



FCC CFR47 PART 15 SUBPART C CLASS II PERSIMIVE CHANGE TEST REPORT

FOR

Broadcom 802.11 a/g Mini PCI Card

MODEL NUMBER: BCM94309MPC0

FCC ID: QDS-BRCM1014

REPORT NUMBER: 04U2882-3

ISSUE DATE: AUGUST 10, 2004

Prepared for BROADCOM CORPORATION 190 MATHILDA PLACE SUNNYVALE, CA 94086 U.S.A.

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



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1. TEST RESULT CERTIFICATION

COMPANY NAME:	BROADCOM CO 190 MATHILDA I SUNNYVALE, CA U.S.A.	PLACE
EUT DESCRIPTION:	Broadcom 802.11	a/g Mini PCI Card
MODEL:	BCM94309MPC0	
DATE TESTED:	AUGUST 2-4, 2004	4
	APPLICABLE	C STANDARDS
STANDAR	D	TEST RESULTS
FCC PART 15 SUB	PART 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 and 5.8 GHz bands are applicable to this report; another band of operation (5.2 GHz) is documented in a separate report.

Approved & Released For CCS By:

THU CHAN SENIOR EMC SUPERVISOR COMPLIANCE CERTIFICATION SERVICES

Tested By:

08

HITESH SOLANKI EMC ENGINEER COMPLIANCE CERTIFICATION SERVICES

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2. CLASS II PERMISSIVE CHANGE DESCRIPTION

Adding portable host, HP laptop (model: HSTNN-C02C)

This is to request a Class II permissive change for FCC ID: QDS-BRCM1014, originally granted 07/23/2004. The major change filed under this application is:

Change #1 Adding portable host, HP laptop model: HSTNN-C02C:

The EUT is a WLAN 802.11a/g Mini PCI transceiver module, operating in the 2400-2483.5 MHz, 5150-5350 MHz, and 5725-5825 MHz bands. The radio utilizes two PIFA antennas for diversity, the antennas information is as follows:

Manufacturer	Antenna Type	Maximum Antenna Gain (dBi)
WNC	Metal PIFA	2.4GHz band: 1.26 (H, Main) 5.2 & 5.8 GHz bands: 1.67 (H, Aux)
Foxconn	Metal PIFA	2.4GHz band: 2.51 (H, Main) 5.2 & 5.8 GHz bands: 1.06 (H, Main)

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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 <u>http://www.ccsemc.com</u>.



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

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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%.

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5.3. TEST AND MEASUREMENT EQUIPMENT

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

	TEST EQUIP	MENT LIST		
Description	Manufacturer	Model	Serial Number	Cal Due
Spectrum Analyzer 20 Hz ~ 44 GHz	Agilent	E4446A	US42070220	4/1/2005
Antenna, Horn 1 ~ 18 GHz	EMCO	3117	29301	12/26/2004
Antenna, Horn, 18 ~ 26 GHz	ARA	MWH-1826/B	1013	2/4/2005
Antenna, Horn 26 ~ 40 GHz	ARA	MWH-2640/B	1029	12/3/2004
Amplifier 1-26GHz	MITEQ	NSP2600-SP	924341	6/10/2005
PreAmplifier 26-40 GHz	Miteq	NSP4000-SP2	924343	6/10/2005
EMI Receiver, 9 kHz ~ 2.9 GHz	HP	8542E	3942A00286	11/21/2004
RF Filter Section	HP	85420E	3705A00256	11/21/2004
Bilog Antenna	Sunol Sciences	JB1	A121003	12/22/2004
LISN, 10 kHz ~ 30 MHz	FCC	50/250-25-2	114	10/13/2004
EMI Test Receiver	R & S	ESHS 20	827129/006	10/22/2005
Site A Line Stabilizer / Conditioner	Tripplite	LC-1800a	A0051681	CNR

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6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT

	PERIPHERAI	SUPPORT EQUIP	MENT LIST	
Description	Manufacturer	Model	Serial Number	FCC ID
HOST LAPTOP	HP	HSTNN-C02C	N/A	N/A
AC ADAPTER	HP	PPP009S	57BC30AU4Q204Y	N/A

I/O CABLES

			I/O (CABLE LIST		
Cable No.	Port	# of Identical Ports		Cable Type	Cable Length	Remarks
1	AC	1	AC	UNSHIELDED	1.86M	U.S (3 PRONG)
2	DC	1	DC	UNSHIELDED	1.86M	N/A

TEST SETUP

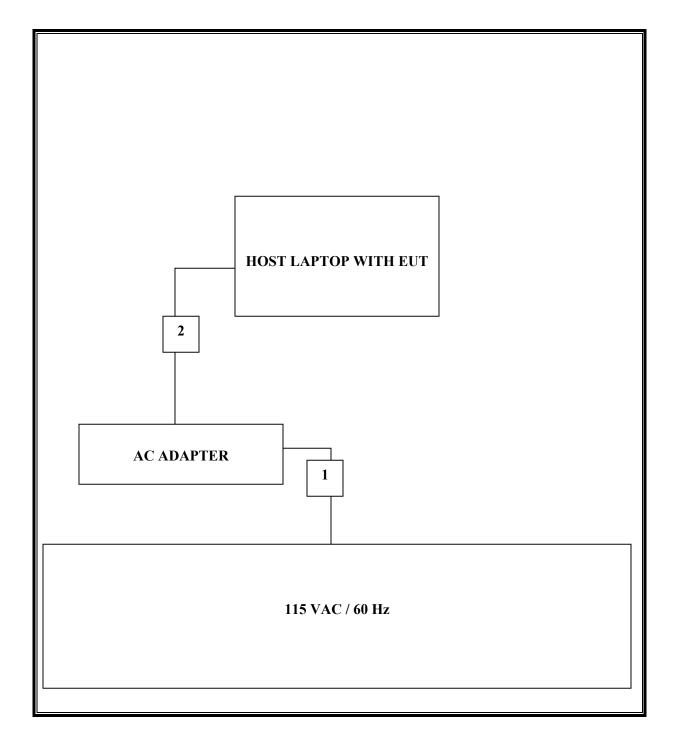
During the testing process the EUT was installed inside a host laptop computer and put in continuous transmit mode. 802.11b, 802.11g and 802.11a modes were investigated.

The EUT was tested as a potable device in the X, Y, and Z positions and as a mobile device. Worst-case was determined to be the high channel in the "Z" position yielding the highest EIRP in 802.11b mode.

The WLAN was Co-located with a Bluetooth transmitter.

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SETUP DIAGRAM FOR TESTS



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7. APPLICABLE LIMITS AND TEST RESULTS

7.1. RADIATED EMISSIONS

7.1.1. 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.

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\$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	Field Strength	Measurement Distance
(MHz)	(microvolts/meter)	(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.

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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 of the 2.4 GHz band.

The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels of the 5.8 GHz band.

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.

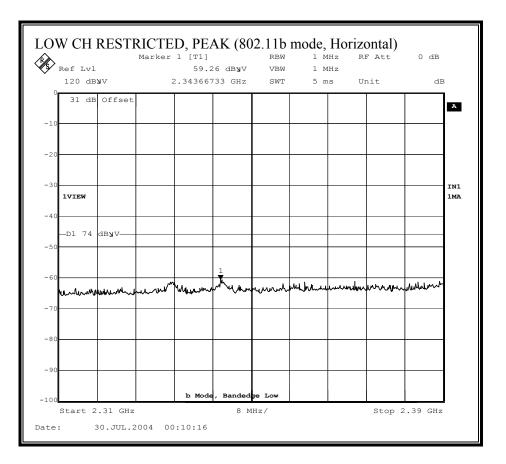
RESULTS

No non-compliance noted:

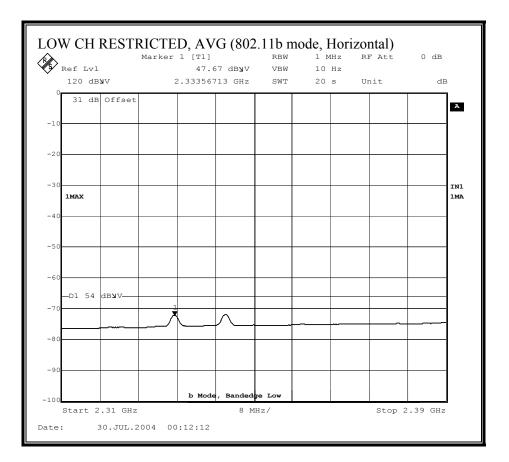
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7.1.2. TRANSMITTER RADIATED EMISSIONS ABOVE 1 GHZ

RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, HORIZONTAL)

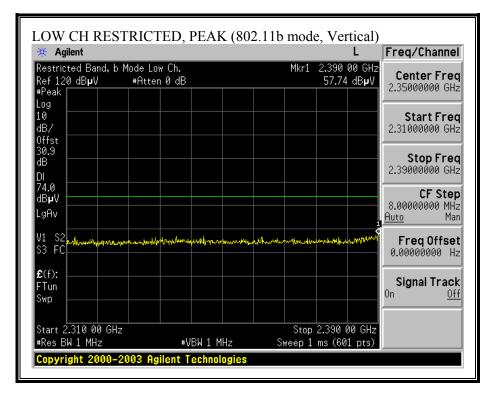


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RESTRICTED BANDEDGE (b MODE, LOW CHANNEL, VERTICAL)

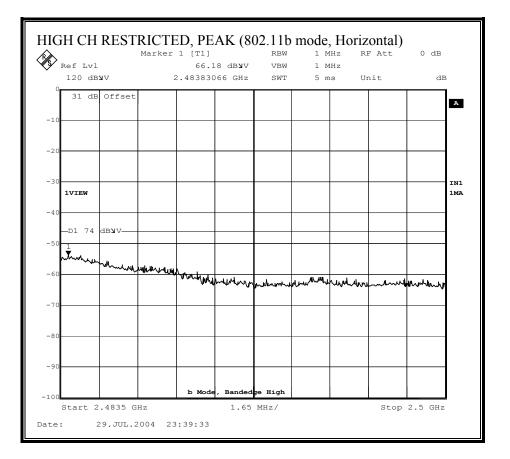


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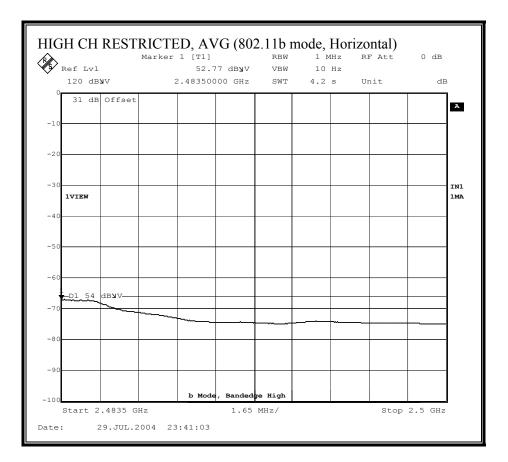
🔆 Agilent			L	Freq/Channel
Restricted Band, Ref 120 dB µ V	3	Mkr1	2.390 00 GH 46.39 dBµ\	
#Peak Log				2.33000000 0H2
10 dB/				Start Freq 2.31000000 GHz
Offst 30.9 dB				Stop Freq 2.39000000 GHz
DI 54.0 dBµV				CF Step 8.0000000 MHz
LgAv				<u>Auto</u> Man
V1 S2 S3 FC				FreqOffset
£(f): FTun Swp				Signal Track On <u>Off</u>
~"P				
Start 2.310 00 G ≢Res BW 1 MHz	⊧VBW 10 Hz		2.390 00 GH 8 s (601 pts)	

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RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, HORIZONTAL)

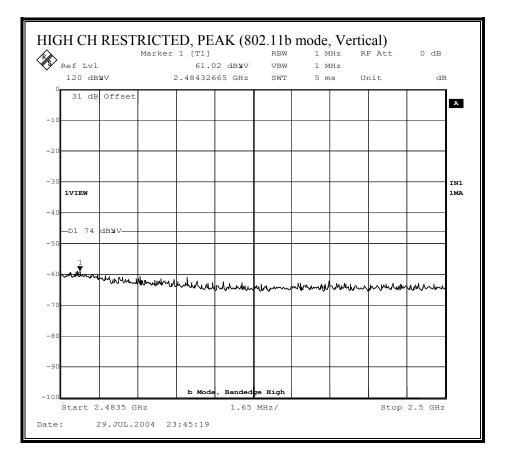


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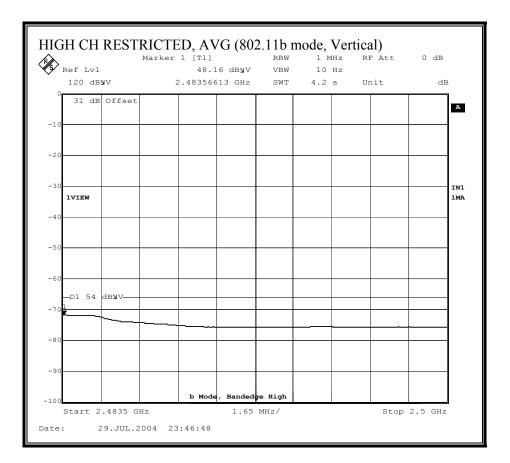


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RESTRICTED BANDEDGE (b MODE, HIGH CHANNEL, VERTICAL)



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HARMONICS AND SPURIOUS EMISSIONS (b MODE), LOW & MID CHANNELS

est Equipm EMCO Hor	orn 1-180			rum Ana	dyzer		Pre-amp	lifer 1-2	6GHz	Pre-amp	blifer 26-40G	Hz		Horn > 18	
T73; S/N: 6	cy Cables -		Agilent E □ (4 ~ 6 ft)		-	-	T87 Mite	eq 9243	42 🔻		Peak Meas 1 MHz Reso 1 MHz Video	lution Bandw	vidth		asurements:
			Read Avg.	AF	CL	Amp	D Corr	HPF	Peak	Avg	Pk Lim	Avg Lim	Pk Mar	Avg Mar	Notes
		dBuV	dBuV	dB/m	dB	dB	dB		dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	
b mode, low	w CH 9.8	62.0	45.8	33.4	3.3	-44.7	0.0	1.0	55.0	38.8	74.0	54.0	-19.0	-15.2	v
900 9	9.8	52.4	35.2	30.4	2.4	-43.2	0.0	1.0	43.1	25.8	74.0	54.0	-30.9	-28.2	V
	9.8	64.7	37.2	26.4	1.6	-43.3	0.0	1.0	50.3	22.8	74.0	54.0	-23.7	-31.2	V
	9.8 9.8	53.9 57.9	39.8 38.1	33.4 24.5	3.3	-44.7 -43.4	0.0	1.0 1.0	46.9 41.2	32.8 21.5	74.0 74.0	54.0 54.0	-27.1 -32.8	-21.2 -32.5	H H
150 5 lb mode, mid		51.7	50.1	44.0	1.5	-43.4	0.0	1.0	71.2	21.0	/ 4.0		-52.0	-54.3	
874 9	9.8	54.8	39.2	33.4	3.3	-44.7	0.0	1.0	47.8	32.2	74.0	54.0	-26.2	-21.8	V
	9.8	64.1	36.8	26.3	1.6	-43.3	0.0	1.0	49.7	22.4	74.0	54.0	-24.3	-31.6	V
	9.8 9.8	51.5 53.9	37.7 35.5	33.4	3.3	-44.7 -43.3	0.0	1.0	44.5 39.5	30.7 21.1	74.0 74.0	54.0 54.0	-29.5 -34.5	-23.3 -32.9	H V
570 9	7.0	33.9	35.5	20.3	1.6	-43.3	0.0	1.0	39.5	41.1	/4.0	34.0	-34.5	-34.9	v
	ist Dis ead An F An		ctor	T		Amp D Corr Avg Peak HPF	Average	Correc Field S ed Peak	et to 3 mete Strength @ c Field Stre	3 m		Pk Lim Avg Mar	Peak Field Margin vs	Field Strengt d Strength Li S. Average L S. Peak Limit	imit imit

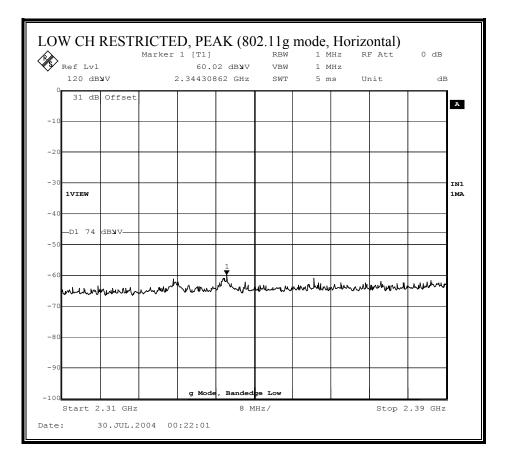
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HARMONICS AND SPURIOUS EMISSIONS (b MODE), HIGH CHANNEL

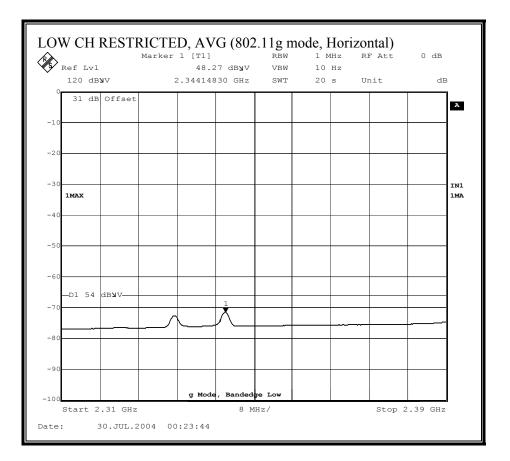
7/29/04 Complis			Measureme Services, Mo		ill Ord	en Field	Site								
				0	m ob		Sitt								
est Eng roject #			William Zhuan 04U2882-1	g											
roject # ompan			04U2882-1 Broadcom												
UT Des	crip.:		802.11 a/b/g M		Card										
UT M/I	N:		BCM94309MF												
'est Tar Iode Oj			FCC 15.247	oda) @ -	voret n -	eition									
			TX ON (11b m	iode) @ V	vorst po	sition									
	ipment:	1										1			
EMCO) Horn 1	-18GHz	Spect	rum Ana	lyzer		Pre-amp	lifer 1-2	6GHz	Pre-am	plifer 26-40G	Hz		Horn >1	8GHz
T73; S/	N: 6717	@3m 💂				-	T63 Mit	eq 6464:	56 🛖			Ŧ			-
- Hi Fred	quency Cat	bles	·								Peak Meas	uremente		Average M.	easurements:
(2			$\Box (4 \sim 6 \text{ ft})$	▼ (12 ft)								lution Bandw	ridth	1 MHz Resol 10Hz Video I	ution Bandwidth
f	Dist		Read Avg.	AF	CL	Amp	D Corr	HPF	Peak	Avg		Avg Lim		Avg Mar	Notes
GHz Mode	feet High (dBuV Ch. 2462MF	dBuV Iz	dB/m	dB	dB	dB		dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	
024	9.8	48.2	1Z 34.1	33.5	3.0	-35.3	0.0	1.0	50.3	36.3	74.0	54.0	-23.7	-17.7	Z position, V
24	9.8	45.6	31.9	33.5	3.0	-35.3	0.0	1.0	47.8	34.1	74.0	54.0	-26.2	-19.9	Z position, H
	f	Measureme	ent Frequency	,		Amp	Preamp (fain				Avg Lim	Average F	ield Strengt	th Limit
	Dist	Distance to		,								Pk Lim		l Strength L	
							Distance		t to 3 mere						
	Read	Analyzer R	eading						t to 3 metestrength @						
	Read AF	Analyzer R Antenna Fa				Avg Peak	Average	Field S	st to 3 mete strength @ Field Stre	3 m		Avg Mar	Margin vs	. Average L . Peak Limi	limit
			ictor			Avg	Average	Field S d Peak	Strength @ Field Stre	3 m		Avg Mar	Margin vs	. Average L	limit
	AF	Antenna Fa	ictor			Avg Peak	Average Calculate	Field S d Peak	Strength @ Field Stre	3 m		Avg Mar	Margin vs	. Average L	limit
	AF	Antenna Fa	ictor			Avg Peak	Average Calculate	Field S d Peak	Strength @ Field Stre	3 m		Avg Mar	Margin vs	. Average L	limit
	AF	Antenna Fa	ictor			Avg Peak	Average Calculate	Field S d Peak	Strength @ Field Stre	3 m		Avg Mar	Margin vs	. Average L	limit
	AF	Antenna Fa	ictor			Avg Peak	Average Calculate	Field S d Peak	Strength @ Field Stre	3 m		Avg Mar	Margin vs	. Average L	limit
	AF	Antenna Fa	ictor			Avg Peak	Average Calculate	Field S d Peak	Strength @ Field Stre	3 m		Avg Mar	Margin vs	. Average L	limit
	AF	Antenna Fa	ictor			Avg Peak	Average Calculate	Field S d Peak	Strength @ Field Stre	3 m		Avg Mar	Margin vs	. Average L	limit
	AF	Antenna Fa	ictor			Avg Peak	Average Calculate	Field S d Peak	Strength @ Field Stre	3 m		Avg Mar	Margin vs	. Average L	limit
	AF	Antenna Fa	ictor			Avg Peak	Average Calculate	Field S d Peak	Strength @ Field Stre	3 m		Avg Mar	Margin vs	. Average L	limit
	AF	Antenna Fa	ictor			Avg Peak	Average Calculate	Field S d Peak	Strength @ Field Stre	3 m		Avg Mar	Margin vs	. Average L	limit
	AF	Antenna Fa	ictor			Avg Peak	Average Calculate	Field S d Peak	Strength @ Field Stre	3 m		Avg Mar	Margin vs	. Average L	limit
	AF	Antenna Fa	ictor			Avg Peak	Average Calculate	Field S d Peak	Strength @ Field Stre	3 m		Avg Mar	Margin vs	. Average L	limit
	AF	Antenna Fa	ictor			Avg Peak	Average Calculate	Field S d Peak	Strength @ Field Stre	3 m		Avg Mar	Margin vs	. Average L	limit
	AF	Antenna Fa	ictor			Avg Peak	Average Calculate	Field S d Peak	Strength @ Field Stre	3 m		Avg Mar	Margin vs	. Average L	limit
	AF	Antenna Fa	ictor			Avg Peak	Average Calculate	Field S d Peak	Strength @ Field Stre	3 m		Avg Mar	Margin vs	. Average L	limit
	AF	Antenna Fa	ictor			Avg Peak	Average Calculate	Field S d Peak	Strength @ Field Stre	3 m		Avg Mar	Margin vs	. Average L	limit
	AF	Antenna Fa	ictor			Avg Peak	Average Calculate	Field S d Peak	Strength @ Field Stre	3 m		Avg Mar	Margin vs	. Average L	limit

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RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, HORIZONTAL)

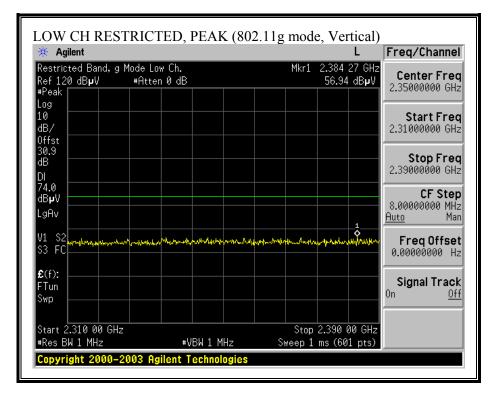


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RESTRICTED BANDEDGE (g MODE, LOW CHANNEL, VERTICAL)

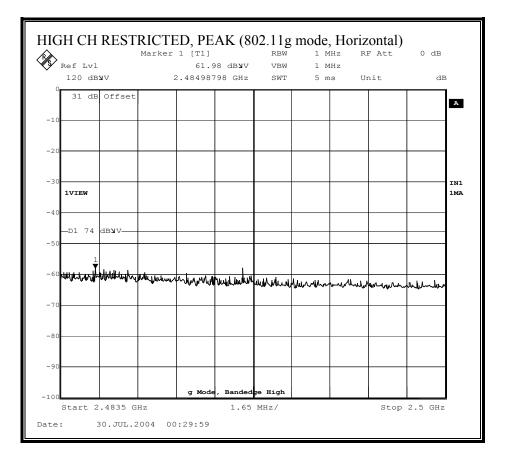


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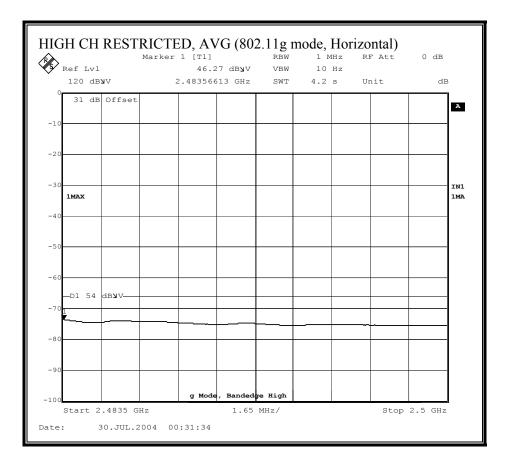
🔆 Agilent		L	Freq/Channel
Restricted Band, g Ref 120 dBµV		30 00 GHz 4.88 dBµV	Center Freq 2.35000000 GHz
#Peak Log 10			Start Freq
dB/ 0ffst 30.9			2.31000000 GHz
dB DI 54.0			Stop Freq 2.39000000 GHz
dB µ V LgAv			CF Step 8.00000000 MHz <u>Auto</u> Man
V1 S2 S3 FC			FreqOffset 0.00000000 Hz
£ (f): FTun Swp			Signal Track On <u>Off</u>
Start 2.310 00 GH; #Res BW 1 MHz	 10 Hz	90 00 GHz	

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RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, HORIZONTAL)

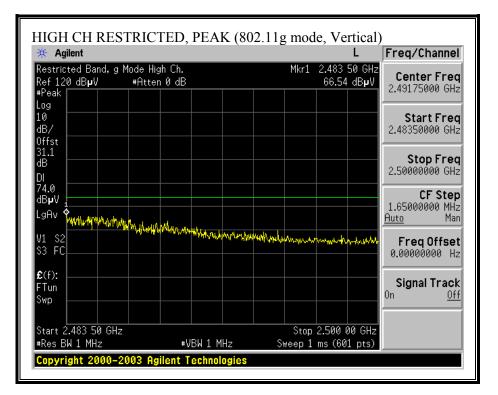


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RESTRICTED BANDEDGE (g MODE, HIGH CHANNEL, VERTICAL)



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🔆 Agilent				L	Freq/Channel
Restricted Band, g Mo Ref 120 dB µ V •				2.483 64 GHz 46.47 dB µ V	Contor From
#Peak Log					
10 dB/					Start Freq 2.48350000 GHz
0ffst 31.1 dB DI					Stop Freq 2.50000000 GHz
54.0 dB µ V LgAv					CF Step 1.65000000 MHz <u>Auto</u> Man
V1 S2 S3 FC					Freq Offset 0.00000000 Hz
£(f): FTun Swp					Signal Track On <u>Off</u>
Start 2.483 50 GHz				.500 00 GHzî	
#Res BW 1 MHz	#\/RW 10	Hz	ے stup Sweep 1.287		

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HARMONICS AND SPURIOUS EMISSIONS (g MODE)

Fest Eng		Frank Irahim														
Project #		04U2882-3														
Company		Broadcom														
EUT Dese EUT M/N		802.11 a/b/g BCM94309M	Mini PCI Card													
Fest Targ		FCC 15.247	IPCO													
Mode Op			mode), @ worst	t position												
<u>Fest Equi</u> EMCO	ipment:) Horn 1-	18GHz	Spect	trum Ana	lyzer		Pre-amp	lifer 1-2	26GHz	Pre-amp	lifer 26-40G	Hz		Horn >1	8GHz	1
T73; S/	N: 6717 (23m 🚽	Agilent E	4446A A	nalyzer		T87 Mit	eq 9243	42 🕌			-	T117; AR	A 18-26GHz;	S/N:1013	1
Hi Frequ	uency Cabl	es ———	1			 					Peak Meas	urements:		Average M	easurements:	*
Hi Frequ			$\boxed{(4 \sim 6 \text{ ft})}$	▼ (12 ft)]						lution Bandw	idth		easurements: ution Bandwidth Bandwidth	<u>-</u>
			☐ (4 ~ 6 ft) F Read Avg.	▼ (12 ft)	CL	Amp	D Corr	HPF	Peak		1 MHz Reso	lution Bandw	idth Pk Mar	1 MHz Resol	ution Bandwidth	*
f GHz	ft) F Dist feet	✓ (2 ~ 3 ft)				Amp dB	D Corr dB	HPF	Peak dBuV/m		1 MHz Reso 1MHz Video	lution Bandw Bandwidth		1 MHz Resol 10Hz Video I	ution Bandwidth Bandwidth	*
f GHz 11g mode,	ft) F Dist feet low CH	(2~3 ft) Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	dB	dB		dBuV/m	Avg dBuV/m	1 MHz Reso 1MHz Video Pk Lim dBuV/m	lution Bandw Bandwidth Avg Lim dBuV/m	Pk Mar dB	1 MHz Resol 10Hz Video 1 Avg Mar dB	ution Bandwidth Bandwidth Notes	-
f GHz 11g mode, .600	ft) F Dist feet low CH 9.8	 (2~3 ft) Read Pk dBuV 63.1 	Read Avg. dBuV 36.3	AF dB/m 26.4	CL dB 1.6	dB -43.3	dB 0.0	1.0	dBuV/m 48.7	Avg dBuV/m 21.9	1 MHz Reso 1MHz Video Pk Lim dBuV/m 74.0	Avg Lim dBuV/m 54.0	Pk Mar dB -25.3	1 MHz Resol 10Hz Video 1 Avg Mar dB -32.1	ution Bandwidth Bandwidth Notes V	-
f GHz 11g mode, 1.600	ft) F Dist feet low CH 9.8 9.8	(2~3 ft) Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	dB	dB		dBuV/m	Avg dBuV/m	1 MHz Reso 1MHz Video Pk Lim dBuV/m	lution Bandw Bandwidth Avg Lim dBuV/m	Pk Mar dB	1 MHz Resol 10Hz Video 1 Avg Mar dB	ution Bandwidth Bandwidth Notes	-
f GHz 11g mode, .600	ft) F Dist feet low CH 9.8 9.8	 (2~3 ft) Read Pk dBuV 63.1 	Read Avg. dBuV 36.3	AF dB/m 26.4	CL dB 1.6	dB -43.3	dB 0.0	1.0	dBuV/m 48.7	Avg dBuV/m 21.9	1 MHz Reso 1MHz Video Pk Lim dBuV/m 74.0	Avg Lim dBuV/m 54.0	Pk Mar dB -25.3	1 MHz Resol 10Hz Video 1 Avg Mar dB -32.1	ution Bandwidth Bandwidth Notes V	•
f GHz 11g mode, 1.600 11g mode, 1.600 1.600	ft) Dist feet low CH 9.8 9.8 mid CH 9.8 9.8	Read Pk dBuV 63.1 61.1 63.1 61.4	Read Avg. dBuV 36.3 35.7	AF dB/m 26.4 26.4	CL dB 1.6 1.6	dB -43.3 -43.3	dB 0.0 0.0	1.0 1.0	dBuV/m 48.7 46.7	Avg dBuV/m 21.9 21.3	1 MHz Reso 1MHz Videc Pk Lim dBuV/m 74.0 74.0	lution Bandwidth Avg Lim dBuV/m 54.0 54.0	Pk Mar dB -25.3 -27.3	1 MHz Resol 10Hz Video I Avg Mar dB -32.1 -32.7	ution Bandwidth Bandwidth Notes V H	·
f GHz (1g mode, 1.600 (1g mode, 1.600 (1g mode,	ft) F Dist feet low CH 9.8 9.8 mid CH 9.8 9.8 high CH	Read Pk dBuV 63.1 61.1 61.4	Read Avg. dBuV 36.3 35.7 37.5 35.7	AF dB/m 26.4 26.4 26.4 26.4	CL dB 1.6 1.6 1.6	dB -43.3 -43.3 -43.3 -43.3	dB 0.0 0.0 0.0 0.0	1.0 1.0 1.0 1.0	dBuV/m 48.7 46.7 48.7 47.0	Avg dBuV/m 21.9 21.3 23.1 21.3	1 MHz Reso 1MHz Video Pk Lim dBuV/m 74.0 74.0 74.0 74.0	lution Bandwidth Avg Lim dBuV/m 54.0 54.0 54.0 54.0	Pk Mar dB -25.3 -27.3 -25.3 -27.0	1 MHz Resol 10Hz Video 1 Avg Mar dB -32.1 -32.7 -30.9 -32.7	ution Bandwidth Bandwidth Notes V H V H H	•
f GHz 11g mode, 1.600 1.600 1.600 1.600 1.1g mode, 1.600	ft) F Dist feet low CH 9.8 9.8 mid CH 9.8 9.8 high CH 9.8 9.8 9.8	Read Pk dBuV 63.1 61.1 63.1 63.1 63.1 63.7	Read Avg. dBuV 36.3 35.7 37.5 35.7 36.8	AF dB/m 26.4 26.4 26.4 26.4 26.4	CL dB 1.6 1.6 1.6 1.6	dB -43.3 -43.3 -43.3 -43.3 -43.3	dB 0.0 0.0 0.0 0.0 0.0	1.0 1.0 1.0 1.0	dBuV/m 48.7 46.7 48.7 47.0 49.3	Avg dBuV/m 21.9 21.3 23.1 21.3 22.4	1 MHz Reso 1MHz Video Pk Lim dBuV/m 74.0 74.0 74.0 74.0 74.0	lution Bandwidth Avg Lim dBuV/m 54.0 54.0 54.0 54.0 54.0 54.0	Pk Mar dB -25.3 -27.3 -25.3 -27.0 -24.7	1 MHz Resol 10Hz Video 1 Avg Mar dB -32.1 -32.7 -30.9 -32.7 -31.6	ution Bandwidth Bandwidth Notes V H V H H V	•
f GHz 11g mode, 1.600 1.600 1.600 1.600 1.600 1.600 1.600	Dist Feet low CH 9.8 9.8 9.8 mid CH 9.8 9.8 9.8 high CH 9.8 9.8 9.8	7 (2~3 ft) Read Pk dBuV 63.1 61.1 63.1 61.4 63.7 61.4	Read Avg. dBuV 36.3 35.7 37.5 35.7 36.8 35.8	AF dB/m 26.4 26.4 26.4 26.4	CL dB 1.6 1.6 1.6	dB -43.3 -43.3 -43.3 -43.3	dB 0.0 0.0 0.0 0.0	1.0 1.0 1.0 1.0	dBuV/m 48.7 46.7 48.7 47.0	Avg dBuV/m 21.9 21.3 23.1 21.3	1 MHz Reso 1MHz Video Pk Lim dBuV/m 74.0 74.0 74.0 74.0	lution Bandwidth Avg Lim dBuV/m 54.0 54.0 54.0 54.0	Pk Mar dB -25.3 -27.3 -25.3 -27.0	1 MHz Resol 10Hz Video 1 Avg Mar dB -32.1 -32.7 -30.9 -32.7	ution Bandwidth Bandwidth Notes V H V H H	•
f GHz 11g mode, 1.600 1.600 1.600 1.600 1.600 1.600 1.600	Dist Feet low CH 9.8 9.8 9.8 mid CH 9.8 9.8 9.8 high CH 9.8 9.8 9.8	Read Pk dBuV 63.1 61.1 63.1 63.1 63.7	Read Avg. dBuV 36.3 35.7 37.5 35.7 36.8 35.8	AF dB/m 26.4 26.4 26.4 26.4 26.4	CL dB 1.6 1.6 1.6 1.6	dB -43.3 -43.3 -43.3 -43.3 -43.3	dB 0.0 0.0 0.0 0.0 0.0	1.0 1.0 1.0 1.0	dBuV/m 48.7 46.7 48.7 47.0 49.3	Avg dBuV/m 21.9 21.3 23.1 21.3 22.4	1 MHz Reso 1MHz Video Pk Lim dBuV/m 74.0 74.0 74.0 74.0 74.0	lution Bandwidth Avg Lim dBuV/m 54.0 54.0 54.0 54.0 54.0 54.0	Pk Mar dB -25.3 -27.3 -25.3 -27.0 -24.7	1 MHz Resol 10Hz Video 1 Avg Mar dB -32.1 -32.7 -30.9 -32.7 -31.6	ution Bandwidth Bandwidth Notes V H V H H V	
f GHz (2 (1g mode, (.600 (.600) (.60)	ft) 7 Dist feet low CH 9.8 9.8 mid CH 9.8 9.8 high CH 9.8 9.8 f scanned	7 (2~3 ft) Read Pk dBuV 63.1 61.1 63.1 61.4 63.7 61.4 from 1GHz	Read Avg. dBuV 36.3 35.7 37.5 35.7 36.8 35.8	AF dB/m 26.4 26.4 26.4 26.4 26.4	CL dB 1.6 1.6 1.6 1.6	dB -43.3 -43.3 -43.3 -43.3 -43.3	dB 0.0 0.0 0.0 0.0 0.0	1.0 1.0 1.0 1.0 1.0	dBuV/m 48.7 46.7 48.7 47.0 49.3	Avg dBuV/m 21.9 21.3 23.1 21.3 22.4	1 MHz Reso 1MHz Video Pk Lim dBuV/m 74.0 74.0 74.0 74.0 74.0	lution Bandwidth Avg Lim dBuV/m 54.0 54.0 54.0 54.0 54.0 54.0 54.0	Pk Mar dB -25.3 -27.3 -25.3 -27.0 -24.7 -27.0	1 MHz Resol 10Hz Video 1 Avg Mar dB -32.1 -32.7 -30.9 -32.7 -31.6	ution Bandwidth Bandwidth Notes V H H H V H H	T
f GHz 11g mode, 1.600 1.600 11g mode, 1.600 1.600 1.600 1.600 1.600	ft) 7 Dist feet low CH 9.8 9.8 mid CH 9.8 9.8 9.8 Migh CH 9.8 9.8 f scanned f	7 (2~3 ft) Read Pk dBuV 63.1 61.1 63.1 61.4 63.7 61.4 from 1GHz	Read Avg. dBuV 36.3 35.7 37.5 35.7 36.8 35.8 to 26 GHz ent Frequency	AF dB/m 26.4 26.4 26.4 26.4 26.4	CL dB 1.6 1.6 1.6 1.6	dB -43.3 -43.3 -43.3 -43.3 -43.3 -43.3 -43.3 -43.3 -43.3	dB 0.0 0.0 0.0 0.0 0.0 0.0 Preamp (1.0 1.0 1.0 1.0 1.0 5ain	dBuV/m 48.7 46.7 48.7 47.0 49.3	Avg dBuV/m 21.9 21.3 23.1 21.3 22.4 21.4	1 MHz Reso 1MHz Video Pk Lim dBuV/m 74.0 74.0 74.0 74.0 74.0	lution Bandwidth Avg Lim dBuV/m 54.0 54.0 54.0 54.0 54.0 54.0 54.0 Avg Lim	Pk Mar dB -25.3 -27.3 -25.3 -27.0 -24.7 -27.0 -24.7 -27.0 -24.7 -27.0	1 MHz Resol 10Hz Video 1 Avg Mar dB 	ution Bandwidth Bandwidth Notes V H H V H H th Limit	_
f GHz 11g mode, 1.600 1.600 11g mode, 1.600 1.600 1.600 1.600 1.600	ft) 7 Dist feet low CH 9.8 9.8 mid CH 9.8 9.8 high CH 9.8 9.8 f Dist	7 (2~3 ft) Read Pk dBuV 63.1 61.1 63.1 61.4 1 from 1GHz Measurement	Read Avg. dBuV 36.3 35.7 37.5 35.7 36.8 35.8 to 26 GHz ent Frequency Antenna	AF dB/m 26.4 26.4 26.4 26.4 26.4	CL dB 1.6 1.6 1.6 1.6	dB -43.3 -43.3 -43.3 -43.3 -43.3 -43.3 -43.3 -43.3 -43.3	dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Distance	1.0 1.0 1.0 1.0 1.0 Gain	dBuV/m 48.7 46.7 48.7 47.0 49.3 47.0	Avg dBuV/m 21.9 21.3 23.1 21.3 22.4 21.4 21.4 5 5	1 MHz Reso 1MHz Videc Pk Lim dBuV/m 74.0 74.0 74.0 74.0 74.0 74.0 74.0	lution Bandwidth Avg Lim dBuV/m 54.0 54.0 54.0 54.0 54.0 54.0 54.0 54.0	Pk Mar dB -25.3 -27.3 -27.0 -24.7 -27.0 -24.7 -27.0 -24.7 -27.0 -24.7 -27.0	I MHz Resol 10Hz Video 10Hz Video Avg Mar dB -32.1 -32.7 -30.9 -32.7 -31.6 -32.6 Field Strengt	ution Bandwidth Bandwidth Notes V H V H V H H th Limit imit	_
f GHz 11g mode, 1.600 1.600 11g mode, 1.600 1.600 1.600 1.600 1.600	ft) 7 Dist feet low CH 9.8 9.8 mid CH 9.8 9.8 high CH 9.8 9.8 f Dist Read	7 (2~3 ft) Read Pk dBuV 63.1 61.1 63.1 61.4 63.7 61.4 1 from 1GHz Measureme Distance to	Read Avg. dBuV 36.3 35.7 37.5 35.7 36.8 35.8 to 26 GHz to 26 GHz ent Frequency Antenna teading	AF dB/m 26.4 26.4 26.4 26.4 26.4	CL dB 1.6 1.6 1.6 1.6	dB -43.3 -43.3 -43.3 -43.3 -43.3 -43.3 -43.3 -43.3 -43.3 -43.3 -43.3	dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	1.0 1.0 1.0 1.0 1.0 5.0 Field S	dBuV/m 48.7 46.7 48.7 47.0 49.3 47.0 et to 3 mete	Avg dBuV/m 21.9 21.3 23.1 21.3 22.4 21.4 3 m	1 MHz Reso 1MHz Videc Pk Lim dBuV/m 74.0 74.0 74.0 74.0 74.0 74.0 74.0	lution Bandwidth Avg Lim dBuV/m 54.0 54.0 54.0 54.0 54.0 54.0 54.0 74.0 74.0 74.0 74.0 74.0 74.0 74.0 7	Pk Mar dB -25.3 -27.3 -25.3 -27.0 -24.7 -27.0 -24.7 -27.0 -24.7 -27.0 -24.7 -27.0 -24.7 -27.0 -24.7 -27.0 -24.7 -27.0 -25.3 -27.0 -25.3 -27.0 -25.3 -27.0 -25.3 -27.0 -25.3 -27.0 -25.3 -27.0 -25.3 -27.0 -2	I MHz Resol 10Hz Video 10Hz Video Avg Mar dB -32.1 -32.7 -30.9 -32.7 -31.6 -32.6 "ield Strengt d Strength L	ution Bandwidth Bandwidth V H H V H H H H th Limit Limit Limit	

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HARMONICS AND SPURIOUS EMISSIONS (a MODE)

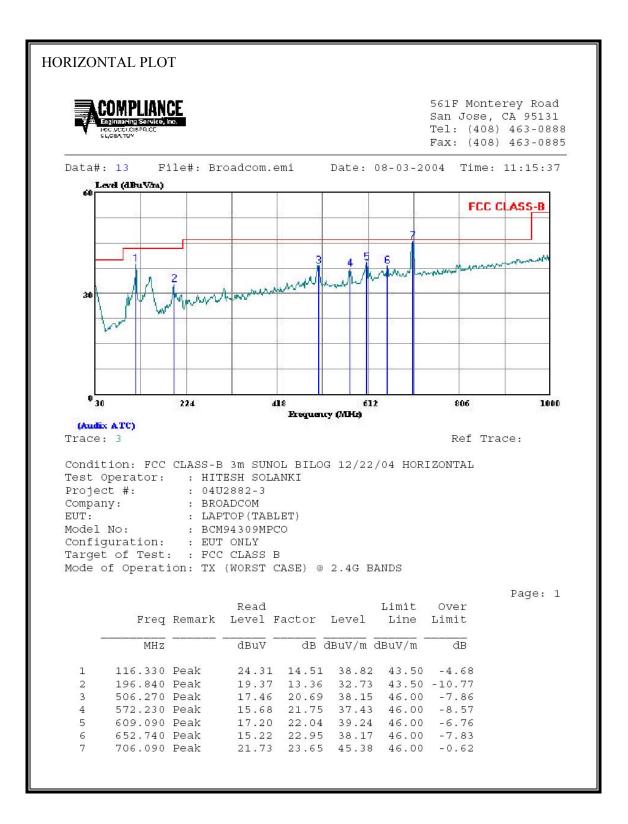
08/02/04 Complia			Measuremen ervices, Morg		Open	Field Sit	e									
Test Eng Project # Company EUT Des EUT M/Y Test Tarş Mode Op	4: y: scrip.: N: get:		Frank Ibrahim 04U2882-3 BROADCOM (802.11 a/b/g M BCM94309MP FCC 15.247 TX ON (11a m	ini PCI C CO		ition										
	D Horn	: I-18GHz 1 @3m 🖵	Spec Agilent E	trum Ana 24446A A		•	Pre-amp T86 Mit				plifer 26-40G iteq 16-40GH		T87; ARA	Horn > 1		-
Hi Frequ		es]	,			ı		surements:			leasurements:	
L (2	ii) ,	(2~3 ll)	L (4 ~ 6 ft)	► (12 ft)		J					1 MHz Resol 1MHz Video	ution Bandwi Bandwidth	dth	1 MHz Resol 10Hz Video I	ution Bandwidth 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	1MHz Video Pk Lim					
f GHz Low Chan	Dist feet nel (5745	Read Pk dBuV MHz)	Read Avg. dBuV	AF dB/m	CL dB	dB	dB		dBuV/m	dBuV/m	1MHz Video Pk Lim dBuV/m	Bandwidth Avg Lim dBuV/m	Pk Mar dB	10Hz Video H Avg Mar dB	Bandwidth Notes	
f GHz Low Chann 11.490	Dist feet nel (5745 9.8	Read Pk dBuV MHz) 53.7	Read Avg.	AF	CL	-		HPF 1.0			1MHz Video Pk Lim	Bandwidth Avg Lim	Pk Mar	10Hz Video I Avg Mar	Bandwidth	
f GHz Low Chann 11.490 Mid Chann	Dist feet nel (5745 9.8	Read Pk dBuV MHz) 53.7	Read Avg. dBuV	AF dB/m	CL dB	dB	dB		dBuV/m	dBuV/m	1MHz Video Pk Lim dBuV/m	Bandwidth Avg Lim dBuV/m	Pk Mar dB	10Hz Video H Avg Mar dB	Bandwidth Notes	
f GHz Low Chann 11.490 Mid Chann 11.570 High Chan	Dist feet nel (5745 9.8 nel (5785 9.8 nel (582:	Read Pk dBuV MHz) 53.7 MHz) 54.7 5 MHz)	Read Avg. dBuV 37.2 38.5	AF dB/m 39.1 39.2	CL dB 5.7 5.7	dB -43.2 -43.3	dB 0.0 0.0	1.0	dBuV/m 56.3 57.4	dBuV/m 39.8 41.2	1MHz Video Pk Lim dBuV/m 74.0 74.0	Bandwidth Avg Lim dBuV/m 54.0 54.0	Pk Mar dB -17.7 -16.6	Avg Mar dB -14.2 -12.8	Sandwidth Notes V V V	
f GHz	Dist feet 9.8 nel (5785 9.8	Read Pk dBuV MHz) 53.7 MHz) 54.7	Read Avg. dBuV 37.2	AF dB/m 39.1	CL dB 5.7	dB -43.2	dB 0.0	1.0	dBuV/m 56.3	dBuV/m 39.8	1MHz Video Pk Lim dBuV/m 74.0	Bandwidth Avg Lim dBuV/m 54.0	Pk Mar dB -17.7	10Hz Video I Avg Mar dB -14.2	Bandwidth Notes V	
f GHz Low Chann 11.490 Mid Chann 11.570 High Chan 11.650	Dist feet nel (5745 9.8 nel (5785 9.8 nel (582: 9.8	Read Pk dBuV MHz) 53.7 MHz) 54.7 5 MHz) 54.2	Read Avg. dBuV 37.2 38.5	AF dB/m 39.1 39.2 39.3	CL dB 5.7 5.7 5.8	dB -43.2 -43.3 -43.3	dB 0.0 0.0 0.0	1.0 1.0 1.0	dBuV/m 56.3 57.4 56.9	dBuV/m 39.8 41.2	1MHz Video Pk Lim dBuV/m 74.0 74.0	Bandwidth Avg Lim dBuV/m 54.0 54.0	Pk Mar dB -17.7 -16.6	Avg Mar dB -14.2 -12.8	Sandwidth Notes V V V	

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7.1.3. WORST-CASE RADIATED EMISSIONS BELOW 1 GHz

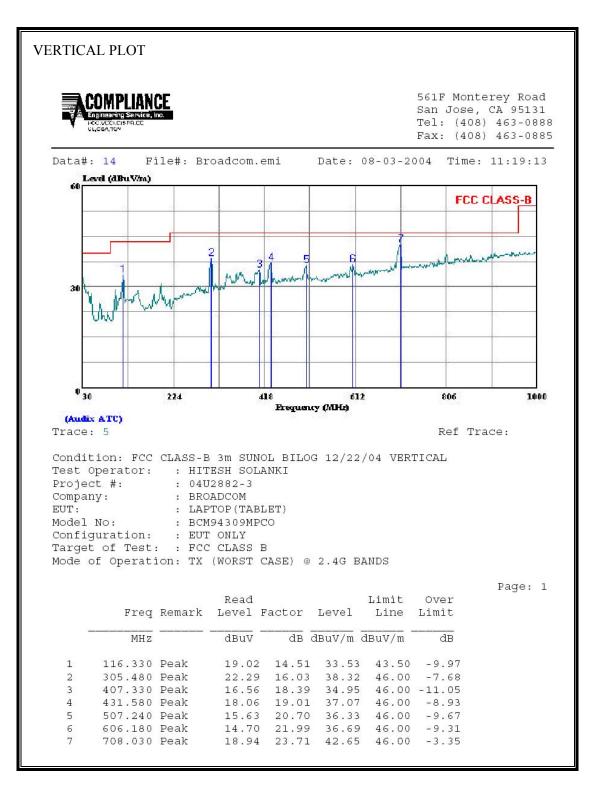
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL) – 2.4 GHz BAND

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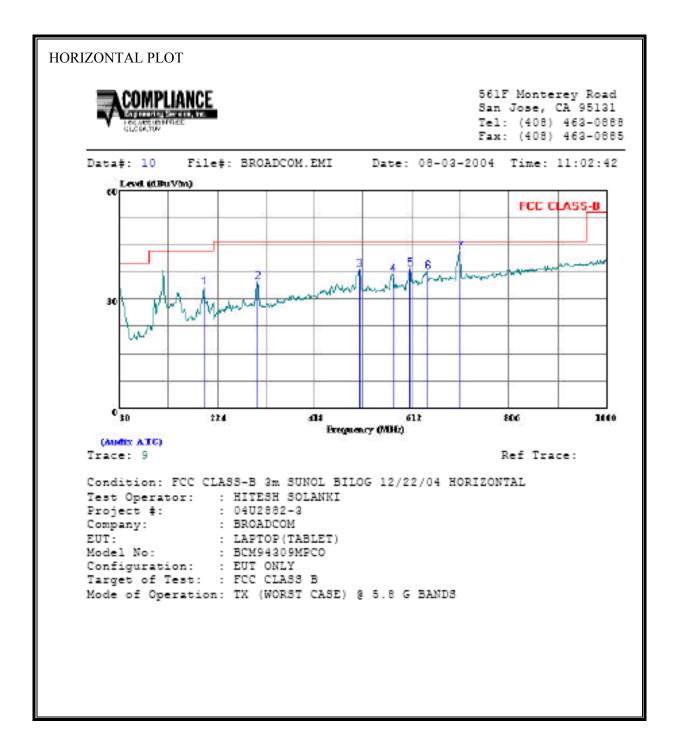


SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL) – 2.4 GHz BAND





SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL) – 5.8 GHz BAND

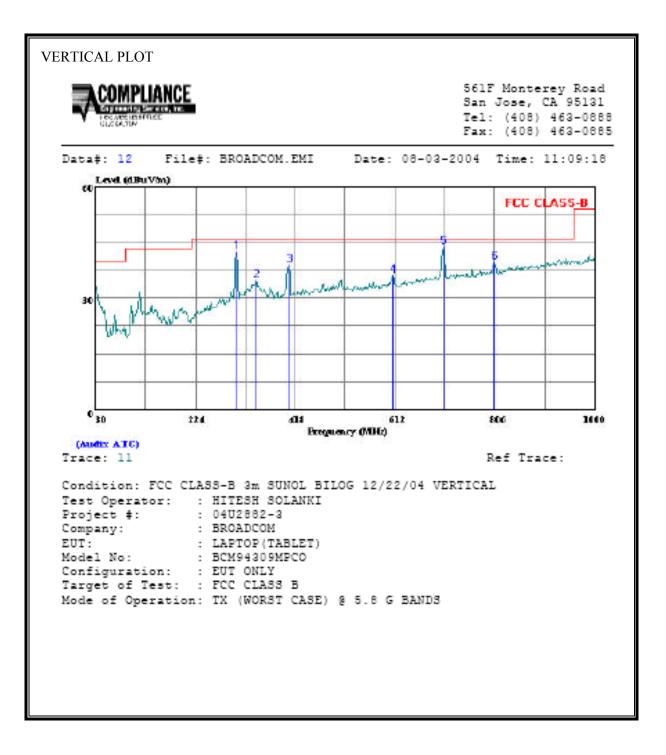


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HORIZO	NTAL DATA						
	Freq	Remark	Read Level	Factor	Level	Limit Line	
-	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
5	MH≡ 196.840 303.540 507.240 574.170 609.090 643.040 708.030	Peak Peak Peak Peak Peak	19.79 18.69 17.47 15.02 16.50 15.01	13.36 15.99 20.70 21.82 22.04 22.76	33.15 34.68 38.17 36.84 38.54 38.54	dBuV/m 48.00 46.00 46.00 46.00 46.00 46.00	-10.35 -11.32 -7.83 -9.16 -7.46 -8.21

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SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL) – 5.8 GHz BAND



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VERTIC	CAL DATA						
	Freq	Remark	Read Level	Factor	Level	Limit Line	
	MHz		dBuV	dB	dBuV/m	dBuV/m	dB
1 2 4 5 6	303.540 342.340 407.330 609.090 706.090 805.030	Peak Peak Peak Peak	18.21 20.48 14.03 20.12	16.71 18.39 22.04 23.65	34.92 38.87 36.07 43.77	46.00	-11.08 -7.13 -9.93 -2.23

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7.1.4. CO-LOCATED TRANSMITTER RADIATED EMISSIONS

SUPPLEMENTAL TEST PROCEDURE

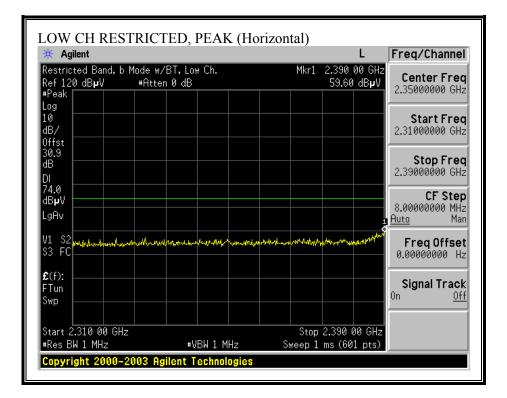
The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna The dominant transmitter is set to the worst case channel. The spurious emissions performance of the dominant transmitter is investigated as the settings of the non-dominant transmitter are varied. Worst case results are reported.

RESULTS

No non-compliance noted:

Dominant transmitter was the WLAN operating the 802.11b mode in the portable "Z" configuration on the low channel and the non-dominant transmitter was the bluetooth operating on the low channel for the lower bandedge, WLAN 802.11b on the high channel with the bluetooth on the high channel for upper bandedge, and WLAN 802.11b on the highest power of mid channel with the bluetooth on the mid channel for the spurious harmonics.

WORST-CASE RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

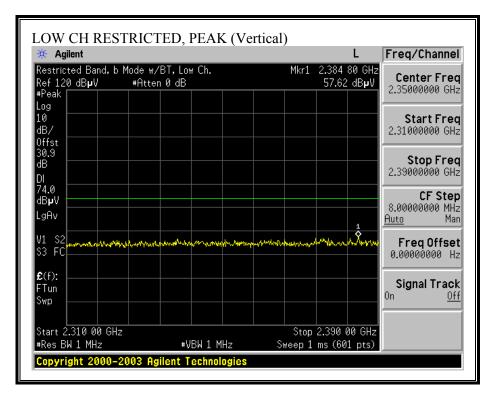


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🔆 Agilent	Freq/Channel					
Ref 120 dB µ V	b Mode w/BT, Low Ch #Atten 0 dB		.390 00 GHz 48.53 dBµV			
#Peak Log				2.03000000 0112		
10 dB/				Start Freq 2.31000000 GHz		
Offst 30.9 dB				Stop Freq 2.39000000 GHz		
DI 54.0 dBµV				CF Step		
LgAv				8.00000000 MHz <u>Auto</u> Man		
V1 S2 S3 FC				FreqOffset 0.00000000 Hz		
£ (f):				Signal Track On Off		
Start 2 <mark>.310 00 G</mark> #Res BW 1 MHz		10 Hz	.390 00 GHz^			

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WORST-CASE RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

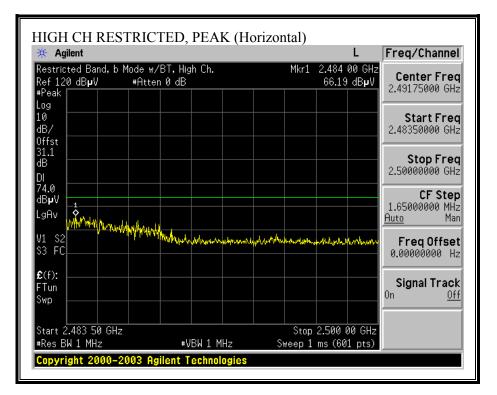


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🔆 Agilent					L [Freq/Channel
Restricted Band, Ref 120 dBµV #Peak	b Mode w/BT, Low Ch #Atten 0 dB		Mkr1	2.376 Ø 46.55		Center Freq 2.35000000 GHz
Log 10 dB/ 0ffst						Start Freq 2.31000000 GHz
30.9 dB DI						Stop Freq 2.39000000 GHz
54.0 dB µ V LgAv						CF Step 8.00000000 MHz <u>Auto</u> Man
V1 S2 S3 FC				1		FreqOffset 0.00000000 Hz
£ (f): FTun Swp						Signal Track On <u>Off</u>
Start 2.310 00 G #Res BW 1 MHz		10 Hz) 2.390 0 38 s (601		

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WORST-CASE RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

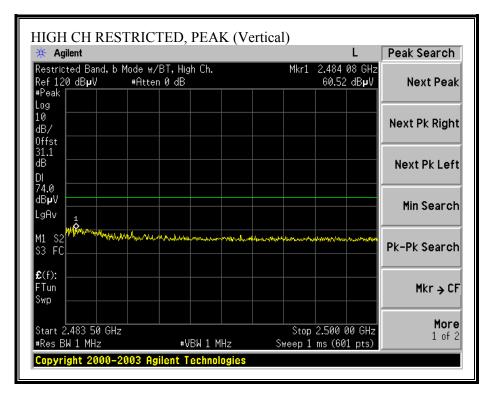


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🔆 Agilent			L Freq/Channe
Restricted Band, b Mo Ref 120 dBµV		Mkr1 2.484 49.97	98 GHz 7 dBµV 2,49175000 GH
#Peak Log			
10 dB/			Start Fre 2.48350000 GH
Offst 31.1 dB DI			Stop Fre 2.50000000 GH
54.0 dBµV LgAv			CF Ste 1.65000000 MH <u>Auto</u> Ma
V1 S2 1 S3 FC 0			Freq Offse 0.00000000 H
£(f): FTun Swp			Signal Trac
Start 2.483 50 GHz		Stop 2.500	00 GHzî
#Res BW 1 MHz	₩VBW 10 Hz		

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WORST-CASE RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



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🔆 Agilent		Ĺ	Peak Search
Restricted Band, b Mode Ref 120 dB µ V #At #Peak		Mkr1 2.484 46 G 49.23 dBµ	
Log 10 dB/			Next Pk Right
0ffst 31.1 dB DI			Next Pk Left
54.0 dBµV LgAv			Min Search
M1 S2 S3 FC			Pk-Pk Search
£(f): FTun Swp			Mkr → CF
Start 2.483 50 GHz #Res BW 1 MHz	#VBW 10 Hz	Stop 2.500 00 GF Sweep 1.287 s (601 pts	

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WORST-CASE HARMONICS AND SPURIOUS EMISSIONS

'omnli			/ Measurem Services, M		T:II ()	oon Fiel	1 6:40									
ompu	ance Ce	ernication	Services, M	organ	ш	pen riei	a Site									
		iam Zhuang	,													
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est Ta	arget: F	CC 15.407														
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ost Fr	quipmen	<i></i>														
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•	Diet	Doad Dir	Pood Arg	AT	CI	4.000	DCom	UDF	Peak	A	Dl. I im	Arra Lim	Pl- Man	Avg Mar	Notos	
f GHz	Dist	1	Read Avg. dBuV		CL dB	Amp dB	D Corr dB	HPF		Avg dBuV/m	1			Avg Mar dB	Notes	
GHz	feet	dBuV	dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF		Avg dBuV/m	1		Pk Mar dB	Avg Mar dB	Notes	
GHz VLAN	feet	1	dBuV			•		HPF 1.0		-	1				Notes	
GHz VLAN .874 .874	feet , Worst 9.8 9.8	dBuV case at Z j 54.3 56.5	dBuV position 40.1 40.3	dB/m 33.4 33.4	dB 3.0 3.0	dB -44.7 -44.7	dB 0.0 0.0	1.0 1.0	dBuV/m 47.0 49.2	dBuV/m 32.8 32.9	dBuV/m 74.0 74.0	dBuV/m 54.0 54.0	dB -27.0 -24.8	dB -21.2 -21.1	V H	
GHz VLAN 874 .874 .311	feet , Worst 9.8 9.8 9.8	dBuV case at Z j 54.3 56.5 46.5	dBuV position 40.1 40.3 35.1	dB/m 33.4 33.4 35.8	dB 3.0 3.0 3.9	dB -44.7 -44.5	dB 0.0 0.0 0.0	1.0 1.0 1.0	dBuV/m 47.0 49.2 42.7	dBuV/m 32.8 32.9 31.3	dBuV/m 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0	dB -27.0 -24.8 -31.3	dB -21.2 -21.1 -22.7	V H V	
GHz VLAN .874 .874 .311 .311	feet , Worst 9.8 9.8 9.8 9.8 9.8	dBuV case at Z I 54.3 56.5 46.5 45.7	dBuV position 40.1 40.3 35.1 34.7	dB/m 33.4 33.4 35.8 35.8	dB 3.0 3.0 3.9 3.9	dB -44.7 -44.7	dB 0.0 0.0	1.0 1.0	dBuV/m 47.0 49.2	dBuV/m 32.8 32.9	dBuV/m 74.0 74.0	dBuV/m 54.0 54.0	dB -27.0 -24.8	dB -21.2 -21.1	V H	
GHz VLAN .874 .874 .311 .311 Co-loca	feet , Worst 9.8 9.8 9.8 9.8 9.8	dBuV case at Z I 54.3 56.5 46.5 45.7	dBuV position 40.1 40.3 35.1	dB/m 33.4 33.4 35.8 35.8	dB 3.0 3.0 3.9 3.9	dB -44.7 -44.5	dB 0.0 0.0 0.0	1.0 1.0 1.0	dBuV/m 47.0 49.2 42.7	dBuV/m 32.8 32.9 31.3	dBuV/m 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0	dB -27.0 -24.8 -31.3	dB -21.2 -21.1 -22.7	V H V	
GHz VLAN .874 .874 .311 .311 .20-loca .874 .874	feet , Worst 9.8 9.8 9.8 9.8 9.8 ation w/I 9.8 9.8 9.8	dBuV case at Z j 54.3 56.5 46.5 45.7 Bluetooth, 52.2 54.0	dBuV position 40.1 35.1 34.7 Worst case : 49.3 51.4	dB/m 33.4 35.8 35.8 at Z pos 33.4 33.4	dB 3.0 3.9 3.9 sition 3.0 3.0	dB -44.7 -44.7 -44.5 -44.5 -44.7 -44.7	dB 0.0 0.0 0.0 0.0 0.0 0.0	1.0 1.0 1.0 1.0 1.0	dBuV/m 47.0 49.2 42.7 41.9 44.9 46.6	dBuV/m 32.8 32.9 31.3 30.8 42.0 44.1	dBuV/m 74.0 74.0 74.0 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0 54.0 54.0 54.0	dB -27.0 -24.8 -31.3 -32.1 -29.1 -27.4	dB -21.2 -21.1 -22.7 -23.2 -12.0 -9.9	V H V H	
GHz VLAN .874 .874 .311 .311 .0-loca .874 .874 .874 .311	feet 9.8 9.8 9.8 9.8 9.8 0.8 0.8 9.8 9.8 9.8 9.8 9.8	dBuV case at Z j 54.3 56.5 46.5 45.7 Bluetooth, 52.2 54.0 45.0	dBuV position 40.1 40.3 35.1 34.7 Worst case : 49.3 51.4 33.9	dB/m 33.4 35.8 35.8 35.8 at Z pos 33.4 33.4 33.4 35.8	dB 3.0 3.9 3.9 3.9 sition 3.0 3.0 3.0 3.9	dB -44.7 -44.7 -44.5 -44.5 -44.7 -44.7 -44.7 -44.5	dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0	1.0 1.0 1.0 1.0 1.0 1.0 1.0	dBuV/m 47.0 49.2 42.7 41.9 44.9 46.6 41.1	dBuV/m 32.8 32.9 31.3 30.8 42.0 44.1 30.0	dBuV/m 74.0 74.0 74.0 74.0 74.0 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0 54.0 54.0 54.0 54.0	dB -27.0 -24.8 -31.3 -32.1 -29.1 -27.4 -32.9	dB -21.2 -21.1 -22.7 -23.2 -12.0 -9.9 -24.0	V H V H V H V	
GHz VLAN 874 874 311 311 Co-locz 874 874 311	feet , Worst 9.8 9.8 9.8 9.8 9.8 ation w/I 9.8 9.8 9.8	dBuV case at Z j 54.3 56.5 46.5 45.7 Bluetooth, 52.2 54.0	dBuV position 40.1 35.1 34.7 Worst case : 49.3 51.4	dB/m 33.4 35.8 35.8 at Z pos 33.4 33.4	dB 3.0 3.9 3.9 sition 3.0 3.0	dB -44.7 -44.7 -44.5 -44.5 -44.7 -44.7	dB 0.0 0.0 0.0 0.0 0.0 0.0	1.0 1.0 1.0 1.0 1.0	dBuV/m 47.0 49.2 42.7 41.9 44.9 46.6	dBuV/m 32.8 32.9 31.3 30.8 42.0 44.1	dBuV/m 74.0 74.0 74.0 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0 54.0 54.0 54.0	dB -27.0 -24.8 -31.3 -32.1 -29.1 -27.4	dB -21.2 -21.1 -22.7 -23.2 -12.0 -9.9	V H V H	
GHz VLAN .874 .874 .311 .311 .20-loca .874 .874	feet 9.8 9.8 9.8 9.8 9.8 9.8 9.8 9.8 9.8 9.8	dBuV case at Z p 54.3 56.5 46.5 45.7 Bluetooth, 52.2 54.0 45.0 45.5	dBuV position 40.1 40.3 35.1 34.7 Worst case : 49.3 51.4 33.9 34.0	dB/m 33.4 35.8 35.8 35.8 at Z pos 33.4 33.4 35.8 35.8 35.8	dB 3.0 3.9 3.9 3.9 sition 3.0 3.0 3.0 3.9	dB -44.7 -44.5 -44.5 -44.5 -44.7 -44.7 -44.5 -44.5	dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	1.0 1.0 1.0 1.0 1.0 1.0 1.0	dBuV/m 47.0 49.2 42.7 41.9 44.9 46.6 41.1	dBuV/m 32.8 32.9 31.3 30.8 42.0 44.1 30.0	dBuV/m 74.0 74.0 74.0 74.0 74.0 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0 54.0 54.0 54.0 54.0 54.0	dB -27.0 -24.8 -31.3 -32.1 -29.1 -27.4 -32.9 -32.3	dB -21.2 -21.1 -22.7 -23.2 -12.0 -9.9 -24.0 -23.8	V H V H V H V H	
GHz VLAN .874 .874 .311 .311 .0-loca .874 .874 .874 .311	feet , Worst 9.8 9.8 9.8 9.8 9.8 9.8 9.8 9.8 9.8 9.8	dBuV case at Z J 54.3 56.5 46.5 45.7 Bluetooth, 52.2 54.0 45.0 45.5 Measurem	dBuV position 40.1 40.3 35.1 34.7 Worst case : 49.3 51.4 33.9 34.0 ent Frequency	dB/m 33.4 35.8 35.8 35.8 at Z pos 33.4 33.4 35.8 35.8 35.8	dB 3.0 3.9 3.9 3.9 sition 3.0 3.0 3.0 3.9	dB -44.7 -44.7 -44.5 -44.5 -44.5 -44.5 -44.5 -44.5 -44.5 -44.5	dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 Preamp (1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 5ain	dBuV/m 47.0 49.2 42.7 41.9 44.9 46.6 41.1 41.7	dBuV/m 32.8 32.9 31.3 30.8 42.0 44.1 30.0 30.2	dBuV/m 74.0 74.0 74.0 74.0 74.0 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0 54.0 54.0 54.0 54.0 54.0	dB -27.0 -24.8 -31.3 -32.1 -29.1 -27.4 -32.9 -32.3 -29.1 -32.3	dB -21.2 -21.1 -22.7 -23.2 -12.0 -9.9 -24.0 -23.8 Field Strength	V H V H V H A Limit	
GHz VLAN .874 .874 .311 .311 .0-loca .874 .874 .874 .311	feet , Worst 9.8 9.8 9.8 9.8 9.8 9.8 9.8 9.8 9.8 9.8	dBuV case at Z 1 54.3 56.5 46.5 45.7 3luetooth, 52.2 54.0 45.0 45.5 Measurem Distance to	dBuV position 40.1 40.3 35.1 34.7 Worst case : 49.3 51.4 33.9 34.0	dB/m 33.4 35.8 35.8 35.8 at Z pos 33.4 33.4 35.8 35.8 35.8	dB 3.0 3.9 3.9 3.9 sition 3.0 3.0 3.0 3.9	dB -44.7 -44.5 -44.5 -44.5 -44.5 -44.5 -44.5 -44.5 -44.5 -44.5 D Corr	dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	1.0 1.0 1.0 1.0 1.0 1.0 1.0 57 ain	dBuV/m 47.0 49.2 42.7 41.9 44.9 46.6 41.1 41.7 ct to 3 met	dBuV/m 32.8 32.9 31.3 30.8 42.0 44.1 30.0 30.2 ers	dBuV/m 74.0 74.0 74.0 74.0 74.0 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0 54.0 54.0 54.0 54.0 54.0	dB -27.0 -24.8 -31.3 -32.1 -29.1 -27.4 -32.9 -32.3 -32.3 -32.3 -29.1 -27.4 -32.9 -32.3	dB -21.2 -21.1 -22.7 -23.2 -12.0 -9.9 -24.0 -23.8 Field Strength Li	V H V H V H t n Limit mit	
GHz VLAN .874 .874 .311 .311 .0-loca .874 .874 .874 .311	feet 9.8 9.8 9.8 9.8 9.8 9.8 9.8 9.8 9.8 9.8	dBuV case at Z 1 54.3 56.5 46.5 45.7 Bluetooth, 54.0 45.5 Measurem Distance to Analyzer R	dBuV oosition 40.1 40.3 35.1 34.7 Worst case : 49.3 51.4 33.9 34.0	dB/m 33.4 35.8 35.8 35.8 at Z pos 33.4 33.4 35.8 35.8 35.8	dB 3.0 3.9 3.9 3.9 sition 3.0 3.0 3.0 3.9	dB -44.7 -44.5 -44.5 -44.5 -44.5 -44.5 -44.5 -44.5 -44.5 -44.5 -44.5 -44.5 -44.5	dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 57 Gain Correct Field S	dBuV/m 47.0 49.2 42.7 41.9 44.9 46.6 41.1 41.7 ct to 3 met Strength @	dBuV/m 32.8 32.9 31.3 30.8 42.0 44.1 30.0 30.2 ers 3 m	dBuV/m 74.0 74.0 74.0 74.0 74.0 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0 54.0 54.0 54.0 54.0 54.0	dB -27.0 -24.8 -31.3 -32.1 -29.1 -29.1 -27.4 -32.9 -32.3 Average I Peak Fiel Margin vs	dB -21.2 -21.1 -22.7 -23.2 -12.0 -9.9 -24.0 -23.8 Field Strength Li s. Average Li	V H V H V H t n Limit mit	
GHz VLAN .874 .874 .311 .311 .0-loca .874 .874 .874 .311	feet , Worst 9.8 9.8 9.8 9.8 9.8 9.8 9.8 9.8 9.8 9.8	dBuV case at Z 1 54.3 56.5 46.5 45.7 3luetooth, 52.2 54.0 45.0 45.5 Measurem Distance to	dBuV oosition 40.1 40.3 35.1 34.7 Worst case : 49.3 51.4 33.9 51.4 33.9 Added Antenna eading actor	dB/m 33.4 35.8 35.8 35.8 at Z pos 33.4 33.4 35.8 35.8 35.8	dB 3.0 3.9 3.9 3.9 sition 3.0 3.0 3.0 3.9	dB -44.7 -44.5 -44.5 -44.5 -44.5 -44.5 -44.5 -44.5 -44.5 -44.5 D Corr	dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 5 ain Correct Field S cd Peal	dBuV/m 47.0 49.2 42.7 41.9 44.9 46.6 41.1 41.7 ct to 3 met Strength @ c Field Strete	dBuV/m 32.8 32.9 31.3 30.8 42.0 44.1 30.0 30.2 ers 3 m	dBuV/m 74.0 74.0 74.0 74.0 74.0 74.0 74.0 74.0	dBuV/m 54.0 54.0 54.0 54.0 54.0 54.0 54.0 54.0	dB -27.0 -24.8 -31.3 -32.1 -29.1 -29.1 -27.4 -32.9 -32.3 Average I Peak Fiel Margin vs	dB -21.2 -21.1 -22.7 -23.2 -12.0 -9.9 -24.0 -23.8 Field Strength Li	V H V H V H t n Limit mit	

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7.2. 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:

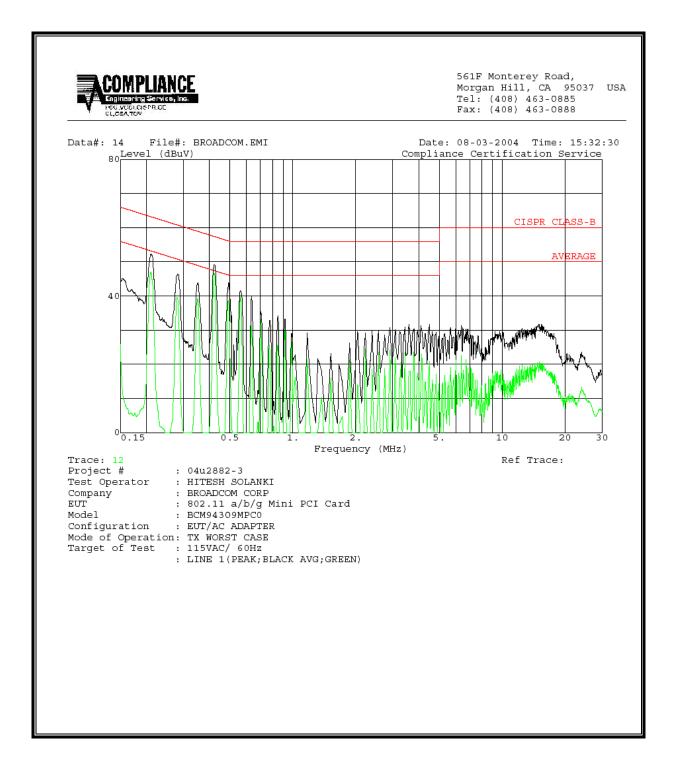
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<u>6 WORST EMISSIONS</u>

(MHz) Pk 0.42	K (dBuV)	OP (dBuV)			Limit	EN_B	Marg	Remark	
0.42		QI (ubuv)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
	48.34		46.34	0.00	58.26	48.26	-9.92	-1.92	L1
0.56	40.70		38.60	0.00	56.00	46.00	-15.30	-7.40	L1
15.80	32.34		21.14	0.00	60.00	50.00	-27.66	-28.86	L1
0.20	52.23		46.68	0.00	64.57	54.57	-12.34	-7.89	L2
0.56	41.56		39.64	0.00	56.00	46.00	-56.00	-6.36	L2
15.07	31.68		20.69	0.00	60.00	50.00	-28.32	-29.31	L2

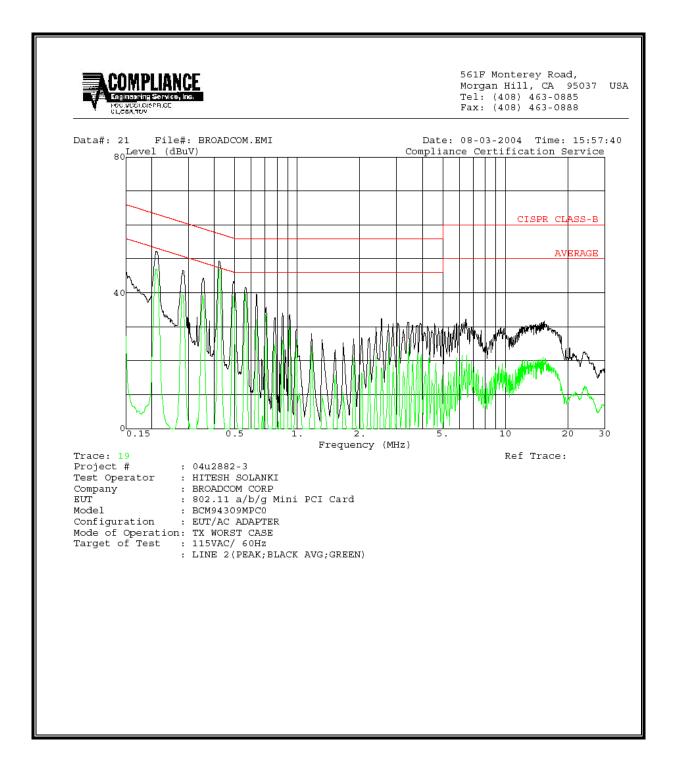
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LINE 1 RESULTS



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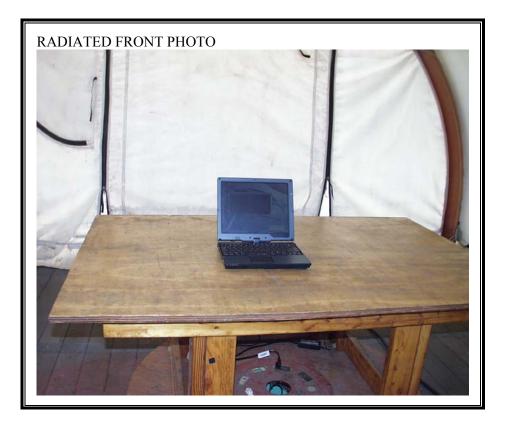
LINE 2 RESULTS



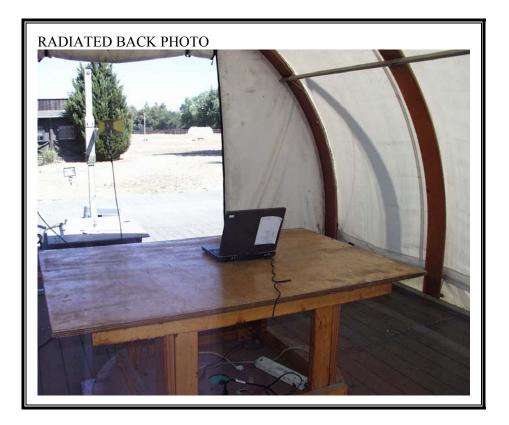
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8. SETUP PHOTOS

RADIATED RF MEASUREMENT SETUP – Laptop Configuration

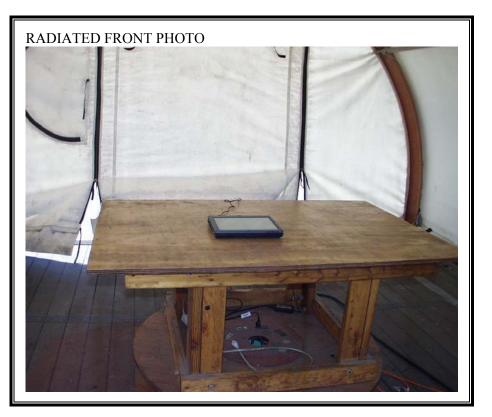


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RADIATED RF MEASUREMENT SETUP – X Configuration



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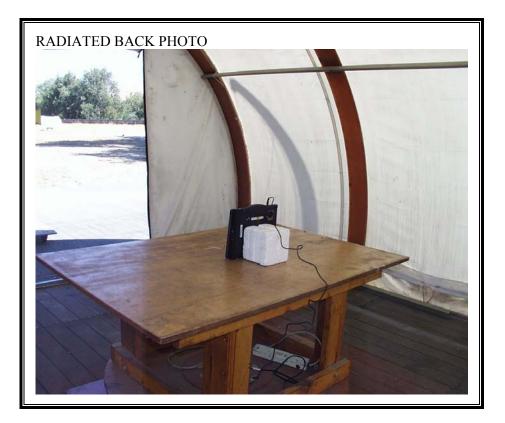


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RADIATED RF MEASUREMENT SETUP – Y Configuration

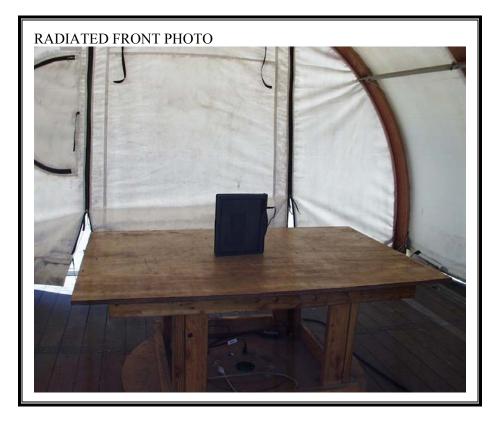


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RADIATED RF MEASUREMENT SETUP – Z Configuration



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POWERLINE CONDUCTED EMISSIONS MEASUREMENT SETUP



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END OF REPORT

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