



**FCC CFR47 PART 15 SUBPART E
CERTIFICATION**

TEST REPORT

FOR

802.11A CARDBUS RADIO MODULE

MODEL NUMBER: AIR-RM21A-A-K9-THD

FCC ID: LDK102053

REPORT NUMBER: 04U2583-1

ISSUE DATE: MAY 5, 2004

Prepared for
**CISCO SYSTEMS, INC.
170 WEST TASMAN DRIVE
SAN JOSE, CA 95134**

Prepared by
**COMPLIANCE CERTIFICATION SERVICES
561F MONTEREY ROAD,
MORGAN HILL, CA 95037, USA
TEL: (408) 463-0885
FAX: (408) 463-0888**



TABLE OF CONTENTS

1. TEST RESULT CERTIFICATION.....	3
2. EUT DESCRIPTION.....	4
3. TEST METHODOLOGY	5
4. FACILITIES AND ACCREDITATION	5
5. CALIBRATION AND UNCERTAINTY.....	6
5.1. MEASURING INSTRUMENT CALIBRATION.....	6
5.2. MEASUREMENT UNCERTAINTY.....	6
5.3. TEST AND MEASUREMENT EQUIPMENT.....	7
6. SETUP OF EQUIPMENT UNDER TEST.....	8
7. APPLICABLE LIMITS AND TEST RESULTS	10
7.1. EMISSION BANDWIDTH.....	10
7.2. PEAK POWER.....	18
7.3. MAXIMUM PERMISSIBLE EXPOSURE	26
7.4. AVERAGE POWER.....	29
7.5. PEAK POWER SPECTRAL DENSITY	30
7.6. PEAK EXCURSION.....	38
7.7. CONDUCTED SPURIOUS EMISSIONS.....	45
7.8. RADIATED EMISSIONS.....	52
7.8.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS	52
7.8.2. TRANSMITTER RADIATED EMISSIONS ABOVE 1 GHZ	55
7.8.3. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz.....	74
7.9. POWERLINE CONDUCTED EMISSIONS	76
8. SETUP PHOTOS.....	83

1. TEST RESULT CERTIFICATION

COMPANY NAME: CISCO SYSTEMS, INC.
170 WEST TASMAN DRIVE
SAN JOSE, CA 95134

EUT DESCRIPTION: 802.11a CARDBUS RADIO MODULE

MODEL: AIR-RM21A-A-K9-THD

DATE TESTED: MARCH 29 - MAY 5, 2004

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 & Released For CCS By:

Tested By:



MICHAEL HECKROTTE
ENGINEERING MANAGER
COMPLIANCE CERTIFICATION SERVICES



DAVID GARCIA
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

The EUT is an 802.11a transceiver Cardbus module.

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

5150 to 5250 MHz Authorized Band

Frequency Band (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5180 - 5250	802.11a	15.00	31.62

5250 to 5350 MHz Authorized Band

Frequency Band (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5250 - 5320	802.11a	17.42	55.21

5725 to 5825 MHz Authorized Band

Frequency Band (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5725 - 5825	802.11a	17.72	59.16

The radio utilizes an integral antenna with a maximum gain of 5 dBi.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4/2001, FCC CFR 47 Part 2 and FCC CFR 47 Part 15.

4. FACILITIES AND ACCREDITATION

The test sites and 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:

PARAMETER	UNCERTAINTY
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				
Description	Manufacturer	Model	Serial Number	Cal Due
Spectrum Analyzer, 26.5 GHz	HP	8593EM	3710A00205	10/1/2004
Spectrum Analyzer	Agilent	E4446A	MY43360112	1/13/2005
EMI Receiver, 9 kHz ~ 2.9 GHz	HP	8542E	3942A00286	11/21/2004
RF Filter Section	HP	85420E	3705A00256	11/21/2004
EMI Test Receiver	R & S	ESHS 20	827129/006	7/17/2004
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	9001-3245	2/4/2005
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	2/4/2005
Antenna, Horn, 18 ~ 26 GHz	ARA	MWH-1826/B	1013	2/4/2005
Antenna, Horn 1 ~ 18 GHz	EMCO	3117	29301	12/26/2004
Preamplifier, 1 ~ 26 GHz	Miteq	NSP10023988	646456	4/25/2004
Amplifier 1-26GHz	MITEQ	NSP2600-SP	924342	4/25/2004
PreAmplifier 26-40 GHz	Miteq	NSP4000-SP2	924343	6/1/2004
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	8379443	10/13/2004
LISN, 10 kHz ~ 30 MHz	FCC	50/250-25-2	114	10/13/2004
Site A Line Stabilizer / Conditioner	Tripplite	LC-1800a	A0051681	CNR
Peak Power Meter	Agilent	E4416A	GB41291160	11/7/2004
5.15-5.35 Rejection Filter	Micronics	BRC 13190	2	CNR
5.47-5.725 Rejection Filter	Micronics	BRC 13191	1	CNR
5.75-5.875 Rejection Filter	Micronics	BRC 13192	2	CNR

6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop PC	IBM	T20	78-B3952	DOC
DC Power Supply	KRM	AEEEG-350	9712154746	None
DC Power Supply	Kenwood	PA36-3A	7060074	None
Extender Card	Sycard	PCC Extend 135	C135A-1066	None
External Antenna	Cisco	5 dBi	N/A	N/A
AC Adapter	IBM	02K6750	11S02K67050Z1Z2U P25G0L	None
AC Adapter	IBM	02K6749	11S02K6749ZJ1MN3 2734CC	None

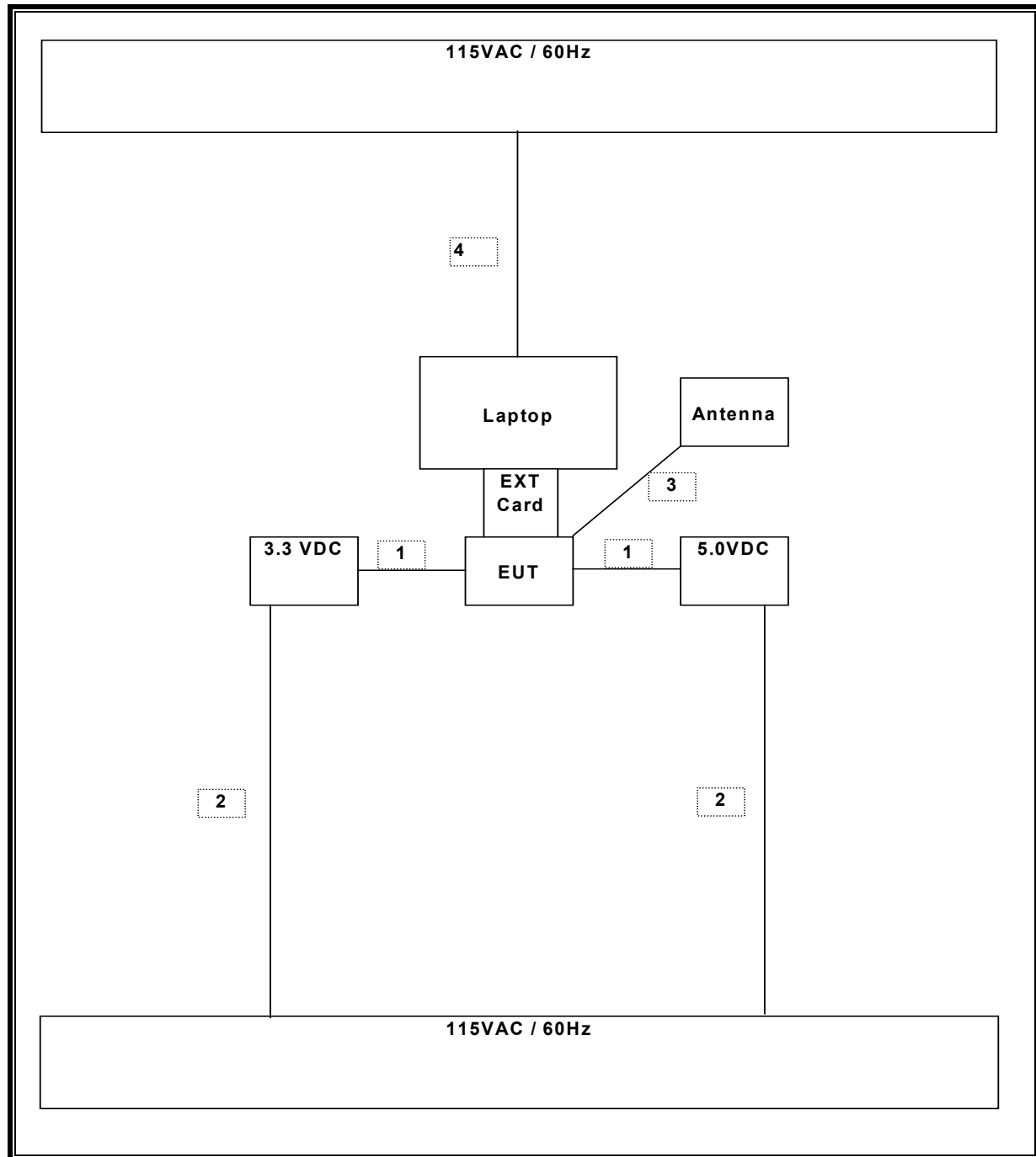
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	Extender	1	Banana to clip	unshielded	1.86M	Connected on Extender Card
2	AC	2	IEC	unshielded	1.86M	DC Power supplies
3	Antenna	1	UFL	shielded	.093M	Antenna cable
4	AC Adapter	1	IEC to Adapter	unshielded	1.86M	ferrite EUT end

TEST SETUP

The EUT is installed in a host laptop computer via a card bus extender card during the tests. Test software exercised the radio card. The EUT was set 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:

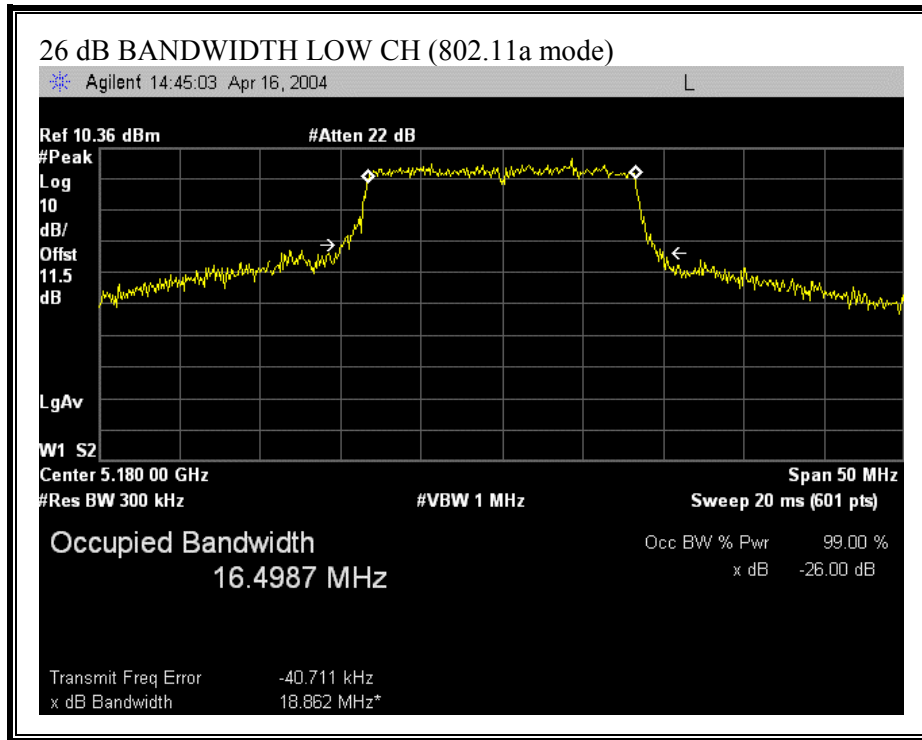
802.11a Mode, 5.2 GHz Band

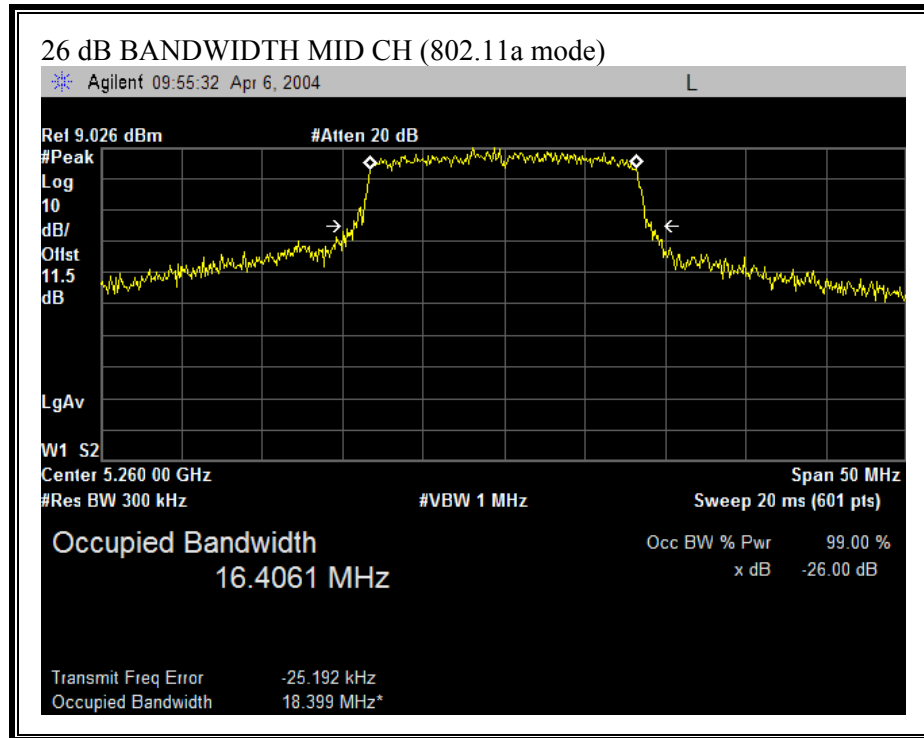
Channel	Frequency (MHz)	B (MHz)	10 Log B (dB)
Low	5180	18.86	12.76
Middle	5260	18.40	12.65
High	5320	18.41	12.65

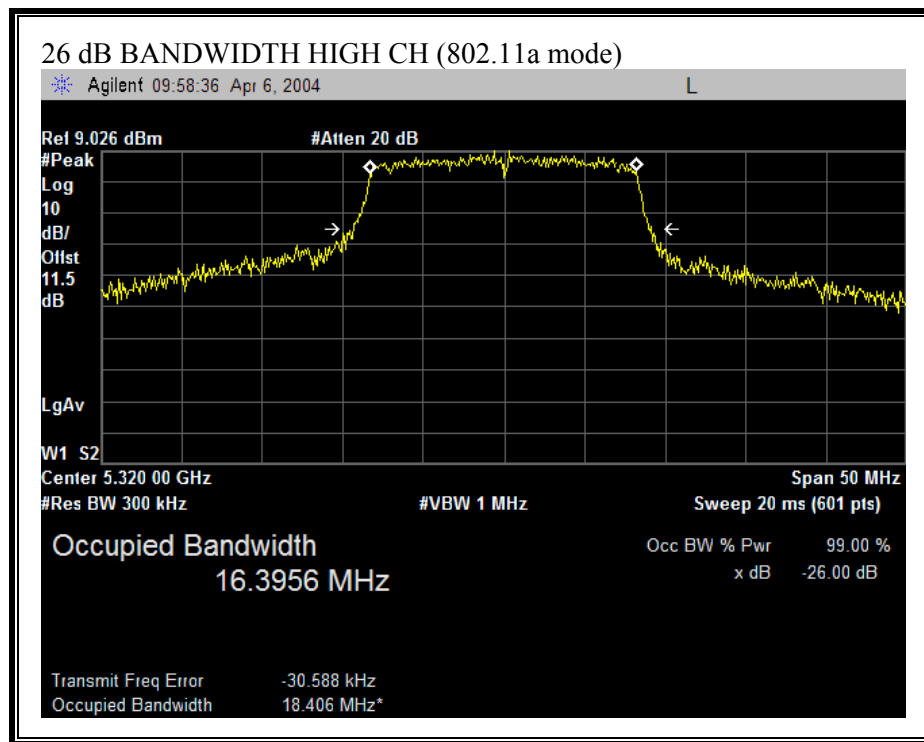
802.11a Mode, 5.8GHz Band

Channel	Frequency (MHz)	B (MHz)	10 Log B (dB)
Low	5745	18.65	12.71
Middle	5785	18.67	12.71
High	5805	18.55	12.68

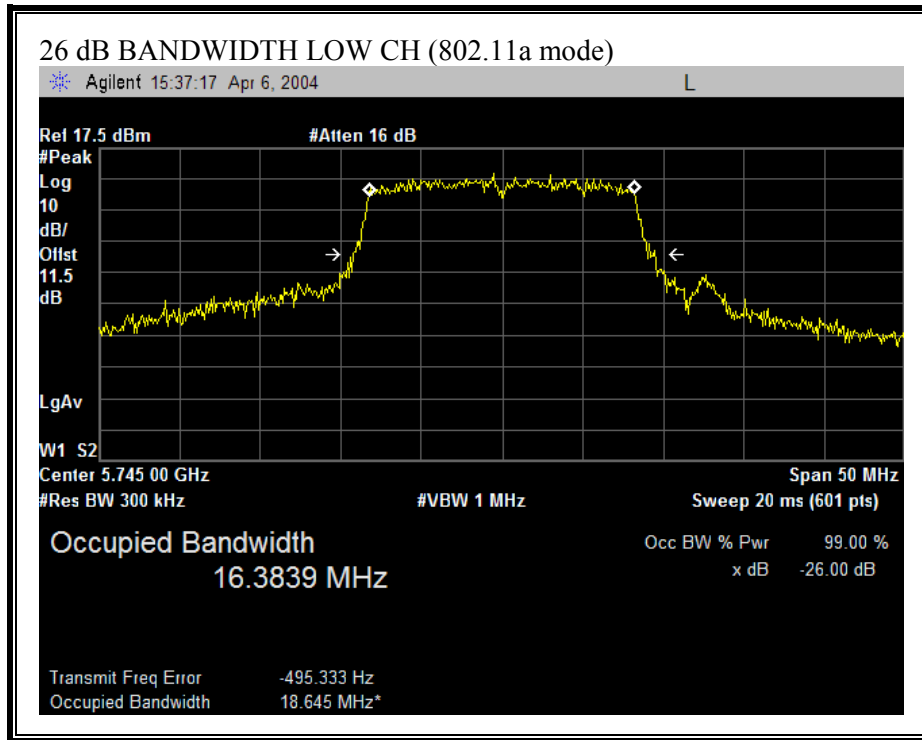
26 dB EMISSION BANDWIDTH (802.11a MODE, 5.2 GHz BAND)

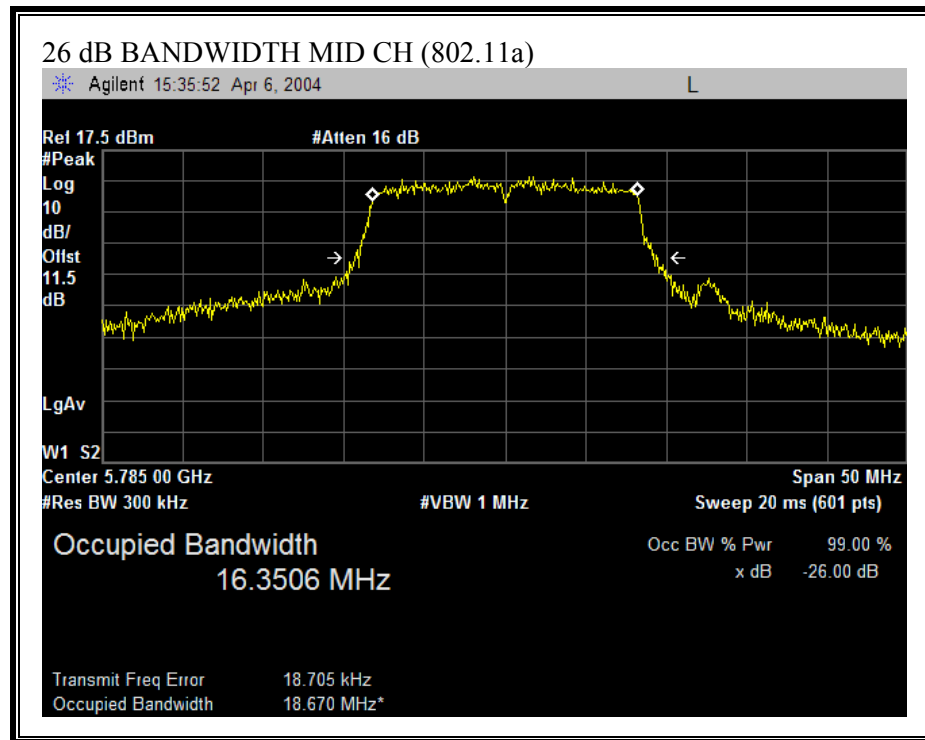


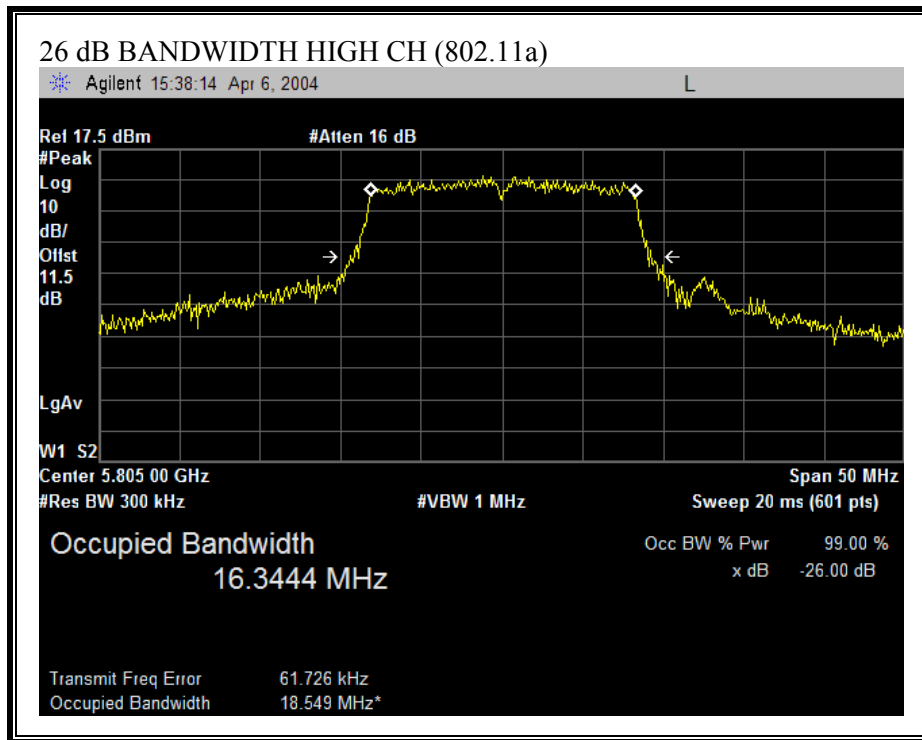




26 dB EMISSION BANDWIDTH (802.11a MODE, 5.8 GHz BAND)







7.2. PEAK POWER

LIMIT

§15.407 (a) (1) For the band 5.15-5.25 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 50 mW (17 dBm) or $4 \text{ dBm} + 10 \log B$, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 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.

§15.407 (a) (2) For the band 5.25-5.35 GHz and 5.47-5.725 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.

§15.407 (a) (3) For the band 5.725-5.825 GHz, the peak transmit power the peak transmit power over the frequency band of operation shall not exceed the lesser of 1 W or $17 \text{ dBm} + 10 \log B$, 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. However, fixed point to point U-NII devices operating in this band may employ transmitting antennas with directional gain up to 23 dBi without any corresponding reduction in the transmitter peak output power or peak power spectral density. For fixed, point-to-point U-NII transmitters that employ a directional antenna gain greater than 23dBi, a 1 dB reduction in peak transmitter power and peak spectral density for each 1 dB of antenna gain in excess of 23 dBi would be required. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omni directional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that the systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

EIRP LIMIT

None; for reporting purposes only.

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 continuously therefore Method # 1 is used.

LIMITS AND RESULTS

No non-compliance noted:

Limit in 5150 to 5250 MHz Band

Mode	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
802.11a	5180	17	18.86	16.76	5.00	16.76

Limit in 5250 to 5350 MHz Band

Mode	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
802.11a	5260	24	18.399	23.65	5.00	23.65
802.11a	5320	24	18.406	23.65	5.00	23.65

Limit in 5725 to 5825 MHz Band

Mode	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	17 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
802.11a	5745	30	18.645	29.71	5.00	29.71
802.11a	5785	30	18.67	29.71	5.00	29.71
802.11a	5805	30	18.549	29.68	5.00	29.68

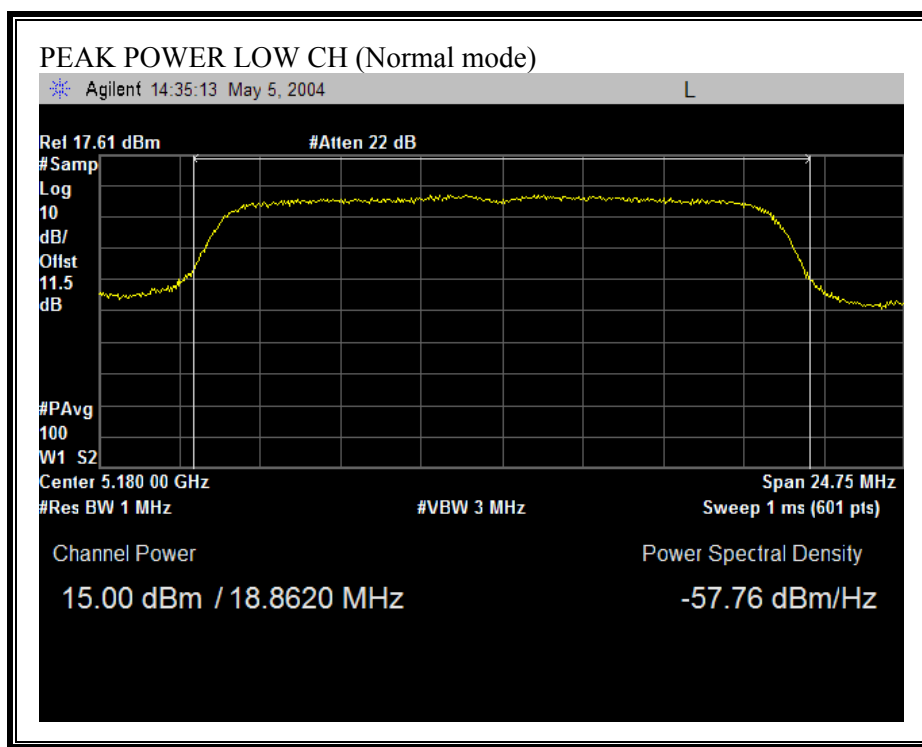
802.11a mode Results

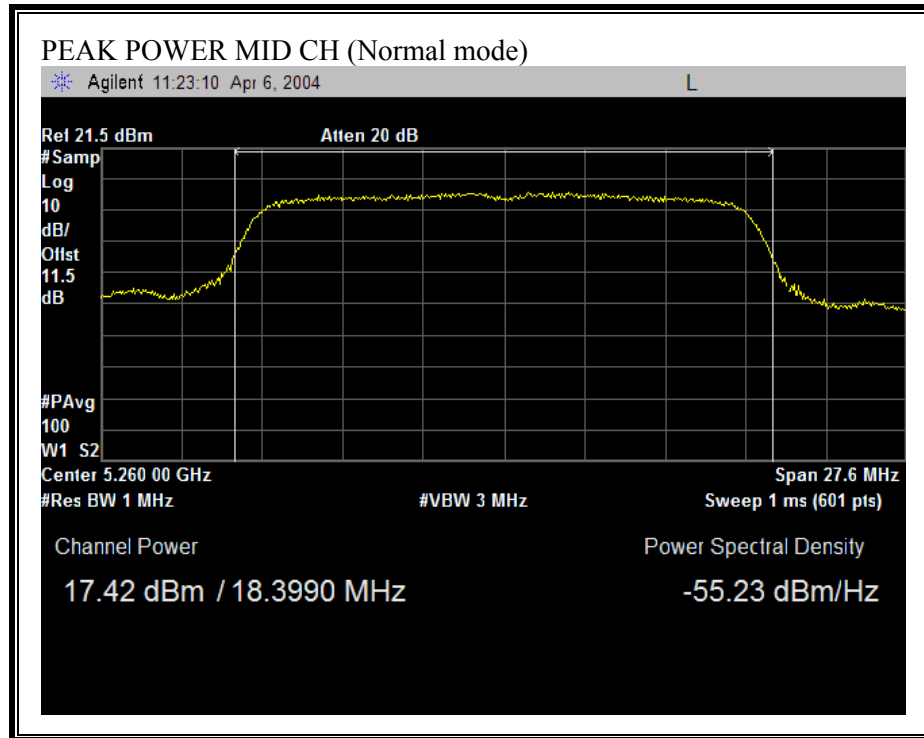
Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5180	15.00	16.76	-1.76
Middle	5260	17.42	23.65	-6.23
High	5320	17.41	23.65	-6.24

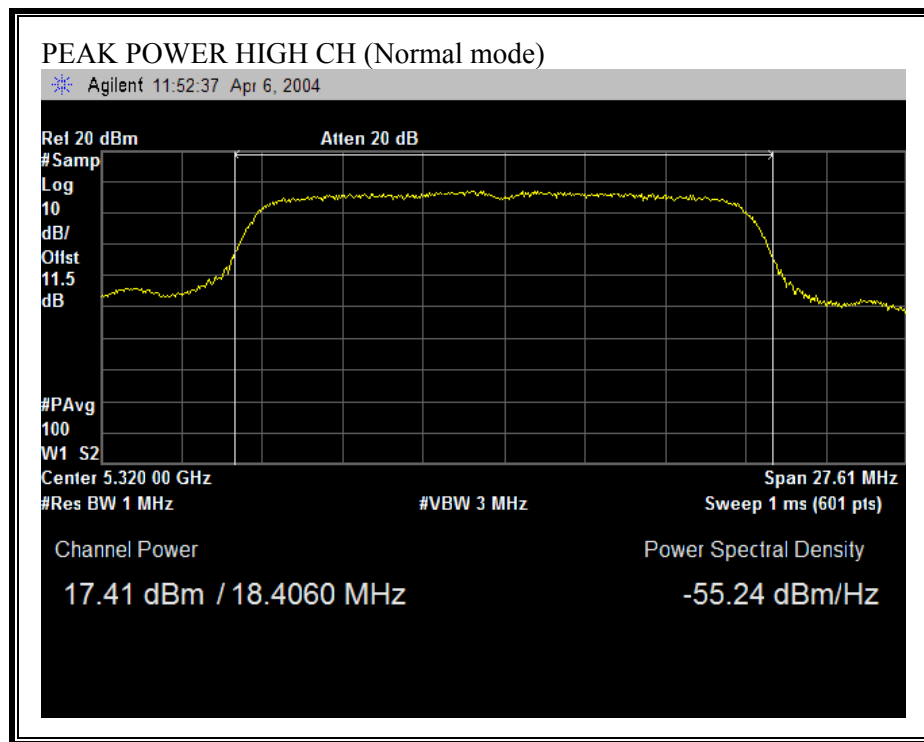
802.11a mode Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5745	17.72	29.71	-11.99
Middle	5785	17.53	29.71	-12.18
High	5805	17.44	29.68	-12.24

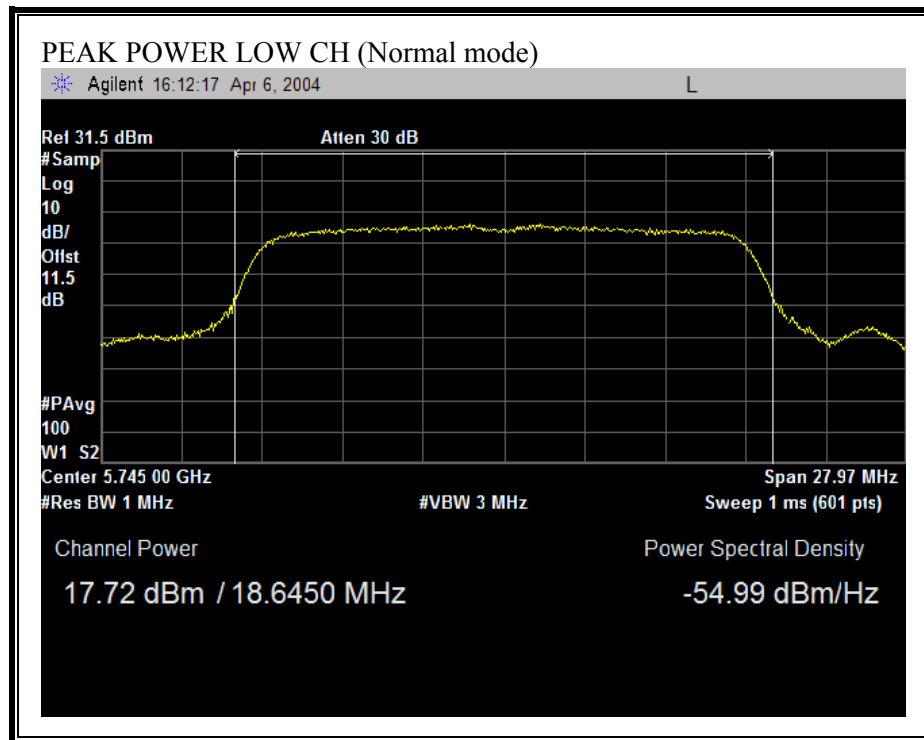
PEAK POWER (NORMAL MODE, 5.2 GHz BAND)

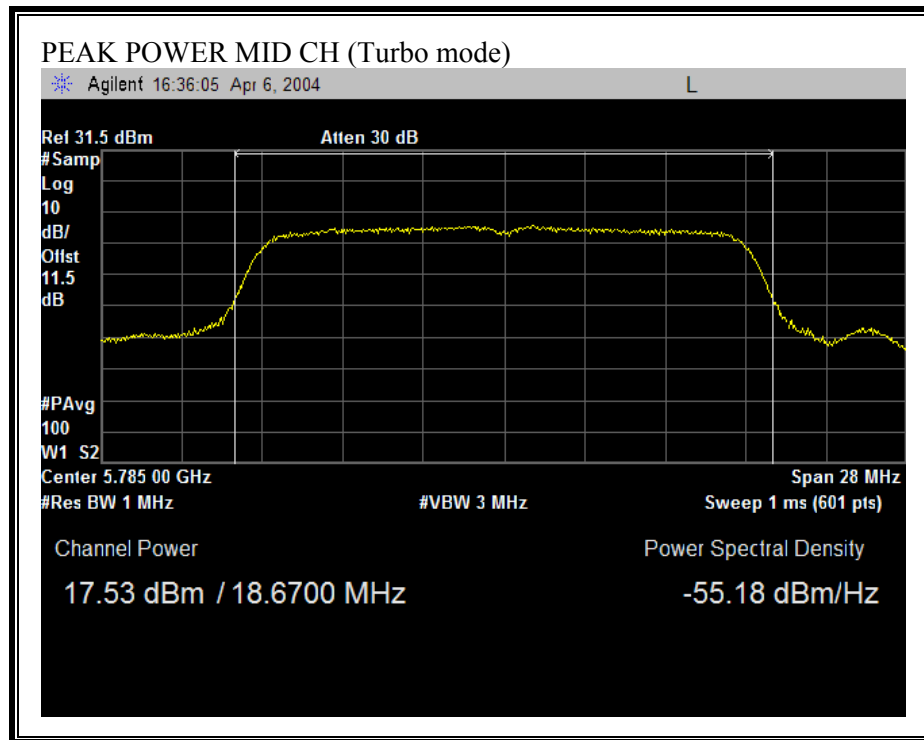


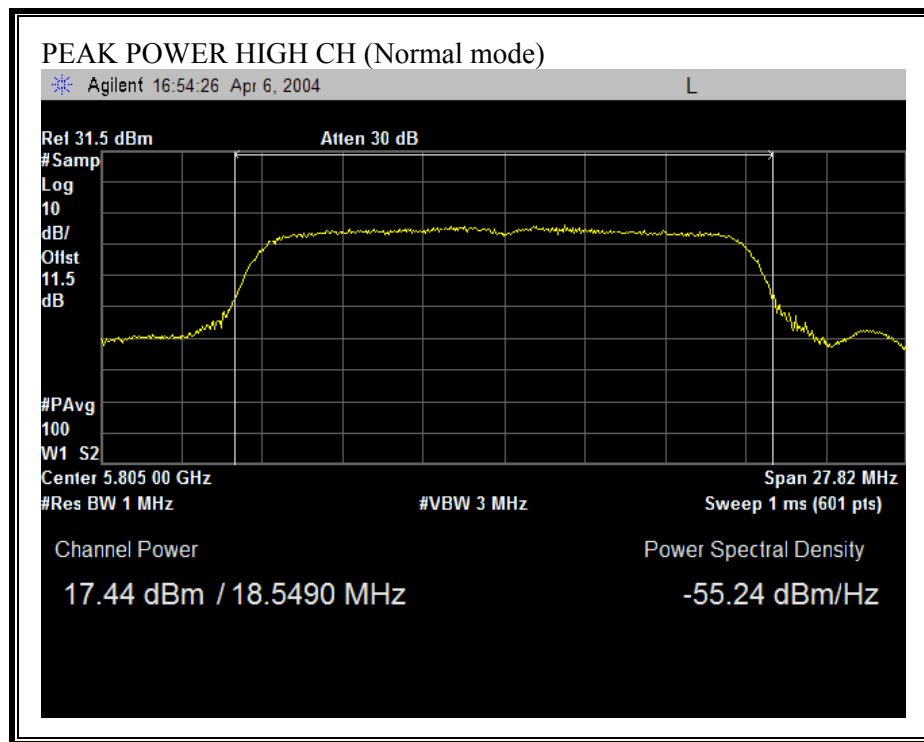




PEAK POWER (NORMAL MODE, 5.8 GHz BAND)







7.3. MAXIMUM PERMISSIBLE EXPOSURE

LIMITS

§1.1310 The criteria listed in Table 1 shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)—Continued

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
30–300	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

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 Power to mW and Distance to 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/cm²

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/cm²

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

LIMITS

From §1.1310 Table 1 (B), $S = 1.0 \text{ mW/cm}^2$

RESULTS

No non-compliance noted:

Band (MHz)	Power Density Limit (mW/cm²)	Output Power (dBm)	Antenna Gain (dBi)	MPE Distance (cm)
5150-5250 MHz	1.0	15.00	5.00	2.82
5250-5320 MHz	1.0	17.42	5.00	3.73
5725-5825 MHz	1.0	17.72	5.00	3.86

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. AVERAGE POWER

AVERAGE POWER LIMIT

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

No non-compliance noted:

The cable assembly insertion loss of 12 dB (including 10 dB pad and 2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

802.11a Mode

Channel	Frequency (MHz)	Average Power (dBm)
Low	5180	14.98
Middle	5260	17.00
High	5320	17.00

802.11a Mode

Channel	Frequency (MHz)	Average Power (dBm)
Low	5745	17.20
Middle	5785	17.10
High	5805	17.00

7.5. PEAK POWER SPECTRAL DENSITY

LIMIT

§15.407 (a) (1) For the band 5.15-5.25 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 50 mW (17 dBm) or $4 \text{ dBm} + 10 \log B$, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 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.

§15.407 (a) (2) For the band 5.25-5.35 GHz and 5.47-5.725 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.

§15.407 (a) (3) For the band 5.725-5.825 GHz, the peak transmit power the peak transmit power over the frequency band of operation shall not exceed the lesser of 1 W or $17 \text{ dBm} + 10 \log B$, 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. However, fixed point to point U-NII devices operating in this band may employ transmitting antennas with directional gain up to 23 dBi without any corresponding reduction in the transmitter peak output power or peak power spectral density. For fixed, point-to-point U-NII transmitters that employ a directional antenna gain greater than 23dBi, a 1 dB reduction in peak transmitter power and peak spectral density for each 1 dB of antenna gain in excess of 23 dBi would be required. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omni directional applications, and multiple colocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that the systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

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

802.11a Mode, 5.2 GHz Band

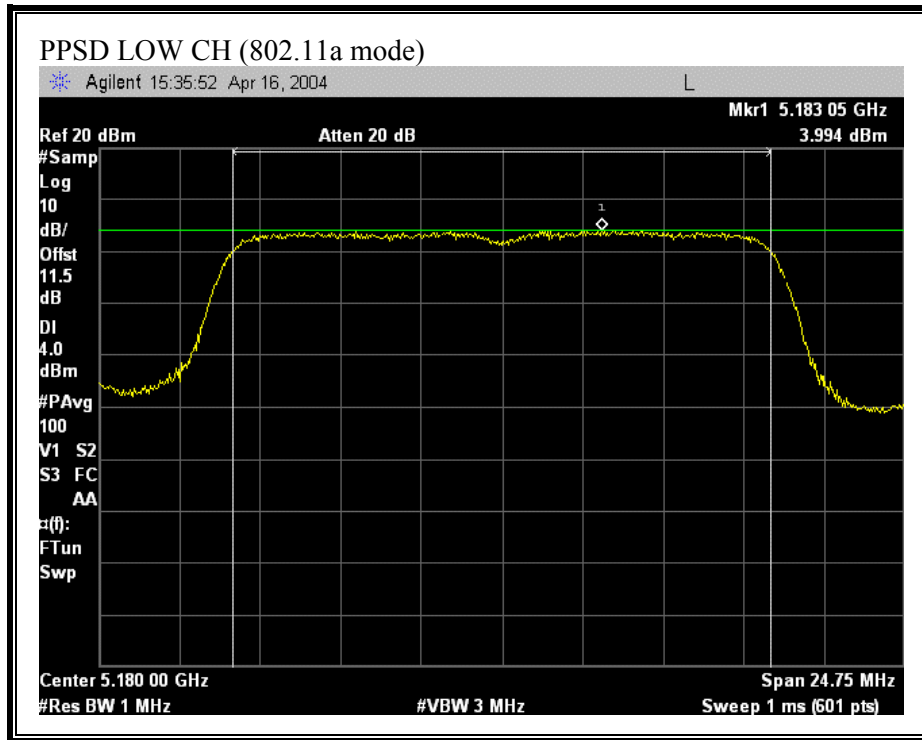
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5180	3.99	4.00	-0.01
Middle	5260	7.28	11.00	-3.73
High	5320	7.23	11.00	-3.77

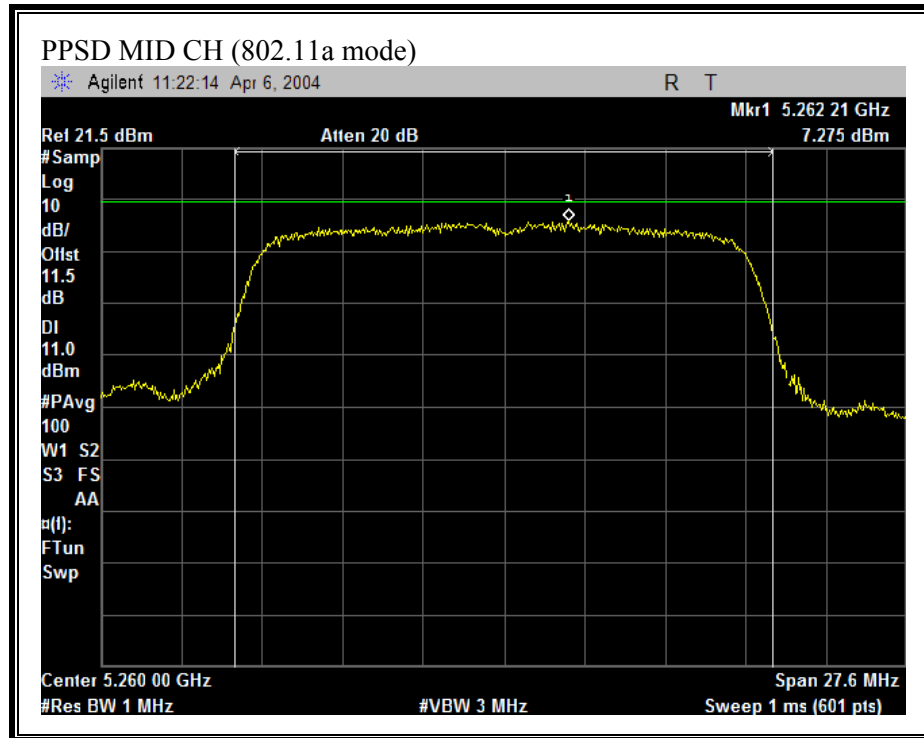
802.11a Mode. 5.8 GHz Band

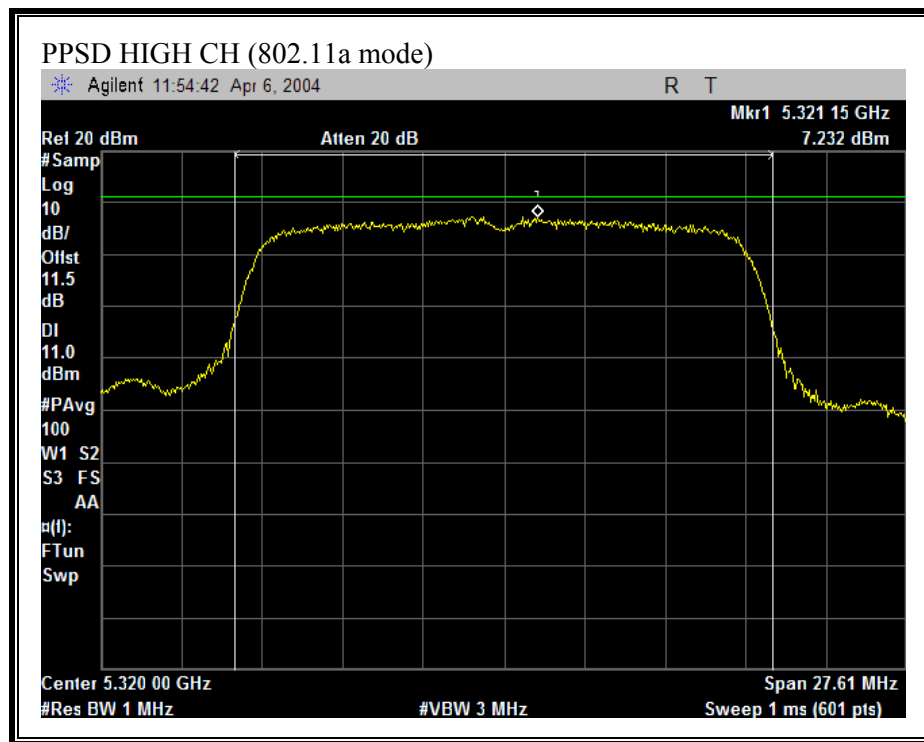
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5745	7.56	17.00	-9.44
Middle	5785	7.18	17.00	-9.82
High	5805	7.61	17.00	-9.39

No non-compliance noted:

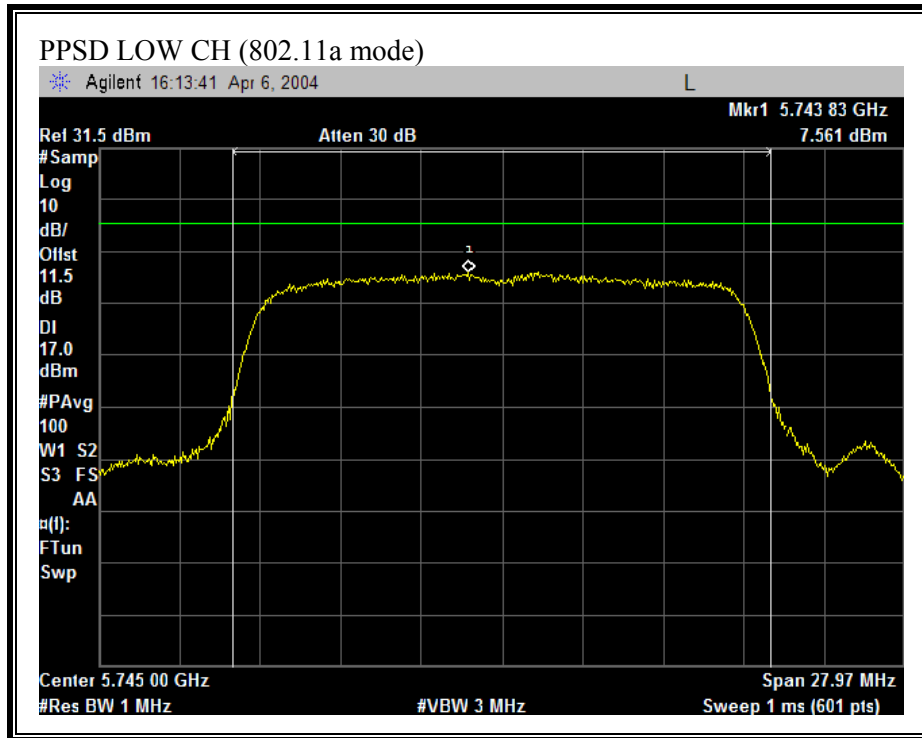
PEAK POWER SPECTRAL DENSITY (802.11a MODE, 5.2 GHZ BAND)

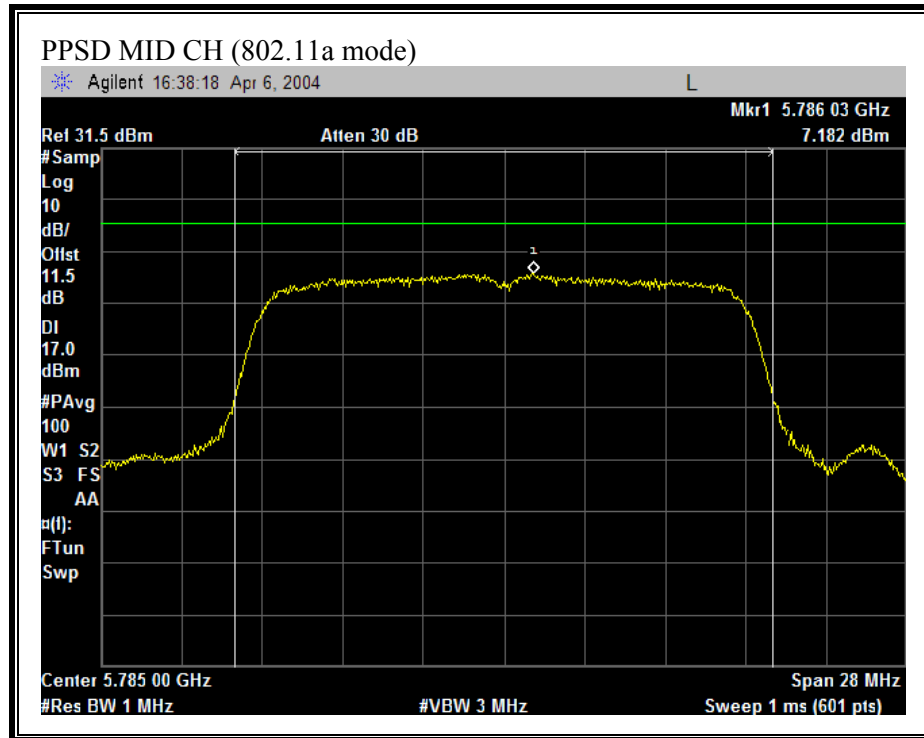


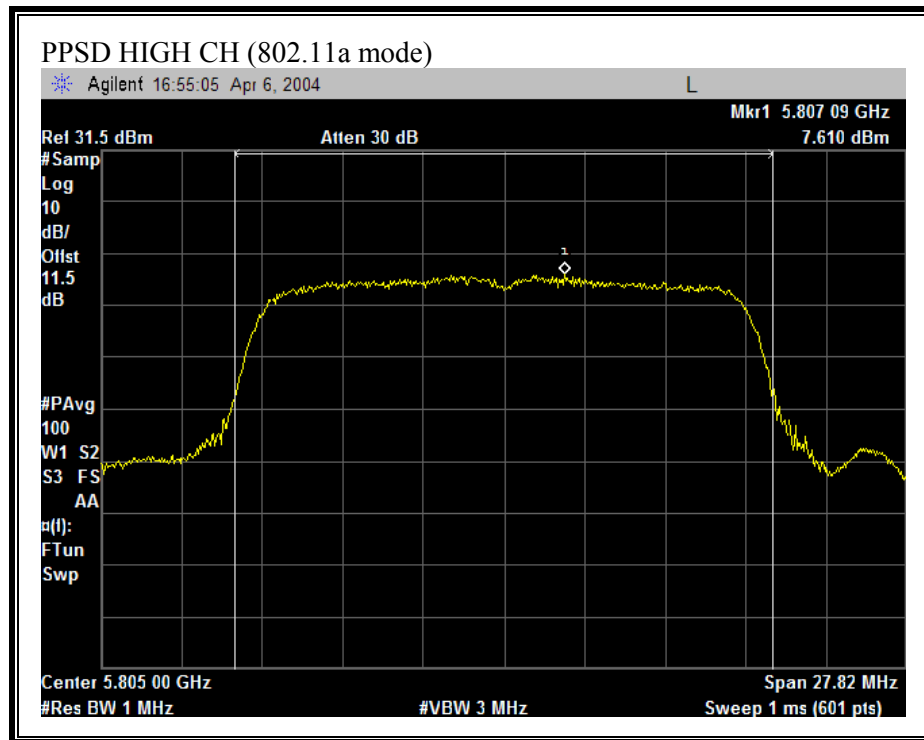




PEAK POWER SPECTRAL DENSITY (802.11a MODE, 5.8GHZ BAND)







7.6. 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 # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

No non-compliance noted:

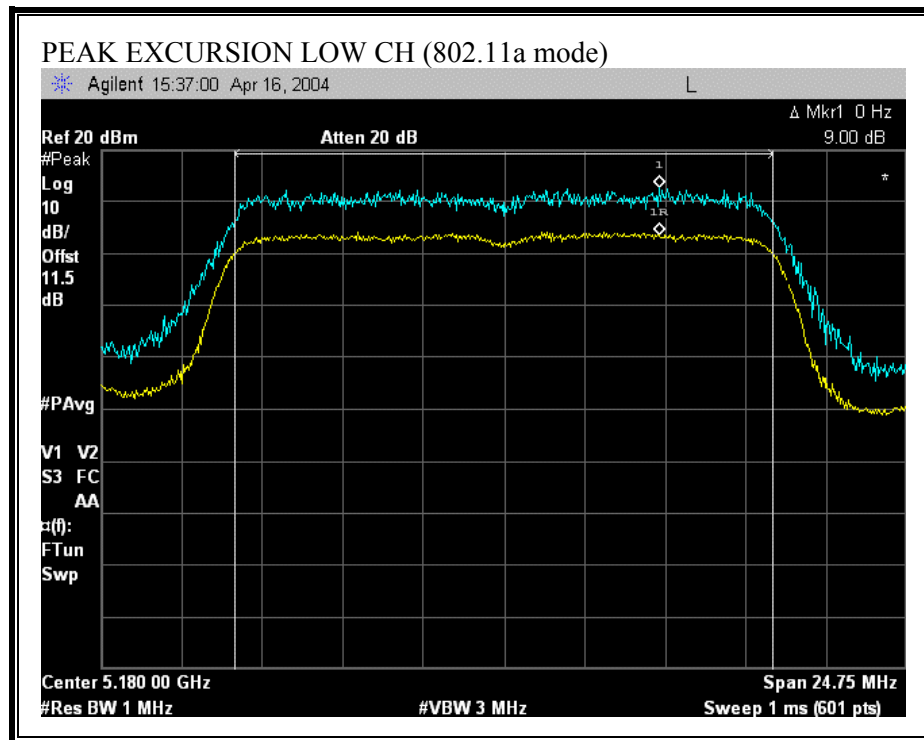
802.11a Mode, 5.2 GHz Band

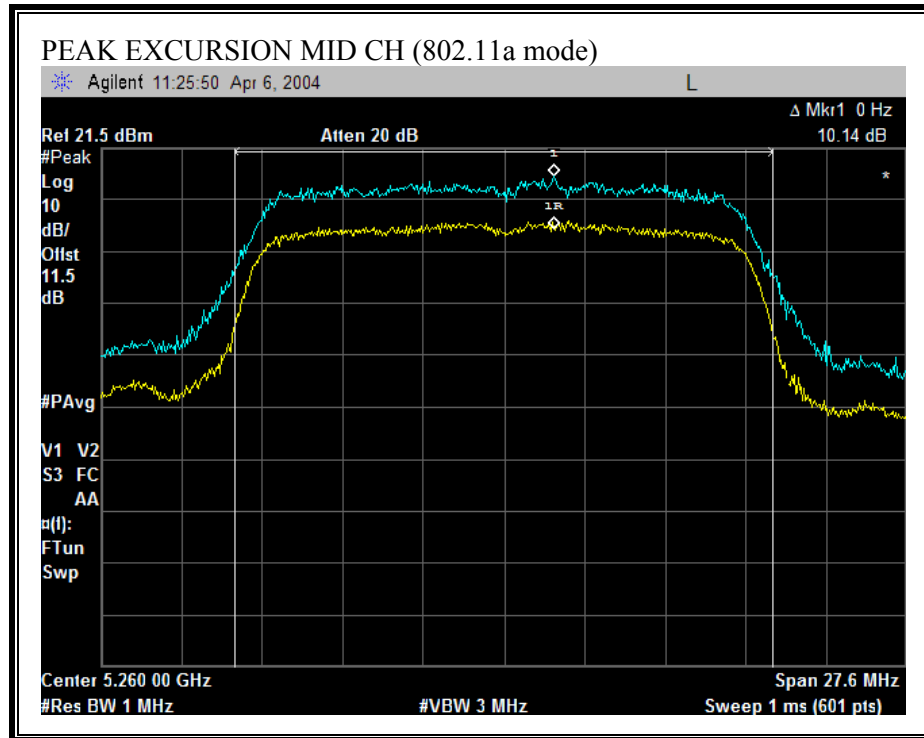
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5180	9.00	13	-4.00
Middle	5260	10.14	13	-2.86
High	5320	8.79	13	-4.21

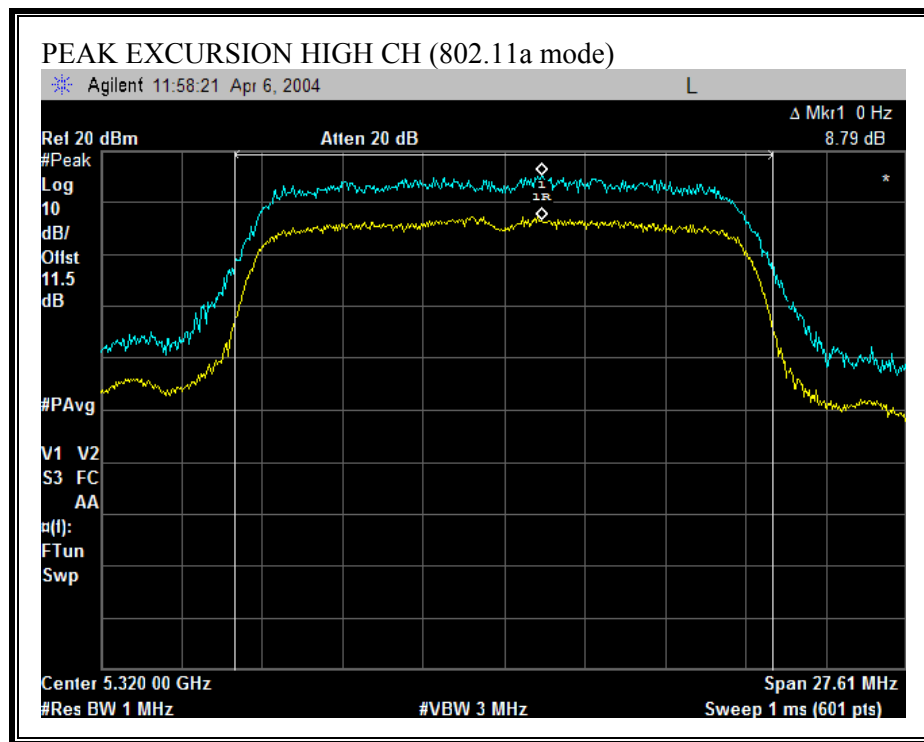
802.11a Mode, 5.8 GHz Band

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5745	8.56	13	-4.44
Middle	5785	7.40	13	-5.60
High	5805	9.24	13	-3.76

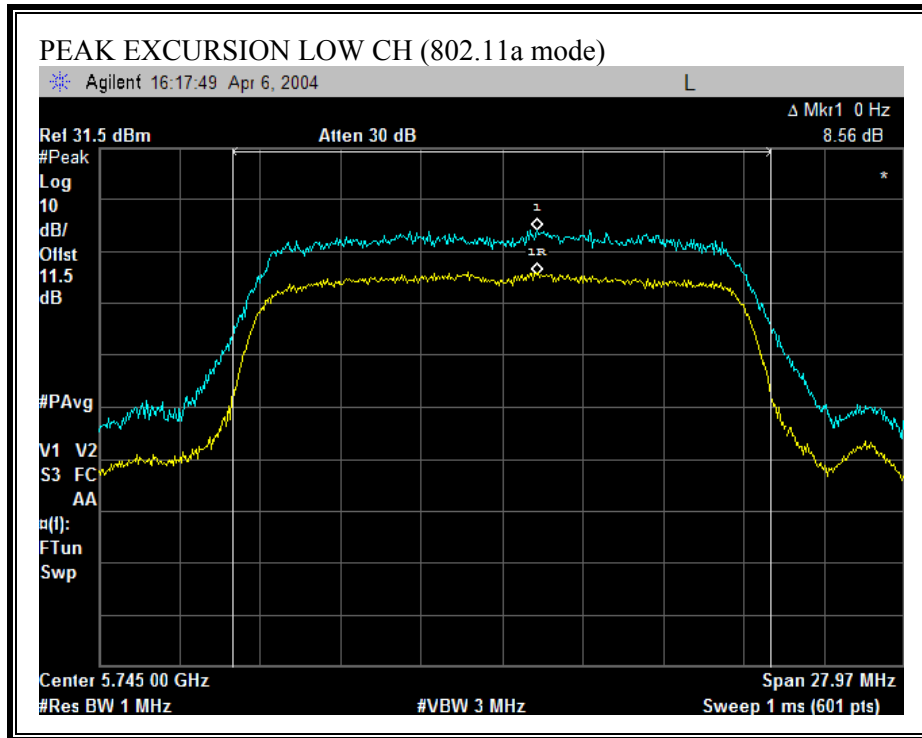
PEAK EXCURSION (802.11a MODE, 5.2 GHz BAND)

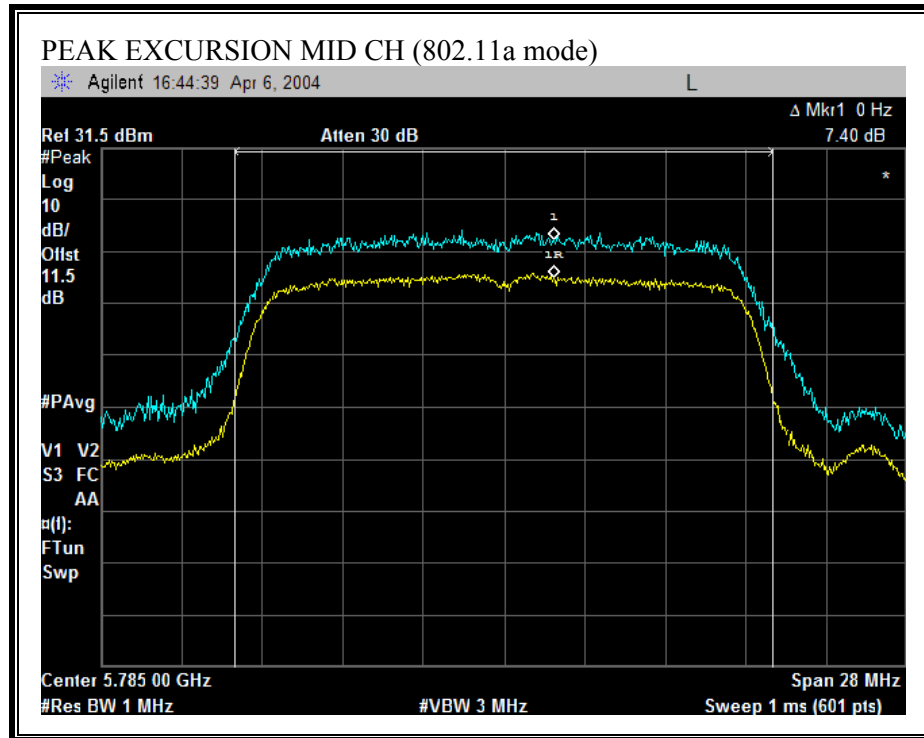


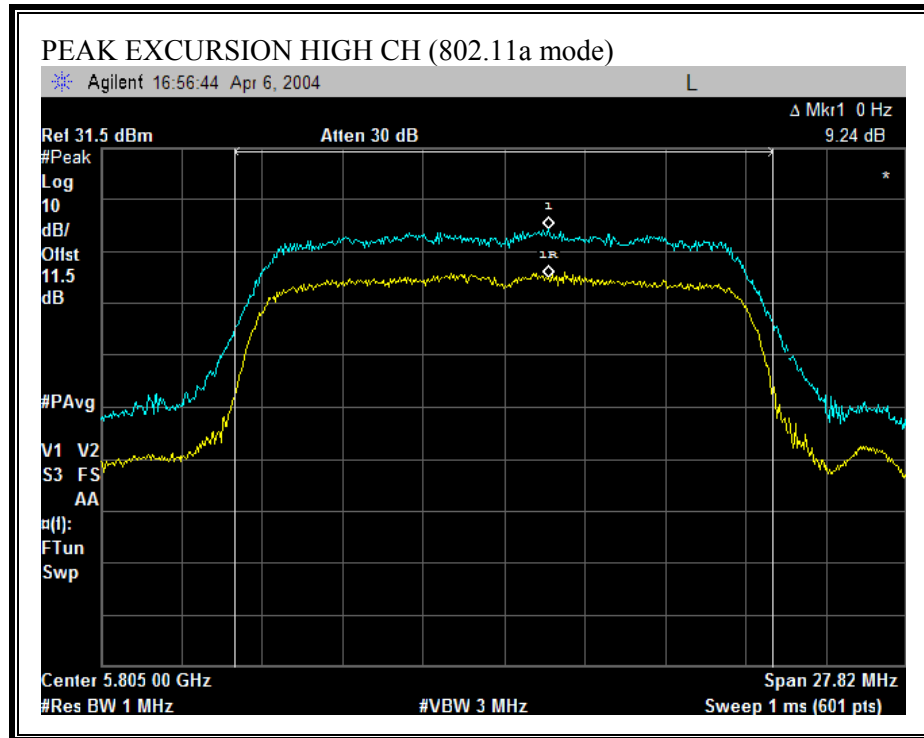




PEAK EXCURSION (802.11a MODE, 5.8GHz BAND)







7.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

§15.407 (b) (1) For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz.

§15.407 (b) (2) For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of –27 dBm/MHz. Devices operating in the 5.25–5.35 GHz band that generate emissions in the 5.15–5.25 GHz band must meet all applicable technical requirements for operation in the 5.15–5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of 27 dBm/MHz in the 5.15–5.25 GHz band.

§15.407 (b) (3) For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of -27 dBm / 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.

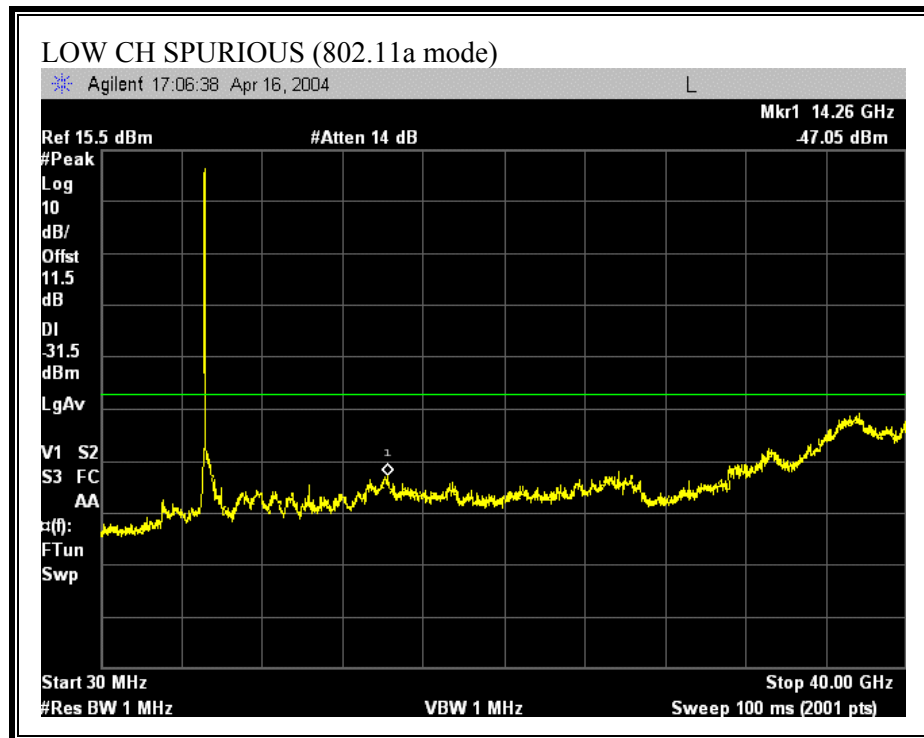
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements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

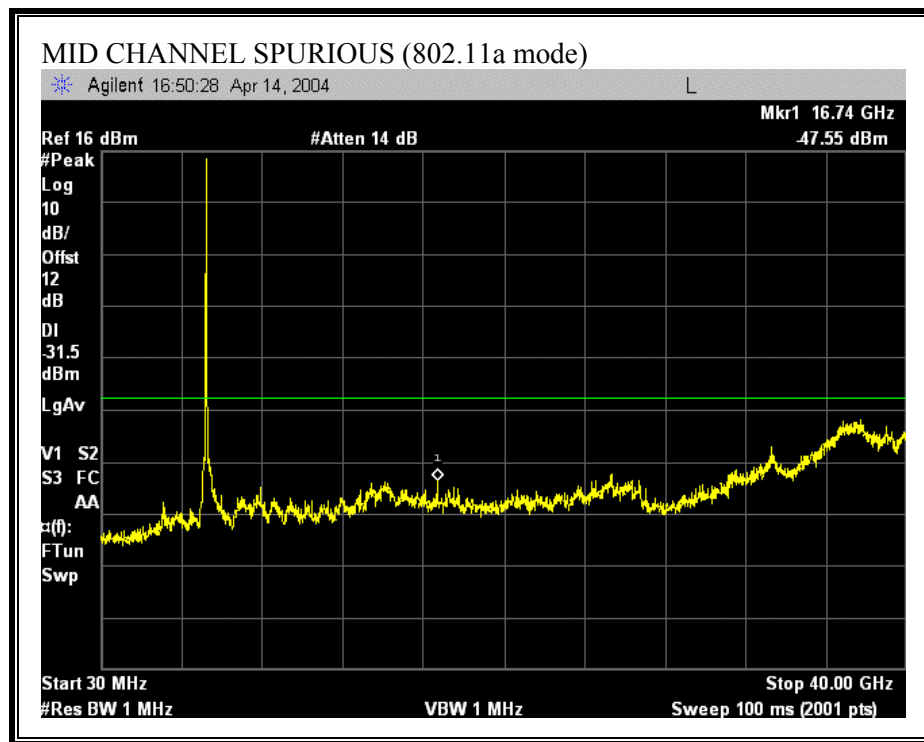
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

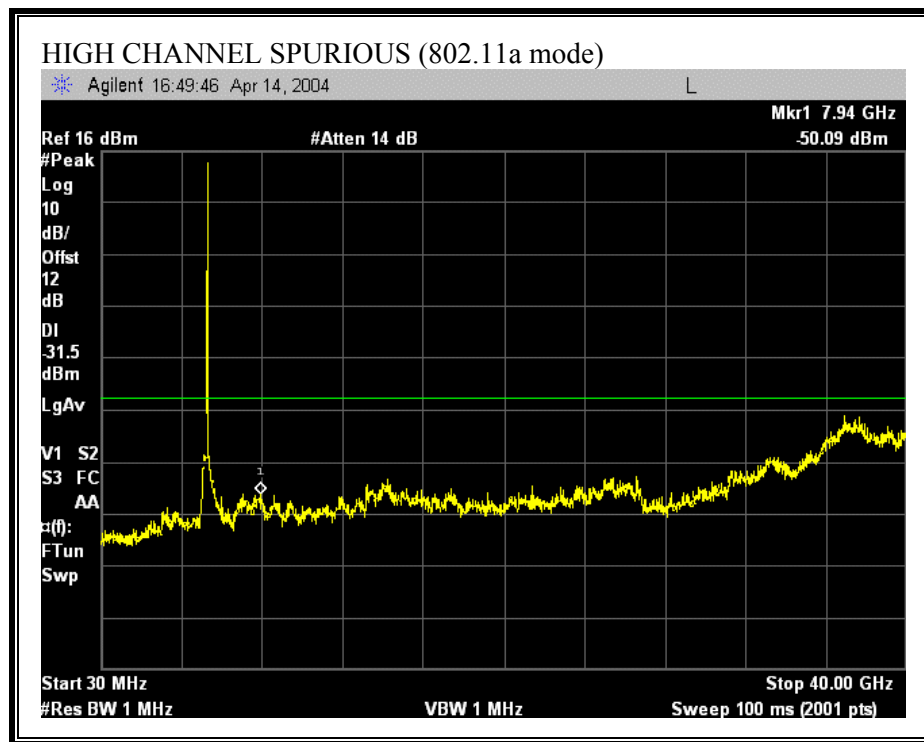
RESULTS

No non-compliance noted:

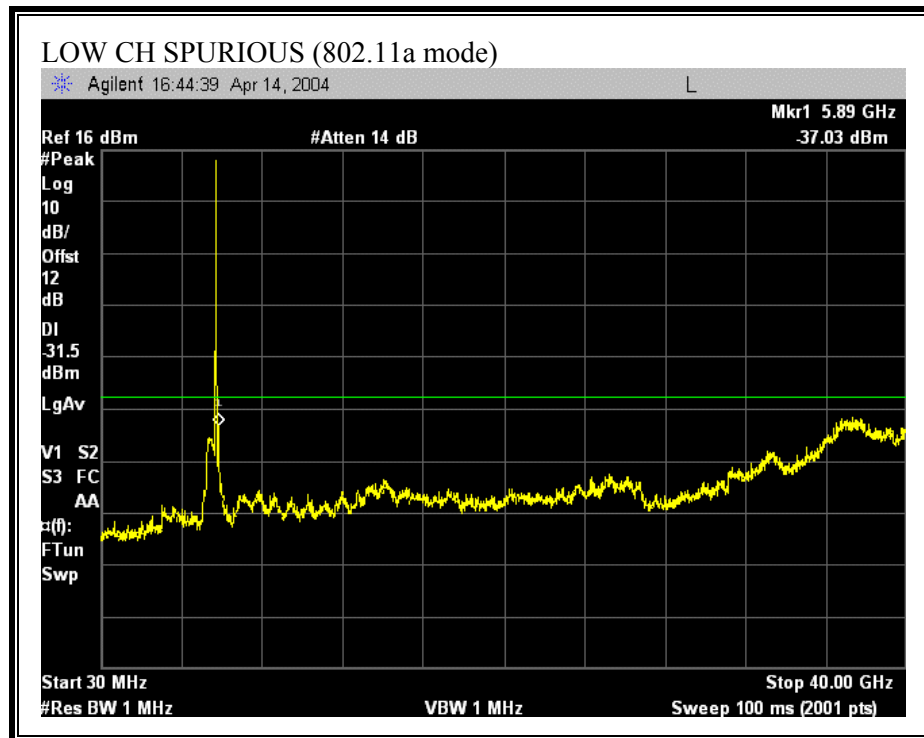
SPURIOUS EMISSIONS (802.11a MODE, 5.2 GHz BAND)

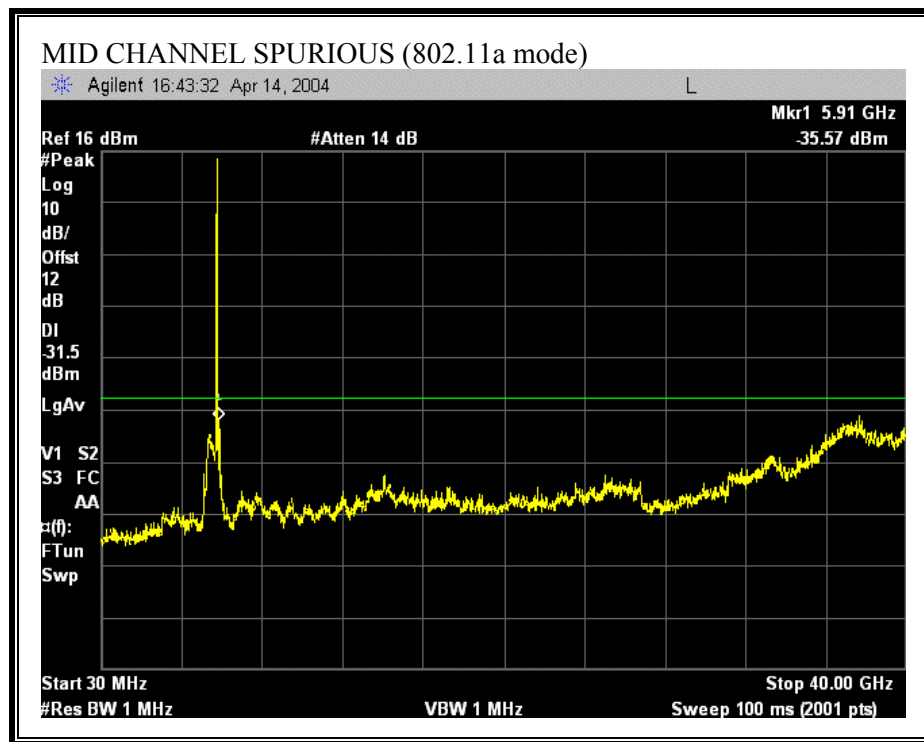


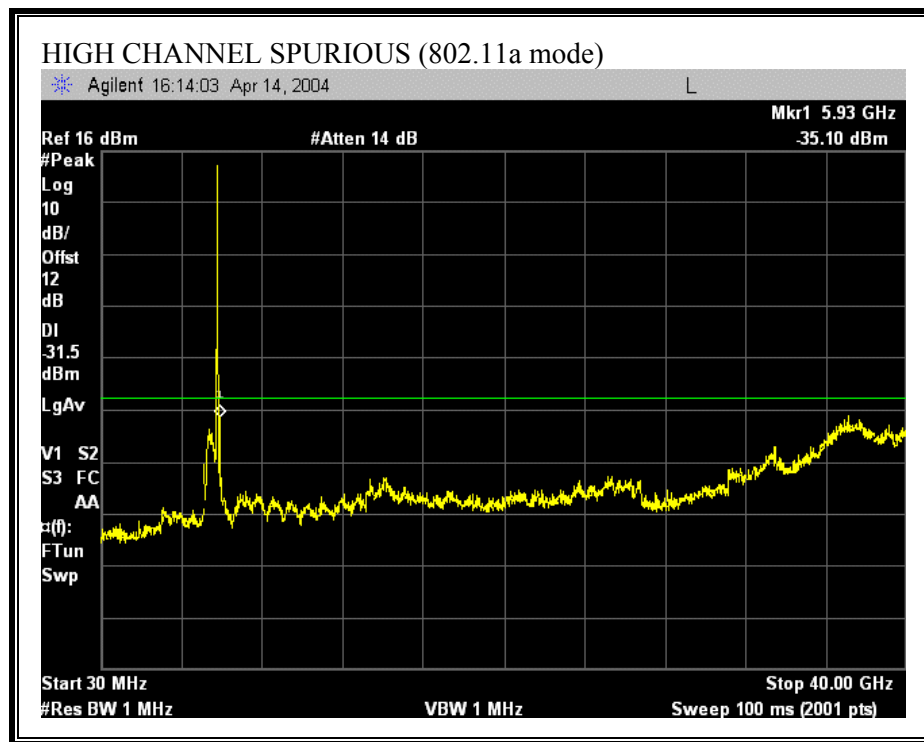




SPURIOUS EMISSIONS (802.11a MODE, 5.8 GHz BAND)







7.8. RADIATED EMISSIONS

7.8.1. TRANSMITTER RADIATED SPURIOUS 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
¹ 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	(²)
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² 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:

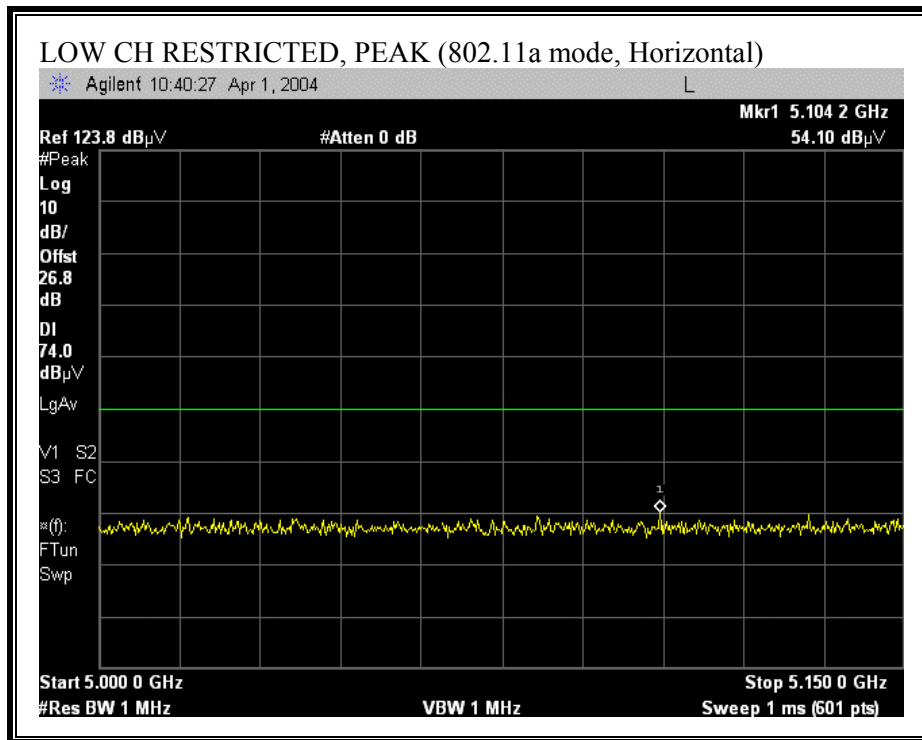
7.8.2. TRANSMITTER RADIATED EMISSIONS ABOVE 1 GHZ

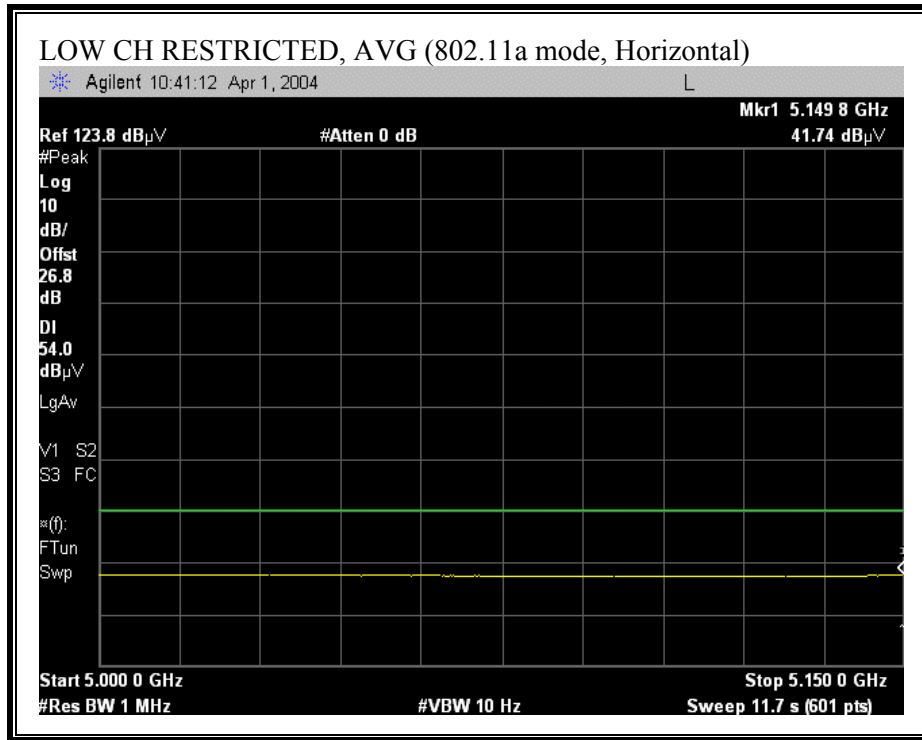
REPORTING NOTES

The nearby restricted band stops 10 MHz below the authorized band. A single plot is taken to show both restricted band emission levels and out-of-band radiated spurious emission levels at and near the lower authorized bandedge. The out-of-band spurious limits of -7 dBm Peak EIRP and -27 dBm Average EIRP are converted to the equivalent 3 meter field strengths of 88.2 dBuV/m Peak and 68.2 dBuV/m Average, respectively, for reporting purposes.

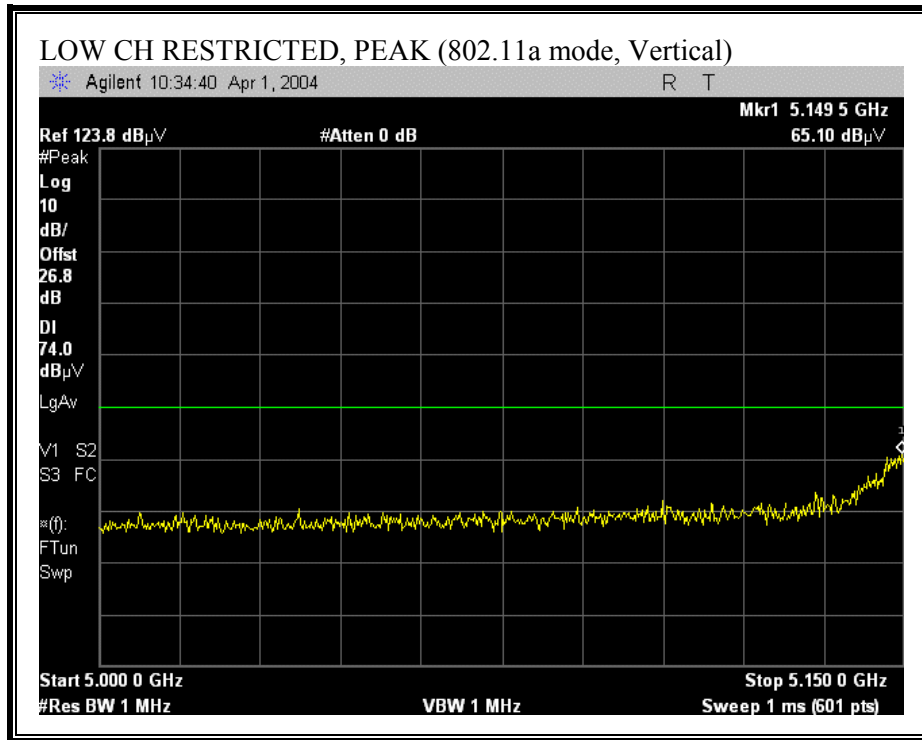
The out-of- band radiated spurious emission levels at and near the upper authorized bandedge are reported as EIRP values.

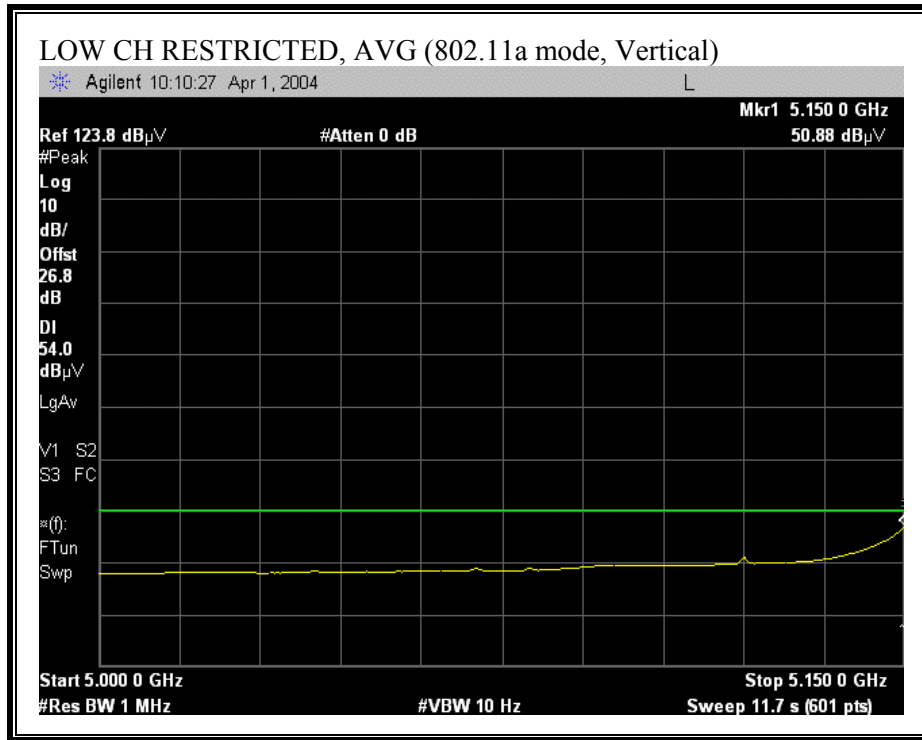
RESTRICTED BAND & BANDEDGE (802.11a MODE, LOW CHANNEL, 5.2 GHz BAND, HORIZONTAL)



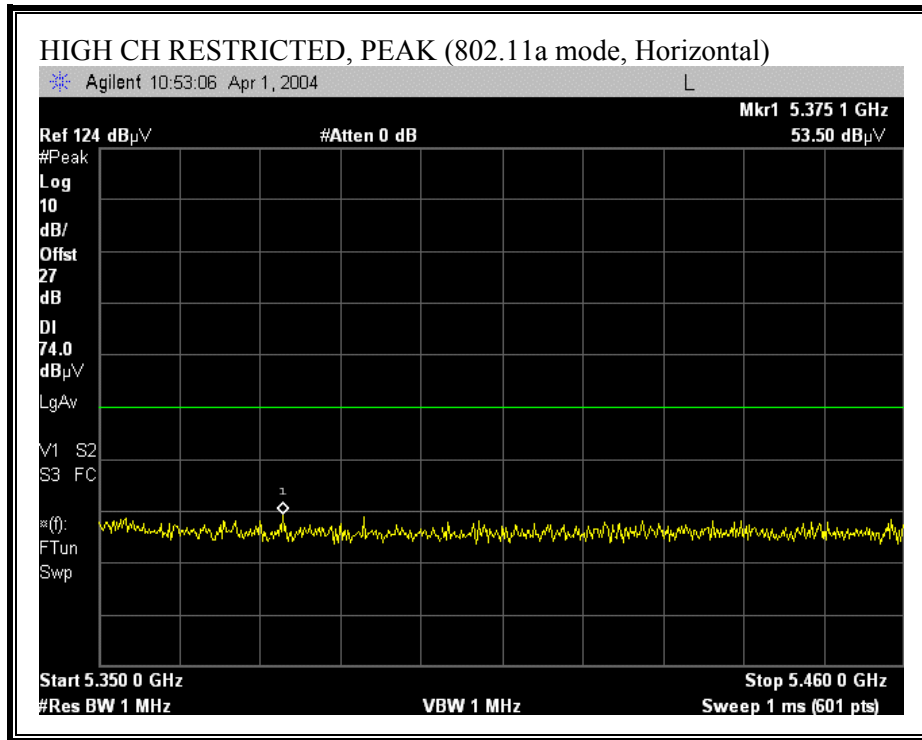


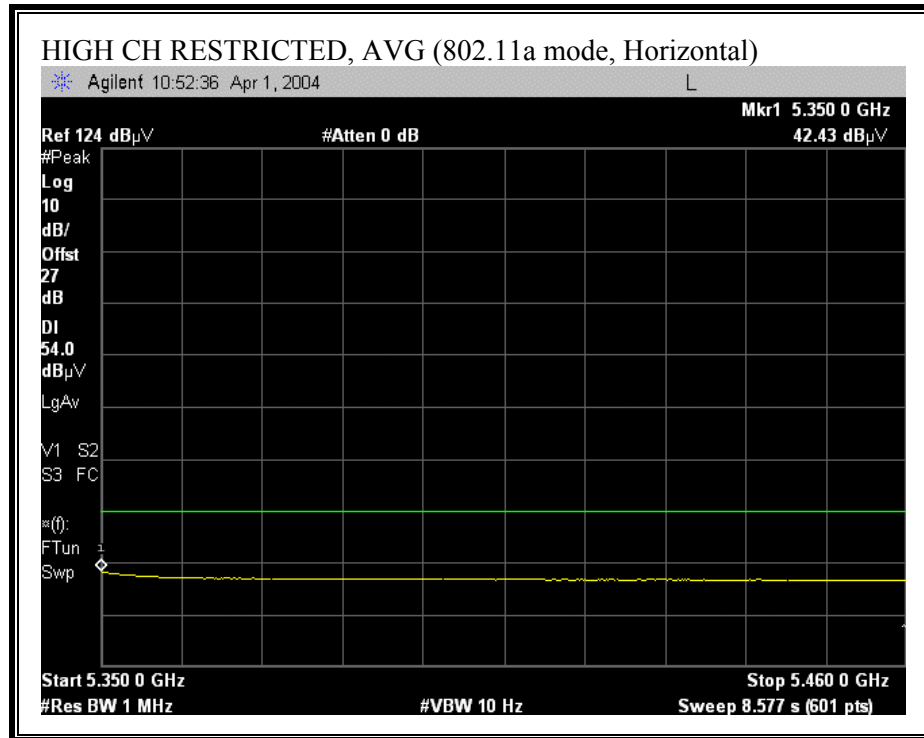
RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, 5.2 GHz BAND, VERTICAL)



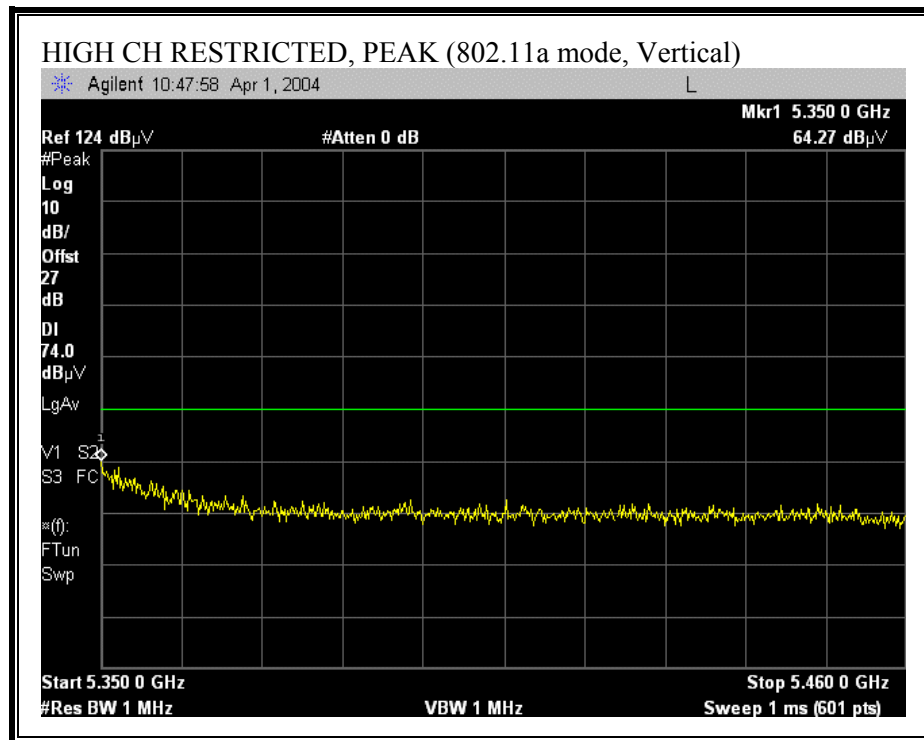


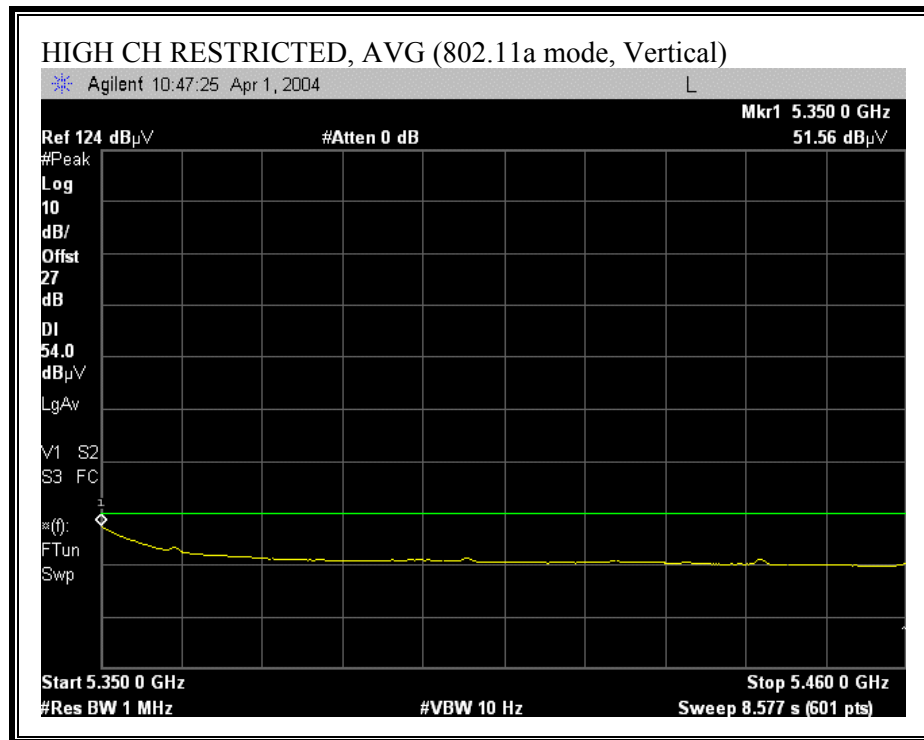
RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, 5.2 GHz BAND, HORIZONTAL)



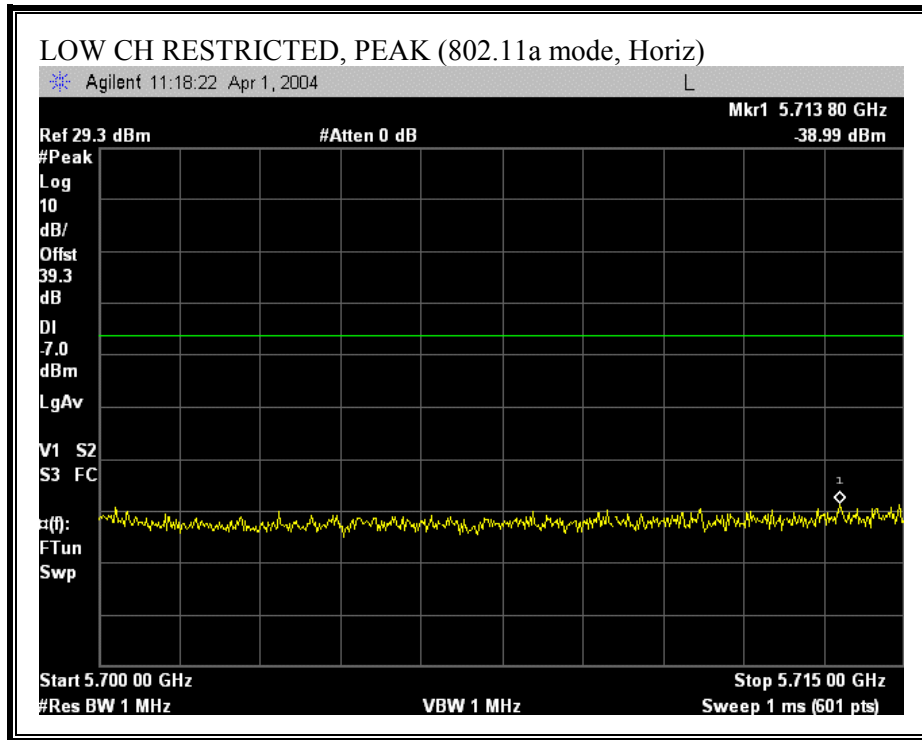


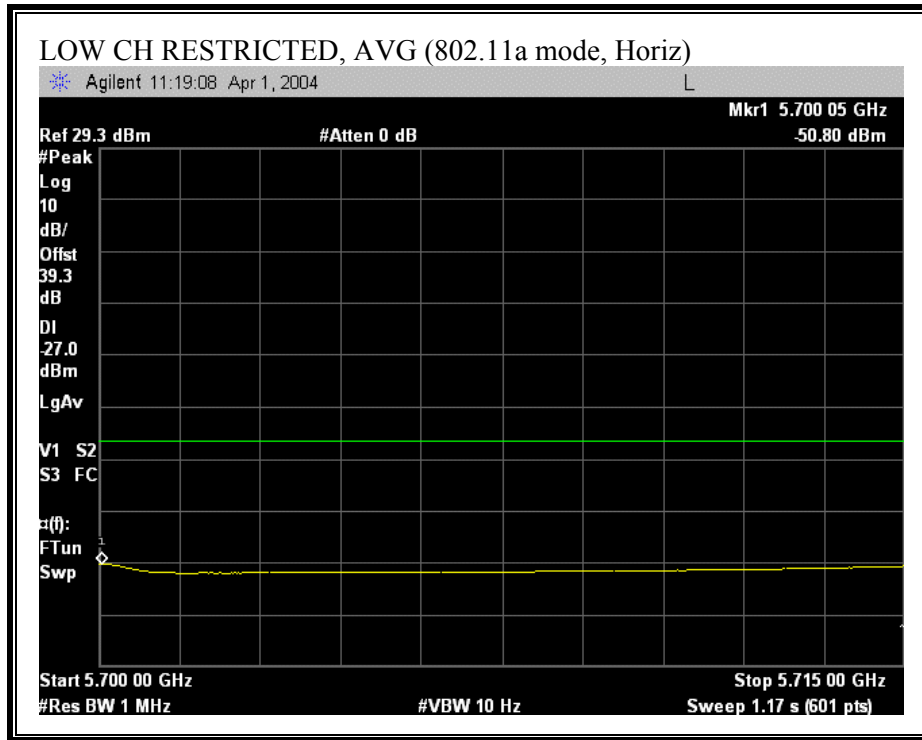
RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, 5.2 GHz BAND, VERTICAL)



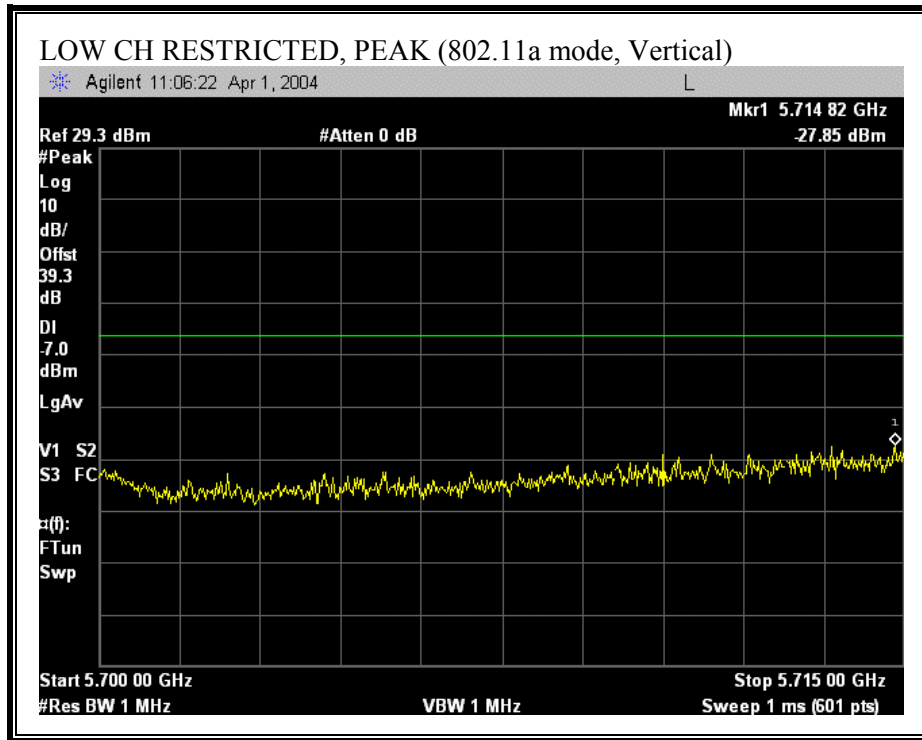


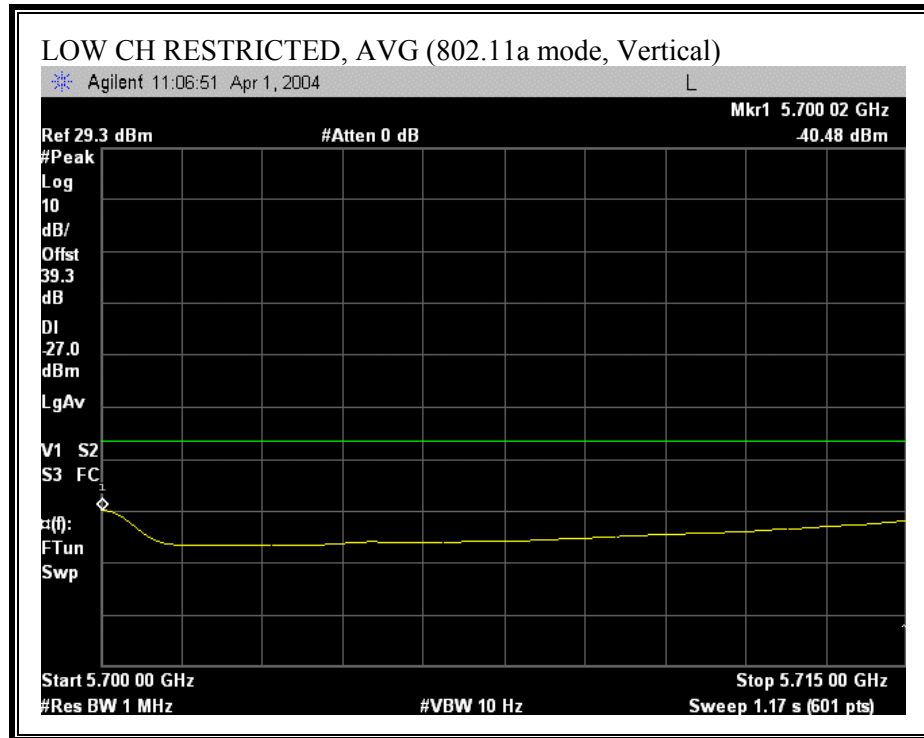
RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, 5.8 GHz BAND, HORIZONTAL)



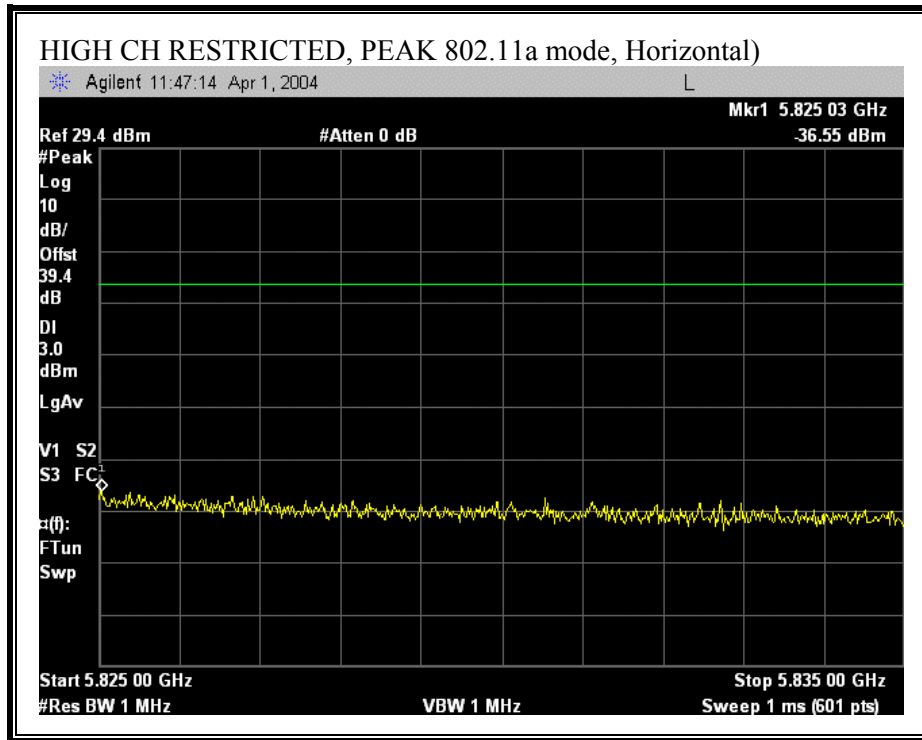


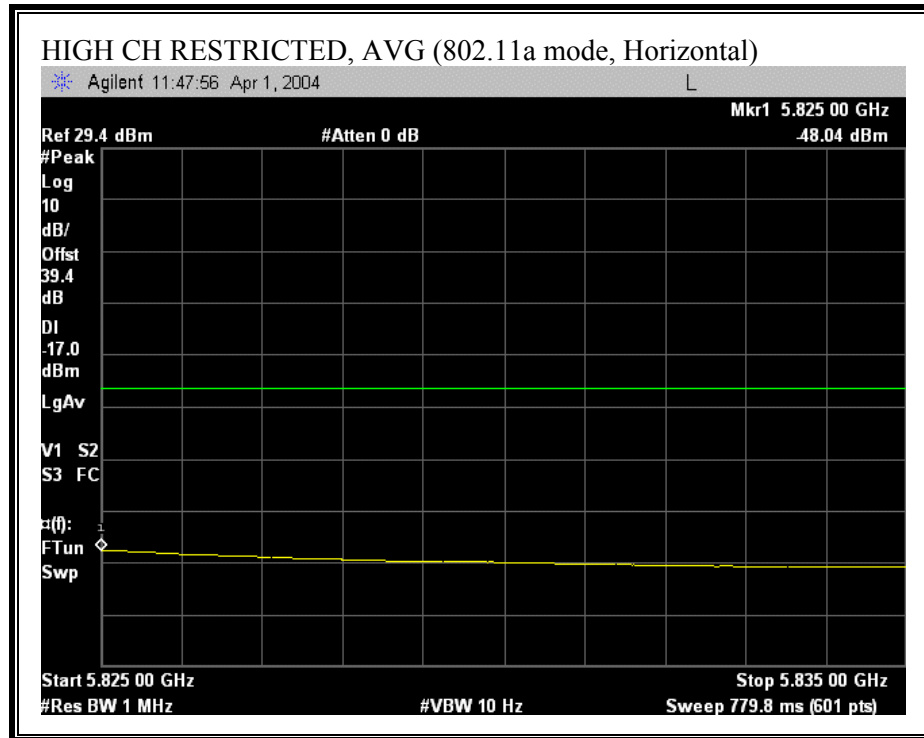
RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, 5.8 GHz BAND, VERTICAL)



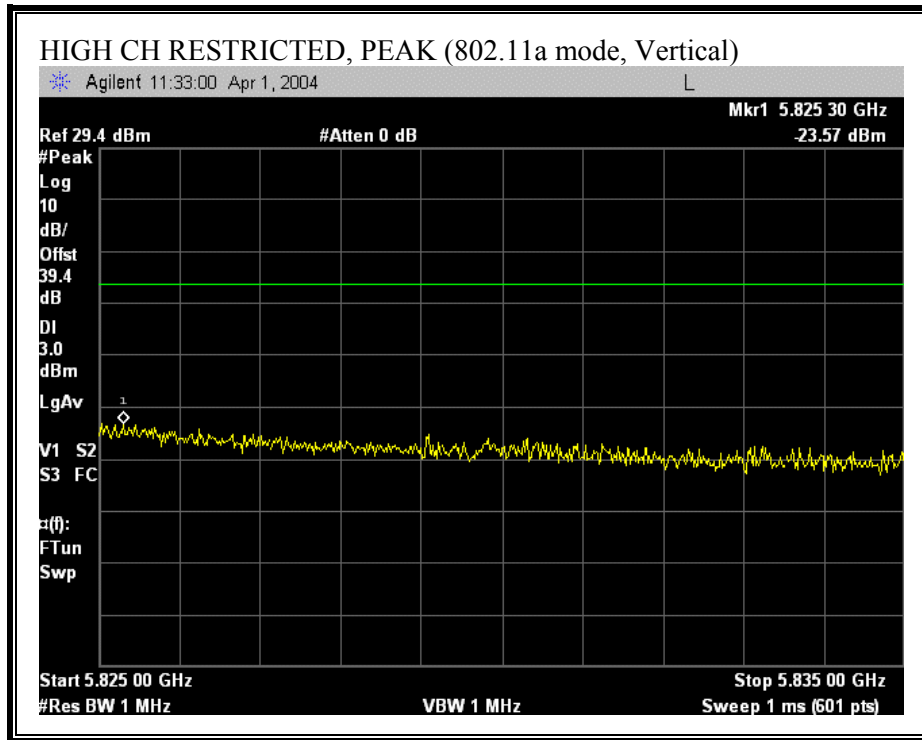


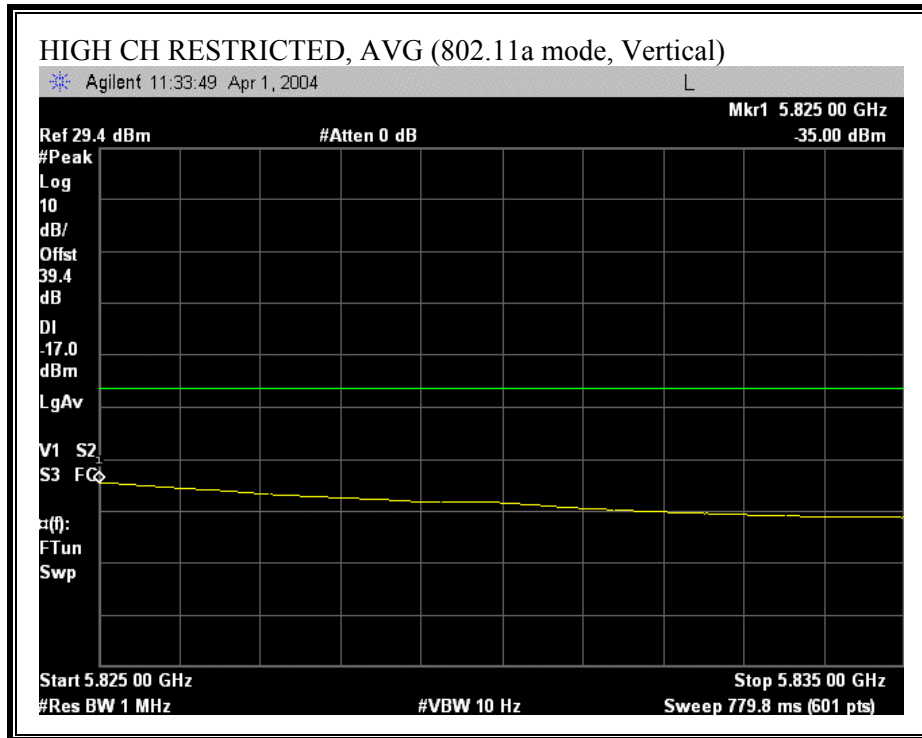
RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, 5.8 GHz BAND, HORIZONTAL)





RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, 5.8 GHz BAND, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS (802.11a MODE, 5.2 GHz BAND)

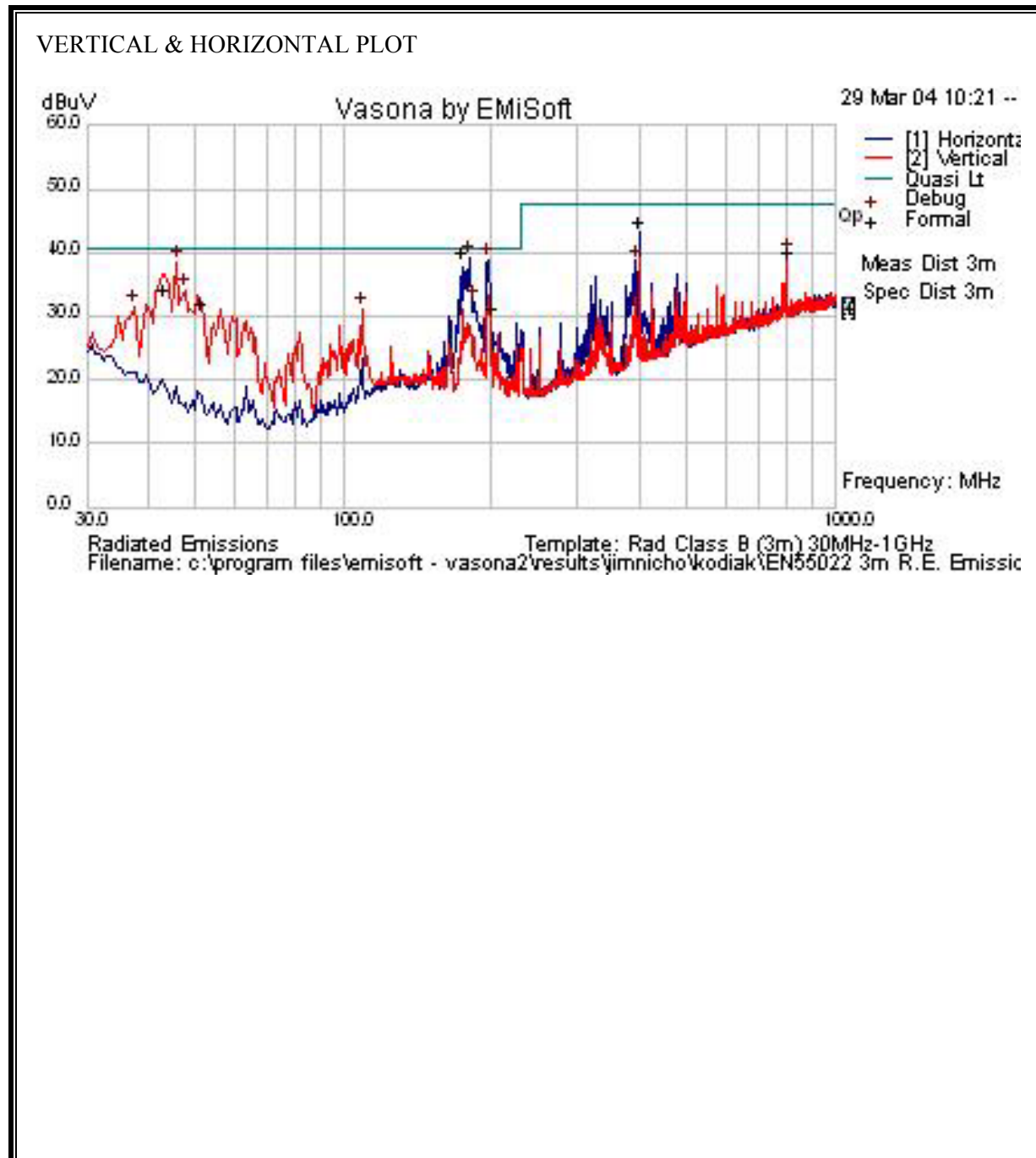
04/01/04 High Frequency Measurement Compliance Certification Services, Morgan Hill Open Field Site															
Test Engr: William Zhuang Project #: 04U2583-1 Company: Cisco Systems, Akron EUT Descr.: Kodiak RM21A 802.11a cardbus radio module EUT M/N: Kodiak AIR-RM21A-_-K9 in the AIR-AP1200 AP Test Target: UNII w/o DFS testing AIR-RM21A-A-K9 Mode Oper: Tx, Band 5180-5320MHz															
Test Equipment:															
EMCO Horn 1-18GHz		Spectrum Analyzer		Pre-amplifier 1-26GHz		Pre-amplifier 26-40GHz		Horn > 18GHz							
T73; S/N: 6717 @1m		Agilent E4446A Analyzer		T63 Miteq 646456				T117; ARA 18-26GHz; S/N:1013							
Hi 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)				Limit		Peak Measurements: 1 MHz Resolution Bandwidth 1 MHz Video Bandwidth				Average Measurements: 1 MHz Resolution Bandwidth 10Hz Video Bandwidth					
				FCC 15.205											
f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
Band 1, Low Ch. 5180MHz															
2.788	9.8	49.4	35.8	30.9	2.4	-35.9	0.0	1.0	47.8	34.2	74.0	54.0	-26.2	-19.8	V
2.788	9.8	45.7	33.5	30.9	2.4	-35.9	0.0	1.0	44.1	31.9	74.0	54.0	-29.9	-22.1	H
5.070	9.8	49.3	36.7	34.1	3.1	-35.3	0.0	1.0	52.2	39.6	74.0	54.0	-21.8	-14.4	V
5.070	9.8	45.8	32.5	34.1	3.1	-35.3	0.0	1.0	48.7	35.4	74.0	54.0	-25.3	-18.6	H
5.460	9.8	48.1	40.2	34.7	3.2	-35.2	0.0	1.0	51.8	43.8	74.0	54.0	-22.2	-10.2	V
5.460	9.8	39.2	32.1	34.7	3.2	-35.2	0.0	1.0	42.9	35.8	74.0	54.0	-31.1	-18.2	H
BAND 1, MID Channel, 5260 MHz															
15.780	9.8	50.0	37.6	38.8	5.7	-40.0	0.0	1.0	55.5	43.1	74.0	54.0	-18.5	-10.9	Noise floor
15.780	9.8	47.8	36.8	38.8	5.7	-40.0	0.0	1.0	53.3	42.3	74.0	54.0	-20.7	-11.7	H/Noise floor
BAND 1, MID Channel, 5320 MHz															
10.640	9.8	45.4	35.8	38.8	4.8	-33.5	0.0	1.0	56.5	46.9	74.0	54.0	-17.5	-7.1	Noise floor
15.960	9.8	49.1	38.2	38.6	5.8	-40.0	0.0	1.0	54.5	43.6	74.0	54.0	-19.5	-10.4	Noise floor
21.280	9.8	46.8	36.8	33.6	7.1	-38.5	0.0	1.0	50.0	40.0	74.0	54.0	-24.0	-14.0	Noise floor
10.640	9.8	45.0	35.7	38.8	4.8	-33.5	0.0	1.0	56.1	46.8	74.0	54.0	-17.9	-7.2	Noise floor
15.960	9.8	49.9	39.2	38.6	5.8	-40.0	0.0	1.0	55.3	44.5	74.0	54.0	-18.7	-9.5	Noise floor
21.280	9.8	46.8	37.6	33.6	7.1	-38.5	0.0	1.0	50.0	40.8	74.0	54.0	-24.0	-13.2	Noise floor
Check LO1 Signals															
4.550	9.8	58.0	46.8	33.7	2.9	-35.4	0.0	1.0	60.2	49.0	74.0	54.0	-13.8	-5.0	V
4.550	9.8	56.7	50.3	33.7	2.9	-35.4	0.0	1.0	58.9	52.5	74.0	54.0	-15.1	-1.5	H
No harmonic emissions above 2nd harmonic.															
No more signal found up to 26.5Ghz															
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			HPF	High Pass Filter										

HARMONICS AND SPURIOUS EMISSIONS 802.11a,5.8 GHz BAND

04/01/04 High Frequency Measurement															
Compliance Certification Services, Morgan Hill Open Field Site															
Test Engr: William Zhuang Project #: 04U2583-1 Company: Cisco Systems, Akron EUT Descrip.: Kodiak RM21A 802.11a cardbus radio module EUT M/N: Kodiak AIR-RM21A - K9 in the AIR-AP1200 AP Test Target: UNII w/o DFS testing AIR-RM21A-A-K9 Mode Oper: Tx, Band 5745-5785MHz															
Test Equipment:															
EMCO Horn 1-18GHz		Spectrum Analyzer		Pre-amplifier 1-26GHz		Pre-amplifier 26-40GHz		Horn > 18GHz							
T73; S/N: 6717 @1m		Agilent E4446A Analyzer		T63 Miteq 646456				T117; ARA 18-26GHz; S/N:1013							
HI 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)				Limit		Peak Measurements:				Average Measurements:					
				FCC 15.205		1 MHz Resolution Bandwidth 1MHz Video Bandwidth				1 MHz Resolution Bandwidth 10Hz Video Bandwidth					
f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
Band 3, Low Ch. 5745MHz															
4.343	9.8	52.0	48.4	33.6	2.9	-35.4	0.0	1.0	54.0	50.3	74.0	54.0	-20.0	-3.7	V
4.343	9.8	53.7	51.1	33.6	2.9	-35.4	0.0	1.0	55.6	53.1	74.0	54.0	-18.4	-0.9	H
5.112	9.8	53.5	40.3	34.2	3.1	-35.3	0.0	1.0	56.5	43.3	74.0	54.0	-17.5	-10.7	V
5.112	9.8	44.8	32.6	34.2	3.1	-35.3	0.0	1.0	47.8	35.6	74.0	54.0	-26.2	-18.4	H
5.380	9.8	56.8	45.7	34.6	3.2	-35.2	0.0	1.0	60.3	49.2	74.0	54.0	-13.7	-4.8	V
5.380	9.8	45.2	32.2	34.6	3.2	-35.2	0.0	1.0	48.8	35.7	74.0	54.0	-25.2	-18.3	H
5.420	9.8	58.2	46.7	34.6	3.2	-35.2	0.0	1.0	61.8	50.3	74.0	54.0	-12.2	-3.7	V
5.420	9.8	46.9	33.2	34.6	3.2	-35.2	0.0	1.0	50.5	36.8	74.0	54.0	-23.5	-17.2	H
5.440	9.8	59.5	46.4	34.7	3.2	-35.2	0.0	1.0	63.1	50.1	74.0	54.0	-10.9	-3.9	V
5.440	9.8	46.1	33.1	34.7	3.2	-35.2	0.0	1.0	49.7	36.8	74.0	54.0	-24.3	-17.2	H
5.460	9.8	60.5	48.3	34.7	3.2	-35.2	0.0	1.0	64.1	52.0	74.0	54.0	-9.9	-2.0	V
5.460	9.8	47.8	34.3	34.7	3.2	-35.2	0.0	1.0	51.5	38.0	74.0	54.0	-22.5	-16.0	H
11.495	9.8	44.2	32.4	39.1	4.9	-34.2	0.0	1.0	55.0	43.2	74.0	54.0	-19.0	-10.8	V
11.495	9.8	48.7	36.9	39.1	4.9	-34.2	0.0	1.0	59.6	47.8	74.0	54.0	-14.4	-6.2	H
No more signal found up to 26.5GHz															
Band 3, Mid Ch. 5785MHz															
4.370	9.8	49.5	43.9	33.6	2.9	-35.4	0.0	1.0	51.5	45.9	74.0	54.0	-22.5	-8.1	V
4.370	9.8	49.3	45.3	33.6	2.9	-35.4	0.0	1.0	51.3	47.3	74.0	54.0	-22.7	-6.7	H
5.139	9.8	57.7	47.3	34.2	3.1	-35.3	0.0	1.0	60.7	50.4	74.0	54.0	-13.3	-3.6	V
5.139	9.8	44.5	32.2	34.2	3.1	-35.3	0.0	1.0	47.6	35.3	74.0	54.0	-26.4	-18.7	H
5.380	9.8	50.0	41.6	34.6	3.2	-35.2	0.0	1.0	53.5	45.1	74.0	54.0	-20.5	-8.9	V
5.380	9.8	48.2	35.0	34.6	3.2	-35.2	0.0	1.0	51.8	38.6	74.0	54.0	-22.2	-15.4	H
5.420	9.8	51.4	45.2	34.6	3.2	-35.2	0.0	1.0	55.1	48.8	74.0	54.0	-18.9	-5.2	V
5.420	9.8	47.9	35.5	34.6	3.2	-35.2	0.0	1.0	51.6	39.1	74.0	54.0	-22.4	-14.9	H
5.440	9.8	51.5	44.2	34.7	3.2	-35.2	0.0	1.0	55.2	47.8	74.0	54.0	-18.8	-6.2	V
5.440	9.8	46.3	33.5	34.7	3.2	-35.2	0.0	1.0	50.0	37.2	74.0	54.0	-24.0	-16.8	H
5.460	9.8	50.1	43.3	34.7	3.2	-35.2	0.0	1.0	53.8	47.0	74.0	54.0	-20.2	-7.0	V
5.460	9.8	47.5	33.3	34.7	3.2	-35.2	0.0	1.0	51.2	37.0	74.0	54.0	-22.8	-17.0	H
11.567	9.8	44.2	31.9	39.2	4.9	-34.3	0.0	1.0	55.0	42.7	74.0	54.0	-19.0	-11.3	V
11.567	9.8	44.0	31.9	39.2	4.9	-34.3	0.0	1.0	54.7	42.7	74.0	54.0	-19.3	-11.3	H
No more signal found up to 26.5GHz															
Band 3, High Ch. 5805MHz															
4.383	9.8	47.8	43.0	33.6	2.9	-35.4	0.0	1.0	49.8	44.9	74.0	54.0	-24.2	-9.1	V
4.383	9.8	51.1	48.0	33.6	2.9	-35.4	0.0	1.0	53.1	50.0	74.0	54.0	-20.9	-4.0	H
5.380	9.8	49.2	46.4	34.6	3.2	-35.2	0.0	1.0	52.7	50.0	74.0	54.0	-21.3	-4.0	V
5.380	9.8	47.6	37.1	34.6	3.2	-35.2	0.0	1.0	51.1	40.6	74.0	54.0	-22.9	-13.4	V
5.420	9.8	49.6	47.0	34.6	3.2	-35.2	0.0	1.0	53.2	50.6	74.0	54.0	-20.8	-3.4	V
5.420	9.8	49.9	37.9	34.6	3.2	-35.2	0.0	1.0	53.5	41.5	74.0	54.0	-20.5	-12.5	H
5.440	9.8	49.4	47.3	34.7	3.2	-35.2	0.0	1.0	53.0	50.9	74.0	54.0	-21.0	-3.1	V
5.440	9.8	48.2	37.5	34.7	3.2	-35.2	0.0	1.0	51.8	41.1	74.0	54.0	-22.2	-12.9	H
5.460	9.8	49.4	48.2	34.7	3.2	-35.2	0.0	1.0	53.1	51.9	74.0	54.0	-20.9	-2.1	V
5.460	9.8	47.3	38.1	34.7	3.2	-35.2	0.0	1.0	51.0	41.8	74.0	54.0	-23.0	-12.2	H
No more signal found up to 26.5GHz															
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				HPF	High Pass Filter									

7.8.3. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

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



VERTICAL & HORIZONTAL DATA

Frequency MHz	Raw dBuV	Cable Loss dB	AF dB	Level dBuV	Type	Pol	Hgt cm	Azt Deg	Limit dBuV	Margin dB	Pass /Fail	Comments
43.01	20.8	0.6	10.9	32.3	Qp	V	98	146	40.5	-8.2	Pass	
51.088	21.3	0.6	8.1	30	Qp	V	126	333	40.5	-10.4	Pass	
175	19	1.1	12	32	Qp	V	270	273	40.5	-8.5	Pass	
200	15.6	1.2	12.6	29.4	Qp	H	173	250	40.5	-11.1	Pass	
400	25.6	1.6	15.8	43	Qp	H	98	51	47.5	-4.5	Pass	
800	14.7	2.3	21.5	38.4	Qp	V	101	353	47.5	-9	Pass	

7.9. 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 μ 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.

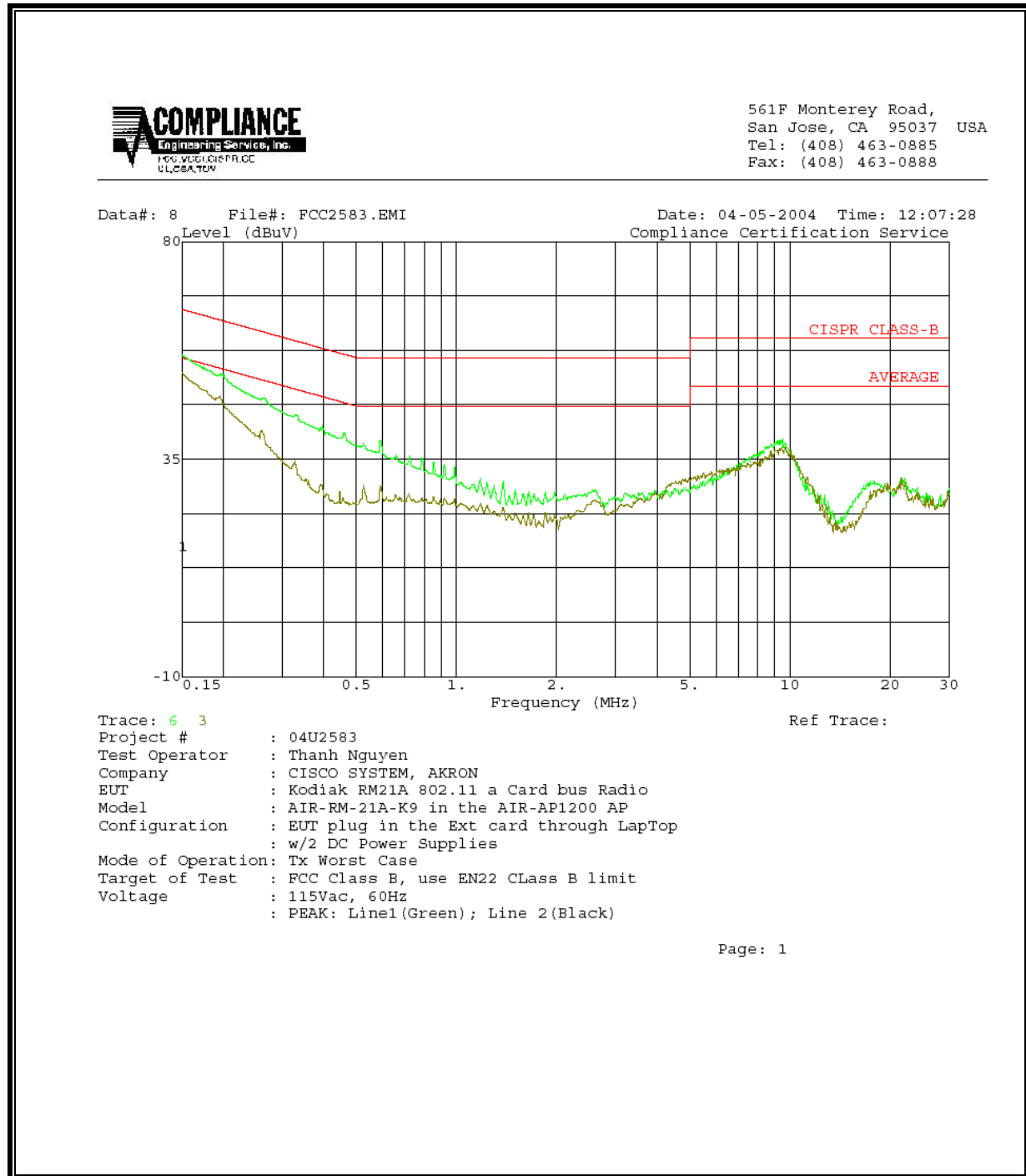
RESULTS

No non-compliance noted:

6 WORST EMISSIONS (AC Power)

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	FCC B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.15	52.74	--	--	0.00	65.97	55.97	-13.23	-3.23	L1
0.59	29.52	--	--	0.00	56.00	46.00	-26.48	-16.48	L1
9.65	37.46	--	--	0.00	60.00	50.00	-22.54	-12.54	L1
0.15	56.40	--	15.20	0.00	65.97	55.97	-9.57	-40.77	L2
0.59	38.34	--	--	0.00	56.00	46.00	-17.66	-7.66	L2
9.50	39.06	--	--	0.00	60.00	50.00	-20.94	-10.94	L2
6 Worst Data									

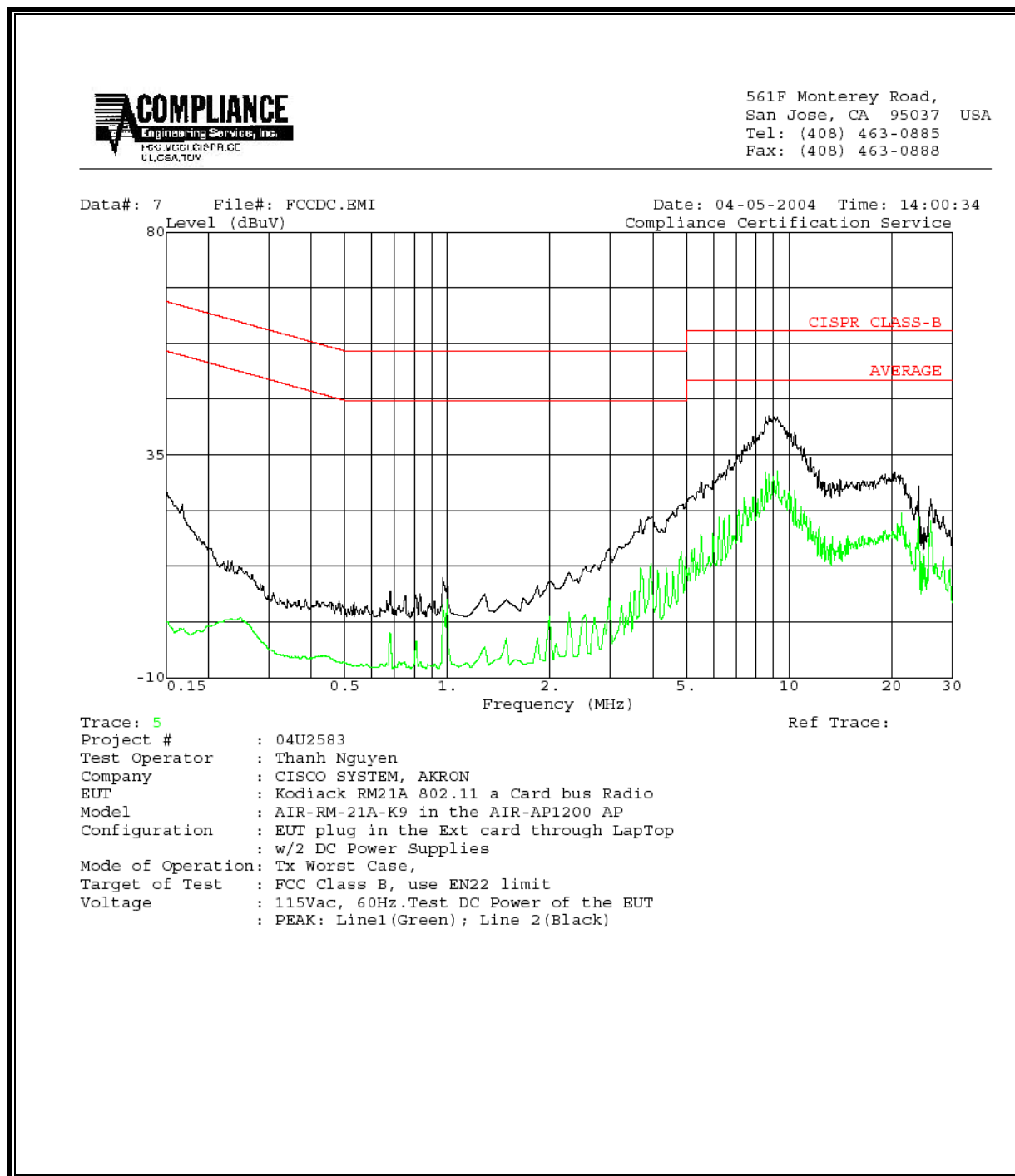
LINE 1 AND LINE 2 RESULTS (AC Power)



6 WORST EMISSIONS (DC Power #1)

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	FCC B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
8.73	42.88	--	--	0.00	60.00	50.00	-17.12	-7.12	L1
20.06	31.62	--	--	0.00	60.00	50.00	-28.38	-18.38	L1
0.15	27.86	--	--	0.00	66.00	56.00	-38.14	-28.14	L1
9.06	43.40	--	--	0.00	60.00	50.00	-16.60	-6.60	L2
21.15	31.72	--	--	0.00	60.00	50.00	-28.28	-18.28	L2
0.15	28.56	--	--	0.00	66.00	56.00	-37.44	-27.44	L2
6 Worst Data									

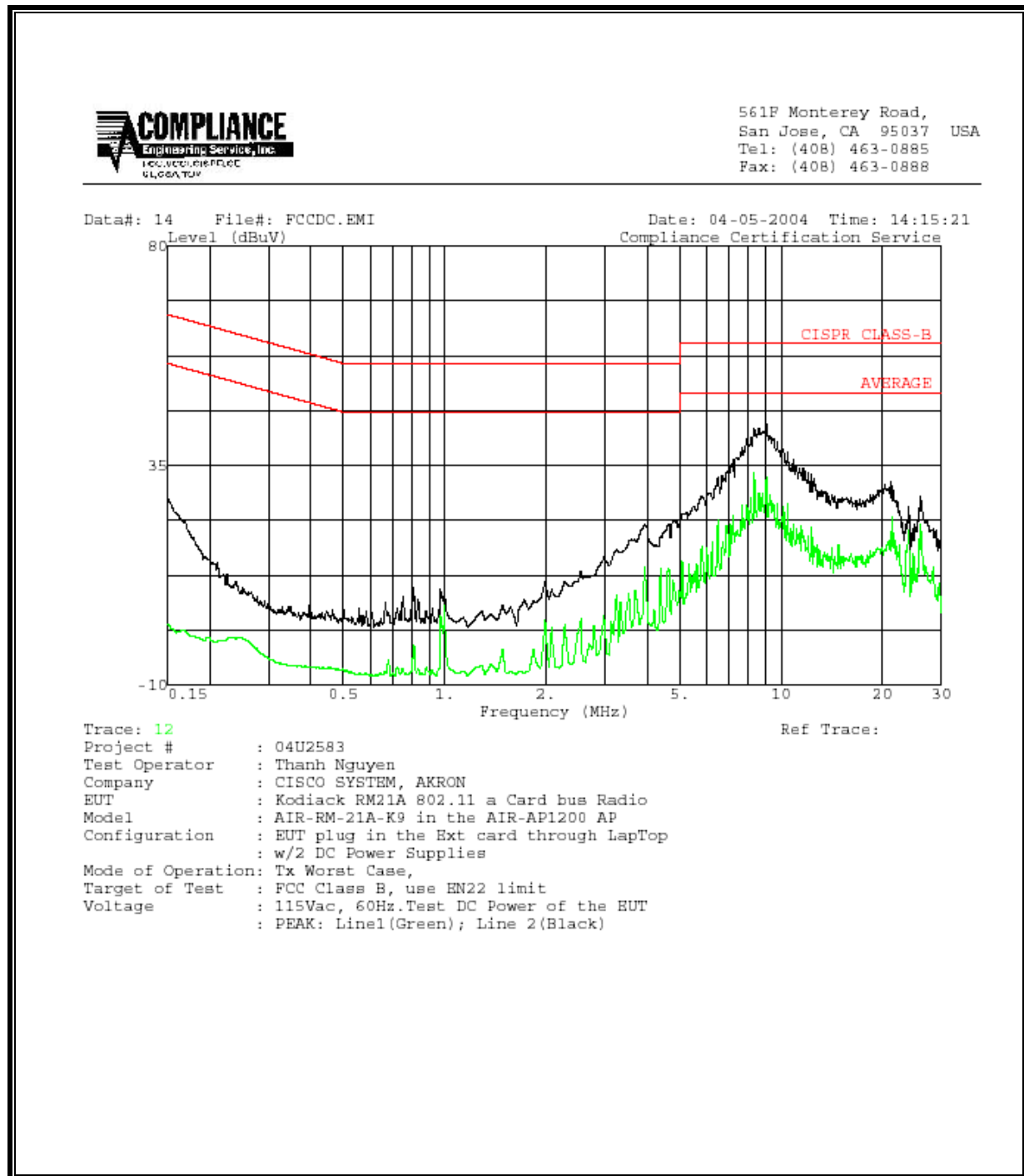
LINE 1 AND LINE 2 RESULTS (DC Power #1)



6 WORST EMISSIONS (DC Power #2)

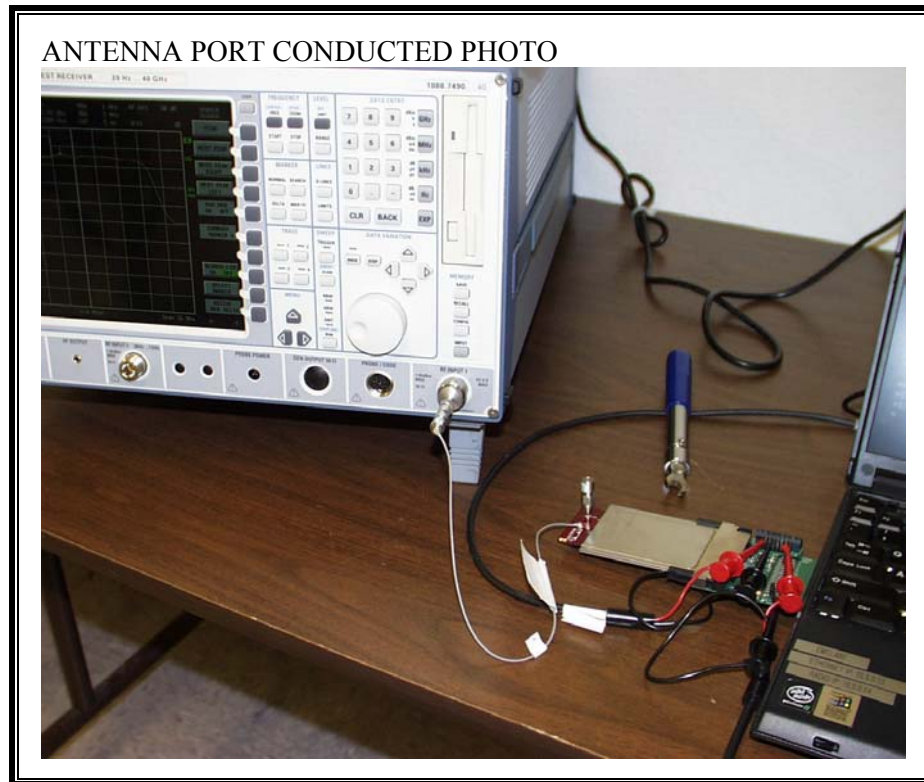
CONDUCTED EMISSIONS DATA (115VAC 60Hz)IC									
Freq.	Reading			Closs	Limit		Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
8.73	42.88	--	--	0.00	48.00	--	-5.12	--	L1
20.38	31.62	--	--	0.00	48.00	--	-16.38	--	L1
24.01	28.74	--	--	0.00	48.00	--	-19.26	--	L1
9.06	43.40	--	--	0.00	48.00	--	-4.60	--	L2
21.15	31.72	--	--	0.00	48.00	--	-16.28	--	L2
26.00	28.66	--	--	0.00	48.00	--	-19.34	--	L2
6 Worst Data									

LINE 1 AND LINE 2 RESULTS (DC Power #2)

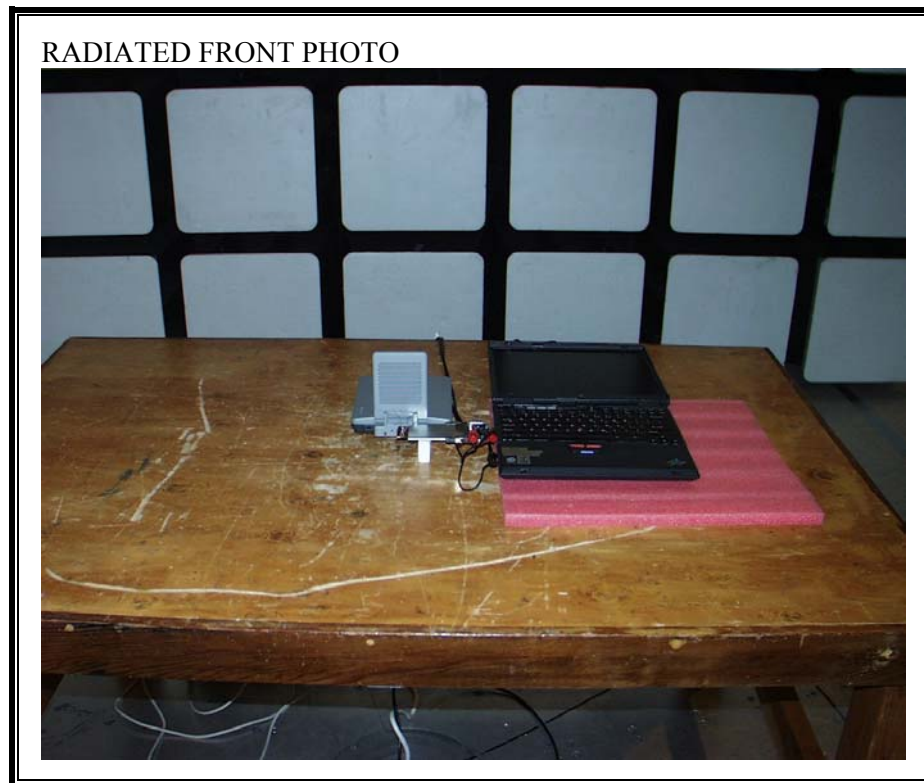


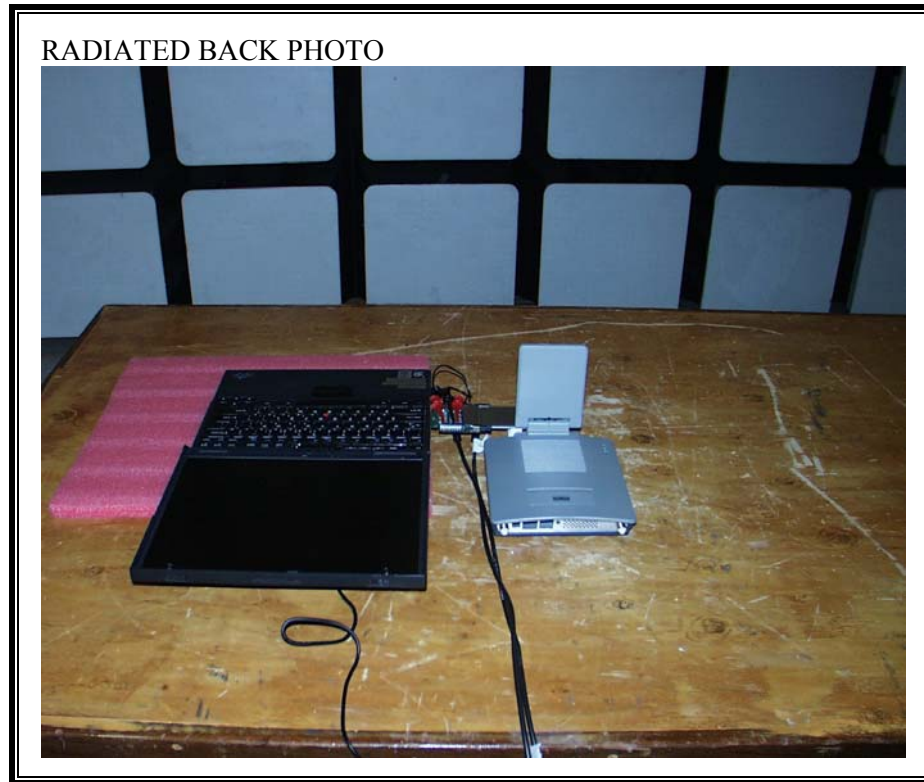
8. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

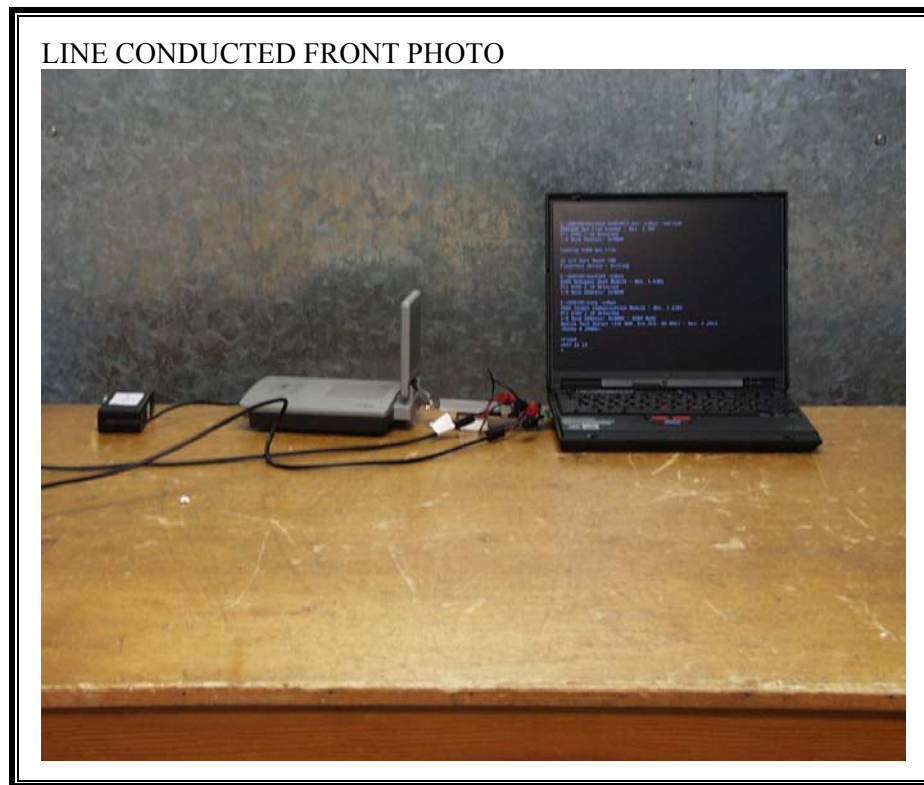


RADIATED RF MEASUREMENT SETUP





POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP



LINE CONDUCTED BACK PHOTO

