

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

CERTIFICATION TEST REPORT

FOR

WIRELESS N NETWORKING ADAPTOR

MODEL NUMBER: 1398

FCC ID: C3K1398 IC: 3048A-1398

REPORT NUMBER: 09U12610-2, REVISION A

ISSUE DATE: SEPTEMBER 9, 2009

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(R)

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Revision History

Rev.	lssue Date	Revisions	Revised By
	08/14/09	Initial Issue	T. Chan
Α	09/09/09	Revised 5.5 GHz band antenna gain specification and 20 MHz bandwidth maximum power	T. Chan

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: MICROSOFT CORPORATION 1 Microsoft Way, Redmond, WA 98052, U.S.A.					
EUT DESCRIPTION:	EUT DESCRIPTION: WIRELESS N NETWORKING ADAPTOR				
MODEL:	1398				
SERIAL NUMBER:	SERIAL NUMBER: 066				
DATE TESTED:	JULY 21 – AUGUST 10, 2009				
	APPLICABLE STANDARDS				
STA	TEST RESULTS				
CFR 47 Pa	art 15 Subpart E	Pass			
INDUSTRY CANADA	RSS-210 Issue 7 Annex 9	Pass			
INDUSTRY CAN	ADA RSS-GEN Issue 2	Pass			

Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For CCS By:

THU CHAN EMC MANAGER COMPLIANCE CERTIFICATION SERVICES

Tested By:

Char

DEVIN CHANG EMC ENGINEER COMPLIANCE CERTIFICATION SERVICES

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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 06-96, RSS-GEN Issue 2, and RSS-210 Issue 7.

3. FACILITIES AND ACCREDITATION

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an USB 2x2 Dual Band 802.11 a/b/g/n Radio.

The radio module is manufactured by Atheros.

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range	Mode	Output Power	Output Power
(MHz)		(dBm)	(mW)
5180 - 5240	802.11a	14.66	29.24
5180 - 5240	802.11n HT20	15.08	32.21
5190 - 5230	802.11n HT40	16.30	42.66
5260 - 5320	802.11a	17.13	51.64
5260 - 5320	802.11n HT20	17.18	52.24
5270 - 5310	802.11n HT40	16.91	49.09
5500 - 5700	802.11a	17.24	52.97
5500 - 5700	802.11n HT20	17.17	52.12
5510 - 5670	802.11n HT40	17.01	50.23

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilize a dipole antennas with maximum gain of 2 dBi from 2400 - 2483.5 MHz, 3.84 dBi from 5150 - 5250 MHz, 3.84 dBi from 5250 - 5350 MHz, 4.92 dBi from 5470 - 5725 MHz, and 3.6 dBi from 5725 - 5850 MHz.

5.4. SOFTWARE AND FIRMWARE

The test utility and driver software used during testing was Art ANWI and Devlib Revision 0.8 Build #120 Art_11n.

5.5. WORST-CASE CONFIGURATION AND MODE

The 1x2 configuration was used for 5GHz testing in this report.

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

All emissions tests were made with following data rates:

- 802.11a mode, 20 MHz Channel Bandwidth, 6 Mb/s, OFDM Modulation.
- 802.11n HT20 mode, 20 MHz Channel Bandwidth, MCS0, 6.5 Mb/s, OFDM Modulation,.
- 802.11n HT40 mode, 40 MHz Channel Bandwidth, MCS0, 13.5 Mb/s, OFDM Modulation.
- ٠

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

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

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST					
Description Manufacturer Model Serial Number FCC					
NoteBook	DELL	PP10S	CN-0C8862-48643-57L-1789	DoC	
AC Adaptor DELL N5825 CN-0N5825-48661-575-A028 Do C					

I/O CABLES

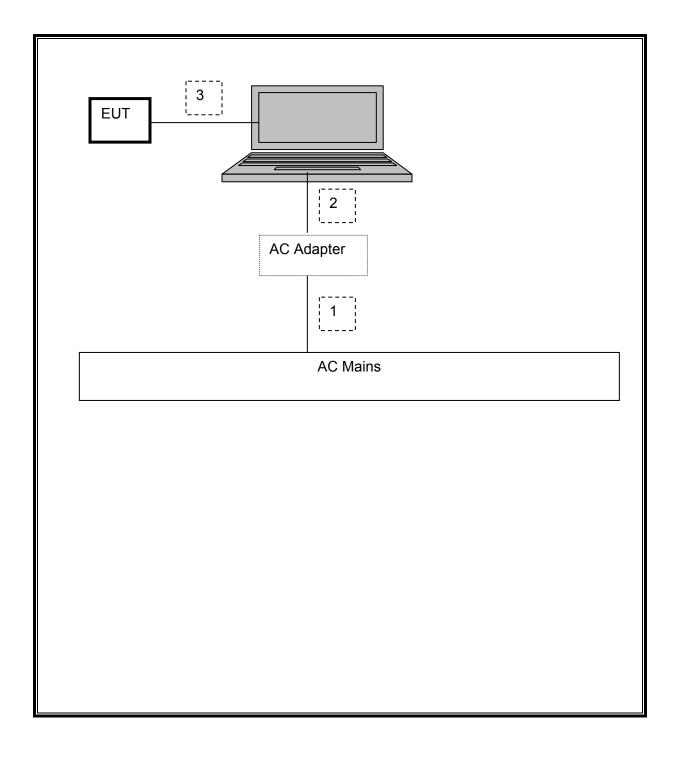
	I/O CABLE LIST							
Cable No.	Port	# of Identica Ports	Connector Type	Cable Type	Cable Length	Remarks		
1	AC	2	US 115V	Un-shielded	0.9 m	No		
2	DC	3	DC	Un-shielded	1.8m	No		
3	USB	1	USB	Un-shielded	1m	No		

TEST SETUP

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

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SETUP DIAGRAM FOR TESTS



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6. TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	Asset	Cal Due	
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	02/04/10	
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01171	01/14/10	
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	12/16/09	
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	04/20/10	
Antenna, Hom, 18 GHz	EMCO	3115	C00872	04/22/10	
EMI Test Receiver, 30 MHz	R&S	ESHS 20	N02396	05/06/11	
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	10/29/09	
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	N02481	10/29/09	
Peak Power Meter	Boonton	4541	N/A	01/15/10	
Peak / Average Power Sensor	Boonton	57318	N/A	02/02/10	
Reject Filter, 5.15-5.35 GHz	Micro-Tronics	BRC13190	N02679	N/A	
Reject Filter, 5.47-5.725 GHz	Micro-Tronics	BRC13191	N02678	NA	
Reject Filter, 5.725-5.825 GHz	Micro-Tronics	BRC13192	N02677	NA	
Highpass Filter, 7.6 GHz	Micro-Tronics	HPM13195	N02682	N/A	

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7. ANTENNA PORT TEST RESULTS

7.1. 802.11a MODE IN THE 5.2 GHz BAND

7.1.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

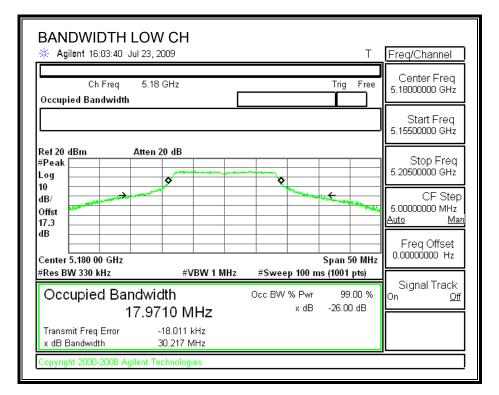
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

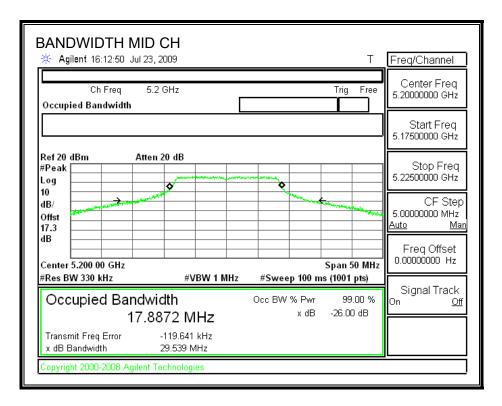
RESULTS

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5180	30.217	16.5977
Middle	5200	29.539	16.6470
High	5240	29.059	16.5318

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26 dB BANDWIDTH



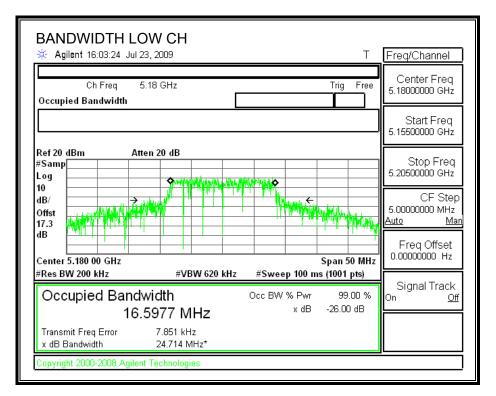


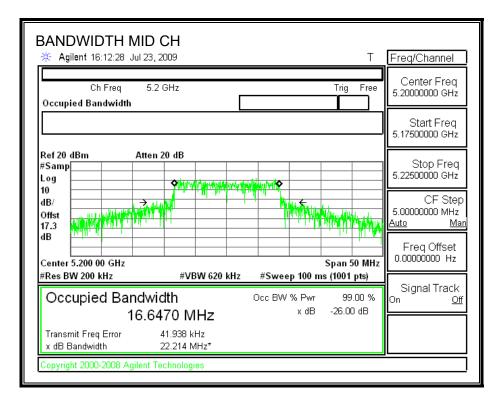
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BANDWIDTH HIGH CH	Т	Freq/Channel
Ch Freq 5.24 GHz Occupied Bandwidth	Trig Free	Center Freq 5.24000000 GHz
		Start Freq 5.21500000 GHz
Ref 20 dBm Atten 20 dB #Peak Log 10 dB/ Offst		Stop Freq 5.2650000 GHz CF Step 5.0000000 MHz
17.3 dB Center 5.240 00 GHz #Res BW 330 kHz #VBW 910 kHz	Span 50 MHz #Sweep 100 ms (1001 pts)	<u>Auto Mar</u> Freq Offset 0.0000000 Hz
Occupied Bandwidth 17.8497 MHz	Occ BW % Pwr 99.00 % x dB -26.00 dB	Signal Track On <u>Off</u>
Transmit Freq Error 16.162 kHz x dB Bandwidth 29.059 MHz		

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99% BANDWIDTH





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BANDWIDTH HIGH (Agilent 16:26:23 Jul 23, 200	-		Т	Freq/Channel
Ch Freq 5.24 GH Occupied Bandwidth	1z		Trig Free	Center Freq 5.24000000 GHz
				Start Freq 5.21500000 GHz
dB/ Offst 17.3				Stop Freq 5.26500000 GHz CF Step 5.00000000 MHz <u>Auto Man</u>
dB Center 5.240 00 GHz #Res BW 200 kHz	#VBW 620 kHz	#Sweep 100 m	Span 50 MHz s (1001 pts)	Freq Offset 0.00000000 Hz
Occupied Bandwidtl 16.531		Occ BW % Pwr x dB	99.00 % -26.00 dB	Signal Track ^{On <u>Off</u>}
·	426 MHz*			
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7.1.2. OUTPUT POWER

<u>LIMITS</u>

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

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

TEST PROCEDURE

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

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

RESULTS

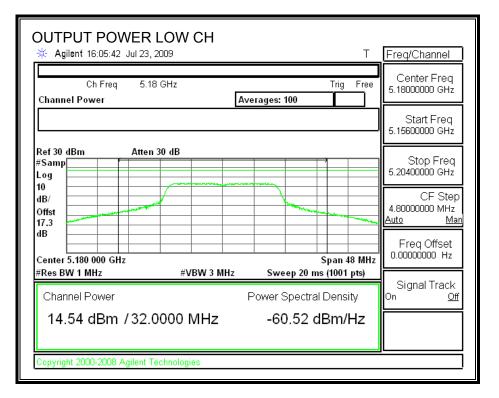
Limit

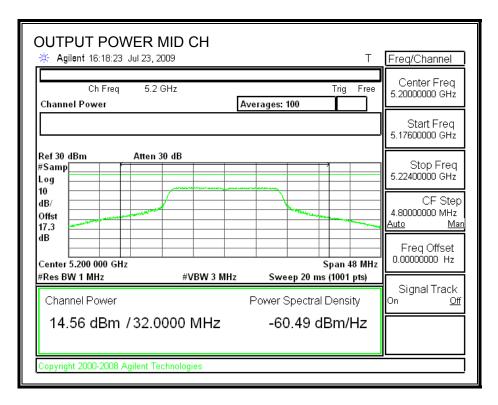
Channel	Frequency	Fixed	В	4 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5180	17	30.217	18.80	3.84	17.00
Mid	5200	17	29.539	18.70	3.84	17.00
High	5240	17	29.059	18.63	3.84	17.00

Results

Channel	Frequency	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5180	14.54	17.00	-2.46
Mid	5200	14.56	17.00	-2.44
High	5240	14.66	17.00	-2.34

OUTPUT POWER





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OUTPUT POWER HIG	н сн		Т	Freq/Channel
Ch Freq 5.24 GHz Channel Power	A	verages: 100	Trig Free	Center Freq 5.24000000 GHz
		-		Start Freq 5.21600000 GHz
Ref 30 dBm Atten 30 dB #Samp Log 10			*	Stop Freq 5.26400000 GHz
dB/ Offst 17.3		- Anterna	Land and the second	CF Step 4.8000000 MHz <u>Auto Man</u>
dB			Span 48 MHz	Freq Offset 0.00000000 Hz
#Res BW 1 MHz Channel Power	#VBW 3 MHz	Sweep 20 ms Power Spectral I	· · ·	Signal Track On <u>Off</u>
14.66 dBm / 32.0000) MHz	-60.39 dl	3m/Hz	
Copyright 2000-2008 Agilent Technol	ogies			1.

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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 17.3 dB (including 16 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Power
	(MHz)	(dBm)
Low	5180	14.71
Middle	5200	14.73
High	5240	14.84

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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)

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

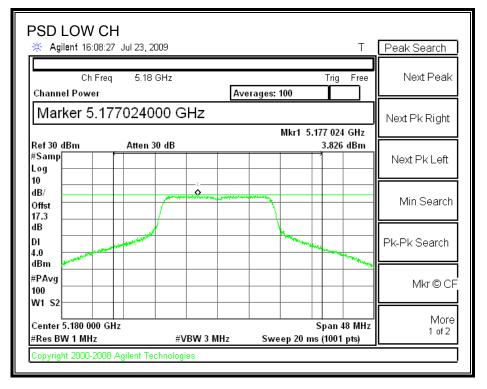
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

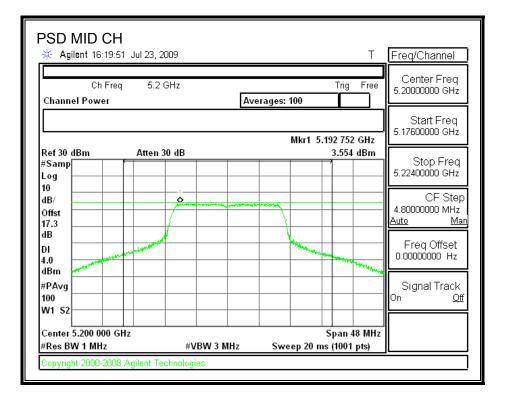
RESULTS

Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5180	3.83	4	-0.17
Middle	5200	3.55	4	-0.45
High	5240	3.87	4	-0.13

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POWER SPECTRAL DENSITY





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								Freq/Channel Center Freq
Ch Fr Channel Power	req 5.24	4 GHz	Av	erages:	100	Trig	Free	5.24000000 GHz
								Start Freq 5.21600000 GHz
Ref 30 dBm	Atten	30 dB			Mkr1 5.3)GHz)dBm	
#Samp Log						1		Stop Freq 5.26400000 GHz
10 dB/								CF Step
Offst 17.3		\downarrow						4.80000000 MHz <u>Auto Ma</u>
dB DI	****	4			North Carlos	-		Freq Offset 0.00000000 Hz
4.0 dBm							and the second	0.0000000 112
#PA∨g 100								Signal Track On <u>Of</u>
W1 S2								
Center 5.240 000 #Res BW 1 MHz	GHz		N 3 MHz		ep 20 m		48 MHz	

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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 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.

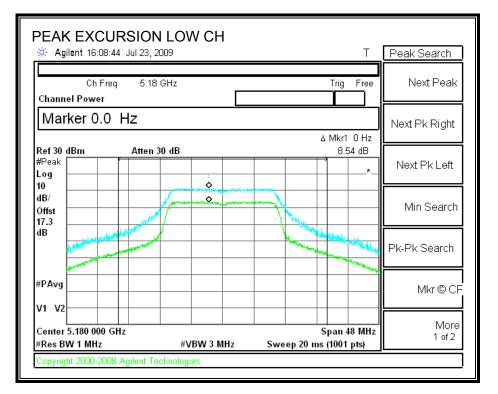
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

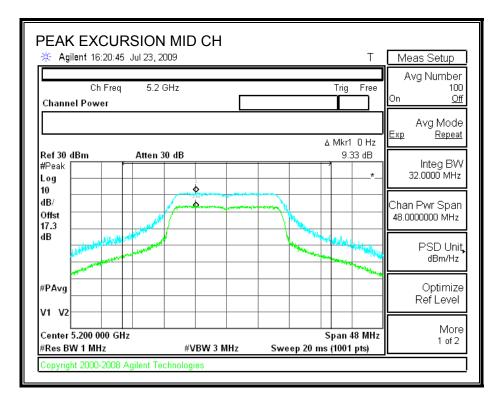
RESULTS

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5180	8.54	13	-4.46
Middle	5200	9.33	13	-3.67
High	5240	8.84	13	-4.16

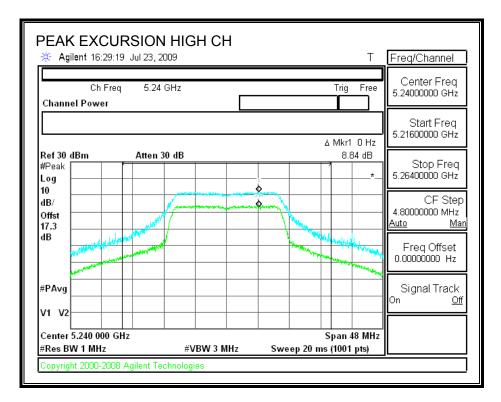
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PEAK EXCURSION





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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.

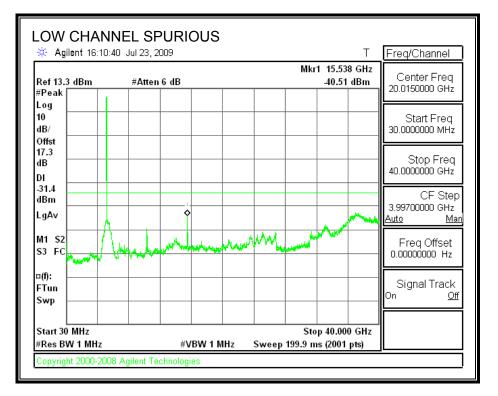
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

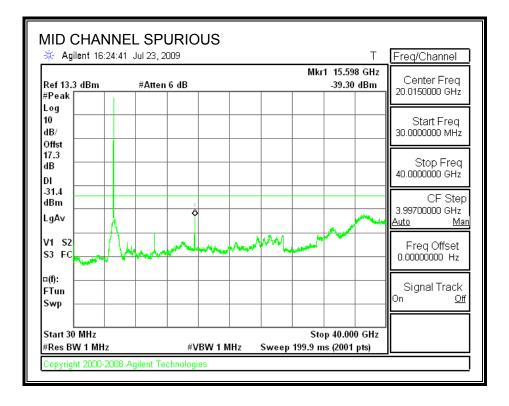
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

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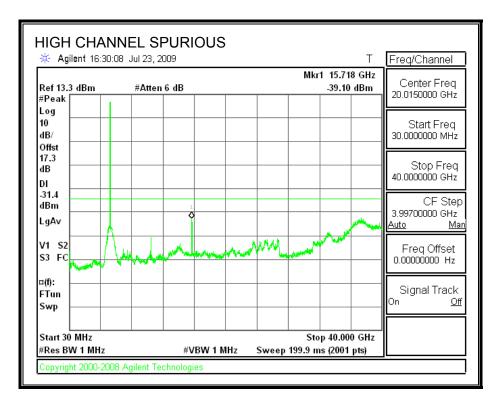
RESULTS

SPURIOUS EMISSIONS





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7.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

7.2.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

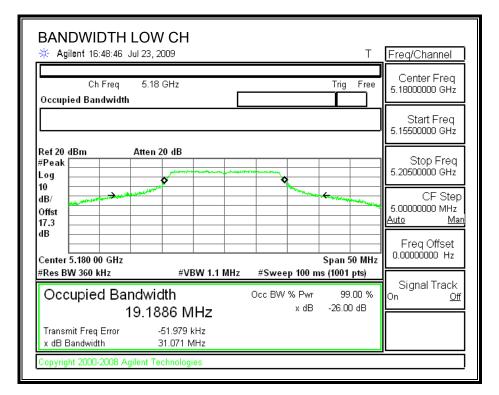
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

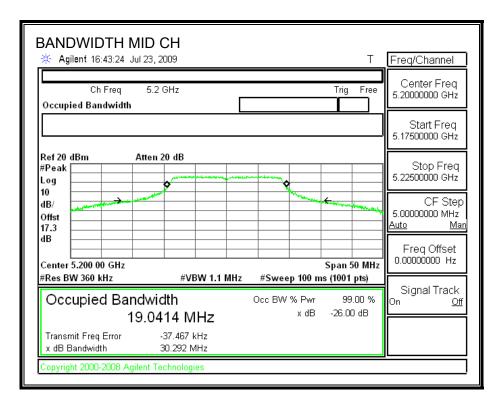
RESULTS

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5180	31.071	17.6654
Middle	5200	30.292	17.7380
High	5240	30.263	17.7770

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26 dB BANDWIDTH



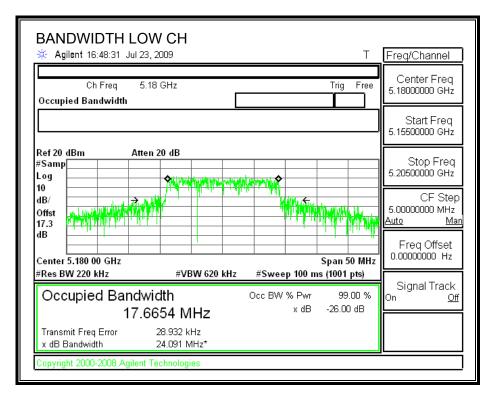


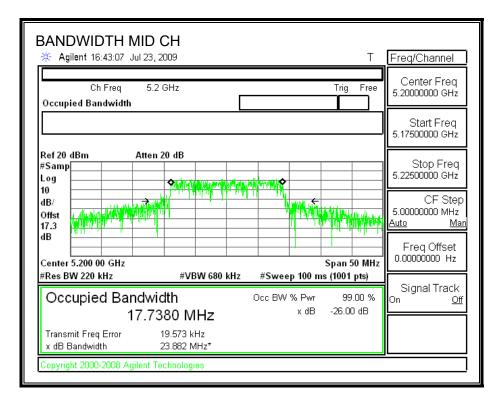
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BANDWIDTH H		Т	Freq/Channel
Ch Freq Occupied Bandwidth	5.24 GHz	Trig Free	Center Freq 5.24000000 GHz
			Start Freq 5.21500000 GHz
#Peak	tten 20 dB		Stop Freq 5.26500000 GHz
10 dB/ Offst 17.3			CF Step 5.0000000 MHz <u>Auto Man</u>
dB Center 5.240 00 GHz #Res BW 360 kHz	#VBW 1.1 MHz	Span 50 MH #Sweep 100 ms (1001 pts)	Freq Offset 0.00000000 Hz
Occupied Band		Occ BW % Pwr 99.00 % x dB -26.00 dB	Signal Track On <u>Off</u>
Transmit Freq Error x dB Bandwidth	19.335 kHz 30.263 MHz		
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99% BANDWIDTH





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Offst 17.3 dB 5.00000000 MHz Center 5.240 00 GHz Span 50 MHz #Res BW 220 kHz #VBW 620 kHz #Sweep 100 ms (1001 pts) Signal Track	BANDWIDTH HIGH CH	T	Freq/Channel
Log 5.21500000 GHz Samp Stop Freq Log 6 10 6 dB/ 6 Offst 6 17.3 6 dB 6 Offst 6 17.3 6 dB 6 Offst 6 17.3 6 dB 6 0 6 0 6 0 6 0 6 0 7 0 7 0 7 0 7 0 7 0 7 0 7 0 7 0 7 0 7 0 7 0 7 0 7 0 7 0 7 0 7 0 7 0 7 0 7 <td< th=""><th></th><th>Trig Free</th><th></th></td<>		Trig Free	
#Samp Stop Freq Log Stop Freq 10 B/ 0ffst CF Step 17.3 Control dB Center 5.240 00 GHz #Res BW 220 kHz #VBW 620 kHz #Sweep 100 ms (1001 pts) Signal Track On Occupied Bandwidth Occ BW % Pwr 99.00 % 17.7770 MHz x dB -26.00 dB			
Center 5.240 00 GHz Span 50 MHz #Res BW 220 kHz #VBW 620 kHz #Sweep 100 ms (1001 pts) Occupied Bandwidth Occ BW % Pwr 99.00 % 17.7770 MHz x dB -26.00 dB	#Samp Log 10 dB/ Offst		5.26500000 GHz CF Step 5.00000000 MHz
Occupied Bandwidth Occ BW % Pwr 99.00 % On Off 17.7770 MHz × dB -26.00 dB	Center 5.240 00 GHz	•	0.00000000 Hz
	· ·		
Copyright 2000-2008 Agilent Technologies	x dB Bandwidth 22.277 MHz*		

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7.2.2. OUTPUT POWER

<u>LIMITS</u>

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

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

TEST PROCEDURE

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

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

RESULTS

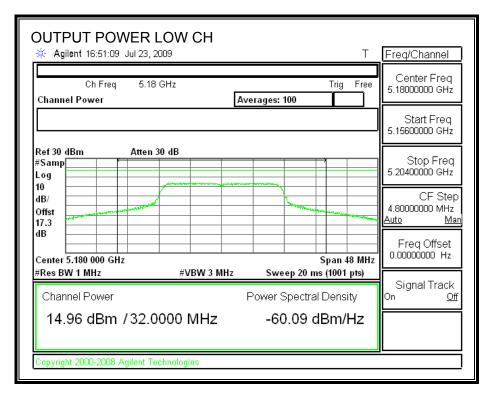
Limit

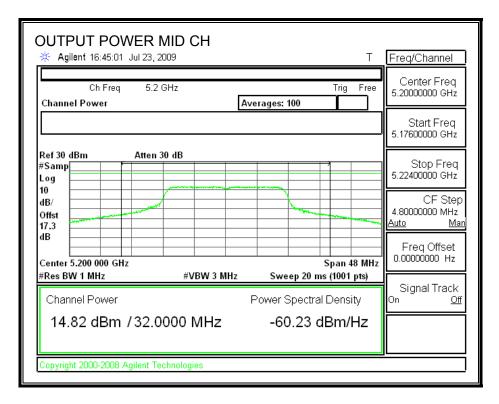
Channel	Frequency	Fixed	В	4 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5180	17	31.071	18.92	3.84	17.00
Mid	5200	17	30.292	18.81	3.84	17.00
High	5240	17	30.263	18.81	3.84	17.00

Results

Channel	Frequency	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5180	14.96	17.00	-2.04
Mid	5200	14.82	17.00	-2.18
High	5240	15.08	17.00	-1.92

OUTPUT POWER





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OUTPUT POWER HIGH CH * Agilent 16:41:55 Jul 23, 2009		Т	Meas Setup
Ch Freq 5.24 GHz Channel Power	Averages: 100	Trig Free	Avg Number 100 <u>On Off</u>
	-		Avg Mode <u>Exp Repeat</u>
Ref 30 dBm Atten 30 dB #Samp Log 10			Integ BW 32.0000 MHz
dB/ Offst			Chan Pwr Span 48.0000000 MHz
dB Center 5.240 000 GHz #Res BW 1 MHz #VBW 3		Span 48 MHz	PSD Unit, dBm/Hz
Channel Power	Power Spe	20 ms (1001 pts) ectral Density	Optimize Ref Level
15.08 dBm /32.0000 MHz	-59.9	98 dBm/Hz	More 1 of 2
Copyright 2000-2008 Agilent Technologies			

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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 17.3 dB (including 16 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Power
	(MHz)	(dBm)
Low	5180	15.13
Middle	5200	14.98
High	5240	15.22

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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.

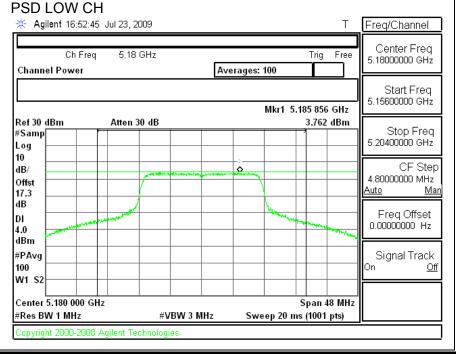
TEST PROCEDURE

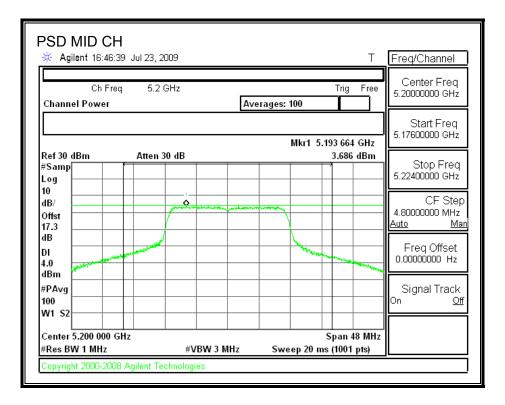
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

RESULTS

Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5180	3.76	4	-0.24
Middle	5200	3.69	4	-0.31
High	5240	3.89	4	-0.11

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PSD HIGH CH Agilent 16:39:59 Jul 2:	3, 2009	Т	Freq/Channel
Ch Freq 5 Channel Power	.24 GHz	Trig Free	Center Freq 5.24000000 GHz
		Mkr1 5.234 384 GHz	Start Freq 5.21600000 GHz
Ref 30 dBm Atte #Samp Log 10	en 30 dB	3.891 dBm	Stop Freq 5.26400000 GHz
dB/ Offst 17.3			CF Step 4.80000000 MHz <u>Auto Man</u>
dB DI 4.0		And a start of the	Freq Offset 0.00000000 Hz
dBm / / / / / / / / / / / / / / / / / / /			Signal Track On <u>Off</u>
Center 5.240 000 GHz #Res BW 1 MHz	#VBW 3 MHz	Span 48 MH: Sweep 20 ms (1001 pts)	z
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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 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.

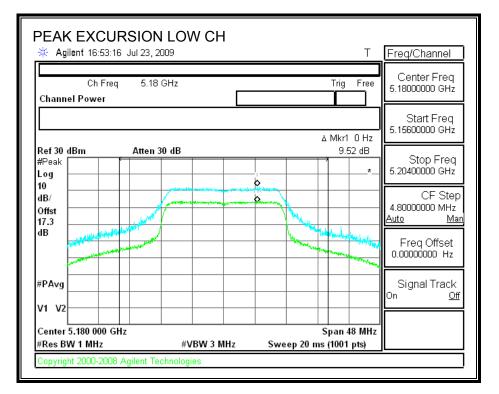
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

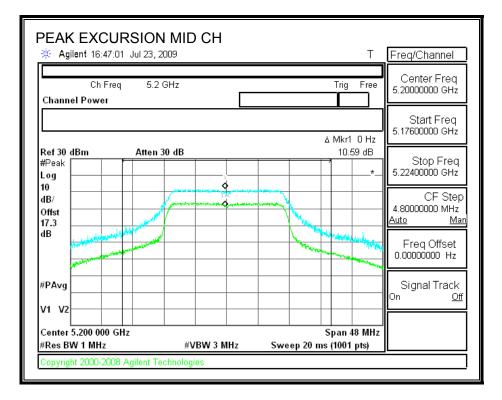
RESULTS

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5180	9.52	13	-3.48
Middle	5200	10.59	13	-2.41
High	5240	8.56	13	-4.44

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PEAK EXCURSION





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PEAK EXCURSIO			т	Freq/Channel
	1 GHz	Tri	g Free	Center Freq 5.24000000 GHz
		ے ک Mł	r1 O Hz	Start Freq 5.21600000 GHz
Ref 30 dBm Atten #Peak Log 10	30 dB		3.56 dB	Stop Freq 5.26400000 GHz
dB/ Offst		(water array of		CF Step 4.80000000 MHz <u>Auto Mar</u>
dB		All and a second s	Hild gill of the hild	Freq Offset 0.00000000 Hz
#PAvg				Signal Track ^{On <u>Off</u>}
V1 V2 Center 5.240 000 GHz #Res BW 1 MHz	#VBW 3 MHz	Span Sweep 20 ms (10	n 48 MHz D1 pts)	
Copyright 2000-2008 Agilent T		(,	1

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7.2.6. CONDUCTED SPURIOUS EMISSIONS

<u>LIMITS</u>

FCC §15.407 (b) (1)

IC RSS-210 A9.3 (1)

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

TEST PROCEDURE

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

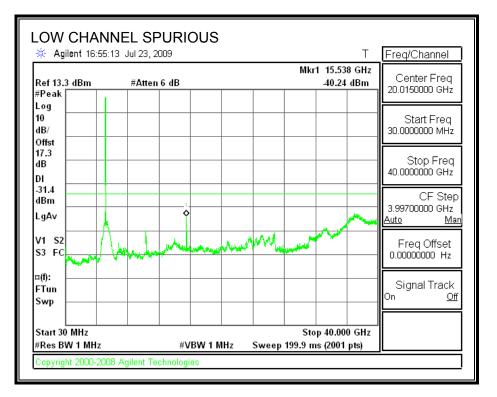
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

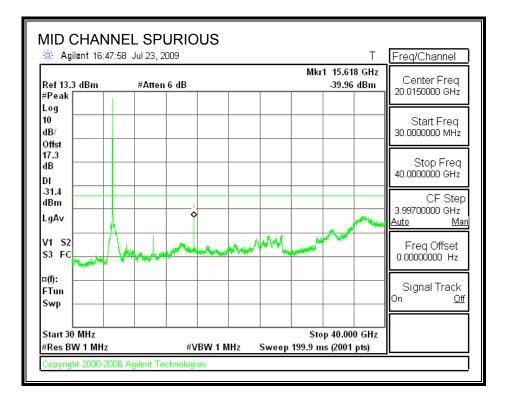
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

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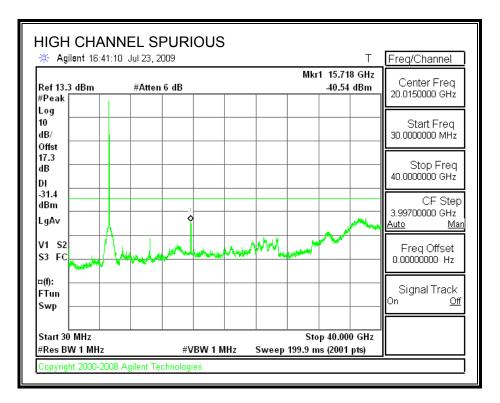
RESULTS

SPURIOUS EMISSIONS





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7.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

7.3.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

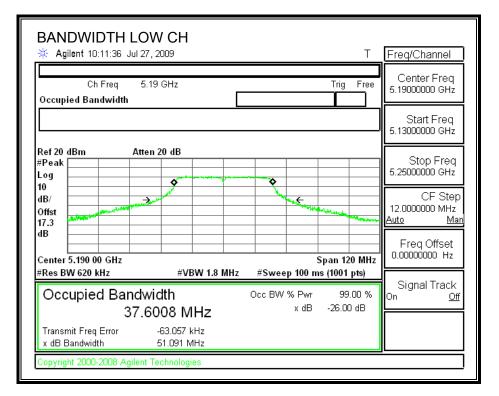
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

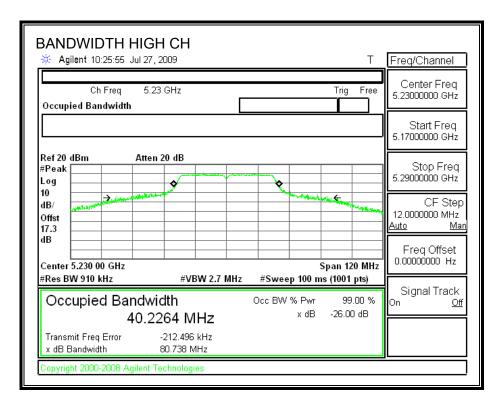
RESULTS

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5190	51.091	36.4861
High	5230	80.738	36.3330

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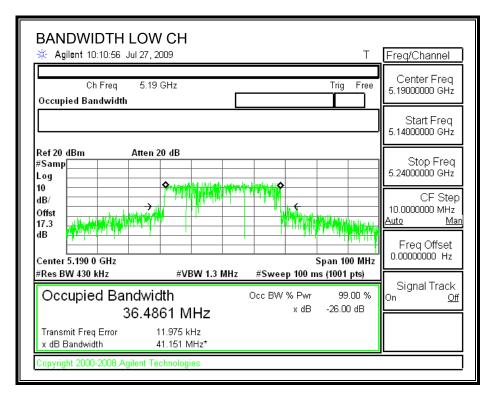
26 dB BANDWIDTH

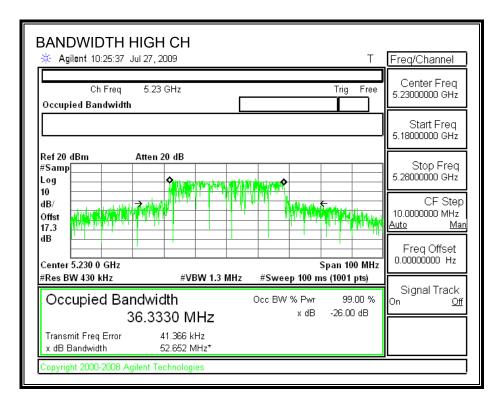




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99% BANDWIDTH





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7.3.2. OUTPUT POWER

<u>LIMITS</u>

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

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

TEST PROCEDURE

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

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

RESULTS

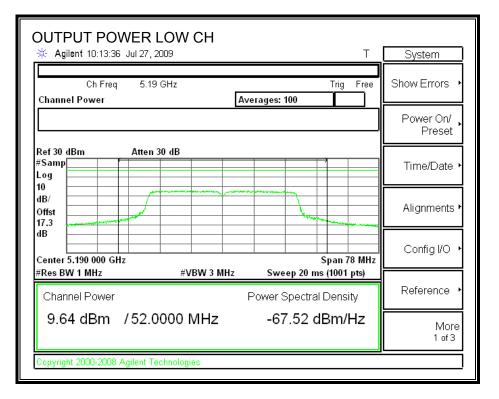
Limit

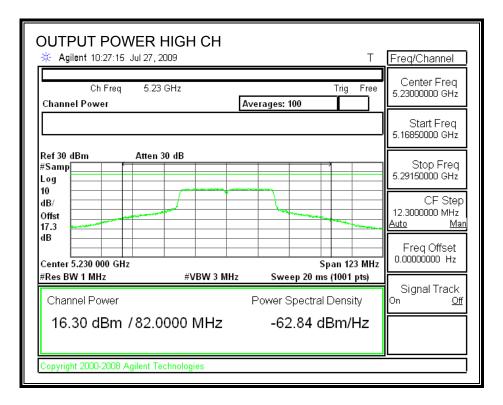
Channel	Frequency	Fixed	В	4 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5190	17	51.091	21.08	3.84	17.00
High	5230	17	80.738	23.07	3.84	17.00

Results

Channel	Frequency	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5190	9.64	17.00	-7.36
High	5230	16.30	17.00	-0.70

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 17.3 dB (including 16 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Power
	(MHz)	(dBm)
Low	5190	9.73
High	5230	16.54

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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

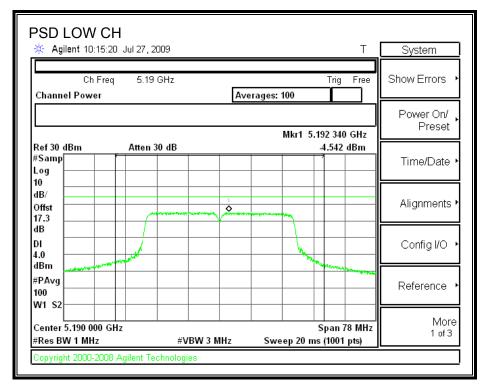
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

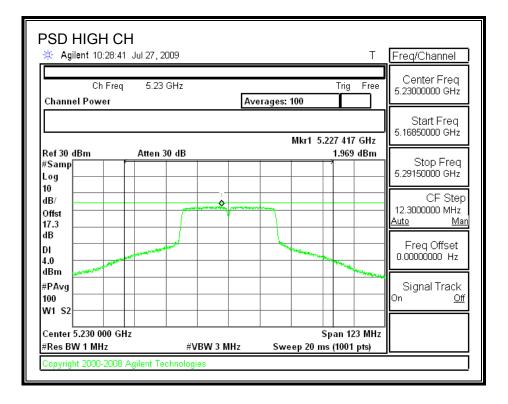
RESULTS

Channel	Frequency	PPSD Limit		Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5190	-4.54	4	-8.54
High	5230	1.97	4	-2.03

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POWER SPECTRAL DENSITY





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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

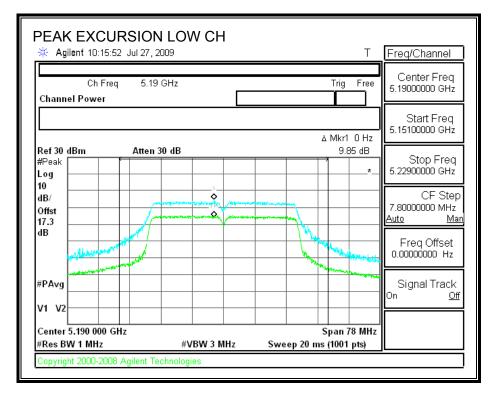
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

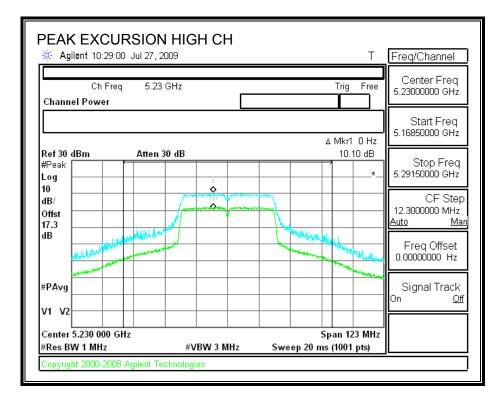
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5190	9.85	13	-3.15
High	5230	10.10	13	-2.90

PEAK EXCURSION





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7.3.6. CONDUCTED SPURIOUS EMISSIONS

<u>LIMITS</u>

FCC §15.407 (b) (1)

IC RSS-210 A9.3 (1)

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

TEST PROCEDURE

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

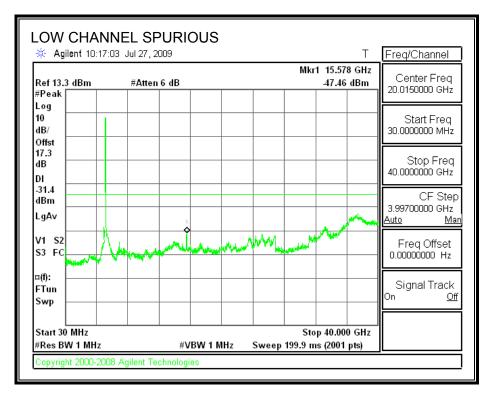
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

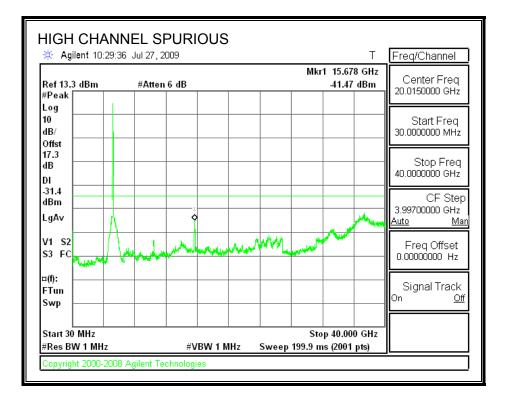
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

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RESULTS

SPURIOUS EMISSIONS





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7.4. 802.11a MODE IN THE 5.3 GHz BAND

7.4.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

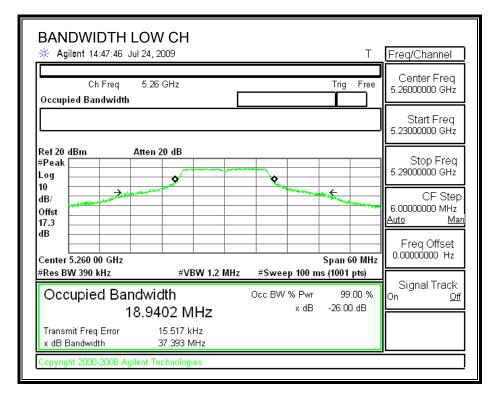
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

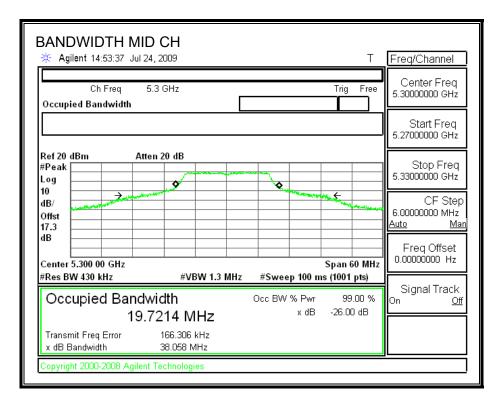
RESULTS

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5260	37.393	16.5904
Middle	5300	38.058	16.6330
High	5320	25.595	16.4295

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26 dB BANDWIDTH



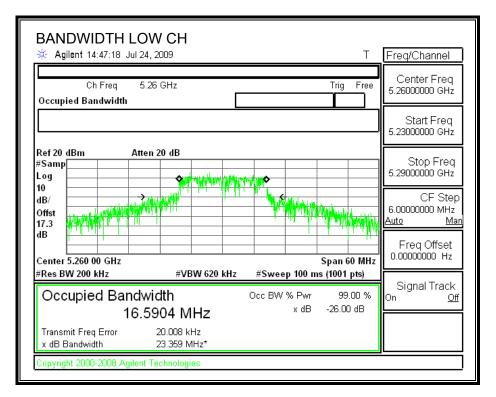


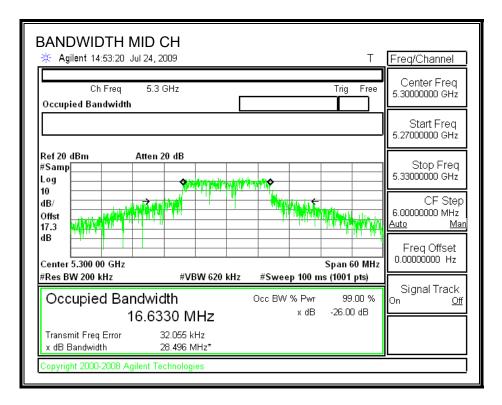
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BANDWIDTH HIG			Т	Freq/Channel
Ch Freq 5.3 Occupied Bandwidth	2 GHz		Trig Free	Center Freq 5.32000000 GHz
				Start Freq 5.29000000 GHz
#Peak	20 dB			Stop Freq 5.3500000 GHz
10 dB/ Offst 17.3			Maria Maria Maria Maria	CF Step 6.0000000 MHz <u>Auto Man</u>
dB Center 5.320 00 GHz			Span 60 MHz	Freq Offset 0.00000000 Hz
#Res BW 300 kHz	#VBW 910 kHz	#Sweep 100 ms		Signal Track
Occupied Bandwi 17.4	dth 330 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB	On <u>Off</u>
Transmit Freq Error x dB Bandwidth	-37.544 kHz 25.595 MHz			
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99% BANDWIDTH





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BANDWIDTH HIGH CH Agilent 13:24:45 Aug 5, 2009 T	Freq/Channel
Ch Freq 5.32 GHz Trig Free Occupied Bandwidth	Center Freq 5.32000000 GHz
	Start Freq 5.29000000 GHz
dB Center 5.320 00 GHz Span 60 MHz	Stop Freq 5.35000000 GHz CF Step 6.00000000 MHz <u>Auto Man</u> Freq Offset 0.00000000 Hz
#Res BW 200 kHz #VBW 620 kHz #Sweep 100 ms (1001 pts) Occupied Bandwidth Occ BW % Pwr 99.00 % 16.4295 MHz × dB -26.00 dB	Signal Track On <u>Off</u>
Transmit Freq Error -7.719 kHz x dB Bandwidth 23.860 MHz*	

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7.4.2. OUTPUT POWER

<u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

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

TEST PROCEDURE

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

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

RESULTS

Limit

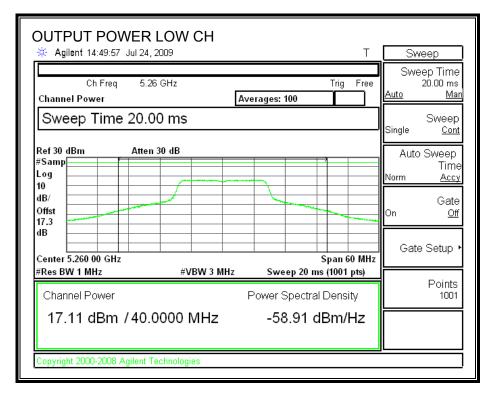
Channel	Frequency	Fixed	В	11 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5260	24	37.393	26.73	3.84	24.00
Mid	5300	24	38.058	26.80	3.84	24.00
High	5320	24	25.595	25.08	3.84	24.00

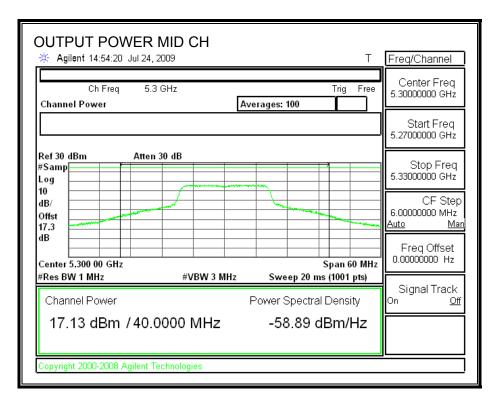
Results

Channel	Frequency	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5260	17.11	24.00	-6.89
Mid	5300	17.13	24.00	-6.87
High	5320	13.20	24.00	-10.80

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OUTPUT POWER





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OUTPUT POWER HIGH CH	Freq/Channel
Ch Freq 5.32 GHz Trig Free Channel Power Averages: 100	Center Freq 5.32000000 GHz
	Start Freq 5.29975000 GHz
Ref 30 dBm Atten 30 dB #Samp	Stop Freq 5.34025000 GHz
dB/ Offst	CF Step 4.05000000 MHz <u>Auto Man</u>
dB Center 5.320 000 0 GHz Span 40.5 MH	Freq Offset 0.00000000 Hz
#Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts) Channel Power Power Spectral Density	Signal Track On <u>Off</u>
13.20 dBm / 27.0000 MHz -61.11 dBm/Hz	
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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 17.3 dB (including 16 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Power
	(MHz)	(dBm)
Low	5260	17.30
Middle	5300	17.36
High	5320	13.42

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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)

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

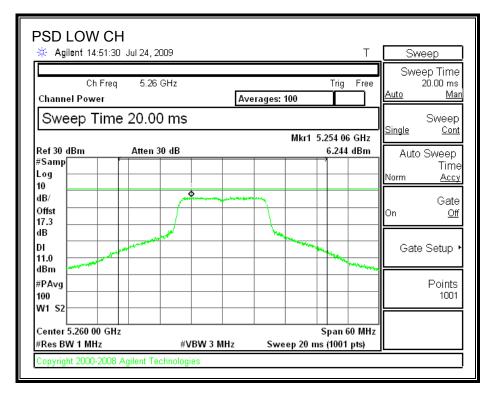
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

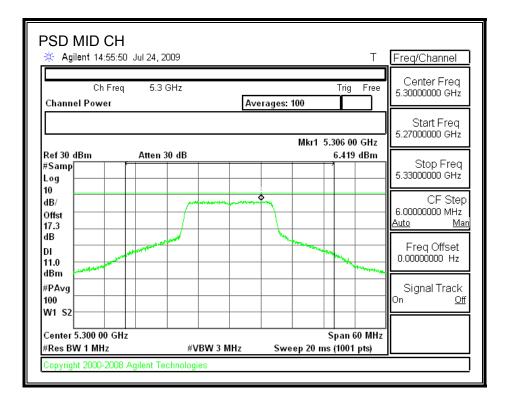
RESULTS

Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5260	6.24	11	-4.76
Middle	5300	6.42	11	-4.58
High	5320	2.09	11	-8.91

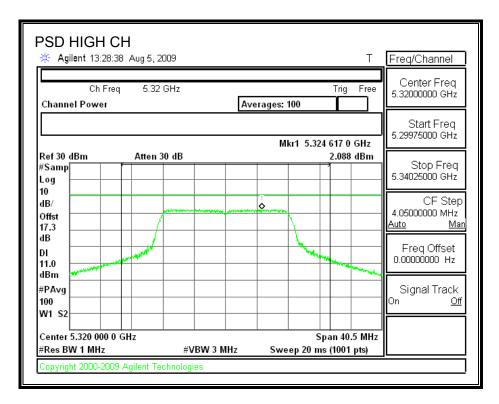
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POWER SPECTRAL DENSITY





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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 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.

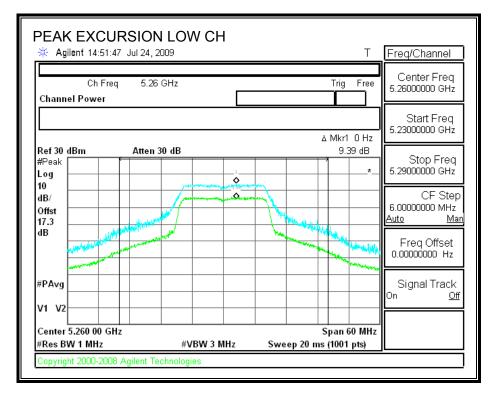
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

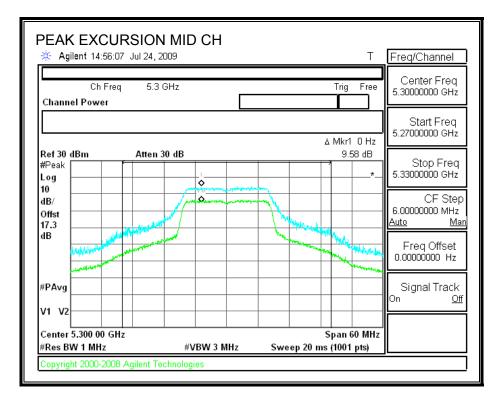
RESULTS

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5260	9.39	13	-3.61
Middle	5300	9.58	13	-3.42
High	5320	9.47	13	-3.53

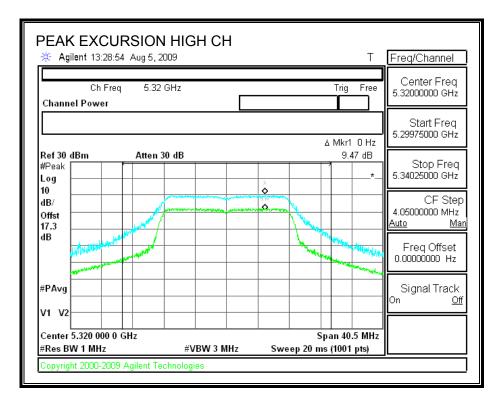
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PEAK EXCURSION





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7.4.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.407 (b) (2)

IC RSS-210 A9.3 (2)

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

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

TEST PROCEDURE

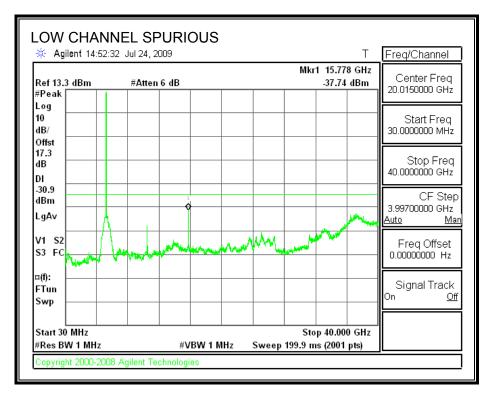
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

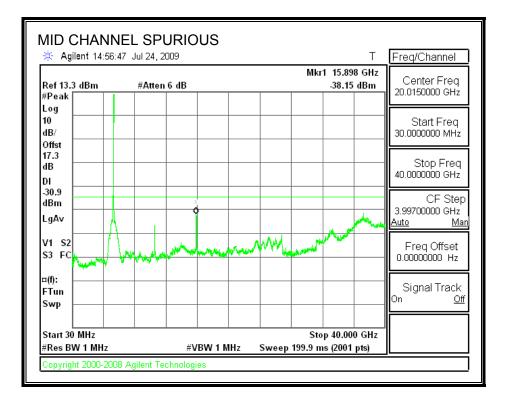
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

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

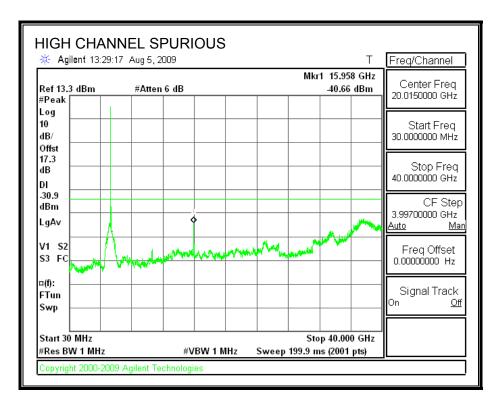
RESULTS

SPURIOUS EMISSIONS





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7.5. 802.11n HT20 MODE IN THE 5.3 GHz BAND

7.5.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

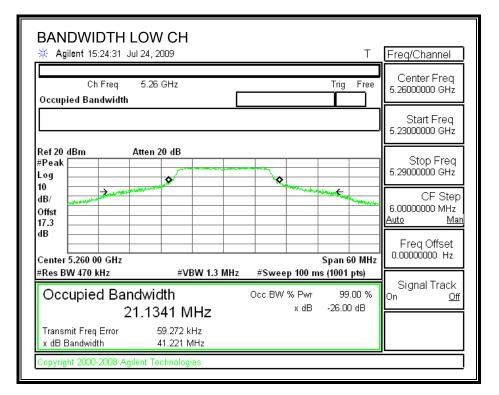
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

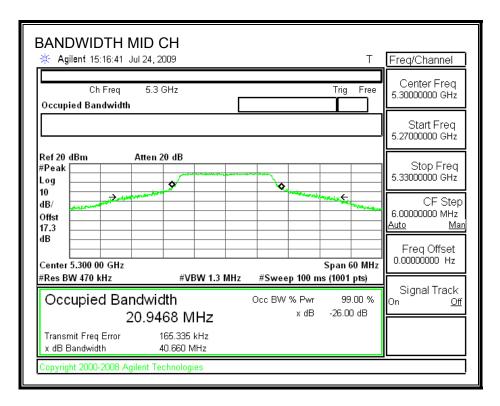
RESULTS

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5260	41.221	17.8294
Middle	5300	40.660	17.7723
High	5320	28.590	17.9184

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26 dB BANDWIDTH



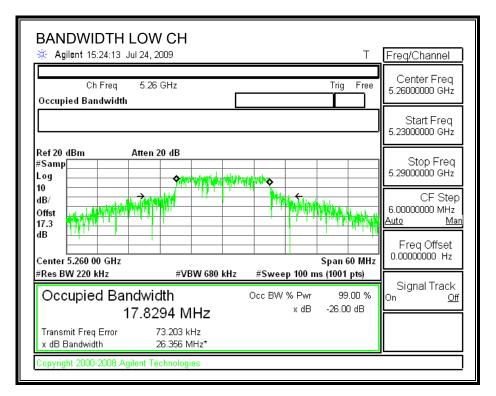


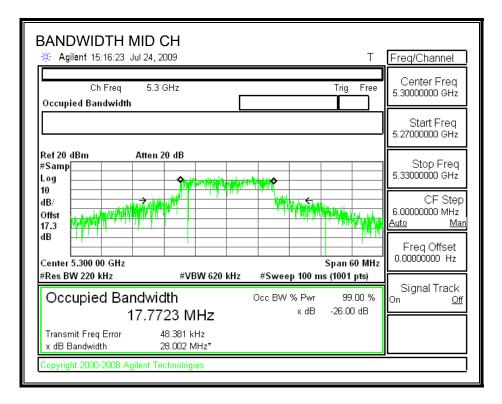
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BANDWIDTH HIG	-		RT	Freq/Channel
Ch Freq 5. Occupied Bandwidth	32 GHz		Trig Free	Center Freq 5.32000000 GHz
				Start Freq 5.29000000 GHz
#Peak	n 20 dB	8		Stop Freq 5.3500000 GHz
dB/ 0ffst 17.3 dB			haddyaurun madaudingeng	CF Step 6.00000000 MHz <u>Auto Man</u>
Center 5.320 00 GHz #Res BW 330 kHz	#VBW 1 MHz	#Sweep 100 ms	Span 60 MHz s (1001 pts)	Freq Offset 0.00000000 Hz
Occupied Bandw 18.6	vidth 6679 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB	Signal Track On <u>Off</u>
Transmit Freq Error x dB Bandwidth	16.577 kHz 28.590 MHz			
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99% BANDWIDTH





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BANDWIDTH HIG	-		RT	Freq/Channel
Ch Freq 5.3 Occupied Bandwidth	2 GHz		Trig Free	Center Freq 5.32000000 GHz
				Start Freq 5.29000000 GHz
Ref 20 dBm Atten #Samp Log 10 dB/ → Offst 17.3 dB				Stop Freq 5.35000000 GHz CF Step 6.00000000 MHz <u>Auto Man</u> Freq Offset
Center 5.320 00 GHz #Res BW 220 kHz	#VBW 620 kHz	#Sweep 100 m	Span 60 MHz s (1001 pts)	0.00000000 Hz
Occupied Bandwi 17.9	dth 184 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB	Signal Track On <u>Off</u>
Transmit Freq Error × dB Bandwidth	54.713 kHz 24.096 MHz*			
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7.5.2. OUTPUT POWER

<u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

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

TEST PROCEDURE

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

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

RESULTS

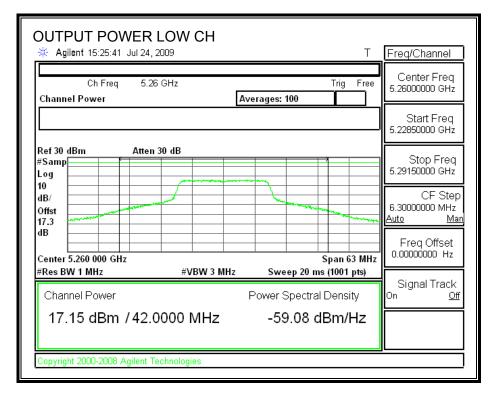
Limit

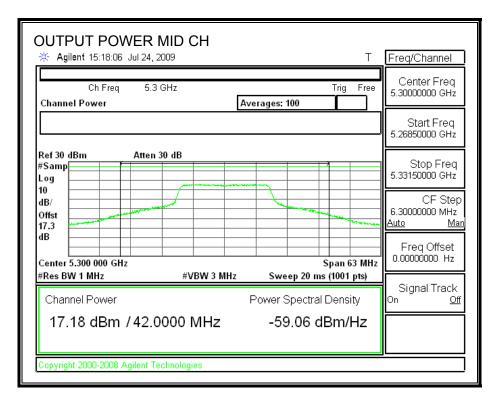
Channel	Frequency	Fixed	В	11 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5260	24	41.221	27.15	3.84	24.00
Mid	5300	24	40.660	27.09	3.84	24.00
High	5320	24	28.590	25.56	3.84	24.00

Results

Channel	Frequency	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5260	17.15	24.00	-6.85
Mid	5300	17.18	24.00	-6.82
High	5320	13.14	24.00	-10.86

OUTPUT POWER





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OUTPUT POWER HIGH C Agilent 13:21:52 Aug 5, 2009	Н	Т	Freq/Channel
Ch Freq 5.32 GHz Channel Power	Averages: 100	Trig Free	Center Freq 5.32000000 GHz
			Start Freq 5.29750000 GHz
Ref 30 dBm Atten 30 dB #Samp			Stop Freq 5.34250000 GHz
0 dB/ Offst 17.3			CF Step 4.50000000 MHz <u>Auto Man</u>
dB		Span 45 MHz	Freq Offset 0.00000000 Hz
#Res BW 1 MHz #VBW Channel Power	3 MHz Sweep 20 ms Power Spectral	• • •	Signal Track On <u>Off</u>
13.14 dBm / 30.0000 MHz -61.63 dBm/Hz			
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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 17.3 dB (including 16 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Power
	(MHz)	(dBm)
Low	5260	17.28
Middle	5300	17.31
High	5320	13.29

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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

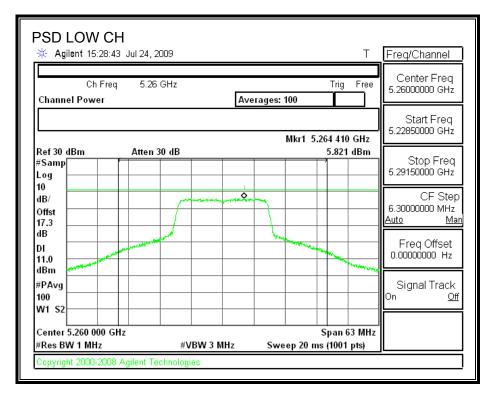
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

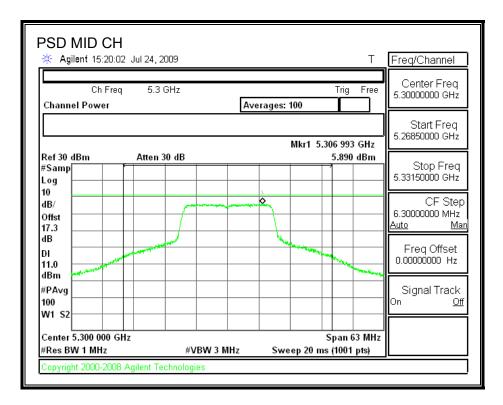
RESULTS

Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5260	5.82	11	-5.18
Middle	5300	5.89	11	-5.11
High	5320	1.82	11	-9.18

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POWER SPECTRAL DENSITY





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- Agilent 13:23:15 Aug 5	, 2009		Т	Freq/Channel
Ch Freq 5.3 Channel Power	32 GHz	Averages: 100	Trig Free	Center Freq 5.32000000 GHz
			313 925 GHz	Start Freq 5.29750000 GHz
Ref 30 dBm Atte #Samp I	n 30 dB	MKIT 5.	1.817 dBm	Stop Freq
Log 10				5.34250000 GHz
dB/ Offst				CF Step 4.5000000 MHz
17.3 dB				Auto Ma Freq Offset
DI 11.0 dBm			the provide and a second second	0.00000000 Hz
#PAvg				Signal Track On <u>Off</u>
W1 S2				
Center 5.320 000 GHz #Res BW 1 MHz	#VBW 3 MH;		Span 45 MHz s (1001 pts)	

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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 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.

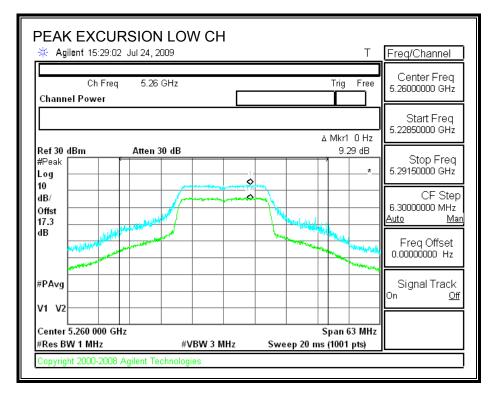
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

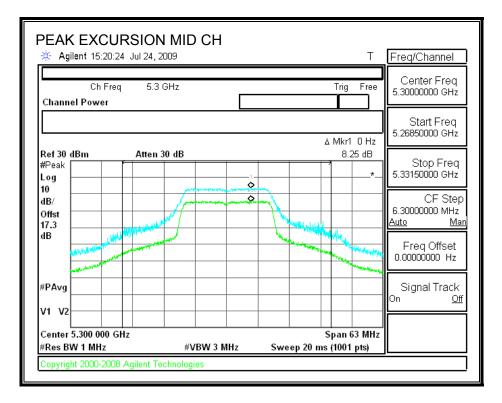
RESULTS

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5260	9.29	13	-3.71
Middle	5300	8.25	13	-4.75
High	5320	8.40	13	-4.60

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PEAK EXCURSION





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PEAK EXCURSION			т	Freq/Channel
Ch Freq 5.32 Channel Power	GHz		Trig Free	Center Freq 5.32000000 GHz
			∆ Mkr1 O Hz	Start Freq 5.29750000 GHz
Ref 30 dBm Atten #Peak Log 10	30 dB	1	8.40 dB	Stop Freq 5.34250000 GHz
dB/ Offst 17.3				CF Step 4.50000000 MHz <u>Auto Mar</u>
dB			the ball all and the second seco	Freq Offset 0.00000000 Hz
#PAvg				Signal Track ^{On <u>Off</u>}
V1 V2 Center 5.320 000 GHz #Res BW 1 MHz	#VBW 3 MHz	Sweep 20 ms	Span 45 MHz ; (1001 pts)	
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7.5.6. CONDUCTED SPURIOUS EMISSIONS

<u>LIMITS</u>

FCC §15.407 (b) (2)

IC RSS-210 A9.3 (2)

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

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

TEST PROCEDURE

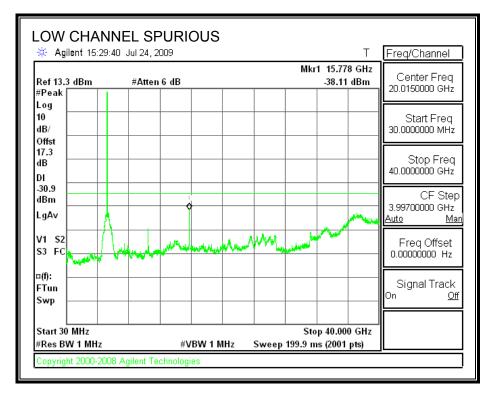
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

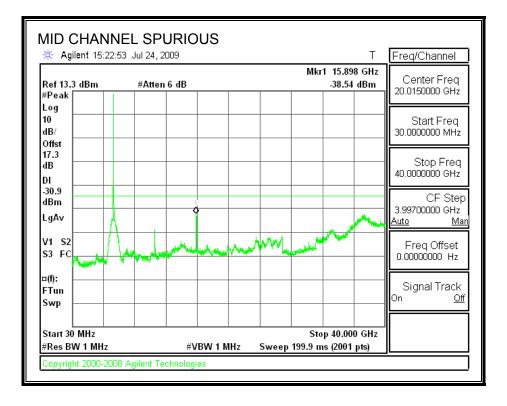
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

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

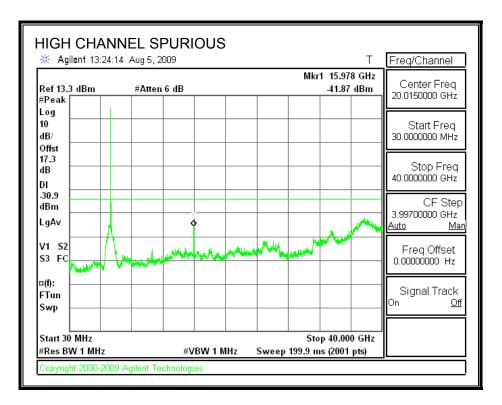
RESULTS

SPURIOUS EMISSIONS





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7.6. 802.11n HT40 MODE IN THE 5.3 GHz BAND

7.6.1. 26 dB and 99% BANDWIDTH

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

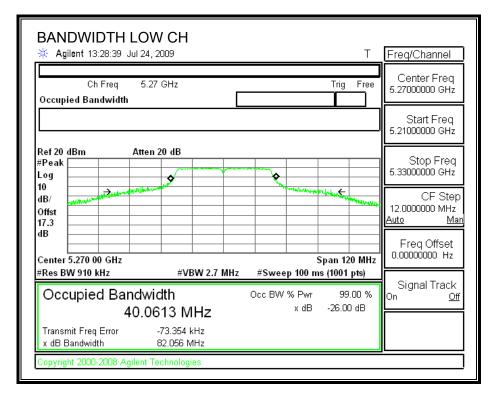
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

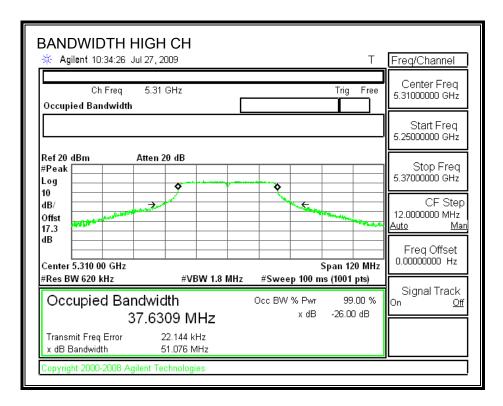
RESULTS

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5270	82.056	36.3520
High	5310	51.076	36.3070

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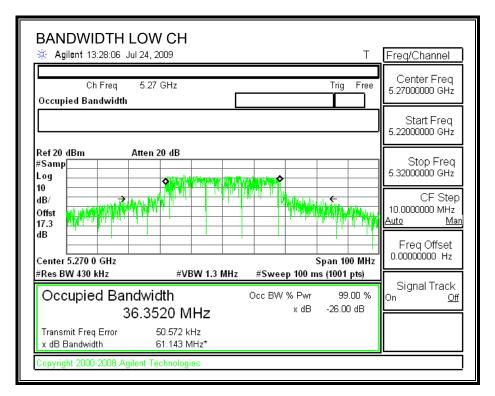
26 dB BANDWIDTH

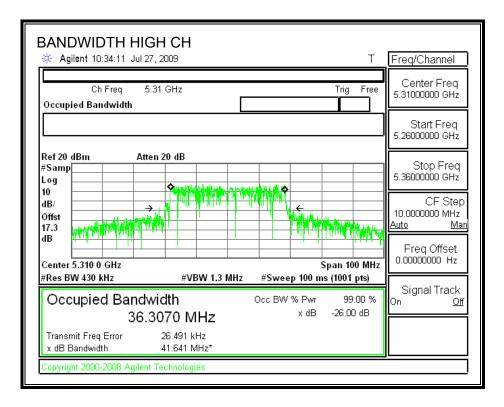




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99% BANDWIDTH





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7.6.2. OUTPUT POWER

<u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

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

TEST PROCEDURE

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

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

RESULTS

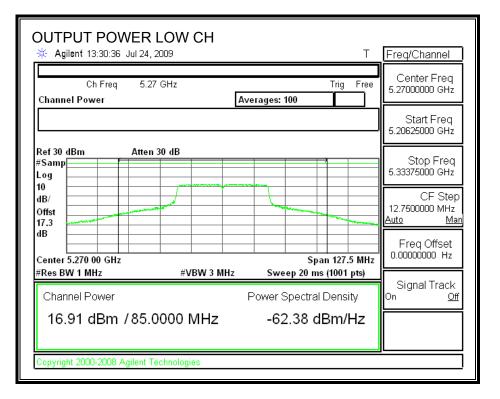
Limit

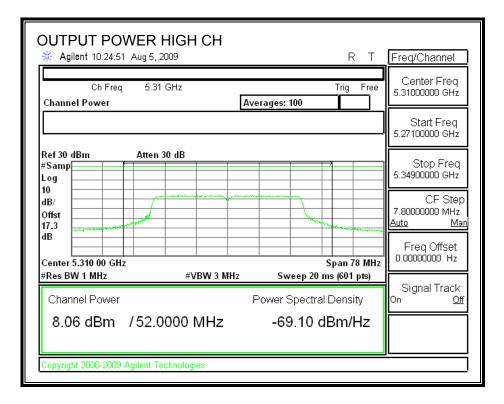
Channel	Frequency	Fixed	В	11 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5270	24	82.056	30.14	3.84	24.00
High	5310	24	51.076	28.08	3.84	24.00

Results

Channel	Frequency	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5270	16.91	24.00	-7.09
High	5310	8.06	24.00	-15.94

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 17.3 dB (including 16 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Power	
	(MHz)	(dBm)	
Low	5270	17.18	
High	5310	8.24	

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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

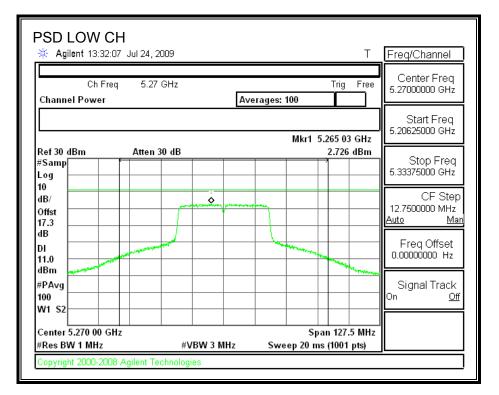
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

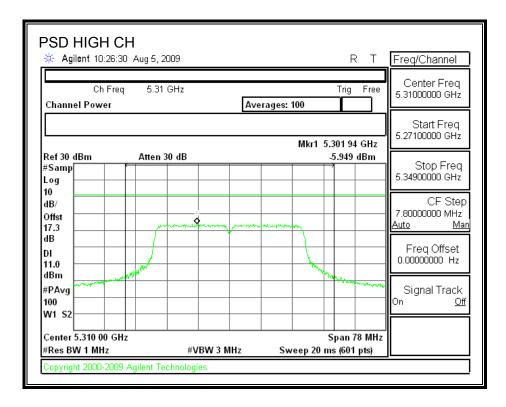
RESULTS

Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5270	2.73	11	-8.27
High	5310	-5.95	11	-16.95

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POWER SPECTRAL DENSITY





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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

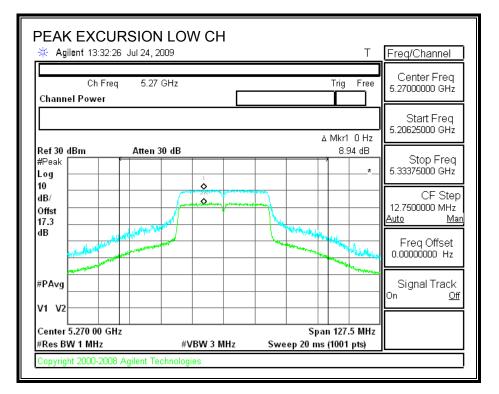
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002.

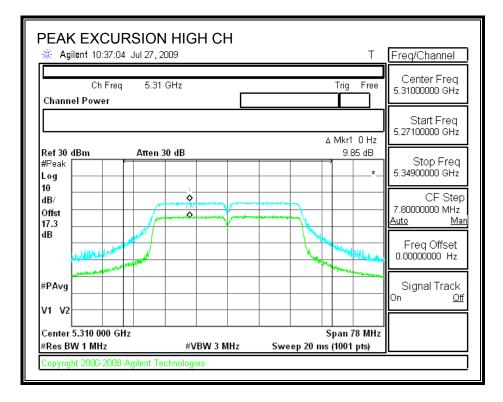
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

RESULTS

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5270	8.94	13	-4.06
High	5310	9.85	13	-3.15

PEAK EXCURSION





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7.6.6. CONDUCTED SPURIOUS EMISSIONS

<u>LIMITS</u>

FCC §15.407 (b) (2)

IC RSS-210 A9.3 (2)

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

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

TEST PROCEDURE

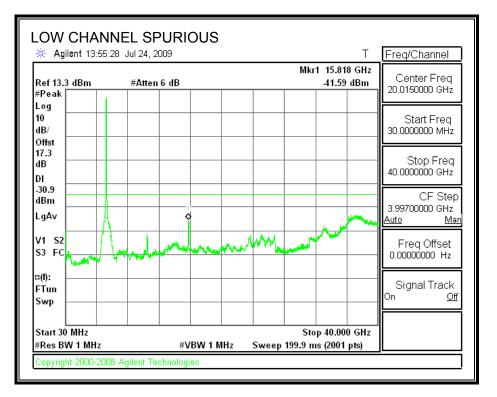
Conducted RF measurements of the transmitter output are made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site.

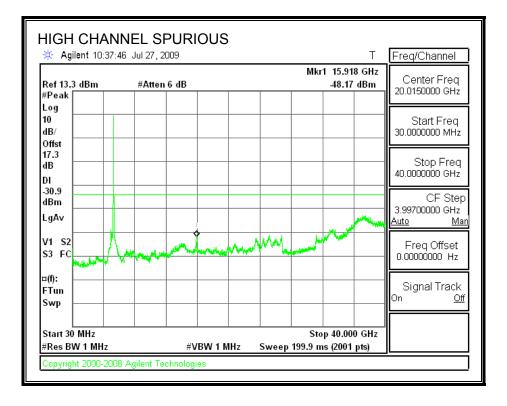
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

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

RESULTS

SPURIOUS EMISSIONS





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7.7. 802.11a 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

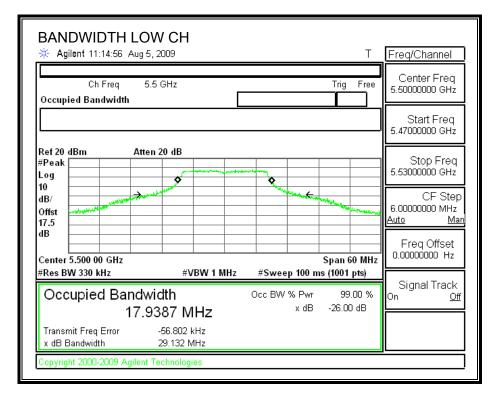
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

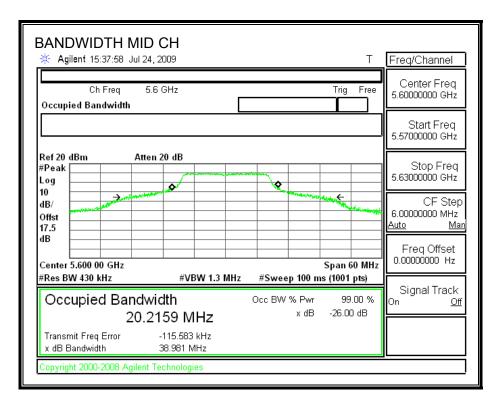
RESULTS

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5500	29.132	16.5001
Middle	5600	38.981	16.5563
High	5700	25.985	16.4918

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26 dB BANDWIDTH



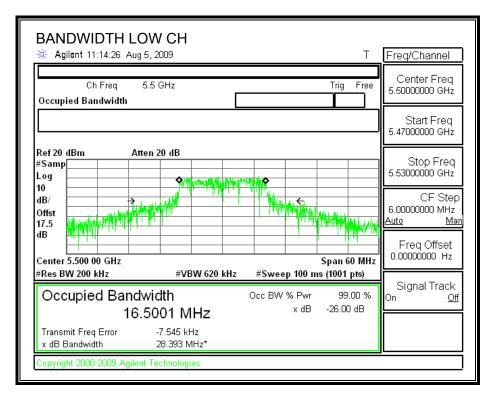


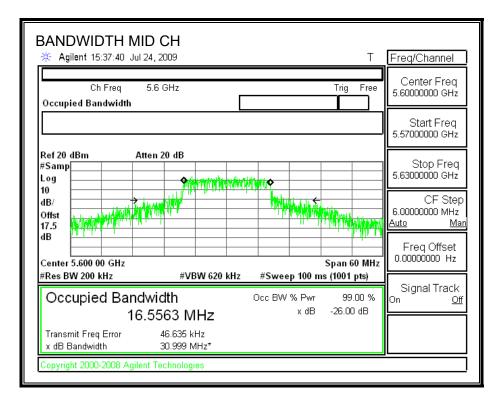
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BANDWIDTH HIG	-		Т	Freq/Channel
Ch Freq 5 Occupied Bandwidth	.7 GHz		Trig Free	Center Freq 5.70000000 GHz
				Start Freq 5.67000000 GHz
#Peak	n 20 dB	••••••••••••••••••••••••••••••••••••••		Stop Freq 5.7300000 GHz
10 dB/ Offst 17.5			Hiles day Brief and generate	CF Step 6.0000000 MHz <u>Auto Man</u>
dB			pan 60 MHz	Freq Offset 0.00000000 Hz
#Res BW 300 kHz Occupied Bandv	#VBW 910 kHz	#Sweep 100 ms Occ BW % Pwr		Signal Track On <u>Off</u>
17.5	5130 MHz	x dB	-26.00 dB	
Transmit Freq Error x dB Bandwidth	-48.458 kHz 25.985 MHz			
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99% BANDWIDTH





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BANDWIDTH HI			Т	Freq/Channel
Ch Freq Occupied Bandwidth	5.7 GHz		Trig Free	Center Freq 5.7000000 GHz
	L			Start Freq 5.6700000 GHz
#Samp Log 10 dB/	en 20 dB			Stop Freq 5.7300000 GHz CF Step 6.0000000 MHz
Offst 17.5 dB Center 5.700 00 GHz #Res BW 200 kHz	#VBW 620 kHz	#Sweep 100 m	Span 60 MHz s (1001 pts)	Auto Mai Freq Offset 0.00000000 Hz
Occupied Band 16.	width 4918 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB	Signal Track On <u>Off</u>
Transmit Freq Error x dB Bandwidth	15.330 kHz 21.615 MHz*			
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7.7.2. OUTPUT POWER

<u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

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

TEST PROCEDURE

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

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

RESULTS

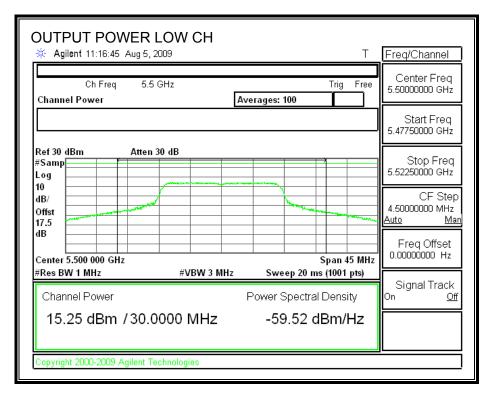
Limit

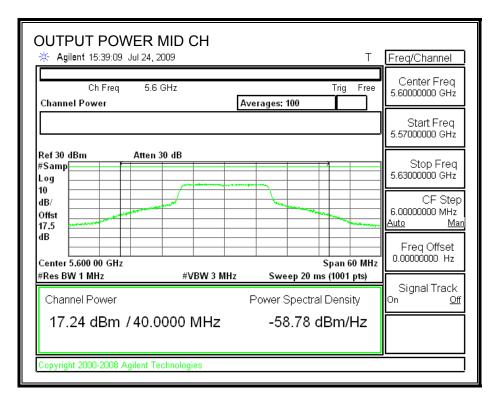
Channel	Frequency	Fixed	В	11 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5500	24	29.132	25.64	4.92	24.00
Mid	5600	24	38.981	26.91	4.92	24.00
High	5700	24	25.985	25.15	4.92	24.00

Results

Channel	Frequency	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5500	15.25	24.00	-8.75
Mid	5600	17.24	24.00	-6.76
High	5700	13.46	24.00	-10.54

OUTPUT POWER





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OUTPUT POWER HIGH CH Agilent 11:23:17 Aug 5, 2009 T	Freq/Channel
Ch Freq 5.7 GHz Trig Free Channel Power Averages: 100	Center Freq 5.70000000 GHz
	Start Freq 5.67975000 GHz
Ref 30 dBm Atten 30 dB #Samp	Stop Freq 5.72025000 GHz
10 dB/ Offst 17.5	CF Step 4.0500000 MHz <u>Auto Ma</u>
dB Genter 5.700 000 0 GHz Span 40.5 MHz	Freq Offset 0.00000000 Hz
#Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts) Channel Power Power Power Spectral Density	Signal Track On <u>Off</u>
13.46 dBm / 27.0000 MHz -60.85 dBm/Hz	
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7.7.3. AVERAGE POWER

<u>LIMITS</u>

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 17.5 dB (including 16 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Power
	(MHz)	(dBm)
Low	5500	15.36
Middle	5600	17.31
High	5700	13.59

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7.7.4. PEAK POWER SPECTRAL DENSITY

LIMITS

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

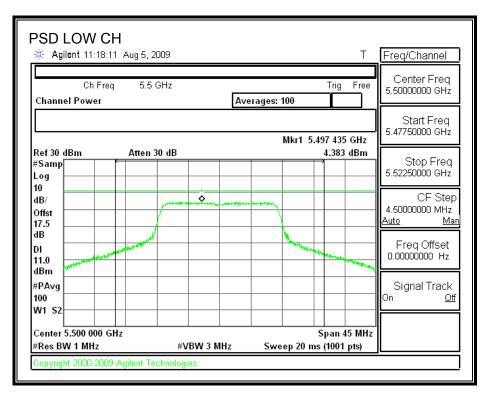
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

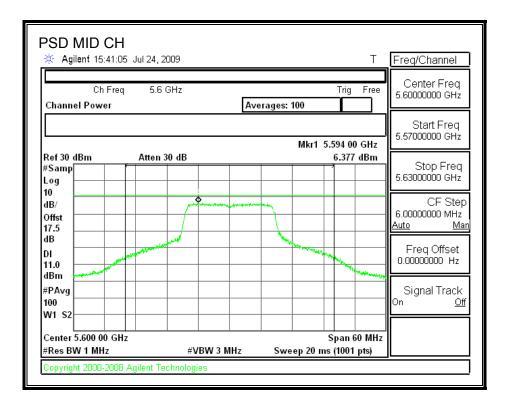
RESULTS

Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5500	4.38	11	-6.62
Middle	5600	6.38	11	-4.62
High	5700	2.50	11	-8.51

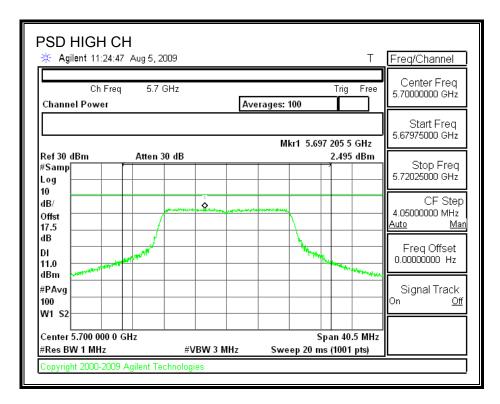
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POWER SPECTRAL DENSITY





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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 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.

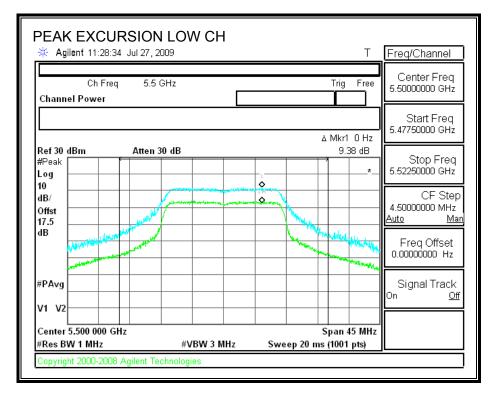
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

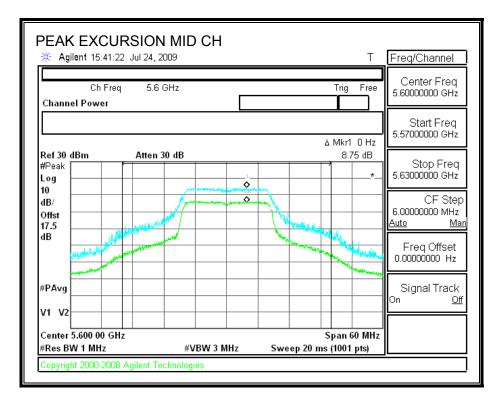
RESULTS

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5500	9.38	13	-3.62
Middle	5600	8.75	13	-4.25
High	5700	10.27	13	-2.73

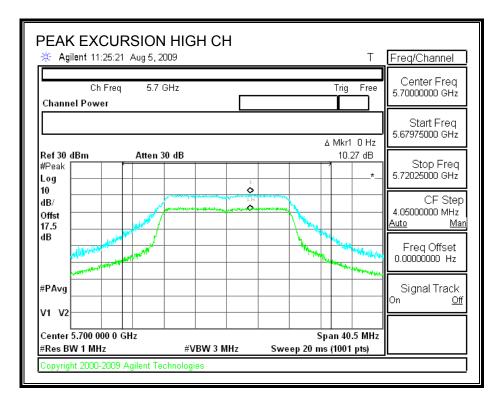
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PEAK EXCURSION





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7.7.6. CONDUCTED SPURIOUS EMISSIONS

<u>LIMITS</u>

FCC §15.407 (b) (3)

IC RSS-210 A9.3 (3)

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

TEST PROCEDURE

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

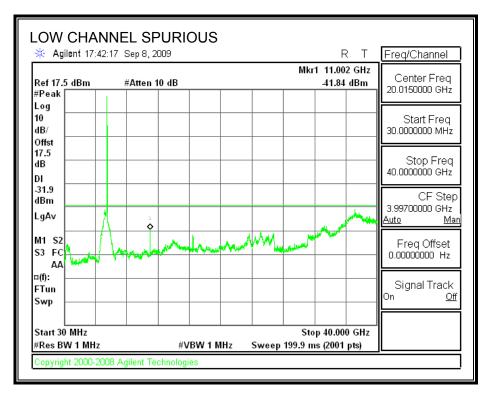
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

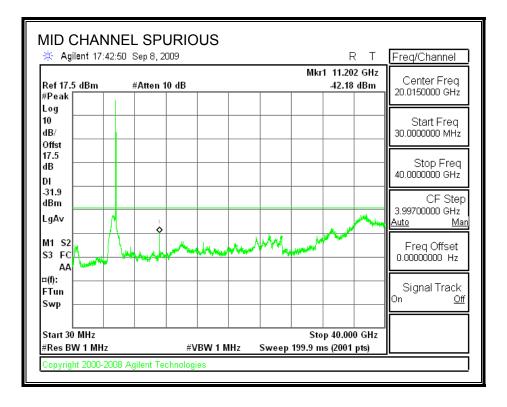
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

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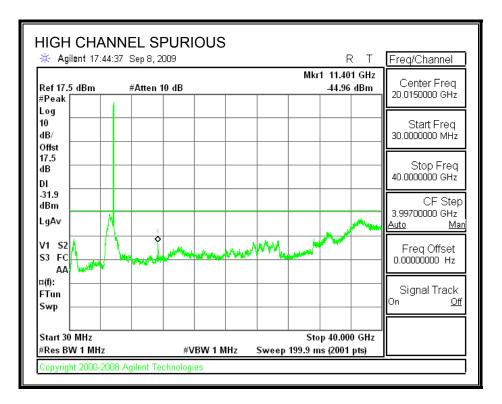
RESULTS

SPURIOUS EMISSIONS





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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

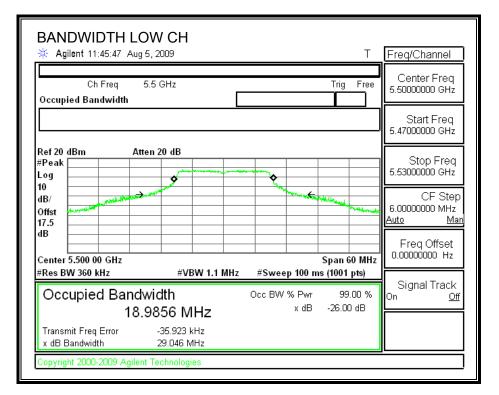
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

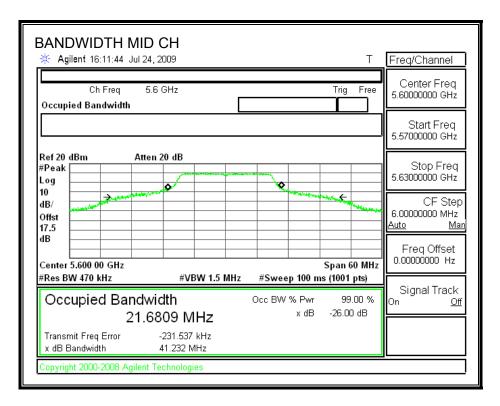
RESULTS

Channel	Frequency 26 dB Bandwidt		99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5500	29.046	17.7789
Middle	5600	41.232	17.7601
High	5700	25.979	17.6288

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26 dB BANDWIDTH



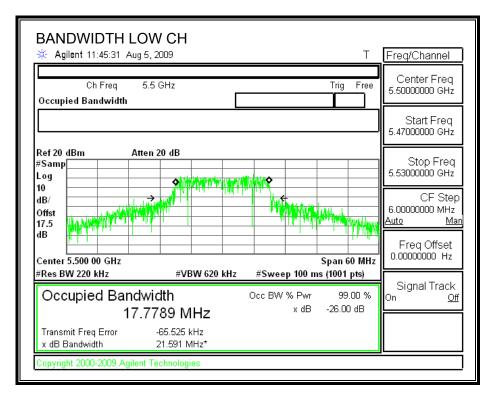


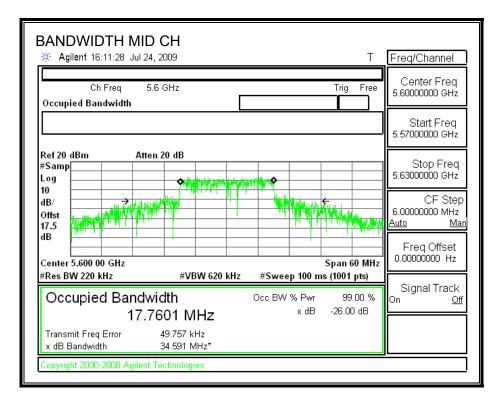
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BANDWIDTH HIG	-		Т	Freq/Channel
Ch Freq 5. Occupied Bandwidth	7 GHz		Trig Free	Center Freq 5.70000000 GHz
				Start Freq 5.6700000 GHz
Ref 20 dBm Atter #Peak	n 20 dB	*		Stop Freq 5.73000000 GHz
dB/ Offst			We want of the state of the sta	CF Step 6.0000000 MHz <u>Auto Man</u>
dB Center 5.700 00 GHz #Res BW 300 kHz	#VBW 910 kHz	#Sweep 100 ms	Span 60 MHz (1001 pts)	Freq Offset 0.00000000 Hz
Occupied Bandw		Occ BW % Pwr	· · /	Signal Track On <u>Off</u>
Transmit Freq Error x dB Bandwidth	4.279 kHz 25.979 MHz			
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99% BANDWIDTH





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BANDWIDTH HIGH CH Agilent 11:27:54 Aug 5, 2009	Т	Freq/Channel
Ch Freq 5.7 GHz Tri Occupied Bandwidth	g Free	Center Freq 5.7000000 GHz
		Start Freq 5.6700000 GHz
•	60 MHz	Stop Freq 5.73000000 GHz CF Step 6.00000000 MHz <u>Auto Mar</u> Freq Offset 0.00000000 Hz
#Res BW 220 kHz #VBW 620 kHz #Sweep 100 ms (100		Signal Track
Occupied Bandwidth Occ BW % Pwr 9 17.6288 MHz × dB -26.	99.00 % 00 dB	On <u>Off</u>
Transmit Freq Error 25.965 kHz x dB Bandwidth 21.634 MHz*		
Copyright 2000-2009 Agilent Technologies		-

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7.8.2. OUTPUT POWER

<u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

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

TEST PROCEDURE

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

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

RESULTS

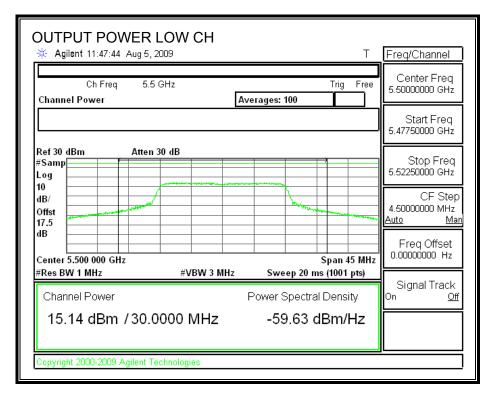
Limit

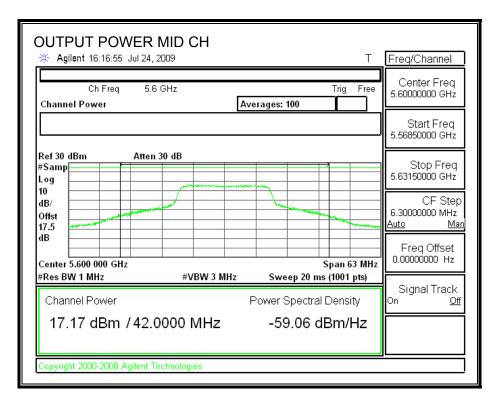
Channel	Frequency	Fixed	В	11 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5500	24	29.046	25.63	4.92	24.00
Mid	5600	24	41.232	27.15	4.92	24.00
High	5700	24	25.979	25.15	4.92	24.00

Results

Channel	Frequency	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5500	15.14	24.00	-8.86
Mid	5600	17.17	24.00	-6.83
High	5700	13.44	24.00	-10.56

OUTPUT POWER





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OUTPUT POWER HIGH CH	Freq/Channel		
Ch Freq 5.7 GHz Trig Free Channel Power Averages: 100	Center Freq 5.70000000 GHz		
	Start Freq 5.67975000 GHz		
Ref 30 dBm Atten 30 dB #Samp Log 10	Stop Freq 5.72025000 GHz		
dB/ Offst	CF Step 4.0500000 MHz <u>Auto Man</u>		
dB	Freq Offset 0.00000000 Hz		
#Res BW 1 MHz #VBW 3 MHz Sweep 20 ms (1001 pts) Channel Power Power Spectral Density	Signal Track ^{On <u>Off</u>}		
13.44 dBm / 27.0000 MHz -60.87 dBm/Hz			
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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 17.5 dB (including 16 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Power
	(MHz)	(dBm)
Low	5500	15.33
Middle	5600	17.36
High	5700	13.59

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7.8.4. PEAK POWER SPECTRAL DENSITY

LIMITS

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

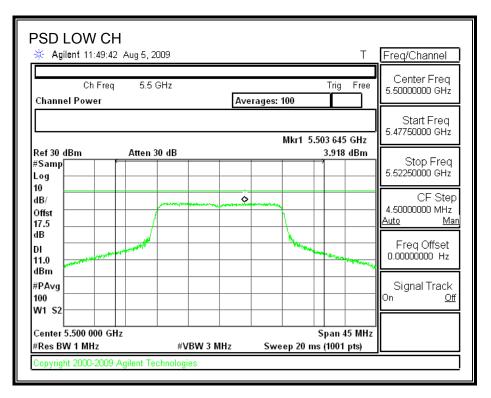
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

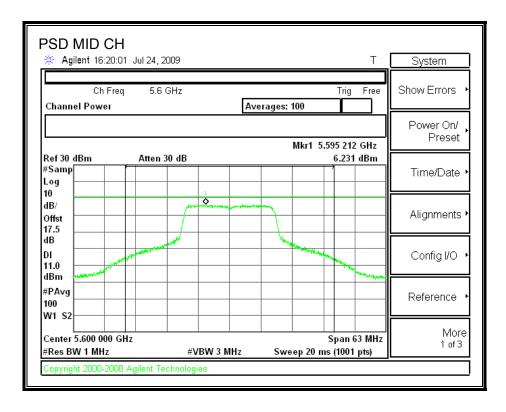
RESULTS

Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5500	3.92	11	-7.08
Middle	5600	6.23	11	-4.77
High	5700	2.27	11	-8.73

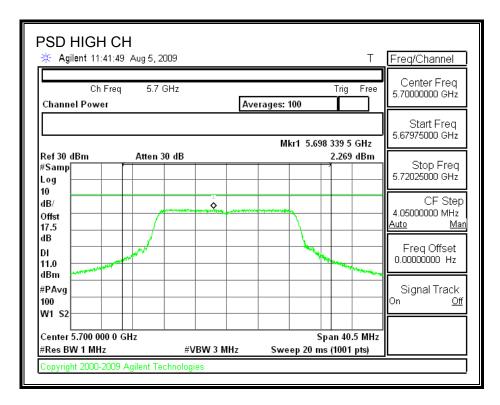
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POWER SPECTRAL DENSITY





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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 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.

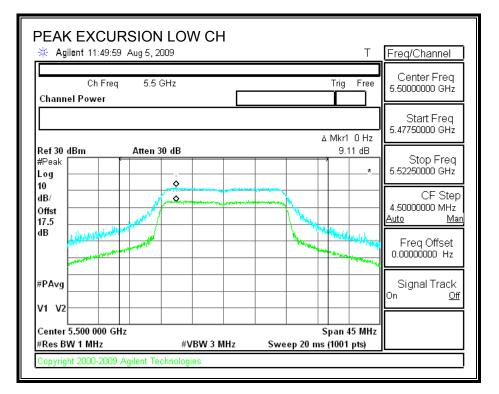
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

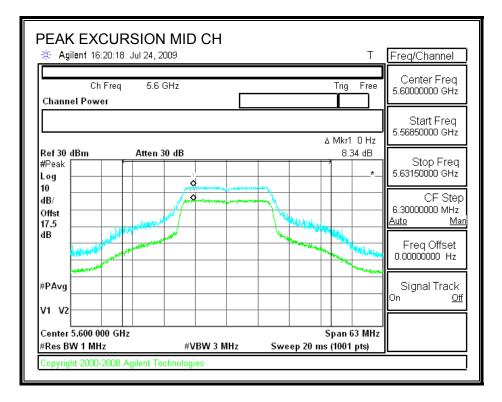
RESULTS

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5500	9.11	13	-3.89
Middle	5600	8.34	13	-4.66
High	5700	9.49	13	-3.51

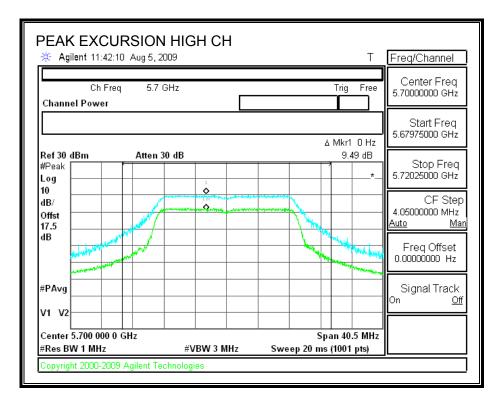
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PEAK EXCURSION





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7.8.6. CONDUCTED SPURIOUS EMISSIONS

<u>LIMITS</u>

FCC §15.407 (b) (3)

IC RSS-210 A9.3 (3)

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

TEST PROCEDURE

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

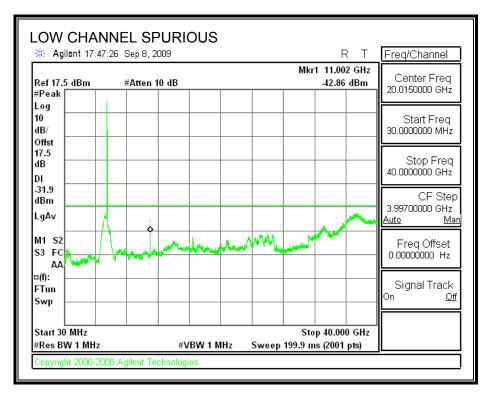
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

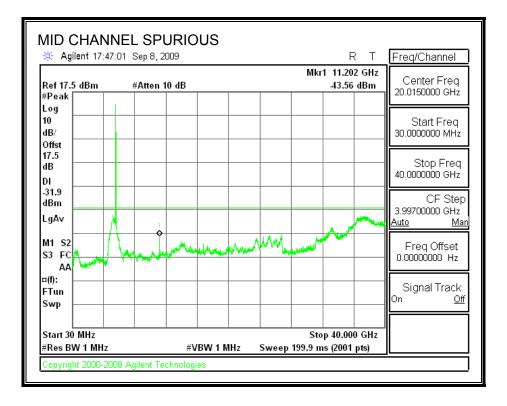
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

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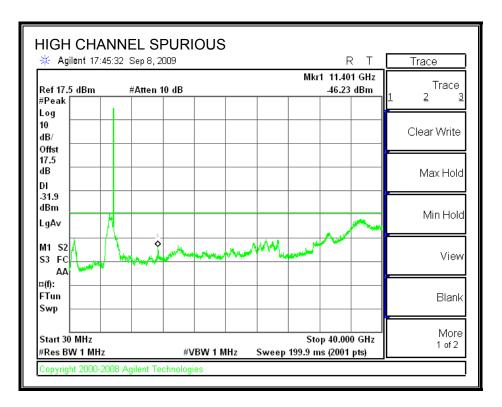
RESULTS

SPURIOUS EMISSIONS





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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

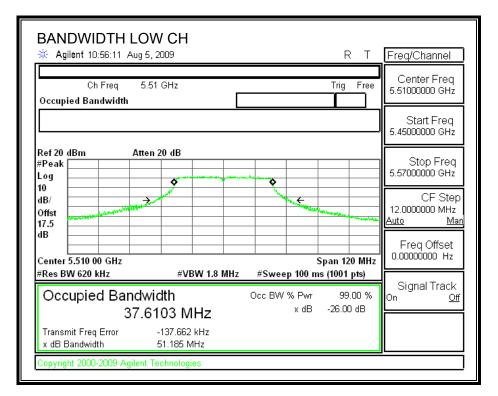
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the measured bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal bandwidth function is utilized.

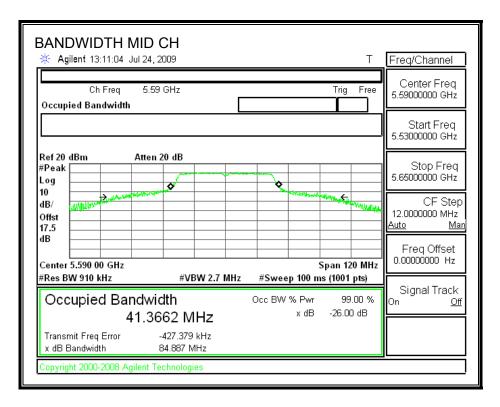
RESULTS

Channel	Frequency	26 dB Bandwidth	99% Bandwidth
	(MHz)	(MHz)	(MHz)
Low	5510	51.185	36.0970
Middle	5590	84.887	36.4388
High	5670	69.798	36.3401

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26 dB BANDWIDTH



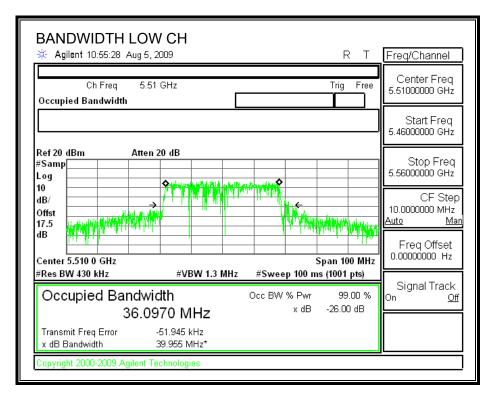


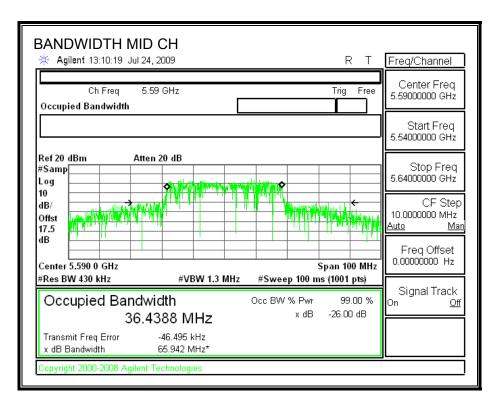
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BANDWIDTH HIGH	•••		Т	Freq/Channel
Ch Freq 5.67 (Occupied Bandwidth	GHz		Trig Free	Center Freq 5.67000000 GHz
				Start Freq 5.61000000 GHz
Ref 20 dBm Atten 20 #Peak) dB	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		Stop Freq 5.7300000 GHz
10 dB/ Offst 17.5			Two-lange where and a state of the	CF Step 12.000000 MHz <u>Auto Man</u>
dB			pan 120 MHz	Freq Offset 0.00000000 Hz
#Res BW 820 kHz	#VBW 2.4 MHz	#Sweep 100 ms		Signal Track
Occupied Bandwid 38.76	th 19 MHz	Occ BW % Pwr x dB	99.00 % -26.00 dB	On <u>Off</u>
	27.953 kHz 9.798 MHz			
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99% BANDWIDTH





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BANDWIDTH HIGH CH Agilent 11:02:13 Aug 5, 2009	Т	Freq/Channel
Ch Freq 5.67 GHz Occupied Bandwidth	Trig Free	Center Freq 5.67000000 GHz
		Start Freq 5.62000000 GHz
Ref 20 dBm Atten 20 dB #Samp	11.070 ~~10.0	Stop Freq 5.72000000 GHz
10 dB/ Offst 17.5		CF Step 10.0000000 MHz <u>Auto Man</u>
dB	Span 100 MHz	Freq Offset 0.00000000 Hz
#Res BW 430 kHz #VBW 1.3 MH: Occupied Bandwidth	z #Sweep 100 ms (1001 pts)	Signal Track On <u>Off</u>
36.3401 MHz	x dB -26.00 dB	
Transmit Freq Error 5.559 kHz x dB Bandwidth 43.863 MHz*		
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7.9.2. OUTPUT POWER

<u>LIMITS</u>

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

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

TEST PROCEDURE

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

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

RESULTS

Limit

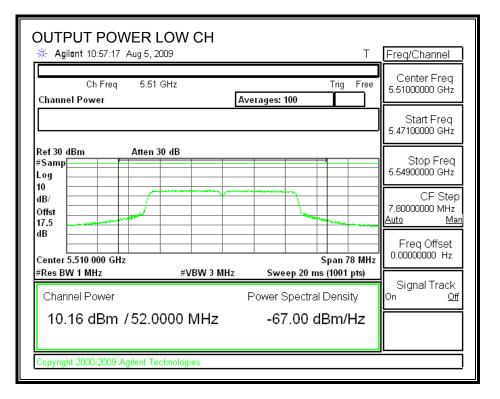
Channel	Frequency	Fixed	В	11 + 10 Log B	Antenna	Limit
		Limit		Limit	Gain	
	(MHz)	(dBm)	(MHz)	(dBm)	(dBi)	(dBm)
Low	5510	24	51.185	28.09	4.92	24.00
Mid	5590	24	84.887	30.29	4.92	24.00
High	5670	24	69.798	29.44	4.92	24.00

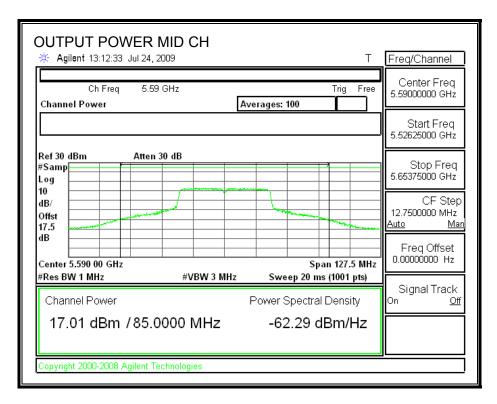
Results

Channel	Frequency	Power	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5510	10.16	24.00	-13.84
Mid	5590	17.01	24.00	-6.99
High	5670	15.74	24.00	-8.26

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OUTPUT POWER





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OUTPUT POWER HIGH * Agilent 11:03:49 Aug 5, 2009	СН		Т	Freq/Channel
Ch Freq 5.67 GHz Channel Power	Avera	ges: 100	Trig Free	Center Freq 5.67000000 GHz
				Start Freq 5.61750000 GHz
Ref 30 dBm Atten 30 dB #Samp Log				Stop Freq 5.72250000 GHz
10 dB/ Offst 17.5		Marine and Marine		CF Step 10.500000 MHz <u>Auto Man</u>
dB		•	an 105 MHz	Freq Offset 0.00000000 Hz
#Res BW 1 MHz #VE	BW 3 MHz Pot	Sweep 20 ms wer Spectral E	•••	Signal Track On <u>Off</u>
15.74 dBm /70.0000 N	/Hz	-62.72 dE	3m/Hz	
Copyright 2000-2009 Agilent Technologie	S			

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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 17.5 dB (including 16 dB pad and 1.5 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency	Power
	(MHz)	(dBm)
Low	5510	10.30
Middle	5590	17.25
High	5670	15.89

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7.9.4. PEAK POWER SPECTRAL DENSITY

LIMITS

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

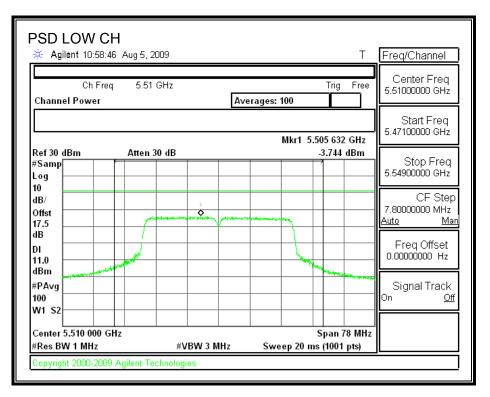
The test is performed in accordance with FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices – Part 15, Subpart E, August 2002. PPSD method #2 was used.

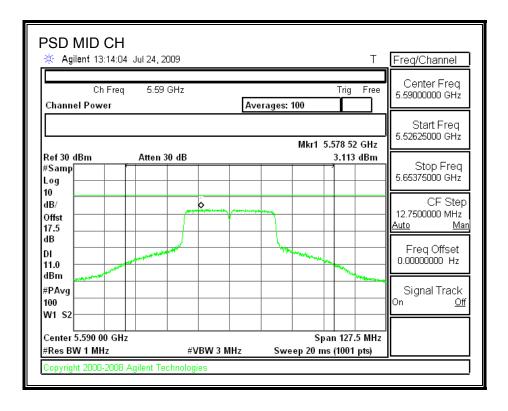
RESULTS

Channel	Frequency	PPSD	Limit	Margin
	(MHz)	(dBm)	(dBm)	(dB)
Low	5510	-3.74	11	-14.74
Middle	5590	3.11	11	-7.89
High	5670	1.81	11	-9.20

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POWER SPECTRAL DENSITY





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PSD HIGH CH	, 2009		T System
Ch Freq 5.8 Channel Power)7 GHz	Trig F	ree Show Errors
	-	Mkr1 5.663 070 G	
Ref 30 dBm Atter #Samp Log 10	1 30 dB	1.805 dB	Time/Date
dB/ Offst 17.5			Alignments
dB Dl 11.0 dBm			Config I/O
#PAvg 100 W1 S2			Reference
Center 5.670 000 GHz #Res BW 1 MHz	#VBW 3 MHz	Span 105 M Sweep 20 ms (1001 pts	101.1

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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 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.

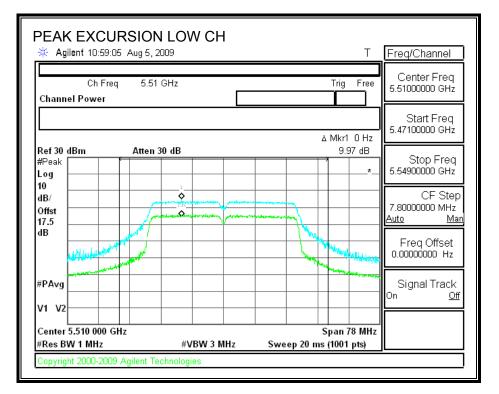
Since Method # 1 was used for peak power measurements, Method # 1 settings are used for the second PPSD trace.

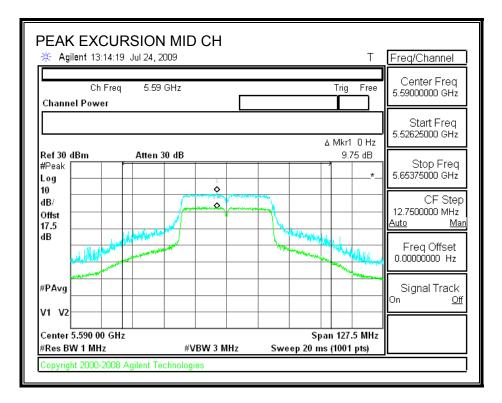
RESULTS

Channel	Frequency	Peak Excursion	Limit	Margin
	(MHz)	(dB)	(dB)	(dB)
Low	5510	9.97	13	-3.03
Middle	5590	9.75	13	-3.25
High	5670	8.66	13	-4.34

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PEAK EXCURSION





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PEAK EXCURSION		Т	Freq/Channel
Ch Freq 5.67 Channel Power	GHz	Trig Free	Center Freq 5.67000000 GHz
		∆ Mkr1 0 Hz	Start Freq 5.61750000 GHz
Ref 30 dBm Atten 3 #Peak Log	1	8.66 dB	Stop Freq 5.72250000 GHz
10 dB/ Offst 17.5			CF Step 10.5000000 MHz <u>Auto Mar</u>
17.5 dB		Markeller Harrison	Freq Offset 0.00000000 Hz
#PAvg			Signal Track
V1 V2 Center 5.670 000 GHz #Res BW 1 MHz	#VBW 3 MHz	Span 105 MHz Sweep 20 ms (1001 pts)	
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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.

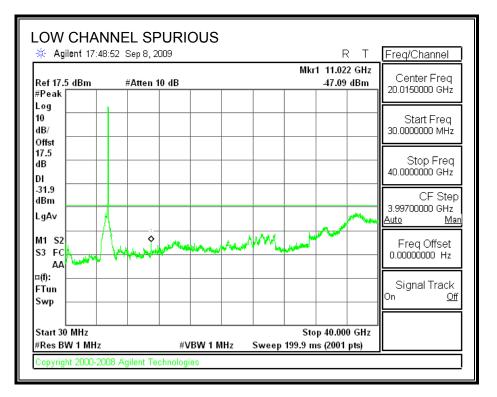
The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 1 MHz. The video bandwidth is set to 1 MHz. Peak detection measurements are compared to EIRP limit, adjusted for the maximum antenna gain.

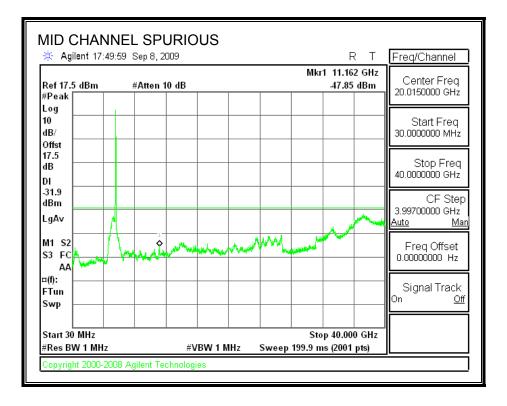
Measurements are made over the 30 MHz to 40 GHz range with the transmitter set to the lowest, middle, and highest channels.

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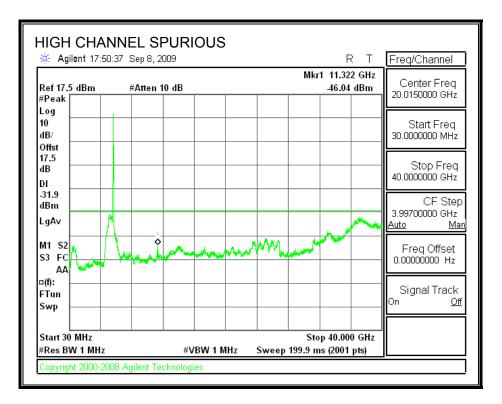
RESULTS

SPURIOUS EMISSIONS





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8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

<u>LIMITS</u>

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

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

TEST PROCEDURE

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

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

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

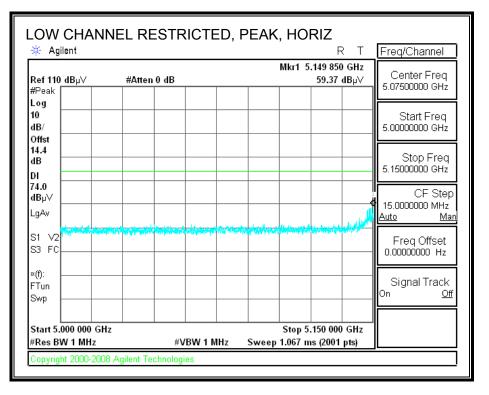
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each appplicable band.

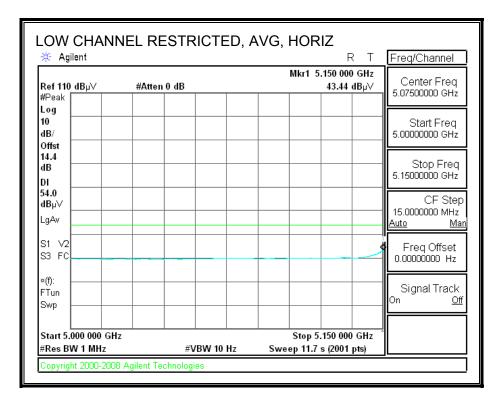
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

8.2.TRANSMITTER ABOVE 1 GHz

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

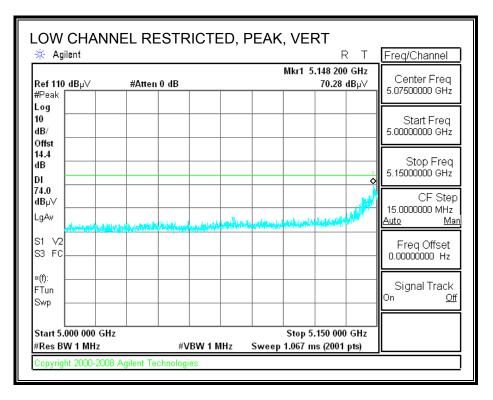
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

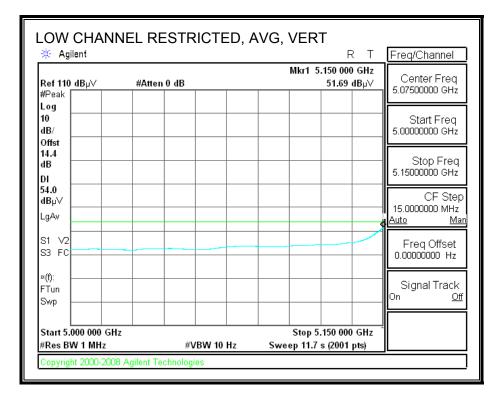




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RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)





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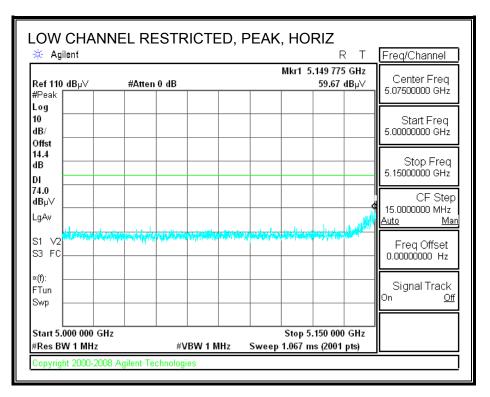
HARMONICS AND SPURIOUS EMISSIONS

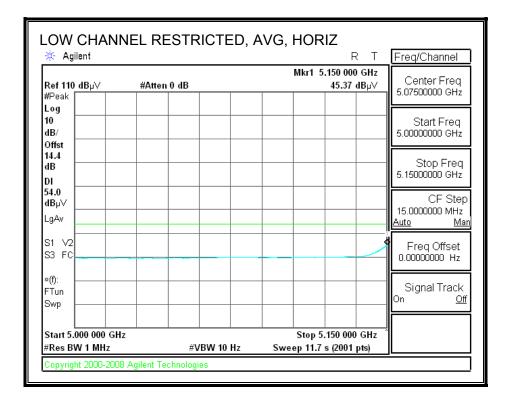
-	ce Cen	tification	Service	s, fren	nont su	a Chamo	er						
fest Engr:		Devin Cl											
Date:		07/26/09											
Project #:		09U1261	.0										
Company:	1	Microsof	oft										
EUT M/N:		Omni N											
Test Targe	t:	Harmon	ic										
Mode Ope	r:	Tx_a mo	ode										
	f	Measurem	nent Freq	quency	Amp	Preamp (Gain			Average	Field Stren	gth Limit	
	Dist	Distance to Antenna D Corr			D Corr	Distance					eld Strength		
	Read	Analyzer	-		Avg	_		trength @	· · · · · · · · · · · · · · · · · · ·	-	vs. Average		
	AF	Antenna l			Peak			r Field Stre	ength	Margin v	vs. Peak Lir	nit	
	CL	Cable Los	iS		HPF	High Pas	s Filter	t					
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
5180MHz						T				T			
10.360	3.0	42.2	37.4	8.9	-36.8	0.0	0.0	51.7	68.2	- 16.5	V	P	
15.540	3.0	40.7	38.9	11.3	-34.8	0.0	0.0	56.0	74.0	- 18.0	V	Р	
15.540	3.0	27.1		11.3	-34.8	0.0	0.0	42.4	54.0	-11.6	V	A	
10.360	3.0	39.8	37.4	8.9	-36.8	0.0	0.0	49.4	68.2	-18.8	H	P	
15.540	3.0	44.2	38.9	11.3	-34.8	0.0	0.0	59.6	74.0	-14.4	H	P	
15.540	3.0	30.3	38.9	11.3	-34.8	0.0	0.0	45.6	54.0	- 8.4	H	Α	
5200MHz	20	42 5	375	0.0	26.0			-21	70 1	101	*7	n	
10.400 15.600	3.0 3.0	43.5 39.8	.	8.9 11.4	-36.8 -34.8	0.0	0.0	53.1 55.1	68.2 74.0	-15.1 -18.9	V V	P P	
15.600	3.0	39.8 26.9	¢	11.4 11.4	-34.8 -34.8	0.0	0.0	55.1 42.2	74.0 54.0	-18.9	v V	P A	
10.400	3.0	40.3	37.5		-34.8	0.0	0.0	42.2 50.0	54.0 68.2	-11.8	V H	P P	
15.600	3.0	44.1	38.7	•••••••••••••••••••	-34.8	0.0	0.0	59.4	74.0	-14.6	H	P	
15.600	3.0	30.3			-34.8	0.0	0.0	45.7	54.0	-8.3	н	Ā	
5240MHz				-				1					,
10.480	3.0	40.1	37.5	9.0	-36.7	0.0	0.0	49.8	68.2	-18.4	V	P	
	3.0	38.7		11.4	-34.7	0.0	0.0	53.8	74.0	-20.2	V	P	
15.720	3.0	26.1		11.4	-34.7	0.0	0.0	41.3	54.0	-12.7	V	Α	
15.720		40.8	37.5	•••••••••••••••••••••••••••••••••••••••	-36.7	0.0	0.0	50.6	68.2	- 17.6	H	P	
15.720 10.480	3.0			114	-34.7	0.0	0.0	58.1	74.0	-15.9	н	P	
15.720	3.0 3.0 3.0	43.0 29.1	38.4 38.4	•••••••••••••••••••••••••••••••••••••••	-34.7	0.0	0.0	44.3	54.0	-9.7	H	A	

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8.2.2. TX ABOVE 1 GHz FOR 802.11n HT20 MODE IN THE 5.2 GHz BAND

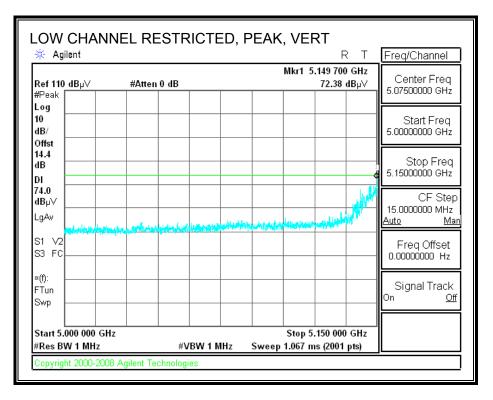
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

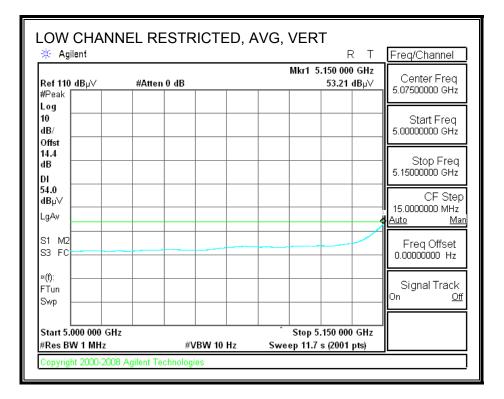




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RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)





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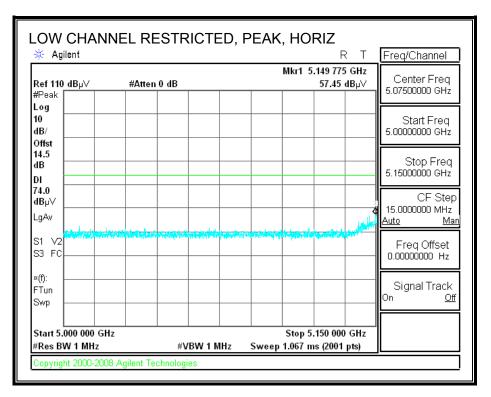
HARMONICS AND SPURIOUS EMISSIONS

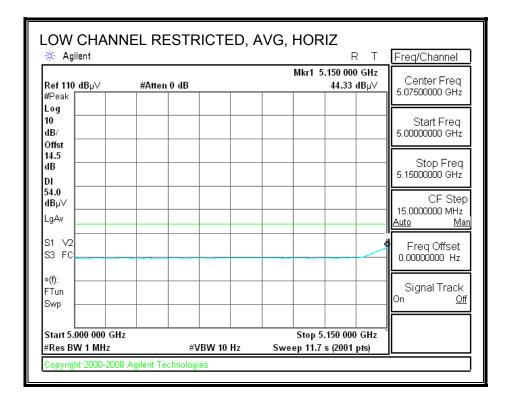
est Engr:		Devin C	hang										
Date:		07/26/09	-										
Project #:		09U1261	0										
Company:		Microsof											
EUT M/N:		Omni N											
Test Targe	t:	Harmon	ic										
Mode Oper: Tx HT20													
	f	Measuren		wency	Amp	Preamp (Gain			Average	Field Stren	gth Limit	
Dist Distance to Antenna					•	Distance		t to 3 me	ters	-	ld Strength	-	
Read Analyzer Reading				Avg			trength @			s. Average			
				Peak	_		Field Str		-	s. Peak Li			
	CL	Cable Los			HPF	High Pas							
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m		V/H	P/A/OP	
5180MHz													
10.360	3.0	41.8	37.4	8.9	-34.6	0.0	0.0	53.6	68.2	-14.6	V	P	
15.540	3.0	40.3		11.3	-32.3	0.0	0.0	58.2	74.0	-15.8	V	P	
15.540	3.0	27.1	¢	11.3	-32.3	0.0	0.0	45.1	54.0	- 8.9	V	A	
10.360	3.0	40.0	37.4	8.9	-34.6	0.0	0.0	51.7	68.2	-16.5	H	P	
15.540	3.0	42.9	38.9	11.3	-32.3	0.0	0.0	60.8	74.0	-13.2	H	P	
15.540	3.0	29.3	38.9	11.3	-32.3	0.0	0.0	47.2	54.0	- 6.8	H	A	
5200MHz													
10.400	3.0	42.9	37.5	8.9	-34.6	0.0	0.0	54.8	68.2	- 13.4	V	Р	
15.600	3.0	40.7	o	11.4	-32.3	0.0	0.0	58.5	74.0	-15.5	V	P	
15.600	3.0	26.8	¢	11.4	-32.3	0.0	0.0	44.6	54.0	-9.4	V	A	
10.400	3.0	38.7	37.5	8.9	-34.6	0.0	0.0	50.5	68.2	-17.7	H	P	
15.600	3.0	43.6	38.7	11.4	-32.3	0.0	0.0	61.4	74.0	-12.6	H	P	
15 200	3.0	30.1	38.7	11.4	-32.3	0.0	0.0	47.9	54.0	- <mark>6.1</mark>	H	A	
15.600		43.6	37.5	9.0	-34.5	0.0	0.0	55.6	68.2	-12.6	V	Р	
5240MHz	30		o	9.0 11.4	-34.5	0.0	0.0	56.2	74.0	-12.0	v	P P	
5240MHz 10.480	3.0	•••••••••••••••••••••••••			-32.3	0.0	0.0	43.1	54.0	-10.9	v	A	
5240MHz 10.480 15.720	3.0	38.7	¢	11.4									
5240MHz 10.480 15.720 15.720	}	•••••••••••••••••••••••••	38.4	11.4 9.0		0.0	0.0	51.0	68.2	-17.2	н	P	
5240MHz	3.0 3.0	38.7 25.5	38.4 37.5	11.4 9.0 11.4	-34.5 -32.3	0.0	0.0 0.0	51.0 59.7	68.2 74.0	-17.2 -14.3	H H	P P	

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8.2.3. TX ABOVE 1 GHz FOR 802.11n HT40 MODE IN THE 5.2 GHz BAND

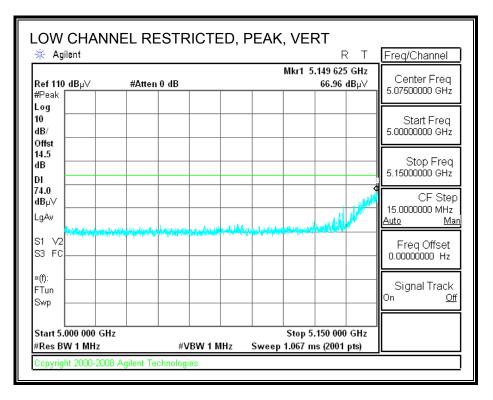
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

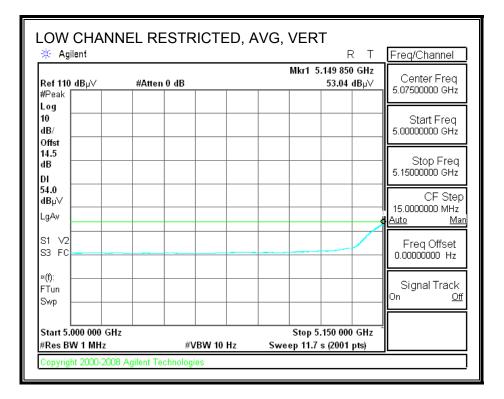




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RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)





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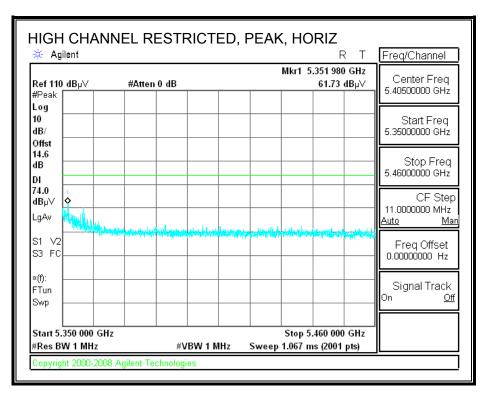
HARMONICS AND SPURIOUS EMISSIONS

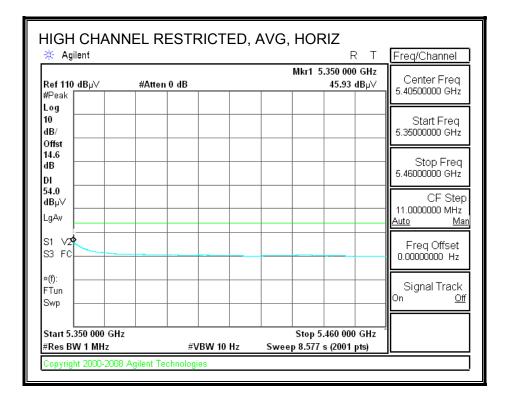
		Measuren tification		s, Frei	nont 5n	n Chamb	er						
est Engr:		Devin C	hang										
Date:		07/26/09	-										
Project #:		09U1261	0										
Company	:	Microsof	ft										
EUT M/N:		Omni N											
Fest Targe	et:	Harmon	ic										
Mode Ope	r:	Tx_HT40											
	f	Measuren			-	Preamp (_	Field Stren	-	
	Dist												
	Read	-	-		Avg	-				_	_		
	AF	Antenna			Peak	Calculate			ength	Margin v	vs. Peak Lis	mit	
	CL	Cable Los	88		HPF	High Pas	s Filter						
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	:	dBuV/m		V/H	P/A/QP	
5190MHz											-	-	
10.380	3.0	39.7	37.4	8.9	-36.8	0.0	0.0	49.3	68.2	-19.0	V	P	
15.570	3.0	37.2	¢	11.4	-34.8	0.0	0.0	52.5	74.0	-21.5	V	P	
15.570	3.0	23.8	38.8		-34.8	0.0	0.0	39.2	54.0	- 14.8	V	A	
10.380	3.0	36.3	\$	8.9	-36.8	0.0	0.0	45.9	68.2	-22.3	H	P	
15.570	3.0	39.1		11.4	-34.8	0.0	0.0	54.4	74.0	-19.6	H	P	
15.570 5230MHz	3.0	26.5	38.8	11.4	-34.8	0.0	0.0	41.9	54.0	-12.1	H	A	
0.460	3.0	38.8	37.5	9.0	-36.7	0.0	0.0	48.5	68.2	-19.7	v	Р	
15.690	3.0	36.6	38.5		-34.7	0.0	0.0	51.8	74.0	-12.2	v	P	
15.690	3.0	24.0	\$		-34.7	0.0	0.0	39.2	54.0	-14.8	v	Ā	
10.460	3.0	36.8	¢	9.0	-36.7	0.0	0.0	46.6	68.2	- 21.6	H	P	
15.690	3.0	37.3			-34.7	0.0	0.0	52.5	74.0	-21.5	H	P	
15.690	3.0	25.2	38.5	11.4	-34.7	0.0	0.0	40.4	54.0	-13.6	H	A	
Rev. 4.1.2. Note: No (: missions	: were de	tected	above t	the system	m nois	: e floor.		:	3	1 1	

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8.2.4. TX ABOVE 1 GHz FOR 802.11a MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

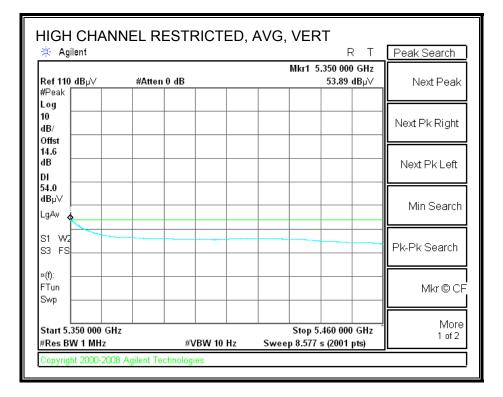




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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

HIGH CHANN	NEL RESTRIC	TED, PEAł	K, VERT	₹Т	Freq/Channel
Ref 110 dBµ∨ #Peak	#Atten 0 dB		Mkr1 5.350 275 70.28		Center Freq 5.40500000 GHz
Log 10 dB/ Offst					Start Freq 5.3500000 GHz
14.6 dB DI Ø					Stop Freq 5.4600000 GHz
74.0 dBµ∨ LgAv	nin teating and the state of th	nite Alminique to a Million Alm	fatelik de sale generation de transport	udition alludan	CF Step 11.0000000 MHz <u>Auto Man</u>
S1 V2 S3 FC					Freq Offset 0.00000000 Hz
×(f): FTun Swp					Signal Track ^{On <u>Off</u>}
Start 5.350 000 GHz #Res BW 1 MHz	#VBW 1	MHz Sweep	Stop 5.460 000 1.067 ms (2001		
Copyright 2000-2008	Agilent Technologies				



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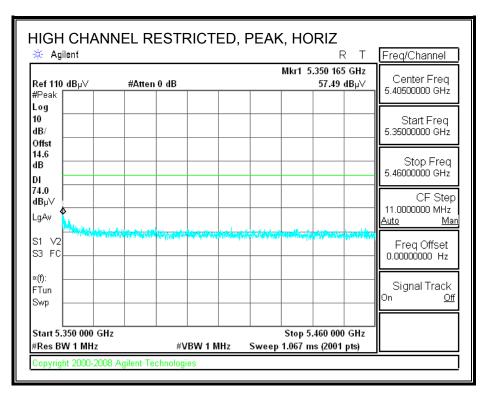
HARMONICS AND SPURIOUS EMISSIONS

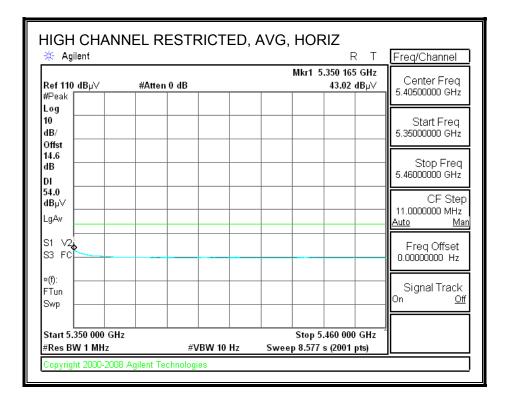
Test Engr:		Devin C	hang										
Date:		08/03/09	-										
Project #:		09U1261	0										
Company		Microso											
EUT M/N:		Omni N											
Test Targe	et:	Harmon	ic										
Mode Ope		Tx amo	ode										
-	f	Measuren	nent Fred	quency	Amp	Preamp (Gain			Average	Field Stren	gth Limit	
	Dist	Distance			-	Distance	Correc	ct to 3 me	ters	-	ld Strength	-	
	Read	Analyzer	Reading		Avg	Average	Field S	trength @	3 m	Margin v	s. Average	Limit	
AF Antenna Factor Peak						Calculate	d Peak	Field Stre	ength	-	rs. Peak Lis		
	CL	Cable Los	88		HPF	High Pas	s Filter	r		-			
						D.C.							
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m		Ant. Pol. V/H	Det. P/A/QP	Notes
5260MHz													
10.520	3.0	50.4	37.5	9.0	-34.4	0.0	0.8	63.3	68.2	-4.9	V	P	
15.780	3.0	43.7	38.2	11.5	-32.2	0.0	0.7	61.8	74.0	-12.2	V	P	
15.780	3.0	30.2	38.2	11.5	-32.2	0.0	0.7	48.4	54.0	- 5.6	V	A	
10.520	3.0	43.9	37.5	9.0	-34.4	0.0	0.8	56.7	68.2	-11.5	H	P	
15.780	3.0	37.9	38.2	11.5	-32.2	0.0	0.7	56.0	74.0	-18.0	H	P	
15.780	3.0	25.1	38.2	11.5	-32.2	0.0	0.7	43.3	54.0	-10.7	H	A	
5300MHz	****************							60.0			••	_	
10.600 10.600	3.0 3.0	47.2 34.9	37.5 37.5	9.0 9.0	-34.3 -34.3	0.0	0.8 0.8	60.3 47.9	74.0 54.0	-13.7	V V	P	
15.900	3.0	40.4	37.9	11.5	-34.5	0.0	0.8	58.3	54.0 74.0	-6.1 -15.7	v	A P	
15.900	3.0	27.4	37.9	11.5	-32.2	0.0	0.7	45.3	54.0	-8.7	v	A	
10.600	3.0	40.0	37.5	9.0	-34.3	0.0	0.8	53.0	74.0	-21.0	H	P	
10.600	3.0	28.5	37.5	9.0	-34.3	0.0	0.8	41.6	54.0	-12.4	H	Ā	
15.900	3.0	38.1	37.9	11.5	-32.2	0.0	0.7	56.0	74.0	-18.0	H	P	
15.900	3.0	25.4	37.9	11.5	-32.2	0.0	0.7	43.4	54.0	-10.6	H	A	
5320MHz	ļ												
10.640	3.0	48.6	37.6	9.1	-34.2	0.0	0.8	61.8	74.0	-12.2	V	P	
10.640	3.0	35.3	37.6	9.1	-34.2	0.0	0.8	48.4	54.0	-5.6	V	A	
15.960	3.0	41.3		11.5	-32.2	0.0	0.7	59.1	74.0	-14.9	V	P	
15.960 10.640	3.0 3.0	27.4 41.1	37.7 37.6	11.5 9.1	-32.2 -34.2	0.0	0.7 0.8	45.2 54.2	54.0 74.0	-8.8 -19.8	V H	A P	
10.640	3.0	41.1 29.3	37.6	9.1	-34.2	0.0	0.8	54.2 42.4	74.0 54.0	-19.8	н Н	A	
15.960	3.0	39.6	37.0	9.1 11.5	-34.2	0.0	0.8	42.4 57.4	54.0 74.0	-11.6	H H	P	
15.960	3.0	26.1			-32.2	0.0	0.7	43.9	54.0	-10.0	H	A	
Rev. 4.1.2.	7												

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8.2.5. TX ABOVE 1 GHz FOR 802.11n HT20 MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

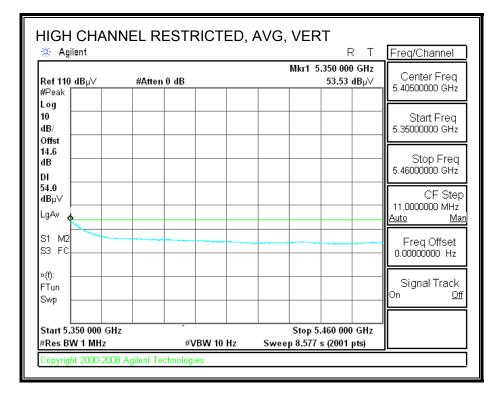




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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

HIGH 🔆 Agi		EL RESTF	RICTED, F	PEAK, VE	RT R T	Freq/Channel
Ref 110 #Peak	dBµ∨	#Atten 0 dB		Mkr1 5	5.352 860 GHz 70.82 dBµ∀	Center Freq 5.40500000 GHz
Log 10 dB/ Offst						Start Freq 5.3500000 GHz
14.6 dB DI	1 •					Stop Freq 5.4600000 GHz
74.0 dBµ∨ LgAv		n <mark>beidd da fan de beidd a stad a beidd a beidd</mark>	Manhar Kulongha sa Kilana kashashira ya	anter and the second	and the second	CF Step 11.0000000 MHz <u>Auto Man</u>
S1 V2 S3 FC						Freq Offset 0.00000000 Hz
≈(f): FTun Swp						Signal Track On <u>Off</u>
	350 000 GHz W 1 MHz	#V	BW 1 MHz	Stop 5 Sweep 1.067 n	.460 000 GHz ns (2001 pts)	
Copyrig	ht 2000-2008 A	gilent Technologi	es			



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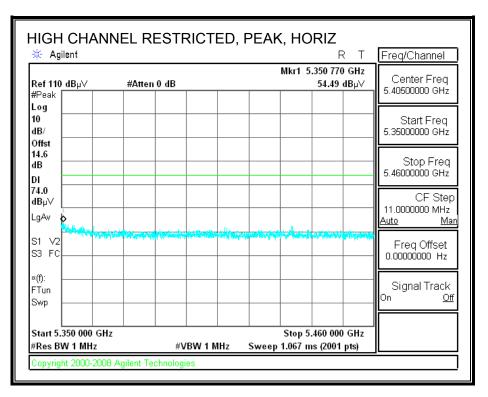
HARMONICS AND SPURIOUS EMISSIONS

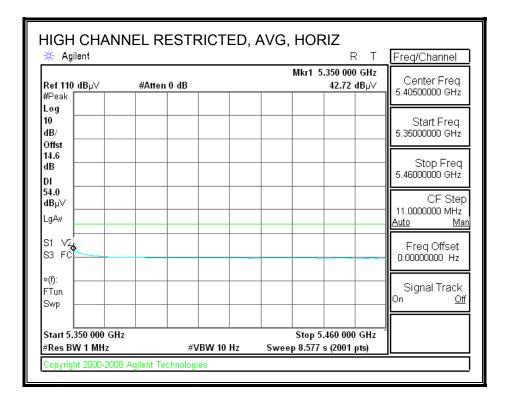
Test Engr:		Devin C	hang										
Date:		08/03/09	_										
Project #:		09U1261											
Company		Microsof											
EUT M/N:		Omni N											
Test Targe	t:	Harmon											
Mode Ope		Tx HT2											
and ope	f	Measuren		wency	Amp	Preamp (Gain			Average	Field Stren	eth Limit	
	Dist	Distance		• •	-	Distance		et to 3 me	ters		ld Strength		
	Read	Analyzer			Avg			trength @			s. Average		
AF Antenna Factor Peak						-		Field Stre		_	/s. Peak Lis		
	CL	Cable Los			HPF	High Pas			3				
f	Dist	Read	AF	CL	Amp	D Corr		Corr.		-	Ant. Pol.		Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
5260MHz 10.520	3.0	51.5	37.5	9.0	-34.4	0.0	0.8	64.4	68.2	-3.8	v	Р	
10.520	3.0	43.3	37.5	9.0	-34.4	0.0	0.8	61.5	68.2 74.0	-3.8 -12.5	V	P	
15.780	3.0	30.0		11.5	-32.2	0.0	0.7	48.2	54.0	-12.5	v	A	
10.520	3.0	42.5	37.5	9.0	-34.4	0.0	0.8	55.4	68.2	-12.8	H	P	
15.780	3.0	37.4	38.2	11.5	-32.2	0.0	0.7	55.6	74.0	-18.4	H	P	
15.780	3.0	25.3	38.2	11.5	-32.2	0.0	0.7	43.5	54.0	-10.5	H	A	
5300MHz		ļ								ļ			
10.600	3.0	48.1	37.6	9.1	-34.2	0.0	0.8	61.2	74.0	- 12.8	V	Р	
10.600	3.0	35.5	37.6	9.1	-34.2	0.0	0.8	48.7	54.0	- 5.3	V	A	
15.900	3.0	40.3	37.7	11.5	-32.2	0.0	0.7	58.1	74.0	-15.9	V	P	
15.900	3.0	27.6	37.7	11.5	-32.2	0.0	0.7	45.4	54.0	-8.6	V	A	
10.600 10.600	3.0 3.0	40.8 28.7	37.6 37.6	9.1 9.1	-34.2 -34.2	0.0 0.0	0.8 0.8	53.9 41.9	74.0 54.0	-20.1 -12.1	H H	P	
10.600	3.0	28.7 38.5	37.6	9.1 11.5	-34.2	0.0	0.8	41.9 56.3	54.0 74.0	-12.1 -17.7	H H	A P	
15.900	3.0	25.8	37.7	11.5	-32.2	0.0	0.7	43.6	74.0 54.0	-17.7	н Н	A	
5320MHz							•••	-1010	V	-101-1			
10.640	3.0	35.1	37.6	9.1	-34.2	0.0	0.8	48.2	74.0	-25.8	V	Р	
10.640	3.0	22.9	37.6	9.1	-34.2	0.0	0.8	36.0	54.0	-18.0	V	A	
15.960	3.0	34.9	37.7	11.5	-32.2	0.0	0.7	52.7	74.0	-21.3	V	P	
15.960	3.0	22.8	37.7	11.5	-32.2	0.0	0.7	40.6	54.0	- 13.4	V	A	
10.640	3.0	34.8	37.6	9.1	-34.2	0.0	0.8	47.9	74.0	-26.1	H	P	
10.640	3.0	22.9	37.6	9.1	-34.2	0.0	0.8	36.0	54.0	-18.0	H	A	
15.960	3.0	35.5	37.7	11.5	-32.2	0.0	0.7	53.3	74.0	-20.7	H	P	
	3.0	22.8	37.7	11.5	-32.2	0.0	0.7	40.6	54.0	-13.4	H	A	
15.960		1	1	į		.							

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8.2.6. TX ABOVE 1 GHz FOR 802.11n HT40 MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

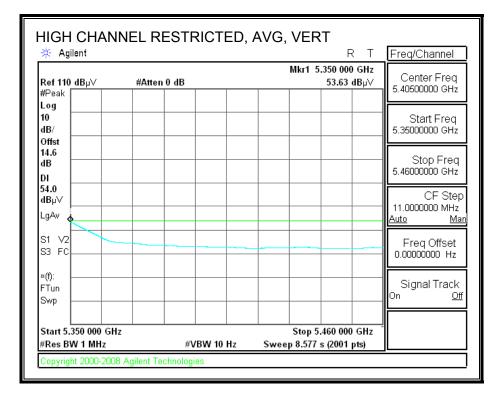




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RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)

🔆 Agilent					Mlad	5,350 055	сц.	Freq/Channel
Ref 110 dBµ` #Peak	v	#Atten	0 dB			66.78		Center Freq 5.40500000 GHz
Log 10 dB/ Offst								Start Freq 5.35000000 GHz
14.6 dB								Stop Freq 5.46000000 GHz
74.0 Φ dBµ∨ LgAv	Haran Market	Number and	Kine in the state	ne entre de	and with show the show	the two doctors in the	lan Jana Mala III	CF Step 11.0000000 MHz <u>Auto Mar</u>
S1 V2 S3 FC								Freq Offset 0.00000000 Hz
×(f): FTun Swp								Signal Track On <u>Off</u>
Start 5.350 0 #Res BW 1 M			#VBW	1 MHz	Stop Sweep 1.067	5.460 000 ms (2001		



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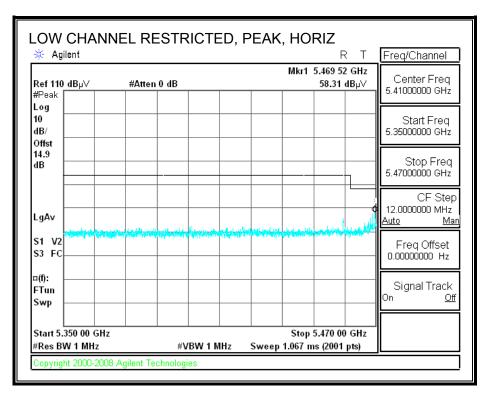
HARMONICS AND SPURIOUS EMISSIONS

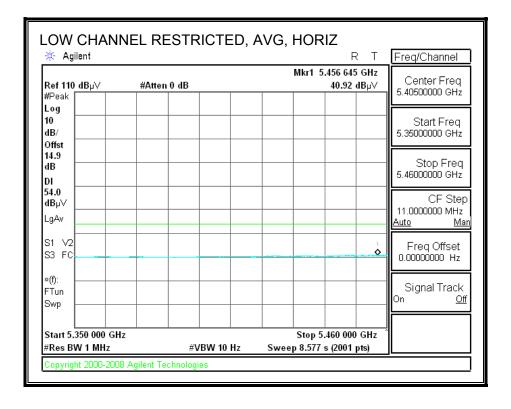
-		Measuren tification		s, Frei	mont 5n	n Chamb	er						
T. T.		Dut of											
est Engr		Devin C	_										
Date:		08/03/09											
Project #:		09U1261											
Company	:	Microso											
UT M/N:		Omni N											
est Targe		Harmon											
fode Ope		Tx_HT4				-							
	f	Measuren			-	Preamp (-	Field Stren	-	
	Dist	Distance				Distance					eld Strength		
	Read												
	AF	Antenna			Peak			Field Stre	ength	Margin	vs. Peak Lis	nit	
	CL	Cable Los	35		HPF	High Pas	s Filter	r					
f	Dist	Read	AF	CL	Amp	D Corr	Fltm	Corr.	Limit	Manala	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m		dB	dB	dB	:	dBuV/m	-	V/H	P/A/QP	notes
270MHz		- unit	un/m	- 00	- 00			ana 1/10	and v/m		*/11	THEY	
0.540	3.0	46.5	37.5	9.0	-34.4	0.0	0.8	59.4	68.2	- <mark>8.8</mark>	v	P	
5.810	3.0	38.8	38.2	11.5	-32.2	0.0	0.7	56.9	74.0	-17.1	v	P	
5.810	3.0	26.7		11.5	-32.2	0.0	0.7	44.8	54.0	-9.2	v	Ā	
0.540	3.0	40.2	37.5	9.0	-34.4	0.0	0.8	53.1	68.2	-15.1	H	P	
5.810	3.0	36.1	38.2	11.5	-32.2	0.0	0.7	54.2	74.0	-19.8	H	P	
5.810	3.0	24.1	¢		-32.2	0.0	0.7	42.2	54.0	-11.8	H	Ā	
310MHz	¢												
0.620	3.0	46.4	37.5	9.1	-34.3	0.0	0.8	59.5	74.0	-14.5	V	P	
0.620	3.0	34.0	37.5	9.1	-34.3	0.0	0.8	47.1	54.0	- 6.9	V	Α	
5.930	3.0	38.5	o		-32.2	0.0	0.7	56.4	74.0	-17.6	V	P	
5.930	3.0	26.4	o		-32.2	0.0	0.7	44.2	54.0	- <mark>9.8</mark>	V	Α	
0.620	3.0	39.7	37.5	9.1	-34.3	0.0	0.8	52.7	74.0	-21.3	H	P	
0.620	3.0	27.3	37.5	9.1	-34.3	0.0	0.8	40.4	54.0	-13.6	H	A	
5.930	3.0	37.0	o		-32.2	0.0	0.7	54.9	74.0	-19.1	H	P	
5.930	3.0	24.1	37.8	11.5	-32.2	0.0	0.7	41.9	54.0	-12.1	H	A	
ev. 4.1.2 Tote: No		missions	were de	tected	above 1	the syste:	m nois	se floor.					

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8.2.7. TX ABOVE 1 GHz FOR 802.11a MODE IN THE 5.6 GHz BAND

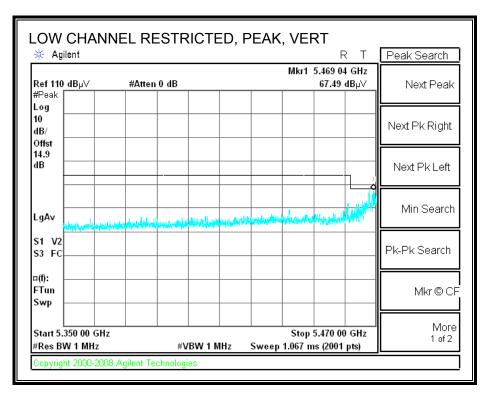
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

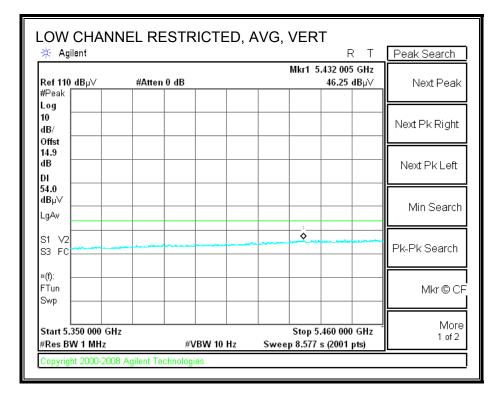




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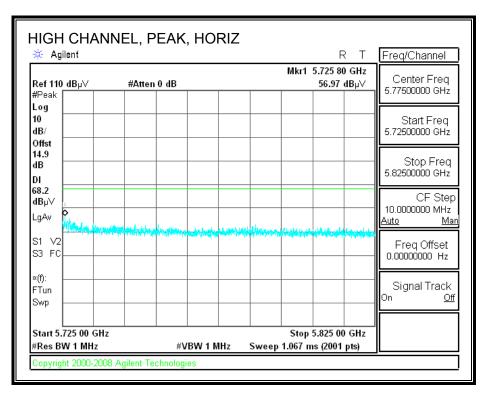
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



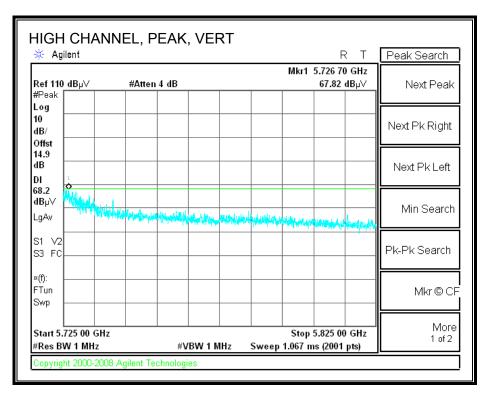


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AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)



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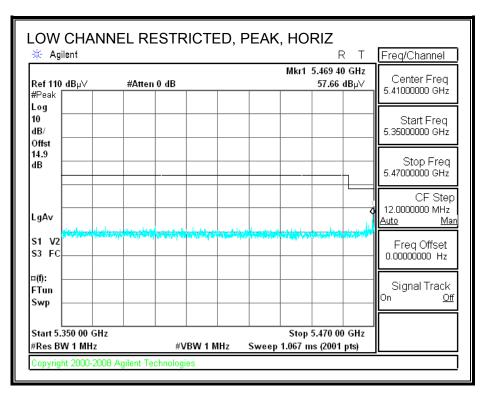
HARMONICS AND SPURIOUS EMISSIONS

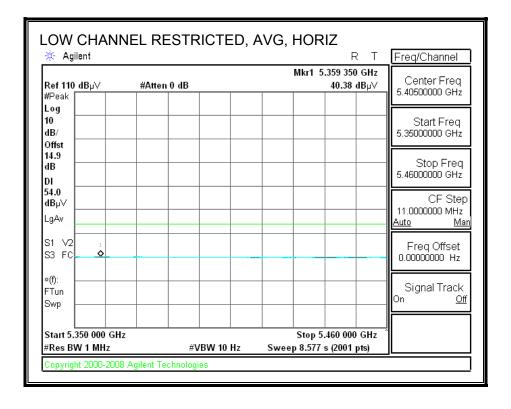
Test Engr:		Devin C	hang										
Date:		08/03/09	-										
Project #:		09U1261											
Company:		Microsof											
EUT M/N:		Omni N											
Test Targe		Harmon											
Mode Ope		Tx a mo											
Mode Ope	f	Measuren		manar	Amo	Preamp (Cain			Average	Field Stren	ath Limit	
	Dist	Distance			-	Distance		nt to 3 ms	tars	_	1d Strength	-	
	Read	Analyzer			Avg			trength @			/s. Average		
	AF	Antenna	_		Peak	_		r Field Str	-	_	78. Average 78. Peak Li		
	CL	Cable Los			HPF	High Pas				-margini V	S. I CAN LI		
f	Dist	Read	AF	CL	Amp	D Corr		Corr.			Ant. Pol.		Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m	dBuV/m	dB	V/H	P/A/QP	
5500MHz													
11.000	3.0	42.0	37.7	9.2	-33.8	0.0	0.7	55.9	74.0	-18.1	V	P	
11.000	3.0	29.0	37.7	9.2	-33.8	0.0	0.7	42.9	54.0	-11.1	V	A	
11.000	3.0	37.0	37.7	9.2	-33.8	0.0	0.7	50.9	74.0	-23.1	H	P	
11.000 16.500	3.0 3.0	24.8 35.8	37.7 39.7	9.2 11.8	-33.8 -32.1	0.0	0.7 0.7	38.7 55.9	54.0 68.2	-15.3 -12.3	H H	A P	
16.500	3.0	36.8	39.7	11.0	-32.1	0.0	0.7	56.9	68.2	-11.3	V	P P	
5600MHz	5.0	30.0	37.1	11.0	-04.1	0.0	0.7	20.2	00.2	-11.0	•		
11.200	3.0	47.7	37.9	9.3	-33.5	0.0	0.7	62.1	74.0	-11.9	V	Р	
11.200	3.0	34.4	37.9	9.3	-33.5	0.0	0.7	48.9	54.0	- 5.1	V	A	
16.800	3.0	35.2	40.9	12.0	-32.0	0.0	0.7	56.7	68.2	-11.5	V	P	
11.200	3.0	39.0	37.9	9.3	-33.5	0.0	0.7	53.5	74.0	-20.5	H	P	
11.200	3.0	27.1	37.9	9.3	-33.5	0.0	0.7	41.5	54.0	-12.5	H	A	
16.800	3.0	35.7	40.9	12.0	-32.0	0.0	0.7	57.2	68.2	-11.0	H	P	
	}		ļ										
	3.0	46.0	38.0	9.4	-33.2	0.0	0.7	61.0	74.0	-13.0	V	P	
5700MHz 11.400		33.1 35.8	38.0	9.4	-33.2	0.0	0.7	48.1	54.0	-6.0	V	A	
11.400 11.400	3.0		42.2		-32.0 -33.2	0.0	0.7 0.7	58.7 56.8	68.2 74.0	-9.5 -17.2	V H	P P	
11.400 11.400 17.100	3.0		38.0			: 0.0		45.1	74.0 54.0	-17.2	H H	A	
11.400 11.400 17.100 11.400	3.0 3.0	41.9	38.0 38.0	9.4 9.4		0.0	0.7						
11.400 11.400 17.100 11.400 11.400	3.0 3.0 3.0	41.9 30.2	38.0	9.4	-33.2	0.0	0.7 0.7	•	¢		H		
11.400 11.400 17.100	3.0 3.0	41.9	¢	9.4		0.0 0.0	0.7 0.7	45.1 60.2	68.2	-8.0	H	Р	

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8.2.8. TX ABOVE 1 GHz FOR 802.11n HT20 MODE IN THE 5.6 GHz BAND

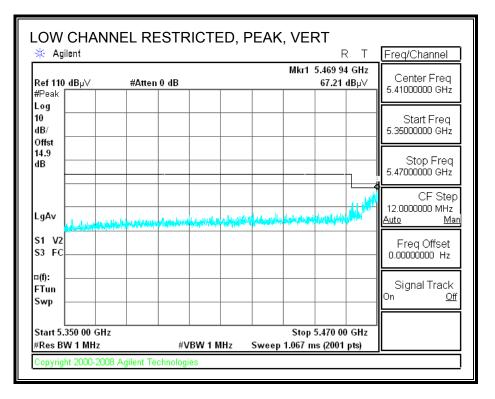
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

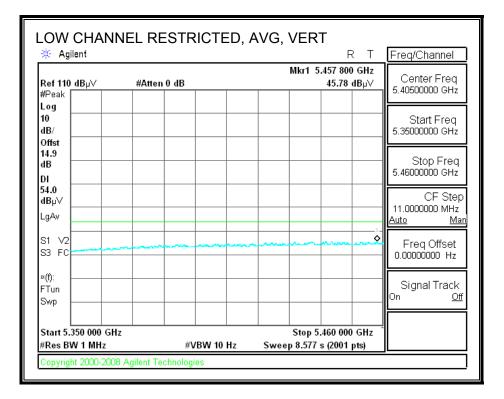




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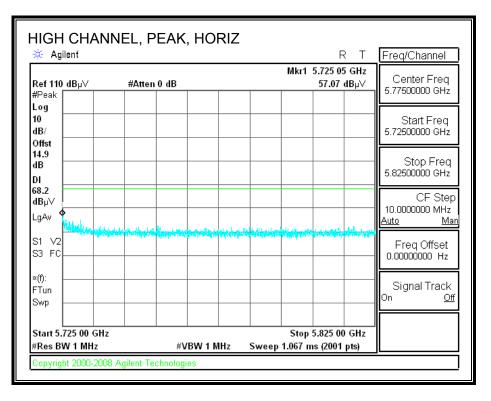
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



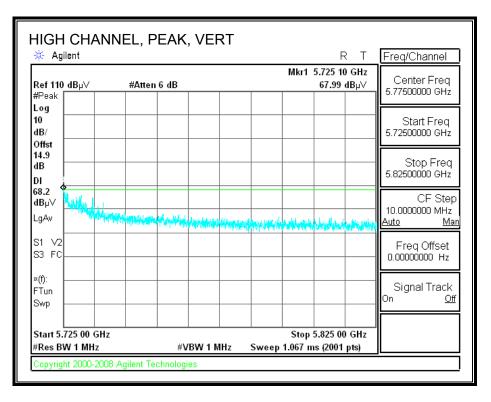


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AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)



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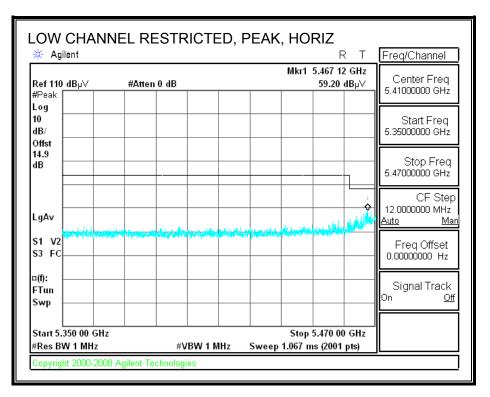
HARMONICS AND SPURIOUS EMISSIONS

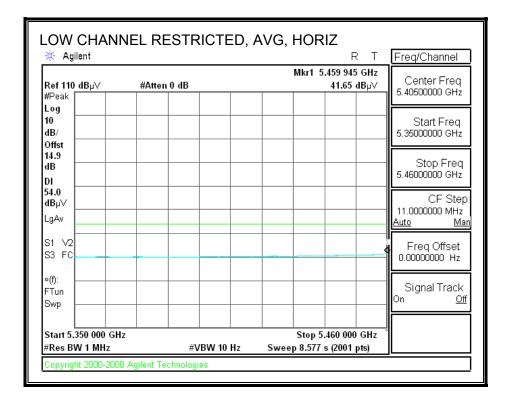
		Devin C	hang										
Date:		08/03/09											
Project #:		09U1261	0										
Company		Microso	ft										
EUT M/N:		Omni N											
Test Targe	t:	Harmon	ic										
Mode Ope		Tx HT2											
	f	Measuren		menca	Amo	Preamp	Gain			Average	Field Stren	eth Limit	
	- Dist	Distance		• •	•	Distance		t to 3 ma	tors	-	ld Strength	-	
	Read	Analyzer			Avg			trength @			is Average		
	AF	Antenna	_		Peak	_		: Field Stre		_	rs. Peak Li		
	CL	Cable Los			HPF	High Pas			ingth	interent v	o. r can Lli		
	01	Capie LO	~			rugii r dă	o i mei						
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	:	dBuV/m		V/H	P/A/QP	
5500MHz													
11.000	3.0	43.0	37.7	9.2	-33.8	0.0	0.7	56.9	74.0	-17.1	V	Р	
11.000	3.0	29.2	37.7	9.2	-33.8	0.0	0.7	43.1	54.0	-10.9	V	A	
16.500	3.0	36.9	39.7	11.8	-32.1	0.0	0.7	57.0	68.2	-11.2	V	P	
11.000	3.0	38.0	37.7	9.2	-33.8	0.0	0.7	51.9	74.0	-22.1	H	P	
11.000	3.0	25.6	37.7	9.2	-33.8	0.0	0.7	39.5	54.0	-14.5	H	Α	
16.500	3.0	36.4	39.7	11.8	-32.1	0.0	0.7	56.5	68.2	-11.7	H	P	
5600MHz													
11.200	3.0	45.9	37.9	9.3	-33.5	0.0	0.7	60.4	74.0	-13.6	V	P	
	3.0	34.2	37.9	9.3	-33.5	0.0	0.7	48.6	54.0	-5.4	V	A	
	3.0	34.9	40.9	12.0	-32.0	0.0	0.7	56.5	68.2	-11.7	V	Р	
16.800	¢			: 0 2	-33.5	0.0	0.7	52.9	74.0	-21.1	H	P	
16.800 11.200	3.0	38.4	37.9	9.3			0.7	40.3	54.0	-13.7	H	A	
11.200 16.800 11.200 11.200	3.0 3.0	25.9	37.9	9.3	-33.5	0.0							
16.800 11.200 11.200 16.800	3.0		o			0.0 0.0	0.7	56.5	68.2	-11.7	H	P	
16.800 11.200 11.200 16.800 5700MHz	3.0 3.0 3.0	25.9 35.0	37.9 40.9	9.3 12.0	-33.5 -32.0	0.0	0.7						
16.800 11.200 11.200 16.800 5700MHz 11.400	3.0 3.0 3.0 3.0	25.9 35.0 47.8	37.9 40.9 38.0	9.3 12.0 9.4	-33.5 -32.0 -33.2	0.0 0.0	0.7 0.7	62.7	74.0	-11.3	v	Р	
16.800 11.200 11.200 16.800 5700MHz 11.400 11.400	3.0 3.0 3.0 3.0 3.0 3.0	25.9 35.0 47.8 34.0	37.9 40.9 38.0 38.0	9.3 12.0 9.4 9.4	-33.5 -32.0 -33.2 -33.2	0.0 0.0 0.0	0.7 0.7 0.7	62.7 49.0	74.0 54.0	-11.3 -5.0	V V	P A	
16.800 11.200 11.200 16.800 5700MHz 11.400 11.400 11.400	3.0 3.0 3.0 3.0 3.0 3.0 3.0	25.9 35.0 47.8 34.0 47.8	37.9 40.9 38.0 38.0 38.0	9.3 12.0 9.4 9.4 9.4	-33.5 -32.0 -33.2 -33.2 -33.2	0.0 0.0 0.0 0.0	0.7 0.7 0.7 0.7	62.7 49.0 62.8	74.0 54.0 68.2	-11.3 -5.0 -5.4	V V V	P A P	
16.800 11.200 11.200 16.800 5700MHz 11.400 11.400 11.400 11.400	3.0 3.0 3.0 3.0 3.0 3.0 3.0 3.0	25.9 35.0 47.8 34.0 47.8 42.4	37.9 40.9 38.0 38.0 38.0 38.0 38.0	9.3 12.0 9.4 9.4 9.4 9.4	-33.5 -32.0 -33.2 -33.2 -33.2 -33.2	0.0 0.0 0.0 0.0 0.0	0.7 0.7 0.7 0.7 0.7	62.7 49.0 62.8 57.3	74.0 54.0 68.2 74.0	-11.3 -5.0 -5.4 -16.7	V V V H	P A P P	
16.800 11.200 11.200 16.800 5700MHz 11.400 11.400 11.400	3.0 3.0 3.0 3.0 3.0 3.0 3.0	25.9 35.0 47.8 34.0 47.8	37.9 40.9 38.0 38.0 38.0	9.3 12.0 9.4 9.4 9.4	-33.5 -32.0 -33.2 -33.2 -33.2	0.0 0.0 0.0 0.0	0.7 0.7 0.7 0.7	62.7 49.0 62.8	74.0 54.0 68.2	-11.3 -5.0 -5.4	V V V	P A P	

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8.2.9. TX ABOVE 1 GHz FOR 802.11n HT40 MODE IN THE 5.6 GHz BAND

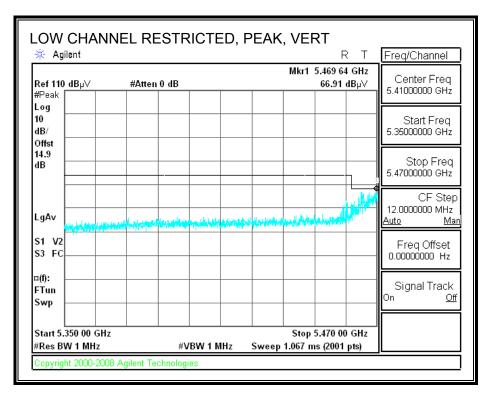
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

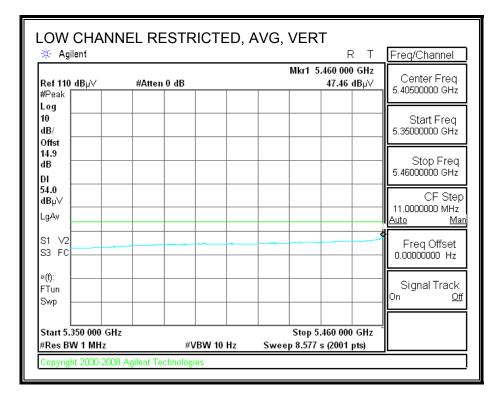




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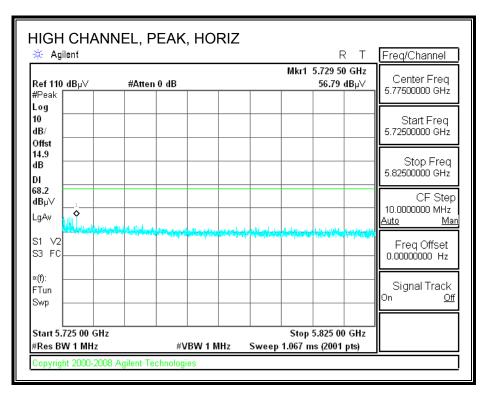
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



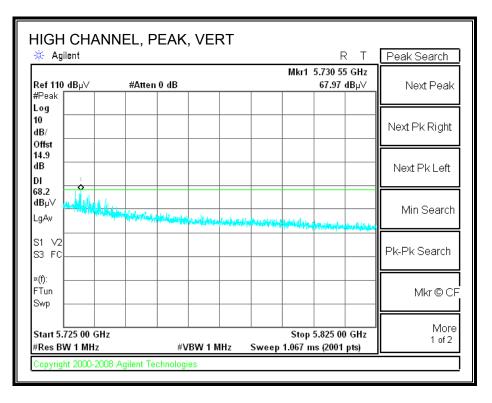


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AUTHORIZED BANDEDGE (HIGH CHANNEL, HORIZONTAL)



AUTHORIZED BANDEDGE (HIGH CHANNEL, VERTICAL)



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HARMONICS AND SPURIOUS EMISSIONS

Test Engr:		Devin C	hang										
Date:		08/03/09	-										
Project #:		09U1261											
Company:		Microsof											
EUT M/N:		Omni N											
Test Targe		Harmon											
Mode Ope		Tx HT4											
atoue ope	f	Measuren		menes	Amo	Preamp	Gain			Average	Field Stren	ath Limit	
	Dist	Distance		• •	•	Distance		nt to 3 ma	tors	_	ld Strength	-	
	Read	Analyzer			Avg			trength @			vs. Average		
	AF	Antenna	-		Peak	_		Field Str	·	_	vs. Peak Lis		
	CL	Cable Los			HPF	High Pas			engun	Margin	vs. Feak Lu	m	
	CL.	Cable Los	10			ingn i as	o i iitei						
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
GHz	(m)	dBuV	dB/m	dB	dB	dB	dB	:	dBuV/m		V/H	P/A/QP	
5510MHz													
11.020	3.0	39.1	37.7	9.2	-33.7	0.0	0.7	53.1	74.0	-20.9	V	P	
11.020	3.0	27.0	37.7	9.2	-33.7	0.0	0.7	40.9	54.0	-13.1	V	Ā	
16.530	3.0	37.0	39.8	11.8	-32.1	0.0	0.7	57.3	68.2	-10.9	V	P	
11.020	3.0	38.1	37.7	9.2	-33.7	0.0	0.7	52.1	74.0	-21.9	H	P	
11.020	3.0	24.5	37.7	9.2	-33.7	0.0	0.7	38.4	54.0	-15.6	H	A	
16.530	3.0	35.2	39.8	11.8	-32.1	0.0	0.7	55.5	68.2	-12.7	H	P	
5590MHz													
11.180	3.0	42.9	37.8	9.3	-33.5	0.0	0.7	57.3	74.0	-16.7	V	P	
11.180	3.0	30.7	37.8	9.3	-33.5	0.0	0.7	45.1	54.0	- <mark>8.9</mark>	V	A	
16.770	3.0	34.4	¢	11.9	-32.1	0.0	0.7	55.7	68.2	-12.5	V	P	
11.180	3.0	36.7	37.8	9.3	-33.5	0.0	0.7	51.1	74.0	-22.9	H	P	
11 100	3.0	24.7	37.8	9.3	-33.5	0.0	0.7	39.1	54.0	-14.9	H	A	
11.180	3.0	34.8	40.8	11.9	-32.1	0.0	0.7	56.2	68.2	-12.0	H	P	
16.770			38.0	9.4	-33.3	0.0	0.7	59.7	74.0	-14.3	v	Р	
16.770 5670MHz	30	45.0		2.00		0.0	0.7	46.7	54.0	-7.3	v	A	
16.770 5670MHz 11.340	3.0 3.0	45.0 31.9	¢	9.4	-33.3								
16.770 5670MHz 11.340 11.340	3.0	31.9	38.0	9.4 12.1	-33.3		0.7	58.5	68.2	-9.7	• V	P	
16.770 5670MHz 11.340 11.340 17.010	3.0 3.0	31.9 35.9	38.0 41.8	12.1	-32.0	0.0	0.7 0.7	58.5 53.0	68.2 74.0	-9.7 -21.0	V H	P P	
16.770 5670MHz 11.340	3.0	31.9	38.0				0.7 0.7 0.7	58.5 53.0 40.7	68.2 74.0 54.0	-9.7 -21.0 -13.3	V H H	P P A	

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8.3. RECEIVER ABOVE 1 GHz

8.3.1. RECEIVER ABOVE 1 GHz FOR 20 MHz BANDWIDTH

Test Engr:		Devin C	hang										
Date:		08/01/09	-										
Project #:		09U1261											
Company		Microsof											
EUT M/N:		Omni N											
Test Targe	at:	Harmon											
Mode Ope		Rx mode											
noue ope	f	Measuren		mencs	Amo	Preamp (Gain			Average	Field Stren	eth Limit	
	Dist	Distance				Distance		t to 3 me	ters	_	ld Strength	-	
	Read				Avg			trength @			/s. Average		
	AF	Antenna	-		Peak	-		Field Str	-	_	/s. Peak Li		
	CL	Cable Los			HPF	High Pas							
						-							
f	Dist	Read	AF	CL	Amp	D Corr	Fltr	Corr.		-	Ant. Pol.		Notes
GHz	(m)	dBuV	dB/m		dB	dB	dB		dBuV/m		V/H	P/A/QP	
.325	3.0	60.7	25.6			0.0	0.0	49.9	74.0	-24.1	V	P	
.325	3.0	42.6	25.6		-39.0	0.0	0.0	31.8	54.0	-22.2	V	A	
.325	3.0	54.8	25.6		-39.0	0.0	0.0	44.1	74.0	-29.9	H	P	
.325	3.0	38.9	25.6		-39.0	0.0	0.0	28.2	54.0	-25.9	H	A	
.663	3.0	58.2	26.7	3.1	-38.5	0.0	0.0	49.5	74.0	-24.5	H	P	
	• & • • • • • • • • • • • • • • • • • •		\$						¢				
	• • • • • • • • • • • • • • • • • • • •		¢					••••••••••••••••••••••••	¢				
.005	3.0	44.0	40. /	3.1	-30.5	0.0	0.0	33.3	34.0	-20.7	n	<u> </u>	
	1		<u>.</u>					•	•				
1.663 1.663 1.663 Rev. 4.1.2 Note: No		42.1 58.2 42.0 missions	26.7 26.7 26.7 were de	3.1 3.1 3.1	-38.5 -38.5 -38.5	0.0 0.0 0.0	0.0 0.0 0.0	33.4 49.4 33.3 se floor.	54.0 74.0 54.0	-20.6 -24.6 -20.7	H H H	A P A	

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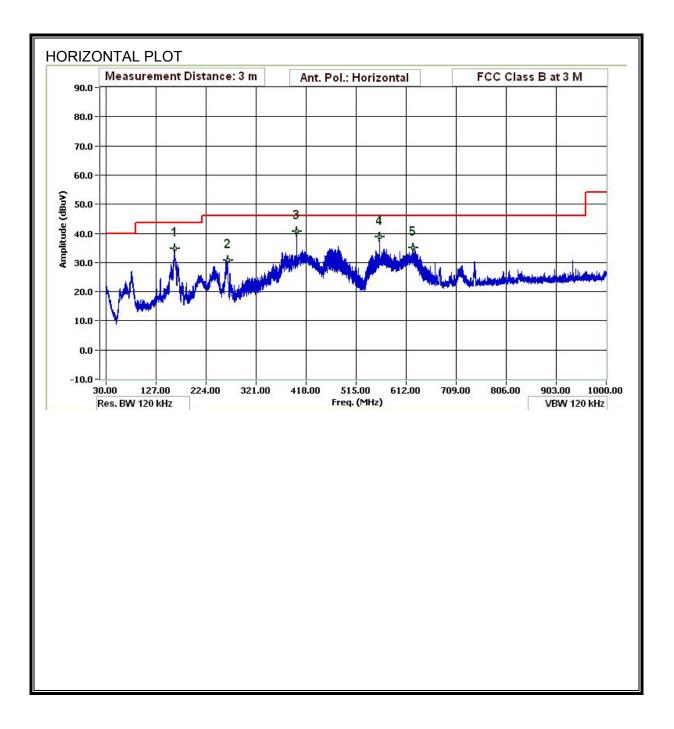
8.3.2. RECEIVER ABOVE 1 GHz FOR 40 MHz BANDWIDTH

bate: 08/01/09 broject #: 09U12610 Company: Microsoft UT M/N: Omni N est Target: Harmonic Idoe Oper: 5CHz_Rx mode f Measurement Frequency Amp Preamp Gain Average Field Strength Limit Dist Distance to Antenna D Corr Distance Correct to 3 meters Peak Field Strength Limit Read Analyzer Reading Avg Average Field Strength @ 3 m Margin vs. Average Limit AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit CL Cable Loss HPF High Pass Filter Margin vs. Peak Limit Notes f Max MBr dB dB dB dBuV/m dBuV/m W V/H P/A/QP 325 3.0 59.6 25.6 2.7 -39.0 0.0 0.0 32.3 54.0 -21.1 V A 325 3.0 43.6 25.6 2.7 -39.0 0.0 0.0 32.2 54.0 -21.1 V A 325 <th>Date: 08/01/09 Project #: 09U12610 Company: Microsoft UT M/N: Omni N eest Target: Harmonic Mode Oper: 5CHz_Rx mode f Measurement Frequency Amp Preamp Gain Average Field Strength Limit Dist Distance to Antenna D Corr Distance Correct to 3 meters Peak Field Strength Limit Read Analyzer Reading Average Field Strength @ 3 m Margin vs. Average Limit AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit CL Cable Loss HPF High Pass Filter Margin vs. Peak Limit Det. Notes GHz Magn dBuV dB dB dB dB dBuV/m dBuV/m dB V/H P/A/QP .325 3.0 59.6 25.6 2.7 -39.0 0.0 0.0 32.9 54.0 -21.1 V A .663 3.0 54.5 26.7 3.1 -38.5 0.0 0.0 32.9 54.0 -21.1 V A</th> <th>est Engr</th> <th></th> <th>Daria C</th> <th>hana</th> <th></th>	Date: 08/01/09 Project #: 09U12610 Company: Microsoft UT M/N: Omni N eest Target: Harmonic Mode Oper: 5CHz_Rx mode f Measurement Frequency Amp Preamp Gain Average Field Strength Limit Dist Distance to Antenna D Corr Distance Correct to 3 meters Peak Field Strength Limit Read Analyzer Reading Average Field Strength @ 3 m Margin vs. Average Limit AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit CL Cable Loss HPF High Pass Filter Margin vs. Peak Limit Det. Notes GHz Magn dBuV dB dB dB dB dBuV/m dBuV/m dB V/H P/A/QP .325 3.0 59.6 25.6 2.7 -39.0 0.0 0.0 32.9 54.0 -21.1 V A .663 3.0 54.5 26.7 3.1 -38.5 0.0 0.0 32.9 54.0 -21.1 V A	est Engr		Daria C	hana										
roject #: 09U12610 ompany: Microsoft JT M/N: Omni N test Target: Harmonic f Measurement Frequency Amp Preamp Gain Average Field Strength Limit Dist Distance to Antenna D Corr Distance Correct to 3 meters Peak Field Strength Limit Read Analyzer Reading Avg Average Field Strength @ 3 m Margin vs. Average Limit AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit CL Cable Loss HPF High Pass Filter f Dist Read AF CL Amp D Corr Fltr Corr. Limit Margin Ant. Pol. Det. Notes FHz (m) dBuV dB/m dB dB dB dB dB dB dB uV/m dBuV/m dB V/H P/A/QP 325 3.0 59.6 25.6 2.7 -39.0 0.0 0.0 48.9 74.0 -25.1 V P 325 3.0 43.6 25.6 2.7 -39.0 0.0 0.0 48.9 74.0 -25.1 V P 325 3.0 43.6 25.6 2.7 -39.0 0.0 0.0 48.9 74.0 -25.1 V P 325 3.0 59.6 25.6 2.7 -39.0 0.0 0.0 48.9 74.0 -25.1 V P 325 3.0 43.6 25.6 2.7 -39.0 0.0 0.0 48.9 74.0 -25.1 V P 325 3.0 59.6 25.6 2.7 -39.0 0.0 0.0 48.9 74.0 -25.1 V P 325 3.0 54.5 26.7 3.1 -38.5 0.0 0.0 0.0 32.2 54.0 -21.1 V A 663 3.0 41.0 26.7 3.1 -38.5 0.0 0.0 0.0 42.5 74.0 -28.3 V P 325 3.0 39.0 25.6 2.7 -39.0 0.0 0.0 43.5 74.0 -25.7 H A 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -25.7 H A 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 74.3 54.0 -19.7 H A 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0	roject #: 09U12610 ompany: Microsoft JT M/N: Omni N test Target: Harmonic f Measurement Frequency Amp Preamp Gain Average Field Strength Limit Dist Distance to Antenna D Corr Distance Correct to 3 meters Peak Field Strength Limit Read Analyzer Reading Avg Average Field Strength @ 3 m Margin vs. Average Limit AF Antenna Factor Peak Calculated Peak Field Strength Margin vs. Peak Limit CL Cable Loss HPF High Pass Filter f Dist Read AF CL Amp D Corr Fltr Corr. Limit Margin Ant. Pol. Det. Notes FHz (m) dBuV dB/m dB dB dB dB dB dB dB uV/m dBuV/m dB V/H P/A/QP 325 3.0 59.6 25.6 2.7 -39.0 0.0 0.0 48.9 74.0 -25.1 V P 325 3.0 43.6 25.6 2.7 -39.0 0.0 0.0 48.9 74.0 -25.1 V P 325 3.0 43.6 25.6 2.7 -39.0 0.0 0.0 48.9 74.0 -25.1 V P 325 3.0 59.6 25.6 2.7 -39.0 0.0 0.0 44.5 74.0 -25.1 V P 325 3.0 43.6 25.6 2.7 -39.0 0.0 0.0 44.5 74.0 -25.1 V P 325 3.0 59.2 25.6 2.7 -39.0 0.0 0.0 44.5 74.0 -25.1 V P 325 3.0 54.5 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -25.1 V P 325 3.0 55.2 25.6 2.7 -39.0 0.0 0.0 44.5 74.0 -25.1 V P 325 3.0 58.6 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -25.7 H A 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -25.7 H A 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -25.7 H A 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0 44.5 74.0 -24.2 H P 663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 0.0	-			-										
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.663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 34.3 54.0 -19.7 H A	.663 3.0 43.1 26.7 3.1 -38.5 0.0 0.0 34.3 54.0 -19.7 H A	.325	3.0	39.0	25.6	2.7	-39.0	0.0	0.0	28.3	54.0	-25.7	H	A	
Rev. 4.1.2.7	Rev. 4.1.2.7	.663	3.0	58.6	26.7	3.1	-38.5	0.0	0.0	49.8	74.0	-24.2	H	P	
		.663	3.0	43.1	26.7	3.1	-38.5	0.0	0.0	34.3	54.0	-19.7	H	A	
					ļ										
			-	1				1				1			
Note: No other emissions were detected above the system noise floor.	vote: No other emissions were detected above the system noise floor.														
		tote: No	other e	missions	were de	tected	l above t	the system	n nois	se floor.					

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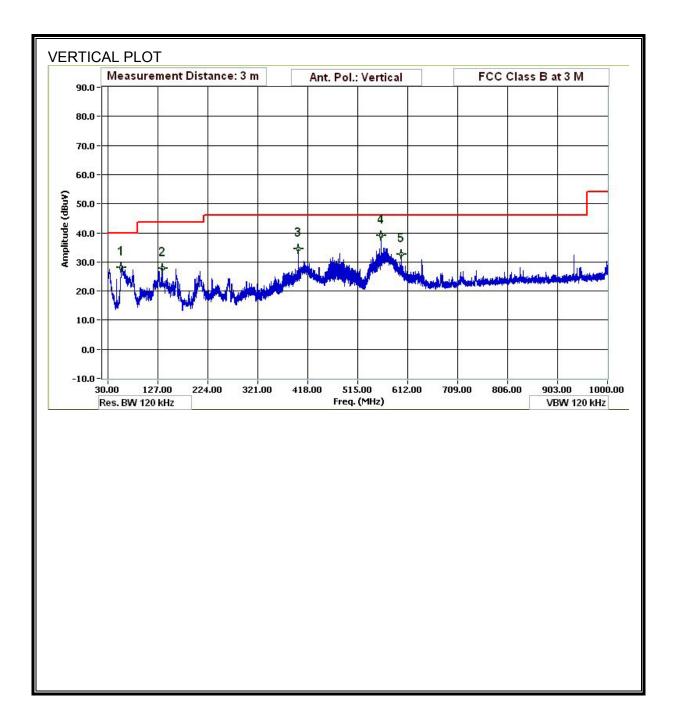
8.4. WORST-CASE BELOW 1 GHz

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



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



COMPLIANCE CERTIFICATION SERVICES FORM NO: CCSUP4701C 47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888 This report shall not be reproduced except in full, without the written approval of CCS.

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Fest Engr:		Devin Ch	lang										
Date:		07/31/09											
Project #:		09U12610	-										
Company:		Microsoft	t .										
EUT M/N:		Omni N											
Test Targe		Harmoni											
Mode Ope		Tx_a mod				_						.	
	f	Measurem		-	Amp	Preamp (Margin	Margin vs.	Limit	
	Dist	Distance t		a				to 3 meters					
	Read	Analyzer I			Filter								
	AF	Antenna F Cable Loss			Corr.	Calculate							
	CL	Cable Loss	3		Limit	Field Stre	ingth Lif	nit					
f	Dist	Read	AF	CL	Amp	D Corr	Filter	Corr.	Limit	Margin	Ant. Pol.	Det.	Notes
MHz	(m)	dBuV	dB/m	dB	dB	dB	dB	dBuV/m			V/H	P/A/QP	
56.041	3.0	47.8	8.1	0.7	28.4	0.0	0.0	28.2	40.0	-11.8	v	Р	
135.484	3.0	41.7	13.4	1.1	28.3	0.0	0.0	27.9	43.5	-15.6	V	Р	
399.975	3.0	46.0	14.9	1.8	28.1	0.0	0.0	34.6	46.0	-11.4	V	Р	
559.942	3.0	46.7	17.7	2.2	27.6	0.0	0.0	38.9	46.0	-7.1	V	P	
600.024	3.0	39.5	18.4	2.2	27.5	0.0	0.0	32.6	46.0	-13.4	V	Р	
163.446	3.0	50.4	11.4	1.1	28.2	0.0	0.0	34.6	43.5	-8.9	H	P	
267.130	3.0	45.3	12.3	1.4	28.2	0.0	0.0	30.9	46.0	-15.1	H	P	
399.975 559.942	3.0 3.0	52.0 46.6	14.9 17.7	1.8 2.2	28.1 27.6	0.0 0.0	0.0 0.0	40.6 38.8	46.0 46.0	-5.4 -7.2	H H	P P	
625.225	3.0	41.3	18.7	2.3	27.6	0.0	0.0	34.9	46.0	-11.1	H	P P	
040.440	3.0	41.5	10.7	4.0	47.4	0.0	0.0	34.7	40.0	-11.1		-	
	-	·	1										
Note: No o	ther em	issions wei	re detect	<u>ed abo</u>	we the sy	ystem noi	se floor						

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9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted I	Limit (dBuV)
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

The EUT is placed on a non-conducting table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane. The EUT is configured in accordance with ANSI C63.4.

The receiver is set to a resolution bandwidth of 9 kHz. Peak detection is used unless otherwise noted as quasi-peak or average.

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

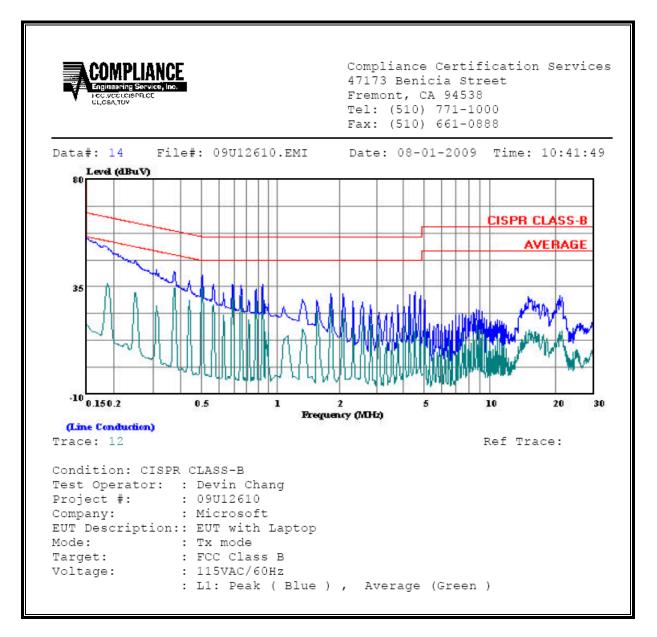
RESULTS

6 WORST EMISSIONS

Freq.		Reading		Closs	Limit	FCC B	Marg	Remark	
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1/L2
0.19	51.45		36.26	0.00	64.1 7	54.17	-12.72	-17.91	L1
0.38	41.40		3.40	0.00	58.35	48.35	-16.95	-44.95	L1
0.50	39.91		36.03	0.00	56.02	46.02	-16.11	-9.99	L1
0.19	52.28		35.83	0.00	64.17	54.17	-11.89	-18.34	L2
0.50	37.89		34.48	0.00	56.02	46.02	-18.13	-11.54	L2
0.94	35.12		33.02	0.00	56.00	46.00	-20.88	-12.98	L2
6 Worst I	Data								

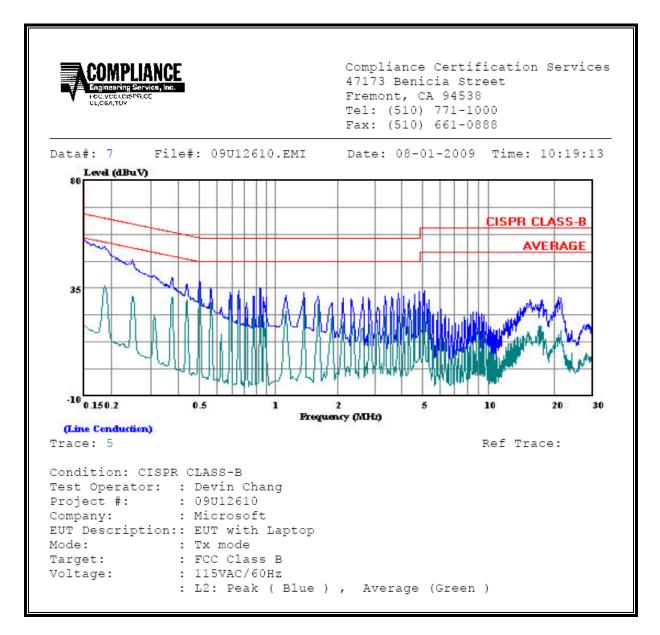
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LINE 1 RESULTS



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LINE 2 RESULTS



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10. DYNAMIC FREQUENCY SELECTION

10.1. OVERVIEW

10.1.1. LIMITS

INDUSTRY CANADA

IC RSS-210 is closely harmonized with FCC Part 15 DFS rules. The deviations are as follows:

RSS-210 Issue 7 A9.4 (b) (ii) Channel Availability Check Time: ...

Additional requirements for the band 5600-5650 MHz: Until further notice, devices subject to this Section shall not be capable of transmitting in the band 5600-5650 MHz, so that Environment Canada weather radars operating in this band are protected.

RSS-210 Issue 7 A9.4 (b) (iv) **Channel closing time:** the maximum channel closing time is 260 ms.

<u>FCC</u>

§15.407 (h) and FCC 06-96 APPENDIX "COMPLIANCE MEASUREMENT PROCEDURES FOR UNLICENSED-NATIONAL INFORMATION INFRASTRUCTURE DEVCIES OPERATING IN THE 5250-5350 MHz AND 5470-5725 MHz BANDS INCORPORATING DYNAMIC FREQUENCY SELECTION".

Requirement	Operatio	nal Mode	
	Master	Client (without radar detection)	Client (with radar detection)
Non-Occupancy Period	Yes	Not required	Yes
DFS Detection Threshold	Yes	Not required	Yes
Channel Availability Check Time	Yes	Not required	Not required
Uniform Spreading	Yes	Not required	Not required

Table 1: Applicability of DFS requirements prior to use of a channel

Table 2: Applicability of DFS requirements during normal operation

Requirement	Operational	Mode	
	Master	Client (without DFS)	Client (with DFS)
DFS Detection Threshold	Yes	Not required	Yes
Channel Closing Transmission Time	Yes	Yes	Yes
Channel Move Time	Yes	Yes	Yes

Table 3: Interference Threshold values, Master or Client incorporating In-Service Monitorina

Maximum Transmit Power	Value
	(see note)
≥ 200 milliwatt	-64 dBm
< 200 milliwatt	-62 dBm
Note 1: This is the level at the input of the receiver a	assuming a 0 dBi receive antenna
Note 2: Throughout these test procedures an additi of the test transmission waveforms to account for va will ensure that the test signal is at or above the def	ariations in measurement equipment. This
response.	

Table 4: DFS Response re	equirement values
Parameter	Value
Non-occupancy period	30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds
Channel Closing Transmission Time	200 milliseconds + approx. 60 milliseconds over remaining 10 second period
The instant that the Channel Move Time and the Cha	annel Closing Transmission Time begins is

The instant that the *Channel Move Time* and the *Channel Closing Transmission Time* begins is as follows:

For the Short pulse radar Test Signals this instant is the end of the Burst.

For the Frequency Hopping radar Test Signal, this instant is the end of the last radar burst generated.

For the Long Pulse radar Test Signal this instant is the end of the 12 second period defining the radar transmission.

The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate channel changes (an aggregate of approximately 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.

Table 5 – Short Pulse Radar Test Waveforms

Radar	Pulse Width	PRI	Pulses	Minimum	Minimum
Туре	(Microseconds)	(Microseconds)		Percentage of	Trials
				Successful	
				Detection	
1	1	1428	18	60%	30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (F	Radar Types 1-4)			80%	120

Table 6 – Long Pulse Radar Test Signal

Radar	Bursts	Pulses	Pulse	Chirp	PRI	Minimum	Minimum
Waveform		per	Width	Width	(µsec)	Percentage	Trials
		Burst	(µsec)	(MHz)		of Successful	
						Detection	
5	8-20	1-3	50-100	5-20	1000-	80%	30
					2000		

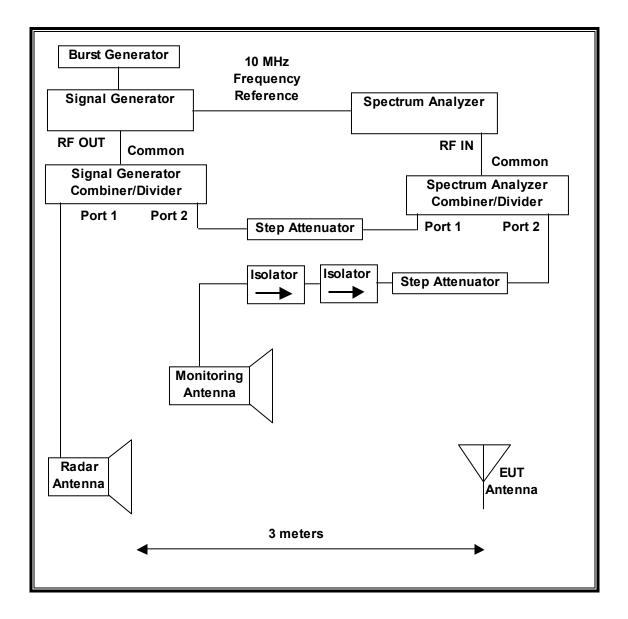
Table 7 – Frequency Hopping Radar Test Signal

Radar Waveform	Pulse Width (µsec)	PRI (µsec)	Burst Length (ms)	Pulses per Hop	Hopping Rate (kHz)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	300	9	.333	70%	30

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10.1.2. TEST AND MEASUREMENT SYSTEM

RADIATED METHOD SYSTEM BLOCK DIAGRAM



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SYSTEM OVERVIEW

The short pulse and long pulse signal generating system utilizes the NTIA software. The Vector Signal Generator has been validated by the NTIA. The hopping signal generating system utilizes the CCS simulated hopping method and system, which has been validated by the DoD, FCC and NTIA. The software selects waveform parameters from within the bounds of the signal type on a random basis using uniform distribution.

The signal monitoring equipment consists of a spectrum analyzer. The aggregate ON time is calculated by multiplying the number of bins above a threshold during a particular observation period by the dwell time per bin, with the analyzer set to peak detection and max hold.

SYSTEM CALIBRATION

A 50-ohm load is connected in place of the spectrum analyzer, and the spectrum analyzer is connected to a horn antenna via a coaxial cable, with the reference level offset set to (horn antenna gain – coaxial cable loss). The signal generator is set to CW mode. The amplitude of the signal generator is adjusted to yield a level of –64 dBm as measured on the spectrum analyzer.

Without changing any of the instrument settings, the spectrum analyer is reconnected to the Common port of the Spectrum Analyzer Combiner/Divider. Measure the amplitude and calculate the difference from –64 dBm. Adjust the Reference Level Offset of the spectrum analyzer to this difference.

The spectrum analyzer displays the level of the signal generator as received at the antenna ports of the Master Device. The interference detection threshold may be varied from the calibrated value of –64 dBm and the spectrum analyzer will still indicate the level as received by the Master Device.

TEST AND MEASUREMENT EQUIPMENT

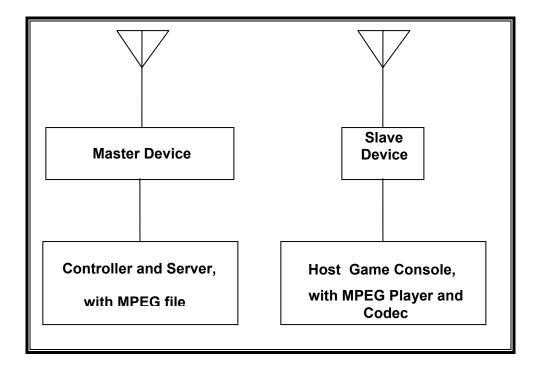
The following test and measurement equipment was utilized for the DFS tests documented in this report:

TEST EQUIPMENT LIST						
Description Manufacturer Model Asset Number Cal Due						
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00986	02/03/10		
Vector signal generator, 20GHz	Agilent / HP	E8267C	C01066	11/16/09		

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10.1.3. SETUP OF EUT

RADIATED METHOD EUT TEST SETUP



SUPPORT EQUIPMENT

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

	PERIPHERAL SU	JPPORT EQUIPMENT	LIST	
Description	Manufacturer	Model	Serial Number	FCC ID
Wireless Access Point	Cisco	AIR-AP1252AG-A-K9	FTX120690N2	LDK102061
(Master Device)				
AC Adapter (Master AP)	Delta	EADP-45BB B	DTH112490BD	DoC
Notebook PC (Host)	Dell	PP04X	CN-0HN241-	DoC
			48643-8AR-1704	
AC Adapter (Host PC)	Dell	DA90-PS1-00	CN-0MM545-	DoC
			48661-88J-HZAH	
Game Console	Microsoft	XBOX 360 Game	029071284807	DoC
AC Adapter (Game	Microsoft	DPSN-186EB A	9902D234813627	DoC
Console)				
Monitor (EUT)	Samsung	910MD S	MZ19HCHY60261	DoC
Handheld Game Controller	Microsoft	XBOX 360 Game	02060000424533	DoC
(EUT)		Controller		

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10.1.4. DESCRIPTION OF EUT

The EUT operates over the 5250-5350 MHz and 5470-5725 MHz ranges.

The EUT is a Slave Device without Radar Detection.

The highest power level within these bands is 21.02 dBm EIRP in the 5250-5350 MHz band and 22.16 dBm EIRP in the 5470-5725 MHz band.

The antenna assembly utilized with the EUT has a gain of 3.84 dBi in the 5250-5350 MHz band and 4.92 dBi in the 5470-5725 MHz band.

Two identical antennas are utilized to meet the diversity and MIMO operational requirements.

The EUT uses two transmitter/receiver chains, each connected to an antenna for radiated testing.

WLAN traffic is generated by streaming the video file TestFile.mp2 "6 ½ Magic Hours" from the Master to the Slave in full motion video mode. The test file is on the Master device server computer and is displayed on the Slave device host console.

TPC is not required since the maximum EIRP is less than 500 mW (27 dBm).

The EUT utilizes the 802.11a/n architecture. Two nominal channel bandwidths are implemented: 20 MHz and 40 MHz.

The software installed in the Slave Device is Nomni revision 2.0.1.51.

OVERVIEW OF MASTER DEVICE WITH RESPECT TO §15.407 (h) REQUIREMENTS

The Master Device is a Cisco Access Point, FCC ID: LDK102061. The minimum antenna gain for the Master Device is 3.5 dBi.

The rated output power of the Master unit is > 23dBm (EIRP). Therefore the required interference threshold level is -63 dBm.

The calibrated radiated DFS Detection Threshold level is set to –64 dBm. The tested level is lower than the required level hence it provides margin to the limit.

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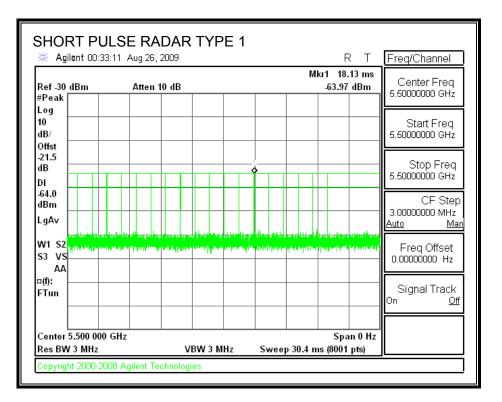
10.2. RESULTS FOR 20 MHz BANDWIDTH

10.2.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5500 MHz.

10.2.2. PLOTS OF RADAR WAVEFORM AND WLAN TRAFFIC

PLOTS OF RADAR WAVEFORM



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PLOT OF WLAN TRAFFIC

🔆 Agilent 01:20		R T Mkr1 6.072 s	Freq/Channel
Ref-30 dBm #Peak	Atten 10 dB	-72.93 dBm	Center Freq 5.5000000 GHz
Log			
10 dB/ Offst			Start Freq 5.50000000 GHz
-21.5 dB			Stop Freq
DI -64.0 dBm ^{Interlegister} LgAv		regelige septimper her na sector in a sector in the	CF Step 3.0000000 MHz <u>Auto Ma</u>
W1 S2 S3 FS AA			Freq Offset 0.00000000 Hz
=(f): FTun			Signal Track
Center 5.500 000 Res BW 3 MHz	GHz VBW 3 MH	Span 0 Hz z Sweep 16 s (8001 pts)	

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10.2.3. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time = (Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the FCC aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

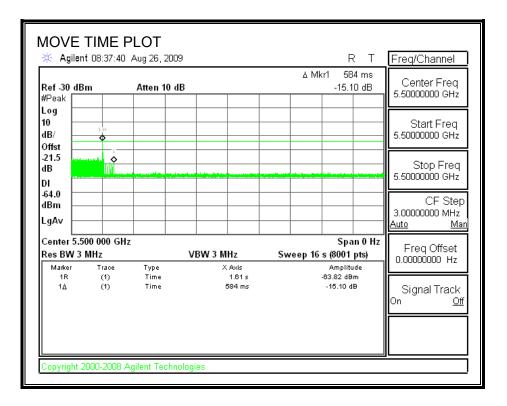
RESULTS

Agency	Channel Move Time	Limit
	(sec)	(sec)
FCC / IC	0.584	10

Agency	Aggregate Channel Closing Transmission Time	Limit
	(msec)	(msec)
FCC	16.0	60
IC	50.0	260

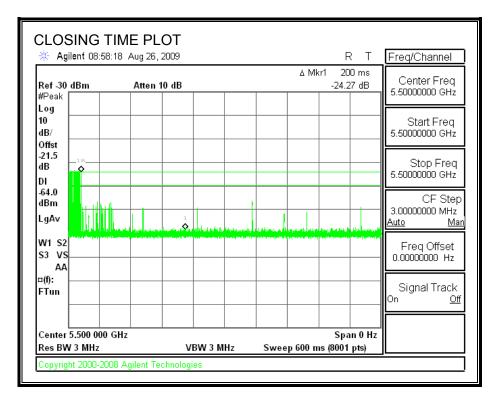
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MOVE TIME



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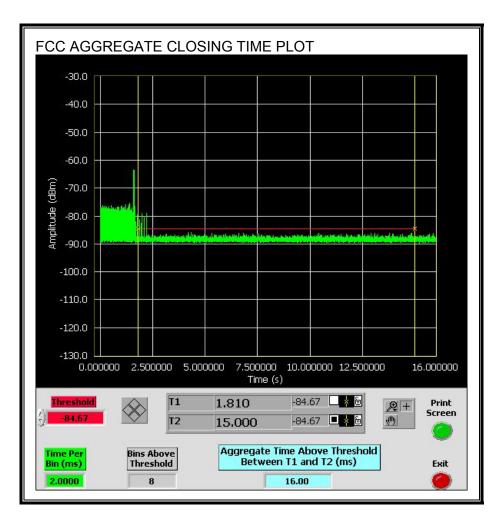
CHANNEL CLOSING TIME



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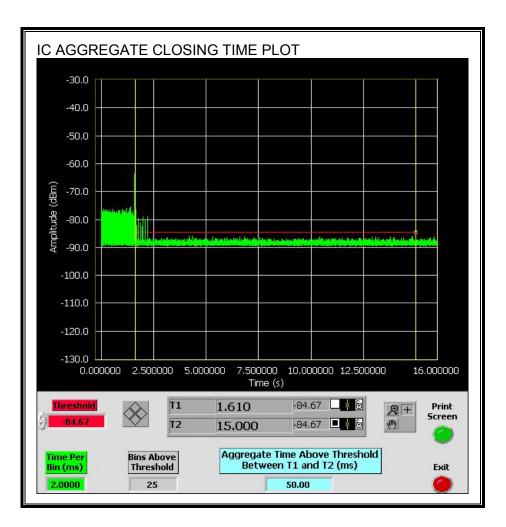
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the FCC aggregate monitoring period.



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Only intermittent transmissions are observed during the IC aggregate monitoring period.



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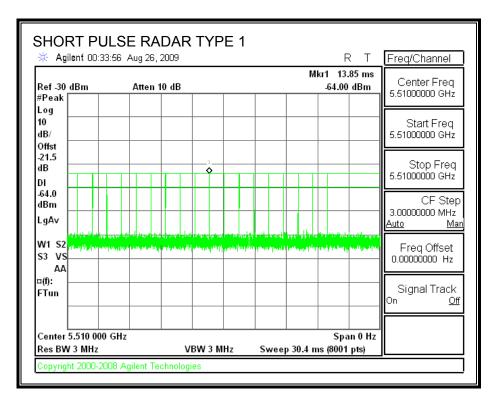
10.3. RESULTS FOR 40 MHz BANDWIDTH

10.3.1. TEST CHANNEL

All tests were performed at a channel center frequency of 5510 MHz.

10.3.2. PLOTS OF RADAR WAVEFORM AND WLAN TRAFFIC

PLOTS OF RADAR WAVEFORM



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PLOT OF WLAN TRAFFIC

Agilent 11:15:		R T Mkr1 1.386 s	Freq/Channel
Ref30 dBm #Peak	Atten 10 dB	-73.90 dBm	Center Freq 5.51000000 GHz
Log			
10 dB/ Offst			Start Freq 5.51000000 GHz
-21.5 dB			Stop Freq
DI 1 64.0 villeterin dBm villeterin LgAv	alafya a polyta bi da da ang na karang barang barang barang b	telogiki pozeti konten donova kipeli (konstrukci pomorosti 1	CF Step 3.0000000 MHz <u>Auto Ma</u>
W1 S2 53 FS AA			Freq Offset 0.00000000 Hz
¤(f): FTun			Signal Track
Center 5.510 000 (Res BW 3 MHz	GHz VBW 3 MH	Span 0 H z Sweep 16 s (8001 pts)	z

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10.3.3. MOVE AND CLOSING TIME

REPORTING NOTES

The reference marker is set at the end of last radar pulse.

The delta marker is set at the end of the last WLAN transmission following the radar pulse. This delta is the channel move time.

The aggregate channel closing transmission time is calculated as follows:

Aggregate Transmission Time = (Number of analyzer bins showing transmission) * (dwell time per bin)

The observation period over which the FCC aggregate time is calculated begins at (Reference Marker + 200 msec) and ends no earlier than (Reference Marker + 10 sec).

The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

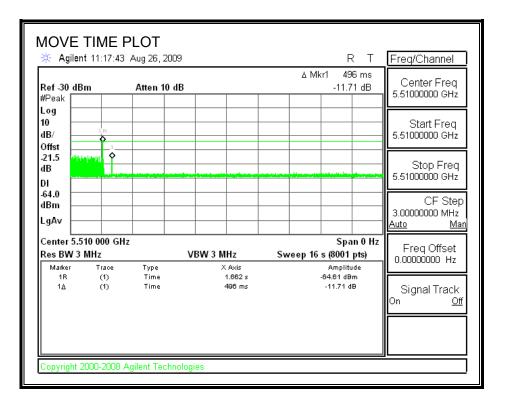
RESULTS

Agency	Channel Move Time	Limit
	(sec)	(sec)
FCC / IC	0.496	10

Agency	Aggregate Channel Closing Transmission Time	Limit
	(msec)	(msec)
FCC	4.0	60
IC	8.0	260

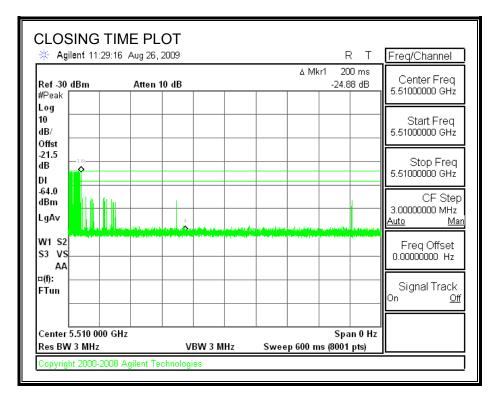
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MOVE TIME



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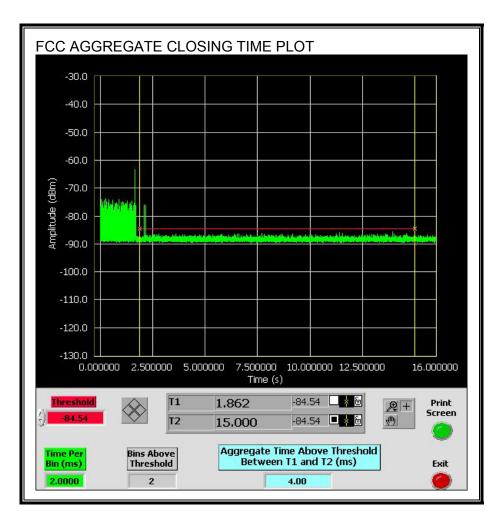
CHANNEL CLOSING TIME



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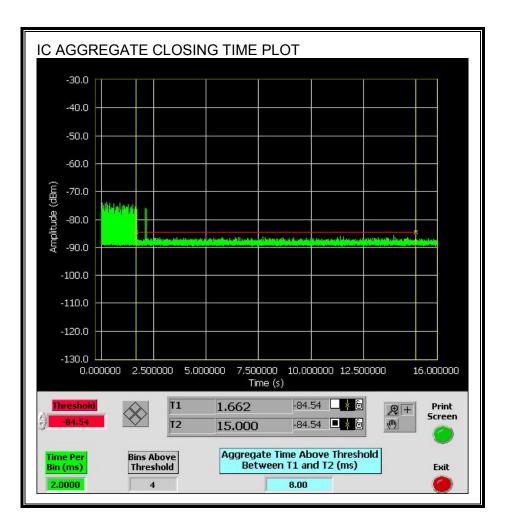
AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

Only intermittent transmissions are observed during the FCC aggregate monitoring period.



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Only intermittent transmissions are observed during the IC aggregate monitoring period.



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10.3.4. NON-OCCUPANCY

RESULTS

No EUT transmissions were observed on the test channel during the 30-minute observation time.

NON-OCCU			RТ	Freq/Channel
Ref -30 dBm #Peak	Atten 10 dB	Δ Μ		Center Freq 5.51000000 GHz
Log 10 dB/ Offst				Start Freq 5.51000000 GHz
-21.5 dB				Stop Freq 5.51000000 GHz
-64.0 dBm LgA∨			1	CF Step 3.0000000 MHz <u>Auto Man</u>
V1 S2 S3 FS AA				Freq Offset 0.00000000 Hz
¤(f): FTun				Signal Track On <u>Off</u>
Center 5.510 000 (Res BW 3 MHz	GHz VBW 3 MH	lz Sweep 2 k	Span 0 Hz <s (8001="" pts)<="" td=""><td></td></s>	
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11. MAXIMUM PERMISSIBLE EXPOSURE

FCC RULES

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

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm²)	Averaging time (minutes)		
(A) Limits for Occupational/Controlled Exposures						
0.3–3.0 3.0–30 30–300 300–1500 1500–100,000	614 1842/f 61.4	1.63 4 <i>.89/</i> F 0.163	*(100) *(900/f²) 1.0 f/300 5	6 6 6 8		
(B) Limits	for General Populati	on/Uncontrolled Exp	posure			
0.3–1.34 1.34–30	614 824/f	1.63 2.19/f	*(100) *(180/f²)	30 30		

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

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

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

f = frequency in MHz

f = frequency in MHz
 * = Plane-wave equivalent power density
 NOTE 1 TO TABLE 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled innits apply provided he or she is made aware of the potential for exposure.
 NOTE 2 TO TABLE 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

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IC RULES

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

Table 5

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

3 Magnetic Field Strength: rms	4 Power	5 Averaging
(A/m)	Density (W/m ²)	Time (min)
2.19		6
2.19/ <i>f</i>		6
2.19/f		6
0.073	2*	6
0.0042f ^{0.5}	f/150	6
0.163	10	6
0.163	10	616 000 /f ^{1.2}
4.21 x 10 ⁻⁴ f ^{0.5}	6.67 x 10 ⁻⁵ f	616 000 /f ^{1.2}
	2.19 2.19/ <i>f</i> 2.19/ <i>f</i> 0.073 0.0042 <i>f</i> ^{0.5} 0.163 0.163	(A/m) (W/m²) 2.19 2.19/f 2.19/f 2.19/f 0.073 2* 0.0042f ^{0.5} f/150 0.163 10

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

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

- 2. A power density of 10 W/m² is equivalent to 1 mW/cm².
- A magnetic field strength of 1 A/m corresponds to 1.257 microtesla (μT) or 12.57 milligauss (mG).

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EQUATIONS

Power density is given by:

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

where

S = Power density in W/m² EIRP = Equivalent Isotropic Radiated Power in W D = Separation distance in m

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

Distance is given by:

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

where

D = Separation distance in m EIRP = Equivalent Isotropic Radiated Power in W S = Power density in W/m²

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

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

where

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

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

LIMITS

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

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

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<u>RESULTS</u>

(MPE distance equals 20 cm)

Band	Separation	Output	Antenna	IC Power	FCC Power
	Distance	Power	Gain	Density	Density
	(m)	(dBm)	(dBi)	(W/m^2)	(mW/cm^2)
5150 - 5250	0.20	16.30	3.84	0.21	0.021
5250 - 5350	0.20	17.18	3.84	0.25	0.025
5470 - 5725	0.20	17.24	4.92	0.33	0.033

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