



**FCC CFR47 PART 15 SUBPART E  
CERTIFICATION**

**TEST REPORT**

**FOR**

**POINT TO MULTIPOINT WIRELESS SYSTEM**

**MODEL NUMBER: AX3155**

**FCC ID: PLRAX315500**

**REPORT NUMBER: 03U2037-7**

**ISSUE DATE: OCTOBER 2, 2003**

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## 1. TEST RESULT CERTIFICATION

**COMPANY NAME:** ARCWAVE, INC.  
910 CAMPISI WAY, #1C  
CAMPBELL, CA 95008  
U.S.A

**EUT DESCRIPTION:** POINT TO MULTIPOINT WIRELESS SYSTEM

**MODEL:** AX3155

**DATE TESTED:** SEPTEMBER 15 – OCTOBER 2, 2003

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART E	NO NON-COMPLIANCE NOTED

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document.

Approved and Released For CCS By:

Tested By:



MIKE HECKROTTE  
CHIEF ENGINEER  
COMPLIANCE CERTIFICATION SERVICES

NEELESH RAJ  
EMC TECHNICIAN  
COMPLIANCE CERTIFICATION SERVICES

## 2. EUT DESCRIPTION

### 2.1. DESCRIPTION OF EUT

The EUT is a point-to-point transceiver operating in the 5250 – 5350 MHz band.

The transmitter has a maximum peak conducted output power as follows:

Frequency Band (MHz)	Output Power (dBm)	Output Power (mW)
5260 - 5340	7.70	5.89

The radio utilizes a flat panel antenna, with a maximum gain of 11 dBi.

### 2.2. DESCRIPTION OF ANTENNA

Manufacturer: Arcwave  
Type: Flat Panel antenna  
Array Dimensions: 11" x 12"  
Overall Dimension: 15" x 15" x 6.5"  
Gain: 11 dBi

### GAIN MEASUREMENT PROCEDURE

The standard site (three antenna) method as documented in ANSI C63.5: 1988 was used to measure the gain of the EUT antenna. The measurement distance was 3 meters.

## **RESULTS**

The maximum EUT Antenna Gain is 11 dBi:

Signal Generator: R&S SMP04, S/N DE 34210, cal due 5/26/05								
Spectrum Analyzer: Agilent E4446A, S/N US42510266, cal due 7/23/04								
Ant 1: Arcwave CPE Antenna								
Ant 2: EMCO 3115 s/n 6739								
Ant 3: EMCO 3115 s/n 2238								
Freq	Polarization	Thru	V 12	V 13	V 23	Gain 1	Gain 2	Gain 3
GHz		dBm	dBm	dBm	dBm	dBi	dBi	dBi
5.3	Vertical	-27.31	-62.14	-62.52	-62.33	10.72	10.91	10.53
5.3	Horizontal	-27.31	-62.05	-62.42	-62.61	10.96	10.77	10.40

### 3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4/1992, FCC CFR 47 Part 2 and FCC CFR 47 Part 15.

### 4. FACILITIES AND ACCREDITATION

The open area test sites and conducted measurement facilities used to collect data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.



No part of this report may be used to claim or imply product endorsement by NVLAP or any agency of the US Government.

## 5. CALIBRATION AND UNCERTAINTY

### 5.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 5.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission, 200 to 1000 MHz	+4.5 / -2.9 dB
Radiated Emission, 1000 to 2000 MHz	+4.5 / -2.9 dB
Power Line Conducted Emission	+/- 2.9 dB

Uncertainty figures are valid to a confidence level of 95%.

### 5.3. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	9001-3245	2/4/2004
Preamplifier, 1 ~ 26 GHz	Miteq	NSP10023988	646456	4/25/2004
Spectrum Analyzer	HP	E4446A	US42510266	7/23/2004
Amplifier 1-26GHz	MITEQ	NSP2600-SP	924342	4/25/2004
Peak Power Meter	Agilent	E4416A	GB41291160	11/7/2004
Peak / Average Power Sensor	Agilent	E9327A	US40440755	11/7/2004
Spectrum Analyzer, 40 GHz	HP	8564E	3943A01643	6/4/2004
EMI Receiver, 9 kHz ~ 2.9 GHz	HP	8542E	3942A00286	11/20/2003
RF Filter Section	HP	85420E	3705A00256	11/20/2003
Antenna, Bicon/Log, 25 ~ 2000 MHz	ARA	LPB-2520/A	1185	3/6/2004
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	8379443	10/4/2003
Line Filter	Lindgren	LMF-3489	497	CNR
LISN, 10 kHz ~ 30 MHz	FCC	50/250-25-2	114	10/6/2003
EMI Test Receiver	R & S	ESHS 20	827129/006	7/17/2004
5.15-5.35 GHz Reject Filter	Micro-Tronics	BRC13190	2	N/A
Amplifier 1-26GHz	MITEQ	NSP2600-SP	924341	4/25/2004
10dB Attenuator	WEINSCHEL	56-10	K16148	N/A



## 6. SETUP OF EQUIPMENT UNDER TEST

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Device Type	Manufacturer	Model	Serial Number	FCC ID
LAPTOP	DELL	PPO1L	N/A	DoC
WIRELESS CABLE MODEM	N/A	VYYO	V-251	N/A
POWER INSERTER	GOOD MIND	D7-10-01	N/A	N/A

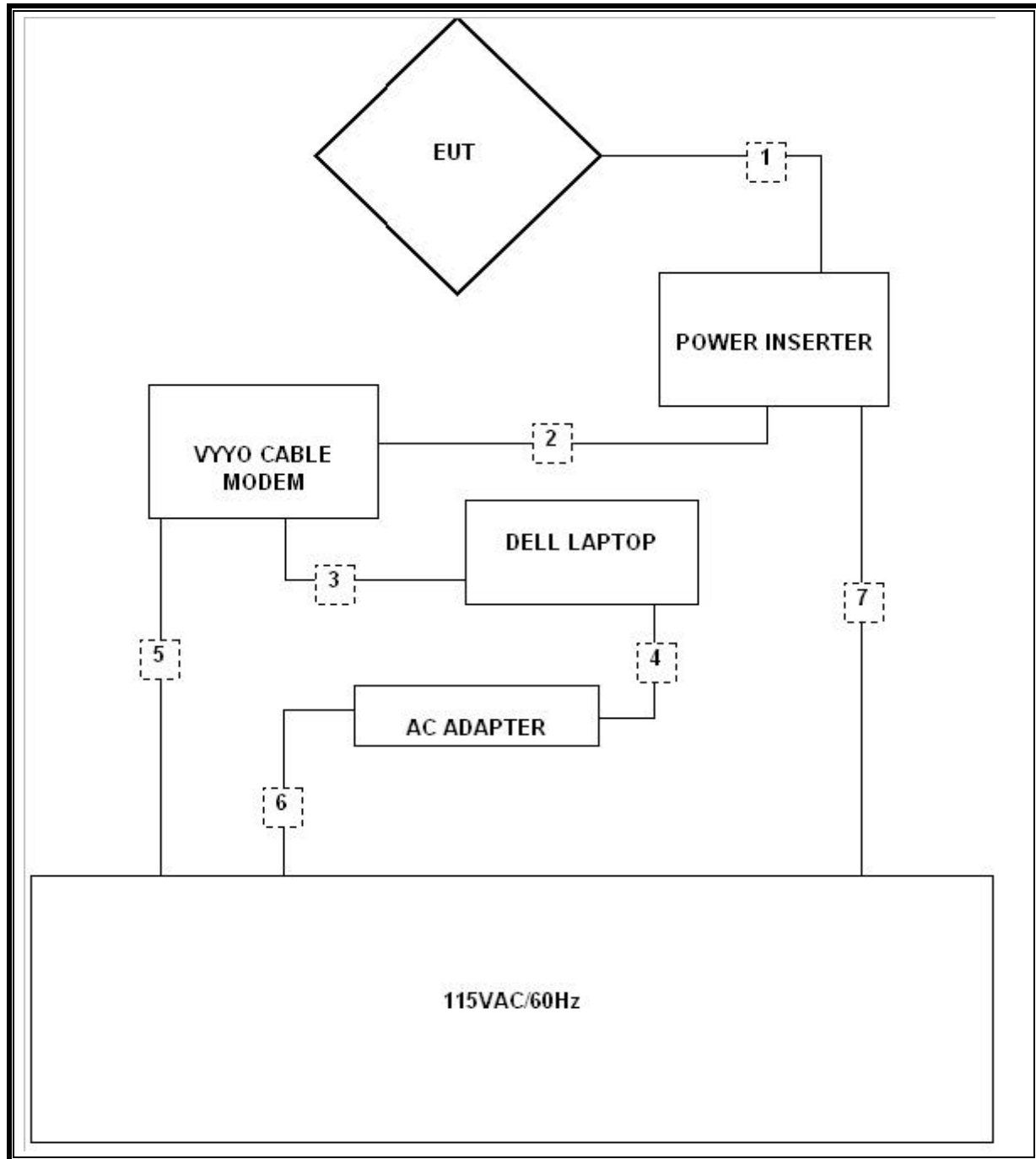
### I/O CABLES

Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	DATA/PWR	1	“F” TYPE	SHIELDED	3.73M	RG-6
2	ETHERNET	1	RJ45	UNSHIELDED	2.48M	N/A
3	ETHERNET	1	RJ45	UNSHIELDED	2.48M	N/A
4	DC PWR	1	DC PWR	UNSHIELDED	1.86M	N/A
5	AC PWR	1	AC PWR	UNSHIELDED	1.86M	N/A
6	AC PWR	1	AC PWR	UNSHIELDED	1.86M	N/A
7	AC PWR	1	AC PWR	UNSHIELDED	1.86M	N/A

### TEST SETUP

During the testing process the EUT was in continuous transmit mode.

**SETUP DIAGRAM FOR TESTS**



## 7. APPLICABLE LIMITS AND TEST RESULTS

### 7.1. EMISSION BANDWIDTH

#### LIMIT

§15.403 (c) Emission bandwidth. For purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Determination of the emissions bandwidth is based on the use of measurement instrumentation employing a peak detector function with an instrument resolutions bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

#### TEST PROCEDURE

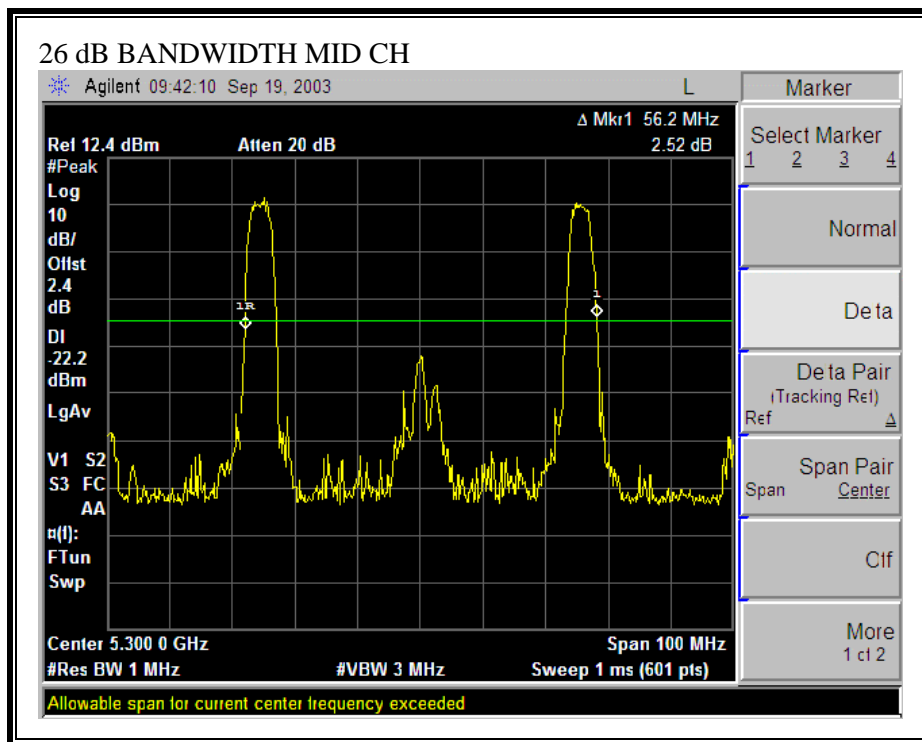
The transmitter output is connected to a spectrum analyzer. The RBW is set to 1% to 3% of the 26 dB bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled.

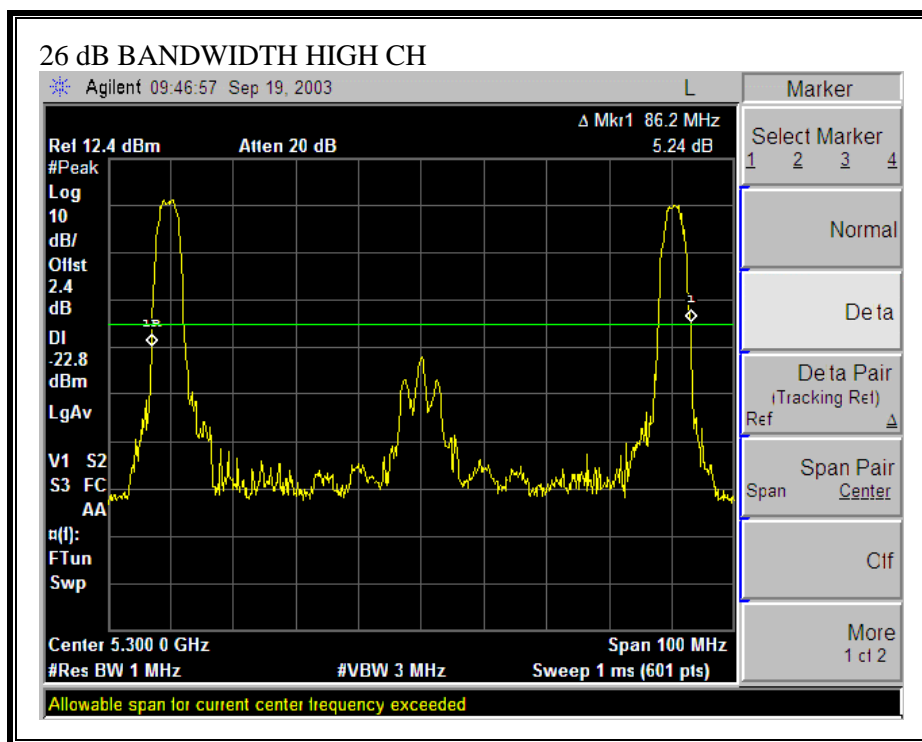
#### RESULTS

No non-compliance noted:

Channel	B (MHz)	10 Log B (dB)
Low	16.67	12.22
Middle	56.20	17.50
High	86.20	19.36







## 7.2. PEAK POWER

### LIMIT

§15.407 (a) (1) For the band 5.25-5.35 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 250 mW (24 dBm) or  $11 \text{ dBm} + 10 \log B$ , where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates in a pulsed mode therefore Method # 3 is used.

### LIMITS AND RESULTS

#### Limit

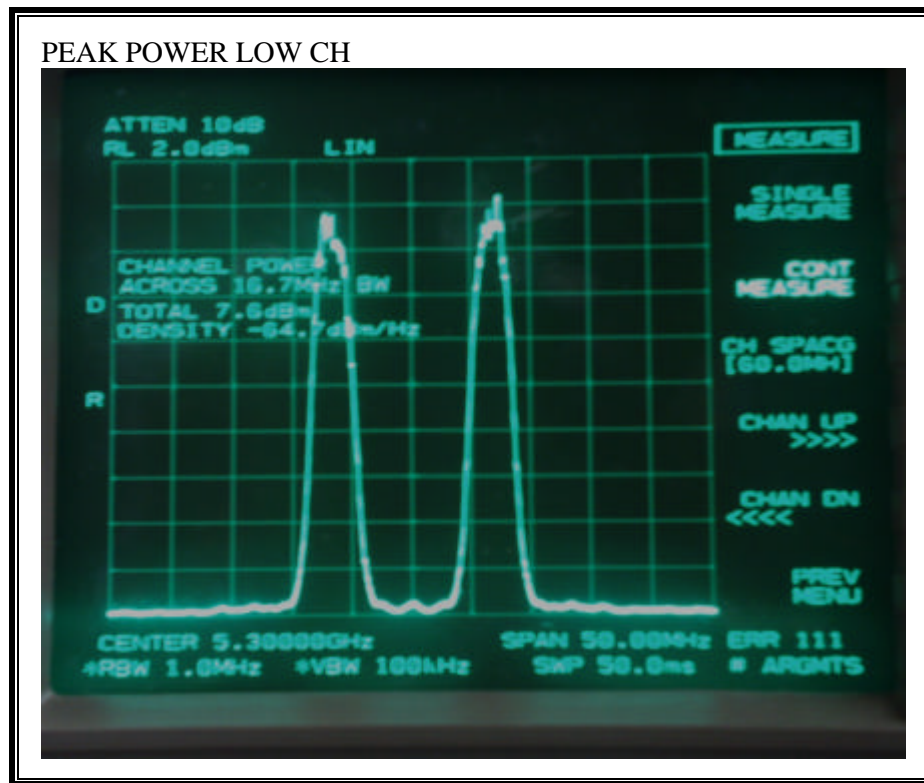
Channel	Fixed Limit (dBm)	B (MHz)	$11 + 10 \log B$ Limit (dBm)	Excess Antenna Gain (dB)	Limit (dBm)
Low	24	16.67	23.22	5.00	18.22
Middle	24	56.2	28.50	5.00	19.00
High	24	86.2	30.36	5.00	19.00

#### Results

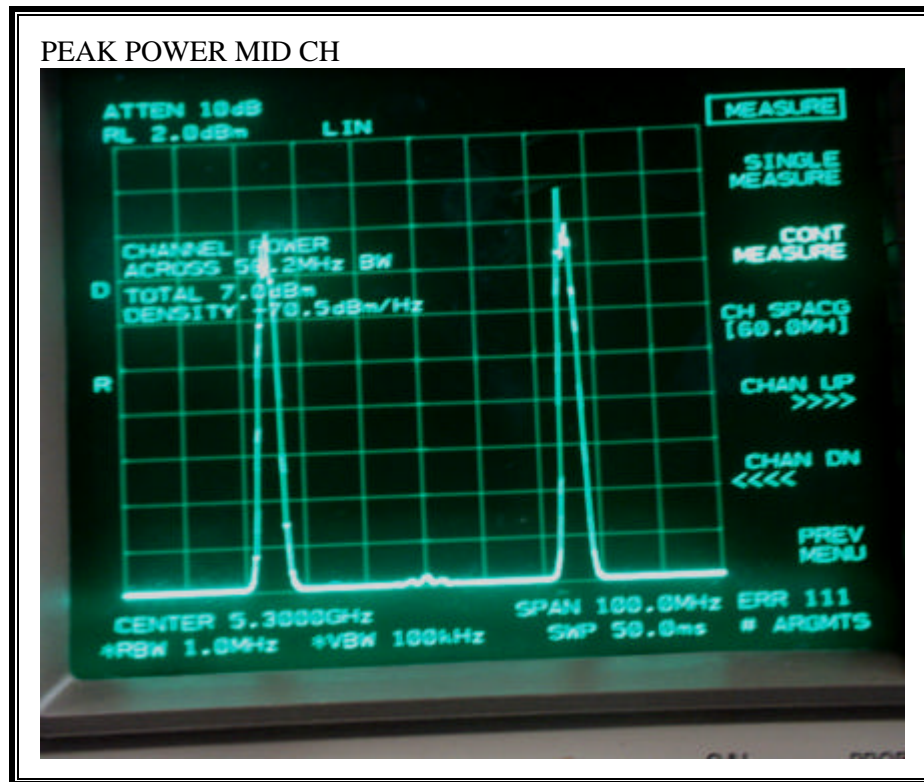
Channel	Power (dBm)	Limit (dBm)	Margin (dB)
Low	7.60	18.22	-10.62
Middle	7.00	19.00	-12.00
High	7.70	19.00	-11.30

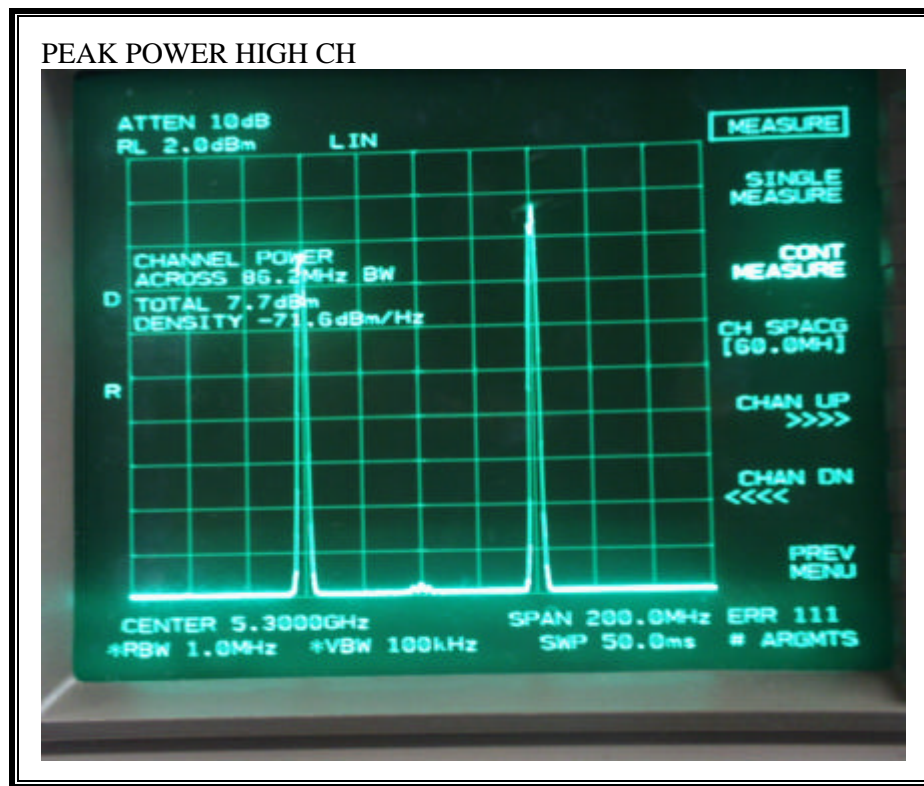
No non-compliance noted:

**PEAK POWER**









### 7.3. MAXIMUM PERMISSIBLE EXPOSURE

#### LIMITS

§15.247 (b) (5) Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See §1.1307(b)(1) of this chapter.

#### CALCULATIONS

Given

$$E = \sqrt{(30 * P * G) / d}$$

and

$$S = E^2 / 3770$$

where

E = Field Strength in Volts / meter

P = Power in Watts

G = Numeric antenna gain

d = distance in meters

S = Power Density in milliwatts / square centimeter

Combining equations and rearranging the terms to express the distance as a function of the remaining variables yields:

$$d = \sqrt{((30 * P * G) / (3770 * S))}$$

Changing to units of mW and cm, using:

$$P \text{ (mW)} = P \text{ (W)} / 1000 \text{ and}$$

$$d \text{ (cm)} = 100 * d \text{ (m)}$$

yields

$$d = 100 * \sqrt{((30 * (P / 1000) * G) / (3770 * S))}$$

$$d = 0.282 * \sqrt{(P * G / S)}$$

where

d = distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power Density in mW / cm<sup>2</sup>

Substituting the logarithmic form of power and gain using:

$$P \text{ (mW)} = 10^{(P \text{ (dBm)} / 10)} \text{ and}$$

$$G \text{ (numeric)} = 10^{(G \text{ (dBi)} / 10)}$$

yields

$$d = 0.282 * 10^{((P + G) / 20) / \sqrt{S}} \quad \text{Equation (1)}$$

where

d = MPE distance in cm

P = Power in dBm

G = Antenna Gain in dBi

S = Power Density Limit in mW / cm<sup>2</sup>

Equation (1) and the measured peak power is used to calculate the MPE distance.

## **LIMITS**

S = 1.0 mW / cm<sup>2</sup> from 1.1310 Table 1

## **RESULTS**

No non-compliance noted:

Power Density Limit (mW/cm <sup>2</sup> )	Output Power (dBm)	Antenna Gain (dBi)	MPE Distance (cm)
1.0	7.70	11.00	2.43

NOTE: For mobile or fixed location transmitters, the minimum separation distance is 20 cm, even if calculations indicate that the MPE distance would be less.

## 7.4. PEAK POWER SPECTRAL DENSITY

### LIMIT

§15.407 (a) (1) For the band 5.25-5.35 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 250 mW (24 dBm) or  $11 \text{ dBm} + 10 \log B$ , where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain = 11 dBi, therefore the limit is 6 dBm.

### TEST PROCEDURE

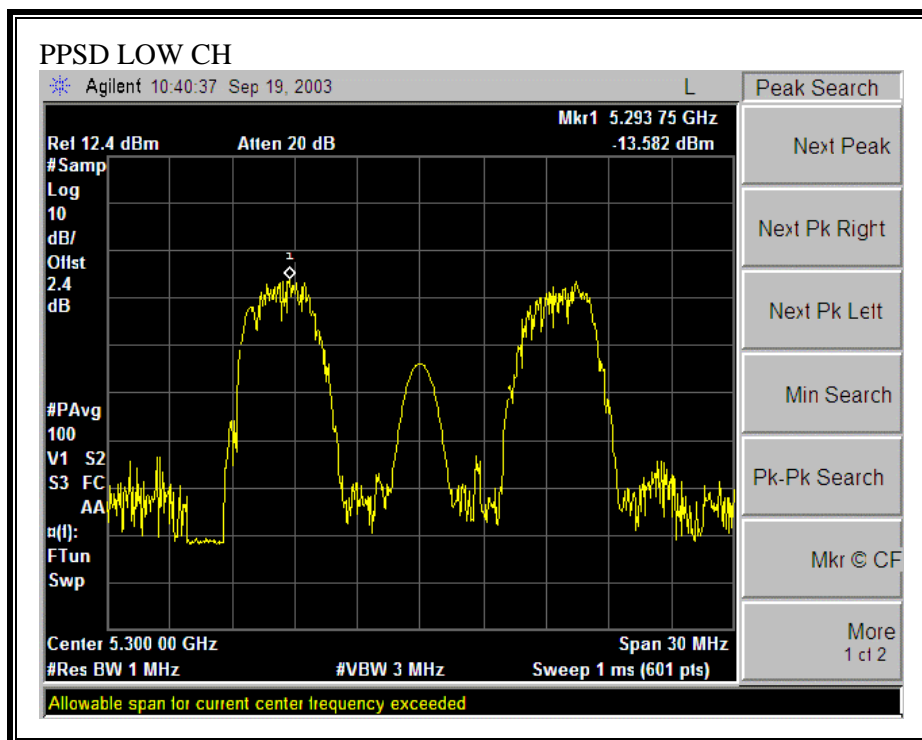
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

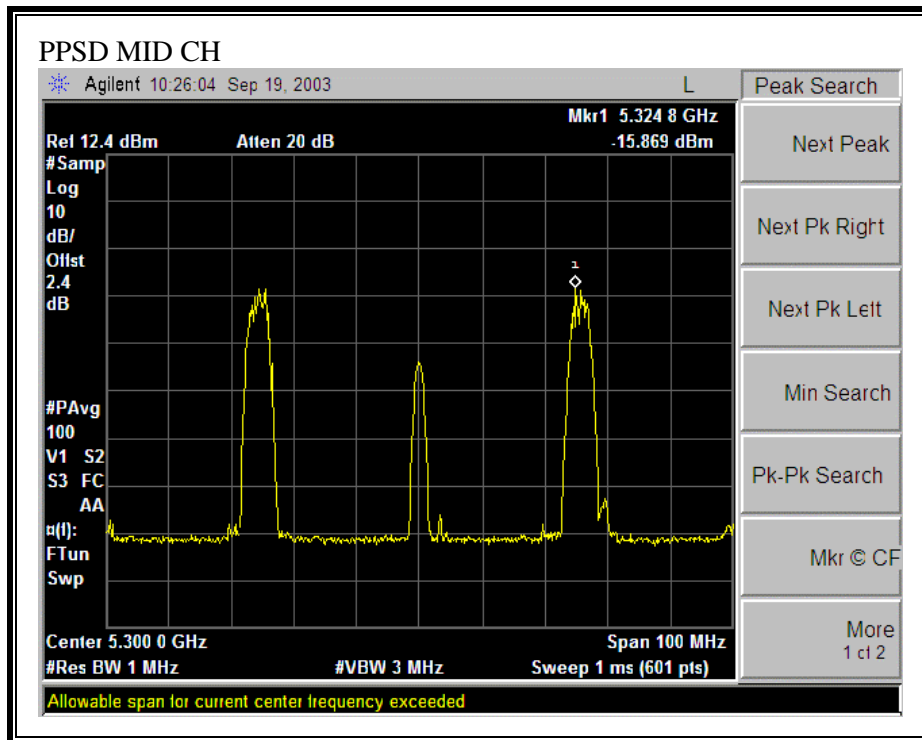
### RESULTS

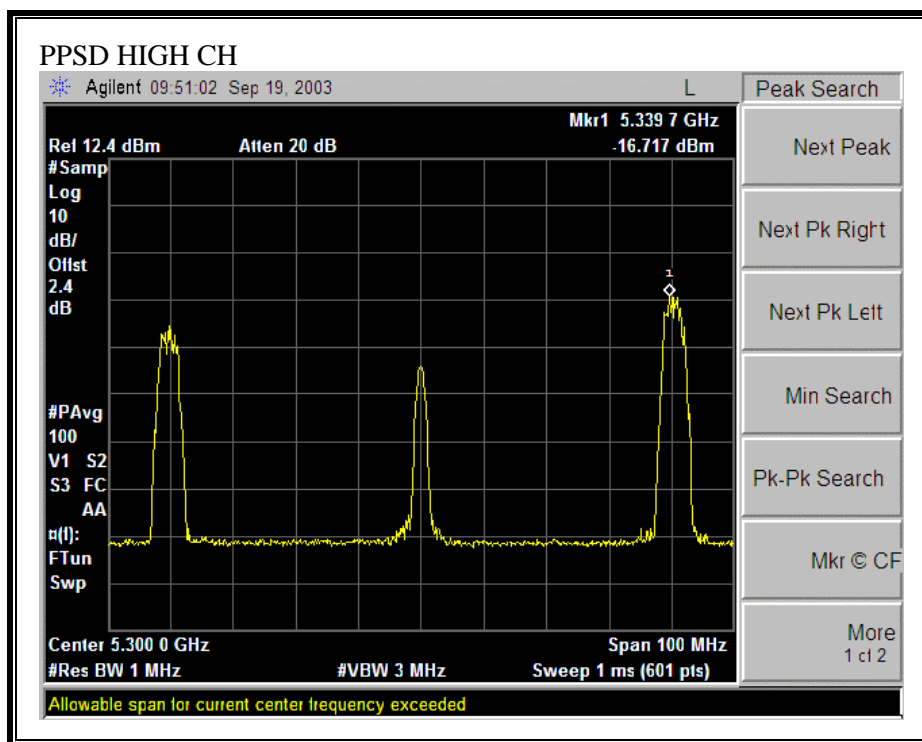
No non-compliance noted:

Channel	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	-13.59	6.00	-19.59
Middle	-15.87	6.00	-21.87
High	-16.72	6.00	-22.72

**PEAK POWER SPECTRAL DENSITY**









## 7.5. PEAK EXCURSION

### LIMIT

§15.407 (a) (6) The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

### TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

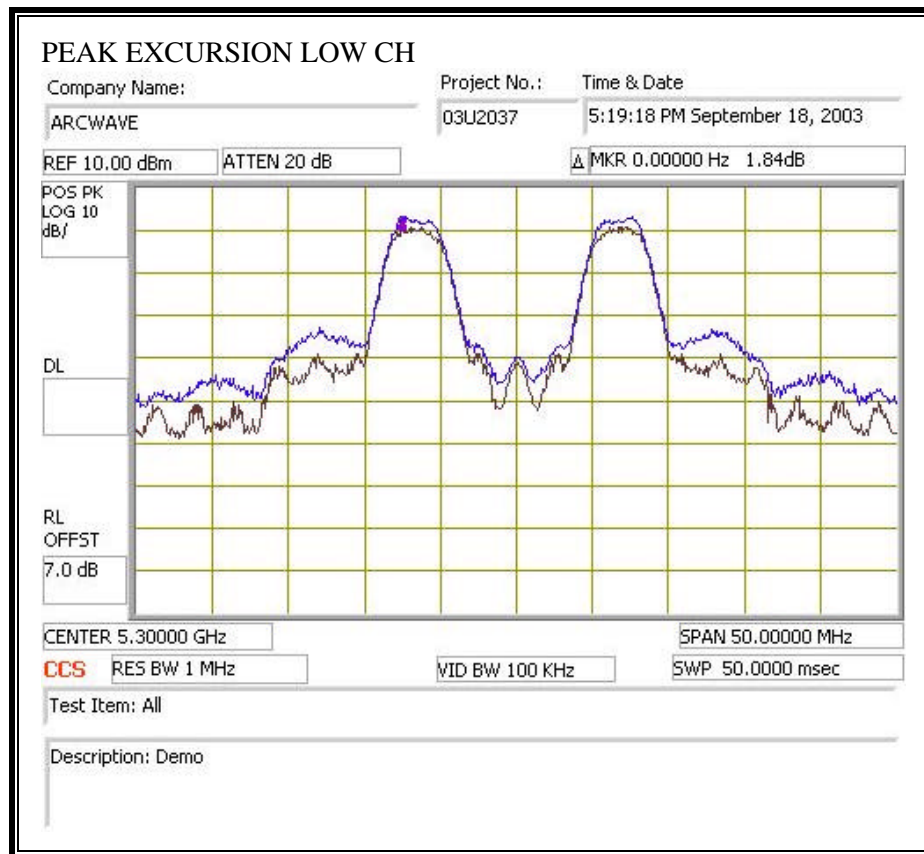
Since Method # 3 was used for peak power measurements, Method # 3 settings are used for the second PPSD trace.

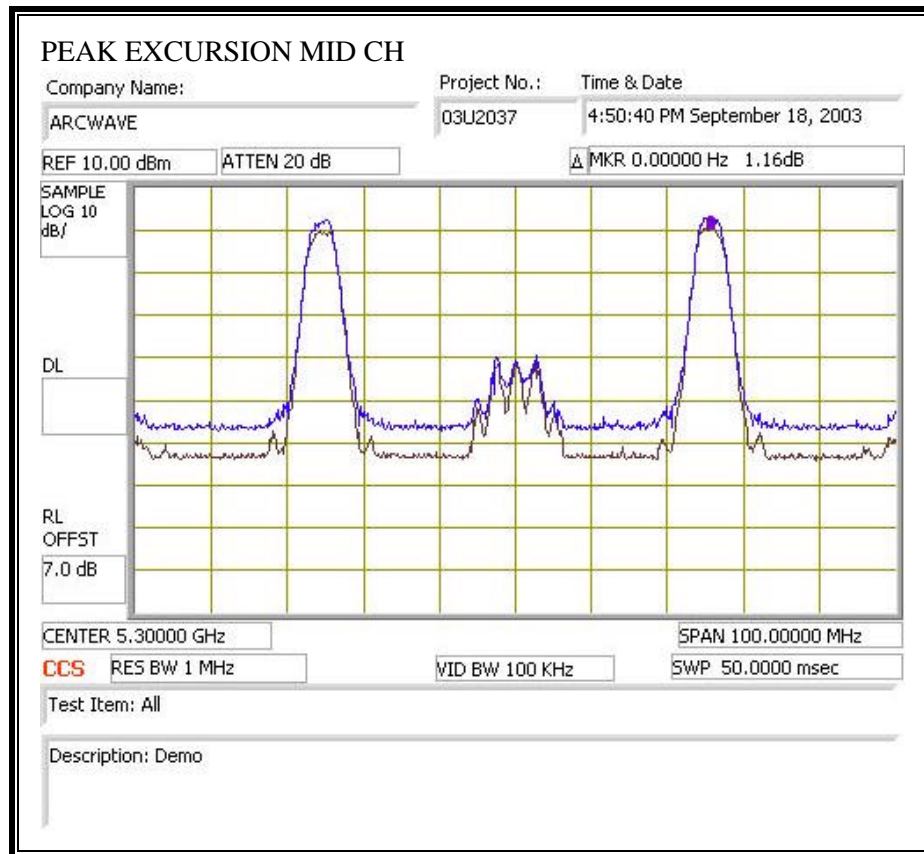
### RESULTS

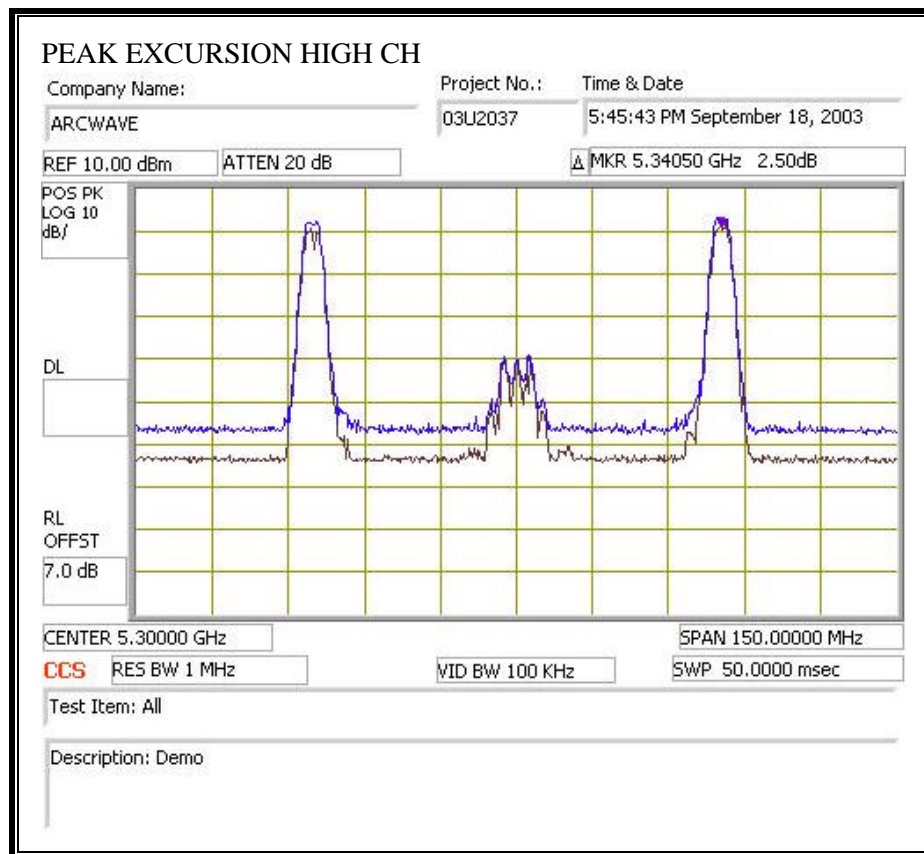
No non-compliance noted:

Channel	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	1.84	13	-11.16
Middle	1.16	13	-11.84
High	2.50	13	-10.50

**PEAK EXCURSION**







## **7.6. CONDUCTED SPURIOUS EMISSIONS**

### **LIMITS**

§15.407 (b) (1 & 2) For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27dBm / MHz.

### **TEST PROCEDURE**

Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements are made.

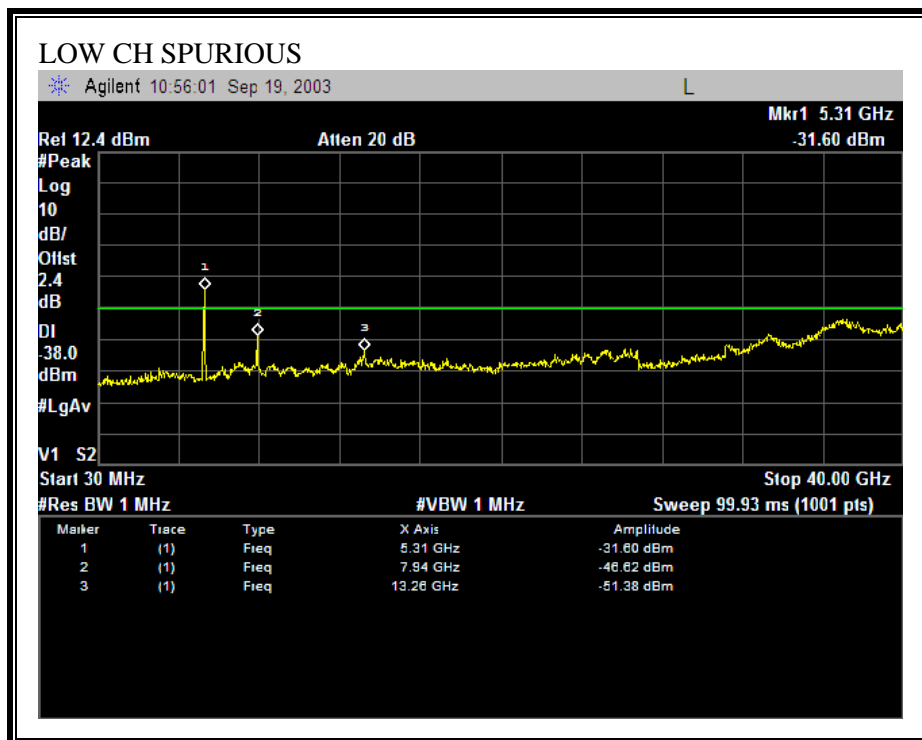
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

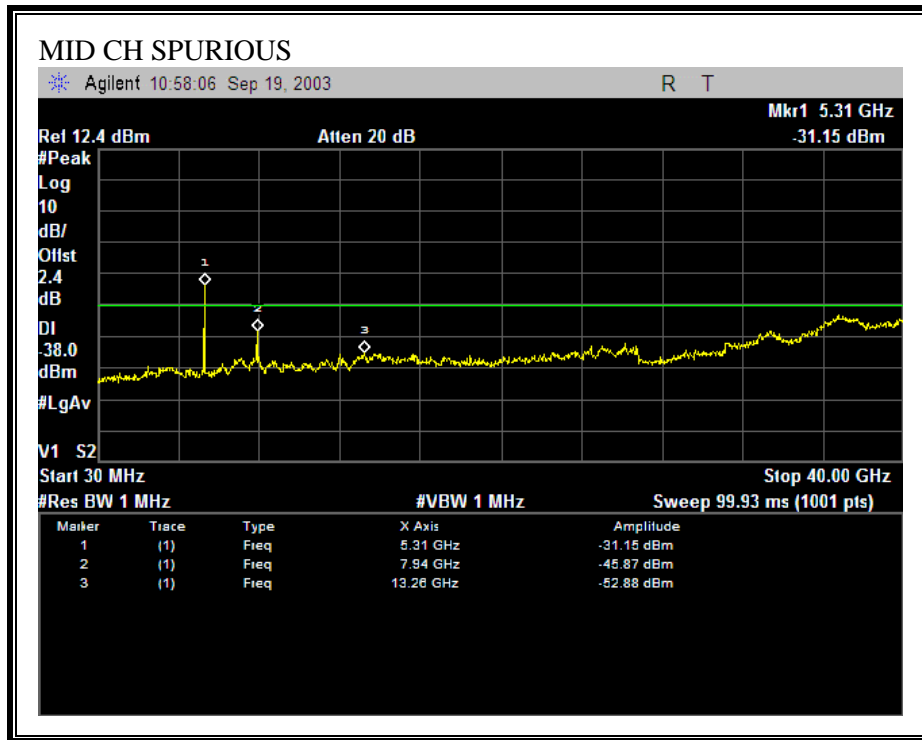
### **RESULTS**

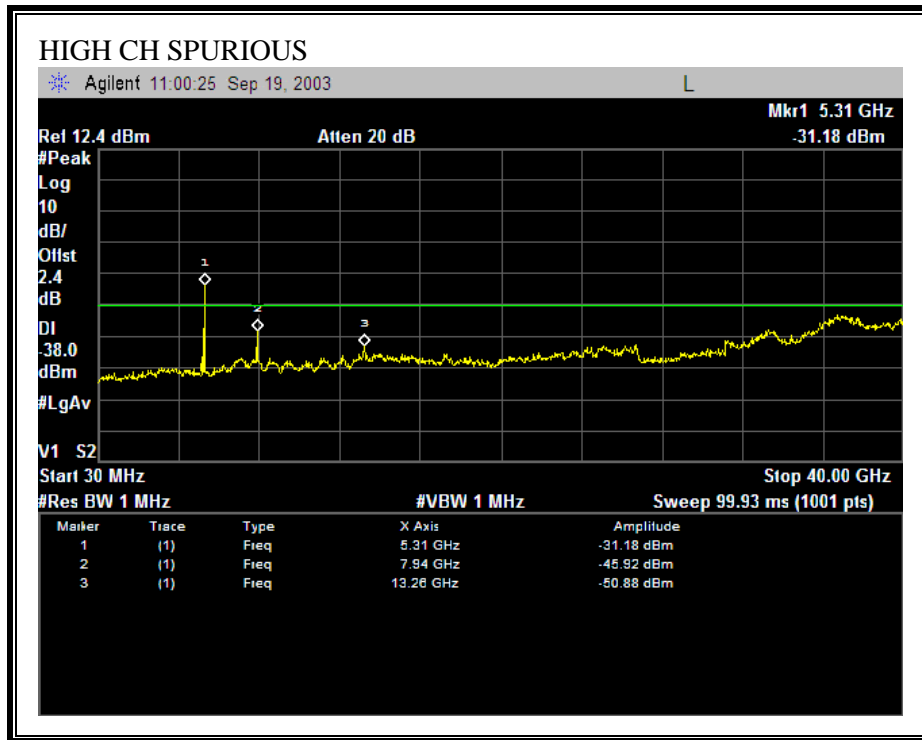
The maximum antenna gain is 14 dBi, therefore the average limit display line is -38 dBm.

No non-compliance noted:

### SPURIOUS EMISSIONS









## 7.7. RADIATED EMISSIONS

### LIMITS

§15.205 (a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41			

<sup>1</sup> Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

<sup>2</sup> Above 38.6

§15.205 (b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209 (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

## **TEST PROCEDURE**

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

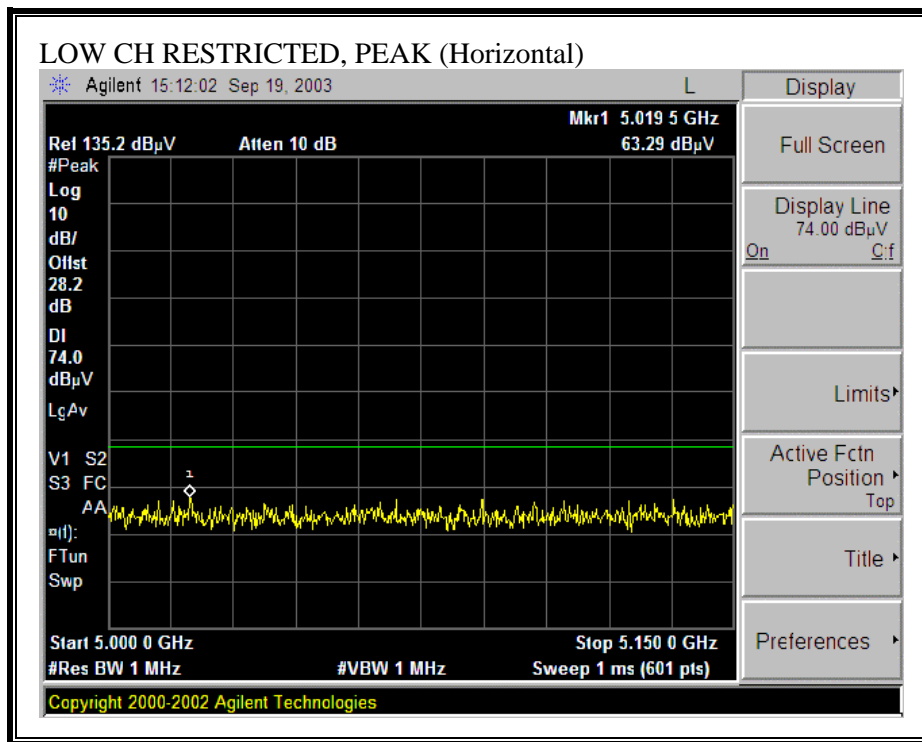
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

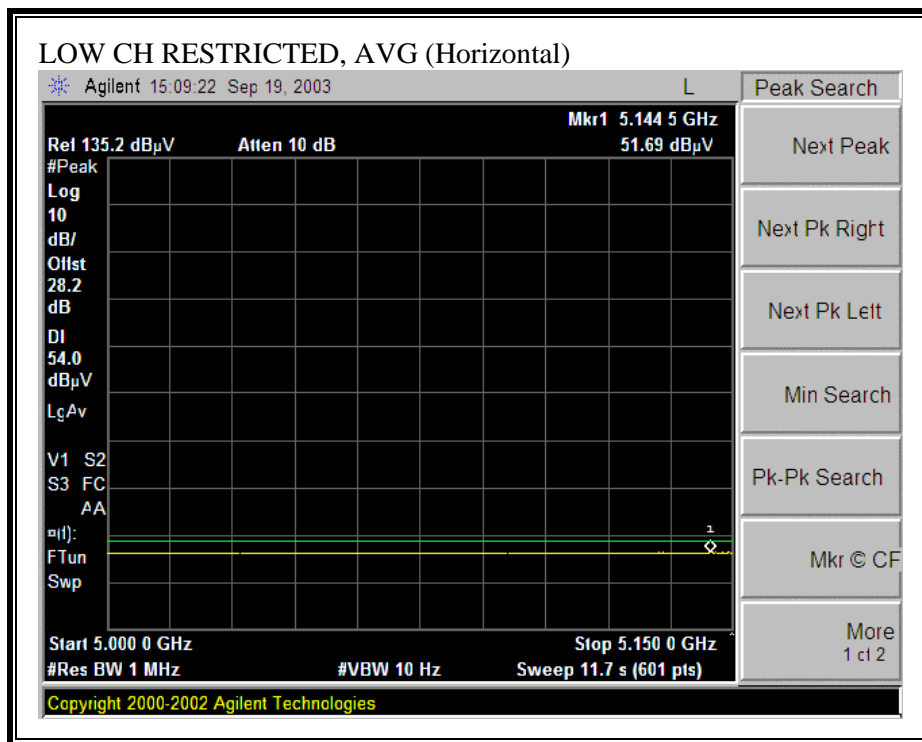
## **RESULTS**

No non-compliance noted:

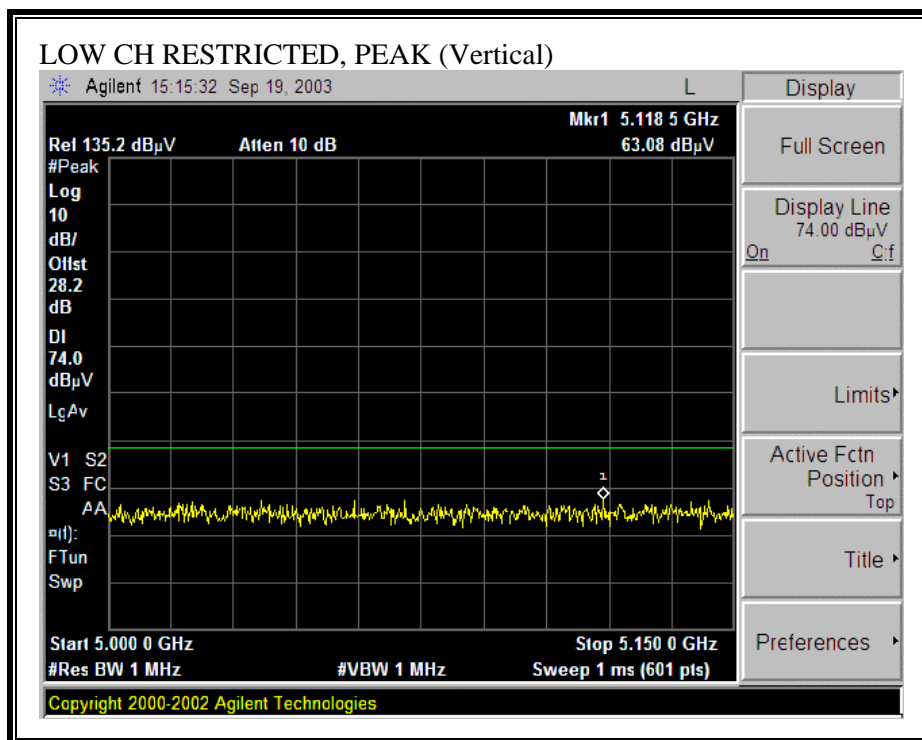
## 7.7.1. RADIATED EMISSIONS ABOVE 1 GHZ

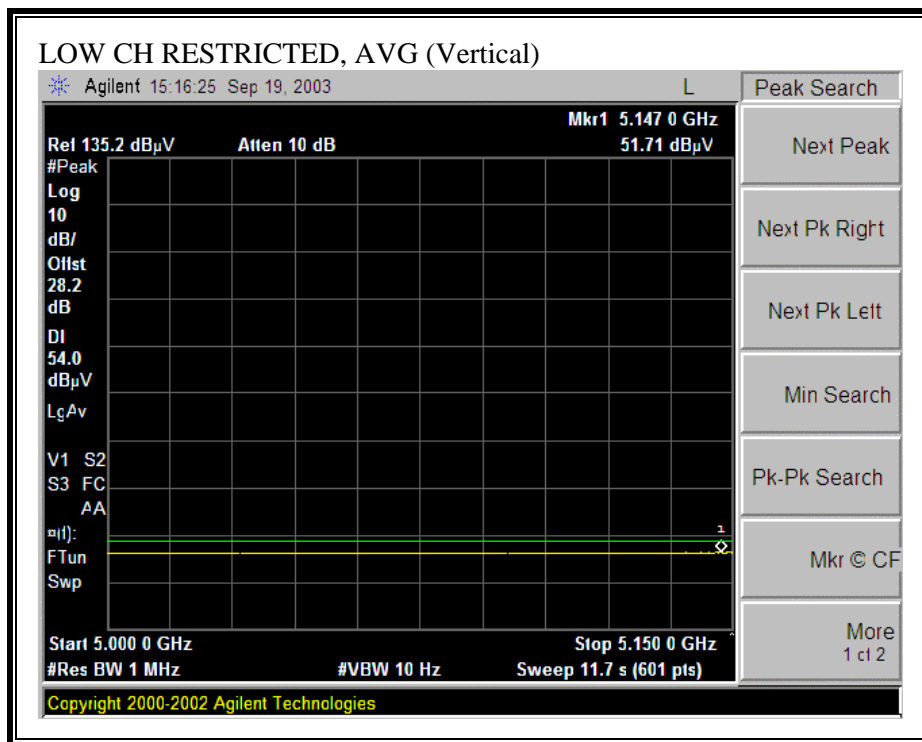
### RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



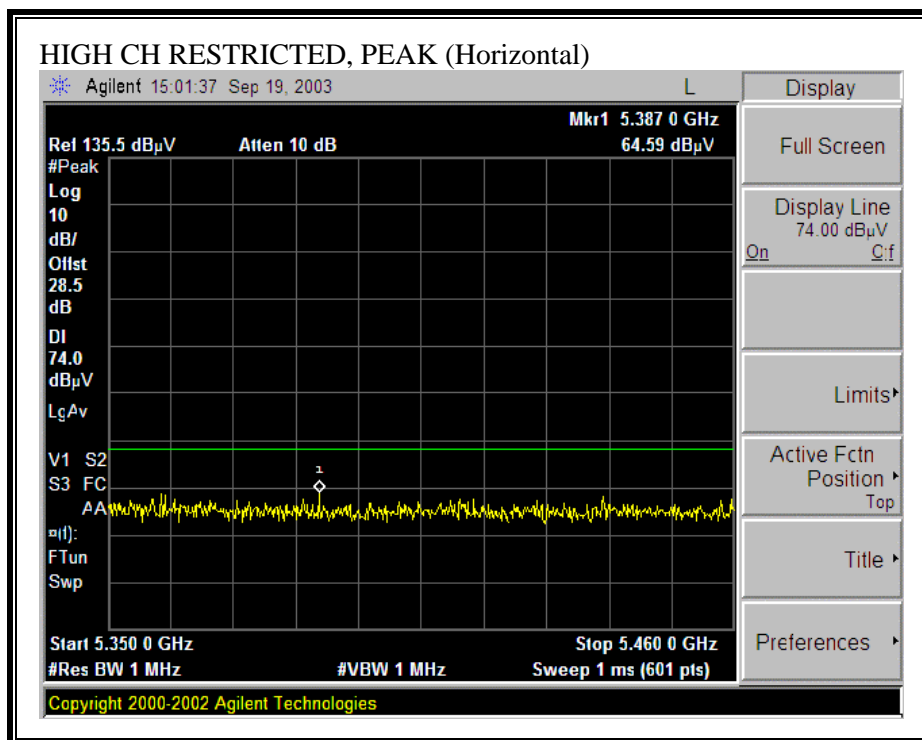


**RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**

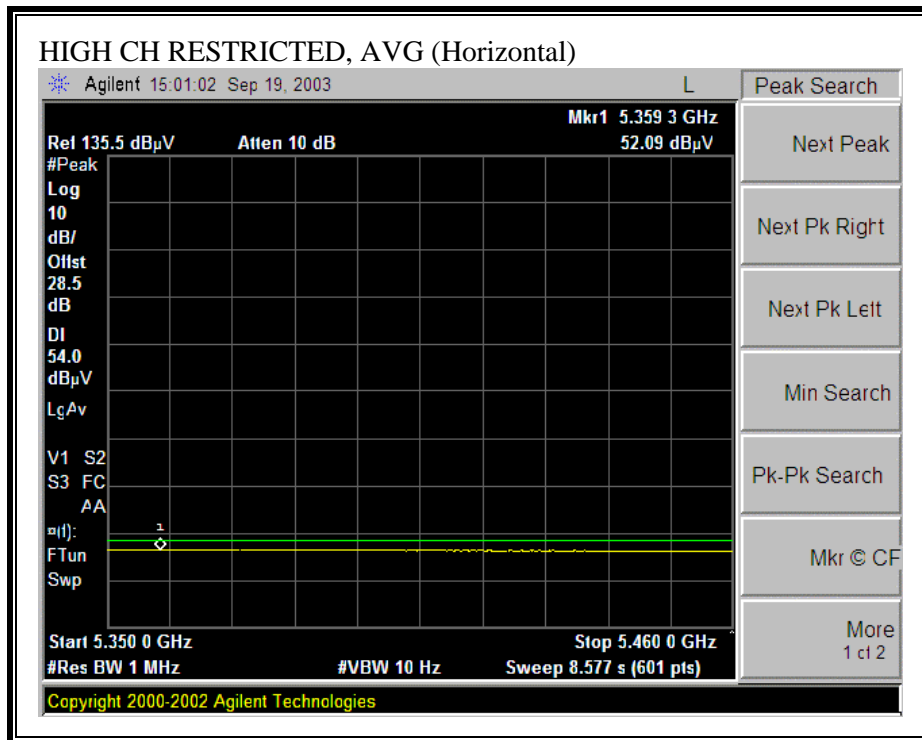




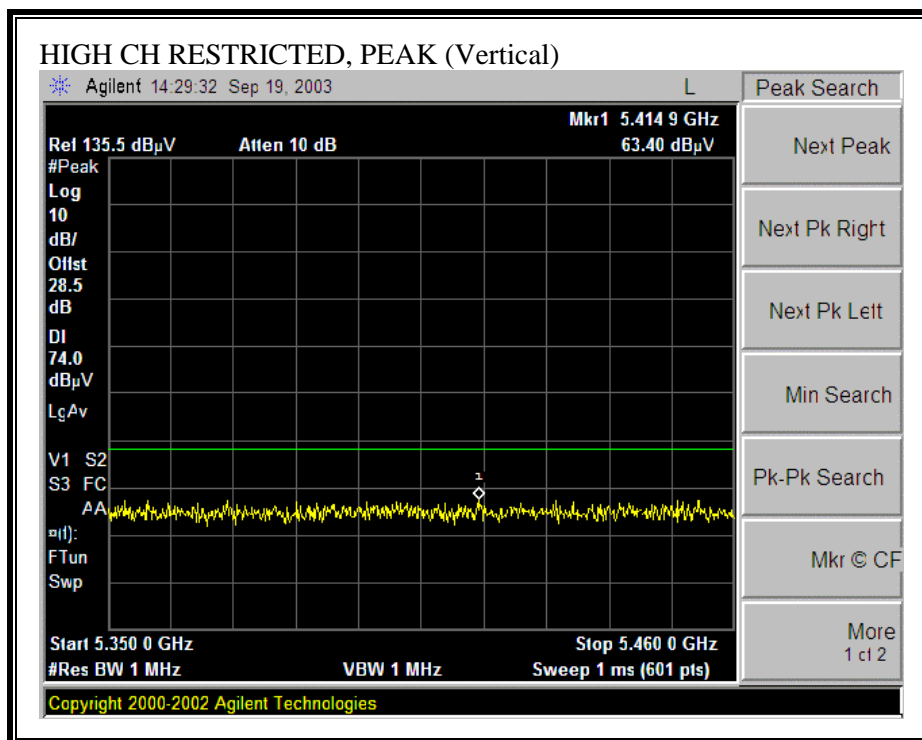
**RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**

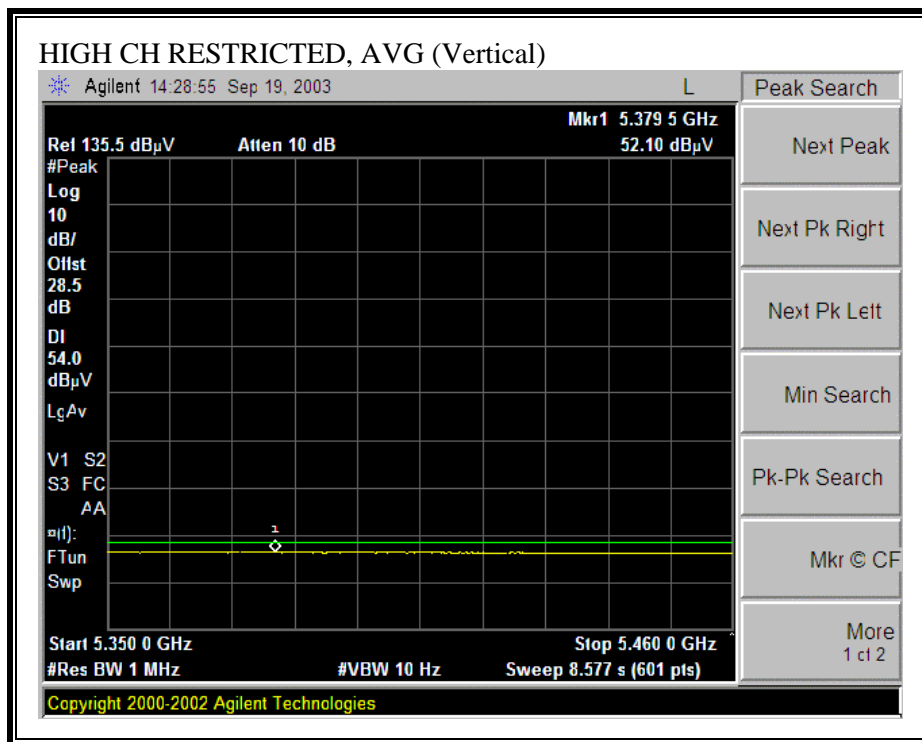






**RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



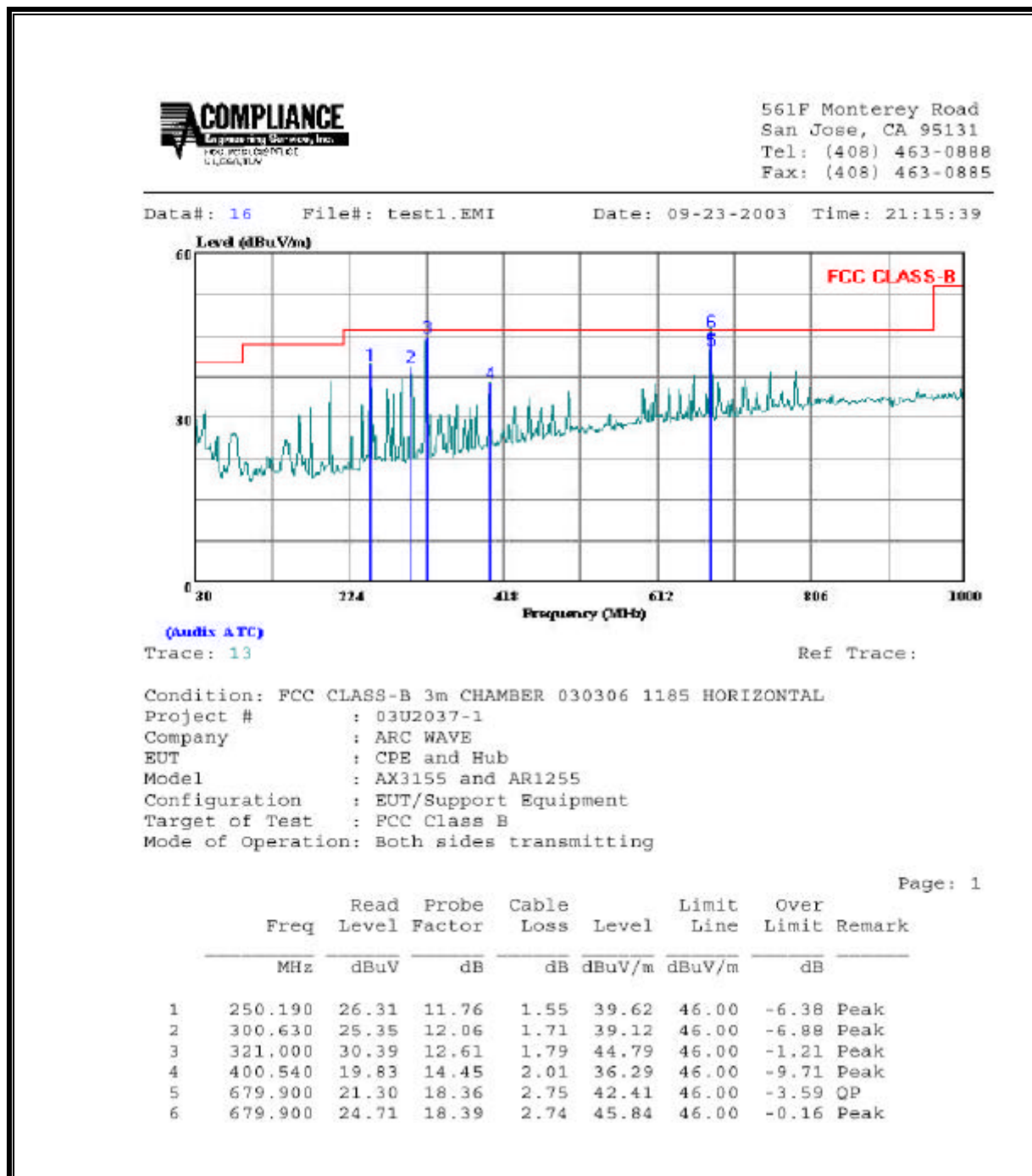


# HARMONICS AND SPURIOUS EMISSIONS (LOW, MIDDLE, AND HIGH CHANNELS)

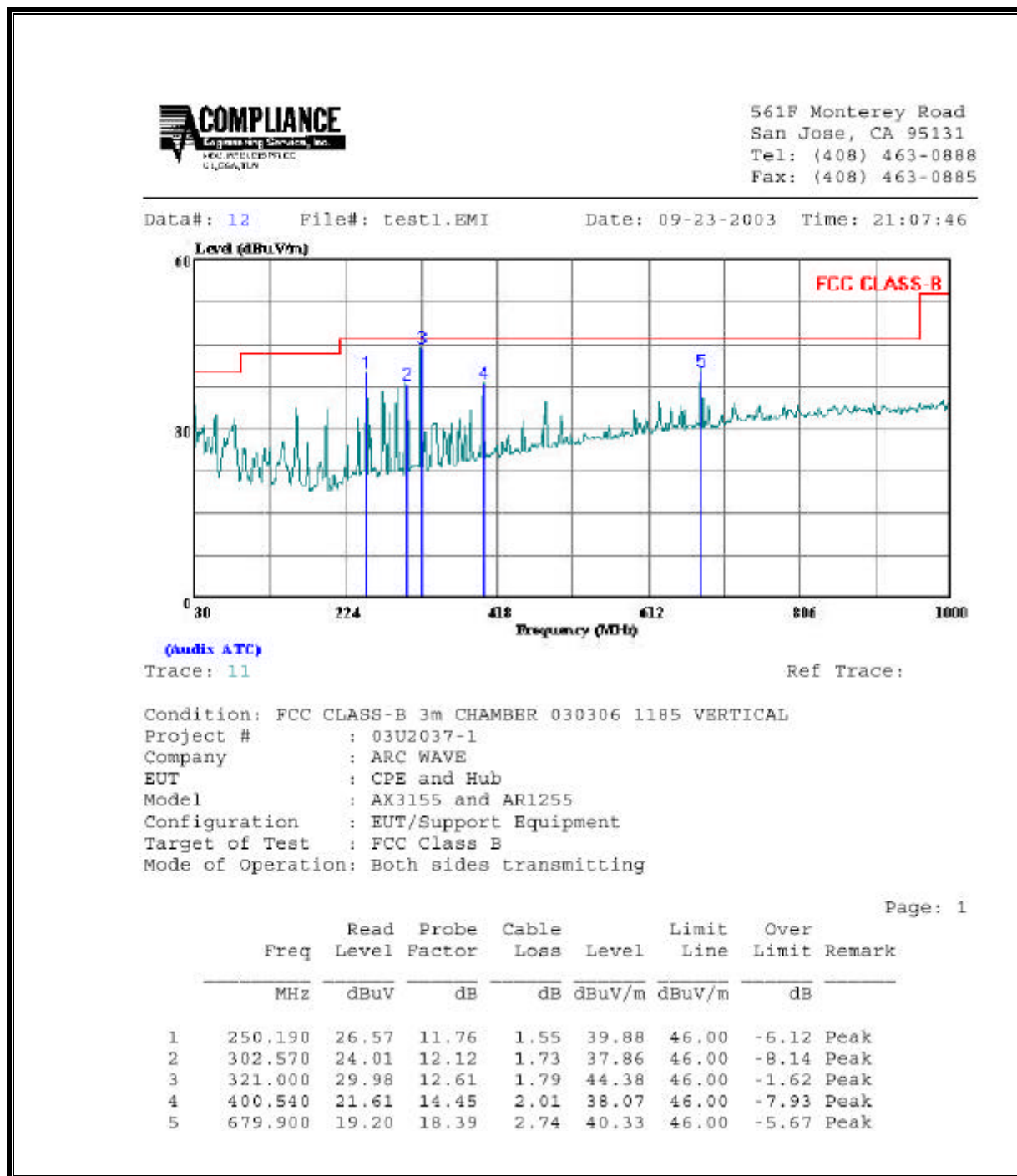
09/19/03 High Frequency Measurement																			
Compliance Certification Services, Morgan Hill Open Field Site																			
Test Engn:		NEELSHRAJ																	
Project #:		03U2037																	
Company:		ARCWAVE																	
EUT Descrip:		SUBSCRIBER																	
EUT M/N:		AC1155																	
Test Target:		PCO																	
Mode Oper:		TX																	
Test Equipment:																			
EMCO Horn 1-18GHz				Pre-amplifier 1-26GHz				Spectrum Analyzer				Horn > 18GHz				Limit			
TS9; S/N: 3245 @5m				T63 Miteq 640456				Agilent E4446A Analyzer				TB7; ARA 18-26GHz; S/N:1049				FCC 15.205			
<div> High Frequency Cables: <input type="checkbox"/> (2 ft) <input checked="" type="checkbox"/> (2 ~ 3 ft) <input type="checkbox"/> (4 ~ 6 ft) <input checked="" type="checkbox"/> (12 ft) </div> <div> Peak Measurements: 1 MHz Resolution Bandwidth  10 GHz Video Bandwidth </div> <div> Average Measurements: 1 MHz Resolution Bandwidth  10 GHz Video Bandwidth </div>																			
f GHz	Dist feet	Read Pk dBuV	Read Avg dBuV	AF dBm	CL dB	Amp dB	D Corr dB	HFF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes				
L.O. Harmonics (worst case from low, middle, and high channels)																			
10.600	9.8	37.7	30.0	38.0	4.7	-33.5	0.0	1.0	47.9	40.2	74.0	54.0	-26.1	-13.8	V(FLOOR NOISE)				
13.250	9.8	43.0	33.3	40.5	5.4	-36.7	0.0	1.0	53.3	43.6	74.0	54.0	-20.7	-10.4	V(FLOOR NOISE)				
15.900	9.8	42.6	34.9	38.7	6.1	-40.0	0.0	1.0	48.4	40.7	74.0	54.0	-25.6	-13.3	V(FLOOR NOISE)				
18.880	9.8	48.7	36.0	34.8	6.7	-39.4	0.0	1.0	48.8	38.8	74.0	54.0	-28.8	-18.2	V(FLOOR NOISE)				
10.600	9.8	37.8	31.1	38.0	4.7	-33.5	0.0	1.0	48.0	41.3	74.0	54.0	-26.0	-12.7	H				
13.250	9.8	46.2	34.4	40.8	5.4	-36.7	0.0	1.0	56.4	44.7	74.0	54.0	-17.6	-9.3	H				
15.900	9.8	42.0	34.1	38.7	6.1	-40.0	0.0	1.0	47.8	39.9	74.0	54.0	-26.2	-14.1	H(FLOOR NOISE)				
18.880	9.8	46.0	36.2	34.8	6.7	-39.4	0.0	1.0	48.8	39.0	74.0	54.0	-28.2	-18.0	H(FLOOR NOISE)				
LOW CHANNEL																			
15.880	9.8	44.6	36.1	38.8	6.1	-40.0	0.0	1.0	50.4	41.9	74.0	54.0	-23.6	-12.1	V(FLOOR NOISE)				
15.880	9.8	44.0	36.2	38.8	6.1	-40.0	0.0	1.0	49.8	42.0	74.0	54.0	-24.2	-12.0	H(FLOOR NOISE)				
10.613	9.8	38.7	30.3	38.0	4.7	-33.5	0.0	1.0	48.9	40.5	74.0	54.0	-25.1	-13.5	V(FLOOR NOISE)				
10.613	9.8	38.3	30.2	38.0	4.7	-33.5	0.0	1.0	48.5	40.4	74.0	54.0	-25.5	-13.6	H(FLOOR NOISE)				
15.919	9.8	42.5	35.9	38.7	6.1	-40.0	0.0	1.0	48.2	41.6	74.0	54.0	-25.8	-12.4	V(FLOOR NOISE)				
15.919	9.8	42.0	36.0	38.7	6.1	-40.0	0.0	1.0	47.7	41.7	74.0	54.0	-26.3	-12.3	H(FLOOR NOISE)				
MIDDLE CHANNEL																			
15.824	9.8	46.3	34.7	38.9	6.1	-40.0	0.0	1.0	52.3	40.6	74.0	54.0	-21.7	-13.4	V(FLOOR NOISE)				
15.824	9.8	45.2	33.9	38.9	6.1	-40.0	0.0	1.0	51.1	39.8	74.0	54.0	-22.9	-14.2	H(FLOOR NOISE)				
10.652	9.8	41.3	30.0	38.0	4.8	-33.5	0.0	1.0	51.5	40.2	74.0	54.0	-22.5	-13.8	V(FLOOR NOISE)				
10.652	9.8	40.8	29.1	38.0	4.8	-33.5	0.0	1.0	51.0	39.3	74.0	54.0	-23.0	-14.7	H(FLOOR NOISE)				
15.977	9.8	45.2	34.7	38.5	6.1	-40.0	0.0	1.0	50.8	40.3	74.0	54.0	-23.2	-13.7	V(FLOOR NOISE)				
15.977	9.8	45.1	34.6	38.5	6.1	-40.0	0.0	1.0	50.7	40.2	74.0	54.0	-23.3	-13.8	H(FLOOR NOISE)				
HIGH CHANNEL																			
15.778	9.8	46.3	34.9	39.0	6.1	-40.0	0.0	1.0	52.3	40.9	74.0	54.0	-21.7	-13.1	V(FLOOR NOISE)				
15.778	9.8	44.4	34.9	39.0	6.1	-40.0	0.0	1.0	50.4	40.9	74.0	54.0	-23.6	-13.1	H(FLOOR NOISE)				
10.681	9.8	40.9	29.5	38.0	4.8	-33.5	0.0	1.0	51.2	39.8	74.0	54.0	-22.8	-14.2	V(FLOOR NOISE)				
10.681	9.8	41.0	29.6	38.0	4.8	-33.5	0.0	1.0	51.3	39.8	74.0	54.0	-22.7	-14.3	H(FLOOR NOISE)				
16.027	9.8	45.8	34.6	38.6	6.1	-40.0	0.0	1.0	51.4	40.3	74.0	54.0	-22.6	-13.7	V(FLOOR NOISE)				
16.027	9.8	46.3	34.6	38.6	6.1	-40.0	0.0	1.0	52.0	40.2	74.0	54.0	-22.0	-13.8	H(FLOOR NOISE)				
NO OTHER SPURIOUS EMISSIONS DETECTED ABOVE THE NOISE FLOOR																			
f	Measurement Frequency					Amp	Preamp Gain					Avg Lim	Average Field Strength Limit						
Dist	Distance to Antenna					D Corr	Distance Correct to 3 meters					Pk Lim	Peak Field Strength Limit						
Read	Analyzer Reading					Avg	Average Field Strength @ 3 m					Avg Mar	Margin vs. Average Limit						
AF	Antenna Factor					Peak	Calculated Peak Field Strength					Pk Mar	Margin vs. Peak Limit						
CL	Cable Loss					HFF	High Pass Filter												

## 7.7.2. RADIATED EMISSIONS BELOW 1 GHZ

### SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)**





## 7.8. POWERLINE CONDUCTED EMISSIONS

### LIMIT

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50  $\mu$ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\* Decreases with the logarithm of the frequency.

### TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The resolution bandwidth is set to 9 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

### RESULTS

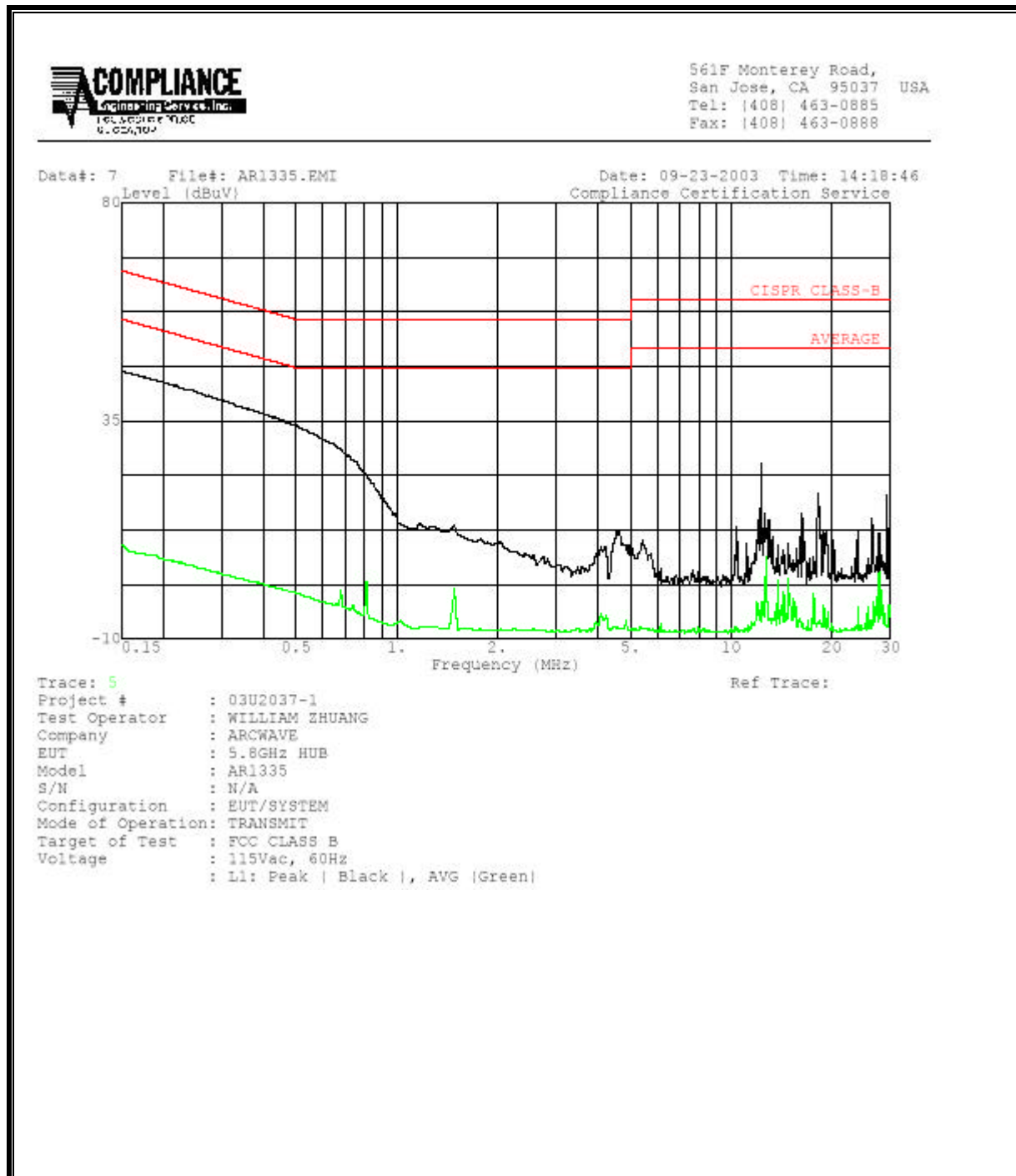
No non-compliance noted:

# **6 WORST EMISSIONS**

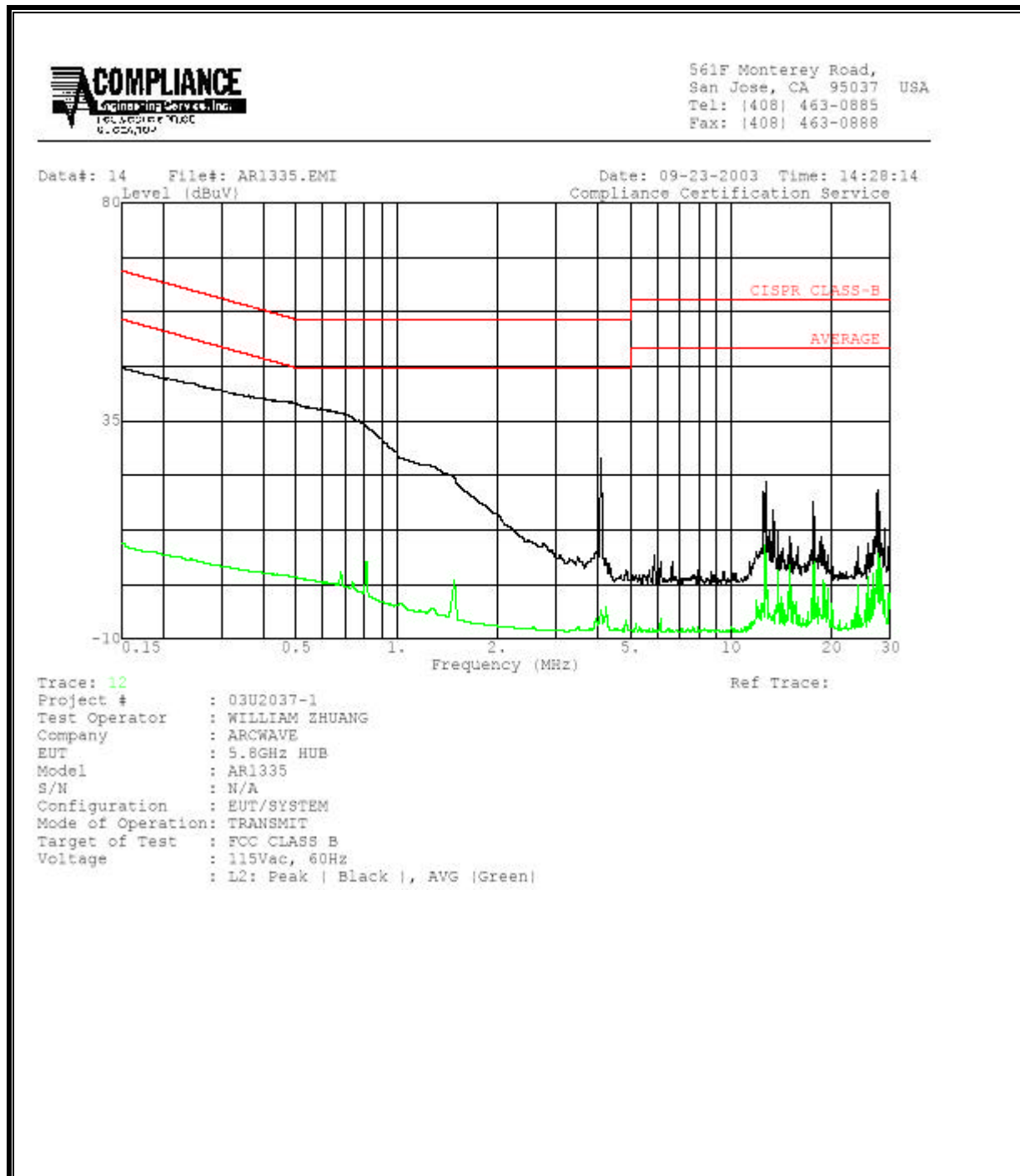
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.15	47.25	--	9.36	0.00	65.97	55.97	-18.72	-46.61	L1
12.32	26.28	--	-2.62	0.00	60.00	50.00	-33.72	-52.62	L1
18.14	20.14	--	-6.43	0.00	60.00	50.00	-39.86	-56.43	L1
0.15	45.90	--	9.76	0.00	65.94	55.94	-20.04	-46.18	L2
4.09	27.32	--	-3.91	0.00	56.00	46.00	-28.68	-49.91	L2
12.72	22.48	--	16.78	0.00	60.00	50.00	-37.52	-33.22	L2
6 Worst Data									



**LINE 1 RESULTS**



**LINE 2 RESULTS**

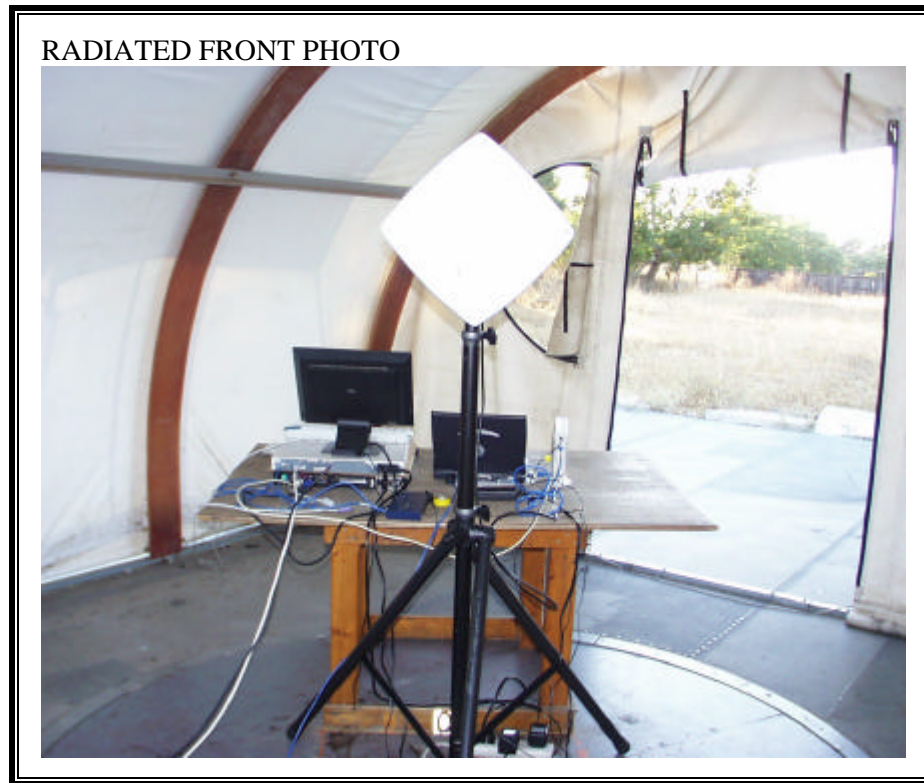


## 8. SETUP PHOTOS

### ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



**RADIATED RF MEASUREMENT SETUP**

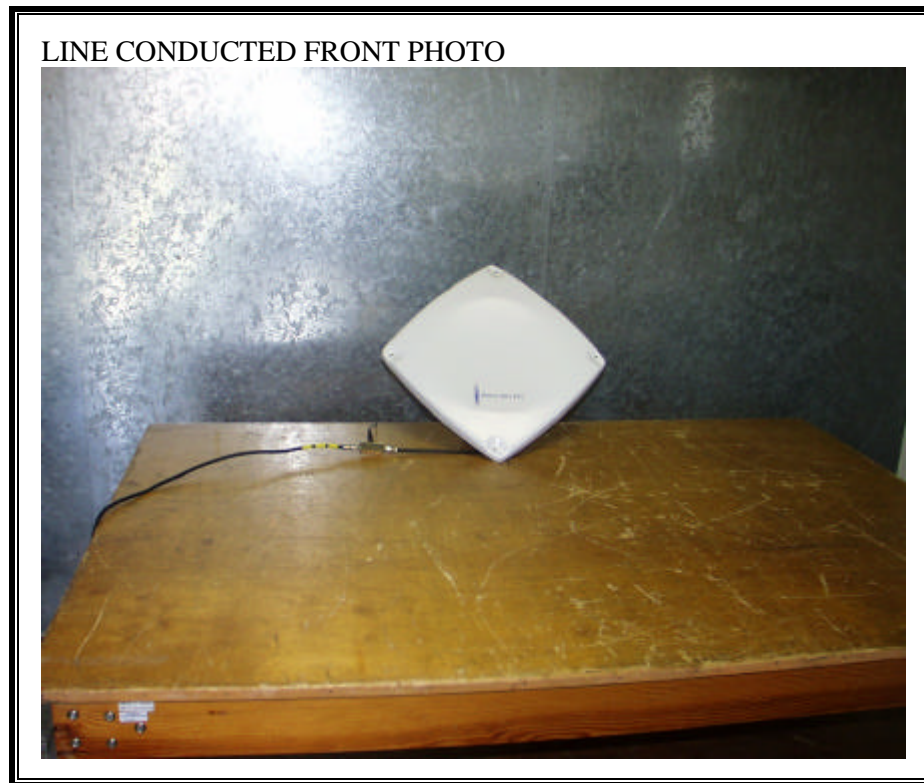


RADIATED BACK PHOTO





**POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP**





**END OF REPORT**