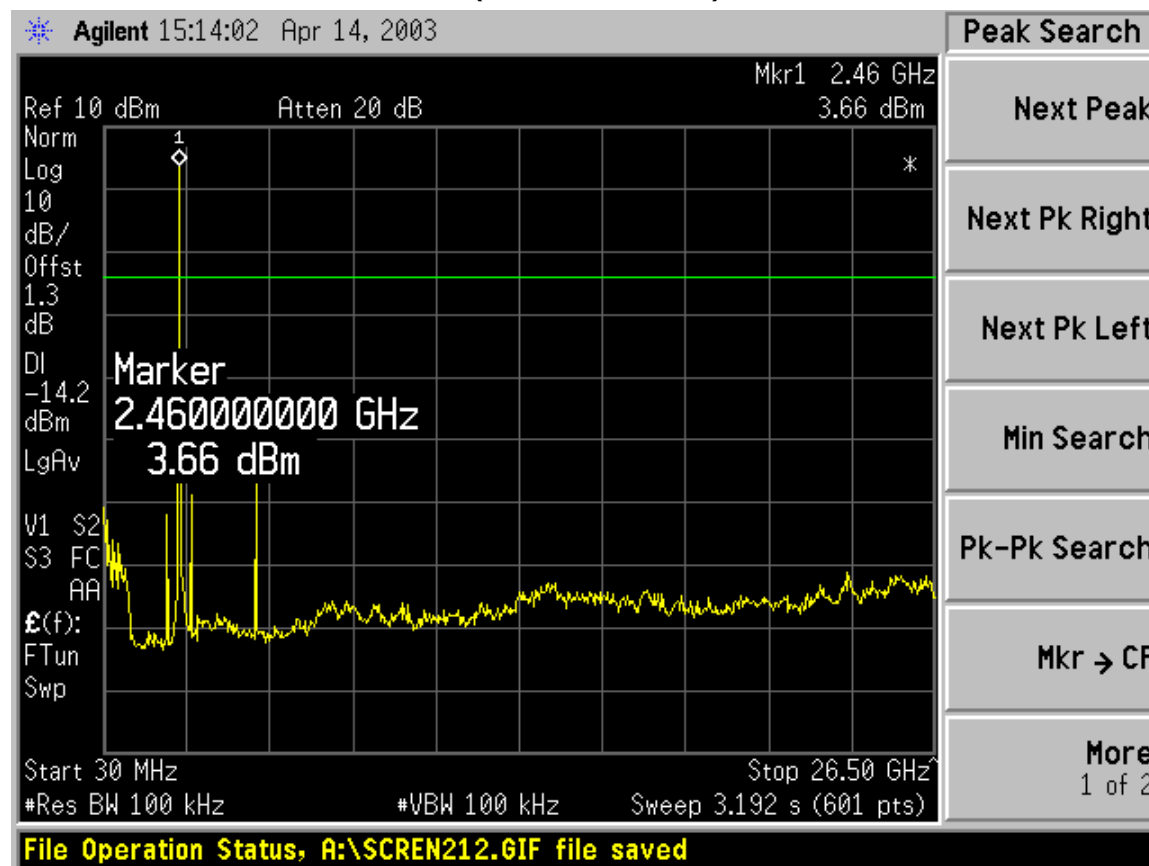


REFERENCE (MIDDLE CHANNEL)



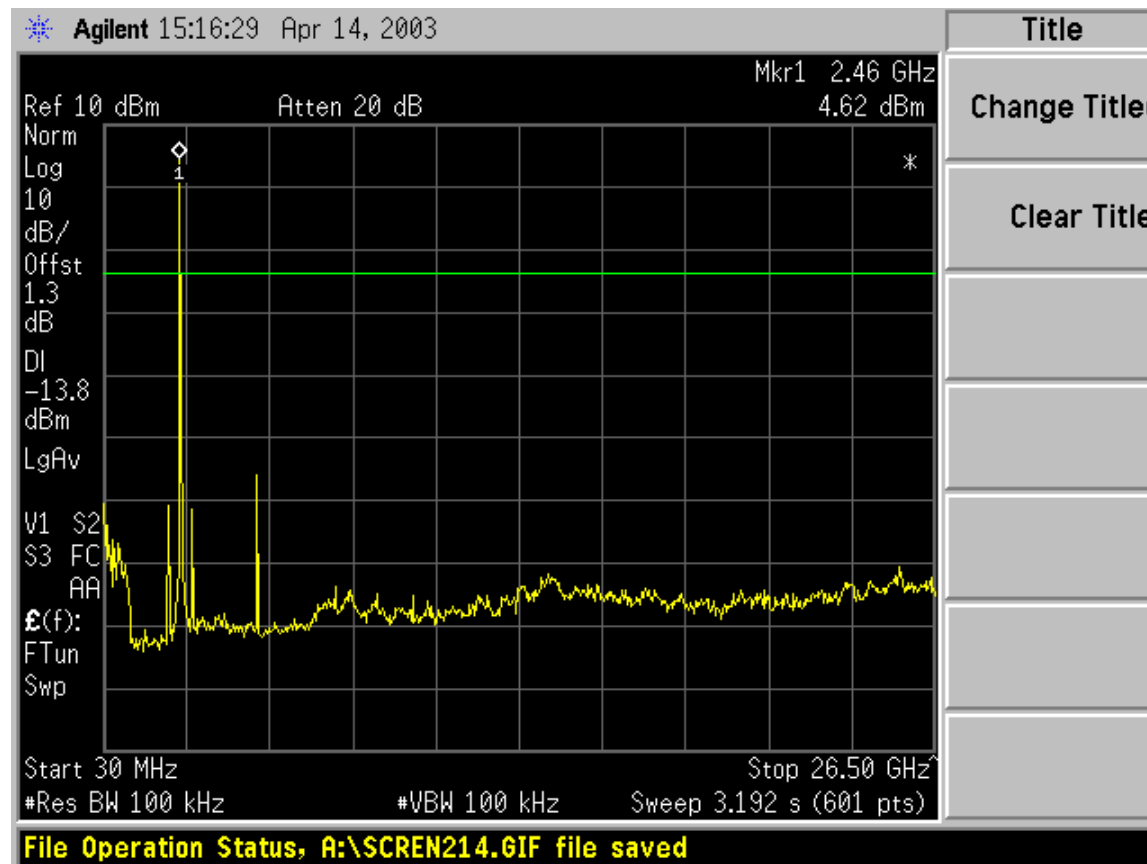
CONDUCTED SPURIOUS EMISSIONS (MIDDLE CHANNEL)



BAND EDGE (HIGH CHANNEL)



CONDUCTED SPURIOUS EMISSIONS (HIGH CHANNEL)



8.5. RADIATED EMISSIONS

TEST SETUP

The EUT is placed on the wooden table. 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.

TEST PROCEDURE

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.

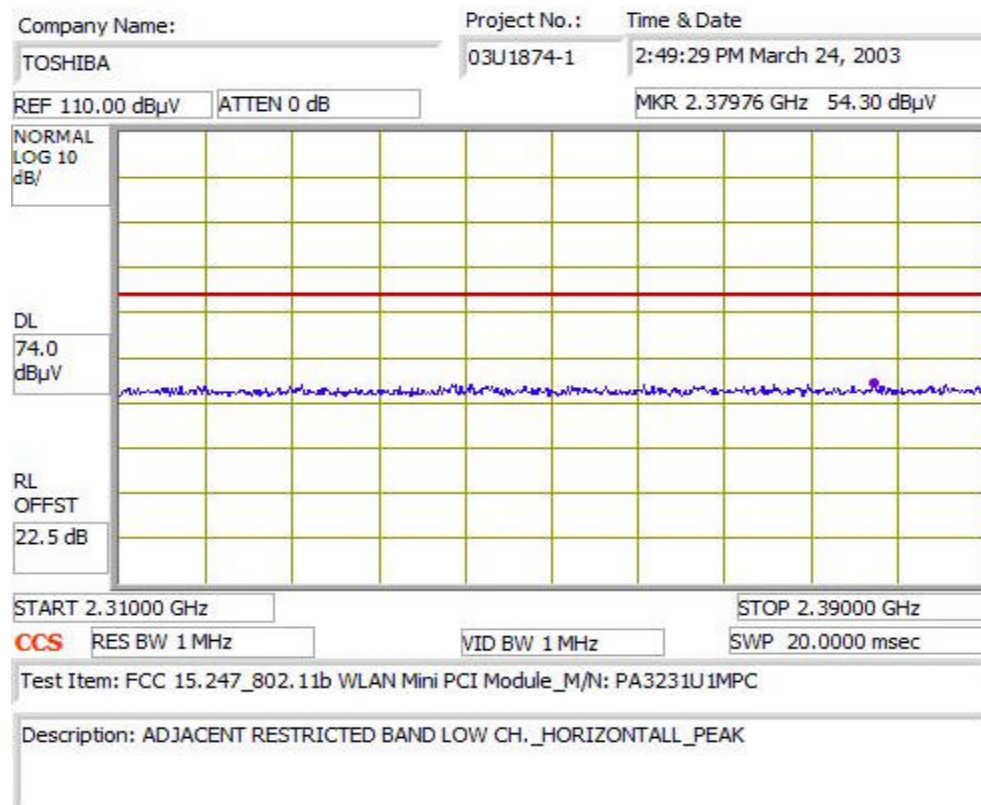
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

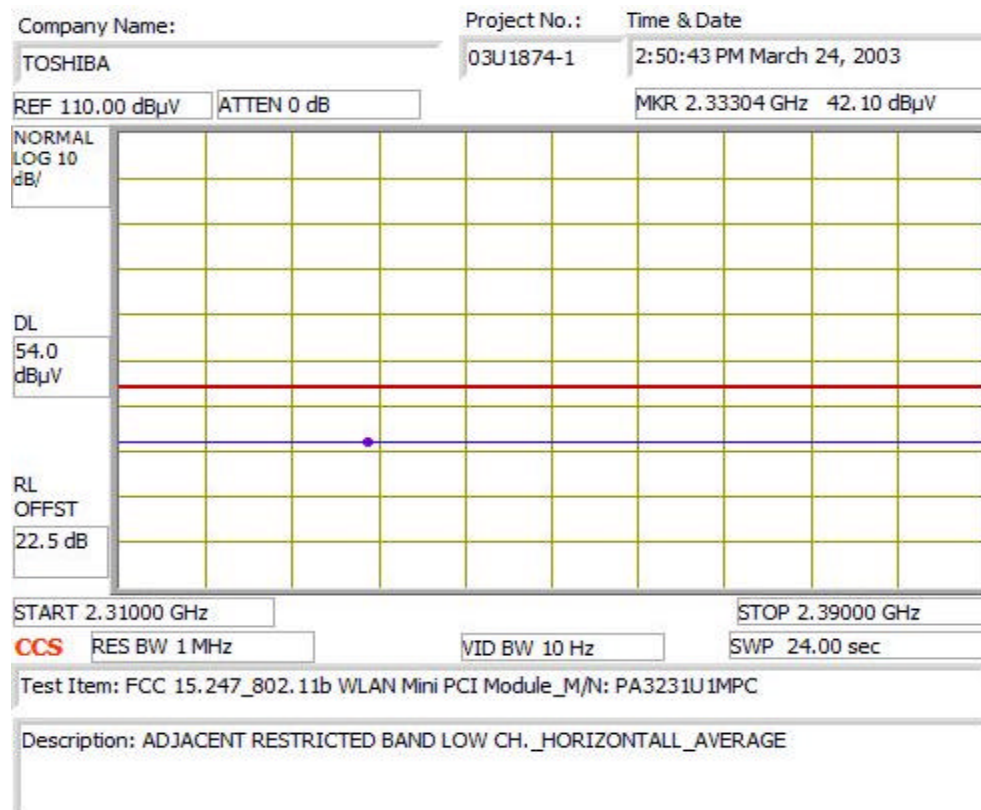
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The frequency span is set small enough to easily differentiate between broadcast stations, intermittent ambient signals and EUT emissions. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the suspected signal. Measurements were made with the antenna polarized in both the vertical and the horizontal positions.

TEST RESULTS

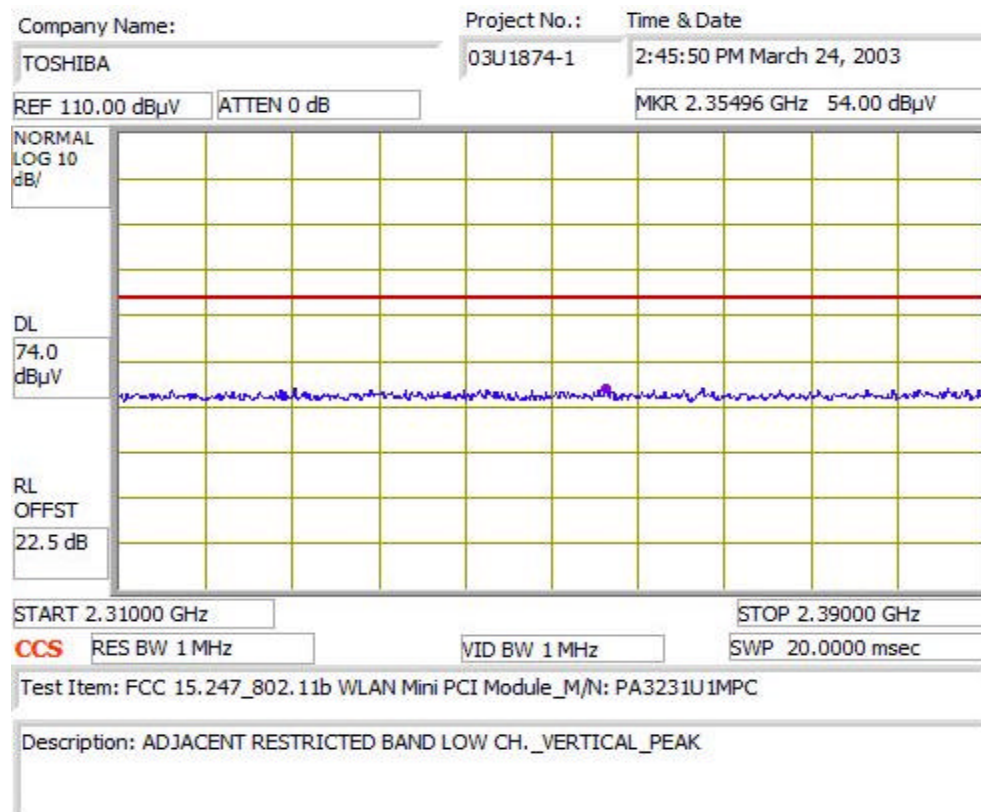
No non-compliance noted:

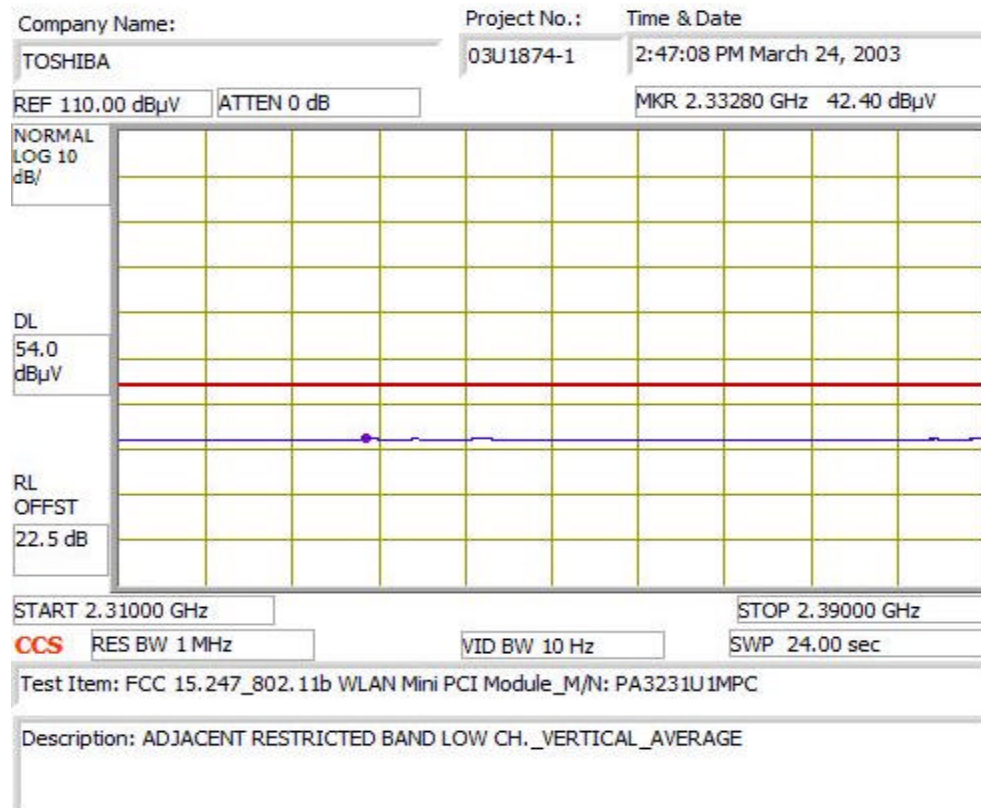
RESTRICTED BAND RADIATED EMISSIONS (LOW CHANNEL, HORIZONTAL POLARIZATION)



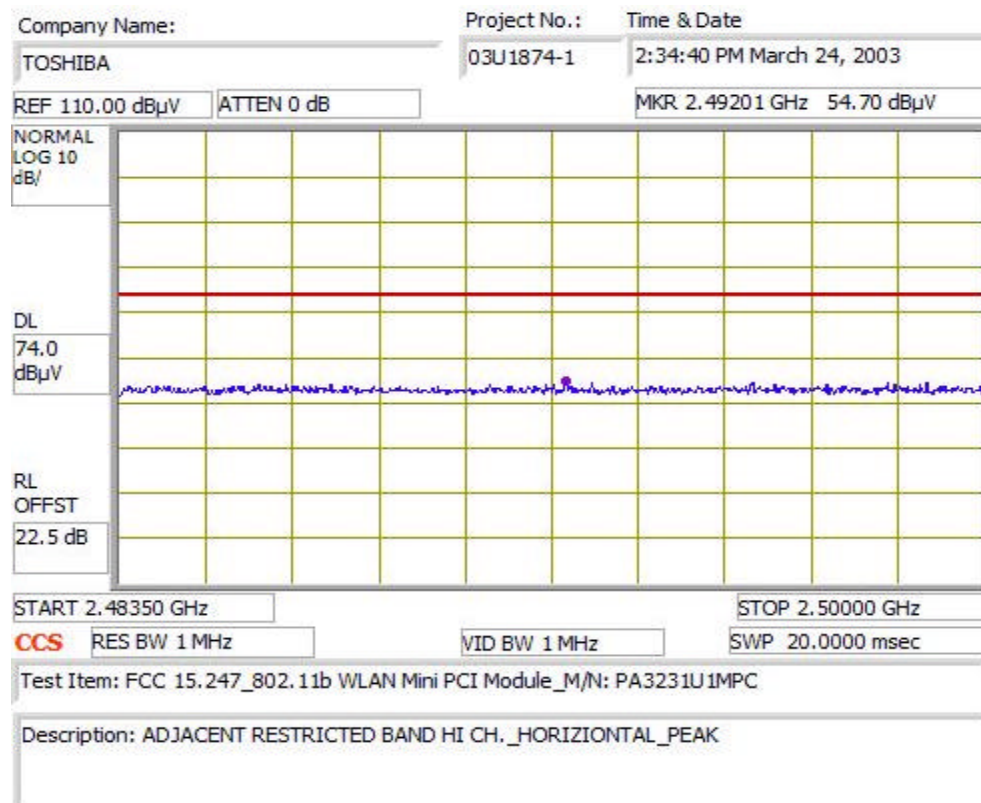


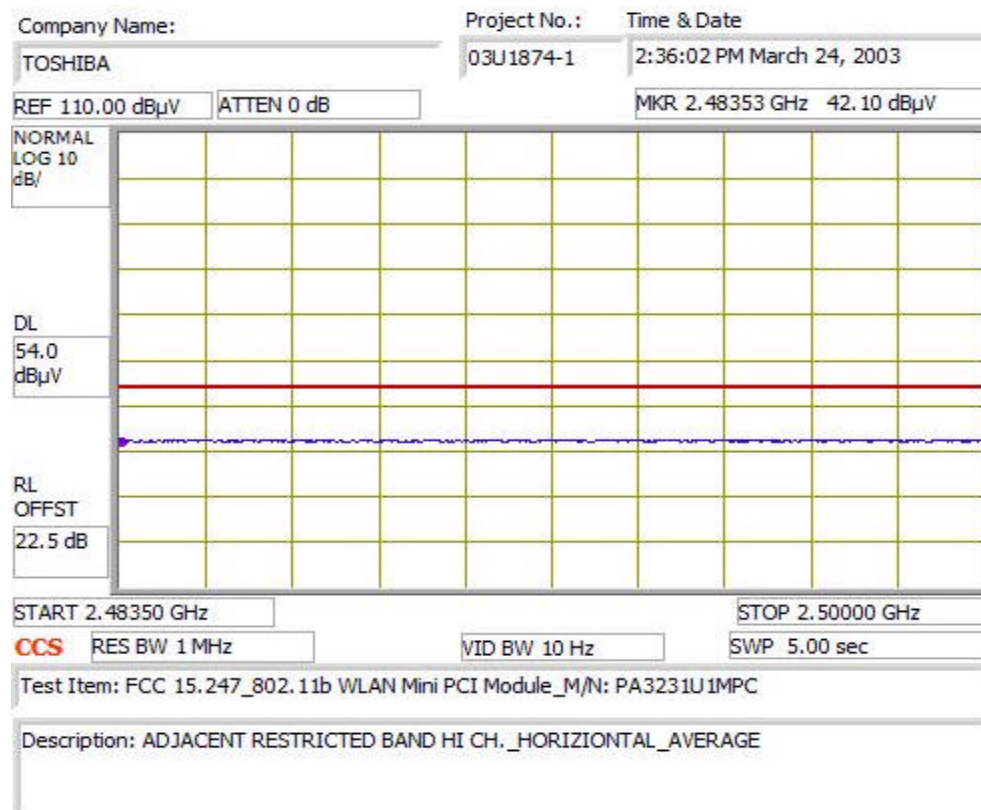
RESTRICTED BAND RADIATED EMISSIONS (LOW CHANNEL, VERTICAL POLARIZATION)



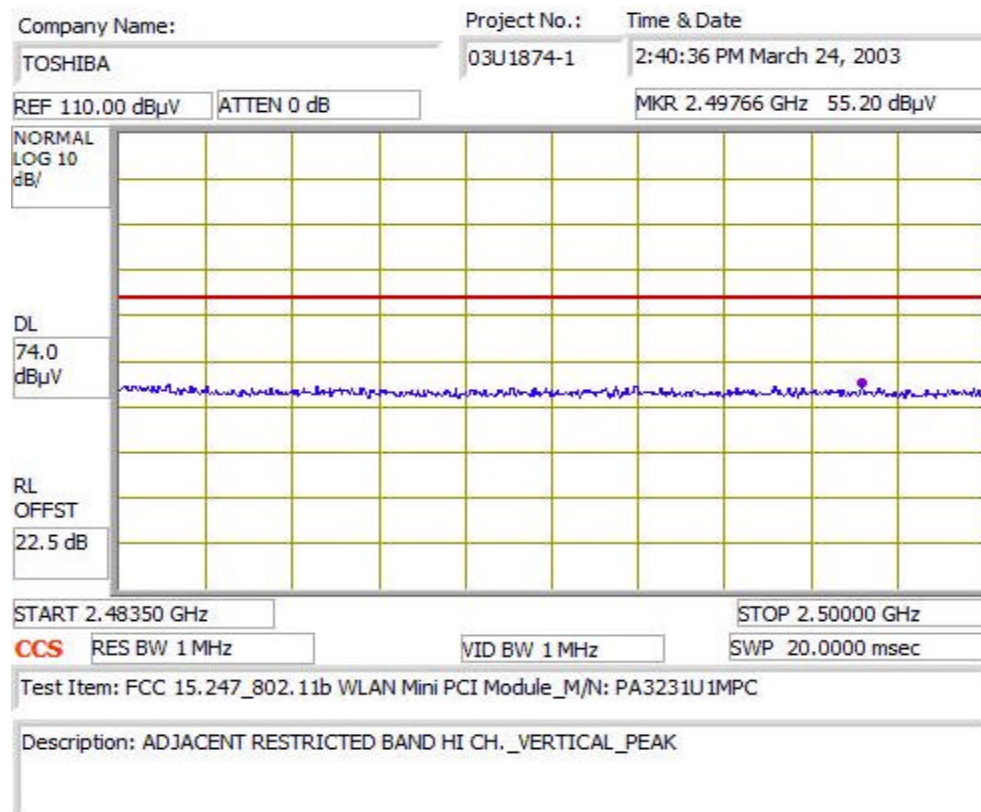


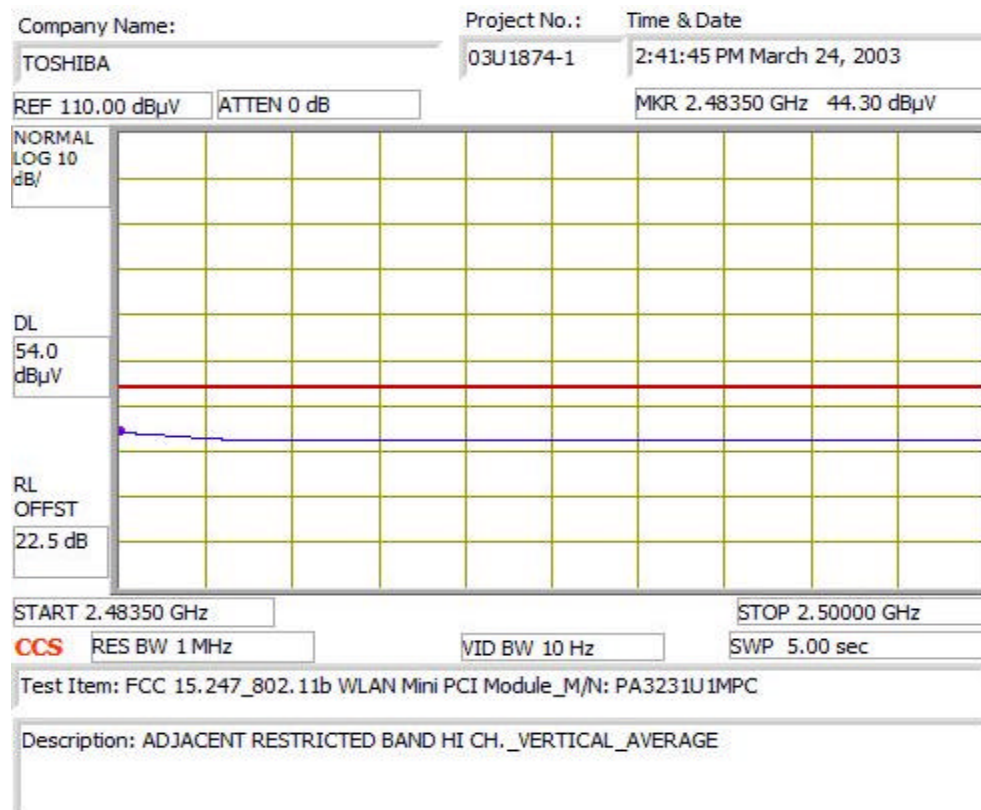
RESTRICTED BAND RADIATED EMISSIONS (HIGH CHANNEL, HORIZONTAL POLARIZATION)





RESTRICTED BAND RADIATED EMISSIONS (HIGH CHANNEL, VERTICAL POLARIZATION)





HARMONIC AND SPURIOUS RADIATED EMISSIONS (2.4 GHZ BAND)
(LOW CHANNEL)

03/24/03 High Frequency Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: VIEN TRAN
Project #: 03U1875-1
Company: TOSHIBA
EUT Descrip.: 802.11b WLAN Mini PCI Module
EUT M/N: PA3231U1MP
Test Target: FCC 15.247
Mode Oper: Tx at Low ch _ Harmonic & Spur

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifier 1-26GHz	Spectrum Analyzer	Horn > 18GHz	Limit
T00; S/N: 2238 @3m	HP 8449B	8566B Analyzer		FCC 15.205

Hi Frequency Cables:

☐ (2 ft) ☐ (2-3 ft) ☒ (4-6 ft) ☒ (12 ft)

Peak Measurements: **Average Measurements:**
1 MHz Resolution Bandwidth 1 MHz Resolution Bandwidth
10Hz Video 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
4.824	9.8	39.8	30.5	33.1	3.4	-34.6	0.0	1.0	42.7	33.4	74.0	54.0	-31.3	-20.6	H, 2nd Harmonic
4.824	9.8	49.0	37.5	33.1	3.4	-34.6	0.0	1.0	51.9	40.4	74.0	54.0	-22.1	-13.6	V, 2nd Harmonic

NO OTHER EMISSION FOUND AFTER 2nd 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		

(MIDDLE CHANNEL)

03/24/03 High Frequency Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Test Eng: VIEN TRAN
Project #: 03U1875-1
Company: TOSHIBA
EUT Descrip.: 802.11b WLAN Mini PCI Module
EUT M/N: PA3231U1MP
Test Target: FCC 15.247
Mode Oper: Tx at Mid ch _ Harmonic & Spur

Test Equipment:

EMCO Horn 1-18GHz T60; S/N: 2238 @3m	Pre-amplifier 1-26GHz HP 8449B	Spectrum Analyzer 8566B Analyser	Horn > 18GHz	Limit FCC 15.205
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Hi Frequency Cables
☐ (2 ft) ☐ (2-3 ft) ☒ (4-6 ft) ☒ (12 ft)

Peak Measurements: 1 MHz Resolution Bandwidth 1 MHz Video Bandwidth
Average Measurements: 1 MHz Resolution Bandwidth 10 Hz Video Bandwidth

f GHz	Dist feet	Read Pk dBuV	Read Avg dBuV	AF dBm	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
4.874	9.8	42.0	31.6	33.1	3.4	-34.6	0.0	1.0	45.0	34.6	74.0	54.0	-29.0	-19.4	H, 2nd Harmonic
7.311	9.8	41.0	30.6	36.2	4.4	-34.6	0.0	1.0	48.1	37.7	74.0	54.0	-25.9	-16.3	H, 3rd Harmonic
4.874	9.8	46.7	42.7	33.1	3.4	-34.6	0.0	1.0	49.7	45.7	74.0	54.0	-24.3	-8.3	V, 2nd Harmonic
7.311	9.8	43.2	35.7	36.2	4.4	-34.6	0.0	1.0	50.3	42.8	74.0	54.0	-23.7	-11.2	V, 3rd Harmonic

NO OTHER EMISSION FOUND AFTER 2nd 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		

(HIGH CHANNEL)

03/24/03 High Frequency Measurement
Compliance Certification Services, Morgan Hill Open Field Site

Test Eng: VIEN TRAN
Project #: 03U1875-1
Company: TOSHIBA
EUT Descr: 802.11b WLAN Mini PCI Module
EUT M/N: PA3231U1MP
Test Target: FCC 15.247
Mode Oper: Tx at Hi ch _ Harmonic & Spur

Test Equipment:

EMCO Horn 1-18GHz T60; S/N: 2238 @3m	Pre-amplifier 1-26GHz HP 8449B	Spectrum Analyzer 8566B Analyser	Horn > 18GHz	Limit FCC 15.205
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Hi Frequency Cables
☐ (2 ft) ☐ (2-3 ft) ☒ (4-6 ft) ☒ (12 ft)

Peak Measurements: 1 MHz Resolution Bandwidth
1 MHz Video Bandwidth
Average Measurements: 1 MHz Resolution Bandwidth
10 Hz 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
4.924	9.8	42.0	30.6	33.2	3.5	-34.5	0.0	1.0	45.1	33.7	74.0	54.0	-28.9	-20.3	H, 2nd Harmonic
7.386	9.8	42.0	30.8	36.3	4.4	-34.6	0.0	1.0	49.2	36.0	74.0	54.0	-24.8	-16.0	H, 3rd Harmonic
4.924	9.8	45.4	41.2	33.2	3.5	-34.5	0.0	1.0	48.5	44.3	74.0	54.0	-25.5	-9.7	V, 2nd Harmonic
7.386	9.8	47.1	39.5	36.3	4.4	-34.6	0.0	1.0	54.3	46.7	74.0	54.0	-19.7	-7.3	V, 3rd Harmonic

NO OTHER EMISSION FOUND AFTER 2nd 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		

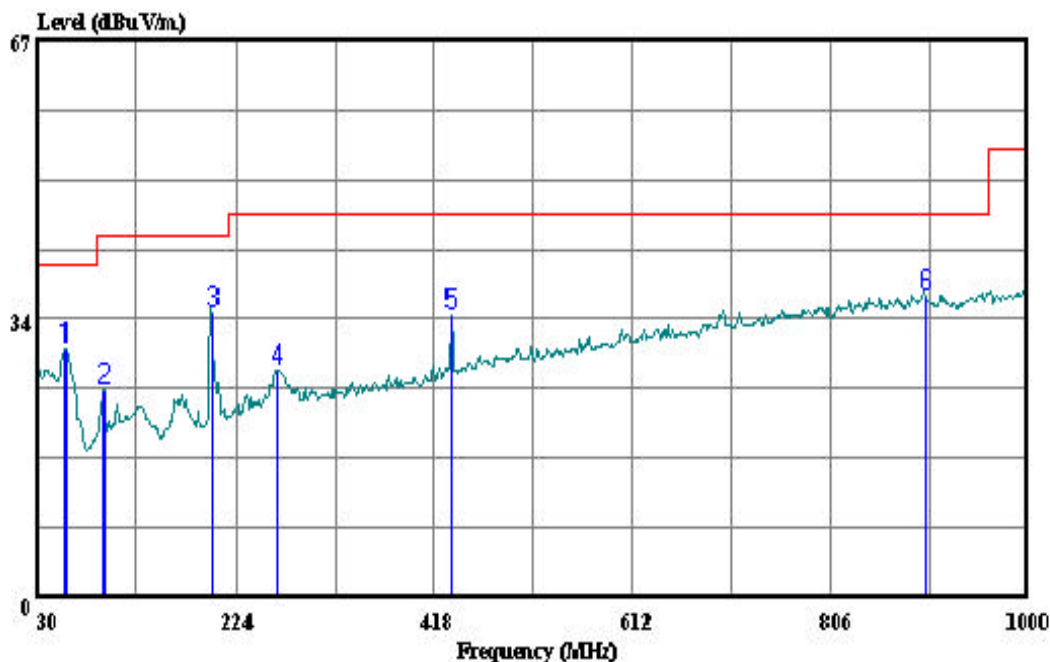
**RADIATED EMISSIONS 30-1000 MHz, WORST CASE CONFIGURATION
(VERTICAL)**



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

Data#: 4 File#: Tx-mid-ch 2437-H.EMI

Date: 03-25-2003 Time: 17:38:49



(Auxil: ATC)

Trace: 3

Ref Trace:

Condition: FCC CLASS-B 3m CHAMBER 030117 1185 VERTICAL
Company : Toshiba America information, Inc.
Project No : 03U1874-1
EUT Description : 802.11b WLAN Mini PCI Module
Model Number : PA3231U-1MPC
Test Configuration : EUT
Test Target : FCC 15.247
Mode of Operation: Tx at Mid Ch. 2.437GHz

Page: 1

	Read	Probe	Cable	Preamp		Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	57.160	15.52	13.52	0.71	0.00	29.75	40.00	-10.25 Peak
2	94.990	13.98	9.94	0.91	0.00	24.83	43.50	-18.67 Peak
3	201.690	22.93	9.95	1.38	0.00	34.26	43.50	-9.24 Peak
4	264.740	13.06	12.56	1.60	0.00	27.23	46.00	-18.77 Peak
5	434.490	16.01	15.84	2.12	0.00	33.97	46.00	-12.03 Peak
6	899.120	10.89	22.04	3.25	0.00	36.18	46.00	-9.82 Peak

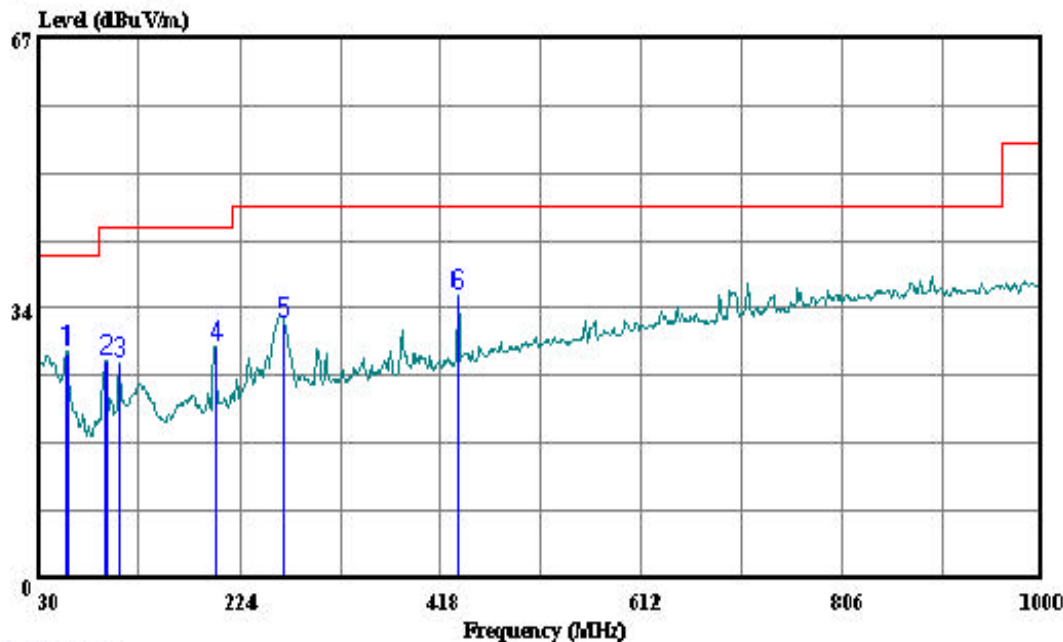
(HORIZONTAL)



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

Data#: 2 File#: Tx-mid-ch 2437-H.EMI

Date: 03-25-2003 Time: 17:18:47



(Audix ATC)

Trace: 1

Ref Trace:

Condition: FCC CLASS-B 3m CHAMBER 030117 1185 HORIZONTAL
Company : Toshiba America information, Inc.
Project No : 03U1874-1
EUT Description : 802.11b WLAN Mini PCI Module
Model Number : PA3231U-1MPC
Test Configuration : EUT
Test Target : FCC 15.247
Mode of Operation: Tx at Mid Ch. 2.437GHz

Page: 1

	Read	Probe	Cable	Preamp		Limit	Over	
Freq	Level	Factor	Loss	Factor	Level	Line	Limit	Remark
MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	56.190	13.78	13.52	0.71	0.00	28.01	40.00	-11.99 Peak
2	94.990	16.14	9.94	0.91	0.00	26.99	43.50	-16.51 Peak
3	106.630	15.16	10.59	1.00	0.00	26.75	43.50	-16.75 Peak
4	201.690	17.29	9.95	1.38	0.00	28.62	43.50	-14.88 Peak
5	266.680	17.45	12.59	1.61	0.00	31.66	46.00	-14.34 Peak
6	434.490	17.03	15.84	2.12	0.00	34.99	46.00	-11.01 Peak

8.6. POWERLINE CONDUCTED EMISSIONS

TEST SETUP

The EUT is placed on a wooden 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 EUT is set to transmit in a continuous mode.

TEST PROCEDURE

The resolution bandwidth is set to 10 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

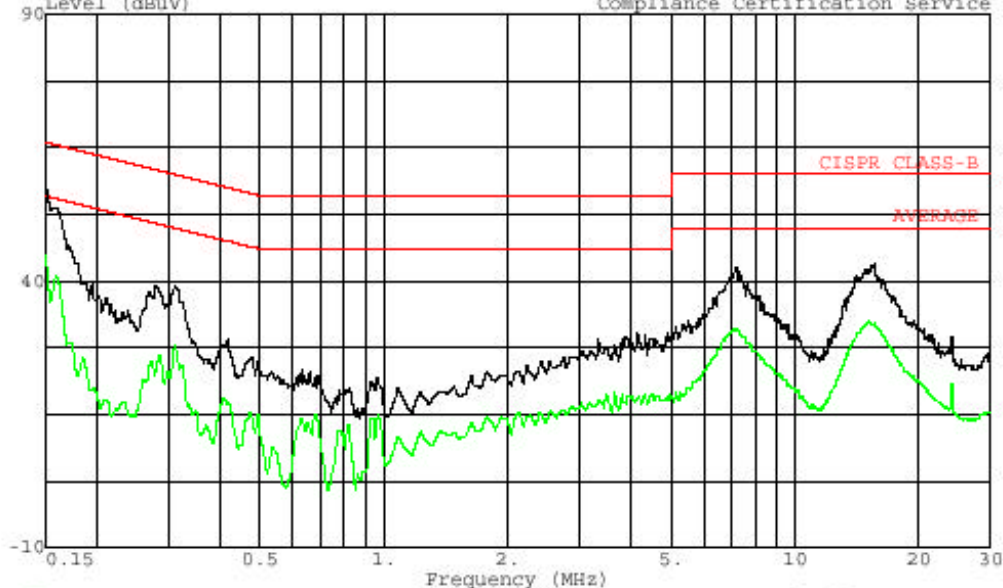
No non-compliance noted:

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.15	57.24	--	43.67	0.00	65.97	55.97	-8.73	-12.30	L1
15.55	42.85	--	32.29	0.00	60.00	50.00	-17.15	-17.71	L1
7.21	42.60	--	31.06	0.00	60.00	50.00	-17.40	-18.94	L1
0.15	55.97	--	42.99	0.00	65.97	55.97	-10.00	-12.98	L2
15.55	41.44	--	31.32	0.00	60.00	50.00	-18.56	-18.68	L2
7.21	39.24	--	29.75	0.00	60.00	50.00	-20.76	-20.25	L2
6 Worst Data									



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

Data#: 7 File#: 03U1874.EMI Date: 03-25-2003 Time: 20:55:15
Level (dBuV) Compliance Certification Service

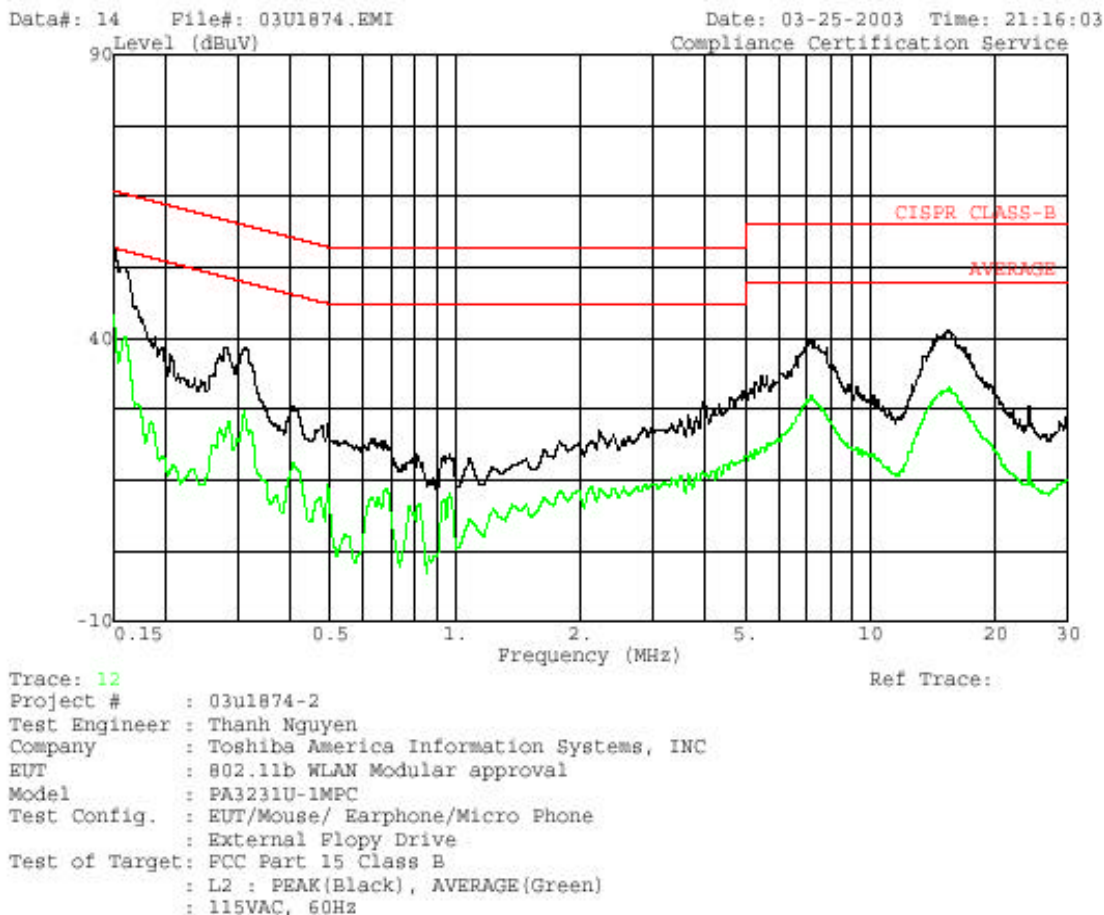


Trace: 5
Project # : 03u1874-2
Test Engineer : Thanh Nguyen
Company : Toshiba America Information Systems, INC
EUT : 802.11b WLAN Modular approval
Model : PA3231U-1MPC
Test Config. : EUT/Mouse/ Earphone/Micro Phone
 : External Floppy Drive
Test of Target: FCC Part 15 Class B
 : L1 : PEAK(Black), AVERAGE(Green)
 : 115VAC, 60Hz

Ref Trace:



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



8.7. SETUP PHOTOS

ANTENNA PORT CONDUCTED RF MEASUREMENT SETUP



RADIATED RF MEASUREMENT SETUP





POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP





END OF REPORT