



**FCC CFR47 PART 15 SUBPART E
CERTIFICATION**

TEST REPORT

FOR

802.11a/b/g MINI PCI TYPE 3B CARD

MODEL NUMBER: WM3A2915ABG

FCC ID: E2K5HCKT

REPORT NUMBER: 04U2790-2

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Prepared for
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1. TEST RESULT CERTIFICATION

COMPANY NAME: DELL COMPUTER CORPORATION
ONE DELL WAY
ROUND ROCK, TX 78682, USA

EUT DESCRIPTION: 802.11a/b/g MINI PCI TYPE 3B CARD

MODEL: WM3A2915ABG

DATE TESTED: JUNE 09 TO JUNE 29, 2004

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

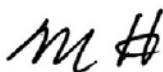
Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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

Note: The 5.2 GHz band is applicable to this report.

Approved & Released For CCS By:

Tested By:



MIKE HECKROTTE
ENGINEERING MANAGER
COMPLIANCE CERTIFICATION SERVICES



VIEN TRAN
EMC TECHNICIAN
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

The EUT is an 802.11a/b/g transceiver 802.11a/b/g Mini PCI type 3B card.

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

5150 to 5250 MHz Authorized Band

Frequency Band (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5180 - 5250	802.11a	11.06	12.76

5250 to 5350 MHz Authorized Band

Frequency Band (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5250 - 5320	802.11a	15.81	38.11

PRECISION M60 LAPTOP WITH WISTRON ANTENNA SET IN BASE

The radio utilizes two identical internal PIFA antennas for diversity. The Wistron model CA9-C has a maximum gain of 3.47 dBi.

PRECISION M60 LAPTOP WITH HITACHI ANTENNA SET IN BASE

The radio utilizes two identical internal Monopole antennas for diversity. The Hitachi model HFT04-DL01 has a maximum gain of 4.9 dBi.

INSPIRON 510M LAPTOP WITH PHYCOMP ANTENNA SET IN LCD

The radio utilizes two identical internal Patch antennas for diversity. The Phycomp model CAN4313 351 has a maximum gain of 2.8 dBi.

INSPIRON 300M LAPTOP WITH WISTRON ANTENNA SET IN LCD

The radio utilizes two identical internal PIFA antennas for diversity. The Wistron model CAO-S has a maximum gain of 2.43 dBi.

INSPIRON 300M LAPTOP WITH HITACHI ANTENNA SET IN LCD

The radio utilizes two identical internal Monopole antennas for diversity. The Hitachi model HFT06 has a maximum gain of 3.7 dBi.

The model number was changed after testing commenced. All data in this report is applicable to the model number documented in Section 1 above.

3. TEST METHODOLOGY

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

4. FACILITIES AND ACCREDITATION

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

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



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

5. CALIBRATION AND UNCERTAINTY

5.1. MEASURING INSTRUMENT CALIBRATION

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

5.2. MEASUREMENT UNCERTAINTY

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

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

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

5.3. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	Cal Due
EMI Receiver, 9 kHz ~ 2.9 GHz	HP	8542E	3942A00286	11/21/2004
RF Filter Section	HP	85420E	3705A00256	11/21/04
30MHz---- 2GHz	Sunol Sciences	JB1 Antenna	A121003	12/22/04
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	2/4/05
Spectrum Analyzer	Agilent	E4446A	MY43360112	1/13/05
Preamplifier, 1 ~ 26 GHz	Miteq	NSP10023988	646456	4/25/05
EMI Test Receiver	R & S	ESHS 20	827129/006	7/17/04
LISN, 10 kHz ~ 30 MHz	FCC	50/250-25-2	114	10/13/04
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	8379443	10/13/04
Site A Line Stabilizer / Conditioner	Tripplite	LC-1800a	A0051681	CNR
EMI Test Receiver	R & S	ESHS 20	827129/006	7/17/04
AC Power Source, 10KVA	ACS	AFC-10K-AFC-2	J1568	CNR
10dB Pad	Weinschel	56-10	M251	CNR
PreAmplifier 26-40 GHz	Miteq	NSP4000-SP2	924343	6/1/05
Antenna, Horn 26 ~ 40 GHz	ARA	MWH-2640/B	1029	12/3/04
Antenna, Horn, 18 ~ 26 GHz	ARA	MWH-1826/B	1013	2/4/05
Hi Pass Filter_4GHz	Micro_Tronic	HPM13351	4	N/A
Hi Pass Filter_7.6GHz	Micro_Tronic	HPM13195	1	N/A

6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
LAPTOP	DELL	Precision M60 (PP02X)	N/A	N/A
LAPTOP	DELL	Inspiron 510M (PP10L)	N/A	N/A
LAPTOP	DELL	Precision M60 (PP02X)	N/A	N/A
LAPTOP	DELL	Inspiron 300M	PR04S	N/A
LAPTOP	DELL	Inspiron 300M	PR04S	N/A
AC ADAPTER	DELL	HP-OQ065B83	N/A	N/A
AC ADAPTER	DELL	PA-1650-05D	N/A	N/A
AC ADAPTER	DELL	PA-1900-02D	N/A	N/A
AC ADAPTER	DELL	HP-OQ065B83	N/A	N/A
AC ADAPTER	DELL	PA-1650-05	N/A	N/A

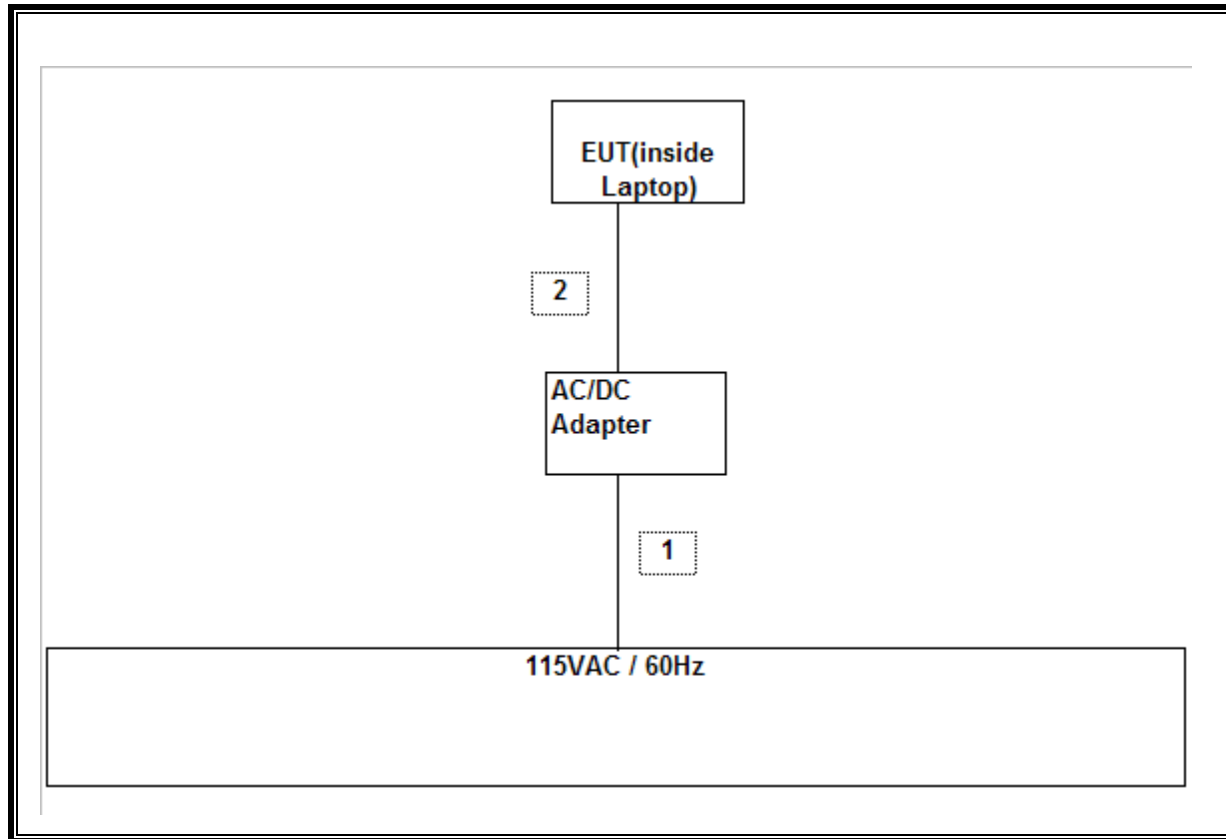
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US 115V	Un-shielded	1m	No
2	DC	1	DC	Un-shielded	2m	No

TEST SETUP

The EUT is installed in a host laptop computer. Test software exercised the radio card.

SETUP DIAGRAM FOR TESTS



7. APPLICABLE LIMITS AND TEST RESULTS

7.1. EMISSION BANDWIDTH

LIMIT

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

TEST PROCEDURE

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

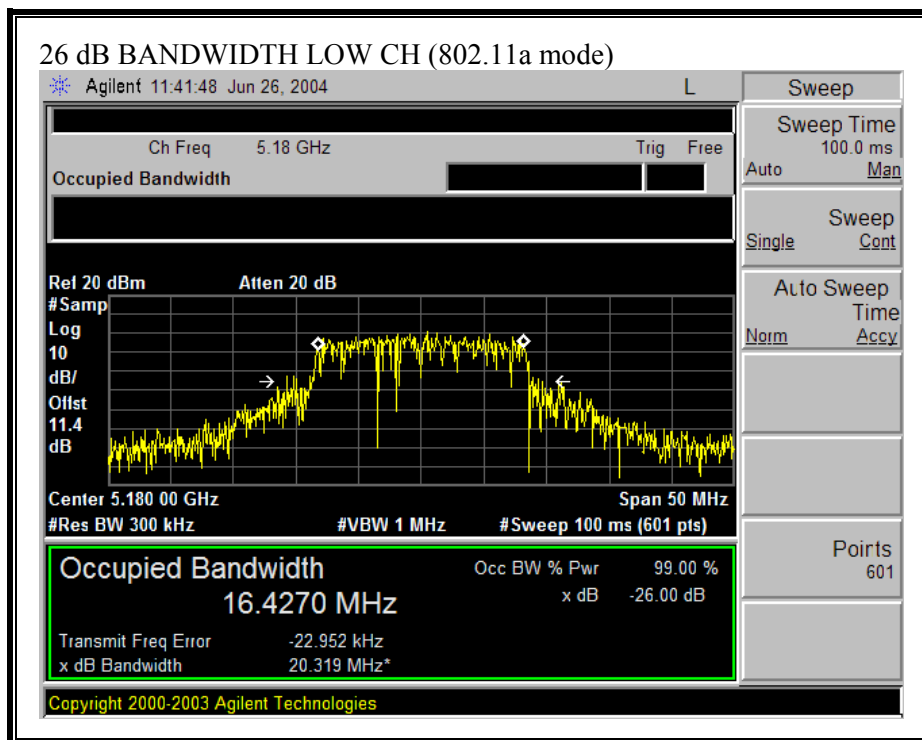
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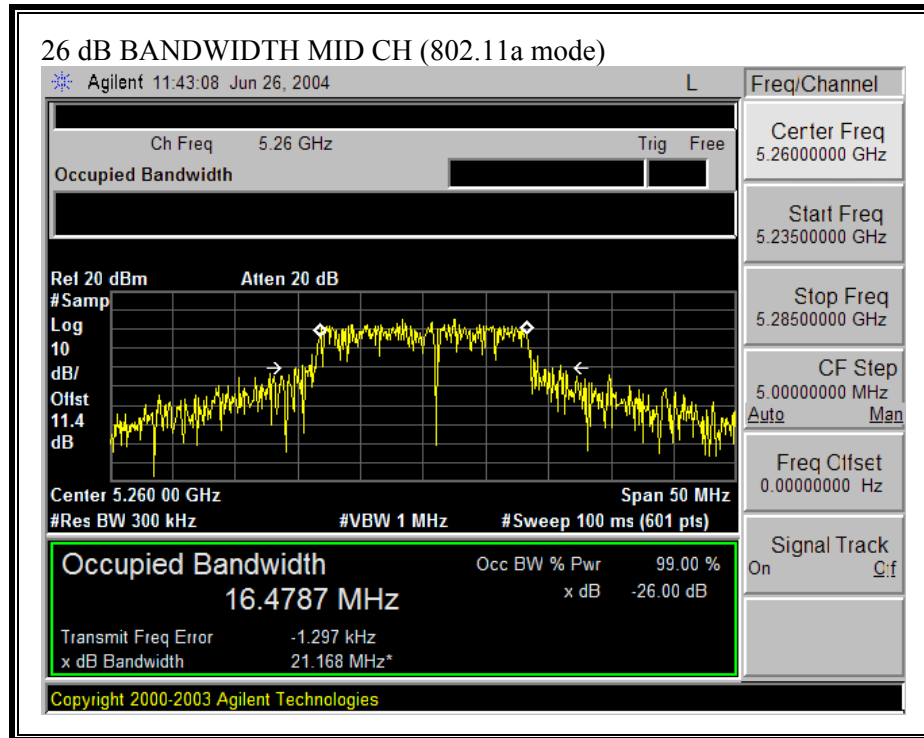
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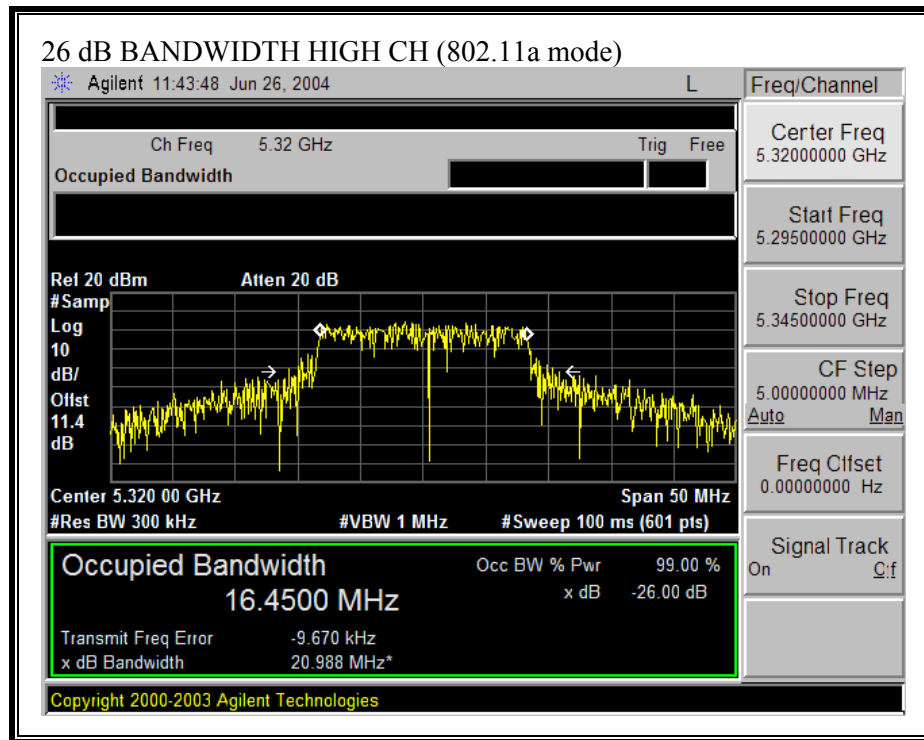
802.11a Mode

Channel	Frequency (MHz)	B (MHz)	10 Log B (dB)
Low	5180	20.32	13.08
Middle	5260	21.17	13.26
High	5320	20.99	13.22

26 dB EMISSION BANDWIDTH (802.11a 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)	Antenna Gain (dBi)	Limit (dBm)
802.11a	5180	17	20.319	17.08	2.18	17.00

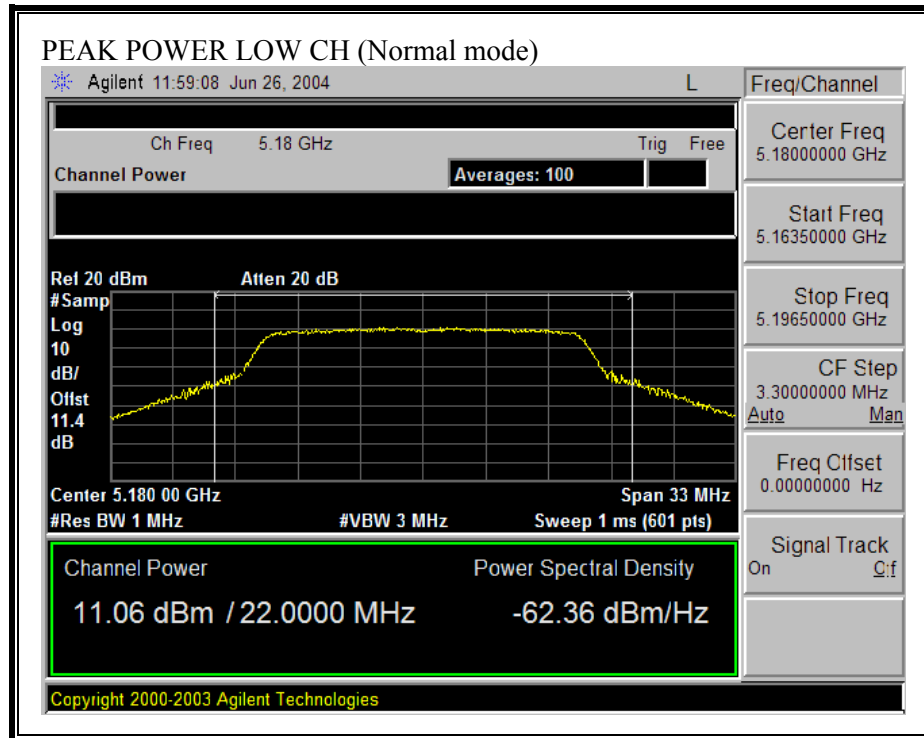
Limit in 5250 to 5350 MHz Band

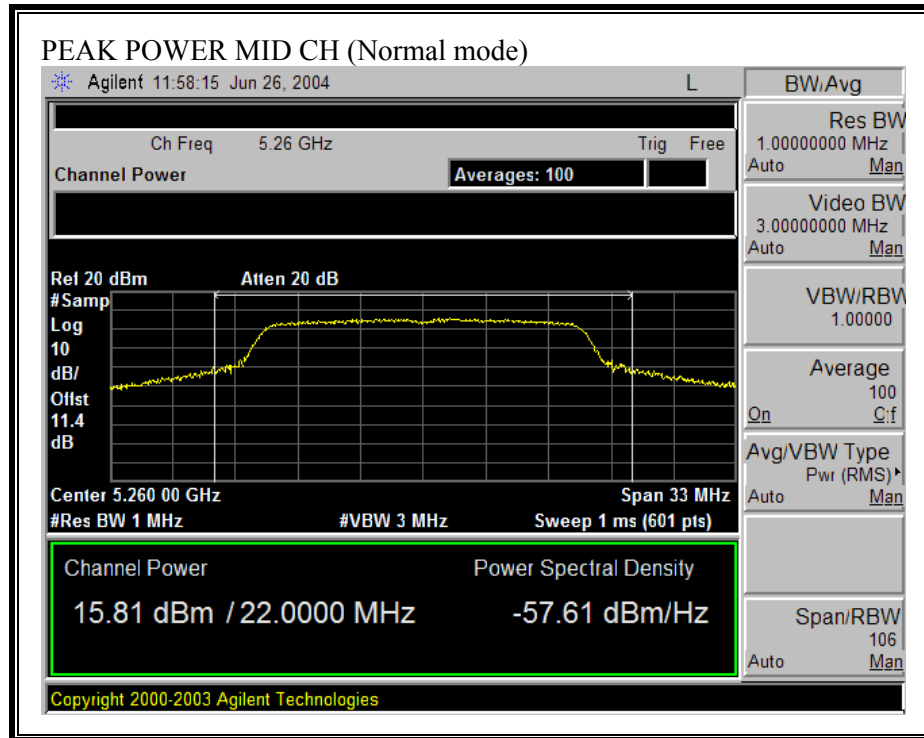
Mode	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Antenna Gain (dBi)	Limit (dBm)
802.11a	5260	24	21.168	24.26	3.39	24.00
802.11a	5320	24	20.988	24.22	3.47	24.00

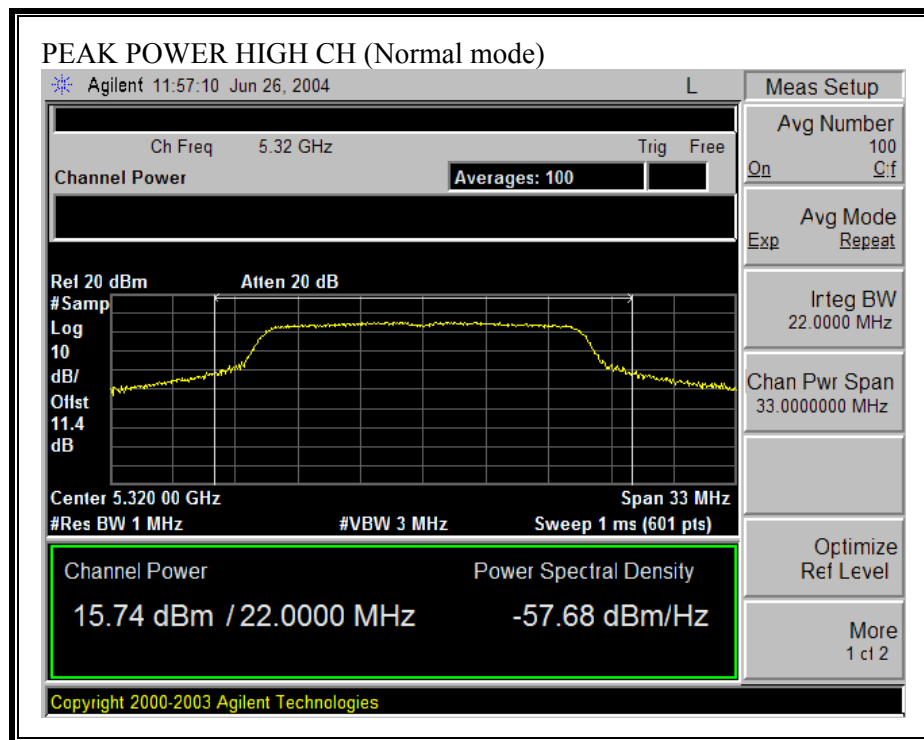
802.11a mode Results

Channel	Frequency (MHz)	Power (dBm)	Limit (dBm)	Margin (dB)
Low	5180	11.06	17.00	-5.94
Middle	5260	15.81	24.00	-8.19
High	5320	15.74	24.00	-8.26

PEAK POWER (802.11a MODE)







7.3. MAXIMUM PERMISSIBLE EXPOSURE

LIMITS

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

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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

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

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

f = frequency in MHz

* = Plane-wave equivalent power density

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

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

CALCULATIONS

Given

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

and

$$S = E^2 / 3770$$

where

E = Field Strength in Volts/meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power Density in milliwatts/square centimeter

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

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

Changing to units of Power to mW and Distance to cm, using:

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

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

yields

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

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

where

d = distance in cm

P = Power in mW

G = Numeric antenna gain

S = Power Density in mW/cm²

Substituting the logarithmic form of power and gain using:

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

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

yields

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

where

d = MPE distance in cm

P = Power in dBm

G = Antenna Gain in dBi

S = Power Density Limit in mW/cm²

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

LIMITS

From §1.1310 Table 1 (B), S = 1.0 mW/cm²

7.3.1. MPE, INSPIRON 510M LAPTOP WITH PHYCOMP ANTENNA SET

RESULTS

No non-compliance noted:

Mode	Power Density Limit (mW/cm ²)	Output Power (dBm)	Antenna Gain (dBi)	MPE Distance (cm)
802.11a	1.0	15.81	2.80	2.40

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.

7.3.2. MPE, INSPIRON 300M LAPTOP WITH WISTRON ANTENNA SET

RESULTS

No non-compliance noted:

Mode	Power Density Limit (mW/cm ²)	Output Power (dBm)	Antenna Gain (dBi)	MPE Distance (cm)
802.11a	1.0	15.81	2.43	2.30

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.

7.3.3. MPE, INSPIRON 300M LAPTOP WITH HITACHI ANTENNA SET

BAND RESULTS

No non-compliance noted:

Mode	Power Density Limit (mW/cm ²)	Output Power (dBm)	Antenna Gain (dBi)	MPE Distance (cm)
802.11a	1.0	15.81	3.70	2.67

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 11.4 dB (including 10 dB pad and 1.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

802.11a Mode

Channel	Frequency (MHz)	Average Power (dBm)
Low	5180	11.20
Middle	5260	16.30
High	5320	16.20

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 $4 \text{ dBm} + 10 \log B$, 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 = 4.9 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.

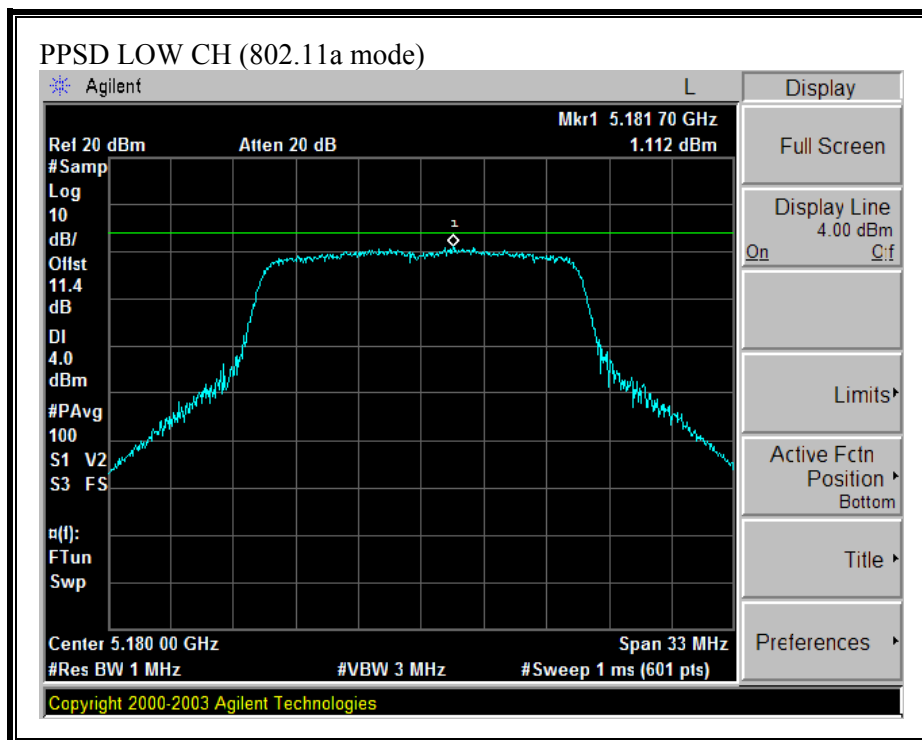
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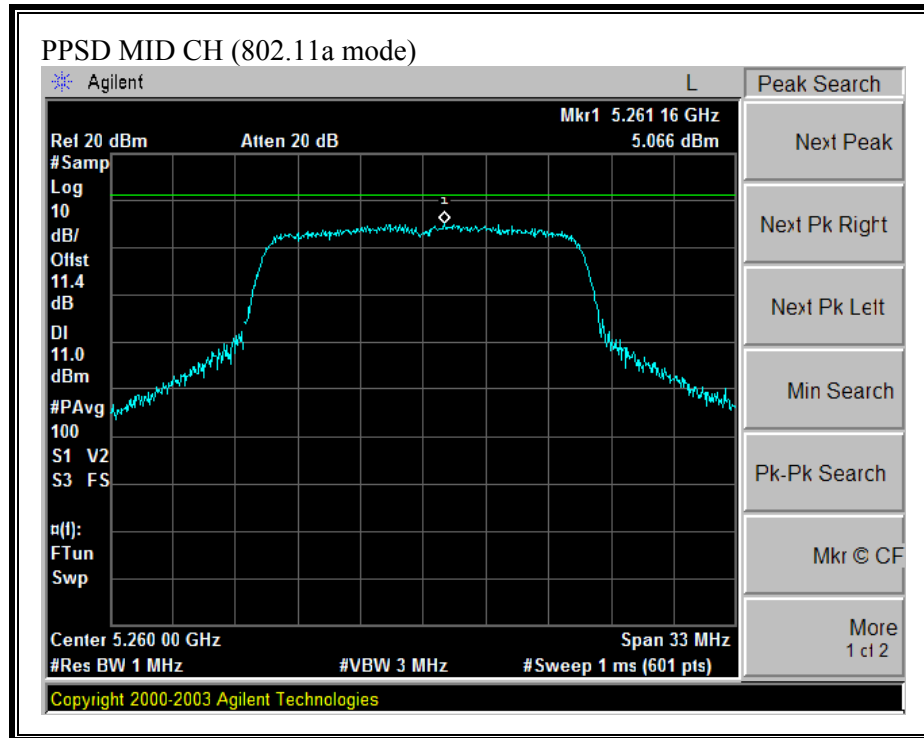
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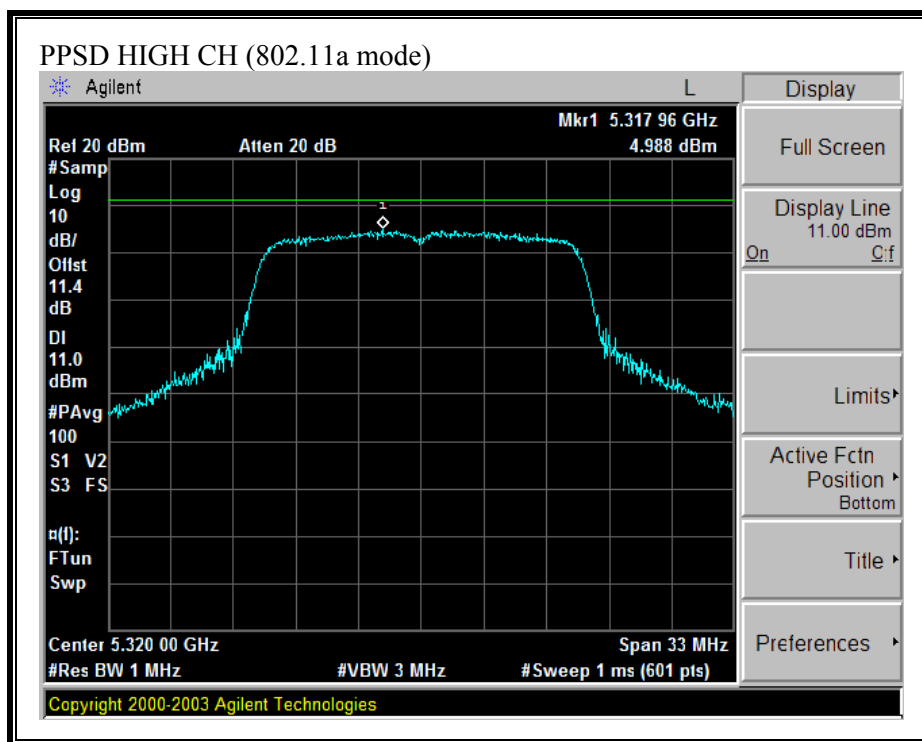
802.11a Mode

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Margin (dB)
Low	5180	1.11	4.00	-2.89
Middle	5260	5.07	11.00	-5.93
High	5320	4.99	11.00	-6.01

PEAK POWER SPECTRAL DENSITY (802.11a 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.

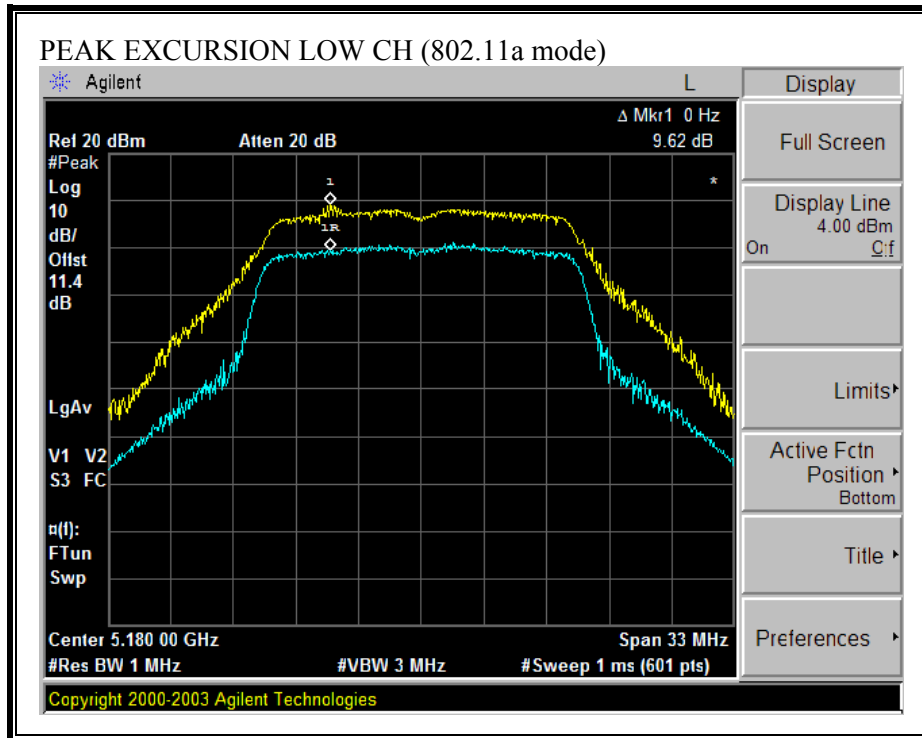
RESULTS

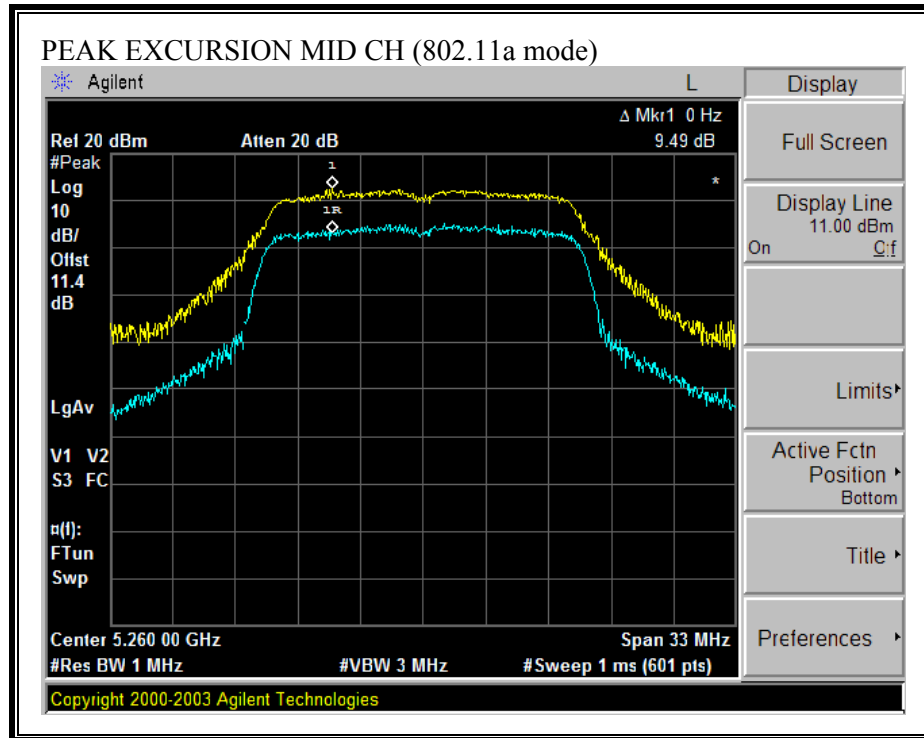
No non-compliance noted:

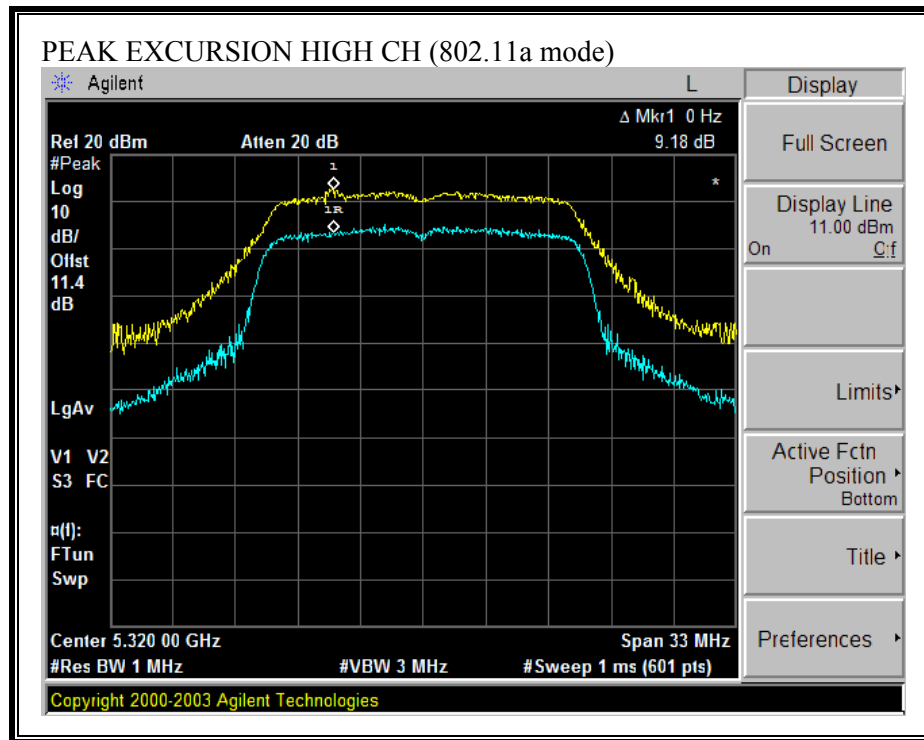
802.11a Mode

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5180	9.26	13	-3.74
Middle	5260	9.49	13	-3.51
High	5320	9.18	13	-3.82

PEAK EXCURSION (802.11a 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.

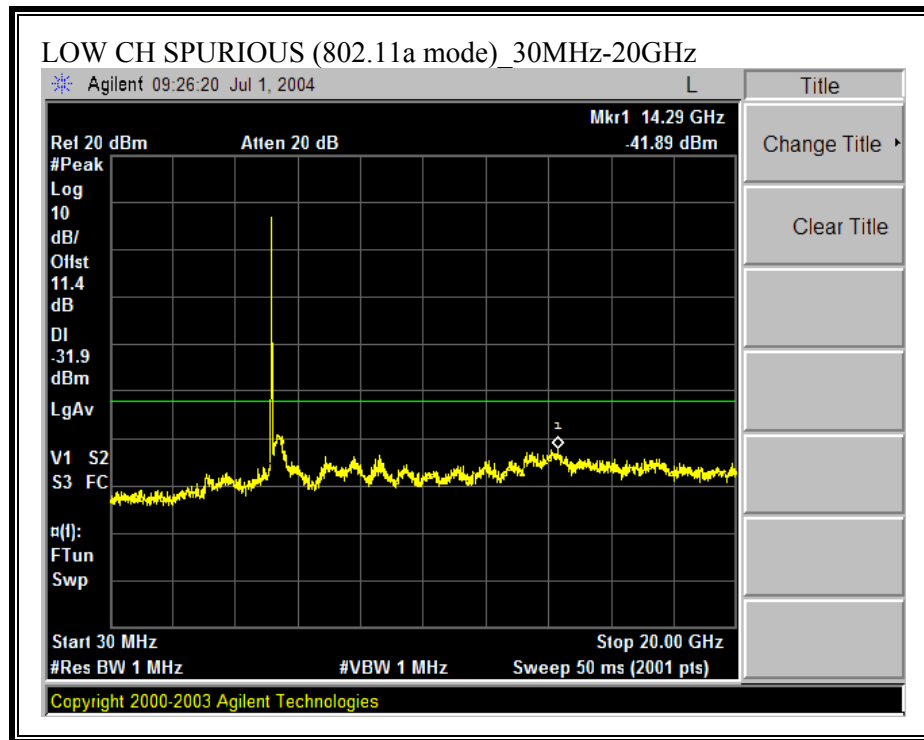
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements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

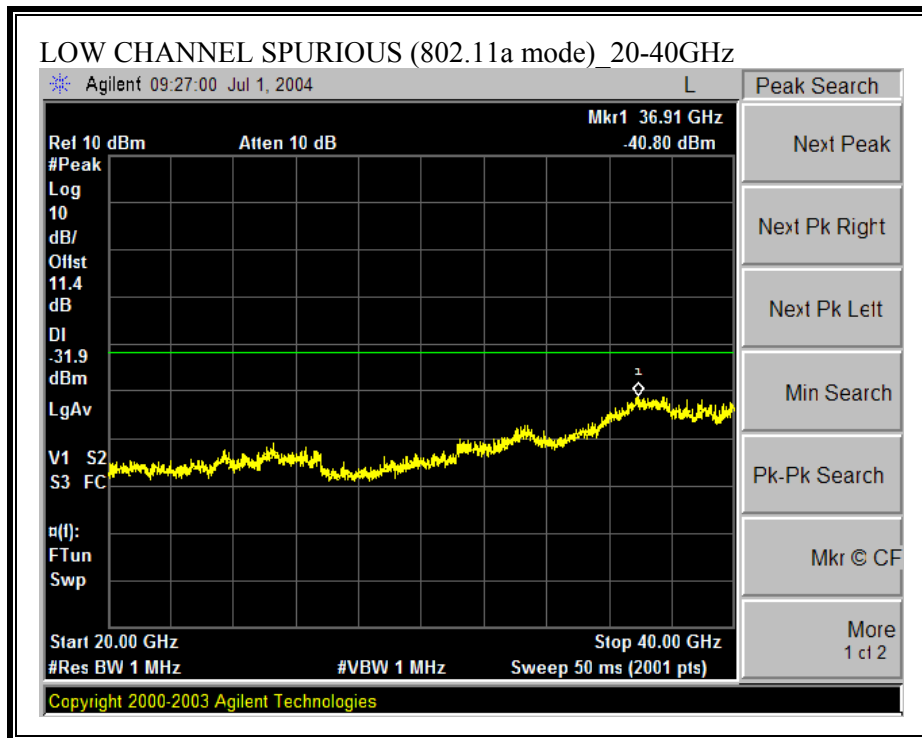
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

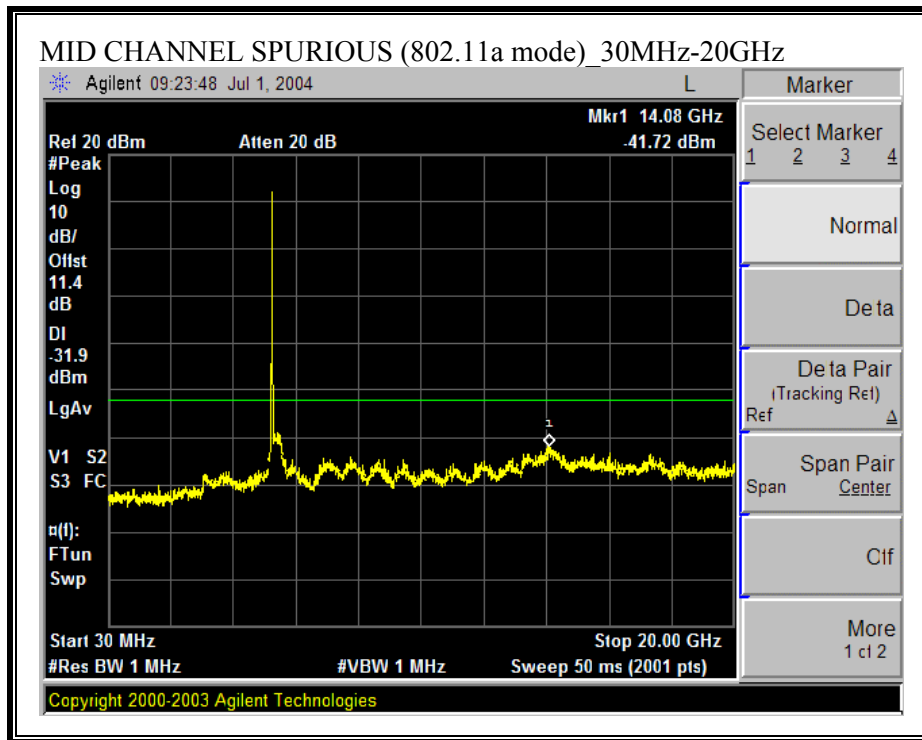
RESULTS

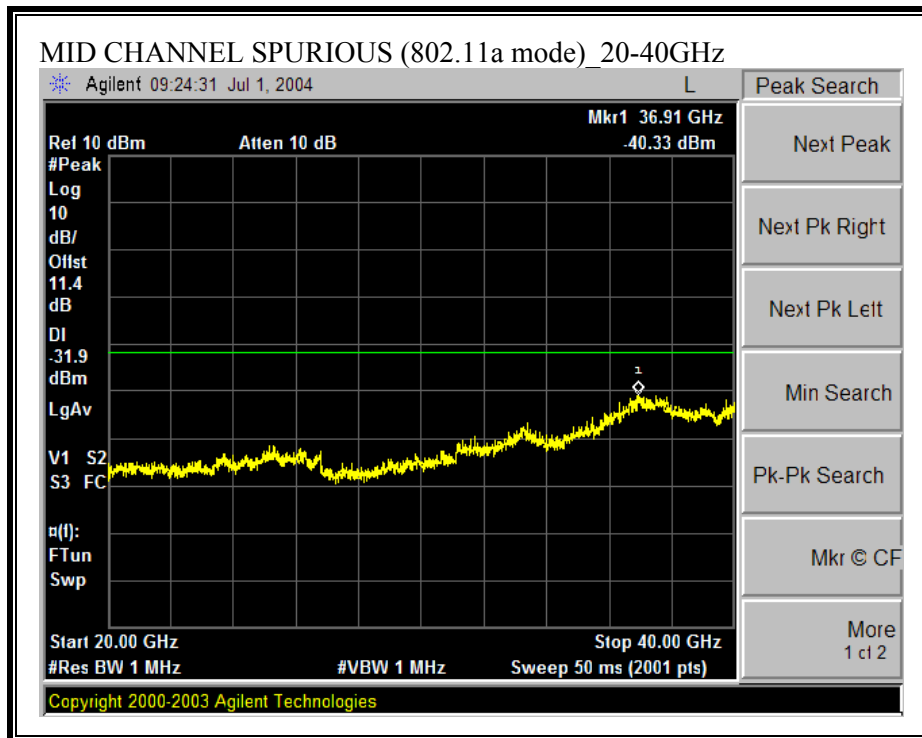
No non-compliance noted:

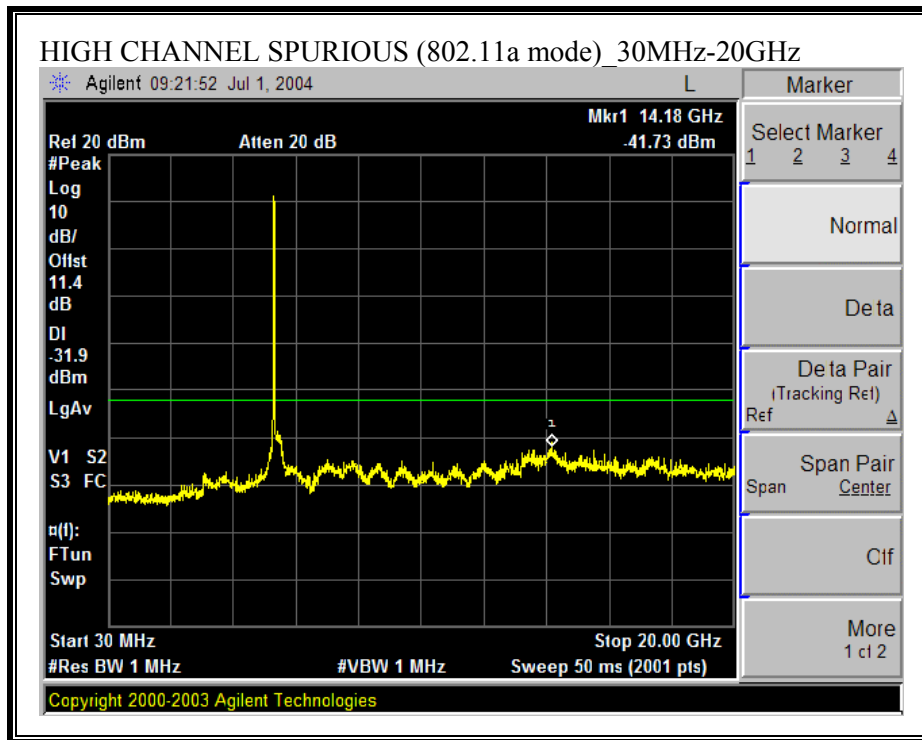
SPURIOUS EMISSIONS (802.11a MODE)

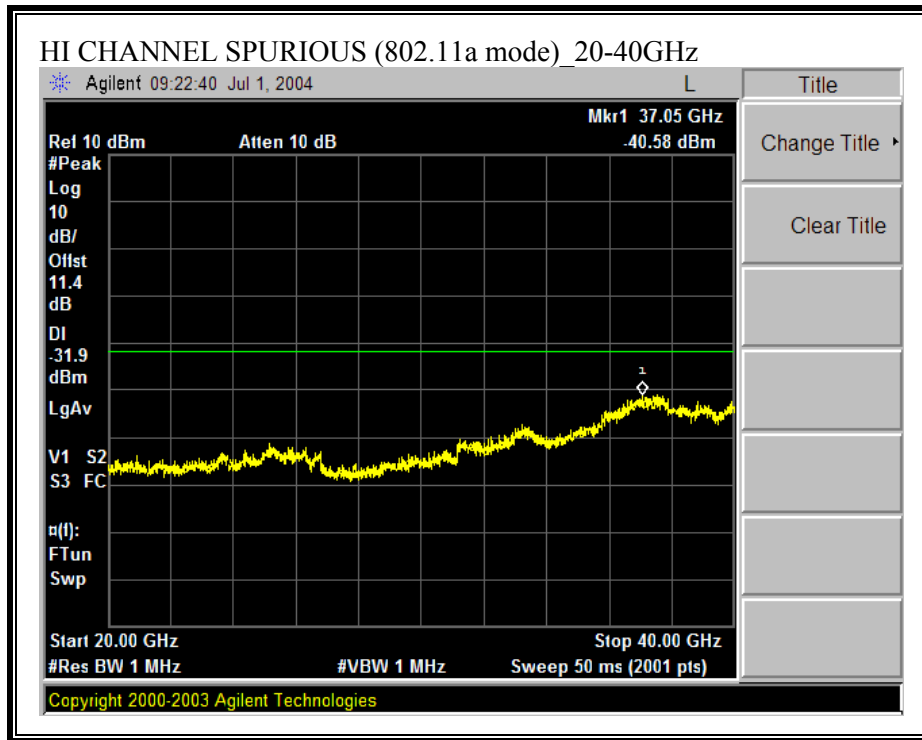












7.8. RADIATED EMISSIONS

7.8.1. TRANSMITTER RADIATED SPURIOUS EMISSIONS

LIMITS

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

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

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

² Above 38.6

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

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

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

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

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

TEST PROCEDURE

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

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

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

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

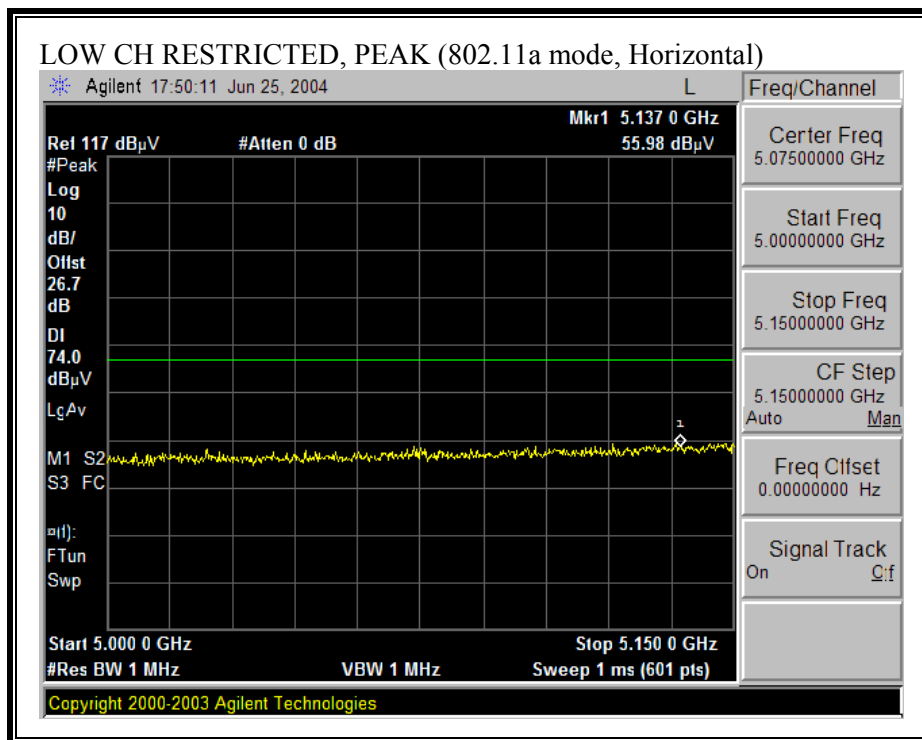
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

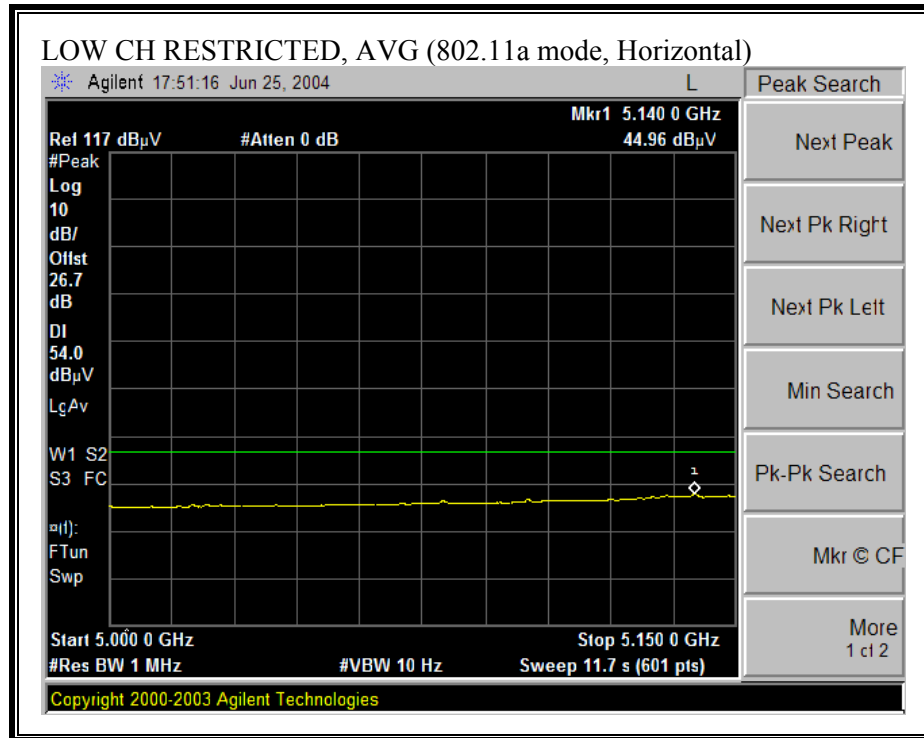
RESULTS

No non-compliance noted:

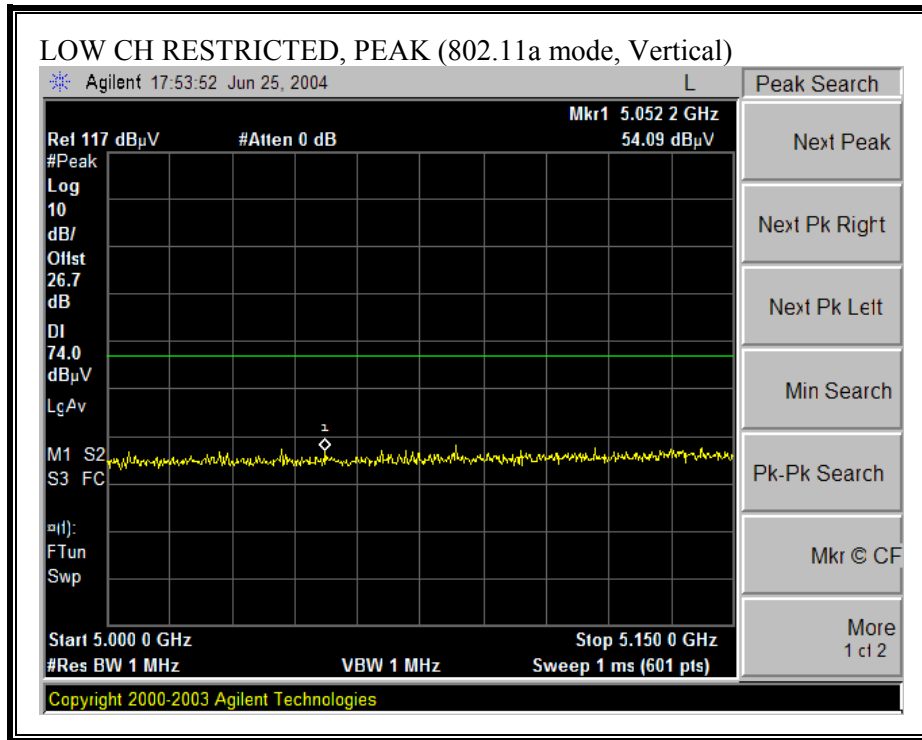
7.8.2. TRANSMITTER RADIATED EMISSIONS ABOVE 1 GHz, PRECISION M60 LAPTOP WITH WISTRON ANTENNA SET

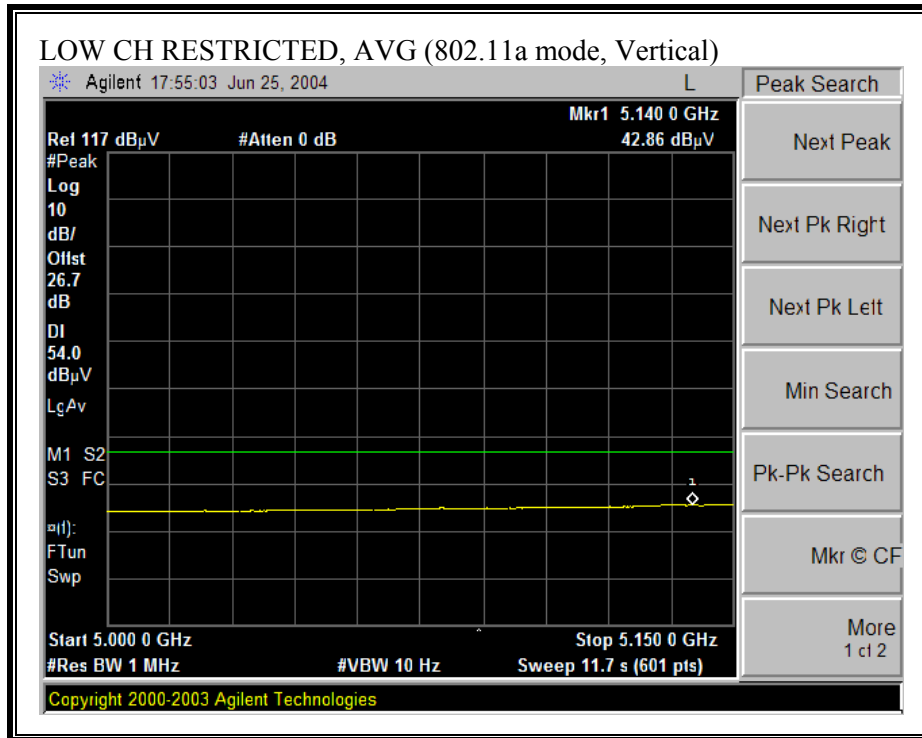
RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, HORIZONTAL)



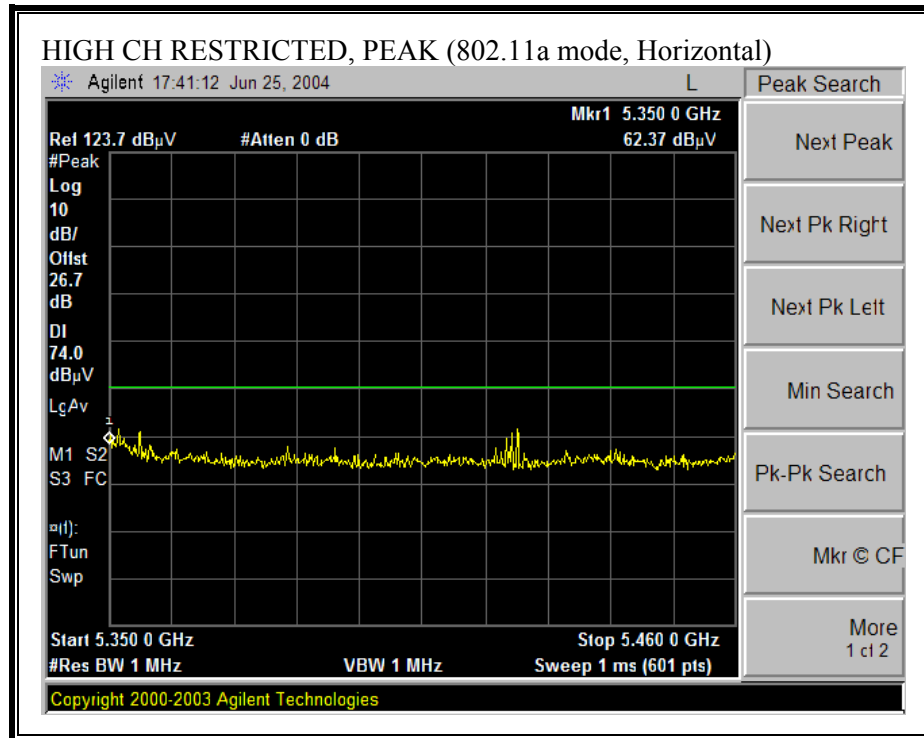


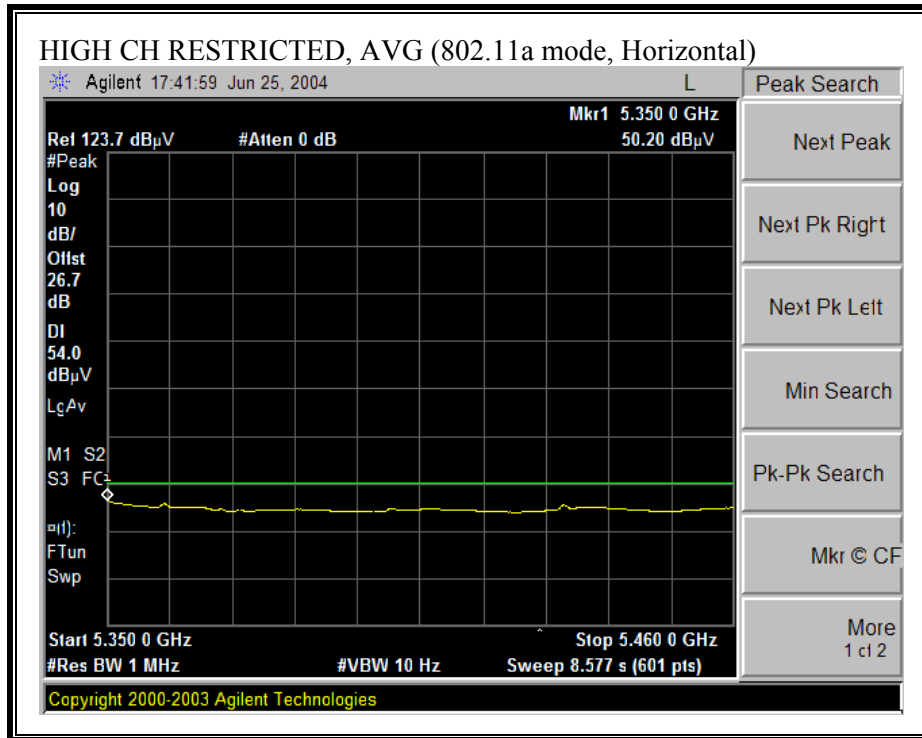
RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, VERTICAL)



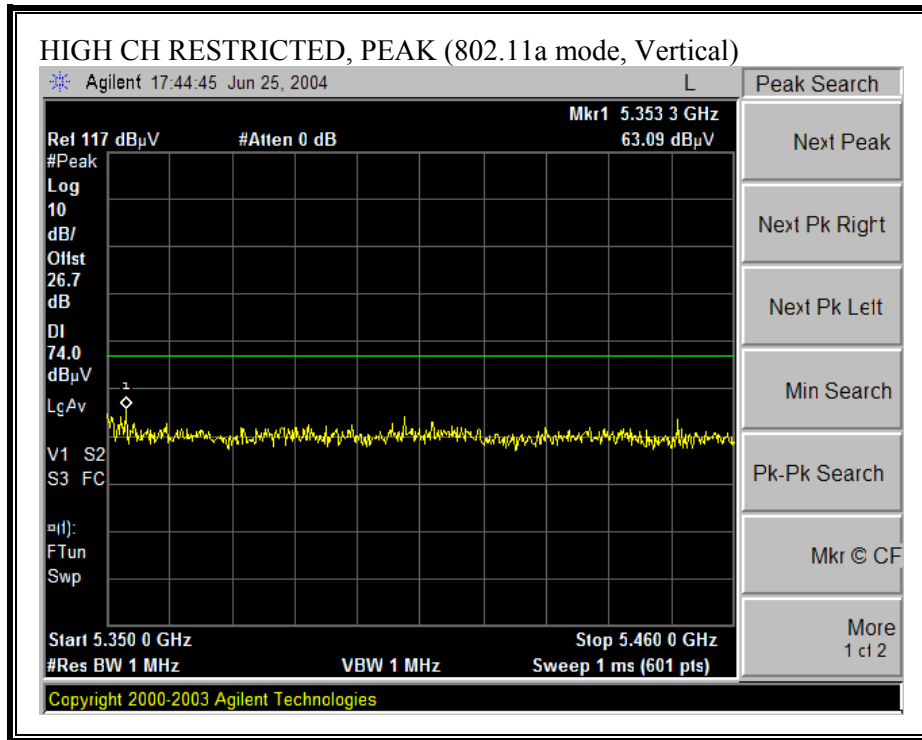


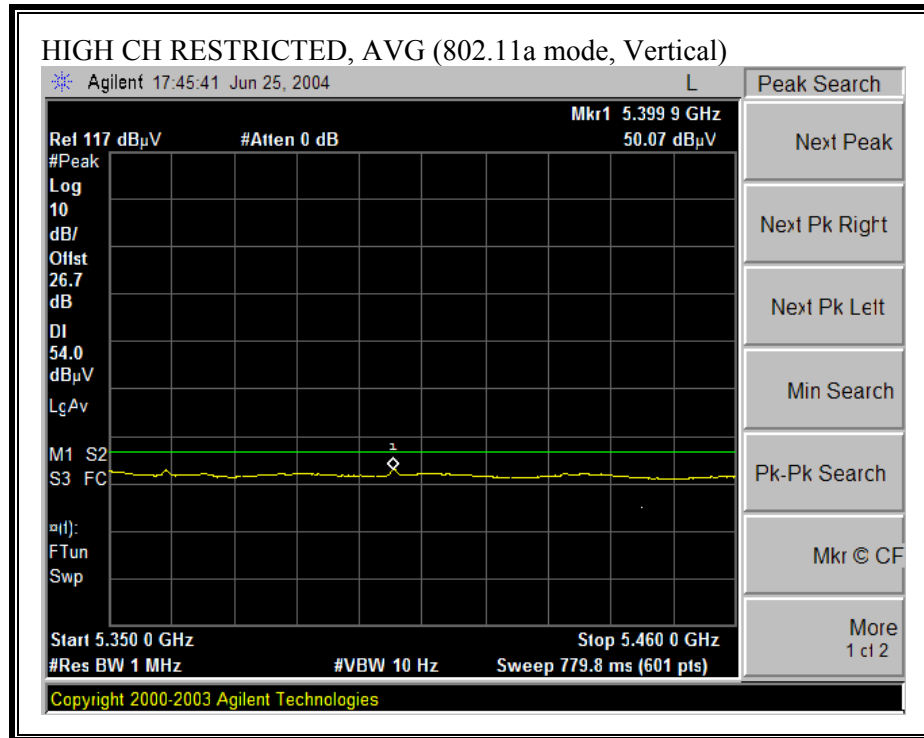
RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, VERTICAL)



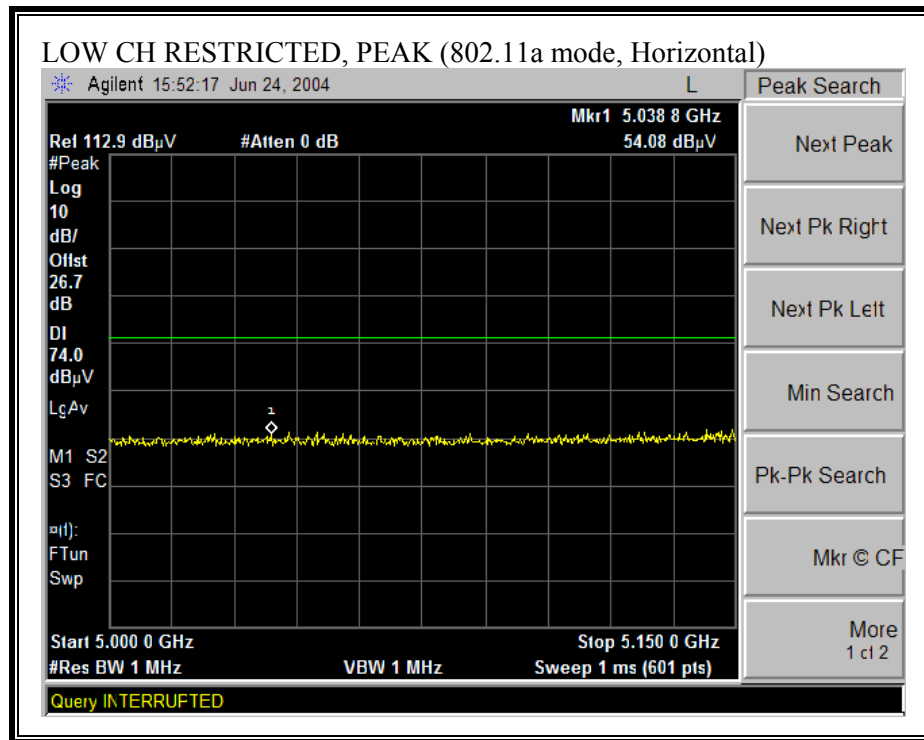


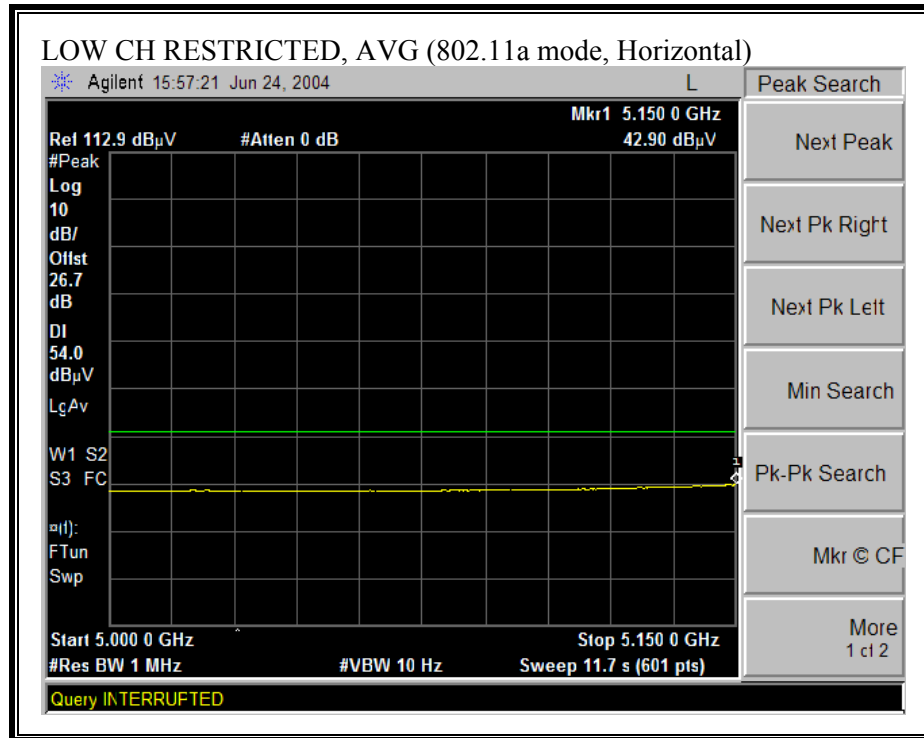
HARMONICS AND SPURIOUS EMISSIONS (802.11a MODE)

06/25/04 High Frequency Measurement Compliance Certification Services, Morgan Hill Open Field Site															
Test Engr: VIEN TRAN Project #: 04U2790 Company: INTEL EUT Descrip.: 802.11abg DELL LAPTOP_PRECISION M60_WNC ONBASE EUT M/N: WM3A2195ABG INTEL CARD Test Target: FCC15.407 Mode Oper: TX_11a 5.18-5.32GHz_LOW / MID / HI CHANNELS_HARMONIC SPUR															
Test Equipment:															
EMCO Horn 1-18GHz T73; S/N: 6717 @3m		Spectrum Analyzer Agilent E4446A Analyzer		Pre-amplifier 1-26GHz T87 Miteq 924342		Pre-amplifier 26-40GHz		Horn > 18GHz							
Hi Frequency Cables ☒ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☒ (12 ft)				Limit FCC 15.205		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
LOW CH 5.18GHz															
15.540	9.8	43.0	31.0	39.2	6.4	-45.5	0.0	1.0	44.0	32.0	74.0	54.0	-30.0	-22.0	V
15.540	9.8	45.3	31.9	39.2	6.4	-45.5	0.0	1.0	46.3	32.9	74.0	54.0	-27.7	-21.1	H
MID CH 5.26GHz															
15.780	9.8	42.0	30.0	38.6	6.5	-45.6	0.0	1.0	42.5	30.5	74.0	54.0	-31.5	-23.5	V
15.780	9.8	43.8	31.7	38.6	6.5	-45.6	0.0	1.0	44.3	32.2	74.0	54.0	-29.7	-21.8	H
HI CH 5.32GHz															
10.642	9.8	42.0	30.7	38.3	5.8	-41.3	0.0	1.0	45.8	34.5	74.0	54.0	-28.2	-19.5	V
15.964	9.8	44.0	32.8	38.2	6.6	-45.7	0.0	1.0	44.1	32.9	74.0	54.0	-29.9	-21.1	V
10.642	9.8	41.6	30.3	38.3	5.8	-41.3	0.0	1.0	45.4	34.1	74.0	54.0	-28.6	-19.9	H
15.964	9.8	42.5	31.1	38.2	6.6	-45.7	0.0	1.0	42.6	31.2	74.0	54.0	-31.4	-22.8	H
NO OTHER RADIATED EMISSION WERE DETECTED UP TO 10TH HARMONIC															
f	Measurement Frequency			Amp	Preamp Gain			Avg Lim	Average Field Strength Limit						
Dist	Distance to Antenna			D Corr	Distance Correct to 3 meters			Pk Lim	Peak Field Strength Limit						
Read	Analyzer Reading			Avg	Average Field Strength @ 3 m			Avg Mar	Margin vs. Average Limit						
AF	Antenna Factor			Peak	Calculated Peak Field Strength			Pk Mar	Margin vs. Peak Limit						
CL	Cable Loss			HPF	High Pass Filter										

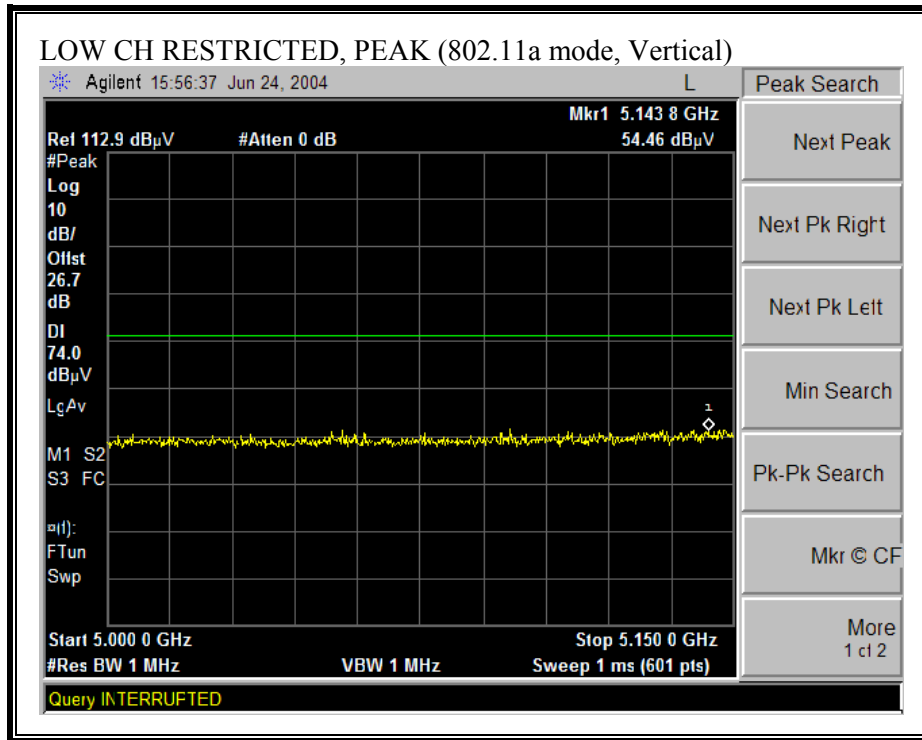
7.8.3. TRANSMITTER RADIATED EMISSIONS ABOVE 1 GHz, PRECISION M60 LAPTOP WITH HITACHI ANTENNA SET

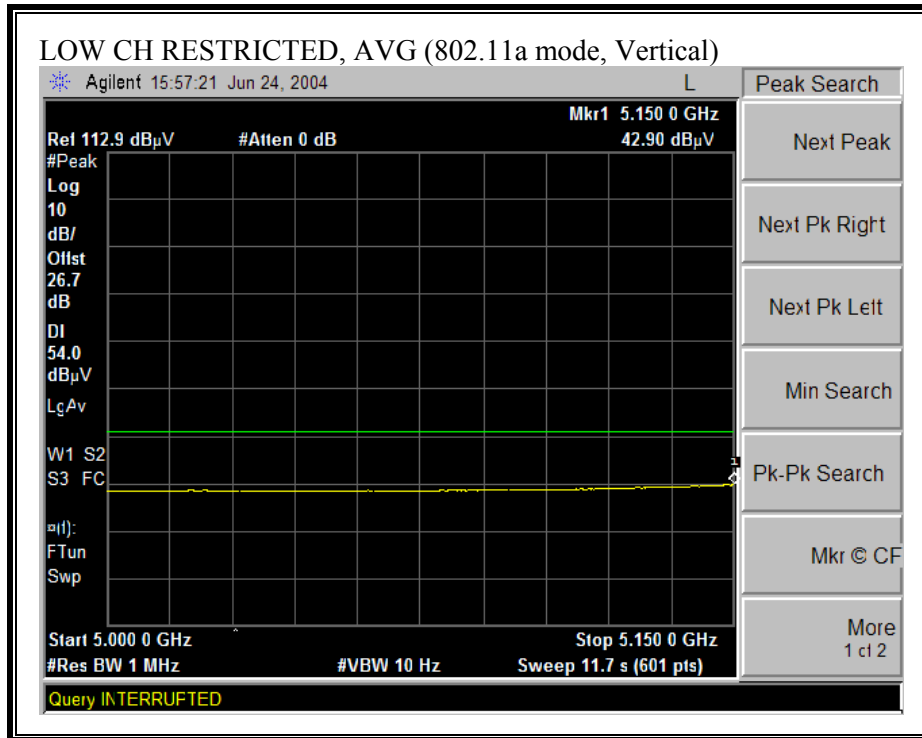
RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, HORIZONTAL)



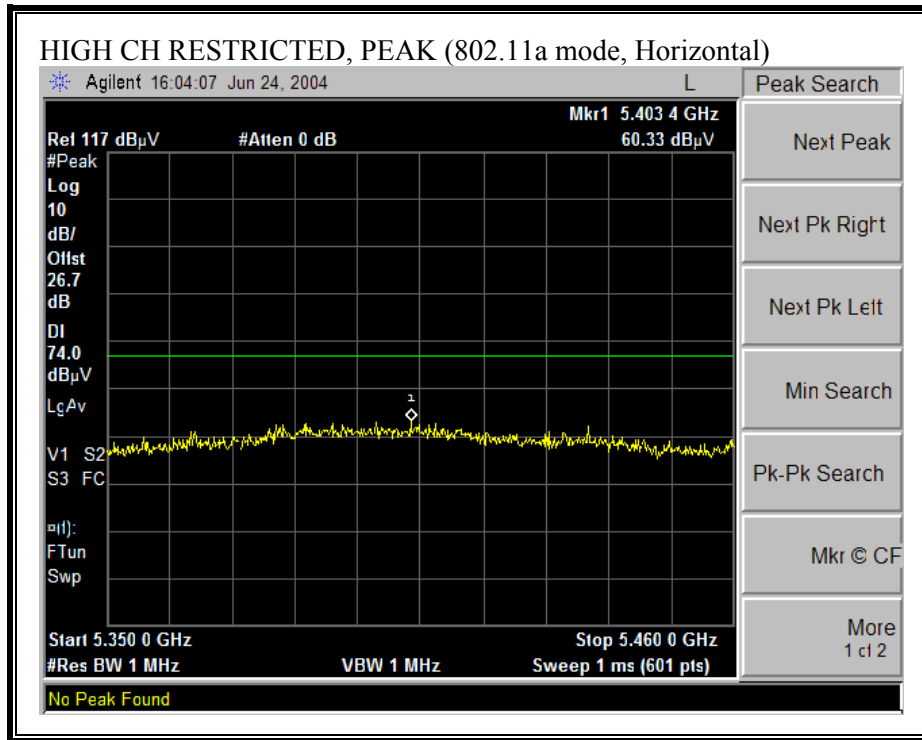


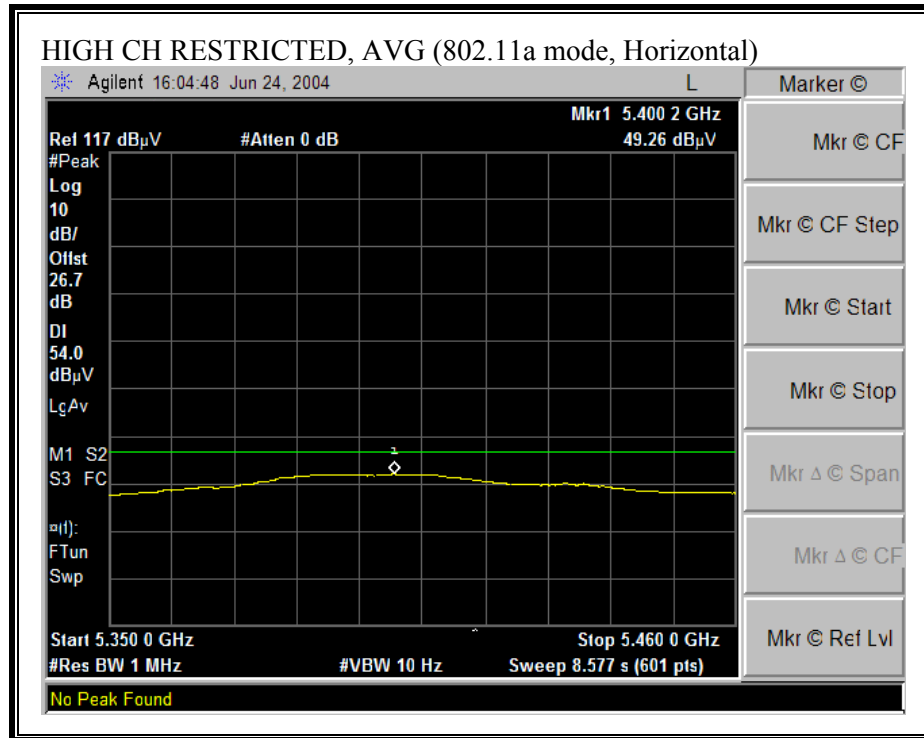
RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, VERTICAL)



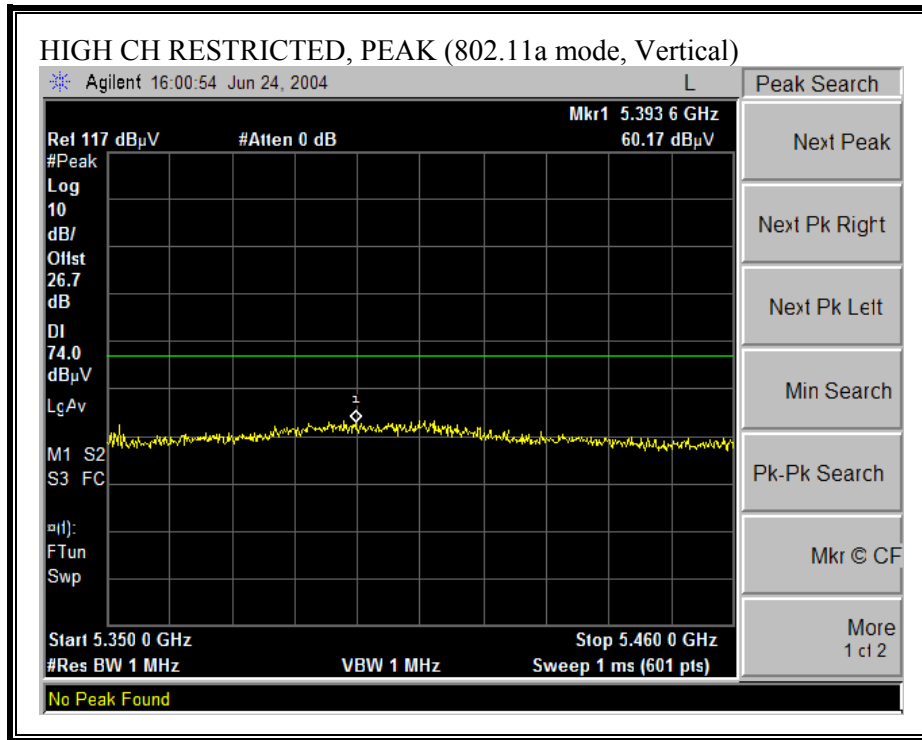


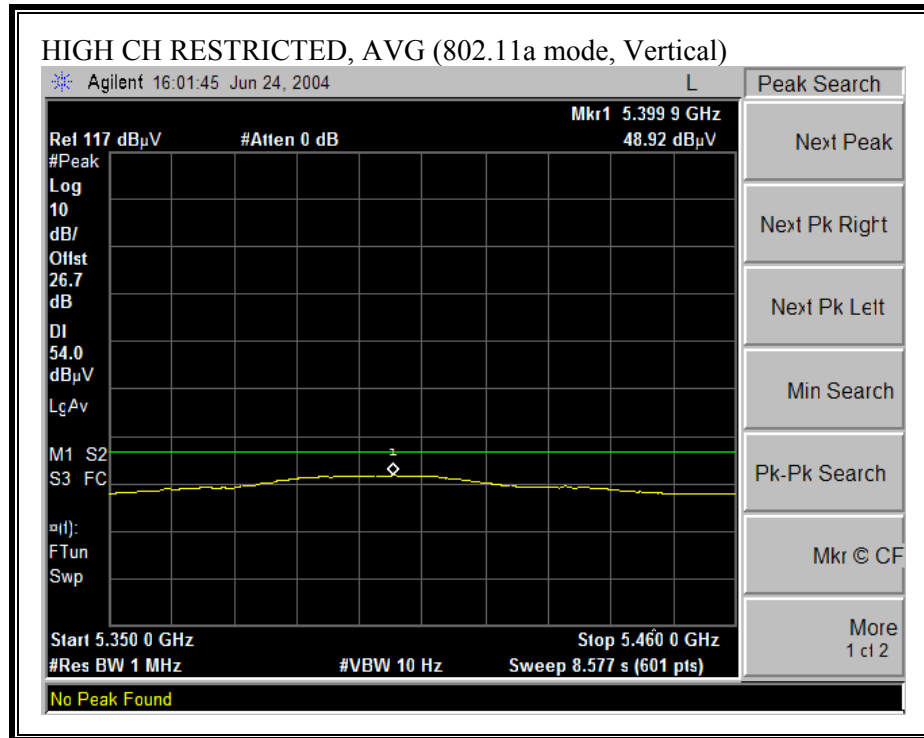
RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, VERTICAL)



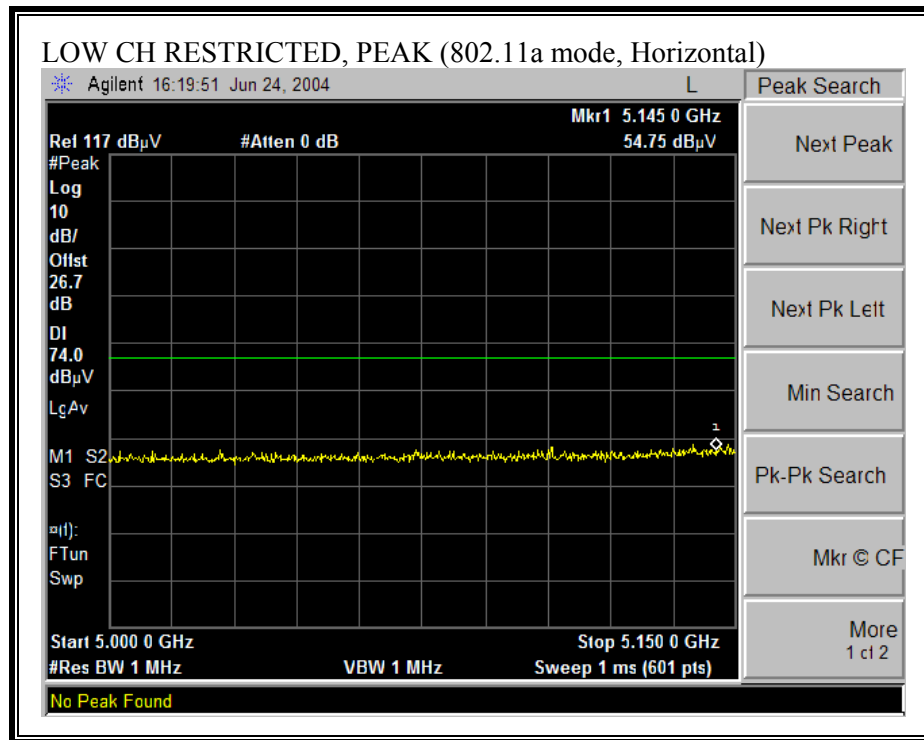


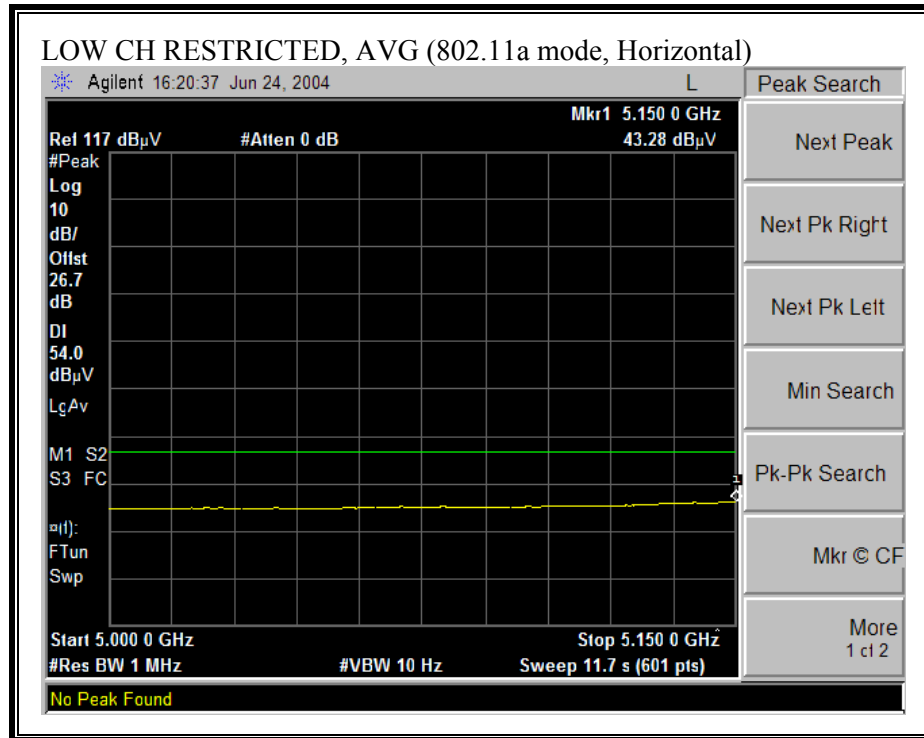
HARMONICS AND SPURIOUS EMISSIONS (802.11a MODE)

06/24/04 High Frequency Measurement Compliance Certification Services, Morgan Hill Open Field Site																
Test Engr: VIEN TRAN Project #: 04U2790 Company: INTEL EUT Descrip.: 802.11abg DELL LAPTOP_M60 (HITACHI ON BASE) EUT M/N: WM3A2195ABG INTEL CARD Test Target: FCC15.407 Mode Oper: TX_11a 5.18-5.32GHz_LOW / MID / HI CHANNELS_HARMONIC SPUR																
Test Equipment:																
EMCO Horn 1-18GHz T73; S/N: 6717 @3m		Spectrum Analyzer Agilent E4446A Analyzer		Pre-amplifier 1-26GHz T87 Miteq 924342		Pre-amplifier 26-40GHz		Horn > 18GHz								
Hi Frequency Cables ☒ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☒ (12 ft)				Limit FCC 15.205		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	
LOW CH 5.18GHz																
15.540	9.8	46.6	34.5	39.2	6.4	-45.5	0.0	1.0	47.6	35.5	74.0	54.0	-26.4	-18.5	V	
15.540	9.8	45.0	33.1	39.2	6.4	-45.5	0.0	1.0	46.0	34.1	74.0	54.0	-28.0	-19.9	H	
MID CH 5.26GHz																
15.780	9.8	46.2	34.3	38.6	6.5	-45.6	0.0	1.0	46.7	34.8	74.0	54.0	-27.3	-19.2	V	
15.780	9.8	45.0	33.3	38.6	6.5	-45.6	0.0	1.0	45.5	33.8	74.0	54.0	-28.5	-20.2	H	
HI CH 5.32GHz																
10.642	9.8	46.0	34.2	38.3	5.8	-41.3	0.0	1.0	49.8	38.0	74.0	54.0	-24.2	-16.0	V	
15.964	9.8	44.6	32.5	38.2	6.6	-45.7	0.0	1.0	44.7	32.6	74.0	54.0	-29.3	-21.4	V	
10.642	9.8	44.3	32.0	38.3	5.8	-41.3	0.0	1.0	48.1	35.8	74.0	54.0	-25.9	-18.2	H	
15.964	9.8	45.3	34.5	38.2	6.6	-45.7	0.0	1.0	45.4	34.6	74.0	54.0	-28.6	-19.4	H	
NO OTHER RADIATED EMISSION WERE DETECTED UP TO 10TH HARMONIC																
f	Measurement Frequency		Amp	Preamp Gain		Avg Lim	Average Field Strength Limit									
Dist	Distance to Antenna		D Corr	Distance Correct to 3 meters		Pk Lim	Peak Field Strength Limit									
Read	Analyzer Reading		Avg	Average Field Strength @ 3 m		Avg Mar	Margin vs. Average Limit									
AF	Antenna Factor		Peak	Calculated Peak Field Strength		Pk Mar	Margin vs. Peak Limit									
CL	Cable Loss		HPF	High Pass Filter												

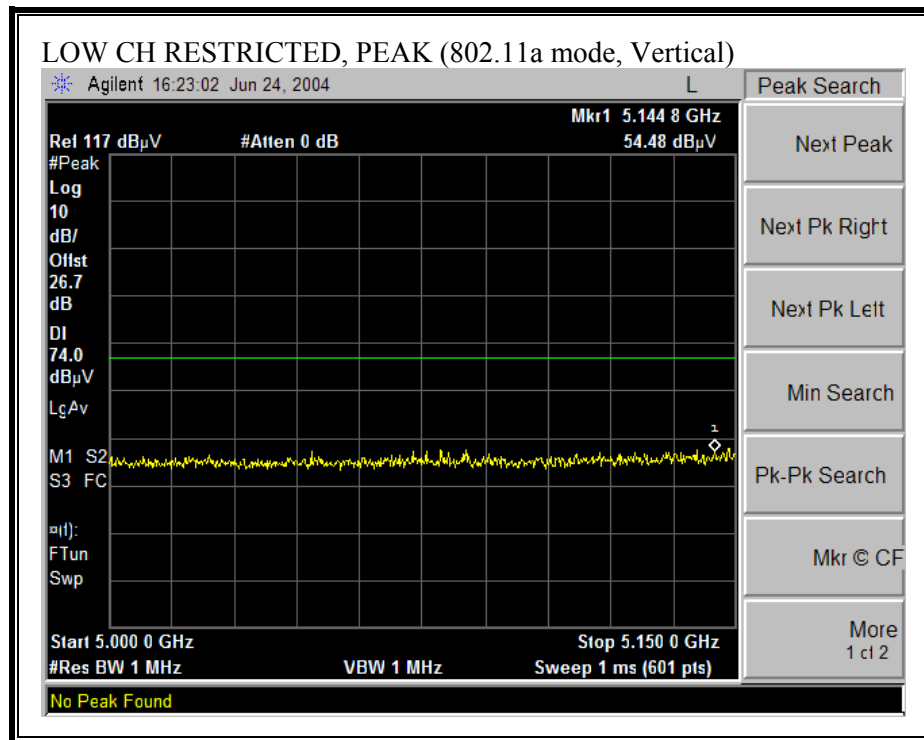
7.8.4. TRANSMITTER RADIATED EMISSIONS ABOVE 1 GHz, INSPIRON 510M LAPTOP WITH PHYCOMP ANTENNA SET

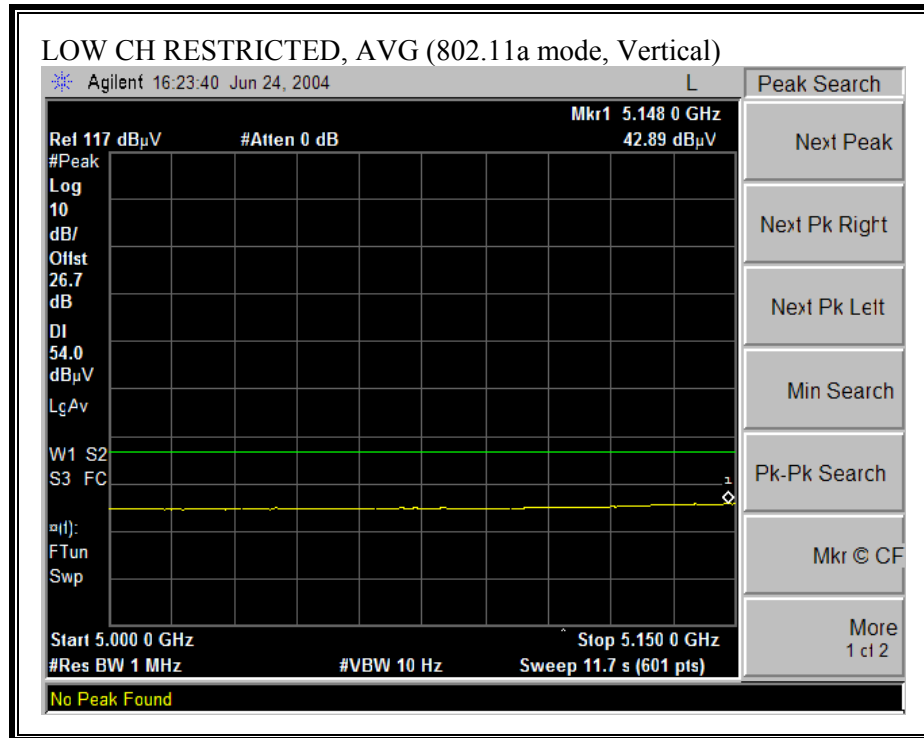
RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, HORIZONTAL)



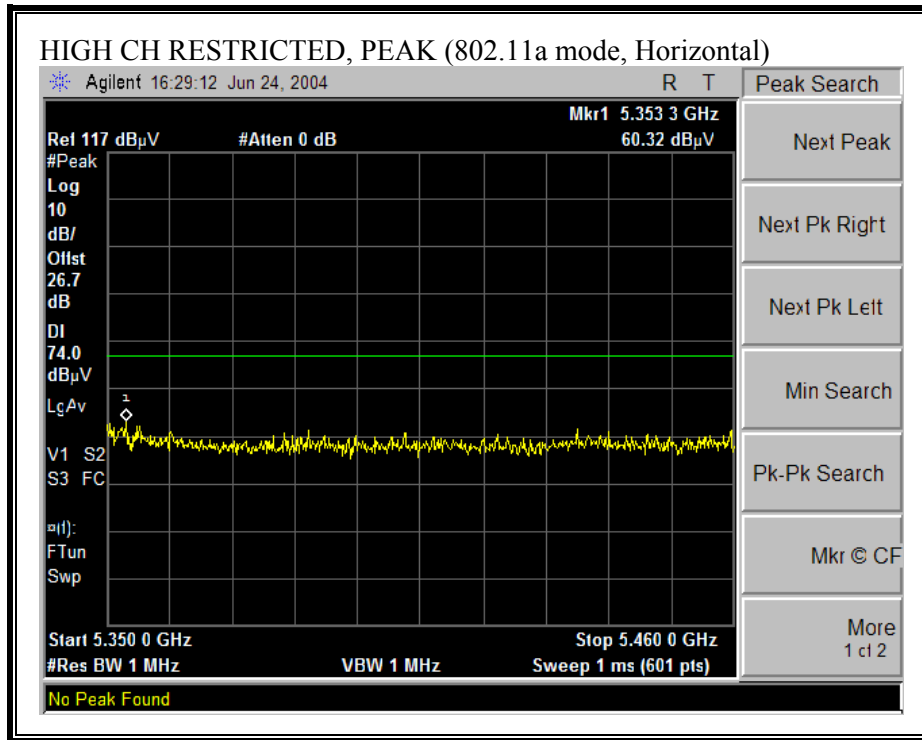


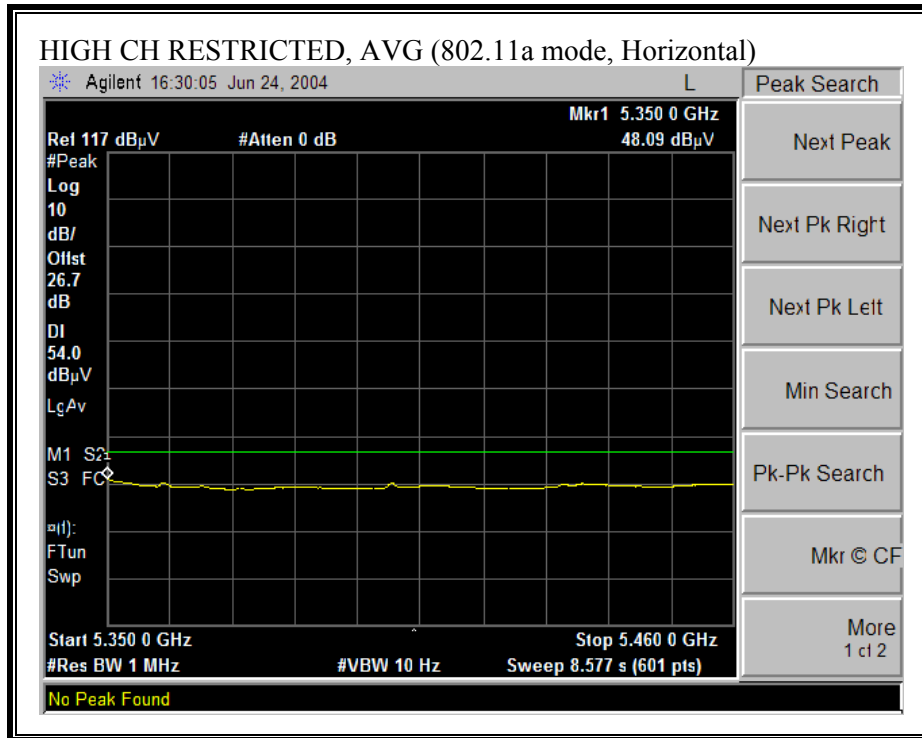
RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, VERTICAL)



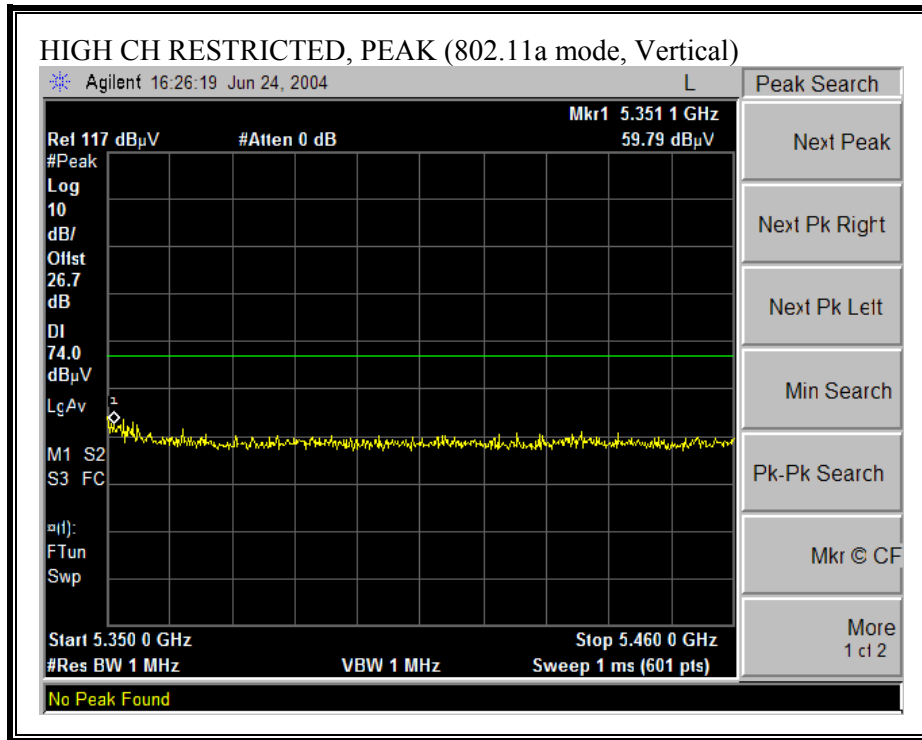


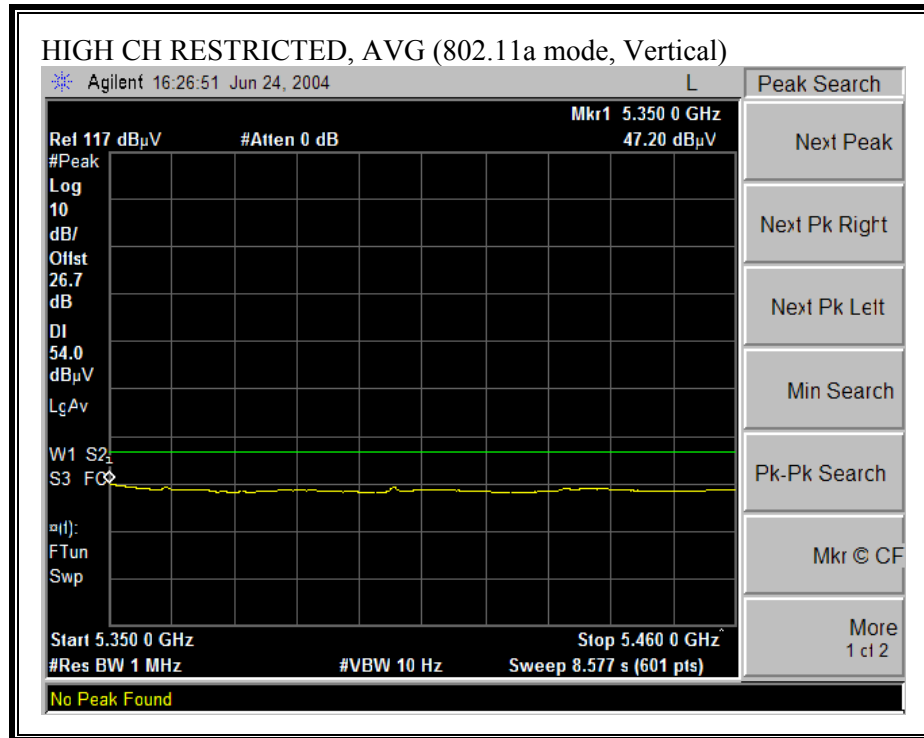
RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, VERTICAL)



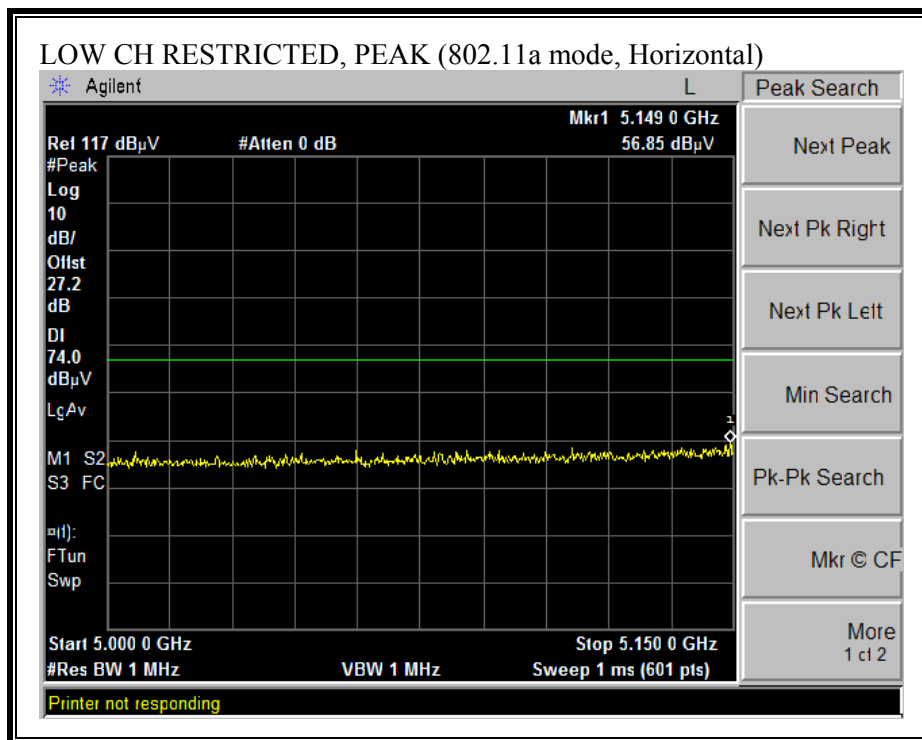


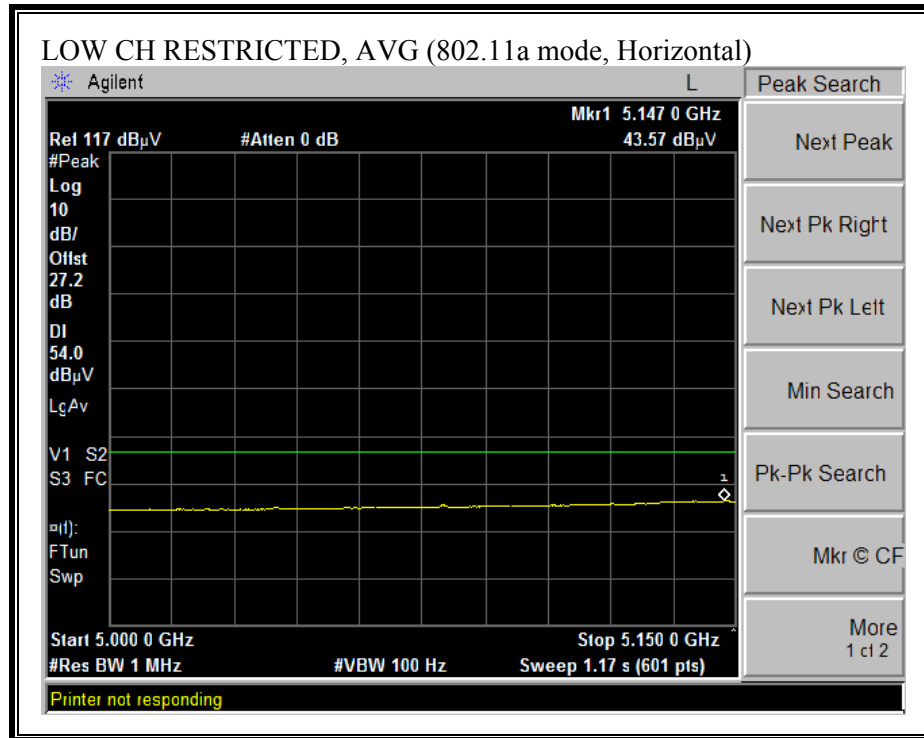
HARMONICS AND SPURIOUS EMISSIONS (802.11a MODE)

06/24/04 High Frequency Measurement Compliance Certification Services, Morgan Hill Open Field Site															
Test Engr: VIEN TRAN Project #: 04U2790 Company: INTEL EUT Descrip.: 802.11abg DELL LAPTOP_INSPIRON 510M (PHY ON LCD) EUT M/N: WM3A2195ABG INTEL CARD Test Target: FCC15.407 Mode Oper: TX_11a 5.18-5.32GHz_LOW / MID / HI CHANNELS_HARMONIC SPUR															
Test Equipment:															
EMCO Horn 1-18GHz T73; S/N: 6717 @3m		Spectrum Analyzer Agilent E4446A Analyzer		Pre-amplifier 1-26GHz T87 Miteq 924342		Pre-amplifier 26-40GHz		Horn > 18GHz							
Hi Frequency Cables ☒ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☒ (12 ft)				Limit FCC 15.205		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
LOW CH 5.18GHz															
15.540	9.8	43.2	32.0	39.2	6.4	-45.5	0.0	1.0	44.2	33.0	74.0	54.0	-29.8	-21.0	V
15.540	9.8	44.7	33.5	39.2	6.4	-45.5	0.0	1.0	45.7	34.5	74.0	54.0	-28.3	-19.5	H
MID CH 5.26GHz															
15.780	9.8	46.4	34.8	38.6	6.5	-45.6	0.0	1.0	46.9	35.3	74.0	54.0	-27.1	-18.7	V
15.780	9.8	47.8	36.1	38.6	6.5	-45.6	0.0	1.0	48.3	36.6	74.0	54.0	-25.7	-17.4	H
HI CH 5.32GHz															
10.642	9.8	45.6	34.0	38.3	5.8	-41.3	0.0	1.0	49.4	37.8	74.0	54.0	-24.6	-16.2	V
15.964	9.8	44.2	33.1	38.2	6.6	-45.7	0.0	1.0	44.3	33.2	74.0	54.0	-29.7	-20.8	V
10.642	9.8	46.8	35.2	38.3	5.8	-41.3	0.0	1.0	50.6	39.0	74.0	54.0	-23.4	-15.0	H
15.964	9.8	45.4	34.3	38.2	6.6	-45.7	0.0	1.0	45.5	34.4	74.0	54.0	-28.5	-19.6	H
NO OTHER RADIATED EMISSION WERE DETECTED UP TO 10TH HARMONIC															
f	Measurement Frequency		Amp	Preamp Gain		Avg Lim	Average Field Strength Limit								
Dist	Distance to Antenna		D Corr	Distance Correct to 3 meters		Pk Lim	Peak Field Strength Limit								
Read	Analyzer Reading		Avg	Average Field Strength @ 3 m		Avg Mar	Margin vs. Average Limit								
AF	Antenna Factor		Peak	Calculated Peak Field Strength		Pk Mar	Margin vs. Peak Limit								
CL	Cable Loss		HPF	High Pass Filter											

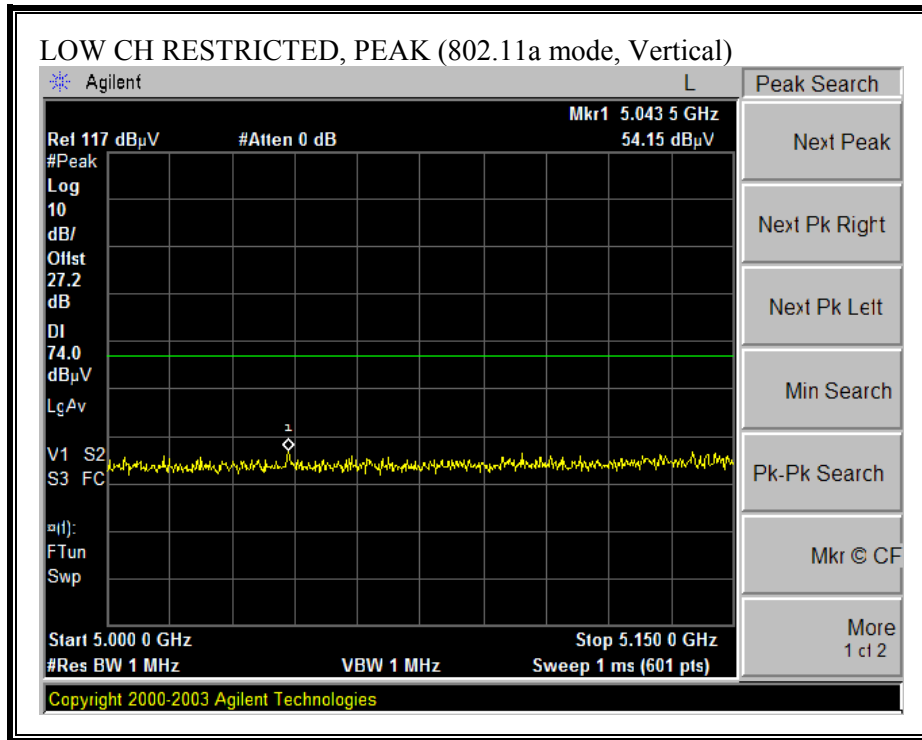
7.8.5. TRANSMITTER RADIATED EMISSIONS ABOVE 1 GHz, INSPIRON 300M LAPTOP WITH WISTRON ANTENNA SET

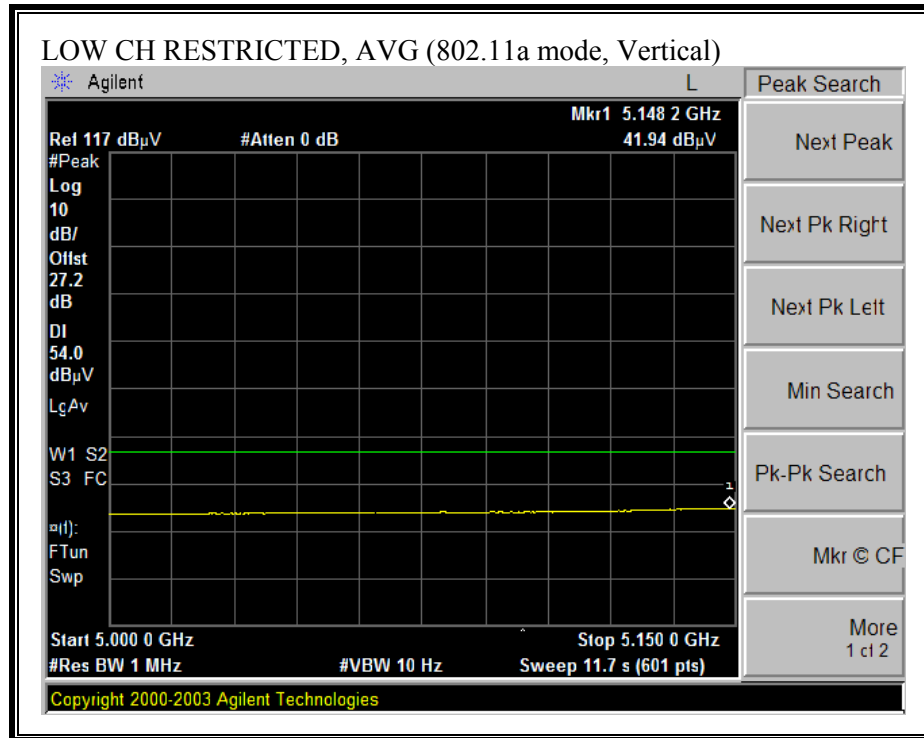
RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, HORIZONTAL)



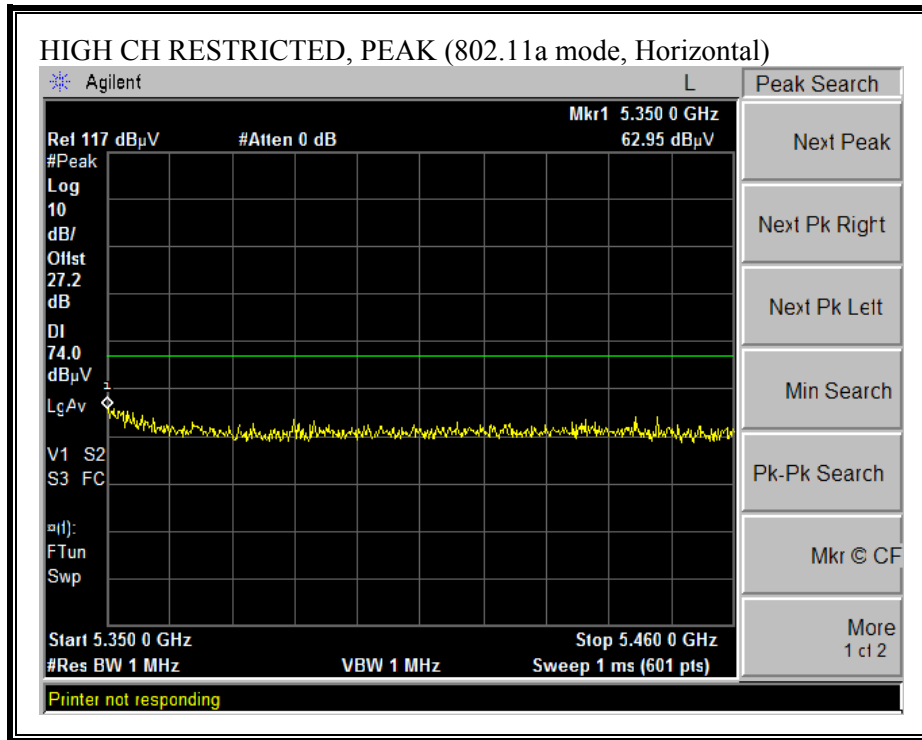


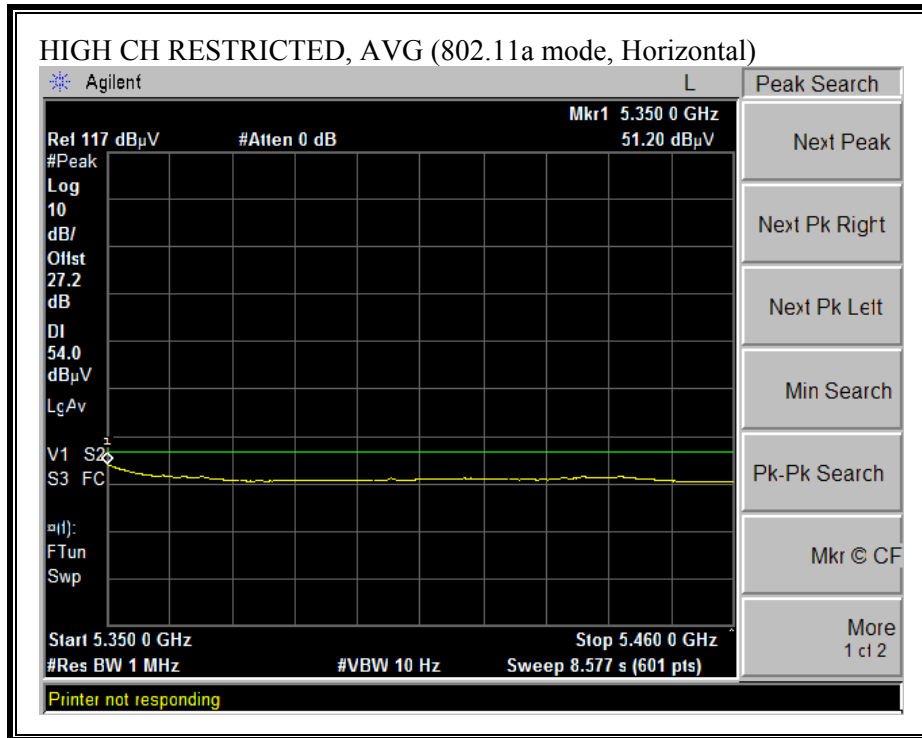
RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, VERTICAL)



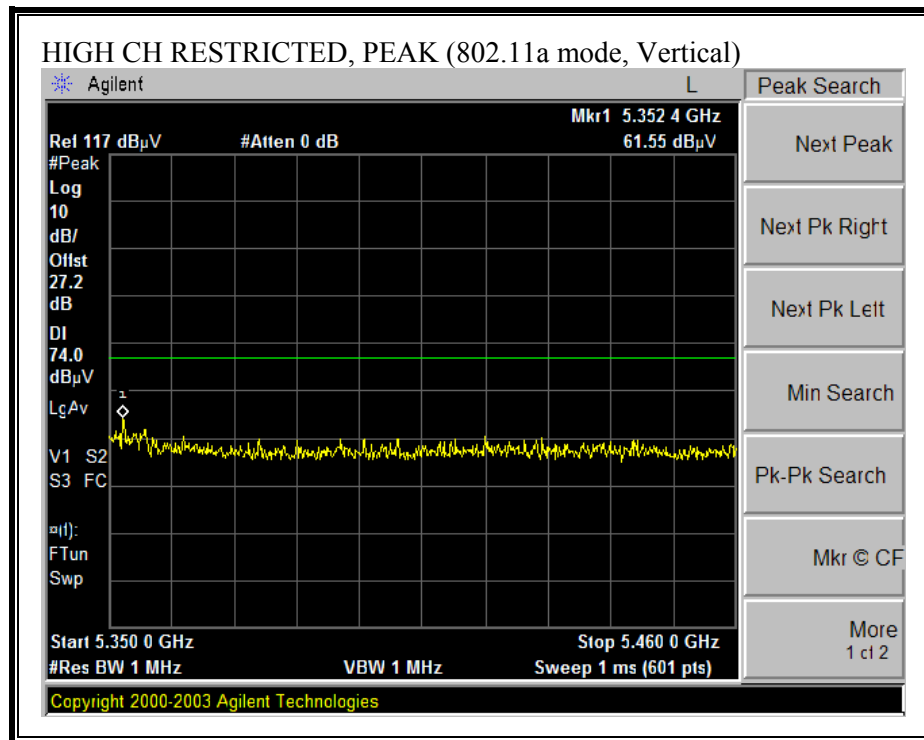


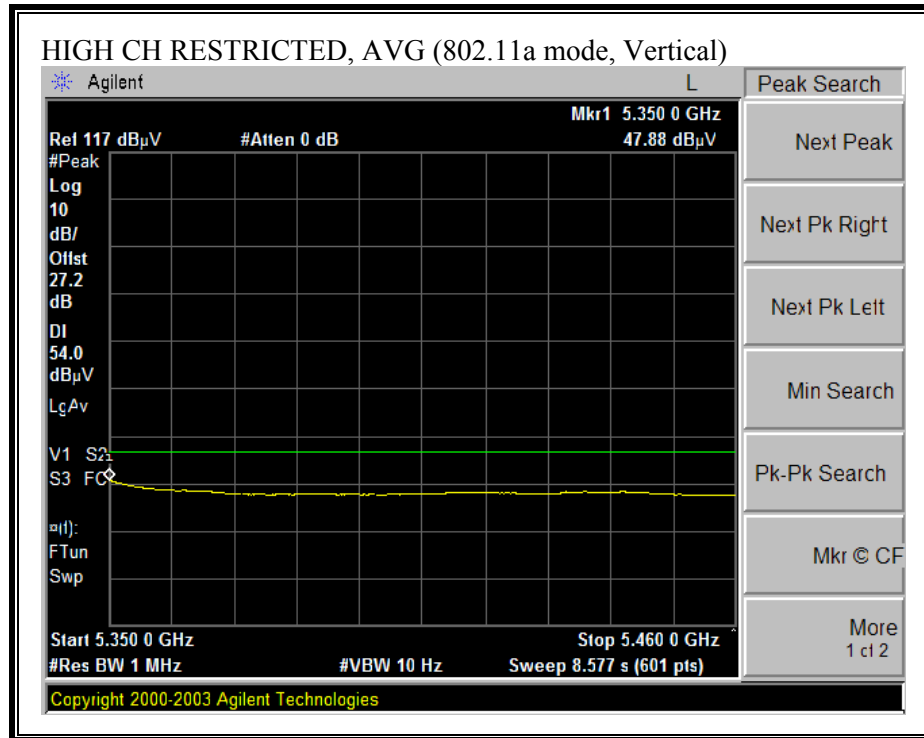
RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEGE (802.11a MODE, HIGH CHANNEL, VERTICAL)



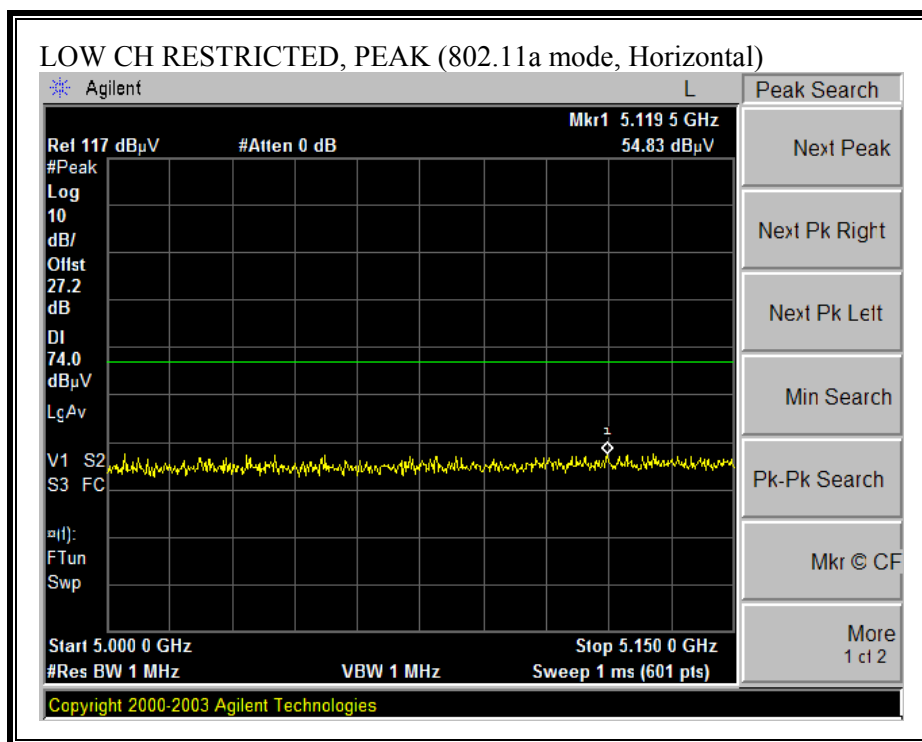


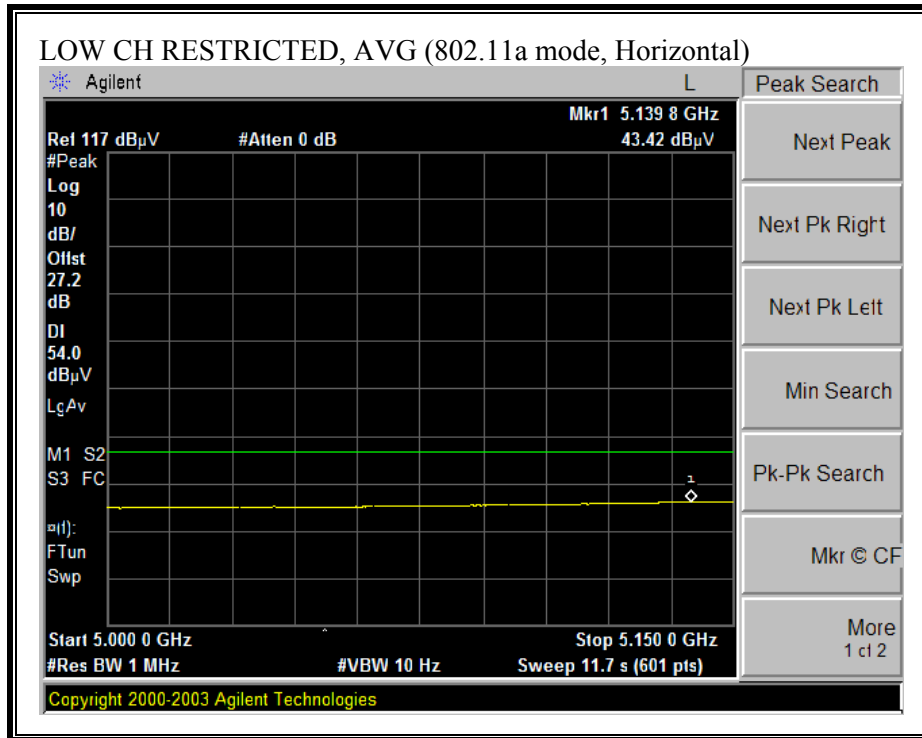
HARMONICS AND SPURIOUS EMISSIONS (802.11a MODE)

07/06/04 High Frequency Measurement Compliance Certification Services, Morgan Hill Open Field Site															
Test Engr: VIEN TRAN Project #: 04U2790 Company: INTEL EUT Descrip.: 802.11abg DELL LAPTOP_INSPIRON 300M_WNC ANTENNA AT BASE_LAPTOP UNDOCK (worstcase) EUT M/N: WM3A2195ABG INTEL CARD Test Target: FCC15.407 Mode Oper: TX_11a 5.2GHz_ LOW / MID / HI CHANNELS_HARMONIC SPUR															
Test Equipment:															
EMCO Horn 1-18GHz T60; S/N: 2238 @3m		Spectrum Analyzer Agilent E4446A Analyzer		Pre-amplifier 1-26GHz T87 Miteq 924342		Pre-amplifier 26-40GHz		Horn > 18GHz							
Hi Frequency Cables ☒ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☒ (12 ft)				Limit FCC 15.205		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
LOW CH 5.18GHz															
15.540	9.8	45.0	32.7	39.4	6.4	-45.5	0.0	1.0	46.2	33.9	74.0	54.0	-27.8	-20.1	V
15.540	9.8	44.0	32.0	39.4	6.4	-45.5	0.0	1.0	45.2	33.2	74.0	54.0	-28.8	-20.8	H
MID CH 5.26GHz															
15.780	9.8	45.8	33.8	38.7	6.5	-45.6	0.0	1.0	46.4	34.4	74.0	54.0	-27.6	-19.6	V
15.780	9.8	44.0	32.2	38.7	6.5	-45.6	0.0	1.0	44.6	32.8	74.0	54.0	-29.4	-21.2	H
HI CH 5.32GHz															
10.642	9.8	42.0	30.0	38.2	5.8	-41.3	0.0	1.0	45.7	33.7	74.0	54.0	-28.3	-20.3	V
15.964	9.8	43.5	32.5	38.3	6.6	-45.7	0.0	1.0	43.6	32.6	74.0	54.0	-30.4	-21.4	V
10.642	9.8	41.5	29.6	38.2	5.8	-41.3	0.0	1.0	45.2	33.3	74.0	54.0	-28.8	-20.7	H
15.964	9.8	43.8	32.5	38.3	6.6	-45.7	0.0	1.0	43.9	32.6	74.0	54.0	-30.1	-21.4	H
NO OTHER RADIATED EMISSION WERE DETECTED UP TO 10TH HARMONIC															
f	Measurement Frequency		Amp	Preamp Gain		Avg Lim	Average Field Strength Limit								
Dist	Distance to Antenna		D Corr	Distance Correct to 3 meters		Pk Lim	Peak Field Strength Limit								
Read	Analyzer Reading		Avg	Average Field Strength @ 3 m		Avg Mar	Margin vs. Average Limit								
AF	Antenna Factor		Peak	Calculated Peak Field Strength		Pk Mar	Margin vs. Peak Limit								
CL	Cable Loss		HPF	High Pass Filter											

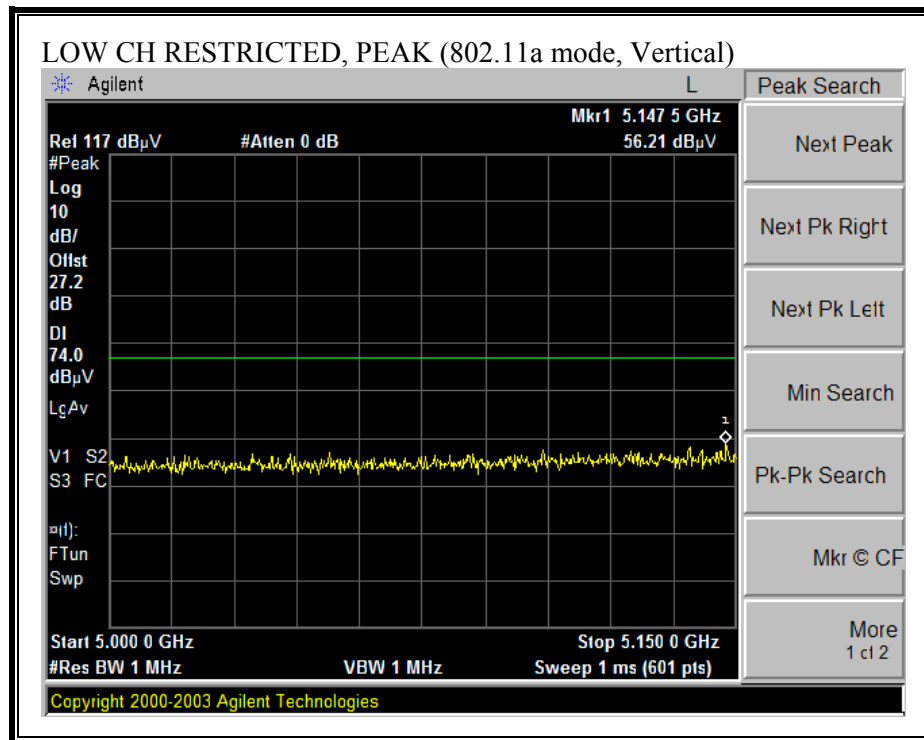
7.8.6. TRANSMITTER RADIATED EMISSIONS ABOVE 1 GHz, INSPIRON 300M LAPTOP WITH HITACHI ANTENNA SET

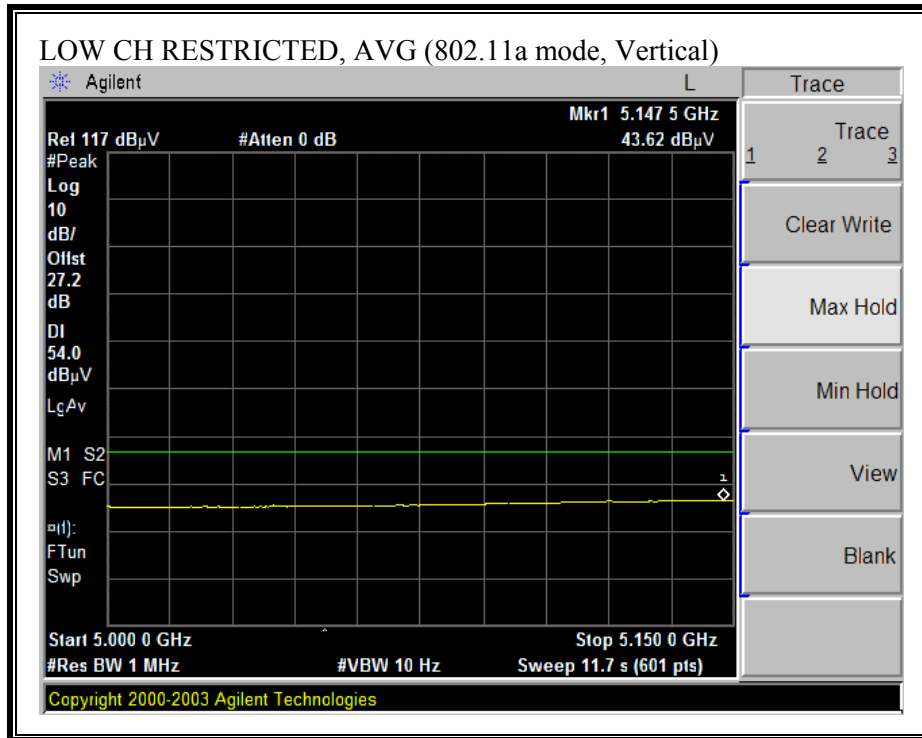
RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, HORIZONTAL)



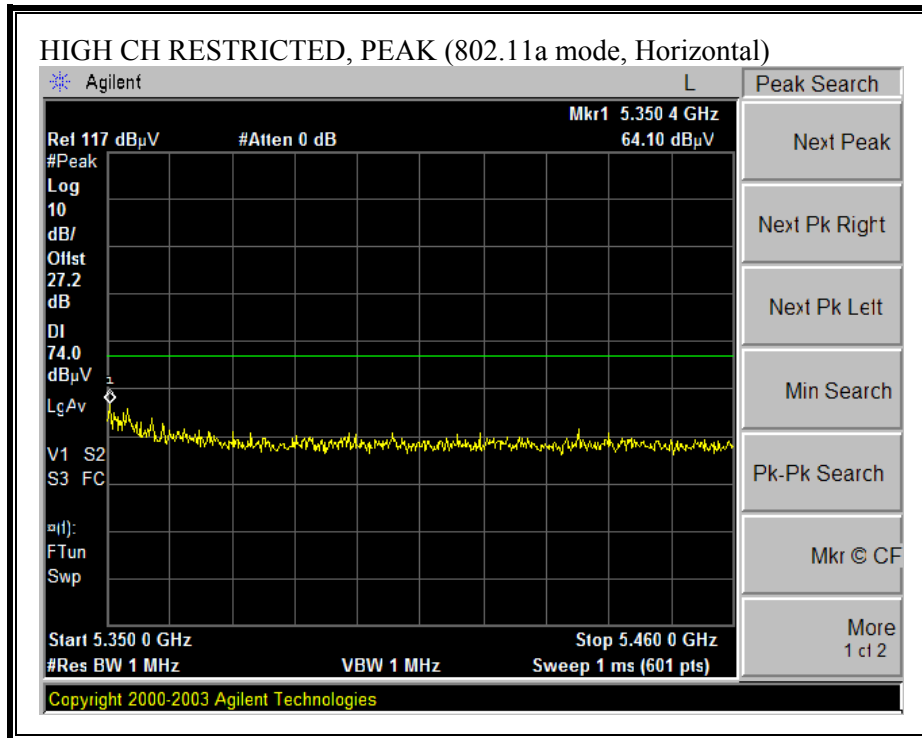


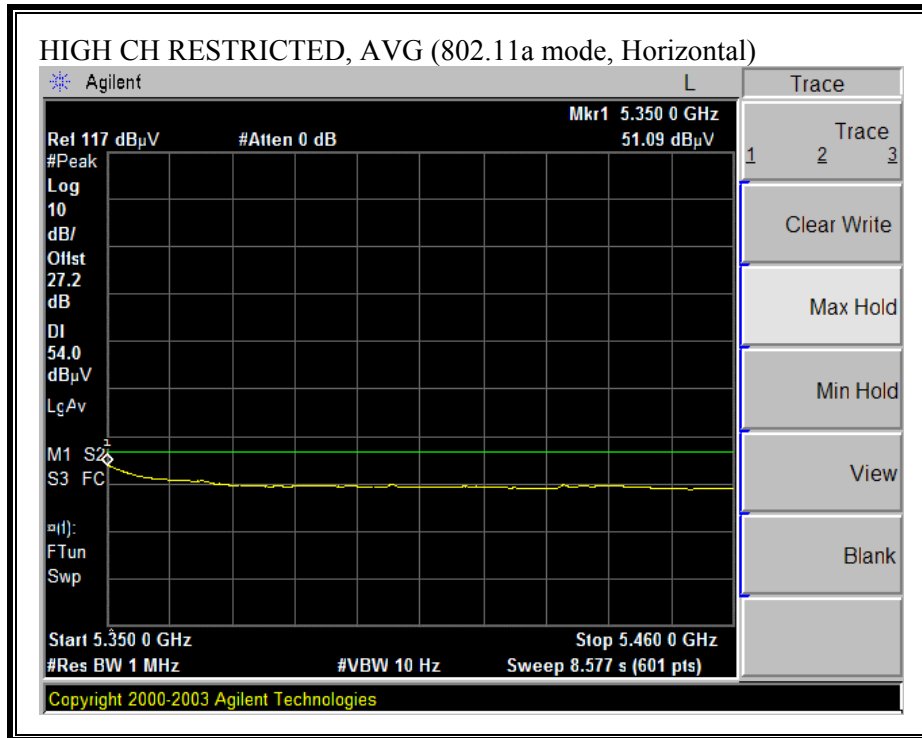
RESTRICTED BANDEDGE (802.11a MODE, LOW CHANNEL, VERTICAL)



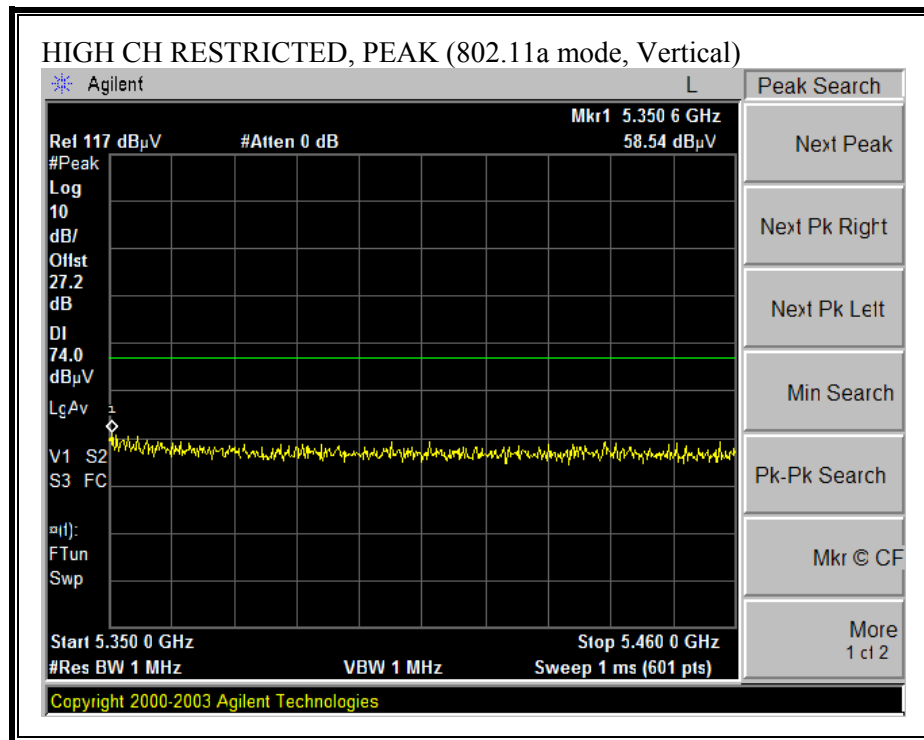


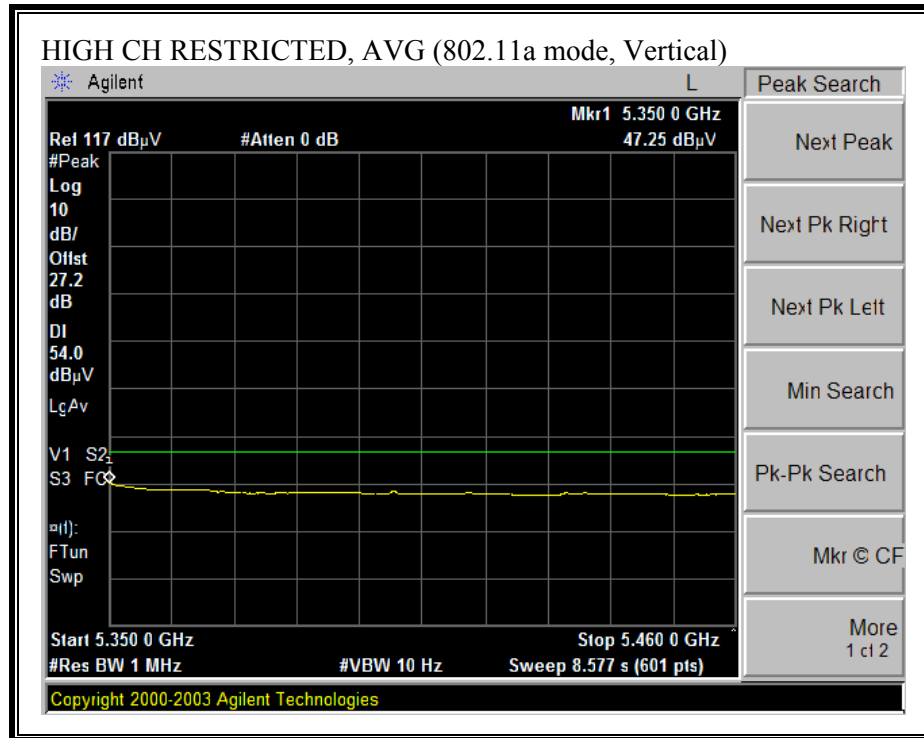
RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, HORIZONTAL)





RESTRICTED BANDEDGE (802.11a MODE, HIGH CHANNEL, VERTICAL)



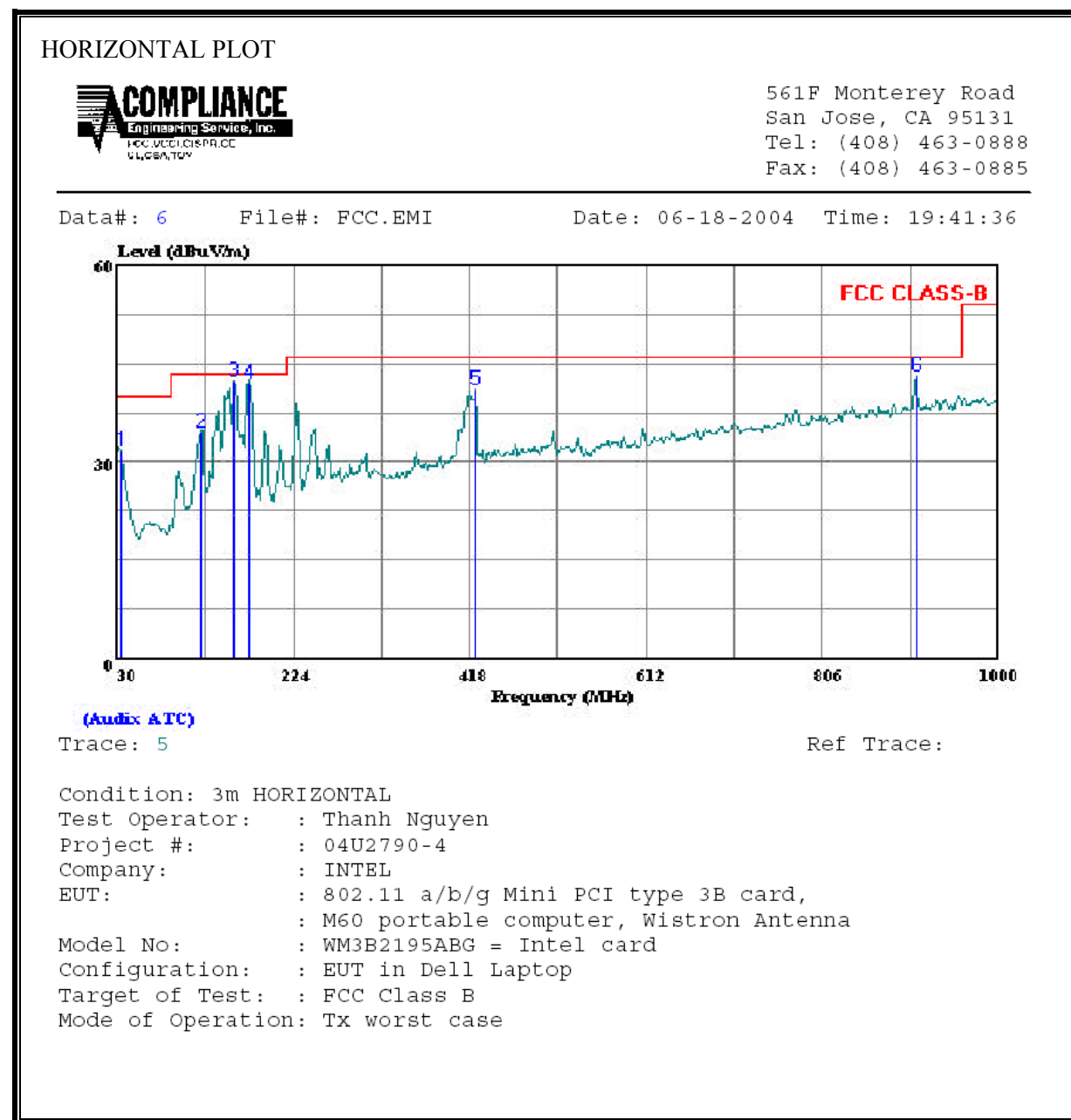


HARMONICS AND SPURIOUS EMISSIONS (802.11a MODE)

07/02/04 High Frequency Measurement Compliance Certification Services, Morgan Hill Open Field Site																
Test Engr: VIEN TRAN Project #: 04U2790 Company: INTEL EUT Descrip.: 802.11abg DELL LAPTOP_INSPIRON 330M_HITACHI ANTENNA AT BASE_LAPTOP UNDOCK (worstcase) EUT M/N: WM3A2195ABG INTEL CARD Test Target: FCC15.407 Mode Oper: TX_11a_LOW / MID / HI CHANNELS_HARMONIC SPUR																
Test Equipment:																
EMCO Horn 1-18GHz T60; S/N: 2238 @3m		Spectrum Analyzer Agilent E4446A Analyzer		Pre-amplifier 1-26GHz T87 Miteq 924342		Pre-amplifier 26-40GHz		Horn > 18GHz								
Hi Frequency Cables ☒ (2 ft) ☐ (2 ~ 3 ft) ☐ (4 ~ 6 ft) ☒ (12 ft)				Limit FCC 15.205		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	
LOW CH 5.18GHz																
15.540	9.8	46.0	34.1	39.4	6.4	-45.5	0.0	1.0	47.2	35.3	74.0	54.0	-26.8	-18.7	V	
15.540	9.8	44.6	32.4	39.4	6.4	-45.5	0.0	1.0	45.8	33.6	74.0	54.0	-28.2	-20.4	H	
MID CH 5.26GHz																
15.780	9.8	45.8	33.8	38.7	6.5	-45.6	0.0	1.0	46.4	34.4	74.0	54.0	-27.6	-19.6	V	
15.780	9.8	44.0	32.2	38.7	6.5	-45.6	0.0	1.0	44.6	32.8	74.0	54.0	-29.4	-21.2	H	
HI CH 5.32GHz																
10.642	9.8	44.0	32.5	38.2	5.8	-41.3	0.0	1.0	47.7	36.2	74.0	54.0	-26.3	-17.8	V	
15.964	9.8	47.0	34.3	38.3	6.6	-45.7	0.0	1.0	47.1	34.4	74.0	54.0	-26.9	-19.6	V	
10.642	9.8	43.0	31.3	38.2	5.8	-41.3	0.0	1.0	46.7	35.0	74.0	54.0	-27.3	-19.0	H	
15.964	9.8	45.8	34.5	38.3	6.6	-45.7	0.0	1.0	45.9	34.6	74.0	54.0	-28.1	-19.4	H	
NO OTHER RADIATED EMISSION WERE DETECTED UP TO 10TH HARMONIC																
f	Measurement Frequency		Amp	Preamp Gain		Avg Lim	Average Field Strength Limit									
Dist	Distance to Antenna		D Corr	Distance Correct to 3 meters		Pk Lim	Peak Field Strength Limit									
Read	Analyzer Reading		Avg	Average Field Strength @ 3 m		Avg Mar	Margin vs. Average Limit									
AF	Antenna Factor		Peak	Calculated Peak Field Strength		Pk Mar	Margin vs. Peak Limit									
CL	Cable Loss		HPF	High Pass Filter												

7.8.7. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz, PRECISION M60 LAPTOP WITH WISTRON ANTENNA SET

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



HORIZONTAL DATA

	Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
1	33.880	Peak	11.10	20.70	31.80	40.00	-8.20
2	122.150	Peak	19.52	15.14	34.66	43.50	-8.84
3	158.040	Peak	28.32	13.90	42.22	43.50	-1.28
4	175.500	Peak	29.03	13.10	42.13	43.50	-1.37
5	424.790	Peak	22.12	18.82	40.94	46.00	-5.06
6	909.790	Peak	16.74	26.42	43.16	46.00	-2.84

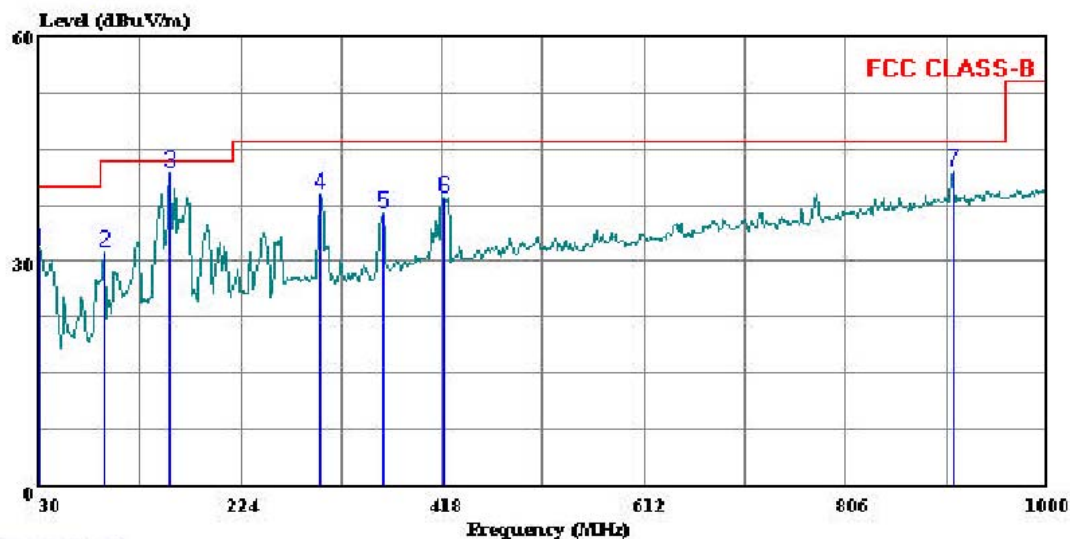
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT



561F Monterey Road
San Jose, CA 95131
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 4 File#: FCC.EMI Date: 06-18-2004 Time: 19:30:39



(Audio: A.TC)

Trace: 3

Ref Trace:

Condition: 3m VERTICAL

Test Operator: : Thanh Nguyen

Project #: : 04U2790-4

Company: : INTEL

EUT: : 802.11 a/b/g Mini PCI type 3B card,
: M60 portable computer, Wistron Antenna

Model No: : WM3B2195ABG = Intel card

Configuration: : EUT in Dell Laptop

Target of Test: : FCC Class B

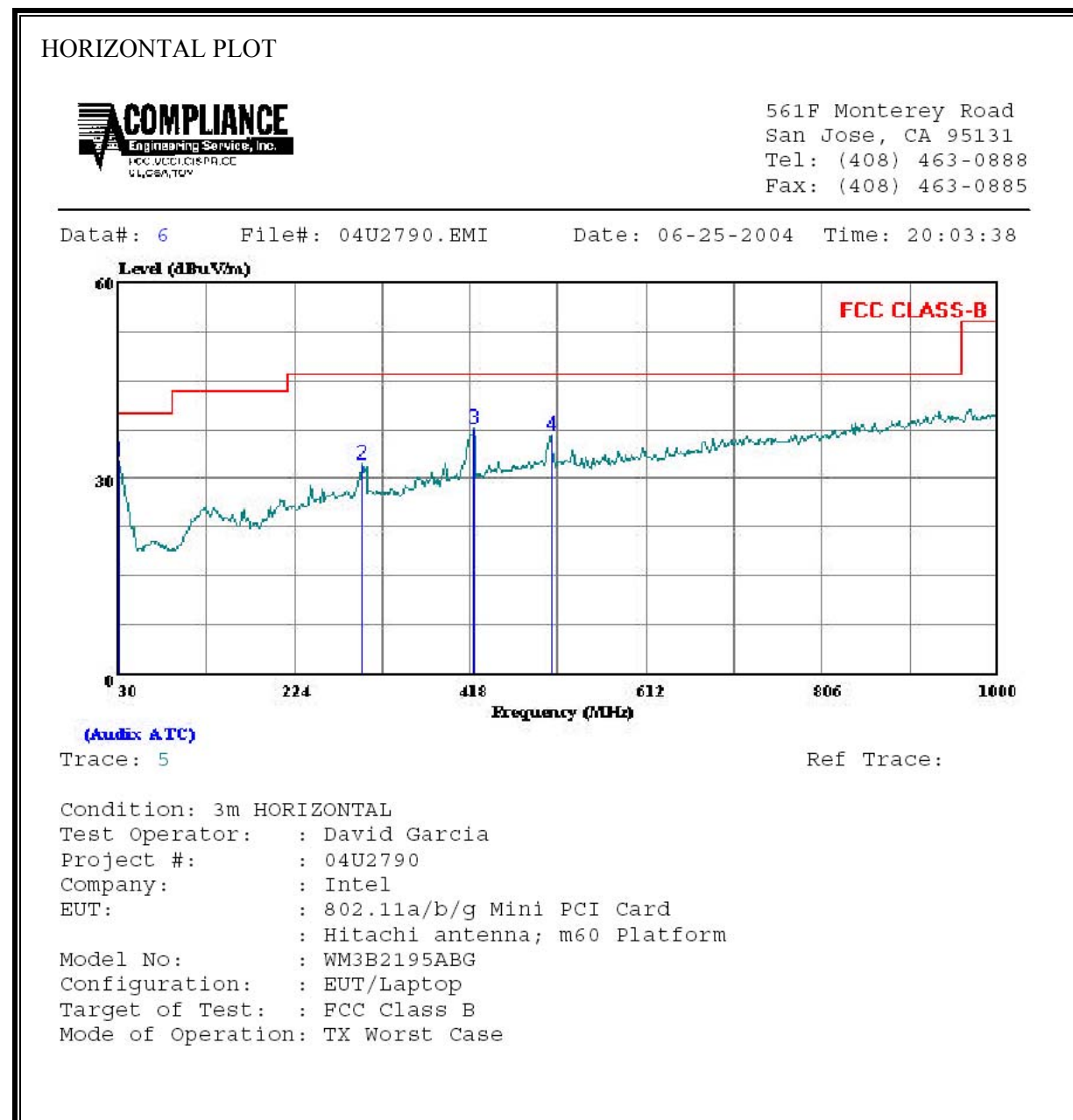
Mode of Operation: TX Worst Case

VERTICAL DATA

	Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
1	30.000	Peak	8.40	22.95	31.35	40.00	-8.65
2	92.080	Peak	22.20	9.08	31.28	43.50	-12.22
3	155.130	Peak	27.72	14.03	41.75	43.50	-1.75
4	300.630	Peak	23.16	15.93	39.09	46.00	-6.91
5	361.740	Peak	19.13	17.22	36.35	46.00	-9.65
6	419.940	Peak	19.66	18.69	38.35	46.00	-7.65
7	909.790	Peak	15.69	26.42	42.11	46.00	-3.89

7.8.8. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz, PRECISION M60 LAPTOP WITH HITACHI ANTENNA SET

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



HORIZONTAL DATA

	Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
1	30.000	Peak	9.89	22.95	32.84	40.00	-7.16
2	298.690	Peak	16.27	15.91	32.18	46.00	-13.83
3	421.880	Peak	19.02	18.75	37.77	46.00	-8.23
4	507.240	Peak	16.02	20.70	36.72	46.00	-9.28

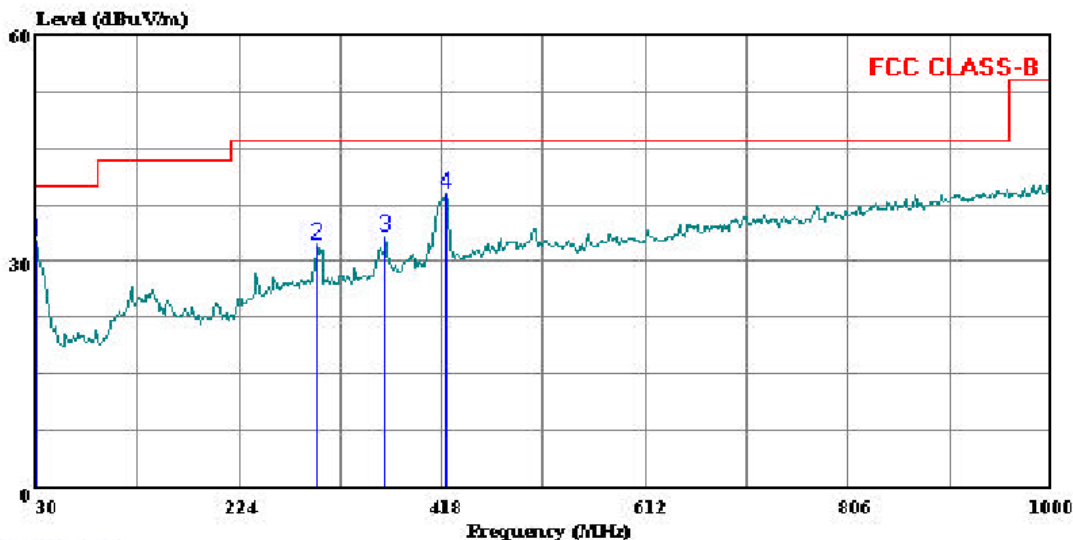
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT



561F Monterey Road
San Jose, CA 95131
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 4 File#: 04U2790.EMI Date: 06-25-2004 Time: 19:56:51



(Auxiliary ATC)

Trace: 3

Ref Trace:

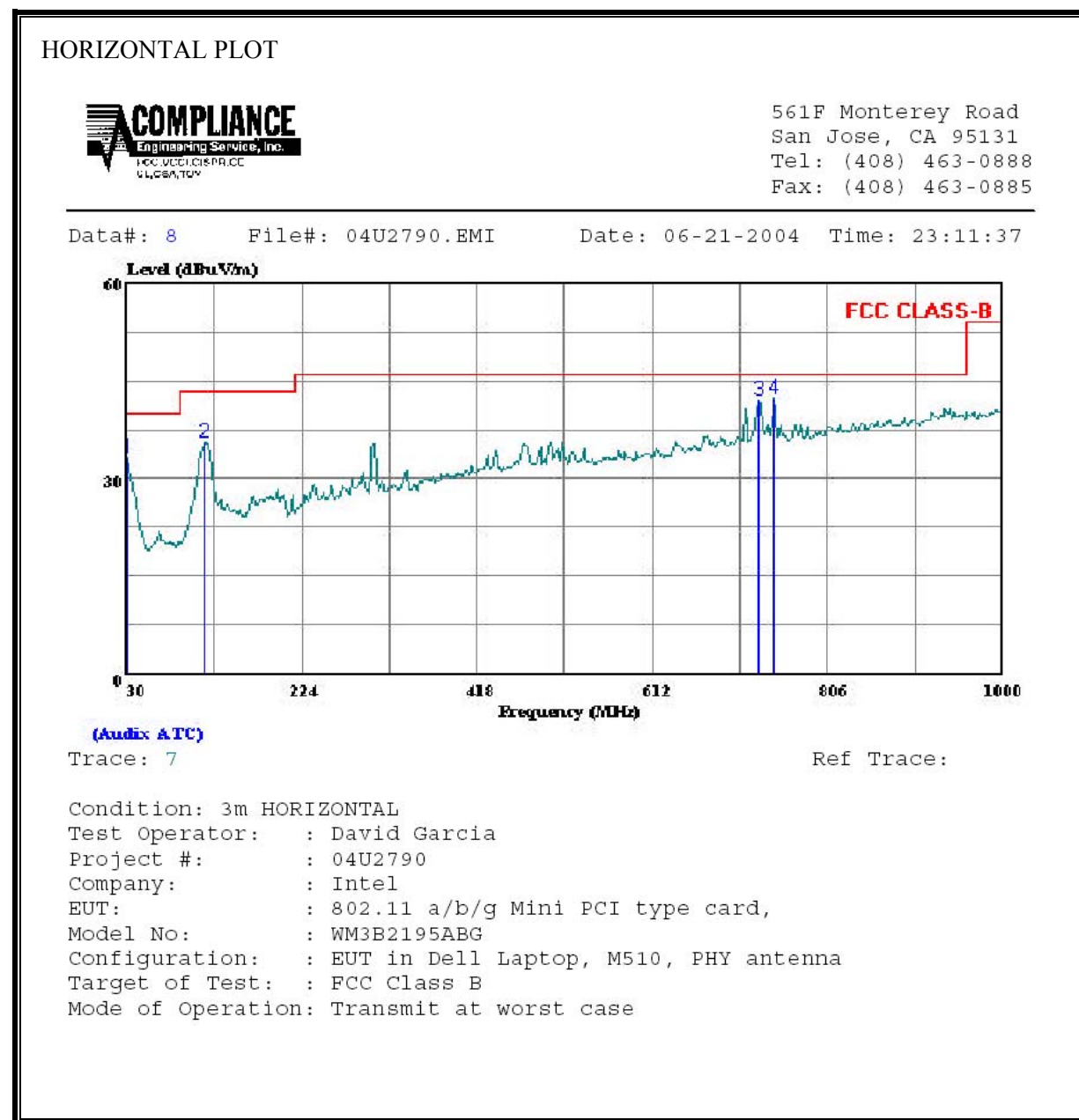
Condition: 3m VERTICAL
Test Operator: : David Garcia
Project #: : 04U2790
Company: : Intel
EUT: : 802.11a/b/g Mini PCI Card
Hitachi antenna; m60 Platform
Model No: : WM3B2195ABG
Configuration: : EUT/Laptop
Target of Test: : FCC Class B
Mode of Operation: TX Worst Case

VERTICAL DATA

	Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
1	30.000	Peak	9.89	22.95	32.84	40.00	-7.16
2	298.690	Peak	16.30	15.91	32.20	46.00	-13.80
3	363.680	Peak	15.94	17.25	33.19	46.00	-12.81
4	421.880	Peak	20.32	18.75	39.07	46.00	-6.93

7.8.9. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz, INSPIRON 510M LAPTOP WITH PHYCOMP ANTENNA SET

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



HORIZONTAL DATA

	Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
	----- MHz	-----	----- dBuV	----- dB	----- dBuV/m	----- dBuV/m	----- dB
1	30.000	Peak	10.36	22.95	33.31	40.00	-6.69
2	116.330	Peak	21.06	14.51	35.57	43.50	-7.93
3	730.340	Peak	17.93	24.26	42.19	46.00	-3.81
4	746.830	Peak	18.04	24.30	42.34	46.00	-3.66

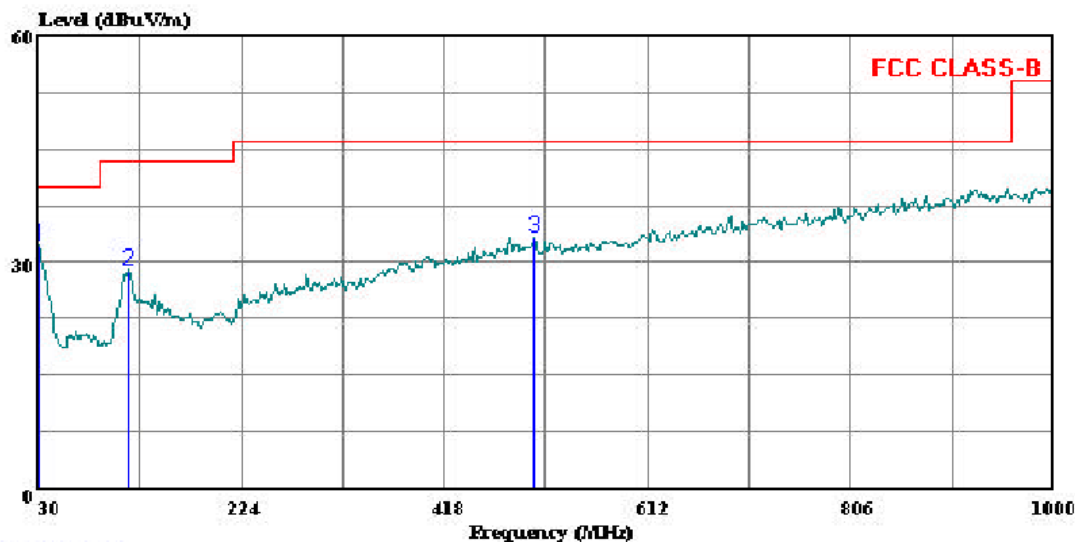
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT



561F Monterey Road
San Jose, CA 95131
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 10 File#: 04u2790.emi Date: 06-21-2004 Time: 23:16:33



(Audio: A TC)

Trace: 9

Ref Trace:

Condition: 3m VERTICAL
Test Operator: : David Garcia
Project #: : 04U2790
Company: : Intel
EUT: : 802.11 a/b/g Mini PCI type card,
Model No: : WM3B2195ABG
Configuration: : EUT in Dell Laptop, M510, PHY antenna
Target of Test: : FCC Class B
Mode of Operation: Transmit at worst case

VERTICAL DATA

	Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
1	30.970	Peak	9.29	22.95	32.24	40.00	-7.76
2	115.360	Peak	14.46	14.39	28.85	43.50	-14.65
3	504.330	Peak	12.54	20.67	33.21	46.00	-12.79

**7.8.10. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz,
INSPIRON 300M LAPTOP WITH WISTRON ANTENNA SET**

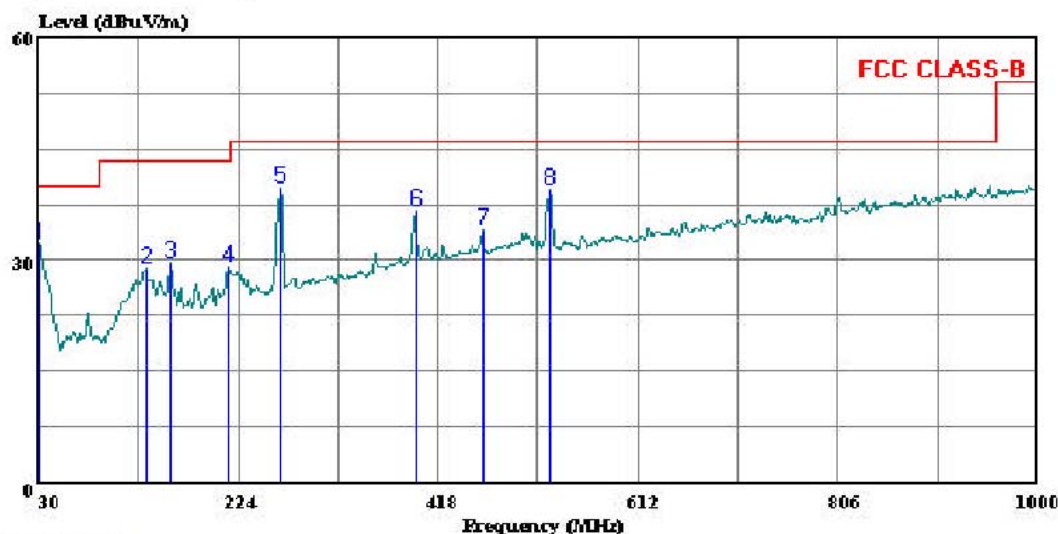
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



561F Monterey Road
San Jose, CA 95131
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 4 File#: Intel-EMC.EMI Date: 07-02-2004 Time: 21:01:56



(Auxiliary ATC)

Trace: 3

Ref Trace:

Condition: FCC CLASS-B SUNOL BILOG 12/22/04 HORIZONTAL
Test Operator: : William Zhuang
Project #: : 04U2790
Company: : INTEL (RP)
EUT: : 802.11 a/b/g Mini PCI type 3B Card,
: 300M WNC Ant. Undocked
Model No: : WM3B2195ABG=Intel Card
Configuration: : EUT stand alone
Target of Test: : FCC Class B
Mode of Operation: TXat worst case

HORIZONTAL DATA

	Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
1	30.970	Peak	9.23	22.95	32.18	40.00	-7.82
2	133.790	Peak	13.33	15.48	28.81	43.50	-14.69
3	158.040	Peak	15.81	13.90	29.71	43.50	-13.79
4	213.330	Peak	16.14	12.85	28.99	43.50	-14.51
5	264.740	Peak	24.93	14.78	39.71	46.00	-6.29
6	395.690	Peak	18.47	18.12	36.59	46.00	-9.41
7	460.680	Peak	14.34	19.71	34.05	46.00	-11.95

	Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
8	526.640	Peak	18.45	20.99	39.44	46.00	-6.56

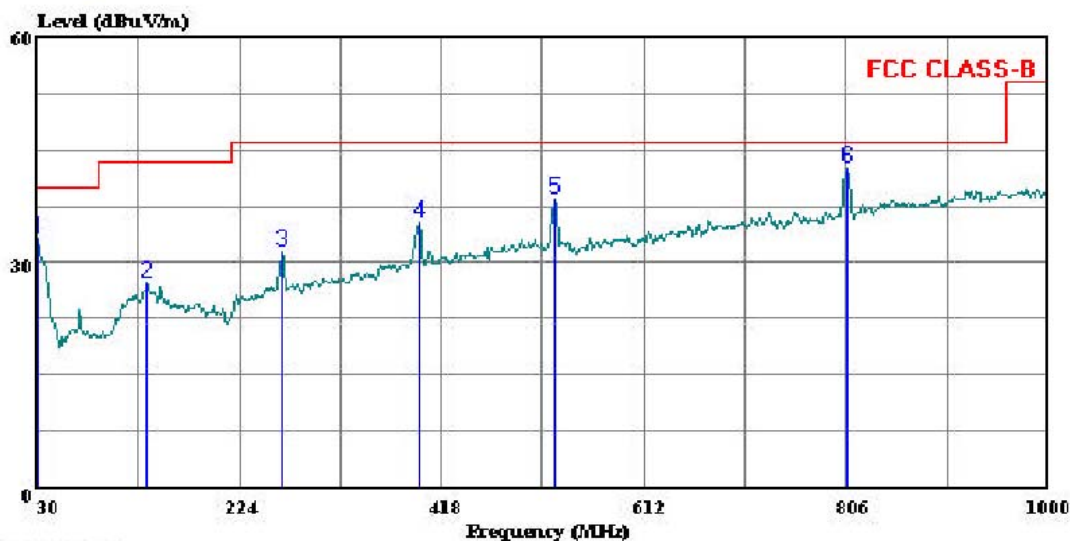
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT



561F Monterey Road
San Jose, CA 95131
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 2 File#: Intel-EMC.EMI Date: 07-02-2004 Time: 20:50:30



(Audix ATC)

Trace: 1

Ref Trace:

Condition: FCC CLASS-B SUNOL BILOG 12/22/04 VERTICAL
Test Operator: : William Zhuang
Project #: : 04U2790
Company: : INTEL (RP)
EUT: : 802.11 a/b/g Mini PCI type 3B Card,
: 300M WNC Ant. Undocked
Model No: : WM3B2195ABG=Intel Card
Configuration: : EUT stand alone
Target of Test: : FCC Class B
Mode of Operation: TX at worst case

VERTICAL DATA

	Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
1	30.000	Peak	10.41	22.95	33.36	40.00	-6.64
2	135.730	Peak	11.97	15.39	27.36	43.50	-16.14
3	264.740	Peak	16.68	14.78	31.46	46.00	-14.54
4	396.660	Peak	17.22	18.14	35.35	46.00	-10.65
5	526.640	Peak	17.47	20.99	38.46	46.00	-7.54
6	807.940	Peak	17.59	25.08	42.67	46.00	-3.33

**7.8.11. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz,
INSPIRON 300M LAPTOP WITH HITACHI ANTENNA SET**

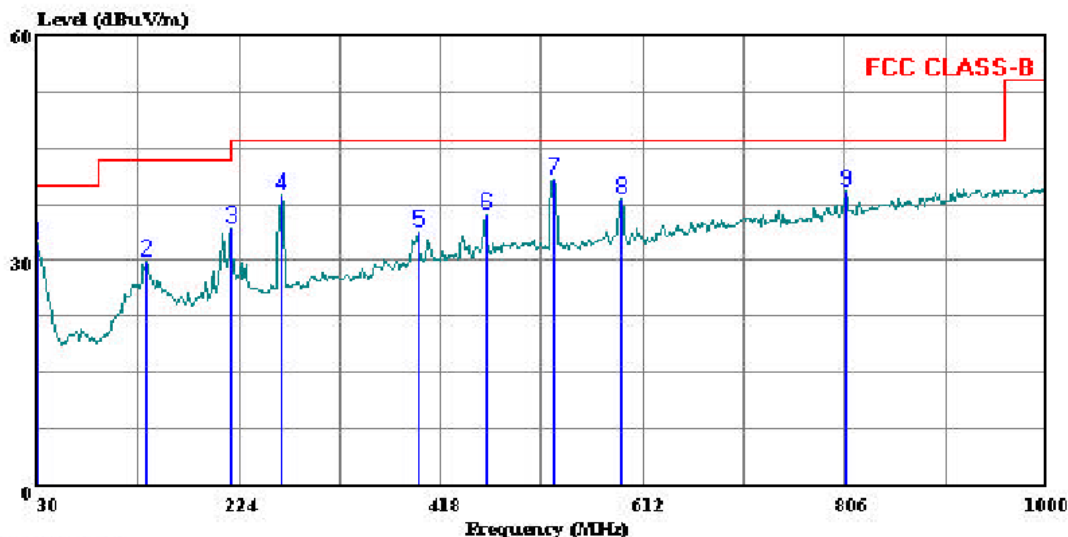
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



561F Monterey Road
San Jose, CA 95131
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 6 File#: Intel-EMC.EMI Date: 07-02-2004 Time: 21:16:08



Trace: 5

Ref Trace:

Condition: FCC CLASS-B SUNOL BILOG 12/22/04 HORIZONTAL
Test Operator: : William Zhuang
Project #: : 04U2790
Company: : INTEL (RP)
EUT: : 802.11 a/b/g Mini PCI type 3B Card,
: 300M Hitachi Ant. Undocked
Model No: : WM3B2195ABG=Intel Card
Configuration: : EUT stand alone
Target of Test: : FCC Class B
Mode of Operation: TX at worst case

HORIZONTAL DATA

	Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
1	30.000	Peak	9.25	22.95	32.20	40.00	-7.80
2	135.730	Peak	14.57	15.39	29.96	43.50	-13.54
3	216.240	Peak	21.43	12.91	34.34	46.00	-11.66
4	264.740	Peak	24.02	14.78	38.80	46.00	-7.20
5	395.690	Peak	15.63	18.12	33.75	46.00	-12.25
6	460.680	Peak	16.32	19.71	36.03	46.00	-9.97
7	525.670	Peak	19.68	20.97	40.66	46.00	-5.34

	Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
8	590.660	Peak	16.21	21.86	38.07	46.00	-7.93
9	807.940	Peak	14.22	25.08	39.30	46.00	-6.70

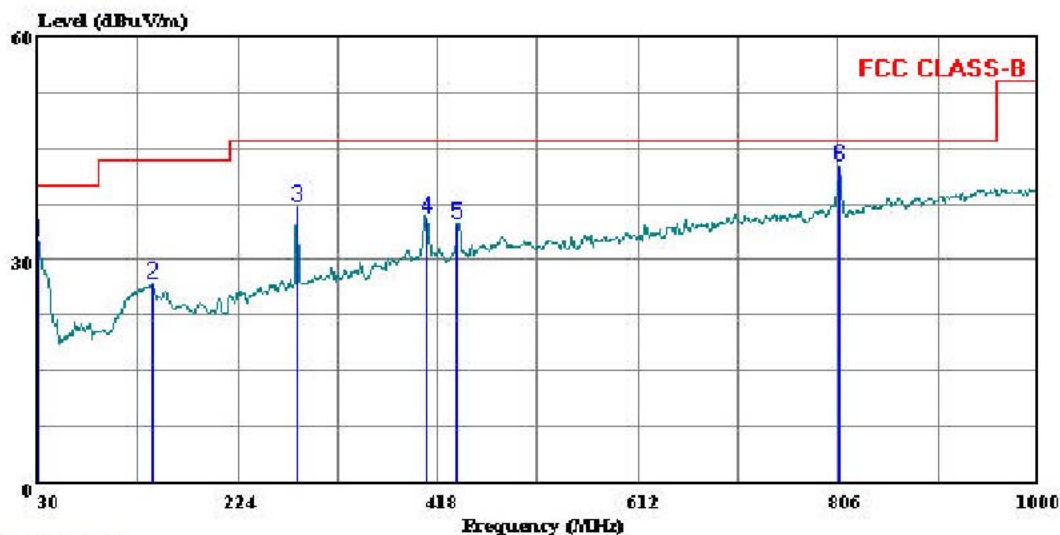
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)

VERTICAL PLOT



561F Monterey Road
San Jose, CA 95131
Tel: (408) 463-0888
Fax: (408) 463-0885

Data#: 8 File#: Intel-EMC.EMI Date: 07-02-2004 Time: 21:25:29



(Auxiliary ATC)

Trace: 7

Ref Trace:

Condition: FCC CLASS-B SUNOL BILOG 12/22/04 VERTICAL
Test Operator: : William Zhuang
Project #: : 04U2790
Company: : INTEL (RP)
EUT: : 802.11 a/b/g Mini PCI type 3B Card,
: 300M Hitachi Ant. Undocked
Model No: : WM3B2195ABG=Intel Card
Configuration: : EUT stand alone
Target of Test: : FCC Class B
Mode of Operation: TX t worst case

VERTICAL DATA

	Freq	Remark	Read Level	Factor	Level	Limit Line	Over Limit
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
1	30.970	Peak	9.55	22.95	32.50	40.00	-7.50
2	140.580	Peak	11.42	15.23	26.65	43.50	-16.85
3	281.230	Peak	21.68	15.47	37.15	46.00	-8.86
4	406.360	Peak	17.24	18.36	35.60	46.00	-10.40
5	437.400	Peak	15.70	19.14	34.84	46.00	-11.16
6	807.940	Peak	17.48	25.08	42.56	46.00	-3.44

7.9. POWERLINE CONDUCTED EMISSIONS

LIMIT

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

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

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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

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

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

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

RESULTS

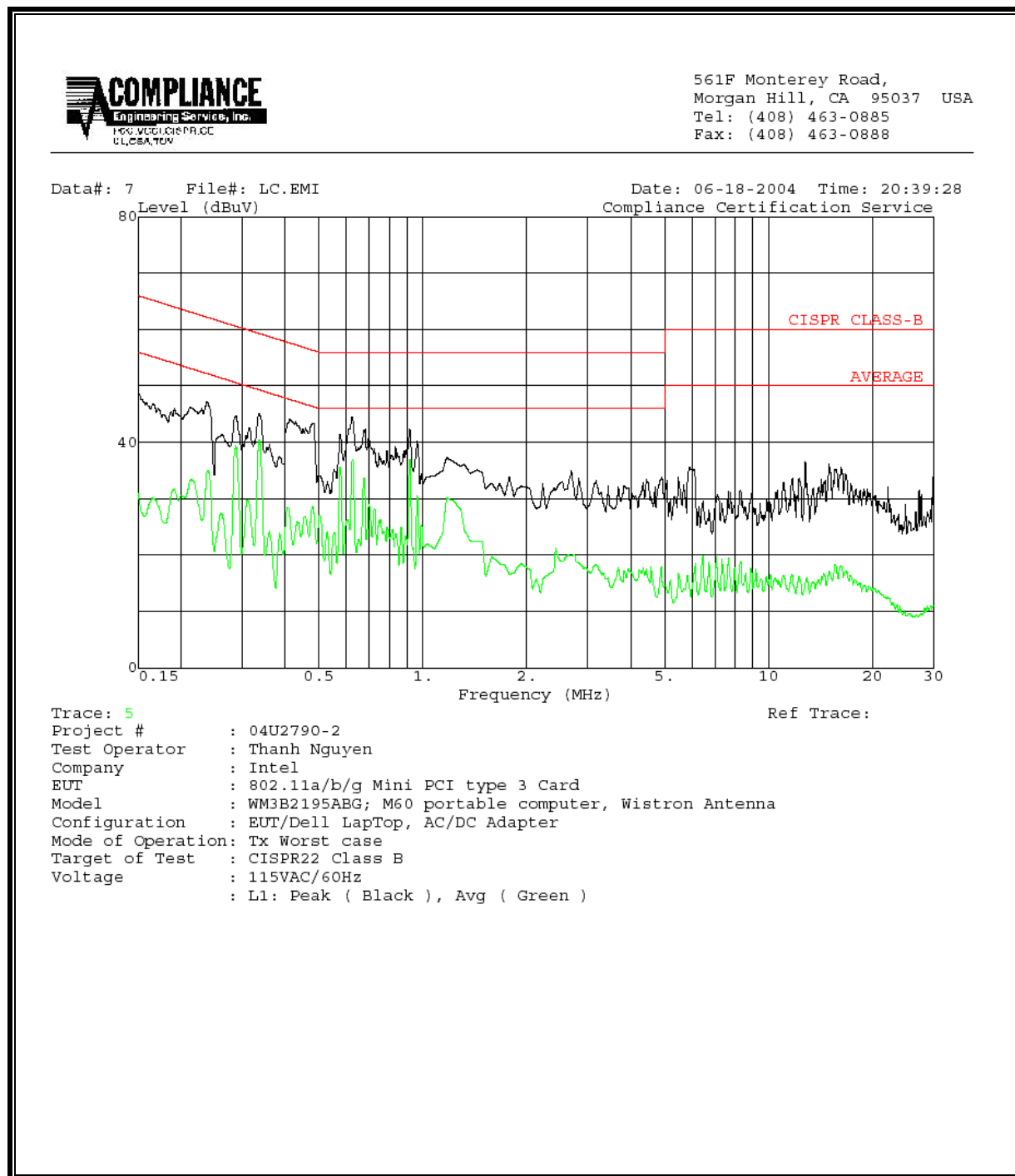
No non-compliance noted:

7.9.1. POWERLINE CONDUCTED EMISSIONS, PRECISION M60 LAPTOP WITH WISTRON ANTENNA SET

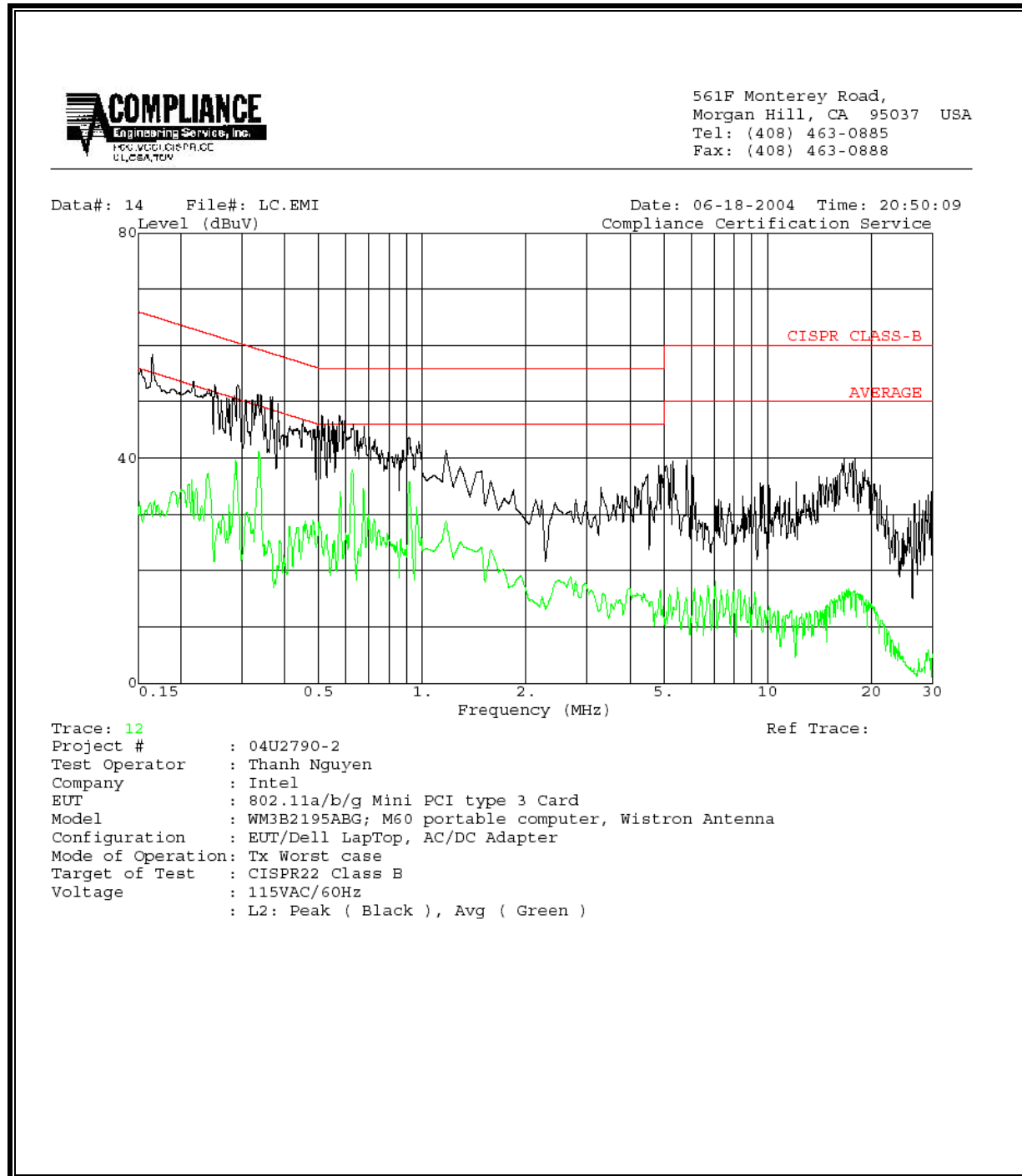
6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	FCC B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.24	47.30	--	--	0.00	63.49	53.49	-16.19	-6.19	L1
0.62	44.44	--	--	0.00	56.00	46.00	-11.56	-1.56	L1
12.78	36.62	--	--	0.00	60.00	50.00	-23.38	-13.38	L1
0.17	58.38	--	32.51	0.00	65.57	55.57	-7.19	-23.06	L2
0.29	52.91	--	39.61	0.00	61.94	51.94	-9.03	-12.33	L2
0.58	47.52	--	33.94	0.00	56.00	46.00	-8.48	-12.06	L2
6 Worst Data									

LINE 1 RESULTS



LINE 2 RESULTS

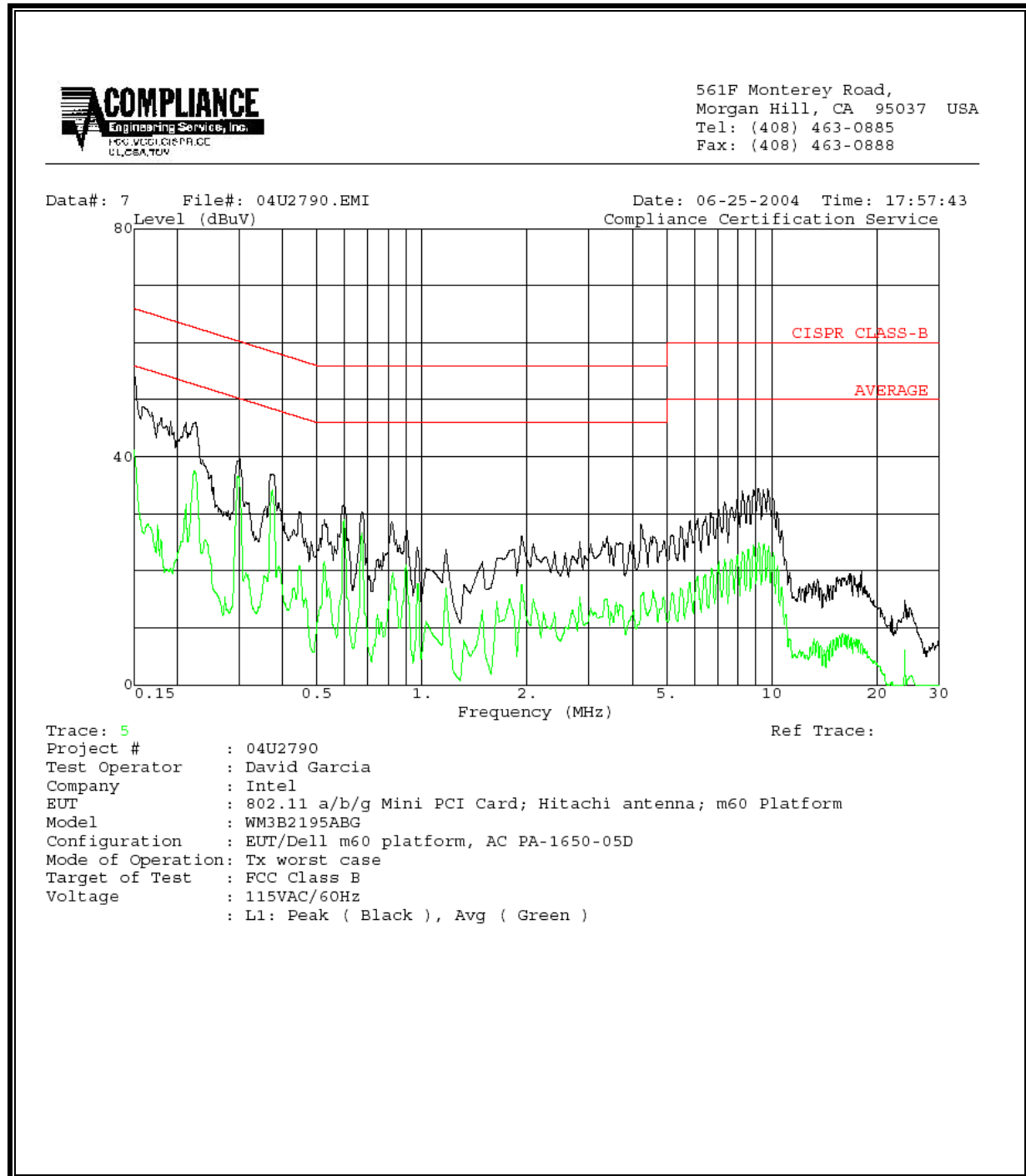


7.9.2. POWERLINE CONDUCTED EMISSIONS, PRECISION M60 LAPTOP WITH HITACHI ANTENNA SET

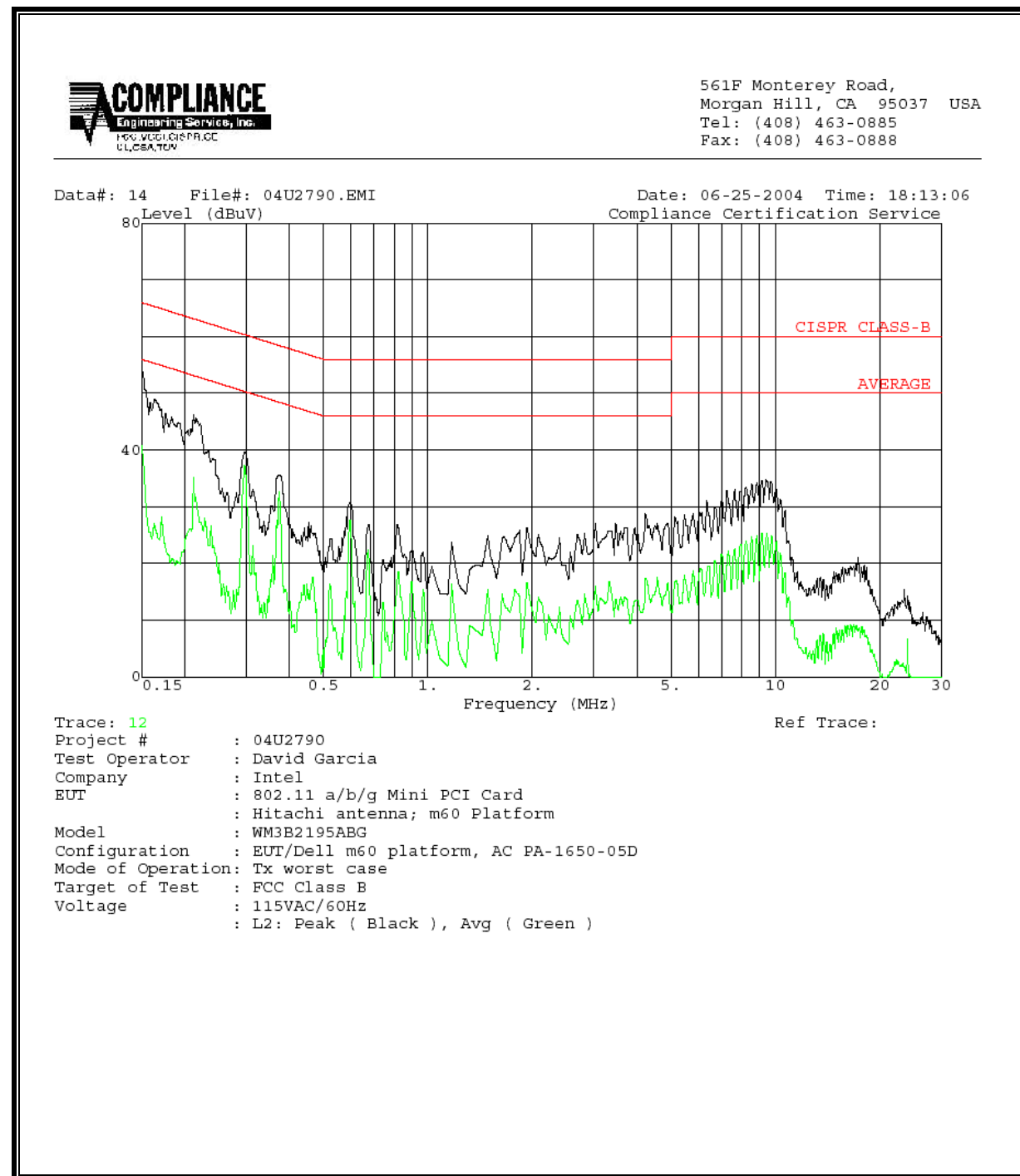
6 WORST EMISSIONS

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
0.16	57.58	--	30.75	0.00	65.74	55.74	-8.16	-24.99	L1
0.60	40.48	--	--	0.00	56.00	46.00	-15.52	-5.52	L1
0.91	36.96	--	--	0.00	56.00	46.00	-19.04	-9.04	L1
0.32	42.40	--	--	0.00	61.20	51.20	-18.80	-8.80	L2
0.60	40.40	--	--	0.00	56.00	46.00	-15.60	-5.60	L2
0.91	38.04	--	--	0.00	56.00	46.00	-17.96	-7.96	L2
6 Worst Data									

LINE 1 RESULTS



LINE 2 RESULTS

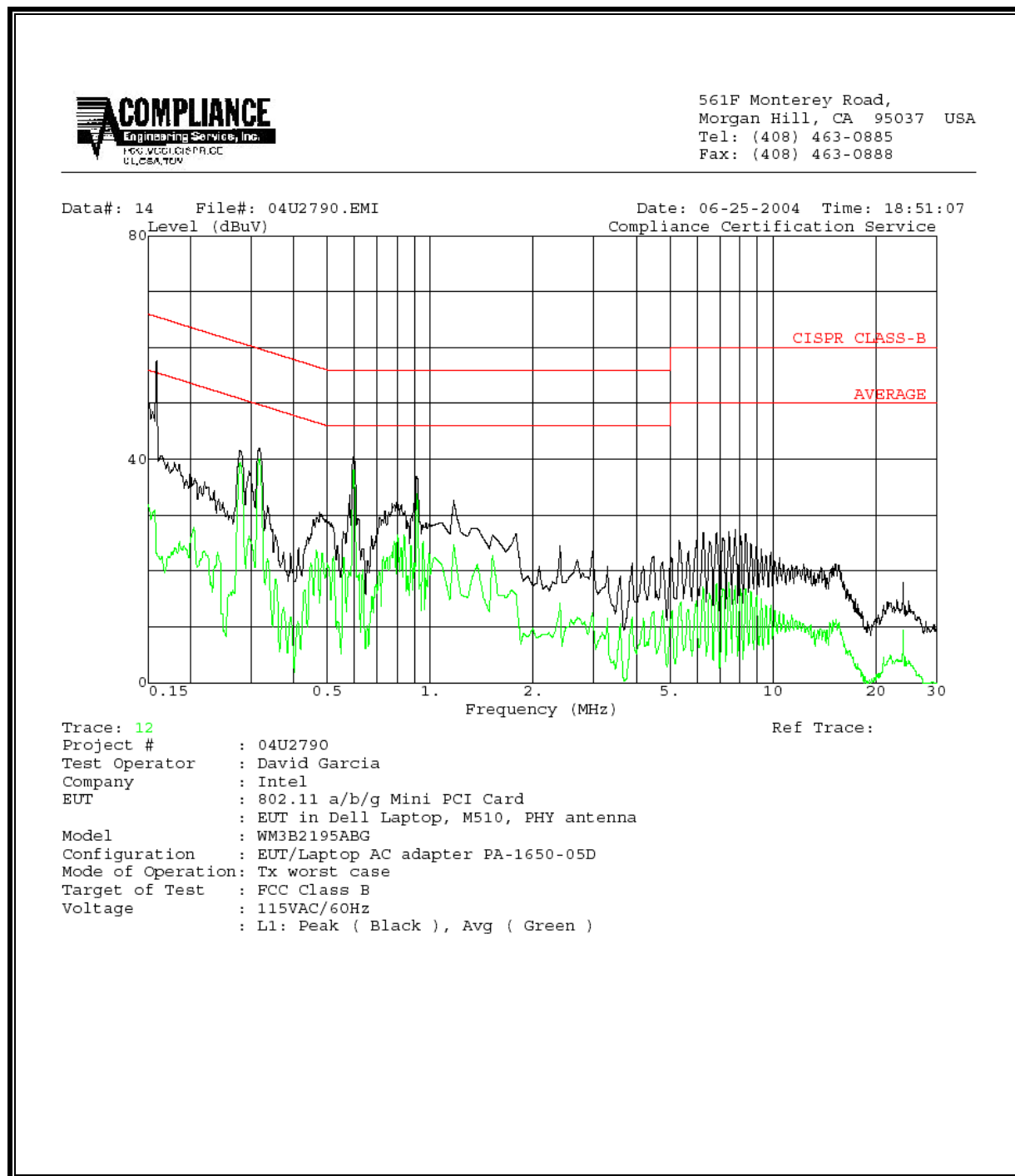


7.9.3. POWERLINE CONDUCTED EMISSIONS, INSPIRON 510M LAPTOP WITH PHYCOMP ANTENNA SET

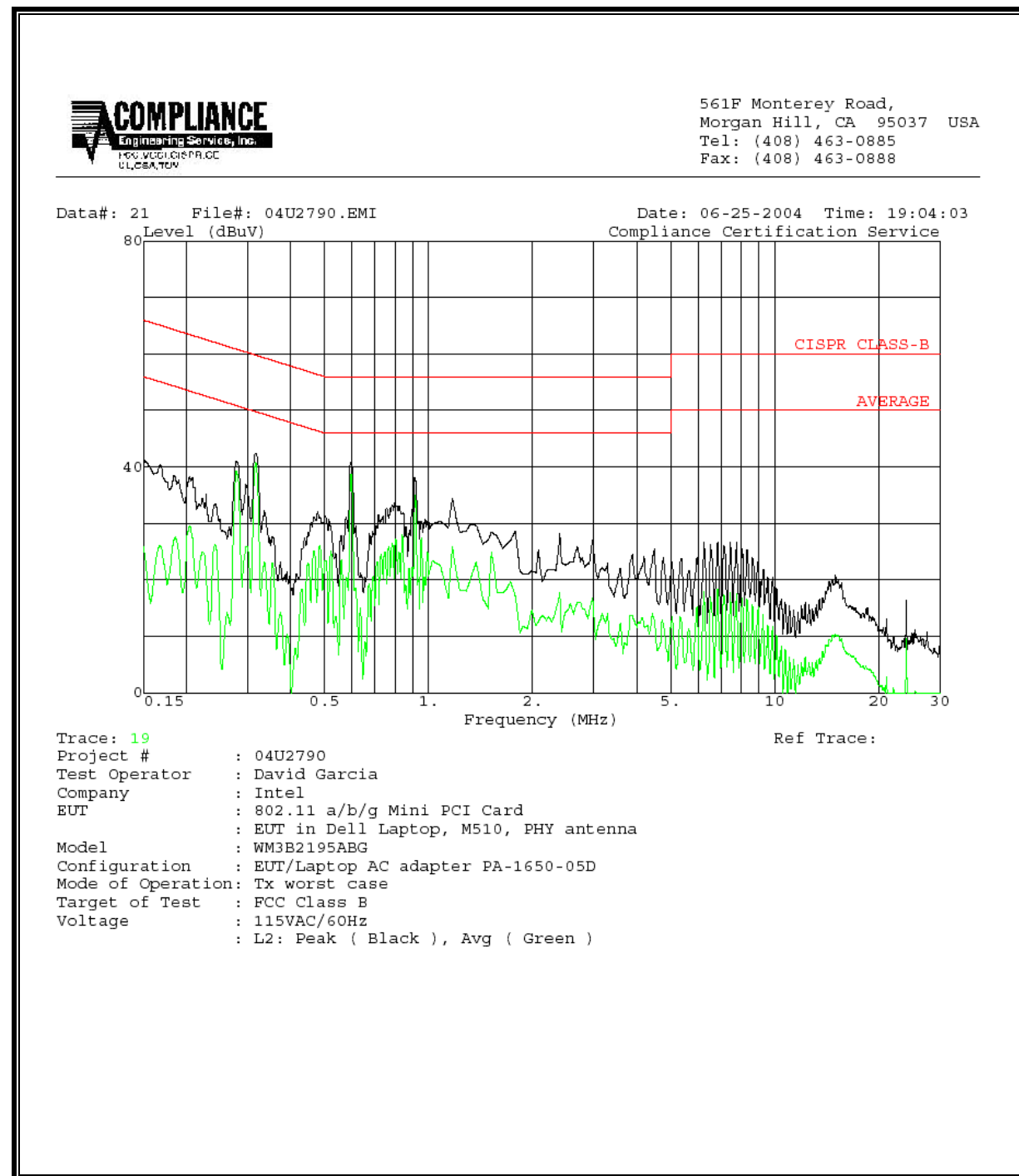
6 WORST EMISSIONS

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
0.16	57.58	--	30.75	0.00	65.74	55.74	-8.16	-24.99	L1
0.60	40.48	--	--	0.00	56.00	46.00	-15.52	-5.52	L1
0.91	36.96	--	--	0.00	56.00	46.00	-19.04	-9.04	L1
0.32	42.40	--	--	0.00	61.20	51.20	-18.80	-8.80	L2
0.60	40.40	--	--	0.00	56.00	46.00	-15.60	-5.60	L2
0.91	38.04	--	--	0.00	56.00	46.00	-17.96	-7.96	L2
6 Worst Data									

LINE 1 RESULTS



LINE 2 RESULTS



7.9.4. POWERLINE CONDUCTED EMISSIONS, INSPIRON 3000M LAPTOP WITH WISTRON ANTENNA SET

Note: The worst-case configuration is with the EUT docked.

6 WORST EMISSIONS

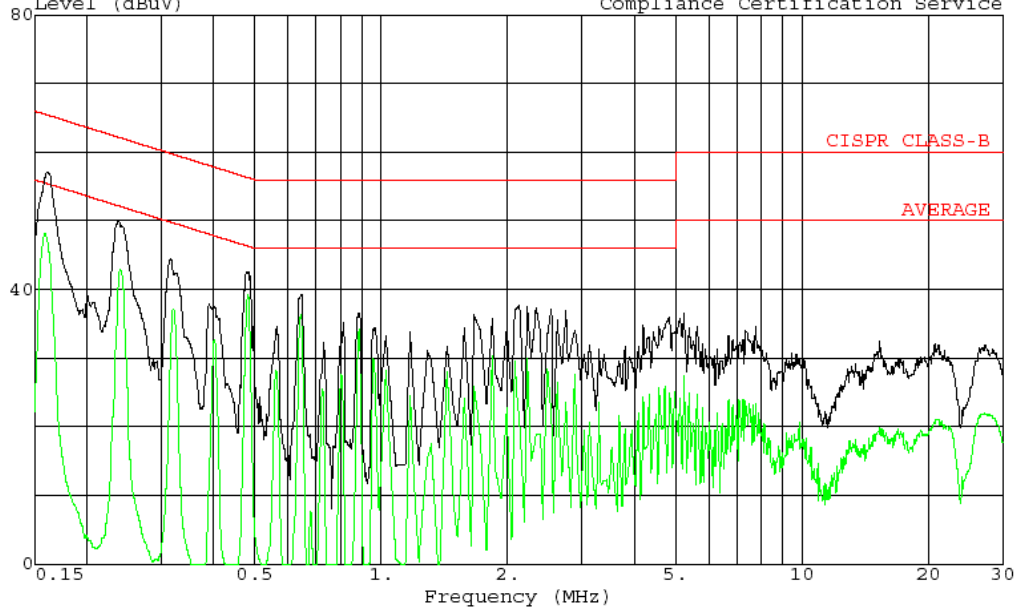
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.16	57.14	--	48.24	0.00	65.71	55.71	-8.57	-7.47	L1
0.64	33.22	--	36.37	0.00	56.00	46.00	-22.78	-9.63	L1
5.22	36.76	--	27.35	0.00	60.00	50.00	-23.24	-22.65	L1
0.16	57.18	--	48.03	0.00	65.71	55.71	-8.53	-7.68	L2
2.26	36.18	--	31.03	0.00	56.00	46.00	-19.82	-14.97	L2
7.49	33.42	--	24.40	0.00	60.00	50.00	-26.58	-25.60	L2
6 Worst Data									

LINE 1 RESULTS



561F Monterey Road,
Morgan Hill, CA 95037 USA
Tel: (408) 463-0885
Fax: (408) 463-0888

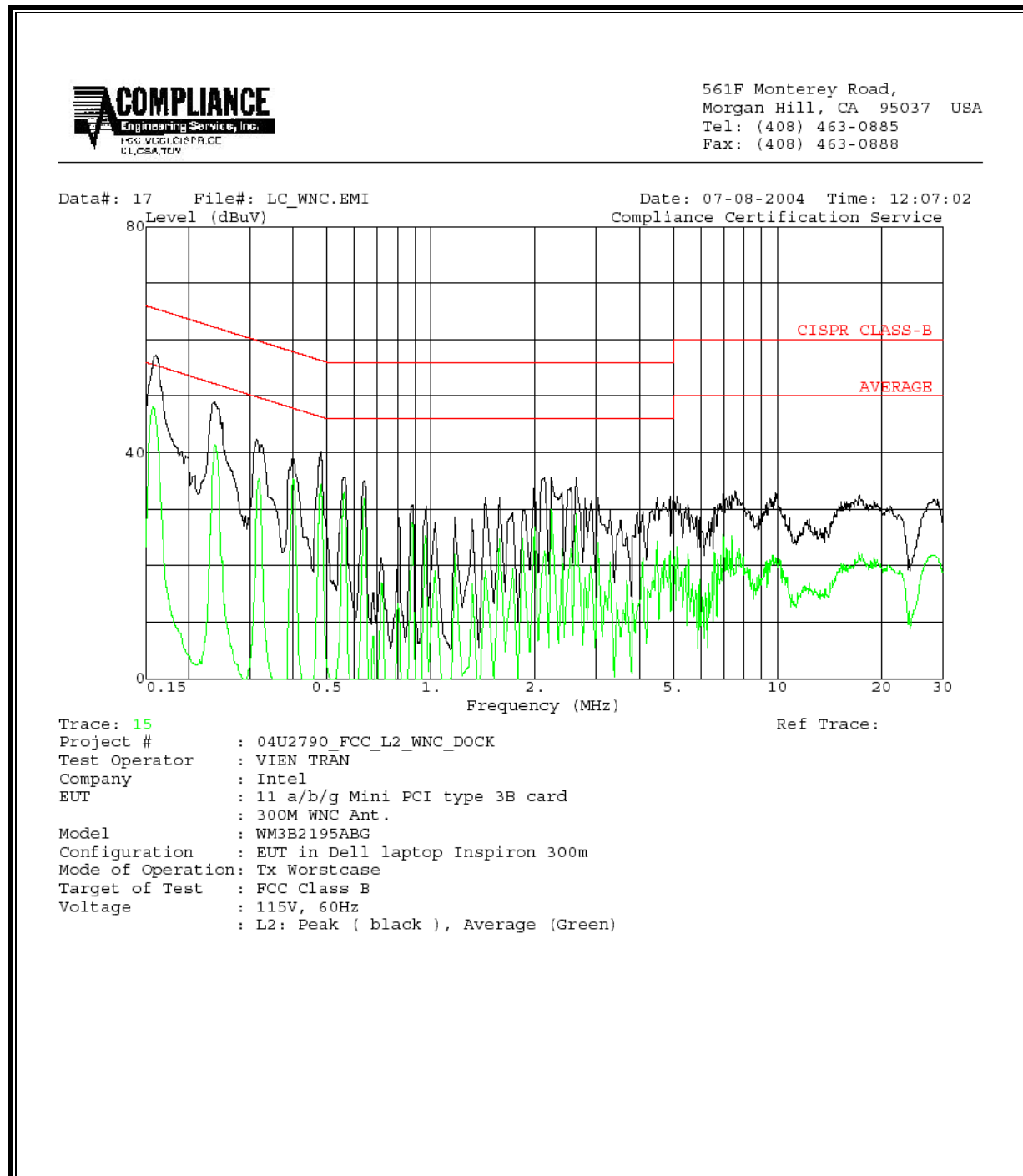
Data#: 10 File#: LC_WNC.EMI Date: 07-08-2004 Time: 11:18:34
Level (dBuV) Compliance Certification Service



Trace: 8
Project # : 04U2790_FCC_L1_WNC_DOCK
Test Operator : VIEN TRAN
Company : Intel
EUT : 11 a/b/g Mini PCI type 3B card
: 300M WNC Ant.
Model : WM3B2195ABG
Configuration : EUT in Dell laptop Inspiron 300m
Mode of Operation: Tx Worstcase
Target of Test : FCC Class B
Voltage : 115V, 60Hz
: L1: Peak (black), Average (Green)

Ref Trace:

LINE 2 RESULTS



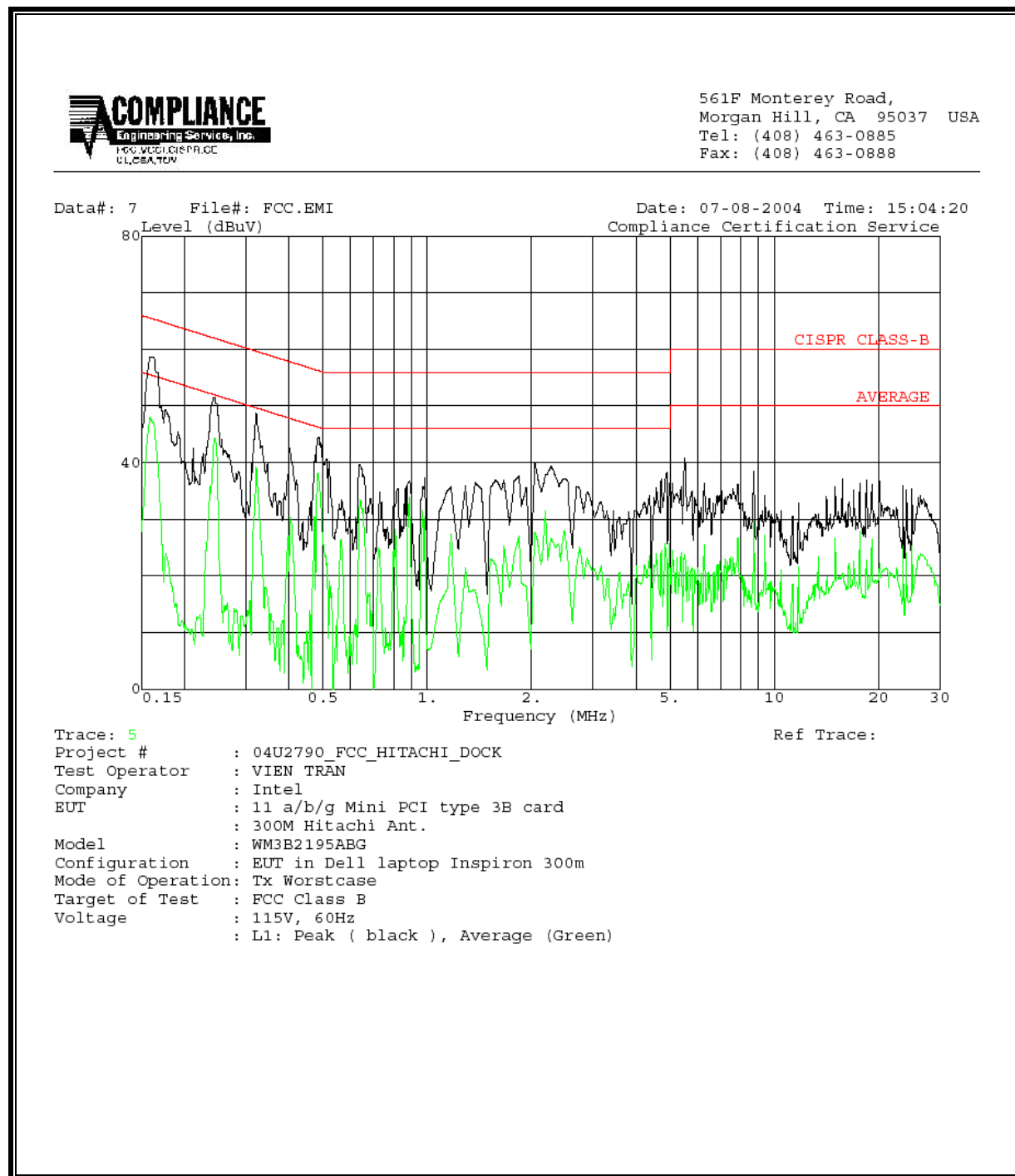
7.9.5. POWERLINE CONDUCTED EMISSIONS, INSPIRON 3000M LAPTOP WITH HITACHI ANTENNA SET

Note: The worst-case configuration is with the EUT undocked.

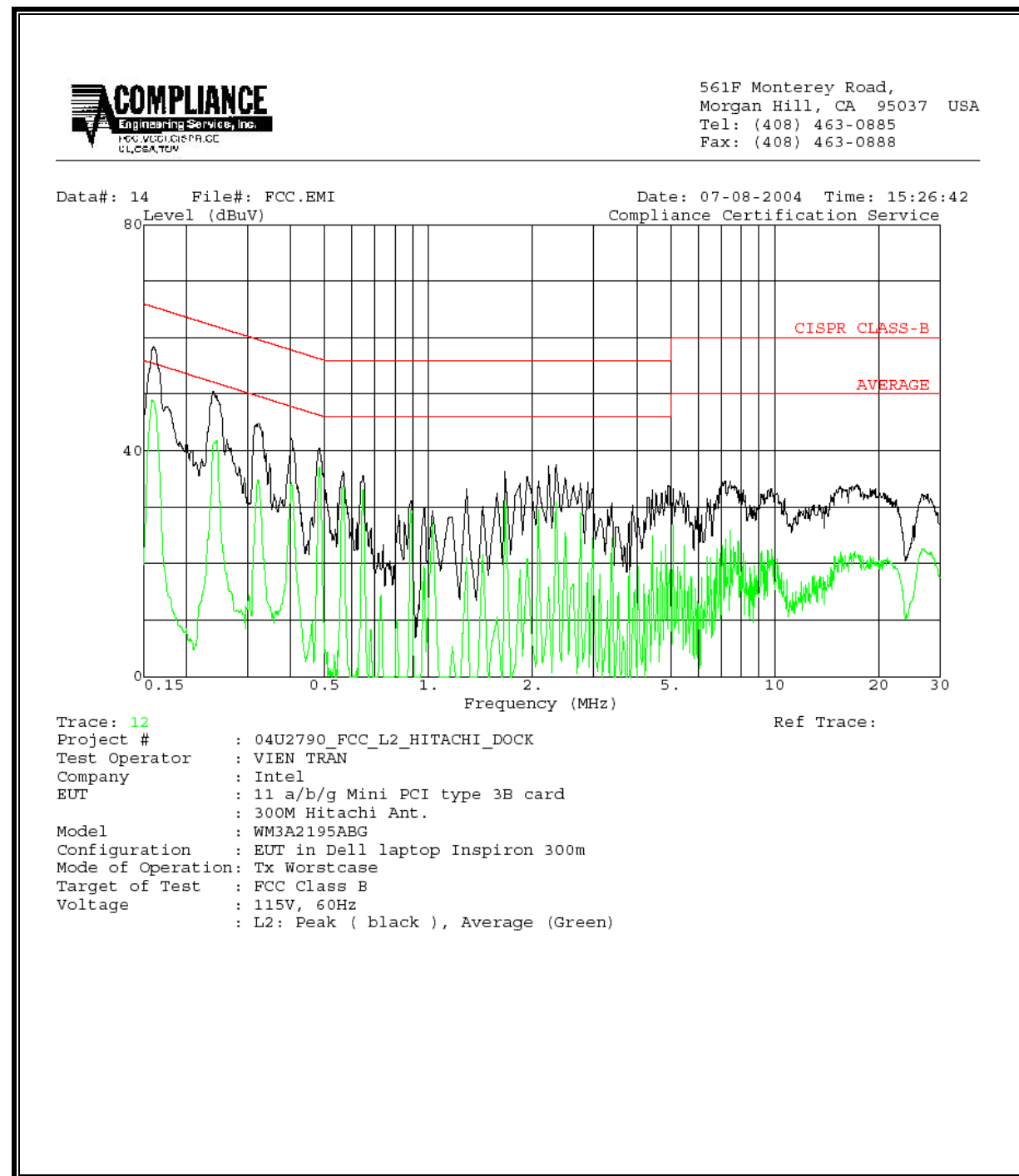
6 WORST EMISSIONS

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
0.16	58.64	--	47.92	0.00	65.71	55.71	-7.07	-7.79	L1
0.63	40.00	--	33.47	0.00	56.00	46.00	-16.00	-12.53	L1
8.78	40.76	--	29.24	0.00	60.00	50.00	-19.24	-20.76	L1
0.16	58.46	--	48.94	0.00	65.71	55.71	-7.25	-6.77	L2
2.31	38.96	--	33.80	0.00	56.00	46.00	-17.04	-12.20	L2
8.78	35.66	--	26.80	0.00	60.00	50.00	-24.34	-23.20	L2
6 Worst Data									

LINE 1 RESULTS

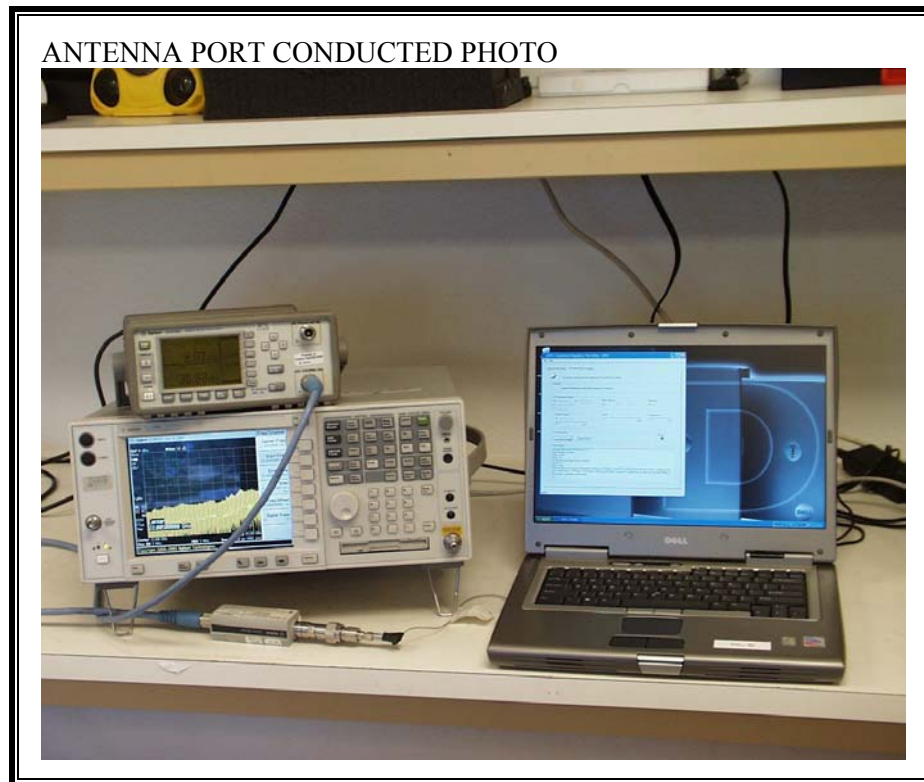


LINE 2 RESULTS



8. SETUP PHOTOS

8.1. ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



8.2. PRECISION M60 LAPTOP WITH WISTRON ANTENNA SET

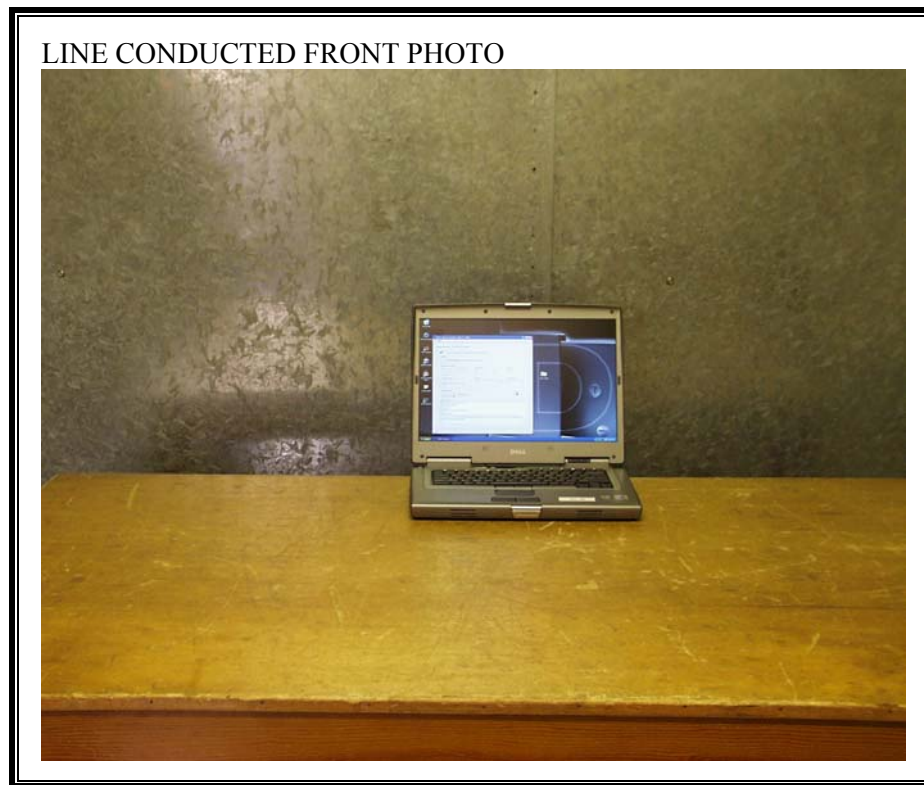
RADIATED RF MEASUREMENT SETUP



RADIATED BACK PHOTO



POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP



LINE CONDUCTED BACK PHOTO



8.3. PRECISION M60 LAPTOP WITH HITACHI ANTENNA SET

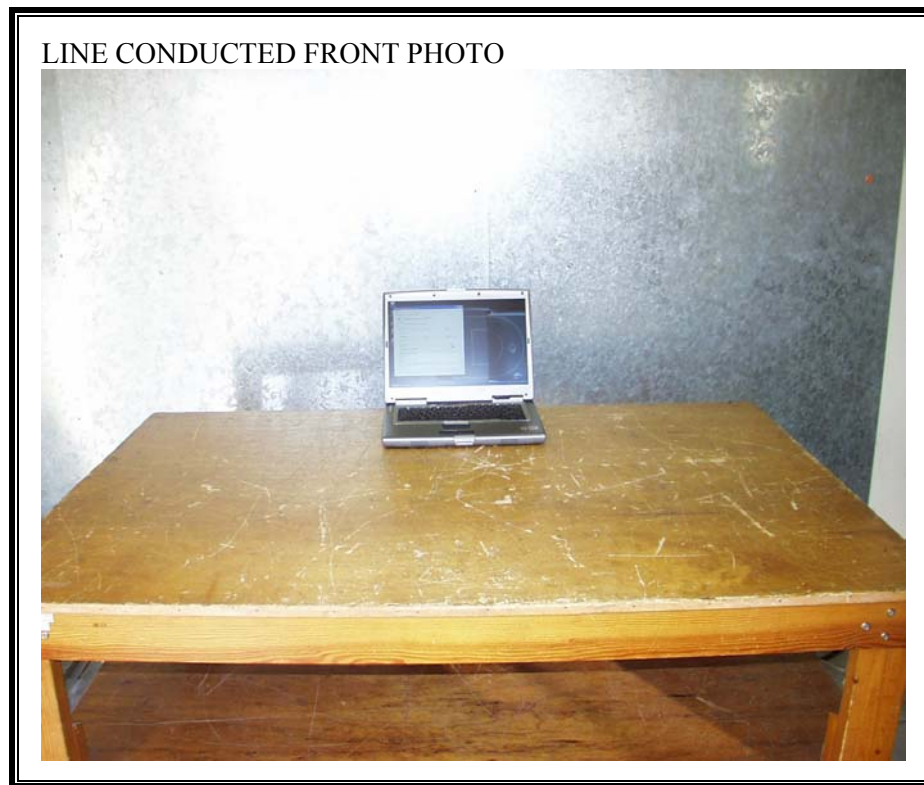
RADIATED RF MEASUREMENT SETUP



RADIATED BACK PHOTO



POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP

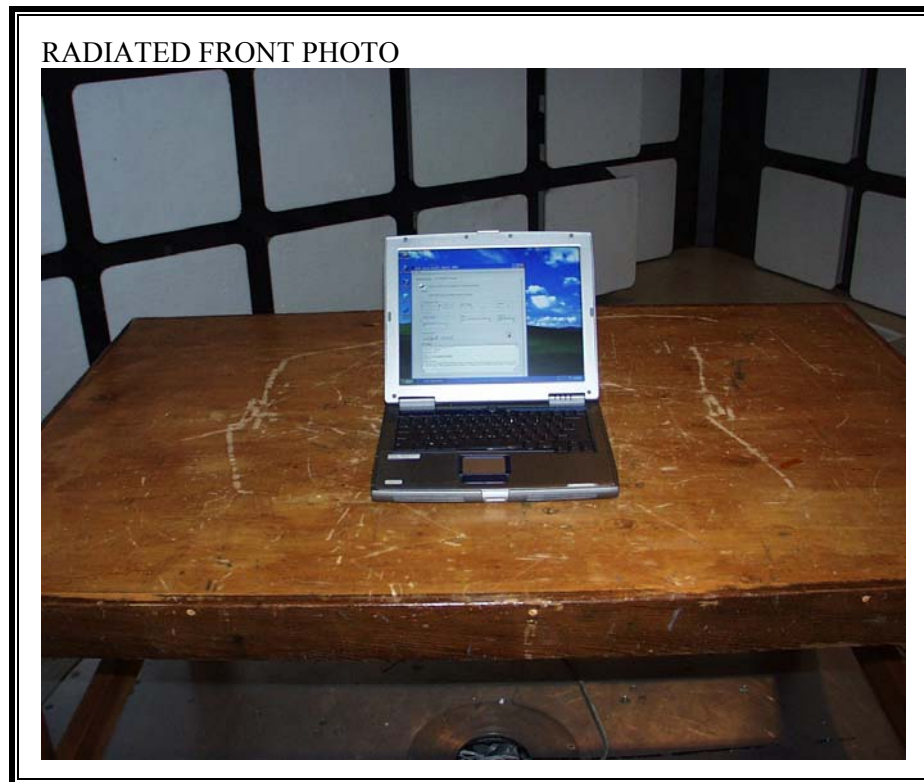


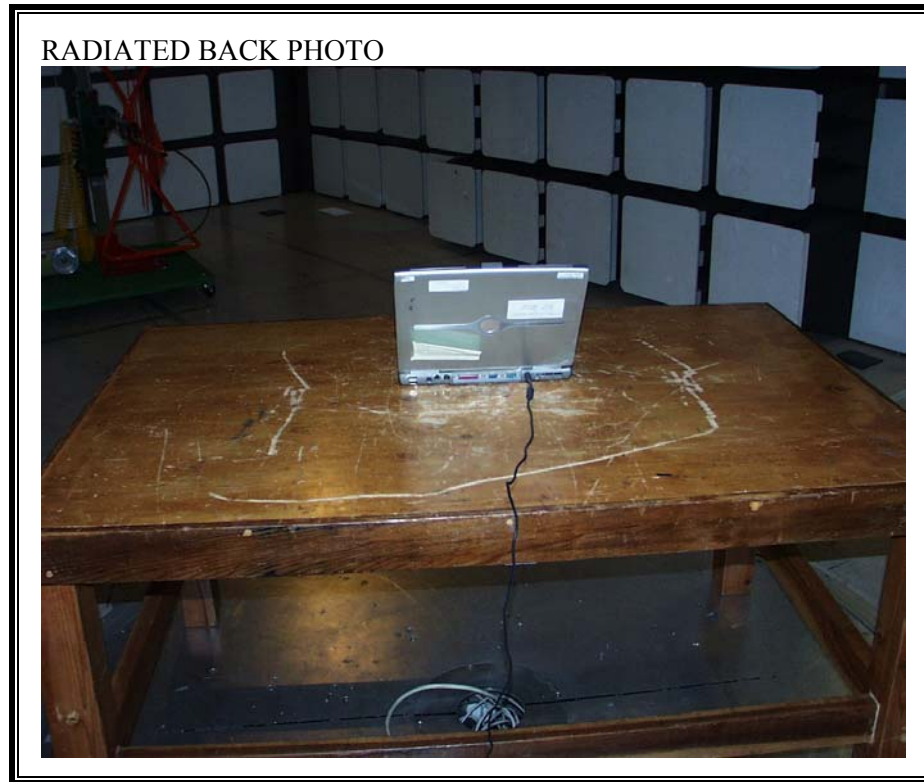
LINE CONDUCTED BACK PHOTO



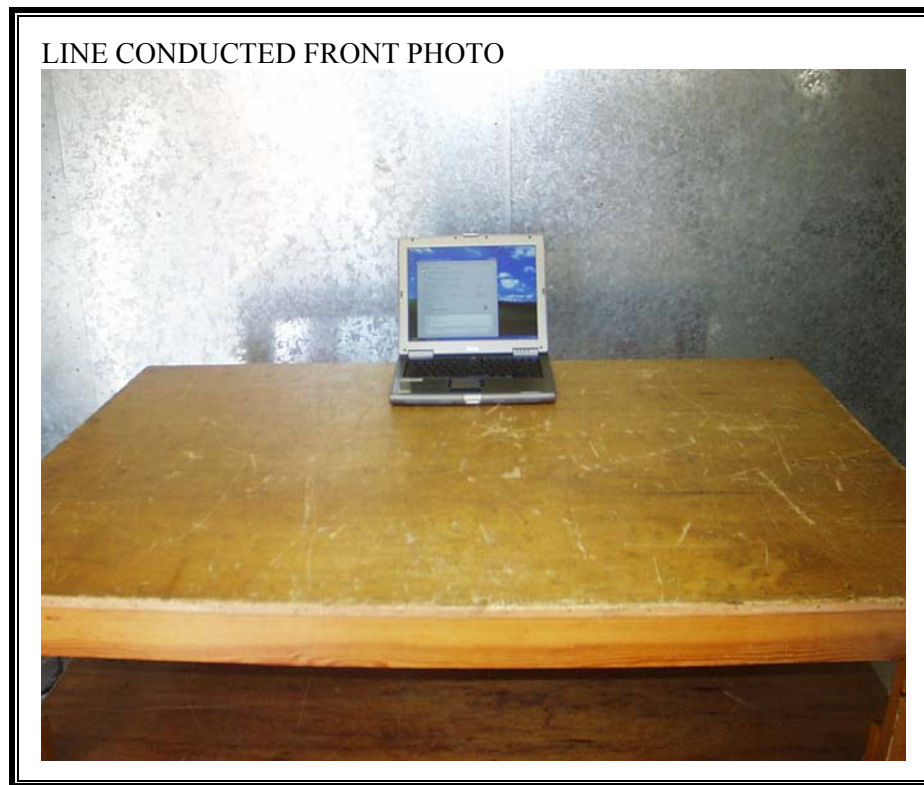
8.4. INSPIRON 510M LAPTOP WITH PHYCOMP ANTENNA SET

RADIATED RF MEASUREMENT SETUP





POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP



LINE CONDUCTED BACK PHOTO



8.5. INSPIRON 300M LAPTOP WITH WISTRON ANTENNA SET

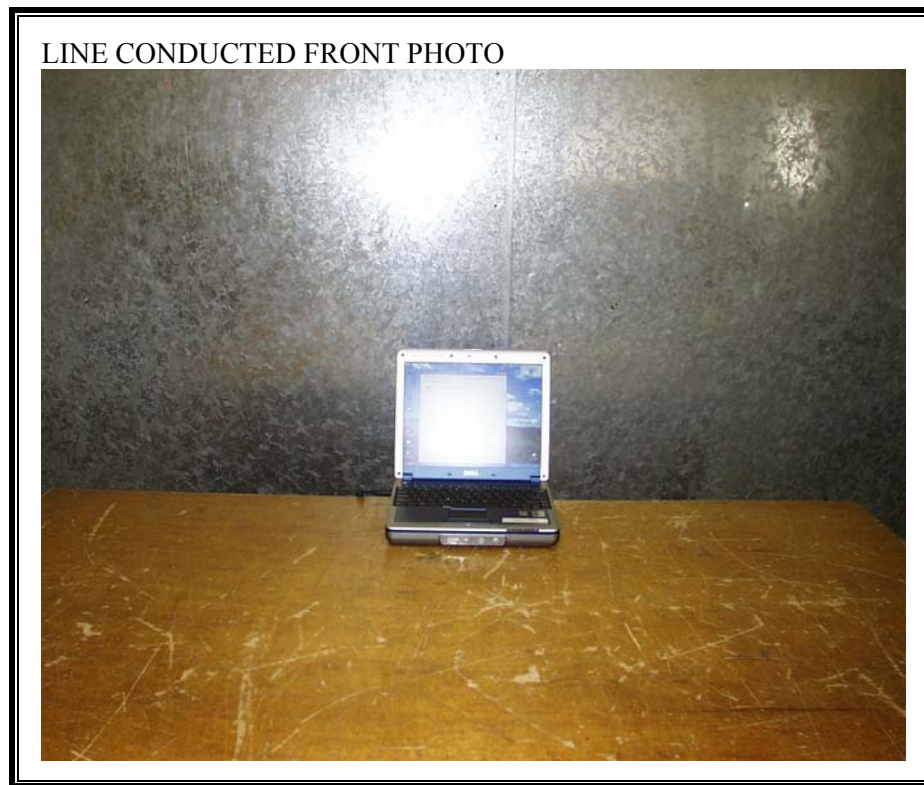
RADIATED RF MEASUREMENT SETUP



RADIATED BACK PHOTO



POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP



LINE CONDUCTED BACK PHOTO



8.6. INSPIRON 300M LAPTOP WITH HITACHI ANTENNA SET

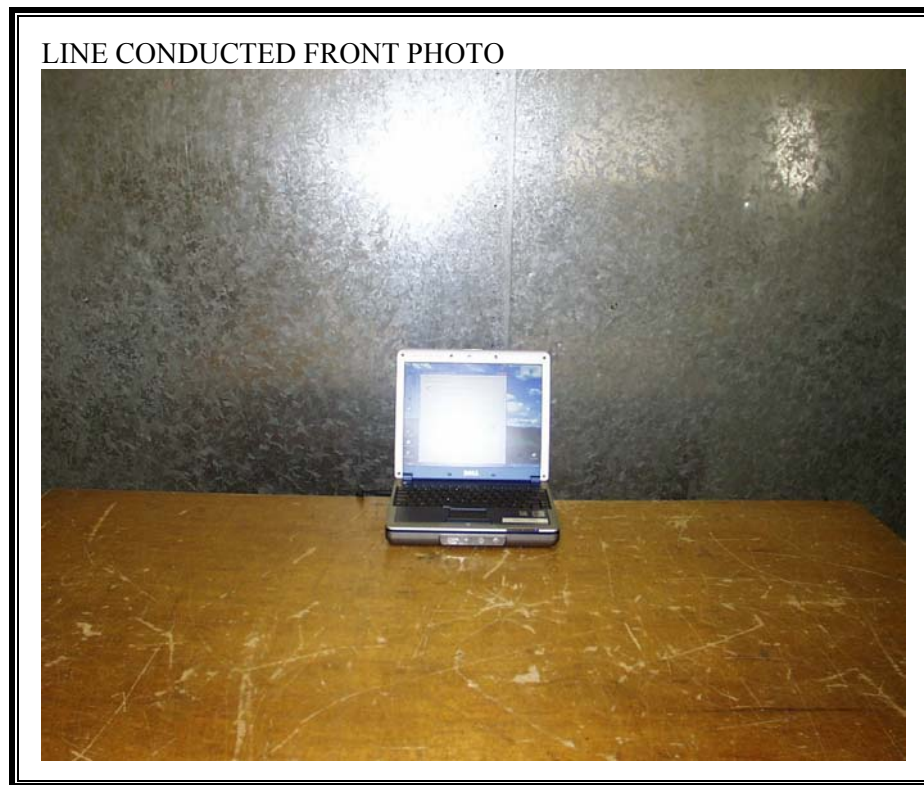
RADIATED RF MEASUREMENT SETUP

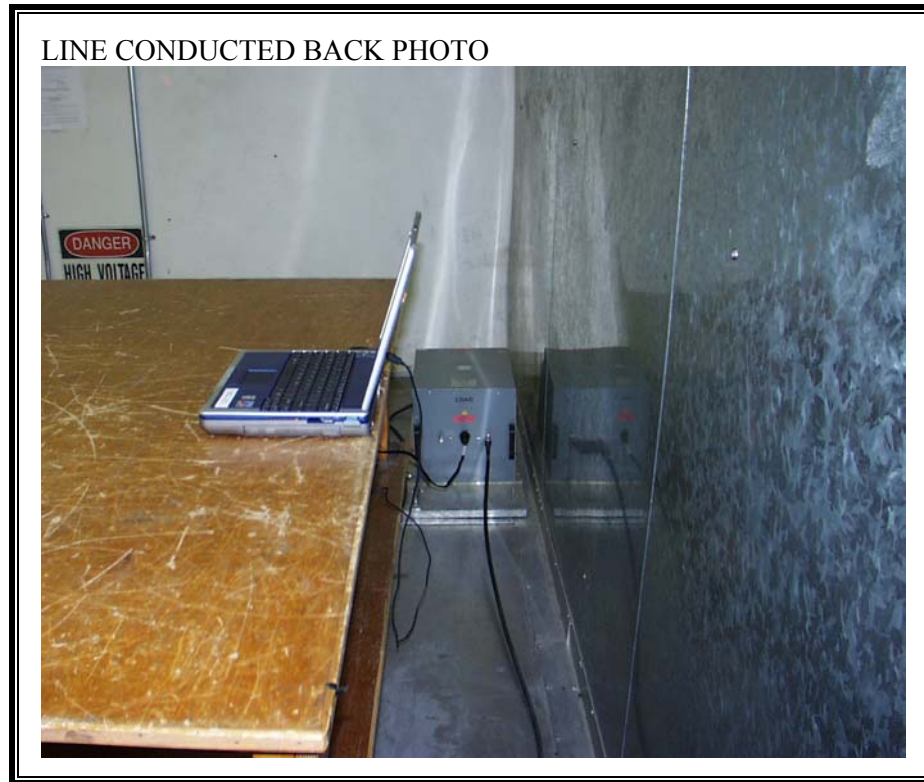


RADIATED BACK PHOTO



POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP





END OF REPORT