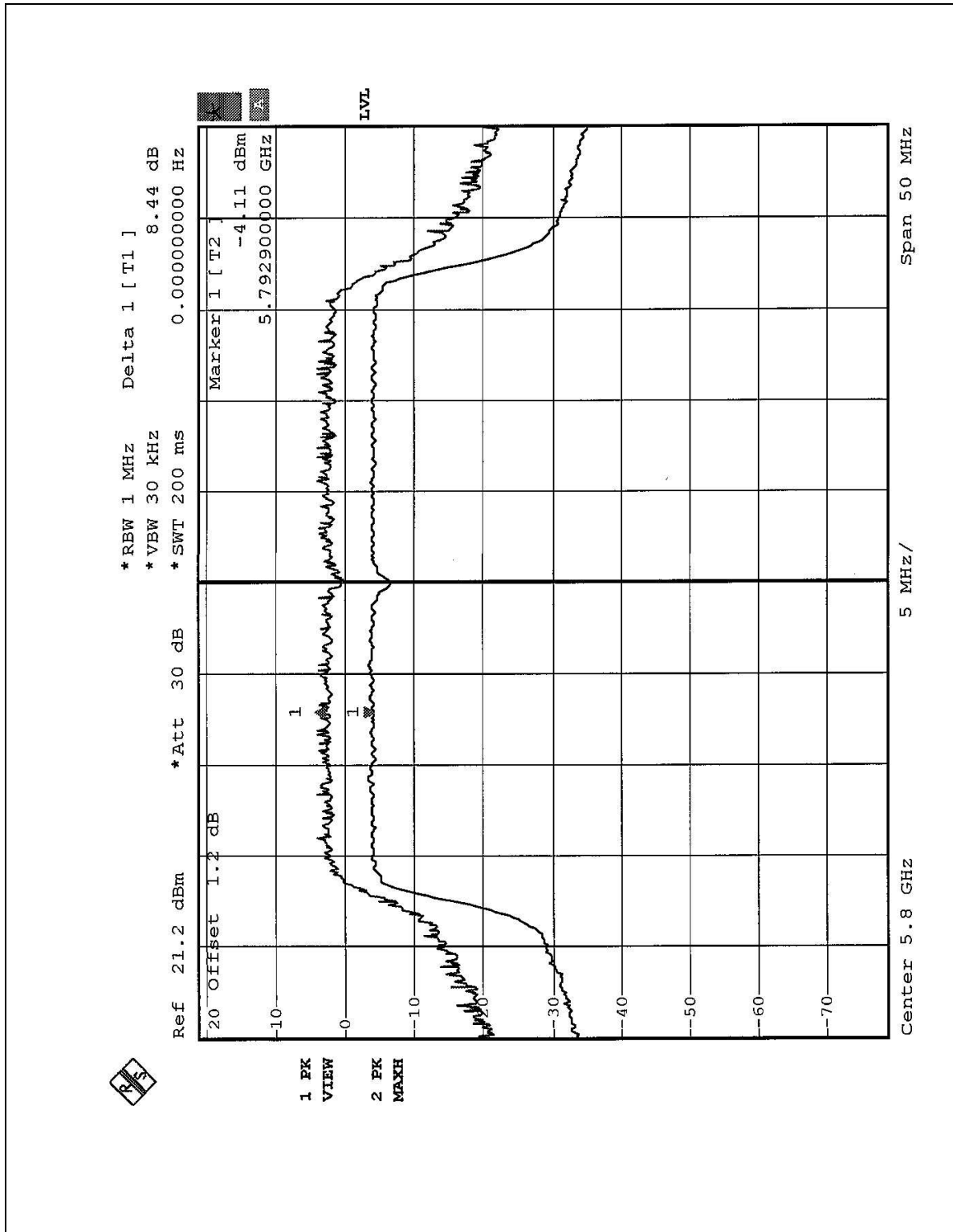


CHANNEL 5



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.

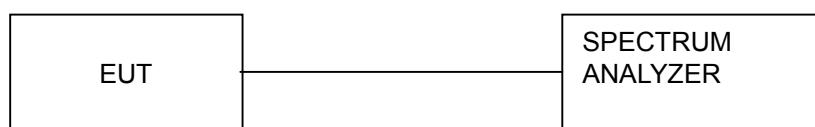
5.5.3 TEST PROCEDURES

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

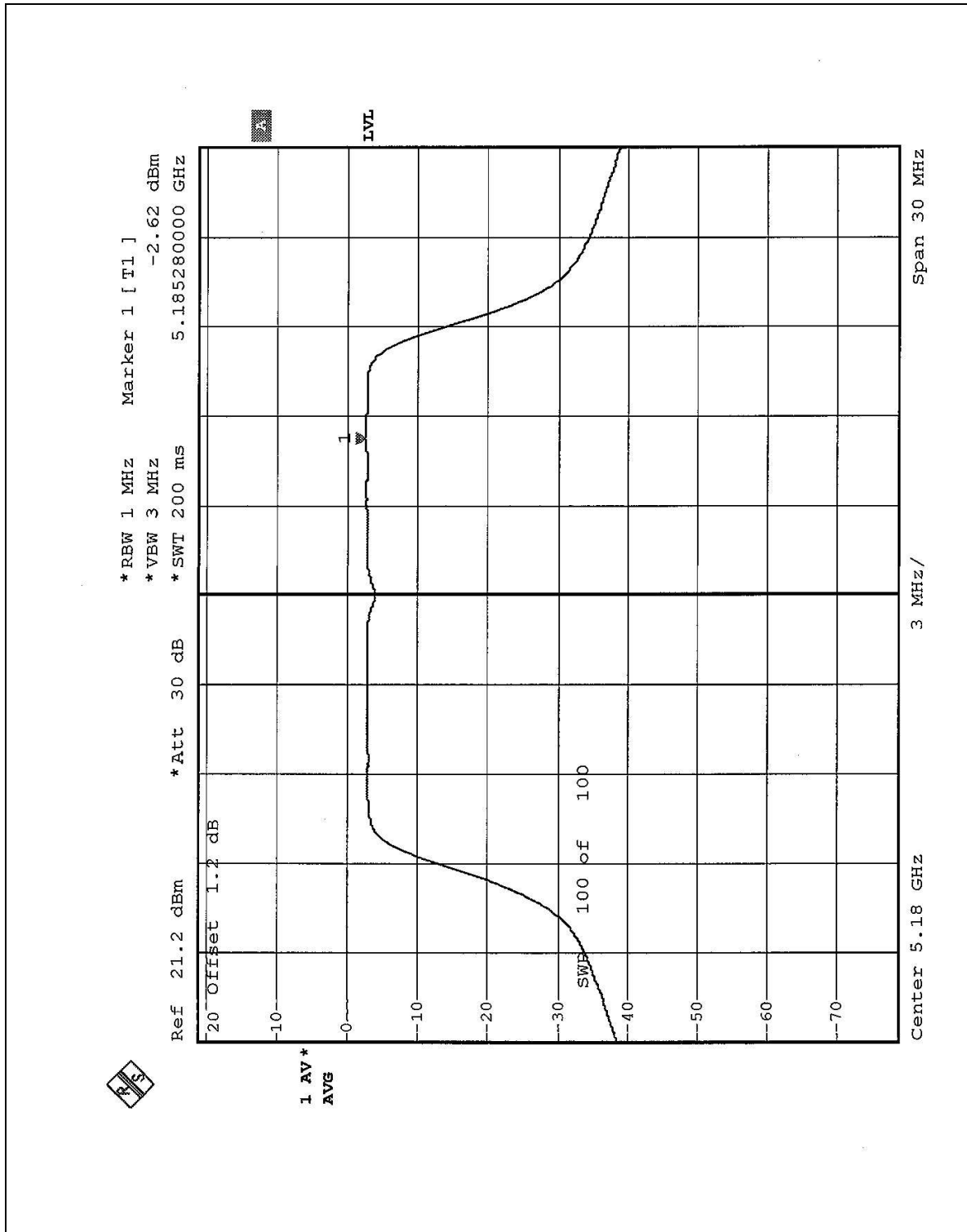
Same as 5.3.6

5.5.7 TEST RESULTS

EUT	WLAN a+b combo mini-PCI	MODEL	VM4-3B
MODE	Normal	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	30 deg. C, 55%RH, 1005 hPa	TESTED BY	Steven Lu

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1 MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5180	-2.62	4	PASS
4	5240	-2.55	4	PASS
5	5260	-2.78	11	PASS
8	5320	-2.16	11	PASS
9	5745	-3.87	17	PASS
12	5805	-2.16	17	PASS

CHANNEL 1



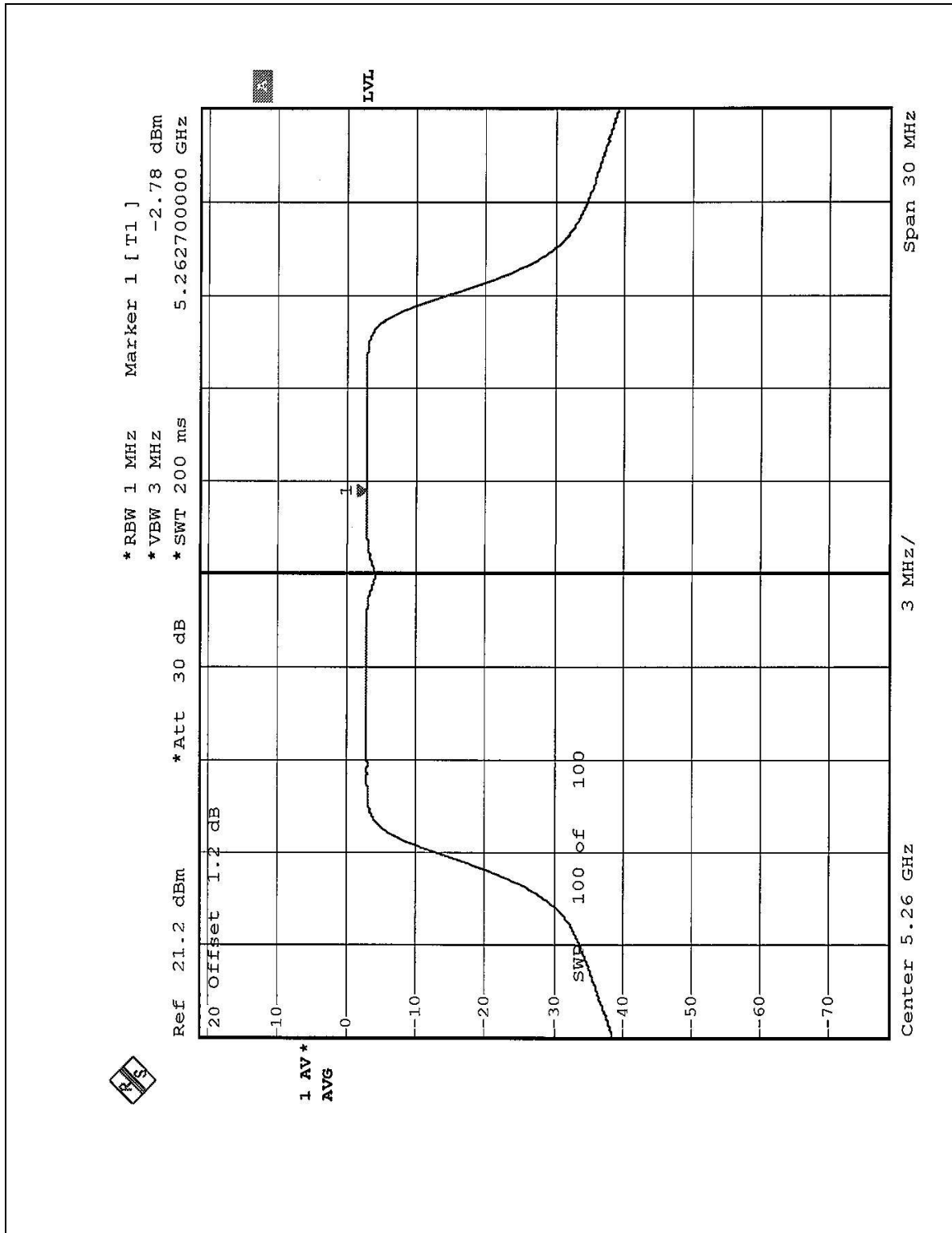
1 AV *
AVG

Ref 21.2 dBm *Att 30 dB *RBW 1 MHz Marker 1 [T1] -2.55 dBm
 Offset 1.2 dB *VBW 3 MHz *SWT 200 ms 5.244560000 GHz

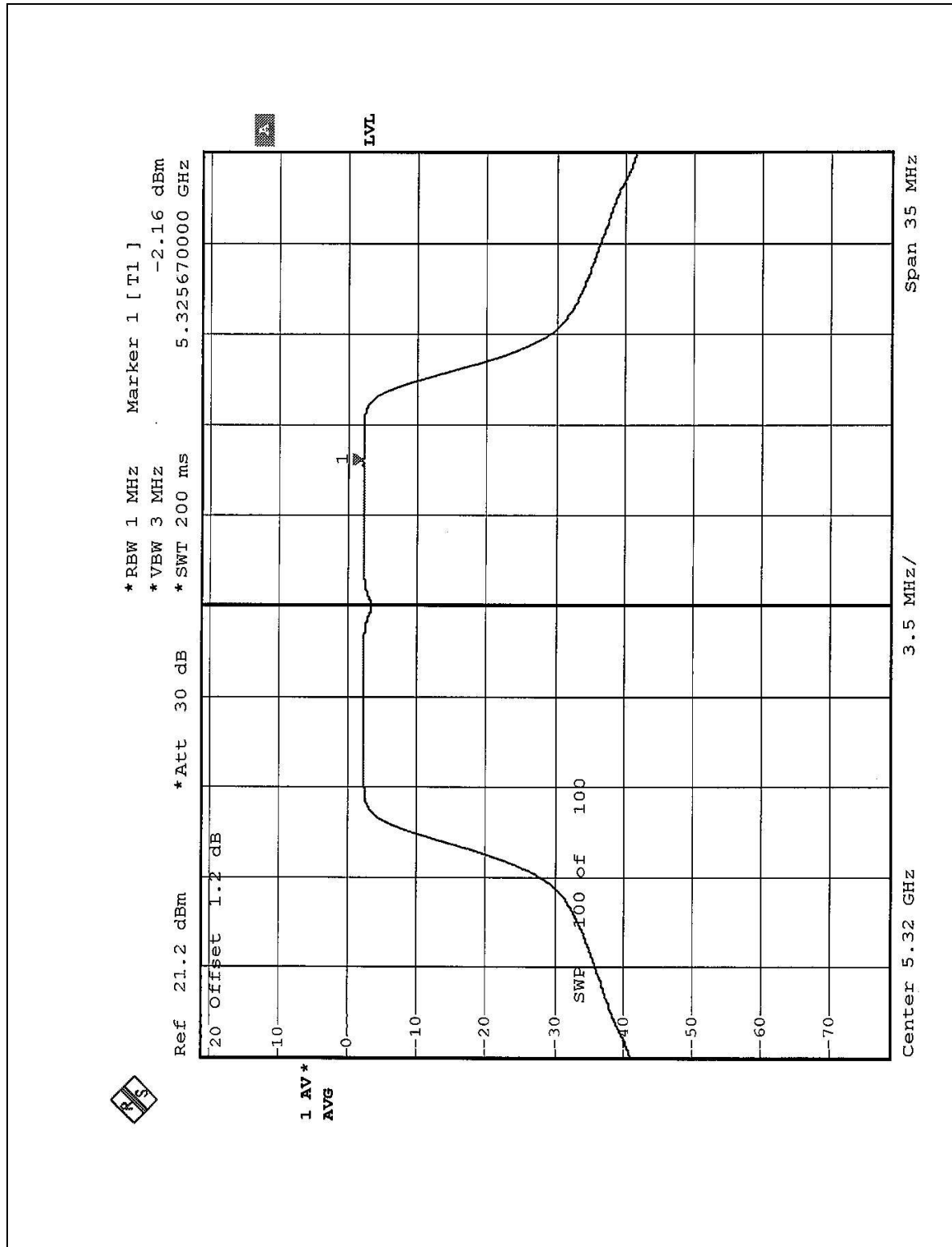
SWR 100 of 100

Center 5.24 GHz Span 30 MHz

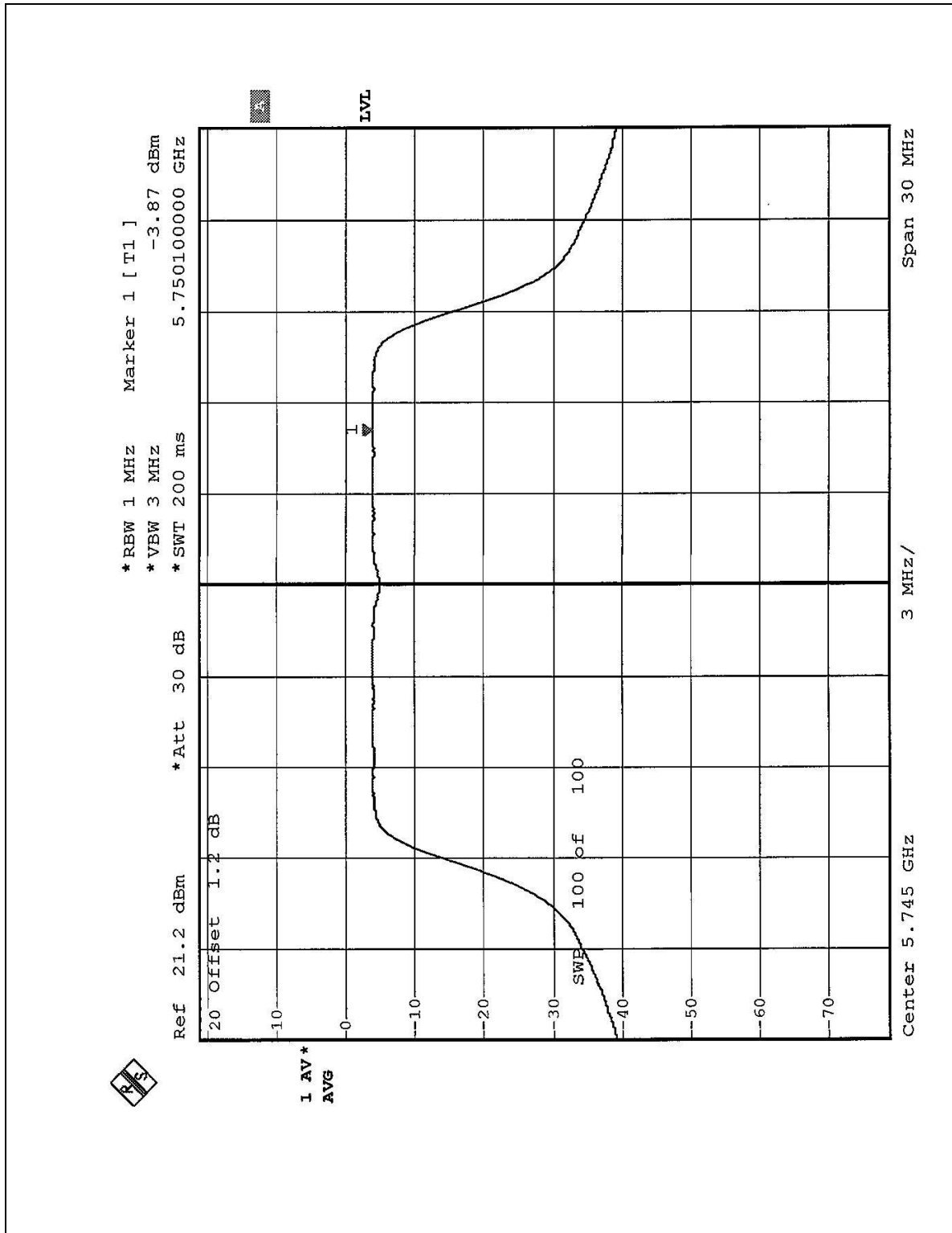
CHANNEL 5



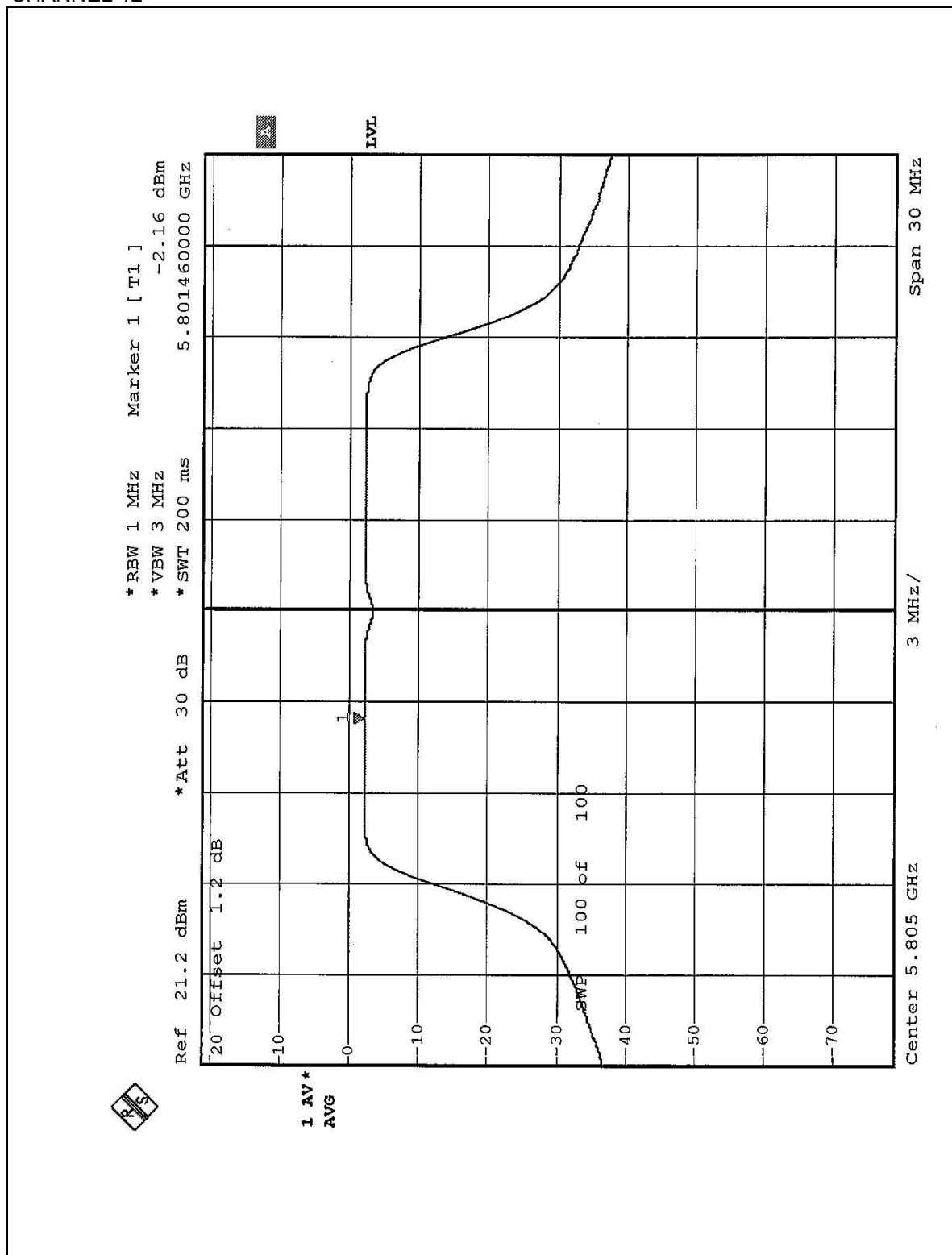
CHANNEL 8



CHANNEL 9



CHANNEL 12

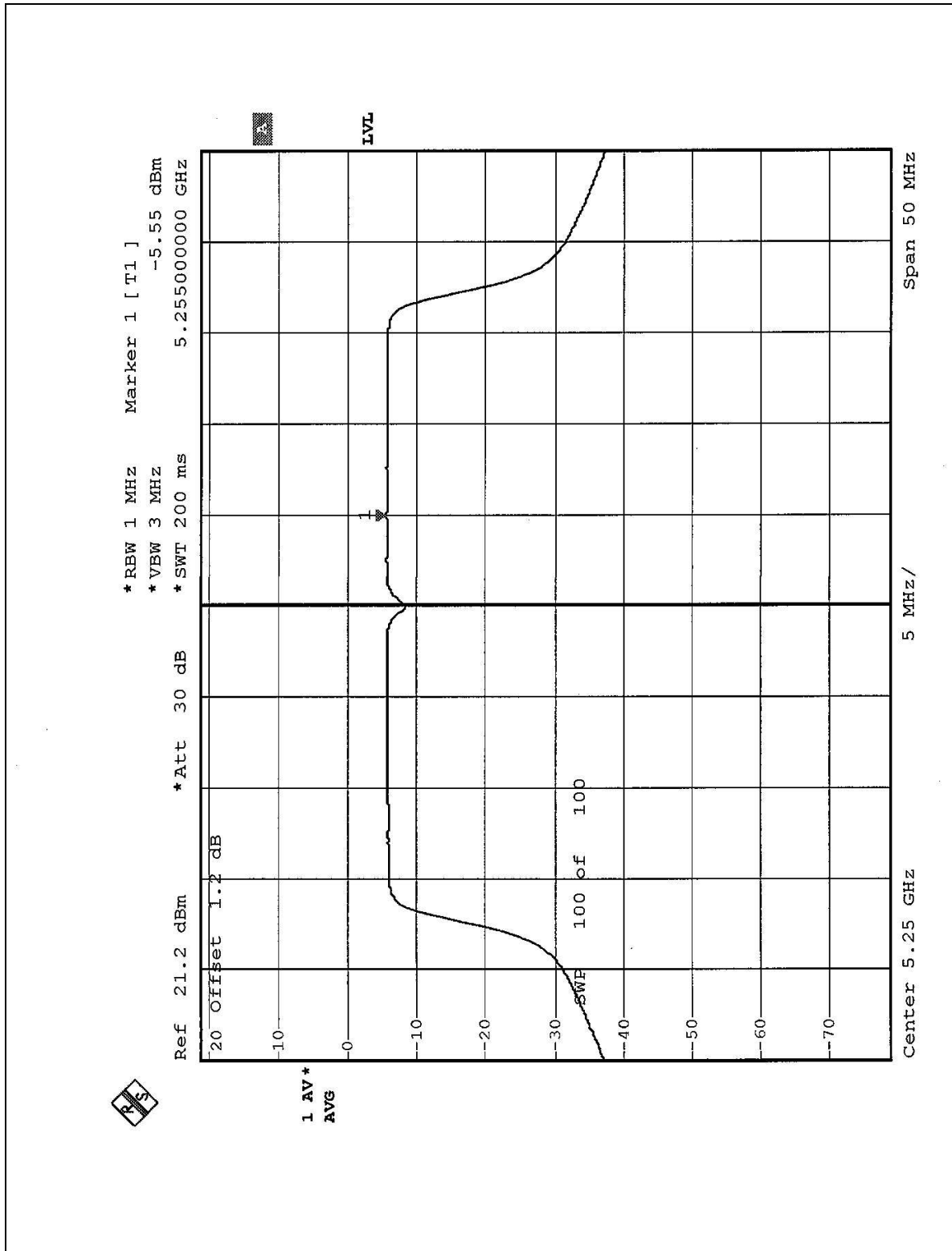




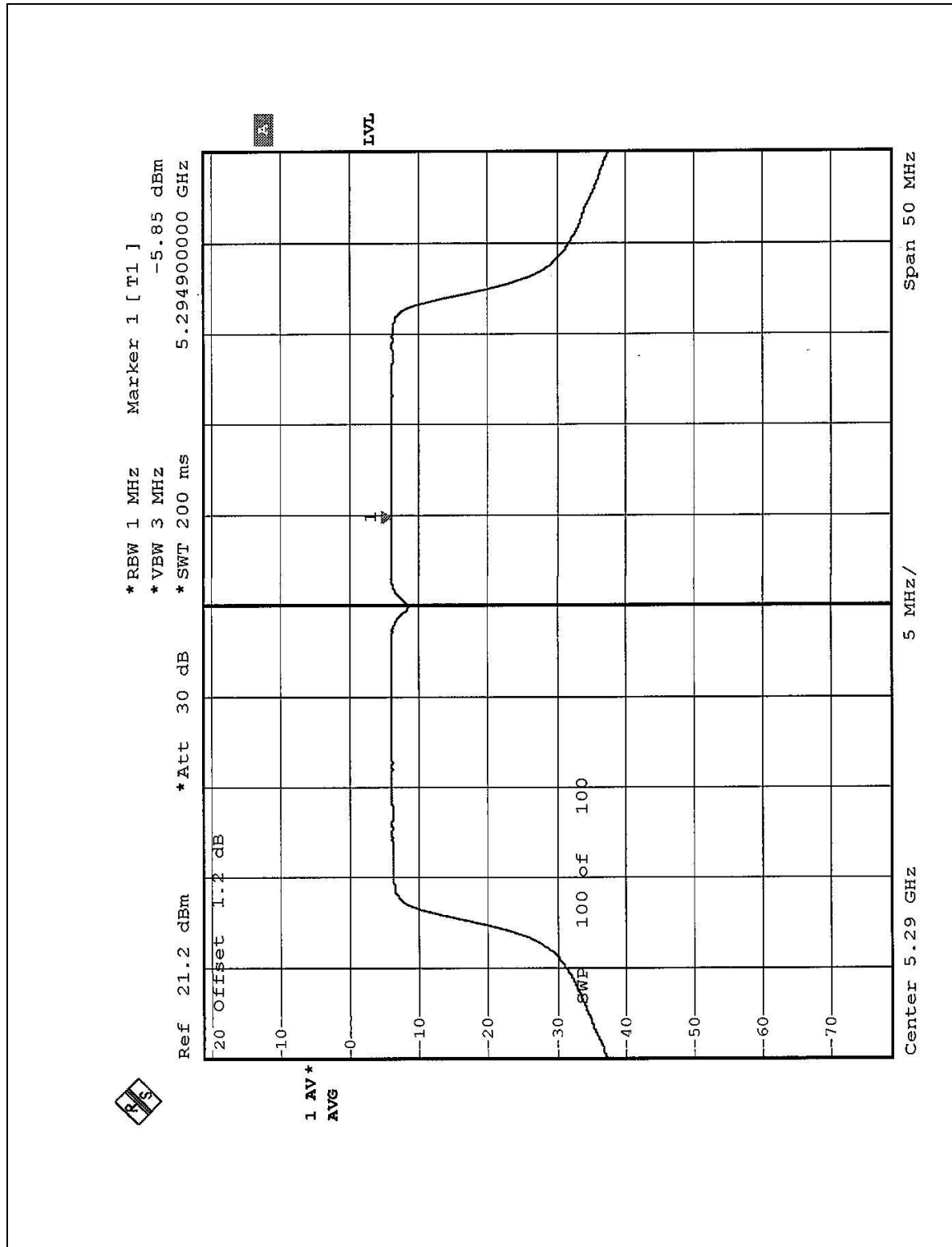
EUT	WLAN a+b combo mini-PCI	MODEL	VM4-3B
MODE	Turbo	INPUT POWER (SYSTEM)	120Vac, 60 Hz
ENVIRONMENTAL CONDITIONS	30 deg. C, 55%RH, 1005 hPa	TESTED BY	Steven Lu

CHANNEL NUMBER	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1 MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5210	-5.20	4	PASS
2	5250	-5.55	4	PASS
3	5290	-5.85	11	PASS
4	5760	-6.20	17	PASS
5	5800	-4.98	17	PASS

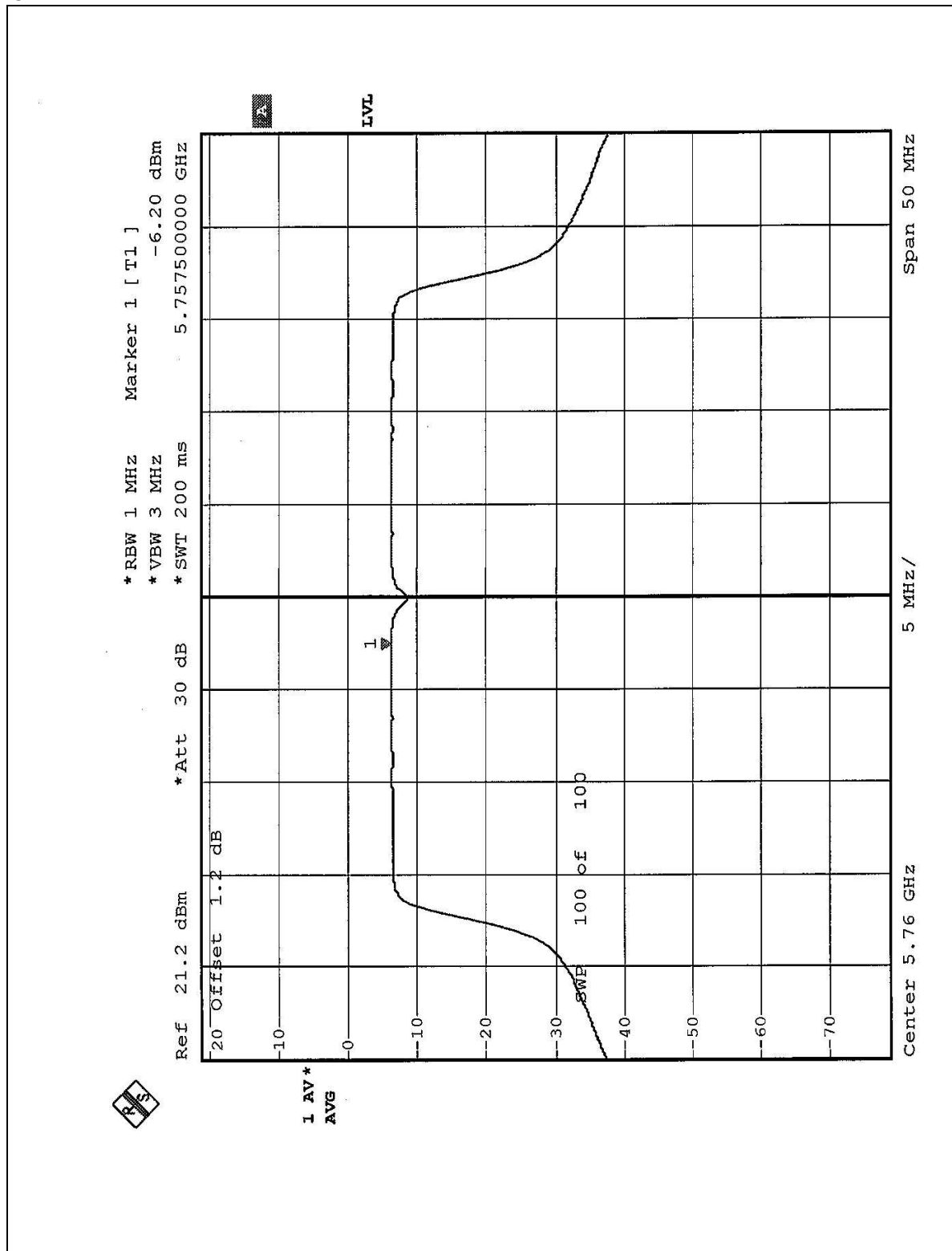
CHANNEL 2



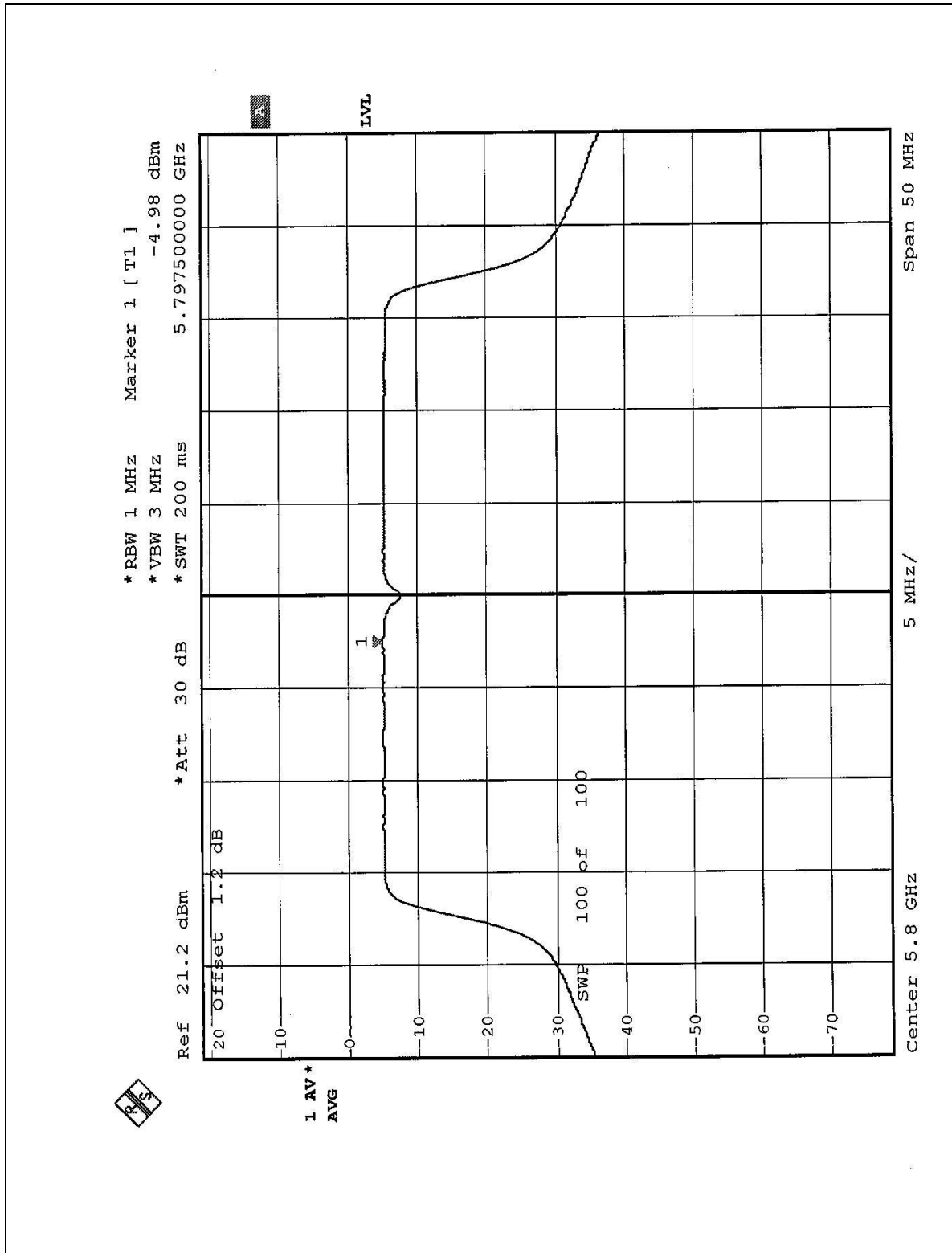
CHANNEL 3



CHANNEL 4



CHANNEL 5



5.6 FREQUENCY STABILITY

5.6.1 LIMITS OF FREQUENCY STABILITY MEASUREMENT

The frequency tolerance of the carrier signal shall be maintained within $\pm 0.02\%$ 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.

5.6.2 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 $\pm 2.6\text{dB}$, 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.

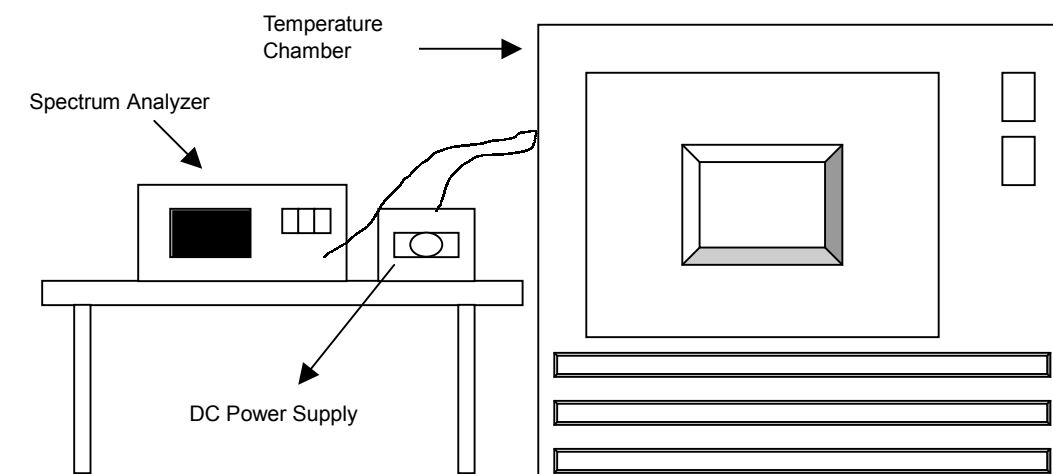
5.6.3 TEST PROCEDURE

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.

5.6.4 DEVIATION FROM TEST STANDARD

No deviation

5.6.5 TEST SETUP



5.6.6 EUT OPERATING CONDITION

Same as Item 5.1.6

5.6.7 TEST RESULTS

Operating frequency: 5180MHz				Limit : $\pm 0.02\%$			
Temp. (°C)	Power supply (VDC)	2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	126.5	5179.9758	-0.0004672	5179.9762	-0.0004595	5179.9760	-0.0004633
	110.0	5179.9756	-0.0004710	5179.9766	-0.0004517	5179.9758	-0.0004672
	93.5	5179.9758	-0.0004672	5179.9762	-0.0004595	5179.9760	-0.0004633
40	126.5	5179.9672	-0.0006332	5179.9682	-0.0006139	5179.9680	-0.0006178
	110.0	5179.9680	-0.0006178	5179.9676	-0.0006255	5179.9682	-0.0006139
	93.5	5179.9678	-0.0006216	5179.9680	-0.0006178	5179.9674	-0.0006293
30	126.5	5179.9654	-0.0006680	5179.9658	-0.0006602	5179.9658	-0.0006602
	110.0	5179.9660	-0.0006564	5179.9660	-0.0006564	5179.9660	-0.0006564
	93.5	5179.9654	-0.0006680	5179.9656	-0.0006641	5179.9658	-0.0006602
20	126.5	5179.9848	-0.0002934	5179.9852	-0.0002857	5179.9850	-0.0002896
	110.0	5179.9842	-0.0003050	5179.9850	-0.0002896	5179.9844	-0.0003012
	93.5	5179.9846	-0.0002973	5179.9852	-0.0002857	5179.9844	-0.0003012
10	126.5	5179.9964	-0.0000695	5179.9968	-0.0000618	5179.9962	-0.0000734
	110.0	5179.9956	-0.0000849	5179.9962	-0.0000734	5179.9960	-0.0000772
	93.5	5179.9964	-0.0000695	5179.9972	-0.0000541	5179.9962	-0.0000734
0	126.5	5180.0094	0.0001815	5180.0098	0.0001892	5180.0104	0.0002008
	110.0	5180.0090	0.0001737	5180.0096	0.0001853	5180.0104	0.0002008
	93.5	5180.0096	0.0001853	5180.0096	0.0001853	5180.0104	0.0002008
-10	126.5	5180.0260	0.0005019	5180.0300	0.0005792	5180.0302	0.0005830
	110.0	5180.0260	0.0005019	5180.0268	0.0005174	5180.0302	0.0005830
	93.5	5180.0264	0.0005097	5180.0264	0.0005097	5180.0308	0.0005946
-20	126.5	5180.0354	0.0006834	5180.0352	0.0006795	5180.0358	0.0006911
	110.0	5180.0350	0.0006757	5180.0350	0.0006757	5180.0354	0.0006834
	93.5	5180.0350	0.0006757	5180.0352	0.0006795	5180.0354	0.0006834
-30	126.5	5180.0358	0.0006911	5180.0358	0.0006911	5180.0358	0.0006911
	110.0	5180.0362	0.0006988	5180.0362	0.0006988	5180.0362	0.0006988
	93.5	5180.0060	0.0001158	5180.0364	0.0007027	5180.0364	0.0007027

5.7 BAND EDGES MEASUREMENT

5.7.1 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.

5.7.2 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.

5.7.3 EUT OPERATING CONDITION

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

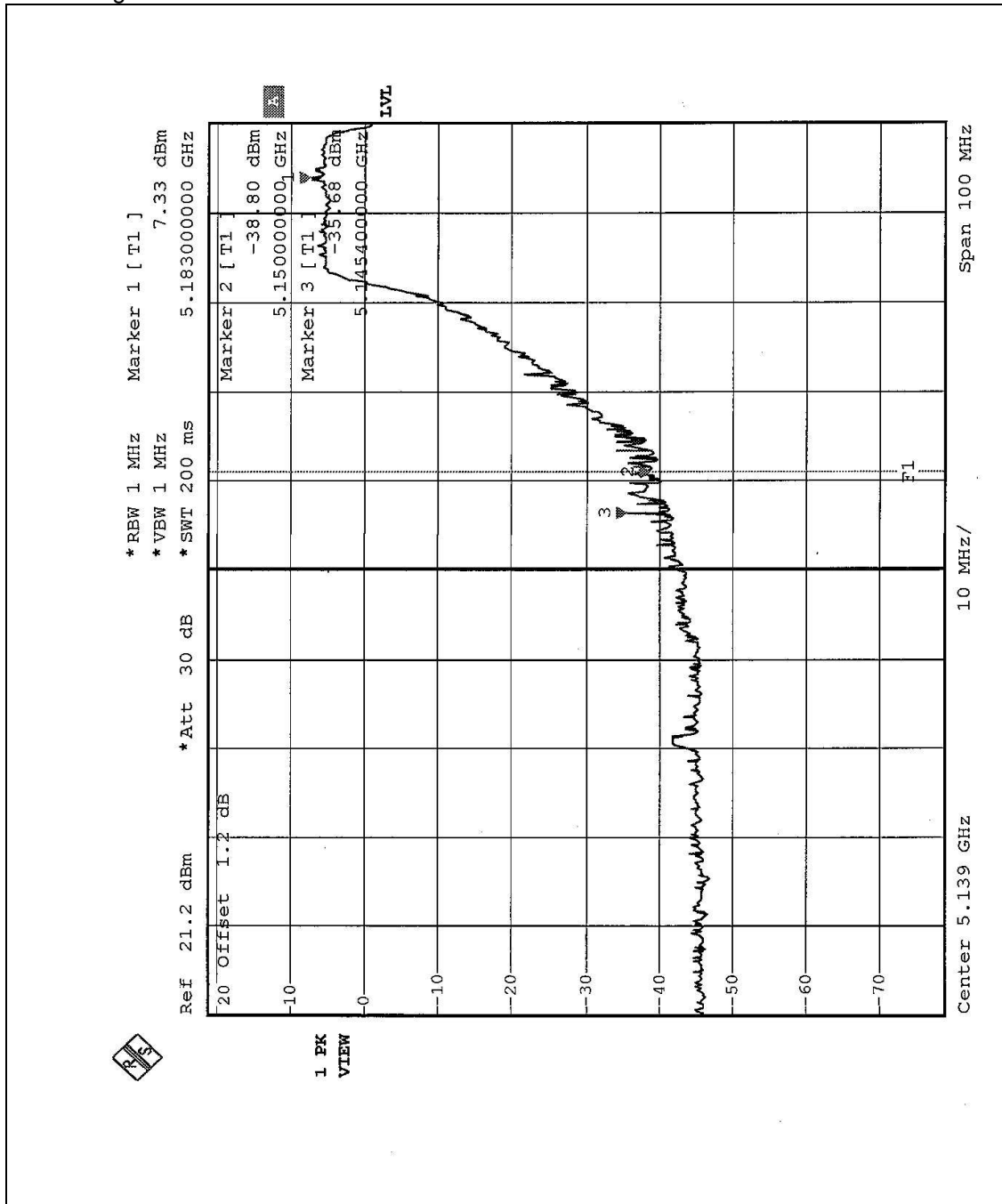
5.7.4 TEST RESULTS

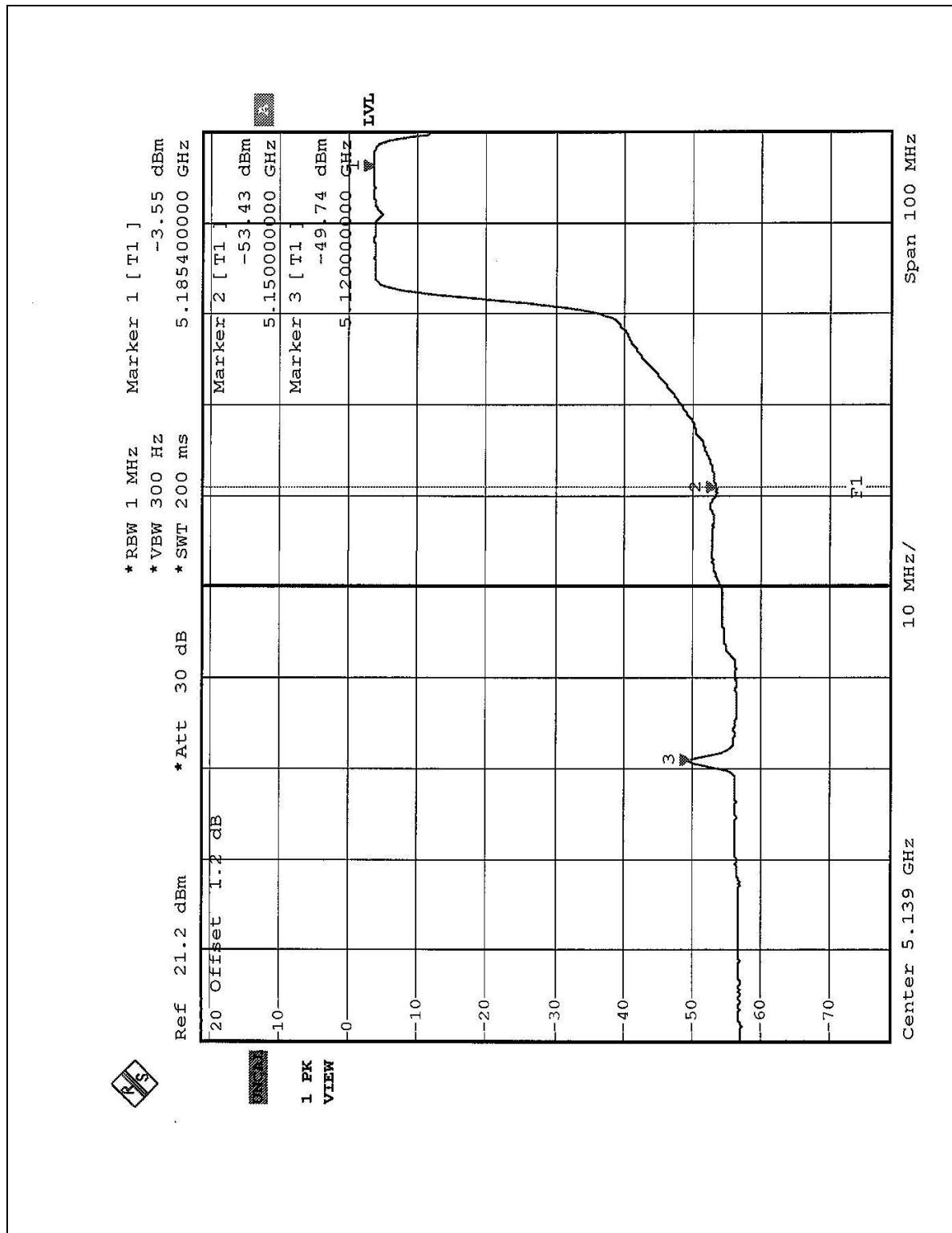
For signals in the restricted bands above and below the 5.15 to 5.35 GHz allocated band a measurement was made of the amplitude of the spurious emissions with respect to the intentional signals. The relative amplitude, in dBc, was applied to the average and peak filed strength of the intentional signal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

Normal Mode: Channel 1 (5180 MHz)

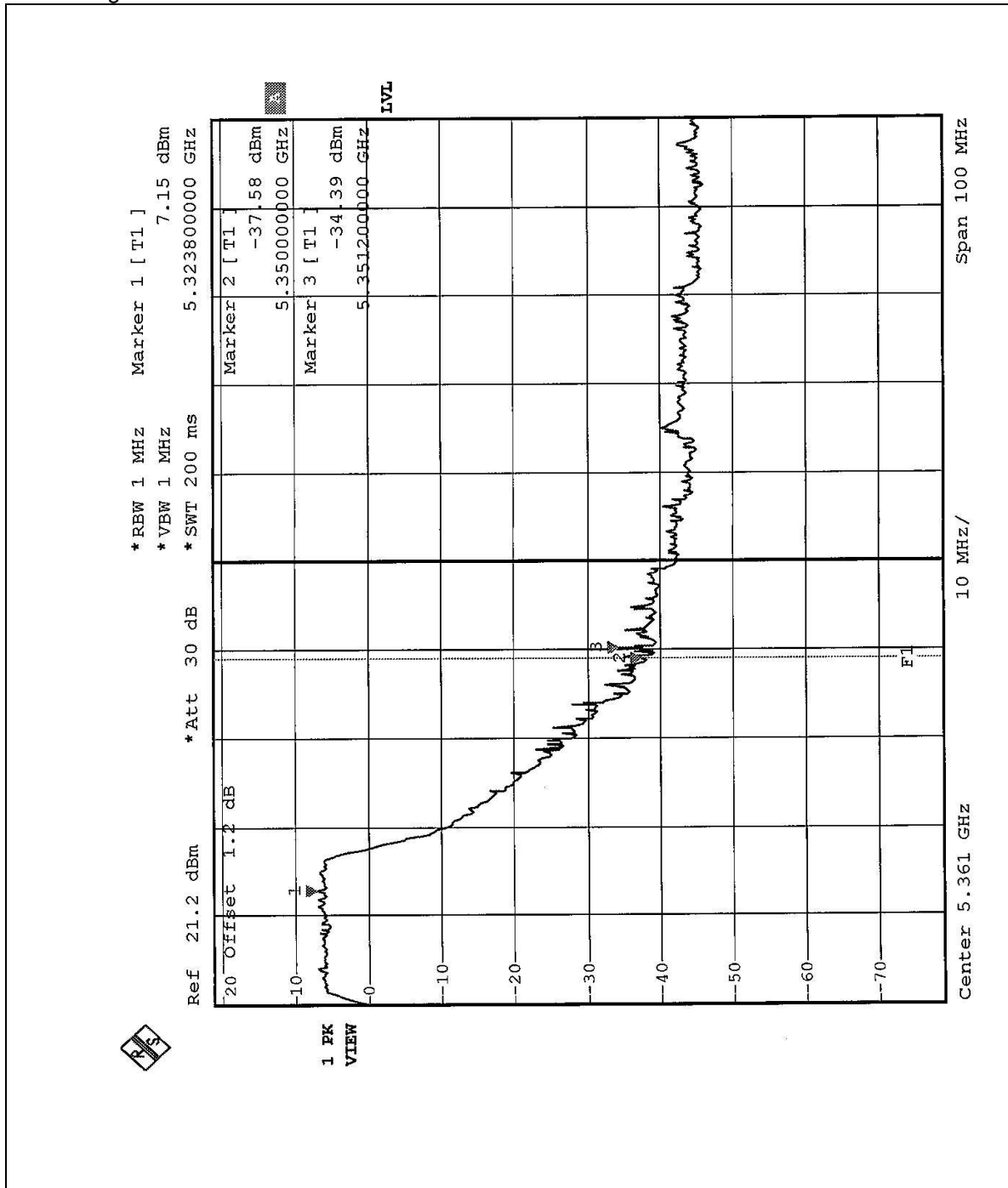
The band edge emission plot on the following 2 pages shows 43.01dBc (Peak) / 46.19dBc (Average) between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 (normal mode) is 88.7dBuV/m, so the maximum field strength in restrict band is $88.7 - 46.19 = 42.51$ dBuV/m which is under 54 dBuV/m limit.

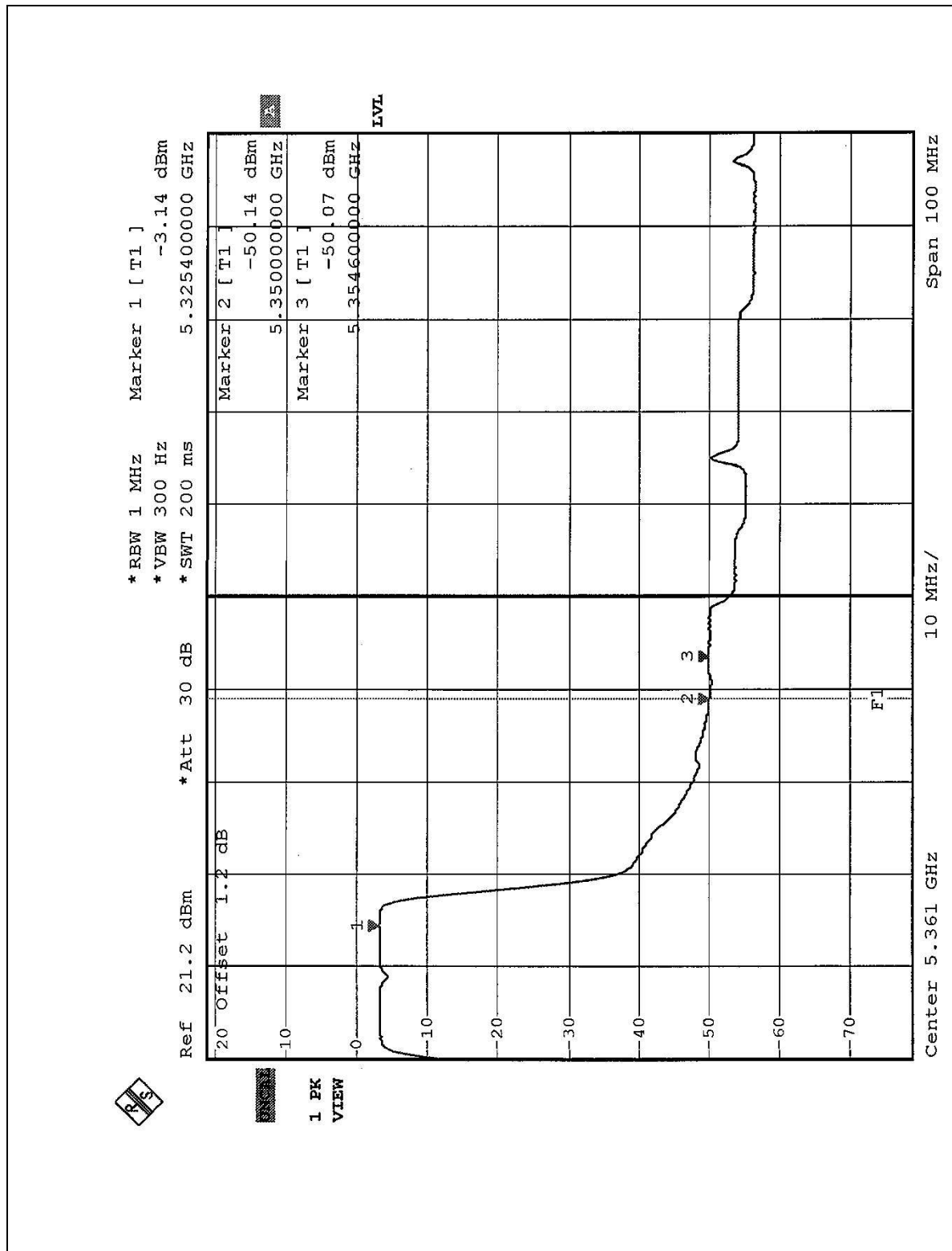




Normal Mode: Channel 8 (5320 MHz)

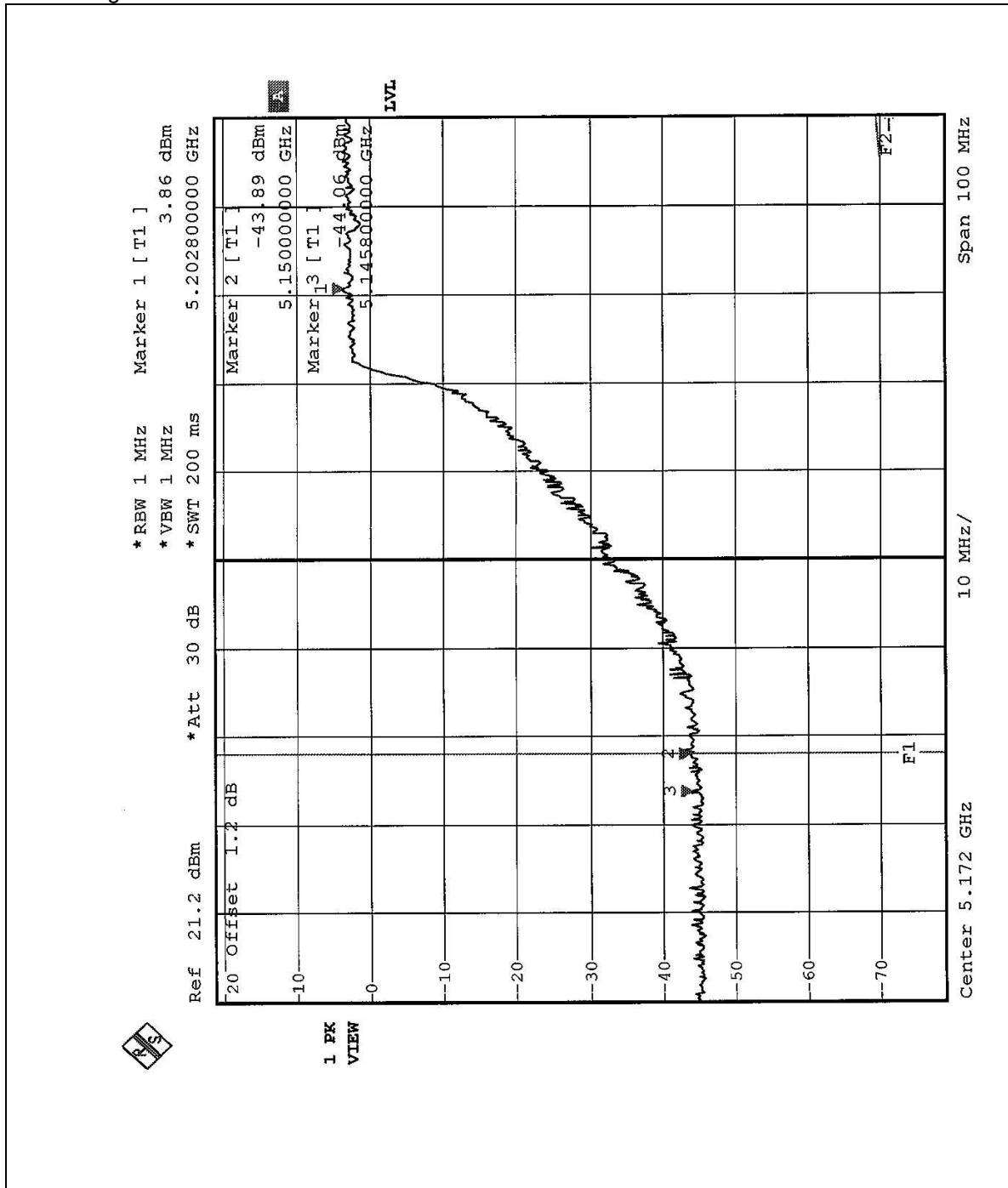
The band edge emission plot on the following 2 pages shows 41.54dBc (Peak) / 46.93dBc (Average) between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 8 (normal mode) is 83.6dBuV/m, so the maximum field strength in restrict band is $83.6 - 46.93 = 36.67$ dBuV/m which is under 54 dBuV/m limit.

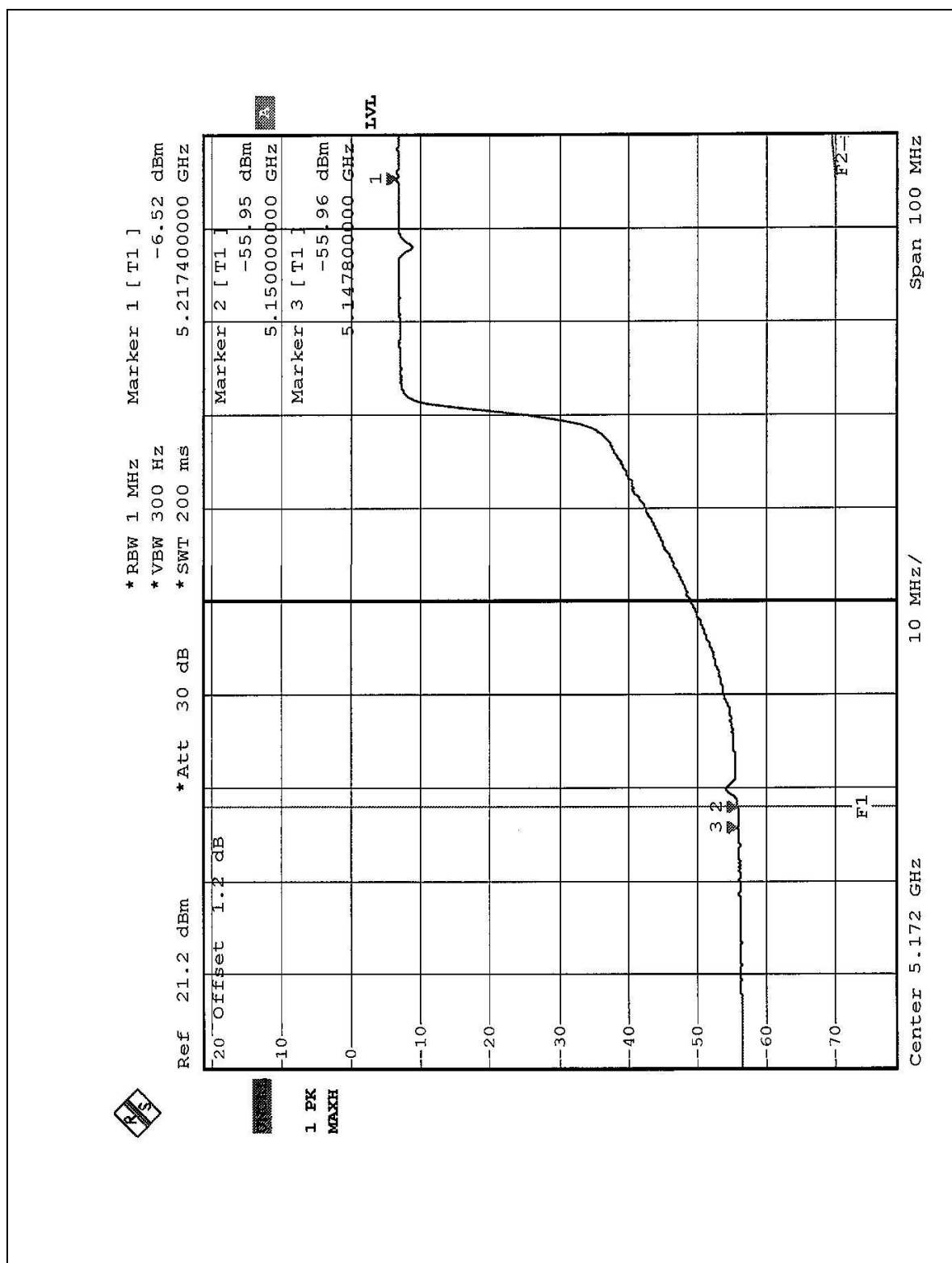




Turbo Mode: Channel 1 (5210 MHz)

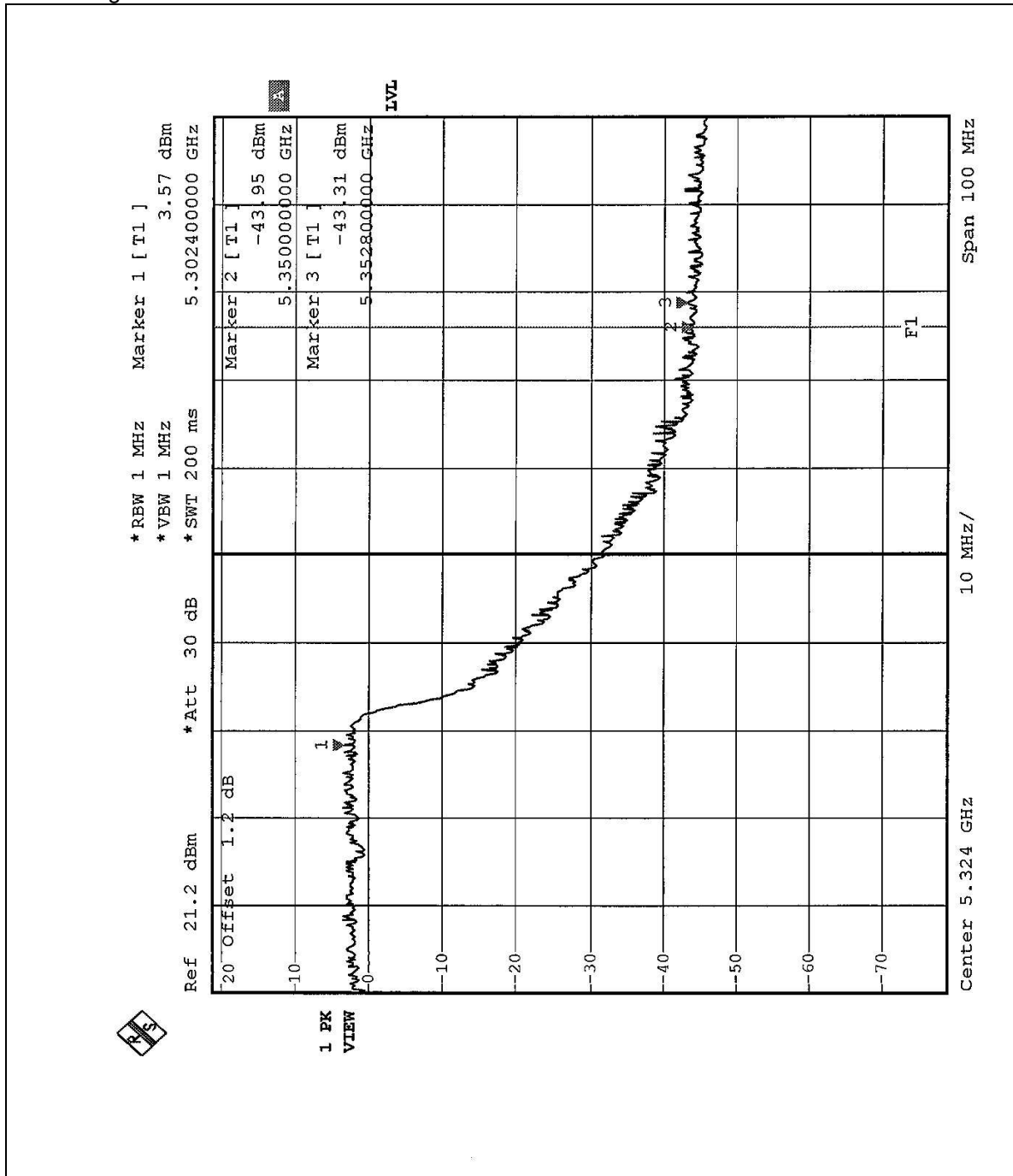
The band edge emission plot on the following 2 pages shows 47.92dBc (Peak) / 49.44dBc (Average) between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 (normal mode) is 89.2dBuV/m, so the maximum field strength in restrict band is $89.2 - 49.44 = 39.76$ dBuV/m which is under 54 dBuV/m limit.

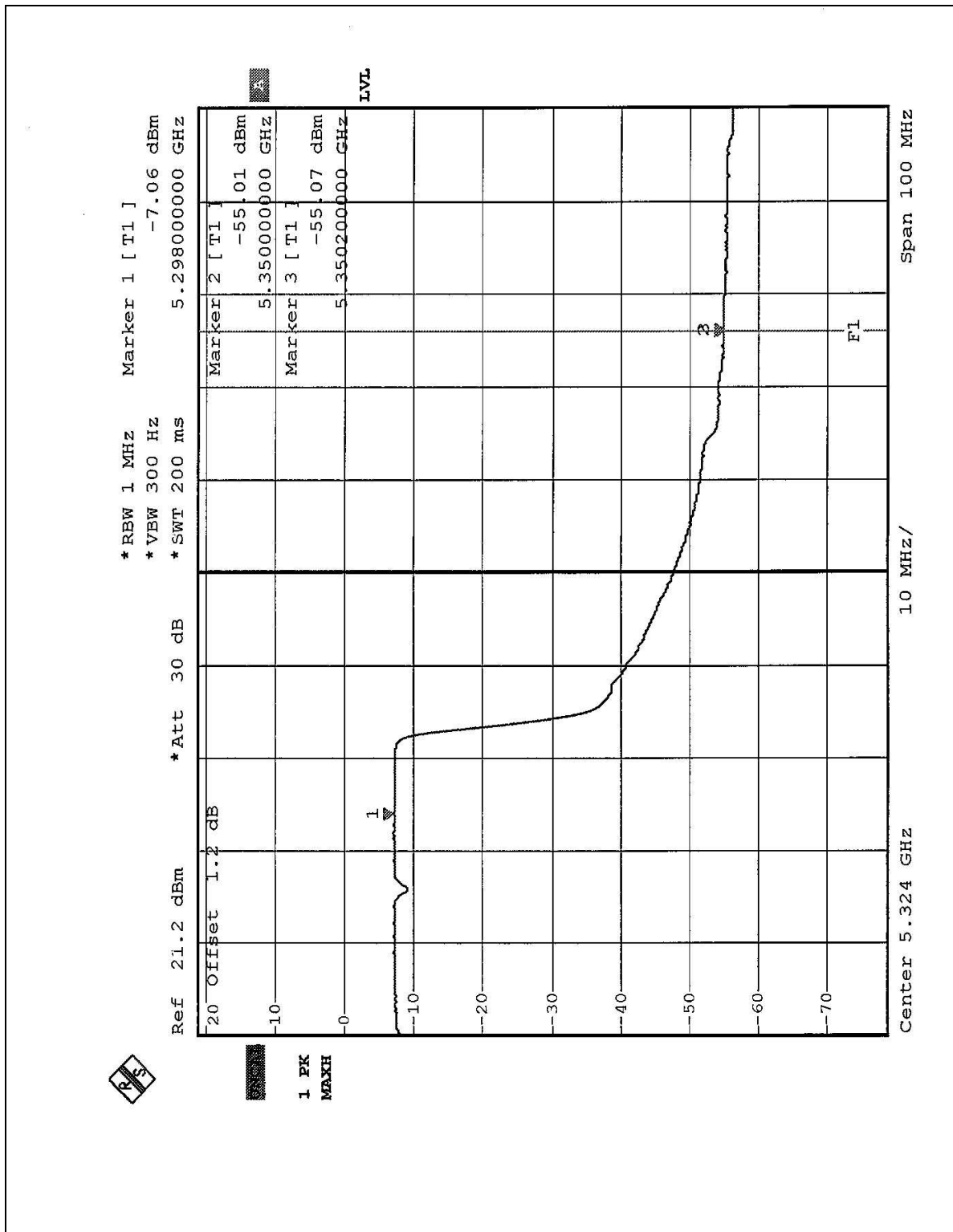




Turbo Mode: Channel 3 (5290 MHz)

The band edge emission plot on the following 2 pages shows 46.88dBc (Peak) / 48.01dBc (Average) between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 3 (normal mode) is 84.0dBuV/m, so the maximum field strength in restrict band is $84.0 - 48.01 = 35.99$ dBuV/m which is under 54 dBuV/m limit.







5.8 ANTENNA REQUIREMENT

5.8.1 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.

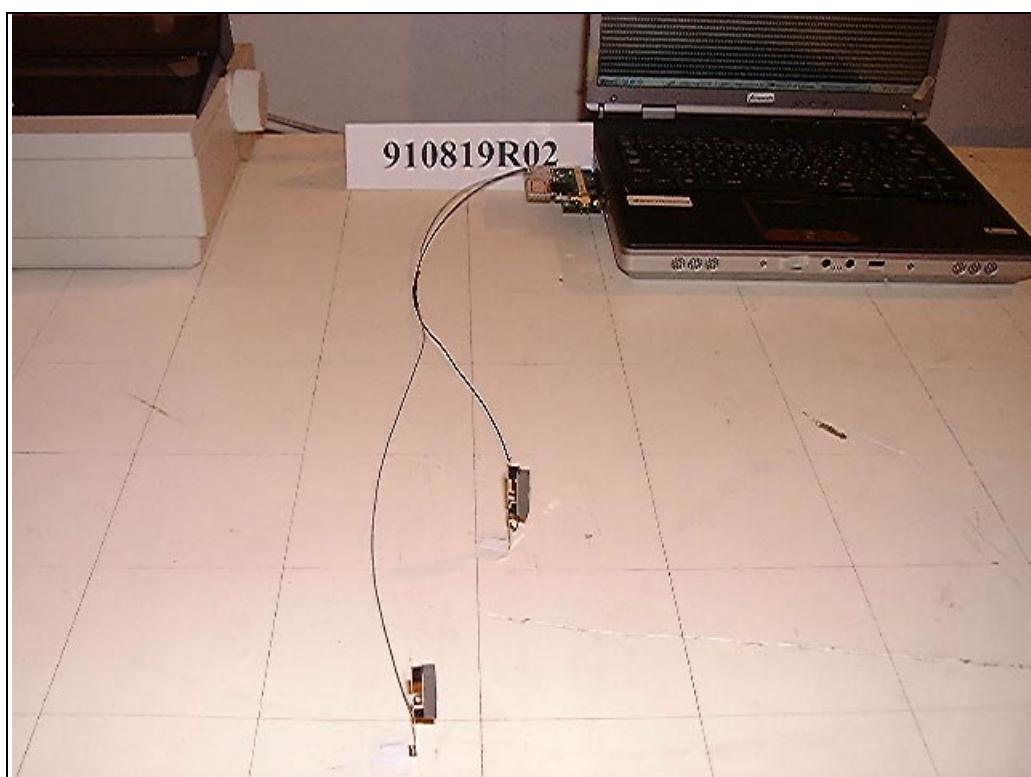
5.8.2 ANTENNA CONNECTED CONSTRUCTION

The antenna used in this product is PIFA Antenna with UFL antenna connector. The maximum Gain of the antenna is 2.7dBi only.

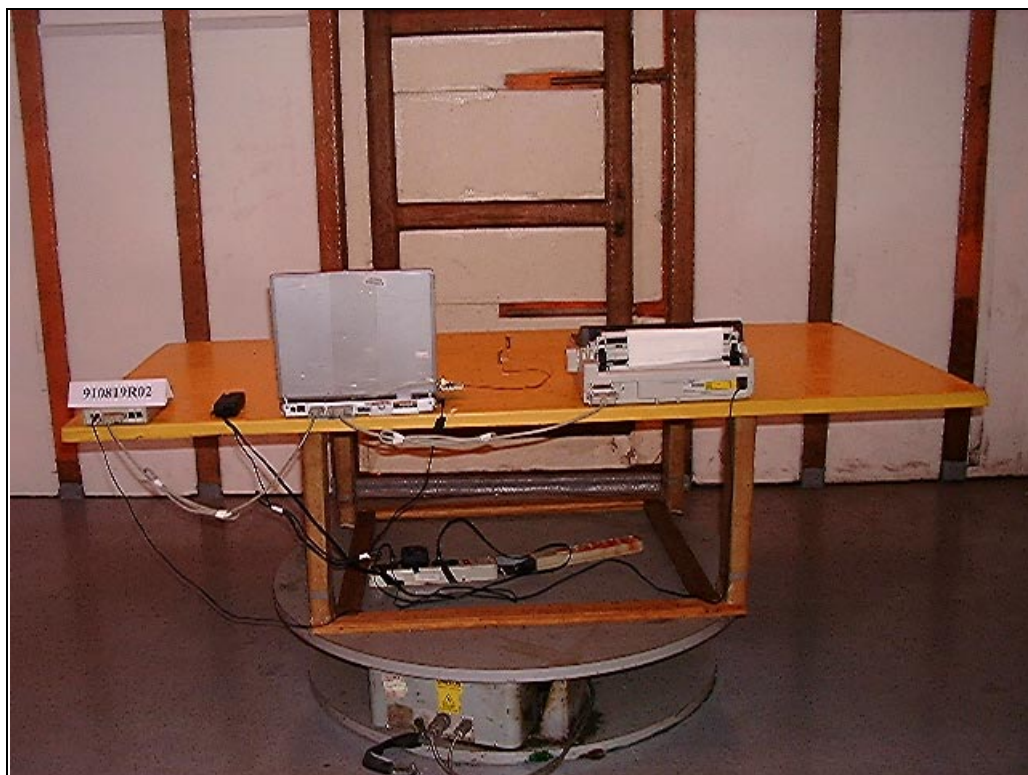
6 PHOTOGRAPHS OF THE TEST CONFIGURATION

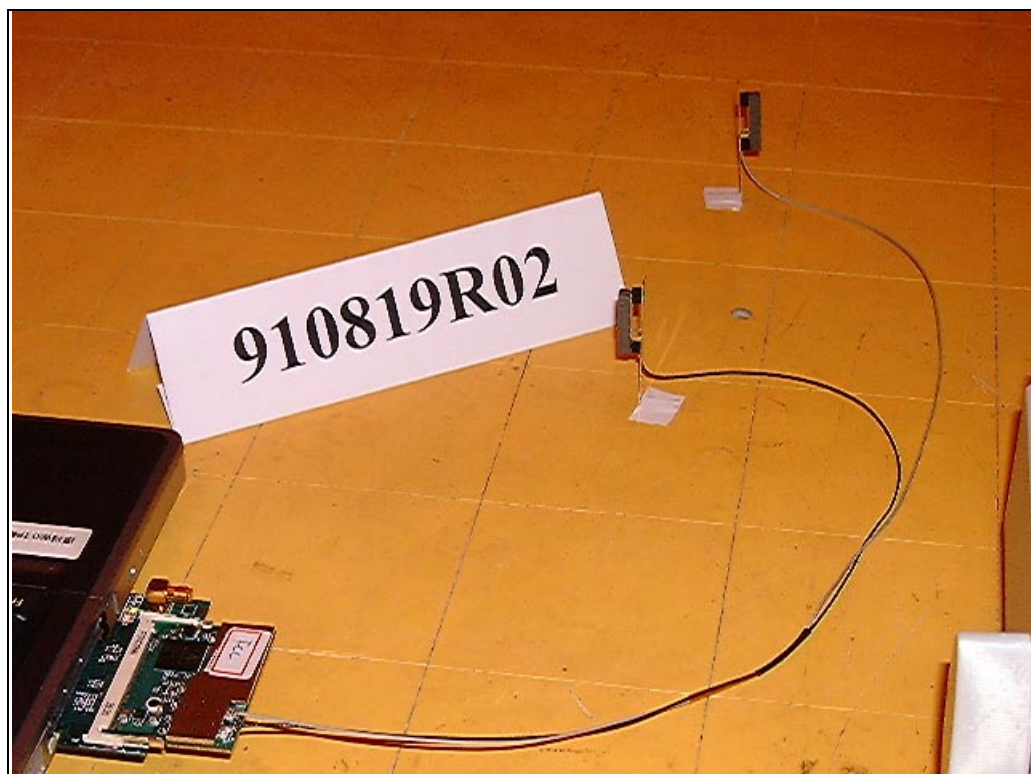
CONDUCTED EMISSION TEST





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:

USA	FCC, NVLAP, UL
Germany	TUV Rheinland
Japan	VCCI
New Zealand	MoC
Norway	NEMKO
R.O.C.	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.

If you have any comments, please feel free to contact us at the following:

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Email: service@mail.adt.com.tw

Web Site: www.adt.com.tw

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