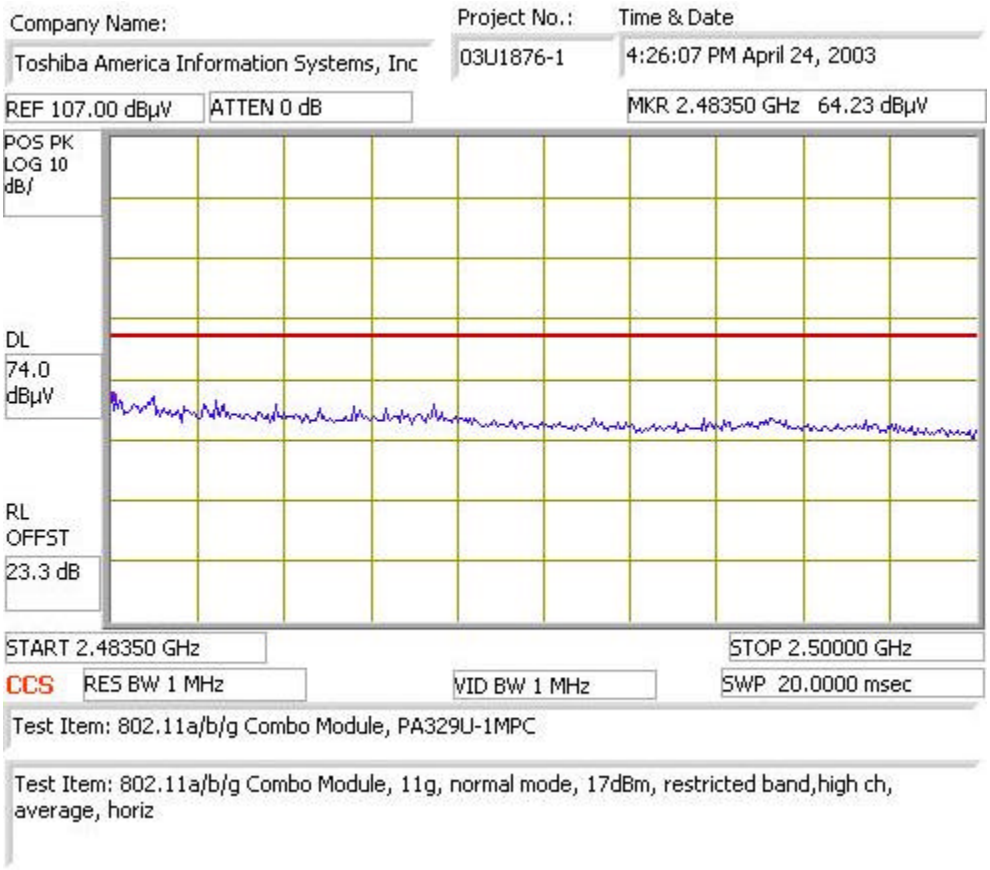
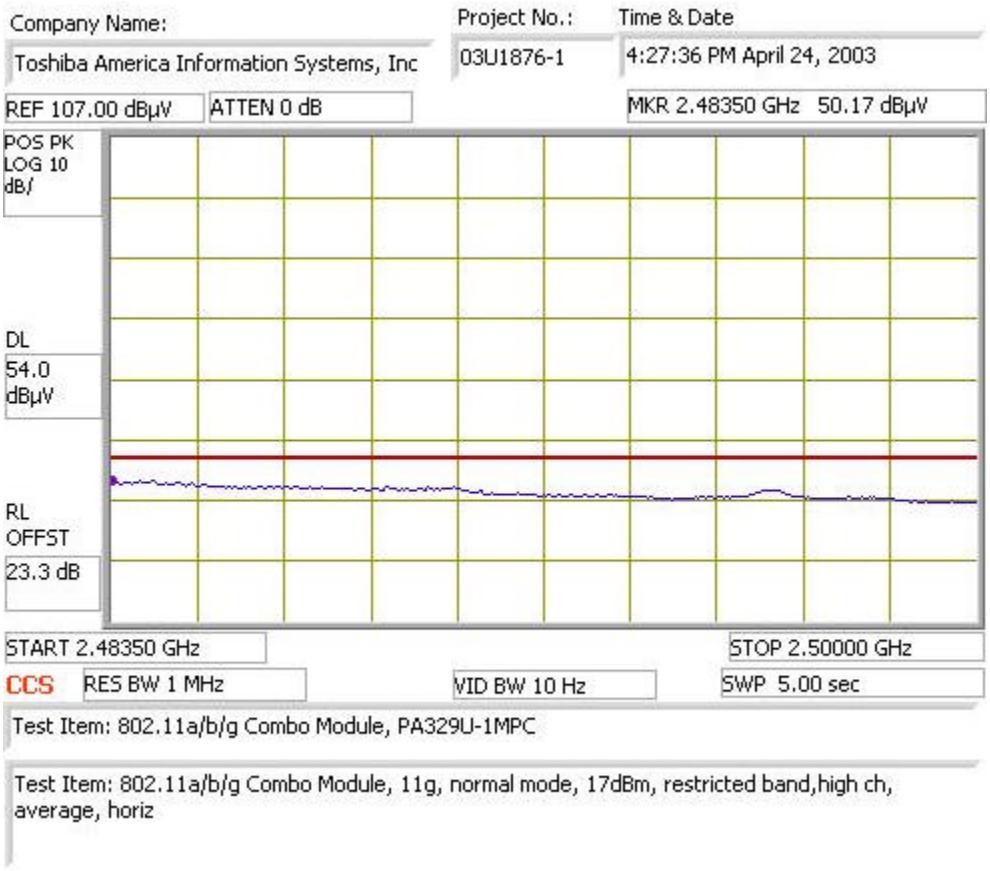
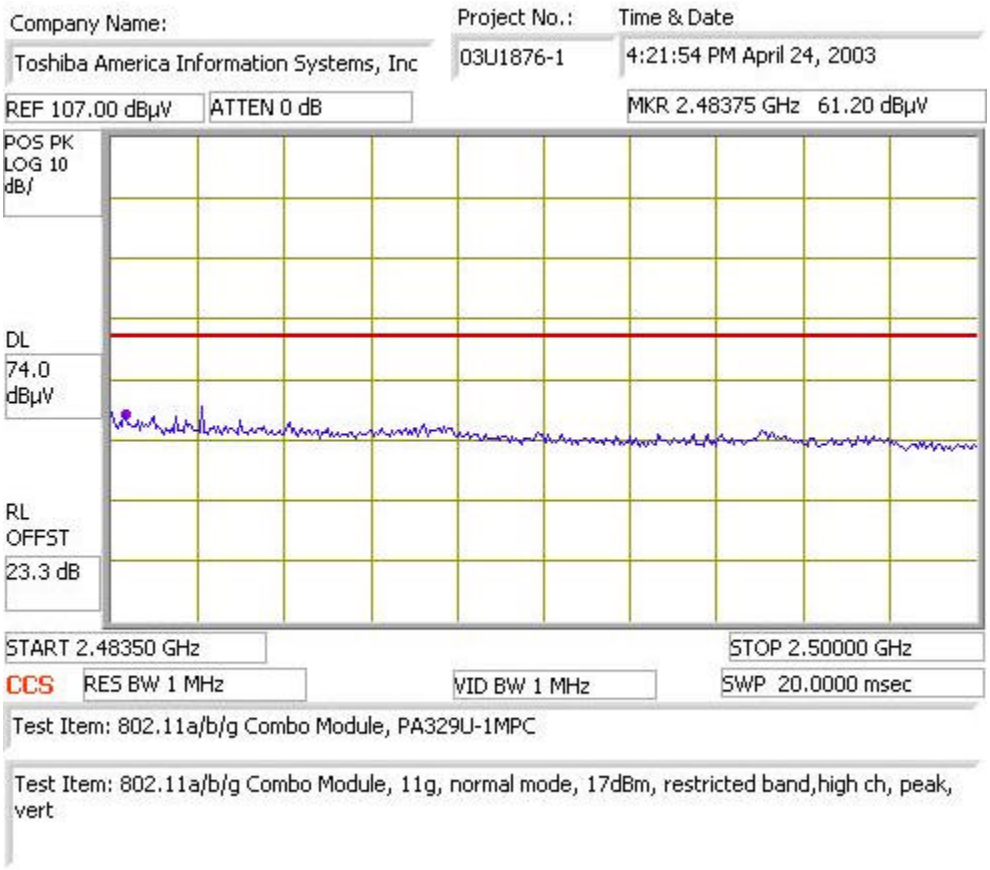
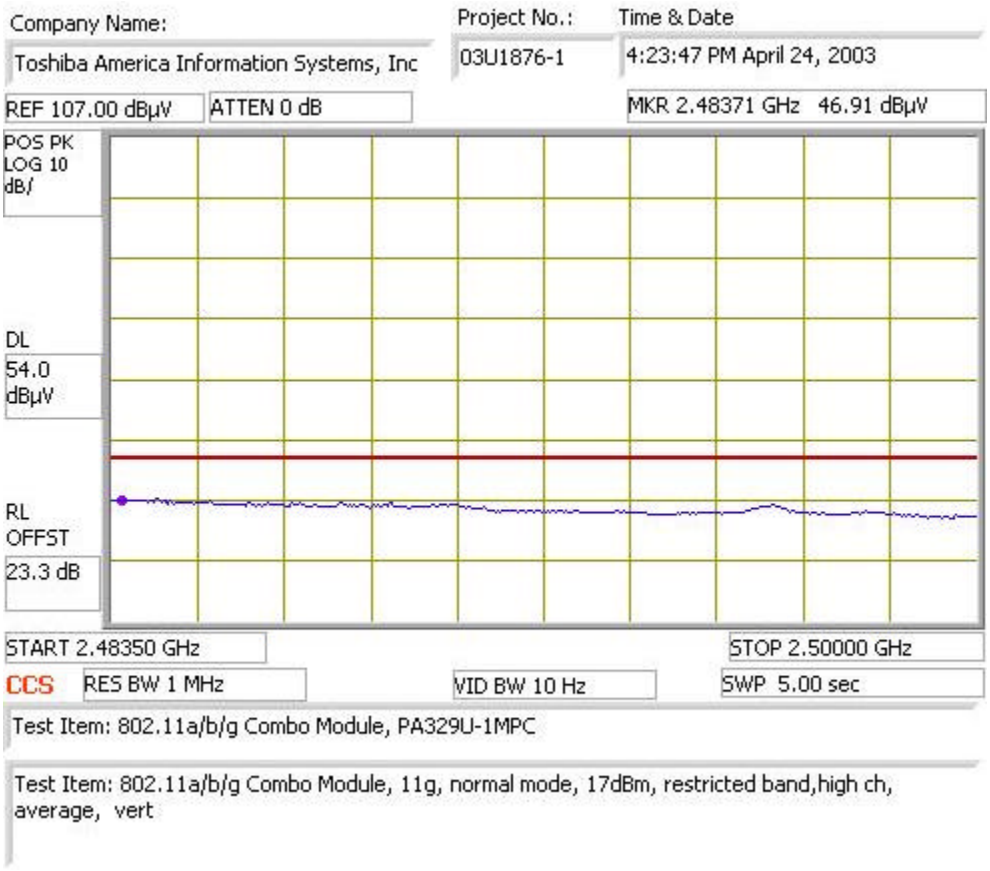
ADJACENT RESTRICTED BAND (g MODE, HIGH CHANNEL, HORIZONTAL)





ADJACENT RESTRICTED BAND (g MODE, HIGH CHANNEL, VERTICAL)





HARMONIC AND SPURIOUS RADIATED EMISSIONS (2.4 GHZ BAND, b MODE)

06/09/03 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: chin pang
Project #: 03u1876-1
Company: Toshiba America Information Systems, Inc.
EUT Descrip.: 802.11a/b/g Combo Module
EUT M/N: PA3297U-1MPC
FCC class B
Mode Oper: Tx

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz
T60; S/N: 2238 @3m	Miteq NSP2600-44	8593EM Analyzer	

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
2.412	9.8	72.2		29.6	2.5	-36.3	0.0	0.0	67.9		74.0	54.0	-6.1		V
2.412	9.8	73.3		29.6	2.5	-36.3	0.0	0.0	69.1		74.0	54.0	-4.9		H
4.824	9.8	45.9	38.6	33.1	3.9	-36.1	0.0	1.0	47.9	40.6	74.0	54.0	-26.1	-13.4	V
4.824	9.8	47.8	41.9	33.1	3.9	-36.1	0.0	1.0	49.8	43.8	74.0	54.0	-24.2	-10.2	H
7.236	9.8	46.3	38.0	36.1	5.1	-36.3	0.0	1.0	52.2	43.9	74.0	54.0	-21.8	-10.1	V, noise floor
7.236	9.8	47.9	38.0	36.1	5.1	-36.3	0.0	1.0	53.8	43.9	74.0	54.0	-20.2	-10.1	H, noise floor
2.437	9.8			29.6	2.5	-36.3	0.0	0.0			74.0	54.0			V
2.437	9.8			29.6	2.5	-36.3	0.0	0.0			74.0	54.0			H
4.874	9.8	47.2	40.1	33.1	4.0	-36.1	0.0	1.0	49.2	42.1	74.0	54.0	-24.8	-11.9	V
4.874	9.8	47.7	41.6	33.1	4.0	-36.1	0.0	1.0	49.7	43.6	74.0	54.0	-24.3	-10.4	H
7.311	9.8	46.5	38.0	36.2	5.2	-36.3	0.0	1.0	52.6	44.1	74.0	54.0	-21.4	-9.9	V, noise floor
7.311	9.8	48.4	38.5	36.2	5.2	-36.3	0.0	1.0	54.5	44.6	74.0	54.0	-19.5	-9.4	H, noise floor
2.462	9.8			29.7	2.6	-36.3	0.0	0.0			74.0	54.0			V
2.462	9.8			29.7	2.6	-36.3	0.0	0.0			74.0	54.0			H
4.924	9.8	43.8	34.0	33.2	4.0	-36.1	0.0	1.0	45.9	36.1	74.0	54.0	-28.1	-17.9	V
4.924	9.8	45.5	37.0	33.2	4.0	-36.1	0.0	1.0	47.6	39.1	74.0	54.0	-26.4	-14.9	H
7.386	9.8	46.2	38.0	36.3	5.2	-36.2	0.0	1.0	52.5	44.3	74.0	54.0	-21.5	-9.7	V, noise floor
7.386	9.8	47.4	38.0	36.3	5.2	-36.2	0.0	1.0	53.7	44.3	74.0	54.0	-20.3	-9.7	H, noise floor

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

HARMONIC AND SPURIOUS RADIATED EMISSIONS (2.4 GHZ BAND, g MODE)

06/09/03 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: chin pang
Project #: 03u1876-1
Company: Toshiba America Information Systems, Inc.
EUT Descrip.: 802.11a/b/g Combo Module
EUT M/N: PA3297U-1MPC
FCC class B
Mode Oper: Tx

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz
T60; S/N: 2238 @3m	Miteq NSP2600-44	8593EM Analyzer	

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

11g, normal mode

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
Transmitting at low Channel															
4.824	9.8	57.4	42.8	33.1	3.9	-36.1	0.0	1.0	59.4	44.8	74.0	54.0	-14.6	-9.2	V
4.824	9.8	55.9	42.5	33.1	3.9	-36.1	0.0	1.0	57.8	44.5	74.0	54.0	-16.2	-9.5	H
7.236	9.8	53.4	41.7	36.1	5.1	-36.3	0.0	1.0	59.3	47.6	74.0	54.0	-14.7	-6.4	V
7.236	9.8	56.5	42.5	36.1	5.1	-36.3	0.0	1.0	62.4	48.4	74.0	54.0	-11.6	-5.6	H
Transmitting at Mid Channel															
4.874	9.8	53.4	41.7	33.1	4.0	-36.1	0.0	1.0	55.4	43.7	74.0	54.0	-18.6	-10.3	V
4.874	9.8	53.3	41.6	33.1	4.0	-36.1	0.0	1.0	55.3	43.6	74.0	54.0	-18.7	-10.4	H
7.311	9.8	54.8	41.8	36.2	5.2	-36.3	0.0	1.0	60.9	47.9	74.0	54.0	-13.1	-6.1	V
7.311	9.8	54.5	41.7	36.2	5.2	-36.3	0.0	1.0	60.6	47.8	74.0	54.0	-13.4	-6.2	H
Transmitting at high Channel															
4.924	9.8	52.6	39.6	33.2	4.0	-36.1	0.0	1.0	54.7	41.7	74.0	54.0	-19.3	-12.3	V
4.924	9.8	51.3	39.2	33.2	4.0	-36.1	0.0	1.0	53.4	41.3	74.0	54.0	-20.6	-12.7	H
7.386	9.8	52.8	39.6	36.3	5.2	-36.2	0.0	1.0	59.1	45.9	74.0	54.0	-14.9	-8.1	V, noise floor
7.386	9.8	51.5	39.4	36.3	5.2	-36.2	0.0	1.0	57.8	45.7	74.0	54.0	-16.2	-8.3	H, noise floor

	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		

HARMONIC AND SPURIOUS RADIATED EMISSIONS (2.4 GHZ BAND, g TURBO MODE)

06/09/03 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: chin pang
Project #: 03u1876-1
Company: Toshiba America Information Systems, Inc.
EUT Descrip.: 802.11a/b/g Combo Module
EUT M/N: PA3297U-1MPC
FCC class B
Mode Oper: Tx

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz
T60; S/N: 2238 @3m	Miteq NSP2600-44	8593EM Analyzer	

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

11g. Turbo Mode

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
Transmitting at Mid Channel															
4.874	9.8	53.7	40.5	33.1	4.0	-36.1	0.0	1.0	55.7	42.5	74.0	54.0	-18.3	-11.5	V
4.874	9.8	52.5	40.2	33.1	4.0	-36.1	0.0	1.0	54.5	42.2	74.0	54.0	-19.5	-11.8	H
7.311	9.8	52.8	40.5	36.2	5.2	-36.3	0.0	1.0	58.9	46.6	74.0	54.0	-15.1	-7.4	V
7.311	9.8	52.4	40.0	36.2	5.2	-36.3	0.0	1.0	58.5	46.1	74.0	54.0	-15.5	-7.9	H

	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		

HARMONIC AND SPURIOUS RADIATED EMISSIONS (5.8 GHZ BAND)

06/05/03 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: VIEN TRAN
Project #: 03U1876-1/2/3
Company: TOSHIBA
EUT Descrip.: 802.11a/b/g Combo Module
EUT M/N: PA3297U-1MPC
Test Target: FCC15.247/IC/DGT (5.8 GHz)
Mode Oper: Tx at Low, Mid, Hi Ch's _ Normal Mode & Turbo Mode

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz
T72; S/N: 6739 @3m	HP 8449B	8566B Analyzer	T87 ARA 18-26GHz & Mixer > 26GHz

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

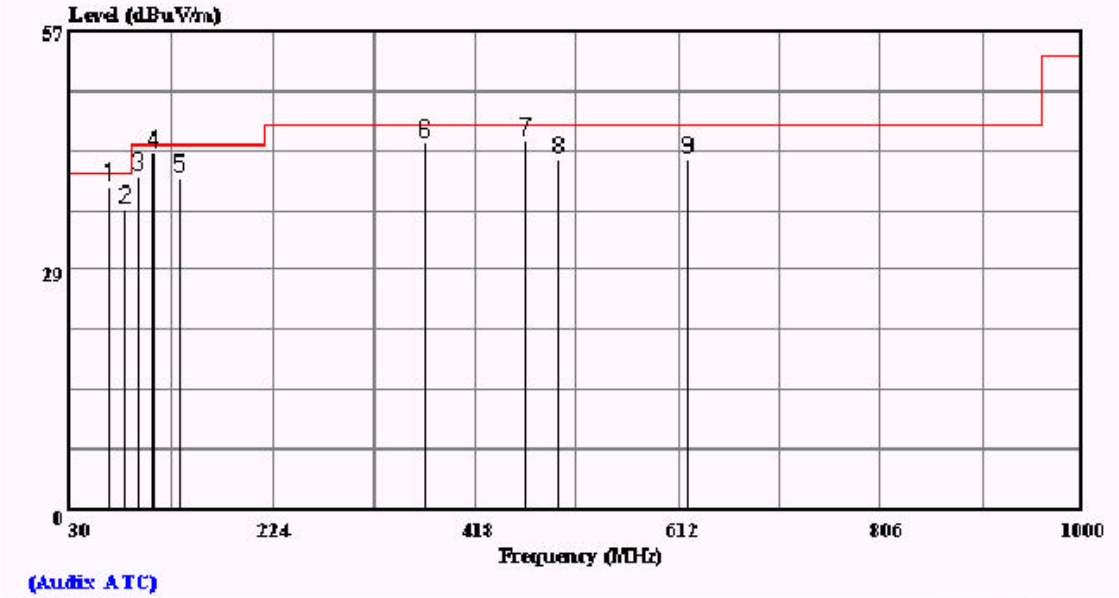
f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
NORMAL MODE															
Mid ch = 5.785															
11.570	9.8	43.0	29.0	38.6	5.8	-33.7	0.0	1.0	54.7	40.7	74.0	54.0	-19.3	-13.3	H, 2nd Har
11.570	9.8	46.4	32.0	38.6	5.8	-33.7	0.0	1.0	58.1	43.7	74.0	54.0	-15.9	-10.3	V, 2nd Har
NO OTHER HARMONICS AND SPURIOUS FOUND AFTER 2nd HARMONIC															
Low ch = 5.745															
11.490	9.8	42.4	28.5	38.5	5.8	-33.8	0.0	1.0	53.9	40.0	74.0	54.0	-20.1	-14.0	H, 2nd Har
22.980	9.8	44.6	31.3	36.3	9.4	-33.7	0.0	1.0	57.6	44.3	74.0	54.0	-16.4	-9.7	V, 2nd Har
11.490	9.8	45.1	30.2	38.5	5.8	-33.8	0.0	1.0	56.6	41.7	74.0	54.0	-17.4	-12.3	H, 4h Har
22.980	9.8	45.5	32.5	36.3	9.4	-33.7	0.0	1.0	58.5	45.5	74.0	54.0	-15.5	-8.5	V, 4th Har
NO OTHER HARMONICS AND SPURIOUS FOUND AFTER 4th HARMONIC															
Hi ch = 5.825															
11.650	9.8	42.8	28.3	38.7	5.9	-33.7	0.0	1.0	54.6	40.1	74.0	54.0	-19.4	-13.9	H, 2nd Har
11.650	9.8	43.1	28.5	38.7	5.9	-33.7	0.0	1.0	54.9	40.3	74.0	54.0	-19.1	-13.7	V, 2nd Har
NO OTHER HARMONICS AND SPURIOUS FOUND AFTER 2nd HARMONIC															
TURBO MODE															
Low ch = 5.76															
11.520	9.8	41.7	29.1	38.6	5.8	-33.8	0.0	1.0	53.3	40.7	74.0	54.0	-20.7	-13.3	H, 2nd Har
11.520	9.8	45.2	31.1	38.6	5.8	-33.8	0.0	1.0	56.8	42.7	74.0	54.0	-17.2	-11.3	V, 2nd Har
NO OTHER HARMONICS AND SPURIOUS FOUND AFTER 2nd HARMONIC															
Hi ch = 5.80															
11.600	9.8	42.0	28.5	38.6	5.8	-33.7	0.0	1.0	53.7	40.2	74.0	54.0	-20.3	-13.8	H, 2nd Har
11.600	9.8	43.3	29.4	38.6	5.8	-33.7	0.0	1.0	55.0	41.1	74.0	54.0	-19.0	-12.9	V, 2nd Har
NO OTHER HARMONICS AND SPURIOUS 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		

SPURIOUS RADIATED EMISSIONS BELOW 1 GHZ (WORST-CASE CONFIGURATION)

COMPLIANCE Engineering Services, Inc.
FCC,VCCI,CISPR,CE
UL,CSA,TUV
561F Monterey Road
Morgan Hill, CA 95037, U.S.A.
Tel: (408) 463-0885
Fax:(408) 463-0888

Data#: 18 File#: 1876 normal.EMI Date: 05-09-2003 Time: 15:39:24



Trace: Ref Trace:

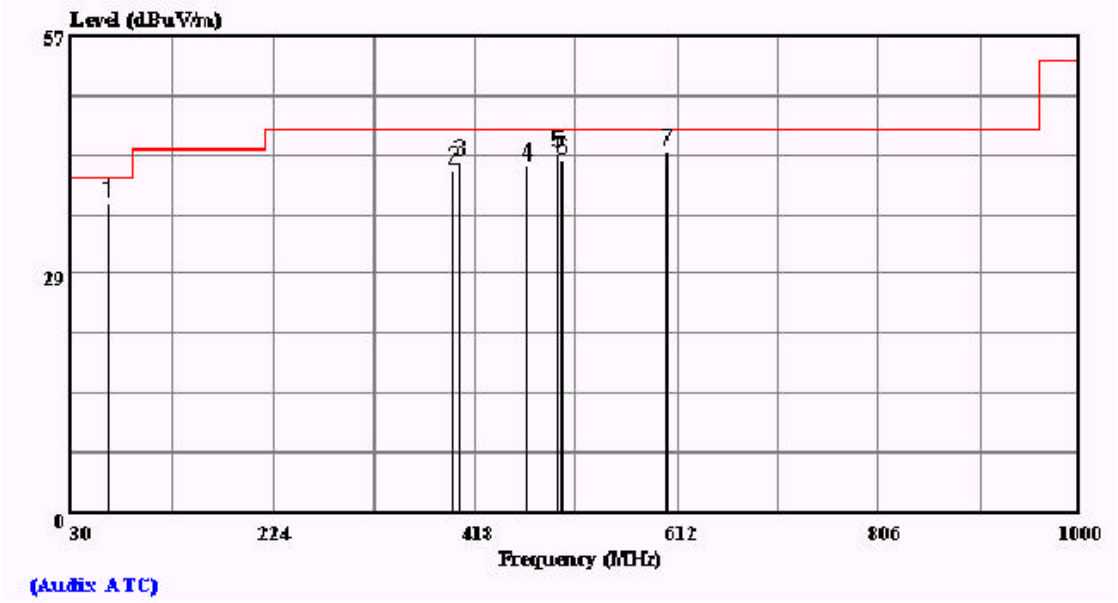
Condition: FCC CLASS-B 3m CHAMBER 030306 1185 HORIZONTAL
Company : TOSHIBA AMERICA IMFORMATION SYSTEM INC.
EUT Description : 802,11a/b/g Combo module
Model Number : PA3297U-1MPC
Test Configurtion: EUC on extender board/laptop
Test Target : 802,11b,Normal Mode (Mid Ch)
Mode of Operation: Worst case Tx Mode
Project No : 03U1876-1
: 2.4GHz Band

Page: 1

	Freq	Read Level	Probe Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	67.830	29.07	8.68	0.79	0.00	38.54	40.00	-1.46	Peak
2	82.380	28.12	6.84	0.84	0.00	35.80	40.00	-4.20	Peak
3	94.990	30.47	8.45	0.91	0.00	39.83	43.50	-3.67	Peak
4	109.540	31.64	9.71	1.01	0.00	42.36	43.50	-1.14	Peak
5	133.790	28.96	9.40	1.11	0.00	39.47	43.50	-4.03	Peak
6	368.530	27.99	13.77	1.96	0.00	43.72	46.00	-2.28	Peak
7	465.530	25.74	15.87	2.25	0.00	43.86	46.00	-2.14	Peak
8	497.540	23.02	16.50	2.29	0.00	41.81	46.00	-4.19	Peak
9	620.730	21.26	17.88	2.58	0.00	41.72	46.00	-4.28	Peak

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

Data#: 15 File#: 1876 normal.EMI Date: 05-09-2003 Time: 15:33:08



Trace: Ref Trace:

Condition: FCC CLASS-B 3m CHAMBER 030306 1185 VERTICAL
Company : TOSHIBA AMERICA IMFORMATION SYSTEM INC.
EUT Description : 802,11a/b/g Combo module
Model Number : PA3297U-1MPC
Test Configurtion: EUC on extender board/laptop
Test Target : 802,11b,Normal Mode (Mid Ch)
Mode of Operation: Worst case Tx Mode
Project No : 03U1876-1
: 2.4GHz Band

Page: 1

	Freq	Read Level	Probe Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dB	dB	dBuV/m	dBuV/m	dB	
1	65.890	26.95	9.38	0.77	0.00	37.10	40.00	-2.90	Peak
2	397.630	24.60	14.39	2.01	0.00	41.00	46.00	-5.00	Peak
3	402.480	25.41	14.50	2.01	0.00	41.92	46.00	-4.08	Peak
4	468.440	23.19	15.94	2.22	0.00	41.35	46.00	-4.65	Peak
5	497.540	24.04	16.50	2.29	0.00	42.83	46.00	-3.17	Peak
6	502.390	23.39	16.57	2.31	0.00	42.27	46.00	-3.73	Peak
7	601.330	22.98	17.70	2.54	0.00	43.22	46.00	-2.78	Peak

7.7. CO-LOCATED 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.

Both transmitters in the EUT are set to transmit simultaneously 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.

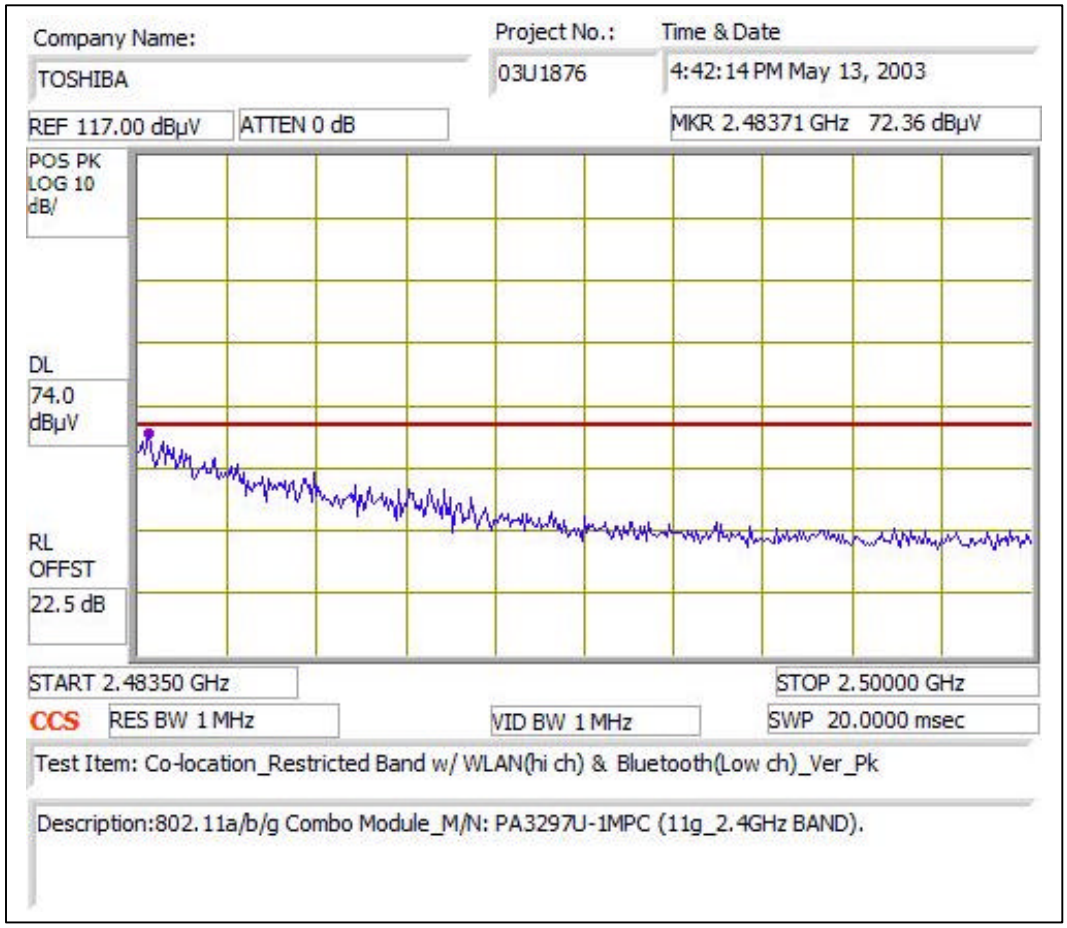
For measurements above 1 GHz within restricted bands, the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

The 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.

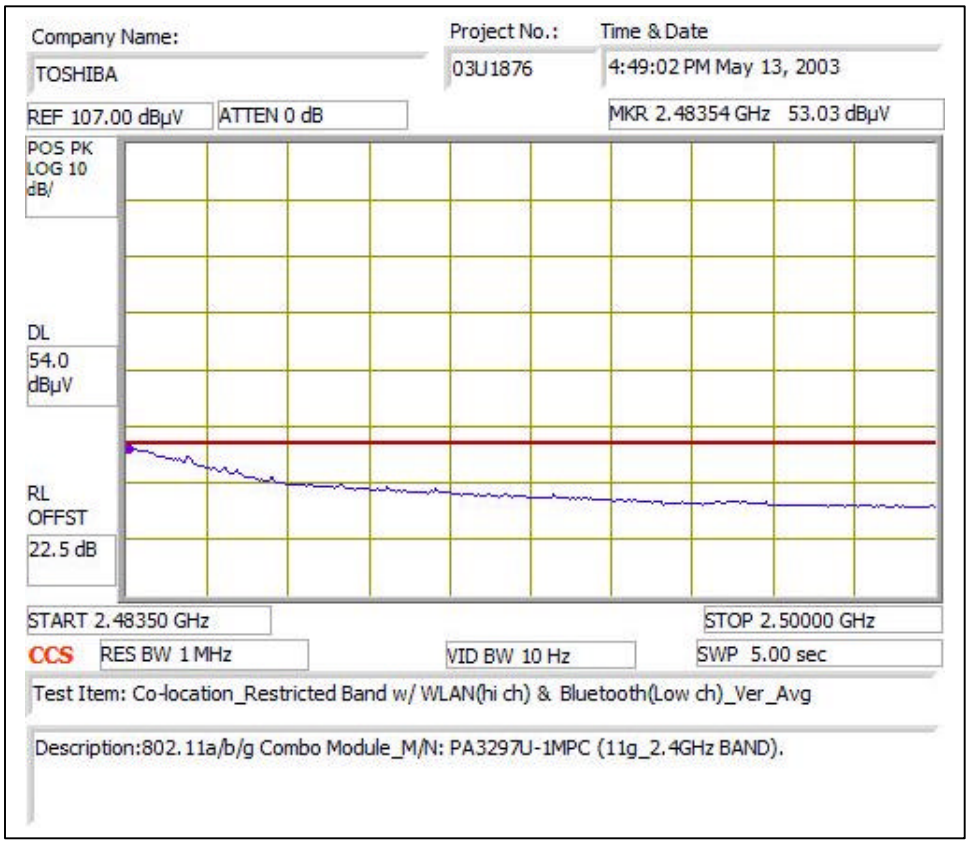
TEST RESULTS

Worst-case results are reported. No non-compliance noted:

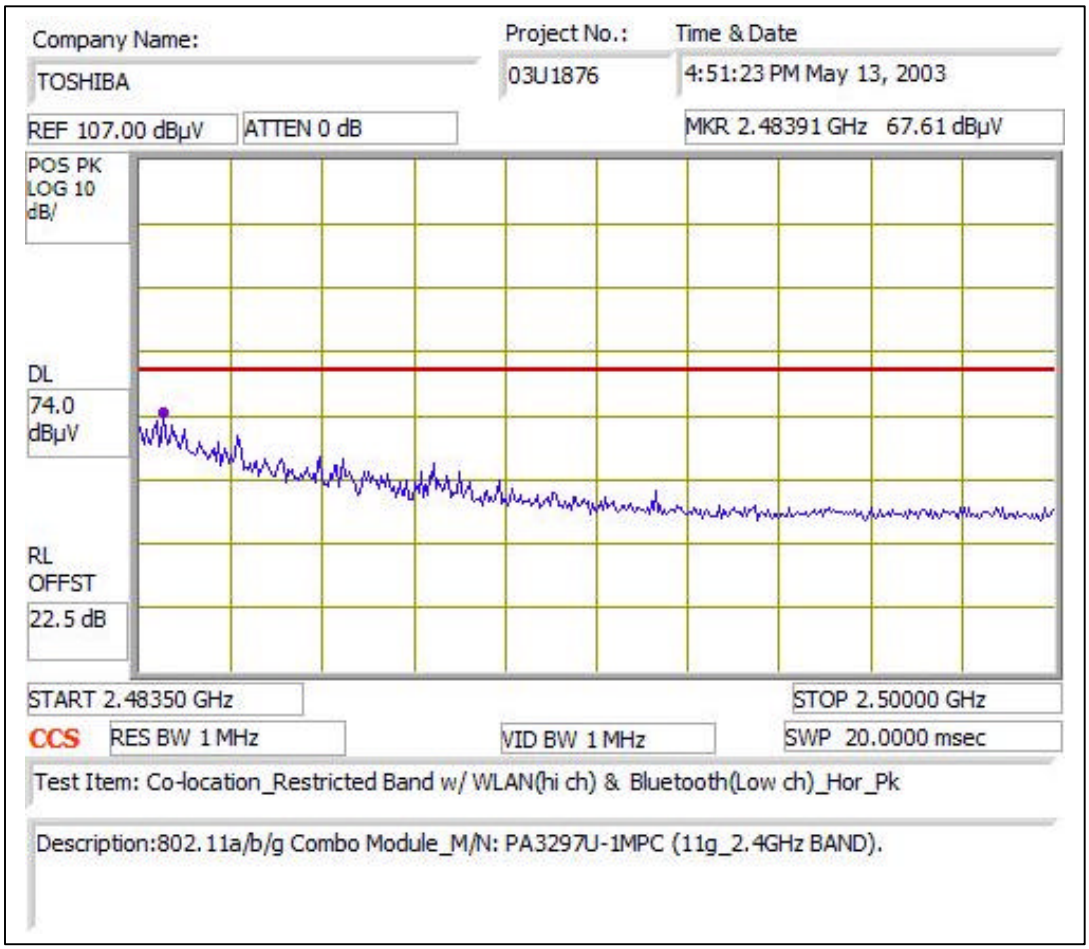
WORST CASE RESTRICTED BAND WITH WLAN OPERATING AT THE WORST-CASE CHANNEL AND THE CO-LOCATED BLUETOOTH OPERATING SIMULTANEOUSLY AT THE LOW FREQUENCY CHANNEL – VERTICAL PEAK



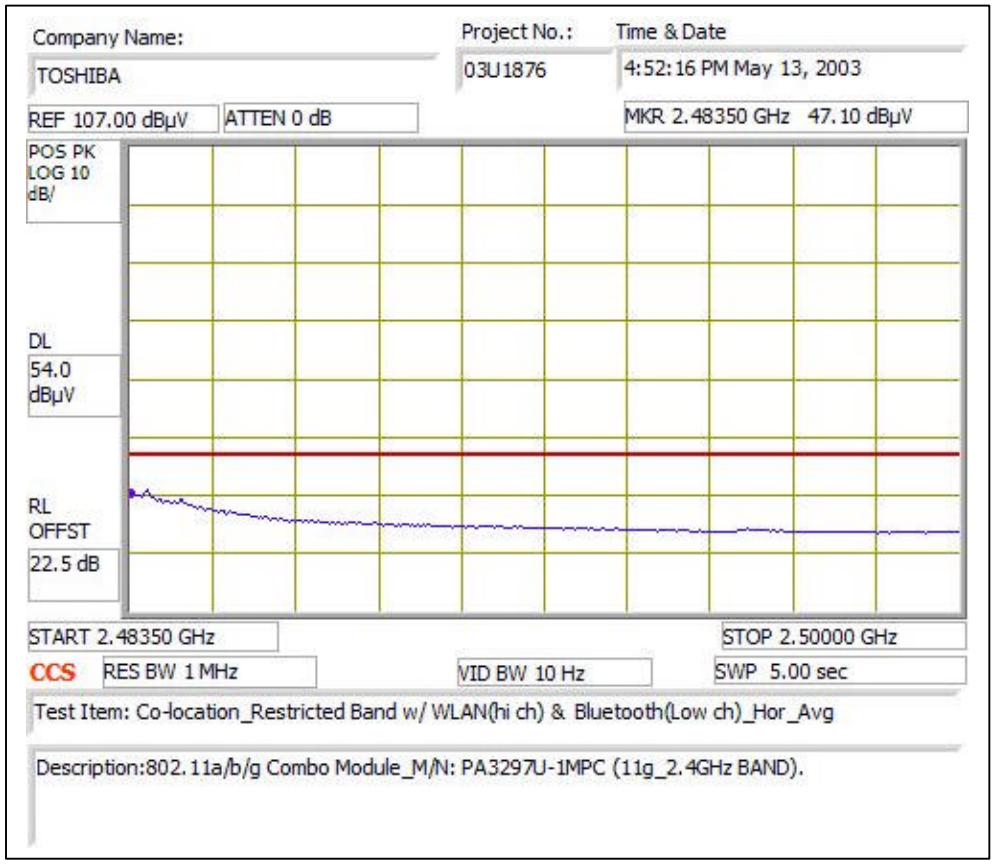
WORST CASE RESTRICTED BAND WITH WLAN OPERATING AT THE WORST-CASE CHANNEL AND THE CO-LOCATED BLUETOOTH OPERATING SIMULTANEOUSLY AT THE LOW FREQUENCY CHANNEL – VERTICAL AVERAGE



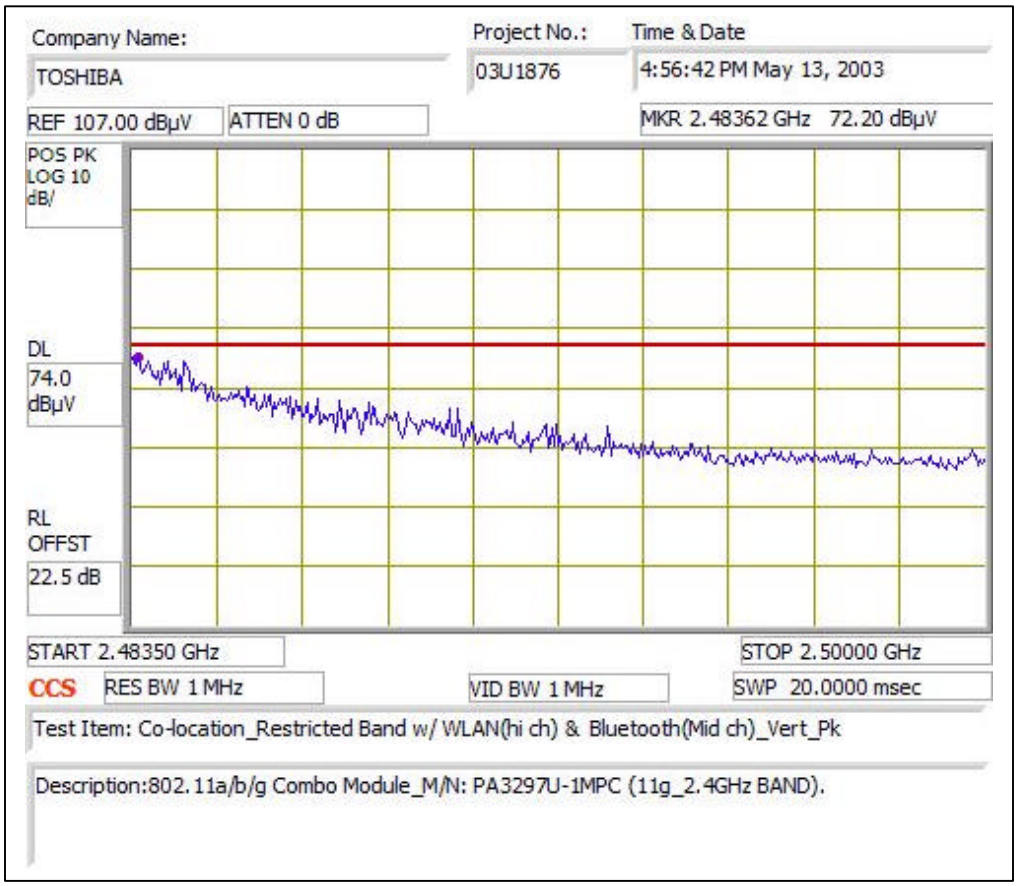
WORST CASE RESTRICTED BAND WITH WLAN OPERATING AT THE WORST-CASE CHANNEL AND THE CO-LOCATED BLUETOOTH OPERATING SIMULTANEOUSLY AT THE LOW FREQUENCY CHANNEL – HORIZONTAL PEAK



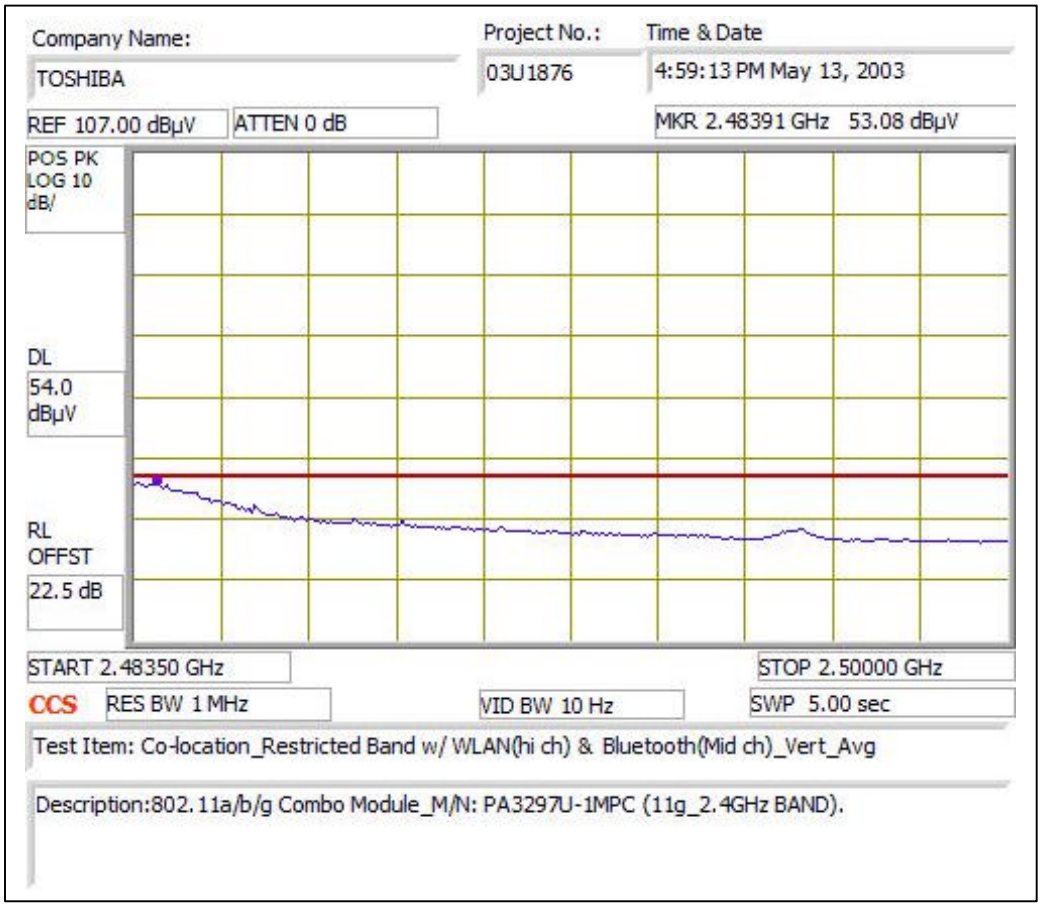
WORST CASE RESTRICTED BAND WITH WLAN OPERATING AT THE WORST-CASE CHANNEL AND THE CO-LOCATED BLUETOOTH OPERATING SIMULTANEOUSLY AT THE LOW FREQUENCY CHANNEL – HORIZONTAL AVERAGE



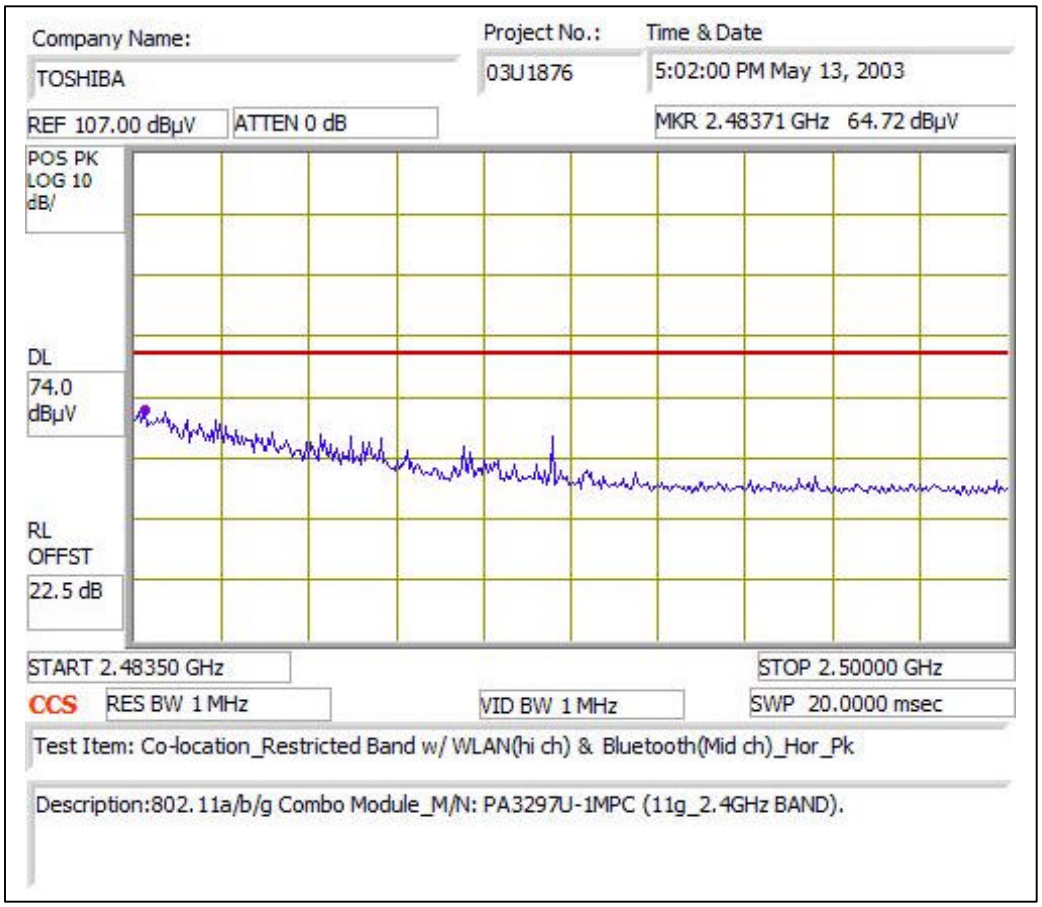
WORST CASE RESTRICTED BAND WITH WLAN OPERATING AT THE WORST-CASE CHANNEL AND THE CO-LOCATED BLUETOOTH OPERATING SIMULTANEOUSLY AT THE MID FREQUENCY CHANNEL – VERTICAL PEAK



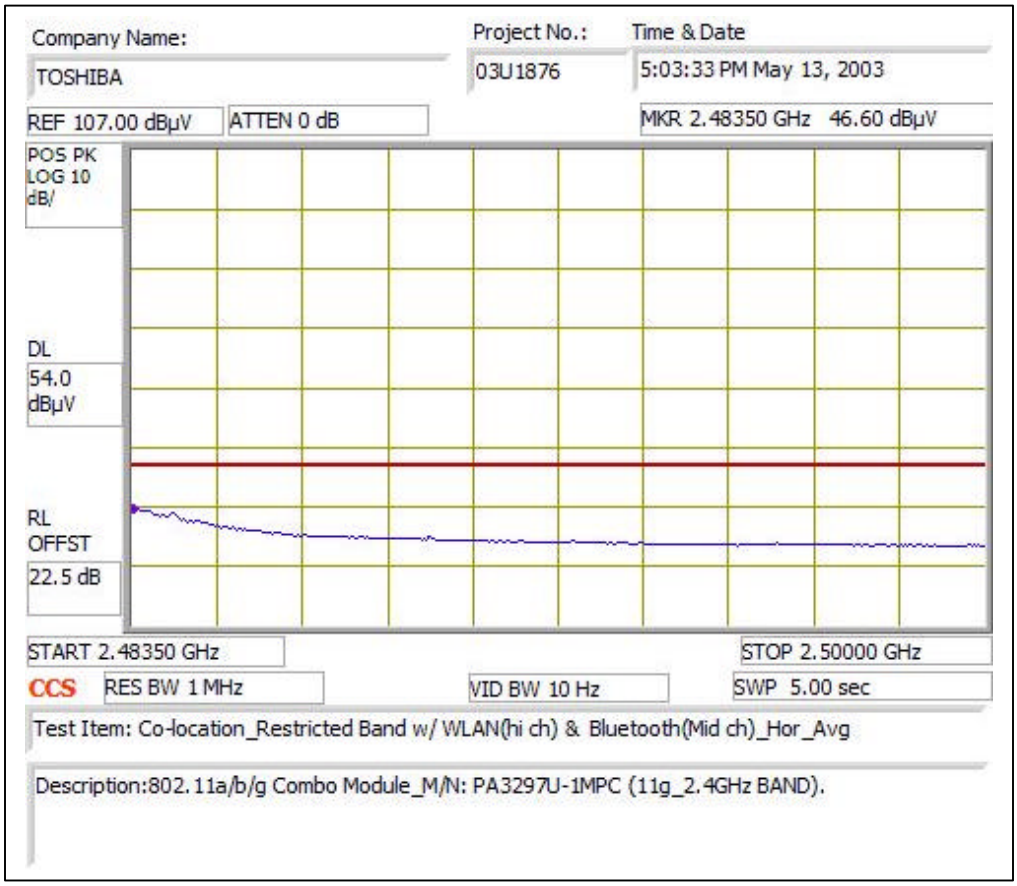
WORST CASE RESTRICTED BAND WITH WLAN OPERATING AT THE WORST-CASE CHANNEL AND THE CO-LOCATED BLUETOOTH OPERATING SIMULTANEOUSLY AT THE MID FREQUENCY CHANNEL – VERTICAL AVERAGE



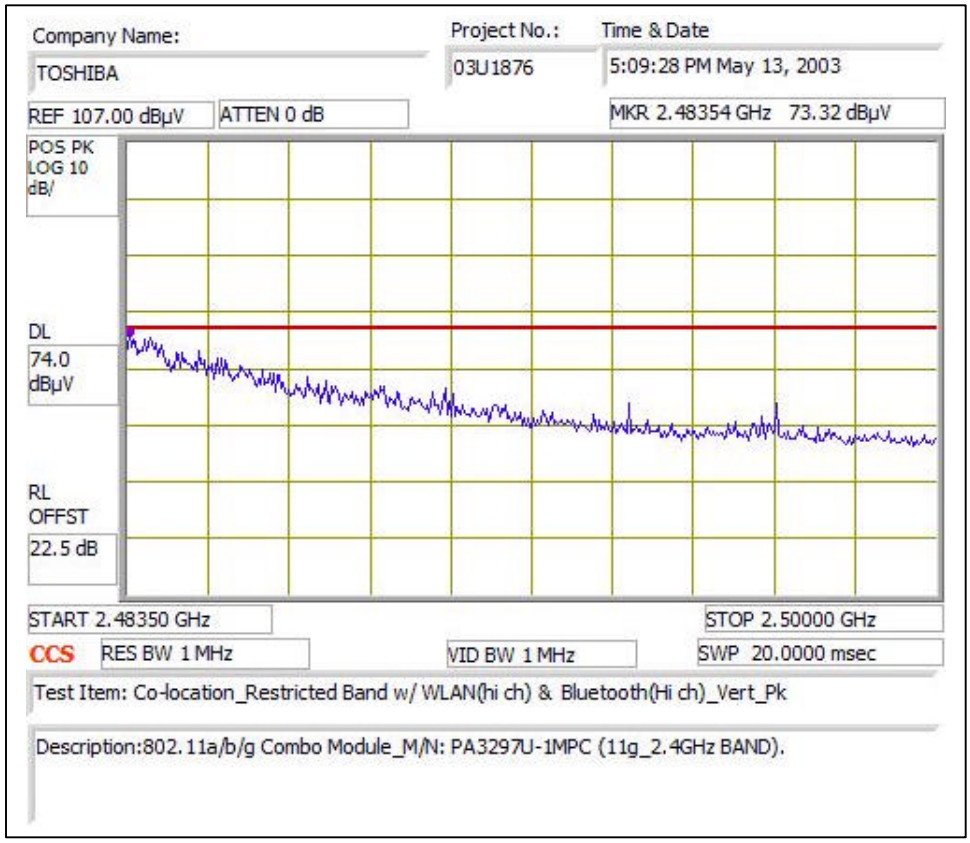
WORST CASE RESTRICTED BAND WITH WLAN OPERATING AT THE WORST-CASE CHANNEL AND THE CO-LOCATED BLUETOOTH OPERATING SIMULTANEOUSLY AT THE MID FREQUENCY CHANNEL – HORIZONTAL PEAK



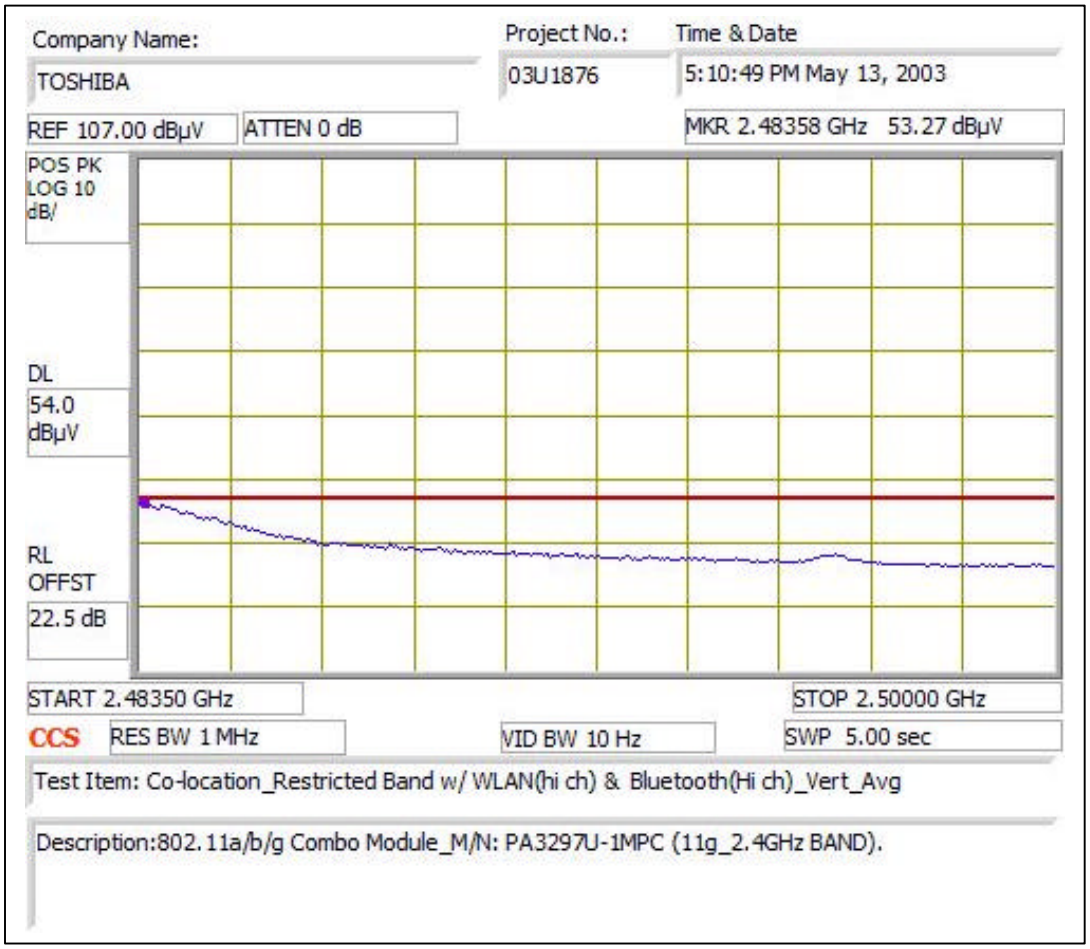
WORST CASE RESTRICTED BAND WITH WLAN OPERATING AT THE WORST-CASE CHANNEL AND THE CO-LOCATED BLUETOOTH OPERATING SIMULTANEOUSLY AT THE MID FREQUENCY CHANNEL – HORIZONTAL AVERAGE



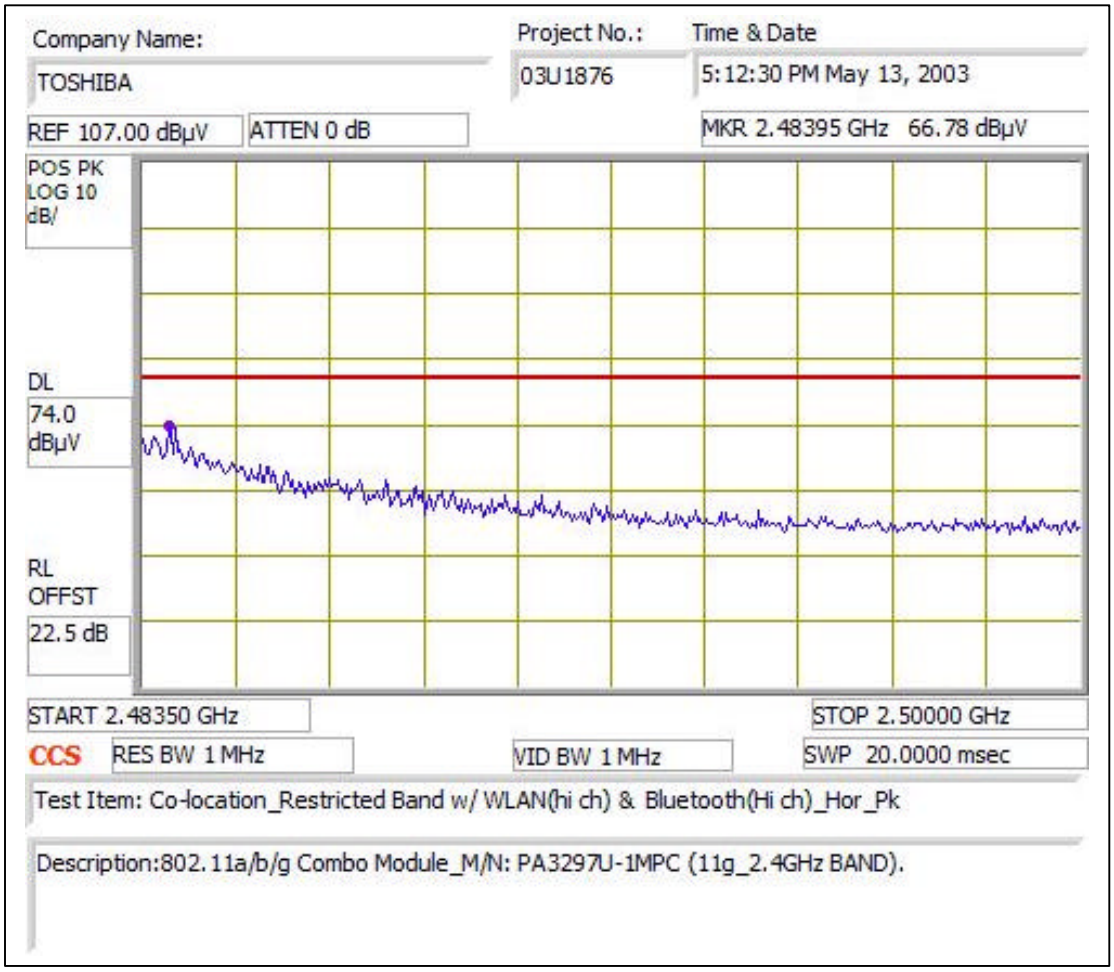
WORST CASE RESTRICTED BAND WITH WLAN OPERATING AT THE WORST-CASE CHANNEL AND THE CO-LOCATED BLUETOOTH OPERATING SIMULTANEOUSLY AT THE HIGH FREQUENCY CHANNEL – VERTICAL -- PEAK



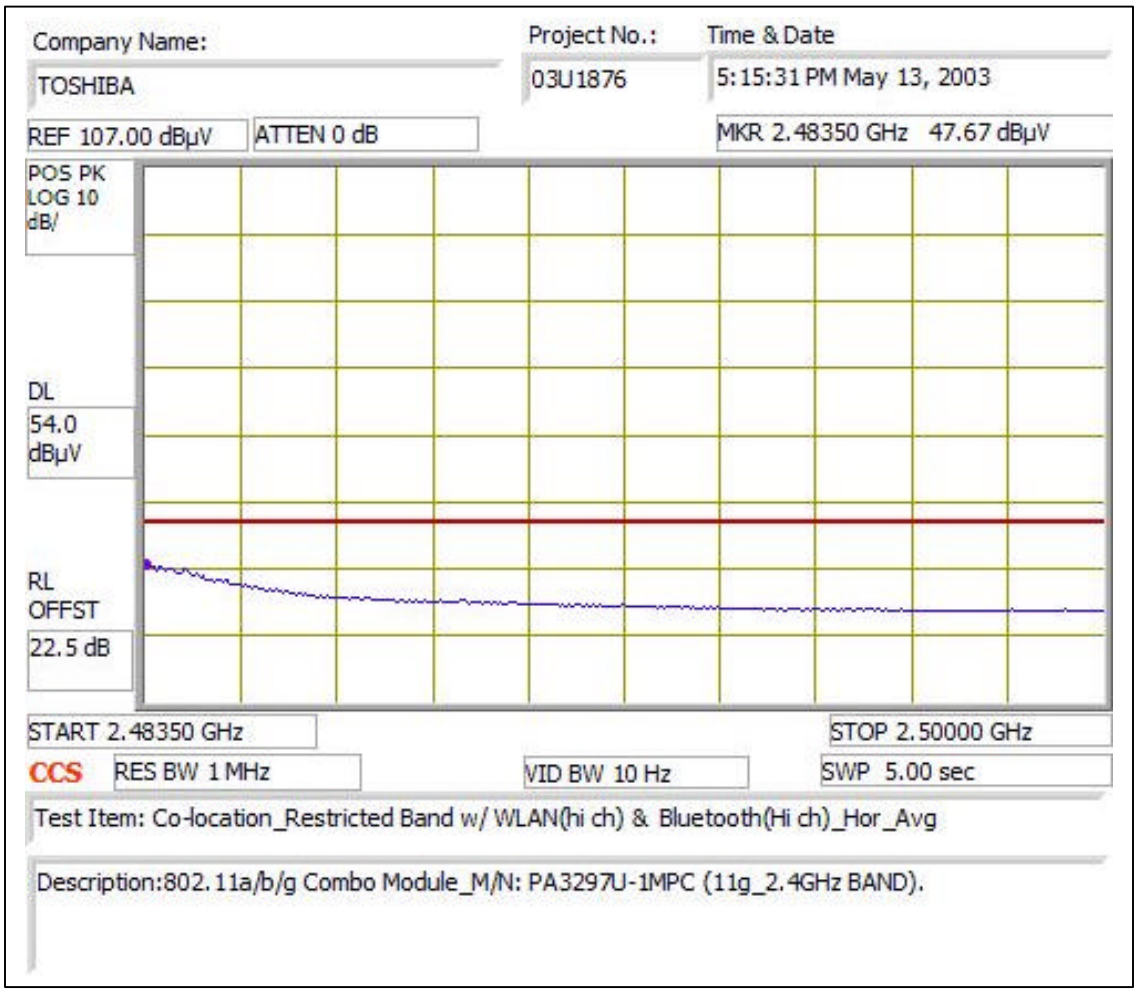
WORST CASE RESTRICTED BAND WITH WLAN OPERATING AT THE WORST-CASE CHANNEL AND THE CO-LOCATED BLUETOOTH OPERATING SIMULTANEOUSLY AT THE HIGH FREQUENCY CHANNEL – VERTICAL AVERAGE



WORST CASE RESTRICTED BAND WITH WLAN OPERATING AT THE WORST-CASE CHANNEL AND THE CO-LOCATED BLUETOOTH OPERATING SIMULTANEOUSLY AT THE HIGH FREQUENCY CHANNEL – HORIZONTAL PEAK



WORST CASE RESTRICTED BAND WITH WLAN OPERATING AT THE WORST-CASE CHANNEL AND THE CO-LOCATED BLUETOOTH OPERATING SIMULTANEOUSLY AT THE HIGH FREQUENCY CHANNEL – HORIZONTAL AVERAGE



WORST CASE HARMONICS AND SPURIOUS WITH CO-LOCATED BLUETOOTH AND WLAN

05/13/03 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: VIEN TRAN
Project #: 03U1867-2
Company: TOSHIBA
EUT Descrip.: 802.11a/b/g Combo Module
EUT M/N: M/N3297U-1MPC
Test Target: FCC 15.247 (Co-Location)
Mode Oper: Tx at H Channel (Worst case Harmonics and Spurious) _11g Hi channel 2.4GHz

Test Equipment:

EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz
T73; S/N: 6717 @3m	Miteq NSP2600-44	8593EM Analyzer	

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
WLAN WORST-CASE CH (2.462GHz) WITH BLUETOOTH LOW CH (2.402GHz)															
4.924	9.8	47.0	33.1	33.5	3.5	-36.1	0.0	1.0	48.8	34.9	74.0	54.0	-25.2	-19.1	V
7.386	9.8	46.7	32.3	36.0	4.4	-36.2	0.0	1.0	51.9	37.4	74.0	54.0	-22.1	-16.6	V
4.924	9.8	46.1	33.4	33.5	3.5	-36.1	0.0	1.0	47.9	35.2	74.0	54.0	-26.1	-18.8	H
7.386	9.8	45.6	33.0	36.0	4.4	-36.2	0.0	2.0	51.8	39.1	74.0	54.0	-22.2	-14.9	H
NO OTHER EMSSION FOUND AFTER 3rd HARMONIC															
WLAN WORST-CASE CH (2.462GHz) WITH BLUETOOTH MID CH (2.441GHz)															
4.924	9.8	45.4	32.5	33.5	3.5	-36.1	0.0	1.0	47.2	34.3	74.0	54.0	-26.8	-19.7	V
7.386	9.8	46.0	32.7	36.0	4.4	-36.2	0.0	1.0	51.1	37.8	74.0	54.0	-22.9	-16.2	V
4.924	9.8	43.2	30.7	33.5	3.5	-36.1	0.0	1.0	45.0	32.5	74.0	54.0	-29.0	-21.5	H
7.386	9.8	42.0	29.1	36.0	4.4	-36.2	0.0	1.0	47.2	34.2	74.0	54.0	-26.8	-19.8	H
NO OTHER EMSSION FOUND AFTER 3rd HARMONIC															
WLAN WORST-CASE CH (2.462GHz) WITH BLUETOOTH HIGH CH (2.480GHz)															
4.924	9.8	45.1	32.7	33.5	3.5	-36.1	0.0	1.0	46.9	34.5	74.0	54.0	-27.1	-19.5	V
7.386	9.8	45.9	33.1	36.0	4.4	-36.2	0.0	1.0	51.1	38.2	74.0	54.0	-22.9	-15.8	V
4.924	9.8	42.1	29.1	33.5	3.5	-36.1	0.0	1.0	43.9	30.9	74.0	54.0	-30.1	-23.1	H
7.386	9.8	43.8	32.0	36.0	4.4	-36.2	0.0	1.0	48.9	37.1	74.0	54.0	-25.1	-16.9	H
NO OTHER EMSSION FOUND AFTER 3rd 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. 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.

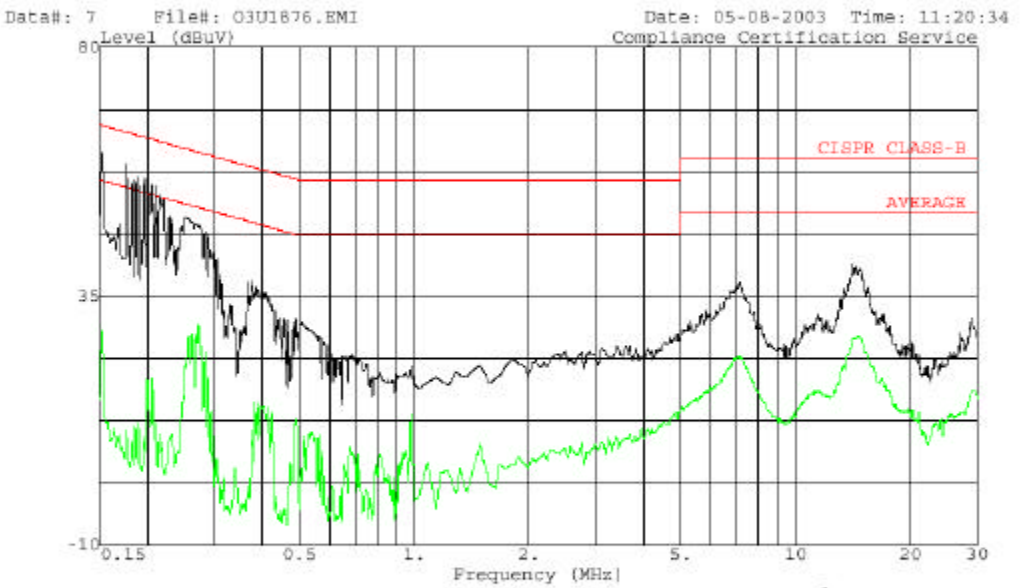
RESULTS

No non-compliance noted:

CONDUCTED EMISSIONS DATA (115VAC 60Hz)

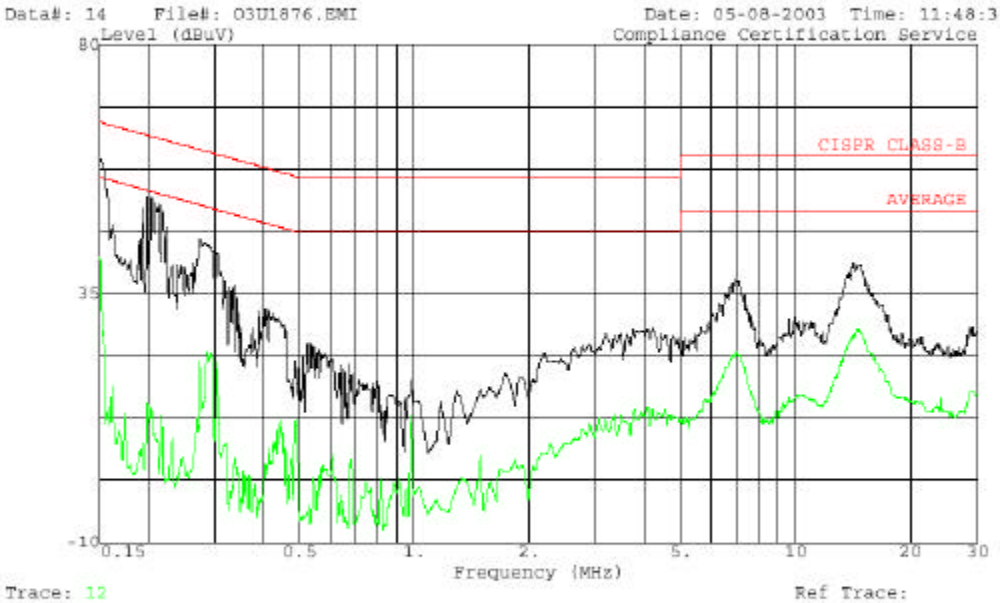
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.15	61.18	--	29.00	0.00	65.94	55.94	-4.76	-26.94	L1
0.26	49.27	--	30.77	0.00	62.86	52.86	-13.59	-22.09	L1
14.36	40.20	--	24.80	0.00	60.00	50.00	-19.80	-25.20	L1
0.15	59.34	--	41.70	0.00	65.94	55.94	-6.60	-14.24	L2
0.26	45.26	--	24.45	0.00	62.86	52.86	-17.60	-28.41	L2
14.36	40.98	--	28.39	0.00	60.00	50.00	-19.02	-21.61	L2
6 Worst Data									

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



Trace: 5 Ref Trace:
Project # : 03U1876-1,2,3 _ L1
Test Engineer : Vien Tran
Company : Toshiba
EUT : 802.11a/b/g Combo Module
Model : PA3297U-1MPC
Configuration : EUT with external antenna
Target of Test: EN55022 Class B
: L1: Peak (Black), Average (Green)
: 115Vac, 60Hz

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



Trace: 12 Ref Trace:
Project # : 03U1876-1,2,3 _ L1
Test Engineer : Vien Tran
Company : Toshiba
EUT : 802.11a/b/g Combo Module
Model : PA3297U-1MPC
Configuration : EUT with external antenna
Target of Test: EN55022 Class B
: L1: Peak (Black), Average (Green)
: 115Vac, 60Hz