

FCC CFR47 PART 15 SUBPART C INDUSTRY CANADA RSS-210 ISSUE 8

CERTIFICATION TEST REPORT

FOR

802.11a/b/g/n WLAN + Bluetooth PCI-E Custom Combination Card

MODEL NUMBER: BCM94331CSAX

FCC ID: QDS-BRCM1062 IC: 4324A-BRCM1062

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	BROADCOM CORPORATION 190 MATHILDA PLACE SUNNYVALE, CA 94086, USA
EUT DESCRIPTION:	802.11a/b/g/n WLAN + Bluetooth PCI-E Custom Combination Card
MODEL:	BCM94331CSAX
SERIAL NUMBER:	C861475004JDNP60X, C86139600XCDNP60J, C86145004BDNP60
DATE TESTED:	NOVEMBER 29 - FEBRUARY 1, 2011

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	PASS
INDUSTRY CANADA RSS-210 Issue 8 Annex 8	PASS
INDUSTRY CANADA RSS-GEN Issue 3	PASS

Compliance Certification Services (UL CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. 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 UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL CCS By:

FRANK IBRAHIM EMC SUPERVISOR UL CCS Tested By:

DAVID GARCIA EMC ENGINEER UL CCS

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2009, FCC CFR 47 Part 2, FCC CFR 47 Part 15, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

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

UL 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. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB) 36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11a/g/n WLAN + Bluetooth PCI-E Custom Combination Card.

The radio module is manufactured by Broadcom.

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5.2. MAXIMUM OUTPUT POWER

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

2400 - 2483.	2400 - 2483.5 MHz Authorized Frequency Band						
Frequency Range (MHz)	Mode	PK Power, Chain 1 (dBm)	PK Power, Chain 2 (dBm)	PK Power, Chain 3 (dBm)	Total PK power (dBm)	Total PK power (mW)	
2412 - 2462	802.11b Legacy 1TX	Covered by the	e worst case 80)2.11b CDD 3T>	Mode testin	g	
2412 - 2462	802.11b CDD 2TX	Covered by the	e worst case 80	2.11b CDD 3T	K Mode testin	g	
2412 - 2462	802.11b CDD 3TX	19.27	18.76	18.95	23.77	238.21	
2412 - 2462	802.11g Legacy 1TX	19.44	N/A	N/A	19.44	87.9	
2412 - 2462	802.11n HT20 1TX	Covered by the	e worst case 80	2.11g Legacy N	Node testing		
2412 - 2462	802.11g CDD 2TX	Covered by the	e worst case 80	2.11n HT20 CD	DD 2TX Mode	testing	
2412 - 2462	802.11g CDD 3TX	Covered by the	e worst case 80	2.11n HT20 CD	DD 3TX Mode	testing	
2412 - 2462	802.11n HT20 CDD 3TX	19.57	18.95	18.94	23.93	247.44	
5725 - 5850	MHz Authorized Frequenc	y Band					
Frequency	Mode	PK Power,	PK Power,	PK Power,	Total PK	Total PK	
Range (MHz)		Chain 1 (dBm)	Chain 2 (dBm)	Chain 3 (dBm)	power (dBm)	power (mW)	
5745 - 5825	802.11a Legacy 1TX	Covered by the	e worst case 80	•)2.11n HT20 CD	DD 3TX		
5745 - 5825	802.11n HT20 1TX	Covered by the	e worst case 80	2.11n HT20 CD	DD 3TX		
5745 - 5825	802.11a CDD 2TX	Covered by the	e worst case 80	2.11n HT20 CE	DD 2TX		
5745 - 5825	802.11a CDD 3TX	Covered by the worst case 802.11n HT20 CDD 3TX					
5745 - 5825	802.11n CDD 3TX	20.17	19.37	19.66	24.52	282.96	
5755 - 5795	802.11n HT40 1TX	Covered by the	e worst case 80		DD 3TX		
5755 - 5795	802.11n HT40 CDD 3TX	19.57	19.34	19.05	23.97	249.41	

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5.3. DESCRIPTION OF AVAILABLE ANTENNAS

			FCC	IC/NCC FMA - BC FCC ID: QDS-BR IC ID: 4324A-BR	CM1062			
No.	Antenna Manufacturer	Antenna Type	Model	Peak gain @ 2412, 2422, 2432MHz,	Peak gain (5150- 5250MHz)	Peak gain (5250- 5350MHz) @5320MHz	Peak gain (5470- 5725MHz) @5500,	Peak gain (5725 5850MHz) @5785,
1	Amphenol/Molex	802.11abgn WLAN Antenna	604-2961 Wi-Fi1	1.42	5.94	5.05	4.07	3.52
1	Amphenol/Molex	802.11abgn WLAN/BT Antenna	604-2961 Wi-Fi2 & Bluetooth	4.97	6.41	6.56	6.39	6.01
1	Amphenol/Molex	802.11abgn WLAN Antenna	604-2961 Wi-Fi3	3.93	2.38	3.01	4.09	3.59
			Composite 2x2	7.49	9.19	8.88	8.40	7.976724045
			Composite 3x3	8.45	10.01	9.88	9.76	9.31

5.4. SOFTWARE AND FIRMWARE

The EUT driver software installed during testing was Broadcom, rev. 5.106.98.42. The test utility software used during testing was BCM Internal, rev. 5.106.RC98.42.

5.5. WORST-CASE CONFIGURATION AND MODE

The EUT was tested as an external module installed in a test jig board connected to a host Laptop PC.

Worst-Case data rates, as provided by the client, were as follows:

For 2.4 GHz Band: 802.11b: 1 Mb/s. 802.11g: 6 Mb/s. 802.11n 20MHz: MCS0.

For 5.8 GHz Band: 802.11a: 6 Mb/s. 802.11n 20MHz: MCS0. 802.11n 40MHz: MCS0

Worst-case mode and channel used for 30-1000 MHz radiated and power line conducted emissions was the mode and channel with the highest output power.

For Radiated Band Edge & Harmonic measurements preliminary testing showed that the worst case was vertical polarization, so final measurements were performed with vertical polarization.

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST							
Description	Manuf.	Model	Serial Number	FCC ID			
Laptop PC	Lenovo	G560	CBU4495773	DoC			
AC Adapter	Lenovo	PA-1650-56LC	11S36001651ZZ40008B9YU	N/A			
Express Card Adapter	Catalyst	384-0153-002	BRCM 07	N/A			
PCI Express Mini Card Adapter	Broadcom	BCM94331CSMFG (X29MFG)	1458963	N/A			

I/O CABLES

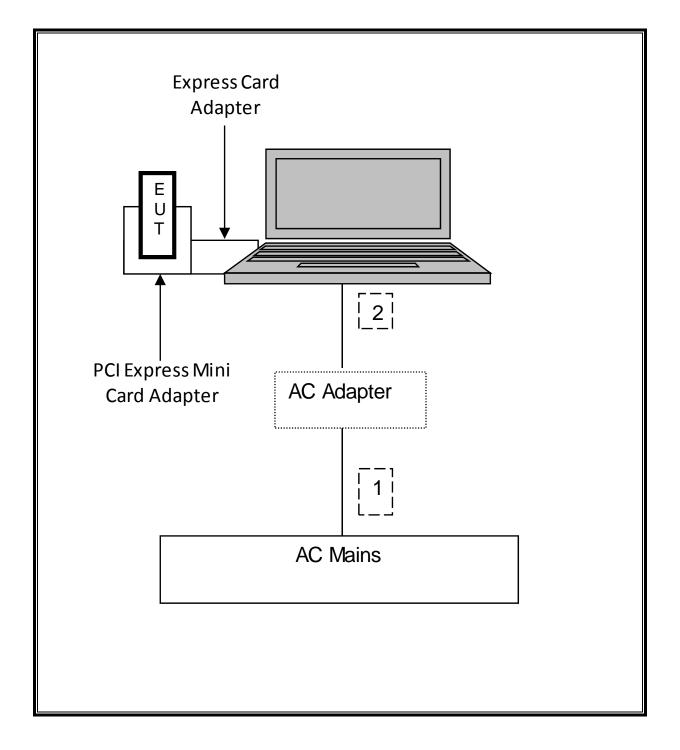
	I/O CABLE LIST							
Cable No.		-	Connector Type	Cable Type	Cable Length	Remarks		
1	AC	1	US 115V	Un-Shielded	6-ft.	Detachable. 3C/18AWG.		
2	DC	1	DC	Un-Shielded	3-ft.	Ferrite-loaded, non-detachable. 2C/18AWG.		

TEST SETUP

The EUT is attached to a jig board which is installed in the PCMCI slot of a host laptop computer during the tests. Test software exercised the radio card.

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SETUP DIAGRAM FOR TESTS



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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		
EMI Test Receiver, 9 kHz-7 GHz	R&S	ESCI 7	1000741	07/06/11	07/06/12		
LISN, 30 MHz	FCC	50/250-25-2	C00626	11/17/11	11/17/12		
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01159	05/11/11	05/11/12		
Peak Power Meter	Agilent / HP	E4416A	C00963	03/22/11	03/22/13		
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	04/13/11	04/13/12		
EMI Receiver, 6.5GHz	Agilent / HP	85462A	CCS-0147	08/23/11	02/23/13		
Antenna, Horn, 18 GHz	EMCO	3115	C00872	09/20/11	09/20/12		
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	09/02/11	09/02/12		
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	07/18/11	07/18/12		
Reject Filter, 2.4-2.5 GHz	Micro-Tronics	BRC13192	N02683	CNR	CNR		
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	07/28/11	07/28/12		
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01171	07/16/11	07/16/12		
Antenna, Horn, 40 GHz	ARA	MWH-2640/B	C00981	06/14/11	06/14/12		
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00558	01/27/11	01/27/12		
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	08/02/11	08/02/12		

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7. ANTENNA PORT TEST RESULTS

7.1. 802.11g 1TX LEGACY 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

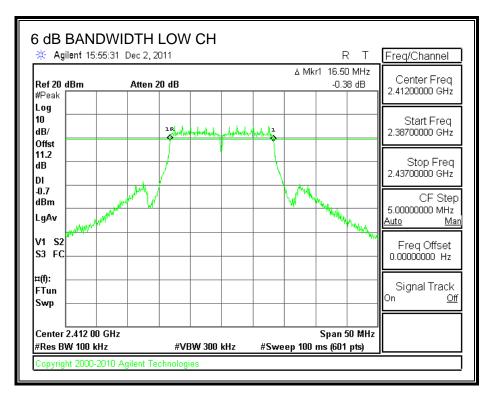
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

Channel	Frequency	6 dB Bandwidth	Minimum Limit	
	(MHz)	(MHz)	(MHz)	
Low	2412	16.50	0.5	
Middle	2437	16.50	0.5	
High	2462	16.08	0.5	

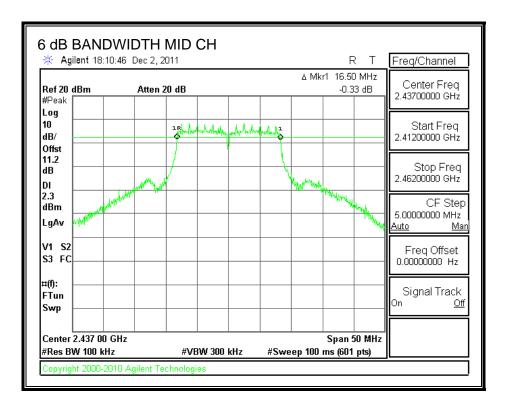
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6 dB BANDWIDTH



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🔆 Agilent 16	:31:54 Dec 2	, 2011					F		Freq/Channel
Ref 20 dBm #Peak	Atte	n 20 dB				∆ Mk	r1 16.08 0.0	3 MHz)9 dB	Center Freq 2.46200000 GHz
Log 10 dB/ Offst			min	philula	1 P				Start Freq 2.43700000 GHz
11.2 dB	Luk								Stop Freq 2.48700000 GHz
2.3 dBm LgAv	physical and a second sec	af /				'W ^{III'''''} ''	NVILLAND CO	YMAN	CF Step 5.00000000 MHz <u>Auto Mar</u>
V1 S2 S3 FC									Freq Offset 0.00000000 Hz
¤(f): FTun Swp									Signal Track On <u>Off</u>
Center 2.462 0 #Res BW 100 k			3W 300	kH7	#Sw/0	en 100	Span 5 ms (601		

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7.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

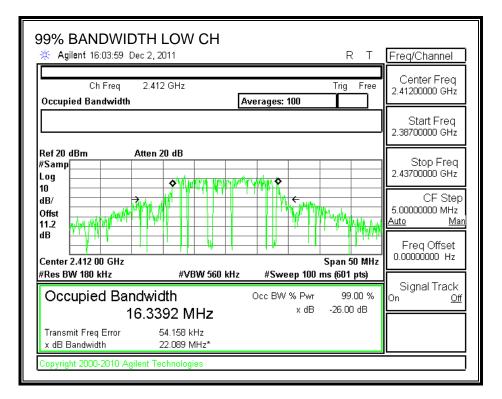
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

Channel	Frequency	99% Bandwidth
	(MHz)	(MHz)
Low	2412	16.3392
Middle	2437	16.2894
High	2462	16.3859

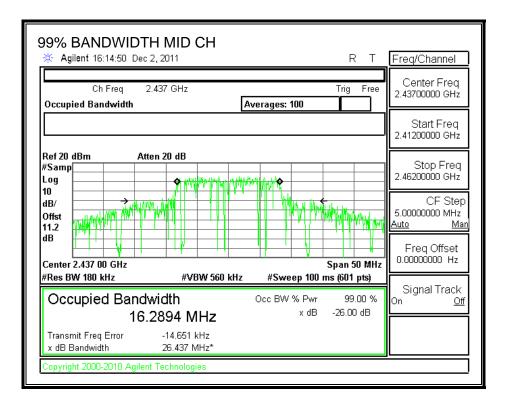
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99% BANDWIDTH

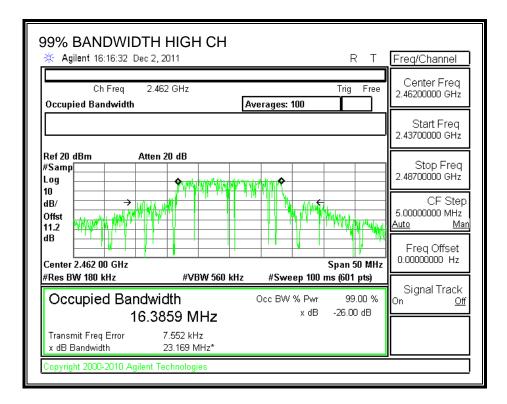


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7.1.3. OUTPUT POWER

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

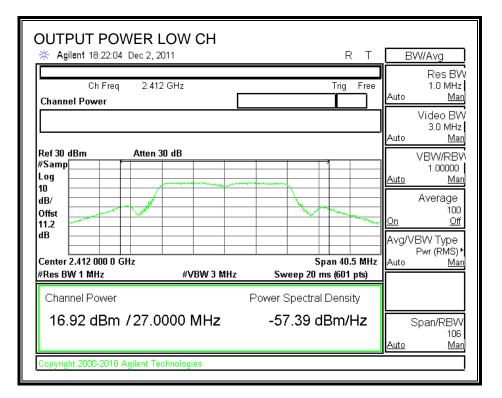
Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

RESULTS

Channel	Frequency	Peak Power	Limit	Margin
		Reading		
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	16.92	30	-13.08
Middle	2437	19.44	30	-10.56
High	2462	17.92	30	-12.08

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OUTPUT POWER



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OUTPUT POWER MID CH	R T	BW/Avg
Ch Freq 2.437 GHz Channel Power	Trig Free	Res BW 1.0 MHz Auto <u>Man</u>
Ref 30 dBm Atten 30 dB		Video BW 3.0 MHz Auto <u>Man</u> VBW/RBW
#Samp Log 10 dB/		1.00000 <u>Auto Man</u> Average
Offst 11.2 dB		On Off Avg/VBW Type Pwr (RMS) •
Center 2.437 000 0 GHz #Res BW 1 MHz #VBW 3	Span 40.5 MHz MHz Sweep 20 ms (601 pts)	Auto <u>Man</u>
Channel Power 19.44 dBm /27.0000 MHz	Power Spectral Density -54.87 dBm/Hz	Span/RBW 106 <u>Auto Man</u>
Copyright 2000-2010 Agilent Technologies		

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OUTPUT POWER HIGH CH	BW/Avg
	Res BW 1.0 MHz Auto <u>Man</u> Video BW 3.0 MHz
Ref 30 dBm Atten 30 dB #Samp	Auto <u>Man</u> VBW/RBV 1.00000 <u>Auto Man</u> Average 100 <u>On Off</u> Avg/VBW Type Pwr (RMS) • Auto Man
#Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (601 pts) Channel Power Power Spectral Density 17.92 dBm / 27.0000 MHz -56.39 dBm/Hz	Span/RBW 106 Auto Man
L Copyright 2000-2010 Agilent Technologies	

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7.1.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11.18 dB (including 10 dB pad and 1.18 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Power
	(MHz)	(dBm)
Low	2412	15.47
Middle	2437	19.06
High	2462	17.75

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7.1.5. 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

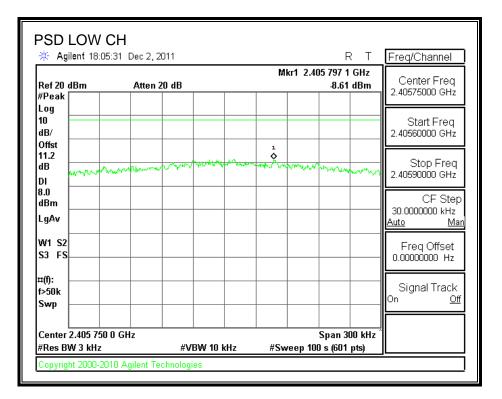
Output power was measured based on the use of a peak measurement, therefore the power spectral density was measured using PSD Option 1 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

<u>RESULTS</u>

Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-8.61	8	-16.61
Middle	2437	-5.50	8	-13.50
High	2462	-6.98	8	-14.98

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POWER SPECTRAL DENSITY



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A A A A A A A A A A A A A A A A A A A	7:33 Dec 2, 2011		Freq/Channel		
Ref 20 dBm #Peak	Atten 20 dB		Mkr1 2.4	34 135 1 GHz -5.50 dBm	Center Freq 2.43420000 GHz
Log 10 dB/					Start Freq 2.43405000 GHz
Offst 11.2 dB	man man Amaria	more	mennin	an marked and the	Stop Freq 2.43435000 GHz
8.0 dBm LgAv					CF Step 30.0000000 kHz <u>Auto Ma</u> i
W1 S2 S3 FS					Freq Offset 0.00000000 Hz
¤(f): f>50k Swp					Signal Track On <u>Off</u>
Center 2.434 200 #Res BW 3 kHz		/BW 10 kHz	#Sweep 10	Span 300 kHz [°] 0 s (601 pts)	

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🔆 Agi	Mkr1 2.455 797 6 GHz									Freq/Cha	
Ref 20 dBm A #Peak		Atten	utten 20 dB			-6.98 dBm			Center 2.4557500		
Log 10 dB/										Start 2.4556000	
Offst 11.2 dB	man	Lugher Varmont	- March	hand	nt lan	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	~~~~~~	m	un	Stop 2.4559000	Freq
DI 8.0 dBm											F Step
LgAv										30.000000 <u>Auto</u>	юкни <u>Mai</u>
W1 S2 S3 FS										Freq C 0.0000000)ffset)0 Hz
¤(f): f>50k Swp										Signal [*] On	Track <u>Off</u>
	2.455 750 I N 3 kHz	0 GHz		/ /BW 10			/eep 10(Span 3			

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7.1.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dB.

TEST PROCEDURE

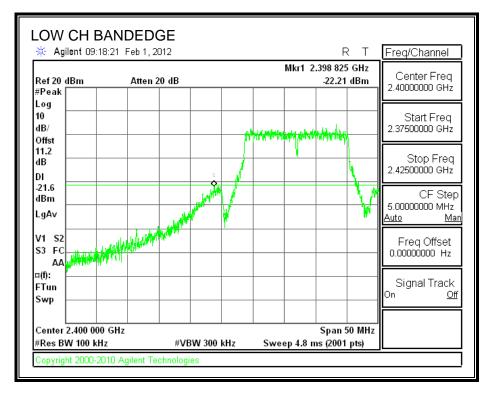
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

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RESULTS

SPURIOUS EMISSIONS, LOW CHANNEL



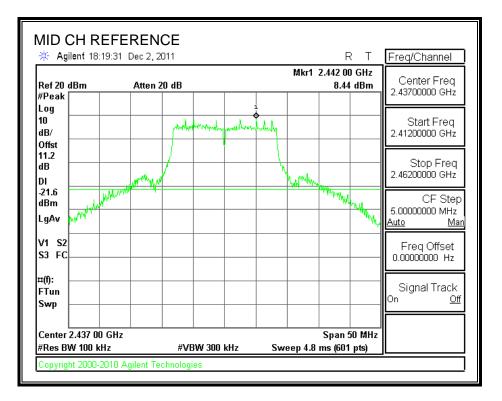
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Agriefit 05.21	:07 Feb 1, 2012			R T	Freq/Channel
Ref 20 dBm #Peak	Atten 20 dB	1	Mki	r1 23.611 GHz -52.66 dBm	Center Freq 13.0150000 GHz
Log					
10 dB/ Offst					Start Freq 30.0000000 MHz
dB					Stop Freq
					26.000000 GHZ
-21.6 dBm LgAv					CF Step 2.59700000 GHz
					Auto <u>Ma</u>
V1 S2 S3 FC				1 1	Freq Offset 0.00000000 Hz
AA ¤(f):	March March	LA BURNELING	-]
FTun Swp					Signal Track On <u>Of</u>
Start 30 MHz			Ste	op 26.000 GHz	ļ

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SPURIOUS EMISSIONS, MID CHANNEL



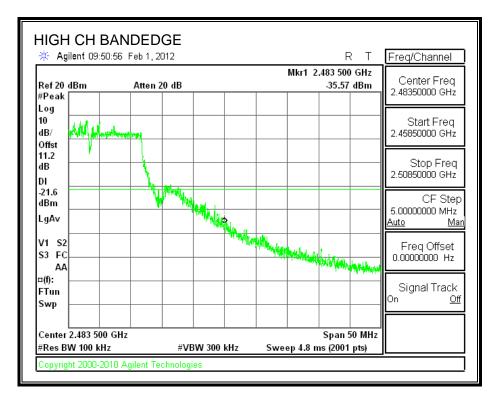
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🔆 Agilen	t 18:20:34	Dec 2, 2011				F		Marker
Ref 20 dBı #Peak	n	Atten 20 d	IB		Mkr	3 25.11 -49.99		Select Marker 1 2 <u>3</u>
Log 10 dB/ Offst								Marker Trace <u>Auto 1</u> 2
11.2 dB DI 1		2					3	Readout Frequency
-21.6 or dBm dBm dBm dBm dBm dBm dBm dBm dBm dBm			Superior Constrainty and any other	man have a free		"Utrysource	Ny North	Marker Table <u>On O</u>
Start 30 M #Res BW 1			#VBW 300 kHz	Swee	Sto p 2.482 s	p 26.00 s (1001		Marker All Off
Marker 1 2 3	Trace (1) (1) (1)	Type Freq Freq Freq	X Axis 809 M 7.302 G 25.117 G	Hz	-	Amplitu 54.34 dB 52.50 dB 49.99 dB	m m	
								Mor 2 of 2

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SPURIOUS EMISSIONS, HIGH CHANNEL



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Ref 20 dBn #Peak	n	Atten 20 d	в			Mkr	2 15.63 -53.87		Center F 13.0150000	
Log 10 dB/									Start F 30.0000000	
Offst 11.2 dB DI		1			2				Stop 26.0000000	
-21.6 dBm LgAv	, A strength		ta ji a ta a ta	La platitude and a			un de la composition		CF 2.59700000 <u>Auto</u>	: Step I GHz <u>Ma</u>
Start 30 MI #Res BW 1	00 kHz		#VBW 300		Swee	Sto p 2.482 s	``	pts)	Freq 01	ffset) Hz
Marker 1 2	Trace (1) (1)	Type Freq Freq	7	X Axis .392 GHz 638 GHz			Amplitu 51.81 dB 53.87 dB	m	Signal T On	rack <u>Of</u>
									On	0

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7.2. 802.11b CDD 3TX 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

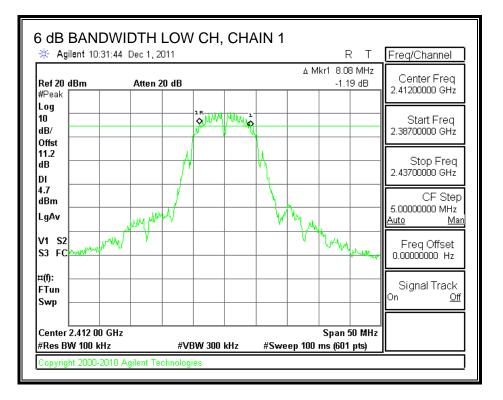
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

Channel	Frequency	Chain 1	Chain 2	Chain 3	Minimum Limit
		6 dB BW	6 dB BW	6 dB BW	
	(MHz)	(MHz)	(MHz)	(MHz)	(MHz)
Low	2412	8.08	8.08	8.58	0.5
Middle	2437	8.08	8.58	8.08	0.5
High	2462	8.58	8.08	8.08	0.5

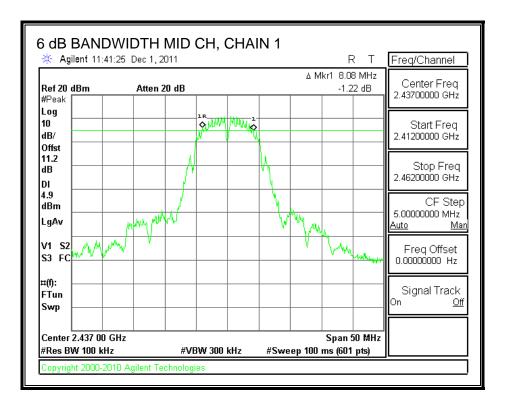
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6 dB BANDWIDTH, CHAIN 1



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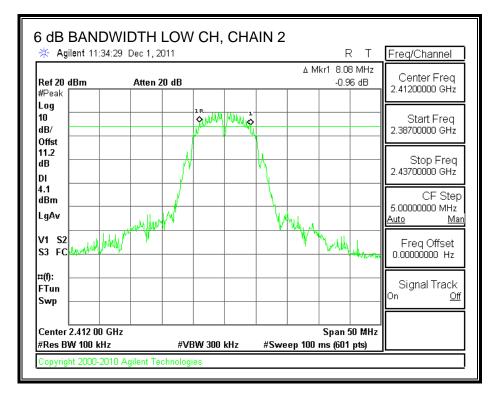


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🔆 Agilent 14:41	1:07 Dec 2, 2011			RT	Freq/Channel
Ref 20 dBm #Peak	Atten 20 dB		∆ Mk	r1 8.08 MHz -1.41 dB	Center Freq 2.46200000 GHz
Log 10 dB/					Start Freq 2.43700000 GHz
Offst 11.2 dB DI			N.		Stop Freq 2.48700000 GHz
5.0 dBm LgAv	Mary Mary				CF Step 5.00000000 MHz Auto Man
V1 S2 S3 FC			- V W	Whenes	Freq Offset 0.00000000 Hz
¤(f): FTun Swp					Signal Track On <u>Off</u>
Center 2.462 00 (#Res BW 100 kH;		BW 300 kHz		Span 50 MHz	

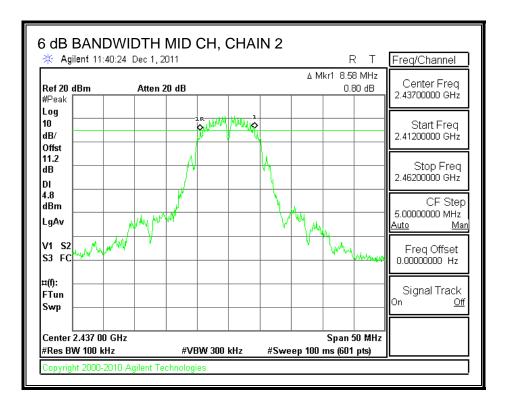
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6 dB BANDWIDTH, CHAIN 2

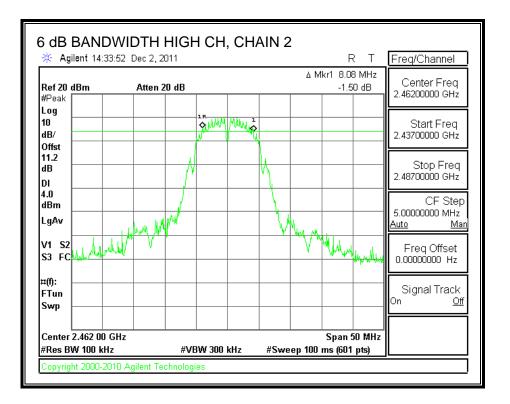


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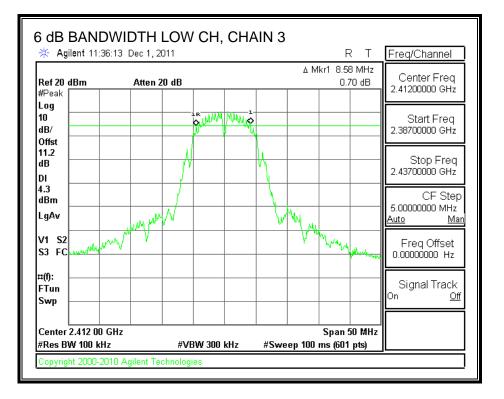


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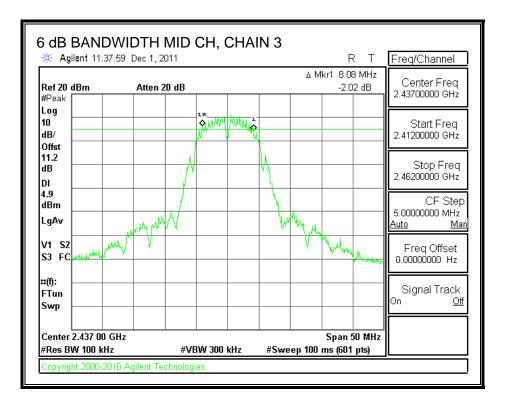
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6 dB BANDWIDTH, CHAIN 3



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🔆 Agilent 14:22:	31 Dec 2, 2011			RT	Freq/Channel
Project: Ref 20 dBm #Peak	Atten 20 dB		۸ MI	<r1 8.08="" mhz<br="">-1.98 dB</r1>	Center Freq 2.46200000 GHz
Log 10 dB/ Offst					Start Freq 2.43700000 GHz
11.2 dB DI	/		\mathbb{N}		Stop Freq 2.48700000 GHz
4.6 dBm LgAv	and mint		Junuary mark		CF Step 5.0000000 MHz <u>Auto Man</u>
LgAv V1 S2 S3 FC	m\/ V		V V	Windows	Freq Offset 0.00000000 Hz
¤(f): FTun Swp					Signal Track On <u>Off</u>
Center 2.462 00 G #Res BW 100 kHz		3W 300 kHz	#Sweep 100 r	Span 50 MHz ns (601 nts)	

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7.2.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

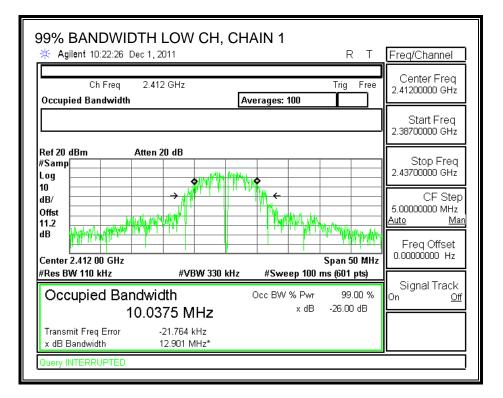
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

Channel	Frequency	Chain 1	Chain 2	Chain 3
		99% Bandwidth	99% Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)	(MHz)
Low	2412	10.0375	10.0152	10.1141
Middle	2437	10.2954	10.1634	10.0702
High	2462	10.0775	10.0496	10.0294

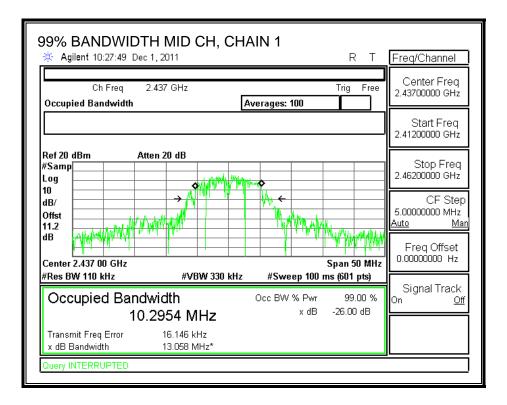
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99% BANDWIDTH, CHAIN 1

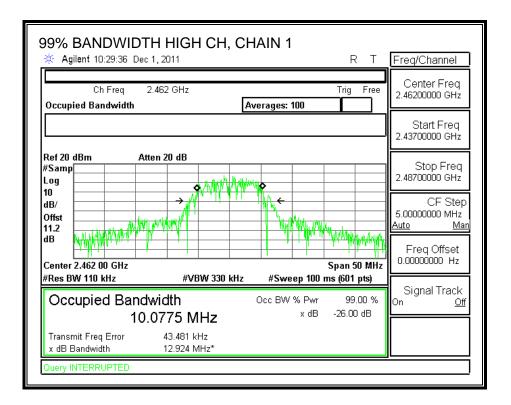


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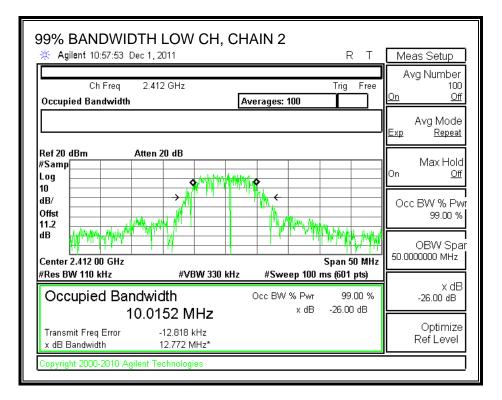


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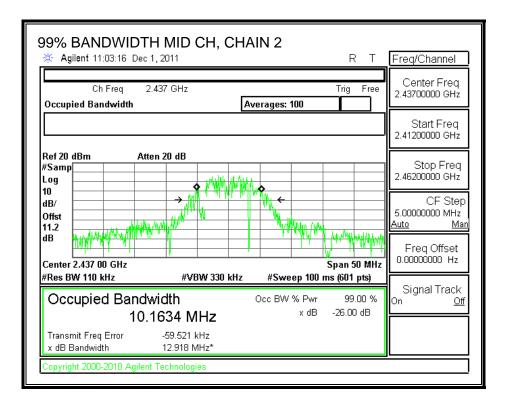
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99% BANDWIDTH, CHAIN 2

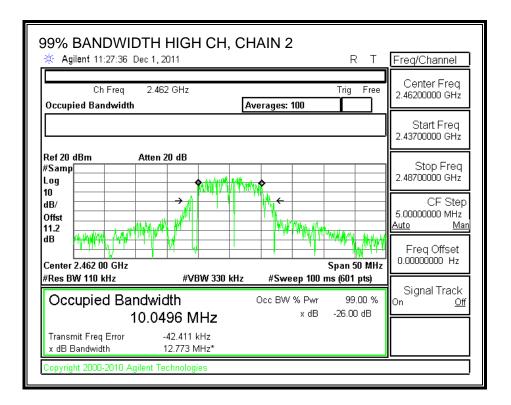


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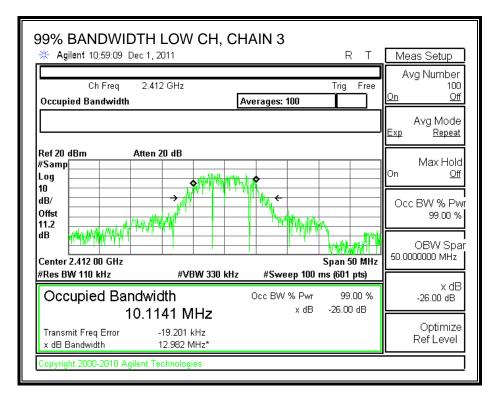


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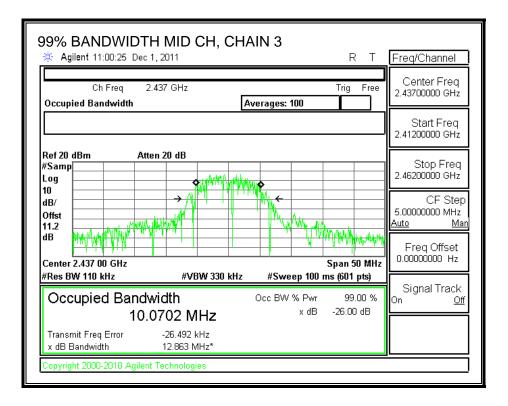
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99% BANDWIDTH, CHAIN 3

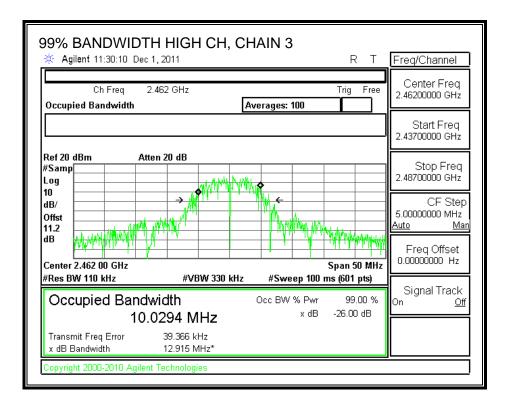


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7.2.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

Antenna Gain	Antenna Gain	Antenna Gain	Effective Legacy
(Chain 1)	(Chain 2)	(Chain 3)	Gain
(dBi)	(dBi)	(dBi)	(dBi)
1.42	4.97	3.93	8.45

The maximum effective legacy gain is 8.45 dBi for other than fixed, point-to-point operations, therefore the limit is 27.55 dBm.

TEST PROCEDURE

Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

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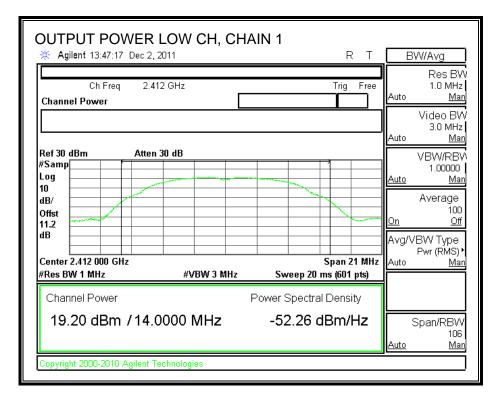
RESULTS

Channel	Frequency	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		PK Power	PK Power	PK Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	19.20	18.76	18.52	23.61	27.55	-3.94
Mid	2437	19.27	18.76	18.95	23.77	27.55	-3.78
High	2462	19.05	18.65	18.80	23.61	27.55	-3.94

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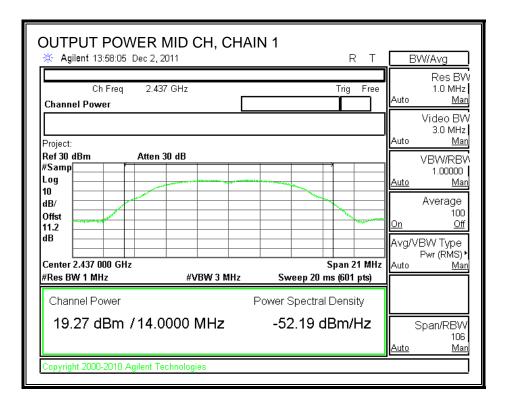
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CHAIN 1 OUTPUT POWER



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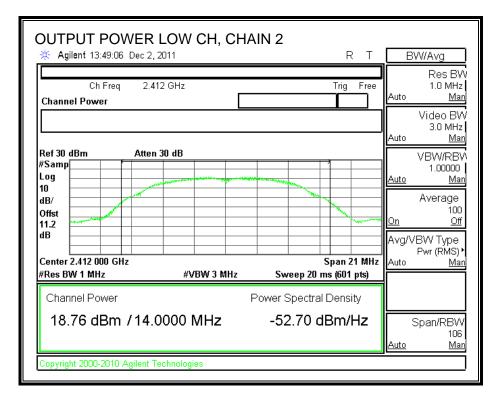


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✤ Agilent 14:00:05 Dec 2, 20	111	R T	BW/Avg Res BV
Ch Freq 2.462 Channel Power	GHz	Trig Fre	
Project:			Video BV 3.0 MHz Auto <u>Mar</u>
Ref 30 dBm Atten 3 #Samp Log	D dB		VBW/RBV 1.00000 <u>Auto Mar</u>
10 dB/ Offst 11.2			Average 100 <u>On Off</u>
dB		Span 21 MH	Avg/VBW Type Pwr (RMS) • Iz Auto Man
#Res BW 1 MHz	#VBW 3 MHz	Sweep 20 ms (601 pts)	
Channel Power	F	Power Spectral Density	
19.05 dBm /14.00	000 MHz	-52.41 dBm/Hz	Span/RBW 106 Auto Mar

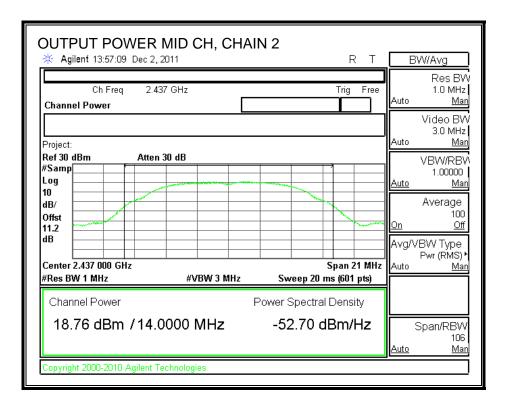
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CHAIN 2 OUTPUT POWER



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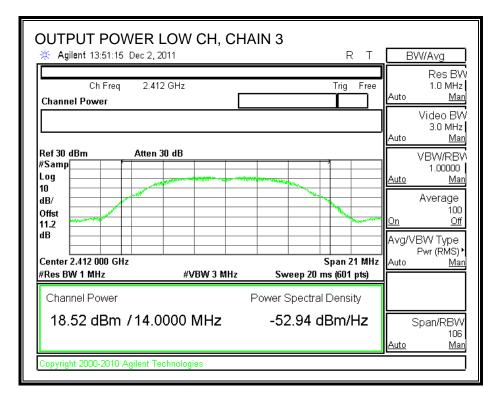


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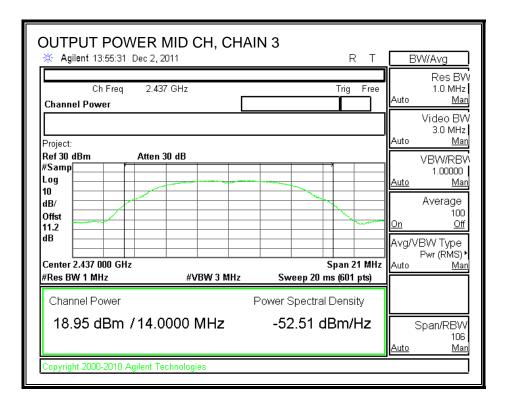
Agilent 14:02:31 Dec 2, 2011		R		3W/Avg
Ch Freq 2.462 GH Channel Power	z	Trig F	ree Auto	Res BV 1.0 MHz <u>Man</u>
Project:		•	Auto	Video BW 3.0 MHz <u>Man</u>
Ref 30 dBm Atten 30 dE #Samp	3		Auto	VBW/RBV 1.00000 <u>Man</u>
dB/ Offst 11.2			<u>On</u>	Average 100 <u>Off</u>
dB		•	AHz Auto	/BW Type Pwr (RMS) ► <u>Man</u>
#Res BW 1 MHz Channel Power	#VBW 3 MHz	Sweep 20 ms (601 pt Power Spectral Density	<u>;)</u>	
18.65 dBm /14.000			Z Auto	Span/RBW 106 Man

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CHAIN 3 OUTPUT POWER



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Agilent 14:03:49 Dec 2, 2011		R		3W/Avg
Ch Freq 2.462 GHz	:	Trig Fr	ree Auto	Res BW 1.0 MHz <u>Man</u>
Project:			Auto	Video BW 3.0 MHz <u>Man</u>
Ref 30 dBm Atten 30 dB #Samp			Auto	VBW/RBV 1.00000 <u>Man</u>
dB/ Offst 11.2			<u>On</u>	Average 100 <u>Off</u>
dB	#VBW 3 MHz	Span 21 M Sweep 20 ms (601 pts	IHz Auto	VBW Type Pwr (RMS)∙ <u>Man</u>
Channel Power		Power Spectral Density	<u>, </u>	
18.80 dBm /14.0000) MHz	-52.66 dBm/Hz	Auto	Span/RBW 106 Man

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7.2.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11.18 dB (including 10 dB pad and 1.18 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Chain 1 Power	Chain 2 Power	Chain 3 Power	Total Power
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)
Low	2412	19.01	18.44	18.57	23.45
Middle	2437	19.05	18.61	18.75	23.58
High	2462	19.03	18.44	18.59	23.47

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7.2.5. 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.

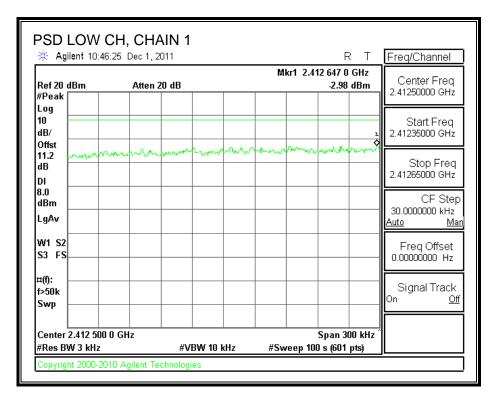
TEST PROCEDURE

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	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		PSD	PSD	PSD	PSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	-2.98	-4.22	-2.73	1.51	8	-6.49
Middle	2437	-0.89	-1.38	-1.24	3.61	8	-4.39
High	2462	-2.14	-2.85	-3.06	2.11	8	-5.89

POWER SPECTRAL DENSITY, CHAIN 1



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🔆 Agilent 1	1:50:17 D	ec 1, 2011							₹ T	Freq/Channel
Ref 20 dBm #Peak		Atten 20 d	B			MI	a1 2.43		GHz dBm	Center Freq 2.43625000 GHz
Log 10 dB/ Offst		mum								Start Freq 2.43610000 GHz
dB	manan		Karnava	1.90	V4, ∧, UP ¹ 04	rw	•~~~ ~			Stop Freq 2.43640000 GHz
DI 8.0 dBm										CF Step 30.000000 kHz
LgAv										Auto Mar
W1 S2 S3 FS										Freq Offset 0.00000000 Hz
¤(f): f>50k Swp										Signal Track On <u>Off</u>
Center 2.436 2 #Res BW 3 kt			#VBW	10 647		#5	eep 100	Span 30		

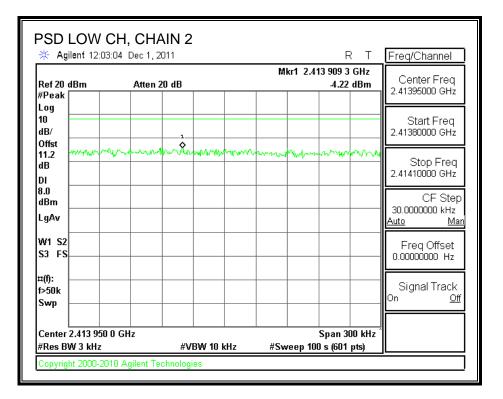
COMPLIANCE CERTIFICATION SERVICES (UL CCS)FORM NO: CCSUP4701D47173 BENICIA STREET, FREMONT, CA 94538, USATEL: (510) 771-1000FAX: (510) 661-0888This report shall not be reproduced except in full, without the written approval of UL CCS.

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🔆 Agile	nt 14:44:35	Dec 2, 201	1						t T	Freq/Channel
Ref 20 dE #Peak	3m	Atten 20	0 dB			Mkr1 2.461 412 9 GHz -2.14 dBm				Center Freq 2.46145000 GHz
Log 10 dB/ Offst			1							Start Freq 2.46130000 GHz
11.2 dB DI	- AMALAN		- Alan	~~~~~	**	mar Martha	~_^~~~	with	www	Stop Freq 2.46160000 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	461 450 0 G 3 kHz	Hz	#\/P\	V 10 kH;	7	#\$	eep 100	Span 30 1 s <i>(</i> 601		

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POWER SPECTRAL DENSITY, CHAIN 2



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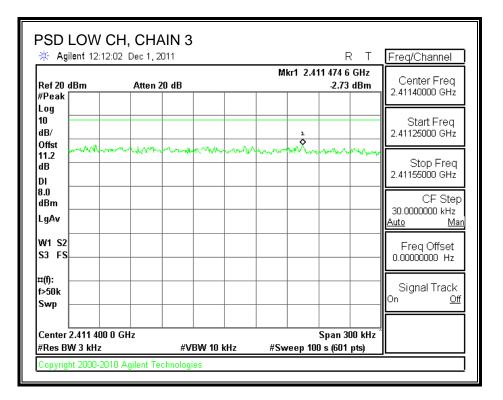
🔆 Agilent 14:5	7:37 Dec 2, 2011			RT	Freq/Channel
Ref 20 dBm #Peak	Atten 20 dB		Mkr1 2.4	36 230 6 GHz -1.38 dBm	Center Freq 2.43630000 GHz
Log 10 dB/ Offst	1 •				Start Freq 2.43615000 GHz
11.2 dB	marina	May Markan	how have a second	mm	Stop Freq 2.43645000 GHz
DI 8.0 dBm					CF Step 30.0000000 kHz
LgAv					Auto Mar
W1 S2 S3 FS					Freq Offset 0.00000000 Hz
¤(f): f>50k Swp					Signal Track On <u>Off</u>
Center 2.436 300 #Res BW 3 kHz		VBW 10 kHz	#Sween 10	Span 300 kHz [°] 0 s (601 pts)	

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🔆 Agi	ient 14:	37:12 l	Jec 2, 2	UTI					F	· ·	Freq/Channel
Ref 20 (#Peak	dBm		Atten 2	20 dB			M	kr1 2.46		GHz dBm	Center Freq 2.46295000 GHz
Log 10 dB/ Offst			1								Start Freq 2.46280000 GHz
11.2 dB DI	maria	mm.	an the	m	min	www.	mond	Myhann	and here are	หา/งงงง	Stop Freq 2.46310000 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 : #Res B)	2.462 95 N 3 kHz		z	#V	BW 10 I	(H ₂	#5.00	reep 100	Span 30		

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POWER SPECTRAL DENSITY, CHAIN 3



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over Agili	and 15:08:5	51 Dec 2,2	UT					-	₹ T	Freq/Channel
Ref 20 d #Peak ∏	Bm	Atten 2	20 dB			M	kr1 2.43		GHz dBm	Center Freq 2.43775000 GHz
Log 10 dB/ Offst					A	1				Start Freq 2.43760000 GHz
11.2 dB	Martinon	mm	- Min	V~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	mon	W-010-06	nunn	jan dan	nanamu	Stop Freq 2.43790000 GHz
DI 8.0 dBm										CF Step 30.0000000 kHz
LgAv										<u>Auto Mar</u>
W1 S2 S3 FS										Freq Offset 0.00000000 Hz
¤(f): - f>50k Swp -										Signal Track On <u>Off</u>
	.437 750 0 (3 kHz	GHz	#1	BW 10 F	(H ₂	#5.		Span 3		

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	ent 14:27:2	0 Det 2,2	.011					F		Freq/Channel
Project: Ref 20 di #Peak ∏	Bm	Atten	20 dB			M	kr1 2.46	52 608 8 -3.06		Center Freq 2.46255000 GHz
Log 10 dB/ Offst						1				Start Freq 2.46240000 GHz
11.2 m dB DI	white	water	- man	phildhead	Arrow .	www.w	-	~~~~	**********	Stop Freq 2.46270000 GHz
8.0 dBm LgAv										CF Step 30.0000000 kHz <u>Auto Mar</u>
W1 S2 S3 FS AA										Freq Offset 0.00000000 Hz
¤(f): f>50k Swp –										Signal Track On <u>Off</u>
Center 2 #Res BW	.462 550 0	GHz	#1	BW 10 F	<u>"</u> на	#5	/eep 100	Span 30 5 c /601		

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7.2.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dB.

TEST PROCEDURE

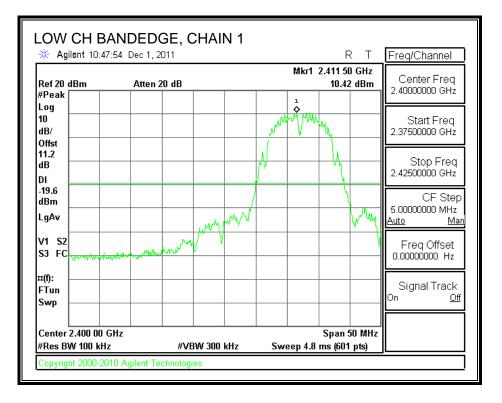
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

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RESULTS

CHAIN 1 SPURIOUS EMISSIONS

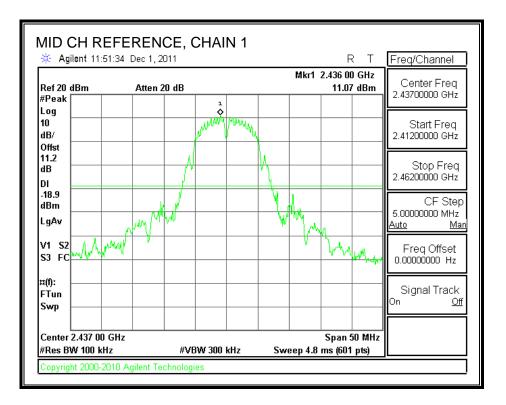


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🔆 Agilent	10:49:22	Dec 1, 20	11				F		Marker
Ref 20 dBm #Peak		Atten 20	dB			Mkr	3 12.05 -51.99		Select Marker
10									Marker Trace
Offst									
11.2	_								Readout
dB		2							Frequency
DI <u>1</u> -19.6 ♦	_ _	^							
dBm	Alerana	Harry Marrie	And Round	And a	denters they	194 48 + 3 + ¹¹ 19 + 4	and the second	14 m m	Marker Table
LgAv									<u>On Off</u>
Start 30 MH	-						p 26.00	0 CH2	
#Res BW 10	-		#VBW 30	10 kHz	Swee	p 2.482 :	-		Marker All Off
Marker	Trace	Туре		X Axis	UNUU	PLITEL	Amplitu		
1	(1)	Freq		809 MHz			-54.94 dB		
2	(1)	Freq		4.834 GHz			-46.58 dB		
3	(1)	Freq	1	2.054 GHz			-51.99 dB	m	
									More
									2 of 2

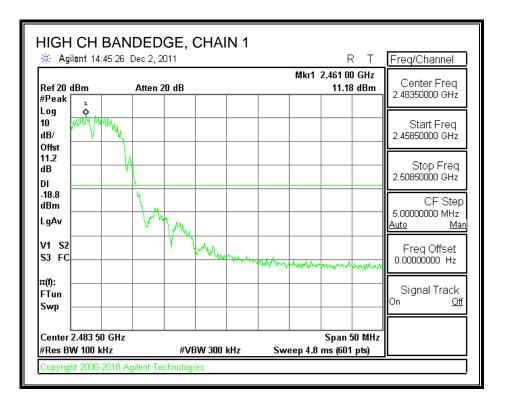
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🔆 Agilen	f 11:53:18	Dec 1, 201	11				F		Marker
Ref 20 dBı #Peak	m	Atten 20	dB			Mkr	3 25.19 -49.69		Select Marker 1 2 <u>3</u> 4
Log 10 dB/ Offst									Marker Trace Auto 1 2 3
11.2 dB DI 1 -18.9 ♦		2						3	Readout Frequency
dBm		A constraints	etter al and a set	adard and and	278-8811-1-4-1 ²⁴ -1-4-1	an a	للديميديية		Marker Table <u>On Off</u>
Start 30 M							p 26.00		
#Res BW 1		-	#VBW	300 kHz	Swee	p 2.482 s		· ·	Marker All Off
Marker 1	Trace (1)	Type Freq		X Axis 809 MHz	<u>.</u>		Amplitu 53.22 dB		
2 3	(1) (1)	Freq Freq		4.886 GHz 25.195 GHz			48.81 dB 49.69 dB		
									More 2 of 2

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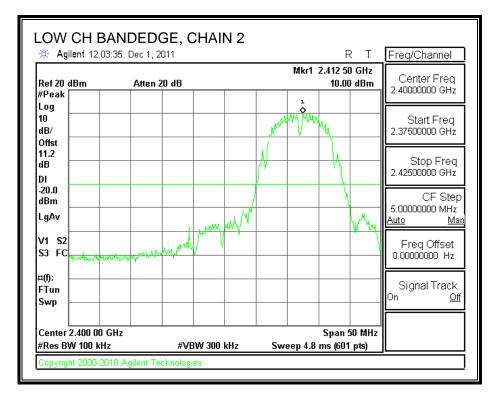


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🔆 Agilent	14:46:47	Dec 2, 201	1				R		Marker
Ref 20 dBn #Peak	1	Atten 20	dB		1	Mkr	4 23.507 -48.89		Select Marker
				_					
10									Marker Trace <u>Auto 1</u> 23
Offst 11.2 dB									Readout , Frequency
DI 1 -18.8	1		ALL	and the second	and the state of	ويغلوه ومعاد	mar and	2 Aur Va	Marker Table
dBm 🙀									<u>On</u> <u>Off</u>
Start 30 MH	lz					Sto	p 26.000	GHz	
#Res BW 1	00 kHz		#VBW 300) kHz	Swee	p 2.482 s	s (1001 p	ots)	Marker All Off
Marker	Trace	Туре		X Axis			Amplitu		
1	(1)	Freq		809 MHz			51.49 dBr		
2	(1)	Freq		.912 GHz .380 GHz			49.96 dBr 49.69 dBr		
4	(1) (1)	Freq Freq		.380 GHZ .507 GHz			49.69 dBr 48.89 dBr		
									More
									2 of 2

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CHAIN 2 SPURIOUS EMISSIONS

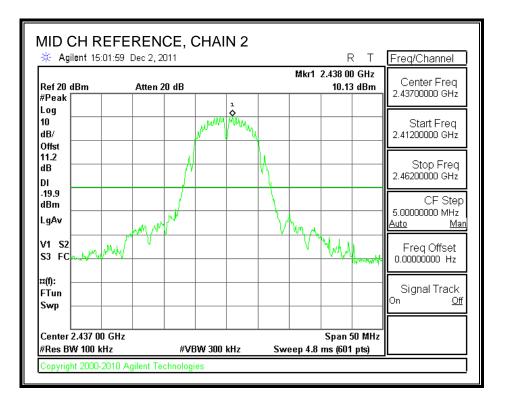


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🔆 Agilent	: 12:04:45	Dec 1, 201	1					<u>ст</u>	Marker
Ref 20 dBn #Peak	n	Atten 20	dB			Mkr	3 25.11 49.38		Select Marker 1 2 <u>3</u> 4
Log 10 dB/ Offst									Marker Trace Auto 1 2 3
11.2 dB DI ¹ -20.0	2							3	Readout Frequency
dBm	¥ 14	and the second second second second	an same			endorre en el	Alter Anteritorial	~~~	Marker Table <u>On Off</u>
Start 30 MH #Res BW 1			#VBW 300) kHz	Swee	Sto 2.482 :	p 26.00 s (1001		Marker All Off
Marker 1 2 3	Trace (1) (1) (1)	Type Freq Freq Freq	1	X Axis 809 MHz .614 GHz .117 GHz			Amplitu 50.65 dB 53.47 dB 49.38 dB	m m	
									More 2 of 2

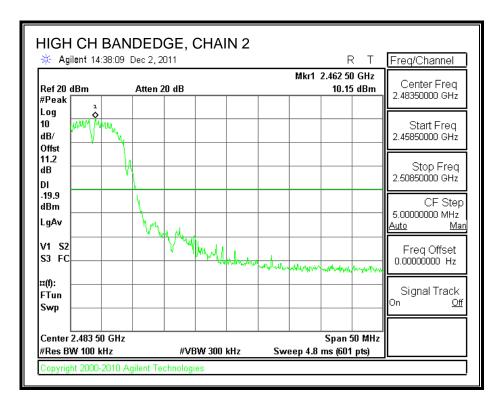
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🔆 Agilen	t 15:03:35	Dec 2, 2011			RT	Marker
Ref 20 dBı #Peak	m	Atten 20 d	1B	Mk	r4 25.091 GHz -48.41 dBm	Select Marker
Log 10 dB/ Offst						Marker Trace
11.2 dB	2					Readout , Frequency
-19.9 dBm		Patron Labor Tarte	Same and the second second	192. Historika an minika a Mi	m	Marker Table
LgAv 📙						<u>On Off</u>
Start 30 M	Hz		· ·	St	op 26.000 GHz	
#Res BW '	100 kHz		#VBW 300 kHz	Sweep 2.482	s (1001 pts)	Marker All Off
Marker	Trace	Туре	X Axis		Amplitude	
	(1) (1)	Freq Freq	809 MH: 2,186 GH:		-49.57 dBm -45.46 dBm	
3	(1)	Freq	23.455 GHz		-50.54 dBm	
4	(Ť)	Freq	25.091 GHz		-48.41 dBm	
						More
						2 of 2

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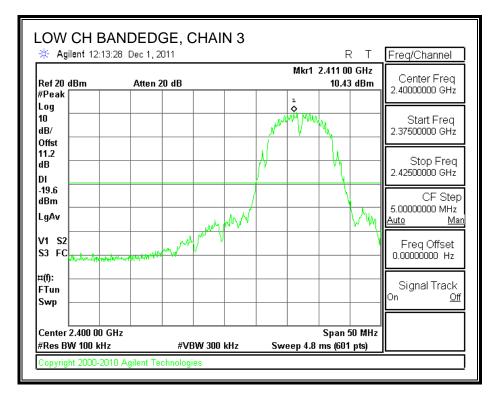


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🔆 Agilen	t 14:39:52	Dec 2, 2011			RT	Marker
Ref 20 dBı #Peak	m	Atten 20 d	B	Mkr	4 25.247 GHz -50.03 dBm	Select Marker
Log 10 dB/ Offst						Marker Trace Auto 1 2 3
11.2 dB DI 0	23				4 	Readout , Frequency
-19.9 dBm + LgAv -	J.h.	and a second	and a solution of the solution	I and a second the second s		Marker Table <u>On Off</u>
Start 30 M	Hz			Sto	op 26.000 GHz	
#Res BW 1	100 kHz		#VBW 300 kHz	Sweep 2.482	s (1001 pts)	Marker All Off
Marker 1 2 3 4	Trace (1) (1) (1) (1)	Type Freq Freq Freq Freq	X Axis 809 MHz 1.640 GHz 2.108 GHz 25.247 GHz		Amplitude -48.83 dBm -49.04 dBm -45.51 dBm -50.03 dBm	
						More 2 of 2

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CHAIN 3 SPURIOUS EMISSIONS

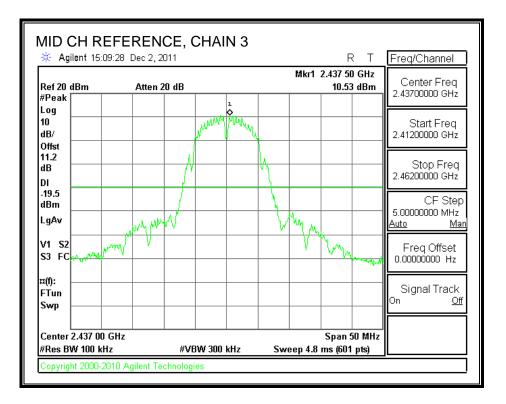


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🔆 Agilen	it 12:14:54	Dec 1, 2011			RT	Marker
Ref 20 dBı #Peak 🗌	m	Atten 20 d	B	Mkr	4 25.013 GHz _48.86 dBm	Select Marker 1 2 3 <u>4</u>
Log 10 dB/ Offst						Marker Trace <u>Auto</u> 1 2 3
11.2 dB DI						Readout , Frequency
-19.6 dBm LgAv		and the second	and the other of the second	set-manager and the set of the se	have the the	Marker Table <u>On Off</u>
Start 30 M	Hz			Sto	p 26.000 GHz	
#Res BW 1	100 kHz		#VBW 300 kHz	Sweep 2.482	s (1001 pts)	Marker All Off
Marker 1 2 3 4	Trace (1) (1) (1) (1)	Type Freq Freq Freq Freq	X Axis 809 MHz 4.834 GHz 7.250 GHz 25.013 GHz		Amplitude -56.88 dBm -50.21 dBm -51.86 dBm -48.86 dBm	
						More 2 of 2

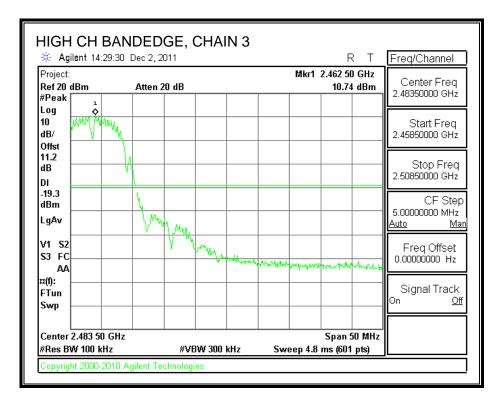
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🔆 Agilen	it 15:11:51	Dec 2, 201	1		RT	Marker
Ref 20 dBı #Peak 🗌	m	Atten 20	dB		1 4.886 GHz -51.28 dBm	Select Marker 1 2 3 4
Log 10 dB/ Offst						Marker Trace <u>Auto 1 2 3</u>
11.2 dB DI					3_4	Readout , Frequency
-19.5 dBm	n Marine	al company sould be	and the second sec	1		Marker Table <u>On Off</u>
Start 30 M				•	26.000 GHz	
#Res BW *			#VBW 300 kHz	Sweep 2.482 s	· · ·	Marker All Off
Marker 1 2 3 4	Trace (1) (1) (1) (1)	Type Freq Freq Freq Freq	X Axis 4.886 GHz 7.302 GHz 23.585 GHz 25.065 GHz	-5 -4 -5	Amplitude 1.28 dBm 9.25 dBm 0.15 dBm 8.75 dBm	
						More 2 of 2

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🔆 Agilen	t 14:32:02	Dec 2, 201	11				R		Marker
Ref 20 dBı #Peak	m	Atten 20	dB			Mkr4 2	25.091 49.08		Select Marker 1 2 3 <u>4</u>
Log									Marker Trace
dB/									<u>Auto 1 2 3</u>
11.2 dB									Readout
DI 1 -19.3 Ø		2 ¢						\$	Frequency
dBm 🗼	- F 1	dimmenter a	and a second where	and a set of the set o	Artulyan (Ways)	and the second		~~~	Marker Table
LgAv									<u>On Off</u>
Start 30 M #Res BW 1			#VBW 300	1 64-	Sweep 2	•	26.000		Marker All Off
Marker	Trace	Туре		X Axis	Sweep	`	Amplitud	<u> </u>	
1	(1)	Freq		809 MHz			.96 dBr		
2	(1)	Freq		.912 GHz		-50	.71 dBm	•	
3	(1)	Freq		.380 GHz			.76 dBr	· .	
4	(1)	Freq	25	.091 GHz		-49	.08 dBn	י	
									More
									2 of 2

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7.3. 802.11n HT20 CDD 3TX MODE IN THE 2.4 GHz BAND

7.3.1. 6 dB BANDWIDTH

<u>LIMITS</u>

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

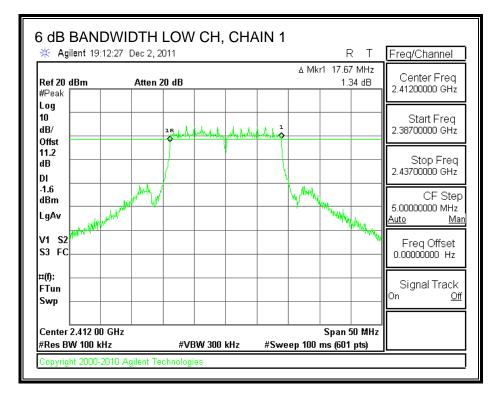
TEST PROCEDURE

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

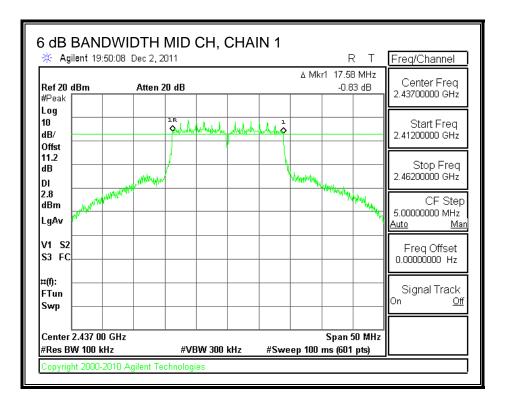
Channel	Frequency	Chain 1	Chain 2	Chain 3	Minimum Limit
		6 dB BW	6 dB BW	6 dB BW	
	(MHz)	(MHz)	(MHz)	(MHz)	(MHz)
Low	2412	17.67	17.67	17.67	0.5
Middle	2437	17.58	17.67	17.67	0.5
High	2462	17.25	16.33	17.00	0.5

6 dB BANDWIDTH, CHAIN 1

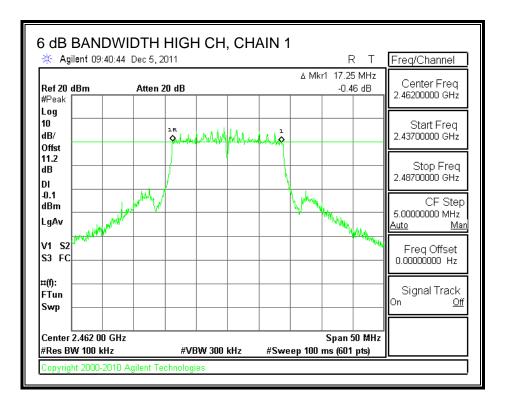


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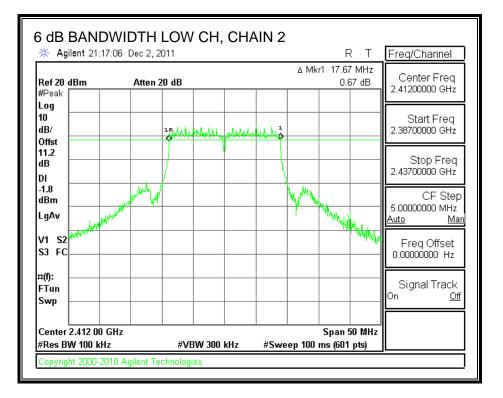


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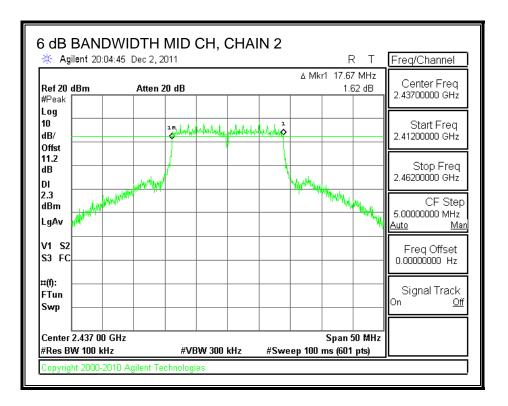
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6 dB BANDWIDTH, CHAIN 2



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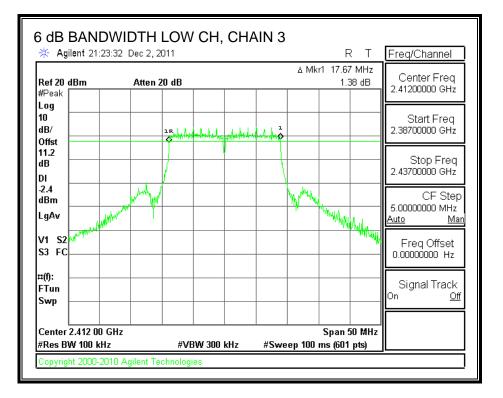


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🔆 Agilent 09:52:	34 Dec 5, 2011			RΤ	Freq/Channel
Ref 20 dBm #Peak	Atten 20 dB		∆ Mkr	1 16.33 MHz 0.66 dB	Center Freq 2.46200000 GHz
Log 10 dB/	lR Ø	and alan			Start Freq 2.43700000 GHz
11.2 dB DI					Stop Freq 2.48700000 GHz
0.3 dBm LgAv	and the second s		hyme	MWM I	CF Step 5.00000000 MHz <u>Auto Man</u>
LgAv V1 S2 S3 FC				Wink Antown May	Freq Offset 0.00000000 Hz
¤(f): FTun Swp					Signal Track On <u>Off</u>
Center 2.462 00 G #Res BW 100 kHz		3W 300 kHz	#Sweep 100 n	Span 50 MHz ns (601 pts)	

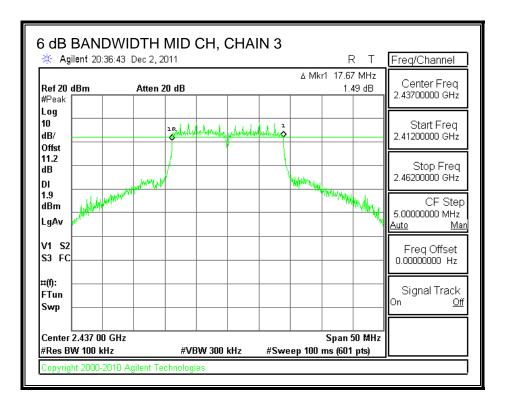
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6 dB BANDWIDTH, CHAIN 3



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🔆 Agilent 10:00:	23 Dec 5, 2011			RT	Freq/Channel
Ref 20 dBm #Peak	Atten 20 dB		∆ Mk	r1 17.00 MHz -1.37 dB	Center Freq 2.46200000 GHz
Log 10 dB/	lR Quinqle	a.n.A.d.M.a.w.	hul ha		Start Freq 2.43700000 GHz
11.2 dB DI					Stop Freq 2.48700000 GHz
0.4 dBm LgAv	and and a start of the start of		\\\\/^^\\\	Marine Walder	CF Step 5.0000000 MHz <u>Auto Man</u>
V1 S2 S3 FC					Freq Offset 0.00000000 Hz
¤(f): FTun Swp					Signal Track On <u>Off</u>
Center 2.462 00 G #Res BW 100 kHz		3W 300 kHz	#Sweep 100	Span 50 MHz ms (601 nts)	

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7.3.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

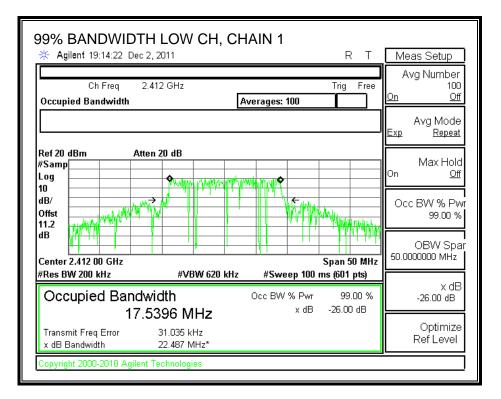
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

Channel	Frequency	Chain 1	Chain 2	Chain 3
		99% Bandwidth	99% Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)	(MHz)
Low	2412	17.5396	17.3706	17.5182
Middle	2437	17.7352	17.5780	17.6348
High	2462	17.2564	17.3091	17.2849

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99% BANDWIDTH, CHAIN 1

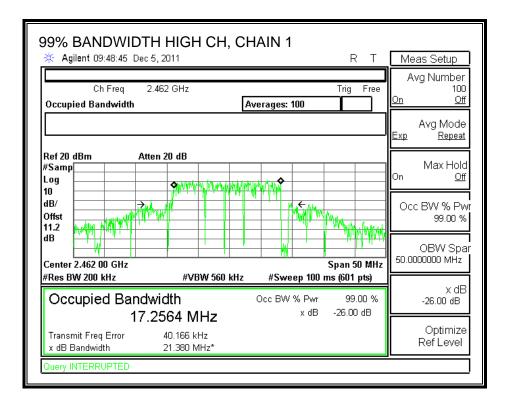


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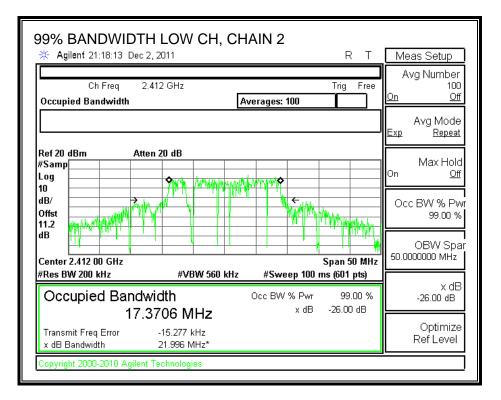
99% BANDWIDTH N	,	R T	Meas Setup
Ch Freq 2.437 (Occupied Bandwidth	GHz Averages: 100	Trig Free	Avg Number 100 <u>On Off</u>
Ref 20 dBm Atten 20	dB		Avg Mode <u>Exp Repeat</u>
#Samp	All we alwant and a structure		Max Hold On <u>Off</u>
dB/ Offst			Occ BW % Pwr 99.00 %
Center 2.437 00 GHz #Res BW 200 kHz	#VBW 620 kHz #Sweep 10	Span 50 MHz 10 ms (601 pts)	OBW Spar 50.0000000 MHz
Occupied Bandwidt 17.735	h Occ BW % Pv	/r 99.00 %	x dB -26.00 dB
Transmit Freq Error -18	2 19112 3.268 kHz .189 MHz*		Optimize Ref Level
Copyright 2000-2010 Agilent Tech	nologies		

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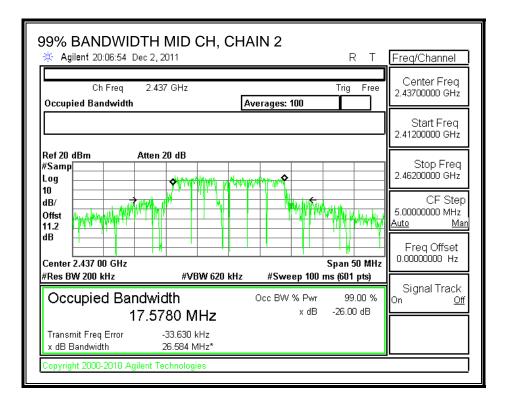
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99% BANDWIDTH, CHAIN 2

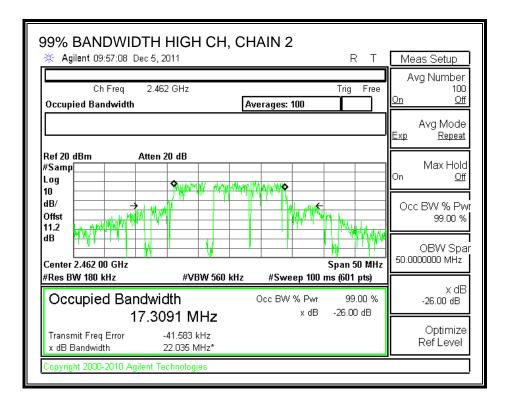


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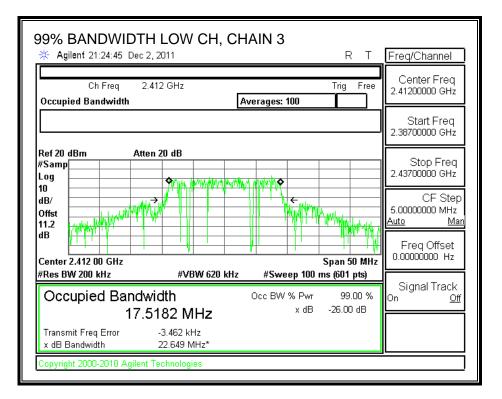


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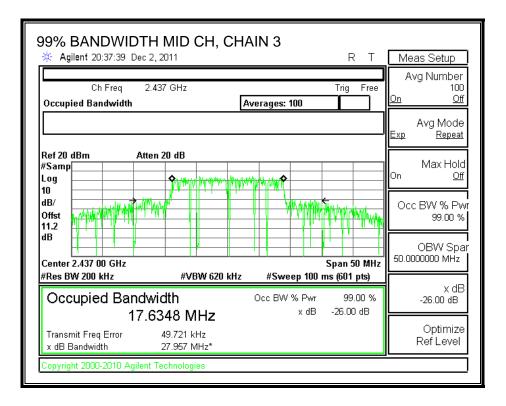
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99% BANDWIDTH, CHAIN 3

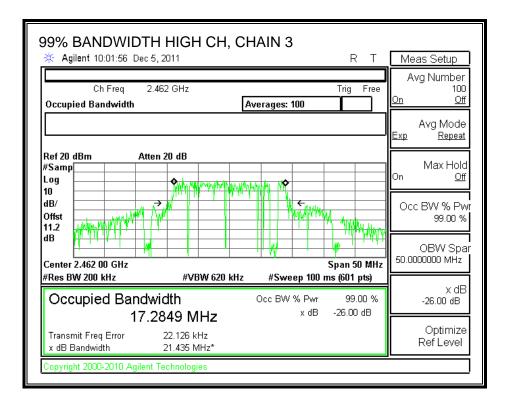


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7.3.3. OUTPUT POWER

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

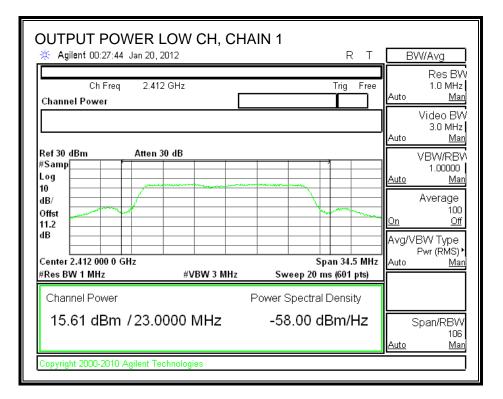
Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

RESULTS

Channel	Frequency	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		PK Power	PK Power	PK Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	15.61	15.58	15.18	20.23	30.00	-9.77
Mid	2437	19.57	18.95	18.94	23.93	30.00	-6.07
High	2462	15.48	15.47	15.49	20.25	30.00	-9.75

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CHAIN 1 OUTPUT POWER

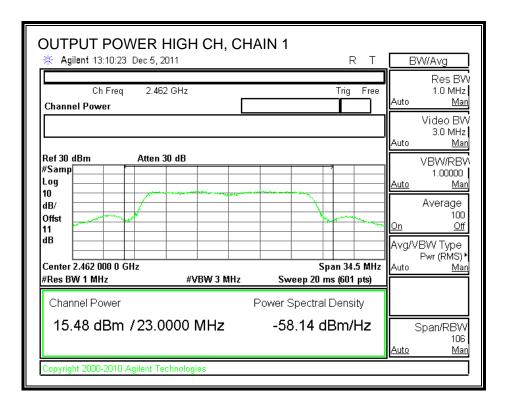


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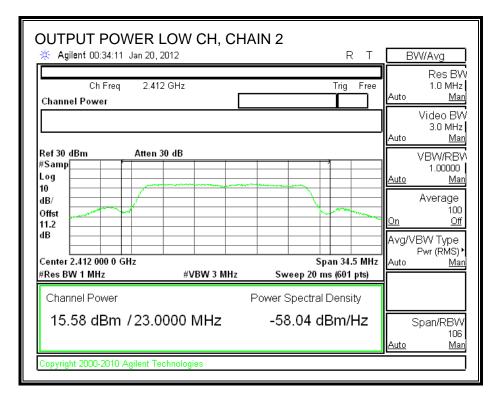
OUTPUT POWER MID CH, Agilent 19:56:09 Dec 2, 2011	CHAIN 1	RТ	BW/Avg
Ch Freq 2.437 GHz Channel Power		Trig Free	Res BW 1.0 MHz Auto <u>Man</u> Video BW
Ref 30 dBm Atten 30 dB #Samp Log 10			3.0 MHz Auto <u>Man</u> VBW/RBW 1.00000 Auto <u>Man</u>
dB/ Offst 11.2 dB Center 2.437 000 GHz		Span 45 MHz	Average 100 <u>On Off</u> Avg/VBW Type Pwr (RMS) ⁺ Auto <u>Man</u>
#Res BW 1 MHz #VBW 3 Channel Power 19.57 dBm / 30.0000 MH	Power Spectra	ms (601 pts) al Density dBm/Hz	Span/RBW 106 <u>Auto Man</u>
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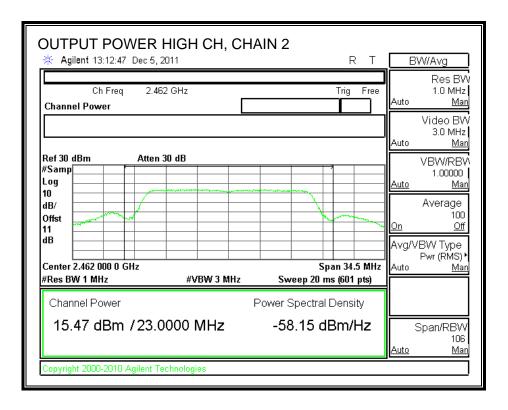
CHAIN 2 OUTPUT POWER



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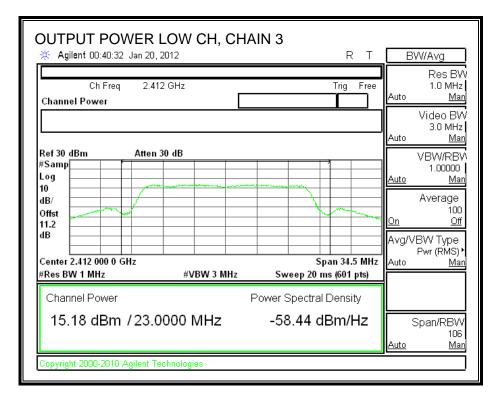
OUTPUT POWER MID CH, CHAIN 2 Agilent 20:08:04 Dec 2, 2011	R T	BW/Avg
Ch Freq 2.437 GHz Channel Power	Trig Free Auto	Video BW
Ref 30 dBm Atten 30 dB #Samp	Auto	VBW/RBW 1.00000
Center 2.437 000 0 GHz #Res BW 1 MHz #VBW 3 MHz Sw	Span 40.5 MHz Auto veep 20 ms (601 pts)	Pwr (RMS) ►
	Spectral Density 5.36 dBm/Hz	Span/RBW 106 <u>Man</u>
Copyright 2000-2010 Agilent Technologies		

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CHAIN 3 OUTPUT POWER

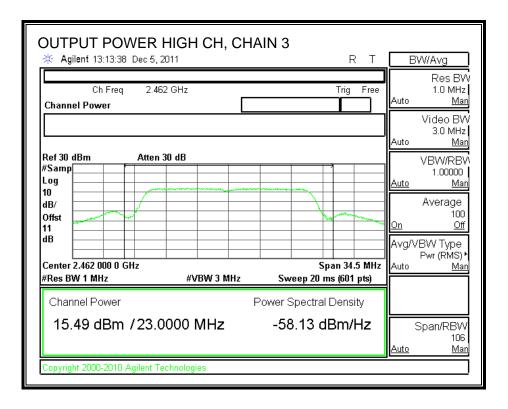


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OUTPUT POWER Agilent 20:38:52 Dec 2,:	,	N 3	BW/Avg
Ch Freq 2.43 Channel Power	37 GHz	Trig Free	Res BW 1.0 MHz Auto <u>Man</u>
			Video BW 3.0 MHz Auto <u>Man</u>
Ref 30 dBm Atten #Samp Log 10	30 dB		VBW/RBV 1.00000 <u>Auto Man</u>
dB/ Offst 11.2			Average 100 <u>On Off</u>
dB Center 2.437 00 GHz		Span 42 MHz	Avg/VBW Type Pwr (RMS) ^ Auto <u>Man</u>
#Res BW 1 MHz Channel Power	#VBW 3 MHz	Sweep 20 ms (601 pts) Power Spectral Density	
18.94 dBm / 28.0	0000 MHz	-55.53 dBm/Hz	Span/RBW 106 <u>Auto Man</u>
Copyright 2000-2010 Agilent To	echnologies		

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7.3.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11.18 dB (including 10 dB pad and 1.18 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Chain 1 Power	Chain 2 Power	Chain 3 Power	Total Power
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)
Low	2412	15.18	15.10	15.15	19.91
Middle	2437	19.19	18.68	18.80	23.67
High	2462	15.14	15.04	15.14	19.88

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7.3.5. 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.

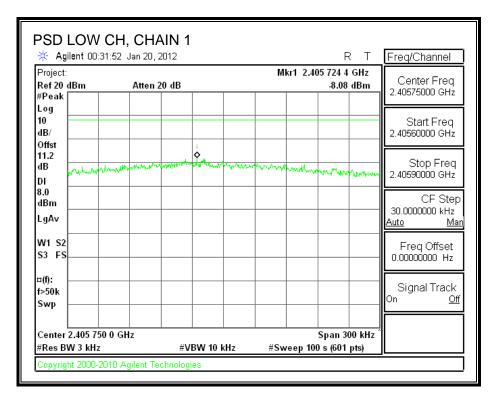
TEST PROCEDURE

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.

RESULTS

Channel	Frequency	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		PSD	PSD	PSD	PSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	-8.08	-10.03	-9.67	-4.40	8	-12.40
Middle	2437	-4.82	-6.54	-6.16	-1.00	8	-9.00
High	2462	-9.11	-10.26	-10.00	-4.99	8	-12.99

POWER SPECTRAL DENSITY, CHAIN 1



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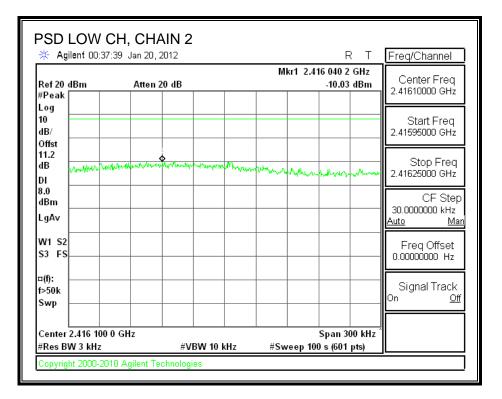
🔆 Agilent 19:5	9:16 Dec 2, 2011			RT	Freq/Channel
Ref 20 dBm #Peak	Atten 20 dB		Mkr1 2.4	33 019 1 GHz _4.82 dBm	Center Freq 2.43295000 GHz
Log 10 dB/			1		Start Freq 2.43280000 GHz
Offst 11.2 dB	way was a funny horner	an margh below the orthe	munun	where the approximation of	Stop Freq 2.43310000 GHz
8.0 dBm LgAv					CF Step 30.0000000 kHz Auto Mai
W1 S2 S3 FS					Freq Offset 0.00000000 Hz
¤(f): f>50k Swp					Signal Track On <u>Off</u>
Center 2.432 950 #Res BW 3 kHz		3W 10 kHz	#Sween 10	Span 300 kHz 0 s (601 pts)	

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🔆 Ag	ilent 09:38:43	3 Dec 5, 2011			RT	Freq/Channel
Ref 20 #Peak	dBm	Atten 20 dB		Mkr1 2.	458 260 0 GHz -9.11 dBm	Center Freq 2.45825000 GHz
Log 10 dB/						Start Freq 2.45810000 GHz
DI	ununun	- and have have been a fear		hanne with the with the state	manganana	Stop Freq 2.45840000 GHz
8.0 dBm LgAv						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>Off</u>
	2.458 250 0 (W 3 kHz		VBW 10 kHz	#Sween 1	Span 300 kHz 100 s (601 pts)	

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POWER SPECTRAL DENSITY, CHAIN 2



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🔆 Agilent 20:1	D:58 Dec 2, 2011			RT	Freq/Channel
Ref 20 dBm #Peak	Atten 20 dB		Mkr1 2.428 8	47 2 GHz 6.54 dBm	Center Freq 2.42890000 GHz
Log 10					Start Freq
dB/					2.42875000 GHz
11.2 dB	www.anuker.	ad the second and	Marin Warman	in the second state	Stop Freq 2.42905000 GHz
8.0 dBm					CF Step
LgAv					30.0000000 kHz <u>Auto Ma</u>
W1 S2 S3 FS					Freq Offset 0.00000000 Hz
¤(f): f>50k					Signal Track
Swp					On <u>Off</u>
Center 2.428 900		V 10 kHz	Sp	an 300 kHz	

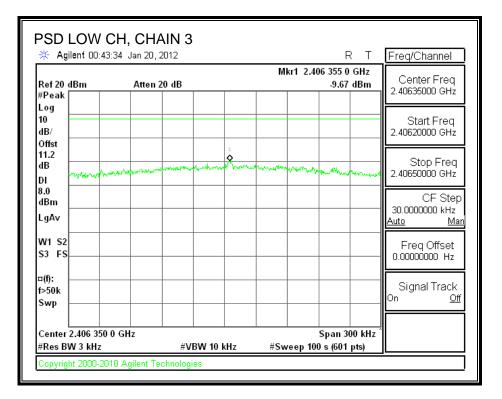
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🔆 Agilent 09:34	:45 Dec 5, 2011			RT	Freq/Channel
Ref 20 dBm #Peak	Atten 20 dB		Mkr1 2.4	459 262 2 GHz -10.26 dBm	Center Freq 2.45920000 GHz
Log 10 dB/ Offst					Start Freq 2.45905000 GHz
11.2 dB DI	www.and	WAAMAA	and the second second	many	Stop Freq 2.45935000 GHz
8.0 dBm LgAv					CF Step 30.000000 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 2.459 200 #Res BW 3 kHz		BW 10 kHz	#Sween 11	Span 300 kHz 00 s (601 pts)	

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POWER SPECTRAL DENSITY, CHAIN 3



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🔆 Agilent 20:43	3:21 Dec 2, 2011			RT	Freq/Channel
Ref 20 dBm #Peak	Atten 20 d	1B	Mkr1 2	2.442 646 2 GHz -6.16 dBm	Center Freq 2.44260000 GHz
Log 10 dB/			1		Start Freq 2.44245000 GHz
Offst 11.2 dB	un appender handere	perform a consect for the construction of the		million and from the start of the	Stop Freq 2.44275000 GHz
8.0 dBm					CF Step 30.0000000 kHz Auto Mar
W1 S2 S3 FS					Freq Offset 0.00000000 Hz
¤(f): f>50k Swp					Signal Track
Center 2.442 600 #Res BW 3 kHz	0 GHz	#VBW 10 kHz	#Sween	Span 300 kHz 100 s (601 pts)	

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🔆 Agilent 09:31	1:21 Dec 5, 2011				T Freq/Cl	nannel	
Ref 20 dBm #Peak	Atten 20 dB		Mkr1 2.466 101 8 GHz -10.00 dBm			Center Freq 2.46605000 GHz	
Log 10 dB/ Offst					Sta	rt Freq 000 GHz	
11.2 dB DI	mannanter	frank water	1 Warman Married	where the second	Sto 2.466200	op Freq 300 GHz	
8.0 dBm LgAv						CF Step 000 kHz <u>Mar</u>	
W1 S2 S3 FS					Freq	Offset 000 Hz	
¤(f): f>50k Swp					Signa	al Track <u>Off</u>	
Center 2.466 050 #Res BW 3 kHz		W 10 kHz	#Swoon	Span 300 k 100 s (601 pts)			

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7.3.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dB.

TEST PROCEDURE

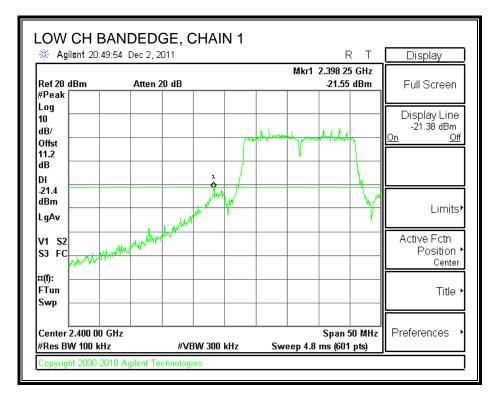
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

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RESULTS

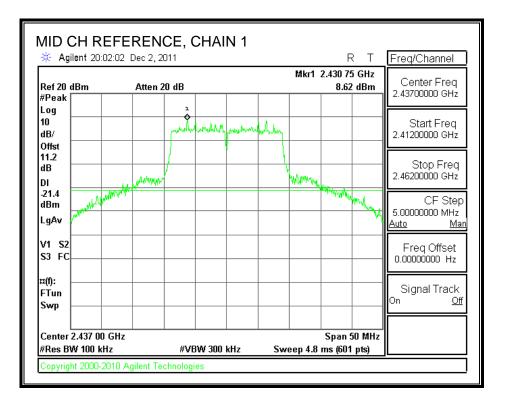
CHAIN 1 SPURIOUS EMISSIONS



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Atten	20 dB	Mkr2 23.53 -50.04	E Coloct M	arlzor
		-JU.U4	Fabra II	<u>3</u> <u>4</u>
			├── ─────	
			Marker T	Frace 2 3
				4 9
				adout ,
	1		÷ III '	uency
and a second and a second as	- Alexon way of the dampton of the there way	the second and the second and the second	Marker	Table
			<u>On</u>	<u>Off</u>
		Stop 26.00	и GHz	
Start 30 MHz #Res BW 100 kHz #VBW 300 kH				All Off
		Amplit	ude	
(I) Fied	23.033 612	-00.04 08	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
				More
	kHz Trace Type (1) Freq	KHz #VBW 300 kHz Trace Type X.Axids (1) Freq 14.028 GHz	KHz #VBW 300 kHz Sweep 2.482 s (1001) (1) Freq 14.028 GHz -51.57 dE	Auto 1 Auto 1 Auto 1 Image: Stop 26.000 GHz Marker Image: Stop 26.000 GHz Mar

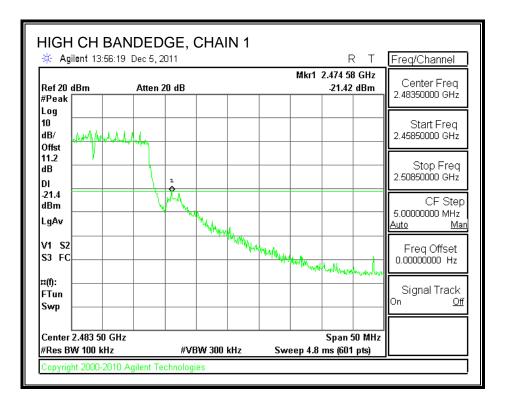
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🔆 Agilen	t 20:03:05	Dec 2, 201	1				F		Marker
Ref 20 dBr #Peak	n	Atten 20	dB			Mkrá	25.27 49.35		Select Marker 1 2 <u>3</u> 4
Log 10 dB/ Offst									Marker Trace Auto 1 2 3
11.2 dB DI 1		2						3	Readout Frequency
-21.4 ↔ dBm → LgAv →		James Mary		arte ^{alta} an ay bu		may the	herefersterr	~	Marker Table <u>On Off</u>
Start 30 MHz #Res BW 100 kHz		#VBW 300 kHz Sweep		Stop 26.000 GHz 2.482 s (1001 pts)			Marker All Off		
Marker 1 2 3	Trace (1) (1) (1)	Type Freq Freq Freq	8 7.3	Axis 09 MHz 02 GHz 73 GHz	Amplitude -54.19 dBm -49.53 dBm -49.35 dBm		n m m		
									More 2 of 2

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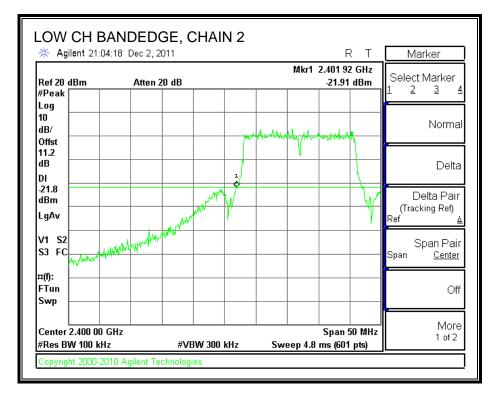
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Ref 20 dBı #Peak 🔽	m	Atten 20 d	B		Mkr4	25.065 -49.84		Center 13.0150000	
Log 10 dB/ Offst								Start 30.0000000	
11.2 dB DI	2					3		Stop 26.0000000	Freq GHz
-21.4 dBm	<u></u>	Augure	and a star and a star	An instantion of the second		**************************************	<u>`</u>	CF 2.59700000	= Step 3 GHz
LgAv Start 30 M #Res BW 1			#VBW 300 kł	17 Swe	Sto 2.482 s	p 26.000 s (1001 n		<u>Auto</u> Freq O	
Marker	Trace	Туре	XA		00 21102 0	Amplitud	· ·	0.0000000	0 Hz
1	(1)	Freq		MHz		57.55 dBm			
2	(1)	Freq	2.030			53.71 dВл 54.95 dВл		Signal ⁻	Frack
4	(1)	Freq	25.065			49.84 dBn		On	Off
3 4	(1) (1)	Freq Freq	23.611 25.065			51.35 dВr 49.84 dВr			

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CHAIN 2 SPURIOUS EMISSIONS



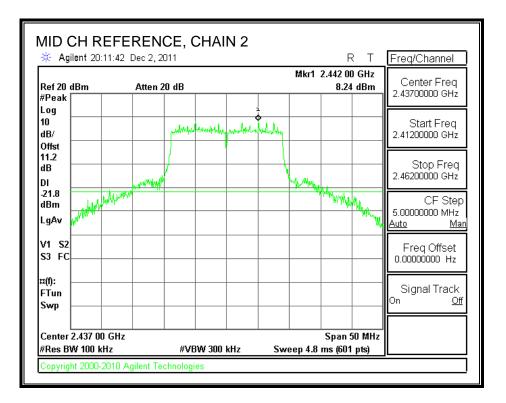
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		Dec 2, 2011			MI	σ2 25.01	२ ⊺ 3 GHz	Marker
Ref 20 dBm #Peak		Atten 20 d	IB			-49.39	dBm	Select Marker
Log								
10								Marker Trace
Offst								
11.2 dB	_							Readout
DI 1	-						2	Frequency
-21.8 🔶	Admin		and the second	and the second second	a south of the south of the	the states	No.	Marker Table
LgAv —								<u>On Off</u>
Start 30 MHz	2				Si	top 26.00	0 GHz	
#Res BW 100			#VBW 300		Sweep 2.482		<u> </u>	Marker All Off
Marker 1	Trace (1)	Type Freq		(Axis 309 MHz		Amplite -52.11 dB		
2	ő	Freq		13 GHz		-49.39 dB		
								More

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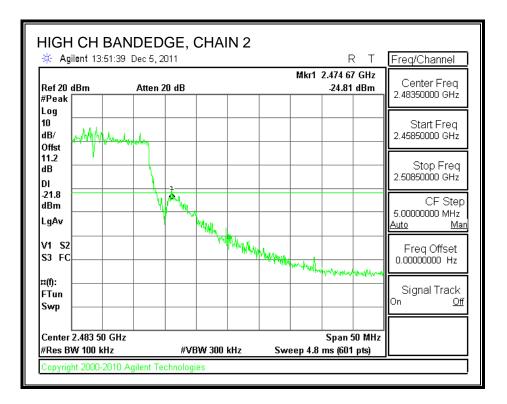


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🔆 Agilen	f 20:12:40	Dec 2, 2011				F		Marker
Ref 20 dBr #Peak	n	Atten 20 dl	3		Mkr2	25.11 -50.09		Select Marker 1 <u>2 3</u> 4
Log 10 dB/ Offst								Marker Trace Auto 1 2 3
11.2 dB DI ¹ -21.8 ◆							2	Readout , Frequency
dBm	Il Kulan		hilly of the desired and the desired	-242.94 Apple (superfring)	nen julon of	المريد مريد المريد	•••••	Marker Table <u>On Off</u>
Start 30 MI #Res BW 1		i	#VBW 300 kHz	Swee	Stoj p 2.482 s	p 26.00 ; (1001		Marker All Off
Marker 1 2	Trace (1) (1)	Type Freq Freq	X Axis 809 Mi 25.117 GH			Amplitu 51.37 dB 50.09 dB	m	
								More 2 of 2

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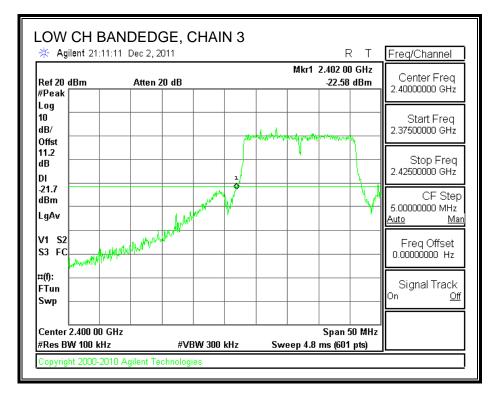
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Ref 20 dBr		Dec 5, 201				Mkr	4 23.50		Freq/Cha	
#Peak	<u></u>	Allen Zu					-JU.JU		13.015000	00 GHz
Log									Start 30.000000	: Freq 10 MHz
Offst 11.2 dB									Stop 26.000000	o Freq 10 GHz
DI 4 -21.8 dBm	N		the second	Nerton Marcal	****	and and a star	Warry where		C 2.5970000	F Step
LgAv 📙									<u>Auto</u>	0 0112 <u>Mai</u>
Start 30 M							p 26.000		Freg	Offset
#Res BW 1 Marker	Trace	Туре	#VBW 3	X Axis	Swee	p 2.482 :	Amplitu		0.000000	
1	(1)	Freq		809 MHz			-50.27 dBi	m		
2	(1)	Freq		2.134 GHz			-48.32 dBi		Signal	Track
4	(1) (1)	Freq Freq		14.106 GHz 23.507 GHz			-52.21 dBi -50.50 dBi		On	<u>Off</u>

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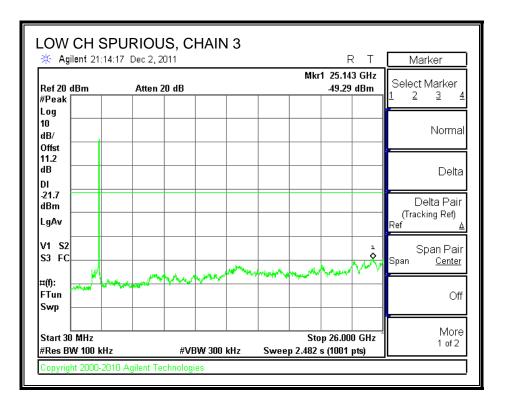
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CHAIN 3 SPURIOUS EMISSIONS

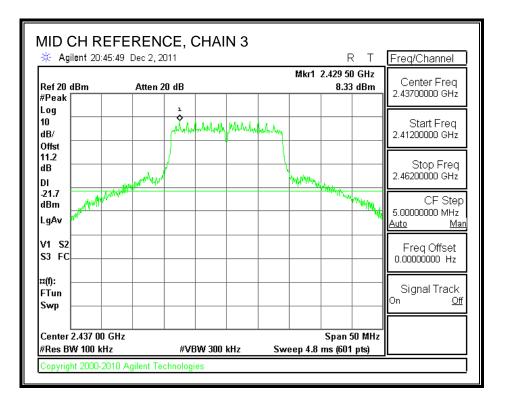


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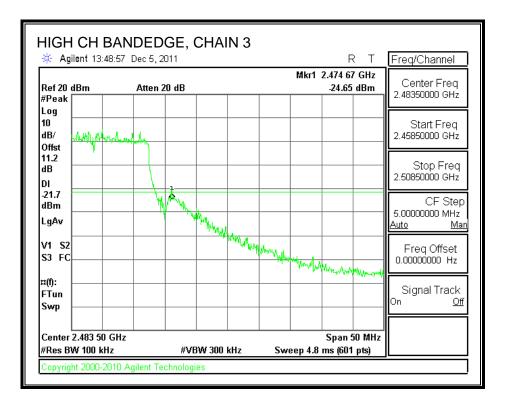


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🔆 Agilen	t 20:47:08	Dec 2, 2011			RT	Marker
Ref 20 dBr #Peak	n	Atten 20 d	IB	Mk	r3 25.039 GHz -49.30 dBm	Select Marker
Log 10 dB/ Offst						Marker Trace Auto 1 2 3
11.2 dB DI		2			3	Readout , Frequency
-21.7 ō dBm 🖂 LgAv —		ala game and a second	and president of and have	and legenterior and a second field of the	Contraction and Contraction	Marker Table <u>On Off</u>
Start 30 M #Res BW 1			#VBW 300 kHz	Sweep 2.482	op 26.000 GHz s (1001 pts)	Marker All Off
Marker 1 2 3	Trace (1) (1) (1) (1)	Type Freq Freq Freq	X Axis 809 MH: 7.302 GH: 25.039 GHz	z	Amplitude -54.90 dBm -48.34 dBm -49.30 dBm	
						More 2 of 2

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🔆 Agilen	(12.39.40	Dec 5, 201			Miles	R 1	. <u>Tregenanne</u>	<u> </u>
Ref 20 dBı #Peak	n	Atten 20	dB			-49.76 dBn	😳 📗 - Contor Ero	
Log 10 dB/ Offst							Start Fre 30.0000000 Mł	
11.2 dB	12					3	Stop Fre 26.0000000 GH	
-21.7 dBm 🚜 LgAv —			and the second second	normality and a state of the	Sector Constitution	× · ·	CF St 2.59700000 GH	Ηz
Start 30 M						. 20 000 CU		Mar
start 30 M #Res BW 1			#VBW 300 ki	Hz Swe		o 26.000 GH : (1001 pts)	Freq Offse	
Marker	Trace	Туре	XA			Amplitude	— 0.00000000 н	IZ
1	(1)	Freq		8 GHz		52.42 dBm		_
2	(1) (1)	Freq Freq	2.16	0 GHz		51.76 dBm 50.71 dBm	Signal Trac	ck
4	(1)	Freq	25.013			49.76 dBm	On	<u>Off</u>

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7.4. 802.11n HT20 CDD 3TX MODE IN THE 5.8 GHz BAND

7.4.1. 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

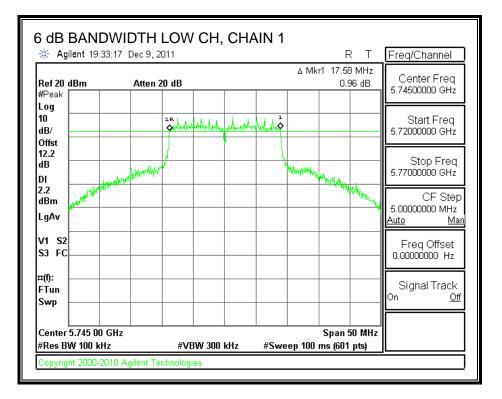
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

RESULTS

Channel	Frequency	Chain 1	Chain 2	Chain 3	Minimum Limit
		6 dB BW	6 dB BW	6 dB BW	
	(MHz)	(MHz)	(MHz)	(MHz)	(MHz)
Low	5745	17.58	17.58	17.58	0.5
Middle	5785	17.58	17.67	17.58	0.5
High	5825	17.42	17.58	17.58	0.5

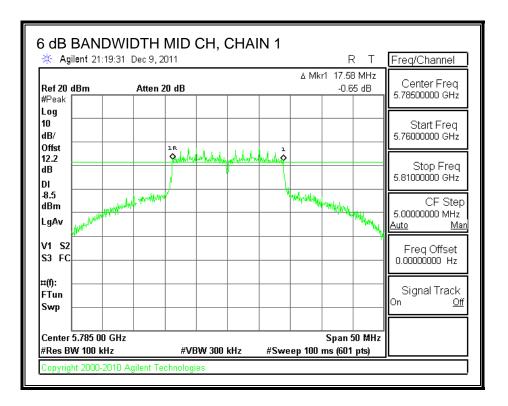
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6 dB BANDWIDTH, CHAIN 1



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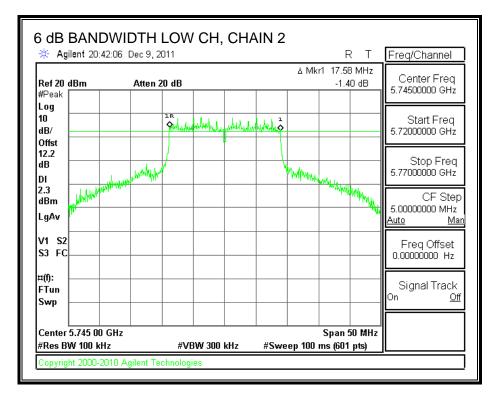


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🔆 Agilent 00::	32:49 Dec 9, 2	2011				RТ	Freq/Channel
Ref 20 dBm #Peak	Atten	20 dB			∆ Mkr1 17.4 -1.1	12 MHz 03 dB	Center Freq 5.82500000 GHz
Log 10 dB/ Offst		IR Quilly hourship	hole whole				Start Freq 5.8000000 GHz
12.2	pertyphan			hun	homentalist		Stop Freq 5.8500000 GHz
dBm LgAv						Market Market	CF Step 5.0000000 MHz <u>Auto Man</u>
V1 S2 S3 FC							Freq Offset 0.00000000 Hz
¤(f): FTun Swp							Signal Track On <u>Off</u>
Center 5.825 00 #Res BW 100 kl		#VBW	300 kHz	#Sween	Span 100 ms (60	50 MHz 1 ntsì	

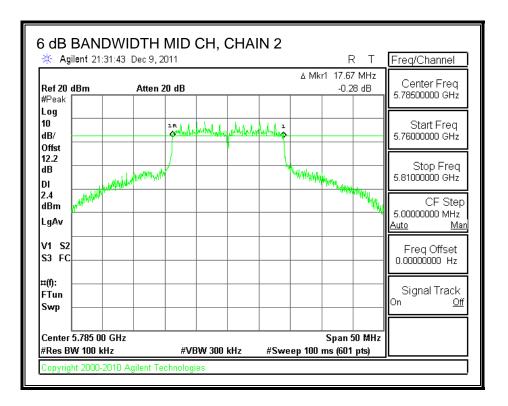
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6 dB BANDWIDTH, CHAIN 2



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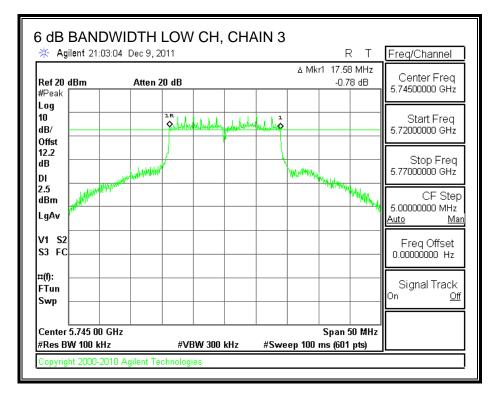


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🔆 Agilent 00:53	3:44 Dec 9, 2011			R T	Freq/Channel
Ref 20 dBm #Peak	Atten 20 dB		∆ Mkr1 17	.58 MHz 0.11 dB	Center Freq 5.82500000 GHz
Log 10 dB/	1R Quy	hand walk along water burband	nluludu v		Start Freq 5.8000000 GHz
Offst 12.2 dB DI	formet former and the second		handrighter and handrighter an		Stop Freq 5.8500000 GHz
2.3 dBm LgAv					CF Step 5.0000000 MHz <u>Auto Man</u>
V1 S2 S3 FC					Freq Offset 0.00000000 Hz
¤(f): FTun Swp					Signal Track On <u>Off</u>
Center 5.825 00 (#Res BW 100 kH;		VBW 300 kHz	Spa #Sweep 100 ms (6	n 50 MHz 01 ntsì	

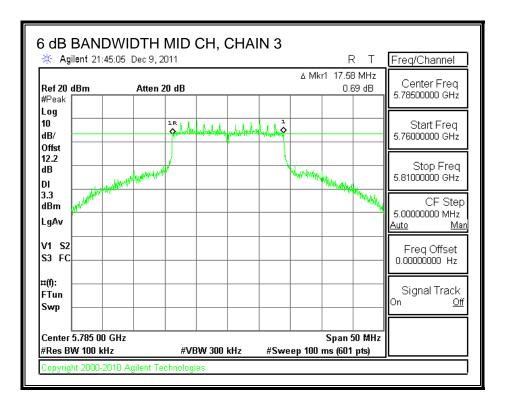
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6 dB BANDWIDTH, CHAIN 3



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🔆 Agilent 01:13	3:39 Dec 9, 2011			RT	Freq/Channel
Ref 20 dBm #Peak	Atten 20 dB		∆ Mkr1 17 -0	.58 MHz).41 dB	Center Freq 5.82500000 GHz
Log 10 dB/		dorquelader yet had to	hili		Start Freq 5.8000000 GHz
12.2	hadroste with add		Malanum Managar		Stop Freq 5.8500000 GHz
2.4 dBm LgAv	Huu,			whether which which	CF Step 5.0000000 MHz <u>Auto Man</u>
V1 S2 S3 FC					Freq Offset 0.00000000 Hz
¤(f): FTun Swp					Signal Track On <u>Off</u>
Center 5.825 00 (#Res BW 100 kH		BW 300 kHz	Spa #Sweep 100 ms (6	n 50 MHz N1 ntsì	

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7.4.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

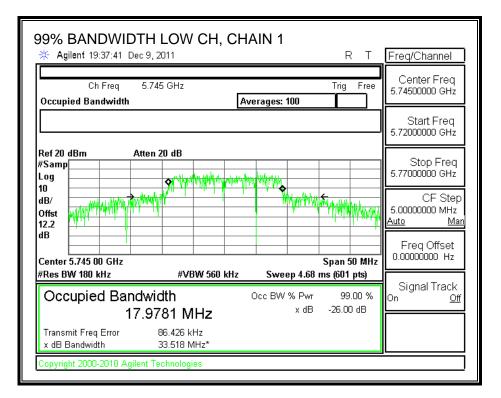
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

Channel	Frequency	Chain 1	Chain 2	Chain 3
		99% Bandwidth	99% Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)	(MHz)
Low	5745	17.9781	17.8105	17.8225
Middle	5785	20.8266	18.2201	18.4659
High	5825	17.9300	17.7879	17.8585

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99% BANDWIDTH, CHAIN 1



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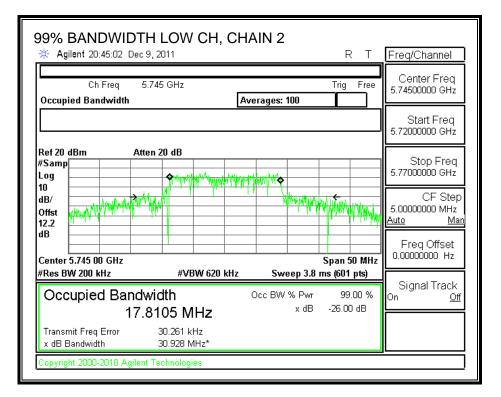
99% BANDWIDTH N	,	IN 1	RТ	Freq/Channel
Ch Freq 5.785 (Occupied Bandwidth	···-	erages: 100	Trig Free	Center Freq 5.78500000 GHz
				Start Freq 5.76000000 GHz
Ref 20 dBm Atten 20 #Samp	dB			Stop Freq 5.81000000 GHz
dB/ Offst 11.2				CF Step 5.0000000 MHz <u>Auto Man</u>
dB Center 5.785 000 GHz #Res BW 270 kHz	VBW 820 kHz	Sweep 2.08	Span 50 MHz	Freq Offset 0.00000000 Hz
Occupied Bandwidt 20.826	h	Occ BW % Pwr x dB	· · /	Signal Track On <u>Off</u>
x dB Bandwidth 38.	7.257 kHz 849 MHz*			
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99% BANDWIDTH HIGH CH, CHAIN 1	Freq/Channel						
Ch Freq 5.825 GHz Trig Free Occupied Bandwidth Averages: 100	Center Freq 5.82500000 GHz						
	Start Freq 5.80000000 GHz						
Ref 20 dBm Atten 20 dB #Samp	Stop Freq 5.8500000 GHz						
dB/ Offst 12.2	CF Step 5.00000000 MHz <u>Auto Man</u>						
dB Center 5.825 00 GHz Span 50 MHz	Freq Offset 0.00000000 Hz						
#Res BW 200 kHz #VBW 620 kHz Sweep 3.8 ms (601 pts) Occupied Bandwidth Occ BW % Pwr 99.00 % 17.9300 MHz × dB -26.00 dB	Signal Track ^{On <u>Off</u>}						
Transmit Freq Error 19.277 kHz x dB Bandwidth 32.814 MHz*							
Copyright 2000-2010 Agilent Technologies							

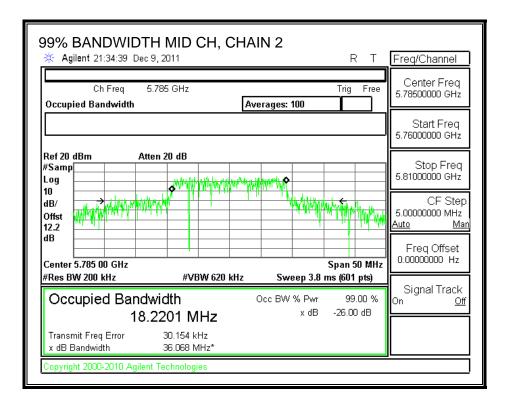
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99% BANDWIDTH, CHAIN 2

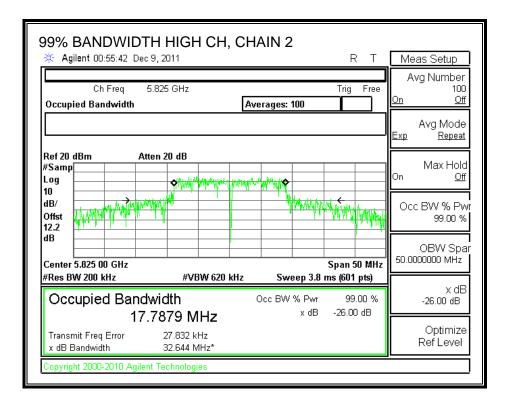


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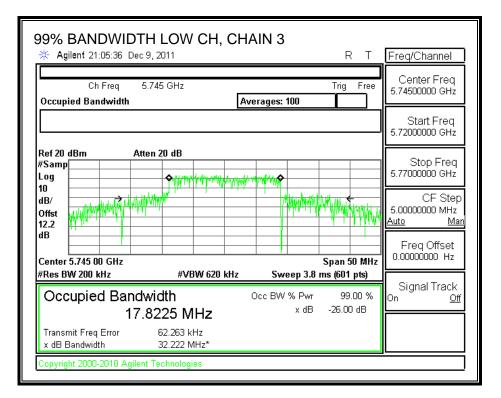
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99% BANDWIDTH, CHAIN 3



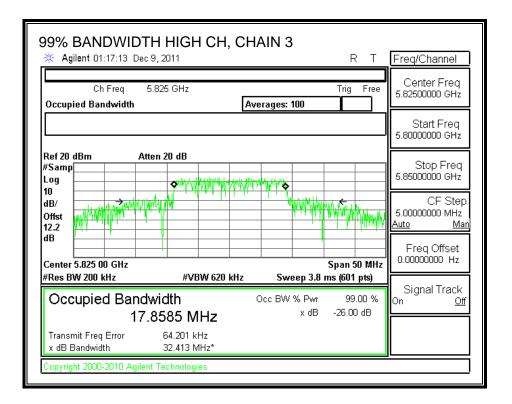
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99% BANDWIDTH MID CH, CHAIN	3 R T Freq/Channel
Ch Freq 5.785 GHz Occupied Bandwidth Average	Trig Free Center Freq 5.78500000 GHz
	Start Freq 5.76000000 GHz
Ref 20 dBm Atten 20 dB #Samp Log 10	Stop Freq 5.81000000 GHz
dB/ Offst 12.2	CF Step 5.0000000 MHz <u>Auto Man</u>
dB Center 5.785 00 GHz #Res BW 200 kHz #VBW 620 kHz	Span 50 MHz Sweep 3.8 ms (601 pts)
	BW % Pwr 99.00 % x dB -26.00 dB
Transmit Freq Error 99.519 kHz x dB Bandwidth 36.146 MHz*	
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7.4.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The combined antenna gain is 9.31 dBi for other than fixed, point-to-point operations, therefore the limit is 26.69 dBm.

TEST PROCEDURE

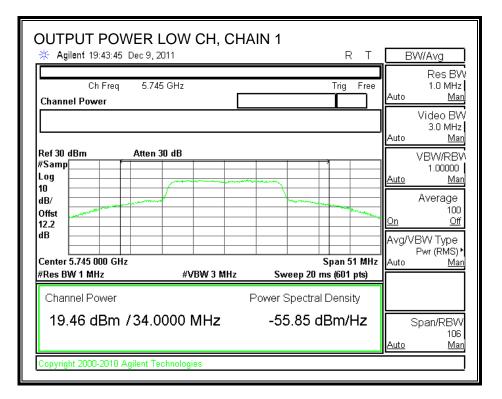
Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

RESULTS

Channel	Frequency	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		PK Power	PK Power	PK Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5745	19.46	18.83	18.86	23.83	26.69	-2.86
Mid	5785	20.17	19.37	19.66	24.52	26.69	-2.17
High	5825	19.35	19.02	18.96	23.88	26.69	-2.81

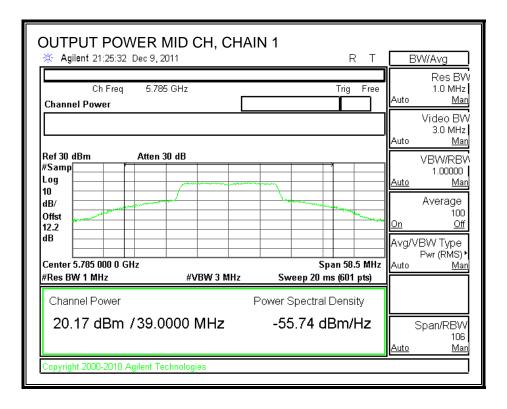
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CHAIN 1 OUTPUT POWER



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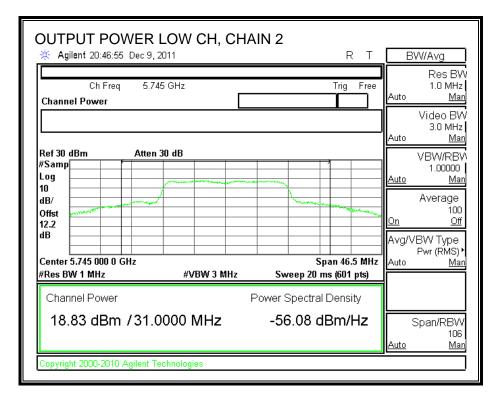


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OUTPUT POWER	•	AIN 1 R T	BW/Avg
Ch Freq 5.82 Channel Power	5 GHz	Trig Free	Res BW 1.0 MHz Auto <u>Man</u>
		•••••	Video BW 3.0 MHz Auto <u>Man</u>
Ref 30 dBm Atten #Samp	30 dB		VBW/RBV 1.00000 <u>Auto Man</u>
dB/ Offst			Average 100 <u>On Off</u>
dB Center 5.825 000 0 GHz		Span 49.5 MHz	Avg/VBW Type Pwr (RMS) • Auto <u>Man</u>
#Res BW 1 MHz Channel Power	#VBW 3 MHz	Sweep 20 ms (601 pts) Power Spectral Density	
19.35 dBm /33.0	0000 MHz	-55.84 dBm/Hz	Span/RBW 106 <u>Auto Man</u>
Copyright 2000-2010 Agilent Te	chnologies		

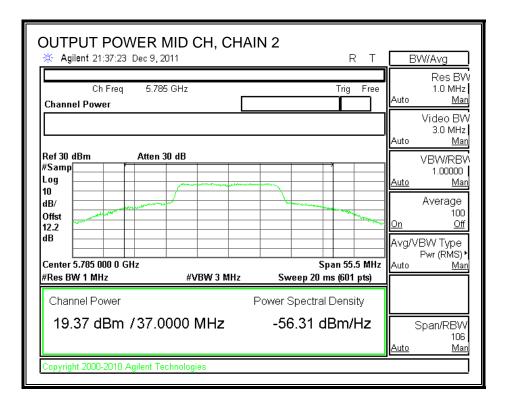
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CHAIN 2 OUTPUT POWER



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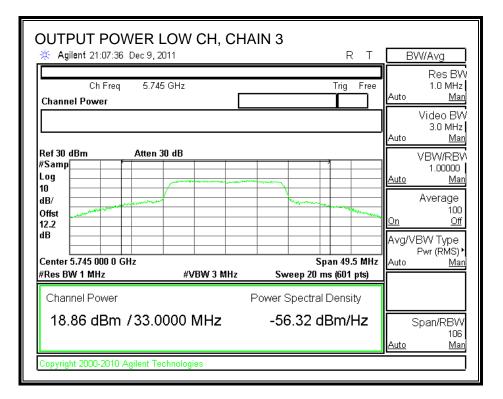


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OUTPUT POWER HIGH CH, CH Agilent 00:57:11 Dec 9, 2011	HAIN 2 R T	BW/Avg
Ch Freq 5.825 GHz Channel Power	Trig Free	Res BW 1.0 MHz Auto <u>Man</u>
		Video BW 3.0 MHz Auto <u>Man</u>
Ref 30 dBm Atten 30 dB #Samp		VBW/RBV 1.00000 <u>Auto Man</u>
dB/ Offst 12.2		Average 100 <u>On Off</u>
dB	Span 49.5 MHz	Avg/VBW Type Pwr (RMS)⊁ Auto <u>Man</u>
#Res BW 1 MHz #VBW 3 MHz Channel Power	Sweep 20 ms (601 pts) Power Spectral Density	
19.02 dBm /33.0000 MHz	-56.17 dBm/Hz	Span/RBW 106 <u>Auto Man</u>
Copyright 2000-2010 Agilent Technologies		

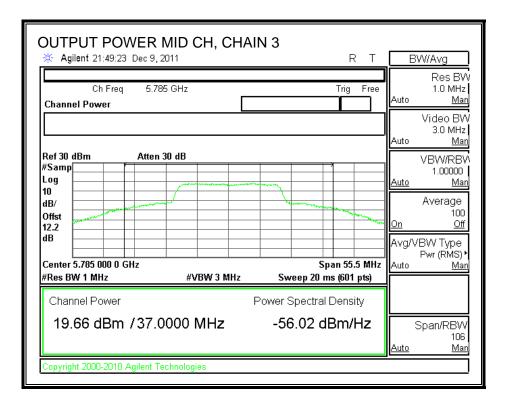
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CHAIN 3 OUTPUT POWER



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Agilent 01:19:03 Dec 9	2011	R T	BW/Avg
Ch Freq 5. Channel Power	825 GHz	Trig Free	Res BV 1.0 MHz Auto <u>Mar</u>
		•	Video BV 3.0 MHz Auto <u>Mar</u>
#Samp Log 10	in 30 dB		VBVV/RBV 1.00000 <u>Auto Mar</u>
dB/ Offst 12.2 dB			Average 100 <u>On Off</u> Avg/VBW Type
Center 5.825 000 0 GHz #Res BW 1 MHz	#VBW 3 MHz	Span 49.5 MHz Sweep 20 ms (601 pts)	Pwr (RMS)
Channel Power	I	Power Spectral Density	
18.96 dBm /33	.0000 MHz	-56.23 dBm/Hz	Span/RBW 106 Auto Mar

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7.4.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.2 dB (including 10 dB pad and 2.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Chain 1 Power	Chain 2 Power	Chain 3 Power	Total Power
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)
Low	5745	18.10	17.58	17.61	22.54
Middle	5785	19.13	18.26	18.40	23.38
High	5825	18.10	17.73	17.36	22.51

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7.4.5. 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.

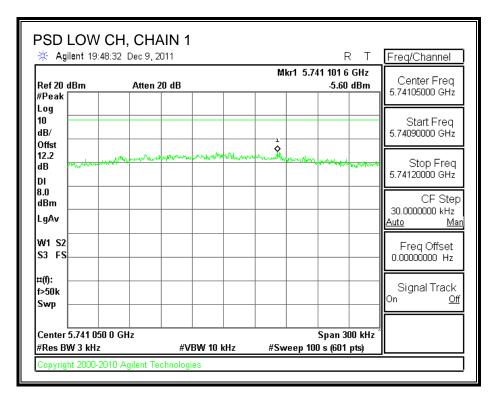
TEST PROCEDURE

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.

RESULTS:

Channel	Frequency	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		PSD	PSD	PSD	PSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5745	-5.6	-6.86	-3.34	-0.25	8	-8.25
Middle	5785	-4.78	-4.99	-2.06	1.04	8	-6.96
High	5825	-6.22	-6.65	-6.55	-1.70	8	-9.70

POWER SPECTRAL DENSITY, CHAIN 1



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🔆 Agiler	t 21:29:50) Dec 9,20	111						х Т	Freq/Channel
Ref 20 dBi #Peak	m	Atten 2	D dB			M	kr1 5.78		GHz dBm	Center Freq 5.78945000 GHz
Log 10 dB/ Offst				1_						Start Freq 5.78930000 GHz
	a the contraction to	menund	Wingthym	nr	underlander	and and a start of the start of	week all and a start of the sta	- playon	wantapo say	Stop Freq 5.78960000 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 5.7 #Res BW (GHz	#\/I	BW 10 F	(Hz	#514	/eep 10(Span 3 1 s <i>(</i> 601		

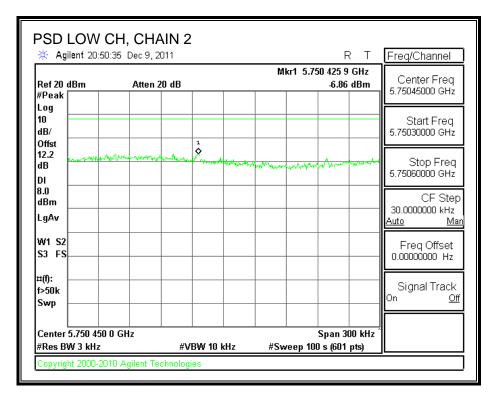
COMPLIANCE CERTIFICATION SERVICES (UL CCS)FORM NO: CCSUP4701D47173 BENICIA STREET, FREMONT, CA 94538, USATEL: (510) 771-1000FAX: (510) 661-0888This report shall not be reproduced except in full, without the written approval of UL CCS.

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🔆 Agilent 00:45	0.40 Dec 9,2011			R		eq/Channel
Ref 20 dBm #Peak	Atten 20 dB		Mkr1	5.825 058 5 GI -6.22 dE	im II I	Center Freq 32505000 GHz
Log 10 dB/ Offst					5.0	Start Freq 32490000 GHz
12.2 dB DI	Muniquerenter	Å		Content and the start	wrw1 5.8	Stop Freq 32520000 GHz
8.0 dBm LgAv					30 <u>Aut</u>	CF Step).0000000 kHz <u>o Mar</u>
W1 S2 S3 FS						Freq Offset 00000000 Hz
¤(f): f>50k Swp					On	Signal Track <u>Off</u>
Center 5.825 050 #Res BW 3 kHz		W 10 kHz	#Sureau	Span 300 100 s (601 pts		

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POWER SPECTRAL DENSITY, CHAIN 2



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🔆 Agilent 21:43	3:12 Dec 9, 2011			RT	Freq/Channel
Ref 20 dBm #Peak	Atten 20 dB		Mkr1 5.78	81 918 8 GHz -4.99 dBm	Center Freq 5.78195000 GHz
Log 10 dB/ Offst					Start Freq 5.78180000 GHz
dB	and the second and the second		and the states	man	Stop Freq 5.78210000 GHz
8.0 dBm					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 5.781 950 #Res BW 3 kHz		BW 10 kHz	#Sweep 10(Span 300 kHz) s (601 pts)	

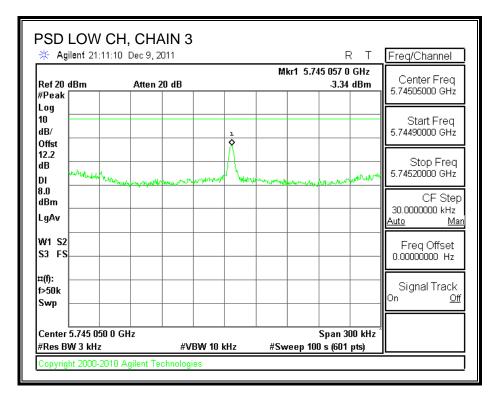
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🔆 Agilen	01:07:28	Dec 9, 2							ς Т	Freq/Channel
Ref 20 dBr #Peak	n	Atten 2	:0 dB			M	kr1 5.82		GHz dBm	Center Freq 5.82845000 GHz
Log 10 dB/ Offst					1					Start Freq 5.82830000 GHz
12.2 dB www	ary mile and a second second	and Capacity and a	~~~~~^~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	h-property de	And Anton	n formal generations	way	wprvi _{de} n	ora ^{na} lowy layo	Stop Freq 5.82860000 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 5.8 #Res BW 3		Hz	#14	BW 10 I	(H)2	# S	reep 100	Span 3		

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POWER SPECTRAL DENSITY, CHAIN 3



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🔆 Agilent 21:5	2:45 Dec 9, 2011			R T	Freq/Channel
Ref 20 dBm #Peak	Atten 20 dB		Mkr1 5.76	85 076 1 GHz -2.06 dBm	Center Freq 5.78505000 GHz
Log 10 dB/		1			Start Freq 5.78490000 GHz
12.2 dB	white was a source of the sour	an a	James and free	manno	Stop Freq 5.78520000 GHz
8.0 dBm LgAv					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>Off</u>
Center 5.785 050 #Res BW 3 kHz		BW 10 kHz	#Sweep 10	Span 300 kHz 0 s (601 nts)	

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🔆 Agilent 01:2	4:02 Dec 9, 2011		RT	Freq/Channel
Ref 20 dBm #Peak	Atten 20 dB	Mkı	r1 5.819 118 4 GHz -6.55 dBm	Center Freq 5.81915000 GHz
Log 10 dB/ Offst				Start Freq 5.81900000 GHz
dB DI	man man man Anna	man war war war and wat your	and a start of the forest and a start of	Stop Freq 5.81930000 GHz
8.0 dBm LgAv				CF Step 30.000000 kHz <u>Auto Ma</u>
W1 S2 S3 FS				Freq Offset 0.00000000 Hz
¤(f): f>50k Swp				Signal Track On <u>Off</u>

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7.4.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dB.

TEST PROCEDURE

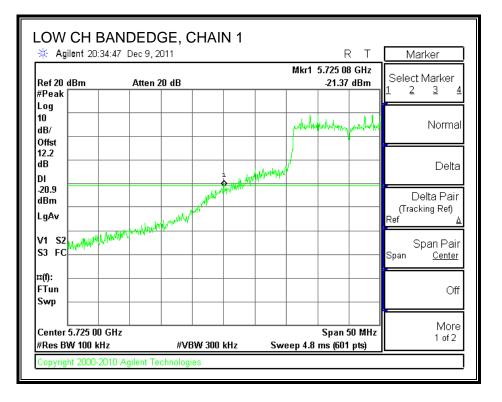
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

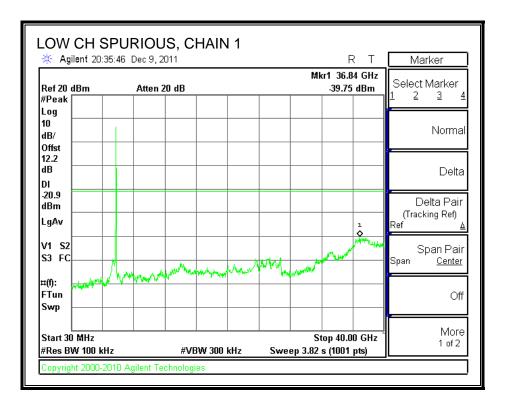
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RESULTS

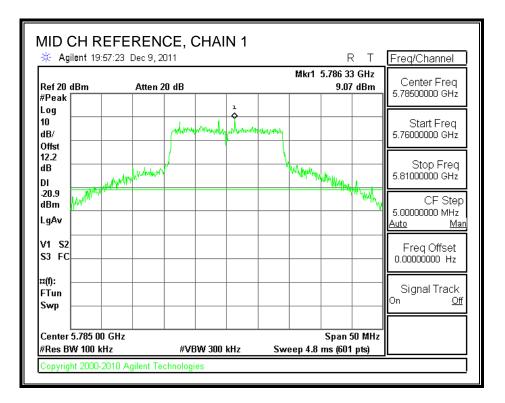
CHAIN 1 SPURIOUS EMISSIONS



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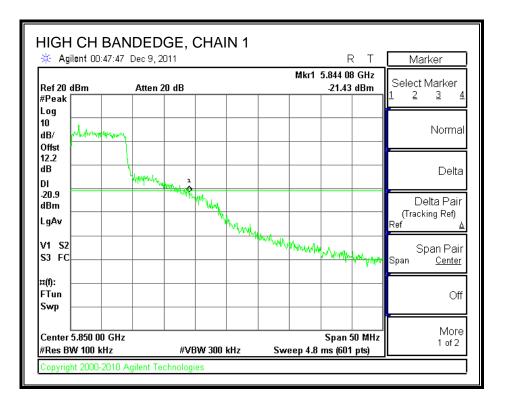


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🔆 Agilen	t 19:58:47	Dec 9, 201	1				F		Marker
Ref 20 dBr #Peak	<u>n</u>	Atten 20	dB			Mk	r2 37.2 _39.17		Select Marker 1 <u>2 3</u> 4
Log — 10 — dB/ — Offst									Marker Trace <u>Auto 1 2</u> 3
12.2 dB DI -20.9	1 •						ر سربالمو	2 •	Readout Frequency
dBm	and the		anin data data ng	Jan Marayan Mar	····	and a second			Marker Table <u>On Off</u>
Start 30 M #Res BW 1			#VBW 300		Swee	St ep 3.82 :	•	pts)	Marker All Off
Marker 1 2	Trace (1) (1)	Type Freq Freq		X Axis 5.51 GHz 7.28 GHz			Amplitu 44.45 dB 39.17 dB	m	
									More 2 of 2

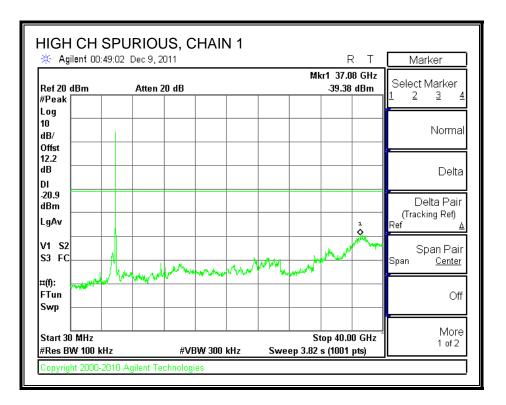
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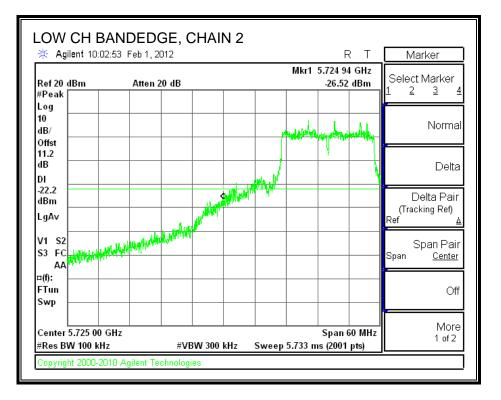
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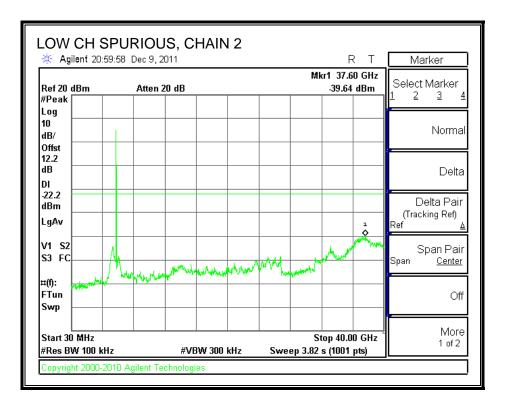
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CHAIN 2 SPURIOUS EMISSIONS

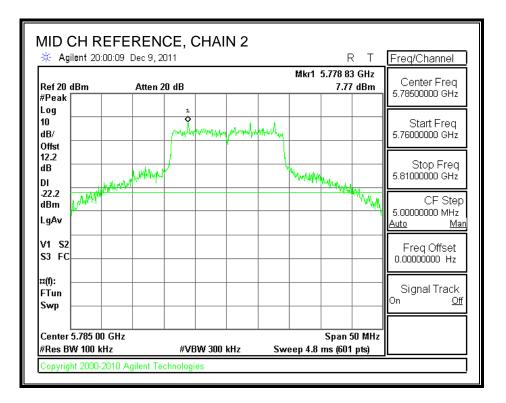


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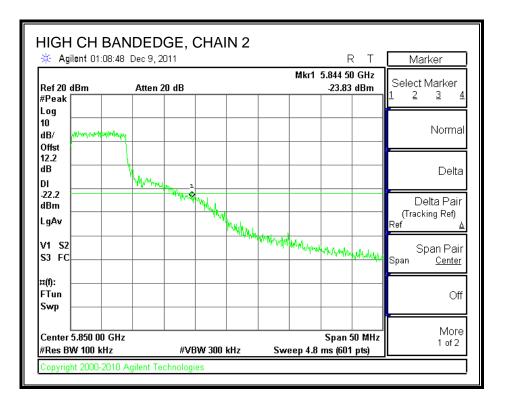


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🔆 Agiler					Marker			
Ref 20 dBi #Peak	m	Atten 20 d	B				37.04 GH 0.14 dBm	Coloot Morkor
Log 10 dB/ Offst								Marker Trace
12.2 dB DI -22.2					And			Readout Frequency
dBm			1999 (Achieven		··• Legen			Marker Table
Start 30 M #Res BW			#VBW 300 I	κHz	Sweep	Stop 3.82 s (1	40.00 GH: 001 pts)	z Marker All Off
Marker 1 2	Trace (1) (1)	Type Freq Freq	5.	Axis 39 GHz 04 GHz		-42.7	nplitude '1 dBm I4 dBm	
								More 2 of 2

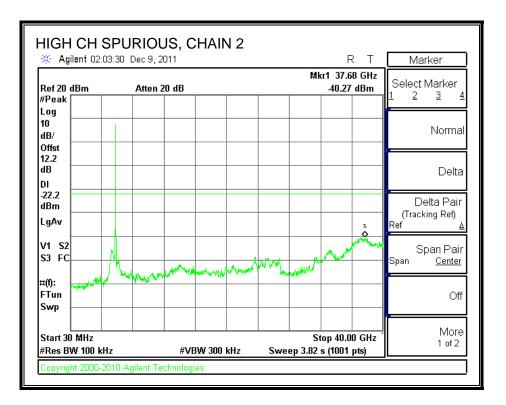
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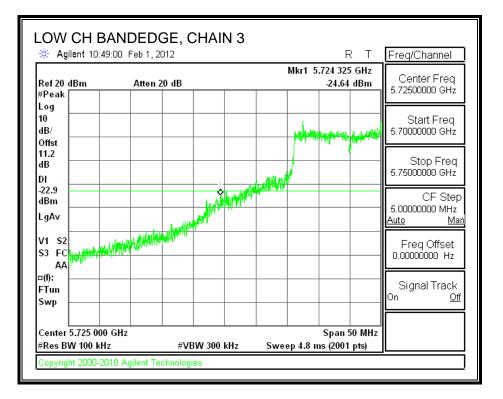
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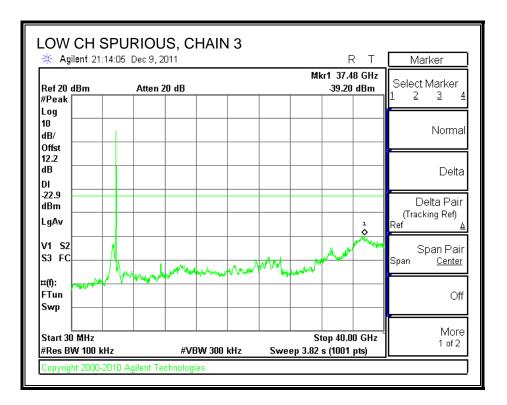
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CHAIN 3 SPURIOUS EMISSIONS

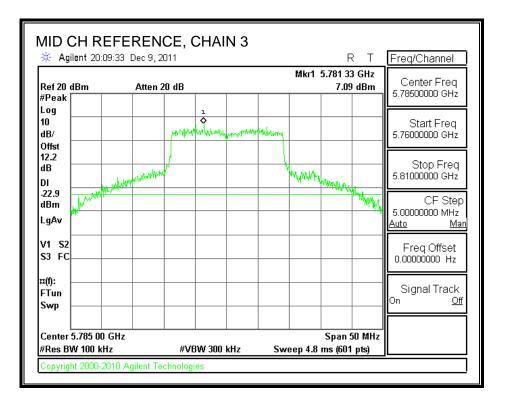


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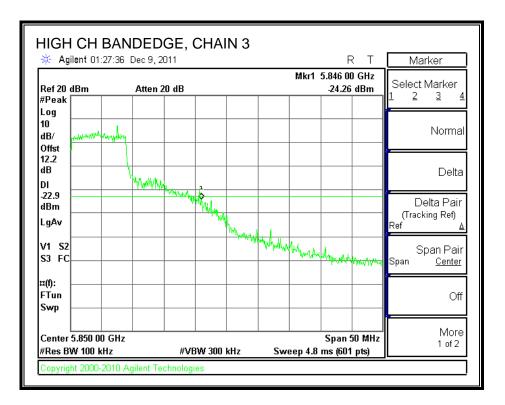


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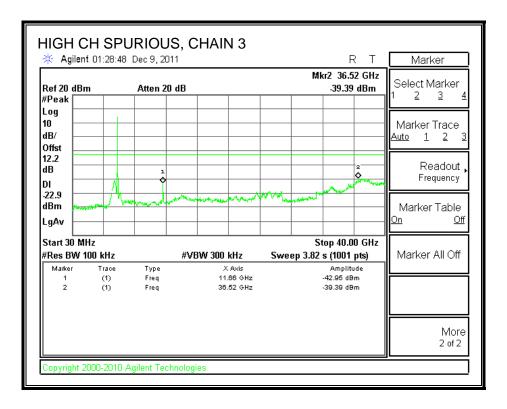
🔆 Agilen	. 20.10.30	Dec 9, 201	1			Mk	r2 37.2	₹ T 24 GHz	Marker
Ref 20 dBn #Peak	n	Atten 20	dB				-39.73	dBm	Select Marker
		_							
10 –									Marker Trace
dB/									<u>Auto 1 2 3</u>
Offst									
dB	1							2	Readout
DI 📂	- 8								Frequency
-22.9	<u> </u>	way and	Participant along	ano mar	and the loss	proceeding the			
dBm 📩	and the second s								Marker Table
LgAv –									<u>On Off</u>
Start 30 MI	Hz					St	op 40.0	0 GHz	
#Res BW 1	00 kHz		#VBW 300) kHz	Swee	ep 3.82 :	s (1001	pts)	Marker All Off
Marker 1	Trace	Туре		X Axis 5.39 GHz			Ampliti 40.30 dB		
2	(1) (1)	Freq Freq		5.39 GHZ 7.24 GHz			-40.30 dB -39.73 dB		
									More
									2 of 2

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7.5. 802.11n HT40 CDD 3TX MODE IN THE 5.8 GHz BAND

7.5.1. 6 dB BANDWIDTH

<u>LIMITS</u>

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

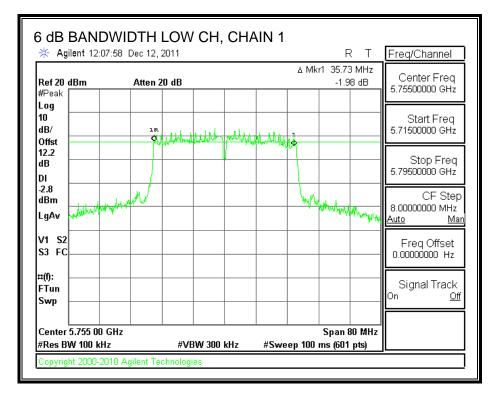
TEST PROCEDURE

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	Chain 1	Chain 2	Chain 3	Minimum Limit
		6 dB BW	6 dB BW	6 dB BW	
	(MHz)	(MHz)	(MHz)	(MHz)	(MHz)
Low	5755	35.73	35.87	36.27	0.5
High	5795	35.33	35.87	36.40	0.5

6 dB BANDWIDTH, CHAIN 1



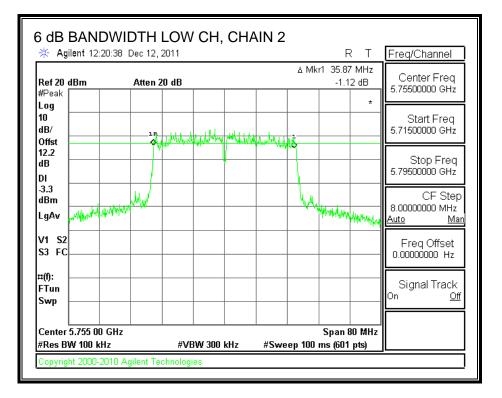
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🔆 Agilent 09:38	WIDTH HIGH 3:35 Dec 12, 2011		R	T Freq/Channel
Ref 20 dBm #Peak	Atten 20 dB		∆ Mkr1 35.33 -0.63	MHz Contor Frog
Log 10 dB/ Offst		tille maltingly		Start Freq 5.75500000 GHz
12.2 dB DI				Stop Freq 5.83500000 GHz
-2.3 dBm LgAv	hand -		why when we want	CF Step 8.00000000 MHz <u>Auto Man</u>
V1 S2 S3 FC				Freq Offset 0.00000000 Hz
¤(f): FTun Swp				Signal Track
Center 5.795 00 (#Res BW 100 kHz		W 300 kHz #	Span 80 Span 80 Sweep 100 ms (601 p	

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6 dB BANDWIDTH, CHAIN 2



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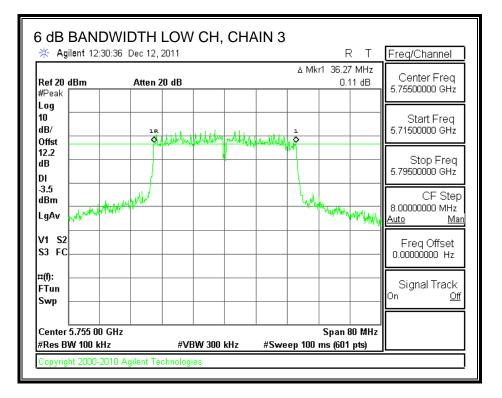
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🔆 Agilent 10:02	211 Dec 12, 2011			RT	Freq/Channel
Ref 20 dBm #Peak	Atten 20 dB		∆ Mkr	1 35.87 MHz -1.22 dB	Center Freq 5.79500000 GHz
Log 10 dB/ Offst		and he we have	ano Muchait		Start Freq 5.7550000 GHz
12.2 dB					Stop Freq 5.83500000 GHz
DI -3.2 dBm LgAv	WHEN WAY		- WA	and full the warrant	CF Step 8.0000000 MHz <u>Auto Man</u>
V1 S2 S3 FC					Freq Offset 0.00000000 Hz
¤(f): FTun Swp					Signal Track On <u>Off</u>
Center 5.795 00 (#Res BW 100 kHz		3W 300 kHz	#Sweep 100 n	Span 80 MHz ns (601 nts)	

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6 dB BANDWIDTH, CHAIN 3



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🔆 Agilent 10:18	:36 Dec 12, 2011		F	R T Freq/Cha	nnel
Ref 20 dBm #Peak	Atten 20 dB		∆ Mkr1 36.4 1.	0 MHz 04 dB 5.7950000	
Log 10 dB/ Offst		the for monthly and	ululu p	Start 5.75500000	
12.2 dB DI				Stop	Freq GHz
-3.5 dBm LgAv	10 ALLAND		her hours and should	CF 8.00000000 <u>Auto</u>	= Step D MHz <u>Man</u>
V1 S2 S3 FC				Freq C 0.0000000	íffset O Hz
¤(f): FTun Swp				Signal ⁻ On	Track <u>Off</u>
Center 5.795 00 G #Res BW 100 kHz		W 300 kHz	Span #Sweep 100 ms (60'	80 MHz 1 pts)	

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7.5.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

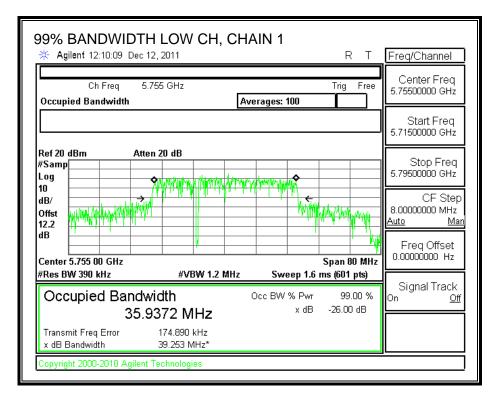
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

Channel	Frequency	Chain 1	Chain 2	Chain 3
		99% Bandwidth	99% Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)	(MHz)
Low	5755	35.9372	35.1442	34.9184
High	5795	35.3693	35.7307	35.6069

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99% BANDWIDTH, CHAIN 1

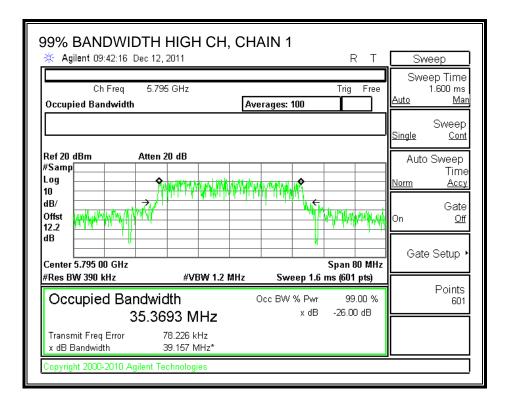


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 COMPLIANCE CERTIFICATION SERVICES (UL CCS)
 FORM NO: CCSUP4701D

 47173 BENICIA STREET, FREMONT, CA 94538, USA
 TEL: (510) 771-1000
 FAX: (510) 661-0888

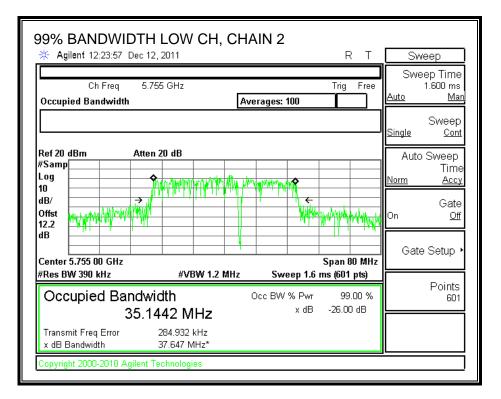
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99% BANDWIDTH, CHAIN 2

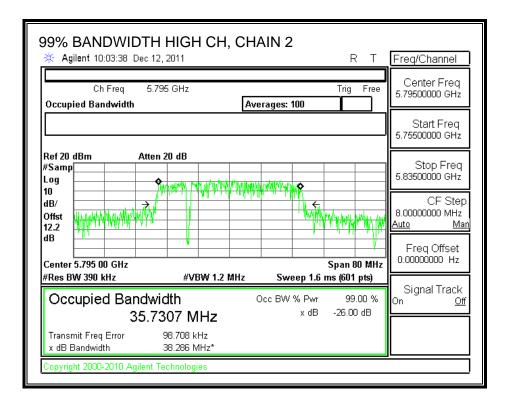


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 COMPLIANCE CERTIFICATION SERVICES (UL CCS)
 FORM NO: CCSUP4701D

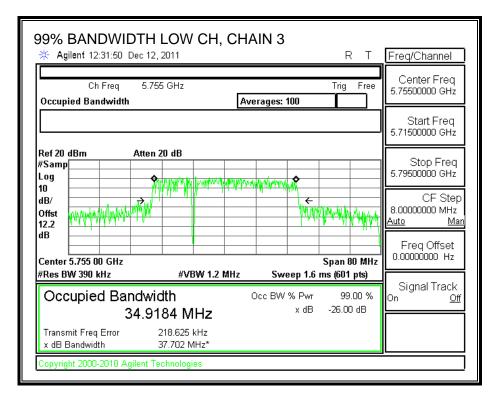
 47173 BENICIA STREET, FREMONT, CA 94538, USA
 TEL: (510) 771-1000
 FAX: (510) 661-0888

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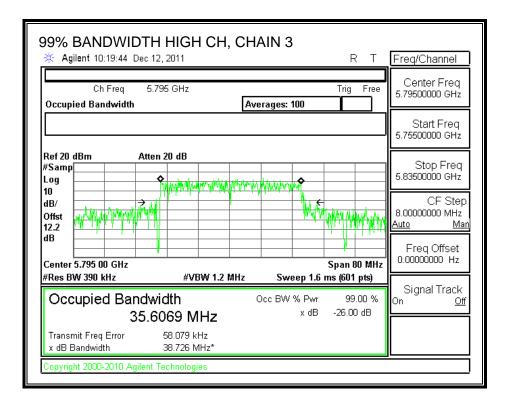


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99% BANDWIDTH, CHAIN 3



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7.5.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The composite antenna gain is equal to 9.31 dBi, therefore the limit is 26.69 dBm.

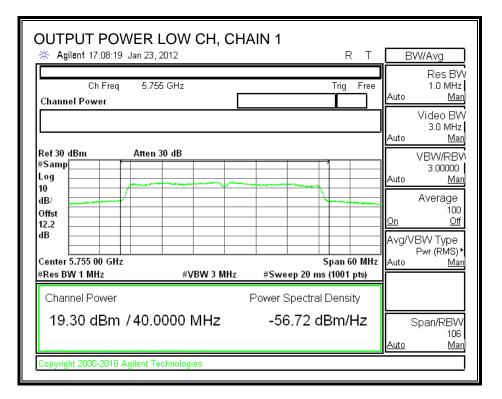
TEST PROCEDURE

Peak power is measured using the Channel bandwidth Alternative peak output power procedure specified in "TCB Training for Devices covered under Scopes A1 - A4" by Joe Dichoso, May 2003.

RESULTS

Channel	Frequency	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		PK Power	PK Power	PK Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5755	19.30	19.24	19.05	23.97	26.69	-2.72
High	5795	19.57	19.34	18.55	23.95	26.69	-2.74

CHAIN 1 OUTPUT POWER



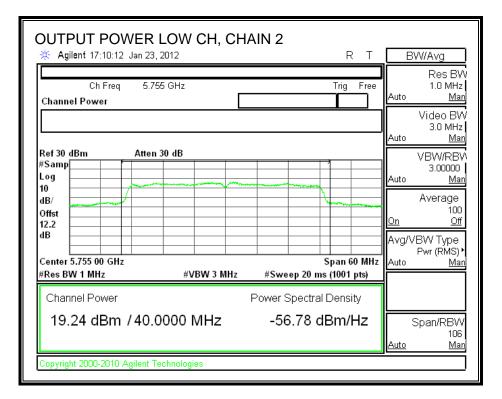
COMPLIANCE CERTIFICATION SERVICES (UL CCS) FORM NO: CCSUP4701D 47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888 This report shall not be reproduced except in full, without the written approval of UL CCS.

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OUTPUT POWER HIGH CH, CHAIN 1 * Agilent 17:16:59 Jan 23, 2012 R T	Amplitude
Ch Freq 5.795 GHz Trig Free	Ref Level 30.00 dBm
Channel Power	Attenuation 30.00 dB <u>Auto Man</u>
Ref 30 dBm Atten 30 dB #Samp Log	Scale/Div 10.00 dB
	Scale Type Log Lin
dB Center 5.795 00 GHz #Res BW 1 MHz #VBW 3 MHz #See D 20 ms (1001 pts)	Presel Center
Channel Power Power Spectral Density	Presel Adjust [3-26 GHz] ♪ 0.000 Hz
19.57 dBm / 40.0000 MHz -56.45 dBm/Hz	More 1 of 3
Copyright 2000-2010 Agilent Technologies	

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CHAIN 2 OUTPUT POWER



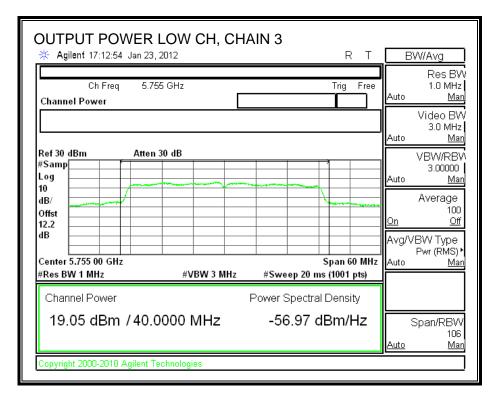
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🔆 Agilent 17:19:36 Jan 23, 2		AIN 2 R	T BW/Avg
Ch Freq 5.795 Channel Power	GHz	Trig	Free 1.0 MHz Auto <u>Man</u>
			Video BW 3.0 MHz Auto <u>Man</u>
Ref 30 dBm Atten 3 #Samp Log 10	0 dB		VBW/RBV 1.00000 Auto Man
dB/ Offst			Average 100 On Off
dB		Span 60	Avg/VBW Type Pwr (RMS)* MHz Auto <u>Man</u>
#Res BW 1 MHz Channel Power	#VBW 3 MHz	#Sweep 20 ms (1001 p Power Spectral Density	
19.34 dBm / 40.0			

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CHAIN 3 OUTPUT POWER



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Ch Freq 5	.795 GHz	Trig Free	Res BW a 1.0 MHz Auto <u>Man</u>
		I	Video BW 3.0 MHz Auto <u>Man</u>
Ref 30 dBm Atte #Samp Log 10	en 30 dB		VBW/RBV 1.00000 <u>Auto Man</u>
dB/ 0ffst			Average 100 On Off
dB		Span 60 MH	Avg/VBW Type Pwr (RMS)► z Auto <u>Man</u>
#Res BW 1 MHz Channel Power	#VBW 3 MHz	#Sweep 20 ms (1001 pts) Power Spectral Density	
18.55 dBm /40	.0000 MHz	-57.48 dBm/Hz	Span/RBW 106 Auto Man

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7.5.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 12.2 dB (including 10 dB pad and 1.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Chain 1 Power	Chain 2 Power	Chain 3 Power	Total Power
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)
Low	5755	19.23	18.86	18.89	23.77
High	5795	19.35	19.06	18.47	23.75

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7.5.5. 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.

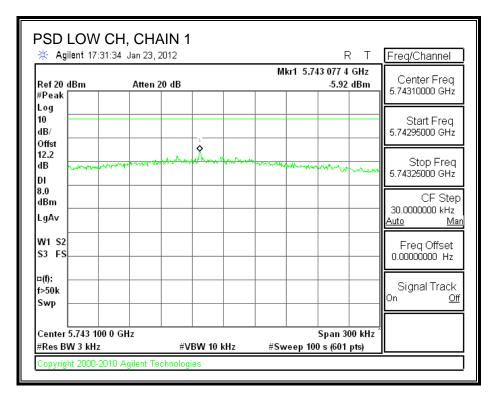
TEST PROCEDURE

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.

RESULTS:

Channel	Frequency	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		PSD	PSD	PSD	PSD		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5755	-5.92	-5.54	-8.27	-1.65	8	-9.65
High	5795	-6.16	-7.08	-8.5	-2.37	8	-10.37

POWER SPECTRAL DENSITY, CHAIN 1



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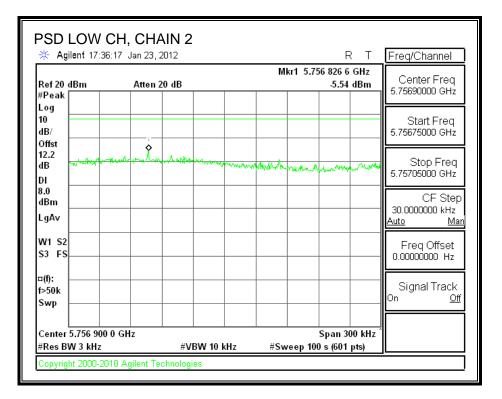
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🔆 Agilent 17:48	6:57 Jan 23, 2012			RT	Freq/Channel
Ref 20 dBm #Peak	Atten 20 dB		Mkr1 5.7	791 826 6 GHz -6.16 dBm	Center Freq 5.79180000 GHz
Log 10 dB/ Offst		1			Start Freq 5.79165000 GHz
12.2 dB	where and the strategies and	www.ushing	Marine and the long contract	- warmen warmen warden war	Stop Freq 5.79195000 GHz
8.0 dBm LgA∨					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 5.791 800 #Res BW 3 kHz		BW 10 kHz	#Sween 10	Span 300 kHz 00 s (601 pts)	

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POWER SPECTRAL DENSITY, CHAIN 2



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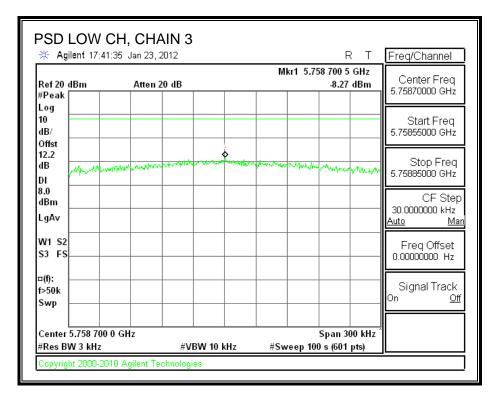
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🔆 Agi	ient 17:	50:30	Jan 23,	2012						₹Т	Freq/Channel
Ref20d #Peak [IBm		Atten 20 dB			Mkr1 5.793 996 4 GHz -7.08 dBm				Center Freq 5.79410000 GHz	
Log 10 dB/ Offst		1									Start Freq 5.79395000 GHz
12.2 dB DI	<u>\444</u>		an a	- Charalt - A	-	nd the Aprena	tage of the second s	and Norther	up Manute	personal	Stop Freq 5.79425000 GHz
8.0 dBm LgA∨											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 { #Res BV			lz	#V	BW 10 I	(H7	#Sw	eep 100	Span 3 s <i>1</i> 601		

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POWER SPECTRAL DENSITY, CHAIN 3



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ow Ag	ilent 17:54:0	Jb Jan 23,	2012						₹Т	Freq/Channel
Ref 20 #Peak	dBm	Atten	20 dB				kr1 5.79		GHz dBm	Center Freq 5.79310000 GHz
Log 10 dB/ Offst										Start Freq 5.79295000 GHz
12.2 dB DI	H.H	and the second	en verste greet	1 X	•••••	-	-turned	them the source	-	Stop Freq 5.79325000 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>
	5.793 100 0 W 3 kHz	GHz	#1	/BW 10 I		#\$14	eep 100	Span 3 Span 3		

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7.5.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

Output power was measured based on the use of RMS averaging over a time interval, therefore the required attenuation is 30 dB.

TEST PROCEDURE

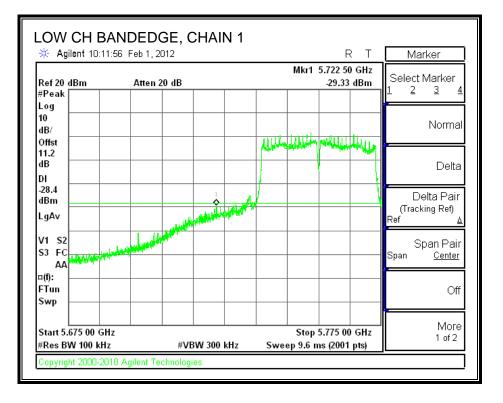
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

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

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RESULTS

CHAIN 1 SPURIOUS EMISSIONS

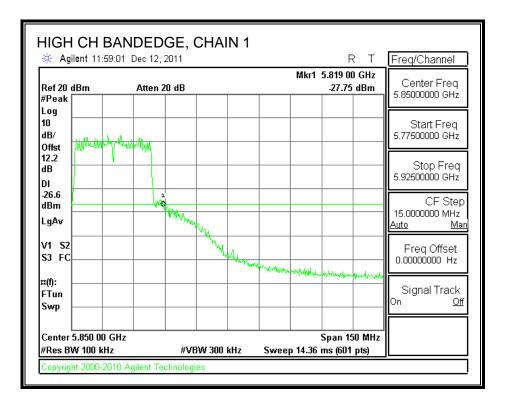


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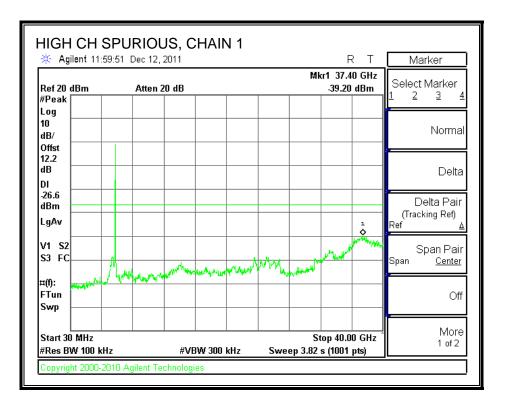
🔆 Agilen	t 10:14:04	Feb 1, 20	12				F		Marker
Ref20dBr #Peak	n	Atten 20	dB			Mk	ar2 5.40 -48.10		Select Marker 1 <u>2 3</u> 4
Log 10									Marker Trace
dB/ Offst									<u>Auto 1 2 3</u>
11.2 dB		2			_				Readout Frequency
28.4		Å		J. C. Marken				, 1997 - 1997	Marker Table
LgAv									<u>On Off</u>
Start 30 M #Res BW 1			#VBW	300 kHz	Swee	Sto p 2.482 s	p 26.00 s (2001		Marker All Off
Marker 1	Trace (1)	Type Freg		X Axis 3.835 GH	7		Amplitu 54.37 dB		
2	(1)	Freq		5.406 GH			-48.10 dB		
									More
									2 of 2

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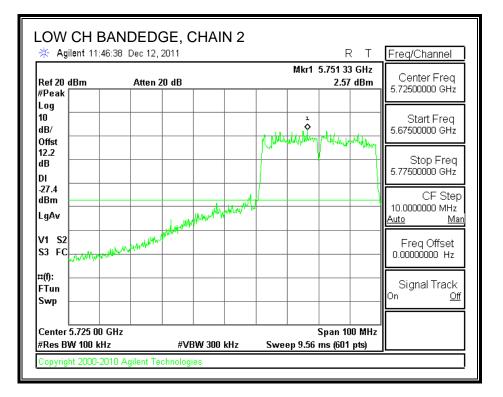


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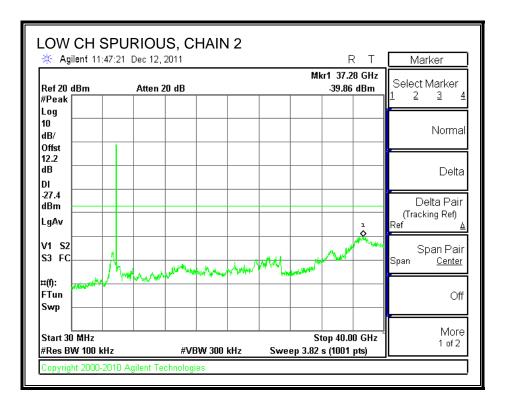
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CHAIN 2 SPURIOUS EMISSIONS

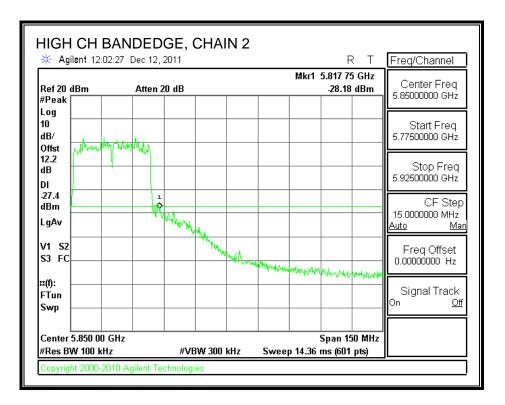


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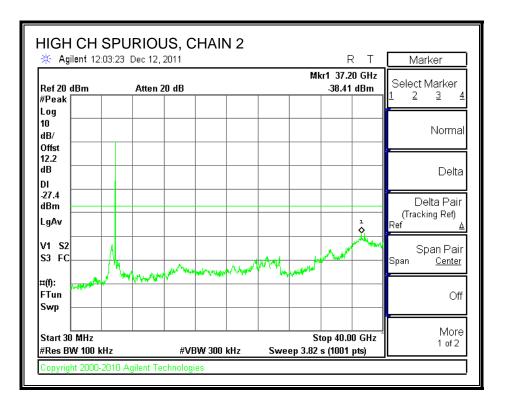


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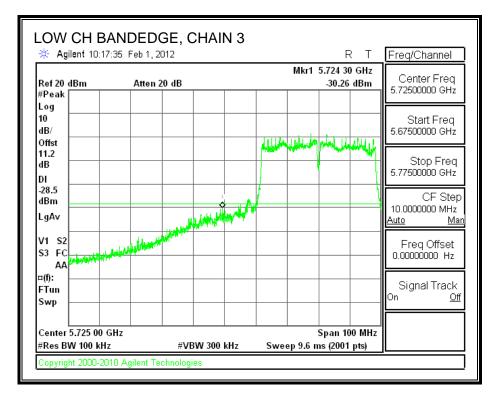
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CHAIN 3 SPURIOUS EMISSIONS



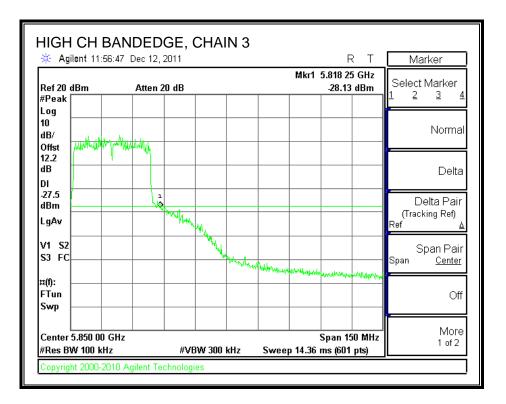
COMPLIANCE CERTIFICATION SERVICES (UL CCS) FORM NO: CCSUP4701D 47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888 This report shall not be reproduced except in full, without the written approval of UL CCS.

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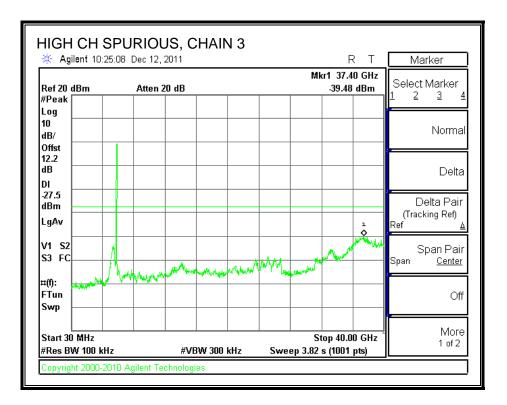
🔆 Agilent 10:19:	54 Feb 1,2012			R T	Freq/Channel
Ref 20 dBm #Peak	Atten 20 dB		Mkr1	13.651 GHz -53.39 dBm	Center Freq 13.0150000 GHz
Log 10 dB/					Start Freq 30.0000000 MHz
Offst 11.2 dB DI					Stop Freq 26.000000 GHz
-28.5 dBm LgAv					CF Step 2.59700000 GHz <u>Auto Ma</u>
V1 S2 S3 FC					Freq Offset 0.00000000 Hz
¤(f): FTun Swp	to the second		nteresteres and a second		Signal Track On <u>Of</u>
Start 30 MHz #Res BW 100 kHz		BW 300 kHz	Stop Sweep 2.482 s	26.000 GHz	~

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8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

<u>LIMITS</u>

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (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 spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable 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.

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8.2. TRANSMITTER ABOVE 1 GHz

8.2.1. TX ABOVE 1 GHz, 802.11g 1TX MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

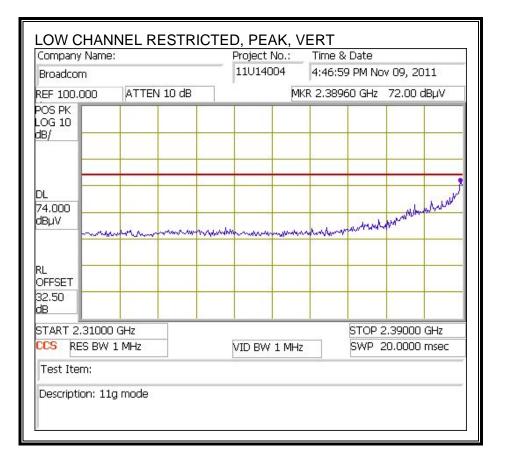
Broadcom			procession and a second	0.:	Time & I	and the second statement of th	2010/00/00/00/00	Startin
	6		11U1400)4	4:58:50	PM No	v 09, 20)11
REF 100.00	DO ATTEN	10 dB		MK	R 2.3896	0 GHz	64.16 0	dBµV
OS PK OG 10 IB/								
)L 74.000 1ΒμV	the contraction of the second of		delange gange	Annada		muund	white	wound
RL DFFSET 32.50								
iB								
	31000 GHz 3 BW 1 MHz	1	VID BW :	l MHz	<u> </u>		2.39000 20.0000	
Test Item								
Descriptio	n: 11g mode							

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Company Nar	ne:	Project No.: 11U14004	
Broadcom	Broadcom		5:00:31 PM Nov 09, 2011
REF 100.000	ATTEN 10 dB	M	1KR 2.39000 GHz 48.97 dBµV
POS PK .OG 10 JB/			
DL 54.000 JBµV			
RL OFFSET			
#В			
START 2.310 C <mark>CS</mark> RES B	00 GHz N 1 MHz	VID BW 10 Ha	STOP 2.39000 GHz SWP 24.00 sec
Test Item:			

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RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



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Company Name: Broadcom		Project No.:	Time & Date	
		11U14004	4:55:50 PM Nov	09, 2011
REF 100.000	ATTEN 10 dB	М	KR 2.38980 GHz 5	i3.55 dBµV
POS PK .OG 10 18/				
DL 54.000 JBµV				
RL DFFSET 32.50 JB				
START 2.31000		VID BW 10 Hz		39000 GHz .00 sec
Test Item:				

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RESTRICTED BANDEDGE (CHANNEL 2, HORIZONTAL)

Company Nar	ne:	Project No.:	 permensions and a statements 	
Broadcom		11U14154	9:18:29 AM No	ov 30, 2011
REF 112.600	ATTEN 10 dB	M	KR 2.32620 GHz	53.62 dBµV
POS PK .OG 10 JB/				
DL 74,000 dBµV				
	www.www.	-		-
32.60 dB				
START 2.310	IOO GHz		STOP	2.39000 GHz
C <mark>CS</mark> RES B	W 1 MHz	VID BW 1 MH	z SWP	20.0000 msec
Test Item: 3	x3 wireless module			
Description:	11g: 2417MHz			

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Company Name	9:	ED, AVG, HORI Project No.:	Time & Da	ate	
Broadcom		11014154	9:20:04 A	M Nov 30, 2011	
REF 112.600	ATTEN 10 dB	M	IKR 2.38820 (GHz 41.63 dBµ\	
POS PK LOG 10 JB/					
DL 54.000 JBµV					
RL OFFSET					
32.60 #B		· · · · · · · · · · · · · · · · · · ·			
START 2.31000) GHz		ST	OP 2.39000 GHz	
CCS RES BW 1 MHz		VID BW 10 H	z SV	SWP 24.00 sec	
Test Item: 3x3	3 wireless module				

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RESTRICTED BANDEDGE (CHANNEL 2, VERTICAL)

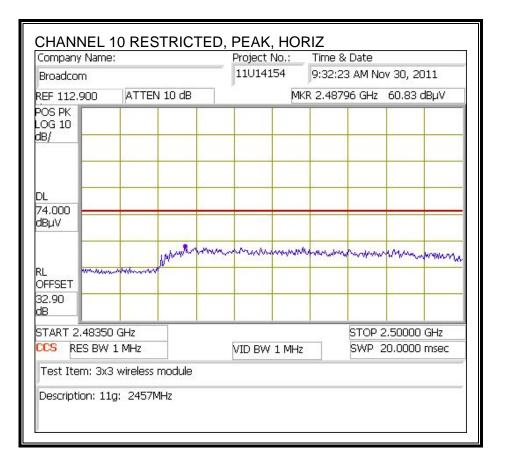
Company Name:			Project No.	-	Time & Date		
Broadcom			11U14154		9:15:52 AM No	ov 30, 20	11
REF 112.600	ATTEN	10 dB		MKR	2.32720 GHz	53.43 c	lBμV
OS PK .OG 10 #B/							
DL 74,000 dBµV							
	Manna	Marian	- And Marken	when	www.www.	vunn	water
32.60 #B							
START 2.310	100 GHz				STOP	2.39000	GHz
C <mark>CS</mark> RES B	W 1 MHz		VID BW 1 M	1Hz	SWP	20.0000	msec
Test Item: 3	3x3 wireless r	module					
Description:	11a: 2417M	IHz					

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Company Name:		Project No.:	- generative second statements			
Broadcom		11014154	9:14:27 AM N	ov 30, 2011		
EF 112.600 ATTEN 10 dB		M	KR 2.38920 GHz	(R 2.38920 GHz - 41.65 dBµV		
POS PK .OG 10 18/						
)L 54.000 IBµV						
32.60 #B		5				
START 2.31000 GHz		VID BW 10 Hz		STOP 2.39000 GHz SWP 24.00 sec		
Test Item:	3x3 wireless modul					

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RESTRICTED BANDEDGE (CHANNEL 10, HORIZONTAL)

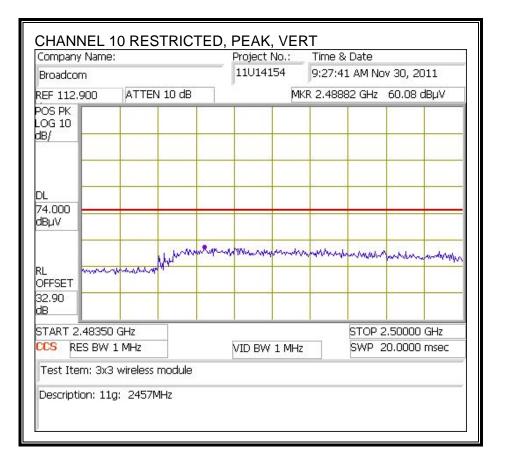


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Company Name	91	Project No.:	Time & Date	
Broadcom		11U14154	9:33:22 AM N	ov 30, 2011
REF 112.900	ATTEN 10 dB	M	KR 2.49443 GHz	42.06 dBµV
OS PK OG 10 IB/				
L 4.000 BµV				
L IFFSET				
ів				
START 2.48350		VID BW 10 H		2.50000 GHz 5.00 sec
Tool there are	3 wireless module			

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RESTRICTED BANDEDGE (CHANNEL 10, VERTICAL)

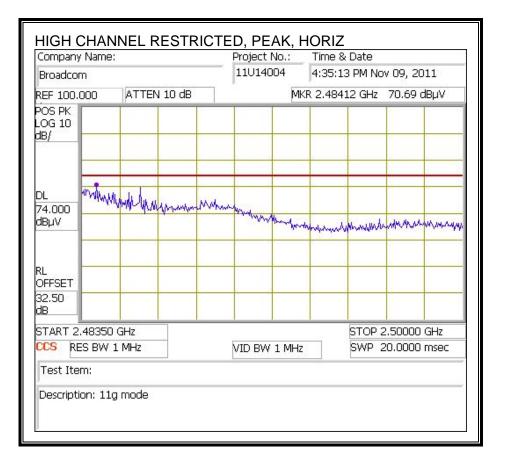


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Company Name	91	Project No.:	Time & Date		
Broadcom		11U14154	9:28:36 AM No	ov 30, 2011	
REF 112.900	ATTEN 10 dB	М	KR 2.48965 GHz	42.08 dBµV	
OS PK OG 10 IB/					
L 4.000 ВµV					
L IFFSET 2.90					
START 2.48350 GHz CCS RES BW 1 MHz		VID BW 10 Hz		STOP 2.50000 GHz SWP 5.00 sec	
	3 wireless module	1			

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RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

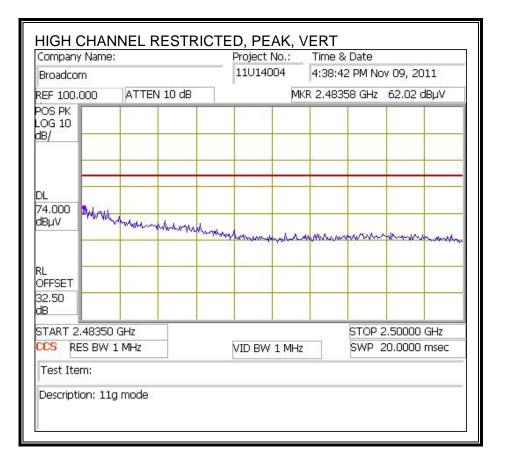


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Company Nam	ie:		Time & Date		
Broadcom REF 100.000 ATTEN 10 dB		11U14004	4:36:29 PM No	ov 09, 2011	
		M	(R 2.48350 GHz 50.19 dBµ)		
OG 10					
DL					
	~~~~~				
32.50 dB					
START 2.4835	io GHz		STOP :	2.50000 GHz	
CCS RES BW 1 MHz		VID BW 10 Hz	SWP 3	SWP 5.00 sec	
Test Item: Description: 1	1g mode				

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#### **RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



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DL 54.000			
REF 100.000         ATTEN 10 dB         MKR 2.48358 GHz         43.5           POS PK LOG 10 dB/                   43.5           DL 54.000 dBµV	53 dBµV		
LOG 10 dB/ DL 54.000			
54.000			
	-		
RL OFFSET			
32.50 dB			
START 2.48350 GHz STOP 2.500	)00 GHz		
CCS RES BW 1 MHz VID BW 10 Hz SWP 5.00	SWP 5.00 sec		
Test Item:			

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### 8.2.2. TX ABOVE 1 GHz, 802.11b CDD 3TX MODE IN THE 2.4 GHz BAND

#### **RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)**

Company N	ame:		Project No.:		propoleon of the device of the second s				
Broadcom			11U14004	4:05:0	4:05:01 PM Nov 09, 2011				
REF 100.00	D ATTE	N 10 dB	M	KR 2.375	540 GHz	i40 GHz 53.37 dBµV			
POS PK .OG 10 18/									
74.000 dBµV	n touting much made	uter annes dats	and and and and a second	-		Annon			
RL OFFSET									
32.50 dB									
	.000 GHz				STOP 2	2.39000 0	GHz		
START 2.31	CCS RES BW 1 MHz			VID BW 1 MHz			nsec		
START 2.31 C <mark>CS</mark> RES									

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Broadcom EF 100.000 ATTEN 10 dB	11U14004 MI	4:07:17 PM N	lov 09, 2011		
	M				
OS PK		KR 2.39000 GHz	2 41.95 dBµV		
OĞ 10 B/					
1L 4.000					
Βμν					
L PFFSET	- v		<u>, , , , , , , , , , , , , , , , , , , </u>		
2.50 B					
TART 2.31000 GHz ICS RES BW 1 MHz	VID BW 10 Hz		STOP 2.39000 GHz SWP 24.00 sec		
Test Item:					

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#### **RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**

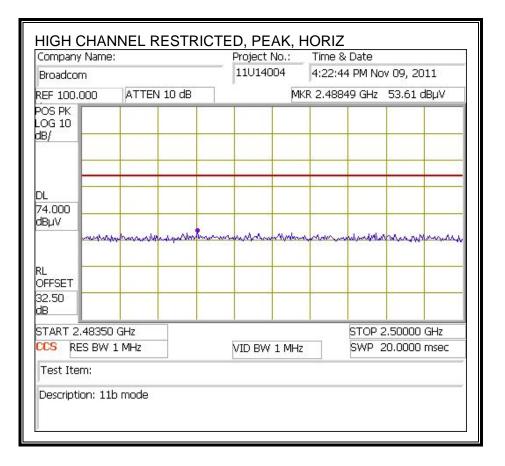
Company Name:		Project No.:	Time & Date	& Date			
Broadcom		11U14004	4:11:12 PM Nov 09, 2011				
REF 100.000	ATTEN 10 dB	М	KR 2.38980 GHz	53.71 dBµV			
OS PK .OG 10 #B/							
DL 74.000 JBµV			nnonnorthead	-mark-upperland			
32.50 #B							
START 2.31000	GHz		STOP 2	2.39000 GHz			
CCS RES BW 1 MHz		VID BW 1 MH	swp 2	SWP 20.0000 msec			
Test Item:							
Description: 11b	o mode						

Page 279 of 320

Company Nam	ie:	Project No.:	<ul> <li>Increase and a second se</li></ul>	and a second s			
Broadcom		11U14004	4:12:56 PM Nov 09, 2011				
REF 100.000	ATTEN 10 dB	М	KR 2.39000 G	39000 GHz 41.68 dBµV			
POS PK .OG 10 JB/							
DL 54.000 dBµV							
RL							
32.50 dB							
START 2.3100 CCS RES BV	DO GHZ V 1 MHZ	VID BW 10 Hz		STOP 2.39000 GHz SWP 24.00 sec			
Test Item:							
Test Item: Description: 1	.1b mode						

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#### **RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**



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Company Nam	e:		Time & Date	& Date			
Broadcom		11U14004	4:23:22 PM Nov 09, 2011				
REF 100.000	ATTEN 10 dB	M	<r 2.48350="" ghz<="" td=""><td colspan="2">39.90 dBµV</td></r>	39.90 dBµV			
OG 10							
DL 54.000 dBµV							
32.50 dB							
START 2.4835	0 GHz		STOP :	2.50000 GHz			
C <mark>CS</mark> RES BW	1 MHz	VID BW 10 Hz	SWP 3	SWP 5.00 sec			
Test Item: Description: 1	1h mode						

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#### **RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**

Company Nami	9:	Project No.:	Time & Date 4:18:09 PM Nov 09, 2011				
Broadcom		11U14004					
REF 100.000	ATTEN 10 dB	М	KR 2.48412 GHz	54.83 dBµV			
POS PK LOG 10 JB/							
DL							
	- Marine Manageria	mand have a show the second	when when a				
32.50 dB							
START 2.4835	D GHz		STOP :	2.50000 GHz			
CCS RES BW	1 MHz	VID BW 1 MH	z SWP :	SWP 20.0000 msec			

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Company Nam Broadcom	IE;	11U14004	Time & Date 4:19:50 PM Nov 09, 2011				
REF 100.000	ATTEN 10 dB	, M	KR 2.48362 GHz	362 GHz 43.49 dBµV			
OS PK OG 10 B/							
DL 54.000 ΙΒμν							
L )FFSET							
18							
START 2.48350 GHz CCS RES BW 1 MHz		VID BW 10 Hz		STOP 2,50000 GHz SWP 5,00 sec			
Test Item:							

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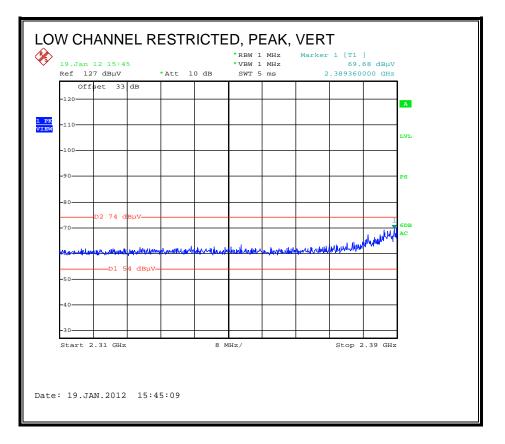
#### HARMONICS AND SPURIOUS EMISSIONS

Test Engr		David Ga	ircia												
Date:		11/09/11													
Project #:		11U1400	4												
Company	:	Broadcon	n												
Test Targe	et:	FCC 15 2	209 B												
Mode Ope	er:	11b, Tx													
	f	M			A	D	<b>a</b> .:				E: 11 0	ah That			
	ı Dist	Measurem Distance			-	Preamp (		ct to 3 me	tore	-	Field Stren d Strength	-			
	Read	Analyzer		ma	Avg			trength @			/s. Average				
	AF	Antenna			Peak			Field Stre			/s. Peak Li				
	CL	Cable Los			HPF	High Pas			ingen	ivital gill	5. I Cak En	iiiit			
						- <u>6</u> uo									
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Ant.High	Table Angle	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	cm	Degree	
Low Char															
4.824	3.0	40.0	33.4	5.8	-36.5	0.0	0.0	42.7	74.0	-31.3	H	Р	100.1	233.4	
4.824	3.0	32.5	33.4	5.8	-36.5	0.0	0.0	35.3	54.0	-18.7	H	A	100.1	233.4	
12.060	3.0	34.7	39.3	9.8	-35.4	0.0	0.0	48.4	74.0	-25.6	H	P	177.8	249.7	
12.060 4.824	3.0	22.5 45.0	39.3 33.4	9.8 5.8	-35.4	0.0	0.0	36.2 47.8	54.0 74.0	-17.8 -26.2	H V	A P	177.8 100.0	249.7 284.2	
4.824	3.0	40.9	33.4	5.8	-36.5	0.0	0.0	43.7	54.0	-20.2	v	A	100.0	284.2	
12.060	3.0	39.9	39.3	9.8	-35.4	0.0	0.0	53.5	74.0	-20.5	v	P	151.9	36.5	
12.060	3.0	34.1	39.3	9.8	-35.4	0.0	0.0	47.8	54.0	-6.2	V	A	151.9	36.5	
Mid Char	nel: 24	37 MHz													
4.874	3.0	38.5	33.5	5.8	-36.5	0.0	0.0	41.4	74.0	-32.6	Н	Р	142.5	187.6	
4.874	3.0	25.2	33.5	5.8	-36.5	0.0	0.0	28.0	54.0	-26.0	Н	A	142.5	187.6	
7.311 7.311	3.0	37.9 24.9	35.7 35.7	7.3	-36.2	0.0	0.0	44.7	74.0 54.0	-29.3 -22.3	H H	P	143.4 143.4	<u>12.2</u> 12.2	
12.185	3.0	34.2	39.3	9.8	-30.2	0.0	0.0 0.0	31.7 48.0	74.0	-22.5	H H	A P	143.4	12.2	
12.185	3.0	22.4	39.3	9.8	-35.4	0.0	0.0	36.1	54.0	-17.9	Н	A	127.7	198.3	
4.874	3.0	42.0	33.5	5.8	-36.5	0.0	0.0	44.9	74.0	-29.1	V	P	100.1	280.3	
4.874	3.0	37.3	33.5	5.8	-36.5	0.0	0.0	40.1	54.0	-13.9	V	A	100.1	280.3	
7.311	3.0	47.0	35.7	7.3	-36.2	0.0	0.0	53.8	74.0	-20.2	V	Р	168.2	60.4	
7.311	3.0	42.4	35.7	7.3	-36.2	0.0	0.0	49.1	54.0	-4.9	V	<u>A</u>	168.2	60.4	
12.185	3.0	37.4	39.3	9.8	-35.4	0.0	0.0	51.1	74.0	-22.9	V V	P	147.7	200.0	
12.185 High Cha	3.0	29.4	39.3	9.8	-35.4	0.0	0.0	43.1	54.0	-10.9	• •	A	147.7	200.0	
4.924	3.0	37.7	33.5	5.9	-36.5	0.0	0.0	40.6	74.0	-33.4	Н	Р	198.5	179.1	
4.924	3.0	26.4	33.5	5.9	-36.5	0.0	0.0	29.4	54.0	-24.6	Н	A	198.5	179.1	
7.386	3.0	39.6	35.8	7.3	-36.2	0.0	0.0	46.6	74.0	-27.4	Н	Р	143.9	245.4	
7.386	3.0	32.0	35.8	7.3	-36.2	0.0	0.0	39.0	54.0	-15.0	Н	A	143.9	245.4	
12.310	3.0	34.9	39.3	9.9	-35.4	0.0	0.0	48.7	74.0	-25.3	H	Р	130.0	26.5	
12.310	3.0	22.5	39.3	9.9	-35.4	0.0	0.0	36.3	54.0	-17.7	H	A	130.0	26.5	
4.924 4.924	3.0	42.1 36.2	33.5 33.5	5.9 5.9	-36.5	0.0	0.0	45.1 39.1	74.0 54.0	-28.9 -14.9	V V	P A	104.0 104.0	234.0 234.0	
4.924 7.386	3.0	<u> </u>	35.8	7.3	-36.2	0.0	0.0	52.9	54.0 74.0	-14.9	v	A P	104.0	234.0	
7.386	3.0	41.3	35.8	7.3	-36.2	0.0	0.0	48.2	54.0	-5.8	v	A	107.8	279.9	
12.310	3.0	38.3	39.3	9.9	-35.4	0.0	0.0	52.1	74.0	-21.9	v	P	172.4	196.9	
12.310	3.0	30.7	39.3	9.9	-35.4	0.0	0.0	44.5	54.0	-9.5	V	Α	172.4	196.9	

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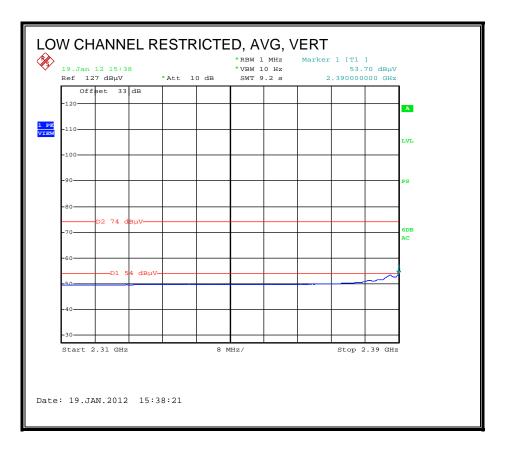
### 8.2.3. TX ABOVE 1 GHz, 802.11n HT20 CDD 3TX MODE IN THE 2.4 GHz BAND

#### **RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)**



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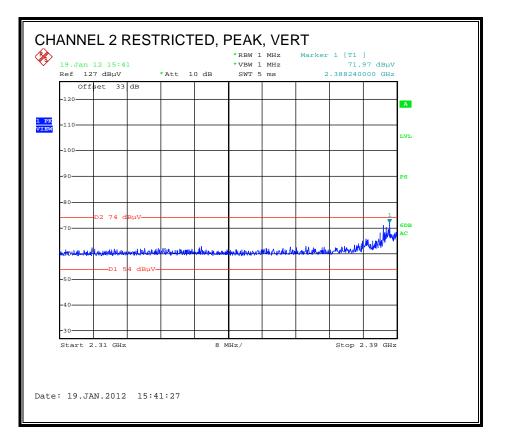
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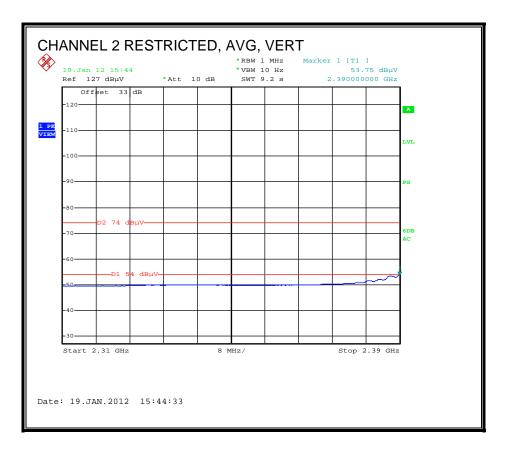
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#### **RESTRICTED BANDEDGE (CHANNEL 2, VERTICAL)**

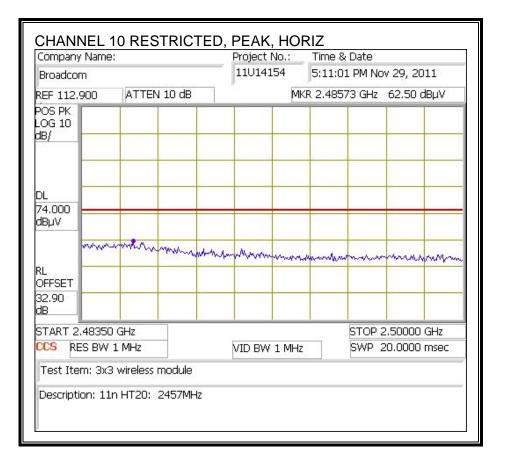


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#### **RESTRICTED BANDEDGE (CHANNEL 10, HORIZONTAL)**

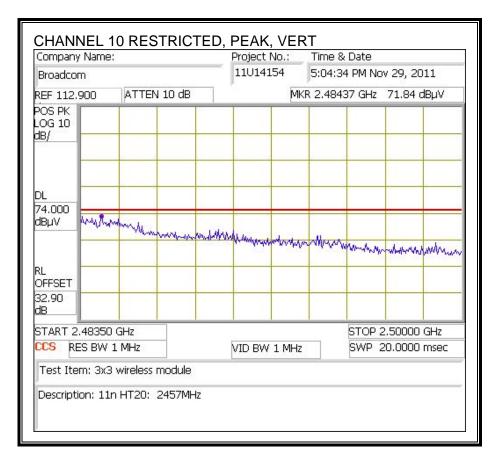


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Company Nam		FED, AVG, HOR Project No.:	Time & Date	
Broadcom		11U14154	5:12:14 PM N	ov 29, 2011
REF 112.900	ATTEN 10 dB	М	KR 2.48507 GHz	45.93 dBµV
OS PK .OG 10 JB/				
DL 54.000 dBµV				
RL OFFSET				
dB				
START 2.4835 CCS RES BW		VID BW 10 Hz		2.50000 GHz 5.00 sec
Test Item: 3x	3 wireless module			
Test Item: 3x	10			3,00 360

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#### **RESTRICTED BANDEDGE (CHANNEL 10, VERTICAL)**

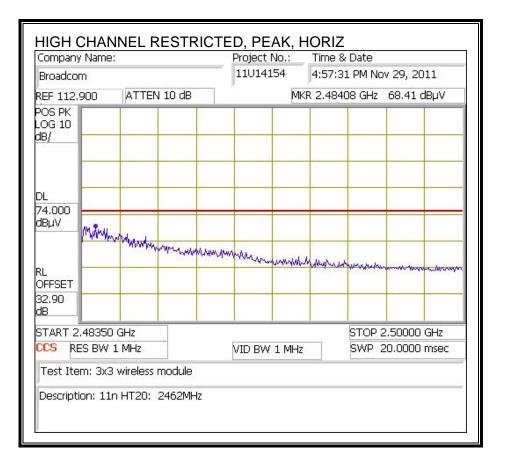


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Company Nam		FED, AVG, VER Project No.:	Time & Date	
Broadcom		11U14154	5:05:57 PM No	ov 29, 2011
REF 112.900	ATTEN 10 dB	M	KR 2.48395 GHz	52.94 dBµV
OS PK OG 10 JB/				
DL 54.000 ქΒμν				
32.90 dB				
START 2.4835 CCS RES BW		VID BW 10 Hz		2.50000 GHz 5.00 sec
Test Item: 3x	3 wireless module			
Test Item: 3x	10	z		

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#### **RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)**

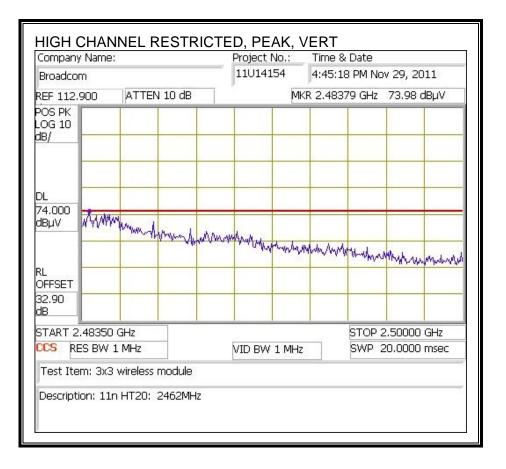


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Company Name	9:	Project No.:	Time & Date	
Broadcom		11U14154	4:54:44 PM N	ov 29, 2011
REF 112.900	ATTEN 10 dB	M	KR 2.48367 GHz	46.86 dBµV
OS PK .OG 10 JB/				
DL 54.000 dBµV				
RL OFFSET				
32.90 dB				
START 2.48350				2.50000 GHz 5.00 sec
LCO RES BY	3 wireless module	VID BW 10 Hz	BWP	D.UU SEC

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#### **RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)**



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Company Name	: :	Project No.:	Time & Date	
Broadcom		11U14154	4:43:58 PM N	ov 29, 2011
REF 112.900	ATTEN 10 dB	М	KR 2.48441 GHz	51.93 dBµV
DOS PK .OG 10 JB/				
DL 54.000 JBµV				
SL DFFSET 32.90 JB				
START 2.48350		VID BW 10 Hz		2.50000 GHz 5.00 sec

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#### HARMONICS AND SPURIOUS EMISSIONS

est Engr		Mark No	lting										
Date:		11/30/11	_										
Project #		11U1415	4										
Company	74	BroadC	pm										
Fest Targ		FCC 15.											
Mode Op	er:	11n HT2	0 MCS0										
	f	Measuren	nent Fred	mency	Amp	Preamp (	fain			Average	Field Stren	sth Limit	
	Dist	Distance				Distance		t to 3 me	eters	_	ld Strength	-	
	Read	Analyzer	Reading		Avg	Average l	Field S	trength @	) 3 m	Margin	rs. Average	Limit	
	AF	Antenna	Factor		Peak	Calculate	d Peak	Field Str	ength	Margin	rs. Peak Lis	mit	
	CL	Cable Los	35		HPF	High Pas	s Filter	r					
				_									
f GHz	Dist	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	f Itr dB	Corr.	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
channel i	(m)		dD/m	dD	dD	dD	dD	dDuv/m	dDuv/m	dD	V/II	PINQP	19dBm setting
4.824	3.0	38.4	33.4	5.8	-36.5	0.0	0.5	41.7	74.0	-32.4	H	P	170Dm setting
1.824	3.0	25.5	33.4	5.8	-36.5	0.0	0.5	28.8	54.0	-25.2	H	Â	
12.060	3.0	35.1	39.3	9.8	-35.4	0.0	0.8	49.6	74.0	-24.4	H	P	
12.060	3.0	22.8	39.3	9.8	-35.4	0.0	0.8	37.3	54.0	-16.7	H	A	
4.824 4.824	3.0 3.0	40.8 26.3	33.4 33.4	5.8 5.8	-36.5 -36.5	0.0	0.5	44.1 29.6	74.0 54.0	-29.9 -24.4	V V	P	
+.824 12.060	3.0	20.5 34.4	39.3	5.0 9.8	-35.4	0.0	0.5	48.9	54.0 74.0	-24.4	V	A P	
12.060	3.0	22.7	39.3	9.8	-35.4	0.0	0.8	37.2	54.0	-16.8	v	Ā	
	1		<u>.</u>					1					
channel i													19dBm setting
4.874	3.0	38.2	33.2	5.8	-34.8	0.0	0.0	42.4	74.0	-31.6	V	P	
4.874 7.311	3.0 3.0	26.4 44.2	33.2 36.3	5.8 7.3	-34.8 -34.1	0.0	0.0	30.6 53.6	54.0 74.0	-23.4 -20.4	V V	A P	
7.311	3.0	31.5	36.3	7.3	-34.1	0.0	0.0	40.9	54.0	-13.1		A	
12.185	3.0	45.4	39.4	9.8	-32.5	0.0	0.0	62.1	74.0	-11.9	V V	Р	
12.185	3.0	31.0	39.4	9.8	-32.5	0.0	0.0	47.7	54.0	- <b>6.3</b>	V	A	
4.874	3.0	37.5	33.2	5.8	-34.8	0.0	0.0	41.7	74.0	-32.3	H	P	
4.874 7.311	3.0 3.0	25.2 38.8	33.2 36.3	5.8 7.3	-34.8 -34.1	0.0	0.0	29.4 48.2	54.0 74.0	-24.6 -25.8	H H	A P	
7.311	3.0	25.1	36.3	7.3	-34.1	0.0	0.0	34.5	54.0	-19.5	H H	A	
12.185	3.0	35.4	39.4	9.8	-32.5	0.0	0.0	52.1	74.0	-21.9	H	P	
12.185	3.0	22.8	39.4	9.8	-32.5	0.0	0.0	39.5	54.0	-14.5	H	A	
		(2) (2)											1010
channel i 4.924	freq: 24 3.0	62MHz 42.8	33.2	5.9	-34.8	0.0	0.0	47.0	74.0	-27.0	V	D	19dBm setting
1.924 1.924	3.0	44.8 25.8	33.2	5.9	-34.8	0.0	0.0	30.0	74.0 54.0	-27.0	V	P A	
7.386	3.0	40.1	36.4	7.3	-34.1	0.0	0.0	49.8	74.0	-24.2	v	P	
7.386	3.0	25.3			-34.1	0.0	0.0		54.0	-19.1	V	A	
2.310	3.0	34.7	•••••••		-32.5	0.0	0.0	51.5	74.0	-22.5	V	P	
12.310 4.924	3.0 3.0	22.0 36.6	39.4 33.2	9.9 5.9		0.0 0.0	0.0	38.8 40.9	54.0 74.0	-15.2 -33.1	V H	A P	
1.924	3.0	24.4	33.2	5.9		0.0	0.0	28.6	54.0	-25.4	H	A	
7.386	3.0	35.6	36.4	7.3	-34.1	0.0	0.0	45.2	74.0	-28.8	H	P	
7.386	3.0	23.4	36.4	7.3	-34.1	0.0	0.0	33.1	54.0	-20.9	H	A	
12.310	3.0	34.4	39.4	9.9	-32.5	0.0	0.0	51.2	74.0	-22.8	H	P	
12.310	3.0	21.6	39.4	9.9	-32.5	0.0	0.0	38.4	54.0	-15.6	H	A	
			<u></u>					•					
Note: No	other e	missions	were de	tected	above t	he syster	n nois	se floor.	<u>.</u>			L	

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# 8.2.4. TX ABOVE 1 GHz, 802.11n HT20 3TX MODE IN THE 5.8 GHz BAND

#### HARMONICS AND SPURIOUS EMISSIONS

Test Engr:	D	avid Gau	rcia										
Date:	12	2/28/11											
Project #:	1	1U14154	4										
Company:	В	Broadcon	a										
Test Target:	F	CC 15.2	05										
Mode Oper:	н	IT20 3x3	MCS0	CDD,	5.8CH:	Band							
f		leasurem	-			Preamp G				_	Field Stren		
Dist	_	Distance to				Distance					ld Strength		
Read		inalyzer F	_		Avg	Average I				_	s. Average		
AF CL		intenna F able Loss			Peak HPF	Calculated High Pass			ingth	Margin v	rs. Peak Lir	nit	
f Di	st	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz (m	ı)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
low Channel:	5745	MHz											
11.490 3.0	0	35.7	38.9	11.2	-32.5	0.0	0.7	53.9	74.0	-20.1	H	P	
1.490 3.0		23.7	38.9	11.2		0.0	0.7	41.9	54.0	- <b>12.1</b>	H	A	
11.490 3.0		36.1	38.9	11.2	-32.5	0.0	0.7	54.4	74.0	- <b>19.6</b>	V	P	
1.490 3.0		23.9	38.9	11.2	-32.5	0.0	0.7	42.1	54.0	-11.9	V	A	
fid Channel:												_	
1.570 3.		36.9	38.9	11.3	-32.5	0.0	0.7	55.3	74.0	-18.7	H	P	
1.570 3.0		25.2	38.9	11.3		0.0	0.7	43.6	54.0	-10.4	H	A	
1.570 3.		39.6	38.9	11.3		0.0	0.7	58.0	74.0	-16.0	V	P	
1.570 3.0		27.3	38.9	11.3	-32.5	0.0	0.7	45.8	54.0	-8.2	V	A	
High Channel 1.650 3.0		35.0	39.0	11.4	-32.5	0.0	0.7	53.6	74.0	-20.4	н	P	
1.650 3.0		23.1		11.4		0.0	0.7	41.7	54.0	-12.3	H	A	
1.650 3.0		39.2		11.4		0.0	0.7	57.8	74.0	-16.2	V	P	
1.650 3.0		27.2		11.4		0.0	0.7	45.8	54.0	-8.2	v	Ā	
Rev. 4.1.2.7													
Note: No other	r emi	issions w	rere det	tected	above t	he systen	n nois	e floor.					

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# 8.2.5. TX ABOVE 1 GHz, 802.11n HT40 3TX MODE IN THE 5.8 GHz BAND

#### HARMONICS AND SPURIOUS EMISSIONS

High Free Complian				s, Frei	mont 5n	n Chamb	er						
Test Engra Date: Project #: Company Test Targe Mode Ope	: 2t:	David Ga 01/18/12 11U1415 Broadcor FCC 15.2 HT40 3x2	4 m 205	MCS0									
	f Dist Read AF CL	Measuren Distance Analyzer Antenna Cable Los	to Anter Reading Factor	ina	D Corr Avg	Distance	Correc Field Si d Peak	trength @ Field Stre	3 m	Peak Fie Margin v	Field Stren eld Strength vs. Average vs. Peak Li:	Limit Limit	
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m		V/H	P/A/QP	
5755 MH ₂													
11.510	3.0	40.9	38.8	9.5		0.0	0.7	54.1	74.0	-19.9	V	P	
11.510 11.510	3.0 3.0	27.0 36.4	38.8 38.8	9.5 9.5	-35.8 -35.8	0.0 0.0	0.7 0.7	40.2 49.6	54.0 74.0	-13.8 -24.4	V H	A	
11.510	3.0	24.4	38.8	9.5 9.5			0.7		74.0 54.0	-24.4 -16.4	н Н	P A	
5795 MHz		47.7	30.0	2.0	-35.0	0.0	<b>U.</b> 7	37.0	24.0	-10.4	••••••		
11.590	3.0	40.2	38.9	9.5	-35.8	0.0	0.7	53.6	74.0	-20.4	V	P	
11.590	3.0	27.6	38.9	9.5		¢	0.7		54.0	-13.0	v	Ā	
11.590	3.0	37.7	38.9	9.5	<b>*</b>	o	0.7		74.0	-22.2	H	P	
11.590	3.0	25.1	38.9	9.5	-35.8		0.7		54.0	-14.9	H	Α	
Rev. 4.1.2 Note: No		missions '	were de	tected	l above t	he syster	m nois	se floor.	·				

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# 8.3. RECEIVER ABOVE 1 GHz

# 8.3.1. RECEIVER ABOVE 1 GHz, 20 MHz BANDWIDTH

Company Project # Date: Cest Eng Configur: Mode:	: ineer:		Broadcom 11U14154 11/30/2011 David Garcia EUT / Laptop Rx Mode_20M	Hz Band [,]	width in	5 GHz B	and								
<u>Fest Equ</u> Ho		<u>t:</u> 18GHz	Pre-am	nplifer	1-260	Hz	Pre-am	plifer	26-40GH	z	Ho	orn > 18G	Hz		Limit
T60; S/	N: 223	3 @3m	▼ T34 HP	8449B		•				• T3	9; ARA 18-260	GHz; S/N:10	13	-	RX RSS 210 🗸
		2807700		<b>able 22</b> ble 2280		00 •	20' cal		2 <b>807500</b> 07500		HPF	Re •	eject Filte	RBV Avera	<u>x Measurements</u> W=VBW=1MHz ge Measurements 1MHz ; VBW=10Hz
f	Dist		Read Avg.	AF	CL	Amp	D Corr	Fltr	Peak	Avg	Pk Lim	-		Avg Mar	Notes
GHz .621	(m) 3.0	dBuV 56.3	dBuV 40.9	dB/m 26.8	dB 3.6	dB -36.9	<b>dB</b> 0.0	dB 0.0	dBuV/m 49.8	dBuV/n 34.4	1 dBuV/m 74	dBuV/m 54	dB -24.2	dB -19.6	(V/H) H
786	3.0	55.7	38.2	27.4	3.8	-36.6	0.0	0.0	50.2	32.7	74	54 54	-23.8	-19.0	H
501	3.0	57.3	36.3	28.8	4.6	-35.6	0.0	0.0	55.1	34.1	74	54	-18.9	-19.9	H
.000 .198	3.0 3.0	51.1 60.2	29.6 44.0	33.2 25.5	6.9 3.0	-34.0 -37.5	0.0 0.0	0.0 0.0	57.2 51.2	35.8 35.0	74	54 54	-16.8 -22.8	-18.2 -19.0	H V
798	3.0	55.4	37.4	27.4	3.8	-36.6	0.0	0.0	50.0	32.0	74	54	- <b>24.0</b>	-22.0	V
.501	3.0	58.3	36.0	28.8	4.6	-35.6	0.0	0.0	56.1	33.8	74	54	-17.9	-20.2	V
	3.0	54.2	30.9	33.2	6.9	-34.0	0.0	0.0	60.3	37.0	74	54	-13.7	-17.0	<u>v</u> v
.000															
	11														
ev. 07.08.	f	Measureme	ent Frequency			Amp	Preamp (					-	-	ield Strength	
.ev. 07.08.	f Dist	Distance to	Antenna	7		D Corr	Distance	Correc	ct to 3 mete			Pk Lim	Peak Field	1 Strength Li	mit
.ev. 07.08.	f Dist Read	Distance to Analyzer R	Antenna eading	7	:	D Corr Avg	Distance Average	Correc Field S	Strength @	3 m		Pk Lim Avg Mar	Peak Field Margin vs	1 Strength Li Average Li	mit mit
	f Dist	Distance to	Antenna eading actor	,		D Corr	Distance Average	Correc Field S d Peak	Strength @ k Field Stre	3 m		Pk Lim Avg Mar	Peak Field Margin vs	1 Strength Li	mit mit

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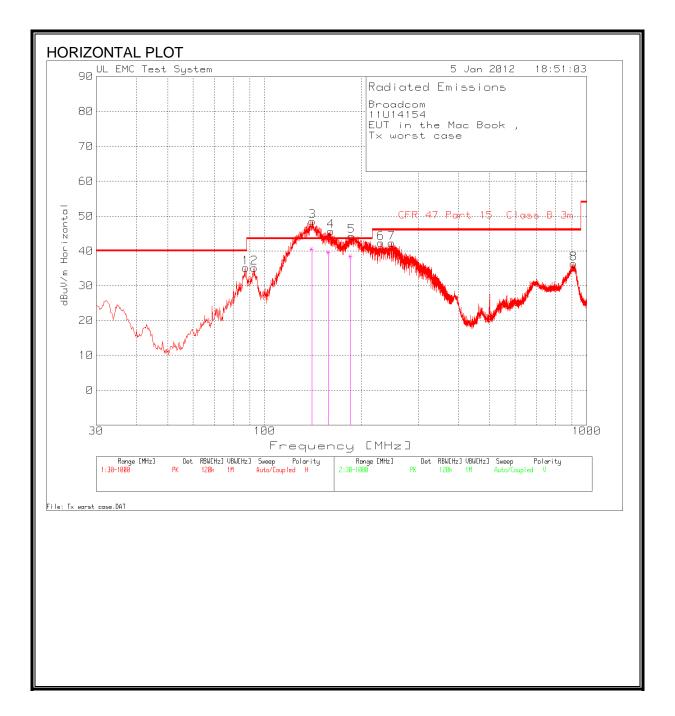
# 8.3.2. RECEIVER ABOVE 1 GHz, 40 MHz BANDWIDTH

Configu Mode:	#: ngineer:		Broadcom 11U14154 11/30/2011 David Garcia EUT / Laptop Rx Mode_40M	•	dwidth ir	n 5 GHz B	and								
	lorn 1-	_	Pre-a	mplifer	1-26	GHz	Pre-am	plifer	26-40GH	z	Ho	orn > 180	GHz		Limit
	S/N: 2238			P 8449B		-					; ARA 18-260			•	RX RSS 210 🗸
3' 0	quency Cab <b>cable 2</b> :able 228	2807700		c <b>able 2</b> 2 able 228		500 T	20' cat		2 <b>807500</b> 07500		HPF	- R	eject Filte	RB	k Measurements W=VBW=1MHz age Measurements =1MHz ; VBW=10Hz
f	Dist	1 1	Read Avg.	1	CL	Amp	D Corr	1	Peak	Avg	Pk Lim			Avg Mar	
GHz	(m) 3.0	dBuV 57.7	dBuV 42.2	dB/m 26.8	dB 3.5	dB -36.9	dB 0.0	dB 0.0	dBuV/m 51.1	dBuV/m 35.6	dBuV/m 74	dBuV/m	dB -22.9	dB -18.4	(V/H) H
.600 .795	3.0 3.0	57.7 56.5	42.2 38.8	26.8 27.4	3.5 3.8	-36.9 -36.6	0.0	0.0	51.1 51.0	35.0 33.3	74	54 54	-22.9 -23.0	-20.7	H
.490	3.0	58.1	37.8	28.8	4.6	-35.6	0.0	0.0	55.9	35.6	74	54	- <b>18.1</b>	-18.4	Н
5.000 L.655	3.0 3.0	51.0 59.3	32.4 42.0	33.2 27.0	6.9 3.6	-34.0 -36.8	0.0 0.0	0.0 0.0	57.1 53.0	38.5 35.7	74 74	54 54	-16.9 -21.0	-15.5 -18.3	H V
1.655 2.125	3.0	59.3 60.4	42.0 39.1	27.0	3.6 4.2	-36.8 -36.1	0.0	0.0	53.0 56.6	35.7 35.3	74 74	54 54	-21.0	-18.3 -18.7	V V
2.490	3.0	59.0	37.3	28.8	4.6	-35.6	0.0	0.0	56.8	35.1	74	54	-17.2	-18.9	V
5.000	3.0	55.4	37.7	33.2	6.9	-34.0	0.0	0.0	61.5	43.8	74	54	-12.5	-10.2	V V
Rev. 07.08	f Dist Read AF	Measureme Distance to Analyzer Re Antenna Fa Cable Loss	eading actor	у		Amp D Corr Avg Peak HPF	Average	Correc Field S ed Peak	ct to 3 mete Strength @ k Field Stre	3 m		Pk Lim Avg Mar	Peak Fiel Margin vs	Field Strengt Id Strength L s. Average L s. Peak Limit	.imit .imit

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# 8.4. WORST-CASE BELOW 1 GHz

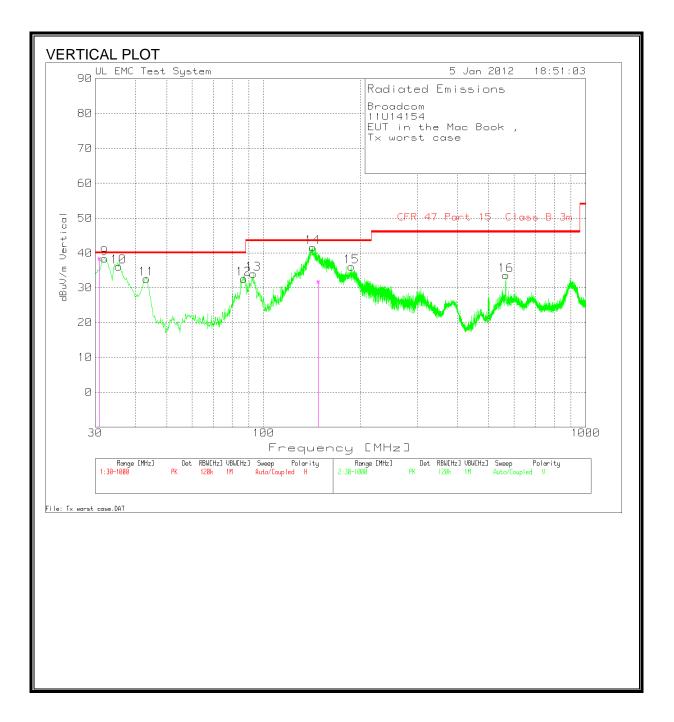
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



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



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#### EMI DATA

est	30 - 1000M	Hz									
	Meter	Detector	Amplifier	Ant, Cabl	dBuV/m	CFR 47	Margin	Height	Polarity		
requen	сy		Factor	factor		Part 15		[cm]			
						Class B 3					
87.378			-27	7.5					Horz		
92.9996		PK	-26.9						Horz		
40.8793			-26.4	13.1	48.6		5.1		Horz		
40.2957			-26.5			43.5			Horz		
160.6516			-26.2	13.1	45.72	43.5	2.22		Horz		
58.239 ⁺  86.6267			-26.2 -25.9	13.1 11.1	39.64 44.3		-3.86 0.8		Horz Horz		
185.3917			-25.9				-5.02		Horz		
229.8541			-20				-5.02		Horz		
229.004 248.4632			-25.6				-3.61		Horz		
911.6067			-23.4			40	-9.61		Horz		
211.000	00.00		-20.0	22.2	30.33	40	-0.01	100	TIOL		
ange: 2	30 - 1000M	l Hz									
est	Meter		Amplifier	Ant. Cabl	dBuV/m	CFR 47	Margin	Height	Polarity		
requen			Factor	factor		Part 15		[cm]	- 1		
						Class B 3	n				
32.1323	3 46.92	PK	-27.5	19	38.42			101	Vert		
31.0368	3 46.39	QP	-27.5	19.5	38.39	40	-1.61	107	Vert	Noise from	MacBook
0.0000		PK	-27.5	17.2		40			Vert		
35.4277		PK	-27.4	12.3		40			Vert		
35.4277 43.3753	3 47.71		-27	7.5		40			Vert		
35.4277 43.3753 86.9904	4 52.2	PK				43.5	-9.39	176	Vert		
35.4277 43.3753 86.9904 92.8058	4 52.2 3 53.11	PK PK	-26.9	7.9							
35.4277 43.3753 86.9904 92.8058 142.2362	4 52.2 3 53.11 2 55.06	PK PK PK	-26.9 -26.4	7.9 13	41.66	43.5	-1.84	251			
35.4277 43.3753 86.9904 92.8058 42.2362 48.368	4 52.2 3 53.11 2 55.06 1 45.5	PK PK PK QP	-26.9 -26.4 -26.4	7.9 13 12.7	41.66 31.8	43.5 43.5	-1.84 -11.7	251 250	Vert		
35.4277 43.3753 86.9904 92.8058 42.2362	4 52.2 3 53.11 2 55.06 1 45.5 9 50.99	РК РК РК <b>QP</b> РК	-26.9 -26.4	7.9 13 12.7 11.1	41.66 31.8 36.19	43.5 43.5	-1.84 -11.7 -7.31	251 250	Vert Vert		

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# 9. AC POWER LINE CONDUCTED EMISSIONS

### **LIMITS**

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted I	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

ANSI C63.4

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#### **RESULTS**

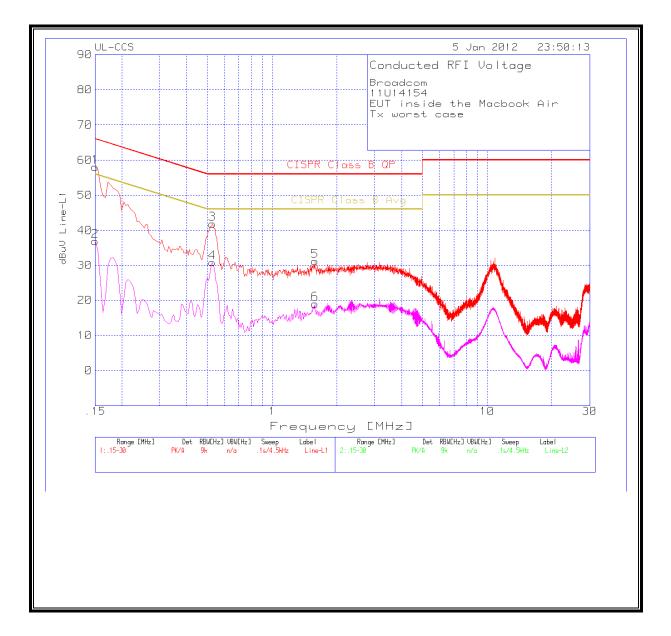
#### **<u>6 WORST EMISSIONS</u>**

Broadcom									
11U14154									
EUT inside	e the Macb	ook Air							
Tx worst c	ase								
Line-L1.15	- 30MHz								
Test	Meter	Detector	T24 IL	LC Cables	dBuV	CISPR	Margin	CISPR Class	Margin
Frequency	Reading		L1.TXT [di	3]		Class B QP	)	B Avg	
0.15	57.88	PK	0.1	0	57.98	66	-8.02	-	-
0.15	36.86	Av	0.1	0	36.96	-	-	56	-19.04
0.528	41.72	PK	0.1	0	41.82	56	-14.18	-	-
0.528	30.73	Av	0.1	0	30.83	-	-	46	-15.17
1.581	31.05	PK	0.1	0.1	31.25	56	-24.75	-	-
1.581	18.77	Av	0.1	0.1	18.97	-	-	46	-27.03
Line-L2.15	- 30MHz								
Test	Meter	Detector	T24 IL	LC Cables	dBuV	CISPR	Margin	CISPR Class	Margin
Frequency	Reading		L1.TXT [dl	3]		Class B QP	)	B Avg	
0.15	57.24	PK	0.1	0	57.34	66	-8.66	-	-
0.15	38.03	Av	0.1	0	38.13	-	-	56	-17.87
0.528	41.41	PK	0.1	0	41.51	56	-14.49	-	-
0.528	31.06	Av	0.1	0	31.16	-	-	46	-14.84
10.7475	32.65	PK	0.2	0.2	33.05	60	-26.95	-	-
10.7475	20.46	A.v.	0.2	0.2	20.86		-	50	-29.14

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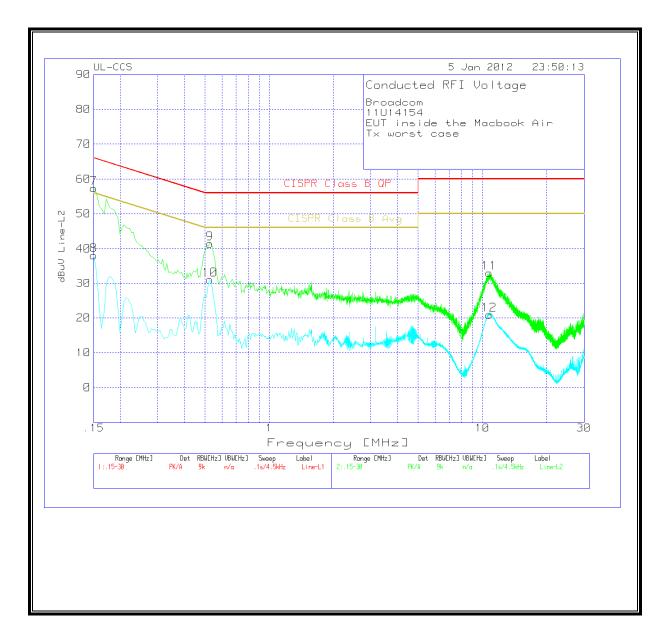
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#### LINE 1 RESULTS



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#### LINE 2 RESULTS



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#### 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) Limits for Occupational/Controlled Exposures							
0.3–3.0 3.0–30 30–300 300–1500 1500–100,000	614 1842/f 61.4	1.63 4. <i>89/</i> f 0.163	*(100) *(900/f²) 1.0 f/300 5	6 6 6 8			
(B) Limits	for General Populati	on/Uncontrolled Exp	posure				
0.3–1.34 1.34–30	614 824/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

t = trequency 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 occupational/controlled imits 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 exposed, 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.

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## 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  $10 \text{ W/m}^2$  is equivalent to  $1 \text{ mW/cm}^2$ .
- A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

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### EQUATIONS

Power density is given by:

S = EIRP / (4 * Pi * D^2)

where

S = Power density in W/m^2 EIRP = Equivalent Isotropic Radiated Power in W D = Separation distance in m

Power density in units of W/m² is converted to units of mWc/m² by dividing by 10.

Distance is given by:

D = SQRT (EIRP / (4 * Pi * S))

where

D = Separation distance in m EIRP = Equivalent Isotropic Radiated Power in W S = Power density in W/m^2

Where applicable (for example, multi-slot cell phone applications) a duty cycle factor may be applied.

Source-based time-averaged EIRP = (DC / 100) * EIRP

where

DC = Duty Cycle in %, as applicable EIRP = Equivalent Isotropic Radiated Power in W

For multiple chain devices, and colocated transmitters operating simultaneously in frequency bands where the limit is identical, the total power density is calculated using the total EIRP obtained by summing the Power * Gain product (in linear units) of each transmitter.

Total EIRP = (P1 * G1) + (P2 * G2) + ... + (Pn * Pn)

where

Px = Power of transmitter xGx = Numeric gain of antenna x

For multiple colocated transmitters operating simultaneously in frequency bands where different limits apply, a fraction of the exposure limit is established for each band, such that the sum of the fractions is less than or equal to one.

In the table(s) below, Power and Gain are entered in units of dBm and dBi respectively and conversions to linear forms are used for the calculations.

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### <u>LIMITS</u>

For mobile radio equipment operating in the cellular phone band, the lowest power density limit is calculated using the lowest frequency, as 824 MHz /  $1500 = 0.55 \text{ mW/cm}^2$  (FCC) and 824 MHz /  $150 = 5.5 \text{ W/m}^2$  (IC).

From FCC §1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm^2

From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m^2

### <u>RESULTS</u>

Multiple chain or colocated transmitters								
Band	Mode	Chain	Separation	Output	Antenna	Duty	IC Power	FCC Power
		for	Distance	AV Power	Gain	Cycle	Density	Density
		ΜΙΜΟ	(m)	(dBm)	(dBi)	(%)	(W/m^2)	(mW/cm^2)
2.4 GHz	Bluetooth	N/A		7.89	1.11	100		
2.4 + 5 GHz	WLAN	1		19.35	6.01	99		
2.4 + 5 GHz	WLAN	2		19.06	6.01	99		
2.4 + 5 GHz	WLAN	3		18.89	6.01	99		
C	ombined		0.20				1.93	0.193

**Note:** the AV output power and antenna gains shown above in this table are the highest power and antenna gain between 2.4 GHz and 5.8 GHz band as worst-case scenario.

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