.70
3	*2412.00	106.8 PK			1.25 H	280	74.10	32.70
4	*2412.00	97.1 AV			1.25 H	280	64.40	32.70
5	4824.00	45.6 PK	74.0	-28.4	1.00 H	60	6.60	39.00
6	4824.00	34.1 AV	54.0	-19.9	1.00 H	60	-4.90	39.00
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	2390.00	63.5 PK	74.0	-10.5	1.00 V	130	30.80	32.70
2	2390.00	49.7 AV	54.0	-4.3	1.00 V	130	17.00	32.70
3	*2412.00	100.8 PK			1.00 V	120	68.10	32.70
4	*2412.00	91.3 AV			1.00 V	120	58.60	32.70
5	4824.00	45.9 PK	74.0	-28.1	1.00 V	250	6.90	39.00
6	4824.00	33.1 AV	54.0	-20.9	1.00 V	250	-5.90	39.00

- 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.



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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	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	106.2 PK			1.70 H	270	73.40	32.80
2	*2437.00	96.7 AV			1.70 H	270	63.90	32.80
3	#3249.00	47.0 PK	86.2	-39.2	1.00 H	170	11.90	35.10
4	#3249.00	33.0 AV	76.7	-43.7	1.00 H	170	-2.10	35.10
5	4874.00	45.3 PK	74.0	-28.7	1.00 H	60	6.20	39.10
6	4874.00	33.6 AV	54.0	-20.4	1.00 H	60	-5.50	39.10
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	*2437.00	100.5 PK			1.30 V	160	67.70	32.80
2	*2437.00	90.6 AV			1.30 V	160	57.80	32.80
3	#3249.00	45.1 PK	80.5	-35.4	1.00 V	80	10.00	35.10
4	#3249.00	36.1 AV	70.6	-34.5	1.00 V	80	1.00	35.10
5	4874.00	45.2 PK	74.0	-28.8	1.00 V	260	6.10	39.10
6	4874.00	32.2 AV	54.0	-21.8	1.00 V	260	-6.90	39.10

- 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 radiated frequency is out the restricted band.



A D T

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	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	105.8 PK			1.80 H	270	72.90	32.90
2	*2462.00	95.0 AV			1.80 H	270	62.10	32.90
3	2483.50	68.5 PK	74.0	-5.5	1.25 H	280	35.50	33.00
4	2483.50	51.0 AV	54.0	-3.0	1.25 H	280	18.00	33.00
5	4924.00	46.5 PK	74.0	-27.5	1.00 H	60	7.30	39.20
6	4924.00	33.8 AV	54.0	-20.2	1.00 H	60	-5.40	39.20
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	*2462.00	101.0 PK			1.50 V	150	68.10	32.90
2	*2462.00	91.7 AV			1.50 V	150	58.80	32.90
3	2483.50	63.5 PK	74.0	-10.5	1.50 V	150	30.50	33.00
4	2483.50	48.8 AV	54.0	-5.2	1.50 V	150	15.80	33.00
5	4924.00	45.2 PK	74.0	-28.8	1.00 V	260	6.00	39.20
6	4924.00	33.8 AV	54.0	-20.2	1.00 V	260	-5.40	39.20

- 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.



A D T

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	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	69.5 PK	74.0	-4.5	1.20 H	280	36.80	32.70
2	2390.00	50.9 AV	54.0	-3.1	1.20 H	280	18.20	32.70
3	*2412.00	105.8 PK			1.20 H	270	73.10	32.70
4	*2412.00	94.7 AV			1.20 H	270	62.00	32.70
5	4824.00	45.0 PK	74.0	-29.0	1.00 H	50	6.00	39.00
6	4824.00	33.3 AV	54.0	-20.7	1.00 H	50	-5.70	39.00
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	2390.00	61.0 PK	74.0	-13.0	1.00 V	120	28.30	32.70
2	2390.00	45.8 AV	54.0	-8.2	1.00 V	120	13.10	32.70
3	*2412.00	98.8 PK			1.00 V	120	66.10	32.70
4	*2412.00	88.0 AV			1.00 V	120	55.30	32.70
5	4824.00	45.2 PK	74.0	-28.8	1.00 V	250	6.20	39.00
6	4824.00	32.0 AV	54.0	-22.0	1.00 V	250	-7.00	39.00

- 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.



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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	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2437.00	104.5 PK			1.70 H	270	71.70	32.80
2	*2437.00	94.4 AV			1.70 H	270	61.60	32.80
3	#3249.00	46.6 PK	84.5	-37.9	1.00 H	165	11.50	35.10
4	#3249.00	32.0 AV	74.4	-42.4	1.00 H	165	-3.10	35.10
5	4874.00	45.3 PK	74.0	-28.7	1.00 H	50	6.20	39.10
6	4874.00	34.6 AV	54.0	-19.4	1.00 H	50	-4.50	39.10
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	*2437.00	99.8 PK			1.05 V	190	67.00	32.80
2	*2437.00	89.8 AV			1.05 V	190	57.00	32.80
3	#3249.00	46.6 PK	79.8	-33.2	1.00 V	65	11.50	35.10
4	#3249.00	37.7 AV	69.8	-32.1	1.00 V	65	2.60	35.10
5	4874.00	45.1 PK	74.0	-28.9	1.00 V	265	6.00	39.10
6	4874.00	32.5 AV	54.0	-21.5	1.00 V	265	-6.60	39.10

- 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 radiated frequency is out the restricted band.



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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	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2462.00	104.6 PK			1.75 H	270	71.70	32.90
2	*2462.00	93.0 AV			1.75 H	270	60.10	32.90
3	2483.50	62.8 PK	74.0	-11.2	1.75 H	270	29.80	33.00
4	2483.50	48.2 AV	54.0	-5.8	1.75 H	270	15.20	33.00
5	4924.00	46.1 PK	74.0	-27.9	1.00 H	50	6.90	39.20
6	4924.00	33.6 AV	54.0	-20.4	1.00 H	50	-5.60	39.20
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	*2462.00	98.8 PK			1.00 V	150	65.90	32.90
2	*2462.00	87.2 AV			1.00 V	150	54.30	32.90
3	2483.50	57.6 PK	74.0	-16.4	1.00 V	145	24.60	33.00
4	2483.50	45.0 AV	54.0	-9.0	1.00 V	145	12.00	33.00
5	4924.00	46.8 PK	74.0	-27.2	1.00 V	265	7.60	39.20
6	4924.00	33.0 AV	54.0	-21.0	1.00 V	265	-6.20	39.20

- 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.



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	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	70.1 PK	74.0	-3.9	1.80 H	280	37.40	32.70
2	2390.00	51.0 AV	54.0	-3.0	1.80 H	280	18.30	32.70
3	*2422.00	102.5 PK			1.80 H	280	69.70	32.80
4	*2422.00	91.0 AV			1.80 H	280	58.20	32.80
5	4844.00	45.6 PK	74.0	-28.4	1.20 H	100	6.60	39.00
6	4844.00	31.0 AV	54.0	-23.0	1.20 H	100	-8.00	39.00
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	2390.00	63.8 PK	74.0	-10.2	1.01 V	15	31.10	32.70
2	2390.00	47.6 AV	54.0	-6.4	1.01 V	15	14.90	32.70
3	*2422.00	93.1 PK			1.00 V	15	60.30	32.80
4	*2422.00	83.0 AV			1.00 V	15	50.20	32.80
5	4844.00	44.2 PK	74.0	-29.8	1.00 V	350	5.20	39.00
6	4844.00	31.1 AV	54.0	-22.9	1.00 V	350	-7.90	39.00

- 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.



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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	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	2390.00	61.1 PK	74.0	-12.9	1.00 H	230	28.40	32.70
2	2390.00	47.3 AV	54.0	-6.7	1.00 H	230	14.60	32.70
3	*2437.00	104.1 PK			1.80 H	290	71.30	32.80
4	*2437.00	94.4 AV			1.80 H	290	61.60	32.80
5	2483.50	60.6 PK	74.0	-13.4	1.45 H	230	27.60	33.00
6	2483.50	46.7 AV	54.0	-7.3	1.45 H	230	13.70	33.00
7	4874.00	45.8 PK	74.0	-28.2	1.30 H	40	6.70	39.10
8	4874.00	31.0 AV	54.0	-23.0	1.30 H	40	-8.10	39.10
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	2390.00	57.9 PK	74.0	-16.1	2.00 V	35	25.20	32.70
2	2390.00	44.7 AV	54.0	-9.3	2.00 V	35	12.00	32.70
3	*2437.00	96.2 PK			1.05 V	217	63.40	32.80
4	*2437.00	86.7 AV			1.05 V	217	53.90	32.80
5	2483.50	57.6 PK	74.0	-16.4	1.00 V	123	24.60	33.00
6	2483.50	44.3 AV	54.0	-9.7	1.00 V	123	11.30	33.00
7	4874.00	45.1 PK	74.0	-28.9	1.20 V	250	6.00	39.10
8	4874.00	31.3 AV	54.0	-22.7	1.20 V	250	-7.80	39.10

- 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.



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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	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
NO.	FREQ. (MHz)	EMISSION LEVEL (dBuV/m)	LIMIT (dBuV/m)	MARGIN (dB)	ANTENNA HEIGHT (m)	TABLE ANGLE (Degree)	RAW VALUE (dBuV)	CORRECTION FACTOR (dB/m)
1	*2452.00	103.9 PK			1.75 H	280	71.00	32.90
2	*2452.00	92.2 AV			1.75 H	280	59.30	32.90
3	2483.50	69.0 PK	74.0	-5.0	1.75 H	85	36.00	33.00
4	2483.50	51.0 AV	54.0	-3.0	1.75 H	85	18.00	33.00
5	4904.00	45.5 PK	74.0	-28.5	1.20 H	170	6.30	39.20
6	4904.00	32.4 AV	54.0	-21.6	1.20 H	170	-6.80	39.20
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	*2452.00	96.5 PK			1.30 V	220	63.60	32.90
2	*2452.00	85.0 AV			1.30 V	220	52.10	32.90
3	2483.50	64.5 PK	74.0	-9.5	1.30 V	190	31.50	33.00
4	2483.50	48.5 AV	54.0	-5.5	1.30 V	190	15.50	33.00
5	4904.00	45.5 PK	74.0	-28.5	1.20 V	210	6.30	39.20
6	4904.00	31.0 AV	54.0	-23.0	1.20 V	210	-8.20	39.20

- 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.



A D T

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

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, 68%RH	TESTED BY	Sun Lin

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	119.34	29.9 QP	43.5	-13.6	2.00 H	58	18.70	11.20
2	249.60	40.2 QP	46.0	-5.8	1.00 H	220	27.60	12.60
3	360.43	40.6 QP	46.0	-5.4	1.00 H	250	24.50	16.10
4	500.42	35.7 QP	46.0	-10.3	1.25 H	127	16.00	19.70
5	624.85	37.6 QP	46.0	-8.4	1.25 H	352	15.20	22.40
6	840.67	36.1 QP	46.0	-9.9	1.50 H	238	11.00	25.10
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	119.34	24.5 QP	43.5	-19.0	1.00 V	196	13.30	11.20
2	189.33	27.5 QP	43.5	-16.0	1.00 V	43	16.70	10.80
3	249.60	36.4 QP	46.0	-9.6	1.00 V	115	23.80	12.60
4	360.43	32.1 QP	46.0	-13.9	1.00 V	166	16.00	16.10
5	500.42	38.7 QP	46.0	-7.3	1.25 V	340	19.00	19.70
6	840.67	33.8 QP	46.0	-12.2	1.25 V	196	8.70	25.10

- 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.



## 4.2 CONDUCTED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

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

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

### 4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Test Receiver ROHDE & SCHWARZ	ESCS30	100027	May 11, 2011	May 10, 2012
RF signal cable Woken	5D-FB	Cable-HYC01-01	Dec. 30, 2010	Dec. 29, 2011
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Jul. 07, 2011	Jul. 06, 2012
LISN ROHDE & SCHWARZ	ESH2-Z5	100100	Jan. 06, 2011	Jan. 05, 2012
LISN ROHDE & SCHWARZ	ESH3-Z5	835239/001	Feb. 22, 2011	Feb. 21, 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 1.  
 3. The VCCI Site Registration No. is C-2040.



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#### 4.2.3 TEST PROCEDURES

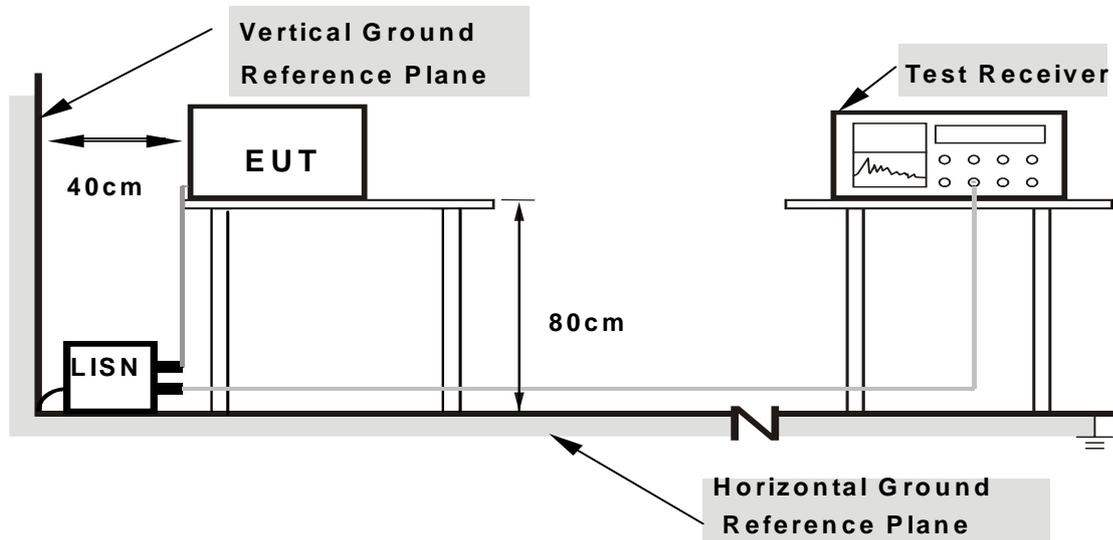
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling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

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

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.2.5 TEST SETUP



**Note: 1.Support units were connected to second LISN.**

**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

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

#### 4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6.

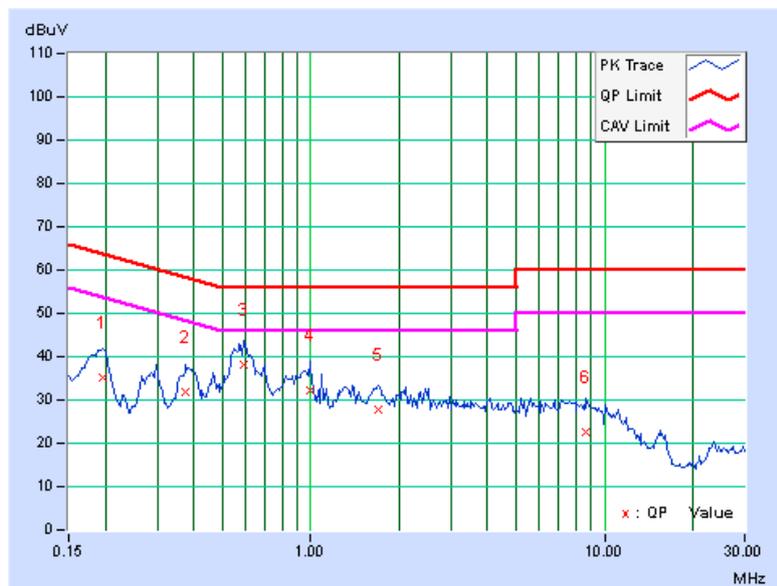
### 4.2.7 TEST RESULTS

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

PHASE	Line 1	6dB BANDWIDTH	9kHz
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No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.197	0.12	34.99	24.54	35.11	24.66	63.74	53.74	-28.63	-29.08
2	0.377	0.12	31.91	25.18	32.03	25.30	58.35	48.35	-26.32	-23.05
<b>3</b>	<b>0.595</b>	<b>0.13</b>	<b>37.88</b>	<b>28.33</b>	<b>38.01</b>	<b>28.46</b>	<b>56.00</b>	<b>46.00</b>	<b>-17.99</b>	<b>-17.54</b>
4	0.994	0.16	32.06	22.53	32.22	22.69	56.00	46.00	-23.78	-23.31
5	1.703	0.18	27.54	20.56	27.72	20.74	56.00	46.00	-28.28	-25.26
6	8.625	0.58	21.84	13.50	22.42	14.08	60.00	50.00	-37.58	-35.92

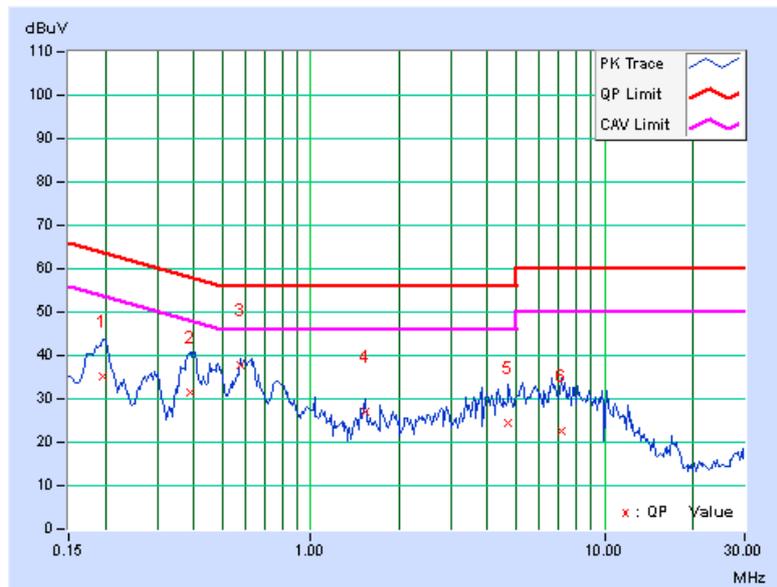
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value = 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	0.197	0.13	34.99	21.79	35.12	21.92	63.74	53.74	-28.62	-31.82
2	0.388	0.14	31.32	18.70	31.46	18.84	58.10	48.10	-26.64	-29.26
3	0.576	0.15	37.54	27.03	37.69	27.18	56.00	46.00	-18.31	-18.82
4	1.535	0.19	26.83	13.68	27.02	13.87	56.00	46.00	-28.98	-32.13
5	4.723	0.35	23.96	14.12	24.31	14.47	56.00	46.00	-31.69	-31.53
6	7.098	0.47	22.08	12.77	22.55	13.24	60.00	50.00	-37.45	-36.76

- 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.

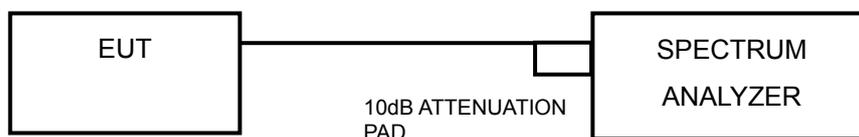


### 4.3 6dB BANDWIDTH MEASUREMENT

#### 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

1. Set resolution bandwidth (RBW) = approximately 1% of the emission bandwidth
2. Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
3. Trace mode = max hold.
4. Sweep = auto couple.
5. 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	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	12.18	0.5	PASS
6	2437	12.22	0.5	PASS
11	2462	12.22	0.5	PASS

#### 802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	16.53	0.5	PASS
6	2437	16.50	0.5	PASS
11	2462	16.50	0.5	PASS

#### 802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2412	17.64	0.5	PASS
6	2437	17.69	0.5	PASS
11	2462	17.69	0.5	PASS

#### 802.11n (40MHz)

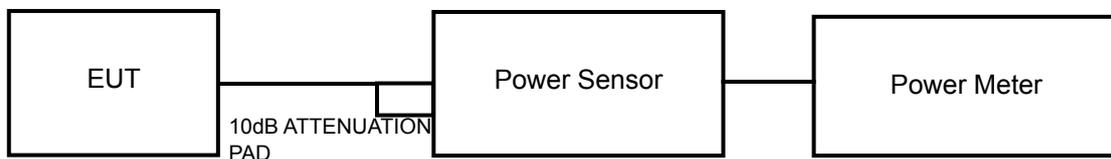
CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS / FAIL
1	2422	36.24	0.5	PASS
4	2437	36.28	0.5	PASS
7	2452	36.24	0.5	PASS

## 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 band: 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 power sensor was used on the output port of the EUT. A power meter was used to read the response of the power sensor. Record the 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

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
1	2412	107.2	20.3	30	PASS
6	2437	112.2	20.5	30	PASS
11	2462	107.2	20.3	30	PASS

##### 802.11g

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
1	2412	331.1	25.2	30	PASS
6	2437	<b>338.8</b>	25.3	30	PASS
11	2462	316.2	25.0	30	PASS

##### 802.11n (20MHz)

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
1	2412	263.0	24.2	30	PASS
6	2437	275.4	24.4	30	PASS
11	2462	251.2	24.0	30	PASS

##### 802.11n (40MHz)

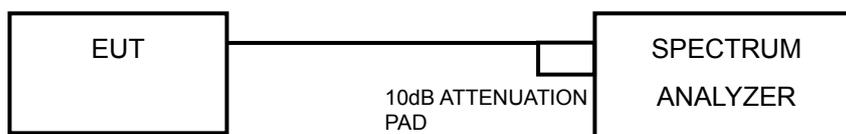
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER (mW)	PEAK POWER (dBm)	POWER LIMIT (dBm)	PASS/FAIL
1	2422	158.5	22.0	30	PASS
4	2437	199.5	23.0	30	PASS
7	2452	245.5	23.9	30	PASS

## 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

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

Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	5.95	-9.28	8	PASS
6	2437	5.95	-9.28	8	PASS
11	2462	5.88	-9.35	8	PASS

#### 802.11g

Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	2.93	-12.30	8	PASS
6	2437	2.90	-12.33	8	PASS
11	2462	2.43	-12.80	8	PASS

#### 802.11n(20MHz)

Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2412	1.15	-14.08	8	PASS
6	2437	1.13	-14.10	8	PASS
11	2462	1.01	-14.22	8	PASS

#### 802.11n(40MHz)

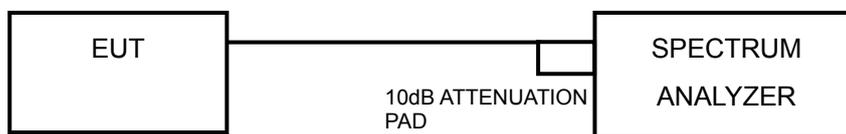
Channel	FREQ. (MHz)	PSD (dBm/100kHz)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	PASS /FAIL
1	2422	-4.46	-19.69	8	PASS
4	2437	-3.39	-18.62	8	PASS
7	2452	-3.93	-19.16	8	PASS

## 4.6 CONDUCTED EMISSION MEASUREMENT

### 4.6.1 LIMITS OF BAND EDGES 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.



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## 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

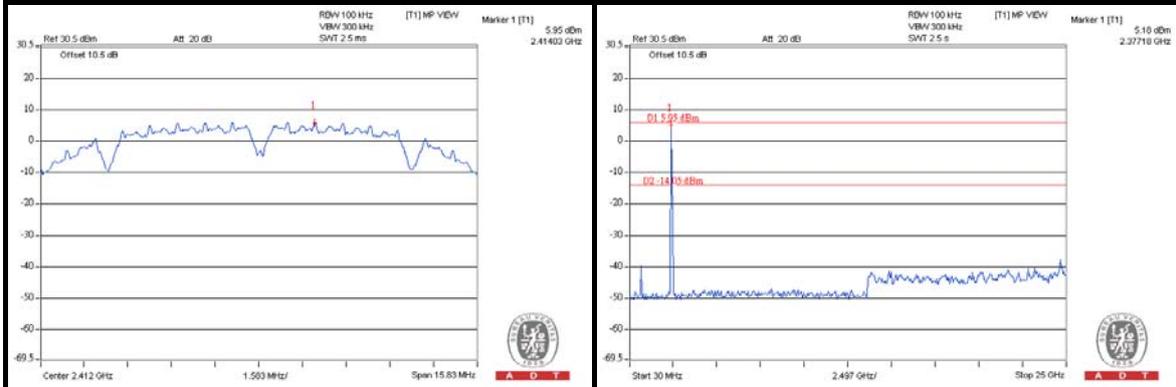
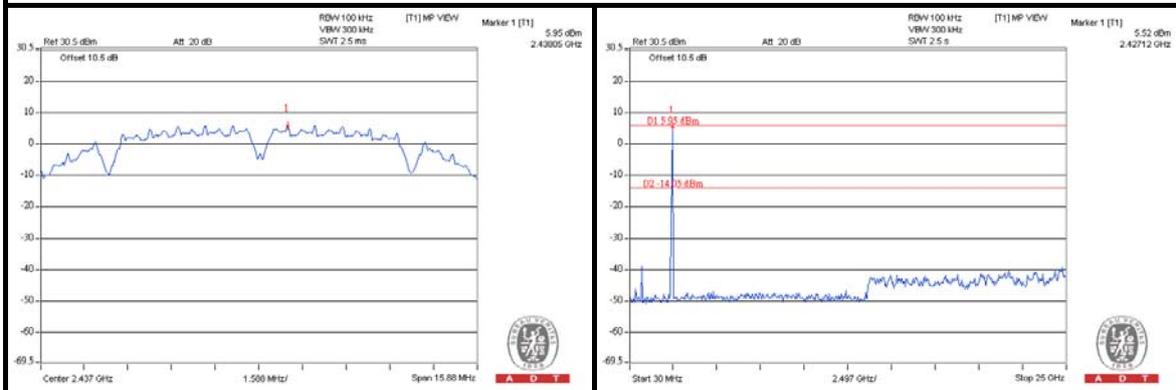
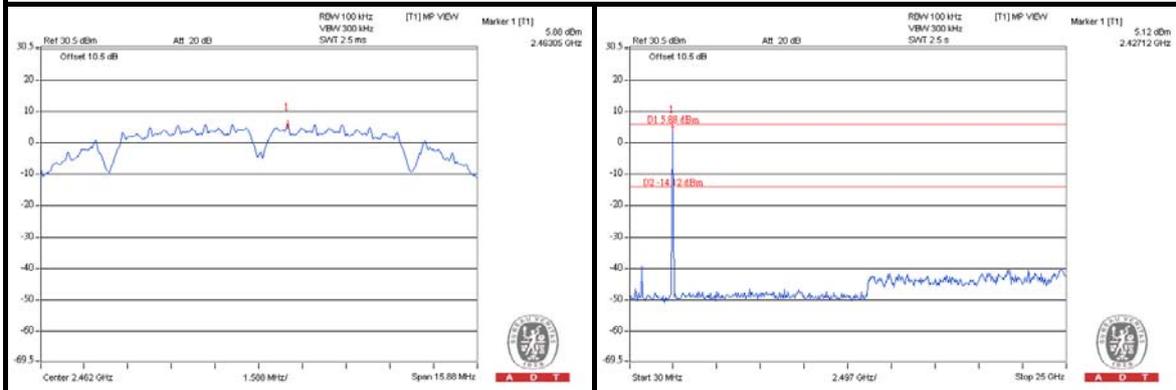
No deviation.

### 4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

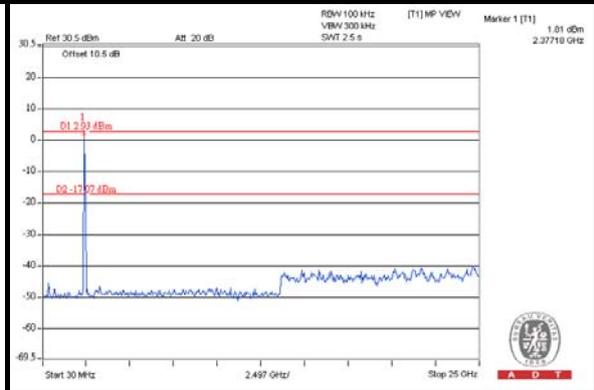
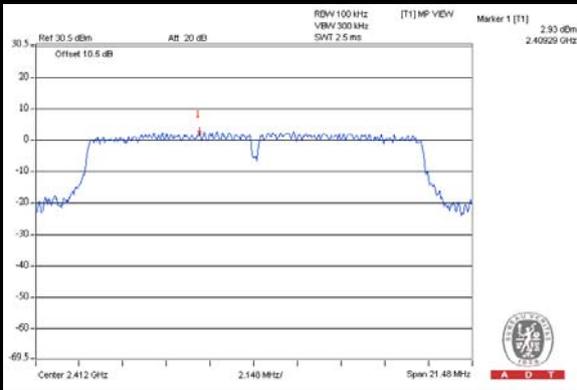
### 4.6.7 TEST RESULTS

The 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 in part 15.247(d).

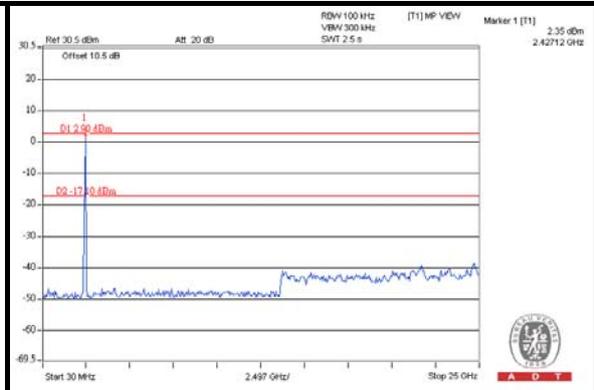
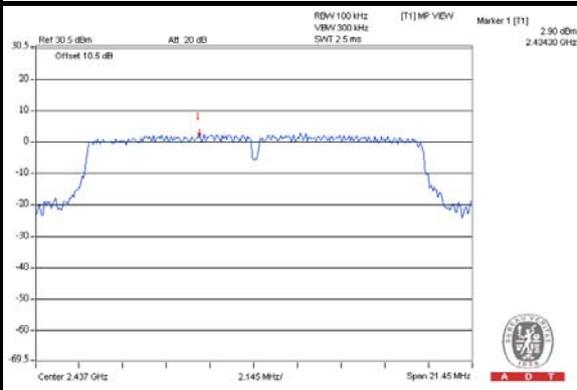
**802.11b****CH 1****CH 6****CH 11**

# 802.11g

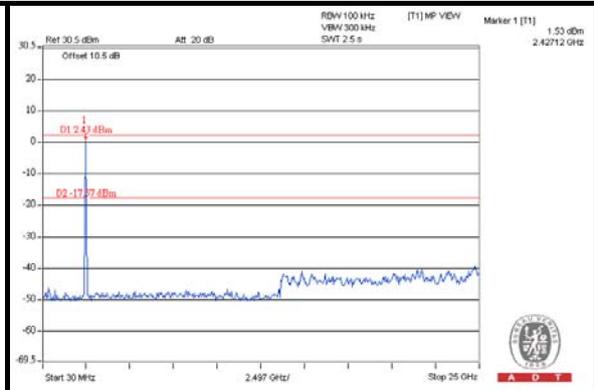
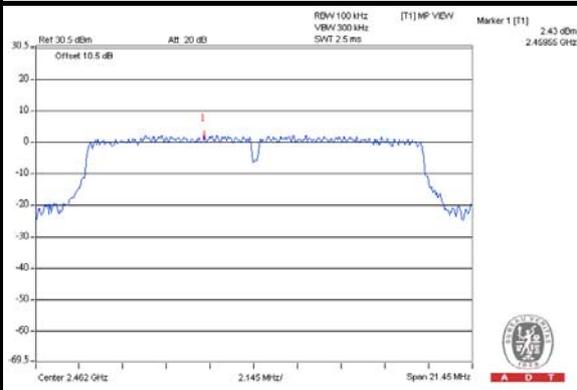
## CH 1



## CH 6

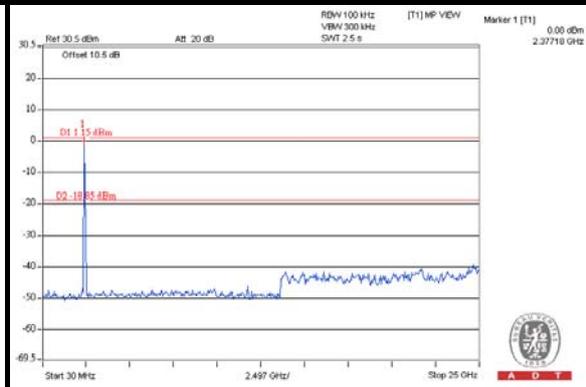
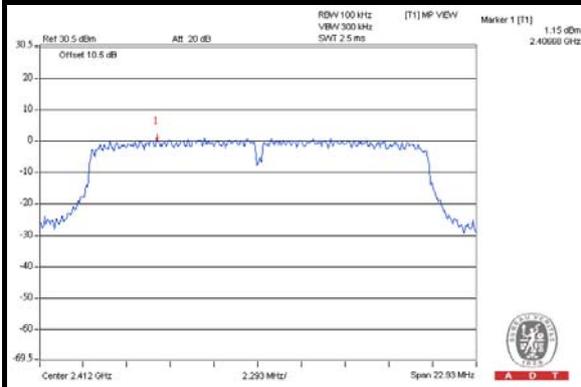


## CH 11

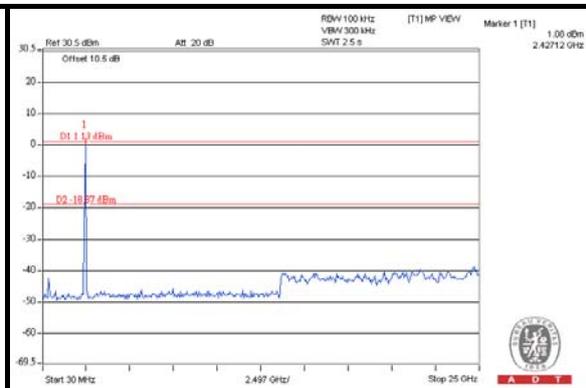
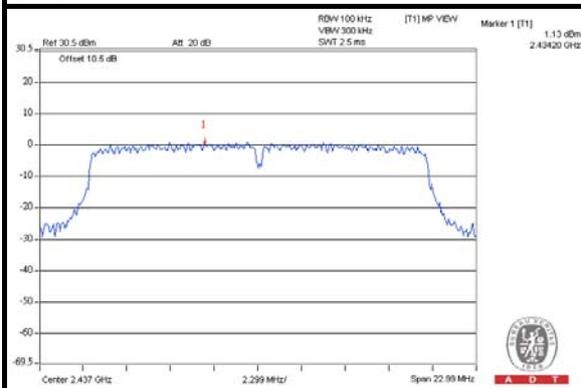


### 802.11n(20MHz)

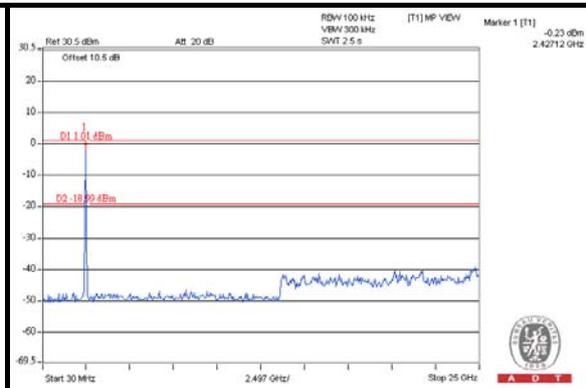
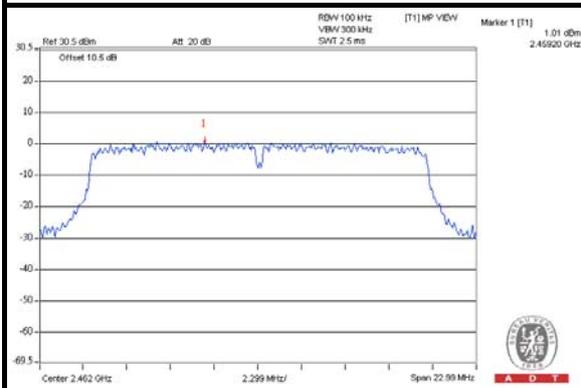
#### CH 1



#### CH 6

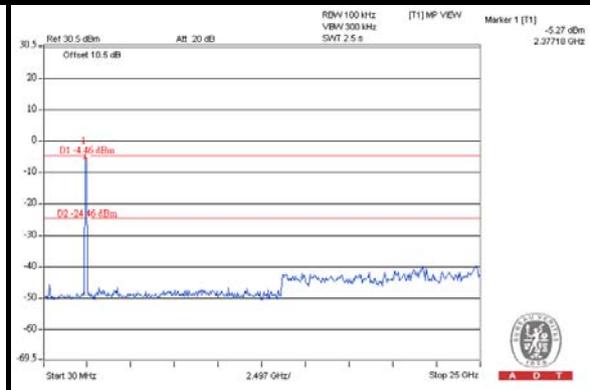
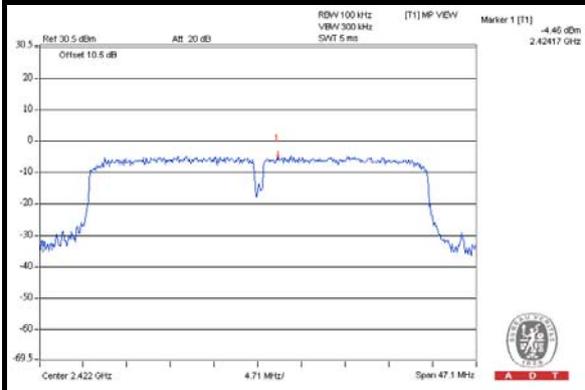


#### CH 11

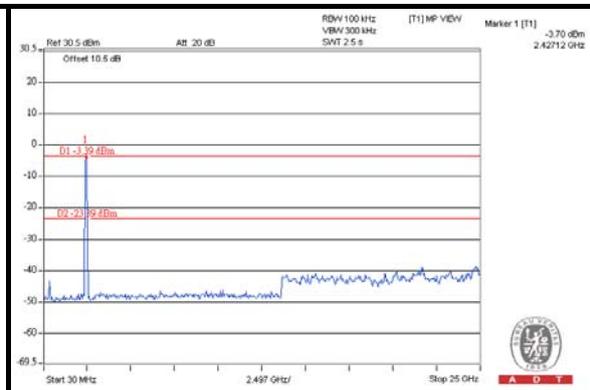
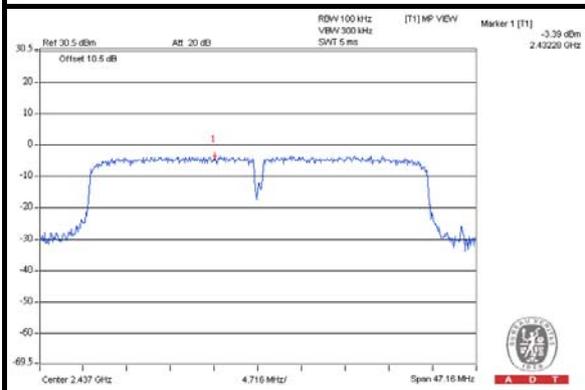


### 802.11n(40MHz)

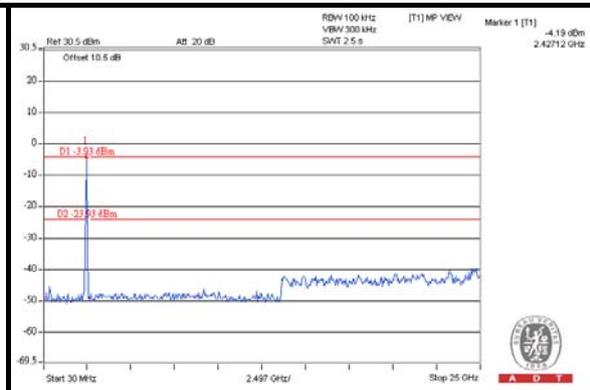
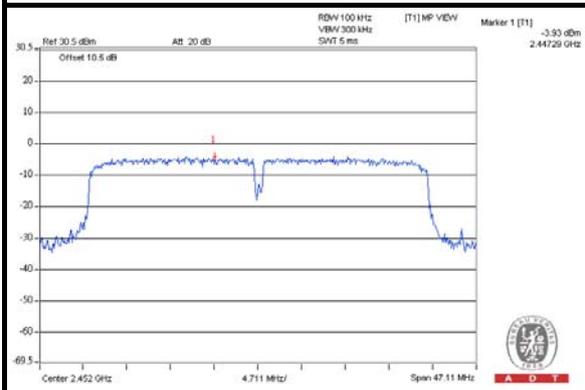
#### CH 1



#### CH 4



#### CH 7





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## 5. PHOTOGRAPHS OF THE TEST CONFIGURATION

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



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## 6. INFORMATION ON THE TESTING LABORATORIES

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

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:

**Linko EMC/RF Lab:**

Tel: 886-2-26052180

Fax: 886-2-26051924

**Hsin Chu EMC/RF Lab:**

Tel: 886-3-5935343

Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety/Telecom Lab:**

Tel: 886-3-3183232

Fax: 886-3-3185050

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**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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## **7. APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

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

**---END---**