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
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.

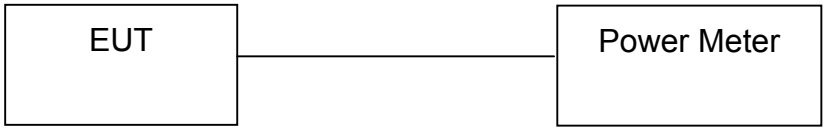
5.4.3 TEST PROCEDURE

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

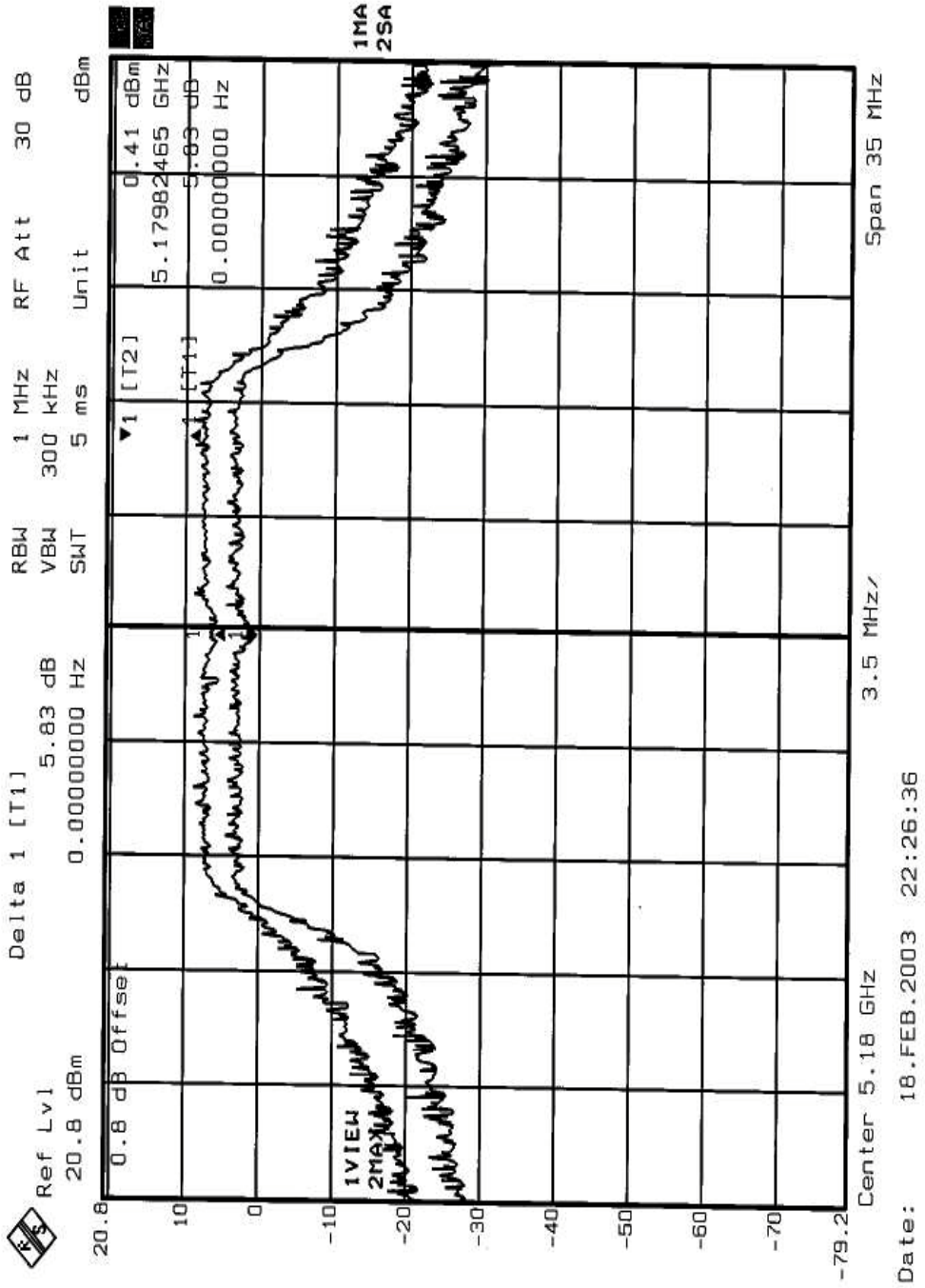
The software provided by client to enable the EUT under transmission condition continuously at specific channel frequencies individually.

5.4.7 TEST RESULTS

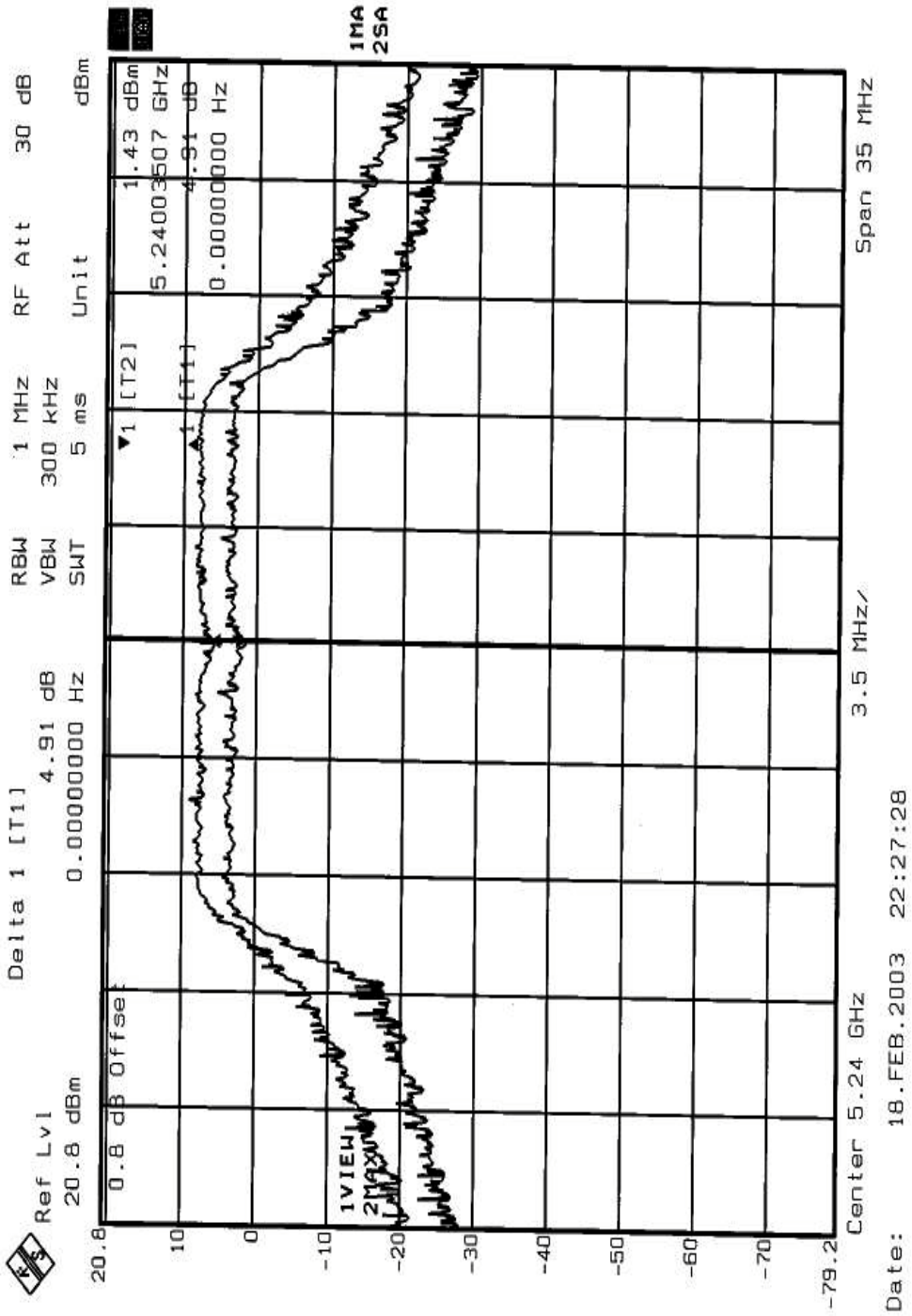
EUT	5.0/2.4GHz Wireless Network Mini PCI	**MODEL**	GL2554MP-0A
ENVIRONMENTAL CONDITIONS	24deg. C, 65%RH, 1005hPa	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
TESTED BY	Ansen Lei		

CHANNEL	CHANNEL FREQUENCY (MHz)	PEAK POWER EXCURSION (dB)	PEAK to AVERAGE EXCURSION LIMIT (dB)	PASS/FAIL
1	5180	5.83	13	PASS
4	5240	4.91	13	PASS
5	5260	8.23	13	PASS
8	5320	4.89	13	PASS
9	5745	5.78	13	PASS
12	5805	5.26	13	PASS

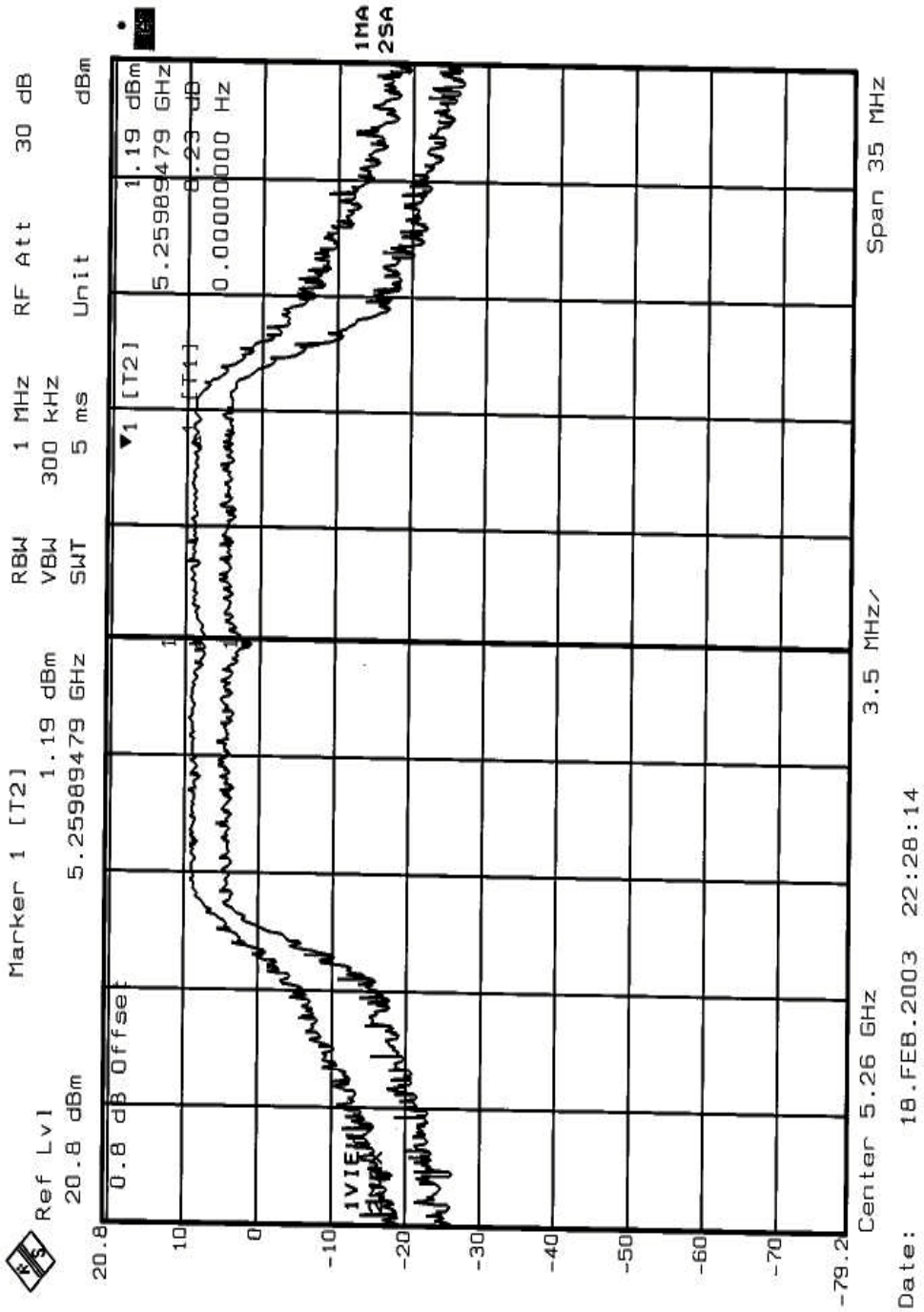
CHANNEL 1


Ref Lvl
20.8 dBm
0.8 dB Offset
Delta 1 [T1]
5.83 dB
0.00000000 Hz
RBW 1 MHz
VBW 300 kHz
SWT 5 ms
RF Att 30 dB
Unit dBm
▼1 [T2]
0.41 dBm
5.17982465 GHz
[T1]
5.83 dB
0.00000000 Hz
1MA
2SA
1VIEW
2MAX
20.8
10
0
-10
-20
-30
-40
-50
-60
-70
-79.2
Center 5.18 GHz
3.5 MHz/
Span 35 MHz
Date: 18.FEB.2003 22:26:36

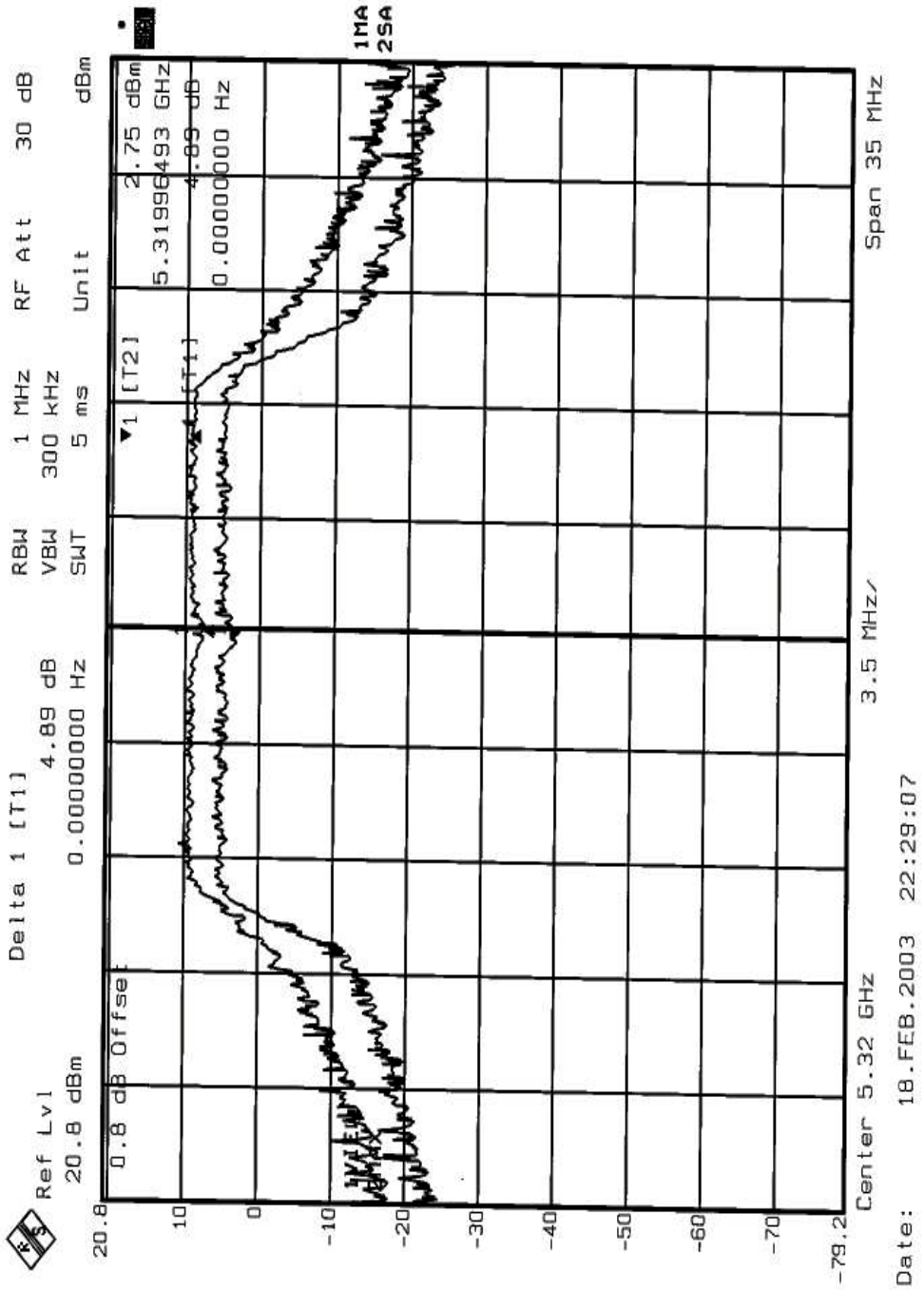
CHANNEL 4


Ref Lvl
20.8 dBm
Delta 1 [T1]
4.91 dB
0.00000000 Hz
RBW 1 MHz
VBW 300 kHz
SWT 5 ms
RF Att 30 dB
Unit dBm
0.8 dB Offset
1 [T2] 1.43 dBm
5.24003507 GHz
1 [T1] 4.91 dB
0.00000000 Hz
1MA
2SA
1VIEW
2MAX
20.8
10
0
-10
-20
-30
-40
-50
-60
-70
-79.2
Center 5.24 GHz
3.5 MHz/
Span 35 MHz
Date: 18.FEB.2003 22:27:28

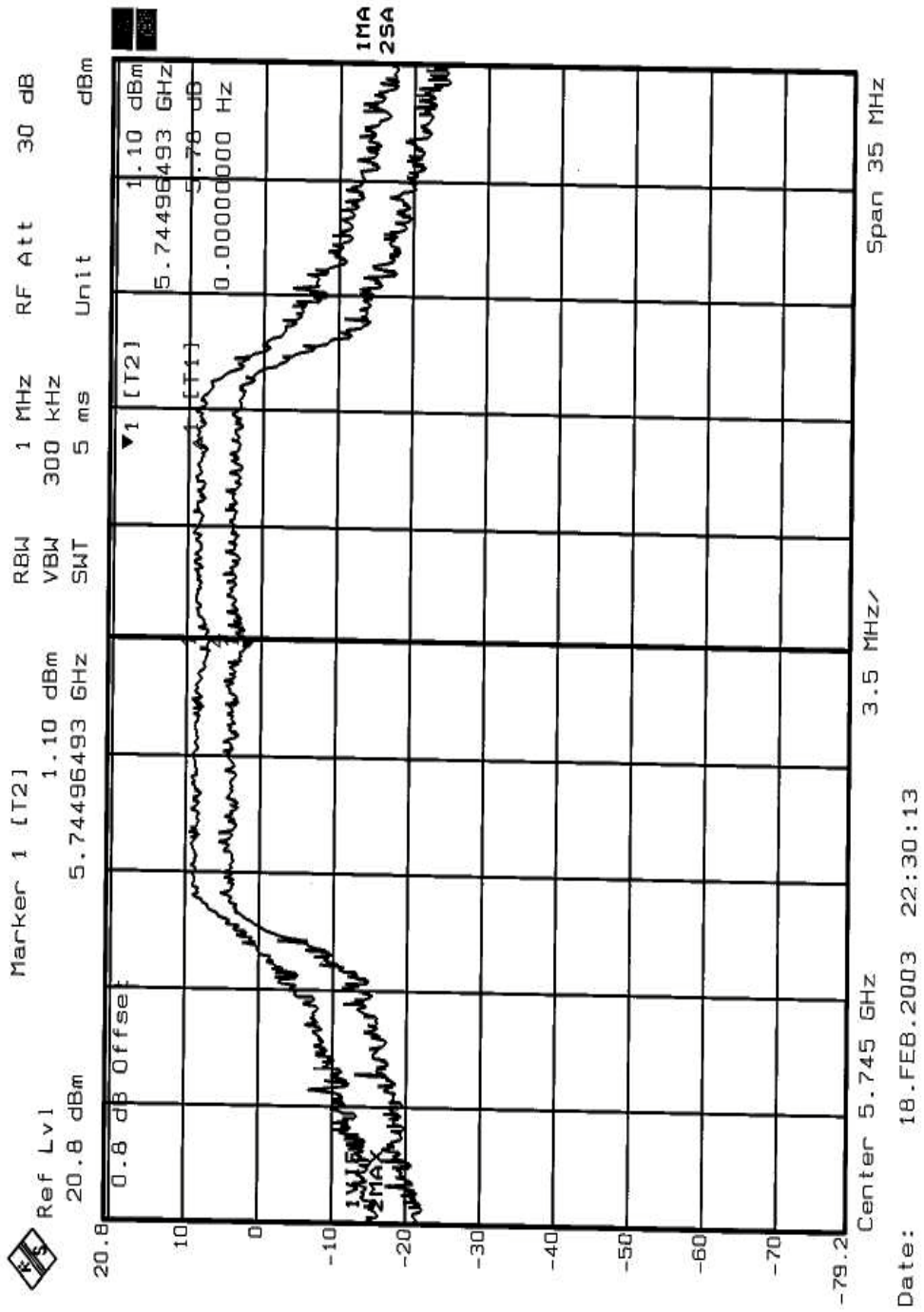
CHANNEL 5


Ref Lvl
20.8 dBm
0.8 dB Offset
Marker 1 [T2]
1.19 dBm
5.25989479 GHz
RBW 1 MHz
VBW 300 kHz
SWT 5 ms
RF Att 30 dB
Unit dBm
1 [T2]
1.19 dBm
5.25989479 GHz
[T1]
0.23 dB
0.00000000 Hz
1MA
2SA
Span 35 MHz
3.5 MHz/
Center 5.26 GHz
Date: 18.FEB.2003 22:28:14

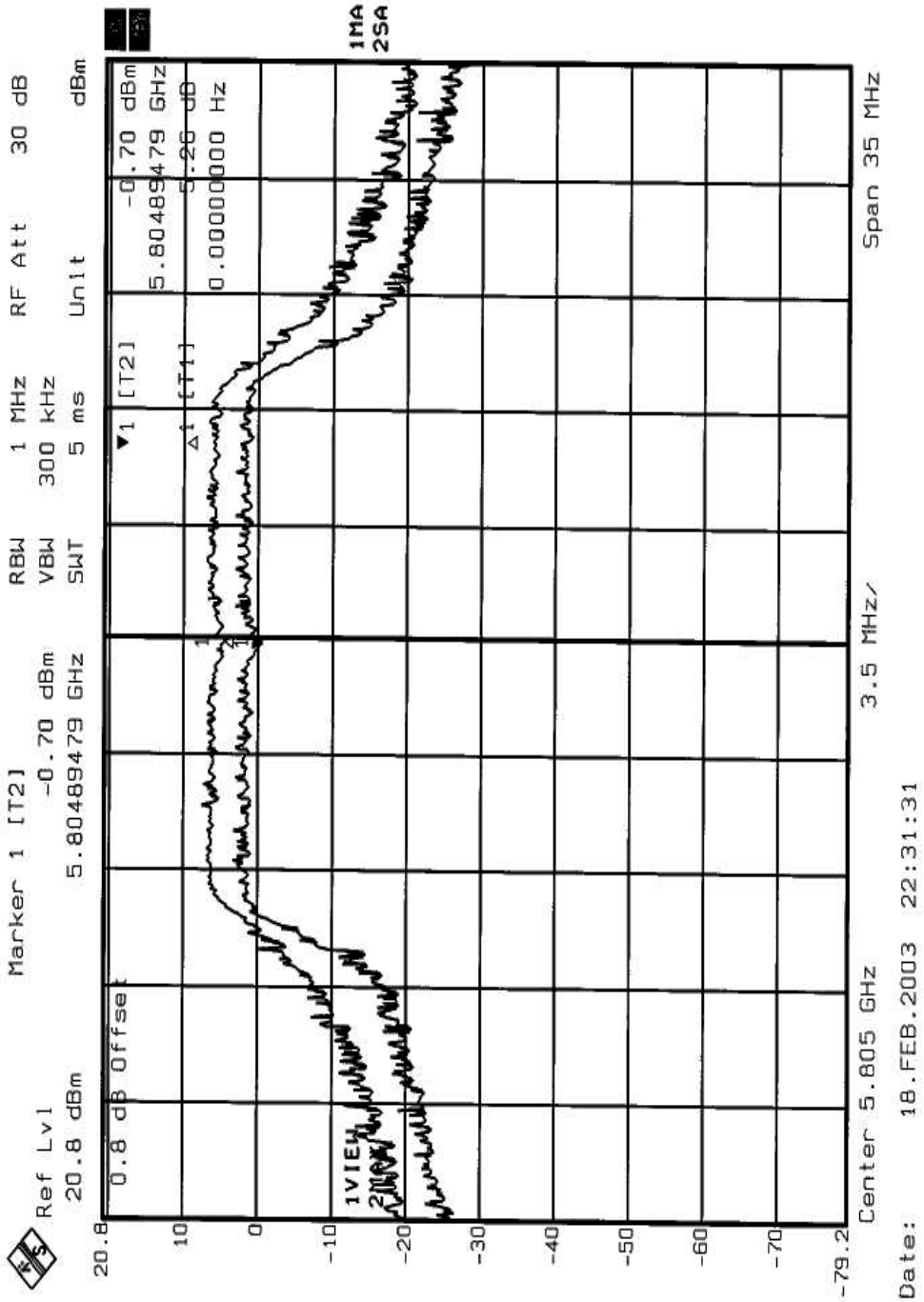
CHANNEL 8


Ref Lvl
20.8 dBm
0.8 dB Offset
Delta 1 [T1]
4.89 dB
0.00000000 Hz
RBW 1 MHz
VBW 300 kHz
SWT 5 ms
RF Att 30 dB
Unit dBm
▼1 [T2]
5.31996493 GHz
2.75 dBm
[T1]
0.00000000 Hz
4.89 dB
1MA
2SA
20.8
10
0
-10
-20
-30
-40
-50
-60
-70
-79.2
Center 5.32 GHz
3.5 MHz/
Span 35 MHz
Date: 18.FEB.2003 22:29:07

CHANNEL 9


Ref Lvl
20.8 dBm
0.8 dB Offset
Marker 1 [T2]
1.10 dBm
5.74496493 GHz
RBW 1 MHz
VBW 300 kHz
SWT 5 ms
RF Att 30 dB
Unit dBm
1 [T2] 1.10 dBm
5.74496493 GHz
[T1] 5.78 dB
0.00000000 Hz
1MA
2SA
1MAX
2MAX
20.8
10
0
-10
-20
-30
-40
-50
-60
-70
-79.2
Center 5.745 GHz
3.5 MHz/
Span 35 MHz
Date: 18.FEB.2003 22:30:13

CHANNEL 12


Ref Lvl
20.8 dBm
0.8 dB Offset
Marker 1 [T2]
-0.70 dBm
5.8048947 9 GHz
RBW 1 MHz
VBW 300 kHz
SWT 5 ms
RF Att 30 dB
Unit dBm
1 [T2]
-0.70 dBm
5.8048947 9 GHz
Δ1 [T1]
5.26 dB
0.000000000 Hz
1MA
2SA
1VIEW
2MAX
20.8
10
0
-10
-20
-30
-40
-50
-60
-70
-79.2
Center 5.805 GHz
3.5 MHz/
Span 35 MHz
Date: 18.FEB.2003 22:31:31

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

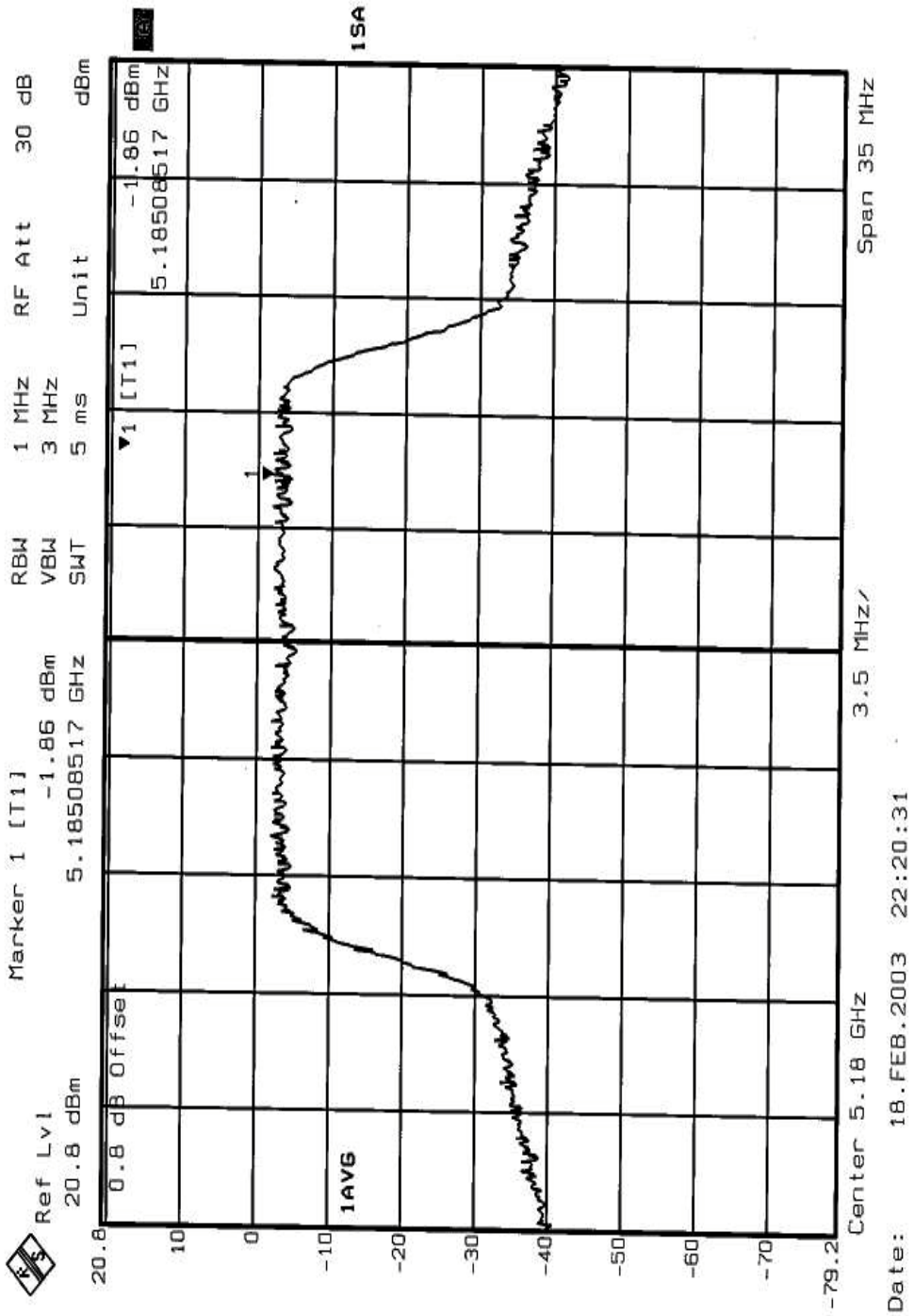
Same as 5.3.6

5.5.7 TEST RESULTS

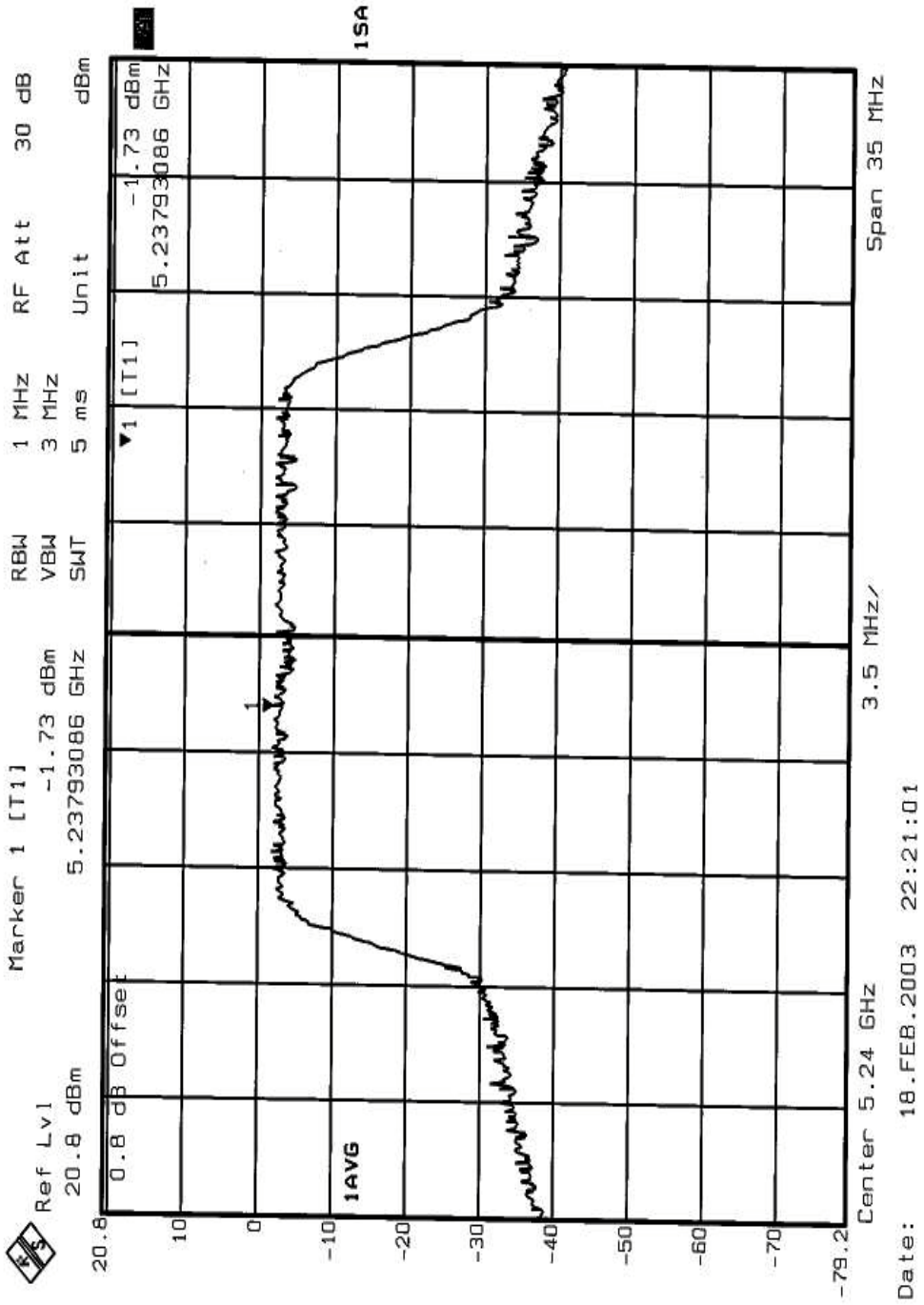
EUT	5.0/2.4GHz Wireless Network Mini PCI	**MODEL**	GL2554MP-0A
ENVIRONMENTAL CONDITIONS	24deg. C, 65%RH, 1005hPa	**INPUT POWER (SYSTEM)**	120Vac, 60 Hz
TESTED BY	Ansen Lei		

CHANNEL	CHANNEL FREQUENCY (MHz)	RF POWER LEVEL IN 1MHz BW (dBm)	MAXIMUM LIMIT (dBm)	PASS/FAIL
1	5180	-1.86	4	PASS
4	5240	-1.73	4	PASS
5	5260	-0.36	11	PASS
8	5320	0.21	11	PASS
9	5745	-1.79	17	PASS
12	5805	-2.89	17	PASS

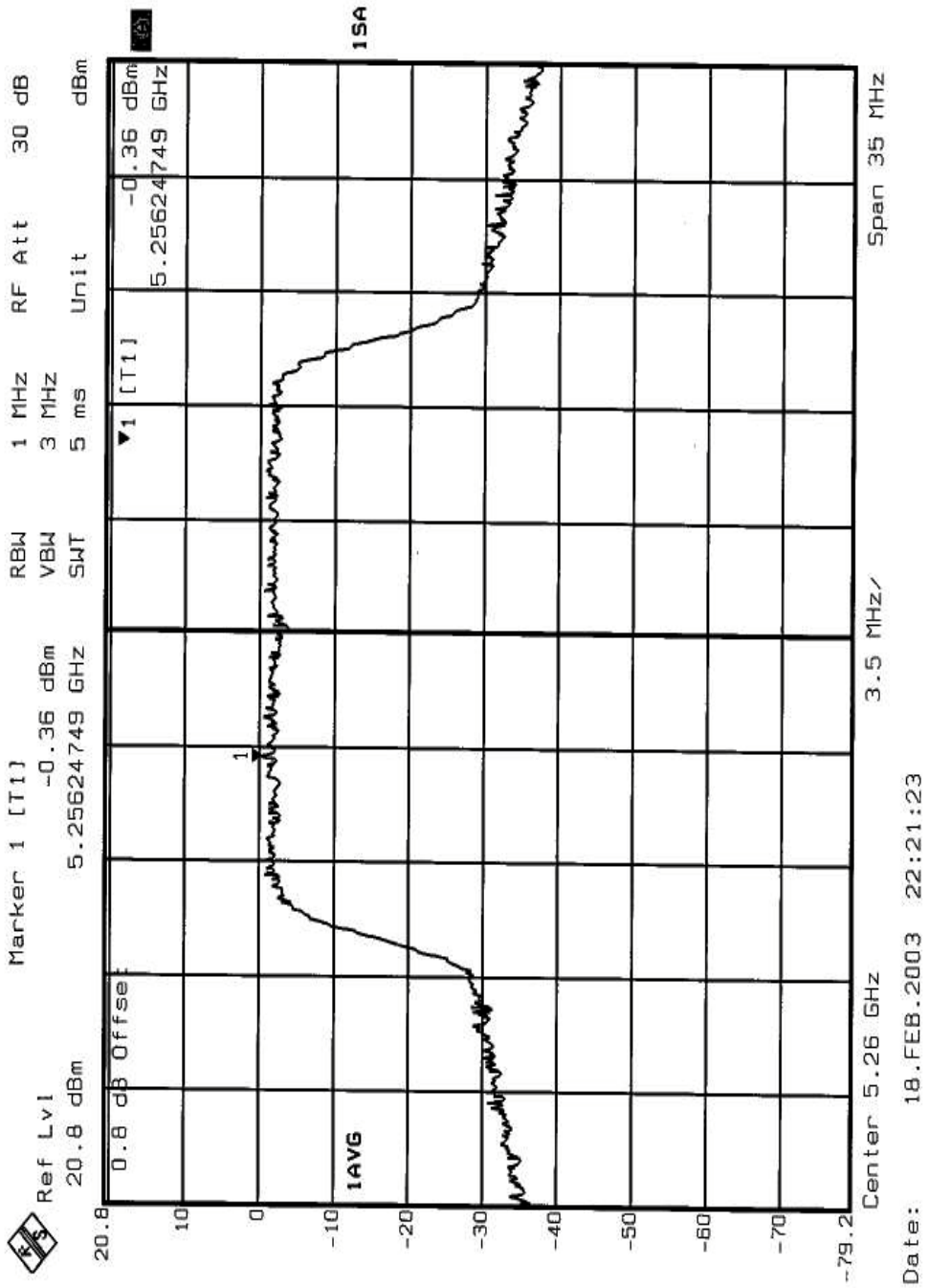
CHANNEL 1


Ref Lvl
20.8 dBm
0.8 dB Offset
Marker 1 [T1]
-1.86 dBm
5.18508517 GHz
RBW 1 MHz
VBW 3 MHz
SWT 5 ms
RF Att 30 dB
Unit dBm
1SA
1AVG
▼1 [T1]
-1.86 dBm
5.18508517 GHz
20.8
10
0
-10
-20
-30
-40
-50
-60
-70
-79.2
Center 5.18 GHz
3.5 MHz/
Span 35 MHz
Date: 18.FEB.2003 22:20:31

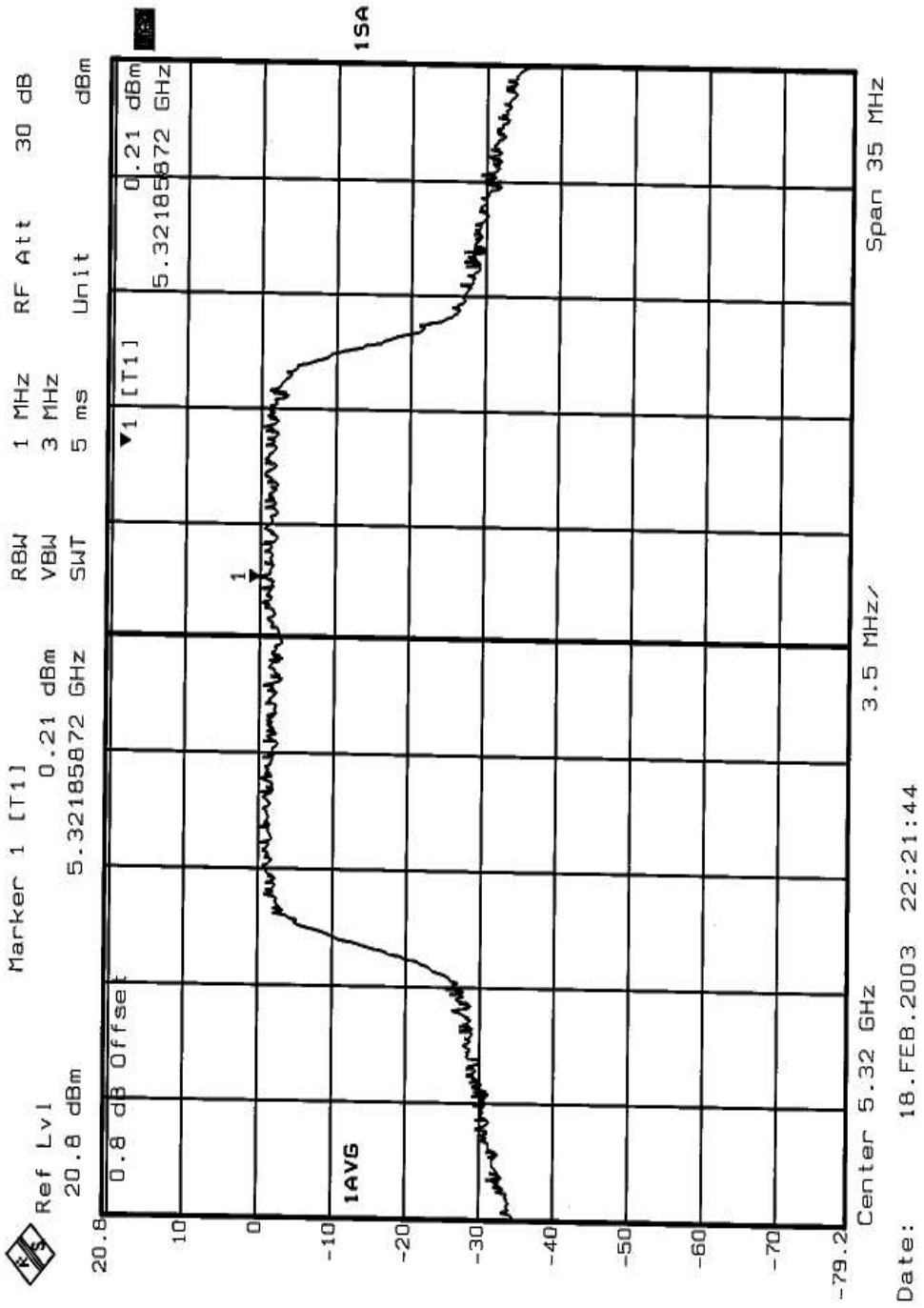
CHANNEL 4


Ref Lvl
20.8 dBm
0.8 dB Offset
Marker 1 [T1]
-1.73 dBm
5.23793086 GHz
RBW 1 MHz
VBW 3 MHz
SWT 5 ms
RF Att 30 dB
Unit dBm
1 [T1]
-1.73 dBm
5.23793086 GHz
1SA
1AVG
20.8
10
0
-10
-20
-30
-40
-50
-60
-70
-79.2
Center 5.24 GHz
3.5 MHz/
Span 35 MHz
Date: 18.FEB.2003 22:21:01

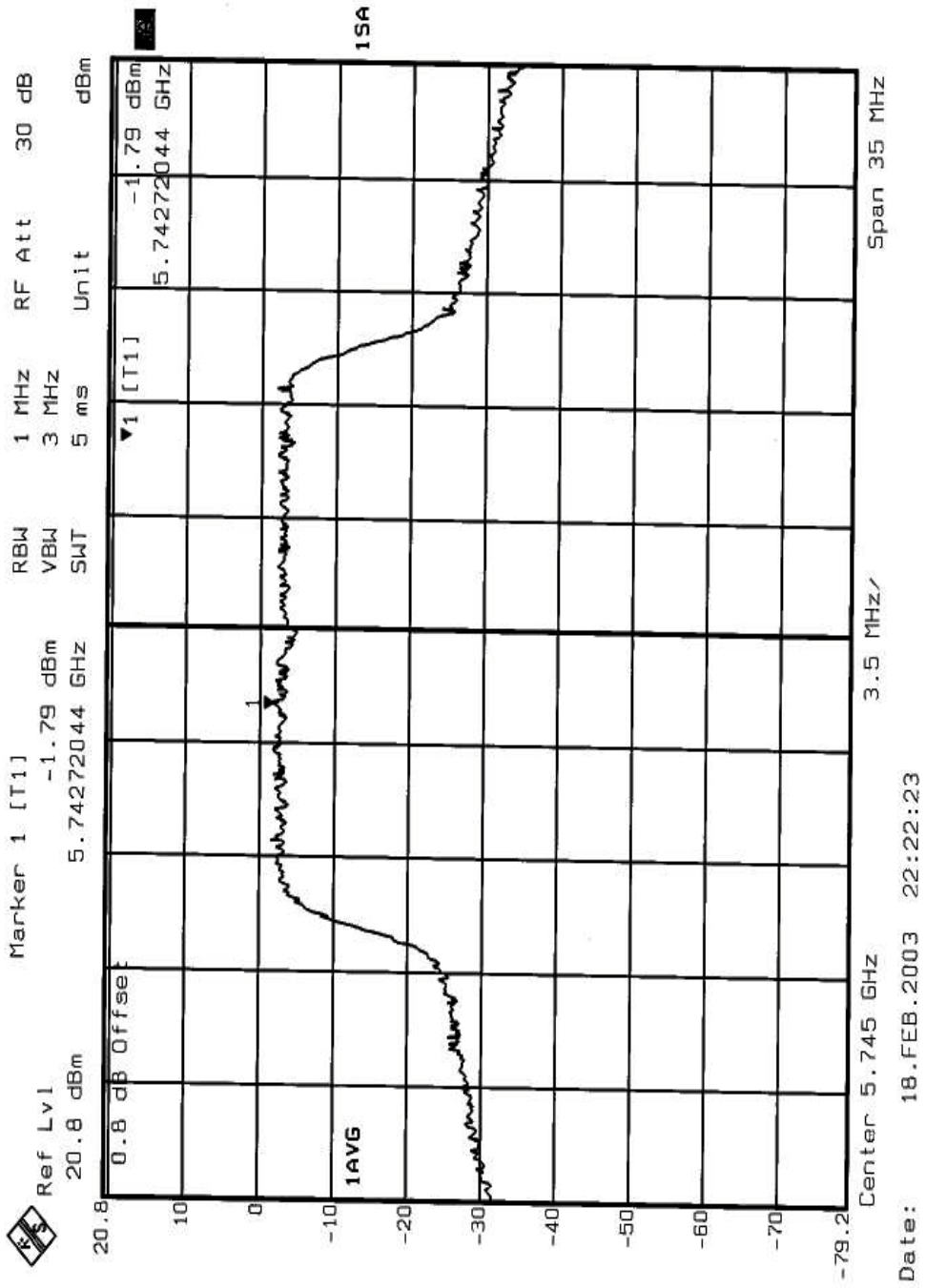
CHANNEL 5


Ref Lvl
20.8 dBm
0.8 dB Offset
Marker 1 [T1]
-0.36 dBm
5.25624749 GHz
RBW 1 MHz
VBW 3 MHz
SWT 5 ms
RF Att 30 dB
Unit dBm
1SA
1AVG
Center 5.26 GHz
3.5 MHz/
Span 35 MHz
Date: 18.FEB.2003 22:21:23

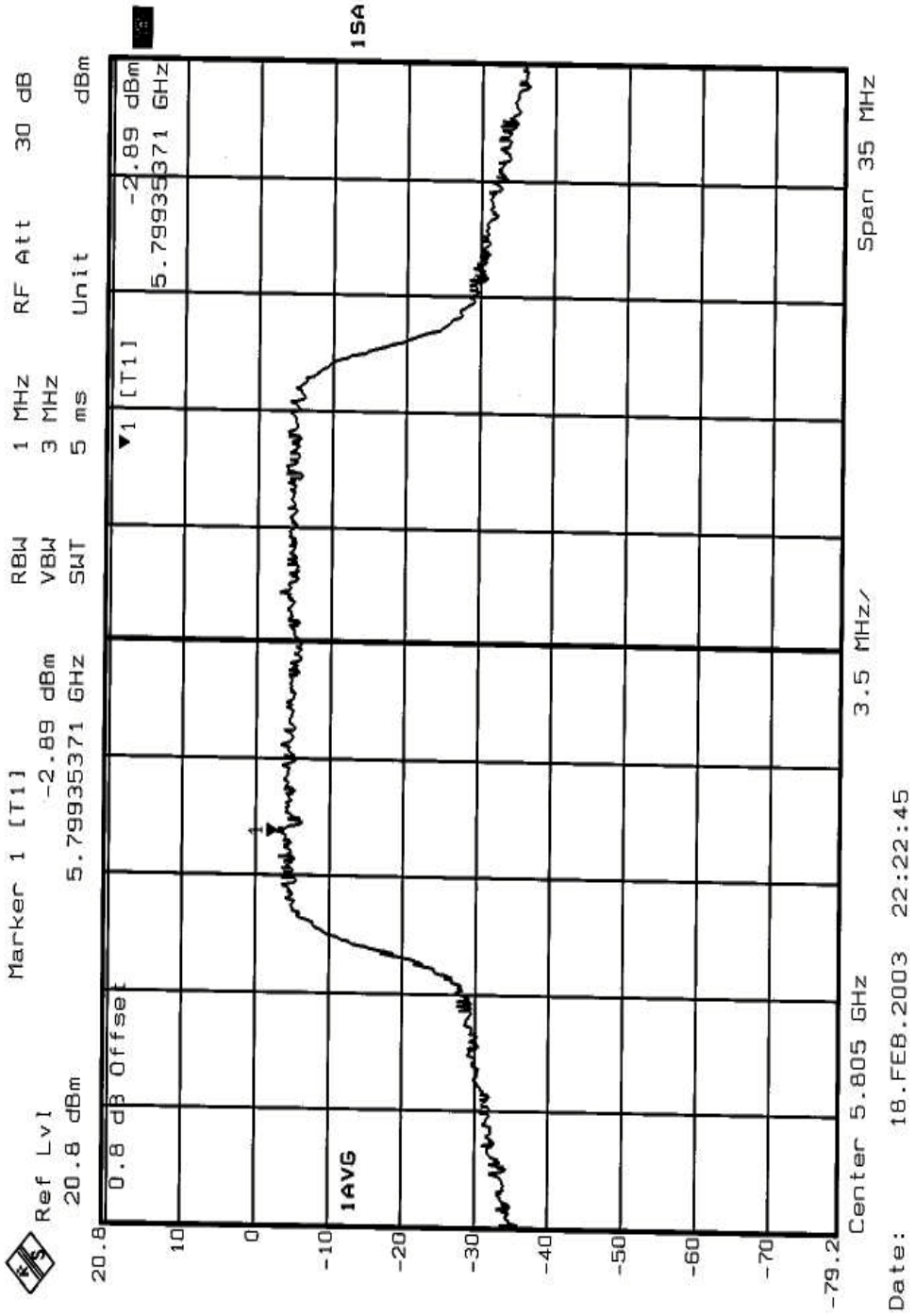
CHANNEL 8


Ref Lvl
20.8 dBm
0.8 dB Offset
Marker 1 [T1]
0.21 dBm
5.32185872 GHz
RBW 1 MHz
VBW 3 MHz
SWT 5 ms
RF Att 30 dB
Unit dBm
1SA
1AVG
1 [T1]
0.21 dBm
5.32185872 GHz
Span 35 MHz
3.5 MHz/
Center 5.32 GHz
Date: 18.FEB.2003 22:21:44

CHANNEL 9


Ref Lvl
20.8 dBm
0.8 dB Offset
Marker 1 [T1]
-1.79 dBm
5.74272044 GHz
RBW 1 MHz
VBW 3 MHz
SWT 5 ms
RF Att 30 dB
Unit dBm
1 [T1]
-1.79 dBm
5.74272044 GHz
1SA
1AVG
20.8
10
0
-10
-20
-30
-40
-50
-60
-70
-79.2
Center 5.745 GHz
3.5 MHz/
Span 35 MHz
Date: 18.FEB.2003 22:22:23

CHANNEL 12


Ref Lvl
20.8 dBm
0.8 dB Offset
Marker 1 [T1]
-2.89 dBm
5.79935371 GHz
RBW 1 MHz
VBW 3 MHz
SWT 5 ms
RF Att 30 dB
Unit dBm
1SA
1AVG
▼1 [T1]
-2.89 dBm
5.79935371 GHz
20.8
10
0
-10
-20
-30
-40
-50
-60
-70
-79.2
Center 5.805 GHz
3.5 MHz/
Span 35 MHz
Date: 18.FEB.2003 22:22:45

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.

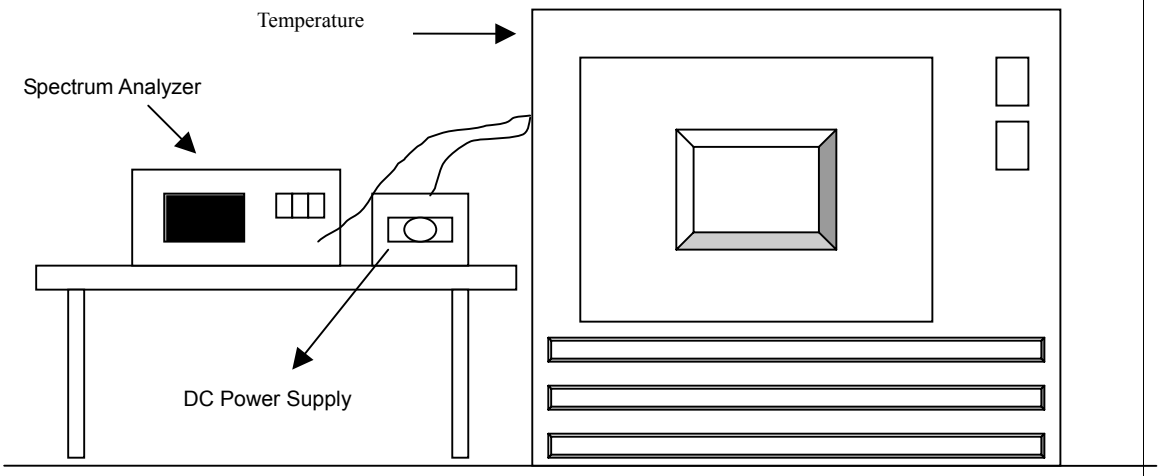
5.6.3 TEST PROCEDURE

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: 5180MHz						Limit : ± 0.02%	
Temp. (℃)	Power supply (VDC)	2 minute		5 minute		10 minute	
		(MHz)	(%)	(MHz)	(%)	(MHz)	(%)
50	126.5	5319.9202	-0.0015000	5319.9206	-0.0014925	5319.9205	-0.0014944
	110.0	5319.9202	-0.0015000	5319.9208	-0.0014887	5319.9205	-0.0014944
	93.5	5319.9204	-0.0014962	5319.9207	-0.0014906	5319.9207	-0.0014906
40	126.5	5319.9132	-0.0016316	5319.9135	-0.0016259	5319.9135	-0.0016259
	110.0	5319.9132	-0.0016316	5319.9133	-0.0016297	5319.9137	-0.0016222
	93.5	5319.9133	-0.0016297	5319.9133	-0.0016297	5319.9136	-0.0016241
30	126.5	5319.9123	-0.0016485	5319.9120	-0.0016541	5319.9129	-0.0016372
	110.0	5319.9123	-0.0016485	5319.9121	-0.0016523	5319.9127	-0.0016410
	93.5	5319.9125	-0.0016447	5319.9121	-0.0016523	5319.9126	-0.0016429
20	126.5	5319.9111	-0.0016711	5319.9115	-0.0016635	5319.9112	-0.0016692
	110.0	5319.9110	-0.0016729	5319.9115	-0.0016635	5319.9112	-0.0016692
	93.5	5319.9110	-0.0016729	5319.9117	-0.0016598	5319.9113	-0.0016673
10	126.5	5319.9156	-0.0015865	5319.9162	-0.0015752	5319.9165	-0.0015695
	110.0	5319.9157	-0.0015846	5319.9162	-0.0015752	5319.9165	-0.0015695
	93.5	5319.9157	-0.0015846	5319.9163	-0.0015733	5319.9168	-0.0015639
0	126.5	5319.9174	-0.0015526	5319.9121	-0.0016523	5319.9133	-0.0016297
	110.0	5319.9125	-0.0016447	5319.9122	-0.0016504	5319.9132	-0.0016316
	93.5	5319.9128	-0.0016391	5319.9122	-0.0016504	5319.9135	-0.0016259
-10	126.5	5319.9126	-0.0016429	5319.9127	-0.0016410	5319.9133	-0.0016297
	110.0	5319.9126	-0.0016429	5319.9128	-0.0016391	5319.9130	-0.0016353
	93.5	5319.9128	-0.0016391	5319.9128	-0.0016391	5319.9131	-0.0016335
-20	126.5	5319.9155	-0.0015883	5319.9154	-0.0015902	5319.9152	-0.0015940
	110.0	5319.9155	-0.0015883	5319.9153	-0.0015921	5319.9150	-0.0015977
	93.5	5319.9157	-0.0015846	5319.9156	-0.0015865	5319.9151	-0.0015959
-30	126.5	5319.9195	-0.0015132	5319.9197	-0.0015094	5319.9195	-0.0015132
	110.0	5319.9195	-0.0015132	5319.9197	-0.0015094	5319.9193	-0.0015169
	93.5	5319.9197	-0.0015094	5319.9196	-0.0015113	5319.9193	-0.0015169

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 lose cable. Set both RBW and VBW of spectrum analyzer to 1MHz with suitable frequency span including 100 MHz bandwidth from band edge. The band edges was measured and recorded.

5.7.3 EUT OPERATING CONDITION

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

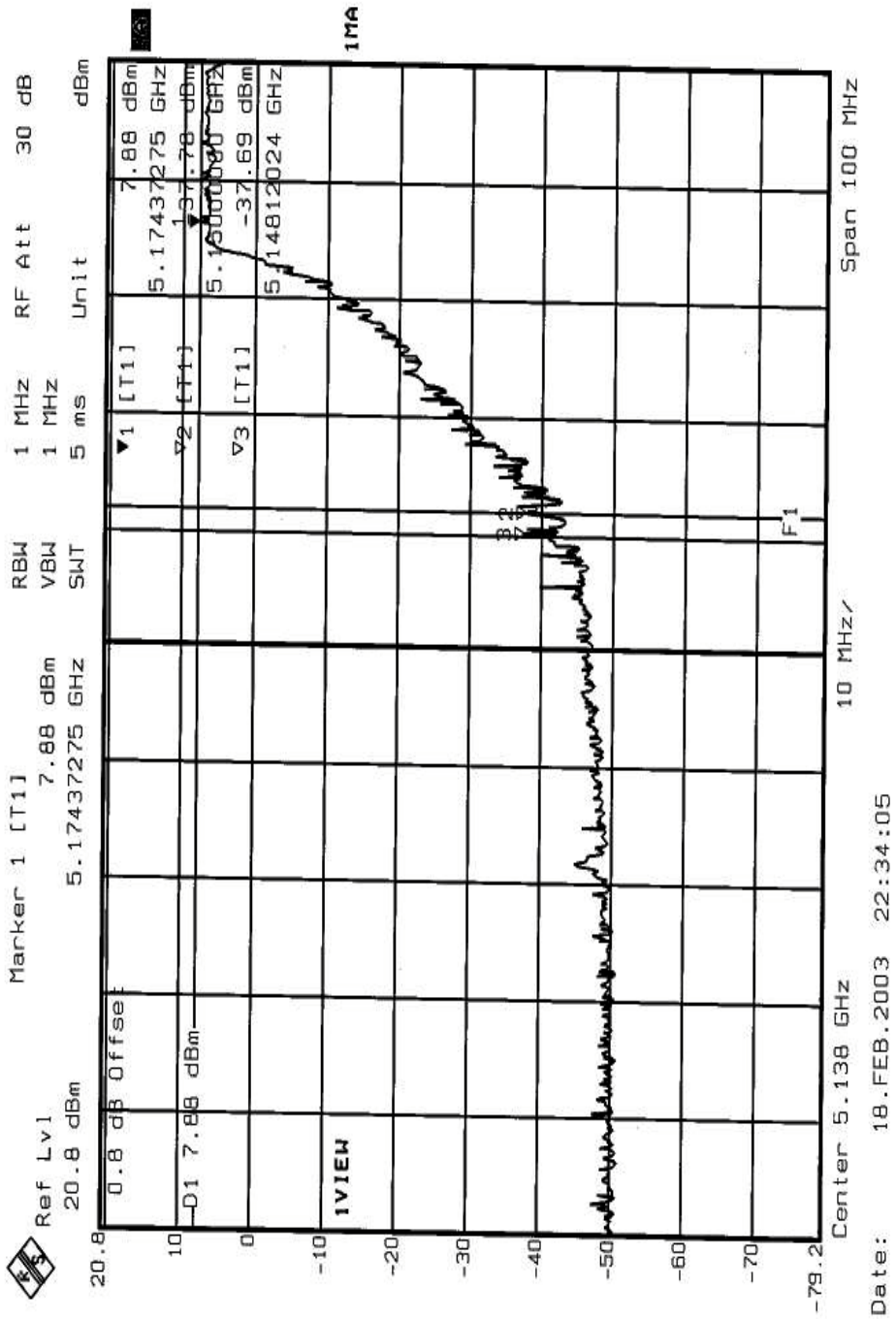
5.7.4 TEST RESULTS

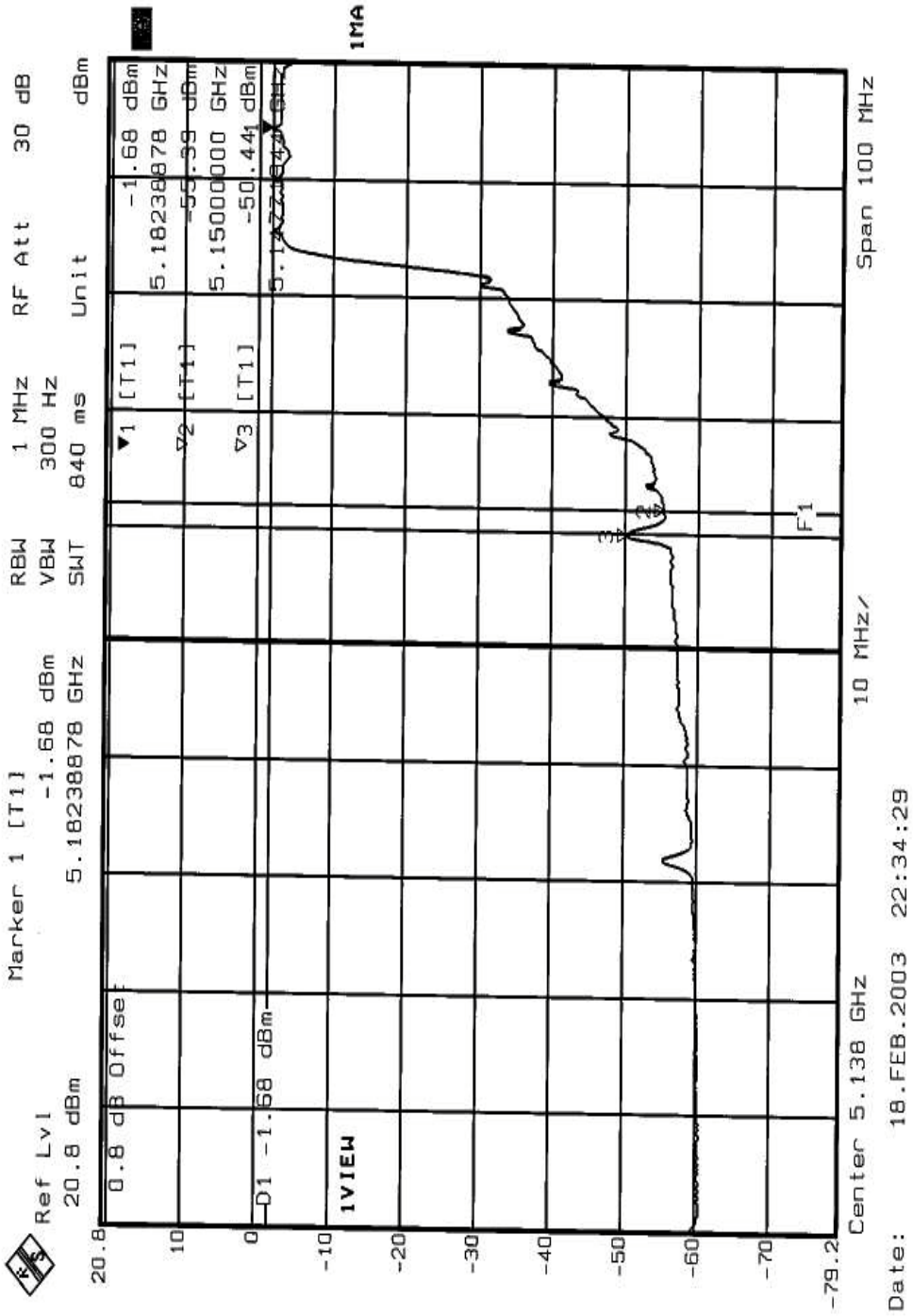
For signals in the restricted bands above and below the 5.15 to 5.35GHz allocated band a measurement was made of the amplitude of the spurious emissions with respect to the intentional signals. The relative amplitude, in dBc, was applied to the average and peak filed strength of the intentional signal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

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

Channel 1 (5180 MHz)

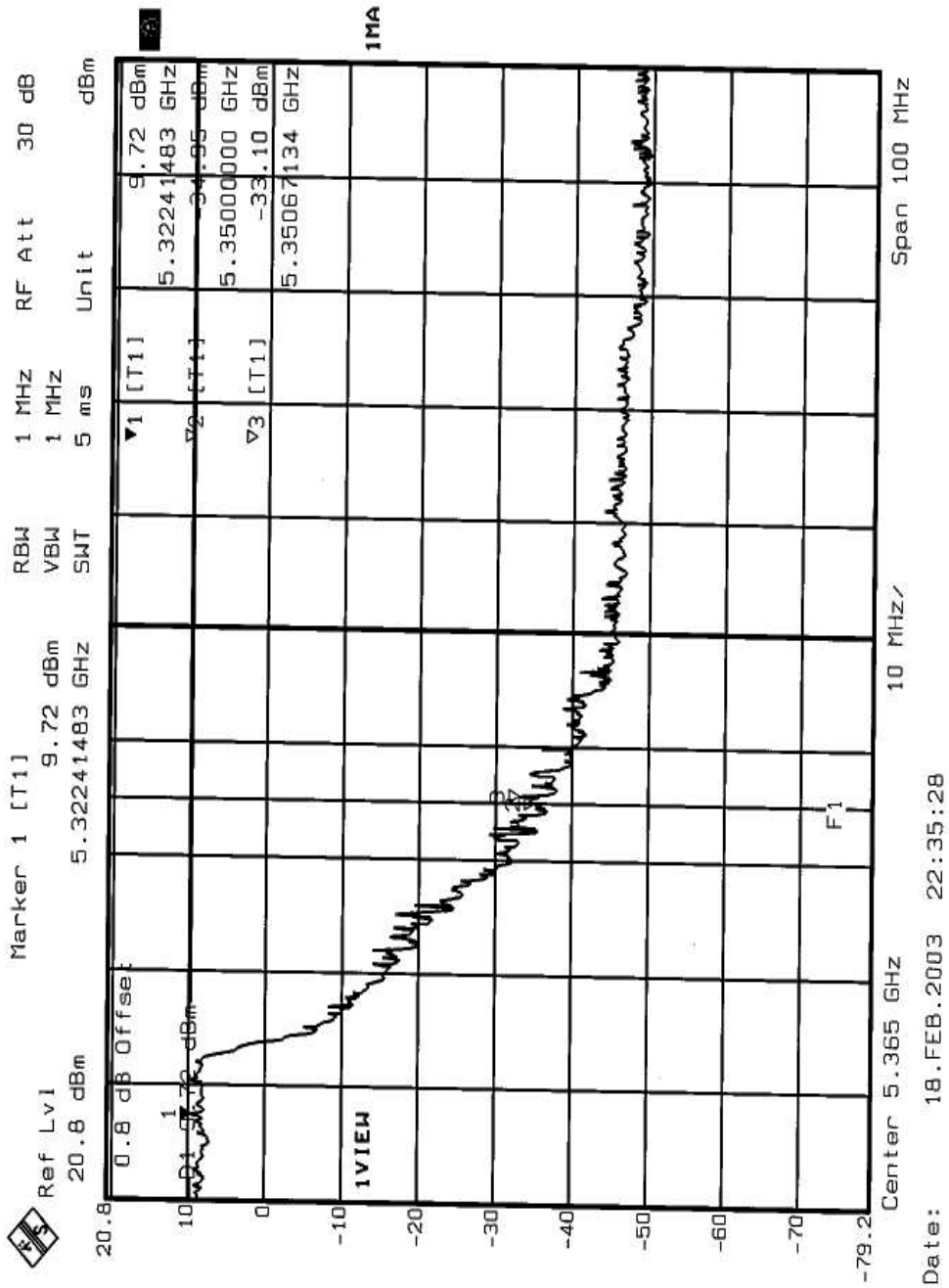
The band edge emission plot on the following 2 pages shows 45.57dBc (Peak) / 48.76 dBc (Average) between carrier maximum power and local maximum emission in restrict band. The emission of carrier strength list in the test result of channel 1 is 93.1dBuV/m, so the maximum field strength in restrict band is 93.1-48.76=44.34dBuV/m which is under 54dBuV/m limit.

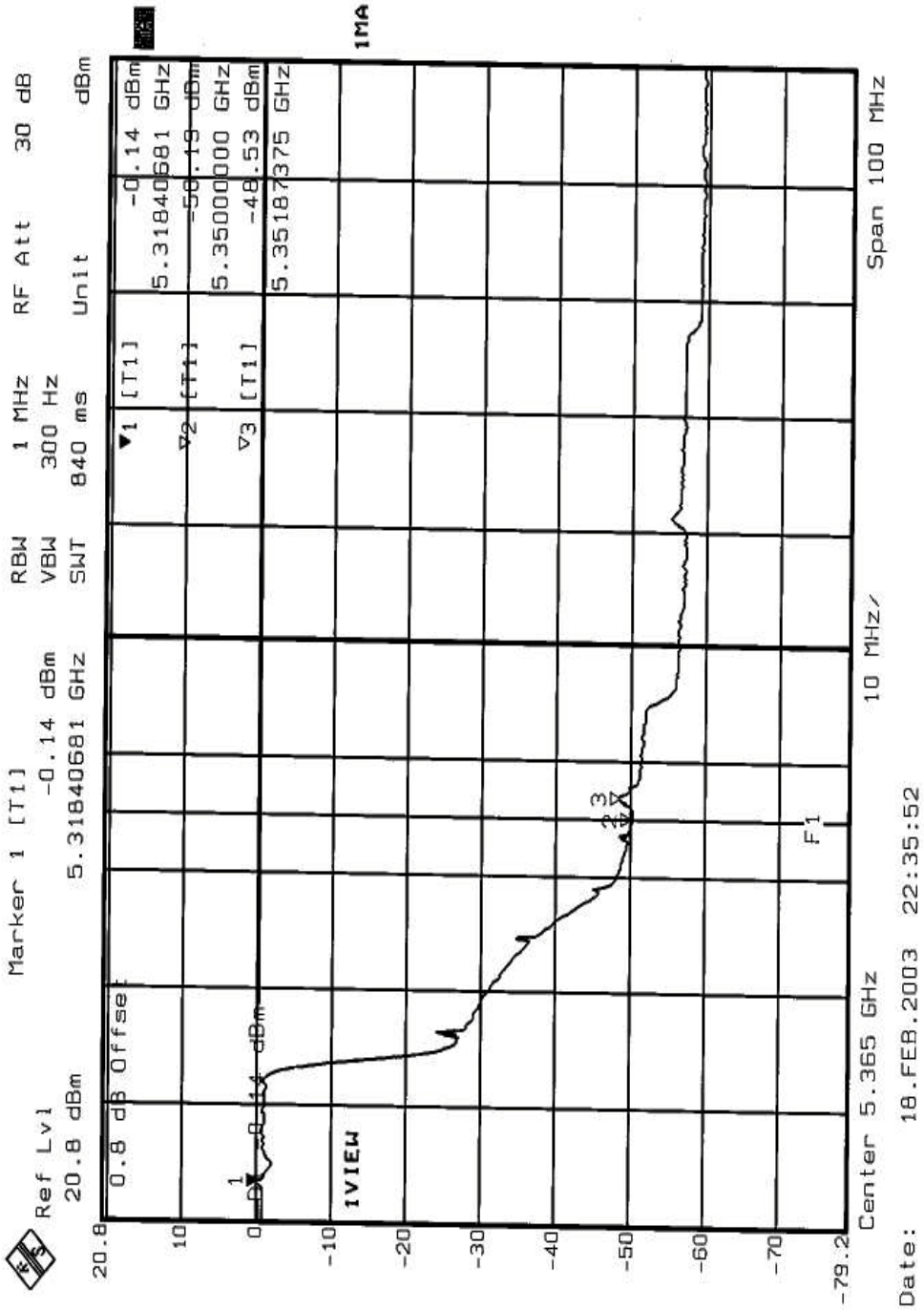



Ref Lvl
20.8 dBm
0.8 dB Offset
D1 -1.68 dBm
Marker 1 [T1]
-1.68 dBm
5.18238878 GHz
RBW 1 MHz
VBW 300 Hz
SWT 840 ms
RF Att 30 dB
Unit dBm
1VIEW
1MA
Center 5.138 GHz
10 MHz/
Span 100 MHz
Date: 18.FEB.2003 22:34:29

Channel 8 (5320 MHz)

The band edge emission plot on the following 2 pages shows 42.82dBc (Peak) / 48.39dBc (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 94.9dBuV/m, so the maximum field strength in restrict band is 94.9-48.39=46.51dBuV/m which is under 54dBuV/m limit.




Ref Lvl
20.8 dBm
0.8 dB Offset
Marker 1 [T1]
-0.14 dBm
5.31840681 GHz
RBW 1 MHz
VBW 300 Hz
SWT 840 ms
RF Att 30 dB
Unit dBm
1 [T1] -0.14 dBm 5.31840681 GHz
2 [T1] -50.19 dBm 5.35000000 GHz
3 [T1] -48.53 dBm 5.35187375 GHz
1MA
1VIEW
20.8
10
0
-10
-20
-30
-40
-50
-60
-70
-79.2
Center 5.365 GHz
10 MHz/
Span 100 MHz
Date: 18.FEB.2003 22:35:52

5.8 ANTENNA REQUIREMENT

5.8.1 STANDARD APPLICABLE

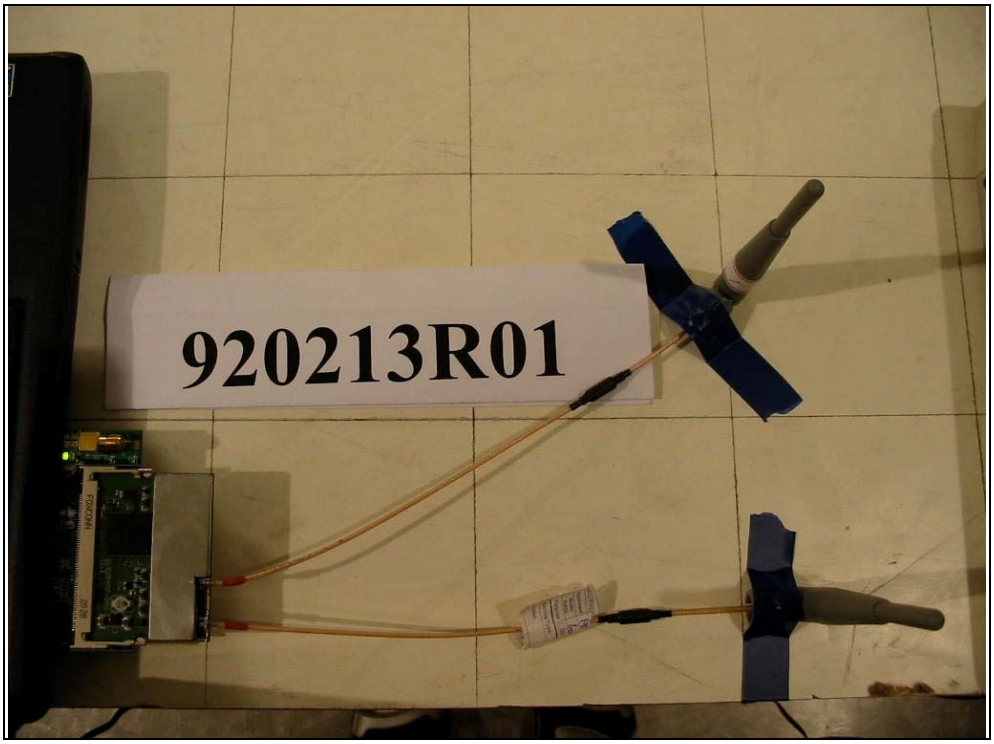
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.
And according to FCC 47 CFR Section 15.407(a), if transmitting antennas of directional 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 Dipole antenna without connector. The maximum Gain of the antenna is 2dBi.

6. PHOTOGRAPHS OF THE TEST CONFIGURATION

CONDUCTED EMISSION TEST


920213R01

RADIATED EMISSION TEST

920213R01

7. INFORMATION ON THE TESTING LABORATORIES

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

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

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml.

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