

## FCC TEST REPORT (15.407)

**REPORT NO.:** RF9940516L09  
**MODEL NO.:** WUB-410Z  
**RECEIVED:** May 16, 2005  
**TESTED:** May 18 ~ May 30, 2005  
**ISSUED:** Jun. 21, 2005

**APPLICANT:** U-MEDIA Communications, Inc.

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**ISSUED BY:** Advance Data Technology Corporation

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**TEST LOCATION:** No. 19, Hwa Ya 2nd Rd., Wen Hwa Tsuen,  
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0528  
ILAC MRA



No. 2177-01

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## 1. CERTIFICATION

**PRODUCT:** USB2.0 802.11a/b/g Wireless Network Adapter  
**BRAND NAME:** U-MEDIA  
**MODEL NO.:** WUB-410Z  
**APPLICANT:** U-MEDIA Communications, Inc.  
**TEST SAMPLE:** ENGINEERING SAMPLE  
**TESTED:** May 18 ~ May 30, 2005  
**STANDARDS:** FCC Part 15, Subpart E (Section 15.407)  
ANSI C63.4-2003

The above equipment 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** : Windy Chou , **DATE:** Jun. 21, 2005  
( Windy Chou )

**TECHNICAL**  
**ACCEPTANCE** : Gary Chang , **DATE:** Jun. 21, 2005  
Responsible for  
RF ( Gary Chang )

**APPROVED BY** : Cody Chang , **DATE:** Jun. 21, 2005  
( Cody Chang, Deputy Manager )

## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

<b>APPLIED STANDARD: FCC Part 15, Subpart E (Section 15.407)</b>			
<b>Standard Section</b>	<b>Test Type</b>	<b>Result</b>	<b>Remark</b>
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -18.93dB at 0.197MHz
15.407(b/1/2/3)(b)(5)	Electric Field Strength Spurious Emissions, 30MHz ~ 40000MHz	PASS	Meet the requirement of limit. Minimum passing margin is -4.13dB at 720.08MHz
15.407(a/1/2/3)	Peak Transmit Power	PASS	Meet the requirement of limit.
15.407(a)(6)	Peak Power Excursion	PASS	Meet the requirement of limit.
15.407(a/1/2/3)	Peak Power Spectral Density	PASS	Meet the requirement of limit.
15.407(g)	Frequency Stability	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:

<b>Measurement</b>	<b>Frequency</b>	<b>Uncertainty</b>
<b>Conducted emissions</b>	9kHz~30MHz	2.44 dB
<b>Radiated emissions</b>	30MHz ~ 200MHz	3.55 dB
	200MHz ~1000MHz	3.58 dB
	1GHz ~ 18GHz	1.10 dB
	18GHz ~ 40GHz	0.91 dB

### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>EUT</b>	USB2.0 802.11a/b/g Wireless Network Adapter
<b>MODEL NO.</b>	WUB-410Z
<b>POWER SUPPLY</b>	5Vdc from host equipment
<b>MODULU-MEDIAON TYPE</b>	CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
<b>MODULU-MEDIAON 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: 2.412 ~ 2.462GHz 802.11a: 5.150 ~ 5.350GHz and 5.725 ~ 5.850GHz
<b>NUMBER OF CHANNEL</b>	802.11b & 802.11g: 11 802.11a: 13
<b>CHANNEL SPACING</b>	802.11b & 802.11g: 5MHz 802.11a: 20MHz
<b>OUTPUT POWER</b>	50.350mW for 802.11b 31.989mW for 802.11g 16.218mW for 5.150 ~ 5.350GHz 15.922mW for 5.725 ~ 5.850GHz
<b>ANTENNA TYPE</b>	Printed Antenna with 1.16dBi gain for 2.4GHz band Printed Antenna with -0.51dBi gain for 5.0GHz band
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	USB
<b>ASSOCIATED DEVICES</b>	NA

**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. This is a multi-functional device features Hotspot Finder and USB 2.0 Wi-Fi Adapter in a compact enclosure. This Finder supports graphical LCD display with readable and complete site survey information, such as Signal Strength, Security and Encryption, Operation Channel, Radio Band and SSID.
3. 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.

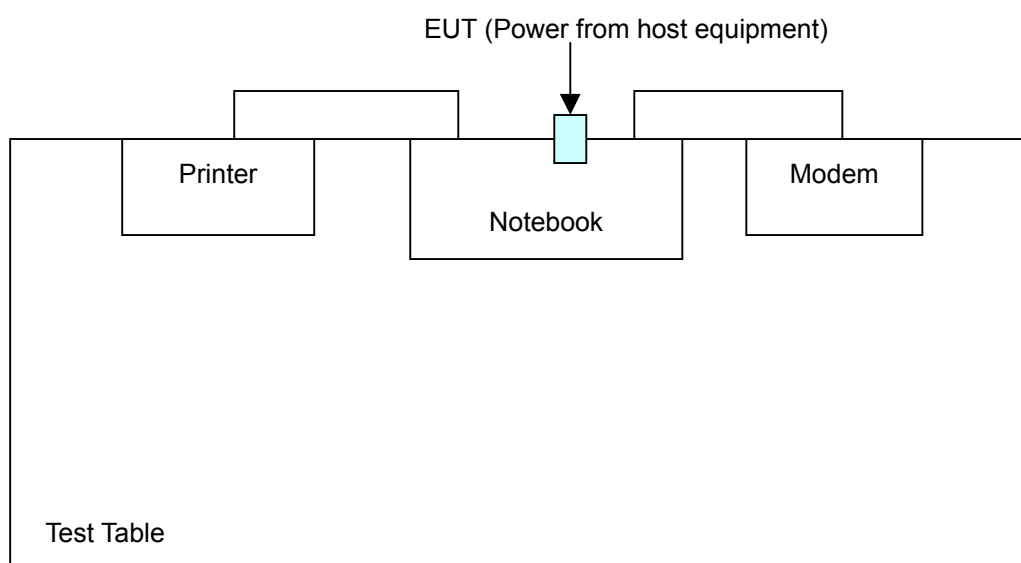
### 3.2 DESCRIPTION OF TEST MODES

Operated in 5150 ~ 5250MHz, 5250MHz ~ 5350MHz bands:

Eight channels are provided to this EUT for normal mode.

Channel	Frequency
1	5180 MHz
2	5200 MHz
3	5220 MHz
4	5240 MHz
5	5260 MHz
6	5280 MHz
7	5300 MHz
8	5320 MHz

#### 3.2.1 CONFIGURATION OF SYSTEM UNDER TEST



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

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

Where PLC: Power Line Conducted Emission

RE&lt;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)
802.11a	1 to 8	3	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)
802.11a	1 to 8	5	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)
802.11a	1 to 8	1, 4, 5, 8	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)
802.11a	1 to 8	1,8	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)
802.11a	1 to 8	1, 4, 5, 8	OFDM	BPSK	6

### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a USB2.0 802.11a/b/g Wireless Network Adapter. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

#### FCC Part 15, Subpart E (15.407)

#### 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.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.	FCC ID
1	MODEM	ACEEX	1414V/3	0401008248	IFAXDM1414
2	PRINTER	EPSON	LQ-300+	DCGY047265	FCC DoC Approved
3	NOTEBOOK COMPUTER	DELL	PP05L	9954115984	E2K24CLNS

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	1.2m shielded cable.
2	1.2m shielded cable.
3	NA

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

## 4. TEST TYPES AND RESULTS (5150 ~ 5350MHz Band)

### 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 ROHDE & SCHWARZ	ESCS30	100291	Nov. 16, 2005
RF signal cable Woken	5D-FB	Cable-HYC01-01	Jan. 09, 2006
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Feb. 15, 2006
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Feb. 15, 2006
Software ADT	ADT_Cond_V3	NA	NA

- NOTE:**
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  2. The test was performed in HwaYa Shielded Room 1.
  3. The VCCI Site Registration No. is C-2040.



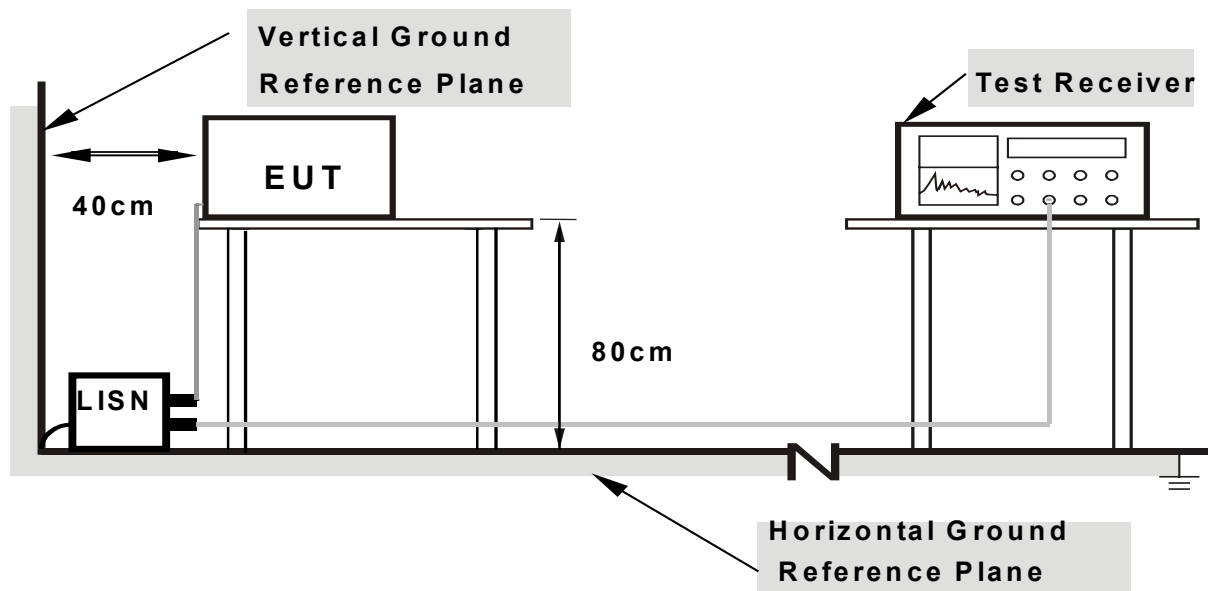
#### 4.1.3 TEST PROCEDURES

- 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 levels 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

- Plugged the EUT to the Notebook system.
- The Notebook system ran a test program (provided by manufacturer) to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- The notebook system sent "H" messages to its screen.
- The notebook system sent "H" messages to its modem.
- The notebook system sent "H" messages to printer and the printer printed them on paper.
- Steps c ~ e were repeated.

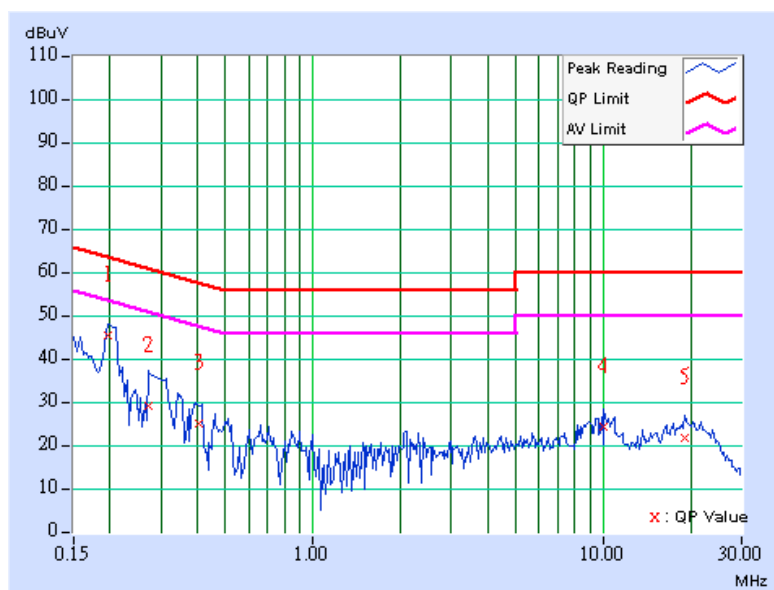
## 4.1.7 TEST RESULTS

## Conducted Worst-Case Data

EUT	USB2.0 802.11a/b/g Wireless Network Adapter	MEASUREMENT DETAIL	
MODEL	WUB-410Z	PHASE	Line 1
CHANNEL	Channel 3	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Gary Chang		

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	0.197	0.11	44.70	26.63	44.81	26.74	63.74	53.74	-18.93	-27.00
2	0.271	0.11	28.25	-	28.36	-	61.08	51.08	-32.72	-
3	0.405	0.11	24.30	-	24.41	-	57.75	47.75	-33.34	-
4	10.074	0.54	23.61	-	24.15	-	60.00	50.00	-35.85	-
5	19.051	0.94	21.07	-	22.01	-	60.00	50.00	-37.99	-

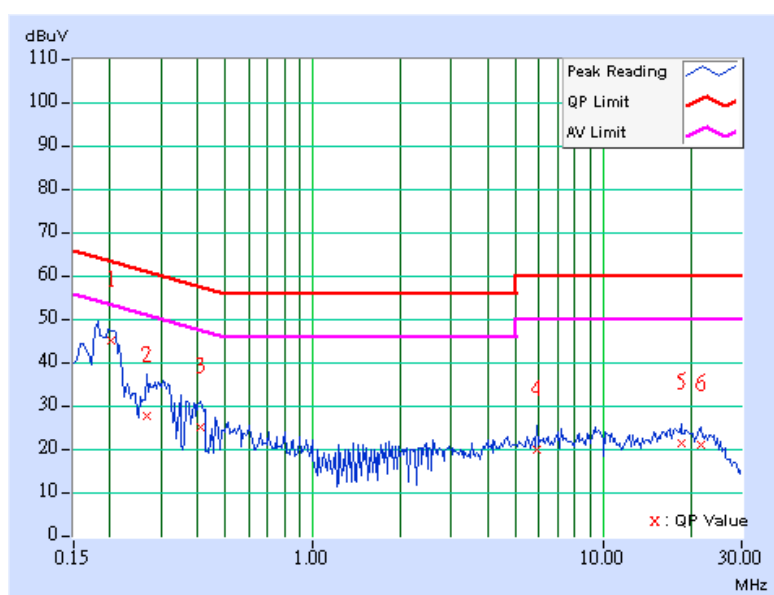
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



EUT	USB2.0 802.11a/b/g Wireless Network Adapter	MEASUREMENT DETAIL	
MODEL	WUB-410Z	PHASE	Line 2
CHANNEL	Channel 3	6dB BANDWIDTH	9 kHz
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	23deg. C, 65%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Gary Chang		

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	0.202	0.11	44.31	28.51	44.42	28.62	63.54	53.54	-19.12	-24.92
2	0.267	0.11	26.97	-	27.08	-	61.20	51.20	-34.12	-
3	0.408	0.11	24.42	-	24.53	-	57.69	47.69	-33.16	-
4	5.945	0.41	19.38	-	19.79	-	60.00	50.00	-40.21	-
5	18.570	0.65	20.81	-	21.46	-	60.00	50.00	-38.54	-
6	21.637	0.77	20.17	-	20.94	-	60.00	50.00	-39.06	-

- 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 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

Frequencies (MHz)	EIRP Limit (dBm)	Equivalent Field Strength at 3m (dBμV/m) *note 3
5150~5250	-27	68.3
5250~5350	-27	68.3
5725~5825	-27 *note 1	68.3
	-17 *note 2	78.3

**NOTE:**

1. For frequencies 10MHz or greater above or below the band edge.
2. All emissions within the frequency range from the band edge to 10MHz above or below the band edge.
3. The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength

$$E = \frac{1000000\sqrt{30P}}{3} \quad \mu\text{V/m, where P is the eirp (Watts)}$$

## 4.2.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESI7	100033	May 19, 2006
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100039	Nov. 21, 2005
BILOG Antenna SCHWARZBECK	VULB9168	9168-157	Jan. 22, 2006
HORN Antenna SCHWARZBECK	9120D	9120D-408	Jan. 17, 2006
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170243	Jan. 23, 2006
Preamplifier Agilent	8447D	2944A10633	Nov. 09, 2005
Preamplifier Agilent	8449B	3008A01964	Nov. 06, 2005
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218183/4	Jan. 26, 2006
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218195/4	Jan. 26, 2006
Software ADT.	ADT_Radiated_V5.14	NA	NA
Antenna Tower inn-co GmbH	MA 4000	013303	NA
Antenna Tower Controller inn-co GmbH	CO2000	017303	NA
Turn Table ADT.	TT100.	TT93021703	NA
Turn Table Controller ADT.	SC100.	SC93021703	NA

- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HwaYa Chamber 2.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The VCCI Site Registration No. is R-237.
5. The IC Site Registration No. is IC4924-3.

#### 4.2.4 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

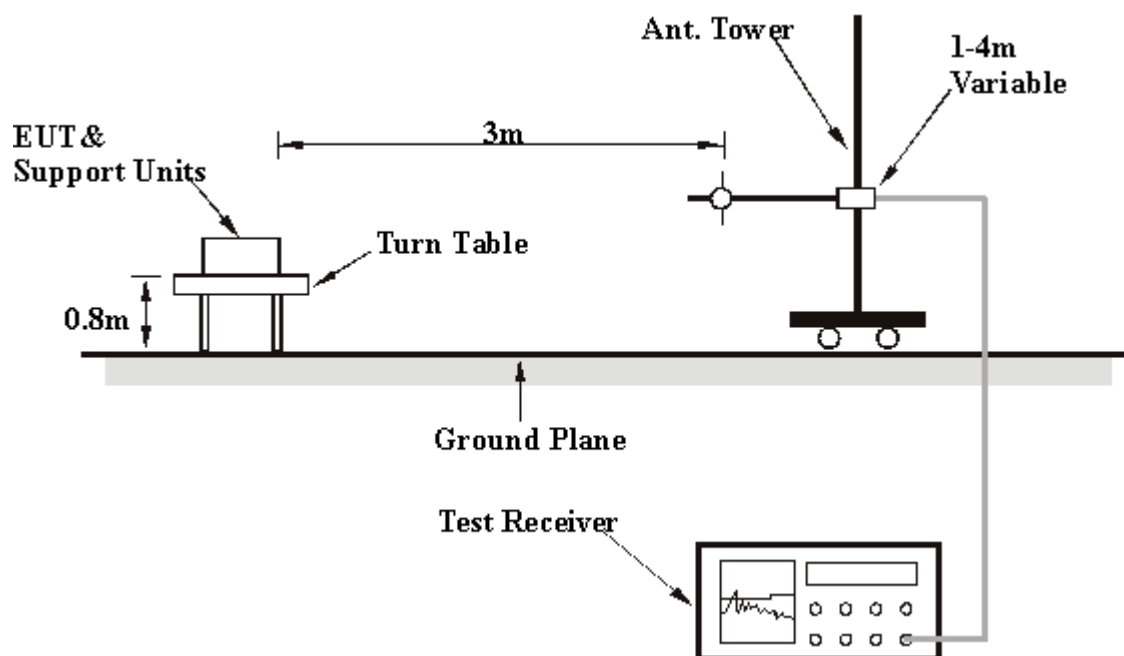
**NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz 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.

#### 4.2.5 DEVIATION FROM TEST STANDARD

No deviation

#### 4.2.6 TEST SETUP



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

#### 4.2.7 EUT OPERATING CONDITION

Same as 4.1.6

## 4.2.8 TEST RESULTS

## Below 1GHz Worst-Case Data

EUT	USB2.0 802.11a/b/g Wireless Network Adapter	MEASUREMENT DETAIL	
MODEL	WUB-410Z	FREQUENCY RANGE	Below 1000MHz
CHANNEL	Channel 5	DETECTOR FUNCTION	Quasi-Peak
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	22deg. C, 63%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Morgan Chen		

## ANTENNA POLARITY &amp; 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	360.46	39.39 QP	46.00	-6.61	1.00 H	271	23.01	16.38
2	399.34	33.50 QP	46.00	-12.50	1.00 H	337	16.27	17.22
3	640.38	35.21 QP	46.00	-10.79	1.00 H	310	13.04	22.17
4	<b>720.08</b>	<b>41.87 QP</b>	<b>46.00</b>	<b>-4.13</b>	<b>1.00 H</b>	<b>298</b>	<b>18.39</b>	<b>23.48</b>
5	799.78	36.77 QP	46.00	-9.23	1.00 H	274	12.19	24.57
6	840.60	35.93 QP	46.00	-10.07	1.00 H	283	11.01	24.92

## ANTENNA POLARITY &amp; 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	35.83	35.81 QP	40.00	-4.19	1.00 V	325	20.98	14.83
2	131.08	30.82 QP	43.50	-12.68	1.25 V	49	16.69	14.13
3	533.47	35.20 QP	46.00	-10.80	1.00 V	145	15.24	19.96
4	720.08	34.95 QP	46.00	-11.05	1.00 V	25	11.47	23.48
5	799.78	33.60 QP	46.00	-12.40	1.25 V	40	9.02	24.57
6	840.60	33.30 QP	46.00	-12.70	1.00 V	31	8.38	24.92

- 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

**802.11a OFDM modulation**

EUT	USB2.0 802.11a/b/g Wireless Network Adapter	MEASUREMENT DETAIL	
MODEL	WUB-410Z	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 1	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	22deg. C, 60%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Long Chen		

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	2400.00	45.90 PK	68.30	-22.40	1.00 H	260	14.54	31.36
2	#5150.00	50.70 PK	74.00	-23.30	1.07 H	0	13.22	37.48
2	#5150.00	40.57 AV	54.00	-13.43	1.07 H	0	3.09	37.48
3	*5180.00	106.30 PK			1.07 H	0	68.80	37.50
3	*5180.00	96.17 AV			1.07 H	0	58.67	37.50
4	6906.00	57.55 PK	68.30	-10.75	1.00 H	2	15.77	41.78
5	10360.00	59.15 PK	68.30	-9.15	1.12 H	258	11.57	47.58

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	2400.00	42.72 PK	68.30	-25.58	1.00 V	355	11.36	31.36
2	#5150.00	46.24 PK	74.00	-27.76	1.32 V	340	8.76	37.48
3	*5180.00	101.84 PK			1.32 V	340	64.34	37.50
3	*5180.00	93.09 AV			1.32 V	340	55.59	37.50
4	6906.00	55.02 PK	68.30	-13.27	1.17 V	353	13.25	41.78
5	10360.00	57.83 PK	68.30	-10.47	1.25 V	25	10.25	47.58

- NOTE:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value
  5. “\*” : Fundamental frequency
  6. “#” The radiated frequency falling in the restricted band.

<b>EUT</b>	USB2.0 802.11a/b/g Wireless Network Adapter	<b>MEASUREMENT DETAIL</b>	
<b>MODEL</b>	WUB-410Z	<b>FREQUENCY RANGE</b>	1 ~ 40 GHz
<b>CHANNEL</b>	Channel 4	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>MODULATION TYPE</b>	BPSK	<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 60%RH, 991hPa
<b>TRANSFER RATE</b>	6Mbps	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>TESTED BY</b>	Long Chen		

**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	2400.00	46.50 PK	68.30	-21.80	1.25 H	20	15.14	31.36
2	*5240.00	106.07 PK			1.00 H	300	68.49	37.58
2	*5240.00	96.41 AV			1.00 H	300	58.83	37.58
3	6986.00	56.00 PK	68.30	-12.30	1.11 H	6	14.00	41.99
4	10480.00	59.58 PK	68.30	-8.72	1.19 H	20	11.72	47.86

**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	2400.00	42.96 PK	68.30	-25.34	1.25 V	258	11.60	31.36
2	*5240.00	101.86 PK			1.12 V	348	64.28	37.58
2	*5240.00	92.21 AV			1.12 V	348	54.63	37.58
3	6986.00	52.98 PK	68.30	-15.32	1.00 V	276	10.99	41.99
4	10480.00	56.26 PK	68.30	-12.04	1.25 V	360	8.40	47.86

- NOTE:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value
  5. “\*” : Fundamental frequency
  6. “#” The radiated frequency falling in the restricted band.

<b>EUT</b>	USB2.0 802.11a/b/g Wireless Network Adapter	<b>MEASUREMENT DETAIL</b>	
<b>MODEL</b>	WUB-410Z	<b>FREQUENCY RANGE</b>	1 ~ 40 GHz
<b>CHANNEL</b>	Channel 5	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>MODULATION TYPE</b>	BPSK	<b>ENVIRONMENTAL CONDITIONS</b>	22deg. C, 60%RH, 991hPa
<b>TRANSFER RATE</b>	6Mbps	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>TESTED BY</b>	Long Chen		

<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	2400.00	45.05 PK	68.30	-23.25	1.25 H	26	13.69	31.36
2	*5260.00	105.96 PK			1.01 H	289	68.36	37.60
2	*5260.00	95.89 AV			1.01 H	289	58.29	37.60
3	7013.00	58.44 PK	68.30	-9.86	1.02 H	349	16.39	42.06
4	10520.00	62.41 PK	68.30	-5.89	1.14 H	58	14.49	47.92

<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	2400.00	41.92 PK	68.30	-26.38	1.14 V	289	10.56	31.36
2	*5260.00	101.98 PK			1.12 V	254	64.38	37.60
2	*5260.00	92.29 AV			1.12 V	254	54.69	37.60
3	7013.00	56.05 PK	68.30	-12.25	1.00 V	289	14.00	42.06
4	10520.00	59.63 PK	68.30	-8.67	1.13 V	207	11.71	47.92

- NOTE:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value
  5. “\*” : Fundamental frequency
  6. “#” The radiated frequency falling in the restricted band.

EUT	USB2.0 802.11a/b/g Wireless Network Adapter	MEASUREMENT DETAIL	
MODEL	WUB-410Z	FREQUENCY RANGE	1 ~ 40 GHz
CHANNEL	Channel 8	DETECTOR FUNCTION	Peak(PK) Average (AV)
MODULATION TYPE	BPSK	ENVIRONMENTAL CONDITIONS	22deg. C, 60%RH, 991hPa
TRANSFER RATE	6Mbps	INPUT POWER (SYSTEM)	120Vac, 60 Hz
TESTED BY	Long Chen		

#### 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	2400.00	45.35 PK	68.30	-22.95	1.25 H	248	13.99	31.36
2	*5320.00	104.12 PK			1.02 H	13	66.45	37.67
2	*5320.00	95.17 AV			1.02 H	13	57.50	37.67
3	#5350.00	48.63 PK	74.00	-25.37	1.02 H	13	10.95	37.69
4	7093.00	56.69 PK	68.30	-11.61	1.00 H	18	14.46	42.23
5	#10640.00	61.41 PK	74.00	-12.59	1.12 H	353	13.47	47.93
5	#10640.00	47.47 AV	54.00	-6.53	1.12 H	353	-0.47	47.93

#### 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	2400.00	43.25 PK	68.30	-25.05	1.24 V	319	11.89	31.36
2	*5320.00	100.91 PK			1.12 V	287	63.24	37.67
2	*5320.00	91.08 AV			1.12 V	287	53.41	37.67
3	#5350.00	45.42 PK	74.00	-22.88	1.12 V	287	7.73	37.69
4	7093.00	51.36 PK	68.30	-16.94	1.17 V	174	9.13	42.23
5	#10640.00	58.92 PK	74.00	-15.08	1.00 V	354	10.99	47.93
5	#10640.00	45.30 AV	54.00	-8.70	1.00 V	354	-2.63	47.93

- NOTE:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
  2. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
  3. The other emission levels were very low against the limit.
  4. Margin value = Emission level – Limit value
  5. "\*" : Fundamental frequency
  6. "#"The radiated frequency falling in the restricted band.

### 4.3 PEAK TRANSMIT POWER MEASUREMENT

#### 4.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

Frequency Band	Limit
5.15 – 5.25GHz	The lesser of 50mW (17dBm) or 4dBm + 10logB
5.25 – 5.35GHz	The lesser of 250mW (24dBm) or 11dBm + 10logB
5.725 – 5.825GHz	The lesser of 1W (30dBm) or 17dBm + 10logB

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

#### 4.3.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
R&S SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

**NOTE:** 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

1. The transmitter output was connected to the spectrum analyzer.
2. Set span to encompass the entire emission bandwidth of the signal.
3. Set RBW to 1MHz, VBW to 3MHz.
4. Using the spectrum analyzer's channel power measurement function to measure the output power.

**NOTE:**

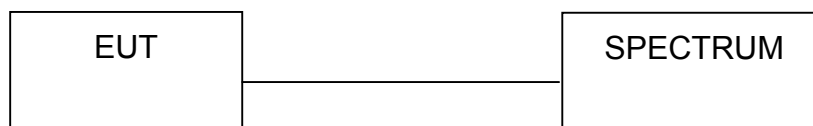
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

#### 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 specific channel frequencies individually.

## 4.3.7 TEST RESULTS

**802.11a OFDM modulation**

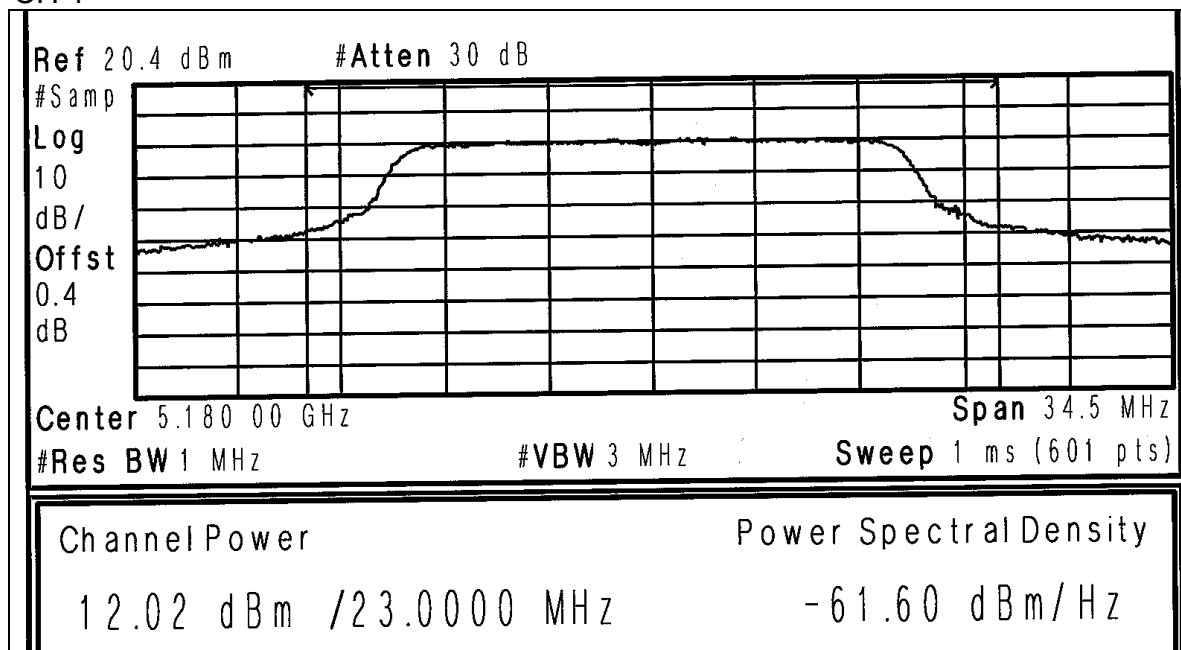
<b>EUT</b>	USB2.0 802.11a/b/g Wireless Network Adapter	<b>MODEL</b>	WUB-410Z
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	24deg.C, 64%RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

CHANNEL	CHANNEL FREQUEN CY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
1	5180	15.922	12.02	17.00	22.50	PASS
4	5240	16.032	12.05	17.00	22.41	PASS
5	5260	16.218	12.10	24.00	22.41	PASS
8	5320	16.106	12.07	24.00	22.32	PASS

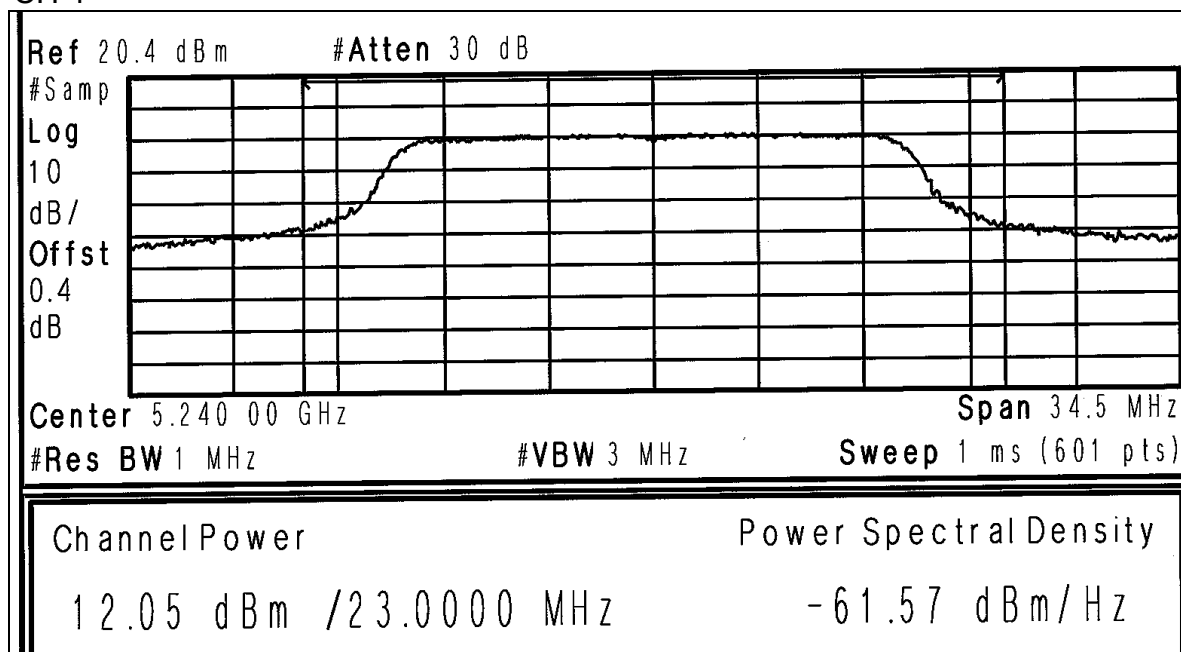
**NOTE:** The 26dBc Occupied Bandwidth plot, please refer to the following pages.

## Peak Power Output:

CH 1

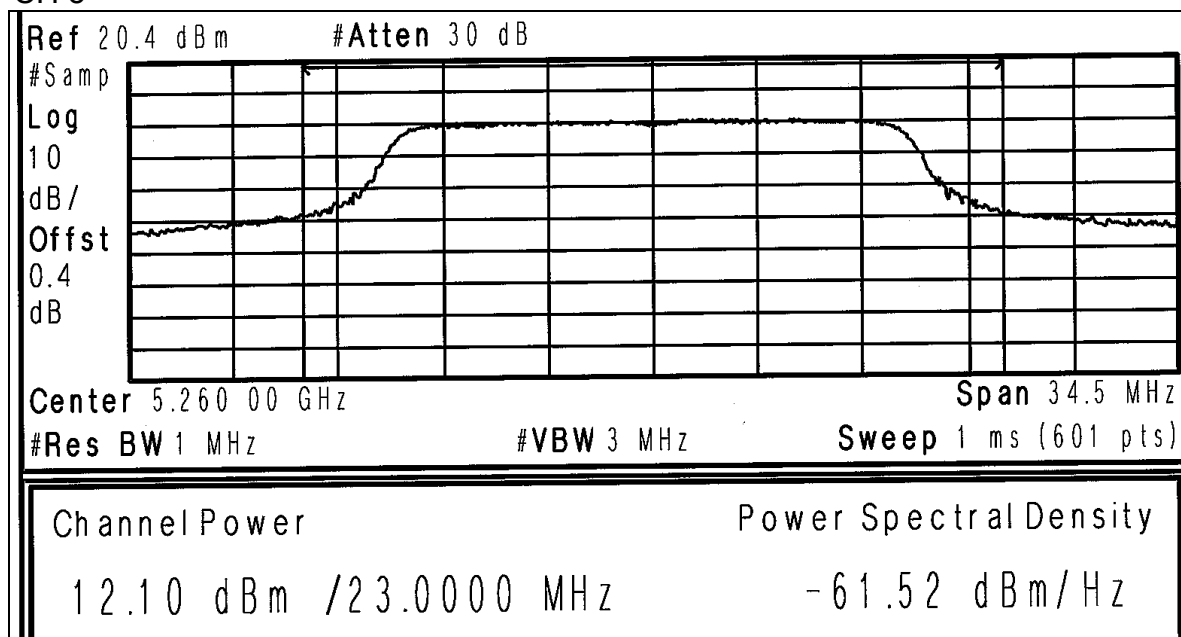


CH 4

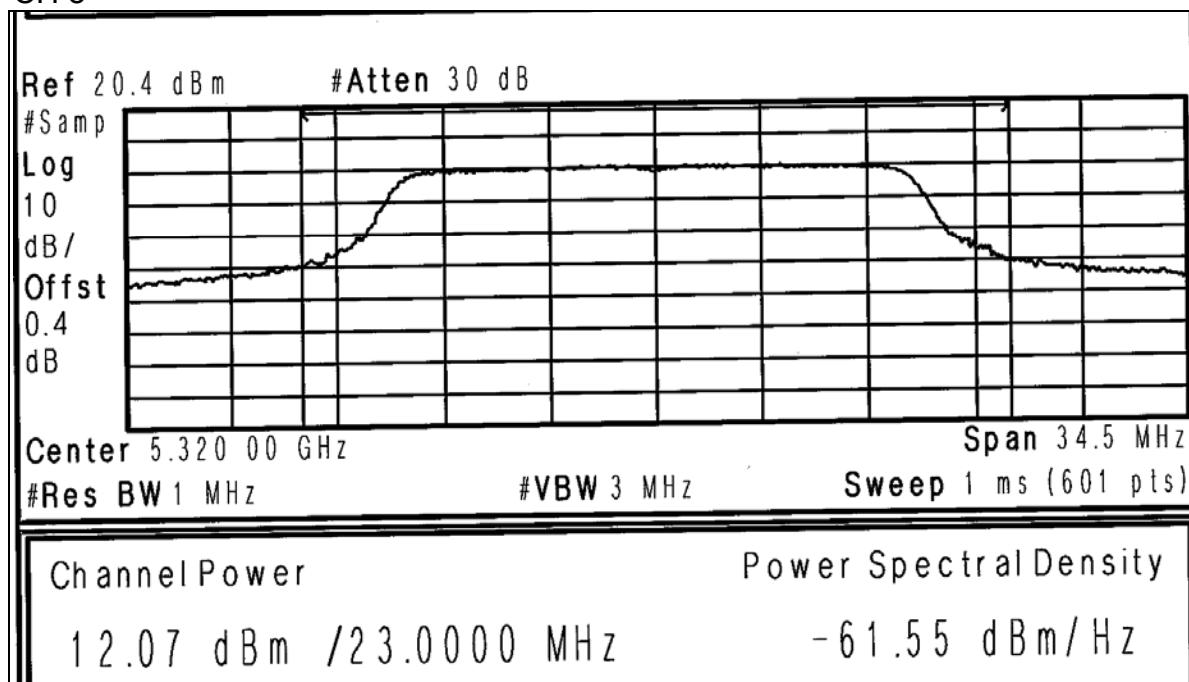




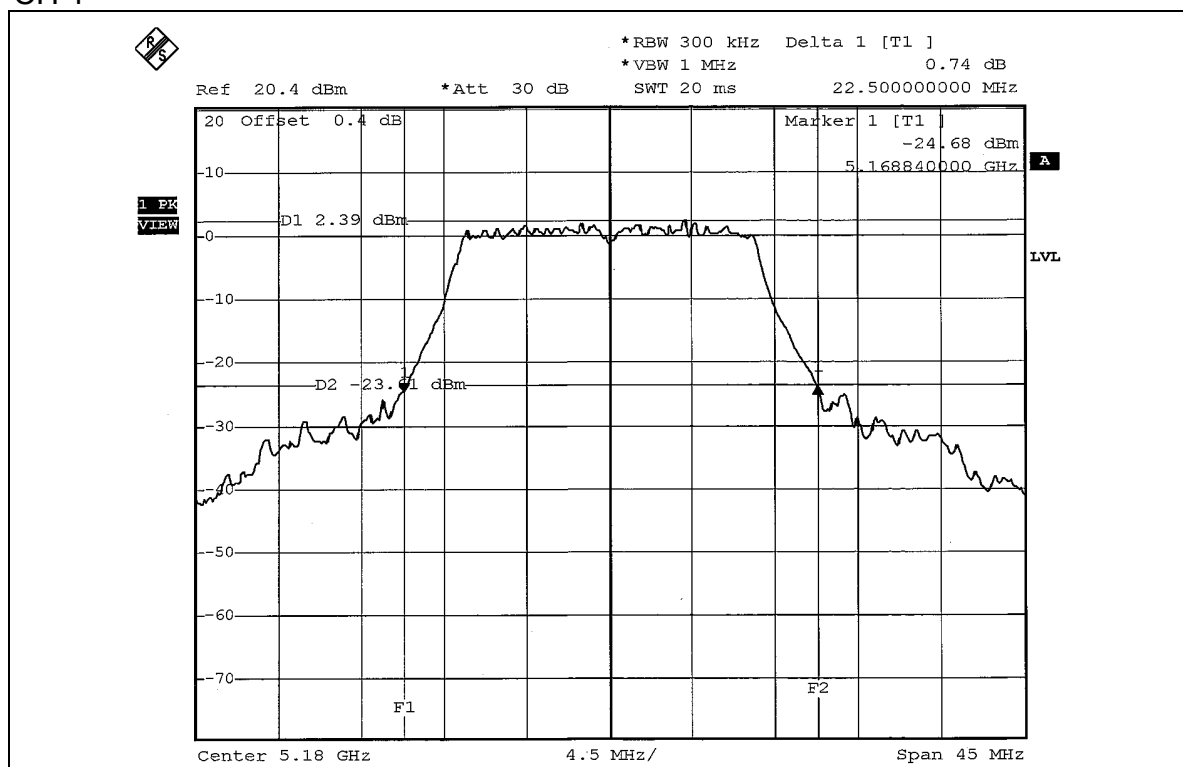
## CH 5



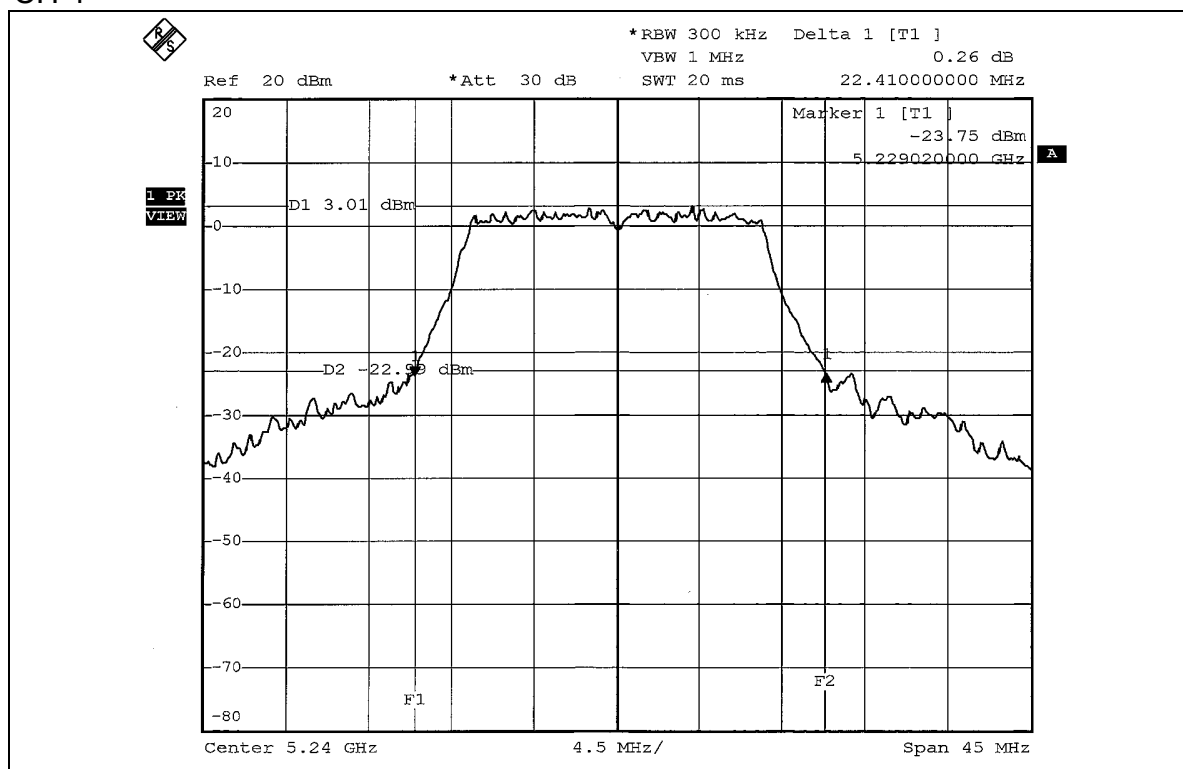
## CH 8



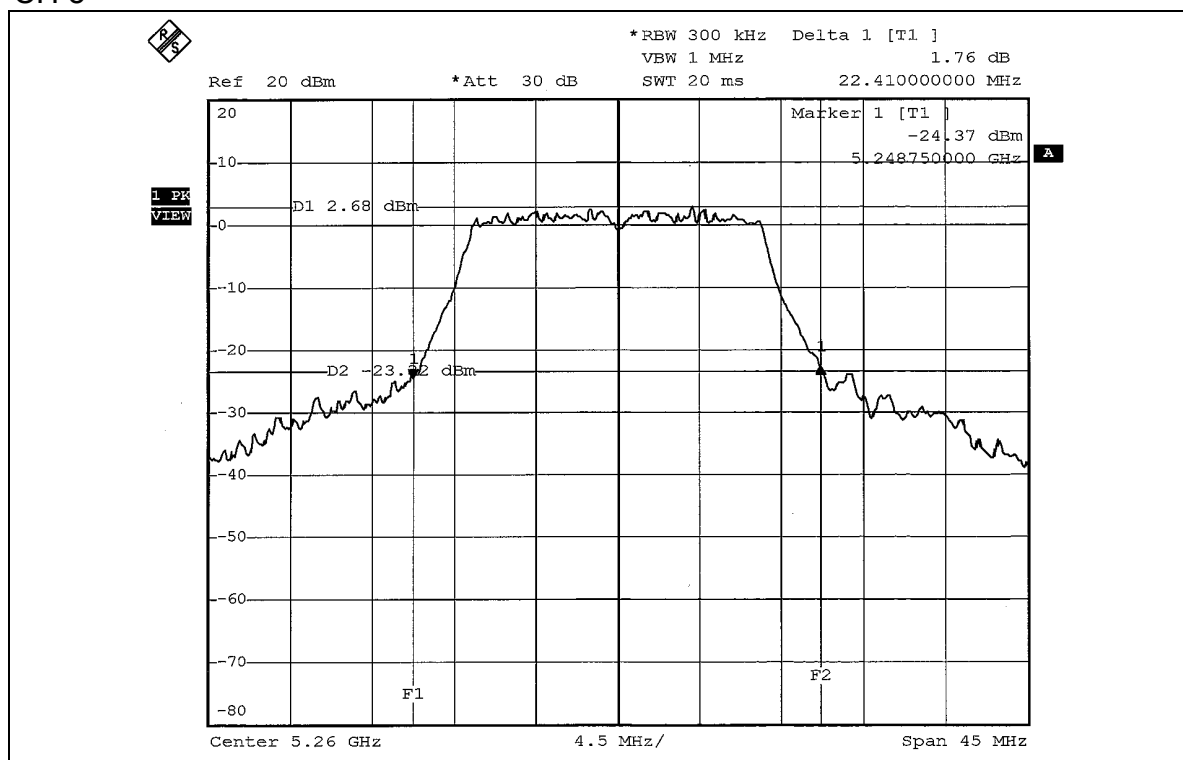
## 26dB Occupied Bandwidth: CH 1



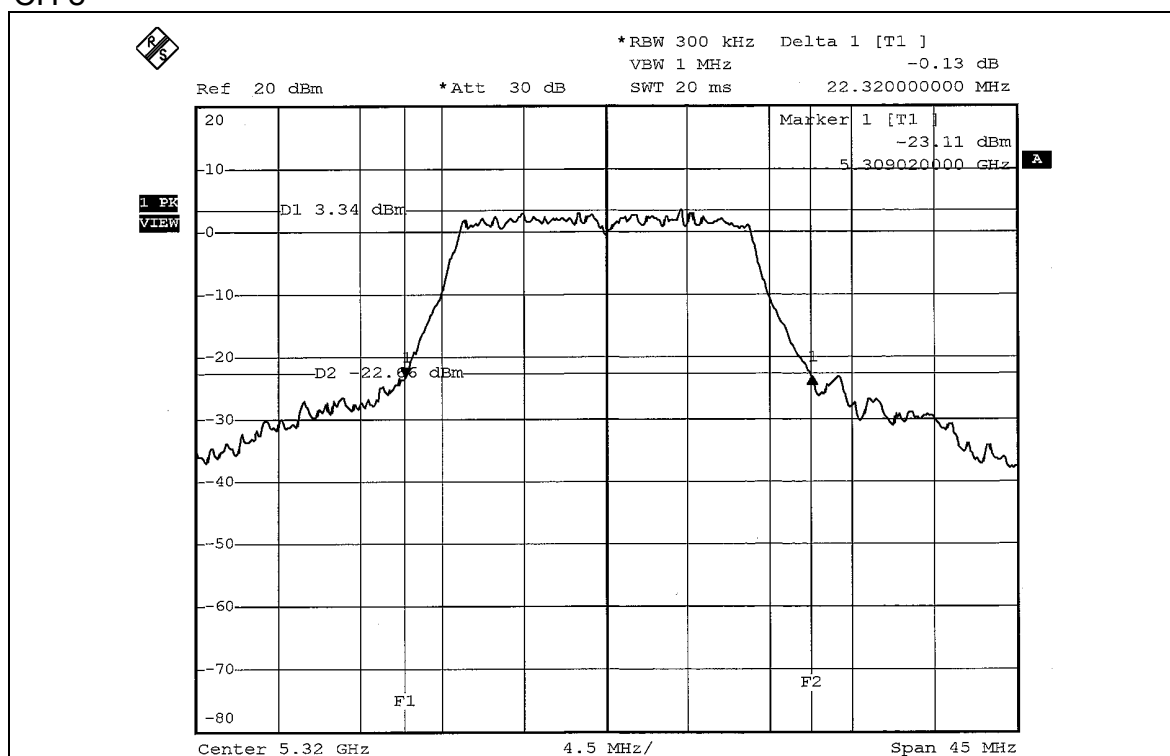
## CH 4



## CH 5



## CH 8



#### 4.4 PEAK POWER EXCURSION MEASUREMENT

##### 4.4.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

Frequency Band	Limit
5.15 – 5.25 GHz	13dB
5.25 – 5.35 GHz	13dB
5.725 – 5.825 GHz	13dB

##### 4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

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

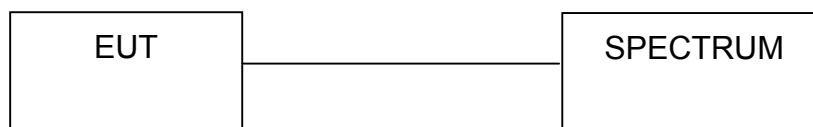
#### 4.4.3 TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer.
2. Set the spectrum bandwidth span to view the entire spectrum.
3. Using peak detector and Max-hold function for Trace 1 (RB=1MHz, VB=3MHz) and 2 (RB=1MHz, VB=300KHz).
4. The largest difference between Trace 1 and Trace 2 in any 1MHz band on any frequency was recorded.

#### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.4.5 TEST SETUP



#### 4.4.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.



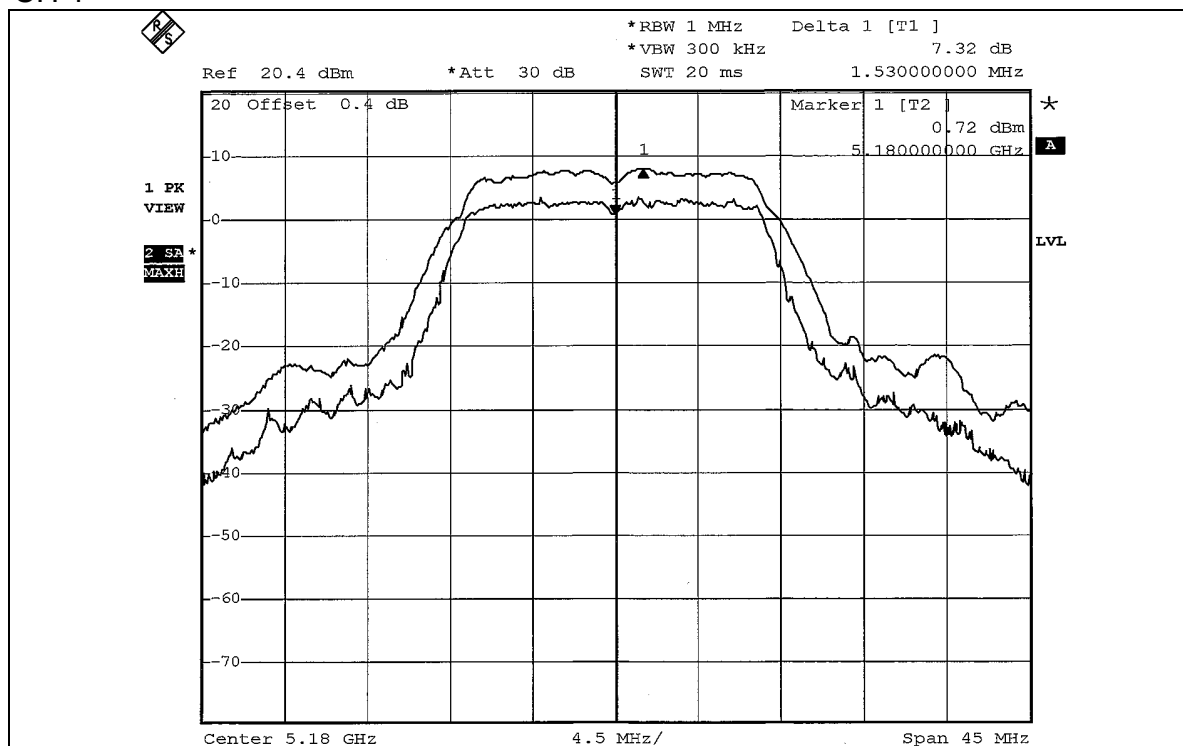
## 4.4.7 TEST RESULTS

**802.11a OFDM modulation**

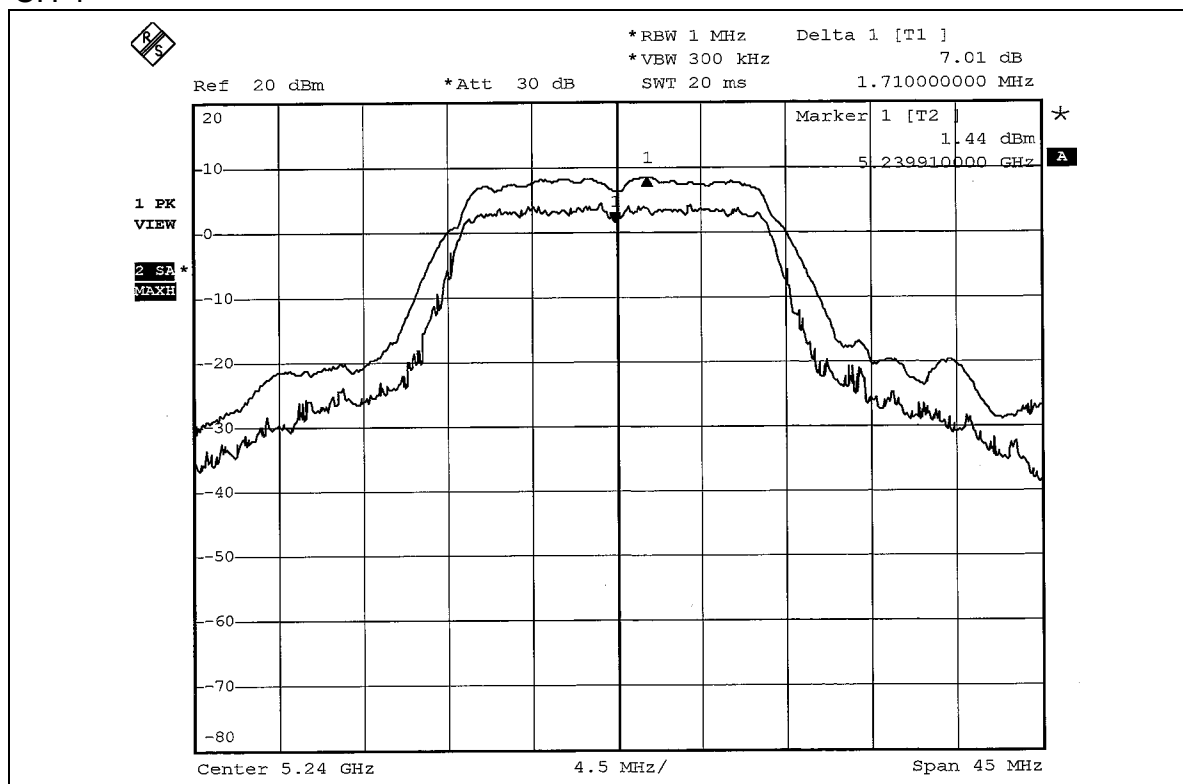
<b>EUT</b>	USB2.0 802.11a/b/g Wireless Network Adapter	<b>MODEL</b>	WUB-410Z
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	24deg.C, 64%RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>PEAK POWER EXCURSION (dB)</b>	<b>PEAK to AVERAGE EXCURSION LIMIT (dB)</b>	<b>PASS/FAIL</b>
1	5180	7.32	13	PASS
4	5240	7.01	13	PASS
5	5260	7.68	13	PASS
8	5320	6.59	13	PASS

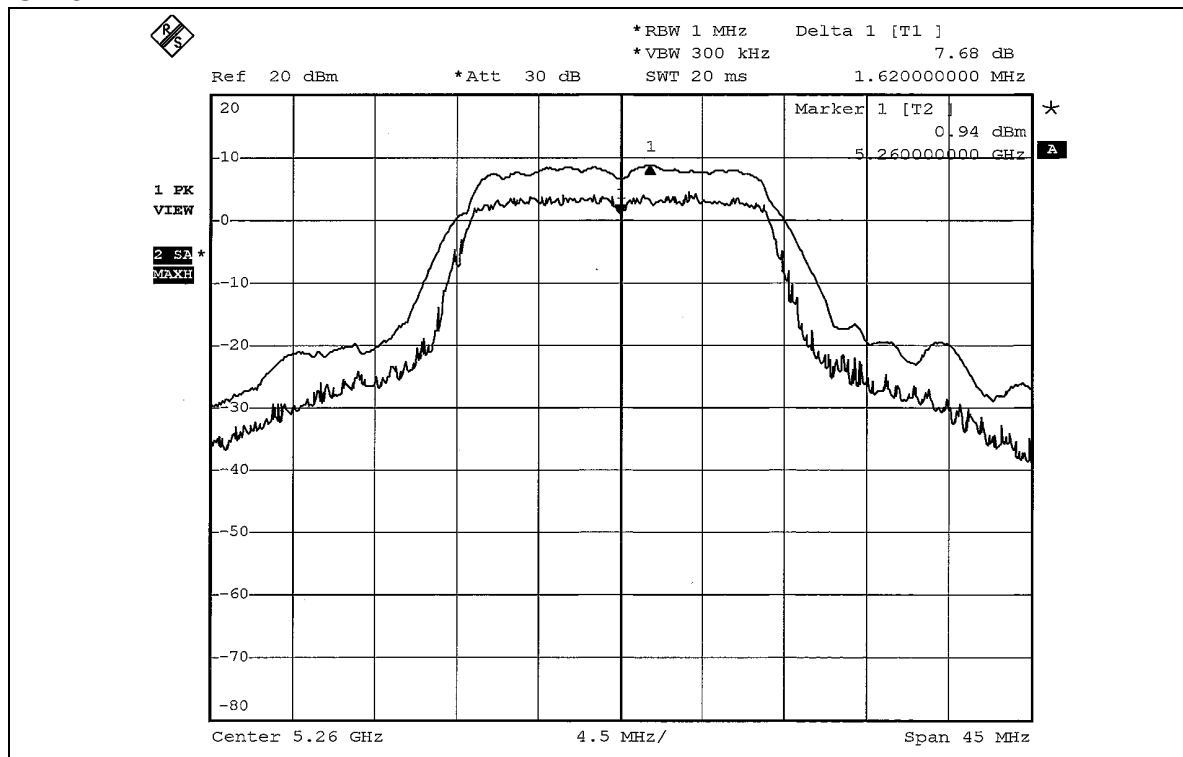
## CH 1



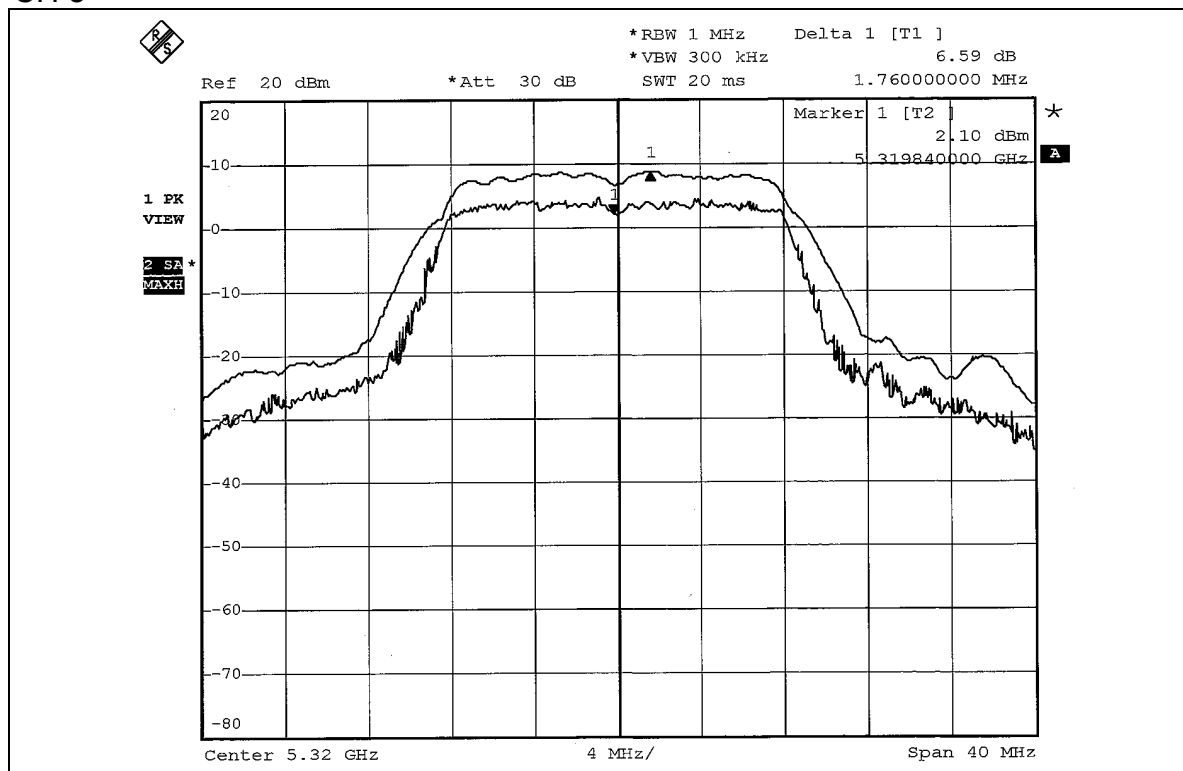
## CH 4



## CH 5



## CH 8



## 4.5 PEAK POWER SPECTRAL DENSITY MEASUREMENT

### 4.5.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

Frequency Band	Limit
5.15 ~ 5.25GHz	4dBm
5.25 ~ 5.35GHz	11dBm
5.725 ~ 5.825GHz	17dBm

### 4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

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

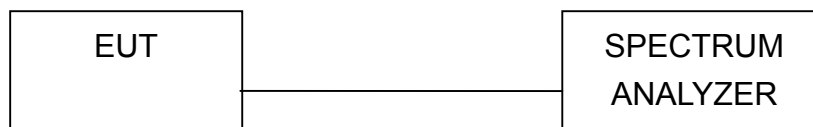
#### 4.5.3 TEST PROCEDURES

1. The transmitter output was connected to the spectrum analyzer.
2. Set RBW=1MHz, VBW=3MHz. The PPSD is the highest level found across the emission in any 1MHz band.

#### 4.5.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.5.5 TEST SETUP



#### 4.5.6 EUT OPERATING CONDITIONS

Same as 5.3.6

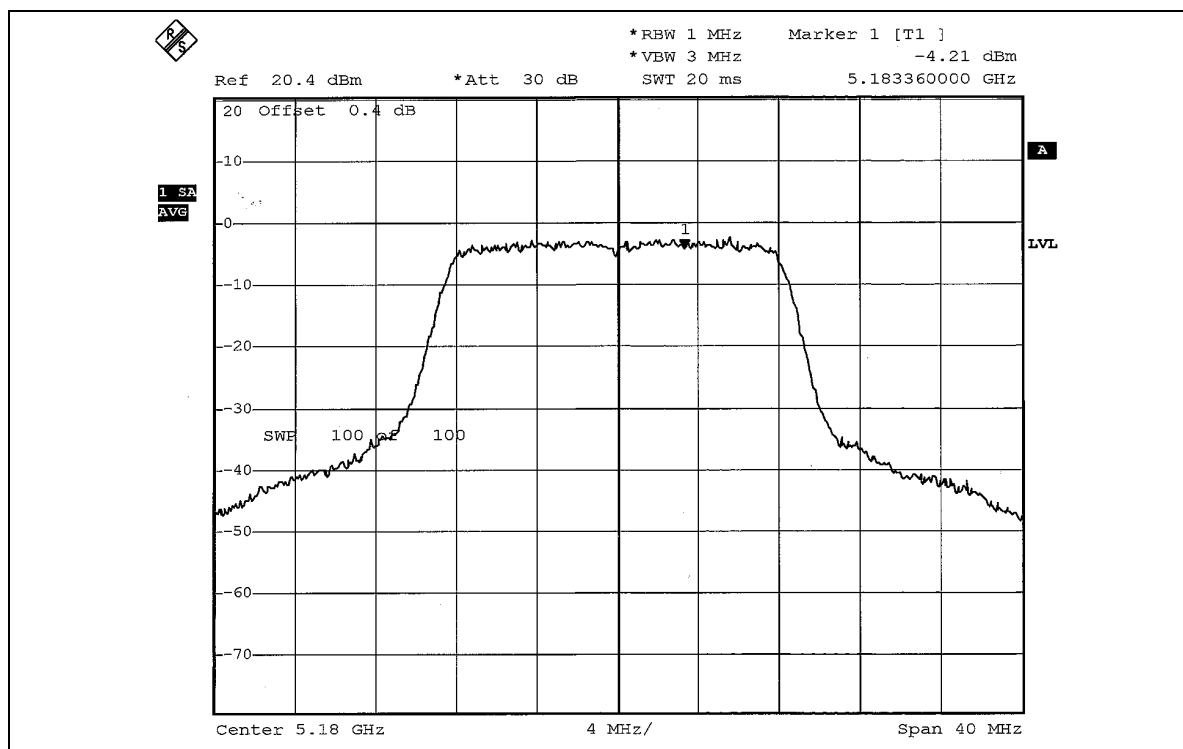
## 4.5.7 TEST RESULTS

**802.11a OFDM modulation**

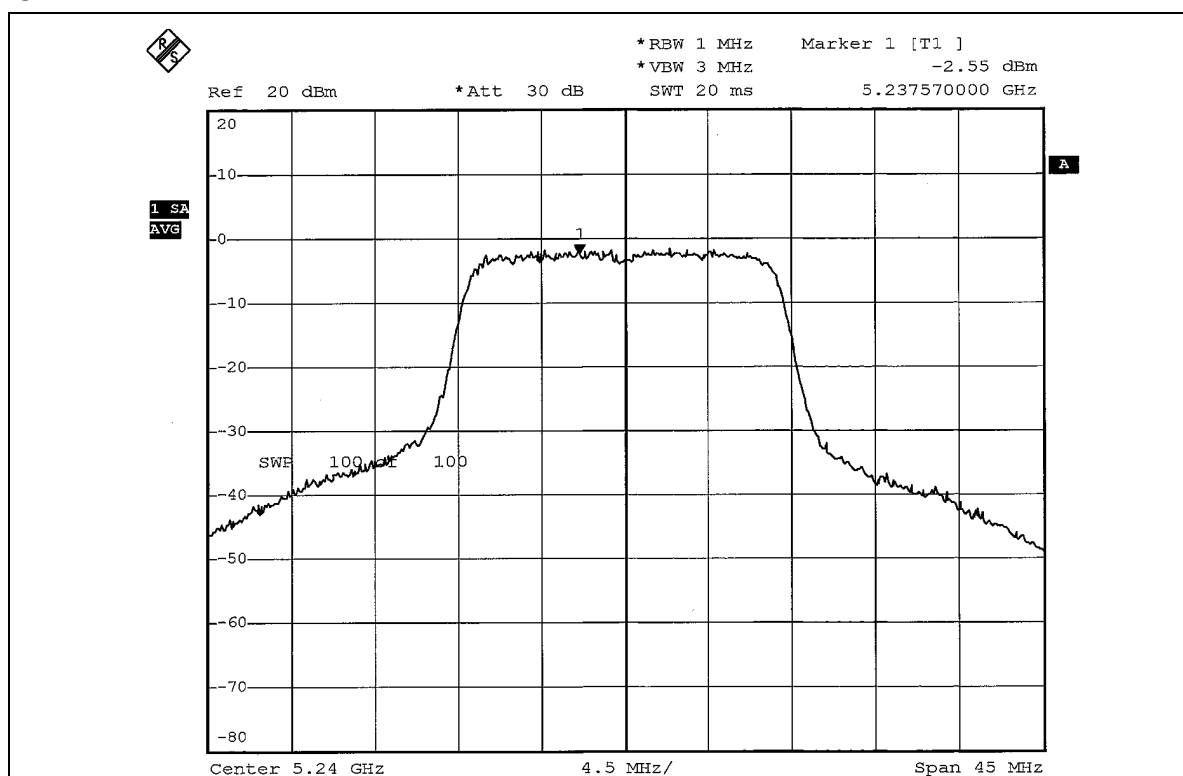
<b>EUT</b>	USB2.0 802.11a/b/g Wireless Network Adapter	<b>MODEL</b>	WUB-410Z
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	24deg.C, 64%RH, 991hPa
<b>TESTED BY</b>	Brad Wu		

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz )</b>	<b>RF POWER LEVEL IN 1MHz BW (dBm)</b>	<b>MAXIMUM LIMIT (dBm)</b>	<b>PASS/FAIL</b>
1	5180	-4.21	4	PASS
4	5240	-2.55	4	PASS
5	5260	-1.86	11	PASS
8	5320	-2.29	11	PASS

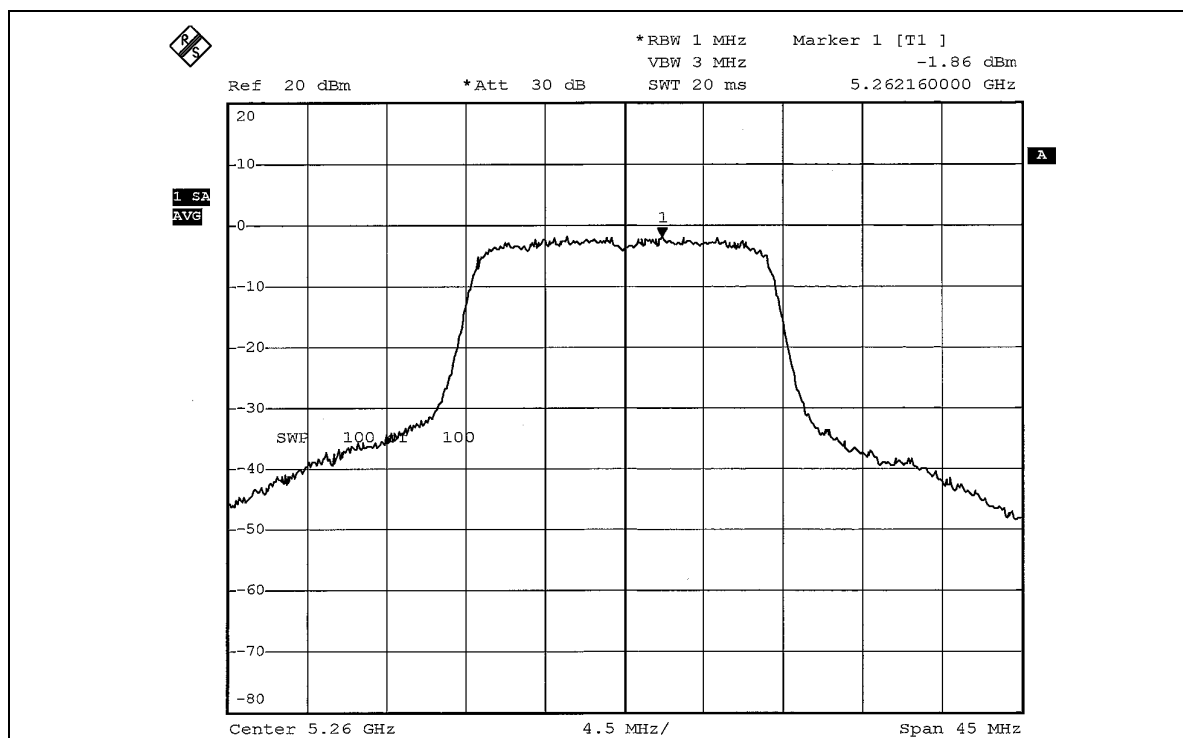
## CH 1



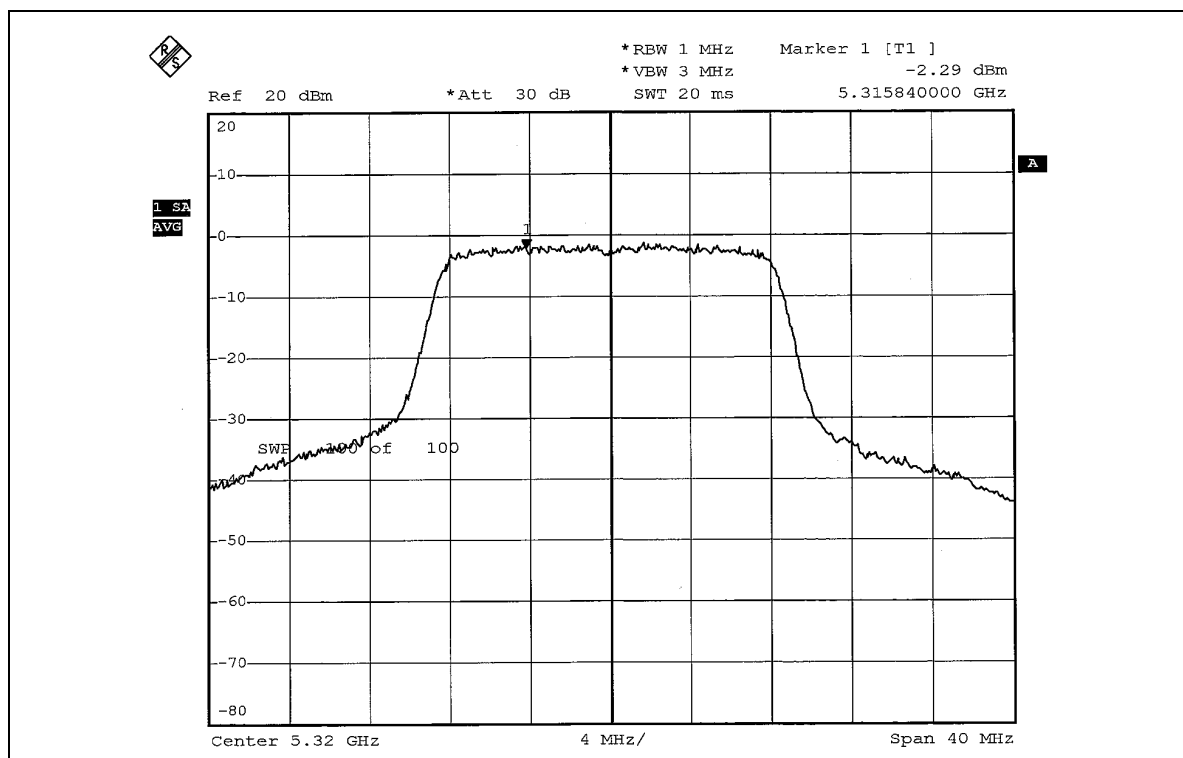
## CH 4



## CH 5



## CH 8



## 4.6 FREQUENCY STABILITY

### 4.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency tolerance of the carrier signal shall be maintained within +/- 0.02% of the operating frequency over a temperature variation of -30 degrees to 50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

### 4.6.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ANRITSU SPECTRUM ANALYZER	MS2667C	M10281	Aug. 12, 2005
WIT STANDARD TEMPERATURE AND HUMIDITY CHAMBER	TH-4S-C	W901030	Aug. 12, 2005

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

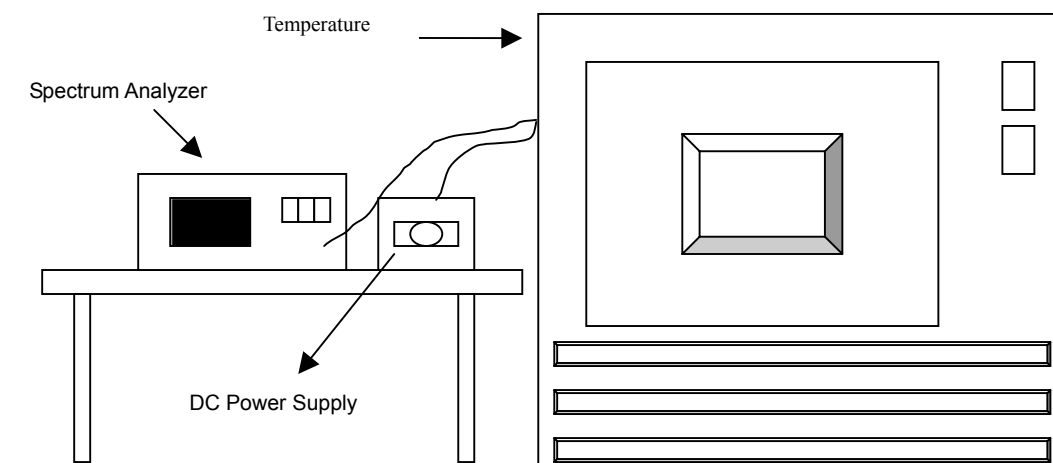
### 4.6.3 TEST PROCEDURE

1. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

### 4.6.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.6.5 TEST SETUP



#### 4.6.6 EUT OPERATING CONDITION

Same as Item 4.3.6

## 4.6.7 TEST RESULTS

Operating frequency: 5320MHz						Limit : $\pm 0.01\%$			
Temp. (°C)	Power supply (Vac)	0 minute		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	138	5319.9708	-0.0005492	5319.9709	-0.0005468	5319.9712	-0.0005408	5319.9713	-0.0005397
	120	5319.9708	-0.0005496	5319.9710	-0.0005460	5319.9712	-0.0005408	5319.9713	-0.0005403
	102	5319.9708	-0.0005494	5319.9710	-0.0005458	5319.9712	-0.0005409	5319.9713	-0.0005402
40	138	5319.9800	-0.0003763	5319.9793	-0.0003898	5319.9786	-0.0004028	5319.9790	-0.0003954
	120	5319.9800	-0.0003767	5319.9793	-0.0003899	5319.9786	-0.0004030	5319.9790	-0.0003952
	102	5319.9800	-0.0003762	5319.9793	-0.0003898	5319.9785	-0.0004032	5319.9790	-0.0003951
30	138	5319.9830	-0.0003188	5319.9830	-0.0003205	5319.9828	-0.0003228	5319.9825	-0.0003293
	120	5319.9831	-0.0003180	5319.9830	-0.0003202	5319.9828	-0.0003224	5319.9825	-0.0003296
	102	5319.9832	-0.0003165	5319.9830	-0.0003200	5319.9829	-0.0003215	5319.9824	-0.0003304
20	138	5320.0222	0.0004165	5320.0222	0.0004164	5320.0224	0.0004204	5320.0223	0.0004184
	120	5320.0222	0.0004167	5320.0222	0.0004167	5320.0224	0.0004208	5320.0222	0.0004182
	102	5320.0222	0.0004168	5320.0222	0.0004170	5320.0224	0.0004208	5320.0223	0.0004189
10	138	5320.0216	0.0004057	5320.0217	0.0004070	5320.0217	0.0004070	5320.0217	0.0004076
	120	5320.0216	0.0004056	5320.0217	0.0004071	5320.0216	0.0004069	5320.0217	0.0004077
	102	5320.0216	0.0004059	5320.0217	0.0004070	5320.0217	0.0004070	5320.0217	0.0004077
0	138	5320.0217	0.0004077	5320.0218	0.0004092	5320.0218	0.0004107	5320.0219	0.0004112
	120	5320.0217	0.0004077	5320.0218	0.0004089	5320.0218	0.0004106	5320.0218	0.0004106
	102	5320.0217	0.0004077	5320.0218	0.0004089	5320.0219	0.0004116	5320.0218	0.0004105
-10	138	5320.0234	0.0004402	5320.0235	0.0004410	5320.0236	0.0004433	5320.0237	0.0004454
	120	5320.0234	0.0004402	5320.0235	0.0004410	5320.0236	0.0004433	5320.0237	0.0004454
	102	5320.0234	0.0004404	5320.0235	0.0004411	5320.0236	0.0004434	5320.0237	0.0004454
-20	138	5320.0248	0.0004662	5320.0235	0.0004419	5320.0257	0.0004826	5320.0260	0.0004885
	120	5320.0249	0.0004678	5320.0236	0.0004429	5320.0257	0.0004827	5320.0260	0.0004884
	102	5320.0249	0.0004678	5320.0235	0.0004421	5320.0257	0.0004826	5320.0260	0.0004883
-30	138	5320.0275	0.0005162	5320.0275	0.0005174	5320.0275	0.0005162	5320.0276	0.0005185
	120	5320.0275	0.0005163	5320.0276	0.0005179	5320.0275	0.0005166	5320.0276	0.0005186
	102	5320.0275	0.0005161	5320.0275	0.0005174	5320.0275	0.0005163	5320.0276	0.0005186

## 4.7 BAND EDGES MEASUREMENT

### 4.7.1 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	Aug. 12, 2005

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

### 4.7.2 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 1MHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges were measured and recorded.

### 4.7.3 EUT OPERATING CONDITION

The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

### 4.7.4 TEST RESULTS

For signals in the restricted bands above and below the 5.15 to 5.35GHz allocated band a measurement was made of the amplitude of the spurious emissions with respect to the intentional signals. The relative amplitude, in dBc, was applied to the average and peak field strength of the intentional signal made on the OATS to calculate the field strength of the unintentional signals.

The spectrum plots (Peak RBW=VBW=1MHz; Average RBW=1MHz, VBW=10Hz) are attached on the following pages.

### 802.11a OFDM modulation

#### Channel 1 (5180MHz)

The band edge emission plot on page 48 shows 49.02Bc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 106.30dBuV/m (Peak), so the maximum field strength in restrict band is  $106.30 - 49.02 = 57.28$ dBuV/m which is under 74dBuV/m limit.

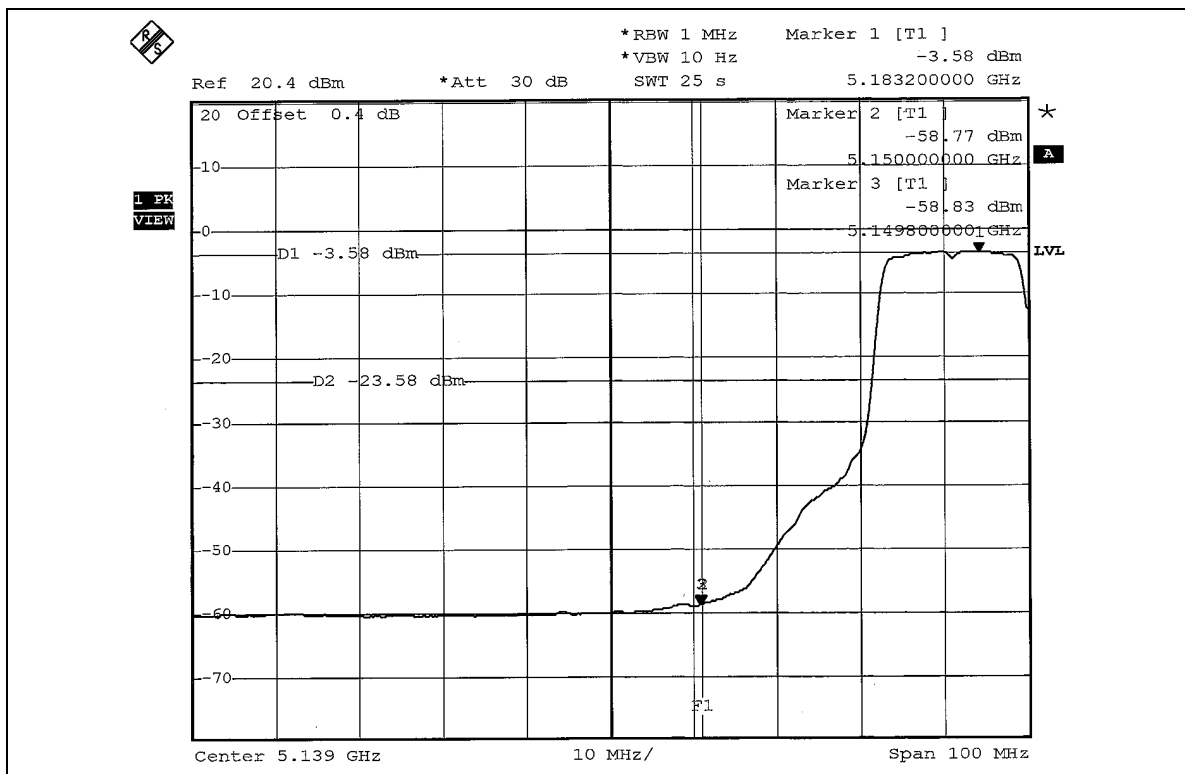
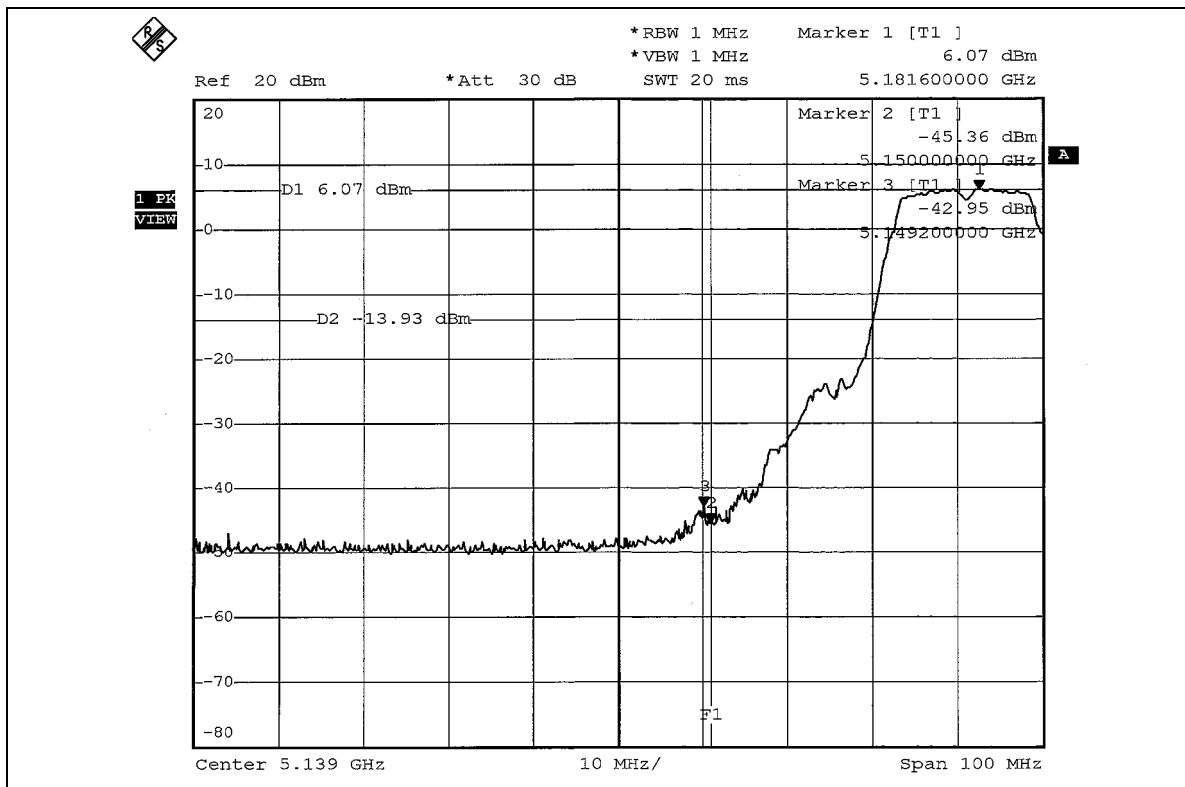
The band edge emission plot on page 48 shows 55.19dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 96.17dBuV/m (Average), so the maximum field strength in restrict band is  $96.17 - 55.19 = 40.98$ dBuV/m which is under 54dBuV/m limit.

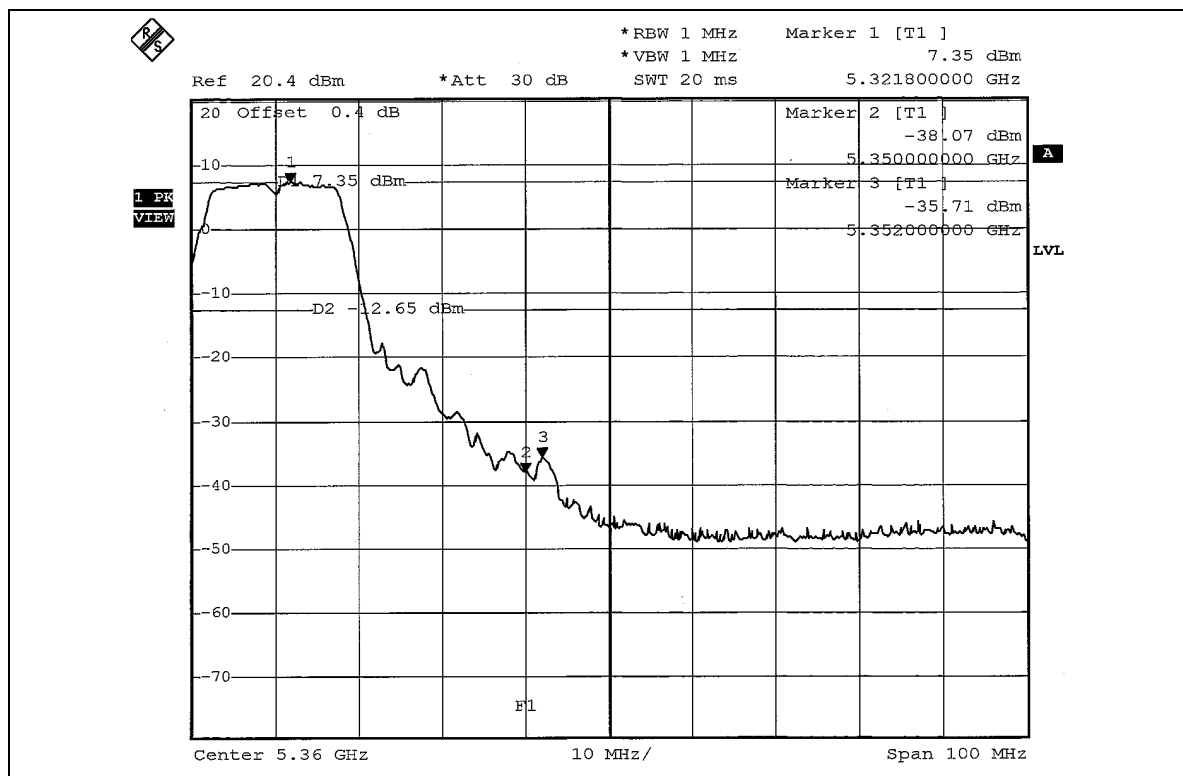
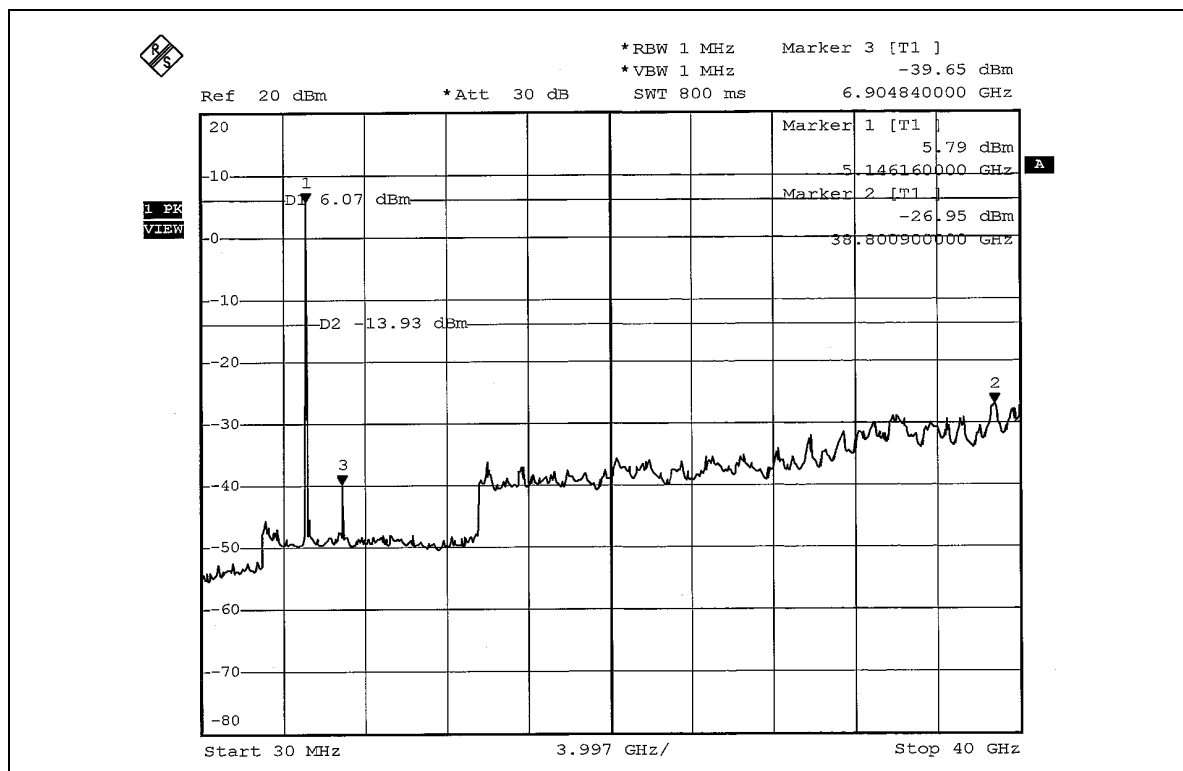
#### Channel 8 (5320MHz)

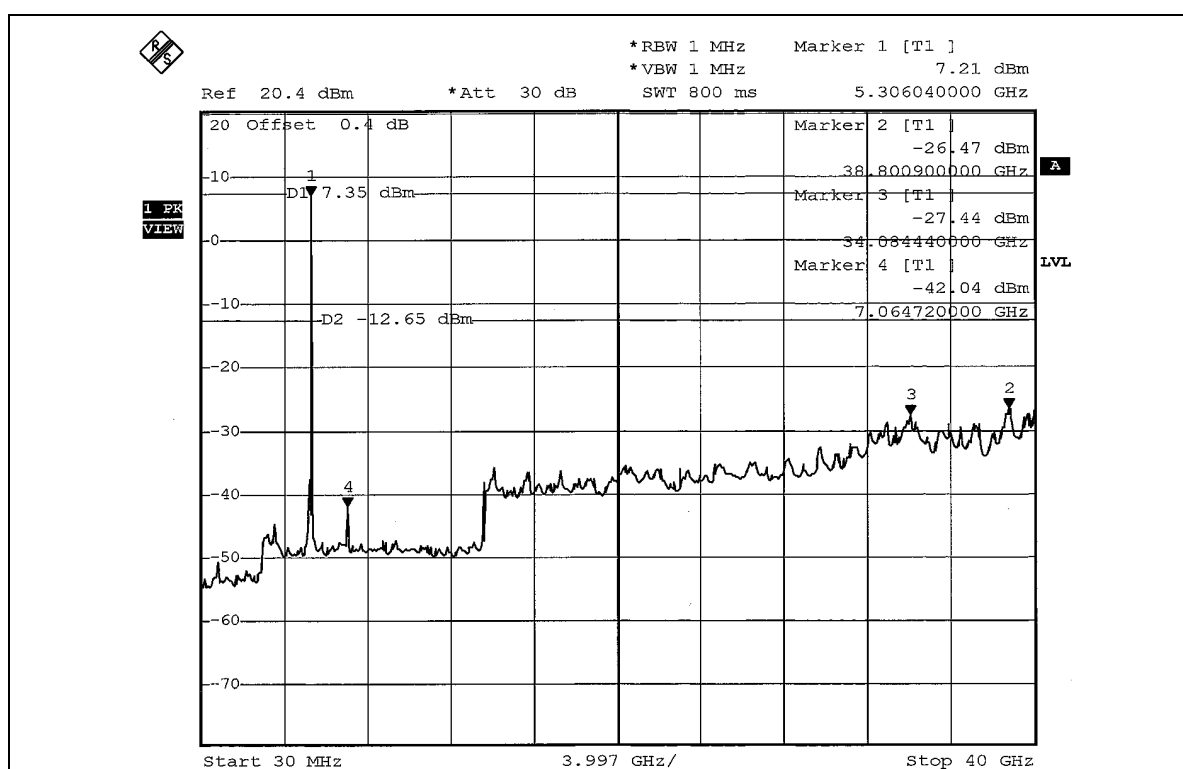
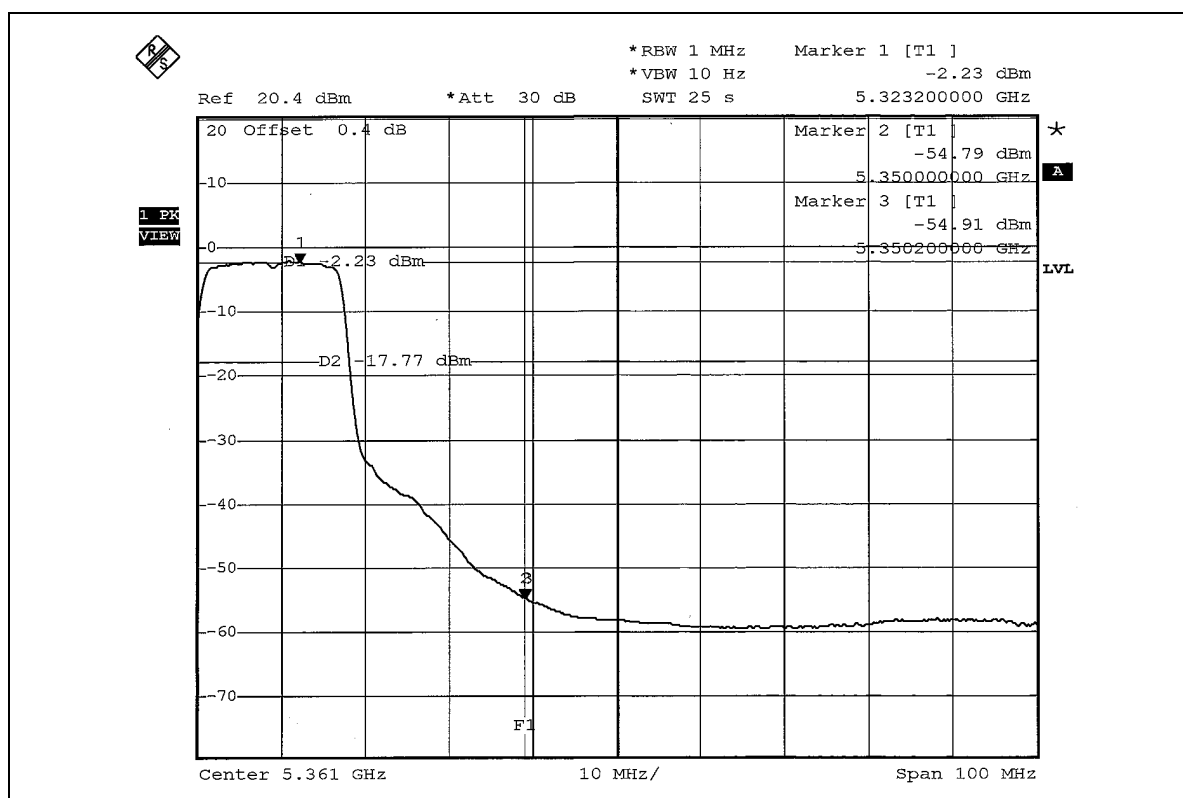
The band edge emission plot on page 49 shows 43.06dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 8 is 104.12dBuV/m (Peak), so the maximum field strength in restrict band is  $104.12 - 43.06 = 61.06$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on page 50 shows 52.56dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 8 is 95.17dBuV/m (Average), so the maximum field strength in restrict band is  $95.17 - 52.56 = 42.61$ dBuV/m which is under 54dBuV/m limit.

## 802.11a OFDM modulation









## **4.8 ANTENNA REQUIREMENT**

### **4.8.1 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 15.407(a), 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.

### **4.8.2 ANTENNA CONNECTED CONSTRUCTION**

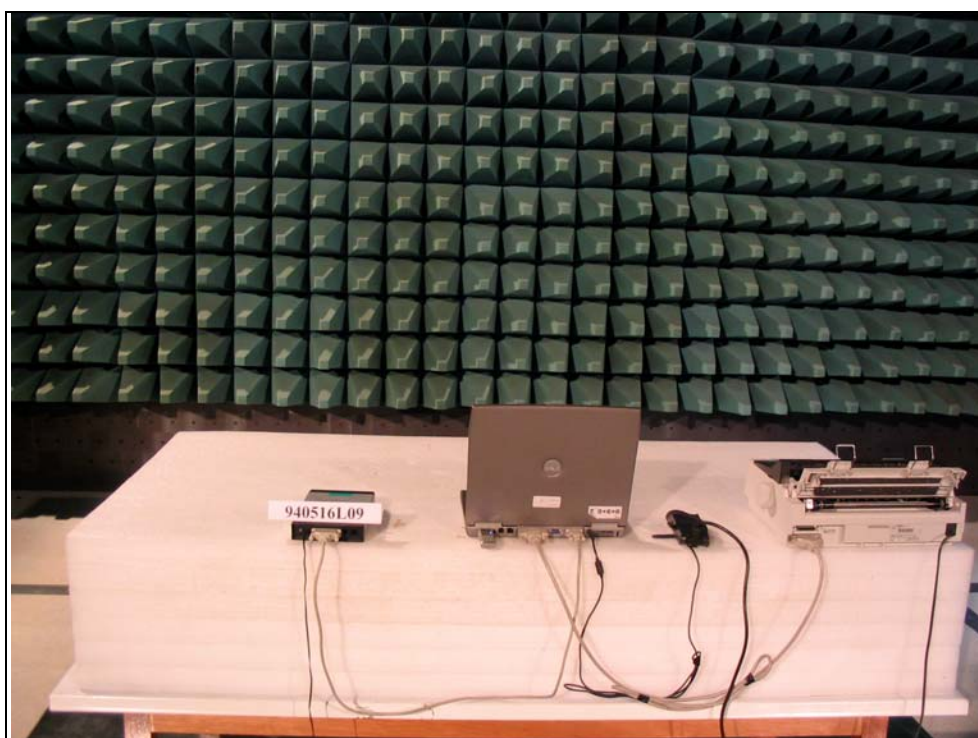
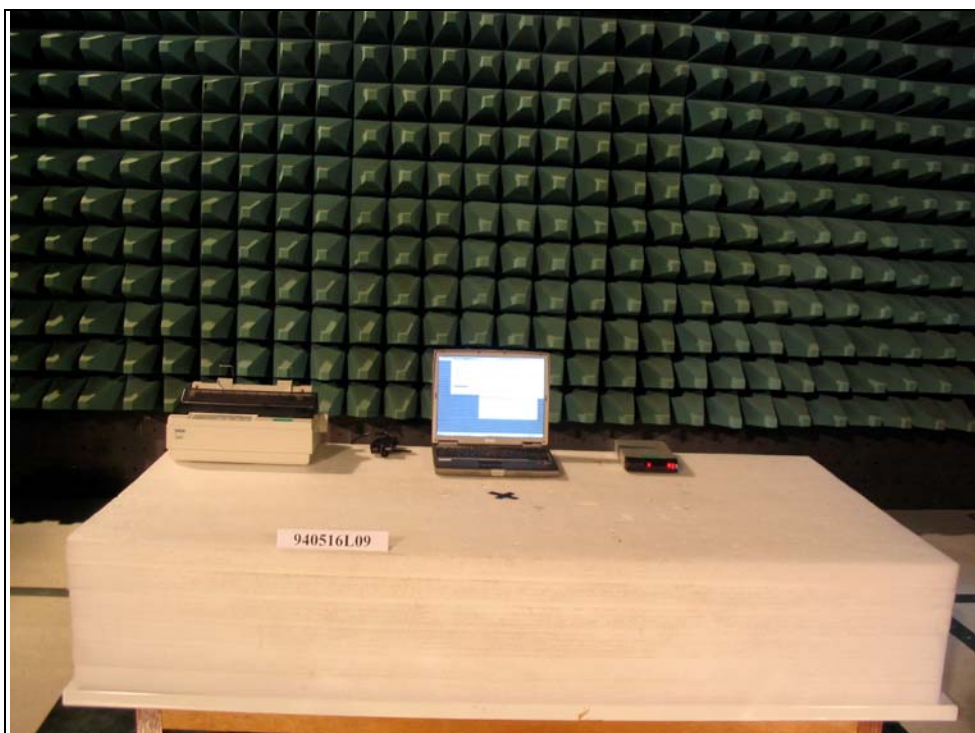
The antenna used in this product is Printed antenna without connector. The maximum Gain of the antenna is  $-0.51\text{dBi}$ .

## 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, NVLAP, 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:**

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Fax: 886-3-3185050

**Linko RF Lab.**

Tel: 886-3-3270910

Fax: 886-3-3270892

**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