Intertek Testing Services
ETL SEMKO

TEST REPORT

Report Number: 30332141
Project Number: 3033214

ReportDate: October 14, 2002
Date of Test: September 5 – October 14, 2002

Testing performed on the

Model: AirMAX 580/5800
FCC ID: QGQ-AM581
to

FCC Part 15 Subpart E
for

Malibu Networks

Test Performed by:
Intertek Testing Services
1365 Adams Court
Menlo Park, CA 94025

Test Authorized by:
Malibu Networks
1107 Investment Blvd., Suite 250
El Dorado Hills, CA 95762

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Ollie Moyrong

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1.0 Summary of Tests

Test	Reference	Results
Output power, EIRP	15.407(a)	Complies, see sec. 4.1 of this report
26 dB Bandwidth	15.407(a)	For calculation only, see sec. 4.2 of this report
Power Density	15.407(a)(5)	Complies, see sec. 4.3 of this report
The ratio of the peak excursion of the modulation envelope to the peak transmit power	15.407(a)(6)	Complies, see sec. 4.4 of this report
Out-of-band Antenna Conducted Emission	15.407(b)	Complies, see sec. 4.5 of this report
Spurious Radiated Emission from transmitter	15.407(b)	Complies, see sec. 4.6 of this report
Radiated Emission in Restricted Bands	15.209, 15.205	Complies, see sec. 4.6 of this report
Digital part Radiated Emission	15.109	Complies, see sec. 4.6 of this report
Radiated Emission from Receiver L.O.	15.109, 15.111	Not Applicable. The operating frequency is above 960 MHz
AC Conducted Emission	15.207	Complies, see sec. 4.7 of this report
Requirement	15.407(c)	Complies, see file “15.407(c)”
Requirement	15.407(d)	Complies, see file “15.407(d)”
Radiation Exposure Requirement	1.1310	Complies, see exhibit "RF Exposure "
Antenna Requirement	15.203	Not applicable, The EUT requires professional installation

2.0 General Description

2.1 Product Description

The Malibu AirMAX™ System is made up of "Base Station Equipment" (BSE) radios and "Customer Premises Equipment" (CPE) radios. The BSE stations are considered point-to- multipoint systems because they communicate with several different CPE stations on a regular basis. The CPE stations are considered point-to-point because they only communicate back to a particular BSE station. Both the BSE and the CPE stations operate on the 5.8 GHz ISM band utilizing IEEE 802.11 protocol. Both the BSE and the CPE radio are identical. The only difference between the two stations, if any at all, will be the antenna that is used at the installation.

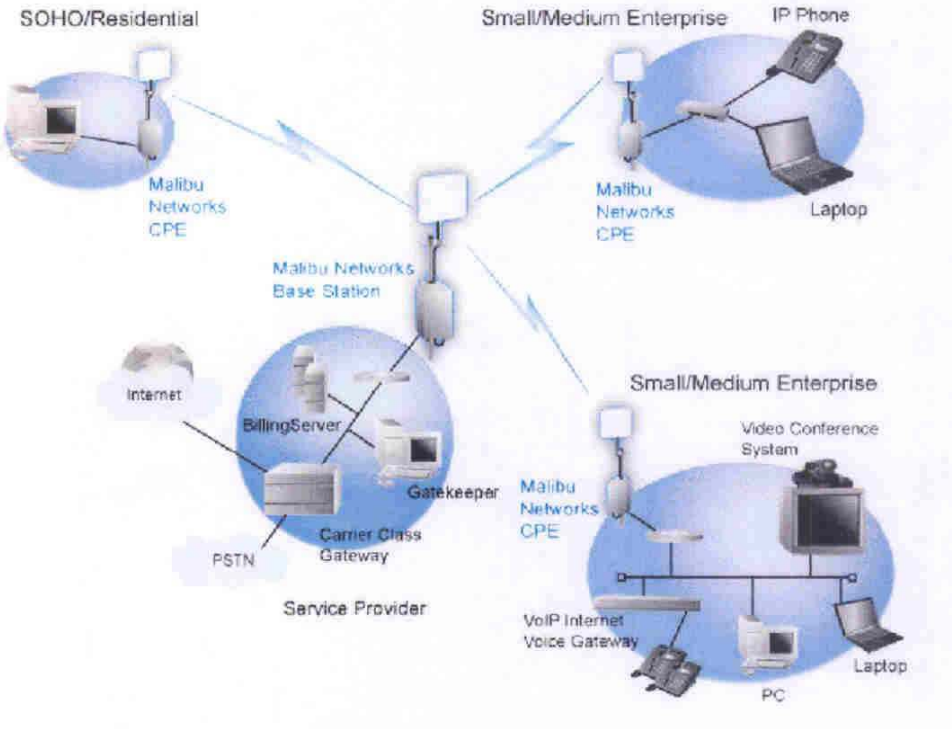
The BSE and CPE may utilize two types of high gain antennas up to and including, a 8/110 dBi Omni and a 11/14 dBi panel antenna. It is expected that in some cases, antennas with lower gains will be used, however the units were tested with these higher gain antennas to allow use of lower gain antennas.

Malibu Networks customers for the AirMAX system will typically be an ISP or a business who wishes to provide wireless Internet connectivity for their customers / employees. Malibu Networks will not be selling the products to the end user of the system. This being the case, both the BSE and the CPE radios are professionally installed and configured.

The transmitter in the AirMAX radio is used a previously certified Cisco 802.11 2.4 GHz PCMCIA card (FCC ID: LDK102040). The Unit is powered by a generic wall plug AC adapter and Power over Ethernet.

A functional diagram of the Malibu Networks wireless system is shown in the diagram to the right.

The diagram shows a AirMAX BSE station supporting 3 AirMAX CPE stations.



Overview of the EUT

Applicant	Malibu Networks
Trade Name & Model No.	AirMax 580/5800
FCC Identifier	QGQ-AM581
Use of Product	Point-to-multipoint wireless communication network
Rated RF Output	20 dBm
Frequency Range	5750 – 5800 MHz
Type of Transmission	TDD
Type of Modulation	DBPSK, DQPSK, CCK
Data Rate	11 Mbps
Number of Channel(s)	11
Antenna(s) & Gain	14 dBi Directional CPE Antenna, model ASTJ22 10 dBi Omni BTS Antenna, model 2360 13 dBi Directional BTS Antenna, model 12010V
Antenna Requirement	The EUT requires professional installation (supporting documentation is attached)
Manufacturer name & address	Malibu Networks 1107 Investment Blvd., Suite 250 El Dorado Hills, CA 95762

A prototype version of the device was received on September 5, 2002 in good operating condition.

2.2 Related Submittal(s) Grants

Part 15.247 Direct Sequence Spread Spectrum.

2.3 Test Methodology

Both AC mains line-conducted and radiated emissions measurements were performed according to the procedures in ANSI C63.4 (1992). Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the **"Data Sheet"** of this Application. All other measurements were made in accordance with the procedures in part 2 of CFR 47.

2.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is site 1. This test facility and site measurement data have been fully placed on file with the FCC and NVLAP accredited.

3.0 System Test Configuration

3.1 System Support Equipment

Table 1.3-1 contains the details of the support equipment associated with the Equipment Under Test.

Table 1.3-1: System Support Equipment

Item #	Description	Model No.	Serial No.
1	IBM Laptop	T21	75-0FX2F

Cables Associated with EUT

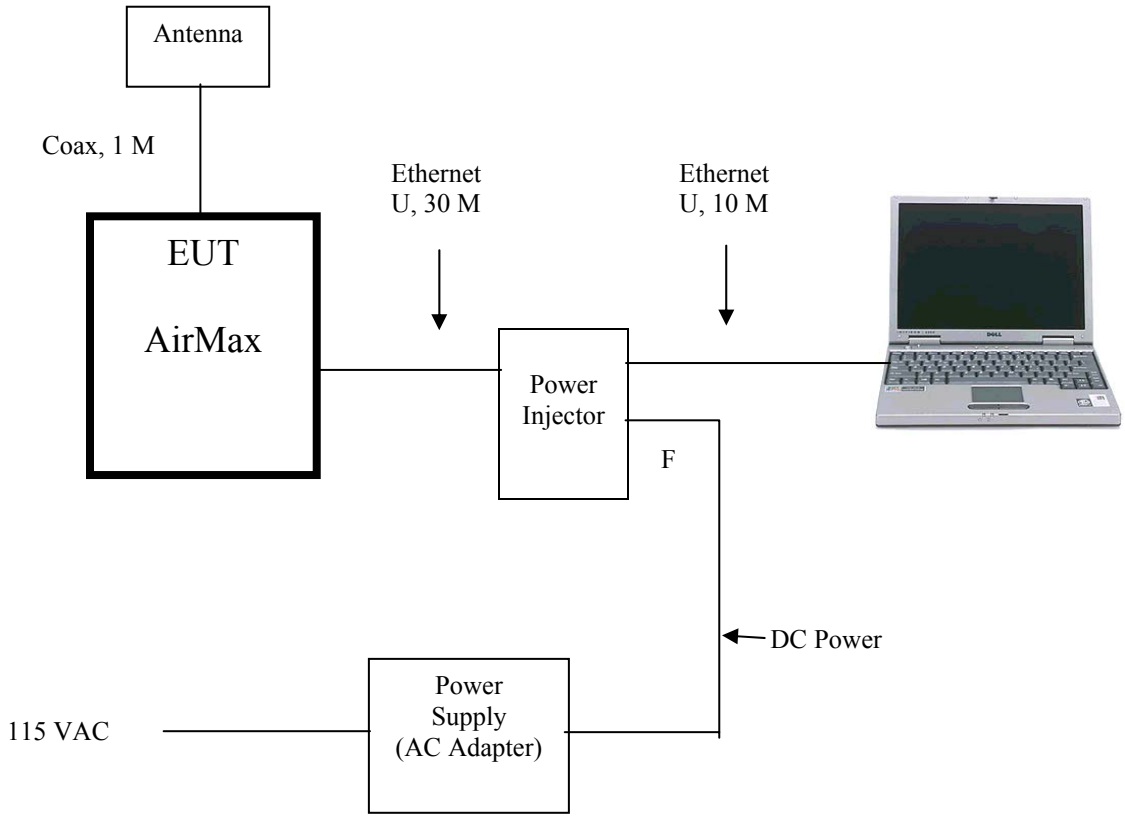
Table 1.3-2 contains the details of the cables associated with the EUT.

Table 1.3-2: Interconnecting cables associated with the EUT

Cables					
Description	Length	Shielding	Ferrites	Connection	
				From	To
Coaxial cable	1 meter	Yes	No	AirMax	Antenna
Ethernet cable	30 meters	No	No	AirMax	Power Injector
Ethernet cable	10 meters	No	No	Power Injector	Computer
DC power cable	1.5 meter	No	Yes	Power Injector	Power Adaptor
AC power cable	1.5 meter	No	No	Power Adaptor	AC Line

3.2 Block Diagram of Test Setup

The diagram shown below details the interconnection of the EUT and support equipment. For specific layout, refer to the test configuration photograph in the relevant section of this report.



S = Shielded	**F** = With Ferrite
U = Unshielded	**M** = Length in Meter

3.3 Justification

For emission testing, the Equipment under Test (EUT) was configured for testing in a typical fashion (as a customer would normally use it). During testing, all cables were manipulated to produce worst-case emissions.

For radiated emission measurements, the EUT is attached to a cardboard box (if necessary) and placed on the wooden turntable. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). The EUT is wired to transmit full power.

The signal is maximized through rotation and placement in the three orthogonal axes. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent three-meter reading using inverse scaling with distance.

3.4 Software Exercise Program

The EUT exercise program used during radiated and conducted testing was designed to exercise the various system components in a manner similar to a typical use. For emissions testing, the units were setup to transmit continuously to simplify the measurement methodology. Care was taken to ensure proper power supply voltages during testing.

3.5 Mode of operation during test

Transmitting signal on low, middle and high channels.

3.6 Modifications required for Compliance

The following modifications were installed during compliance testing in order to bring the product into compliance (Please note that this list does not include changes made specifically by Malibu Networks prior to compliance testing):

Intertek Testing Services made no modifications to the EUT.

3.7 Additions, deviations and exclusions from standards

No additions, deviations or exclusion have been made from standard.

4.0 Measurement Results

4.1 Conducted Output Power at Antenna Terminal, EIRP
FCC Rule 15.407(a)

Requirement:

For U-NII devices operating in 5.725-5.825 GHz band, the peak transmit power shall not exceed the lesser of 1 Watt (30 dBm) or 17 dBm+10Log(B), where B is the 26-dB emission bandwidth in MHz, with the maximum antenna gain: 23 dBi – for fixed point-to-point operation, 6 dBi – for point-to-multipoint operation.

Procedure:

The test procedure, described in the FCC Public Notice DA 02-2138, was used. Measurements were performed with a spectrum analyzer in the following steps:

1. The 26-dB Emission Bandwidth was measured with a spectrum analyzer resolution bandwidth (RBW) of 300 kHz (which is 1% - 2% of the 26-dB Emission Bandwidth), and was found about 18 MHz (see plots in section 4.2).
2. The RBW was set to 1 MHz, SPAN – to 18 MHz, and the sweep time was recorded as 50 ms.
3. The pulse duration (T) was measured and found equals 1.335 ms.

As the sweep time was found more than T, and Emission Bandwidth – more than available spectrum analyzer RBW, Method 3 of DA 02-2138 was used (video averaging with max hold and sum power across the band) in the following steps:

1. The SPAN was set to 18 MHz, RBW- to 1 MHz, Video bandwidth (VBW) – to 1 kHz (as 1/T=775 Hz).
2. Display mode was set to Linear.
3. As a bin width (equals 0.83 MHz) is more than 0.5 MHz, the detector mode was set to Peak.
4. The Peak power was recorded.
5. The bandwidth correction factor 10Log(BW/1 MHz) was applied.

Result:

Base Station

Frequency MHz	Measured Output Power dBm	Bandwidth correction factor dB	Total Output Power dBm	Calculated EIRP * dBm	EIRP Limit dBm	Margin dB	Plot
5750	3.33	12.5	15.8	28.8	53	-24.2	1a
5775	4.89	12.5	17.4	30.4	53	-22.6	1b
5800	6.67	12.5	19.2	32.2	53	-20.8	1c

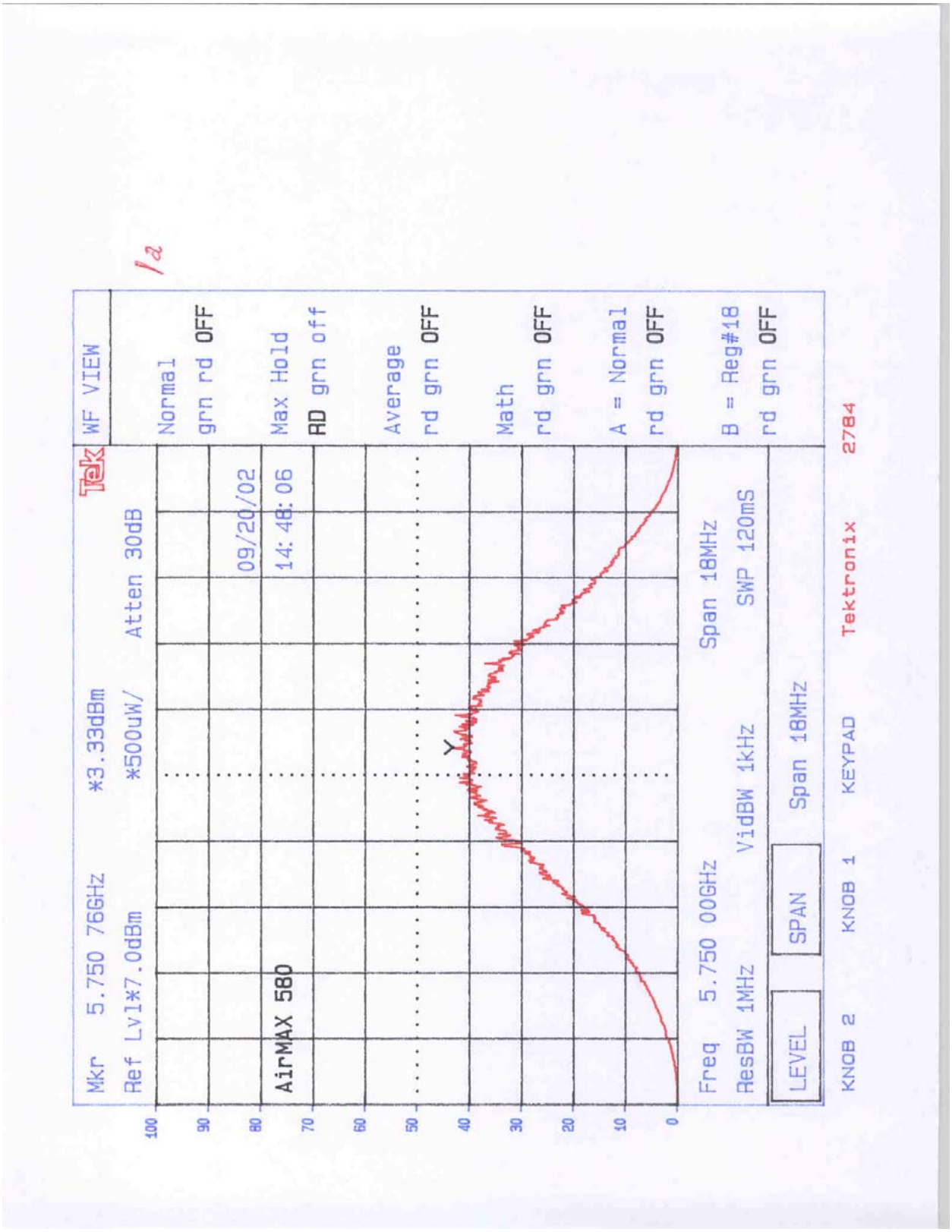
* Calculated for antenna Gain = 13 dBi

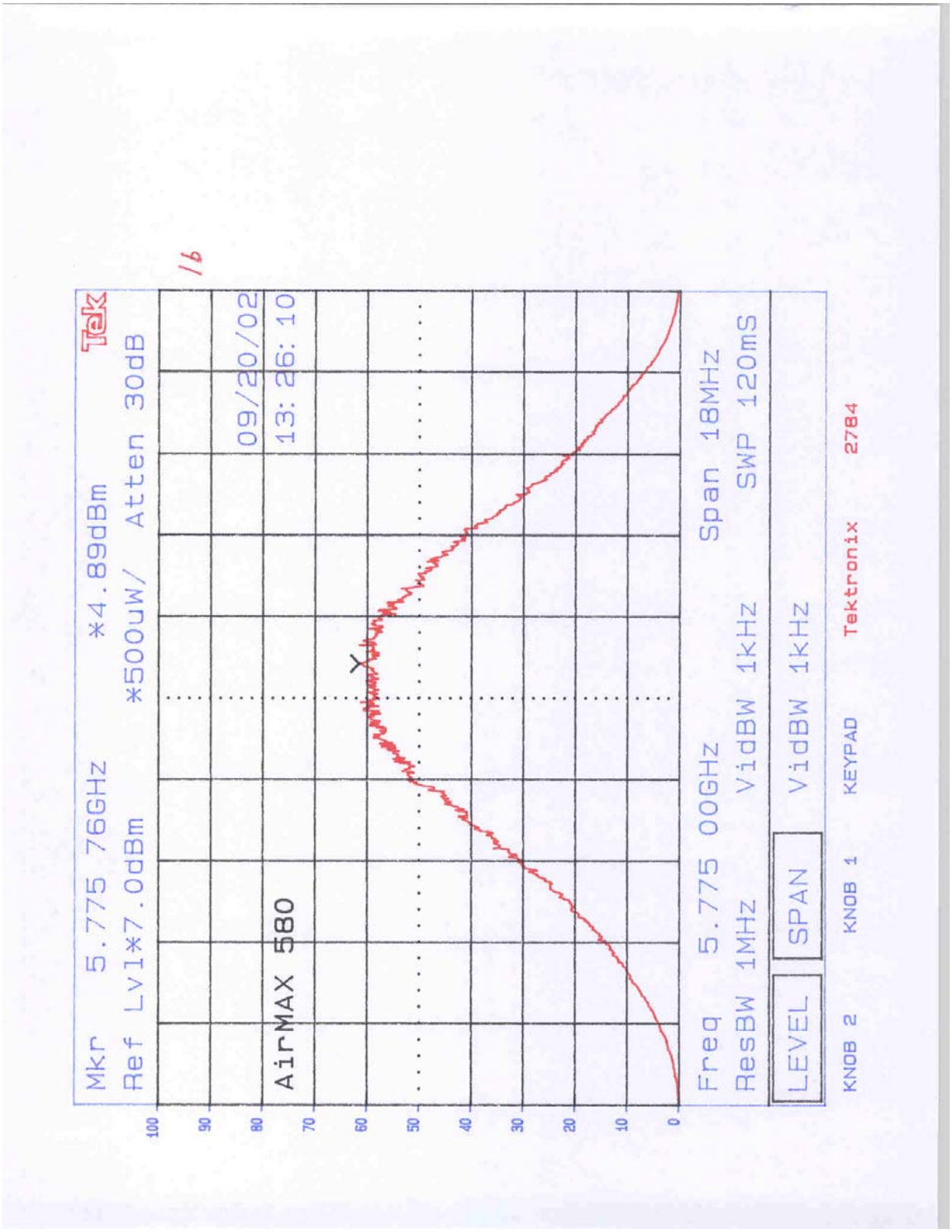
Subscriber Unit

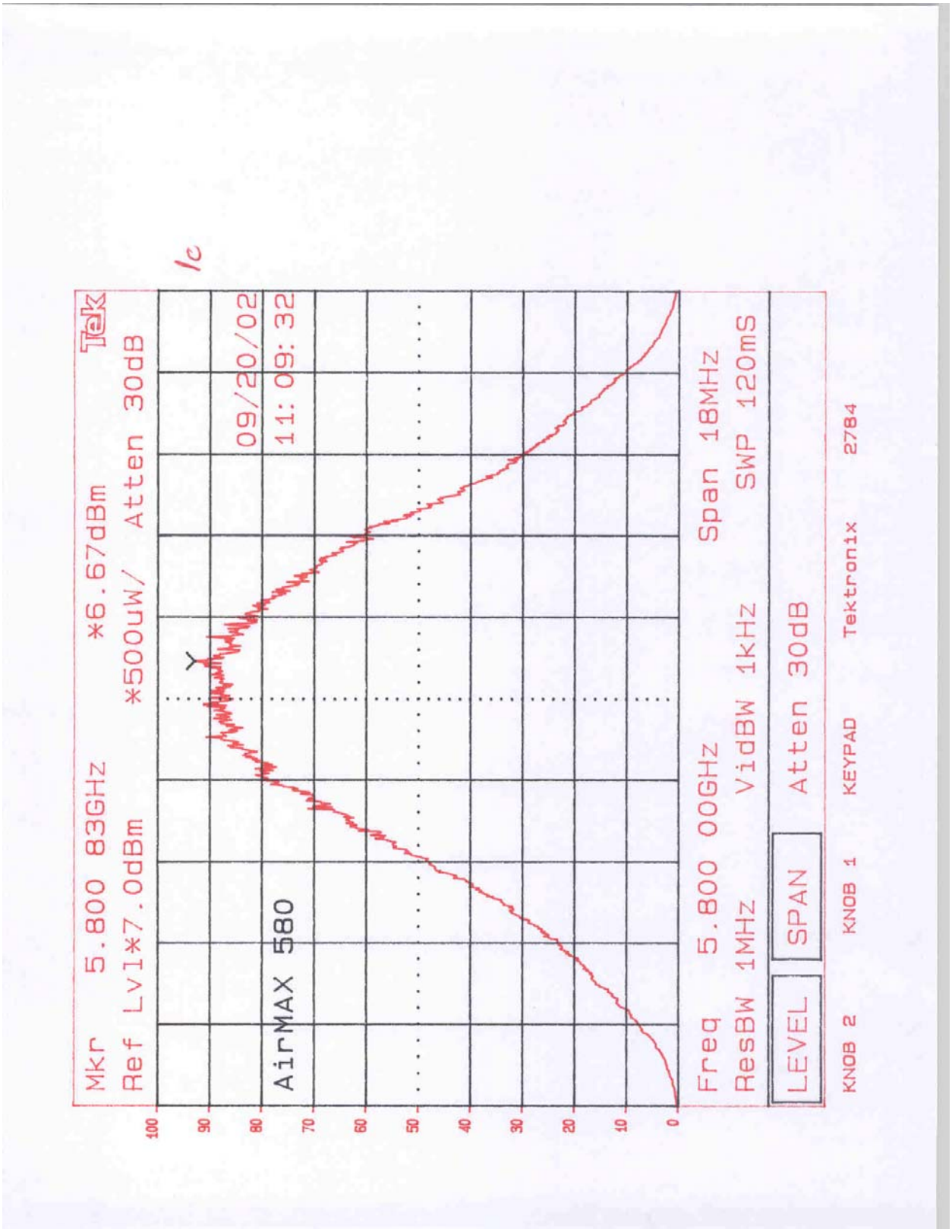
Frequency MHz	Measured Output Power dBm	Bandwidth correction factor dB	Total Output Power dBm	Calculated EIRP * dBm	EIRP Limit dBm	Margin dB	Plot
5750	3.33	12.5	15.8	29.8	36	-6.2	1a
5775	4.89	12.5	17.4	31.4	36	-4.6	1b
5800	6.67	12.5	19.2	33.2	36	-2.8	1c

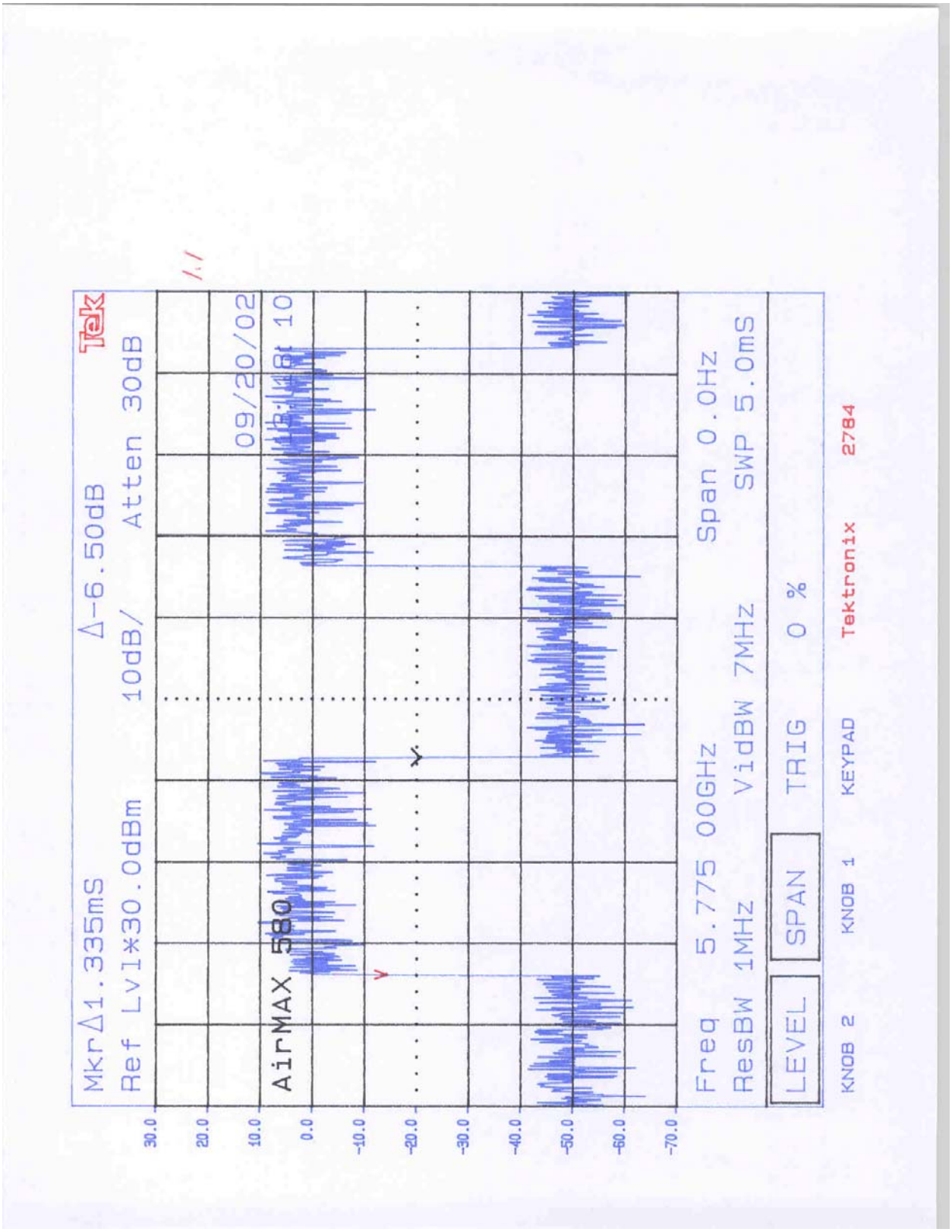
* Calculated for antenna Gain = 14 dBi

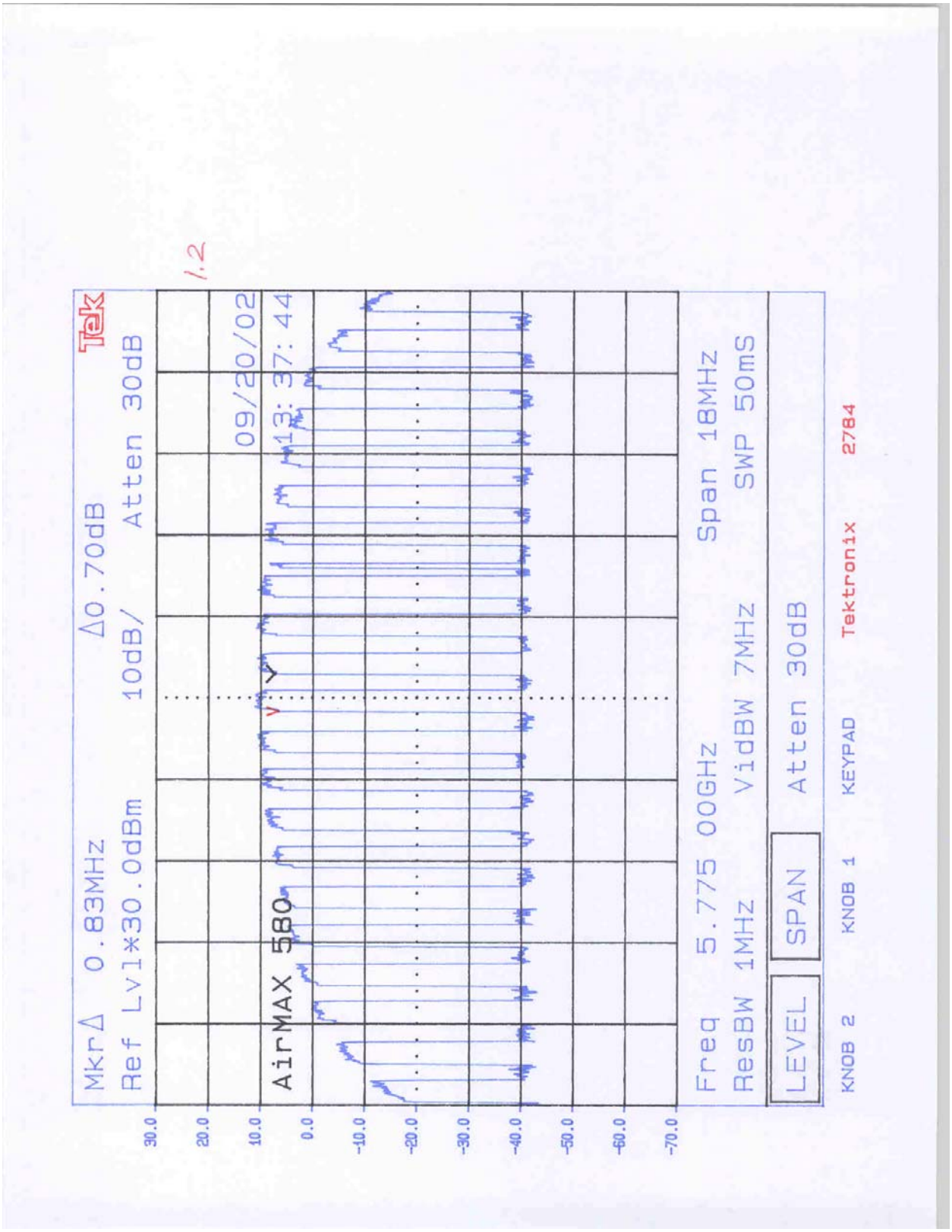
For details, see also plots: 1.1-1.6.

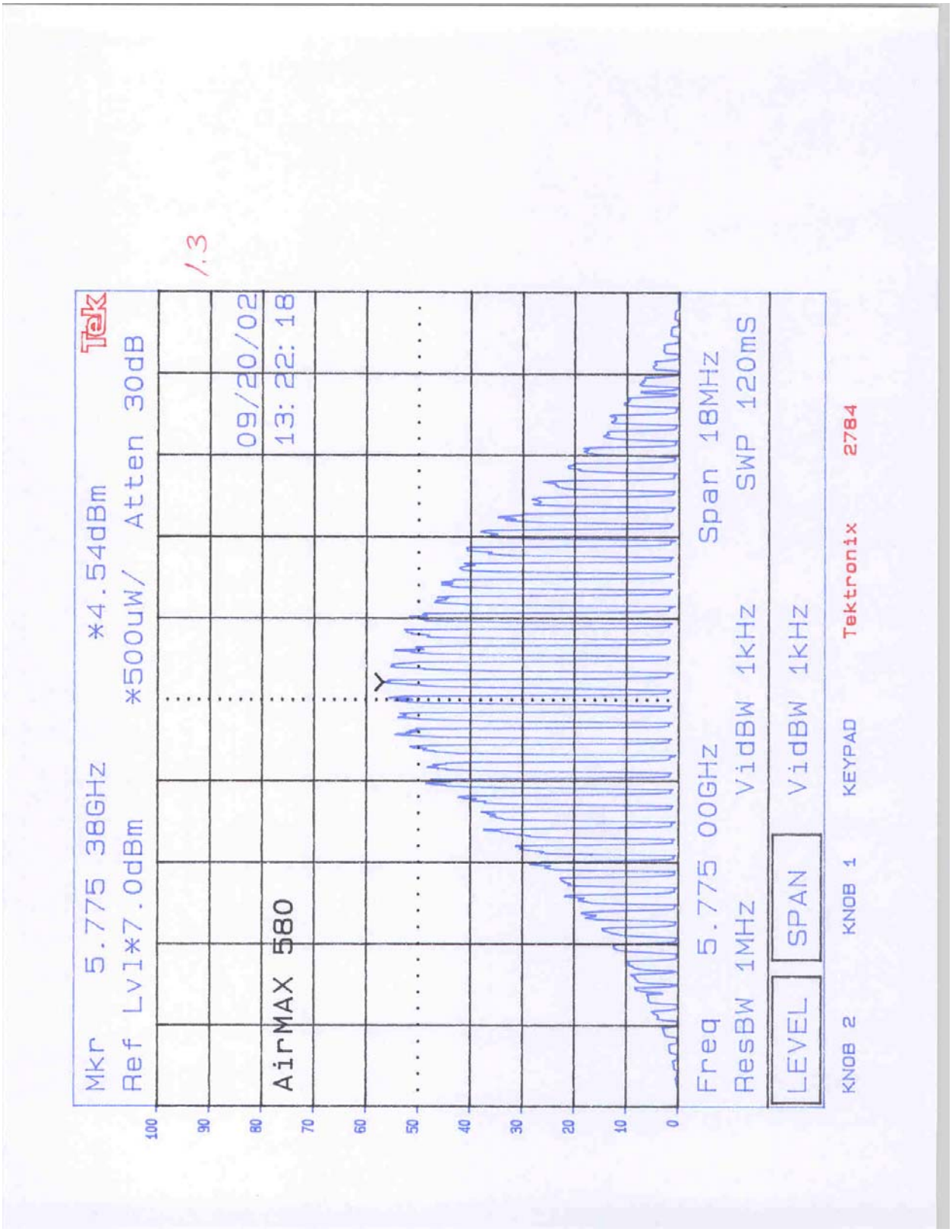

1a
WF VIEW
Normal
grn rd OFF
Max Hold
RD grn off
Average
rd grn OFF
Math
rd grn OFF
A = Normal
rd grn OFF
B = Reg#18
rd grn OFF
Tek
Mkr 5.750 76GHz *3.33dBm
Ref Lvl*7.0dBm *500uW/ Atten 30dB
09/20/02
14:48:06
AirMAX 580
Span 18MHz
SWP 120mS
Freq 5.750 00GHz
ResBW 1MHz VidBW 1KHz
LEVEL SPAN Span 18MHz
KNOB 2 KNOB 1 KEYPAD
Tektronix 2784
100 90 80 70 60 50 40 30 20 10 0

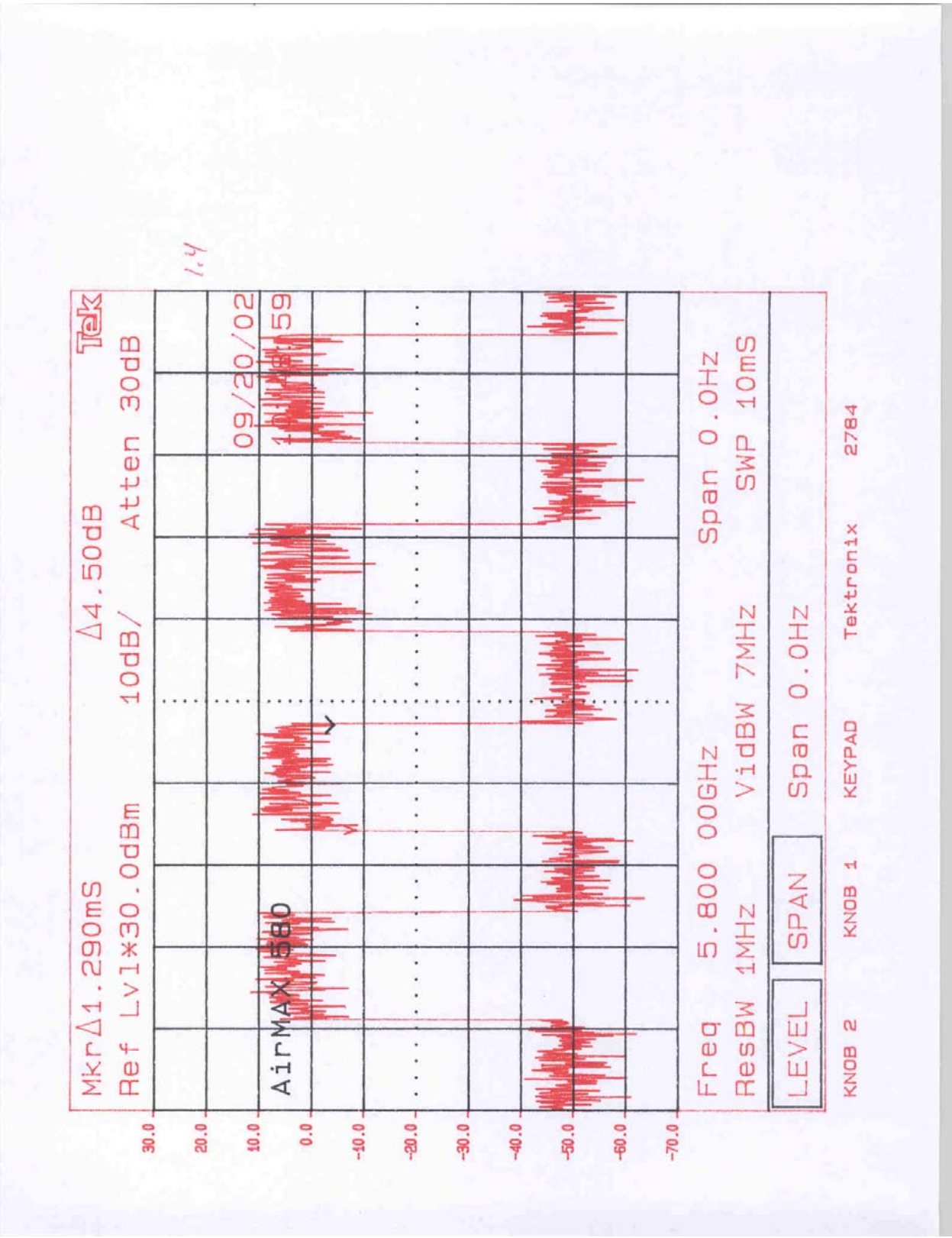

Mkr 5.775 76GHz *4.89dBm
Ref Lvl*7.0dBm *500uW/ Atten 30dB
AirMAX 580
09/20/02
13: 26: 10
Freq 5.775 00GHz Span 18MHz
ResBW 1MHz VidBW 1KHz SWP 120mS
LEVEL SPAN VidBW 1KHz
KNOB 2 KNOB 1 KEYPAD Tektronix 2784
100 90 80 70 60 50 40 30 20 10 0

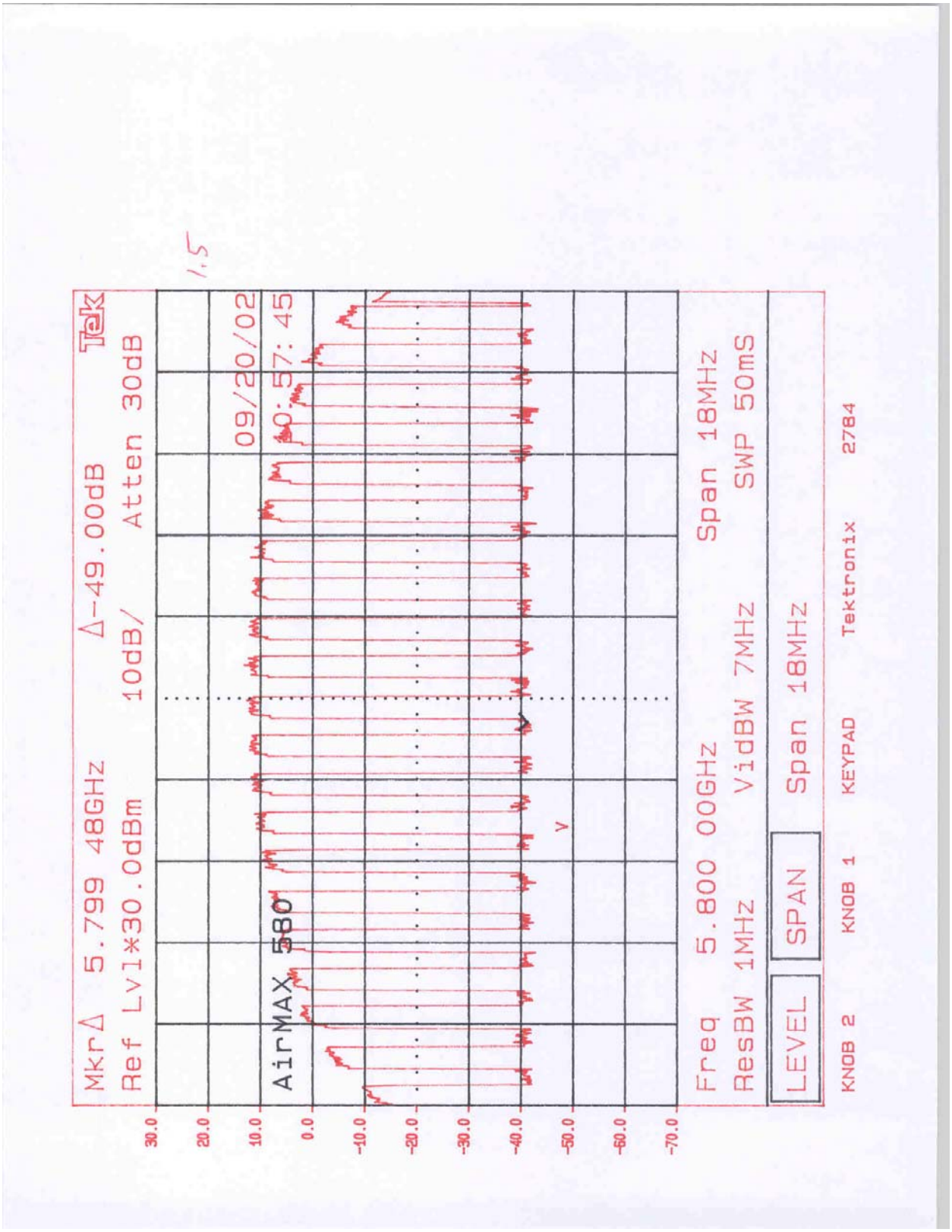

Mkr 5.800 83GHz *6.67dBm
Ref Lvl *7.0dBm *500uW/ Atten 30dB
AirMAX 580
09/20/02
11: 09: 32
Tek
Freq 5.800 00GHz Span 18MHz
ResBW 1MHz VidBW 1KHz SWP 120mS
LEVEL SPAN Atten 30dB
KNOB 2 KNOB 1 KEYPAD Tektronix 2784
100 90 80 70 60 50 40 30 20 10 0

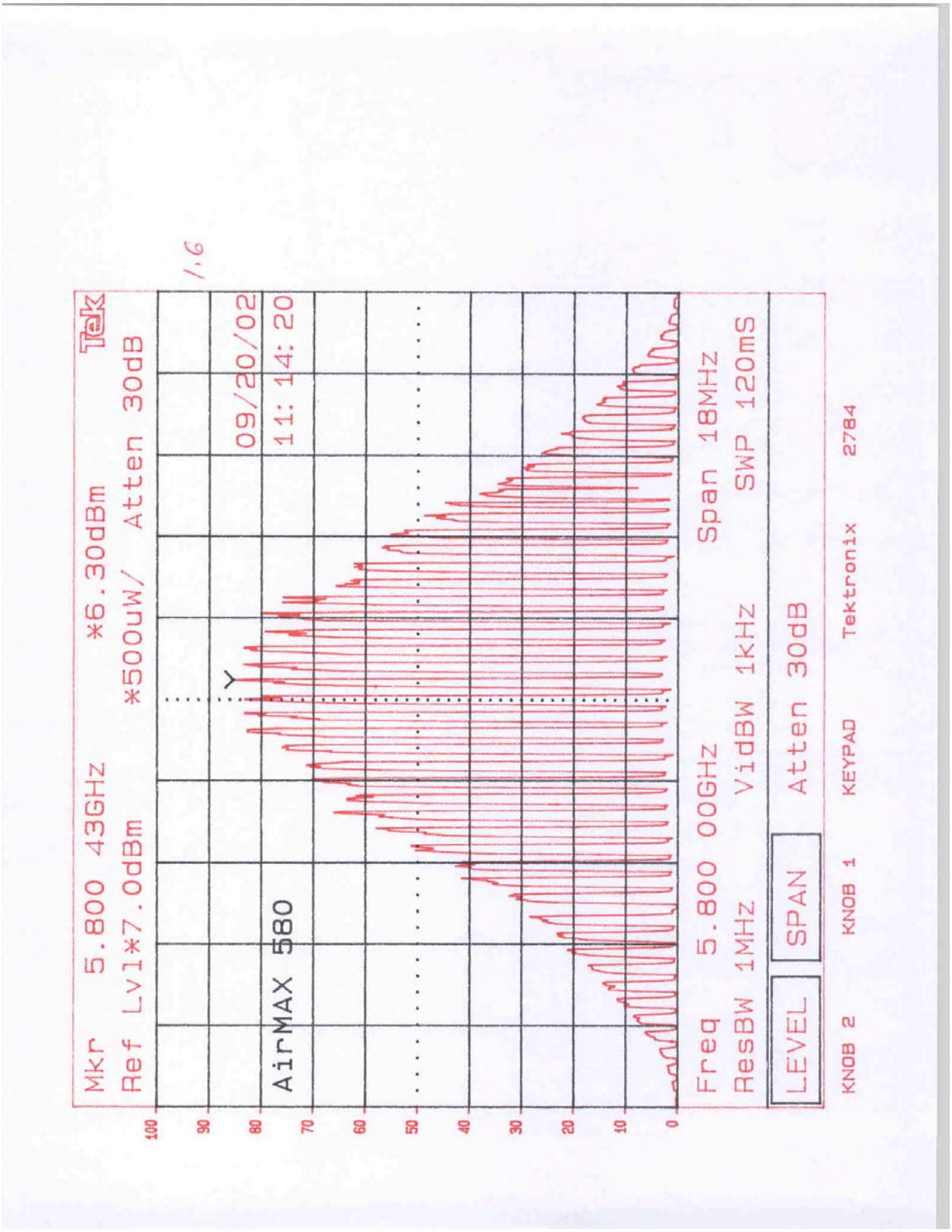

MkrΔ1.335mS
Ref Lvl*30.0dBm
Δ-6.50dB
10dB/
Atten 30dB
Tek
09/20/02
AirMAX 580
Freq 5.775 00GHz
ResBW 1MHz
Span 0.0Hz
VidBW 7MHz
SWP 5.0mS
LEVEL
SPAN
TRIG
0 %
KNOB 2
KNOB 1
KEYPAD
Tektronix
2784
30.0
20.0
10.0
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0


1.2
Tek
MkrΔ 0.83MHz
Ref Lvl*30.0dBm
Δ0.70dB
10dB/
Atten 30dB
09/20/02
13: 37: 44
AirMAX 580
Freq 5.775 00GHz
ResBW 1MHz
Span 18MHz
VidBW 7MHz
SWP 50mS
LEVEL
SPAN
Atten 30dB
KNOB 2
KNOB 1
KEYPAD
Tektronix
2784
30.0
20.0
10.0
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0


1.3
Tek
Mkr 5.775 38GHz *4.54dBm
Ref Lvl *7.0dBm *500uW/ Atten 30dB
09/20/02
13: 22: 18
AirMAX 580
Freq 5.775 00GHz Span 18MHz
ResBW 1MHz VidBW 1KHz SWP 120mS
LEVEL SPAN VidBW 1KHz
KNOB 2 KNOB 1 KEYPAD Tektronix 2784
100 90 80 70 60 50 40 30 20 10 0


Tek
MkrΔ1.290mS
Ref Lvl*30.0dBm
Δ4.50dB
10dB/
Atten 30dB
09/20/02
AirMAX 580
30.0
20.0
10.0
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
Freq 5.800 00GHz
ResBW 1MHz
VidBW 7MHz
Span 0.0Hz
SWP 10mS
LEVEL
SPAN
Span 0.0Hz
KNOB 2
KNOB 1
KEYPAD
Tektronix
2784


1.5
MkrΔ 5.799 48GHz
Ref Lvl*30.0dBm
Δ-49.00dB
10dB/
Atten 30dB
Tek
09/20/02
10:57:45
AirMAX 580
Freq 5.800 00GHz
ResBW 1MHz
VidBW 7MHz
Span 18MHz
SWP 50mS
LEVEL
SPAN
Span 18MHz
KNOB 2
KNOB 1
KEYPAD
Tektronix
2784
30.0
20.0
10.0
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0


1.6
Tek
Mkr 5.800 43GHz *6.30dBm
Ref Lvl *7.0dBm *500uW/ Atten 30dB
09/20/02
11: 14: 20
AirMAX 580
Freq 5.800 00GHz Span 18MHz
ResBW 1MHz VidBW 1KHz SWP 120mS
LEVEL SPAN Atten 30dB
KNOB 2 KNOB 1 KEYPAD Tektronix 2784
100 90 80 70 60 50 40 30 20 10 0

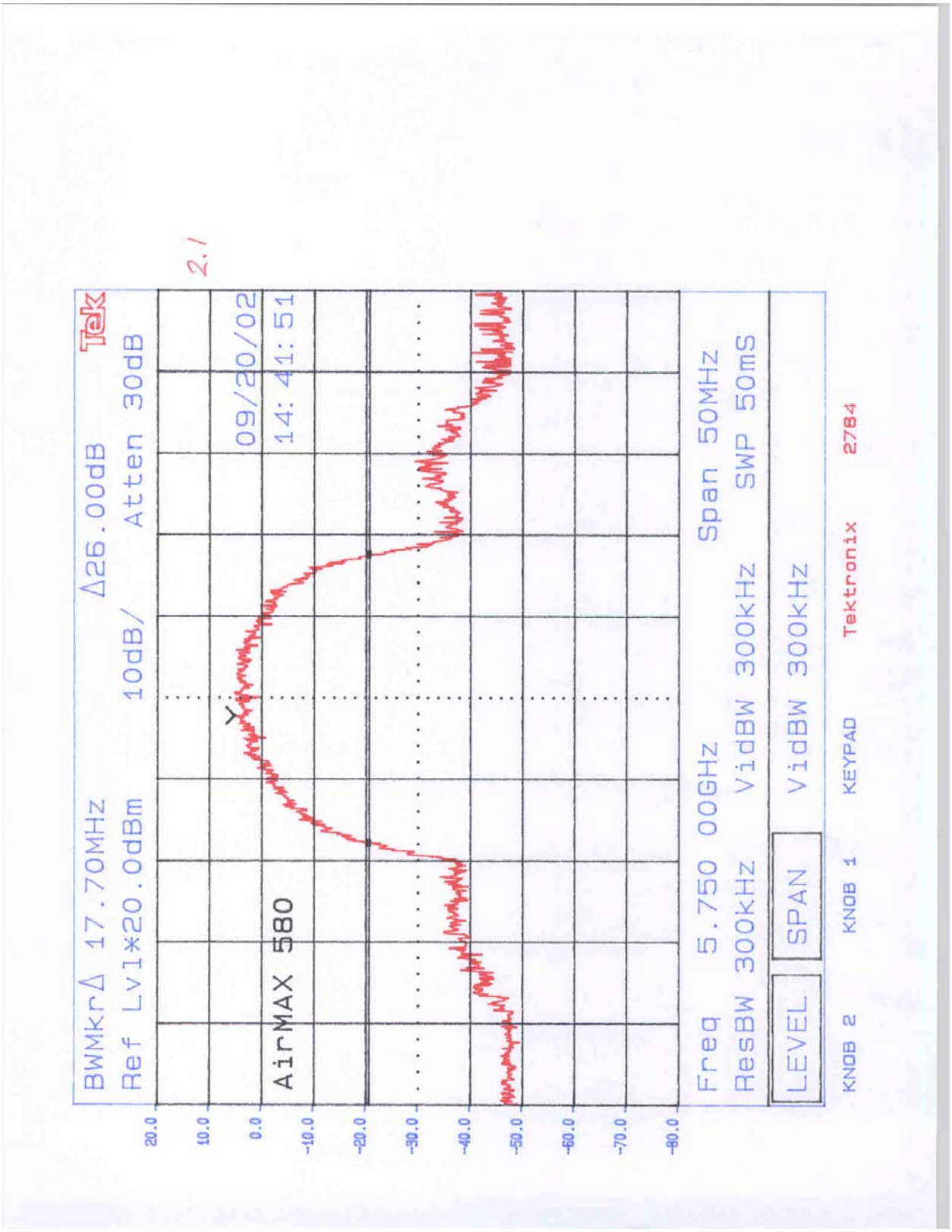
4.2 26 dB Bandwidth
FCC Rule 15.407(a) (for calculation only)

Procedure:

The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer Resolution BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was taken, a DISPLAY line was drawn 26 dB lower than PEAK level. The 26-dB bandwidth was determined from where the channel output spectrum intersected the display line.

Result:

Frequency, MHz	26 dB Bandwidth, MHz	Plot
5750	17.7	2.1
5775	17.9	2.2
5800	17.8	2.3


2.1
BWMkrΔ 17.70MHz
Ref Lvl*20.0dBm
Δ26.00dB
10dB/
Atten 30dB
Tek
09/20/02
14:41:51
AirMAX 580
Freq 5.750 00GHz
ResBW 300kHz
VidBW 300kHz
Span 50MHz
SWP 50mS
LEVEL
SPAN
VidBW 300kHz
KNOB 2
KNOB 1
KEYPAD
Tektronix
2784
20.0
10.0
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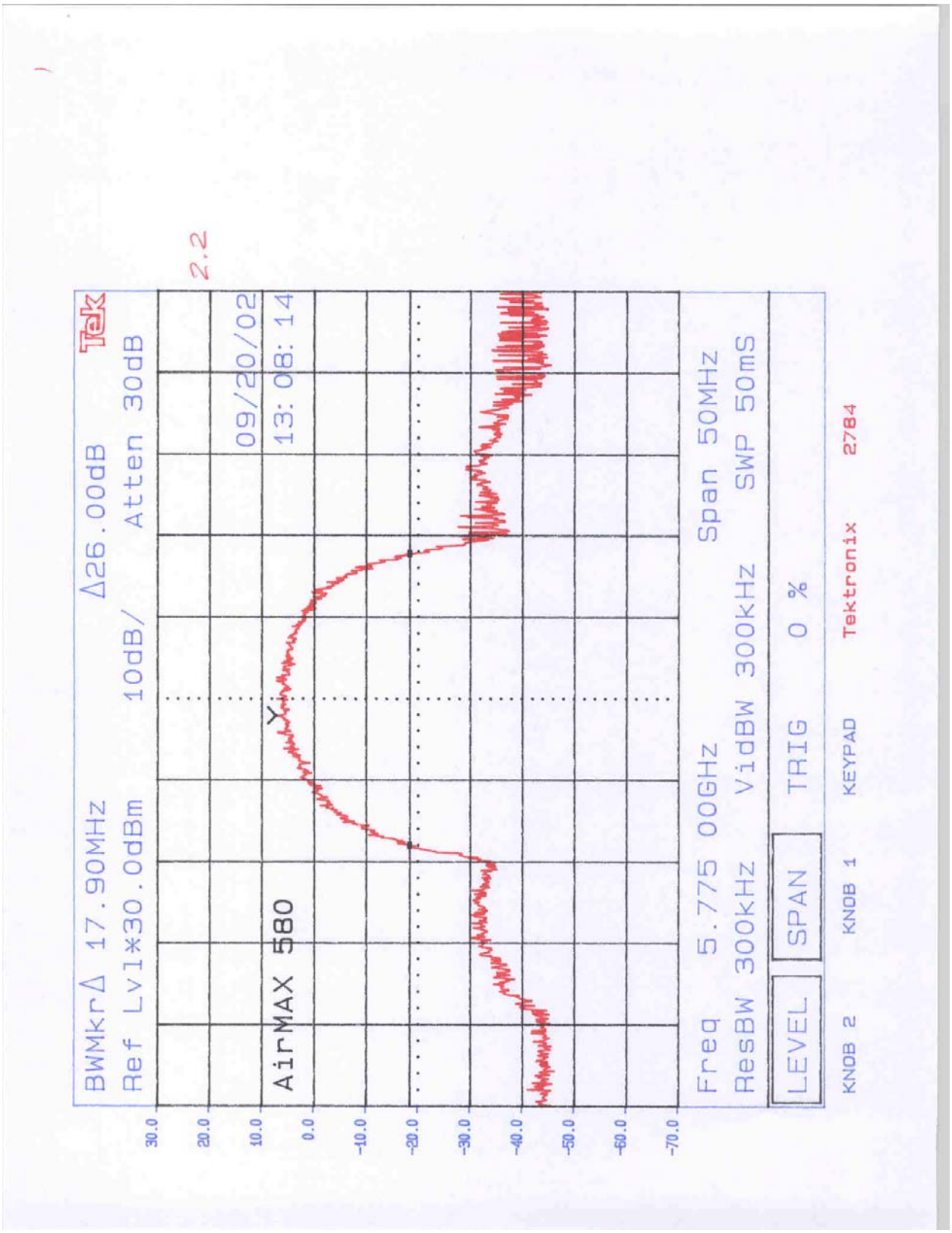
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0


2.2
BWMkrΔ 17.90MHz
Ref Lvl*30.0dBm
Δ26.00dB
10dB/
Atten 30dB
Tek
09/20/02
13: 08: 14
AirMAX 580
Freq 5.775 00GHz
ResBW 300kHz
Span 50MHz
VidBW 300kHz
SWP 50mS
LEVEL
SPAN
TRIG
0 %
KNOB 2
KNOB 1
KEYPAD
Tektronix
2784
30.0
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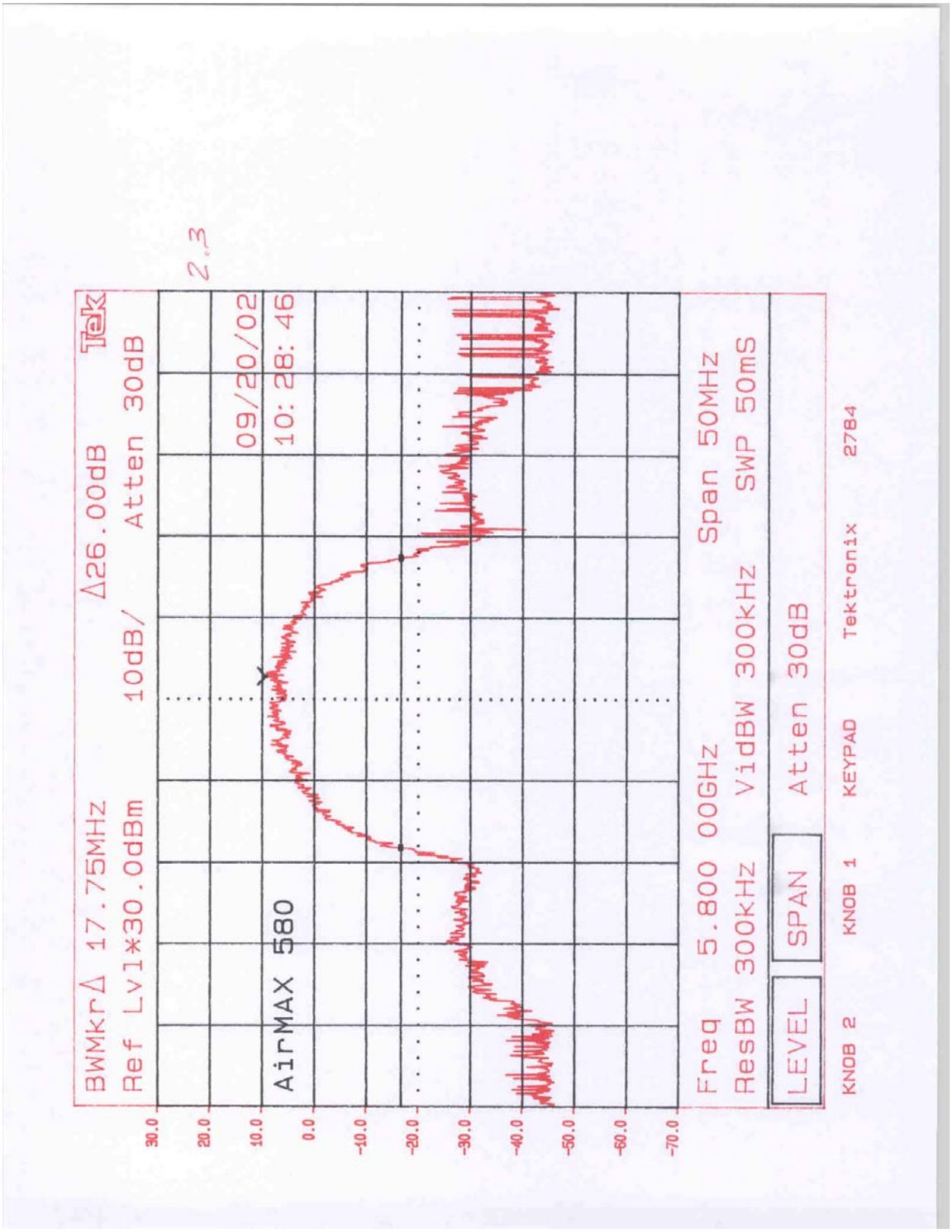
10.0
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0


2.3
BWMkrΔ 17.75MHz
Ref Lvl*30.0dBm
Δ26.00dB
10dB/
Atten 30dB
Tek
09/20/02
10:28:46
AirMAX 580
Freq 5.800 00GHz
ResBW 300kHz
VidBW 300kHz
Span 50MHz
SWP 50mS
LEVEL
SPAN
Atten 30dB
KNOB 2
KNOB 1
KEYPAD
Tektronix
2784
30.0
20.0
10.0
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0

4.3 Power Density
FCC Rule 15.407(a)(3)

Requirement:

For U-NII devices operating in 5.725-5.825 GHz band, the peak power spectral density shall not exceed 17 dBm in any 1 MHz band with the maximum antenna gain: 23 dBi – for fixed point-to-point operation, 6 dBi – for point-to-multipoint operation.

Procedure:

Antenna output of the EUT was coupled directly to spectrum analyzer; if an external attenuator and/or cable was used, these losses are compensated for with the analyzer OFFSET function.

The spectrum analyzer Resolution Bandwidth was set to 1 MHz and Video Bandwidth was set to 7 MHz. Peak power spectral density reading was recorded.

Result:

Base Station

Frequency MHz	Peak Power Density dBm	Calculated EIRP Density* dBm	EIRP Density Limit dBm	Margin dB	Plot
5750	9.7	22.7	23	-0.3	3.1
5775	11.2	24.2	23	1.2 **	3.2
5800	12.9	25.9	23	2.9 **	3.3

* Calculated for antenna Gain = 13 dBi.
** The output Power must be reduce if 13 dBi gain antenna is used.

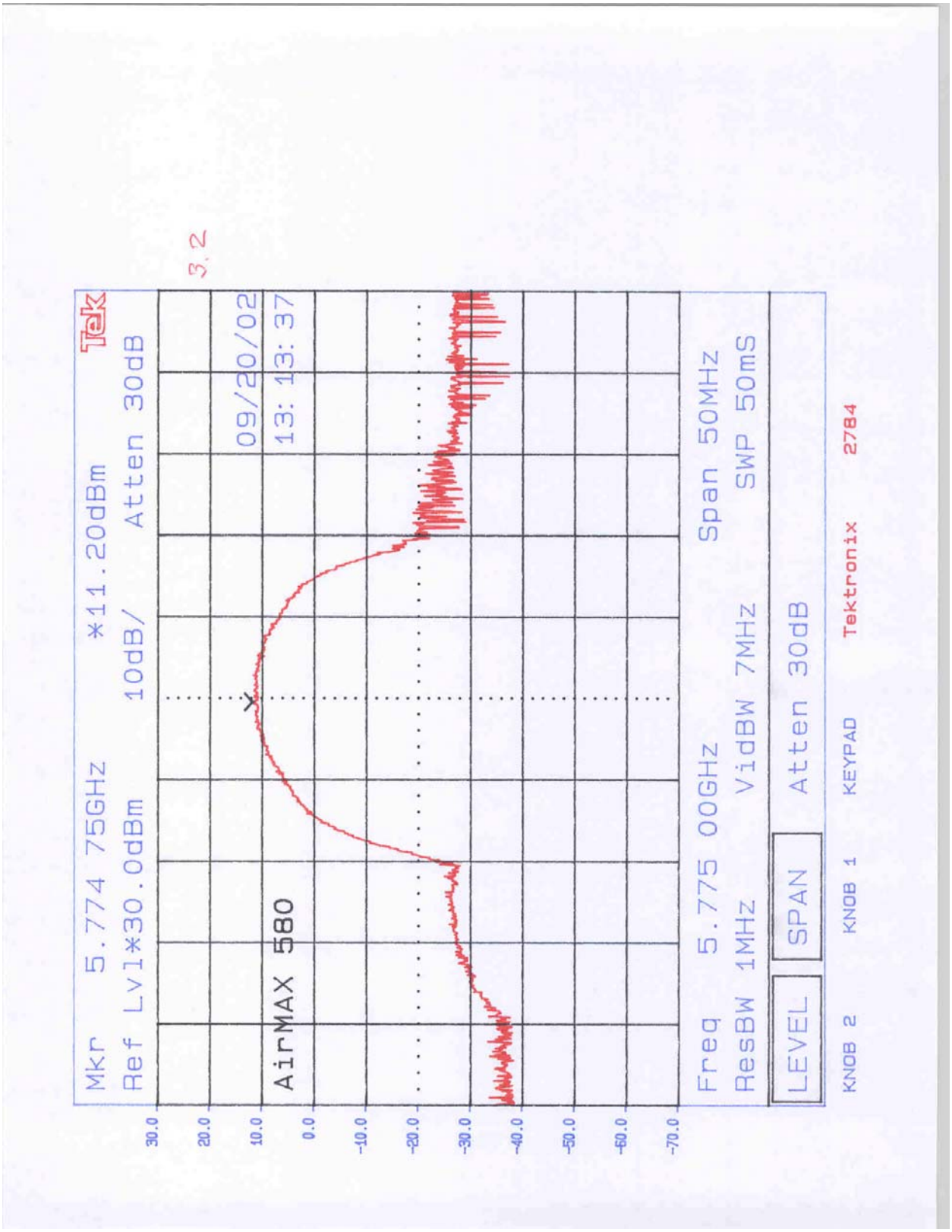
Subscriber Unit

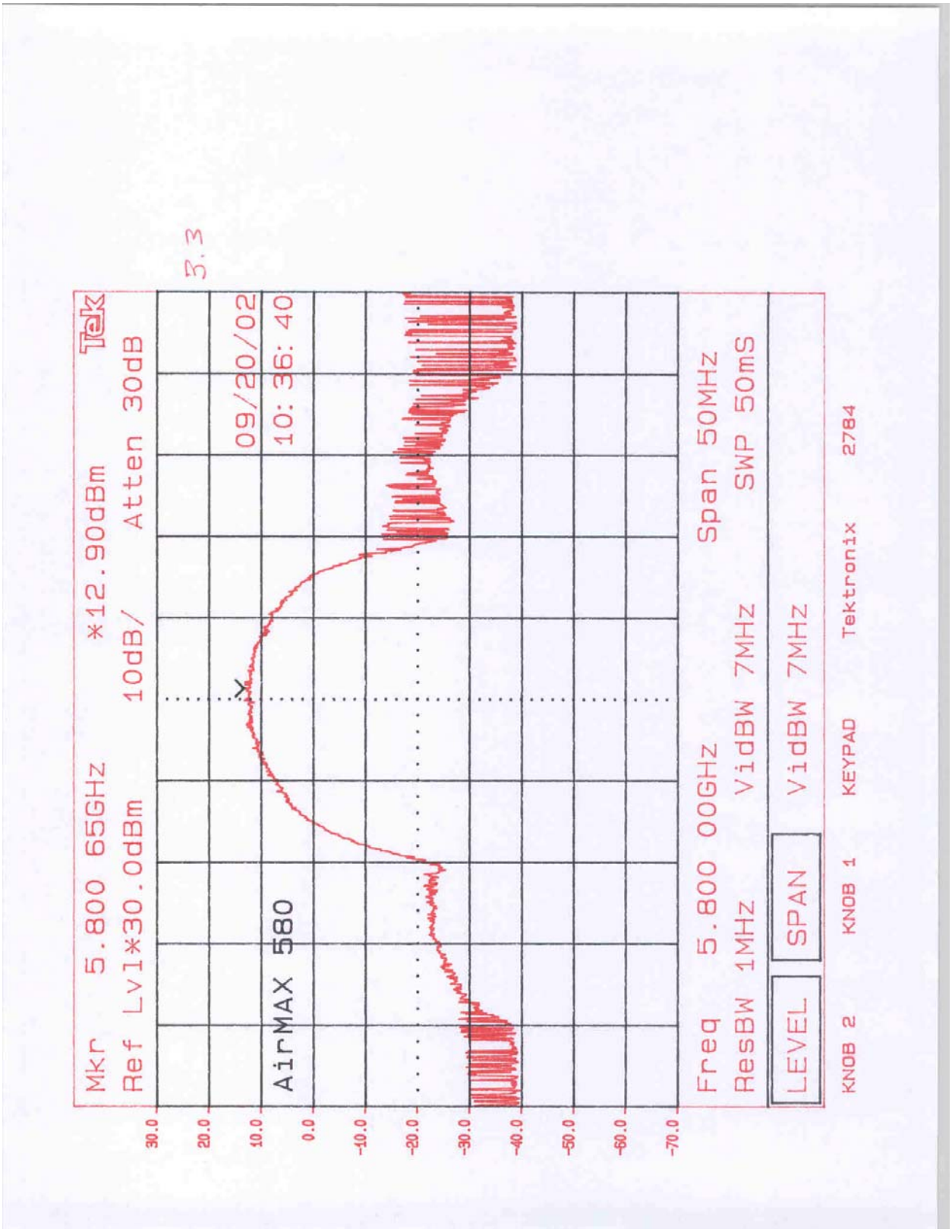
Frequency MHz	Peak Power Density dBm	Calculated EIRP Density* dBm	EIRP Density Limit dBm	Margin dB	Plot
5750	9.7	23.7	40	-16.7	3.1
5775	11.2	25.2	40	-14.8	3.2
5800	12.9	26.9	40	-13.1	3.3

* Calculated for antenna Gain = 14 dBi.

Refer to the following plots for power density data.


3.1
Tek
Mkr 5.749 90GHz *9.70dBm
Ref Lvl*30.0dBm 10dB/ Atten 30dB
09/20/02
14:38:08
AirMAX 580
Freq 5.750 00GHz Span 50MHz
ResBW 1MHz VidBW 7MHz SWP 50mS
LEVEL SPAN VidBW 7MHz
KNOB 2 KNOB 1 KEYPAD Tektronix 2784
30.0
20.0
10.0
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0


3.2
Tek
Mkr 5.774 75GHz *11.20dBm
Ref Lvl*30.0dBm 10dB/ Atten 30dB
09/20/02
13: 13: 37
AirMAX 580
Freq 5.775 00GHz Span 50MHz
ResBW 1MHz VidBW 7MHz SWP 50mS
LEVEL SPAN Atten 30dB
KNOB 2 KNOB 1 KEYPAD Tektronix 2784
30.0
20.0
10.0
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0


3.3
Tek
Mkr 5.800 65GHz *12.90dBm
Ref Lvl*30.0dBm 10dB/ Atten 30dB
09/20/02
10: 36: 40
AirMAX 580
Freq 5.800 00GHz Span 50MHz
ResBW 1MHz VidBW 7MHz SWP 50mS
LEVEL SPAN VidBW 7MHz
KNOB 2 KNOB 1 KEYPAD Tektronix 2784
30.0
20.0
10.0
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0

4.4 The ratio of the peak excursion of the modulation envelope to the peak power
FCC Rule 15.407(a)(6)

Requirement:

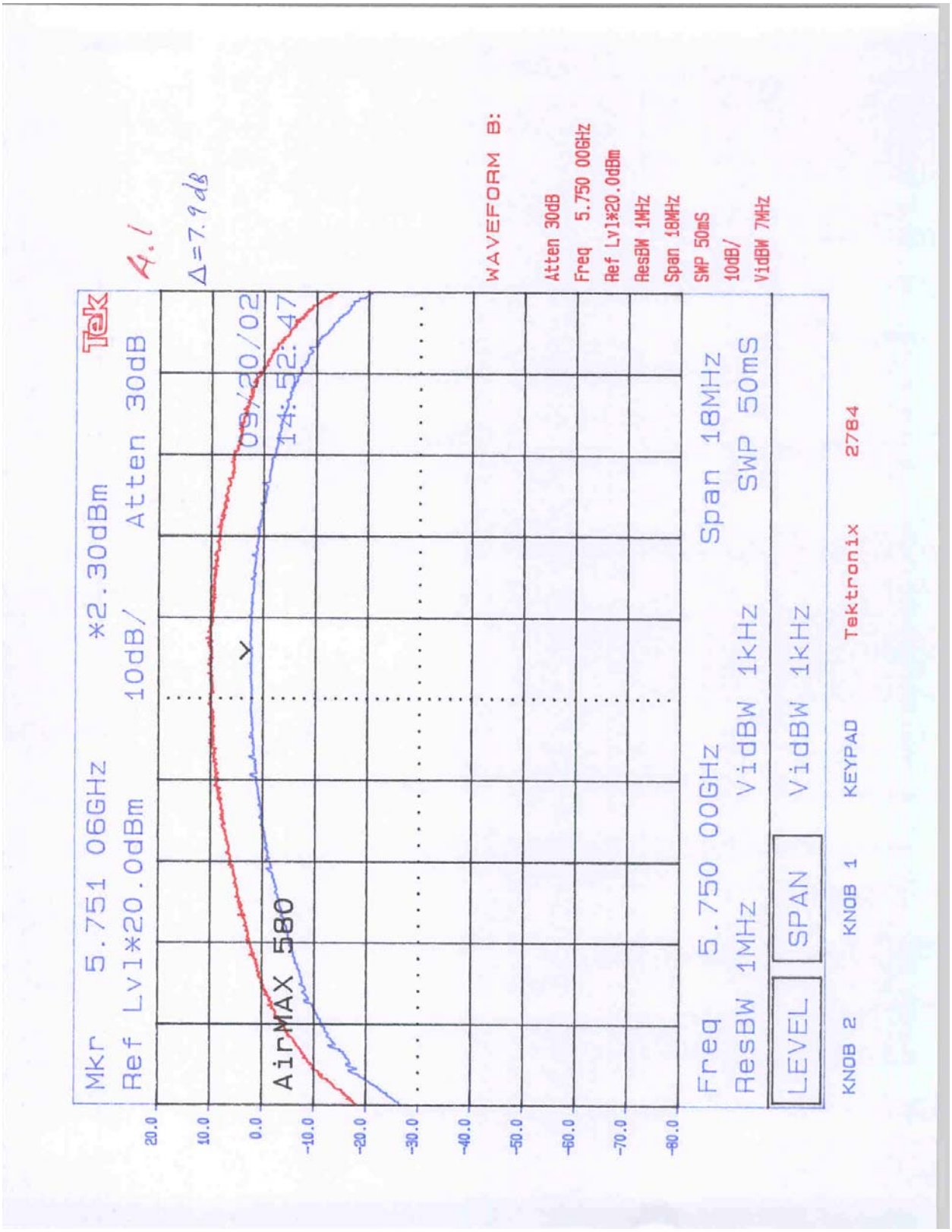
The ratio of the peak excursion of the modulation envelope to the peak transmit power shall not exceed 13 dB.

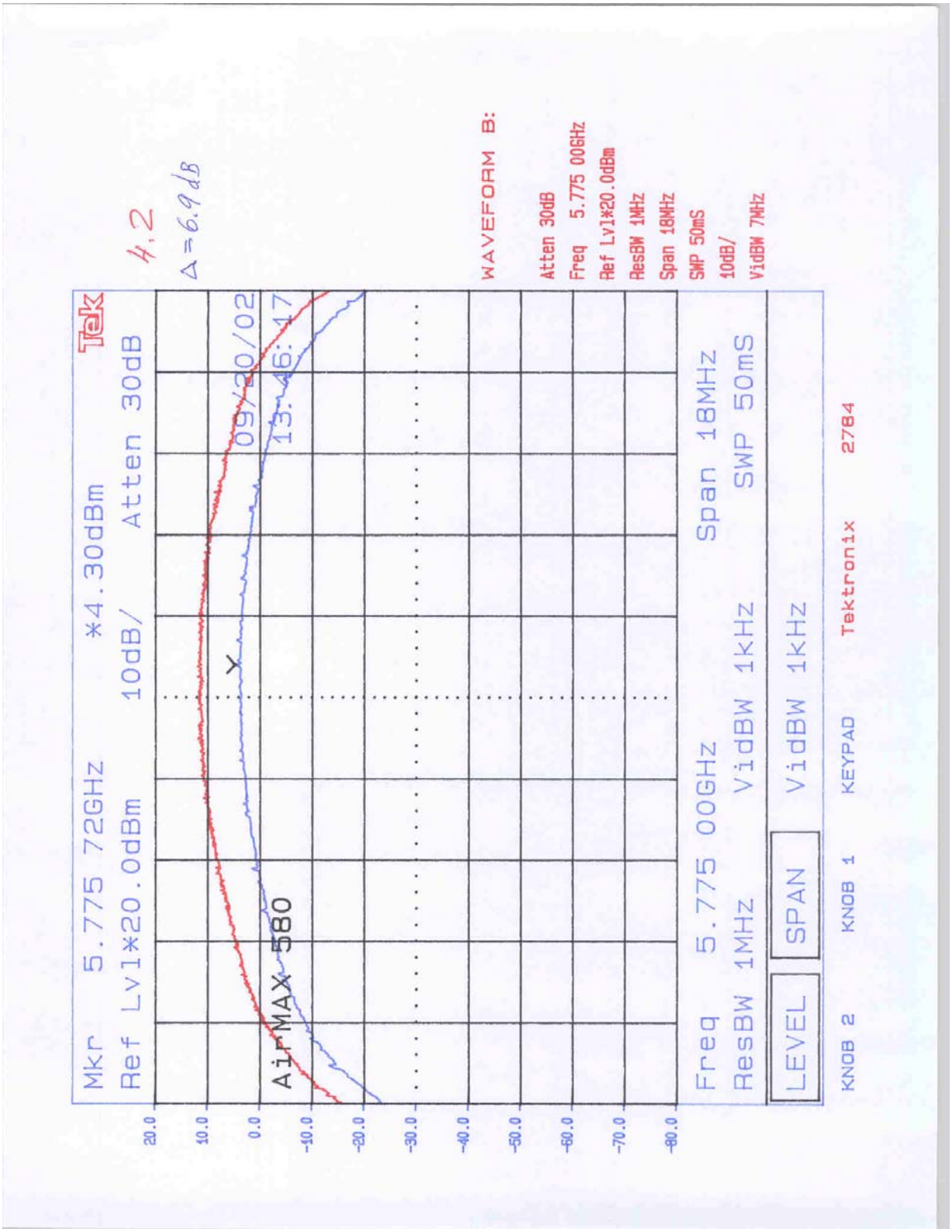
Procedure:

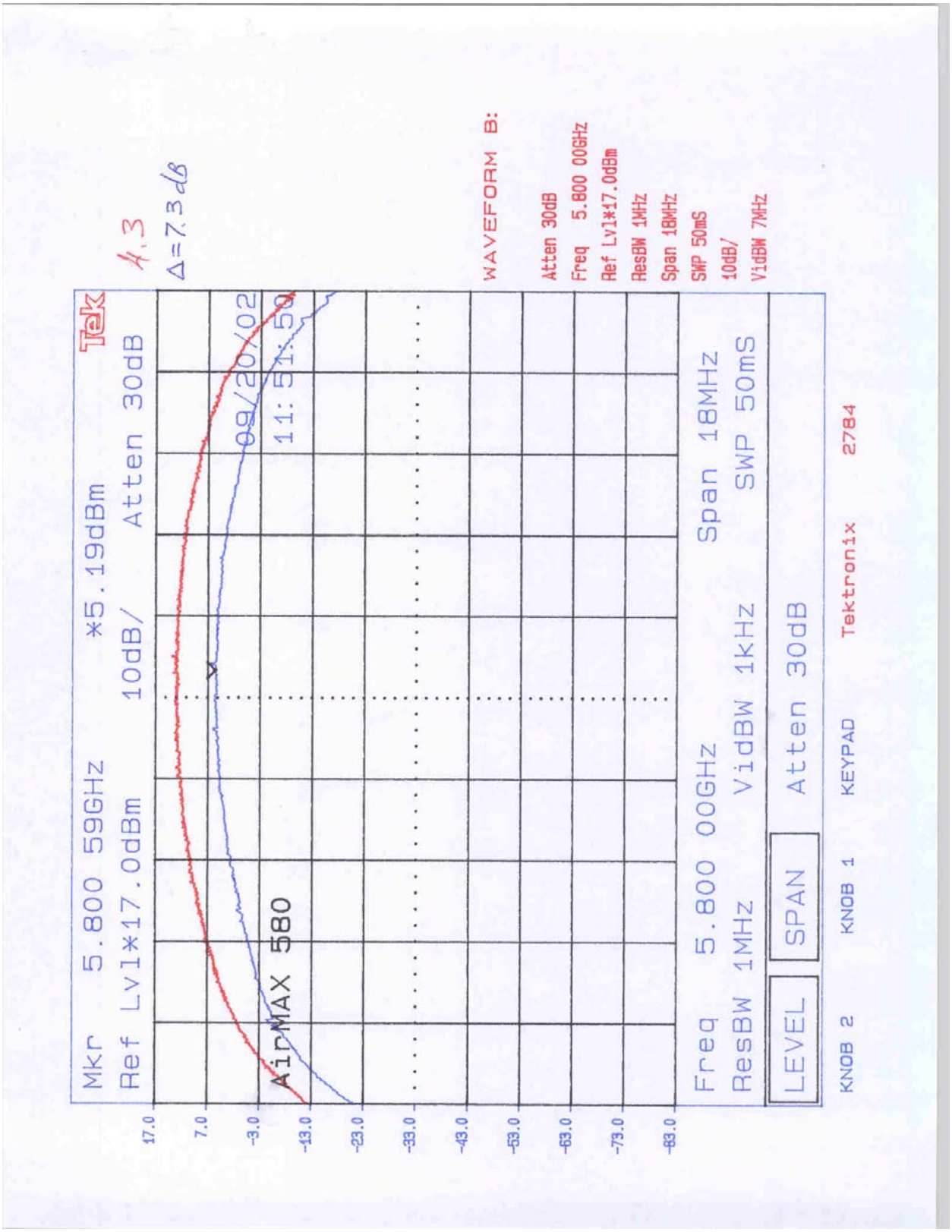
Spectrum Analyzer was connected to the output of the EUT. The Resolution Bandwidth was set to 1 MHz. Two plots were made in each band: with the Video Bandwidth set to 7 MHz and with the Video Bandwidth set to 1 kHz. The difference between spectrum analyzer readings indicates the ratio of the peak excursion of the modulation envelope to the peak transmit power.

Test Result:

See attached plots 4.1 – 4.3 for the ratio of the peak excursion of the modulation envelope to the peak power. The maximum Ratio is 7.9 dB.


Mkr 5.751 06GHz
Ref Lvl*20.0dBm
*2.30dBm
10dB/ Atten 30dB
Tek
4.1
Δ=7.9dB
09/20/02
14:52:47
AirMAX 580
WAVEFORM B:
Atten 30dB
Freq 5.750 00GHz
Ref Lvl*20.0dBm
ResBW 1MHz
Span 18MHz
SWP 50mS
10dB/
VidBW 7MHz
Freq 5.750 00GHz
ResBW 1MHz
VidBW 1kHz
Span 18MHz
SWP 50mS
LEVEL
SPAN
VidBW 1kHz
KNOB 2
KNOB 1
KEYPAD
Tektronix
2784
20.0
10.0
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0


4.2
Δ=6.9dB
Tek
Mkr 5.775 72GHz *4.30dBm
Ref Lv1*20.0dBm 10dB/ Atten 30dB
09/20/02
13:46:17
AirMAX 580
WAVEFORM B:
Atten 30dB
Freq 5.775 006Hz
Ref Lv1*20.0dBm
ResBW 1MHz
Span 18MHz
SWP 50mS
10dB/
VidBW 7MHz
Freq 5.775 00GHz Span 18MHz
ResBW 1MHz VidBW 1kHz SWP 50mS
LEVEL SPAN VidBW 1kHz
KNOB 2 KNOB 1 KEYPAD Tektronix 2784
20.0
10.0
0.0
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
-70.0
-80.0


Mkr 5.800 59GHz *5.19dBm
Ref Lv1*17.0dBm 10dB/ Atten 30dB
Tek
4.3
Δ=7.3 dB
09/20/02
11:51:50
AirMAX 580
WAVEFORM B:
Atten 30dB
Freq 5.800 00GHz
Ref Lv1*17.0dBm
ResBW 1MHz
Span 18MHz
SWP 50mS
10dB/
VidBW 7MHz
17.0
7.0
-3.0
-13.0
-23.0
-33.0
-43.0
-53.0
-63.0
-73.0
-83.0
Freq 5.800 00GHz Span 18MHz
ResBW 1MHz VidBW 1kHz SWP 50mS
LEVEL SPAN Atten 30dB
KNOB 2 KNOB 1 KEYPAD Tektronix 2784

4.5 Out-of-Band Conducted Emissions
FCC Rule 15.407(b)

Requirement:

For transmitters operating in the 5.725-5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EIRP of –17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed and EIRP of –27 dBm/MHz.

The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

Procedure:

Spectrum Analyzer was connected to the output of the EUT. For measurements above 1 GHz, the Resolution Bandwidth was set to 1 MHz; for measurements below 1 GHz, the Resolution Bandwidth was set 100 kHz, and the Video Bandwidth was set to 100 kHz. Several plots were made in the frequency range from 5715 to 5835 MHz.

In addition, plots were made in the frequency range from 30 MHz to 40 GHz.

Result:

Refer to the data tables on the next page and plots in Appendix 1 (FCC 15 E Appendix 1 file) for the Out-of-band Conducted Emissions data.

Operating Frequency, MHz	Frequency MHz	Measured Conducted Level dBm/MHz	Calculated EIRP * dBm/MHz	EIRP Limit dBm/MHz	Margin dB	Plot
5750	≤ 5715	-60.0	-46.0	-27.0	-19.0	5.1b
	5715-5725	-56.4	-42.4	-17.0	-25.4	5.1c
	5825-5835	-52.7	-38.7	-17.0	-21.7	5.1d
	> 5835	-55.2	-41.2	-27.0	-14.2	5.1f

Operating Frequency, MHz	Frequency MHz	Measured Conducted Level dBm/MHz	Calculated EIRP * dBm/MHz	EIRP Limit dBm/MHz	Margin dB	Plot
5775	≤ 5715	-60.2	-36.2	-27.0	-9.2	5.2b
	5715-5725	-58.8	-44.8	-17.0	-27.8	5.2c
	5825-5835	-53.4	-39.4	-17.0	-22.4	5.2d
	> 5835	-55.2	-41.2	-27.0	-14.2	5.2f

Operating Frequency, MHz	Frequency MHz	Measured Conducted Level dBm/MHz	Calculated EIRP * dBm/MHz	EIRP Limit dBm/MHz	Margin DB	Plot
5800	≤ 5715	-59.9	-45.9	-27.0	-18.9	5.3b
	5715-5725	-59.8	-45.8	-17.0	-28.8	5.3c
	5825-5835	-48.2	-34.2	-17.0	-17.2	5.3d
	> 5835	-53.3	-39.3	-27.0	-12.3	5.3f

* Calculated for antenna Gain = 14 dBi.

4.6 Radiated Emissions
FCC Rule 15.407(b), 15.209, 15.205

Procedure

Radiated emission measurements were performed from 30 MHz to 40,000 MHz. Spectrum Analyzer Resolution Bandwidth is 100 kHz or greater for frequencies 30 MHz to 1000 MHz, 1 MHz - for frequencies above 1000 MHz.

The EUT is placed on the wooden turntable. If the EUT attaches to peripherals, they are connected and operational (as typical as possible). During testing, all cables were manipulated to produce worst case emissions. The signal is maximized through rotation. The antenna height and polarization are varied during the search for maximum signal level. The antenna height is varied from 1 to 4 meters.

Radiated emissions are taken at three meters unless the signal level is too low for measurement at that distance. If necessary, a pre-amplifier is used and/or the test is conducted at a closer distance. All readings are extrapolated back to the equivalent three meter reading using inverse scaling with distance.

Data is included of the worst case configuration (the configuration which resulted in the highest emission levels). A sample calculation, configuration photographs and data tables of the emissions are included. All measurements were performed with peak and average detection.

The measurements were performed for three fundamental frequencies with three transmitting antennas: ASTJ22, 12010V, 2360.

Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF – AG + Att
Where FS = Field Strength in dB(μV/m)
RA = Receiver Amplitude (including preamplifier) in dB(μV)
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB(1/m)
AG = Amplifier Gain in dB
Att = External attenuator (if used)

Assume a receiver reading of 52.0 dB(μV) is obtained. The antennas factor of 7.4 dB(1/m) and cable factor of 1.6 dB is added. The amplifier gain of 29.0 dB is subtracted, giving field strength of 32.0 dB(μV/m). This value in dB(μV/m) was converted to its corresponding level in μV/m.
RA = 52.0 dB(μV)
AF = 7.4 dB
CF = 1.6 dB
AG = 29.0 dB
Att = 0 dB
FS = 52+7.4+1.6-29.0+0 = 32.0 dB(μV/m)

Level in μV/m = Common Antilogarithm [(32.0 dBμV/m)/20] = 39.8 μV/m

Transmitter Radiated Emission Test Result

The data on the following pages shows the measured Field Strength. The EUT complies with the Field Strength requirement in restricted bands by 1.2 dB. For frequencies outside the restricted bands, the Field Strength (average value) at 3 m is less than 54 dB(μV/m). This corresponds to radiated power (EIRP) of –41.3 dBm, which is well below the limit of –27 dBm/1MHz.

Company:	MALIBU NETWORKS	**Model #:**	AirMax 580/5800	**Standard_**	**FCC § 15B**
EUT:	UNII Radio	**S/N #:**	none	**Limits_**	2
Project #:	3033217	**Test Date:**	October 11, 2002	**Test Distance_**	1 meter
Test Mode:	TX at 5800 MHz with antenna ASTJ22	**Engineer:**	Bruce G.	**Duty Relaxation**	0 dB

	Antenna Used			Pre-Amp Used			Cable Used			
Number:	14	21	22	9	4	13	10	0	0	0
Model:	EMCO 3115	3160-9	3160-10	Miteq	None	ACO/400	NPS72-1	None	None	None

Frequency	Reading	Detector	Ant.	Amp.	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	D. C. F.	Net	Limit @3m	Margin
MHz	dB(µV)	P/A/Q	#	#	H/V	dB(1/m)	dB	dB	dB	dB(µV/m)	dB(µV/m)	dB
11600	57.6	Peak	14	9	V	41.2	36.8	5.1	-9.5	57.6	74.0	-16.4
11600	38.8	Ave.	14	9	V	41.2	36.8	5.1	-9.5	38.8	54.0	-15.2
11600	58.9	Peak	14	9	H	41.9	36.8	5.1	-9.5	59.6	74.0	-15.4
11600	49.0	Ave.	14	9	H	41.9	36.8	5.1	-9.5	49.7	54.0	-4.3
17400	56.3	Peak	14	9	V	42.2	35.6	7.1	-9.5	60.5	74.0	-13.5
17400	37.3	Ave.	14	9	V	42.2	35.6	7.1	-9.5	41.5	54.0	-12.5
17400	55.4	Peak	14	9	H	43.0	35.6	7.1	-9.5	60.4	74.0	-13.6
17400	34.5	Ave.	14	9	H	43.0	35.6	7.1	-9.5	39.5	54.0	-14.5
23200	34.3*	Peak	21	13	V/H	40.4	23.3	2.2	-9.5	44.1	74.0	-29.9
23200	26.5*	Ave.	21	13	V/H	40.4	23.3	2.2	-9.5	36.3	54.0	-17.7
29000	43.3*	Peak	22	13	V/H	43.5	24.2	2.8	-9.5	55.8	74.0	-18.8
29000	36.8*	Ave.	22	13	V/H	43.5	24.2	2.8	-9.5	49.3	54.0	-4.7
34800	47.0*	Peak	22	13	V/H	43.6	23.8	3.2	-9.5	60.5	74.0	-13.5
34800	37.9*	Ave.	22	13	V/H	43.6	23.8	3.2	-9.5	51.4	54.0	-2.6

Notes:

a) D.C.F.:Distance Correction Factor
b) Insert. Loss (dB) = Cable A + Cable B + Cable C .
c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss. - Duty Relaxation (transmitter only).
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 6 dB below the limits.
* noise floor level

Company:	MALIBU NETWORKS	**Model #:**	AirMax 580/5800	**Standard_**	**FCC § 15B**
EUT:	UNII Radio	**S/N #:**		**Limits_**	2
Project #:	3033217	**Test Date:**	October 11 2002	**Test Distance_**	1 meter
Test Mode:	TX at 5775 MHz with antenna ASTJ22	**Engineer:**	Bruce G.	**Duty Relaxation**	0 dB

	Antenna Used			Pre-Amp Used			Cable Used			
Number:	14	21	22	9	4	13	10	0	0	0
Model:	EMCO 3115	3160-9	3160-10	Miteq	None	ACO/400	NPS72-1	None	None	None

Frequency	Reading	Detector	Ant. #	Amp. #	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	D. C. F.	Net	Limit @3m	Margin
MHz	dB(μV)	P/A/Q			H/V	dB(1/m)	dB	dB	dB	dB(μV/m)	dB(μV/m)	dB
11550	54.7	Peak	14	9	V	41.2	36.8	5.1	-9.5	54.7	74.0	-19.3
11550	38.5	Ave.	14	9	V	41.2	36.8	5.1	-9.5	38.5	54.0	-15.5
11550	60.1	Peak	14	9	H	41.9	36.8	5.1	-9.5	60.8	74.0	-13.2
11550	50.0	Ave.	14	9	H	41.9	36.8	5.1	-9.5	50.7	54.0	-3.3
17325	52.7	Peak	14	9	V	42.2	35.6	7.1	-9.5	56.9	74.0	-17.1
17325	34.2	Ave.	14	9	V	42.2	35.6	7.1	-9.5	38.4	54.0	-15.6
17325	54.5	Peak	14	9	H	43.0	35.6	7.1	-9.5	59.5	74.0	-14.5
17325	34.0	Ave.	14	9	H	43.0	35.6	7.1	-9.5	39.0	54.0	-15.0
23100	35.0*	Peak	21	13	V/H	40.4	23.3	2.2	-9.5	44.8	74.0	-29.8
23100	26.4*	Ave.	21	13	V/H	40.4	23.3	2.2	-9.5	36.2	54.0	-17.8
28875	45.0*	Peak	22	13	V/H	43.4	24.2	2.8	-9.5	57.5	74.0	-16.5
28875	36.4*	Ave.	22	13	V/H	43.4	24.2	2.8	-9.5	48.9	54.0	-5.1
34650	45.6*	Peak	22	13	V/H	43.6	23.8	3.2	-9.5	59.1	74.0	-14.9
34650	38.0*	Ave.	22	13	V/H	43.6	23.8	3.2	-9.5	51.5	54.0	-2.5

Notes:

a) D.C.F.:Distance Correction Factor
b) Insert. Loss (dB) = Cable A + Cable B + Cable C .
c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss. - Duty Relaxation (transmitter only).
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 6 dB below the limits.
* noise floor level

Company:	MALIBU NETWORKS	**Model #:**	AirMax 580/5800	**Standard_**	**FCC § 15B**	
EUT:	UNII Radio	**S/N #:**		**Limits_**	2	
Project #:	3033217	**Test Date:**	October 11, 2002	**Test Distance_**	1	meter
Test Mode:	TX at 5750 MHz with antenna ASTJ22	**Engineer:**	Bruce G.	**Duty Relaxation**	0	dB

	Antenna Used			Pre-Amp Used			Cable Used			
Number:	14	21	22	9	4	13	10	0	0	0
Model:	EMCO 3115	3160-9	3160-10	Miteq	None	ACO/400	NPS72-1	None	None	None

Frequency	**Reading**	**Detector**	**Ant.**	**Amp.**	**Ant. Pol.**	**Ant. Factor**	**Pre-Amp**	**Insert. Loss**	**D. C. F.**	**Net**	**Limit @3m**	**Margin**
MHz	dB(μV)	P/A/Q	#	#	H/V	dB(1/m)	dB	dB	dB	dB(μV/m)	dB(μV/m)	dB
11500	57.3	Peak	14	9	V	41.2	36.8	5.1	-9.5	57.3	74.0	-16.7
11500	50.5	Ave.	14	9	V	41.2	36.8	5.1	-9.5	50.5	54.0	-3.5
11500	61.9	Peak	14	9	H	41.9	36.8	5.1	-9.5	62.6	74.0	-11.4
11500	52.1	Ave.	14	9	H	41.9	36.8	5.1	-9.5	52.8	54.0	-1.2
17250	50.7	Peak	14	9	V	42.2	35.6	7.1	-9.5	54.9	74.0	-19.1
17250	34.0	Ave.	14	9	V	42.2	35.6	7.1	-9.5	38.2	54.0	-15.8
17250	52.8	Peak	14	9	H	43.0	35.6	7.1	-9.5	57.8	74.0	-16.2
17250	34.5	Ave.	14	9	H	43.0	35.6	7.1	-9.5	39.5	54.0	-14.5
23000	35.6*	Peak	21	13	V/H	40.4	23.3	2.2	-9.5	45.4	74.0	-28.6
23000	27.0*	Ave.	21	13	V/H	40.4	23.3	2.2	-9.5	36.8	54.0	-17.2
28750	44.0*	Peak	22	13	V/H	43.4	24.2	2.8	-9.5	56.5	74.0	-17.5
28750	35.6*	Ave.	22	13	V/H	43.4	24.2	2.8	-9.5	48.1	54.0	-5.9
34500	48.0*	Peak	22	13	V/H	43.6	23.8	3.2	-9.5	61.5	74.0	-12.5
34500	38.3*	Ave.	22	13	V/H	43.6	23.8	3.2	-9.5	51.8	54.0	-2.2

Notes:

a) D.C.F.:Distance Correction Factor
b) Insert. Loss (dB) = Cable A + Cable B + Cable C .
c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss. - Duty Relaxation (transmitter only).
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 6 dB below the limits.
* noise floor level

Company:	MALIBU NETWORKS	**Model #:**	AirMax 580/5800	**Standard_**	**FCC § 15B**
EUT:	UNII Radio	**S/N #:**	none	**Limits_**	2
Project #:	3033217	**Test Date:**	October 11, 2002	**Test Distance_**	1 meter
Test Mode:	TX at 5800 MHz with antenna 12010V	**Engineer:**	Bruce G.	**Duty Relaxation**	0 dB

	Antenna Used			Pre-Amp Used			Cable Used			
Number:	14	21	22	9	4	13	10	0	0	0
Model:	EMCO 3115	3160-9	3160-10	Miteq	None	ACO/400	NPS72-1	None	None	None

Frequency	Reading	Detector	Ant.	Amp.	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	D. C. F.	Net	Limit @3m	Margin
MHz	dB(µV)	P/A/Q	#	#	H/V	dB(1/m)	dB	dB	dB	dB(µV/m)	dB(µV/m)	dB
11600	54.6	Peak	14	9	V	41.2	36.8	5.1	-9.5	54.6	74.0	-19.4
11600	45.3	Ave.	14	9	V	41.2	36.8	5.1	-9.5	45.3	54.0	-8.7
11600	55.5	Peak	14	9	H	41.9	36.8	5.1	-9.5	56.2	74.0	-17.8
11600	45.8	Ave.	14	9	H	41.9	36.8	5.1	-9.5	46.5	54.0	-7.5
17400	47.0	Peak	14	9	V	42.2	35.6	7.1	-9.5	51.2	74.0	-22.8
17400	40.2	Ave.	14	9	V	42.2	35.6	7.1	-9.5	44.4	54.0	-9.6
17400	59.8	Peak	14	9	H	43.0	35.6	7.1	-9.5	64.8	74.0	-9.2
17400	36.7	Ave.	14	9	H	43.0	35.6	7.1	-9.5	41.7	54.0	-12.3
23200	34.3*	Peak	21	13	V/H	40.4	23.3	2.2	-9.5	44.1	74.0	-29.9
23200	26.5*	Ave.	21	13	V/H	40.4	23.3	2.2	-9.5	36.3	54.0	-17.7
29000	43.3*	Peak	22	13	V/H	43.5	24.2	2.8	-9.5	55.8	74.0	-18.2
29000	36.8*	Ave.	22	13	V/H	43.5	24.2	2.8	-9.5	49.3	54.0	-4.7
34800	47.0*	Peak	22	13	V/H	43.6	23.8	3.2	-9.5	60.5	74.0	-13.5
34800	37.9*	Ave.	22	13	V/H	43.6	23.8	3.2	-9.5	51.4	54.0	-2.6

Notes:

a) D.C.F.:Distance Correction Factor
b) Insert. Loss (dB) = Cable A + Cable B + Cable C .
c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss. - Duty Relaxation (transmitter only).
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 6 dB below the limits.
* noise floor level

Company:	MALIBU NETWORKS	**Model #:**	AirMax 580/5800	**Standard_**	**FCC § 15B**
EUT:	UNII Radio	**S/N #:**		**Limits_**	2
Project #:	3033217	**Test Date:**	October 11 2002	**Test Distance_**	1 meter
Test Mode:	TX at 5775 MHz with antenna 12010V	**Engineer:**	Bruce G.	**Duty Relaxation**	0 dB

	Antenna Used			Pre-Amp Used			Cable Used			
Number:	14	21	22	9	4	13	10	0	0	0
Model:	EMCO 3115	3160-9	3160-10	Miteq	None	ACO/400	NPS72-1	None	None	None

Frequency	Reading	Detector	Ant.	Amp.	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	D. C. F.	Net	Limit @3m	Margin
MHz	dB(µV)	P/A/Q	#	#	H/V	dB(1/m)	dB	dB	dB	dB(µV/m)	dB(µV/m)	dB
11550	54.3	Peak	14	9	V	41.2	36.8	5.1	-9.5	54.3	74.0	-19.3
11550	45.2	Ave.	14	9	V	41.2	36.8	5.1	-9.5	45.2	54.0	-8.8
11550	56.0	Peak	14	9	H	41.9	36.8	5.1	-9.5	56.7	74.0	-17.3
11550	46.4	Ave.	14	9	H	41.9	36.8	5.1	-9.5	47.1	54.0	-6.9
17325	53.1	Peak	14	9	V	42.2	35.6	7.1	-9.5	57.3	74.0	-16.7
17325	32.3	Ave.	14	9	V	42.2	35.6	7.1	-9.5	36.5	54.0	-17.5
17325	56.5	Peak	14	9	H	43.0	35.6	7.1	-9.5	61.5	74.0	-12.5
17325	33.7	Ave.	14	9	H	43.0	35.6	7.1	-9.5	38.7	54.0	-15.3
23100	35.0*	Peak	21	13	V/H	40.4	23.3	2.2	-9.5	44.8	74.0	-29.2
23100	26.4*	Ave.	21	13	V/H	40.4	23.3	2.2	-9.5	36.2	54.0	-17.8
28875	45.0*	Peak	22	13	V/H	43.4	24.2	2.8	-9.5	57.5	74.0	-16.5
28875	36.4*	Ave.	22	13	V/H	43.4	24.2	2.8	-9.5	48.9	54.0	-5.1
34650	45.6*	Peak	22	13	V/H	43.6	23.8	3.2	-9.5	59.1	74.0	-14.9
34650	38.0*	Ave.	22	13	V/H	43.6	23.8	3.2	-9.5	51.5	54.0	-2.5

Notes:

a) D.C.F.:Distance Correction Factor
b) Insert. Loss (dB) = Cable A + Cable B + Cable C .
c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss. - Duty Relaxation (transmitter only).
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 6 dB below the limits.
* noise floor level

Company:	MALIBU NETWORKS	**Model #:**	AirMax 580/5800	**Standard_**	**FCC § 15B**	
EUT:	UNII Radio	**S/N #:**		**Limits_**	2	
Project #:	3033217	**Test Date:**	October 11, 2002	**Test Distance_**	1	meter
Test Mode:	TX at 5750 MHz with antenna 12010V	**Engineer:**	Bruce G.	**Duty Relaxation**	0	dB

	Antenna Used			Pre-Amp Used			Cable Used			
Number:	14	21	22	9	4	13	10	0	0	0
Model:	EMCO 3115	3160-9	3160-10	Miteq	None	ACO/400	NPS72-1	None	None	None

Frequency	**Reading**	**Detector**	**Ant.**	**Amp.**	**Ant. Pol.**	**Ant. Factor**	**Pre-Amp**	**Insert. Loss**	**D. C. F.**	**Net**	**Limit @3m**	**Margin**
MHz	dB(μV)	P/A/Q	#	#	H/V	dB(1/m)	dB	dB	dB	dB(μV/m)	dB(μV/m)	dB
11500	57.0	Peak	14	9	V	41.2	36.8	5.1	-9.5	57.0	74.0	-17.0
11500	47.5	Ave.	14	9	V	41.2	36.8	5.1	-9.5	47.5	54.0	-6.5
11500	60.0	Peak	14	9	H	41.9	36.8	5.1	-9.5	60.9	74.0	-13.1
11500	50.8	Ave.	14	9	H	41.9	36.8	5.1	-9.5	51.6	54.0	-2.4
17250	44.3	Peak	14	9	V	42.2	35.6	7.1	-9.5	48.5	74.0	-25.5
17250	36.6	Ave.	14	9	V	42.2	35.6	7.1	-9.5	40.8	54.0	-13.2
17250	56.0	Peak	14	9	H	43.0	35.6	7.1	-9.5	61.0	74.0	-13.0
17250	33.0	Ave.	14	9	H	43.0	35.6	7.1	-9.5	38.0	54.0	-16.0
23000	35.6*	Peak	21	13	V/H	40.4	23.3	2.2	-9.5	45.4	74.0	-28.6
23000	27.0*	Ave.	21	13	V/H	40.4	23.3	2.2	-9.5	36.8	54.0	-17.2
28750	44.0*	Peak	22	13	V/H	43.4	24.2	2.8	-9.5	56.5	74.0	-17.5
28750	35.6*	Ave.	22	13	V/H	43.4	24.2	2.8	-9.5	48.1	54.0	-5.9
34500	48.0*	Peak	22	13	V/H	43.6	23.8	3.2	-9.5	61.5	74.0	-12.5
34500	38.3*	Ave.	22	13	V/H	43.6	23.8	3.2	-9.5	51.8	54.0	-2.2

Notes:

a) D.C.F.:Distance Correction Factor
b) Insert. Loss (dB) = Cable A + Cable B + Cable C .
c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss. - Duty Relaxation (transmitter only).
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 6 dB below the limits.
* noise floor level

Company:	MALIBU NETWORKS	**Model #:**	AirMax 580/5800	**Standard_**	**FCC § 15B**
EUT:	UNII Radio	**S/N #:**	none	**Limits_**	2
Project #:	3033217	**Test Date:**	October 11, 2002	**Test Distance_**	1 meter
Test Mode:	TX at 5800 MHz with antenna 2360	**Engineer:**	Bruce G.	**Duty Relaxation**	0 dB

	Antenna Used			Pre-Amp Used			Cable Used			
Number:	14	21	22	9	4	13	10	0	0	0
Model:	EMCO 3115	3160-9	3160-10	Miteq	None	ACO/400	NPS72-1	None	None	None

Frequency	Reading	Detector	Ant.	Amp.	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	D. C. F.	Net	Limit @3m	Margin
MHz	dB(µV)	P/A/Q	#	#	H/V	dB(1/m)	dB	dB	dB	dB(µV/m)	dB(µV/m)	dB
11600	56.2	Peak	14	9	V	41.2	36.8	5.1	-9.5	56.2	74.0	-17.8
11600	44.9	Ave.	14	9	V	41.2	36.8	5.1	-9.5	44.9	54.0	-9.1
11600	58.5	Peak	14	9	H	41.9	36.8	5.1	-9.5	59.2	74.0	-14.8
11600	47.0	Ave.	14	9	H	41.9	36.8	5.1	-9.5	47.7	54.0	-6.3
17400	42.0	Peak	14	9	V	42.2	35.6	7.1	-9.5	46.2	74.0	-27.8
17400	31.5	Ave.	14	9	V	42.2	35.6	7.1	-9.5	35.7	54.0	-18.3
17400	62.1	Peak	14	9	H	43.0	35.6	7.1	-9.5	67.1	74.0	-6.9
17400	40.0	Ave.	14	9	H	43.0	35.6	7.1	-9.5	45.0	54.0	-9.0
23200	34.3*	Peak	21	13	V/H	40.4	23.3	2.2	-9.5	44.1	74.0	-29.9
23200	26.5*	Ave.	21	13	V/H	40.4	23.3	2.2	-9.5	36.3	54.0	-17.7
29000	43.3*	Peak	22	13	V/H	43.5	24.2	2.8	-9.5	55.8	74.0	-18.2
29000	36.8*	Ave.	22	13	V/H	43.5	24.2	2.8	-9.5	49.3	54.0	-4.7
34800	47.0*	Peak	22	13	V/H	43.6	23.8	3.2	-9.5	60.5	74.0	-13.5
34800	37.9*	Ave.	22	13	V/H	43.6	23.8	3.2	-9.5	51.4	54.0	-2.6

Notes:

a) D.C.F.:Distance Correction Factor
b) Insert. Loss (dB) = Cable A + Cable B + Cable C .
c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss. - Duty Relaxation (transmitter only).
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 6 dB below the limits.
* noise floor level

Company:	MALIBU NETWORKS	**Model #:**	AirMax 580/5800	**Standard_**	**FCC § 15B**
EUT:	UNII Radio	**S/N #:**		**Limits_**	2
Project #:	3033217	**Test Date:**	October 11 2002	**Test Distance_**	1 meter
Test Mode:	TX at 5775 MHz with antenna 2360	**Engineer:**	Bruce G.	**Duty Relaxation**	0 dB

	Antenna Used			Pre-Amp Used			Cable Used			
Number:	14	21	22	9	4	13	10	0	0	0
Model:	EMCO 3115	3160-9	3160-10	Miteq	None	ACO/400	NPS72-1	None	None	None

Frequency	Reading	Detector	Ant.	Amp.	Ant. Pol.	Ant. Factor	Pre-Amp	Insert. Loss	D. C. F.	Net	Limit @3m	Margin
MHz	dB(µV)	P/A/Q	#	#	H/V	dB(1/m)	dB	dB	dB	dB(µV/m)	dB(µV/m)	dB
11550	53.5	Peak	14	9	V	41.2	36.8	5.1	-9.5	53.5	74.0	-20.5
11550	42.4	Ave.	14	9	V	41.2	36.8	5.1	-9.5	42.4	54.0	-11.6
11550	60.7	Peak	14	9	H	41.9	36.8	5.1	-9.5	61.4	74.0	-12.6
11550	49.2	Ave.	14	9	H	41.9	36.8	5.1	-9.5	49.9	54.0	-4.1
17325	43.3	Peak	14	9	V	42.2	35.6	7.1	-9.5	47.5	74.0	-26.5
17325	34.1	Ave.	14	9	V	42.2	35.6	7.1	-9.5	38.3	54.0	-15.7
17325	54.0	Peak	14	9	H	43.0	35.6	7.1	-9.5	59.0	74.0	-15.0
17325	31.6	Ave.	14	9	H	43.0	35.6	7.1	-9.5	36.6	54.0	-17.4
23100	35.0*	Peak	21	13	V/H	40.4	23.3	2.2	-9.5	44.8	74.0	-29.2
23100	26.4*	Ave.	21	13	V/H	40.4	23.3	2.2	-9.5	36.2	54.0	-17.8
28875	45.0*	Peak	22	13	V/H	43.4	24.2	2.8	-9.5	57.5	74.0	-16.5
28875	36.4*	Ave.	22	13	V/H	43.4	24.2	2.8	-9.5	48.9	54.0	-5.1
34650	45.6*	Peak	22	13	V/H	43.6	23.8	3.2	-9.5	59.1	74.0	-14.9
34650	38.0*	Ave.	22	13	V/H	43.6	23.8	3.2	-9.5	51.5	54.0	-2.5

Notes:

a) D.C.F.:Distance Correction Factor
b) Insert. Loss (dB) = Cable A + Cable B + Cable C .
c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss. - Duty Relaxation (transmitter only).
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 6 dB below the limits.
* noise floor level

Company:	MALIBU NETWORKS	**Model #:**	AirMax 580/5800	**Standard_**	**FCC § 15B**	
EUT:	UNII Radio	**S/N #:**		**Limits_**	2	
Project #:	3033217	**Test Date:**	October 11, 2002	**Test Distance_**	1	meter
Test Mode:	TX at 5750 MHz with antenna 2360	**Engineer:**	Bruce G.	**Duty Relaxation**	0	dB

	Antenna Used			Pre-Amp Used			Cable Used			
Number:	14	21	22	9	4	13	10	0	0	0
Model:	EMCO 3115	3160-9	3160-10	Miteq	None	ACO/400	NPS72-1	None	None	None

Frequency	**Reading**	**Detector**	**Ant.**	**Amp.**	**Ant. Pol.**	**Ant. Factor**	**Pre-Amp**	**Insert. Loss**	**D. C. F.**	**Net**	**Limit @3m**	**Margin**
MHz	dB(μV)	P/A/Q	#	#	H/V	dB(1/m)	dB	dB	dB	dB(μV/m)	dB(μV/m)	dB
11500	59.4	Peak	14	9	V	41.2	36.8	5.1	-9.5	59.4	74.0	-14.6
11500	48.1	Ave.	14	9	V	41.2	36.8	5.1	-9.5	48.1	54.0	-5.9
11500	60.0	Peak	14	9	H	41.9	36.8	5.1	-9.5	60.7	74.0	-13.3
11500	48.4	Ave.	14	9	H	41.9	36.8	5.1	-9.5	49.1	54.0	-4.9
17250	40.5	Peak	14	9	V	42.2	35.6	7.1	-9.5	44.7	74.0	-29.3
17250	30.0	Ave.	14	9	V	42.2	35.6	7.1	-9.5	34.2	54.0	-19.8
17250	55.1	Peak	14	9	H	43.0	35.6	7.1	-9.5	60.1	74.0	-13.9
17250	33.7	Ave.	14	9	H	43.0	35.6	7.1	-9.5	38.7	54.0	-15.3
23000	35.6*	Peak	21	13	V/H	40.4	23.3	2.2	-9.5	45.4	74.0	-28.6
23000	27.0*	Ave.	21	13	V/H	40.4	23.3	2.2	-9.5	36.8	54.0	-17.2
28750	44.0*	Peak	22	13	V/H	43.4	24.2	2.8	-9.5	56.5	74.0	-17.5
28750	35.6*	Ave.	22	13	V/H	43.4	24.2	2.8	-9.5	48.1	54.0	-5.9
34500	48.0*	Peak	22	13	V/H	43.6	23.8	3.2	-9.5	61.5	74.0	-12.5
34500	38.3*	Ave.	22	13	V/H	43.6	23.8	3.2	-9.5	51.8	54.0	-2.2

Notes:

a) D.C.F.:Distance Correction Factor
b) Insert. Loss (dB) = Cable A + Cable B + Cable C .
c) Net (dB) = Reading + Antenna Factor - Pre-amp + Insert. Loss. - Duty Relaxation (transmitter only).
d) Negative signs (-) in Margin column signify levels below the limits.
e) All other emissions not reported are below the equipment noise floor which is at least 6 dB below the limits.
* noise floor level

Digital part Radiated Emission Test Result
FCC Rule 15.109

The CISPR 22 Limit and test procedure were user. Test was performed at 10 m distance.

The data on the following pages list the significant emission frequencies, the limit and the margin of Compliance. The EUT complies with the 15.109 requirement by 1.8 dB.

Intertek Testing Services
Radiated Emissions 30 MHz - 1000 MHz
EN55022 Class B (QP-Horizontal)

Operator: krishna

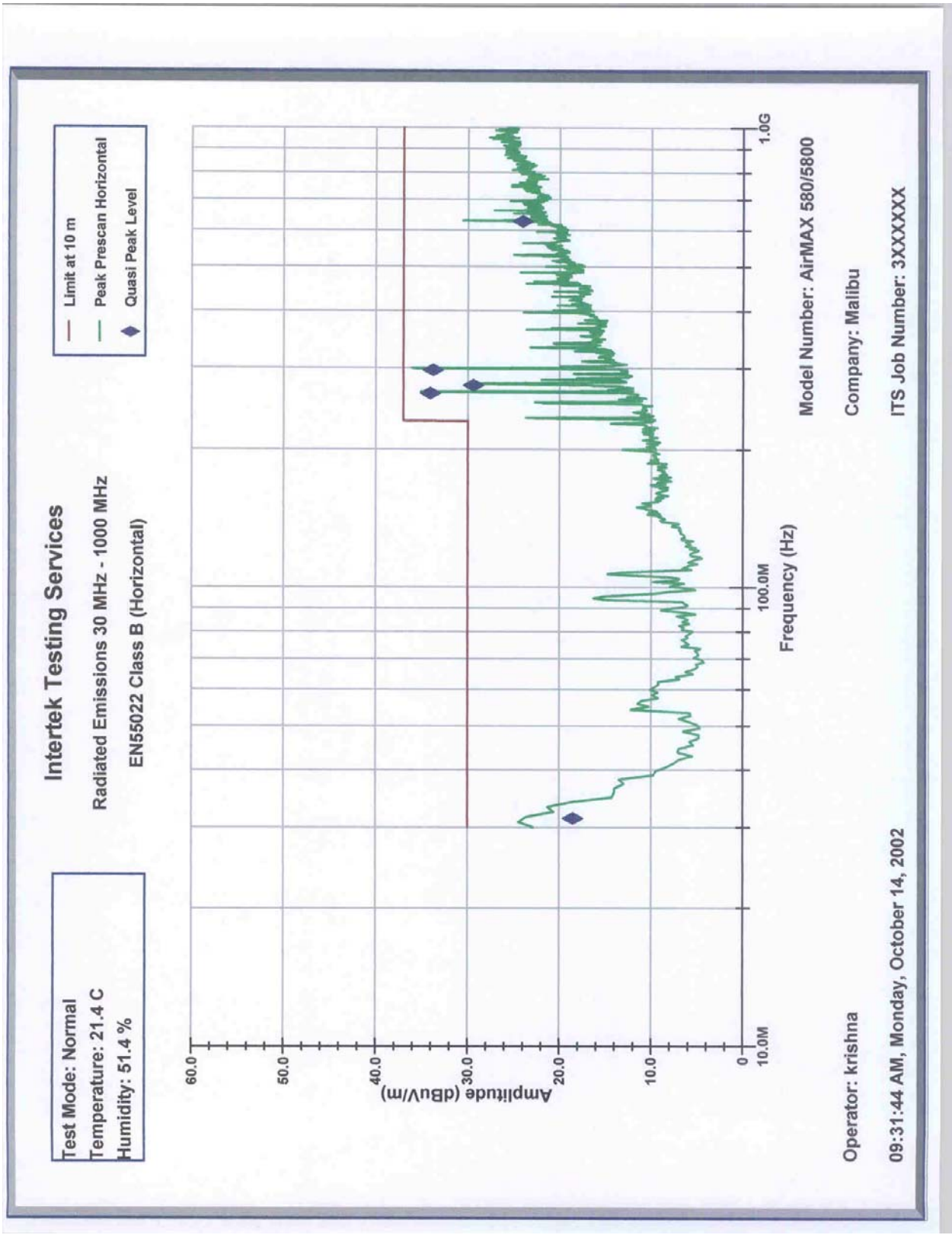
Model Number: AirMAX 580/5800
ITS Job Number: 3XXXXXX
Company: Malibu

10:13:51 AM, Monday, October 14, 2002

	1	2	3	4	5	6	7
Frequency	Quasi Pk FS	Limit@10m	Margin	RA	CF	AG	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB(1/m)
31.3738 MHz	18.5	30.0	-11.5	28.0	3.5	25.3	12.4
264.0718 MHz	34.1	37.0	-2.9	42.0	5.1	24.8	11.9
275.0043 MHz	29.4	37.0	-7.6	36.4	5.1	24.8	12.7
297.08 MHz	33.8	37.0	-3.2	40.6	5.1	24.8	12.8
627.1688 MHz	24.1	37.0	-12.9	21.9	6.4	24.6	20.4

Test Mode: Normal
Temperature: 21.4 C
Humidity: 51.4 %

Page 1


Intertek Testing Services
Radiated Emissions 30 MHz - 1000 MHz
EN55022 Class B (Horizontal)
Limit at 10 m
Peak Prescan Horizontal
Quasi Peak Level
Test Mode: Normal
Temperature: 21.4 C
Humidity: 51.4 %
Amplitude (dBuV/m)
60.0
50.0
40.0
30.0
20.0
10.0
0
10.0M
100.0M
1.0G
Frequency (Hz)
Model Number: AirMAX 580/5800
Company: Malibu
ITS Job Number: 3XXXXXX
Operator: krishna
09:31:44 AM, Monday, October 14, 2002

Intertek Testing Services
Radiated Emissions 30 MHz - 1000 MHz
EN55022 Class B (QP-Vertical)

Operator: krishna

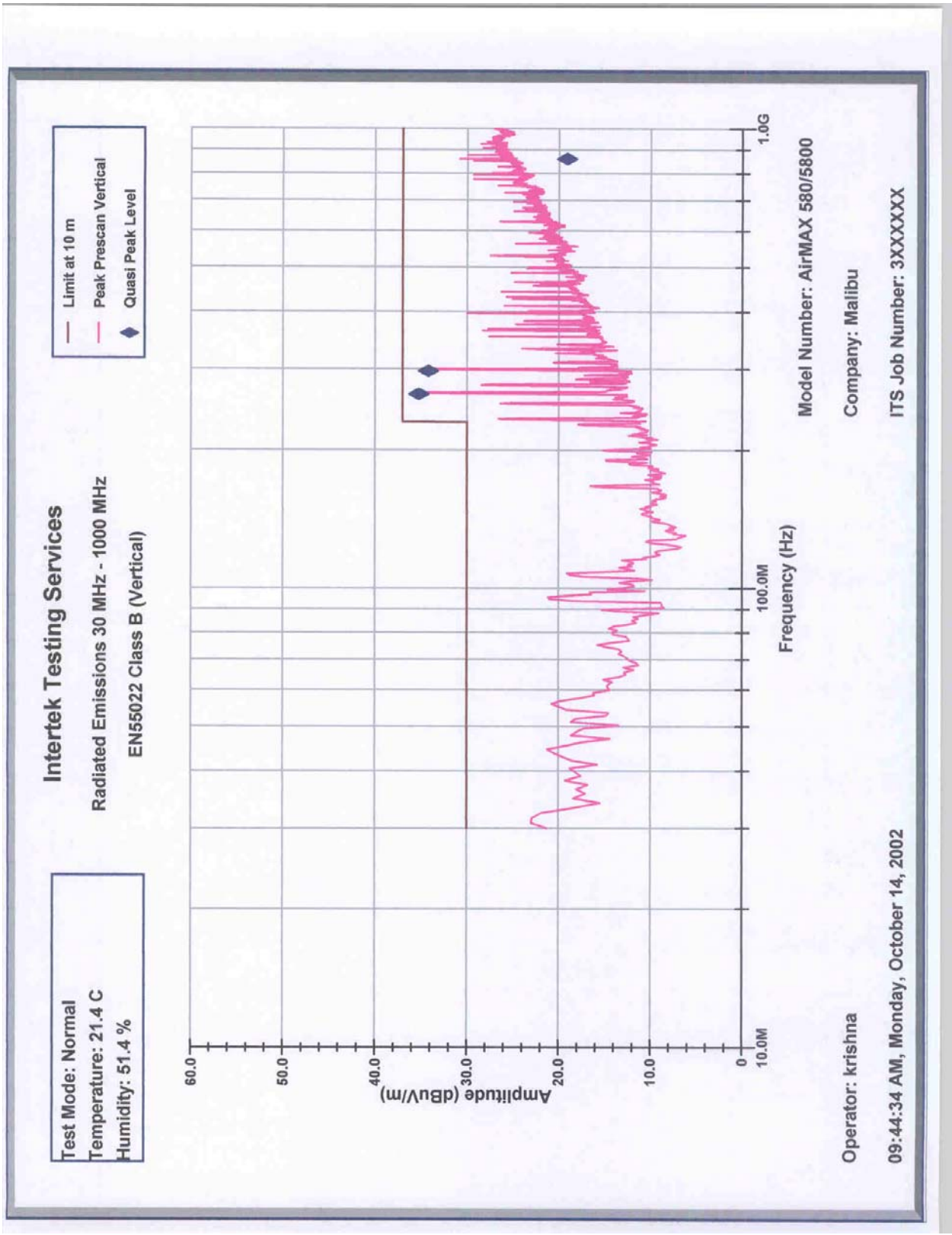
Model Number: AirMAX 580/5800
ITS Job Number: 3XXXXXX
Company: Malibu

10:27:58 AM, Monday, October 14, 2002

	1	2	3	4	5	6	7
Frequency	Quasi Pk FS	Limit@10m	Margin	RA	CF	AG	AF
MHz	dB(uV/m)	dB(uV/m)	dB	dB(uV)	dB	dB	dB(1/m)
264.0705 MHz	35.2	37.0	-1.8	42.3	5.1	24.8	12.6
297.08 MHz	34.2	37.0	-2.8	41.1	5.1	24.8	12.8
859.3943 MHz	19.1	37.0	-17.9	13.2	7.2	24.2	22.9

Test Mode: Normal
Temperature: 21.4 C
Humidity: 51.4 %

Page 1


Intertek Testing Services
Radiated Emissions 30 MHz - 1000 MHz
EN55022 Class B (Vertical)
Limit at 10 m
Peak Prescan Vertical
Quasi Peak Level
Test Mode: Normal
Temperature: 21.4 C
Humidity: 51.4 %
Amplitude (dBuV/m)
60.0
50.0
40.0
30.0
20.0
10.0
0
10.0M
100.0M
1.0G
Frequency (Hz)
Model Number: AirMAX 580/5800
Company: Malibu
ITS Job Number: 3XXXXXX
Operator: krishna
09:44:34 AM, Monday, October 14, 2002

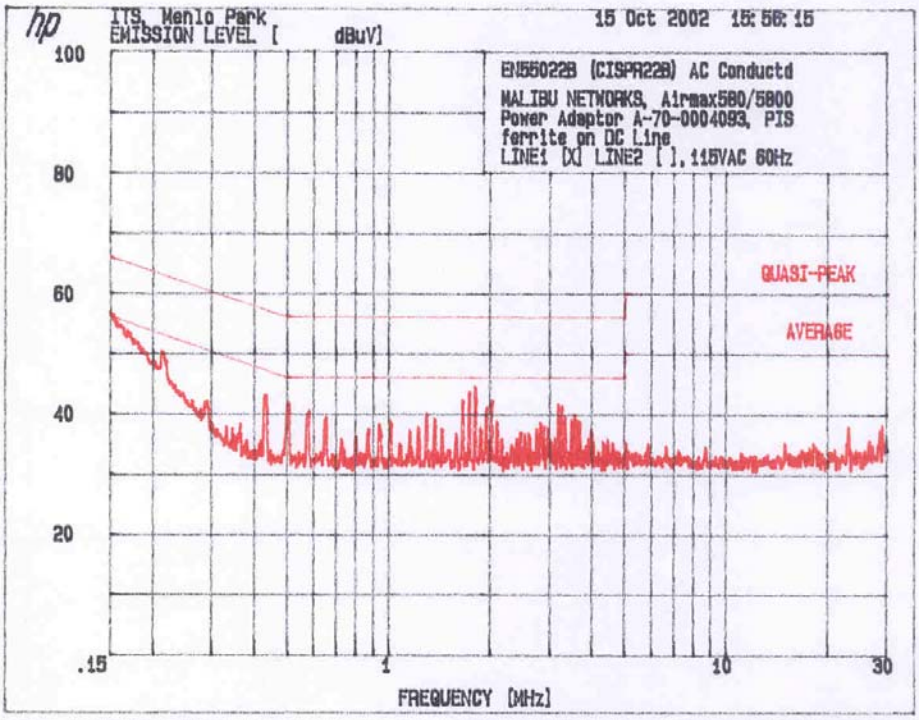
4.7 AC Line Conducted Emission

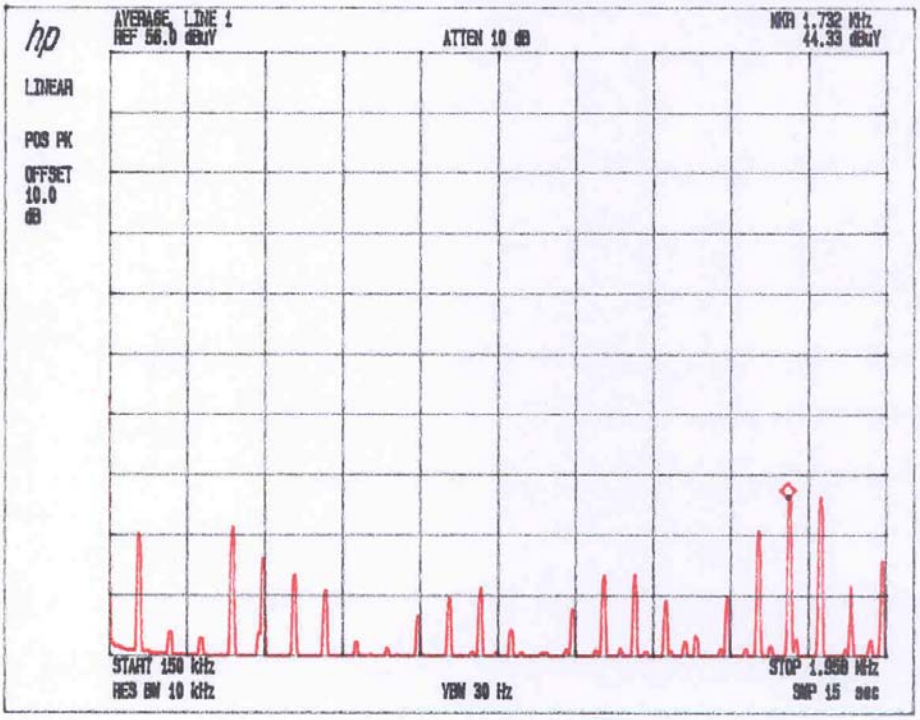
FCC Rule 15.207

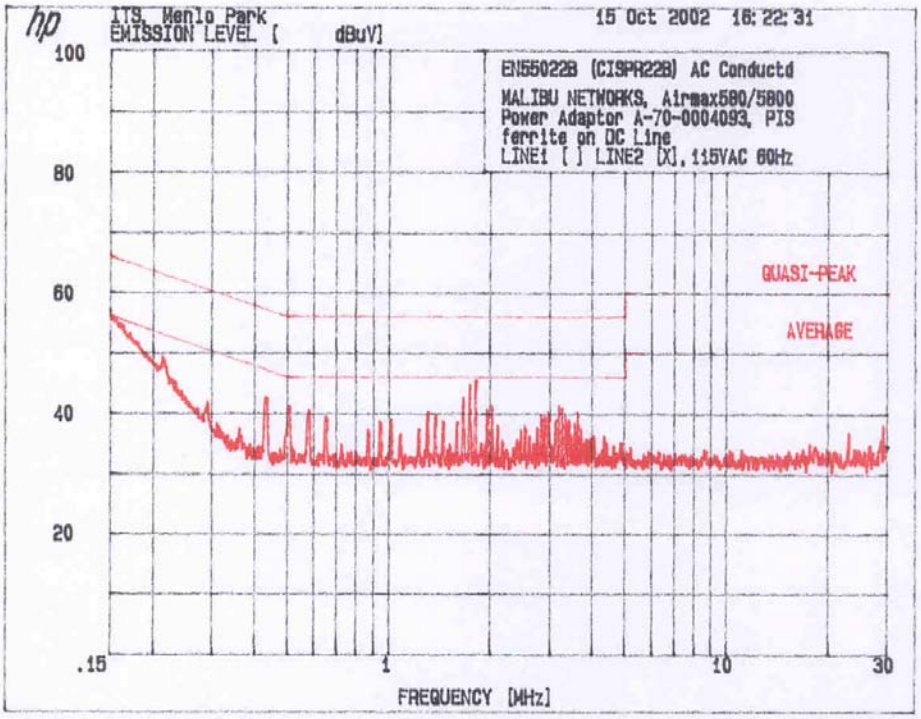
AC line conducted emission test was performed according the ANSI C63.4 standard. The CISPR 22 Limit was used. The EUT was connected to DC Power Supply which was connected to AC Line through the LISNs.

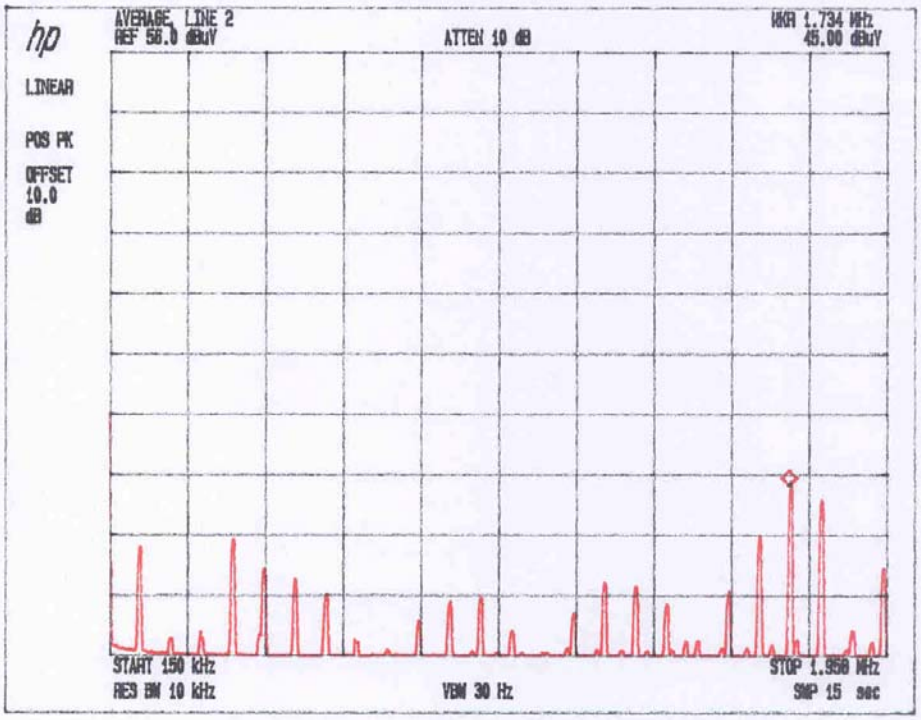
For the test result, see attached plots. The Fair-Rite Snap-its ferrite, p/n 0443167251 with 2 turns was used on DC power cable.

EUT passed by 1 dB.


ITS, Menlo Park
EMISSION LEVEL [dBuV]
15 Oct 2002 15:56:15
EN55022B (CISPR22B) AC Conductd
MALIBU NETWORKS, Airmax580/5800
Power Adaptor A-70-0004093, PIS
ferrite on DC Line
LINE1 [X] LINE2 [ ], 115VAC 60Hz
QUASI-PEAK
AVERAGE
100
80
60
40
20
.15
1
10
30
FREQUENCY [MHz]


AVERAGE, LINE 1
REF 56.0 dBuV
ATTEN 10 dB
MKR 1.732 MHz
44.33 dBuV
LINEAR
POS PK
OFFSET
10.0
dB
START 150 kHz
RES BW 10 kHz
VBW 30 Hz
STOP 1.950 MHz
SWP 15 sec


ITS, Menlo Park
EMISSION LEVEL [dBuV]
15 Oct 2002 16:22:31
EN55022B (CISPR22B) AC Conductd
MALIBU NETWORKS, Airmax580/5800
Power Adaptor A-70-0004093, PIS
ferrite on DC Line
LINE1 [ ] LINE2 [X], 115VAC 60Hz
QUASI-PEAK
AVERAGE
100
80
60
40
20
.15
1
10
30
FREQUENCY [MHz]


AVERAGE LINE 2
REF 56.0 dBuV
ATTEN 10 dB
MKR 1.734 MHz
45.00 dBuV
LINEAR
POS PK
OFFSET
10.0
dB
START 150 kHz
RES BW 10 kHz
VBW 30 Hz
STOP 1.950 MHz
SWP 15 sec

4.8 Transmitter Duty Cycle Calculation / Measurements
FCC Rule 15.35(b), (c)

The EUT antenna output port was connected to the input of the spectrum analyzer. The analyzer center frequency was set to EUT RF channel carrier. The SWEEP function on the analyzer was set to ZERO SPAN. The transmitter ON time was determined from the resultant time-amplitude display:

Duty cycle = Maximum ON time in 100 msec/100

Duty cycle correction, dB = 20 * log (DC)

Duty cycle correction was not used.

5.0 List of Test Equipment

Equipment	Manufacturer	Model/Type	Serial #	Cal Int	Cal Due
BI-Log Antenna	EMCO	3143	9509-1164	12	3/04/03
Pre-Amplifier	Sonoma Inst.	310	185634	12	01/10/03
RF Filter Section	Hewlett Packard	85460A	3448A00267	12	7/16/03
EMI Receiver	Hewlett Packard	8546A	3710A00373	12	7/16/03
Spectrum Analyzer	Tektronix	2784	B3020108	12	8/08/03
Spectrum Analyzer w/8650 QP Adapter	Hewlett Packard	8568B	1912A0053 2521A01021	12	3/15/03
Double-ridged Horn Antenna	EMCO	3115	8812-3049	12	4/03/03
Horn Antenna	EMCO	3160-09	-	#	#
Horn Antenna	EMCO	3160-10	-	#	#
Pre-Amplifier	Miteq	AMF-4D-001180-24-10P	799159	12	04/05/03
Pre-amplifier	CTT	ACO/400	47526	12	9/5/03
Pre-Amplifier	Avantek	AFT-18855	8723H705	12	9/5/03
Power Meter	Hewlett Packard	8900D	3607U00673	12	7/8/03
LISN	FCC	FCC-LISN-50-50-M-H	2011	12	1/02/03

No calibration required

6.0 Document History

Revision/ Job Number	Writer Initials	Date	Change
1.0 / 30332141	SS	September 30 , 2002	Original document