



# FCC TEST REPORT

**REPORT NO.:** RF920130R01  
**MODEL NO.:** WLL220  
**MODEL NO.:** ACY25 (PLATFORM)  
**RECEIVED:** Jan. 30, 2003  
**TESTED:** Feb. 20 ~ Mar. 3, 2003

**APPLICANT:** ASKEY COMPUTER CORP.

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0528  
ILAC MRA



Lab Code: 200102-0



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# 1. CERTIFICATION

**PRODUCT :** 2.4GHz/5GHz Mini - PCI Card  
**BRAND NAME :** ASKEY  
**MODEL NO. :** WLL220  
**PLATFORM BRAND NAME :** Compal  
**PLATFORM MODEL NO. :** ACY25  
**APPLICANT :** ASKEY COMPUTER CORP.  
**STANDARDS :** 47 CFR Part 15, Subpart C (Section 15.247),  
Subpart E (Section 15.407), ANSI C63.4-1992

We, **Advance Data Technology Corporation**, hereby certify that one sample of the designation has been tested in our facility from Feb. 20 ~ Mar. 3, 2003. The test record, data evaluation and Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions herein specified.

**CHECKED BY:** *Kelsey Chang* **DATE:** Mar. 17, 2003  
Kelsey Chang

**APPROVED BY:** *Dr. Alan Lane* **DATE:** Mar. 17, 2003  
Dr. Alan Lane  
Manager

## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

<b>APPLIED STANDARD: 47 CFR Part 15, Subpart C</b>			
<b>Standard Section</b>	<b>Test Type and Limit</b>	<b>Result</b>	<b>REMARK</b>
15.207	AC Power Conducted Emission	PASS	Meet the requirement of limit Minimum passing margin is -12.42dBuV at 0.185MHz
15.247(a)(2)	Spectrum Bandwidth of a Direct Sequence Spread Spectrum System Limit: min. 500kHz	PASS	Meet the requirement of limit
15.247(b)	Maximum Peak Output Power Limit: max. 30dBm	PASS	Meet the requirement of limit
15.247(c)	Radiated Emissions Limit: Table 15.209	PASS	Meet the requirement of limit Minimum passing margin is -2.3dBuV at 2389.00 / 2483.60MHz
15.247(d)	Power Spectral Density Limit: max. 8dBm	PASS	Meet the requirement of limit
15.247(c)	Band Edge Measurement Limit: 20dB less than the peak value of fundamental frequency	PASS	Meet the requirement of limit



<b>APPLIED STANDARD: 47 CFR Part 15, Subpart E</b>			
<b>Standard Section</b>	<b>Test Type</b>	<b>Result</b>	<b>REMARK</b>
15.407(b)(5)	AC Power Conducted Emission	PASS	Meet the requirement of limit Minimum passing margin is -12.47dBuV at 0.185MHz
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 -1.40dBuV at 5715.00MHz
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





### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

<b>PRODUCT</b>	2.4GHz/5GHz Mini - PCI Card
<b>MODEL NO.</b>	WLL220
<b>PLATFORM Model No.</b>	ACY25
<b>POWER SUPPLY</b>	3.3VDC from host equipment
<b>MODULATION</b>	BPSK, QPSK, CCK, OFDM
<b>TRANSFER RATE</b>	up to 54Mbps *(Turbo mode : up to 108Mbps)
<b>FREQUENCY RANGE</b>	802.11b and draft 802.11g: 2412~2462MHz 802.11a: 5.15GHz ~ 5.85GHz
<b>NUMBER OF CHANNEL</b>	802.11b and draft 802.11g: 11 802.11a: 12 for Normal mode / 5 for Turbo mode
<b>CHANNEL SPACING</b>	802.11b and draft 802.11g: 5MHz 802.11a: 20MHz
<b>OUTPUT POWER</b>	802.11b and draft 802.11g: 16.96dBm 802.11a: 20.25dBm
<b>DATA CABLE</b>	NA
<b>ANTENNA TYPE</b>	T-type antenna
<b>I/O PORTS</b>	NA
<b>ASSOCIATED DEVICES</b>	NA

**NOTE:**

1. The EUT operates in both the 5GHz and 2.4GHz Bands and compatibility with 802.11a and 802.11g technology.
2. This EUT is capable of providing data rates up to 108Mbps in turbo mode depending upon reception qua
3. IEEE 802.11a, 802.11b, and Draft 802.11g Compliant.
4. For more detailed features description, please refer to the manufacturer's specifications or User's Manual.



### 3.2 DESCRIPTION OF TEST MODES

For 802.11b and draft 802.11g: Eleven channels are provided to this EUT.

Channel	Frequency	Channel	Frequency
1	2412 MHz	7	2442 MHz
2	2417 MHz	8	2447 MHz
3	2422 MHz	9	2452 MHz
4	2427 MHz	10	2457 MHz
5	2432 MHz	11	2462 MHz
6	2437 MHz		

**NOTE:**

1. Below 1GHz, the channel 1, 6, and 11 were pre-tested in chamber. The channel 11, worst case one, was chosen for final test.
2. Above 1GHz, the channel 1, 6, and 11 were tested individually.
3. Transfer rate of 11Mbps with CCK technique and 6Mbps with OFDM technique, the worst case, was chosen for final test.

For 802.11a: Twelve channels are provided to this EUT for Normal mode.

Channel	Frequency	Channel	Frequency
1	5180 MHz	7	5300 MHz
2	5200 MHz	8	5320 MHz
3	5220 MHz	9	5745 MHz
4	5240 MHz	10	5765 MHz
5	5260 MHz	11	5785 MHz
6	5280 MHz	12	5805 MHz

Five channels are provided to this EUT for Turbo Mode.

Channel	Frequency	Channel	Frequency
1	5210 MHz	4	5760 MHz
2	5250 MHz	5	5800 MHz
3	5290 MHz		

**NOTE:**

1. The EUT was transmitting at full power on the specified channel with a duty cycle of 99% (maximum allowed). The EUT was tested in both normal mode (channel bandwidth of approximately 30MHz) and turbo mode (channel bandwidth of approximately 60MHz).
2. "Normal Mode" allows data rates of up to 54Mbps. The device was, therefore, tested in Normal mode at the data rate that produced the highest output power for normal mode (6Mbps).
3. "Turbo Mode" allows data rates of up to 108Mbps. At data rates higher than 12Mbps the PA gain is reduced to improve signal fidelity. The device was, therefore, tested in turbo mode at the data rate that produced the highest output power for turbo mode (12Mbps).
4. Channel 1, 4, 5, 8, 9 and 12 are the closest frequencies to the band edge, were chosen for final test of Normal Mode.
5. Channel 1 ~ 5 were chosen for final test of turbo mode.



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

The EUT is a 2.4GHz/5GHz Mini - PCI Card. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC 47 CFR Part 15, Subpart C. (15.247),  
Subpart E (15.407). ANSI C63.4: 1992**

All tests 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	Dell	PP01L	TW-09C748-12800-190-B220	FCC DoC Approved
2	PRINTER	EPSON	LQ-300+	DCGY017096	FCC DoC Approved
3	MODEM	ACEEX	1414	980020569	IFAXDM1414

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA
2	1.2m braid shielded wire, terminated with DB25 and Centronics connector via metallic frame, w/o core
3	1.2 m braid shielded wire, terminated with DB25 and DB9 connector via metallic frame, w/o core.

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



## 4. TEST TYPES AND RESULTS (FOR PART 802.11b & draft 802.11g)

### 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
ROHDE & SCHWARZ Test Receiver	ESCS30	847793/022	Mar. 12, 2003
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH2-Z5	828075/003	July 23, 2003
ROHDE & SCHWARZ 200-A Four-line V-Network	ENV4200	830326/018	Oct. 30, 2003
* ROHDE & SCHWARZ 4-wire ISN	ENY41	838119/028	Nov. 29, 2003
* ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/018	Nov. 29, 2003
EMCO-L.I.S.N. (for peripheral)	3825/2	90031627	July 23, 2003
Software	Cond-V2M1	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C05.01	July 19, 2003
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-305	Feb. 23, 2004
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-306	Feb. 23, 2004

- 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. “\*”: These equipment are used for conducted telecom port test only (if tested).
  3. The test was performed in ADT Shielded Room No. 5.
  4. The VCCI Site Registration No. is C-1093.



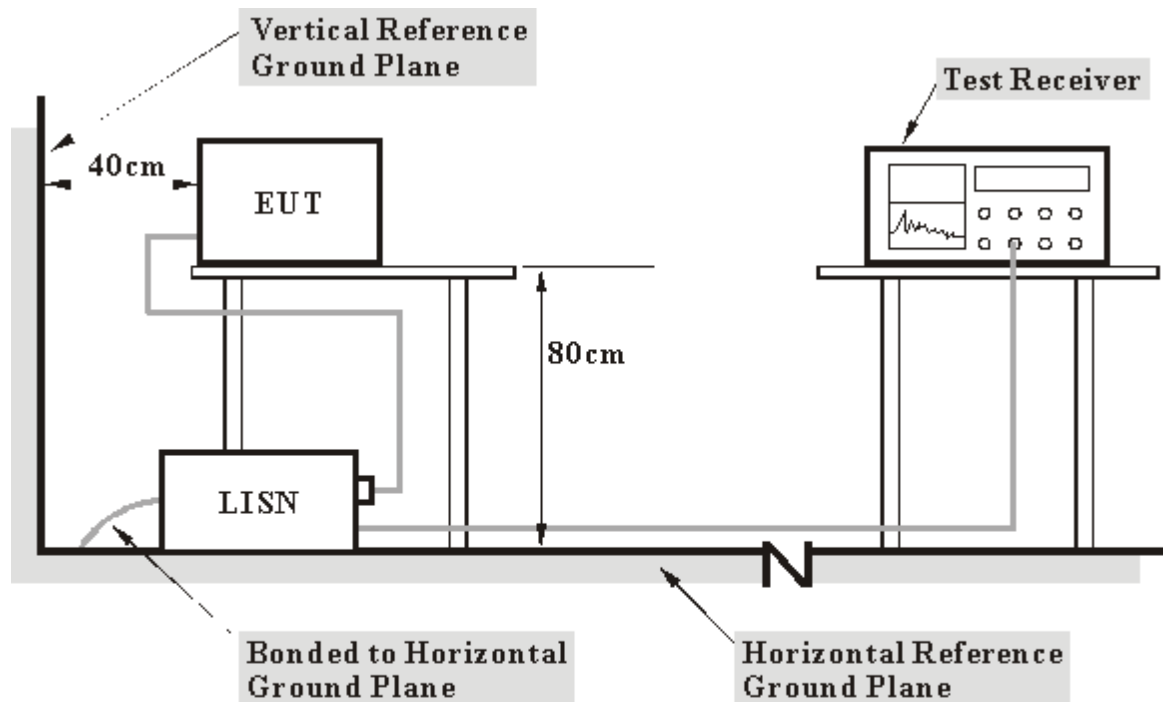
#### 4.1.3 TEST PROCEDURES

- 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 over 10dB under the prescribed limits could not be reported

#### 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) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

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

#### 4.1.6 EUT OPERATING CONDITIONS

- a. Plug the EUT into the computer system placed on a testing table.
- b. The computer system ran a test program to enable EUT under transmission/receiving condition continuously at specific channel frequency.
- c. The computer system sent "H" messages to its screen.
- d. The computer system sent "H" messages to modem.
- e. The computer system sent "H" messages to printer, and the printer prints them on paper.

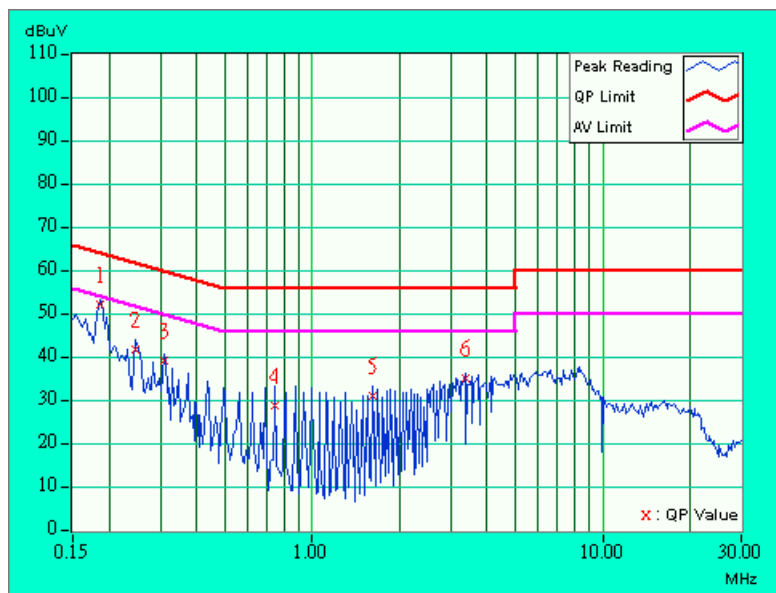


4.1.7 TEST RESULTS

<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>MODE</b>	Channel 1	<b>6dB BANDWIDTH</b>	9 kHz
		<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 54%RH, 991hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>TESTED BY</b>	Cody Chang		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.185	0.10	51.73	-	51.83	-	64.25	54.25	-12.42	-
2	0.248	0.10	41.54	-	41.64	-	61.84	51.84	-20.20	-
3	0.310	0.10	39.06	-	39.16	-	59.97	49.97	-20.81	-
4	0.744	0.16	28.58	-	28.74	-	56.00	46.00	-27.26	-
5	1.621	0.20	30.65	-	30.85	-	56.00	46.00	-25.15	-
6	3.363	0.34	34.92	-	35.26	-	56.00	46.00	-20.74	-

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



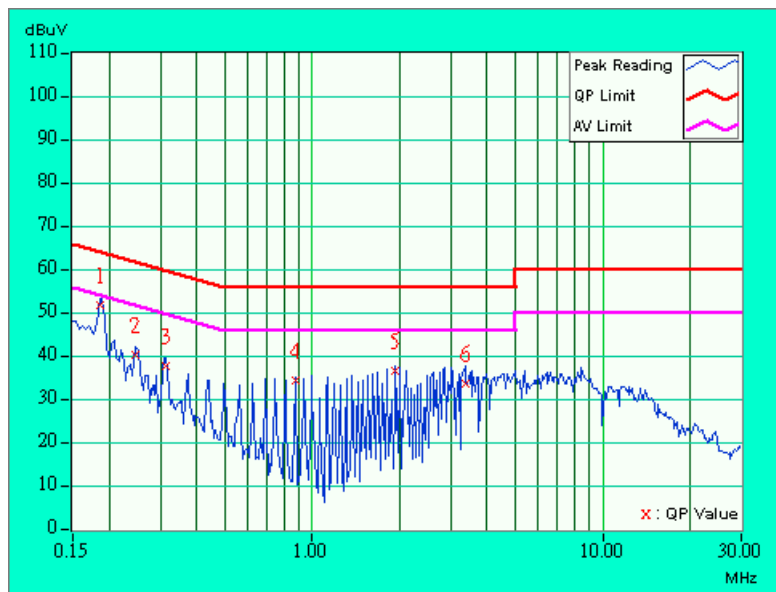




<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>MODE</b>	Channel 1	<b>6dB BANDWIDTH</b>	9 kHz
		<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 54%RH, 991hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>TESTED BY</b>	Cody Chang		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.185	0.10	51.63	-	51.73	-	64.25	54.25	-12.52	-
2	0.248	0.10	40.01	-	40.11	-	61.84	51.84	-21.73	-
3	0.314	0.10	37.43	-	37.53	-	59.86	49.86	-22.33	-
4	0.873	0.18	34.07	-	34.25	-	56.00	46.00	-21.75	-
5	1.932	0.20	36.39	-	36.59	-	56.00	46.00	-19.41	-
6	3.371	0.27	33.41	-	33.68	-	56.00	46.00	-22.32	-

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

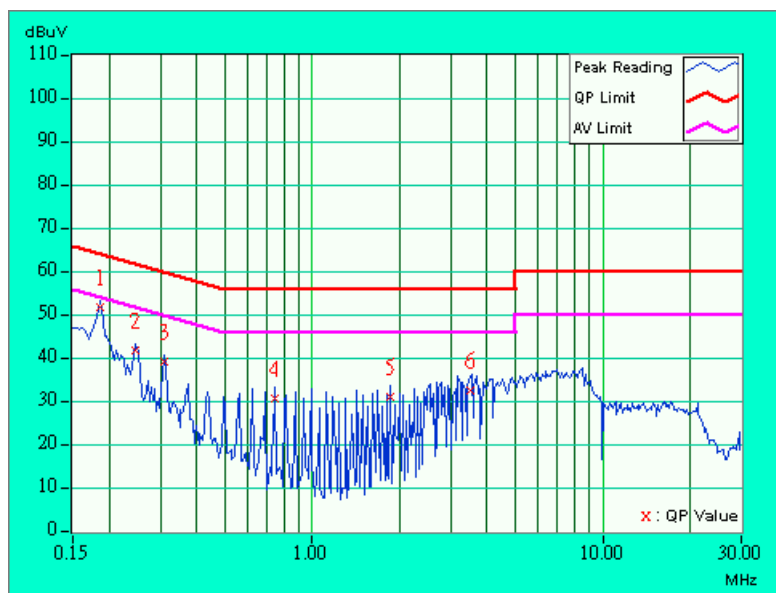




<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>MODE</b>	Channel 6	<b>6dB BANDWIDTH</b>	9 kHz
		<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 54%RH, 991hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>TESTED BY</b>	Cody Chang		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value [dB (uV)]		Emission Level [dB (uV)]		Limit [dB (uV)]		Margin (dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
			1	0.185	0.10	51.67	-	51.77	-	64.25
2	0.248	0.10	41.56	-	41.66	-	61.84	51.84	-20.18	-
3	0.310	0.10	38.98	-	39.08	-	59.97	49.97	-20.89	-
4	0.744	0.16	30.47	-	30.63	-	56.00	46.00	-25.37	-
5	1.867	0.20	30.88	-	31.08	-	56.00	46.00	-24.92	-
6	3.484	0.35	32.29	-	32.64	-	56.00	46.00	-23.36	-

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

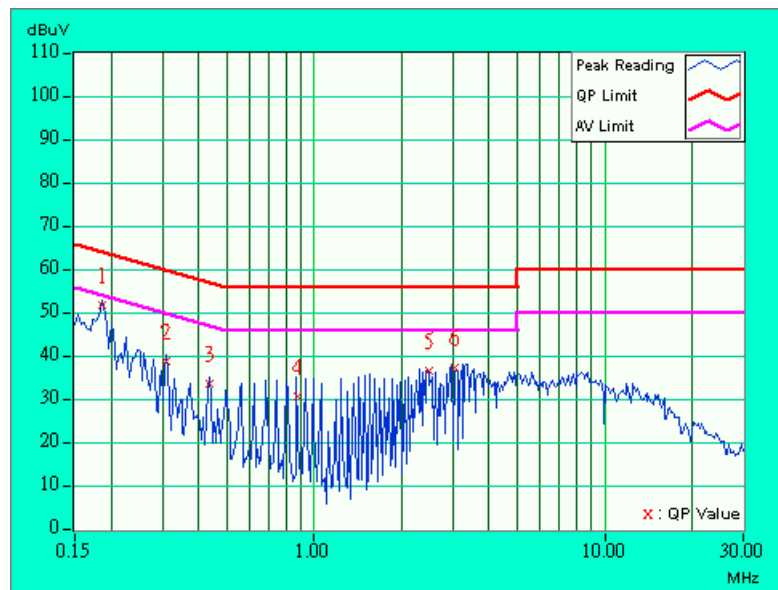




<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>MODE</b>	Channel 6	<b>6dB BANDWIDTH</b>	9 kHz
		<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 54%RH, 991hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>TESTED BY</b>	Cody Chang		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.185	0.10	51.47	-	51.57	-	64.25	54.25	-12.68	-
2	0.310	0.10	38.58	-	38.68	-	59.97	49.97	-21.29	-
3	0.435	0.11	33.40	-	33.51	-	57.15	47.15	-23.65	-
4	0.873	0.18	30.42	-	30.60	-	56.00	46.00	-25.40	-
5	2.484	0.22	36.57	-	36.79	-	56.00	46.00	-19.21	-
6	3.043	0.25	37.05	-	37.30	-	56.00	46.00	-18.70	-

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

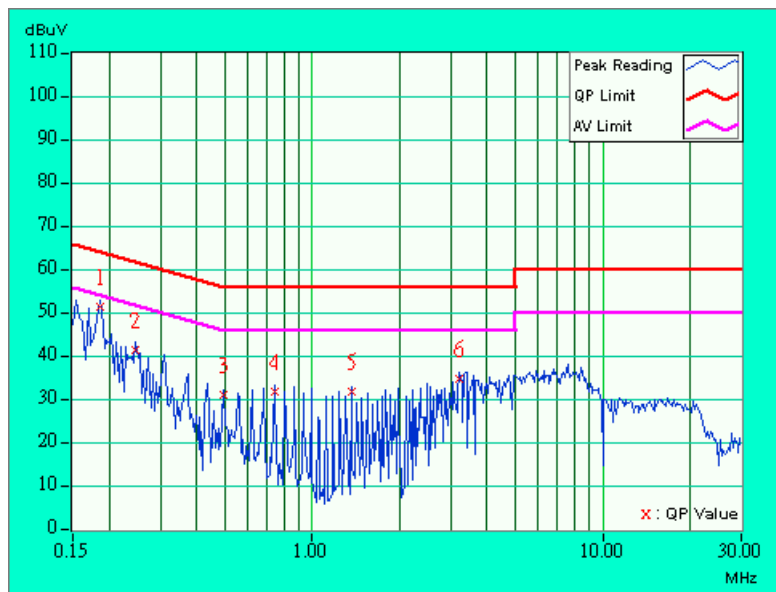




<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>MODE</b>	Channel 11	<b>6dB BANDWIDTH</b>	9 kHz
		<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 54%RH, 991hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>TESTED BY</b>	Cody Chang		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.185	0.10	51.33	-	51.43	-	64.25	54.25	-12.82	-
2	0.248	0.10	41.32	-	41.42	-	61.84	51.84	-20.42	-
3	0.494	0.12	30.74	-	30.86	-	56.10	46.10	-25.25	-
4	0.744	0.16	31.68	-	31.84	-	56.00	46.00	-24.16	-
5	1.363	0.20	31.55	-	31.75	-	56.00	46.00	-24.25	-
6	3.219	0.32	34.56	-	34.88	-	56.00	46.00	-21.12	-

- 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.

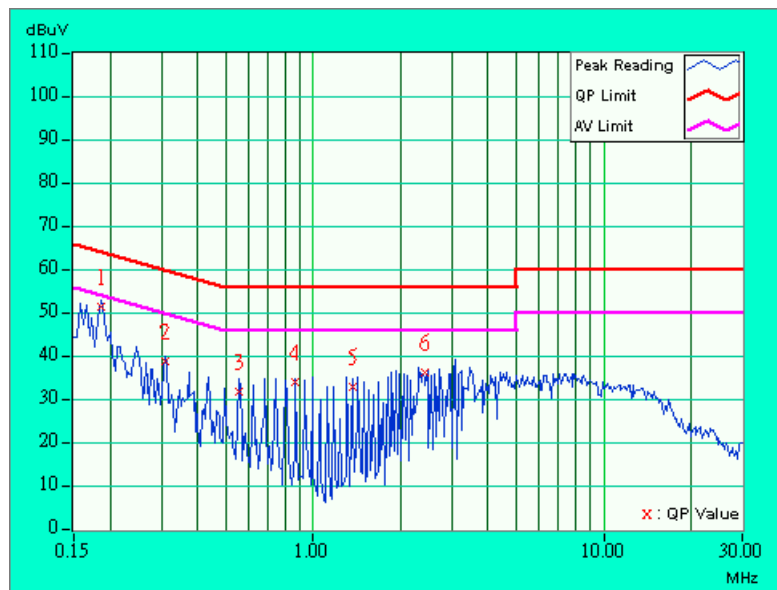




<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>MODE</b>	Channel 11	<b>6dB BANDWIDTH</b>	9 kHz
		<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 54%RH, 991hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>TESTED BY</b>	Cody Chang		

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.185	0.10	51.41	-	51.51	-	64.25	54.25	-12.74	-
2	0.310	0.10	38.62	-	38.72	-	59.97	49.97	-21.25	-
3	0.556	0.13	31.57	-	31.70	-	56.00	46.00	-24.30	-
4	0.868	0.18	33.79	-	33.97	-	56.00	46.00	-22.03	-
5	1.367	0.20	32.88	-	33.08	-	56.00	46.00	-22.92	-
6	2.418	0.22	36.12	-	36.34	-	56.00	46.00	-19.66	-

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





## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

Frequencies (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

**NOTE:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



#### 4.2.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
* HP Spectrum Analyzer	8590L	3544A01176	May 13, 2003
* HP Preamplifier	8447D	2944A08485	Apr. 29, 2003
* HP Preamplifier	8449B	3008A01201	Dec. 01, 2003
* HP Preamplifier	8449B	3008A01292	Aug. 07, 2003
*Spectrum Analyzer	8593E	3926A04191	Mar. 28, 2003
*Test Receiver	ESI7	838496/016	Feb. 23, 2004
SCHAFFNER Tunable Dipole Antenna	VHBA 9123	459	Nov. 22, 2003
SCHWARZBECK Tunable Dipole Antenna	UHA 9105	977	
* CHASE BILOG Antenna	CBL6112A	2221	Aug. 02, 2003
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	July 03, 2003
* EMCO Horn Antenna	3115	9312-4192	Apr. 09, 2003
* EMCO Turn Table	1060	1115	NA
* SHOSHIN Tower	AP-4701	A6Y005	NA
* Software	ADT_Radiated _V5.09	NA	NA
* ANRITSU RF Switches	MP59B	M35046	Jul. 11. 2003
* TIMES RF cable	LMR-600	CABLE-ST5-01	Jul. 11. 2003

**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. "\*" = These equipment are used for the final measurement.
3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
4. The test was performed in ADT Open Site No. 5.
5. The VCCI Site Registration No. is R-1039.
6. The VCCI Site Registration No. is R-1626.



### 4.2.3 TEST PROCEDURES

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

**NOTE:**

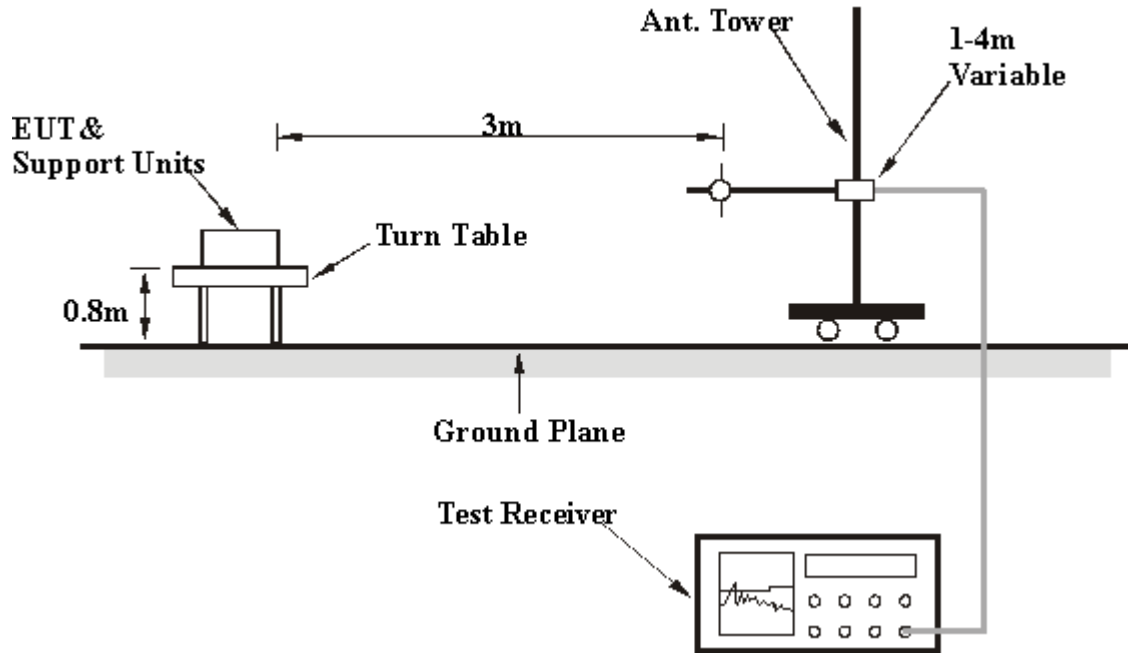
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 300 Hz for Average detection (AV) at frequency above 1GHz.

### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation



### 4.2.5 TEST SETUP



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

### 4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6

## 4.2.7 TEST RESULTS

<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>FREQUENCY RANGE</b>	Below 1000MHz	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>TESTED BY</b>	Gary Chang		

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	135.00	31.0 QP	43.50	-12.50	1.15 H	74	18.50	12.50
2	166.70	33.2 QP	43.50	-10.30	1.04 H	136	22.50	10.70
3	192.20	31.8 QP	43.50	-11.70	1.00 H	89	21.00	10.80
4	214.76	35.7 QP	43.50	-7.80	1.52 H	288	23.40	12.30
5	243.43	43.6 QP	46.00	-2.40	1.36 H	158	28.60	15.00
6	272.03	39.3 QP	46.00	-6.70	1.31 H	67	22.90	16.40
7	329.32	38.5 QP	46.00	-7.50	1.36 H	341	21.10	17.30
8	343.61	41.5 QP	46.00	-4.50	1.33 H	258	23.90	17.60
9	363.89	33.0 QP	46.00	-13.00	1.36 H	244	14.90	18.10
10	400.91	40.2 QP	46.00	-5.80	1.20 H	89	21.10	19.10
11	429.51	38.8 QP	46.00	-7.20	1.00 H	300	19.30	19.50
12	465.00	31.7 QP	46.00	-14.30	1.06 H	56	11.50	20.20
13	472.47	39.1 QP	46.00	-6.90	1.03 H	194	18.70	20.40
14	472.47	39.4 QP	46.00	-6.60	1.03 H	312	19.00	20.40
15	501.10	41.4 QP	46.00	-4.60	1.02 H	71	20.20	21.20
16	529.75	42.5 QP	46.00	-3.50	1.83 H	316	21.40	21.10
17	566.08	37.1 QP	46.00	-8.90	1.00 H	77	15.50	21.60
18	587.02	38.3 QP	46.00	-7.70	1.82 H	50	16.00	22.30
19	599.90	32.0 QP	46.00	-14.00	1.47 H	204	9.30	22.70
20	629.98	39.9 QP	46.00	-6.10	1.84 H	294	17.10	22.80
21	920.36	32.7 QP	46.00	-13.30	1.60 H	202	7.70	25.00

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
  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.



<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>FREQUENCY RANGE</b>	Below 1000MHz	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>TESTED BY</b>	Gary Chang		

#### 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	125.00	32.4 QP	43.50	-11.10	1.42 V	73	19.20	13.20
2	196.15	32.8 QP	43.50	-10.70	1.10 V	186	21.90	10.90
3	214.79	24.8 QP	43.50	-18.70	1.20 V	267	12.40	12.30
4	272.03	31.7 QP	46.00	-14.30	1.84 V	12	15.30	16.40
5	324.03	40.2 QP	46.00	-5.80	1.85 V	91	22.90	17.20
6	372.27	36.0 QP	46.00	-10.00	1.43 V	198	17.60	18.30
7	458.28	42.3 QP	46.00	-3.70	1.15 V	51	22.30	20.00
8	501.11	38.6 QP	46.00	-7.40	1.35 V	321	17.40	21.20
9	529.78	38.0 QP	46.00	-8.00	1.41 V	61	16.80	21.10
10	563.78	32.0 QP	46.00	-14.00	1.40 V	291	10.50	21.50
11	629.99	36.3 QP	46.00	-9.70	1.35 V	82	13.60	22.80
12	658.70	34.0 QP	46.00	-12.00	1.02 V	268	11.20	22.80
13	696.41	32.7 QP	46.00	-13.30	1.11 V	202	9.70	23.00
14	716.59	38.1 QP	46.00	-7.90	1.09 V	11	14.70	23.40
15	733.51	33.7 QP	46.00	-12.30	1.42 V	175	10.00	23.80
16	797.00	31.0 QP	46.00	-15.00	1.10 V	35	6.20	24.80
17	927.50	33.7 QP	46.00	-12.30	1.47 V	6	8.70	25.00

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
  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.



<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>MODE</b>	Channel 1	<b>FREQUENCY RANGE</b>	Above 1000 MHz
<b>TEST MODE</b>	CCK	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>TESTED BY</b>	Gary Chang		

#### 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	*2412.00	109.6 PK			1.02 H	348	76.90	32.80
1	*2412.00	102.6 AV			1.02 H	348	69.90	32.80
2	2389.00	62.6 PK	74.00	-11.40	1.02 H	348	29.90	32.80
2	2389.00	51.7 AV	54.00	-2.30	1.02 H	348	19.00	32.80
3	3168.00	42.7 PK	74.00	-31.30	1.35 H	25	8.90	33.80
4	4824.00	48.6 PK	74.00	-25.40	1.37 H	31	11.60	36.90
5	6336.00	61.4 PK	89.60	-28.20	1.54 H	64	22.30	39.10
5	6336.00	59.2 AV	82.60	-23.40	1.54 H	64	20.10	33.80
6	7236.00	50.4 PK	74.00	-23.60	1.04 H	355	8.90	41.40
6	7236.00	42.4 AV	54.00	-11.60	1.04 H	355	0.90	36.90

#### 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	*2412.00	107.2 PK			1.00 V	97	74.40	32.80
1	*2412.00	100.9 AV			1.00 V	97	68.10	32.80
2	2389.00	59.9 PK	74.00	-14.10	1.00 V	97	27.00	32.90
2	2389.00	51.3 AV	54.00	-2.70	1.00 V	97	18.40	32.90
3	3168.00	44.9 PK	74.00	-29.10	1.32 V	33	11.10	33.80
4	4824.00	49.2 PK	74.00	-24.80	1.46 V	57	12.20	36.90
5	6336.00	63.2 PK	87.20	-24.00	1.43 V	77	24.10	39.10
5	6336.00	61.4 AV	80.90	-19.50	1.43 V	77	22.30	33.80
6	7236.00	50.7 PK	74.00	-23.30	1.12 V	254	9.30	41.40
6	7236.00	40.4 AV	54.00	-13.60	1.12 V	254	-1.10	36.90

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

<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>MODE</b>	Channel 6	<b>FREQUENCY RANGE</b>	Above 1000 MHz
<b>TEST MODE</b>	CCK	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>TESTED BY</b>	Gary Chang		

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

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	110.7 PK			1.03 H	349	77.90	32.80
1	*2437.00	104.7 AV			1.03 H	349	71.90	32.80
2	3168.00	43.2 PK	74.00	-30.80	1.33 H	45	9.40	33.80
3	4874.00	50.3 PK	74.00	-23.70	1.42 H	25	13.10	37.10
3	4874.00	40.4 AV	54.00	-13.60	1.42 H	25	3.20	33.80
4	6336.00	60.7 PK	90.70	-30.00	1.32 H	57	21.60	39.10
4	6336.00	59.0 AV	84.70	-25.70	1.32 H	57	19.90	37.10
5	7311.00	50.3 PK	74.00	-23.70	1.15 H	325	8.70	41.50
5	7311.00	40.5 AV	54.00	-13.50	1.15 H	325	-1.10	39.10

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

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	108.7 PK			1.11 V	38	75.90	32.80
1	*2437.00	102.9 AV			1.11 V	38	70.10	32.80
2	3168.00	43.7 PK	74.00	-30.30	1.31 V	204	9.90	33.80
3	4874.00	53.4 PK	74.00	-20.60	1.17 V	308	16.20	37.10
3	4874.00	42.4 AV	54.00	-11.60	1.17 V	308	5.20	33.80
4	6336.00	62.1 PK	88.70	-26.60	1.24 V	122	23.00	39.10
4	6336.00	59.3 AV	82.90	-23.60	1.24 V	122	20.20	37.10
5	7311.00	53.5 PK	74.00	-20.50	1.45 V	291	11.90	41.50
5	7311.00	42.5 AV	54.00	-11.50	1.45 V	291	0.90	39.10

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



<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>MODE</b>	Channel 11	<b>FREQUENCY RANGE</b>	Above 1000 MHz
<b>TEST MODE</b>	CCK	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>TESTED BY</b>	Gary Chang		

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

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	105.8 PK			1.24 H	265	73.00	32.90
1	*2462.00	100.2 AV			1.24 H	265	67.40	32.90
2	2483.60	62.8 PK	74.00	-11.20	1.24 H	265	29.90	32.90
2	2483.60	50.8 AV	54.00	-3.20	1.24 H	265	17.90	32.90
3	3168.00	42.7 PK	74.00	-31.30	1.13 H	65	8.90	33.80
4	4924.00	46.6 PK	74.00	-27.40	1.09 H	27	9.20	37.30
5	6336.00	61.7 PK	85.80	-24.10	1.24 H	87	22.60	39.10
5	6336.00	58.2 AV	80.20	-22.00	1.24 H	87	19.10	33.80
6	7384.00	51.0 PK	74.00	-23.00	1.12 H	24	9.40	41.70
6	7384.00	40.5 AV	54.00	-13.50	1.12 H	24	-1.10	37.30

#### 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	*2463.00	106.6 PK			2.07 V	352	73.80	32.90
1	*2463.00	99.1 AV			2.07 V	352	66.30	32.90
2	2483.50	59.8 PK	74.00	-14.20	1.36 V	54	26.90	32.90
2	2483.50	47.8 AV	54.00	-6.20	1.36 V	54	14.90	32.90
3	3168.00	43.7 PK	74.00	-30.30	1.52 V	74	9.90	33.80
4	4924.00	48.3 PK	74.00	-25.70	1.25 V	74	10.90	37.30
5	6336.00	62.7 PK	86.60	-23.90	1.24 V	33	23.60	39.10
5	6336.00	60.2 AV	79.10	-18.90	1.24 V	33	21.10	33.80
6	7386.00	49.5 PK	74.00	-24.50	1.62 V	45	7.90	41.70

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

<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>MODE</b>	Channel 1	<b>FREQUENCY RANGE</b>	Above 1000 MHz
<b>TEST MODE</b>	OFDM	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>TESTED BY</b>	Gary Chang		

#### 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	*2412.00	103.6 PK			1.18 H	310	70.90	32.80
1	*2412.00	89.6 AV			1.18 H	310	56.90	32.80
2	3168.00	44.2 PK	74.00	-29.80	1.05 H	74	10.40	33.80
3	4824.00	46.6 PK	74.00	-27.40	1.35 H	9	9.60	36.90
4	6336.00	51.0 PK	74.00	-23.00	1.17 H	8	11.90	39.10
4	6336.00	48.2 AV	54.00	-5.80	1.17 H	8	9.10	33.80
5	7237.00	51.4 PK	74.00	-22.60	1.24 H	73	9.90	41.40
5	7237.00	41.2 AV	54.00	-12.80	1.24 H	73	-0.30	36.90

#### 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	2389.00	62.7 PK	74.00	-11.30	1.07 V	265	30.00	32.70
1	2389.00	48.7 AV	54.00	-5.30	1.07 V	265	16.00	32.70
2	*2412.00	106.6 PK			1.07 V	265	73.80	32.80
2	*2412.00	92.3 AV			1.07 V	265	59.50	32.80
3	3168.00	42.5 PK	74.00	-31.50	1.32 V	57	8.70	33.80
4	4824.00	45.8 PK	74.00	-28.20	1.09 V	335	8.80	36.90
5	6336.00	51.8 PK	74.00	-22.20	1.42 V	87	12.70	39.10
5	6336.00	48.9 AV	54.00	-5.10	1.42 V	87	9.80	33.80
6	7237.00	51.2 PK	74.00	-22.80	1.21 V	356	9.70	41.40
6	7237.00	42.4 AV	54.00	-11.60	1.21 V	356	0.90	36.90

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



<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>MODE</b>	Channel 6	<b>FREQUENCY RANGE</b>	Above 1000 MHz
<b>TEST MODE</b>	OFDM	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>TESTED BY</b>	Gary Chang		

<b>ANTENNA POLARITY &amp; TEST DISTANCE: HORIZONTAL AT 3 M</b>								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	108.6 PK			1.02 H	35	75.80	32.80
1	*2437.00	93.3 AV			1.02 H	35	60.50	32.80
2	3168.00	44.2 PK	74.00	-29.80	1.03 H	34	10.40	33.80
3	4874.00	48.4 PK	74.00	-25.60	1.32 H	54	11.20	37.10
4	6336.00	51.7 PK	74.00	-22.30	1.03 H	34	12.60	39.10
4	6336.00	48.6 AV	54.00	-5.40	1.03 H	34	9.50	33.80
5	7311.00	52.3 PK	74.00	-21.70	1.52 H	81	10.70	41.50
5	7311.00	42.2 AV	54.00	-11.80	1.52 H	81	0.60	37.10

<b>ANTENNA POLARITY &amp; TEST DISTANCE: VERTICAL AT 3 M</b>								
No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2437.00	110.5 PK			1.05 V	135	77.70	32.80
1	*2437.00	96.3 AV			1.05 V	135	63.50	32.80
2	3168.00	44.7 PK	74.00	-29.30	1.15 V	36	10.90	33.80
3	4874.00	53.0 PK	74.00	-21.00	1.64 V	74	15.90	37.10
3	4874.00	41.4 AV	54.00	-12.60	1.64 V	74	4.20	33.80
4	6336.00	50.7 PK	74.00	-23.30	1.03 V	34	11.60	39.10
4	6336.00	48.2 AV	54.00	-5.80	1.03 V	34	9.10	37.10
5	7312.00	59.1 PK	74.00	-14.90	1.45 V	319	17.60	41.60
5	7312.00	43.9 AV	54.00	-10.10	1.45 V	319	2.40	39.10

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





<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>MODE</b>	Channel 11	<b>FREQUENCY RANGE</b>	Above 1000 MHz
<b>TEST MODE</b>	OFDM	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>TESTED BY</b>	Gary Chang		

#### 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	*2463.00	102.7 PK			1.68 H	22	69.80	32.90
1	*2463.00	88.0 AV			1.68 H	22	55.10	32.90
2	2483.60	57.9 PK	74.00	-16.10	1.68 H	22	25.00	32.90
2	2483.60	48.9 AV	54.00	-5.10	1.68 H	22	16.00	32.90
3	3168.00	43.5 PK	74.00	-30.50	1.13 H	54	9.70	33.80
4	4924.00	48.3 PK	74.00	-25.70	1.13 H	227	10.90	37.30
5	6336.00	50.2 PK	74.00	-23.80	1.05 H	61	11.10	39.10
5	6336.00	48.2 AV	54.00	-5.80	1.05 H	61	9.10	33.80
6	7386.00	50.8 PK	74.00	-23.20	1.44 H	100	9.20	41.70
6	7386.00	41.5 AV	54.00	-12.50	1.44 H	100	-0.10	37.30

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

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*2462.00	107.1 PK			1.03 V	305	74.20	32.90
1	*2462.00	92.5 AV			1.03 V	305	59.60	32.90
2	2483.60	60.9 PK	74.00	-13.10	1.03 V	305	28.00	32.90
2	2483.60	51.7 AV	54.00	-2.30	1.03 V	305	18.80	32.90
3	3168.00	43.7 PK	74.00	-30.30	1.15 V	85	9.90	33.80
4	4924.00	49.6 PK	74.00	-24.40	1.59 V	132	12.20	37.30
5	6336.00	52.2 PK	74.00	-21.80	1.25 V	35	13.10	39.10
5	6336.00	50.2 AV	54.00	-3.80	1.25 V	35	11.10	33.80
6	7386.00	54.5 PK	74.00	-19.50	1.24 V	57	12.90	41.70
6	7386.00	44.5 AV	54.00	-9.50	1.24 V	57	2.90	37.30

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



### 4.3 6dB BANDWIDTH MEASUREMENT

#### 4.3.1 LIMITS OF 6dB BANDWIDTH MEASUREMENT

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 TEST INSTRUMENTS

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

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

### 4.3.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW and 100kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

### 4.3.4 DEVIATION FROM TEST STANDARD

No deviation

### 4.3.5 TEST SETUP



### 4.3.6 EUT OPERATING CONDITIONS

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



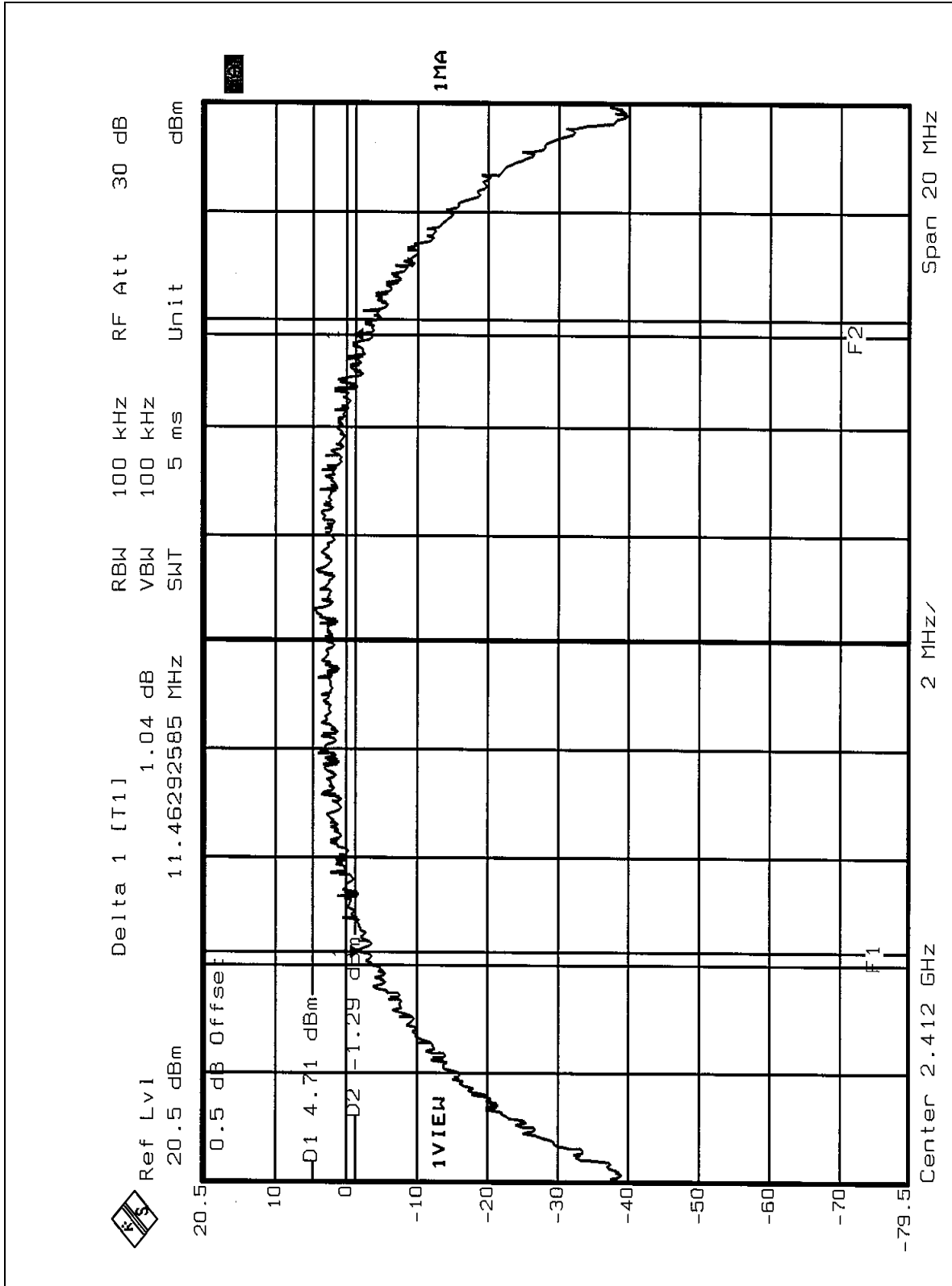
## 4.3.7 TEST RESULTS

<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 67%RH, 991hPa
<b>TEST MODE</b>	CCK	<b>TESTED BY</b>	Ansen Lei

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>6dB BANDWIDTH (MHz)</b>	<b>MINIMUM LIMIT (MHz)</b>	<b>PASS/FAIL</b>
1	2412	11.46	0.5	PASS
6	2437	10.98	0.5	PASS
11	2462	11.30	0.5	PASS

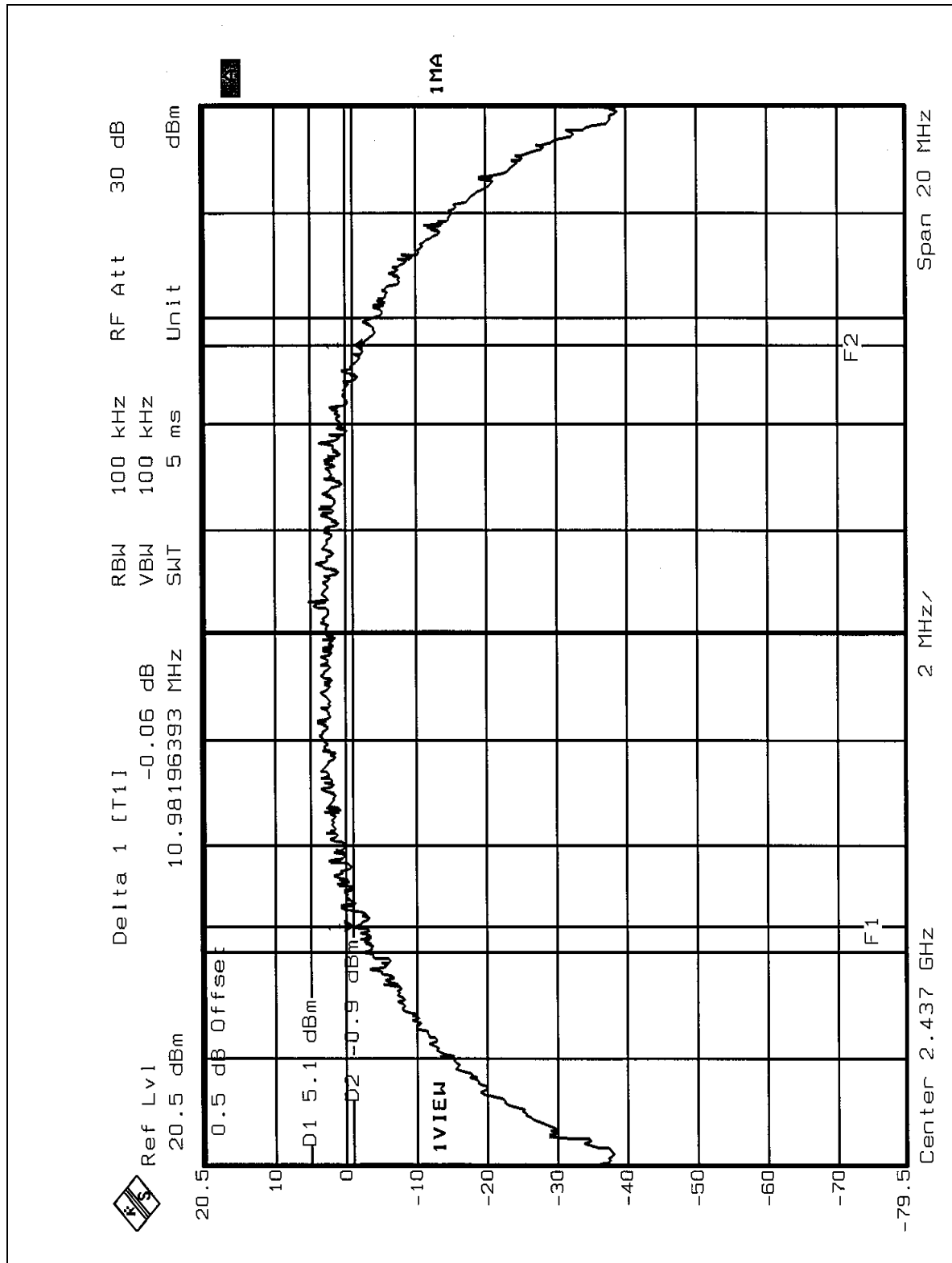


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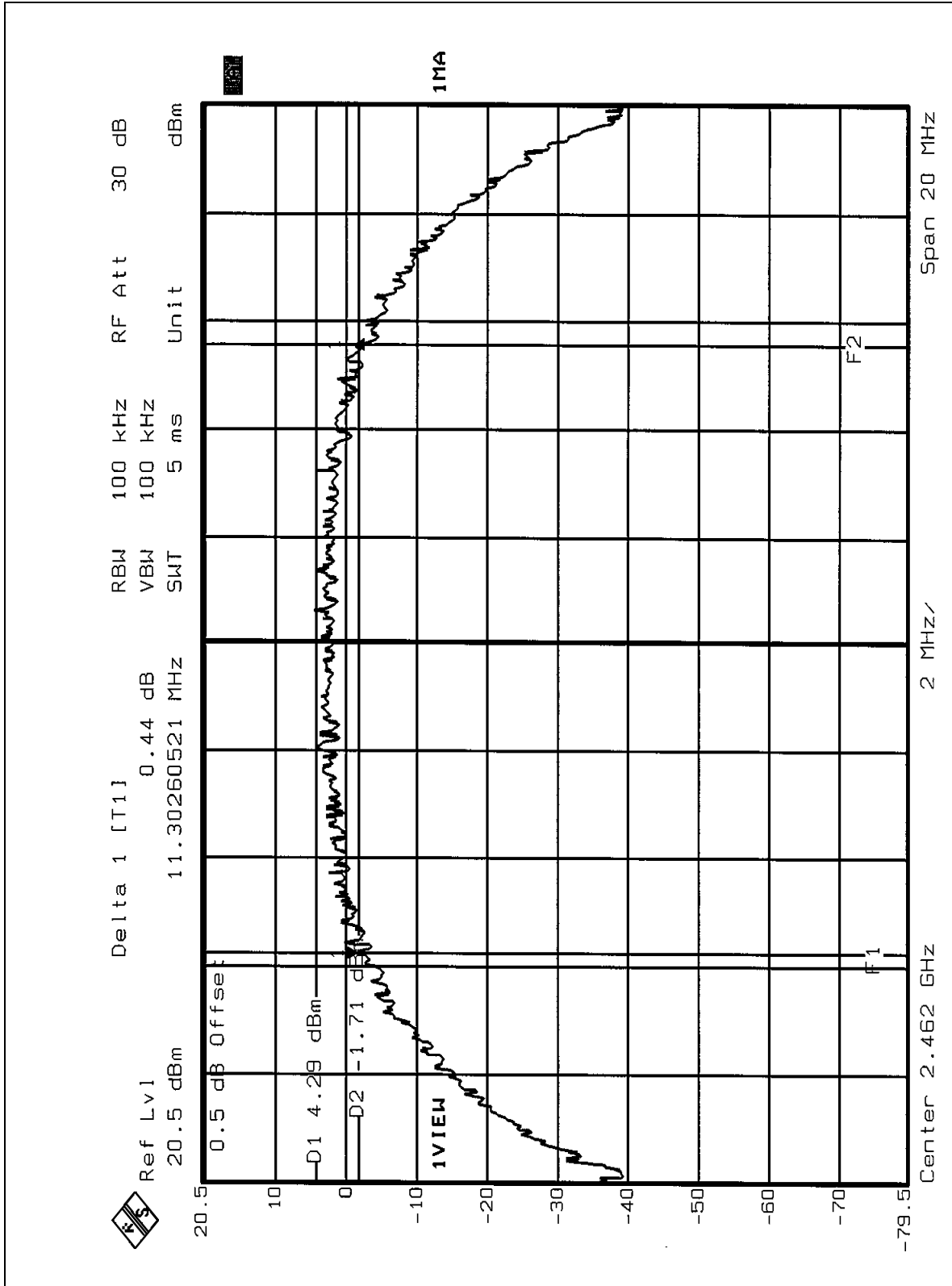


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## 4.3.8 TEST RESULTS

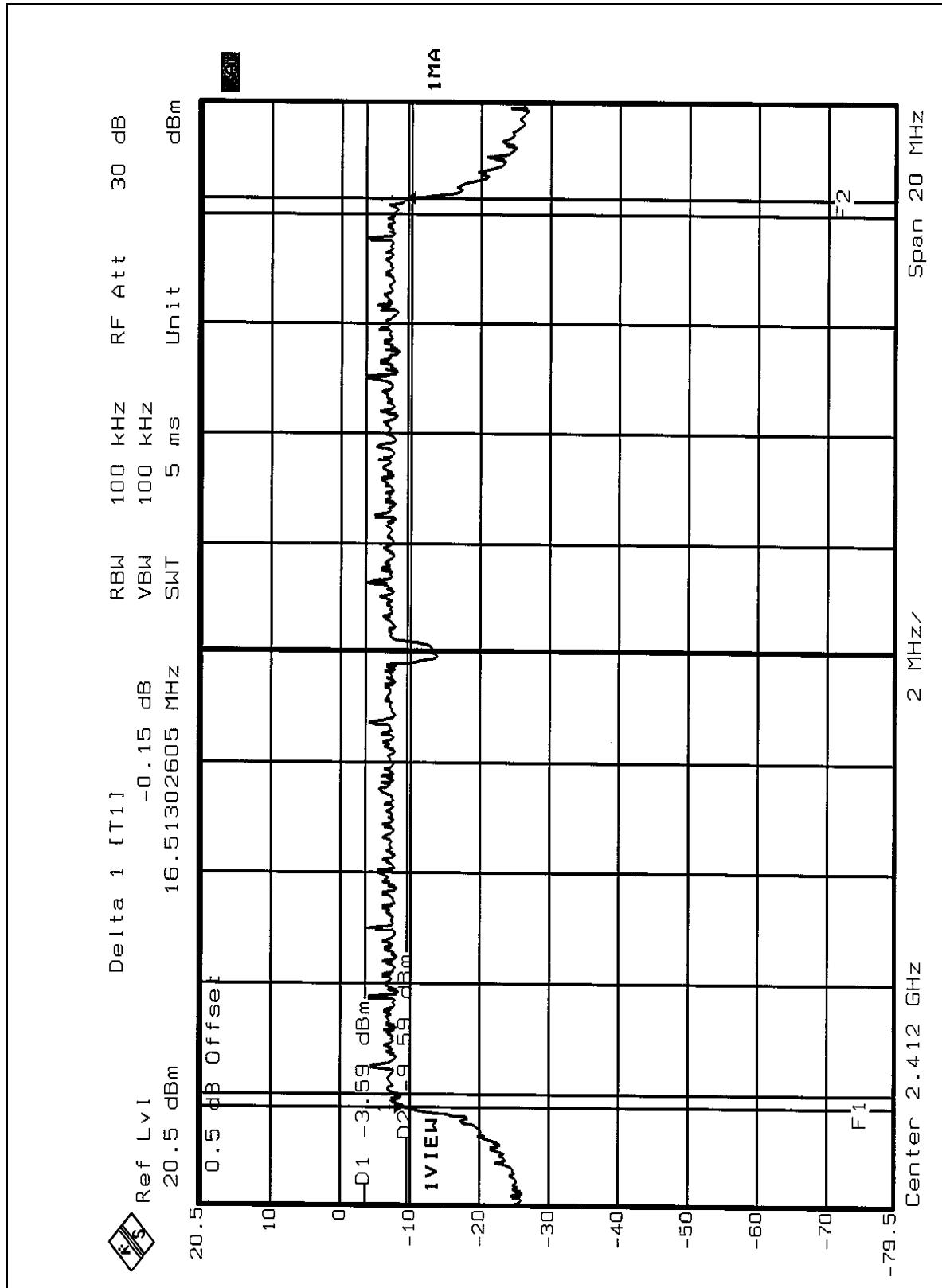
<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	214deg. C, 65%RH, 991hPa
<b>TEST MODE</b>	OFDM	<b>TESTED BY</b>	Ansen Lei

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>6dB BANDWIDTH (MHz)</b>	<b>MINIMUM LIMIT (MHz)</b>	<b>PASS/FAIL</b>
1	2412	16.51	0.5	PASS
6	2437	16.43	0.5	PASS
11	2462	16.47	0.5	PASS



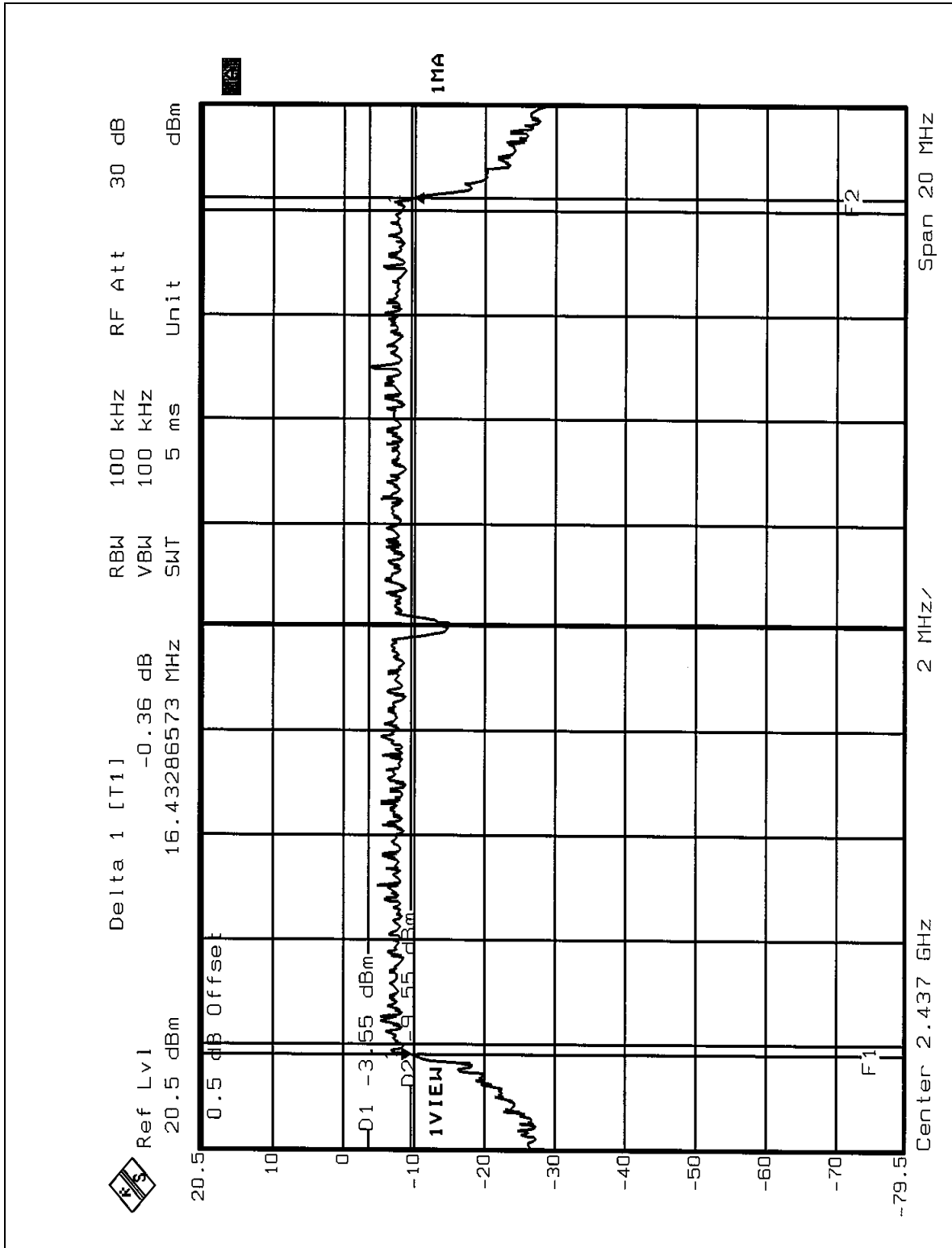


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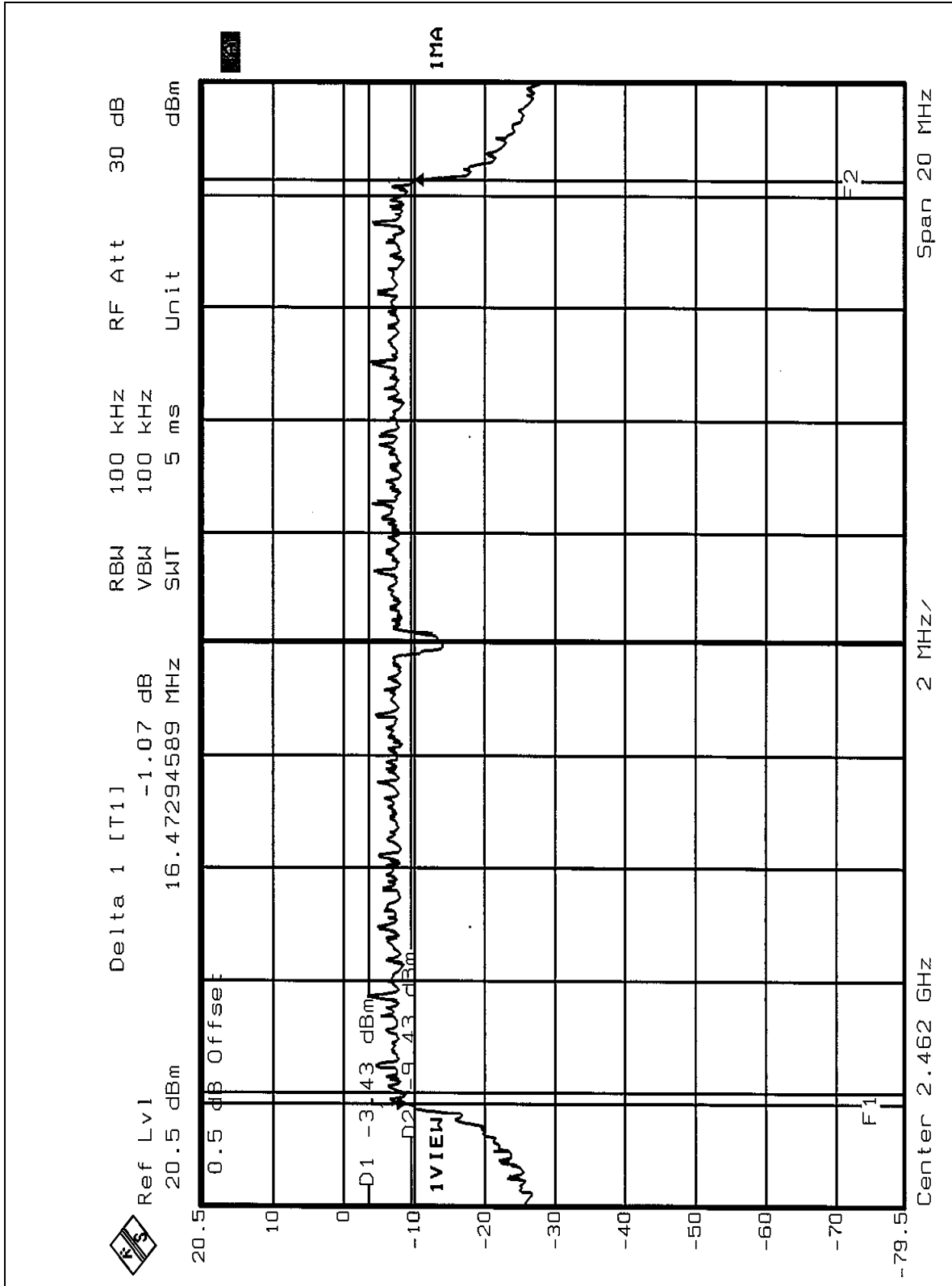


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#### 4.4 MAXIMUM PEAK OUTPUT POWER

##### 4.4.1 LIMITS OF MAXIMUM PEAK OUTPUT POWER MEASUREMENT

The Maximum Peak Output Power Measurement is 30dBm.

##### 4.4.2 INSTRUMENTS

Description & Manufacturer	Model No.	Serial No.	Calibrated Until
PEAK POWER SENSOR	E9327A	US40440722	July 30, 2003
POWER METER	E4416A	GB41291118	July 30, 2003

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



#### 4.4.3 TEST PROCEDURES

The transmitter output was connected to the peak power meter.

#### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.4.5 TEST SETUP



#### 4.4.6 EUT OPERATING CONDITIONS

Same as Item 4.3.6



## 4.4.7 TEST RESULTS

<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	21deg. C, 65%RH, 991hPa
<b>TEST MODE</b>	CCK	<b>TESTED BY</b>	Ansen Lei

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>PEAK POWER OUTPUT (dBm)</b>	<b>PEAK POWER LIMIT (dBm)</b>	<b>PASS/FAIL</b>
1	2412	16.96	30	PASS
6	2437	16.84	30	PASS
11	2462	16.63	30	PASS



## 4.4.8 TEST RESULTS

<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	21deg. C, 65%RH, 991hPa
<b>TEST MODE</b>	OFDM	<b>TESTED BY</b>	Ansen Lei

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>PEAK POWER OUTPUT (dBm)</b>	<b>PEAK POWER LIMIT (dBm)</b>	<b>PASS/FAIL</b>
1	2412	16.58	30	PASS
6	2437	16.42	30	PASS
11	2462	16.21	30	PASS



## 4.5 POWER SPECTRAL DENSITY MEASUREMENT

### 4.5.1 LIMITS OF POWER SPECTRAL DENSITY MEASUREMENT

The Maximum of Power Spectral Density Measurement is 8dBm.

### 4.5.2 TEST INSTRUMENTS

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

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



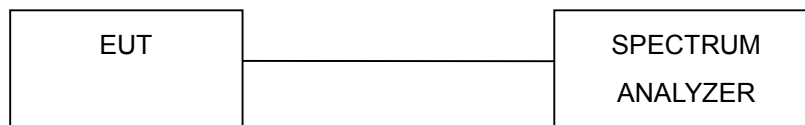
#### 4.5.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator, the bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/3kHz. The power spectral density was measured and recorded. The sweep time is allowed to be longer than span/3kHz for a full response of the mixer in the spectrum analyzer.

#### 4.5.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.5.5 TEST SETUP



#### 4.5.6 EUT OPERATING CONDITION

Same as Item 4.3.6



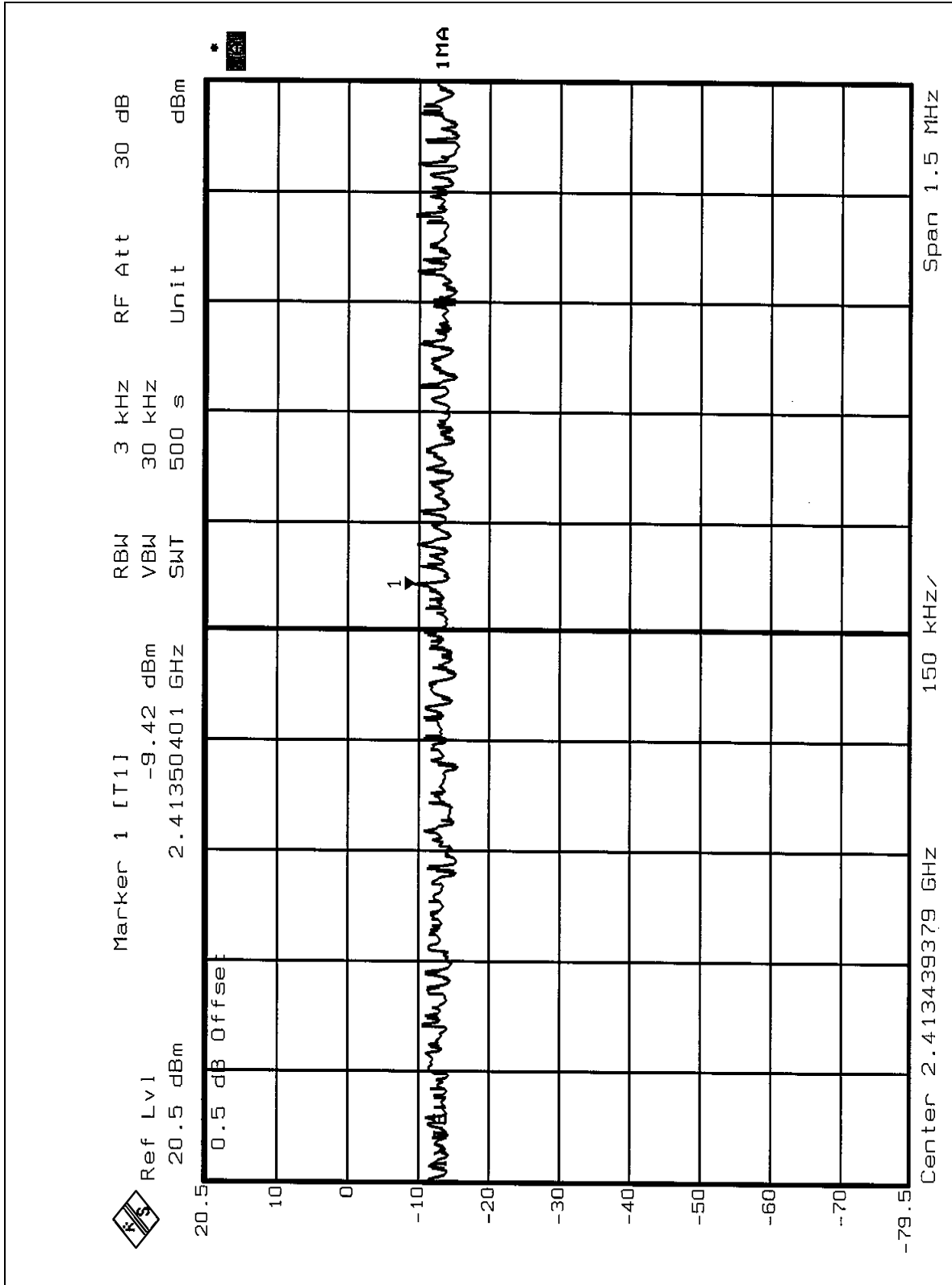
## 4.5.7 TEST RESULTS

<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 67%RH, 991hPa
<b>TEST MODE</b>	CCK	<b>TESTED BY</b>	Ansen Lei

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz )</b>	<b>RF POWER LEVEL IN 3kHz BW (dBm)</b>	<b>MAXIMUM LIMIT (dBm)</b>	<b>PASS/FAIL</b>
1	2412	-9.42	8	PASS
6	2437	-8.53	8	PASS
11	2462	-9.85	8	PASS

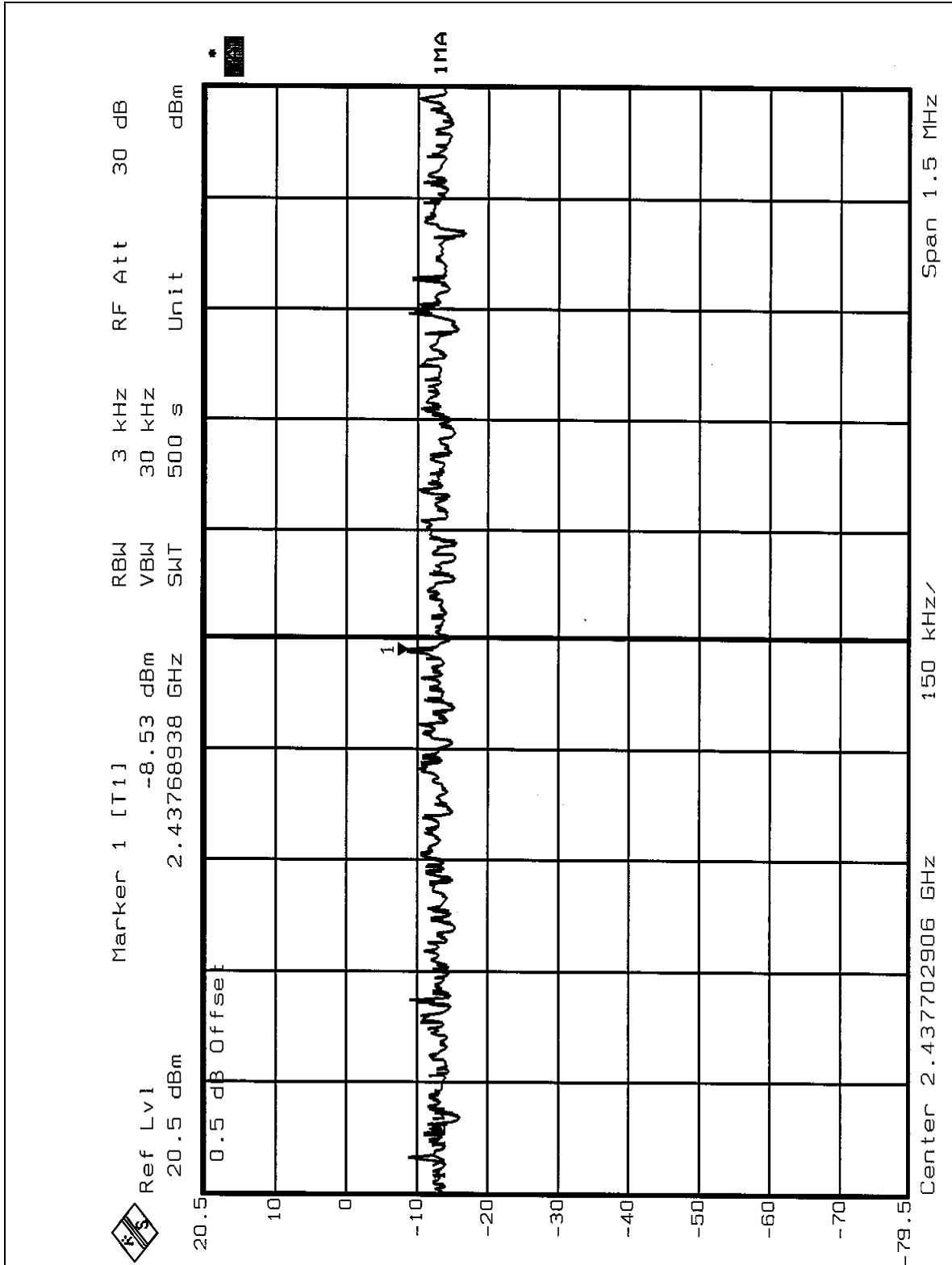


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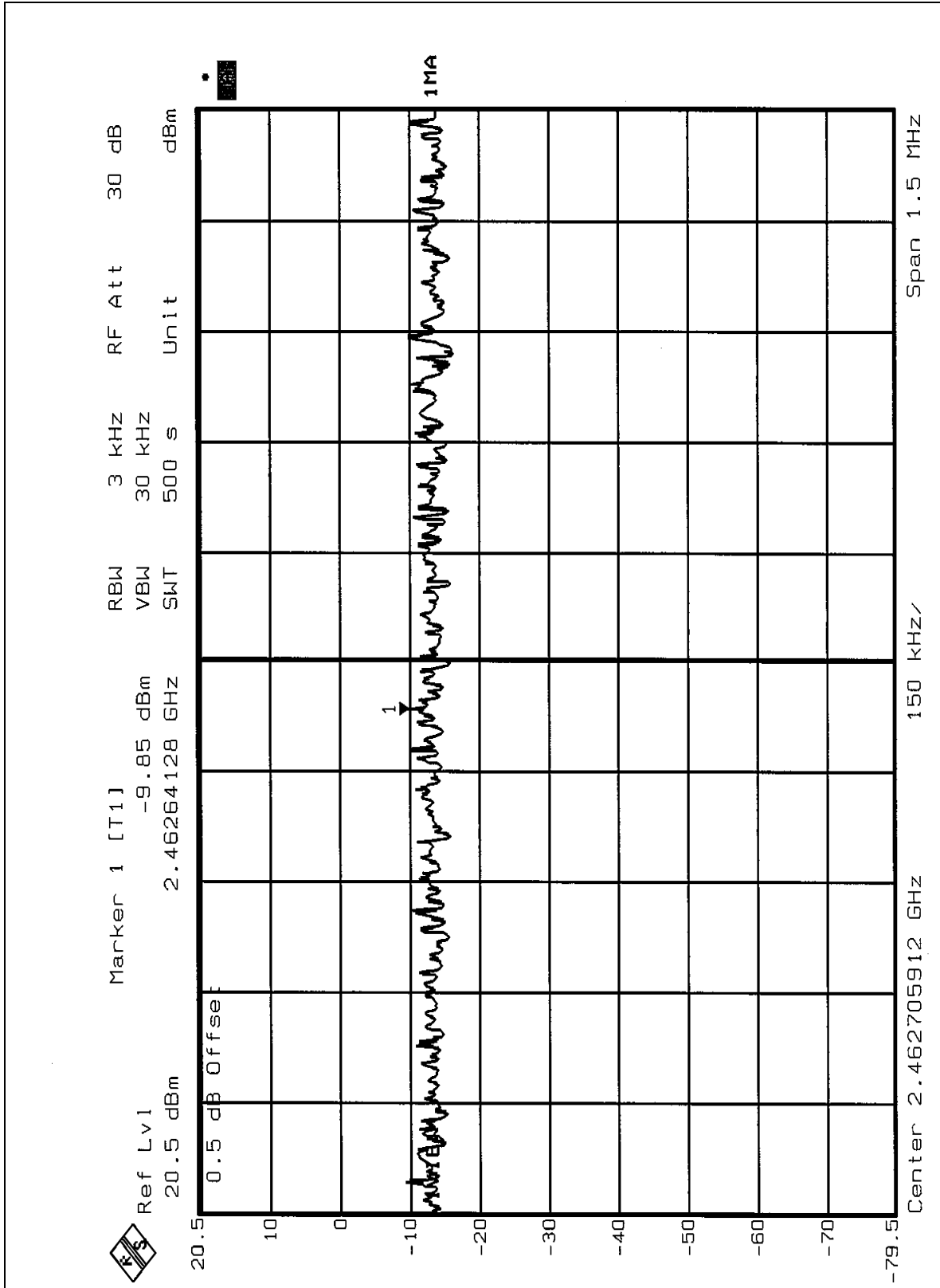


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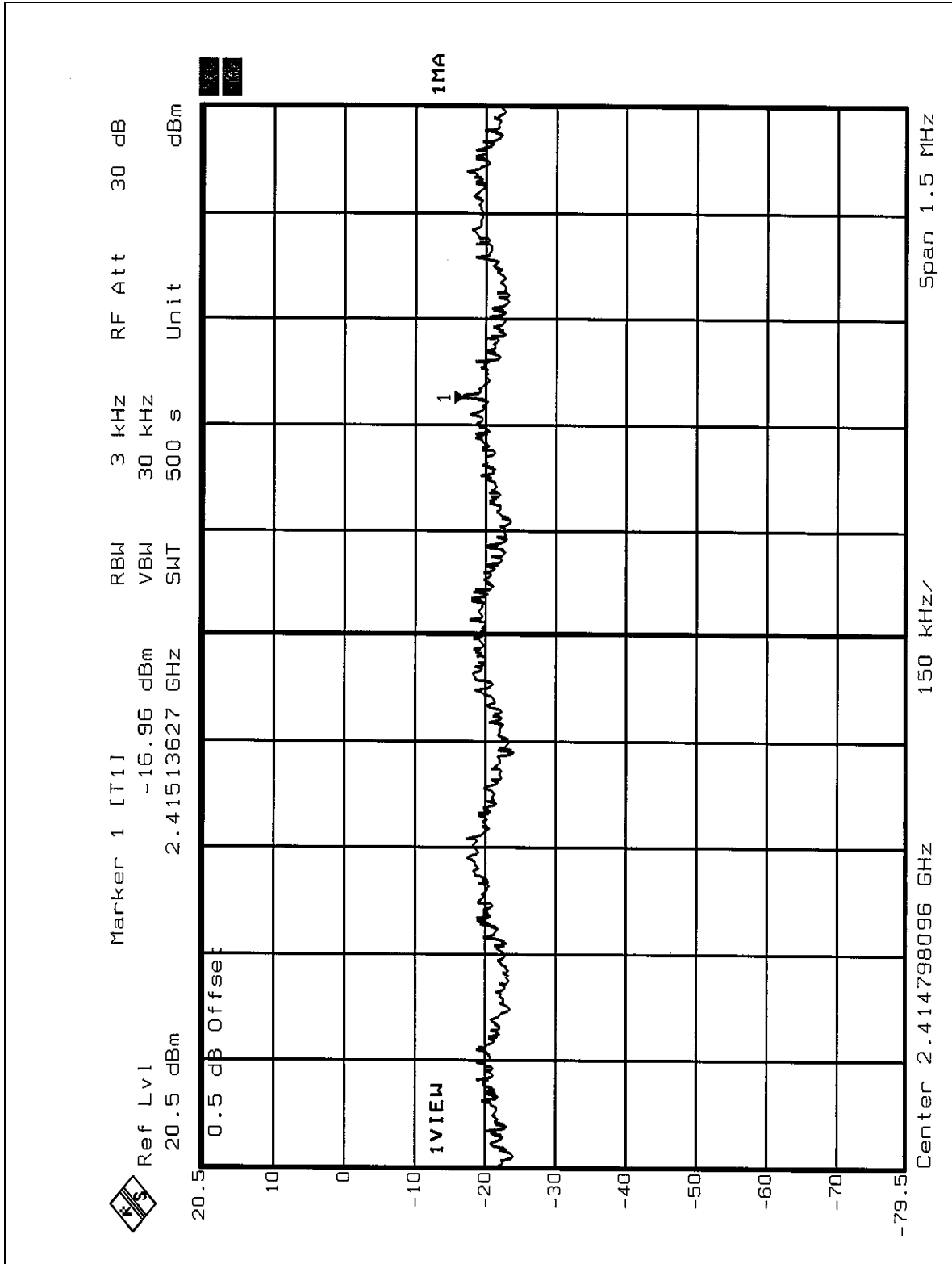
## 4.5.8 TEST RESULTS

<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>ENVIRONMENTAL CONDITIONS</b>	21deg. C, 65%RH, 991hPa
<b>TEST MODE</b>	OFDM	<b>TESTED BY</b>	Ansen Lei

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz )</b>	<b>RF POWER LEVEL IN 3kHz BW (dBm)</b>	<b>MAXIMUM LIMIT (dBm)</b>	<b>PASS/FAIL</b>
1	2412	-16.96	8	PASS
6	2437	-16.64	8	PASS
11	2462	-15.43	8	PASS

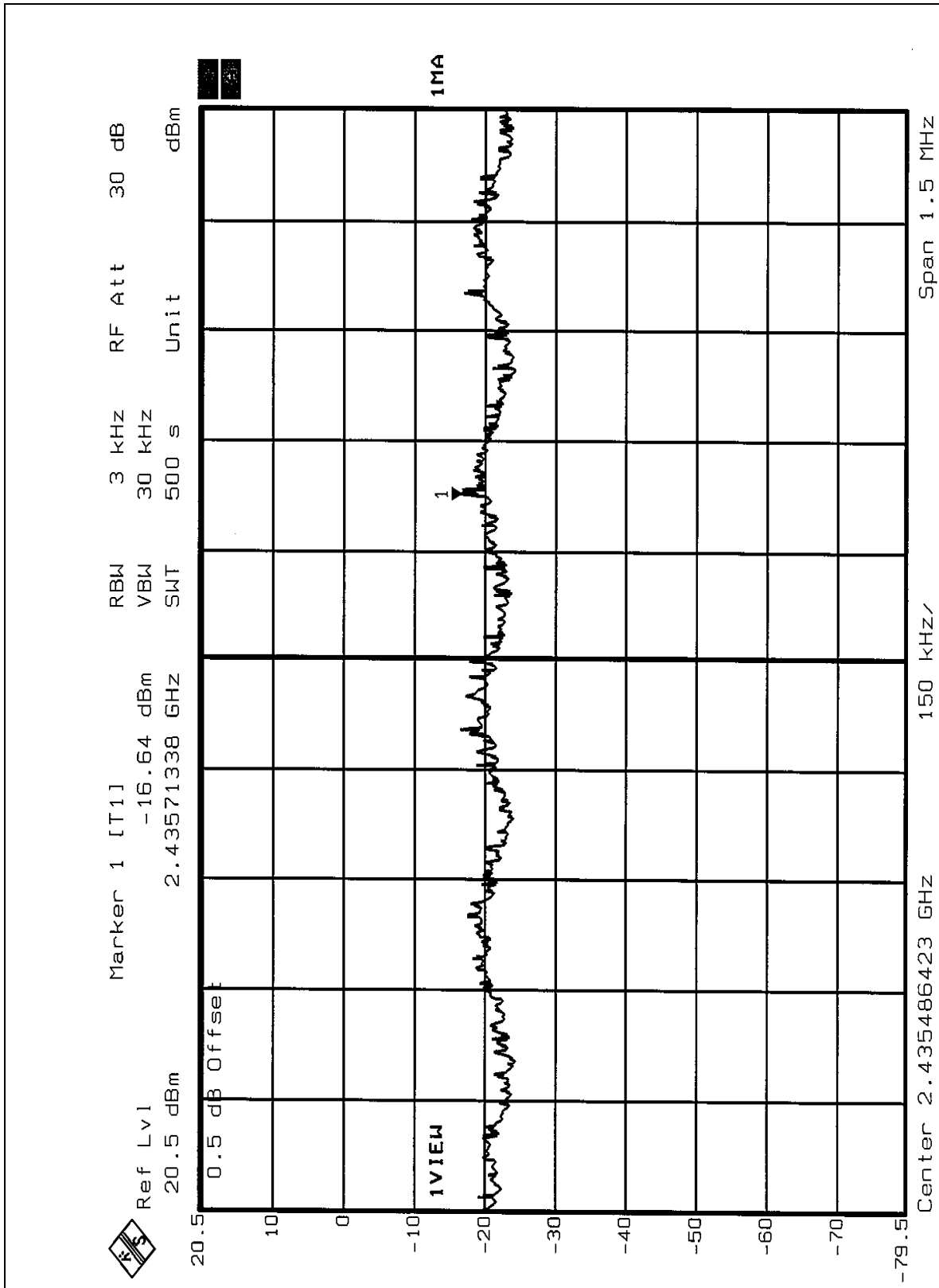


CH1





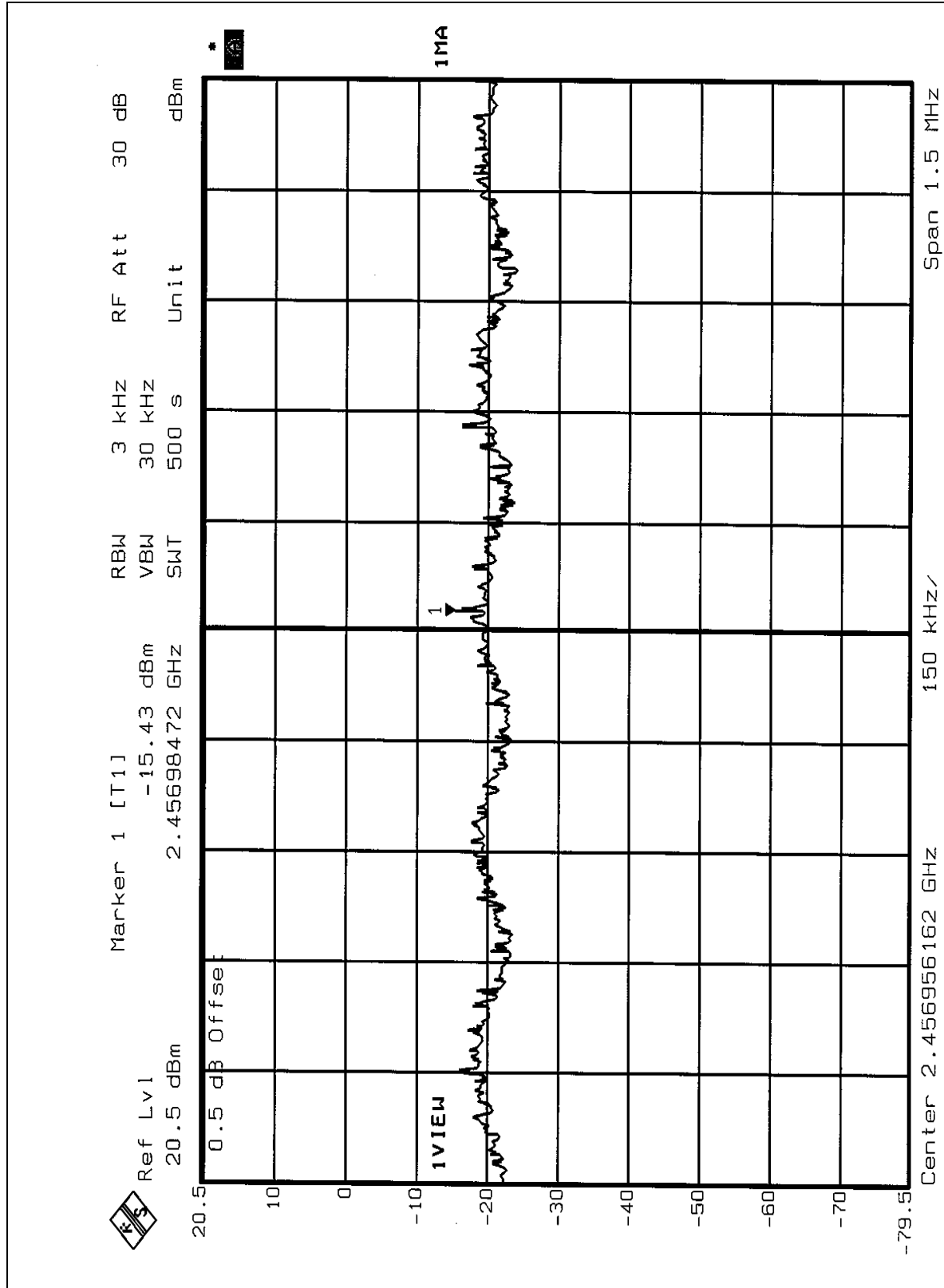
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## 4.6 BAND EDGES MEASUREMENT

### 4.6.1 LIMITS OF BAND EDGES MEASUREMENT

Below  $-20\text{dB}$  of the highest emission level of operating band (in 100KHz Resolution Bandwidth).

### 4.6.2 TEST INSTRUMENTS

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

**NOTE:** The measurement uncertainty is less than  $\pm 2.6\text{dB}$ , which is calculated as per the NAMAS document NIS81.

### 4.6.3 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 and 300Hz with suitable frequency span including 100kHz bandwidth from band edge. The band edges was measured and recorded.

### 4.6.4 DEVIATION FROM TEST STANDARD

No deviation



#### 4.6.5 EUT OPERATING CONDITION

Same as Item 4.3.6

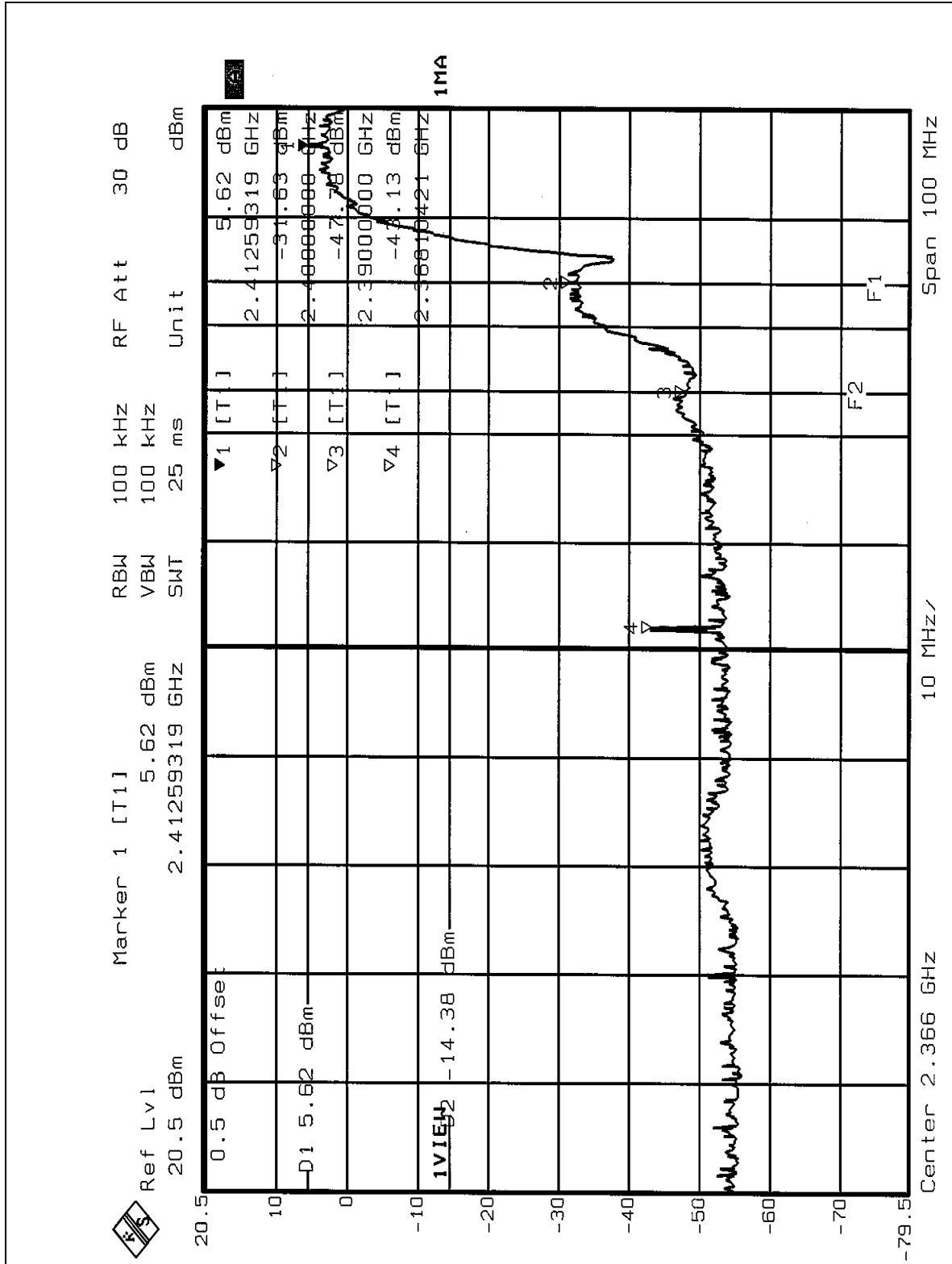
#### 4.6.6 TEST RESULTS

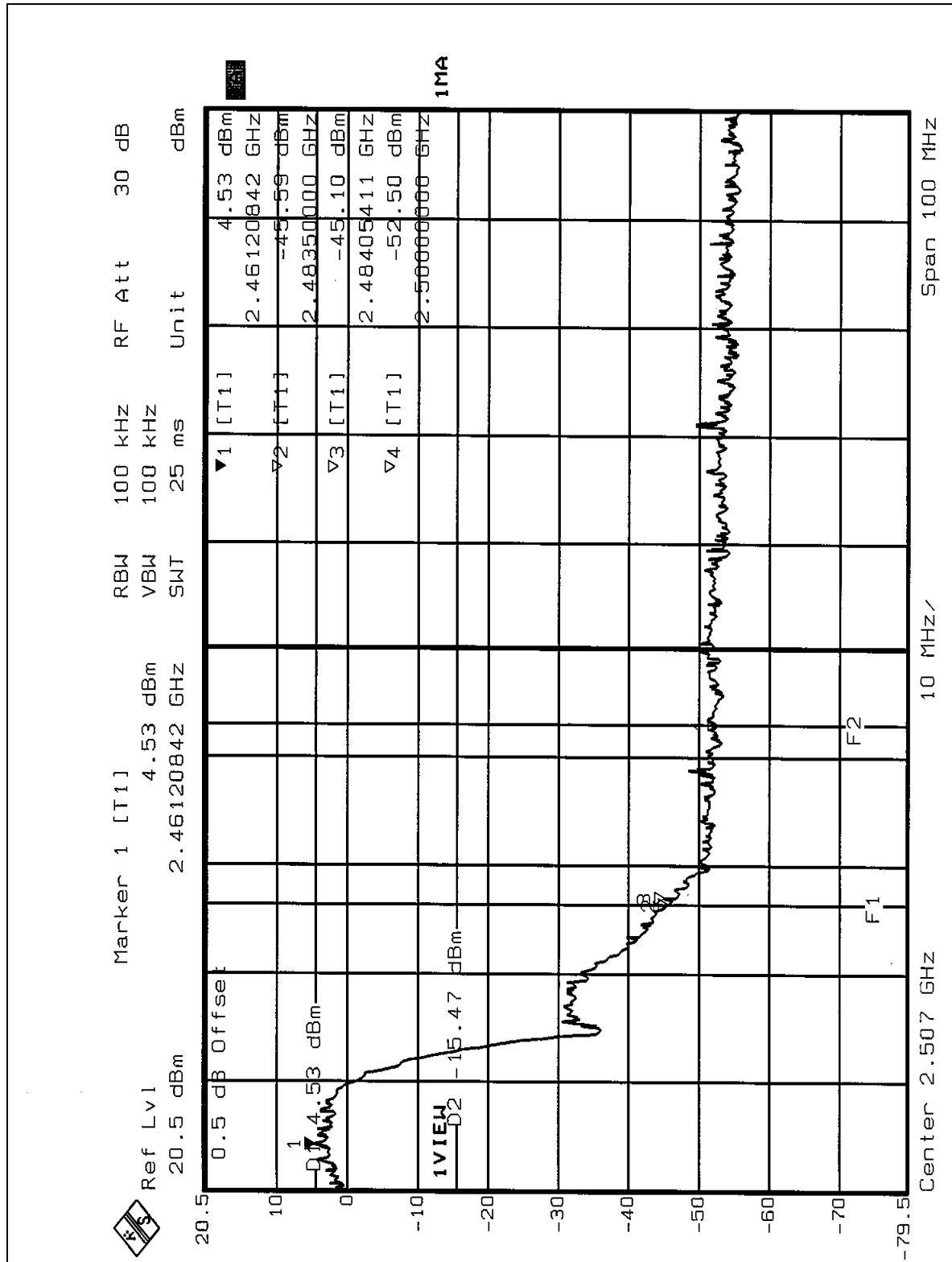
The spectrum plots are attached on the following 2 pages. D2 line indicates the highest level, and D1 line indicates the 20dB offset below D2. It shows compliance with the requirement in part 15.247(C).

**NOTE:**

The band edge emission plot of CCK technique on the first page shows 48.75dB delta between carrier maximum power and local maximum emission in restrict band (2.3681GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 102.6dBuV/m, so the maximum field strength in restrict band is  $102.6 - 48.75 = 53.85$ dBuV/m which is under 54dBuV/m limit.

The band edge emission plot of CCK technique on the second page shows 49.63dB delta between carrier maximum power and local maximum emission in restrict band (2.4841GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 100.2dBuV/m, so the maximum field strength in restrict band is  $103.2 - 49.63 = 53.57$ dBuV/m which is under 54dBuV/m limit.

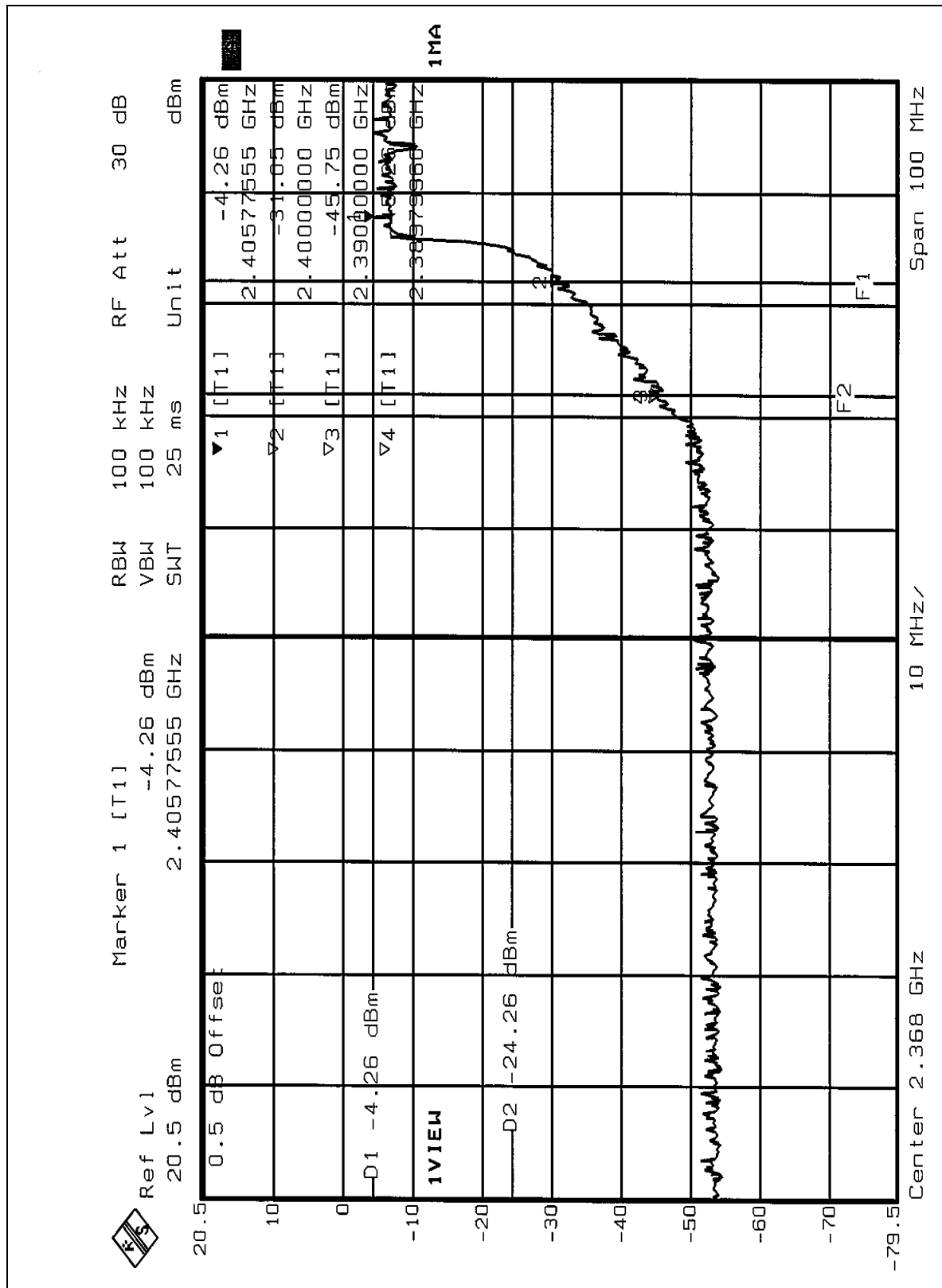


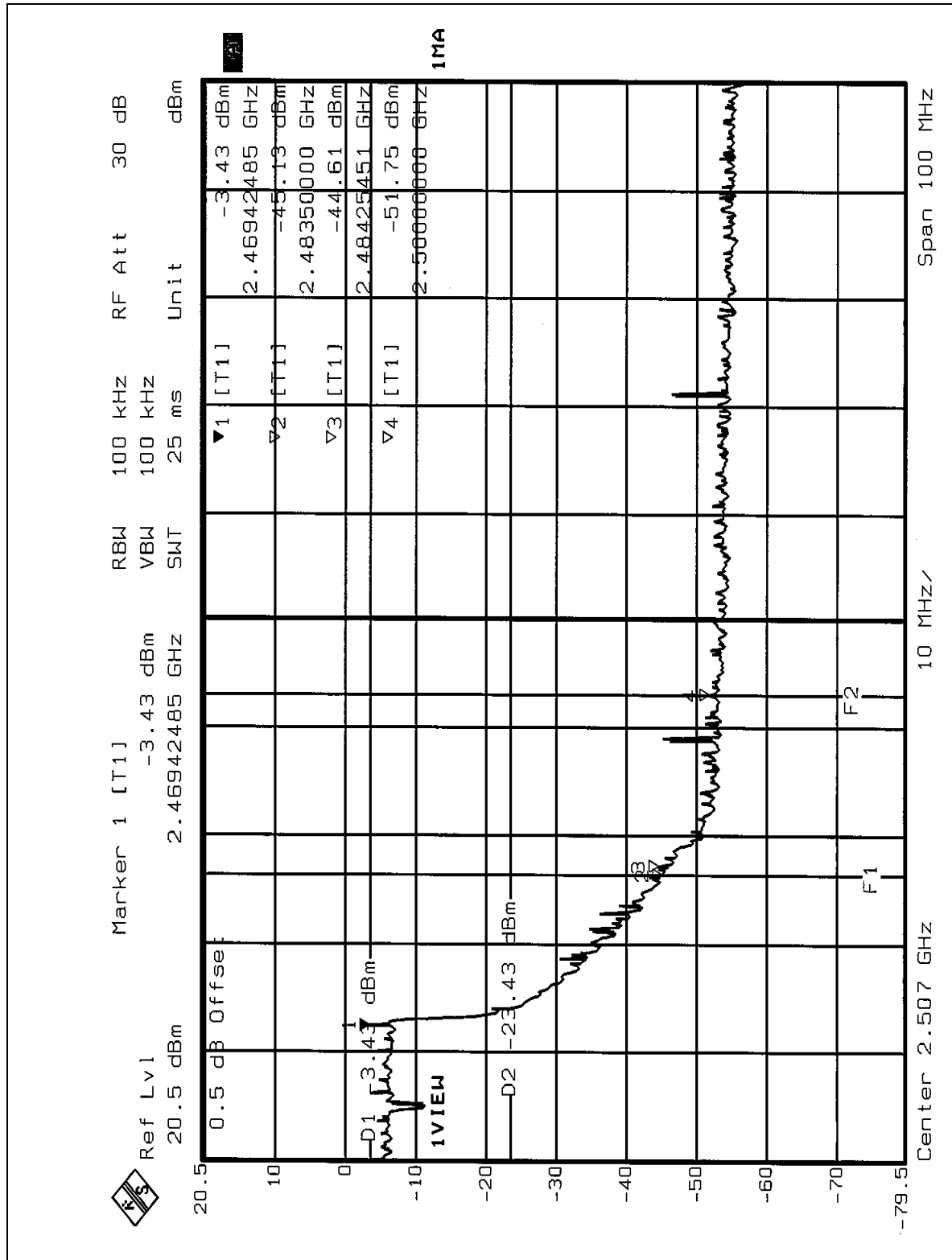


**NOTE:**

The band edge emission plot of OFDM technique on the first page shows 41dB delta between carrier maximum power and local maximum emission in restrict band (2.3898GHz). The emission of carrier strength list in the test result of channel 1 at the item 4.2.7 is 92.3dBuV/m, so the maximum field strength in restrict band is  $92.3 - 41 = 51.3$ dBuV/m which is under 54dBuV/m limit.

The band edge emission plot of OFDM technique on the first page shows 41.18dB delta between carrier maximum power and local maximum emission in restrict band (2.4843GHz). The emission of carrier strength list in the test result of channel 11 at the item 4.2.7 is 92.5dBuV/m, so the maximum field strength in restrict band is  $92.5 - 41.18 = 51.32$ dBuV/m which is under 54dBuV/m limit.









## **4.7 ANTENNA REQUIREMENT**

### **4.7.1 STANDARD APPLICABLE**

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### **4.7.2 ANTENNA CONNECTED CONSTRUCTION**

The antenna used in this product is T-type antenna with UFL connectors. The maximum Gain of the antenna is 0.39dBi.



## 5. TEST TYPES AND RESULTS (FOR PART 802.11a)

### 5.1 CONDUCTED EMISSION MEASUREMENT

#### 5.1.1 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.

#### 5.1.2 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
ROHDE & SCHWARZ Test Receiver	ESCS30	847793/022	Mar. 12, 2003
ROHDE & SCHWARZ Artificial Mains Network (for EUT)	ESH2-Z5	828075/003	July 23, 2003
ROHDE & SCHWARZ 200-A Four-line V-Network	ENV4200	830326/018	Oct. 30, 2003
* ROHDE & SCHWARZ 4-wire ISN	ENY41	838119/028	Nov. 29, 2003
* ROHDE & SCHWARZ 2-wire ISN	ENY22	837497/018	Nov. 29, 2003
EMCO-L.I.S.N. (for peripheral)	3825/2	90031627	July 23, 2003
Software	Cond-V2M1	NA	NA
RF cable (JYEBAO)	5D-FB	Cable-C05.01	July 19, 2003
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-305	Feb. 23, 2004
LYNICS Terminator (For EMCO LISN)	0900510	E1-01-306	Feb. 23, 2004

- 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. “\*”: These equipment are used for conducted telecom port test only (if tested).
  3. The test was performed in ADT Shielded Room No. 5.
  4. The VCCI Site Registration No. is C-1093.



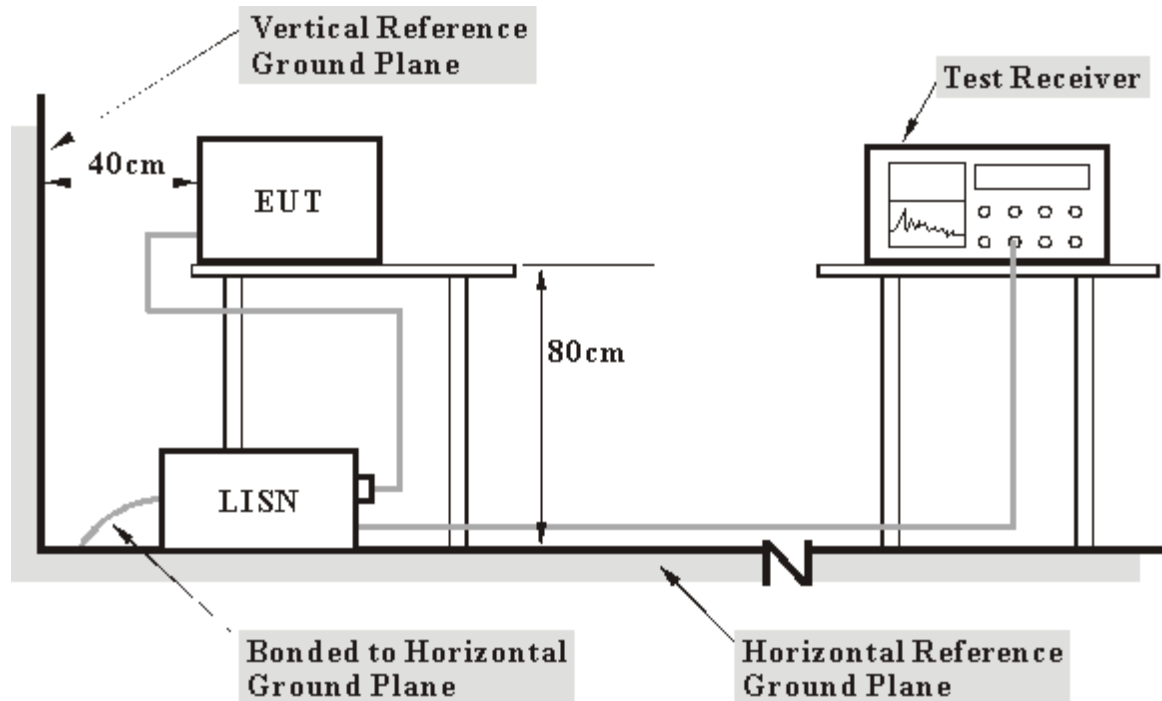
### 5.1.3 TEST PROCEDURES

- 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 over 10dB under the prescribed limits could not be reported

### 5.1.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.1.5 TEST SETUP



- Note:**
1. Support units were connected to second LISN.
  2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

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

### 5.1.6 EUT OPERATING CONDITIONS

Same as 4.1.6

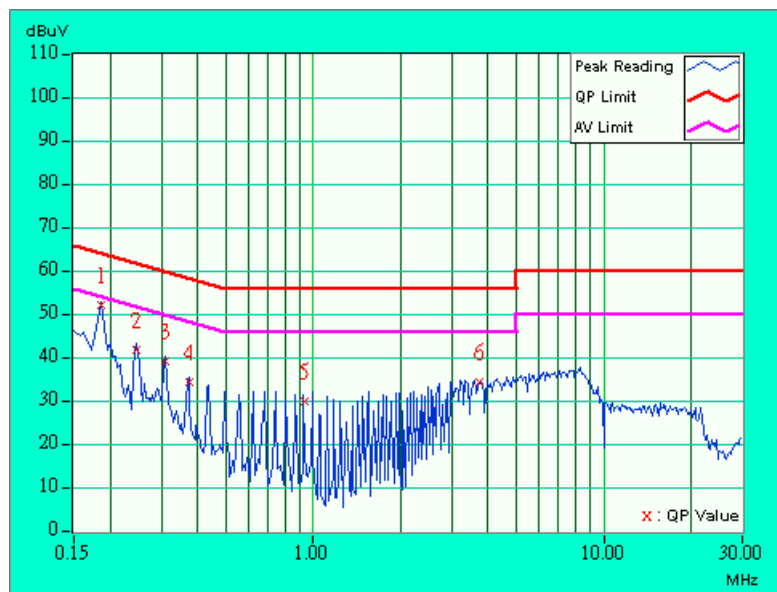


5.1.7 TEST RESULTS

<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
		<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Line (L)
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 54%RH, 991hPa	<b>TESTED BY:</b> Cody Chang	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.185	0.10	51.68	-	51.78	-	64.25	54.25	-12.47	-
2	0.248	0.10	41.53	-	41.63	-	61.84	51.84	-20.21	-
3	0.310	0.10	38.93	-	39.03	-	59.97	49.97	-20.94	-
4	0.373	0.10	34.25	-	34.35	-	58.44	48.44	-24.09	-
5	0.930	0.19	29.67	-	29.86	-	56.00	46.00	-26.14	-
6	3.715	0.37	34.03	-	34.40	-	56.00	46.00	-21.60	-

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

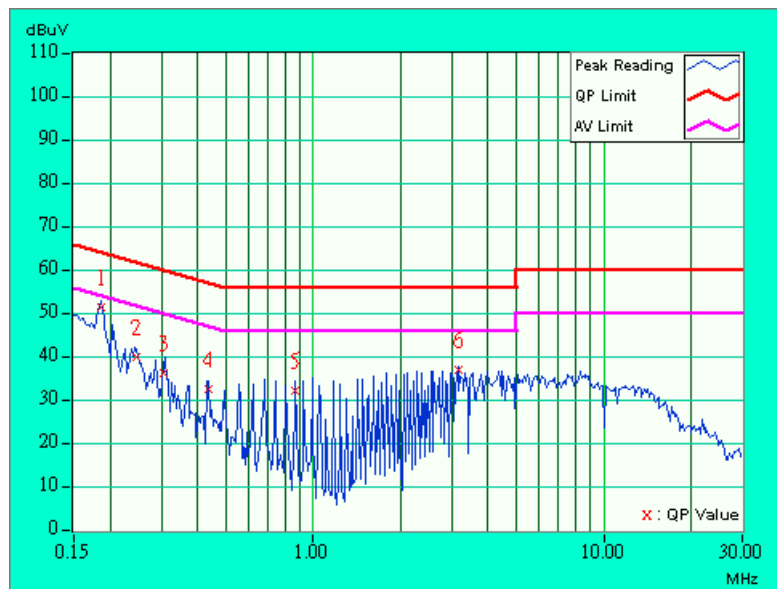




<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
		<b>6dB BANDWIDTH</b>	9 kHz
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz	<b>PHASE</b>	Neutral (N)
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 54%RH, 991hP	<b>TESTED BY:</b> Cody Chang	

No	Freq. [MHz]	Corr. Factor (dB)	Reading Value		Emission Level		Limit		Margin	
			[dB (uV)]		[dB (uV)]		[dB (uV)]		(dB)	
			Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
1	0.185	0.10	51.29	-	51.39	-	64.25	54.25	-12.86	-
2	0.248	0.10	39.67	-	39.77	-	61.84	51.84	-22.07	-
3	0.306	0.10	35.99	-	36.09	-	60.07	50.07	-23.98	-
4	0.435	0.11	32.19	-	32.30	-	57.15	47.15	-24.86	-
5	0.863	0.18	31.88	-	32.06	-	56.00	46.00	-23.94	-
6	3.156	0.26	36.94	-	37.20	-	56.00	46.00	-18.80	-

- 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.





## 5.2 RADIATED EMISSION MEASUREMENT

### 5.2.1 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.

### 5.2.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

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

**NOTE:**

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

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



## 5.2.3 TEST INSTRUMENTS

DESCRIPTION & MANUFACTURER	MODEL NO.	SERIAL NO.	CALIBRATED UNTIL
* HP Spectrum Analyzer	8590L	3544A01176	May 13, 2003
* HP Preamplifier	8447D	2944A08485	Apr. 29, 2003
* HP Preamplifier	8449B	3008A01201	Dec. 01, 2003
* HP Preamplifier	8449B	3008A01292	Aug. 07, 2003
*Spectrum Analyzer	8593E	3926A04191	Mar. 28, 2003
*Test Receiver	ESI7	838496/016	Feb. 23, 2004
SCHAFFNER Tunable Dipole Antenna	VHBA 9123	459	Nov. 22, 2003
SCHWARZBECK Tunable Dipole Antenna	UHA 9105	977	
* CHASE BILOG Antenna	CBL6112A	2221	Aug. 02, 2003
* SCHWARZBECK Horn Antenna	BBHA9120-D1	D130	July 03, 2003
* EMCO Horn Antenna	3115	9312-4192	Apr. 09, 2003
* EMCO Turn Table	1060	1115	NA
* SHOSHIN Tower	AP-4701	A6Y005	NA
* Software	ADT_Radiated_V5.09	NA	NA
* ANRITSU RF Switches	MP59B	M35046	Jul. 11. 2003
* TIMES RF cable	LMR-600	CABLE-ST5-01	Jul. 11. 2003

- 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. "\*" = These equipment are used for the final measurement.
  3. The horn antenna and HP preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
  4. The test was performed in ADT Open Site No. 5.
  5. The VCCI Site Registration No. is R-1039.





#### 5.2.4 TEST PROCEDURES

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

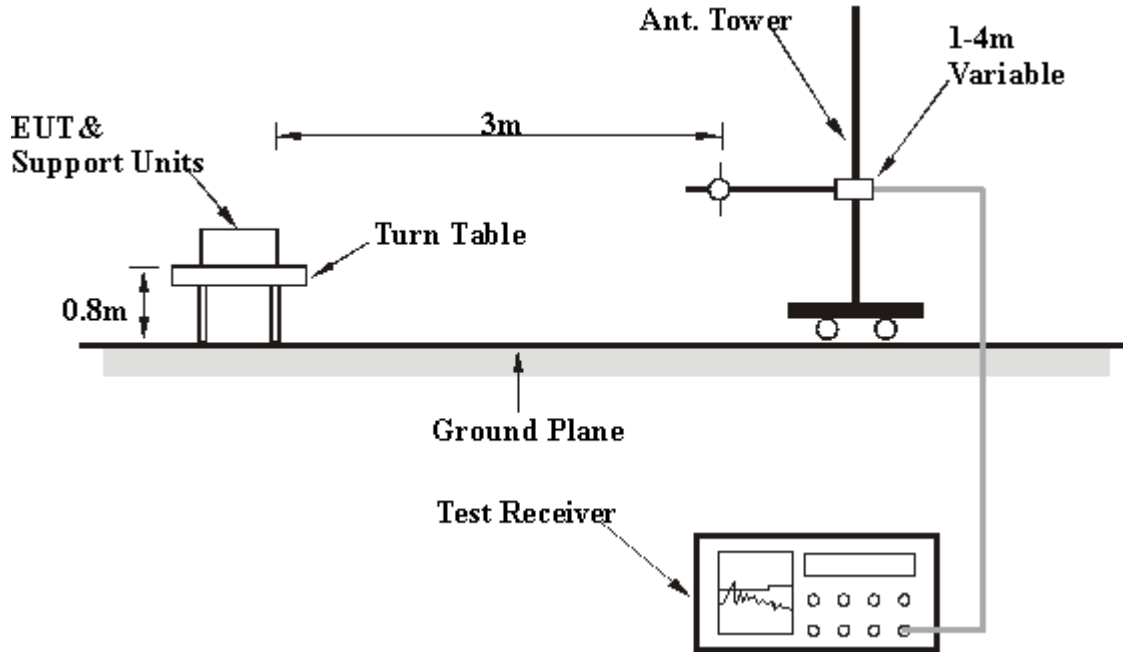
**NOTE:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 1 MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 300 Hz for Average detection (AV) at frequency above 1GHz.

#### 5.2.5 DEVIATION FROM TEST STANDARD

No deviation

### 5.2.6 TEST SETUP



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

### 5.2.7 EUT OPERATING CONDITIONS

Same as 4.1.6



## 5.2.8 TEST RESULTS

<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>FREQUENCY RANGE</b>	Below 1000MHz	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>TESTED BY</b>	Gary Chang		

### 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	135.00	31.0 QP	43.50	-12.50	1.15 H	74	18.50	12.50
2	166.70	33.2 QP	43.50	-10.30	1.04 H	136	22.50	10.70
3	192.20	31.8 QP	43.50	-11.70	1.00 H	89	21.00	10.80
4	214.76	35.7 QP	43.50	-7.80	1.52 H	288	23.40	12.30
5	243.43	43.6 QP	46.00	-2.40	1.36 H	158	28.60	15.00
6	272.03	39.3 QP	46.00	-6.70	1.31 H	67	22.90	16.40
7	329.32	38.5 QP	46.00	-7.50	1.36 H	341	21.10	17.30
8	343.61	41.5 QP	46.00	-4.50	1.33 H	258	23.90	17.60
9	363.89	33.0 QP	46.00	-13.00	1.36 H	244	14.90	18.10
10	400.91	40.2 QP	46.00	-5.80	1.20 H	89	21.10	19.10
11	429.51	38.8 QP	46.00	-7.20	1.00 H	300	19.30	19.50
12	465.00	31.7 QP	46.00	-14.30	1.06 H	56	11.50	20.20
13	472.47	39.1 QP	46.00	-6.90	1.03 H	194	18.70	20.40
14	472.47	39.4 QP	46.00	-6.60	1.03 H	312	19.00	20.40
15	501.10	41.4 QP	46.00	-4.60	1.02 H	71	20.20	21.20
16	529.75	42.5 QP	46.00	-3.50	1.83 H	316	21.40	21.10
17	566.08	37.1 QP	46.00	-8.90	1.00 H	77	15.50	21.60
18	587.02	38.3 QP	46.00	-7.70	1.82 H	50	16.00	22.30
19	599.90	32.0 QP	46.00	-14.00	1.47 H	204	9.30	22.70
20	629.98	39.9 QP	46.00	-6.10	1.84 H	294	17.10	22.80
21	920.36	32.7 QP	46.00	-13.30	1.60 H	202	7.70	25.00

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
  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.



<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>FREQUENCY RANGE</b>	Below 1000MHz	<b>DETECTOR FUNCTION</b>	Quasi-Peak
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz
<b>TESTED BY</b>	Gary Chang		

#### 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	125.00	32.4 QP	43.50	-11.10	1.42 V	73	19.20	13.20
2	196.15	32.8 QP	43.50	-10.70	1.10 V	186	21.90	10.90
3	214.79	24.8 QP	43.50	-18.70	1.20 V	267	12.40	12.30
4	272.03	31.7 QP	46.00	-14.30	1.84 V	12	15.30	16.40
5	324.03	40.2 QP	46.00	-5.80	1.85 V	91	22.90	17.20
6	372.27	36.0 QP	46.00	-10.00	1.43 V	198	17.60	18.30
7	458.28	42.3 QP	46.00	-3.70	1.15 V	51	22.30	20.00
8	501.11	38.6 QP	46.00	-7.40	1.35 V	321	17.40	21.20
9	529.78	38.0 QP	46.00	-8.00	1.41 V	61	16.80	21.10
10	563.78	32.0 QP	46.00	-14.00	1.40 V	291	10.50	21.50
11	629.99	36.3 QP	46.00	-9.70	1.35 V	82	13.60	22.80
12	658.70	34.0 QP	46.00	-12.00	1.02 V	268	11.20	22.80
13	696.41	32.7 QP	46.00	-13.30	1.11 V	202	9.70	23.00
14	716.59	38.1 QP	46.00	-7.90	1.09 V	11	14.70	23.40
15	733.51	33.7 QP	46.00	-12.30	1.42 V	175	10.00	23.80
16	797.00	31.0 QP	46.00	-15.00	1.10 V	35	6.20	24.80
17	927.50	33.7 QP	46.00	-12.30	1.47 V	6	8.70	25.00

- REMARKS:**
1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
  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.



## 5.2.9 TEST RESULTS – NORMAL MODE

<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>CHANNEL</b>	1
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>TESTED BY</b>	Gary Chang

**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	#5150.00	55.7 PK	74.00	-18.30	1.32 H	24	18.00	37.70
1	#5150.00	46.7 AV	54.00	-7.30	1.32 H	24	9.00	37.70
2	*5180.00	101.7 PK			1.32 H	24	64.00	37.70
2	*5180.00	94.7 AV			1.32 H	24	57.00	37.70
3	10360.00	45.0 PK	68.30	-23.30	1.42 H	13	0.50	44.50

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

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	#5150.00	59.7 PK	74.00	-14.30	1.29 V	45	22.00	37.70
1	#5150.00	49.7 AV	54.00	-4.30	1.29 V	45	12.00	37.70
2	*5180.00	107.8 PK			1.29 V	45	70.10	37.70
2	*5180.00	99.0 AV			1.29 V	45	61.40	37.70
3	10360.00	50.0 PK	68.30	-18.30	1.09 V	325	5.50	44.50

**REMARKS:**

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



<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>CHANNEL</b>	4
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>TESTED BY</b>	Gary Chang

#### 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	*5240.00	103.1 PK			1.24 H	25	65.40	37.70
1	*5240.00	96.0 AV			1.24 H	25	58.30	37.70
2	10480.00	52.0 PK	68.30	-16.30	1.35 H	74	7.00	45.00

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

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5240.00	108.5 PK			1.27 V	33	70.80	37.70
1	*5240.00	98.9 AV			1.27 V	33	61.20	37.70
2	10480.00	51.0 PK	68.30	-17.30	1.29 V	117	6.00	45.00

#### REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
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



<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>CHANNEL</b>	5
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>TESTED BY</b>	Gary Chang

#### 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	*5260.00	108.1 PK			1.46 H	266	70.40	37.70
1	*5260.00	99.7 AV			1.46 H	266	62.00	37.70
2	10520.00	64.0 PK	68.30	-4.30	1.52 H	43	18.90	45.10

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

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5260.00	109.4 PK			1.28 V	35	71.70	37.70
1	*5260.00	100.8 AV			1.28 V	35	63.10	37.70
2	10520.00	62.0 PK	68.30	-6.30	1.34 V	5	16.90	45.10

#### REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
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



<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>CHANNEL</b>	8
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>TESTED BY</b>	Gary Chang

#### 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	*5320.00	104.7 PK			1.91 H	32	67.00	37.70
1	*5320.00	96.7 AV			1.91 H	32	59.00	37.70
2	#5350.00	60.2 PK	74.00	-13.80	1.52 H	45	22.50	37.70
2	#5350.00	51.7 AV	54.00	-2.30	1.52 H	45	14.00	37.70
3	#10640.00	56.2 PK	74.00	-17.80	1.11 H	34	10.90	45.20
3	#10640.00	43.2 AV	54.00	-10.80	1.11 H	34	-2.10	45.20

#### 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	*5320.00	103.7 PK			1.21 V	13	66.00	37.70
1	*5320.00	95.7 AV			1.21 V	13	58.00	37.70
2	#5350.00	60.7 PK	74.00	-13.30	1.21 V	13	23.00	37.70
2	#5350.00	51.9 AV	54.00	-2.10	1.21 V	13	14.20	37.70
3	#10640.00	58.2 PK	74.00	-15.80	1.29 V	294	12.90	45.20
3	#10640.00	44.2 AV	54.00	-9.80	1.29 V	294	-1.10	45.20

#### REMARKS:

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





<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>CHANNEL</b>	9
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>TESTED BY</b>	Gary Chang

#### 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	5715.00	66.9 PK	68.30	-1.40	1.57 H	302	29.00	37.90
2	5725.00	76.8 PK	78.30	-1.50	1.57 H	302	38.90	37.90
3	*5745.00	104.3 PK			1.57 H	302	66.40	37.90
3	*5745.00	96.9 AV			1.57 H	302	59.00	37.90
4	#11490.00	52.5 PK	74.00	-21.50	1.23 H	19	7.00	45.50
4	#11490.00	44.5 AV	54.00	-9.50	1.23 H	19	-1.00	45.50

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

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5715.00	64.9 PK	68.30	-3.40	1.27 V	35	27.00	37.90
2	5725.00	75.9 PK	78.30	-2.40	1.27 V	35	38.00	37.90
3	*5745.00	103.7 PK			1.27 V	35	65.80	37.90
3	*5745.00	94.9 AV			1.27 V	35	57.00	37.90
4	#11490.00	54.5 PK	74.00	-19.50	1.07 V	350	9.00	45.50
4	#11490.00	46.5 AV	54.00	-7.50	1.07 V	350	1.00	45.50

#### REMARKS:

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



<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>CHANNEL</b>	12
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>TESTED BY</b>	Gary Chang

#### 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	*5805.00	99.2 PK			1.15 H	175	61.30	38.00
1	*5805.00	92.6 AV			1.15 H	175	54.60	38.00
2	5825.00	73.0 PK	78.30	-5.30	1.15 H	175	35.00	38.00
3	5835.00	65.0 PK	68.30	-3.30	1.15 H	175	27.00	38.00
4	#11609.00	54.5 PK	74.00	-19.50	1.28 H	245	9.00	45.50
4	#11609.00	46.3 AV	54.00	-7.70	1.28 H	245	0.80	45.50

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

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5805.00	102.5 PK			1.59 V	311	64.50	38.00
1	*5805.00	93.4 AV			1.59 V	311	55.40	38.00
2	5825.00	76.0 PK	78.30	-2.30	1.59 V	311	38.00	38.00
3	5835.00	66.0 PK	68.30	-2.30	1.59 V	311	28.00	38.00
4	#11609.00	53.5 PK	74.00	-20.50	1.30 V	21	8.00	45.50
4	#11609.00	44.5 AV	54.00	-9.50	1.30 V	21	-1.00	45.50

#### REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
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.



## 5.2.10 TEST RESULTS – TURBO MODE

<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>CHANNEL</b>	1
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>TESTED BY</b>	Gary Chang

**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	*5210.00	101.2 PK			1.09 H	212	63.50	37.70
1	*5210.00	92.1 AV			1.09 H	212	54.40	37.70
2	10420.00	55.2 PK	68.30	-13.10	1.24 H	323	10.50	44.80

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

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5210.00	102.0 PK			1.30 V	42	64.30	37.70
1	*5210.00	92.2 AV			1.30 V	42	54.50	37.70
2	10420.00	55.0 PK	68.30	-13.30	1.32 V	77	10.30	44.80

**REMARKS:**

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
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



<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>CHANNEL</b>	2
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>TESTED BY</b>	Gary Chang

#### 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	5250.00	100.0 PK			1.12 H	74	62.30	37.70
1	5250.00	92.0 AV			1.12 H	74	54.30	37.70
2	10500.00	55.1 PK	68.30	-13.20	1.21 H	28	10.10	45.10

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

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5250.00	98.9 PK			1.38 V	192	61.20	37.70
1	*5250.00	91.4 AV			1.38 V	192	53.70	37.70
2	10500.00	53.8 PK	68.30	-14.50	1.45 V	65	8.80	45.10

#### REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
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



<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>CHANNEL</b>	3
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>TESTED BY</b>	Gary Chang

#### 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	*5290.00	99.6 PK			1.43 H	257	61.90	37.70
1	*5290.00	91.6 AV			1.43 H	257	53.90	37.70
2	10580.00	54.9 PK	68.30	-13.40	1.30 H	25	9.70	45.10

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

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5290.00	104.0 PK			1.45 V	37	66.30	37.70
1	*5290.00	94.4 AV			1.45 V	37	56.80	37.70
2	10580.00	56.3 PK	68.30	-12.00	1.67 V	47	11.10	45.10

#### REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
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



<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>CHANNEL</b>	4
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>TESTED BY</b>	Gary Chang

#### 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	5715.00	65.9 PK	68.30	-2.40	1.42 H	74	28.00	37.90
2	5725.00	72.9 PK	78.30	-5.40	1.54 H	236	35.00	37.90
3	*5760.00	100.6 PK			1.54 H	236	62.70	37.90
3	*5760.00	93.1 AV			1.54 H	236	55.10	37.90
4	#11520.00	54.5 PK	74.00	-19.50	1.26 H	11	9.00	45.50
4	#11520.00	44.0 AV	54.00	-10.00	1.26 H	11	-1.50	45.50

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

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	5715.00	64.9 PK	68.30	-3.40	1.42 V	71	27.00	37.90
2	5725.00	72.9 PK	78.30	-6.30	1.22 V	153	35.00	37.90
3	*5760.00	98.4 PK			1.22 V	153	60.50	37.90
3	*5760.00	90.5 AV			1.22 V	153	52.60	37.90
4	#11520.00	56.7 PK	74.00	-17.30	1.30 V	257	11.20	45.50
4	#11520.00	44.1 AV	54.00	-9.90	1.30 V	257	-1.40	45.50

#### REMARKS:

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



<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>FREQUENCY RANGE</b>	Above 1000 MHz	<b>CHANNEL</b>	5
<b>ENVIRONMENTAL CONDITIONS</b>	20deg. C, 60%RH, 991hPa	<b>DETECTOR FUNCTION</b>	Peak(PK) Average (AV)
<b>INPUT POWER (SYSTEM)</b>	120Vac, 60Hz	<b>TESTED BY</b>	Gary Chang

#### 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	*5800.00	101.9 PK			1.54 H	254	63.90	38.00
1	*5800.00	92.8 AV			1.54 H	254	54.80	38.00
2	5825.00	76.0 PK	78.30	-2.30	1.54 H	254	38.00	38.00
3	5835.00	66.0 PK	68.30	-2.30	1.12 H	74	28.00	38.00
4	#11600.00	53.5 PK	74.00	-20.50	1.06 H	145	8.00	45.50
4	#11600.00	43.5 AV	54.00	-10.50	1.06 H	145	-2.00	45.50

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

No.	Freq. (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Height (m)	Table Angle (Degree)	Raw Value (dBuV)	Correction Factor (dB/m)
1	*5800.00	98.5 PK			1.14 V	42	60.50	38.00
1	*5800.00	90.7 AV			1.14 V	42	52.70	38.00
2	5825.00	74.5 PK	78.30	-3.80	1.25 V	42	36.50	38.00
3	5835.00	66.4 PK	68.30	-1.90	1.25 V	42	28.40	38.00
4	#11600.00	54.5 PK	74.00	-19.50	1.31 V	54	9.00	45.50
4	#11600.00	44.3 AV	54.00	-9.70	1.31 V	54	-1.20	45.50

#### REMARKS:

1. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB)
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.



### 5.3 PEAK TRANSMIT POWER MEASUREMENT

#### 5.3.1 LIMITS OF PEAK TRANSMIT POWER MEASUREMENT

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

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

#### 5.3.2 TEST INSTRUMENTS

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

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



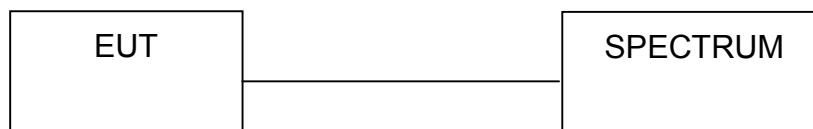
### 5.3.3 TEST PROCEDURE

1. The transmitter output was connected to the spectrum analyzer.
2. Set span to encompass the entire emission bandwidth of the signal.
3. Set RBW to 1MHz, VBW to 300kHz.
4. Using the spectrum analyzer's channel power measurement function to measure the output power.

### 5.3.4 DEVIATION FROM TEST STANDARD

No deviation

### 5.3.5 TEST SETUP



### 5.3.6 EUT OPERATING CONDITIONS

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



## 5.3.7 TEST RESULTS – NORMAL MODE

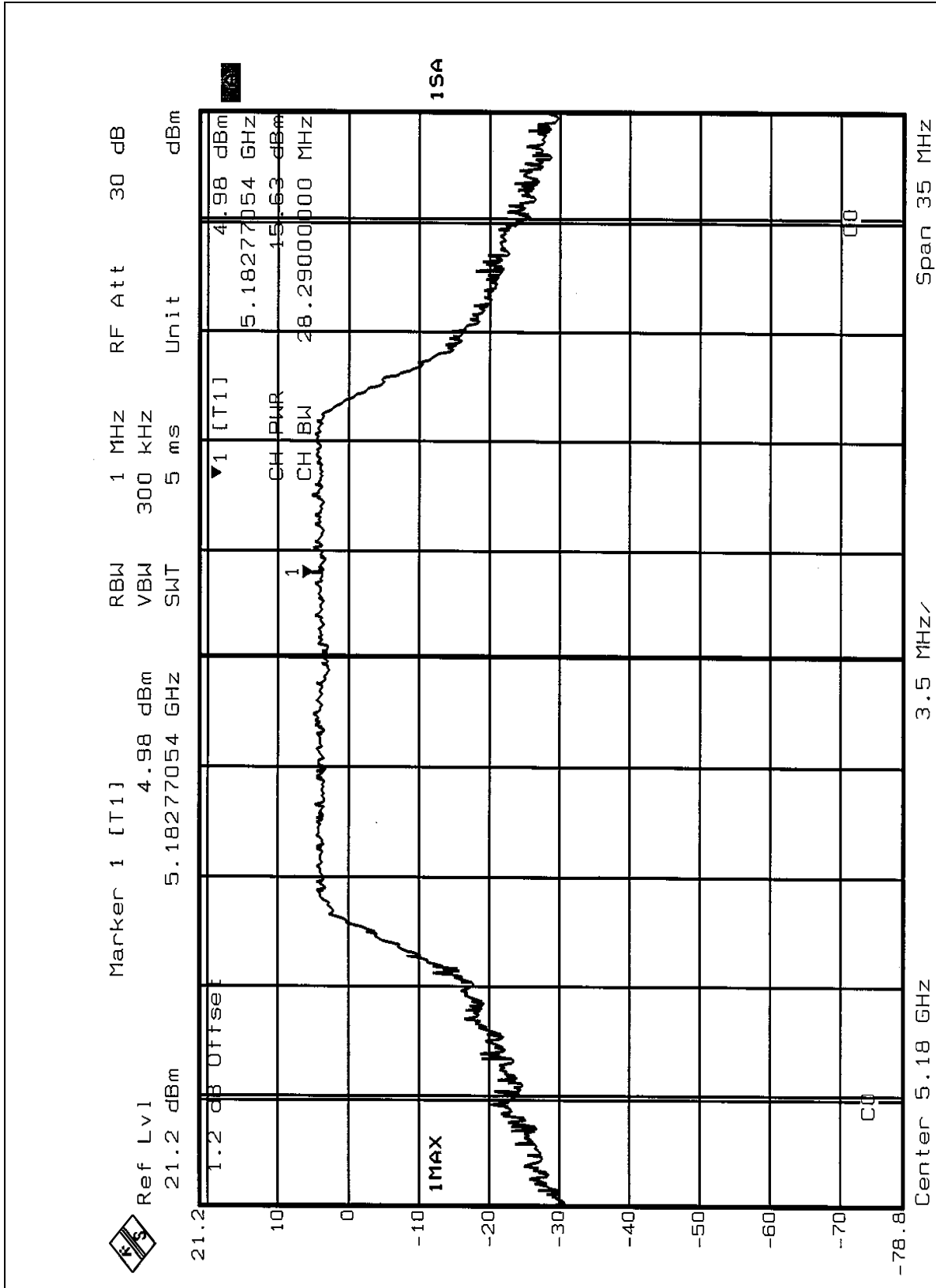
<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 67%RH, 991hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>TESTED BY</b>	Ansen Lei		

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>PEAK POWER OUTPUT (dBm)</b>	<b>PEAK POWER LIMIT (dBm)</b>	<b>26dBc Occupied Bandwidth (MHz)</b>	<b>PASS/FAIL</b>
1	5180	15.63	17.00	28.30	PASS
4	5240	16.07	17.00	27.25	PASS
5	5260	20.22	24.00	26.77	PASS
8	5320	17.87	24.00	27.33	PASS
9	5745	18.92	30.00	27.17	PASS
12	5805	18.33	30.00	27.25	PASS

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

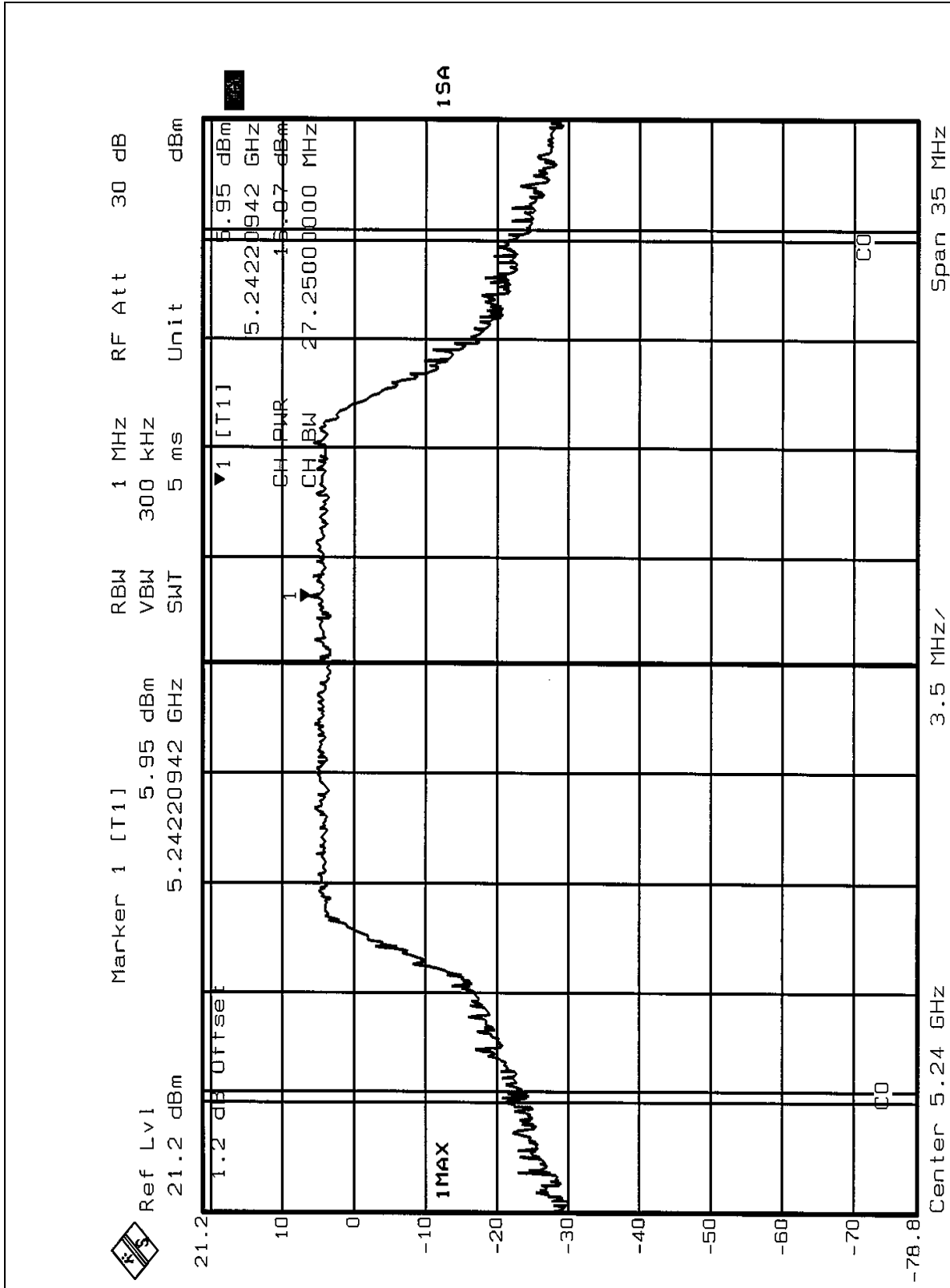


CHANNEL 1



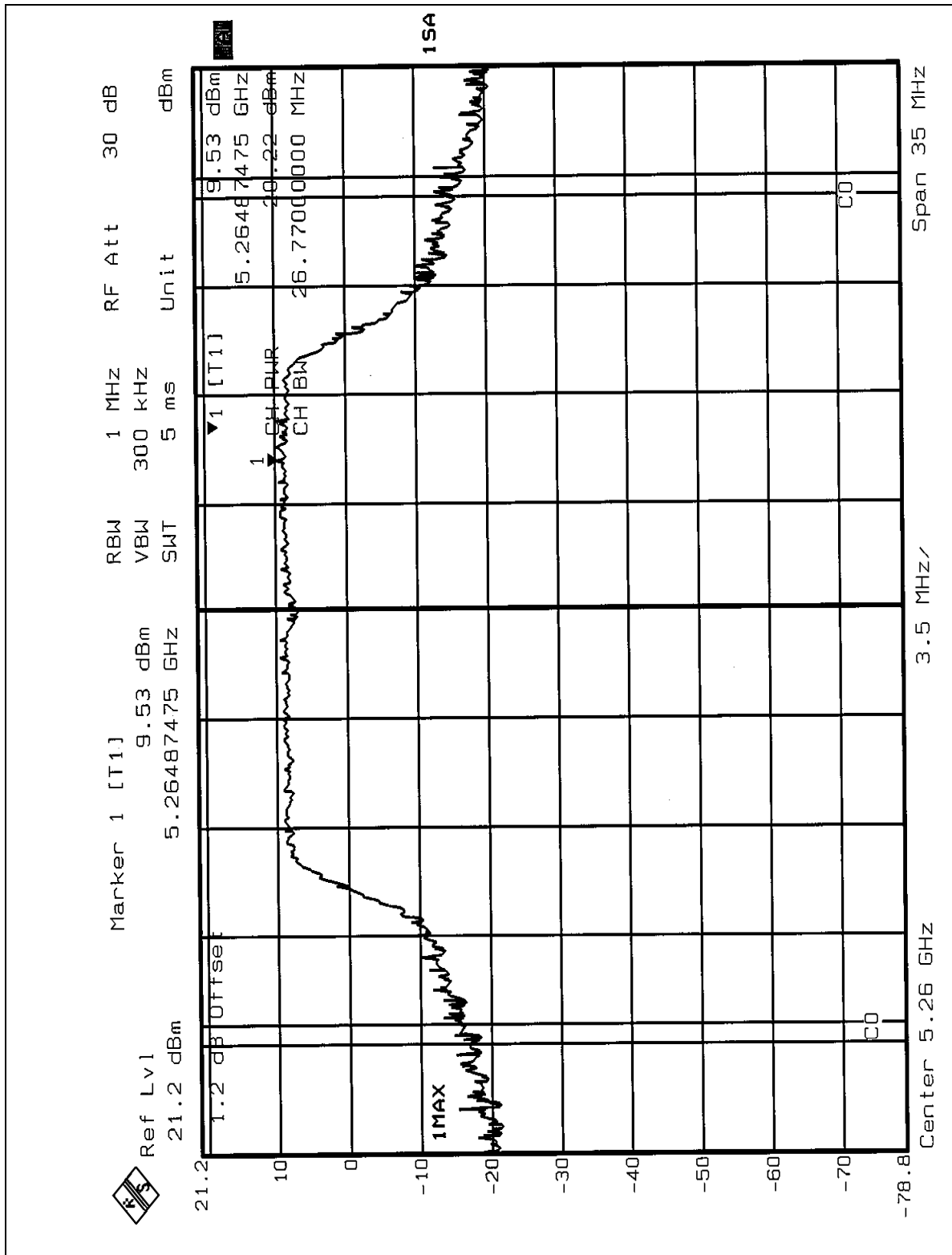


CHANNEL 4



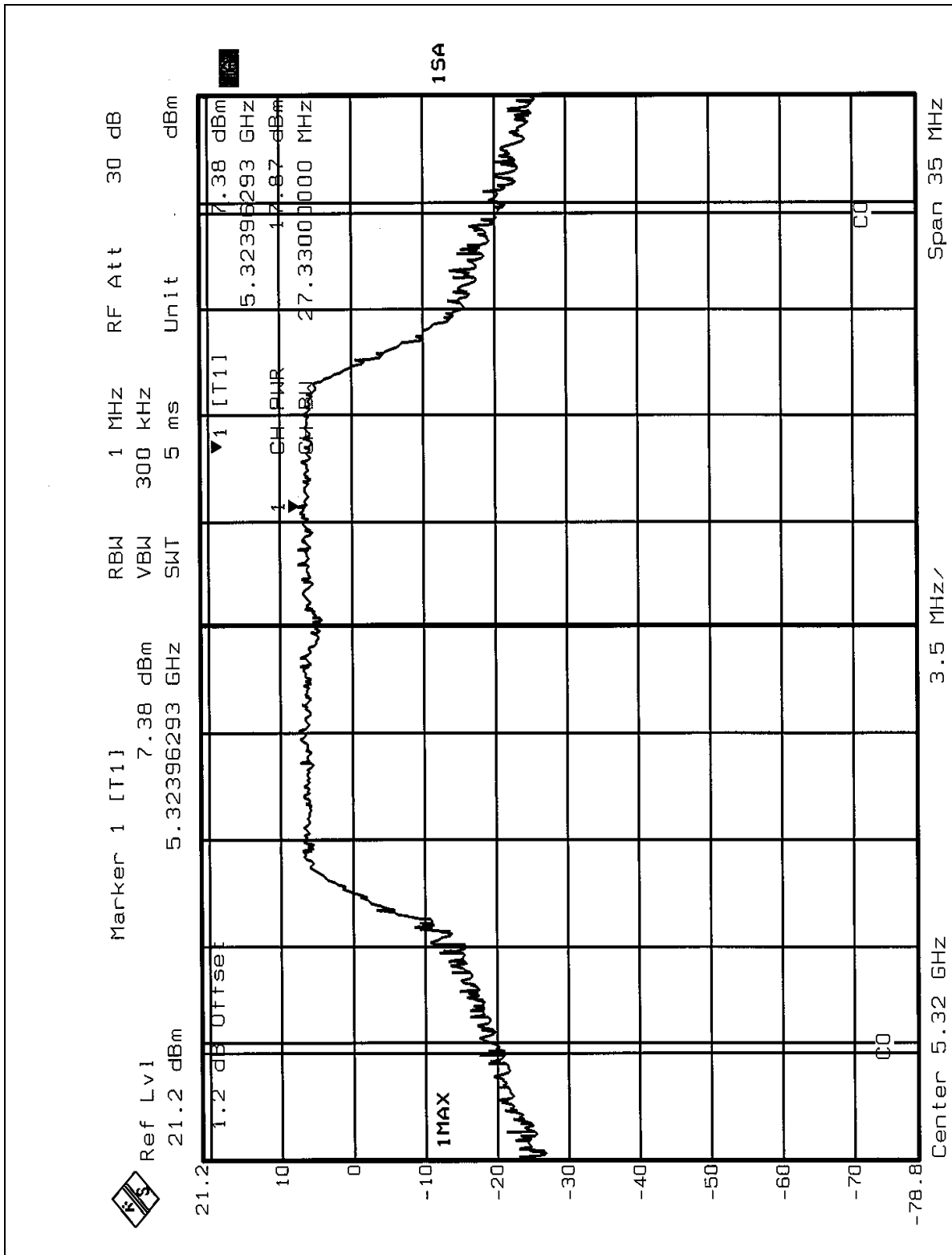


CHANNEL 5



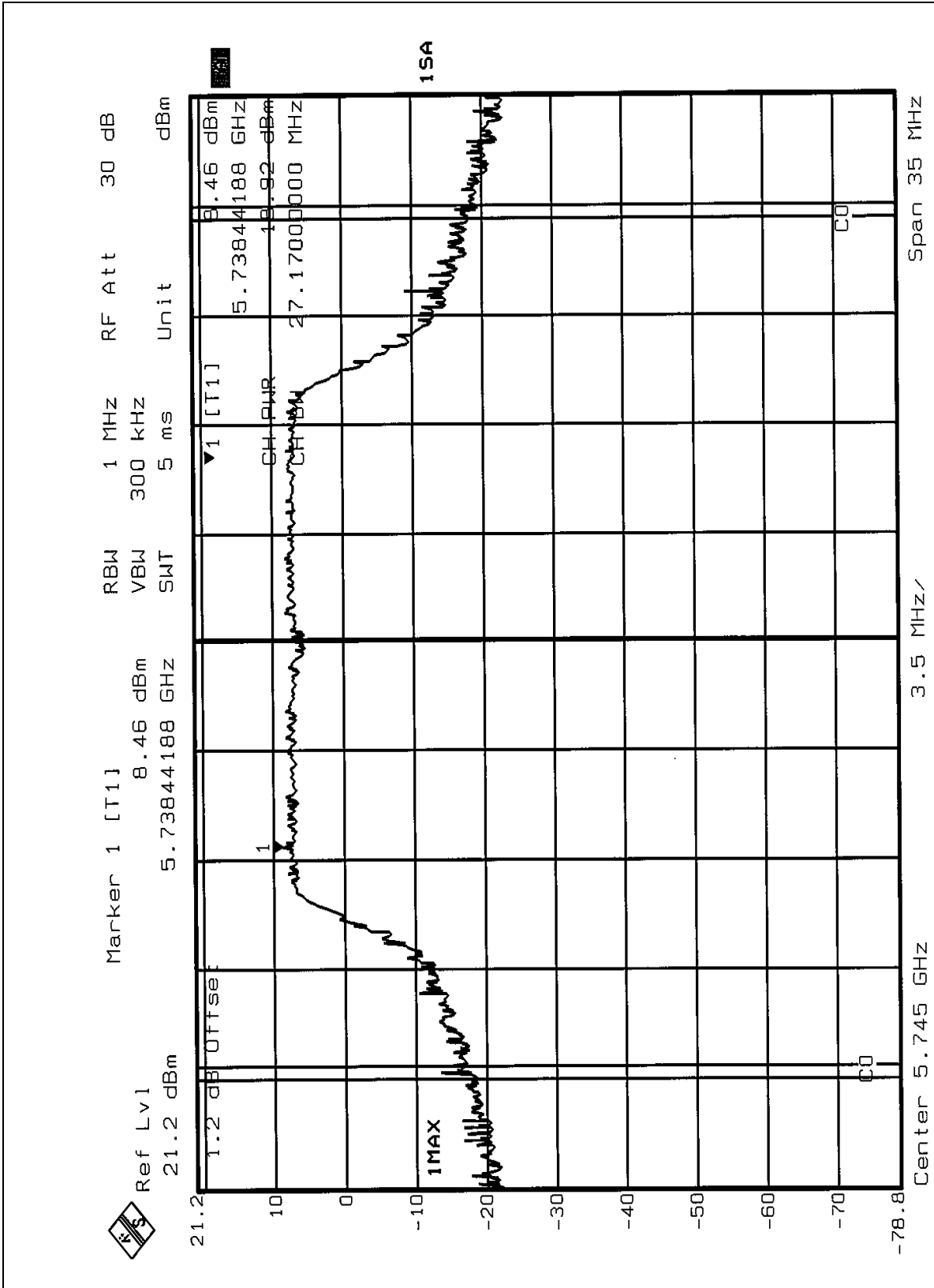


CHANNEL 8



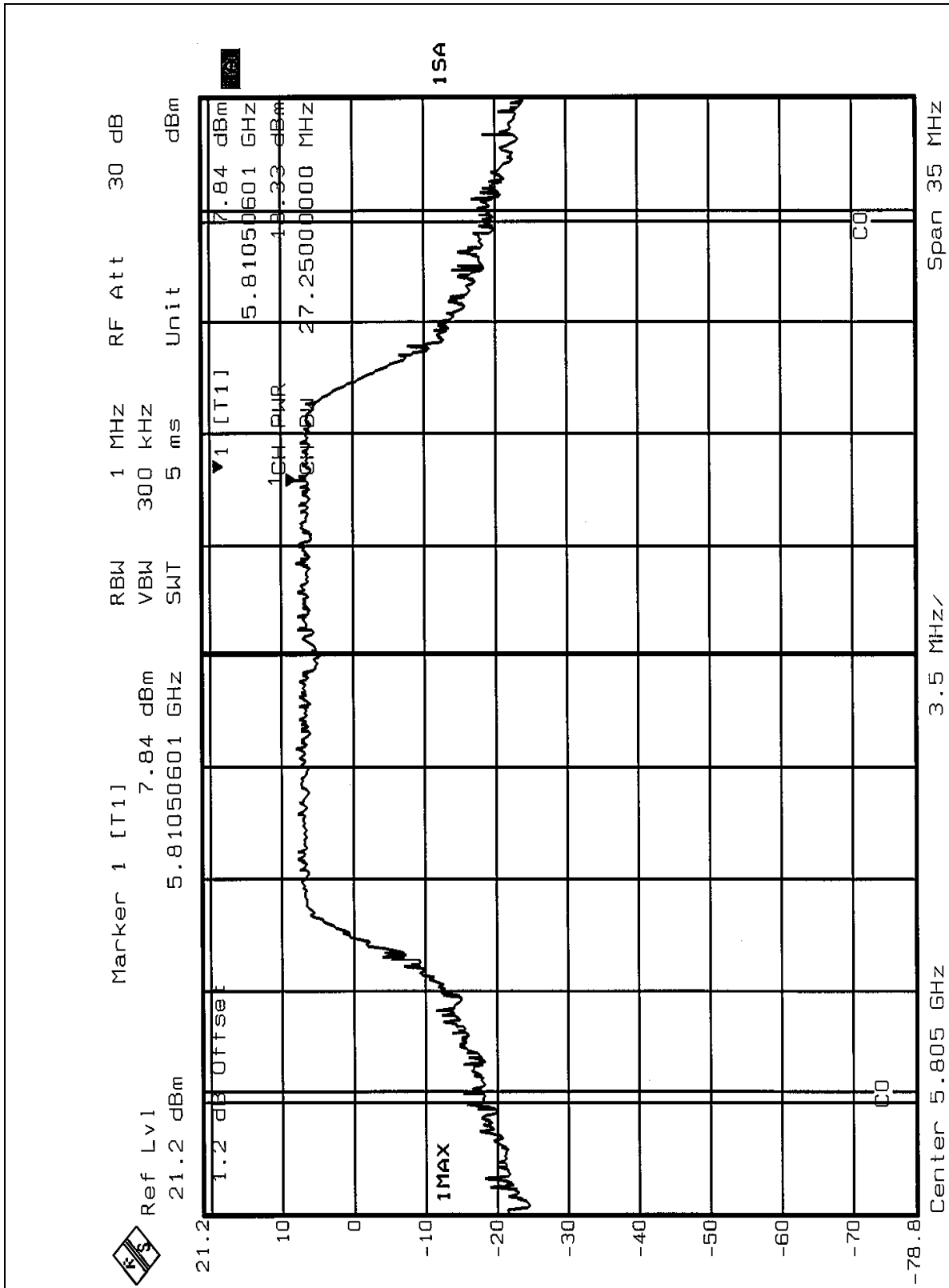


CHANNEL 9





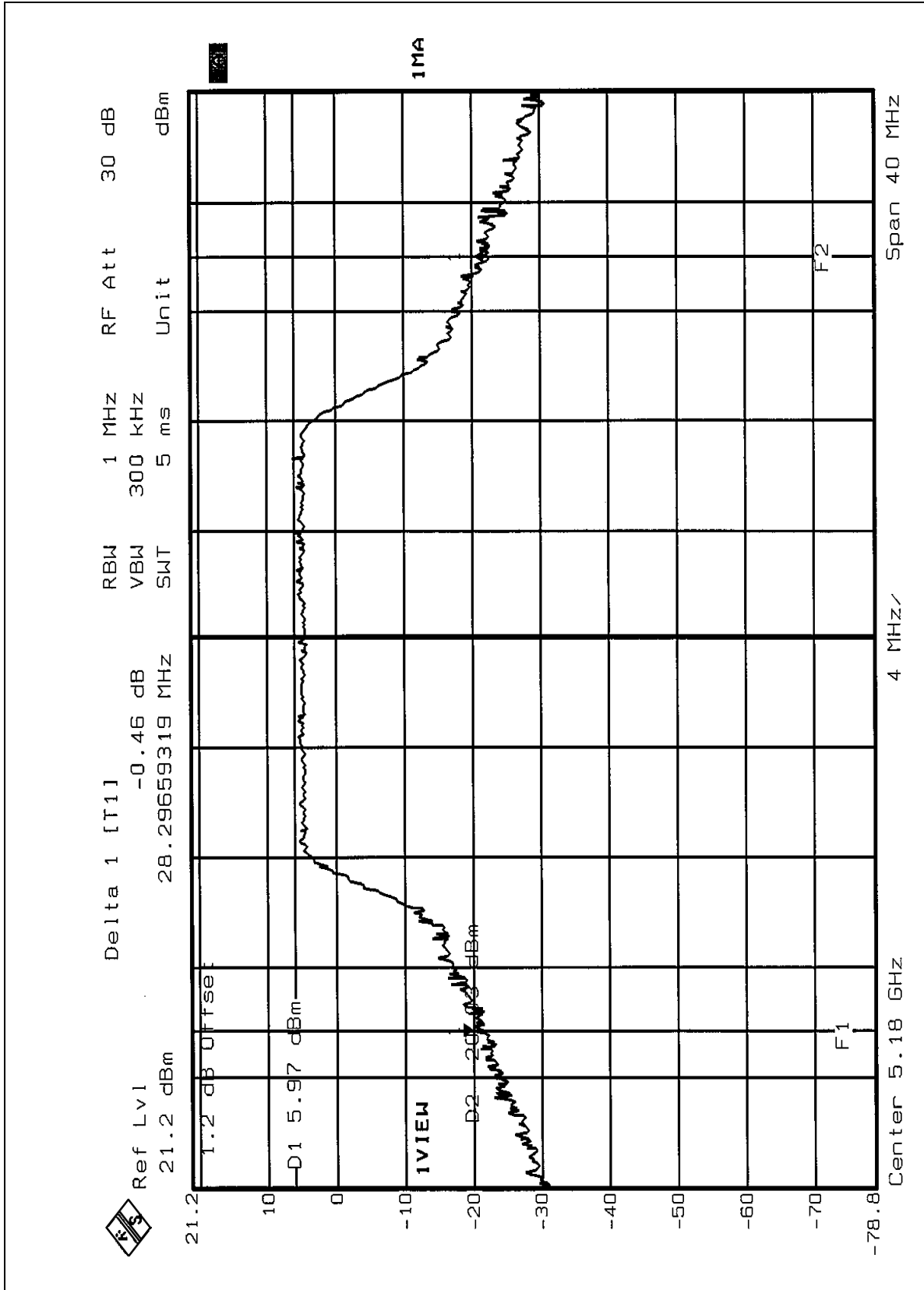
CHANNEL 12





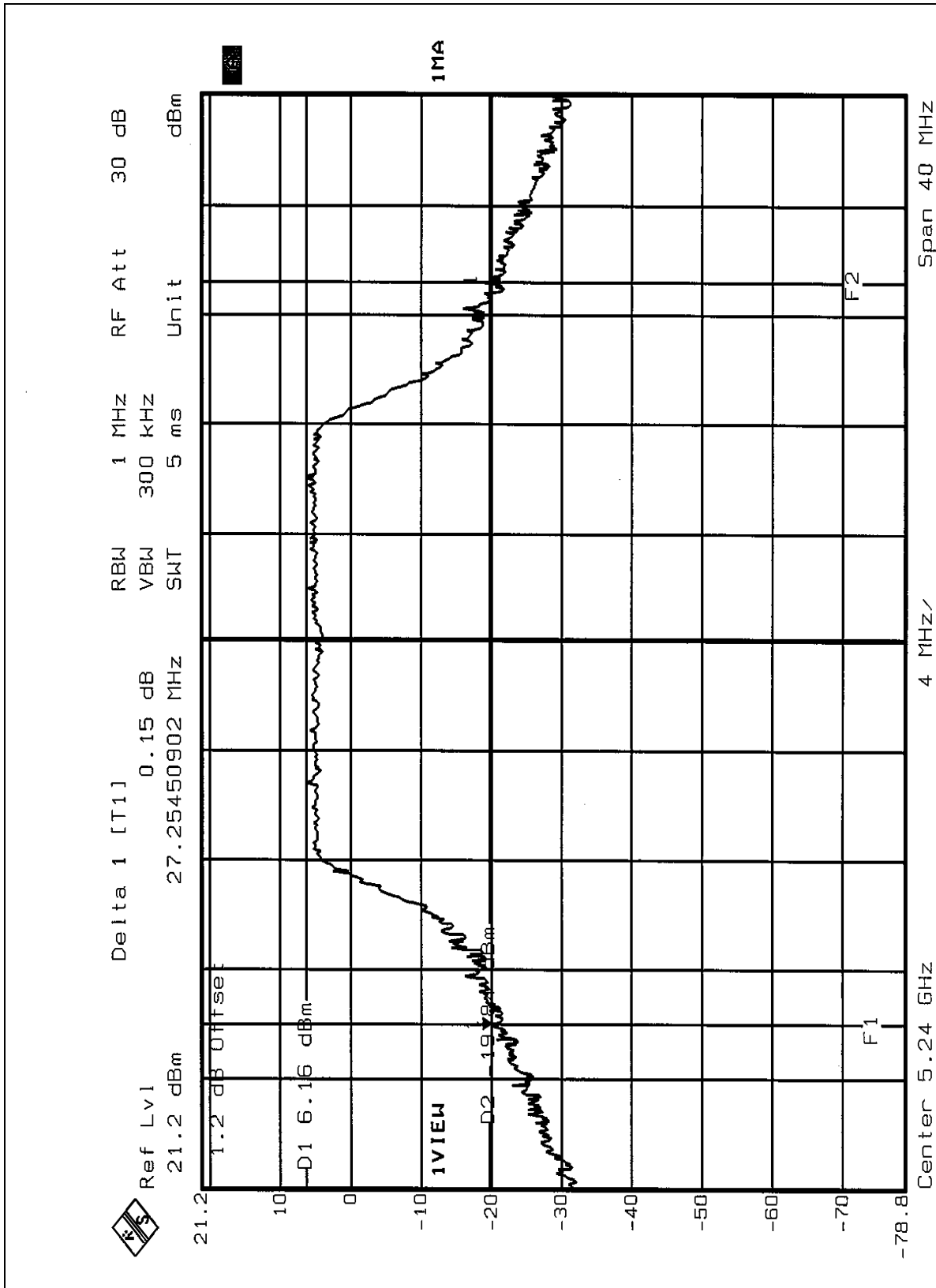


CHANNEL 1



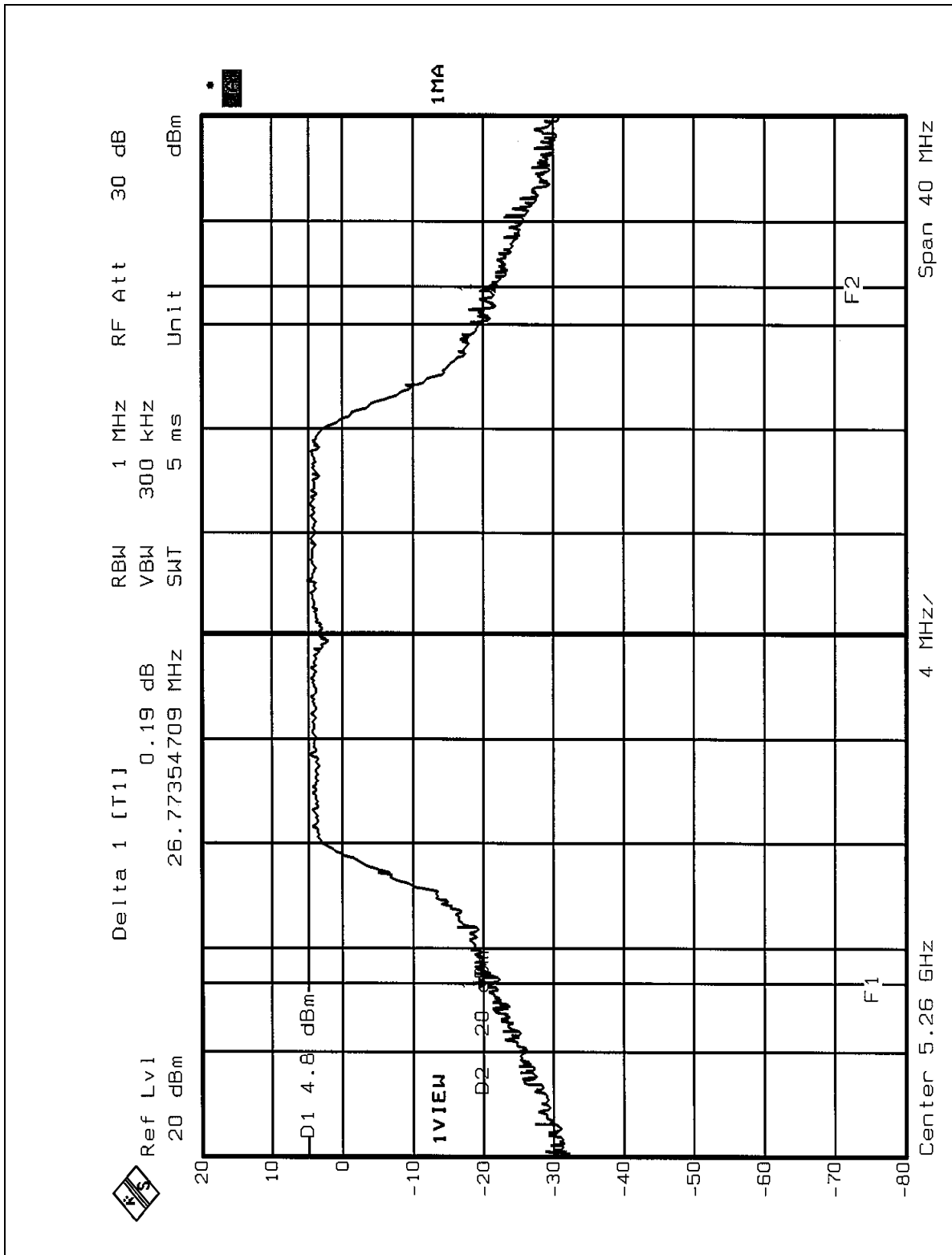


CHANNEL 4



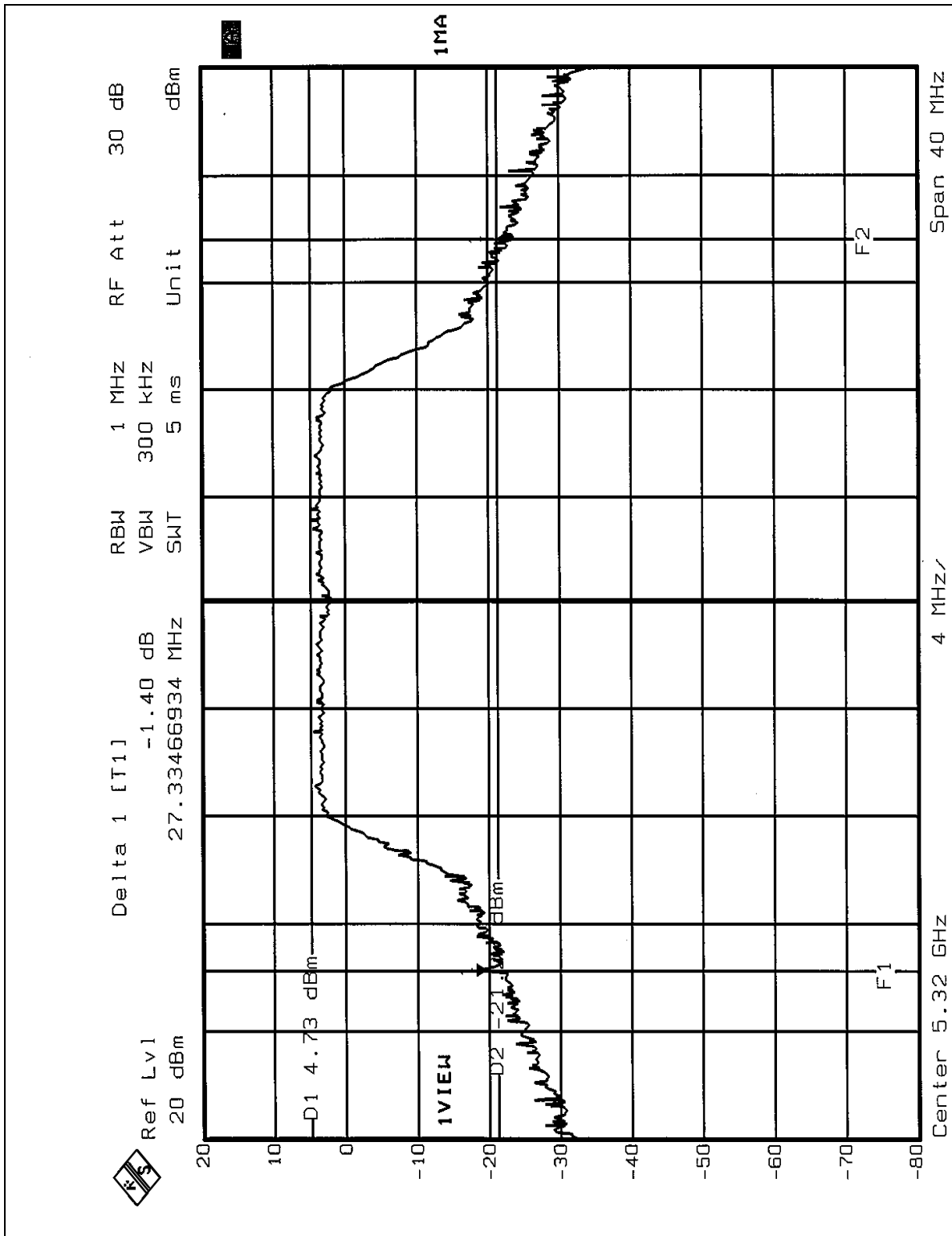


CHANNEL 5



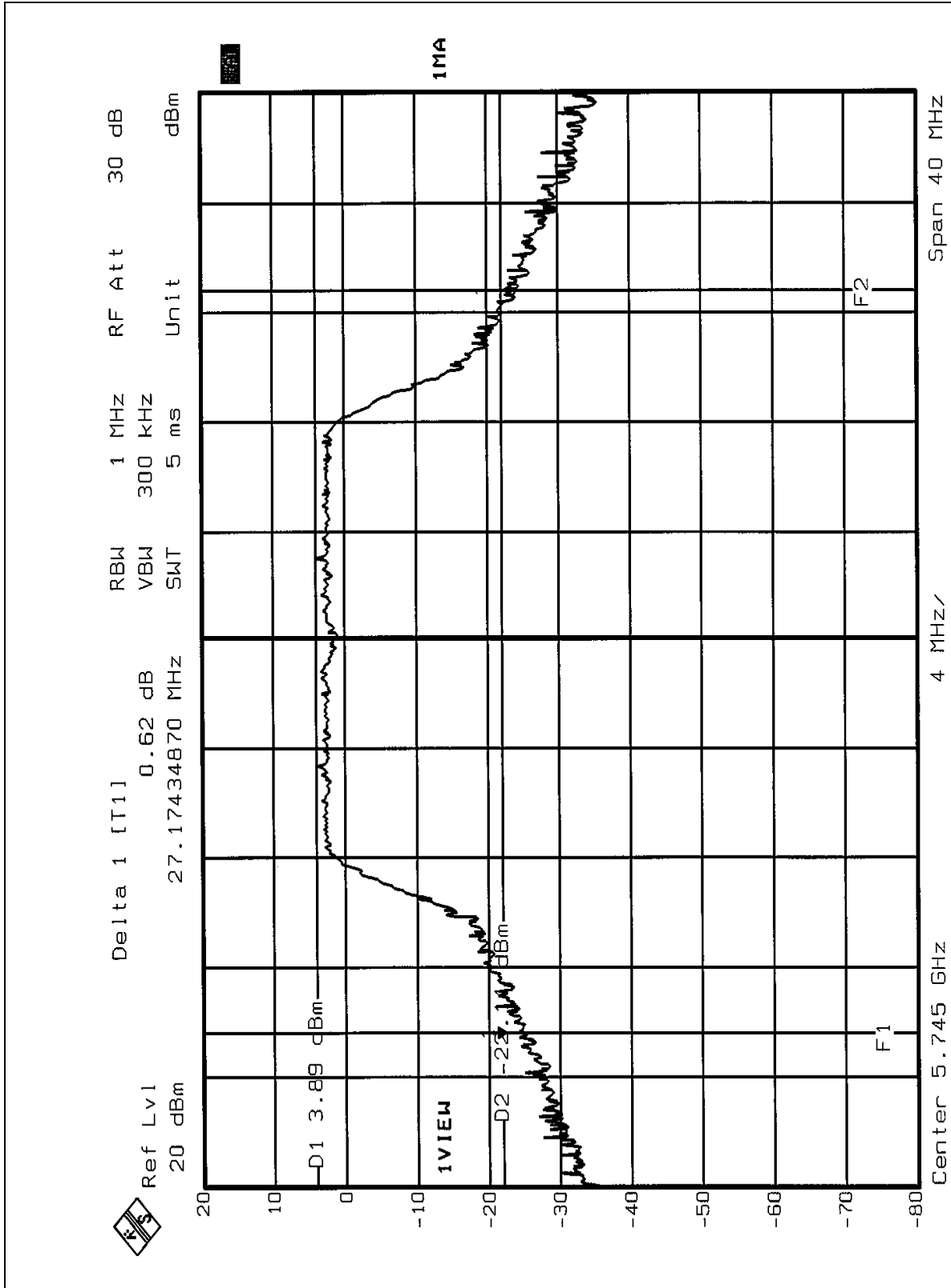


CHANNEL 8



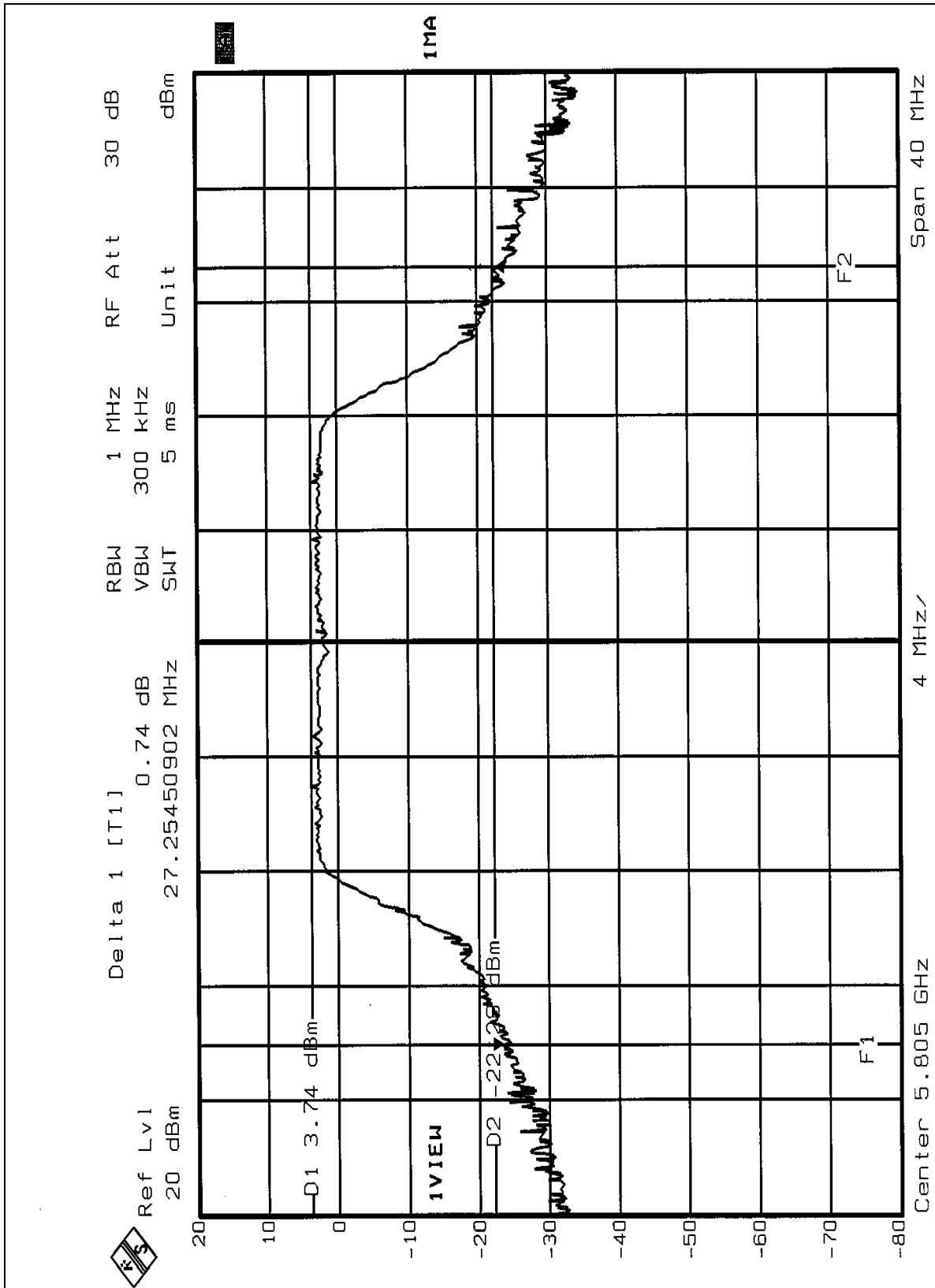


CHANNEL 9





CHANNEL 12





## 5.3.8 TEST RESULTS – TURBO MODE

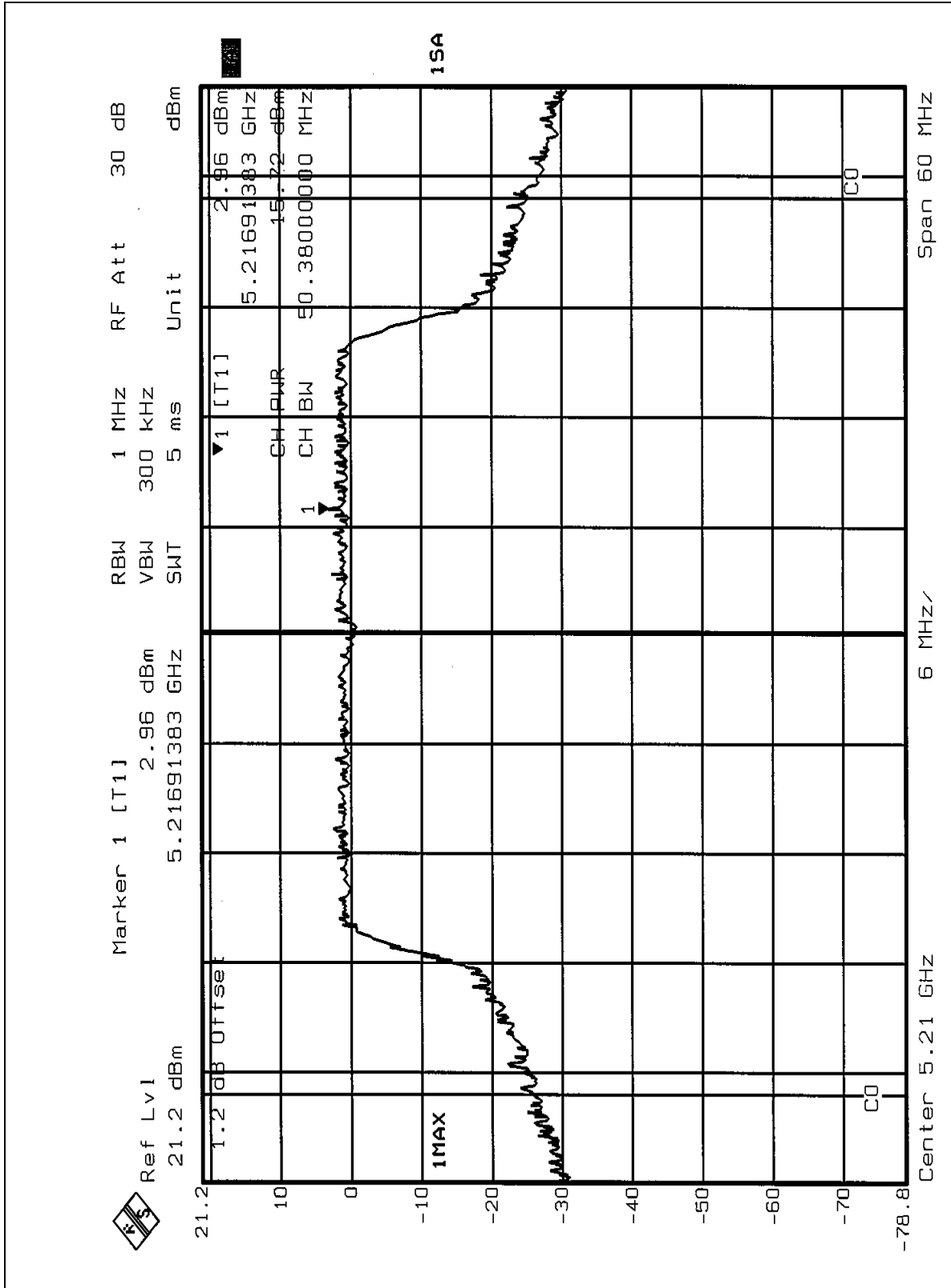
<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 67%RH, 991hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>TESTED BY</b>	Ansen Lei		

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz)</b>	<b>PEAK POWER OUTPUT (dBm)</b>	<b>PEAK POWER LIMIT (dBm)</b>	<b>26dBc Occupied Bandwidth (MHz)</b>	<b>PASS/FAIL</b>
1	5210	15.72	17.00	50.38	PASS
2	5250	15.65	17.00	49.78	PASS
3	5290	20.25	24.00	49.54	PASS
4	5760	18.88	30.00	48.58	PASS
5	5800	16.28	30.00	48.22	PASS

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



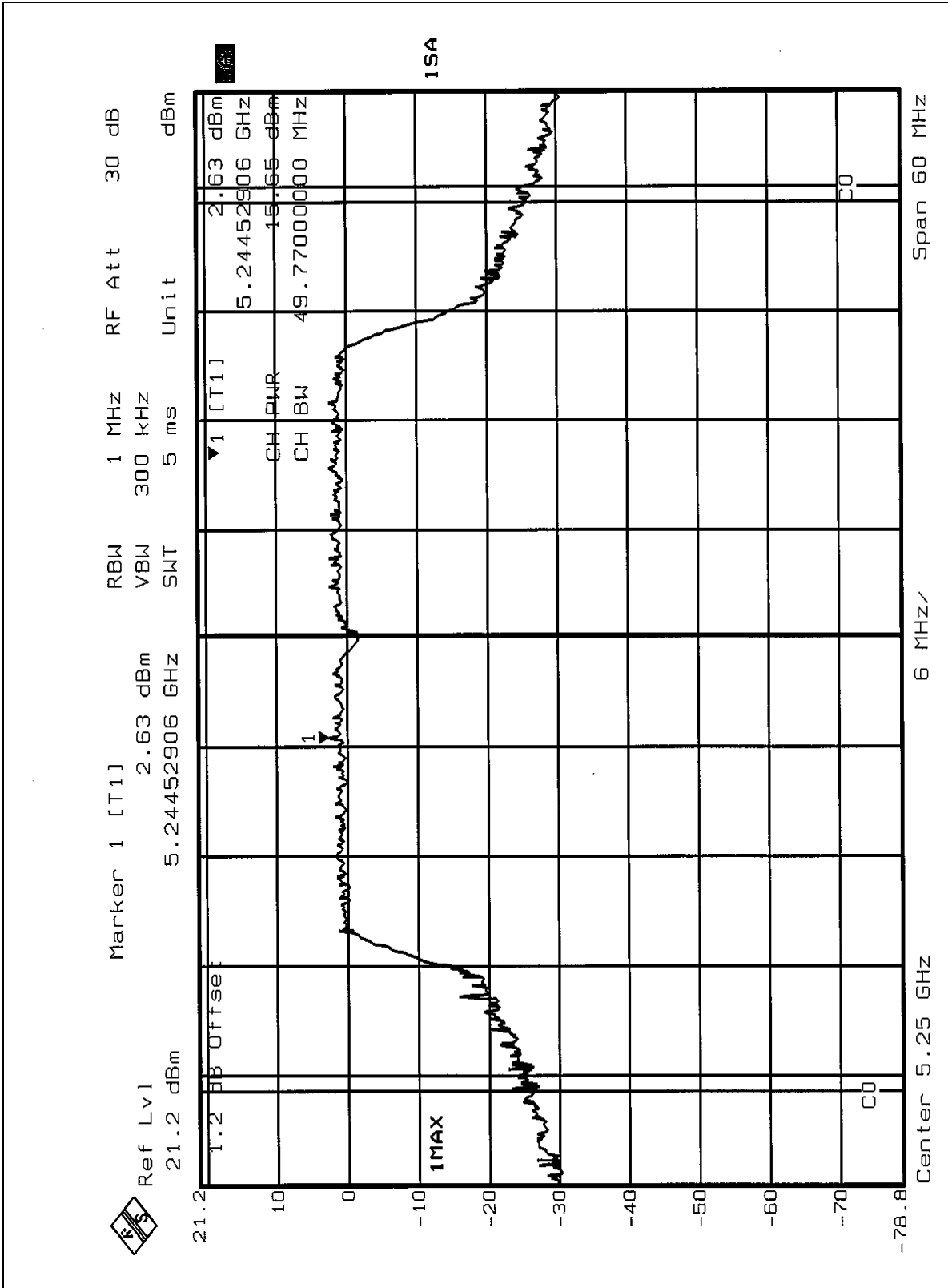
CHANNEL 1





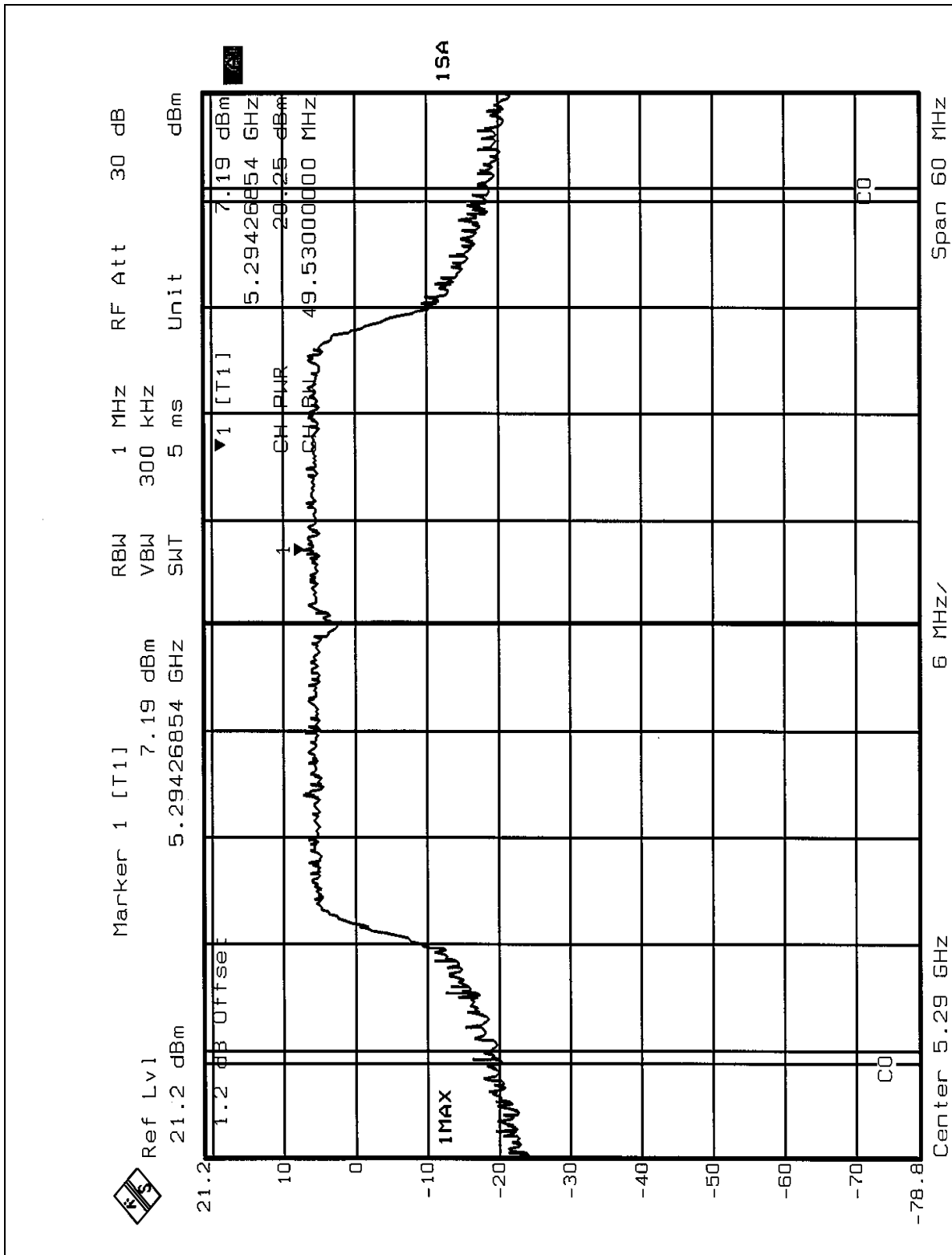


CHANNEL 2



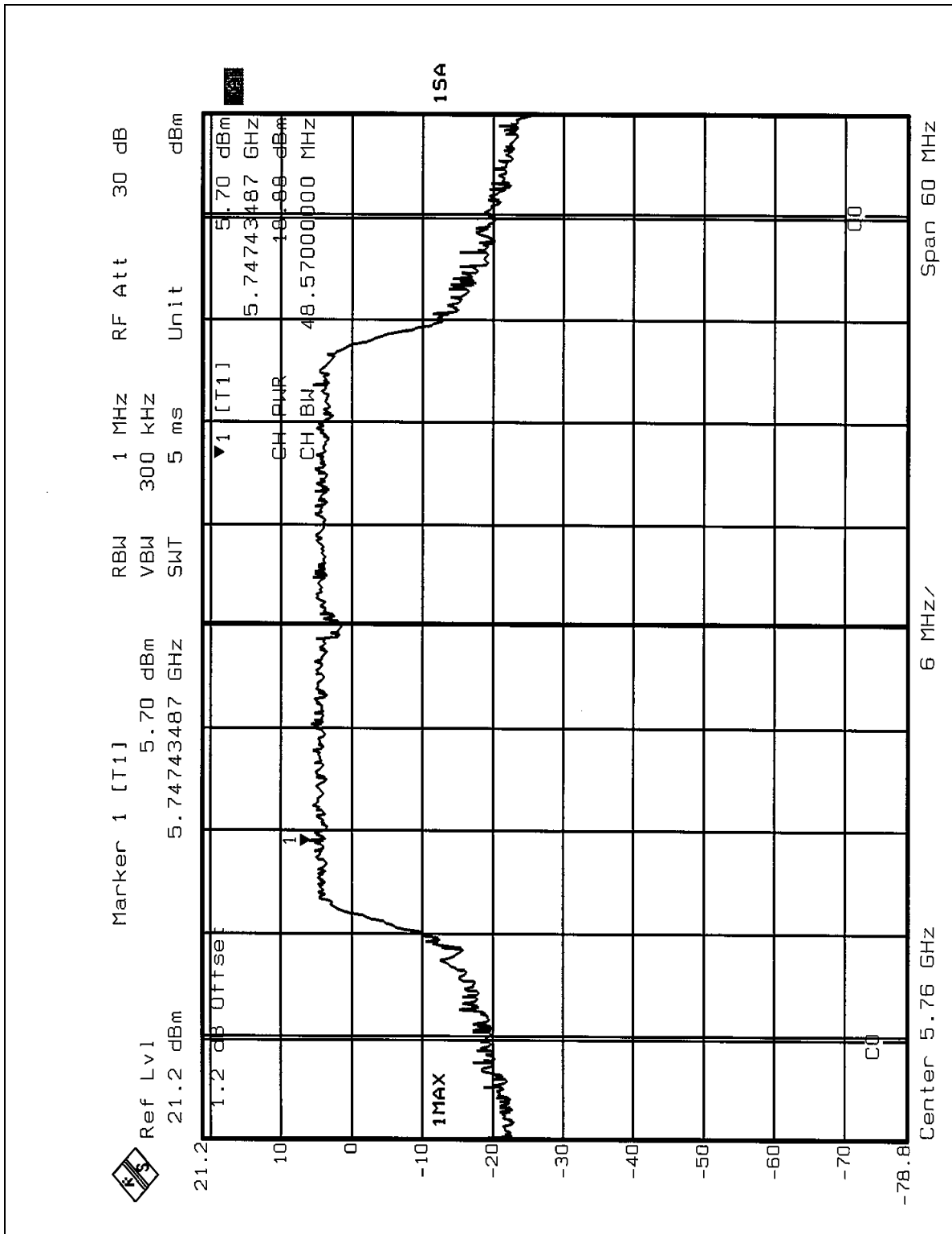


CHANNEL3



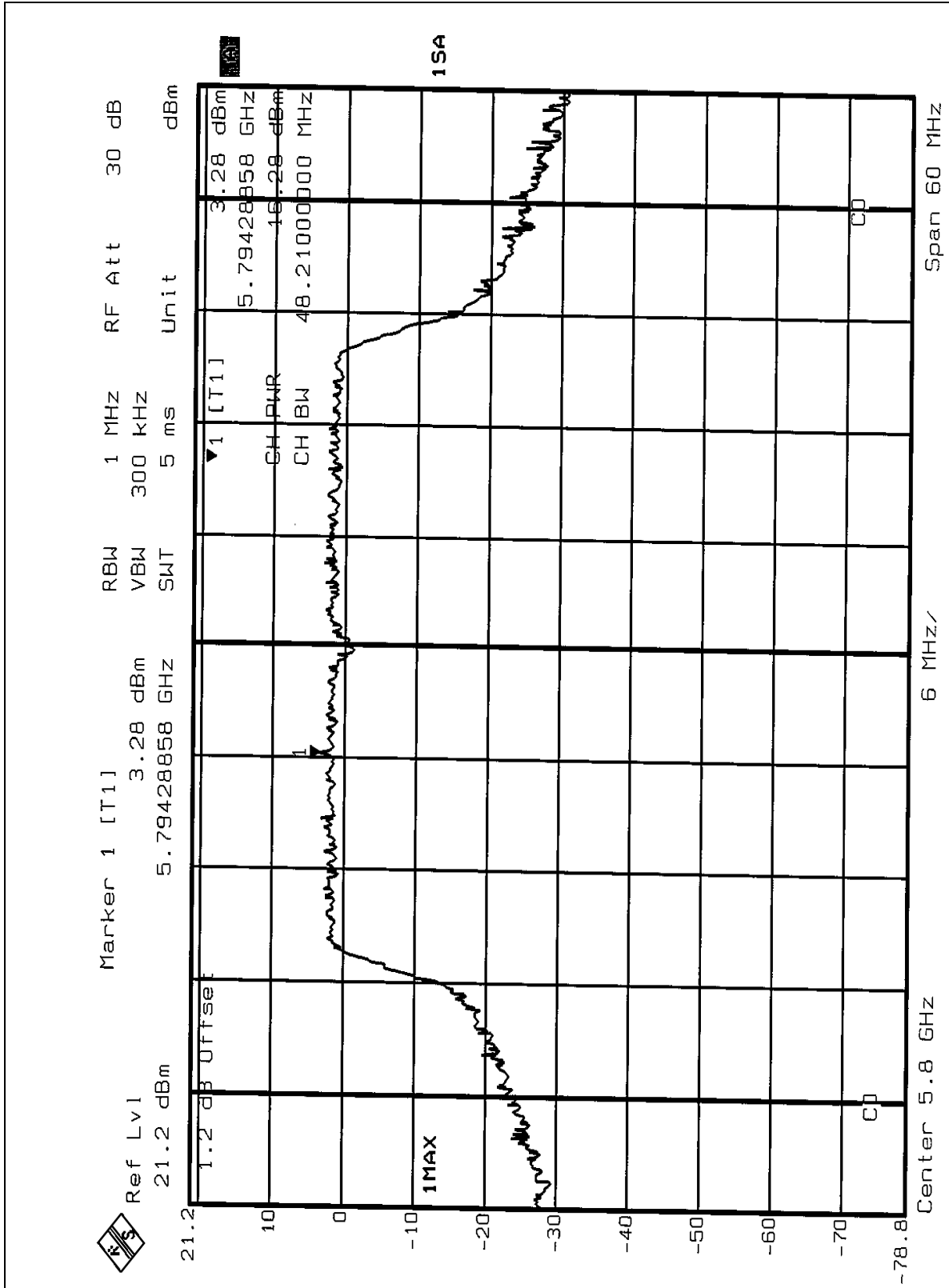


CHANNEL 4



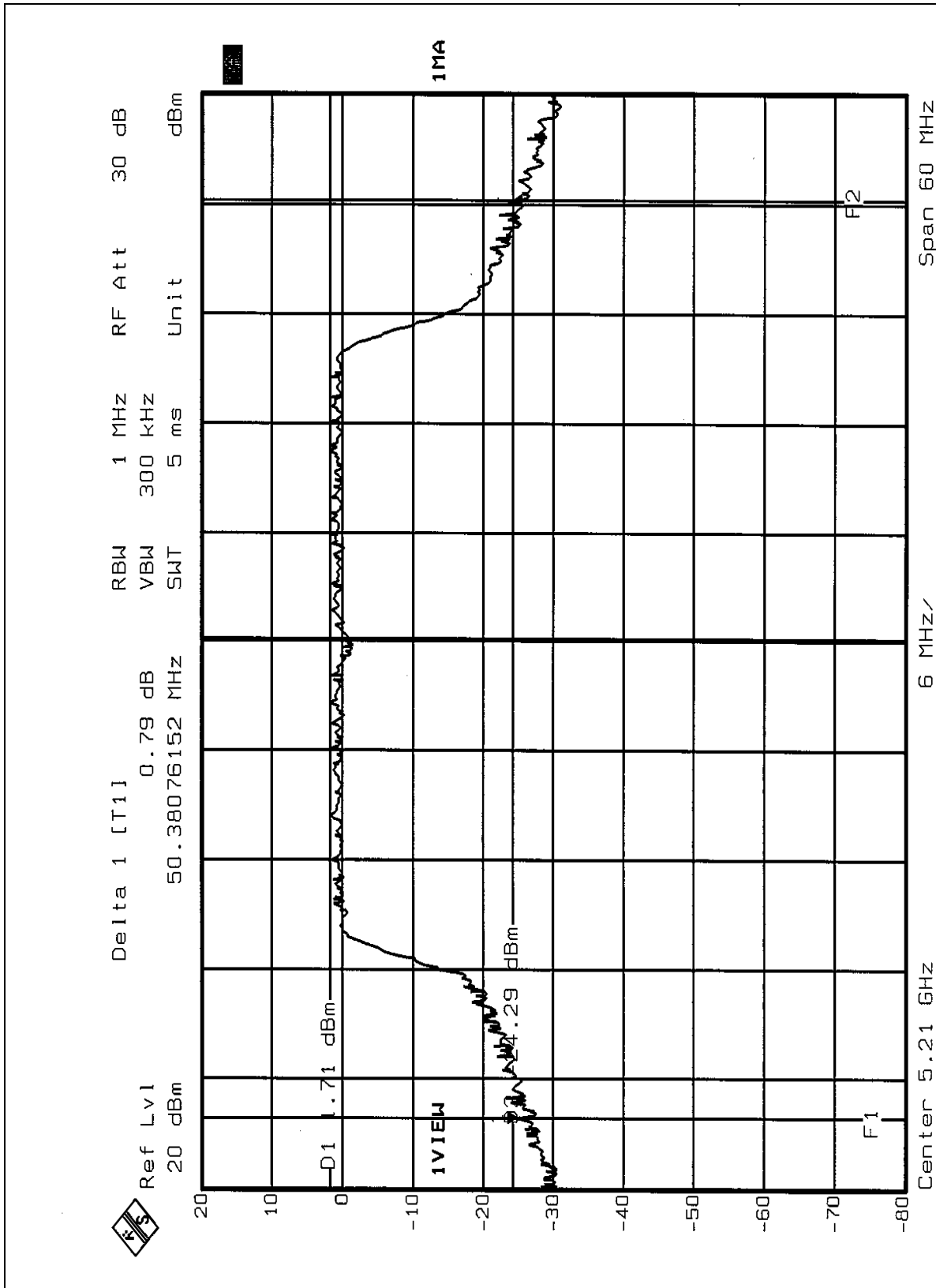


CHANNEL 5



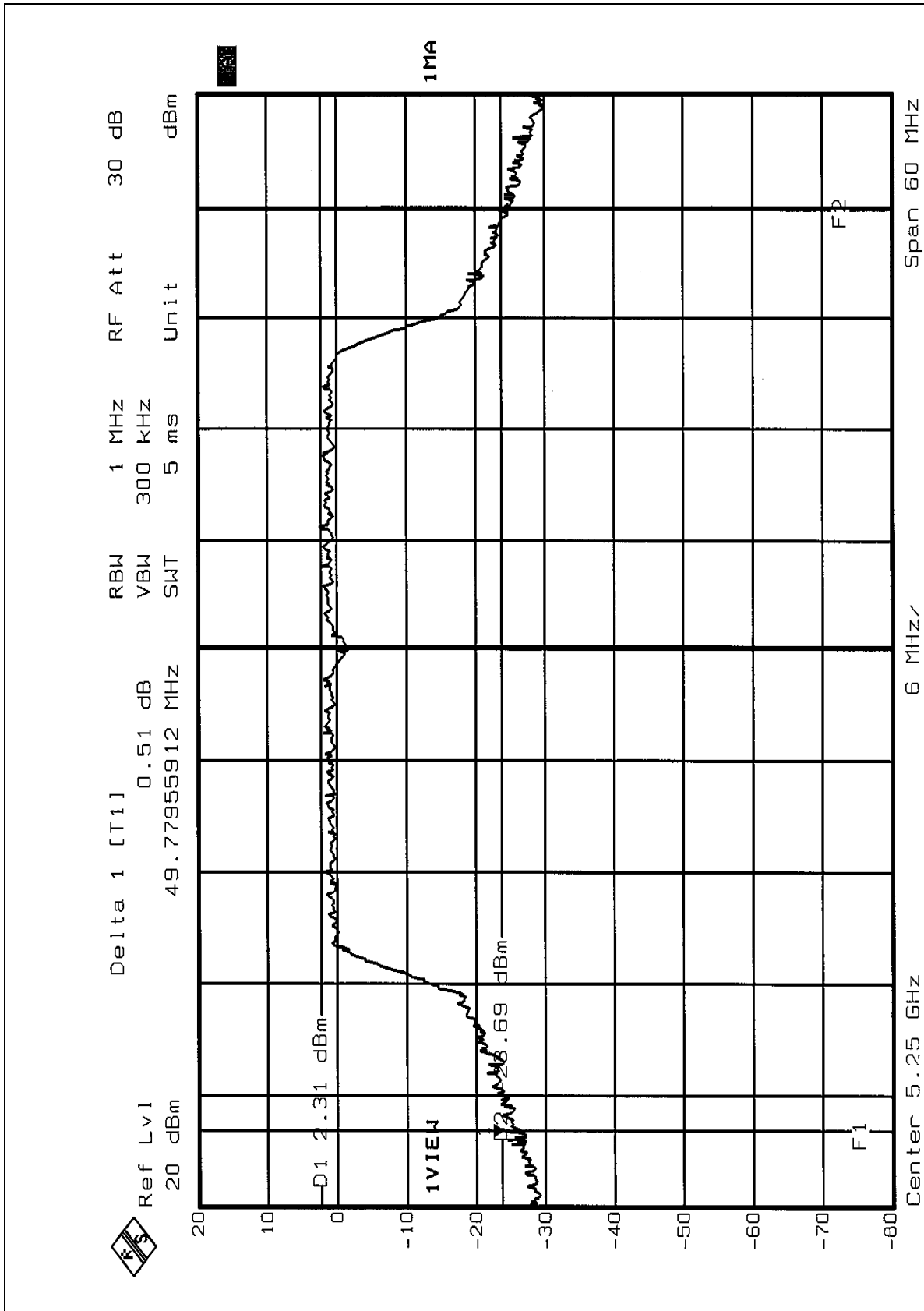


CHANNEL 1



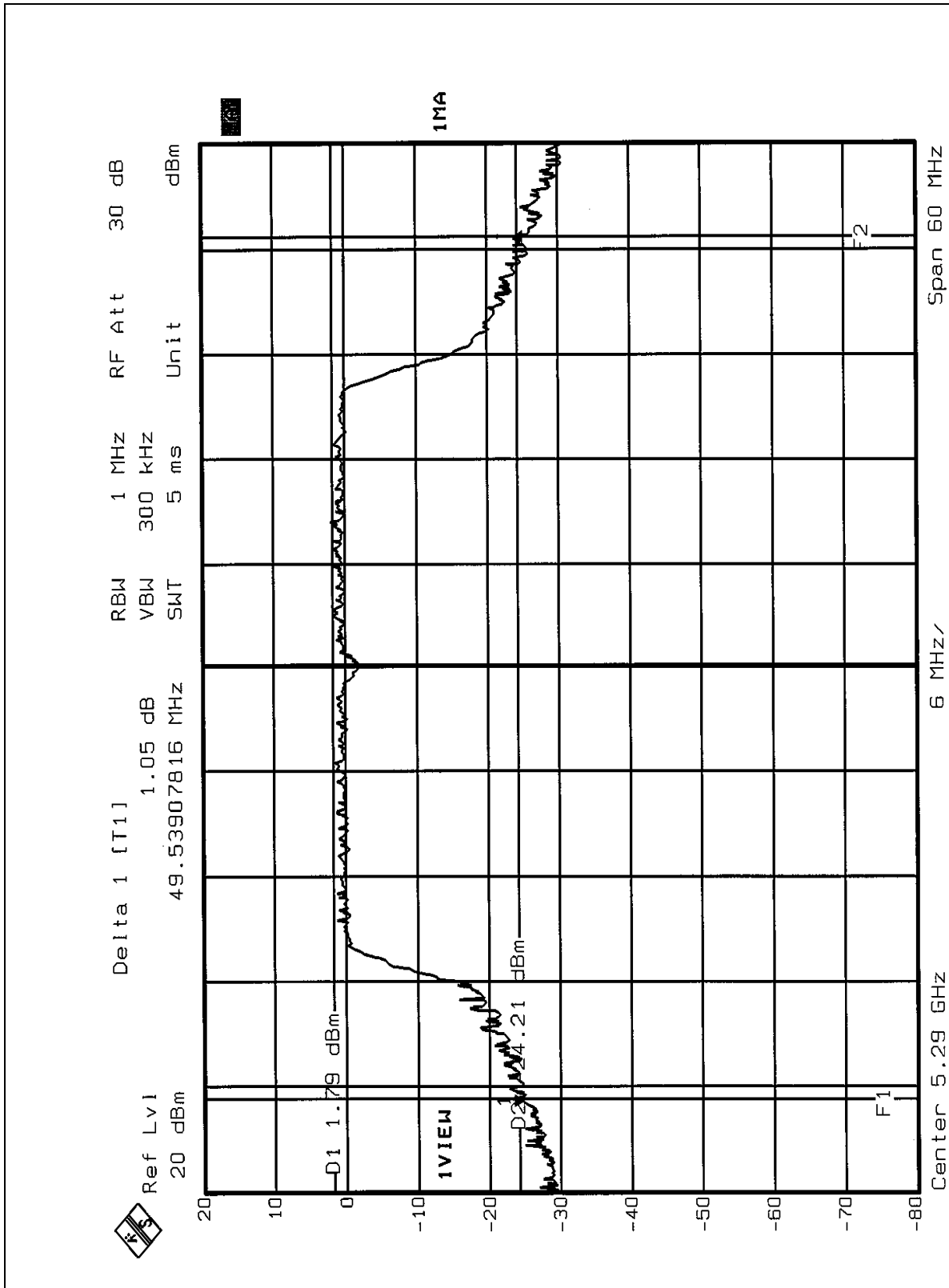


CHANNEL 2



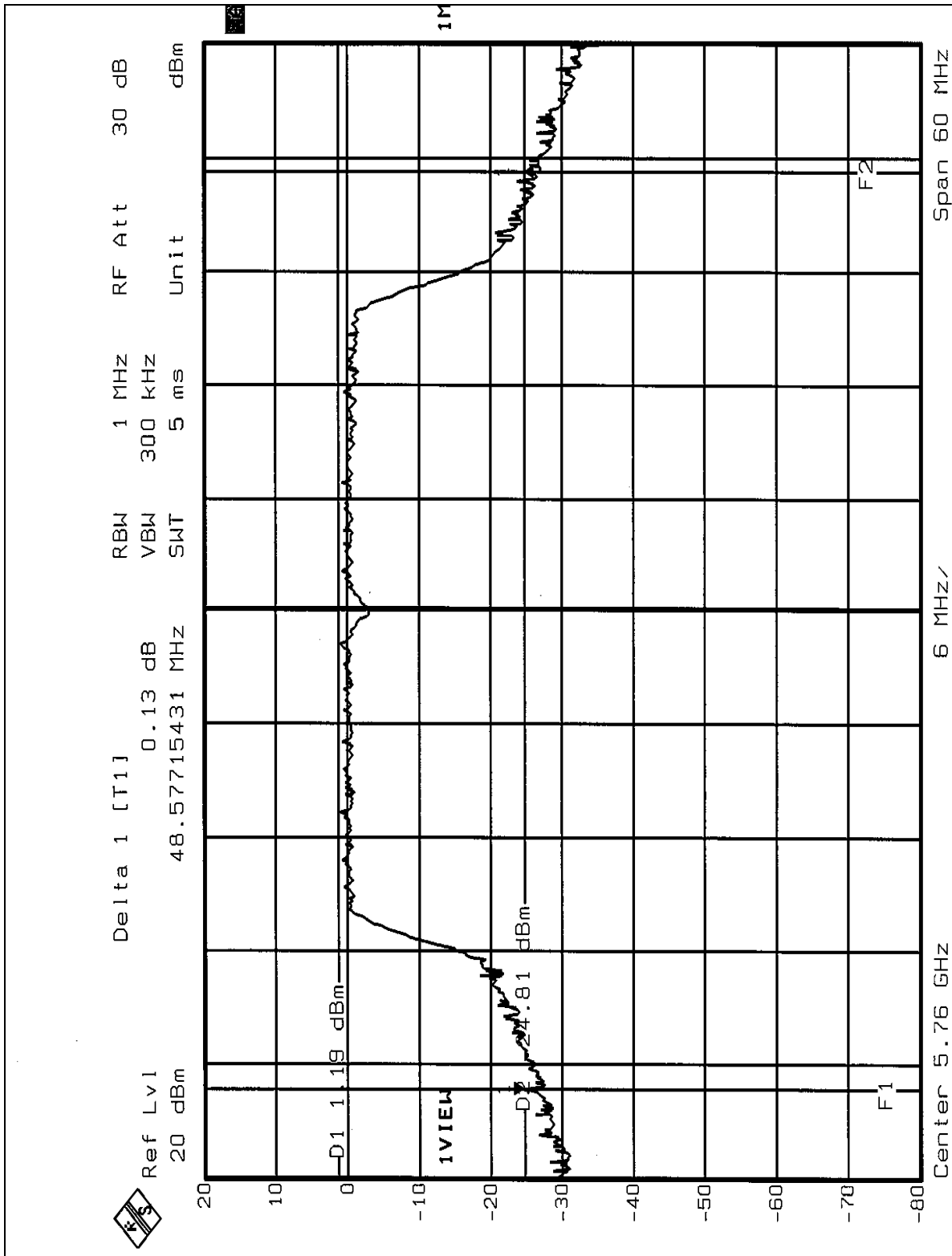


CHANNEL 3





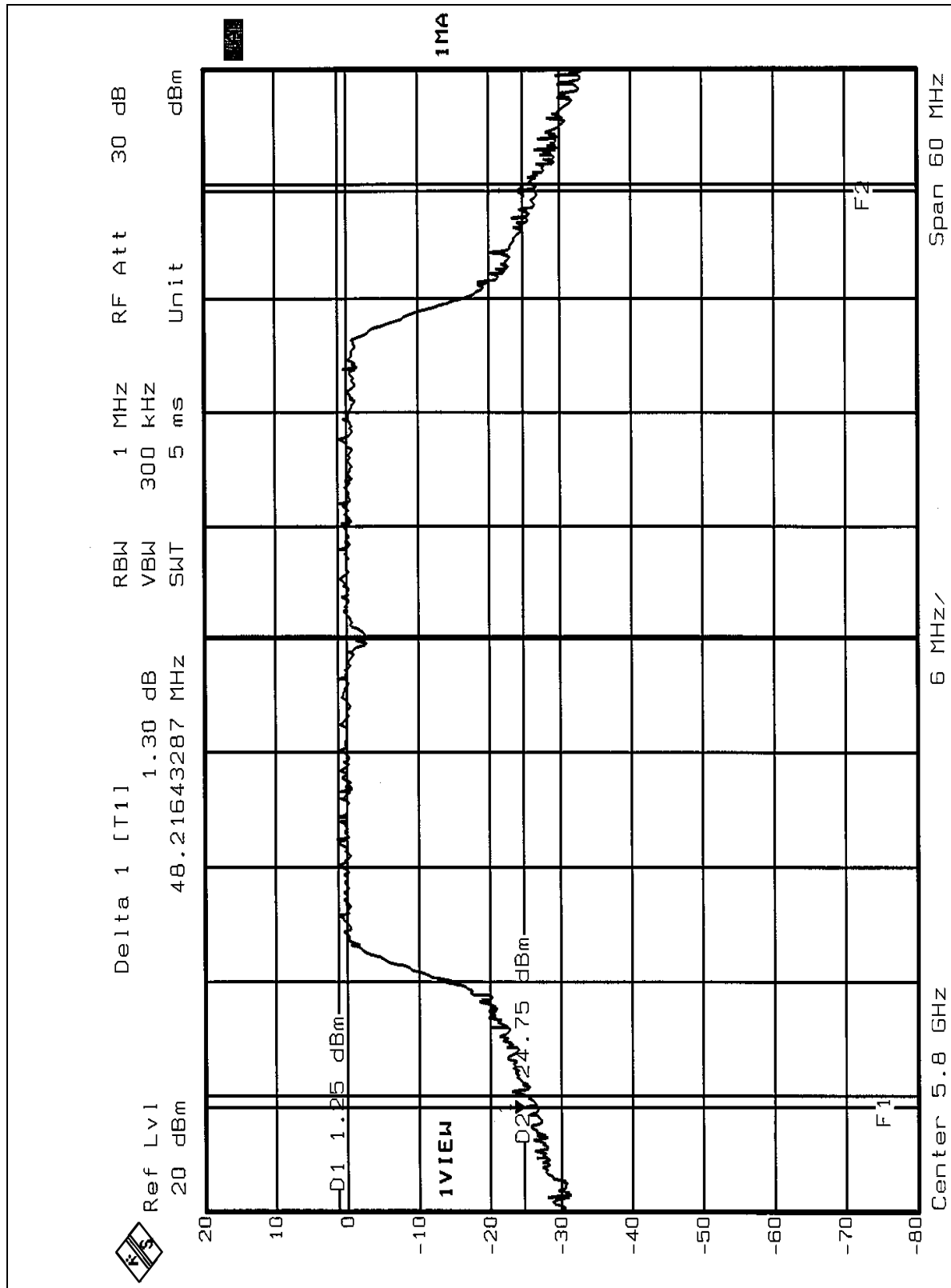
CHANNEL 4







CHANNEL 5





## 5.4 PEAK POWER EXCURSION MEASUREMENT

### 5.4.1 LIMITS OF PEAK POWER EXCURSION MEASUREMENT

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

### 5.4.2 TEST INSTRUMENTS

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

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

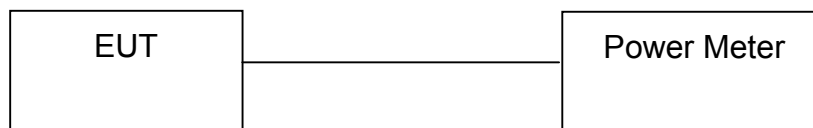
### 5.4.3 TEST PROCEDURE

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=300kHz).
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.



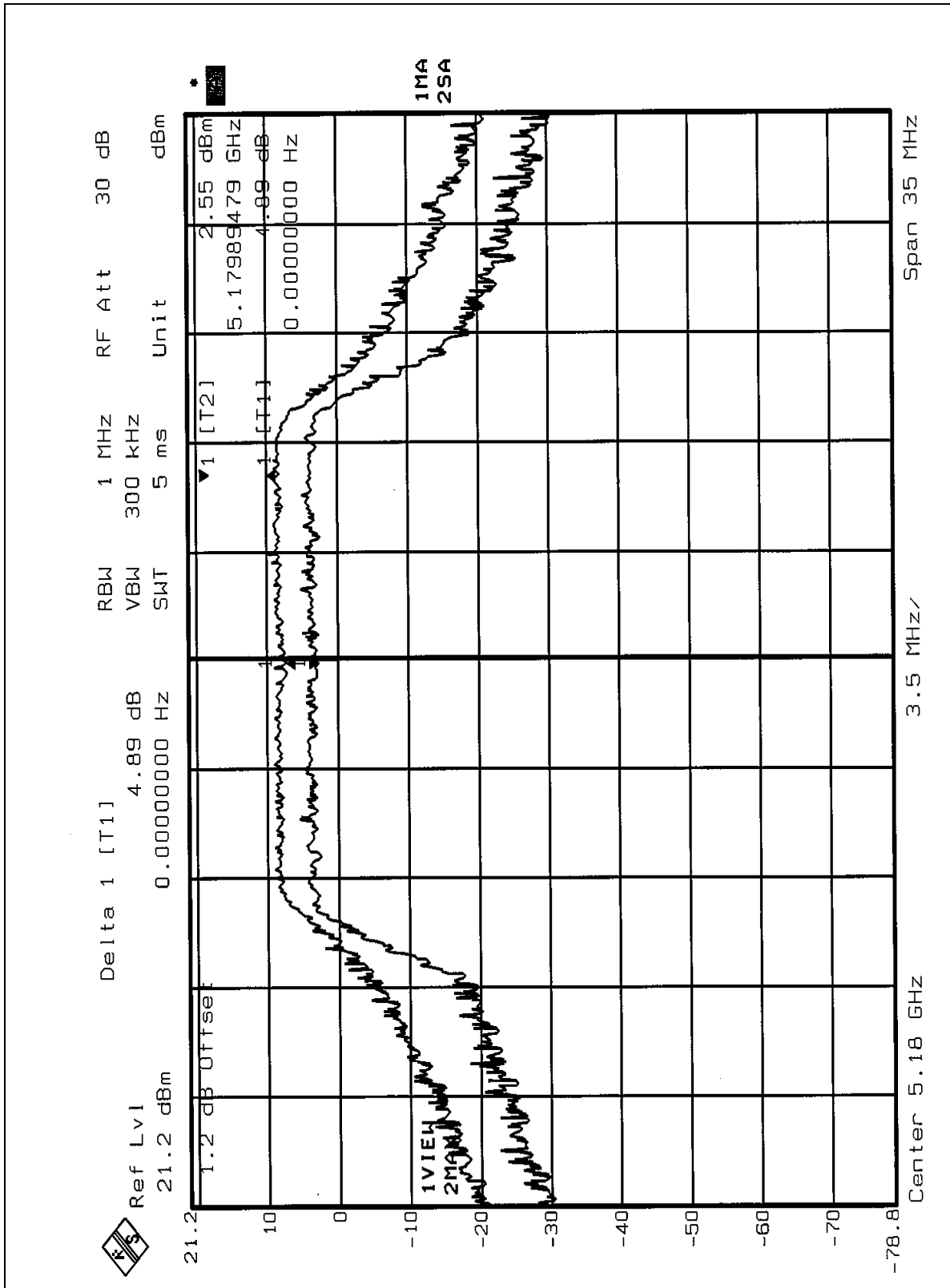
## 5.4.7 TEST RESULTS – NORMAL MODE

<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 67%RH, 991hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>TESTED BY</b>	Ansen Lei		

<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	4.89	13	PASS
4	5240	5.64	13	PASS
5	5260	5.78	13	PASS
8	5320	6.56	13	PASS
9	5745	5.85	13	PASS
12	5805	7.66	13	PASS

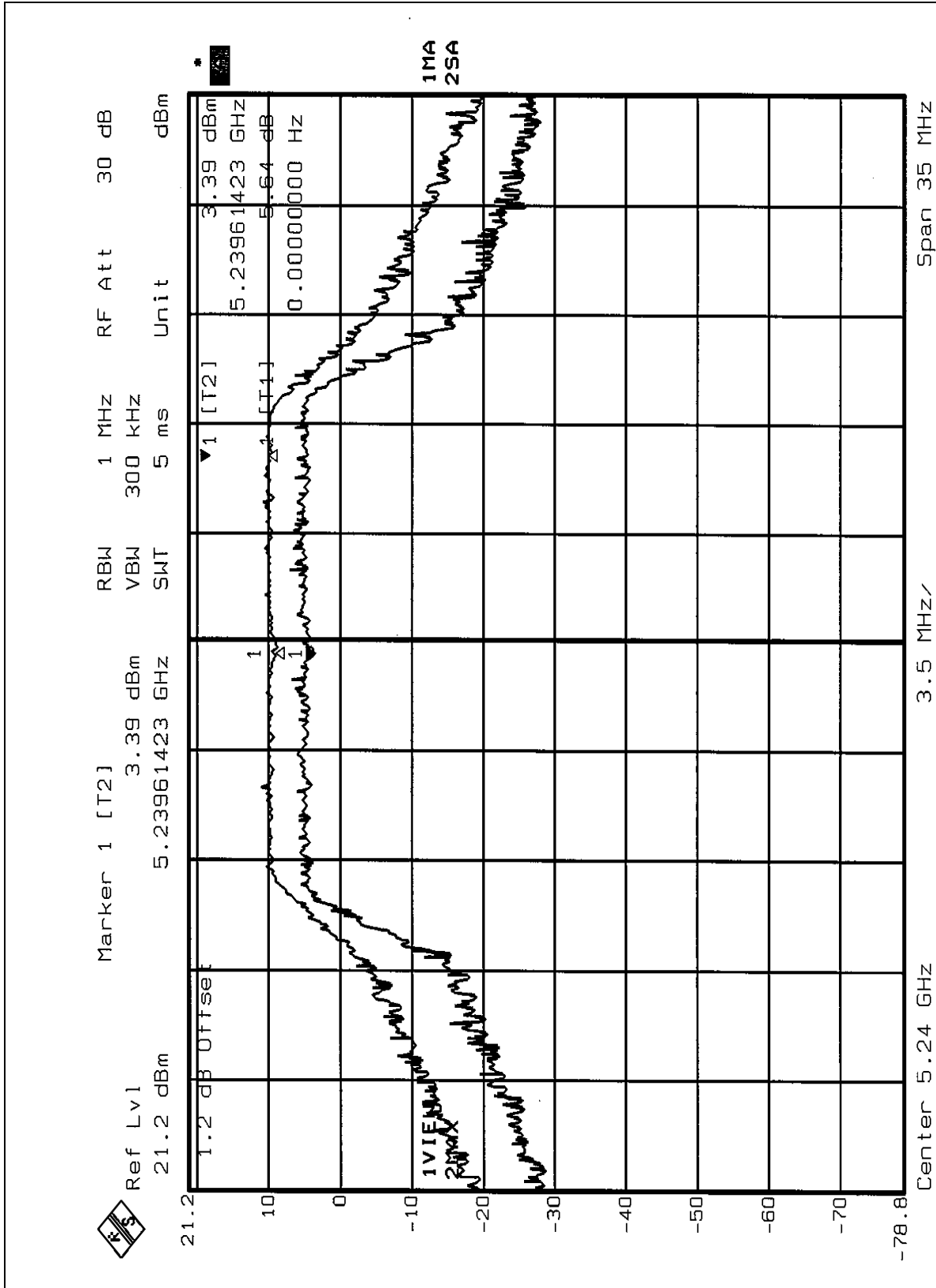


CHANNEL 1



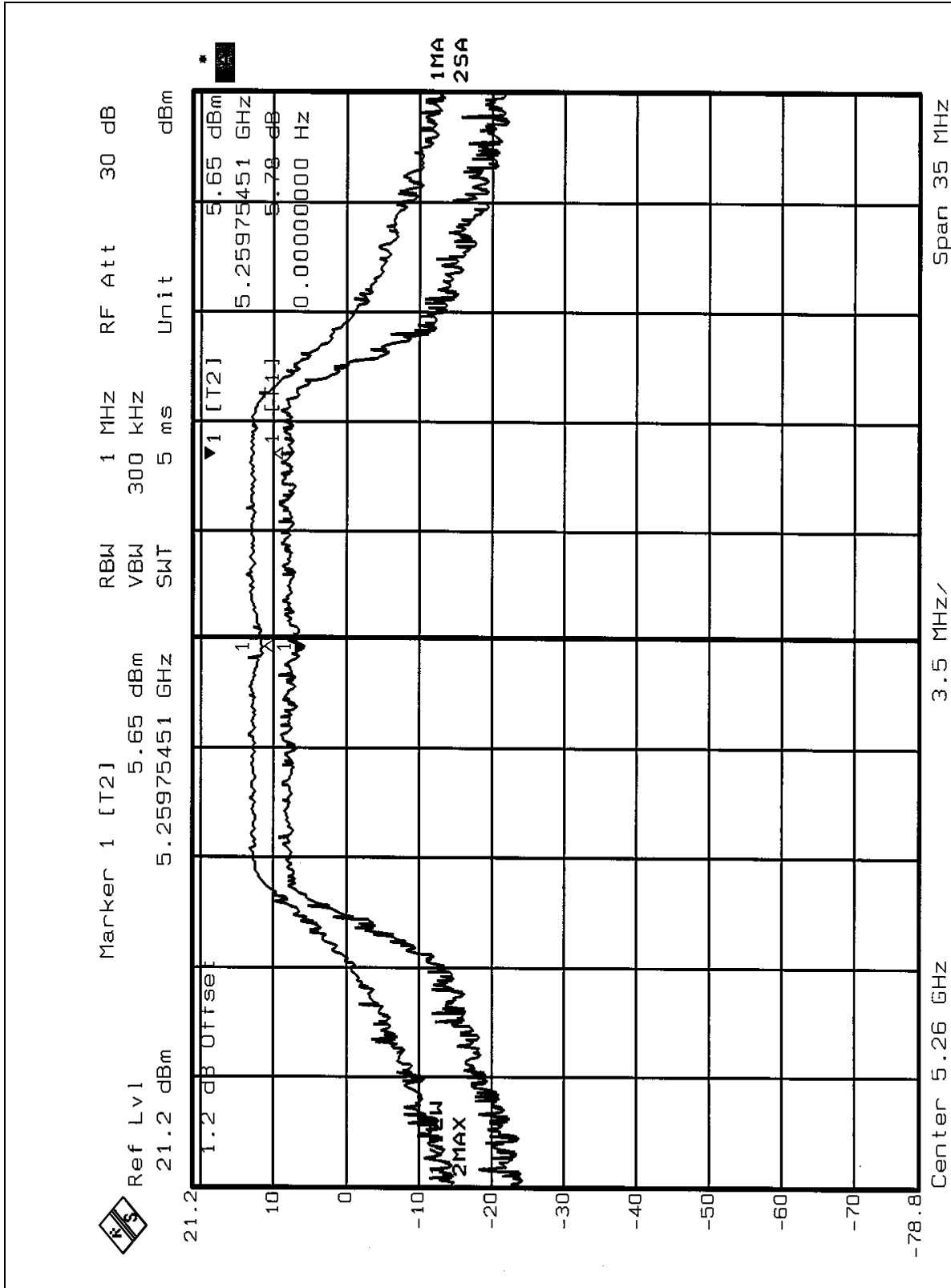


CHANNEL 4



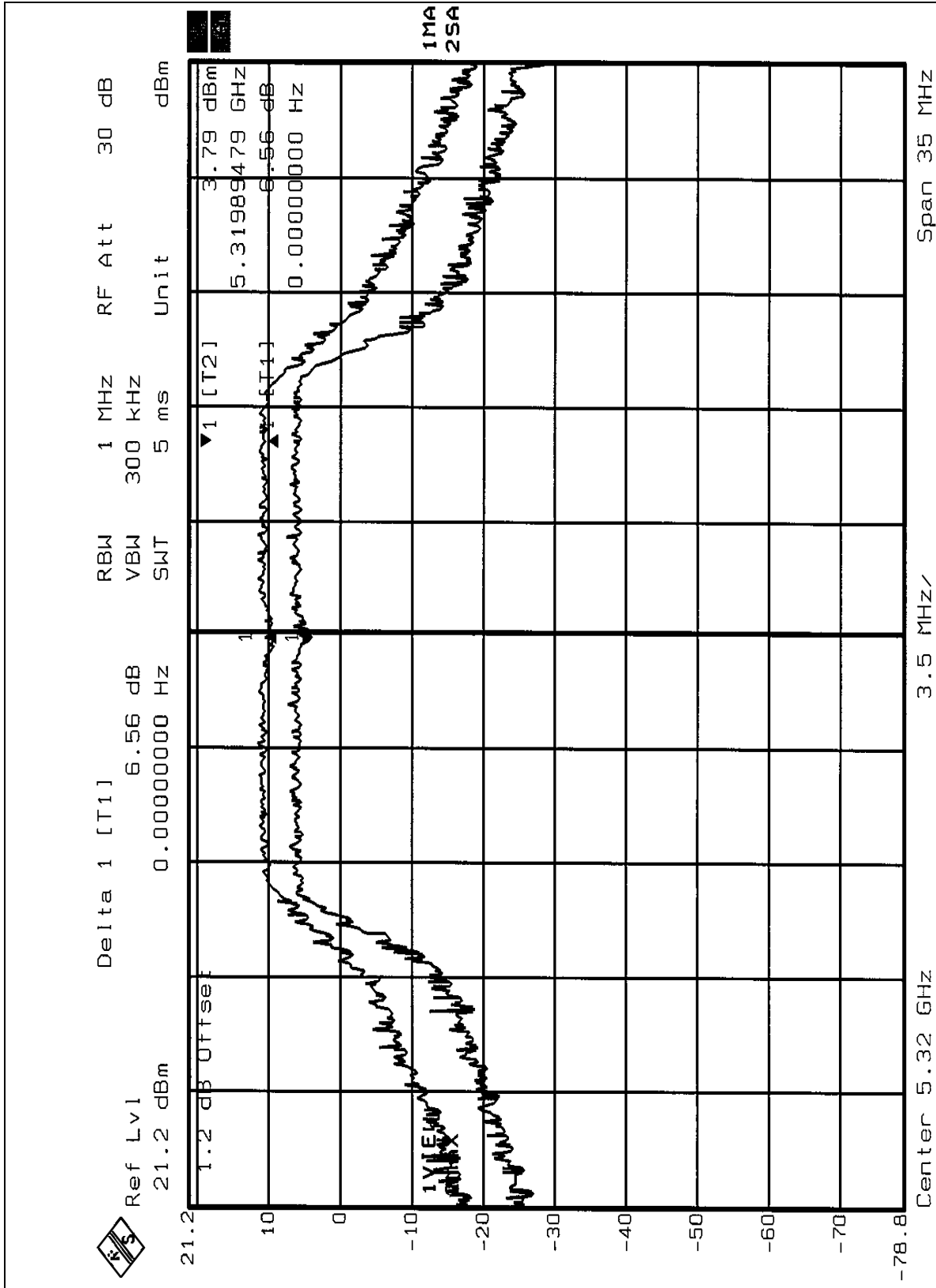


CHANNEL 5





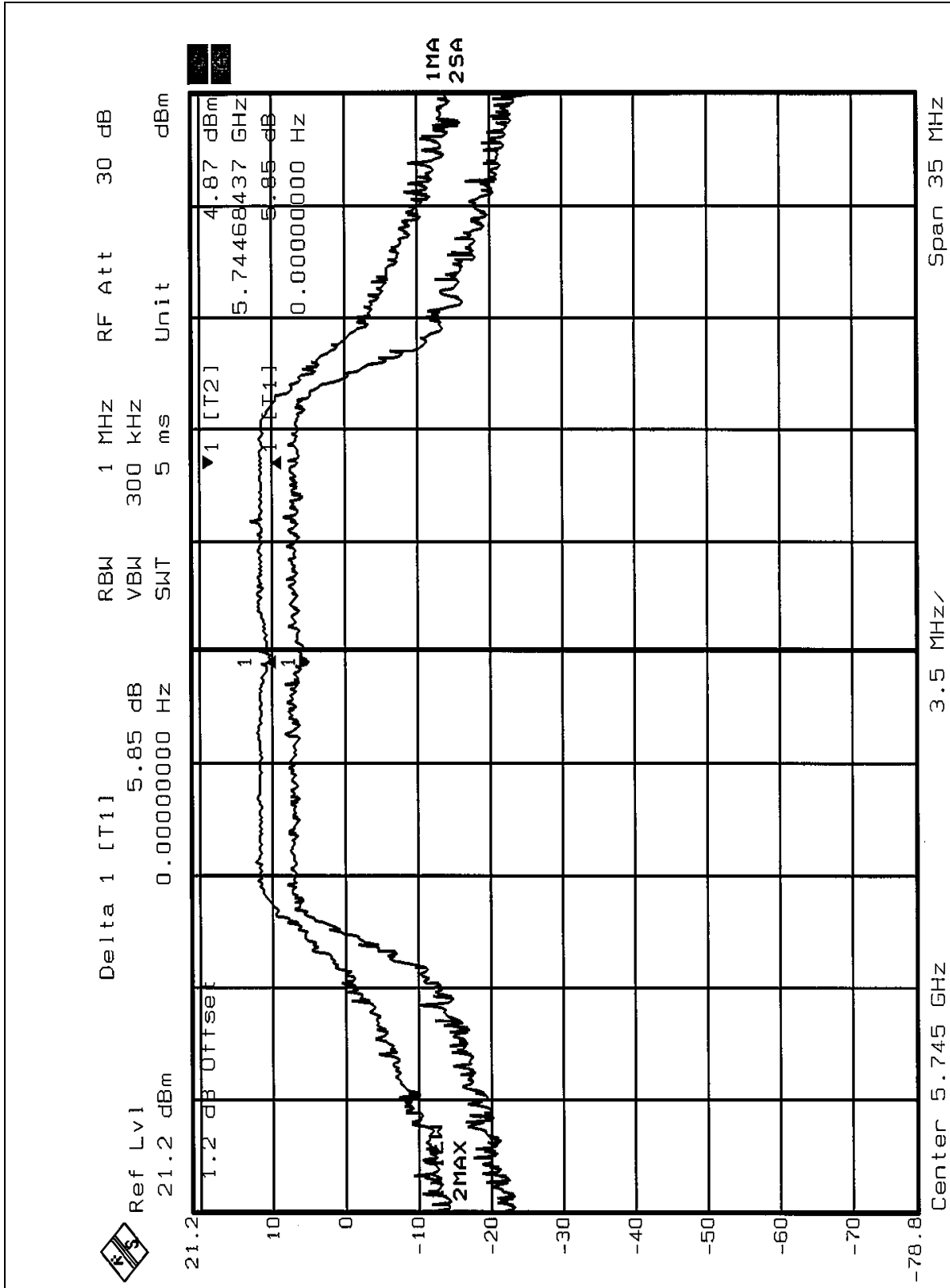
CHANNEL 8





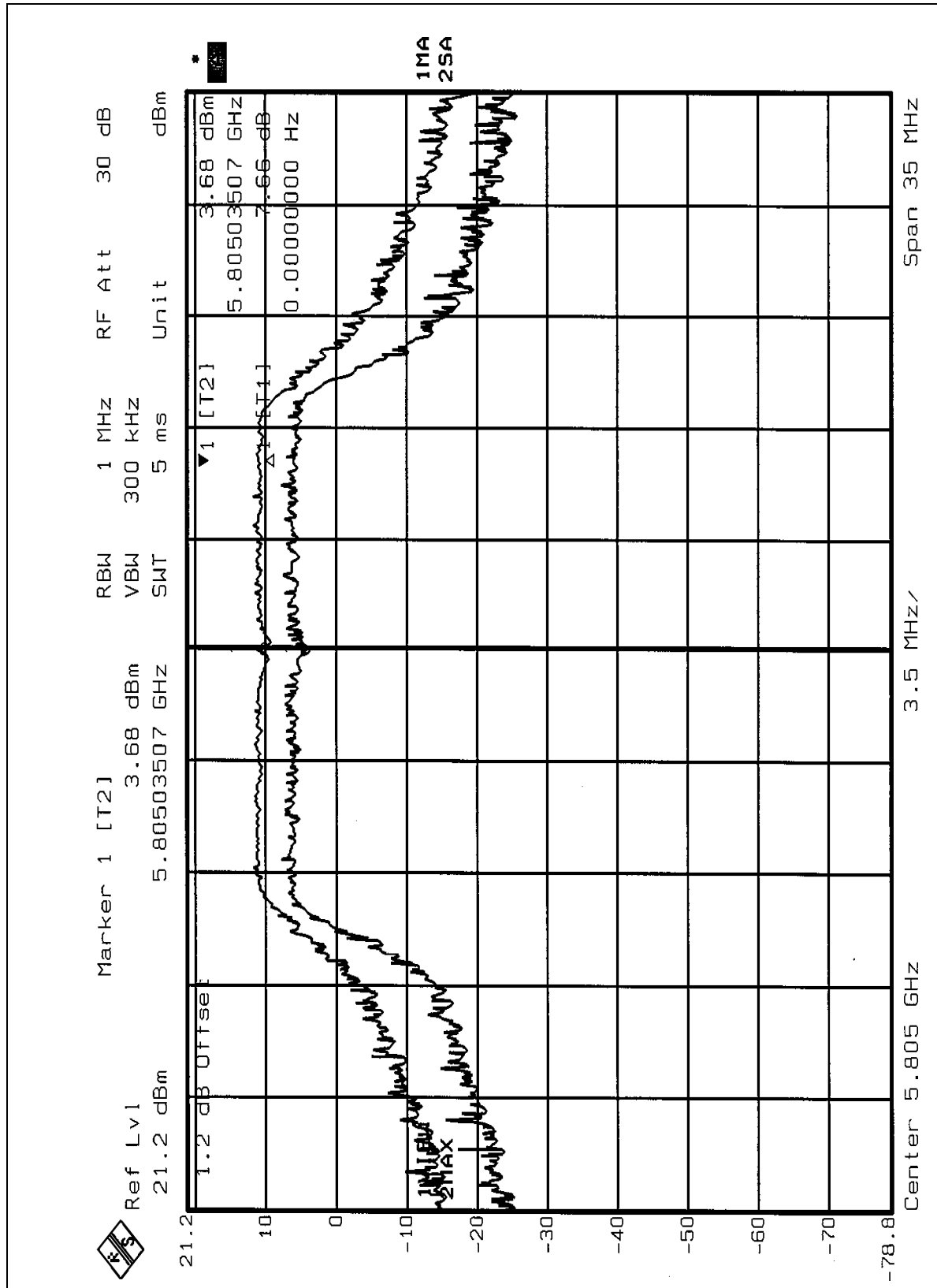


CHANNEL 9





CHANNEL 12





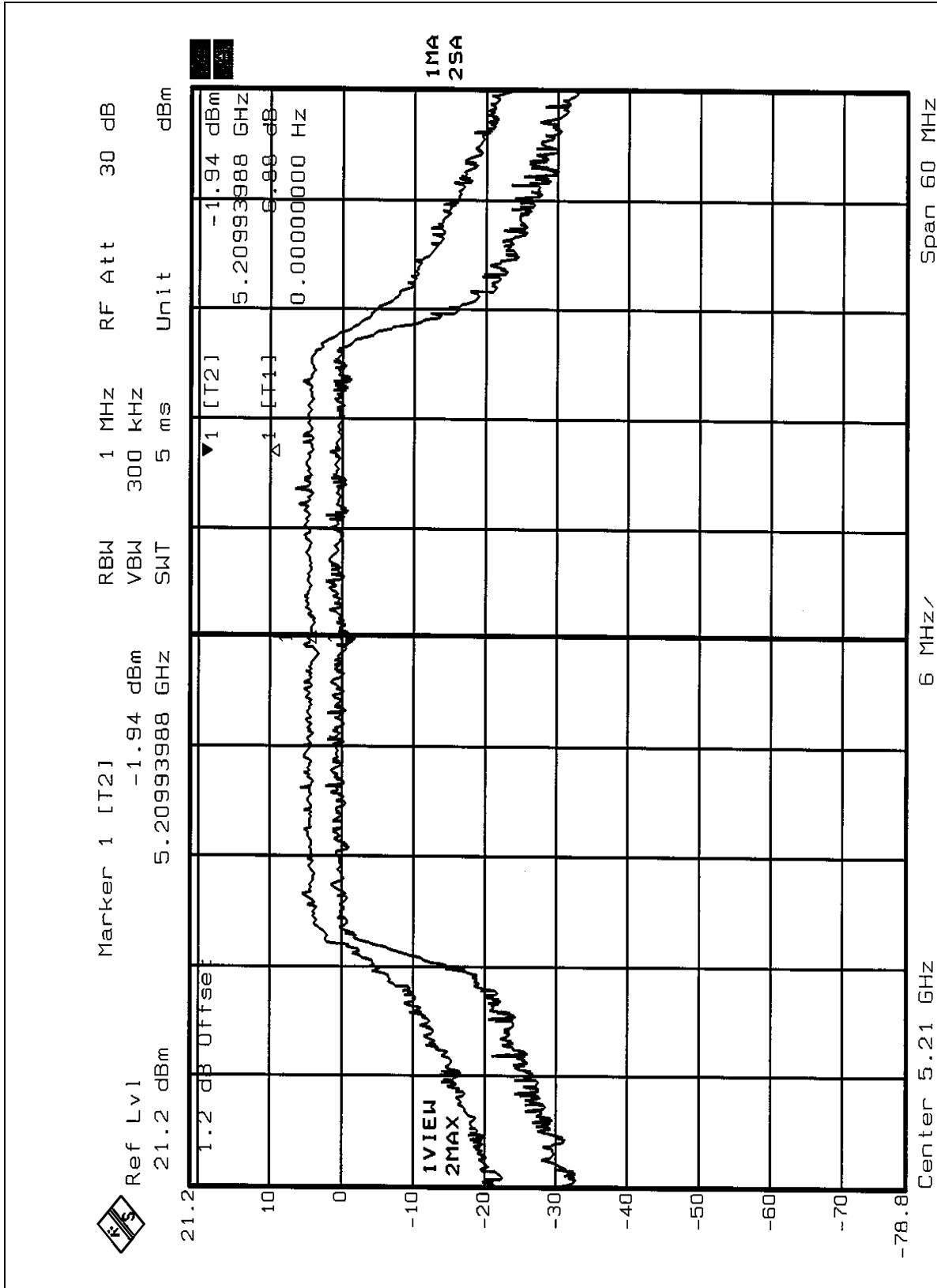
## 5.4.8 TEST RESULTS – TURBO MODE

<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 67%RH, 991hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>TESTED BY</b>	Ansen Lei		

<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	5210	6.88	13	PASS
2	5250	5.57	13	PASS
3	5290	6.28	13	PASS
4	5760	6.36	13	PASS
5	5800	6.76	13	PASS

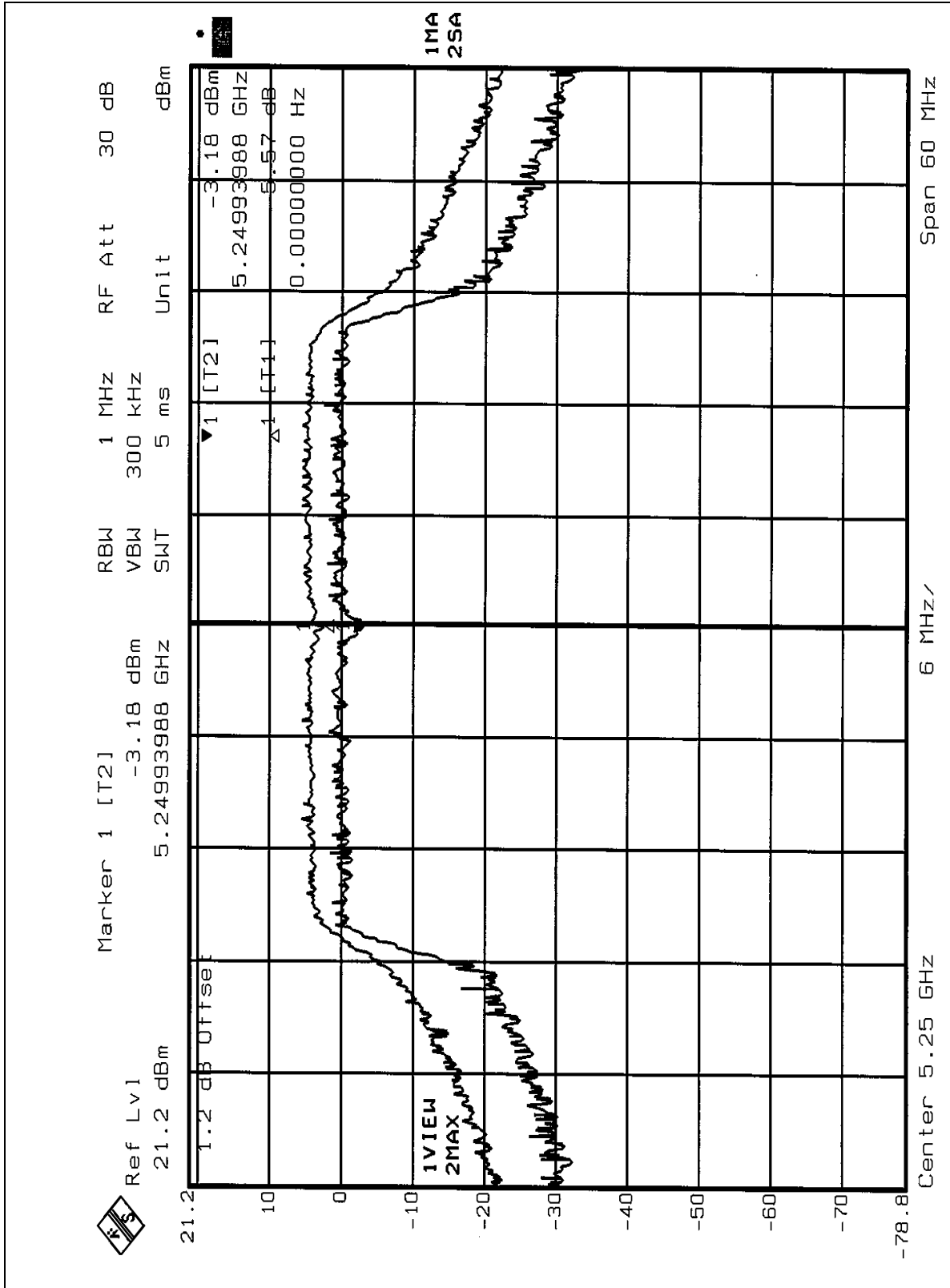


CHANNEL 1



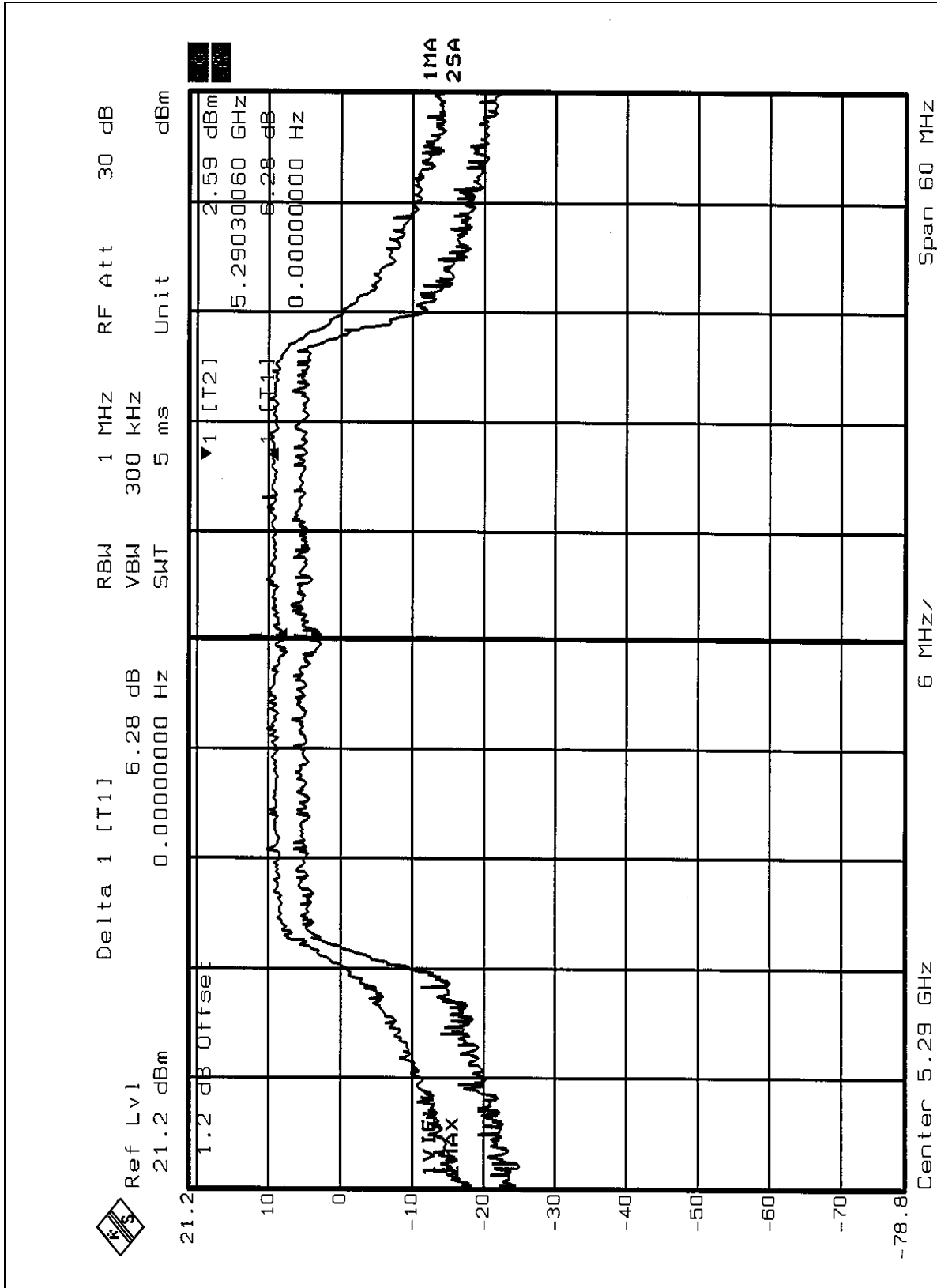


CHANNEL 2



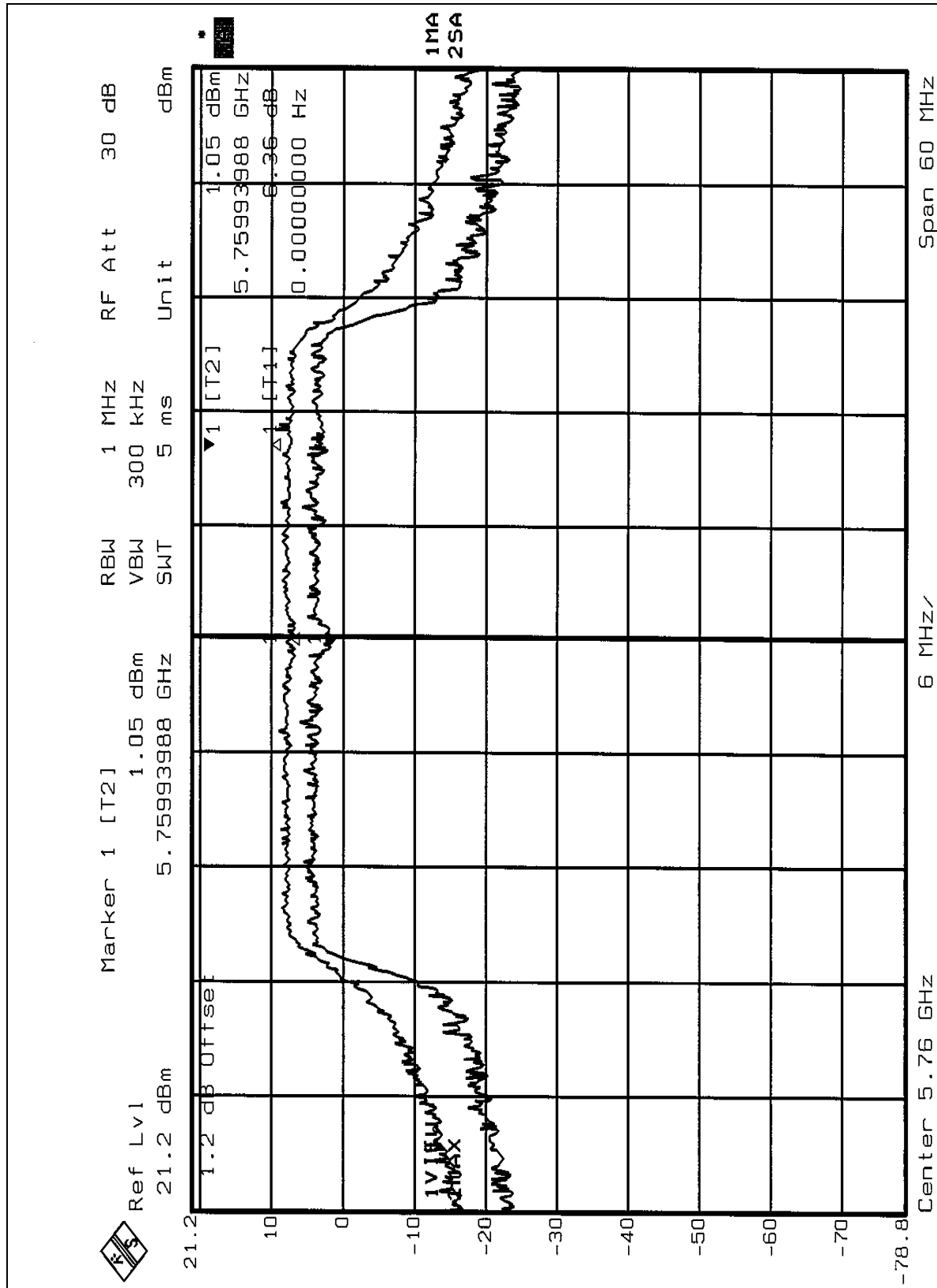


CHANNEL 3



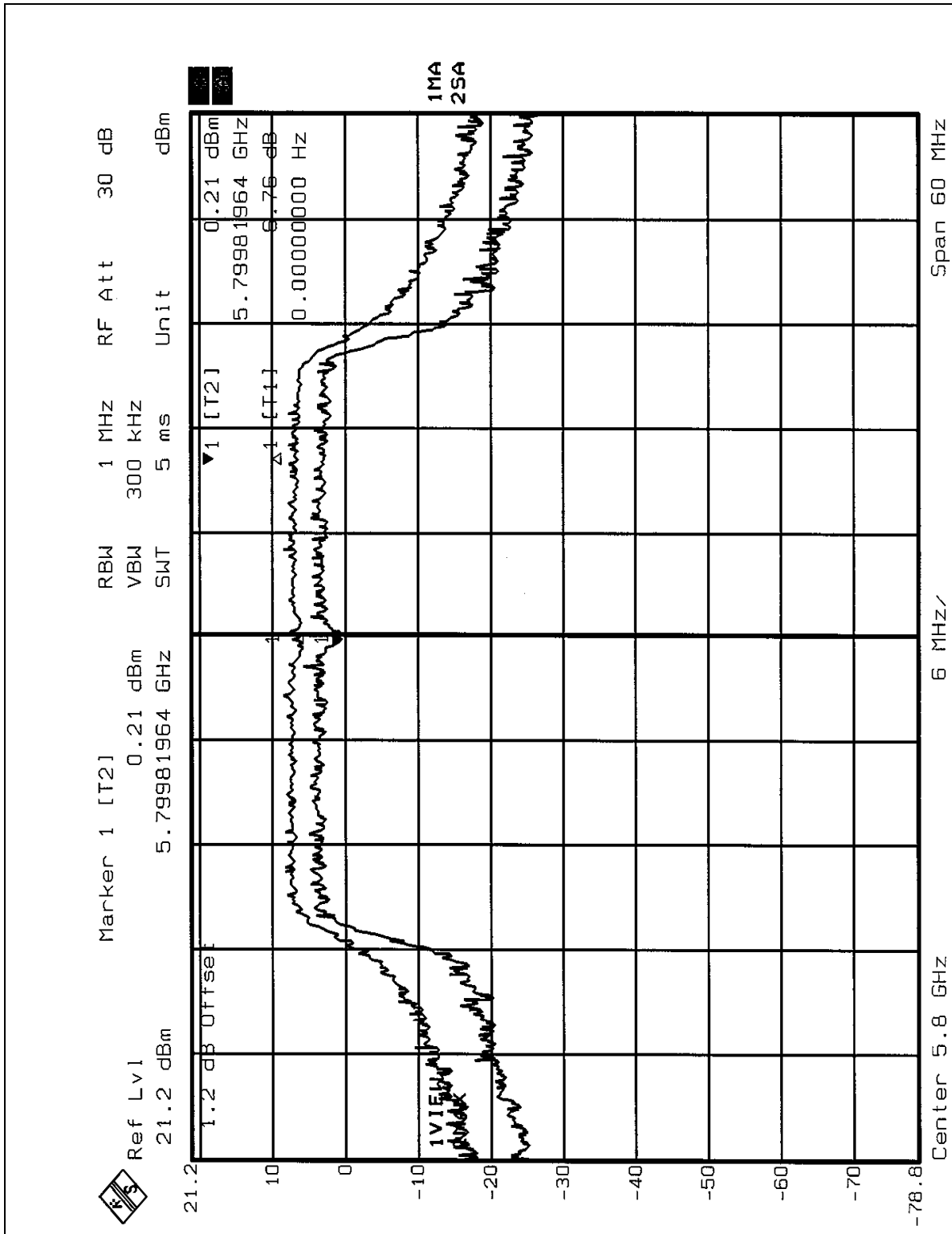


CHANNEL 4





CHANNEL 5







## 5.5 PEAK POWER SPECTRAL DENSITY MEASUREMENT

### 5.5.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

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

### 5.5.2 TEST INSTRUMENTS

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

**NOTE** 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 is the highest level found across the emission in any 1MHz band.

### 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



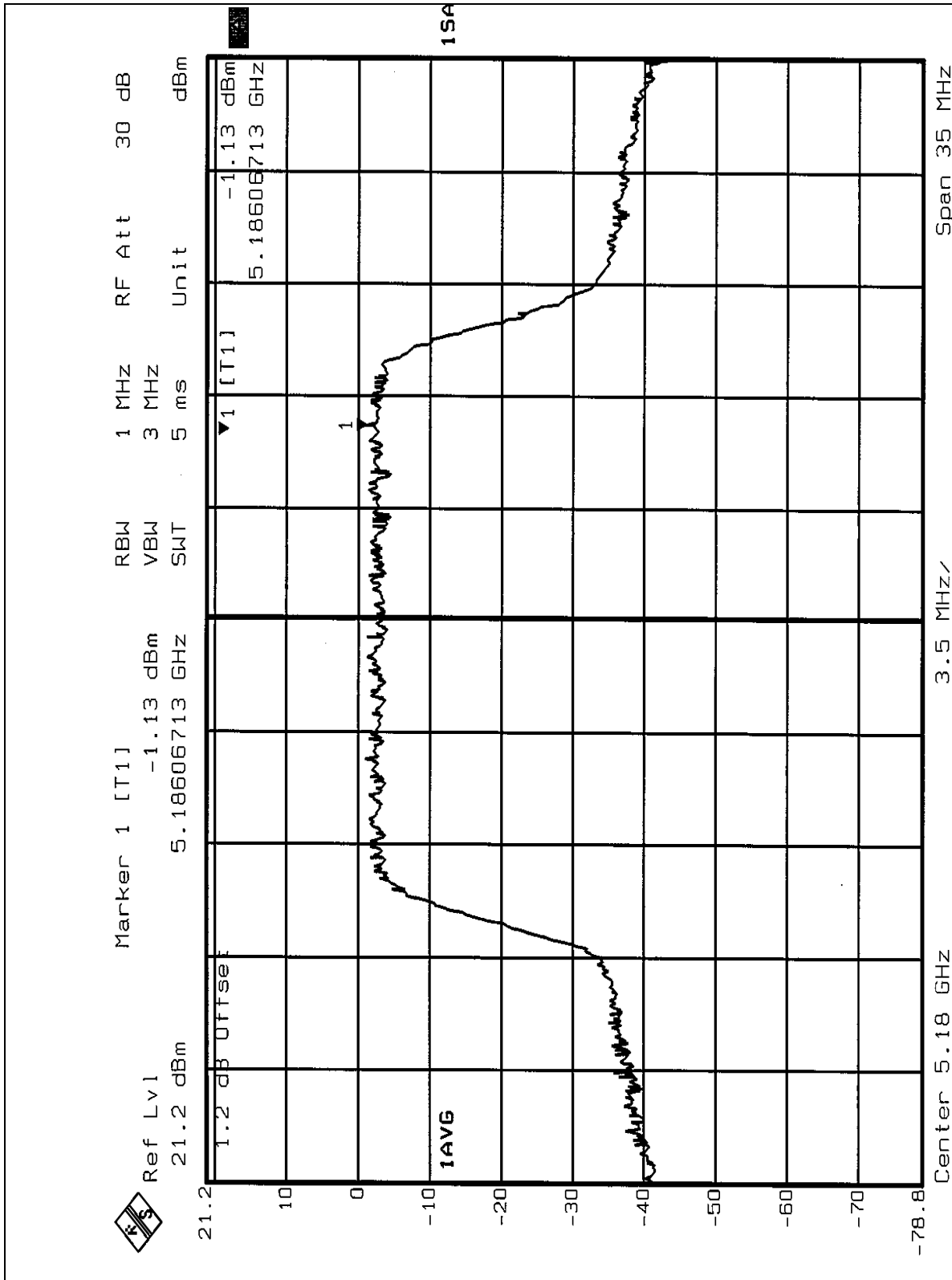
## 5.5.7 TEST RESULTS – NORMAL MODE

<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 67%RH, 991hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>TESTED BY</b>	Ansen Lei		

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz )</b>	<b>RF POWER LEVEL IN 1MHz BW (dBm)</b>	<b>MAXIMUM LIMIT (dBm)</b>	<b>PASS/FAIL</b>
1	5180	-1.13	4	PASS
4	5240	-0.56	4	PASS
5	5260	3.31	11	PASS
8	5320	1.10	11	PASS
9	5745	2.41	17	PASS
12	5805	1.57	17	PASS

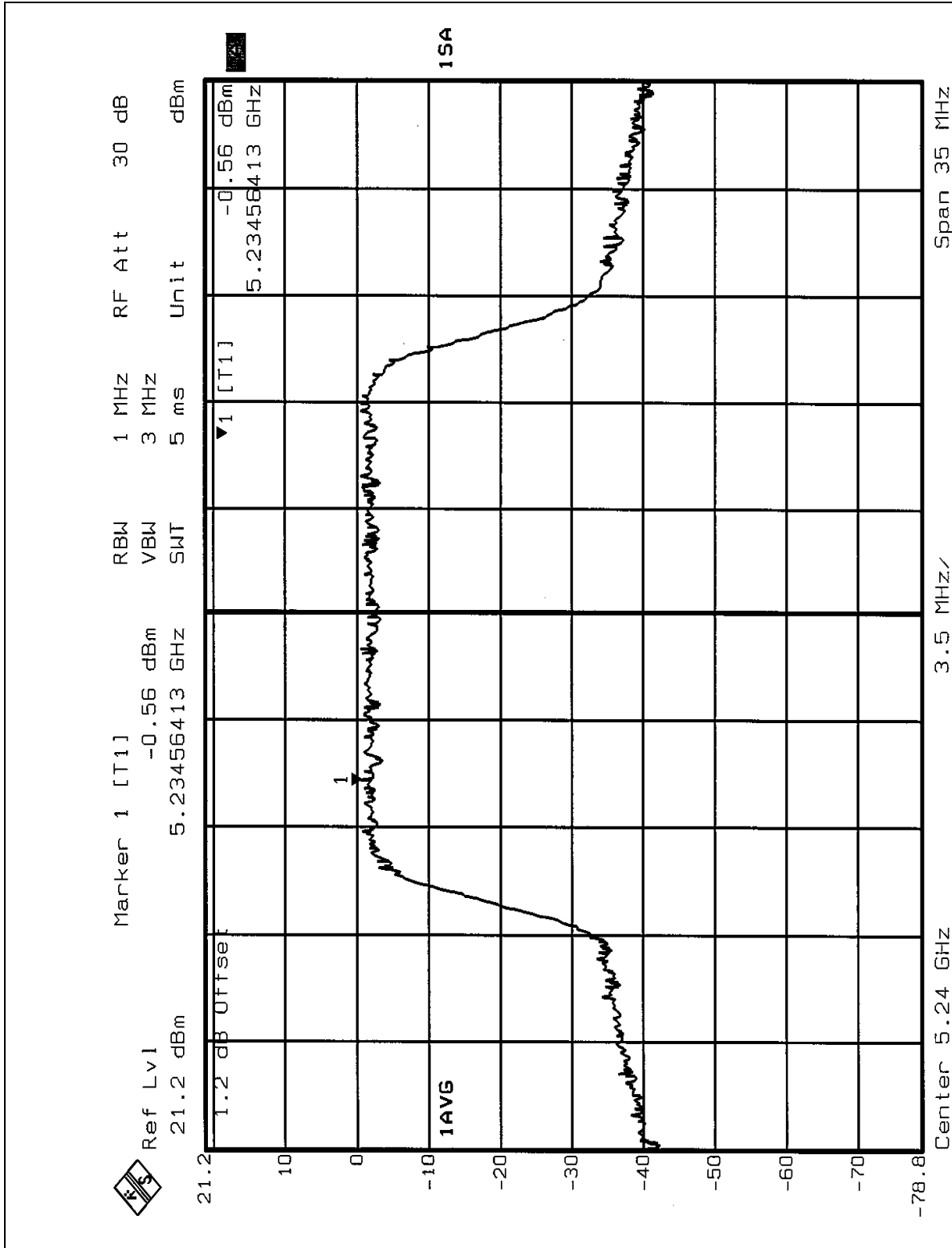


CHANNEL 1



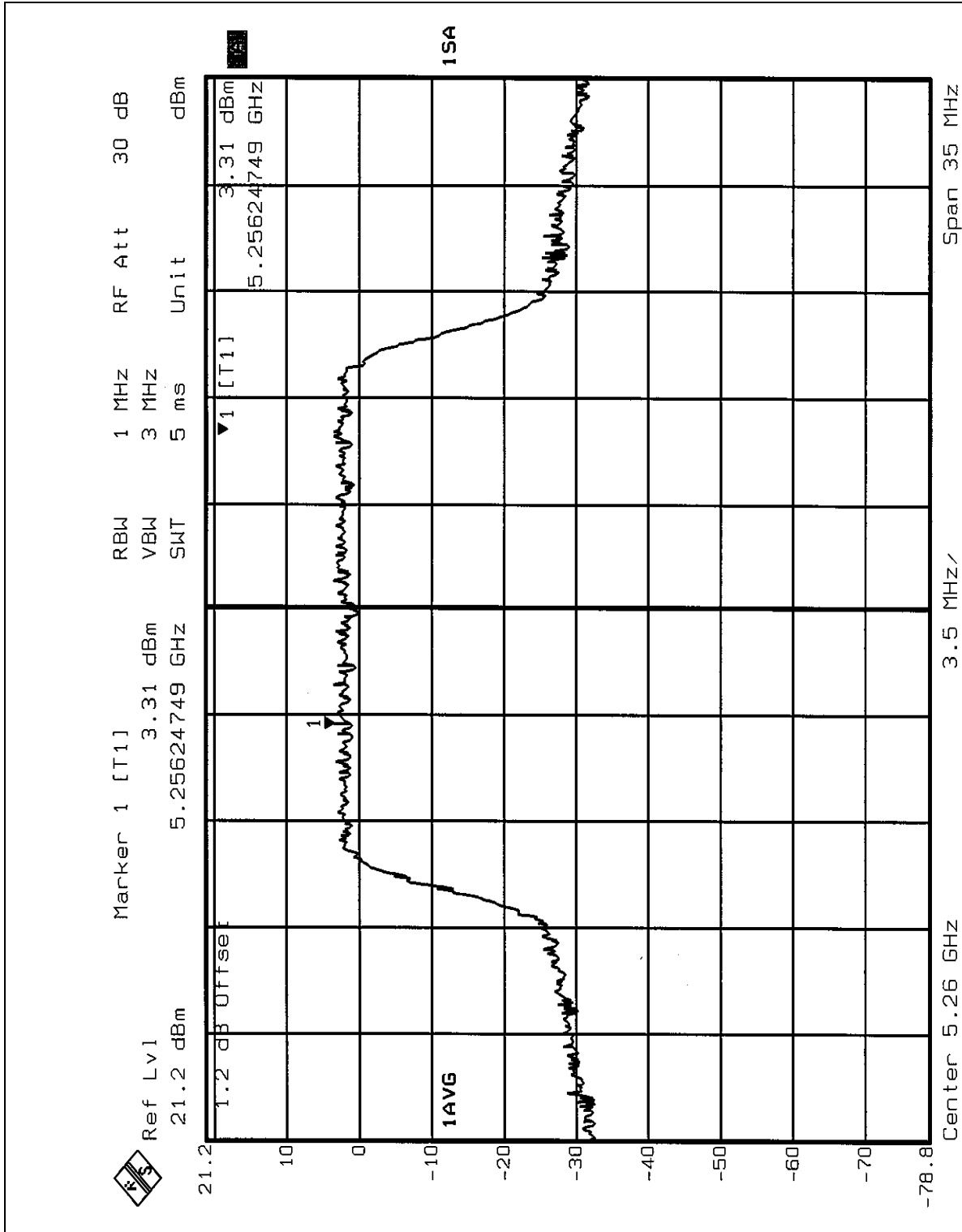


CHANNEL 4



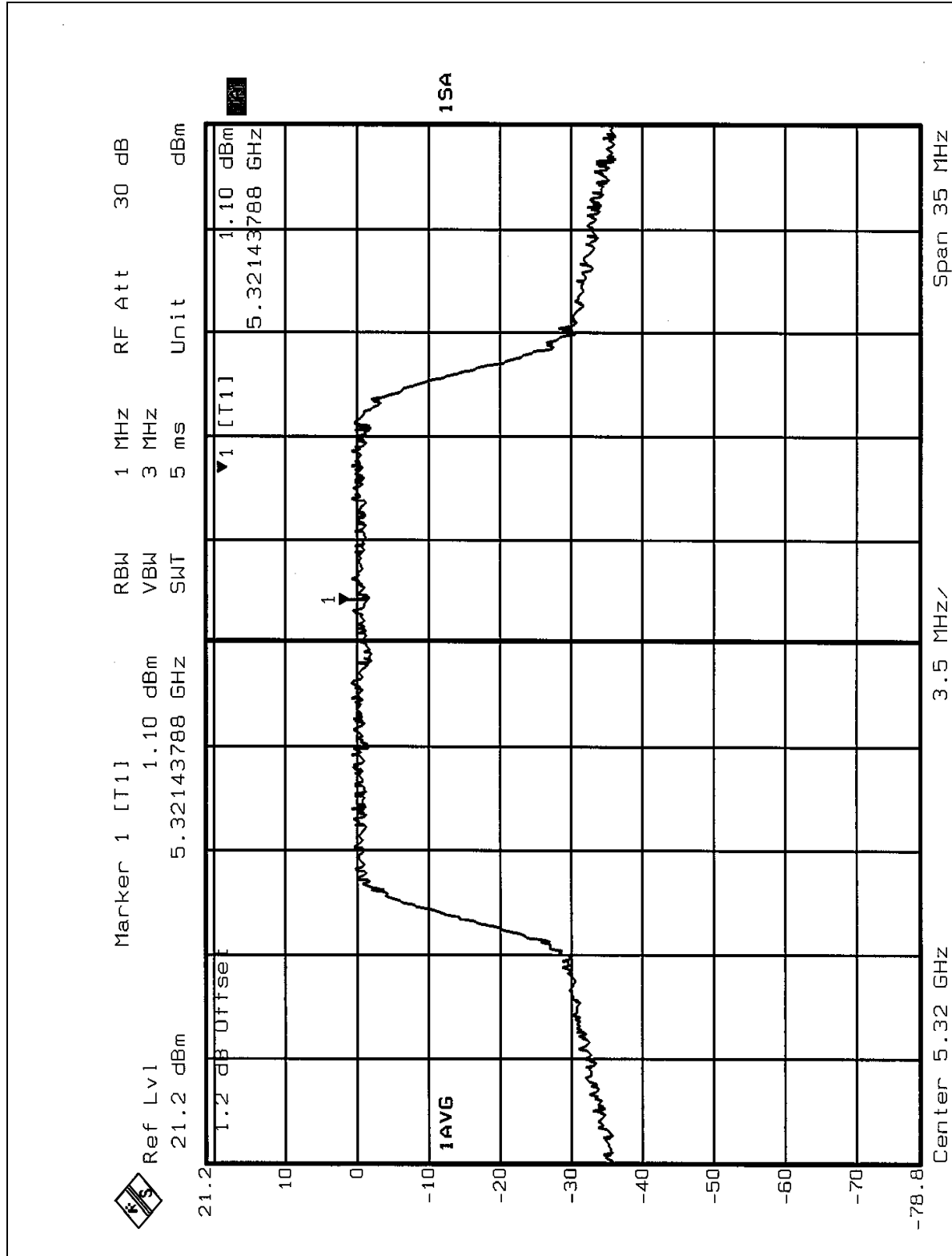


CHANNEL 5



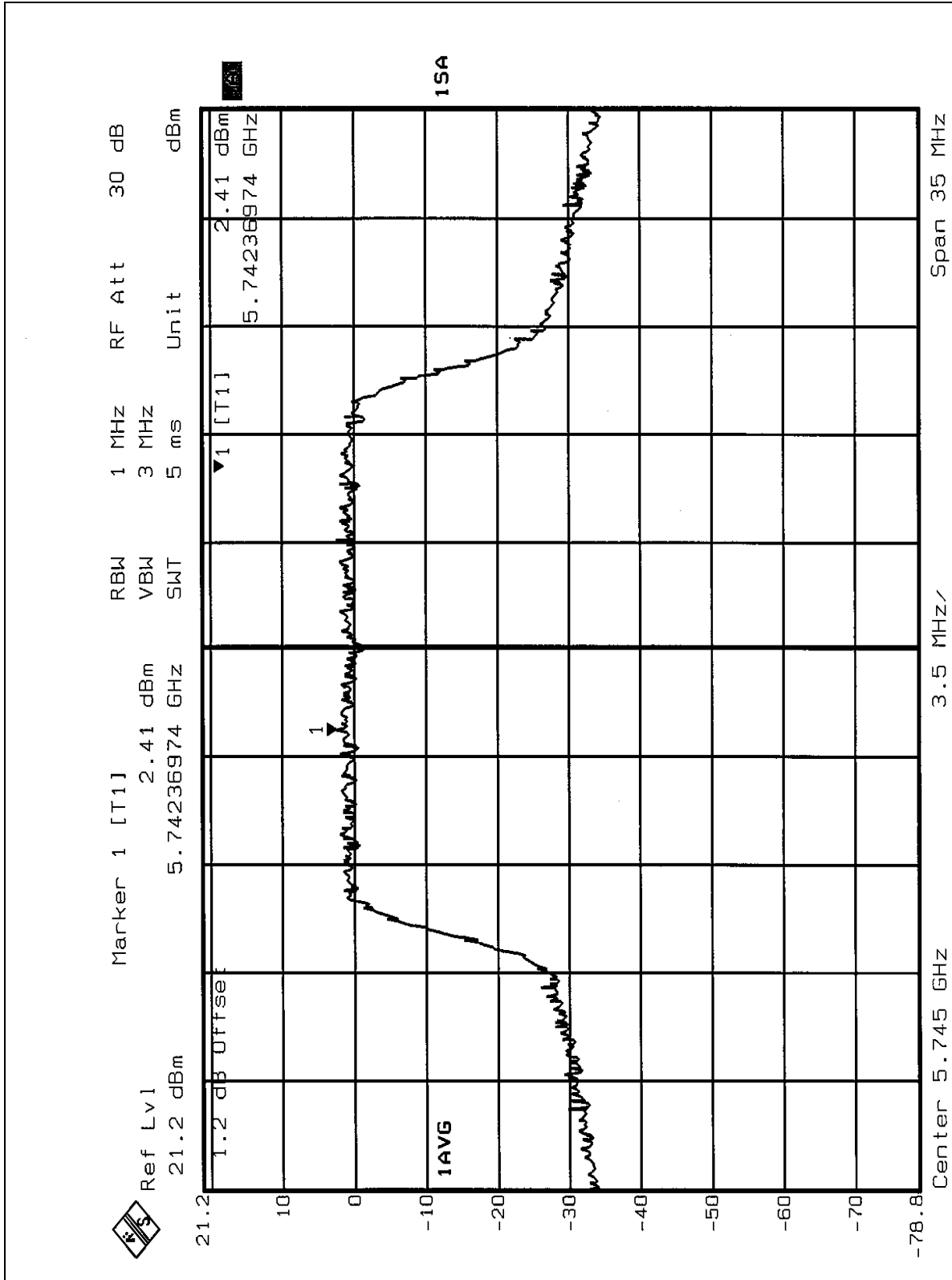


CHANNEL 8





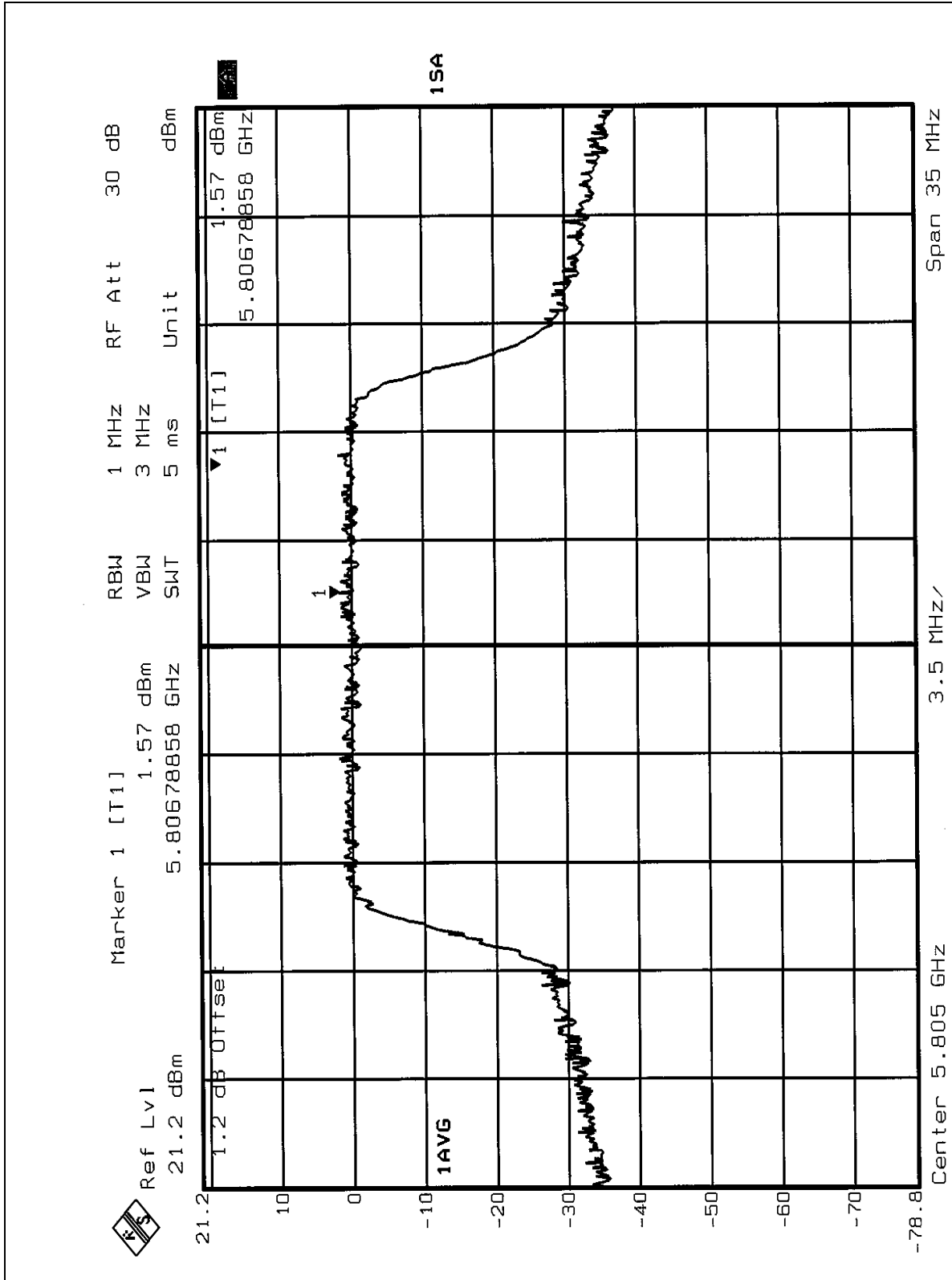
CHANNEL 9







CHANNEL 12





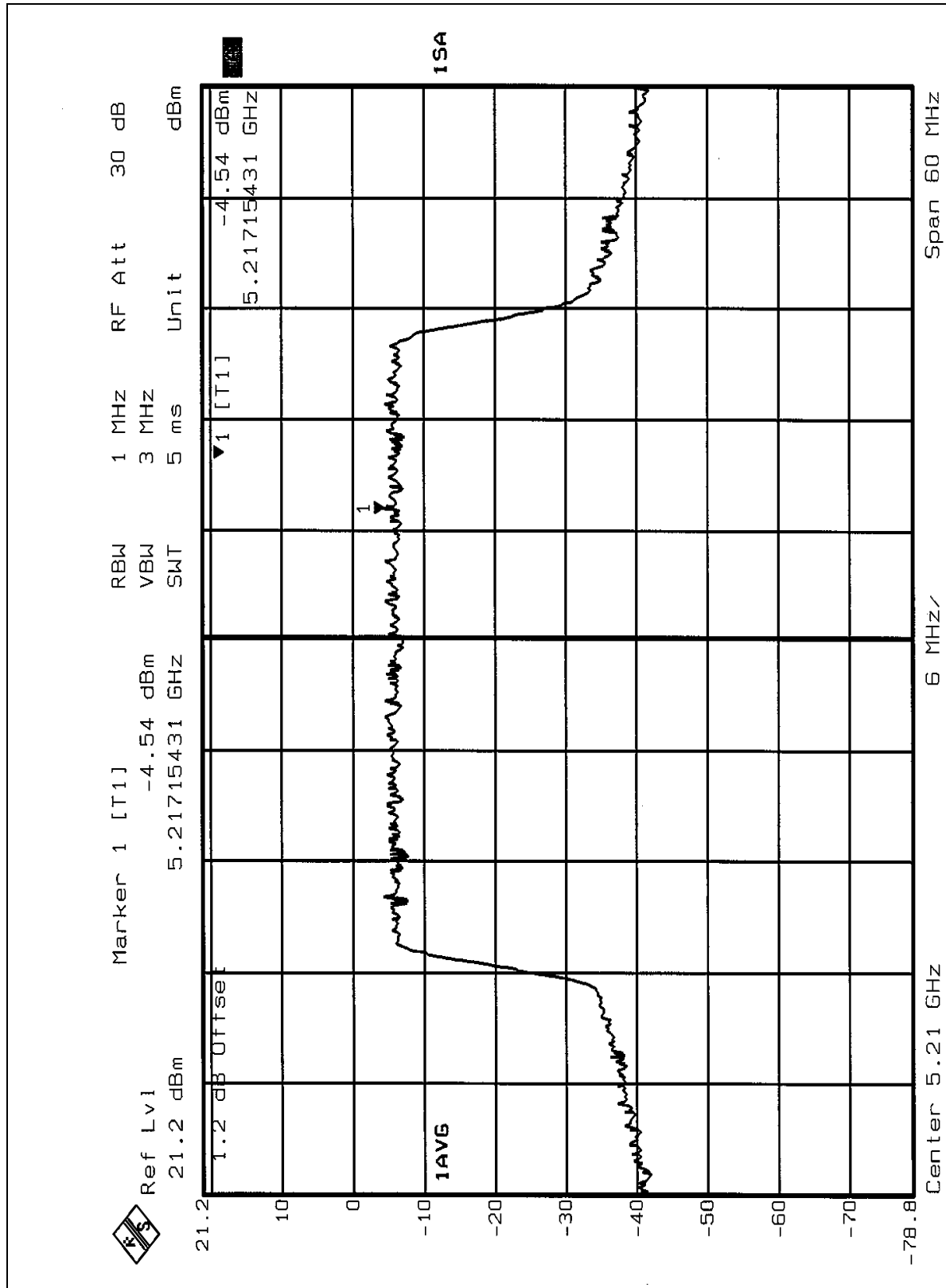
## 5.5.8 TEST RESULTS – TURBO MODE

<b>EUT</b>	2.4GHz/5GHz Mini - PCI Card	<b>MODEL</b>	WLL220
<b>ENVIRONMENTAL CONDITIONS</b>	24deg. C, 67%RH, 991hPa	<b>INPUT POWER (SYSTEM)</b>	120Vac, 60 Hz
<b>TESTED BY</b>	Ansen Lei		

<b>CHANNEL</b>	<b>CHANNEL FREQUENCY (MHz )</b>	<b>RF POWER LEVEL IN 1MHz BW (dBm)</b>	<b>MAXIMUM LIMIT (dBm)</b>	<b>PASS/FAIL</b>
1	5210	-4.54	4	PASS
2	5250	-3.94	4	PASS
3	5290	0.43	11	PASS
4	5760	-0.62	17	PASS
5	5800	-3.25	17	PASS

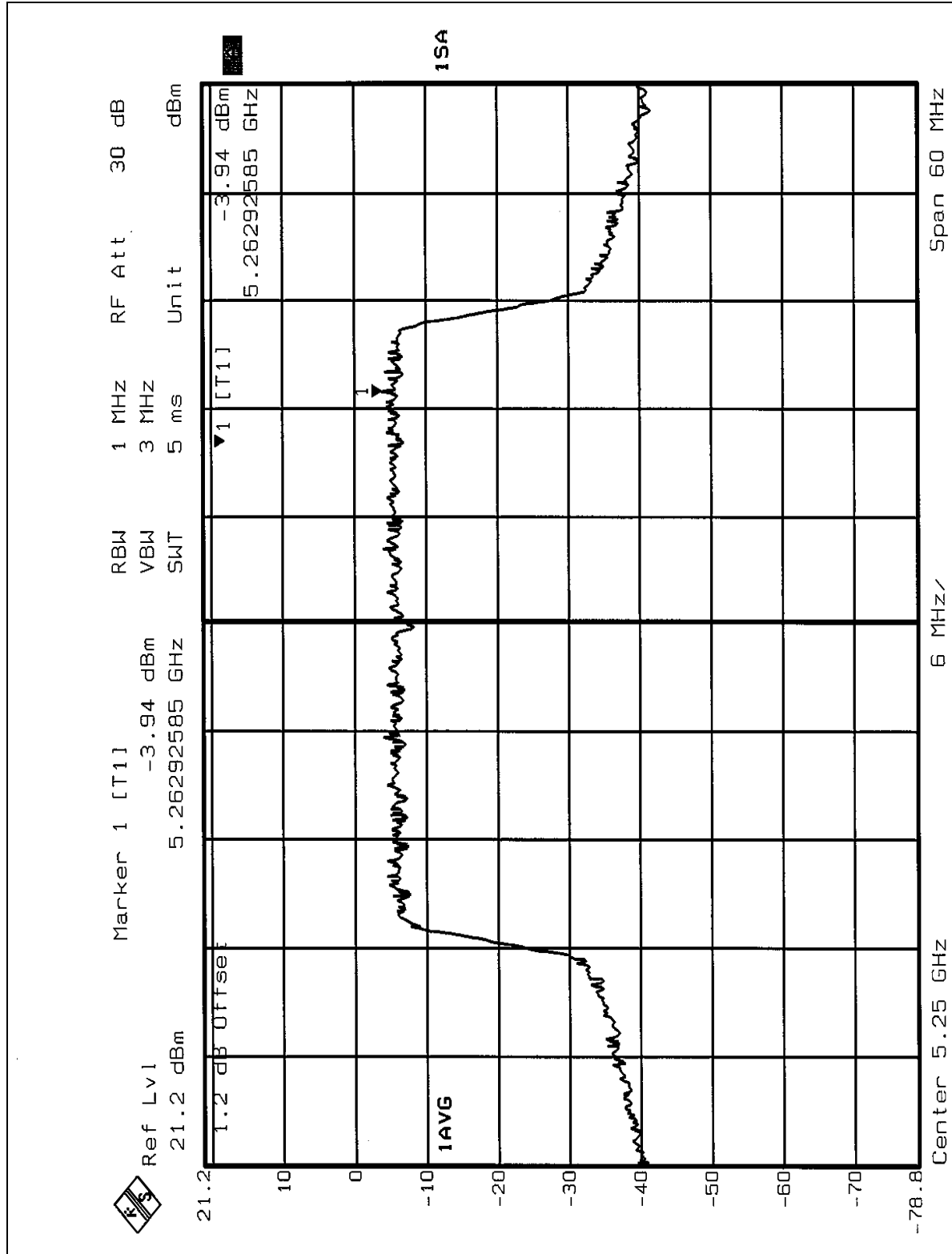


CHANNEL 1



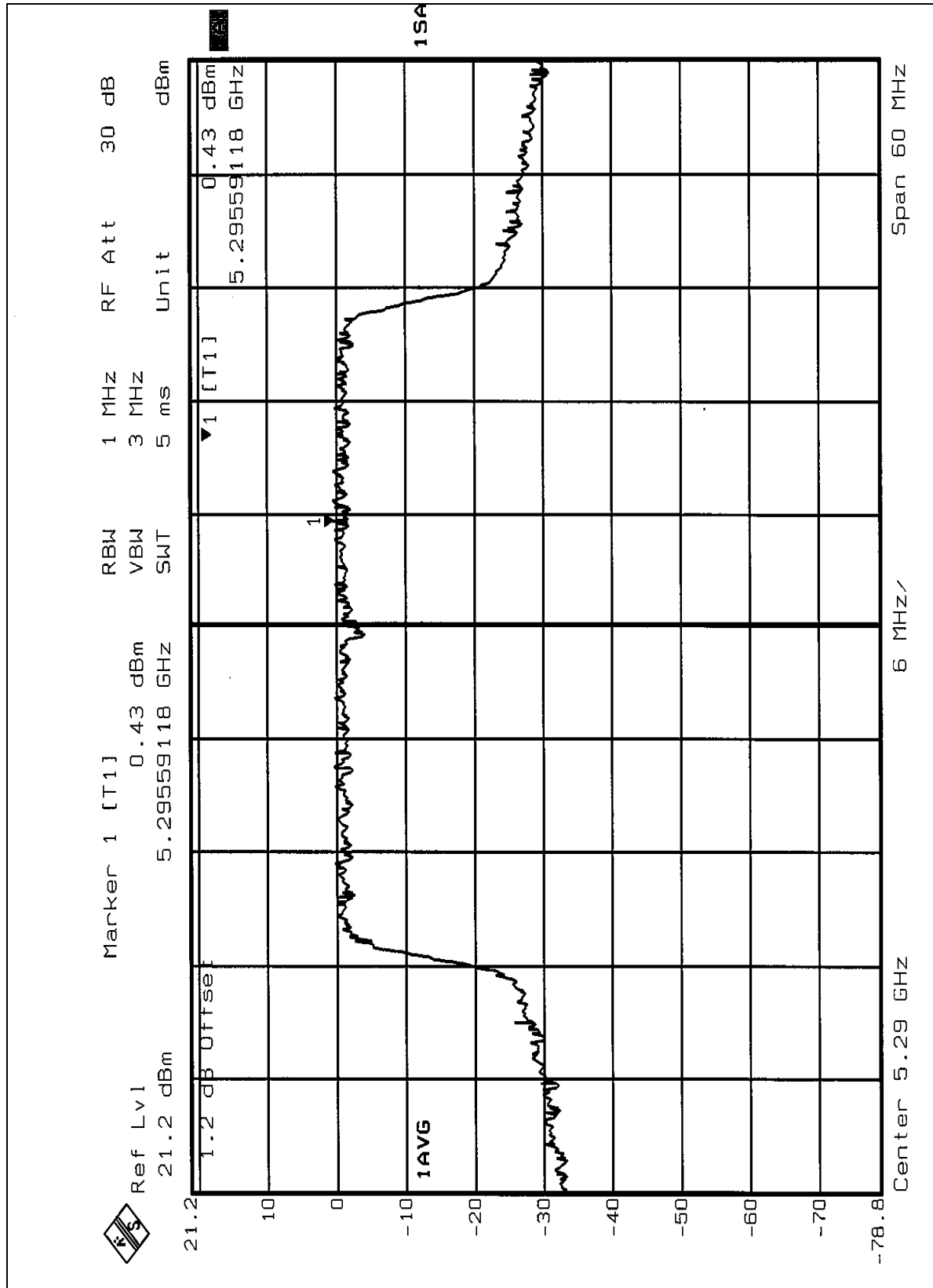


CHANNEL 2



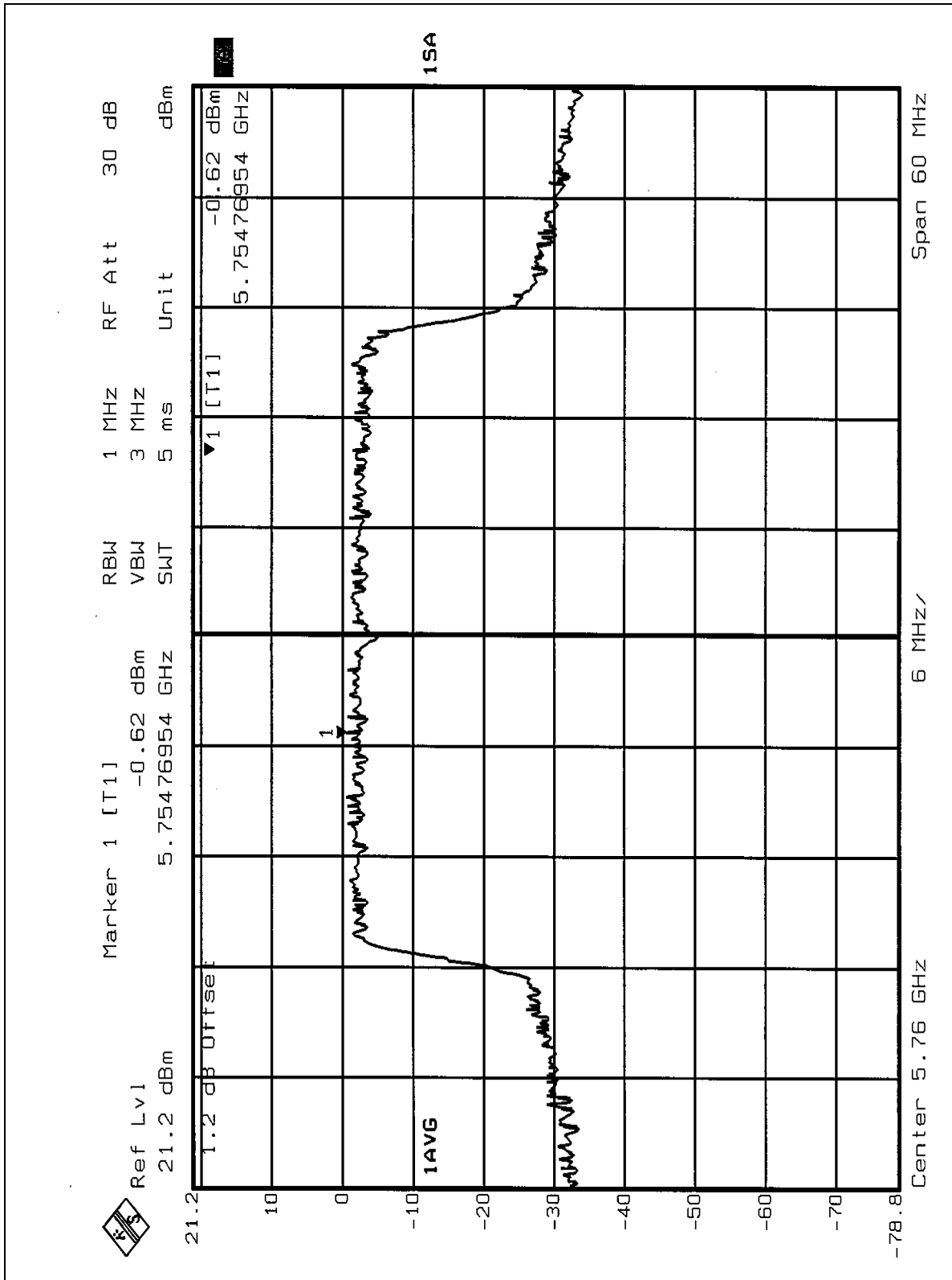


CHANNEL 3





CHANNEL 4







## 5.6 FREQUENCY STABILITY

### 5.6.1 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.

### 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 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

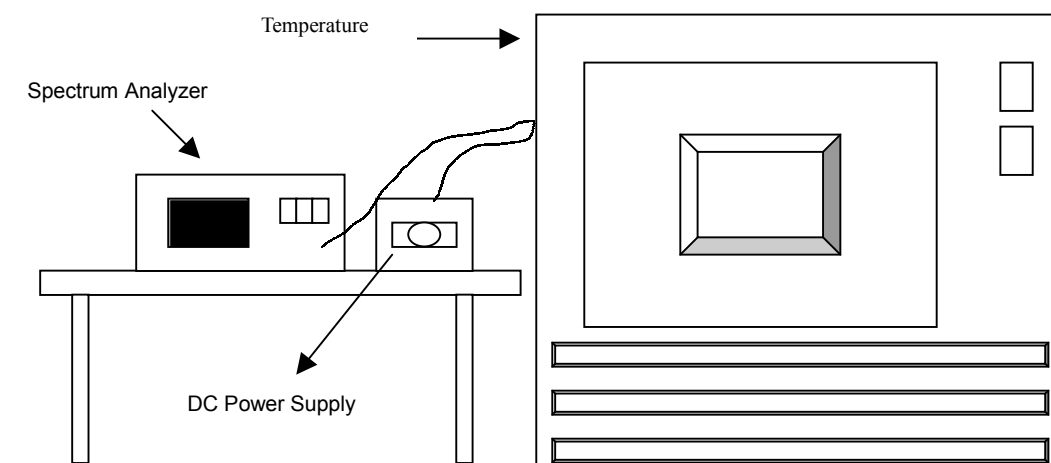
1. The EUT was placed inside the environmental test chamber and powered by nominal DC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature 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 4.1.6



5.6.7 TEST RESULTS

		Operating frequency: 5320MHz				Limit : ± 0.02%	
Temp. (°C)	Power supply (VDC)	2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	126.5	5320.0423	0.000795	5320.0425	0.000799	5320.0423	0.000795
	110.0	5320.0418	0.000786	5320.0425	0.000799	5320.0427	0.000803
	93.5	5320.0427	0.000803	5320.0427	0.000803	5320.0428	0.000805
40	126.5	5320.0445	0.000836	5320.0433	0.000814	5320.0443	0.000833
	110.0	5320.0433	0.000814	5320.0437	0.000821	5320.0425	0.000799
	93.5	5320.0438	0.000823	5320.0432	0.000812	5320.0428	0.000805
30	126.5	5320.0518	0.000974	5320.0515	0.000968	5320.0510	0.000959
	110.0	5320.0512	0.000962	5320.0512	0.000962	5320.0507	0.000953
	93.5	5320.0510	0.000959	5320.0507	0.000953	5320.0508	0.000955
20	126.5	5320.0447	0.000840	5320.0478	0.000898	5320.0482	0.000906
	110.0	5320.0477	0.000897	5320.0475	0.000893	5320.0487	0.000915
	93.5	5320.0476	0.000895	5320.0478	0.000898	5320.0483	0.000908
10	126.5	5320.0372	0.000699	5320.0373	0.000701	5320.0381	0.000716
	110.0	5320.0370	0.000695	5320.0373	0.000701	5320.0383	0.000720
	93.5	5320.0370	0.000695	5320.0375	0.000705	5320.0386	0.000726
0	126.5	5320.0286	0.000538	5320.0283	0.000532	5320.0283	0.000532
	110.0	5320.0288	0.000541	5320.0285	0.000536	5320.0282	0.000530
	93.5	5320.0288	0.000541	5320.0287	0.000539	5320.0286	0.000538
-10	126.5	5320.0445	0.000836	5320.0443	0.000833	5320.0445	0.000836
	110.0	5320.0447	0.000840	5320.0445	0.000836	5320.0443	0.000833
	93.5	5320.0447	0.000840	5320.0447	0.000840	5320.0443	0.000833
-20	126.5	5320.0458	0.000861	5320.0457	0.000859	5320.0458	0.000861
	110.0	5320.0460	0.000865	5320.0458	0.000861	5320.0457	0.000859
	93.5	5320.0462	0.000868	5320.0460	0.000865	5320.0460	0.000865
-30	126.5	5320.0513	0.000964	5320.0513	0.000964	5320.0514	0.000966
	110.0	5320.0510	0.000959	5320.0515	0.000968	5320.0513	0.000964
	93.5	5320.0510	0.000959	5320.0518	0.000974	5320.0515	0.000968



## 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:** 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 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.

### 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

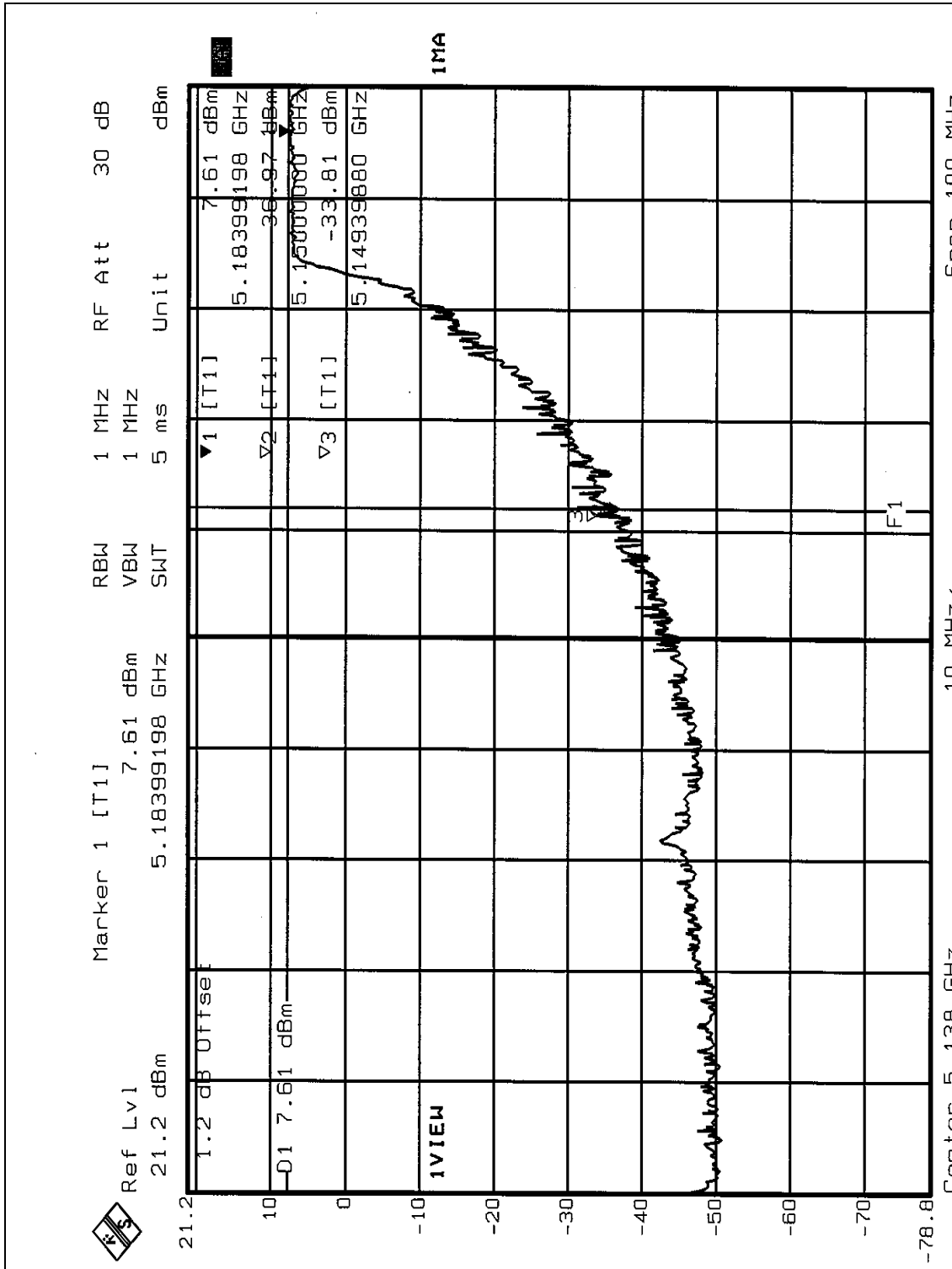
For signals in the restricted bands above and below the 5.15 to 5.35GHz allocated band a measurement was made of the amplitude of the spurious emissions with respect to the intentional signals. The relative amplitude, in dBc, was applied to the average and peak field strength of the intentional signal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

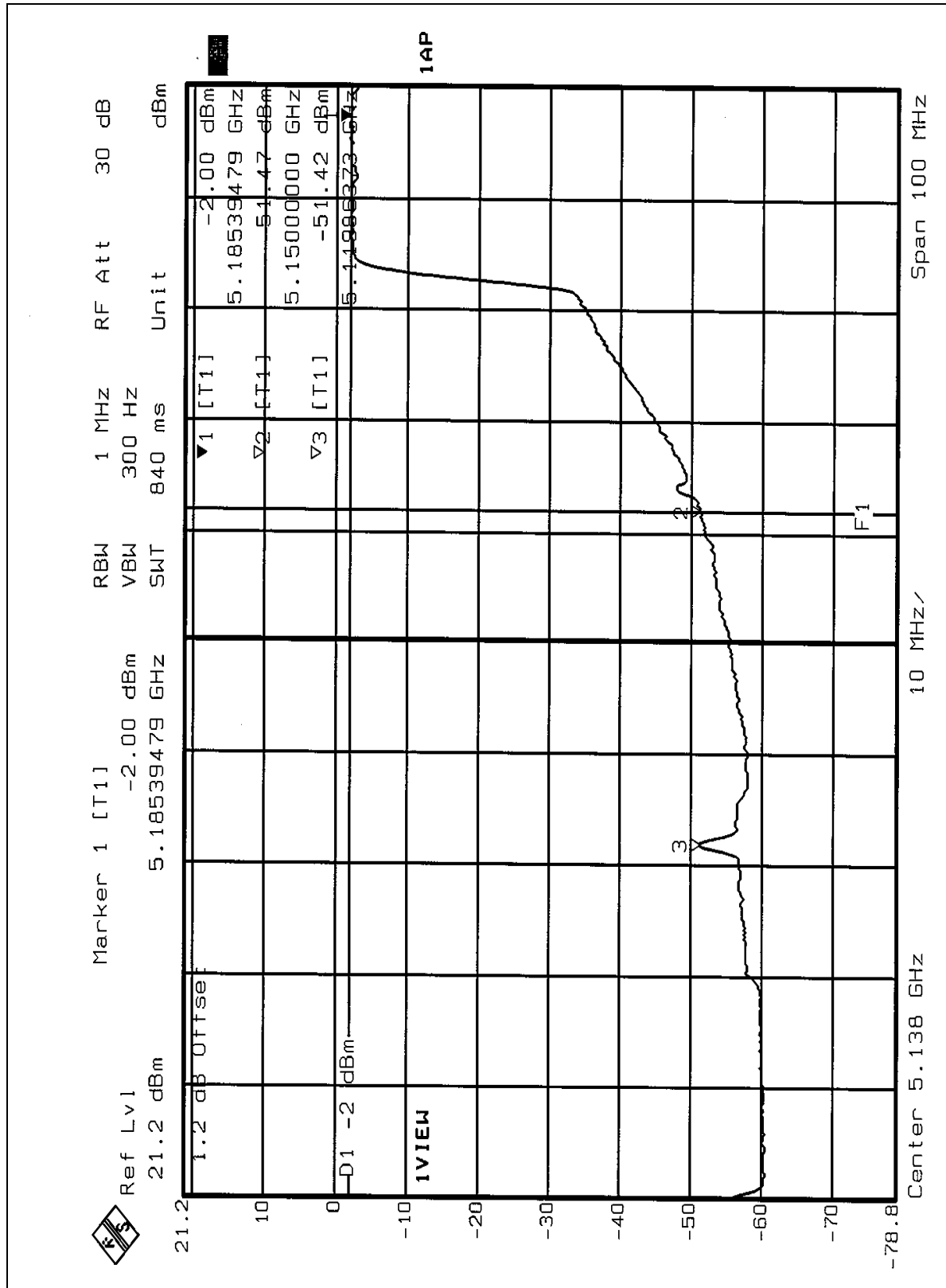
The spectrum plots (Peak RBW=VBW=1MHz; Average RBW=1MHz, VBW=300Hz) are attached on the following 8 pages.



Channel 1 (5180 MHz)

The band edge emission plot on the following 2 pages shows 41.42dBc (Peak) / 49.42 dBc (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 99.0dBuV/m, so the maximum field strength in restrict band is 99.0-49.42=49.58dBuV/m which is under 54dBuV/m limit.

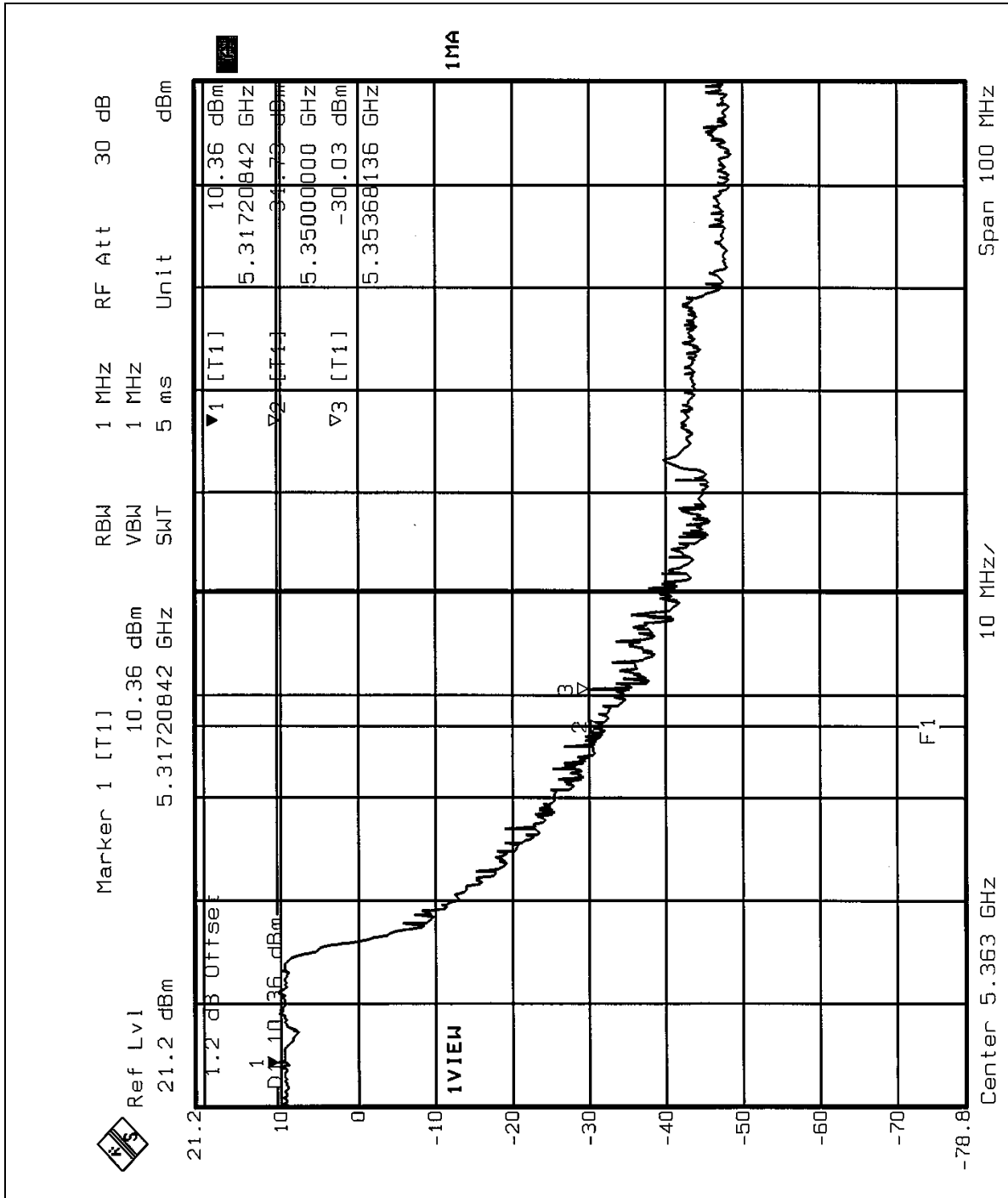


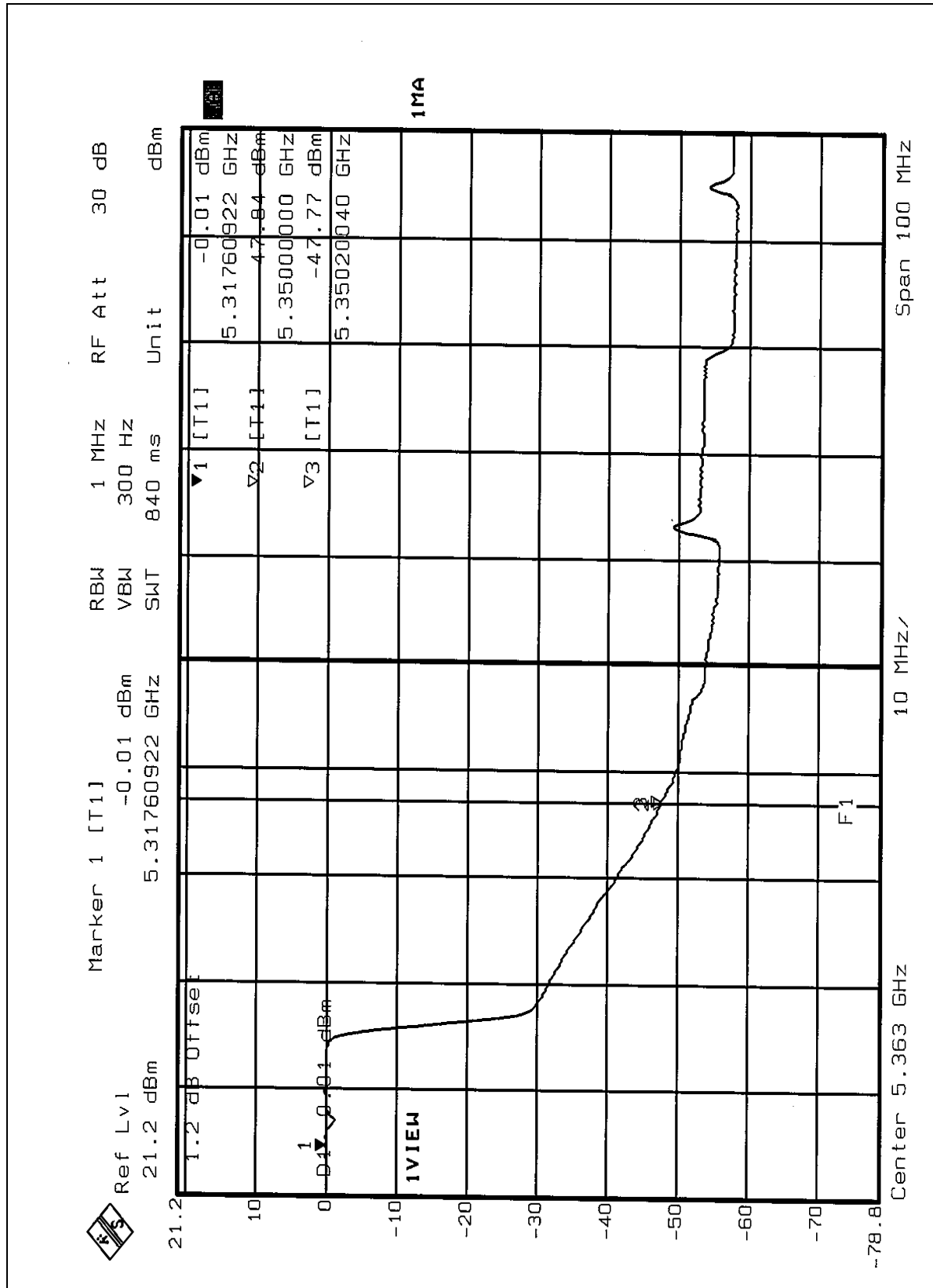




Channel 8 (5320 MHz)

The band edge emission plot on the following 2 pages shows 40.39dBc (Peak) / 47.76dBc (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 96.7dBuV/m, so the maximum field strength in restrict band is 96.7-47.76=48.94dBuV/m which is under 54dBuV/m limit.

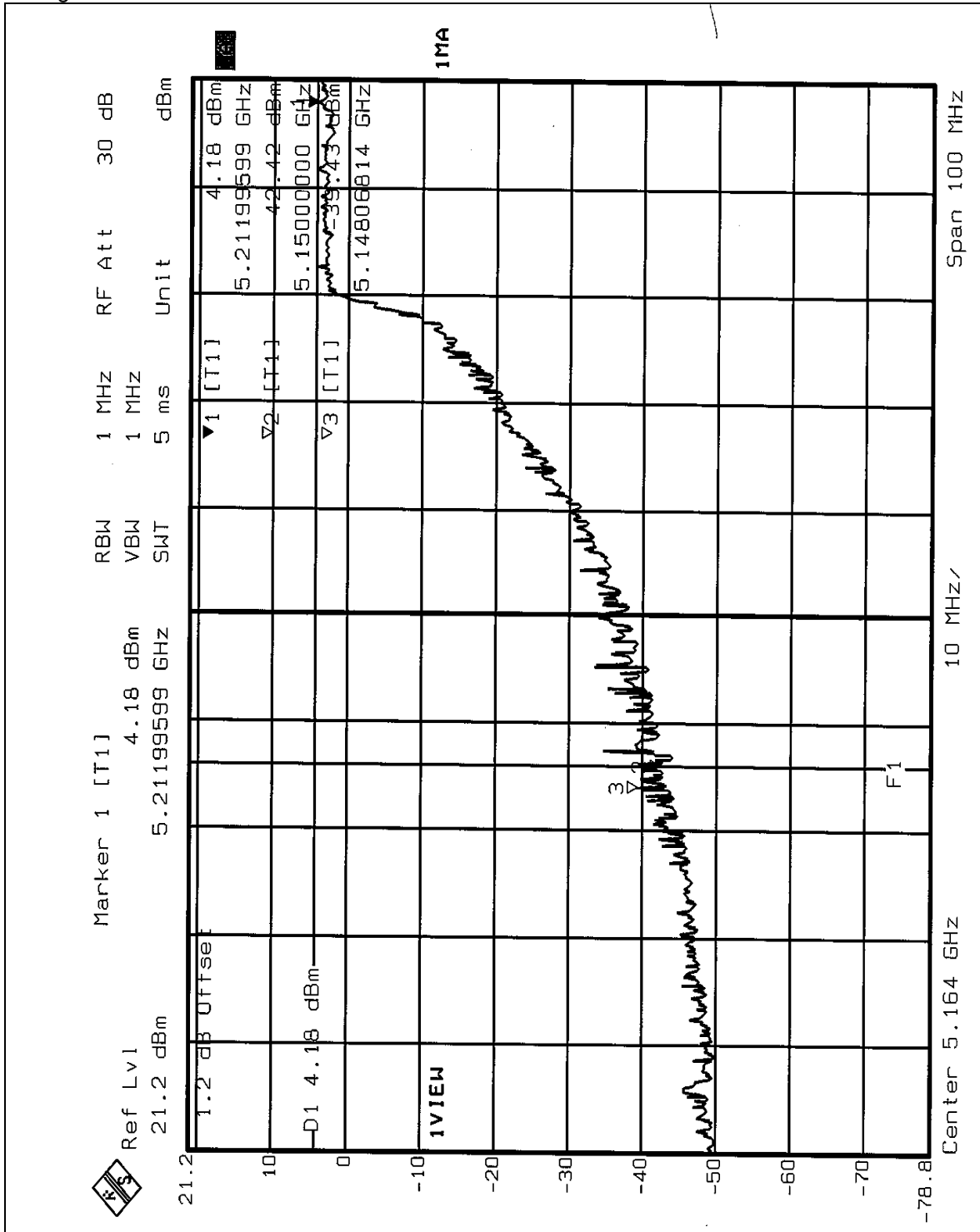




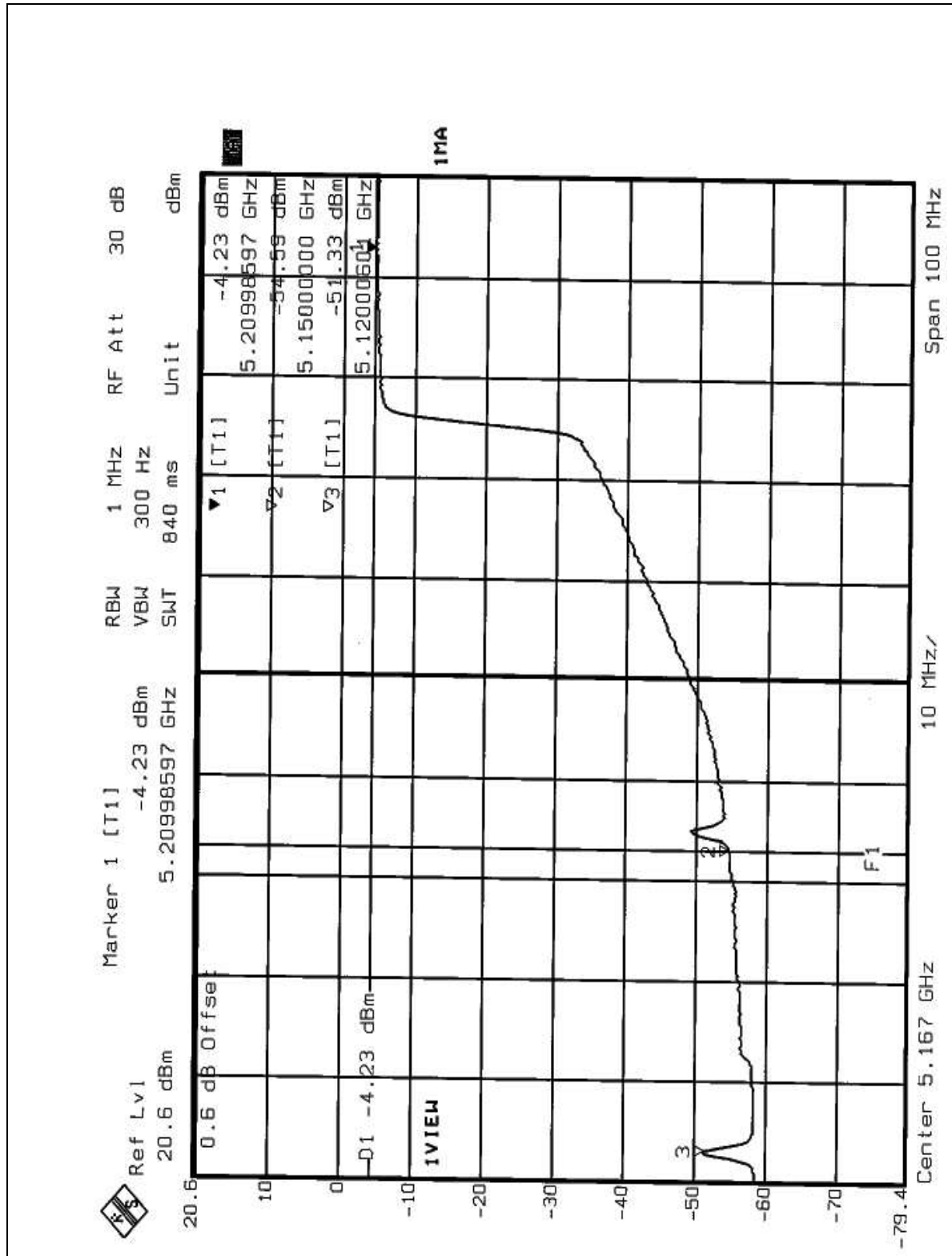


Turbo Mode: Channel 1 (5210 MHz)

The band edge emission plot on the following 2 pages shows 43.61dBc (Peak) / 49.21dBc (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 (turbo mode) is 92.2dBuV/m, so the maximum field strength in restrict band is  $92.2 - 49.21 = 42.99$  dBuV/m which is under 54dBuV/m limit.



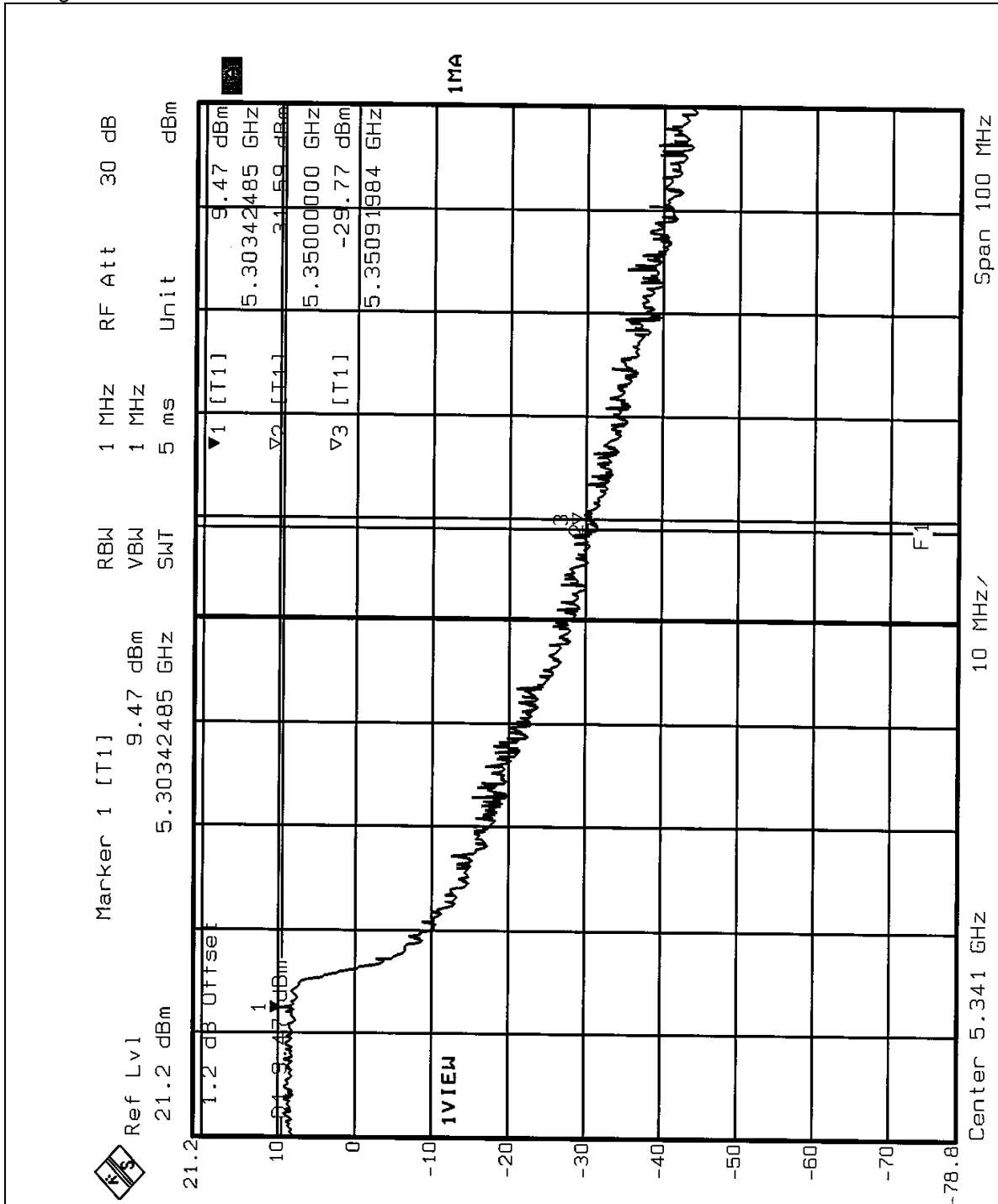


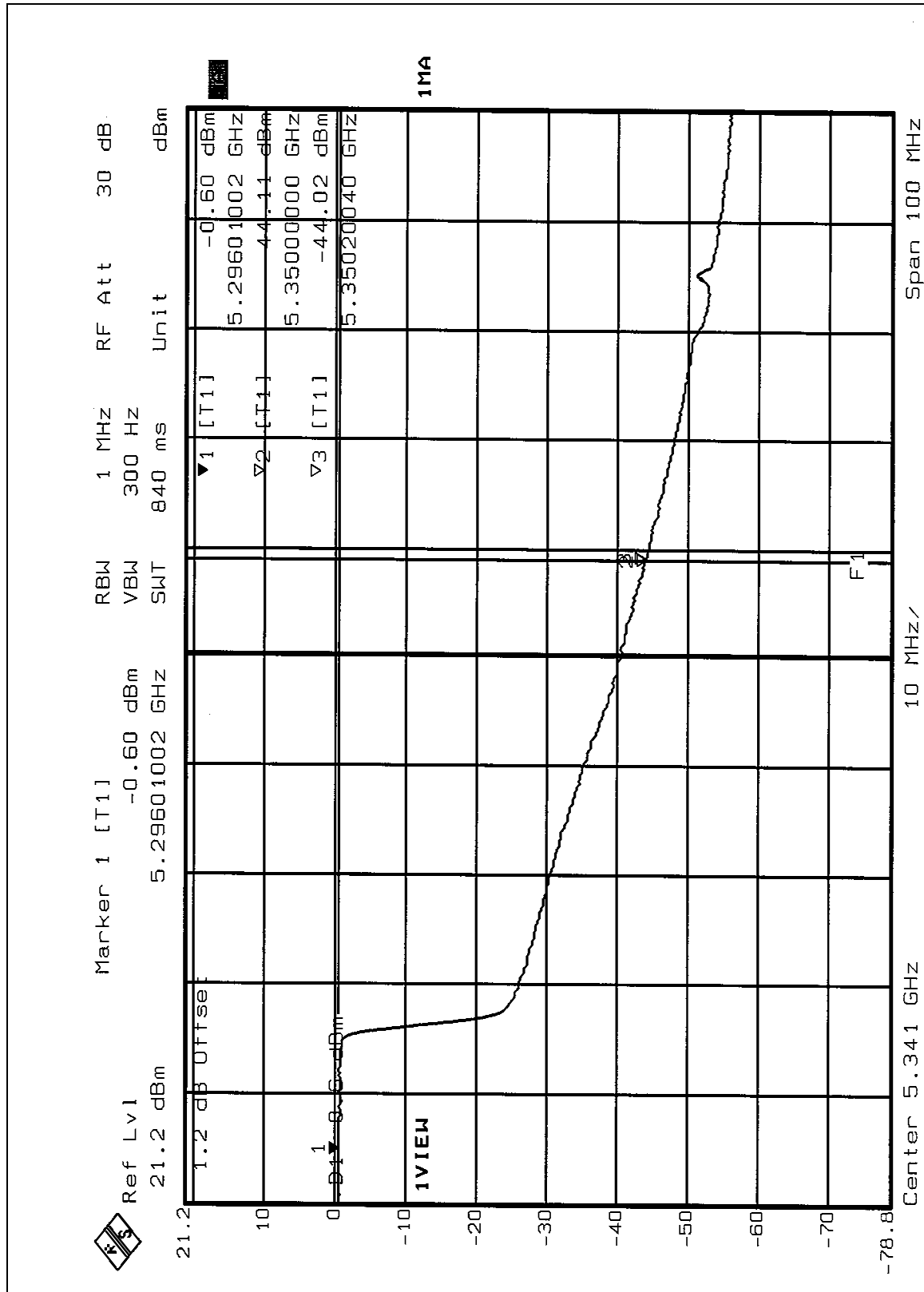




Turbo Mode: Channel 3 (5290 MHz)

The band edge emission plot on the following 2 pages shows 39.24dBc (Peak) / 43.42dBc (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 (turbo mode) is 94.4dBuV/m, so the maximum field strength in restrict band is  $94.4 - 43.42 = 50.98$  dBuV/m which is under 54dBuV/m limit.







## **5.8 ANTENNA REQUIREMENT**

### **5.8.1 STANDARD APPLICABLE**

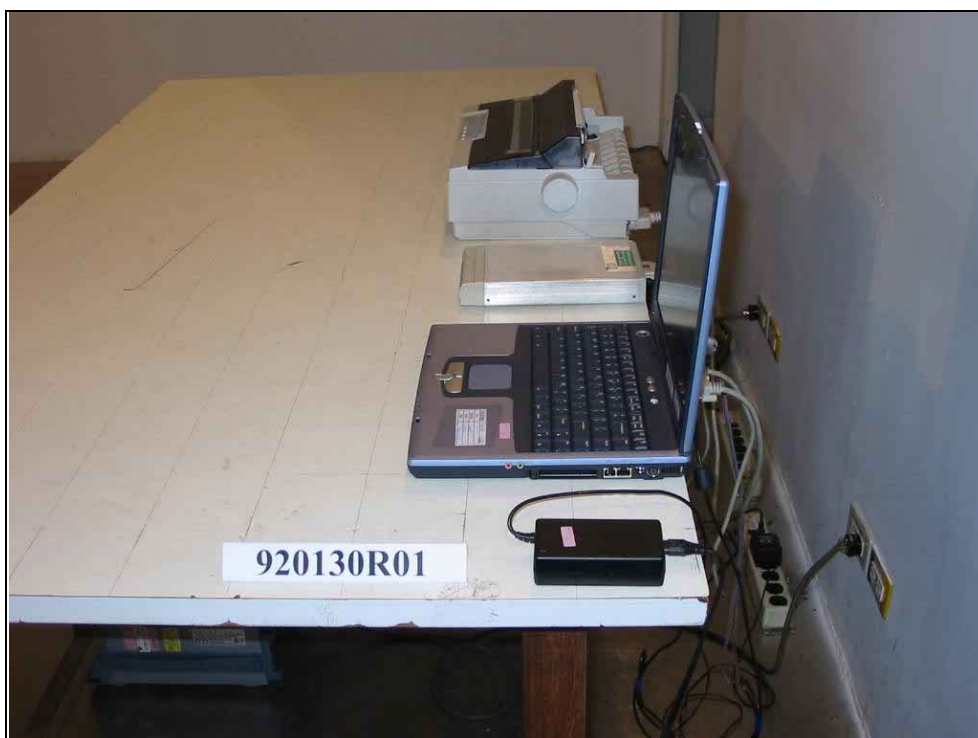
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

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 T-type antenna with UFL connector. The maximum Gain of the antenna is 3.43dBi.

## 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).

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