

FCC CFR47 PART 15 SUBPART C

TEST REPORT

FOR

802.11a/b MINIPCI TYPE 3B CARD

MODEL NUMBER: PA3234U-1MPC, PA3267U-1MPC

FCC ID: CJ6UPA3234WL

REPORT NUMBER: 03U2054-1

ISSUE DATE: 6/30/2003

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

> Prepared by COMPLIANCE CERTIFICATION SERVICES 561F MONTEREY ROAD, MORGAN HILL, CA 95037, USA TEL: (408) 463-0885 FAX: (408) 463-0888

TABLE OF CONTENTS

1.	TE	ST RESULT CERTIFICATION	3
2.	DE	SCRIPTION OF EUT	4
3.	TE	ST METHODOLOGY	5
4.	FA	CILITIES AND ACCREDITATION	5
	4.1.	FACILITIES AND EQUIPMENT	5
	4.2.	TABLE OF ACCREDITATIONS AND LISTINGS	6
5.	CA	LIBRATION AND UNCERTAINTY	7
	5.1.	MEASURING INSTRUMENT CALIBRATION	7
	5.2.	MEASUREMENT UNCERTAINTY	7
	5.3.	TEST AND MEASUREMENT EQUIPMENT	8
6.	SE	TUP OF EQUIPMENT UNDER TEST	9
7.	AP	PLICABLE LIMITS AND TEST RESULTS 1	.3
	7.1.	RADIATED EMISSIONS	3
	7.2.	CO-LOCATED RADIATED EMISSIONS 2	28
	7.3.	POWERLINE CONDUCTED EMISSIONS	84
8.	SE	TUP PHOTOS	;8

Page 2 of 43

1. TEST RESULT CERTIFICATION

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

EUT DESCRIPTION: 802.11a/b MINIPCI TYPE 3B CARD

MODEL: PA3234U-1MPC, PA3267-1MPC

MODEL DIFFERENCE: THE ONLY DIFFERENCE IS THE END-USE APPLICATION OF THE MODULE.

DATE TESTED: 6/12 – 6/15/2003

APPLIC	ABLE STANDARDS
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	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 2.4 GHz band is applicable to this report; the 5.2 GHz band of operation is documented in a separate report. Conducted measurement is documented in separate report.

Approved & Released For CCS By:

Tested By:

MH

MIKE HECKROTTE CHIEF ENGINEER COMPLIANCE CERTIFICATION SERVICES All K

NEELESH RAJ EMC ENGINEER COMPLIANCE CERTIFICATION SERVICES

Page 3 of 43

2. DESCRIPTION OF EUT

The EUT is an 802.11a/b Mini PCI Type 3B Card operating in the 2400 – 2483.5 MHz band with a peak output power of 16.53dBm (45mW) has a peak antenna gain of 4.8dBi. The changes are as follows:

Add a new host Toshiba computer model PP4012-624F and add three new film antennas.

1. Hitachi Cable, Dual Band Film antenna, model: HTL008, antenna gain 4.8dBi.

2. Hitachi Cable, Wide band film antenna, model: HTL012, antenna gain 4.1dBi.

3. Tyco Electronics AMP, Dual band film antenna, TIAN01, antenna gain 1.0dBi.

Testing was performed on the worst-case, highest gain antenna since all three antennas are the same type.

Page 4 of 43

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4/1992, FCC CFR 47 Part 2 and FCC CFR 47 Part 15.

4. FACILITIES AND ACCREDITATION

4.1. FACILITIES AND EQUIPMENT

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

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

Page 5 of 43

4.2. TABLE OF ACCREDITATIONS AND LISTINGS

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

Page 6 of 43

5. CALIBRATION AND UNCERTAINTY

5.1. MEASURING INSTRUMENT CALIBRATION

The measurement instruments utilized to perform the tests documented in this report have been calibrated in accordance with the manufacturer's recommendations, and are traceable to national standards.

5.2. MEASUREMENT UNCERTAINTY

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

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

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

Page 7 of 43

5.3. TEST AND MEASUREMENT EQUIPMENT

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

TEST AND MEASUREMENT EQUIPMENT LIST					
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due Date	
Bilog Antenna	AR	LPB-25201A	1185	3/28/2004	
EMI Receiver	HP	8542A	3942A00280	11/20/2003	
RF Filter Section	HP	85420E	3705A00256	11/20/2003	
EMI Test Receiver	R & S	ESHS 20	827129/006	7/17/2004	
LISN, 10 kHz ~ 30 MHz	FCC	50/250-25-2	114	9/6/2003	
Line Filter	Lindgren	LMF-3489	497	CNR	
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	837990	9/6/2003	
Preamplifier, 1 ~ 26 GHz	Miteq	NSP10023988	646456	4/25/2004	
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	2/4/2004	
Psa SeriesSpectrum Analyzer	HP	E4440A	US41421507	5/8/2004	
2.4-2.5GHz reject filter	Micro Tronic	BRM50702	2	N.C.R	

Page 8 of 43

6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST					
Device Type	Manufacturer	Model	Serial Number	FCC ID	
LAPTOP	TOSHIBA	PP4012-624FM	92033677	DoC	
AC ADAPTER	TOSHIBA	ADP-45XH	215141	DoC	

I/O CABLES

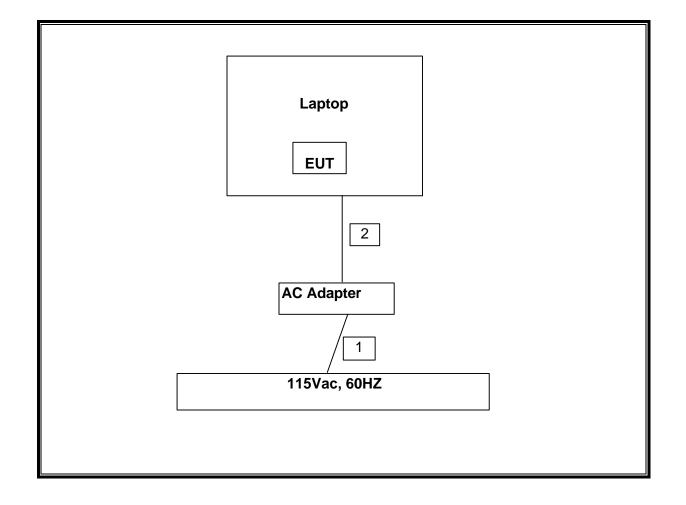
				TEST	I / O CA	ABLES		
Cable	I/O	# of I/O	Connector	Type of	Cable	Data		
No	Port	Port	Туре	Cable	Length	Traffic	Bundled	Remark
1	AC	1	US 115V	Un-shielded	2m	No	No	Yes on LC Test
2	DC	1	DC	Un-shielded	2m	No	No	N/A
3	USB	2	USB	Un-shielded	2m	Yes	No	Ferrite on EUT's end

TEST SETUP

The EUT was installed in a host computer.

Page 9 of 43

SETUP DIAGRAM



Page 10 of 43

SETUP FOR DIGITAL DEVICE TESTS

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST					
Device Type	Manufacturer	Model	Serial Number	FCC ID	
USB MOUSE	MICROSOFT	4902	4947675	DoC	
USB MOUSE	MICROSOFT	4902	4947676	DoC	
LAPTOP	TOSHIBA	PP4012-624FM	92033677	DoC	
AC ADAPTER	TOSHIBA	ADP-45XH	215141	DoC	

I/O CABLES

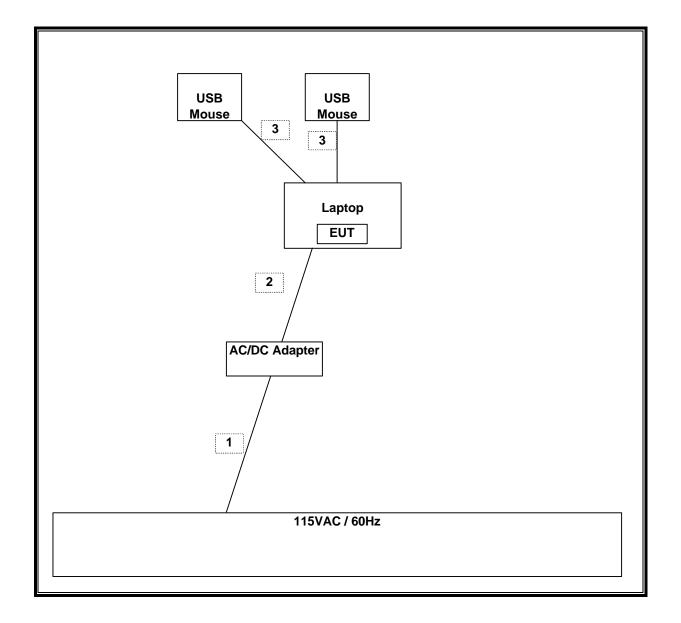
Cable	Port	# of	Connector	Cable	Cable	Remarks
No.		Identical Ports	Туре	Туре	Length	
1	AC	1	US 115V	Un-shielded	2m	No
2	DC	1	DC	Un-shielded	2m	No
3	USB	2	USB	Un-shielded	2m	Yes

TEST SETUP

The EUT was installed in a host computer.

Page 11 of 43

SETUP DIAGRAM FOR DIGITAL DEVICE TESTS



Page 12 of 43

7. APPLICABLE LIMITS AND TEST RESULTS

7.1. RADIATED EMISSIONS

LIMITS

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

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

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

² Above 38.6

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

Page 13 of 43

\$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 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

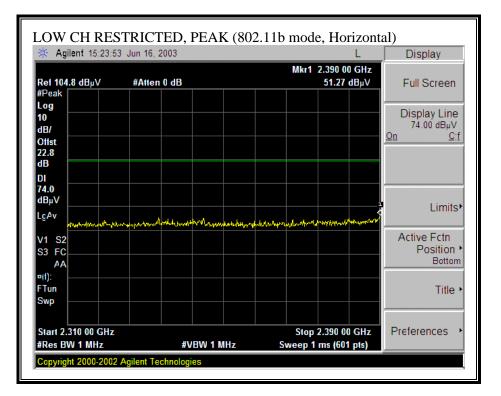
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

RESULTS

No non-compliance noted:

Page 14 of 43

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

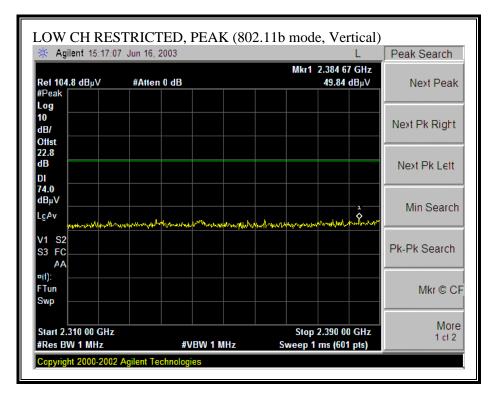


Page 15 of 43

🔆 Agilent 15:24:	49 Jun 16, 2003			L	Peak Search
Ref 104.8 dBµV	#Atten 0 dl	3	Mkr1 3	2.390 00 GHz 41.02 dBµV	Next Peak
#Peak Log					
10 dB/					Next Pk Right
Offst 22.8 dB					Next Pk Lett
DI					NEATERLEIL
54.0 dBμV					Min Search
LgAv					Min Gearch
V1 S2 S3 FC					Pk-Pk Search
A ¤(1): FTun					Mkr © CF
Swp					
Start 2.310 00 GH #Res BW 1 MHz	Z	#VBW 10 Hz	Stop 2 Sweep 6.238	2.390 00 GHz	More

Page 16 of 43

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

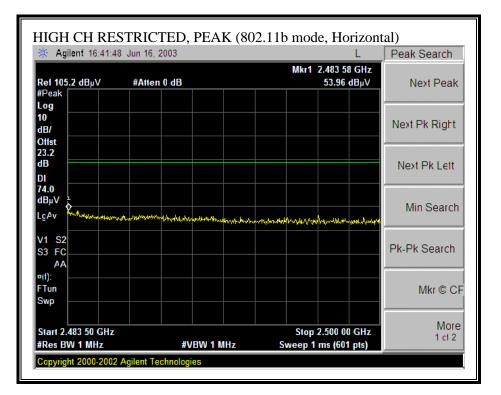


Page 17 of 43

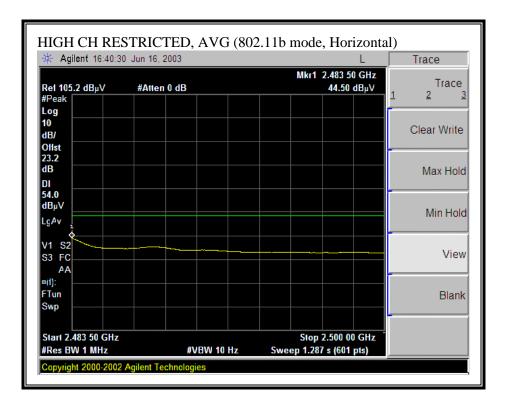
🔆 Agilent 15:17:5	4 Jun 16, 2003	L	Peak Search
Ref 104.8 dBµV	#Atten 0 dB	Mkr1 2.390 00 G 39.93 dB	
#Peak Log			
10 dB/			Next Pk Right
Offst 22.8 dB			Next Division
DI			Next Pk Lett
dBµV			Min Search
V1 S2 S3 FC			Pk-Pk Search
AA ¤(1): FTun			Mkr © CF
Swp			
Start 2.310 00 GHz #Res BW 1 MHz	#VBW 10	Stop 2.390 00 G Hz Sweep 6.238 s (601 pts	

Page 18 of 43

RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

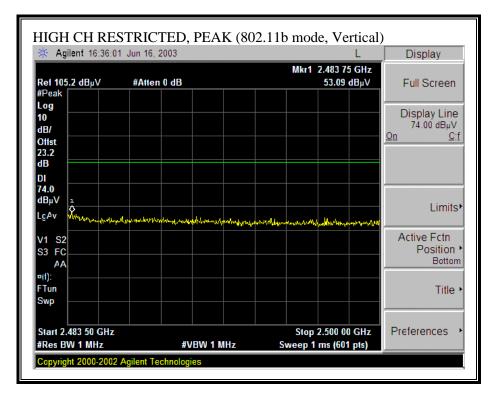


Page 19 of 43

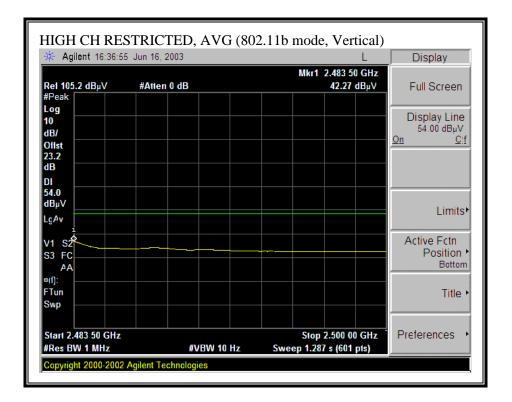


Page 20 of 43

RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)



Page 21 of 43



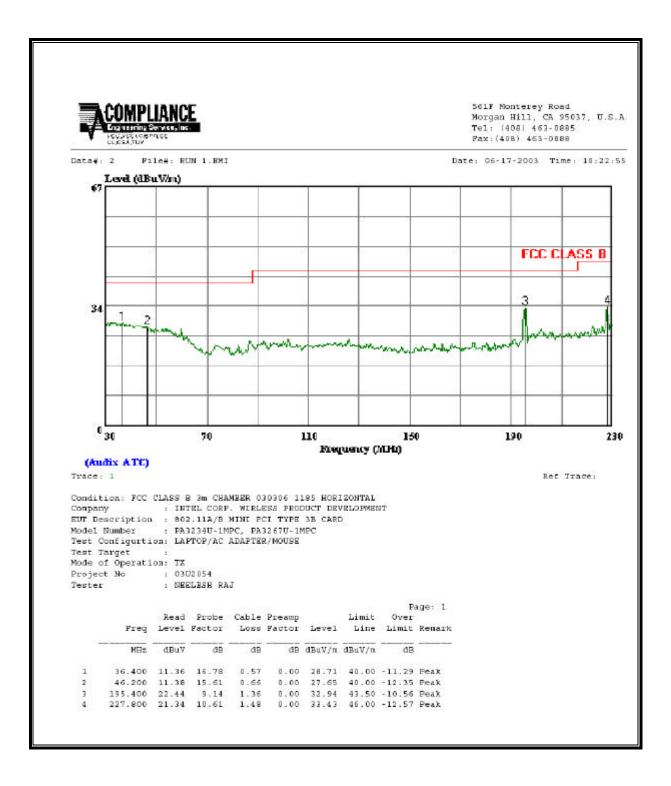
Page 22 of 43

HARMONICS AND SPURIOUS EMISSIONS b-MODE

Test Eng Project # Company EUT Des EUT M/N Test Targ Mode Op	: y: crip.: N: get:	802.11a/b M	AJ P. WIRELESS iniPCI Type 3B MPC, PA3267U	Card	T										
lest Equi	ipment:														
EMCO	Horn 1-	18GHz	Pre-amplife	er 1-26GI	Ξz	5	spectrum A	nalyzer			Horn > 18	GHz			
T73; S/	N: 6717	@3m 🗕	T86 Miteq 9	24341	•	psa			-	T87; ARA 1	18-26GHz; S/	N:1049	•		
Hi Freq	uency Cab ft) [(4 ~ 6 ft)	▼ (12 ft)				1 MHz	Measureme Resolution B Video Bandw	andwidth		easuremen lution Bandw Bandwidth			
f	Dist	Read Pk	Read Avg.	AF	CL	Amp	D Corr	HPF	Peak	Avg	Pk Lim	Avg Lim	Pk Mar	Avg Mar	Notes
GHz	feet	dBuV / CHANNEI	dBuV	dB/m	dB	dB	dB		dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	
824	9.8	46.6	37.2	33.4	2.9	-45.6	0.0	1.0	38.3	28.9	74.0	54.0	-35.7	-25.1	V (NOISE FLOOR)
.824	9.8	47.9	36.7	33.4	2.9	-45.6	0.0	1.0	39.6	28.4	74.0	54.0	-34.4	-25.6	H (NOISE FLOOR)
2.060	9.8	48.0	37.8	39.2	5.1	-45.4	0.0	1.0	47.9	37.7	74.0	54.0	-26.1	-16.3	V (NOISE FLOOR)
2.060	9.8 MIDD	50.2 LE CHANNI	37.9 EL 2437	39.2	5.1	-45.4	0.0	1.0	50.0	37.7	74.0	54.0	-24.0	-16.3	H (NOISE FLOOR)
.874	9.8	48.1	37.1	33.4	3.0	-45.6	0.0	1.0	39.8	28.8	74.0	54.0	-34.2	-25.2	V (NOISE FLOOR)
.874	9.8	48.0	37.3	33.4	3.0	-45.6	0.0	1.0	39.7	29.0	74.0	54.0	-34.3	-25.0	H (NOISE FLOOR)
.311	9.8	47.1	38.1	35.8	3.8	-46.6	0.0	1.0	41.1	32.1	74.0	54.0	-32.9	-21.9	V (NOISE FLOOR)
.311 2.185	9.8 9.8	47.0 45.7	38.0 39.1	35.8 39.2	3.8 5.2	-46.6 -45.6	0.0	1.0 1.0	41.0 45.4	32.0 38.8	74.0 74.0	54.0 54.0	-33.0	-22.0	H (NOISE FLOOR) V (NOISE FLOOR)
2.185	9.8	47.3	39.1	39.2	5.2	-45.6	0.0	1.0	43.4	38.8	74.0	54.0	-28.0	-15.2	H (NOISE FLOOR)
	HIGI	I CHANNEI													
924	9.8	48.8	38.1	33.5	3.0	-45.7	0.0	2.0	41.5	30.8	74.0	54.0	-32.5	-23.2	V (NOISE FLOOR)
924 386	9.8 9.8	47.1 50.8	37.2 39.6	33.5 36.0	3.0 3.8	-45.7 -46.5	0.0	2.0	39.8 46.0	29.9 34.8	74.0 74.0	54.0 54.0	-34.2	-24.1 -19.2	H (NOISE FLOOR) V (NOISE FLOOR)
386	9.8	48.0	39.0	36.0	3.8	-46.5	0.0	2.0	43.2	34.2	74.0	54.0	-30.8	-19.8	H (NOISE FLOOR)
2.310	9.8	50.0	38.5	39.2	5.2	-45.7	0.0	2.0	50.6	39.1	74.0	54.0	-23.4	-14.9	V (NOISE FLOOR)
2.310	9.8	47.8	38.5	39.2	5.2	-45.7	0.0	2.0	48.4	39.1	74.0	54.0	-25.6	-14.9	H (NOISE FLOOR)
			NO OTHER S	PURIOU	S EMIS	SIONS SI	EEN IN TH	1E RES	IRICTED I	SANDS UPT	O 26GHz				
	f Dist Read AF CL	Measurem Distance to Analyzer F Antenna F Cable Loss	Reading actor	y		Amp D Corr Avg Peak HPF	Average	Correc Field S ed Peak	t to 3 mete strength @ Field Stre	3 m	1	Pk Lim Avg Mar	Peak Fiel Margin v	Field Strengtl d Strength Li s. Average Li s. Peak Limit	mit mit

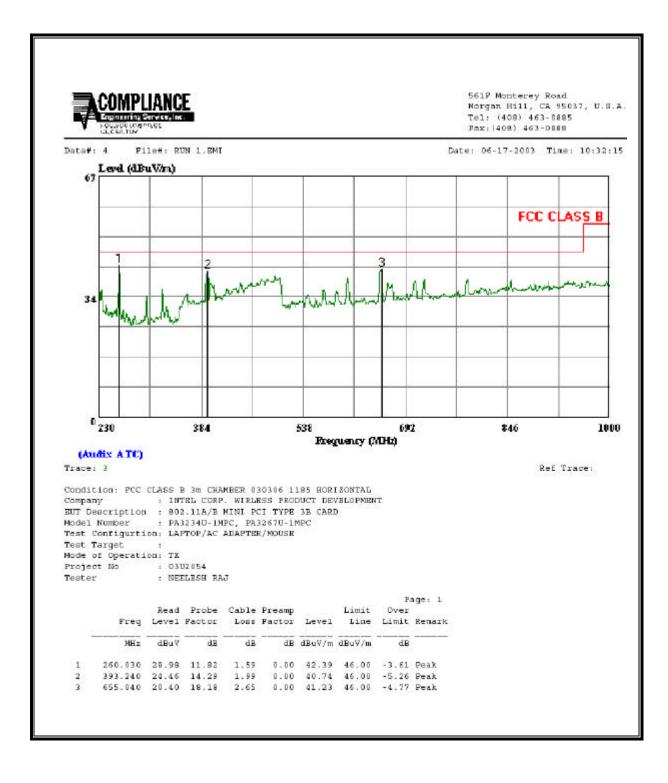
Page 23 of 43

SPURIOUS EMISSIONS 30 TO 230MHz HORIZONTAL (WORST-CASE CONFIGURATION)



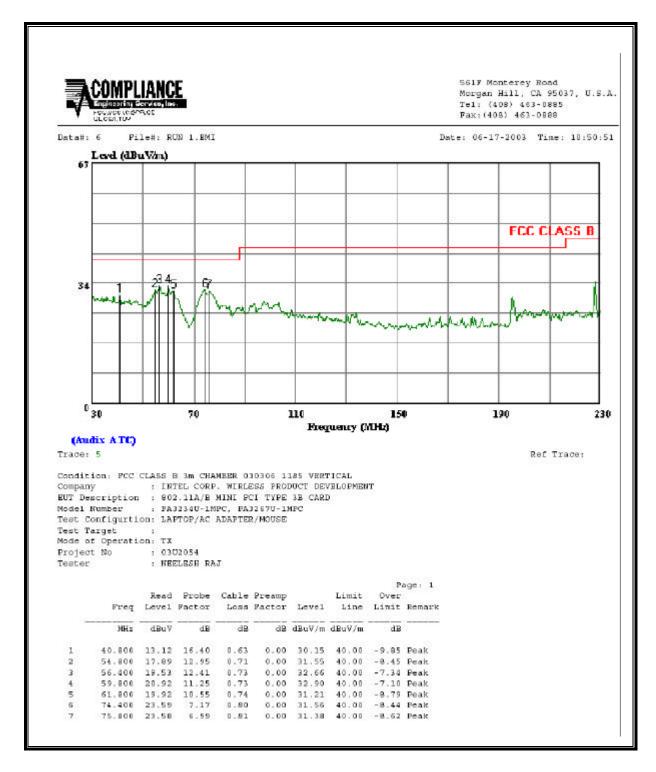
Page 24 of 43

SPURIOUS EMISSIONS 230 TO 1000 MHz HORIZONTAL (WORST-CASE CONFIGURATION)



Page 25 of 43

SPURIOUS EMISSIONS 30 TO 230MHz VERTICAL (WORST-CASE CONFIGURATION)





SPURIOUS EMISSIONS 230 TO 1000 MHz VERTICAL (WORST-CASE CONFIGURATION)



Page 27 of 43

7.2. CO-LOCATED RADIATED EMISSIONS

TEST PROCEDURE

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

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

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

The dominant transmitter WLAN is set to the worst case channel. The spurious emissions performance of the dominant transmitter is investigated as the settings of the non-dominant transmitter Bluetooth are varied. Worst case results are reported.

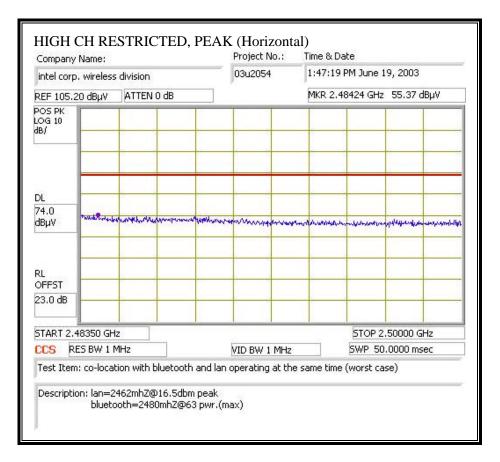
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

RESULTS

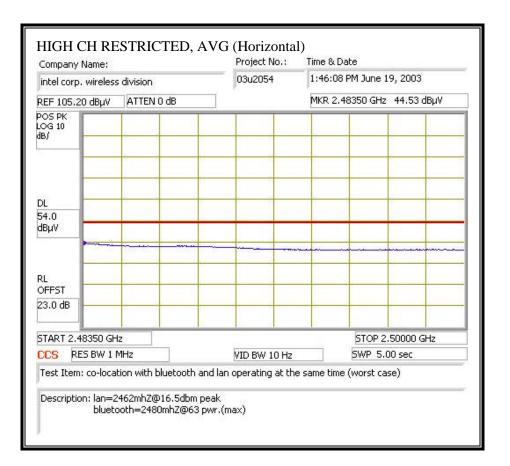
No non-compliance noted:

Page 28 of 43

WORST-CASE RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

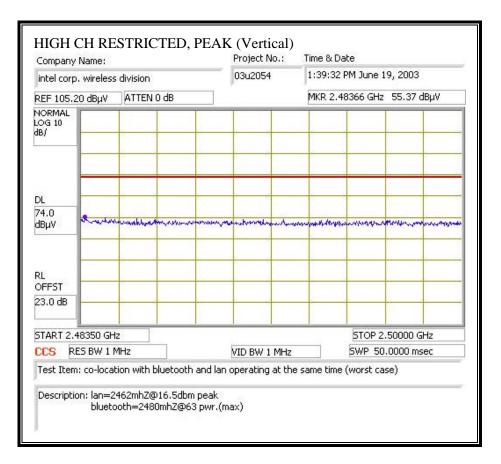


Page 29 of 43

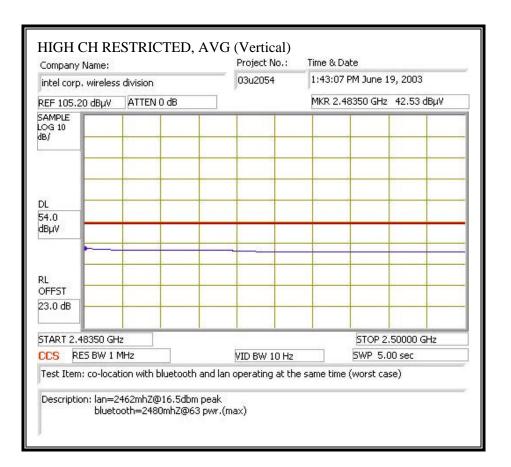


Page 30 of 43

WORST-CASE RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



Page 31 of 43



Page 32 of 43

WORST-CASE CO-LOCATED HARMONICS AND SPURIOUS EMISSIONS

Test Eng		NEELESH R	AT												
roject #		03U2054	AJ												
Compan		Toshiba													
EUT Des		802.11a/b Mi	ini PCI Card												
EUT M/		PA33234U-1													
Test Tar	get:	FCC15.247 /	15.407												
Mode O	per:	TX													
Foot For	ipment:														
est Eqt	upment.														
EMCO	Horn 1-	18GHz	Pre-amplife	er 1-26GF	łz	s	Spectrum A	nalyzer			Horn > 18	GHz			
T73; S	/N: 6717 (@3m 🚽	T86 Miteq 9	24341	-	psa			-	T87; ARA 1	18-26GHz; S/	N:1049	-		
			-			I									
Hi Free	quency Cab	les				1		Pook I	Measureme	nte.	Average M	leasuremen	te.		
(2	ft)	✓ (2 ~ 3 ft)	(4 ~ 6 ft)	🗸 (12 ft)					Resolution E			lution Bandw			
								1MHz	Video Bandv	vidth	10Hz Video	Bandwidth			
	D	D J Dl.	D 14	AE	CL	A	D Corr	HPF	Peak	Arra	Pk Lim				
f	Dist	Read Pk	Read Avg.	AF	UL	Amp			геак	Avg	PKLIM	Avg Lim	Pk Mar	Avg Mar	Notes
f GHz	Dist feet	dBuV	dBuV	AF dB/m	dB	dB	dB			Avg dBuV/m	dBuV/m		Pk Mar dB	Avg Mar dB	Notes
GHz		dBuV		dB/m	dB	dB	dB		dBuV/m				dB		
GHz 4.924	feet 9.8	dBuV HIGH C 49.3	dBuV HANNEL LAN 38.6	dB/m 2462 Al 33.5	dB ND BLU 3.0	dB UETOOTI -45.7	dB H 2480 0.0	2.0	dBuV/m 42.0	dBuV/m 31.3	dBuV/m 74.0	dBuV/m 54.0	dB -32.0	dB -22.7	V (NOISE FLOOR)
GHz 4.924 4.924	feet 9.8 9.8	dBuV HIGH C 49.3 47.6	dBuV HANNEL LAN 38.6 37.9	dB/m 2462 A 33.5 33.5	dB ND BLU 3.0 3.0	dB UETOOTI -45.7 -45.7	dB H 2480 0.0 0.0	2.0 2.0	dBuV/m 42.0 40.3	dBuV/m 31.3 30.6	dBuV/m 74.0 74.0	dBuV/m 54.0 54.0	dB -32.0 -33.7	dB -22.7 -23.4	V (NOISE FLOOR) H (NOISE FLOOR)
GHz 4.924 4.924 7.386	feet 9.8 9.8 9.8	dBuV HIGH C 49.3 47.6 51.0	dBuV HANNEL LAN 38.6 37.9 40.1	dB/m 2462 A 33.5 33.5 36.0	dB ND BLU 3.0 3.0 3.8	dB UETOOTI -45.7 -45.7 -46.5	dB H 2480 0.0 0.0 0.0	2.0 2.0 2.0	dBuV/m 42.0 40.3 46.2	dBuV/m 31.3 30.6 35.3	dBuV/m 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0	dB -32.0 -33.7 -27.8	dB -22.7 -23.4 -18.7	V (NOISE FLOOR) H (NOISE FLOOR) V (NOISE FLOOR)
GHz 1.924 1.924 7.386	feet 9.8 9.8	dBuV HIGH C 49.3 47.6	dBuV HANNEL LAN 38.6 37.9	dB/m 2462 A 33.5 33.5	dB ND BLU 3.0 3.0	dB UETOOTI -45.7 -45.7	dB H 2480 0.0 0.0	2.0 2.0	dBuV/m 42.0 40.3	dBuV/m 31.3 30.6	dBuV/m 74.0 74.0	dBuV/m 54.0 54.0	dB -32.0 -33.7	dB -22.7 -23.4	V (NOISE FLOOR) H (NOISE FLOOR)
GHz 4.924 4.924 7.386	feet 9.8 9.8 9.8	dBuV HIGH C 49.3 47.6 51.0	dBuV HANNEL LAN 38.6 37.9 40.1	dB/m 2462 A 33.5 33.5 36.0	dB ND BLU 3.0 3.0 3.8	dB UETOOTI -45.7 -45.7 -46.5	dB H 2480 0.0 0.0 0.0	2.0 2.0 2.0	dBuV/m 42.0 40.3 46.2	dBuV/m 31.3 30.6 35.3	dBuV/m 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0	dB -32.0 -33.7 -27.8	dB -22.7 -23.4 -18.7	V (NOISE FLOOR) H (NOISE FLOOR) V (NOISE FLOOR)
GHz 4.924 4.924 7.386	feet 9.8 9.8 9.8	dBuV 49.3 47.6 51.0 48.3	dBuV HANNEL LAN 38.6 37.9 40.1 39.7	dB/m V 2462 AU 33.5 33.5 36.0 36.0	dB ND BLU 3.0 3.0 3.8 3.8	dB UETOOTI -45.7 -45.7 -46.5 -46.5	dB H 2480 0.0 0.0 0.0 0.0	2.0 2.0 2.0 2.0	dBuV/m 42.0 40.3 46.2 43.5	dBuV/m 31.3 30.6 35.3 34.9	dBuV/m 74.0 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0	dB -32.0 -33.7 -27.8	dB -22.7 -23.4 -18.7	V (NOISE FLOOR) H (NOISE FLOOR) V (NOISE FLOOR)
GHz 4.924 4.924 7.386	feet 9.8 9.8 9.8	dBuV 49.3 47.6 51.0 48.3	dBuV HANNEL LAN 38.6 37.9 40.1	dB/m V 2462 AU 33.5 33.5 36.0 36.0	dB ND BLU 3.0 3.0 3.8 3.8	dB UETOOTI -45.7 -45.7 -46.5 -46.5	dB H 2480 0.0 0.0 0.0 0.0	2.0 2.0 2.0 2.0	dBuV/m 42.0 40.3 46.2 43.5	dBuV/m 31.3 30.6 35.3 34.9	dBuV/m 74.0 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0	dB -32.0 -33.7 -27.8	dB -22.7 -23.4 -18.7	V (NOISE FLOOR) H (NOISE FLOOR) V (NOISE FLOOR)
GHz 1.924 1.924 7.386	feet 9.8 9.8 9.8	dBuV 49.3 47.6 51.0 48.3	dBuV HANNEL LAN 38.6 37.9 40.1 39.7	dB/m V 2462 AU 33.5 33.5 36.0 36.0	dB ND BLU 3.0 3.0 3.8 3.8	dB UETOOTI -45.7 -45.7 -46.5 -46.5	dB H 2480 0.0 0.0 0.0 0.0	2.0 2.0 2.0 2.0	dBuV/m 42.0 40.3 46.2 43.5	dBuV/m 31.3 30.6 35.3 34.9	dBuV/m 74.0 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0	dB -32.0 -33.7 -27.8	dB -22.7 -23.4 -18.7	V (NOISE FLOOR) H (NOISE FLOOR) V (NOISE FLOOR)
GHz 4.924 4.924 7.386	feet 9.8 9.8 9.8	dBuV 49.3 47.6 51.0 48.3	dBuV HANNEL LAN 38.6 37.9 40.1 39.7	dB/m V 2462 AU 33.5 33.5 36.0 36.0	dB ND BLU 3.0 3.0 3.8 3.8	dB UETOOTI -45.7 -45.7 -46.5 -46.5	dB H 2480 0.0 0.0 0.0 0.0	2.0 2.0 2.0 2.0	dBuV/m 42.0 40.3 46.2 43.5	dBuV/m 31.3 30.6 35.3 34.9	dBuV/m 74.0 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0	dB -32.0 -33.7 -27.8	dB -22.7 -23.4 -18.7	V (NOISE FLOOR) H (NOISE FLOOR) V (NOISE FLOOR)
GHz 4.924 4.924 7.386	feet 9.8 9.8 9.8	dBuV 49.3 47.6 51.0 48.3	dBuV HANNEL LAN 38.6 37.9 40.1 39.7	dB/m V 2462 AU 33.5 33.5 36.0 36.0	dB ND BLU 3.0 3.0 3.8 3.8	dB UETOOTI -45.7 -45.7 -46.5 -46.5	dB H 2480 0.0 0.0 0.0 0.0	2.0 2.0 2.0 2.0	dBuV/m 42.0 40.3 46.2 43.5	dBuV/m 31.3 30.6 35.3 34.9	dBuV/m 74.0 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0	dB -32.0 -33.7 -27.8	dB -22.7 -23.4 -18.7	V (NOISE FLOOR) H (NOISE FLOOR) V (NOISE FLOOR)
GHz 4.924 4.924 7.386	feet 9.8 9.8 9.8	dBuV 49.3 47.6 51.0 48.3	dBuV HANNEL LAN 38.6 37.9 40.1 39.7	dB/m V 2462 AU 33.5 33.5 36.0 36.0	dB ND BLU 3.0 3.0 3.8 3.8	dB UETOOTI -45.7 -45.7 -46.5 -46.5	dB H 2480 0.0 0.0 0.0 0.0	2.0 2.0 2.0 2.0	dBuV/m 42.0 40.3 46.2 43.5	dBuV/m 31.3 30.6 35.3 34.9	dBuV/m 74.0 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0	dB -32.0 -33.7 -27.8	dB -22.7 -23.4 -18.7	V (NOISE FLOOR) H (NOISE FLOOR) V (NOISE FLOOR)
GHz 4.924 4.924 7.386	feet 9.8 9.8 9.8 9.8	dBuV HIGH C 49.3 47.6 51.0 48.3	dBuV HANNEL LAN 38.6 37.9 40.1 39.7 NO OTHER SI	dB/m V 2462 AV 33.5 33.5 36.0 36.0 PURIOU	dB ND BLU 3.0 3.0 3.8 3.8	dB UETOOTI -45.7 -45.7 -46.5 -46.5	dB H 2480 0.0 0.0 0.0 0.0	2.0 2.0 2.0 2.0	dBuV/m 42.0 40.3 46.2 43.5	dBuV/m 31.3 30.6 35.3 34.9	dBuV/m 74.0 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0 54.0	dB -32.0 -33.7 -27.8 -30.5	dB -22.7 -23.4 -18.7 -19.1	V (NOISE FLOOR) H (NOISE FLOOR) V (NOISE FLOOR) H (NOISE FLOOR)
-	feet 9.8 9.8 9.8	dBuV HIGH C 49.3 47.6 51.0 48.3	dBuV HANNEL LAN 38.6 37.9 40.1 39.7	dB/m V 2462 AV 33.5 33.5 36.0 36.0 PURIOU	dB ND BLU 3.0 3.8 3.8 S EMIS	dB UETOOTI -45.7 -45.7 -46.5 -46.5 -3000000000000000000000000000000000000	dB H 2480 0.0 0.0 0.0 0.0	2.0 2.0 2.0 2.0	dBuV/m 42.0 40.3 46.2 43.5	dBuV/m 31.3 30.6 35.3 34.9	dBuV/m 74.0 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0 54.0	dB -32.0 -33.7 -27.8 -30.5	dB -22.7 -23.4 -18.7	V (NOISE FLOOR) H (NOISE FLOOR) V (NOISE FLOOR) H (NOISE FLOOR)
GHz 4.924 4.924 7.386	feet 9.8 9.8 9.8 9.8 9.8 9.8 9.8 9.8 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	dBuV HIGH C 49.3 47.6 51.0 48.3	dBuV HANNEL LAN 38.6 37.9 40.1 39.7 NO OTHER SI	dB/m V 2462 AV 33.5 33.5 36.0 36.0 PURIOU	dB ND BLU 3.0 3.8 3.8 S EMIS	dB UETOOTI -45.7 -45.5 -46.5 -46.5 -46.5 -46.5 -46.5 -46.5	dB H 2480 0.0 0.0 0.0 0.0 EEN IN TF	2.0 2.0 2.0 2.0 HE RES	dBuV/m 42.0 40.3 46.2 43.5	dBuV/m 31.3 30.6 35.3 34.9 BANDS UP1	dBuV/m 74.0 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0 54.0	dB -32.0 -33.7 -27.8 -30.5	dB -22.7 -23.4 -18.7 -19.1	V (NOISE FLOOR) H (NOISE FLOOR) V (NOISE FLOOR) H (NOISE FLOOR)
GHz 4.924 4.924 7.386	feet 9.8 9.8 9.8 9.8 9.8 	dBuV HIGH Cl 49.3 47.6 51.0 48.3 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	dBuV HANNEL LAN 38.6 37.9 40.1 39.7 NO OTHER SI	dB/m V 2462 AV 33.5 33.5 36.0 36.0 PURIOU	dB ND BLU 3.0 3.0 3.8 3.8 S EMIS	dB UETOOTI -45.7 -45.7 -46.5 -46.5 SSIONS SI Amp D Corr	dB H 2480 0.0 0.0 0.0 0.0 EEN IN TE EEN IN TE	2.0 2.0 2.0 2.0 HE RES	dBuV/m 42.0 40.3 46.2 43.5 TRICTED 1	dBuV/m 31.3 30.6 35.3 34.9 BANDS UP1	dBuV/m 74.0 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0 54.0 	dB -32.0 -33.7 -27.8 -30.5 	dB -22.7 -23.4 -18.7 -19.1	V (NOISE FLOOR) H (NOISE FLOOR) V (NOISE FLOOR) H (NOISE FLOOR) to the second s
GHz 4.924 4.924 7.386	feet 9.8 9.8 9.8 9.8 9.8 	dBuV HIGH Cl 49.3 47.6 51.0 48.3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	dBuV HANNEL LAN 38.6 37.9 40.1 39.7 NO OTHER SI ent Frequency > Antenna Reading	dB/m V 2462 AV 33.5 33.5 36.0 36.0 PURIOU	dB ND BLU 3.0 3.0 3.8 3.8 5 EMIS	dB UETOOTI -45.7 -45.7 -46.5 -46.5 -46.5 	dB H 2480 0.0 0.0 0.0 EEN IN TE	2.0 2.0 2.0 2.0 HE RES Gain Correct	dBuV/m 42.0 40.3 46.2 43.5 TRICTED 1	dBuV/m 31.3 30.6 35.3 34.9 BANDS UPT BANDS UPT CARTER OF THE OFFICE OFFICO OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFICE OFFI	dBuV/m 74.0 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0 54.0 54.0 4.0 54.0 54.0	dB -32.0 -33.7 -27.8 -30.5 	dB -22.7 -23.4 -18.7 -19.1 	V (NOISE FLOOR) H (NOISE FLOOR) V (NOISE FLOOR) H (NOISE FLOOR) th Limit Limit

Page 33 of 43

7.3. POWERLINE CONDUCTED EMISSIONS

<u>LIMIT</u>

\$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:

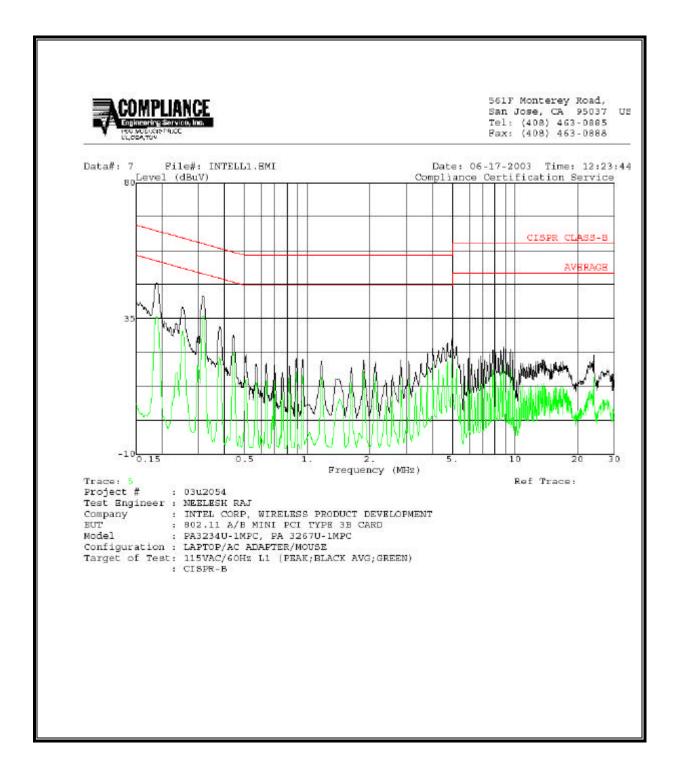
Page 34 of 43

<u>6 WORST EMISSIONS</u>

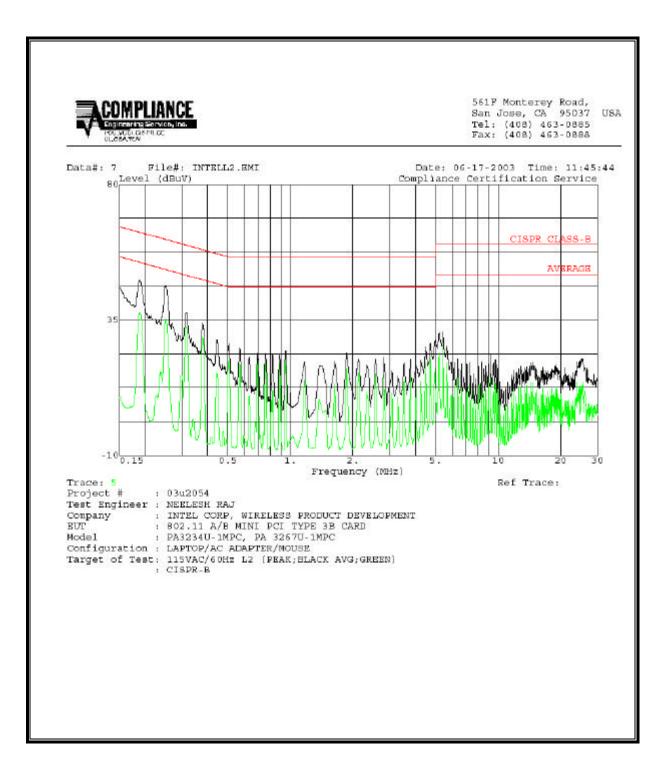
	CONDUCTED EMISSIONS DATA (115VAC 60Hz)											
Freq.		Closs	Limit	EN_B	Mar	Remark						
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2			
0.19	46.86		35.58	0.00	64.94	54.94	-18.08	-19.36	L1			
0.25	38.63		30.80	0.00	63.09	53.09	-24.46	-22.29	L1			
0.31	42.52		35.83	0.00	61.34	51.34	-18.82	-15.51	L1			
0.19	48.20		37.50	0.00	64.94	54.94	-16.74	-17.44	L2			
0.25	46.46		35.25	0.00	63.11	53.11	-16.65	-17.86	L2			
0.32	37.48		32.59	0.00	61.20	51.20	-23.72	-18.61	L2			
6 Worst I	Data											

Page 35 of 43

LINE 1 AND LINE 2 RESULTS



Page 36 of 43



Page 37 of 43

8. SETUP PHOTOS

RADIATED RF MEASUREMENT SETUP

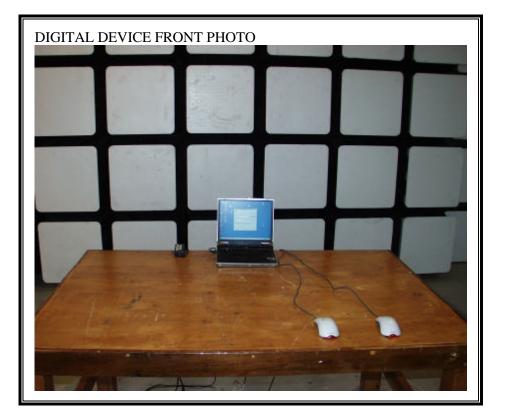


Page 38 of 43

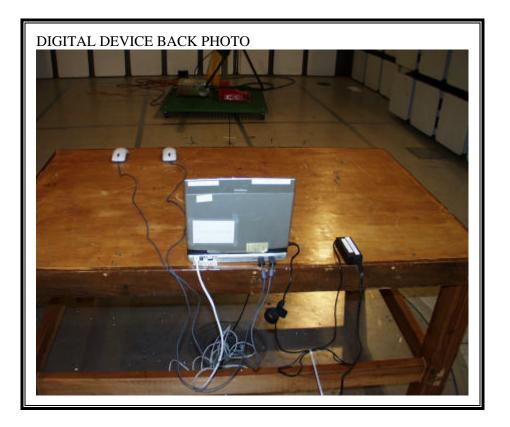


Page 39 of 43

DIGITAL DEVICE RADIATED EMISSIONS SETUP



Page 40 of 43



Page 41 of 43

POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP



Page 42 of 43



END OF REPORT

Page 43 of 43