



# FCC TEST REPORT

## (PART 15, SUBPART E, 15.407)

**REPORT NO.:** RF950627L01A  
**MODEL NO.:** WUBA-180AG  
**RECEIVED:** Dec. 05, 2006  
**TESTED:** Jan. 04 ~ Jan. 08, 2007  
**ISSUED:** Jan. 10, 2007

**APPLICANT:** Gemtek Technology Co., Ltd.

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Hukou Hsinchu, Taiwan, R.O.C. 303

**ISSUED BY:** Advance Data Technology Corporation

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

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## 1. CERTIFICATION

**PRODUCT:** HP 802.11abg wireless LAN  
**MODEL:** WUBA-180AG  
**BRAND:** Gemtek  
**APPLICANT:** Gemtek Technology Co., Ltd.  
**TEST SAMPLE:** ENGINEERING SAMPLE  
**TESTED:** Jan. 04 ~ Jan. 08, 2007  
**STANDARDS:** **FCC Part 15, Subpart E (Section 15.407)**  
ANSI C63.4-2003

The above equipment (model: WUBA-180AG) 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** : Rennie Wang , **DATE:** Jan. 10, 2007  
Rennie Wang

**TECHNICAL ACCEPTANCE** : Long Chen , **DATE:** Jan. 10, 2007  
Responsible for RF Long Chen

**APPROVED BY** : Gary Chang , **DATE:** Jan. 10, 2007  
Gary Chang / Supervisor

## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

APPLIED STANDARD: FCC Part 15, Subpart E (Section 15.407)			
Standard Section	Test Type	Result	Remark
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit. Minimum passing margin is -19.15dB at 0.158MHz
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 -1.13dB at 5470.00MHz
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.
15.407 (h)(1)	TPC	PASS	The power consumption of EUT is less than 250mW and no limits apply

## 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:

MEASUREMENT	FREQUENCY	UNCERTAINTY
Conducted emissions	9kHz~30MHz	2.44 dB
Radiated emissions	30MHz ~ 200MHz	3.59 dB
	200MHz ~1000MHz	3.61 dB
	1GHz ~ 18GHz	2.26 dB
	18GHz ~ 40GHz	1.94 dB

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

### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>EUT</b>	HP 802.11abg wireless LAN
<b>MODEL NO.</b>	WUBA-180AG
<b>FCC ID</b>	MXF-U950711AG
<b>POWER SUPPLY</b>	5Vdc 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: 2.412 ~ 2.462GHz 802.11a: 5.150 ~ 5.250GHz, 5.250 ~ 5.350GHz, 5.470 ~ 5.725GHz, 5.725 ~ 5.850GHz
<b>NUMBER OF CHANNEL</b>	802.11b & 802.11g: 11 802.11a: 5.150 ~ 5.250GHz: 4 5.250 ~ 5.350GHz: 4 5.470 ~ 5.725GHz: 11 5.725 ~ 5.850GHz: 5
<b>CHANNEL SPACING</b>	802.11b & 802.11g: 5MHz 802.11a: 20MHz
<b>OUTPUT POWER</b>	112.460mW for 802.11b 89.536mW for 802.11g 46.774mW for 5.150 ~ 5.250GHz 50.816mW for 5.250 ~ 5.350GHz 51.050mW for 5.470 ~ 5.725GHz 71.285mW for 5.725 ~ 5.850GHz
<b>ANTENNA TYPE</b>	Inverted F antenna with 1.56dBi gain (for 2.4GHz) Inverted F antenna with 1.95dBi gain (for 5.0GHz)
<b>DATA CABLE</b>	NA
<b>I/O PORTS</b>	NA
<b>ASSOCIATED DEVICES</b>	NA

**NOTE:**

1. This report is issued as a supplementary report of RF950627L01. This report shall be combined together with its original report.
2. This report is prepared for FCC class II permissive change. The model in this report is identical to the original application one. The differences are adding frequency band for 5.25~5.35GHz and 5.47~5.725GHz.
3. The EUT operates in both the 5GHz and 2.4GHz Bands and compatibility with 802.11a and 802.11b, 802.11g technology.
4. 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 5250 ~ 5350MHz

4 channels are provided to this EUT.

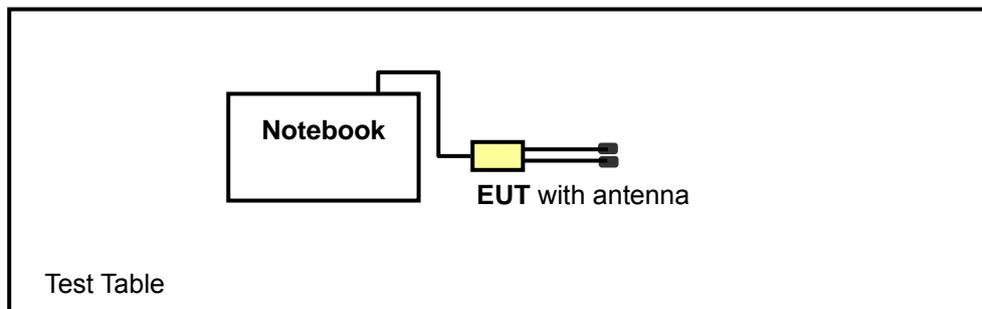
CHANNEL	FREQUENCY
1	5260 MHz
2	5280 MHz
3	5300 MHz
4	5320 MHz

#### Operated in 5470 ~ 5725MHz

11 channels are provided to this EUT.

CHANNEL	FREQUENCY
1	5500 MHz
2	5520 MHz
3	5540 MHz
4	5560 MHz
5	5580 MHz
6	5600 MHz
7	5620 MHz
8	5640 MHz
9	5660 MHz
10	5680 MHz
11	5700 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	
-	√	√	√	√	-

Where **PLC**: Power Line Conducted Emission      **RE<1G**: Radiated Emission below 1GHz  
**RE≥1G**: Radiated Emission above 1GHz      **APCM**: Antenna Port Conducted Measurement

#### **Power Line Conducted Emission Test:**

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

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a (5.25~5.35GHz)	1 to 4	1	OFDM	BPSK	6
-	802.11a (5.47~5.725GHz)	1 to 11	1	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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a (5.25~5.35GHz)	1 to 4	1	OFDM	BPSK	6
-	802.11a (5.47~5.725GHz)	1 to 11	1	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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a (5.25~5.35GHz)	1 to 4	1, 2, 4	OFDM	BPSK	6
-	802.11a (5.47~5.725GHz)	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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a (5.25~5.35GHz)	1 to 4	1, 4	OFDM	BPSK	6
-	802.11a (5.47~5.725GHz)	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.

EUT CONFIGURE MODE	MODE	AVAILABLE CHANNEL	TESTED CHANNEL	MODULATION TECHNOLOGY	MODULATION TYPE	DATA RATE (Mbps)
-	802.11a (5.25~5.35GHz)	1 to 4	1, 2, 4	OFDM	BPSK	6
-	802.11a (5.47~5.725GHz)	1 to 11	1, 6, 11	OFDM	BPSK	6



### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

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

#### FCC Part 15, Subpart 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	NOTEBOOK COMPUTER	DELL	PP05L	16484462992	E2K24CLNS

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

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



## 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 ROHDE & SCHWARZ	ESCS30	100289	Dec. 07, 2007
RF signal cable Woken	5D-FB	Cable-HYC01-01	Jan. 06, 2008
LISN ROHDE & SCHWARZ	ESH3-Z5	100312	Feb. 15, 2007
LISN ROHDE & SCHWARZ	ESH2-Z5	100104	Feb. 07, 2007
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.

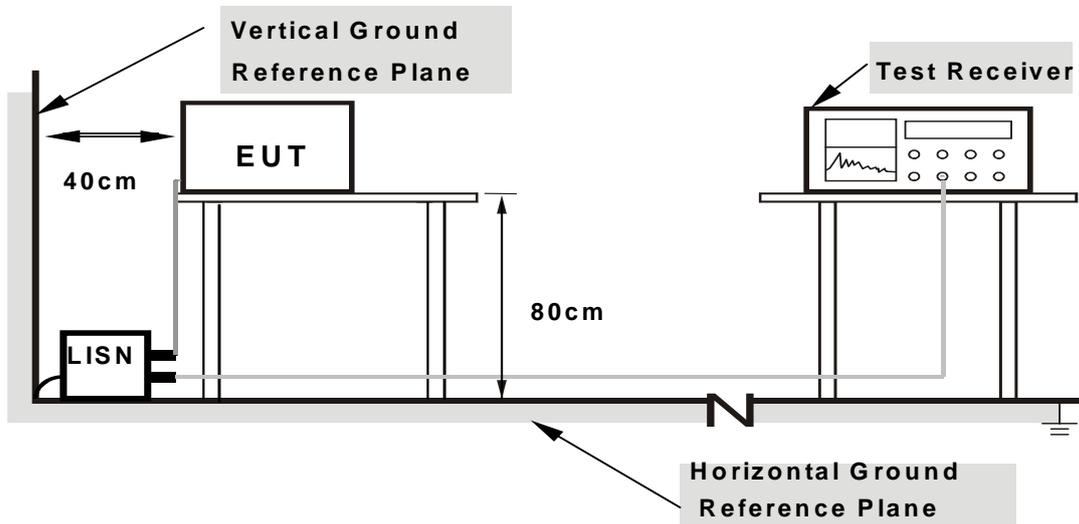
#### 4.1.3 TEST PROCEDURES

- 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 attached file (Test Setup Photo).

#### 4.1.6 EUT OPERATING CONDITIONS

- Connected the EUT to notebook with USB cable and placed on a testing table.
- The notebook ran a test program (provided by manufacturer) to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- The necessary accessories enable the system in full functions.

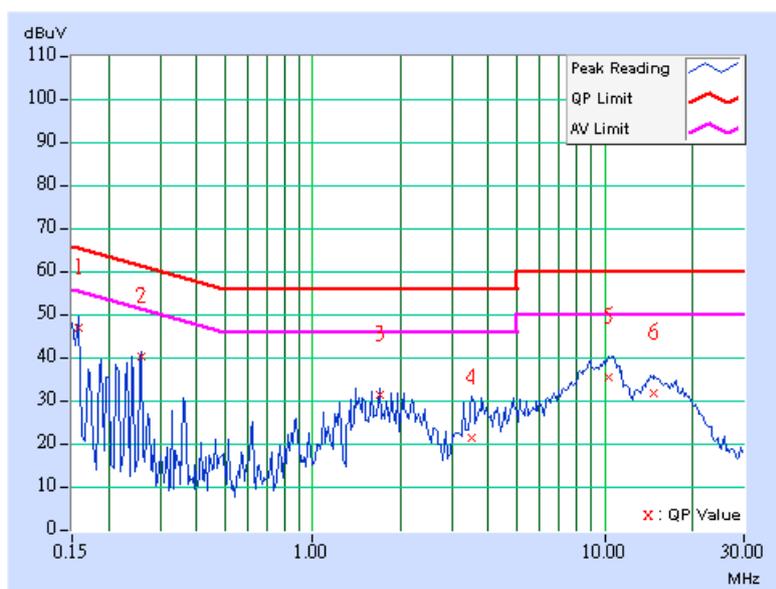
#### 4.1.7 TEST RESULTS

#### CONDUCTED WORST-CASE DATA FOR FREQUENCY BAND: 5.25 ~ 5.35GHz

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 1
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	20deg. C, 65%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Long Chen

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	0.158	0.21	46.22	-	46.43	-	65.58
2	0.259	0.21	39.75	-	39.96	-	61.45	51.45	-21.49	-
3	1.707	0.25	30.72	-	30.97	-	56.00	46.00	-25.03	-
4	3.520	0.36	20.92	-	21.28	-	56.00	46.00	-34.72	-
5	10.340	0.55	34.74	-	35.29	-	60.00	50.00	-24.71	-
6	14.688	0.74	30.96	-	31.70	-	60.00	50.00	-28.30	-

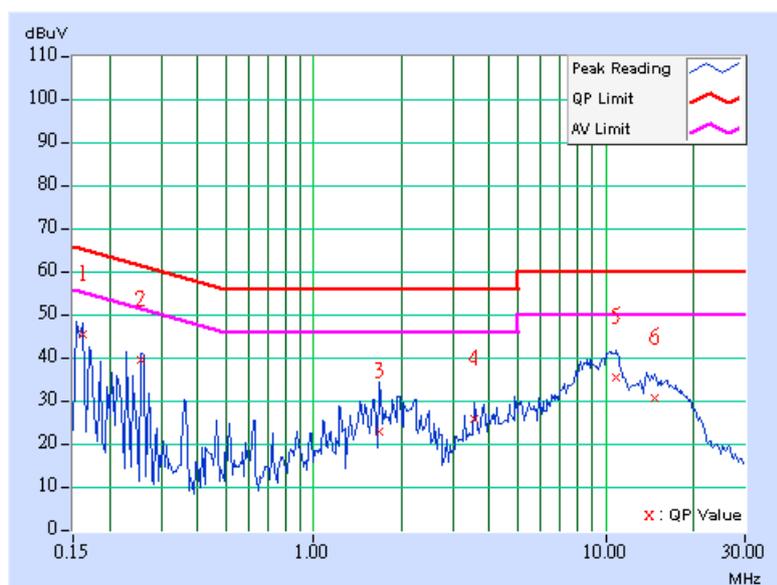
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 2
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	20deg. C, 65%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Long Chen

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	0.162	0.21	45.25	-	45.46	-	65.38
2	0.255	0.21	39.20	-	39.41	-	61.58	51.58	-22.17	-
3	1.668	0.25	22.46	-	22.71	-	56.00	46.00	-33.29	-
4	3.566	0.36	25.29	-	25.65	-	56.00	46.00	-30.35	-
5	10.844	0.52	35.15	-	35.67	-	60.00	50.00	-24.33	-
6	14.766	0.45	30.43	-	30.88	-	60.00	50.00	-29.12	-

- 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.

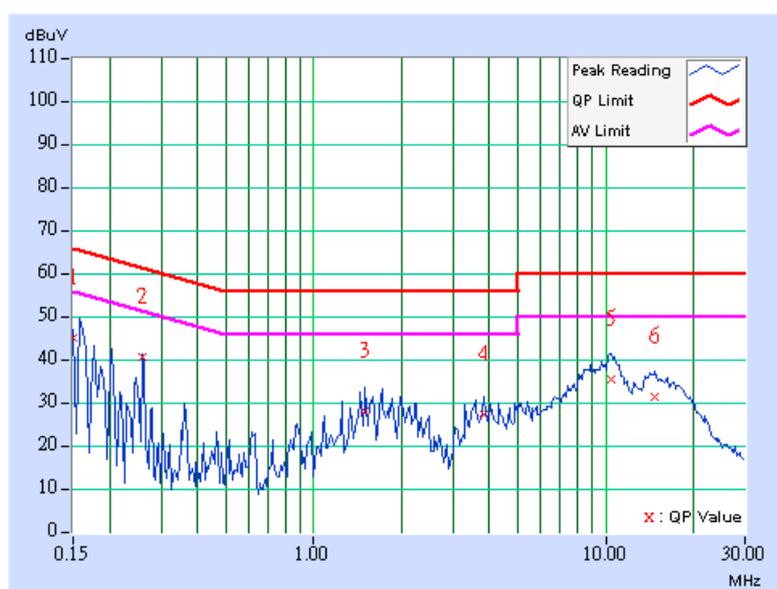


**FOR FREQUENCY BAND: 5.47 ~ 5.725GHz**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 1
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	20deg. C, 65%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Long Chen

No	Freq. [MHz]	Corr.	Reading Value		Emission Level		Limit		Margin	
		Factor	[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
		(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.150	0.21	44.44	-	44.65	-	66.00	56.00	-21.35	-
2	0.259	0.21	39.88	-	40.09	-	61.45	51.45	-21.36	-
3	1.504	0.25	27.44	-	27.69	-	56.00	46.00	-28.31	-
4	3.816	0.38	26.53	-	26.91	-	56.00	46.00	-29.09	-
5	10.410	0.56	34.98	-	35.54	-	60.00	50.00	-24.46	-
6	14.676	0.74	30.74	-	31.48	-	60.00	50.00	-28.52	-

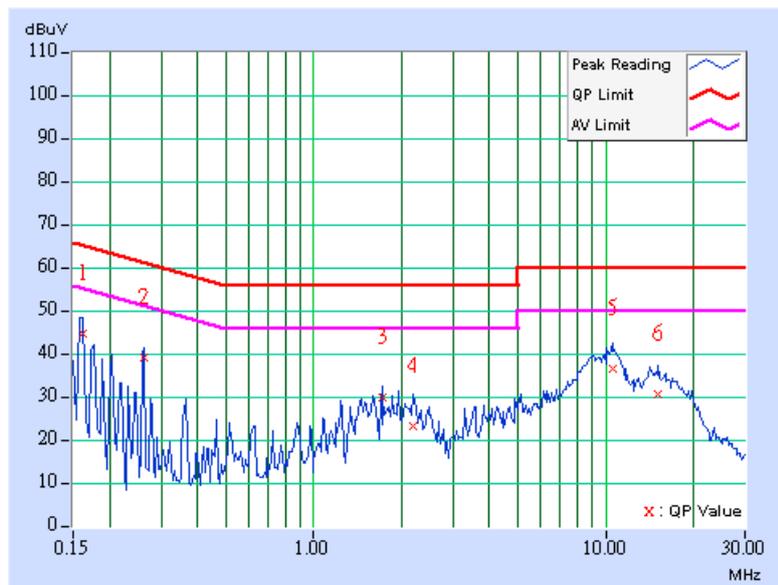
- REMARKS:**
1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
  2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
  3. The emission levels of other frequencies were very low against the limit.
  4. Margin value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



EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	PHASE	Line 2
MODULATION TYPE	BPSK	6dB BANDWIDTH	9 kHz
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	20deg. C, 65%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Long Chen

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	0.162	0.21	44.39	-	44.60	-	65.38
2	0.263	0.21	38.71	-	38.92	-	61.33	51.33	-22.41	-
3	1.711	0.25	29.67	-	29.92	-	56.00	46.00	-26.08	-
4	2.199	0.27	22.88	-	23.15	-	56.00	46.00	-32.85	-
5	10.523	0.53	36.23	-	36.76	-	60.00	50.00	-23.24	-
6	15.066	0.45	30.41	-	30.86	-	60.00	50.00	-29.14	-

- 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
5470~5725	-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

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

### 4.2.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
Test Receiver ROHDE & SCHWARZ	ESIB7	100212	May. 08, 2007
Spectrum Analyzer ROHDE & SCHWARZ	FSP40	100269	Aug. 07, 2007
BILOG Antenna SCHWARZBECK	VULB9168	9168-153	Jan. 04, 2008
HORN Antenna SCHWARZBECK	BBHA 9120 D	9120D-563	Jul. 26, 2007
HORN Antenna SCHWARZBECK	BBHA 9170	BBHA9170242	Jan. 19, 2007
Preamplifier Agilent	8449B	3008A01911	Sep. 13, 2007
Preamplifier Agilent	8447D	2944A10638	Dec.20, 2007
RF signal cable HUBER+SUHNNER	SUCOFLEX 104	218188/218189	Nov. 14, 2007
RF signal cable Worken	8D-FB	Cable-HYCH9-01	Mar. 08, 2007
Software	ADT_Radiated_V7.6	NA	NA
Antenna Tower EMCO	2070/2080	512.835.4684	NA
Turn Table EMCO	2087-2.03	NA	NA
Antenna Tower & Turn Table Controller EMCO	2090	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 Chamber 9.
  3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
  4. The IC Site Registration No. is IC4924A-9.

#### 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.

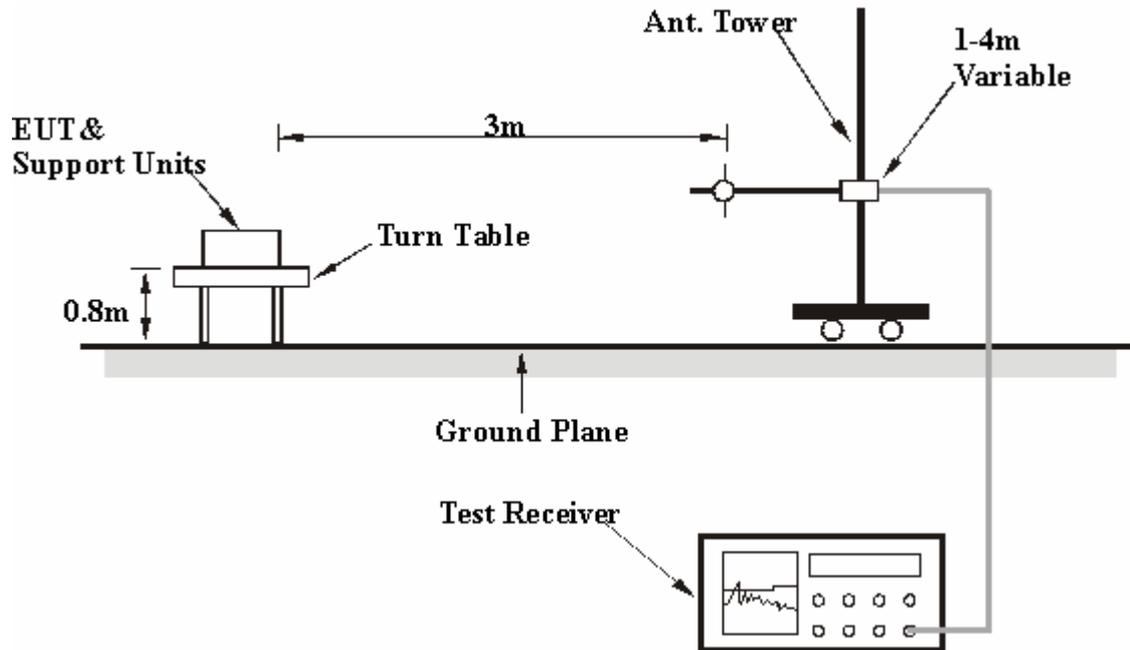
**NOTE:**

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 of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10Hz 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 attached file (Test Setup Photo).

#### 4.2.7 EUT OPERATING CONDITION

Same as 4.1.6

#### 4.2.8 TEST RESULTS

**FOR FREQUENCY BAND: 5.25 ~ 5.35GHz**

**BELOW 1GHz WORST-CASE DATA**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Quasi-Peak
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	26deg. C, 65%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Match Tsui

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	90.26	30.29 QP	43.50	-13.21	1.00 H	48	21.63	8.65
2	115.53	29.94 QP	43.50	-13.56	2.50 H	118	20.28	9.66
3	203.01	29.74 QP	43.50	-13.76	1.00 H	73	19.71	10.03
4	239.94	39.08 QP	46.00	-6.92	2.00 H	130	27.84	11.24
5	480.98	37.94 QP	46.00	-8.06	1.00 H	92	19.74	18.19
6	601.50	34.13 QP	46.00	-11.87	2.00 H	130	13.30	20.82
7	722.02	32.15 QP	46.00	-13.85	2.50 H	24	9.09	23.06
8	955.29	33.27 QP	46.00	-12.73	2.00 H	118	6.05	27.21

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	74.71	27.22 QP	40.00	-12.78	2.00 V	80	16.40	10.82
2	350.74	30.12 QP	46.00	-15.88	1.00 V	24	15.01	15.11
3	480.98	35.56 QP	46.00	-10.44	1.00 V	80	17.36	18.19
4	722.02	31.32 QP	46.00	-14.68	1.00 V	225	8.26	23.06
5	933.91	30.61 QP	46.00	-15.39	1.00 V	24	4.04	26.58
6	953.35	36.18 QP	46.00	-9.82	2.00 V	80	8.91	27.27

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#1440.00	48.69 PK	74.00	-25.31	1.12 H	245	19.48	29.21
1	#1440.00	43.88 AV	54.00	-10.12	1.12 H	245	14.67	29.21
2	#5150.00	50.88 PK	74.00	-23.12	1.12 H	245	11.60	39.28
2	#5150.00	36.88 AV	54.00	-17.12	1.12 H	245	-2.40	39.28
3	*5260.00	108.24 PK			1.11 H	334	68.86	39.38
3	*5260.00	98.83 AV			1.11 H	334	59.45	39.38
4	10520.00	59.48 PK	68.30	-8.82	1.13 H	49	8.78	50.70

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	#1440.00	47.52 PK	74.00	-26.48	1.15 V	217	18.31	29.21
1	#1440.00	42.64 AV	54.00	-11.36	1.15 V	217	13.43	29.21
2	#5150.00	49.26 PK	74.00	-24.74	1.15 V	217	9.98	39.28
2	#5150.00	34.99 AV	54.00	-19.01	1.15 V	217	-4.29	39.28
3	*5260.00	103.12 PK			1.11 V	224	63.74	39.38
3	*5260.00	93.65 AV			1.11 V	224	54.27	39.38
4	10520.00	58.74 PK	68.30	-9.56	1.13 V	29	8.04	50.70

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 2	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#1440.00	51.21 PK	74.00	-22.79	1.00 H	341	22.99	28.21
1	#1440.00	43.41 AV	54.00	-10.59	1.00 H	341	15.19	28.21
2	3520.00	41.36 PK	68.30	-26.94	1.36 H	7	8.26	33.09
3	#5150.00	50.28 PK	74.00	-23.72	1.15 H	214	13.30	36.98
3	#5150.00	35.69 AV	54.00	-18.31	1.15 H	214	-1.29	36.98
4	*5280.00	108.28 PK			1.15 H	214	71.16	37.12
4	*5280.00	99.36 AV			1.15 H	214	62.24	37.12
5	10560.00	54.54 PK	68.30	-13.76	1.08 H	300	7.67	46.87

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	#1440.00	46.20 PK	74.00	-27.80	1.49 V	360	17.98	28.21
1	#1440.00	37.51 AV	54.00	-16.49	1.49 V	360	9.29	28.21
2	#5150.00	48.46 PK	74.00	-25.54	1.15 V	209	11.48	36.98
2	#5150.00	33.65 AV	54.00	-20.35	1.15 V	209	-3.33	36.98
3	*5280.00	103.44 PK			1.15 V	209	66.32	37.12
3	*5280.00	93.88 AV			1.15 V	209	56.76	37.12
4	10560.00	54.66 PK	68.30	-13.64	1.00 V	0	7.79	46.87

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 4	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#1440.00	48.85 PK	74.00	-25.15	1.14 H	28	19.64	29.21
1	#1440.00	44.03 AV	54.00	-9.97	1.14 H	28	14.82	29.21
2	*5320.00	105.12 PK			1.20 H	332	65.69	39.43
2	*5320.00	95.50 AV			1.20 H	332	56.07	39.43
3	#5350.00	59.59 PK	74.00	-14.41	1.20 H	332	20.13	39.46
3	#5350.00	49.97 AV	54.00	-4.03	1.20 H	332	10.51	39.46
4	#10640.00	59.47 PK	74.00	-14.53	1.05 H	17	8.48	50.99
4	#10640.00	47.13 AV	54.00	-6.87	1.05 H	17	-3.86	50.99

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	#1440.00	47.51 PK	74.00	-26.49	1.01 V	88	18.30	29.21
1	#1440.00	42.69 AV	54.00	-11.31	1.01 V	88	13.48	29.21
2	*5320.00	100.25 PK			1.10 V	229	60.82	39.43
2	*5320.00	90.81 AV			1.10 V	229	51.38	39.43
3	#5350.00	54.72 PK	74.00	-19.28	1.10 V	229	15.26	39.46
3	#5350.00	45.28 AV	54.00	-8.72	1.10 V	229	5.82	39.46
4	#10640.00	59.62 PK	74.00	-14.38	1.08 V	62	8.63	50.99
4	#10640.00	47.34 AV	54.00	-6.66	1.08 V	62	-3.65	50.99

- 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.



**FOR FREQUENCY BAND: 5.47 ~ 5.725GHz**  
**BELOW 1GHz WORST-CASE DATA**

EUT TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	Below 1000MHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Quasi-Peak
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	26deg. C, 65%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Match Tsui

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	82.48	30.07 QP	40.00	-9.93	2.00 H	10	20.37	9.71
2	113.59	29.20 QP	43.50	-14.30	2.00 H	124	19.71	9.50
3	203.01	30.09 QP	43.50	-13.41	1.00 H	289	20.06	10.03
4	239.94	39.23 QP	46.00	-6.77	1.00 H	156	27.99	11.24
5	276.87	32.19 QP	46.00	-13.81	2.00 H	194	18.66	13.53
6	480.98	36.93 QP	46.00	-9.07	1.50 H	270	18.74	18.19
7	564.57	31.12 QP	46.00	-14.88	2.00 H	16	11.17	19.95
8	601.50	32.05 QP	46.00	-13.95	2.00 H	130	11.23	20.82
9	733.69	32.03 QP	46.00	-13.97	2.00 H	130	8.62	23.41
10	902.81	31.49 QP	46.00	-14.51	1.00 H	282	6.42	25.06

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	74.71	24.95 QP	40.00	-15.05	1.00 V	99	14.13	10.82
2	300.20	30.26 QP	46.00	-15.74	1.00 V	29	15.74	14.52
3	479.04	33.86 QP	46.00	-12.14	1.00 V	61	15.71	18.15
4	667.60	31.76 QP	46.00	-14.24	1.50 V	149	10.05	21.72
5	865.87	30.31 QP	46.00	-15.69	1.00 V	111	5.60	24.71
6	953.35	34.96 QP	46.00	-11.04	1.00 V	99	7.69	27.27

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 1	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#1440.00	52.29 PK	74.00	-21.71	1.00 H	252	24.07	28.21
1	#1440.00	42.20 AV	54.00	-11.80	1.00 H	252	13.98	28.21
2	#5460.00	59.55 PK	74.00	-14.45	1.00 H	211	22.21	37.34
2	#5460.00	50.35 AV	54.00	-3.65	1.00 H	211	13.01	37.34
<b>3</b>	<b>5470.00</b>	<b>67.17 PK</b>	<b>68.30</b>	<b>-1.13</b>	<b>1.00 H</b>	<b>211</b>	<b>29.81</b>	<b>37.36</b>
4	*5500.00	107.81 PK			1.00 H	211	70.39	37.42
4	*5500.00	98.64 AV			1.00 H	211	61.22	37.42
5	#11000.00	55.21 PK	74.00	-18.79	1.00 H	0	7.69	47.52
5	#11000.00	43.29 AV	54.00	-10.71	1.00 H	0	-4.23	47.52

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	#1440.00	45.37 PK	74.00	-28.63	1.26 V	257	17.15	28.21
1	#1440.00	39.20 AV	54.00	-14.80	1.26 V	257	10.98	28.21
2	#5460.00	57.43 PK	74.00	-16.57	1.08 V	204	20.09	37.34
2	#5460.00	48.03 AV	54.00	-5.97	1.08 V	204	10.69	37.34
<b>3</b>	<b>5470.00</b>	<b>66.76 PK</b>	<b>68.30</b>	<b>-1.54</b>	<b>1.08 V</b>	<b>204</b>	<b>29.40</b>	<b>37.36</b>
4	*5500.00	102.19 PK			1.08 V	204	64.77	37.42
4	*5500.00	92.79 AV			1.08 V	204	55.37	37.42
5	#11000.00	54.69 PK	74.00	-19.31	1.20 V	360	7.17	47.52
5	#11000.00	43.09 AV	54.00	-10.91	1.20 V	360	-4.43	47.52

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 6	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#1440.00	50.19 PK	74.00	-23.81	1.00 H	176	21.97	28.21
1	#1440.00	40.35 AV	54.00	-13.65	1.00 H	176	12.13	28.21
2	*5600.00	107.84 PK			1.64 H	211	70.22	37.62
2	*5600.00	97.93 AV			1.64 H	211	60.31	37.62
3	#11200.00	53.69 PK	74.00	-20.31	1.10 H	0	6.22	47.47
3	#11200.00	43.42 AV	54.00	-10.58	1.10 H	0	-4.05	47.47

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	#1440.00	50.30 PK	74.00	-23.70	1.40 V	360	22.09	28.21
1	#1440.00	39.68 AV	54.00	-14.32	1.40 V	360	11.47	28.21
2	*5600.00	105.43 PK			1.01 V	200	67.81	37.62
2	*5600.00	96.36 AV			1.01 V	200	58.74	37.62
3	#11200.00	54.36 PK	74.00	-19.64	1.00 V	0	6.89	47.47
3	#11200.00	43.08 AV	54.00	-10.92	1.00 V	0	-4.39	47.47

- 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 TEST CONDITION		MEASUREMENT DETAIL	
CHANNEL	Channel 11	FREQUENCY RANGE	1 ~ 40 GHz
MODULATION TYPE	BPSK	DETECTOR FUNCTION	Peak(PK) Average (AV)
TRANSFER RATE	6Mbps	ENVIRONMENTAL CONDITIONS	25deg. C, 65%RH, 991hPa
INPUT POWER (SYSTEM)	120Vac, 60 Hz	TESTED BY	Brad Wu

ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#1440.00	50.09 PK	74.00	-23.91	1.45 H	176	21.87	28.21
1	#1440.00	40.75 AV	54.00	-13.25	1.45 H	176	12.53	28.21
2	*5700.00	106.29 PK			1.06 H	203	68.43	37.86
2	*5700.00	97.22 AV			1.06 H	203	59.37	37.86
3	5725.00	67.04 PK	68.30	-1.26	1.06 H	204	29.13	37.91
4	#11400.00	54.29 PK	74.00	-19.71	1.10 H	360	6.87	47.42
4	#11400.00	43.11 AV	54.00	-10.89	1.10 H	360	-4.31	47.42

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	#1440.00	49.67 PK	74.00	-24.33	1.37 V	336	21.45	28.21
1	#1440.00	39.36 AV	54.00	-14.64	1.37 V	336	11.14	28.21
2	*5700.00	101.42 PK			1.00 V	192	63.56	37.86
2	*5700.00	92.30 AV			1.00 V	192	54.44	37.86
3	5725.00	65.06 PK	68.30	-3.24	1.00 V	192	27.15	37.91
4	#11400.00	54.08 PK	74.00	-19.92	1.20 V	360	6.66	47.42
4	#11400.00	42.89 AV	54.00	-11.11	1.20 V	360	-4.53	47.42

- 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
5.150 ~ 5.250GHz	The lesser of 50mW (17dBm) or 4dBm + 10logB
5.250 ~ 5.350GHz 5.470 ~ 5.725GHz	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
SPECTRUM ANALYZER	E4446A	MY44360128	Dec. 03, 2007
SPECTRUM ANALYZER	FSP40	100040	Jun. 07, 2007

**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

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

**NOTE:**

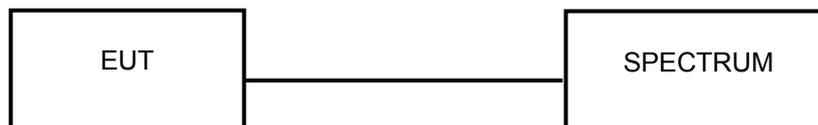
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # a 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

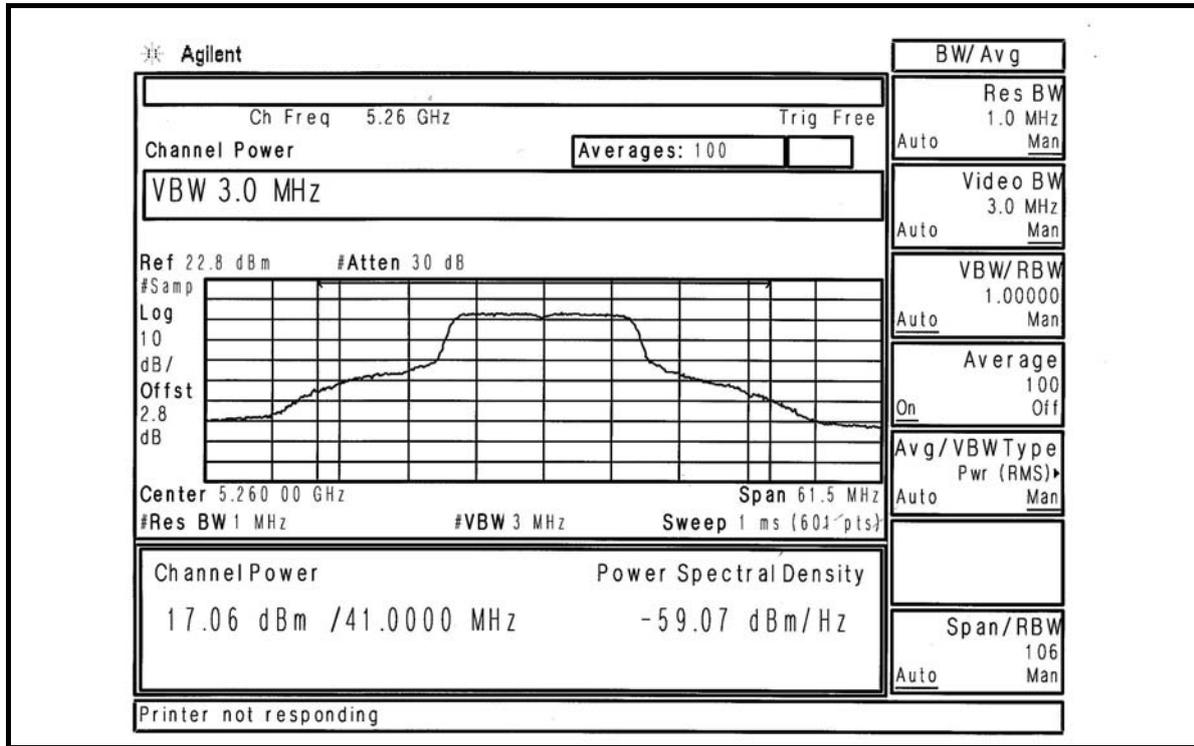
**FOR FREQUENCY BAND: 5.25 ~ 5.35GHz**  
**802.11a OFDM MODULATION**

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	27deg.C, 69%RH, 991hPa
<b>TESTED BY</b>	Match Tsui		

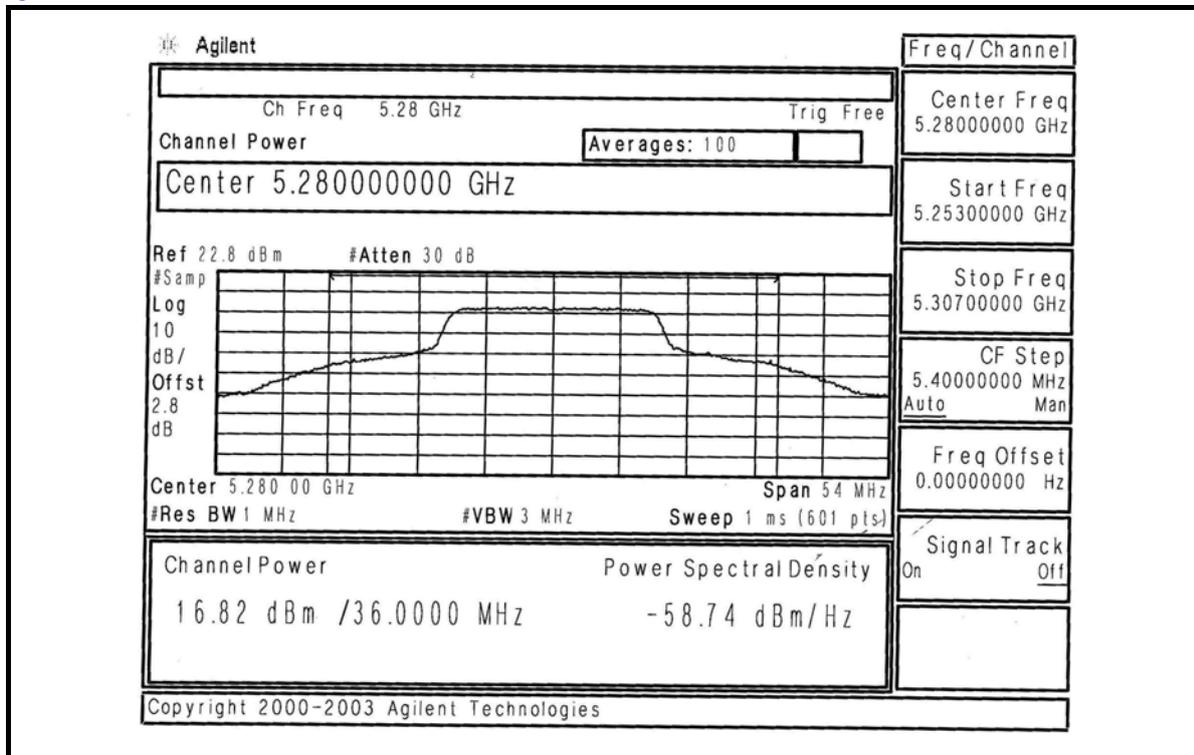
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
1	5260	50.816	17.06	24.00	40.50	PASS
2	5280	48.084	16.82	24.00	35.19	PASS
4	5320	31.769	15.02	24.00	34.56	PASS

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

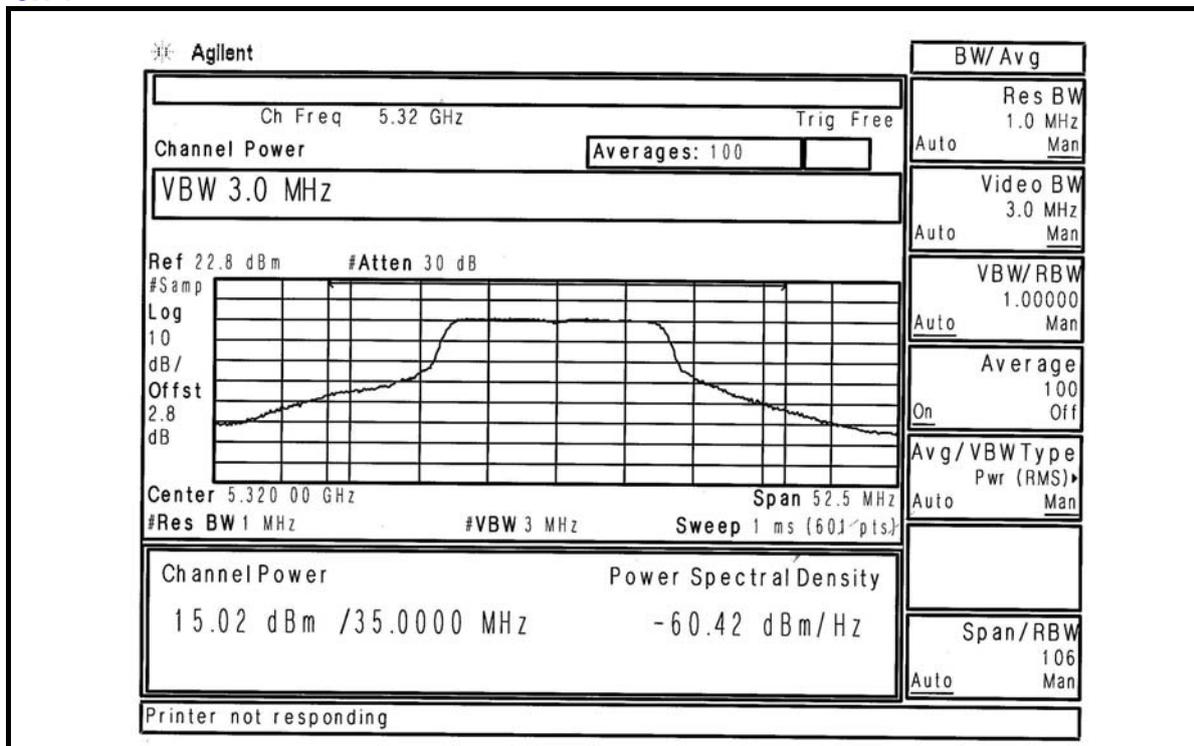
**Peak Power Output:  
CH 1**



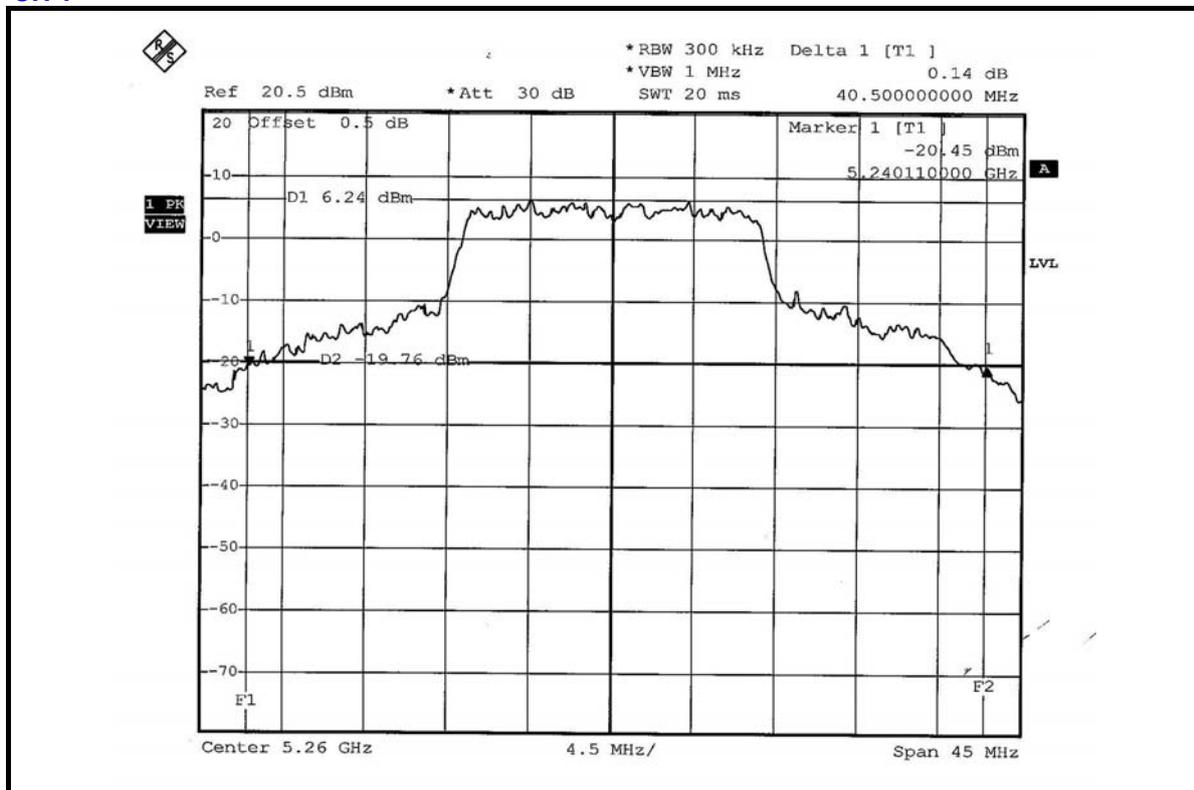
**CH 2**



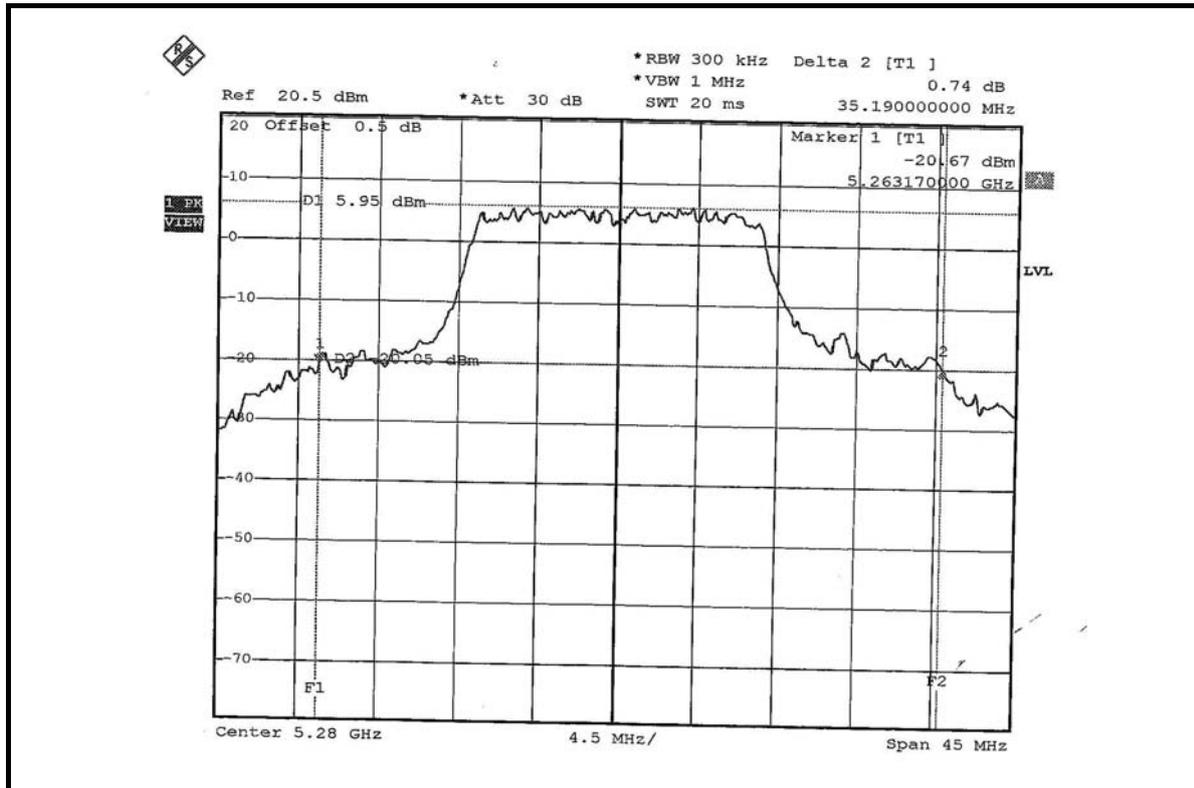
CH 4



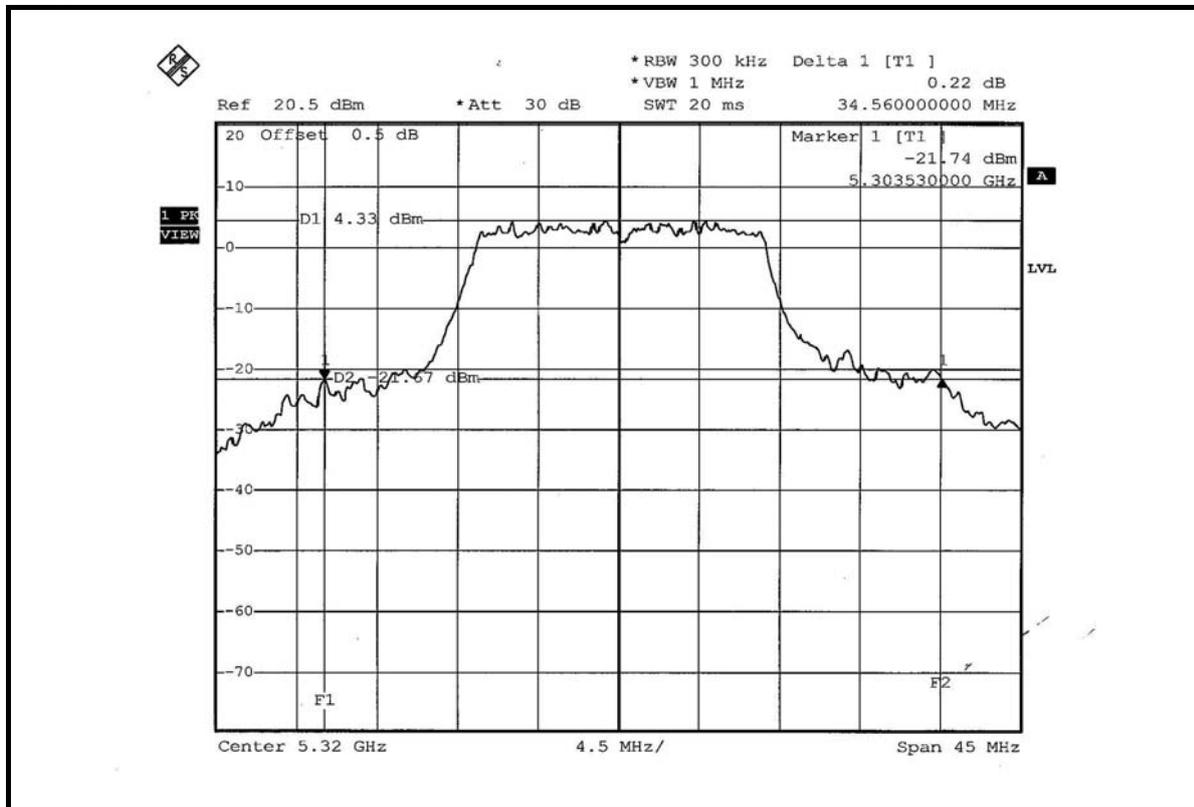
26dB Occupied Bandwidth:  
CH 1



### CH 2



### CH 4





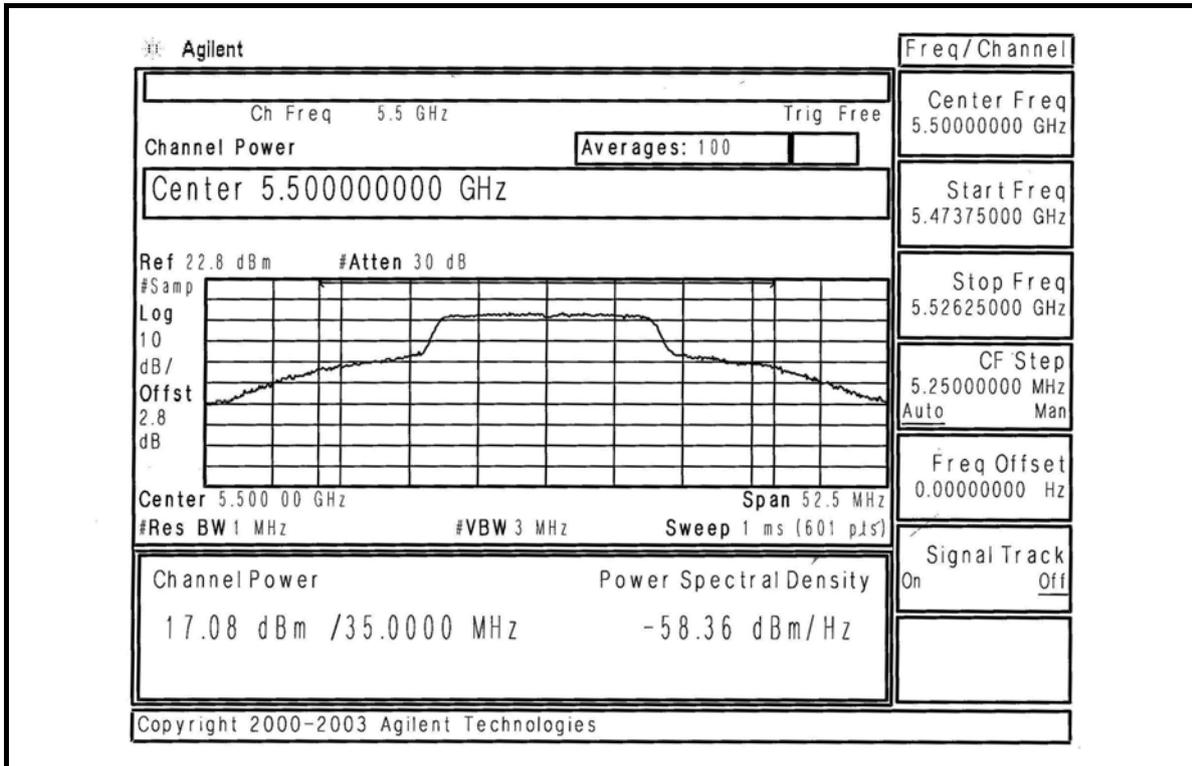
**FOR FREQUENCY BAND: 5.47 ~ 5.725GHz**  
**802.11a OFDM MODULATION**

<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	27deg.C, 69%RH, 991hPa
<b>TESTED BY</b>	Match Tsui		

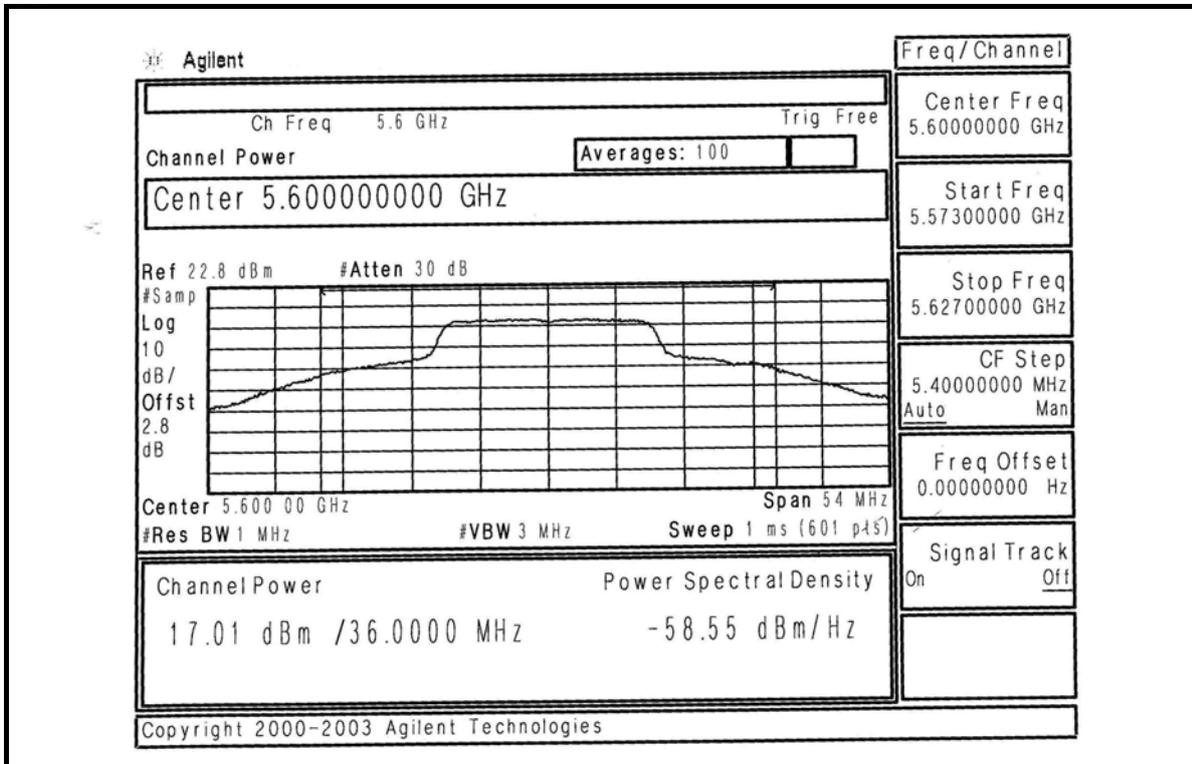
CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER OUTPUT (mW)	PEAK POWER OUTPUT (dBm)	PEAK POWER LIMIT (dBm)	26dBc Occupied Bandwidth (MHz)	PASS/FAIL
1	5500	51.050	17.08	24.00	34.65	PASS
6	5600	50.234	17.01	24.00	35.01	PASS
11	5700	31.769	15.02	24.00	25.47	PASS

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

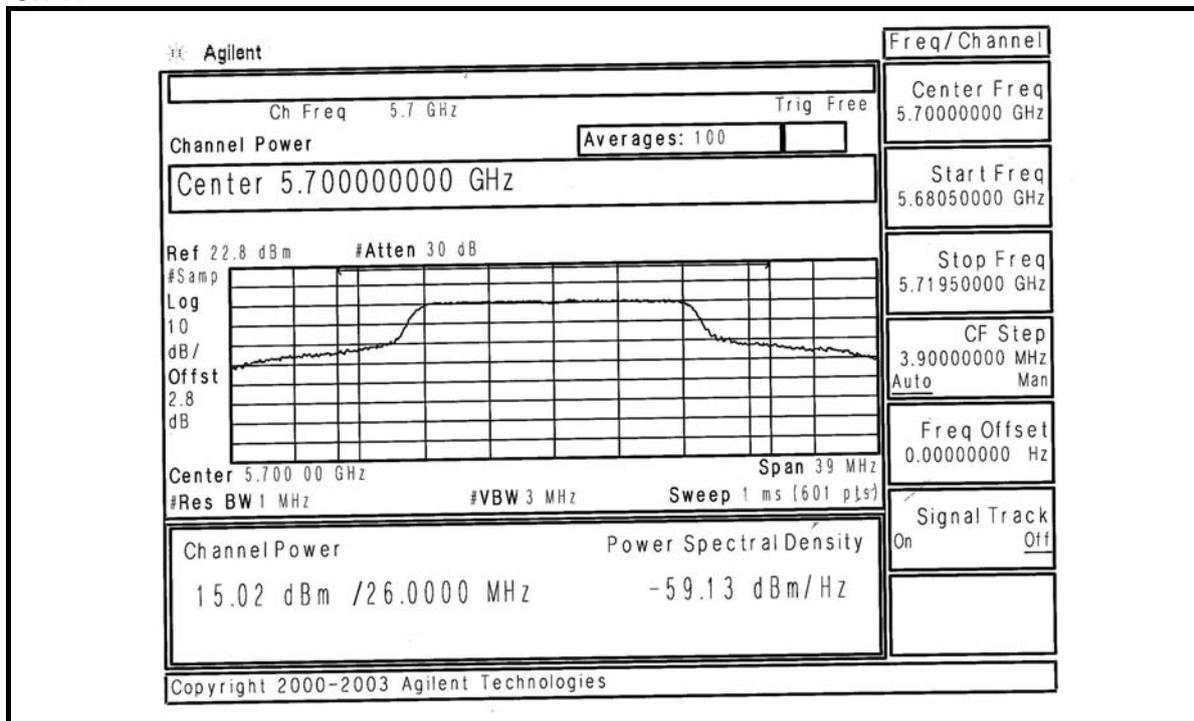
**Peak Power Output:  
CH 1**



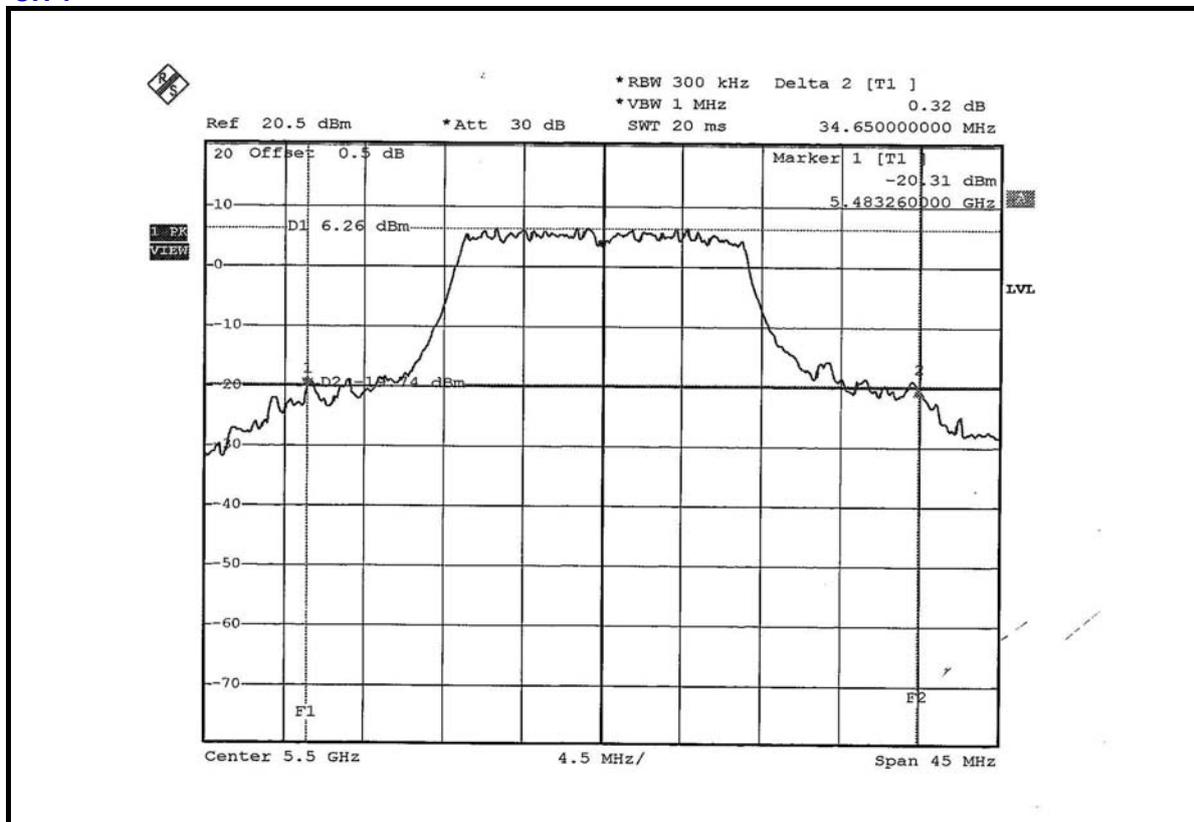
**CH 6**



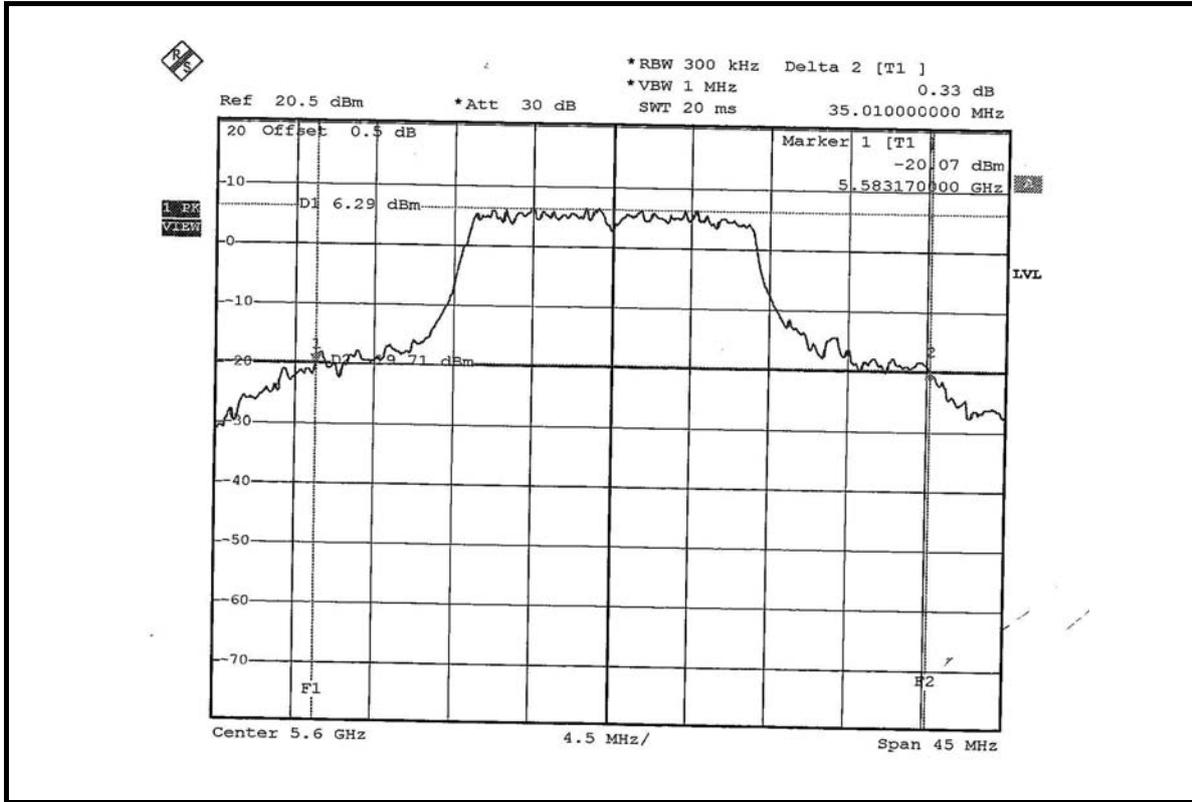
CH 11



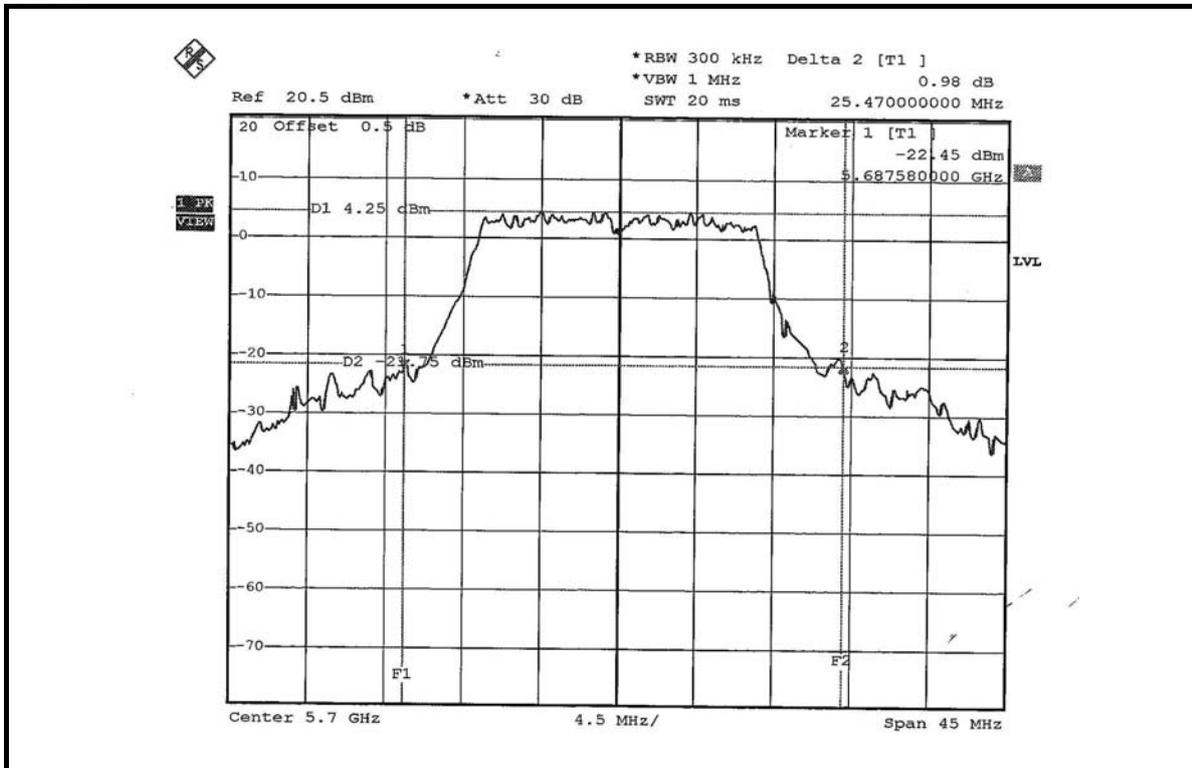
26dB Occupied Bandwidth:  
CH 1



### CH 6



### CH 11





#### 4.4 PEAK POWER EXCURSION MEASUREMENT

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

Frequency Band	Limit
5.150 ~ 5.250 GHz	13dB
5.250 ~ 5.350 GHz 5.470 ~ 5.725 GHz	13dB
5.725 ~ 5.825 GHz	13dB

##### 4.4.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSP 40	100040	Jun. 07, 2007

**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

- a. The transmitter output was connected to the spectrum analyzer.
- b. Set the spectrum bandwidth span to view the entire spectrum.
- c. Using peak detector and Max-hold function for Trace 1 (RB=1MHz, VB=3MHz) and 2 (RB=1MHz, VB=300kHz).
- d. 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

Same as 4.3.5

#### 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

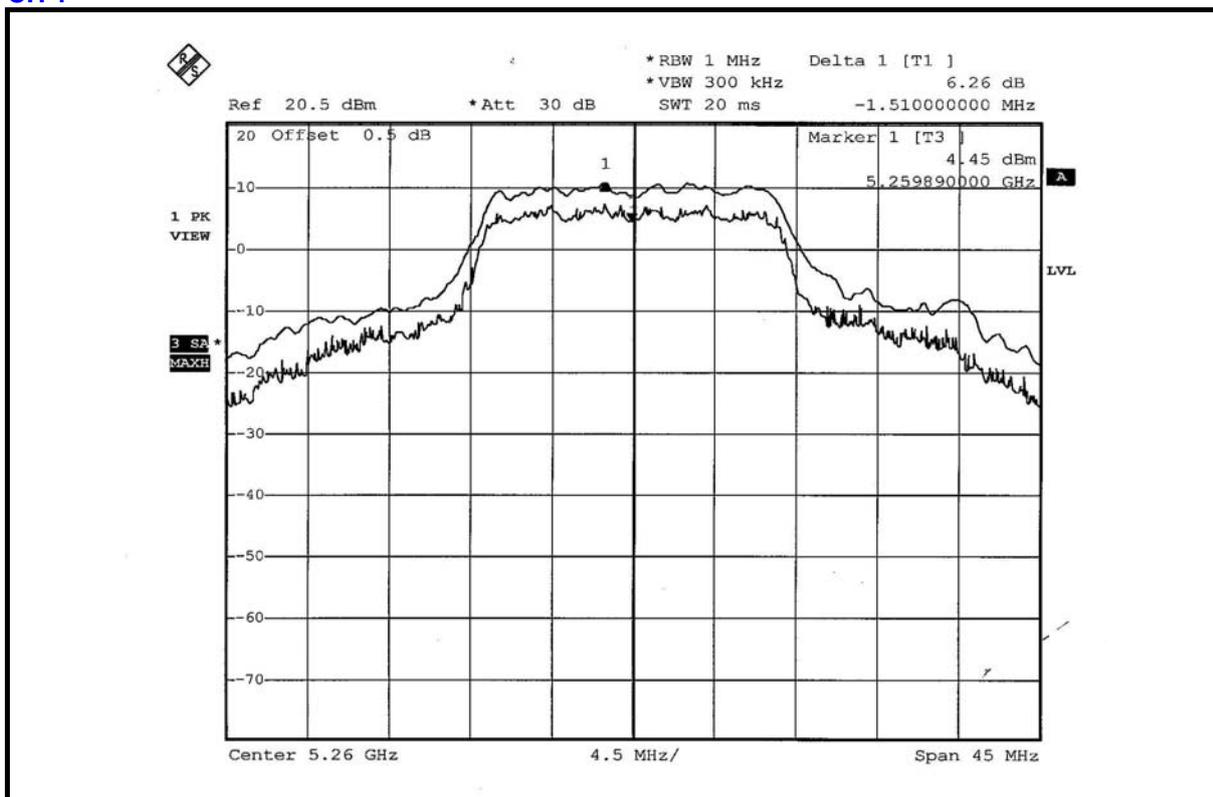
**FOR FREQUENCY BAND: 5.25 ~ 5.35GHz**

**802.11a OFDM MODULATION**

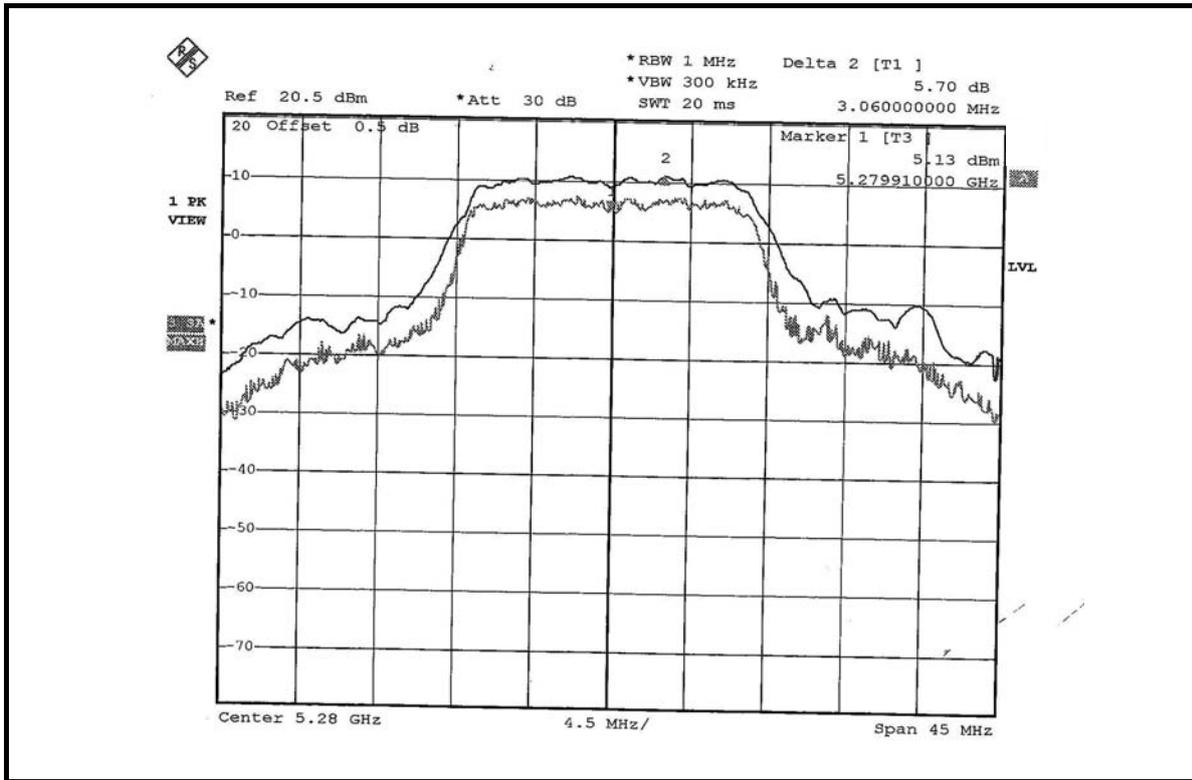
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	27deg.C, 69%RH, 991hPa
<b>TESTED BY</b>	Match Tsui		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5260	6.26	13	PASS
2	5280	5.70	13	PASS
4	5320	6.68	13	PASS

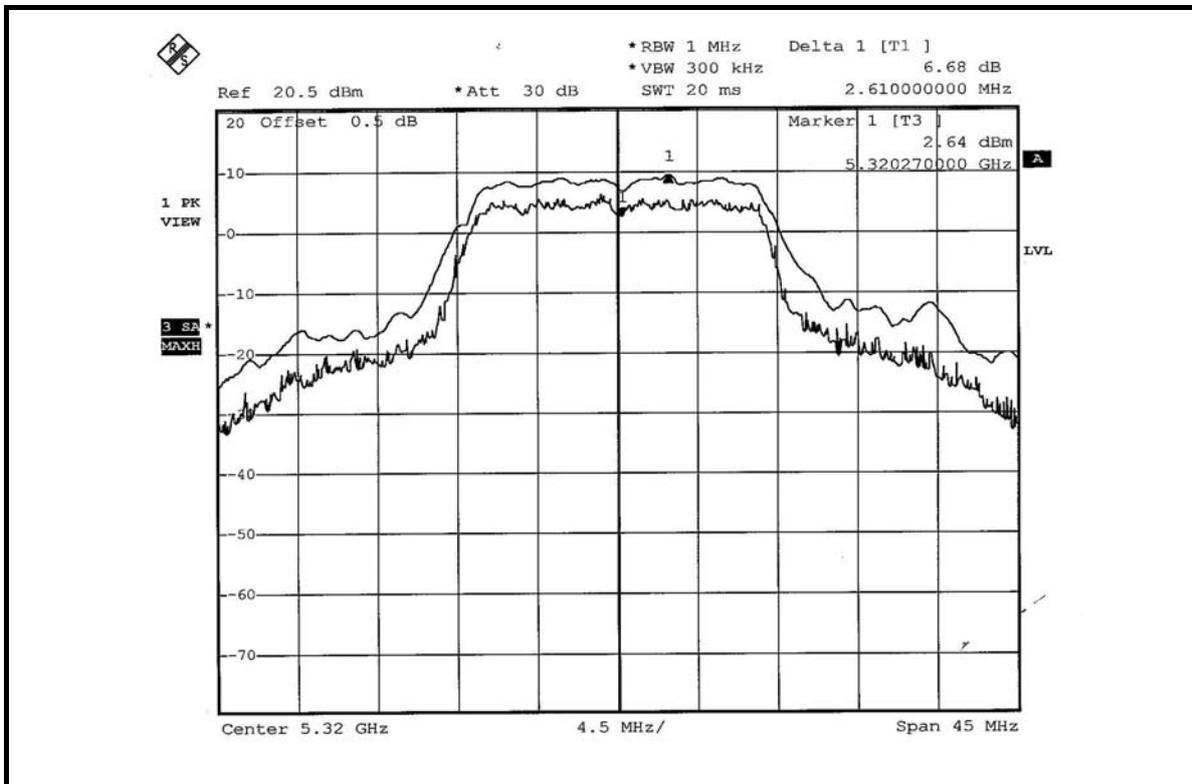
### CH 1



CH 2



CH 4



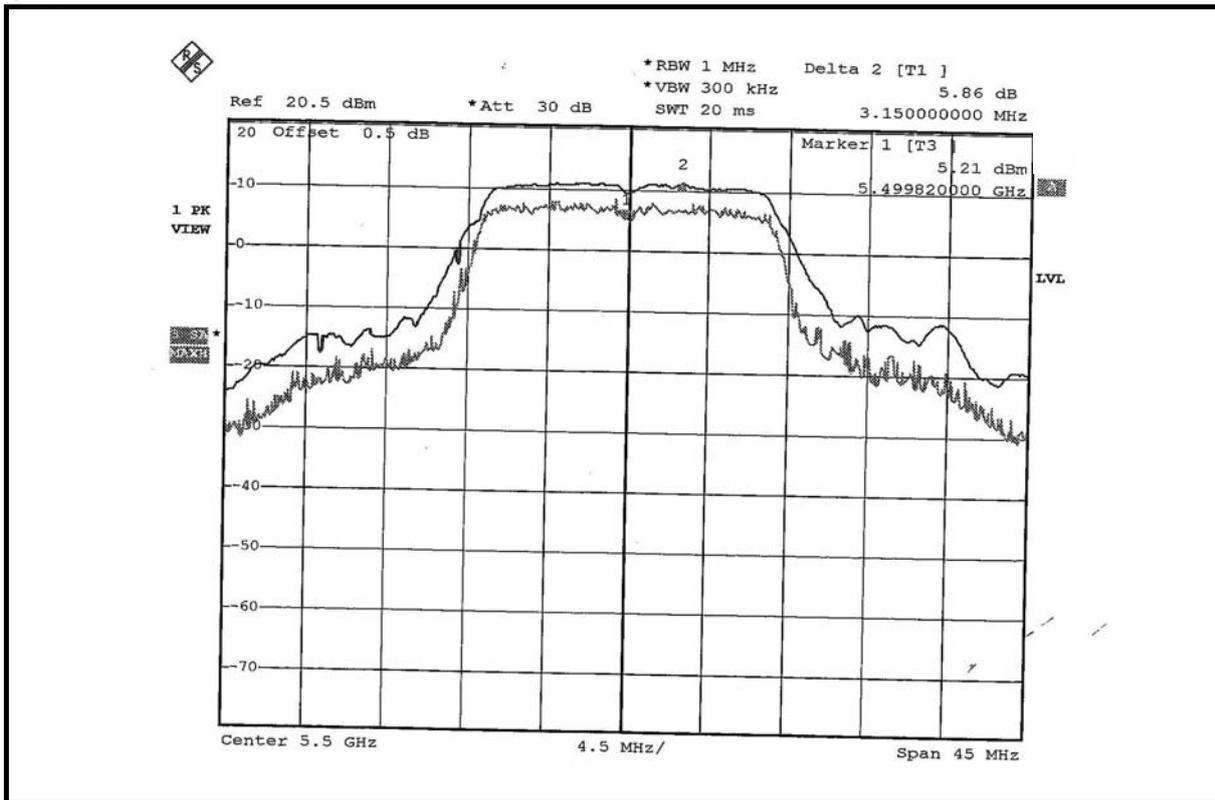


**FOR FREQUENCY BAND: 5.47 ~ 5.725GHz**  
**802.11a OFDM MODULATION**

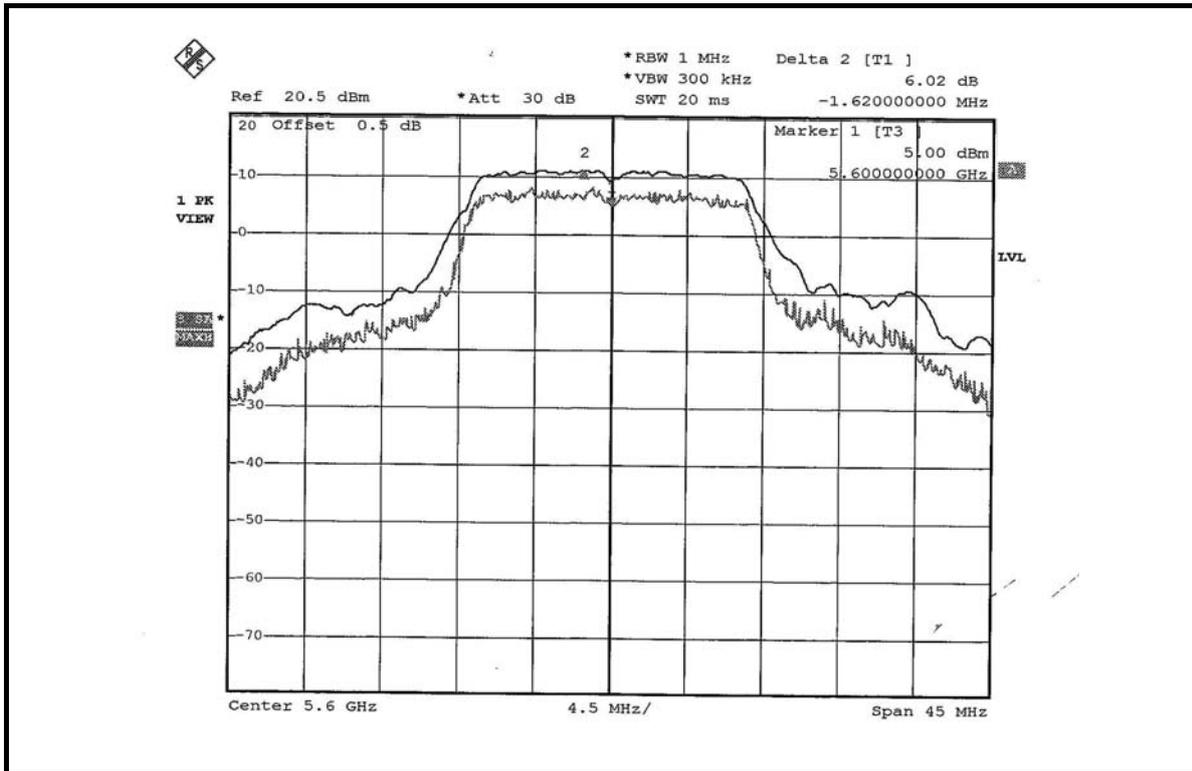
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	27deg.C, 69%RH, 991hPa
<b>TESTED BY</b>	Match Tsui		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5500	5.86	13	PASS
6	5600	6.02	13	PASS
11	5700	6.18	13	PASS

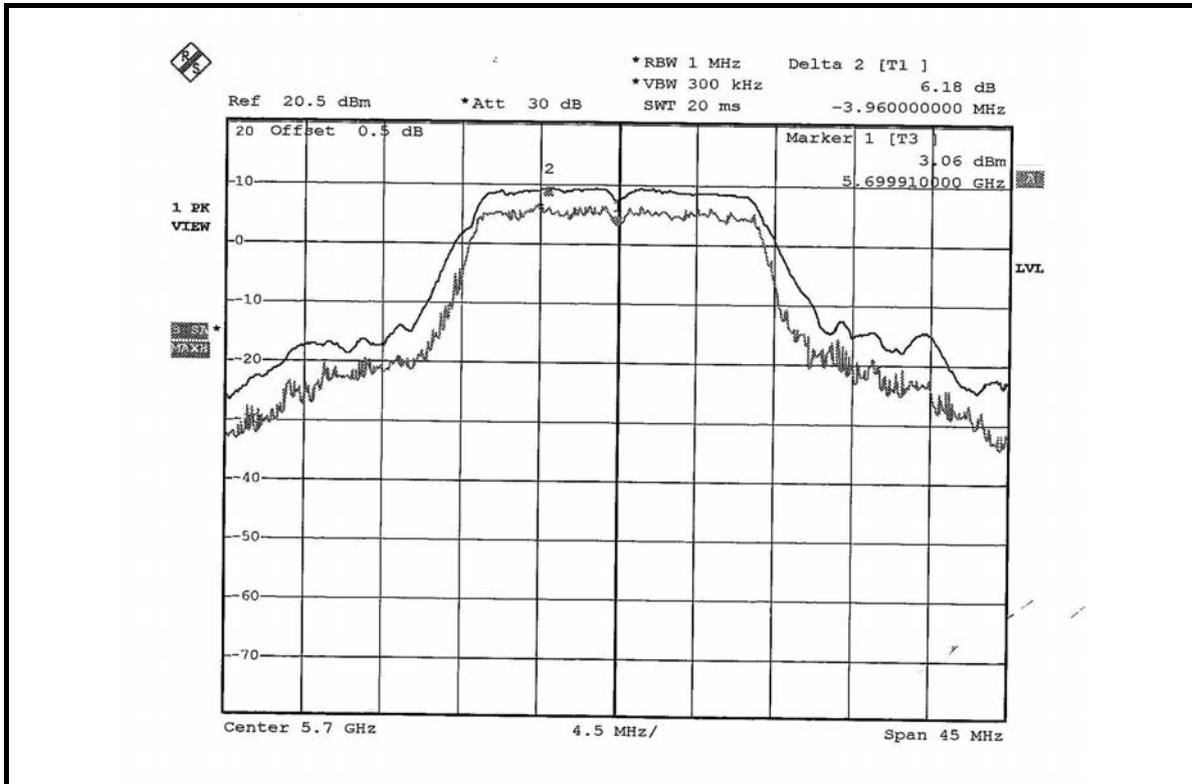
**CH 1**



CH 6



CH 11





## 4.5 PEAK POWER SPECTRAL DENSITY MEASUREMENT

### 4.5.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

Frequency Band	Limit
5.150 ~ 5.250 GHz	4dBm
5.250 ~ 5.350 GHz 5.470 ~ 5.725 GHz	11dBm
5.725 ~ 5.825 GHz	17dBm

### 4.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSP 40	100040	Jun. 07, 2007

**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

- a. The transmitter output was connected to the spectrum analyzer.
- b. 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

Same as 4.3.5

### 4.5.6 EUT OPERATING CONDITIONS

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

### 4.5.7 TEST RESULTS

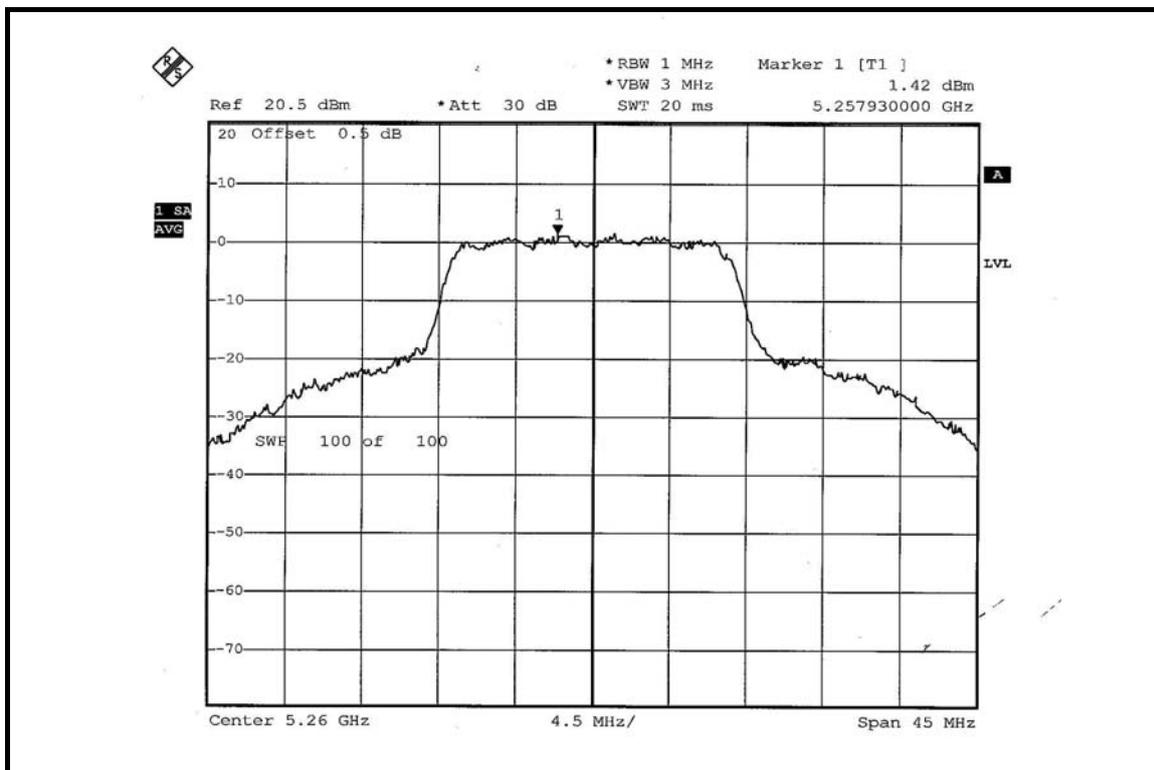
**FOR FREQUENCY BAND: 5.25 ~ 5.35GHz**

**802.11a OFDM MODULATION**

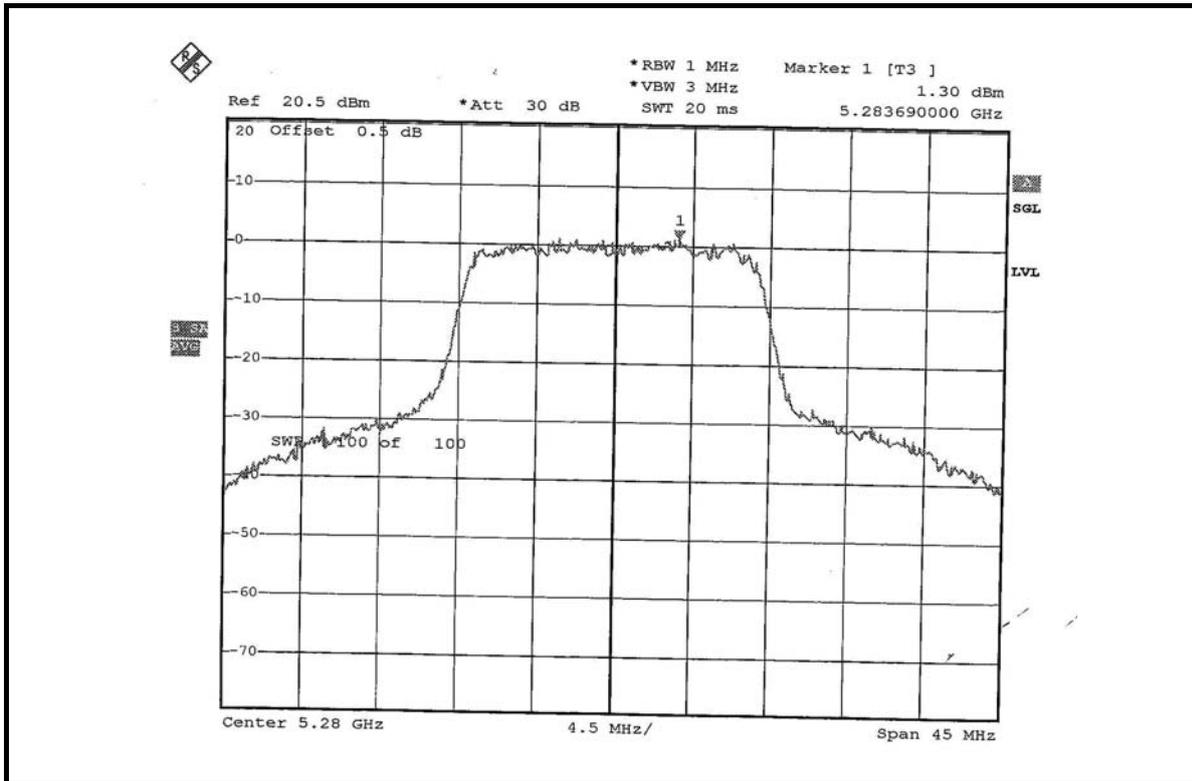
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	27deg.C, 69%RH, 991hPa
<b>TESTED BY</b>	Match Tsui		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5260	1.42	11	PASS
2	5280	1.30	11	PASS
4	5320	-0.35	11	PASS

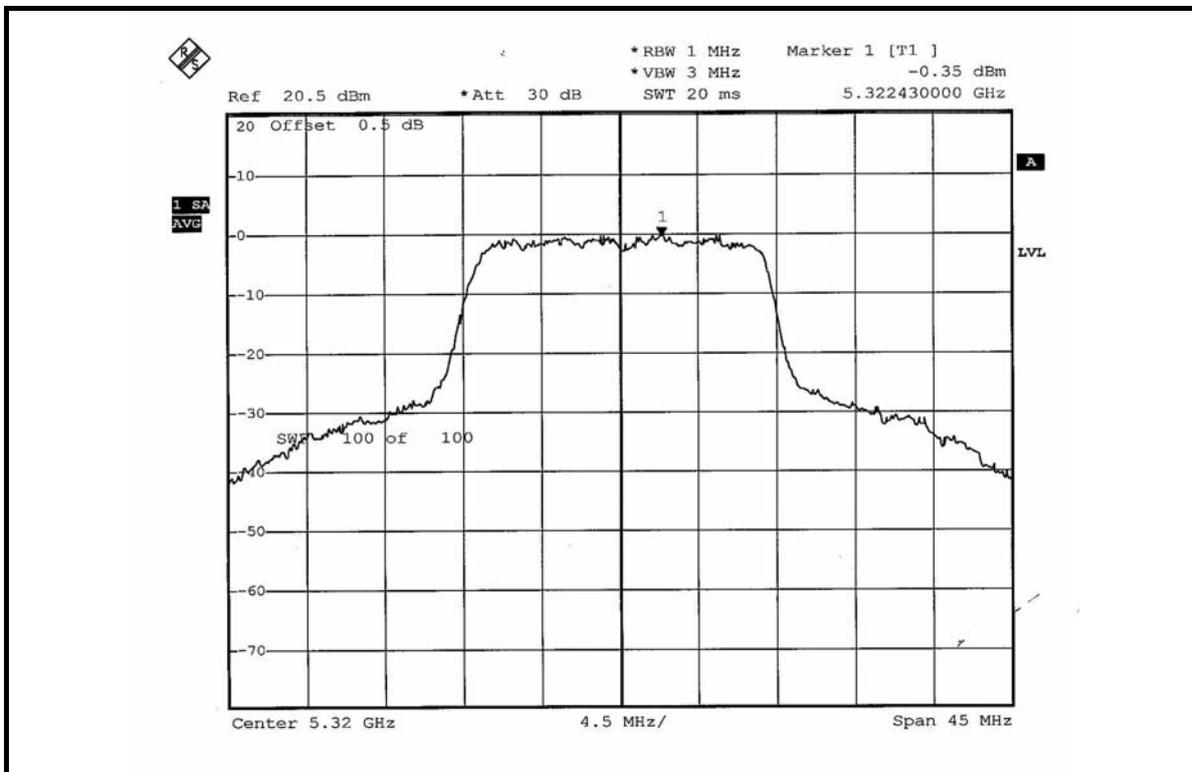
#### CH 1



### CH 2



### CH 4



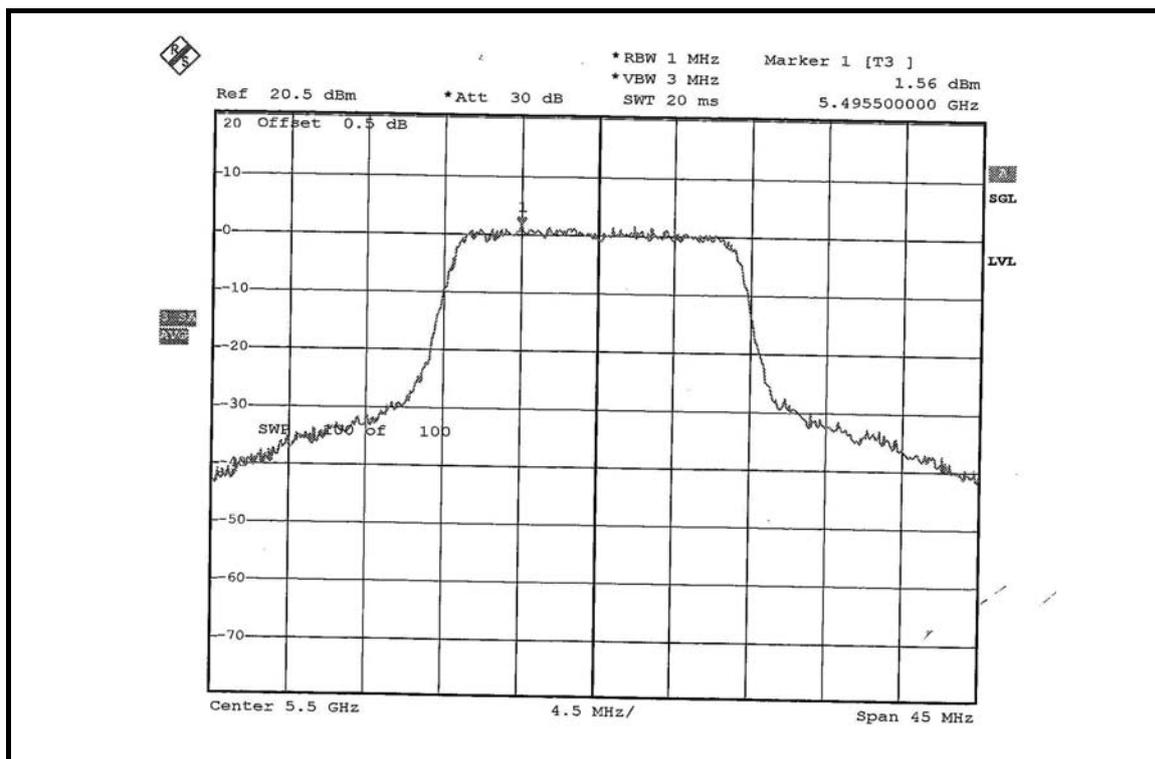


**FOR FREQUENCY BAND: 5.47 ~ 5.725GHz**  
**802.11a OFDM MODULATION**

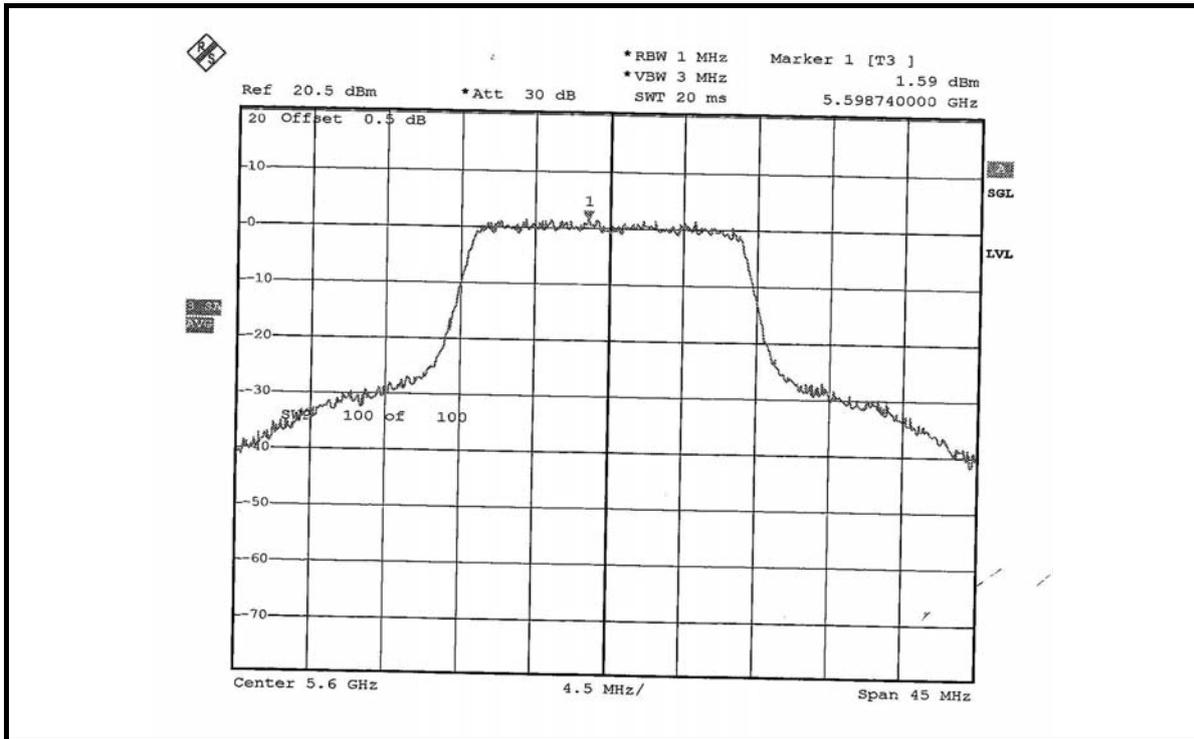
<b>MODULATION TYPE</b>	BPSK	<b>TRANSFER RATE</b>	6Mbps
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>ENVIRONMENTAL CONDITIONS</b>	27deg.C, 69%RH, 991hPa
<b>TESTED BY</b>	Match Tsui		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5500	1.56	11	PASS
6	5600	1.59	11	PASS
11	5700	-0.40	11	PASS

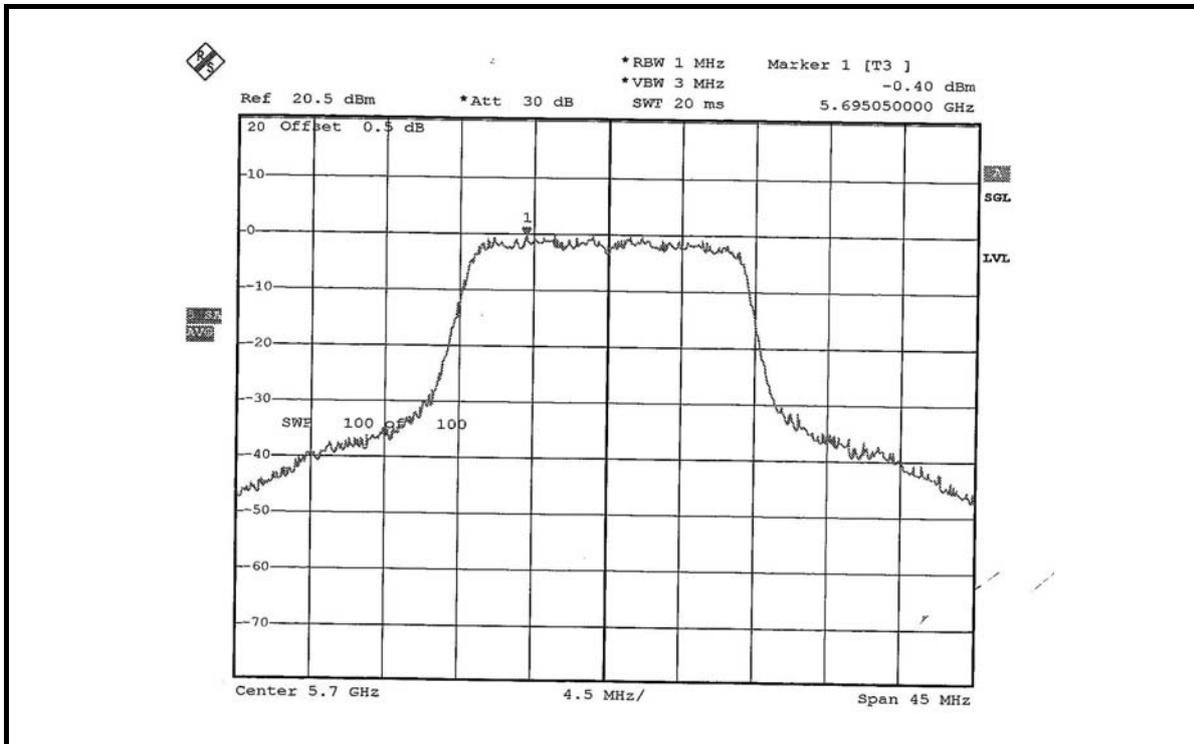
**CH 1**



CH 6



CH 11





## 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	Mar. 08, 2007
WIT STANDARD TEMPERATURE AND HUMIDITY CHAMBER	TH-4S-C	W981030	Jul. 10, 2007

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

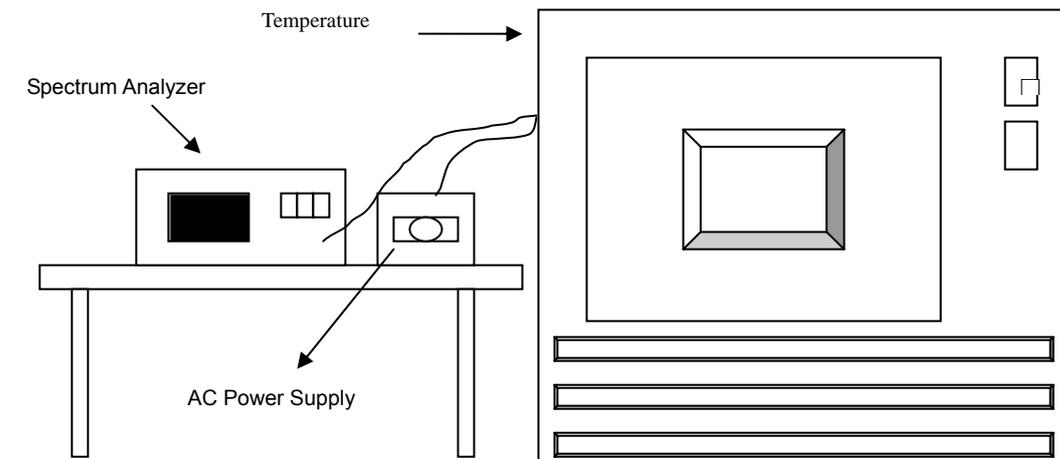
### 4.6.3 TEST PROCEDURE

- a. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
- b. Turn the EUT on and couple its output to a spectrum analyzer.
- c. Turn the EUT off and set the chamber to the highest temperature specified.
- d. 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.
- e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
- f. 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 4.1.6

#### 4.6.7 TEST RESULTS

Operating frequency: 5320MHz						Limit : ± 0.01%			
Temp. (°C)	Power supply (Vac)	0 minute		2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	138	5320.017820	0.0003350	5320.017650	0.0003318	5320.017280	0.0003248	5320.017020	0.0003199
	120	5320.017510	0.0003291	5320.017460	0.0003282	5320.017310	0.0003254	5320.017190	0.0003231
	102	5320.017440	0.0003278	5320.017320	0.0003256	5320.017220	0.0003237	5320.017160	0.0003226
40	138	5320.008620	0.0001620	5320.008450	0.0001588	5320.008250	0.0001551	5320.008010	0.0001506
	120	5320.008530	0.0001603	5320.008420	0.0001583	5320.008360	0.0001571	5320.008240	0.0001549
	102	5320.008490	0.0001596	5320.008220	0.0001545	5320.008210	0.0001543	5320.008100	0.0001523
30	138	5320.004827	0.0000907	5320.004606	0.0000866	5320.004655	0.0000875	5320.004560	0.0000857
	120	5320.002473	0.0000465	5320.002231	0.0000419	5320.002336	0.0000439	5320.002257	0.0000424
	102	5320.000118	0.0000022	5319.999855	-0.0000027	5320.000016	0.0000003	5319.999954	-0.0000009
20	138	5319.997764	-0.0000420	5319.997480	-0.0000474	5319.997697	-0.0000433	5319.997651	-0.0000441
	120	5319.995409	-0.0000863	5319.995104	-0.0000920	5319.995378	-0.0000869	5319.995349	-0.0000874
	102	5319.993054	-0.0001306	5319.992729	-0.0001367	5319.993059	-0.0001305	5319.993046	-0.0001307
10	138	5319.990700	-0.0001748	5319.990353	-0.0001813	5319.990740	-0.0001741	5319.990743	-0.0001740
	120	5319.988345	-0.0002191	5319.988178	-0.0002222	5319.988421	-0.0002177	5319.988440	-0.0002173
	102	5319.985991	-0.0002633	5319.985603	-0.0002706	5319.986102	-0.0002612	5319.986137	-0.0002606
0	138	5319.983636	-0.0003076	5319.983227	-0.0003153	5319.983782	-0.0003048	5319.983834	-0.0003039
	120	5319.981282	-0.0003518	5319.981152	-0.0003543	5319.981463	-0.0003484	5319.981531	-0.0003472
	102	5319.978927	-0.0003961	5319.978476	-0.0004046	5319.979144	-0.0003920	5319.979229	-0.0003904
-10	138	5319.976572	-0.0004404	5319.976101	-0.0004492	5319.976825	-0.0004356	5319.976926	-0.0004337
	120	5319.974218	-0.0004846	5319.974325	-0.0004826	5319.974506	-0.0004792	5319.974623	-0.0004770
	102	5319.971863	-0.0005289	5319.971350	-0.0005385	5319.971187	-0.0005416	5319.971320	-0.0005391
-20	138	5319.969509	-0.0005731	5319.968975	-0.0005832	5319.969868	-0.0005664	5319.970017	-0.0005636
	120	5319.967154	-0.0006174	5319.967599	-0.0006090	5319.967548	-0.0006100	5319.967714	-0.0006069
	102	5319.964800	-0.0006617	5319.964224	-0.0006725	5319.964229	-0.0006724	5319.964411	-0.0006690
-30	138	5319.962445	-0.0007059	5319.962848	-0.0006983	5319.962910	-0.0006972	5319.962109	-0.0007122
	120	5319.960090	-0.0007502	5319.960473	-0.0007430	5319.960591	-0.0007408	5319.960806	-0.0007367
	102	5319.957736	-0.0007944	5319.957097	-0.0008064	5319.957272	-0.0008032	5319.957503	-0.0007988

## 4.7 BAND EDGES MEASUREMENT

### 4.7.1 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSP 40	100040	Jun. 07, 2007

**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 was 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 5.25 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 filed 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.

**FOR FREQUENCY BAND: 5.25 ~ 5.35GHz**

**Channel 1 (5260MHz)**

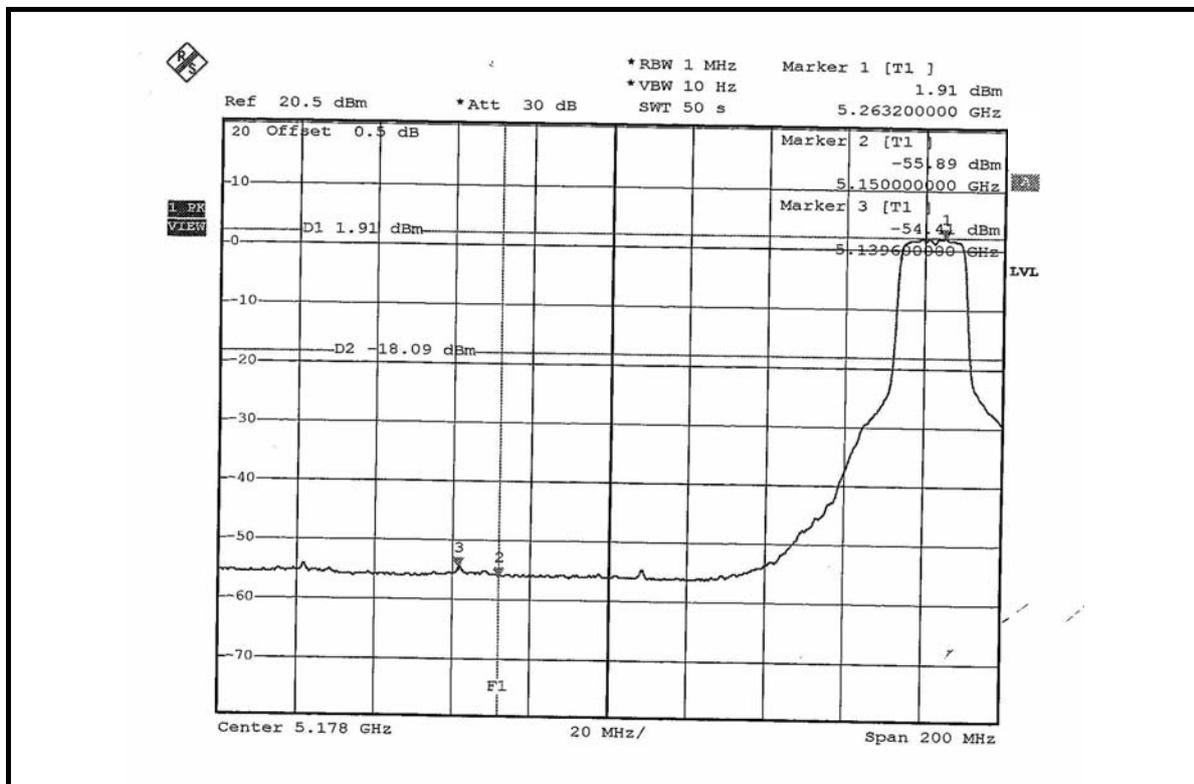
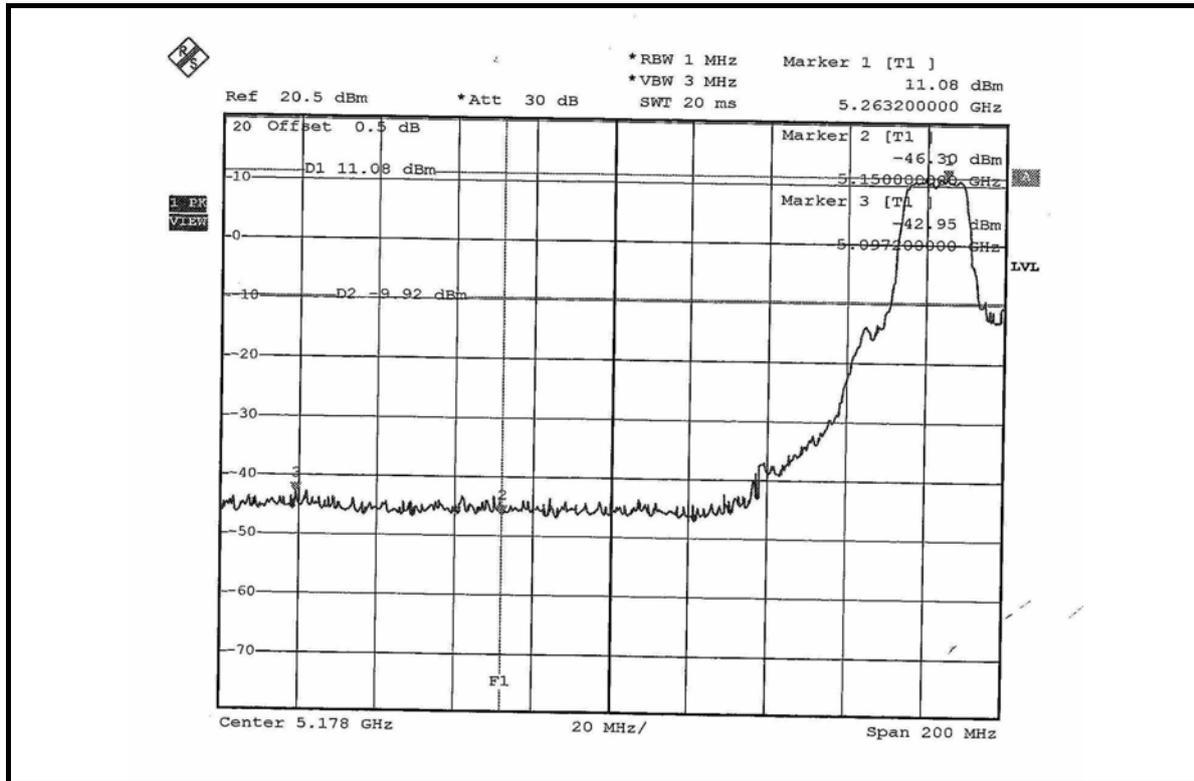
The band edge emission plot on the next page shows 54.03dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 108.24dBuV/m (Peak), so the maximum field strength in restrict band is  $108.24 - 54.03 = 54.21$ dBuV/m which is under 74dBuV/m limit.

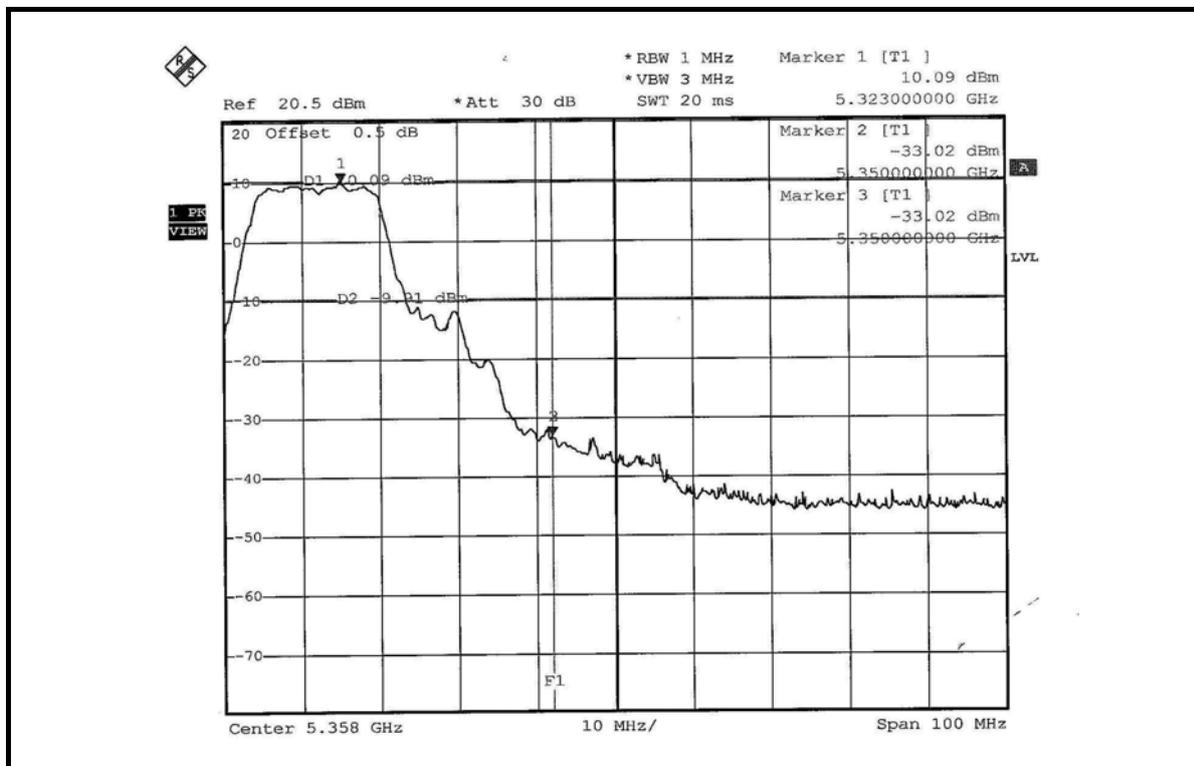
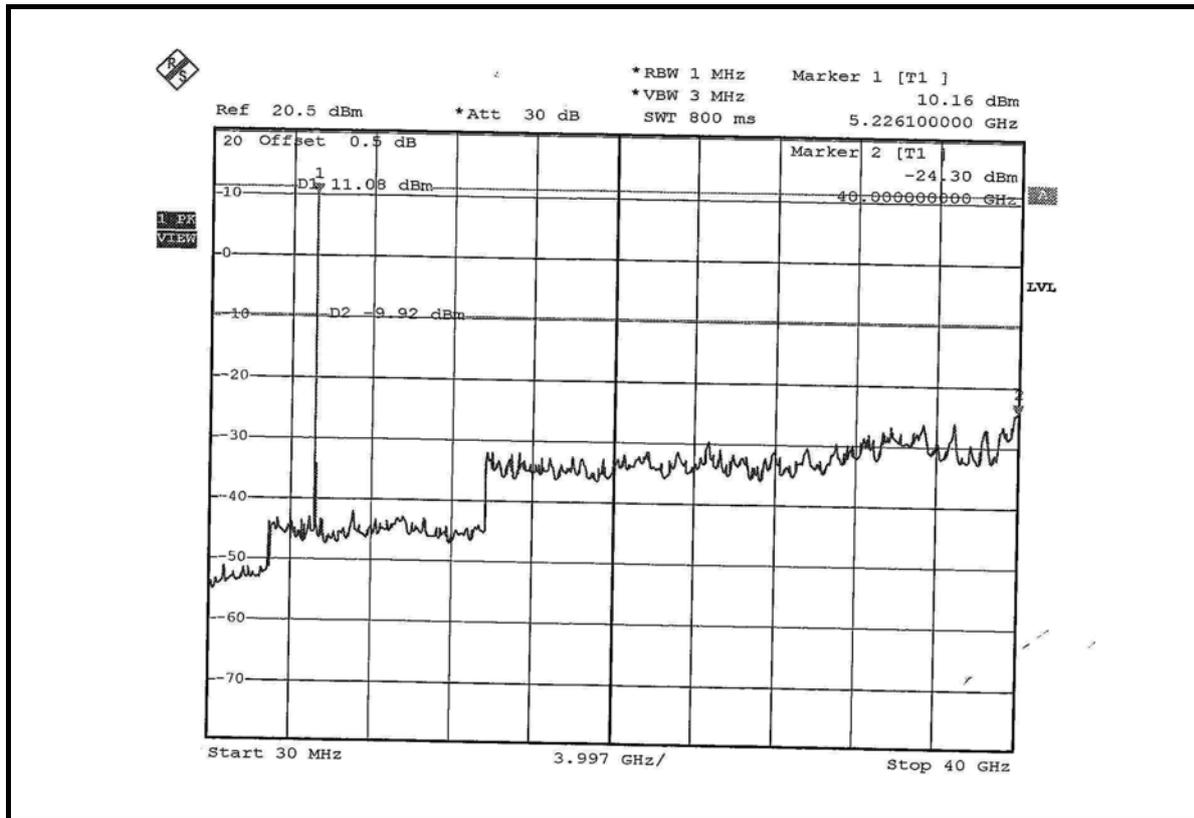
The band edge emission plot on the next page shows 56.32dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 98.83dBuV/m (Average), so the maximum field strength in restrict band is  $98.83 - 56.32 = 42.51$ dBuV/m which is under 54dBuV/m limit.

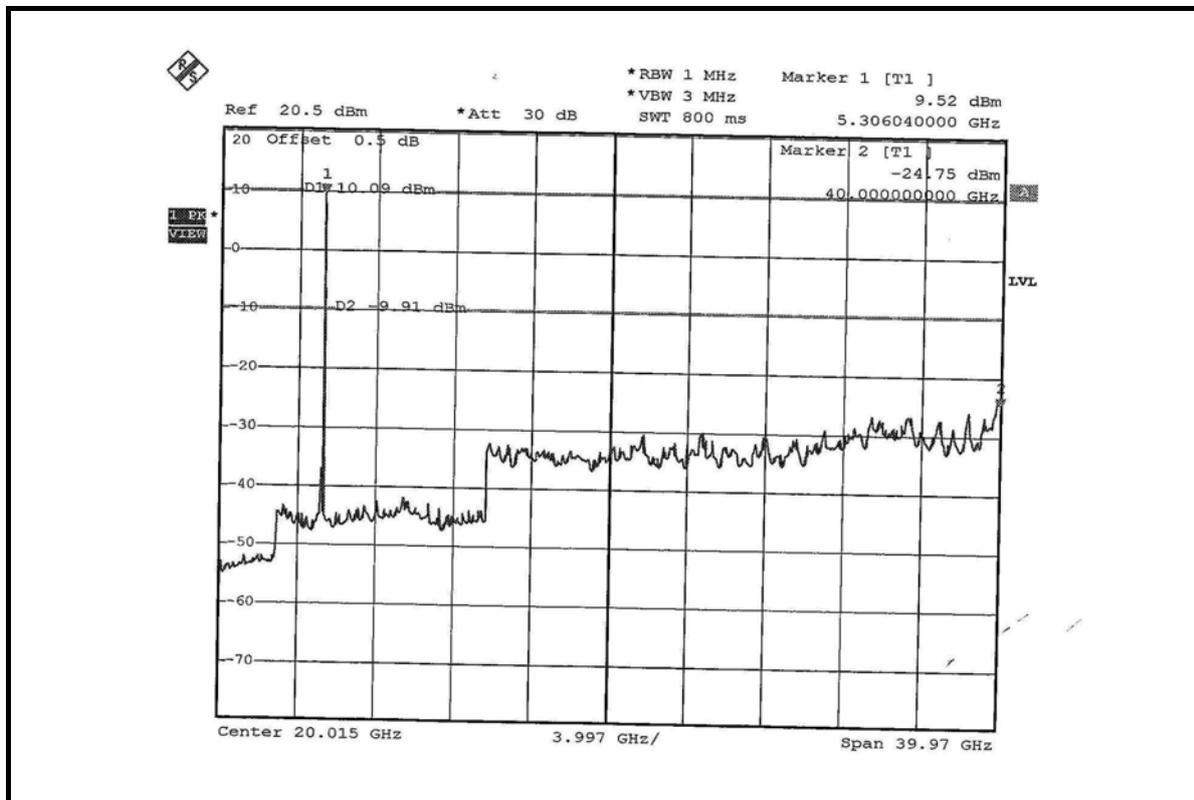
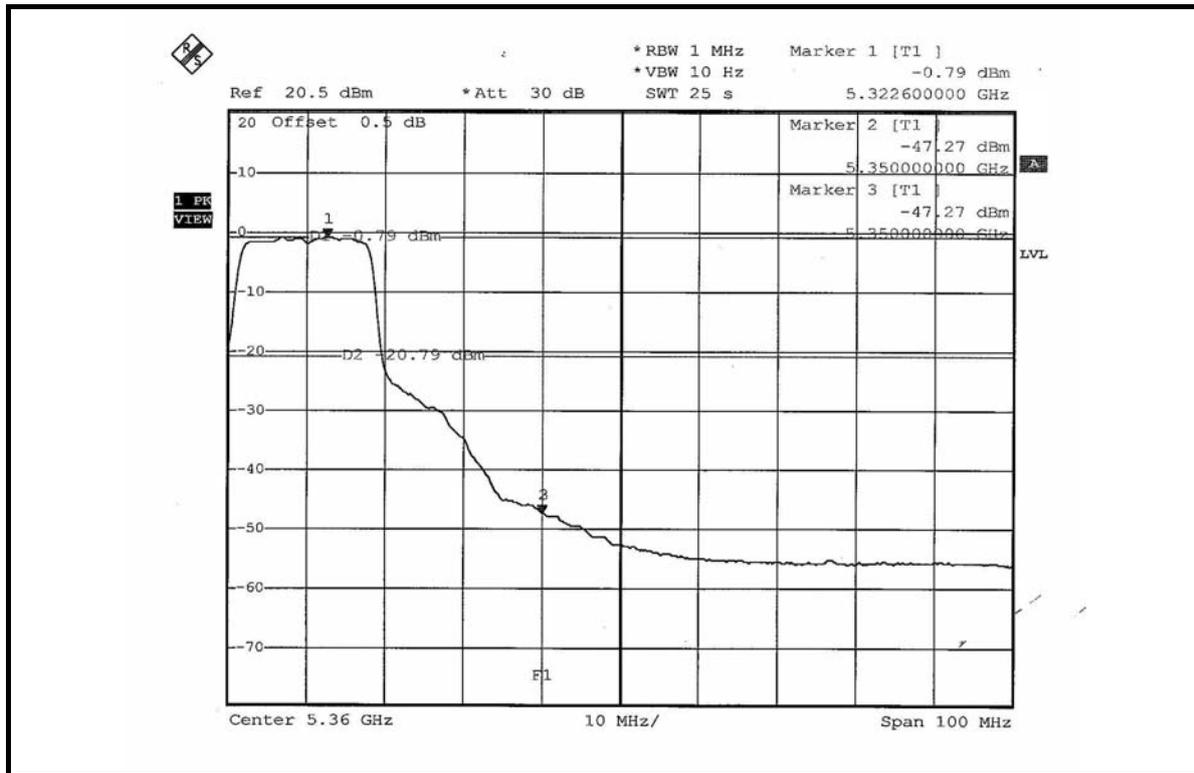
**Channel 4 (5320MHz)**

The band edge emission plot on the next second page shows 43.11dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 4 is 105.12dBuV/m (Peak), so the maximum field strength in restrict band is  $105.12 - 43.11 = 62.01$ dBuV/m which is under 74dBuV/m limit.

The band edge emission plot on the next third page shows 46.48dBc between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 4 is 95.50dBuV/m (Average), so the maximum field strength in restrict band is  $95.50 - 46.48 = 49.02$ dBuV/m which is under 54dBuV/m limit.







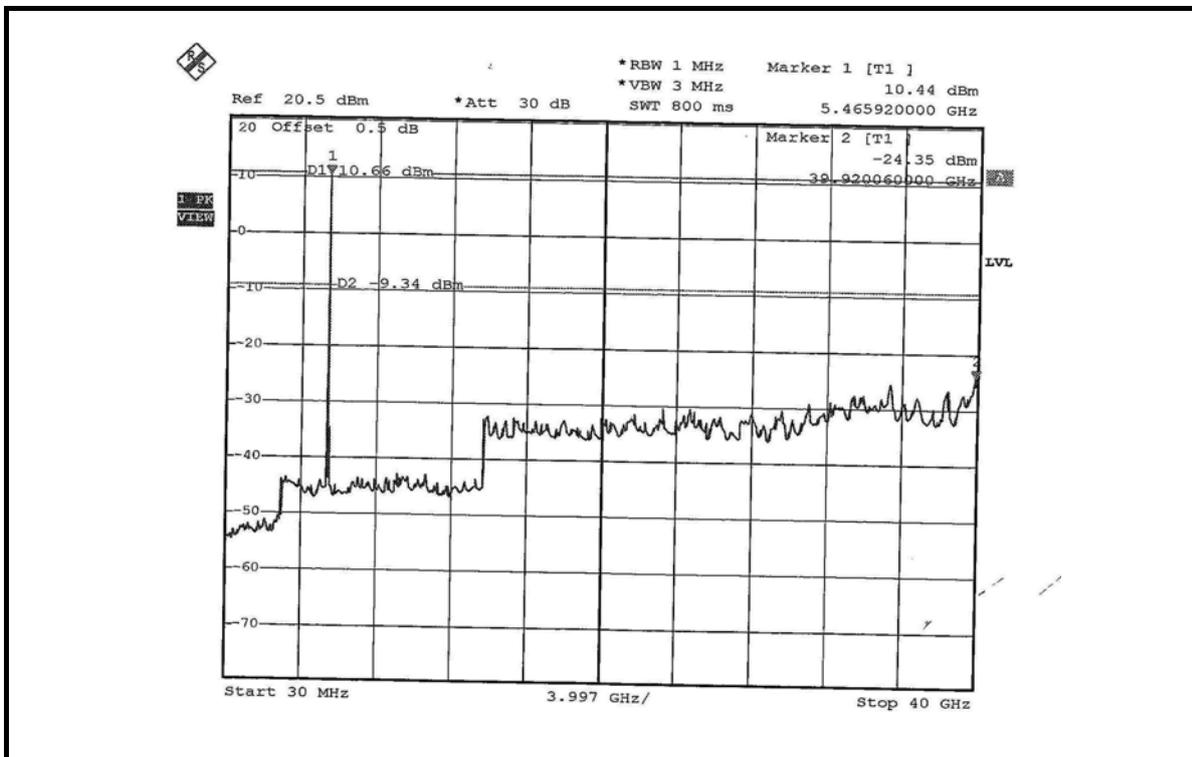
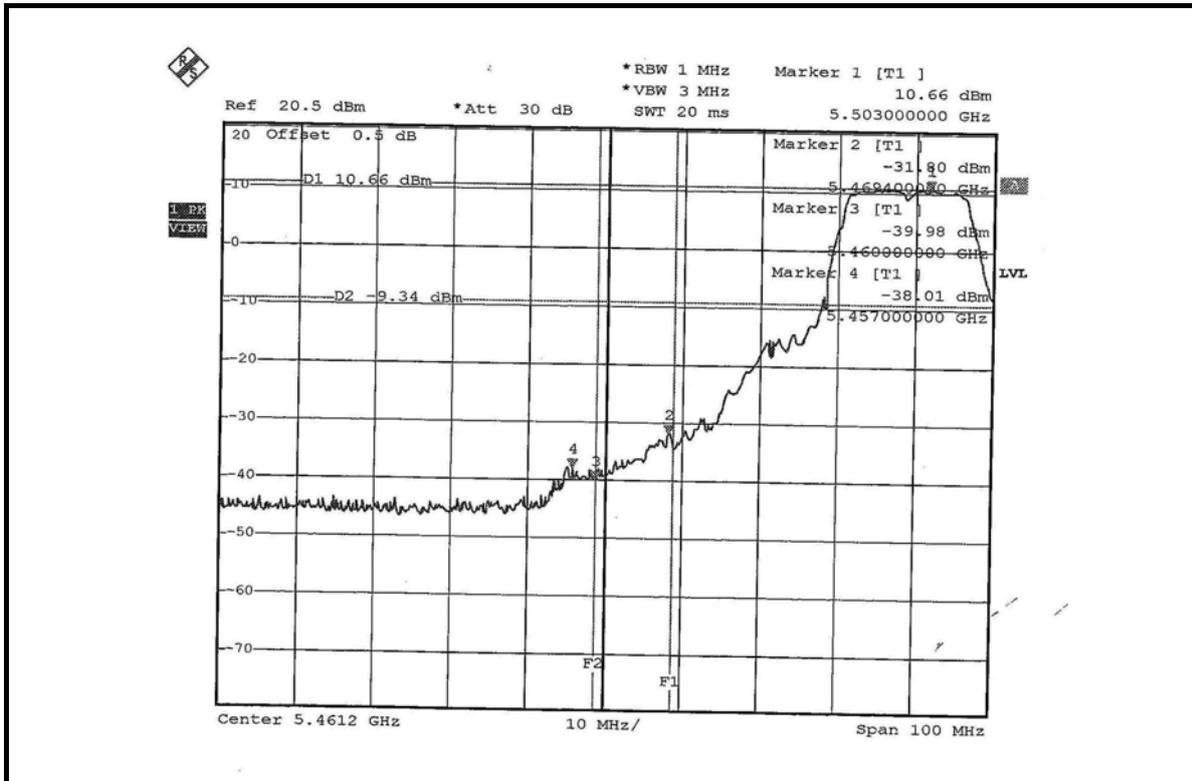
**FOR FREQUENCY BAND: 5.47 ~ 5.725GHz**

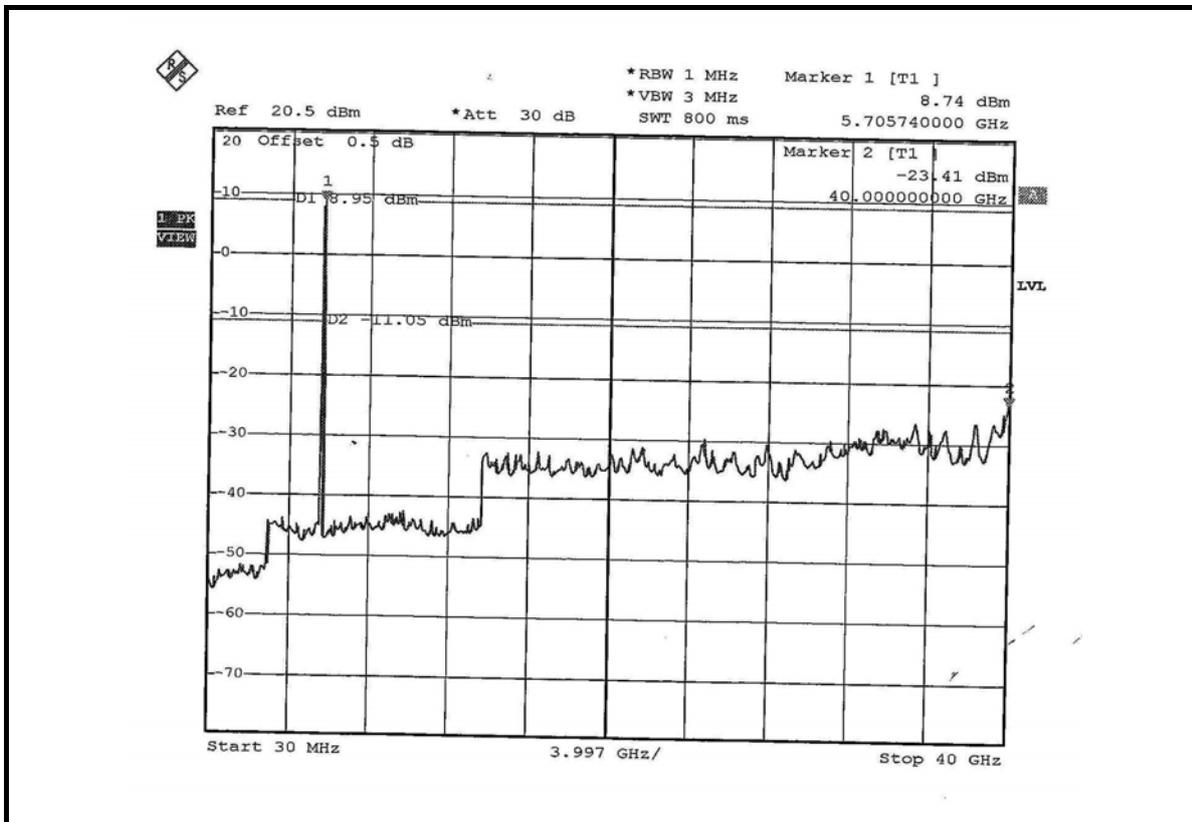
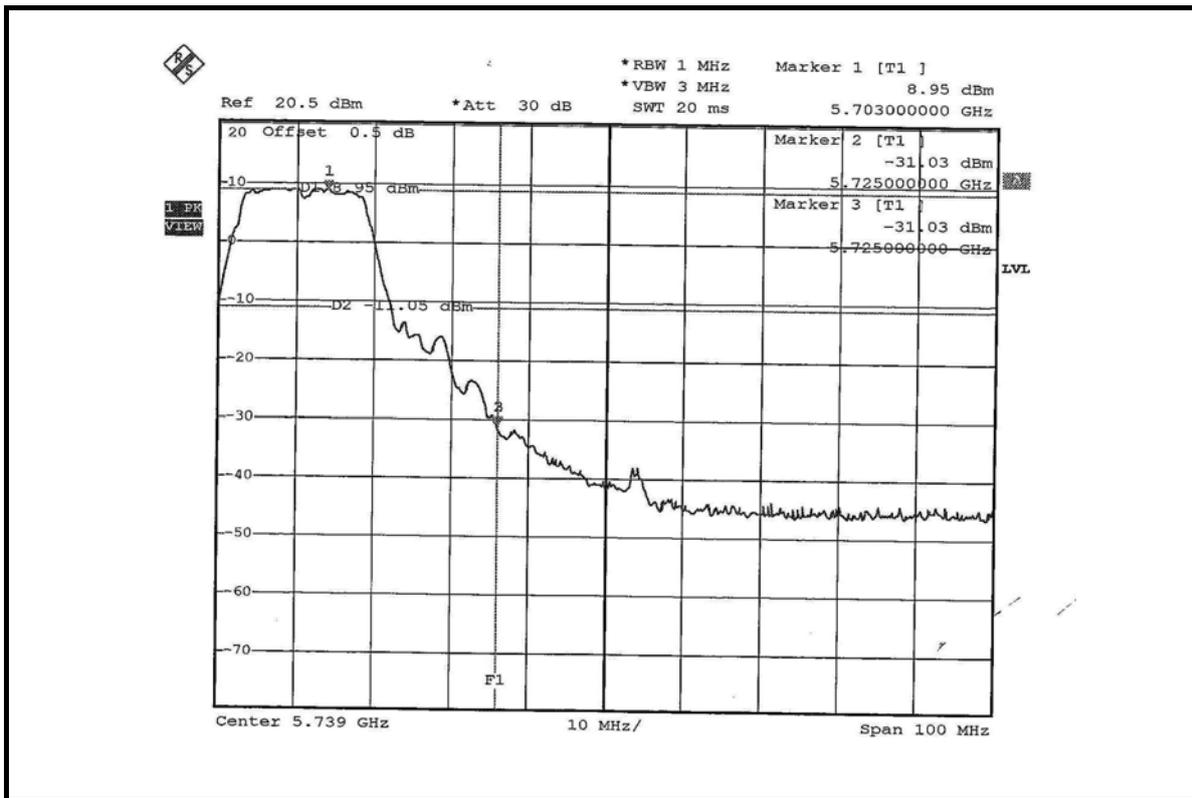
**Channel 1 (5500MHz)**

The band edge emission plot on the next page shows 42.46dBc between carrier maximum power and local maximum emission out of band emission. The emission of carrier strength list in the test result of channel 1 is 107.81dBuV/m (Peak), so the maximum field strength out of band emission is  $107.81 - 42.46 = 65.35$ dBuV/m which is under 68.3dBuV/m limit.

**Channel 11 (5700MHz)**

The band edge emission plot on the next second page shows 39.98dBc between carrier maximum power and local maximum emission out of band emission. The emission of carrier strength list in the test result of channel 11 is 106.29dBuV/m (Peak), so the maximum field strength out of band emission is  $106.29 - 39.98 = 66.31$ dBuV/m which is under 68.3dBuV/m limit.







## **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 Inverted F antenna with I-PEX connector. The maximum Gain of the antenna is 1.95dBi.



## 5. INFORMATION ON THE TESTING LABORATORIES

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

<b>USA</b>	FCC, UL, A2LA
<b>Germany</b>	TUV Rheinland
<b>Japan</b>	VCCI
<b>Norway</b>	NEMKO
<b>Canada</b>	INDUSTRY CANADA , CSA
<b>R.O.C.</b>	CNLA, BSMI, NCC
<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: 886-2-26051924

**Hsin Chu EMC/RF Lab:**  
Tel: 886-3-5935343  
Fax: 886-3-5935342

**Hwa Ya EMC/RF/Safety Telecom Lab:**  
Tel: 886-3-3183232  
Fax: 886-3-3185050

**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.