

# FCC TEST REPORT

**REPORT NO.:** RF960927H03

**MODEL NO.:** PHS300, PHS300S

**RECEIVED:** Sep. 27, 2007

**TESTED:** Sep. 28 to Oct. 11, 2007

**ISSUED:** Oct. 17, 2007

**APPLICANT:** Cradlepoint, Inc.

**ADDRESS:** 1199 Shoreline Lane, Suite 301 Boise, ID 83702

**ISSUED BY:** Advance Data Technology Corporation

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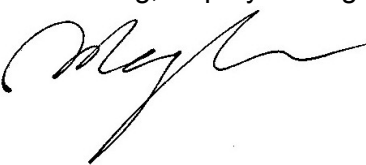
## 1 CERTIFICATION

**PRODUCT :** PHS Travel Router  
**BRAND NAME :** Cradlepoint, Sprint  
**MODEL NO. :** PHS300, PHS300S  
**TESTED:** Sep. 28 to Oct. 11, 2007  
**APPLICANT :** Cradlepoint, Inc.  
**TEST ITEM:** ENGINEERING SAMPLE  
**STANDARDS :** 47 CFR Part 15, Subpart C (Section 15.247)  
ANSI C63.4-2003

The above equipment (Model: PHS300) has been tested by **Advance Data Technology Corporation**, 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 :**   
(Midoli Peng, Specialist ) , **DATE:** Oct. 17, 2007

**TECHNICAL ACCEPTANCE :**   
Responsible for RF (Hank Chung, Deputy Manager ) , **DATE:** Oct. 17, 2007

**APPROVED BY :**   
( May Chen, Deputy Manager ) , **DATE:** Oct. 17, 2007

## 2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: 47 CFR Part 15, Subpart C			
Standard Section	Test Type and Limit	Result	REMARK
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit Minimum passing margin is -12.52 dB at 15.980 MHz
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit
15.247(c)	Transmitter Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -0.49 dB at 2483.5 MHz
15.247(d)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit
15.247(c)	Band Edge Measurement Limit: 20 dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit

### 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:

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

Measurement	Value
Conducted emissions	2.41 dB
Radiated emissions (30MHz-1GHz)	3.89 dB
Radiated emissions (1GHz -18GHz)	2.21 dB
Radiated emissions (18GHz -40GHz)	1.88 dB

### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	PHS Travel Router
<b>MODEL NO.</b>	PHS300, PHS300S
<b>FCC ID</b>	UXX-PHS300
<b>POWER SUPPLY</b>	3.7VDC from battery or DC 5V from power adapter or DC 5V from Car charger
<b>MODULATION TYPE</b>	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
<b>RADIO TECHNOLOGY</b>	DSSS, OFDM
<b>TRANSFER RATE</b>	802.11b: 11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps
<b>FREQUENCY RANGE</b>	2412MHz ~ 2462MHz
<b>NUMBER OF CHANNEL</b>	11
<b>CHANNEL SPACING</b>	5MHz
<b>OUTPUT POWER</b>	802.11b: 103.276mW 802.11g: 221.820mW
<b>ANTENNA TYPE</b>	PCB Printed Antenna (Antenna gain : 0dBi)
<b>DATA CABLE</b>	NA
<b>I/O PORT</b>	USB port x 1
<b>ASSOCIATED DEVICES</b>	Adapter*1, Battery*1, Car charger*1(optional device)

#### NOTE:

1. The EUT has two model names, which are identical to each other in all aspects except for the followings:

Brand Name	Model Name	Different
Cradlepoint	PHS300	For marketing requirement use.
Sprint	PHS300S	

From the above models, model: **PHS300** was selected as representative model for the test and its data was recorded in this report.

2. The EUT could be supplied with Li-ion 3.7V battery or the following power adapter and Cigarette adapter:

Power adapter		
Brand	Model Name	Specification
DVE	DSA-15P-05 US 050125	Input: AC100V-240VAC, 50/60Hz 0.5A Output: 5VDC, 2.5A DC cable 1.9m, Unshielded
Car charger		
Brand	Model Name	Specification
ELEMENTECH	C5-05V250-26A02	Input: 12Vdc Output: 5V/2.5A DC cable 1.3m, Unshielded
Battery		
Brand	Model Name	Specification
KYOCERA	TXBAT10073	3.7V, 1800mA

3. The EUT was pre-tested under the following modes:

Test Mode	Description
Mode A	X-Y plane
Mode B	Z-X plane
<b>Mode C</b>	<b>Z-Y plane</b>

From the above modes, the worst emission level was found in **Mode C**. Therefore only the test data of the modes were recorded in this report individually.

4. The EUT was pre-tested under the following modes:

Test Mode	Description
<b>Mode D</b>	<b>With Adapter</b>
Mode E	With Battery
Mode F	With Adapter+ Battery
Mode G	With Battery + Car charger

From the above modes, the worst emission level was found in **Mode D**. Therefore only the test data of the modes were recorded in this report individually.

5. The EUT operates in the 2.4GHz frequency spectrum with throughput of up to 54Mbps.
6. The EUT complies with IEEE 802.11g standards, and backwards compatible with IEEE 802.11b products.

7. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

### 3.2 DESCRIPTION OF TEST MODES

Operated in 2400 ~ 2483.5MHz band:

For 802.11b/g normal mode: Eleven channels are provided to this EUT.

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



### 3.3 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

EUT configure mode	Applicable to				Description
	PLC	RE<1G	RE≥1G	APCM	
-	√	√	√	√	NA

Where PLC: Power Line Conducted Emission

RE<1G: Radiated Emission below 1GHz

RE≥1G: Radiated Emission above 1GHz

APCM: Antenna Port Conducted Measurement

#### **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.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1	DSSS	CCK	1

#### **Radiated Emission Test (Below 1 GHz):**

- ☒ 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.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1	DSSS	CCK	1

#### **Radiated Emission Test (Above 1 GHz):**

- ☒ 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.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	CCK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6

**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.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 11	DSSS	CCK	1
802.11g	1 to 11	1, 11	OFDM	BPSK	6

**Antenna Port Conducted 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.

Mode	Available Channel	Tested Channel	Modulation Technology	Modulation Type	Data Rate (Mbps)
802.11b	1 to 11	1, 6, 11	DSSS	CCK	1
802.11g	1 to 11	1, 6, 11	OFDM	BPSK	6

### **3.4 GENERAL DESCRIPTION OF APPLIED STANDARDS**

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

**47 CFR Part 15, Subpart C. (15.247)**  
**ANSI C63.4 : 2003**

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

### 3.5 DESCRIPTION OF SUPPORT UNITS

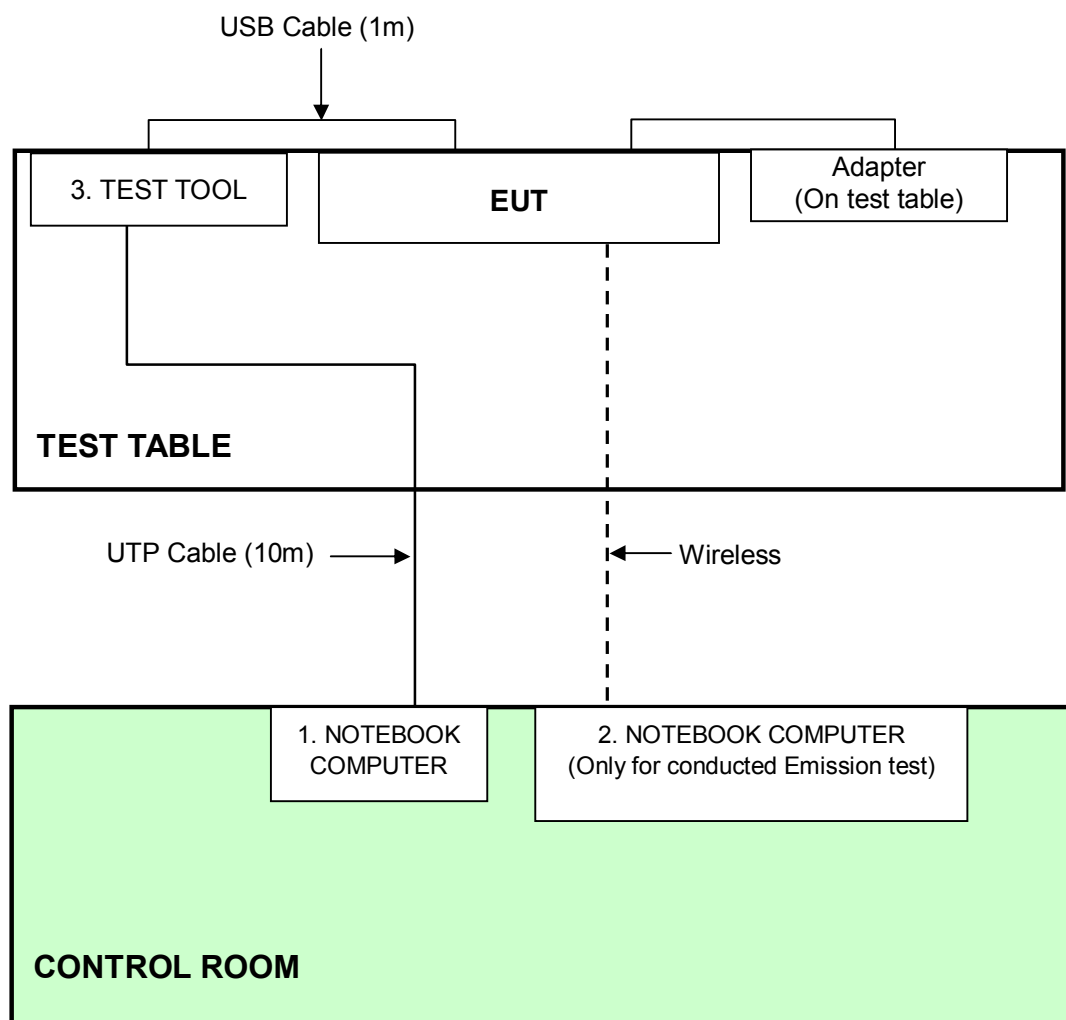
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP18L	6976685584	FCC DoC
2	NOTEBOOK COMPUTER (Only for conducted Emission test)	DELL	PP21L	CN-0GD366-70166-5 B3-09ZX	QDS-BRCM1016
3	TEST TOOL	Cradlepoint	PS6U1UPE	NA	NA

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

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

### 3.6 CONFIGURATION OF SYSTEM UNDER TEST



**NOTE:** 1. Support units 1-2 were kept in the control room during the test.

## 4 TEST TYPES AND RESULTS

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 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. All emanations from a class B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

#### 4.1.2 TEST INSTRUMENTS

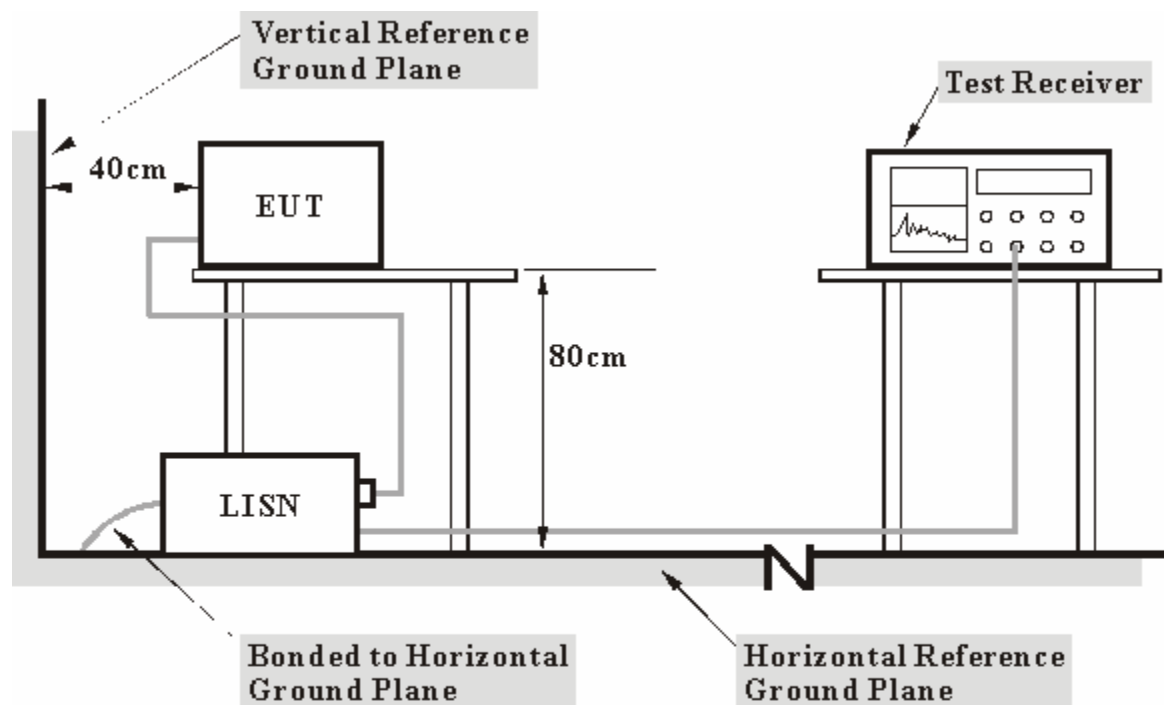
DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver	ESCS 30	847124/029	Mar. 28, 2008
Line-Impedance Stabilization Network(for EUT)	ENV-216	100071	Nov. 26, 2007
Line-Impedance Stabilization Network(for Peripheral)	ESH3-Z5	848773/004	Oct. 26, 2007
RF Cable (JETBAO)	RG233/U	Cable_CB_01	Dec. 09, 2007
Terminator	50	2	Oct. 30, 2007
Software	ADT_Cond_V7.3.2	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 ADT Shielded Room No. B.
3. The VCCI Con B Registration No. is C-2193.

#### 4.1.3 TEST PROCEDURES

- The EUT/HOST was placed 0.4 meters from the conducting wall of the shielded room with EUT/HOST being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT/HOST were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels over 10dB under the prescribed limits could not be reported

#### 4.1.4 TEST SETUP



- Note:**
- Support units were connected to second LISN.
  - Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### 4.1.5 EUT OPERATING CONDITIONS

- a. Placed the EUT on testing table.
- b. Prepared other computer systems (support units 1 ~ 2) to act as communication partners and placed them outside of testing area.
- c. The communication partners run test program "Ping.exe" to enable EUT under transmission/receiving condition continuously via USB cable, UTP cable and wireless transmission.
- d. Repeat steps b-c.

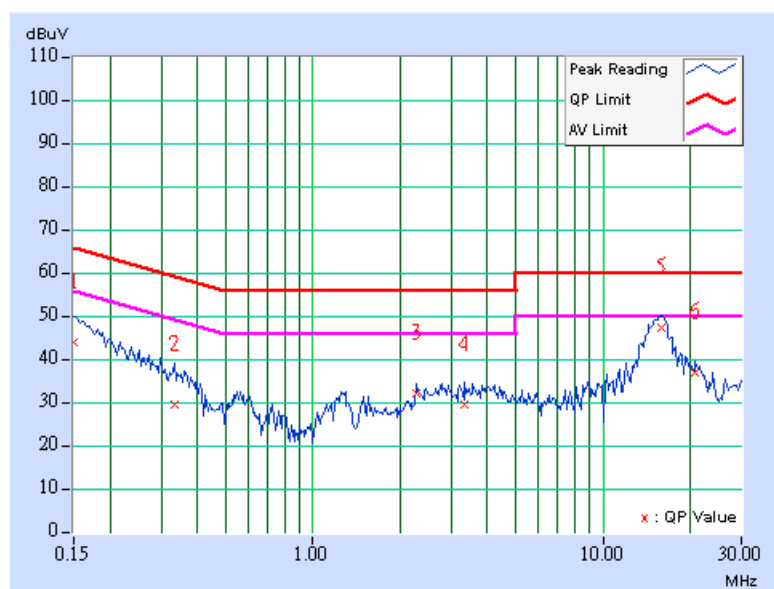


#### 4.1.6 TEST RESULTS

<b>INPUT POWER</b>	120Vac, 60 Hz	<b>6dB BANDWIDTH</b>	9 kHz
<b>PHASE</b>	Line (L)	<b>TRANSFER RATE</b>	1Mbps
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 56%RH, 959hPa	<b>TESTED BY</b>	Rex Huang

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	0.150	0.40	43.03	-	43.43	-	66.00	56.00	-22.57	-
2	0.334	0.40	28.80	-	29.20	-	59.36	49.36	-30.16	-
3	2.287	0.51	31.15	-	31.66	-	56.00	46.00	-24.34	-
4	3.344	0.57	28.68	-	29.25	-	56.00	46.00	-26.75	-
<b>5</b>	<b>15.980</b>	<b>1.08</b>	<b>46.40</b>	-	<b>47.48</b>	-	<b>60.00</b>	<b>50.00</b>	<b>-12.52</b>	-
6	20.840	1.00	35.93	-	36.93	-	60.00	50.00	-23.07	-

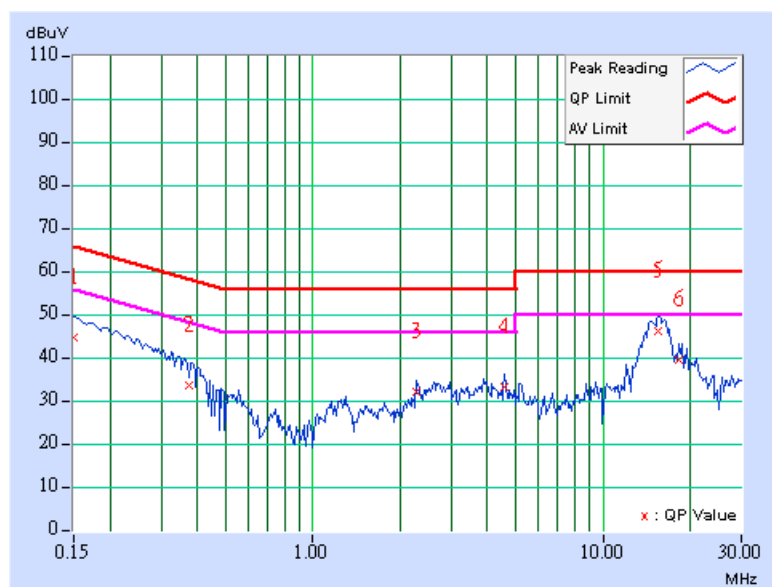
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



<b>INPUT POWER</b>	120Vac, 60 Hz	<b>6dB BANDWIDTH</b>	9 kHz
<b>PHASE</b>	Neutral (N)	<b>TRANSFER RATE</b>	1Mbps
<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 56%RH, 959hPa	<b>TESTED BY</b>	Rex Huang

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	0.150	0.20	43.67	-	43.87	-	66.00	56.00	-22.13	-
2	0.372	0.20	32.29	-	32.49	-	58.45	48.45	-25.96	-
3	2.287	0.41	31.10	-	31.51	-	56.00	46.00	-24.49	-
4	4.603	0.54	32.01	-	32.55	-	56.00	46.00	-23.45	-
5	15.567	1.21	44.91	-	46.12	-	60.00	50.00	-13.88	-
6	18.247	1.26	38.48	-	39.74	-	60.00	50.00	-20.26	-

- 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.



## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

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.

#### 4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ADVANTEST Spectrum Analyzer	R3271A	85060311	July 15, 2008
HP Pre_Amplifier	8449B	3008A01922	Oct. 04, 2008
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	Mar. 26, 2008
CHASE Broadband Antenna	VULB 9168	138	July 26, 2008
Schwarzbeck Horn_Antenna	BBHA9120	D124	Jan. 01, 2008
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 25, 2008
TRILOG Broad Band Antenna	VULB 9168	138	July 26, 2008
RF Switches (ARNITSU)	CS-201	1565157	Aug. 13, 2008
RF CABLE (Chaintek)	SF102	22054-2	Nov. 14, 2007
RF Cable(RICHTEC)	9913-30M N-N Cable	STCCAB-30M-1 GHz	Aug. 13, 2008
Software	ADT_Radiated_V 7.6.15.7	NA	NA
CHANCE MOST Antenna Tower	AT-100	0203	NA
CHANCE MOST Turn Table	TT-100	0203	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 horn antenna, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: R3271A) are used only for the measurement of emission frequency above 1GHz if tested.
3. The test was performed in ADT Open Site No. C.
4. The FCC Site Registration No. is 656396.
5. The VCCI Site Registration No. is R-1626.
6. The CANADA Site Registration No. is IC 4824A-3.

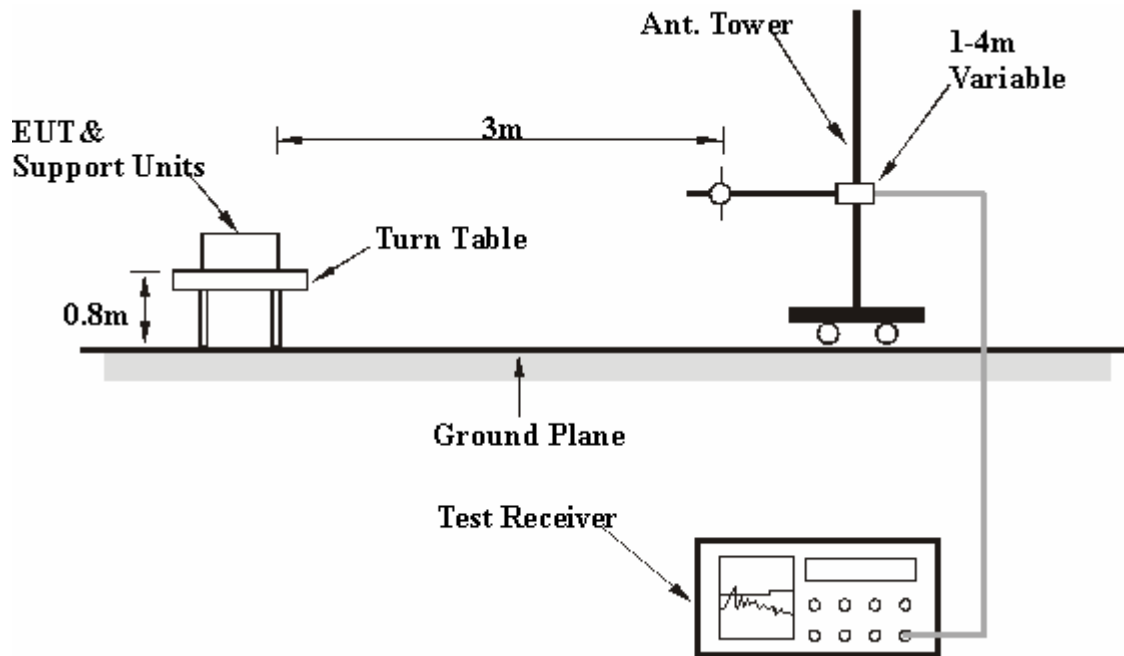
### 4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. 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 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

**NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

#### 4.2.4 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### 4.2.5 EUT OPERATING CONDITIONS

- a. Placed the EUT on testing table.
- b. Prepared other computer system (support unit 1) to act as communication partners and placed them outside of testing area.
- c. The communication partner runs test program “Web control” to enable EUT under transmission/receiving condition continuously via USB cable, and UTP cable.
- d. Repeat steps b-c.

## 4.2.6 TEST RESULTS

### Below 1GHz Worst-Case Data

<b>MODULATION TYPE</b>	DSSS	<b>CHANNEL</b>	Channel 1
<b>INPUT POWER</b>	120Vac, 60 Hz	<b>FREQUENCY RANGE</b>	30-1000 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	22 deg. C, 75%RH, 960hPa	<b>TRANSFER RATE</b>	1Mbps
<b>TESTED BY</b>	Wen Yu	<b>DETECTOR FUNCTION</b>	Quasi-Peak, 120kHz

### 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	84.08	30.97 QP	40.00	-9.03	2.38 H	56	21.27	9.70
2	125.01	28.15 QP	43.50	-15.35	1.51 H	259	14.92	13.23
3	186.00	37.07 QP	43.50	-6.43	1.43 H	98	24.13	12.94
4	310.01	29.93 QP	46.00	-16.07	1.32 H	68	13.28	16.65
5	496.01	33.74 QP	46.00	-12.26	1.98 H	65	12.78	20.96
6	500.02	27.04 QP	46.00	-18.96	1.05 H	150	5.99	21.05
7	558.01	31.02 QP	46.00	-14.98	1.47 H	158	9.71	21.31
8	750.03	34.74 QP	46.00	-11.26	1.92 H	115	7.48	27.26

### 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	50.00	34.12 QP	40.00	-5.88	1.00 V	298	18.18	15.94
2	86.84	33.37 QP	40.00	-6.63	1.00 V	32	23.98	9.39
3	125.01	24.79 QP	43.50	-18.71	1.00 V	1	11.56	13.23
4	186.00	36.07 QP	43.50	-7.43	1.00 V	132	23.13	12.94
5	250.00	27.84 QP	46.00	-18.16	1.31 V	49	15.01	12.83
6	375.00	28.90 QP	46.00	-17.10	1.61 V	244	11.42	17.48
7	500.02	29.02 QP	46.00	-16.98	1.04 V	1	7.97	21.05
8	625.03	28.44 QP	46.00	-17.56	1.00 V	199	4.44	24.00
9	750.03	34.25 QP	46.00	-11.75	1.07 V	127	6.99	27.26

- 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.



**802.11b DSSS modulation**

<b>MODE</b>	Channel 1	<b>FREQUENCY RANGE</b>	1000~25000MHz
<b>INPUT POWER</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>	Peak (PK) Average (AV) 1 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	26 deg. C, 65%RH, 960hPa	<b>TESTED BY</b>	Rex 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	2280.00	53.70 PK	74.00	-20.30	1.54 H	9	23.86	29.84
2	2280.00	46.60 AV	54.00	-7.40	1.54 H	9	16.76	29.84
3	2390.00	58.33 PK	74.00	-15.67	1.41 H	15	28.01	30.32
4	2390.00	45.25 AV	54.00	-8.75	1.41 H	15	14.93	30.32
5	*2412.00	105.60 PK			1.41 H	15	75.19	30.41
6	*2412.00	100.70 AV			1.41 H	15	70.29	30.41
7	4824.00	49.50 PK	74.00	-24.50	1.15 H	119	13.71	35.79
8	4824.00	41.90 AV	54.00	-12.10	1.15 H	119	6.11	35.79
9	7236.00	53.10 PK	74.00	-20.90	1.23 H	137	11.50	41.60
10	7236.00	40.00 AV	54.00	-14.00	1.23 H	137	-1.60	41.60

**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	2280.00	52.80 PK	74.00	-21.20	1.02 V	100	22.96	29.84
2	2280.00	45.20 AV	54.00	-8.80	1.02 V	100	15.36	29.84
3	2390.00	56.16 PK	74.00	-17.84	1.00 V	39	25.84	30.32
4	2390.00	43.62 AV	54.00	-10.38	1.00 V	39	13.30	30.32
5	*2412.00	99.90 PK			1.00 V	38	69.49	30.41
6	*2412.00	95.00 AV			1.00 V	38	64.59	30.41
7	4824.00	48.40 PK	74.00	-25.60	1.00 V	95	12.61	35.79
8	4824.00	40.60 AV	54.00	-13.40	1.00 V	95	4.81	35.79
9	7236.00	52.80 PK	74.00	-21.20	1.00 V	20	11.20	41.60
10	7236.00	39.40 AV	54.00	-14.60	1.00 V	20	-2.20	41.60

**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. The limit value is defined as per 15.247
6. “ \* ” : Fundamental frequency

<b>MODE</b>	Channel 6	<b>FREQUENCY RANGE</b>	1000~25000MHz
<b>INPUT POWER</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>	Peak (PK) Average (AV) 1 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	26 deg. C, 65%RH, 960hPa	<b>TESTED BY</b>	Rex 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	103.80 PK			1.41 H	15	73.28	30.52
2	*2437.00	99.10 AV			1.41 H	15	68.58	30.52
3	4874.00	52.30 PK	74.00	-21.70	1.16 H	113	16.38	35.92
4	4874.00	47.40 AV	54.00	-6.60	1.16 H	113	11.48	35.92
5	7311.00	53.50 PK	74.00	-20.50	1.26 H	134	11.69	41.81
6	7311.00	40.90 AV	54.00	-13.10	1.26 H	134	-0.91	41.81

#### 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	100.20 PK			1.00 V	41	69.68	30.52
2	*2437.00	95.10 AV			1.00 V	41	64.58	30.52
3	4874.00	50.30 PK	74.00	-23.70	1.00 V	92	14.38	35.92
4	4874.00	44.70 AV	54.00	-9.30	1.00 V	92	8.78	35.92
5	7311.00	53.10 PK	74.00	-20.90	1.00 V	17	11.29	41.81
6	7311.00	39.90 AV	54.00	-14.10	1.00 V	17	-1.91	41.81

- 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. The limit value is defined as per 15.247
  6. “ \* “ : Fundamental frequency

<b>MODE</b>	Channel 11	<b>FREQUENCY RANGE</b>	1000~25000MHz
<b>INPUT POWER</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>	Peak (PK) Average (AV) 1 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	26 deg. C, 65%RH, 960hPa	<b>TESTED BY</b>	Rex Huang

#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

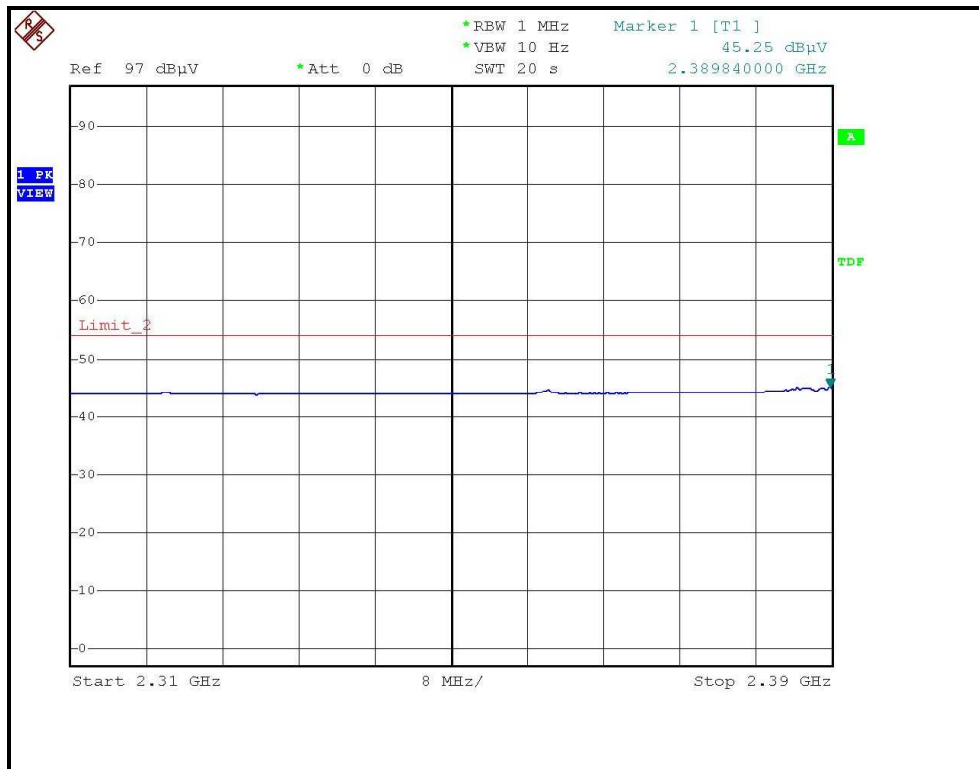
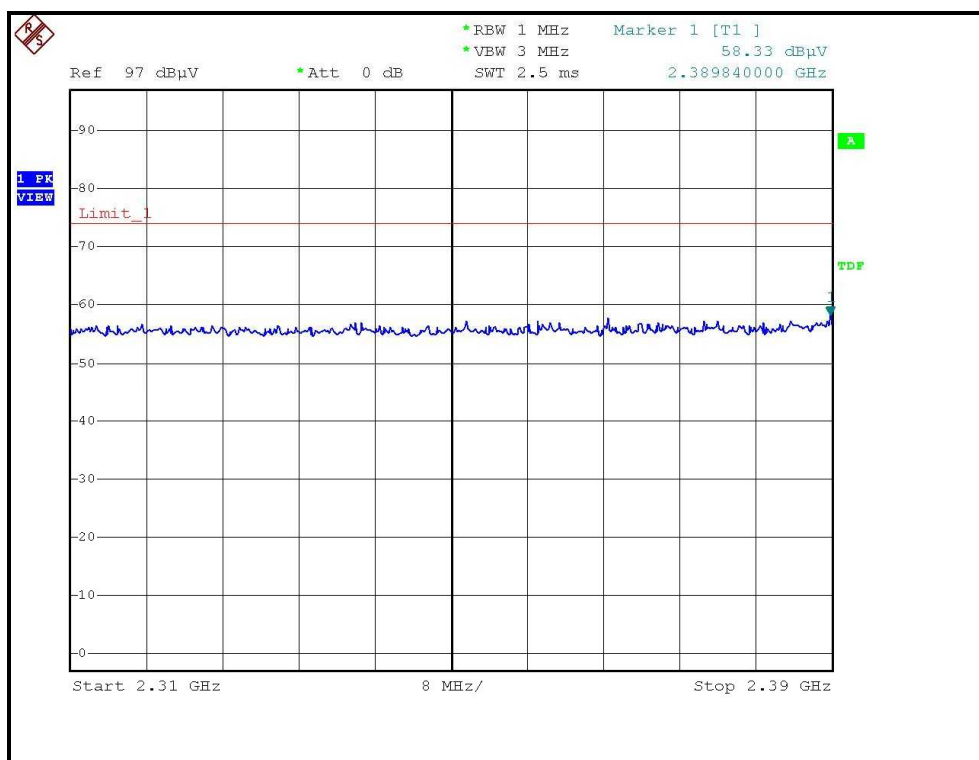
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	100.70 PK			1.41 H	357	70.07	30.63
2	*2462.00	95.90 AV			1.41 H	357	65.27	30.63
3	2488.00	61.74 PK	74.00	-12.26	1.41 H	357	31.00	30.74
4	2488.00	52.32 AV	54.00	-1.68	1.41 H	357	21.58	30.74
5	4924.00	47.80 PK	74.00	-26.20	1.10 H	116	11.74	36.06
6	4924.00	37.30 AV	54.00	-16.70	1.10 H	116	1.24	36.06
7	7386.00	52.80 PK	74.00	-21.20	1.25 H	132	10.79	42.01
8	7386.00	39.70 AV	54.00	-14.30	1.25 H	132	-2.31	42.01

#### ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

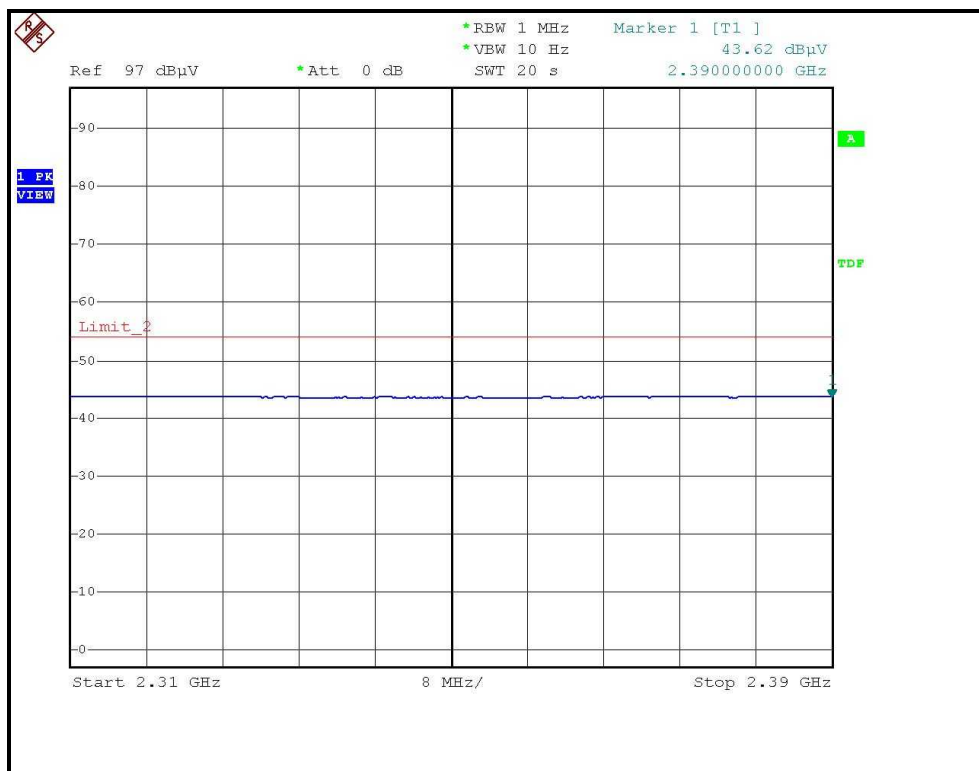
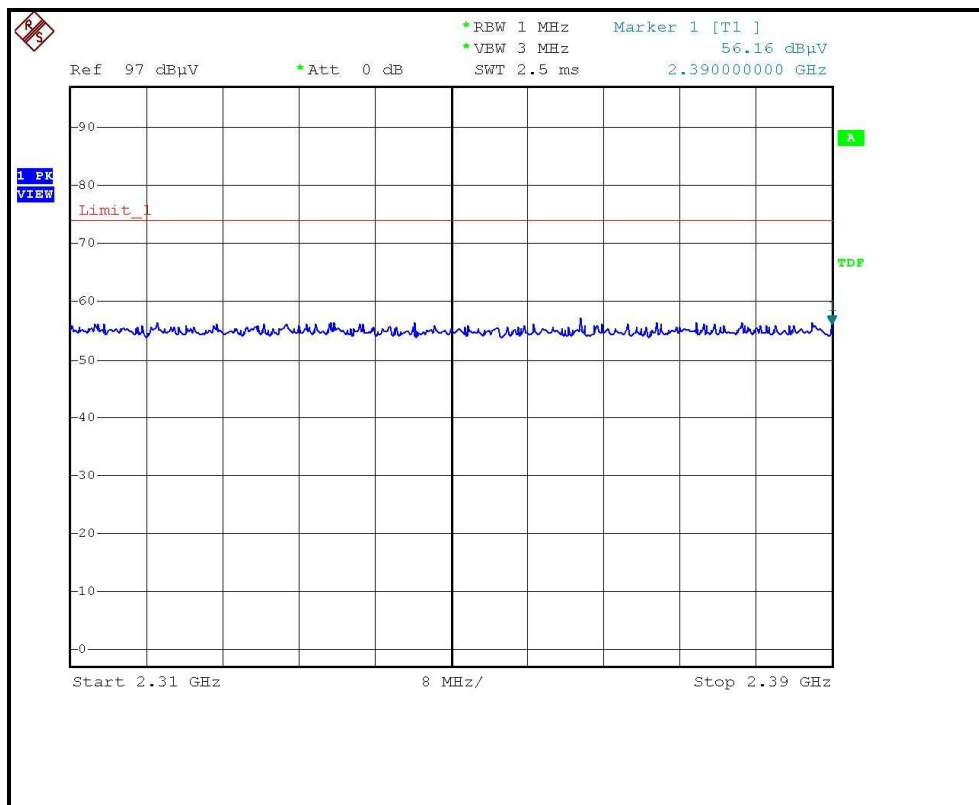
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	96.50 PK			1.00 V	42	65.87	30.63
2	*2462.00	91.40 AV			1.00 V	42	60.77	30.63
3	2488.00	59.16 PK	74.00	-14.84	1.00 V	42	28.42	30.74
4	2488.00	45.09 AV	54.00	-8.91	1.00 V	42	14.35	30.74
5	4924.00	46.90 PK	74.00	-27.10	1.00 V	93	10.84	36.06
6	4924.00	36.70 AV	54.00	-17.30	1.00 V	93	0.64	36.06
7	7386.00	52.60 PK	74.00	-21.40	1.00 V	16	10.59	42.01
8	7386.00	39.30 AV	54.00	-14.70	1.00 V	16	-2.71	42.01

- 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. The limit value is defined as per 15.247
  6. “ \* ” : Fundamental frequency

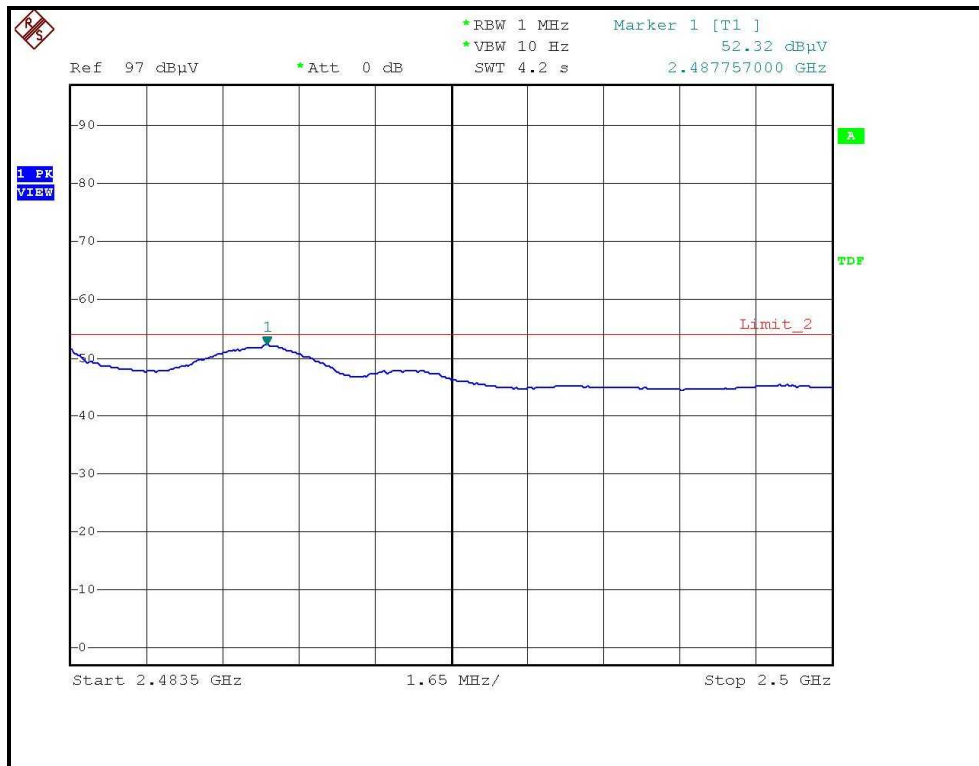
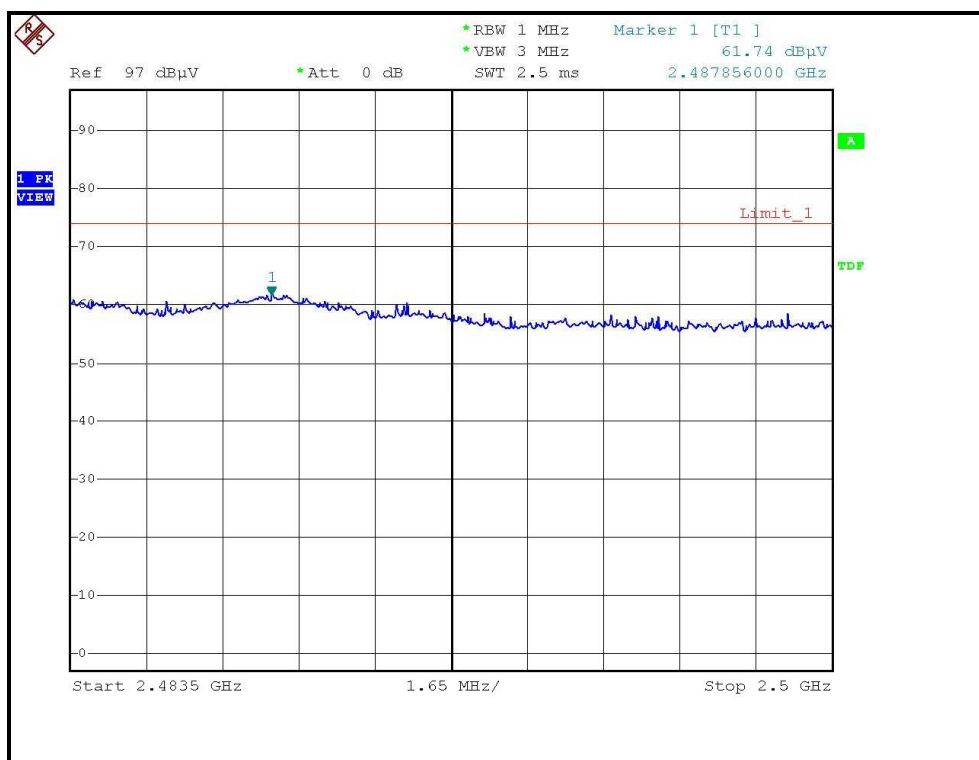
# RESTRICTED BANDEDGE (802.11b MODE, CH1, HORIZONTAL)



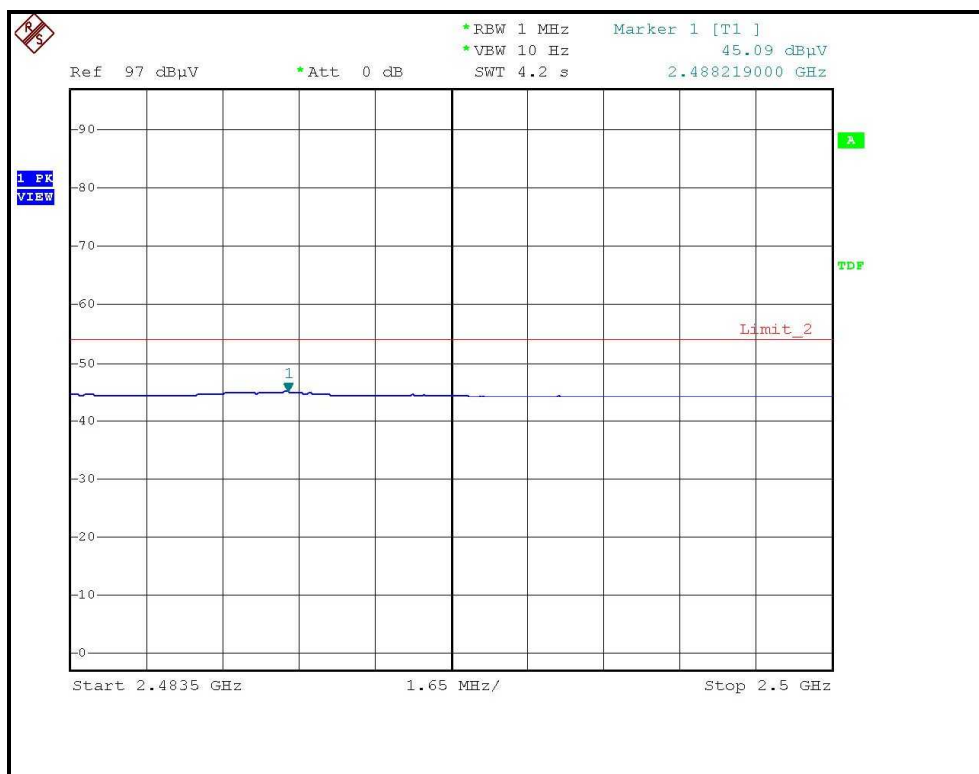
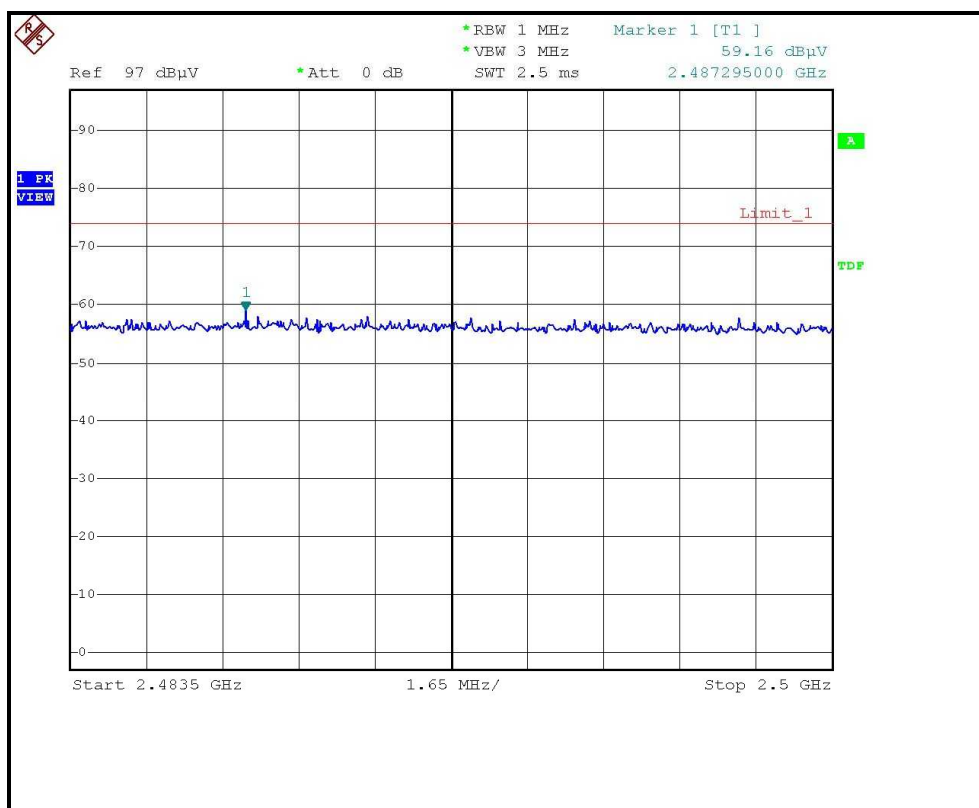
# RESTRICTED BANDEDGE (802.11b MODE, CH1, VERTICAL)



# RESTRICTED BANDEDGE (802.11b MODE, CH11, HORIZONTAL)



# RESTRICTED BANDEDGE (802.11b MODE, CH11, VERTICAL)



## 802.11g OFDM modulation

<b>MODE</b>	Channel 1	<b>FREQUENCY RANGE</b>	1000~25000MHz
<b>INPUT POWER</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>	Peak (PK) Average (AV) 1 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	26 deg. C, 65%RH, 960hPa	<b>TESTED BY</b>	Rex 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	2280.00	56.30 PK	74.00	-17.70	1.55 H	9	26.46	29.84
2	2280.00	49.90 AV	54.00	-4.10	1.55 H	9	20.06	29.84
3	2390.00	65.91 PK	74.00	-8.09	1.42 H	14	35.59	30.32
4	2390.00	48.25 AV	54.00	-5.75	1.42 H	14	17.93	30.32
5	*2412.00	107.20 PK			1.41 H	16	76.79	30.41
6	*2412.00	95.90 AV			1.41 H	16	65.49	30.41
7	4824.00	50.30 PK	74.00	-23.70	1.13 H	118	14.51	35.79
8	4824.00	34.40 AV	54.00	-19.60	1.13 H	118	-1.39	35.79
9	7236.00	52.90 PK	74.00	-21.10	1.28 H	131	11.30	41.60
10	7236.00	39.40 AV	54.00	-14.60	1.28 H	131	-2.20	41.60

### 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	2280.00	56.40 PK	74.00	-17.60	1.02 V	99	26.56	29.84
2	2280.00	50.20 AV	54.00	-3.80	1.02 V	99	20.36	29.84
3	2390.00	61.12 PK	74.00	-12.88	1.00 V	40	30.80	30.32
4	2390.00	45.22 AV	54.00	-8.78	1.00 V	40	14.90	30.32
5	*2412.00	101.30 PK			1.00 V	40	70.89	30.41
6	*2412.00	94.60 AV			1.00 V	40	64.19	30.41
7	4824.00	49.70 PK	74.00	-24.30	1.00 V	97	13.91	35.79
8	4824.00	33.50 AV	54.00	-20.50	1.00 V	97	-2.29	35.79
9	7236.00	53.10 PK	74.00	-20.90	1.00 V	20	11.50	41.60
10	7236.00	39.20 AV	54.00	-14.80	1.00 V	20	-2.40	41.60

#### 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. The limit value is defined as per 15.247
6. “ \* ” : Fundamental frequency



<b>MODE</b>	Channel 6	<b>FREQUENCY RANGE</b>	1000~25000MHz
<b>INPUT POWER</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>	Peak (PK) Average (AV) 1 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	26 deg. C, 65%RH, 960hPa	<b>TESTED BY</b>	Rex 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	104.60 PK			1.41 H	15	74.08	30.52
2	*2437.00	94.20 AV			1.41 H	15	63.68	30.52
3	4874.00	53.70 PK	74.00	-20.30	1.16 H	114	17.78	35.92
4	4874.00	36.90 AV	54.00	-17.10	1.16 H	114	0.98	35.92
5	7311.00	53.30 PK	74.00	-20.70	1.25 H	137	11.49	41.81
6	7311.00	40.40 AV	54.00	-13.60	1.25 H	137	-1.41	41.81

#### 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	101.10 PK			1.00 V	41	70.58	30.52
2	*2437.00	90.60 AV			1.00 V	41	60.08	30.52
3	4874.00	50.20 PK	74.00	-23.80	1.00 V	97	14.28	35.92
4	4874.00	34.10 AV	54.00	-19.90	1.00 V	97	-1.82	35.92
5	7311.00	52.90 PK	74.00	-21.10	1.00 V	19	11.09	41.81
6	7311.00	39.60 AV	54.00	-14.40	1.00 V	19	-2.21	41.81

- 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. The limit value is defined as per 15.247
  6. “ \* “ : Fundamental frequency

<b>MODE</b>	Channel 11	<b>FREQUENCY RANGE</b>	1000~25000MHz
<b>INPUT POWER</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION &amp; BANDWIDTH</b>	Peak (PK) Average (AV) 1 MHz
<b>ENVIRONMENTAL CONDITIONS</b>	26 deg. C, 65%RH, 960hPa	<b>TESTED BY</b>	Rex Huang

#### ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M

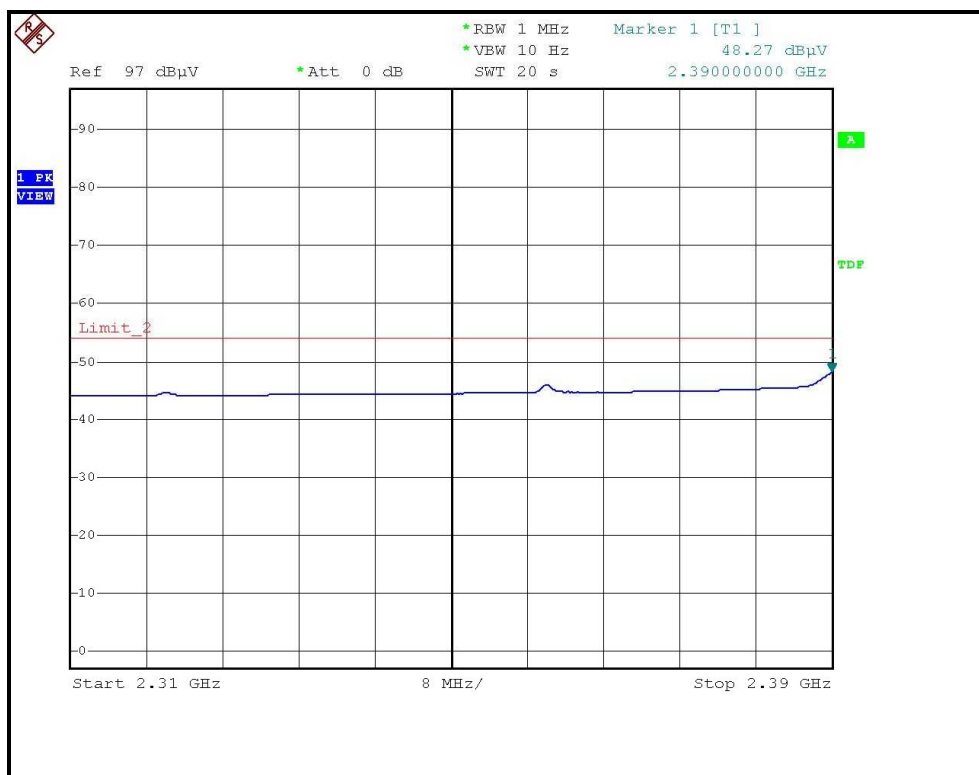
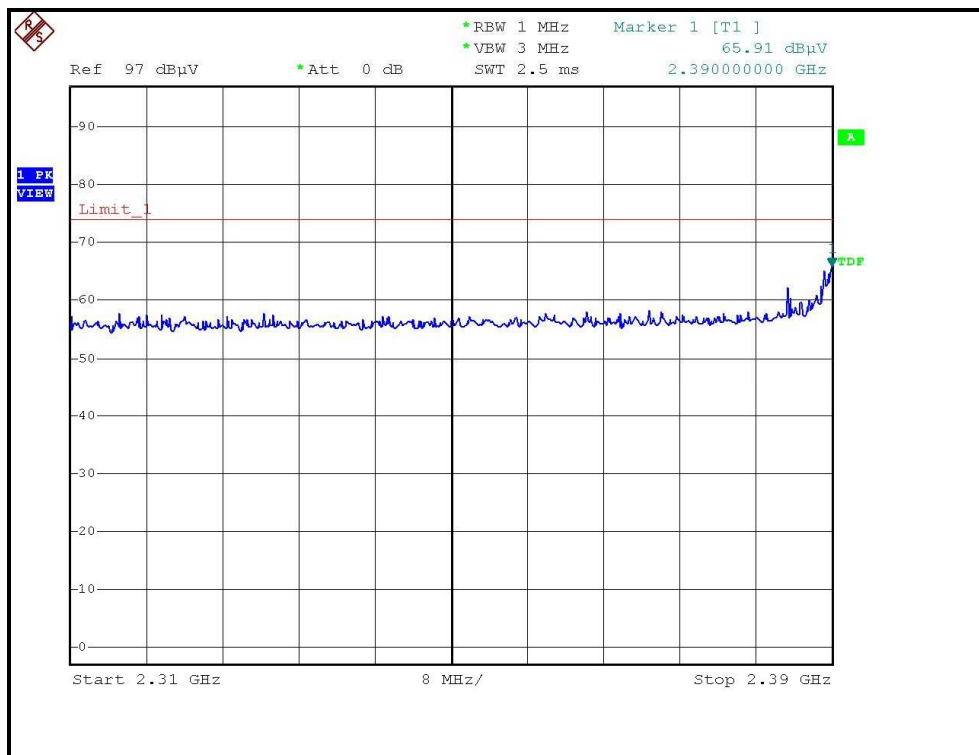
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	103.10 PK			1.41 H	357	72.47	30.63
2	*2462.00	92.00 AV			1.41 H	357	61.37	30.63
3	2483.50	72.85 PK	74.00	-1.15	1.41 H	357	42.13	30.72
4	<b>2483.50</b>	<b>53.51 AV</b>	<b>54.00</b>	<b>-0.49</b>	<b>1.41 H</b>	<b>357</b>	<b>22.79</b>	<b>30.72</b>
5	4924.00	55.50 PK	74.00	-18.50	1.10 H	119	19.44	36.06
6	4924.00	38.50 AV	54.00	-15.50	1.10 H	119	2.44	36.06
7	7386.00	52.50 PK	74.00	-21.50	1.21 H	124	10.49	42.01
8	7386.00	39.20 AV	54.00	-14.80	1.21 H	124	-2.81	42.01

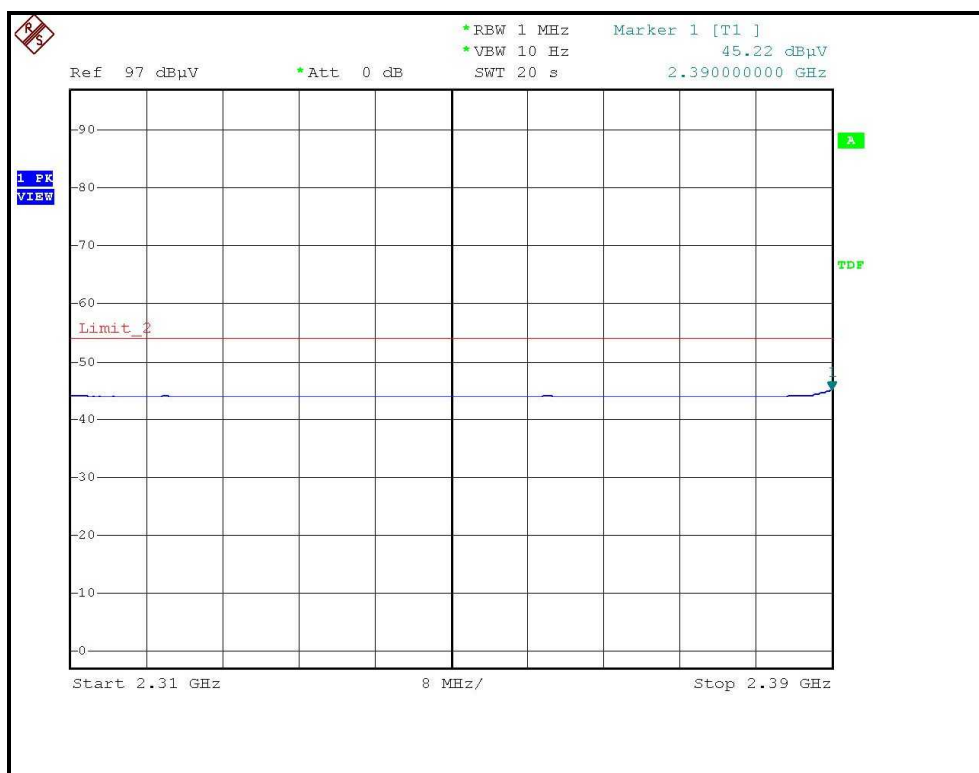
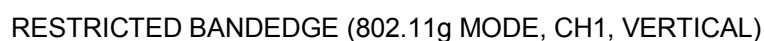
#### ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

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	100.20 PK			1.00 V	42	69.57	30.63
2	*2462.00	88.80 AV			1.00 V	42	58.17	30.63
3	2483.50	68.57 PK	74.00	-5.43	1.00 V	42	37.85	30.72
4	2483.50	49.55 AV	54.00	-4.45	1.00 V	42	18.83	30.72
5	4924.00	54.80 PK	74.00	-19.20	1.00 V	96	18.74	36.06
6	4924.00	37.40 AV	54.00	-16.60	1.00 V	96	1.34	36.06
7	7386.00	52.40 PK	74.00	-21.60	1.00 V	14	10.39	42.01
8	7386.00	38.70 AV	54.00	-15.30	1.00 V	14	-3.31	42.01

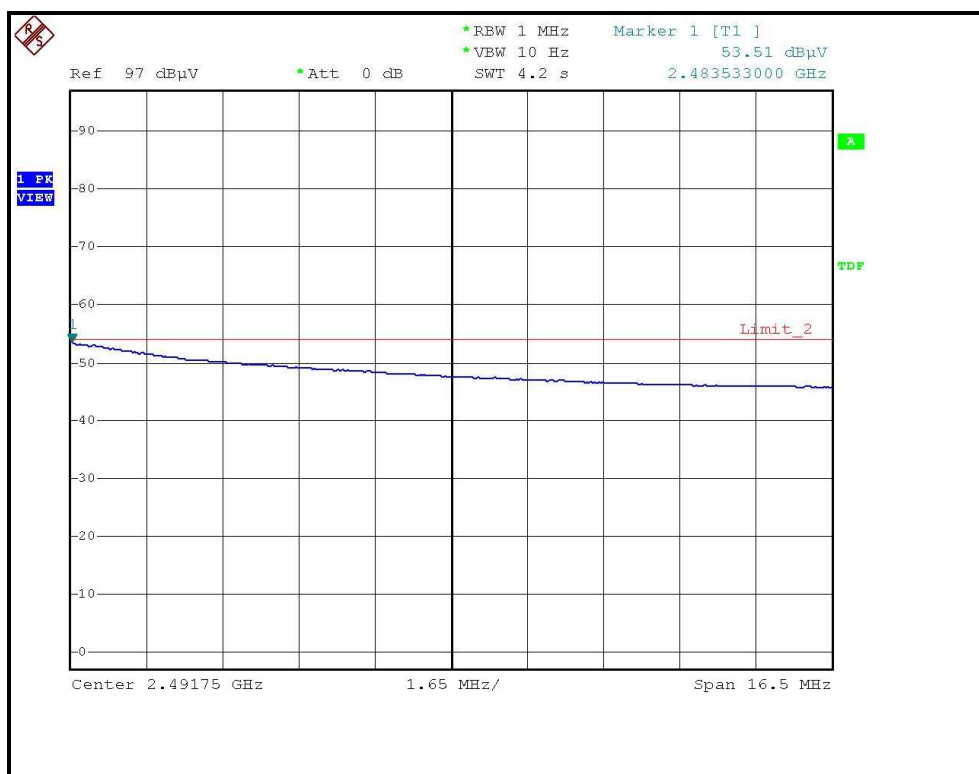
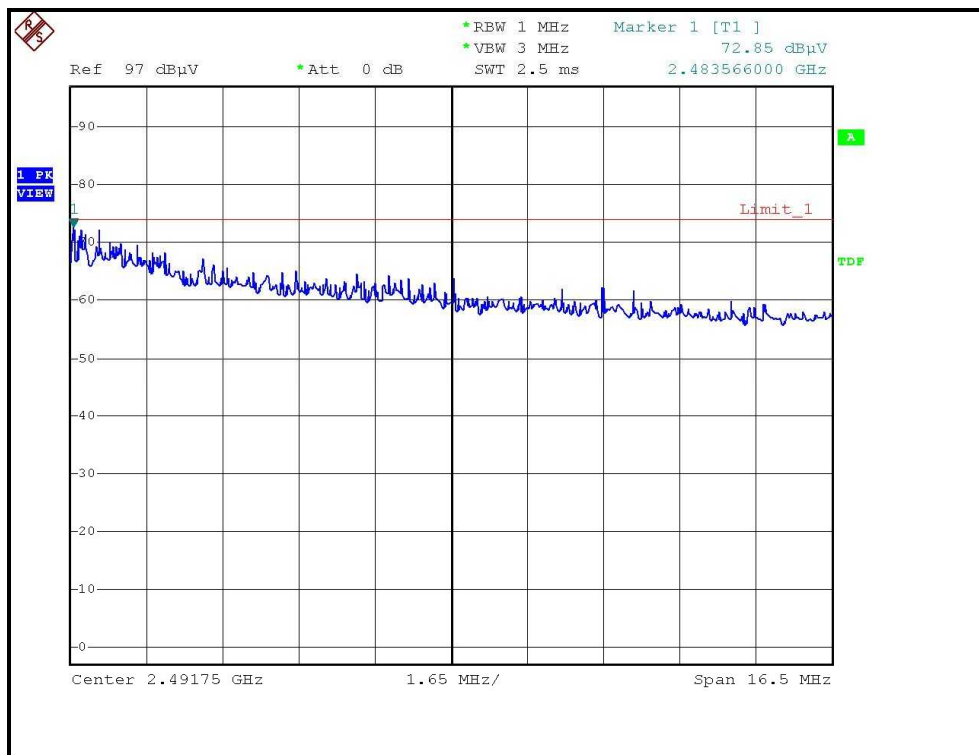
- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. The limit value is defined as per 15.247
  6. “ \* ” : Fundamental frequency

# RESTRICTED BANDEDGE (802.11g MODE, CH1, HORIZONTAL)

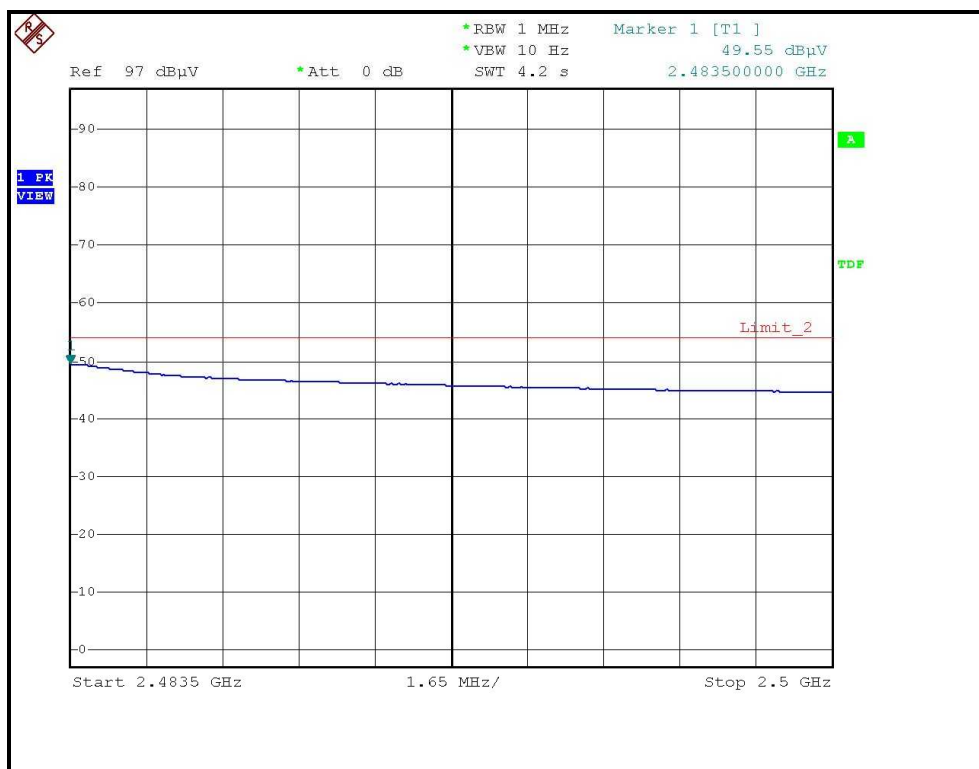
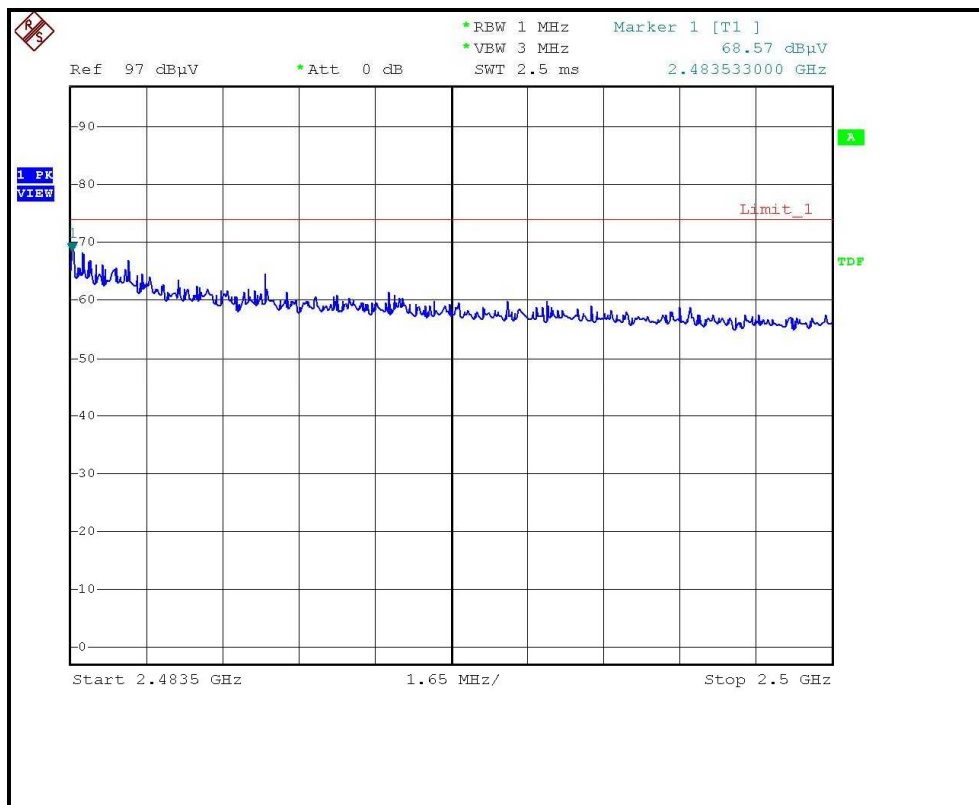




# RESTRICTED BANDEDGE (802.11g MODE, CH11, HORIZONTAL)



# RESTRICTED BANDEDGE (802.11g MODE, CH11, VERTICAL)



### 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 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 22, 2007

**NOTE:**

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
- 2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

#### 4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100 kHz RBW and 100 kHz VBW. The 6 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB.

#### 4.3.4 TEST SETUP



For the actual test configuration, please refer to the related Item – Photographs of the Test Configuration.

#### 4.3.5 EUT OPERATING CONDITIONS

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



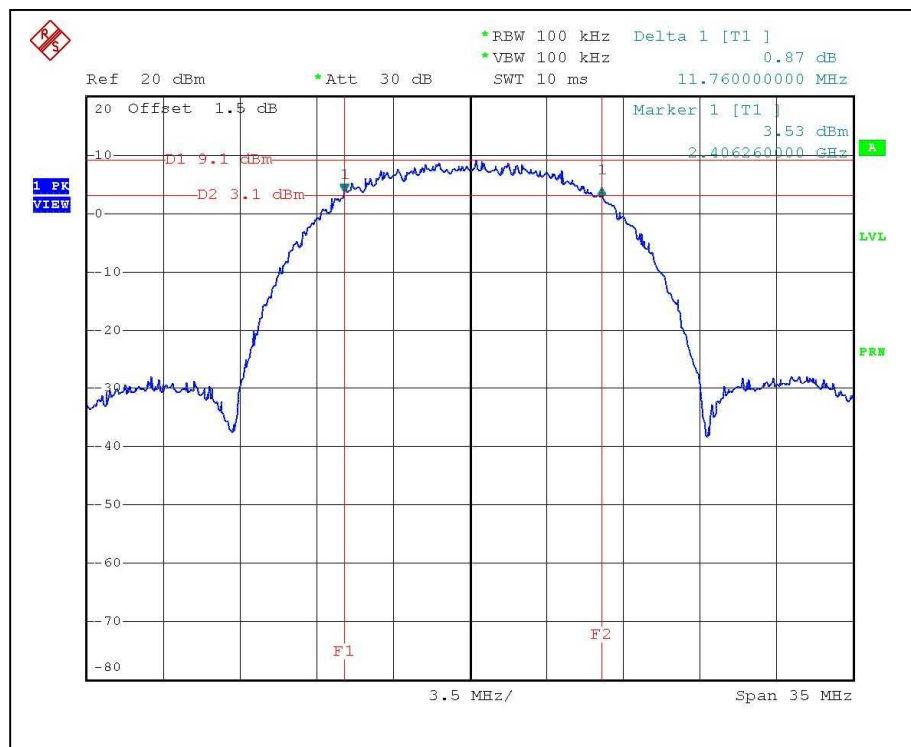
#### 4.3.6 TEST RESULTS

##### 802.11b DSSS modulation

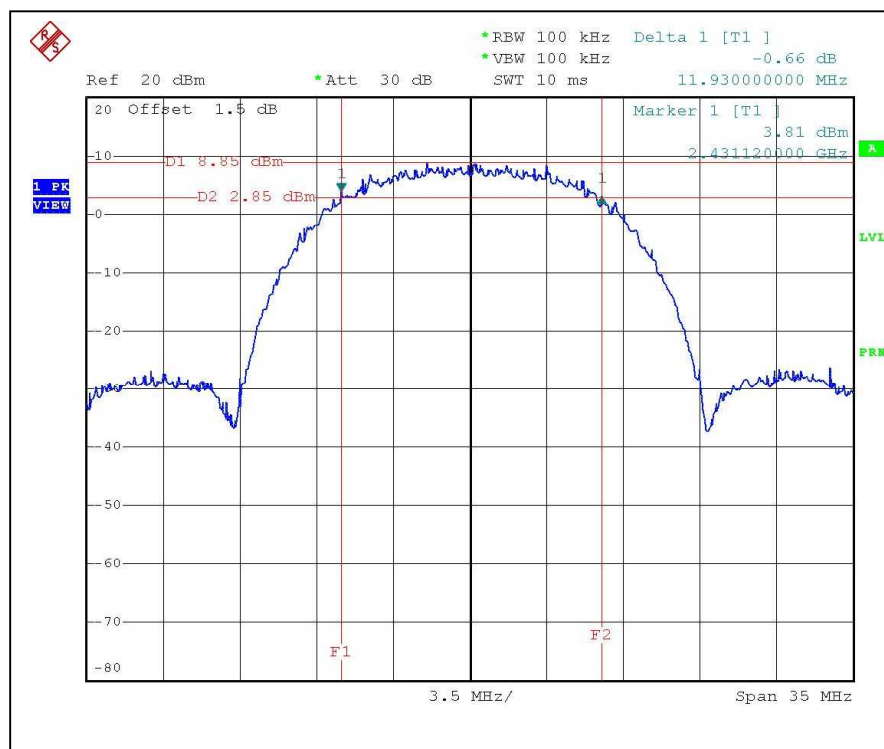
<b>MODULATION TYPE</b>	CCK	<b>TRANSFER RATE</b>	1Mbps
<b>INPUT POWER</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 65%RH, 960hPa
<b>TESTED BY</b>	Phoenix Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	6 dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	11.76	0.5	PASS
6	2437	11.93	0.5	PASS
11	2462	11.71	0.5	PASS

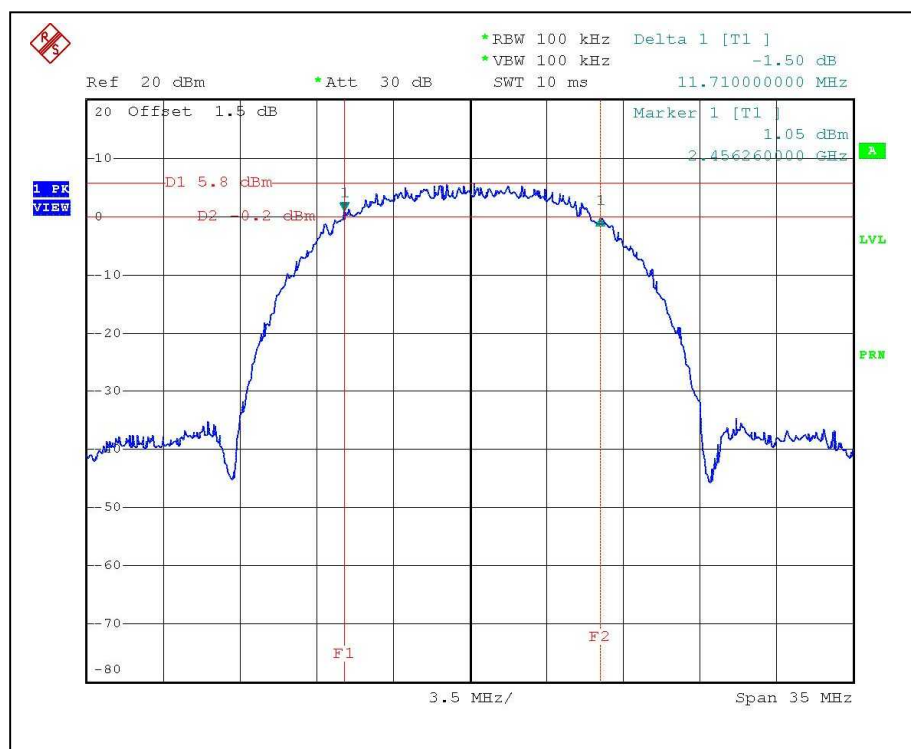
CH1



CH6



CH11

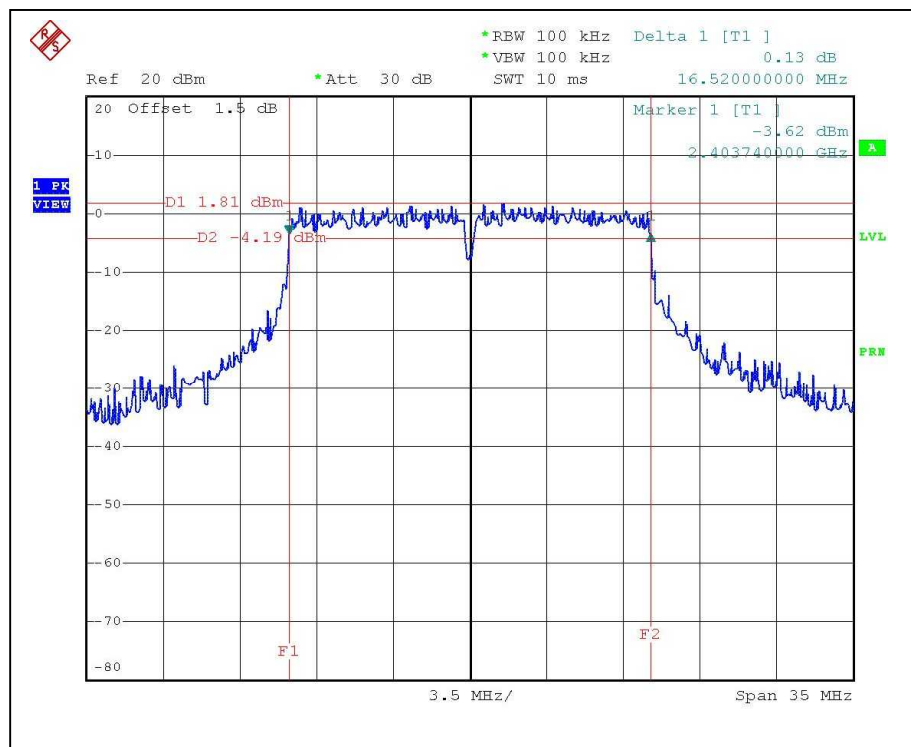


**802.11g OFDM modulation**

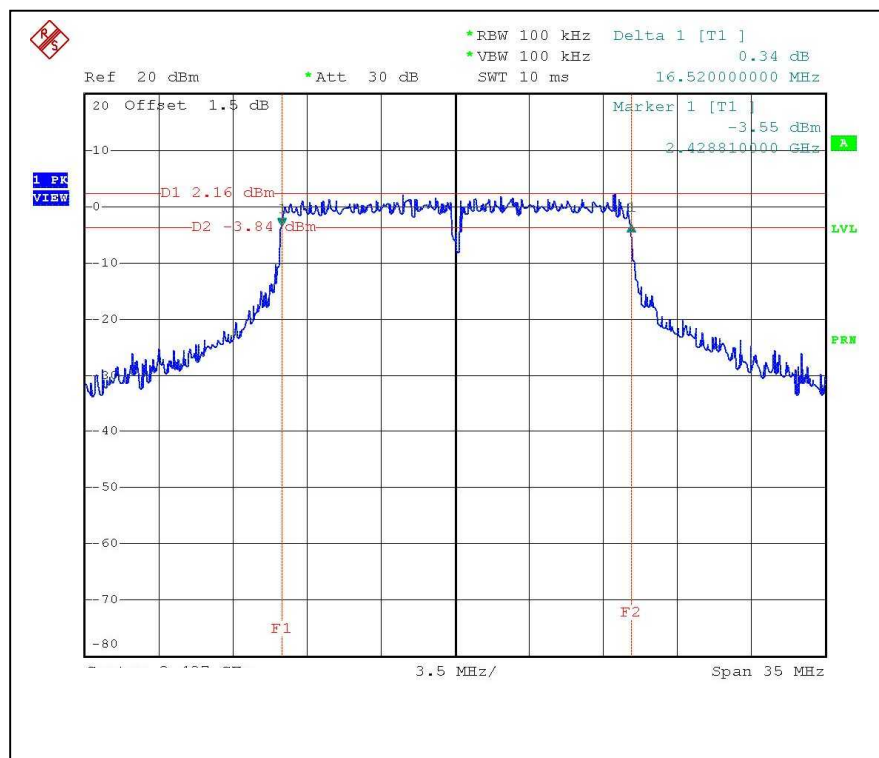
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 65%RH, 961hPa
<b>TESTED BY</b>	Phoenix Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	6 dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	16.52	0.5	PASS
6	2437	16.52	0.5	PASS
11	2462	16.59	0.5	PASS

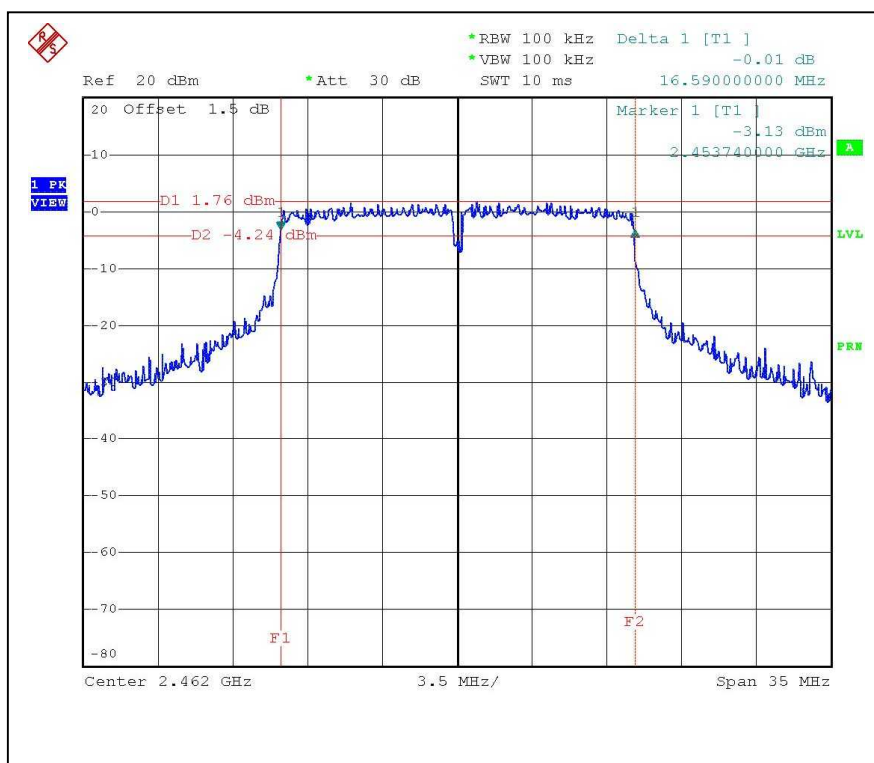
# CH1



# CH6



# CH11



## 4.4 MAXIMUM PEAK OUTPUT POWER

### 4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

### 4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 22, 2007
Agilent SIGNAL GENERATOR	E8257C	MY43320668	Dec. 07, 2007
TEKTRONIX OSCILLOSCOPE	TDS380	B016335	July. 15, 2008
NARDA DETECTOR	4503A	FSCM99899	NA

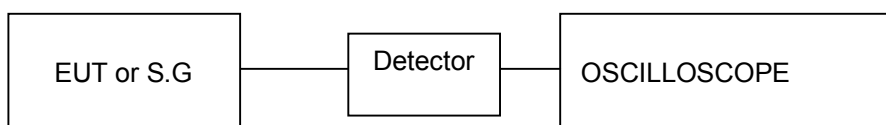
**NOTE:**

The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

#### 4.4.3 TEST PROCEDURES

1. A detector was used on the output port of the EUT. An oscilloscope was used to read the peak response of the detector.
2. Replaced the EUT by the signal generator. The center frequency of the S.G was adjusted to the center frequency of the measured channel.
3. Adjusted the power to have the same peak reading on oscilloscope. Record the power level.

#### 4.4.4 TEST SETUP



#### 4.4.5 EUT OPERATING CONDITIONS

Same as Item 4.3.5



#### 4.4.6 TEST RESULTS

##### 802.11b DSSS modulation

<b>MODULATION TYPE</b>	CCK	<b>TRANSFER RATE</b>	1Mbps
<b>INPUT POWER</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 65%RH, 960hPa
<b>TESTED BY</b>	Phoenix Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	103.276	20.14	30	PASS
6	2437	102.565	20.11	30	PASS
11	2462	64.863	18.12	30	PASS

### 802.11g OFDM modulation

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 65%RH, 960hPa
<b>TESTED BY</b>	Phoenix Huang		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	221.820	23.46	30	PASS
6	2437	206.063	23.14	30	PASS
11	2462	206.538	23.15	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 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 22, 2007

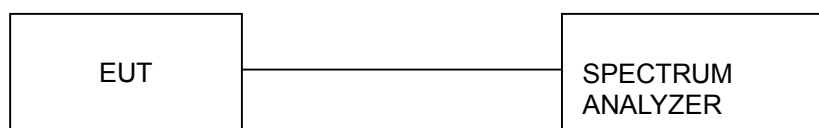
**NOTE:**

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
- 2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

#### 4.5.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3 kHz RBW and 30 kHz VBW, set sweep time=span/3kHz. The power spectral density was measured and recorded. The sweep time is allowed to be longer than span/3KHz for a full response of the mixer in the spectrum analyzer.

#### 4.5.4 TEST SETUP



#### 4.5.5 EUT OPERATING CONDITIONS

Same as 4.3.5

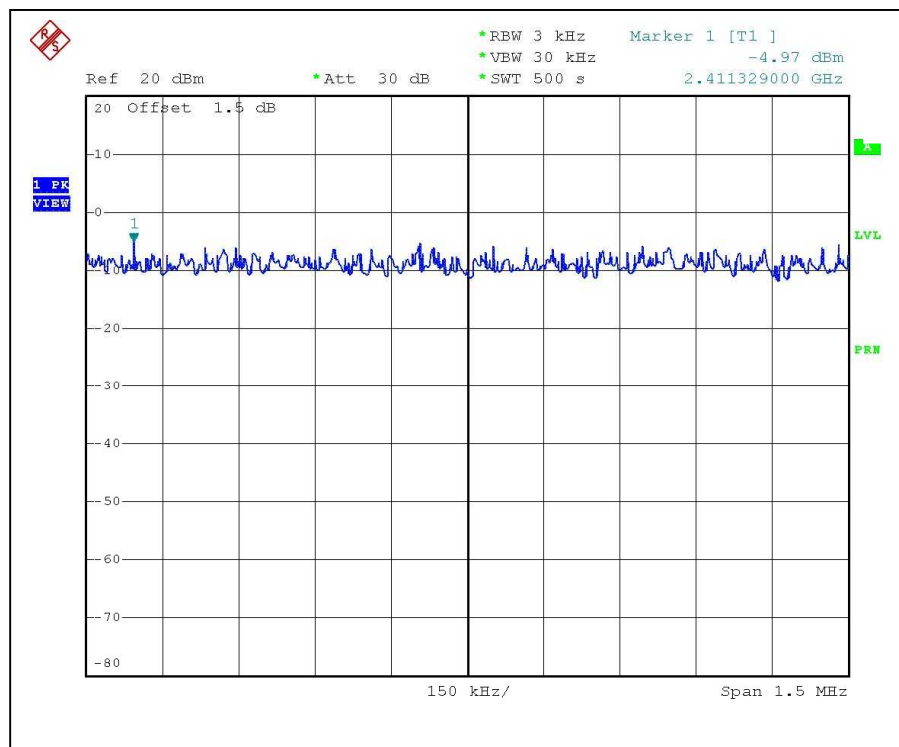
#### 4.5.6 TEST RESULTS

##### 802.11b DSSS modulation

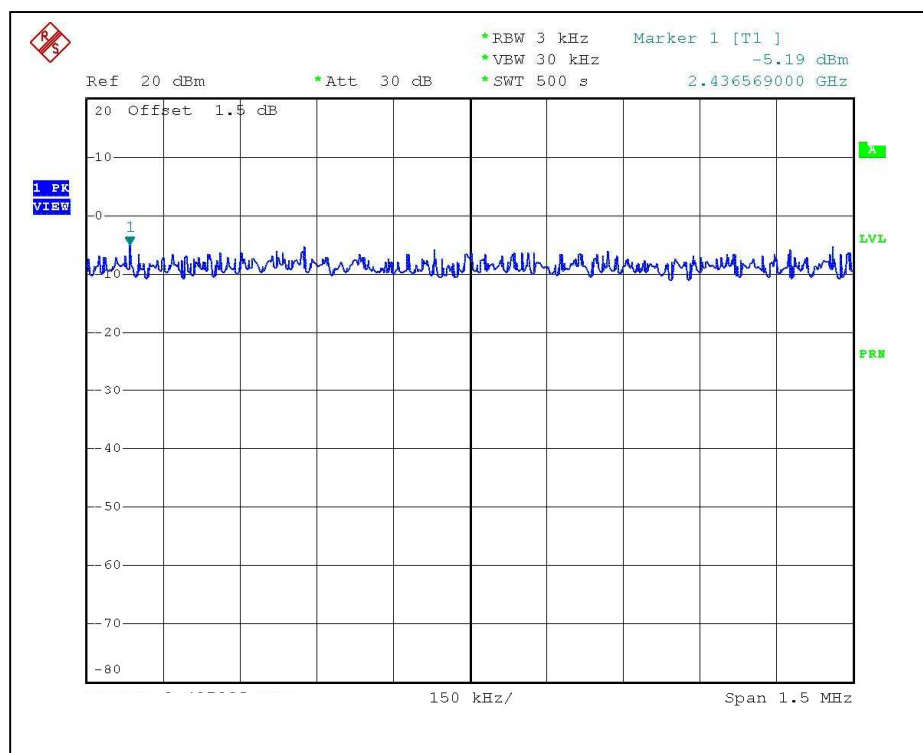
<b>MODULATION TYPE</b>	CCK	<b>TRANSFER RATE</b>	1Mbps
<b>INPUT POWER</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 65%RH, 960hPa
<b>TESTED BY</b>	Phoenix Huang		

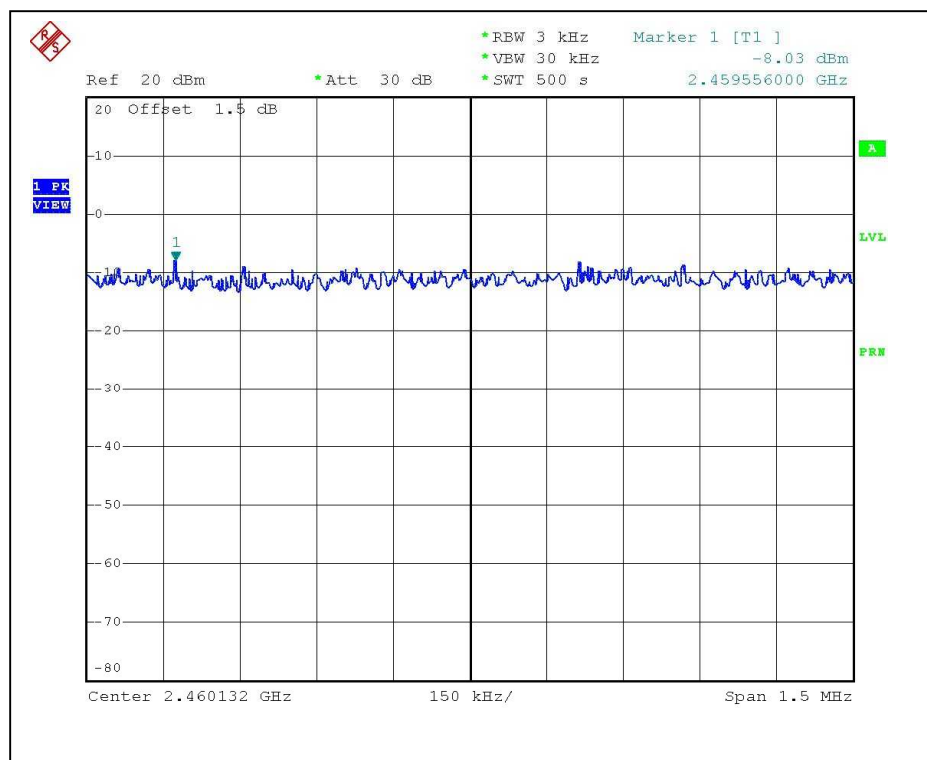
CHANNEL NUMBER	CHANNEL FREQUENCY (MHz )	RF POWER LEVEL IN 3 KHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-4.97	8	PASS
6	2437	-5.19	8	PASS
11	2462	-8.03	8	PASS

# CH1



# CH6





### 802.11g OFDM modulation

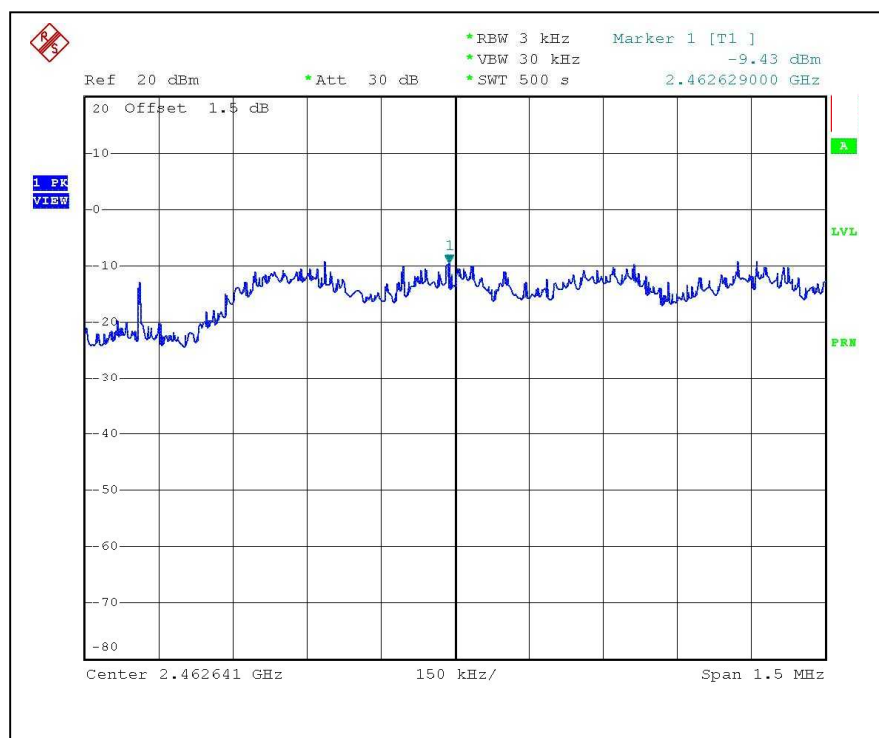
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	25deg. C, 65%RH, 961hPa
<b>TESTED BY</b>	Phoenix Huang		

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz )	RF POWER LEVEL IN 3 KHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-8.80	8	PASS
6	2437	-8.85	8	PASS
11	2462	-9.43	8	PASS





CH11



## 4.6 CONDUCTED EMISSION AND BAND EDGES MEASUREMENT

### 4.6.1 LIMITS OF CONDUCTED EMISSION AND BAND EDGES MEASUREMENT

Below -20dB of the highest emission level of operating band (in 100KHz Resolution Bandwidth).

### 4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 22, 2007

**NOTE:**

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.
- 2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

### 4.6.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low loss cable. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges were measured and recorded.

The spectrum plots (RBW = VBW = 100kHz) are attached on the following pages.

### 4.6.4 EUT OPERATING CONDITION

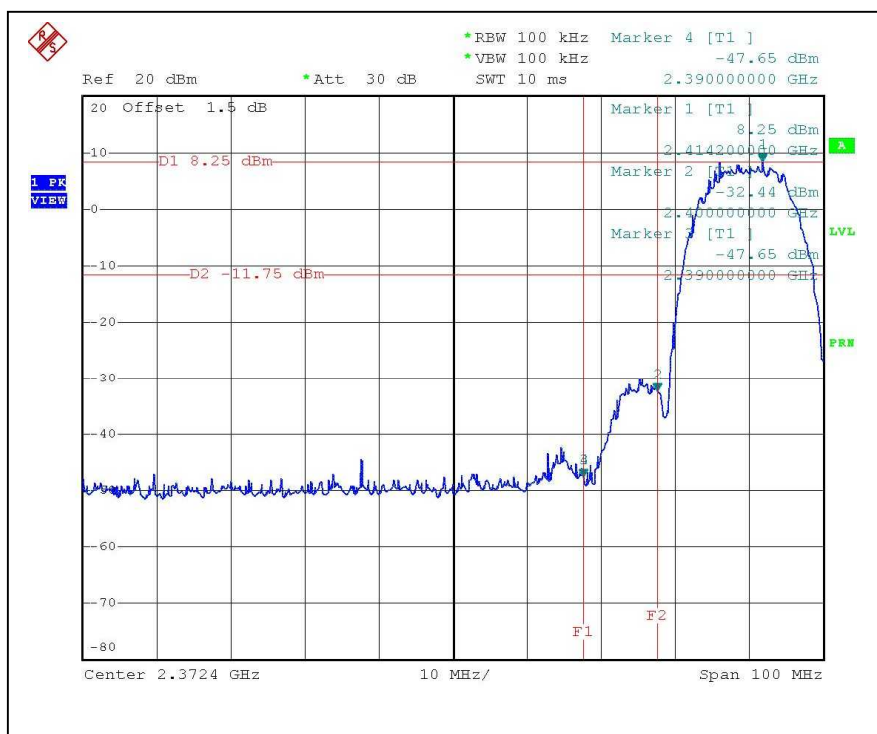
Same as Item 4.3.5

#### 4.6.5 TEST RESULTS

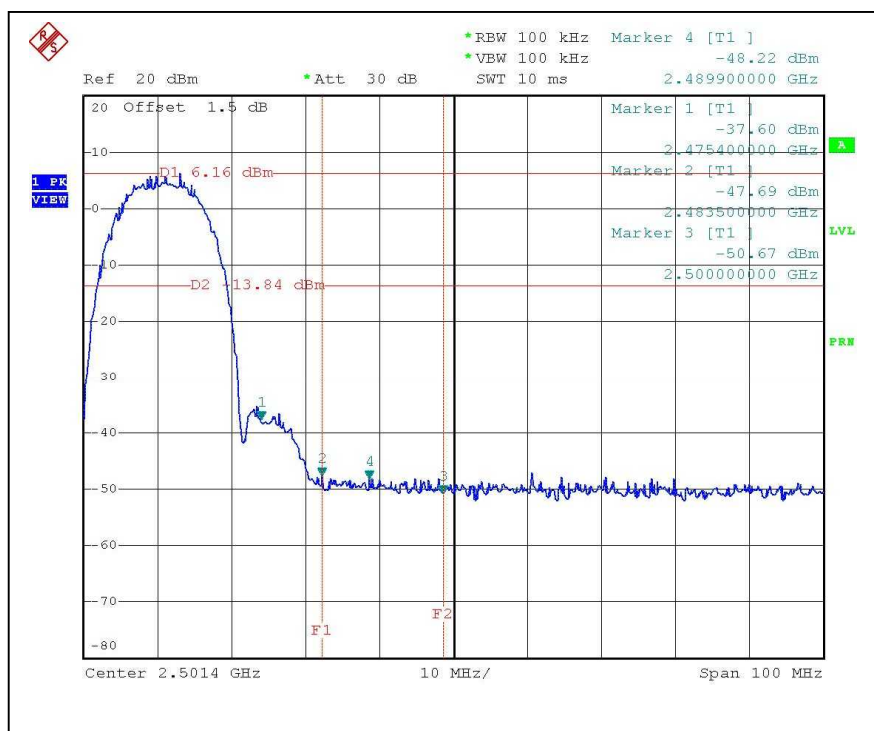
The spectrum plots are attached on the following pages. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

## 802.11b DSSS MODULATION:

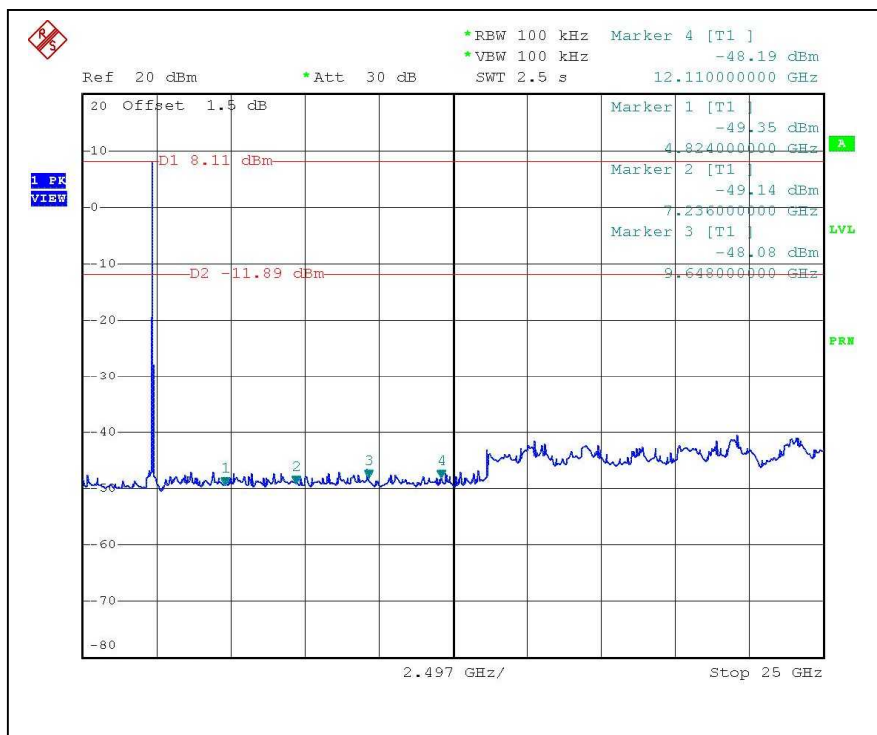
CH1



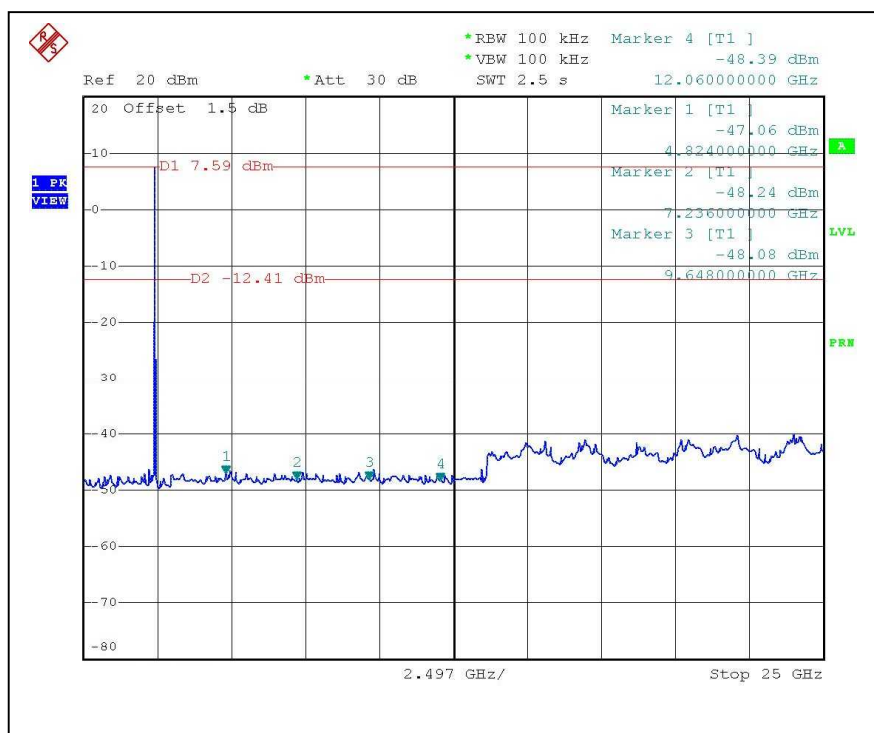
CH11



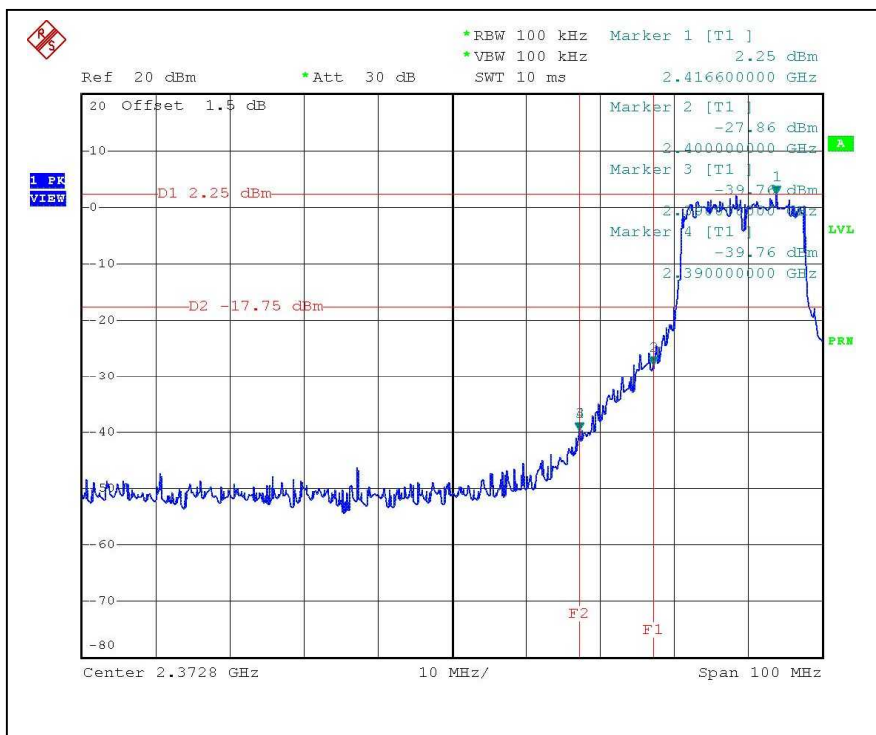
CH1



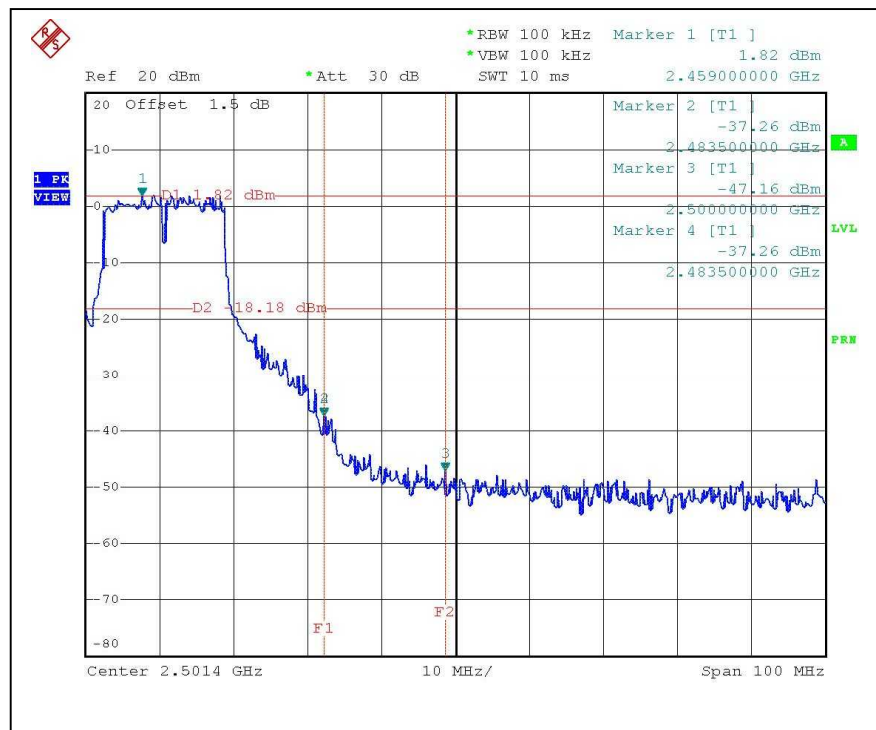
CH11



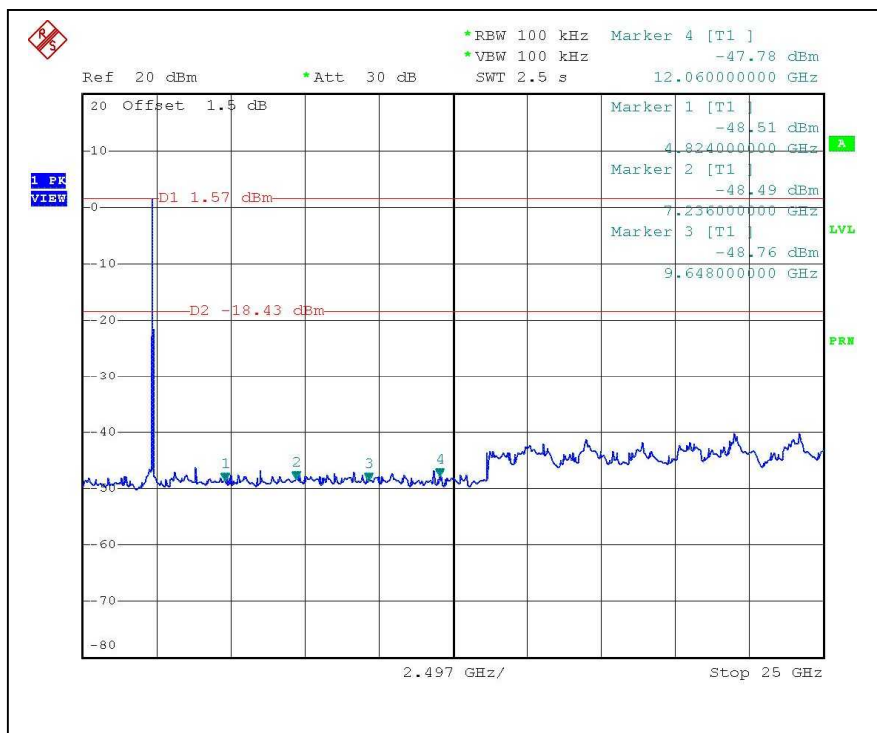
## 802.11g OFDM MODULATION: CH1



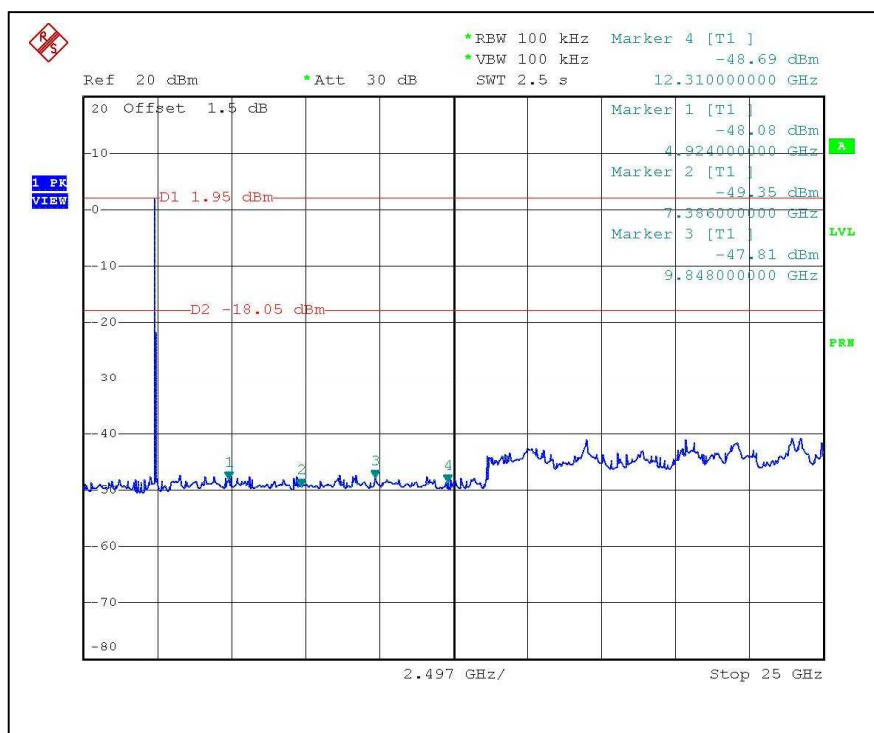
CH11



CH1



CH11





## **4.7 ANTENNA REQUIREMENT**

### **4.7.1 STANDARD APPLICABLE**

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### **4.7.2 ANTENNA CONNECTED CONSTRUCTION**

The antenna used in this product is PCB Printed antenna without connector. The maximum Gain of the antenna is 0dBi

## 5 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025:

<b>USA</b>	FCC, UL, A2LA
<b>Germany</b>	TUV Rheinland
<b>Japan</b>	VCCI
<b>Norway</b>	NEMKO
<b>Canada</b>	INDUSTRY CANADA, CSA
<b>R.O.C.</b>	TAF, BSMI, NCC
<b>Netherlands</b>	Telefication
<b>Singapore</b>	GOST-ASIA (MOU)
<b>Russia</b>	CERTIS (MOU)

Copies of accreditation 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: 886-2-26052943

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

**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.

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

No any modifications are made to the EUT by the lab during the test.