

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

FOR 802.11N 2X2 PCIe MINICARD TRANSCEIVER MODEL NUMBER: AR5BHB92 FCC ID: PPD-AR5BHB92 IC: 4104A-AR5BHB92

> REPORT NUMBER: 08U11571-2B ISSUE DATE: MARCH 20, 2008

> > Prepared for

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Prepared by

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NVLAP LAB CODE 200065-0

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME:	ATHEROS COMMUNICATION, INC			
	5480 GREAT AMERICA PARKWAY			
	SANTA CLARA, CA 95054 USA			
EUT DESCRIPTION:	802.11N 2X2 PCIe MINICARD TRANSCEIVER			
MODEL:	AR5BHB92			
SERIAL NUMBER:	HB92-031-S0830 AND HB92-031-S805			
DATE TESTED:	FEBRUARY 25-29, 2008			

APPLICABLE STANDARDS						
STANDARD	TEST RESULTS					
CFR 47 Part 15 Subpart E	No Non-Compliance Noted					
RSS-210 Issue 7 Annex 9 and RSS-GEN Issue 2	No Non-Compliance Noted					

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

THU CHAN EMC SUPERVISOR COMPLIANCE CERTIFICATION SERVICES

Tested By:

Chare own

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 MO&O 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. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Power Line Conducted Emission	+/- 2.3 dB
Radiated Emission	+/- 3.4 dB

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

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11n 2x2 PCIe minicard transceiver, model AR5BHB92. Two front-end module parts were evaluated; vendors are SiGe (FEM1) and Hitachi (FEM2).

The radio module is manufactured by Atheros Communications, Inc.

5.2. MAXIMUM OUTPUT POWER

Frequency Range	Mode	Chain 0	Chain 1	Total Power	Total Power
(MHz)		(dBm)	(dBm)	(dBm)	(mW)
5180 - 5240	802.11a	12.92	12.70	15.82	38.21
5180 - 5240	802.11n HT20	14.00	13.60	16.81	48.03
5190 - 5230	802.11n HT40	13.80	13.95	16.89	48.82
5260 - 5320	802.11a	18.30	17.80	21.07	127.86
5260 - 5320	802.11n HT20	20.73	20.60	23.68	233.12
5270 - 5310	802.11n HT40	20.30	20.54	23.43	220.39
5500 - 5700	802.11a	18.62	18.29	21.47	140.23
5500 - 5700	802.11n HT20	19.22	19.08	22.16	164.47
5510 - 5670	802.11n HT40	20.61	20.52	23.58	227.80

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

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The 2x2 configuration utilizes a set of PIFA antennas with maximum gain of 3.62 dBi from 2400 - 2483.5 MHz, 4.63 dBi from 5150 - 5250 MHz, 5.56 dBi from 5250 - 5350 MHz, 5.34 dBi from 5470 - 5725 MHz, and 4.76 dBi from 5725 - 5850 MHz.

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5.4. SOFTWARE AND FIRMWARE

The test utility and driver software used during testing was Art ANWI 1.4 and Devlib Revision 0.6 Build #18 Art_11n.

5.5. WORST-CASE CONFIGURATION AND MODE

The 2x2 configuration was used for all testing in this report.

Both FEM1 and FEM2 boards were evaluated on conducted and radiated emissions tests to find the worst case.

The worst-case data rates are determined to be as follows for each mode, based on the investigations by measuring the average power, peak power and PPSD across all the data rates, bandwidths, modulations and spatial stream modes.

Thus all emissions tests were made with following data rates:

- 802.11a mode, 20 MHz Channel Bandwidth, 9 Mb/s, OFDM Modulation, Spatial Stream 1.
- 802.11n HT20 mode, 20 MHz Channel Bandwidth, MCS0, 6.5 Mb/s, OFDM Modulation, Spatial Stream 1.
- 802.11n HT40 mode, 40 MHz Channel Bandwidth, MCS0, 13.5 Mb/s, OFDM Modulation, Spatial Stream 1.

Baseline testing demonstrated that the Power Spectral Density as measured through a combiner with both chains operating simultaneously is worst case.

For RF radiated and conducted emissions, all tests were performed on FEM2 board.

For radiated emissions bandedge, both FEM1 and FEM2 boards were performed at both vertical and horizontal polarizations.

For radiated emissions TX below 1 GHz, RX spurious, and AC line conduction were performed at FEM2 board.

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5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST							
Description Manufacturer Model Serial Number FCC ID							
Laptop	IBM	ThinkPad T43	I3-BR298	DoC			
AC Adapter	IBM	08k8202	11S08k8202Z1Z6LR36000	DoC			

I/O CABLES

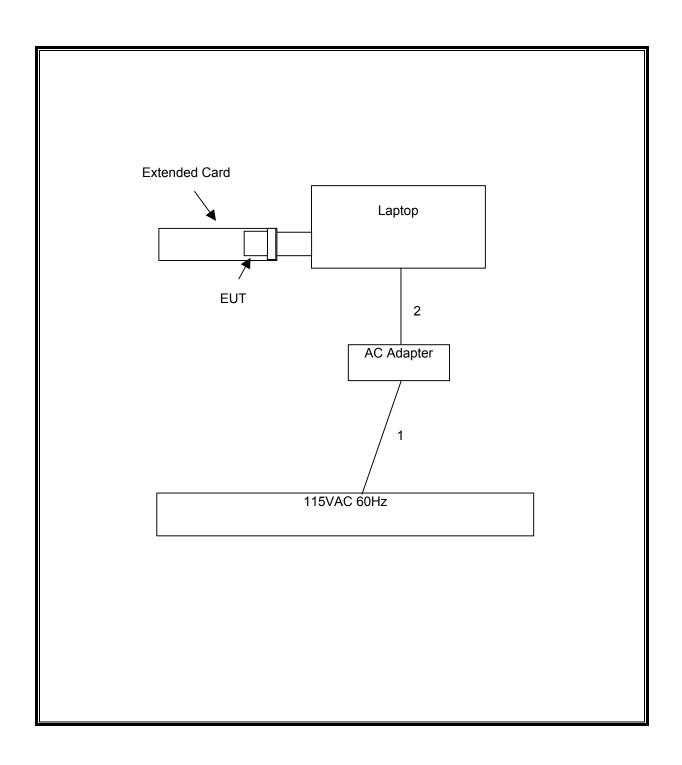
I/O CABLE LIST							
Cable	Port	# of	Connector	Cable	Cable	Remarks	
No.		Identica	Туре	Туре	Length		
		Ports					
1	AC	1	US 115V	Un-shielded	2m	No	
2	DC	1	DC	Un-shielded	2m	No	

TEST SETUP

The EUT is installed in a host laptop computer via an extended card during the tests. Test software exercised the radio card.

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SETUP DIAGRAM FOR TESTS



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6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST								
Description	Description Manufacturer Model Asset Cal Date Cal Due							
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	12/3/2007	3/3/2009			
Peak Power Meter	Agilent / HP	E4416A	C00963	12/4/2007	12/4/2009			
Peak / Average Power Sensor	Agilent	E9327A	C00964	12/7/2007	12/7/2009			
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	9/28/2007	9/28/2008			
Antenna, Horn, 18 GHz	EMCO	3115	C00945	4/15/2007	4/15/2008			
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	9/27/2007	9/27/2008			
EMI Receiver, 2.9 GHz	Agilent / HP	8542E	C00957	2/6/2007	6/12/2008			
RF Filter Section, 2.9 GHz	Agilent / HP	85420E	C00958	2/6/2007	6/12/2008			
EMI Test Receiver, 30 MHz	R&S	ESHS 20	N02396	2/6/2008	8/6/2009			
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	10/25/2007	10/25/2008			
2.4-2.5GHz Reject Filter	Micro Tronics	BRM50702	N02685	CNR	CNR			
High Pass Filter 7.6GHz	Micro Tronics	HPM13195	N02681	CNR	CNR			

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7. ANTENNA PORT TEST RESULTS

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

7.1.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

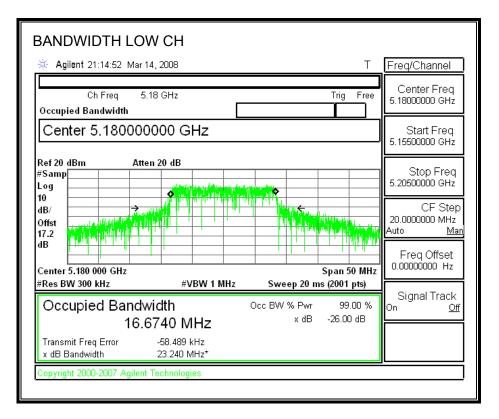
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

RESULTS

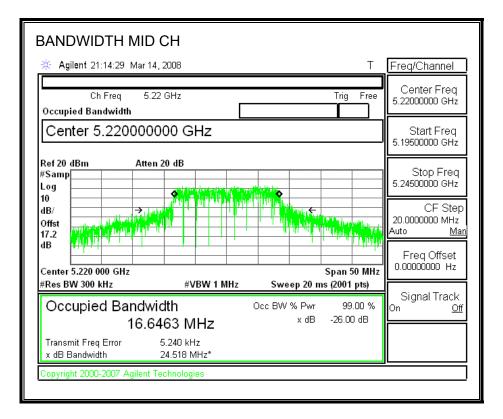
Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5180	23.24	16.6740
Middle	5220	24.518	16.6463
High	5240	21.864	16.6261

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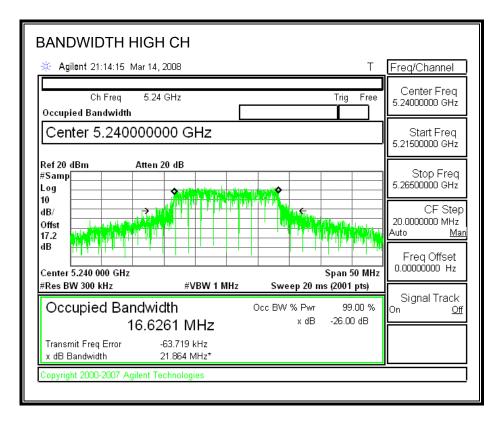
26 dB and 99% BANDWIDTH



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7.1.2. OUTPUT POWER

<u>LIMITS</u>

FCC §15.407 (a) (1) IC RSS-210 A9.2 (1)

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

Effective Legacy Gain
(dBi)
7.06

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.

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REPORT NO: 08U11571-2B FCC ID: PPD-AR5BHB92

RESULTS

Limit

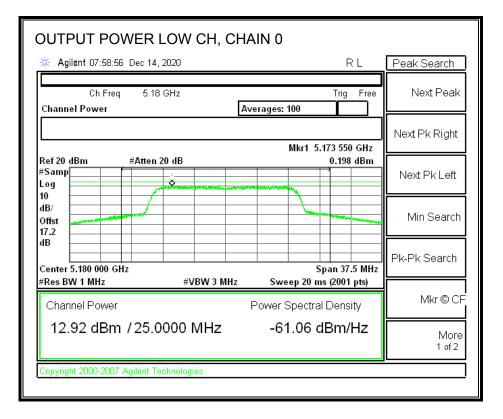
Channel	Frequency	Fixed	В	4 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5180	17.00	23.240	17.66	7.06	15.94
Mid	5220	17.00	24.518	17.89	7.06	15.94
High	5240	17.00	21.864	17.40	7.06	15.94

Individual Chain Results

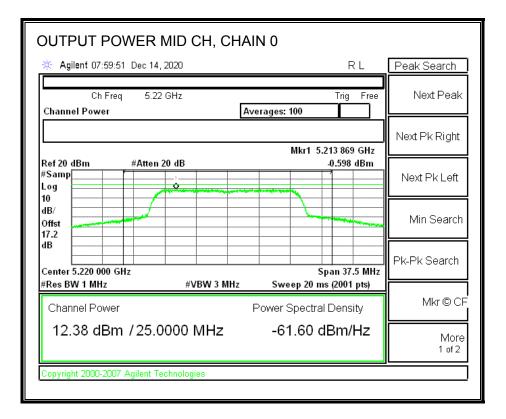
Channel	Frequency	Chain 0	Chain 1	Total	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5180	12.92	12.70	15.82	15.94	-0.12
Mid	5220	12.38	12.40	15.40	15.94	-0.54
High	5240	12.68	12.72	15.71	15.94	-0.23

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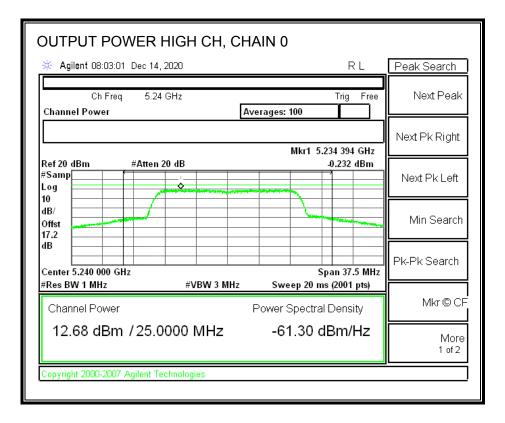
CHAIN 0 OUTPUT POWER



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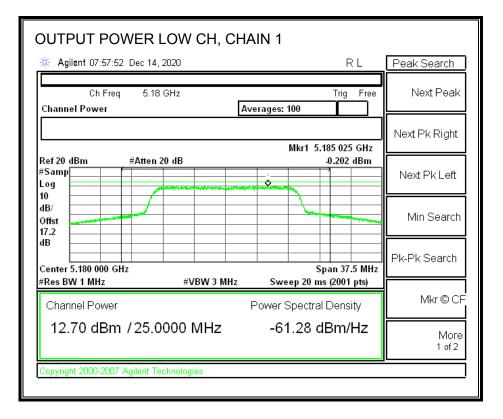


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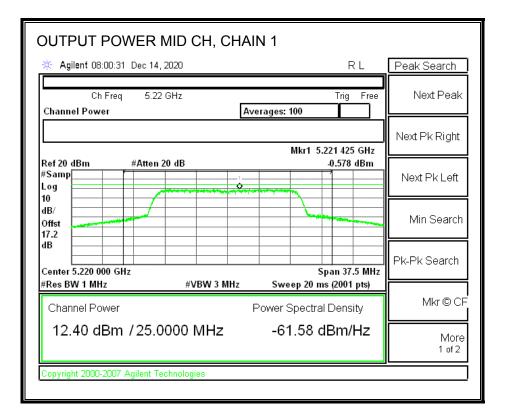


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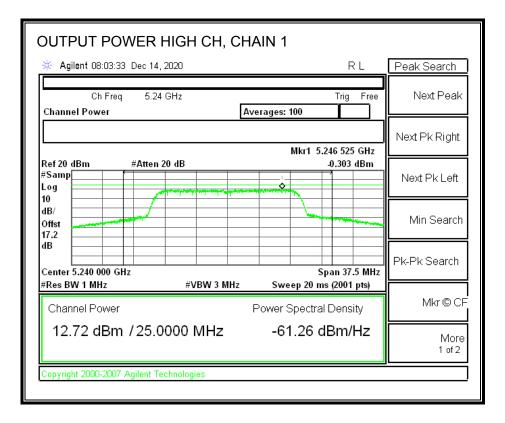
CHAIN 1 OUTPUT POWER



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7.1.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 17.2 dB (including 16 dB pad and 1.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Chain 0	Chain 1	Total
		Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)
Low	5180	12.54	12.32	15.44
Middle	5220	12.16	12.13	15.16
High	5240	12.47	12.58	15.54

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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)

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

Effective Legacy Gain
(dBi)
7.06

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 7.06 dBi, therefore the limit is 2.94 dBm.

TEST PROCEDURE

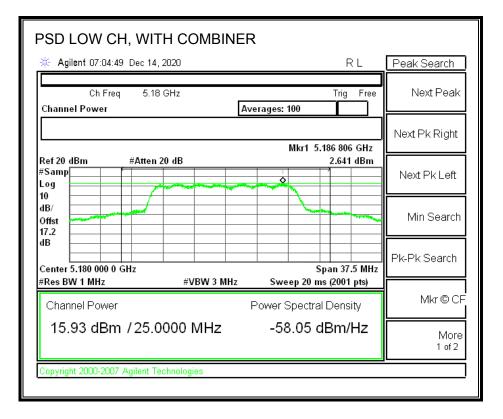
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

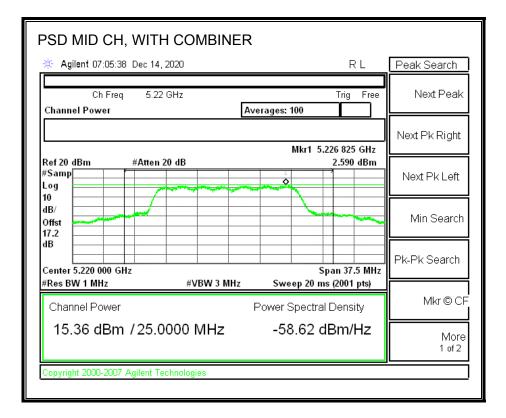
Channel	Frequency	PPSD With Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5180	2.64	2.94	-0.30
Middle	5220	2.59	2.94	-0.35
High	5240	2.23	2.94	-0.71

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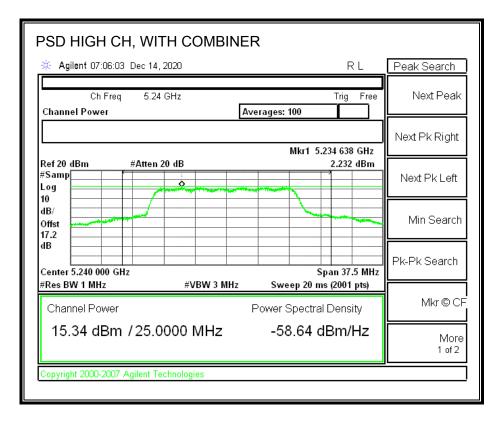
POWER SPECTRAL DENSITY WITH COMBINER



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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.

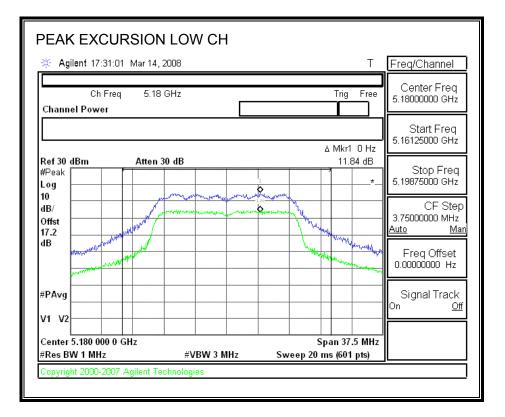
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

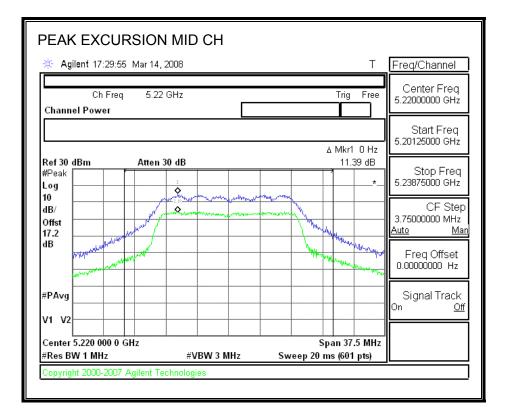
Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5180	11.84	13	-1.16
Middle	5220	11.39	13	-1.61
High	5240	12.16	13	-0.84

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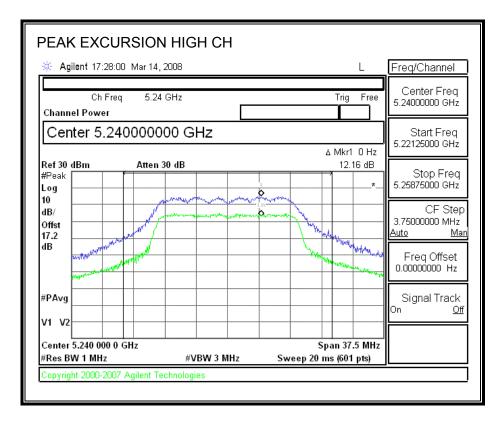
PEAK EXCURSION



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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.

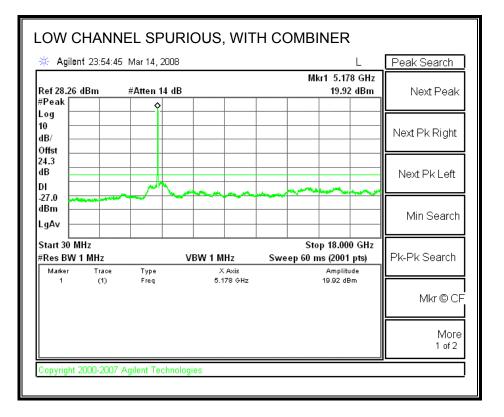
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements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

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

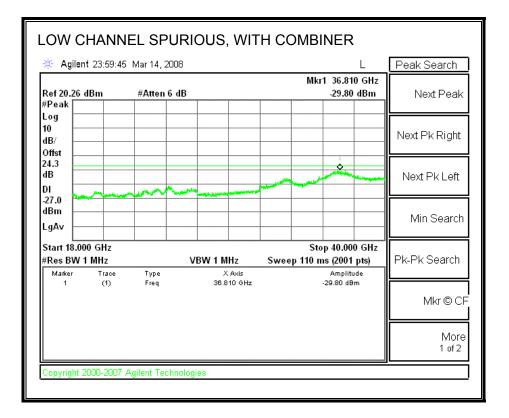
RESULTS

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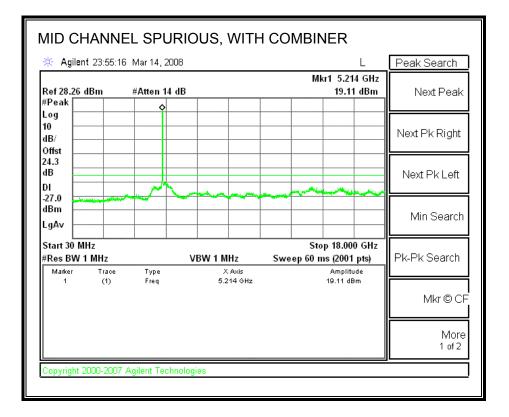
SPURIOUS EMISSIONS WITH COMBINER



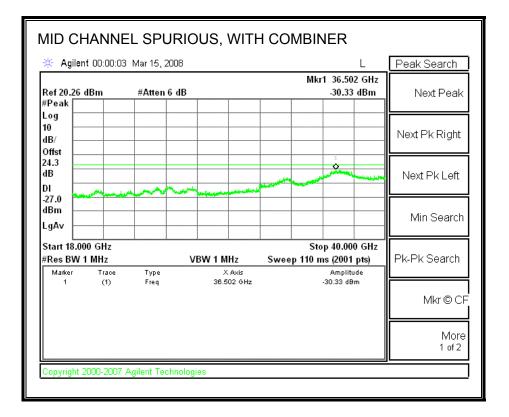
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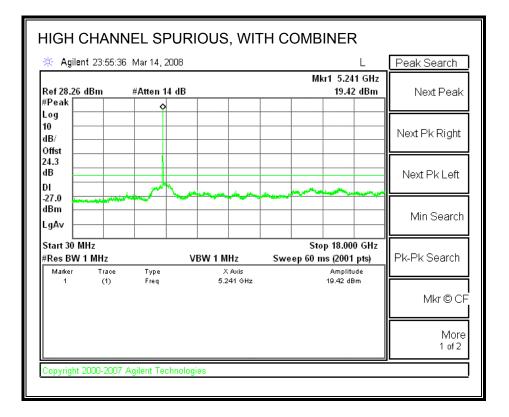
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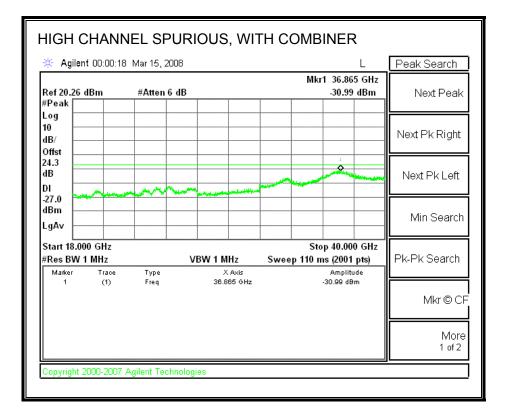
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7.2. 802.11n HT20 MODE IN THE LOWER 5.2 GHz BAND

7.2.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

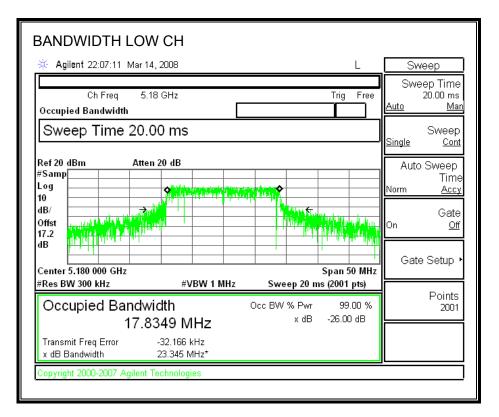
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

<u>RESULTS</u>

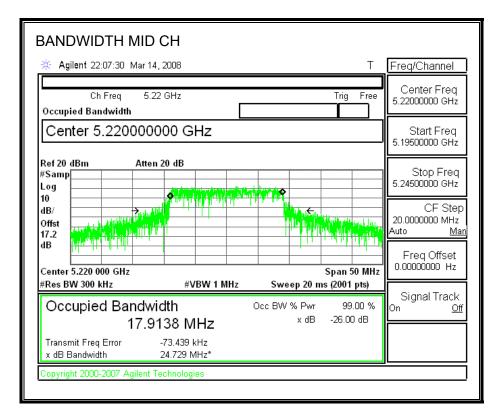
Frequency	26 dB Bandwidth	99% Bandwidth
(MHz)	(MHz)	(MHz)
5180	23.345	17.8349
5220	24.729	17.9138
5240	24.472	17.7437

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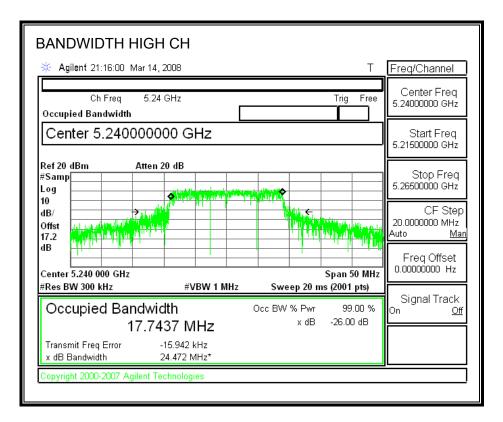
26 dB and 99% BANDWIDTH



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7.2.2. OUTPUT POWER

LIMITS

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

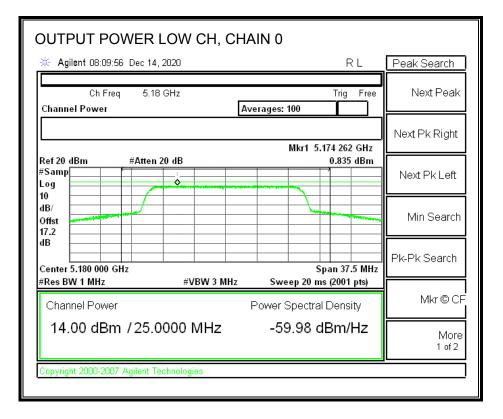
Limit

Channel	Frequency	Fixed	В	4 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5180	17.00	23.345	17.68	4.63	17.00
Mid	5220	17.00	24.729	17.93	4.63	17.00
High	5240	17.00	24.472	17.89	4.63	17.00

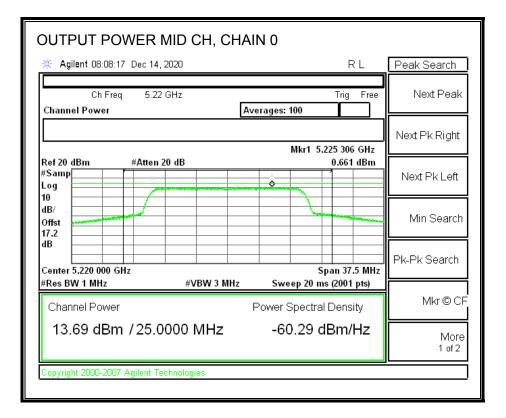
Individual Chain Results

Channel	Frequency	Chain 0	Chain 1	Total	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5180	14.00	13.60	16.81	17.00	-0.19
Mid	5220	13.69	13.57	16.64	17.00	-0.36
High	5240	13.67	13.81	16.75	17.00	-0.25

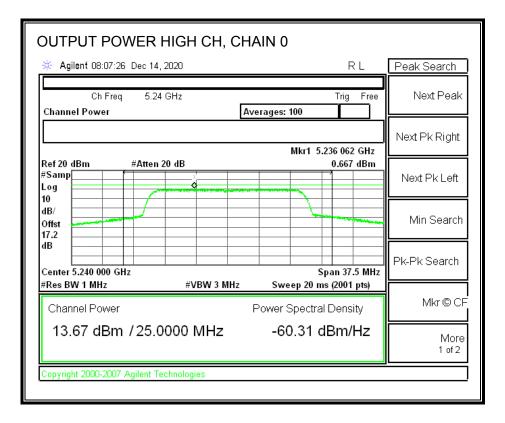
CHAIN 0 OUTPUT POWER



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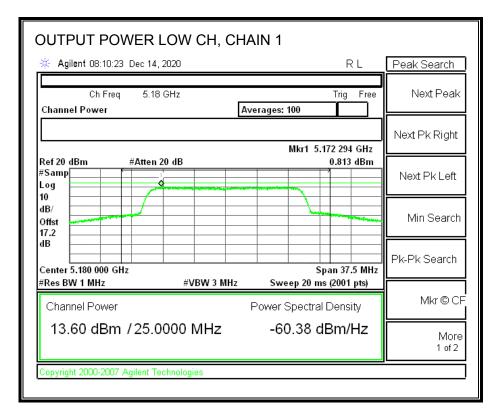


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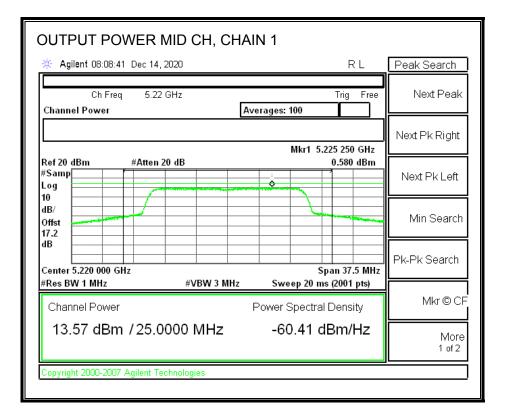


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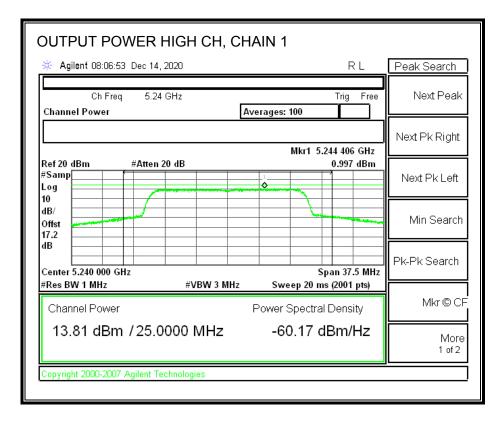
CHAIN 1 OUTPUT POWER



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7.2.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 17.2 dB (including 16 dB pad and 1.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Frequency	Chain 0	Chain 1	Total
	Power	Power	Power
(MHz)	(dBm)	(dBm)	(dBm)
5180	13.71	13.24	16.49
5220	13.40	13.31	16.37
5240	13.60	13.67	16.65

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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

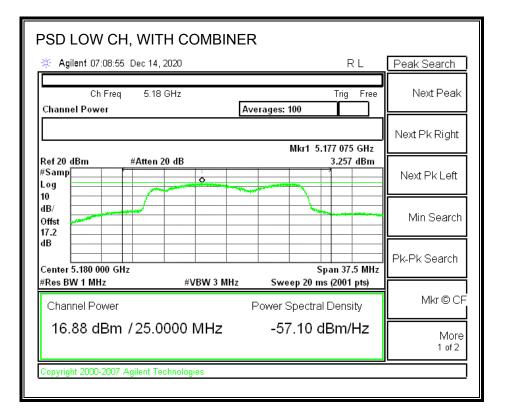
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

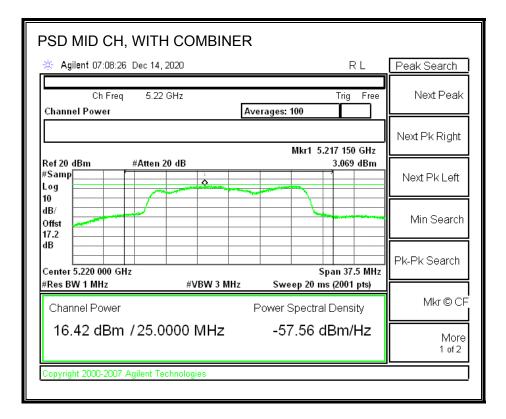
Channel	Frequency	PPSD With Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5180	3.26	4	-0.74
Middle	5220	3.07	4	-0.93
High	5240	2.85	4	-1.15

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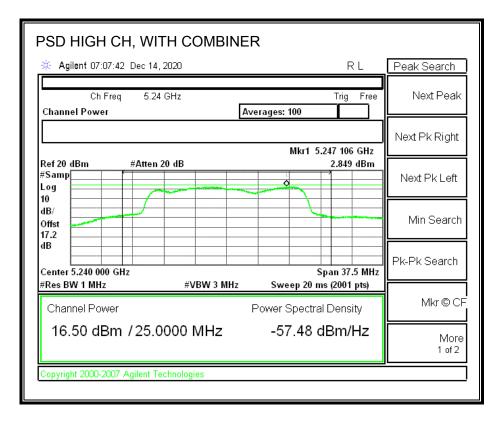
POWER SPECTRAL DENSITY WITH COMBINER



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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.

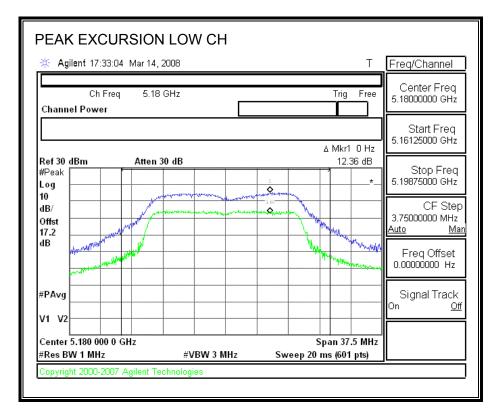
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

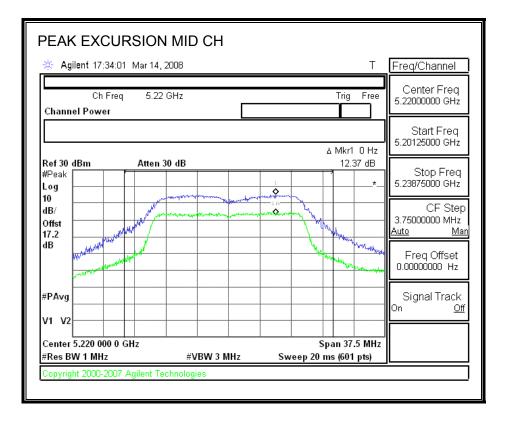
Channel	Frequency	Frequency Peak Excursion		Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5180	12.36	13	-0.64
Middle	5220	12.37	13	-0.63
High	5240	11.81	13	-1.19

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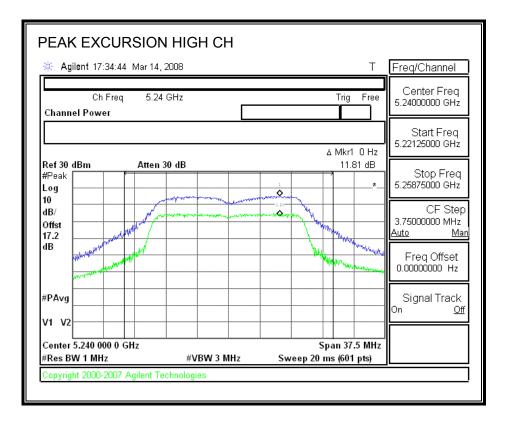
PEAK EXCURSION



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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.

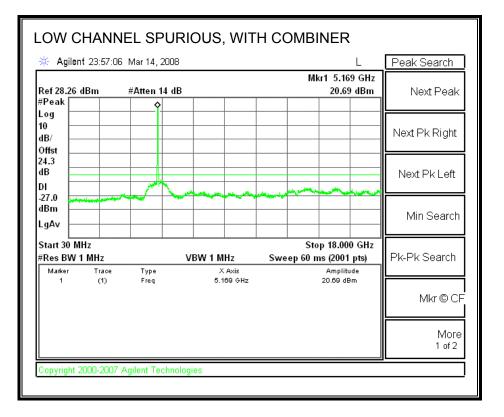
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements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

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

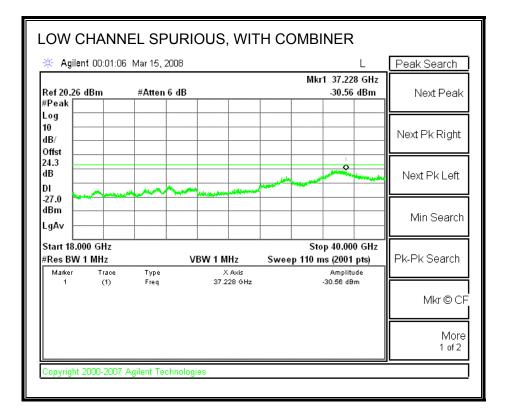
RESULTS

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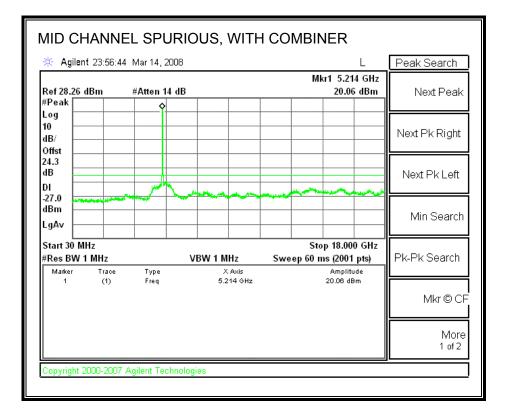
SPURIOUS EMISSIONS WITH COMBINER



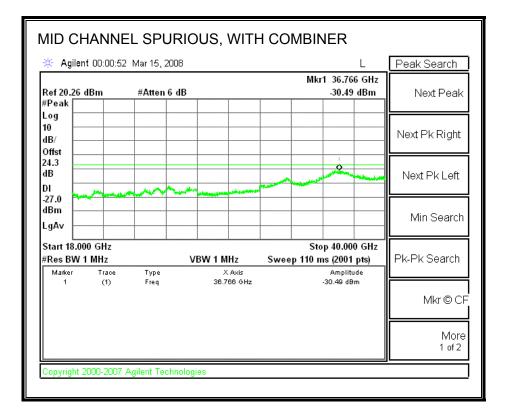
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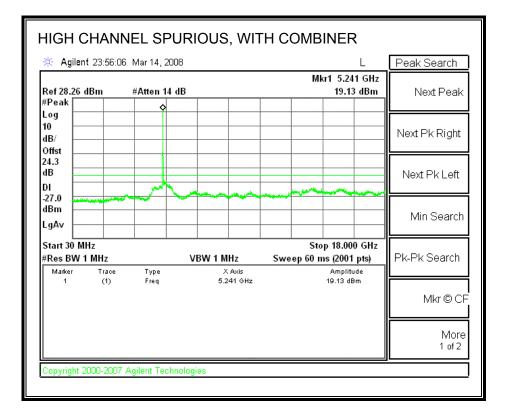
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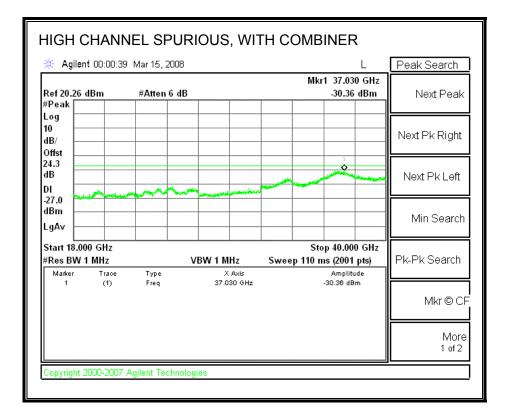
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7.3. 802.11n HT40 MODE IN THE LOWER 5.2 GHz BAND

7.3.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

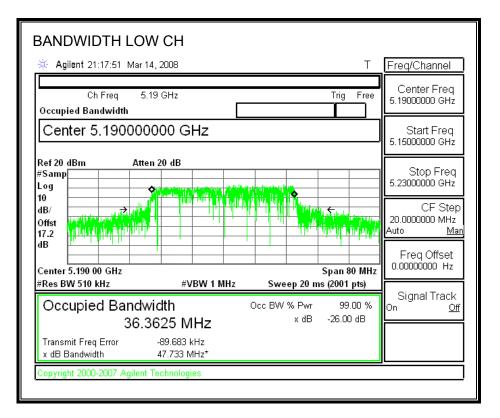
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

<u>RESULTS</u>

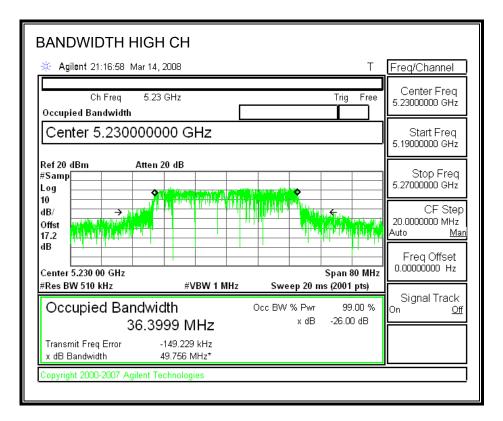
Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5190	47.733	36.3625
High	5230	49.756	36.3999

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26 dB and 99% BANDWIDTH



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7.3.2. OUTPUT POWER

LIMITS

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

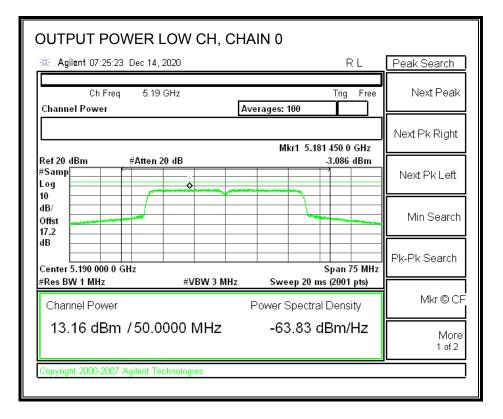
Limit

Channel	Frequency	Fixed	В	4 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5190	17.00	47.733	20.79	7.06	17.00
High	5230	17.00	49.756	20.97	7.06	17.00

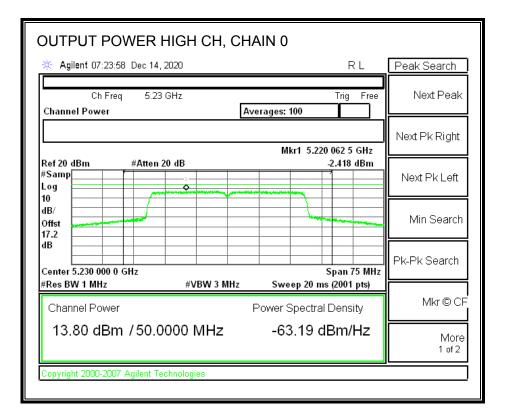
Individual Chain Results

Channel	Frequency	Chain 0	Chain 1	Total	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5190	13.16	12.86	16.02	17.00	-0.98
High	5230	13.80	13.95	16.89	17.00	-0.11

CHAIN 0 OUTPUT POWER

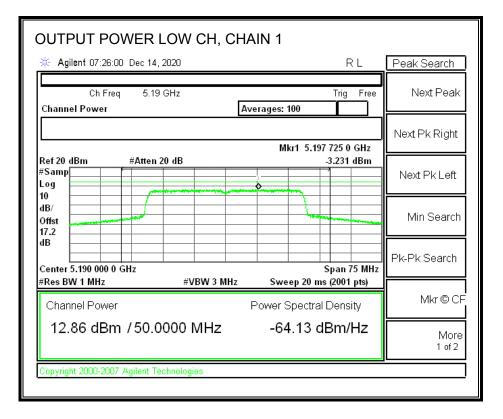


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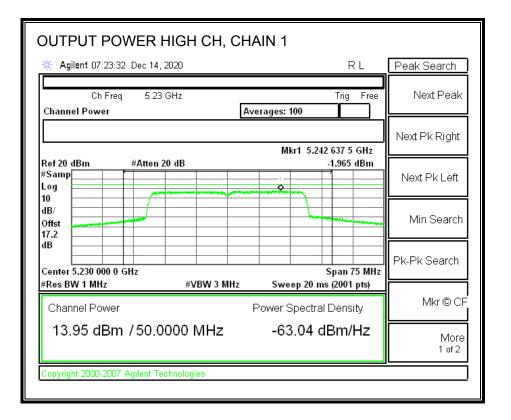


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CHAIN 1 OUTPUT POWER



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7.3.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 17.2 dB (including 16 dB pad and 1.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Chain 0	Chain 1	Total
		Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)
Low	5190	12.81	12.52	15.68
High	5230	13.61	13.77	16.70

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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

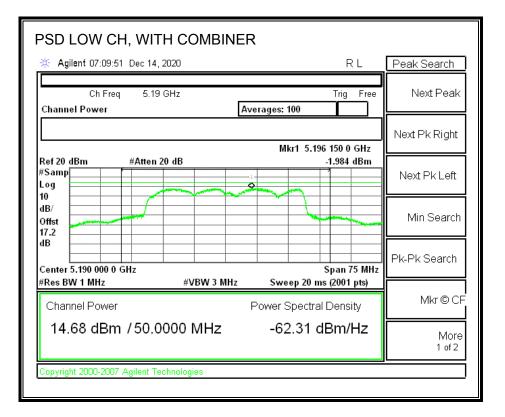
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

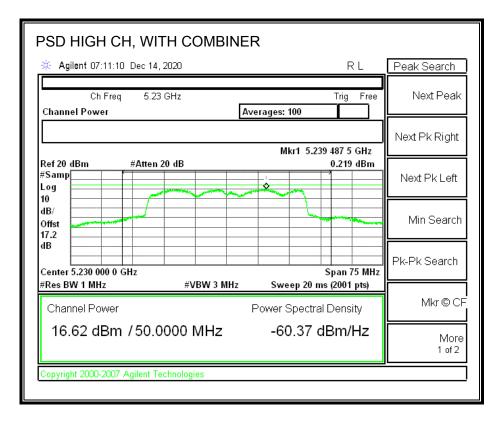
Channel	Frequency	PPSD With Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5190	-1.98	4	-5.98
High	5230	0.22	4	-3.78

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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.

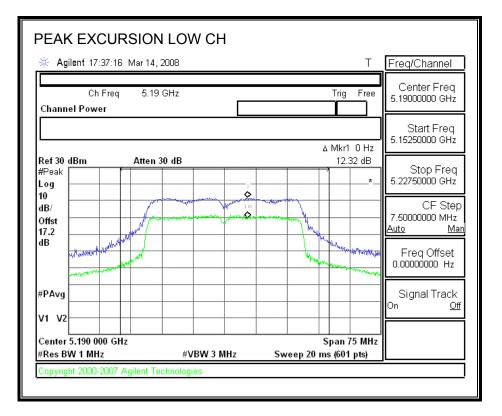
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

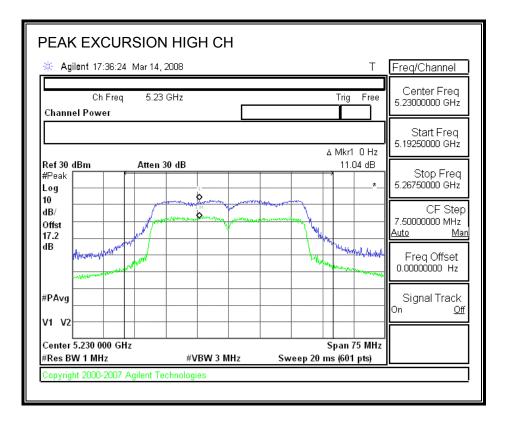
Channel	Frequency	requency Peak Excursion Limit		Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5190	12.32	13	-0.68
High	5230	11.04	13	-1.96

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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.

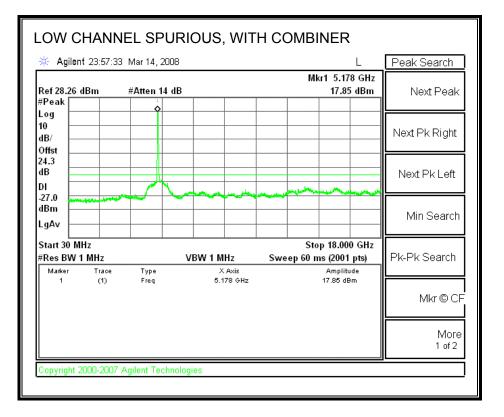
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements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

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

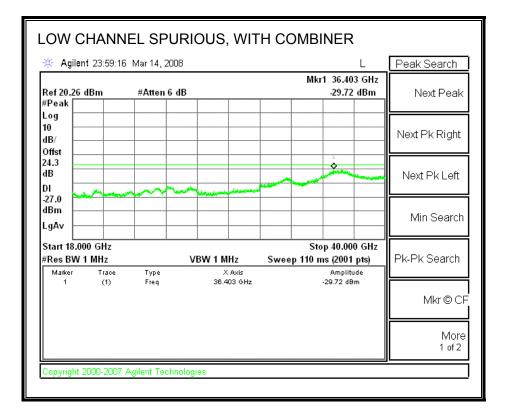
RESULTS

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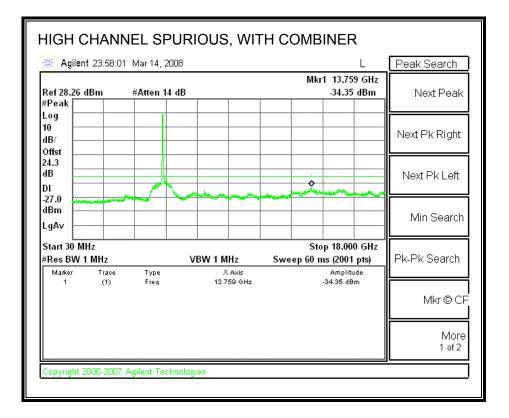
SPURIOUS EMISSIONS WITH COMBINER



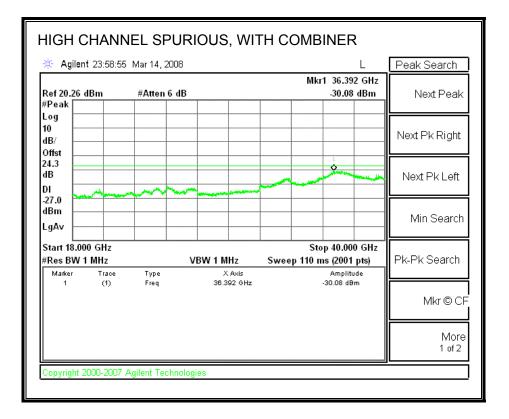
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7.4. 802.11a DUAL CHAIN LEGACY MODE IN THE UPPER 5.2 GHz BAND

7.4.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

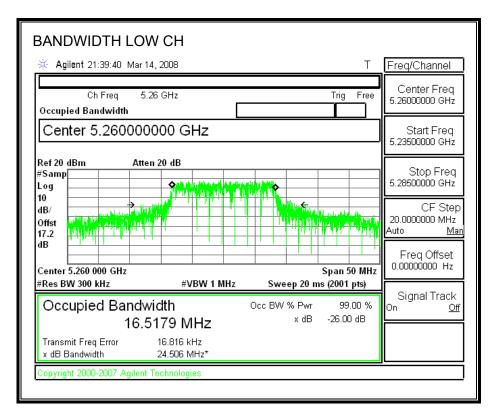
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

<u>RESULTS</u>

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5260	24.506	16.5179
Middle	5300	23.430	16.6588
High	5320	22.659	16.5021

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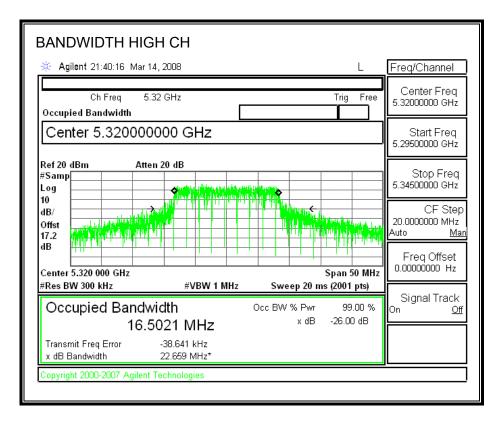
26 dB and 99% BANDWIDTH



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BANDWIDTH MID CH	
ዡ Agilent 21:40:01 Mar 14, 2008	Freq/Channel
Ch Freq 5.3 GHz Trig Free Occupied Bandwidth	Center Freq 5.3000000 GHz
Center 5.30000000 GHz	Start Freq 5.27500000 GHz
	Stop Freq 5.32500000 GHz 20.0000000 MHz Auto <u>Man</u> Freq Offset 0.00000000 Hz
Center 5.300 000 GHz Span 50 MHz #Res BW 300 kHz #VBW 1 MHz Sweep 20 ms (2001 pts)	
16.6588 MHz × dB -26.00 dB	Signal Track On <u>Off</u>
Transmit Freq Error -40.370 kHz x dB Bandwidth 23.430 MHz* Copyright 2000-2007 Agilent Technologies	
eopingin 2000 2001 - gironi reonnologico	

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7.4.2. OUTPUT POWER

<u>LIMITS</u>

FCC §15.407 (a) (2) IC RSS-210 A9.2 (2)

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

Effective Legacy Gain	
(dBi)	
7.76	

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.

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REPORT NO: 08U11571-2B FCC ID: PPD-AR5BHB92

RESULTS

Limit

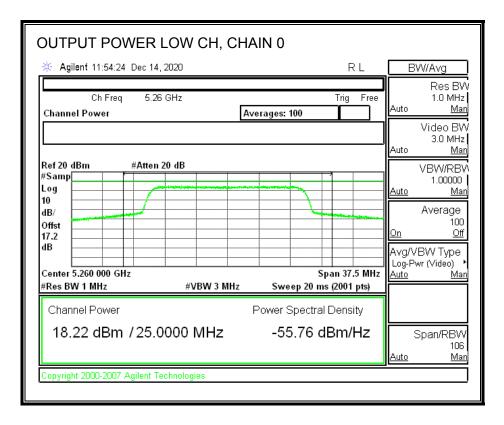
Channel	Frequency	Fixed	В	11 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5260	24	24.506	24.89	7.76	22.24
Mid	5300	24	23.430	24.70	7.76	22.24
High	5320	24	22.659	24.55	7.76	22.24

Individual Chain Results

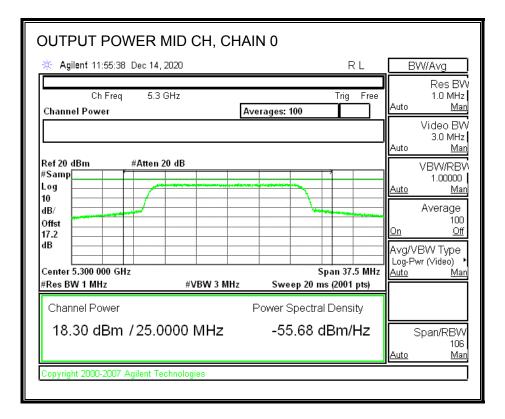
Channel	Frequency	Chain 0	Chain 1	Total	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	18.22	17.88	21.06	22.24	-1.18
Mid	5300	18.30	17.80	21.07	22.24	-1.17
High	5320	16.84	16.89	19.88	22.24	-2.36

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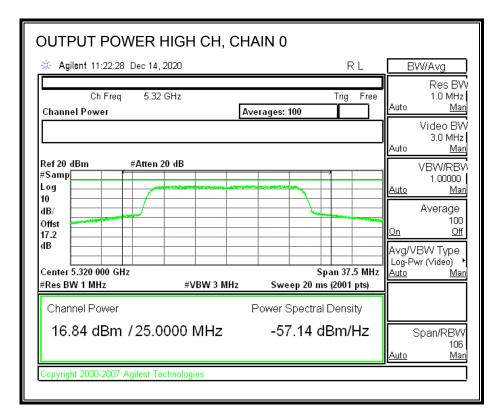
CHAIN 0 OUTPUT POWER



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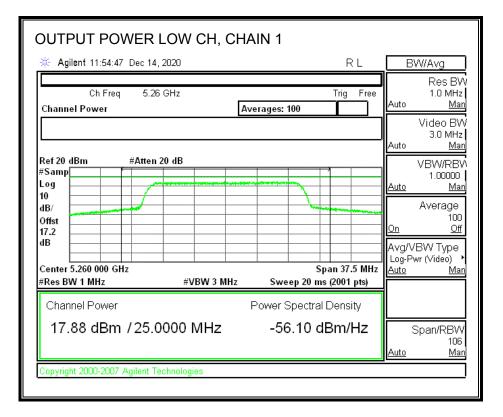


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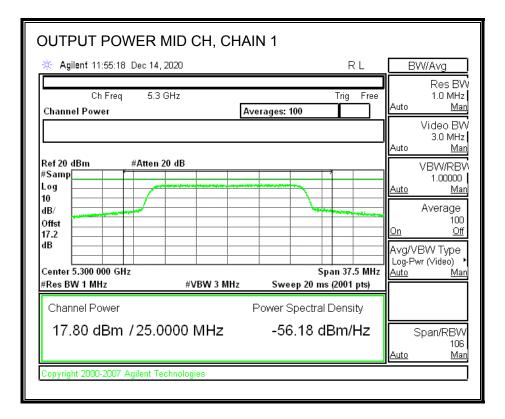


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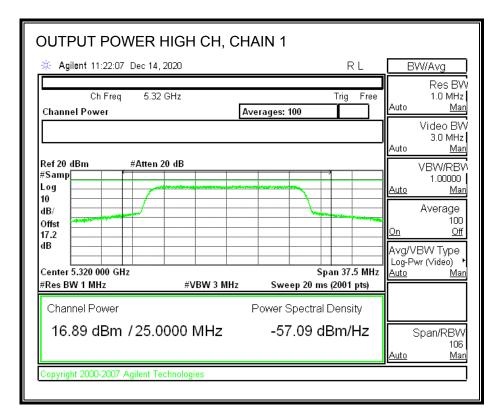
CHAIN 1 OUTPUT POWER



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7.4.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 17.2 dB (including 16 dB pad and 1.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Frequency	Chain 0	Chain 1	Total
	Power	Power	Power
(MHz)	(dBm)	(dBm)	(dBm)
5260	18.07	17.71	20.90
5300	18.14	17.69	20.93
5320	16.63	16.85	19.75

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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)

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

Effective Legacy Gain
(dBi)
7.76

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 7.76 dBi, therefore the limit is 9.24 dBm.

TEST PROCEDURE

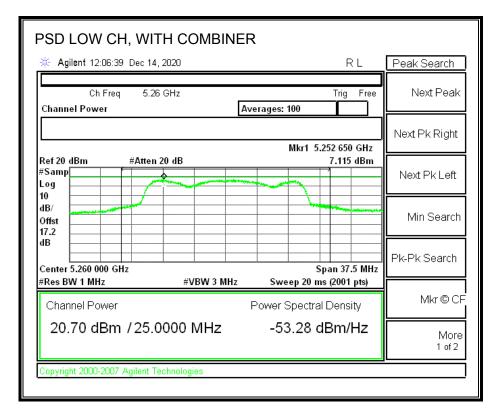
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

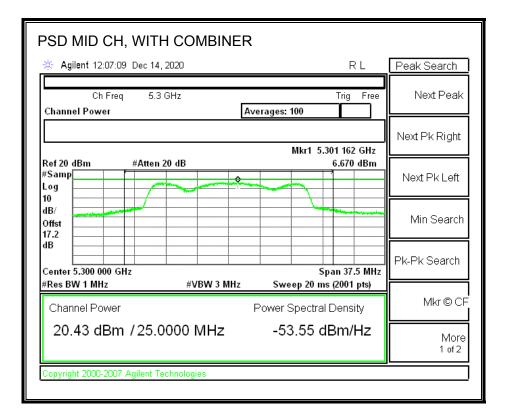
Channel	Frequency	PPSD With Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5260	7.12	9.24	-2.13
Middle	5300	6.67	9.24	-2.57
High	5320	5.75	9.24	-3.49

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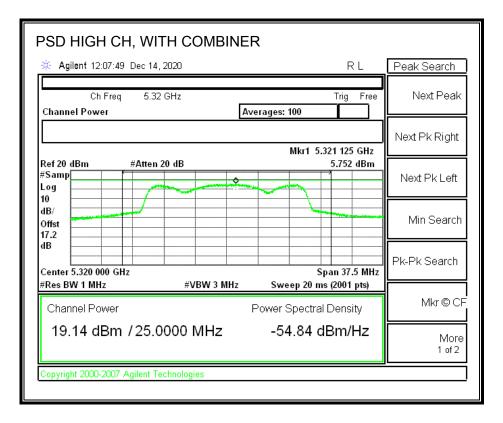
POWER SPECTRAL DENSITY WITH COMBINER



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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.

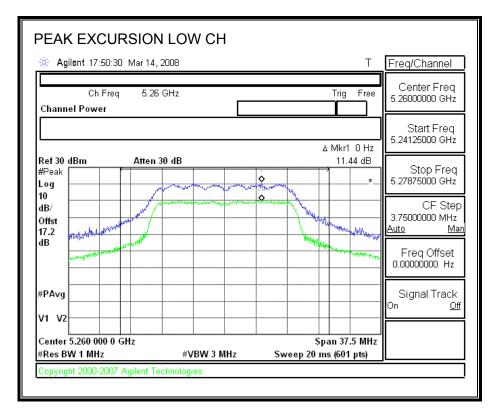
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

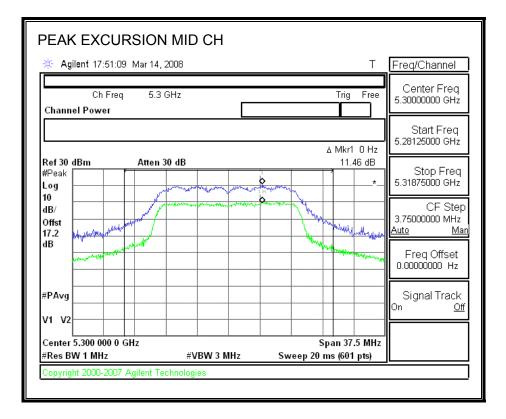
Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5260	11.44	13	-1.56
Middle	5300	11.46	13	-1.54
High	5320	11.77	13	-1.23

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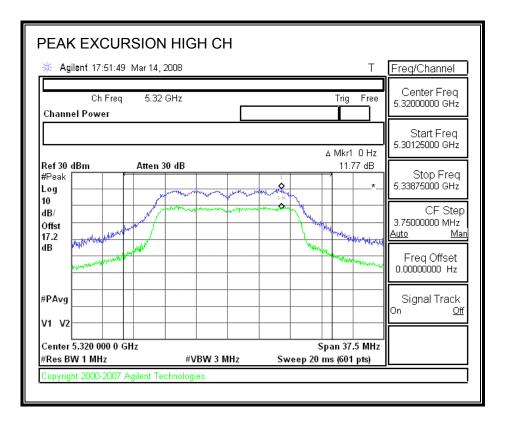
PEAK EXCURSION



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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.

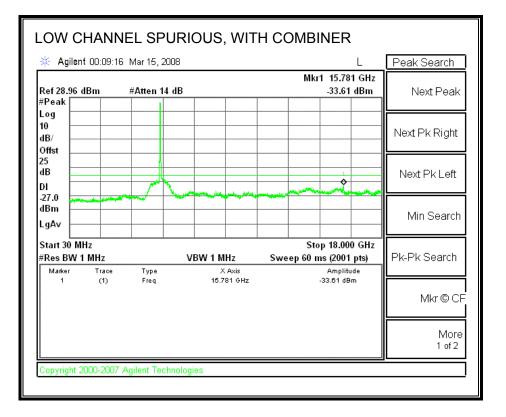
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements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

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

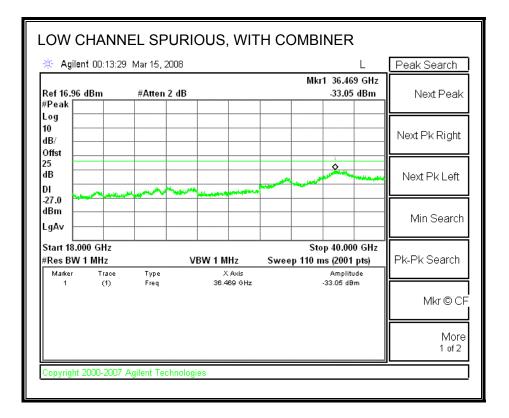
RESULTS

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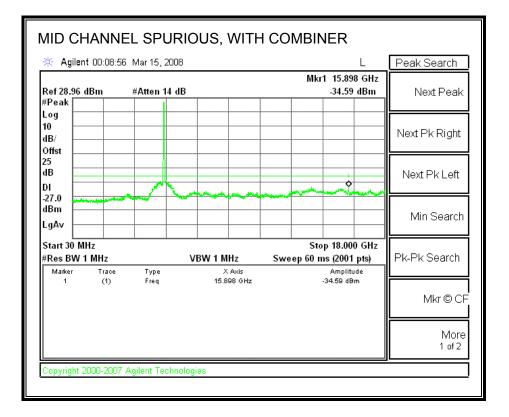
SPURIOUS EMISSIONS WITH COMBINER



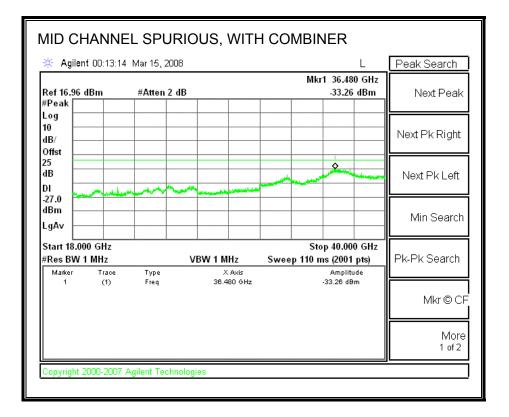
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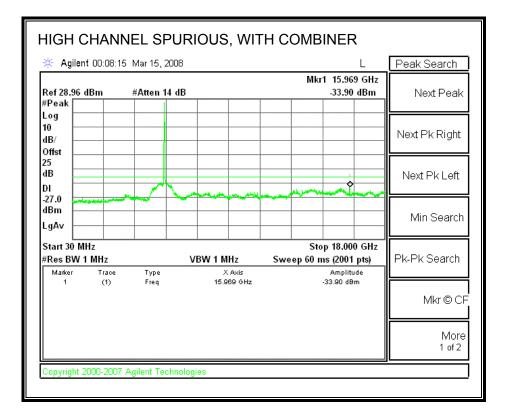
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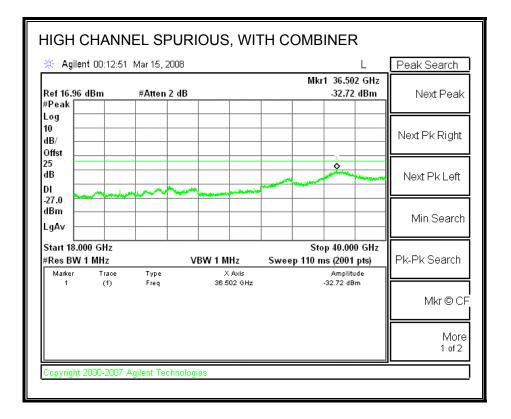
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7.5. 802.11n HT20 MODE IN THE UPPER 5.2 GHz BAND

7.5.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

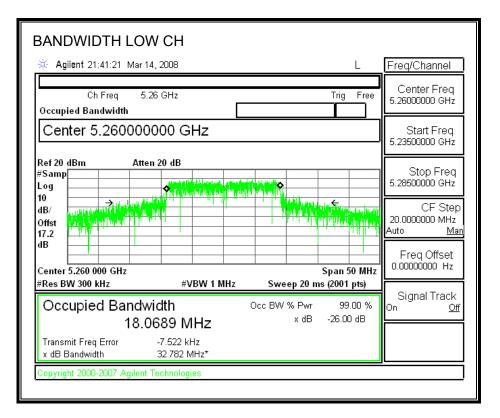
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

<u>RESULTS</u>

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5260	32.782	18.0689
Middle	5300	35.688	17.9233
High	5320	24.887	17.8537

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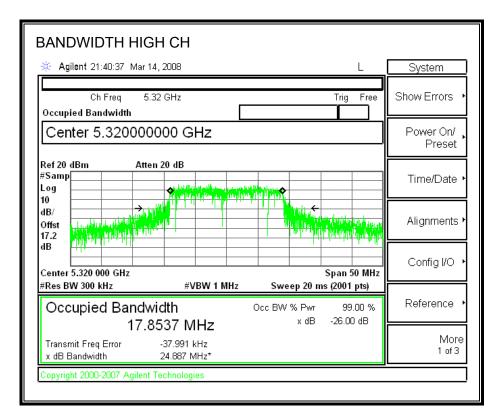
26 dB and 99% BANDWIDTH



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BANDWIDTH MID CH	
⅔ Agilent 21:41:06 Mar 14, 2008	System
Ch Freq 5.3 GHz Trig Free Occupied Bandwidth Center 5.300000000 GHz	Show Errors
	Preset
Ref 20 dBm Atten 20 dB #Samp Log 10	Time/Date •
10 dB/ Offst 17.2 dB	Alignments 🕨
Center 5.300 000 GHz Span 50 MHz #Res BW 300 kHz #VBW 1 MHz Sweep 20 ms (2001 pts)	Config I/O ▸
Occupied Bandwidth Occ BW % Pwr 99.00 % 17.9233 MHz x dB -26.00 dB	Reference 🕨
Transmit Freq Error -24.509 kHz x dB Bandwidth 35.688 MHz*	More 1 of 3
Copyright 2000-2007 Agilent Technologies	

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7.5.2. OUTPUT POWER

LIMITS

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

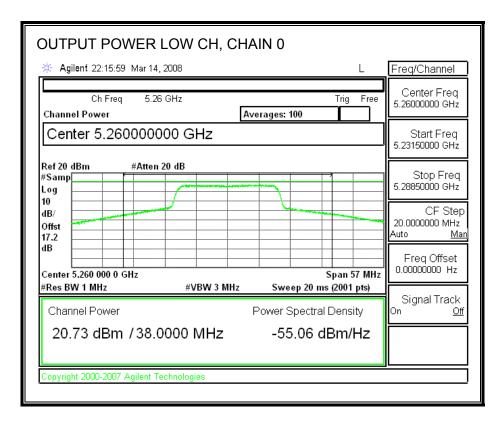
Limit

E 11111						
Channel	Frequency	Fixed	В	11 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5260	24.00	32.782	26.16	5.56	24.00
Mid	5300	24.00	35.688	26.53	5.56	24.00
High	5320	24.00	24.887	24.96	5.56	24.00

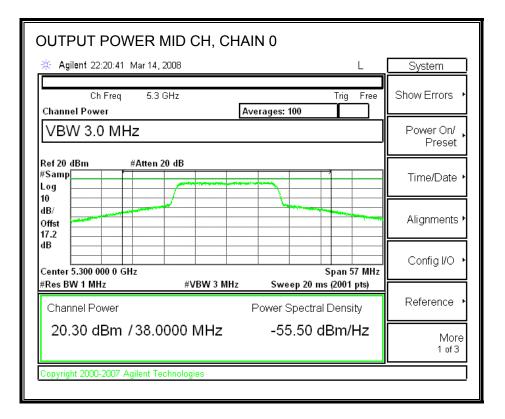
Individual Chain Results

Channel	Frequency	Chain 0	Chain 1	Total	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5260	20.73	20.60	23.68	24.00	-0.32
Mid	5300	20.30	20.40	23.36	24.00	-0.64
High	5320	15.72	16.19	18.97	24.00	-5.03

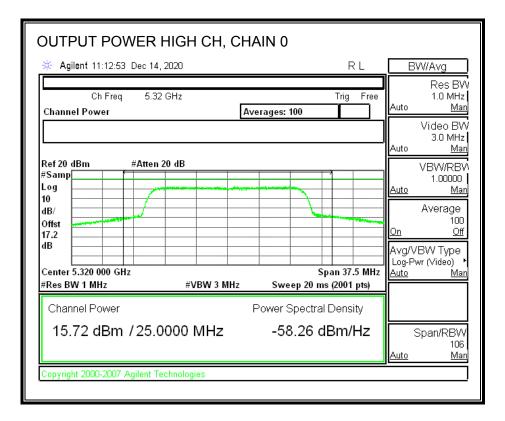
CHAIN 0 OUTPUT POWER



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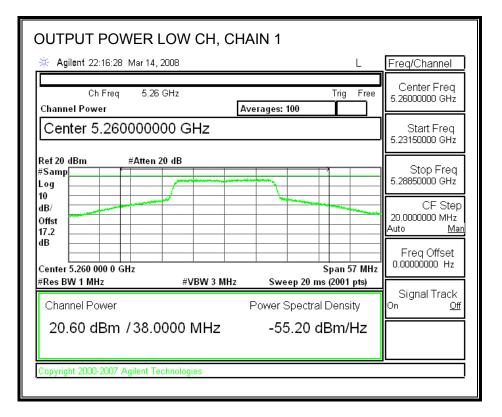


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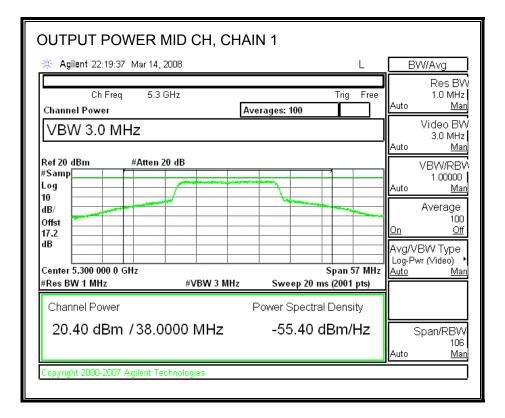


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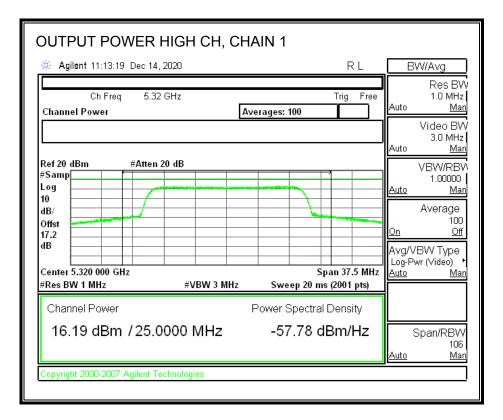
CHAIN 1 OUTPUT POWER



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7.5.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 17.2 dB (including 16 dB pad and 1.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Frequency	Chain 0	Chain 1	Total
	Power	Power	Power
(MHz)	(dBm)	(dBm)	(dBm)
5260	19.99	20.01	23.01
5300	19.53	19.72	22.64
5320	16.01	15.59	18.82

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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

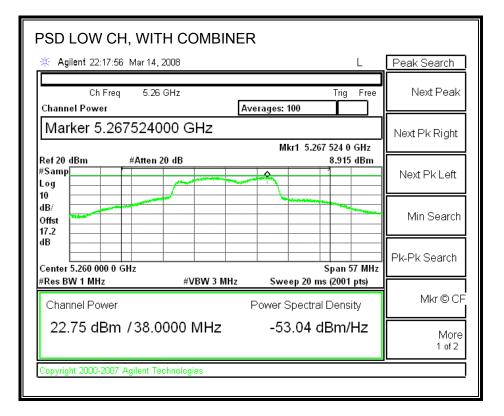
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

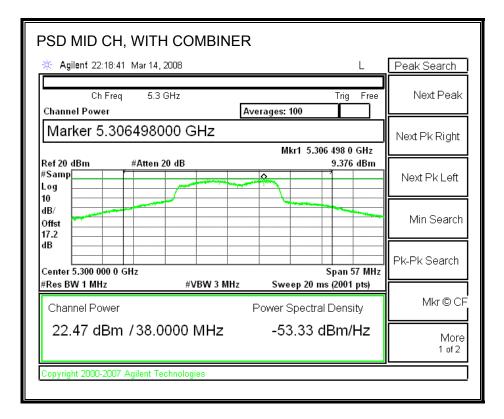
Channel	Frequency	PPSD With Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5260	8.92	11	-2.09
Middle	5300	9.38	11	-1.62
High	5320	5.55	11	-5.45

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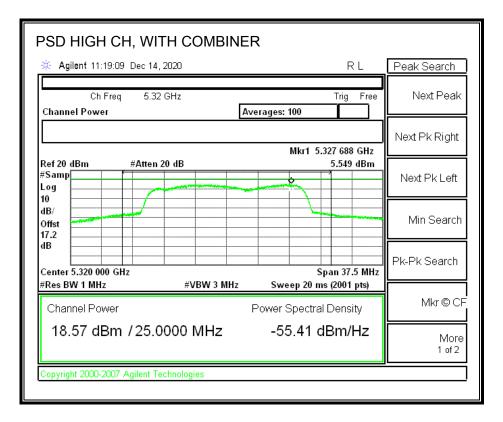
POWER SPECTRAL DENSITY WITH COMBINER



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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.

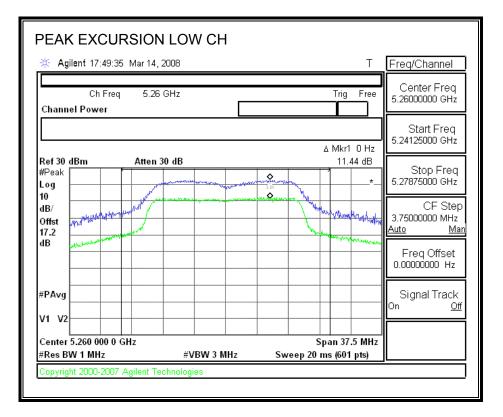
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5260	11.44	13	-1.56
Middle	5300	11.42	13	-1.58
High	5320	11.62	13	-1.38

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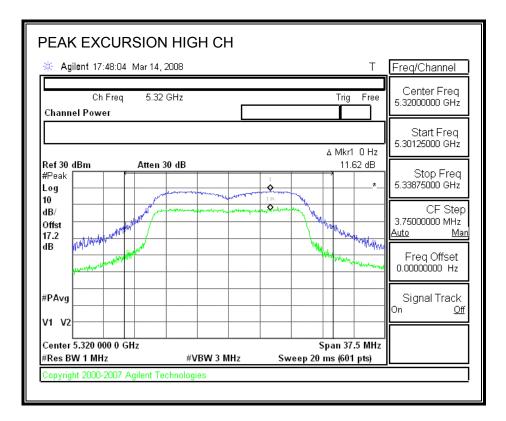
PEAK EXCURSION



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PEAK EXCURSION	MID CH		
🔆 Agilent 17:48:57 Mar 14, 2	2008	Т	Freq/Channel
Ch Freq 5.3 C Channel Power	GHz	Trig Fre	e Center Freq 5.3000000 GHz
		۵ Mkr1 O H	Start Freq 5.28125000 GHz
Ref 30 dBm Atten 3 #Peak Log 10	0 dB	11.42 dE	Stop Freq 5.31875000 GHz
dB/ Offst dwww.www.www.		the second statements loss	CF Step 3.7500000 MHz <u>Auto Man</u>
			Freq Offset 0.00000000 Hz
#PAvg			Signal Track On <u>Off</u>
V1 V2 Center 5.300 000 0 GHz #Res BW 1 MHz	#VBW 3 MHz	Span 37.5 MH Sweep 20 ms (601 pts)	lz
Copyright 2000-2007 Agilent Tec	chnologies		

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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.

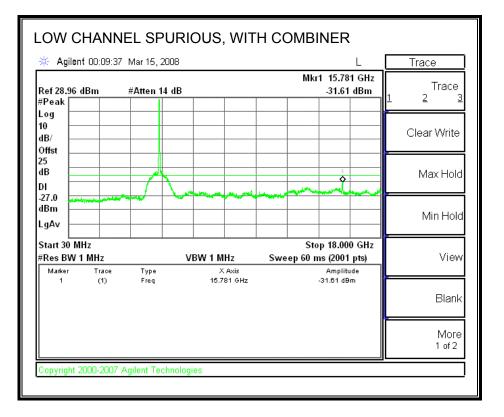
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements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

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

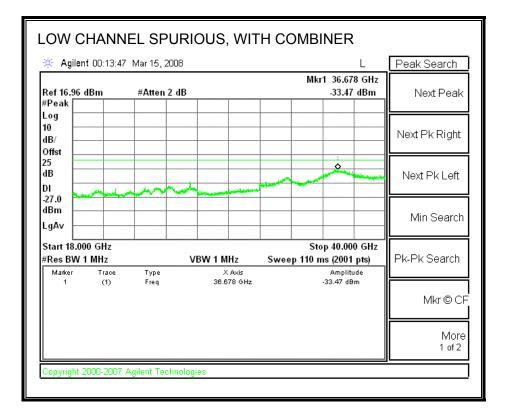
RESULTS

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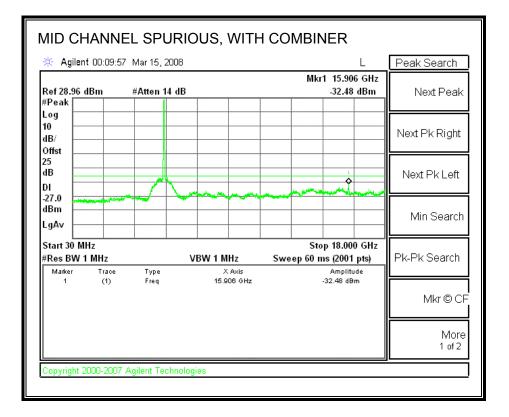
SPURIOUS EMISSIONS WITH COMBINER



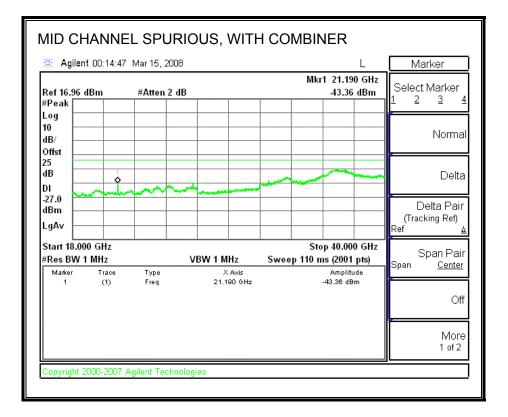
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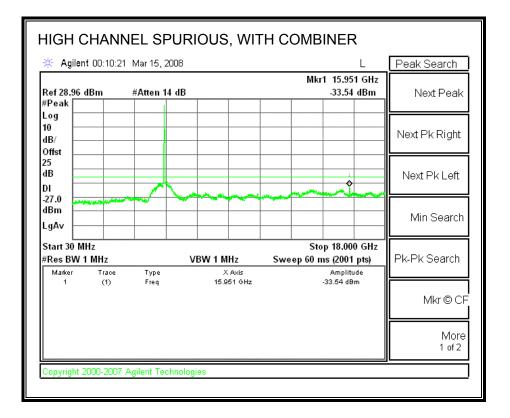
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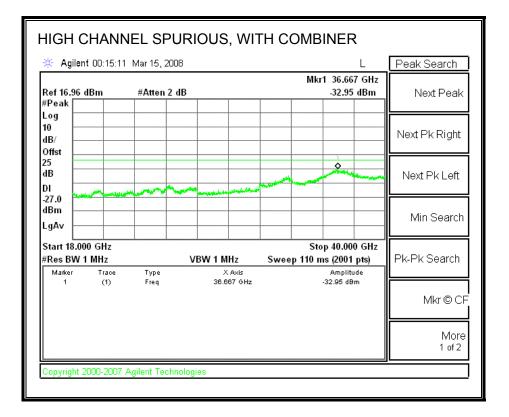
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7.6. 802.11n HT40 MODE IN THE UPPER 5.2 GHz BAND

7.6.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

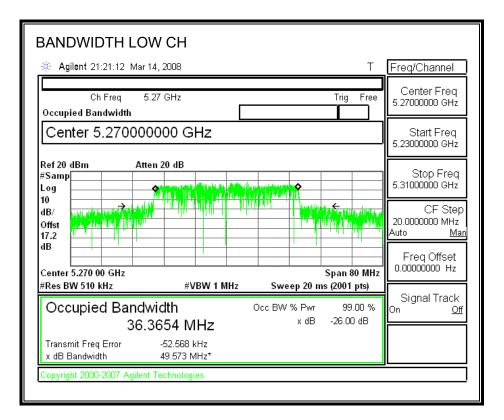
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

<u>RESULTS</u>

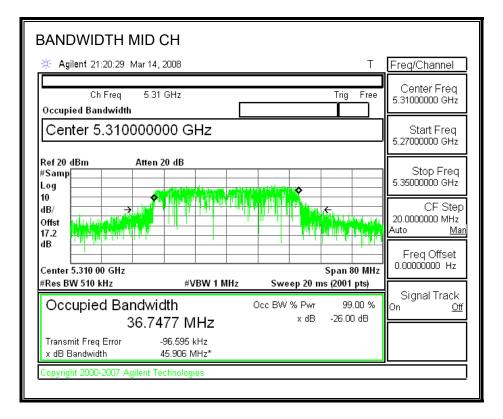
Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5270	49.573	36.3654
High	5310	45.906	36.7477

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26 dB and 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

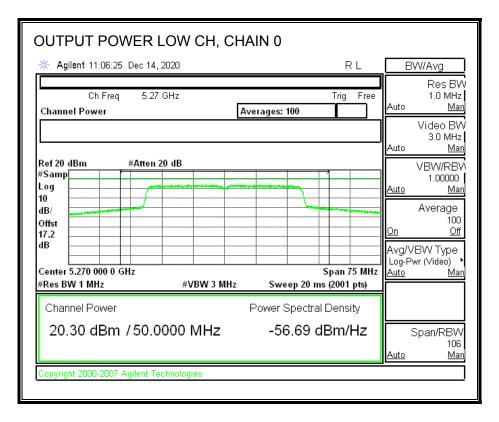
Channel	Frequency	Fixed	В	11 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5270	24.00	49.573	27.95	5.60	24.00
High	5310	24.00	45.906	27.62	5.56	24.00

Individual Chain Results

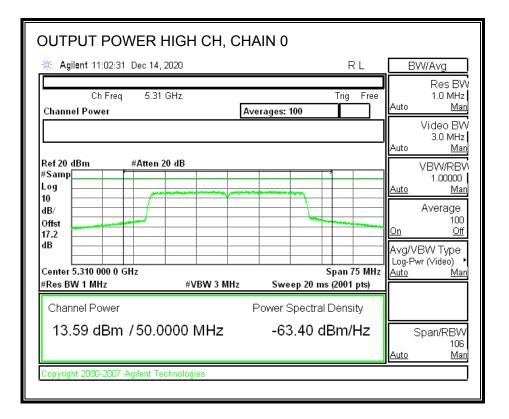
Channel	Frequency	Chain 0	Chain 1	Total	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5270	20.30	20.54	23.43	24.00	-0.57
High	5310	13.59	14.04	16.83	24.00	-7.17

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CHAIN 0 OUTPUT POWER

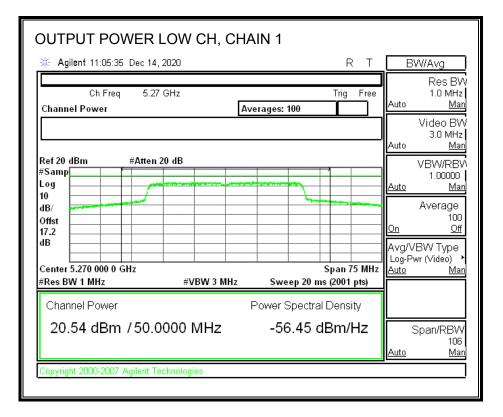


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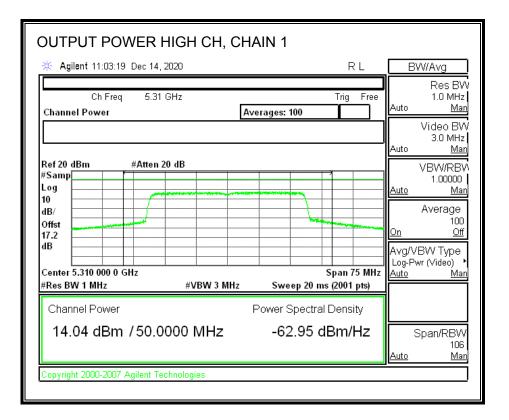


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CHAIN 1 OUTPUT POWER



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7.6.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 17.2 dB (including 16 dB pad and 1.2 dB cable) entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Chain 0	Chain 1	Total
		Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)
Low	5270	20.13	20.41	23.28
High	5310	13.52	13.85	16.70

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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

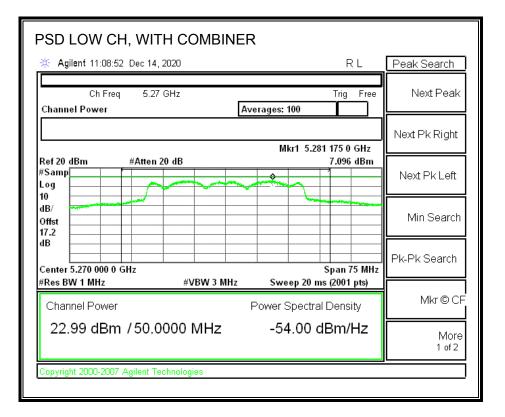
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

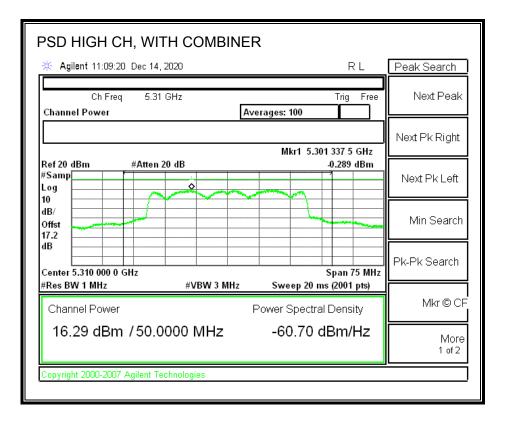
Channel	Frequency	PPSD With Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5270	7.10	11	-3.90
High	5310	-0.29	11	-11.29

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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.

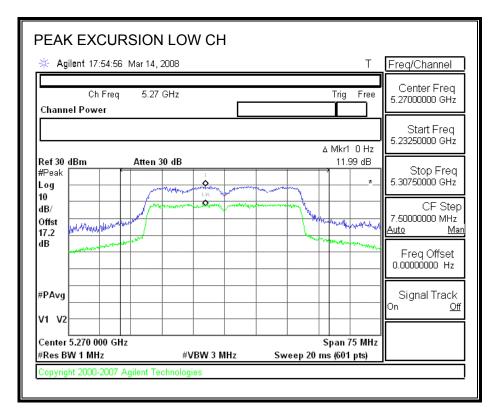
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

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

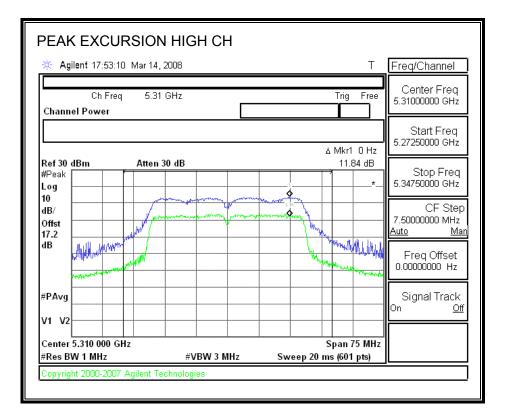
Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5270	11.99	13	-1.01
High	5310	11.84	13	-1.16

<u>RESULTS</u>

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.

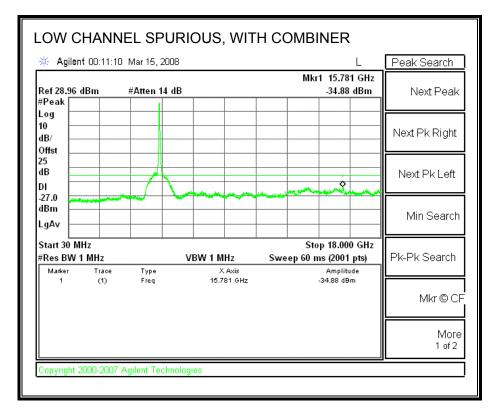
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements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

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

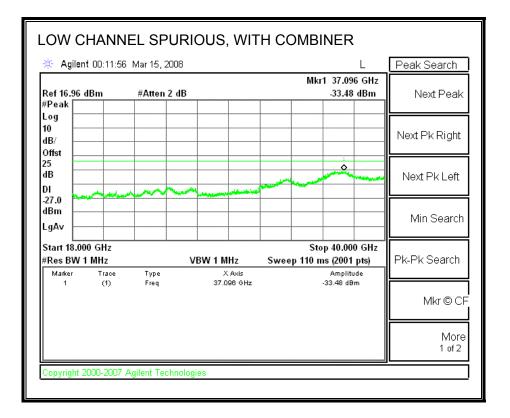
RESULTS

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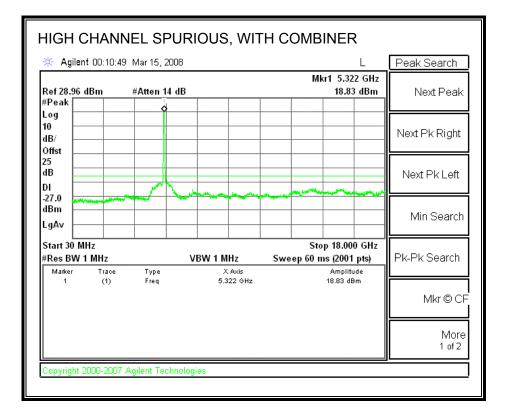
SPURIOUS EMISSIONS WITH COMBINER



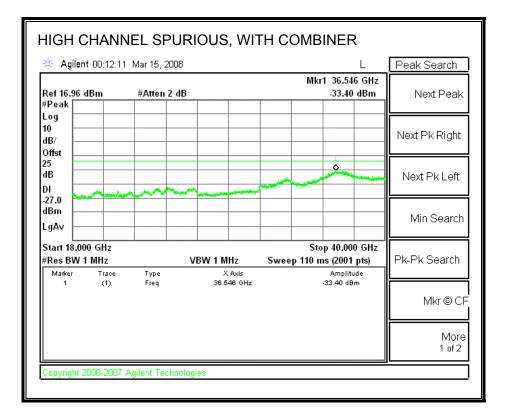
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7.7. 802.11a DUAL CHAIN LEGACY MODE IN THE 5.6 GHz BAND

7.7.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

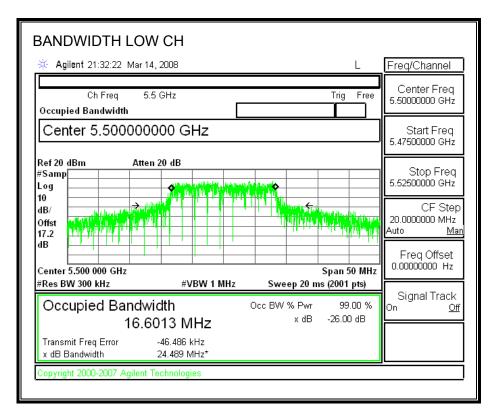
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

<u>RESULTS</u>

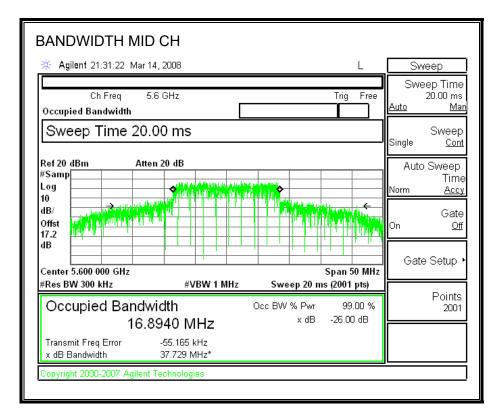
Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5500	24.489	16.6013
Middle	5600	37.729	16.8940
High	5700	25.040	16.5911

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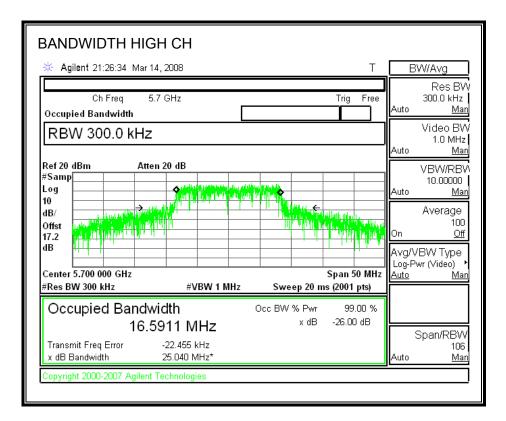
26 dB and 99% BANDWIDTH



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7.7.2. OUTPUT POWER

<u>LIMITS</u>

FCC §15.407 (a) (2) IC RSS-210 A9.2 (2)

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

tive Legacy Gain
(dBi)
8.20
(dBi)

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.

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REPORT NO: 08U11571-2B FCC ID: PPD-AR5BHB92

RESULTS

Limit

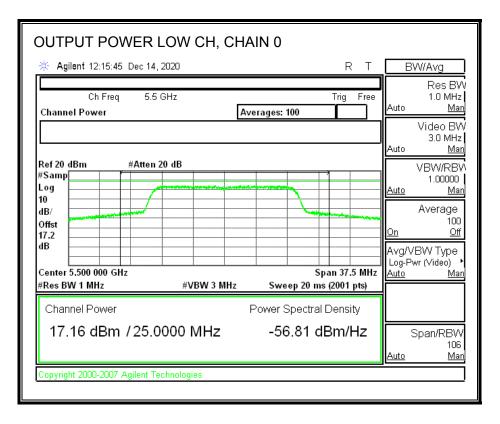
Channel	Frequency	Fixed	В	11 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5500	24	24.489	24.89	8.20	21.80
Mid	5600	24	37.729	26.77	8.20	21.80
High	5700	24	25.040	24.99	8.20	21.80

Individual Chain Results

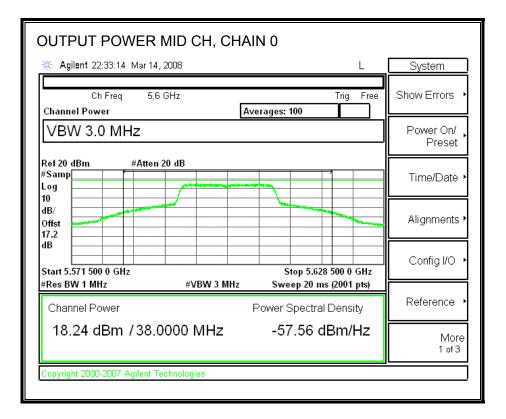
Channel	Frequency	Chain 0	Chain 1	Total	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	17.16	17.27	20.23	21.80	-1.57
Mid	5600	18.24	18.15	21.21	21.80	-0.59
High	5700	18.62	18.29	21.47	21.80	-0.33

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CHAIN 0 OUTPUT POWER



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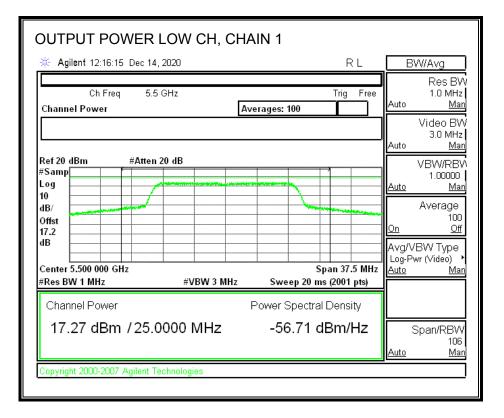


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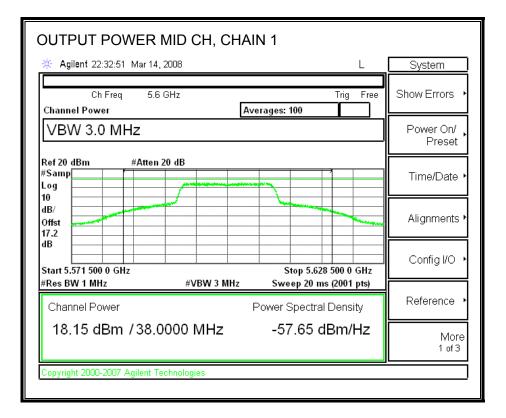
🔆 Agilent 12:18:35 Dec 14,	2020		RL	BW/	Avg
Ch Freq 5.7 Channel Power	····	verages: 100	Trig Free	Auto	Res BV 1.0 MHz <u>Man</u>
				Vi Auto	ideo BW 3.0 MHz <u>Man</u>
Ref 20 dBm #Atten 2 #Samp Log 10	20 dB			VE <u>Auto</u>	3W/RBV 1.00000 <u>Man</u>
0 dB/				A <u>On</u>	verage 100 <u>Off</u>
dB		Sp	an 37.5 MHz	Avg/VBV Log-Pwr (<u>Auto</u>	
#Res BW 1 MHz	#VBW 3 MHz	Sweep 20 ms	(2001 pts)		
Channel Power		Power Spectral I	Density		
18.62 dBm /25.0	000 MHz	-55.36 di	3m/Hz	Sp: <u>Auto</u>	an/RBW 106 <u>Man</u>

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CHAIN 1 OUTPUT POWER



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🔆 Agilent 12:18:56 Dec 14, 202	D		RL	BW	Avg
Ch Freq 5.7 GHz Channel Power		erages: 100	Trig Free	Auto	Res BV 1.0 MHz <u>Man</u>
]	Vi Auto	ideo BV\ 3.0 MHz <u>Man</u>
209	B			VE <u>Auto</u>	3W/RBV 1.00000 <u>Man</u>
10 dB/ Offst 17.2				A <u>On</u>	verage 100 <u>Off</u>
dB		SI	Dan 37.5 MHz	Avg/VBV Log-Pwr (<u>Auto</u>	
#Res BW 1 MHz	#VBW 3 MHz	Sweep 20 ms	s (2001 pts)		
Channel Power	F	^o ower Spectral	Density		
18.29 dBm / 25.000	0 MHz	-55.69 d	Bm/Hz	Sp: <u>Auto</u>	an/RBW 106 <u>Man</u>

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7.7.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 17.2 dB (including 16 dB pad and 1.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Chain 0	Chain 1	Total
		Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)
Low	5500	17.60	17.37	20.50
Middle	5600	17.74	17.79	20.78
High	5700	17.93	17.67	20.81

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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)

Directional gain = gain of antenna element + 10 log (# of TX antenna elements)

Effective Legacy Gain				
(dBi)				
8.20				

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 8.2 dBi, therefore the limit is 8.8 dBm.

TEST PROCEDURE

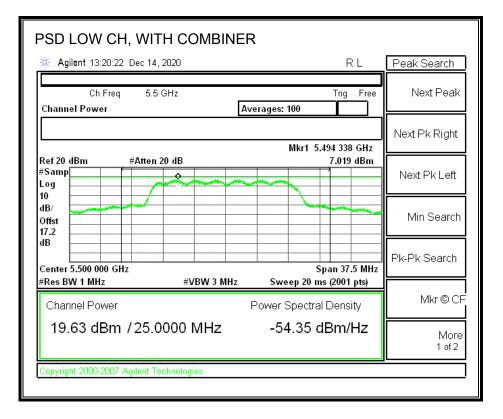
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

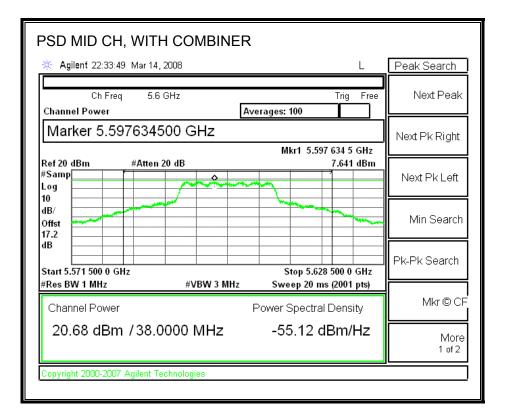
Channel	Frequency	PPSD With Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5500	7.02	8.80	-1.78
Middle	5600	7.64	8.80	-1.16
High	5700	7.17	8.80	-1.63

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POWER SPECTRAL DENSITY WITH COMBINER



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PSD HIGH CH, WITH COMBINER					
Image: Image	Peak Search				
Ch Freq 5.7 GHz Trig Free Channel Power Averages: 100	Next Peak				
	Next Pk Right				
Ref 20 dBm #Atten 20 dB 7.169 dBm #Samp	Next Pk Left				
10 dB/ Offst 17.2	Min Search				
dB Center 5.700 000 GHz Span 37.5 MHz	Pk-Pk Search				
#Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (2001 pts) Channel Power Power Spectral Density	Mkr © CF				
20.34 dBm / 25.0000 MHz -53.64 dBm/Hz	More 1 of 2				
Copyright 2000-2007 Agilent Technologies					

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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.

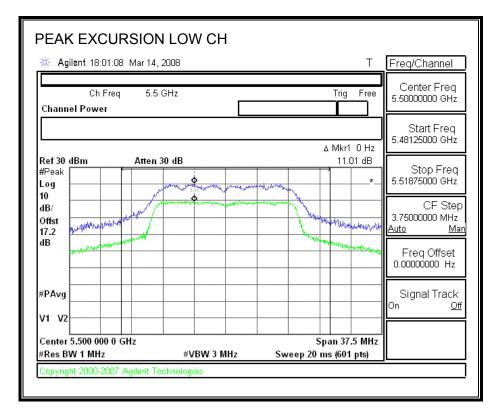
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5500	11.01	13	-1.99
Middle	5600	11.01	13	-1.99
High	5700	11.67	13	-1.33

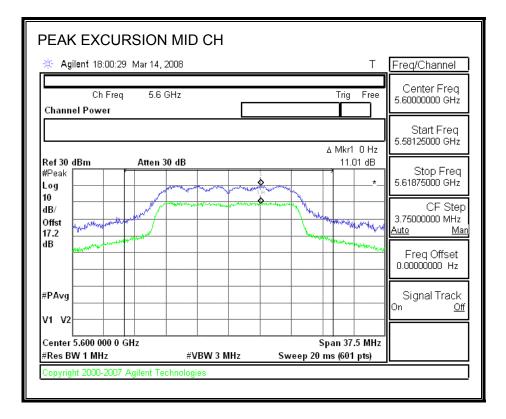
RESULT	S
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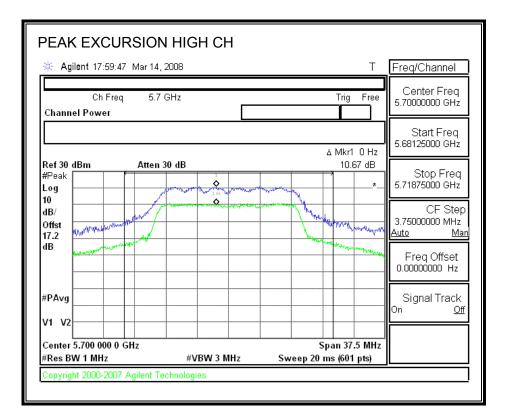
PEAK EXCURSION



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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.

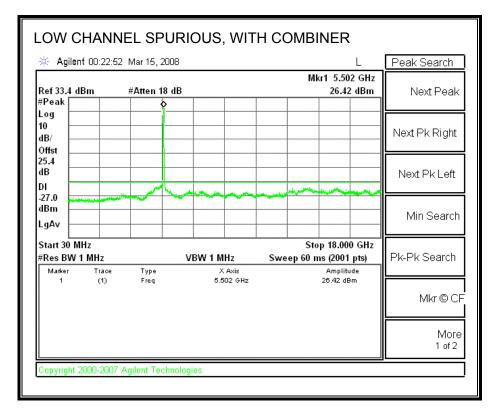
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements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

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

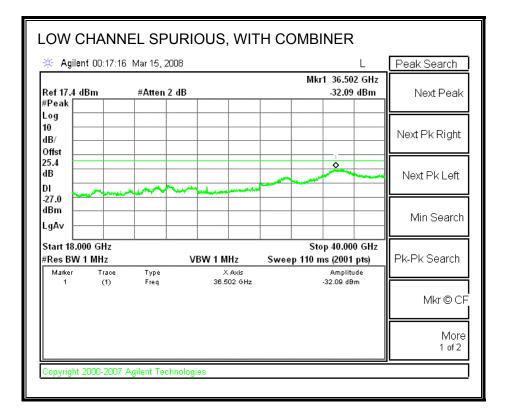
RESULTS

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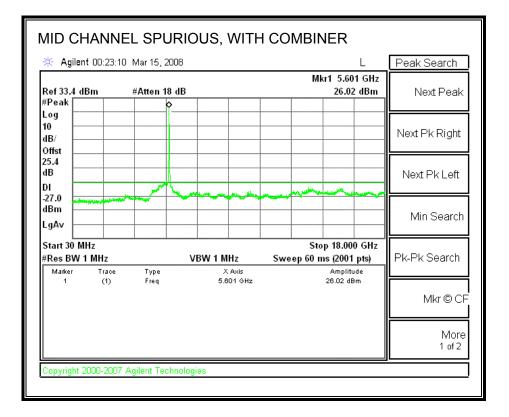
SPURIOUS EMISSIONS WITH COMBINER



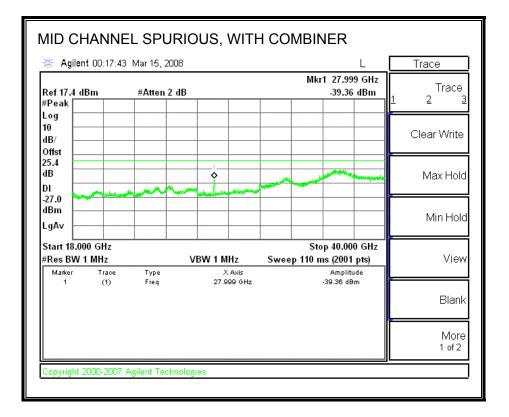
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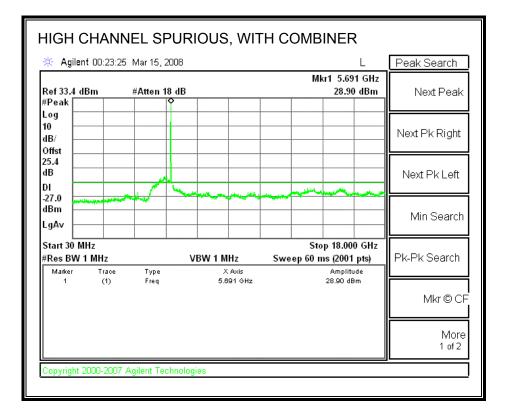
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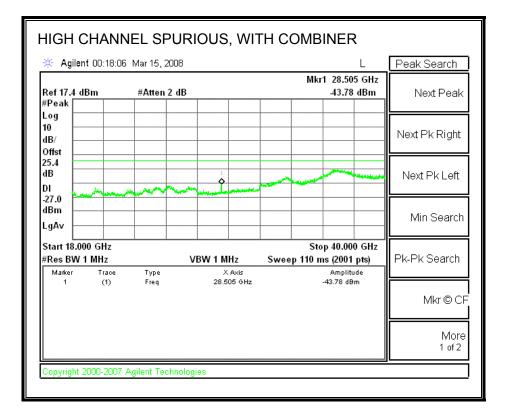
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7.8. 802.11n HT20 MODE IN THE 5.6 GHz BAND

7.8.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

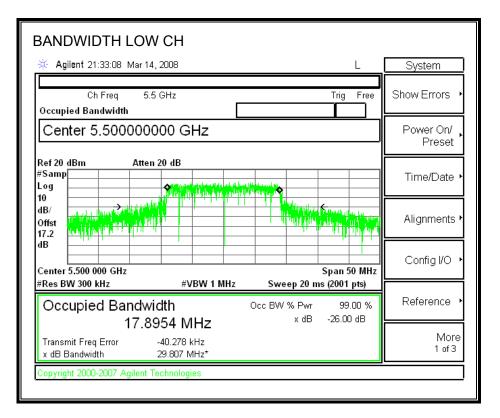
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

<u>RESULTS</u>

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5500	29.807	17.8954
Middle	5600	41.740	21.0754
High	5700	26.765	17.9214

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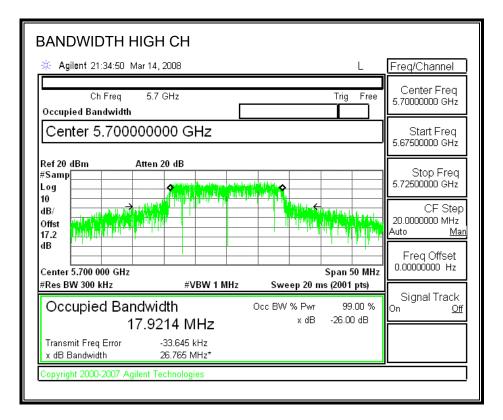
26 dB and 99% BANDWIDTH



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BANDWIDTH MID CI	4			
🔆 Agilent 21:33:57 Mar 14, 200	08		L	Freq/Channel
Ch Freq 5.6 GH Occupied Bandwidth	lz		Trig Free	Center Freq 5.6000000 GHz
Center 5.60000000) GHz			Start Freq 5.57500000 GHz
Ref 20 dBm Atten 20 #Samp Log 10 dtext atten 20				Stop Freq 5.62500000 GHz
Offst 17.2				CF Step 20.000000 MHz Auto <u>Man</u>
dB			Span 50 MHz	Freq Offset 0.00000000 Hz
#Res BW 300 kHz	#VBW 1 MHz	Sweep 20 n	ns (2001 pts)	Signal Track
Occupied Bandwidtl 21.075		Occ BW % Pwr x dB	99.00 % -26.00 dB	On <u>Off</u>
).257 kHz 740 MHz*			
Copyright 2000-2007 Agilent Tech	nologies			

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7.8.2. OUTPUT POWER

LIMITS

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

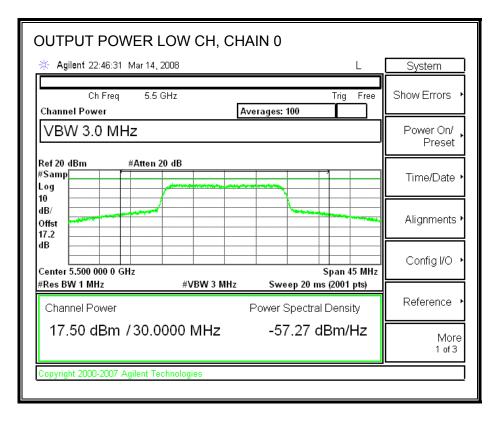
Channel	Frequency	Fixed	В	11 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5500	24	29.807	25.74	5.34	24
Mid	5600	24	41.740	27.21	5.34	24
High	5700	24	26.765	25.28	5.34	24

Individual Chain Results

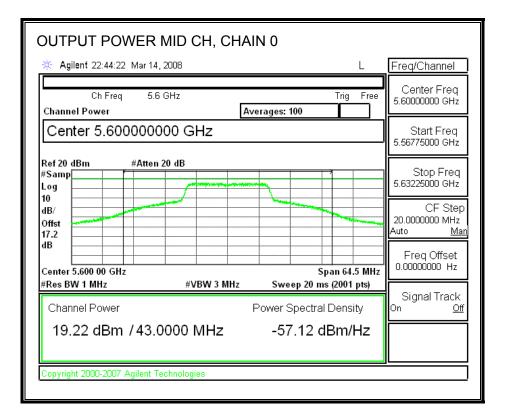
Channel	Frequency	Chain 0	Chain 1	Total	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5500	17.50	17.31	20.42	24.00	-3.58
Mid	5600	19.22	19.08	22.16	24.00	-1.84
High	5700	18.65	18.38	21.53	24.00	-2.47

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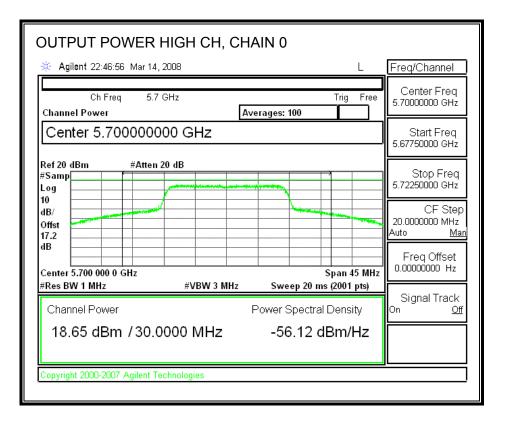
CHAIN 0 OUTPUT POWER



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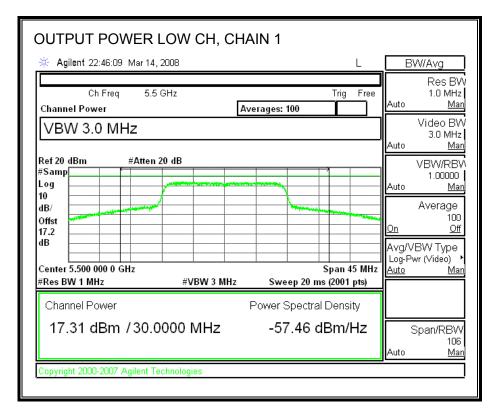


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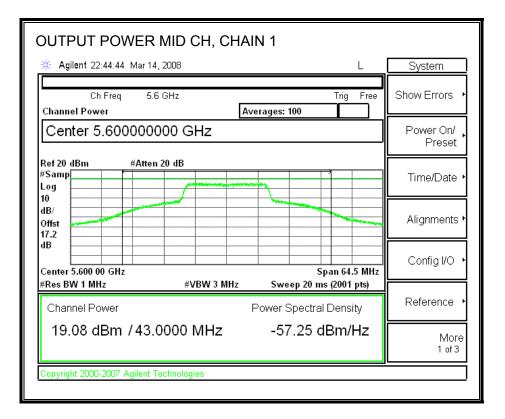


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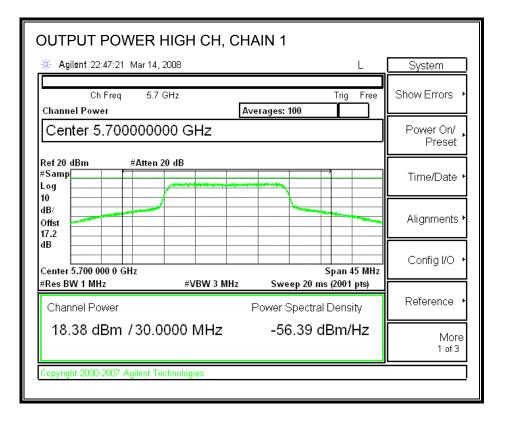
CHAIN 1 OUTPUT POWER



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7.8.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 17.2 dB (including 16 dB pad and 1.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Chain 0	Chain 1	Total
		Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)
Low	5500	17.61	17.41	20.52
Middle	5600	19.63	19.83	22.74
High	5700	17.96	17.72	20.85

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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

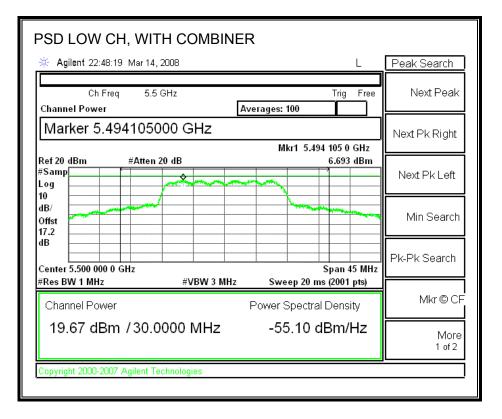
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

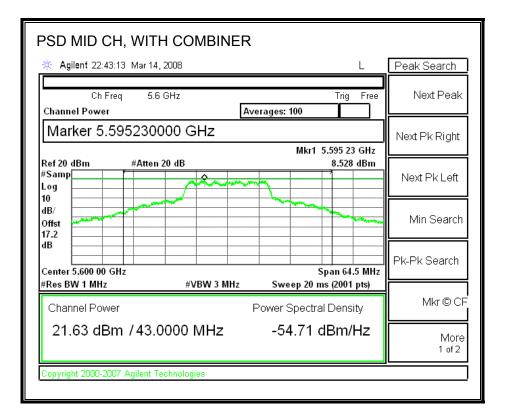
Channel	Frequency	PPSD With Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5500	6.69	11	-4.31
Middle	5600	8.53	11	-2.47
High	5700	7.47	11	-3.53

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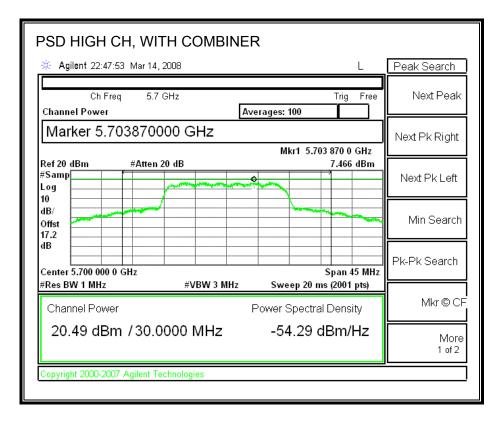
POWER SPECTRAL DENSITY WITH COMBINER



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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.

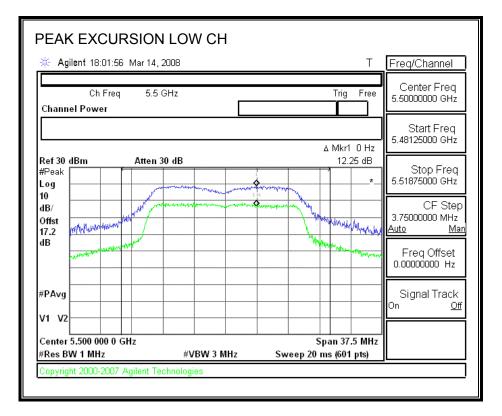
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5500	12.25	13	-0.75
Middle	5600	11.53	13	-1.47
High	5700	11.27	13	-1.73

RESULT	S
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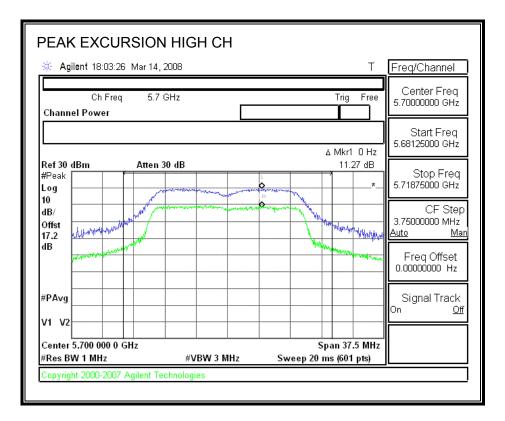
PEAK EXCURSION



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PEAK EXCURSION	I MID CH		
🔆 Agilent 18:02:44 Mar 14,	2008	Т	Freq/Channel
Ch Freq 5.6 Channel Power	GHz	Trig Fre	e Center Freq 5.6000000 GHz
		۵ Mkr1 O H	Start Freq 5.58125000 GHz
Ref 30 dBm Atten #Peak Log 10	30 dB	11.53 dB	Stop Freq
dB/ Offst 17.2		Manager Manager	CF Step 3.75000000 MHz <u>Auto Man</u>
			Freq Offset 0.00000000 Hz
#PAvg			Signal Track On
V1 V2 Center 5.600 000 0 GHz #Res BW 1 MHz	#VBW 3 MHz	Span 37.5 MH Sweep 20 ms (601 pts)	Iz
Copyright 2000-2007 Agilent Te	chnologies	<u> </u>	

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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.

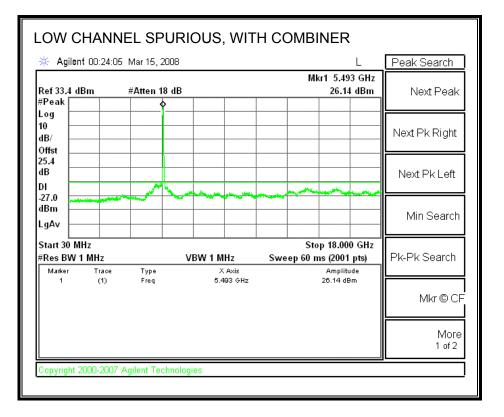
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements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

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

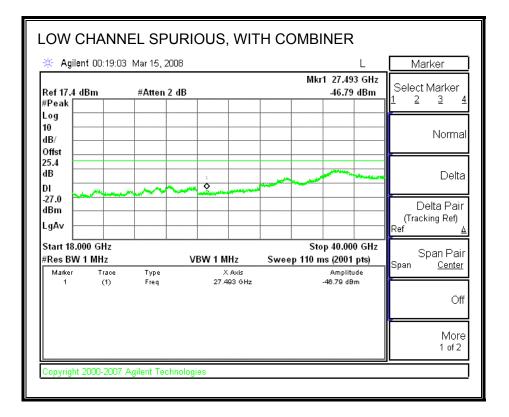
RESULTS

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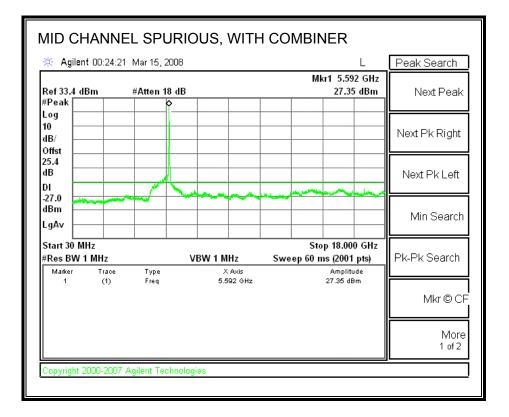
SPURIOUS EMISSIONS WITH COMBINER



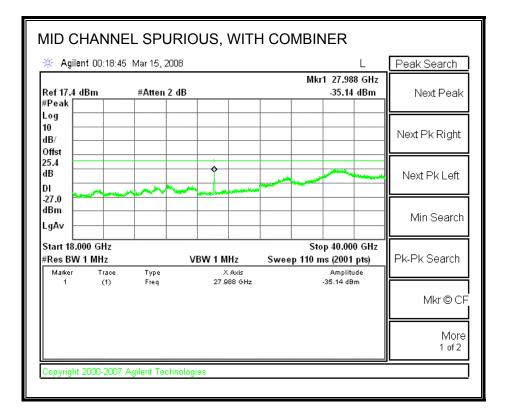
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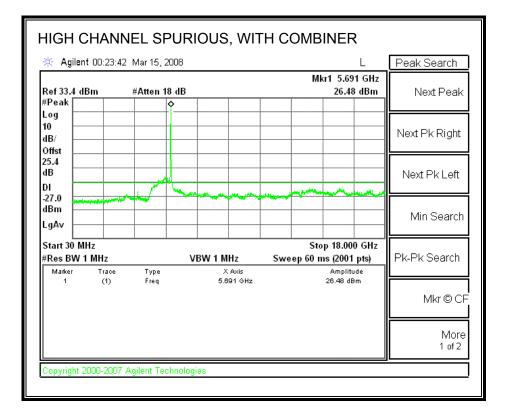
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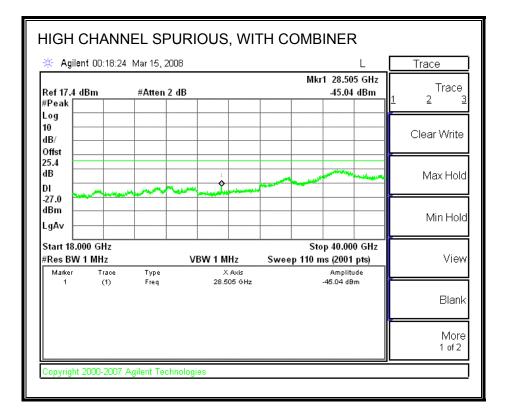
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7.9. 802.11n HT40 MODE IN THE 5.6 GHz BAND

7.9.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

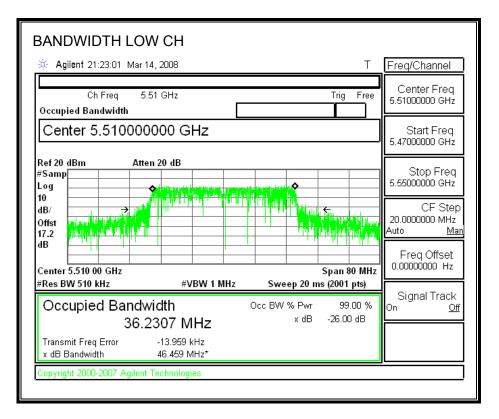
The transmitter outputs are connected to the spectrum analyzer via a combiner. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

<u>RESULTS</u>

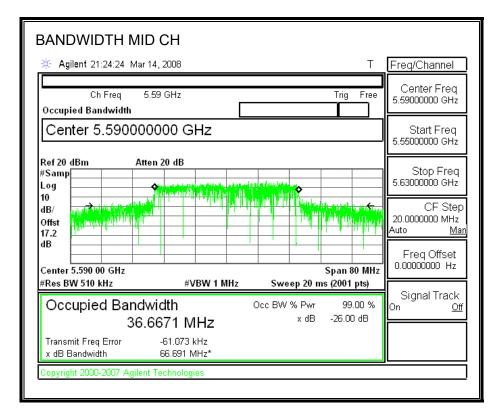
Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5510	46.459	36.2307
Middle	5590	66.691	36.6671
High	5670	60.782	36.5906

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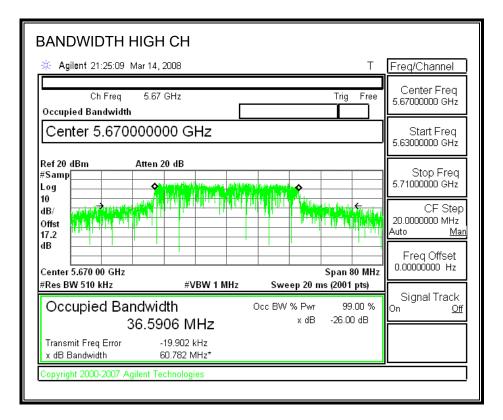
26 dB and 99% BANDWIDTH



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7.9.2. OUTPUT POWER

LIMITS

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

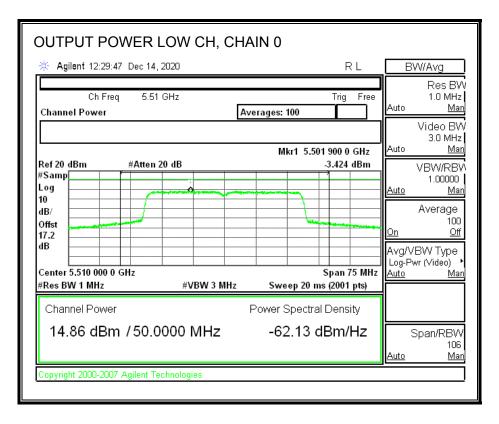
Limit

2000						
Channel	Frequency	Fixed	В	11 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5510	24.00	46.459	27.67	5.34	24.00
Mid	5590	24.00	66.691	29.24	5.34	24.00
High	5670	24.00	60.782	28.84	5.34	24.00

Individual Chain Results

Channel	Frequency	Chain 0	Chain 1	Total	Limit	Margin
		Power	Power	Power		
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
Low	5510	14.86	15.24	18.06	24.00	-5.94
Mid	5590	20.61	20.52	23.58	24.00	-0.42
High	5670	18.78	18.69	21.75	24.00	-2.25

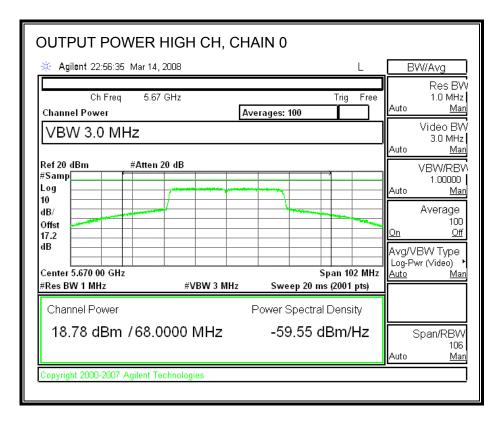
CHAIN 0 OUTPUT POWER



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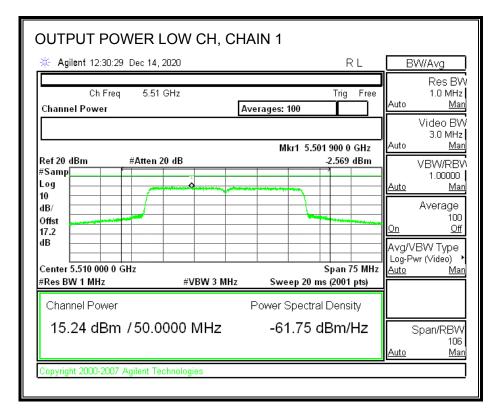
OUTPUT POWER	MID CH, CHAI	N 0	
🔆 Agilent 22:55:58 Mar 14,	2008	L	System
Ch Freq 5.59 Channel Power	GHz	Trig Fre	e Show Errors
Center 5.5900000			Power On/ Preset
Ref 20 dBm #Atten # #Samp Log 10	20 dB		Time/Date •
dB/			Alignments •
dB		Span 102 MF	Lz Config I/O ▸
# Res BW 1 MHz Channel Power	#VBW 3 MHz	Sweep 20 ms (2001 pts) Power Spectral Density	Reference •
20.61 dBm /68.0	0000 MHz	-57.71 dBm/Hz	More 1 of 3
Copyright 2000-2007 Agilent Te	echnologies		

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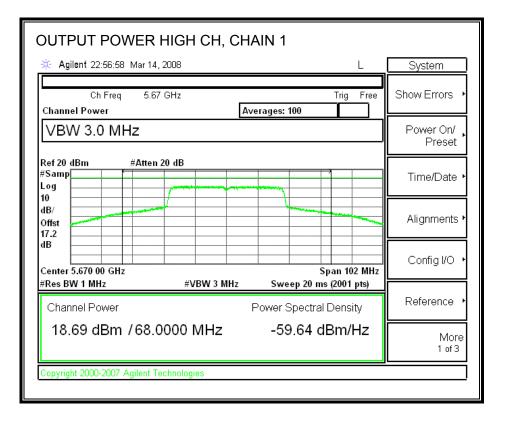
CHAIN 1 OUTPUT POWER



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OUTPUT POWER M	ID CH, CHAI	N 1		
🔆 Agilent 22:55:27 Mar 14, 20	08		L	Freq/Channel
Ch Freq 5.59 G Channel Power		erages: 100	Trig Free	Center Freq 5.59000000 GHz
Center 5.59000000	0 GHz			Start Freq 5.53900000 GHz
Ref 20 dBm #Atten 20 #Samp Log 10	dB			Stop Freq 5.64100000 GHz
dB/ Offst 17.2				CF Step 20.0000000 MHz Auto <u>Man</u>
dB Center 5.590 00 GHz #Res BW 1 MHz	#VBW 3 MHz	Sp Sweep 20 ms	an 102 MHz (2001 ptc)	Freq Offset 0.00000000 Hz
Channel Power		Power Spectral [· · /	Signal Track On <u>Off</u>
20.52 dBm /68.00	00 MHz	-57.80 dE	3m/Hz	
Copyright 2000-2007 Agilent Tech	nologies			

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7.9.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 172 dB (including 16 dB pad and 1.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Chain 0	Chain 1	Total
		Power	Power	Power
	(MHz)	(dBm)	(dBm)	(dBm)
Low	5510	14.92	15.36	18.16
Middle	5590	20.01	20.22	23.13
High	5670	18.21	18.24	21.24

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7.9.4. 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

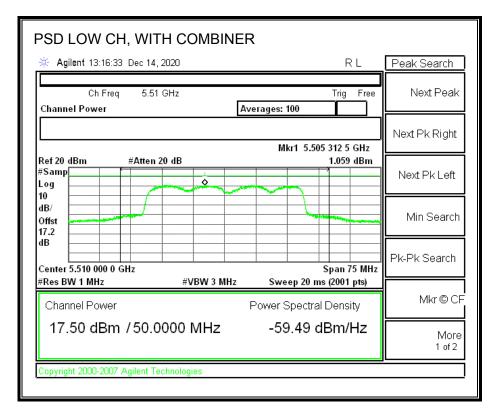
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

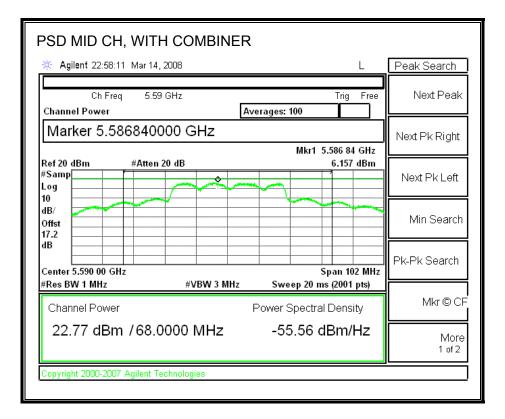
Channel	Frequency	PPSD With Combiner	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5510	1.06	11	-9.94
Middle	5590	6.16	11	-4.84
High	5670	4.27	11	-6.73

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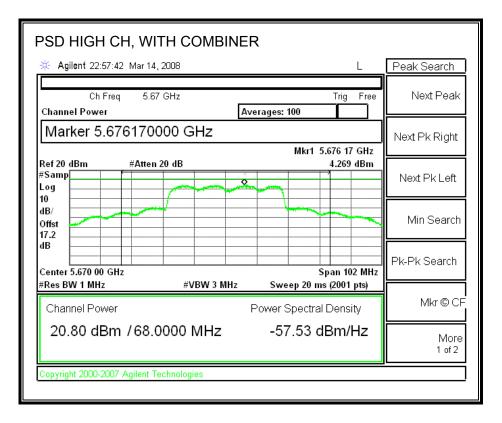
POWER SPECTRAL DENSITY WITH COMBINER



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7.9.5. 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.

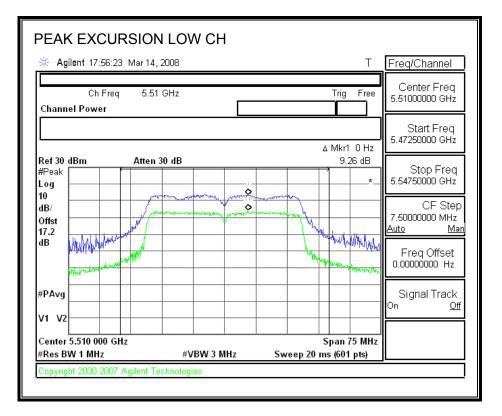
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5510	9.26	13	-3.74
Middle	5590	12.26	13	-0.74
High	5670	11.21	13	-1.79

RESULT	S
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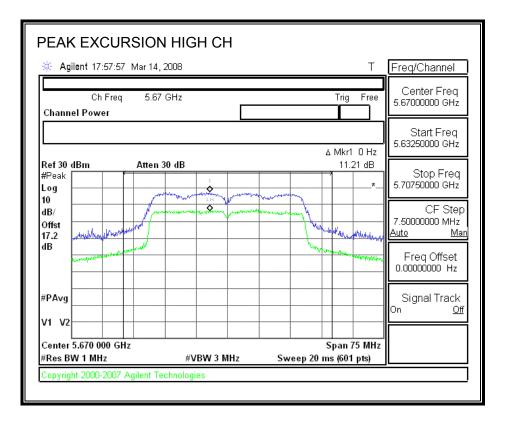
PEAK EXCURSION



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PEAK EXCURSION N	AID CH		
🔆 Agilent 17:57:10 Mar 14, 200)8	Т	Freq/Channel
Ch Freq 5.59 GH Channel Power	Hz	Trig Free	Center Freq 5.59000000 GHz
		∆ Mkr1 0 Hz	Start Freq 5.55250000 GHz
Ref 30 dBm Atten 30 d #Peak	1 American	12.26 dB	Stop Freq 5.62750000 GHz
dB/ Offst 17.2	and the second second second second	and a second for a second	CF Step 7.5000000 MHz <u>Auto Man</u>
dB			Freq Offset 0.00000000 Hz
#PAvg			Signal Track On <u>Off</u>
Center 5.590 000 GHz #Res BW 1 MHz	#VBW 3 MHz	Span 75 MHz Sweep 20 ms (601 pts)	
Copyright 2000-2007 Agilent Techn	nologies		

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7.9.6. 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.

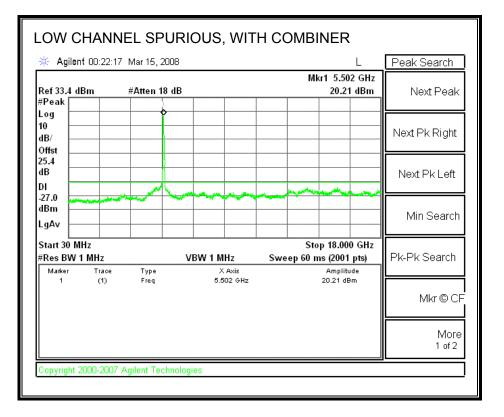
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to the average EIRP limit, adjusted for the maximum antenna gain. If necessary, additional average detection measurements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

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

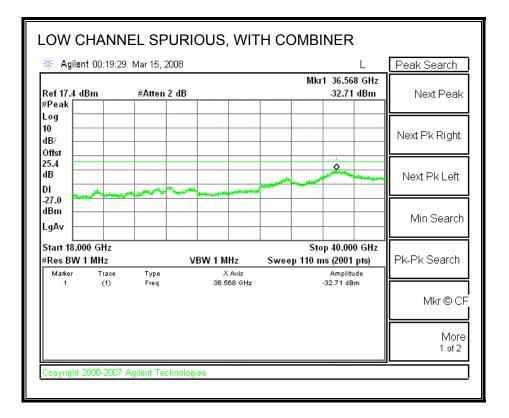
RESULTS

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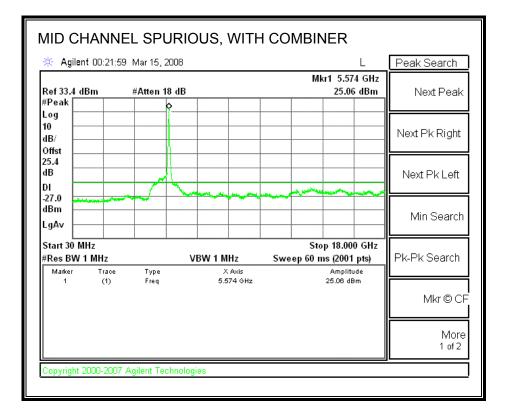
SPURIOUS EMISSIONS WITH COMBINER



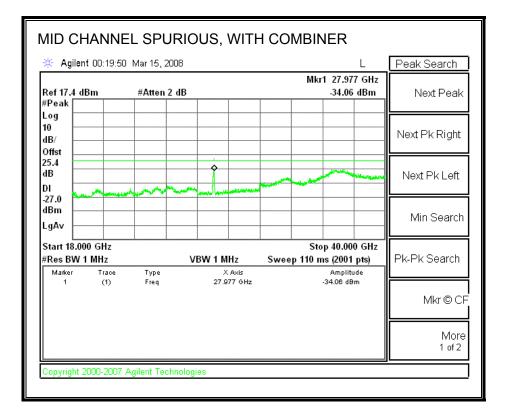
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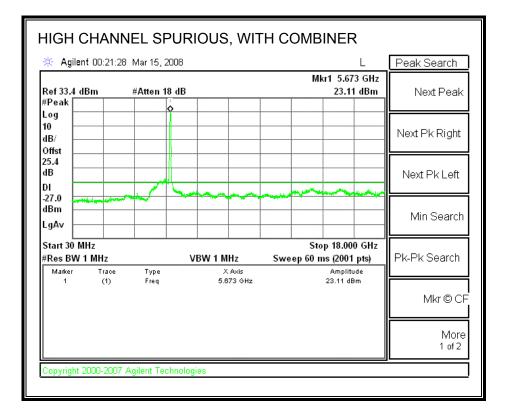
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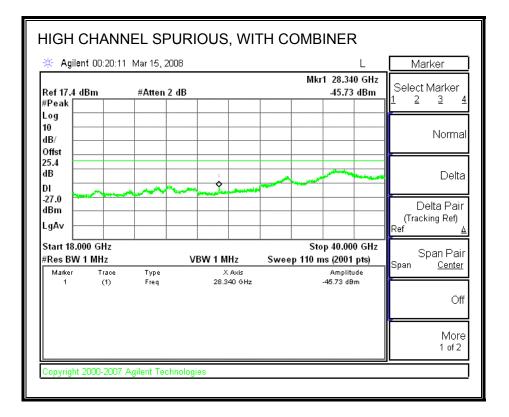
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8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

<u>LIMITS</u>

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

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

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

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The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

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

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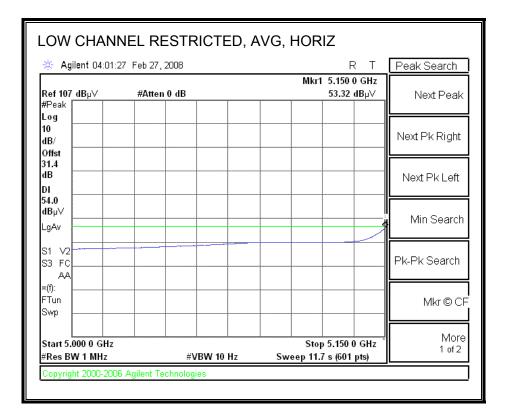
8.2. TRANSMITTER ABOVE 1 GHz

8.2.1. TRANSMITTER ABOVE 1 GHz FOR 802.11a MODE IN THE LOWER 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

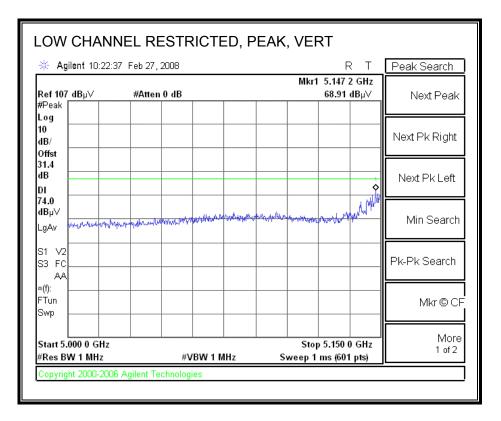
Agilent 04:00	:55 Feb 27 , 2008			RT	Peak Search
f 107_dBµ∨	#Atten 0 dB		Mkr	1 5.149 0 GHz 68.96 dBµ∀	Next Peal
eak g					
					Next Pk Right
st 4					Next Pk Left
					*
0 μ∨	munimum	LAN. Junder By anticipation the	With a Martin Martin		Min Search
AV Papelikonikonikonikoni	L CHANNEL MARKET COLUMN				
V2 FC					Pk-Pk Search
Jn p					Mkr © C
nt 5.000 0 GHz es BW 1 MHz		/BW 1 MHz		p 5.150 0 GHz I ms (601 pts)	Mor 1 of 2

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RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



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