



**FCC CFR47 PART 15 SUBPART E
CERTIFICATION
TEST REPORT**

FOR

802.11a ACCESS POINT

MODEL NUMBER: IPCN064A

BRAND NAME: TOSHIBA

FCC ID: CJ6UZPCN064WL

REPORT NUMBER: 03U2067-2

ISSUE DATE: JULY 24TH, 2003

Prepared for

**TOSHIBA CORPORATION DIGITAL MEDIA NETWORK COMPANY
OME COMPLEX, 2-9, SUEHIRO-CHO, OME
TOKYO 198-8710
JAPAN**

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
4.1. <i>FACILITIES AND EQUIPMENT</i>	<i>5</i>
4.2. <i>TABLE OF ACCREDITATIONS AND LISTINGS</i>	<i>6</i>
5. CALIBRATION AND UNCERTAINTY	7
5.1. <i>MEASURING INSTRUMENT CALIBRATION</i>	<i>7</i>
5.2. <i>MEASUREMENT UNCERTAINTY</i>	<i>7</i>
5.3. <i>TEST AND MEASUREMENT EQUIPMENT</i>	<i>8</i>
6. SETUP OF EQUIPMENT UNDER TEST	9
7. APPLICABLE LIMITS AND TEST RESULTS	11
7.1. <i>EMISSION BANDWIDTH</i>	<i>11</i>
7.2. <i>PEAK POWER</i>	<i>18</i>
7.3. <i>MAXIMUM PERMISSIBLE EXPOSURE</i>	<i>26</i>
7.4. <i>AVERAGE POWER</i>	<i>28</i>
7.5. <i>PEAK POWER SPECTRAL DENSITY</i>	<i>29</i>
7.6. <i>PEAK EXCURSION</i>	<i>37</i>
7.7. <i>CONDUCTED SPURIOUS EMISSIONS</i>	<i>44</i>
7.8. <i>RADIATED EMISSIONS</i>	<i>51</i>
7.9. <i>POWERLINE CONDUCTED EMISSIONS</i>	<i>71</i>
8. SETUP PHOTOS	74

1. TEST RESULT CERTIFICATION

COMPANY NAME: TOSHIBA CORP. DIGITAL MEDIA NETWORK COMPANY
OME COMPLEX, 2-9, SUEHIRO-CHO, OME
TOKYO 198-8710
JAPAN

EUT DESCRIPTION: 802.11A ACCESS POINT

MODEL: IPCN064A

DATE TESTED: JULY 14-18, 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 (5.8 GHz) are documented in a separate report.

Approved & Released For CCS By:

Tested By:



THU CHAN
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

CHIN PANG
EMC TECHNICIAN
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

The EUT is an 802.11a access point operating in the 5.15-5.35GHz band. The EUT has a peak output power of 16.11 dBm (40.8 mW), and an antenna gain of 4.94 dBi.

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 EQUIPMENT LIST				
Name of Equipment	Manufacturer	Model No.	Serial No.	Due Date
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	2/4/2004
Amplifier 1-26GHz	MITEQ	NSP2600-SP	924341	4/25/2004
Amplifier 1-26GHz	MITEQ	NSP2600-SP	924342	4/25/2004
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	837990	9/6/2003
Line Filter	Lindgren	LMF-3489	497	CNR
LISN, 10 kHz ~ 30 MHz	FCC	50/250-25-2	114	9/6/2003
EMI Test Receiver	R & S	ESHS 20	827129/006	7/17/2004
PSA	AGILENT	E4446A	US42070220	1/13/2004
Peak Power Meter	AGILENT	E4416A	6B41291160	8/9/2003
Power Sensor	AGILENT	E9327A	US40440755	8/9/2003
EMI Test Receiver	HP	8542E	3942A00286	11/20/2003
RF Filter Section	HP	85420E	3705A00256	11/20/2003
Bilog Antenna	ARA	LPB-25201A	1185	3/6/2004
10dB Pad	WEINSCHEL	56-10	K16148	N/A
5.15-5.35GHz	MICROTRONICS	BRC-13190	1	N/A

6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Device Type	Manufacturer	Model	Serial Number	FCC ID
POWER HUB	SONY	PCWA-AC04	0211A0008642	N/A
LAPTOP	TOSHIBA	PT9102-601V4	Z2015995J	DoC
AC ADAPTER	TOSHIBA	PA3083U-1ACA	0203A09064706	N/A

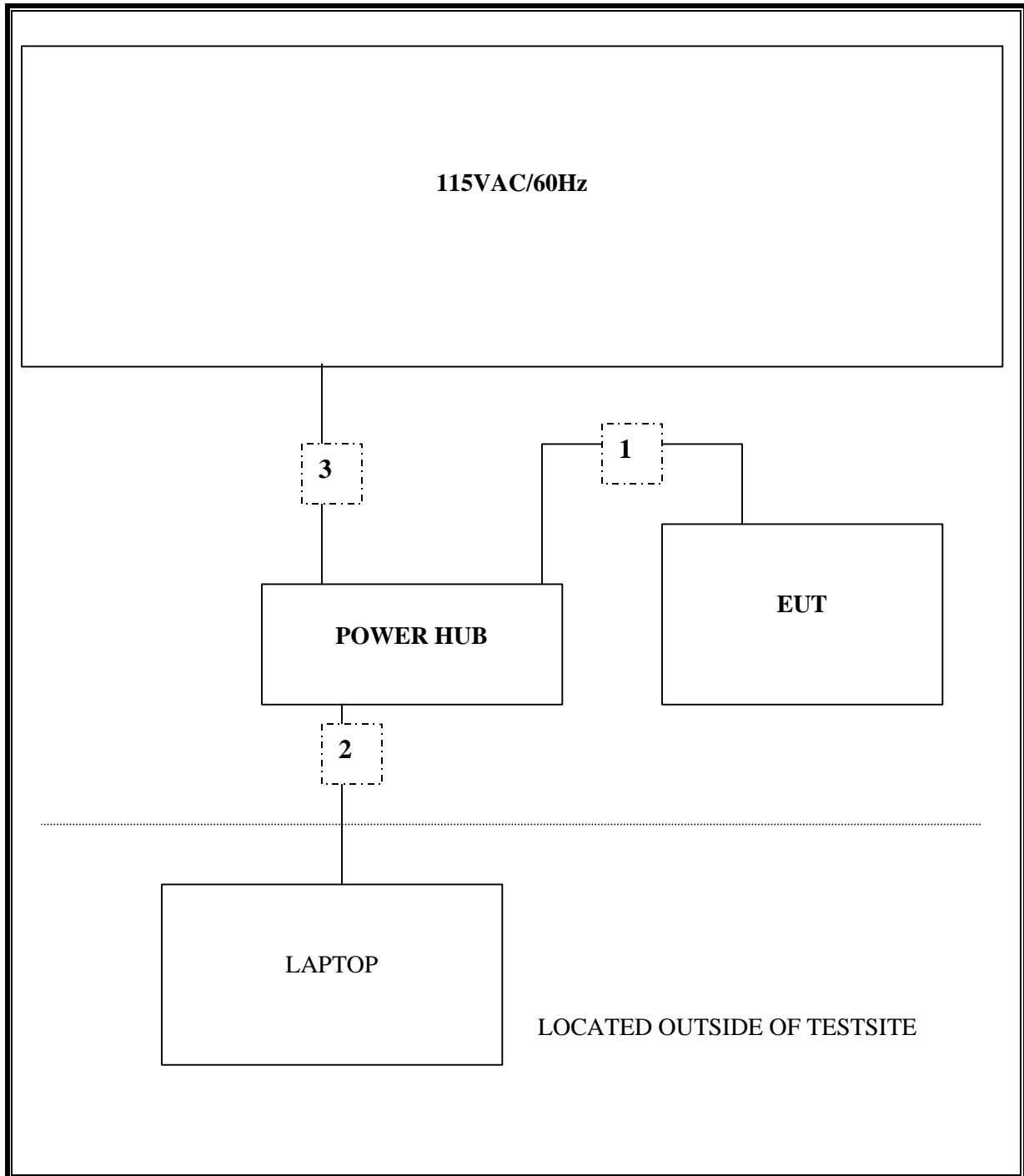
I/O CABLES

Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	ETHERNET	1	RJ45	UNSHIELDED	2.5M	N/A
2	ETHERNET	1	RJ45	SHIELDED	15M	N/A
3	AC PWR	1	AC PWR	UNSHIELDED	1.8M	N/A

TEST SETUP

The EUT was operated remotely by the laptop

SETUP DIAGRAM



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 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:

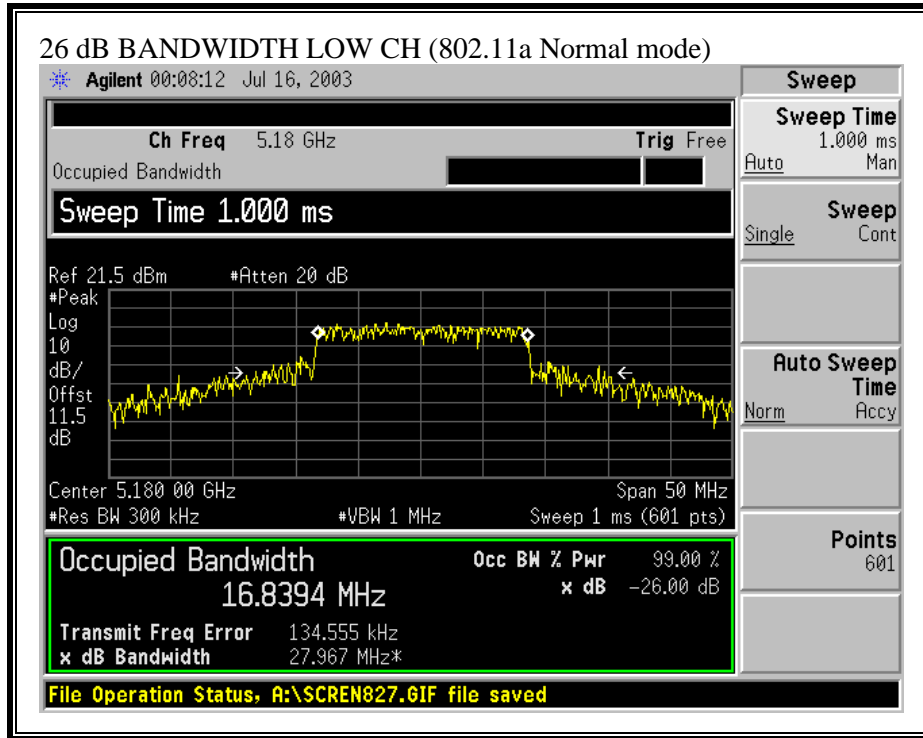
Normal Mode

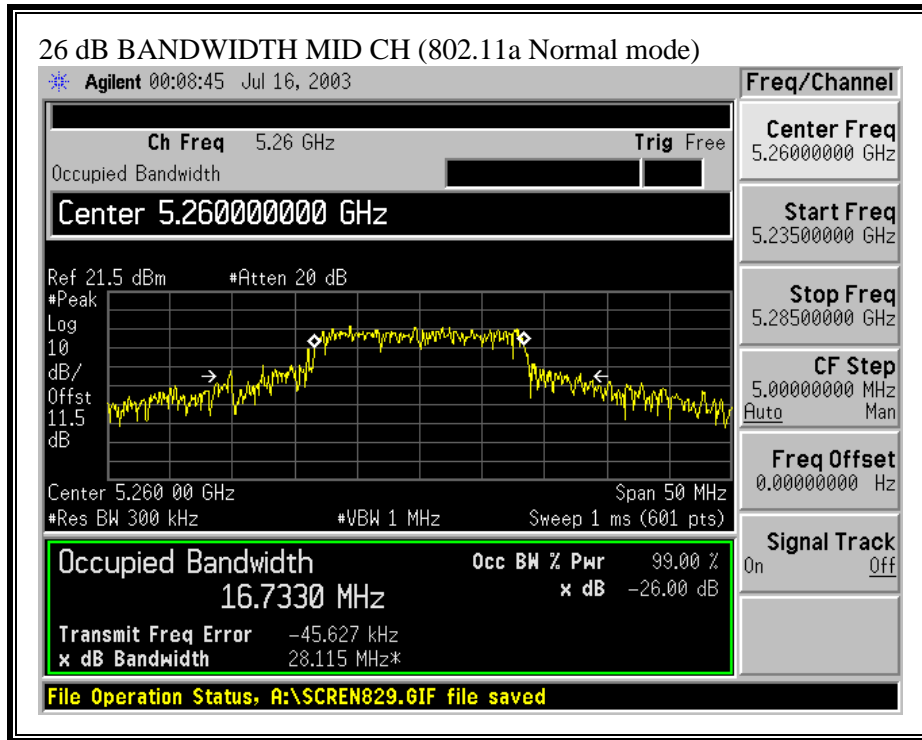
Channel	Frequency (MHz)	B (MHz)	10 Log B (dB)
Low	5180	27.97	14.47
Middle	5260	28.12	14.49
High	5320	28.27	14.51

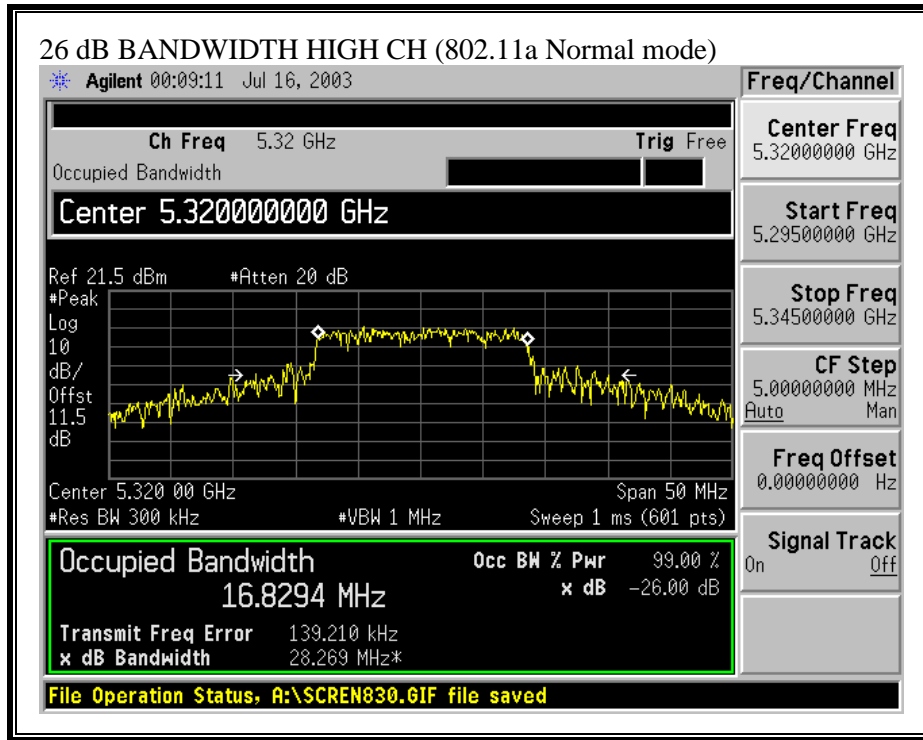
Turbo Mode

Channel	Frequency (MHz)	B (MHz)	10 Log B (dB)
Low	5210	49.56	16.95
Middle	5250	49.02	16.90
High	5290	49.54	16.95

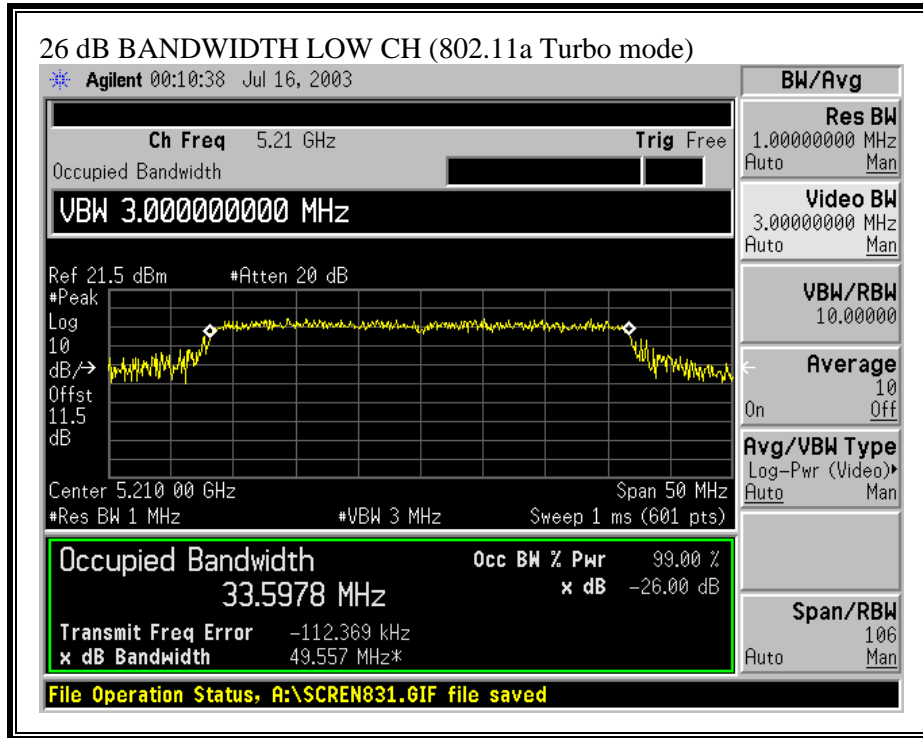
26 dB EMISSION BANDWIDTH (802.11a NORMAL MODE)

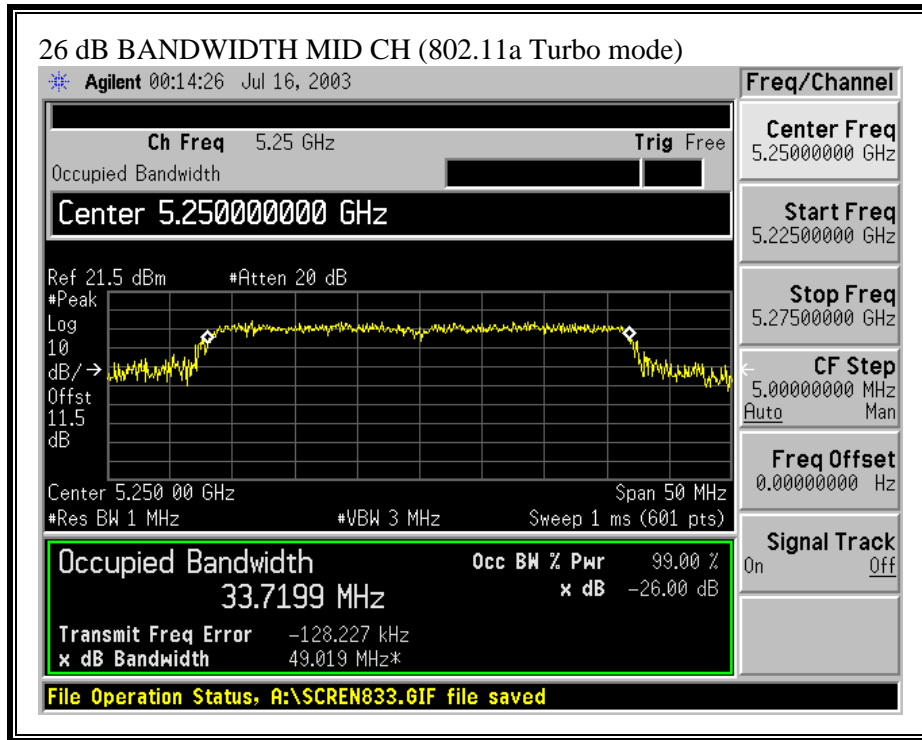


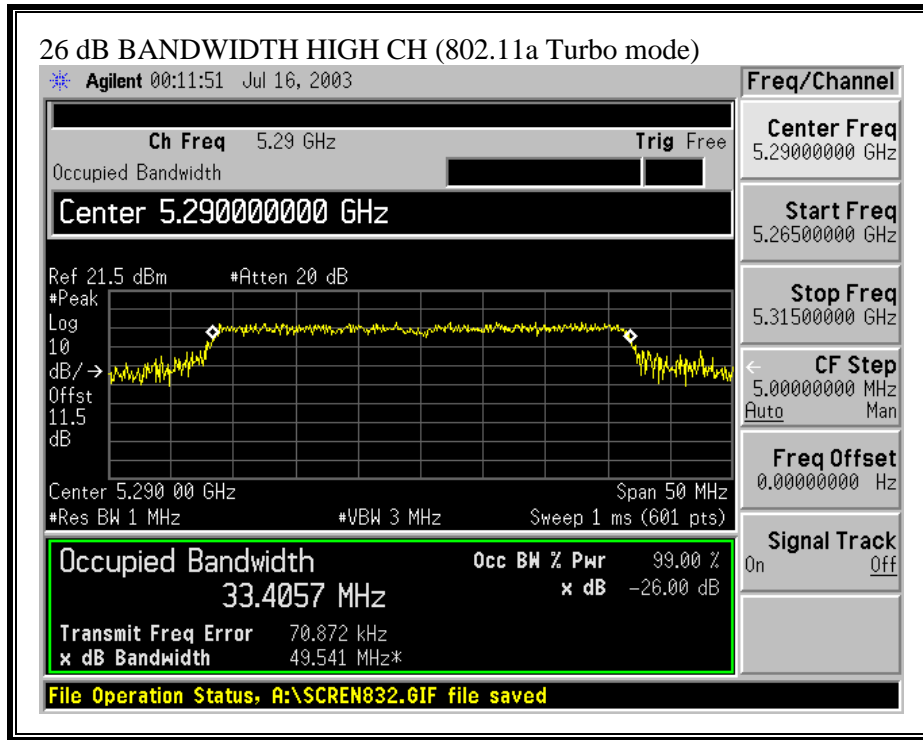




26 dB EMISSION BANDWIDTH (802.11a TURBO MODE)







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 $4 \text{ dBm} + 10 \log B$, 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) (1) For the band 5.25-5.35 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 250 mW (24 dBm) or $11 \text{ dBm} + 10 \log B$, where B is the 26-dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

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

The transmitter output operates 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	27.967	18.47	0.00	17.00
Turbo	5210	17	28.115	18.49	0.00	17.00
Turbo	5250	17	28.269	18.51	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	49.557	27.95	0.00	24.00
Normal	5320	24	49.019	27.90	0.00	24.00
Turbo	5290	24	49.541	27.95	0.00	24.00

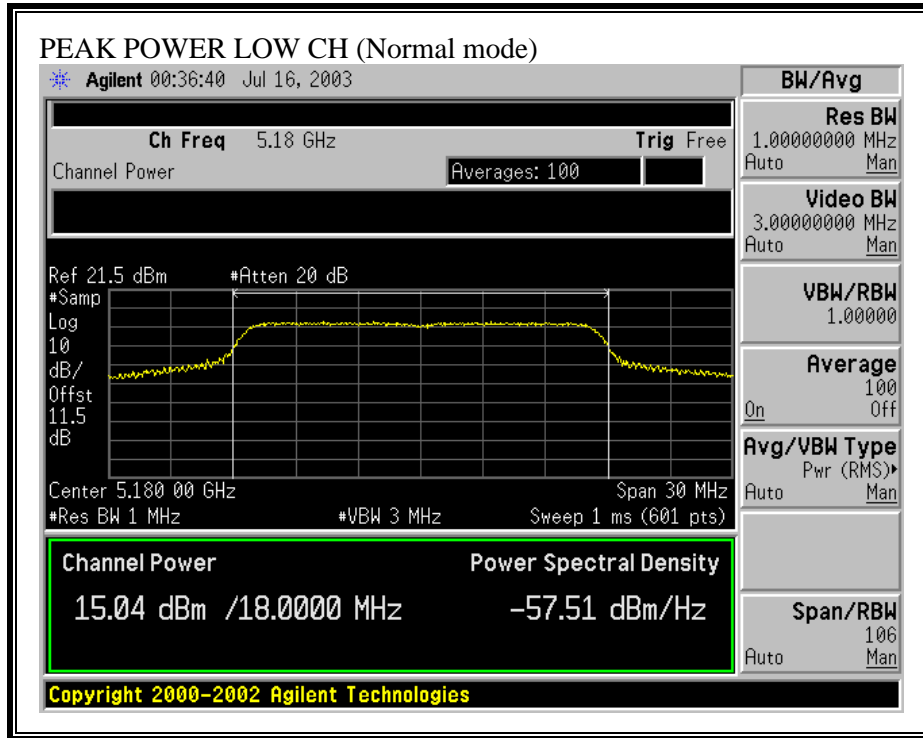
Normal Mode Results

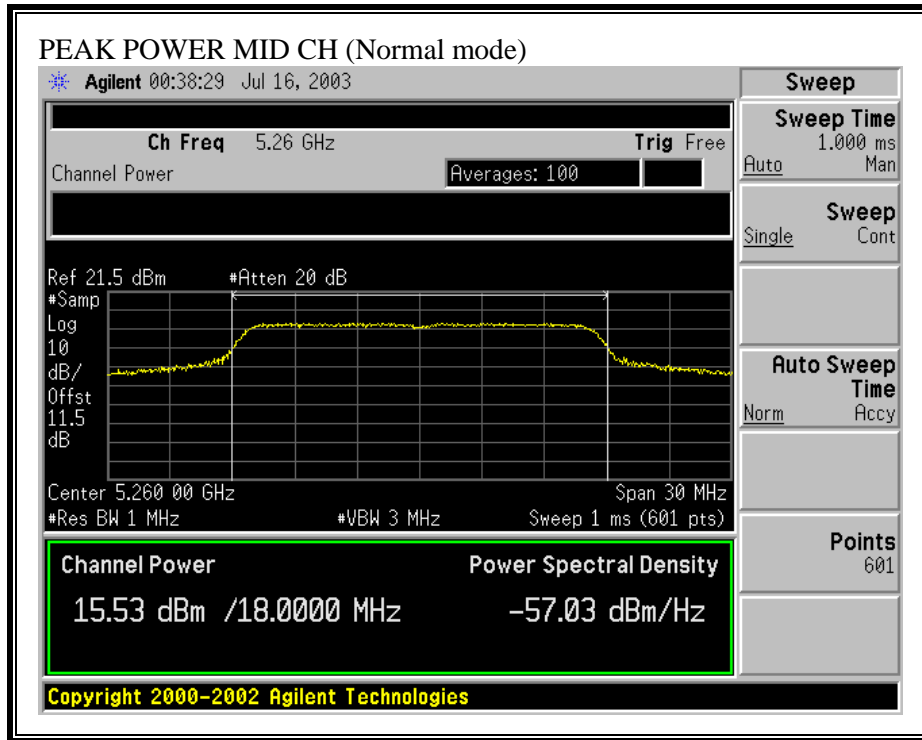
Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5180	15.04	17.00	-1.96
Middle	5260	15.53	24.00	-8.47
High	5320	15.61	24.00	-8.39

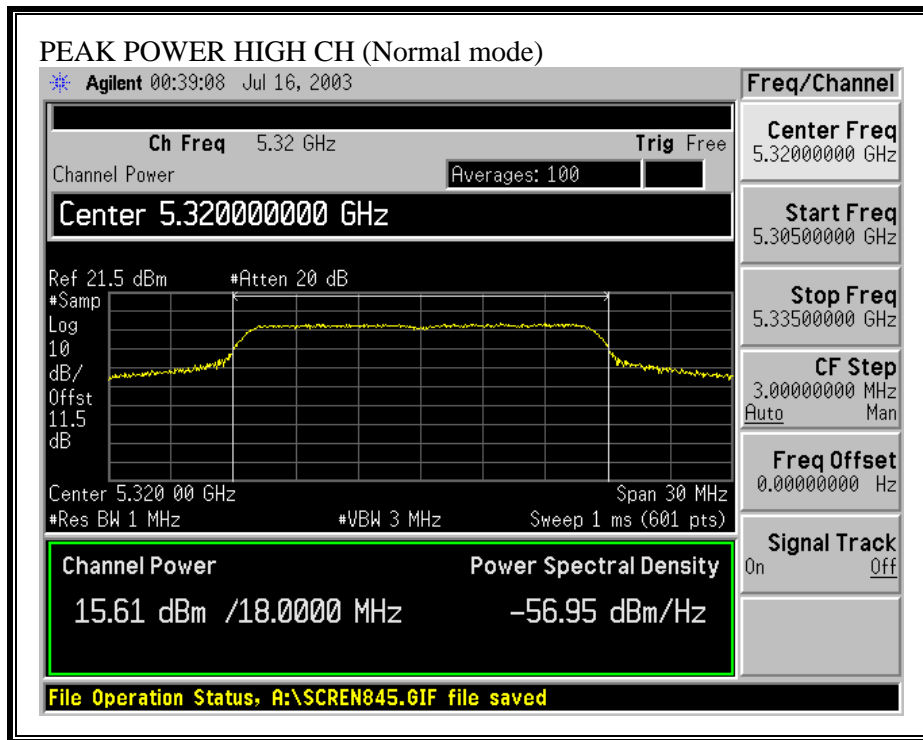
Turbo Mode Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5210	16.11	17.00	-0.89
Middle	5250	15.64	17.00	-1.36
High	5290	16.05	24.00	-7.95

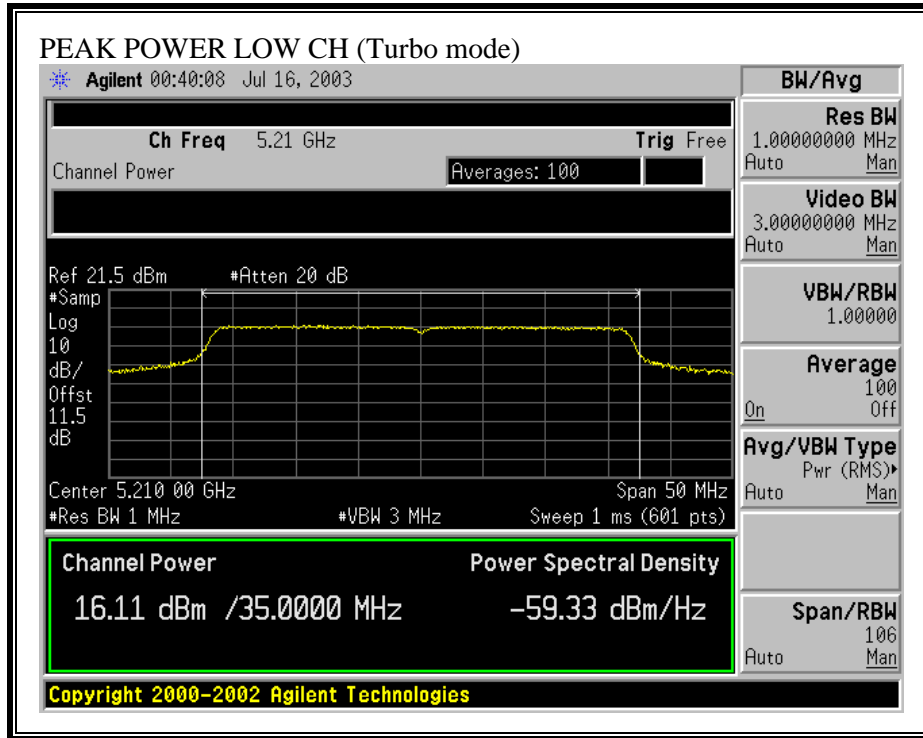
PEAK POWER (NORMAL MODE)

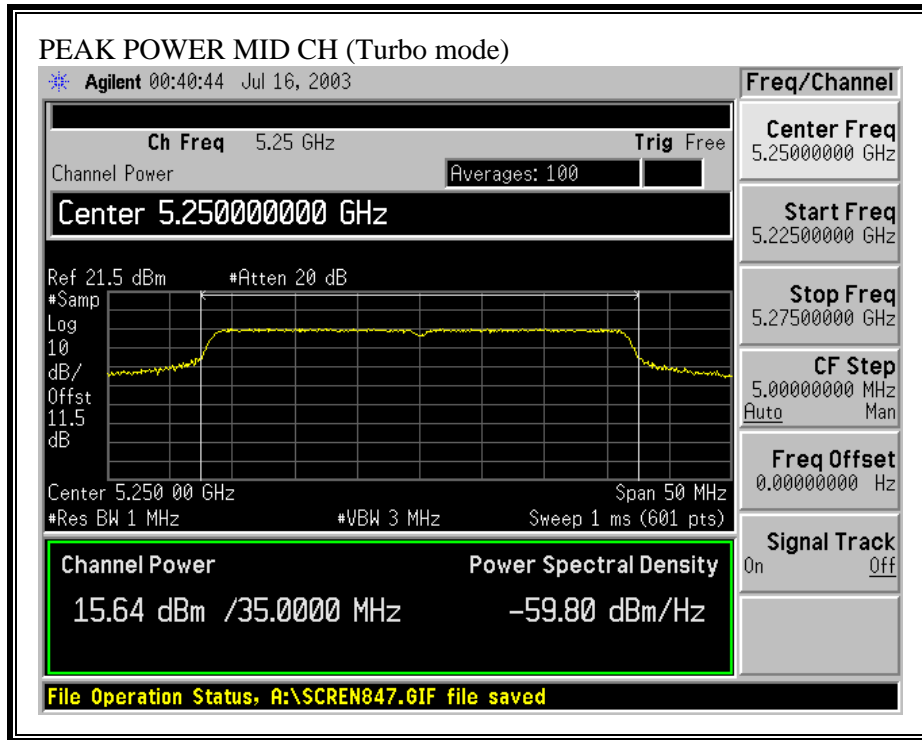


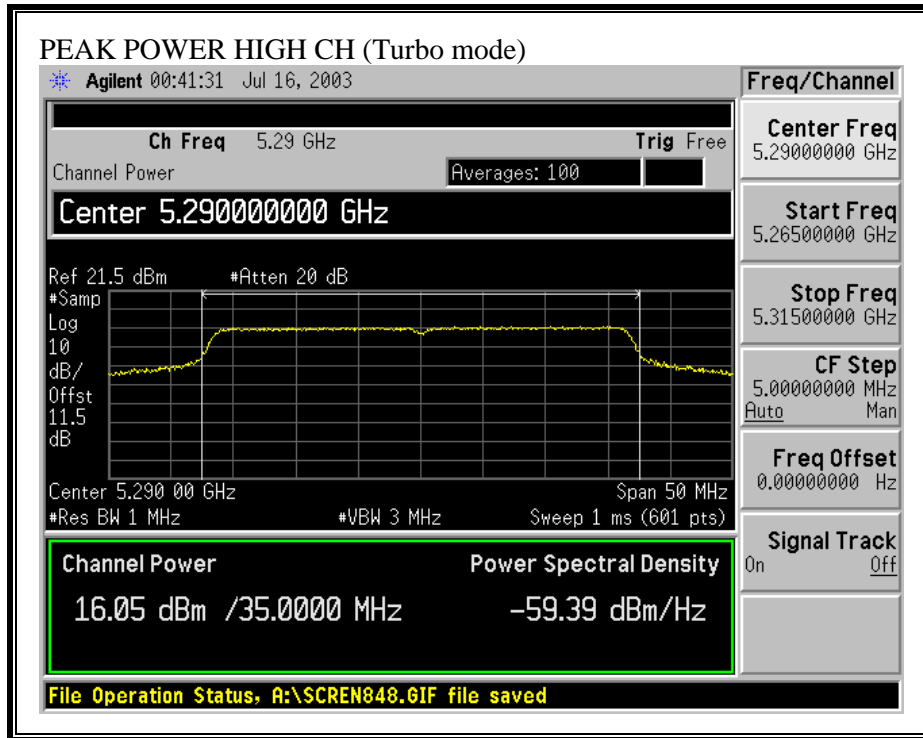




PEAK POWER (TURBO MODE)







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

$$S = E^2 / 3770$$

where

E = Field Strength in Volts / meter

P = Power in Watts

G = Numeric antenna gain

d = distance in meters

S = Power Density in milliwatts / square centimeter

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

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

Changing to units of mW and cm, using:

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

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

yields

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

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

where

d = distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power Density in mW / 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

S = 1.0 mW / cm² 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	15.61	4.94	3.00
Turbo	1.0	16.11	4.94	3.18

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. The power meter is set to simultaneously read peak power and average power.

RESULTS

No non-compliance noted:

The cable assembly insertion loss of 11.5 dB (including 10 dB pad and 1.5 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	15.04
Middle	5260	15.53
High	5320	15.61

Turbo Mode

Channel	Frequency (MHz)	Average Power (dBm)
Low	5210	16.11
Middle	5250	15.64
High	5290	16.05

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

The maximum antenna gain = 4.94 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:

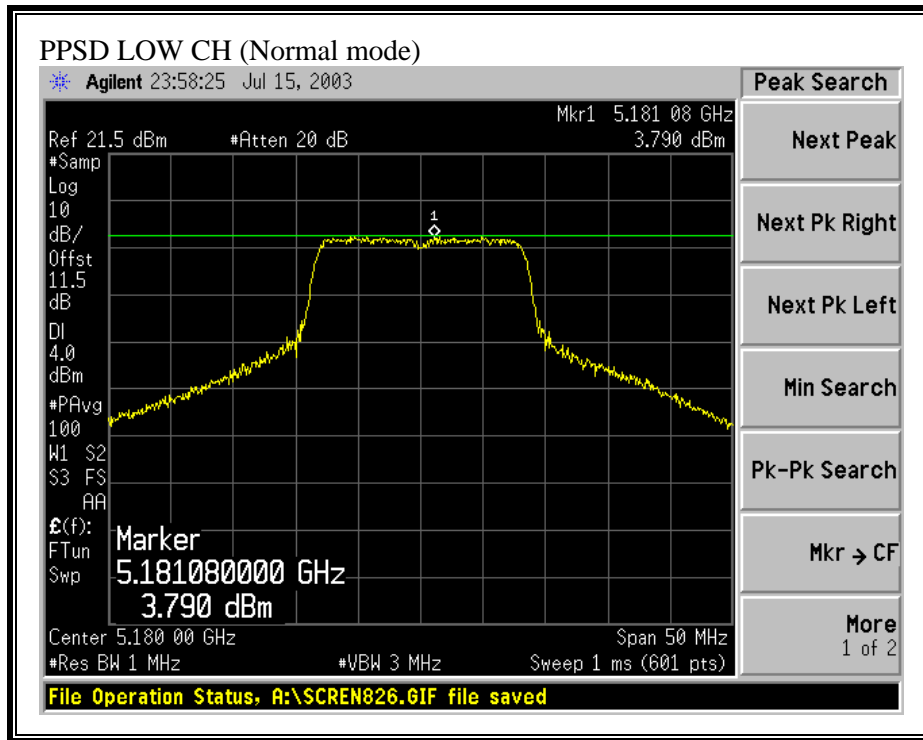
Normal Mode

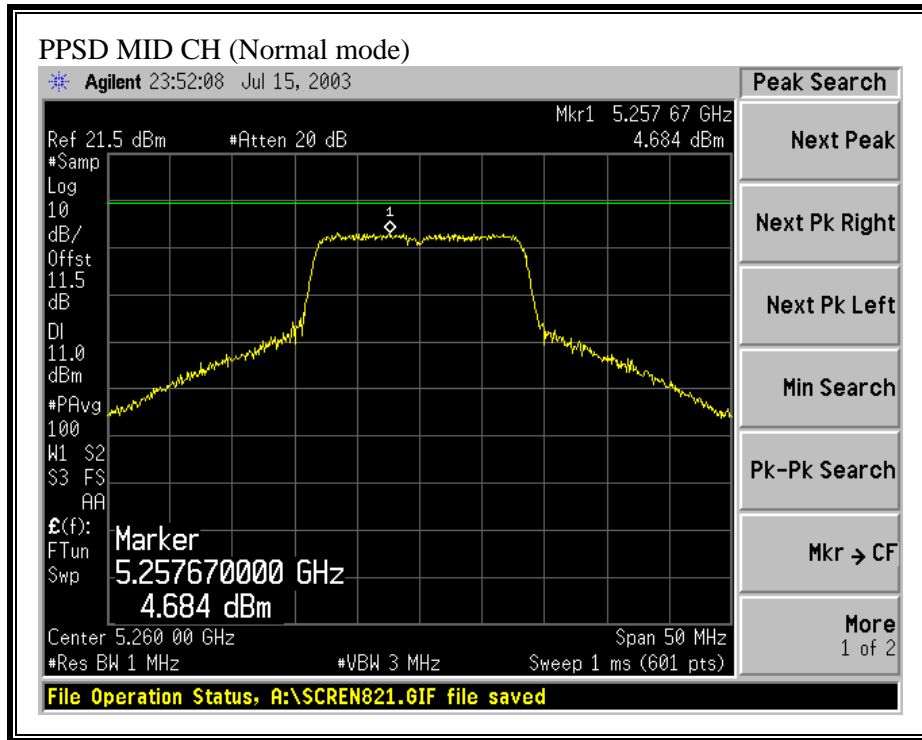
Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5180	3.79	4.00	-0.21
Middle	5260	4.68	11.00	-6.32
High	5320	4.78	11.00	-6.23

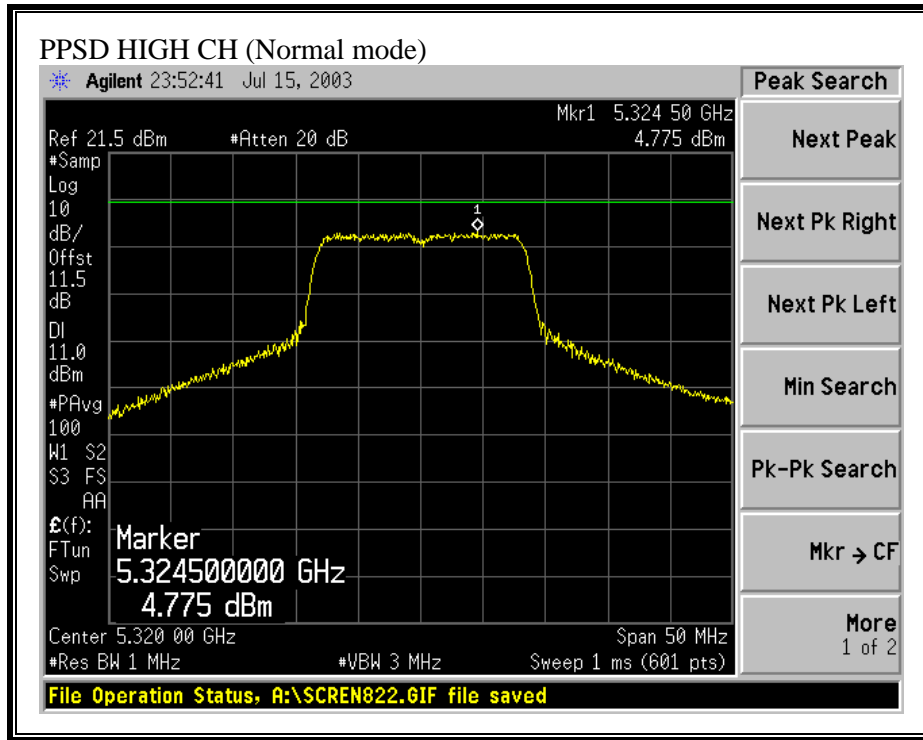
Turbo Mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5210	2.64	4.00	-1.37
Middle	5250	2.00	4.00	-2.00
High	5290	1.10	11.00	-9.90

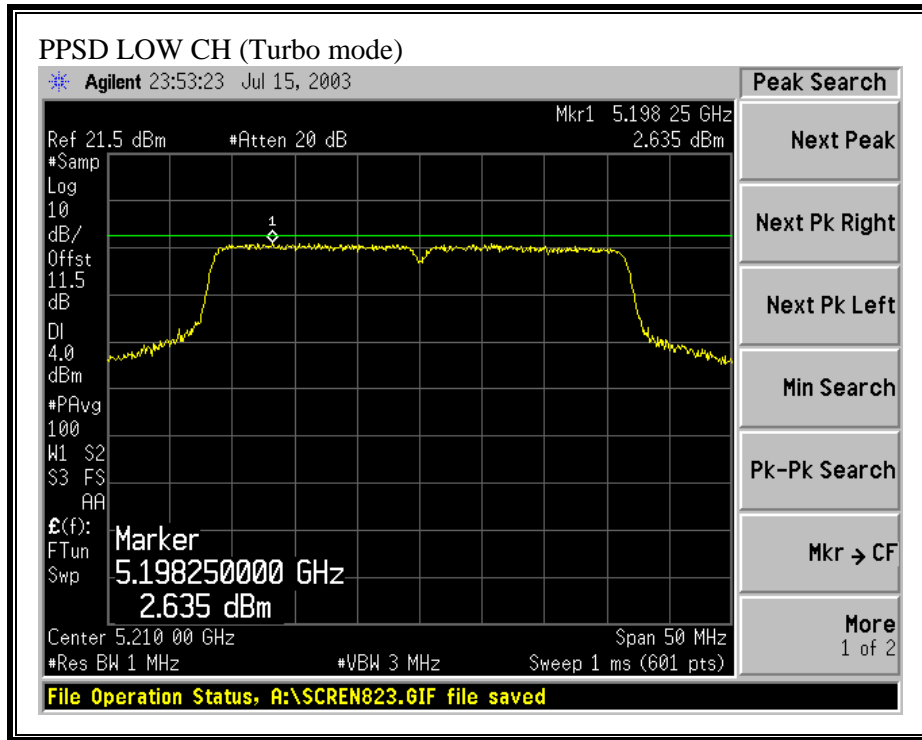
PEAK POWER SPECTRAL DENSITY (NORMAL MODE)

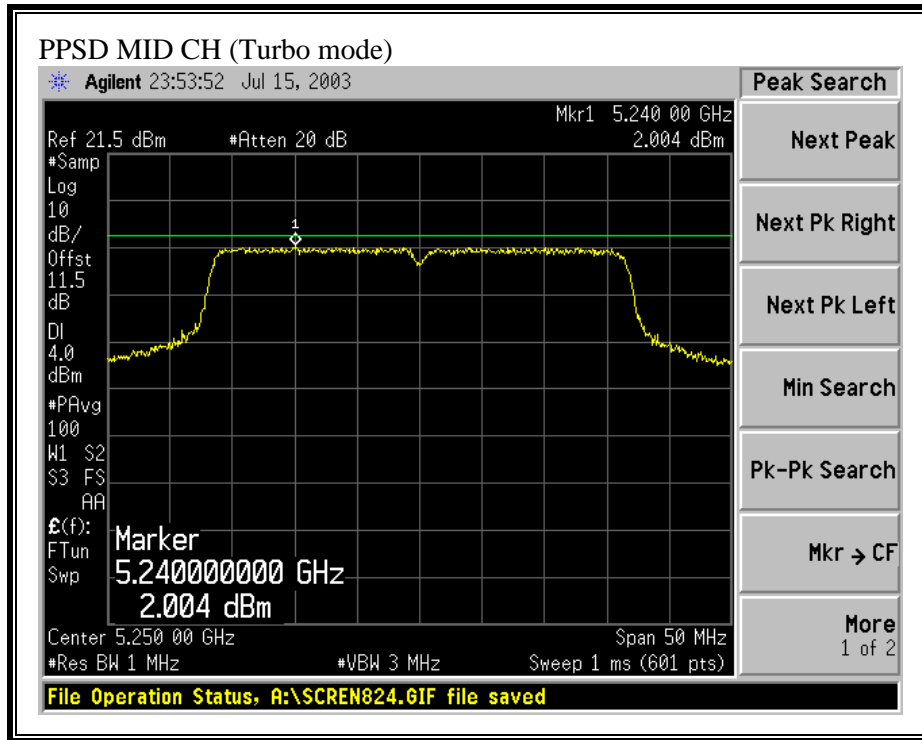


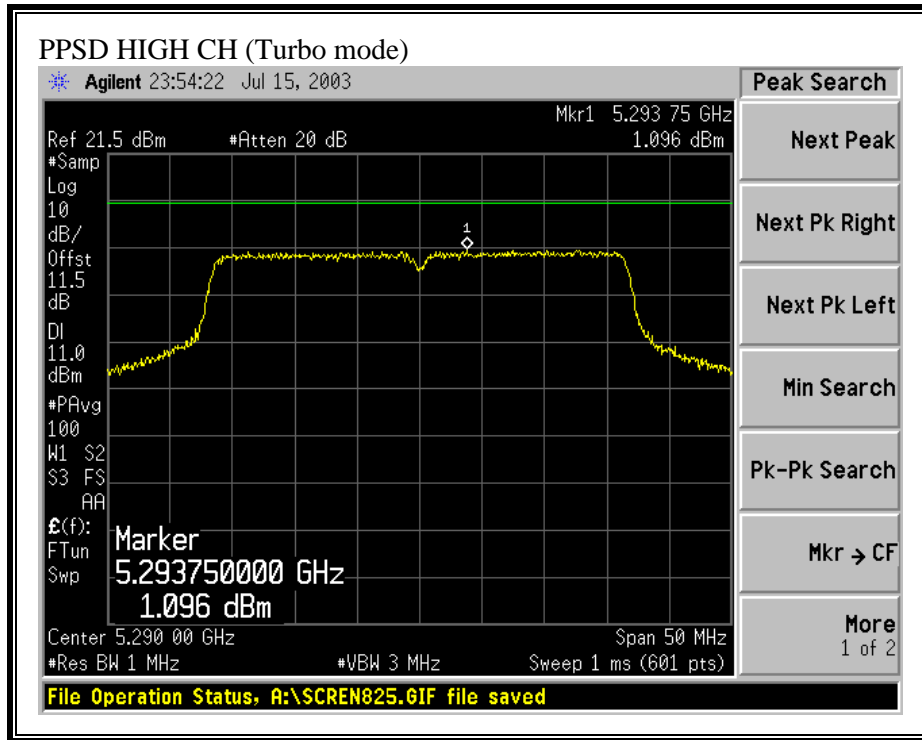




PEAK POWER SPECTRAL DENSITY (TURBO MODE)







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:

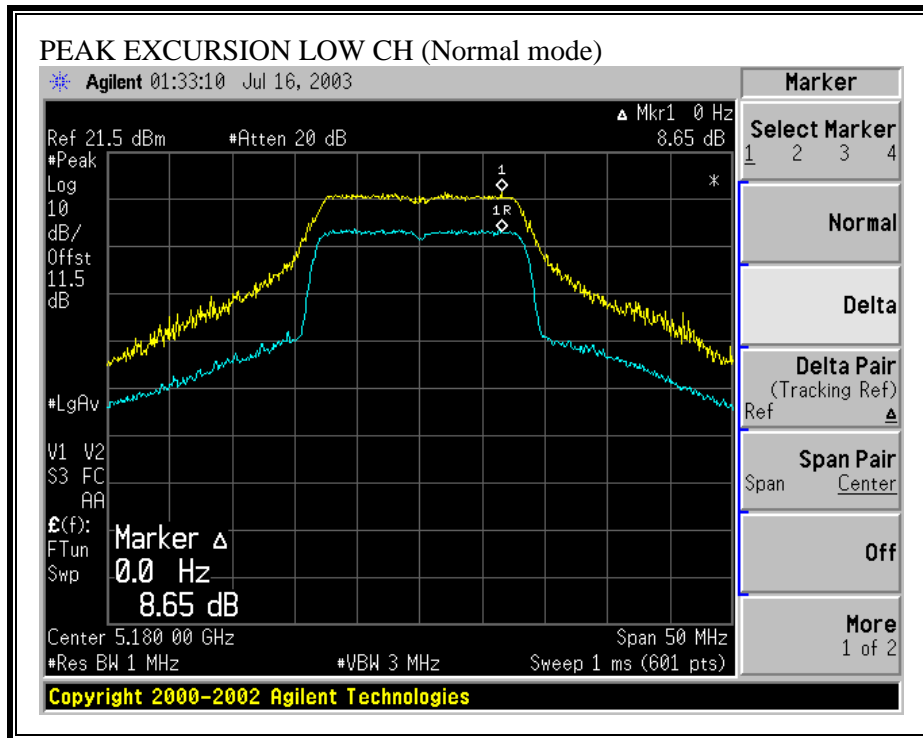
Normal Mode

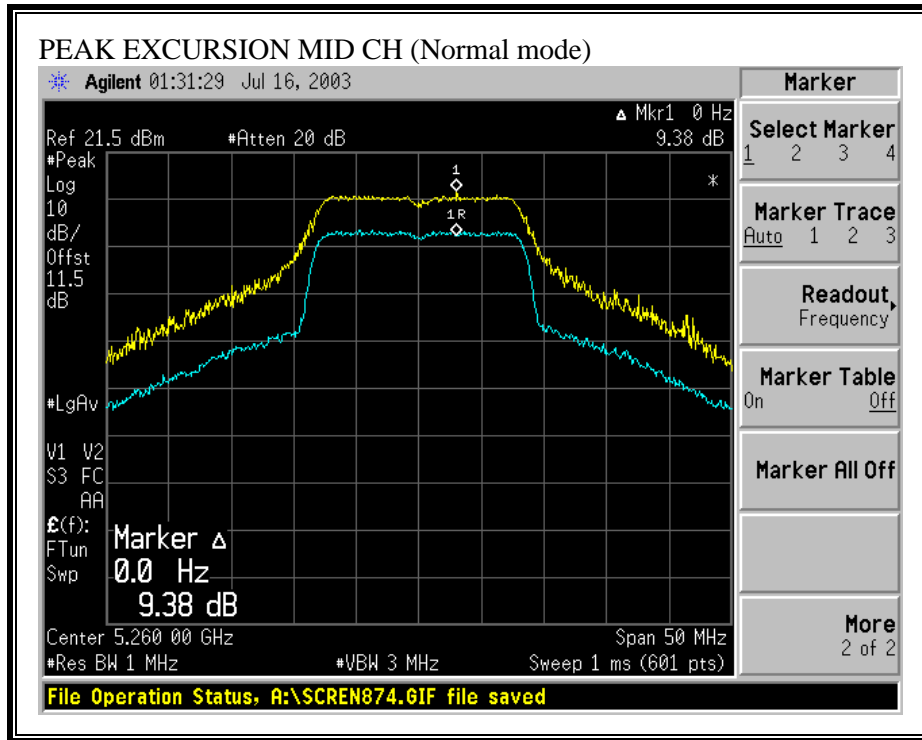
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5180	8.65	13	-4.35
Middle	5260	9.38	13	-3.62
High	5320	8.26	13	-4.74

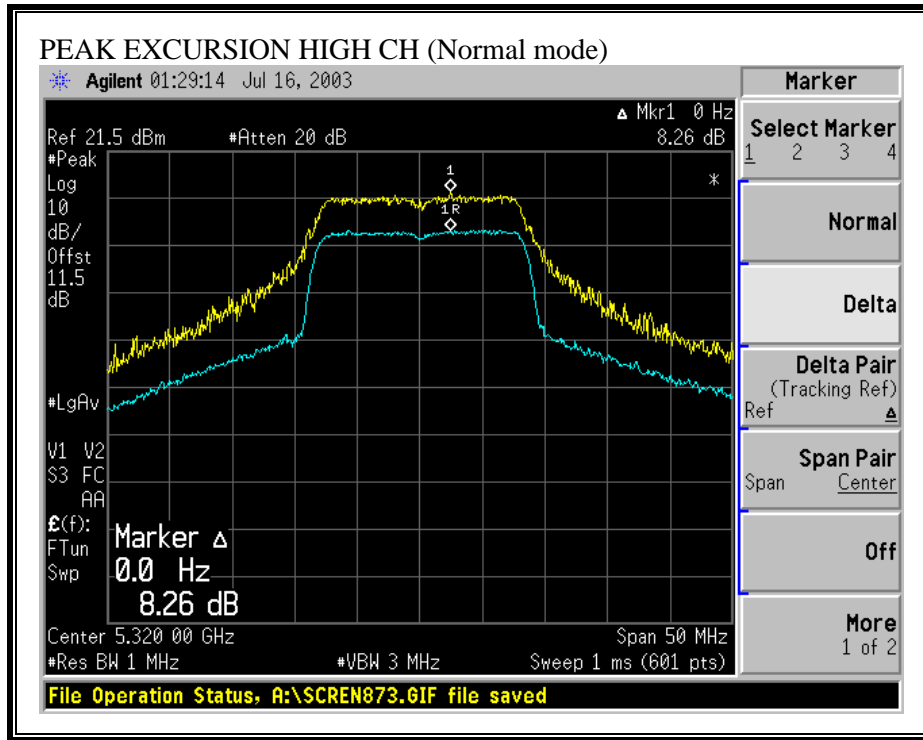
Turbo Mode

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5210	8.42	13	-4.58
Middle	5250	8.42	13	-4.58
High	5290	8.11	13	-4.89

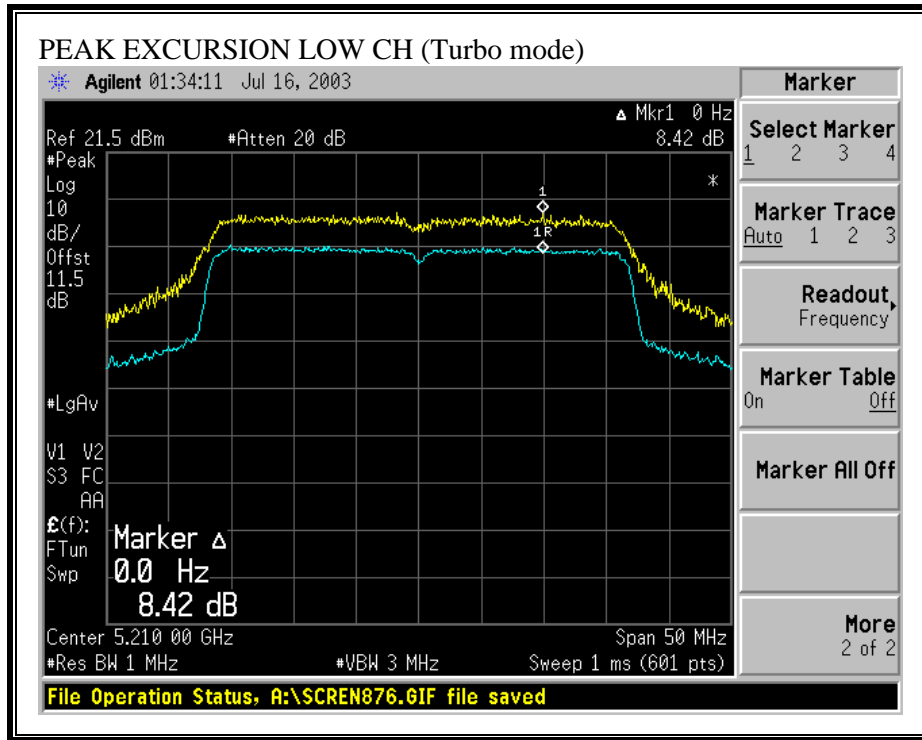
PEAK EXCURSION (NORMAL MODE)

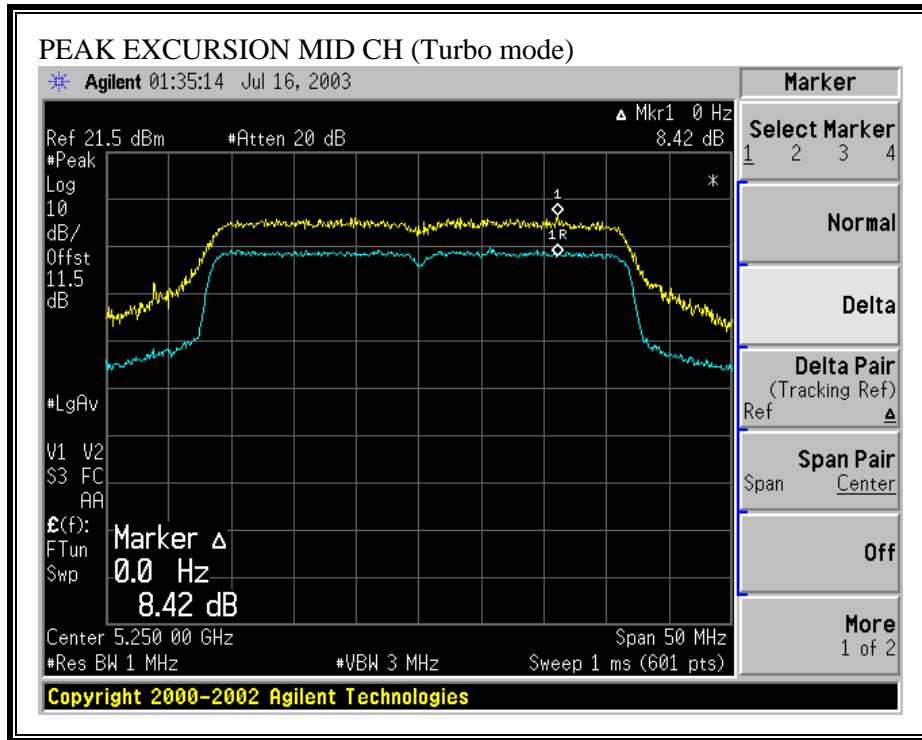


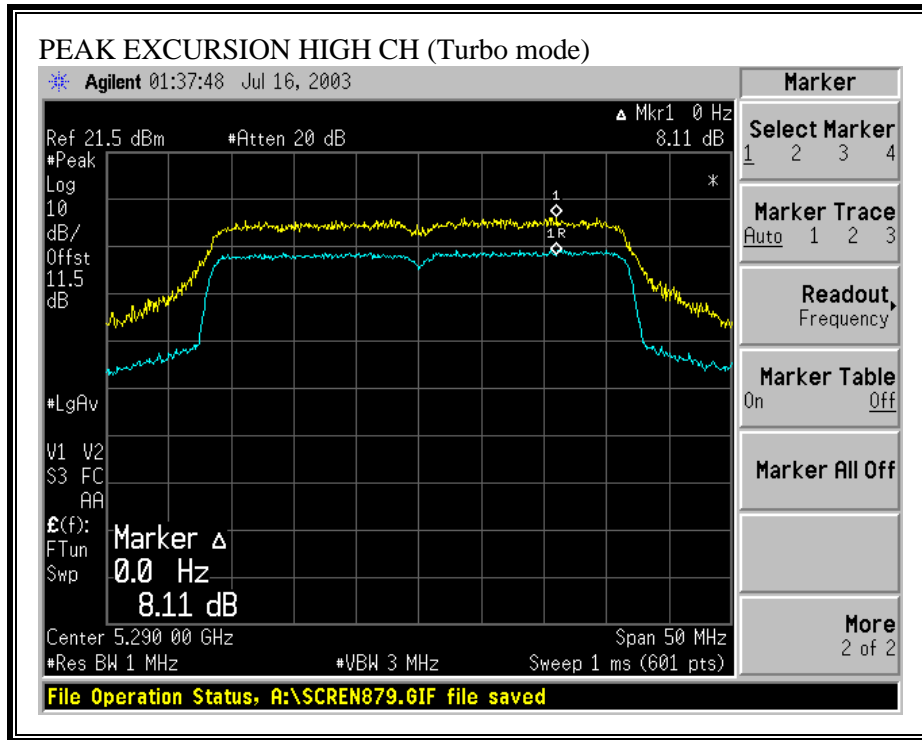




PEAK EXCURSION (TURBO MODE)







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.

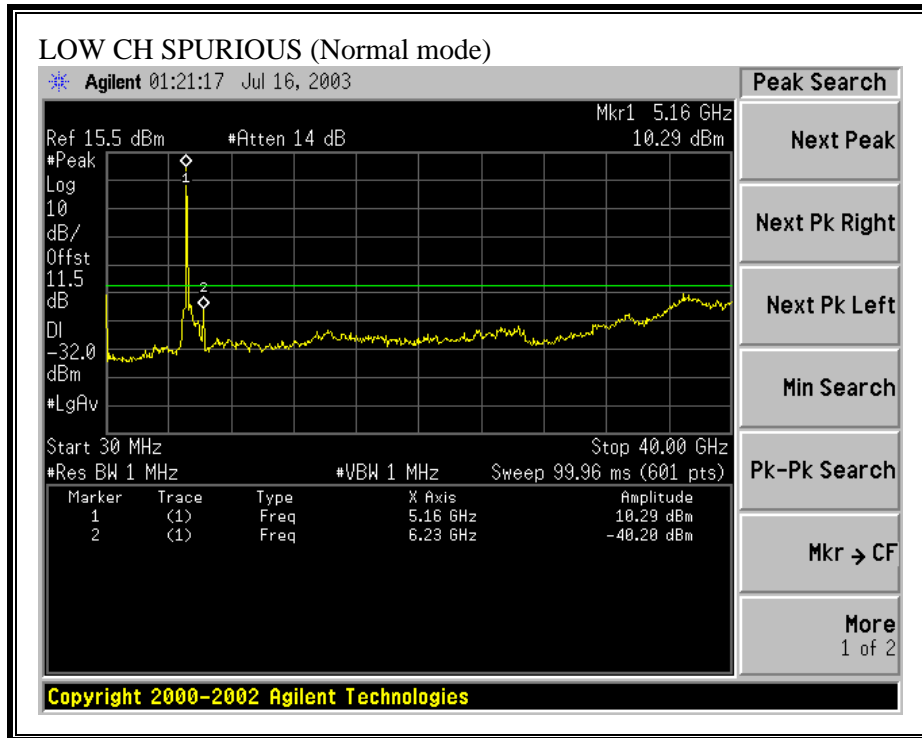
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements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

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

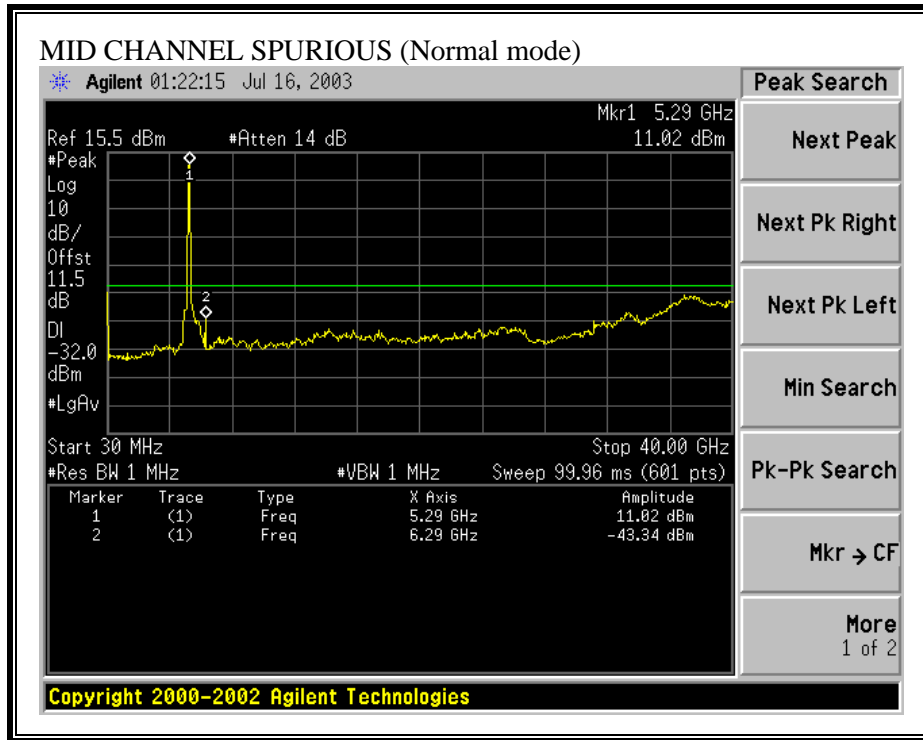
RESULTS

No non-compliance noted:

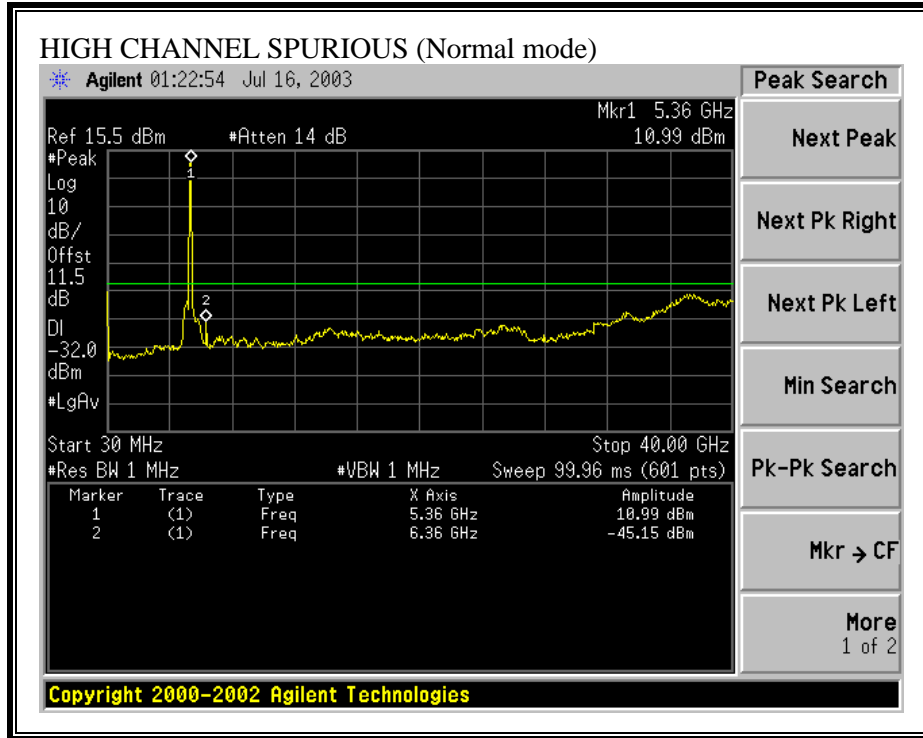
SPURIOUS EMISSIONS, LOW CHANNEL (NORMAL MODE)



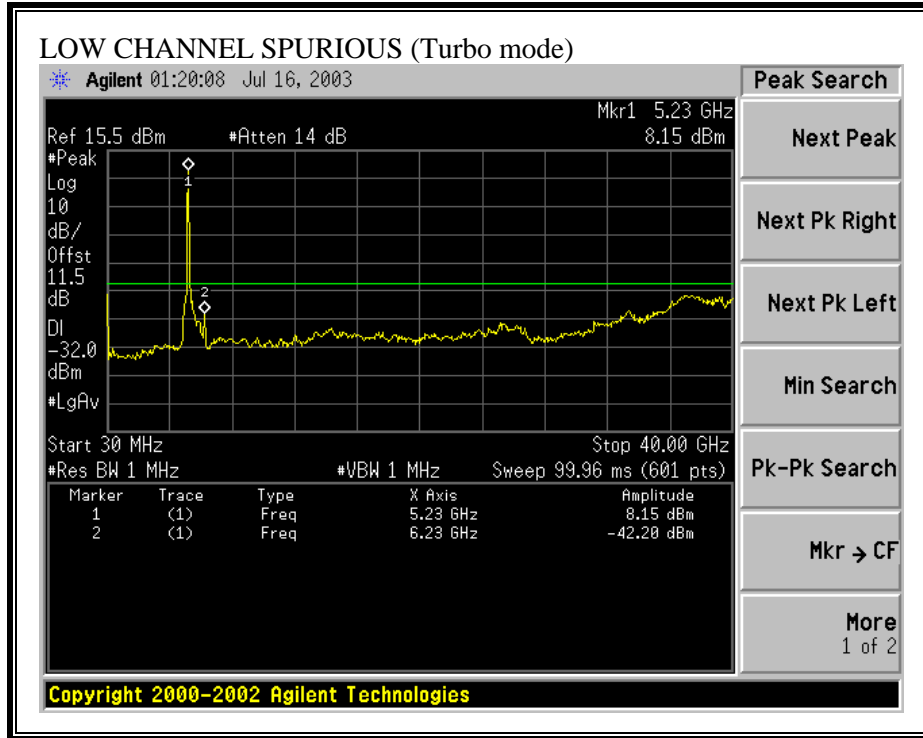
SPURIOUS EMISSIONS, MID CHANNEL (NORMAL MODE)



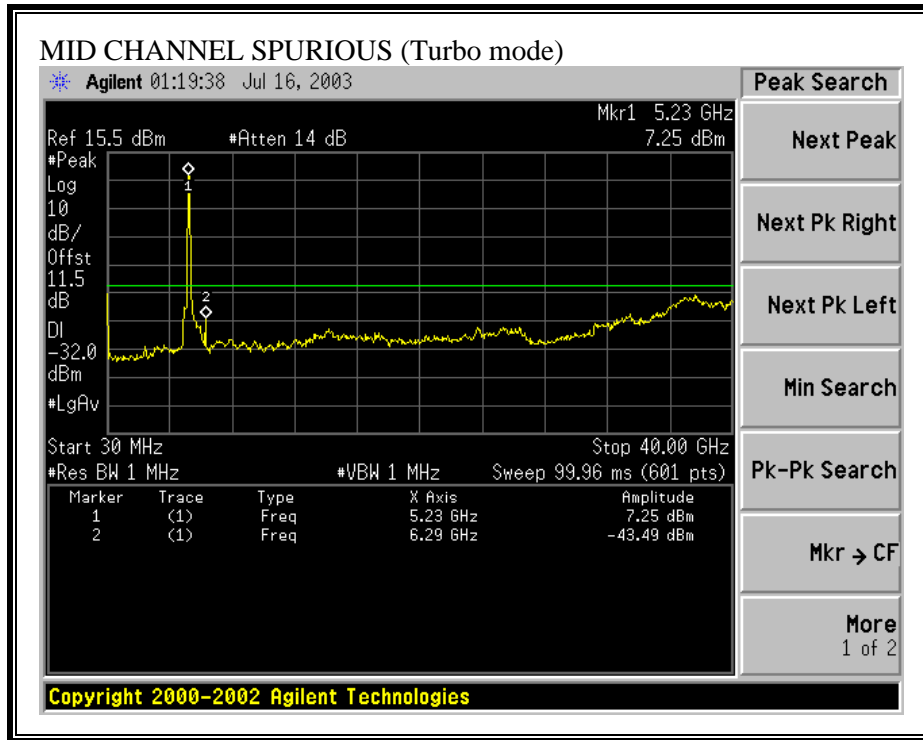
SPURIOUS EMISSIONS, HIGH CHANNEL (NORMAL MODE)



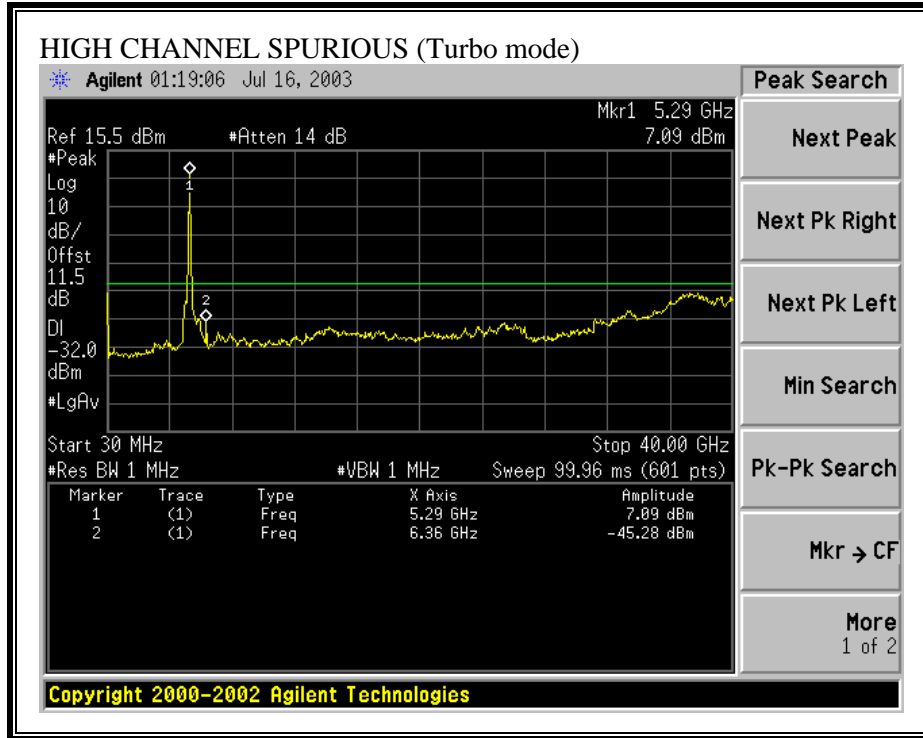
SPURIOUS EMISSIONS, LOW CHANNEL (TURBO MODE)



SPURIOUS EMISSIONS, MID CHANNEL (TURBO MODE)



SPURIOUS EMISSIONS, HIGH CHANNEL (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.

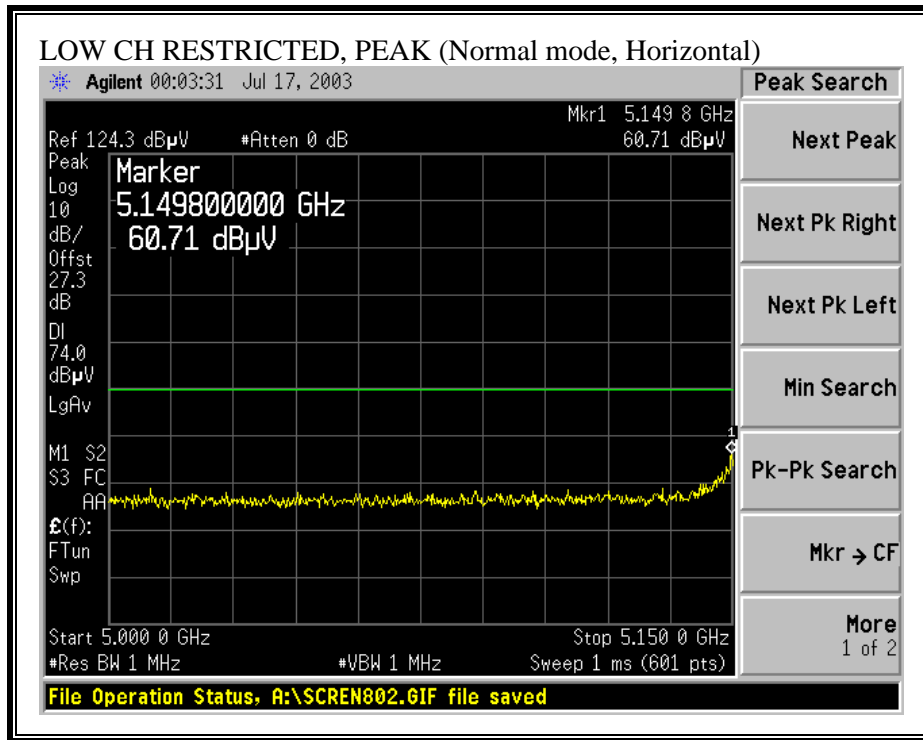
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

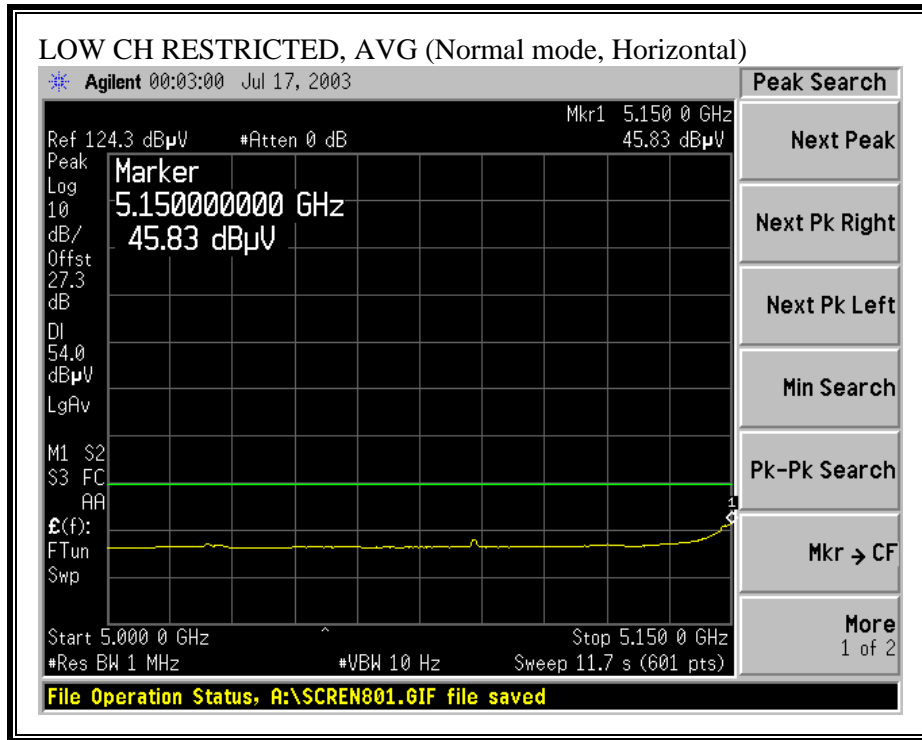
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

RESULTS

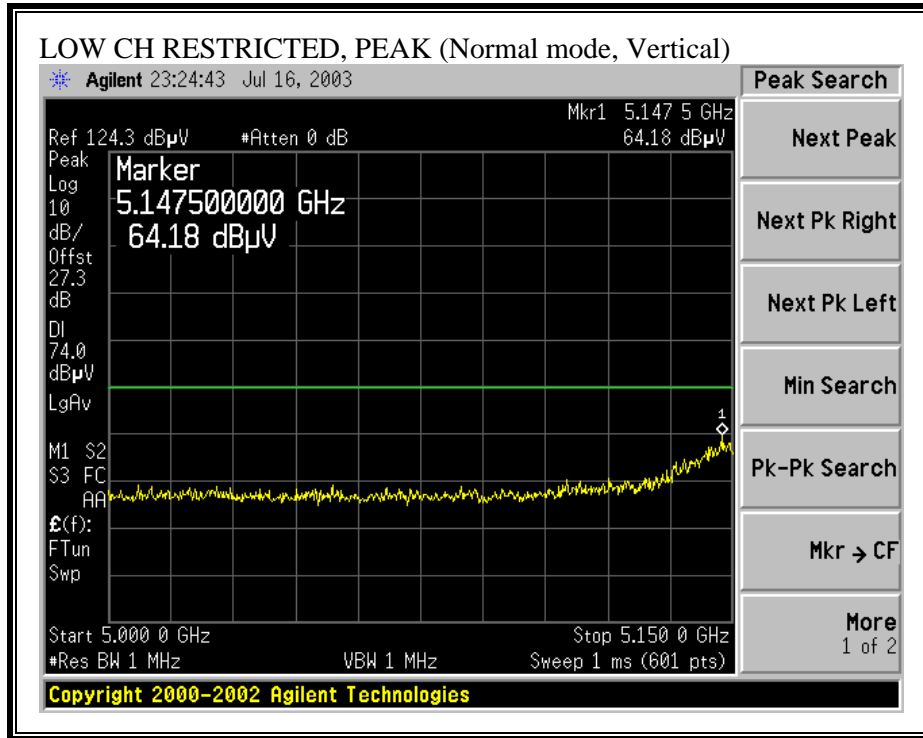
No non-compliance noted:

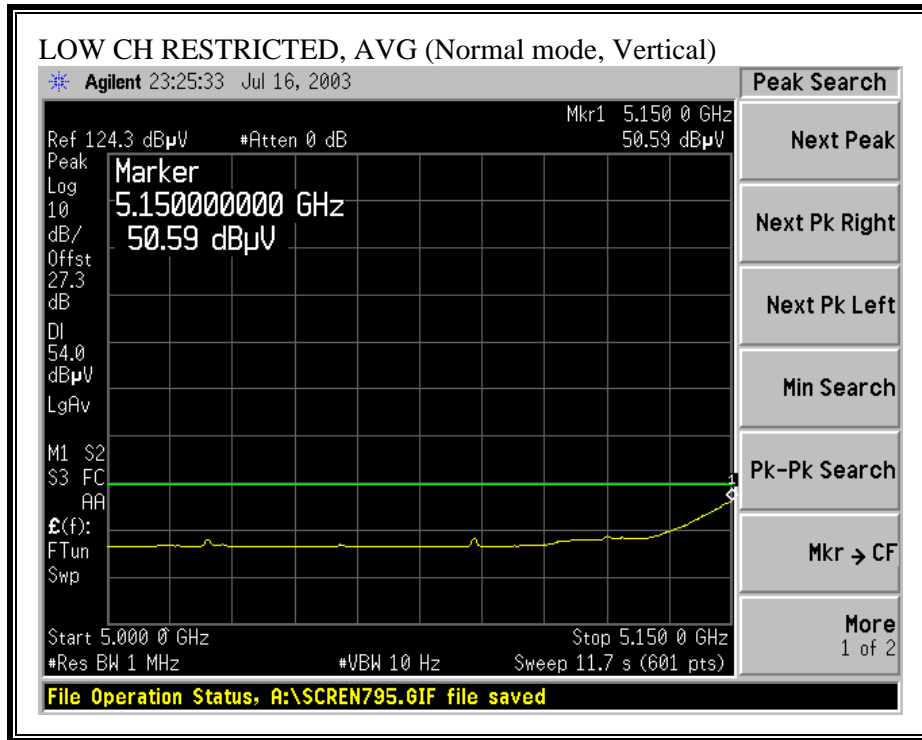
RESTRICTED BANDEDGE (NORMAL MODE, LOW CHANNEL, HORIZONTAL)



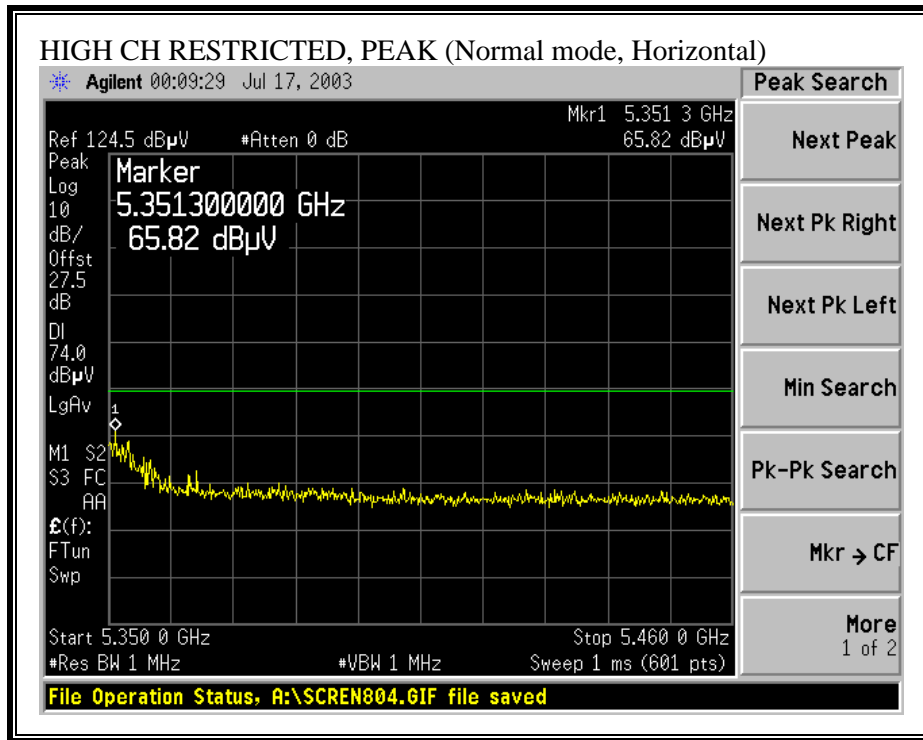


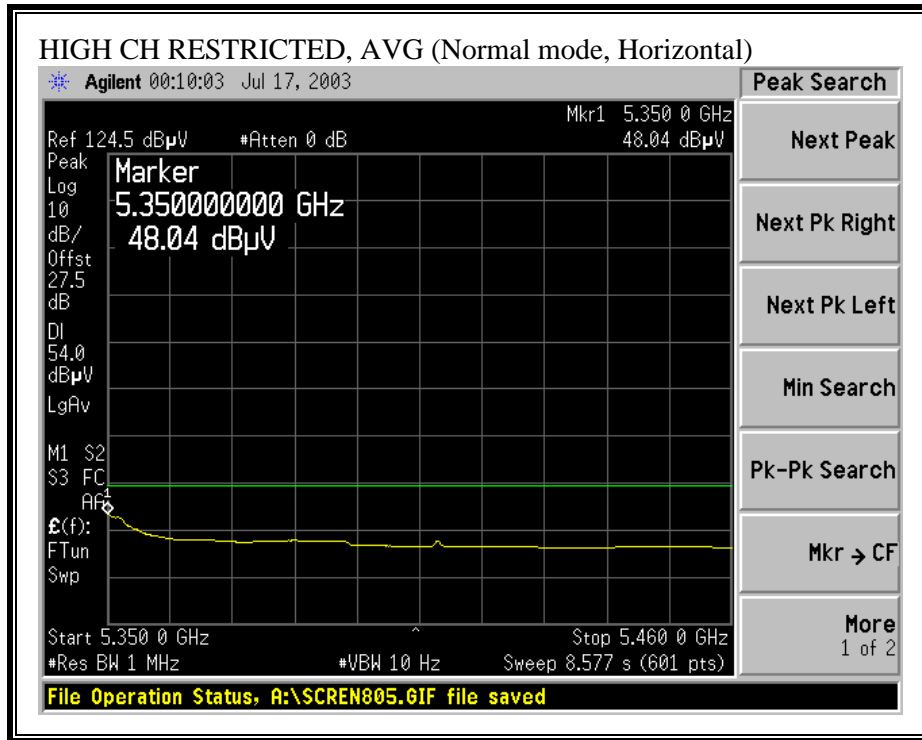
RESTRICTED BANDEDGE (NORMAL MODE, LOW CHANNEL, VERTICAL)



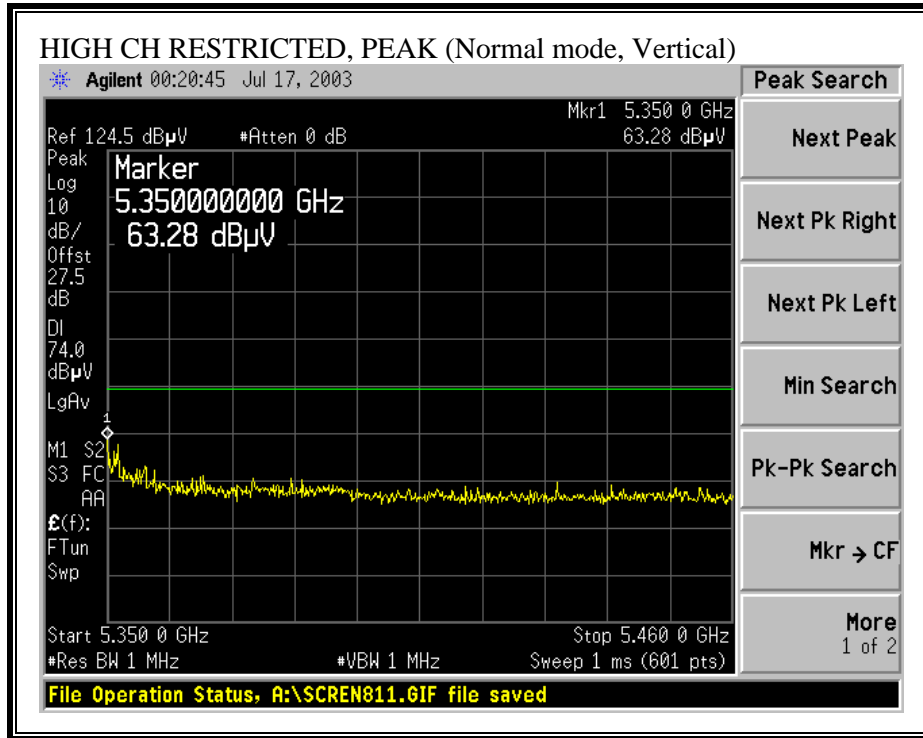


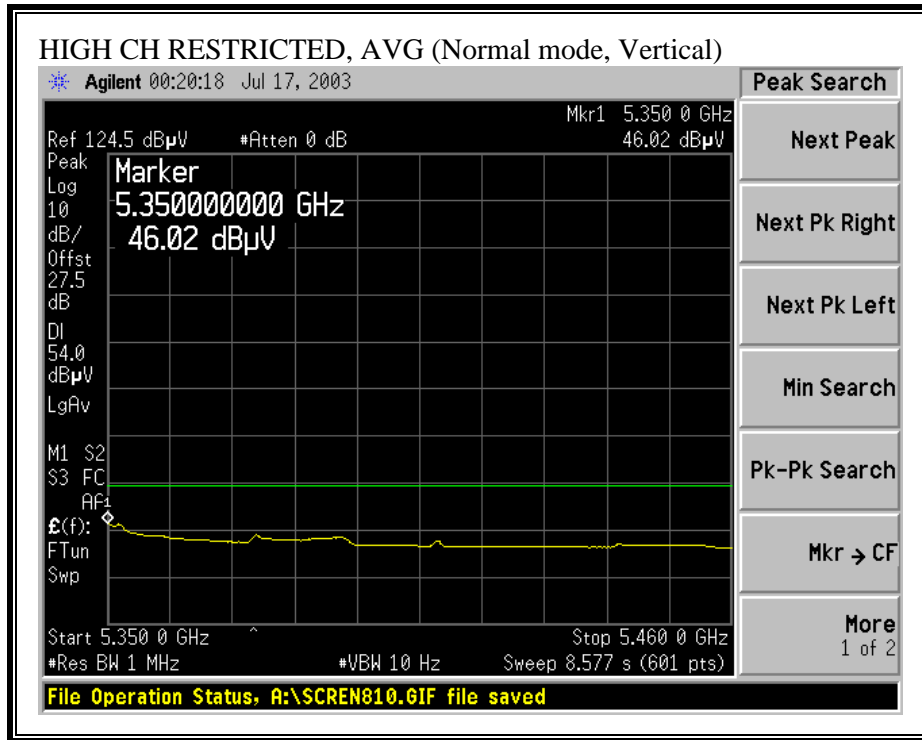
RESTRICTED BANDEGE (NORMAL MODE, HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (NORMAL MODE, HIGH CHANNEL, VERTICAL)

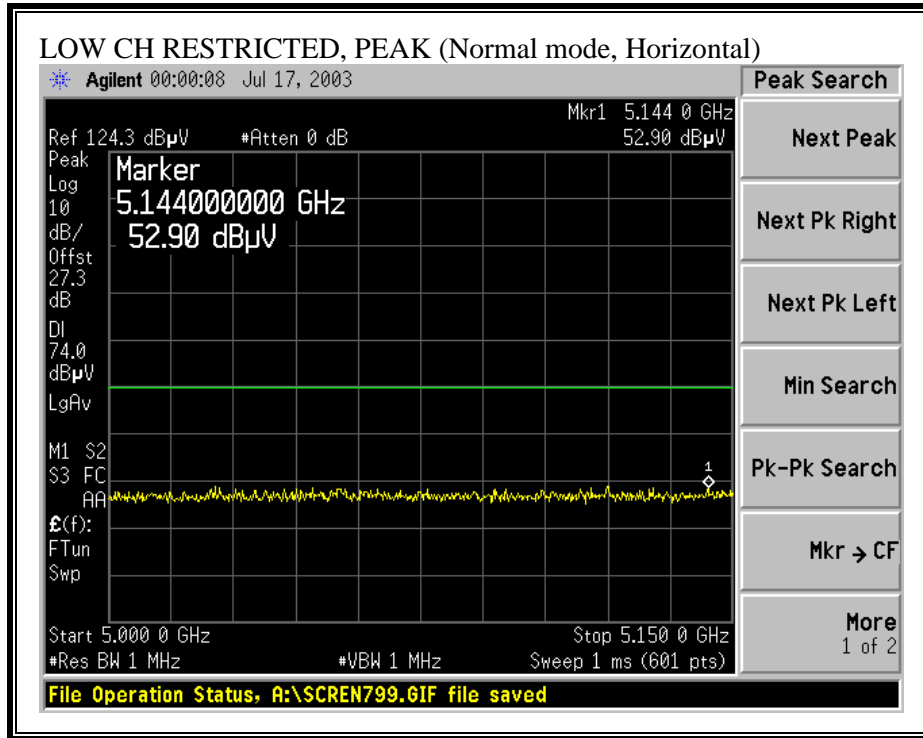


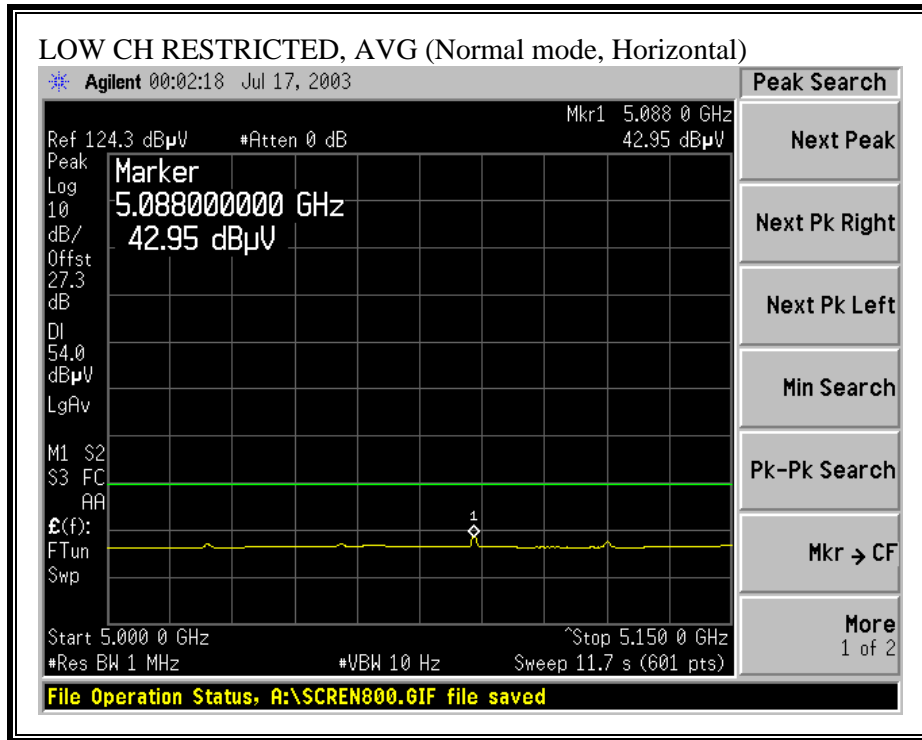


HARMONICS AND SPURIOUS EMISSIONS (NORMAL MODE)

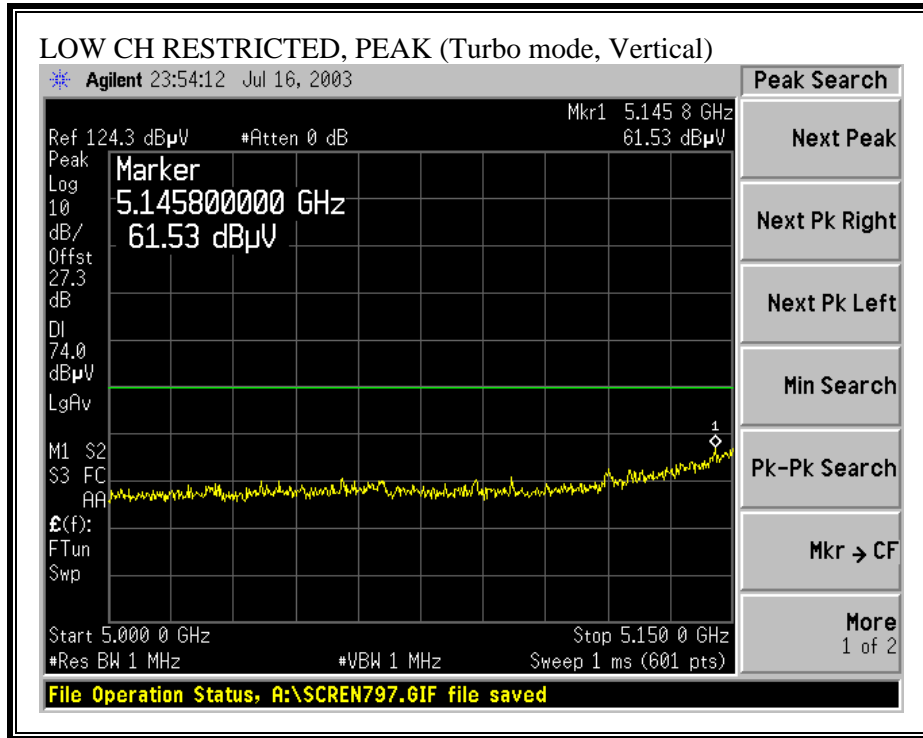
07/15/03 High Frequency Measurement Compliance Certification Services, Morgan Hill Open Field Site																
Test Engr: Devin Chang Project #: 03U2067-1 Company: TOSHIBA EUT Descrip.: 802.11a EUT M/N: IPCN064A Test Target: FCC 15.407 Mode Oper: Transmitt																
Test Equipment:																
EMCO Horn 1-18GHz T59; S/N: 3245 @3m		Pre-amplifier 1-26GHz T86 Miteq 924341		Spectrum Analyzer Agilent E4446A Analyzer				Horn > 18GHz T117; ARA 18-26GHz; S/N:1013								
Hi Frequency Cables: <input checked="" type="checkbox"/> (2 ft) <input type="checkbox"/> (2-3 ft) <input type="checkbox"/> (4-6 ft) <input checked="" type="checkbox"/> (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 1 (5180MHz)																
1.163	9.8	68.2	63.5	24.6	1.2	-44.3	0.0	1.0	50.8	46.0	74.0	54.0	-23.2	-8.0	V	
10.361	9.8	63.1	50.8	37.8	5.9	-44.5	0.0	1.0	63.3	51.0	74.0	54.0	-10.7	-3.0	V	
1.163	9.8	61.4	54.2	24.6	1.2	-44.3	0.0	1.0	43.9	36.8	74.0	54.0	-30.1	-17.2	H	
10.361	9.8	59.3	47.9	37.8	5.9	-44.5	0.0	1.0	59.5	48.1	74.0	54.0	-14.5	-5.9	H	
Channel 1 (5260MHz)																
1.163	9.8	67.9	63.3	24.6	1.2	-44.3	0.0	1.0	50.5	45.9	74.0	54.0	-23.5	-8.1	V	
10.521	9.8	66.8	51.9	37.9	6.0	-44.3	0.0	1.0	67.3	52.4	74.0	54.0	-6.7	-1.6	V	
1.163	9.8	61.1	54.1	24.6	1.2	-44.3	0.0	1.0	43.7	36.7	74.0	54.0	-30.3	-17.3	H	
10.521	9.8	60.3	48.5	37.9	6.0	-44.3	0.0	1.0	60.9	49.0	74.0	54.0	-13.1	-5.0	H	
Channel 1 (5320MHz)																
1.163	9.8	68.1	63.4	24.6	1.2	-44.3	0.0	1.0	50.7	46.0	74.0	54.0	-23.3	-8.0	V	
10.641	9.8	67.4	52.4	38.0	6.0	-44.2	0.0	1.0	68.2	53.2	74.0	54.0	-5.8	-0.8	V	
1.163	9.8	59.6	52.6	24.6	1.2	-44.3	0.0	1.0	42.2	35.2	74.0	54.0	-31.8	-18.8	H	
10.641	9.8	67.4	51.9	38.0	6.0	-44.2	0.0	1.0	68.1	52.7	74.0	54.0	-5.9	-1.3	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									

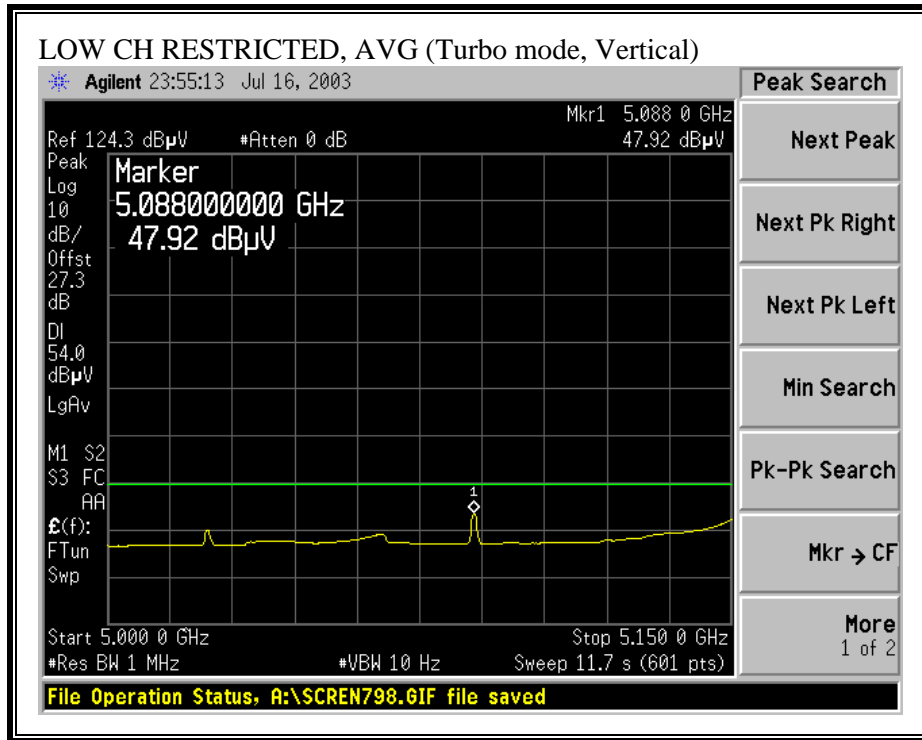
RESTRICTED BANDEDGE (TURBO MODE, LOW CHANNEL, HORIZONTAL)



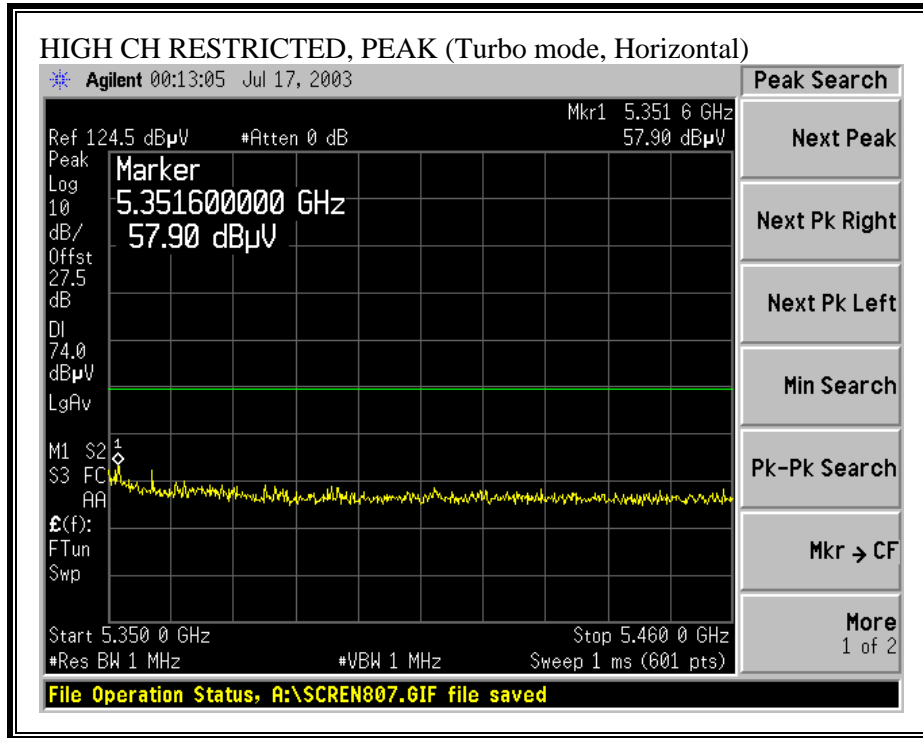


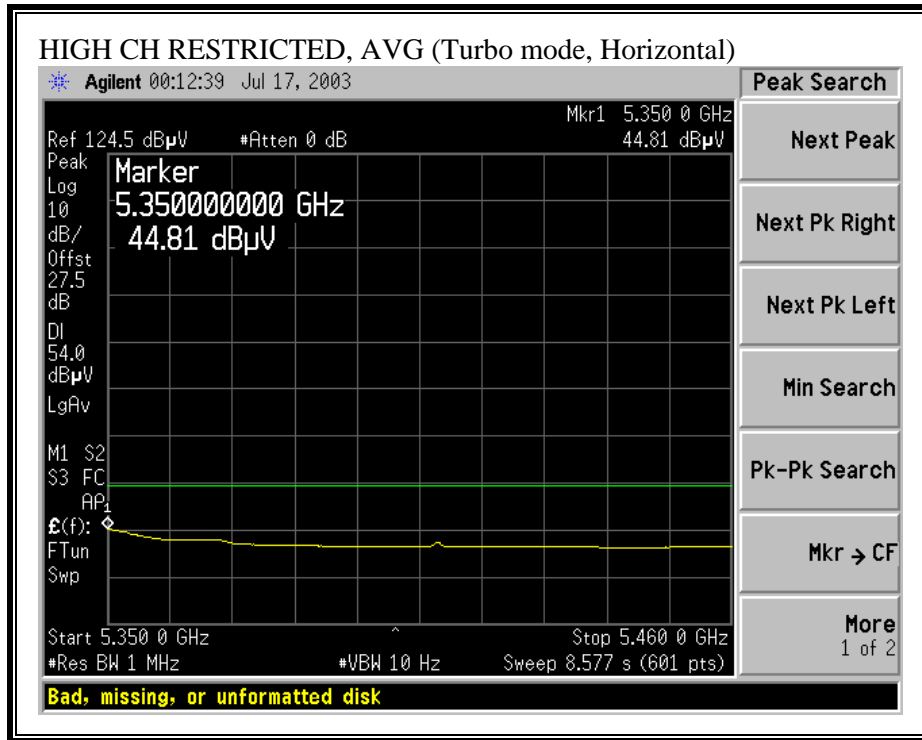
RESTRICTED BANDEDGE (TURBO MODE, LOW CHANNEL, VERTICAL)



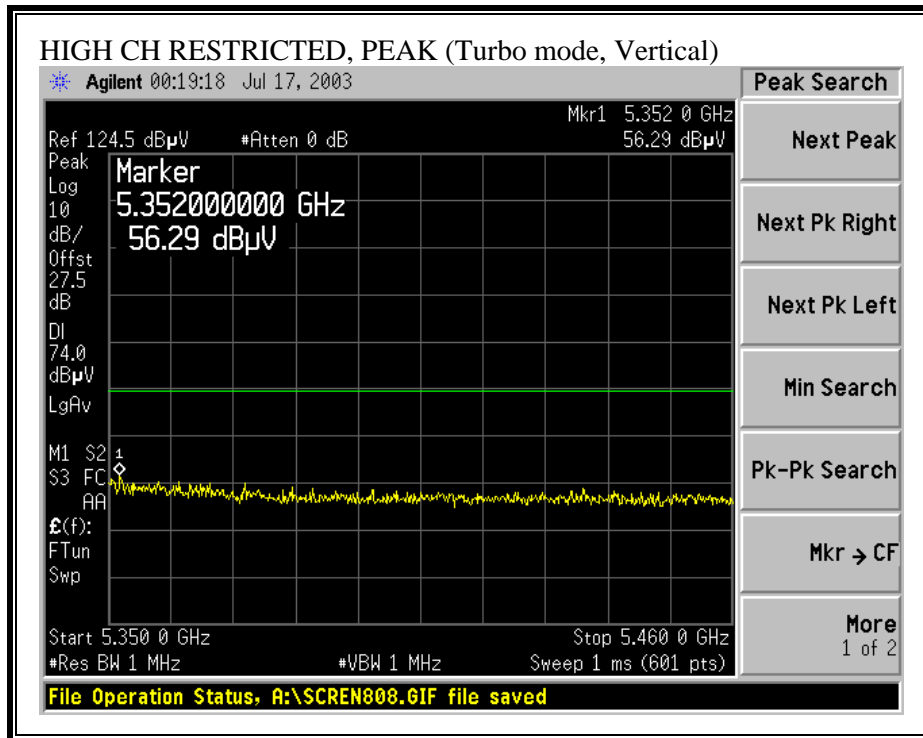


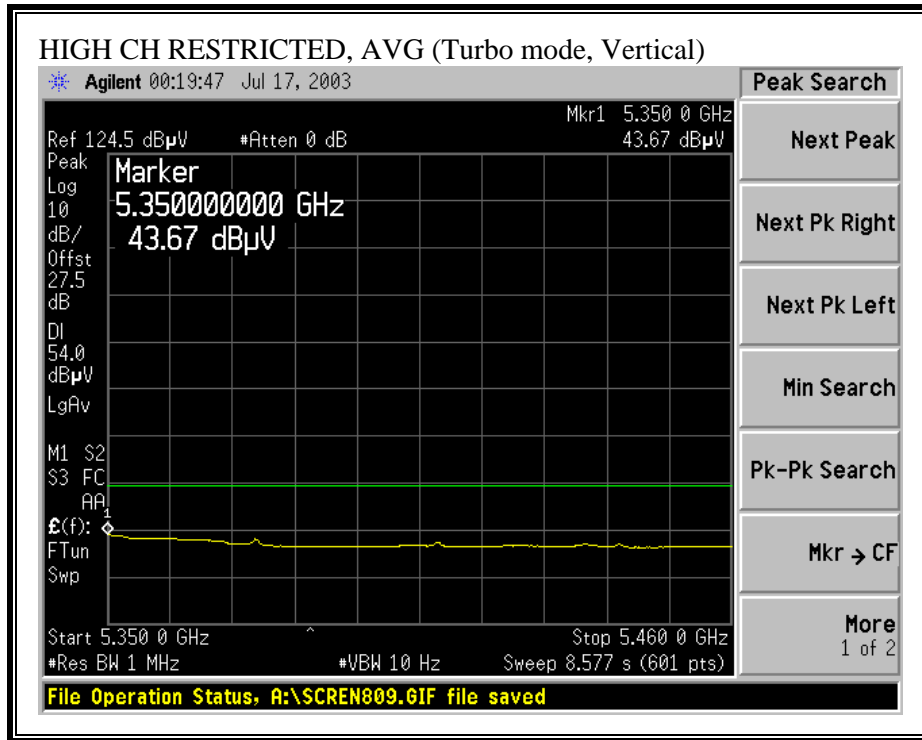
RESTRICTED BANDEDGE (TURBO MODE, HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (TURBO MODE, HIGH CHANNEL, VERTICAL)





HARMONICS AND SPURIOUS EMISSIONS (TURBO MODE)

Test Engr: Devin Chang
Project #: 03U2067-1
Company: TOSHIBA
EUT Descrip.: 802.11a
EUT M/N: IPCN064A
Test Target: FCC 15.407
Mode Oper: Transmitt

Test Equipment:

EMCO Horn 1-18GHz
 T59; S/N: 3245 @ 3m

Pre-amplifier 1-26GHz
 T86 Miteq 924341

Spectrum Analyzer
 Agilent E4446A Analyzer

Horn > 18GHz
 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 1 (TS210MHz)															
1.163	9.8	66.4	61.1	24.6	1.2	-44.3	0.0	1.0	48.9	43.7	74.0	54.0	-25.1	-10.3	V
6.252	9.8	61.5	52.7	34.6	4.4	-46.4	0.0	1.0	55.1	46.3	74.0	54.0	-18.9	-7.7	V
1.163	9.8	62.3	54.9	24.6	1.2	-44.3	0.0	1.0	44.9	37.5	74.0	54.0	-29.1	-16.5	H
6.252	9.8	59.9	50.0	34.6	4.4	-46.4	0.0	1.0	53.5	43.6	74.0	54.0	-20.5	-10.4	H
Channel 1 (TS250MHz)															
1.163	9.8	67.4	63.3	24.6	1.2	-44.3	0.0	1.0	50.0	45.9	74.0	54.0	-24.0	-8.1	V
6.300	9.8	59.8	50.6	34.6	4.4	-46.4	0.0	1.0	53.5	44.3	74.0	54.0	-20.5	-9.7	V
1.163	9.8	63.6	55.2	24.6	1.2	-44.3	0.0	1.0	46.2	37.8	74.0	54.0	-27.8	-16.2	H
6.300	9.8	59.3	49.0	34.6	4.4	-46.4	0.0	1.0	52.9	42.7	74.0	54.0	-21.1	-11.3	H
Channel 1 (TS290MHz)															
1.163	9.8	69.6	64.7	24.6	1.2	-44.3	0.0	1.0	52.2	47.3	74.0	54.0	-21.8	-6.7	V
6.348	9.8	59.9	49.2	34.7	4.4	-46.4	0.0	1.0	53.6	42.9	74.0	54.0	-20.4	-11.1	V
1.163	9.8	59.6	51.3	24.6	1.2	-44.3	0.0	1.0	42.2	33.9	74.0	54.0	-31.8	-20.1	H
10.641	9.8	59.0	48.3	38.0	6.0	-44.2	0.0	1.0	59.8	49.0	74.0	54.0	-14.2	-5.0	H

f Measurement Frequency
 Dist Distance to Antenna
 Read Analyzer Reading
 AF Antenna Factor
 CL Cable Loss

Amp Preamp Gain
 D Corr Distance Correct to 3 meters
 Avg Average Field Strength @ 3 m
 Peak Calculated Peak Field Strength
 HPF High Pass Filter

Avg Lim Average Field Strength Limit
 Pk Lim Peak Field Strength Limit
 Avg Mar Margin vs. Average Limit
 Pk Mar Margin vs. Peak Limit

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 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.

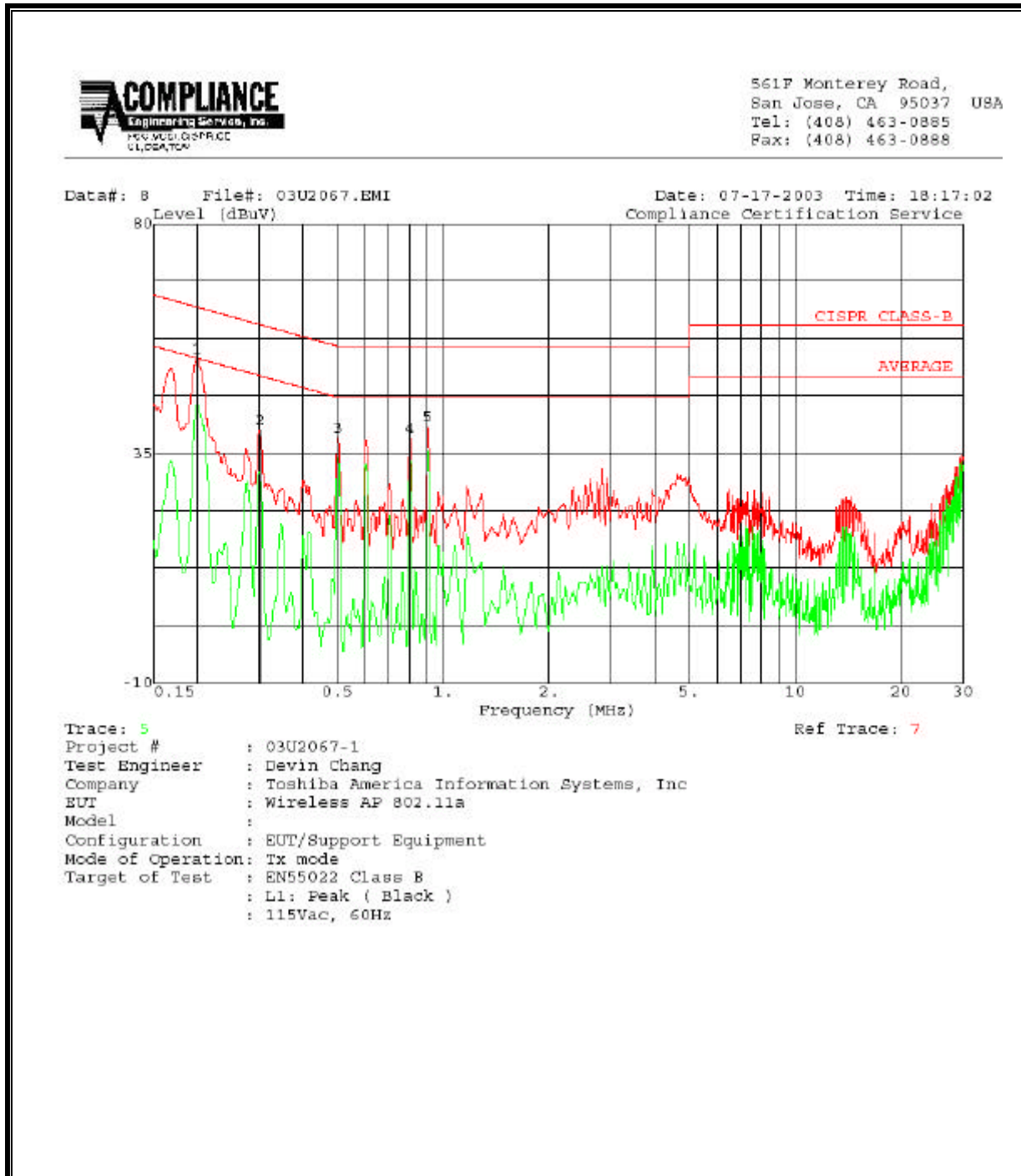
Line conducted data is recorded for both NEUTRAL and HOT lines.

RESULTS

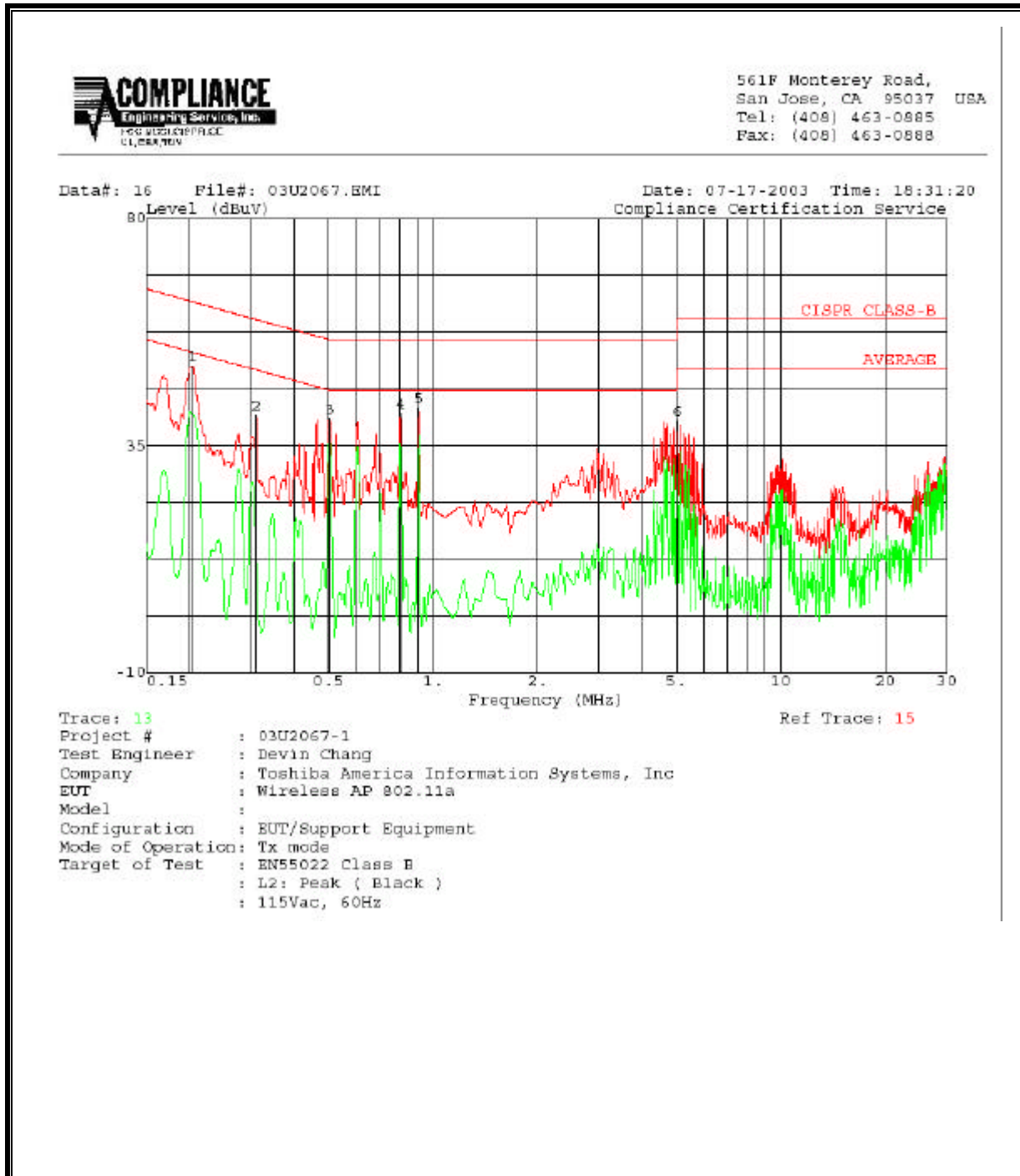
No non-compliance noted:

CONDUCTED EMISSIONS DATA (115VAC 60Hz)										
Freq. (MHz)	Reading			Closs (dB)	Limit QP	EN_B		Margin		Remark L1 / L2
	PK (dBuV)	QP (dBuV)	AV (dBuV)			AV	QP (dB)	AV (dB)		
0.20	53.46	--	--	0.00	64.57	54.57	-11.11	-1.11	L1	
0.50	38.16	--	--	0.00	56.00	46.00	-17.84	-7.84	L1	
0.90	40.40	--	--	0.00	56.00	46.00	-15.60	-5.60	L1	
0.20	50.68	--	--	0.00	64.46	54.46	-13.78	-3.78	L2	
0.81	41.28	--	--	0.00	56.00	46.00	-14.72	-4.72	L2	
0.91	42.46	--	--	0.00	56.00	46.00	-13.54	-3.54	L2	
6 Worst Data										

LINE 1 RESULTS

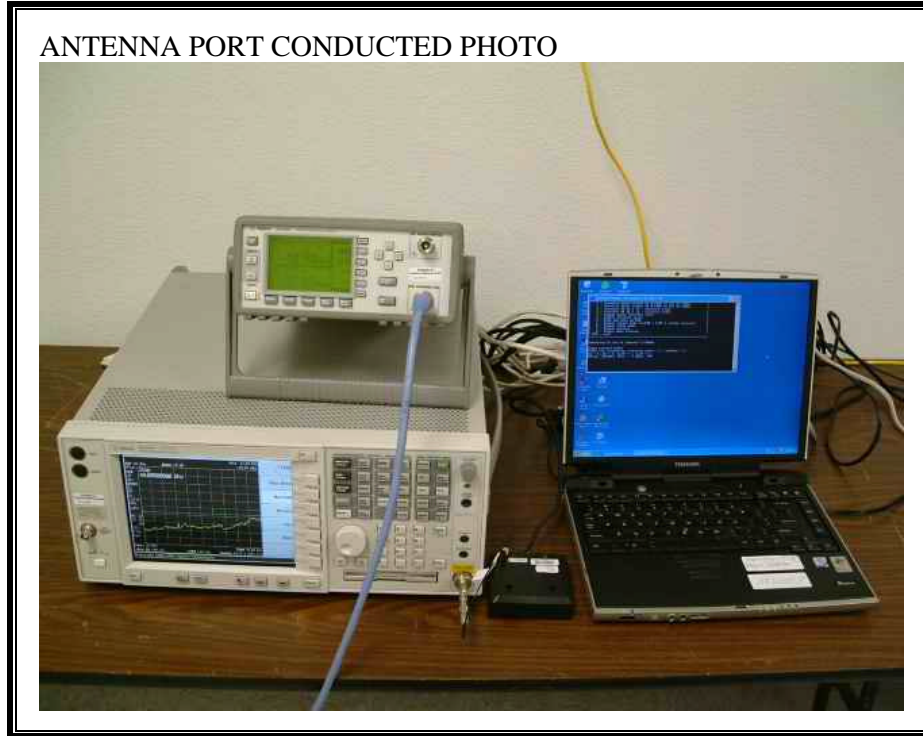


LINE 2 RESULTS



8. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



RADIATED RF MEASUREMENT SETUP





POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP





END OF REPORT