

### 5.4.3 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=30KHz).
4. The largest difference between Trace 1 and Trace 2 in any 1MHz band on any frequency was recorded.

### 5.4.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.4.5 TEST SETUP



### 5.4.6 EUT OPERATING CONDITIONS

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



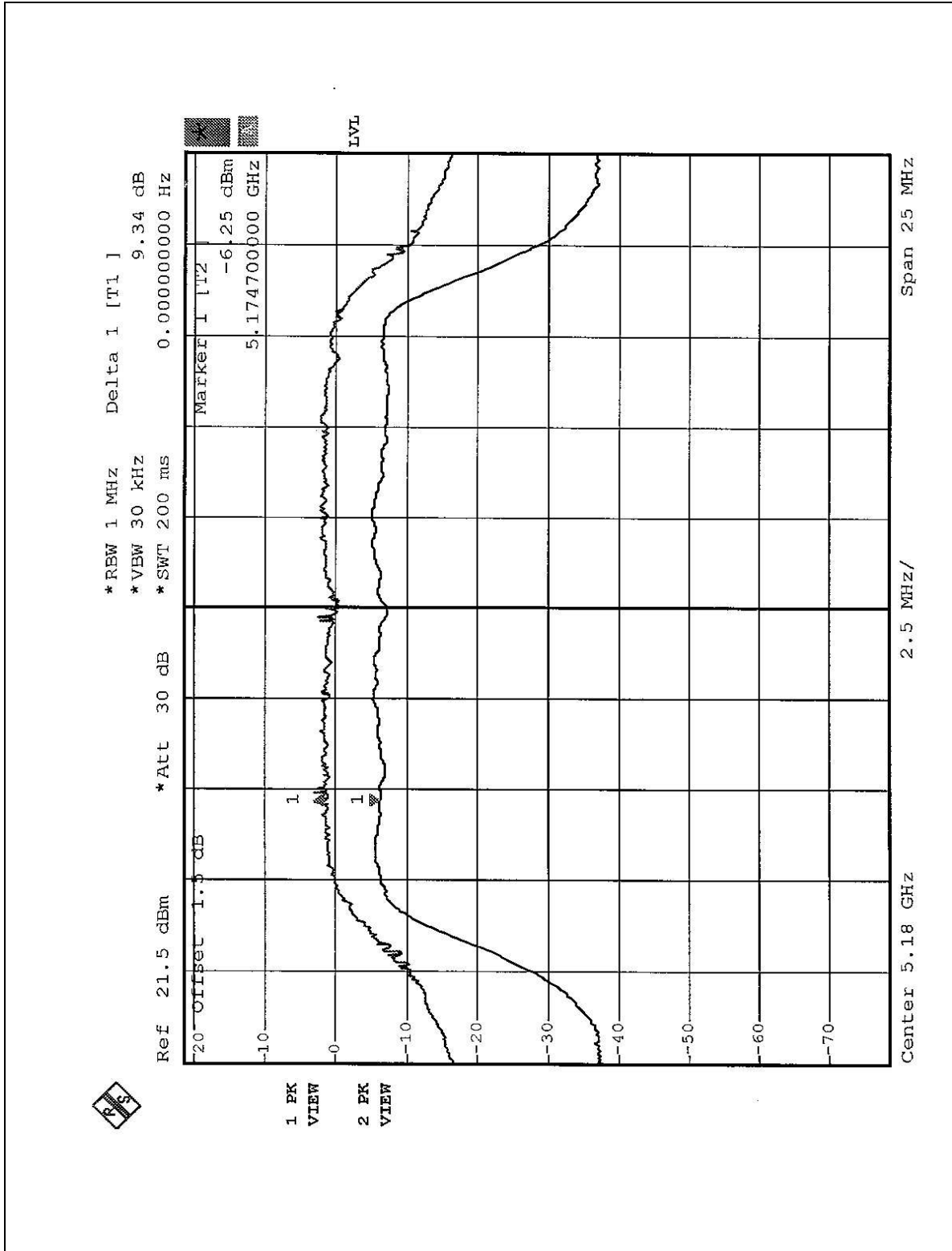
## 5.4.7 TEST RESULTS

<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>CHANNEL</b>	1, 4, 5, 8	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>ENVIRONMENTAL CONDITIONS</b>	32 deg. C, 55%RH, 1005 hPa	<b>TESTED BY</b>	Steven Lu

<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	9.34	13	PASS
4	5240	9.19	13	PASS
5	5260	9.01	13	PASS
8	5320	8.93	13	PASS

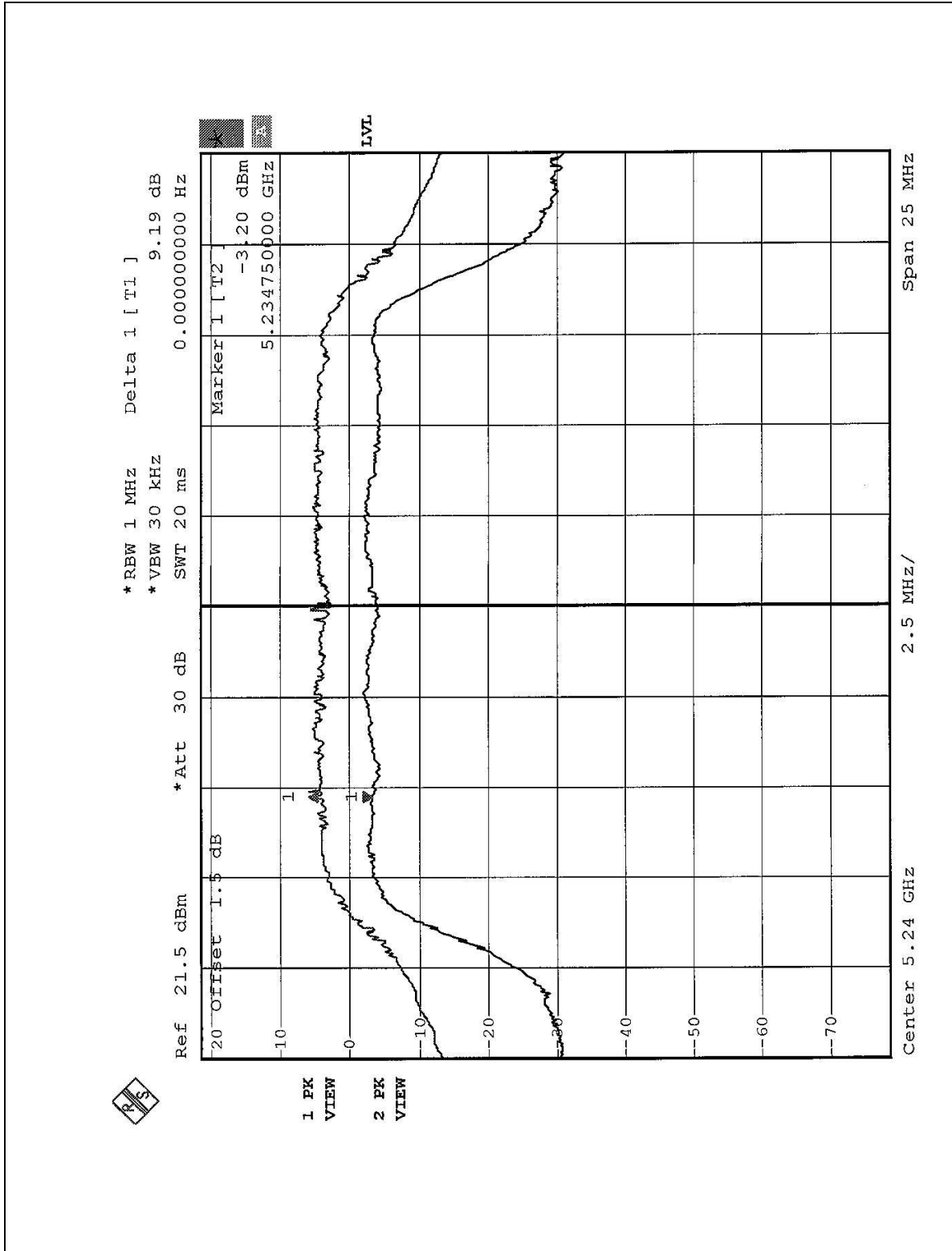


CHANNEL 1



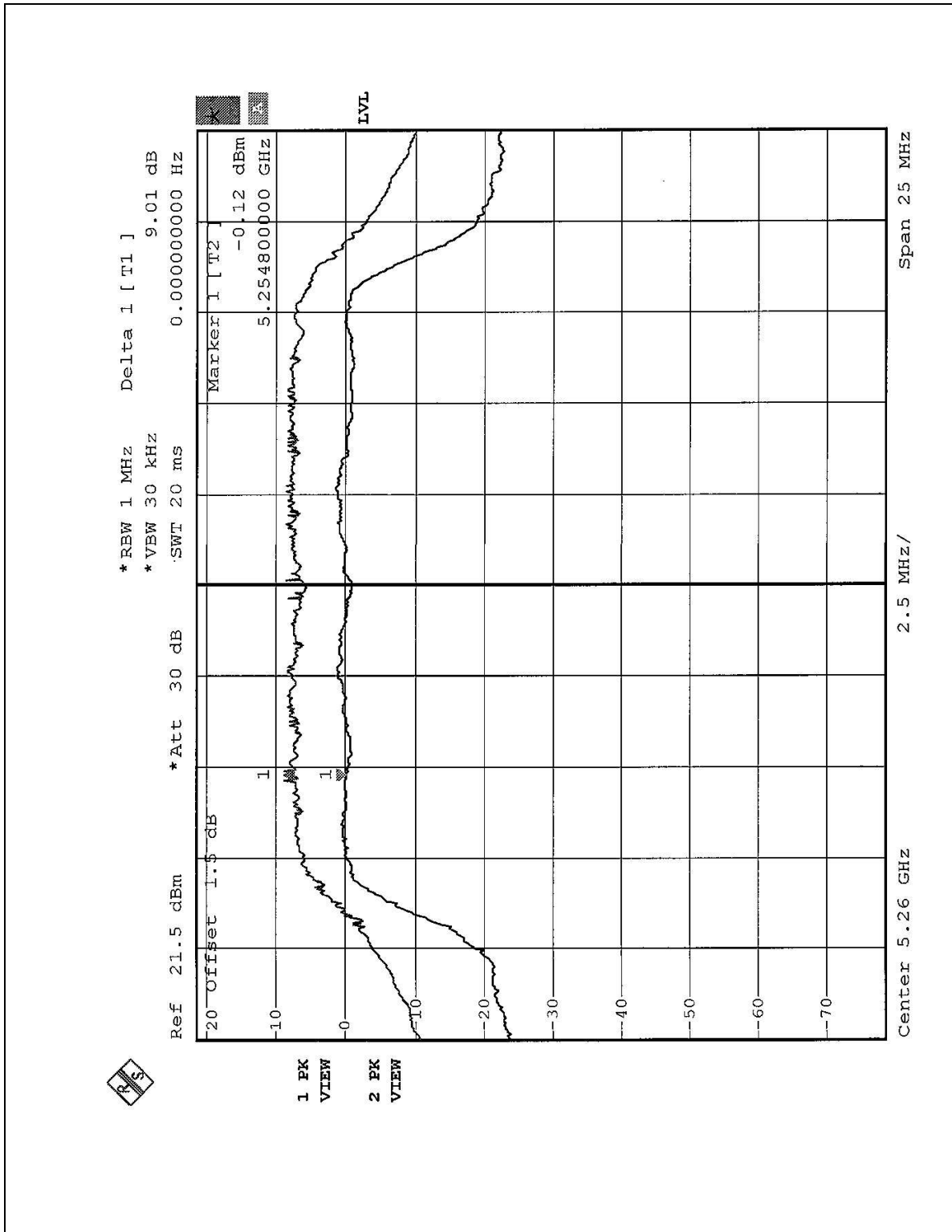


CHANNEL 4



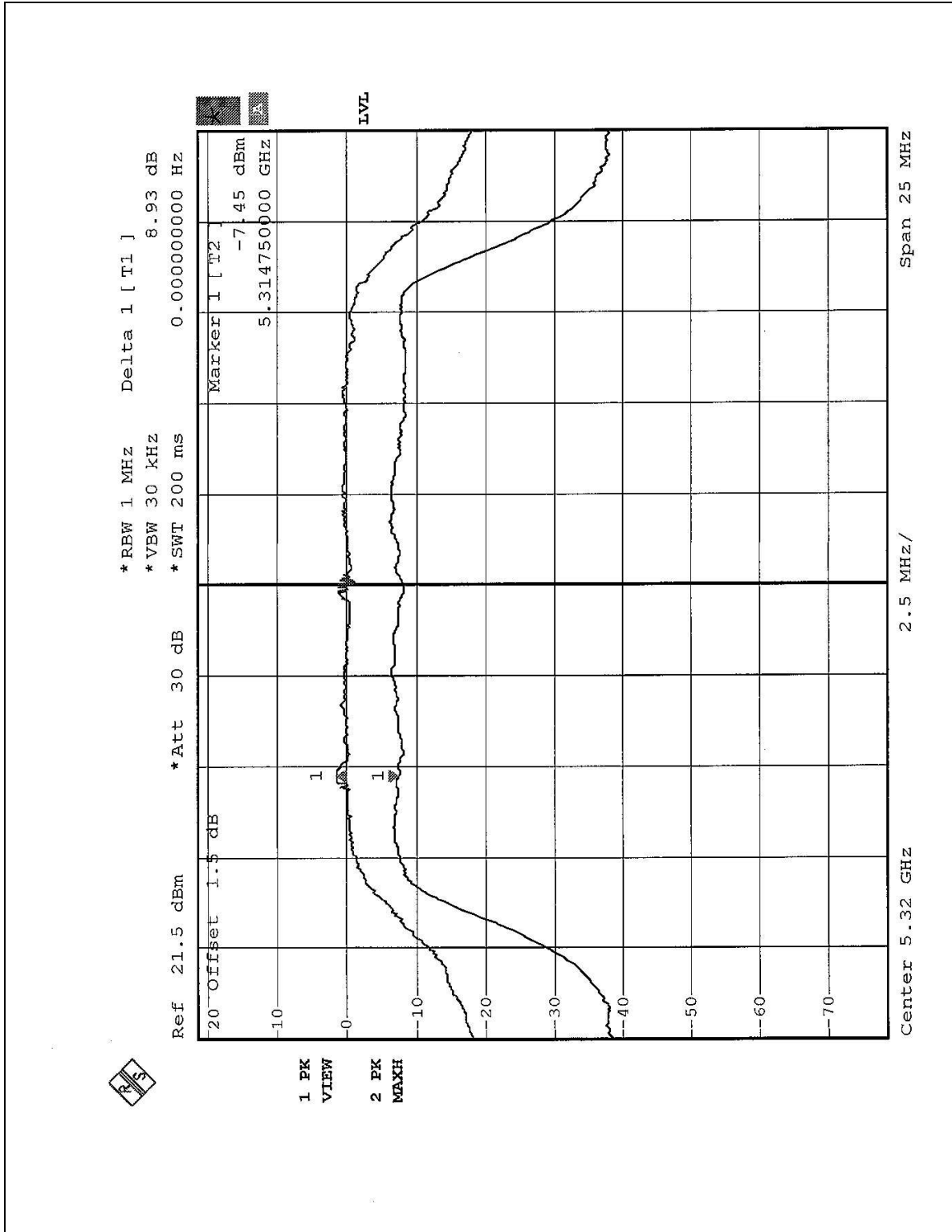


CHANNEL 5





CHANNEL 8





## 5.5 PEAK POWER SPECTRAL DENSITY MEASUREMENT

### 5.5.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

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

### 5.5.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ROHDE&SCHWARZ SPECTRUM ANALYZER	FSEK30	100049	July 24, 2003

**NOTE:**

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

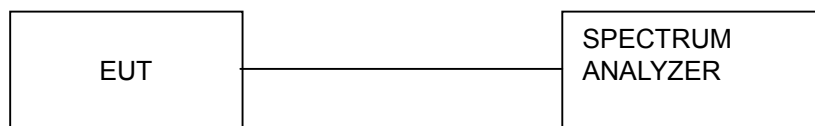
### 5.5.3 TEST PROCEDURES

1. The transmitter output was connected to the spectrum analyzer.
2. Set RBW=1MHz, VBW=3MHz. The PPSD can be found.

### 5.5.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.5.5 TEST SETUP



### 5.5.6 EUT OPERATING CONDITIONS

Same as 5.3.5





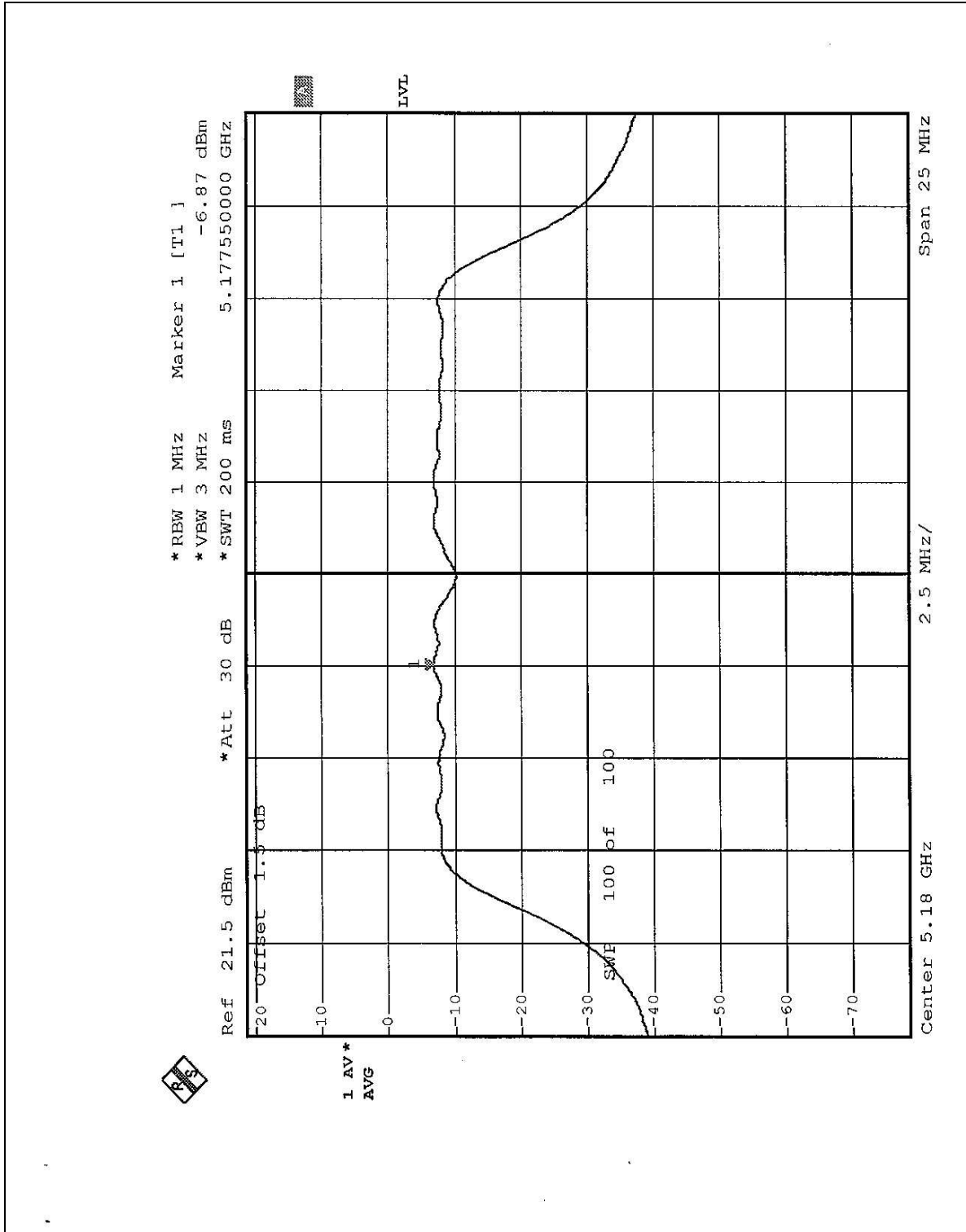
## 5.5.7 TEST RESULTS

<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>CHANNEL</b>	1, 4, 5, 8	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>ENVIRONMENTAL CONDITIONS</b>	32 deg. C, 55%RH, 1005 hPa	<b>TESTED BY</b>	Steven Lu

<b>CHANNEL NUMBER</b>	<b>CHANNEL FREQUENCY (MHz )</b>	<b>RF POWER LEVEL IN 1 MHz BW (dBm)</b>	<b>MAXIMUM LIMIT (dBm)</b>	<b>PASS/FAIL</b>
1	5180	-6.87	4	PASS
4	5240	-1.98	4	PASS
5	5260	1.04	11	PASS
8	5320	-7.83	11	PASS

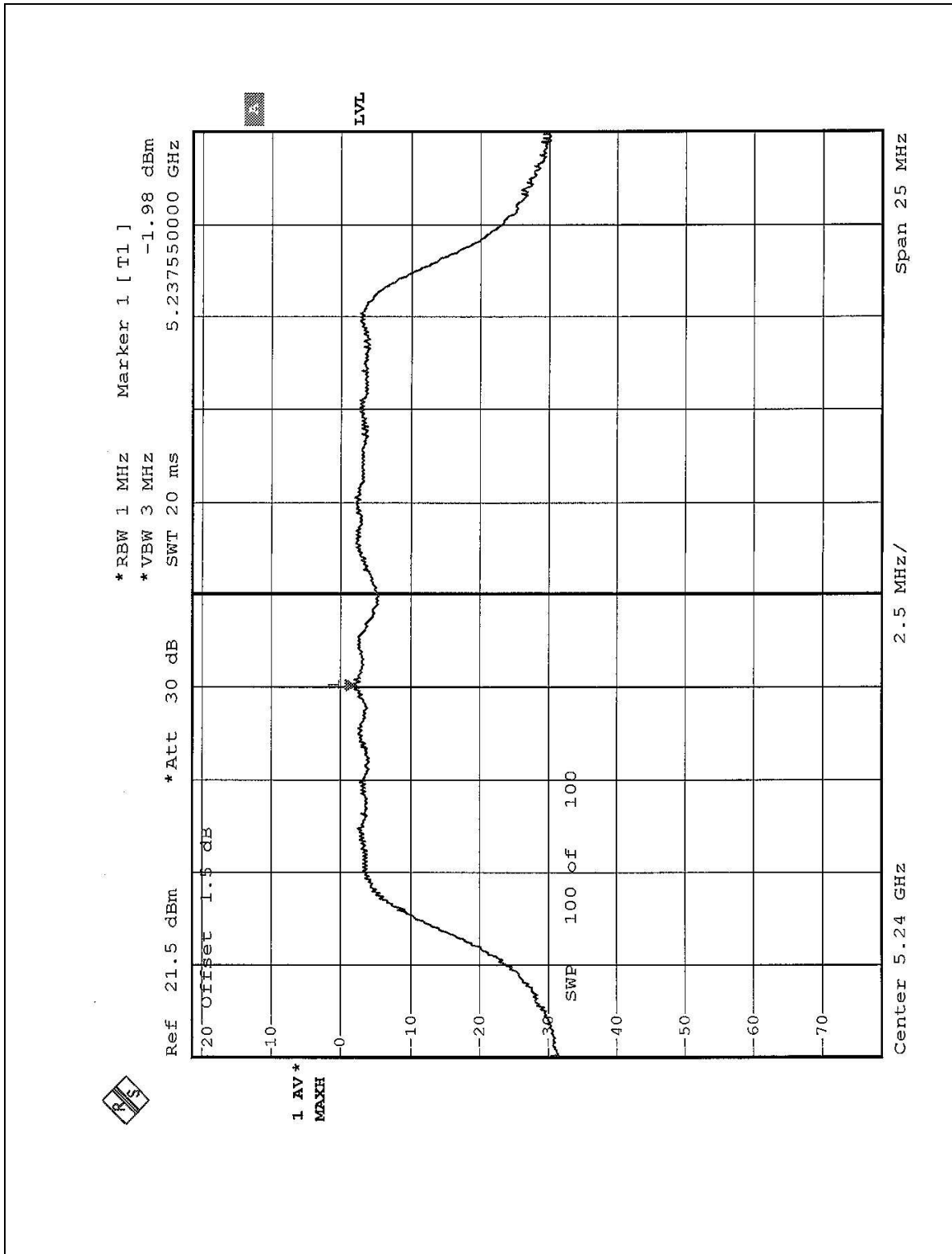


CHANNEL 1



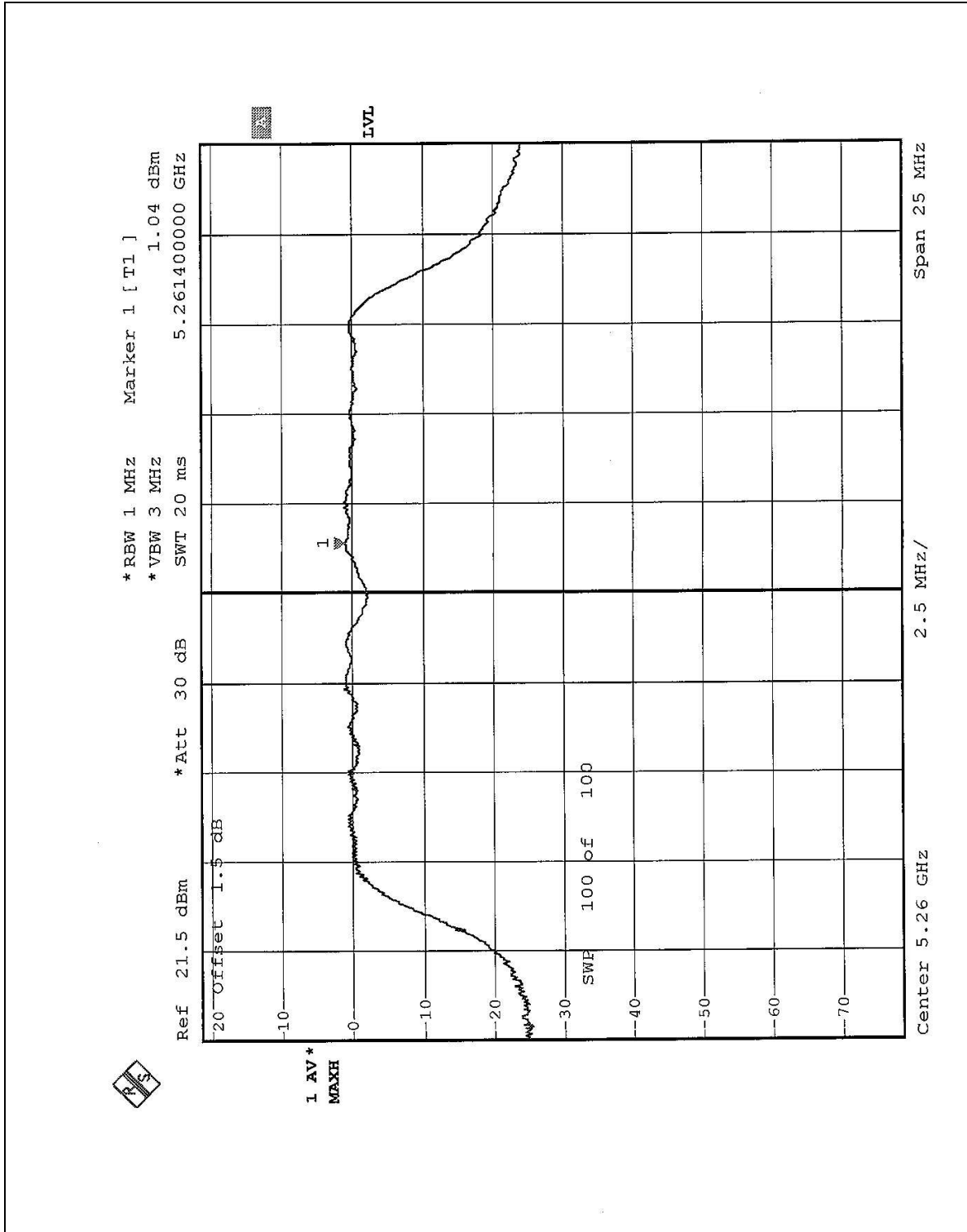


CHANNEL 4



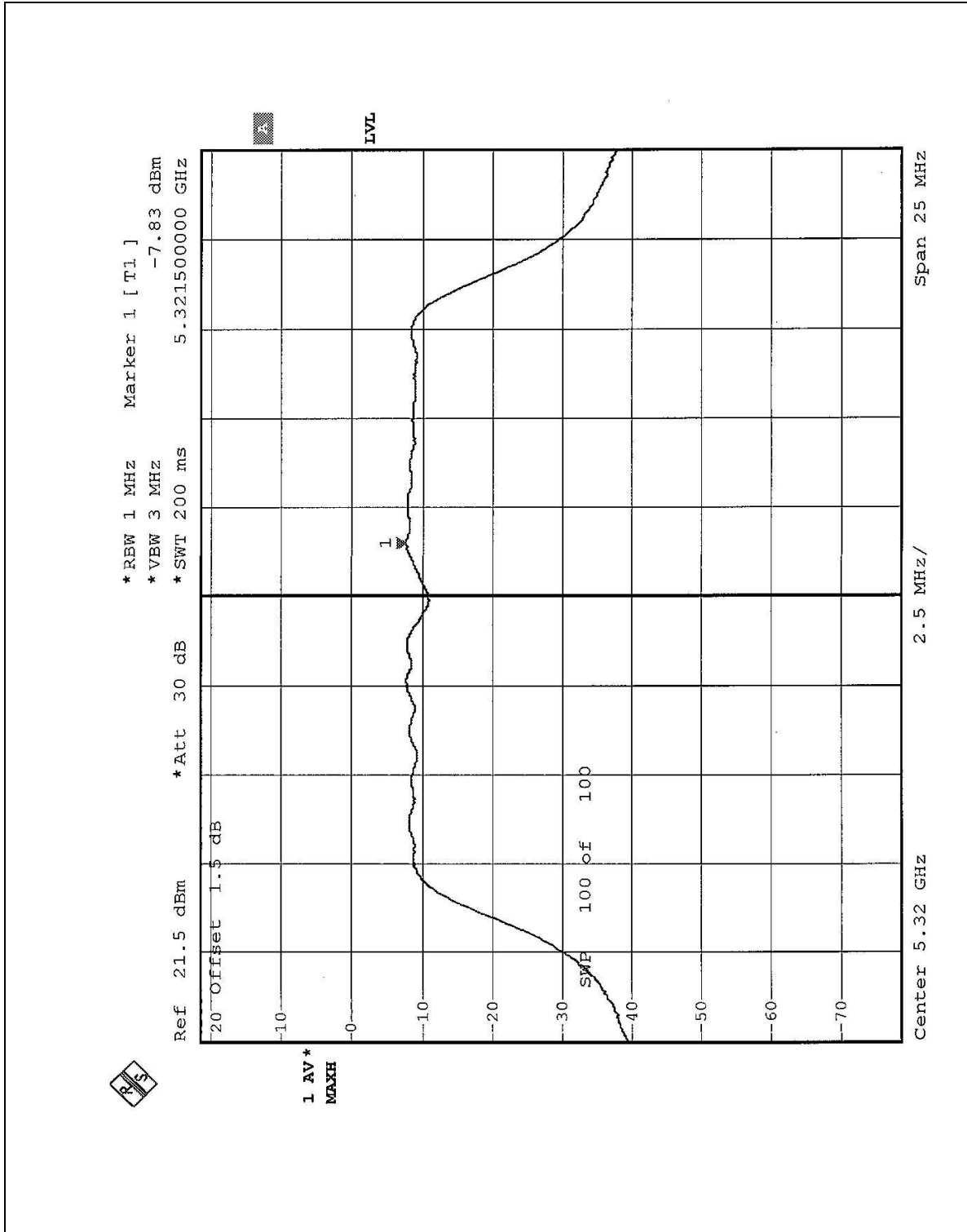


CHANNEL 5





CHANNEL 8





## 5.6 EFFECTIVE ISOTROPIC RADIATED POWER SPURIOUS EMISSIONS MEASUREMENT

### 5.6.1 LIMITS OF EFFECTIVE ISOTROPIC RADIATED POWER SPURIOUS EMISSIONS MEASUREMENT

- (1) For transmitters operating in the 5.15 – 5.25 GHz band:  
All emissions outside of the 5.15 – 5.25 GHz band shall not exceed an EIRP of  $-27\text{dBm/MHz}$ .
- (2) For transmitters operating in the 5.25 – 5.35 GHz band:  
All emissions outside of the 5.25 – 5.35 GHz band shall not exceed an EIRP of  $-27\text{dBm/MHz}$ .
- (3) For transmitters operating in the 5.725 – 5.825 GHz band:  
All emissions operating within the frequency range from the band edge 10 MHz above or below the band edge shall not exceed an EIRP of  $-17\text{dBm/MHz}$ ; for frequencies 10 MHz or greater above or below the band edge shall not exceed an EIRP of  $-27\text{dBm/MHz}$ .

### 5.6.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
* ROHDE & SCHWARZ Spectrum Analyzer	FSEK30	100049	July 24, 2003
ROHDE & SCHWARZ Signal Generator	68247B	984703	May 31, 2003
* EMCO Horn Antenna	3115	5623	May 23, 2003
* EMCO Horn Antenna	3115	5619	May 22, 2003
MITEQ Preamplifier	AMF-4D-0051	692677	NA
MITEQ Preamplifier	AFS33-18002	690751	NA
Broadband Horn Antenna	BBHA 9170	147	May 30, 2003
Broadband Horn Antenna	BBHA 9170	148	May 31, 2003

#### NOTE:

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



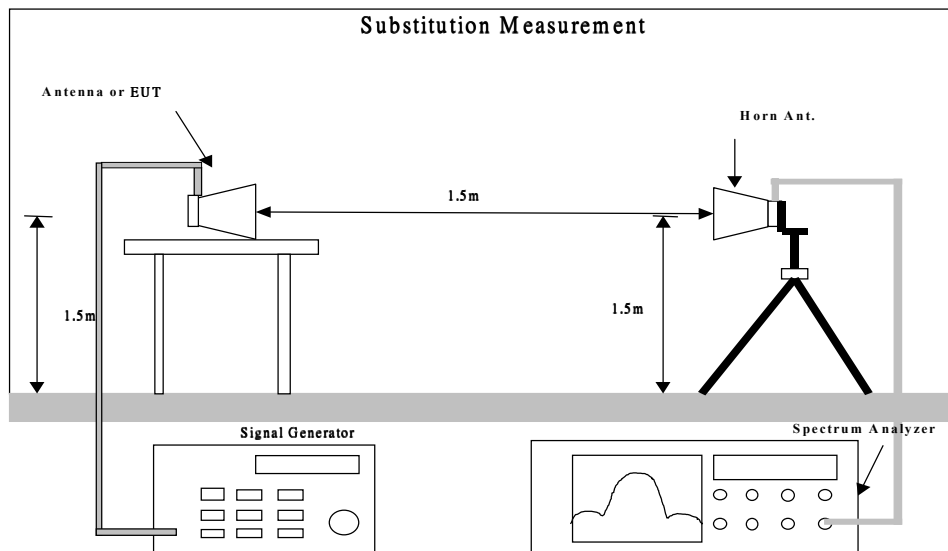
### 5.6.3 TEST PROCEDURE

1. The EUT was placed on the top of a rotating table 1.5 meters above the ground.
2. The table was rotated 360 degrees to determine the position of the highest radiation.
3. The EUT was set 1.5 meters away from the receiving antenna, which was mounted on antenna tower and its position at 1.5 m above the ground.
4. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading and recorded the value.
5. The EUT is replaced by a horn antenna connected to a signal generator tuned to the frequency of emission and with the same radiation nature.
6. The radiated power can be calculated via the factor and antenna gain.
7. Repeat step 1-6 for horizontal polarization.

### 5.6.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.6.5 TEST SETUP



### 5.6.6 EUT OPERATING CONDITION

Same as Item 5.3.5





## 5.6.7 TEST RESULTS

<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>CHANNEL</b>	1	<b>DETECTOR FUNCTION</b>	Peak(PK)
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 70%RH, 1050 hPa	<b>TESTED BY</b>	Ansen Lei

EIRP SPURIOUS EMISSION LEVEL					
Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin	Remark
5149.80	V	-29.2	-27.0	-2.2	
10354.20	H	-48.3	-27.0	-21.3	
10358.00	V	-45.3	-27.0	-18.3	
15541.44	-	-	-	-	NOTE
20679.44	-	-	-	-	NOTE
25890.88	V	-58.6	-27.0	-31.6	
25937.68	H	-58.0	-27.0	-31.0	

**NOTE:**

1. Emission level = S.G level + Cable lose – Antenna Gain
2. The emissions appearing in the restricted Bands shall not exceed the general limits of 15.209.



<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>CHANNEL</b>	4	<b>DETECTOR FUNCTION</b>	Peak(PK)
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 70%RH, 1050 hPa	<b>TESTED BY</b>	Ansen Lei

#### EIRP SPURIOUS EMISSION LEVEL

Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin	Remark
5240.00	-	-	-	-	NOTE
10478.00	H	-48.0	-27.0	-21.0	
10478.60	V	-43.8	-27.0	-16.8	
15725.52	-	-	-	-	NOTE
20940.08	-	-	-	-	NOTE
26145.28	V	-59.2	-27.0	-32.2	
26162.08	H	-59.2	-27.0	-32.2	

**NOTE:**

1. Emission level = S.G level + Cable lose – Antenna Gain
2. The emissions appearing in the restricted Bands shall not exceed the general limits of 15.209.



<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>CHANNEL</b>	5	<b>DETECTOR FUNCTION</b>	Peak(PK)
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 70%RH, 1050 hPa	<b>TESTED BY</b>	Ansen Lei

#### EIRP SPURIOUS EMISSION LEVEL

Frequency (MHz)	Antenna Polarization	Level (dBm)	Limit (dBm)	Margin	Remark
5260.00	-	-	-	-	NOTE
10519.60	V	-37.4	-27.0	-10.4	
10522.80	H	-45.9	-27.0	-18.9	
15780.72	-	-	-	-	NOTE
21042.64	-	-	-	-	NOTE
26241.68	V	-59.4	-27.0	-32.4	
26248.16	H	-59.4	-27.0	-32.4	

**NOTE:**

1. Emission level = S.G level + Cable lose – Antenna Gain
2. The emissions appearing in the restricted Bands shall not exceed the general limits of 15.209.



<b>EUT</b>	Dual-Band Wireless Access Point	<b>MODEL</b>	WAP51AB
<b>CHANNEL</b>	8	<b>DETECTOR FUNCTION</b>	Peak(PK)
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>ENVIRONMENTAL CONDITIONS</b>	25 deg. C, 70%RH, 1050 hPa	<b>TESTED BY</b>	Ansen Lei

<b>EIRP SPURIOUS EMISSION LEVEL</b>					
<b>Frequency (MHz)</b>	<b>Antenna Polarization</b>	<b>Level (dBm)</b>	<b>Limit (dBm)</b>	<b>Margin</b>	<b>Remark</b>
5351.60	-	-	-	-	NOTE
10641.60	-	-	-	-	NOTE
15988.08	-	-	-	-	NOTE
21275.20	-	-	-	-	NOTE
26613.20	H	-59.6	-27.0	-32.6	
26613.20	V	-59.6	-27.0	-32.6	

**NOTE:**

1. Emission level = S.G level + Cable lose – Antenna Gain
2. The emissions appearing in the restricted Bands shall not exceed the general limits of 15.209.



## 5.7 FREQUENCY STABILITY

### 5.7.1 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.

### 5.7.2 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
ANRITSU SPECTRUM ANALYZER	MS2667C	M10281	Mar. 15, 2003
WIT STANDARD TEMPERATURE AND HUMIDITY CHAMBER	TH-4S-C	W901030	Jun. 24, 2003

**NOTE:**

The measurement uncertainty is less than +/- 2.6dB, which is calculated as per the NAMAS document NIS81.

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

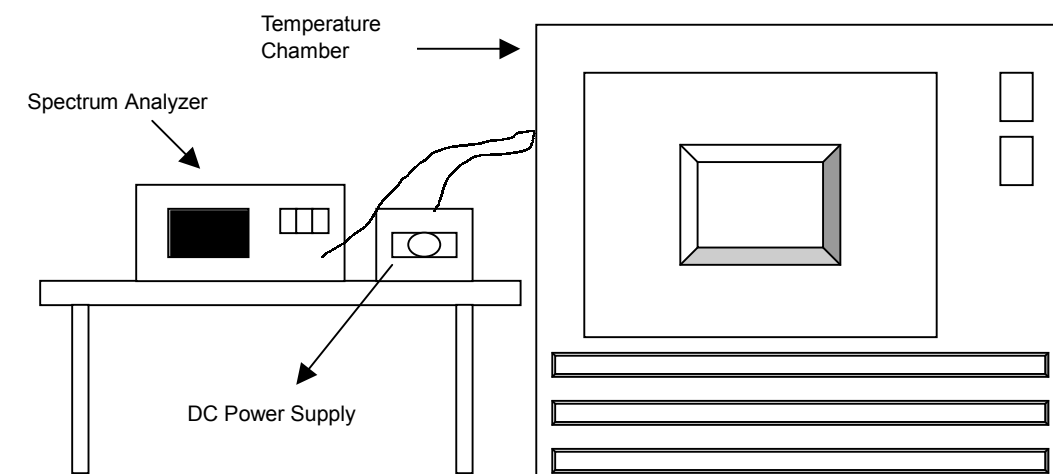
### 5.7.3 TEST PROCEDURE

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.

### 5.7.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.7.5 TEST SETUP



### 5.7.6 EUT OPERATING CONDITION

Same as Item 5.1.5



5.7.7 TEST RESULTS

Operating frequency: 5180MHz								Limit : ± 0.02%							
Temp. (°C)	Power supply (VDC)	2 minute		5 minute		10 minute									
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)								
50	127.5	5179.9978	0.000042	5179.9980	0.000039	5179.9978	0.000042								
	110.0	5179.9978	0.000042	5179.9979	0.000041	5179.9979	0.000041								
	93.5	5179.9979	0.000041	5179.9979	0.000041	5179.9980	0.000039								
40	127.5	5179.9825	0.000338	5179.9826	0.000336	5179.9825	0.000338								
	110.0	5179.9825	0.000338	5179.9827	0.000334	5179.9825	0.000338								
	93.5	5179.9825	0.000338	5179.9827	0.000334	5179.9825	0.000338								
30	127.5	5179.9775	0.000434	5179.9775	0.000434	5179.9775	0.000434								
	110.0	5179.9773	0.000438	5179.9774	0.000436	5179.9775	0.000434								
	93.5	5179.9772	0.000440	5179.9776	0.000432	5179.9774	0.000436								
20	127.5	5179.9791	0.000403	5179.9790	0.000405	5179.9790	0.000405								
	110.0	5179.9790	0.000405	5179.9790	0.000405	5179.9790	0.000405								
	93.5	5179.9789	0.000407	5179.9790	0.000405	5179.9790	0.000405								
10	127.5	5179.9853	0.000284	5179.9854	0.000282	5179.9852	0.000286								
	110.0	5179.9854	0.000282	5179.9854	0.000282	5179.9854	0.000282								
	93.5	5179.9852	0.000286	5179.9855	0.000280	5179.9854	0.000282								
0	127.5	5179.9918	0.000158	5179.9920	0.000154	5179.9919	0.000156								
	110.0	5179.9917	0.000160	5179.9918	0.000158	5179.9919	0.000156								
	93.5	5179.9920	0.000154	5179.9918	0.000158	5179.9920	0.000154								
-10	127.5	5179.9963	0.000071	5179.9964	0.000069	5179.9965	0.000068								
	110.0	5179.9964	0.000069	5179.9964	0.000069	5179.9964	0.000069								
	93.5	5179.9964	0.000069	5179.9964	0.000069	5179.9964	0.000069								
-20	127.5	5179.9961	0.000075	5179.9961	0.000075	5179.9960	0.000077								
	110.0	5179.9961	0.000075	5179.9962	0.000073	5179.9960	0.000077								
	93.5	5179.9961	0.000075	5179.9961	0.000075	5179.9960	0.000077								
-30	127.5	5179.9990	0.000020	5179.9990	0.000020	5179.9989	0.000022								
	110.0	5179.9901	0.000191	5179.9990	0.000020	5179.9989	0.000022								
	93.5	5179.9990	0.000020	5179.9990	0.000020	5179.9990	0.000020								



## 5.8 BAND EDGES MEASUREMENT

### 5.8.1 TEST INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
SPECTRUM ANALYZER	FSEK30	100049	July 24, 2003

#### NOTE:

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

### 5.8.2 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose 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.

### 5.8.3 EUT OPERATING CONDITION

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

### 5.8.4 TEST RESULTS

For signals in the restricted bands above and below the 5.15 to 5.35 GHz 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.

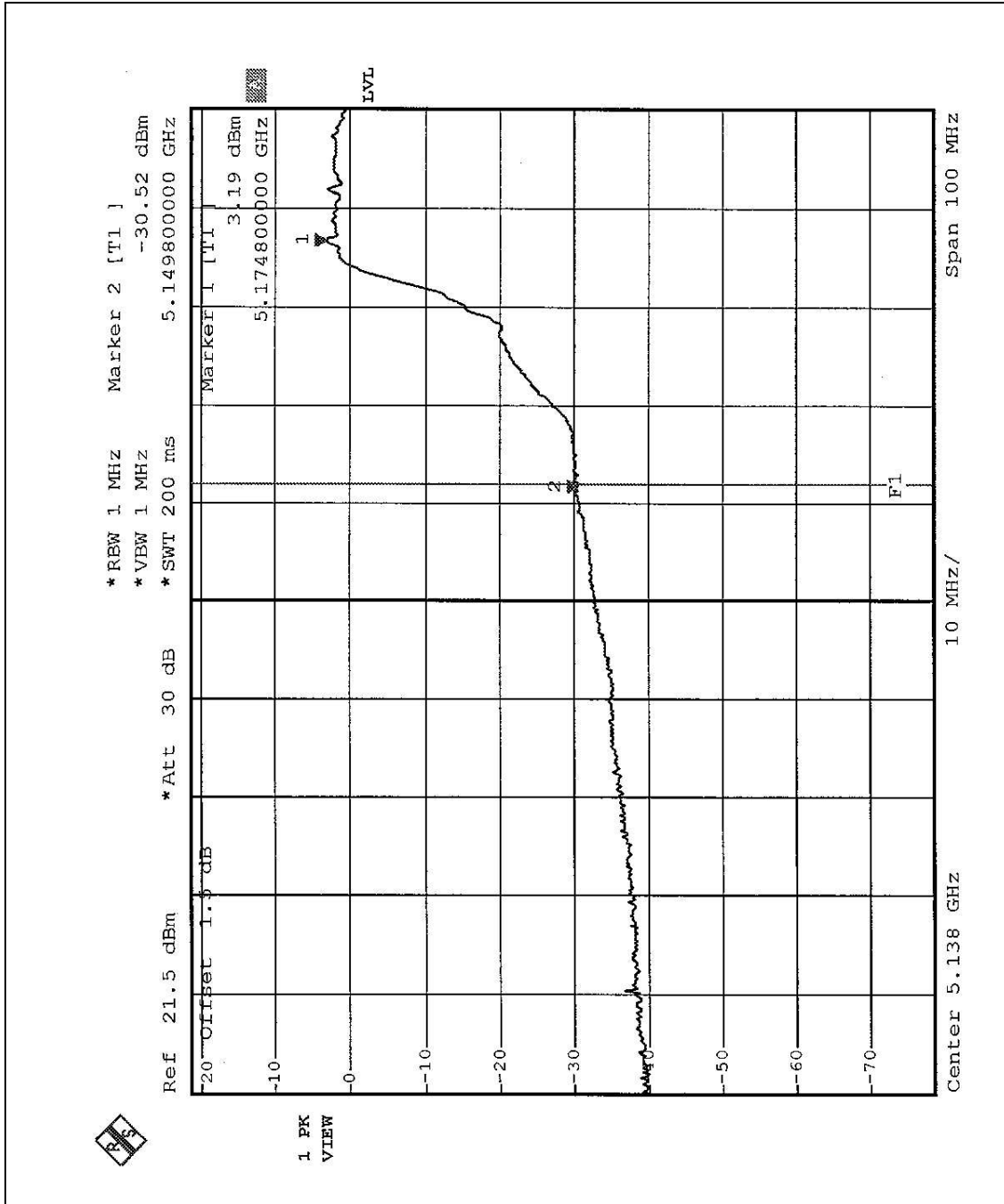
The spectrum plots (Peak RBW=VBW=1MHz; Average RBW=1MHz, VBW=300Hz) are attached on the following 8 pages.

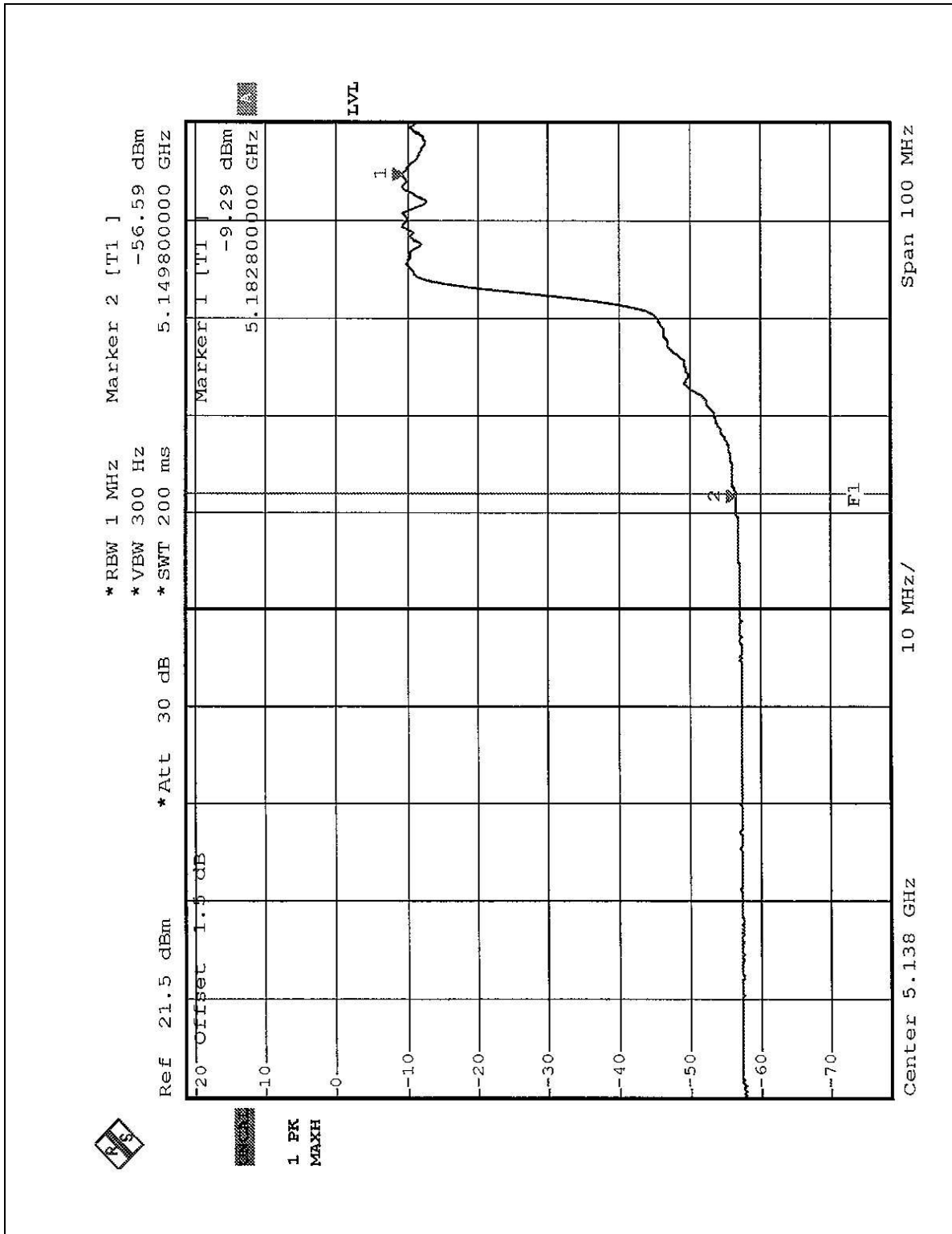




Channel 1 (5180 MHz)

The band edge emission plot on the following 2 pages shows 33.71dBc (Peak) / 47.3dBc (Average) 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 80.7dBuV/m, so the maximum field strength in restrict band is  $80.7 - 47.3 = 33.4$  dBuV/m which is under 54 dBuV/m limit.

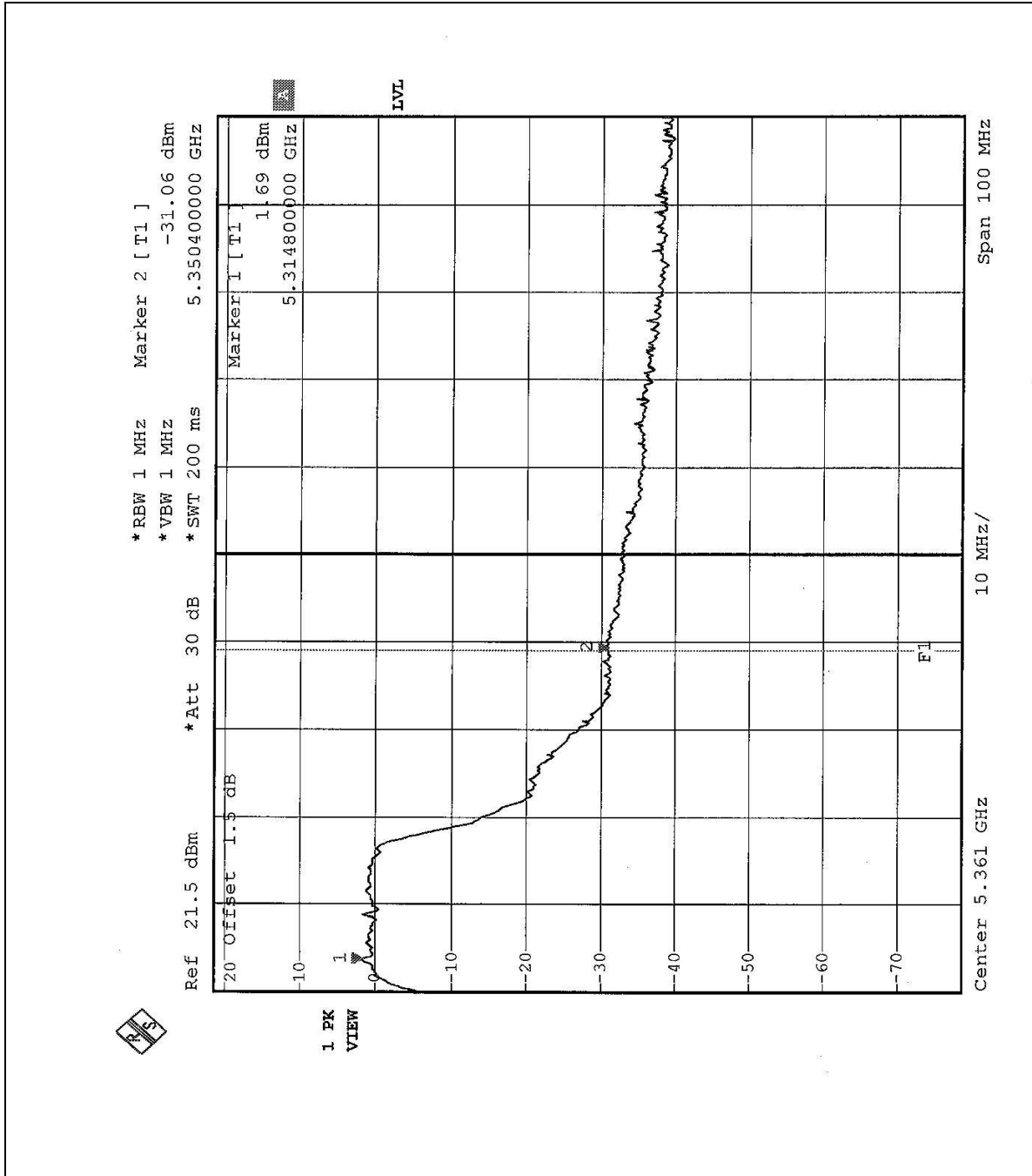


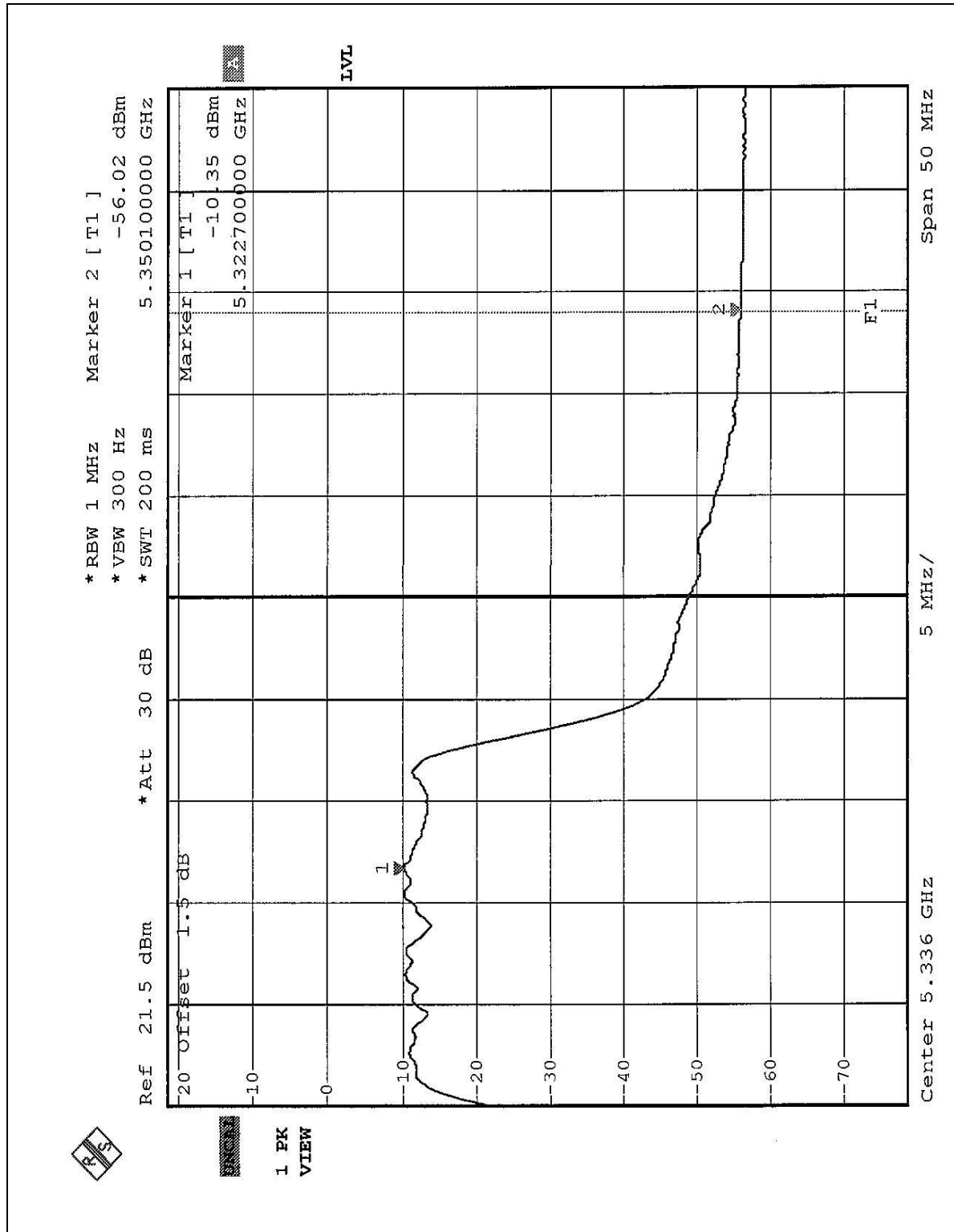




Channel 8 (5320 MHz)

The band edge emission plot on the following 2 pages shows 32.75dBc (Peak) / 45.67dBc (Average) 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 80.2dBuV/m, so the maximum field strength in restrict band is  $80.2 - 45.67 = 34.53$  dBuV/m which is under 54 dBuV/m limit.







## **5.9 ANTENNA REQUIREMENT**

### **5.9.1 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.

### **5.9.2 ANTENNA CONNECTED CONSTRUCTION**

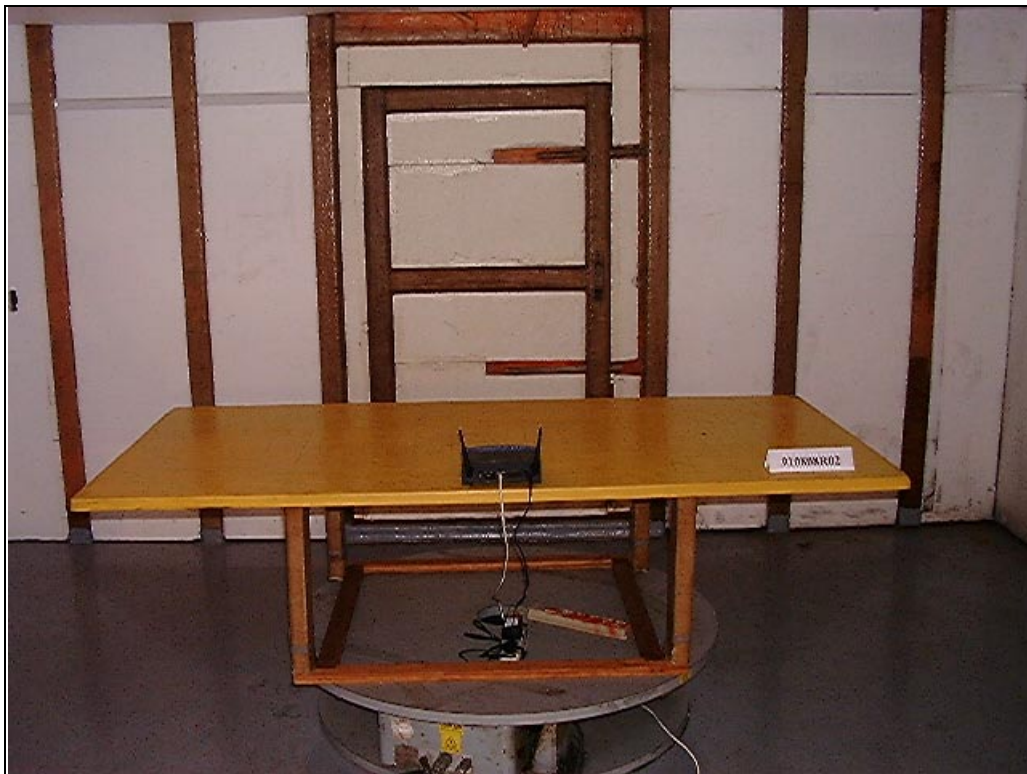
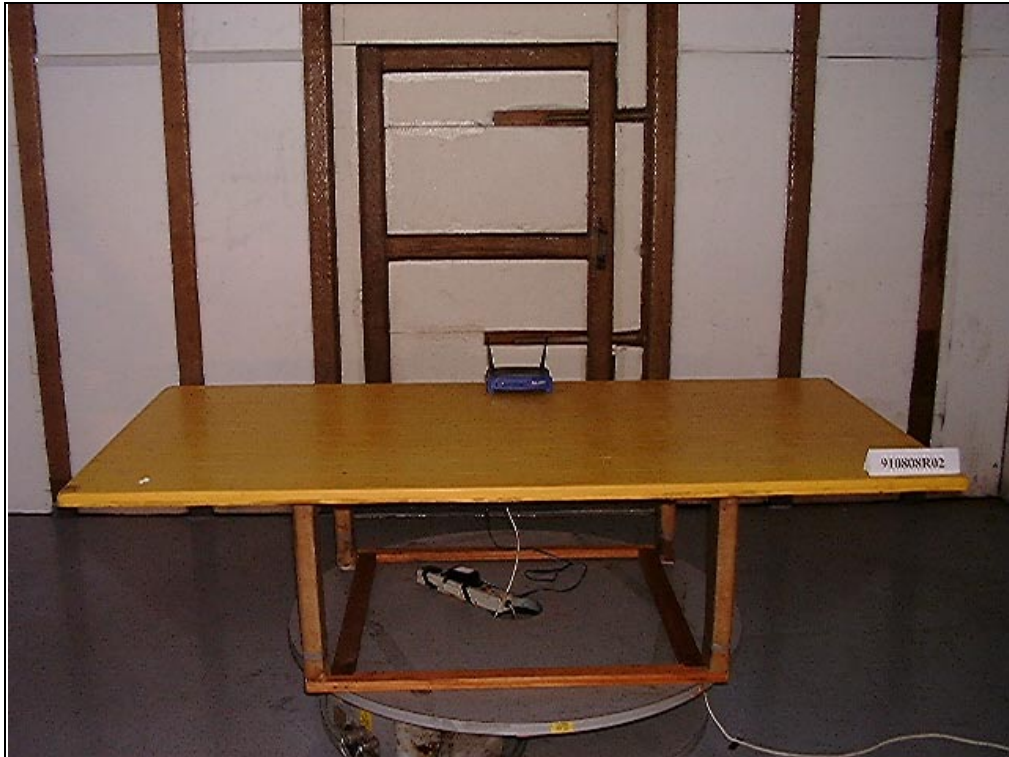
The antenna used in this product is Dipole Antenna without antenna connector. The maximum Gain of the antenna is 1dBi only.

## 6 PHOTOGRAPHS OF THE TEST CONFIGURATION CONDUCTED EMISSION TEST





### RADIATED EMISSION TEST





## 7 INFORMATION ON THE TESTING LABORATORIES

We, ADT Corp., were founded in 1988 to provide our best service in EMC and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025, Guide 25 or EN 45001:

<b>USA</b>	FCC, NVLAP, UL
<b>Germany</b>	TUV Rheinland
<b>Japan</b>	VCCI
<b>New Zealand</b>	MoC
<b>Norway</b>	NEMKO
<b>R.O.C.</b>	BSMI, DGT, CNLA

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:

**Lin Kou EMC Lab:**

Tel: 886-2-26052180

Fax: 886-2-26052943

**Hsin Chu EMC Lab:**

Tel: 886-35-935343

Fax: 886-35-935342

**Lin Kou Safety Lab:**

Tel: 886-2-26093195

Fax: 886-2-26093184

**Lin Kou RF&Telecom Lab**

Tel: 886-3-3270910

Fax: 886-3-3270892

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

**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)

The address and road map of all our labs can be found in our web site also.