

# FCC TEST REPORT (15.247)

**REPORT NO.:** RF950614H04

**MODEL NO.:** AG-220

**RECEIVED:** June 14, 2006

**TESTED:** June 17 to July 14, 2006

**ISSUED:** July 15, 2006

**APPLICANT:** ZyXEL Communications Corporation

**ADDRESS:** No. 6, Innovation Road II, Science Park,  
Hsinchu 300 TAIWAN ROC

**ISSUED BY:** Advance Data Technology Corporation

**TEST LOCATION:** No. 81-1, Lu Liao Keng, 9 Ling, Wu Lung  
Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien,  
Taiwan, R.O.C.

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No. 2177-01

## Table of Contents

1.	CERTIFICATION .....	4
2.	SUMMARY OF TEST RESULTS .....	5
3.	GENERAL INFORMATION .....	6
3.1	GENERAL DESCRIPTION OF EUT .....	6
3.2	DESCRIPTION OF TEST MODES .....	7
3.2.1	TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL: .....	8
3.3	GENERAL DESCRIPTION OF APPLIED STANDARDS .....	10
3.4	DESCRIPTION OF SUPPORT UNITS.....	11
3.5	CONFIGURATION OF SYSTEM UNDER TEST .....	12
4.	TEST TYPES AND RESULTS .....	13
4.1	CONDUCTED EMISSION MEASUREMENT .....	13
4.1.1	LIMITS OF CONDUCTED EMISSION MEASUREMENT .....	13
4.1.2	TEST INSTRUMENTS.....	13
4.1.3	TEST PROCEDURES .....	14
4.1.4	DEVIATION FROM TEST STANDARD .....	14
4.1.5	TEST SETUP .....	15
4.1.6	EUT OPERATING CONDITIONS .....	15
4.1.7	TEST RESULTS .....	16
4.2	RADIATED EMISSION MEASUREMENT .....	18
4.2.1	LIMITS OF RADIATED EMISSION MEASUREMENT .....	18
4.2.2	TEST INSTRUMENTS.....	19
4.2.3	TEST PROCEDURES .....	20
4.2.4	DEVIATION FROM TEST STANDARD .....	20
4.2.5	TEST SETUP .....	21
4.2.6	EUT OPERATING CONDITIONS .....	21
4.2.7	TEST RESULTS .....	22
4.3	6dB BANDWIDTH MEASUREMENT .....	37
4.3.1	LIMITS OF 6DB BANDWIDTH MEASUREMENT .....	37
4.3.2	TEST INSTRUMENTS.....	37
4.3.3	TEST PROCEDURE.....	38
4.3.4	DEVIATION FROM TEST STANDARD .....	38
4.3.5	TEST SETUP .....	38



4.3.6	EUT OPERATING CONDITIONS .....	38
4.3.7	TEST RESULTS .....	39
4.4	MAXIMUM PEAK OUTPUT POWER.....	43
4.4.1	LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT .....	43
4.4.2	INSTRUMENTS .....	43
4.4.3	TEST PROCEDURES .....	44
4.4.4	DEVIATION FROM TEST STANDARD .....	44
4.4.5	TEST SETUP .....	44
4.4.6	EUT OPERATING CONDITIONS .....	44
4.4.7	TEST RESULTS .....	45
4.5	POWER SPECTRAL DENSITY MEASUREMENT.....	46
4.5.1	LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT.....	46
4.5.2	TEST INSTRUMENTS.....	46
4.5.3	TEST PROCEDURE.....	47
4.5.4	DEVIATION FROM TEST STANDARD.....	47
4.5.5	TEST SETUP .....	47
4.5.6	EUT OPERATING CONDITION.....	47
4.5.7	TEST RESULTS .....	48
4.6	CONDUCTED EMISSION AND BAND EDGES MEASUREMENT.....	52
4.6.1	LIMITS OF CONDUCTED EMISSION AND BAND EDGES MEASUREMENT .....	52
4.6.2	TEST INSTRUMENTS.....	52
4.6.3	TEST PROCEDURE.....	52
4.6.4	EUT OPERATING CONDITION.....	52
4.6.5	TEST RESULTS .....	53
4.7	ANTENNA REQUIREMENT .....	58
4.7.1	STANDARD APPLICABLE.....	58
4.7.2	ANTENNA CONNECTED CONSTRUCTION.....	58
5.	PHOTOGRAPHS OF THE TEST CONFIGURATION.....	59
6.	INFORMATION ON THE TESTING LABORATORIES .....	61
	APPENDIX-A.....	A-1



# 1. CERTIFICATION

**PRODUCT:** 802.11a/g Wireless USB Adapter  
**BRAND NAME:** ZyXEL  
**MODEL NO.:** AG-220  
**TEST SAMPLE:** ENGINEERING SAMPLE  
**TESTED:** June 17 to July 14, 2006  
**APPLICANT:** ZyXEL Communications Corporation  
**STANDARDS:** FCC Part 15, Subpart C (Section 15.247),  
ANSI C63.4-2003

The above equipment (Model: AG-220) 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 :** Carol Liao , **DATE:** July 15, 2006  
( Carol Liao )

**TECHNICAL ACCEPTANCE :** Hank Chung , **DATE:** July 15, 2006  
Responsible for RF ( Hank Chung )

**APPROVED BY :** May Chen , **DATE:** July 15, 2006  
(May Chen, Deputy Manager )

## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

For 802.11b & g, 2412~2462MHz Band

APPLIED STANDARD: FCC Part 15, Subpart C (Section 15.247)			
Standard Section	Test Type and Limit	Result	Remark
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -14.22dB at 0.166MHz
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(d)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit. Minimum passing margin is -0.9dB at 2483.5MHz
15.247(e)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit.
15.247(d)	Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit.

### NOTE:

- The EUT was operating in 2.412 ~ 2.462GHz, 5.150 ~ 5.350GHz and 5.725 ~ 5.825GHz frequencies band. This report was recorded the RF parameters including 2.412 ~ 2.462GHz. For the 5.150 ~ 5.350GHz and 5.725 ~ 5.825GHz RF parameters was recorded in another test report.

### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>EUT</b>	802.11a/g Wireless USB Adapter
<b>MODEL NO.</b>	AG-220
<b>FCC ID</b>	I88AG220
<b>POWER SUPPLY</b>	DC 5V from host equipment
<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: 11/5.5/2/1Mbps 802.11g: 54/48/36/24/18/12/9/6Mbps 802.11a: 54/48/36/24/18/12/9/6Mbps
<b>FREQUENCY RANGE</b>	802.11b & 802.11g: 2412 ~ 2462MHz 802.11a: 5.15 ~ 5.35GHz and 5.725 ~ 5.825GHz
<b>NUMBER OF CHANNEL</b>	802.11b & 802.11g: 11 802.11a: 12
<b>CHANNEL SPACING</b>	802.11b & 802.11g: 5MHz 802.11a: 20MHz for Normal mode
<b>OUTPUT POWER</b>	802.11b: 56.234mW 802.11g: 69.183mW 802.11a: 37.411mW
<b>ANTENNA TYPE</b>	11a: PCB Printe antenna with gain 2.92 dBi 11b/g: PCB Printe antenna with gain 2.67 dBi

**NOTE:**

1. The EUT operates in both the 5GHz and 2.4GHz Bands and compatibility with 802.11a and 802.11b, 802.11g technology.
2. 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: 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		

### 3.2.1 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 RE: 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)
802.11g	1 to 11	11	OFDM	BPSK	6

#### **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)
802.11g	1 to 11	11	OFDM	BPSK	6

#### **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



### **3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS**

The EUT is an 802.11a/g Wireless USB Adapter. 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**

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

**NOTE:** The EUT is also considered as a kind of computer peripheral, because the connection to computer is necessary for typical use. It has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC). The test report has been issued separately.

### 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.

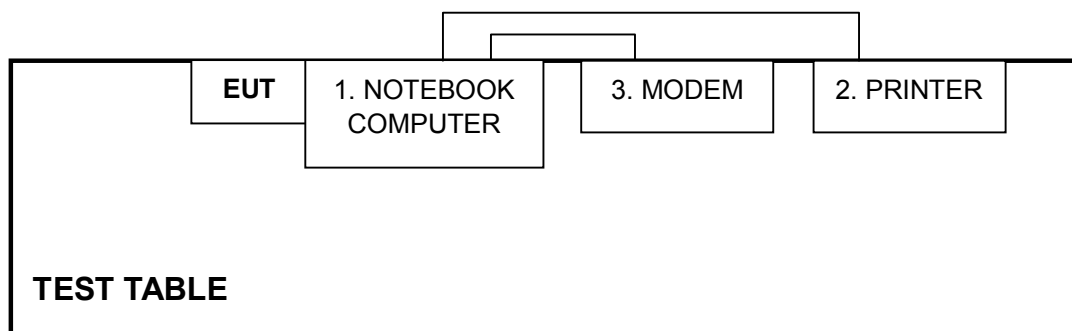
For Conducted Emission Test					
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP21L	CN-0GD366-70166-5B3-09ZX	QDS-BRCM1016
2	PRINTER	HP	C2642A	MY79F1C3MZ	B94C2642X
3	MODEM	ACEEX	1414	0206026775	IFAXDM1414
For Radiated Emission Test					
NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	NOTEBOOK COMPUTER	DELL	PP21L	CN-0GD366-70166-5B3-09ZX	QDS-BRCM1016

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.8 m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core.
3	1.3 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core

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

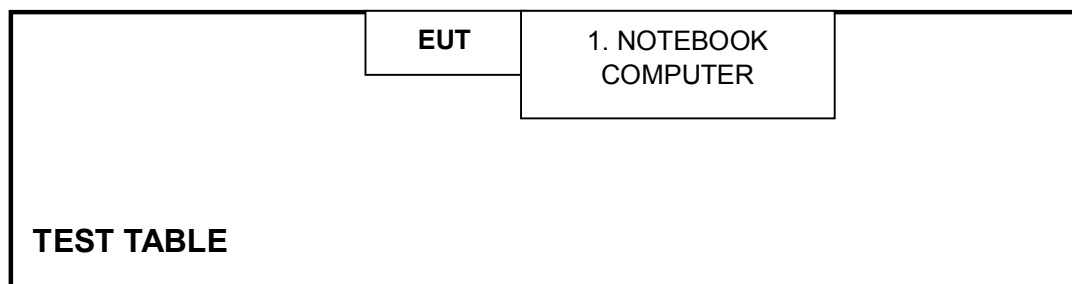
### 3.5 CONFIGURATION OF SYSTEM UNDER TEST

#### For Conducted Emission Test



**NOTE:** 1. Please refer to the photos of test configuration in Item 5 also.

#### For Radiated Emission Test



**NOTE:** 1. Please refer to the photos of test configuration in Item 5 also.

## 4. TEST TYPES AND RESULTS

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

FREQUENCY OF EMISSION (MHz)	CONDUCTED LIMIT (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50

- NOTE:**
1. The lower limit shall apply at the transition frequencies.
  2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.
  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.

#### 4.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver	ESCS 30	100375	Sep. 19, 2006
Line-Impedance Stabilization Network(for EUT)	ENV-216	100071	Nov. 10, 2006
ROHDE & SCHWARZ LISN	KNW-407	8/1395/12	Jul. 19, 2006
RF Signal Cable	RG233/U	Cable_CA_02	Dec. 10, 2006
Terminator(for KYORITSU)	50	2	Oct. 08, 2006
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. \* = These equipment are used for the final measurement.
5. The measurement uncertainty is 2.26 dB, which is calculated as per the document CISPR 16-4. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

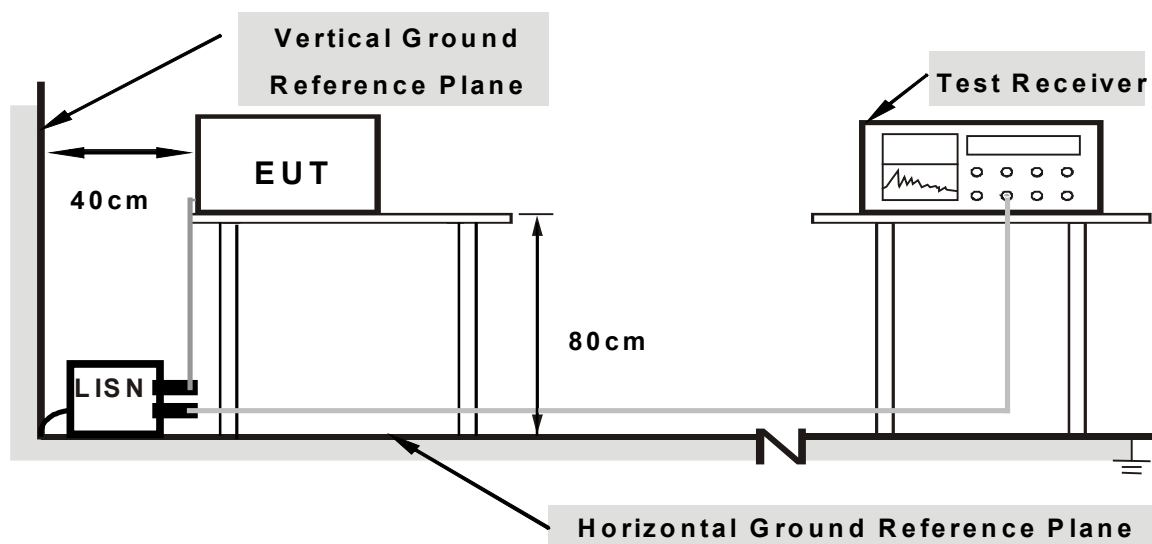
#### 4.1.3 TEST PROCEDURES

- 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 level under (Limit - 20dB) was not recorded.

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.5 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 related item – Photographs of the Test Configuration.

#### 4.1.6 EUT OPERATING CONDITIONS

- a. Plug the EUT into the support unit 1 (Notebook computer) and placed it on the testing table.
- b. The support unit 1 (Notebook computer) ran a test program “ZD1212 EVR TOOL V5.5.4.0” to enable EUT under transmission condition continuously at specific channel frequency.
- c. Notebook computer sends "H" messages to modem.
- d. Notebook computer sends "H" messages to printer, and the printer prints them on paper.

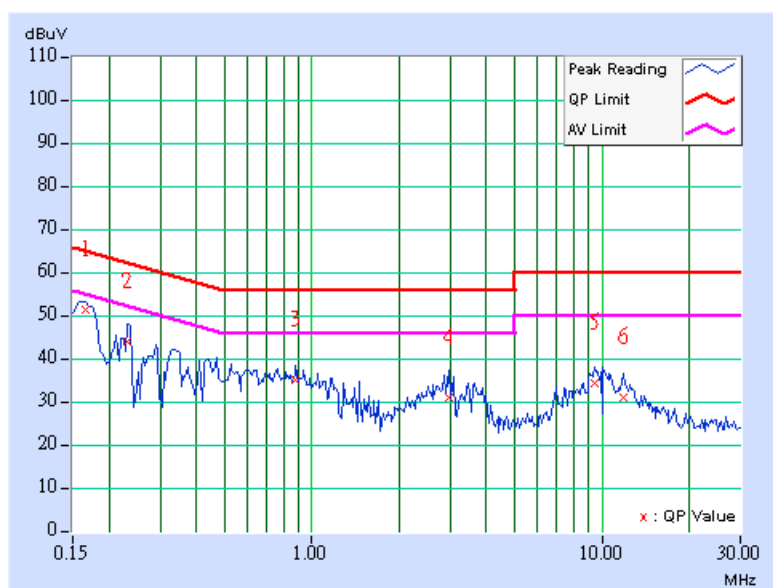
#### 4.1.7 TEST RESULTS

##### Conducted Worst-Case Data

<b>MODULATION TYPE</b>	BPSK	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>TRANSFER RATE</b>	6Mbps
<b>ENVIRONMENTAL CONDITIONS</b>	30deg. C, 60%RH, 955hPa	<b>PHASE</b>	Line (L)
<b>TESTED BY</b>	Moris Lin		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
	1	0.166	9.60	41.36	-	50.96	-	65.18	55.18	-14.22
2	0.232	9.60	34.25	-	43.85	-	62.38	52.38	-18.53	-
3	0.877	9.60	25.37	-	34.97	-	56.00	46.00	-21.03	-
4	2.982	9.70	21.26	-	30.96	-	56.00	46.00	-25.04	-
5	9.422	9.88	24.30	-	34.18	-	60.00	50.00	-25.82	-
6	11.816	9.97	21.10	-	31.07	-	60.00	50.00	-28.93	-

- 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.

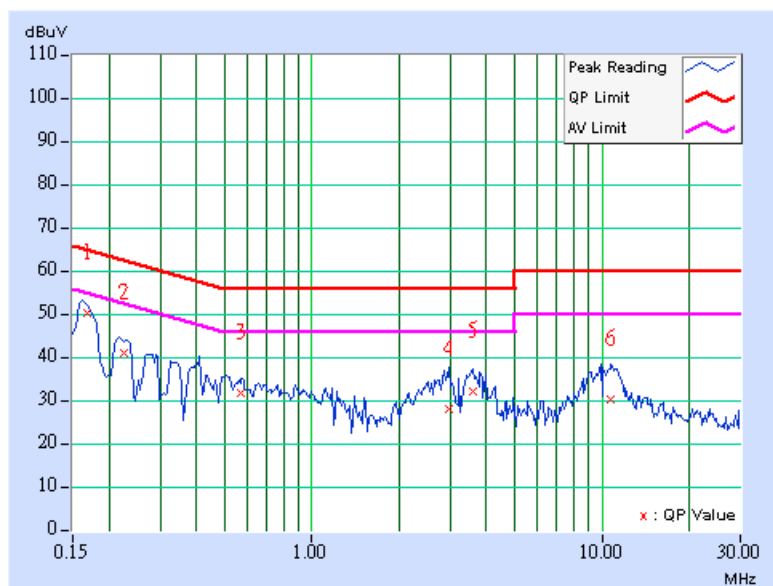




<b>MODULATION TYPE</b>	BPSK	<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>TRANSFER RATE</b>	6Mbps
<b>ENVIRONMENTAL CONDITIONS</b>	30deg. C, 60%RH, 955hPa	<b>PHASE</b>	Neutral (N)
<b>TESTED BY</b>	Moris Lin		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.169	9.60	40.62	-	50.22	-	65.02
2	0.226	9.60	31.26	-	40.86	-	62.61	52.61	-21.75	-
3	0.572	9.60	21.92	-	31.52	-	56.00	46.00	-24.48	-
4	2.982	9.70	18.40	-	28.10	-	56.00	46.00	-27.90	-
5	3.586	9.70	22.40	-	32.10	-	56.00	46.00	-23.90	-
6	10.770	9.92	20.53	-	30.45	-	60.00	50.00	-29.55	-

- 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 03, 2007
HP Pre_Amplifier	8449B	3008A01922	Oct. 02, 2006
ROHDE & SCHWARZ Test Receiver	ESCS30	100375	Sep. 19, 2006
CHASE Broadband Antenna	VULB9168	138	Dec. 11, 2006
Schwarzbeck Horn_Antenna	BBHA9120	D124	Dec. 27, 2006
Schwarzbeck Horn_Antenna	BBHA 9170	BBHA9170153	Jan. 05, 2007
SCHWARZBECK Biconical Antenna	VHBA9123	459	Jun. 08, 2009
SCHWARZBECK Periodic Antenna	UPA6108	1148	Jun. 08, 2009
RF Switches (ARNITSU)	CS-201	1565157	NA
RF CABLE (Chaintek)	SF102	22054-2	Nov. 16. 2006
RF Cable(RICHTEC)	9913-30M N-N Cable	STCCAB-30M- 1GHz	Jul. 16, 2006
Software	ADT_Radiated_V 5.14	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 (36 months for Biconical and Periodic Antenna) 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.
7. The following table is for the measurement uncertainty, which is calculated as per the document 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
Radiated emissions (30MHz-1GHz)	2.98 dB
Radiated emissions (1GHz ~18GHz)	2.21 dB
Radiated emissions (18GHz ~40GHz)	1.88 dB

#### 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 3 meter semi- anechoic. 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 the quasi-peak method or average method as specified and then reported in Data sheet peak mode and QP mode.

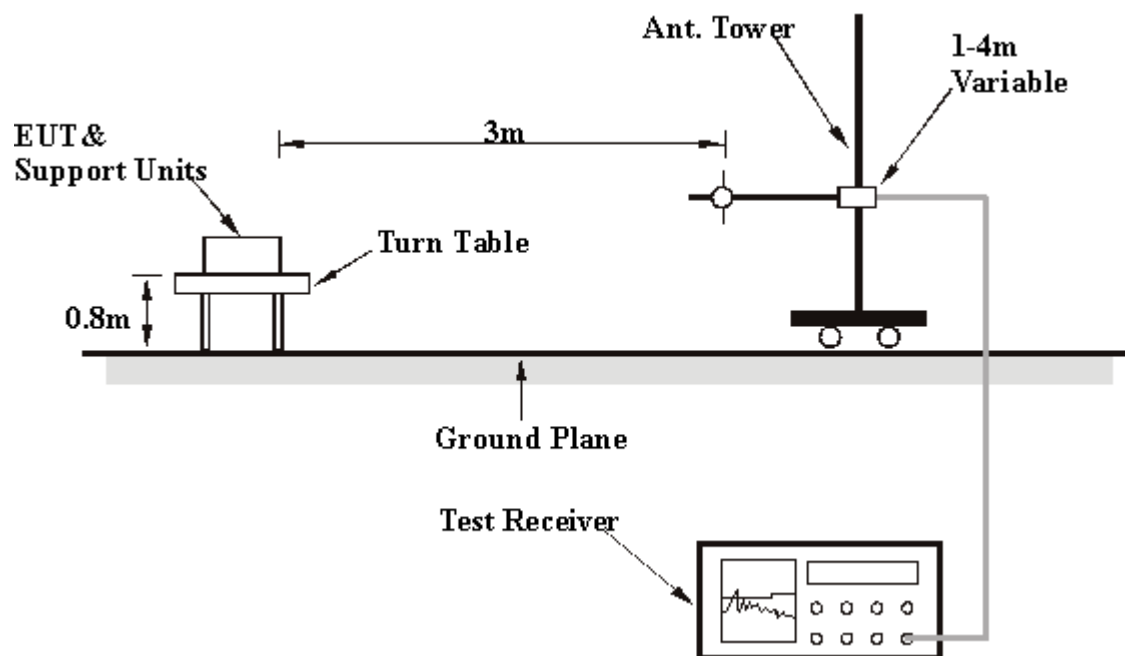
**NOTE:**

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 and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection (PK) 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 DEVIATION FROM TEST STANDARD

No deviation

#### 4.2.5 TEST SETUP



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

#### 4.2.6 EUT OPERATING CONDITIONS

- a. Plug the EUT into the support unit 1 (Notebook computer) and placed it on the testing table.
- b. The support unit 1 (Notebook computer) ran a test program “ZD1212 EVR TOOL V5.5.4.0” to enable EUT under transmission condition continuously at specific channel frequency.



#### 4.2.7 TEST RESULTS

##### Below 1GHz Worst-Case Data

<b>MODULATION TYPE</b>	BPSK	<b>FREQUENCY RANGE</b>	Below 1000MHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>TRANSFER RATE</b>	6Mbps
<b>ENVIRONMENTAL CONDITIONS</b>	27deg. C, 69%RH, 955hPa	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>TESTED BY</b>	Eric Lee		

##### 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	133.32	34.70 QP	43.50	-8.80	1.52 H	24	21.80	12.90
2	180.00	20.00 QP	43.50	-23.50	1.24 H	20	7.00	13.00
3	222.20	28.20 QP	46.00	-17.80	1.45 H	178	15.60	12.60
4	300.00	28.80 QP	46.00	-17.20	1.46 H	172	12.00	16.80
5	320.50	32.20 QP	46.00	-13.80	1.46 H	138	15.10	17.10
6	499.99	27.80 QP	46.00	-18.20	1.64 H	182	6.00	21.80
7	604.00	27.10 QP	46.00	-18.90	1.24 H	24	2.60	24.50
8	765.80	32.00 QP	46.00	-14.00	1.54 H	8	4.60	27.40

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

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	133.32	30.10 QP	43.50	-13.40	1.54 V	24	17.20	12.90
2	192.33	26.90 QP	43.50	-16.60	1.00 V	23	14.80	12.10
3	230.01	29.50 QP	46.00	-16.50	1.03 V	326	16.60	12.90
4	266.66	26.30 QP	46.00	-19.70	1.54 V	264	11.40	14.90
5	434.51	26.10 QP	46.00	-19.90	1.24 V	1	6.10	20.00
6	500.03	35.20 QP	46.00	-10.80	1.02 V	89	13.40	21.80
7	610.00	29.90 QP	46.00	-16.10	1.68 V	246	5.30	24.60
8	762.20	33.00 QP	46.00	-13.00	1.50 V	2	5.60	27.40
9	898.50	25.20 QP	46.00	-20.80	1.45 V	24	-3.60	28.80

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value

### 802.11b DSSS modulation

<b>CHANNEL</b>	Channel 1	<b>FREQUENCY RANGE</b>	1 ~ 25GHz
<b>MODULATION TYPE</b>	CCK	<b>TRANSFER RATE</b>	1Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 66%RH, 955hPa	<b>TESTED BY</b>	Sky Liao

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

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	54.50 PK	74.00	-19.50	1.41 H	110	24.70	29.80
1	2390.00	43.20 AV	54.00	-10.80	1.41 H	110	13.50	29.80
2	*2412.00	106.20 PK			1.09 H	71	76.30	29.90
2	*2412.00	102.60 AV			1.09 H	71	72.70	29.90
3	4824.00	46.60 PK	74.00	-27.40	1.00 H	21	11.60	35.00
3	4824.00	39.80 AV	54.00	-14.20	1.00 H	21	4.80	35.00
4	7236.00	44.50 PK	74.00	-29.50	1.00 H	2	3.40	41.10
4	7236.00	32.00 AV	54.00	-22.00	1.00 H	2	-9.10	41.10

#### 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	53.40 PK	74.00	-20.60	1.00 V	288	23.70	29.80
1	2390.00	42.70 AV	54.00	-11.30	1.00 V	288	12.90	29.80
2	*2412.00	99.00 PK			1.00 V	288	69.10	29.90
2	*2412.00	95.80 AV			1.00 V	288	65.90	29.90
3	4824.00	46.50 PK	74.00	-27.50	1.00 V	56	11.50	35.00
3	4824.00	38.60 AV	54.00	-15.40	1.00 V	56	3.60	35.00
4	7236.00	50.20 PK	74.00	-23.80	1.00 V	32	9.00	41.10
4	7236.00	38.00 AV	54.00	-16.00	1.00 V	32	-3.20	41.10

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

<b>CHANNEL</b>	Channel 6	<b>FREQUENCY RANGE</b>	1 ~ 25GHz
<b>MODULATION TYPE</b>	CCK	<b>TRANSFER RATE</b>	1Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 66%RH, 955hPa	<b>TESTED BY</b>	Sky Liao

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
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	106.40 PK			1.09 H	68	76.30	30.00
1	*2437.00	102.70 AV			1.09 H	68	72.70	30.00
2	4874.00	47.30 PK	74.00	-26.70	1.00 H	28	12.10	35.20
2	4874.00	40.30 AV	54.00	-13.70	1.00 H	28	5.10	35.20
3	7311.00	50.90 PK	74.00	-23.10	1.00 H	16	9.50	41.40
3	7311.00	38.30 AV	54.00	-15.70	1.00 H	16	-3.10	41.40

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
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	99.30 PK			1.00 V	289	69.30	30.00
1	*2437.00	95.80 AV			1.00 V	289	65.80	30.00
2	4874.00	47.00 PK	74.00	-27.00	1.00 V	42	11.80	35.20
2	4874.00	39.00 AV	54.00	-15.00	1.00 V	42	3.80	35.20
3	7311.00	50.50 PK	74.00	-23.50	1.00 V	64	9.10	41.40
3	7311.00	38.50 AV	54.00	-15.50	1.00 V	64	-2.90	41.40

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



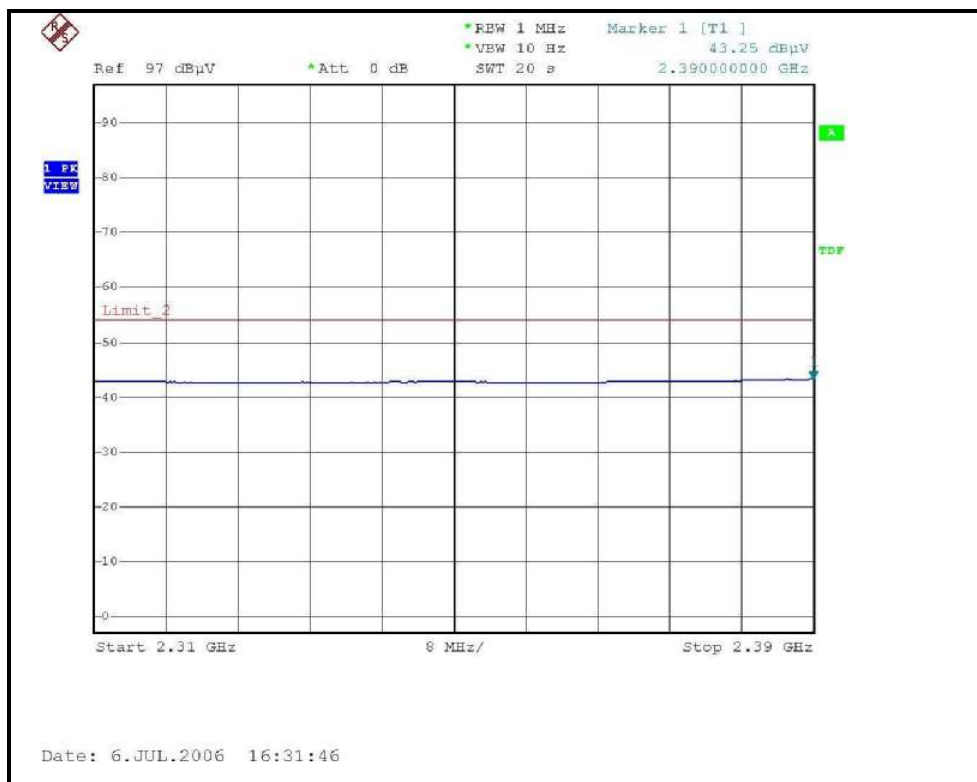
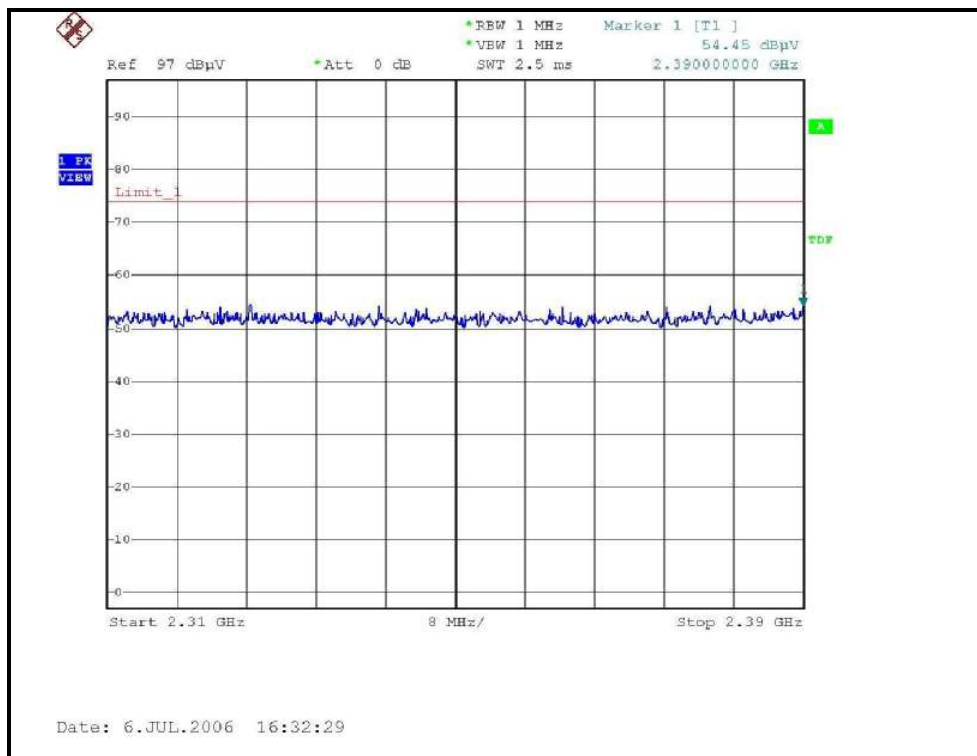
<b>CHANNEL</b>	Channel 11	<b>FREQUENCY RANGE</b>	1 ~ 25GHz
<b>MODULATION TYPE</b>	CCK	<b>TRANSFER RATE</b>	1Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 66%RH, 955hPa	<b>TESTED BY</b>	Sky Liao

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
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	105.00 PK			1.10 H	73	74.80	30.10
1	*2462.00	101.20 AV			1.10 H	73	71.00	30.10
2	2483.50	53.30 PK	74.00	-20.70	1.26 H	22	23.10	30.20
2	2483.50	43.20 AV	54.00	-10.80	1.26 H	22	13.00	30.20
3	4924.00	46.00 PK	74.00	-28.00	1.02 H	2	10.60	35.40
3	4924.00	37.20 AV	54.00	-16.80	1.02 H	2	1.80	35.40
4	7386.00	51.80 PK	74.00	-22.20	1.00 H	68	10.20	41.60
4	7386.00	38.50 AV	54.00	-15.50	1.00 H	68	-3.10	41.60

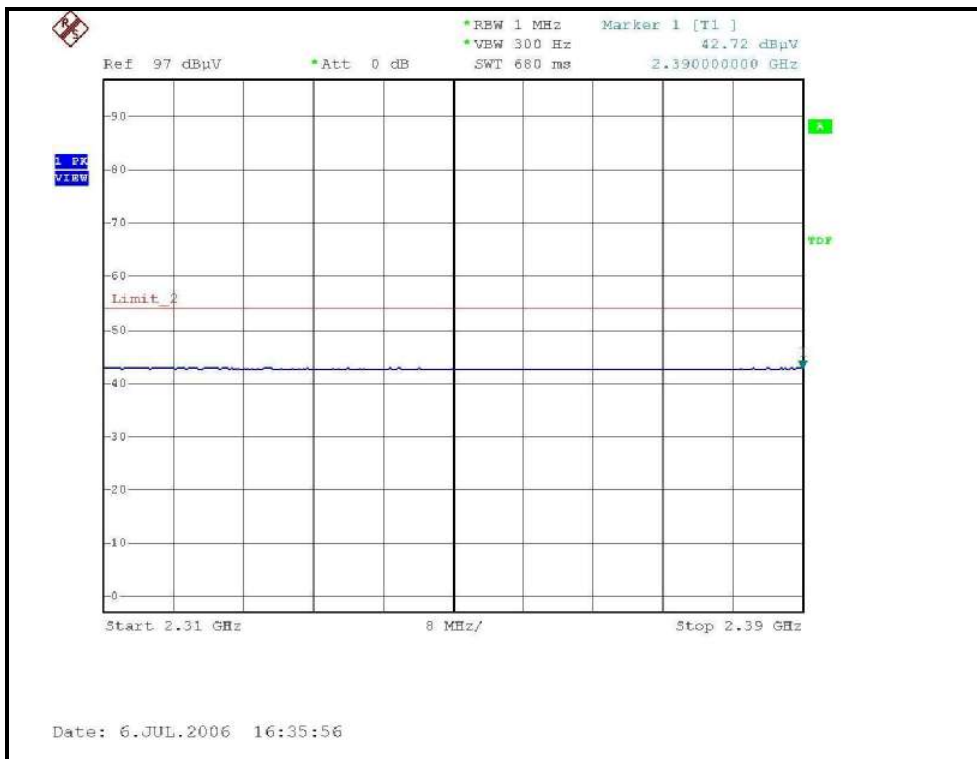
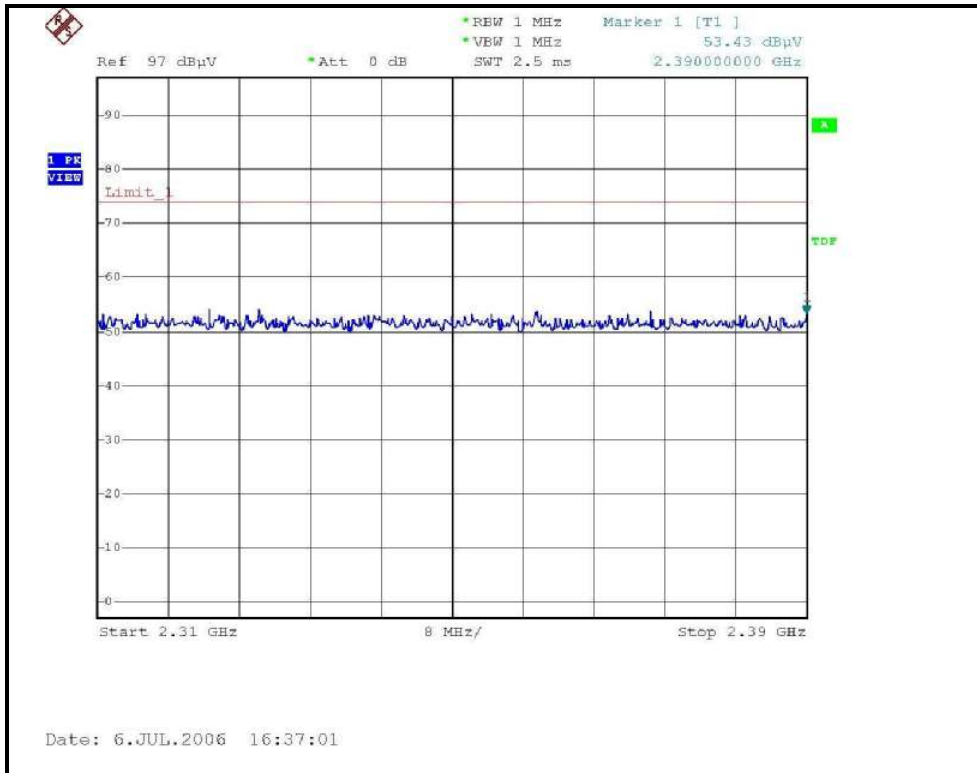
<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	98.80 PK			1.43 V	280	68.70	30.10
1	*2462.00	95.30 AV			1.43 V	280	65.20	30.10
2	2483.50	53.40 PK	74.00	-20.60	1.40 V	280	23.20	30.20
2	2483.50	43.10 AV	54.00	-10.90	1.40 V	280	12.90	30.20
3	4924.00	47.60 PK	74.00	-26.40	1.08 V	34	12.20	35.40
3	4924.00	39.50 AV	54.00	-14.50	1.08 V	34	4.10	35.40
4	7386.00	50.60 PK	74.00	-23.40	1.02 V	72	9.00	41.60
4	7386.00	38.60 AV	54.00	-15.40	1.02 V	72	-3.00	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

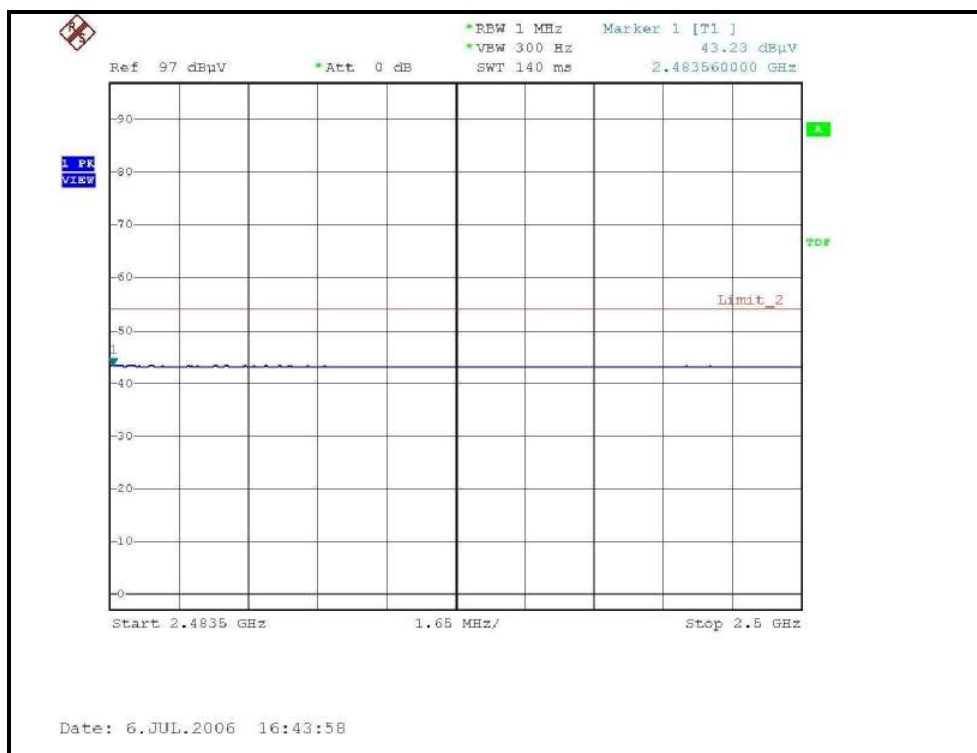
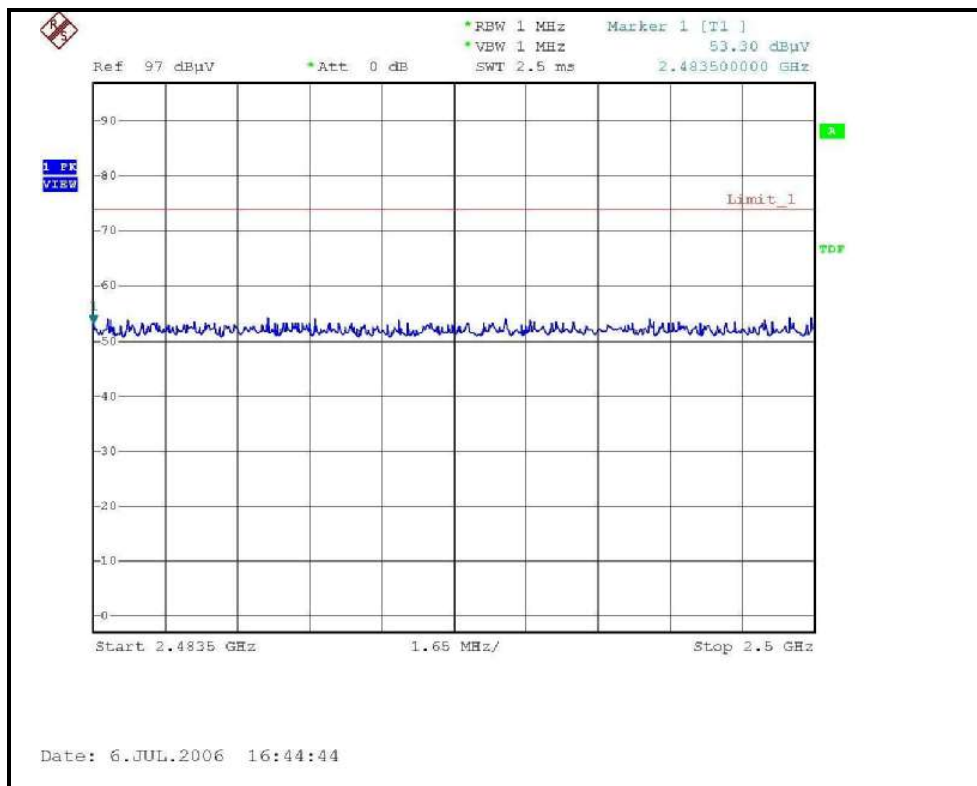
RESTRICTED BANDEDGE (802.11b MODE, CH1, HORIZONTAL )



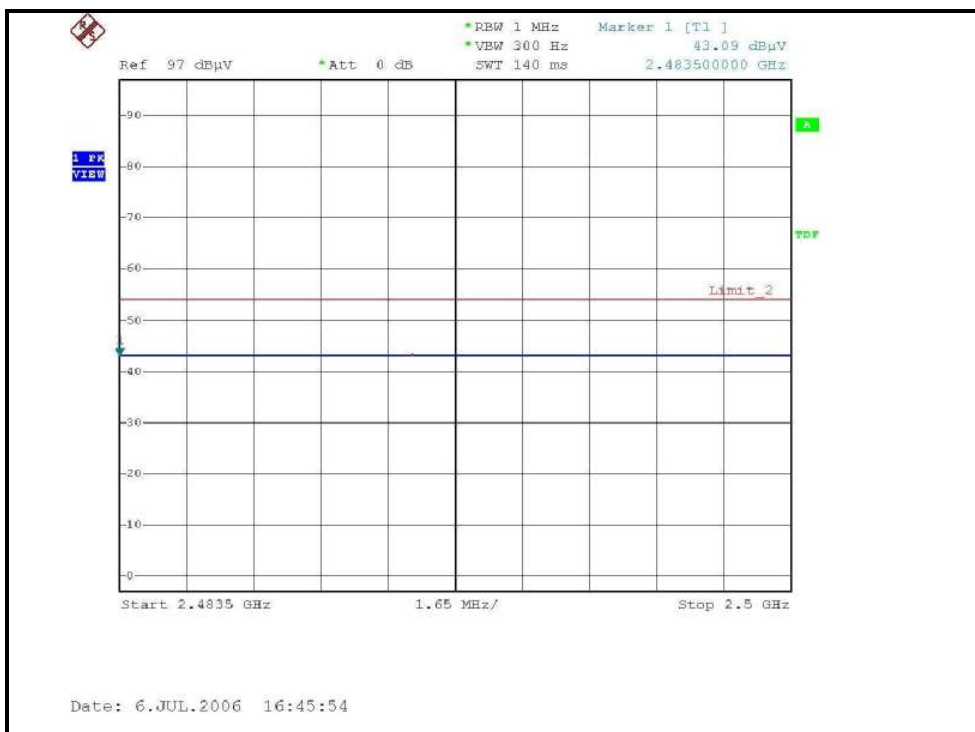
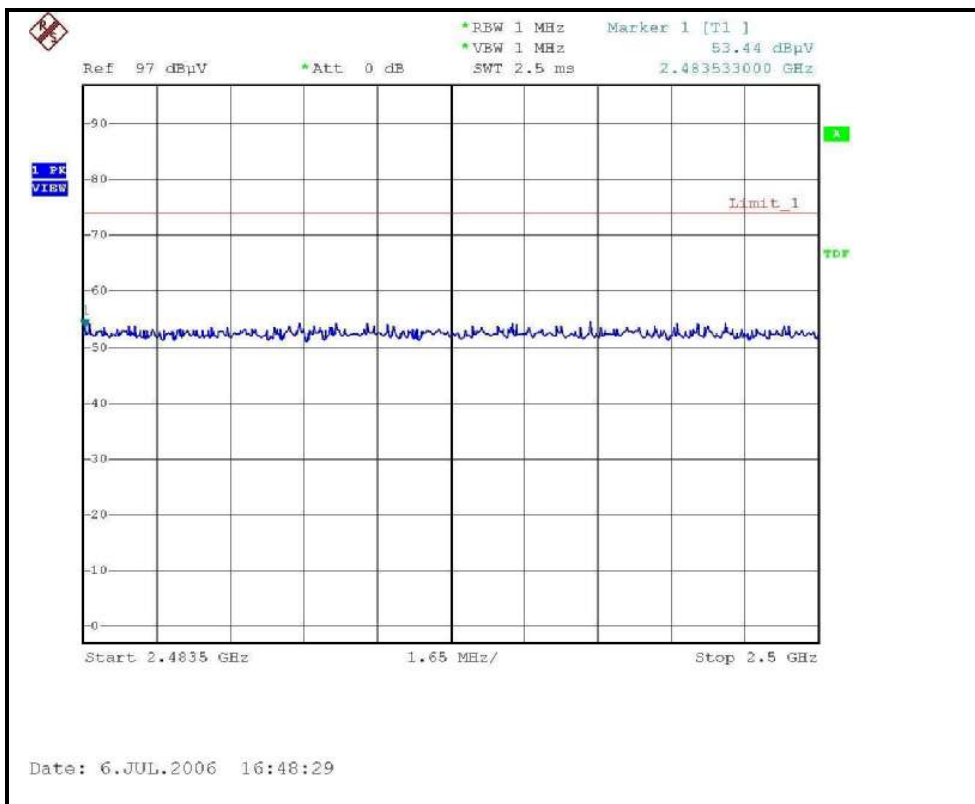
RESTRICTED BANDEDGE (802.11b MODE, CH1, VERTICAL )



RESTRICTED BANDEDGE (802.11b MODE, CH11, HORIZONTAL )



RESTRICTED BANDEDGE (802.11b MODE, CH11, VERTICAL )



### 802.11g OFDM modulation

<b>CHANNEL</b>	Channel 1	<b>FREQUENCY RANGE</b>	1 ~ 25GHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 66%RH, 955hPa	<b>TESTED BY</b>	Sky Liao

#### 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	68.80 PK	74.00	-5.20	1.28 H	336	36.30	32.50
1	2390.00	51.90 AV	54.00	-2.10	1.28 H	336	19.40	32.50
2	*2412.00	109.20 PK			1.28 H	318	76.60	32.60
2	*2412.00	100.00 AV			1.28 H	318	67.40	32.60
3	4824.00	48.30 PK	74.00	-25.70	1.22 H	308	12.00	36.30
3	4824.00	36.20 AV	54.00	-17.80	1.22 H	308	-0.10	36.30
4	7236.00	52.80 PK	74.00	-21.20	1.06 H	24	11.30	41.50
4	7236.00	38.40 AV	54.00	-15.60	1.06 H	24	-3.10	41.50

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

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	2390.00	62.20 PK	74.00	-11.80	1.24 V	228	29.70	32.50
1	2390.00	47.40 AV	54.00	-6.60	1.24 V	228	14.90	32.50
2	*2412.00	101.60 PK			1.24 V	228	69.00	32.60
2	*2412.00	92.40 AV			1.24 V	228	59.80	32.60
3	4824.00	49.30 PK	74.00	-24.70	1.06 V	262	13.00	36.30
3	4824.00	35.60 AV	54.00	-18.40	1.06 V	262	-0.70	36.30
4	7236.00	53.20 PK	74.00	-20.80	1.00 V	96	11.70	41.50
4	7236.00	38.20 AV	54.00	-15.80	1.00 V	96	-3.30	41.50

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

<b>CHANNEL</b>	Channel 6	<b>FREQUENCY RANGE</b>	1 ~ 25GHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 66%RH, 955hPa	<b>TESTED BY</b>	Sky Liao

#### 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	109.50 PK			1.25 H	330	76.80	32.70
1	*2437.00	100.20 AV			1.25 H	330	67.50	32.70
2	4874.00	49.20 PK	74.00	-24.80	1.20 H	62	12.80	36.40
2	4874.00	36.00 AV	54.00	-18.00	1.20 H	62	-0.40	36.40
3	7311.00	50.30 PK	74.00	-23.70	1.06 H	25	8.50	41.80
3	7311.00	37.20 AV	54.00	-16.80	1.06 H	25	-4.60	41.80

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

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	101.80 PK			1.15 V	220	69.10	32.70
1	*2437.00	92.80 AV			1.15 V	220	60.10	32.70
2	4874.00	47.60 PK	74.00	-26.40	1.00 V	204	11.20	36.40
2	4874.00	35.80 AV	54.00	-18.20	1.00 V	204	-0.60	36.40
3	7311.00	52.00 PK	74.00	-22.00	1.08 V	62	10.20	41.80
3	7311.00	38.40 AV	54.00	-15.60	1.08 V	62	-3.40	41.80

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

<b>CHANNEL</b>	Channel 11	<b>FREQUENCY RANGE</b>	1 ~ 25GHz
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 66%RH, 955hPa	<b>TESTED BY</b>	Sky Liao

#### 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	109.80 PK			1.20 H	348	77.00	32.80
1	*2462.00	100.50 AV			1.20 H	348	67.70	32.80
2	2483.50	71.50 PK	74.00	-2.50	1.18 H	350	38.60	32.90
<b>2</b>	<b>2483.50</b>	<b>53.10 AV</b>	<b>54.00</b>	<b>-0.90</b>	<b>1.18 H</b>	<b>350</b>	<b>20.20</b>	<b>32.90</b>
3	4924.00	48.80 PK	74.00	-25.20	1.11 H	81	12.30	36.50
3	4924.00	35.90 AV	54.00	-18.10	1.11 H	81	-0.60	36.50
4	7386.00	52.60 PK	74.00	-21.40	1.30 H	330	10.60	42.00
4	7386.00	39.20 AV	54.00	-14.80	1.30 H	330	-2.80	42.00

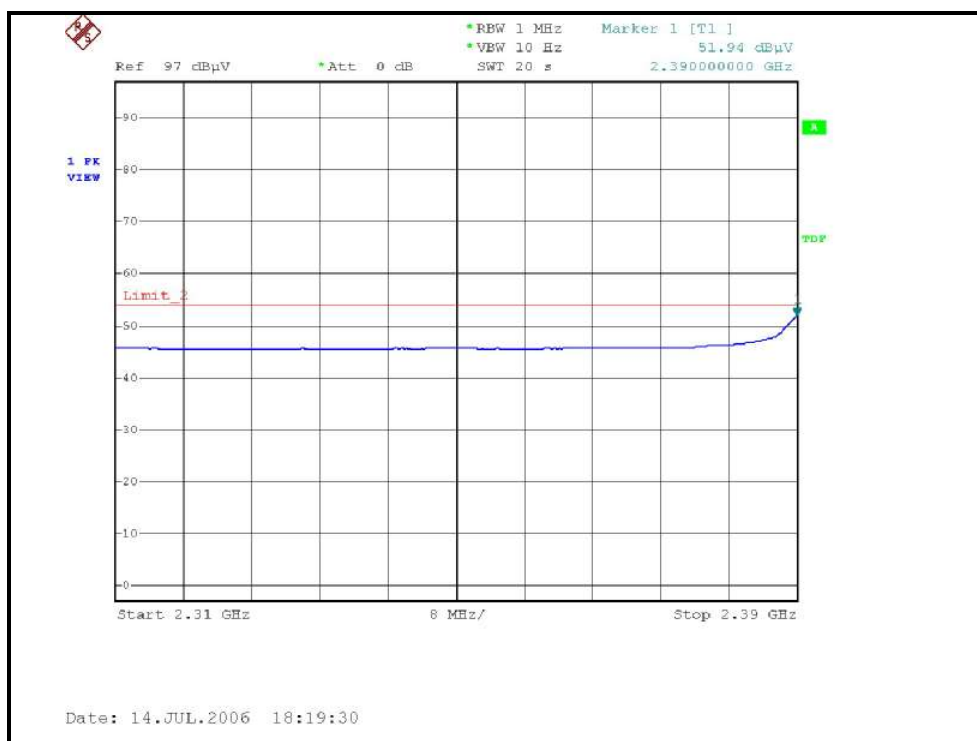
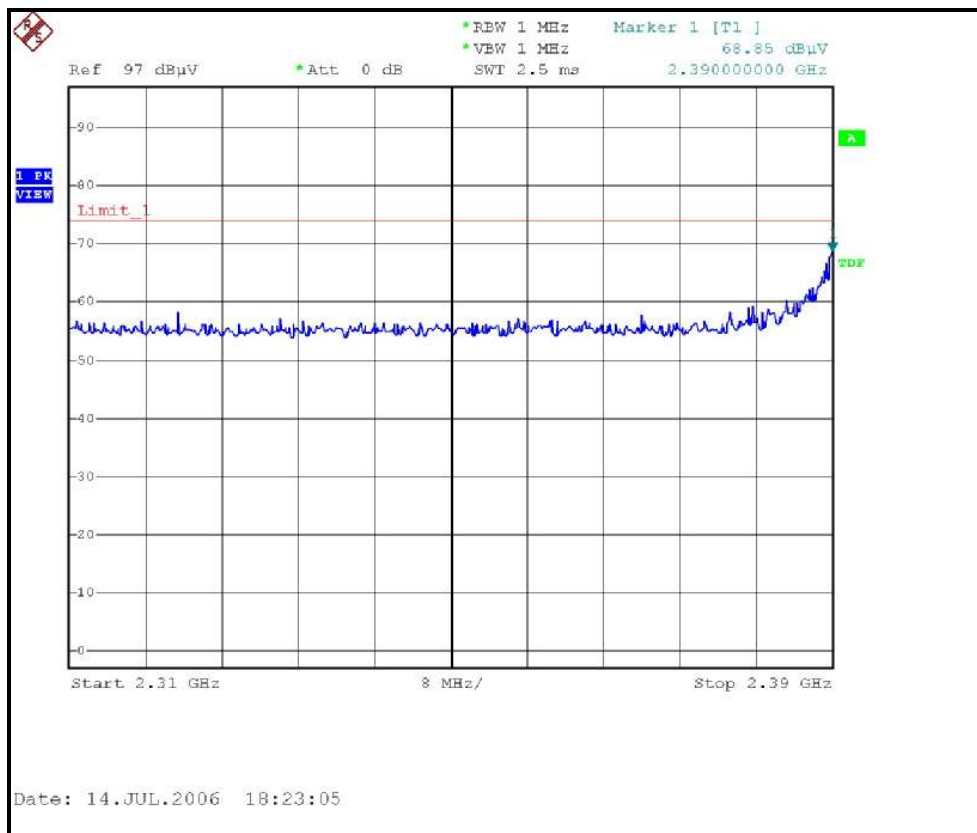
#### ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M

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	*2462.00	101.70 PK			1.00 V	204	68.90	32.80
1	*2462.00	93.00 AV			1.00 V	204	60.20	32.80
2	2483.50	66.20 PK	74.00	-7.80	1.20 V	170	33.30	32.90
2	2483.50	48.50 AV	54.00	-5.50	1.20 V	170	15.60	32.90
3	4924.00	48.60 PK	74.00	-25.40	1.00 V	97	12.10	36.50
3	4924.00	37.70 AV	54.00	-16.30	1.00 V	97	1.20	36.50
4	7386.00	52.70 PK	74.00	-21.30	1.00 V	165	10.70	42.00
4	7386.00	39.40 AV	54.00	-14.60	1.00 V	165	-2.60	42.00

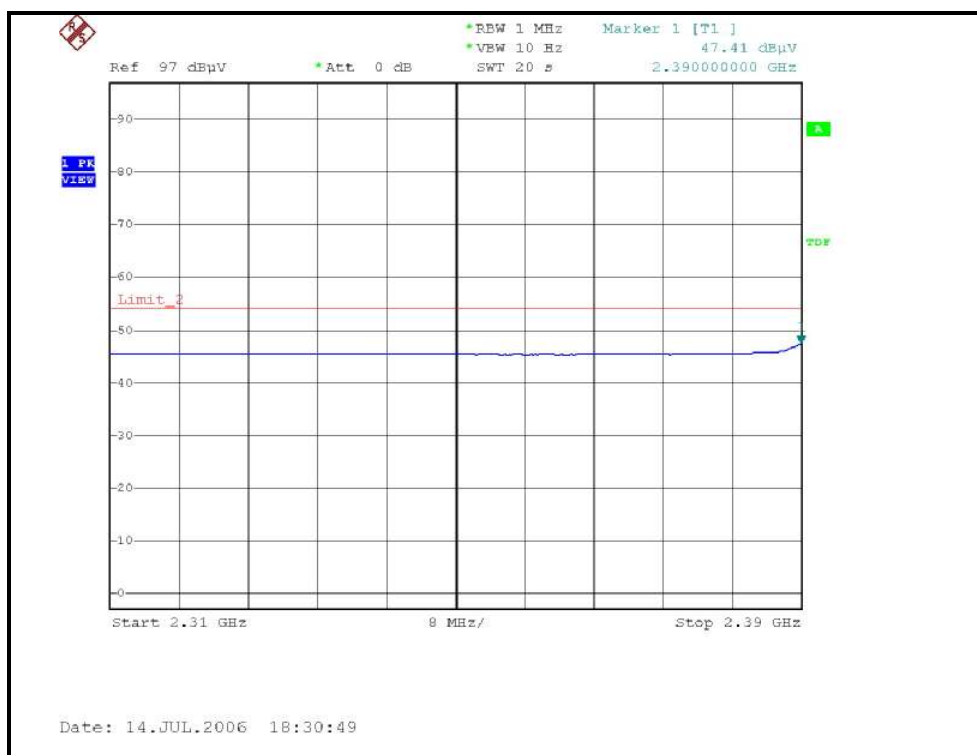
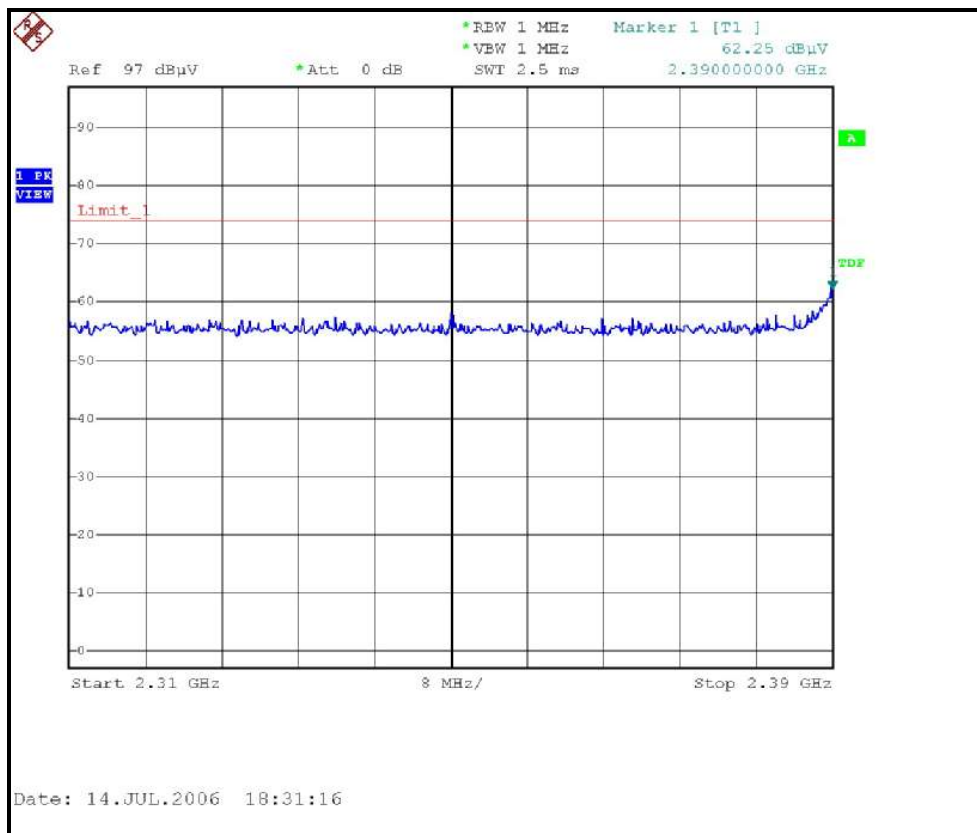
- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value.
  5. The limit value is defined as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



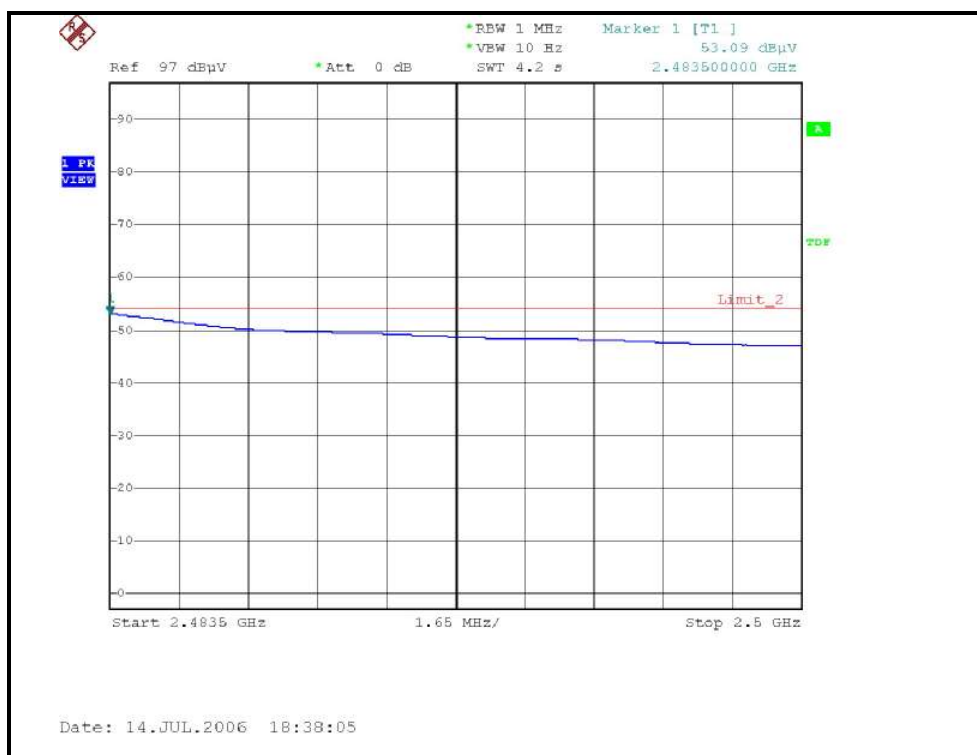
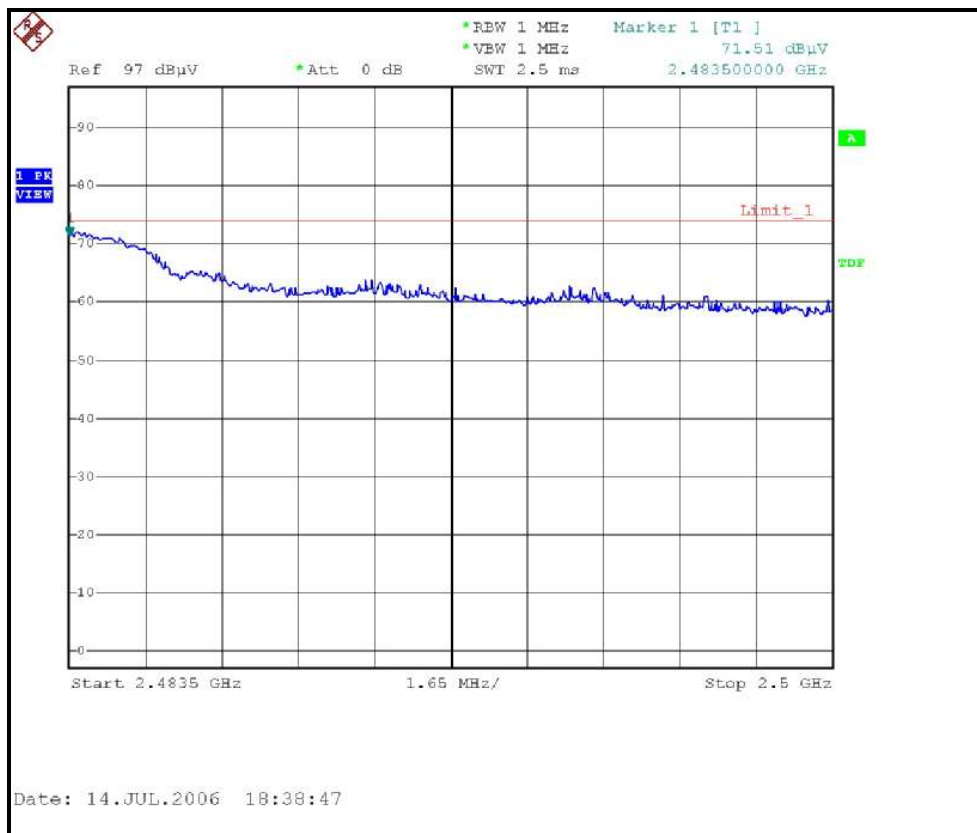
RESTRICTED BANDEDGE (802.11g MODE, CH1, HORIZONTAL )



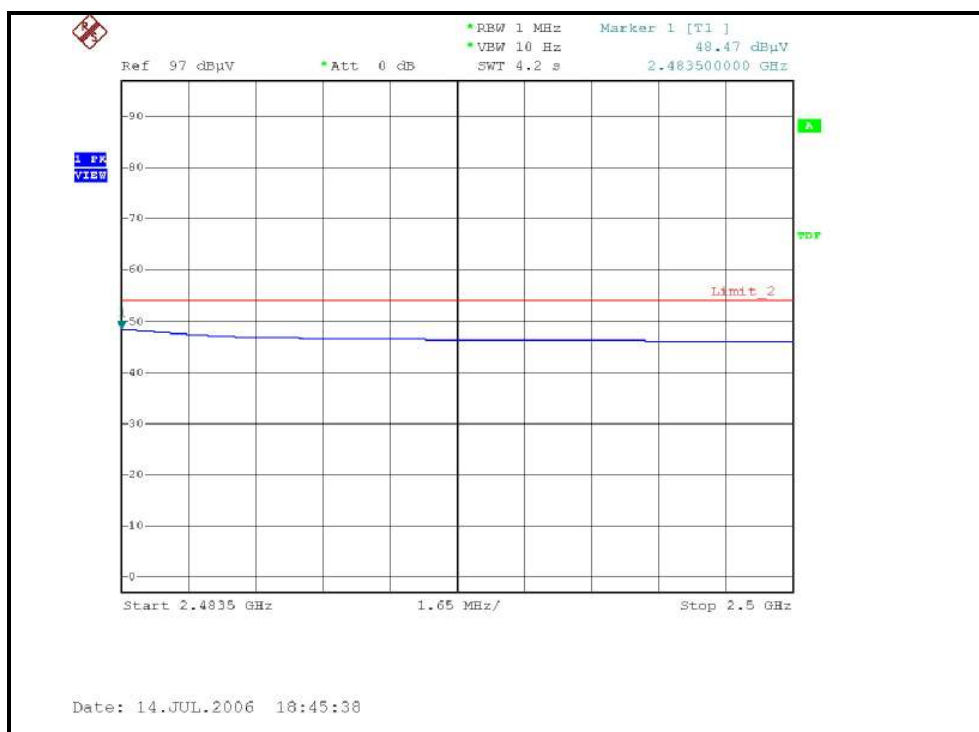
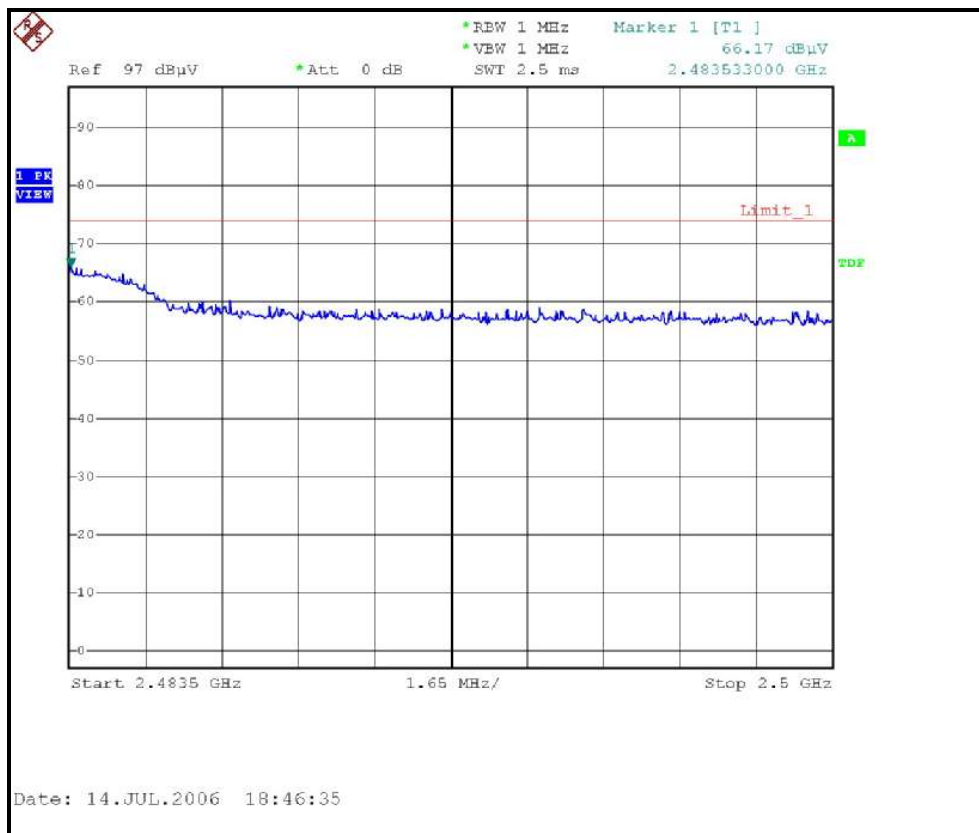
RESTRICTED BANDEDGE (802.11g MODE, CH1, VERTICAL )



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	Nov. 23, 2006

**NOTE:**

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
- 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 100kHz RBW and 100kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.3.5 TEST SETUP



### 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.

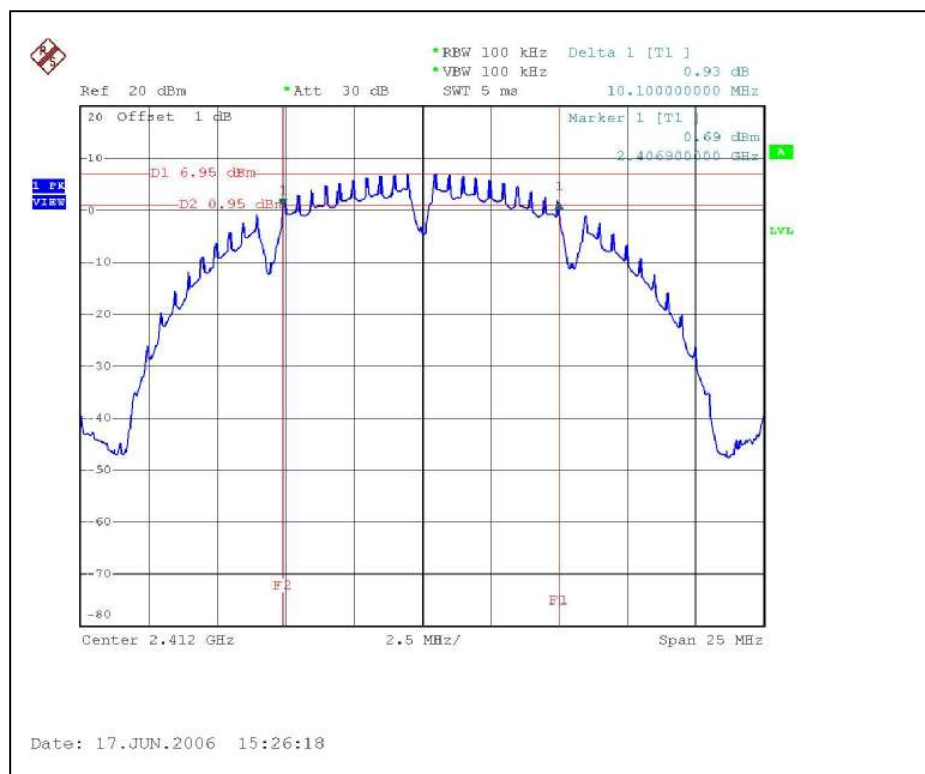
### 4.3.7 TEST RESULTS

#### 802.11b DSSS modulation

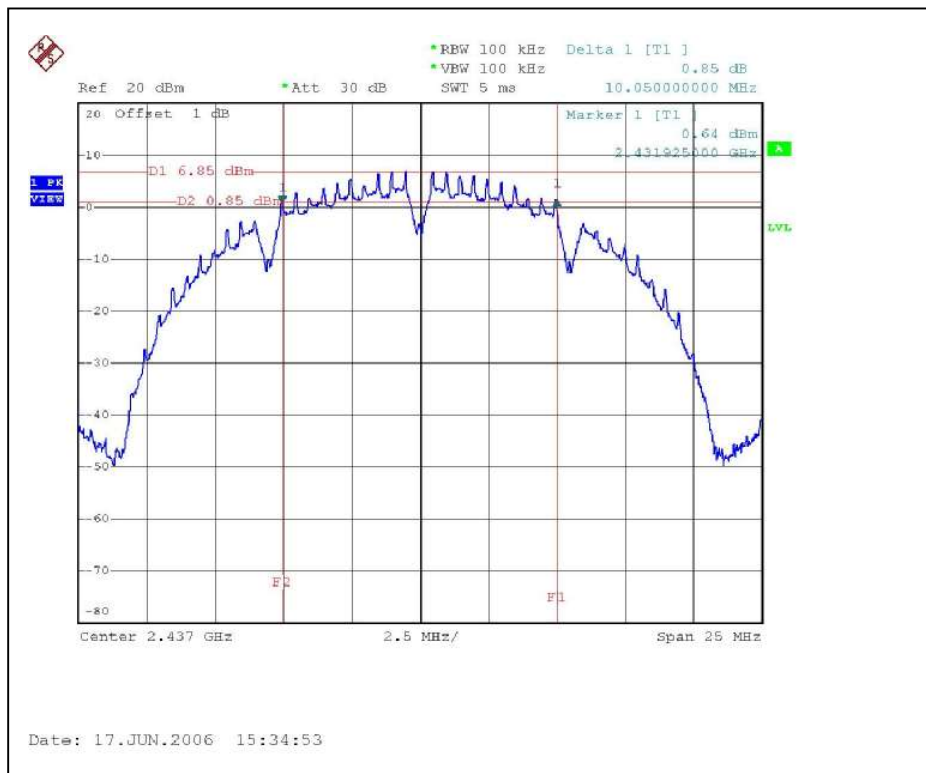
<b>MODULATION TYPE</b>	CCK	<b>TRANSFER RATE</b>	1Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	26deg. C, 66%RH, 955hPa
<b>TESTED BY</b>	Eric Lee		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	10.10	0.5	PASS
6	2437	10.05	0.5	PASS
11	2462	9.55	0.5	PASS

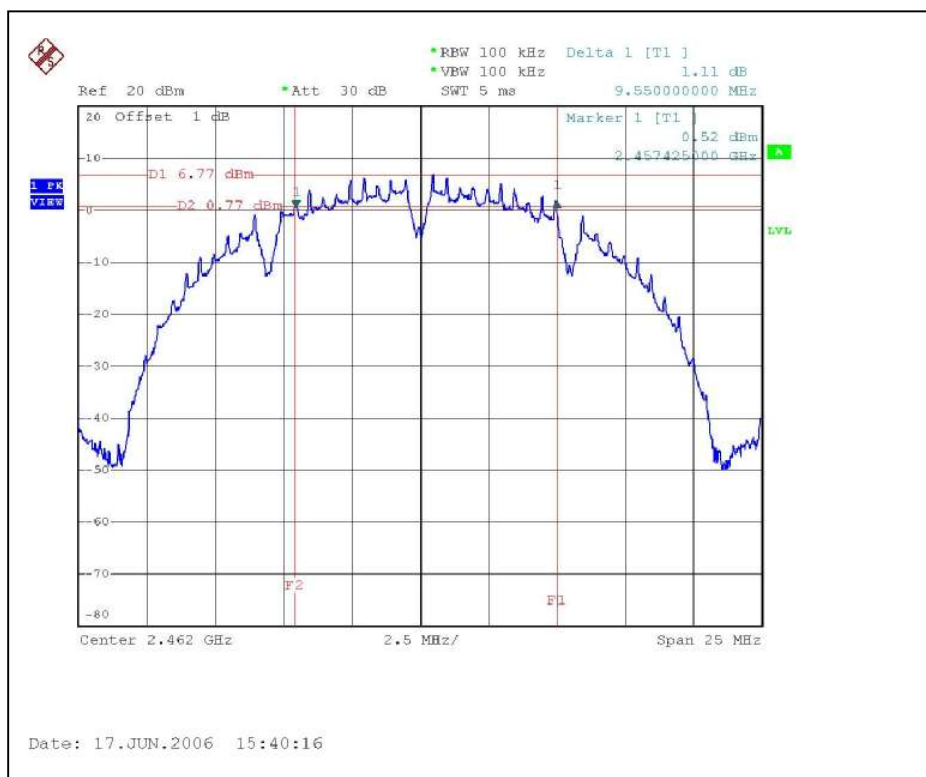
CH1



CH6



CH11



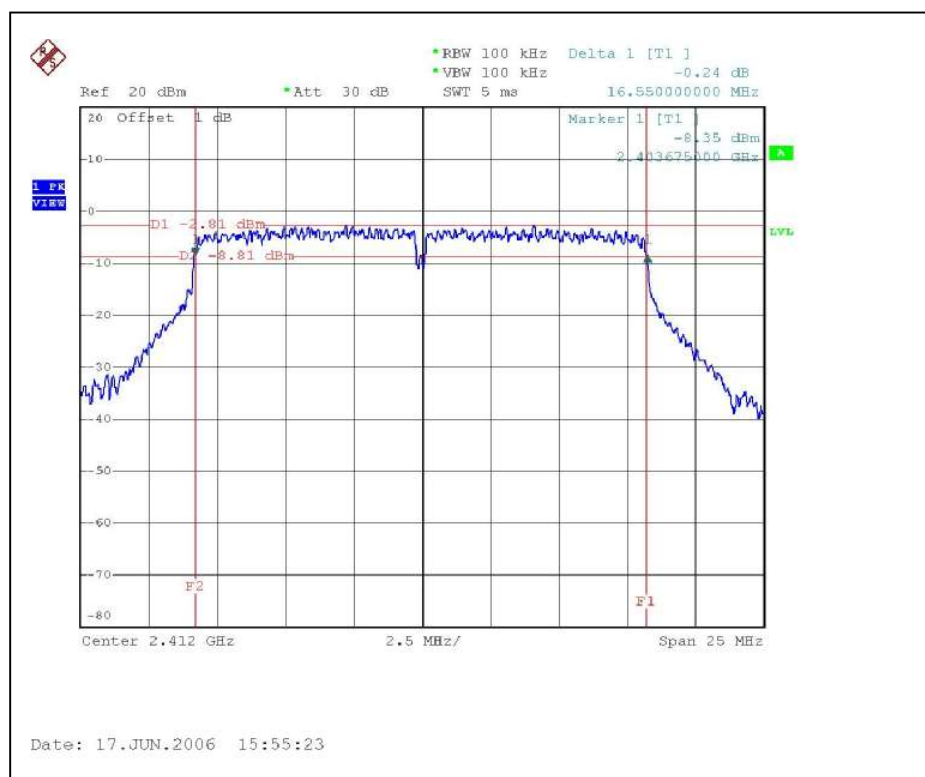


### 802.11g OFDM modulation

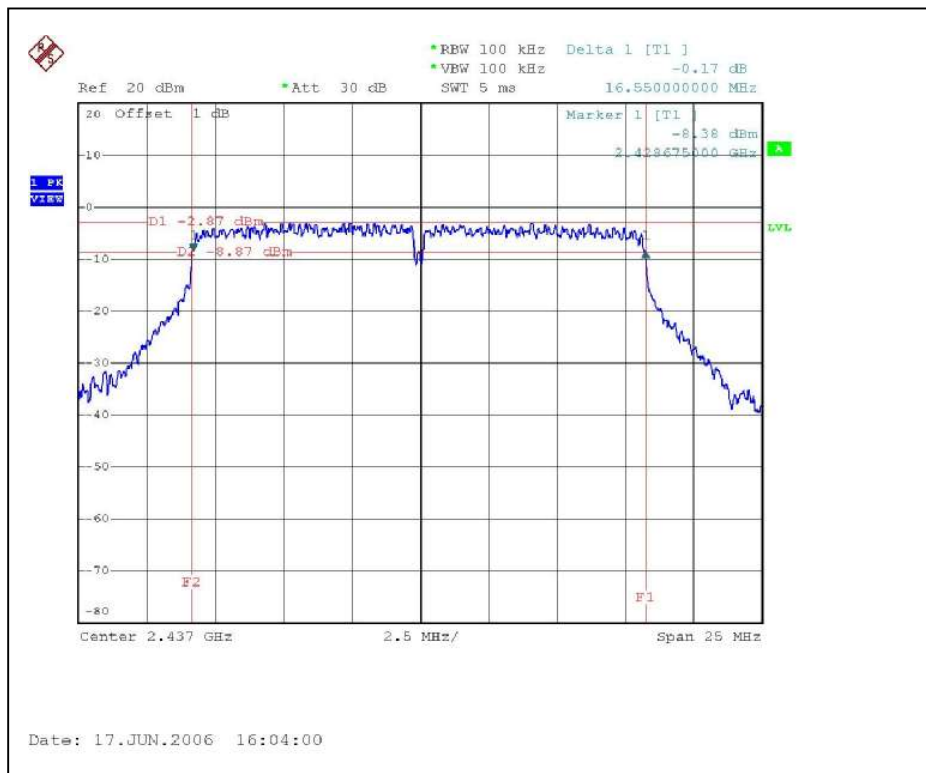
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	26deg. C, 66%RH, 955hPa
<b>TESTED BY</b>	Eric Lee		

CHANNEL	CHANNEL FREQUENCY (MHz)	6dB BANDWIDTH (MHz)	MINIMUM LIMIT (MHz)	PASS/FAIL
1	2412	16.55	0.5	PASS
6	2437	16.55	0.5	PASS
11	2462	16.55	0.5	PASS

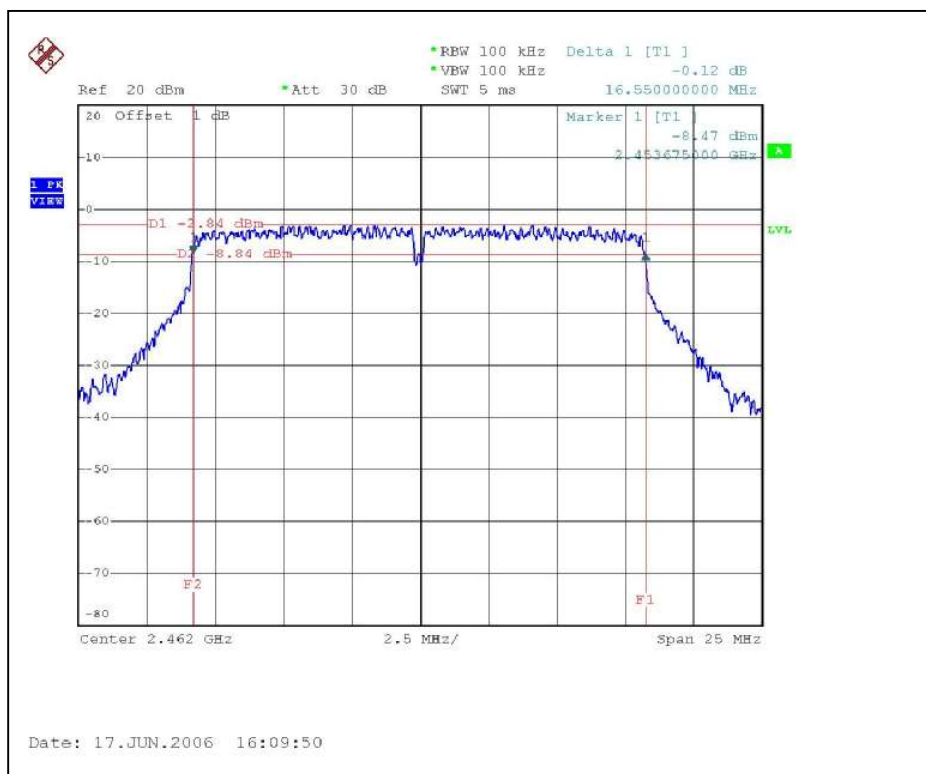
CH1



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 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSP40	100036	Dec. 09, 2006
Agilent SIGNAL GENERATOR	E8257C	MY43320668	Dec. 07, 2006
TEKTRONIX OSCILLOSCOPE	TDS380	B016335	Jun. 21, 2007
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 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 reading on oscilloscope. Record the power level.

#### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.4.5 TEST SETUP



#### 4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6



#### 4.4.7 TEST RESULTS

##### 802.11b DSSS modulation

<b>MODULATION TYPE</b>	CCK	<b>TRANSFER RATE</b>	1Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	26deg. C, 66%RH, 955hPa
<b>TESTED BY</b>	Eric Lee		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	54.954	17.4	30	PASS
6	2437	56.234	17.5	30	PASS
11	2462	53.703	17.3	30	PASS

##### 802.11g OFDM modulation

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	26deg. C, 66%RH, 955hPa
<b>TESTED BY</b>	Eric Lee		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	PASS/FAIL
1	2412	67.608	18.3	30	PASS
6	2437	69.183	18.4	30	PASS
11	2462	69.183	18.4	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	Nov. 23, 2006

**NOTE:**

- 1.The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.
- 2.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

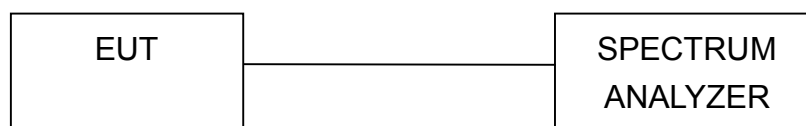
#### 4.5.3 TEST PROCEDURE

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 3kHz RBW and 30kHz 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 DEVIATION FROM TEST STANDARD

No deviation

#### 4.5.5 TEST SETUP



#### 4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6

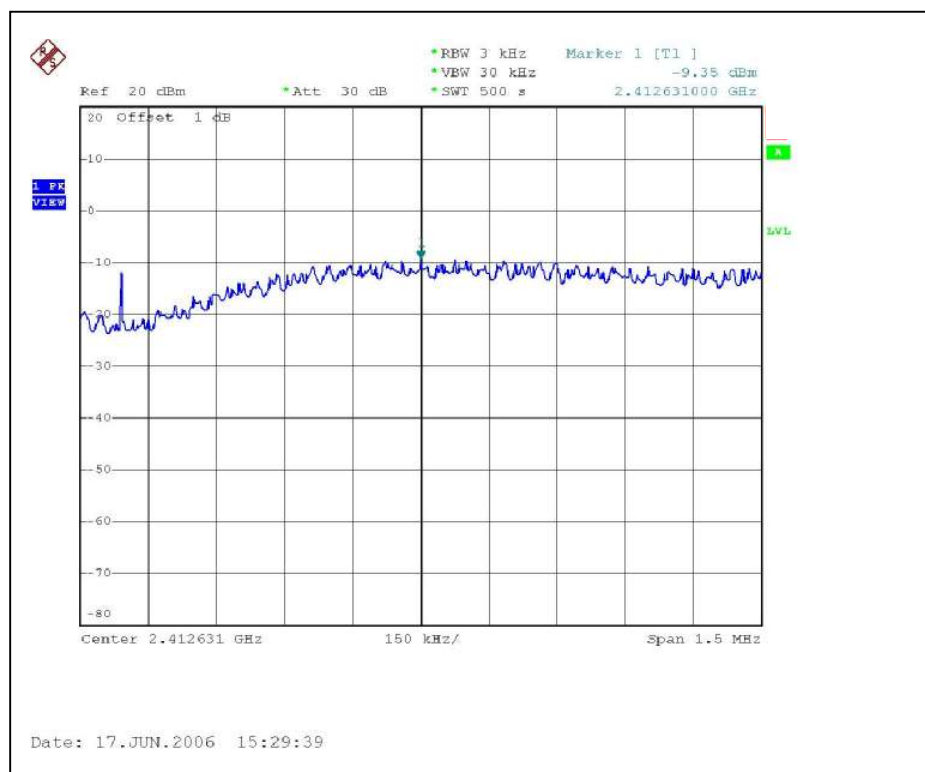
## 4.5.7 TEST RESULTS

### 802.11b DSSS modulation

<b>MODULATION TYPE</b>	CCK	<b>TRANSFER RATE</b>	1Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	26deg. C, 66%RH, 955hPa
<b>TESTED BY</b>	Eric Lee		

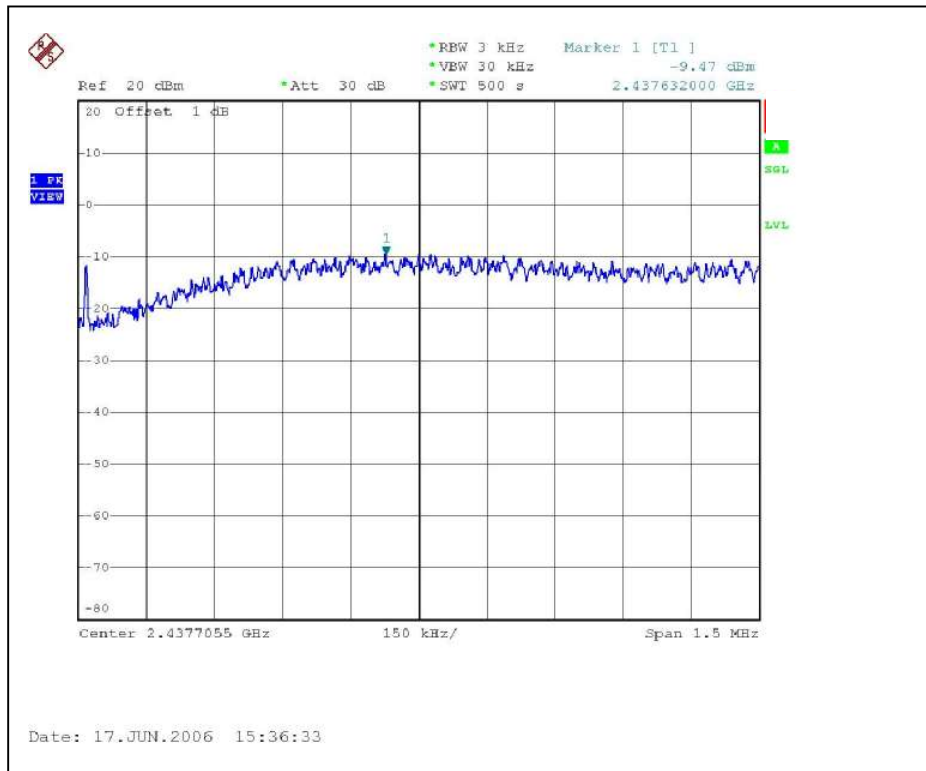
CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 KHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-9.35	8	PASS
6	2437	-9.47	8	PASS
11	2462	-9.33	8	PASS

CH1

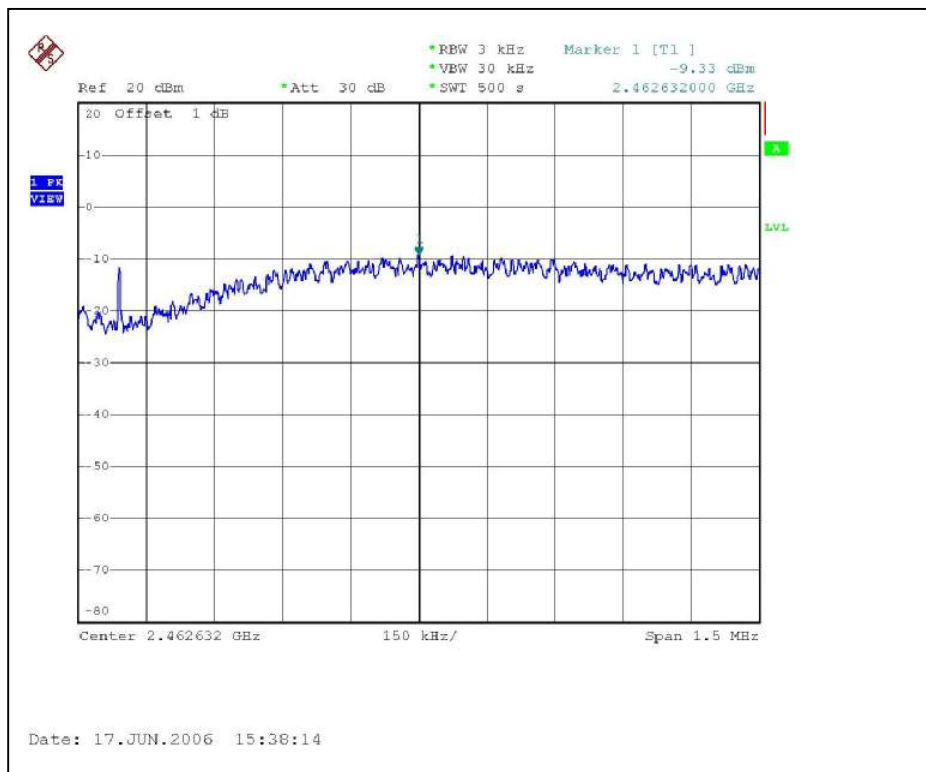




### CH6



### CH11

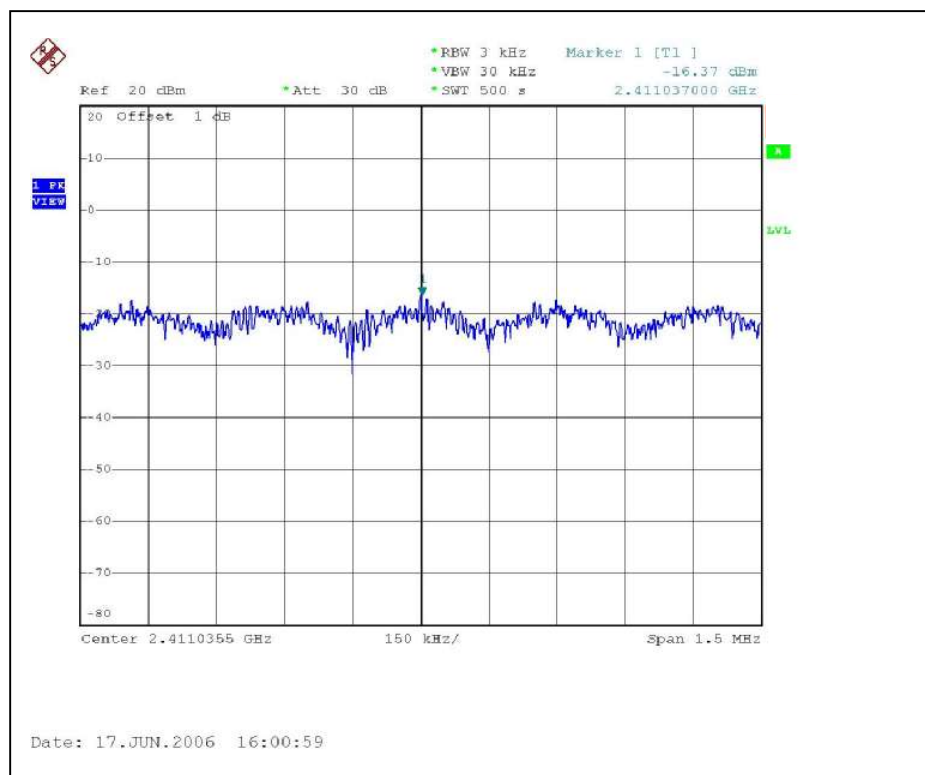


### 802.11g OFDM modulation

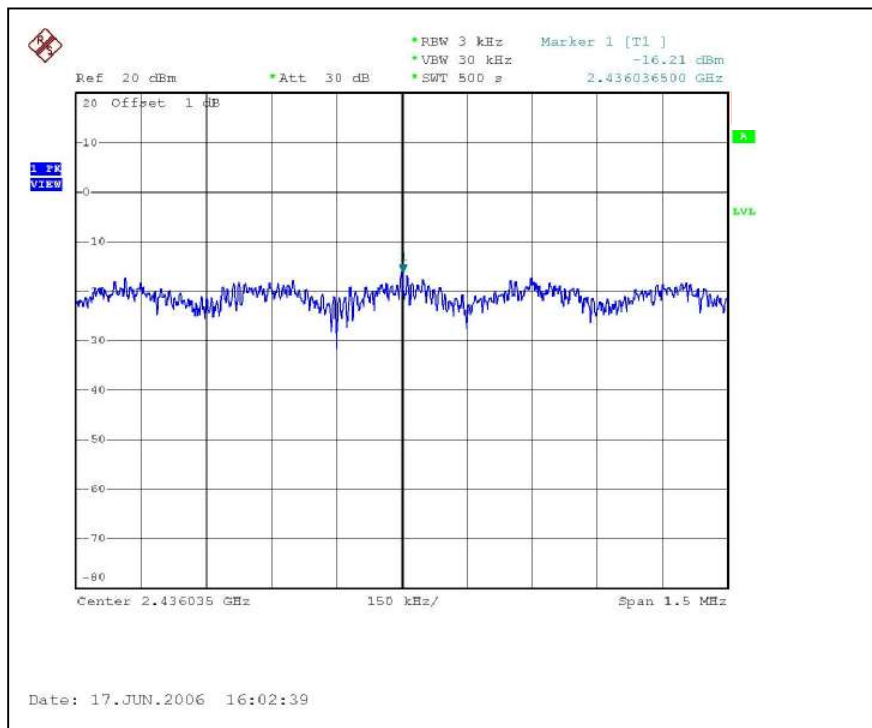
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	26deg. C, 66%RH, 955hPa
<b>TESTED BY</b>	Eric Lee		

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 3 KHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	2412	-16.37	8	PASS
6	2437	-16.21	8	PASS
11	2462	-16.20	8	PASS

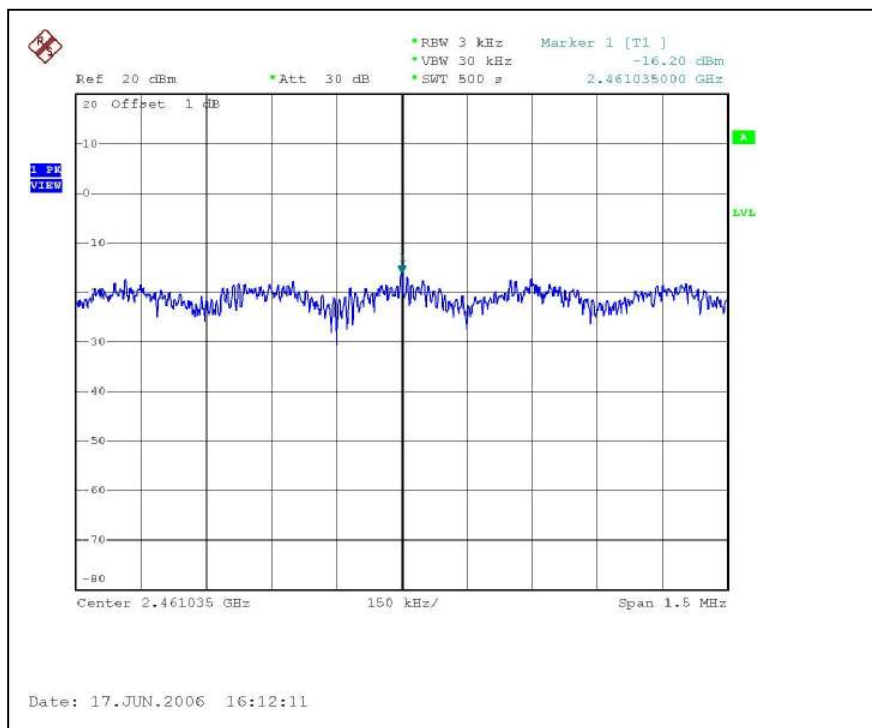
CH1



CH6



CH11



## 4.6 CONDUCTED EMISSION AND BAND EDGES MEASUREMENT

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

Below  $-20\text{dB}$  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	Nov. 23, 2006

**NOTE:**

- 1.The measurement uncertainty is less than  $\pm 2.6\text{dB}$ , which is calculated as per the NAMAS document NIS81. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k=2$ .
- 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 was 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

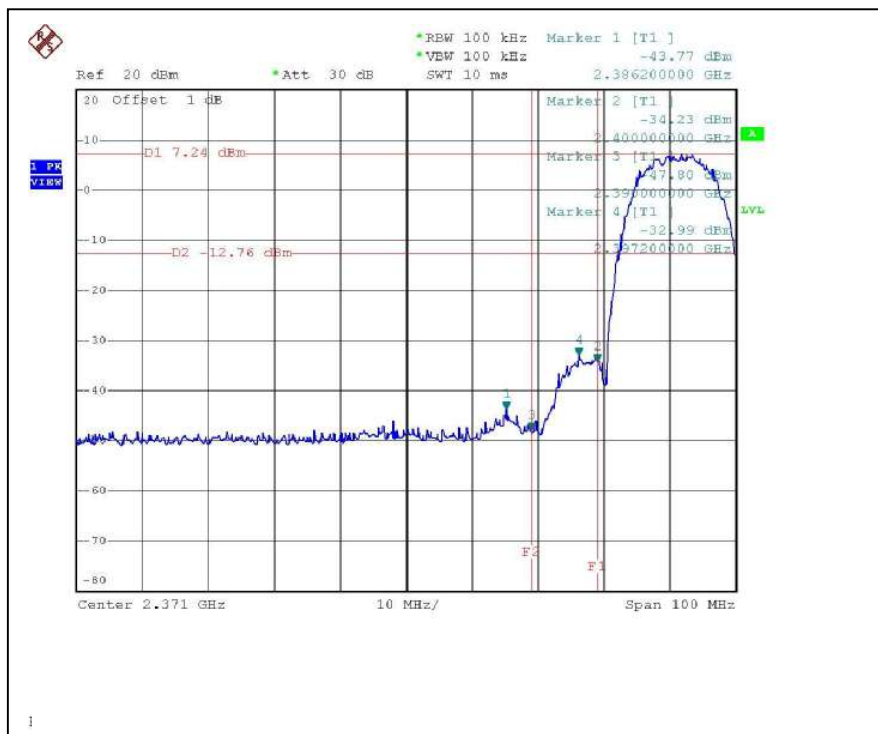


#### 4.6.5 TEST RESULTS

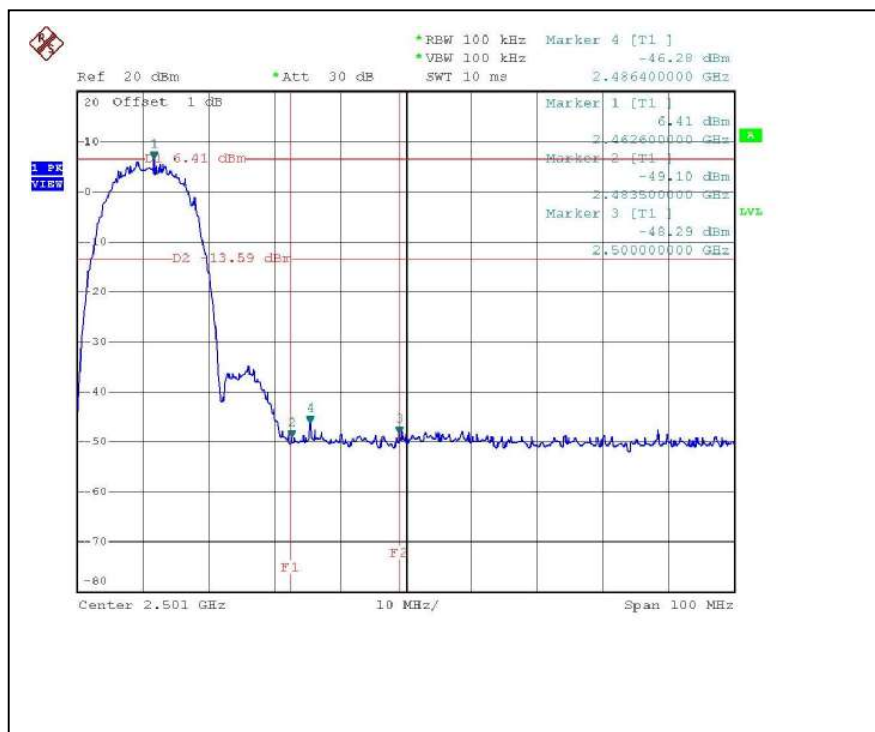
The spectrum plots are attached on the following 8 images. D1 line indicates the highest level, and D2 line indicates the 20dB offset below D1. It shows compliance with the requirement in part 15.247(d).

## 802.11b DSSS MODULATION:

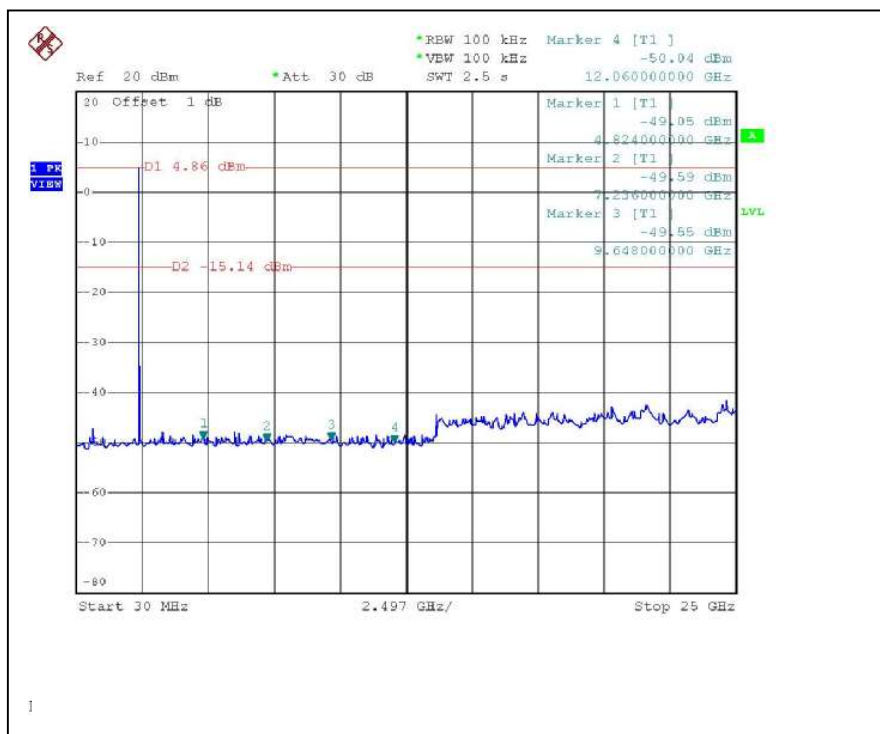
### CH1



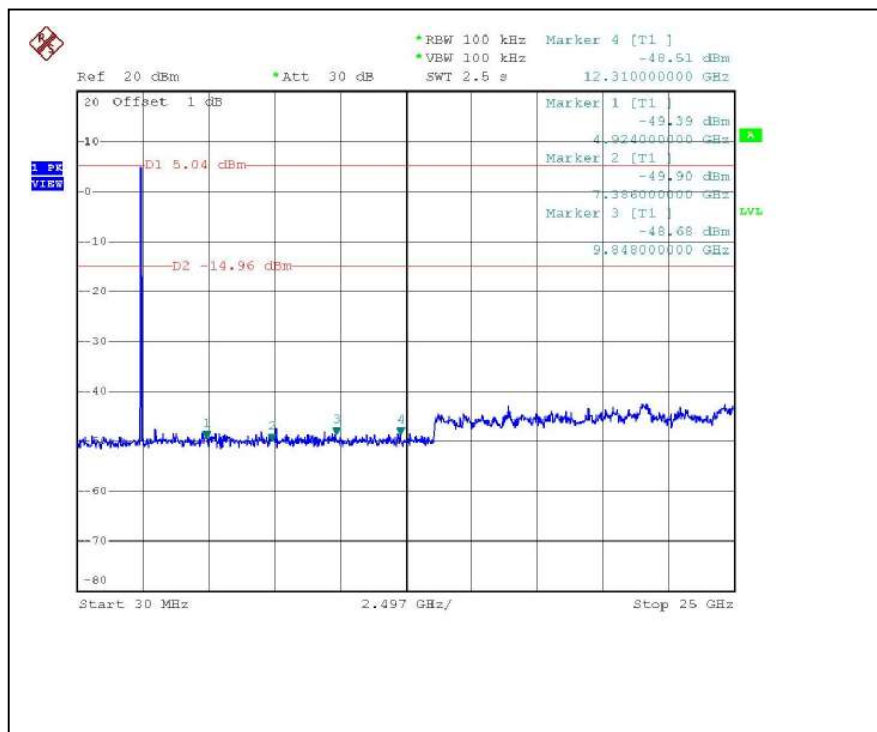
### CH11



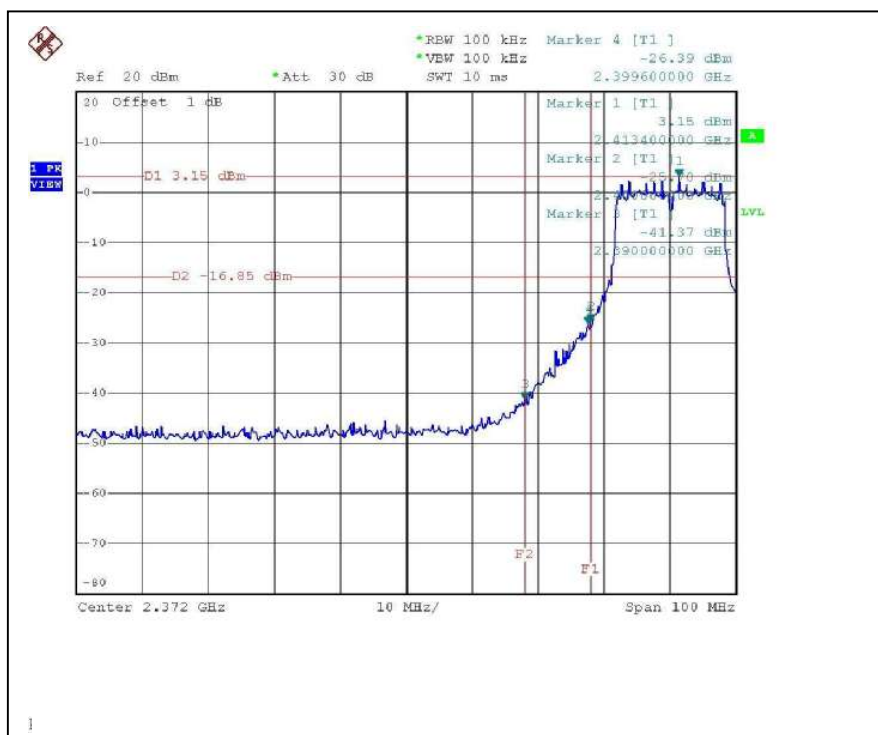
# CH1



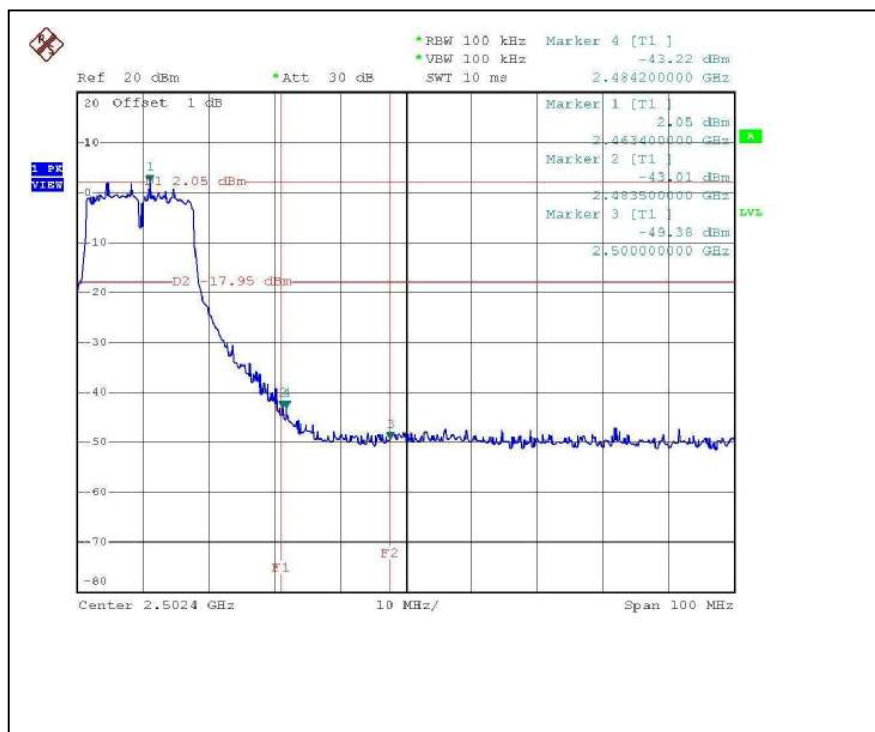
# CH11



## 802.11g OFDM MODULATION: CH1

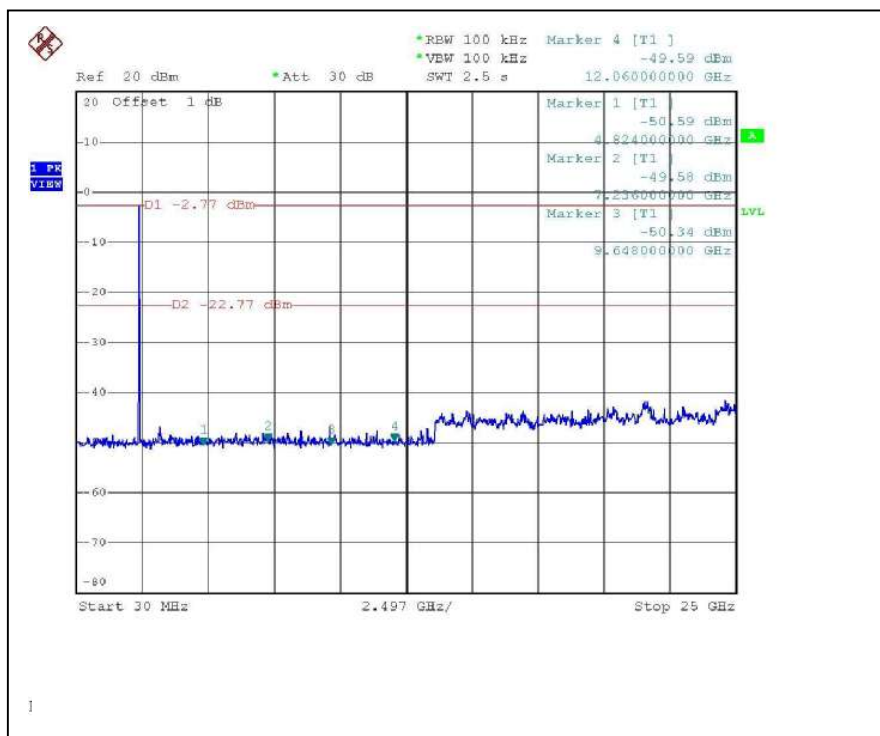


CH11

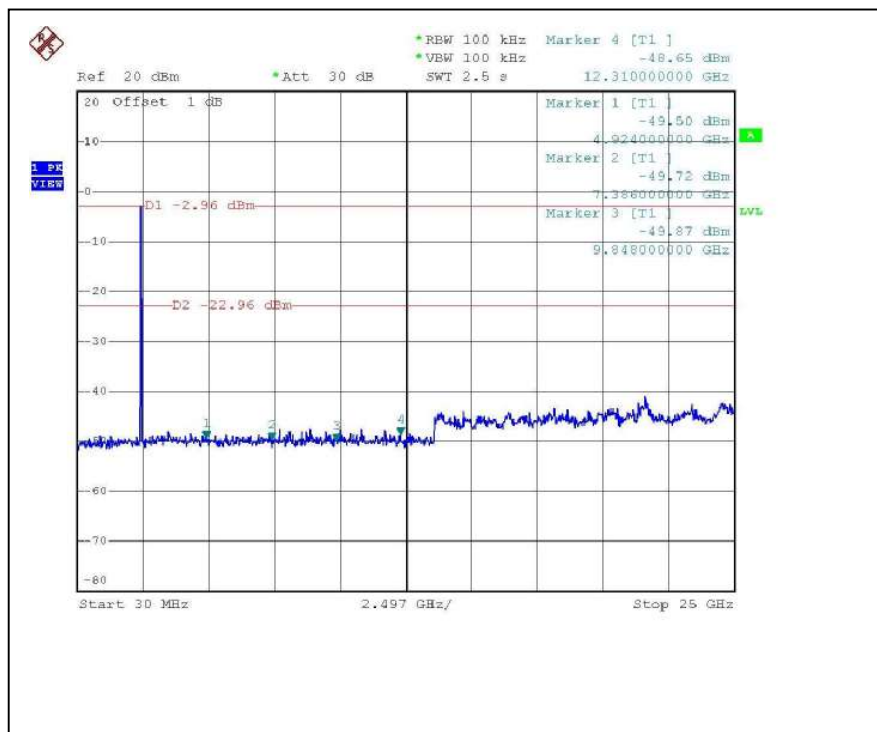




# CH1



# 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 2.67dBi.

## 5. PHOTOGRAPHS OF THE TEST CONFIGURATION

### CONDUCTED EMISSION TEST



## RADIATED EMISSION TEST





## 6. 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>	CNLA, BSMI, DGT
<b>Netherlands</b>	Telefication
<b>Singapore</b>	PSB , 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

**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



## **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.