FCC CFR47 PART 15 SUBPART E
CERTIFICATION
TEST REPORT

FOR

802.11a/b/g ACCESS POINT

MODEL NUMBER: AR5BAP-00032

BRAND NAME: ATHEROS

FCC ID: PPD-AR5BAP-00032

REPORT NUMBER: 03U2012-2

ISSUE DATE: JULY 1, 2003

Prepared for
ATHEROS COMMUNICATIONS
529 ALMANOR AVE.
SUNNYVALE
CA 94085, USA

Prepared by
COMPLIANCE CERTIFICATION SERVICES
561F MONTEREY ROAD,
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1. TEST RESULT CERTIFICATION

COMPANY NAME: ATHEROS COMMUNICATIONS
529 ALMANOR AVE.
SUNNYVALE, CA 94085

EUT DESCRIPTION: 802.11A/B/G ACCESS POINT

MODEL: AR5BAP-00032

DATE TESTED: JUNE 1 – JUNE 30, 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.

Note: The 5.2 GHz band is applicable to this report; other bands of operation (2.4 and 5.8 GHz) are documented in a separate report.

Approved & Released For CCS By:

MIKE HECKROTTE
CHIEF ENGINEER
COMPLIANCE CERTIFICATION SERVICES

Tested By:

VIEN TRAN
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

The model AR5BAP-00032 Access Point contains two radios capable of simultaneous 802.11b/g (2.4 GHz) and 802.11a (5 GHz) operation.

The AR5BAP-00032 has an output power of 20.97 dBm (125 mW) and an antenna gain of 4.0 dBi in the 5150 – 5350 MHz band.

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

4.1. FACILITIES AND EQUIPMENT

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

4.2. TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	1300
Japan	VCCI	CISPR 22 Two OATS and one conducted Site	R-1014, R-619, C-640
Norway	NEMKO	EN50081-1, EN50081-2, EN50082-1, EN50082-2, IEC61000-6-1, IEC61000-6-2, EN50083-2, EN50091-2, EN50130-4, EN55011, EN55013, EN55014-1, EN55104, EN55015, EN61547, EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN60945, EN61326-1	ELA 117
Norway	NEMKO	EN60601-1-2 and IEC 60601-1-2, the Collateral Standards for Electro-Medical Products. MDD, 93/42/EEC, AIMD 90/385/EEC	ELA-171
Taiwan	BSMI	CNS 13438	SL2-IN-E-1012
Canada	Industry Canada	RSS210 Low Power Transmitter and Receiver	IC2324 A,B,C, and F

5. CALIBRATION AND UNCERTAINTY

5.1. MEASURING INSTRUMENT CALIBRATION

The measurement instruments utilized to perform the tests documented in this report have been calibrated in accordance with the manufacturer's recommendations, and are traceable to 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 AND MEASUREMENT EQUIPMENT LIST				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due Date
Quasi-Peak Adapter	HP	85650A	2521A01038	7/16/04
SA Display Section	HP	85662A	2314A04793	7/16/04
SA RF Section	HP	85680A	2314A02604	7/16/04
Horn Antenna (1 - 18GHz)	EMCO	3115	6739	2/4/04
Antenna, Biconical	Eaton	94455-1	1214	3/6/04
Antenna, Log Periodic 200-1000MHz	EMCO	3146	9107-3163	3/06/04
Preamplifier	Miteq	NSP10023988	646456	4/26/04
Spectrum Analyzer	HP	8564E	3943A01643	7/22/03
High Pass Filter (7.6 GHz)	FSY Microwave	FM-7600-9SS	002	N.C.R.
Spectrum Analyzer	Agilent	E4446A	US42070220	03/01/04
Spectrum Analyzer	Rohde &Schwarz	FSP	100112	06/28/03
Power Sensor	Agilent	E9327A	US40440755	08/09/03

6. SETUP OF EQUIPMENT UNDER TEST

SETUP INFORMATION FOR TRANSMITTER TESTS

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Device Type	Manufacturer	Model	Serial Number	FCC ID
Laptop	Toshiba	NA	J291200E8019	Doc
Power Adapter	Toshiba	PA3083U-1ACA	0536906G	Doc
5V DC power adapter	Switching Adapter	RHC-060200-1	0319	DOC

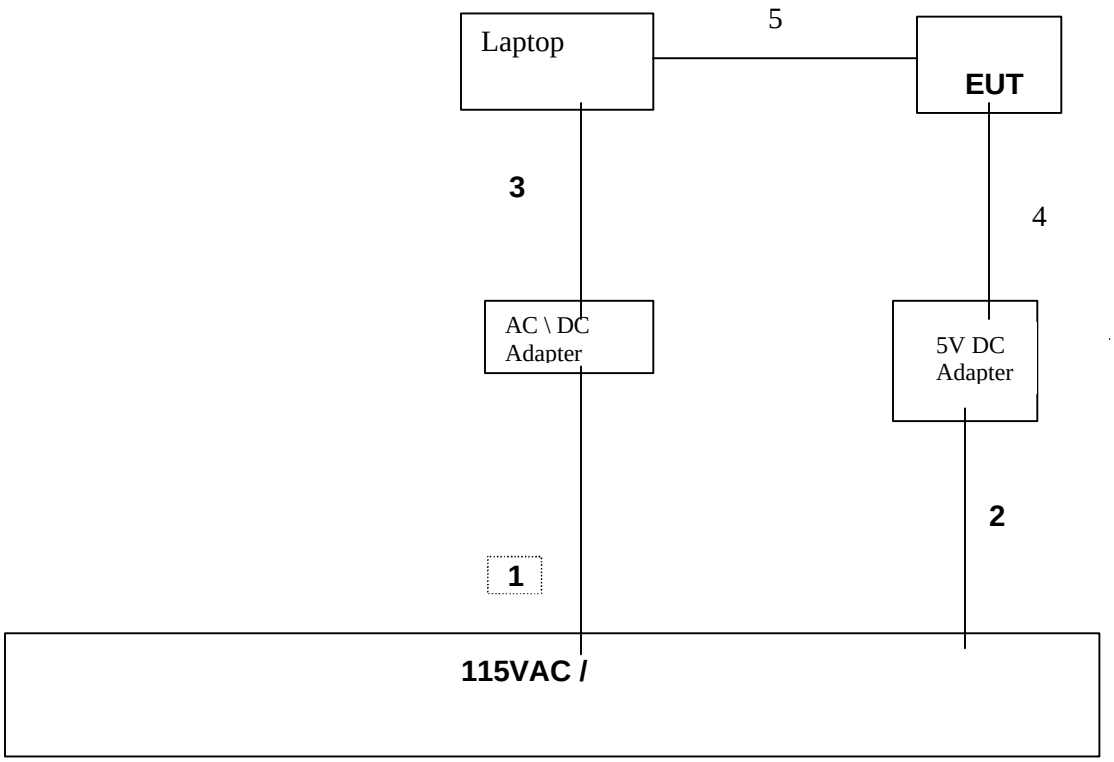
I/O CABLES

Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	2	US115V	Un-Shielded	2m	NA
2	AC	2	US115V	Un-Shielded	2m	NA
3	DC	2	DC	Un-Shielded	2m	Integral with adapter
4	DC	2	DC	Un-Shielded	2m	Integral with adapter
5	RJ45	1	RJ45	Un-Shielded	2m	NA

TEST SETUP

The EUT was controlled by the laptop via Ethernet cable.

SETUP DIAGRAM FOR TRANSMITTER TESTS



SETUP INFORMATION FOR DIGITAL DEVICE TESTS

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Device Type	Manufacturer	Model	Serial Number	FCC ID
Laptop	Toshiba	NA	J291200E8019	Doc
Power Adapter	Toshiba	PA3083U-1ACA	0536906G	Doc
MOUSE	HP	M-S34	LZB75062022	DZL211029
PRINTER	HP	2225C	2541S41679	BS46XU2225C
5V DC power adapter	Switching Adapter	RHC-060200-1	0319	DOC

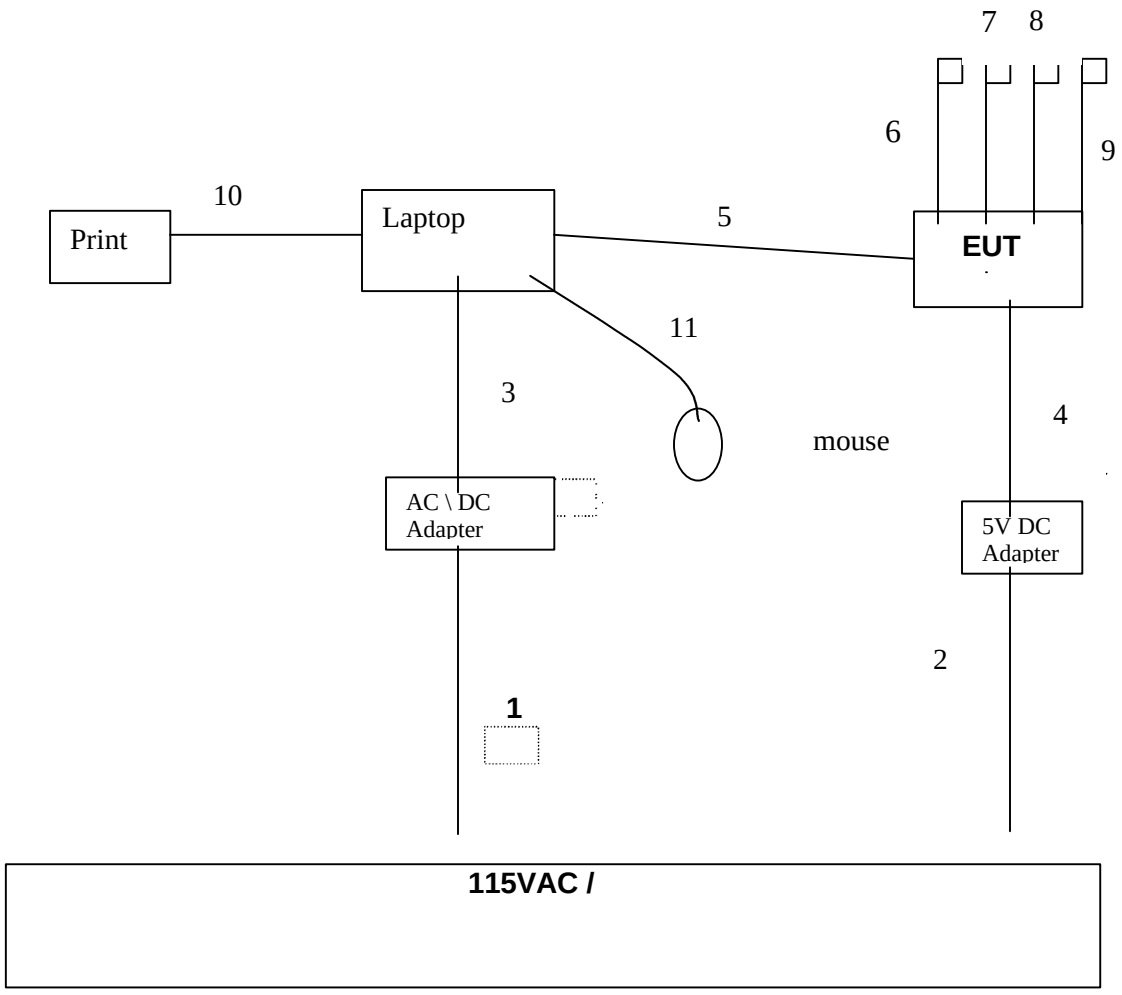
I/O CABLES

Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	2	US115V	Un-Shielded	2m	NA
2	AC	2	US115V	Un-Shielded	2m	NA
3	DC	2	DC	Un-Shielded	2m	Integral with adapter
4	DC	2	DC	Un-Shielded	2m	Integral with adapter
5	RJ45	1	RJ45	Un-Shielded	2m	NA
6	RJ45	1	RJ45	Un-Shielded	2m	NA
7	RJ45	1	RJ45	Un-Shielded	2m	NA
8	RJ45	1	RJ45	Un-Shielded	2m	NA
9	RJ45	1	RJ45	Un-Shielded	2m	NA
10	Parallel	1	DB25	Un-Shielded	2m	NA
11	Mouse	1	Mini	Shielded	1m	Integral with mouse

TEST SETUP

The EUT was controlled by the laptop via Ethernet cable.

SETUP DIAGRAM FOR DIGITAL DEVICE TESTS



7. APPLICABLE RULES 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 226 dB EMISSION 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 EMISSION bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled.

RESULTS

No non-compliance noted:

Normal Mode

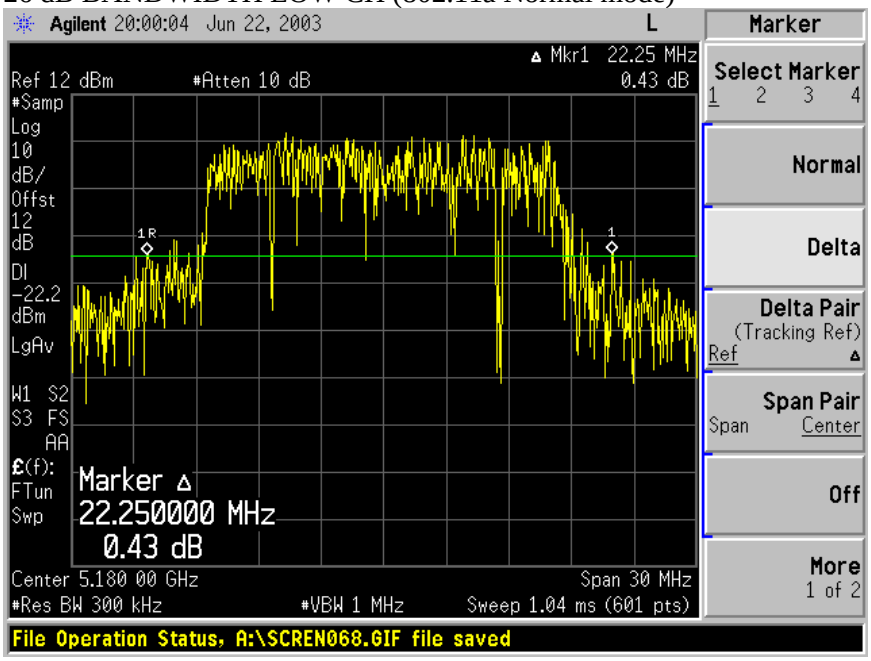
Channel	Frequency (MHz)	B (MHz)	10 Log B (dB)
Low	5180	22.25	13.47
Middle	5260	22.35	13.49
High	5320	22.35	13.49

Turbo Mode

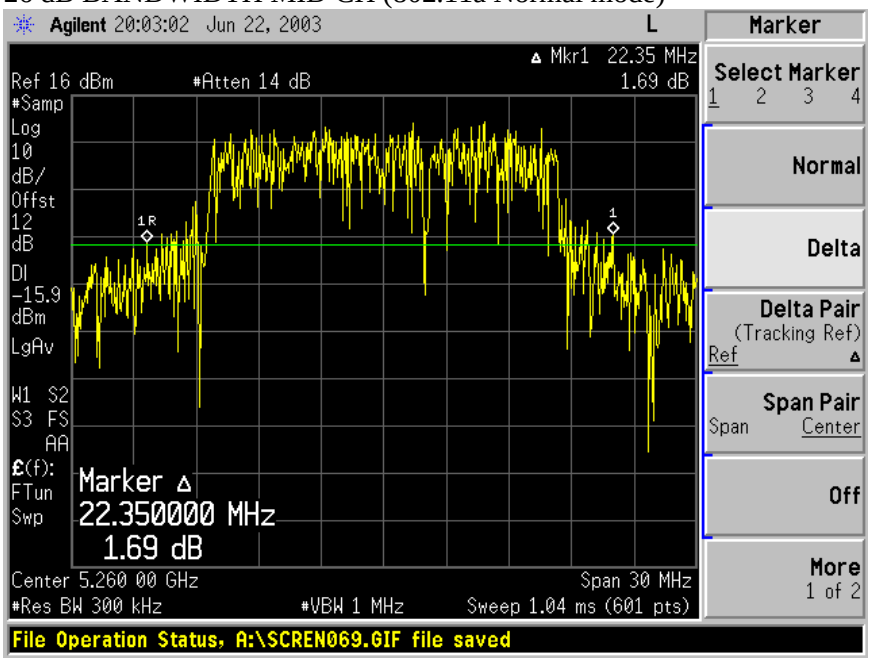
Channel	Frequency (MHz)	B (MHz)	10 Log B (dB)
Low	5200	45.33	16.56
Middle	5250	46.00	16.63
High	5290	44.53	16.49

26 dB EMISSION BANDWIDTH (802.11a NORMAL MODE)

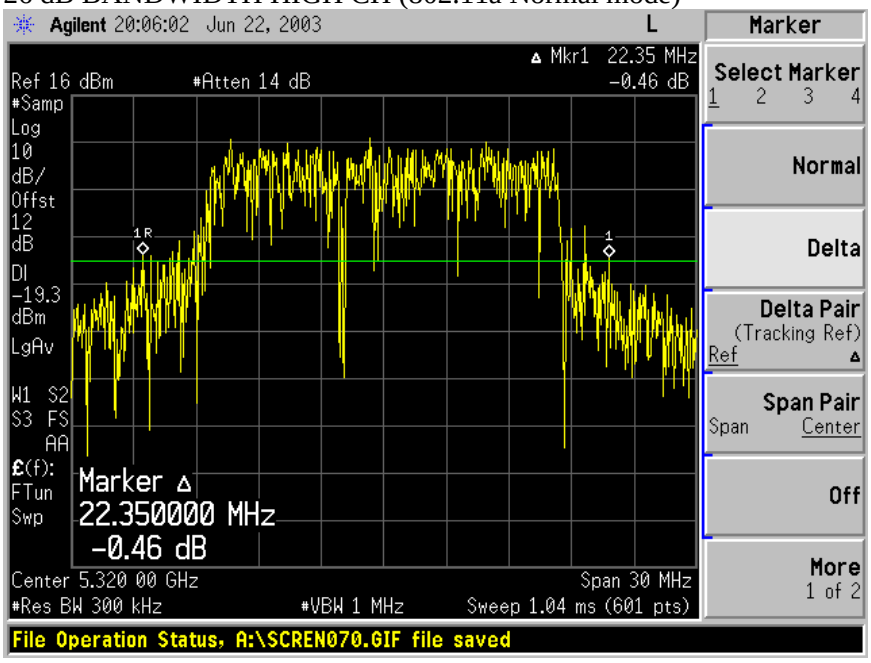
26 dB BANDWIDTH LOW CH (802.11a Normal mode)



26 dB BANDWIDTH MID CH (802.11a Normal mode)

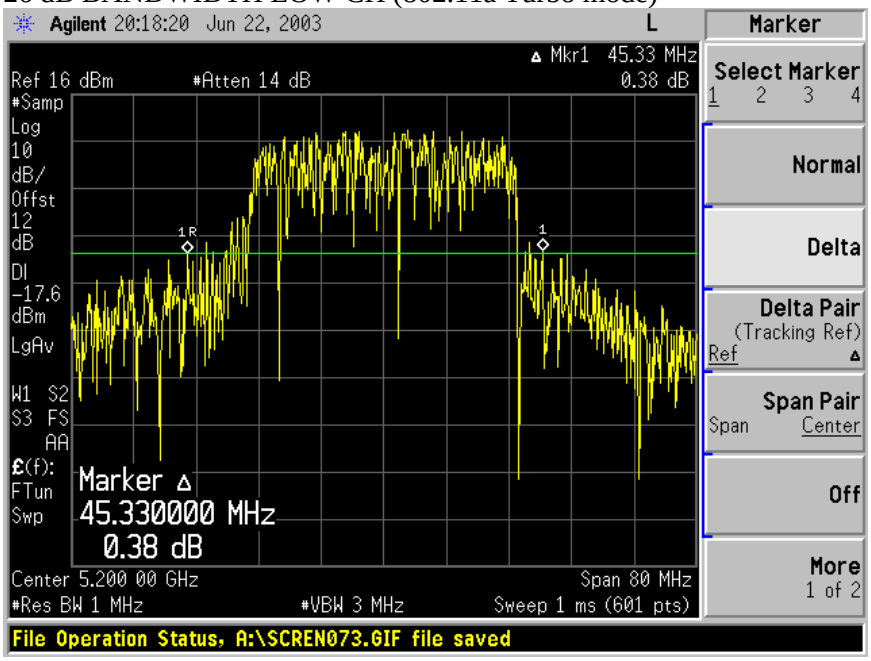


26 dB BANDWIDTH HIGH CH (802.11a Normal mode)

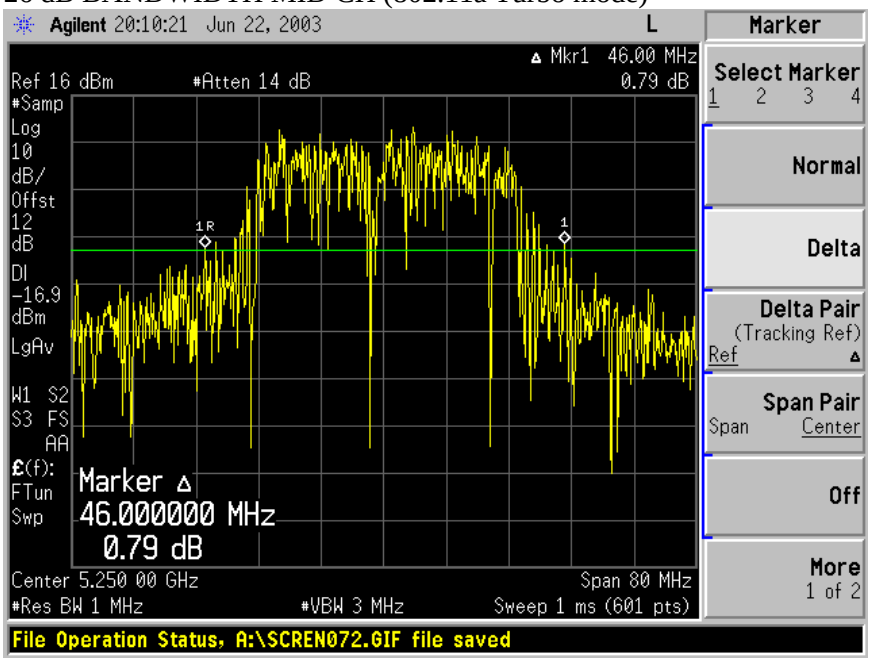


26 dB EMISSION BANDWIDTH (802.11a TURBO MODE)

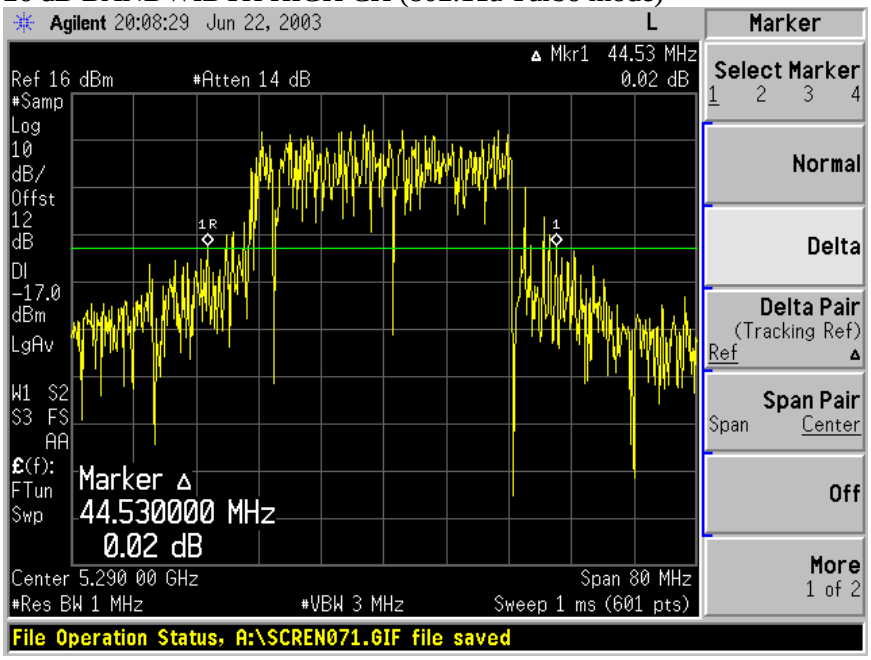
26 dB BANDWIDTH LOW CH (802.11a Turbo mode)



26 dB BANDWIDTH MID CH (802.11a Turbo mode)



26 dB BANDWIDTH HIGH CH (802.11a Turbo mode)



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 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) (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 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 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)	Excess Antenna Gain (dB)	Limit (dBm)
Normal	5180	17	22.25	17.47	0.00	17.00
Turbo	5200	17	45.33	20.56	0.00	17.00
Turbo	5250	17	46	20.63	0.00	17.00

Limit in 5250 to 5350 MHz Band

Mode	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Excess Antenna Gain (dB)	Limit (dBm)
Normal	5260	24	22.35	24.49	0.00	24.00
Normal	5320	24	22.35	24.49	0.00	24.00
Turbo	5290	24	44.53	27.49	0.00	24.00

Normal Mode Results

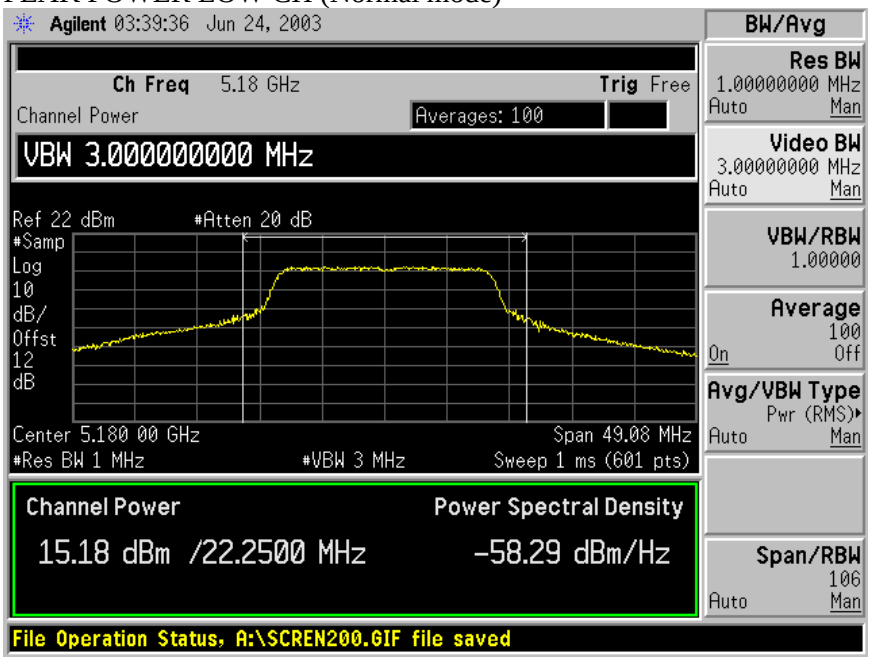
Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5180	15.18	17.00	-1.82
Middle	5260	20.65	24.00	-3.35
High	5320	17.10	24.00	-6.90

Turbo Mode Results

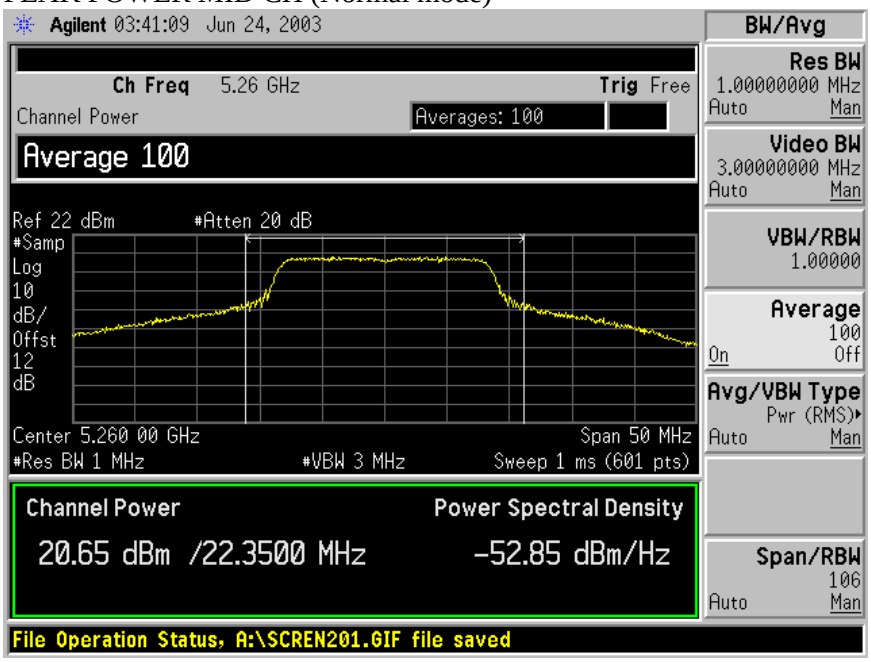
Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5200	16.64	17.00	-0.36
Middle	5250	16.33	17.00	-0.67
High	5290	20.97	24.00	-3.03

PEAK POWER (NORMAL MODE)

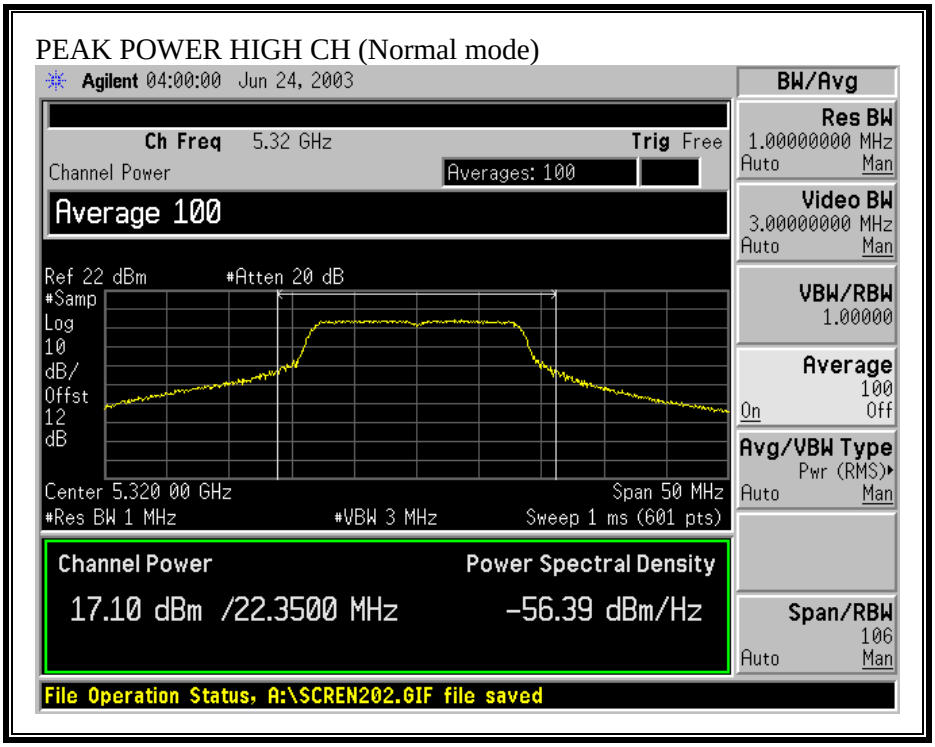
PEAK POWER LOW CH (Normal mode)



PEAK POWER MID CH (Normal mode)

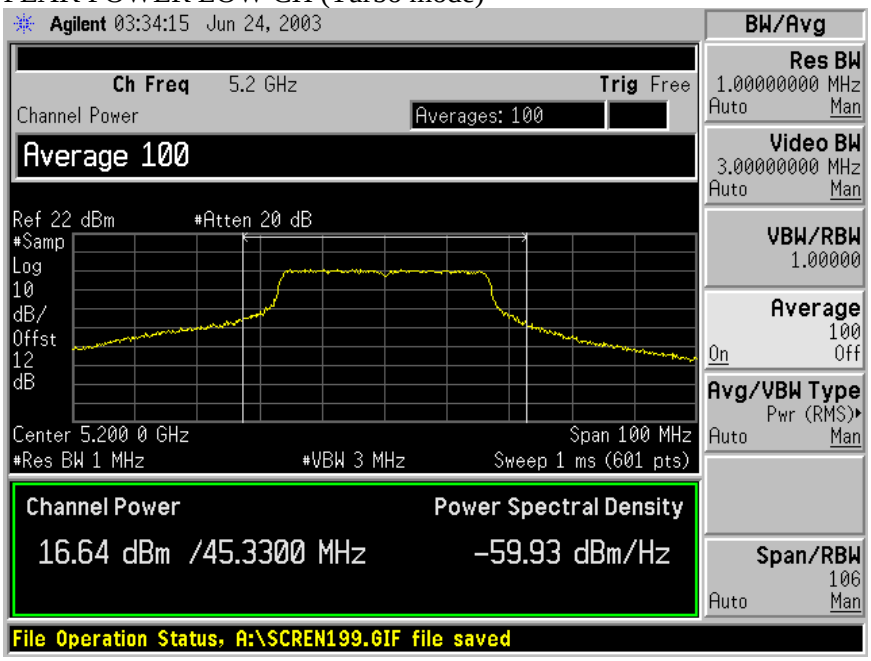


PEAK POWER HIGH CH (Normal mode)

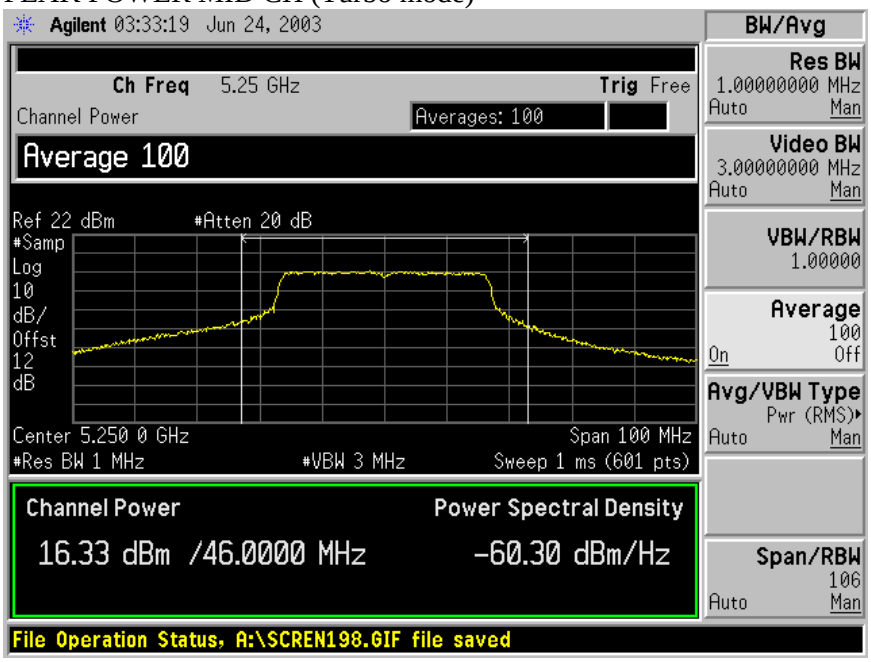


PEAK POWER (TURBO MODE)

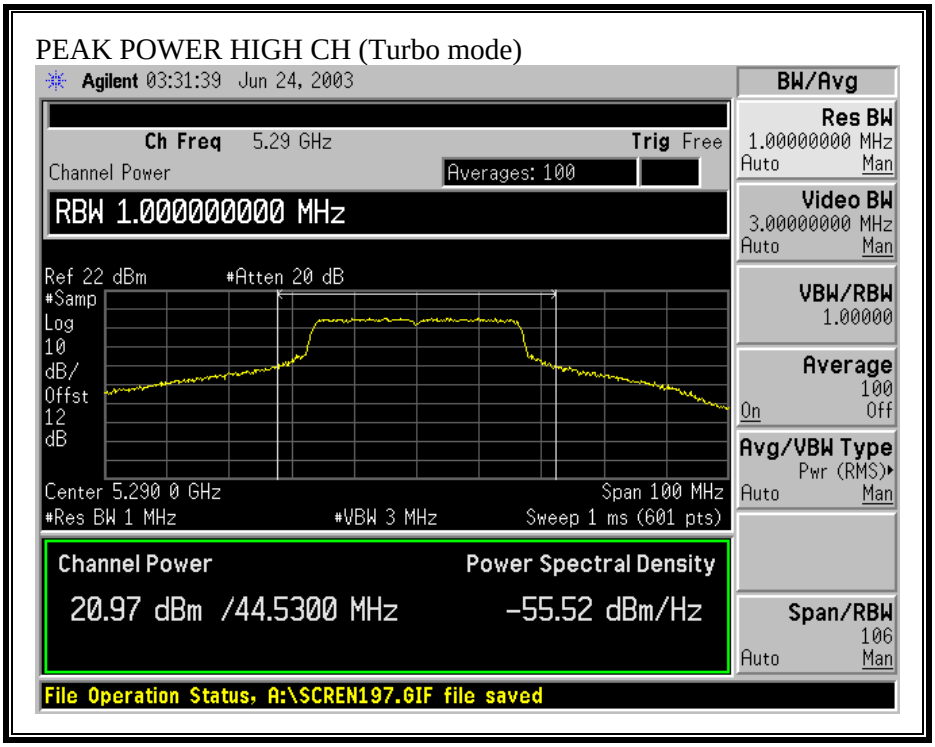
PEAK POWER LOW CH (Turbo mode)



PEAK POWER MID CH (Turbo mode)



PEAK POWER HIGH CH (Turbo mode)



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

$S = E \wedge 2 / 3770$

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 (mW) = P (W) / 1000 and
d (cm) =100 * d (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^2

Substituting the logarithmic form of power and gain using:

P (mW) = 10 ^ (P (dBm) / 10) and
G (numeric) = 10 ^ (G (dBi) / 10)

yields

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

where

d = MPE distance in cm
P = Power in dBm
G = Antenna Gain in dBi
S = Power Density Limit in mW / cm^2

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

LIMITS

S = 1.0 mW / cm^2 from 1.1310 Table 1

RESULTS

No non-compliance noted:

Mode	Power Density Limit (mW/cm^2)	Output Power (dBm)	Antenna Gain (dBi)	MPE Distance (cm)
Normal	1.0	20.65	4.00	4.82
Turbo	1.0	20.97	4.00	5.00

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 11.8 dB (including 10 dB pad and 1.8 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Normal Mode

Channel	Frequency (MHz)	Average Power (dBm)
Low	5180	15.22
Middle	5260	20.66
High	5320	17.45

Turbo Mode

Channel	Frequency (MHz)	Average Power (dBm)
Low	5200	17.00
Middle	5250	16.74
High	5290	21.20

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 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) (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 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 = 4.0 dBi, therefore there is no reduction due to antenna gain.

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:

Normal Mode

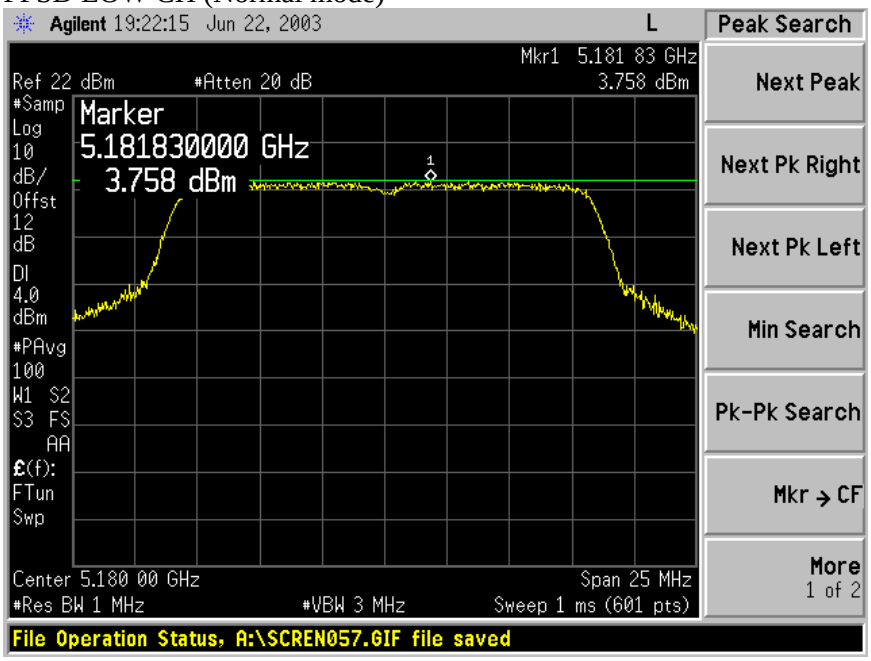
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5180	3.76	4.00	-0.24
Middle	5260	9.65	11.00	-1.35
High	5320	6.94	11.00	-4.06

Turbo Mode

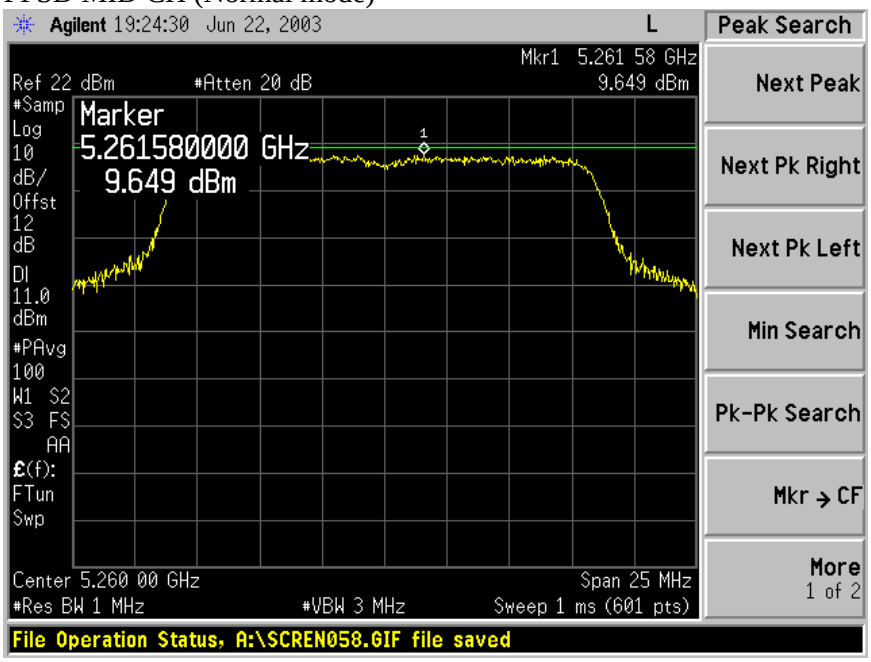
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5200	3.01	4.00	-0.99
Middle	5250	2.65	4.00	-1.36
High	5290	7.30	11.00	-3.70

PEAK POWER SPECTRAL DENSITY (NORMAL MODE)

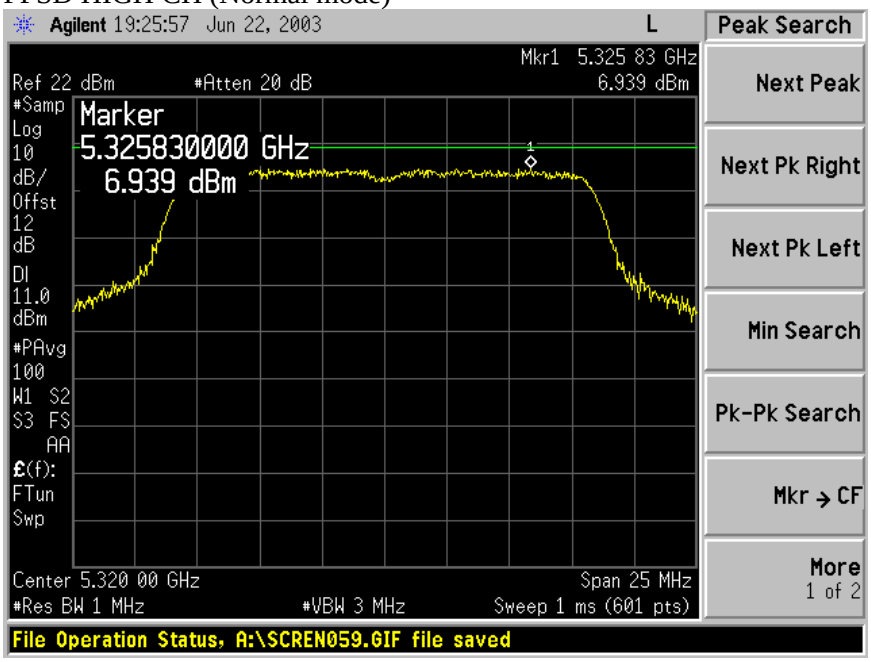
PPSD LOW CH (Normal mode)



PPSD MID CH (Normal mode)

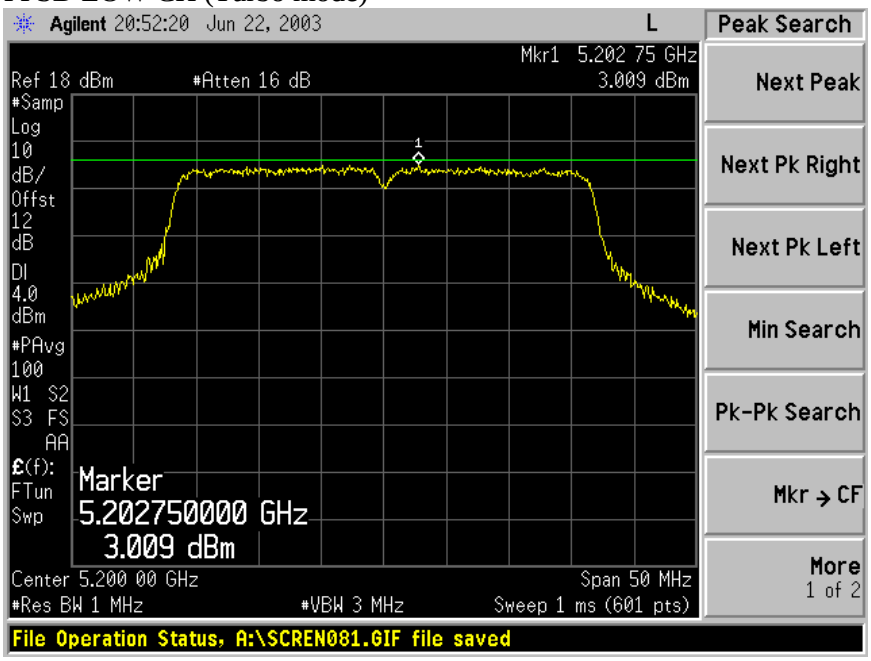


PPSD HIGH CH (Normal mode)

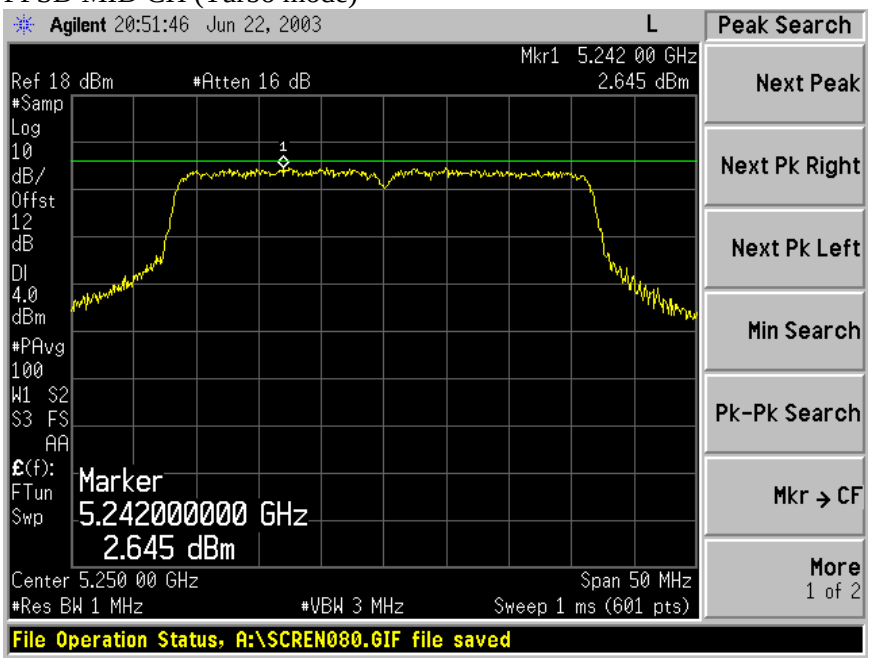


PEAK POWER SPECTRAL DENSITY (TURBO MODE)

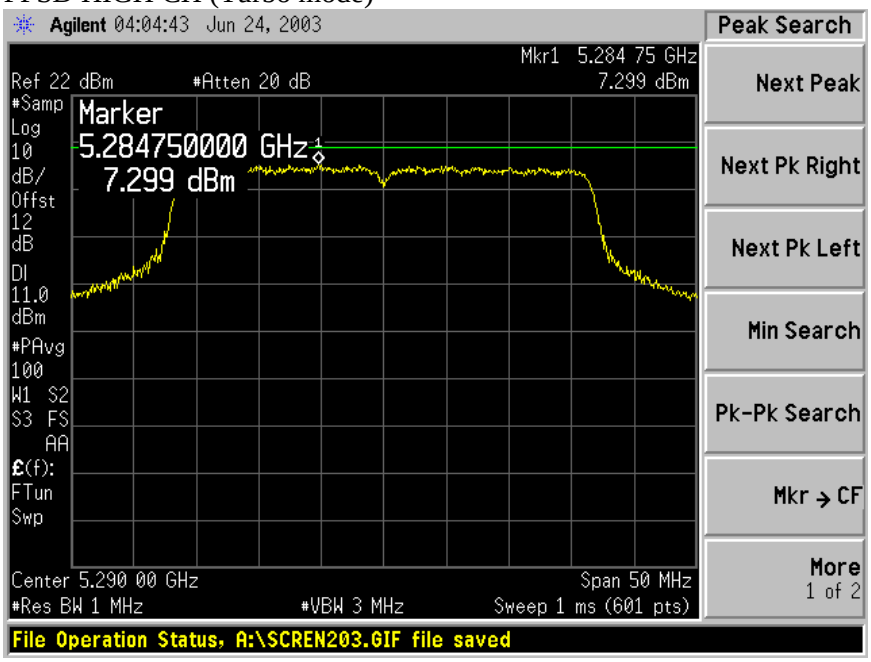
PPSD LOW CH (Turbo mode)



PPSD MID CH (Turbo mode)



PPSD HIGH CH (Turbo mode)



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:

Normal Mode

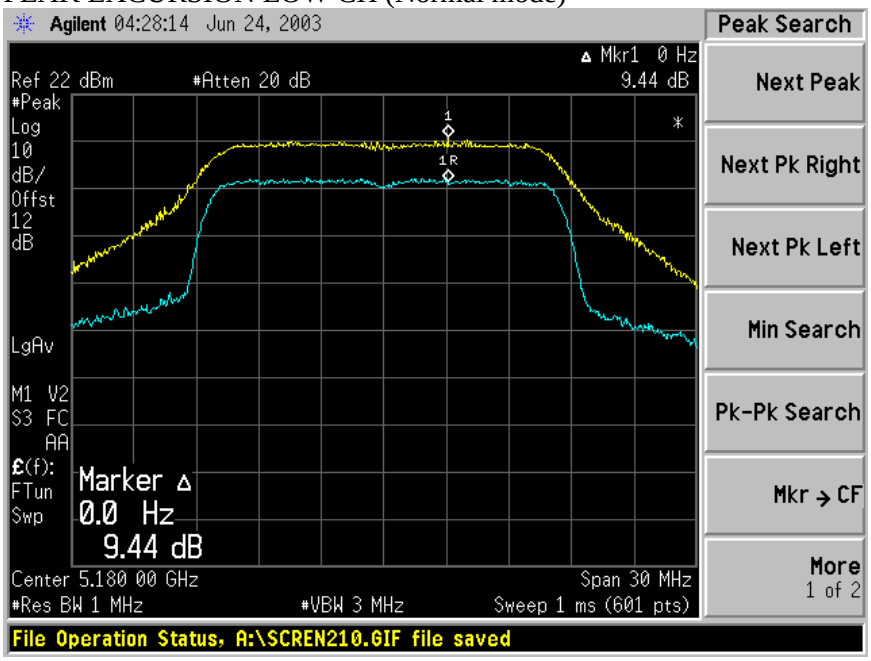
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5180	9.44	13	-3.56
Middle	5260	8.60	13	-4.40
High	5320	8.52	13	-4.48

Turbo Mode

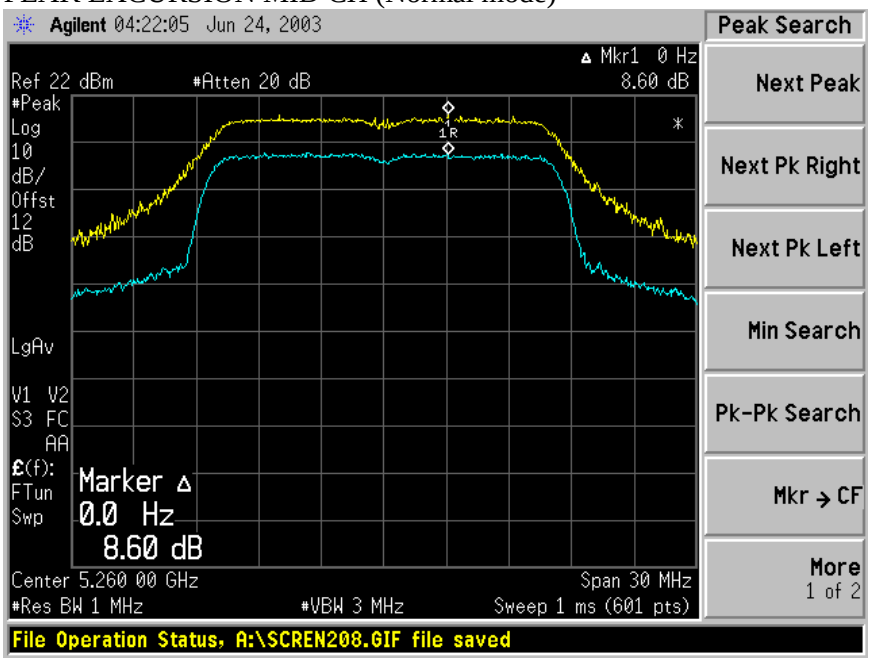
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5200	8.65	13	-4.35
Middle	5250	7.84	13	-5.16
High	5290	7.99	13	-5.01

PEAK EXCURSION (NORMAL MODE)

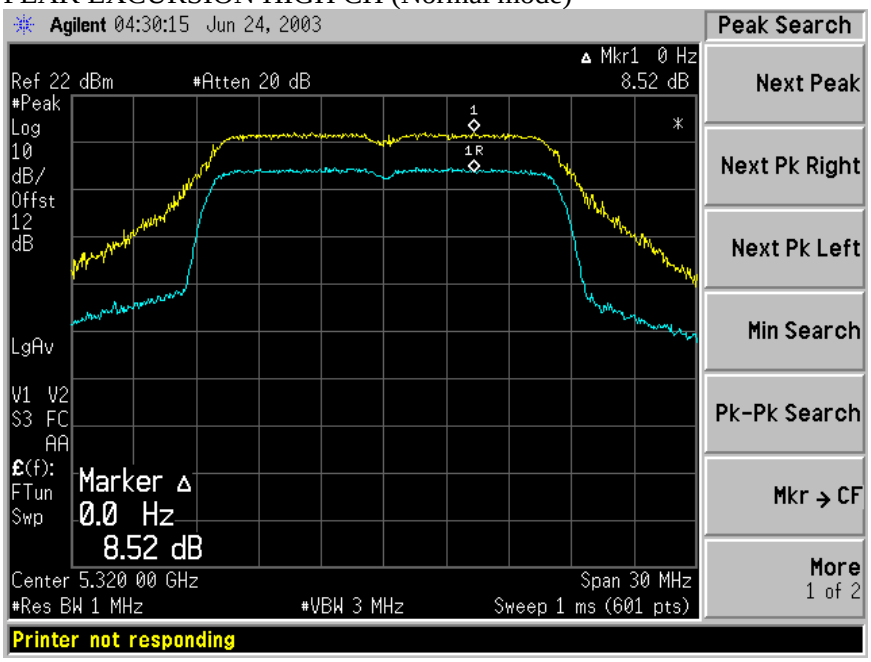
PEAK EXCURSION LOW CH (Normal mode)



PEAK EXCURSION MID CH (Normal mode)

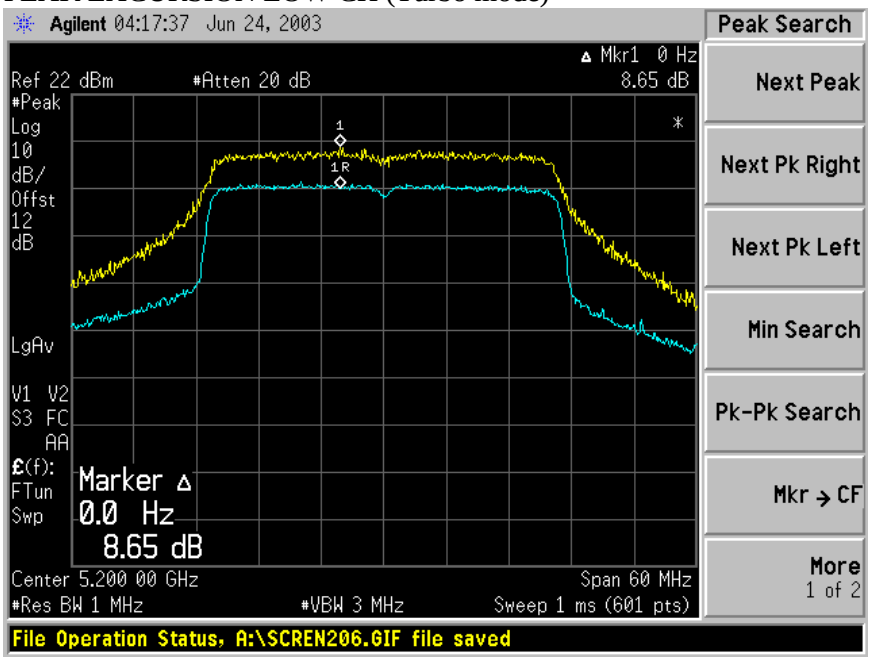


PEAK EXCURSION HIGH CH (Normal mode)

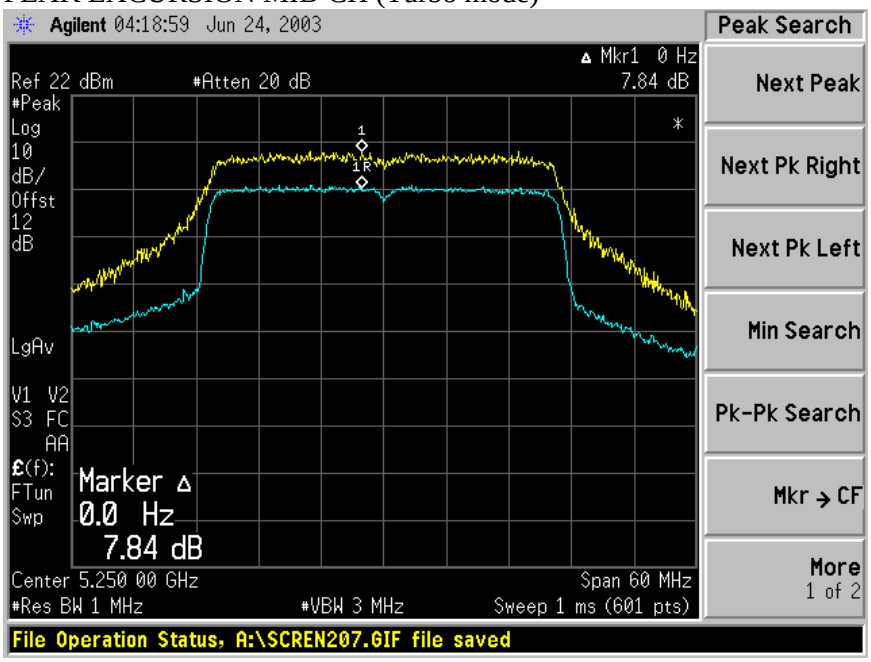


PEAK EXCURSION (TURBO MODE)

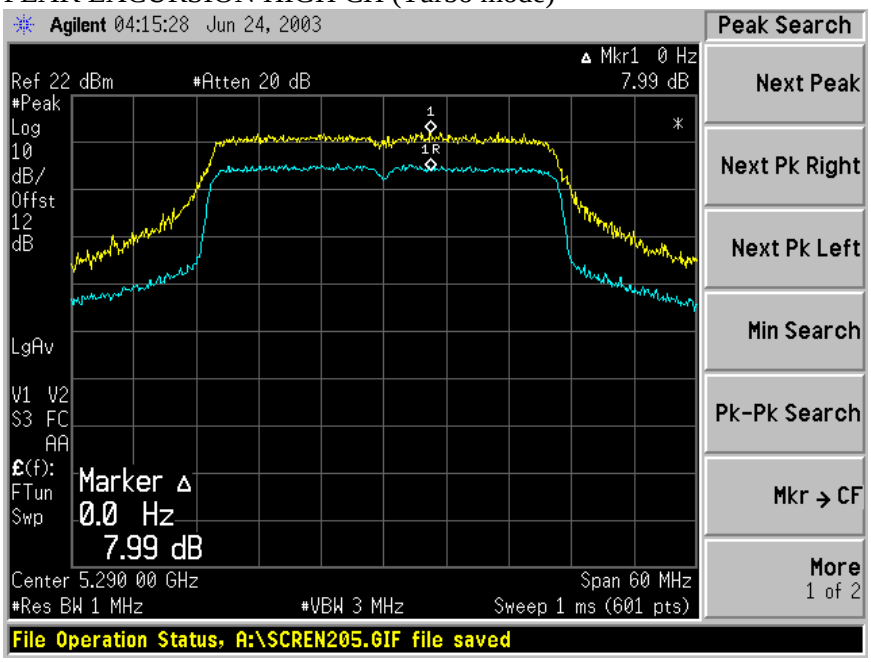
PEAK EXCURSION LOW CH (Turbo mode)



PEAK EXCURSION MID CH (Turbo mode)



PEAK EXCURSION HIGH CH (Turbo mode)



7.7. 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.

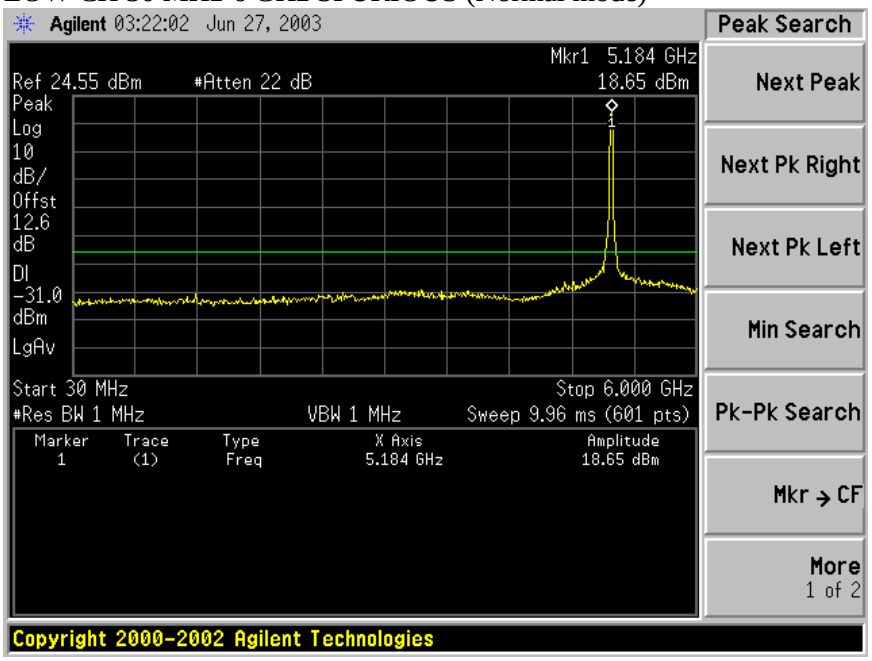
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

RESULTS

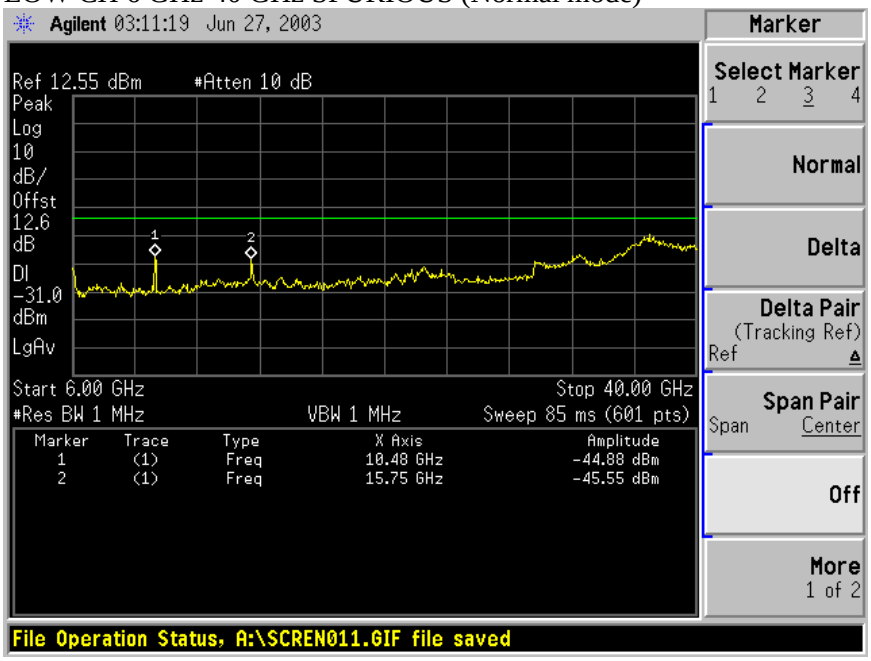
No non-compliance noted:

SPURIOUS EMISSIONS, LOW CHANNEL (NORMAL MODE)

LOW CH 30 MHz-6 GHz SPURIOUS (Normal mode)

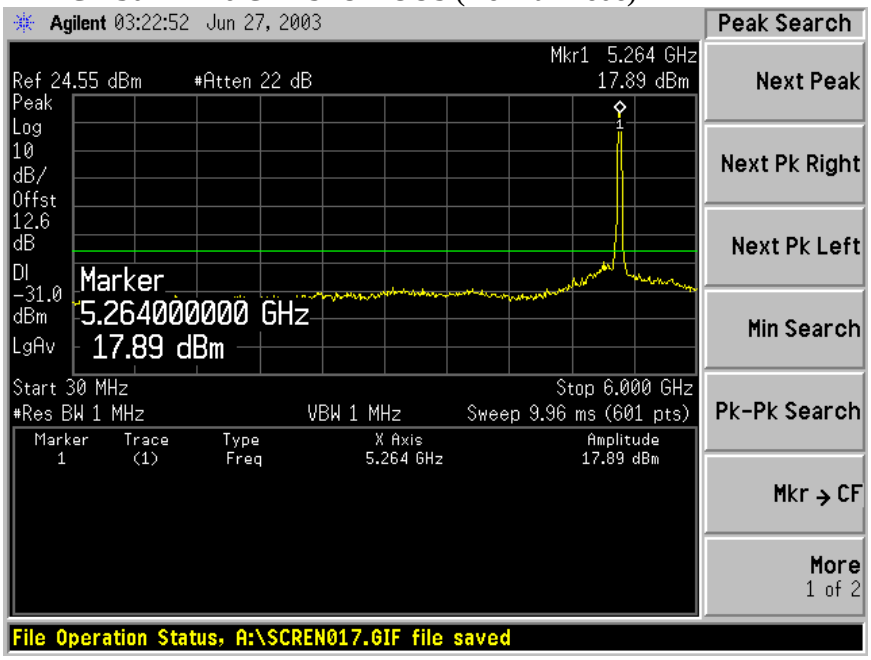


LOW CH 6 GHz-40 GHz SPURIOUS (Normal mode)

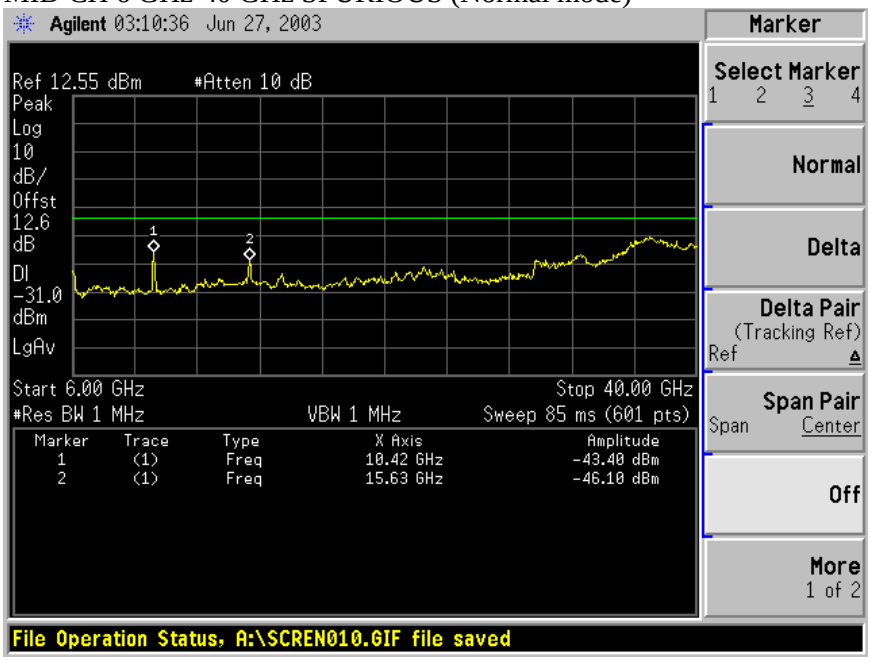


SPURIOUS EMISSIONS, MID CHANNEL (NORMAL MODE)

MID CH 30 MHz-6 GHz SPURIOUS (Normal mode)

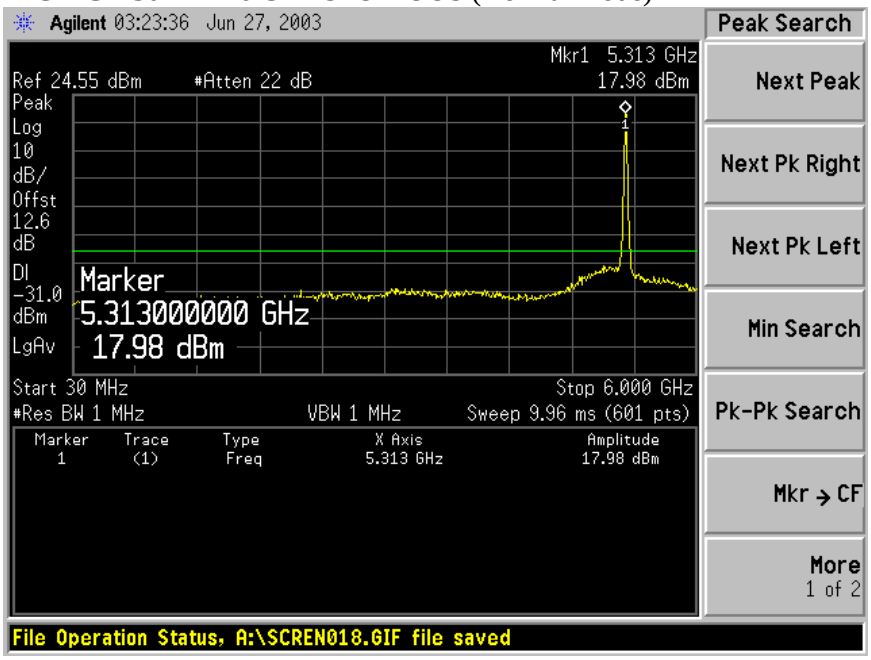


MID CH 6 GHz-40 GHz SPURIOUS (Normal mode)

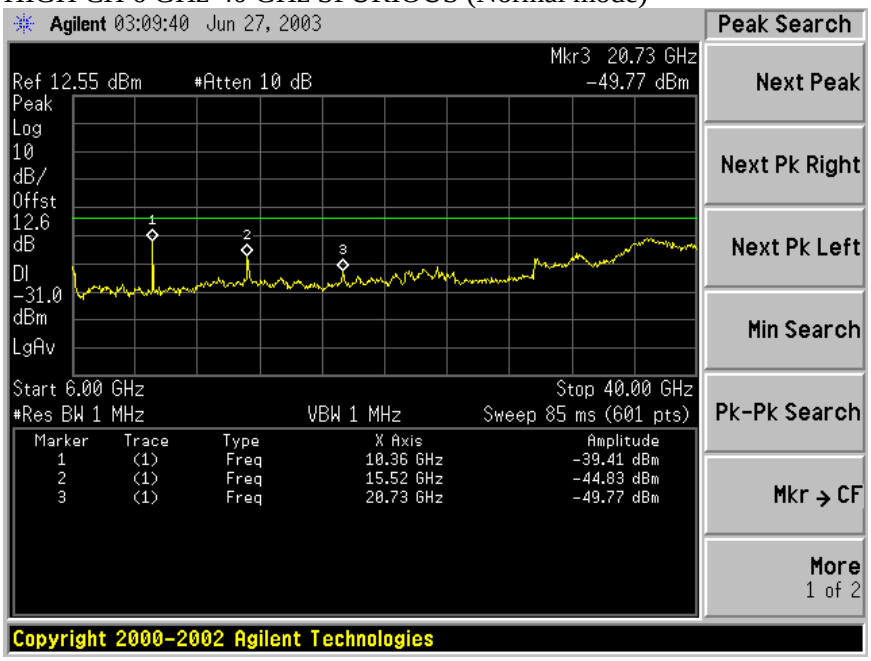


SPURIOUS EMISSIONS, HIGH CHANNEL (NORMAL MODE)

HIGH CH 30 MHz-6 GHz SPURIOUS (Normal mode)

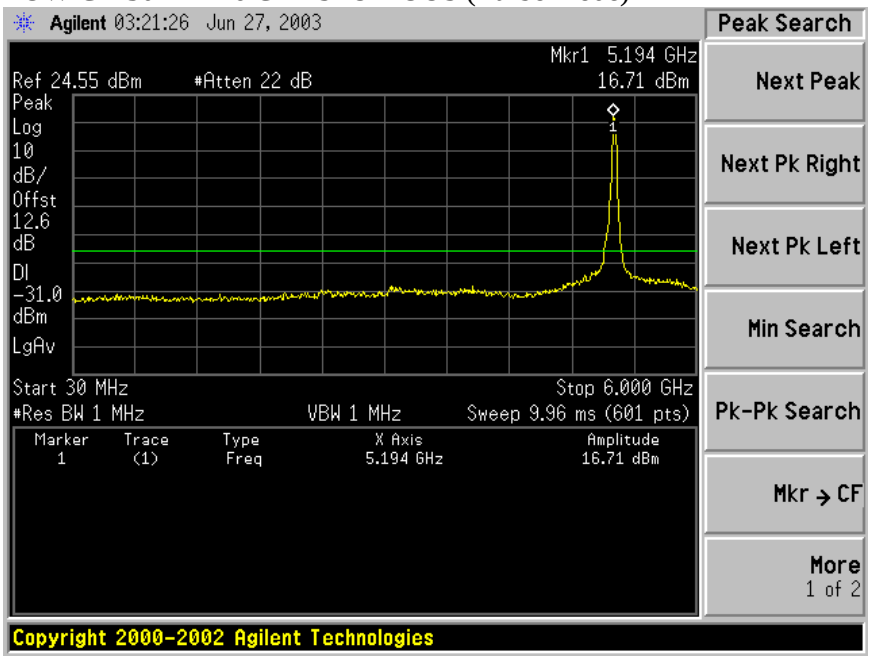


HIGH CH 6 GHz-40 GHz SPURIOUS (Normal mode)

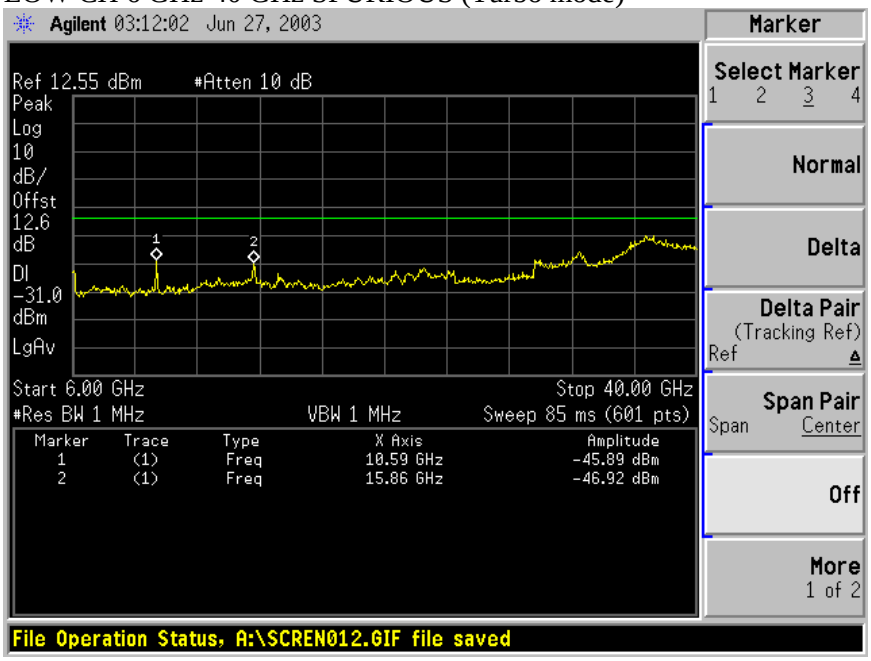


SPURIOUS EMISSIONS, LOW CHANNEL (TURBO MODE)

LOW CH 30 MHz-6 GHz SPURIOUS (Turbo mode)

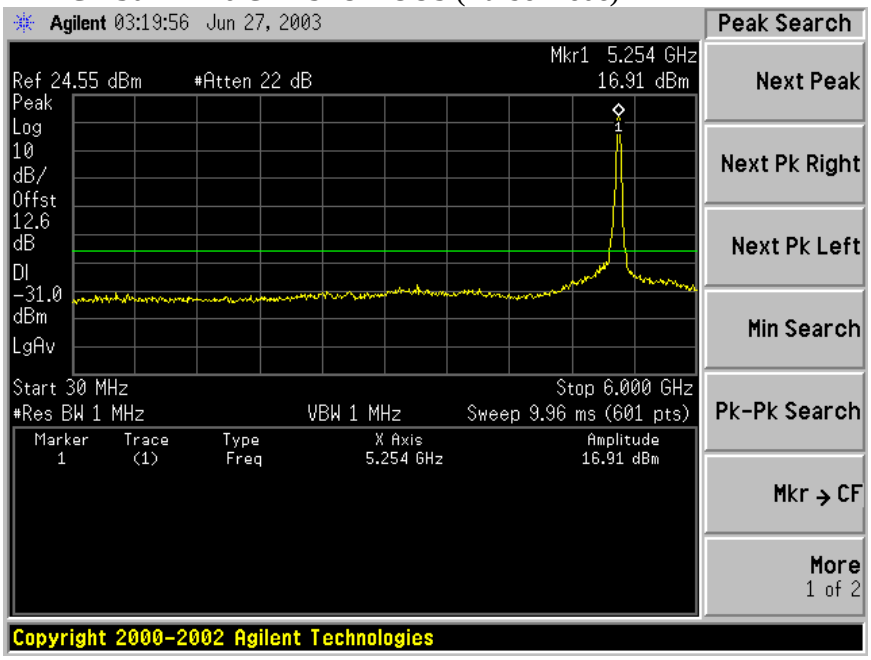


LOW CH 6 GHz-40 GHz SPURIOUS (Turbo mode)

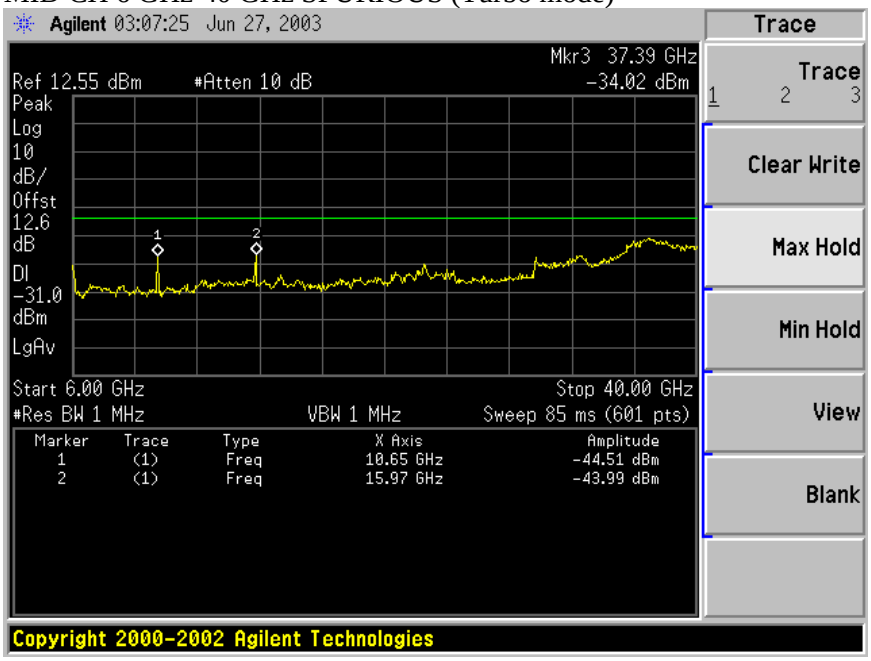


SPURIOUS EMISSIONS, MID CHANNEL (TURBO MODE)

MID CH 30 MHz-6 GHz SPURIOUS (Turbo mode)

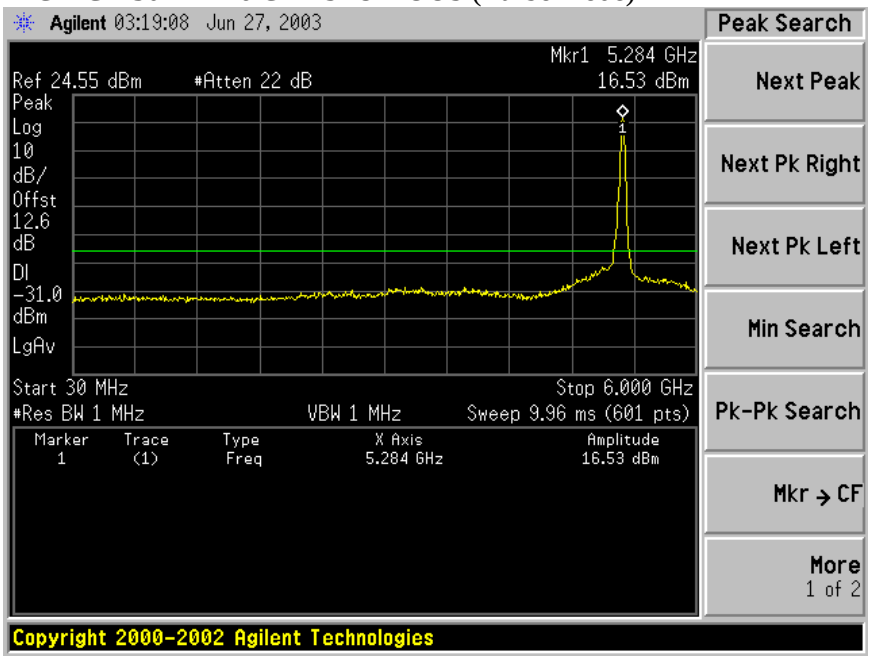


MID CH 6 GHz-40 GHz SPURIOUS (Turbo mode)

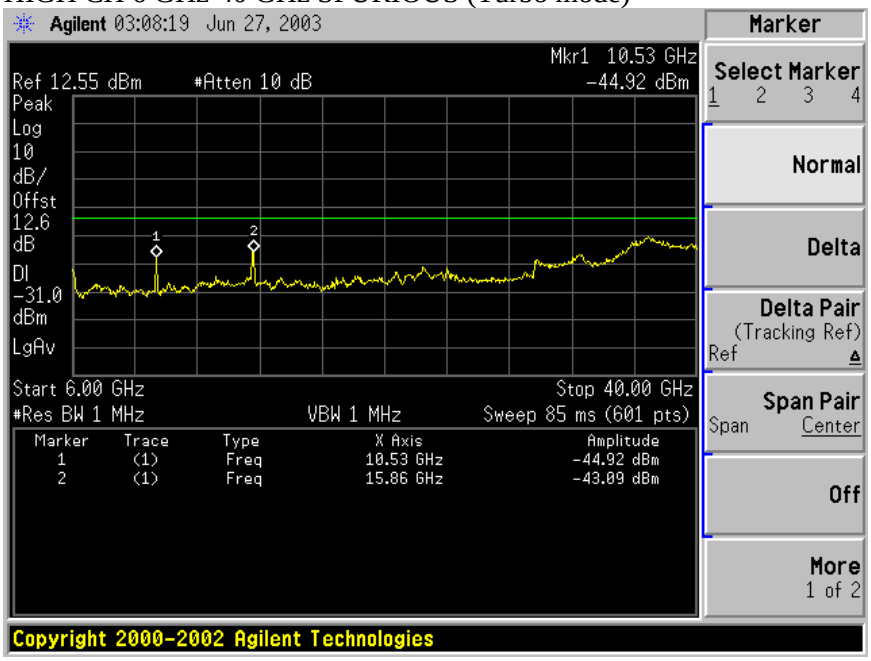


SPURIOUS EMISSIONS, HIGH CHANNEL (TURBO MODE)

HIGH CH 30 MHz-6 GHz SPURIOUS (Turbo mode)



HIGH CH 6 GHz-40 GHz SPURIOUS (Turbo mode)



7.8. 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
[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.

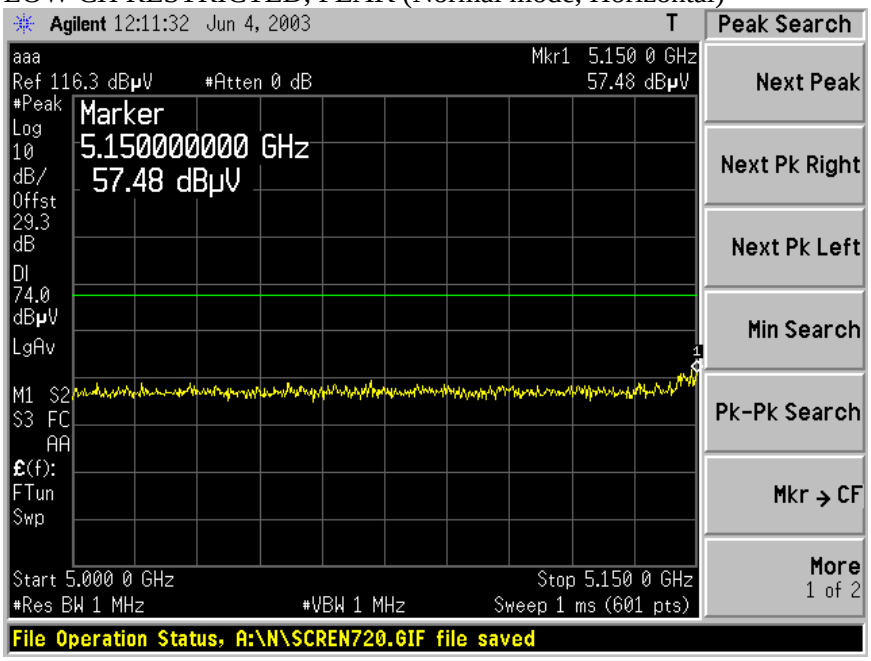
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

RESULTS

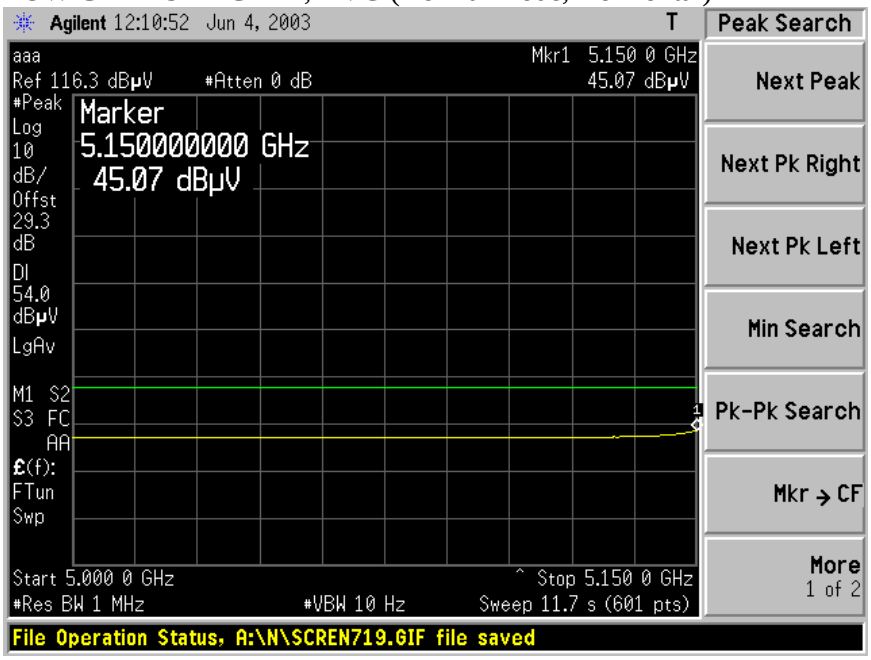
No non-compliance noted:

RESTRICTED BANDEDGE (NORMAL MODE, LOW CHANNEL, HORIZONTAL)

LOW CH RESTRICTED, PEAK (Normal mode, Horizontal)

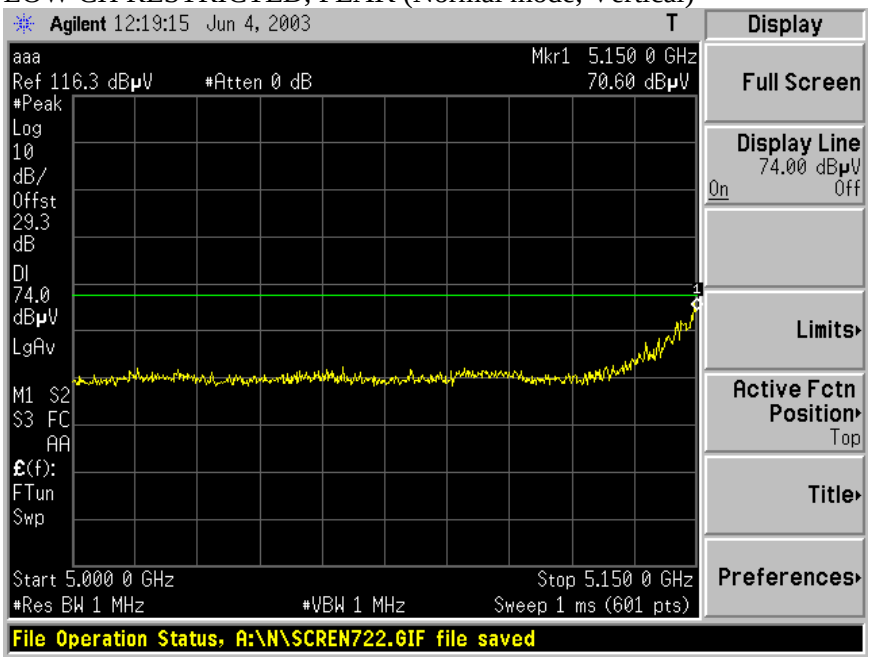


LOW CH RESTRICTED, AVG (Normal mode, Horizontal)

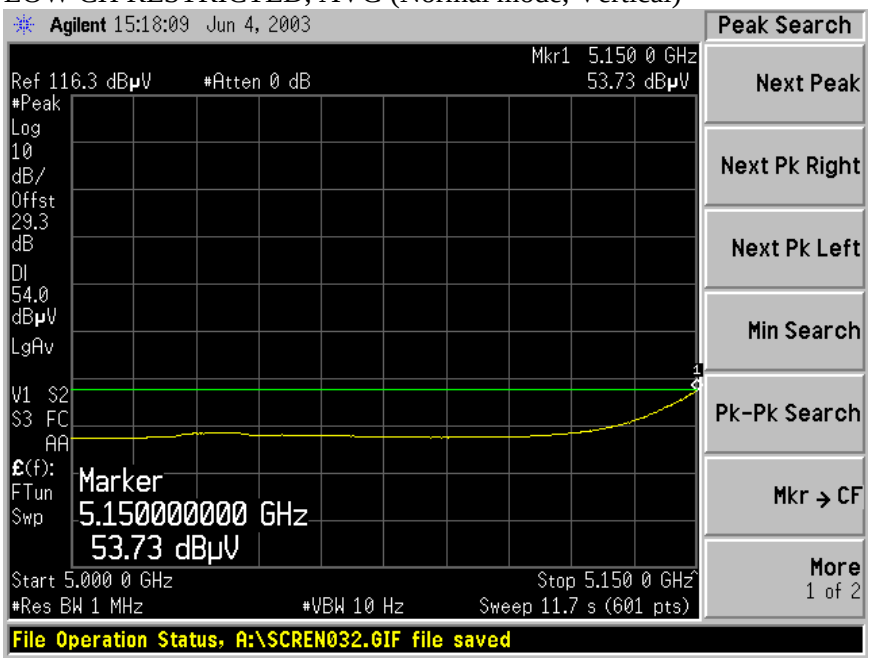


RESTRICTED BANDEDGE (NORMAL MODE, LOW CHANNEL, VERTICAL)

LOW CH RESTRICTED, PEAK (Normal mode, Vertical)

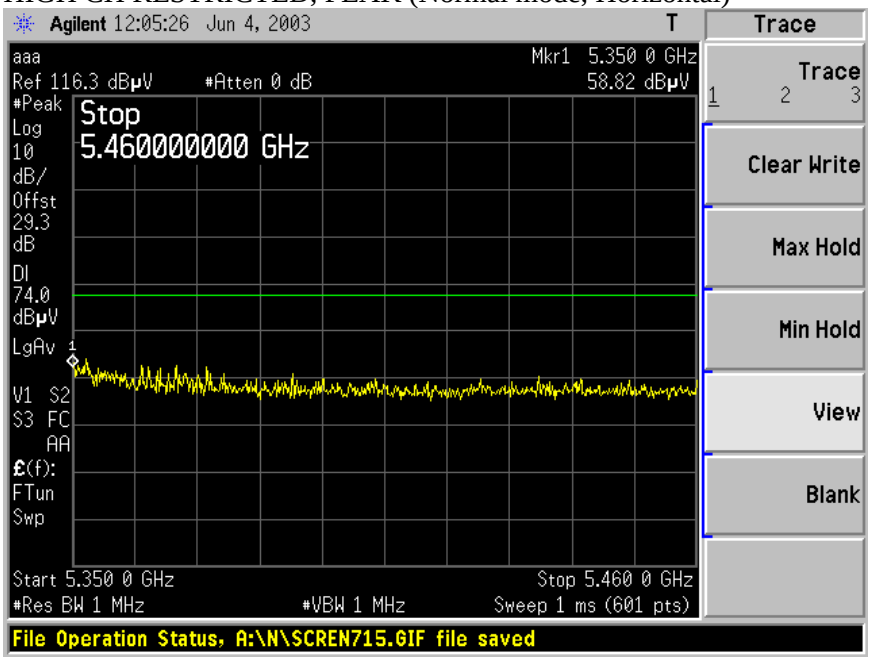


LOW CH RESTRICTED, AVG (Normal mode, Vertical)

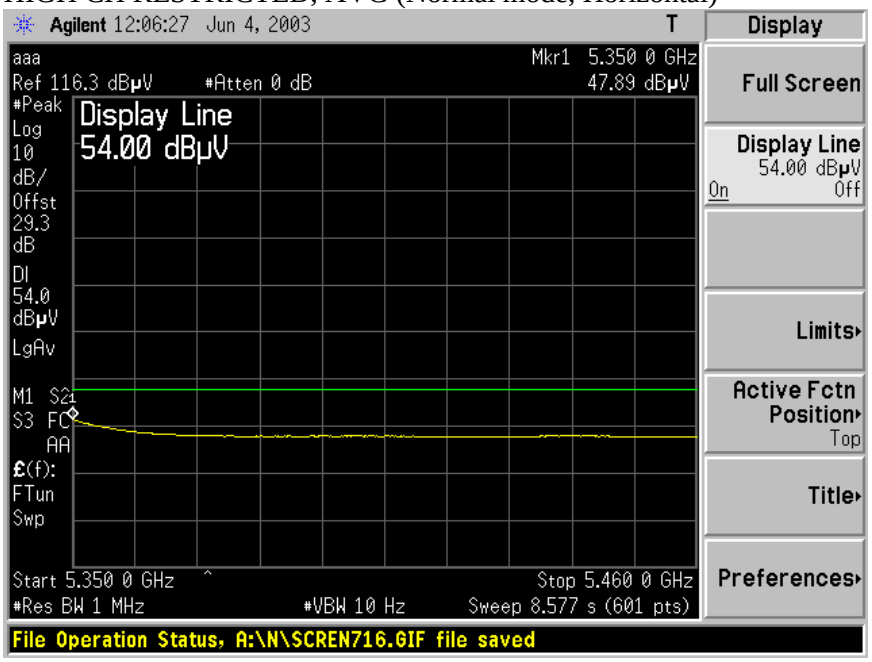


RESTRICTED BANDEDGE (NORMAL MODE, HIGH CHANNEL, HORIZONTAL)

HIGH CH RESTRICTED, PEAK (Normal mode, Horizontal)

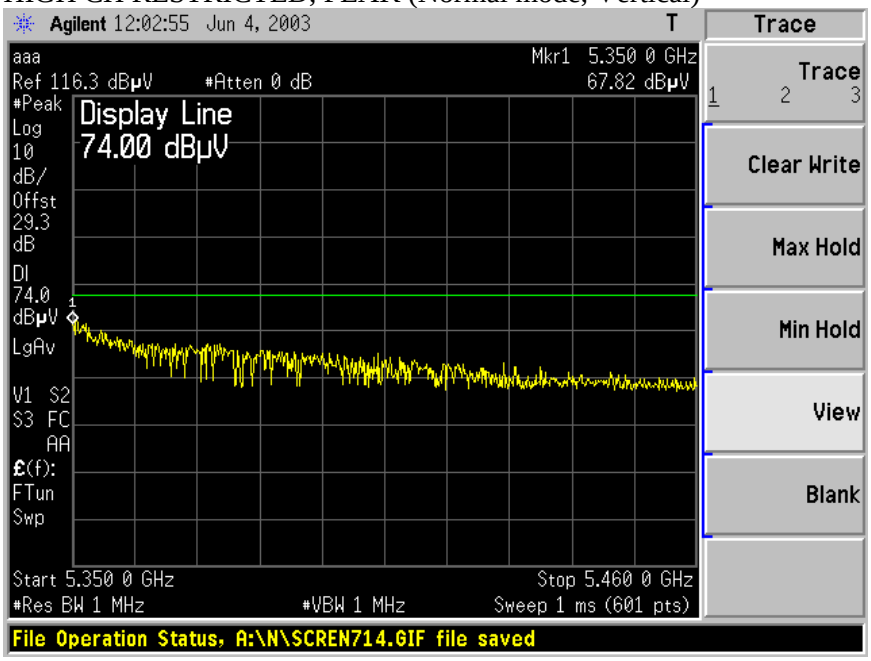


HIGH CH RESTRICTED, AVG (Normal mode, Horizontal)

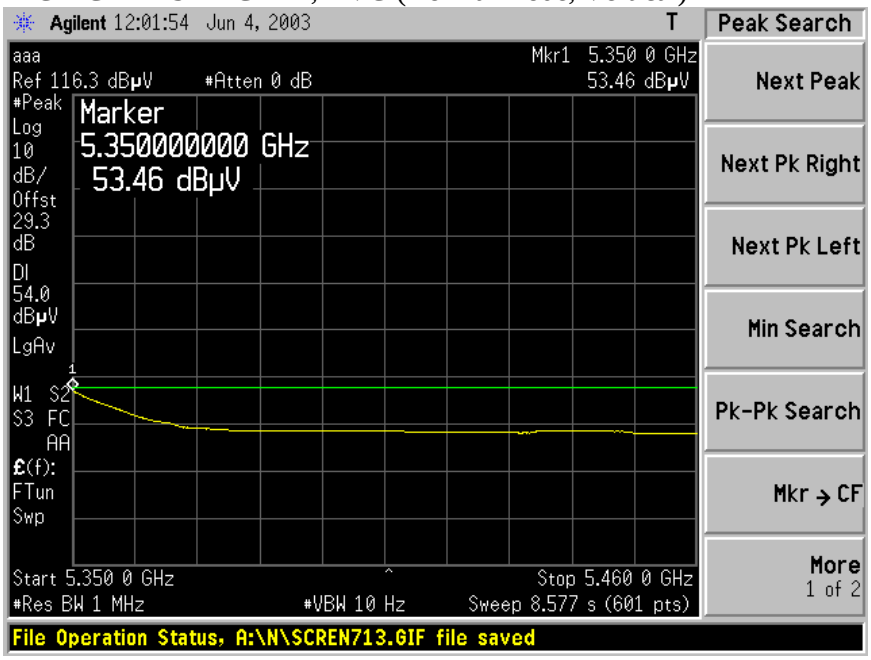


RESTRICTED BANDEDGE (NORMAL MODE, HIGH CHANNEL, VERTICAL)

HIGH CH RESTRICTED, PEAK (Normal mode, Vertical)



HIGH CH RESTRICTED, AVG (Normal mode, Vertical)



HARMONICS AND SPURIOUS EMISSIONS (NORMAL MODE, LOW CHANNEL)

06/27/03 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Yan Zheng
Project #: 03U2012
Company: Atheros
EUT Descrip.: 802.11a, L
EUT M/N: AP30-401
Test Target:
Mode Oper: Transmitt

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz
T72; S/N: 6739 @1m	T87 Miteq 924342	HP 8566B Analyzer	T117; ARA 18-26GHz; S/N:1013

Hi Frequency Cables
☐ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
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
Channel 5.18 GHz, 11a, low															
10.360	9.8	48.5	36.4	38.7	5.9	-41.6	0.0	1.0	52.5	40.4	74.0	54.0	-21.5	-13.6	H
15.540	9.8	49.0	36.2	39.2	7.6	-45.5	0.0	1.0	51.3	38.5	74.0	54.0	-22.7	-15.5	H
15.540	9.8	48.4	36.3	39.2	7.6	-45.5	0.0	1.0	50.7	38.6	74.0	54.0	-23.3	-15.4	V
10.360	9.8	48.7	36.7	38.7	5.9	-41.6	0.0	1.0	52.7	40.7	74.0	54.0	-21.3	-13.3	V

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 (NORMAL MODE, MID CHANNEL)

06/27/03 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Yan Zheng
Project #: 03U2012
Company: Atheros
EUT Descrip.: 802.11a, M
EUT M/N: AP30-401
Test Target:
Mode Oper: Transmitt

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz
T72; S/N: 6739 @1m	T87 Miteq 924342	HP 8566B Analyzer	T117; ARA 18-26GHz; S/N:1013

Hi Frequency Cables
☐ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
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
Channel 5.26 GHz, 11a, mid															
15.780	9.8	48.6	36.2	38.8	7.7	-45.6	0.0	1.0	50.4	38.0	74.0	54.0	-23.6	-16.0	H
15.780	9.8	49.3	36.3	38.8	7.7	-45.6	0.0	1.0	51.1	38.1	74.0	54.0	-22.9	-15.9	V

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 (NORMAL MODE, HIGH CHANNEL)

06/27/03 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Yan Zheng
Project #: 03U2012
Company: Atheros
EUT Descrip.: 802.11a,H
EUT M/N: AP30-401
Test Target:
Mode Oper: Transmitt

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz
T72; S/N: 6739 @1m	T87 Miteq 924342	HP 8566B Analyzer	T117; ARA 18-26GHz; S/N:1013

Hi Frequency Cables
☐ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

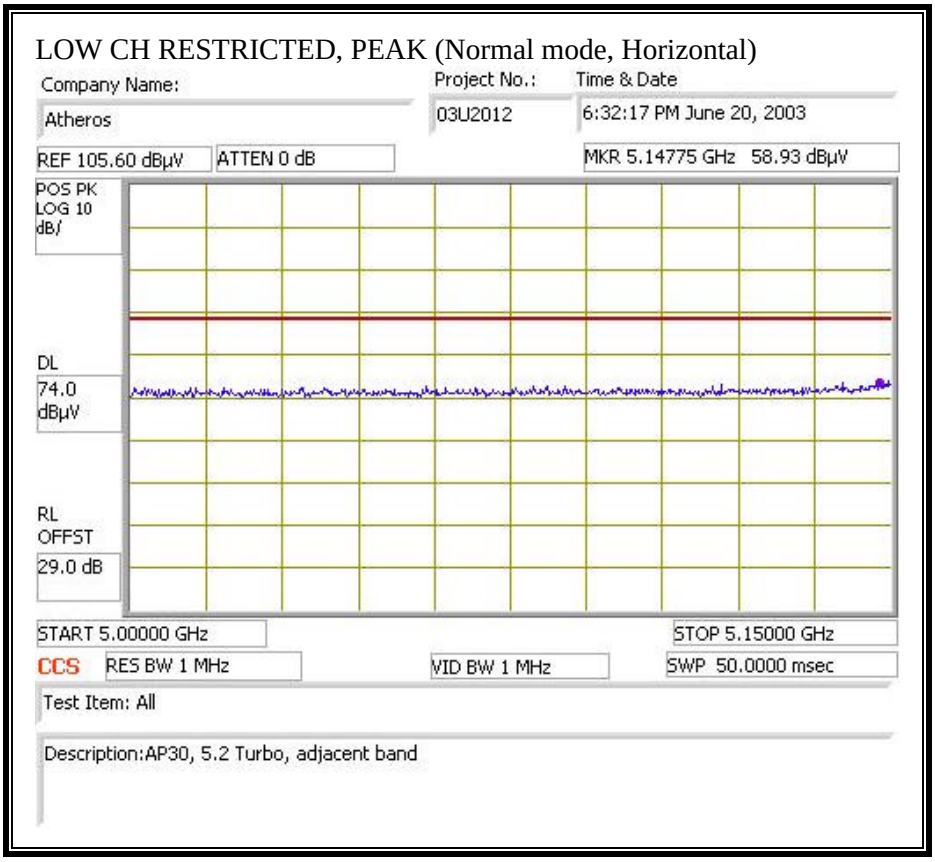
Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

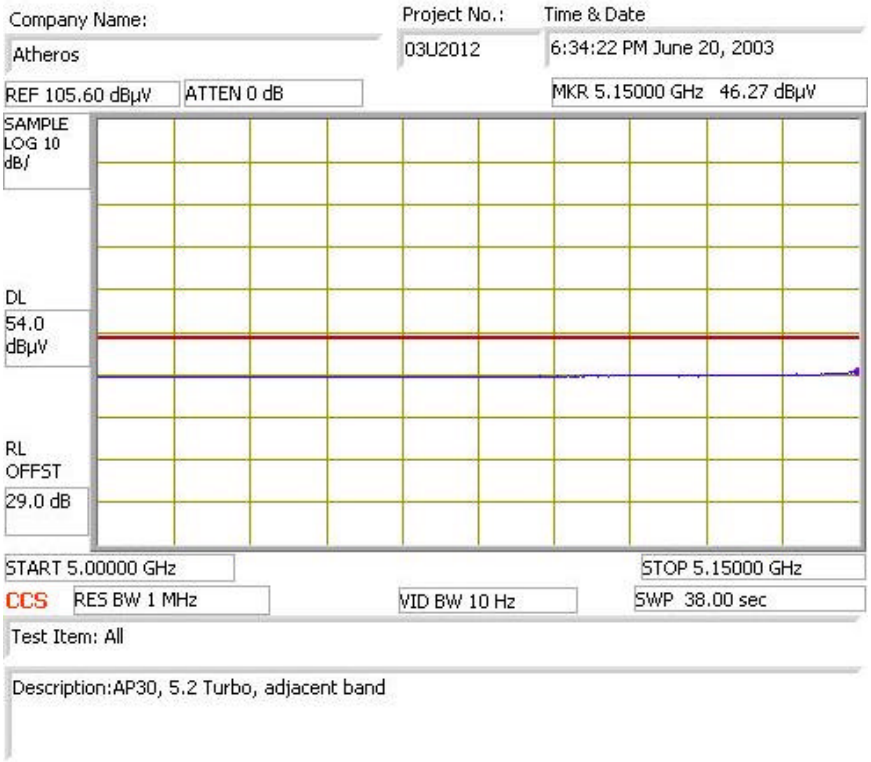
f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
a mode, 5.32 GHz, high															
10.640	9.8	51.0	40.1	38.8	6.0	-41.3	0.0	1.0	55.5	44.6	74.0	54.0	-18.5	-9.4	V
15.960	9.8	59.7	45.8	38.5	7.7	-45.7	0.0	1.0	61.2	47.3	74.0	54.0	-12.8	-6.7	V
15.960	9.8	57.9	46.2	38.5	7.7	-45.7	0.0	1.0	59.5	47.7	74.0	54.0	-14.5	-6.3	H
10.640	9.8	47.1	40.3	38.8	6.0	-41.3	0.0	1.0	51.6	44.8	74.0	54.0	-22.4	-9.2	H

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		

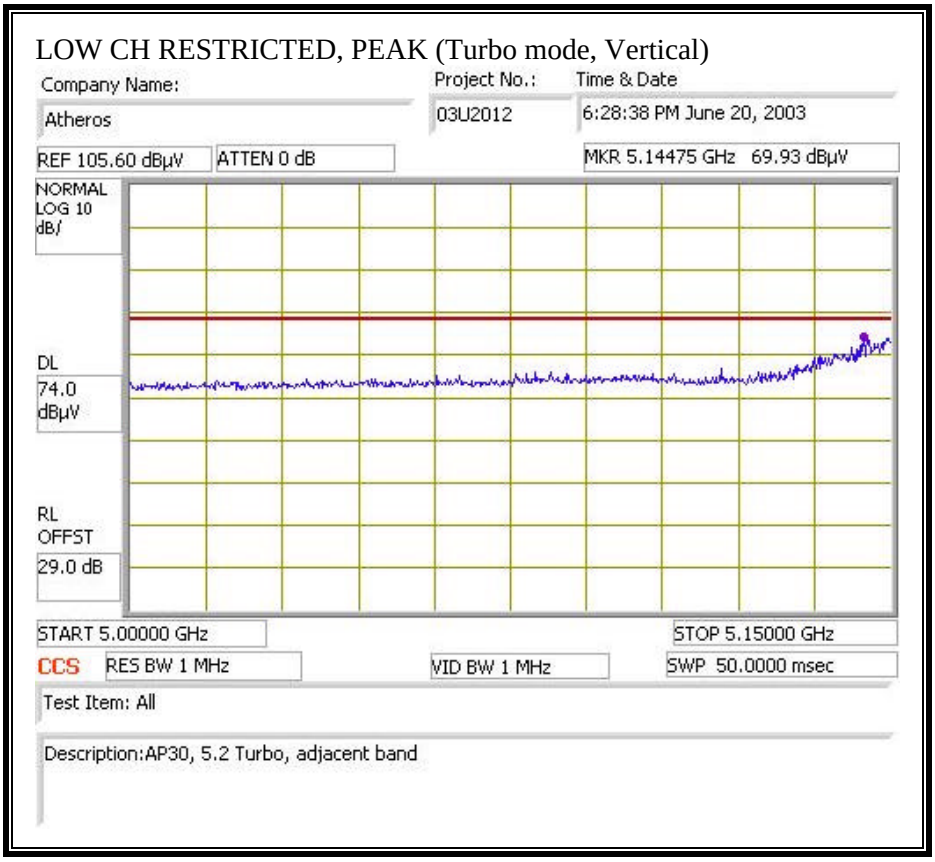
RESTRICTED BANDEDGE (TURBO MODE, LOW CHANNEL, HORIZONTAL)

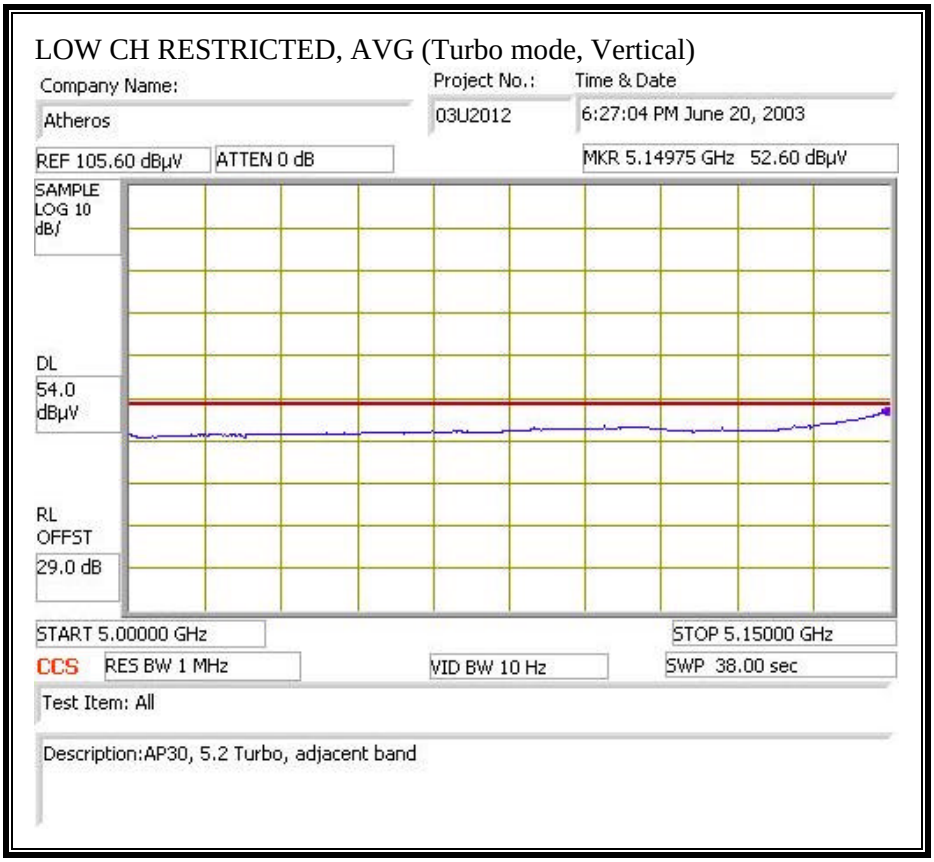


LOW CH RESTRICTED, AVG (Normal mode, Horizontal)

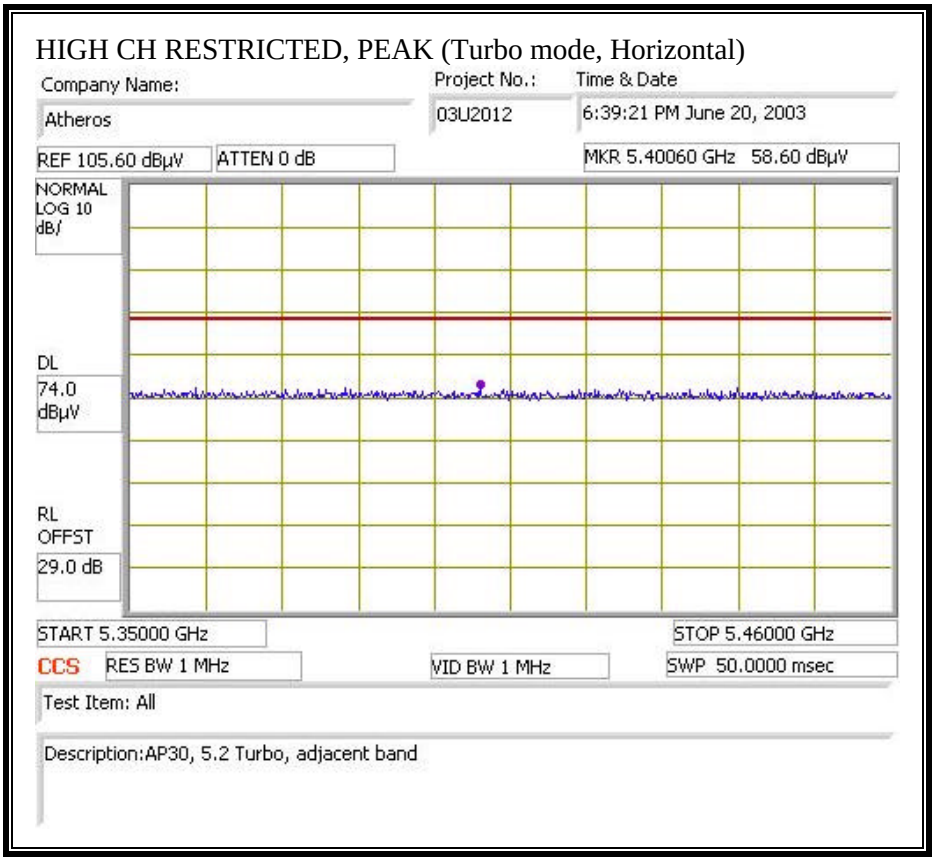


RESTRICTED BANDEDGE (TURBO MODE, LOW CHANNEL, VERTICAL)

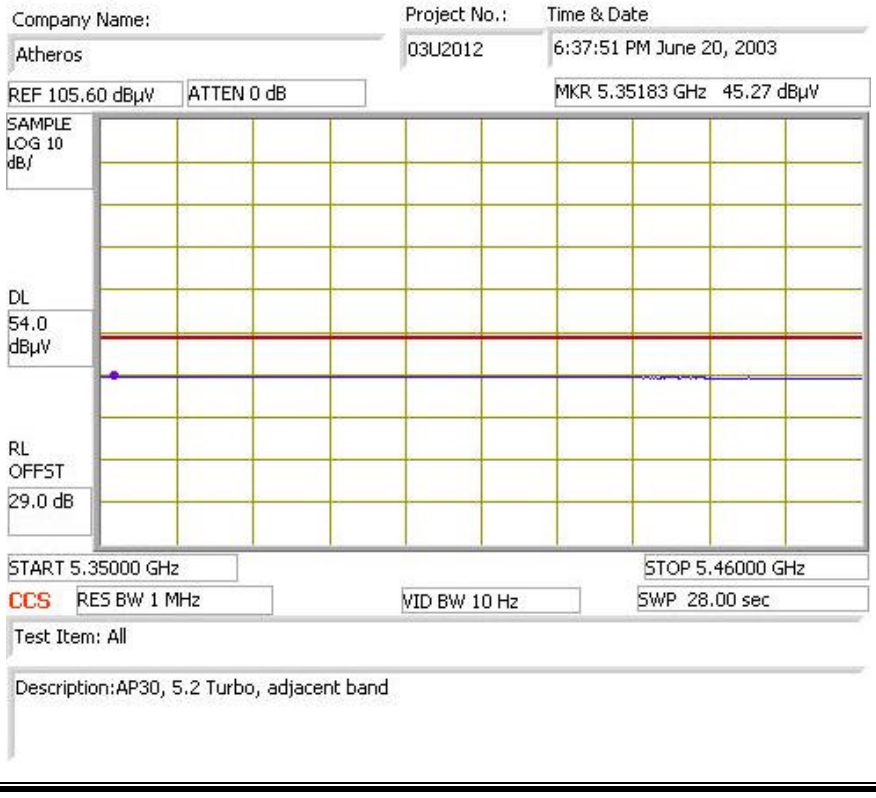




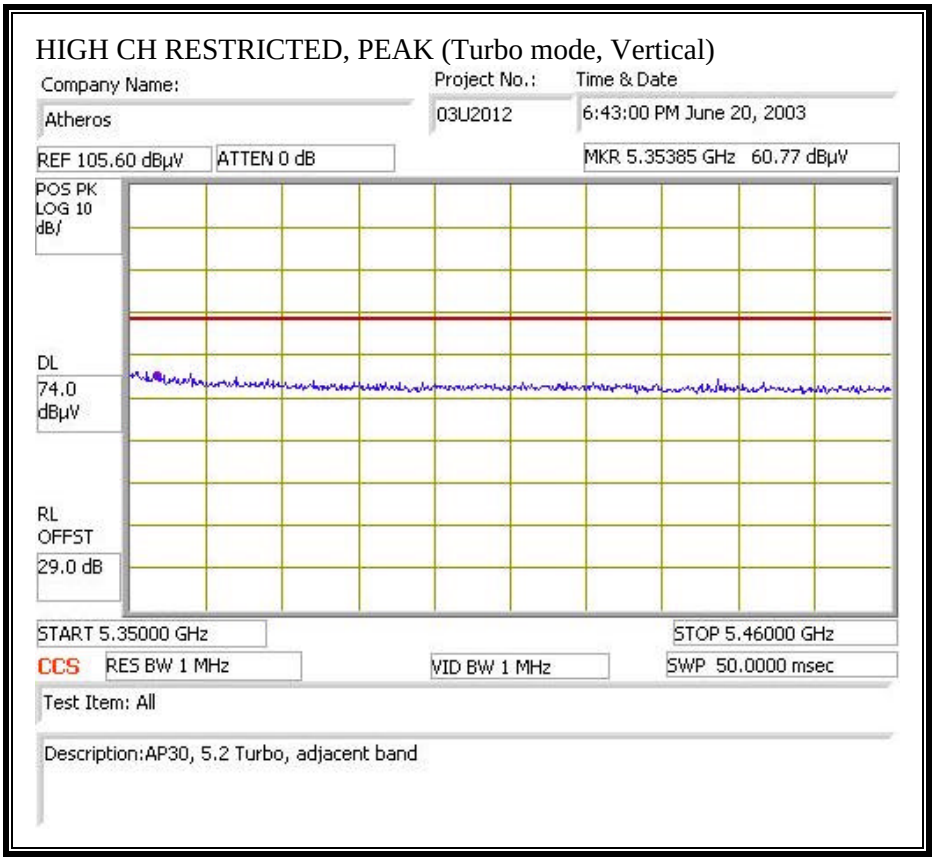
RESTRICTED BANDEDGE (TURBO MODE, HIGH CHANNEL, HORIZONTAL)

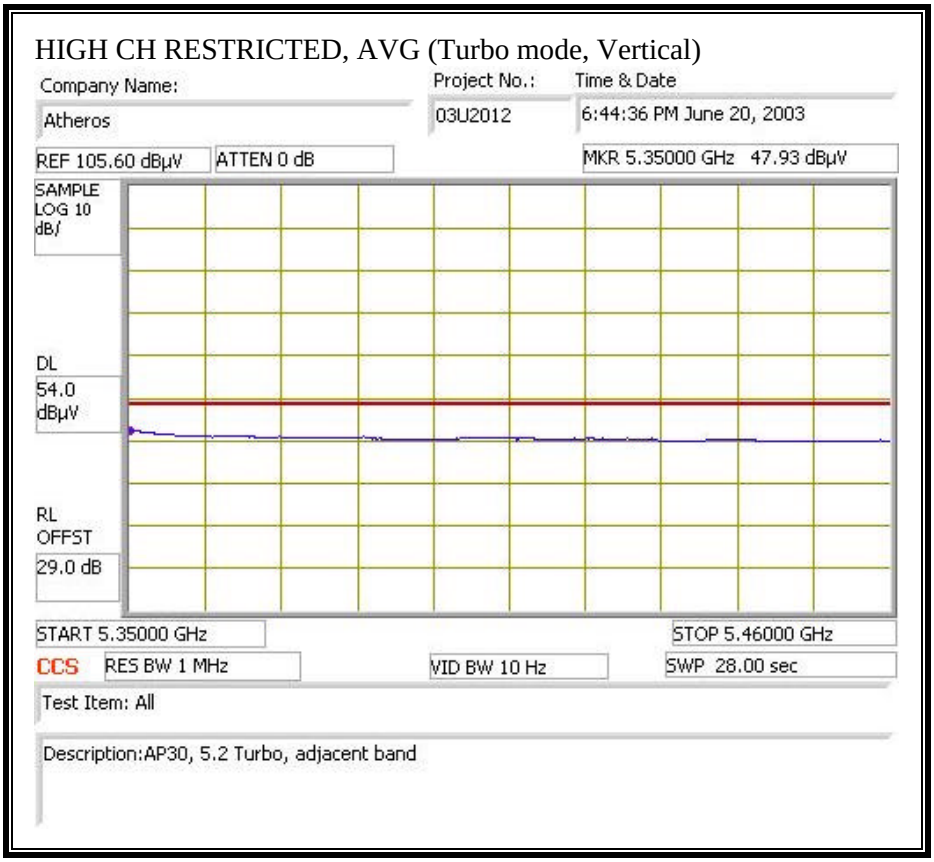


HIGH CH RESTRICTED, AVG (Turbo mode, Horizontal)



RESTRICTED BANDEDGE (TURBO MODE, HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS (TURBO MODE)

06/27/03 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Yan Zheng
Project #: 03U2012
Company: Atheros
EUT Descrip.: 802.11a, L, M, H
EUT M/N: AP30-401
Test Target:
Mode Oper: Transmitt

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz
T72; S/N: 6739 @1m	T87 Miteq 924342	HP 8566B Analyzer	T117; ARA 18-26GHz; S/N:1013

Hi Frequency Cables
☐ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

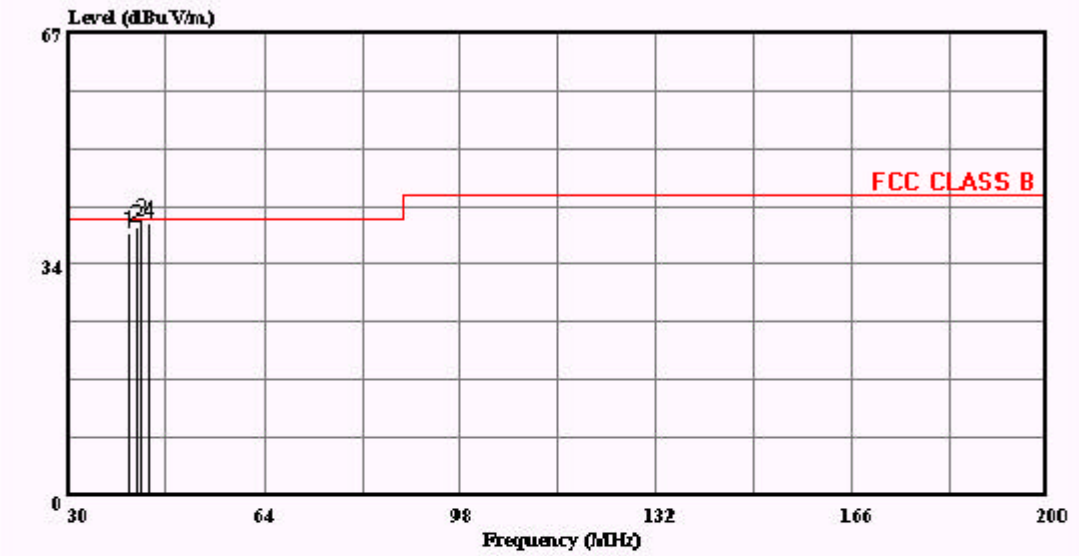
f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
Channel 5.20 GHz, 11a, low turbo															
No harmonics or spurious detected above the system noise floor															
Channel 5.25 GHz, 11a, mid turbo															
No harmonics or spurious detected above the system noise floor															
Channel 5.29 GHz, 11a, high turbo															
No harmonics or spurious detected above the system 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	HPF	High Pass Filter		

DIGITAL DEVICE EMISSIONS 30 TO 200 MHz (WORST-CASE HORIZONTAL)

COMPLIANCE Engineering Services, Inc.
561F Monterey Road
Morgan Hill, CA 95037, U.S.A.
Tel: (408) 463-0885
Fax:(408) 463-0888

Data#: 8 File#: Digital 30_1000GHz.EMI Date: 06-24-2003 Time: 17:02:29



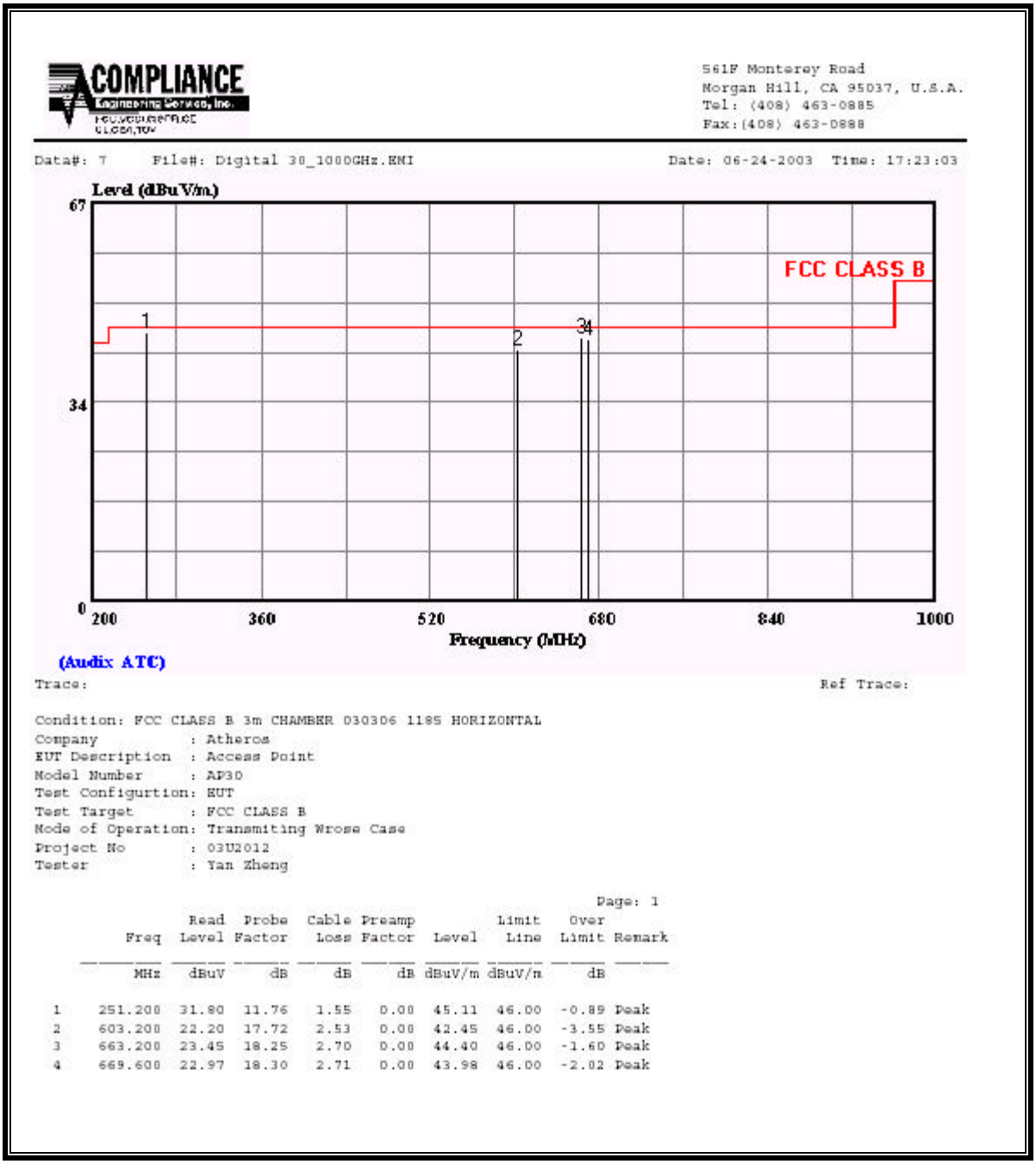
Trace: Ref Trace:

Condition: FCC CLASS B 3m CHAMBER 030306 1185 HORIZONTAL
Company : Atheros
EUT Description : Access Point
Model Number : AP30
Test Configurtion: EUT
Test Target : FCC CLASS B
Mode of Operation: TRANSMITING WROSE CASE
Project No : 03U2012
Tester : Yan Zheng

Page: 1

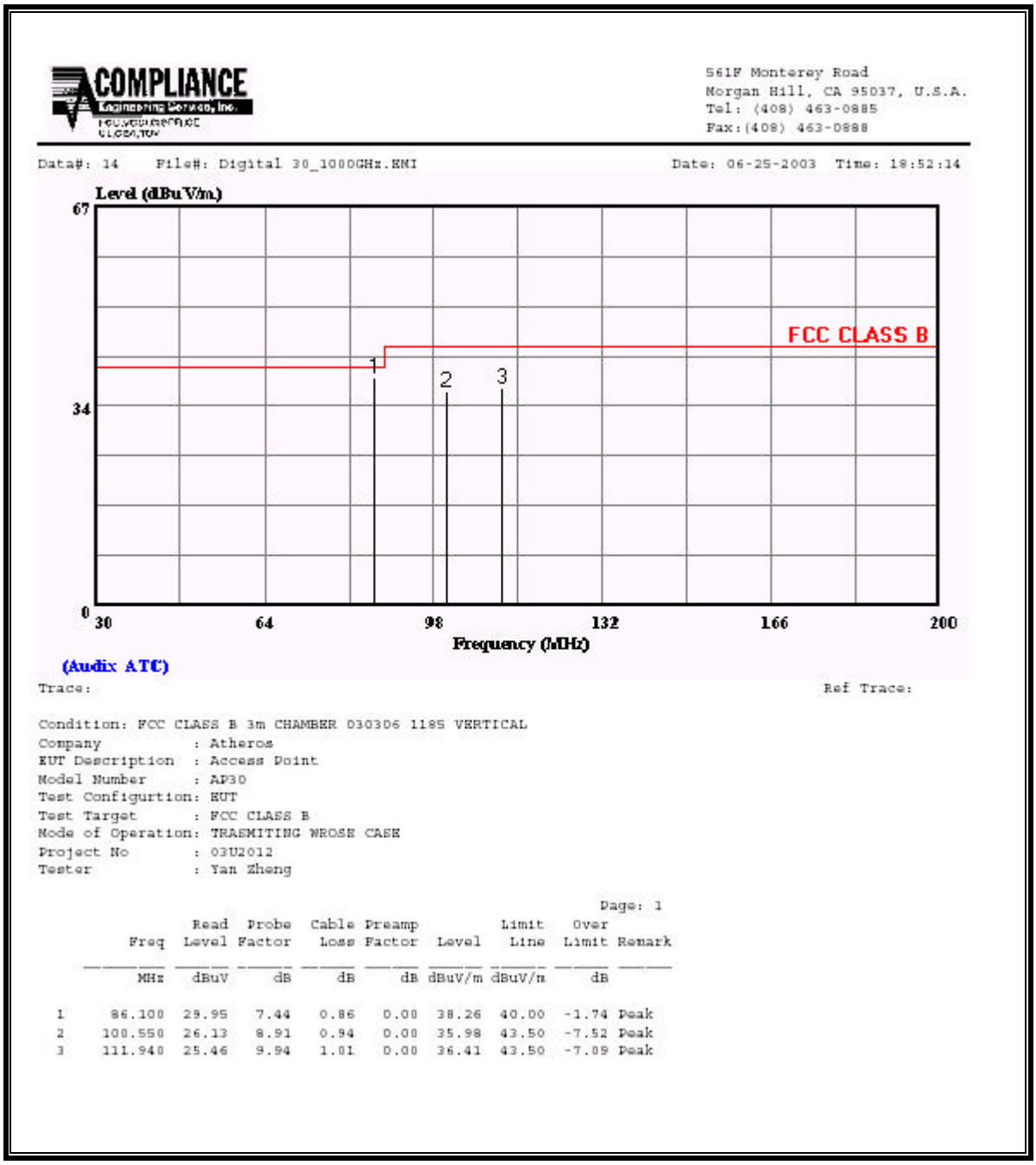
	Freq	Read Level	Probe Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	40.540	21.04	16.40	0.63	0.00	38.07	40.00	-1.93	Peak
2	41.730	21.98	16.26	0.64	0.00	38.88	40.00	-1.12	Peak
3	42.580	22.85	16.16	0.64	0.00	39.65	40.00	-0.35	Peak
4	43.940	22.91	16.00	0.65	0.00	39.56	40.00	-0.44	Peak

DIGITAL DEVICE EMISSIONS 200 TO 1000 MHz (WORST-CASE HORIZONTAL)



	Freq	Read Level	Probe Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	251.200	31.80	11.76	1.55	0.00	45.11	46.00	-0.89	Peak
2	603.200	22.20	17.72	2.53	0.00	42.45	46.00	-3.55	Peak
3	663.200	23.45	18.25	2.70	0.00	44.40	46.00	-1.60	Peak
4	669.600	22.97	18.30	2.71	0.00	43.98	46.00	-2.02	Peak

DIGITAL DEVICE EMISSIONS 30 TO 200 MHz (WORST-CASE VERTICAL)

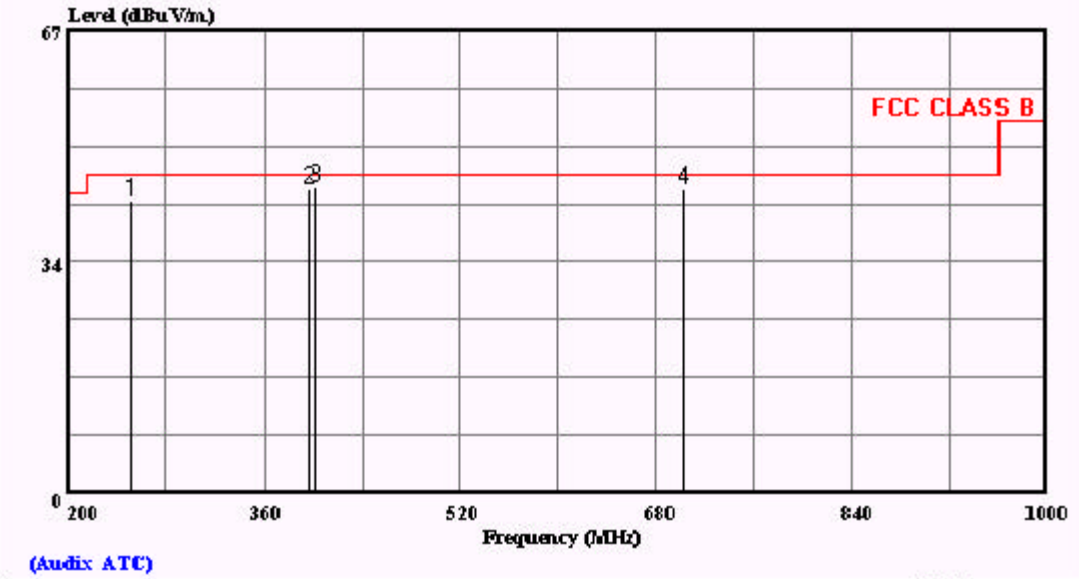


	Freq	Read Level	Probe Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	86.100	29.95	7.44	0.86	0.00	38.26	40.00	-1.74	Peak
2	100.550	26.13	8.91	0.94	0.00	35.98	43.50	-7.52	Peak
3	111.940	25.46	9.94	1.01	0.00	36.41	43.50	-7.09	Peak

DIGITAL DEVICE EMISSIONS 200 TO 1000 MHz (WORST-CASE VERTICAL)

561F Monterey Road
Morgan Hill, CA 95037, U.S.A.
Tel: (408) 463-0885
Fax:(408) 463-0888

Data#: 11 File#: Digital 30_1000GHz.EMI Date: 06-25-2003 Time: 18:36:56



Trace: Ref Trace:

Condition: FCC CLASS B 3m CHAMBER 030306 1185 VERTICAL
Company : Atheros
EUT Description : Access Point
Model Number : AP30
Test Configurtion: EUT
Test Target : FCC CLASS B
Mode of Operation: TRASMITING WROSE CASE
Project No : 03U2012
Tester : Yan Zheng

Page: 1

	Freq	Read Level	Probe Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	251.200	29.01	11.76	1.55	0.00	42.32	46.00	-3.68	Peak
2	397.600	27.69	14.39	2.01	0.00	44.09	46.00	-1.91	Peak
3	401.600	27.75	14.48	2.01	0.00	44.24	46.00	-1.76	Peak
4	703.200	22.78	18.61	2.78	0.00	44.17	46.00	-1.83	Peak

7.9. CO-LOCATED RADIATED EMISSIONS

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 EUT can transmit simultaneously in the 802.11a mode and the 802.11b/g mode.

The dominant transmitter (802.11a) is set to the worst case channel. The spurious emissions performance of the dominant transmitter is investigated as the settings of the non-dominant transmitter (802.11b/g) are varied. Worst case results are reported.

Note: Although the dominant transmitter is worst-case in the 5.8 GHz band and the non-dominant transmitter is in the 2.4 GHz band, these co-located emission results are also being reported in this UNII report (5.2 GHz band) since this is a composite application.

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:

WORST-CASE CO-LOCATED HARMONICS AND SPURIOUS EMISSIONS

07/02/03 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Yan Zheng
Project #: 03U2012
Company: Atheros
EUT Descrip.: 802.11a, 5.745GHz
EUT M/N: AP30
Test Target:
Mode Oper: Simultaneous Transmission on Dominand and Non-Dominant Transmitters

~~Test Equipment:~~

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz
T73; S/N: 6717 @1m	T86 Miteq 924341	HP 8566B Analyzer	T117; ARA 18-26GHz; S/N:1013

Hi Frequency Cables
☐ (2 ft) ☑ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☑ (12 ft)

~~Peak Measurements:~~
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

~~Average Measurements:~~
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
Dominant Transmitter Harmonic (Co-location)															
11.490	9.8	54.9	42.3	39.1	7.5	-44.6	0.0	1.0	57.9	45.3	74.0	54.0	-16.1	-8.7	V
11.490	9.8	49.5	38.2	39.1	7.5	-44.6	0.0	1.0	52.5	41.2	74.0	54.0	-21.5	-12.8	H

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		

7.10. CO-LOCATED 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

$S = E \wedge 2 / 3770$

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 (mW) = P (W) / 1000 and
d (cm) =100 * d (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^2

This equation is kept in the linear form to enable the proper summation of the power densities for each of the two radios:

$$d = 0.282 * \sqrt{\{ [(P1 * G1) + (P2 * G2)] / S\}} \qquad \text{Equation (1)}$$

where

d = distance in cm
P1 = Power of Radio 1 in mW
G1 = Numeric antenna gain of Radio 1
P2 = Power of Radio 2 in mW
G2 = Numeric antenna gain of Radio 2
S = Power Density in mW / cm^2

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

LIMITS

S = 1.0 mW / cm^2 from 1.1310 Table 1

CO-LOCATED RADIO RESULTS

No non-compliance noted:

The dominant transmitter is the 802.11a mode:
P1 = 0.716 W
G1 = 2.51

The non-dominant transmitter is the 802.11g mode:
P2 = 0.637 W
G2 = 1.41

Substituting actual values into Equation (1) yields:

D = 14.6 cm

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.

7.11. 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 µH/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.

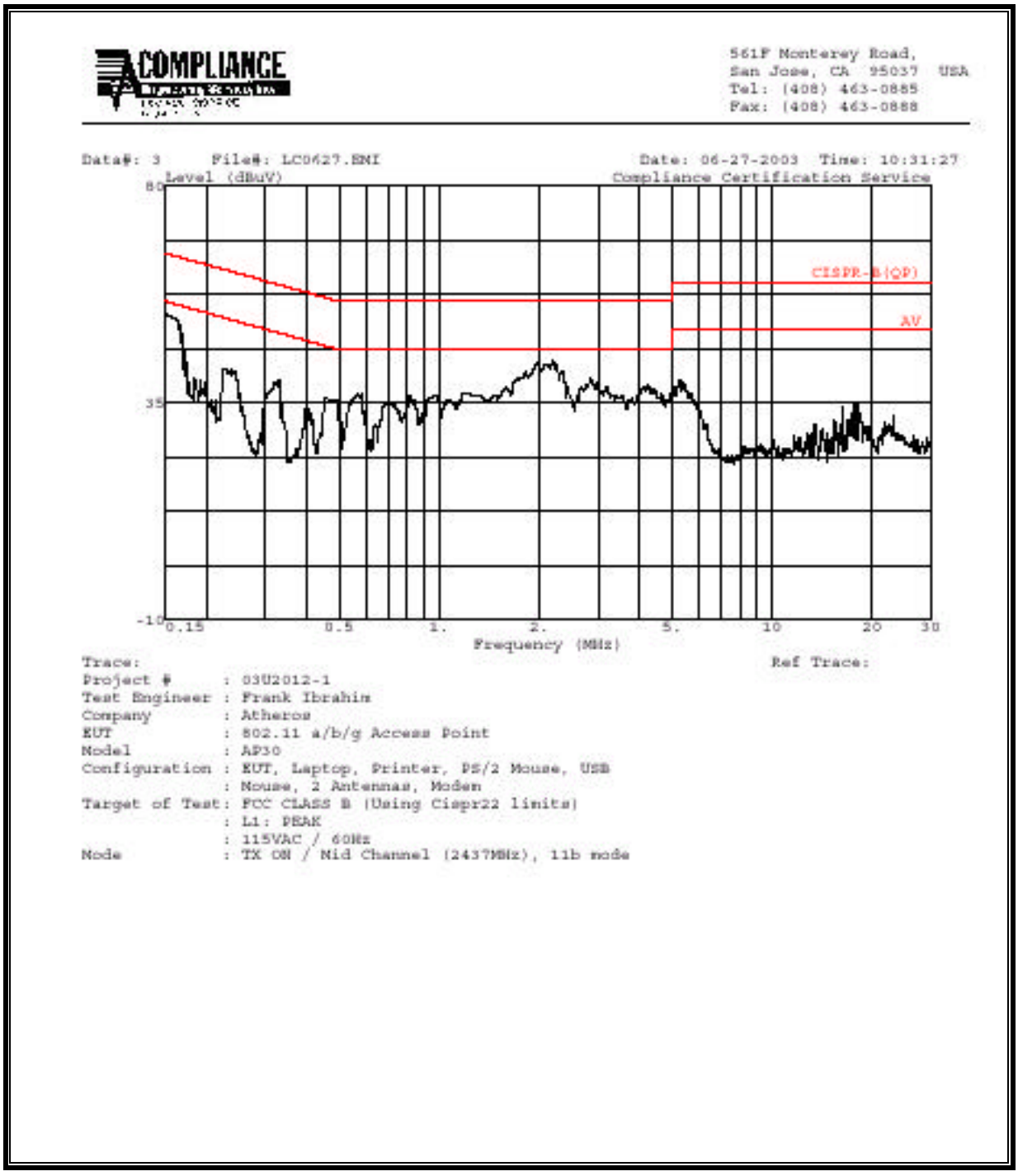
RESULTS

No non-compliance noted:

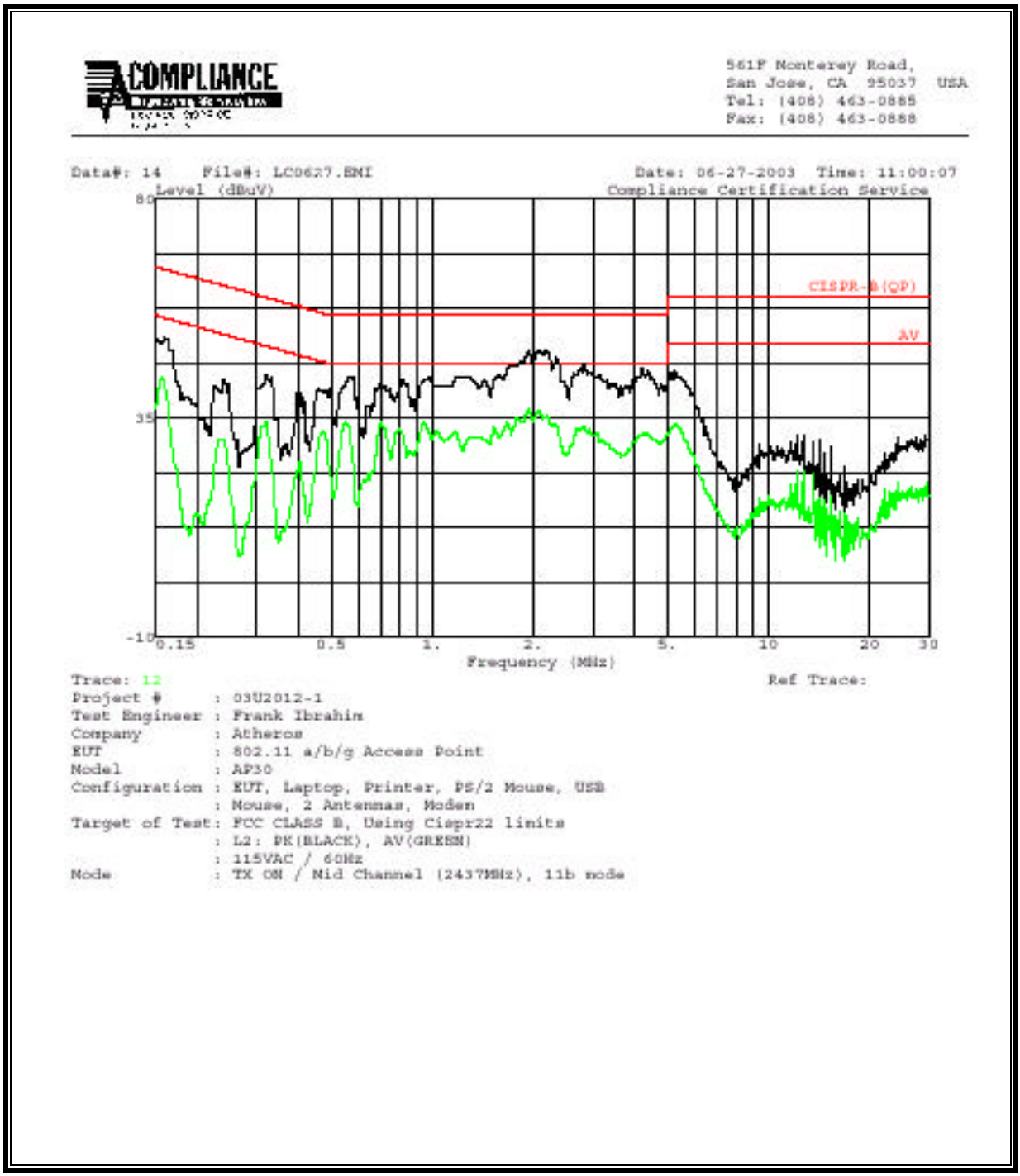
6 WORST EMISSIONS

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	53.44	--	--	0.00	65.97	55.97	-12.53	-2.53	L1
0.24	41.80	--	--	0.00	63.51	53.51	-21.71	-11.71	L1
2.20	43.62	--	--	0.00	56.00	46.00	-12.38	-2.38	L1
1.93	48.92	--	36.74	0.00	56.00	46.00	-7.08	-9.26	L2
2.08	48.92	--	36.30	0.00	56.00	46.00	-7.08	-9.70	L2
2.18	48.82	--	35.51	0.00	56.00	46.00	-7.18	-10.49	L2
6 Worst Data									

LINE 1 RESULTS



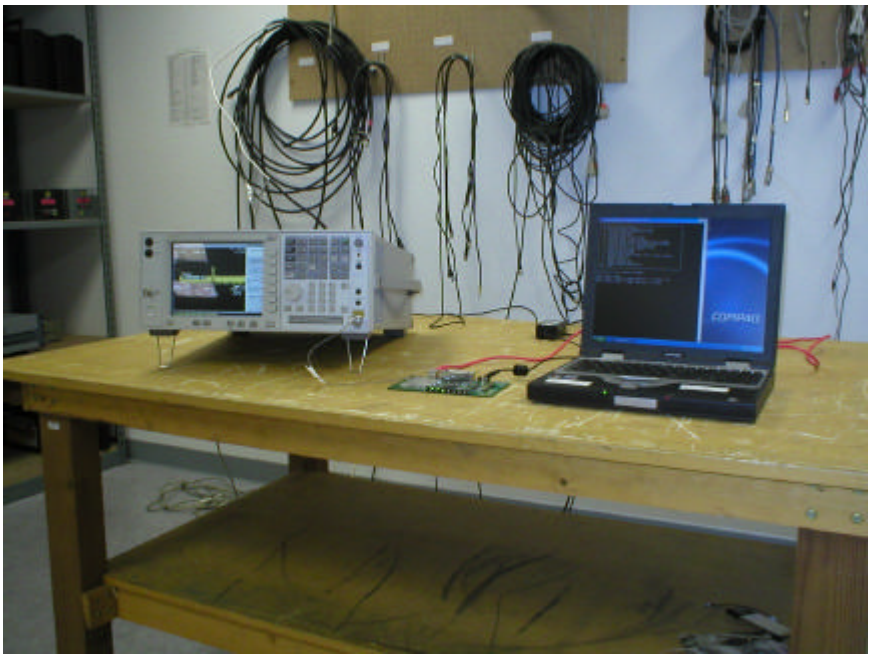
LINE 2 RESULTS



8. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP

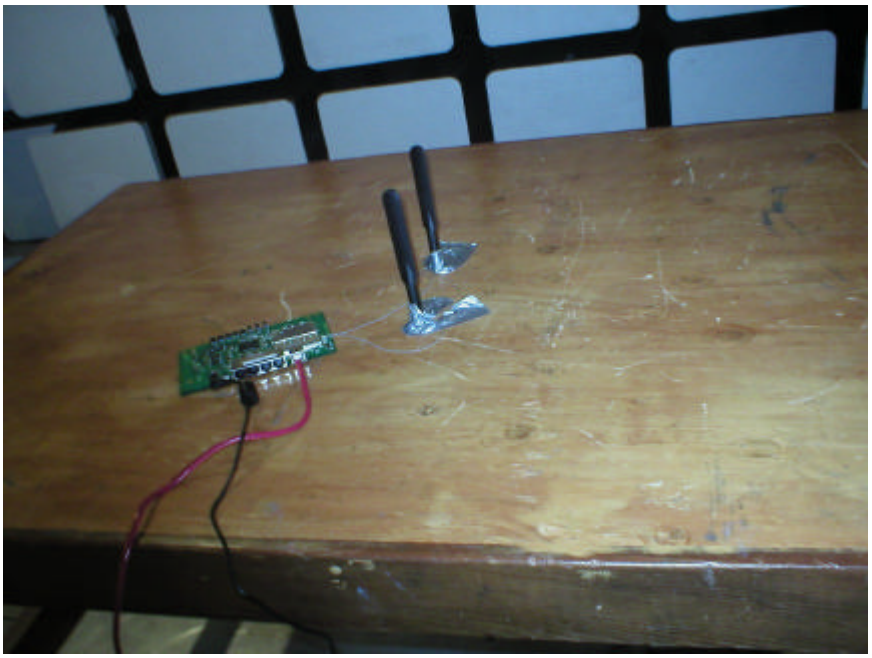
ANTENNA PORT CONDUCTED PHOTO



RADIATED RF MEASUREMENT SETUP

RADIATED FRONT PHOTO

RADIATED BACK PHOTO



DIGITAL DEVICE RADIATED EMISSIONS SETUP

DIGITAL DEVICE FRONT PHOTO

DIGITAL DEVICE BACK PHOTO

POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP

LINE CONDUCTED FRONT PHOTO

LINE CONDUCTED BACK PHOTO

END OF REPORT