

FCC CFR47 PART 15 SUBPART C INDUSTRY CANADA RSS-210 ISSUE 7 CERTIFICATION TEST REPORT

FOR BROADCOM 802.11g WLAN PCI-E MINI CARD

> MODEL NUMBER: BCM94312HMG FCC ID: QDS-BRCM1030 IC: 4324A-BRCM1030

REPORT NUMBER: 07U11426-1, REVISION A

ISSUE DATE: NOVEMBER 15, 2007

Prepared for BROADCOM CORPORATION 190 MATHILDA PLACE SUNNYVALE, CA 94086, USA

Prepared by COMPLIANCE CERTIFICATION SERVICES 47173 BENICIA STREET FREMONT, CA 94538, U.S.A. TEL: (510) 771-1000 FAX: (510) 661-0888

NVLAP LAB CODE 200065-0

Revision History

	Issue		
Rev.	Date	Revisions	Revised By
	11/12/07	Initial Issue	Hsin Fu Shih
Α	11/15/07	Modified EUT name and corrected IC # on cover	T. Hong
A	11/15/07		I. Hong

Page 2 of 77

TABLE OF CONTENTS

1.	ATTE	STATION OF TEST RESULTS	4
2.	TEST	METHODOLOGY	5
3.	FACIL	ITIES AND ACCREDITATION	5
4.	CALIE	BRATION AND UNCERTAINTY	5
4.	1. N	MEASURING INSTRUMENT CALIBRATION	5
4.	2. N	MEASUREMENT UNCERTAINTY	5
5.	EQUIF	PMENT UNDER TEST	6
5.	1. L	DESCRIPTION OF EUT	6
5.	2. N	MAXIMUM OUTPUT POWER	6
5.	3. L	DESCRIPTION OF AVAILABLE ANTENNAS	6
5.	4. 5	SOFTWARE AND FIRMWARE	6
5.	5. V	VORST-CASE CONFIGURATION AND MODE	6
5.	6. (CHANNELS AND TEST ITEMS	7
5.	7. L	DESCRIPTION OF TEST SETUP	8
6.	TEST	AND MEASUREMENT EQUIPMENT	10
7.	ANTE	NNA PORT TEST RESULTS	.11
7.	1. 8	302.11b MODE IN THE 2.4 GHz BAND	11
	7.1.1.	6 dB BANDWIDTH	.11
	7.1.2.	99% BANDWIDTH	.14
	7.1.3.	OUTPUT POWER	.17
	7.1.4.	POWER SPECTRAL DENSITY	20
	7.1.5.	CONDUCTED SPURIOUS EMISSIONS	23
7.	2. 8	302.11g MODE IN THE 2.4 GHz BAND	27
	7.2.1.	6 dB BANDWIDTH	27
	7.2.2.	99% BANDWIDTH	30
	7.2.3.	OUTPUT POWER	33
	7.2.4.	POWER SPECTRAL DENSITY	37
	7.2.5.	CONDUCTED SPURIOUS EMISSIONS	41
8.	RADI	ATED TEST RESULTS	45
8.	1. L	IMITS AND PROCEDURE	45
	8.1.1.	TRANSMITTER ABOVE 1 GHz FOR 802.11b MODE IN THE 2.4 GHz BAND	46
	8.1.2.	TRANSMITTER ABOVE 1 GHz FOR 802.11g MODE IN THE 2.4 GHz BAND	52
8.	2. F	RECEIVER ABOVE 1 GHz	62
	8.2.1.	RECEIVER ABOVE 1 GHz 802.11 b MODE IN THE 2.4 GHz BAND	62
	8.2.2.	RECEIVER ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND	63
8.	3. I	NORST-CASE BELOW 1 GHz	64
9.	AC PC	OWER LINE CONDUCTED EMISSIONS	66
10.	MA	XIMUM PERMISSIBLE EXPOSURE	70
11.	SE	TUP PHOTOS	74

Page 3 of 77

1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	BROADCOM CORPORATION 190 MATHILDA PLACE SUNNYVALE, CA 94086, USA				
EUT DESCRIPTION:	BROADCOM 802.11g WLAN PCI	E MINI CARD			
MODEL:	BCM94312HMG				
SERIAL NUMBER:	200-116263-0000G B				
DATE TESTED: NOVEMBER 05 - 12, 2007					
	APPLICABLE STANDARDS				
ST	ANDARD	TEST RESULTS			
CFR 47 Part 15 S	ubpart C and Subpart E	No Non-Compliance Noted			
RSS-210 Issue 7 Ann	ex 8 and RSS-GEN Issue 2	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: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. 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. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

Tested By:

Hsin-Fr Shih

HSIN FU SHIH EMC SUPERVISOR COMPLIANCE CERTIFICATION SERVICES

Jungundes

VIEN TRAN EMC ENGINEER COMPLIANCE CERTIFICATION SERVICES

Page 4 of 77

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 2, and RSS-210 Issue 7.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

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

4. CALIBRATION AND UNCERTAINTY

4.1. 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.

4.2. 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%.

Page 5 of 77

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11g WLAN Transceiver card manufactured by Broadcom. Model number is BCM94312HMG.

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11b	22.28	169.04
2412 - 2462	802.11g	23.05	201.84

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a stamped metal antenna (Hitachi, HMT05/HFT17-DL07), with a maximum gain of 3.9 dBi.

5.4. SOFTWARE AND FIRMWARE

The EUT driver software installed during testing was BCMWL5, rev. 4.170.20.2.

The test utility software used during testing was wl_tool, rev. 4.150 RC27.0.

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel is determined as the channel with the highest output power.

Page 6 of 77

5.6. CHANNELS AND TEST ITEMS

	CHANNELS &						
11b	Bandedge	PSD	Ch. Power	Cond./Rad.			
CH1	*	*	*	**			
CH6	N/A	*	*	**			
CH11	*	*	*	**			
11g	Bandedge	PSD	Ch. Power	Cond./Rad.			
CH1	*	*	*	**			
CH2	*	*	*	N/A			
CH6	N/A	*	*	**			
CH10	*	*	*	N/A			
CH11	*	*	*	**			
<u>NOTE:</u>		. <u> </u>					
		* : Base on Band Edge power setting					
	** : Set to high	** : Set to highest output power					

Page 7 of 77

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST						
Description Manufacturer Model Serial Number FCC ID						
Laptop PC	Dell	Inspiron 0000	TD429	DOC		
AC Adapter	Dell	ADP-60NH B	MOW00528000191	DOC		

I/O CABLES

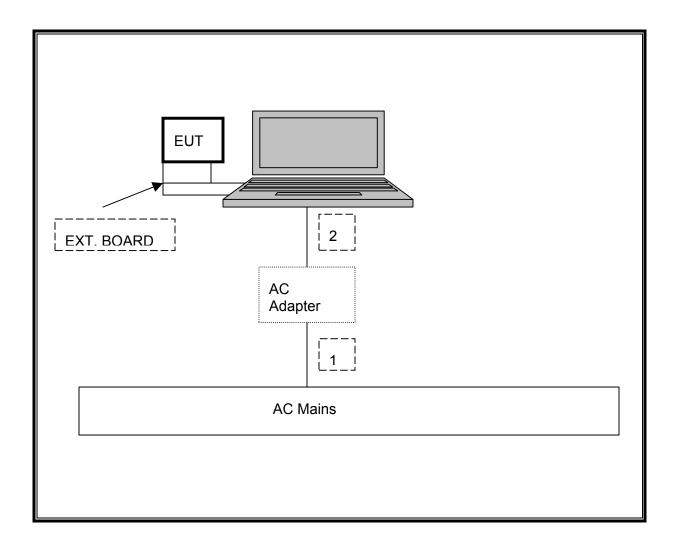
	I/O CABLE LIST						
Cable	Port	# of	Connector	Cable	Cable	Remarks	
No.		Identic	Туре	Туре	Length		
		Ports					
1	AC	1	AC	Unshielded	1.2 m	N/A	
2	DC	1	DC	Unshielded	1.2 m	N/A	

TEST SETUP

The EUT is installed in a host laptop computer via Express card to MiniPCI-E adapter boards during the tests. Test software exercised the radio card.

Page 8 of 77

SETUP DIAGRAM FOR TESTS



Page 9 of 77

6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST						
Description	Manufacturer	Model	Asset	Cal Date	Cal Due	
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	05/02/06	08/07/08	
Antenna, Horn, 18 GHz	ETS	3117	C01006	04/15/07	4/15/08	
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	08/03/07	8/3/08	
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	10/13/07	10/13/08	
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	09/15/06	9/15/08	
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	N02481	09/15/07	9/15/08	
EMI Test Receiver, 30 MHz	R&S	ESHS 20	N02396	10/16/06	1/27/08	
Peak power Meter	Agilent / HP	E4416A	Broadcom	N/A	N/A	
Highpass Filter, 4.0 GHz	Micro-Tronics	HPM13351	N02709	CNR	CNR	
Power Sensor	Agilent / HP	E9323A	Broadcom	CNR	CNR	

Page 10 of 77

7. ANTENNA PORT TEST RESULTS

7.1. 802.11b MODE IN THE 2.4 GHz BAND

7.1.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

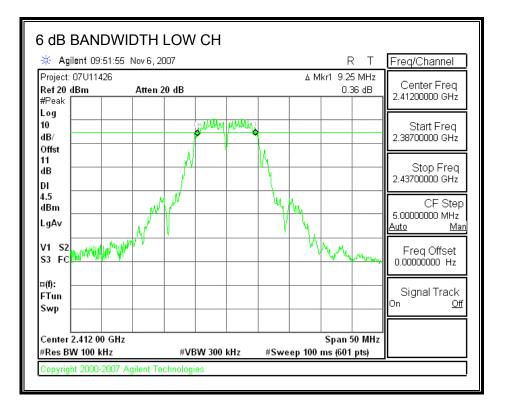
TEST PROCEDURE

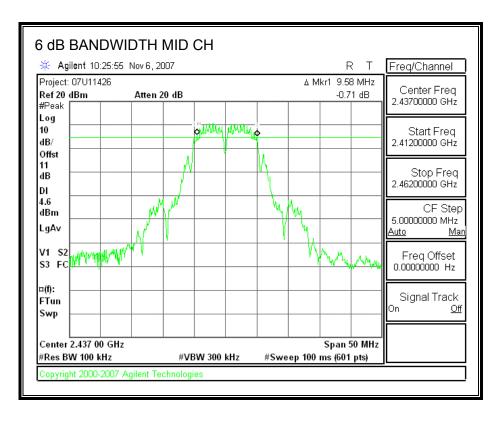
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

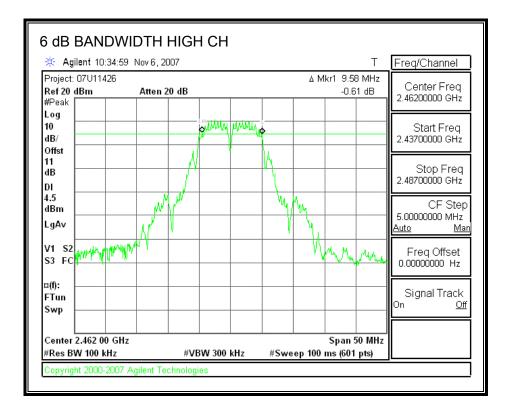
Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2412	9.25	0.5
Middle	2437	9.58	0.5
High	2462	9.58	0.5

Page 11 of 77





Page 12 of 77



Page 13 of 77

7.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

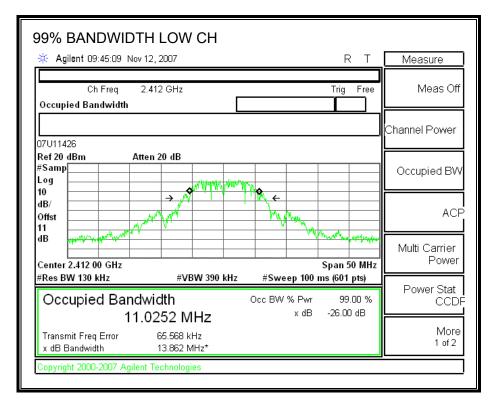
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

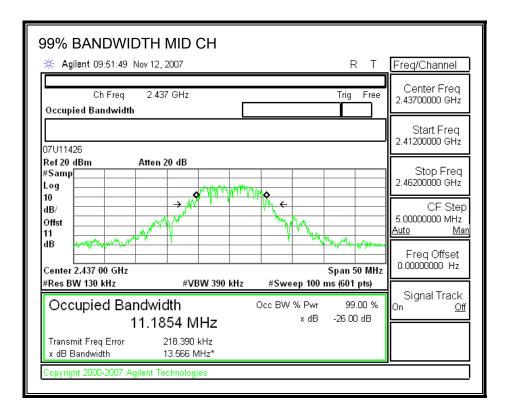
RESULTS

Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	2412	11.0252
Middle	2437	11.1854
High	2462	11.0716

Page 14 of 77

99% BANDWIDTH





Page 15 of 77

99% BANDWIDTH HIGH CH	Freq/Channel
Ch Freq 2.462 GHz Trig Free Occupied Bandwidth	Center Freq 2.46200000 GHz
07U11426	Start Freq 2.43700000 GHz
Ref 20 dBm Atten 20 dB #Samp	Stop Freq 2.48700000 GHz
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	CF Step 5.0000000 MHz <u>Auto Man</u>
Center 2.462 00 GHz Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 130 kHz #VBW 390 kHz #Sweep 100 ms (601 pts) Occupied Bandwidth Occ BW % Pwr 99.00 % 11.0716 MHz × dB -26.00 dB	Signal Track On <u>Off</u>
Transmit Freq Error 272.613 kHz x dB Bandwidth 13.787 MHz*	
Copyright 2000-2007 Agilent Technologies	

Page 16 of 77

7.1.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

Peak power is measured using the spectrum analyzer's internal channel power integration function. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

RESULTS

Channel	Frequency	Output Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	22.28	30	-7.72
Middle	2437	22.22	30	-7.78
High	2462	22.11	30	-7.89

Page 17 of 77

OUTPUT POWER

OUTPUT POWER L	OW CH		
🔆 Agilent 10:02:16 Nov 6, 20	007	Т	Freq/Channel
Ch Freq 2.412 Channel Power	! GHz	Trig Free	Center Freq 2.41200000 GHz
Project: 07U11426			Start Freq 2.40300000 GHz
Ref 20 dBm Atten 2 #Peak Log 10	0 dB		Stop Freq 2.42100000 GHz
dB/			CF Step 1.80000000 MHz <u>Auto Man</u>
dB	#VBW 3 MHz	Span 18 MH	Freq Offset 0.00000000 Hz
Channel Power		Sweep 1 ms (601 pts) Ower Spectral Density	Signal Track On <u>Off</u>
22.28 dBm /12.0	000 MHz	-48.51 dBm/Hz	
Copyright 2000-2007 Agilent Teo	chnologies		

OUTPUT POWER MID CH Agilent 10:27:33 Nov 6, 2007 T	FraciChannal					
Ch Freq 2.437 GHz Trig Free Channel Power	Freq/Channel Center Freq 2.43700000 GHz					
Project: 07U11426	Start Freq 2.42800000 GHz					
Ref 20 dBm Atten 20 dB #Peak Log 10	Stop Freq 2.44600000 GHz					
dB/ Offst	CF Step 1.8000000 MHz <u>Auto Man</u>					
Center 2.437 00 GHz Span 18 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 1 ms (601 pts)	Freq Offset 0.00000000 Hz					
Channel Power Power Spectral Density	Signal Track On <u>Off</u>					
22.22 dBm / 12.0000 MHz -48.57 dBm/Hz						
Copyright 2000-2007 Agilent Technologies						

Page 18 of 77

OUTPUT POWER H			
- 🧩 Agilent 10:37:44 Nov 6, 20	70	T	Freq/Channel
Ch Freq 2.462 Channel Power	GHz	Trig Fre	e Center Freq 2.46200000 GHz
Project: 07U11426			Start Freq 2.45300000 GHz
Ref 20 dBm Atten 20 #Peak) dB		Stop Freq 2.47100000 GHz
10 dB/ Offst			CF Step 1.8000000 MHz
11 dB			Freq Offset
Center 2.462 00 GHz #Res BW 1 MHz	#VBW 3 MHz	Span 18 MH Sweep 1 ms (601 pts)	
Channel Power	Signal Track On <u>Off</u>		
22.11 dBm /12.00			
Copyright 2000-2007 Agilent Tec	hnologies		

Page 19 of 77

7.1.4. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST PROCEDURE

Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

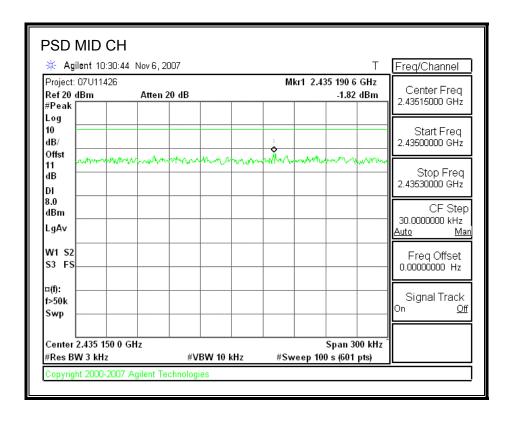
<u>RESULTS</u>

Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-3.46	8	-11.46
Middle	2437	-1.82	8	-9.82
High	2462	-2.61	8	-10.61

Page 20 of 77

POWER SPECTRAL DENSITY

🌾 Agilent 10:07				Т	Freq/Channel
Project: 07U11426 Kef 20 dBm Peak	Atten 20 d	B	Mkr1 2.	409 376 7 GHz -3.46 dBm	Center Freq 2.40950000 GHz
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0					Start Freq 2.40935000 GHz
ffst 1 B	ndhurterbrydnaf		reparante	- white prove	Stop Freq 2.40965000 GHz
.0 Bm					CF Step 30.0000000 kHz Auto Ma
V1 S2 3 FS					Freq Offset 0.00000000 Hz
(f): ⊳50k wp					Signal Track On <u>O</u> t
Center 2.409 500 Res BW 3 kHz	0 GHz	#VBW 10 kHz		Span 300 kHz [*] 00 s (601 pts)	



Page 21 of 77

	nt 10:41:19	1404 6, 200				4 9 45	0 754 0	T	Freq/Channel
Project: 07 Ref 20 dB #Peak ∏		Atten 20	dB		MI	GT 2.45	9 751 8 -2.61		Center Freq 2.45970000 GHz
Log 10 = dB/ Offst									Start Freq 2.45955000 GHz
11 ⁴⁴ dB	www	nun	www.www.www.	mm	-Mrd hi	www	www	awayn da	Stop Freq 2.45985000 GHz
DI 8.0 dBm LgA∨									CF Step 30.0000000 kHz <u>Auto Ma</u>
W1 S2 S3 FS									Freq Offset 0.00000000 Hz
¤(f): f>50k Swp									Signal Track On <u>Of</u>
Center 2.4 #Res BW	459 700 0 G	Hz	#VBW 1	0 647	#\$		Span 30) s (601		

Page 22 of 77

7.1.5. CONDUCTED SPURIOUS EMISSIONS

<u>LIMITS</u>

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

TEST PROCEDURE

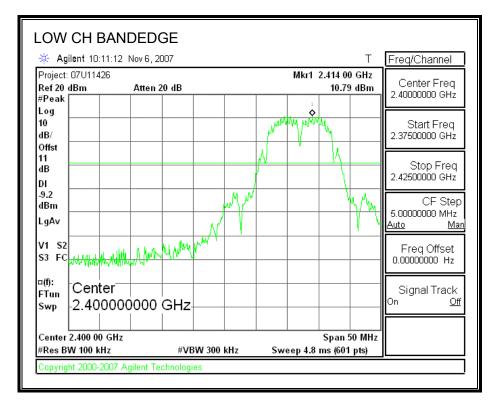
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

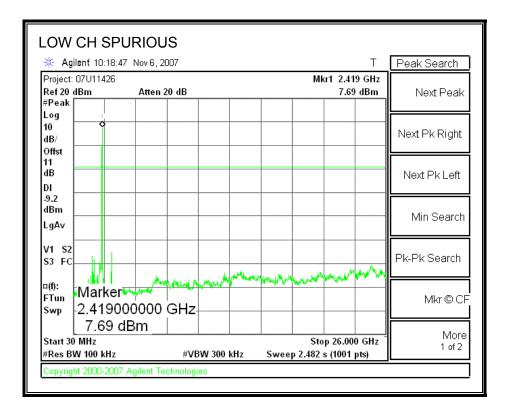
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

Page 23 of 77

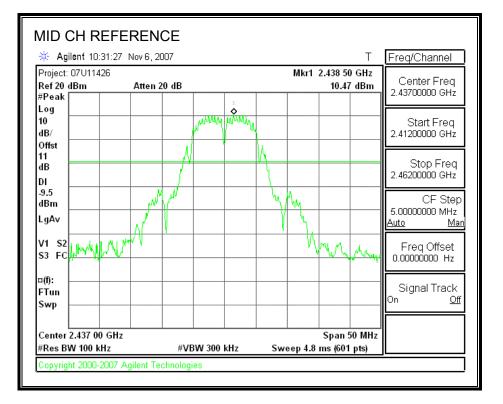
SPURIOUS EMISSIONS, LOW CHANNEL

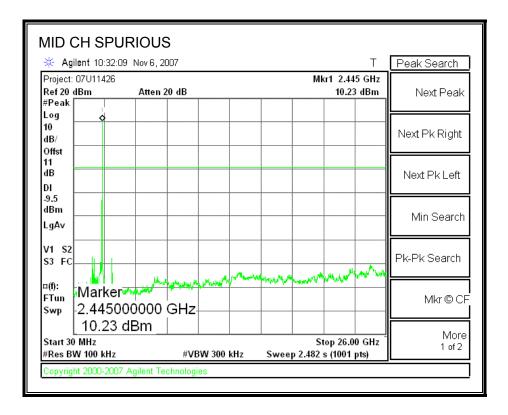




Page 24 of 77

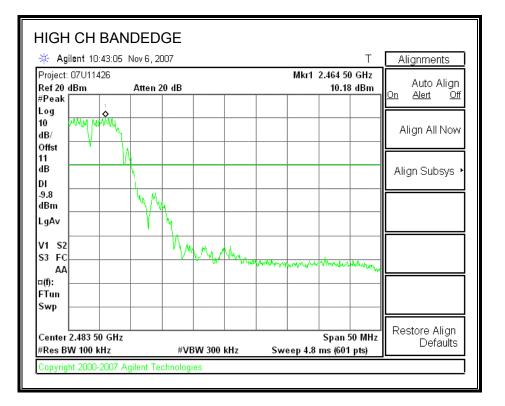
SPURIOUS EMISSIONS, MID CHANNEL

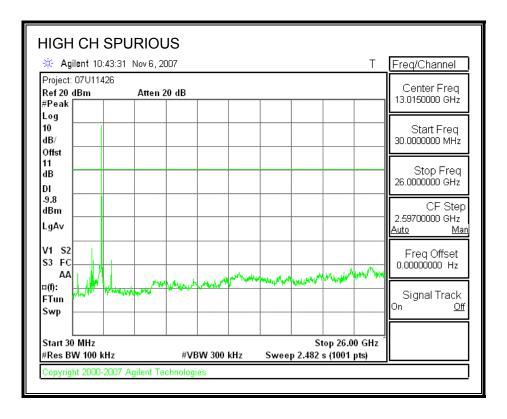




Page 25 of 77

SPURIOUS EMISSIONS, HIGH CHANNEL





Page 26 of 77

7.2. 802.11g MODE IN THE 2.4 GHz BAND

7.2.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

The minimum 6 dB bandwidth shall be at least 500 kHz.

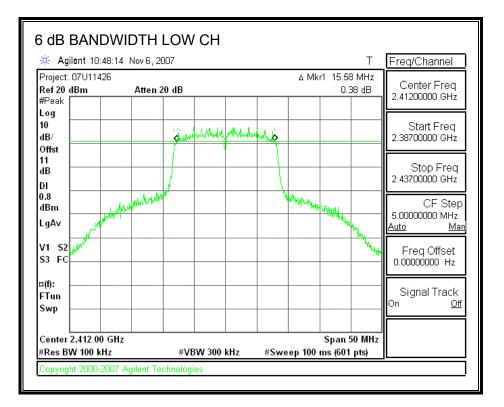
TEST PROCEDURE

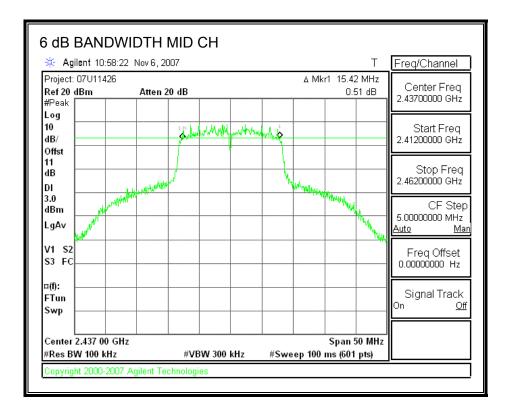
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

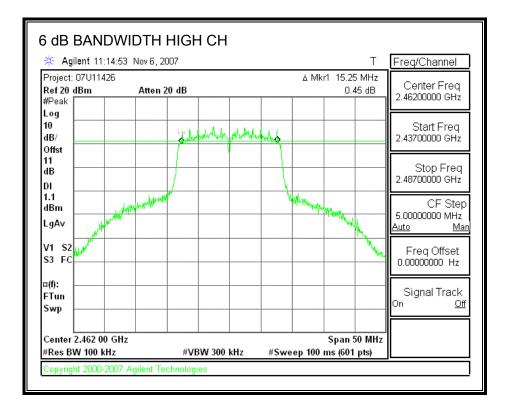
Channel	Frequency	6 dB Bandwidth	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2412	15.58	0.5
Middle	2437	15.42	0.5
High	2462	15.25	0.5

Page 27 of 77





Page 28 of 77



Page 29 of 77

7.2.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

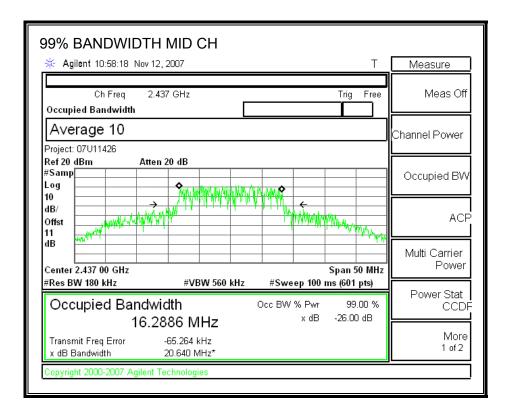
RESULTS

Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	2412	16.3529
Middle	2437	16.2886
High	2462	16.2575

Page 30 of 77

99% BANDWIDTH

99% BANDWIDTH LOW CH	Measure
Ch Freq 2.457 GHz Trig Free Occupied Bandwidth	Meas Off
Average 10	Channel Power
Project: 07U11426 Ref 20 dBm Atten 20 dB #Samp Log 10 dB/ Offst 11 dB Center 2.457 00 GHz Span 50 MHz	Occupied BW ACP Multi Carrier Power
#Res BW 180 kHz #VBW 560 kHz #Sweep 100 ms (601 pts)	Power Stat
Occupied Bandwidth Occ BW % Pwr 99.00 % 16.3529 MHz × dB -26.00 dB	
Transmit Freq Error -38.986 kHz x dB Bandwidth 22.256 MHz*	More 1 of 2
Copyright 2000-2007 Agilent Technologies	



Page 31 of 77

99% BANDWIDTH HIGH CH	Measure
Ch Freq 2.462 GHz Trig Free Occupied Bandwidth	Meas Off
Average 10	Channel Power
Project: 07U11426 Ref 20 dBm Atten 20 dB #Samp Log	Occupied BW
ID Image: Constraint of the second	ACP
Center 2.462 00 GHz Span 50 MHz #Res BW 180 kHz #VBW 560 kHz #Sweep 100 ms (601 pts)	Multi Carrier Power
Occupied Bandwidth Occ BW % Pwr 99.00 % 16.2575 MHz x dB -26.00 dB	Power Stat CCDF
Transmit Freq Error -3.331 kHz x dB Bandwidth 17.673 MHz*	More 1 of 2
Copyright 2000-2007 Agilent Technologies	

Page 32 of 77

7.2.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

TEST PROCEDURE

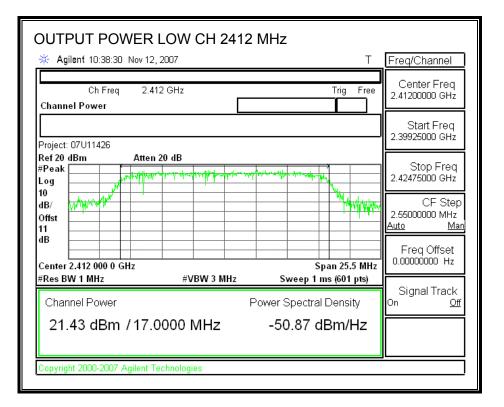
Peak power is measured using the spectrum analyzer's internal channel power integration function. Power is integrated over a bandwidth greater than or equal to the 99% bandwidth.

RESULTS

Channel	Frequency	Output Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	21.34	30	-8.66
Low	2417	22.98	30	-7.02
Middle	2437	23.05	30	-6.95
High	2457	23.02	30	-6.98
High	2462	20.89	30	-9.11

Page 33 of 77

OUTPUT POWER



OUTPUT POWER	LOW CH 2417	MHz		
- 🔆 Agilent 10:53:02 Nov 12,	2007		T Sys	stem
Ch Freq 2.41 Channel Power	7 GHz	Trig	Free Show	Errors 🔸
Project: 07U11426			Pov	ver On/ Preset
	20 dB			ne/Date ►
10 dB/ Offst 11			Alic	anments •
dB		Span 25.5	MHz	nfig I/O 🔸
#Res BW 1 MHz Channel Power	#VBW 3 MHz	Sweep 1 ms (601) Power Spectral Densit	- Ref	erence 🔸
22.98 dBm /17.0	0000 MHz	-49.32 dBm/H	lz	More 1 of 3
Copyright 2000-2007 Agilent To	echnologies			

Page 34 of 77

OUTPUT POWER N	1ID CH 2437	MHz		
🔆 🔆 Agilent 11:00:06 Nov 12, 2	007		Т	Measure
Ch Freq 2.437 Channel Power	GHz		Trig Free	Meas Off
Project: 07U11426				Channel Power
	D dB Hyproxingtryphysiques, and a second	and the state of t		Occupied BW
dB/ 0ffst				ACP
dB Center 2.437 000 0 GHz		•	an 25.5 MHz	Multi Carrier Power
#Res BW 1 MHz Channel Power		Sweep 1 m Power Spectral [<u>, , ,</u>	Power Stat CCDF
23.05 dBm / 17.00	000 MHz	-49.25 dE	3m/Hz	More 1 of 2
Copyright 2000-2007 Agilent Tec	hnologies			

OUTPUT POWER HIGH CH 2457 MHz	
* Agilent 11:11:09 Nov 12, 2007 T	Measure
Ch Freq 2.457 GHz Trig Free Channel Power	Meas Off
Ref Level 20.00 dBm	Channel Power
Project: 07U11426 Ref 20 dBm Atten 20 dB #Peak	Occupied BW
10 ////////////////////////////////////	ACP
Center 2.457 000 0 GHz Span 25.5 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 1 ms (601 pts)	Multi Carrier Power
Channel Power Power Spectral Density	Power Stat CCDF
23.02 dBm / 17.0000 MHz -49.28 dBm/Hz	More 1 of 2
Copyright 2000-2007 Agilent Technologies	

OUTPUT POWER HIGH CH 2462 MHz	
∰ Agilent 11:19:29 Nov 12, 2007 T	Freq/Channel
Ch Freq 2.462 GHz Trig Free Channel Power	Center Freq 2.46200000 GHz
Project: 07U11426	Start Freq 2.44925000 GHz
Ref 20 dBm Atten 20 dB #Peak Log 10	Stop Freq 2.47475000 GHz
dB/ offst	CF Step 2.5500000 MHz <u>Auto Man</u>
dB Center 2.462 000 0 GHz Span 25.5 MHz	Freq Offset 0.00000000 Hz
#Res BW 1 MHz #VBW 3 MHz Sweep 1 ms (601 pts) Channel Power Power Spectral Density	Signal Track ^{On <u>Off</u>}
20.89 dBm / 17.0000 MHz -51.41 dBm/Hz	
L Copyright 2000-2007 Agilent Technologies	

Page 36 of 77

7.2.4. POWER SPECTRAL DENSITY

<u>LIMITS</u>

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST PROCEDURE

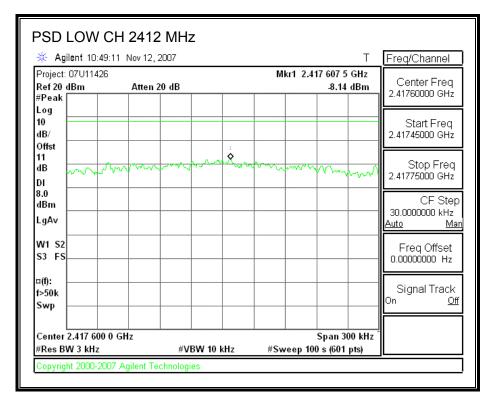
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

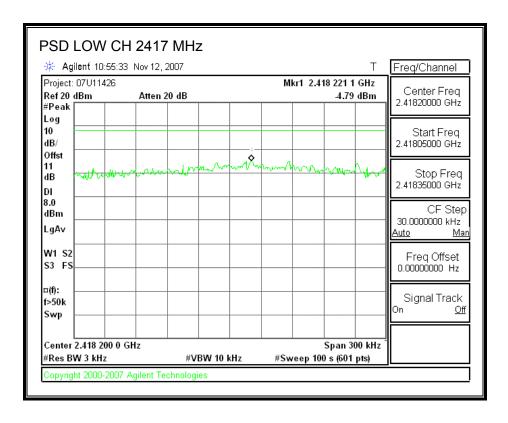
<u>RESULTS</u>

Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-8.14	8	-16.14
Low	2417	-4.79	8	-12.79
Middle	2437	-5.22	8	-13.22
High	2457	-5.42	8	-13.42
High	2462	-6.94	8	-14.94

Page 37 of 77

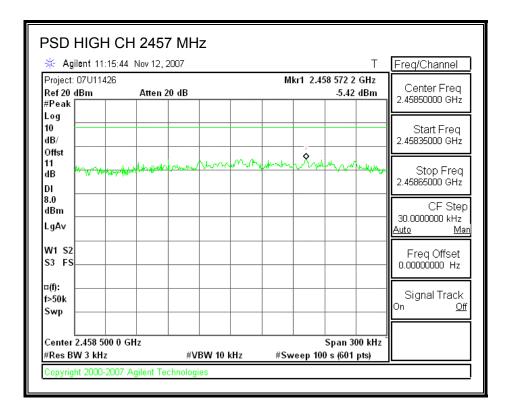
POWER SPECTRAL DENSITY





Page 38 of 77

	nt 11:06:13	NOV 12, 2	2007						Т	Freq/Channel
Project: 0 Ref 20 dE		Atten 2	20 dB			M	kr1 2.43	6 328 1 -5.22		Center Freq 2.43620000 GHz
#Peak Log										
10 dB/										Start Freq 2.43605000 GHz
Offst 11 - <u>√</u> dB	mm	man	m	hwww.	whe	ledge arryl	al and the second second	~v~v	hon	Stop Freq 2.43635000 GHz
DI										CF Ster
LgAv										30.0000000 kHz <u>Auto Ma</u>
W1 S2 S3 FS										Freq Offset 0.00000000 Hz
¤(f): f>50k										Signal Track
Swp –										
	436 200 0 G 3 kHz	Hz		BW 10 F			/eep 100	Span 30		



Page 39 of 77

	nt 11:21:58	NUV 12,.	2007						Т	Freq/Channel
Project: 07 Ref 20 dB #Peak [Atten 2	20 dB			MI	kr1 2.46		GHz dBm	Center Freq 2.46510000 GHz
Log 10 dB/ Offst										Start Freq 2.46495000 GHz
44	with training	w	-	-	ww	ᡒᢦᠰᠣ᠋ᡇᢦ	white	mar	~~~	Stop Freq 2.46525000 GHz
8.0 dBm LgAv										CF Step 30.0000000 kHz <u>Auto Mar</u>
W1 S2 S3 FS										Freq Offset 0.00000000 Hz
¤(f): f>50k Swp										Signal Track ^{On <u>Off</u>}
Center 2. #Res BW	465 100 0 GH 3 kHz	lz	#V	BW 10 I	(H7	#Sw	eep 100	Span 3) s <i>(</i> 601		

Page 40 of 77

7.2.5. CONDUCTED SPURIOUS EMISSIONS

<u>LIMITS</u>

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

TEST PROCEDURE

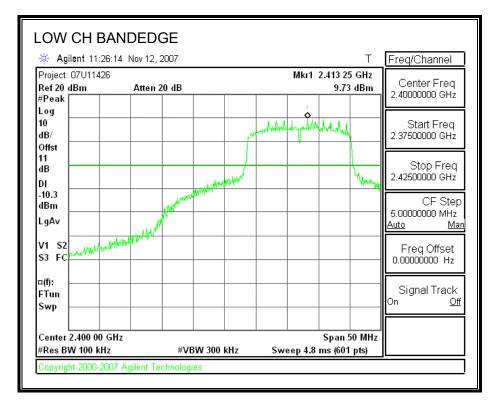
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

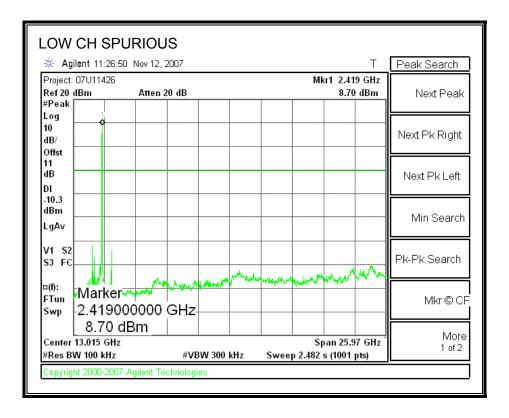
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

RESULTS

Page 41 of 77

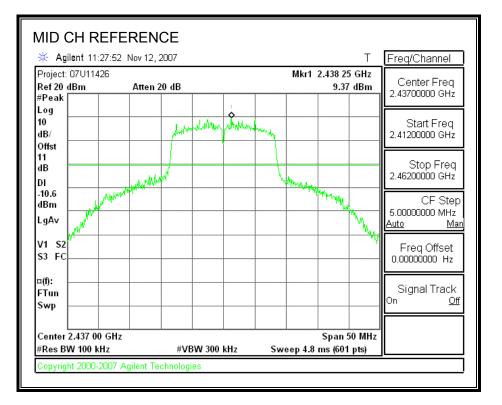
SPURIOUS EMISSIONS, LOW CHANNEL

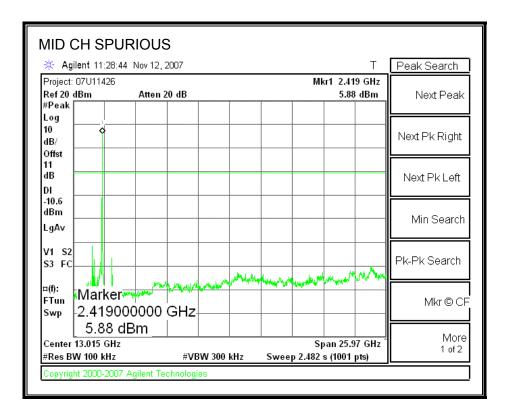




Page 42 of 77

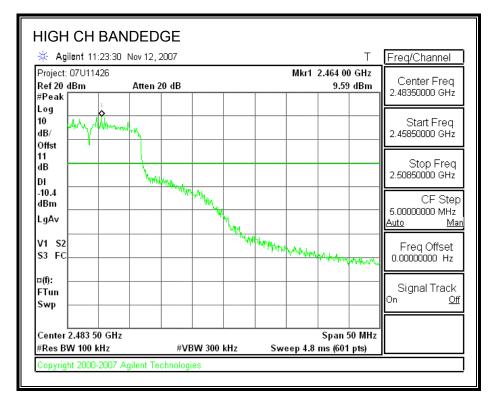
SPURIOUS EMISSIONS, MID CHANNEL

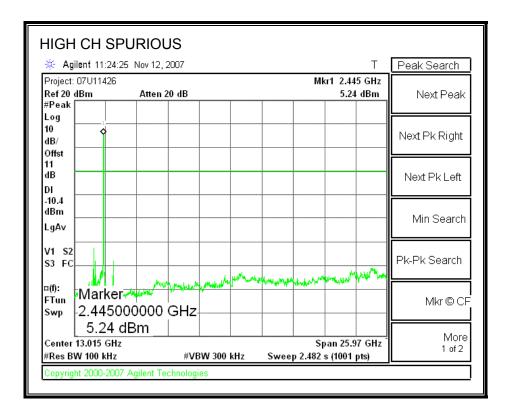




Page 43 of 77

SPURIOUS EMISSIONS, HIGH CHANNEL





Page 44 of 77

8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

Frequency Range	Field Strength Limit	Field Strength Limit
(MHz)	(uV/m) at 3 m	(dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

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 in the 2.4 GHz band.

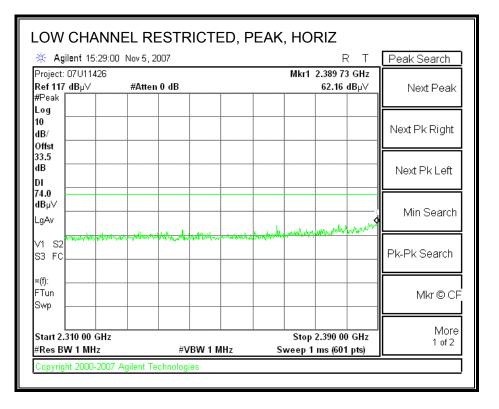
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

Page 45 of 77

8.1.1. TRANSMITTER ABOVE 1 GHz FOR 802.11b MODE IN THE 2.4 GHz BAND

<u>CH1, 2412 MHz</u>

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)



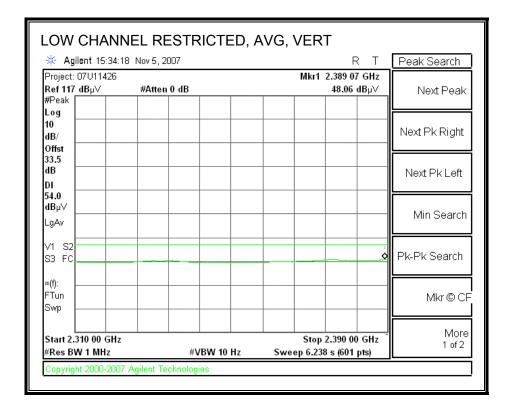
Page 46 of 77

🔆 Agilent 15:29:4	I3 Nov 5, 2007	RT	Peak Search		
Project: 07U11426		Mkr1 2.390 00 GHz			
Ref 117 dBµ∨ #Peak	#Atten 0 dB	53.73 dBµ∀	Next Peak		
Log			⊪		
10			Next Pk Right		
dB/ Offst			- NOALT KINGHL		
33.5					
dB			Next Pk Left		
DI					
54.0 dBµ∀					
LgAv			Min Search		
-			반 체		
V1 S2			Pk-Pk Search		
×(f):			-		
FTun			Mkr © CF		
Swp			<u> </u>		
			More		
Start 2.310 00 GHz #Res BW 1 MHz	#VBW 10 H	Stop 2.390 00 GHz z Sweep 6.238 s (601 pts)	1 of 2		

Page 47 of 77

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

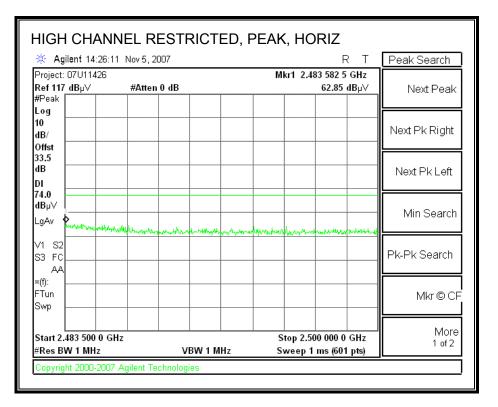
🗧 Agilent 15:35:4	l4 Nov 5, 2007			RΤ	Peak Search
roject: 07U11426 e f 117 dB µ∀ Peak	#Atten 0 dB		Mkr1 2.38 59	35 07 GHz).13 dBµ∨	Next Peak
og 0 B/					Next Pk Right
3.5 B					Next Pk Left
4.0 Βμ∨ gAv				1	Min Search
1 S2 З FC	ernen aller en fransk bester fransk skolar som	ava dada ana	u-and an and a second	/~~***********************************	Pk-Pk Search
(f): Tun wp					Mkr © C
tart 2.310 00 GHz Res BW 1 MHz		W 1 MHz	Stop 2.39 Sweep 1 ms)0 00 GHz (601 pts)	More 1 of 2

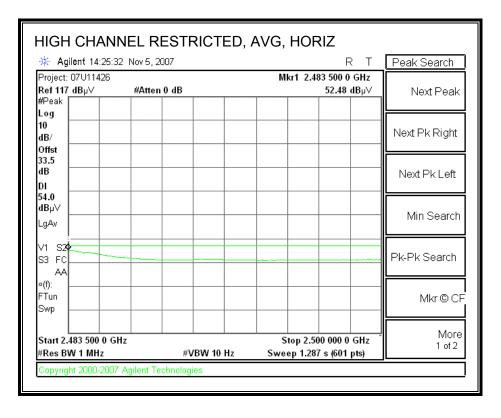


Page 48 of 77

CH11, 2462 MHz

RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

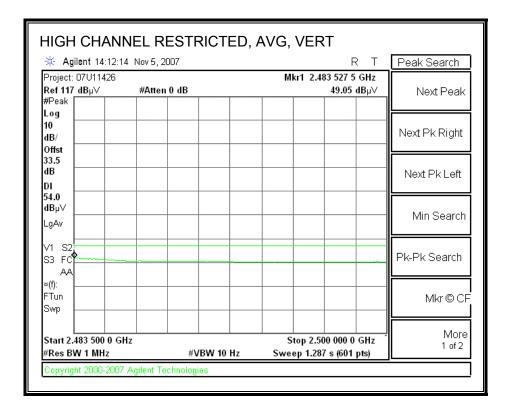




Page 49 of 77

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

Agilent 14:11:	25 Nov 5, 20)07			R	T Peak Sea	arch
ect: 07U11426 117 dB µ∨ ak	#Atten	0 dB		Mkr1 2.4	87 817 5 GH 60.63 dB⊧	- 11	Pea
						Next Pk F	Righ
						Next Pk	Left
				իշարու Դեր		Min S	earc
S2 FC		al wat d'ale de la constant	fiest Minuscutified	achte des an Meader		Pk-Pk Se	arch
Marker 2.4878	17500	GHz				Mk	r©(
60.63 t 2.483 500 0 G s BW 1 MHz		VBW 1	MHz	•	00 000 0 GH ms (601 pt		Mor 1 of 2



Page 50 of 77

REPORT NO: 07U11426-1A FCC ID: QDS-BRCM1030

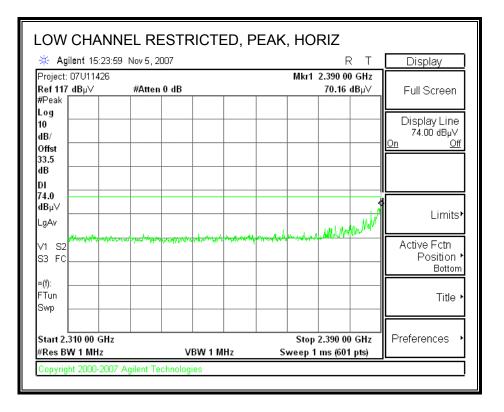
ionfigurati Iode: Tx I iest Equipy Horr T119; S/N	07U1142 5/07 ieer: Vier ion: EUT 11b oment: n 1-18G N: 29301 @	2б en Tran Г on exte GHz	tended card												
roject #: 0 ate: 11/05 est Engind onfigurati Iode: Tx J est Equipy Horr T119; S/N	07U1142 5/07 ieer: Vier ion: EUT 11b oment: n 1-18G N: 29301 @	2б en Tran Г on exte GHz													
ate: 11/05 est Engine onfigurati Iode: Tx 1 est Equip Horr T119; S/N	5/07 ieer: Vier ion: EUT 11b <u>oment:</u> n 1-18G N: 29301 @	on Tran F on exte GHz													
/Iode: Tx J ` <u>est Equip</u> Horr T119; S/N - Hi Frequend	ion: EUT 11b <u>oment:</u> n 1-18G N: 29301 @	f on exte GHz													
Vlode: Tx J Cest Equipy Horr T119; S/N	11b p <u>ment:</u> n 1-18G N: 29301 @	GHz													
Cest Equips Horr T119; S/N	o <u>ment:</u> n 1-18G N: 29301 @		Pre-an												
Horn T119; S/N	n 1-18G N: 29301 @		Pre-an												
T119; S/N	N: 29301 @		Pre-an							-					
Hi Frequenc		@3m ,					Pre-am	plifer	r 26-40GH	iz	He	orn > 180	GHz		Limit
	cy Cables -	-	▼ T34 HP	9 8449B		•		•							FCC 15.205
2 f										ה 💼		-			
	foot cab	le	3	3 foot c	able		12	foot c	cable		HPF	Re		<u>ak Measurements</u> BW=VBW=1MHz	
			Gorde	on 17708	80004	-	Chin 20	0035400	01 🗸	HP	PF_4.0GHz	Hz 🗸 🗛			age Measurements
														📕 RBW=	=1MHz ; VBW=10Hz
f D	Dist Re	ad Pk	Read Avg.	AF	CL	Amp	D Corr	Fltr	Peak	Avg	Pk Lim	Avg Lim	Pk Mar	Avg Mar	Notes
	(m) d	BuV	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dBuV/m	dBuV/m	dB	dB	(V/H)
OW CH, 24		45.2	35.5	33.7	35	-34.8	0.0	0.0	48.1	38.4	74	54	-25.9	-15.6	v
		45.2	35.5 38.9	33.7	35	-34.8	0.0	0.0	48.1 50.1	38.4 41.8	74	54 54	-259 -239	-15.0 -12.2	H
						-	-					[]	ļ		
AID CH, 243		48.6	43.6	33.7	35	-34.8	0.0	0.0	51.6	46.6	74	54	-22.4	-7.4	v
311	3.0 4	46.5	37.1	35.2	4.1	-34.1	0.0	0.0	52.2	42.8	74	54	-21.8	-11.2	v
		47.8	41.6	33.7	3.5	-34.8	0.0	0.0	50.8	44.6	74	54	-23.2	-9.4	H
311 3	3.0 4	46.7	37.2	35.2	4.1	-34.1	0.0	0.0	52.5	43.0	74	54	-21.5	-11.0	H
II CH. 2462 I										1					
		49.8	44.3	33.8	3.5	-34.8	0.0	0.0	52.8	47.4	74	54	-21.2	-6.6	v
		45.2 45.7	33.6 38.2	35.2 33.8	4.1 3.5	-34.1 -34.8	0.0 0.0	6.0 6.0	51.0 48.8	39.4 41.3	74 74	54 54	-23.0 -25.2	-14.6 -12.7	V H
		45./ 45.6	36.2 35.5	35.2	4.1	-34.8	0.0	0.0	46.6 51.4	41.3	74	54 54	-25.2 -22.6	-12.7	H
						<u> </u>	-				ļ	ļ	ļ		
				<u> </u>	-			-						ļ	-
		l.			L	1		.i		i	.i	k			
Rev. 5.1.6															
f	Me	asureme	ent Frequency	A		Amp	Preamp	Gain				Avg Lim	Average F	Field Strengt	th Limit
Di			Antenna				Distance	e Correc	ect to 3 mete			Pk Lim	Peak Field	d Strength L	Limit
Re	ead Ana	alyzer Re	eading			Avg	Average	Field ?	Strength @	,3 m		Avg Mar	Margin vs	. Average L	Limit
AI	F Ant	tenna Fao	lctor			Peak	Calculate	ed Pea ¹	ik Field Stre	ength		Pk Mar	Margin vs	. Peak Limit	ıt
CI	L Cat	ble Loss				HPF	High Pas	ss Filter	r						

COMPLIANCE CERTIFICATION SERVICESFORM NO: CCSUP4031B47173 BENICIA STREET, FREMONT, CA 94538, USATEL: (510) 771-1000FAX: (510) 661-0888This report shall not be reproduced except in full, without the written approval of CCS.

Page 51 of 77

8.1.2. TRANSMITTER ABOVE 1 GHz FOR 802.11g MODE IN THE 2.4 GHz BAND

<u>CH1, 2412 MHz</u> RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

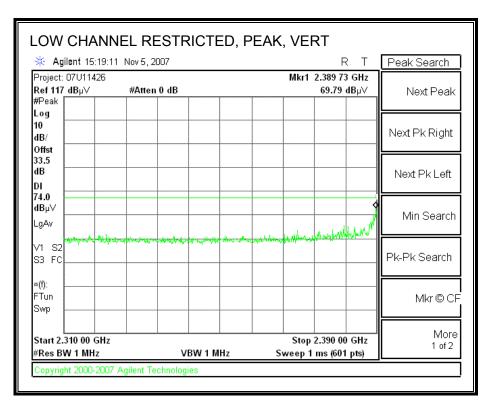


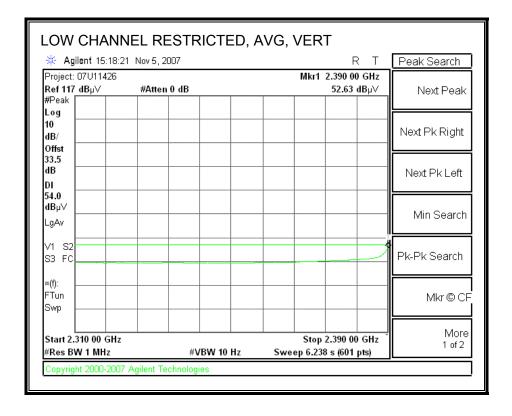
Page 52 of 77

🔆 Agilent 15:23:	30 Nov 5, 2007	RT	Peak Search
Project: 07U11426 Ref 117 dB µ∨ #Peak □	#Atten 0 dB	Mkr1 2.390 00 GHz 53.89 dBµ∨	Next Peak
dB/			Next Pk Right
33.5 dB DI			Next Pk Left
54.0 dBµ∨ LgAv			Min Search
V1 S2			Pk-Pk Search
×(f): FTun Swp			Mkr © CF
Start 2.310 00 GH; #Res BW 1 MHz	z #VBW 10 H	Stop 2.390 00 GHz z Sweep 6.238 s (601 pts)	More 1 of 2

Page 53 of 77

RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

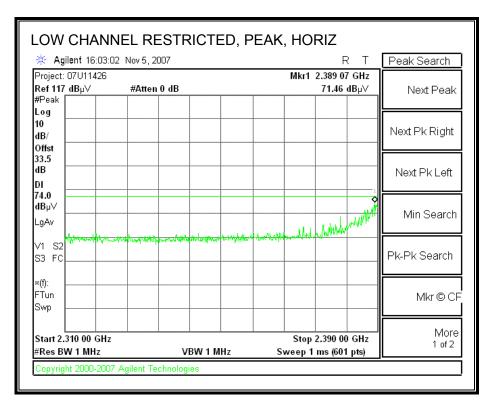


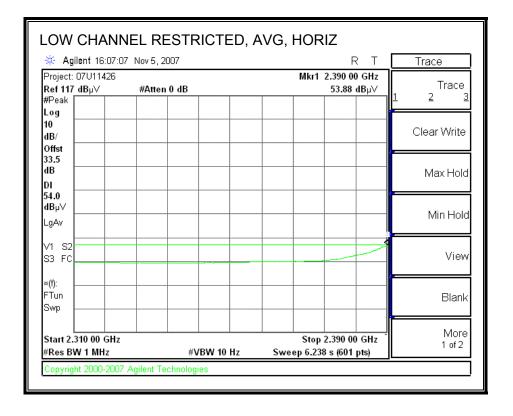


Page 54 of 77

<u>CH2, 2417 MHz</u>

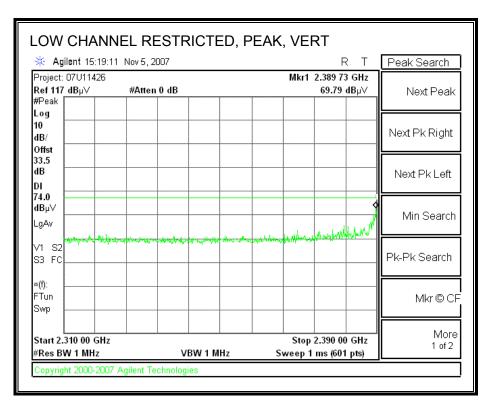
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

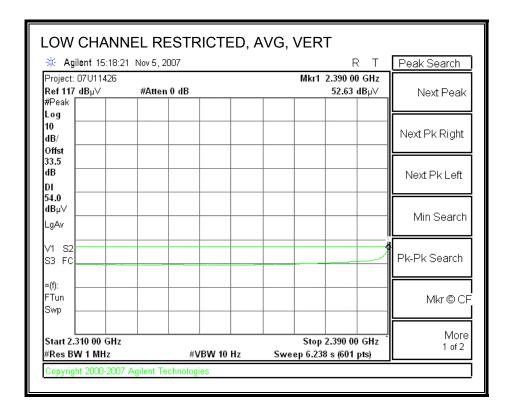




Page 55 of 77

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

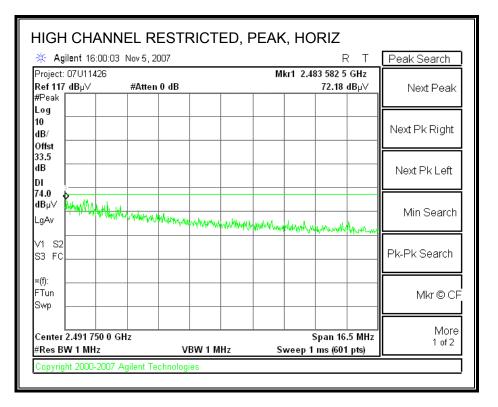


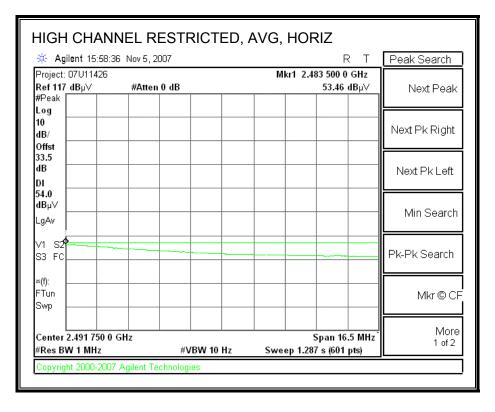


Page 56 of 77

CH10, 2457 MHz

RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

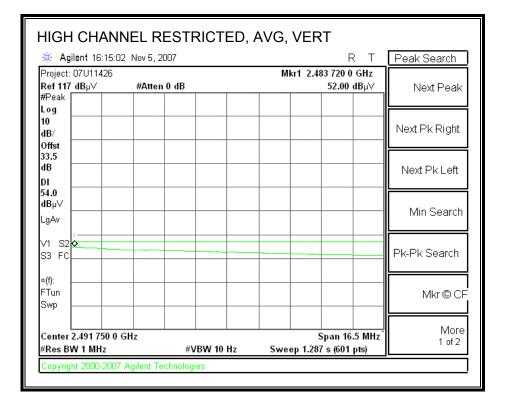




Page 57 of 77

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

Agilent 16:14:	26 Nov 5, 2007			RT	Peak Search
ject: 07∪11426 117_dBµ∨	#Atten 0 dB		Mkr1 2	.483 555 0 GHz 69.86 dBµ∨	Next Peak
eak J					-
st					Next Pk Right
5					Next Pk Left
					Min Oo anal
w WAAYYMAAN	MANDA ANNAN ANNAN ANNA M	VHWWWWWWWW	monthemation	Month Marin	Min Search
S2 FC					Pk-Pk Search
n					Mkr©C
p					
nter 2.491 750 0 es BW 1 MHz		V 1 MHz	Swoon	Span 16.5 MHz 1 ms (601 pts)	More 1 of 2

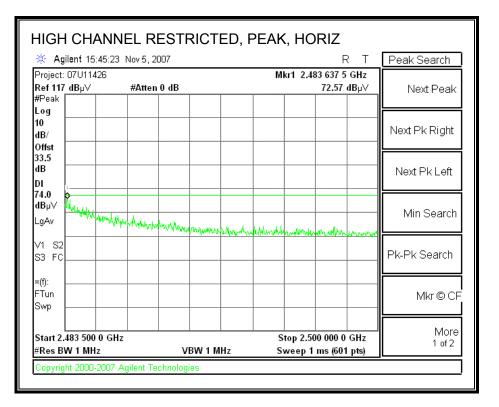


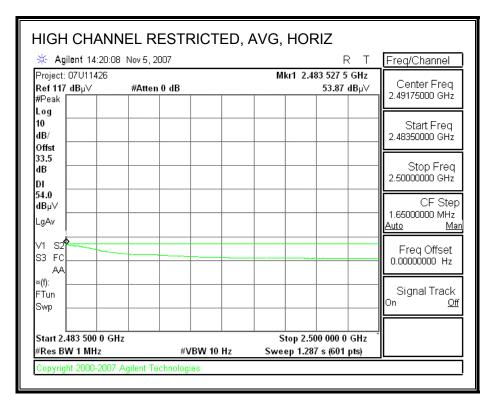
COMPLIANCE CERTIFICATION SERVICES FORM NO: CCSUP4031B 47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888 This report shall not be reproduced except in full, without the written approval of CCS.

Page 58 of 77

CH11, 2462 MHz

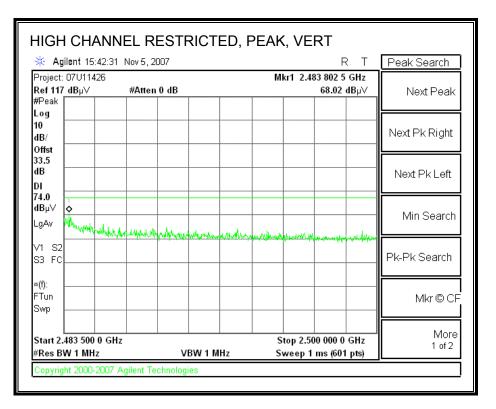
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

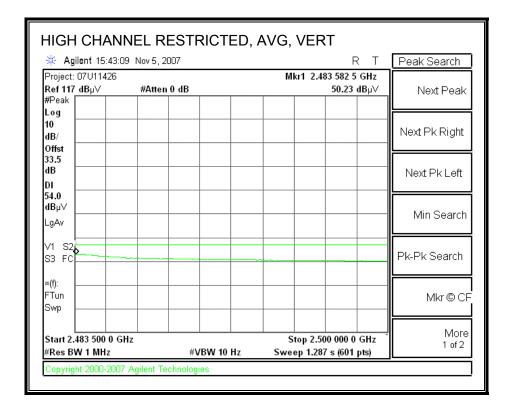




Page 59 of 77

RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





Page 60 of 77

REPORT NO: 07U11426-1A FCC ID: QDS-BRCM1030

HARMONICS AND SPURIOUS EMISSIONS

mpli	-		7 Measurem Services, M		Hill Or	oen Fiel	d Site								
-			,,	-											
	ıy: Broa #: 07U1														
	#:0701 1/05/07	11420													
est En	igineer:	Vien Tran													
	ration: Tx 11g	EUT on ex	tended card												
est Eq	uipmen	<u>t:</u>													
н	lorn 1-	18GHz	Pre-a	nplifer	1-260	GHz	Pre-am	plifer	26-40GH	z	H	orn > 180	GHz		Limit
T119;	S/N: 29	301 @3m		P 8449B		-				-				-	FCC 15.205
Hi Fred	quency Cal	bles —													
				fact	able		10	footo	able		LIDE	-	la at The	Peak	Measurements
	2 foot	cable	3	foot c	able		12	1001 0	able		HPF	Re	ject Filte		W=VBW=1MHz
			Gord	on 1770	30004	-	Chin 20	003540	01 🚽	НР	F_4.0GHz	-			ge Measurements
							I		_					RBW=	1MHz; VBW=10Hz
f	Dist	Read Pk	Read Avg.	AF	CL	Amp	D Corr	Fltr	Peak	Avg	Pk Lim	Avg Lim	Pk Mar	Avg Mar	Notes
GHz	(m)	dBuV	dBuV	dB/m	dB	dB	dB	dB		dBuV/m	1	-	dB	۵B	(V/H)
	I, 2412 M														
24 24	3.0 3.0	50.8 47.1	35.5 33.1	33.7 33.7	35 35	-34.8 -34.8	0.0 0.0	0.6 0.0	53.7 50.0	38.4 36.0	74 74	54 54	-20.3 -24.0	-15.6 -18.0	V H
						-010	0.0	0.0	200					-1000	
	2437 MH		26.2		35	04.0	0.0	0.6		39.2			-19.6	14.0	v
374	3.0 3.0	51.4 45.7	36.2 33.1	33.7 35.2	3.5 4.1	-34.8 -34.1	0.0 0.0	0.0	54.A 51.A	39.2 38.8	74 74	54 54	-19.6	-14.8 -15.2	v
311		46.7	33.4	33.7	35	-34.8	QO	0.6	49.7	36.4	74	54	-24.3	-17.6	Н
374	3.0		35.7	35.2	4.1	-34.1	0.0	0.6	54.4	41.4	74	54	-19.6	-12.6	Н
374	3.D 3.D	48.6													
311 874 311 [CH. 24		48.0													
874 811 CH. 24	3.0 462 MHz 3.0	51.7	36.8	33.8	3.5	-34.8	Q.O	0.0	54.8	39.9	74	54	- 19.2	-14.1	v
874 811 CH. 24	3.0 462 MHz			33.8 33.8	35 35	-34.8 -34.8	0.0 0.0	0.0 0.0	54.8 50.3	39.9 36.7	74 74	54 54	-19.2 -23.7	-14.1 -17.3	V H
874 311	3.0 462 MHz 3.0 3.0	51.7 47.2	36.8 33.6	33.8			0.0	6.0				54	-23.7	-173	H
874 811 CH. 24	3.0 462 MHz 3.0 3.0	51.7 47.2 Measurem	36.8 33.6 ent Frequenc	33.8		- 34.8 Amp	0.0 Preamp	0.6 Gain	50.3	36.7		54 Avg Lim	-23.7 Average I	-17.3	H h Limit
874 311 CH. 24 924	3.0 462 MHz 3.0 3.0 f Dist	51.7 47.2 Measurem Distance to	36.8 33.6 ent Frequenc	33.8		- 34.8 Amp D Corr	0.0 Preamp Distance	0.6 Gain Corre	50.3	36.7		54 Avg Lim Pk Lim	-23.7 Average I Peak Field	-17.3 Field Strength d Strength Li	H h Limit imit
874 311 [CH. 24 924	3.0 462 MHz 3.0 3.0 f Dist Read	51.7 47.2 Measurem Distance to Analyzer R	36.8 33.6 ent Frequenc Antenna eading	33.8		- 34.8 Amp D Corr Avg	0.0 Preamp Distance Average	0.6 Gain Corre Field :	50.3 ct to 3 mete Strength @	36.7 ers 3 m		54 Avg Lim Pk Lim Avg Mar	-23.7 Average I Peak Field Margin vs	-17.3 Field Strength d Strength Li . Average Li	H h Limit imit imit
874 811 CH. 24	3.0 462 MHz 3.0 3.0 f Dist	51.7 47.2 Measurem Distance to	36.8 33.6 ent Frequenc o Antenna eading actor	33.8		- 34.8 Amp D Corr	0.0 Preamp Distance Average	0.6 Gain Corre Field : ed Peal	50.3 ct to 3 mete Strength @ k Field Stre	36.7 ers 3 m		54 Avg Lim Pk Lim Avg Mar	-23.7 Average I Peak Field Margin vs	-17.3 Field Strength d Strength Li	H h Limit imit imit

Page 61 of 77

8.2. RECEIVER ABOVE 1 GHz

8.2.1. RECEIVER ABOVE 1 GHz 802.11 b MODE IN THE 2.4 GHz BAND

Complia	-	Frequency rtification			5m Cł	lamber									
Compan			Broadcom												
Project : Date:	#:		07U11426 11/5/2007												
	gineer:		Mengistu M	lekuria											
Configu Mode:	ration:		EUT, Extent Rx b mode	ion Card, a	ind Lapt	op									
			rcx o mode												
fest Eq	uipmen	<u>t:</u>													
н	orn 1-	18GHz	Pre-	amplife	r 1-26	GHz	Pre-amplifer 26-40GHz Horn > 18GHz								Limit
T120;	S/N: 29	310 @3m	▼ T145	Agilent	3008A0	1005(-	RX RSS 210 🗸	
- Hi Freq	quency Cal	oles —													
	2 foot	cable		3 foot	cable		12	foot c	able		HPF	Re	ject Filte		<u>k Measurements</u> W=VBW=1MHz
			•			•	B-5m C	hamb	er 🗸	1		•		Avera	<u>ge Measurements</u> 1MHz ; VBW=10Hz
I										·	,				
f GHz	Dist (m)	Read Pk dBuV	Read Av dBuV	g. AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dPuV/m	Avg dBuV/m	Pk Lim dBuV/m		Pk Mar dB	Avg Mar dB	Notes (V/H)
.036	(m) 3.0	49.0	34.3	28.0	33	-36.1	0.0	<u>مت</u> ۵.0	44.1	29.4	ави v/m 74	ави v/m 54	- <u>29.9</u>	-24.6	(V/H) V
.485	3.0	57.2	34.3	31.8	5.1	-35.1	0.0	0.0	59.D	36.1	74	54	-15.0	-17.9	v
.045 .300	3.0 3.0	51.0 50.3	35.9 35.2	28.0 29.0	3.3 3.6	-36.1 -35.9	0.0 0.0	0.0 0.0	46.2 47.0	31.1 31.9	74 74	54 54	-27.8 -27.0	-22.9	H H
.600	3.0	50.3	35.2	30.1	4.0	-35.9	0.0	0.0	47.0	31.9	74	54 54	-27.0 -25.5	-22.1 -20.8	н Н
485	3.0	54.5	33.3	31.8	5.1	-35.1	0.0	0.0	56.2	35.1	74	54	-17.8	-18.9	H
	-											•			
lev. 4.12.	f Dist	Measurem Distance to Analyzer R Antenna Fa	Antenna .eading	су		Amp D Corr Avg Peak HPF	Average	Corre Field S ed Peal	ct to 3 met Strength @ c Field Stre	3 m		Pk Lim Avg Mar	Peak Fiel Margin vs	Field Strengt d Strength L . Average L . Peak Limit	imit imit

Page 62 of 77

8.2.2. RECEIVER ABOVE 1 GHz 802.11g MODE IN THE 2.4 GHz BAND

Complia	~		y Measurem Services, Fr		im Ch	amber									
Company Project # Date: Cest Eng Configui Mode:	; #: gineer:		Broadcom 07U11426 11/5/2007 Mengistu Mek EUT, Extentior Rx g mode		1d Lapt	op									
est Equ	uipmen	<u>t:</u>													
Н	orn 1-	18GHz	Pre-ar	nplifer	1-260	GHz	Pre-am	plifer	26-40GH	Iz	н	orn > 180	GHz		Limit
T120;	S/N: 293	310 @3m	▼ T145 A	Agilent 3	008A0	056 🗸				-				•	RX RSS 210
	uency Cal <mark>2 foot</mark>		3	foot c	able		121	foot c	able		HPF	Re	eject Filte		<u>k Measurements</u> W=VBW=1MHz
			•			•	B-5m C	hamb	er 🗸			•			a <u>ge Measurements</u> =1MHz ; VBW=10Hz
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m			Avg Mar dB	Notes (V/H)
.036	3.0	51.6	34.8	28.0	33	-36.1	0.0	0.0	46.7	30.0	74	54	-27.3	-24.0	v
.485 .090	3.0 3.0	57.4 52.1	34.3 39.4	31.8 28.2	5.1 3.3	-35.1 -36.1	0.0 0.0	0.0 0.0	59.1 47.5	36.1 34.9	74 74	54 54	-14.9 -26.5	-17 <i>9</i> -19.1	N H
.195	3.0	50.4	36.2	28.6	3.5	-36.0	0.0	0.0	46.4	32.2	74	54	- 27.6	- 21.8	Н
.600 .485	3.0 3.0	48.6 54.9	34.2 33.4	30.1 31.8	4.0 5.1	-35.7 -35.1	0.0 0.0	0.0 0.0	47.0 56.7	32.6 35.2	74 74	54 54	-27.0 -17.3	-21.4 -18.8	H H
Rev. 4.12.7	,			<u> </u>		L		I	1		1	1		1	
		Measureme Distance to Analyzer R Antenna Fa Cable Loss	leading actor	ÿ		Amp D Corr Avg Peak HPF	Average	Corre Field S d Peal	ct to 3 mete Strength @ k Field Stre r	3 m		Pk Lim Avg Mar	Peak Fiel Margin vs	Field Strengt d Strength L : Average L : Peak Limi	imit imit

Page 63 of 77

8.3. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT & DATA	
Sector 47173 B Sector Fremont Foundation Fremont Foundation Tel: (5)	nce Certification Services enicia Street , CA 94538 10) 771-1000 10) 661-0888
Data#: 37 File#: 07U11426_EMI.EMI Date: 1	1-07-2007 Time: 00:41:21
Condition: FCC CLASS-B HORIZONTAL Test Operator:: Mengistu Mekuria Project #: : 07U11426 Company: : Broadcom Configuration:: BUT, Extention Card, and Lap Mode : : Tx Worst Case Target: : FCC Class B	top
Limit Over	Page: 1
Freq Level Line Limit Remark	
MHZ dBuV/m dBuV/m dB	
1 402.480 35.81 46.00 -10.19 Peak 2 417.030 35.64 46.00 -10.36 Peak	
3 555.740 32.04 46.00 -13.96 Peak	
4 722.580 36.99 46.00 -9.01 Peak	

Page 64 of 77

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

VERTICAL PLOT & DATA	
	Compliance Certification Services 47173 Benicia Street Fremont, CA 94538 Tel: (510) 771-1000 Fax: (510) 661-0888
Data#: 38 File#: 07U11426_EMI.EMI	Date: 11-07-2007 Time: 00:45:49
Condition: FCC CLASS-B VERTICAL Test Operator:: Mengistu Mekuria Project #: : 07U11426 Company: : Broadcom Configuration:: BUT, Extention Card, Mode : : Tx Worst Case Target: : FCC Class B	and Laptop
Limit Over	Page: 1
Freq Level Line Limit	Remark
MHZ dBuV/m dBuV/m dB	
1 101.780 35.91 43.50 -7.59 2 279.290 32.13 46.00 -13.87 3 367.560 33.29 46.00 -12.71 4 383.080 33.21 46.00 -12.79 5 450.980 37.58 46.00 -8.42 6 698.330 38.27 46.00 -7.73	Peak Peak Peak Peak

Page 65 of 77

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted I	.imit (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 receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

RESULTS

Page 66 of 77

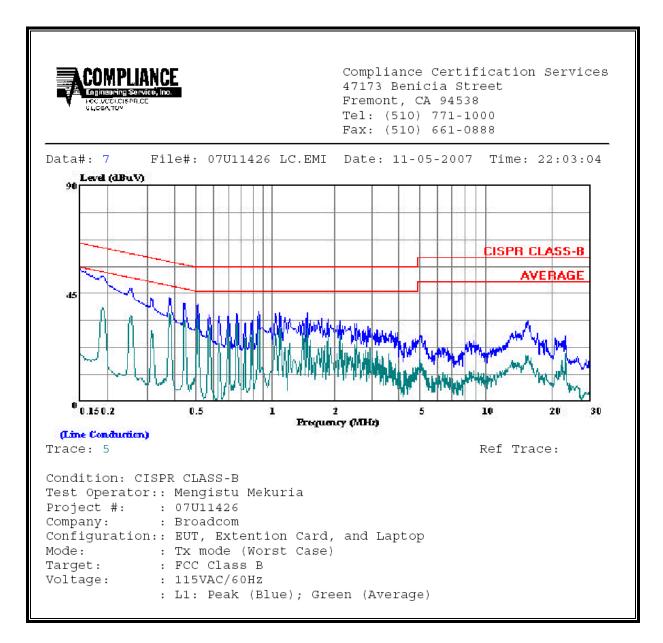
6 WORST EMISSIONS

	CONDUCTED EMISSIONS DATA (115VAC 60Hz)										
Freq.		Closs	Limit	EN_B	Marg	çin	Remark				
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV(dB)	L1/L2		
0.38	43.19			0.00	58.30	48.30	-15.11	-5.11	L1		
0.51	40.35			0.00	56.00	46.00	-15.65	-5.65	L1		
0.95	37.57			0.00	56.00	46.00	-18.43	-8.43	L1		
0.38	42.89			0.00	58.30	48.30	-15.41	-5.41	L2		
0.51	40.55			0.00	56.00	46.00	-15.45	-5.45	L2		
0.95	38.45			0.00	56.00	46.00	-17.55	-7.55	L2		
6 Worst I	Data										

COMPLIANCE CERTIFICATION SERVICESFORM NO: CCSUP4031B47173 BENICIA STREET, FREMONT, CA 94538, USATEL: (510) 771-1000FAX: (510) 661-0888This report shall not be reproduced except in full, without the written approval of CCS.

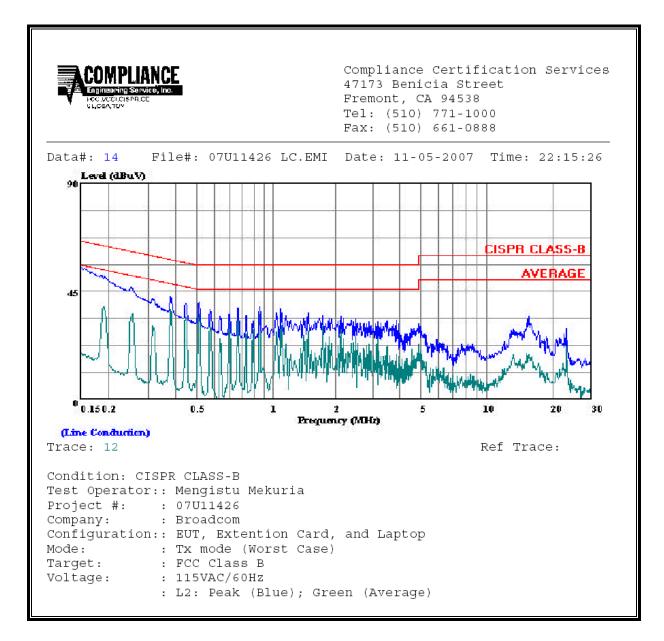
Page 67 of 77

LINE 1 RESULTS



Page 68 of 77

LINE 2 RESULTS



10. MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES

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

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	Averaging time (minutes)
(A) Lim	its for Occupational	I/Controlled Exposu	res	
0.3–3.0 3.0–30 30–300 300–1500 1500–100,000	614 1842/f 61.4	1.63 4.89/f 0.163	*(100) *(900/f²) 1.0 f/300 5	6 6 6 6 6
(B) Limits	for General Populati	ion/Uncontrolled Exp	posure	
0.3–1.34 1.34–30	614 824 <i>/</i> f	1.63 2.19/f	*(100) *(180/f²)	30 30

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	Averaging time (minutes)
30–300 300–1500 1500–100,000	27.5	0.073	0.2 f/1500 1.0	30 30 30

f = frequency in MHz

* = Plane-wave equivalent power density NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occu-tion for the set of the exposure also apply in situations when an individual is transient through a location where occu-tion for the set of the set of the exposure also apply in situations.

pational/controlled limits apply provided he or she is made aware of the potential for exposure. NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be ex-posed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

Page 70 of 77

IC RULES

IC Safety Code 6, Section 2.2.1 (a) A person other than an RF and microwave exposed worker shall not be exposed to electromagnetic radiation in a frequency band listed in Column 1 of Table 5, if the field strength exceeds the value given in Column 2 or 3 of Table 5, when averaged spatially and over time, or if the power density exceeds the value given in Column 4 of Table 5, when averaged spatially and over time.

Table 5

Exposure Limits for Persons Not Classed As RF and Microwave Ex-
posed Workers (Including the General Public)

1 Frequency (MHz)	2 Electric Field Strength; rms (V/m)	3 Magnetic Field Strength; rms (A/m)	4 Power Density (W/m ²)	5 Averaging Time (min)
0.003–1	280	2.19		6
1–10	280/f	2.19/ <i>f</i>		6
10–30	28	2.19/ <i>f</i>		6
30–300	28	0.073	2*	6
300–1 500	1.585 <i>f</i> ^{0.5}	0.0042f ^{0.5}	f/150	6
1 500–15 000	61.4	0.163	10	6
15 000–150 000	61.4	0.163	10	616 000 /f ^{1.2}
150 000–300 000	0.158 <i>f</i> ^{0.5}	4.21 x 10 ⁻⁴ f ^{0.5}	6.67 x 10 ⁻⁵ f	616 000 /f ^{1.2}

* Power density limit is applicable at frequencies greater than 100 MHz.

Notes: 1. Frequency, f, is in MHz.

- 2. A power density of 10 W/m² is equivalent to 1 mW/cm^2 .
- A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

Page 71 of 77

CALCULATIONS

Given

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

and

S = E ^ 2 / 3770

where

E = Field Strength in Volts/meter

P = Power in Watts

G = Numeric antenna gain

d = Distance in meters

S = Power Density in milliwatts/square centimeter

Combining equations, rearranging the terms to express the distance as a function of the remaining variables, changing to units of Power to mW and Distance to cm, and substituting the logarithmic form of power and gain yields:

d = 0.282 * 10 ^ ((P + G) / 20) / \sqrt{S}

where

d = MPE distance in cm P = Power in dBm G = Antenna Gain in dBi S = Power Density Limit in mW/cm^2

Rearranging terms to calculate the power density at a specific distance yields

S = 0.0795 * 10 ^ ((P + G) / 10) / (d^2)

The power density in units of mW/cm² is converted to units of W/m² by multiplying by a factor of 10.

Page 72 of 77

<u>LIMITS</u>

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm²

From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m²

RESULTS

(MPE distance equals 20 cm)

Mode	Band	MPE	Output	Antenna	FCC Power	IC Power
		Distance	Power	Gain	Density	Density
		(cm)	(dBm)	(dBi)	(mW/cm^2)	(W/m^2)
WLAN	2.4 GHz	20.0	23.05	3.90	0.10	0.98

NOTE: For mobile or fixed location transmitters, the minimum separation distance is 20 cm, even if calculations indicate that the MPE distance would be less.

Page 73 of 77