

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

CERTIFICATION TEST REPORT

FOR

DC544D_3 PCIe DAUGHTER CARD FOR 2.4 / 5 GHz AP APPLICATIONS_NON DFS

MODEL NUMBER: 65-VN780-P3

FCC ID: J9C-DC544D3 IC: 2723A-DC544D3

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Prepared for QUALCOMM INC. 3165 KIFER ROAD SANTA CLARA, CA 95051 USA

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	QUALCOMM INC. 3165 KIFER RD SANTA CLARA, CA 95051 USA
EUT DESCRIPTION:	DC544D_3 PCIe DAUGHTER CARD FOR 2.4 / 5 GHz AP APPLICATIONS_NON DFS
MODEL:	65-VN780-P3
SERIAL NUMBER:	7916 for Antenna Port, 7929 for Radiated Emission
DATE TESTED:	JUNE 24 – JULY 17, 2009
	APPLICABLE STANDARDS

APPLICABLE STANDARDS					
STANDARD	TEST RESULTS				
CFR 47 Part 15 Subpart C	Pass				
INDUSTRY CANADA RSS-210 Issue 7 Annex 8	Pass				
INDUSTRY CANADA RSS-GEN Issue 2	Pass				

Compliance Certification Services, Inc. (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 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 CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by 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 CCS By:

FRANK IBRAHIM EMC SUPERVISOR COMPLIANCE CERTIFICATION SERVICES

Tested By:

VIEN TRAN EMC ENGINEER COMPLIANCE CERTIFICATION SERVICES

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2. TEST METHODOLOGY

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

3. FACILITIES AND ACCREDITATION

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. 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%.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11a/b/g/n WLAN transceiver module in a PCI form factor, for 2.4 / 5 GHz AP Applications that do not include DFS bands. It is equipped with four identical transmitter / receiver chains.

The radio module is manufactured by Qualcomm, Inc.

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range	Mode	Output Power	Output Power
(MHz)		(dBm)	(mW)
2.4 GHz BAND			
2412 - 2462	802.11b	24.37	273.53
2412 - 2462	802.11g	26.20	416.87
2412 - 2462	802.11n HT20	26.15	412.10
2422 - 2452 802.11n HT40		26.05	402.72
5.8 GHz BAND			
5745 - 5825	802.11a	25.15	327.34
5745 - 5825	802.11n HT20	25.24	334.20
5755 - 5795	802.11n HT40	25.05	319.89

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a dual band omni monopole (4 identical) antenna, each with a maximum gain of 2 dBi in the 2.4 GHz band and 3 dBi in the 5.8 GHz band.

For the 802.11a/b/g legacy modes the effective legacy antenna gain is:

Antenna Gain (dBi)	10 Log (# Tx Chains) (dB)	Effective Legacy Gain (dBi)
2	6.02	8.02
3	6.02	9.02

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5.4. SOFTWARE AND FIRMWARE

The EUT driver software installed during testing was Qualcomm, rev. 0.0.500.5.

The test utility software used during emissions testing was PTT Gui, rev. 5.1.

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 were utilized from preliminary testing of the Chipset, worst-case data rates used during the testing are as follows:

802.11b Mode (20 MHz BW operation): 1 Mbps, CCK.
802.11g Mode (20 MHz BW operation): 6 Mbps, OFDM.
802.11n MIMO HT20 Mode: MCS31, 260 Mbps, 4 Spatial Streams.
802.11n MIMO HT40 Mode: MCS31, 540 Mbps, 4 Spatial Streams.

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, that was determined to be 11g mode, mid channel.

For bandwidth measurement preliminary testing showed that there is no significant difference among different chains, so the measurements were performed using Chain 0.

For conducted spurious measurement preliminary testing showed that combiner is worst-case compared to individual chains; therefore final measurements were performed using combiner for all channels and modes.

For PSD measurement preliminary testing showed that combiner is worst-case compared to individual chains; therefore final measurements were performed using combiner for all channels and modes.

For Radiated Band Edge 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	Manufacturer	Model	Serial Number	FCC ID			
Laptop	IBM	T43 ThinkPad	L3-XDLXW06/02	DoC			
AC Adapter	IBM	08K8204	11S08K8204Z1Z9	DoC			
DC Power Supply	Tektronic	PS2521G	N/A	N/A			
DC Power Supply	HP	336108	KR24104150	N/A			
Extender PCI	ALLION	V1 EC-PEM V1.0	A073	N/A			

I/O CABLES

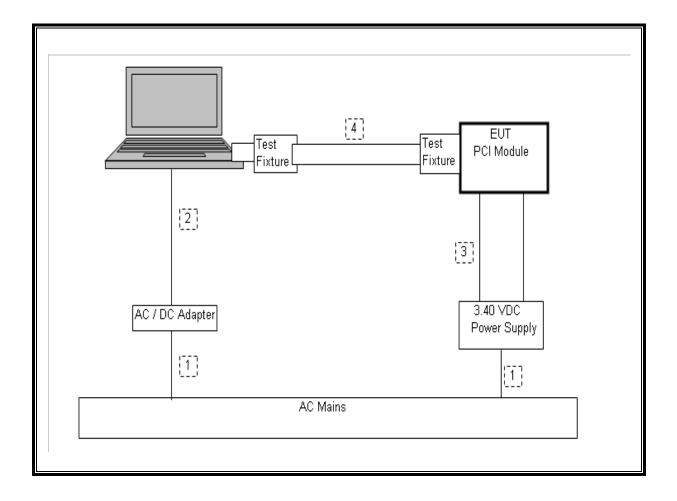
	I/O CABLE LIST								
Cable No.	Port	# of Identical Ports	Connecto Type	Cable Type	Cable Length	Remarks			
1	AC	2	US115	Un-shielded	1.5 m	For laptop			
2	DC	1	DC	Un-shielded	1.5 m	For laptop			
3	DC	1	Cable	Un-shielded	1.0 m	For EUT			
4	Ribbon	1	Ribbon	Un-shielded	.4 m	Test Fixture			

TEST SETUP

The EUT is connected to a host laptop computer via a test fixture 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							
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	01/05/09	01/05/10		
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	01/14/09	01/14/10		
Antenna, Horn, 18 GHz	EMCO	3115	C00945	04/22/09	04/22/10		
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	09/29/08	11/28/09		
Antenna, Horn, 40 GHz	ARA	MWH-2640B	C00981	05/21/09	05/21/10		
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	10/11/08	10/11/09		
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	03/31/09	03/31/10		
Preamplifier, 1-26GHz	Agilent / HP	8449B	C01052	08/05/08	08/05/09		
Peak Power Meter	Boonton	4541	C01186	01/19/09	01/19/10		
Peak Power Sensor	Boonton	4541	C01189	01/15/09	01/15/10		
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	10/29/08	10/29/09		
EMI Test Receiver, 30 MHz	R&S	ESHS 20	N02396	02/06/08	08/06/09		

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7. ANTENNA PORT TEST RESULTS

7.1. 2.4 GHz BAND CHANNEL TESTS FOR 802.11b MODE

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

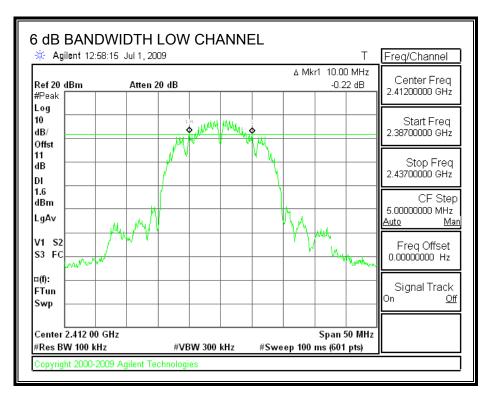
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

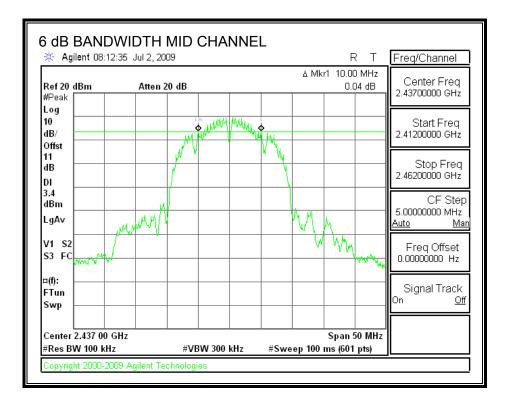
RESULTS

Channel	Frequency	6 dB BW	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2412	10.00	0.5
Middle	2437	10.00	0.5
High	2462	9.00	0.5

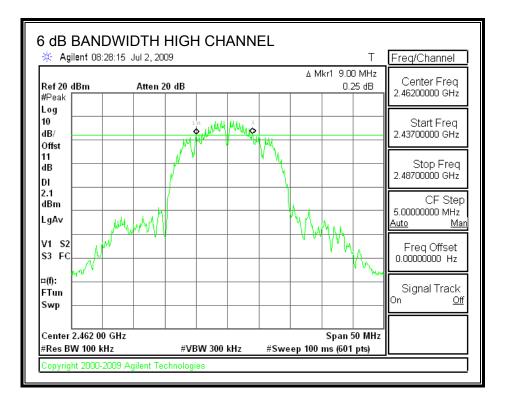
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6 dB BANDWIDTH





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7.1.2. 99% & 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

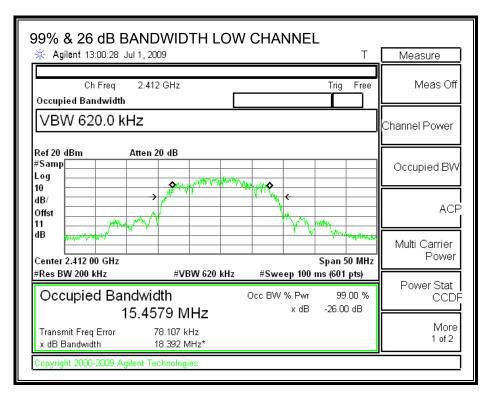
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

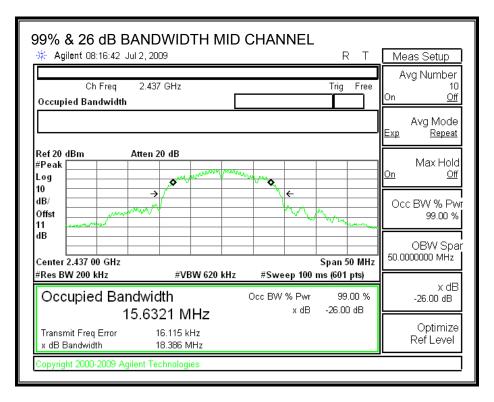
RESULTS

Channel	Frequency	99% OBW	26 dB BW
	(MHz)	(MHz)	(MHz)
Low	2412	15.46	18.39
Middle	2437	15.63	18.39
High	2462	15.61	18.45

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99% & 26 dB BANDWIDTH





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99% & 26 dB BA		IIGH CHANNE			
- 🔆 Agilent 08:28:56 Jul	12,2009		T	BA	V/Avg
Ch Freq Occupied Bandwidth	2.462 GHz		Trig Free	Auto	Res BW 200.0 kHz <u>Man</u>
RBW 200.0 kH	Iz				Video BW 620.0 kHz <u>Man</u>
Ref 20 dBm A #Peak Log 10 dB/ Offst	Atten 20 dB	Manuna me		Auto	VBW/RBW 3.00000 <u>Man</u> Average 10 Off
dB Center 2.462 00 GHz #Res BW 200 kHz	VBW 620 F		Span 50 MHz	Log-Pw	BW Type r (Video) ► <u>Man</u>
Occupied Band 15	dwidth 5.6128 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB		
Transmit Freq Error x dB Bandwidth	151.036 kHz 18.448 MHz			Auto	pan/RBW 106 <u>Man</u>
Copyright 2000-2009 Agile	ent Technologies				

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7.1.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

TEST PROCEDURE

Output power was measured based on the use of RMS averaging over a time interval in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

Effective Legacy Mode Composite Gain of 4 Identical Antennas:

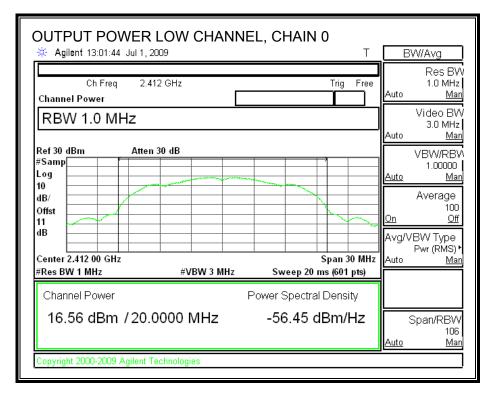
Antenna Gain (dBi)	• • • •	Effective Legacy Gain (dBi)
2	6.02	8.02

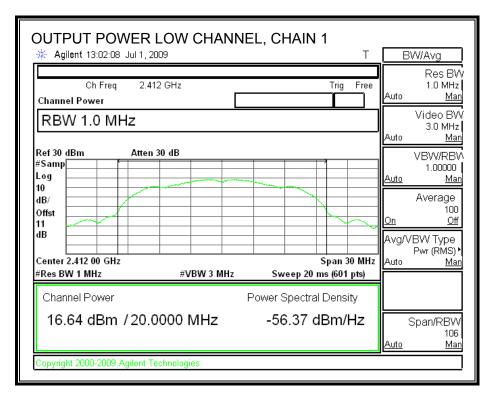
The composite antenna gain is 8.02 dBi, therefore the limit is 27.98 dBm.

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		Power	Power	Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	16.56	16.64	16.57	16.55	22.60	27.98	-5.38
Mid	2437	18.35	18.38	18.35	18.30	24.37	27.98	-3.61
High	2462	16.70	16.80	16.79	16.65	22.76	27.98	-5.22

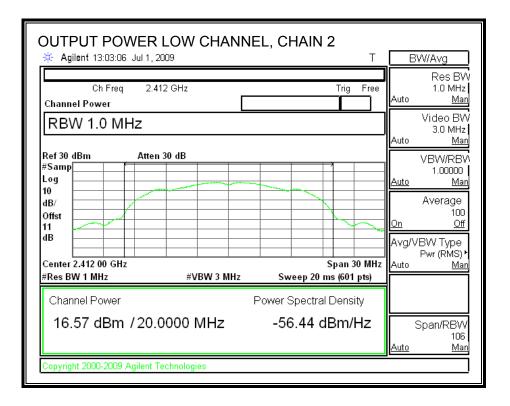
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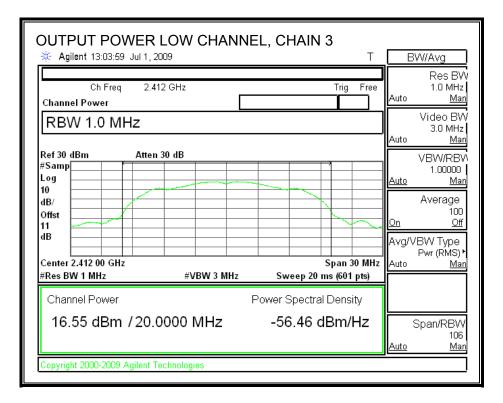
OUTPUT POWER, LOW CHANNEL





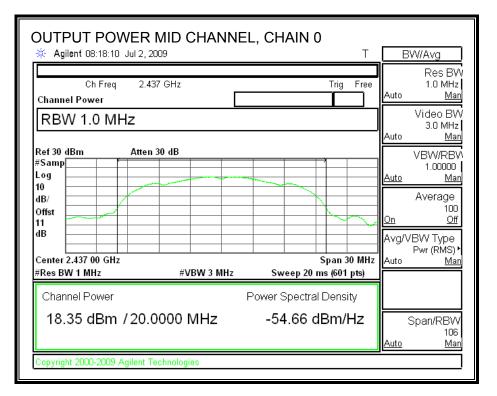
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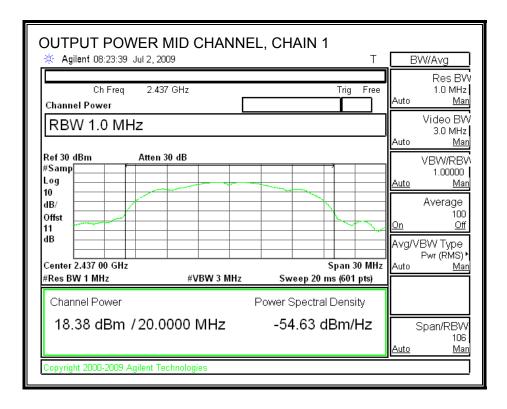




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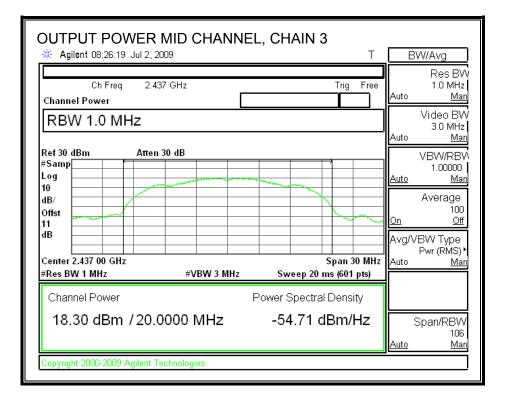
OUTPUT POWER, MID CHANNEL





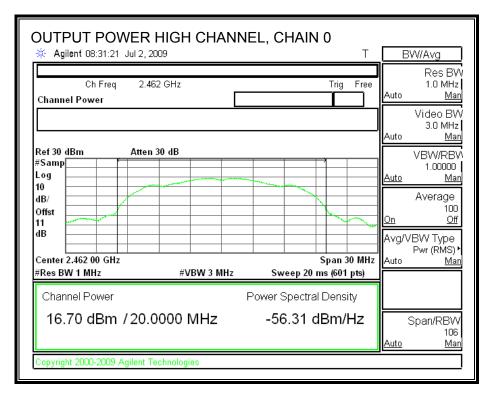
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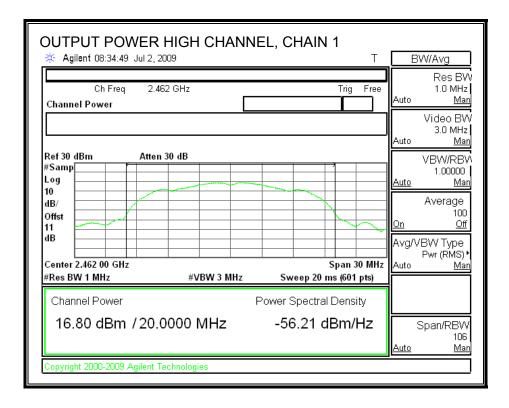
Ch Freq 2.437 GHz Trig Free 1.0 MHz Channel Power Image: constraint of the stress of t	OUTPUT POWER		EL, CHAIN 2	Т	B	W/Avg
Ref 30 dBm Atten 30 dB 3.0 MHz Auto Main Log VBW/RBV 10 0 dB/ 0 Offst 0 11 0 dB 0 Center 2.437 00 GHz Span 30 MHz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (601 pts) Channel Power Power Spectral Density 18.35 dBm / 20.0000 MHz -54.66 dBm/Hz Span/RBW	1	7 GHz		Trig Free	Auto	Res BW 1.0 MHz <u>Man</u>
#Samp Image: Control of the second secon		20. J.D.			Auto	3.0 MHz <u>Man</u>
Center 2.437 00 GHz Span 30 MHz Auto Máz #Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (601 pts)	#Samp Log 10 dB/ Offst 11				<u>On</u>	1.00000 <u>Man</u> Average 100 <u>Off</u> 'BW Type
18.35 dBm / 20.0000 MHz -54.66 dBm/Hz Span/RBW		#VBW 3 MHz		•	Auto	Pwr (RMS)∙ <u>Mar</u>
						Span/RBW 106 <u>Mar</u>



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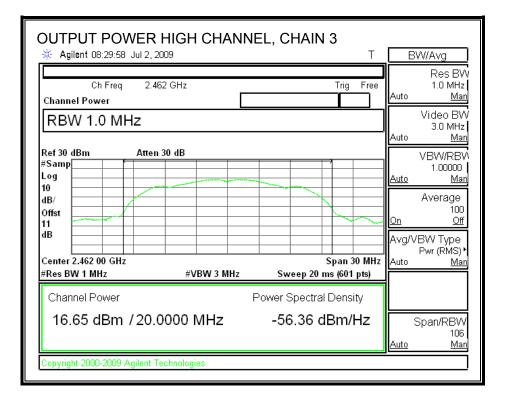
OUTPUT POWER, HIGH CHANNEL





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OUTPUT POWER		EL, CHAIN 2	r BW/Avg
Ch Freq 2.462 Channel Power	2 GHz	Trig Fre	Res BW 1.0 MHz Auto <u>Man</u>
			Video BV 3.0 MHz Auto <u>Man</u>
Ref 30 dBm Atten 3 #Samp Log 10			VBW/RBV 1.00000 <u>Auto Man</u>
dB/ Offst 11 dB			Average 100 <u>On Off</u> Avg/VBW Type
Center 2.462 00 GHz #Res BW 1 MHz	#VBW 3 MHz	Span 30 M Sweep 20 ms (601 pts)	Bwr (RMS)► Hz Auto Man
Channel Power 16.79 dBm / 20.0		Power Spectral Density -56.22 dBm/Hz	Span/RBW
			Auto Man
Copyright 2000-2009 Agilent Te	chnologies		



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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.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3
		Power	Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)
Low	2412	16.54	16.67	16.65	16.50
Middle	2437	18.23	18.36	18.29	18.04
High	2462	16.69	16.88	16.68	16.77

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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 RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

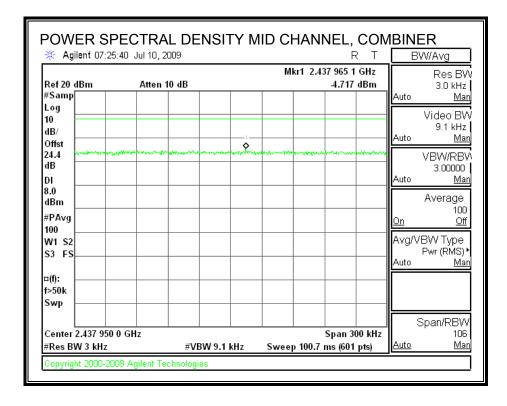
RESULTS

Channel	Frequency	PSD with Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-9.55	8	-17.55
Middle	2437	-4.72	8	-12.72
High	2462	-7.01	8	-15.01

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POWER SPECTRAL DENSITY

🔆 Agilent 07:22	2:18 Jul 10, 2009			RT	BV	///Avg
Ref 20 dBm Samp	Atten 10 dB		Mkr1 2.4	14 224 7 GHz -9.547 dBm	Auto	Res BV 3.0 kHz <u>Ma</u>
.og 0 IB/					Auto	Video BV 9.1 kHz <u>Ma</u>
	an hang gang an	ungeletise in a second and a second	1	The ward in a strict of the	Auto	VBW/RB 3.00000 <u>Ma</u>
:.0 IBm :PA∨g 00					<u>On</u>	Average 100 <u>Off</u>
N1 S2 53 FS AA					Avg/VI Auto	BW Type Pwr (RMS) <u>Ma</u>
l(f): >50k Swp						
Center 2.414 150 Res BW 3 kHz		3W 9.1 kHz	Sweep 100.7	Span 300 kHz ms (601 pts)	Auto S	pan/RBV 106 <u>Ma</u> i



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* Agilent 07:29			HCHANNEL, COR	BW/Avg
Project: Ref 20 dBm #Samp	Atten 10 dB		Mkr1 2.460 447 4 GHz -7.006 dBm	Res BV 3.0 kHz Auto <u>Ma</u>
Log 10 dB/ Offst				Video BV 9.1 kHz Auto <u>Ma</u>
dB DI	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	VBW/RB\ 1.00000 <u>Auto Ma</u>
8.0 dBm #PAvg 100				Average 100 <u>On Off</u>
W1 S2 S3 FS				Avg/VBW Type Pwr (RMS) Auto <u>Ma</u>
¤(f): f>50k Swp				
Center 2.460 500 #Res BW 3 kHz	0 GHz #VBW 1).1 kHz Sw	Span 300 kHz eep 100.7 ms (601 pts)	Span/RBW z 106 <u>Auto Ma</u>

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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 dBc.

TEST PROCEDURE

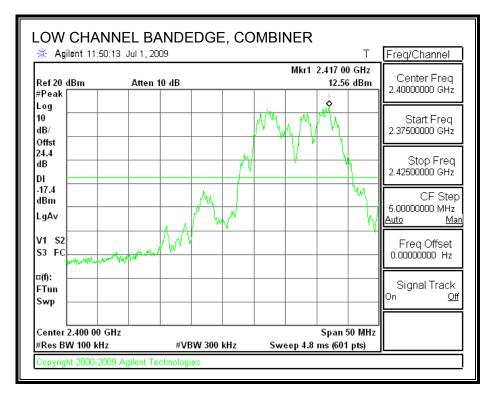
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

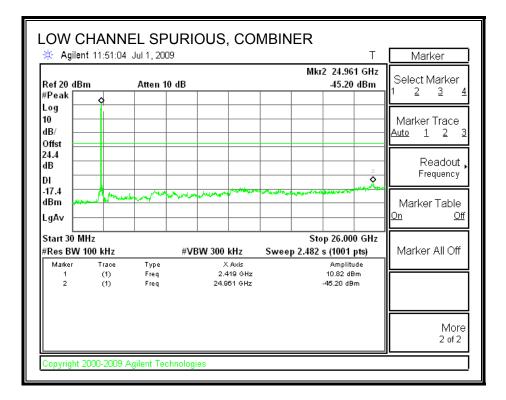
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

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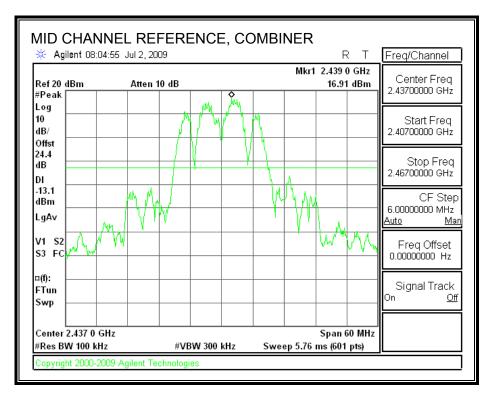
LOW CHANNEL SPURIOUS EMISSIONS

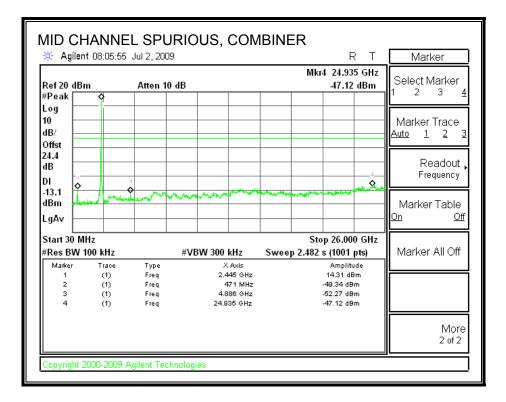




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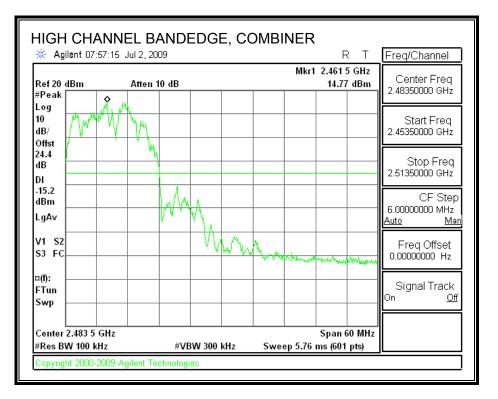
MID CHANNEL SPURIOUS EMISSIONS

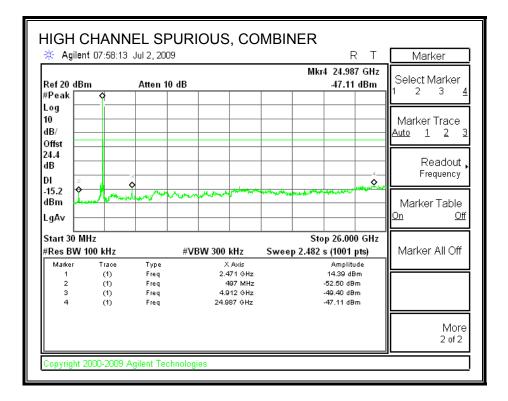




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HIGH CHANNEL SPURIOUS EMISSIONS





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7.2. 2.4 GHz BAND CHANNEL TESTS FOR 802.11g MODE

7.2.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

TEST PROCEDURE

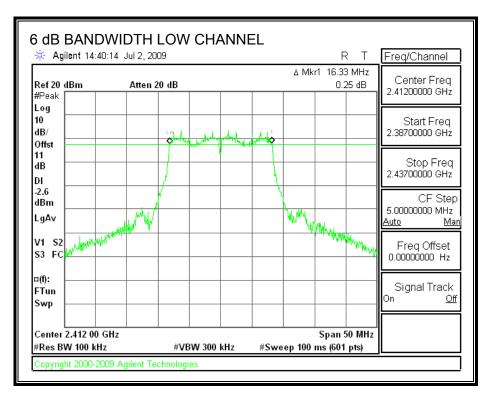
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

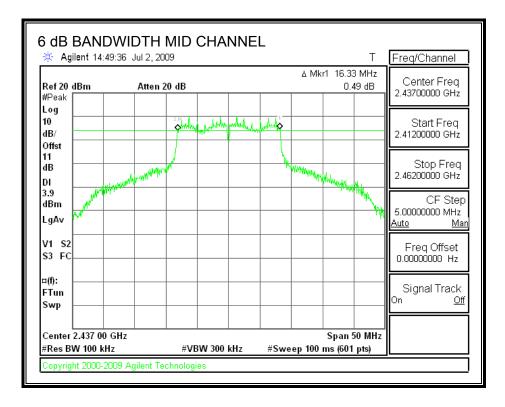
RESULTS

Channel	Frequency	6 dB BW	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2412	16.33	0.5
Middle	2437	16.33	0.5
High	2462	16.33	0.5

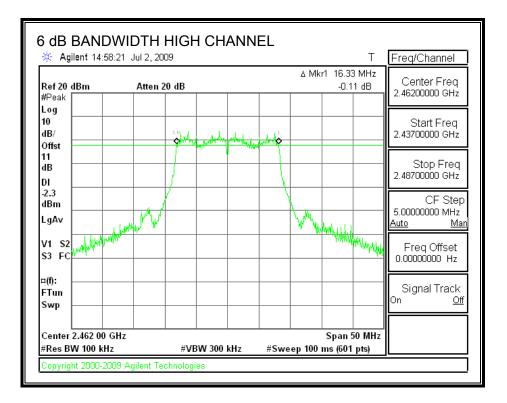
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6 dB BANDWIDTH





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7.2.2. 99% & 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

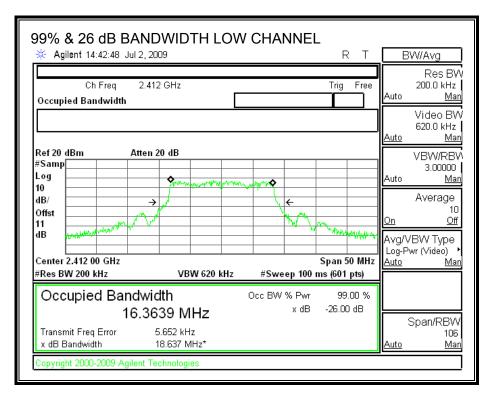
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

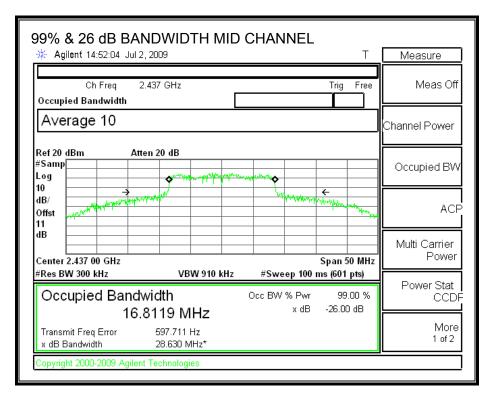
RESULTS

Channel	Frequency	99% OBW	26 dB BW
	(MHz)	(MHz)	(MHz)
Low	2412	16.36	18.64
Middle	2437	16.81	28.63
High	2462	16.49	18.38

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99% & 26 dB BANDWIDTH





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99% & 26 dB BAND		H CHANNE	L T	[]
🔆 Agilent 14:59:10 Jul 2, 200	19			Measure
Ch Freq 2.462 Occupied Bandwidth	GHz		Trig Free	Meas Off
				Channel Power
Ref 20 dBm Atten 20 #Samp	0 dB			Occupied BW
dB/ → Offst 11		_ ←	North Market Market Market	ACP
Center 2.462 00 GHz			Span 50 MHz	Multi Carrier Power
#Res BW 180 kHz	#VBW 560 kHz	#Sweep 100 i	ns (601 pts)	Power Stat
Occupied Bandwid 16.487	th 74 MHz	Occ BW % Pwr x dB		CCDF
Transmit Freq Error 12	2.553 kHz 3.376 MHz*			More 1 of 2
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7.2.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

TEST PROCEDURE

Output power was measured based on the use of RMS averaging over a time interval in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

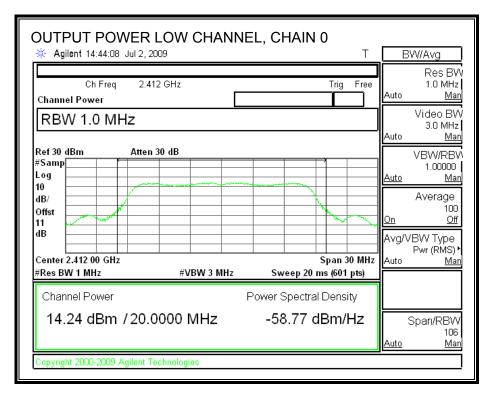
Effective Legacy Mode Composite Gain of 4 Identical Antennas:

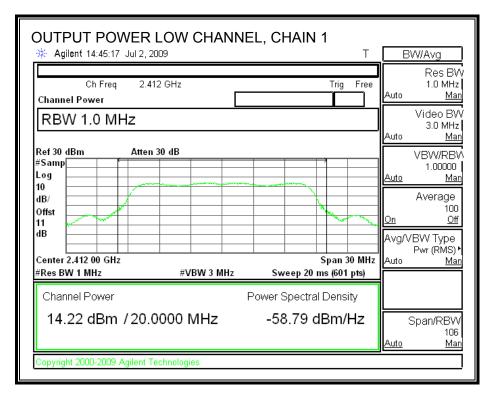
Antenna Gain (dBi)	• • • •	Effective Legacy Gain (dBi)
2	6.02	8.02

The composite antenna gain is 8.02 dBi, therefore the limit is 27.98 dBm.

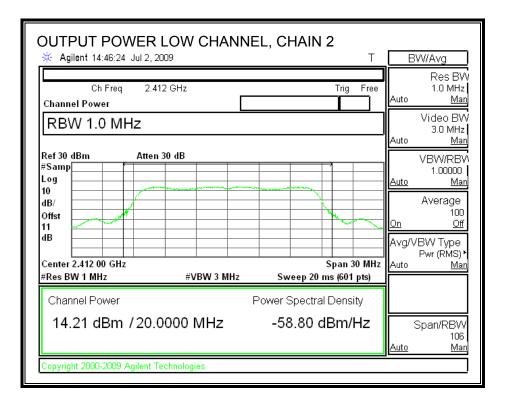
Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		Power	Power	Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	14.24	14.22	14.21	14.19	20.24	27.98	-7.74
Mid	2437	20.21	20.24	20.11	20.17	26.20	27.98	-1.78
High	2462	14.13	13.99	14.14	14.08	20.11	27.98	-7.87

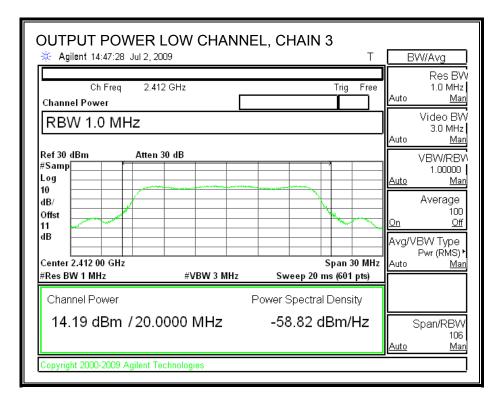
OUTPUT POWER, LOW CHANNEL





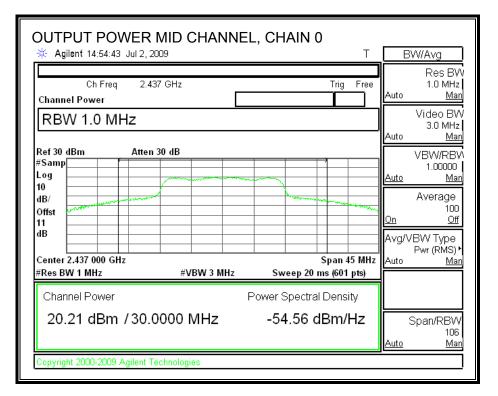
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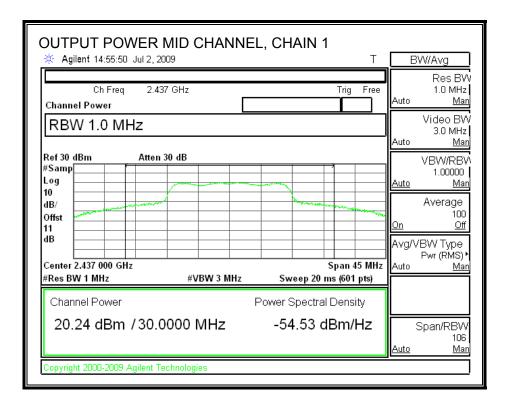




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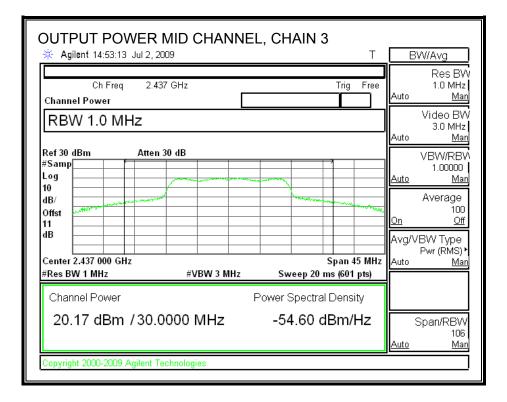
OUTPUT POWER, MID CHANNEL





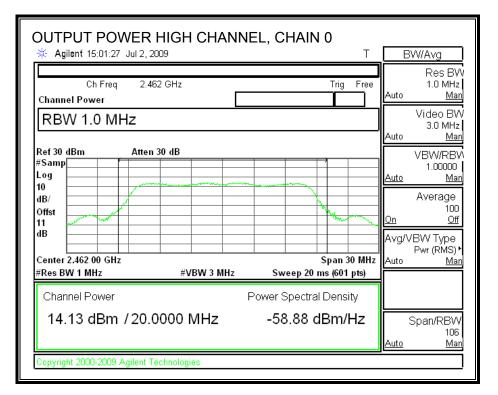
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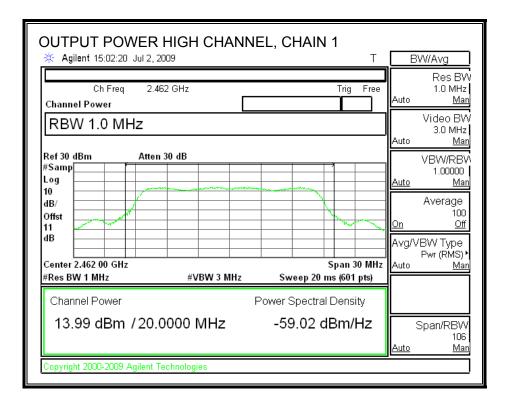
Ch Freq 2.437 GHz Trig Free Channel Power Intervention Auto Man Ref 30 dBm Atten 30 dB Video BW 3.0 MHz Auto Man Video BW 3.0 MHz Auto Man Video BW 3.0 MHz Log Intervention VBW/RBW 1.00000 Auto Man VBW/RBW 1.00000 Auto Man VBW/RBW 1.00000 Auto Man Average 100 0ffst Intervention Span 45 MHz Man Kes BW 1 MHz #VBW 3 MHz Sweep 20 ms (601 pts) Average Channel Power Power Spectral Density Auto Man 20.11 dBm / 30.0000 MHz -54.66 dBm/Hz Span/RBW Man	OUTPUT POWER N		L, CHAIN 2	Т	BW/Avg	
Ref 30 dBm Atten 30 dB Auto Man #Samp Image: Constraint of the second sec	Channel Power	GHz		Trig Free	1.0 M Auto Video	MHz <u>Man</u> BW
Onst On Off 11 Image: Construction of the state of	Ref 30 dBm Atten 3 #Samp Log 10 dB/	0 dB			Auto VBW/F 1.000 Auto Avera	<u>Man</u> RBV DOO <u>Man</u> ge
20.11 dBm / 30.0000 MHz -54.66 dBm/Hz Span/RBW	11 dB Center 2.437 000 GHz	#VBW 3 MHz			<u>On</u> Avg/VBW Ty Pwr (RN	<u>Off</u> pe ∕IS)►
				-		106



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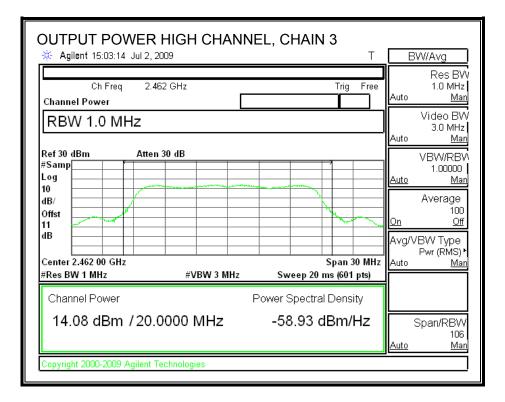
OUTPUT POWER, HIGH CHANNEL





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OUTPUT POWER I		EL, CHAIN 2	BW/Avg
Ch Freq 2.462 Channel Power	2 GHz	Trig Free	Res BW 1.0 MHz Auto <u>Man</u>
RBW 1.0 MHz			Video BW 3.0 MHz Auto <u>Man</u>
Ref 30 dBm Atten 3 #Samp Log 10 dB/	90 dB		VBW/RBV 1.00000 <u>Auto Man</u> Average
Offst 11 dB			100 <u>On Off</u> Avg/VBW Type Pwr (RMS) ^
Center 2.462 00 GHz #Res BW 1 MHz	#VBW 3 MHz	Span 30 MHz Sweep 20 ms (601 pts)	
Channel Power 14.14 dBm /20.0		Power Spectral Density -58.87 dBm/Hz	Span/RBW 106 <u>Auto Man</u>
Copyright 2000-2009 Agilent Te	chnologies		



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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.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3
		Power	Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)
Low	2412.00	14.12	14.04	14.11	14.14
Middle	2437.00	20.15	20.21	20.12	20.14
High	2462.00	13.95	14.10	14.02	14.11

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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 RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

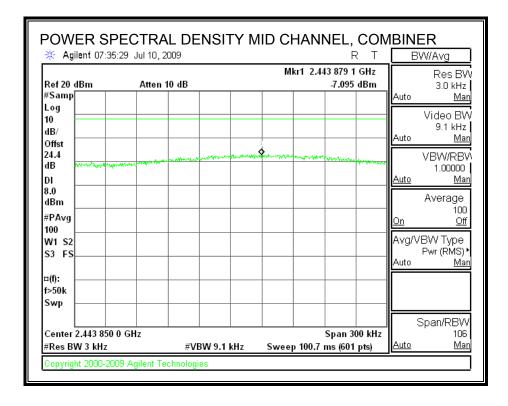
RESULTS

Channel	Frequency	PSD with Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-10.12	8	-18.12
Middle	2437	-7.10	8	-15.10
High	2462	-11.32	8	-19.32

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POWER SPECTRAL DENSITY

🔆 Agilent 07:32	233 Jul 10, 2009		RT	Peak Search
Ref 20 dBm ∉Samp	Atten 10 dB		Mkr1 2.419 208 9 GHz -10.116 dBm	
_og 10 1B/ Dffst				Next Pk Right
24.4 1B DI	1	newson when we have a source		Next Pk Left
3.0 IBm ∉PAvg				- Min Search
100 W1 S2 S3 FS				Pk-Pk Search
ι(f): >50k Swp				Mkr@Cl
Center 2.419 250 Res BW 3 kHz		/ 9.1 kHz Sv	Span 300 kH weep 100.7 ms (601 pts)	Iz More 1 of 2



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🔆 Agilent 07:37	:24 Jul 10, 2009		R	T BW/Avg
Ref 20 dBm #Samp	Atten 10 dB		Mkr1 2.464 507 5 -11.317	Kes Di
Log 10 dB/ Offst				Video BV 9.1 kHz Auto <u>Ma</u>
24.4		1	"Marine harring a second and	VBW/RB ¹ 1.00000 <u>Auto Ma</u>
dBm #PAvg 100				Average 100 <u>On Off</u>
W1 S2 S3 FS				Avg/VBW Type Pwr (RMS) Auto <u>Ma</u>
¤(f): f>50k Swp				
Center 2.464 500 #Res BW 3 kHz		9.1 kHz S	Span 30 weep 100.7 ms (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 dBc.

TEST PROCEDURE

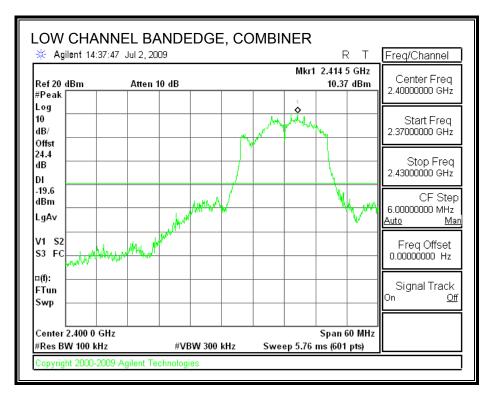
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

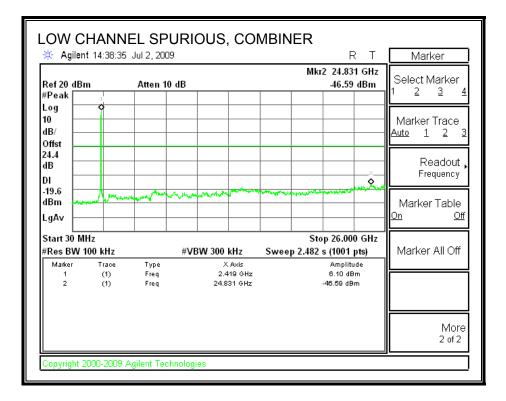
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

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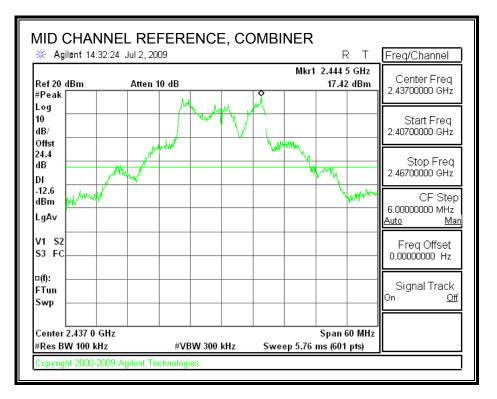
LOW CHANNEL SPURIOUS EMISSIONS

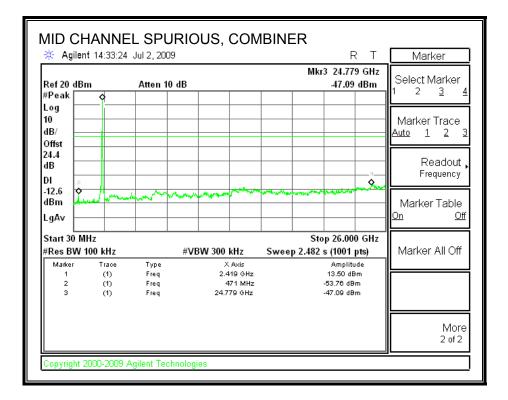




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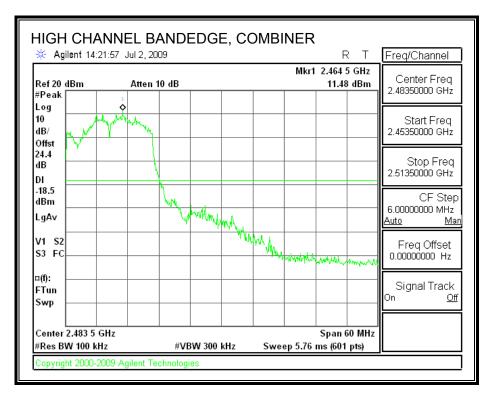
MID CHANNEL SPURIOUS EMISSIONS

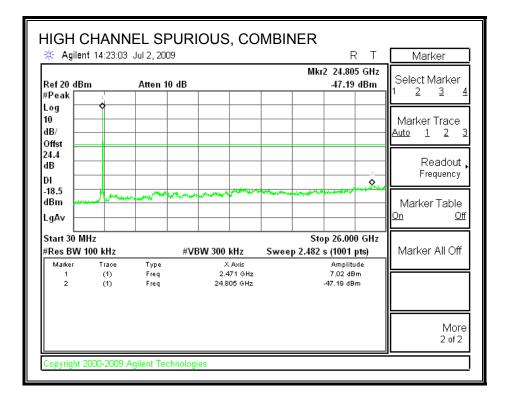




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HIGH CHANNEL SPURIOUS EMISSIONS





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7.3. 2.4 GHz BAND CHANNEL TESTS FOR 802.11n HT20 MODE

7.3.1. 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

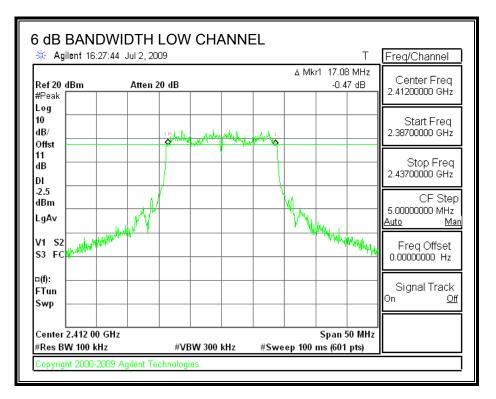
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

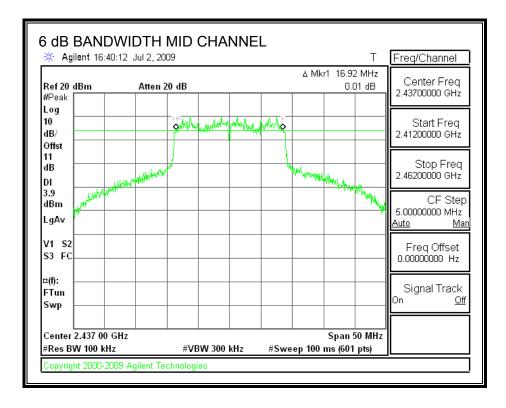
RESULTS

Channel	Frequency	6 dB BW	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2412	17.08	0.5
Middle	2437	16.92	0.5
High	2462	17.25	0.5

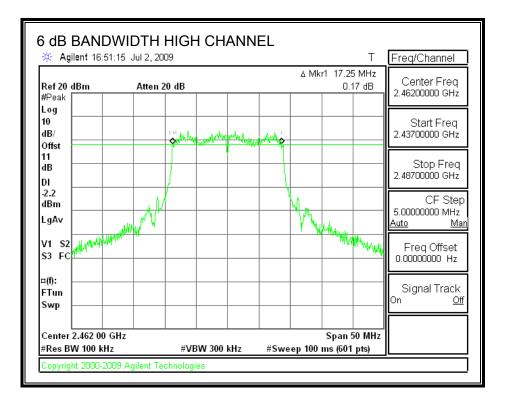
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6 dB BANDWIDTH





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7.3.2. 99% & 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

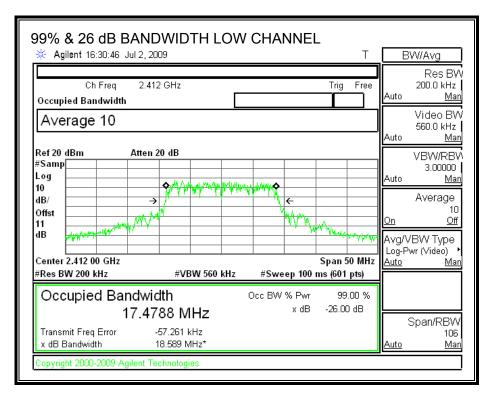
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

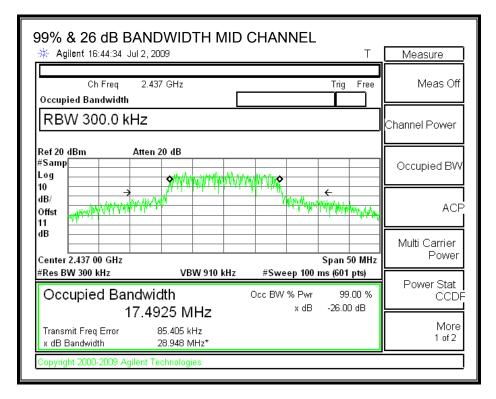
RESULTS

Channel	Frequency	99% OBW	26 dB BW
	(MHz)	(MHz)	(MHz)
Low	2412	17.48	18.59
Middle	2437	17.49	28.95
High	2462	17.43	18.30

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99% & 26 dB BANDWIDTH





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99% & 26 dB BANI	-	H CHANNE	L T	В	W/Avg
Ch Freq 2.48 Occupied Bandwidth	62 GHz		Trig Free	Auto	Res BW 200.0 kHz <u>Man</u>
Average 10				Auto	Video BW 560.0 kHz <u>Man</u>
#Samp Log 10	20 dB	· · · · · · · · · · · · · · · · · · ·	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Logi	
Center 2.462 00 GHz #Res BW 200 kHz	#VBW 560 kHz	#Sweep 100 i	Span 50 MHz ns (601 pts)	<u>Auto</u>	<u>Man</u>
Occupied Bandwi 17.43	dth 306 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB		Span/RBW
Transmit Freq Error x dB Bandwidth	-31.402 kHz 18.300 MHz*			<u>Auto</u>	106 <u>Man</u>
Copyright 2000-2009 Agilent T	echnologies				

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7.3.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

TEST PROCEDURE

Output power was measured based on the use of RMS averaging over a time interval in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

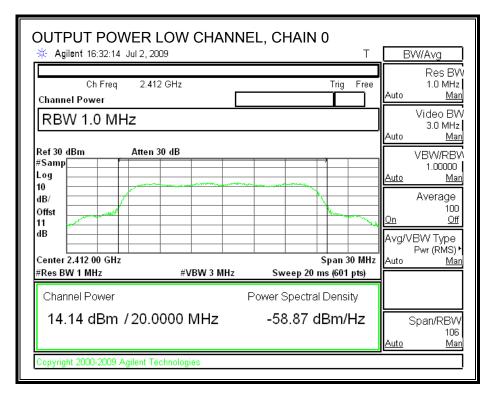
RESULTS

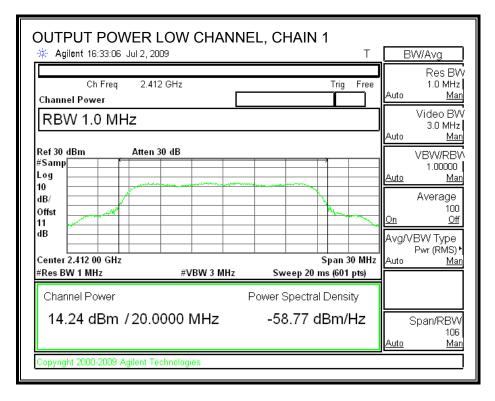
The antenna gain is less than 6 dBi, therefore the limit is 30 dBm.

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		Power	Power	Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	2412	14.14	14.24	14.18	13.98	20.16	30	-9.84
Mid	2437	20.16	20.25	19.99	20.10	26.15	30	-3.85
High	2462	14.22	14.20	14.22	14.17	20.22	30	-9.78

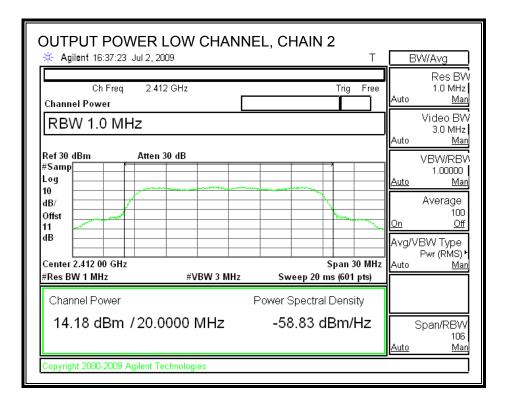
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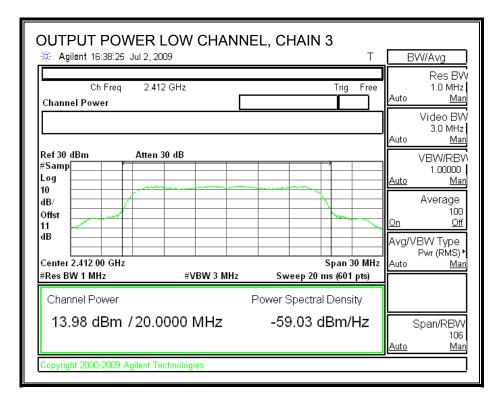
OUTPUT POWER, LOW CHANNEL





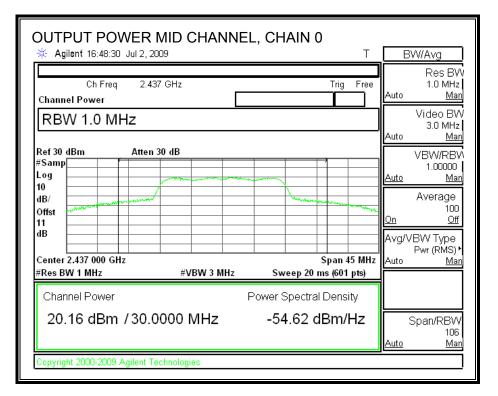
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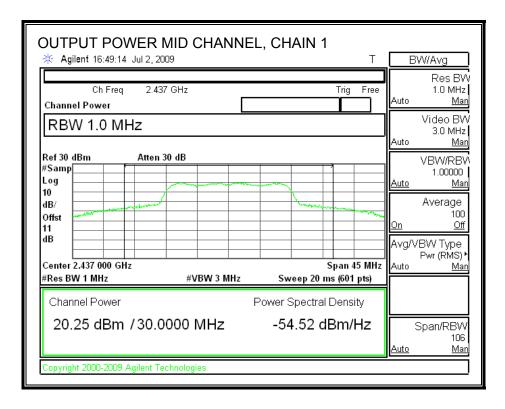




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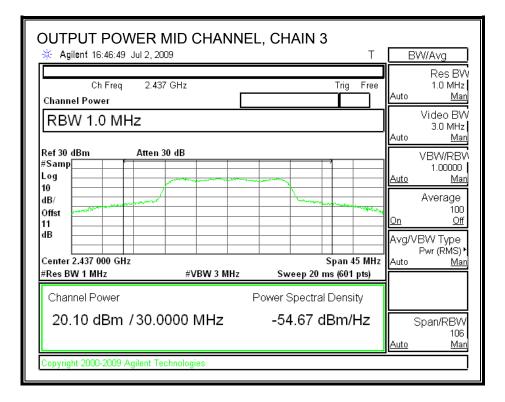
OUTPUT POWER, MID CHANNEL





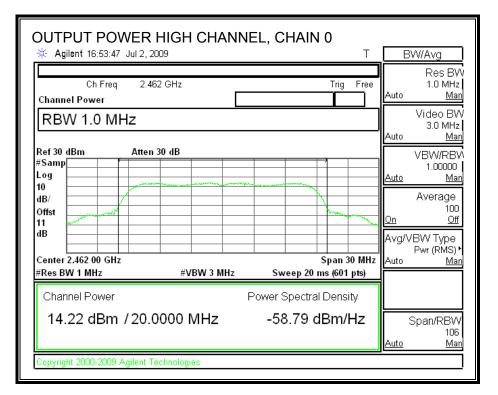
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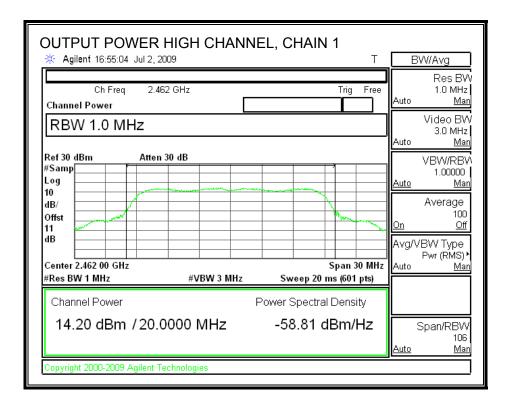
OUTPUT POWER N		L, CHAIN 2	Т	В	///Avg
Ch Freq 2.437 Channel Power	GHz		Trig Free	Auto	Res BW 1.0 MHz <u>Man</u> Video BW
RBW 1.0 MHz	dB			Auto	3.0 MHz <u>Man</u> VBW/RBV
#Samp Log 10 dB/ Offst 11			and the state	<u>Auto</u> On	1.00000 <u>Man</u> Average 100 <u>Off</u>
dB Center 2.437 000 GHz #Res BW 1 MHz	#VBW 3 MHz	Sweep 20 ms	pan 45 MHz s (601 pts)		BW Type Pwr (RMS) ► <u>Man</u>
Channel Power Power Spectral Density 19.99 dBm / 30.0000 MHz -54.78 dBm/Hz				Auto	Span/RBW 106 <u>Man</u>
Copyright 2000-2009 Agilent Tecl	hnologies				



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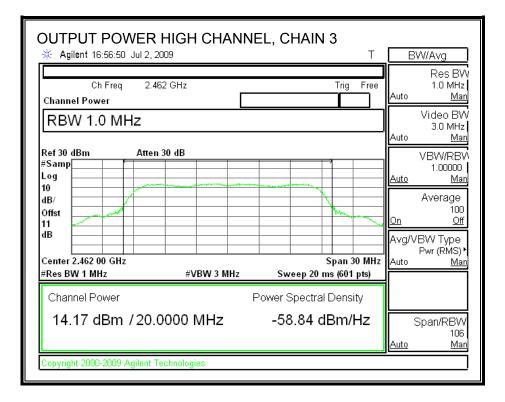
OUTPUT POWER, HIGH CHANNEL





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OUTPUT POWER		EL, CHAIN 2	BW/Avg
Ch Freq 2.46 Channel Power RBW 1.0 MHz	i2 GHz	Trig Fre	Pe Res BW 1.0 MHz Auto Man Video BW 3.0 MHz
Ref 30 dBm Atten #Samp 0 Log 0 dB/ 0 offst 0 dB 0 dB 0 dB 0 dB 0 dB 0 dB 0 dB 0 dB	30 dB		Auto Man VBW/RBW 1.00000 Auto Man Average 100 On Off Avg/VBW Type
Center 2.462 00 GHz #Res BW 1 MHz	#VBW 3 MHz	Span 30 M Sweep 20 ms (601 pts)	Pwr (RMS) ►
Channel Power 14.22 dBm /20.0	Span/RBW 106 <u>Auto Man</u>		
Copyright 2000-2009 Agilent Te	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.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3
		Power	Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)
Low	2412.00	14.16	14.11	14.05	14.14
Middle	2437.00	20.18	20.16	20.11	20.09
High	2462.00	14.17	14.14	14.08	14.18

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7.3.5. POWER SPECTRAL DENSITY

<u>LIMITS</u>

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

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

TEST PROCEDURE

Output power was measured based on the use of RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

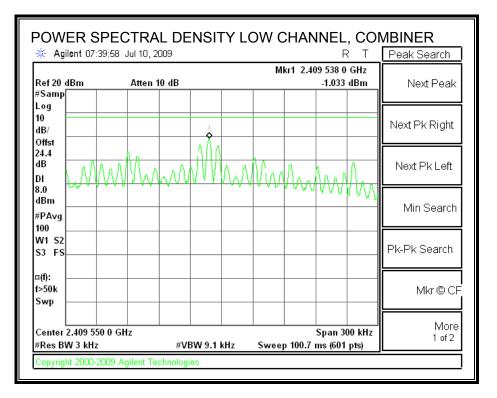
Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

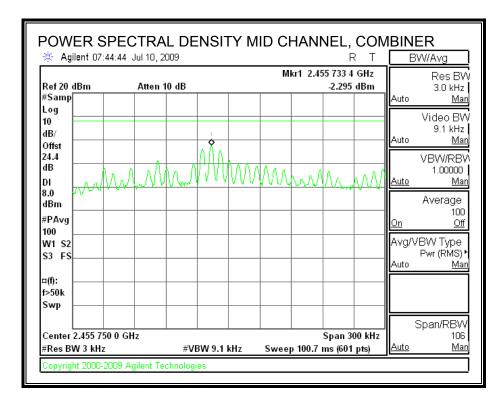
RESULTS

Channel	Frequency	PSD with Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2412	-1.03	8	-9.03
Middle	2437	-2.30	8	-10.30
High	2462	-11.32	8	-19.32

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POWER SPECTRAL DENSITY





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🔆 Agilent 07:37	:24 Jul 10, 2009			RT	BW/Avg	
Ref 20 dBm #Samp	Atten 10 dB			4 507 5 GHz -11.317 dBm	Res 3.0 Auto	
Log 10 dB/ Offst					Video 9.1 Auto	BV
24.4	han and the second of the seco	1. 	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	www.www.	VBVV/I 1.00 <u>Auto</u>	000 <u>Ma</u>
dBm #PAvg 100					Avera	ige 100 <u>Off</u>
W1 S2 S3 FS					Avg/VBW Ty Pwr (R) Auto	′pe vIS) <u>Ma</u>
¤(f): f>50k Swp						
Center 2.464 500 #Res BW 3 kHz		/ 9.1 kHz 1	Sweep 100.7 (Span 300 kHz ms (601 pts)	Span/R	:BV 106 Ma

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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 dBc.

TEST PROCEDURE

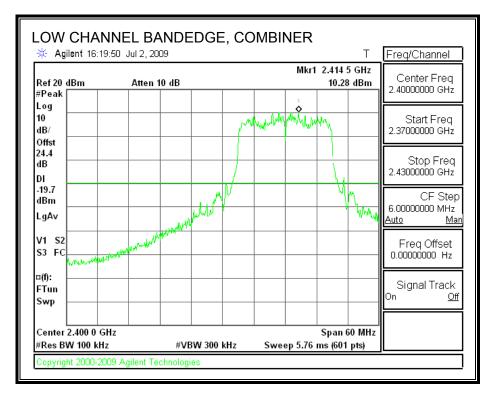
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

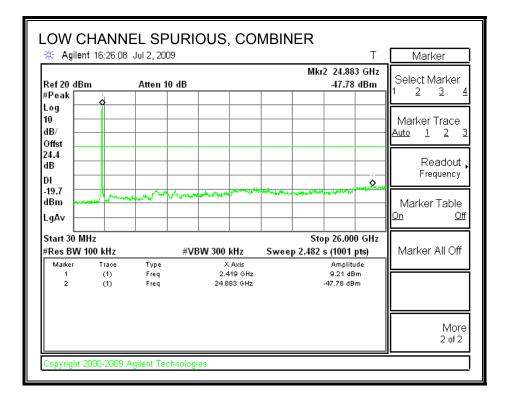
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

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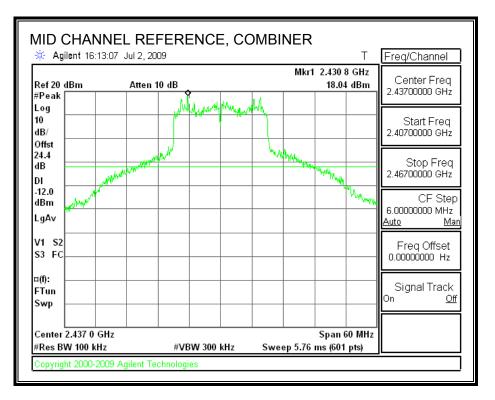
LOW CHANNEL SPURIOUS EMISSIONS

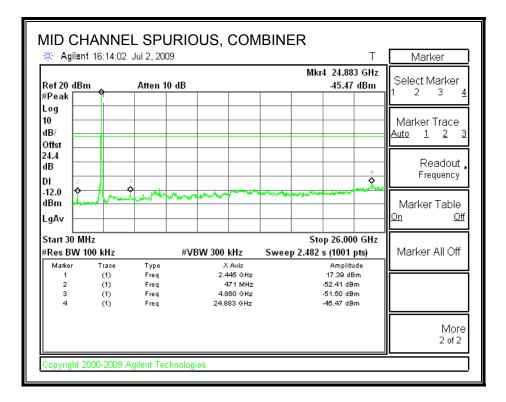




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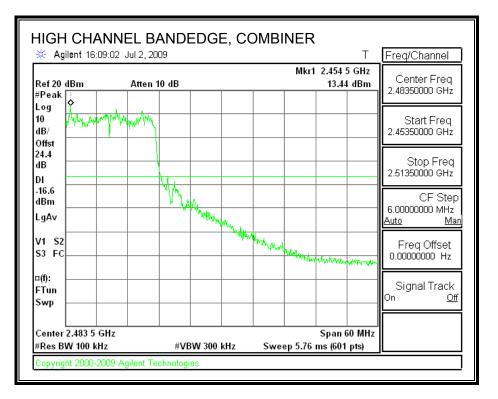
MID CHANNEL SPURIOUS EMISSIONS

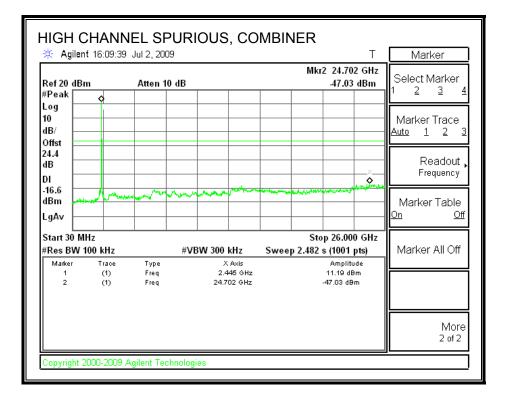




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HIGH CHANNEL SPURIOUS EMISSIONS





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7.4. 2.4 GHz BAND CHANNEL TESTS FOR 802.11n HT40 MODE

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

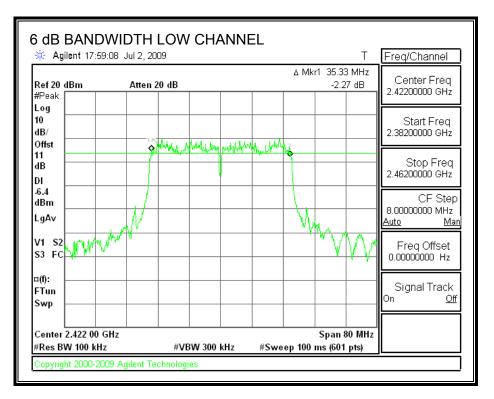
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

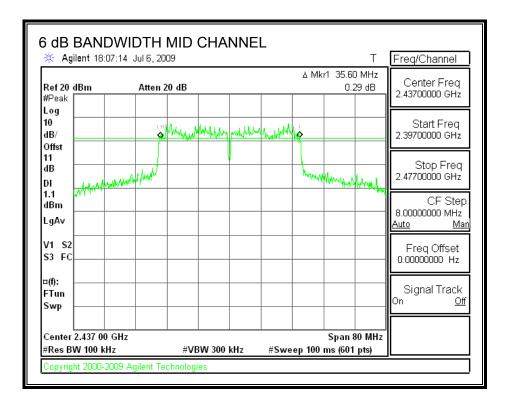
RESULTS

Channel	Frequency	6 dB BW	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	2422	35.33	0.5
Mid	2437	35.60	0.5
High	2452	35.47	0.5

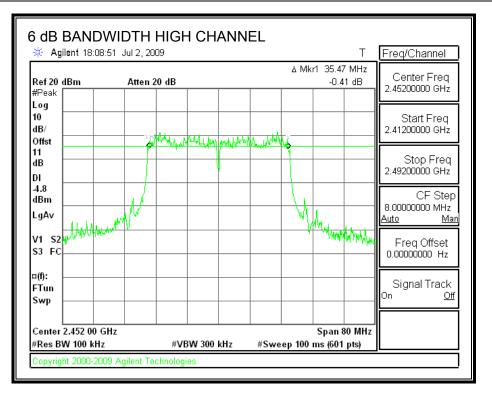
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6 dB BANDWIDTH





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7.4.2. 99% & 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

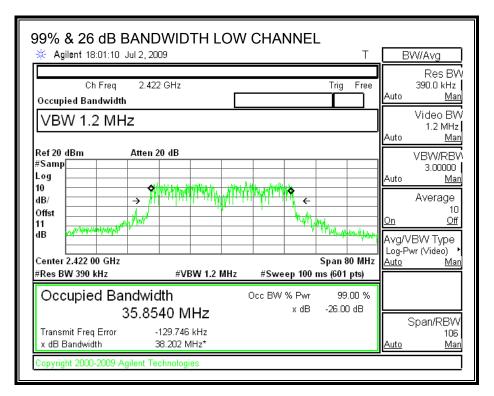
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

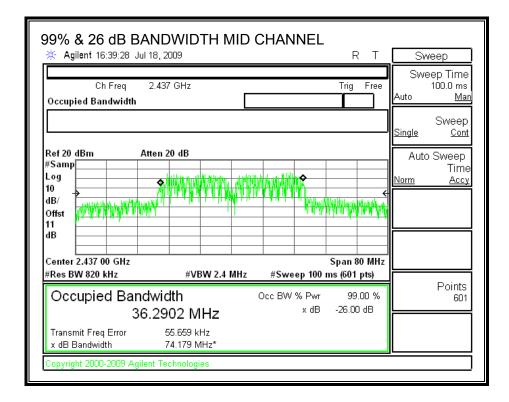
RESULTS

Channel	Frequency	99% OBW	26 dB BW
	(MHz)	(MHz)	(MHz)
Low	2422	35.85	38.20
Mid	2437	36.29	74.18
High	2452	35.51	38.76

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99% & 26 dB BANDWIDTH





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🔆 Agilent 18:11:06 Jul 2, 2	009		Т	В	W/Avg
Ch Freq 2.4: Occupied Bandwidth	52 GHz		Trig Free	Auto	Res BV 390.0 kHz <u>Ma</u>
Average 10				Auto	Video BV 1.2 MHz <u>Ma</u> r
#Samp			Vester of a local state		VBW/RB ¹ 10.00000 <u>Ma</u> Average 10 <u>Off</u> (BW Type wr (Video)
Center 2.452 00 GHz #Res BW 390 kHz	#VBW 1.2 MHz	#Sweep 100 n	Span 80 MHz ns (601 pts)	<u>Auto</u>	Ma (Maeo) Ma
Occupied Bandwi 35.5	dth 145 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB		Span/RBV
Transmit Freq Error x dB Bandwidth	2.365 kHz 38.756 MHz*			Auto .	5ран/к.бм 106 <u>Ма</u>

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7.4.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

TEST PROCEDURE

Output power was measured based on the use of RMS averaging over a time interval in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

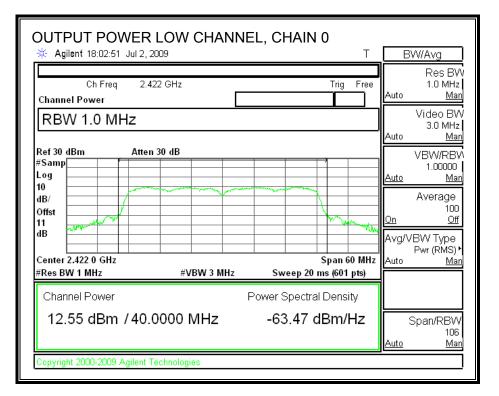
RESULTS

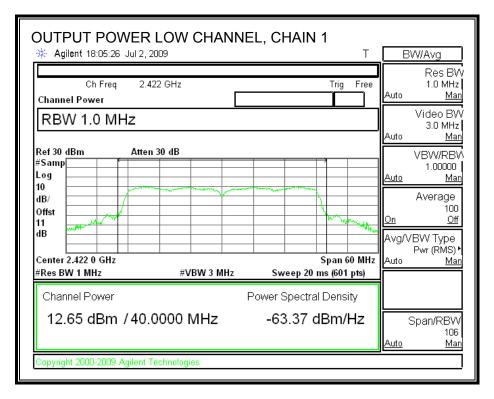
The antenna gain is less than 6 dBi, therefore the limit is 30 dBm.

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		Power	Power	Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	2422	12.55	12.65	12.64	12.49	18.60	30	-11.40
Mid	2437	20.08	20.01	19.99	20.02	26.05	30	-3.95
High	2452	13.54	13.57	13.56	13.61	19.59	30	-10.41

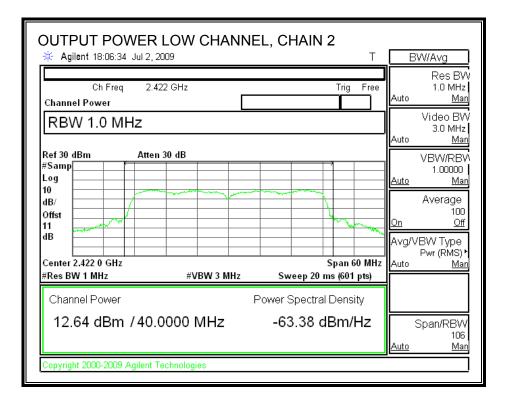
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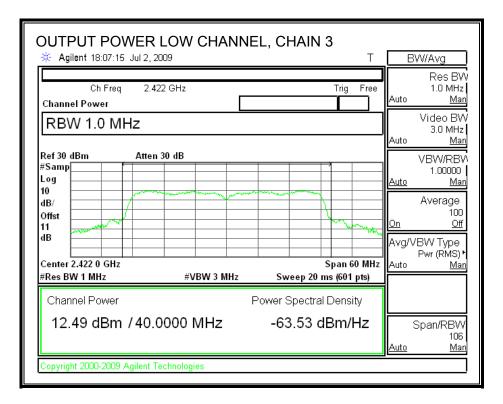
OUTPUT POWER, LOW CHANNEL





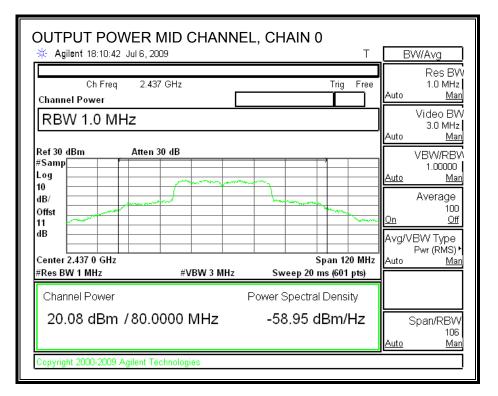
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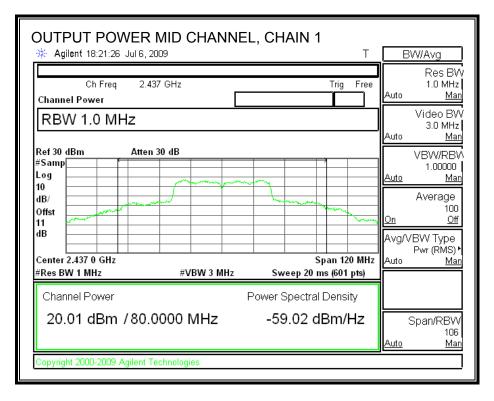




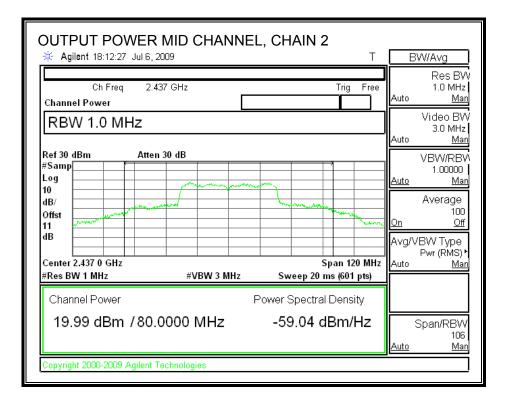
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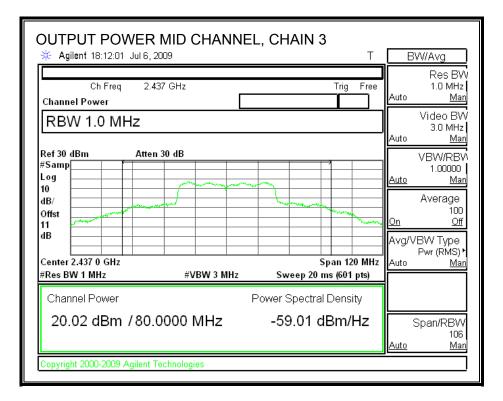
OUTPUT POWER, MID CHANNEL





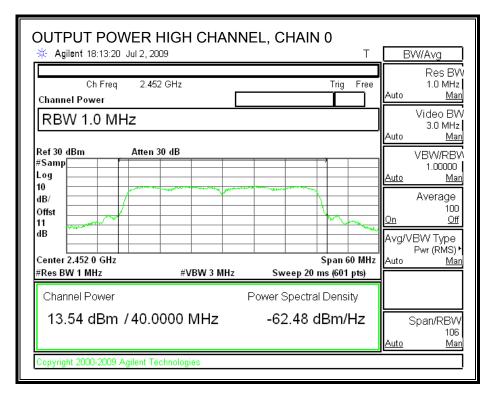
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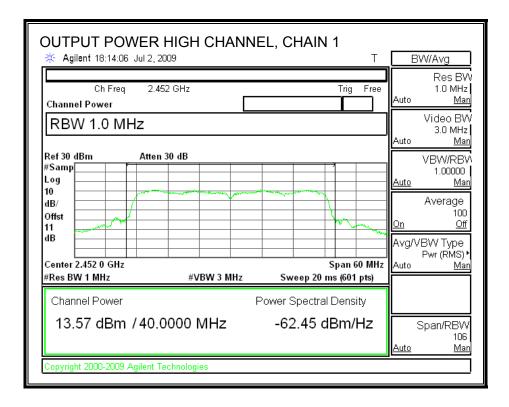




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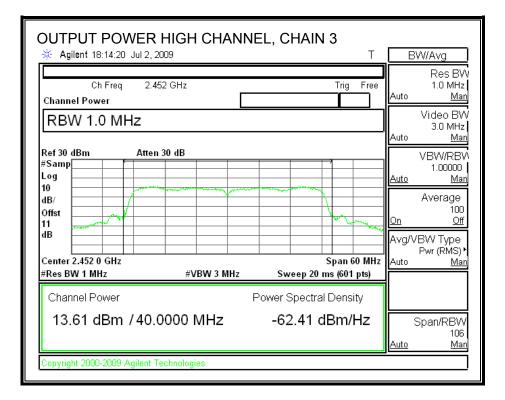
OUTPUT POWER, HIGH CHANNEL





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OUTPUT POWER		EL, CHAIN 2	BW/Avg
Ch Freq 2.4 Channel Power	52 GHz	Trig Free	Res BW
RBW 1.0 MHZ Ref 30 dBm Atten #Samp	30 dB		3.0 MHz Auto <u>Man</u> VBW/RBW
Log 10 dB/ Offst 11 dB			1.00000 Auto Man Average 100 On Off
Center 2.452 0 GHz #Res BW 1 MHz	#VBW 3 MHz	Span 60 MH: Sweep 20 ms (601 pts)	Avg/VBW Type Pwr (RMS) • Z Auto <u>Man</u>
Channel Power 13.56 dBm /40.		Power Spectral Density -62.46 dBm/Hz	Span/RBW 106 <u>Auto Man</u>
Copyright 2000-2009 Agilent T	echnologies		



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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.

The cable assembly insertion loss of 11 dB (including 10 dB pad and 1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3	
		Power Power		Power Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	
Low	2422.00	12.64	12.53	12.50	12.65	
Mid	2437.00	20.19	20.20	20.19	20.23	
High	2452.00	13.65	13.54	13.52	13.53	

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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 RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

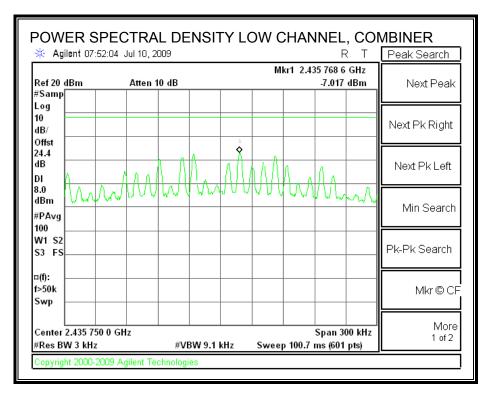
Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

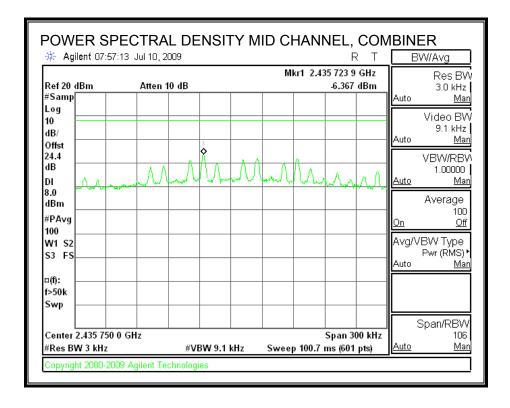
RESULTS

Channel	Frequency	PSD with Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	2422	-7.02	8	-15.02
Mid	2437	-6.37	8	-14.37
High	2452	-9.84	8	-17.84

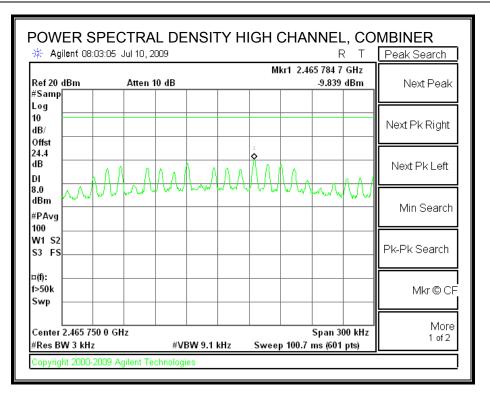
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POWER SPECTRAL DENSITY





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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 dBc.

TEST PROCEDURE

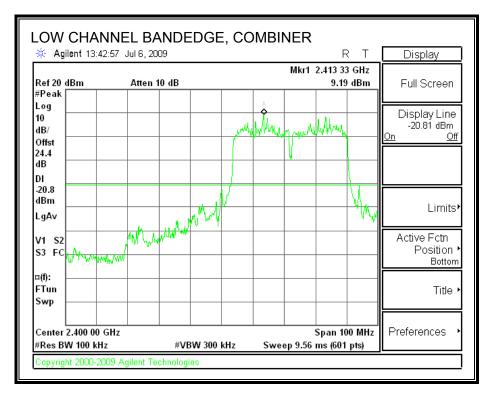
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

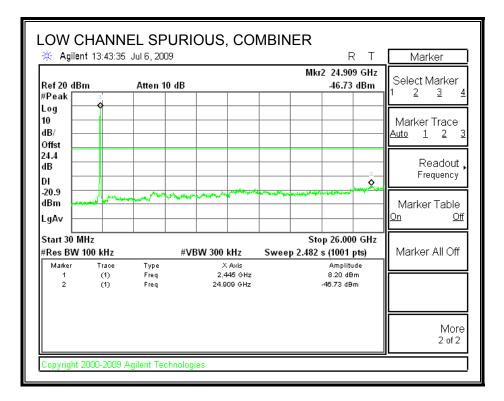
The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

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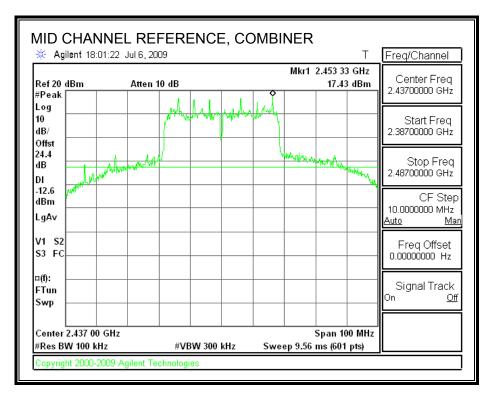
LOW CHANNEL SPURIOUS EMISSIONS

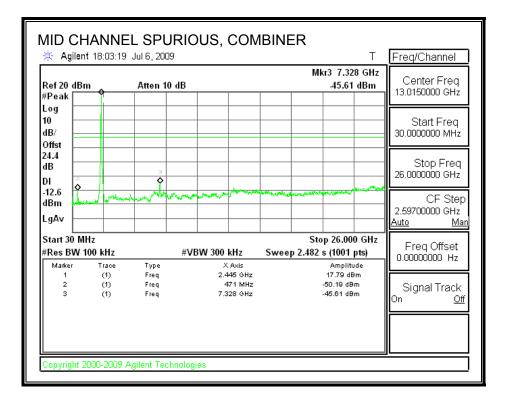




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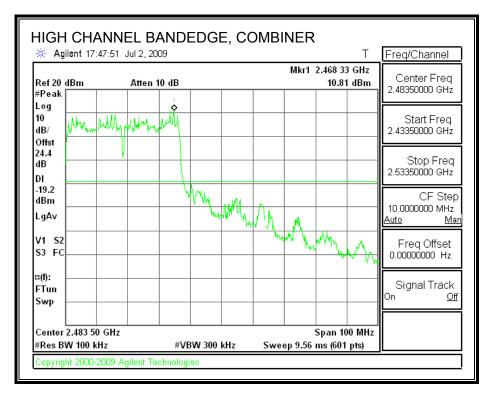
MID CHANNEL SPURIOUS EMISSIONS

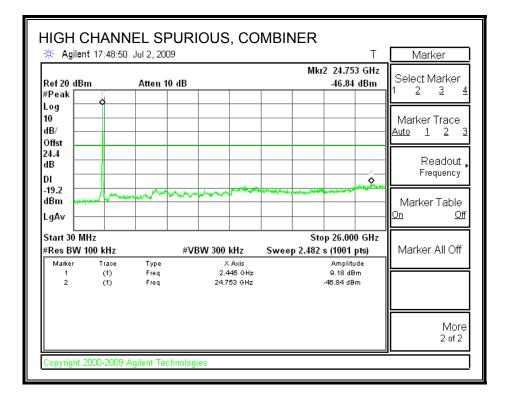




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HIGH CHANNEL SPURIOUS EMISSIONS





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7.5. 5.8 GHz BAND CHANNEL TESTS FOR 802.11a MODE

7.5.1. 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

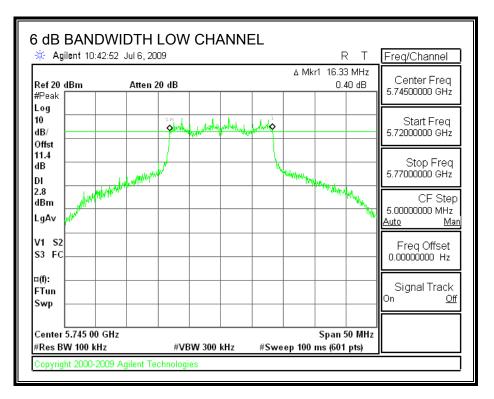
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

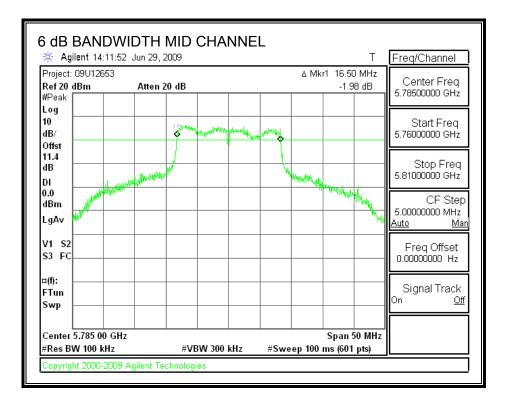
RESULTS

Channel	Frequency	6 dB BW	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	5745	16.33	0.5
Middle	5785	16.50	0.5
High	5825	16.33	0.5

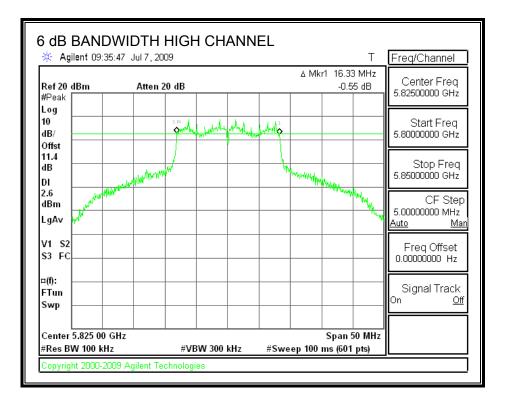
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6 dB BANDWIDTH





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7.5.2. 99% & 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

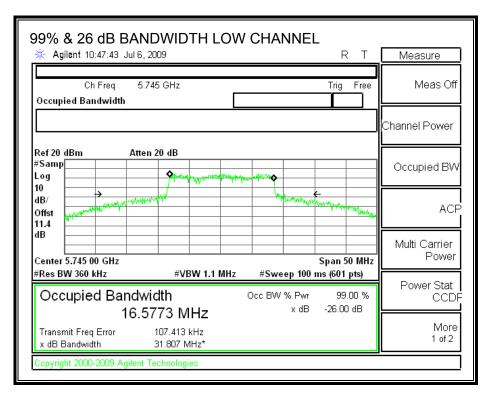
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

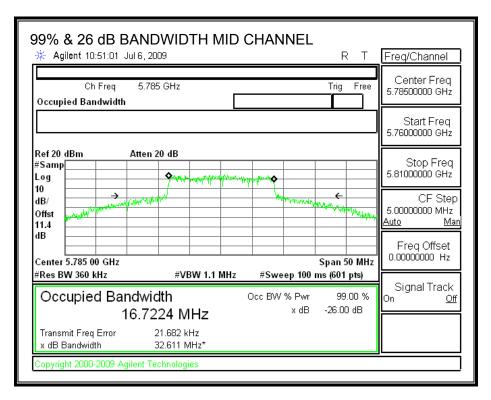
RESULTS

Channel	Frequency	99% OBW	26 dB BW
	(MHz)	(MHz)	(MHz)
Low	5745	16.58	31.81
Middle	5785	16.72	32.61
High	5825	16.79	31.51

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99% & 26 dB BANDWIDTH





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99% & 26 dB BANDWID	TH HIGH	H CHANNE			
🔆 Agilent 09:31:48 Jul 7, 2009			R T		W/Avg
Ch Freq 5.825 GHz Occupied Bandwidth			Trig Free	Auto	Res BW 360.0 kHz <u>Man</u>
				Auto	Video BW 1.2 MHz <u>Man</u>
	www.war			Auto	VBW/RBV 3.00000 <u>Man</u>
10 dB/ Offst 11.4		Mingathaning	+ wy-inded and production of the second	<u>On</u>	Average 10 <u>Off</u>
dB			Span 50 MHz		/BW Type wr (Video) Man
#Res BW 360 kHz #V	BW 1.2 MHz	#Sweep 100	ms (601 pts)		
Occupied Bandwidth 16.7895 M	1Hz	Occ BW % Pwr x dB	99.00 % -26.00 dB		
Transmit Freq Error 141.052 x dB Bandwidth 31.512 M	kHz			Auto	Span/RBW 106 <u>Man</u>
Copyright 2000-2009 Agilent Technolog	ies			-	

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7.5.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

TEST PROCEDURE

Output power was measured based on the use of RMS averaging over a time interval in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

RESULTS

Effective Legacy Mode Composite Gain of 4 Identical Antennas:

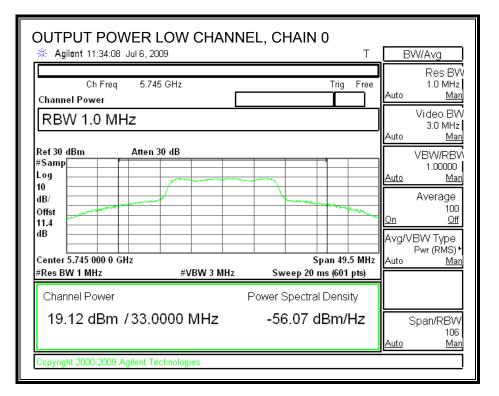
Antenna Gain (dBi)	• • • •	Effective Legacy Gain (dBi)		
3	6.02	9.02		

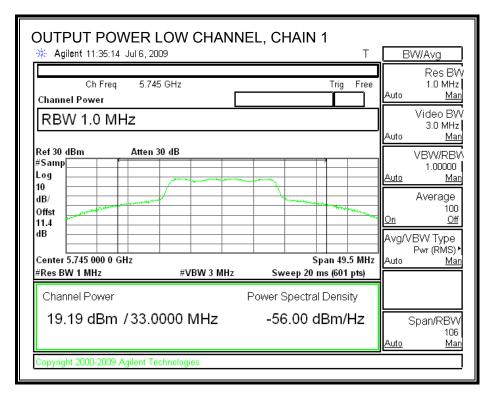
The composite antenna gain is 9.02 dBi, therefore the limit is 26.98 dBm.

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		Power	Power	Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5745	19.12	19.19	19.16	19.06	25.15	26.98	-1.83
Mid	5785	19.19	19.22	19.11	18.94	25.14	26.98	-1.84
High	5825	19.14	19.08	19.11	19.07	25.12	26.98	-1.86

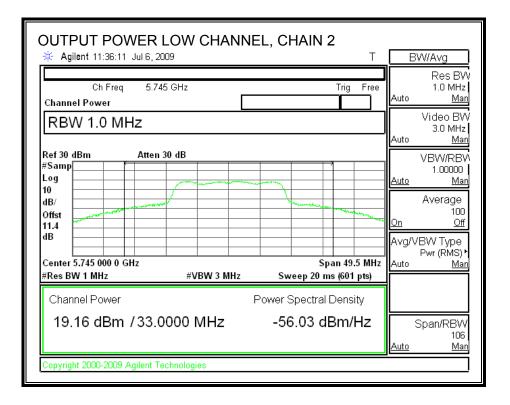
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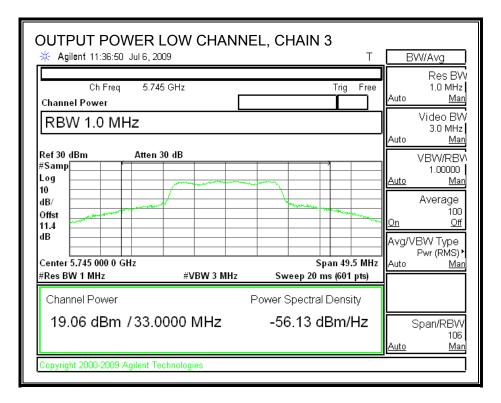
OUTPUT POWER, LOW CHANNEL





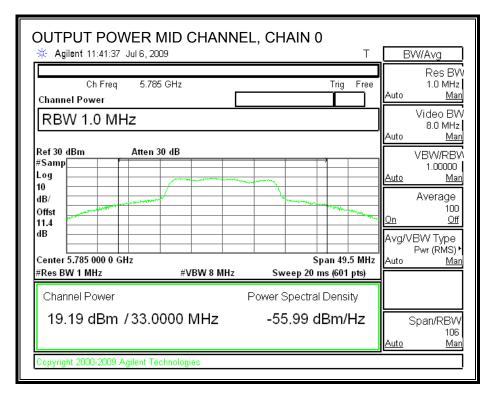
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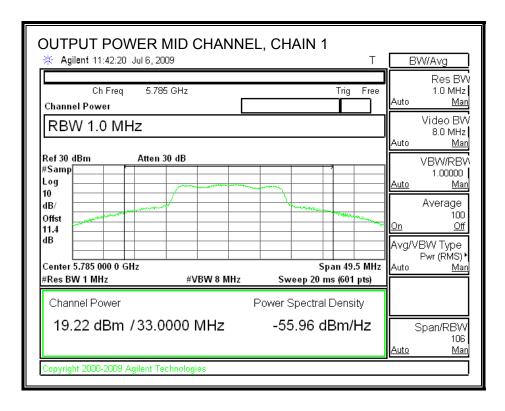




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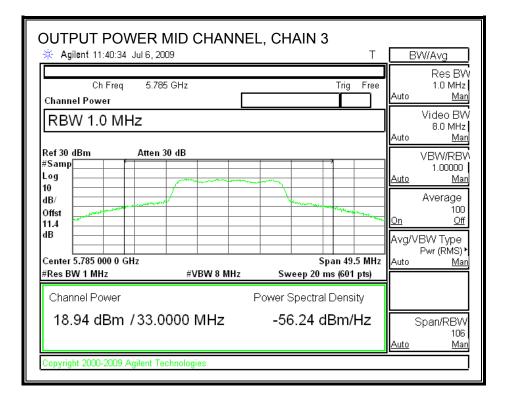
OUTPUT POWER, MID CHANNEL





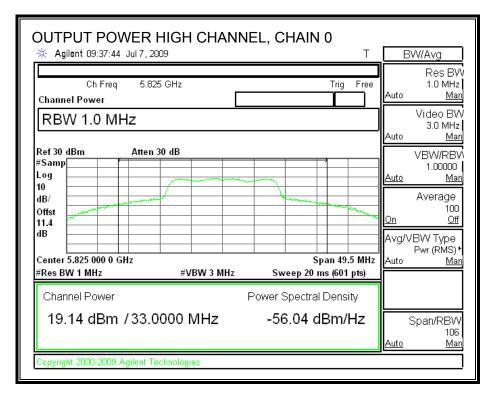
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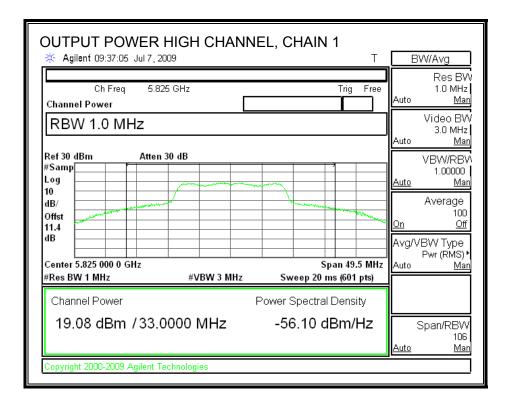
OUTPUT POWER		L, CHAIN 2	Т	BW/Avg
Channel Power	5 GHz		Trig Free	Res BW 1.0 MHz Auto <u>Man</u> Video BW
RBW 1.0 MHz	30 dB			8.0 MHz Auto <u>Man</u> VBW/RBW
#Samp Log 10 dB/ Offst 11.4 dB				1.00000 <u>Auto Man</u> Average 100 <u>On Off</u>
Center 5.785 000 0 GHz #Res BW 1 MHz	#VBW 8 MHz	Spa Sweep 20 ms	in 49.5 MHz ; (601 pts)	Avg/VBW Type Pwr (RMS) • Auto <u>Man</u>
Channel Power 19.11 dBm / 33.0	Span/RBW 106 <u>Auto Man</u>			
Copyright 2000-2009 Agilent Te	echnologies			



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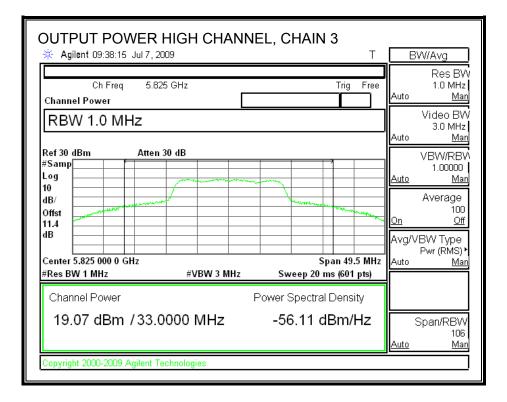
OUTPUT POWER, HIGH CHANNEL





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OUTPUT POWER		EL, CHAIN 2	2 T	BW/Avg
Ch Freq 5.82 Channel Power RBW 1.0 MHz	5 GHz		Trig Free	Res BW 1.0 MHz Auto <u>Man</u> Video BW
Ref 30 dBm Atten #Samp Dug Log Dug 10 dB/ Dug Dug	30 dB			3.0 MHz Auto <u>Man</u> VBW/RBW 1.00000 <u>Auto Man</u> Average 100
Offst 11.4 dB Center 5.825 000 0 GHz #Res BW 1 MHz	#VBW 3 MHz	Spa Sweep 20 ms	n 49.5 MHz	<u>On Off</u> Avg/VBW Type Pwr (RMS) ^k Auto <u>Man</u>
Channel Power 19.11 dBm /33.0	Span/RBW 106 <u>Auto Man</u>			
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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.

The cable assembly insertion loss of 11.4 dB (including 10 dB pad and 1.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3
		Power	Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)
Low	5745	19.17	18.99	19.22	19.11
Middle	5785	19.18	19.04	19.13	19.17
High	5825	19.21	18.90	19.22	19.13

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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 RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

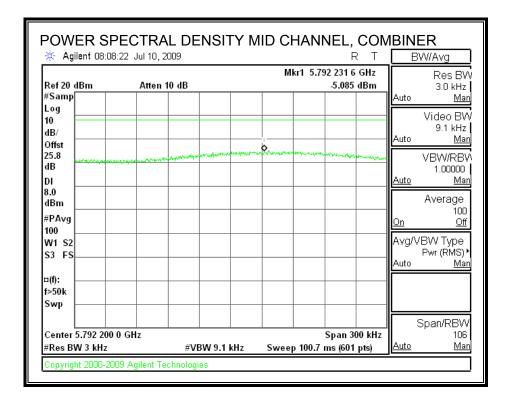
RESULTS

Channel	Frequency	PSD with Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5745	-6.00	8	-14.00
Middle	5785	-5.09	8	-13.09
High	5825	-6.41	8	-14.41

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POWER SPECTRAL DENSITY

🔆 Agilent 08:08				RT	Peak Search
Ref 20 dBm ≇Samp	Atten 10 dB		Mkr1 5.7	51 914 6 GHz -6.000 dBm	Next Peak
Log 10 dB/ Offst			1.		Next Pk Right
25.8 dB DI	we wanted and the second	Marrow and a second		when the second s	Next Pk Left
3.0 dBm ≇PA∨g					Min Search
100 W1 S2 S3 FS					Pk-Pk Search
⊐(f): i>50k Swp					Mkr © Cf
Center 5.751 850 ≇Res BW 3 kHz		BW 9.1 kHz	Sweep 100.7	Span 300 kHz ms (601 pts)	More 1 of 2



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🔆 Agilent 08:10):50 Jul 10, 2009			RT	BW/Avg
Ref 20 dBm #Samp	Atten 10 dB		Mkr1 5.4	319 763 5 GHz -6.410 dBm	Res B\ 3.0 kHz Auto <u>Ma</u>
Log 10 dB/ Offst		1			Video B\ 9.1 kHz Auto <u>Ma</u>
dB DI	and the second	Mineter Marian	- marine marine	the same the second second	VBVV/RB 1.00000 <u>Auto Ma</u>
8.0 dBm #PAvg					Average 100 <u>On Of</u>
100 W1 S2 S3 FS					Avg/VBW Type Pwr (RMS) Auto <u>Ma</u>
⊏(f): f>50k Swp					
Center 5.819 750 #Res BW 3 kHz		W 9.1 kHz	Sweep 100.7	Span 300 kHz ′ms (601 pts)	Span/RBV 108 <u>Auto Ma</u>

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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 dBc.

TEST PROCEDURE

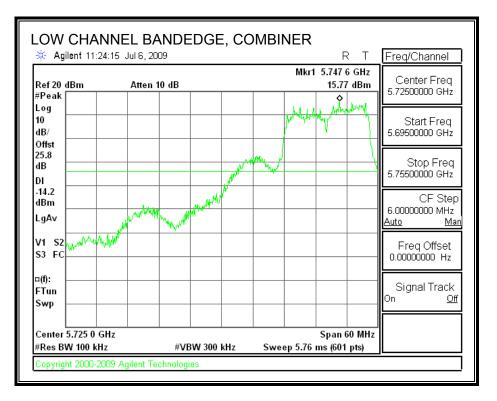
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

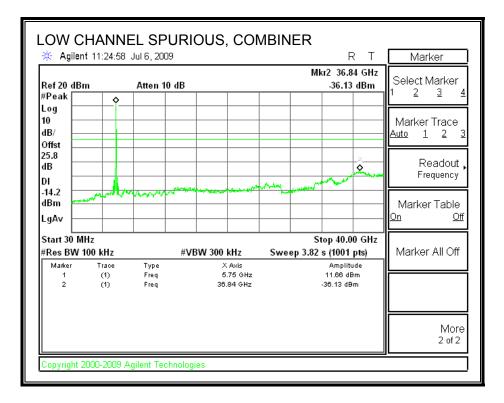
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

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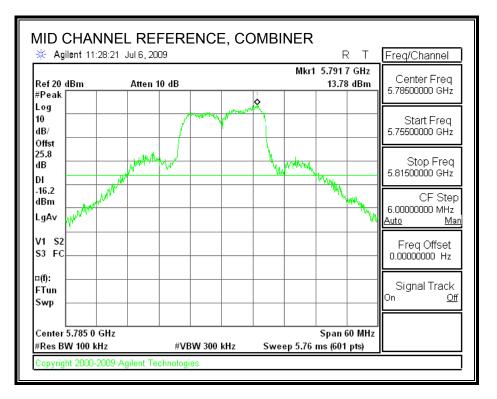
LOW CHANNEL SPURIOUS EMISSIONS

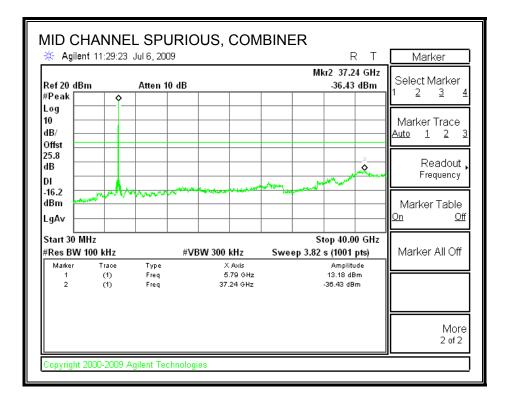




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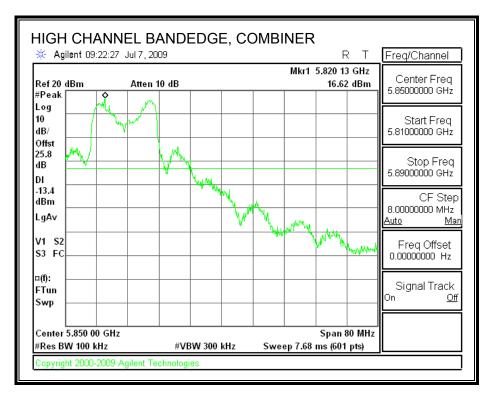
MID CHANNEL SPURIOUS EMISSIONS

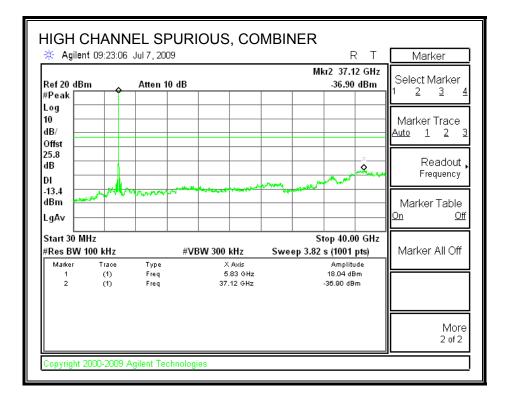




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HIGH CHANNEL SPURIOUS EMISSIONS





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7.6. 5.8 GHz BAND CHANNEL TESTS FOR 802.11n HT20 MODE

7.6.1. 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

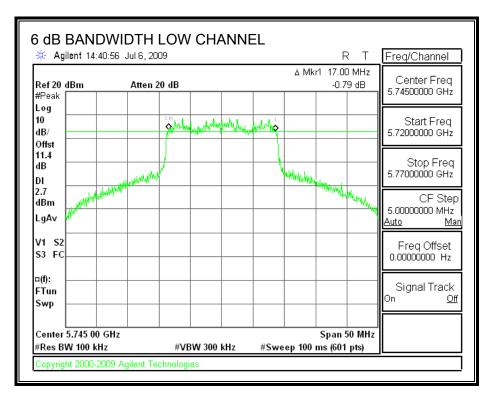
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

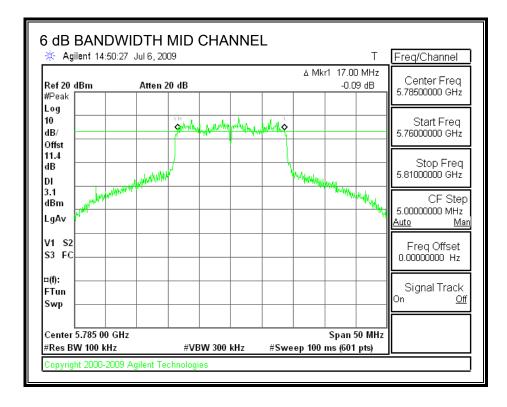
RESULTS

Channel	Frequency	6 dB BW	Minimum Limit
	(MHz)	(MHz)	(MHz)
Low	5745	17.00	0.5
Middle	5785	17.00	0.5
High	5825	16.50	0.5

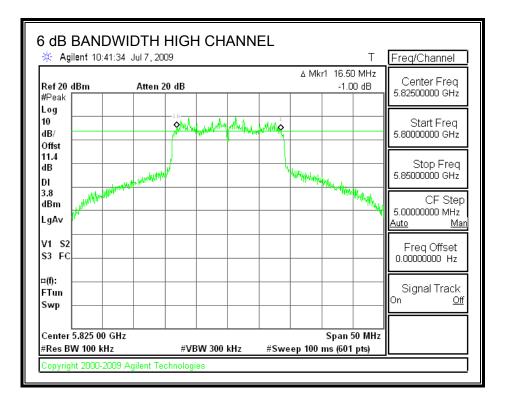
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6 dB BANDWIDTH





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7.6.2. 99% & 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

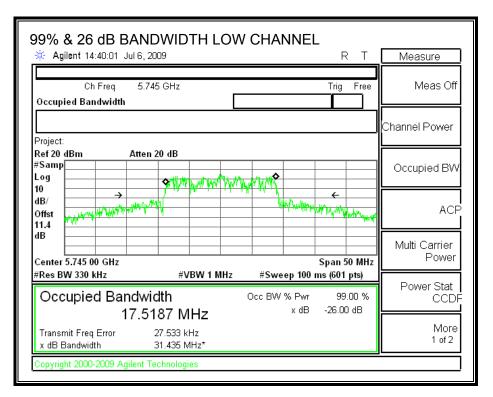
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

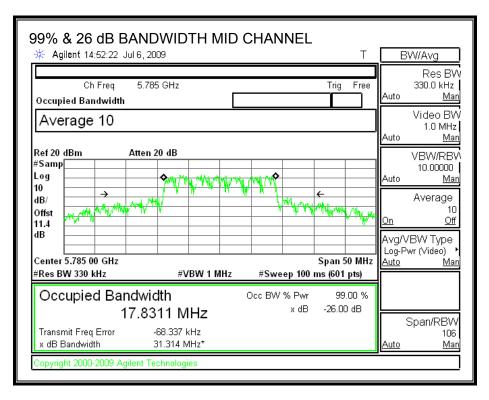
RESULTS

Channel	Frequency	99% OBW	26 dB BW
	(MHz)	(MHz)	(MHz)
Low	5745	17.52	31.44
Middle	5785	17.83	31.31
High	5825	17.58	31.29

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99% & 26 dB BANDWIDTH





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99% & 26 dB BANDWIDTH HIGH CHANNEL	
	Measure
Ch Freq 5.825 GHz Trig Free Occupied Bandwidth	Meas Off
Average 10	Channel Power
Ref 20 dBm Atten 20 dB #Samp Log	Occupied BW
dB/ offst 11.4	ACF
dB Center 5.825 00 GHz Span 50 MHz	Multi Carrier Power
#Res BW 330 kHz #VBW 1.2 MHz #Sweep 100 ms (601 pts)	Power Stat
Occupied Bandwidth Occ BW % Pwr 99.00 % 17.5760 MHz × dB -26.00 dB	CCDF
Transmit Freq Error 61.513 kHz x dB Bandwidth 31.285 MHz*	More 1 of 2
Copyright 2000-2009 Agilent Technologies	

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7.6.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

TEST PROCEDURE

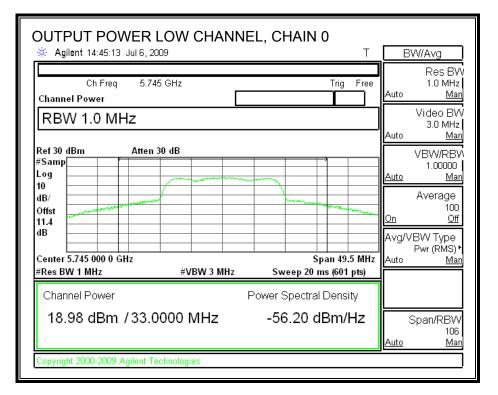
Output power was measured based on the use of RMS averaging over a time interval in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

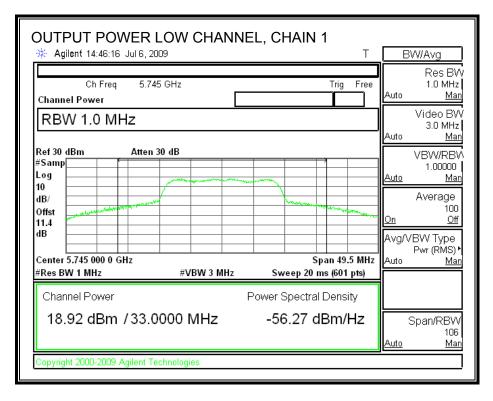
RESULTS

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

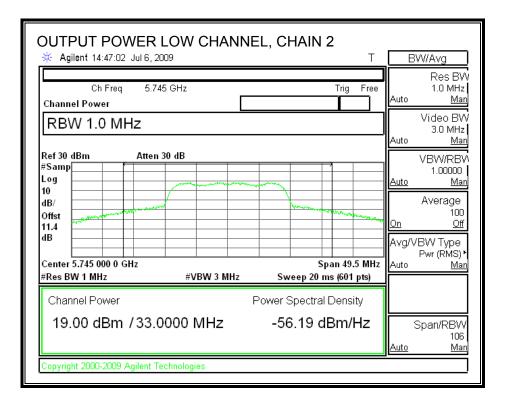
Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		Power	Power	Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5745	18.98	18.92	19.00	19.04	25.01	30	-4.99
Mid	5785	18.98	19.13	18.96	18.99	25.04	30	-4.96
High	5825	19.23	19.19	19.28	19.16	25.24	30	-4.76

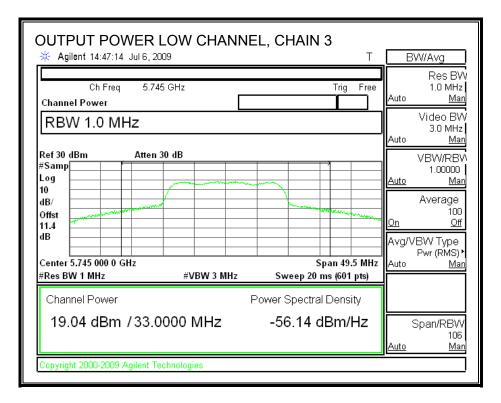
OUTPUT POWER, LOW CHANNEL





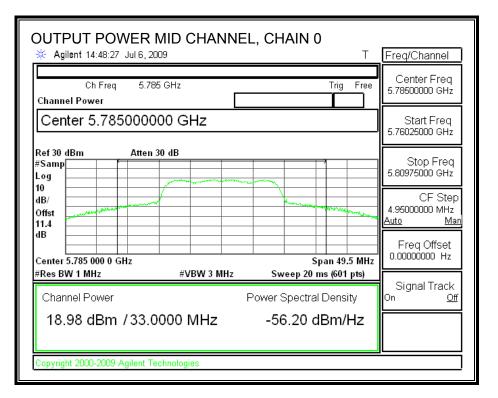
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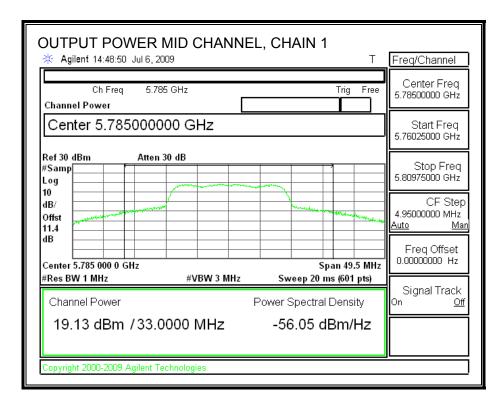




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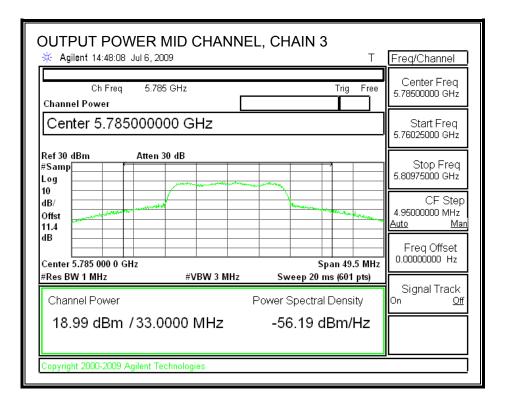
OUTPUT POWER, MID CHANNEL





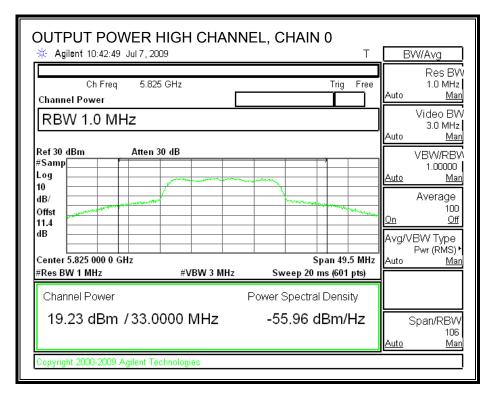
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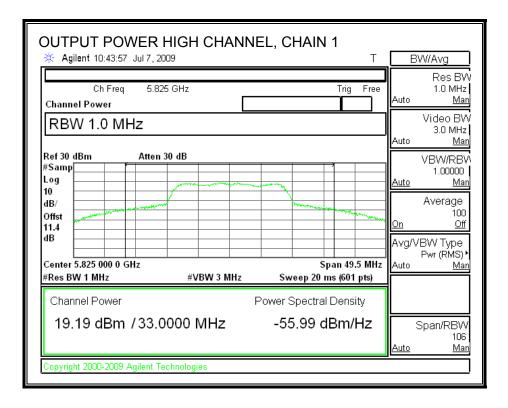
OUTPUT POWER		L, CHAIN 2	Т	Freq/Channel
Ch Freq 5.785 Channel Power	5 GHz	Trig	Free	Center Freq 5.7850000 GHz
Center 5.7850000	00 GHz			Start Freq 5.76025000 GHz
Ref 30 dBm Atten 3 #Samp	80 dB			Stop Freq 5.80975000 GHz
dB/ Offst puter for the second			the second s	CF Step 4.9500000 MHz <u>Auto Man</u>
dB	#VBW 3 MHz	Span 49 Sweep 20 ms (601		Freq Offset 0.00000000 Hz
Channel Power		Power Spectral Dens	• ⁄	Signal Track On <u>Off</u>
18.96 dBm / 33.0	000 MHz	-56.23 dBm/	'Hz	
Copyright 2000-2009 Agilent Te	chnologies			



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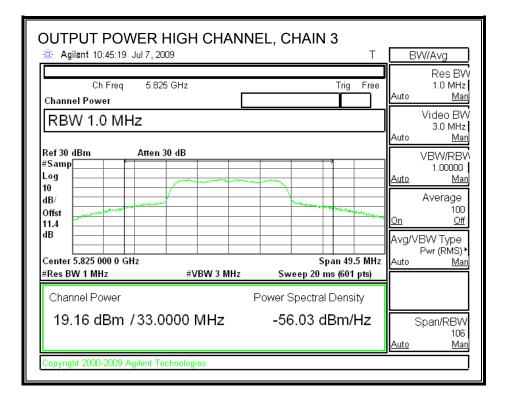
OUTPUT POWER, HIGH CHANNEL





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OUTPUT POWER		EL, CHAIN 2	2 T	BW/Avg
Ch Freq 5.825 Channel Power	i GHz		Trig Free	Res BW 1.0 MHz Auto <u>Man</u> Video BW
RBW 1.0 MHz	0 dB	· · · · · · · · · · · · · · · · · · ·]	3.0 MHz Auto <u>Man</u> VBW/RBV
#Samp Log 10 dB/ Offst			······	1.00000 <u>Auto Man</u> Average 100 <u>On Off</u>
dB Center 5.825 000 0 GHz #Res BW 1 MHz	#VBW 3 MHz	Spa Sweep 20 ms	n 49.5 MHz (601 pts)	Avg/VBW Type Pwr (RMS) • Auto <u>Man</u>
Channel Power 19.28 dBm /33.0	Span/RBW 106 <u>Auto Man</u>			
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7.6.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.4 dB (including 10 dB pad and 1.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3
		Power	Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)
Low	5745	18.93	18.98	19.04	19.13
Middle	5785	19.13	18.95	19.09	19.19
High	5825	19.23	19.2	19.27	19.17

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7.6.5. POWER SPECTRAL DENSITY

<u>LIMITS</u>

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

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

TEST PROCEDURE

Output power was measured based on the use of RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

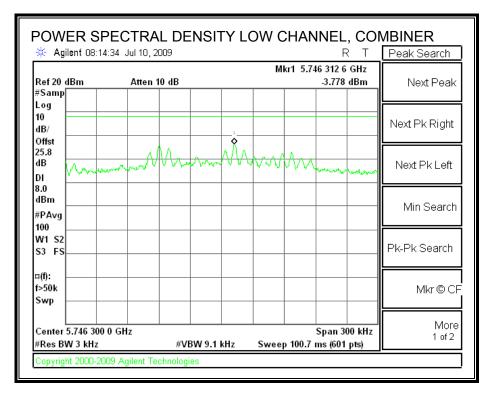
Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

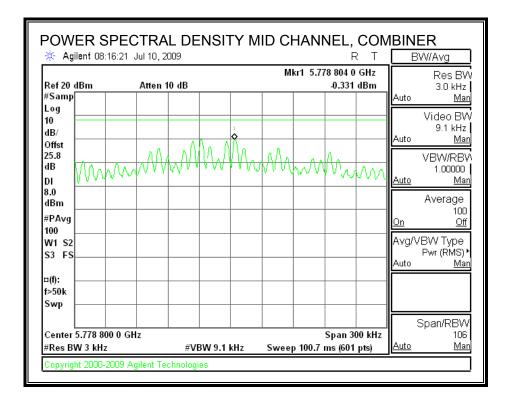
RESULTS

Channel	Frequency	PSD with Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5745	-3.778	8	-11.78
Middle	5785	-0.331	8	-8.33
High	5825	0.326	8	-7.67

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POWER SPECTRAL DENSITY





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🔆 Agilent 08:18:0	🖗 Agilent 08:18:01 Jul 10, 2009 🛛 💦 🕅 🤆			BW/Avg	
Ref 20 dBm #Samp	Atten 10 dB	Mkr1 5.778 805 0 GHz tten 10 dB 0.326 dBm			Res BV 3.0 kHz Auto <u>Ma</u>
Log 10 dB/ Offst					Video BV 9.1 kHz Auto <u>Ma</u>
25.8 dB DI 8.0	~~~~	WWW	MALAN	Mum	VBW/RB\ 1.00000 <u>Auto Ma</u>
dBm #PA∨g 100					Average 100 <u>On Off</u>
W1 S2 S3 FS					Avg/VBW Type Pwr (RMS) Auto <u>Ma</u>
⊏(f): f>50k Swp					
Center 5.778 800 0 #Res BW 3 kHz		BW 9.1 kHz	Sweep 100.7	Span 300 kHz ms (601 pts)	Span/RBV 106 Auto Ma

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7.6.6. 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 dBc.

TEST PROCEDURE

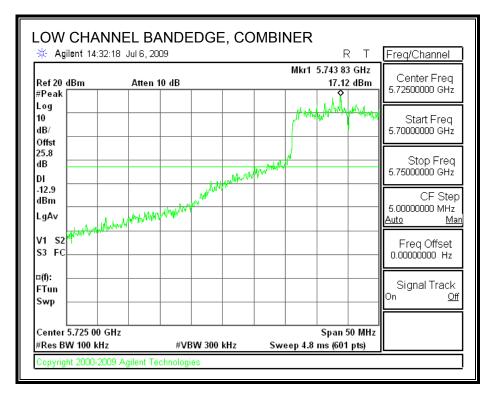
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

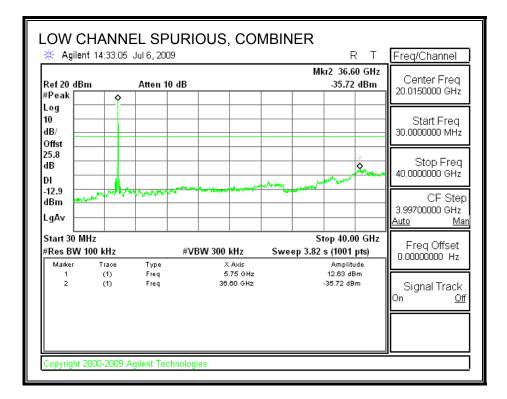
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

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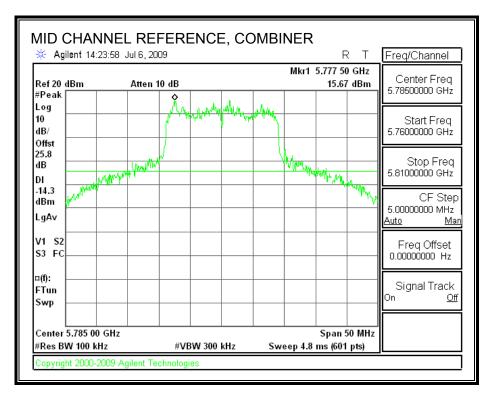
LOW CHANNEL SPURIOUS EMISSIONS

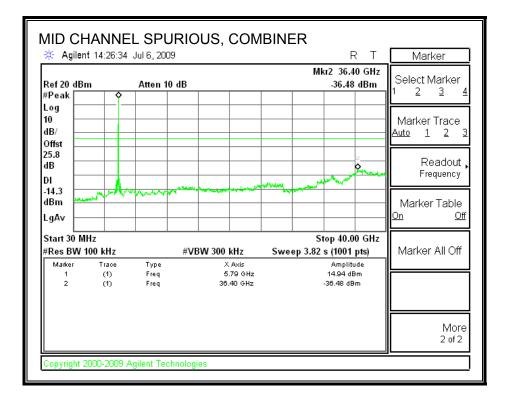




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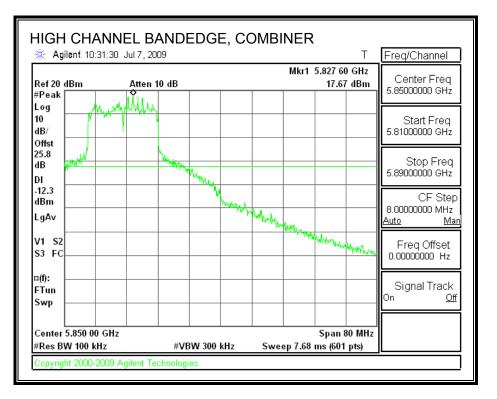
MID CHANNEL SPURIOUS EMISSIONS

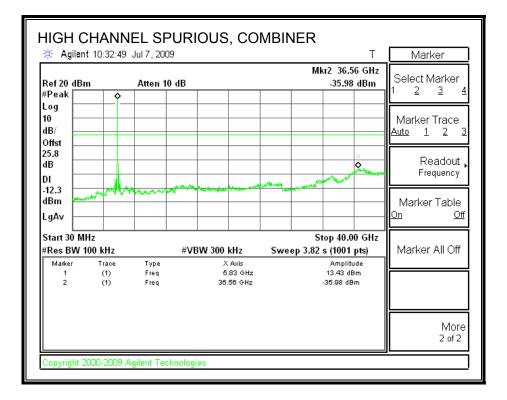




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HIGH CHANNEL SPURIOUS EMISSIONS





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7.7. 5.8 GHz BAND CHANNEL TESTS FOR 802.11n HT40 MODE

7.7.1. 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

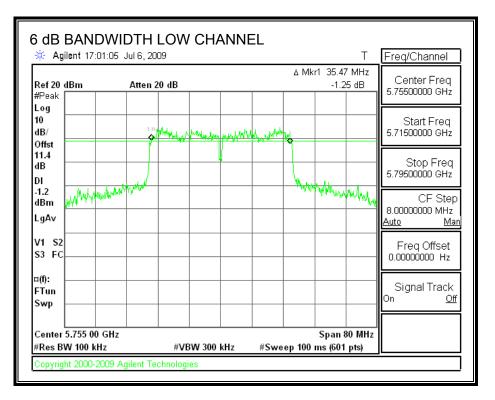
The transmitter output is connected to a spectrum analyzer. The RBW is set to 100 kHz and the VBW is set to 300 kHz. The sweep time is coupled.

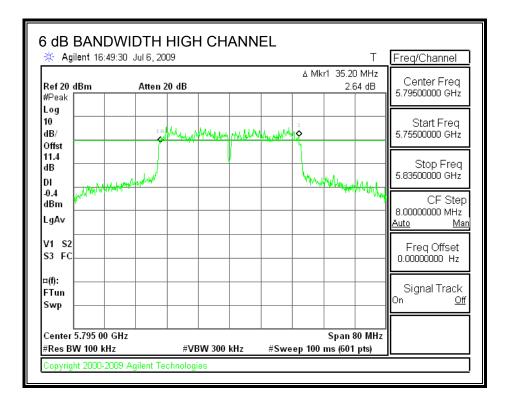
RESULTS

Channel	Frequency	6 dB BW	Minimum Limit		
	(MHz)	(MHz)	(MHz)		
Low	5755	35.47	0.5		
High	5795	35.20	0.5		

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6 dB BANDWIDTH





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7.7.2. 99% & 26 dB BANDWIDTH

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

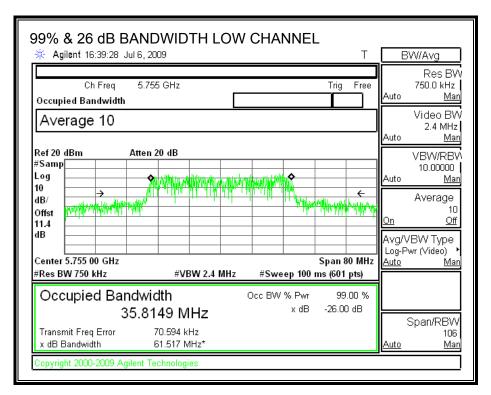
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth measurement function is utilized.

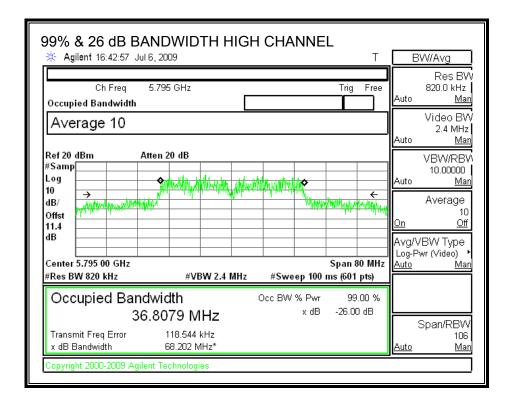
RESULTS

Channel	Frequency	99% OBW	26 dB BW	
	(MHz)	(MHz)	(MHz)	
Low	5755	35.8149	61.517	
High	5795	36.8079	68.202	

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99% & 26 dB BANDWIDTH





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7.7.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

TEST PROCEDURE

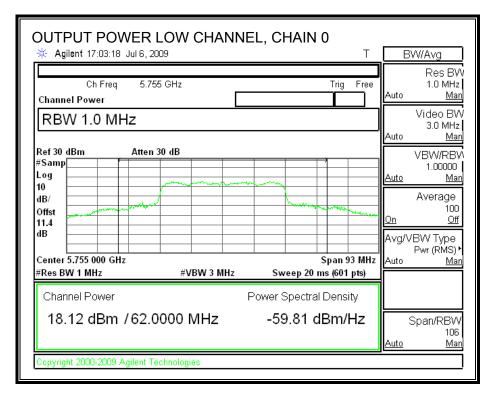
Output power was measured based on the use of RMS averaging over a time interval in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

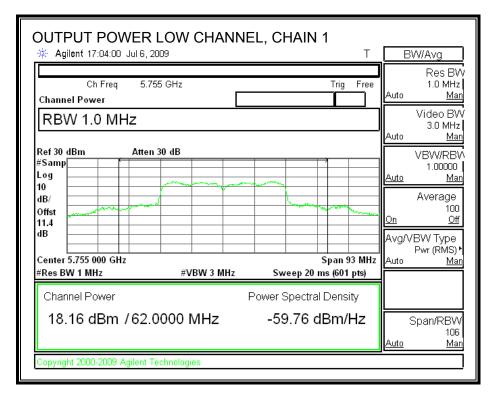
RESULTS

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

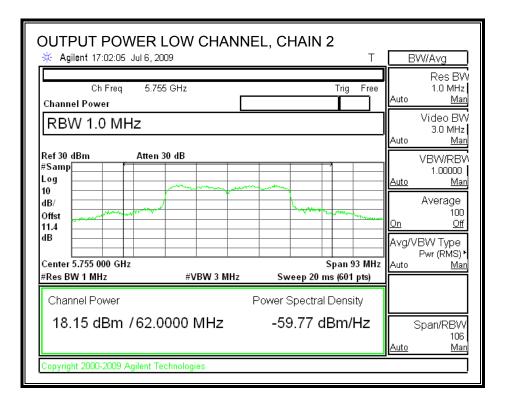
Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3	Total	Limit	Margin
		Power	Power	Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5755	18.12	18.16	18.15	18.10	24.15	30.00	-5.85
High	5795	19.12	18.94	19.04	18.97	25.04	30.00	-4.96

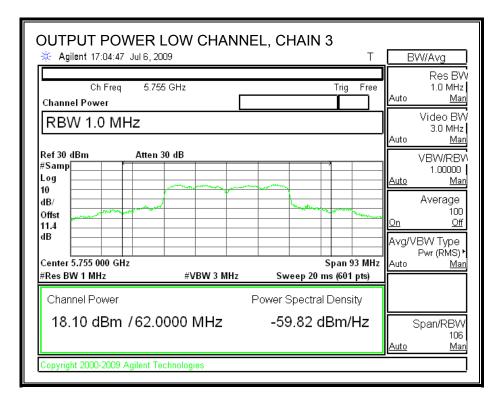
OUTPUT POWER, LOW CHANNEL





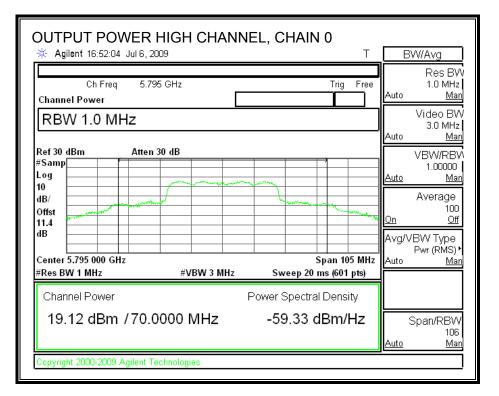
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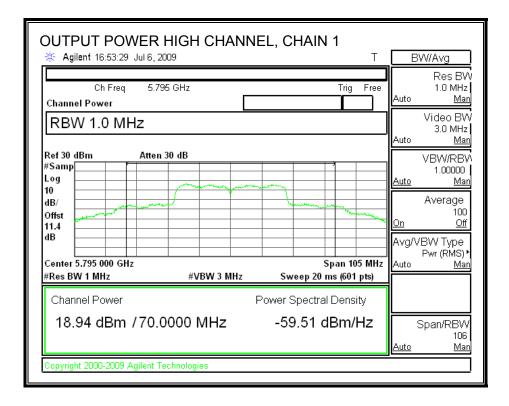




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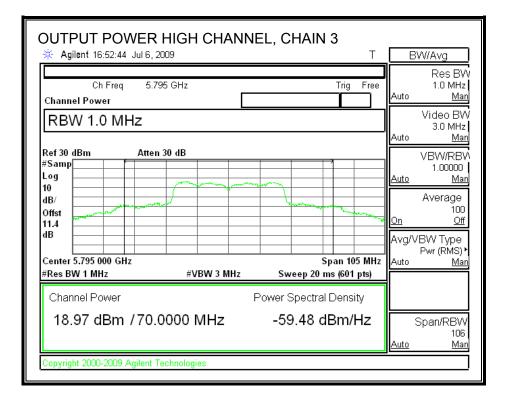
OUTPUT POWER, HIGH CHANNEL





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OUTPUT POWER I		EL, CHAIN	2 T	BM	//Avg
Ch Freq 5.799 Channel Power RBW 1.0 MHz	5 GHz		Trig Free	Auto	Res BW 1.0 MHz <u>Man</u> Video BW
Ref 30 dBm Atten 3	30 dB		*	Auto \ <u>Auto</u>	3.0 MHz <u>Man</u> /BW/RBV 1.00000 <u>Man</u>
dB/ Offst 11.4 dB				<u>On</u> Avg/VE	Average 100 <u>Off</u> 3VV Type Pwr (RMS) •
Center 5.795 000 GHz #Res BW 1 MHz	#VBW 3 MHz	Sweep 20 n	pan 105 MHz 1s (601 pts)	Auto	<u>Man</u>
Channel Power 19.04 dBm /70.0		[⊃] ower Spectral -59.41 d	,	S; <u>Auto</u>	oan/RBW 106 <u>Man</u>
Copyright 2000-2009 Agilent Te	chnologies			•	



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7.7.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 11.4 dB (including 10 dB pad and 1.4 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency	Chain 0	Chain 1	Chain 2	Chain 3
		Power	Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)
Low	5755	18.13	18.29	18.15	17.92
High	5795	18.91	18.96	19.02	19.06

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7.7.5. POWER SPECTRAL DENSITY

<u>LIMITS</u>

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

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

TEST PROCEDURE

Output power was measured based on the use of RMS averaging over a time interval, therefore the power spectral density was measured using PSD Option 2 in accordance with FCC document "Measurement of Digital Transmission Systems Operating under Section 15.247", March 23, 2005.

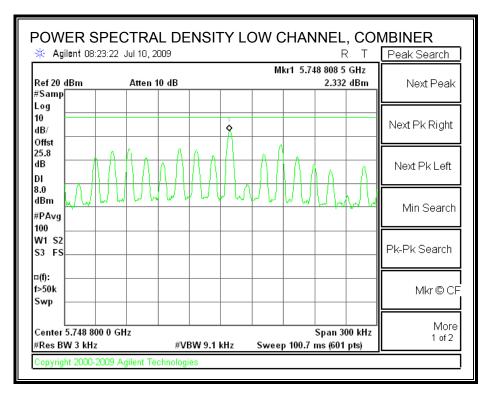
Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

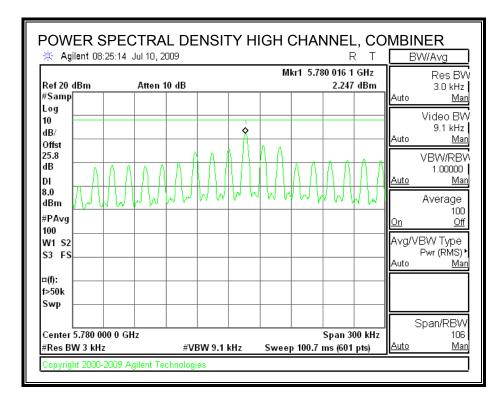
RESULTS

Channel	Frequency	PSD with Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5755	2.332	8	-5.67
High	5795	2.25	8	-5.75

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POWER SPECTRAL DENSITY





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7.7.6. CONDUCTED SPURIOUS EMISSIONS

<u>LIMITS</u>

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 dBc.

TEST PROCEDURE

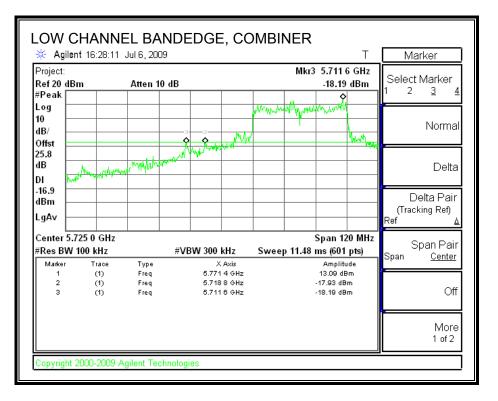
The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100 kHz. The video bandwidth is set to 300 kHz.

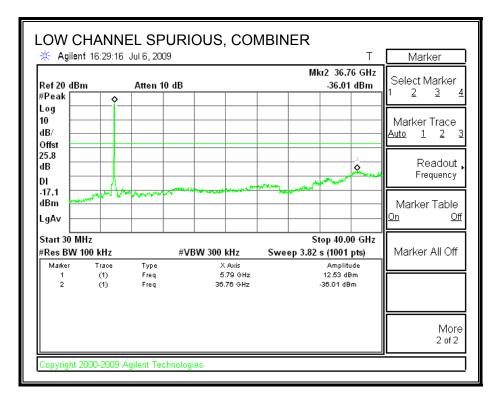
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

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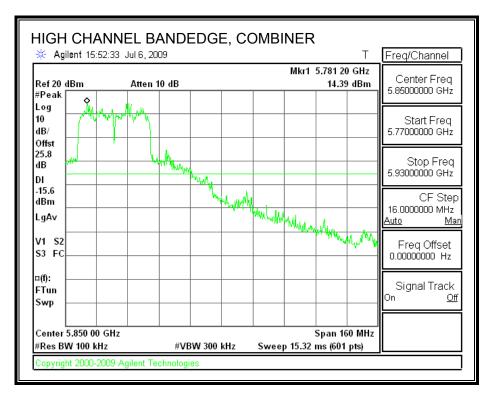
LOW CHANNEL SPURIOUS EMISSIONS

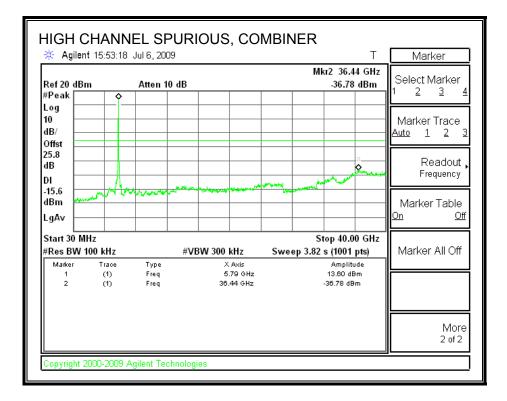




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HIGH CHANNEL SPURIOUS EMISSIONS





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7.8. RECEIVER CONDUCTED SPURIOUS EMISSIONS

LIMITS

IC RSS-GEN 7.2.3.1

Antenna Conducted Measurement: Receiver spurious emissions at any discrete frequency shall not exceed 2 nanowatts (-57 dBm) in the band 30-1000 MHz, or 5 nanowatts (-53 dBm) above 1 GHz.

TEST PROCEDURE

IC RSS-GEN 4.10, Conducted Method

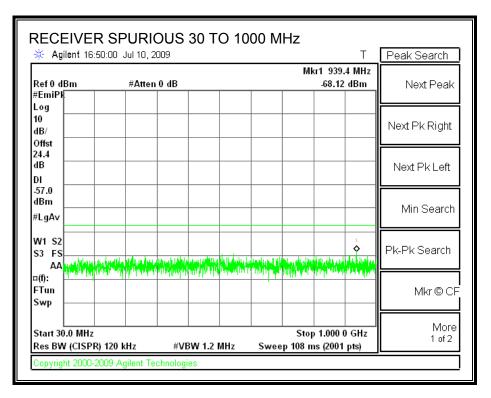
The receiver antenna port is connected to a spectrum analyzer.

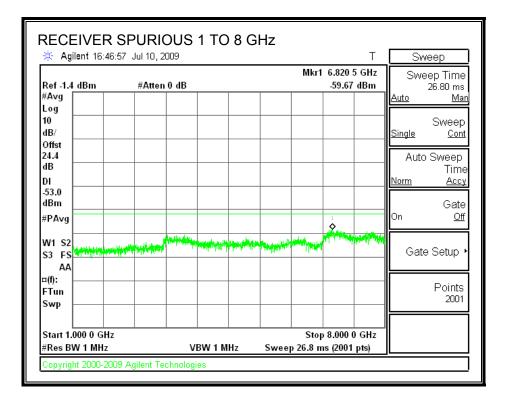
The spectrum from 30 MHz to 8 GHz is investigated with the receiver set to the middle channel of the 2.4 GHz band.

The spectrum from 30 MHz to 18 GHz is investigated with the receiver set to the middle channel of each 5 GHz band.

Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were performed with all chains feeding a combiner.

RECEIVER SPURIOUS EMISSIONS IN THE 2.4 GHz BAND

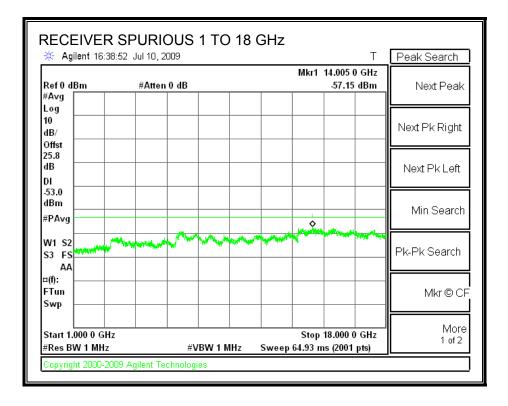




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RECEIVER SPURIOUS EMISSIONS IN THE 5.8 GHz BAND

🔆 Agilent 16:3			TO 10				Т	Peak Search
Ref0dBm #EmiPk	#Atten	0 dB			Mk	r1 607. _67.23		Next Peak
Log 10 dB/ Offst								Next Pk Right
dB DI								Next Pk Left
-57.0 dBm #LgAv								Min Search
W1 S2 S3 FS								Pk-Pk Search
¤(f): FTun Swp	and the sector	••••••••••••••••••••••••••••••••••••••		- 1				Mkr © CF
Start 30.0 MHz #Res BW (CISP	R) 120 kHz	VBW 1.	2 MHz	Swee	Stop p108 m	1.000 (s (2001		More 1 of 2



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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.

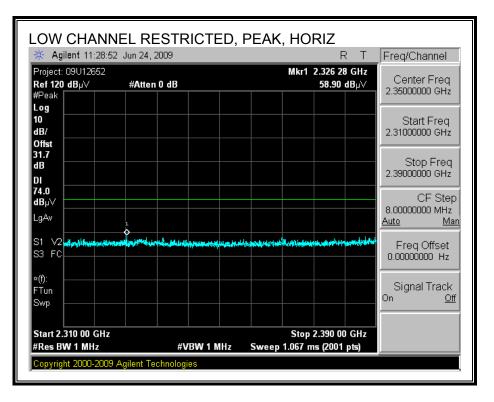
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

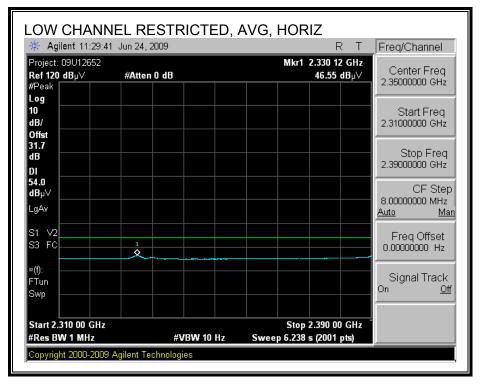
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8.2. TRANSMITTER ABOVE 1 GHz

8.2.1. 802.11b MODE IN THE 2.4 GHz BAND

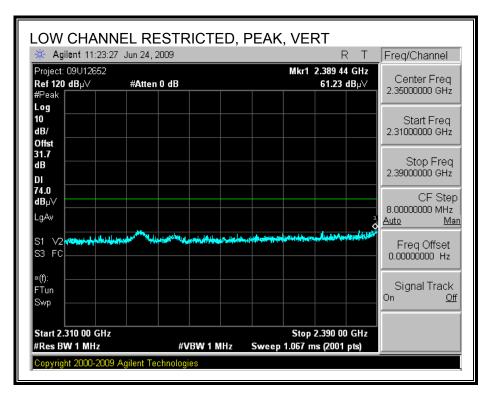
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

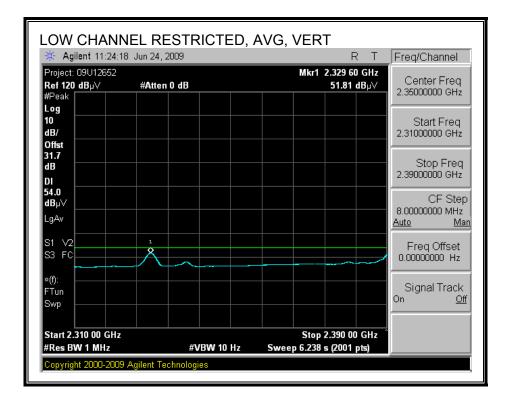




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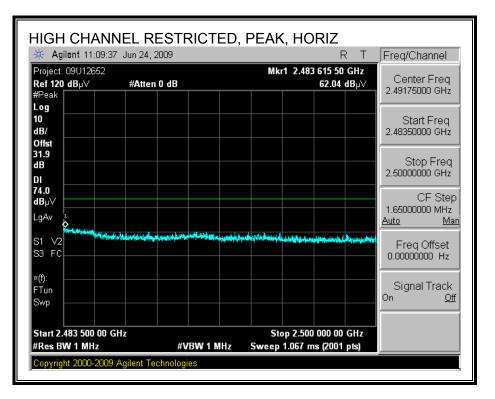
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

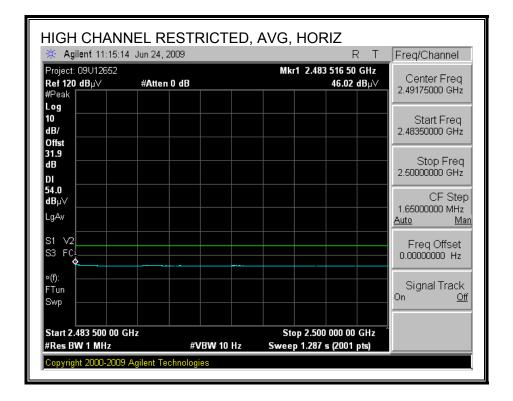




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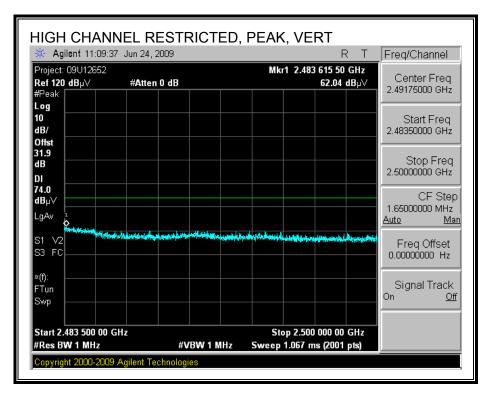
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

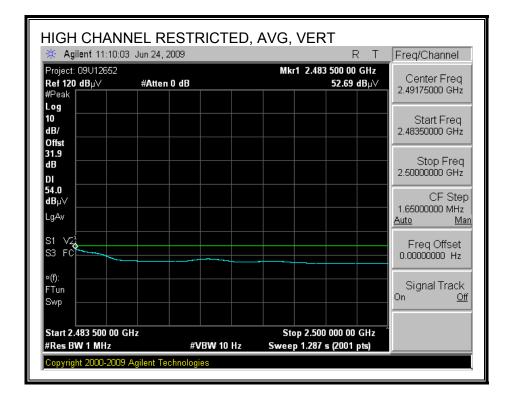




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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





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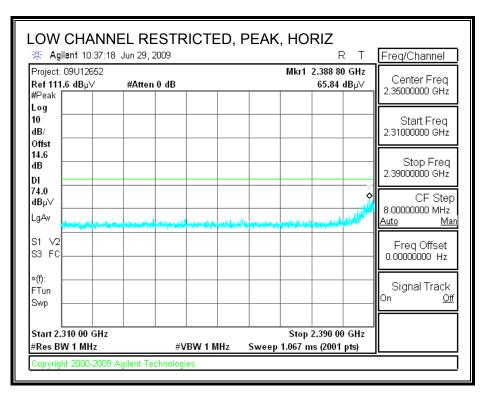
HARMONICS AND SPURIOUS EMISSIONS

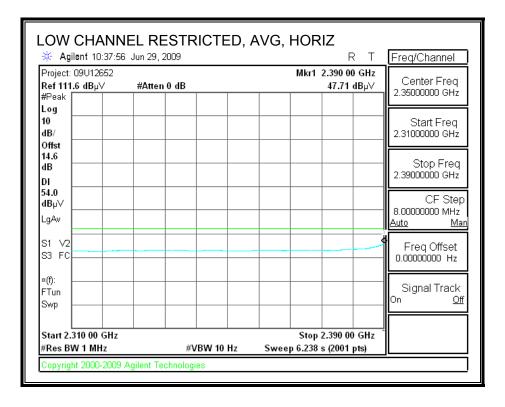
Iest Engr: Date:		dification	Services, F	/remo:	nt 5m C	hamber									
Date:			Thanh Ngu	uyen											
Date:			06/30/09	v											
Company	:		Qualcomn	m Inc.	,										
EUT Descr		,	802.11 abg			e									
EUT M/N:	-		65-VN780-	-											
Test Targe	st:		FCC Class	s B											
Mode Ope	2 r:		Transmit h	b mod	æ										
	f	Measurer	ment Frequen	acy	Amp	Preamp (Average	Field Streng	gth Limit			
	Dist		to Antenna		D Corr	Distance					eld Strength				
	Read	Analyzer	· ·		Avg			Strength @			vs. Average				
	AF	Antenna			Peak			k Field Stre	ength	Margin v	vs. Peak Lin	.nit			
	CL	Cable Los	55		HPF	High Pass	s Filter	1							
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Mennin	Ant. Pol.	Det	+ An+ High	Table Angle	Notes
GHz	(m)	neaa dBuV	dB/m	dB		dB			n dBuV/m		V/H	Det P/A/QP		Degree	110162
Low 24121		·			<u> </u>	<u> </u>	<u> </u>		- ub u v ran				<u> </u>	Degree	
4.824	3.0	44.8	33.0	5.8	-36.5	0.0	0.0	47.1	74.0	-26.9	v	Р	129.4	241.0	
4.824	3.0	41.4	33.0	5.8			0.0	43.8	54.0	-10.2	v	Â	129.4	241.0	
4.824	3.0	40.2	33.0	5.8			0.0	42.6	74.0	-31.4	H	P	116.2	197.3	Noise floor
4.824	3.0	31.4	33.0	5.8	-36.5	0.0	0.0	33.8	54.0	-20.2	H	A	116.2	197.3	Noise floor
Mid ch 24		.f.,					.			ļ!	Į				
4.874	3.0	46.0	33.1	5.8	-36.5	0.0	0.0	48.5	74.0	-25.5	V	P	116.1	272.7	
4.874	3.0	42.9	33.1	5.8	-36.5		0.0	45.3	54.0	-8.7	V.	A	116.1	272.7	
7.311	3.0	45.0	35.3	7.3			0.0	51.3	74.0	-22.7	V	P	157.9	305.2	
7.311 12.185	3.0 3.0	39.5 36.8	35.3 39.0	7.3 9.8			0.0	45.9 50.2	54.0 74.0	-8.1 -23.8	v v	A P	157.9 103.8	305.2 360.0	Noise floor
12.185	3.0	23.6	39.0	9.8 9.8	-35.4		0.0	37.0	54.0	-17.0	v	P A	103.8	360.0	Noise floor
4.874	3.0	40.3	33.1	5.8	-36.5		0.0	42.8	74.0	-31.2	Ň	P	103.9	221.2	TIVIDE HVVA
4.874	3.0	32.7	33.1	5.8			0.0	35.1	54.0	-18.9	H	Ā	103.9	221.2	
7.311	3.0	37.5	35.3	7.3			0.0	43.9	74.0	-30.1	H	P	142.0	211.3	
7.311	3.0	27.6	35.3	7.3	-36.2		0.0	33.9	54.0	-20.1	H	A	142.0	211.3	
12.185	3.0	35.7	39.0	9.8		··•	0.0	49.1	74.0	-24.9	H	P	116.2	356.5	Noise floor
12.185	3.0	23.5	39.0	9.8	-35.4	0.0	0.0	36.9	54.0	-17.1	H	A	116.2	356.5	Noise floor
High Ch 2		•••		= = 0	26 8		0.0	47.0	74.0		v	Р	100 1	245.0	
4.924 4.924	3.0	45.3 41.4	33.1	5.9 5.9	-36.5		0.0	47.9 43.9	74.0 54.0	-26.1 -10.1	v	A P	198.1 198.1	245.8 245.8	
4.924 7.386	3.0	41.4 39.8	35.4	7.3			0.6	45.9	54.0 74.0	-10.1	v	P	198.1	170.9	
7.386	3.0	31.1	35.4	7.3			0.6	38.2	54.0	-15.8	v	A	156.2	170.9	
4.924	3.0	40.6	33.1	5.9	-36.5		0.0	43.2	74.0	-30.8	Ĥ	P	102.3	150.9	
4.924	3.0	33.1	33.1	5.9			0.0	35.7	54.0	-18.3	H	Ā	102.3	150.9	
7.386	3.0	36.8	35.4	7.3			0.6	43.9	74.0	- 30.1	H	P	173.5	156.4	Noise floor
7.386	3.0	24.9	35.4	7.3	-36.2	0.0	0.6	32.0	54.0	-22.0	H	A	173.5	156.4	Noise floor
						ı	<u> </u>			لــــــــــــــــــــــــــــــــــــــ	لــــــــــــــــــــــــــــــــــــــ	<u>. </u>		<u> </u>	
Rev. 4.1.2.			were detect												

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8.2.2. 802.11g MODE IN THE 2.4 GHz BAND

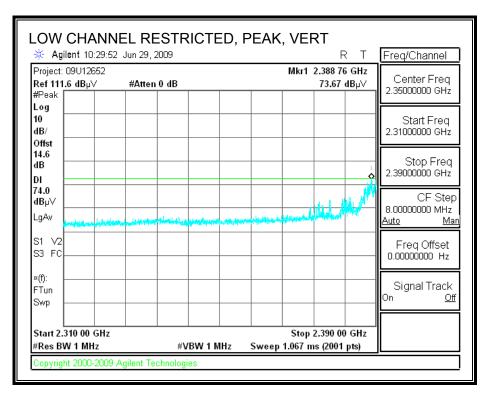
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

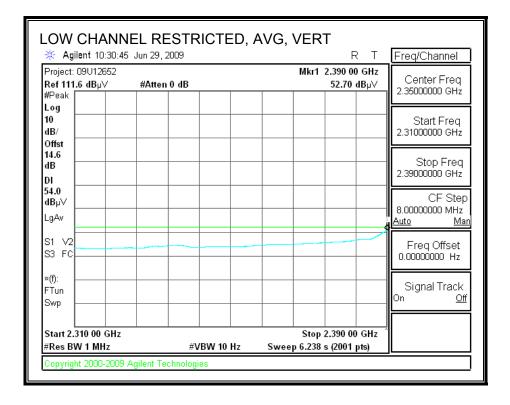




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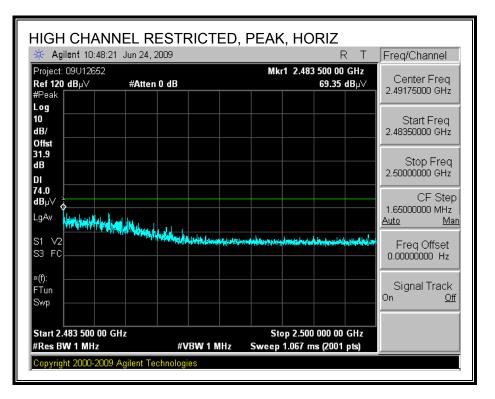
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

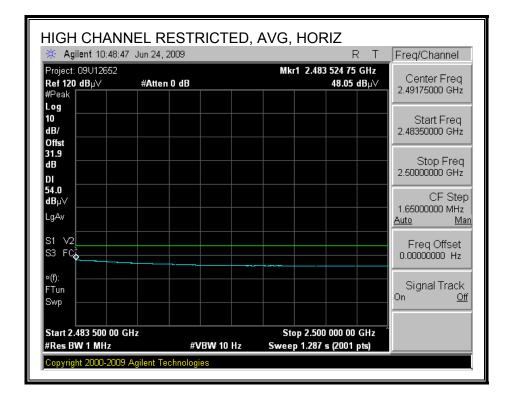




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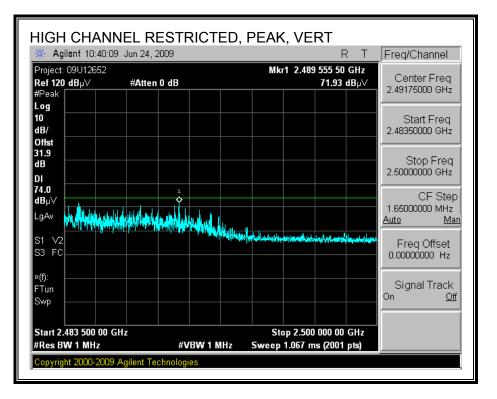
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

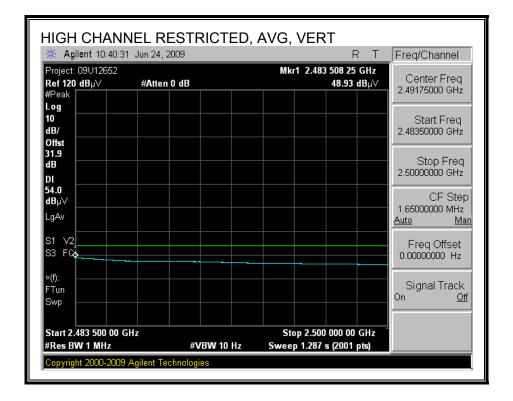




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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





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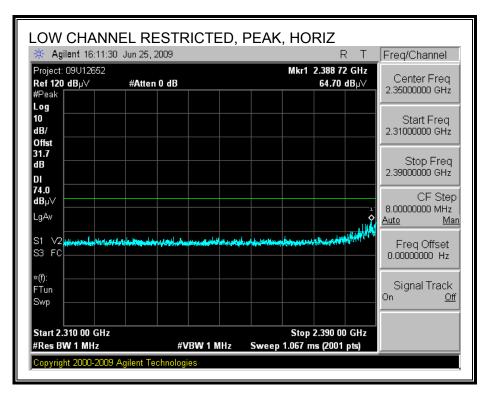
HARMONICS AND SPURIOUS EMISSIONS

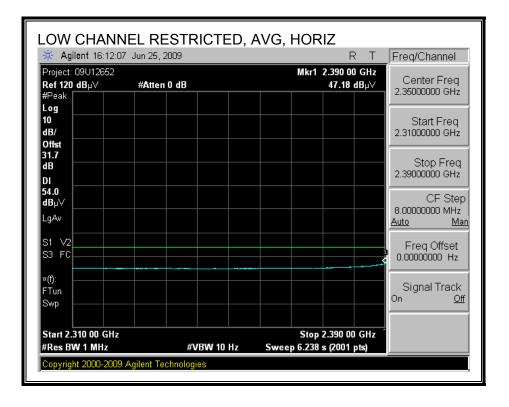
9U12652 Qualcom 02.11 ab 5-VN78(CC Clar ransmit leasurem tistance t nalyzer 1 ntenna F able Loss Read dBuV 41.2 35.0	m Inc. gn 4X4)-P2 ss B ent Freq o Anten Reading factor	e puency	• Amp		Corre Field S d Peak s Filter	trength @ r Field Stre r Corr.	3 m	Peak Fie Margin Margin	Field Stren ald Strength vs. Average vs. Peak Liv	Limit Limit			
02.11 ab 5-VN78(CC Clar ransmit leasurem fistance t nalyzer l ntenna F able Loss Read dBuV 41.2	gn 4X4)-P2 ss B g mode ent Freq o Anten Reading Factor s AF dB/m	na CL	Amp D Corr Avg Peak HPF Amp	Distance Average I Calculate High Pas: D Corr	Correc Field S d Peak s Filter Fltr	trength @ r Field Stre r Corr.	3 m angth	Peak Fie Margin Margin	eld Strength vs. Average vs. Peak Lir	Limit Limit			
5-VN78(CC Clas ransmit leasurem tistance t nalyzer l ntenna F able Loss Read dBuV 41.2)-P2 ss B ent Freq o Anten Reading Factor AF dB/m	na CL	Amp D Corr Avg Peak HPF Amp	Distance Average I Calculate High Pas: D Corr	Correc Field S d Peak s Filter Fltr	trength @ r Field Stre r Corr.	3 m angth	Peak Fie Margin Margin	eld Strength vs. Average vs. Peak Lir	Limit Limit			
CC Clar ransmit leasurem iistance t nalyzer l ntenna F able Loss Read dBuV 41.2	ss B ent Freq o Anten Reading Factor AF dB/m	pency na CL	D Corr Avg Peak HPF Amp	Distance Average I Calculate High Pas: D Corr	Correc Field S d Peak s Filter Fltr	trength @ r Field Stre r Corr.	3 m angth	Peak Fie Margin Margin	eld Strength vs. Average vs. Peak Lir	Limit Limit			
ransmit leasurem istance t nalyzer l ntenna F able Loss Read dBuV 41.2	g mode ent Freg o Anten Reading Factor ; AF dB/m	pency na CL	D Corr Avg Peak HPF Amp	Distance Average I Calculate High Pas: D Corr	Correc Field S d Peak s Filter Fltr	trength @ r Field Stre r Corr.	3 m angth	Peak Fie Margin Margin	eld Strength vs. Average vs. Peak Lir	Limit Limit			
leasurem istance t nalyzer l ntenna F able Loss Read dBuV 41.2	ent Freq o Anten Reading Factor s AF dB/m	pency na CL	D Corr Avg Peak HPF Amp	Distance Average I Calculate High Pas: D Corr	Correc Field S d Peak s Filter Fltr	trength @ r Field Stre r Corr.	3 m angth	Peak Fie Margin Margin	eld Strength vs. Average vs. Peak Lir	Limit Limit			
istance t nalyzer l ntenna F able Loss Read dBuV 41.2	o Anten Reading Factor AF dB/m	na	D Corr Avg Peak HPF Amp	Distance Average I Calculate High Pas: D Corr	Correc Field S d Peak s Filter Fltr	trength @ r Field Stre r Corr.	3 m angth	Peak Fie Margin Margin	eld Strength vs. Average vs. Peak Lir	Limit Limit			
nalyzer l ntenna F able Loss Read dBuV 41.2	Reading Factor AF dB/m	CL	Avg Peak HPF Amp	Average I Calculate High Pass	Field S d Peak s Filter Fltr	trength @ r Field Stre r Corr.	3 m angth	Margin v Margin v	vs. Average vs. Peak Li	Limit			
ntenna F able Loss Read dBuV 41.2	AF dB/m		Peak HPF Amp	Calculate High Pas D Corr	d Peak s Filter Fltr	r Field Stre r Corr.	ength	Margin	vs. Peak Li				
able Loss Read dBuV 41.2	AF dB/m		HPF Amp	High Pas D Corr	s Filter Fltr	r Corr.		-	-	mit			
Read dBuV 41.2	AF dB/m		Amp	D Corr	Fltr	Согт.	Limit						
dBuV 41.2	dB/m						Limit			-			
dBuV 41.2	dB/m						Limit						
41.2		۵۵	<u> </u>			3D U/	dBuV/m		Ant. Pol. V/H	Det. P/A/QP		Table Angle	Notes
	22.0				ab	abuv/m	abuv/m		• •/n	PIA/QP	cm	Degree	
						40.0	- 10		v	Р	110.1	225.9	
3 2. 0 i		5.8	-36.5 -36.5	0.0	0.0	43.6	74.0	-30.4	v V	ö	113.1 113.1	225.9	
39.4	33.0 33.0	5.8 5.8	-36.5	0.0 0.0	0.0 0.0	37.4 41.7	54.0 74.0	-16.6 -32.3	V H	A P	113.1	187.4	
30.2	33.0	5.8	-36.5	0.0	0.0	32.5	54.0	-32.5	H H	F A	100.0	187.4	
			-30.2		v.v		~~~~				100.0	101.4	
50.2	33.1	5.8	-36.5	0.0	0.0	52.7	74.0	-21.3	v	Р	139.4	228.7	
34.5	33.1	5.8	-36.5	0.0	0.0	37.0	54.0	-17.0	v	Ā	139.4	228.7	
48.5	35.3	7.3	-36.2	0.0	0.0	56.4	74.0	-17.6	v	P	157.0	294.1	
34.6	35.3	7.3	-36.2	0.0	0.0	40.9	54.0	-13.1	V	A	157.0	294.1	
46.2	33.1	5.8	-36.5	0.0	0.0	48.8	74.0	-25.2	H	P	139.4	228.7	
30.2	33.1	5.8	-36.5	0.0	0.0	42.8	54.0	-11.2	H	A	139.4	228.7	
45.6	35.3	7.3	-36.2	0.0	0.0	56.4	74.0	-21.4	н	Р	157.0	294.1	
40.0	35.3	7.3	-36.2	0.0	0.0	47.0	54.0	- 7.0	H	A	157.0	294.1	
								ļ					
42.6	33.1	5.9	-36.5	0.0	0.0	45.2	74.0	-28.8	v		111.5	225.7	
36.3				• • • • • • • • • • • • • • • • • • • •					\$	A	¢		
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	48.5 34.6 46.2 30.2 45.6 40.0 42.6	34.5 33.1 48.5 35.3 34.6 35.3 34.6 35.3 46.2 33.1 30.2 33.1 45.6 35.3 40.0 35.3 42.6 33.1 36.3 33.1 38.5 35.4 26.0 35.4 37.3 33.1 36.5 35.4 36.5 35.4	34.5 33.1 5.8 48.5 35.3 7.3 44.6 35.3 7.3 46.2 33.1 5.8 46.2 33.1 5.8 46.2 33.1 5.8 45.6 35.3 7.3 40.0 35.3 7.3 40.0 35.3 7.3 42.6 33.1 5.9 38.5 35.4 7.3 26.0 35.4 7.3 37.3 33.1 5.9 33.4 33.1 5.9 36.5 35.4 7.3 36.5 35.4 7.3	34.5 33.1 5.8 -36.5 48.5 35.3 7.3 -36.2 34.6 35.3 7.3 -36.2 46.2 33.1 5.8 -36.5 46.2 33.1 5.8 -36.5 45.0 35.3 7.3 -36.2 40.0 35.3 7.3 -36.2 40.0 35.3 7.3 -36.2 40.0 35.3 7.3 -36.2 42.6 33.1 5.9 -36.5 36.3 33.1 5.9 -36.5 36.3 33.1 5.9 -36.5 38.5 35.4 7.3 -36.2 26.0 35.4 7.3 -36.2 37.3 33.1 5.9 -36.5 36.5 35.4 7.3 -36.2 33.1 5.9 -36.5 36.5	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{rrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrrr$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$

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8.2.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

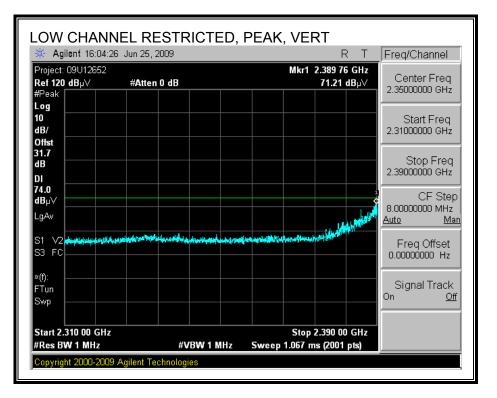
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

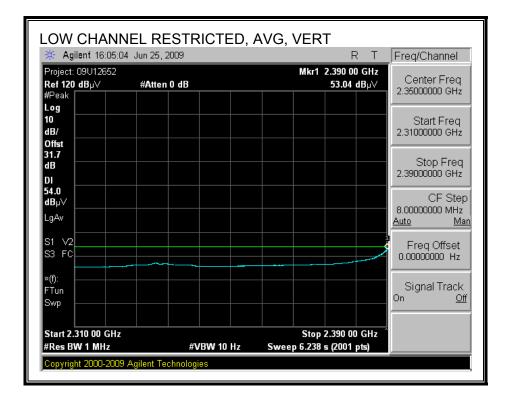




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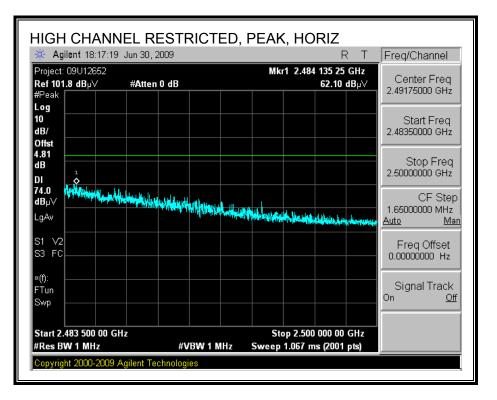
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

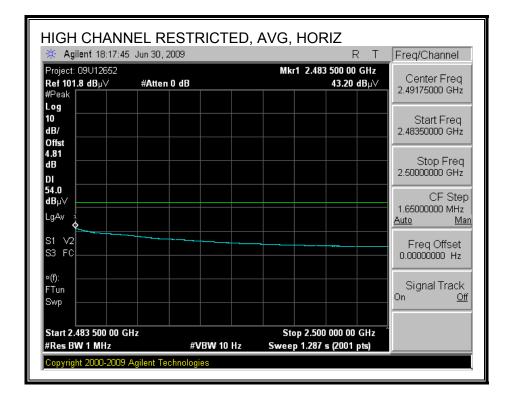




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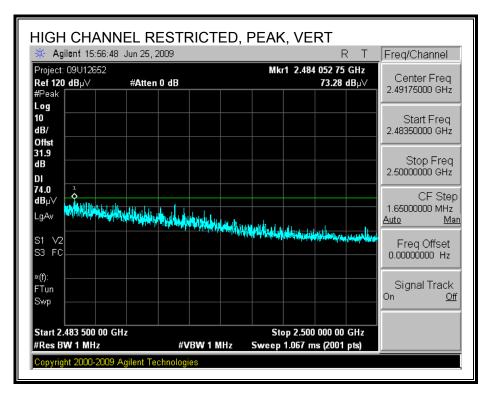
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

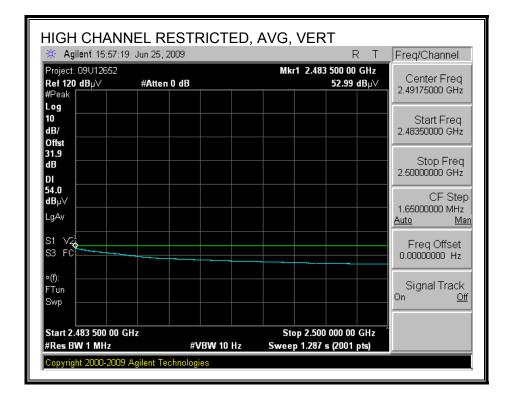




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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





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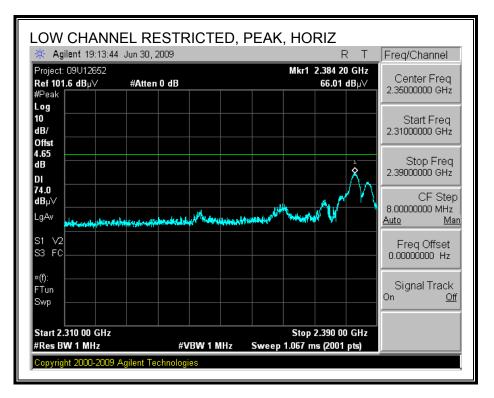
HARMONICS AND SPURIOUS EMISSIONS

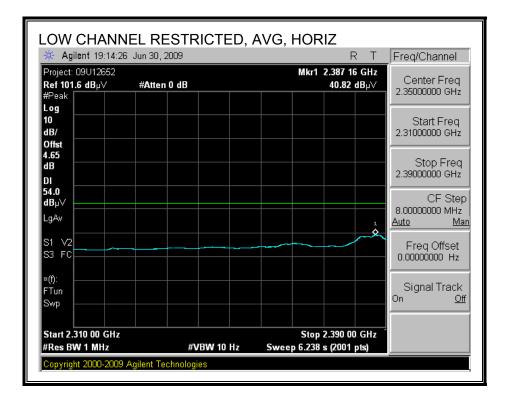
-	ice Ceri		Service	s, Fre	mont 51	n Chamb	er								
Test Engr: Date:		Thanh N 06/30/09													
Company		Qualcon													
EUT Desci		-		Mod	ule										
EUT M/N:	•	65-VN78	-												
Test Targe	et:	FCC Cla	ass B												
Mode Ope	er:	Transmi	t HT20 :	mode											
	f	Measuren	nent Fre	quency	7 Amp	Preamp (Gain			Average	Field Stren	gth Limit			
	Dist	Distance	to Anter	nna	D Corr	Distance	Correc	t to 3 me	ters	Peak Fie	eld Strength	Limit			
	Read	Analyzer	Reading		Avg	Average	Field St	trength @	3 m	Margin	vs. Average	Limit			
	AF	Antenna	Factor		Peak	Calculate	d Peak	Field Stre	ength	Margin	vs. Peak Lii	mit			
	CL	Cable Los	55		HPF	High Pas	s Filter								
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_set l	4dbm														
4.824	3.0	41.3	33.0	5.8	-36.5	0.0	0.0	43.7	74.0	-30.3	V	Р	100.0	225.9	
4.824	3.0	34.2	33.0	5.8	-36.5	0.0	0.0	36.5	54.0	-17.5	V	A	100.0	225.9	
4.824	3.0	38.8	33.0	5.8	-36.5	0.0	0.0	41.1	74.0	-32.9	H	P	114.9	197.8	
4.824 Mid set 2	3.0	29.5	33.0	5.8	-36.5	0.0	0.0	31.8	54.0	-22.2	H	A	114.9	197.8	
4.874	Jan 10 3.0	52.8	33.1	5.8	-36.5	0.0	0.0	55.3	74.0	-18.7	v	Р	108.3	187.0	
4.874	3.0	35.7	33.1	5.8	-36.5	0.0	0.0	38.2	54.0	-15.8	v	A A	108.3	187.0	
7.311	3.0	50.3	35.3	7.3	-36.2	0.0	0.6	57.3	74.0	-16.7	v	P	162.7	212.0	
7.311	3.0	30.2	35.3	7.3	-36.2	0.0	0.6	37.1	54.0	-16.9	v	Ā	162.7	212.0	
12.185	3.0	35.6	39.0	9.8	-35.4	0.0	0.7	49.7	74.0	-24.3	v	P	162.7	212.0	
12.185	3.0	23.6	39.0	9.8	-35.4	0.0	0.7	37.6	54.0	- 16.4	V	A	162.7	212.0	
4.874	3.0	43.7	33.1	5.8	-36.5	0.0	0.0	46.2	74.0	-27.8	H	P	100.0	198.4	
4.874	3.0	29.4	33.1	5.8	-36.5	0.0	0.0	31.9	54.0	-22.1	H	A	100.0	198.4	
7.311	3.0	39.3	35.3	7.3	-36.2	0.0	0.6	46.3	74.0	-27.7	H	P	136.4	245.8	
7.311	3.0	25.1	35.3	7.3	-36.2	0.0	0.6	32.1	54.0	-21.9	H	A	136.4	245.8	
High_set 4.924	14dbm 3.0	43.5	33.1	5.9	-36.5	0.0	0.0	46.1	74.0	-27.9	v	Р	125.1	224.9	
4.924 4.924	3.0	43.5 35.6	33.1	5.9 5.9	-36.5	0.0 0.0	0.0	46.1	74.0 54.0	-27.9	v V	P A	125.1	224.9 224.9	
4.924 7.386	3.0	37.4	35.4	7.3	-36.2	0.0	0.6	38.1 44.5	54.0 74.0	-15.9	v	P	145.1	224.9	
7.386	3.0	25.8	35.4	7.3	-36.2	0.0	0.6	32.9	54.0	-21.1	v	A A	165.5	286.8	
4.924	3.0	39.1	33.1	5.9	-36.5	0.0	0.0	41.6	74.0	-32.4	Ĥ	P	100.0	198.8	
	3.0	29.9	33.1	5.9	-36.5	0.0	0.0	32.4	54.0	-21.6	H	Ā	100.0	198.8	
	3.0	36.8	35.4	7.3	-36.2	0.0	0.6	43.9	74.0	-30.1	H	P	100.0	198.8	
4.924 7.386		24.7	35.4	7.3	-36.2	0.0	0.6	31.8	54.0	-22.2	н	A	100.0	198.8	

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8.2.4. 802.11n HT40 MODE IN THE 2.4 GHz BAND

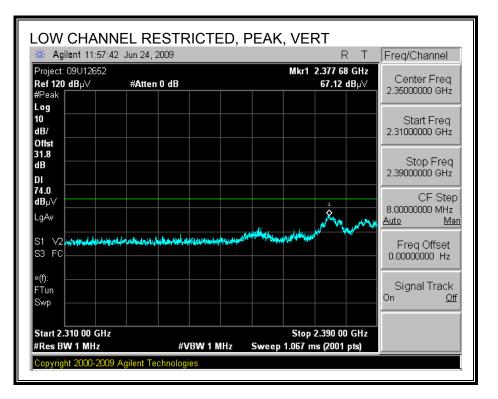
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

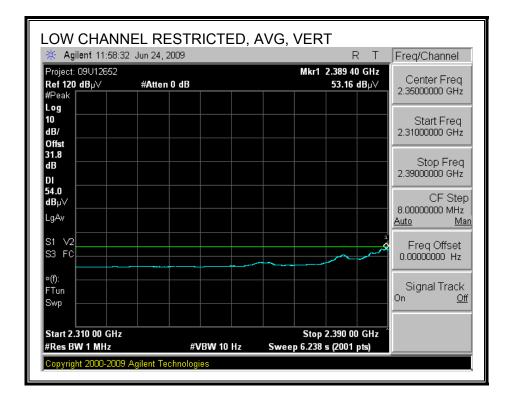




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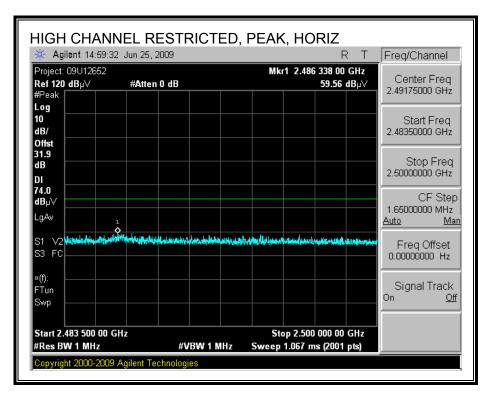
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

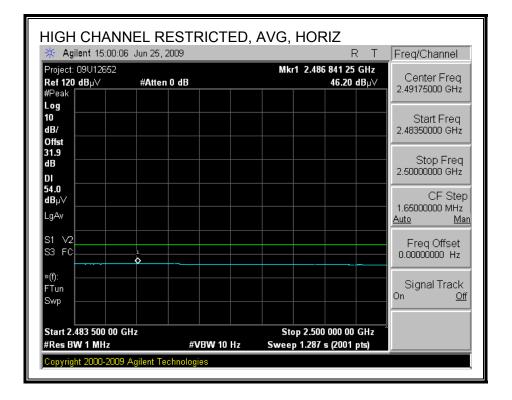




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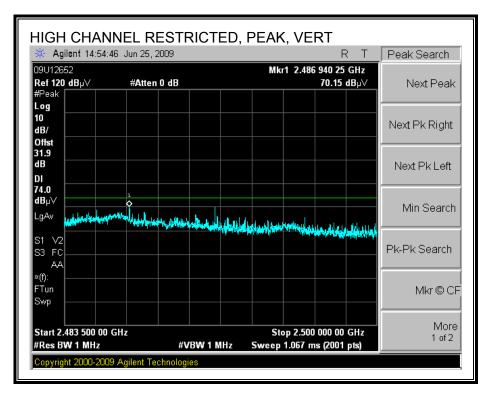
RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

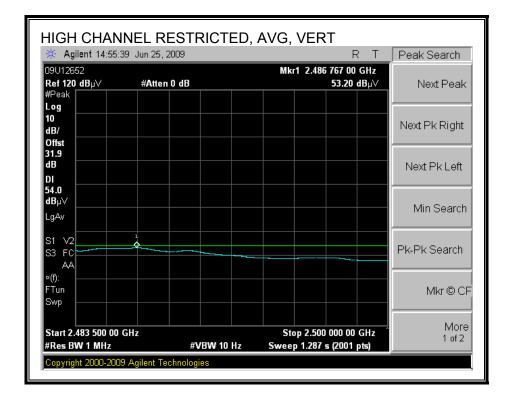




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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)





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HARMONICS AND SPURIOUS EMISSIONS

CUT M/N: Cest Target: Mode Oper: f Di	FC Tra	VN780- C Class ansmit l													
Node Oper: f	Tra														
f															
-		asureme:			A	Preamp (A	Field Stren:	-+1. T :			
		asureme: tance to				-		t to 3 mete	or:	· ·	ld Strength	~			
		alyzer R			Avg			trength @ 1			m Strengtn 75. Average				
AI		tenna Fa	~		Peak			Field Strer			rs. Peak Lir				
CI		ole Loss			HPF	High Pas									
		lead	AF	CL	-	D Corr					Ant. Pol.	Det.	Ant.High	Table Angle	Notes
	<u> </u>	BuV (dB/m	dB	dB	dB	dB	dBuV/m o	dBuV/m	dB	V/H	P/A/QP	cm	Degree	
.ow ch set 12														ļ	
			33.1	5.8	-36.5	0.0	10.0	51.3	74.0	-22.7	V	P	188.2	209.4	Noise floor
		25.9	33.1	5.8	-36.5	0.0	10.0	38.3	54.0	-15.7	v	A	188.2	209.4	
ligh ch set l 904		39.4	33.1	5.9	-36.5	0.0	10.0	51.9	74.0	-22.1	v	Р	186.0	269.7	Noise floor
			33.1		-36.5	0.0	10.0	38.8	54.0	-15.2	v	F A	186.0	269.7	10026 1001
				***					* •••		•				
Rev. 4.1.2.7															
			ere dei	tected	ahove 1	the system	m nois	e floor.							

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8.2.5. 802.11a MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

Date:	:	Thanh N 06/30/09													
Company EUT Desc EUT M/N:	ription:	Qualcor 802.11 a 65-VN78	bgn 4X4		ule										
Test Targ		FCC DT													
Mode Op		Transmi													
	f	Measurer			-	Preamp (Field Stren;				
	Dist	Distance				Distance					ld Strength				
	Read	Analyzer	-	5	Avg			trength @			75. Average				
	AF	Antenna			Peak			Field Stre	ength	Margin v	rs. Peak Lii	mit			
	CL	Cable Lo:	55		HPF	High Pas	s Filter	£							
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Согт.	Limit	Margin	Ant. Pol.	Det.	AntHigh	Table Angle	Notes
GHz	(m)	dBuV	dB/m		dB	dB	dB		dBuV/m	dB	V/H	P/A/OP	cm	Degree	
Low ch 57	1 2 6				<u> </u>					<u> </u>					
11.490	3.0	43.3	38.4	9.5	-35.9	0.0	0.7	56.0	74.0	-18.0	v	P	100.1	302.3	
11.490	3.0	40.0	38.4	9.5	-35.9	0.0	0.7	52.8	54.0	-1.2	V	Ā	100.1	302.3	
11.490	3.0	38.6	38.4	9.5	-35.9	0.0	0.7	51.4	74.0	-22.6	H	Р	100.1	26.6	
11.490	3.0	30.9	38.4	9.5	-35.9	0.0	0.7	43.7	54.0	- 10.3	H	A	100.1	26.6	
Mid ch 57	85MHz	set 19dbı	n												
11.570	3.0	43.1	38.5	9.5	-35.8	0.0	0.7	56.0	74.0	- 18.0	V	P	149.9	303.4	
11.570	3.0	39.8	38.5	9.5	-35.8	0.0	0.7	52.7	54.0	-1.3	v	A	149.9	303.4	
11.570	3.0	39.5	38.5	9.5	-35.8	0.0	0.7	52.4	74.0	-21.6	H	P	100.0	27.0	
11.570	3.0	32.1	38.5	9.5	-35.8	0.0	0.7	45.0	54.0	-9.0	H	A	100.0	27.0	
High ch #			·····						- 10	17.0	T T		100 /	100 -	
11.650	3.0 3.0	43.9	38.6	9.6	-35.7	0.0	0.7	57.0	74.0	-17.0 -0.5	v v	P	120.4	133.7	
11 250	3.0	40.3 38.1	38.6 38.6	9.6 9.6	-35.7	0.0 0.0	0.7 0.7	53.5 51.2	54.0 74.0	-0.5	V H	A P	120.4 102.4	133.7 18.9	
11.650 11.650		J0.1	******			0.0	0.7	43.6	74.0 54.0	-10.4	п Н	P A	102.4	18.9	
11.650 11.650 11.650	3.0	30.5	38.6	9.6	-35.7										

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8.2.6. 802.11n HT20 MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

	:	Thanh N													
Date:		06/30/09													
Project #:		09U1265	2												
Company		Qualcor	nm Inc.												
EUT Desci	ription:	802.11 a	bgn 4X4	Modu	ıle										
EUT M/N:		65-VN78	0-P2												
Test Targ	et:	FCC DT	s												
Mode Op	er:	Transmi	t												
	f	Measurer	nent Freq	puency		Preamp (Field Stren				
	Dist	Distance	to Anter	ina	D Corr	Distance	Corre	ct to 3 me	eters	Peak Fie	ld Strength	Limit			
	Read	Analyzer	Reading		Avg			trength @			rs. Average				
	AF	Antenna	Factor		Peak	Calculate	d Peal	t Field Str	ength	Margin v	rs. Peak Lii	mit			
	CL	Cable Lo:	55		HPF	High Pas:	s Filte:	r							
				<u> </u>											
f	Dist	Read	AF	CL	Amp	D Corr					Ant. Pol.			Table Angle	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/n	dBuV/m	dB	V/H	P/A/QP	cm	Degree	
HT20 Low		·····		ļ <u>.</u>											
11.490	3.0	44.0	38.4	9.5	-35.9	0.0	0.0	56.0	74.0	- 18.0	V	Р	131.7	159.5	
11.490	3.0	40.8	38.4	9.5		0.0	0.0	52.9	54.0	-1.1	V	A	131.7	159.5	
11.490	3.0	41.9	38.4	9.5 9.5	-35.9 -35.9	0.0	0.0	53.9	74.0	-20.1	H H	P	131.9	100.7	
11.490 HT20 Mid	3.0	30.5	38.4	9.5	-35.9	0.0	0.0	42.6	54.0	-11.4	п	A	131.9	100.7	
11120 Mila 11.570	3.0	43.7	38.5	9.5	-35.8	0.0	0.0	56.0	74.0	-18.0	v	Р	131.5	159.8	
	3.0	40.7	38.5	9.5		0.0	0.0	52.9	54.0	-10.0	v	Å	131.5	159.8	
11.570	3.0	36.8	38.5	9.5		0.0	0.0	49.0	74.0	-25.0	Ĥ	P	101.0	92.4	
11.570 11.570		28.2	38.5	9.5	-35.8	0.0	0.0	40.5	54.0	-13.5	H	Ā	101.0	92.4	
11.570 11.570 11.570	3.0	10.1			4	· ·····			1	1			1		
11.570	3.0			1											
11.570 11.570	3.0		38.6	9.6	-35.7	0.0	0.0	57.8	74.0	- 16.2	v	Р	122.8	120.5	
11.570 11.570 HT20 Hig 11.650 11.650	3.0 h Ch se 3.0 3.0	t 19dbm	38.6 38.6	9.6	-35.7	0.0 0.0	0.0	54.0	74.0 54.0	0.0	V	P A	122.8 122.8	120.5	
11.570 11.570 HT20 Hig 11.650	3.0 h Ch se 3.0	t 19dbm 45.4	38.6	¢	-35.7	• • • • • • • • • • • • • • • • • • • •				·					

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8.2.7. 802.11n HT40 MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

Company: EUT Descrip EUT M/N: Fest Target:				Mod	.1.										
EUT M/N:			ogn 4A4												
		65-VIN/8	0-P2		iiic										
		FCC DT													
Mode Oper		Transmi	t HT40	Mode											
- f		Measuren	nent Fre	piency	Amp	Preamp (Gain			Average	Field Stren;	zth Limit			
I	Dist	Distance [•]	to Anter	na	D Corr	Distance	Correc	rt to 3 me	ters	Peak Fie	ld Strength	Limit			
F	Read	Analyzer	Reading		Avg	Average I	Field S	trength @	3 m	Margin v	rs. Average	Limit			
-		Antenna	Factor		Peak	Calculate	d Peak	Field Stre	ngth	Margin v	rs. Peak Lir	nit			
C	CL	Cable Los	is		HPF	High Pas	s Filter	r							
	Dist	Read	AF	CL	Amp	D Corr	Fltr	Согт.		Margin	Ant. Pol.		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 Ch 575	5MHz														
11.510	3.0	41.4	38.4	9.5	-35.9	0.0	0.0	53.5	74.0	-20.5	V	P	129.3	281.3	
11.510	3.0	25.4	38.4	9.5	-35.9	0.0	0.0	37.4	54.0	-16.6	v	<u>A</u>	129.3	281.3	
11.510 11.510	3.0 3.0	36.7 24.2	38.4 38.4	9.5 9.5	-35.9 -35.9	0.0 0.0	0.0 0.0	48.8 36.3	74.0 54.0	-25.2 -17.7	H H	P A	187.2 187.2	309.1 309.1	
High Ch 57				7.7	-32.9	U.U	0.0	J0.J	74.U	-1/./	п	n	10/.4	309.1	
11.585	3.0	36.5	38.6	9.6	-35.7	0.0	0.0	49.0	74.0	-25.0	v	Р	127.9	270.8	
11.585	3.0	24.0	38.6	9.6	-35.7	0.0	0.0	36.4	54.0	-17.6	v	Ā	127.9	270.8	
11.585	3.0	36.8	38.6	9.6	-35.7	0.0	0.0	49.2	74.0	-24.8	н	Р	187.2	309.1	
11.585	3.0	24.2	38.6	9.6	-35.7	0.0	0.0	36.6	54.0	- 17.4	H	A	187.2	309.1	

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8.3. WORST-CASE BELOW 1 GHz

2.4 GHz BAND

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

ce Certif	fication Se	urement rvices, Fi		t 5m Ch	amber									
		çuyen												
		_												
-			шe											
: r:	Iransmit	Worst C	ase 2.	4GHz ba	ind									
f	Measurem	ent Frequ	ency	Amp	Preamp (Gain			Margin	Margin vs.	Limit			
Dist	Distance to	o Antenn	a	D Corr	Distance	Correct	to 3 meters							
Read	Analyzer H	Reading		Filter	Filter Ins	ert Loss								
AF	Antenna F	`actor		Corr.	Calculate	d Field S	trength							
CL	Cable Loss	:		Limit	Field Stre	ength Lir	nit							
Dist	Read	AF	CL	Amp			Согт.	Limit	; -	:		Notes		
<u> </u>	· · · · · · · · · · · · · · · · · · ·			<u> </u>	<u>.</u>									
		•••••••••					************************* ***********		*********************** *************		······	Full Scan		
		••••••••••	>											
														
										·····				
							¢		\$					
							\$		\$					
							&		&	·····				
									*********************** *************					
3.0	44.1	21.8	2.8	27.8	0.0	0.0	41.0	46.0	-5.1	H	EP			
	: iption: et: F Dist Read AF CL	Thanh Ng 06/25/09 iption: QualCon 65-VN780 wit: FCC Classing FCC Classing f Measurem Dist Dist Distance to Read Anlayzer H AF Antenna F CL Dist Read (m) 3.0 53.1 3.0 45.6 3.0 38.3 3.0 50.6 3.0 50.6 3.0 50.7 3.0 52.5 3.0 42.7	Thanh Nguyen 06/25/09 ciption: QualComm Inc. iption: PCI 802.11n mode 65-VN780-P1 rt: FCC Class B rr: Transmit Worst C f Measurement Frequ Dist Dist ance to Antenn Read Analyzer Reading AF Artenna Factor CL Cable Loss Dist Read dBuV AF dB/m 3.0 53.1 7.9 3.0 45.6 13.3 3.0 41.3 14.4 3.0 38.3 20.2 3.0 44.2 21.0 3.0 50.6 7.3 3.0 52.5 13.4 3.0 42.7 19.8	Thanh Nguyen 06/25/09 • QualComm Inc. iption: PCI 802.11n module 65-VN780-P1 etc: FC C Class B sr: Transmit Worst Case 2. f Measurement Frequency Dist Distance to Antenna Read Analyzer Reading AF Antenna Factor CL Cable Loss Dist Read AF Qual Obst Gable Loss Dist Read AF Off. 13.3 1.1 3.0 53.1 7.9 0.7 3.0 45.6 13.3 1.1 3.0 45.6 13.3 1.1 3.0 38.3 20.2 2.5 3.0 44.2 21.0 2.6 3.0 50.6 7.3 0.8 3.0 50.7 11.9 1.3 3.0 52.5 13.4 1.5	Thanh Nguyen 06/25/09 06/25/09 Qual Comm Inc. iption: PCI 802.11n module 65-VN780-P1 FCC Class B Transmit Worst Case 2.4GHz base f Measurement Frequency Amp Dist Distance to Antenna D Corr CL Cable Loss Limit Dist Read Ang Filter AF Antenna Factor Corr. CL Amp dB dB Dist Read AF CL Amp dB dB Joint Read AF CL Amp dB dB Joint Read AF CL Amp dB dB dB dB dB Joint BuV dB/m dB dB </td <td>Thanh Nguyen 06/25/09 colspan="2">Object 25/09 colspan="2">Calcomm Inc. inption: PCI 802.11n module 65-VN780-P1 FCC Class B Transmit Worst Case 2.4 GHz band f Measurement Frequency Dist Amp Distance to Antenna D Corr Distance AF Antenna Factor Corr. Calculate Claculate Dist Read Analyzer Reading Filter Filed Stres Dist Read Antenna Factor Corr. Calculate Dist Read Antenna Factor Corr. Calculate Dist Read Antenna Factor Cl. Amp D Corr D Corr Joint Read BBW AF CL Amp D Corr D Corr Joint Read BBM AF CL Amp D Corr D Corr Maint 17.0 0.7 28.4 0.0 3.0 43.3 20.2 2.5 27.3 0.0 3.0 30.4 50.6 7.3 0.8 28.3 0.0 3.0 50.6 7.3 0.8 28.3 0.0 3.0</td> <td>Thanh Nguyen 06/25/09 colspan="2">Object 25/09 colspan="2">QualComm Inc. iption: PCI 802.11n module 65-VN780-P1 FC Class B Transmit Worst Case 2.4GHz band f Measurement Frequency Dist Distance to Antenna D Corr Distance Correct Amp Preamp Gain Dist Distance to Antenna D Corr Distance Correct Corr Calculated Field S CL Dist Read AF CL Amp D corr Filter Insert Loss Dist Read AF CL Calculated Field S Dist Read AF CL Calculated Field S Dist Read AF CL CL Amp D corr Filter Mit Mode AB dB Dist Read All cols Limit</td> <td>Thanh Nguyen 06/25/09 cigualComm Inc. iption: PCI 802.11n module 65-VN780-P1 FC C Class B tr: Transmit Worst Case 2.4GHz band f Measurement Frequency Amp Preamp Gain Dist Distance to Antenna D Corr Distance Correct to 3 meters Read Anlyzer Reading Filter Filter Insert Loss AF Antenna Factor Corr. Calculated Field Strength Clinit Dist Read AF CL Amp D Corr Filter Insert Loss Dist Read AF CL Calculated Field Strength Dist Read AF CL Calculated Field Strength Dist Read AF CL CL Amp Corr Galculated Field Strength Gin D</td> <td>Thanh Nguyen 06/25/09 colspan="2">Object 25/09 colspan="2">QualComm Inc. iption: PCI 802.11n module 65-VN780-P1 FCC Class B Transmit Worst Case 2.4GHz band f Measurement Frequency Dist Preamp Gain Dist Distance to Antenna Read D Corr Distance Correct to 3 meters Read Analyzer Reading Filter Filter Insert Loss AF Antenna Factor Corr Corr Calculated Field Strength Limit Dist Read Analyzer Reading CL Cable Loss Limit Filter Silter Insert Loss Dist Read Analyzer Reading CL Cable Loss Limit Dist Read Analyzer Reading CL Cable Loss Limit Dist Read AB D Corr Filter Corr Limit Dist Read AB AB dB dB Dist <th <="" colspan="2" td=""><td>Thanh Nguyen 06/25/09 c: QualComm Inc. iption: PCI 802.11n module 65-VN780-P1 FC Class B Transmit Worst Case 2.4CHz band f Measurement Frequency Amp Preamp Gain Margin Dist Distance to Antenna D Corr Distance Correct to 3 meters Read Antenna Factor Corr. Calculated Field Strength CL Cable Loss Limit Filter Filter Filter Corr. Limit Margin Dist Distance to Antenna D Corr Calculated Field Strength CL Cable Loss Limit Filter Rimer Limit Margin 3.0 5.1 7 Orr Calculated Field Strength CL Calculated Bield MB Margin Margin <tr< td=""><td>$\begin{array}{cccccccccccccccccccccccccccccccccccc$</td><td>Thanh Nguyen 06/25/09 c. QualComm Inc. iption: PCI 802.11n module 65-VN780-P1 65-VN780-P1 tr: FCC Class B marki Worst Case 2.4GHz band f Margin Margin vs. Limit Dist Distance to Antenna D Corr Distance Correct to 3 meters Read Anlyzer Reading Filter Filter Insert Loss AF Antenna Factor Corr. Calculated Field Strength CL Cabe Loss Limit Filter Silter Roors. Limit Margin Margin Ant Pol Det Magin Margin vs. Limit Dist Read AF Antenna Factor Corr. Calculated Field Strength CL Cabe Loss Limit Filter Bits 3.0 45.6 13.3 1.1 28.4 P 3.0 Site Correct to 3 meters Site Correct to 3 meters</td></tr<></td></th></td>	Thanh Nguyen 06/25/09 colspan="2">Object 25/09 colspan="2">Calcomm Inc. inption: PCI 802.11n module 65-VN780-P1 FCC Class B Transmit Worst Case 2.4 GHz band f Measurement Frequency Dist Amp Distance to Antenna D Corr Distance AF Antenna Factor Corr. Calculate Claculate Dist Read Analyzer Reading Filter Filed Stres Dist Read Antenna Factor Corr. Calculate Dist Read Antenna Factor Corr. Calculate Dist Read Antenna Factor Cl. Amp D Corr D Corr Joint Read BBW AF CL Amp D Corr D Corr Joint Read BBM AF CL Amp D Corr D Corr Maint 17.0 0.7 28.4 0.0 3.0 43.3 20.2 2.5 27.3 0.0 3.0 30.4 50.6 7.3 0.8 28.3 0.0 3.0 50.6 7.3 0.8 28.3 0.0 3.0	Thanh Nguyen 06/25/09 colspan="2">Object 25/09 colspan="2">QualComm Inc. iption: PCI 802.11n module 65-VN780-P1 FC Class B Transmit Worst Case 2.4GHz band f Measurement Frequency Dist Distance to Antenna D Corr Distance Correct Amp Preamp Gain Dist Distance to Antenna D Corr Distance Correct Corr Calculated Field S CL Dist Read AF CL Amp D corr Filter Insert Loss Dist Read AF CL Calculated Field S Dist Read AF CL Calculated Field S Dist Read AF CL CL Amp D corr Filter Mit Mode AB dB Dist Read All cols Limit	Thanh Nguyen 06/25/09 cigualComm Inc. iption: PCI 802.11n module 65-VN780-P1 FC C Class B tr: Transmit Worst Case 2.4GHz band f Measurement Frequency Amp Preamp Gain Dist Distance to Antenna D Corr Distance Correct to 3 meters Read Anlyzer Reading Filter Filter Insert Loss AF Antenna Factor Corr. 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Calculated Field Strength CL Cable Loss Limit Filter Filter Filter Corr. Limit Margin Dist Distance to Antenna D Corr Calculated Field Strength CL Cable Loss Limit Filter Rimer Limit Margin 3.0 5.1 7 Orr Calculated Field Strength CL Calculated Bield MB Margin Margin <tr< td=""><td>$\begin{array}{cccccccccccccccccccccccccccccccccccc$</td><td>Thanh Nguyen 06/25/09 c. QualComm Inc. iption: PCI 802.11n module 65-VN780-P1 65-VN780-P1 tr: FCC Class B marki Worst Case 2.4GHz band f Margin Margin vs. Limit Dist Distance to Antenna D Corr Distance Correct to 3 meters Read Anlyzer Reading Filter Filter Insert Loss AF Antenna Factor Corr. Calculated Field Strength CL Cabe Loss Limit Filter Silter Roors. Limit Margin Margin Ant Pol Det Magin Margin vs. Limit Dist Read AF Antenna Factor Corr. Calculated Field Strength CL Cabe Loss Limit Filter Bits 3.0 45.6 13.3 1.1 28.4 P 3.0 Site Correct to 3 meters Site Correct to 3 meters</td></tr<></td></th>	<td>Thanh Nguyen 06/25/09 c: QualComm Inc. iption: PCI 802.11n module 65-VN780-P1 FC Class B Transmit Worst Case 2.4CHz band f Measurement Frequency Amp Preamp Gain Margin Dist Distance to Antenna D Corr Distance Correct to 3 meters Read Antenna Factor Corr. Calculated Field Strength CL Cable Loss Limit Filter Filter Filter Corr. Limit Margin Dist Distance to Antenna D Corr Calculated Field Strength CL Cable Loss Limit Filter Rimer Limit Margin 3.0 5.1 7 Orr Calculated Field Strength CL Calculated Bield MB Margin Margin <tr< td=""><td>$\begin{array}{cccccccccccccccccccccccccccccccccccc$</td><td>Thanh Nguyen 06/25/09 c. QualComm Inc. iption: PCI 802.11n module 65-VN780-P1 65-VN780-P1 tr: FCC Class B marki Worst Case 2.4GHz band f Margin Margin vs. Limit Dist Distance to Antenna D Corr Distance Correct to 3 meters Read Anlyzer Reading Filter Filter Insert Loss AF Antenna Factor Corr. Calculated Field Strength CL Cabe Loss Limit Filter Silter Roors. Limit Margin Margin Ant Pol Det Magin Margin vs. Limit Dist Read AF Antenna Factor Corr. Calculated Field Strength CL Cabe Loss Limit Filter Bits 3.0 45.6 13.3 1.1 28.4 P 3.0 Site Correct to 3 meters Site Correct to 3 meters</td></tr<></td>		Thanh Nguyen 06/25/09 c: QualComm Inc. iption: PCI 802.11n module 65-VN780-P1 FC Class B Transmit Worst Case 2.4CHz band f Measurement Frequency Amp Preamp Gain Margin Dist Distance to Antenna D Corr Distance Correct to 3 meters Read Antenna Factor Corr. Calculated Field Strength CL Cable Loss Limit Filter Filter Filter Corr. Limit Margin Dist Distance to Antenna D Corr Calculated Field Strength CL Cable Loss Limit Filter Rimer Limit Margin 3.0 5.1 7 Orr Calculated Field Strength CL Calculated Bield MB Margin Margin <tr< td=""><td>$\begin{array}{cccccccccccccccccccccccccccccccccccc$</td><td>Thanh Nguyen 06/25/09 c. QualComm Inc. iption: PCI 802.11n module 65-VN780-P1 65-VN780-P1 tr: FCC Class B marki Worst Case 2.4GHz band f Margin Margin vs. Limit Dist Distance to Antenna D Corr Distance Correct to 3 meters Read Anlyzer Reading Filter Filter Insert Loss AF Antenna Factor Corr. Calculated Field Strength CL Cabe Loss Limit Filter Silter Roors. Limit Margin Margin Ant Pol Det Magin Margin vs. Limit Dist Read AF Antenna Factor Corr. Calculated Field Strength CL Cabe Loss Limit Filter Bits 3.0 45.6 13.3 1.1 28.4 P 3.0 Site Correct to 3 meters Site Correct to 3 meters</td></tr<>	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	Thanh Nguyen 06/25/09 c. QualComm Inc. iption: PCI 802.11n module 65-VN780-P1 65-VN780-P1 tr: FCC Class B marki Worst Case 2.4GHz band f Margin Margin vs. Limit Dist Distance to Antenna D Corr Distance Correct to 3 meters Read Anlyzer Reading Filter Filter Insert Loss AF Antenna Factor Corr. Calculated Field Strength CL Cabe Loss Limit Filter Silter Roors. Limit Margin Margin Ant Pol Det Magin Margin vs. Limit Dist Read AF Antenna Factor Corr. Calculated Field Strength CL Cabe Loss Limit Filter Bits 3.0 45.6 13.3 1.1 28.4 P 3.0 Site Correct to 3 meters Site Correct to 3 meters

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5.8 GHz BAND

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

сопфпал	-	ency Meas ication Se			t 5m Cha	mber							
Test Engr:		Thanh Ng	çuyen										
Date:		06/25/09											
Company		QualCor											
EUT Desci	iption:	PCI 802.1		ıle									
EUT M/N:		65-VN780											
Test Targe		FCC Cla											
Mode Ope	: r :	Tx 5 GH	z Band_\	Vorst	Case								
	f	Measurem	ent Fremu	ency	Amp	Preamp (Tain			Margin	Margin vs.	Limit	
	Dist	Distance t	-		-	-		to 3 meters					
	Read	Analyzer I	Reading	-	Filter	Filter Ins	ert Loss						
	AF	Antenna F	-		Corr.	Calculate		twownth					
	CL	Cable Loss			Limit	Field Stre							
f			;	CL	Limit	Field Stre	ngth Lir	nit	Limit	Margin	Ant. Pol.	Det.	Notes
f MHz	CL Dist (m)	Cable Loss Read dBuV		CL dB			ngth Lir		Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
MHz	Dist	Read	AF		Limit Amp	Field Stre	ngth Lir Filter	nit Corr.					Notes Full Scan
MHz 90.002	Dist (m)	Read dBuV	AF dB/m	dB	Limit Amp dB	Field Stre D Corr dB	ngth Lir Filter dB	nit Corr. dBuV/m	dBuV/m	<u>ab</u>	V/H	P/A/QP	
	Dist (m) 3.0	Read dBuV 52.1 51.0 51.5	AF dB/m 7.6 11.9 13.4	dB 0.8 1.3 1.5	Limit Amp dB 28.3	Field Stre D Corr dB 0.0	ngth Lir Filter dB 0.0	nit Corr. <u>dBuV/m</u> 32.2 36.0 38.2	dBuV/m 43.5	dB -11.3	V/H H	P/A/QP EP EP EP	
MHz 90.002 234.608 299.171 429.136	Dist (m) 3.0 3.0 3.0 3.0 3.0	Read dBuV 52.1 51.0 51.5 45.8	AF dB/m 7.6 11.9 13.4 15.4	dB 0.8 1.3 1.5 1.9	Limit Amp dB 28.3 28.2 28.1 28.0	Field Stree D Corr dB 0.0 0.0 0.0 0.0 0.0 0.0	rigth Lir Filter dB 0.0 0.0 0.0 0.0	nit Corr. dBuV/m 32.2 36.0 38.2 35.1	dBuV/m 43.5 46.0 46.0 46.0	dB -11.3 -10.0 -7.8 -10.9	V/H H H H	P/A/QP EP EP EP EP	
MHz 90.002 234.608 299.171 429.136 639.985	Dist (m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0	Read dBuV 52.1 51.0 51.5 45.8 44.1	AF dB/m 7.6 11.9 13.4 15.4 18.9	dB 0.8 1.3 1.5 1.9 2.3	Limit Amp dB 28.3 28.2 28.1 28.0 27.4	Field Stree D Corr dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0	ngth Lir Filter dB 0.0 0.0 0.0 0.0 0.0	nit Corr. dBuV/m 32.2 36.0 38.2 35.1 37.9	dBuV/m 43.5 46.0 46.0 46.0 46.0	dB -11.3 -10.0 -7.8 -10.9 -8.1	V/H H H H H	P/A/QP EP EP EP EP EP	
MHz 90.002 234.608 299.171 429.136 639.985 799.952	Dist (m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	Read dBuV 52.1 51.0 51.5 45.8 44.1 46.2	AF dB/m 7.6 11.9 13.4 15.4 18.9 21.0	dB 0.8 1.3 1.5 1.9 2.3 2.6	Limit Amp dB 28.3 28.2 28.1 28.0 27.4 27.4	Field Stree dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	ngth Lir Filter dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0	nit Corr. dBuV/m 32.2 36.0 38.2 35.1 37.9 42.3	dBuV/m 43.5 46.0 46.0 46.0 46.0 46.0	dB -11.3 -10.0 -7.8 -10.9 -8.1 -3.7	V/H H H H H H H	P/A/QP EP EP EP EP EP EP	
MHz 90.002 234.608 299.171 429.136 639.985 799.952 61.441	Dist (m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	Read dBuV 52.1 51.0 51.5 45.8 44.1 46.2 53.4	AF dB/m 7.6 11.9 13.4 15.4 18.9 21.0 7.9	dB 0.8 1.3 1.5 1.9 2.3 2.6 0.7	Limit Amp dB 28.3 28.2 28.1 28.0 27.4 27.4 28.4	Field Stree dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	ngth Lir Filter dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	nit Corr. dBuV/m 32.2 36.0 38.2 35.1 37.9 42.3 33.7	dBuV/m 43.5 46.0 46.0 46.0 46.0 46.0 46.0 40.0	dB -11.3 -10.0 -7.8 -10.9 -8.1 -3.7 -6.3	V/H H H H H	P/A/QP EP	
MHz 90.002 234.608 299.171 429.136 639.985 799.952 61.441 142.925	Dist (m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	Read dBuV 52.1 51.0 51.5 45.8 44.1 46.2 53.4 45.9	AF dB/m 7.6 11.9 13.4 15.4 18.9 21.0 7.9 13.1	dB 0.8 1.3 1.5 1.9 2.3 2.6 0.7 1.1	Limit Amp dB 28.3 28.2 28.1 28.0 27.4 27.4 28.4 28.3	Field Stree D Corr dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	ngth Lir Filter dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	nit Corr. dBuV/m 32.2 36.0 38.2 35.1 37.9 42.3 33.7 31.8	dBuV/m 43.5 46.0 46.0 46.0 46.0 46.0 40.0 43.5	dB -11.3 -10.0 -7.8 -10.9 -8.1 -3.7 -6.3 -11.7	V/H H H H H V V V	P/A/QP EP EP EP EP EP EP EP EP	
MHz 90.002 234.608 299.171 429.136 639.985 799.952 61.441 142.925 498.379	Dist (m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	Read dBuV 52.1 51.0 51.5 45.8 44.1 46.2 53.4 45.9 39.0	AF dB/m 7.6 11.9 13.4 15.4 18.9 21.0 7.9 13.1 16.7	dB 0.8 1.3 1.5 1.9 2.3 2.6 0.7 1.1 2.0	Limit Amp dB 28.3 28.2 28.1 28.0 27.4 27.4 27.4 28.4 27.4 28.3 27.8	Field Stree D Corr dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	ngth Lir Filter dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Corr. dBuV/m 32.2 36.0 38.2 35.1 37.9 42.3 33.7 31.8 29.9	dBuV/m 43.5 46.0 46.0 46.0 46.0 46.0 40.0 43.5 46.0	dB -11.3 -10.0 -7.8 -10.9 -8.1 -3.7 -6.3 -11.7 -16.1	V/H H H H H V V V V	P/A/QP EP EP	
MHz 90.002 234.608 299.171 429.136 639.985 799.952 61.441 142.925	Dist (m) 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	Read dBuV 52.1 51.0 51.5 45.8 44.1 46.2 53.4 45.9	AF dB/m 7.6 11.9 13.4 15.4 18.9 21.0 7.9 13.1	dB 0.8 1.3 1.5 1.9 2.3 2.6 0.7 1.1	Limit Amp dB 28.3 28.2 28.1 28.0 27.4 27.4 28.4 28.3	Field Stree D Corr dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	ngth Lir Filter dB 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	nit Corr. dBuV/m 32.2 36.0 38.2 35.1 37.9 42.3 33.7 31.8	dBuV/m 43.5 46.0 46.0 46.0 46.0 46.0 40.0 43.5	dB -11.3 -10.0 -7.8 -10.9 -8.1 -3.7 -6.3 -11.7	V/H H H H H V V V	P/A/QP EP EP EP EP EP EP EP EP	

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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>

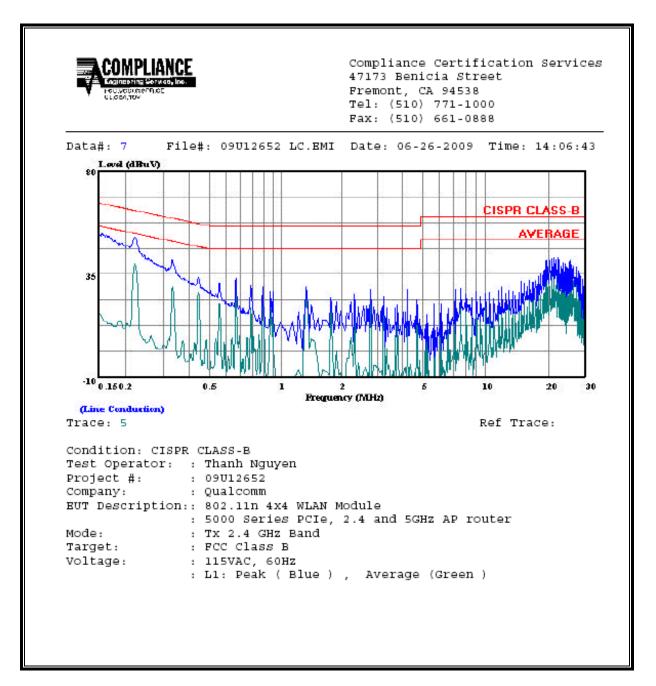
Transmit 2.4 GHz

	CONDUCTED EMISSIONS DATA (115VAC 60Hz)												
Freq.		Closs Limi	Limit	t EN_B	Margin		Remark						
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV(dB)	L1/L2				
0.22	51.00		38.34	0.00	62.78	52.78	-11.78	-14.44	L1				
0.33	41.16		29.23	0.00	59.35	49.35	-18.19	-20.12	L1				
21.26	42.22		35.52	0.00	60.00	50.00	-17.78	-14.48	L1				
0.22	50.33		36.39	0.00	62.78	52.78	-12.45	-16.39	L2				
0.33	39.00		27.59	0.00	59.35	49.35	-20.35	-21.76	L2				
21.71	38.01		31.87	0.00	60.00	50.00	-21.99	-18.13	L2				
6 Worst I	 Data 												
Transmi	ransmit 5.8GHz												

	CONDUCTED EMISSIONS DATA (115VAC 60Hz)											
Freq.		Closs	Limit	EN_B	Marg	jin .	Remark					
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV(dB)	L1/L2			
0.22	49.94		36.55	0.00	62.74	52.74	-12.80	-16.19	L1			
0.33	39.76		28.62	0.00	59.35	49.35	-19.59	-20.73	L1			
21.15	41.63		37.25	0.00	60.00	50.00	-18.37	-12.75	L1			
0.22	49.89		36.03	0.00	62.82	52.82	-12.93	-16.79	L2			
0.33	39.80		27.12	0.00	59.35	49.35	-19.55	-22.23	L2			
21.71	38.81		32.20	0.00	60.00	50.00	-21.19	-17.80	L2			
6 Worst I	Data											

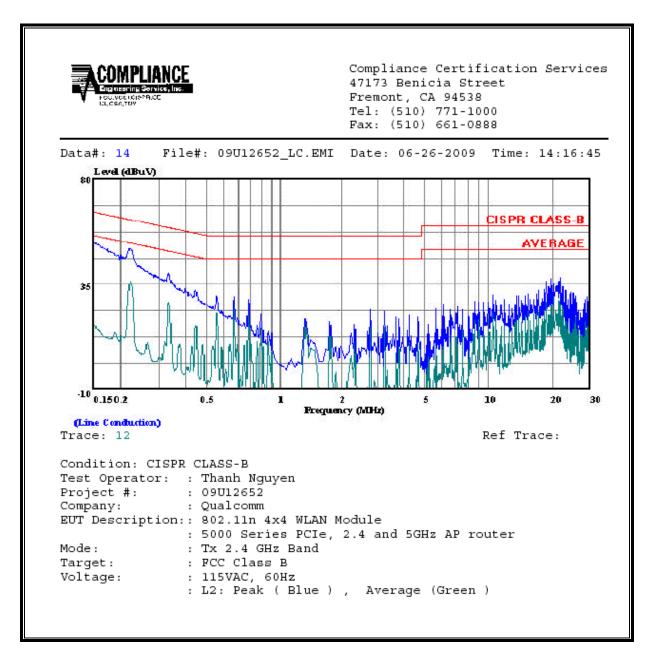
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LINE 1 RESULTS: Transmit 2.4GHz



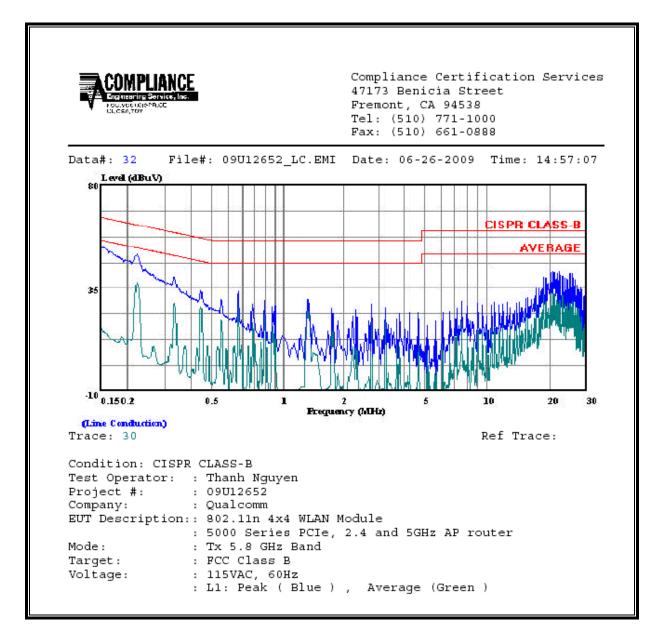
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LINE 2 RESULTS



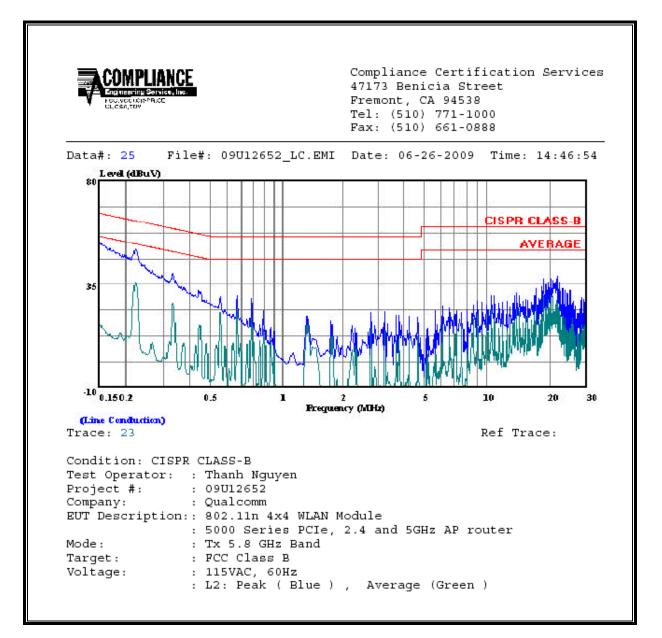
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LINE 1 RESULTS: Transmit 5.8GHz



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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) Lim	its for Occupational	l/Controlled Exposu	res	
0.3–3.0 3.0–30 30–300 300–1500 1500–100,000	614 1842/f 61.4	1.63 4.89/F 0.163	*(100) *(900/f²) 1.0 f/300 5	6 6 6 6
(B) Limits	for General Populati	on/Uncontrolled Exp	oosure	
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

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

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

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

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EQUATIONS

Power density is given by:

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

where

S = Power density in W/m² 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/m²

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.

<u>LIMITS</u>

From FCC 1.1310 Table 1 (B), the maximum value of S = 1.0 mW/cm² From IC Safety Code 6, Section 2.2 Table 5 Column 4, S = 10 W/m²

<u>RESULTS</u>

(MPE distance equals 20 cm)

Band	Mode	Separation	Output	Antenna	IC Power	FCC Power
		Distance	Power	Gain	Density	Density
		(m)	(dBm)	(dBi)	(W/m^2)	(mW/cm^2)
2.4 GHz	Legacy	0.20	26.20	8.02	5.26	0.526
2.4 GHz	MIMO	0.20	26.15	2	1.30	0.130
5.8 GHz	Legacy	0.20	25.15	9.02	5.20	0.520
5.8 GHz	MIMO	0.20	25.24	3	1.33	0.133

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