

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

CERTIFICATION TEST REPORT

FOR

802.11abgn WLAN Module

MODEL NUMBER: DWM-W034

FCC ID: EW4DWMW034 IC: 4250A-DWMW034

REPORT NUMBER: 09J12784-2

ISSUE DATE: OCTOBER 07, 2009

Prepared for MITSUMI ELECTRIC CO., LTD. 1601, SAKAI ATSUGI-SHI KANAGAWA, JAPAN, 243-8533

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(R)

NVLAP LAB CODE 200065-0

Revision History

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	10/07/09	Initial Issue	T. Chan

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	MITSUMI ELECTRIC CO., LTD. 1601, SAKAI ATSUGI-SHI KANAGAWA, JAPAN, 243-8533	
EUT DESCRIPTION:	802.11abgn WLAN Module	
MODEL:	DWM-W034	
SERIAL NUMBER:	00A096_700D13	
DATE TESTED:	September 01 to October 02, 2009	
	APPLICABLE STANDARDS	
STA	ANDARD	TEST RESULTS
CFR 47 Pa	art 15 Subpart E	Pass
INDUSTRY CANADA	RSS-210 Issue 7 Annex 9	Pass
INDUSTRY CANA	ADA 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:

THU CHAN EMC MANAGER COMPLIANCE CERTIFICATION SERVICES

Tested By:

Chare

DEVIN CHANG 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, FCC 06-96, 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%.

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11abgn WLAN Module.

The radio module is manufactured by Atheros

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)
5180 - 5240	802.11a	13.87	24.38
5180 - 5240	802.11n HT20	14.28	26.79
5190 - 5230	802.11n HT40	16.95	49.55
5260 - 5320	802.11a	19.48	88.72
5260 - 5320	802.11n HT20	19.44	87.90
5270 - 5310	802.11n HT40	19.08	80.91
5500 - 5700	802.11a	19.28	84.72
5500 - 5700	802.11n HT20	19.28	84.72
5510 - 5670	802.11n HT40	18.79	75.68

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes the following antennas:

Dipole Antenna

	Black: ANT008		White: ANT007	
2.4GHz	1.67	Н	1.92	Н
5.15-5.25GHz	1.91	Н	1.98	Н
5.25-5.35GHz	1.91	Н	1.98	Н
5.4-5.725GHz	1.84	V	2.13	Н
5.725-5.825GHz	1.32	Н	2.05	Н

PIFA Antenna

	Black: 1554396-1		White: 1554396-2	
2.4GHz	-2.54	Н	-2.13	Н
5.15-5.25GHz	-8.74	Н	-10.71	Н
5.25-5.35GHz	-6.45	Н	-8.62	Н
5.4-5.725GHz	-7.76	Н	-5.79	V
5.725-5.825GHz	-6.71	Н	-5.79	V

PIFA Antenna

	Black: 1554396-3		White: 1554396-4	
2.4GHz	-1.97	Н	-2.85	Н
5.15-5.25GHz	0.46	Н	2.05	Н
5.25-5.35GHz	0.46	Н	1.55	Н
5.4-5.725GHz	0.6	Н	1.36	V
5.725-5.825GHz	2.88	Н	1.36	V

5.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was ART, Revision 8, B122

5.5. WORST-CASE CONFIGURATION AND MODE

The 2x2 configuration was used for 2.4GHz and 5GHz testing in this report. The chain 1 is Black, chain 2 is White.

The worst-case data rate for each mode is determined to be as follows, based on input from the manufacturer of the radio.

All emissions tests were made with following data rates:

- 802.11a mode, 20 MHz Channel Bandwidth, 6 Mb/s, OFDM Modulation.
- 802.11n HT20 mode, 20 MHz Channel Bandwidth, MCS0, 6.5 Mb/s, OFDM Modulation.
- 802.11n HT40 mode, 40 MHz Channel Bandwidth, MCS0, 13.5 Mb/s, OFDM Modulation.

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For radiated emissions below 1 GHz the worst-case configuration is determined to be the mode and channel with the highest output power.

Investigation that the Power Spectral Density and Conducted Spurious as measured through a combiner with both chains operating simultaneously is worst case.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST							
Description Manufacturer Model Serial Number FCC ID							
Laptop PC	HP	HP Pavilion dv1000	CNF62007RV	DOC			
AC adaptor							

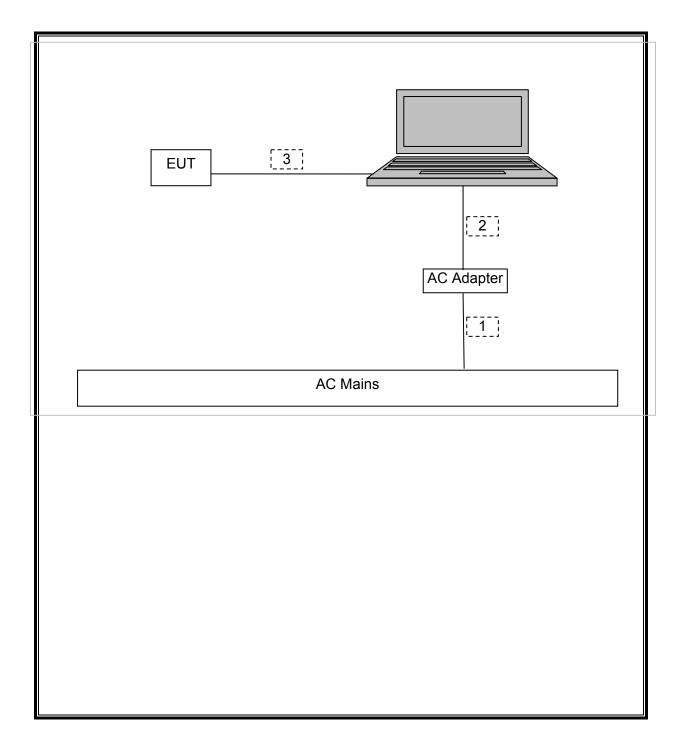
I/O CABLES

	I/O CABLE LIST							
Cable	Port	ort # of Connector Cable Cable Remarks						
No.		Identica	Туре	Туре	Length			
		Ports						
1	AC	2	US 115V	Un-shielded	1.7 m	No		
2	DC	3	DC	Un-shielded	1.7 m	No		
3	USB	1	USB	Un-shielded	0.2m	No		

TEST SETUP

The EUT is connected to a host laptop computer via USB cable during the tests. Test software exercised the radio card.

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 Due	
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	02/04/10	
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01171	01/14/10	
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	12/16/09	
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	04/20/10	
Antenna, Horn, 18 GHz	EMCO	3115	C00872	04/22/10	
EMI Test Receiver, 30 MHz	R&S	ESHS 20	N02396	05/06/11	
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	10/29/09	
LISN, 10 kHz~30 MHz	Solar	8012-50-R-24-BNC	N02481	10/29/09	
Peak Power Meter	Boonton	4541	NVA	01/15/10	
Peak / Average Power Sensor	Boonton	57318	N/A	02/02/10	
Highpass Filter, 7.6 GHz	Micro-Tronics	HPM13195	N02682	N/A	

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7. ANTENNA PORT TEST RESULTS

7.1. 802.11a DUAL CHAIN LEGACY MODE IN THE 5.2 GHz BAND

7.1.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

<u>RESULTS</u>

CHAIN 1

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5180	26.070	16.5272
Middle	5200	25.165	16.4828
High	5240	25.438	16.4456

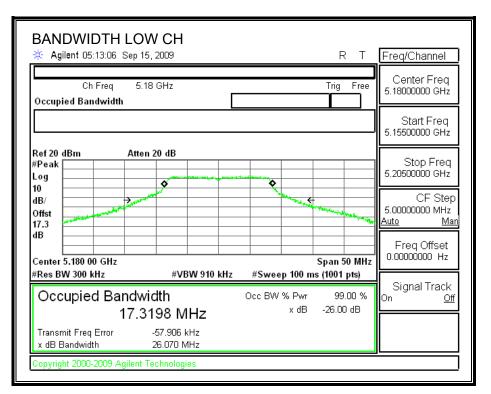
CHAIN 2

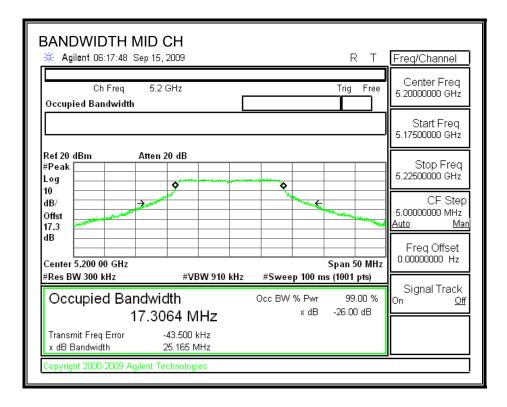
Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5180	24.880	16.5855
Middle	5200	25.295	16.4657
High	5240	24.626	16.5478

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REPORT NO: 09U12784-2 FCC ID: EW4DWMW034 CHAIN 1

26 dB BANDWIDTH



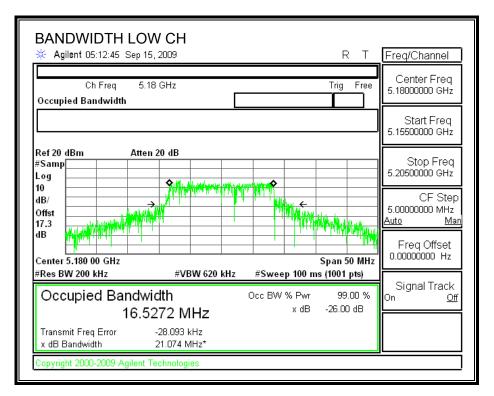


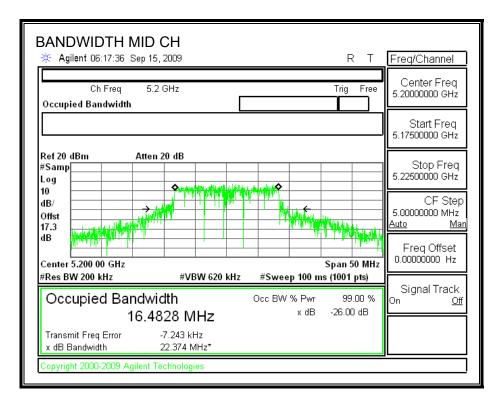
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BANDWIDTH HIGH CH Agilent 06:19:41 Sep 15, 2009	R T	Freq/Channel
Ch Freq 5.24 GHz Occupied Bandwidth	Trig Free	Center Freq 5.24000000 GHz
		Start Freq 5.21500000 GHz
Ref 20 dBm Atten 20 dB #Peak Log 10	×	Stop Freq 5.26500000 GHz
dB/ Offst 17.3		CF Step 5.0000000 MHz <u>Auto Man</u>
dB	Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 300 kHz #VBW 910 kH Occupied Bandwidth	Iz #Sweep 100 ms (1001 pts) Occ BW % Pwr 99.00 %	Signal Track On <u>Off</u>
17.3405 MHz Transmit Freq Error -20.536 kHz × dB Bandwidth 25.438 MHz	x dB -26.00 dB	
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99% BANDWIDTH





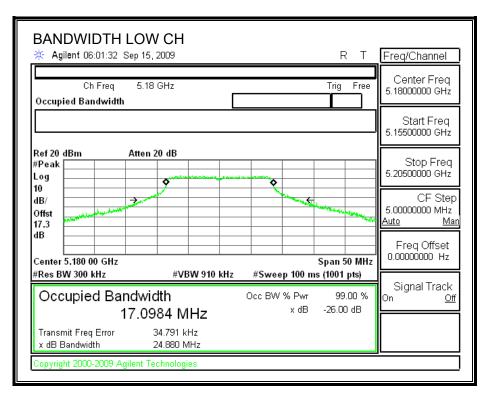
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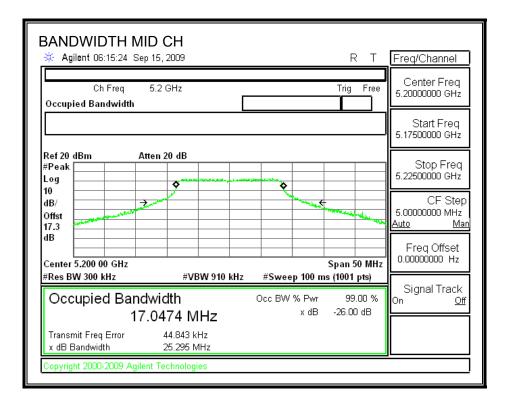
BANDWIDTH HIGH CH			RТ	Freq/Channel
Ch Freq 5.24 GHz Occupied Bandwidth			Trig Free	Center Freq 5.24000000 GHz
				Start Freq 5.21500000 GHz
Ref 20 dBm Atten 20 dB #Samp				Stop Freq 5.26500000 GHz
dB/ Offst 17.3			MLANNAN	CF Step 5.0000000 MHz <u>Auto Man</u>
dB			Span 50 MHz	Freq Offset 0.00000000 Hz
	/BW 620 kHz	#Sweep 100 m	s (1001 pts)	Signal Track
Occupied Bandwidth 16.4456 N	ЛНz	Occ BW % Pwr x dB		On <u>Off</u>
Transmit Freq Error-11.218x dB Bandwidth21.445				
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REPORT NO: 09U12784-2 FCC ID: EW4DWMW034 CHAIN 2

26 dB BANDWIDTH



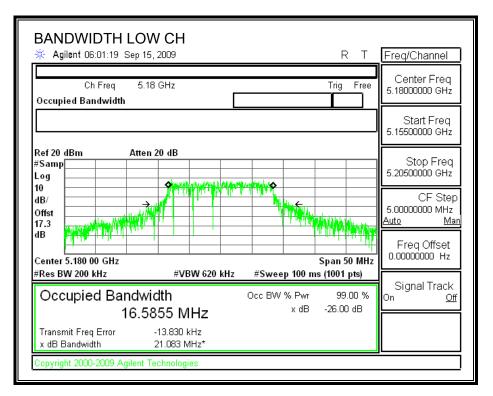


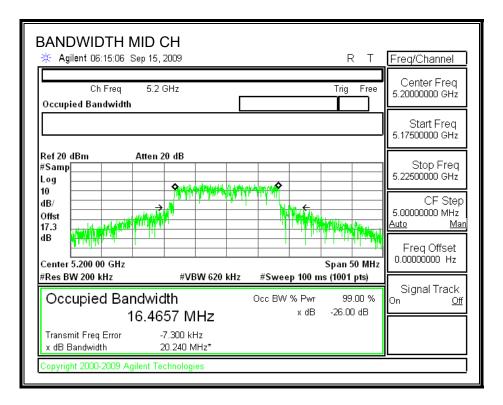
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BANDWIDTH HIG	-		RΤ	Freq/Channel
Ch Freq 5.2 Occupied Bandwidth	4 GHz		Trig Free	Center Freq 5.24000000 GHz
				Start Freq 5.21500000 GHz
#Peak	20 dB			Stop Freq 5.2650000 GHz
10 dB/ Offst 17.3			and and a second second	CF Step 5.0000000 MHz <u>Auto Man</u>
dB Center 5.240 00 GHz			Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 300 kHz	#VBW 910 kHz	#Sweep 100 m		Signal Track
Occupied Bandw 17.0	ath 986 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB	On <u>Off</u>
Transmit Freq Error x dB Bandwidth	55.434 kHz 24.626 MHz			
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99% BANDWIDTH





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BANDWIDTH HIG			RТ	Freq/Channel
Ch Freq 5.2 Occupied Bandwidth	4 GHz		Trig Free	Center Freq 5.24000000 GHz
				Start Freq 5.21500000 GHz
Ref 20 dBm Atter #Samp Log 10	20 dB	up/244104.14114414		Stop Freq 5.26500000 GHz
dB/ Offst 17.3 dB				CF Step 5.0000000 MHz <u>Auto Man</u>
Center 5.240 00 GHz #Res BW 200 kHz	#VBW 620 k	Hz #Sweep 100 n	Span 50 MHz ns (1001 pts)	Freq Offset 0.00000000 Hz
Occupied Bandw 16.5	idth 478 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB	Signal Track On <u>Off</u>
Transmit Freq Error x dB Bandwidth	34.783 kHz 22.514 MHz*			
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7.1.2. OUTPUT POWER

<u>LIMITS</u>

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

Antenna Gain (Chain 1)	Antenna Gain (Chain 2)	Effective Legacy Gain
(dBi)	(dBi)	(dBi)
1.91	1.98	4.96

For the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

Limit

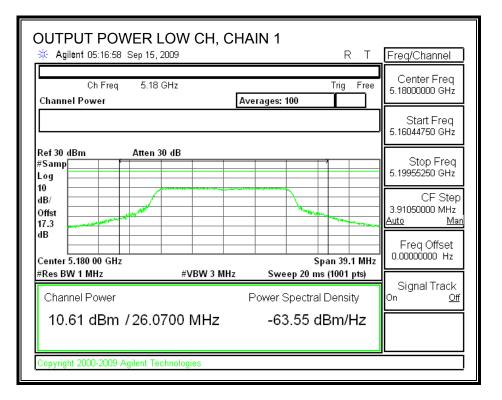
-						
Channel	Frequency	Fixed	В	4 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5180	17	26.070	18.16	4.96	17.00
Mid	5200	17	25.165	18.01	4.96	17.00
High	5240	17	25.438	18.05	4.96	17.00

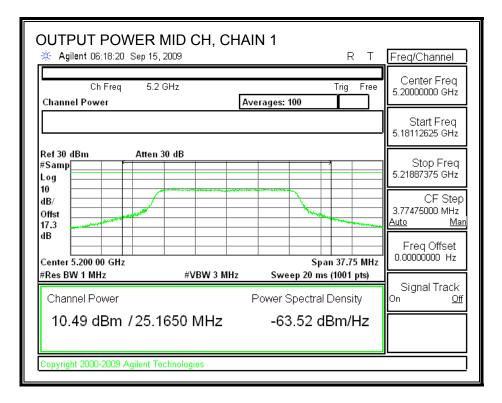
Individual Chain Results

Channel	Frequency	Chain 1	Chain 2	Total	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5180	10.61	11.09	13.87	17.00	-3.13
Mid	5200	10.49	10.88	13.70	17.00	-3.30
High	5240	10.36	11.12	13.77	17.00	-3.23

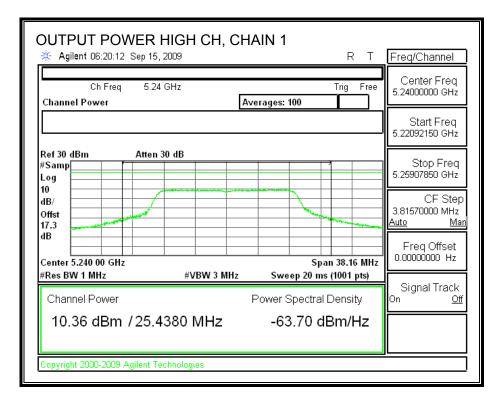
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CHAIN 1 OUTPUT POWER



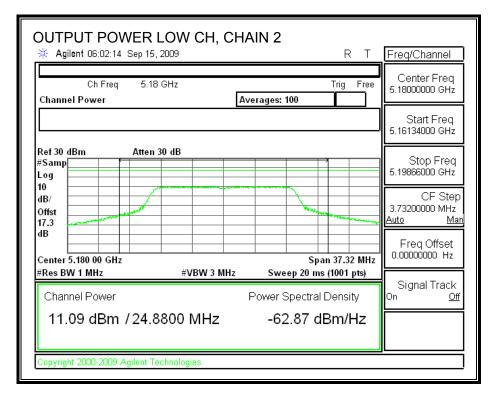


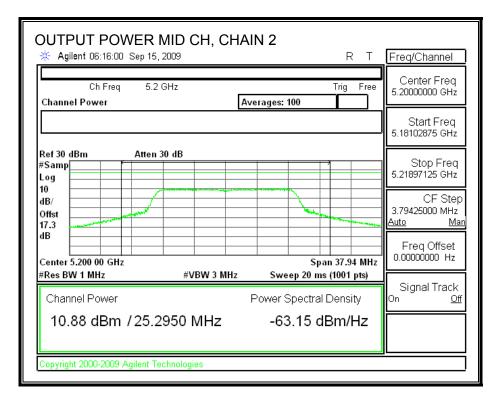
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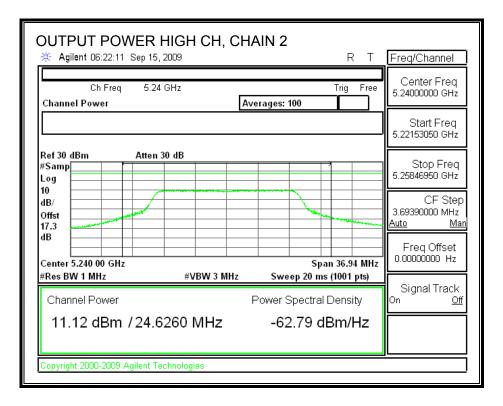
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CHAIN 2 OUTPUT POWER





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7.1.3. AVERAGE POWER

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 17.3 dB (including 10 dB pad and 7.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Chain 1	Chain 2	Total
		Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)
Low	5180	10.97	11.38	14.19
Middle	5200	10.79	11.19	14.00
High	5240	10.75	11.54	14.17

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7.1.4. PEAK POWER SPECTRAL DENSITY

<u>LIMITS</u>

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

Antenna Gain (Chain 1)	Antenna Gain (Chain 2)	Effective Legacy Gain	
(dBi)	(dBi)	(dBi)	
1.91	1.98	4.96	

For the 5.15-5.25 GHz band, the peak power spectral density shall not exceed 4 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum effective antenna gain is less than or equal to 6 dBi, therefore the limit is 4 dBm.

TEST PROCEDURE

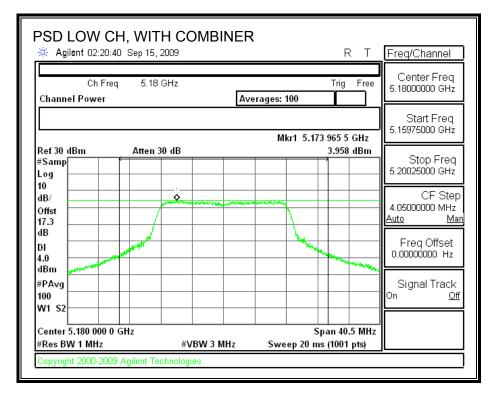
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

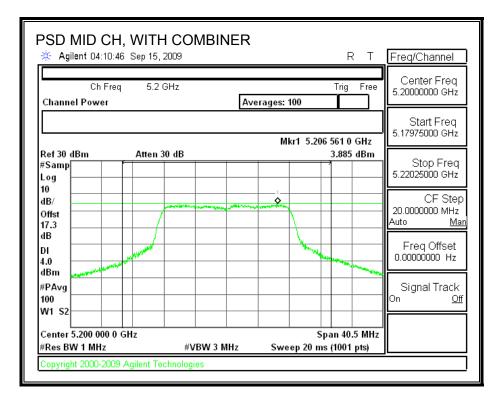
<u>RESULTS</u>

Channel	Frequency	PPSD With Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5180	3.96	4	-0.04
Middle	5200	3.89	4	-0.12
High	5240	3.75	4	-0.25

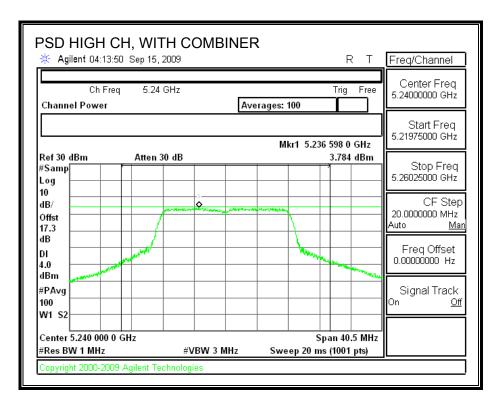
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POWER SPECTRAL DENSITY WITH COMBINER





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7.1.5. PEAK EXCURSION

<u>LIMITS</u>

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner.

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

CHAIN 1

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5180	9.68	13	-3.32
Middle	5200	9.47	13	-3.53
High	5240	8.85	13	-4.15

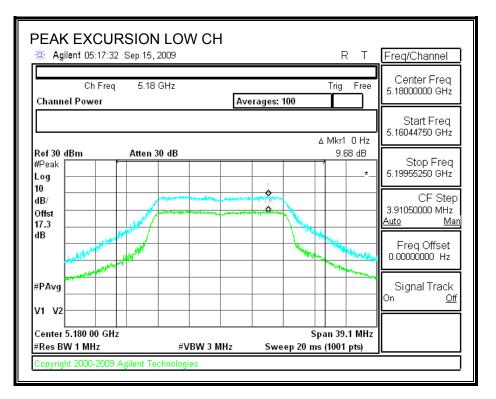
CHAIN 2

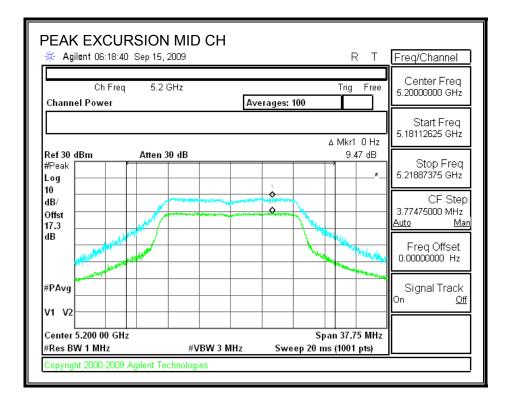
Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5180	9.58	13	-3.42
Middle	5200	10.16	13	-2.84
High	5240	10.71	13	-2.29

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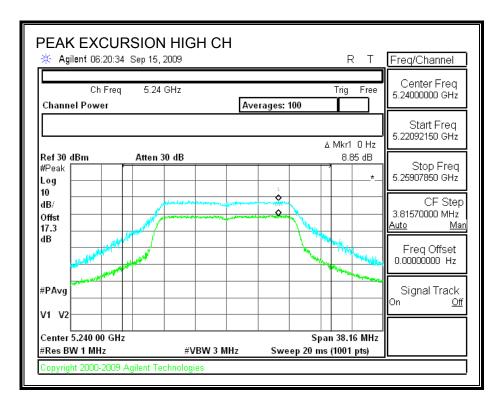
REPORT NO: 09U12784-2 FCC ID: EW4DWMW034 CHAIN 1

PEAK EXCURSION





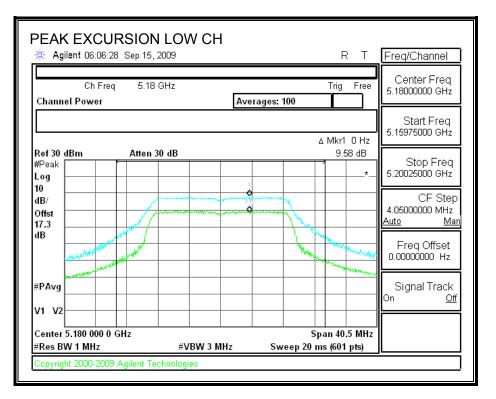
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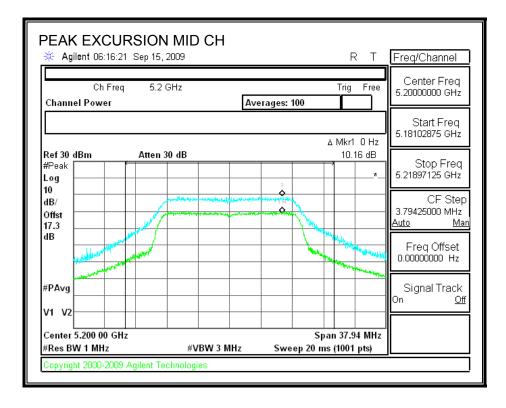


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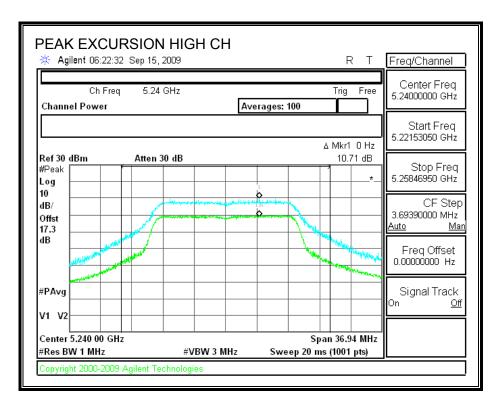
REPORT NO: 09U12784-2 FCC ID: EW4DWMW034 CHAIN 2

PEAK EXCURSION





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7.1.6. CONDUCTED SPURIOUS EMISSIONS

<u>LIMITS</u>

FCC §15.407 (b) (1)

IC RSS-210 A9.3 (1)

For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

TEST PROCEDURE

Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

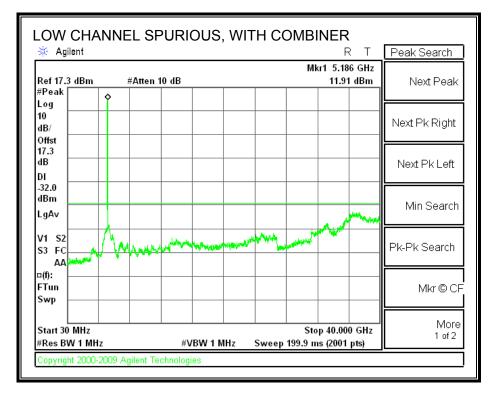
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

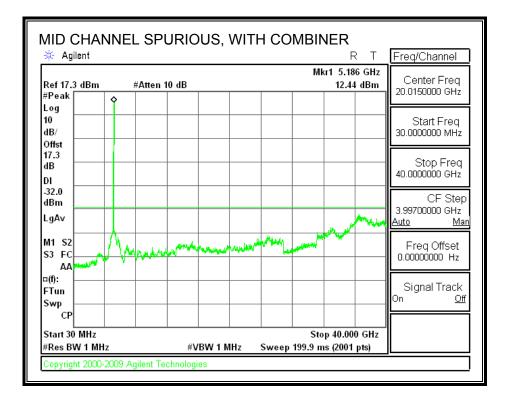
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

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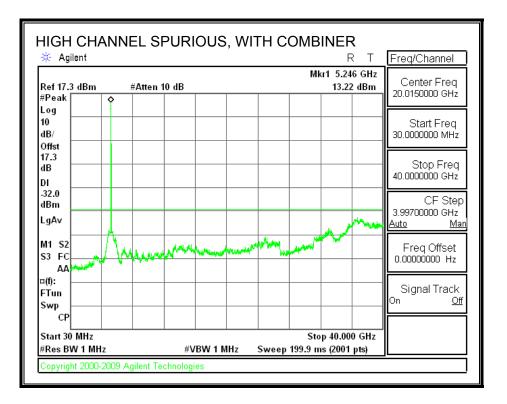
RESULTS

SPURIOUS EMISSIONS WITH COMBINER





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7.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

7.2.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

CHAIN 1

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5180	25.863	17.7480
Middle	5200	25.449	17.6675
High	5240	25.518	17.6990

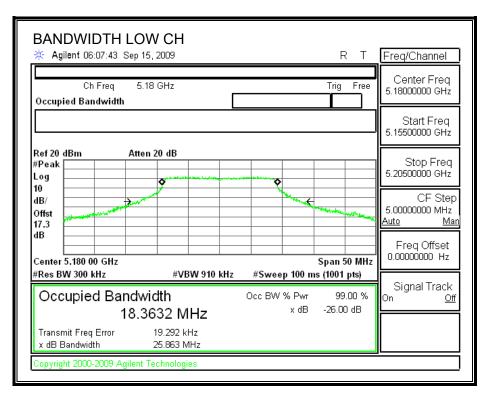
CHAIN 2

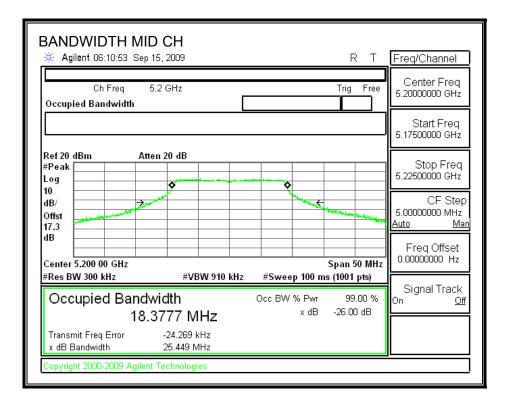
Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5180	26.496	17.7586
Middle	5200	26.361	17.7369
High	5240	25.889	17.6385

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REPORT NO: 09U12784-2 FCC ID: EW4DWMW034 CHAIN 1

26 dB BANDWIDTH

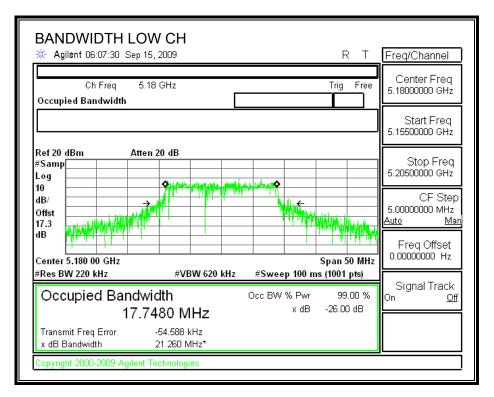


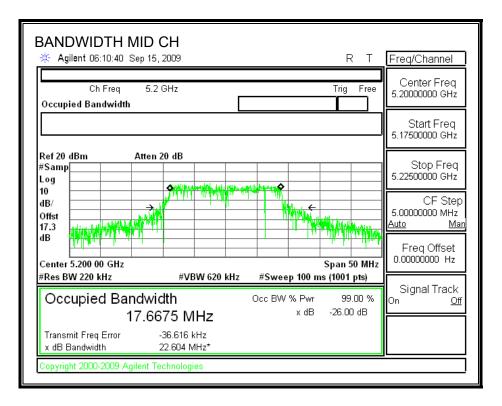


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BANDWIDTH HIC			RТ	Freq/Channel
Ch Freq 5 Occupied Bandwidth	.24 GHz		Trig Free	Center Freq 5.24000000 GHz
	_			Start Freq 5.21500000 GHz
Ref 20 dBm Atte #Peak Log 10	en 20 dB	×		Stop Freq 5.26500000 GHz
dB/ Offst 17.3			And and any the	CF Step 5.0000000 MHz <u>Auto Man</u>
dB			Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 300 kHz	#VBW 910 kHz	#Sweep 100 m	· · · /	Signal Track On Off
	3225 MHz	x dB	-26.00 dB	
Transmit Freq Error x dB Bandwidth	9.925 kHz 25.518 MHz			
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99% BANDWIDTH





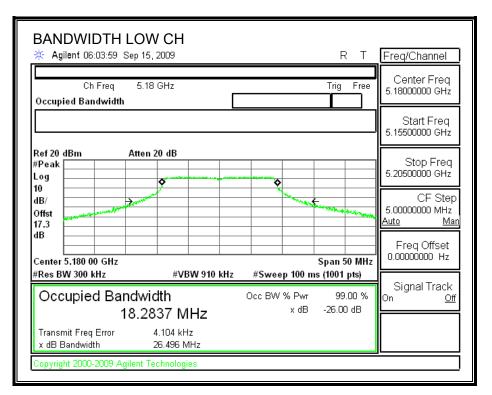
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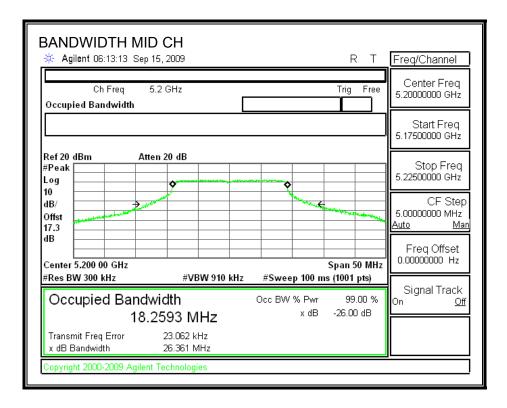
BANDWIDTH HIGH CH Agilent 06:25:36 Sep 15, 2009	R T Freq/Channel
Ch Freq 5.24 GHz Occupied Bandwidth	Trig Free Center Freq 5.24000000 GHz
	Start Freq 5.21500000 GHz
Ref 20 dBm Atten 20 dB #Samp	Stop Freq 5.26500000 GHz
dB/ Offst 17.3	CF Step 5.0000000 MHz <u>Auto Man</u>
dB	Span 50 MHz
#Res BW 220 kHz #VBW 62 Occupied Bandwidth 17.6990 MHz	0 kHz #Sweep 100 ms (1001 pts) Occ BW % Pwr 99.00 % x dB -26.00 dB
Transmit Freq Error -5.551 kHz x dB Bandwidth 20.413 MHz*	
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REPORT NO: 09U12784-2 FCC ID: EW4DWMW034 CHAIN 2

26 dB BANDWIDTH

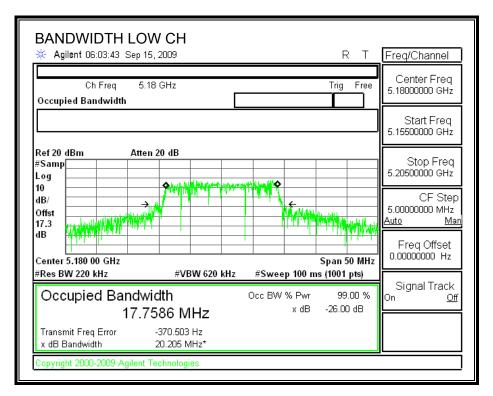


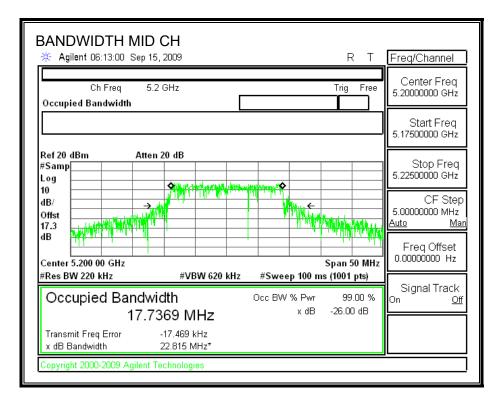


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BANDWIDTH HI Agilent 06:23:21 Sep			RТ	Freq/Channel
Ch Freq &	5.24 GHz		Trig Free	Center Freq 5.24000000 GHz
				Start Freq 5.21500000 GHz
#Peak	ten 20 dB	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Stop Freq 5.2650000 GHz
10 dB/ Offst 17.3				CF Step 5.0000000 MHz <u>Auto Man</u>
dB			Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 300 kHz	#VBW 910 kHz	#Sweep 100 m	s (1001 pts)	Signal Track
Occupied Band 18.	width 3160 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB	On <u>Off</u>
Transmit Freq Error x dB Bandwidth	28.038 kHz 25.889 MHz			
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99% BANDWIDTH





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BANDWIDTH HIG			RТ	Freq/Channel
Ch Freq 5.3 Occupied Bandwidth	24 GHz		Trig Free	Center Freq 5.24000000 GHz
				Start Freq 5.21500000 GHz
#Samp Log	n 20 dB	Juniorani Altani 🛆		Stop Freq 5.2650000 GHz
10 dB/ Offst 17.3 dB				CF Step 5.0000000 MHz <u>Auto Man</u>
Center 5.240 00 GHz			Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 220 kHz Occupied Bandw	#VBW 620 k	Hz #Sweep 100 m	· · · /	Signal Track On Off
	385 MHz	x dB	-26.00 dB	
Transmit Freq Error x dB Bandwidth	2.179 kHz 22.025 MHz*			
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7.2.2. OUTPUT POWER

<u>LIMITS</u>

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

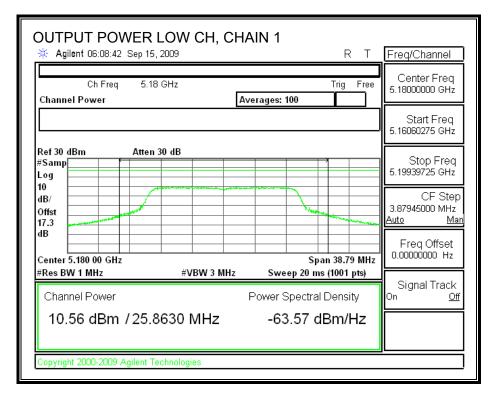
Limit

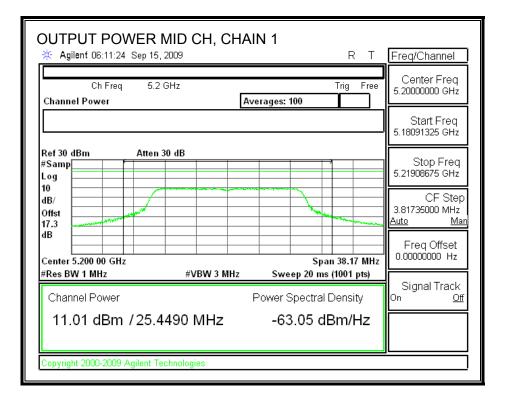
Channel	Frequency	Fixed	В	4 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5180	17	25.863	18.13	2.05	17.00
Mid	5200	17	25.449	18.06	2.05	17.00
High	5240	17	25.518	18.07	2.05	17.00

Individual Chain Results

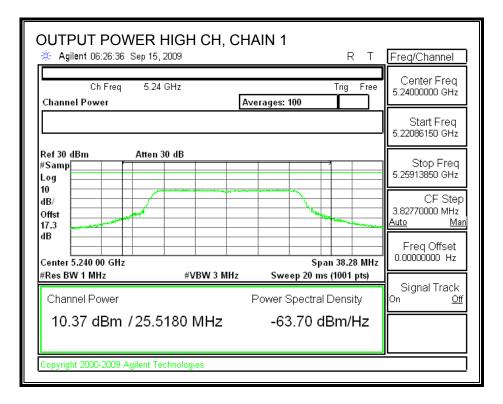
Channel	Frequency	Chain 1	Chain 2	Total	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5180	10.56	11.06	13.83	17.00	-3.17
Mid	5200	11.01	11.52	14.28	17.00	-5.99
High	5240	10.37	11.11	13.77	17.00	-6.63

CHAIN 1 OUTPUT POWER



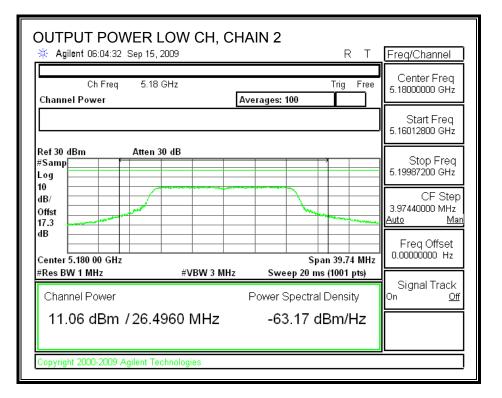


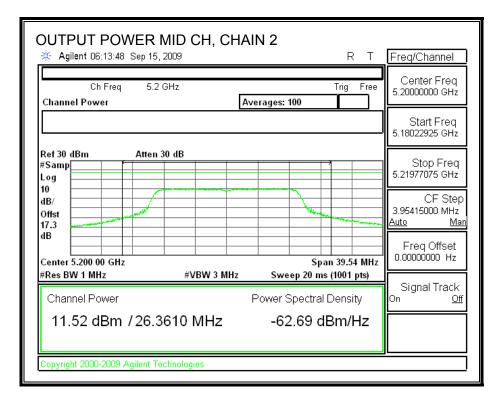
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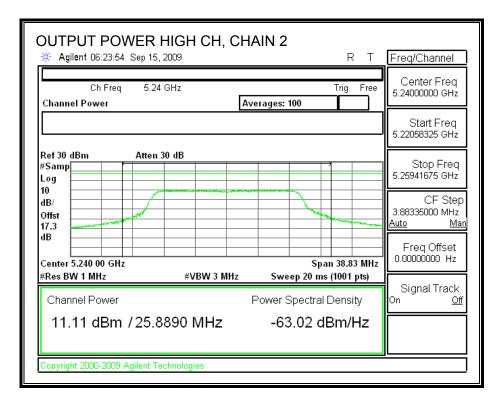
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CHAIN 2 OUTPUT POWER





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7.2.3. AVERAGE POWER

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 17.3 dB (including 10 dB pad and 7.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Chain 1	Chain 2	Total
		Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)
Low	5180	10.92	11.46	14.21
Middle	5200	11.32	11.70	14.52
High	5240	10.72	11.52	14.15

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7.2.4. PEAK POWER SPECTRAL DENSITY

<u>LIMITS</u>

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the peak power spectral density shall not exceed 4 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 4 dBm.

TEST PROCEDURE

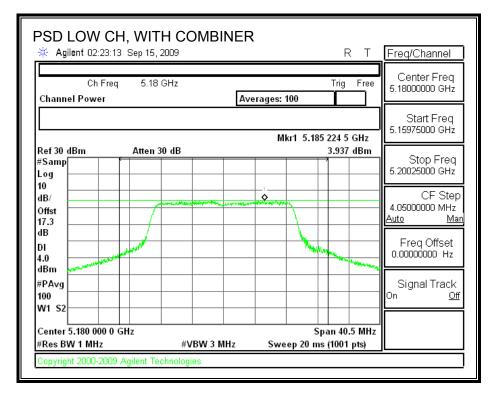
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

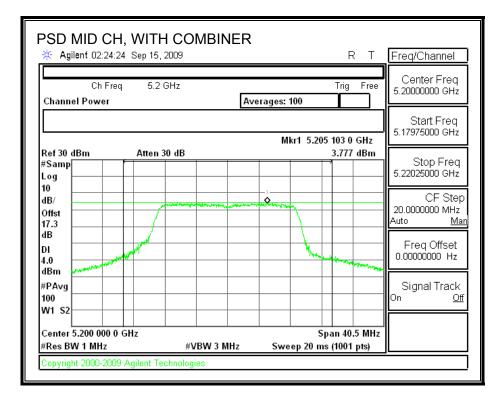
RESULTS

Channel	Frequency	PPSD With Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5180	3.94	4	-0.06
Middle	5200	3.78	4	-0.22
High	5240	3.68	4	-0.32

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POWER SPECTRAL DENSITY WITH COMBINER





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PSD HIGH CH, WIT			
🔆 Agilent 04:15:19 Sep 15, 2	009	R T	Peak Search
Ch Freq 5.24 G Channel Power	Hz Averages:	Trig Free	Next Peak
Marker 5.23457300		kr1 5.234 573 0 GHz	Next Pk Right
Ref 30 dBm Atten 30 #Samp Log		3.679 dBm	Next Pk Left
10 dB/ Offst 17.3	-1-		Min Search
dB DI 4.0 dBm		Marine Contraction	Pk-Pk Search
#PAvg 100 W1 S2			Mkr © CF
Center 5.240 000 0 GHz #Res BW 1 MHz	#VBW 3 MHz Swe	Span 40.5 MHz ep 20 ms (1001 pts)	More 1 of 2
Copyright 2000-2009 Agilent Tec	hnologies		

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7.2.5. PEAK EXCURSION

<u>LIMITS</u>

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner.

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

CHAIN 1

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5180	9.55	13	-3.45
Middle	5200	10.33	13	-2.67
High	5240	9.44	13	-3.56

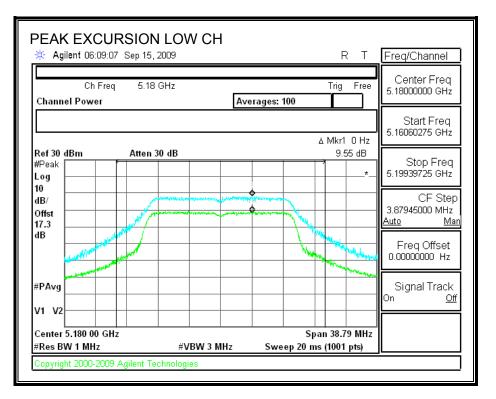
CHAIN 2

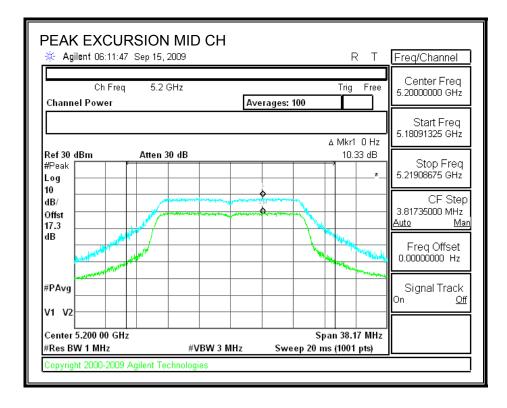
Channel	Frequency	Peak Excursion	Limit	Margin	
	(MHz)	(dB)	(dB)	(dB)	
Low	5180	8.36	13	-4.64	
Middle	5200	10.49	13	-2.51	
High	5240	9.24	13	-3.76	

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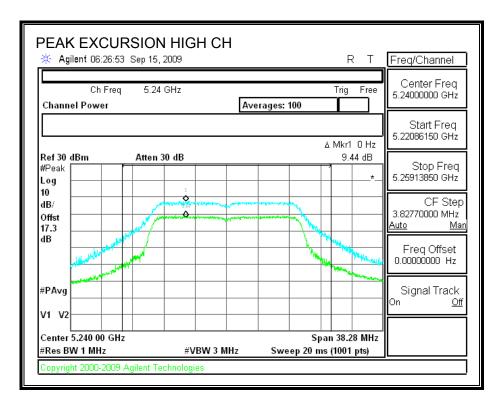
REPORT NO: 09U12784-2 FCC ID: EW4DWMW034 CHAIN 1

PEAK EXCURSION





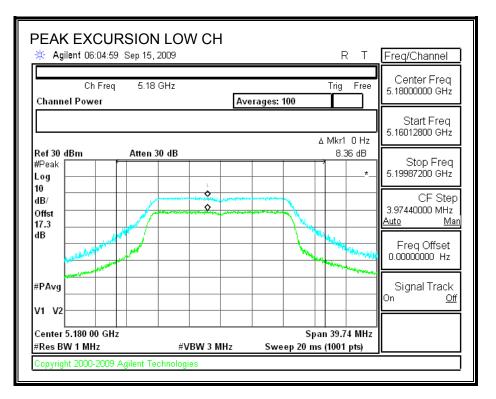
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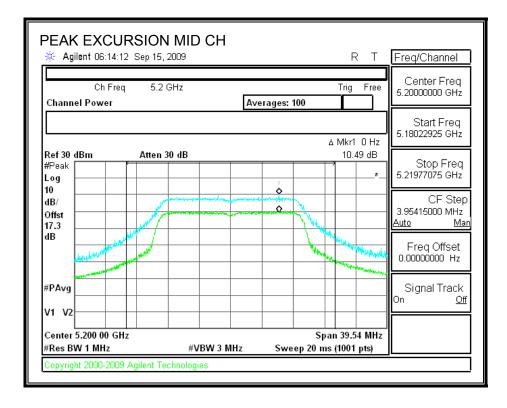


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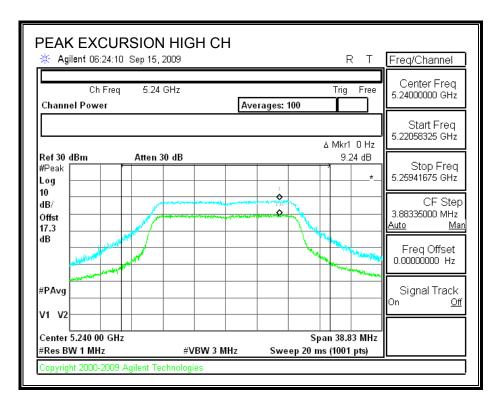
REPORT NO: 09U12784-2 FCC ID: EW4DWMW034 CHAIN 2

PEAK EXCURSION





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7.2.6. CONDUCTED SPURIOUS EMISSIONS

<u>LIMITS</u>

FCC §15.407 (b) (1)

IC RSS-210 A9.3 (1)

For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

TEST PROCEDURE

Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

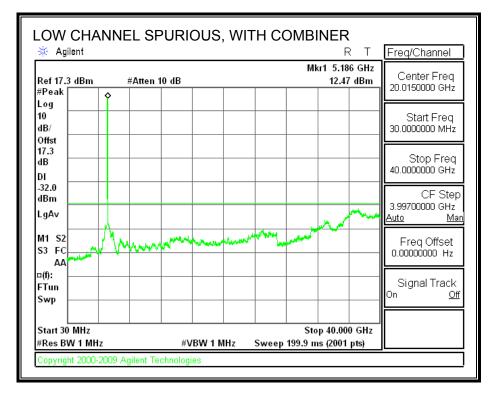
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

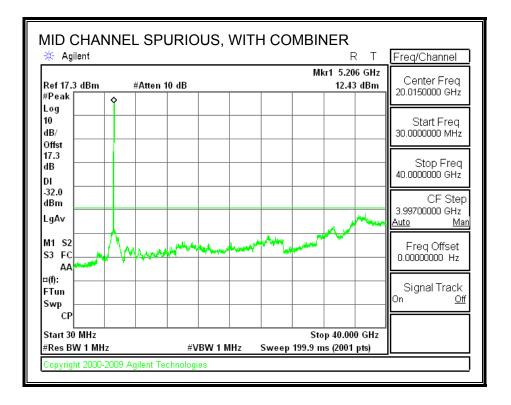
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

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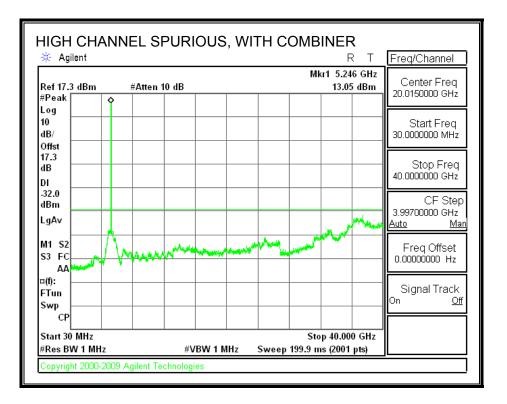
RESULTS

SPURIOUS EMISSIONS WITH COMBINER





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7.3.802.11n HT40 MODE IN THE 5.2 GHz BAND

7.3.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

CHAIN 1

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5190	52.457	36.2391
High	5230	53.041	36.4096

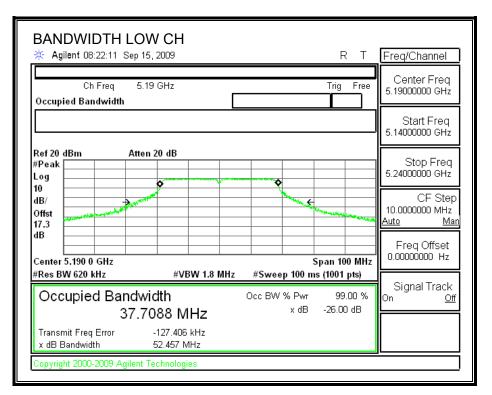
CHAIN 2

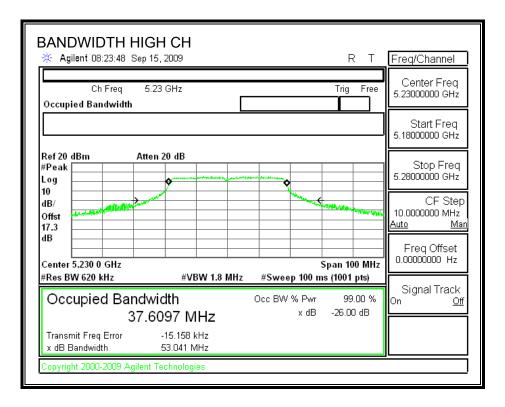
Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5190	52.225	36.3033
High	5230	63.465	36.4264

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REPORT NO: 09U12784-2 FCC ID: EW4DWMW034 CHAIN 1

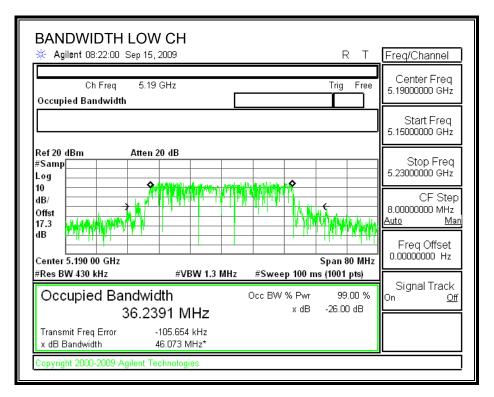
26 dB BANDWIDTH

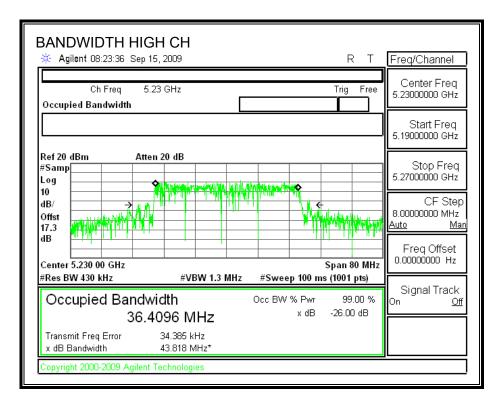




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99% BANDWIDTH

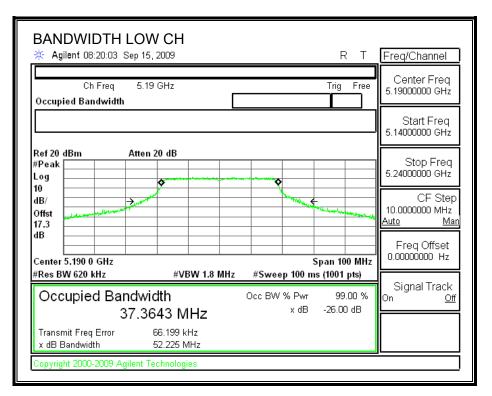


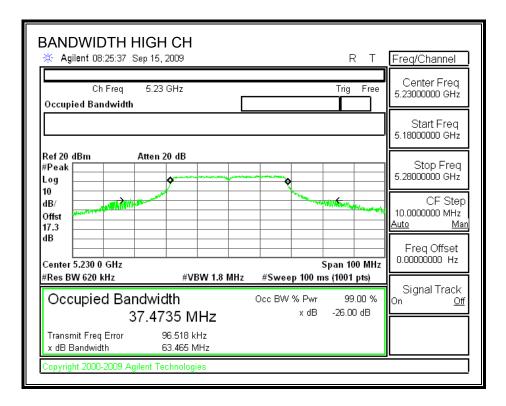


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REPORT NO: 09U12784-2 FCC ID: EW4DWMW034 CHAIN 2

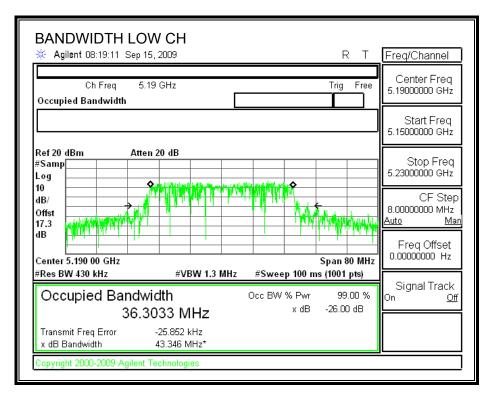
26 dB BANDWIDTH

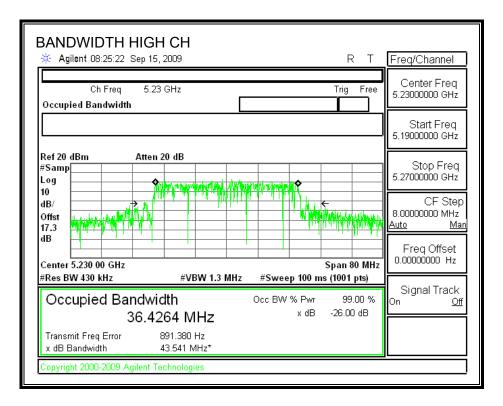




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99% BANDWIDTH





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7.3.2. OUTPUT POWER

<u>LIMITS</u>

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

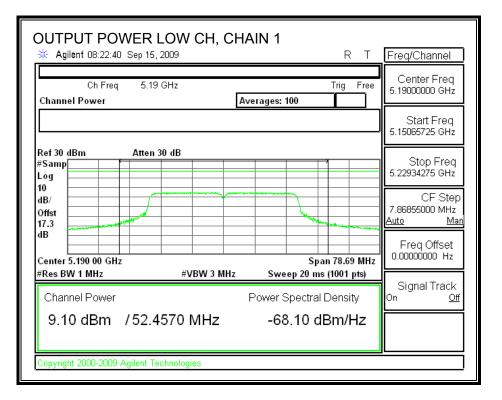
Limit

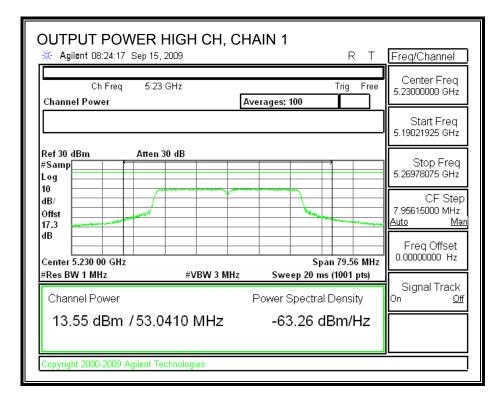
Channel	Frequency	Fixed	В	4 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5190	17	52.457	21.20	2.05	17.00
High	5230	17	53.041	21.25	2.05	17.00

Individual Chain Results

Channel	Frequency	Chain 1	Chain 2	Total	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5190	9.10	9.63	12.38	17.00	-4.62
High	5230	13.55	14.29	16.95	17.00	-0.05

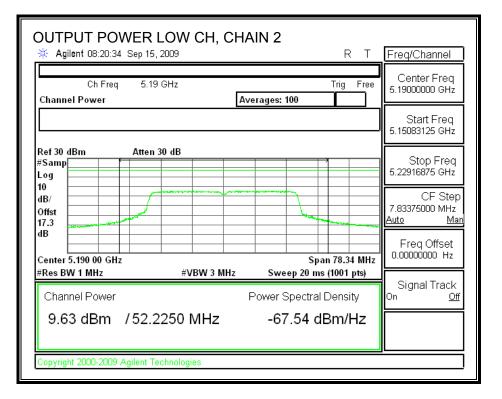
CHAIN 1 OUTPUT POWER

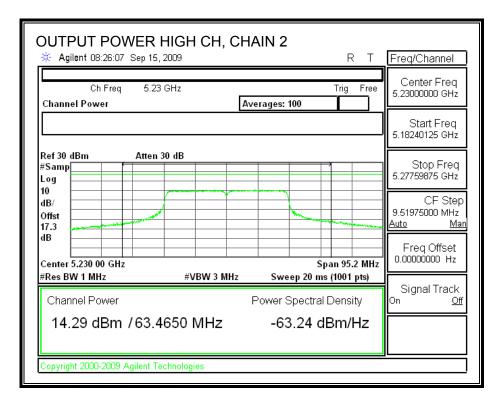




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CHAIN 2 OUTPUT POWER





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7.3.3. AVERAGE POWER

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 17.3 dB (including 10 dB pad and 7.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Chain 1	Chain 2	Total
		Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)
Low	5190	9.44	9.92	12.70
High	5230	14.19	15.04	17.65

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7.3.4. PEAK POWER SPECTRAL DENSITY

<u>LIMITS</u>

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the 5.15-5.25 GHz band, the peak power spectral density shall not exceed 4 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 4 dBm.

TEST PROCEDURE

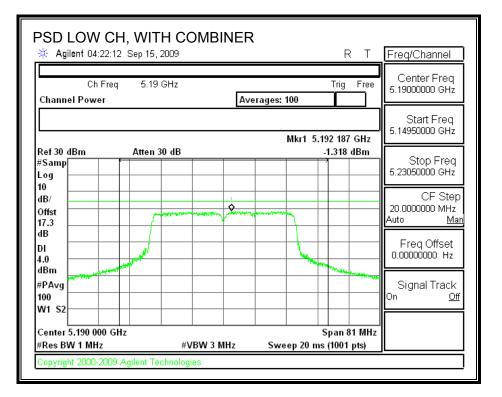
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

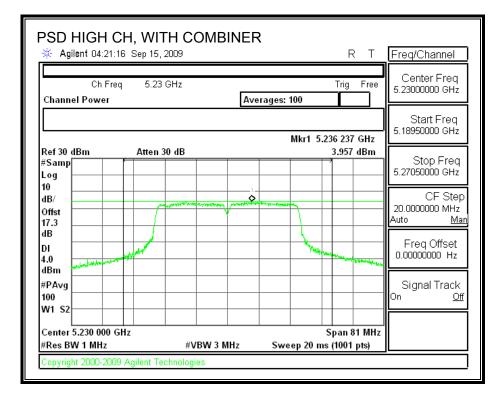
RESULTS

Channel	Frequency	PPSD With Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5190	-1.32	4	-5.32
High	5230	3.96	4	-0.04

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POWER SPECTRAL DENSITY WITH COMBINER





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7.3.5. PEAK EXCURSION

<u>LIMITS</u>

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner.

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

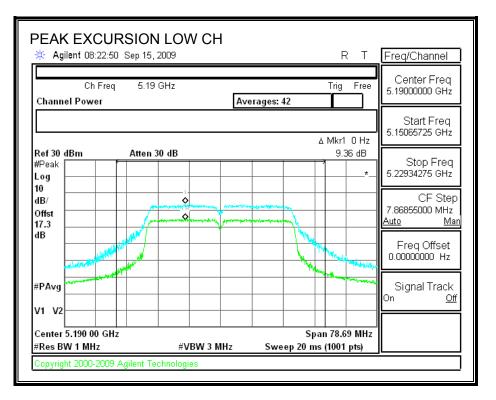
CHAIN 1

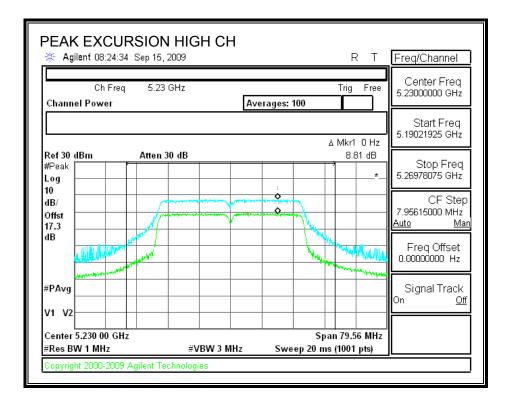
Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5190	9.36	13	-3.64
High	5230	8.81	13	-4.19

CHAIN 2

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5190	10.19	13	-2.81
High	5230	9.55	13	-3.45

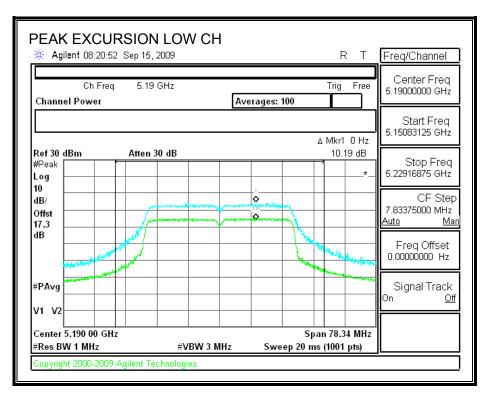
PEAK EXCURSION

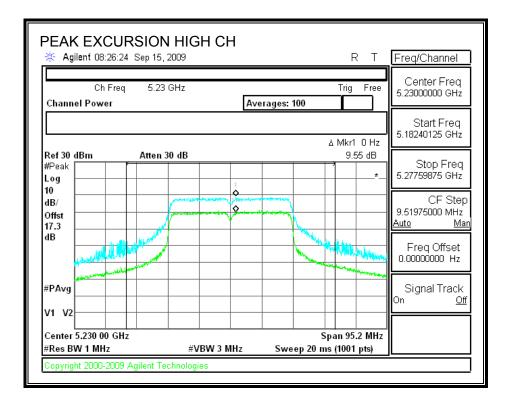




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PEAK EXCURSION





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7.3.6. CONDUCTED SPURIOUS EMISSIONS

<u>LIMITS</u>

FCC §15.407 (b) (1)

IC RSS-210 A9.3 (1)

For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

TEST PROCEDURE

Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

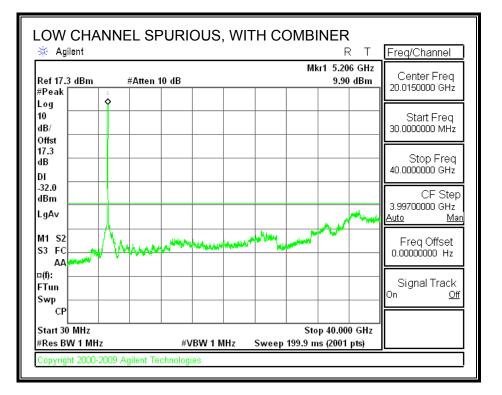
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

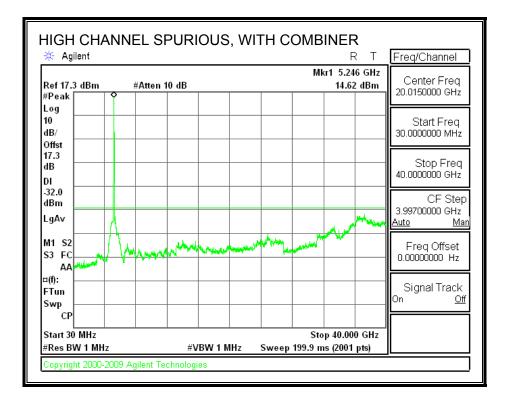
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

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RESULTS

SPURIOUS EMISSIONS WITH COMBINER





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7.4.802.11a DUAL CHAIN LEGACY MODE IN THE 5.3 GHz BAND

7.4.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

CHAIN 1

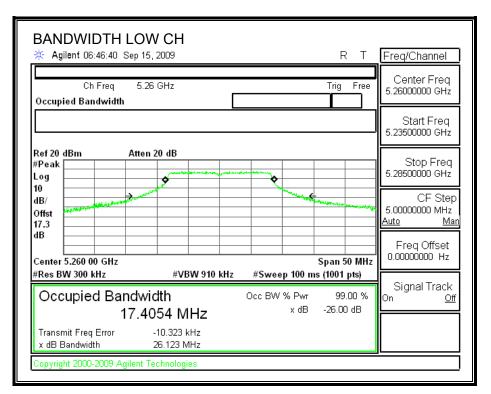
Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5260	26.123	16.4685
Middle	5300	26.536	16.4998
High	5320	25.472	16.4769

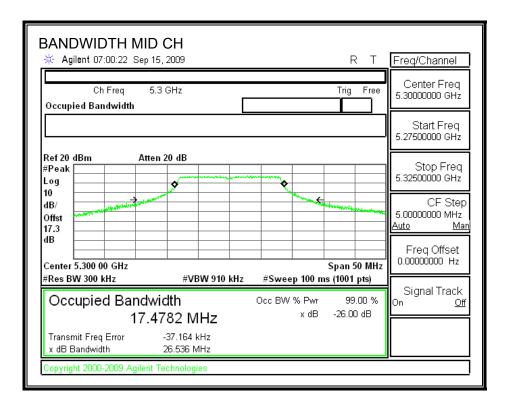
CHAIN 2

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5260	26.841	16.5447
Middle	5300	26.213	16.5435
High	5320	25.433	16.4485

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26 dB BANDWIDTH

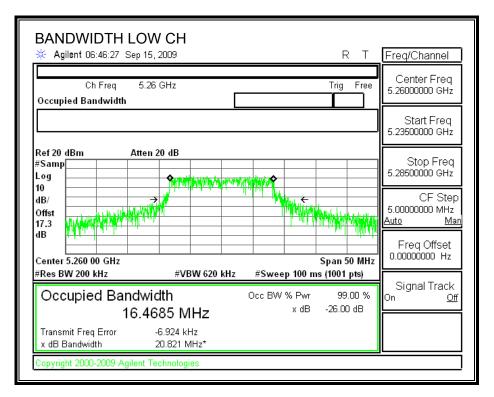


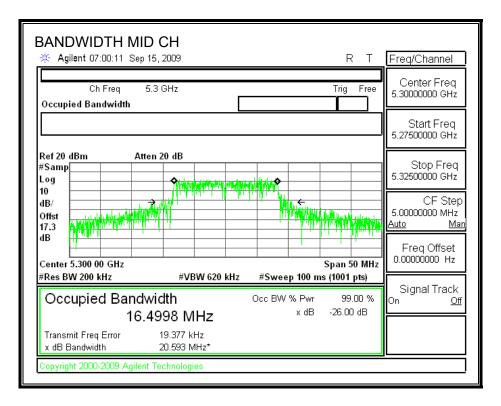


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BANDWIDTH HIG	-		RТ	Freq/Channel
Ch Freq 5.3 Occupied Bandwidth	32 GHz		Trig Free	Center Freq 5.32000000 GHz
				Start Freq 5.29500000 GHz
Ref 20 dBm Atte #Peak Log	n 20 dB			Stop Freq 5.3450000 GHz
dB/ Offst			Manual And Public And And	CF Step 5.0000000 MHz <u>Auto Man</u>
dB Center 5.320 00 GHz			Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 300 kHz	#VBW 910 kHz	#Sweep 100 m	s (1001 pts)	Signal Track
Occupied Bandw 17.3	idth 870 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB	On <u>Off</u>
Transmit Freq Error x dB Bandwidth	18.235 kHz 25.472 MHz			
Copyright 2000-2009 Agilent	Technologies			

99% BANDWIDTH



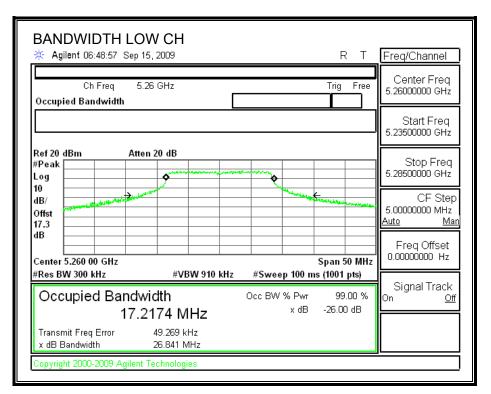


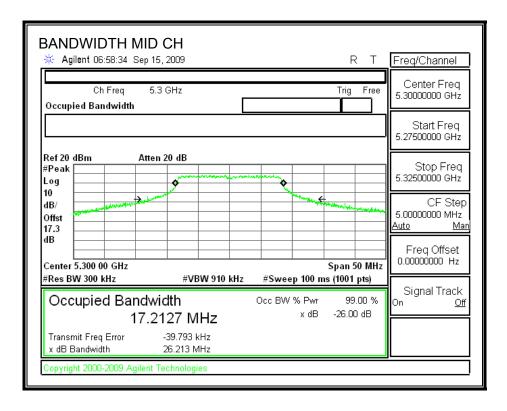
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BANDWIDTH HIGH CH * Agilent 07:01:52 Sep 15, 2009	R T	Freq/Channel
Ch Freq 5.32 GHz Occupied Bandwidth	Trig Free	Center Freq 5.32000000 GHz
	<u> </u>	Start Freq 5.29500000 GHz
Ref 20 dBm Atten 20 dB #Samp		Stop Freq 5.34500000 GHz
dB/ Offst 17.3		CF Step 5.00000000 MHz <u>Auto Man</u>
dB Arran Arr	Span 50 MH	Freq Offset 0.00000000 Hz
Occupied Bandwidth 16.4769 MH:	620 kHz #Sweep 100 ms (1001 pts) Occ BW % Pwr 99.00 % x dB -26.00 dB	Signal Track On <u>Off</u>
Transmit Freq Error 1.203 kHz x dB Bandwidth 20.916 MHz	*	
Copyright 2000-2009 Agilent Technologies		

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26 dB BANDWIDTH



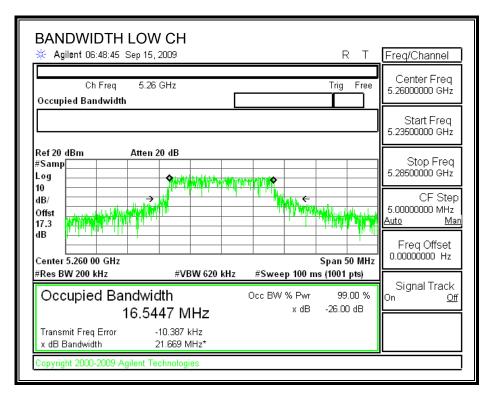


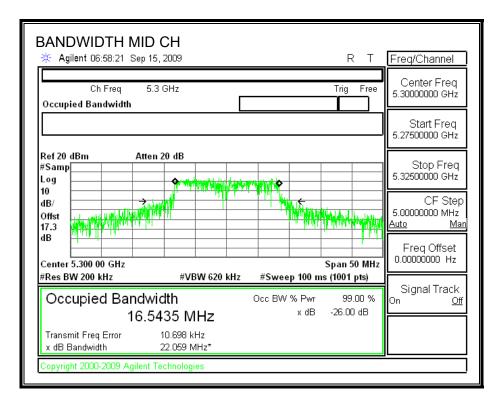
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BANDWIDTH HIG	-		RТ	Freq/Channel
Ch Freq 5. Occupied Bandwidth	32 GHz		Trig Free	Center Freq 5.32000000 GHz
				Start Freq 5.29500000 GHz
#Peak	n 20 dB	•		Stop Freq 5.3450000 GHz
10 dB/ Offst 17.3			Anna and an and a second	CF Step 5.0000000 MHz <u>Auto Man</u>
dB Center 5.320 00 GHz			Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 300 kHz	#VBW 910 kHz	#Sweep 100 m	s (1001 pts)	Signal Track
Occupied Bandw 17.1	idth 259 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB	Signal Track On <u>Off</u>
Transmit Freq Error x dB Bandwidth	21.652 kHz 25.433 MHz			
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99% BANDWIDTH





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BANDWIDTH HIGH CH * Agilent 07:03:56 Sep 15, 2009 R T	Freq/Channel
Ch Freq 5.32 GHz Trig Free Occupied Bandwidth	Center Freq 5.32000000 GHz
	Start Freq 5.29500000 GHz
Ref 20 dBm Atten 20 dB #Samp	Stop Freq 5.34500000 GHz
dB/ Offst 17.3 August 17 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	CF Step 5.00000000 MHz <u>Auto Man</u>
dB Center 5.320 00 GHz Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 200 kHz #VBW 620 kHz #Sweep 100 ms (1001 pts) Occupied Bandwidth Occ BW % Pwr 99.00 % 16.4485 MHz × dB -26.00 dB	Signal Track On <u>Off</u>
Transmit Freq Error 16.213 kHz x dB Bandwidth 21.992 MHz*	
Copyright 2000-2009 Agilent Technologies	

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7.4.2. OUTPUT POWER

<u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

Antenna Gain (Chain 1)	Antenna Gain (Chain 2)	Effective Legacy Gain
(dBi)	(dBi)	(dBi)
1.91	1.98	4.96

For the 5.25-5.35 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

Limit

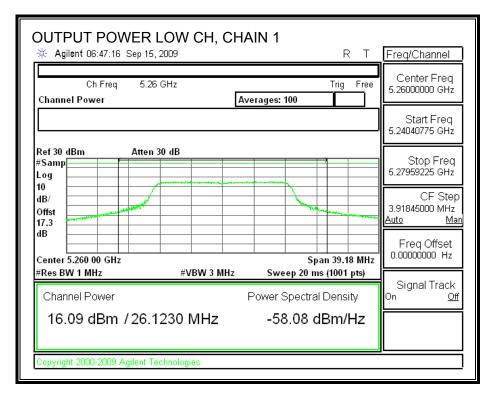
Channel	Frequency	Fixed	В	11 + 10 Log B	Effective	Limit
		Limit		Limit	Ant Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5260	24	26.123	25.17	4.96	24.00
Mid	5300	24	26.536	25.24	4.96	24.00
High	5320	24	25.472	25.06	4.96	24.00

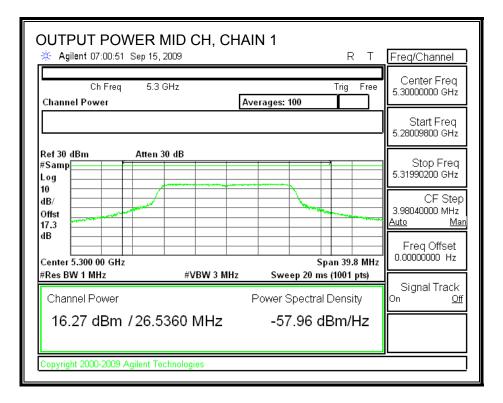
Individual Chain Results

Channel	Frequency	Chain 1	Chain 2	Total	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	16.09	16.42	19.27	24.00	-4.73
Mid	5300	16.27	16.66	19.48	24.00	-4.52
High	5320	14.23	15.13	17.71	24.00	-6.29

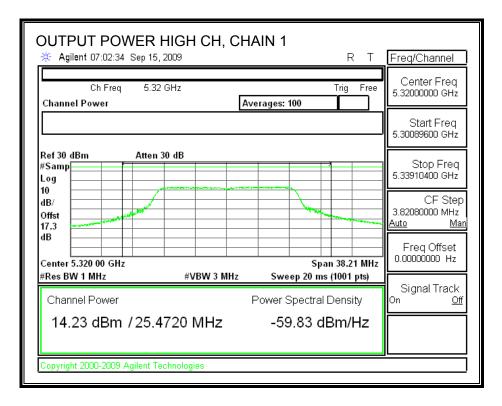
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CHAIN 1 OUTPUT POWER



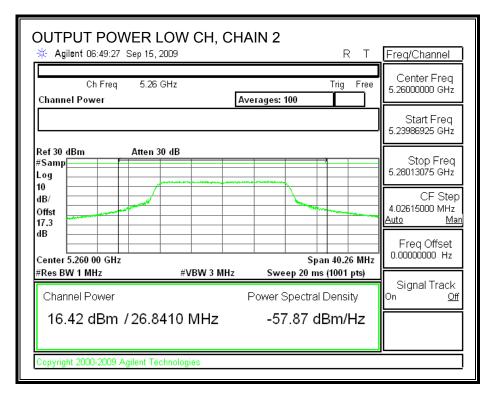


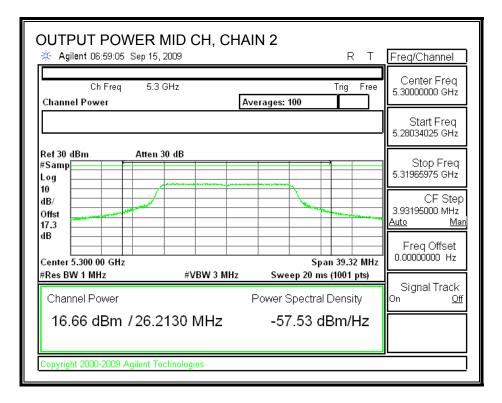
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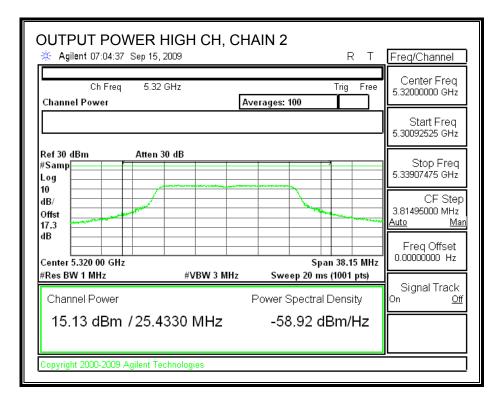
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CHAIN 2 OUTPUT POWER





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7.4.3. AVERAGE POWER

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 17.3 dB (including 10 dB pad and 7.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Chain 1	Chain 2	Total
		Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)
Low	5260	16.45	16.64	19.56
Middle	5300	16.78	16.96	19.88
High	5320	14.56	15.56	18.10

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7.4.4. PEAK POWER SPECTRAL DENSITY

<u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

Antenna Gain (Chain 1)	Antenna Gain (Chain 2)	Effective Legacy Gain
(dBi)	(dBi)	(dBi)
1.91	1.98	4.96

For the 5.25–5.35 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum effective antenna gain is less than or equal to 6 dBi, therefore the limit is 11 dBm.

TEST PROCEDURE

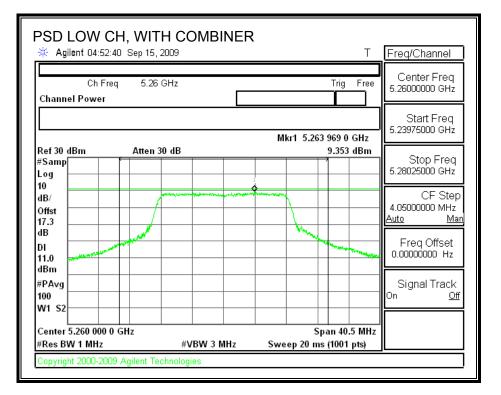
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

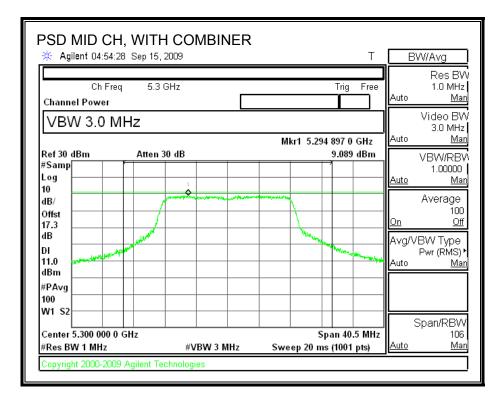
<u>RESULTS</u>

Channel	Frequency	PPSD With Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5260	9.35	11	-1.65
Middle	5300	9.09	11	-1.91
High	5320	7.39	11	-3.61

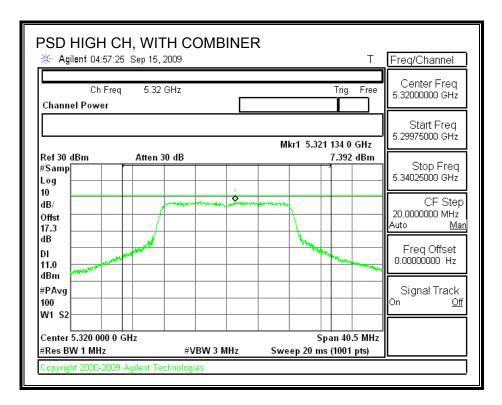
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POWER SPECTRAL DENSITY WITH COMBINER





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7.4.5. PEAK EXCURSION

<u>LIMITS</u>

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner.

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

CHAIN 1

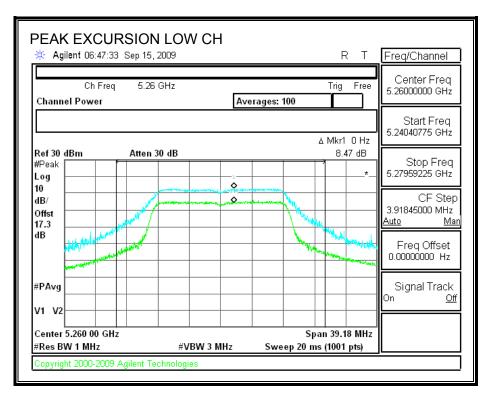
Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5260	8.47	13	-4.53
Middle	5300	8.39	13	-4.61
High	5320	7.92	13	-5.08

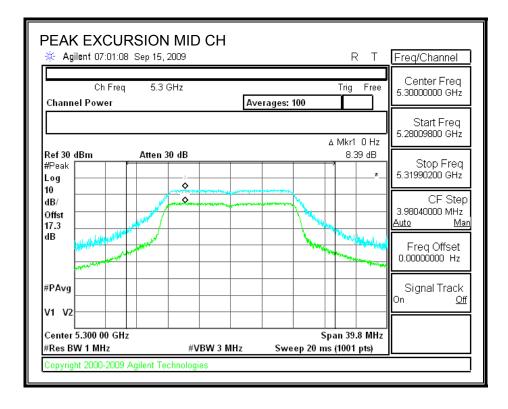
CHAIN 2

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5260	10.42	13	-2.58
Middle	5300	10.33	13	-2.67
High	5320	9.64	13	-3.36

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PEAK EXCURSION



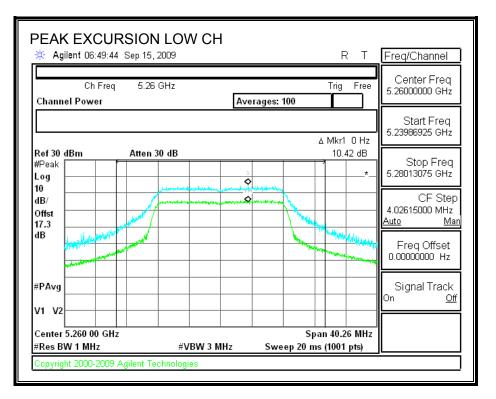


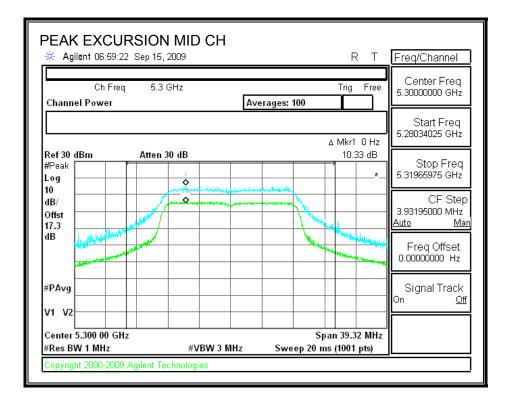
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* Agilent 07:02:51 Sep *					Freq/Channel Center Freq
Ch Freq 5 Channel Power	32 GHz	Average		Trig Free	5.32000000 GHz
			14	víkr1 0 Hz	Start Freq 5.30089600 GHz
Ref 30 dBm Atte	en 30 dB			7.92 dB	Stop Freq
Log		1		*	5.33910400 GHz
10 dB/		 ♦ 			CF Step 3.82080000 MHz
Offst 17.3	7		- The second		<u>Auto Ma</u>
dB			-	Willing and the second se	Freq Offset 0.00000000 Hz
#PAvg					Signal Track
V1 M2					On <u>Of</u>
Center 5.320 00 GHz #Res BW 1 MHz	#VBW		Span weep 20 ms (1	38.21 MHz	

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PEAK EXCURSION





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PEAK EXCURSION			RT	Freq/Channel
Ch Freq 5.32 (Channel Power		erages: 100	Trig Free	Center Freq 5.32000000 GHz
		۵	Mkr1 0 Hz	Start Freq 5.30092525 GHz
Ref 30 dBm Atten 34 #Peak Log 10			9.64 dB	Stop Freq 5.33907475 GHz
dB/ Offst				CF Step 3.81495000 MHz <u>Auto Ma</u>
dB		- Newson	March Carlor Contraction	Freq Offset 0.00000000 Hz
#PAvg				Signal Track ^{On <u>Off</u>}
Center 5.320 00 GHz #Res BW 1 MHz	#VBW 3 MHz	Spar Sweep 20 ms	n 38.15 MHz (1001 pts)	

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7.4.6. CONDUCTED SPURIOUS EMISSIONS

<u>LIMITS</u>

FCC §15.407 (b) (2)

IC RSS-210 A9.3 (2)

For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.25-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.

TEST PROCEDURE

Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

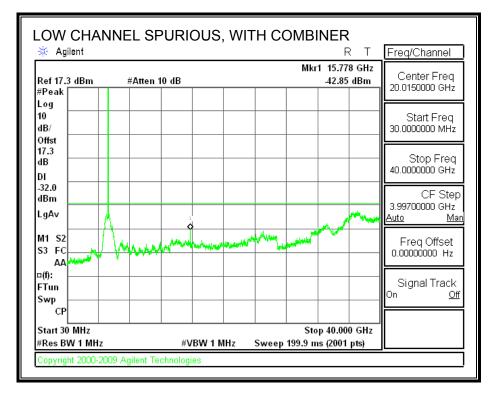
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

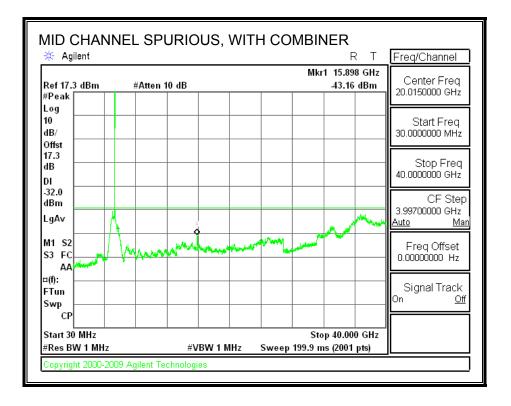
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

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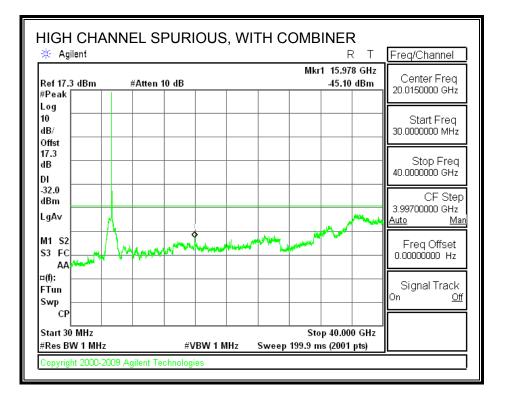
RESULTS

SPURIOUS EMISSIONS WITH COMBINER





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7.5. 802.11n HT20 MODE IN THE 5.3 GHz BAND

7.5.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

CHAIN 1

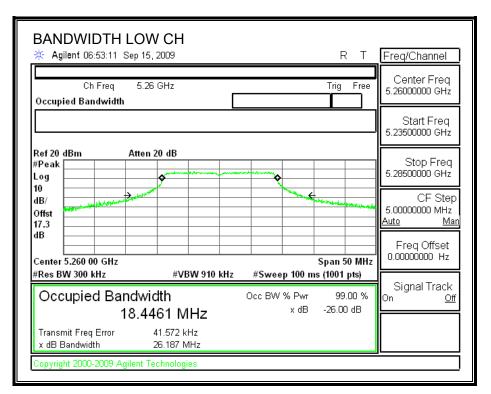
Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5260	26.187	17.7343
Middle	5300	27.272	17.6301
High	5320	25.401	17.7218

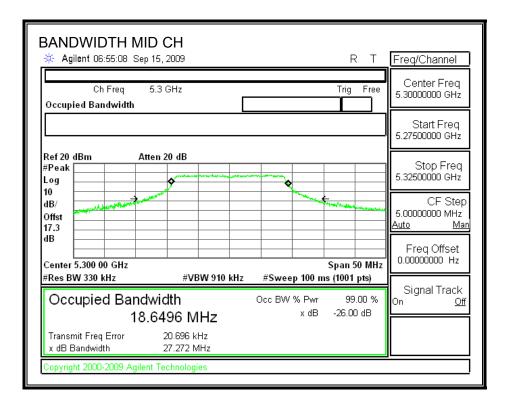
CHAIN 2

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5260	27.715	17.7316
Middle	5300	27.125	17.7803
High	5320	26.076	17.7470

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26 dB BANDWIDTH



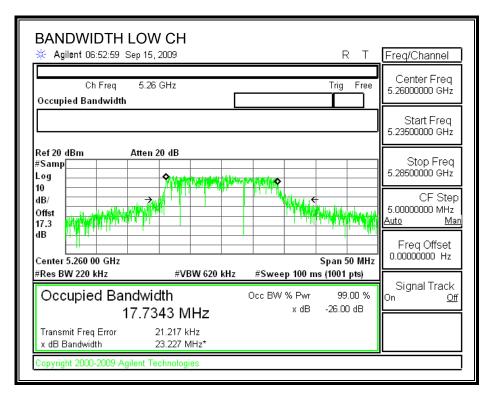


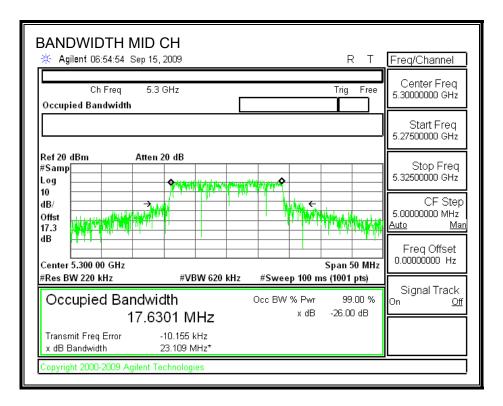
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BANDWIDTH HIG	-		RТ	Freq/Channel
Ch Freq 5. Occupied Bandwidth	32 GHz		Trig Free	Center Freq 5.32000000 GHz
				Start Freq 5.29500000 GHz
#Peak	n 20 dB			Stop Freq 5.3450000 GHz
10 dB/ Offst				CF Step 5.0000000 MHz <u>Auto Man</u>
dB Center 5.320 00 GHz			Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 300 kHz	#VBW 910 kHz		· · ·	Signal Track
Occupied Bandv 18.4	/idth 1055 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB	On <u>Off</u>
Transmit Freq Error x dB Bandwidth	54.947 kHz 25.401 MHz			
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99% BANDWIDTH





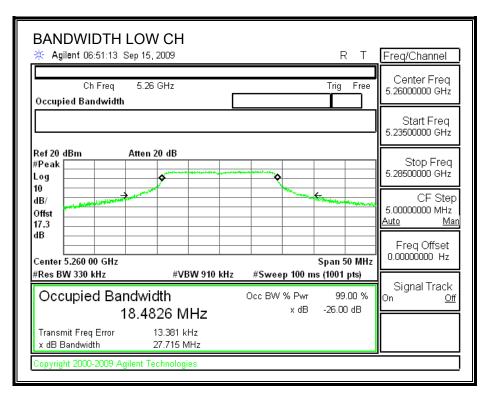
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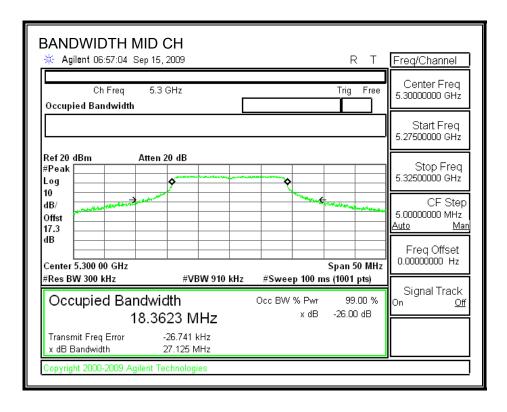
BANDWIDTH HIGH CH * Agilent 07:07:23 Sep 15, 2009 R T	Freq/Channel
Ch Freq 5.32 GHz Trig Free Occupied Bandwidth	Center Freq 5.32000000 GHz
	Start Freq 5.29500000 GHz
Ref 20 dBm Atten 20 dB #Samp	Stop Freq 5.34500000 GHz
dB/ Offst 17.3	CF Step 5.00000000 MHz <u>Auto Man</u>
dB Center 5.320 00 GHz Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 220 kHz #VBW 620 kHz #Sweep 100 ms (1001 pts) Occupied Bandwidth Occ BW % Pwr 99.00 % 17.7218 MHz × dB -26.00 dB	Signal Track On <u>Off</u>
Transmit Freq Error 32.632 kHz x dB Bandwidth 20.808 MHz*	
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REPORT NO: 09U12784-2 FCC ID: EW4DWMW034 CHAIN 2

26 dB BANDWIDTH



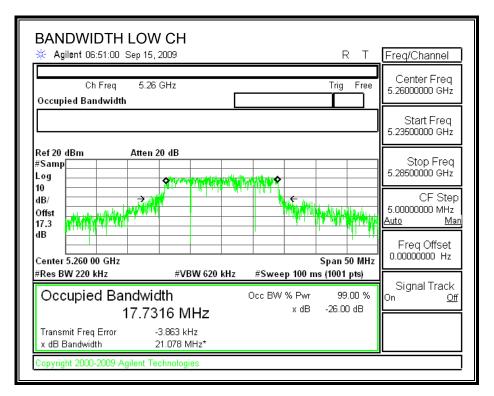


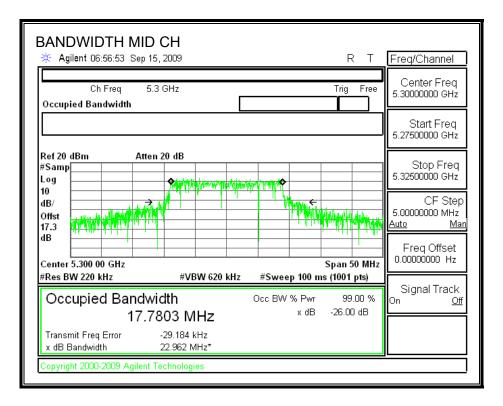
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BANDWIDTH HIGH	-		RТ	Freq/Channel
Ch Freq 5.32 Occupied Bandwidth	GHz		Trig Free	Center Freq 5.32000000 GHz
				Start Freq 5.29500000 GHz
Ref 20 dBm Atten 2 #Peak Log	20 dB			Stop Freq 5.34500000 GHz
dB/ Offst 17.3				CF Step 5.0000000 MHz <u>Auto Man</u>
dB			Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 300 kHz	#VBW 910 kHz	#Sweep 100 m		Signal Track
Occupied Bandwid 18.32	an 78 MHz	Occ BW % Pwr x dB		On <u>Off</u>
	11.302 kHz 26.076 MHz			
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99% BANDWIDTH





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BANDWIDTH HIGH CH Agilent 07:05:27 Sep 15, 2009	RT	Freq/Channel
Ch Freq 5.32 GHz Occupied Bandwidth	Trig Free	Center Freq 5.32000000 GHz
		Start Freq 5.29500000 GHz
Ref 20 dBm Atten 20 dB #Samp Log 10		Stop Freq 5.34500000 GHz
dB/ Offst 17.3		CF Step 5.0000000 MHz <u>Auto Man</u>
dB	Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 220 kHz #VBW 620 kHz #Sweep 100 Occupied Bandwidth Occ BW % Pw	ms (1001 pts) ·	Signal Track On Off
	-26.00 dB	
Transmit Freq Error 21.473 kHz x dB Bandwidth 22.217 MHz*		
Copyright 2000-2009 Agilent Technologies		

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7.5.2. OUTPUT POWER

<u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25-5.35 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

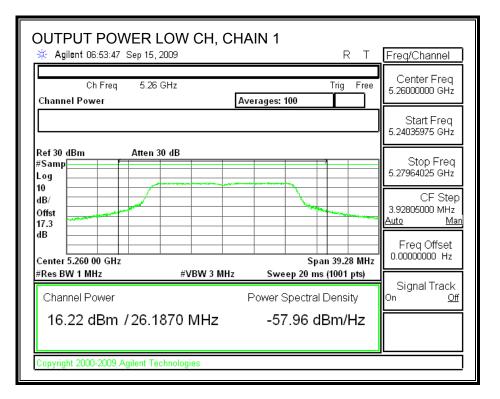
Limit

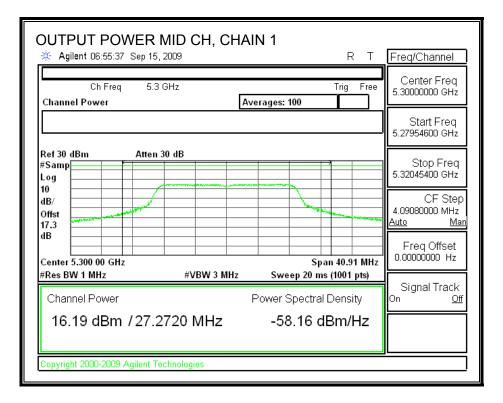
Channel	Frequency	Fixed	В	11 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5260	24	26.187	25.18	1.98	24.00
Mid	5300	24	27.272	25.36	1.98	24.00
High	5320	24	25.401	25.05	1.98	24.00

Individual Chain Results

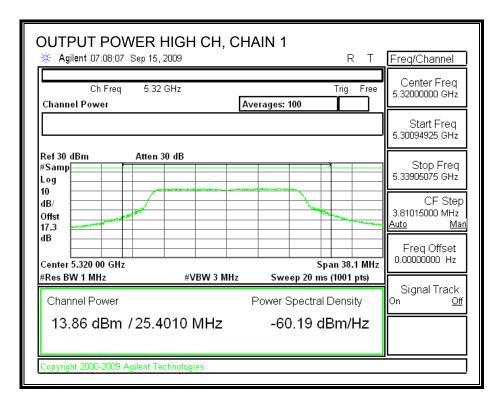
Channel	Frequency	Chain 1	Chain 2	Total	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	16.22	16.52	19.38	24.00	-4.62
Mid	5300	16.19	16.65	19.44	24.00	-4.56
High	5320	13.86	14.62	17.27	24.00	-6.73

CHAIN 1 OUTPUT POWER



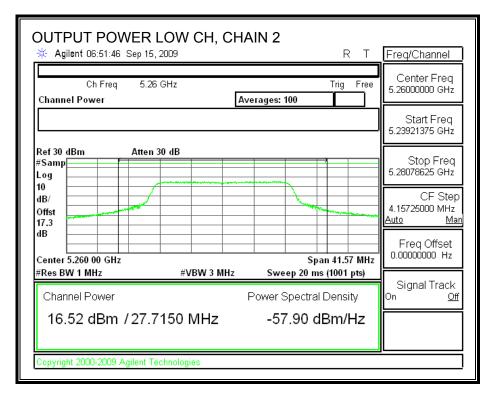


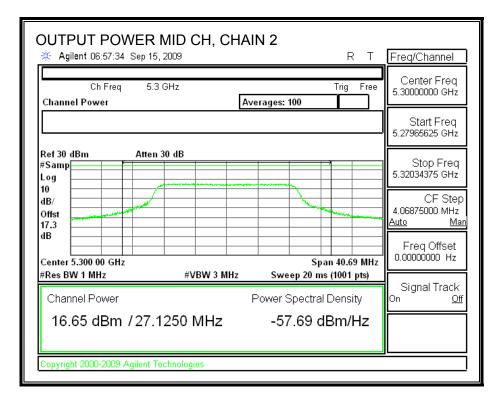
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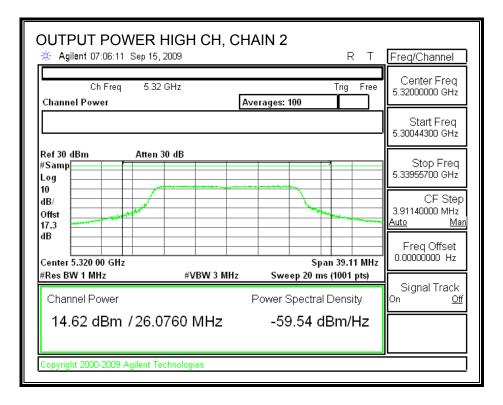
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CHAIN 2 OUTPUT POWER





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7.5.3. AVERAGE POWER

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 17.3 dB (including 10 dB pad and 7.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Chain 1	Chain 2	Total
		Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)
Low	5260	16.62	16.91	19.78
Middle	5300	16.54	17.07	19.82
High	5320	14.26	14.99	17.65

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7.5.4. PEAK POWER SPECTRAL DENSITY

<u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25-5.35 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 11 dBm.

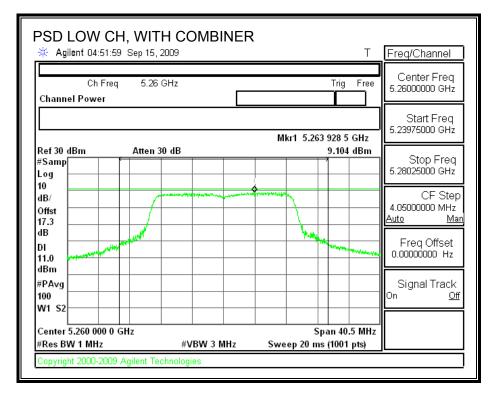
TEST PROCEDURE

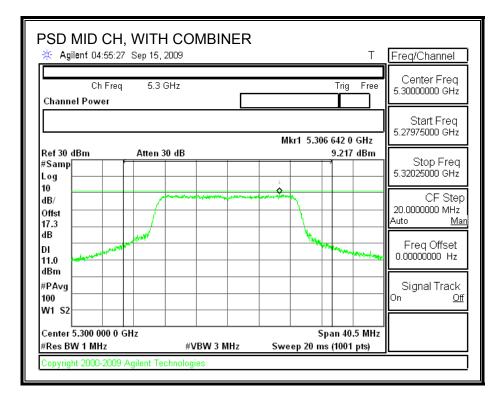
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

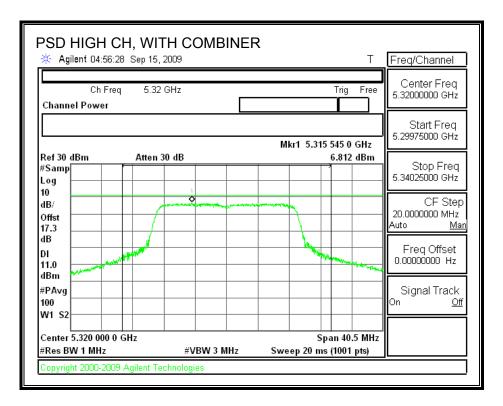
Channel	Frequency	PPSD With Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5260	9.10	11	-1.90
Middle	5300	9.22	11	-1.78
High	5320	6.81	11	-4.19

POWER SPECTRAL DENSITY WITH COMBINER





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7.5.5. PEAK EXCURSION

<u>LIMITS</u>

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner.

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

CHAIN 1

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5260	9.13	13	-3.87
Middle	5300	8.31	13	-4.69
High	5320	9.62	13	-3.38

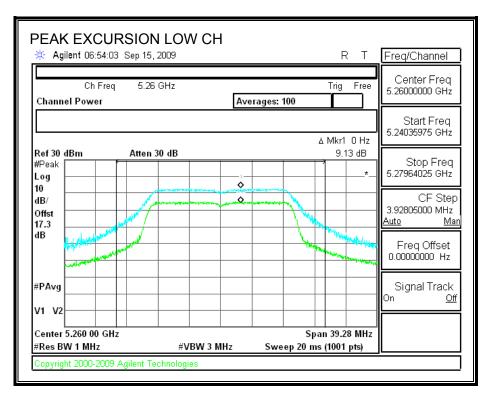
CHAIN 2

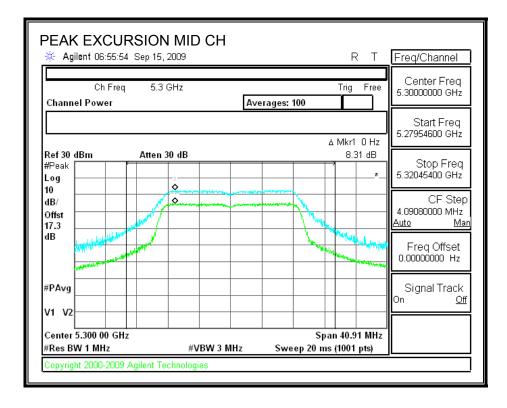
Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5260	10.05	13	-2.95
Middle	5300	8.54	13	-4.46
High	5320	9.38	13	-3.62

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PEAK EXCURSION





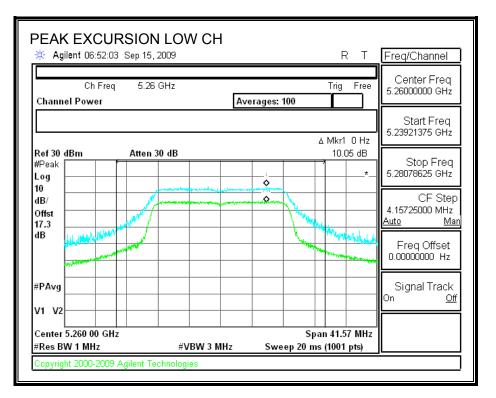
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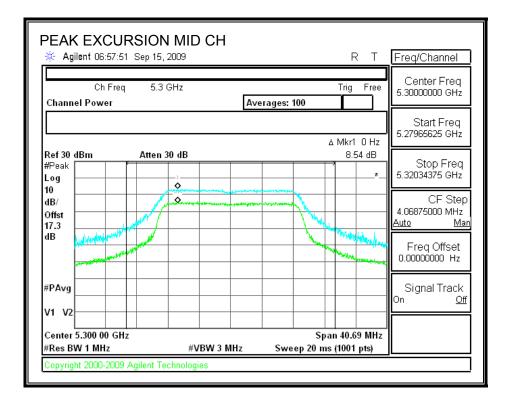
PEAK EXCURSION # Agilent 07:08:25 Sep 15, 2			RТ	Freq/Channel
Ch Freq 5.32 (Channel Power		Trages: 100	rig Free	Center Freq 5.32000000 GHz
		- ۵ M	kr1 0 Hz	Start Freq 5.30094925 GHz
Ref 30 dBm Atten 3 #Peak Log 10	0 dB		9.62 dB	Stop Freq 5.33905075 GHz
dB/ Offst	۵ ۵ ۵ ۵ ۵ ۵ ۵ ۵ ۵ ۵ ۵ ۵ ۵ ۵ ۵ ۵ ۵ ۵ ۵			CF Step 3.81015000 MHz <u>Auto Ma</u>
dB blogger		1000 1000 1000 1000 1000 1000 1000 100	A BALLY A How Mand Store of	Freq Offset 0.00000000 Hz
#PAvg				Signal Track On <u>Off</u>
Center 5.320 00 GHz #Res BW 1 MHz	#VBW 3 MHz	Span Sweep 20 ms (10	38.1 MHz)01 pts)	

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REPORT NO: 09U12784-2 FCC ID: EW4DWMW034 CHAIN 2

PEAK EXCURSION





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				Freq/Channel Center Freq
Ch Freq 5. Channel Power	32 GHz	Averages: 100	Trig Free	5.32000000 GHz
		- ·	Mkr1 0 Hz	Start Freq 5.30044300 GHz
#Peak	n 30 dB		9.38 dB	Stop Freq 5.33955700 GHz
Log 10 dB/	Sector Se	2	^^	CF Step
Offst 17.3 dB			Martin and a	3.91140000 MHz <u>Auto Ma</u>
We when he was a start of the s		- North	March March March March	Freq Offset 0.00000000 Hz
#PAvg				Signal Track On Of
V1 V2				
Center 5.320 00 GHz #Res BW 1 MHz	#VBW 3 MHz	•	n 39.11 MHz /1001.pts)	

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7.5.6. CONDUCTED SPURIOUS EMISSIONS

<u>LIMITS</u>

FCC §15.407 (b) (2)

IC RSS-210 A9.3 (2)

For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.25-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.

TEST PROCEDURE

Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

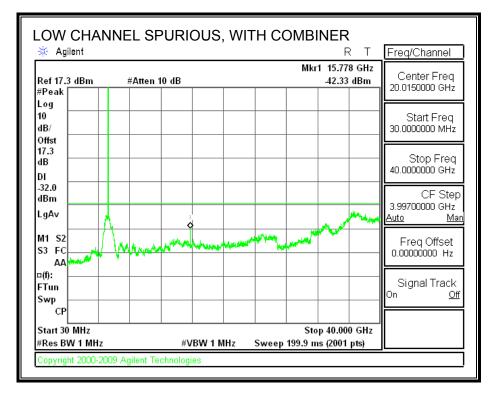
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

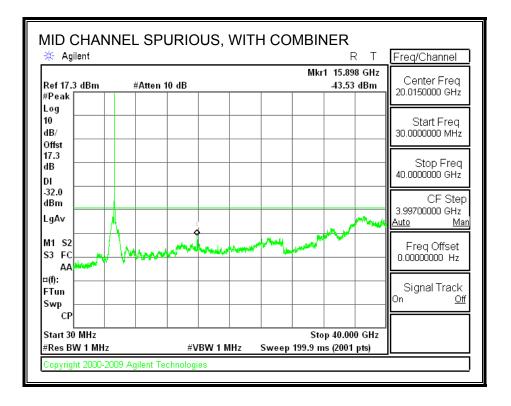
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

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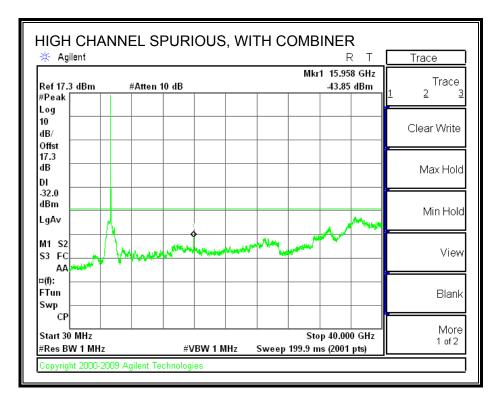
RESULTS

SPURIOUS EMISSIONS WITH COMBINER





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7.6. 802.11n HT40 MODE IN THE 5.3 GHz BAND

7.6.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

CHAIN 1

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5270	66.924	36.4102
High	5310	52.714	36.2734

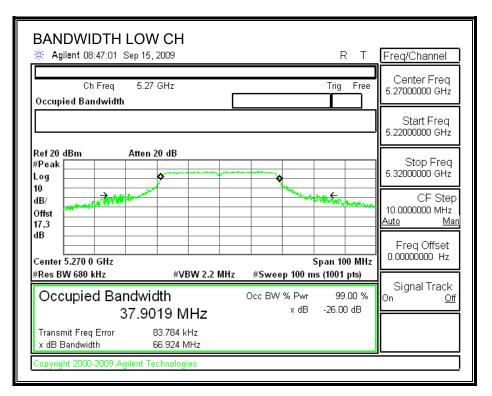
CHAIN 2

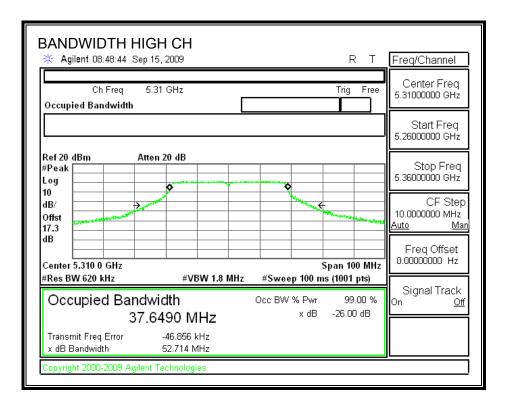
Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5270	67.608	36.2226
High	5310	50.798	36.2406

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REPORT NO: 09U12784-2 FCC ID: EW4DWMW034 CHAIN 1

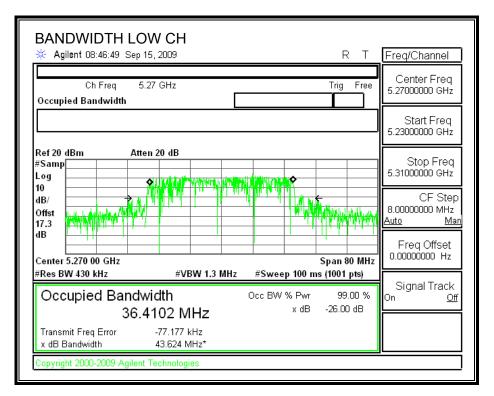
26 dB BANDWIDTH

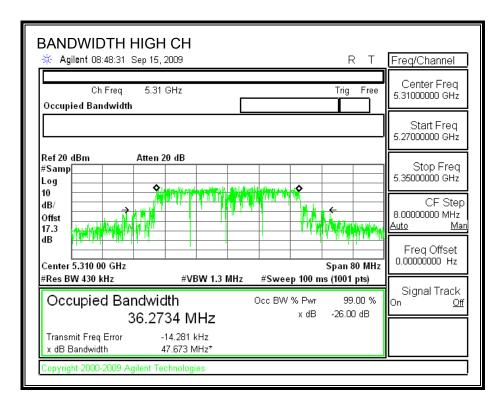




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99% BANDWIDTH

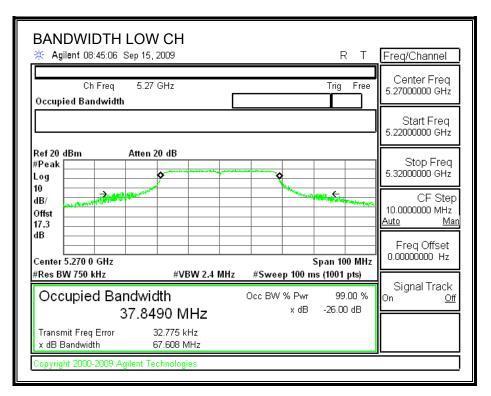


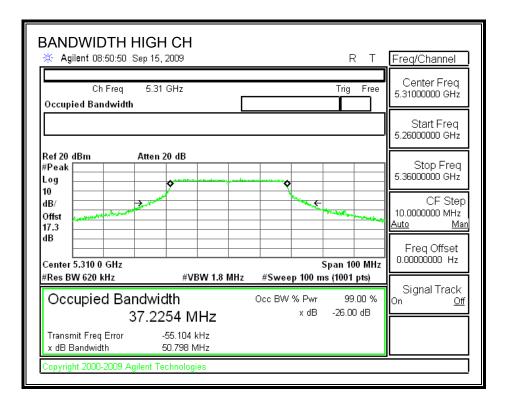


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REPORT NO: 09U12784-2 FCC ID: EW4DWMW034 CHAIN 2

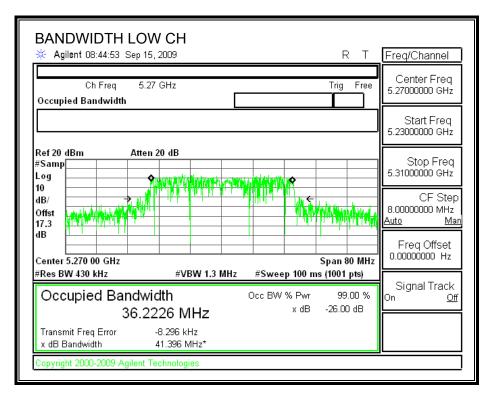
26 dB BANDWIDTH

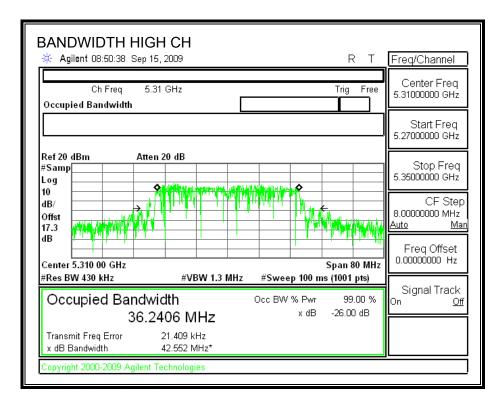




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99% BANDWIDTH





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7.6.2. OUTPUT POWER

<u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25-5.35 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

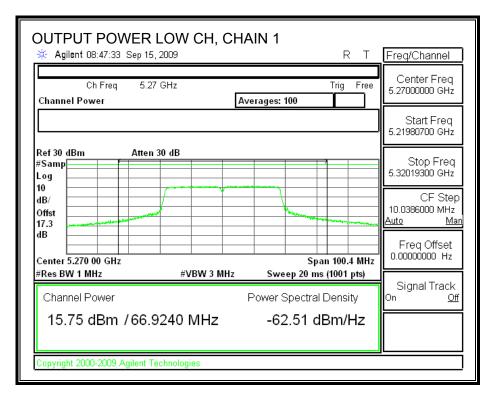
Limit

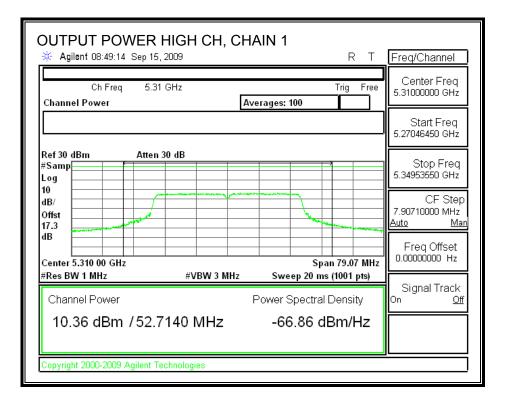
Channel	Frequency	Fixed	В	11 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5270	24	66.924	29.26	1.98	24.00
High	5310	24	52.714	28.22	1.98	24.00

Individual Chain Results

Channel	Frequency	Chain 1	Chain 2	Total	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5270	15.75	16.36	19.08	24.00	-4.92
High	5310	10.36	11.03	13.72	24.00	-10.28

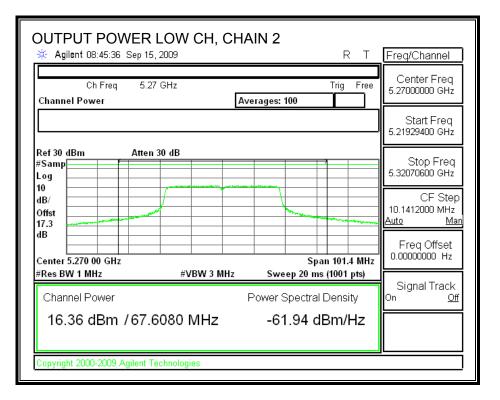
CHAIN 1 OUTPUT POWER

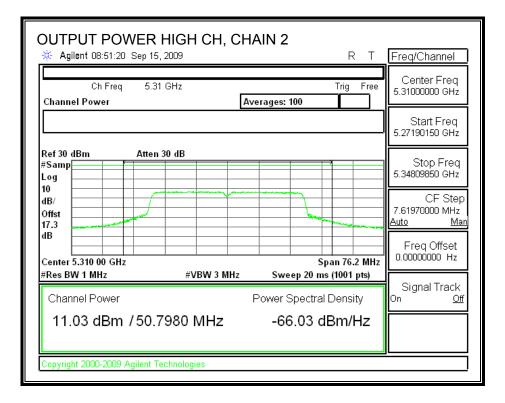




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CHAIN 2 OUTPUT POWER





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7.6.3. AVERAGE POWER

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 17.3 dB (including 10 dB pad and 7.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Chain 1	Chain 2	Total
		Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)
Low	5270	15.89	16.52	19.23
High	5310	10.61	11.23	13.94

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7.6.4. PEAK POWER SPECTRAL DENSITY

<u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25-5.35 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 11 dBm.

TEST PROCEDURE

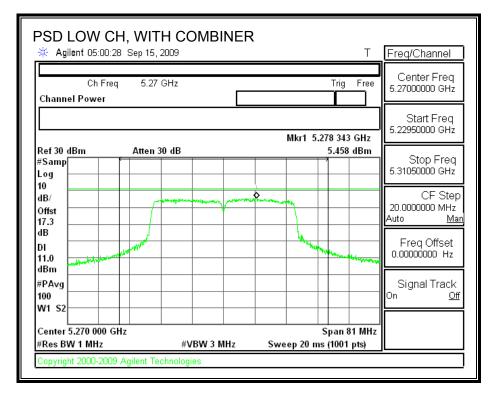
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

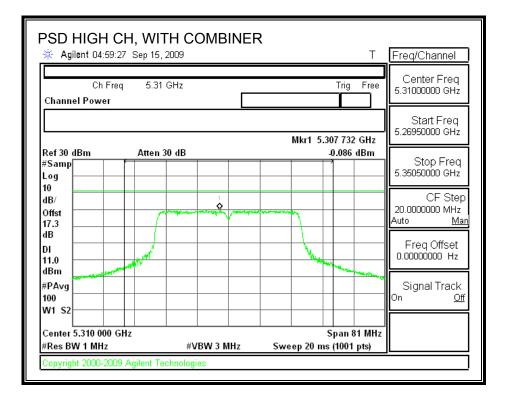
RESULTS

Channel	Frequency	PPSD With Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5270	5.46	11	-5.54
High	5310	-0.09	11	-11.09

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POWER SPECTRAL DENSITY WITH COMBINER





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7.6.5. PEAK EXCURSION

<u>LIMITS</u>

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner.

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

CHAIN 1

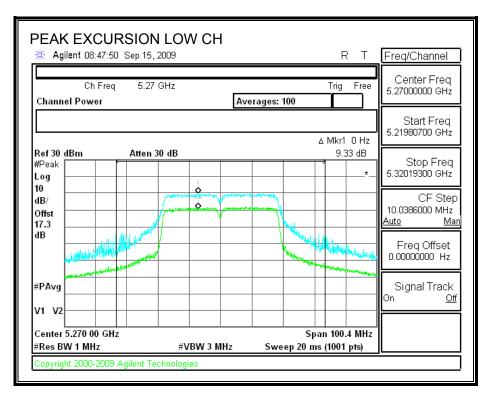
Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5270	9.33	13	-3.67
High	5310	8.99	13	-4.01

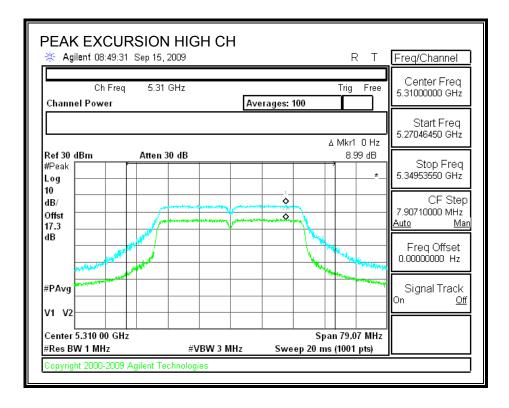
CHAIN 2

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5270	9.23	13	-3.77
High	5310	9.94	13	-3.06

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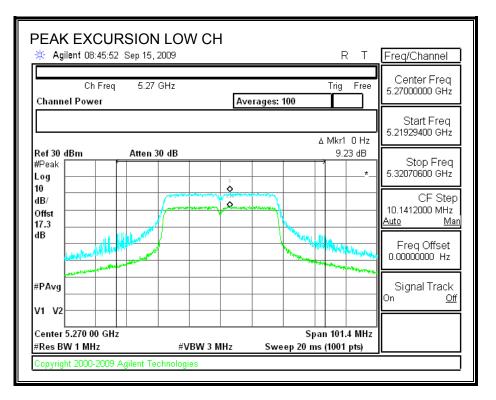
PEAK EXCURSION

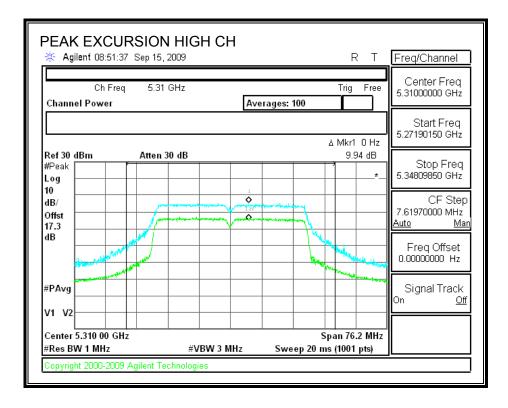




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PEAK EXCURSION





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7.6.6. CONDUCTED SPURIOUS EMISSIONS

<u>LIMITS</u>

FCC §15.407 (b) (2)

IC RSS-210 A9.3 (2)

For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.25-5.35 GHz band shall not exceed an EIRP of -27 dBm / MHz.

Devices operating in the 5.25-5.35 GHz band that generate emissions in the 5.15-5.25 GHz band must meet all applicable technical requirements for operation in the 5.15-5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of -27 dBm/MHz in the 5.15-5.25 GHz band.

TEST PROCEDURE

Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

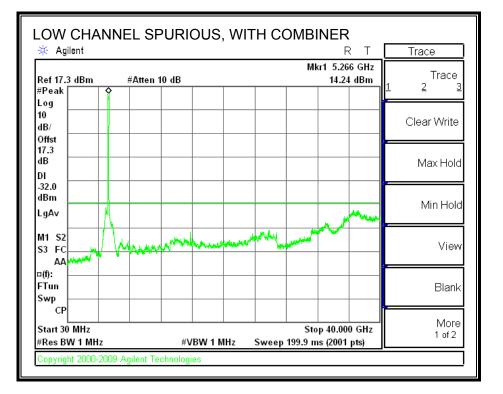
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

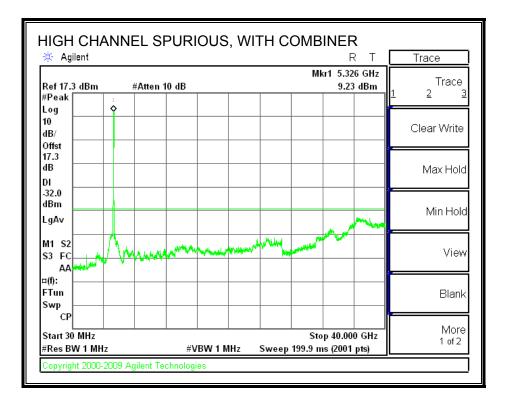
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

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RESULTS

SPURIOUS EMISSIONS WITH COMBINER





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7.7. 802.11a DUAL CHAIN LEGACY MODE IN THE 5.6 GHz BAND

7.7.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

CHAIN 1

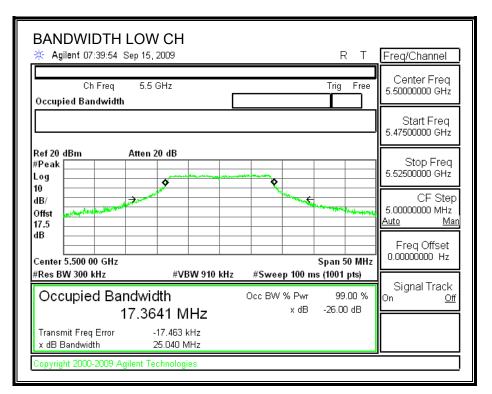
Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5500	25.040	16.5159
Middle	5600	38.280	16.5702
High	5700	24.668	16.2821

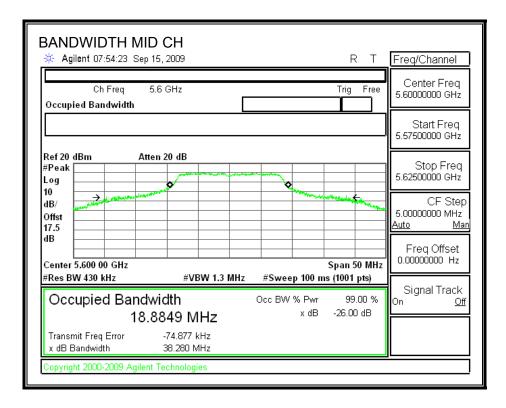
CHAIN 2

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5500	24.612	16.6265
Middle	5600	39.106	16.6962
High	5700	24.036	16.5359

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26 dB BANDWIDTH



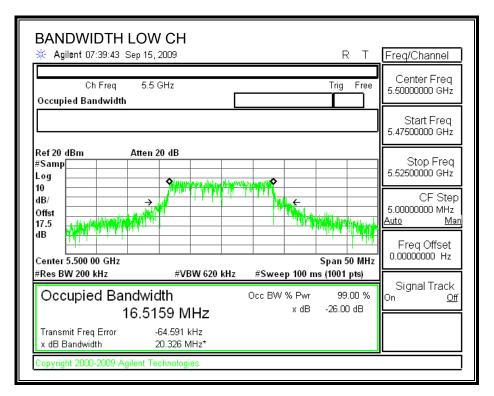


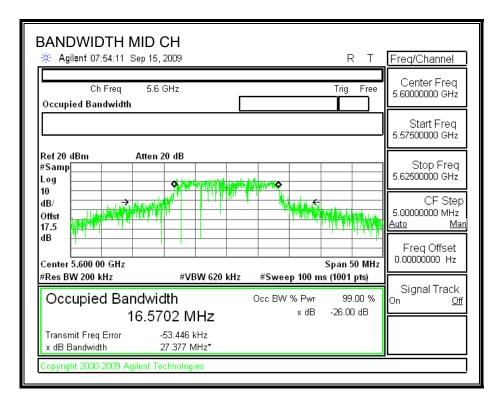
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BANDWIDTH HIGH CH # Agilent 07:56:08 Sep 15, 2009			RТ	Freq/Channel
Ch Freq 5.7 GHz Occupied Bandwidth			Trig Free	Center Freq 5.70000000 GHz
				Start Freq 5.67500000 GHz
Ref 20 dBm Atten 20 dB #Peak Log				Stop Freq 5.72500000 GHz
dB/ 0 ffst 17.5 → → → → → → → → → → → → → → → → → → →			www.a.manata	CF Step 5.0000000 MHz <u>Auto Man</u>
dB			Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 270 kHz #VBW 82	0 kHz	#Sweep 100 m		Signal Track
Occupied Bandwidth 17.2175 MHz		Occ BW % Pwr x dB	99.00 % -26.00 dB	On <u>Off</u>
Transmit Freq Error-20.544 kHzx dB Bandwidth24.668 MHz				
Copyright 2000-2009 Agilent Technologies				

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99% BANDWIDTH



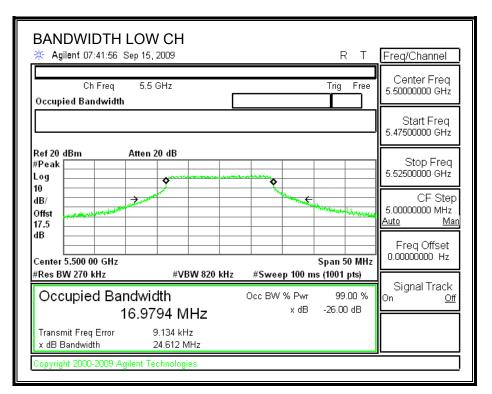


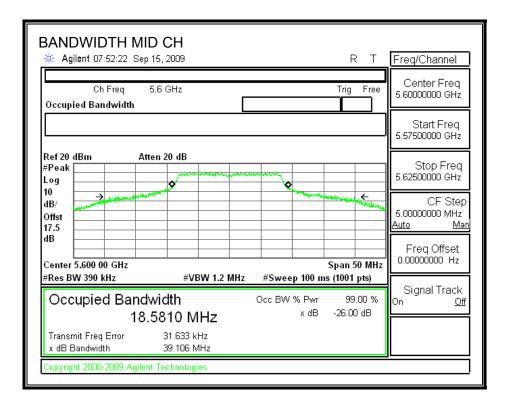
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BANDWIDTH HIGH CH	Freq/Channel
Ch Freq 5.7 GHz Trig Free Occupied Bandwidth	Center Freq 5.7000000 GHz
	Start Freq 5.67500000 GHz
Ref 20 dBm Atten 20 dB #Samp Log 10 Atten 20 dB	Stop Freq 5.72500000 GHz
dB/ → ← ← ← ← ← ← ← ← ← ← ← ← ← ← ← ← ← ←	CF Step 5.00000000 MHz <u>Auto Man</u>
Center 5.700 00 GHz Span 50 MH	Freq Offset 0.00000000 Hz
#Res BW 200 kHz #VBW 620 kHz #Sweep 100 ms (1001 pts)	Signal Track
Occupied Bandwidth Occ BW % Pwr 99.00 % 16.2821 MHz × dB -26.00 dB	On <u>Off</u>
Transmit Freq Error -19.089 kHz x dB Bandwidth 17.931 MHz*	
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26 dB BANDWIDTH



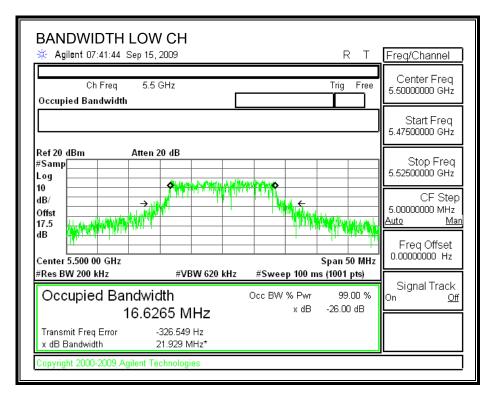


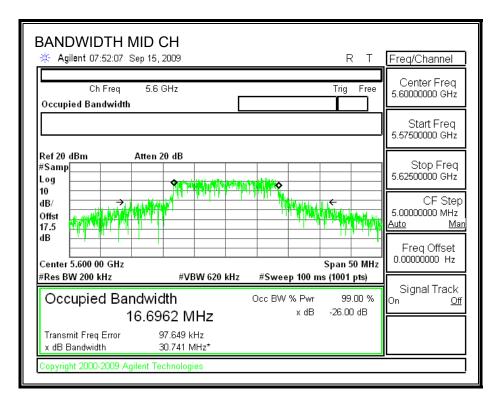
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BANDWIDTH HIGH			RТ	Freq/Channel
Ch Freq 5.7 Gł Occupied Bandwidth	Hz		Trig Free	Center Freq 5.70000000 GHz
				Start Freq 5.67500000 GHz
Ref 20 dBm Atten 20 #Peak	dB	••••••		Stop Freq 5.72500000 GHz
10 dB/ Offst 17.5			Warth distance of	CF Step 5.0000000 MHz <u>Auto Man</u>
dB			Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 270 kHz Occupied Bandwidt	#VBW 820 kHz	#Sweep 100 m		Signal Track
	5 MHz	x dB	-26.00 dB	On <u>Off</u>
	104 kHz .036 MHz			
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99% BANDWIDTH





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BANDWIDTH HIGH CH Agilent 07:57:44 Sep 15, 2009	RΤ	Freq/Channel
Ch Freq 5.7 GHz T Occupied Bandwidth	rig Free	Center Freq 5.70000000 GHz
		Start Freq 5.67500000 GHz
Ref 20 dBm Atten 20 dB #Samp Log 10 Provide at the second		Stop Freq 5.72500000 GHz
dB/ Offst 17.5		CF Step 5.0000000 MHz <u>Auto Man</u>
Center 5.700 00 GHz Spa	an 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 200 kHz #VBW 620 kHz #Sweep 100 ms (10 Occupied Bandwidth Occ BW % Pwr	99.00 %	Signal Track On Off
16.5359 MHz x dB -2		On <u>Off</u>
Transmit Freq Error 82.455 kHz x dB Bandwidth 19.784 MHz*		
Copyright 2000-2009 Agilent Technologies		

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7.7.2. OUTPUT POWER

<u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

Antenna Gain (Chain 1)	Antenna Gain (Chain 2)	Effective Legacy Gain
(dBi)	(dBi)	(dBi)
1.84	2.13	5.00

For the 5.47-5.725 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

Limit

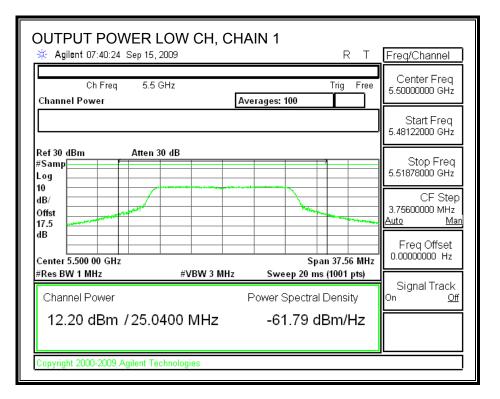
Channel	Frequency	Fixed	В	11 + 10 Log B	Effective	Limit
		Limit		Limit	Ant Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5500	24	25.040	24.99	5.00	24.00
Mid	5600	24	38.280	26.83	5.00	24.00
High	5700	24	24.668	24.92	5.00	24.00

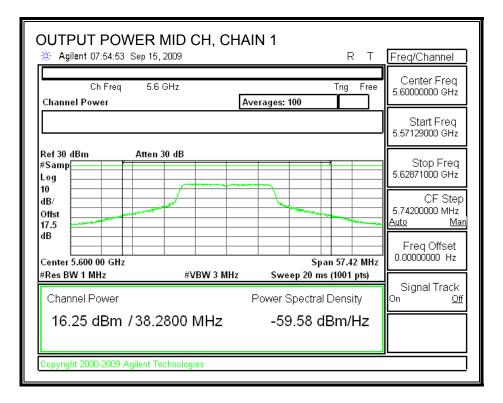
Individual Chain Results

Channe	Frequency	Chain 1	Chain 2	Total	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	12.20	12.19	15.21	24.00	-11.80
Mid	5600	16.25	16.29	19.28	24.00	-7.75
High	5700	12.11	12.69	15.42	24.00	-11.89

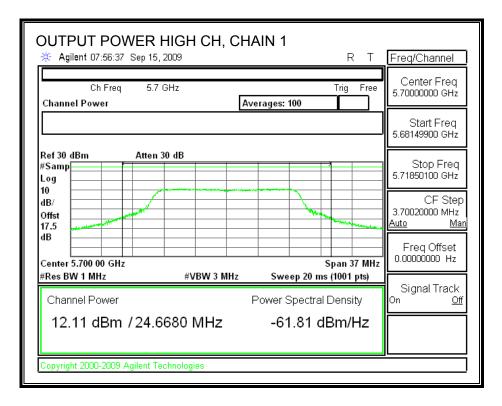
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CHAIN 1 OUTPUT POWER



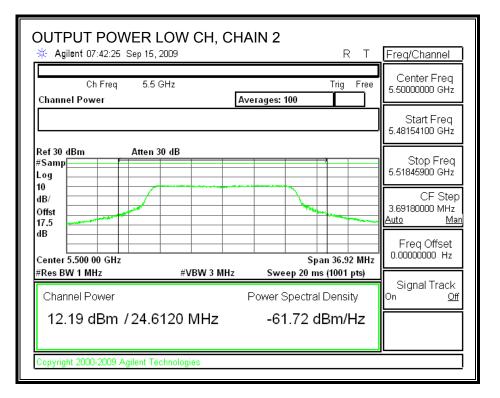


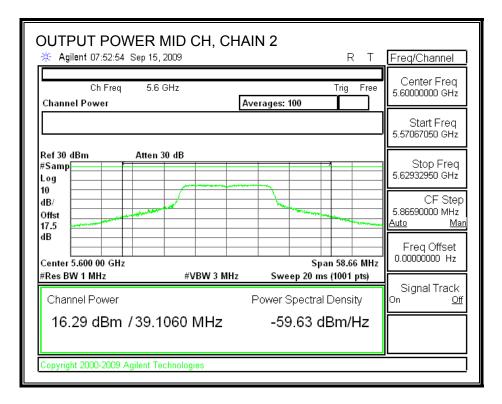
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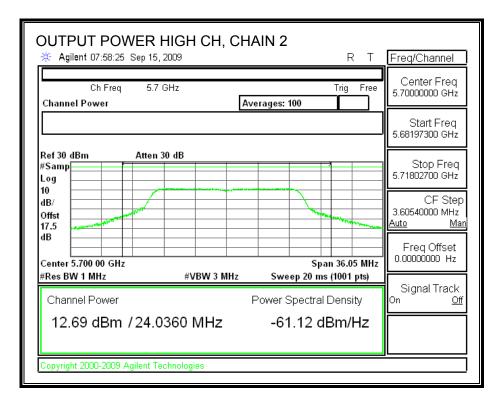
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CHAIN 2 OUTPUT POWER





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7.7.3. AVERAGE POWER

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 17.5 dB (including 10 dB pad and 7.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Chain 1	Chain 2	Total
		Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)
Low	5500	12.84	12.87	15.87
Middle	5600	16.72	16.87	19.81
High	5700	11.91	12.58	15.27

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7.7.4. PEAK POWER SPECTRAL DENSITY

<u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

Antenna Gain (Chain 1)	Antenna Gain (Chain 2)	Effective Legacy Gain
(dBi)	(dBi)	(dBi)
1.84	2.13	5.00

For the 5.47-5.725 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum effective antenna gain is less than or equal to 6 dBi, therefore the limit is 11 dBm.

TEST PROCEDURE

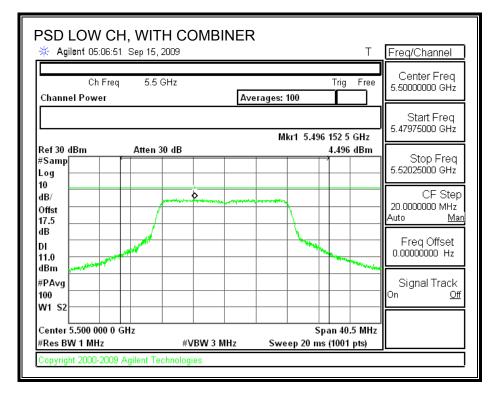
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

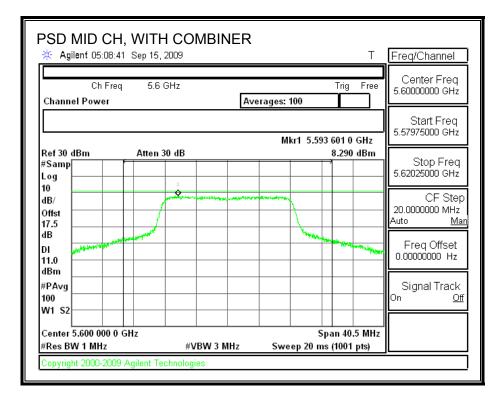
<u>RESULTS</u>

Channel	Frequency	PPSD With Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5500	4.50	11	-6.50
Middle	5600	8.29	11	-2.71
High	5700	3.55	11	-7.46

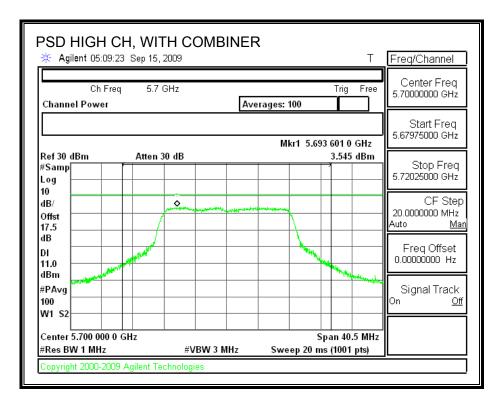
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POWER SPECTRAL DENSITY WITH COMBINER





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7.7.5. PEAK EXCURSION

<u>LIMITS</u>

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner.

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

CHAIN 1

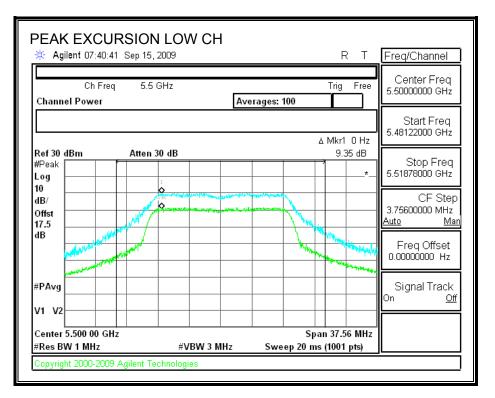
Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5500	9.35	13	-3.65
Middle	5600	9.26	13	-3.74
High	5700	9.31	13	-3.69

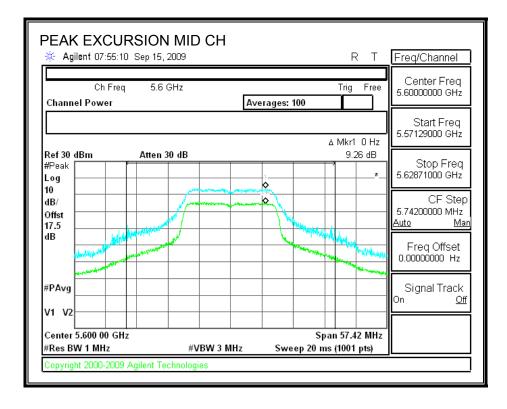
CHAIN 2

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5500	10.93	13	-2.07
Middle	5600	10.22	13	-2.78
High	5700	10.40	13	-2.60

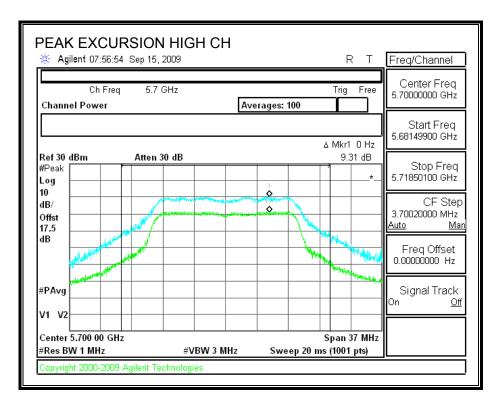
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PEAK EXCURSION



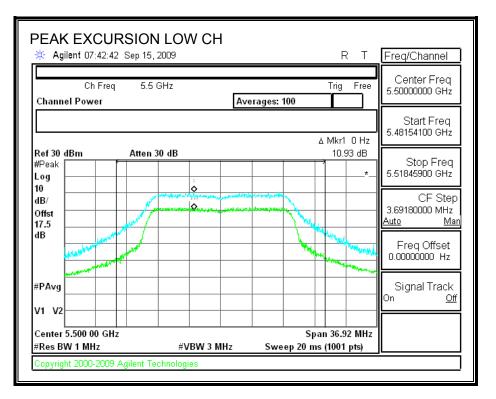


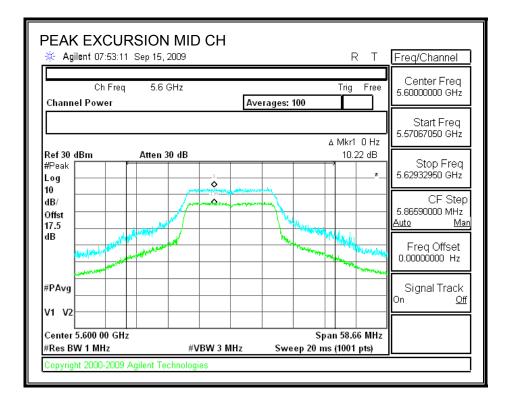
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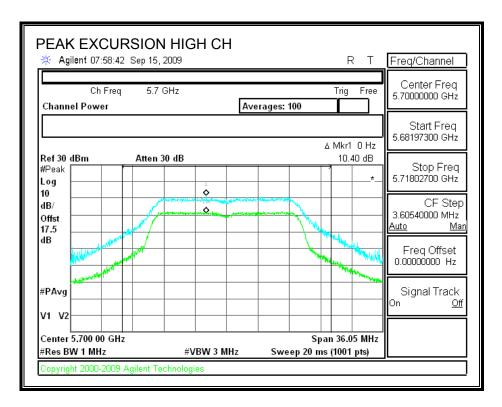
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PEAK EXCURSION





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7.7.6. CONDUCTED SPURIOUS EMISSIONS

<u>LIMITS</u>

FCC §15.407 (b) (3)

IC RSS-210 A9.3 (3)

For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm / MHz.

TEST PROCEDURE

Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

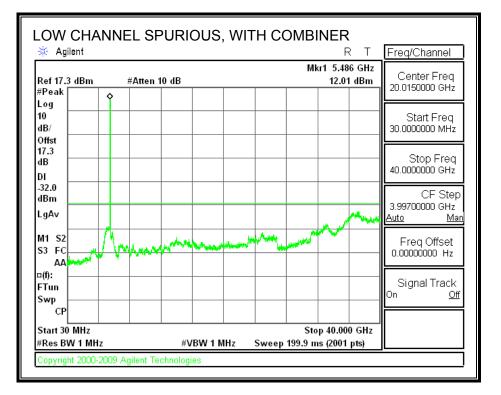
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

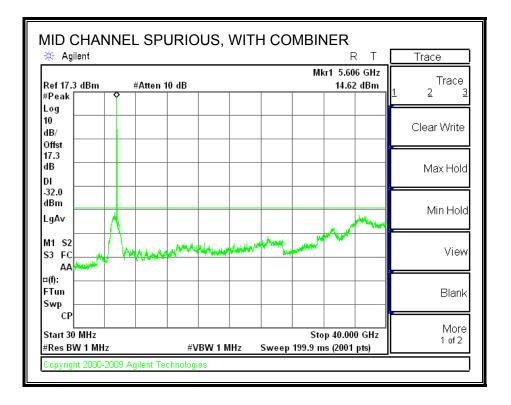
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

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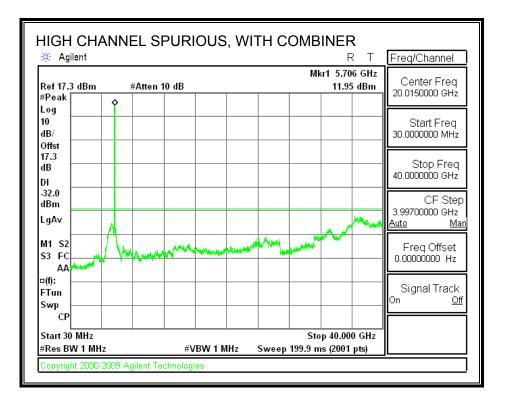
RESULTS

SPURIOUS EMISSIONS WITH COMBINER





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7.8.802.11n HT20 MODE IN THE 5.6 GHz BAND

7.8.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

CHAIN 1

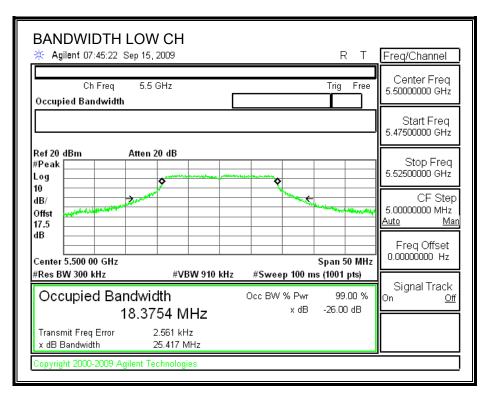
Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5500	25.417	17.7742
Middle	5600	39.674	17.7981
High	5700	25.181	17.4199

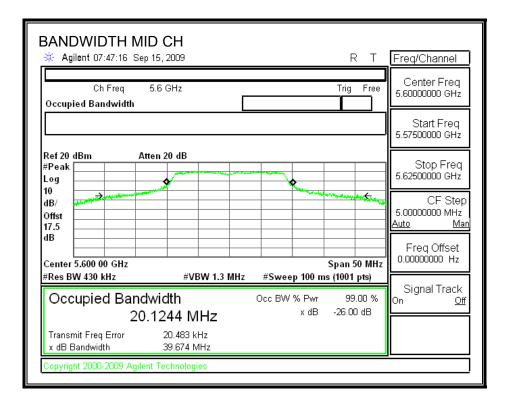
CHAIN 2

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5500	25.599	17.7072
Middle	5600	38.430	17.7444
High	5700	24.928	17.6812

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26 dB BANDWIDTH



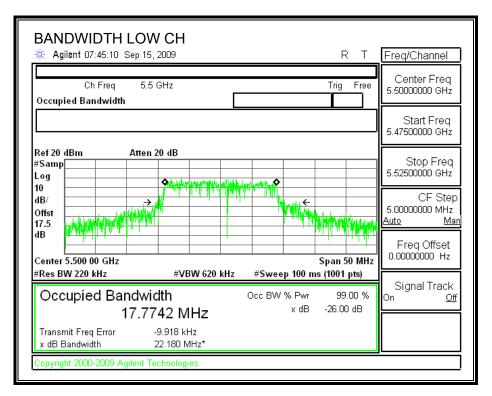


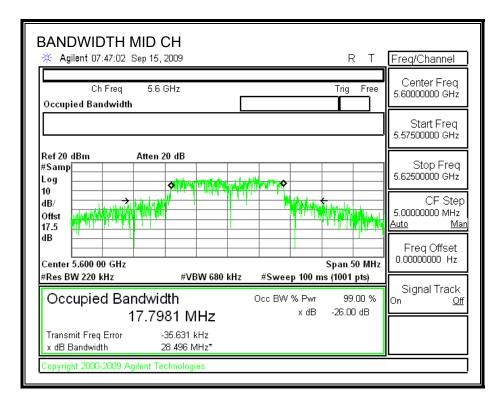
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BANDWIDTH HIGH C			RТ	Freq/Channel
Ch Freq 5.7 GH: Occupied Bandwidth	z		Trig Free	Center Freq 5.70000000 GHz
				Start Freq 5.67500000 GHz
Ref 20 dBm Atten 20 d #Peak Log				Stop Freq 5.72500000 GHz
10 dB/ Offst 17.5			المعنية اللي المعنية المعالمة المعالمة المعالية اللي المعالية اللي المعالمة معالمة م	CF Step 5.0000000 MHz <u>Auto Man</u>
dB			Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 300 kHz Occupied Bandwidth	#VBW 910 kHz	#Sweep 100 m		Signal Track On Off
18.2686		x dB		On <u>Off</u>
	84 kHz 81 MHz			
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99% BANDWIDTH



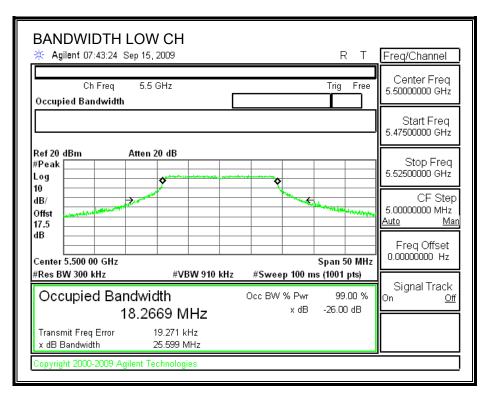


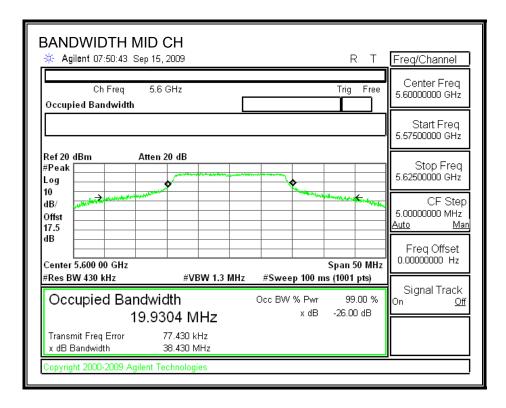
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BANDWIDTH HIGH CH # Agilent 08:01:10 Sep 15, 2009	R T	Freq/Channel
Ch Freq 5.7 GHz Occupied Bandwidth	Trig Free	Center Freq 5.7000000 GHz
		Start Freq 5.67500000 GHz
Ref 20 dBm Atten 20 dB #Samp Log 10 dB/		Stop Freq 5.72500000 GHz
Offst 17.5 dB		5.00000000 MHz <u>Auto Man</u> Freq Offset
Center 5.700 00 GHz #Res BW 220 kHz #VBW 62	Span 50 MHz 0 kHz #Sweep 100 ms (1001 pts)	0.00000000 Hz
Occupied Bandwidth 17.4199 MHz	Occ BW % Pwr 99.00 % x dB -26.00 dB	Signal Track On <u>Off</u>
Transmit Freq Error56.296 kHzx dB Bandwidth19.326 MHz*		
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26 dB BANDWIDTH



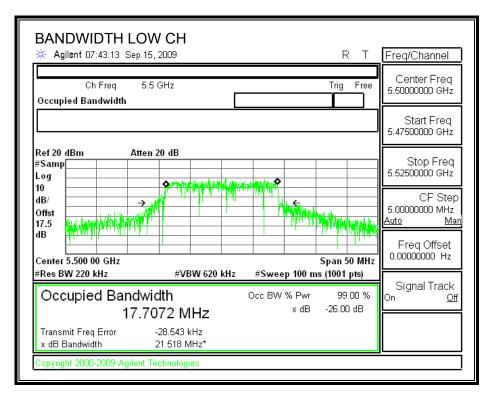


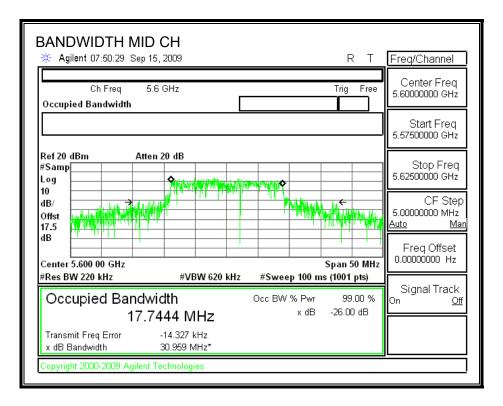
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BANDWIDTH HIGH CH Agilent 07:59:30 Sep 15, 2009	RT	Freq/Channel
Ch Freq 5.7 GHz Occupied Bandwidth	Trig Free	Center Freq 5.70000000 GHz
		Start Freq 5.67500000 GHz
Ref 20 dBm Atten 20 dB #Peak Log 10	•••••	Stop Freq 5.72500000 GHz
dB/ Offst 17.5	The second secon	CF Step 5.0000000 MHz <u>Auto Man</u>
dB	Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 300 kHz #VBW 910 kF Occupied Bandwidth 18.2550 MHz	Hz #Sweep 100 ms (1001 pts) Occ BW % Pwr 99.00 % x dB -26.00 dB	Signal Track ^{On <u>Off</u>}
To.2330 IVIH2 Transmit Freq Error -10.396 kHz x dB Bandwidth 24.928 MHz		
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99% BANDWIDTH





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BANDWIDTH HIGH CH * Agilent 07:59:18 Sep 15, 2009	R T	Freq/Channel
Ch Freq 5.7 GHz Occupied Bandwidth	Trig Free	Center Freq 5.70000000 GHz
		Start Freq 5.67500000 GHz
Ref 20 dBm Atten 20 dB #Samp Log		Stop Freq 5.72500000 GHz
10 dB/ Offst 17.5		CF Step 5.0000000 MHz <u>Auto Man</u>
dB	Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 220 kHz #VBW 620 kHz	#Sweep 100 ms (1001 pts)	Signal Track
Occupied Bandwidth 17.6812 MHz	Occ BW % Pwr 99.00 % x dB -26.00 dB	On <u>Off</u>
Transmit Freq Error 15.506 kHz x dB Bandwidth 21.660 MHz*		
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7.8.2. OUTPUT POWER

<u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.47-5.725 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26-dB emission bandwidth in MHz. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

The transmitter output operates continuously therefore Method # 1 is used.

RESULTS

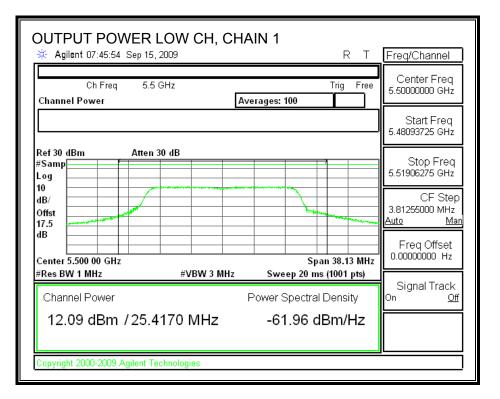
Limit

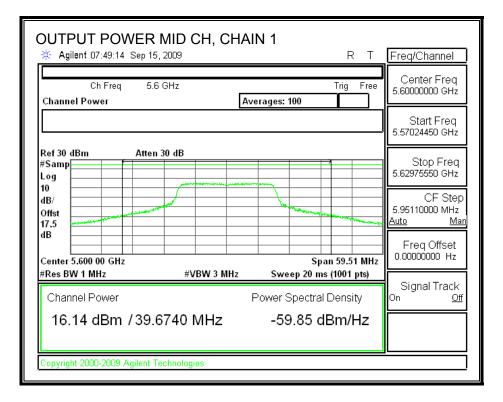
Channel	Frequency	Fixed	В	11 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5500	24	25.417	25.05	2.13	24.00
Mid	5600	24	39.674	26.99	2.13	24.00
High	5700	24	25.181	25.01	2.13	24.00

Individual Chain Results

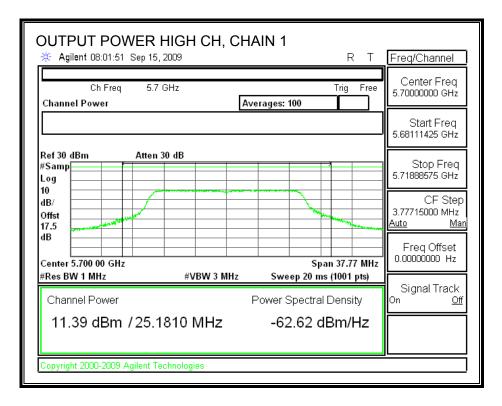
Channel	Frequency	Chain 1	Chain 2	Total	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	12.09	12.15	15.13	24.00	-11.91
Mid	5600	16.14	16.40	19.28	24.00	-7.86
High	5700	11.39	11.96	14.69	24.00	-12.61

CHAIN 1 OUTPUT POWER



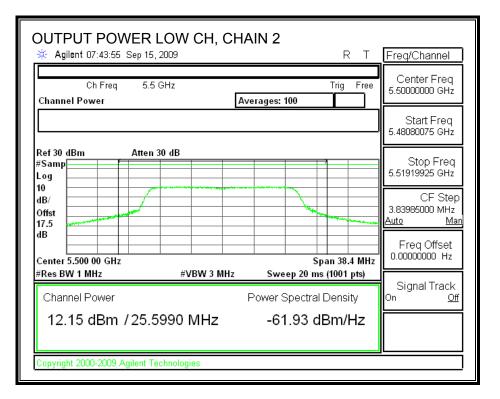


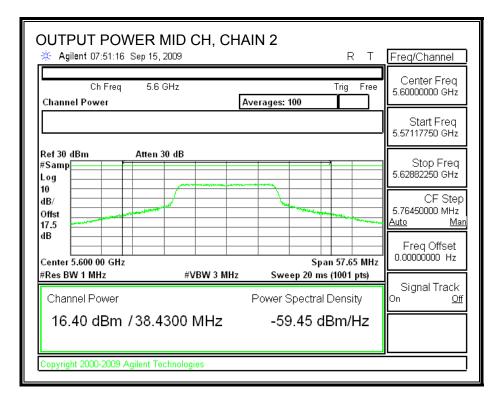
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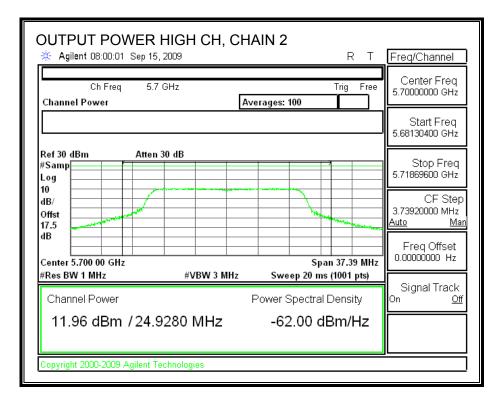
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CHAIN 2 OUTPUT POWER





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7.8.3. AVERAGE POWER

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 17.5 dB (including 10 dB pad and 7.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Chain 1	Chain 2	Total
		Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)
Low	5500	12.80	12.85	15.84
Middle	5600	16.76	16.78	19.78
High	5700	11.24	11.82	14.55

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7.8.4. PEAK POWER SPECTRAL DENSITY

<u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.47-5.725 GHz band, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 11 dBm.

TEST PROCEDURE

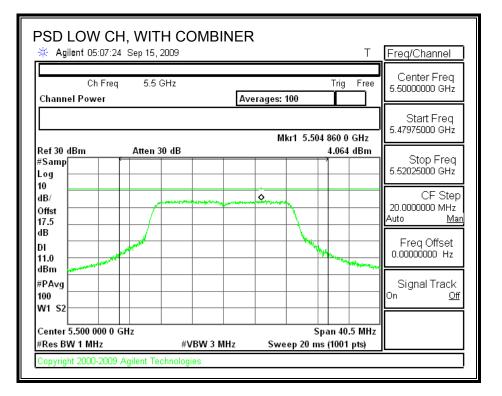
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

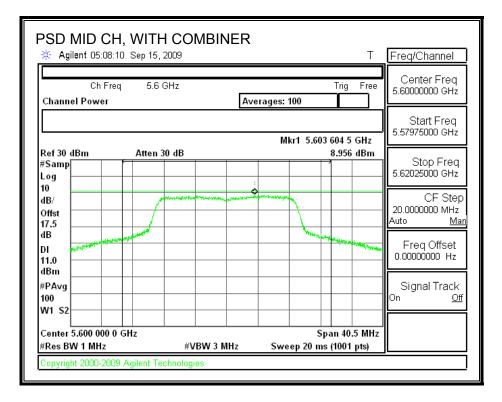
RESULTS

Channel	Frequency	PPSD With Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5500	4.06	11	-6.94
Middle	5600	8.96	11	-2.04
High	5700	3.10	11	-7.90

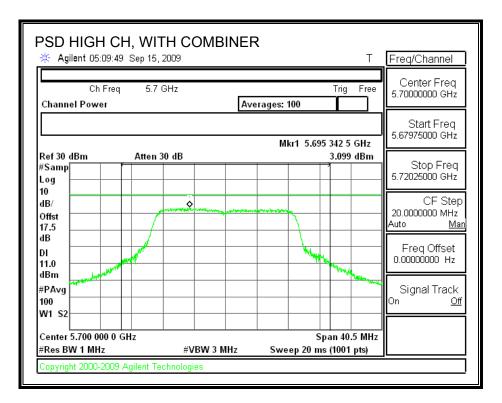
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POWER SPECTRAL DENSITY WITH COMBINER





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7.8.5. PEAK EXCURSION

<u>LIMITS</u>

FCC §15.407 (a) (6)

The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

TEST PROCEDURE

The transmitter outputs are connected to the spectrum analyzer via a combiner.

The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

CHAIN 1

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5500	10.32	13	-2.68
Middle	5600	9.71	13	-3.29
High	5700	10.14	13	-2.86

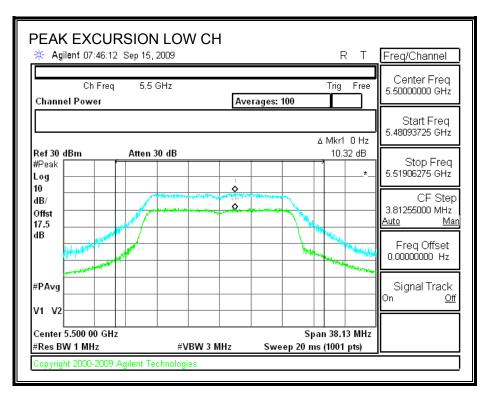
CHAIN 2

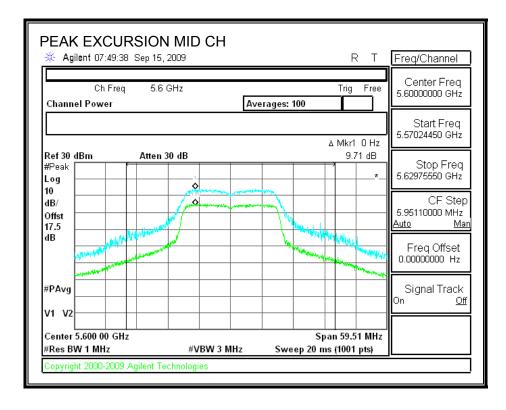
Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5500	9.09	13	-3.91
Middle	5600	9.50	13	-3.50
High	5700	8.64	13	-4.36

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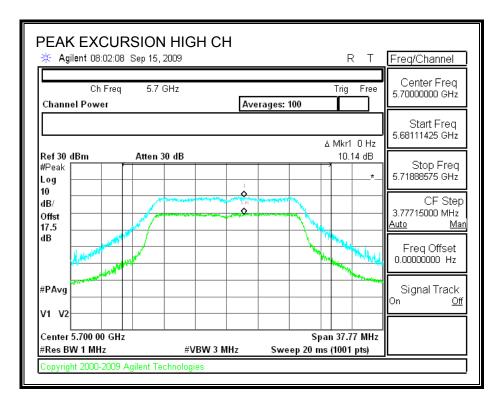
REPORT NO: 09U12784-2 FCC ID: EW4DWMW034 CHAIN 1

PEAK EXCURSION





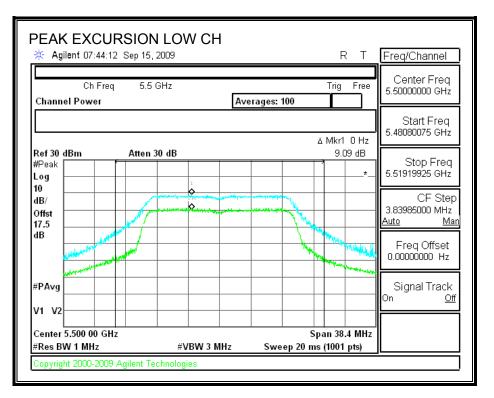
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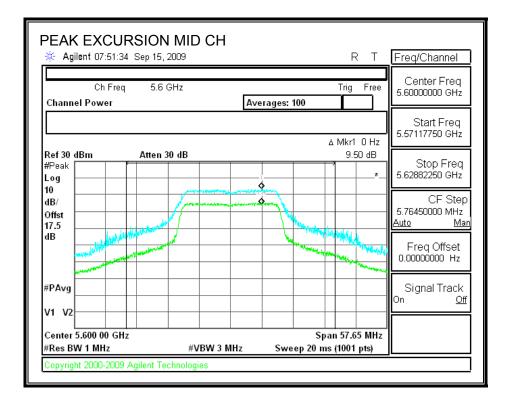


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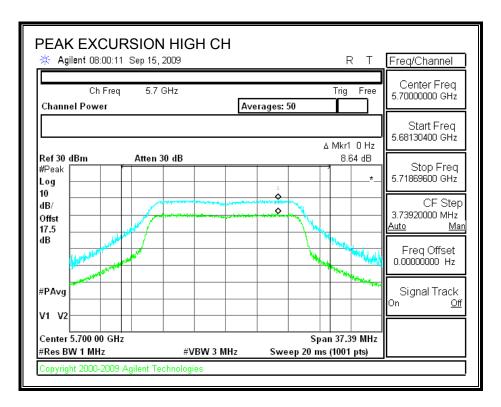
REPORT NO: 09U12784-2 FCC ID: EW4DWMW034 CHAIN 2

PEAK EXCURSION





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7.8.6. CONDUCTED SPURIOUS EMISSIONS

<u>LIMITS</u>

FCC §15.407 (b) (3)

IC RSS-210 A9.3 (3)

For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an EIRP of -27 dBm / MHz.

TEST PROCEDURE

Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

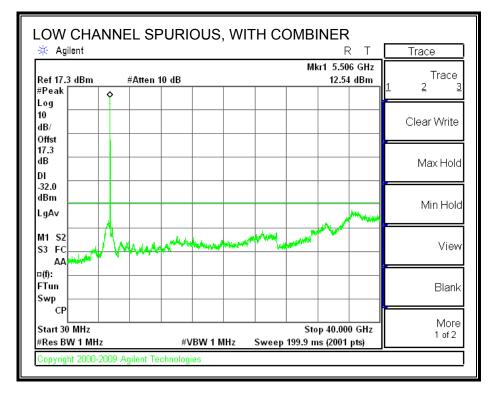
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

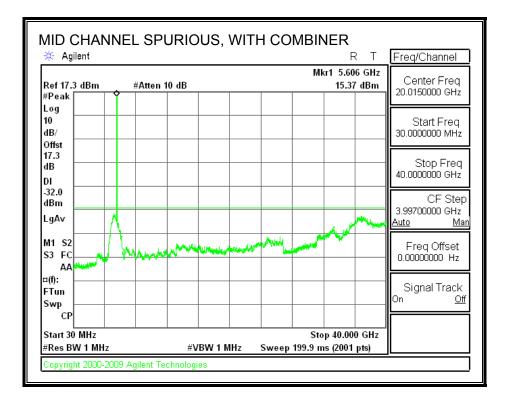
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

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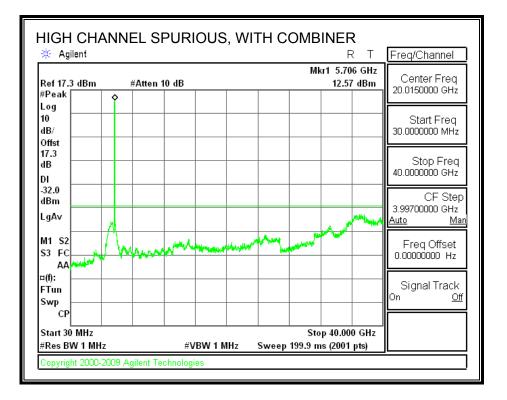
RESULTS

SPURIOUS EMISSIONS WITH COMBINER





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