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

CERTIFICATION TEST REPORT

FOR

802.11n + BT MODULE

MODEL NUMBER: WCN3660

FCC ID: PPD-WCN3660
IC: 4104A-WCN3660

REPORT NUMBER: 12U14222-7

ISSUE DATE: JUNE 07, 2012

Prepared for
QUALCOMM ATHEROS, INC.
1700 TECHNOLOGY DRIVE
SAN JOSE, CA 95110, U.S.A.

Prepared by
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	06/07/12	Initial Issue	F. Ibrahim

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: QUALCOMM ATHEROS, INC.
1700 TECHNOLOGY DRIVE
SAN JOSE, CA, 95110, U.S.A.

EUT DESCRIPTION: 802.11n + BT MODULE

MODEL: WCN3660

SERIAL NUMBER: N10FXYDC9 and N10G84TRF

DATE TESTED: February 2, 2012 – May 31, 2012

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart E	Pass
INDUSTRY CANADA RSS-210 Issue 8 Annex 9	Pass
INDUSTRY CANADA RSS-GEN Issue 3	Pass

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

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

Approved & Released For UL CCS By:

FRANK IBRAHIM
EMC SUPERVISOR
UL CCS

Tested By:

DENNIS HUANG
EMC ENGINEER
UL CCS

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 06-96, FCC KDB 789033, ANSI C63.4-2003, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

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

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

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 Qualcomm Atheros 802.11n + Bluetooth Adapter supports 802.11a/b/g/n and Bluetooth v2.1 + EDR/ Bluetooth 3.0/ Bluetooth 4.0 LE operation.

The test platform contains the WCN3660 module and the Qualcomm APQ8060A host processor which serves as the WLAN and BT baseband.

The radio module is manufactured by Qualcomm Atheros.

5.2. MODIFICATIONS

The manufacturer declares the following modification in order to pass 2nd harmonic:

"We have identified a source of leakage for the 2nd harmonic as the 1.8V bias line from the WCN3660 chip. We implemented a notch filter on this line inside the module to filter the harmonic and achieve compliance. This filter will be used in the production version of the module. It was added at the output of chip inside the Y0253 module on Vdd 1p8 LDO net.

5.3. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5180 - 5240	802.11a	15.563	36.000
5180 - 5240	802.11n HT20	15.588	36.208
5190 - 5230	802.11n HT40	16.256	42.228
5260 - 5320	802.11a	16.515	44.823
5260 - 5320	802.11n HT20	16.613	45.846
5270 - 5310	802.11n HT40	16.407	43.722
5500 - 5700	802.11a	16.450	44.157
5500 - 5700	802.11n HT20	16.320	42.855
5510 - 5670	802.11n HT40	16.218	41.860

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes **WCN3660 WLAN/BT** antenna with the following specification:

Band of operation (MHz)	2400-2483.5	5.15-5.35	5.47-5.725	5.725-5.850
Antenna Type	PIFA	PIFA	PIFA	PIFA
Antenna model	EBJ Aux	ED4 Main	ED4 Aux	ED4 Main
Antenna Gain (dBi)	3.62	5.6	5.3	4.8

5.5. SOFTWARE AND FIRMWARE

The test utility software used during testing was QRCT, Version 2.4.74.0.

5.6. WORST-CASE CONFIGURATION AND MODE

Radiated emission below 1 GHz and power line conducted emission were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

The fundamental of the EUT was investigated in three orthogonal orientations X,Y,Z, it was determined that Y orientation was worst-case orientation; therefore, all final radiated testing was performed with the EUT in Y orientation.

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

802.11b mode: 1 Mbps
802.11g mode: 6 Mbps
802.11a mode: 6 Mbps
802.11n HT20mode: MCS0
802.11n HT40mode: MCS0

All Radiated Emissions tests were tested with a new modified module (see Section 5.2 for Client's Description of changes).

All Antenna port tests were tested with the original RF module and verified with the new modified module to ensure its compliance performance.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop PC	Lenovo	2007-64U	L3-5C76D	DoC
Laptop 1	HP	EliteBook 8460P	CNU20326PD	Doc
Laptop 1 AC/DC Adapter	HP	PPP012D-S	608428-003	Doc
AC/DC Combo Adapter	Lenovo	40Y7649	670044390K	DoC
Host (MTP Test Platform)	Qualcomm	N10G1DJYG	7415BA7C	None
JTAG & Power Supply Adapter Board	Qualcomm	1DN14ASSY20-N6859	N10G1C4WW	None
Module Test Board	Qualcomm	1DN14ASSY20-Y0122	N10G3JMG8	None
DC power supply	Lambda	LA-300	783974	None
DC power supply	Xantrex	XHR 60-18	27519	None

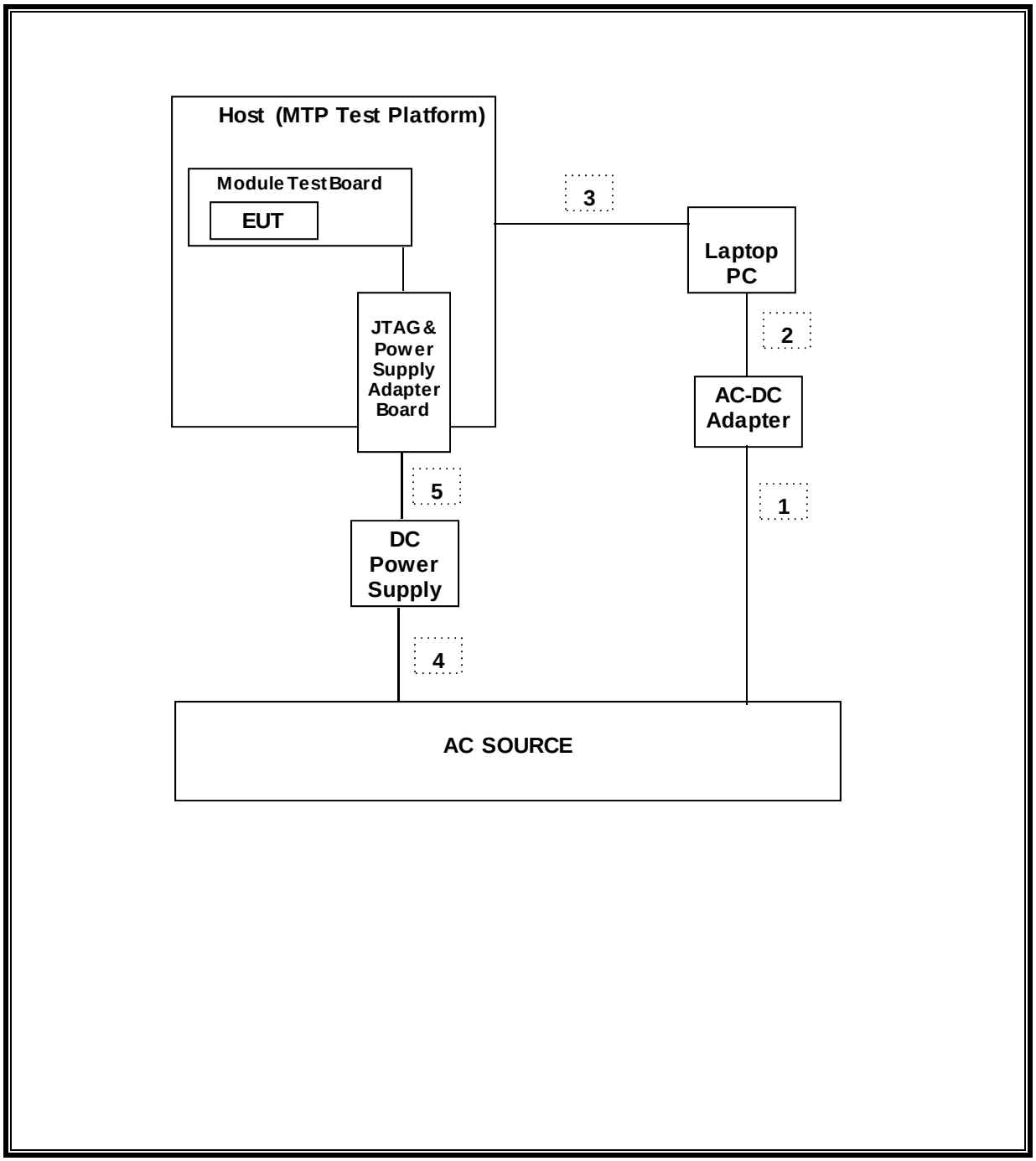
I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC	1	US 115V	Shielded	1	N/A
2	DC	1	DC	Un-shielded	1.85	Ferrite at laptop's end
3	USB	1	USB	Un-shielded	1.8	N/A
4	AC	1	US 115V	Shielded	1.85	N/A
5	DC	1	DC	Un-shielded	1	N/A

TEST SETUP

The EUT is soldered on a test board that is mounted on the MTP Test Platform. The back cover of the MTP is removed so that the EUT is totally exposed, outside of the host platform. Test software exercised the EUT.

SETUP DIAGRAM FOR TESTS



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 Date**
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	07/14/12
Antenna, Horn, 18 GHz	EMCO	3115	C00945	06/29/12
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	11/11/12
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01016	07/12/12
Horn Antenna, 26.5 GHz	ARA	MWH-1826/B	C00589	07/28/12
Horn Antenna, 40 GHz	ARA	MWH-2640/B	C00981	06/14/12
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	03/14/13
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C00986	03/22/13
Power Meter	Agilent / HP	437B	N02778	08/11/12
Power Sensor, 18 GHz	Agilent / HP	8481A	N02782	07/29/12
High pass Filter, 7.6 GHz	Micro-Tronics	HPM13195	N02682	CNR
Reject Notch Filter, 2.4 GHz	Micro-Tronics	-	-	CNR
EMI Test Receiver	R & S	ESHS 20	N02396	08/19/13
LISN	FCC	FCC-LISN-50/250	C00626	12/13/12

7. ANTENNA PORT TEST RESULTS

7.1. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 789033 Zero-Span Spectrum Analyzer Method.

7.1.1. ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
802.11a 20 MHz	1.363	1.377	0.990	98.98%	0.044	0.734
802.11n HT20	1.277	1.287	0.992	99.22%	0.034	0.783
802.11n HT40	0.6350	0.6417	0.9896	98.96%	0.0456	1.5748

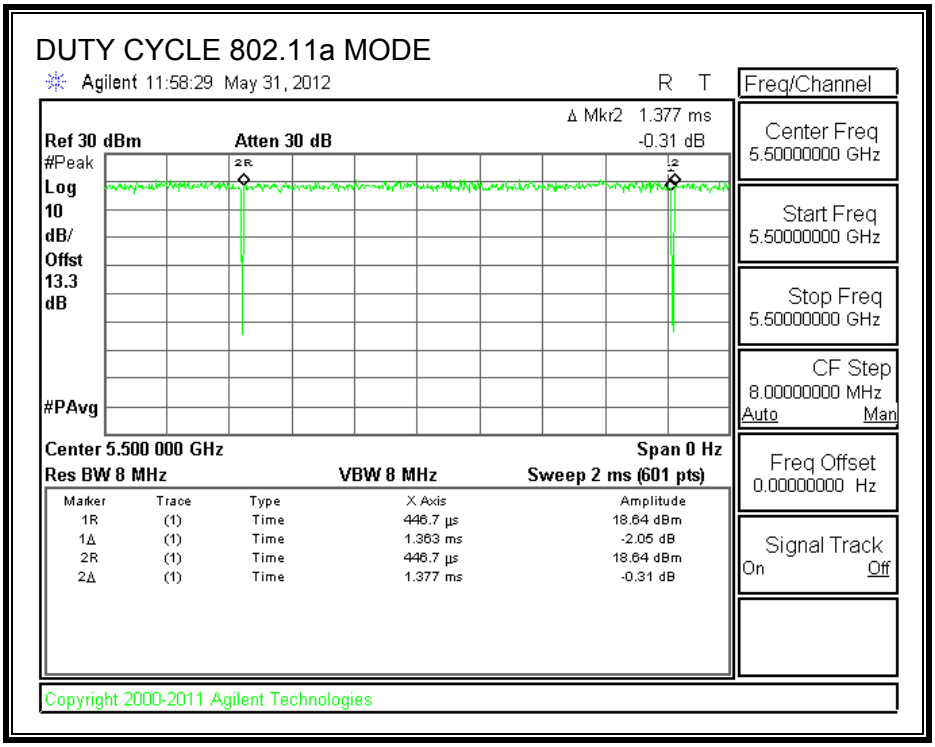
7.1.2. MEASUREMENT METHOD FOR POWER AND PPSD

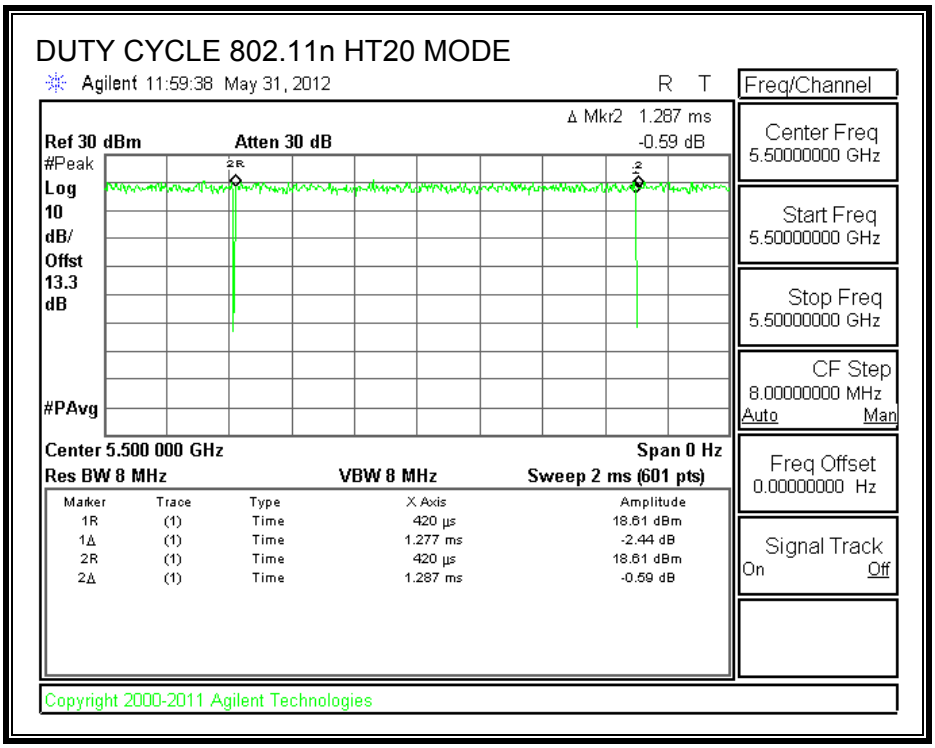
The Duty Cycle is greater than or equal to 98% therefore KDB 789033 Method SA-1 is used.

7.1.3. MEASUREMENT METHOD FOR AVG SPURIOUS EMISSIONS ABOVE 1 GHz

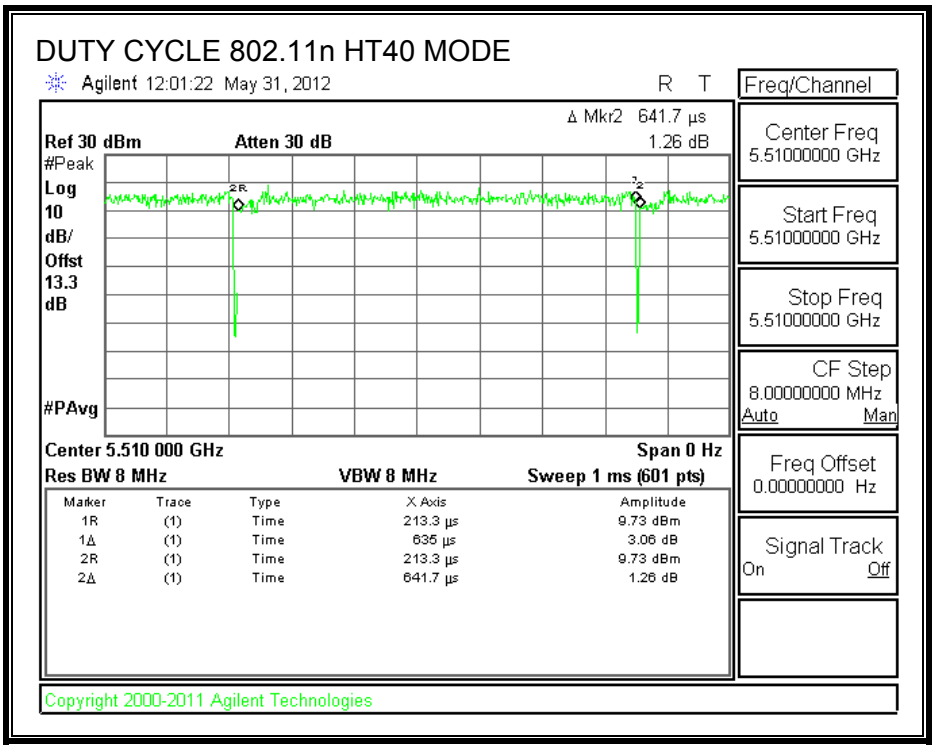
The Duty Cycle is greater than or equal to 98%, KDB 789033 Method VB with Power RMS Averaging is used.

7.1.4. DUTY CYCLE PLOTS





DUTY CYCLE 802.11n HT40 MODE



7.2. 802.11a MODE IN THE 5.2 GHz BAND

7.2.1. 99% BANDWIDTH

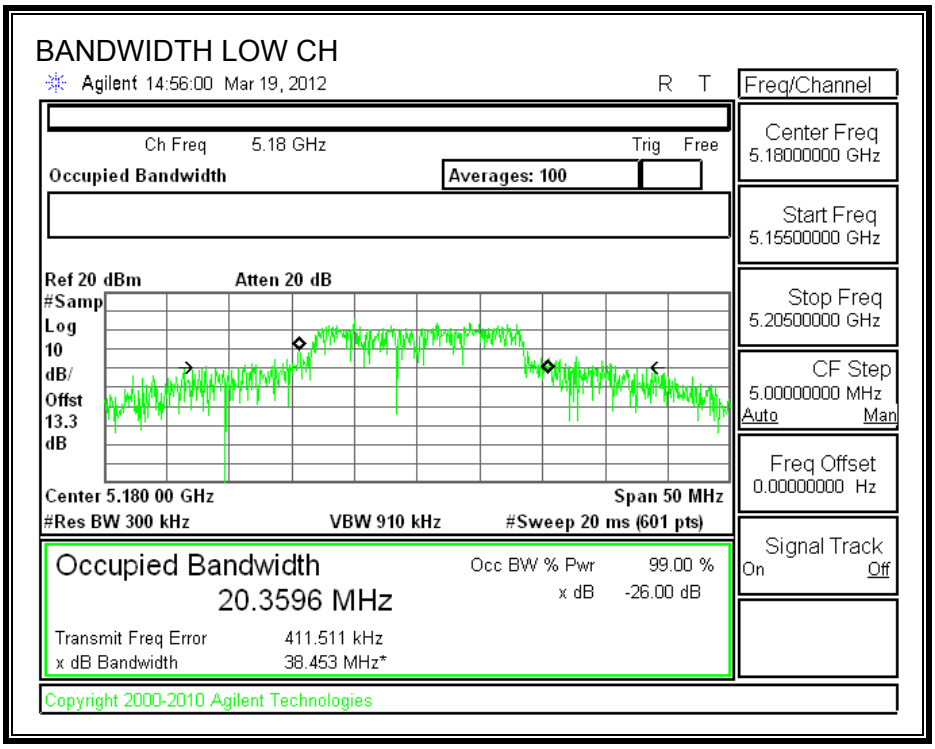
LIMITS

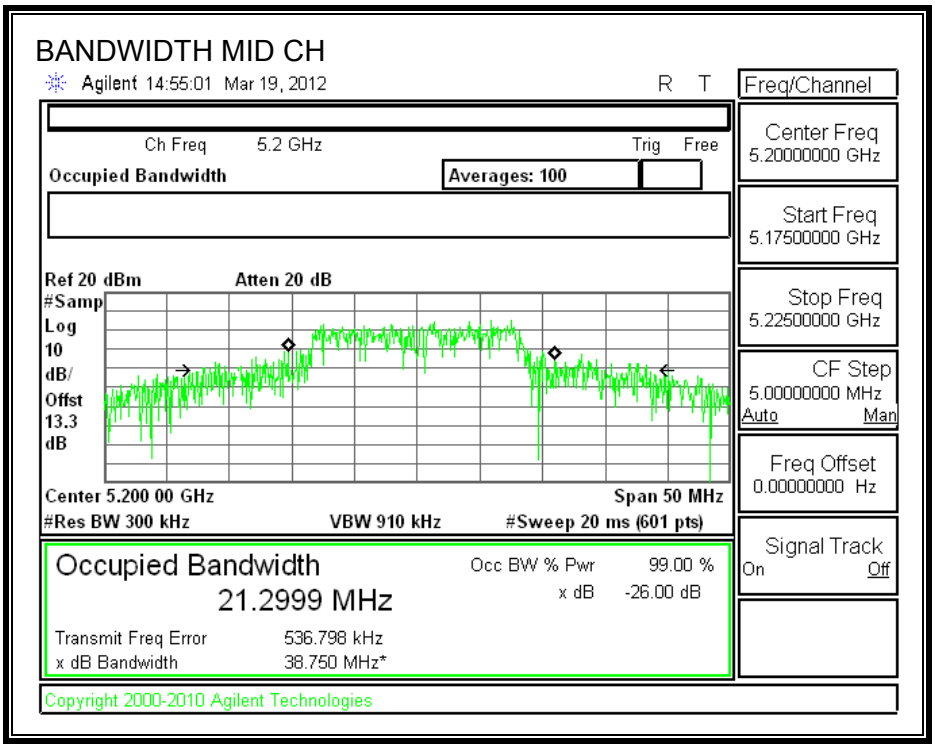
None; for reporting purposes only.

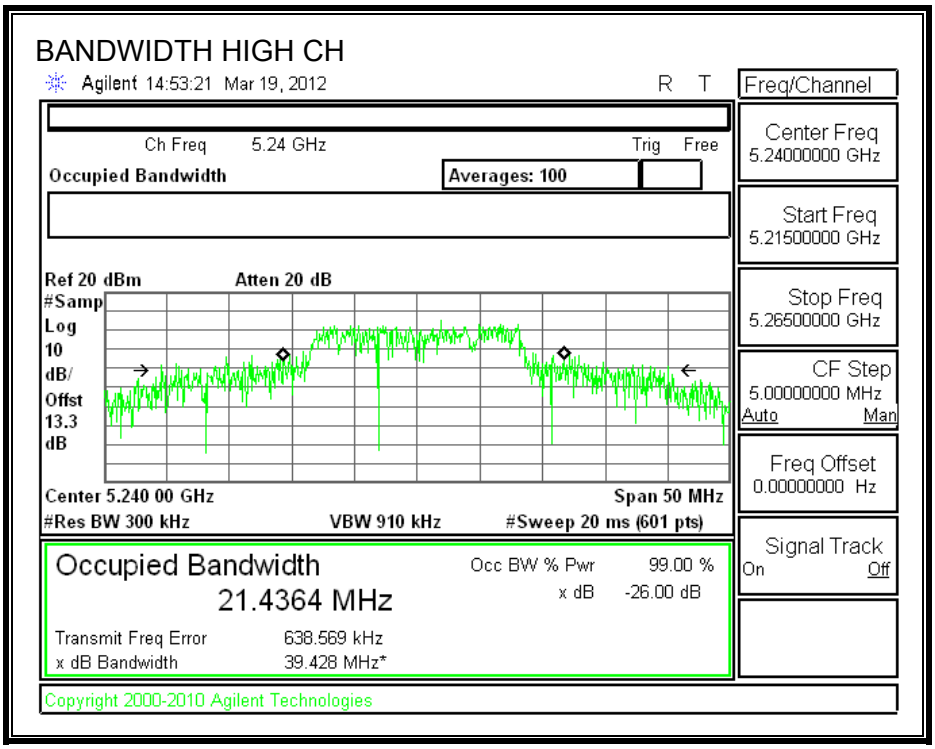
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5180	20.3596
Mid	5200	21.2999
High	5240	21.4364

99% BANDWIDTH







7.2.2. 26 dB BANDWIDTH

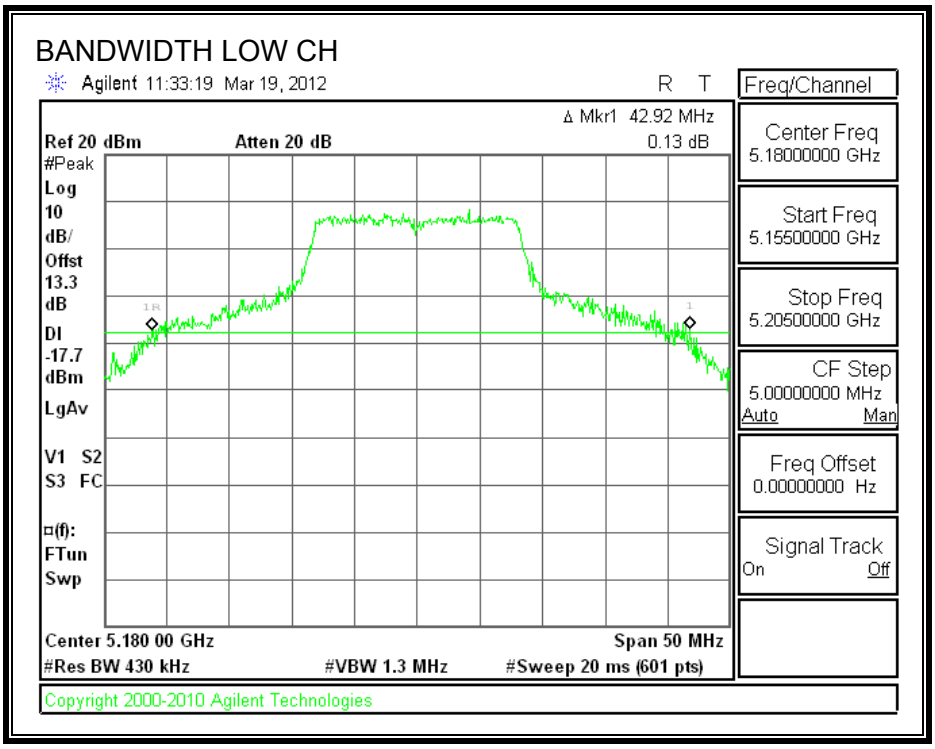
LIMITS

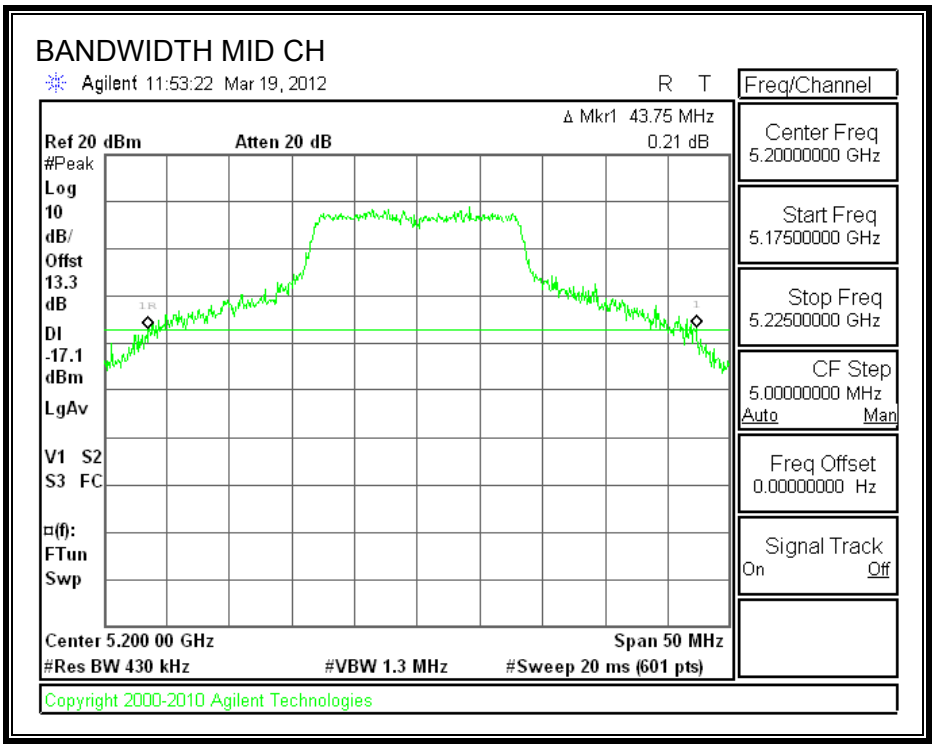
None; for reporting purposes only.

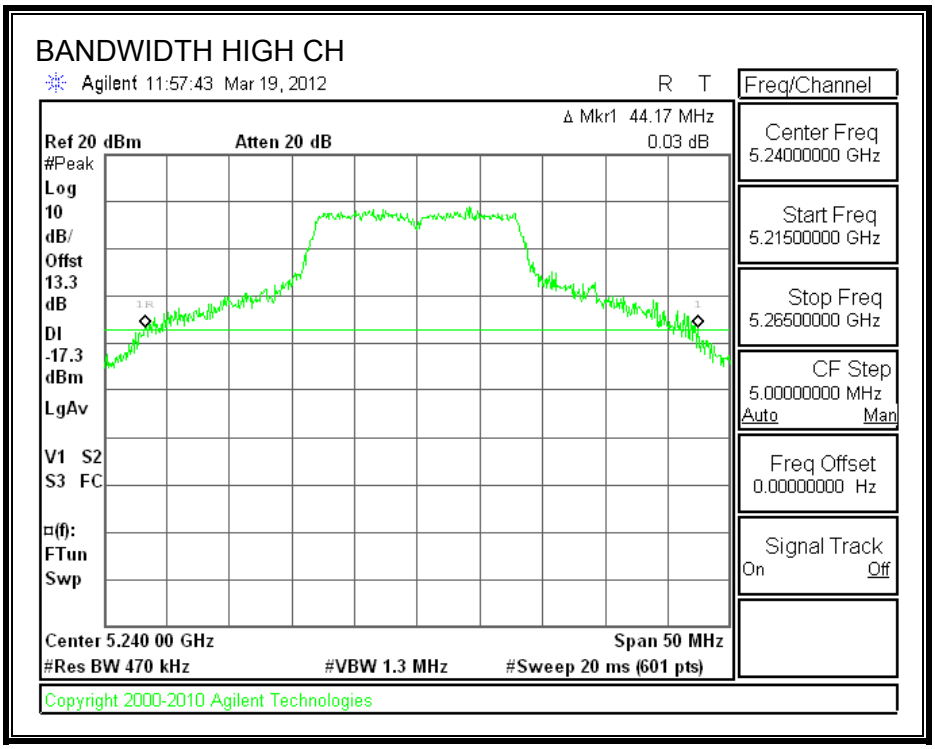
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5180	42.92
Mid	5200	43.75
High	5240	44.17

26 dB BANDWIDTH







7.2.3. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the band 5.15–5.25 GHz, 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. In addition, 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 maximum conducted output 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.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5180	17	42.92	20.33	5.60	17.00	4.00
Mid	5200	17	43.75	20.41	5.60	17.00	4.00
High	5240	17	44.17	20.45	5.60	17.00	4.00

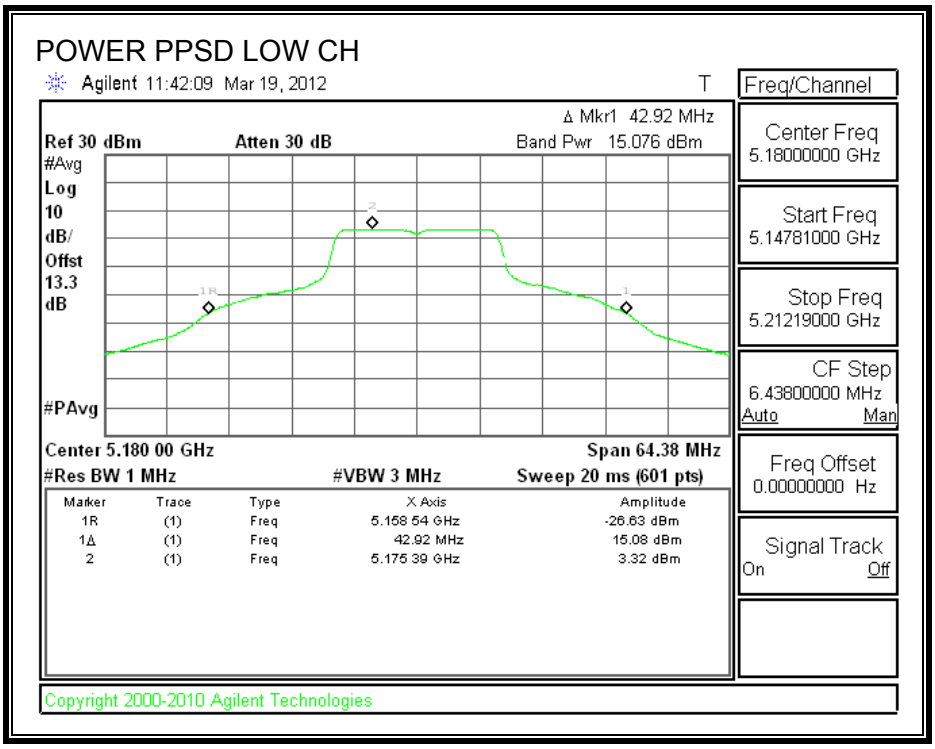
Output Power Results

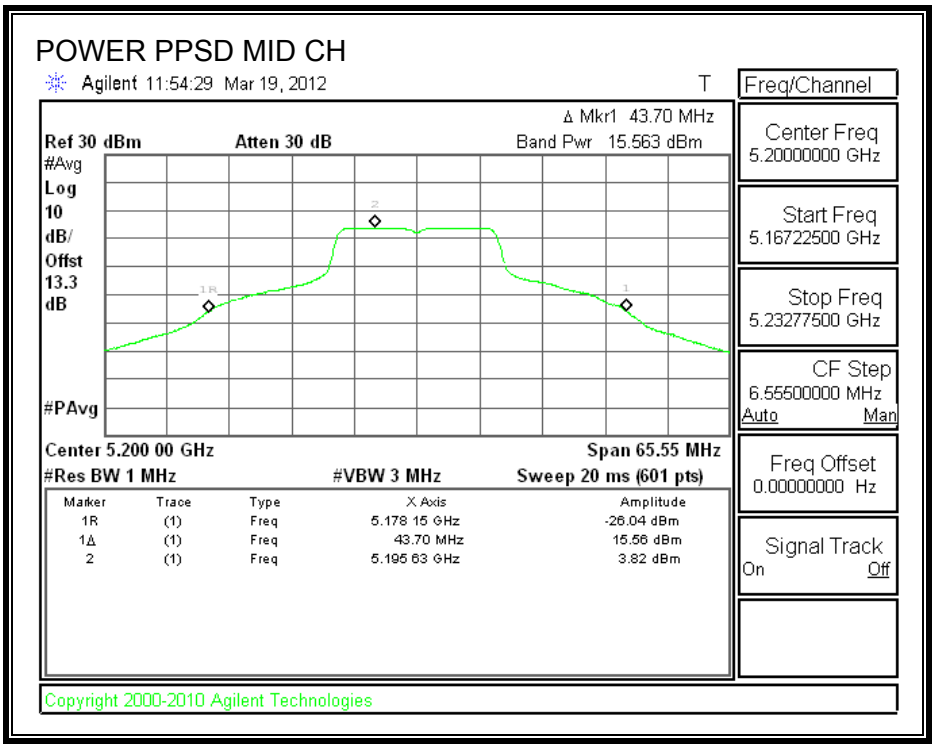
Channel	Frequency (MHz)	Meas Power (dBm)	Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	15.076	15.076	17.00	-1.924
Mid	5200	15.563	15.563	17.00	-1.437
High	5240	15.492	15.492	17.00	-1.508

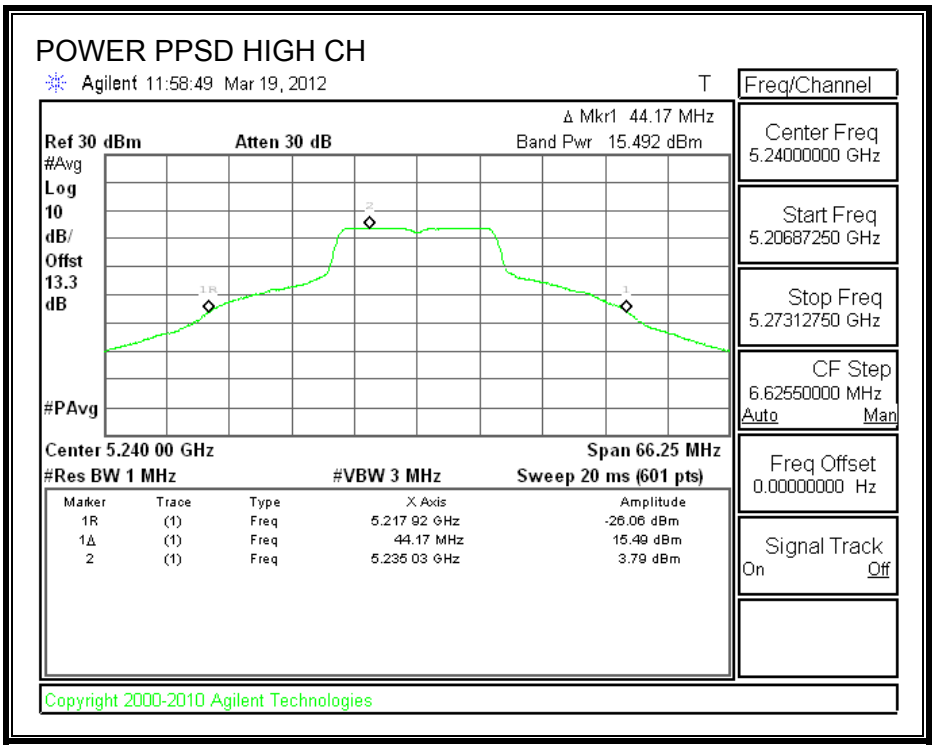
PPSD Results

Channel	Frequency (MHz)	Meas PPSD (dBm)	Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5180	3.32	3.32	4.00	-0.68
Mid	5200	3.82	3.82	4.00	-0.18
High	5240	3.79	3.79	4.00	-0.21

OUTPUT POWER AND PPSD







7.2.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 13.3 dB (including 12 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5180	15.0
Mid	5200	15.0
High	5240	15.0

7.2.5. PEAK EXCURSION

LIMITS

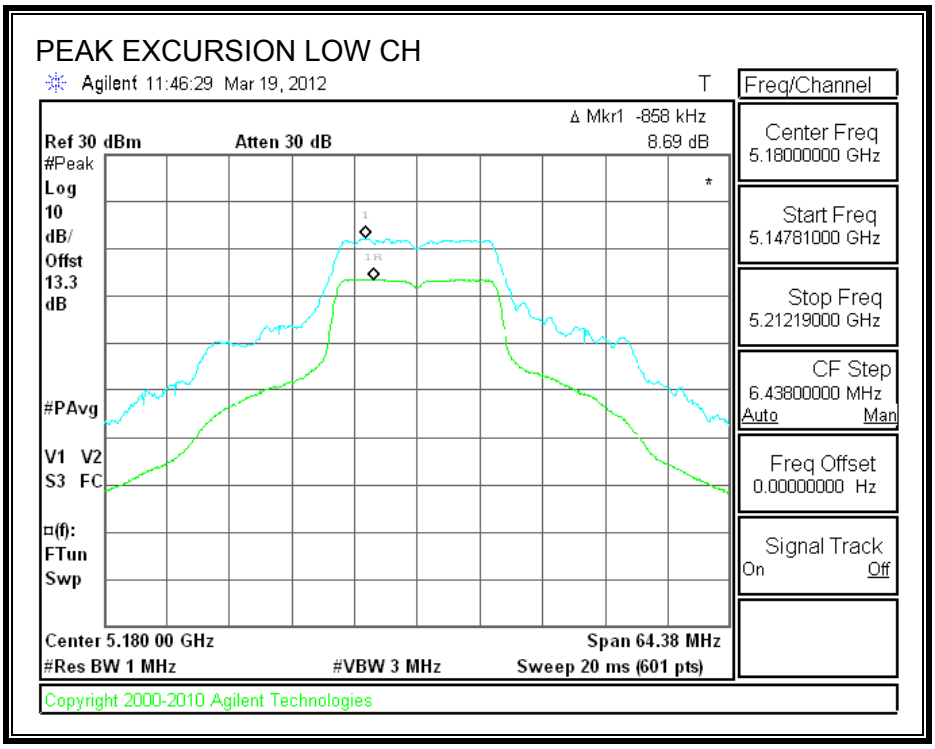
FCC §15.407 (a) (6)

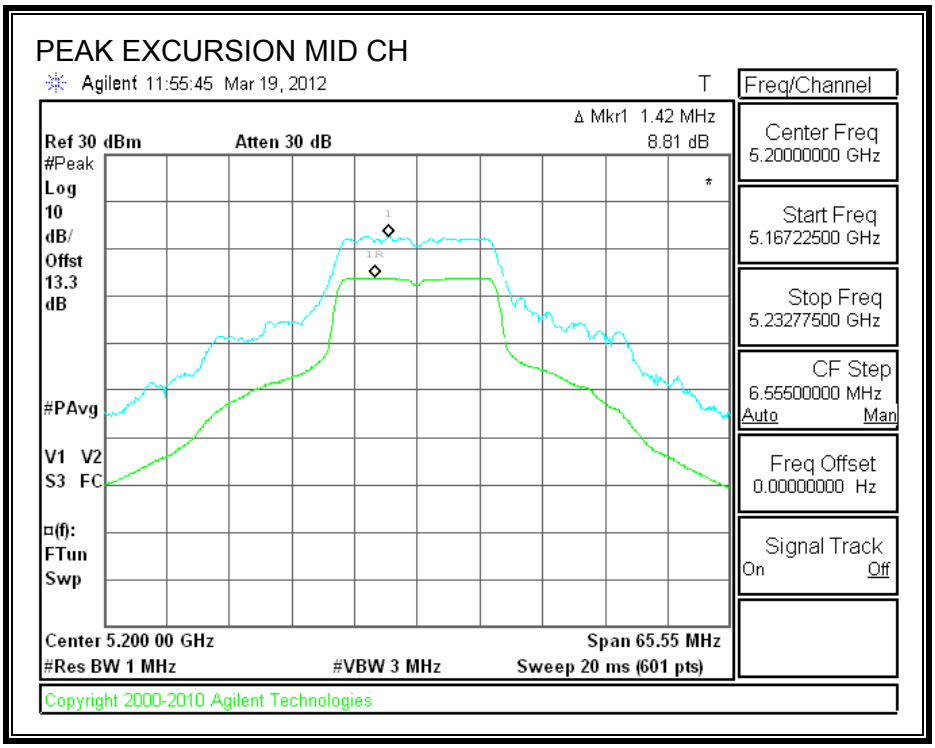
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

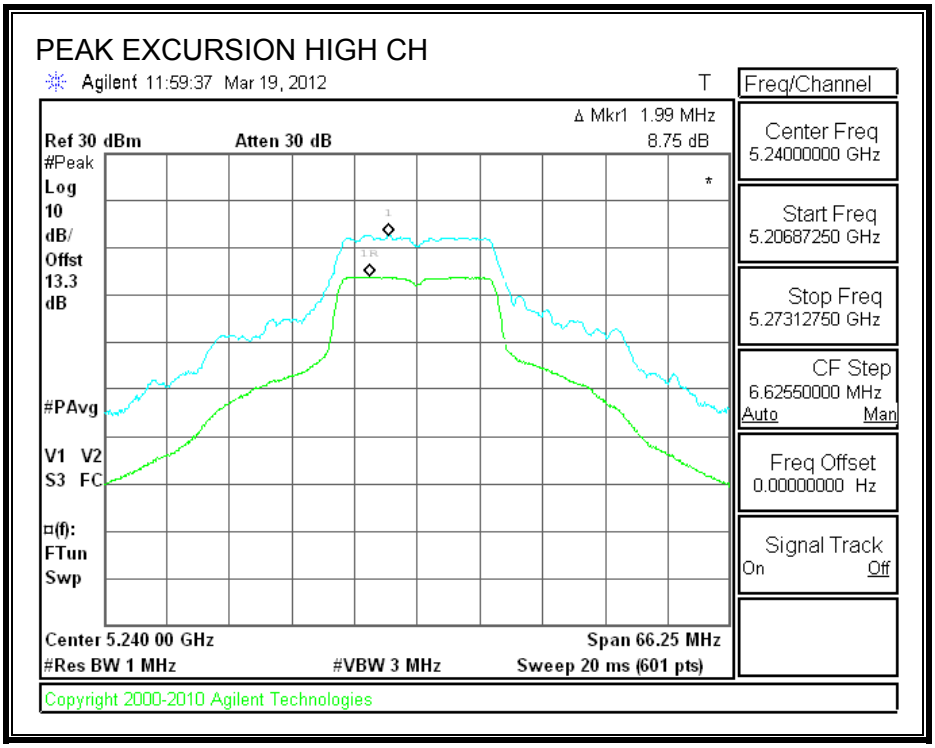
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5180	8.69	13	-4.3
Mid	5200	8.81	13	-4.2
High	5240	8.75	13	-4.3

PEAK EXCURSION





PEAK EXCURSION HIGH CH



7.3. 802.11n HT20 MODE IN THE 5.2 GHz BAND

7.3.1. 99% BANDWIDTH

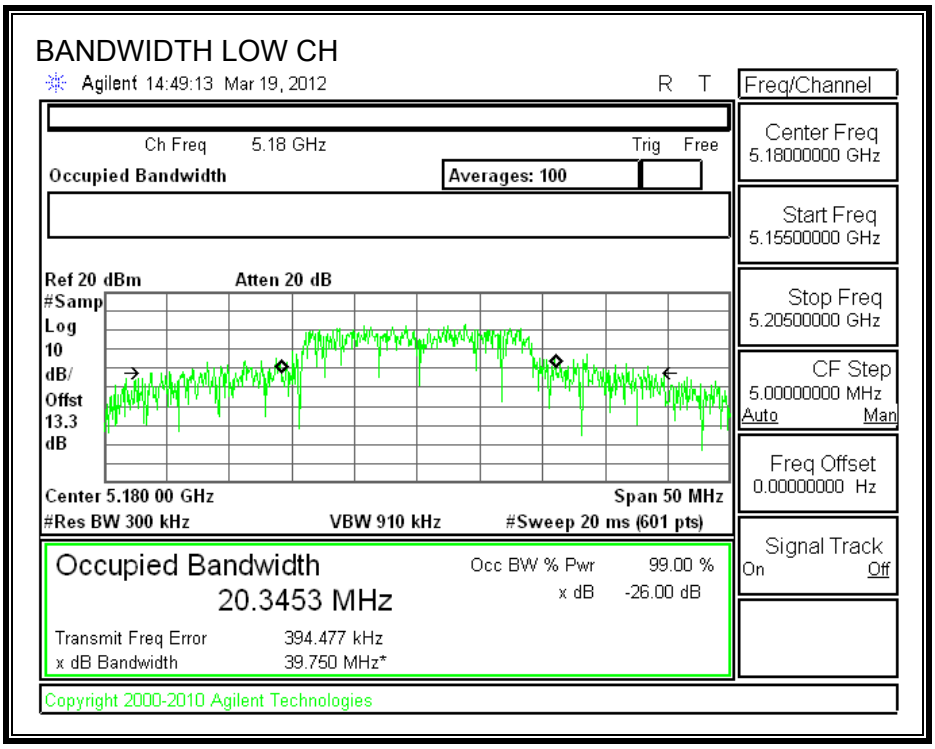
LIMITS

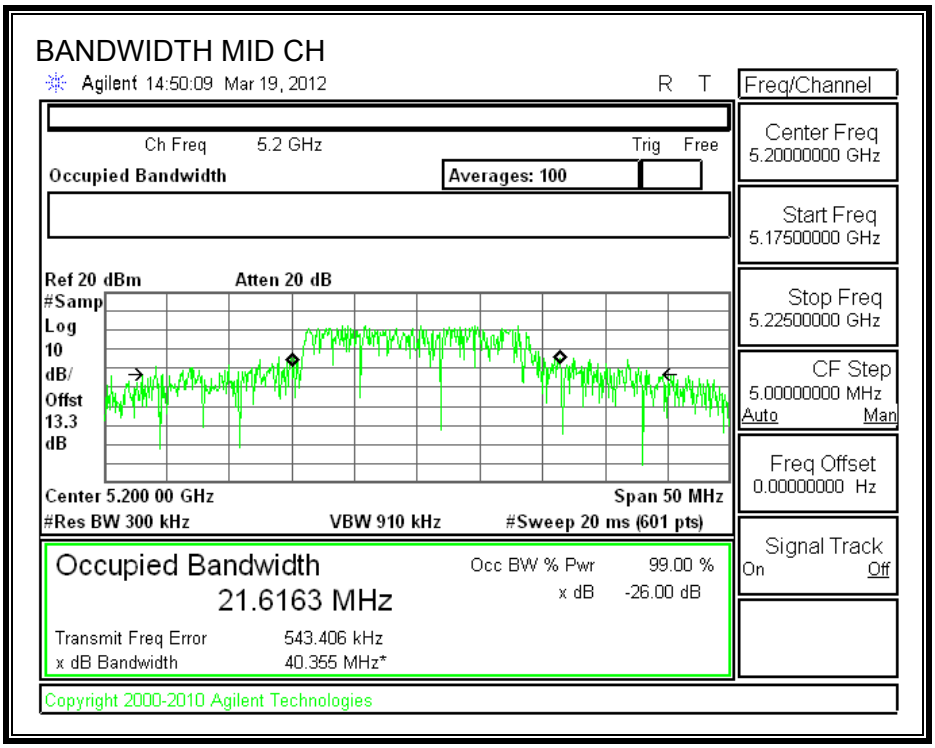
None; for reporting purposes only.

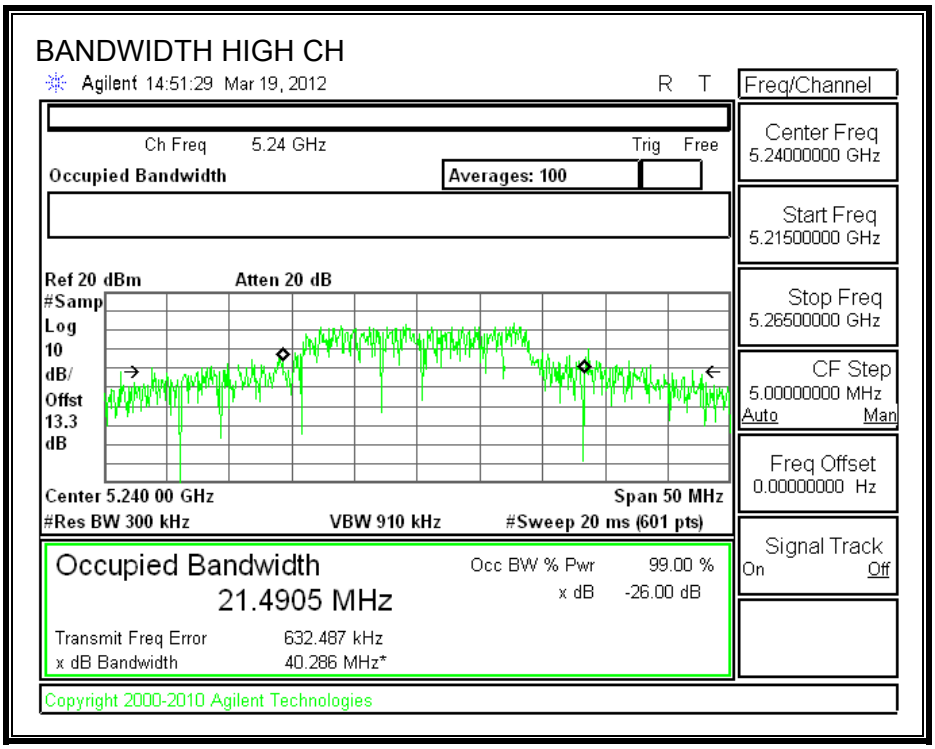
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5180	20.3453
Mid	5200	21.6163
High	5240	21.4905

99% BANDWIDTH







7.3.2. 26 dB BANDWIDTH

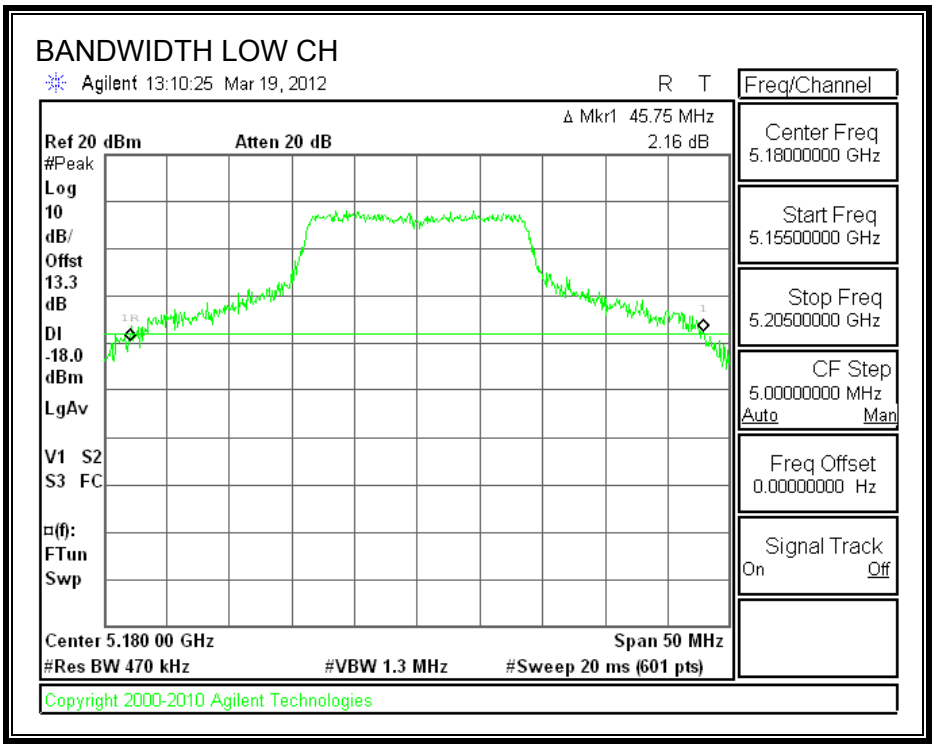
LIMITS

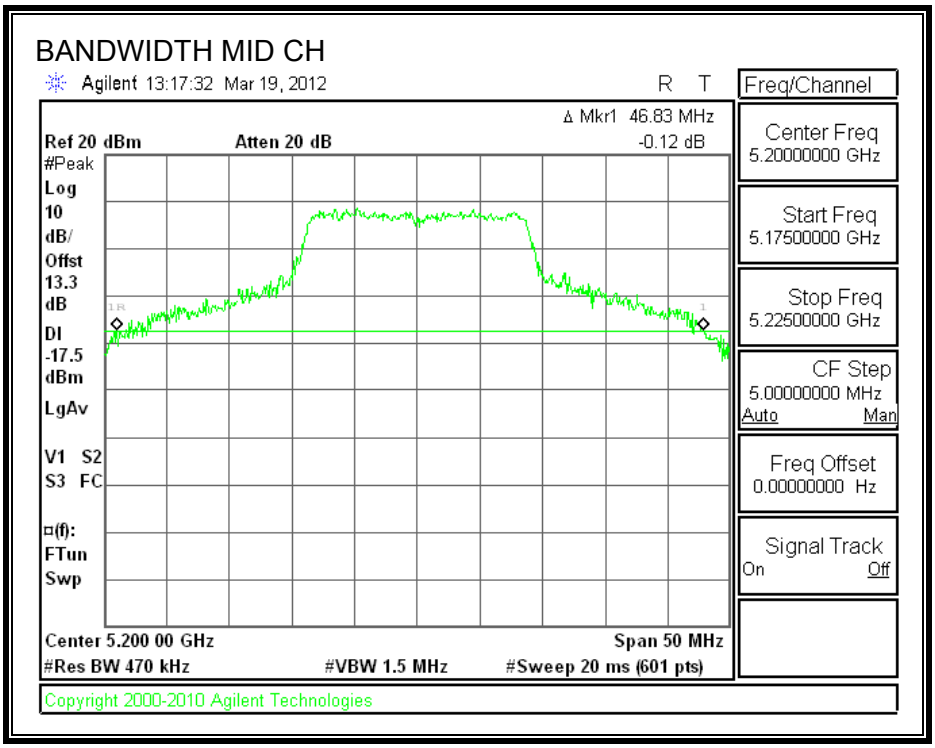
None; for reporting purposes only.

RESULTS

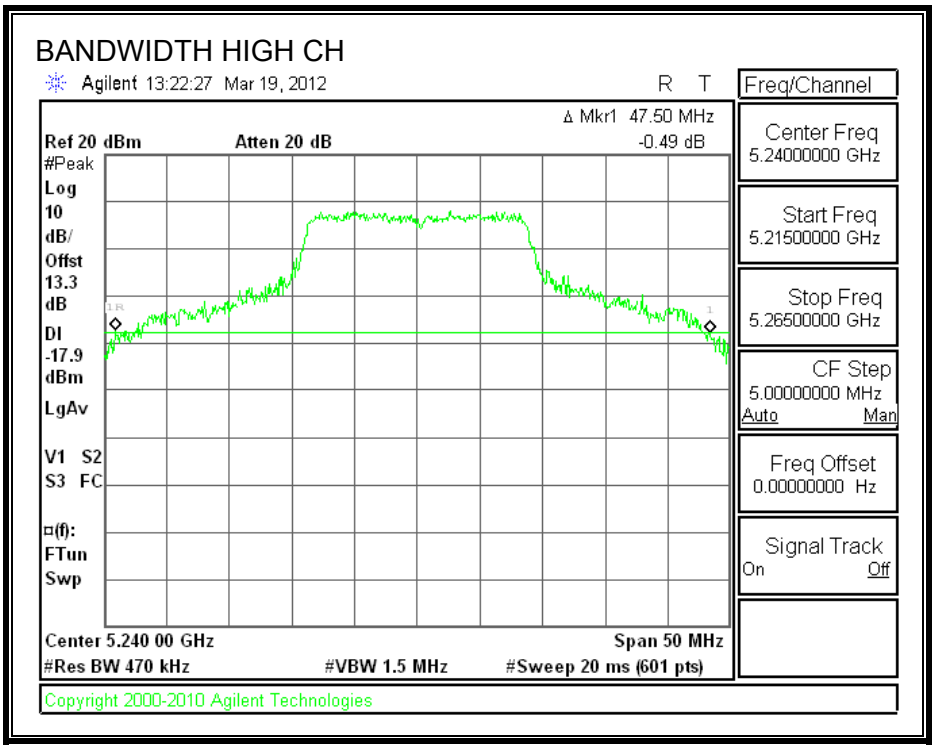
Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5180	45.75
Mid	5200	46.83
High	5240	47.50

26 dB BANDWIDTH





BANDWIDTH HIGH CH



7.3.3. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the band 5.15–5.25 GHz, 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. In addition, 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 maximum conducted output 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.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5180	17	45.75	20.60	5.60	17.00	4.00
Mid	5200	17	46.83	20.71	5.60	17.00	4.00
High	5240	17	47.50	20.77	5.60	17.00	4.00

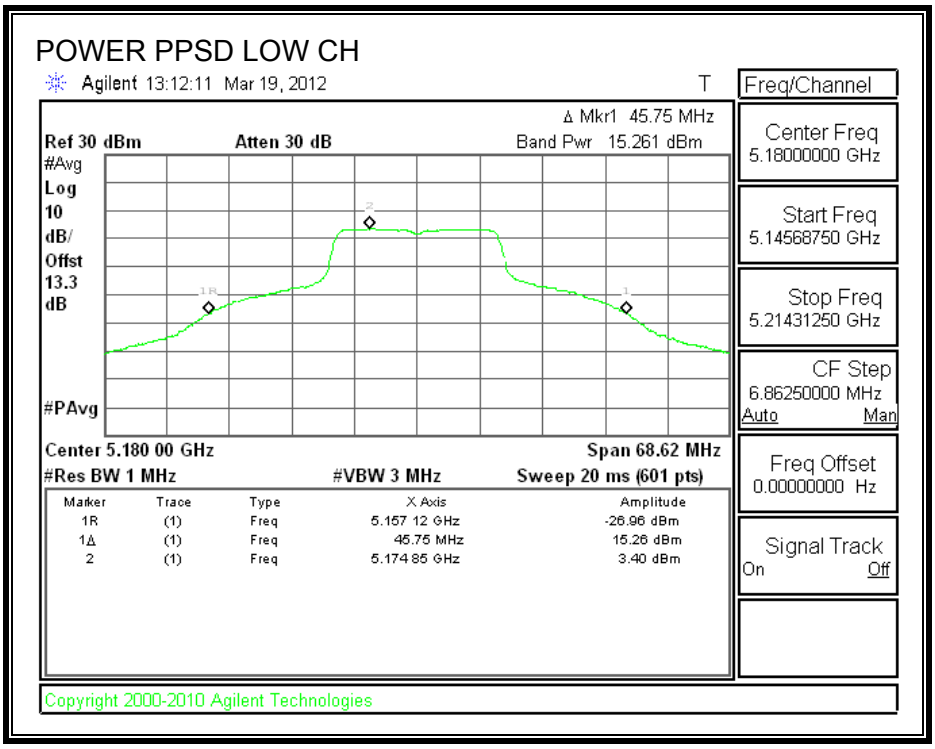
Output Power Results

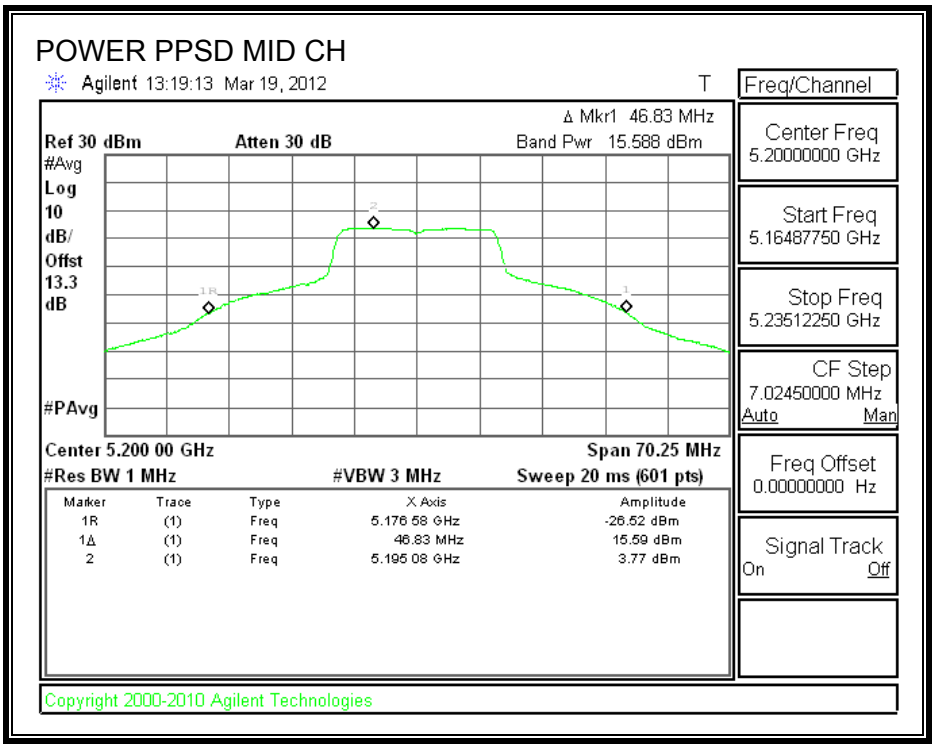
Channel	Frequency (MHz)	Meas Power (dBm)	Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	15.261	15.261	17.00	-1.739
Mid	5200	15.588	15.588	17.00	-1.412
High	5240	15.374	15.374	17.00	-1.626

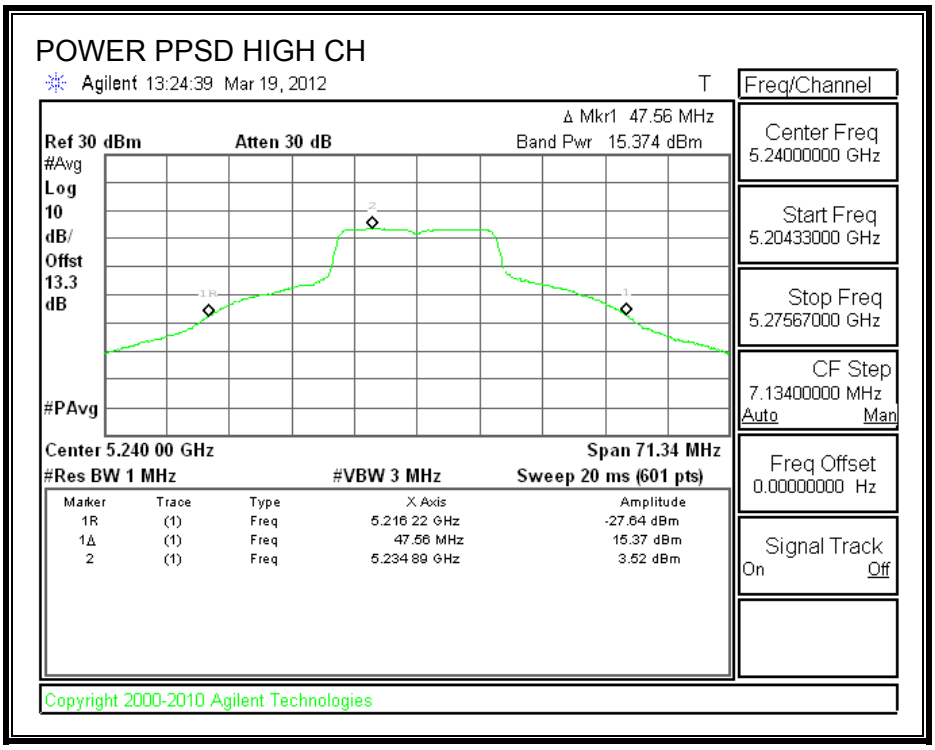
PPSD Results

Channel	Frequency (MHz)	Meas PPSD (dBm)	Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5180	3.40	3.40	4.00	-0.60
Mid	5200	3.77	3.77	4.00	-0.23
High	5240	3.52	3.52	4.00	-0.48

OUTPUT POWER AND PPSD







7.3.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 13.3 dB (including 12 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5180	15.0
Mid	5200	15.0
High	5240	15.0

7.3.5. PEAK EXCURSION

LIMITS

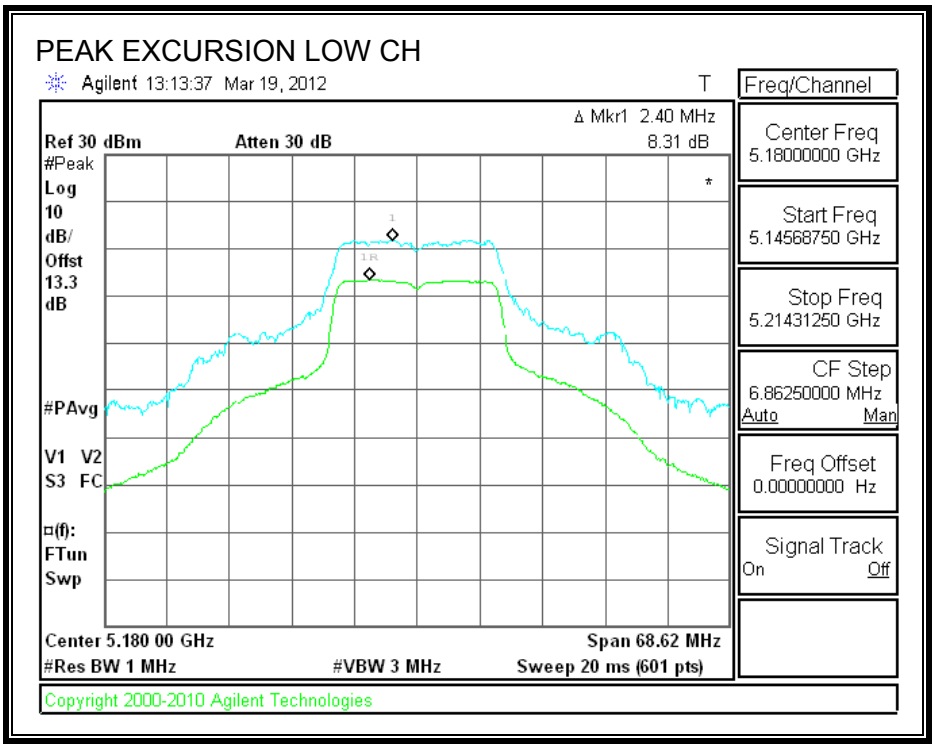
FCC §15.407 (a) (6)

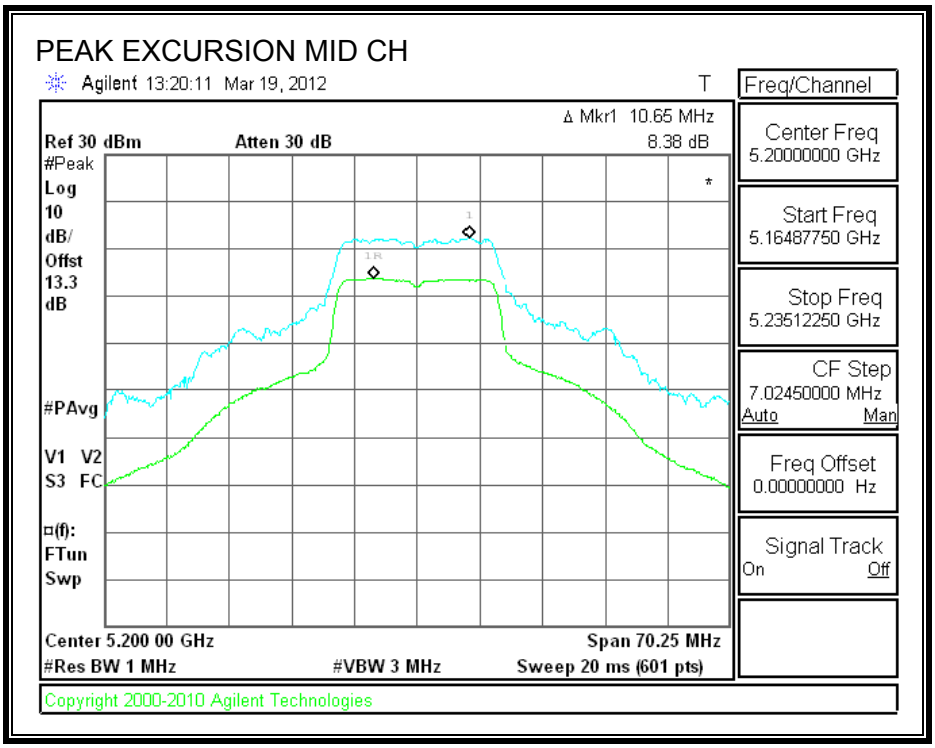
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

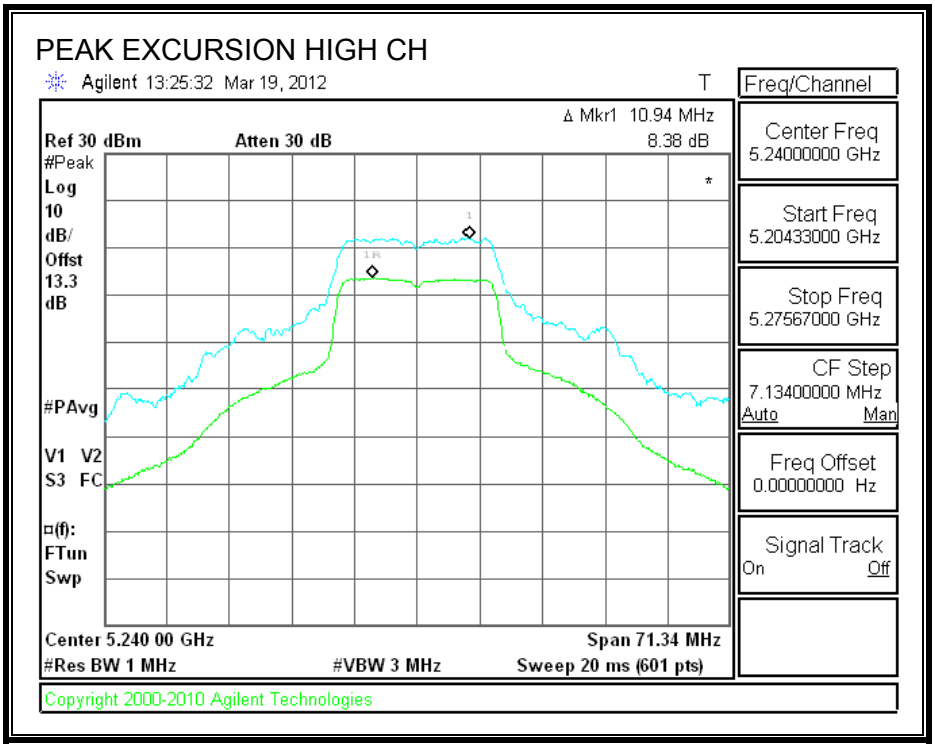
Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5180	8.31	13	-4.7
Mid	5200	8.38	13	-4.6
High	5240	8.38	13	-4.6

PEAK EXCURSION





PEAK EXCURSION HIGH CH



7.4. 802.11n HT40 MODE IN THE 5.2 GHz BAND

7.4.1. 99% BANDWIDTH

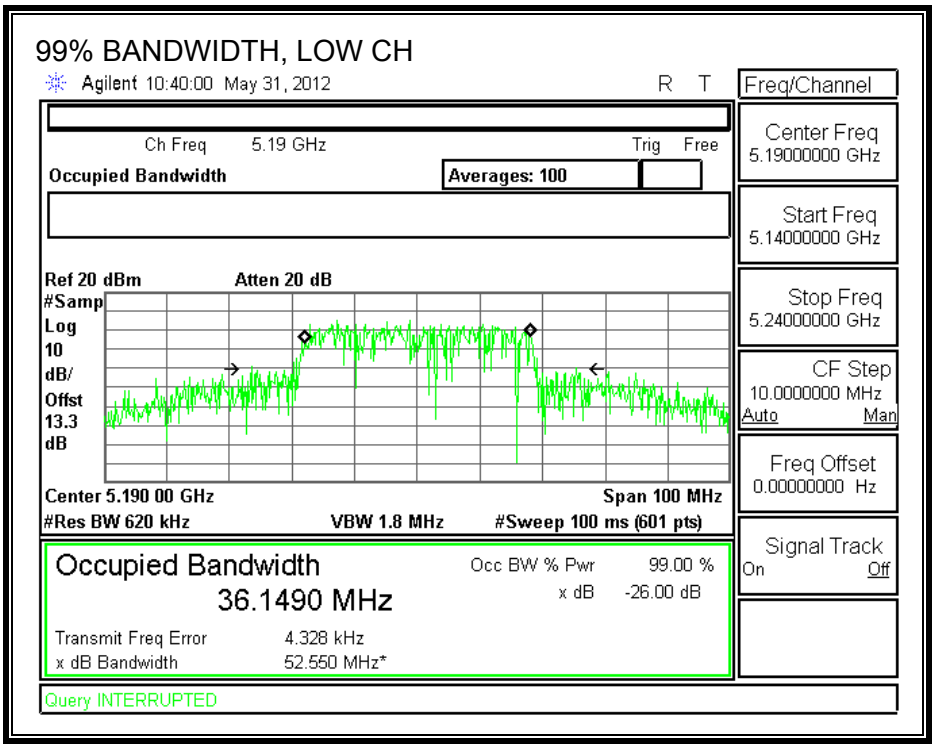
LIMITS

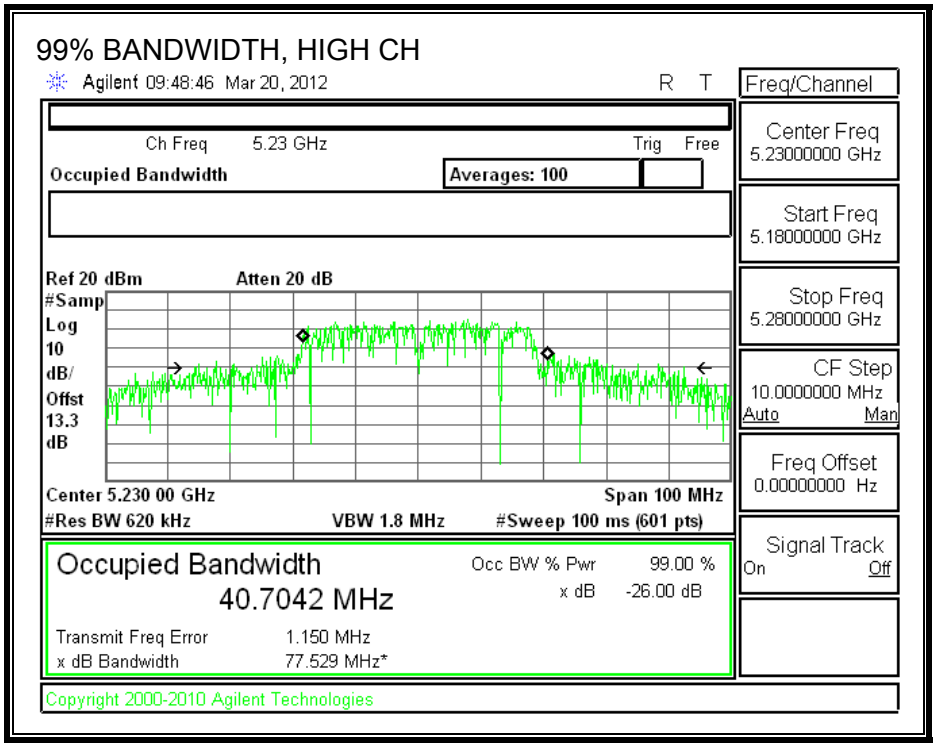
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5190	36.1490
High	5230	40.7042

99% BANDWIDTH





7.4.2. 26 dB BANDWIDTH

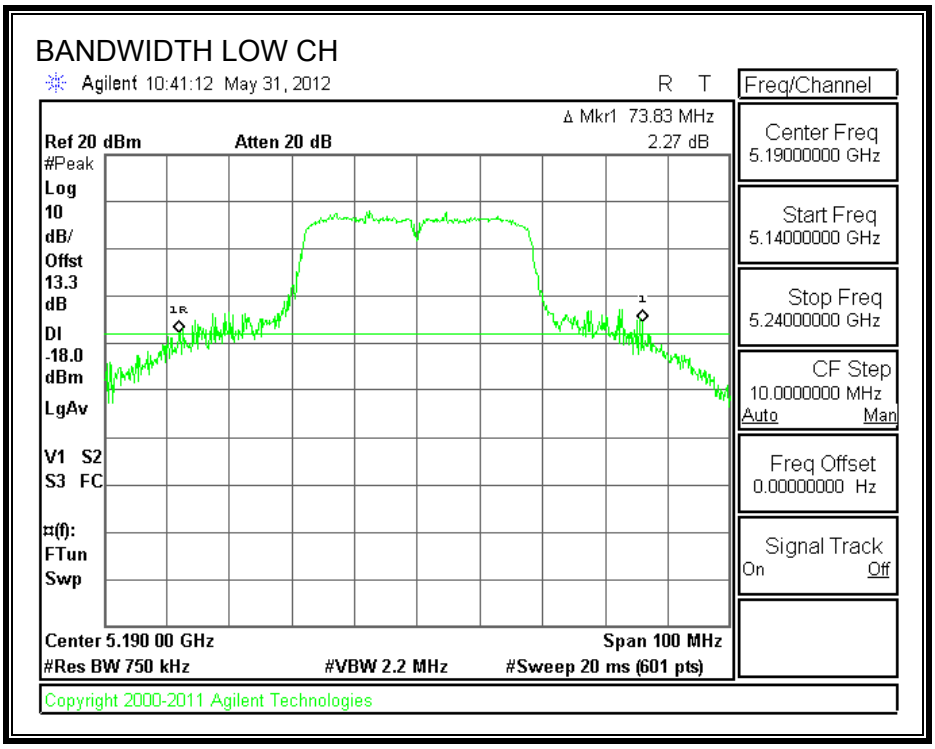
LIMITS

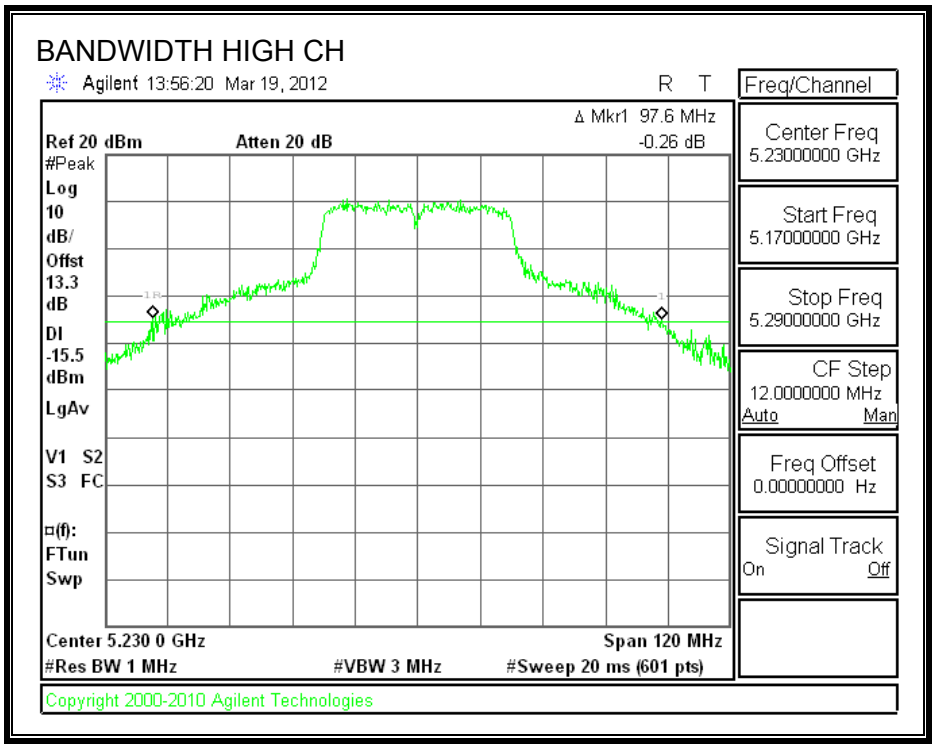
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5190	73.83
High	5230	97.60

26 dB BANDWIDTH





7.4.3. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

For the band 5.15–5.25 GHz, 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. In addition, 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 maximum conducted output 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.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5190	17	73.80	22.68	5.60	17.00	4.00
High	5230	17	97.60	23.89	5.60	17.00	4.00

Output Power Results

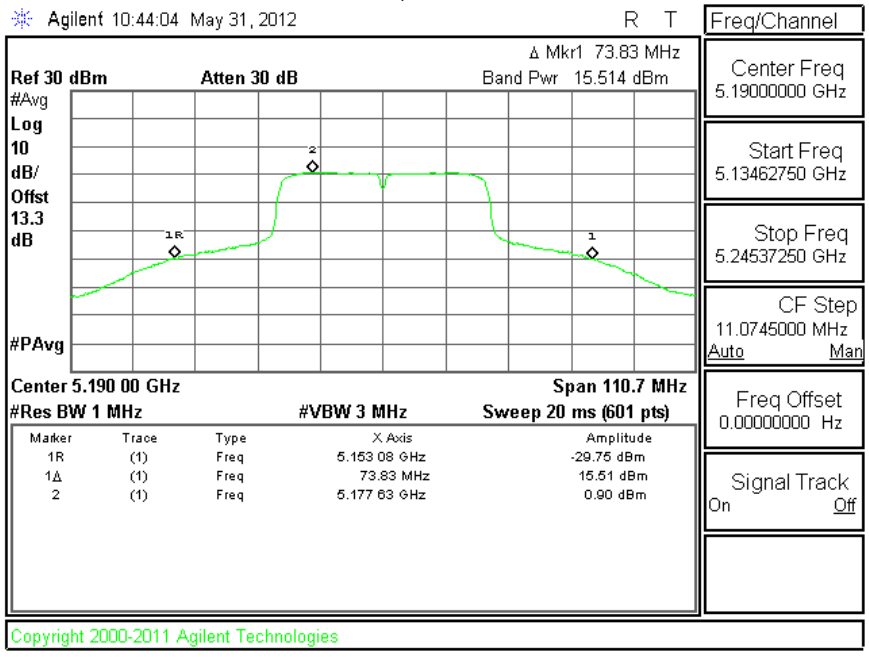
Channel	Frequency (MHz)	Meas Power (dBm)	Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	15.514	15.514	17.00	-1.486
High	5230	16.256	16.256	17.00	-0.744

PPSD Results

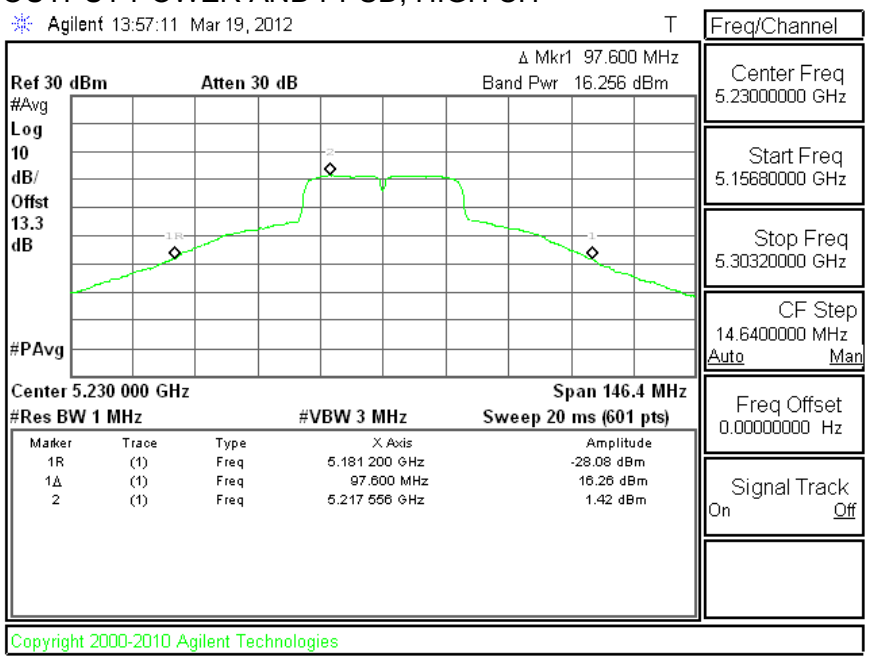
Channel	Frequency (MHz)	Meas PPSD (dBm)	Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5190	0.90	0.90	4.00	-3.10
High	5230	1.42	1.42	4.00	-2.58

OUTPUT POWER AND PPSD

OUTPUT POWER AND PPSD, LOW CH



OUTPUT POWER AND PPSD, HIGH CH



7.4.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 13.3 dB (including 12 dB pad and1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5190	15.4
High	5230	16.0

7.4.5. PEAK EXCURSION

LIMITS

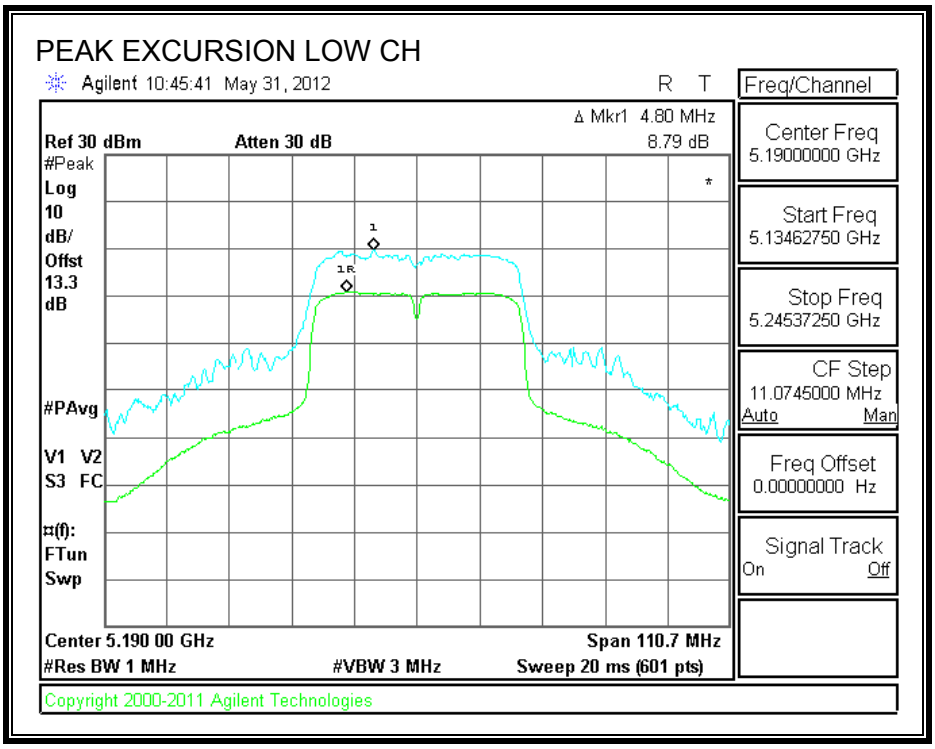
FCC §15.407 (a) (6)

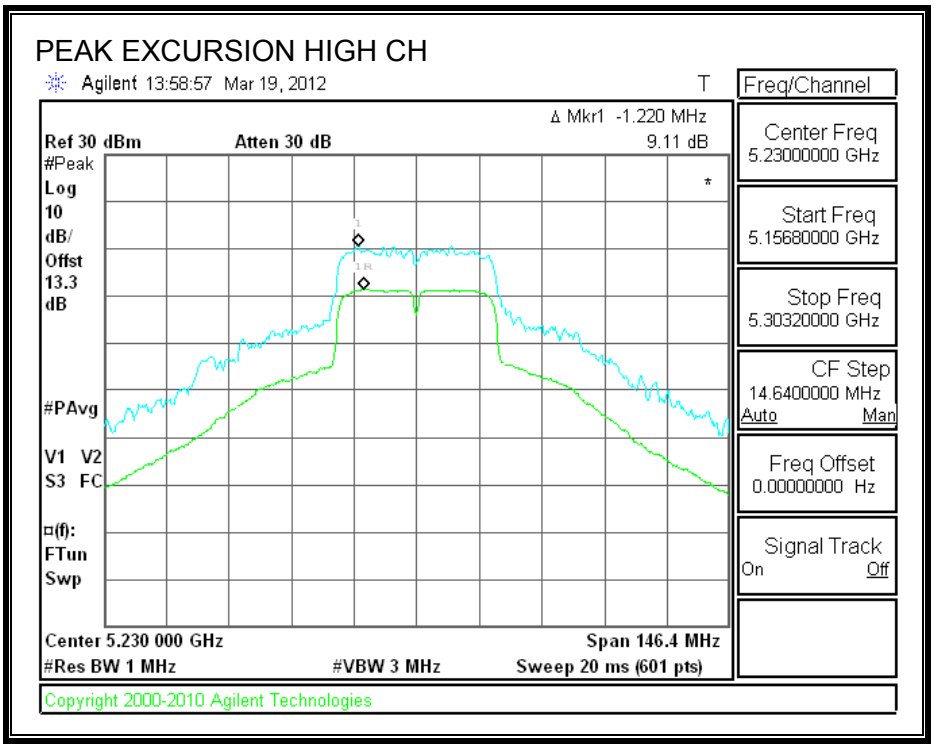
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5190	8.79	13	-4.2
High	5230	9.11	13	-3.9

PEAK EXCURSION





7.5. 802.11a MODE IN THE 5.3 GHz BAND

7.5.1. 99% BANDWIDTH

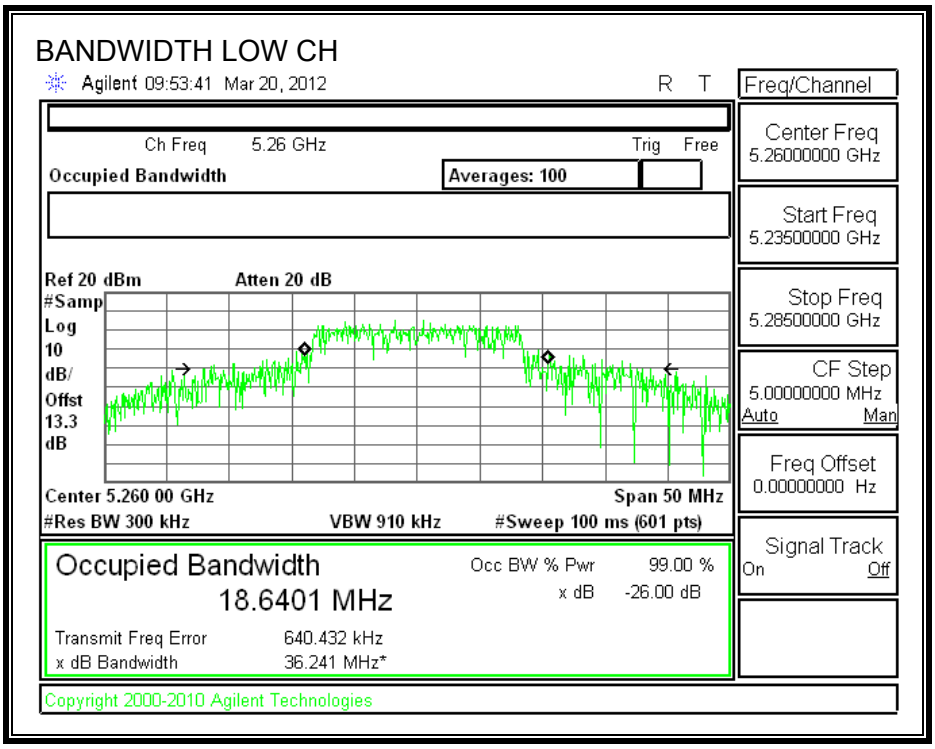
LIMITS

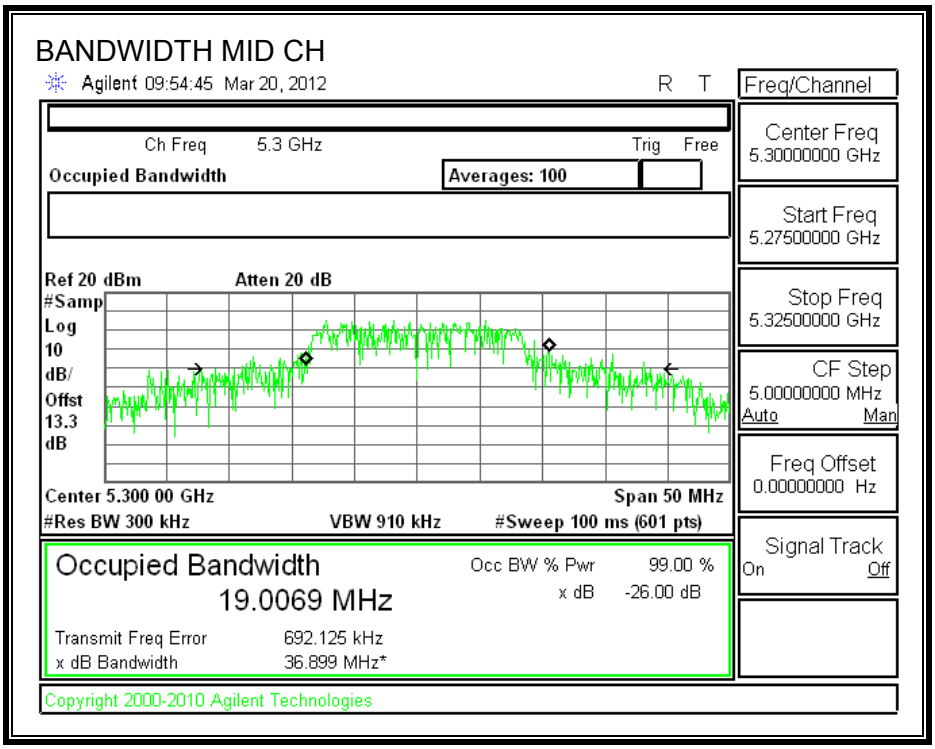
None; for reporting purposes only.

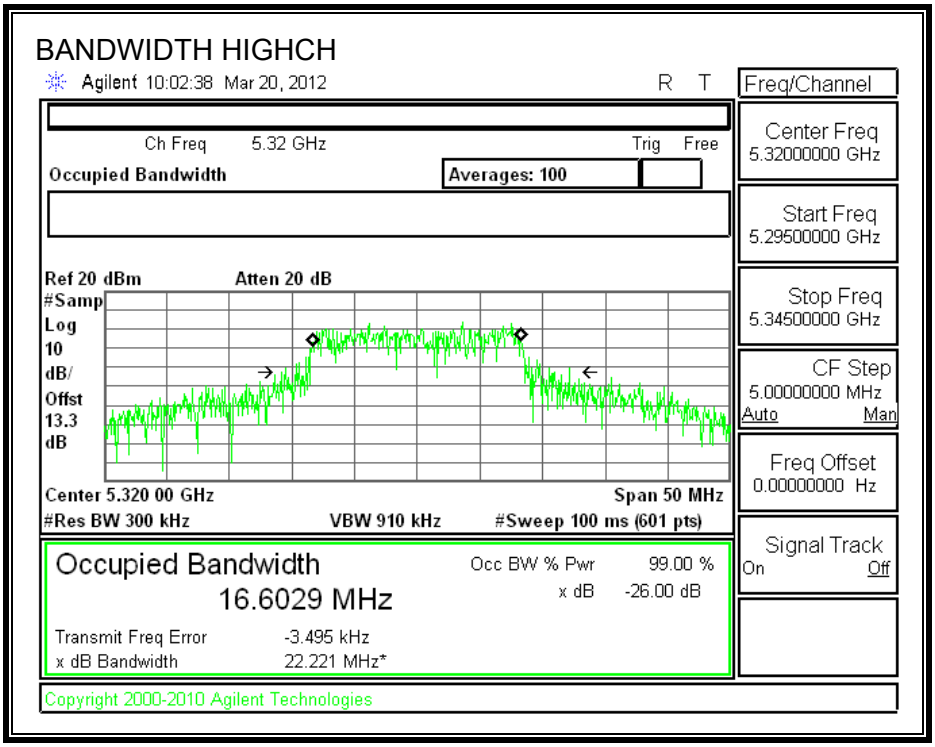
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5260	18.6401
Mid	5300	19.0069
High	5320	16.6029

99% BANDWIDTH







7.5.2. 26 dB BANDWIDTH

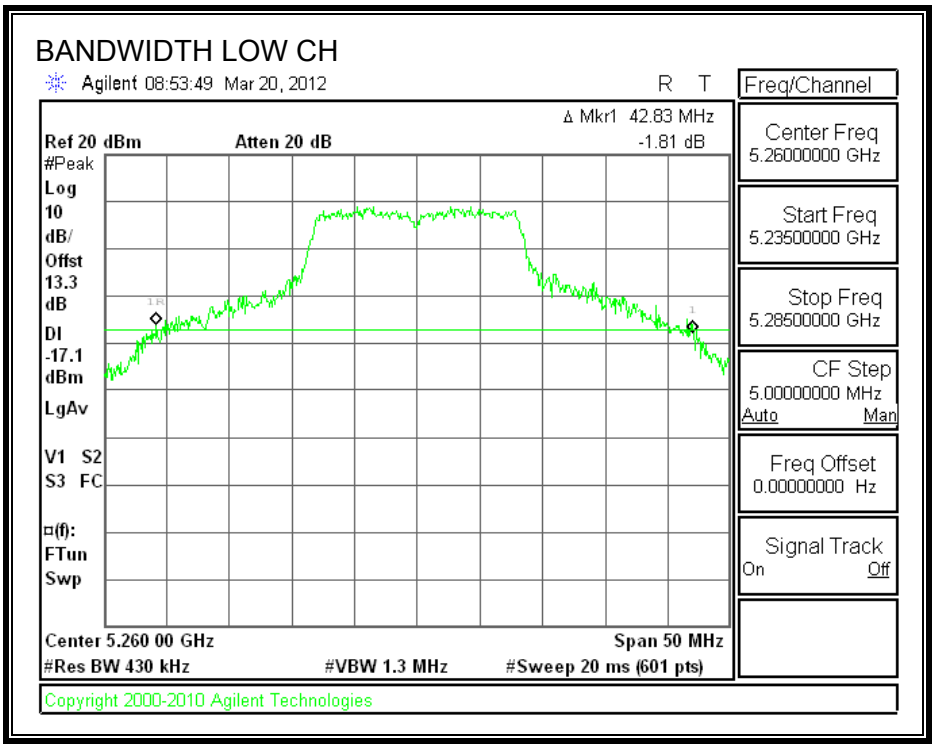
LIMITS

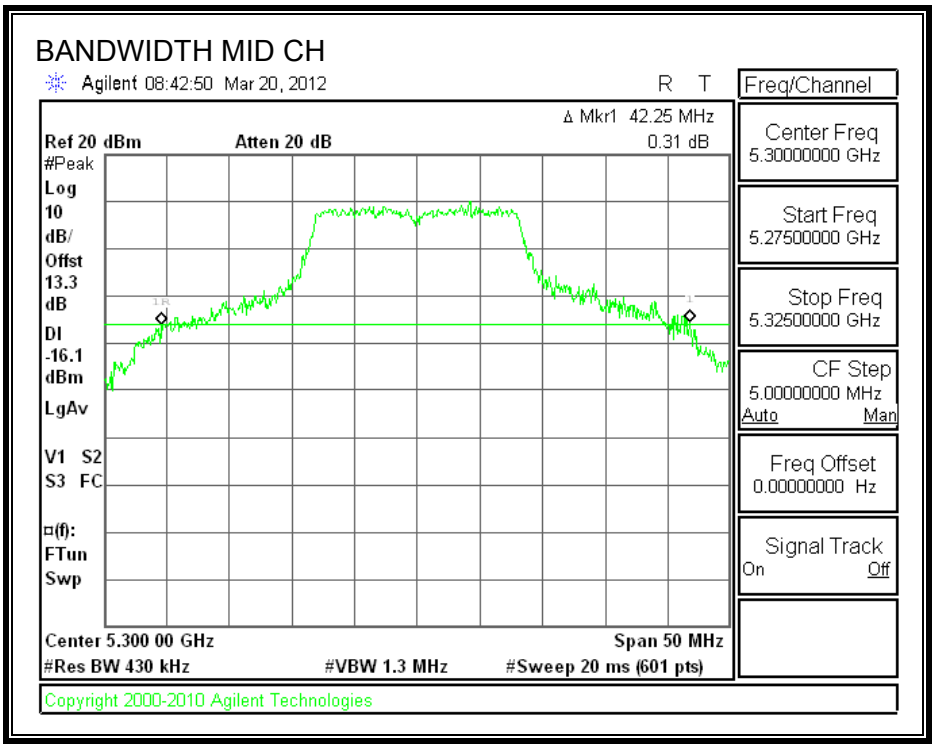
None; for reporting purposes only.

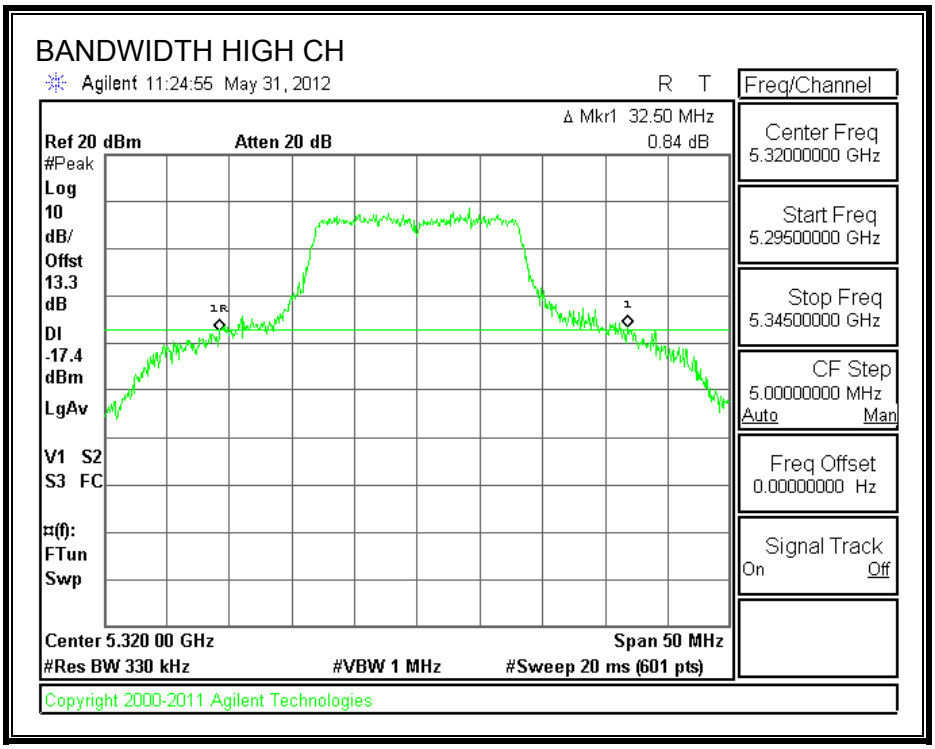
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5260	42.83
Mid	5300	42.25
High	5320	32.50

26 dB BANDWIDTH







7.5.3. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands 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 megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output 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.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5260	24	42.83	27.32	5.60	24.00	11.00
Mid	5300	24	42.25	27.26	5.60	24.00	11.00
High	5320	24	32.50	26.12	5.60	24.00	11.00

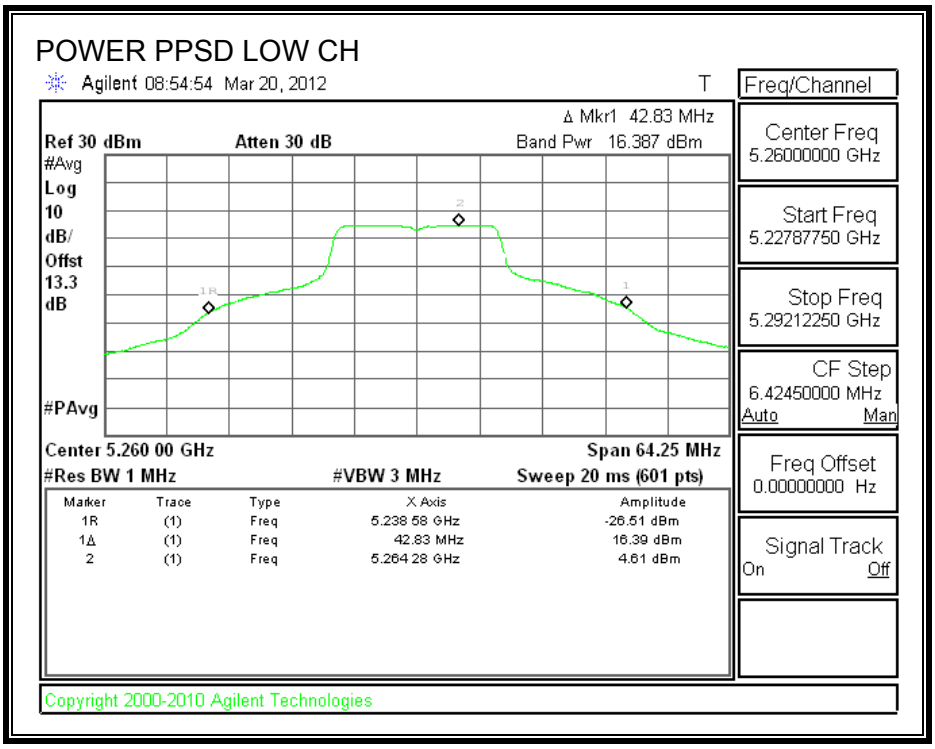
Output Power Results

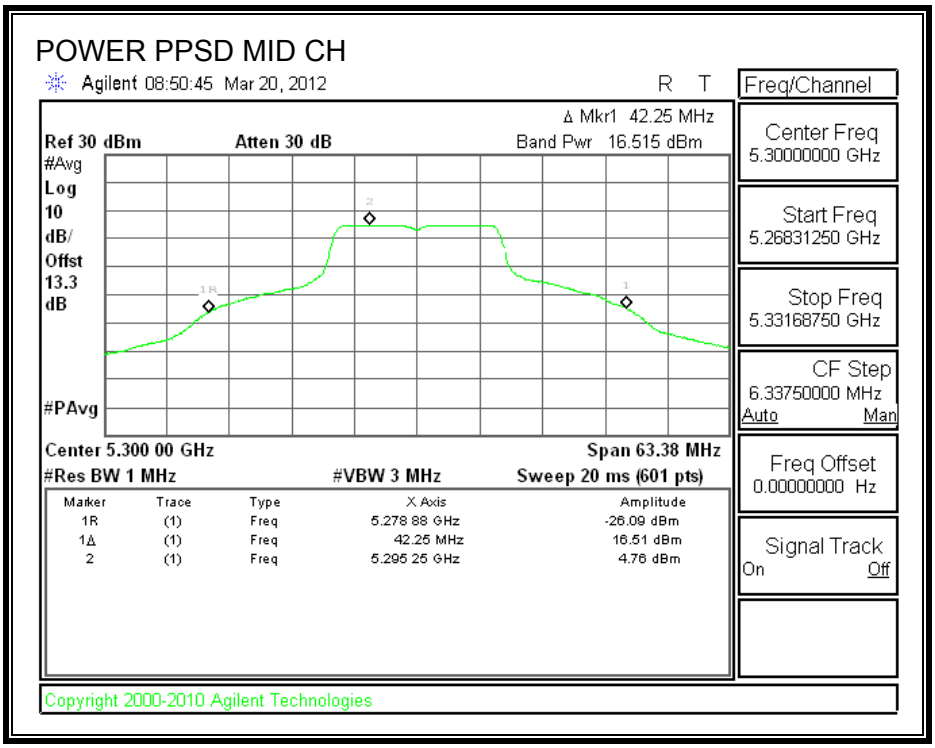
Channel	Frequency (MHz)	Meas Power (dBm)	Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	16.387	16.387	24.00	-7.613
Mid	5300	16.515	16.515	24.00	-7.485
High	5320	16.086	16.086	24.00	-7.914

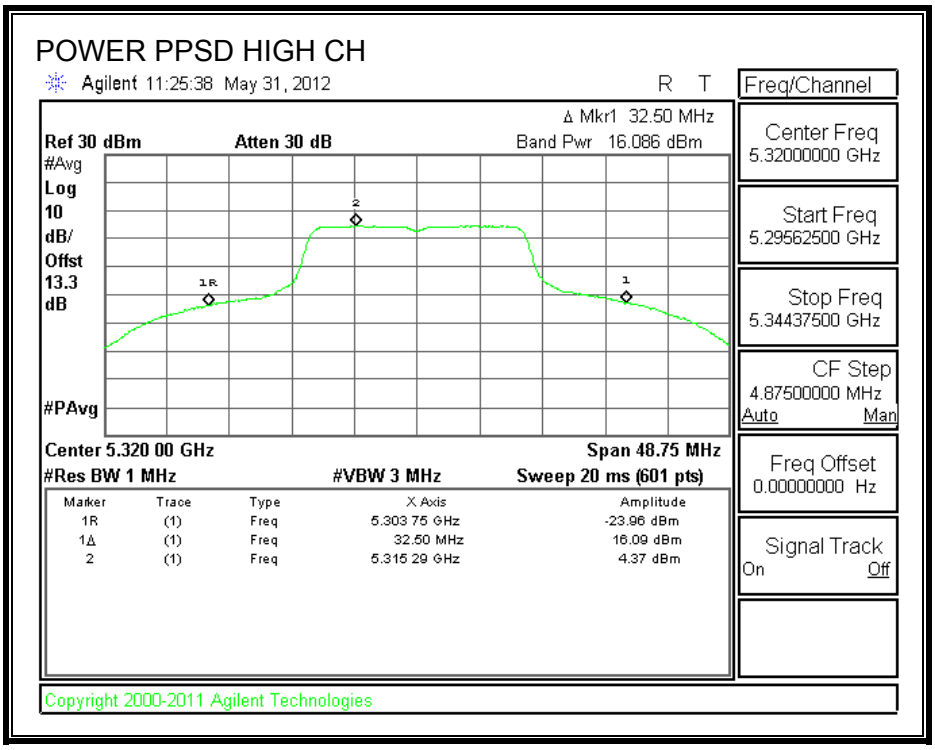
PPSD Results

Channel	Frequency (MHz)	Meas PPSD (dBm)	Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5260	4.61	4.61	11.00	-6.39
Mid	5300	4.76	4.76	11.00	-6.24
High	5320	4.37	4.37	11.00	-6.63

OUTPUT POWER AND PPSD







7.5.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 13.3 dB (including 12 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5260	16.0
Mid	5300	16.0
High	5320	16.0

7.5.5. PEAK EXCURSION

LIMITS

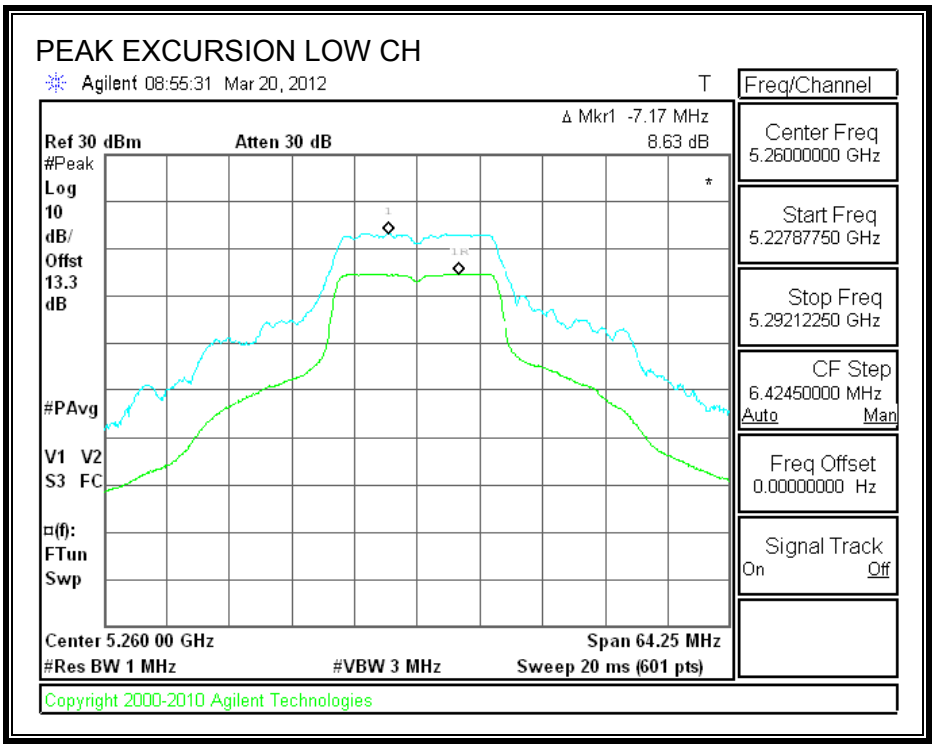
FCC §15.407 (a) (6)

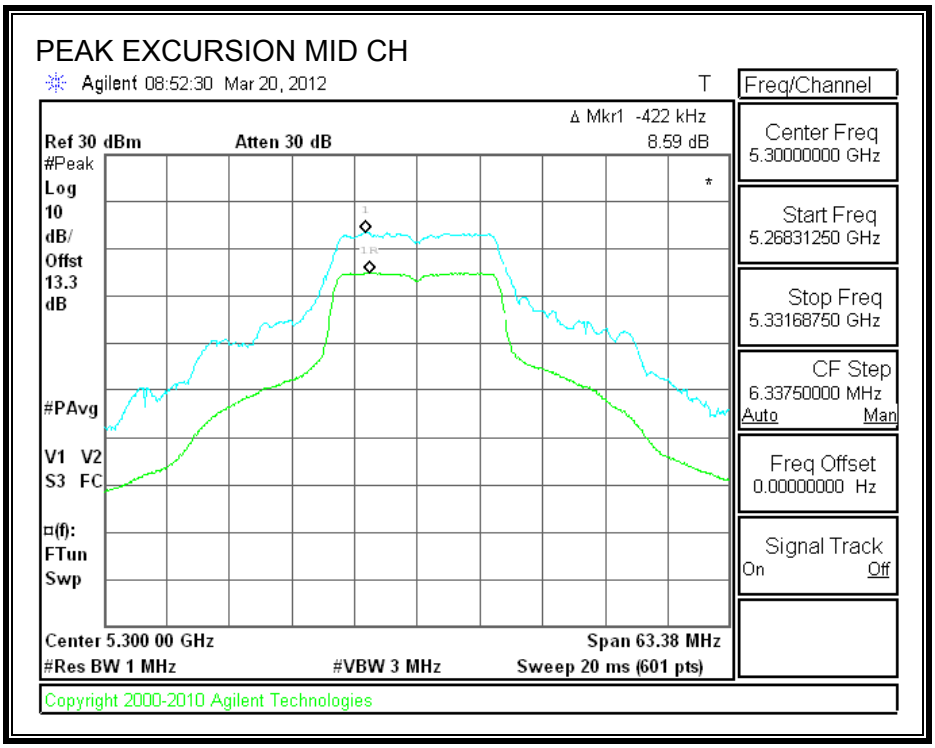
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

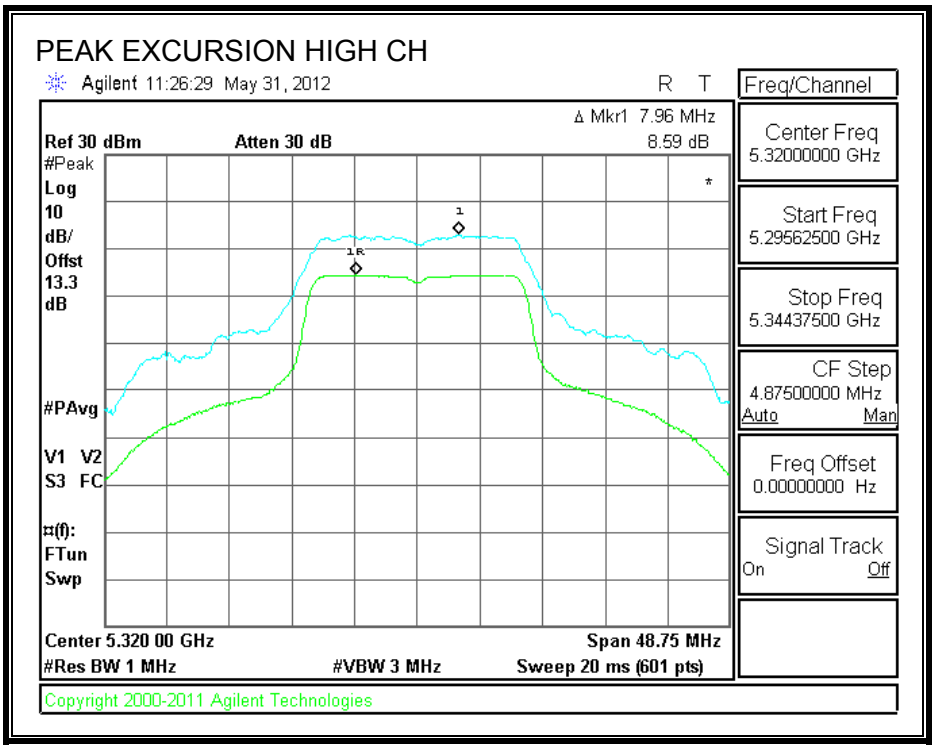
RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5260	8.63	13	-4.4
Mid	5300	8.59	13	-4.4
High	5320	8.59	13	-4.4

PEAK EXCURSION







7.6. 802.11n HT20 MODE IN THE 5.3 GHz BAND

7.6.1. 99% BANDWIDTH

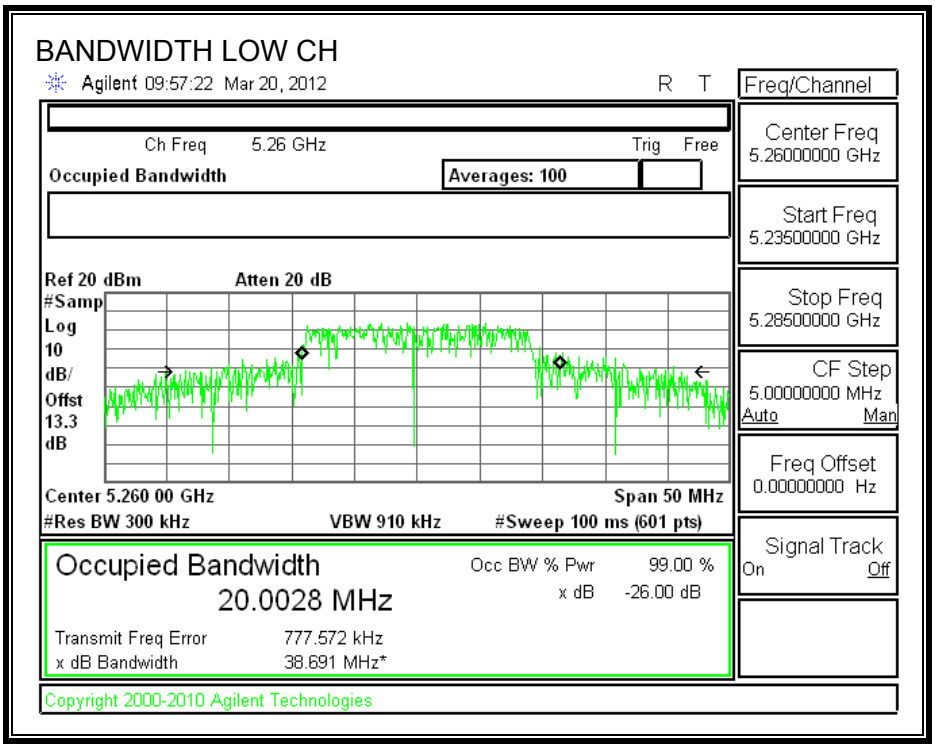
LIMITS

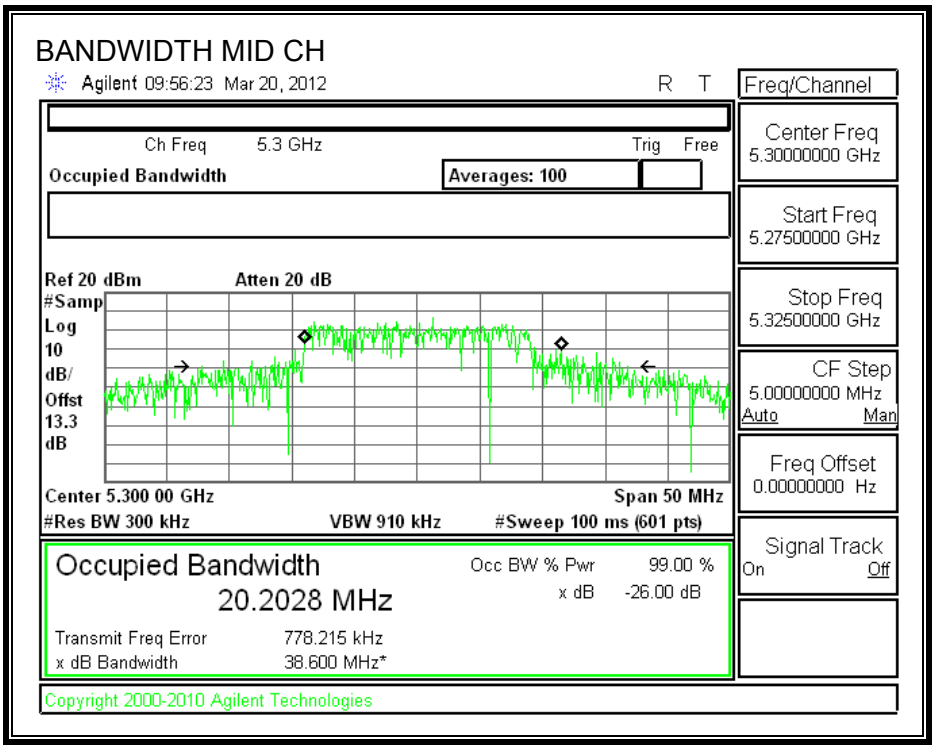
None; for reporting purposes only.

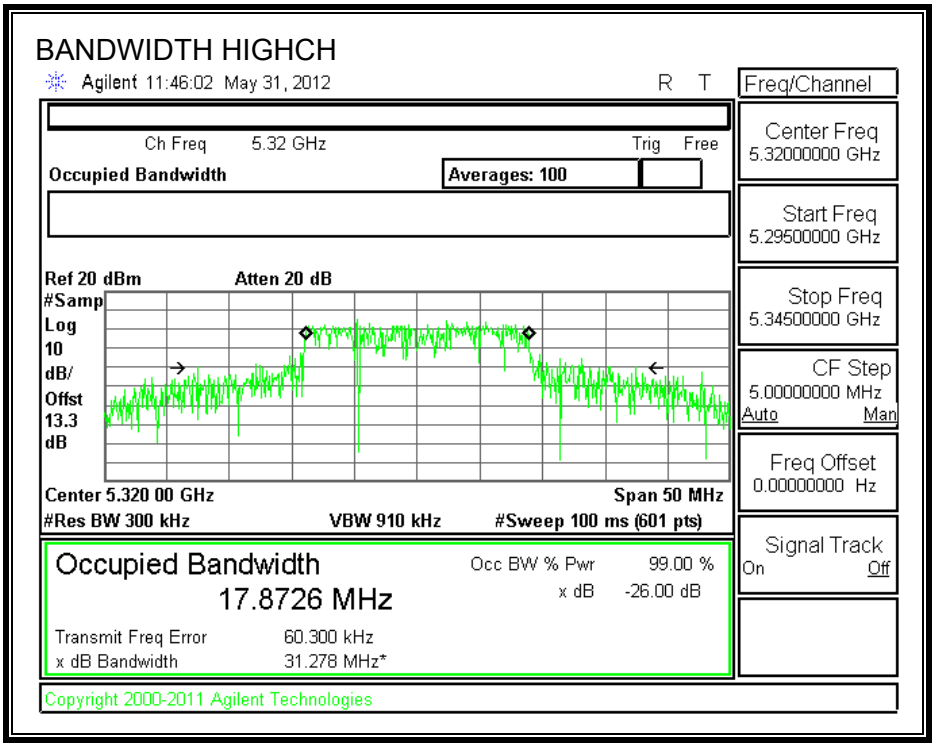
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5260	20.0028
Mid	5300	20.2028
High	5320	17.8726

99% BANDWIDTH







7.6.2. 26 dB BANDWIDTH

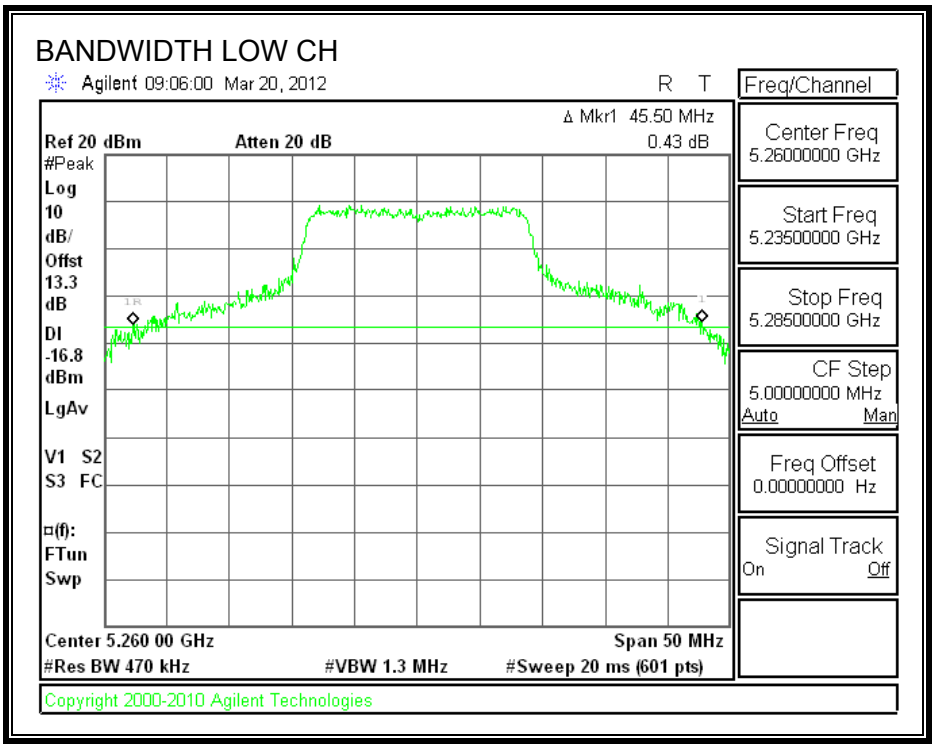
LIMITS

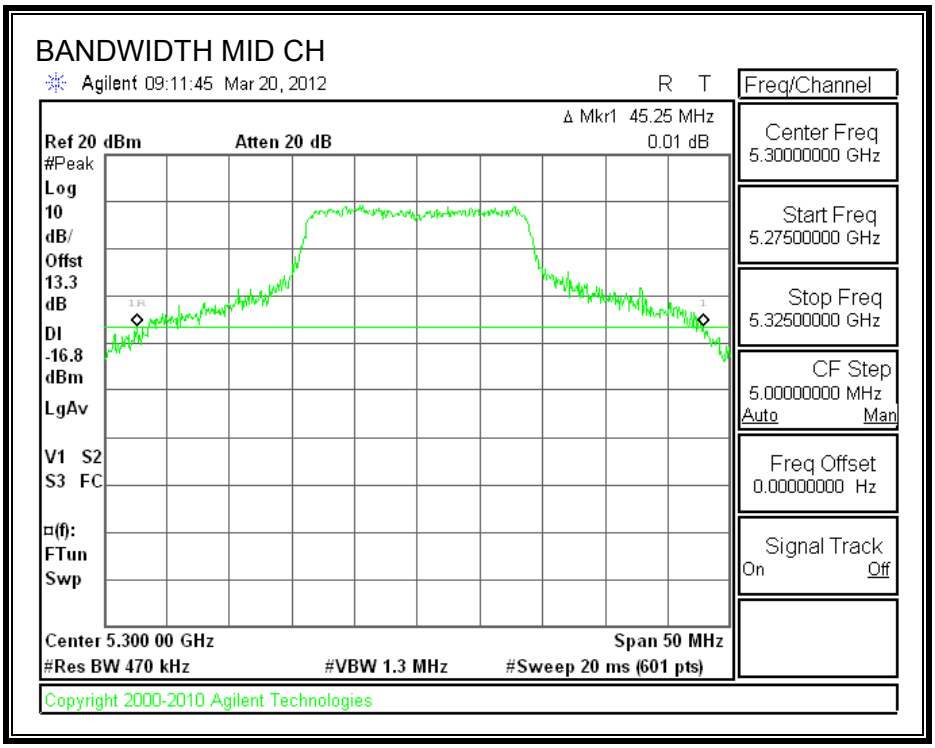
None; for reporting purposes only.

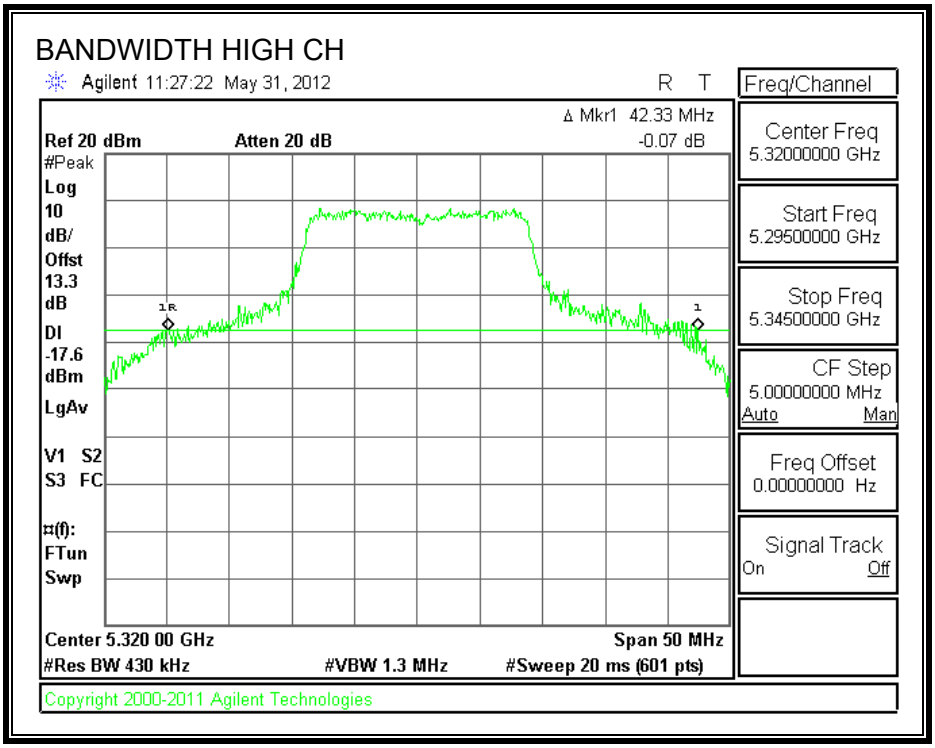
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5260	45.50
Mid	5300	45.25
High	5320	42.30

26 dB BANDWIDTH







7.6.3. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands 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 megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output 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.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5260	24	45.50	27.58	5.60	24.00	11.00
Mid	5300	24	45.25	27.56	5.60	24.00	11.00
High	5320	24	42.30	27.26	5.60	24.00	11.00

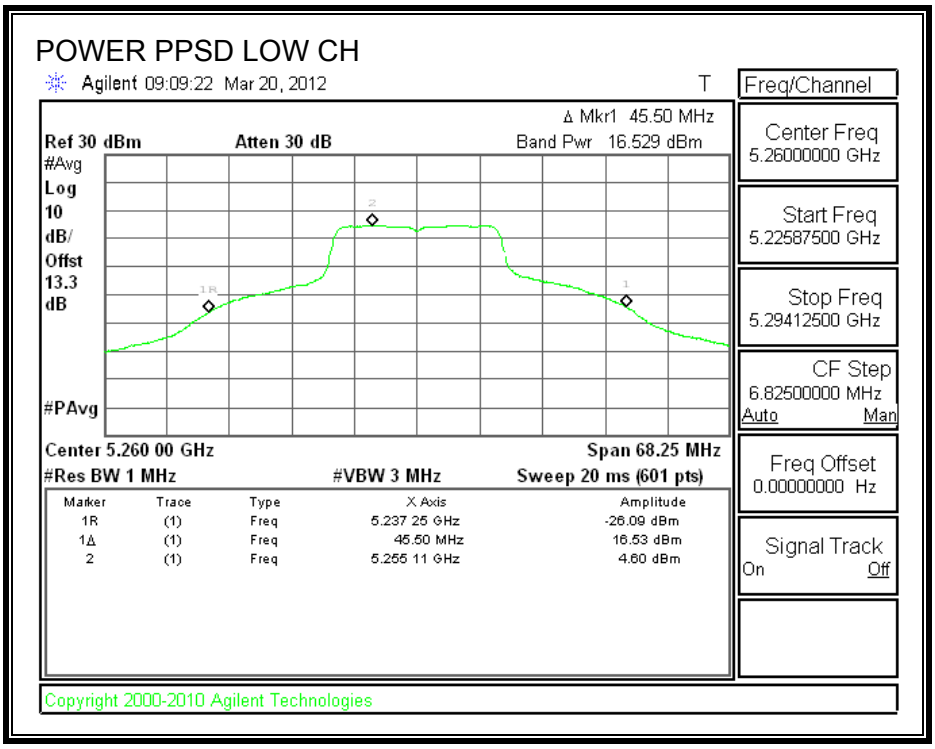
Output Power Results

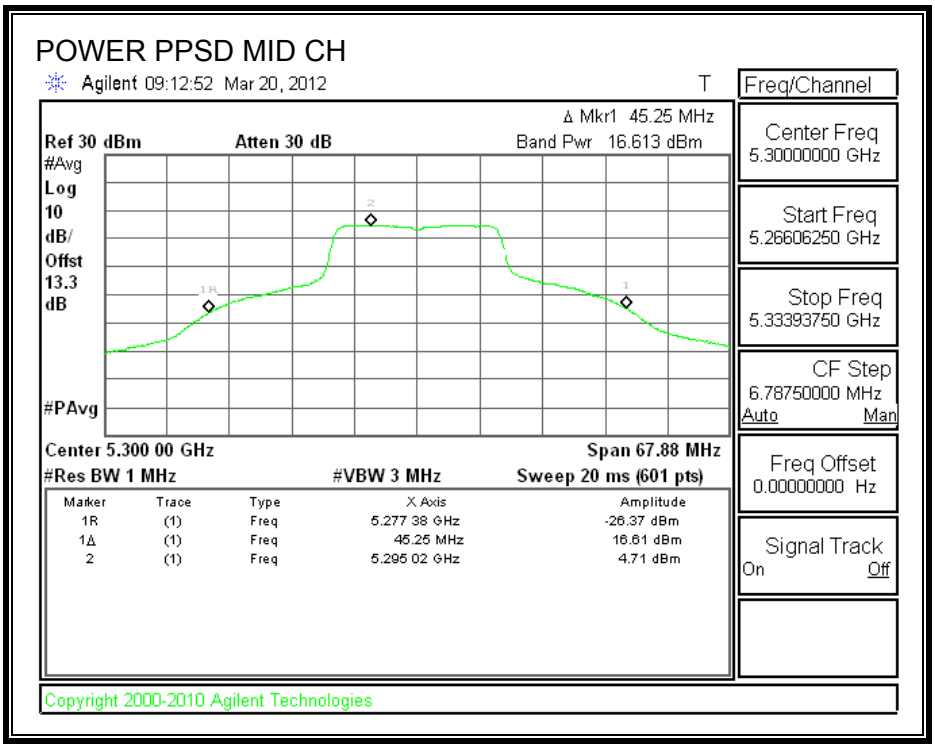
Channel	Frequency (MHz)	Meas Power (dBm)	Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	16.529	16.529	24.00	-7.471
Mid	5300	16.613	16.613	24.00	-7.387
High	5320	16.063	16.063	24.00	-7.937

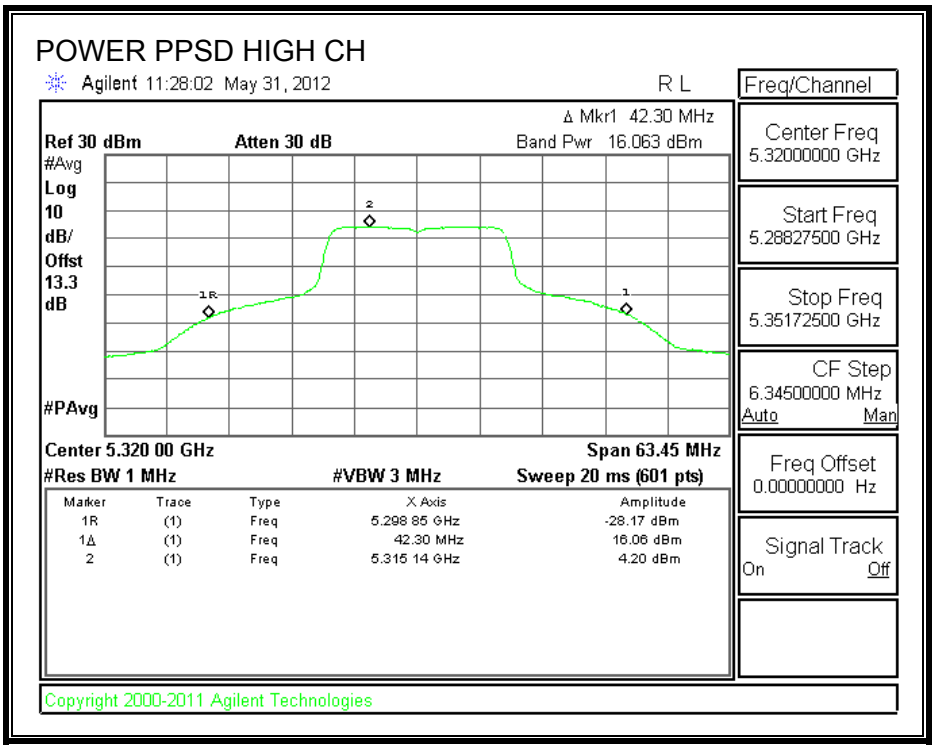
PPSD Results

Channel	Frequency (MHz)	Meas PPSD (dBm)	Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5260	4.60	4.60	11.00	-6.40
Mid	5300	4.71	4.71	11.00	-6.29
High	5320	4.20	4.20	11.00	-6.80

OUTPUT POWER AND PPSD







7.6.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 13.3 dB (including 12 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5260	16.0
Mid	5300	16.0
High	5320	16.0

7.6.5. PEAK EXCURSION

LIMITS

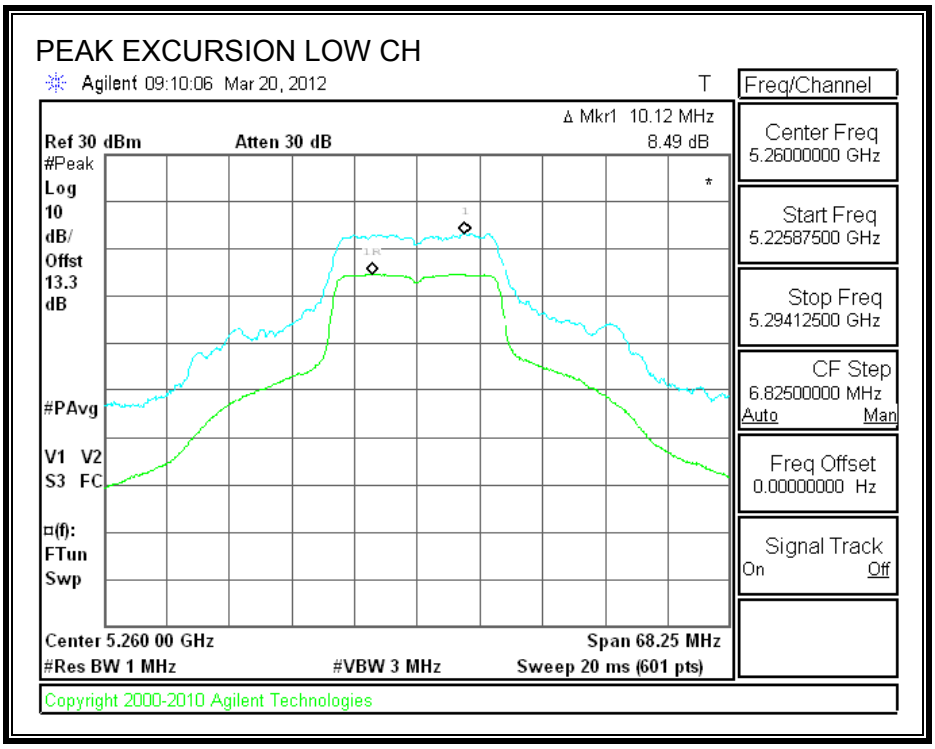
FCC §15.407 (a) (6)

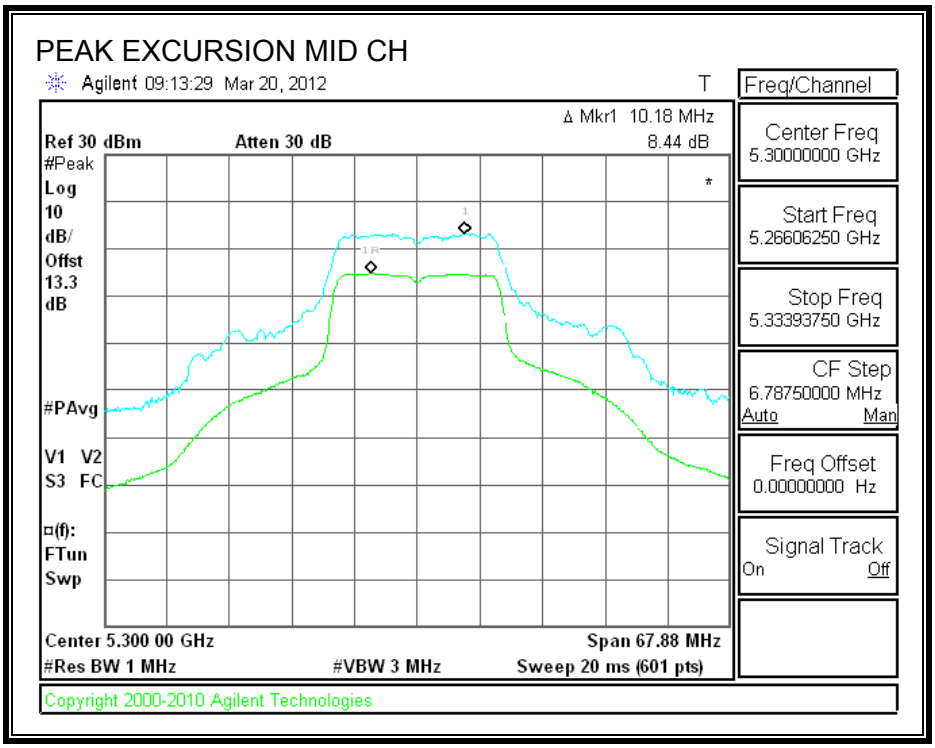
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

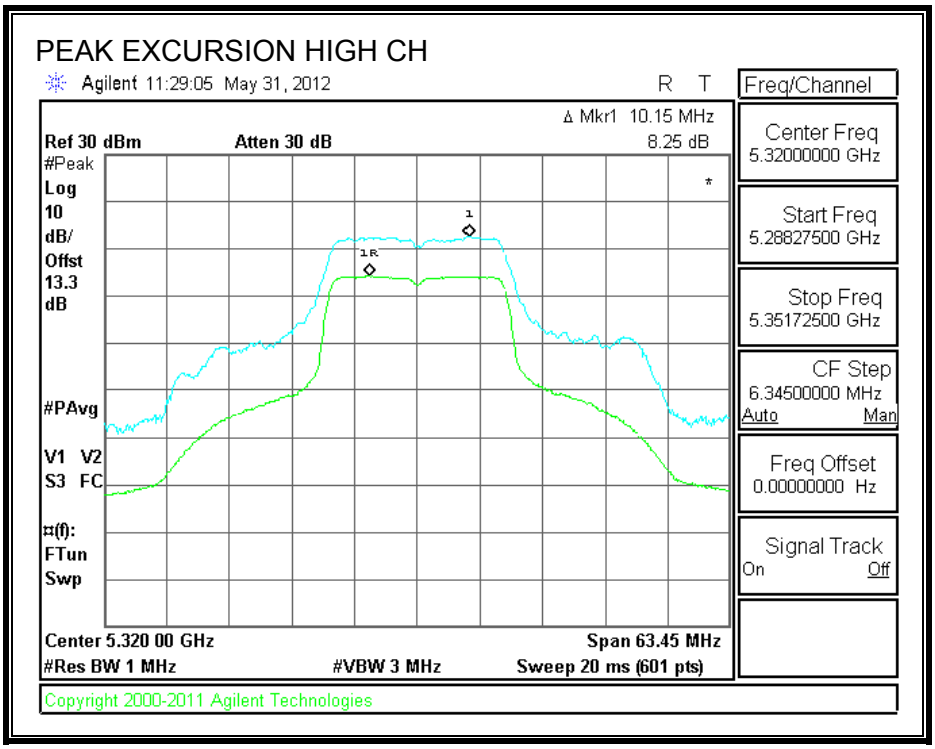
RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5260	8.49	13	-4.5
Mid	5300	8.44	13	-4.6
High	5320	8.25	13	-4.8

PEAK EXCURSION







7.7. 802.11n HT40 MODE IN THE 5.3 GHz BAND

7.7.1. 99% BANDWIDTH

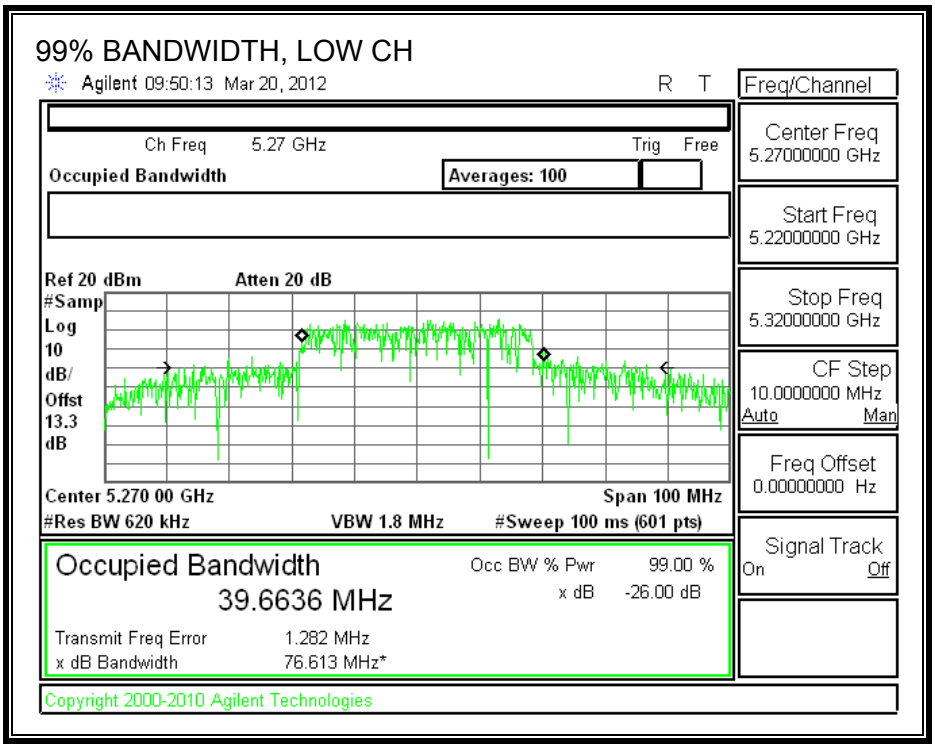
LIMITS

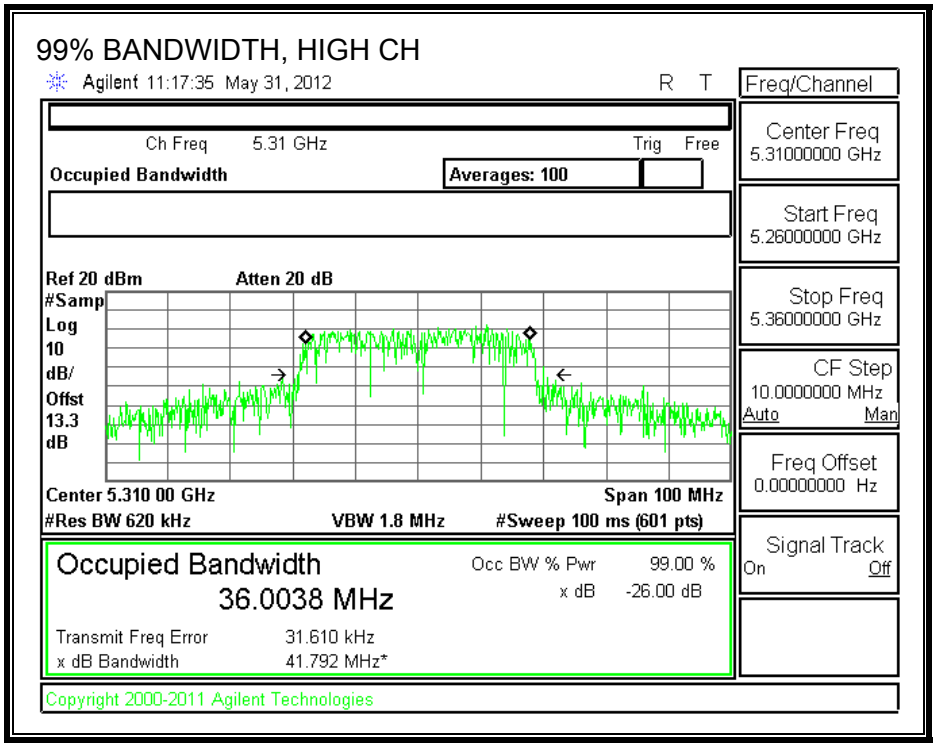
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5270	39.6636
High	5310	36.0038

99% BANDWIDTH





7.7.2. 26 dB BANDWIDTH

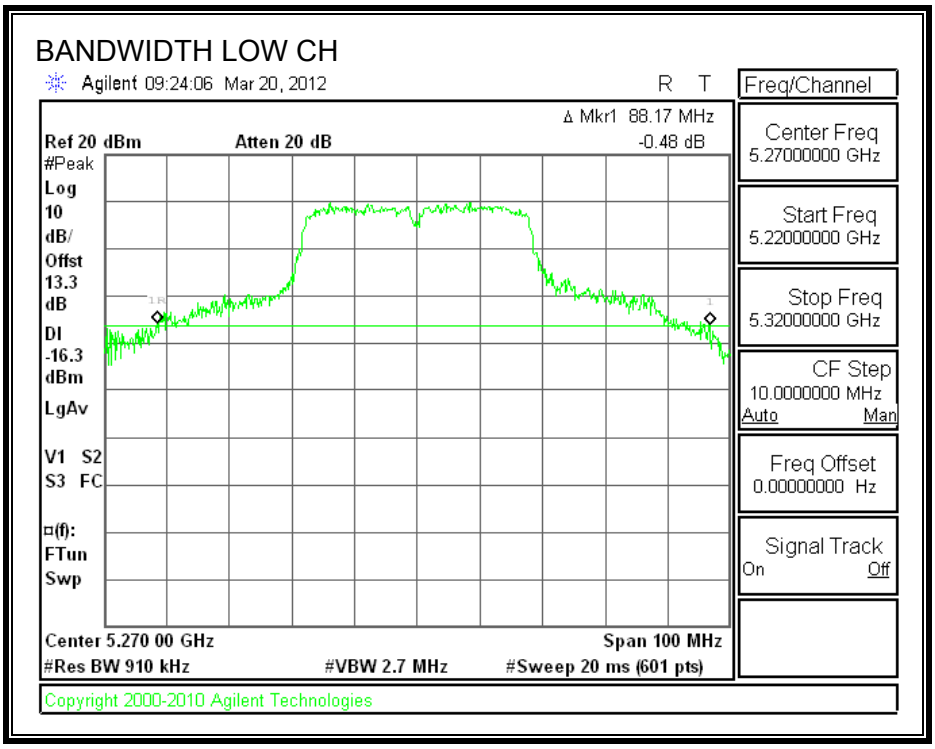
LIMITS

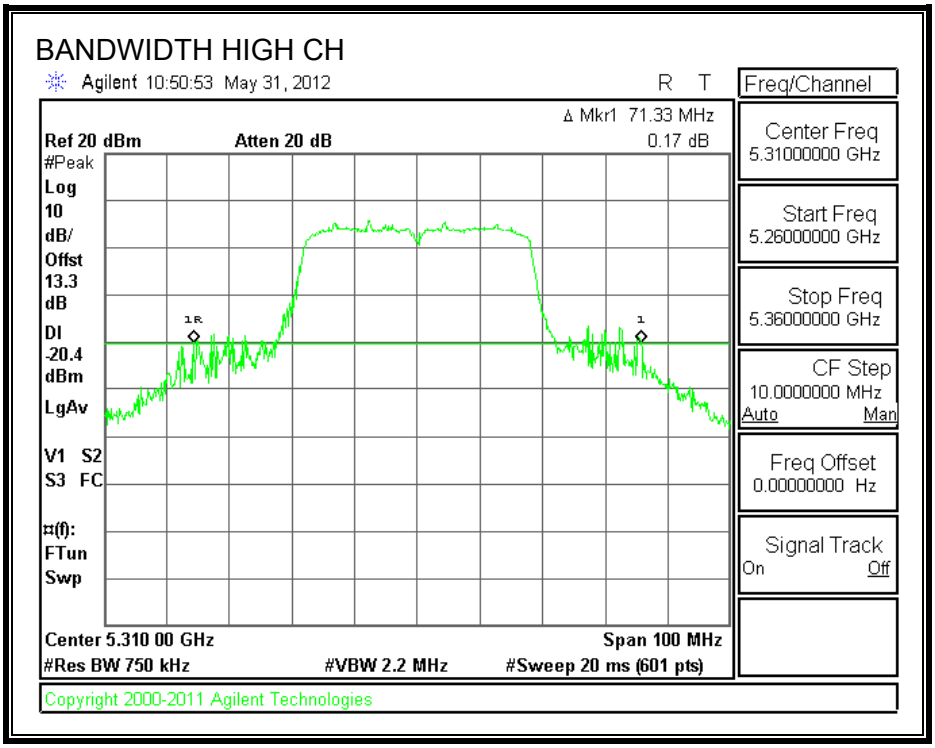
None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5270	88.17
High	5310	71.33

26 dB BANDWIDTH





7.7.3. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (2)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands 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 megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output 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.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5270	24	88.17	30.45	5.60	24.00	11.00
High	5310	24	71.33	29.53	5.60	24.00	11.00

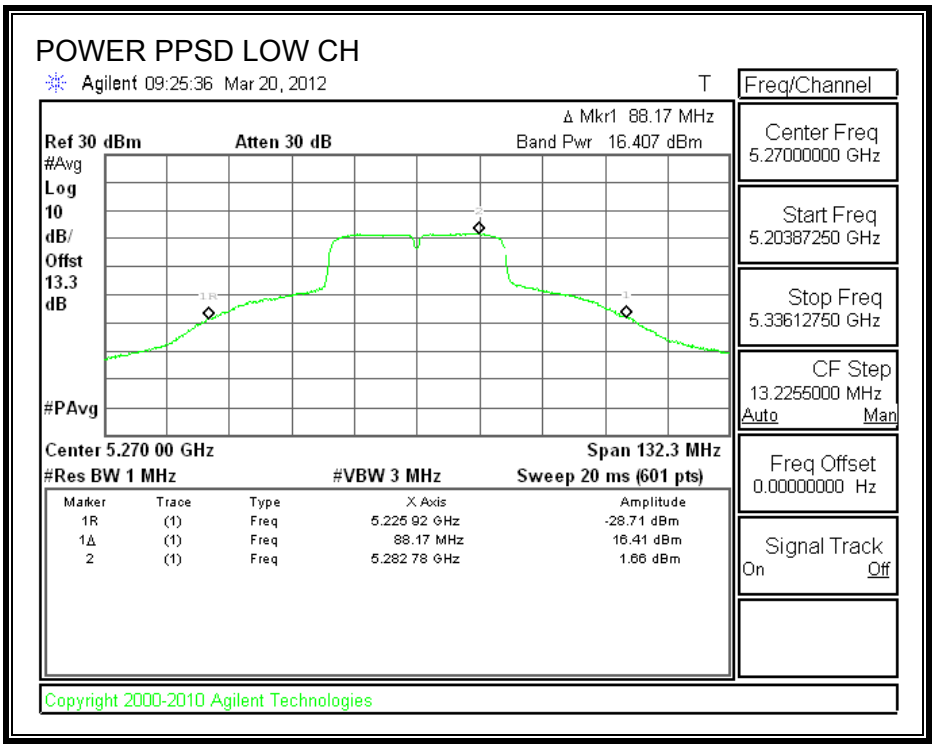
Output Power Results

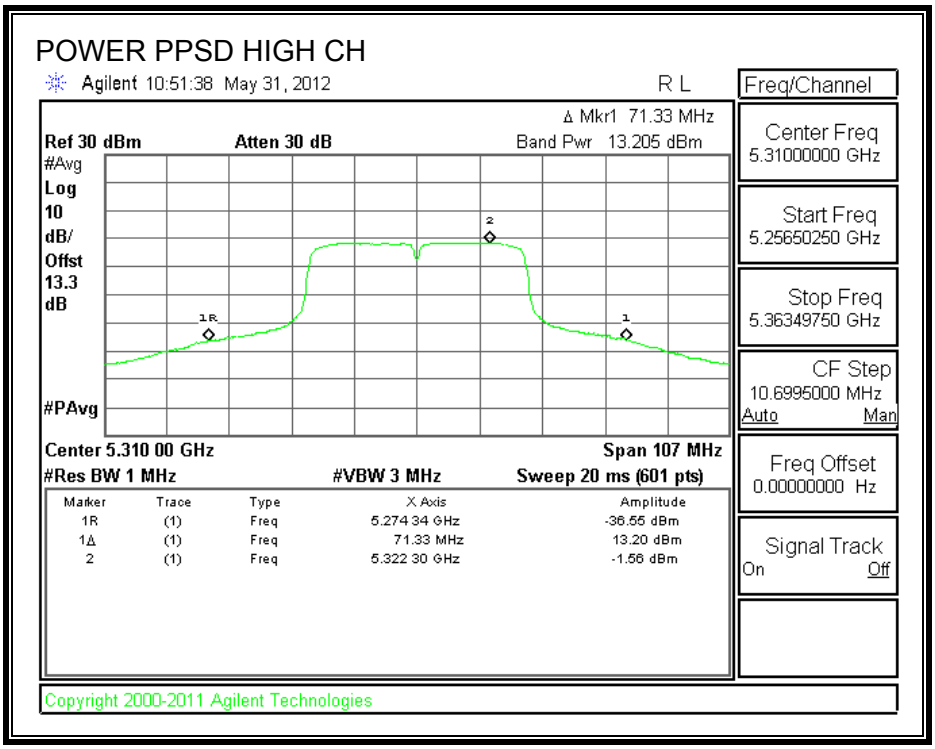
Channel	Frequency (MHz)	Meas Power (dBm)	Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5270	16.407	16.407	24.00	-7.593
High	5310	13.205	13.205	24.00	-10.795

PPSD Results

Channel	Frequency (MHz)	Meas PPSD (dBm)	Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5270	1.66	1.66	11.00	-9.34
High	5310	-1.56	-1.56	11.00	-12.56

OUTPUT POWER AND PPSD





7.7.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 13.3 dB (including 12 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5270	16.0
High	5310	12.6

7.7.5. PEAK EXCURSION

LIMITS

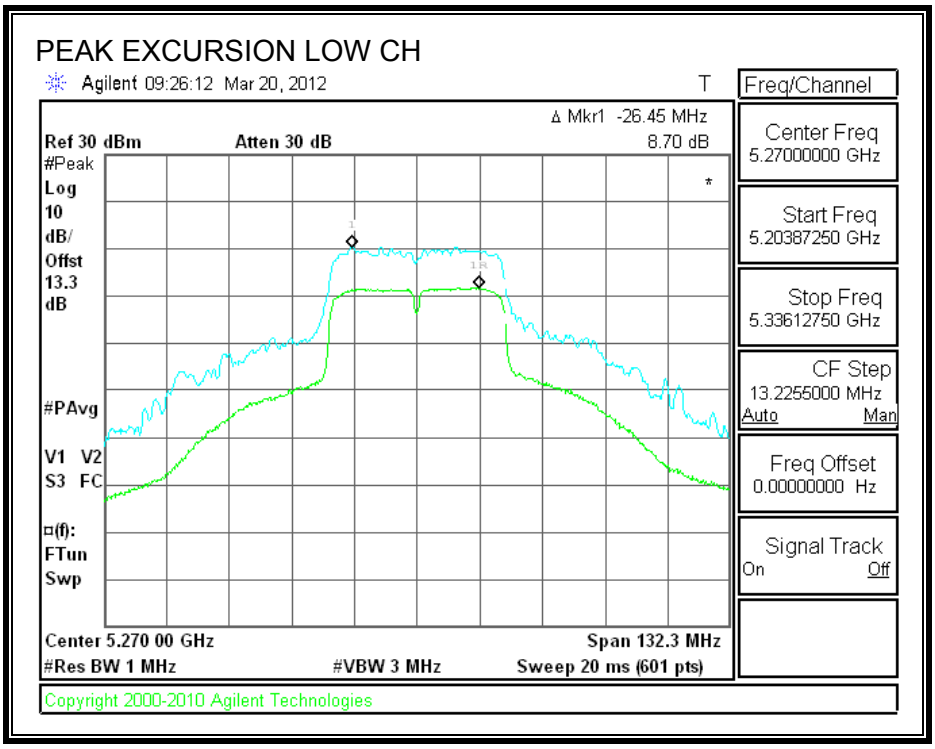
FCC §15.407 (a) (6)

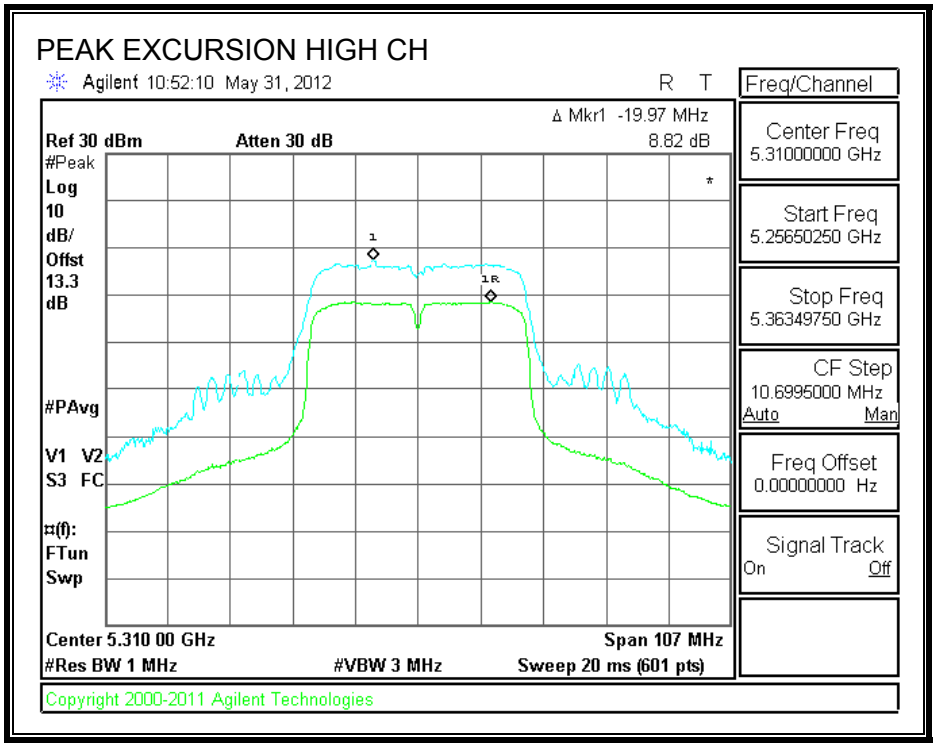
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5270	8.70	13	-4.3
High	5310	8.82	13	-4.2

PEAK EXCURSION





7.8. 802.11a MODE IN THE 5.6 GHz BAND

7.8.1. 99% BANDWIDTH

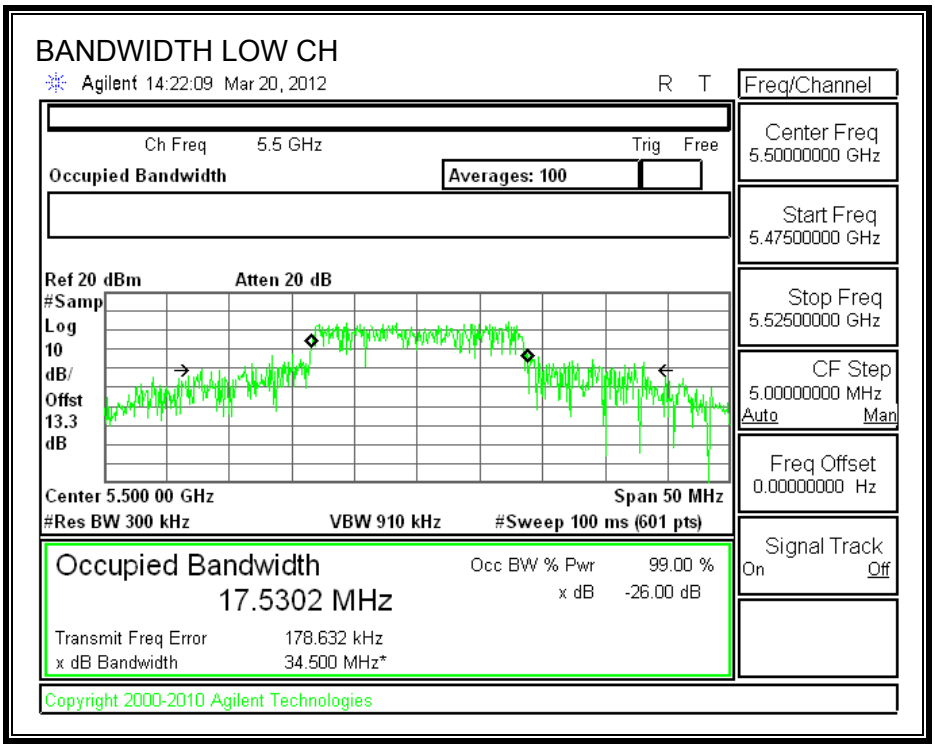
LIMITS

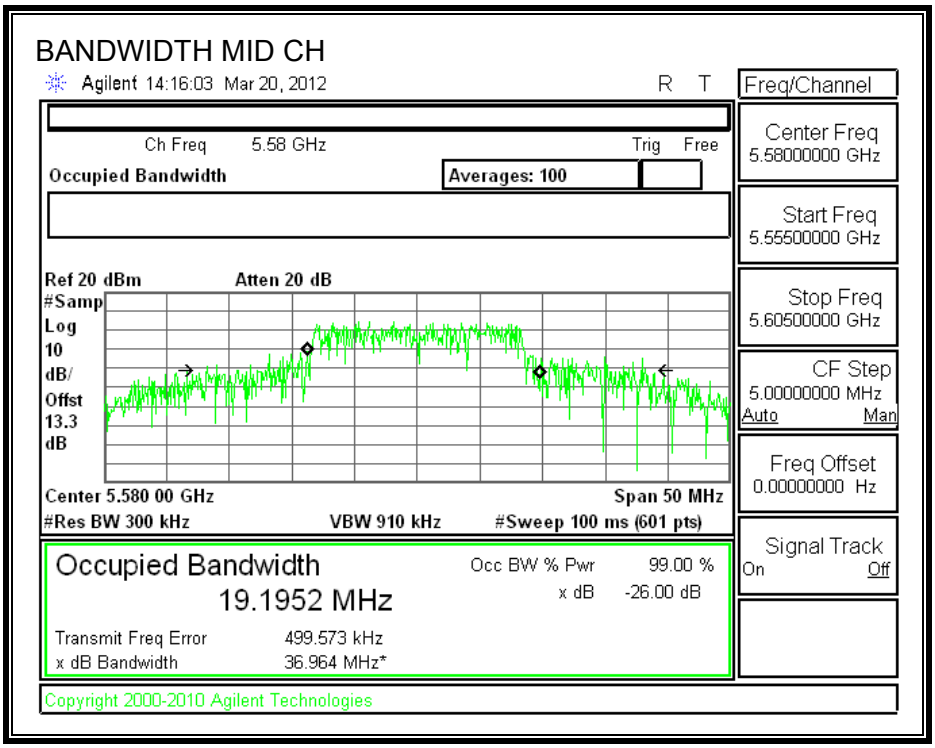
None; for reporting purposes only.

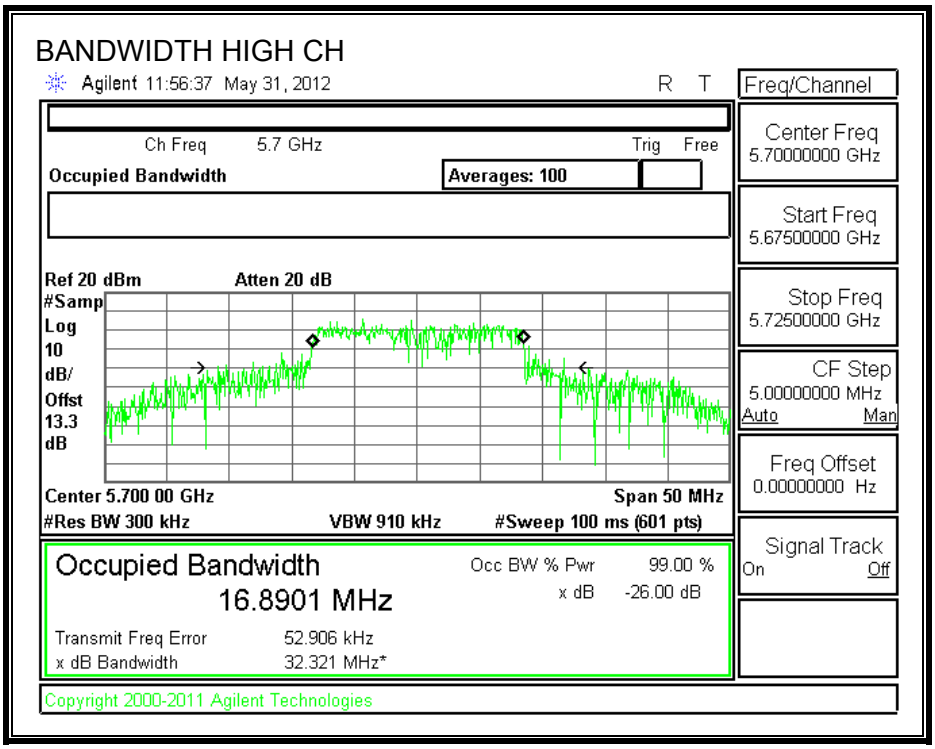
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5500	17.5302
Mid	5580	19.1952
High	5700	16.8901

99% BANDWIDTH







7.8.2. 26 dB BANDWIDTH

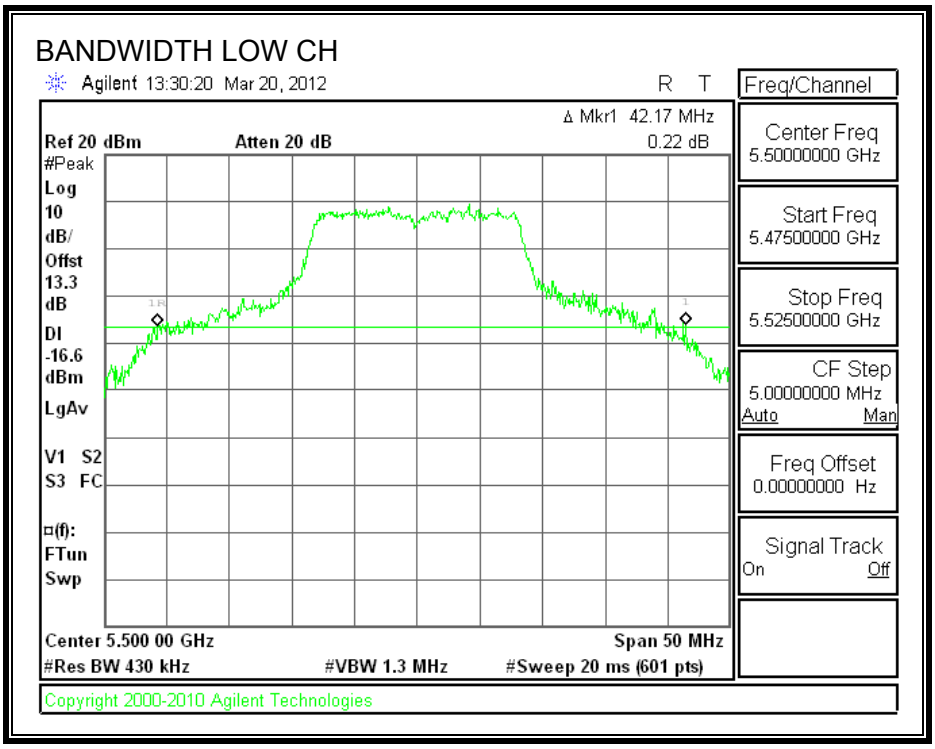
LIMITS

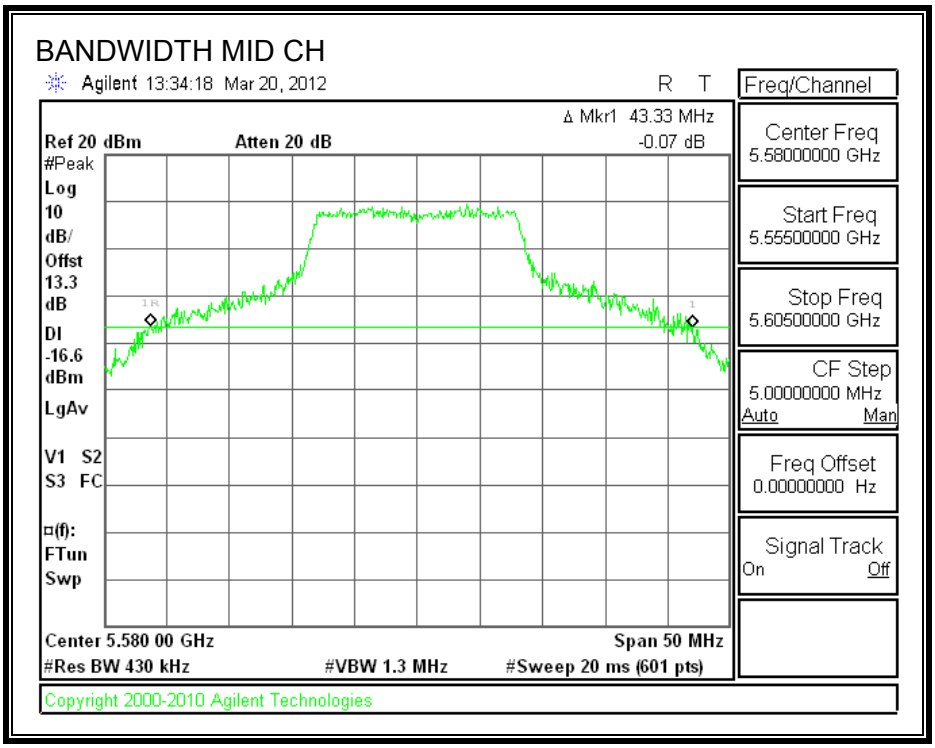
None; for reporting purposes only.

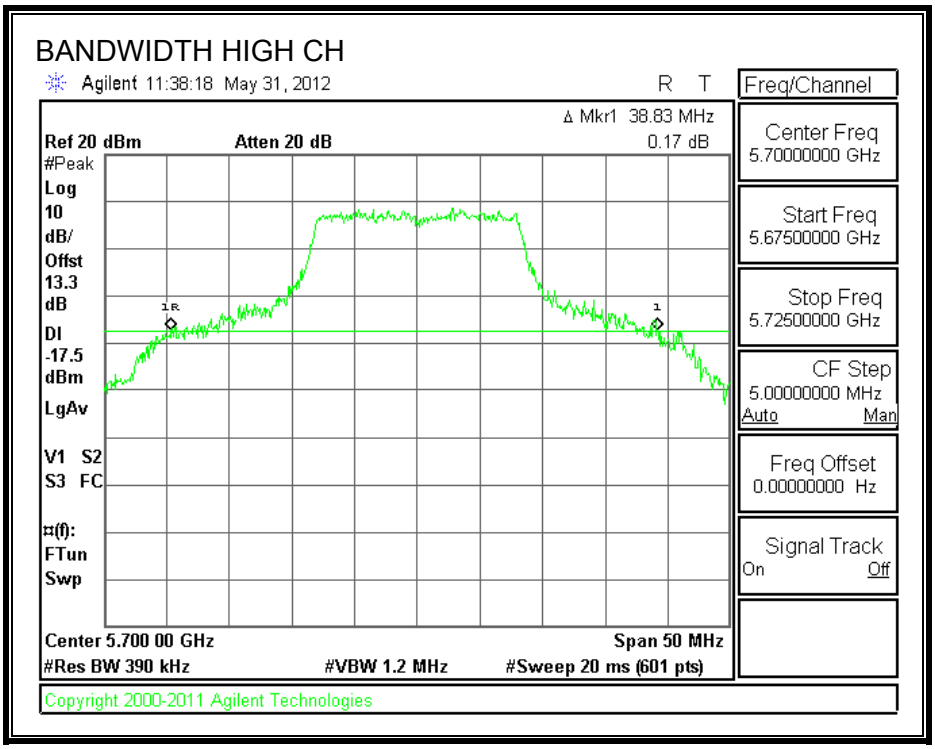
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5500	42.17
Mid	5580	43.33
High	5700	38.83

26 dB BANDWIDTH







7.8.3. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (3)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands 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 megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output 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.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5500	24	42.17	27.25	5.30	24.00	11.00
Mid	5580	24	43.33	27.37	5.30	24.00	11.00
High	5700	24	38.83	26.89	5.30	24.00	11.00

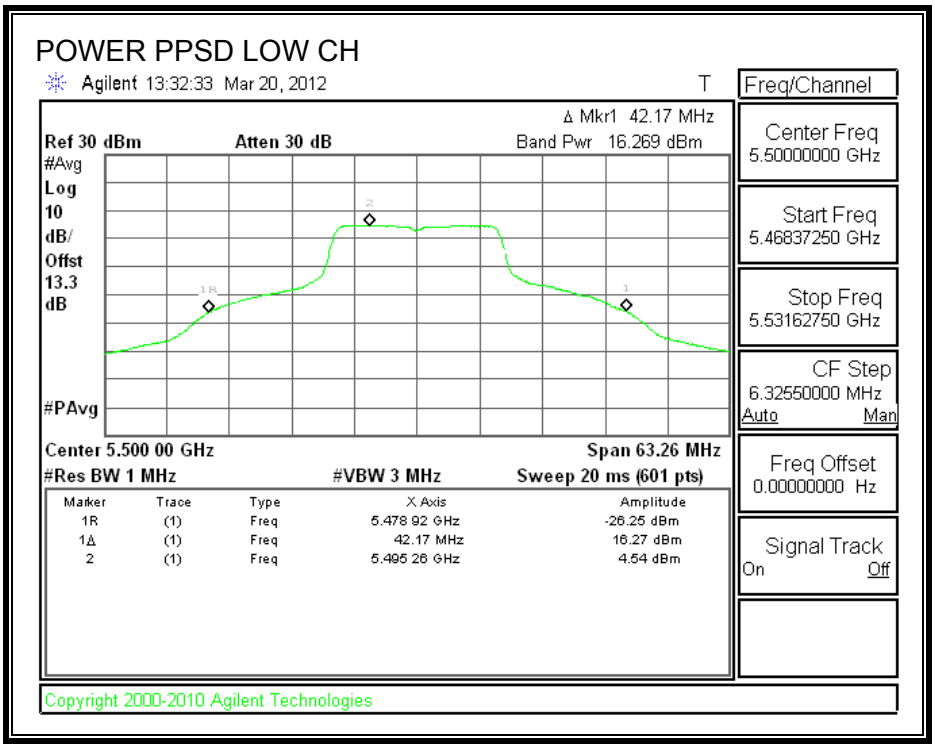
Output Power Results

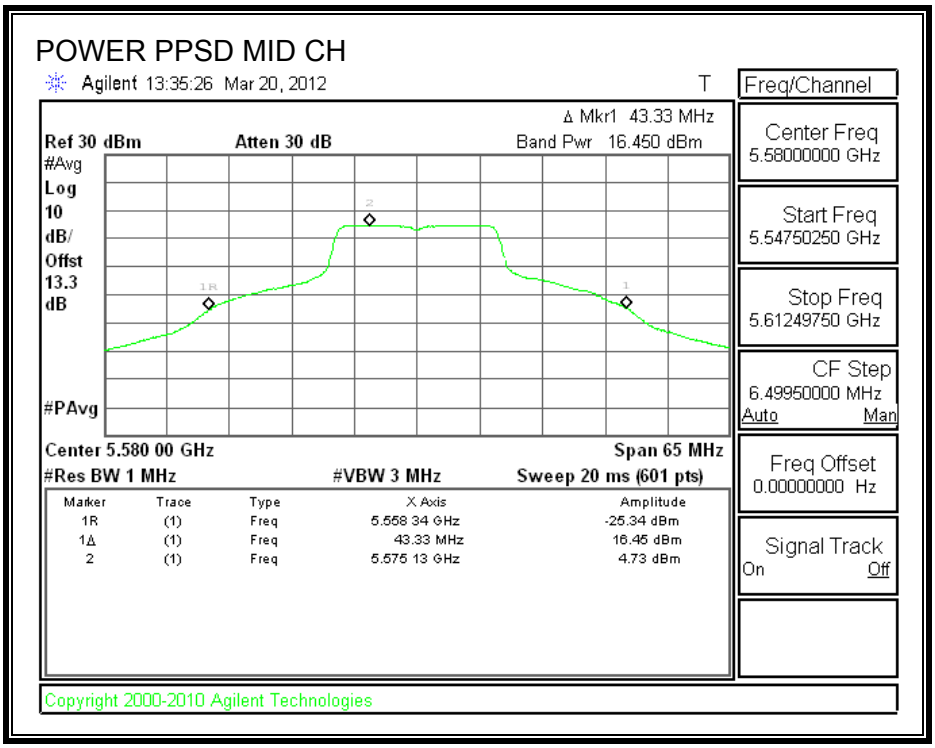
Channel	Frequency (MHz)	Meas Power (dBm)	Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	16.269	16.269	24.00	-7.731
Mid	5580	16.450	16.450	24.00	-7.550
High	5700	16.161	16.161	24.00	-7.839

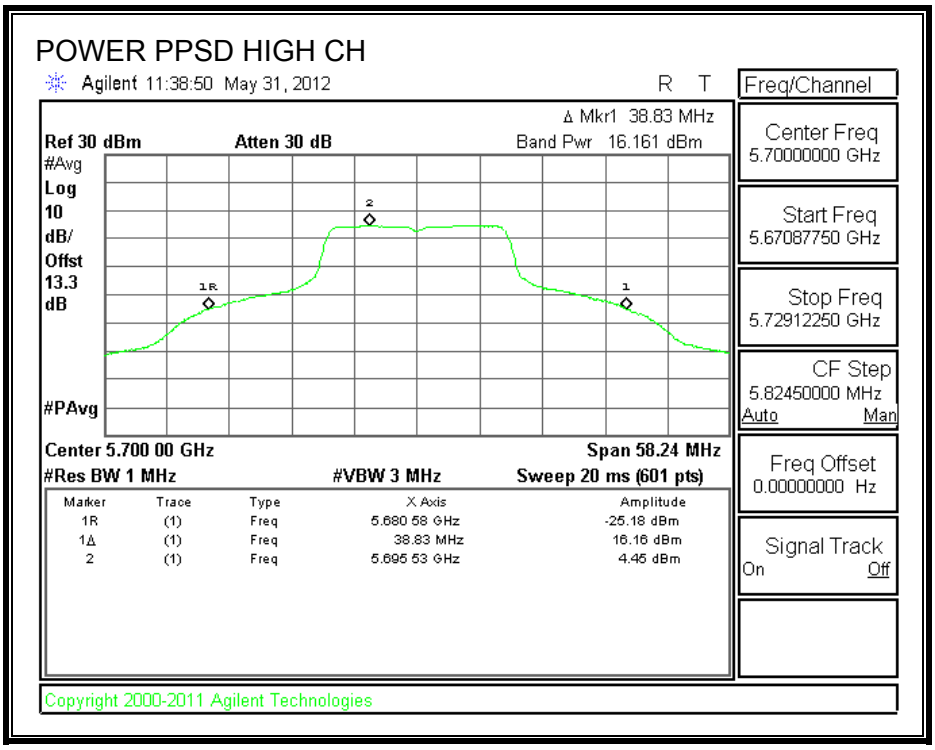
PPSD Results

Channel	Frequency (MHz)	Meas PPSD (dBm)	Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5500	4.54	4.54	11.00	-6.46
Mid	5580	4.73	4.73	11.00	-6.27
High	5700	4.45	4.45	11.00	-6.55

OUTPUT POWER AND PPSD







7.8.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 13.3 dB (including 12 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5500	16.0
Mid	5580	16.0
High	5700	16.0

7.8.5. PEAK EXCURSION

LIMITS

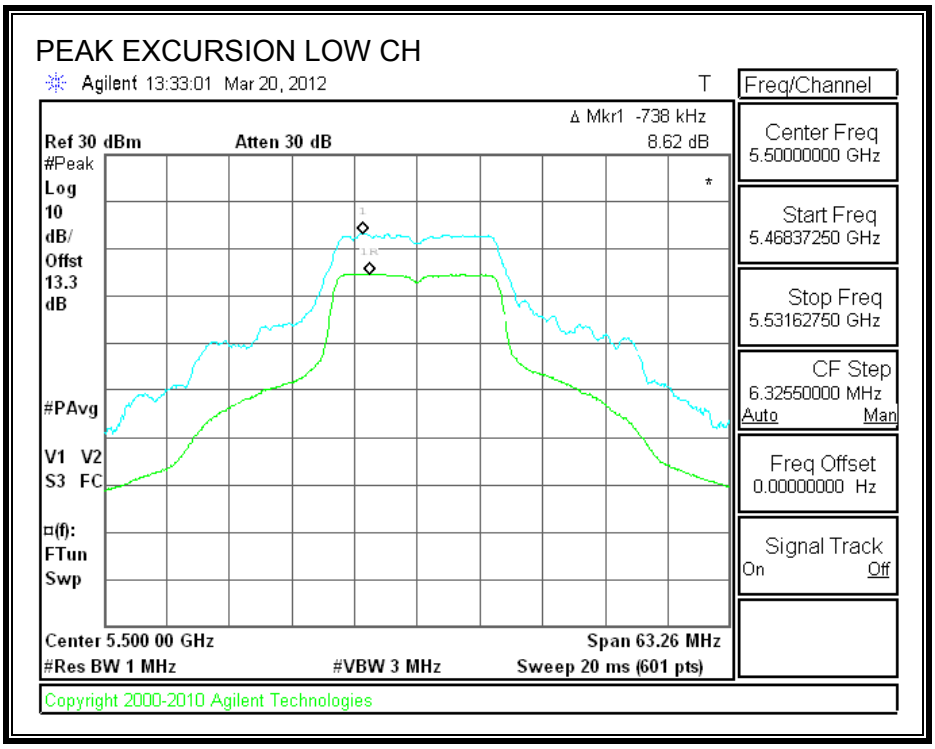
FCC §15.407 (a) (6)

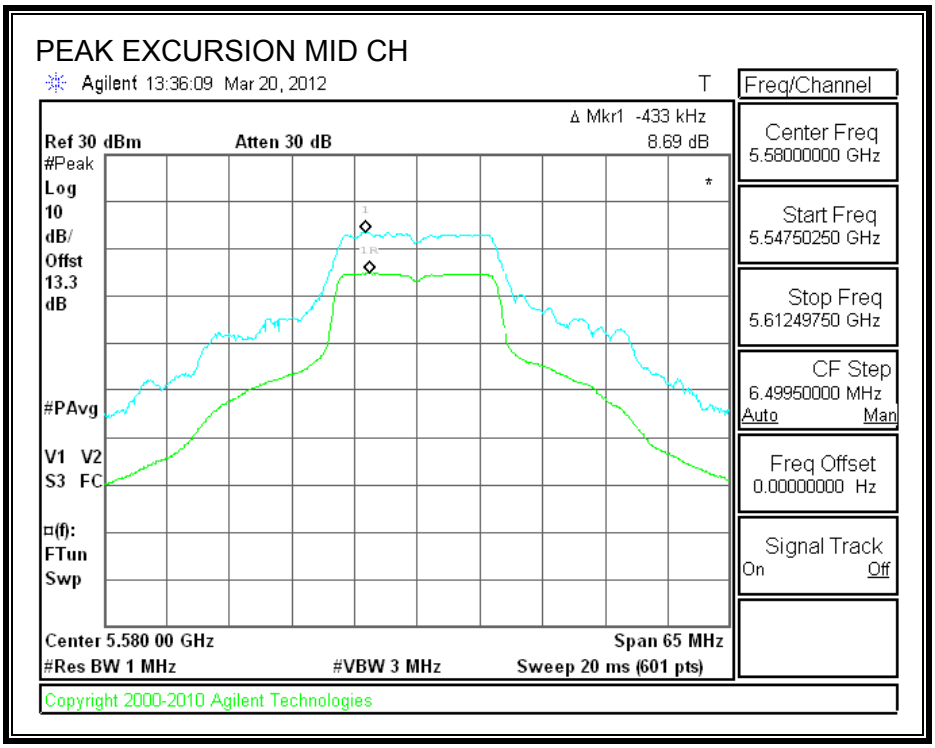
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

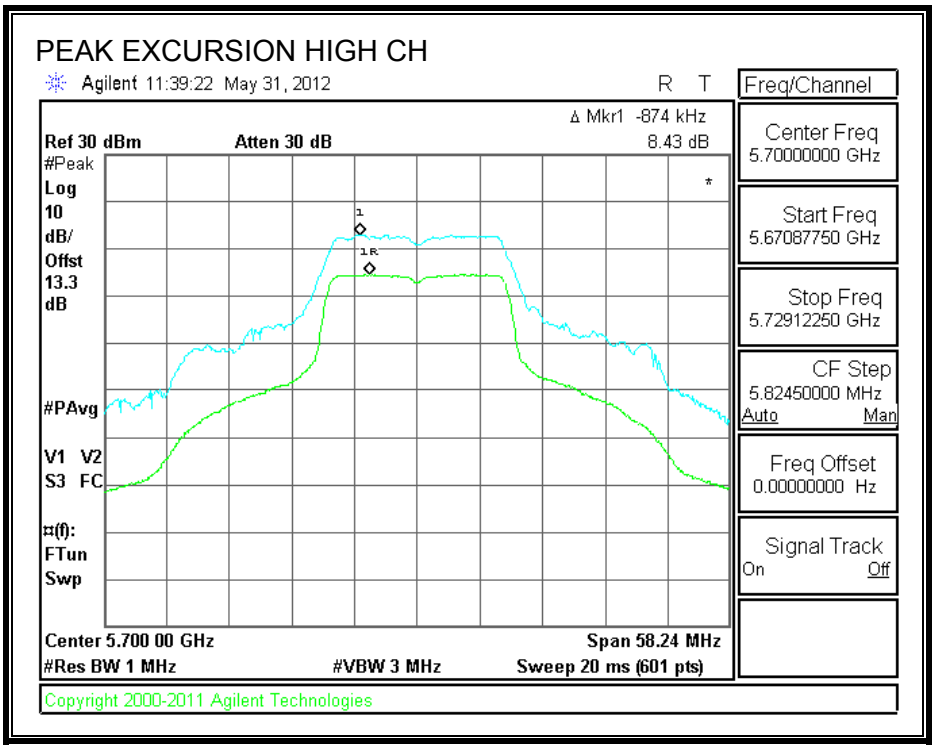
RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	8.62	13	-4.4
Mid	5580	8.69	13	-4.3
High	5700	8.43	13	-4.6

PEAK EXCURSION







7.9. 802.11n HT20 MODE IN THE 5.6 GHz BAND

7.9.1. 99% BANDWIDTH

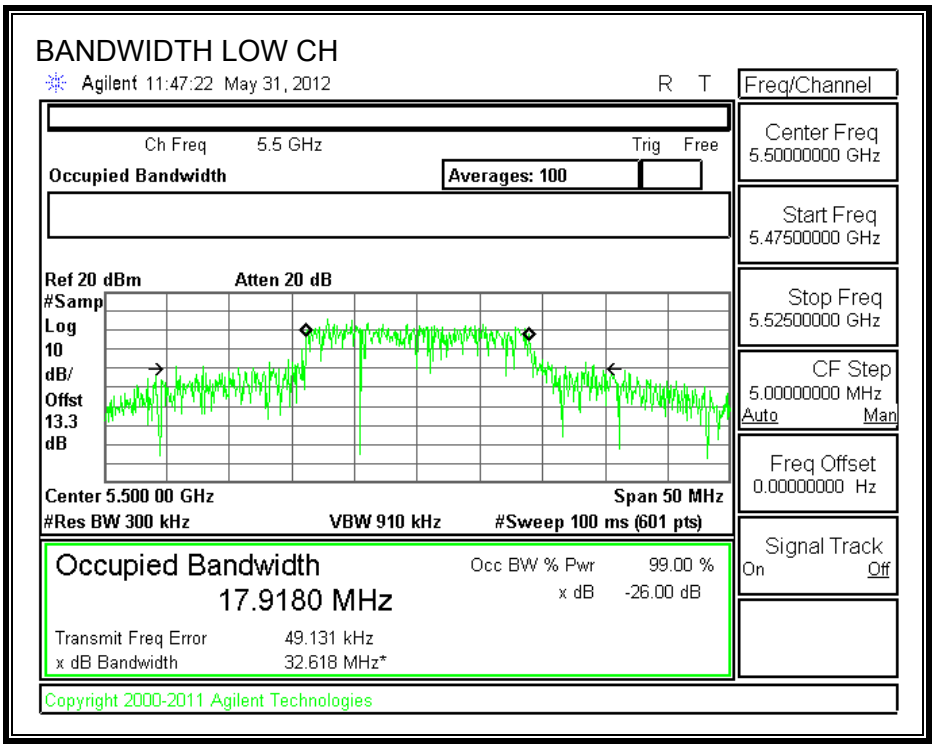
LIMITS

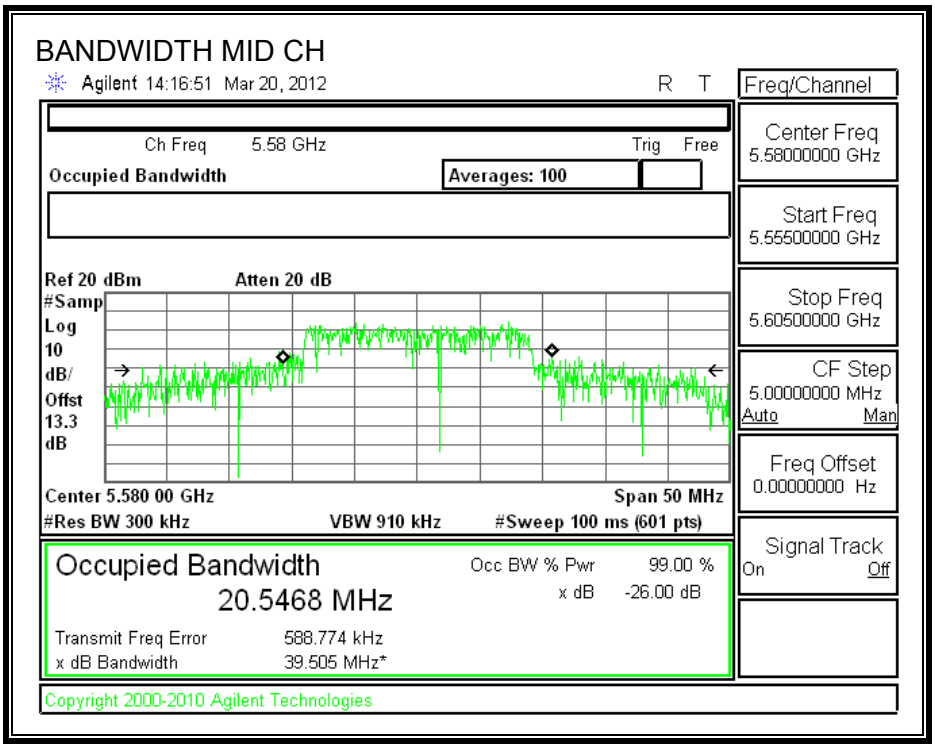
None; for reporting purposes only.

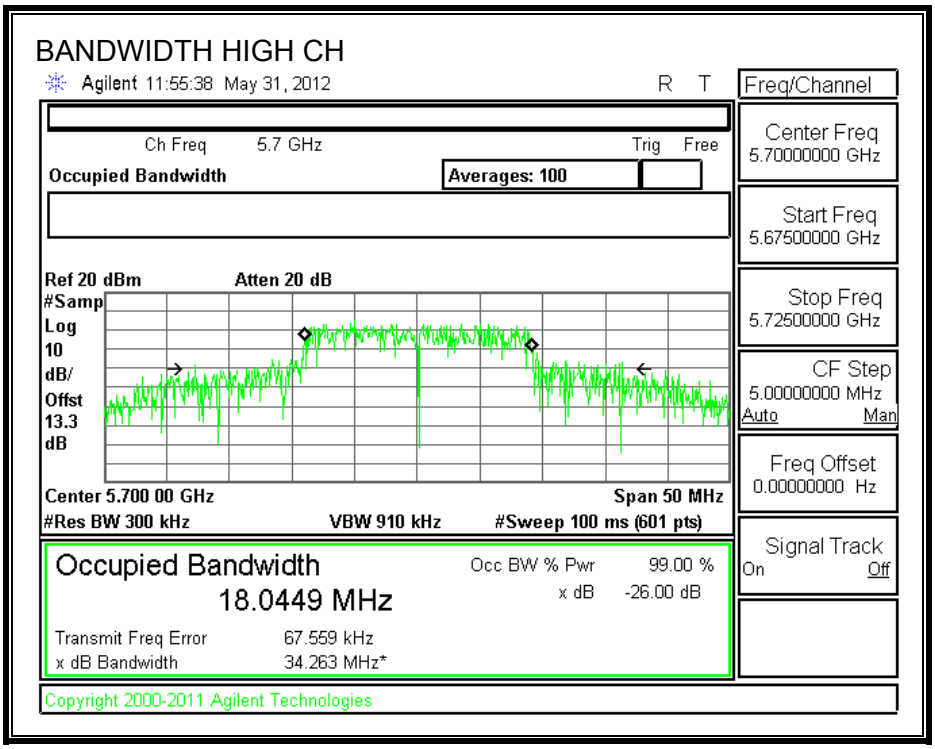
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5500	17.9180
Mid	5580	20.5468
High	5700	18.0049

99% BANDWIDTH







7.9.2. 26 dB BANDWIDTH

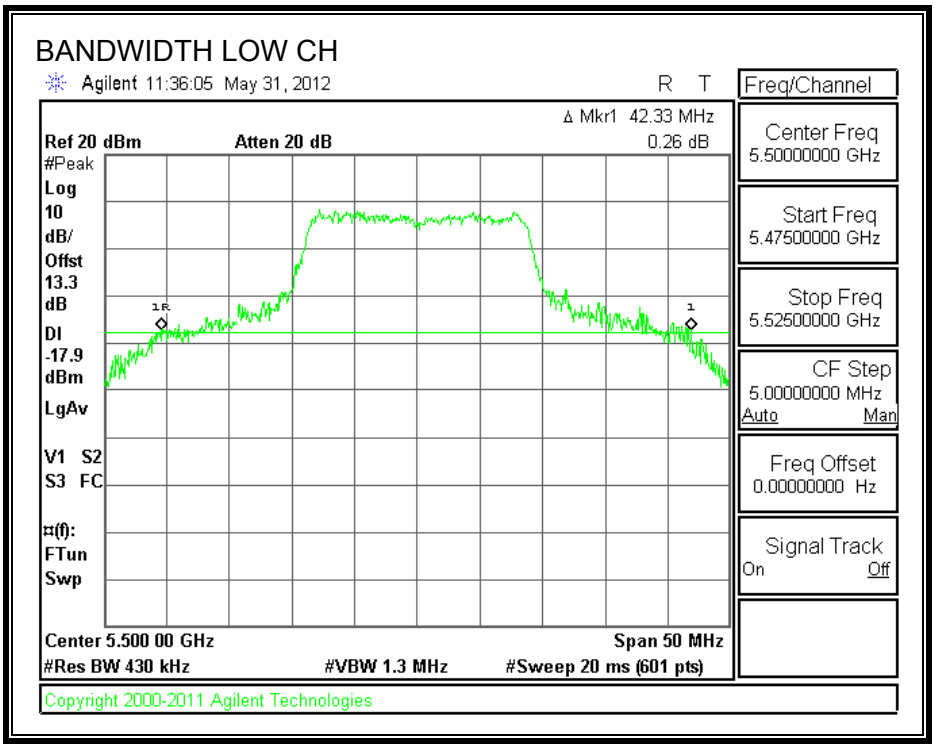
LIMITS

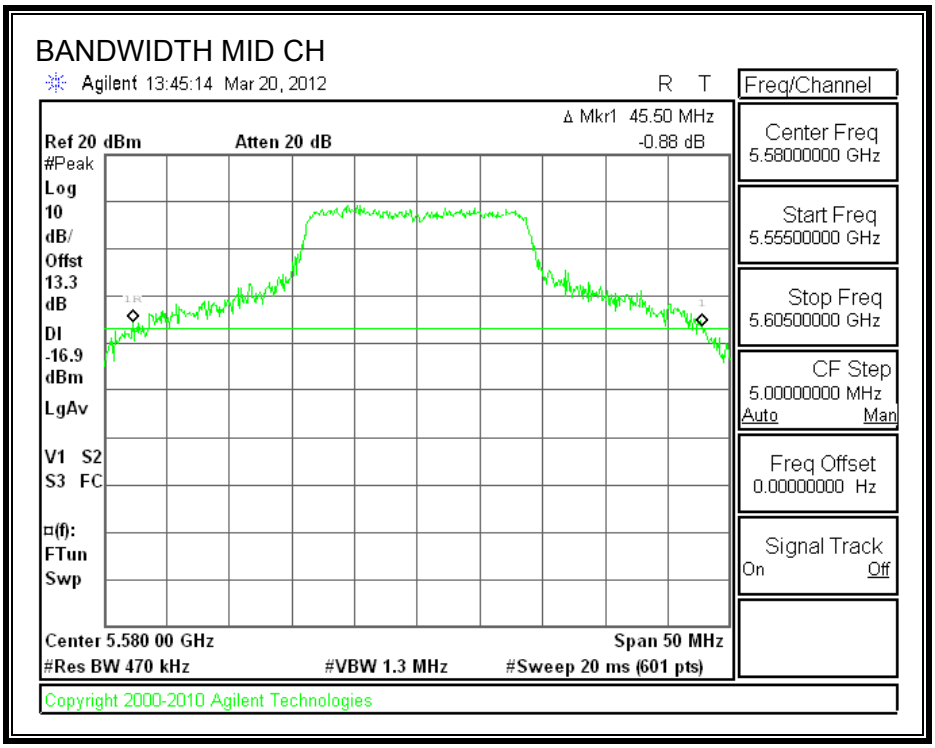
None; for reporting purposes only.

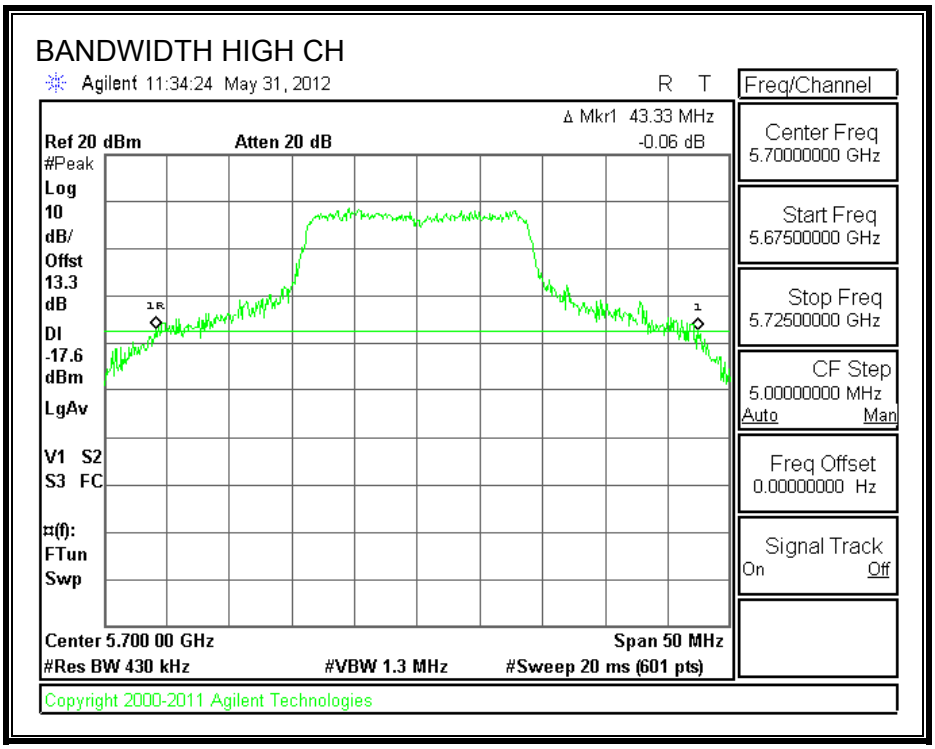
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5500	42.33
Mid	5580	45.50
High	5700	43.30

26 dB BANDWIDTH







7.9.3. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (3)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands 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 megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output 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.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5500	24	42.33	27.27	5.30	24.00	11.00
Mid	5580	24	45.50	27.58	5.30	24.00	11.00
High	5700	24	43.33	27.37	5.30	24.00	11.00

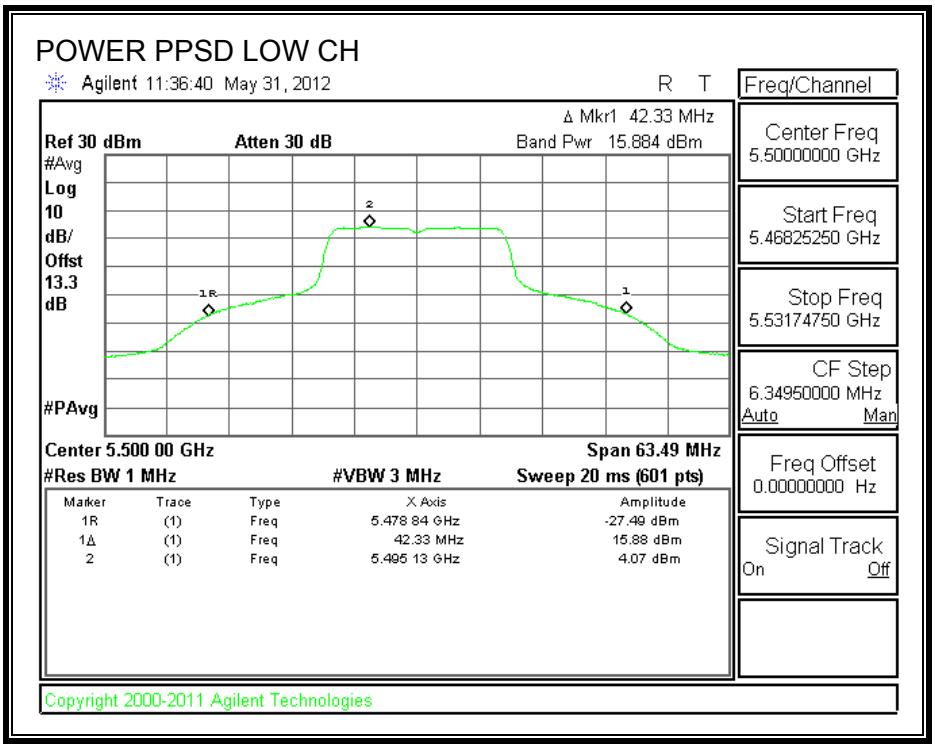
Output Power Results

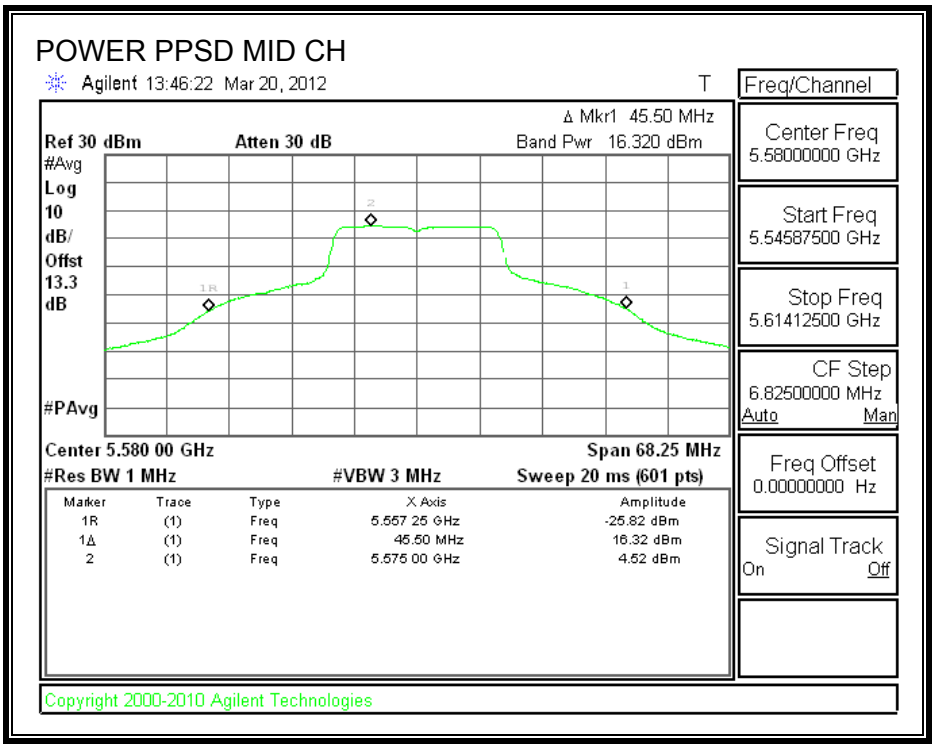
Channel	Frequency (MHz)	Meas Power (dBm)	Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	15.884	15.884	24.00	-8.116
Mid	5580	16.320	16.320	24.00	-7.680
High	5700	16.139	16.139	24.00	-7.861

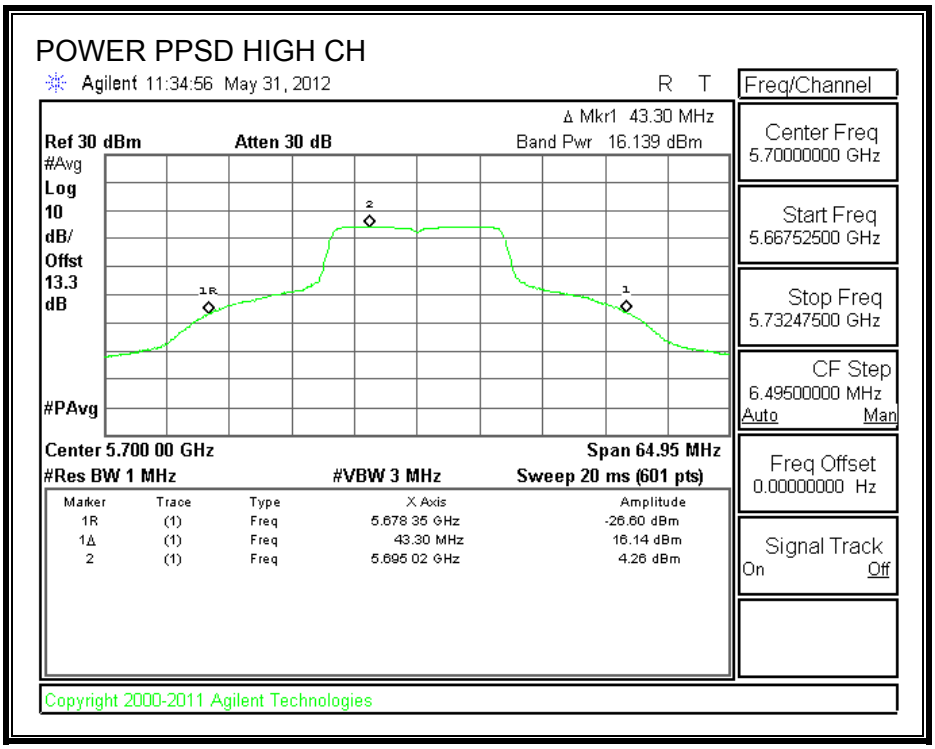
PPSD Results

Channel	Frequency (MHz)	Meas PPSD (dBm)	Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5500	4.07	4.07	11.00	-6.93
Mid	5580	4.52	4.52	11.00	-6.48
High	5700	4.26	4.26	11.00	-6.74

OUTPUT POWER AND PPSD







7.9.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 13.3 dB (including 12 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5500	16.0
Mid	5580	16.0
High	5700	16.0

7.9.5. PEAK EXCURSION

LIMITS

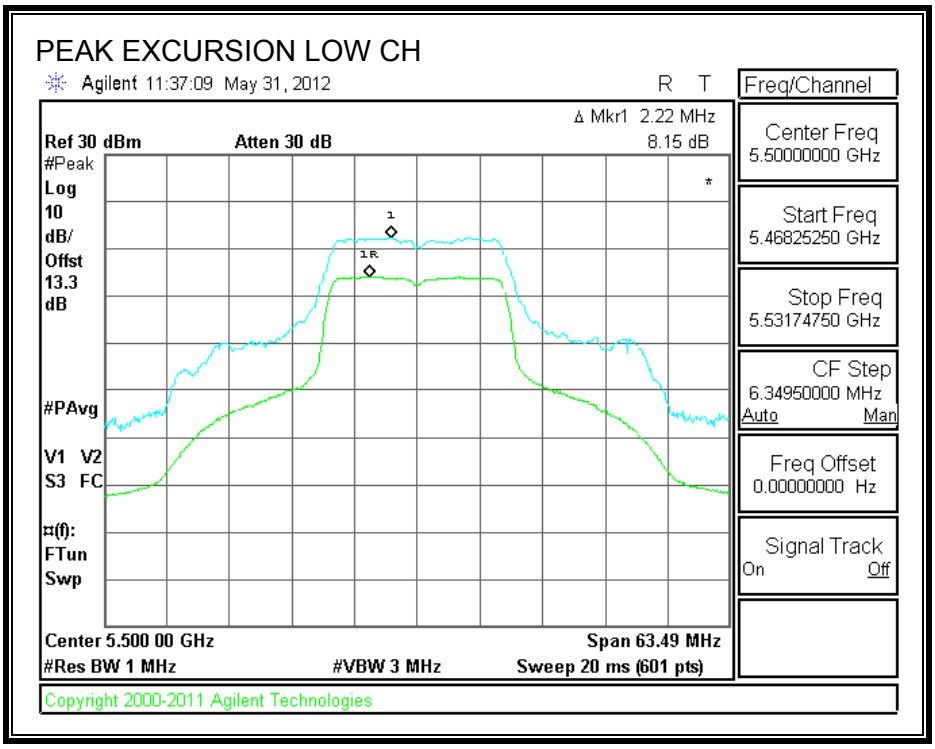
FCC §15.407 (a) (6)

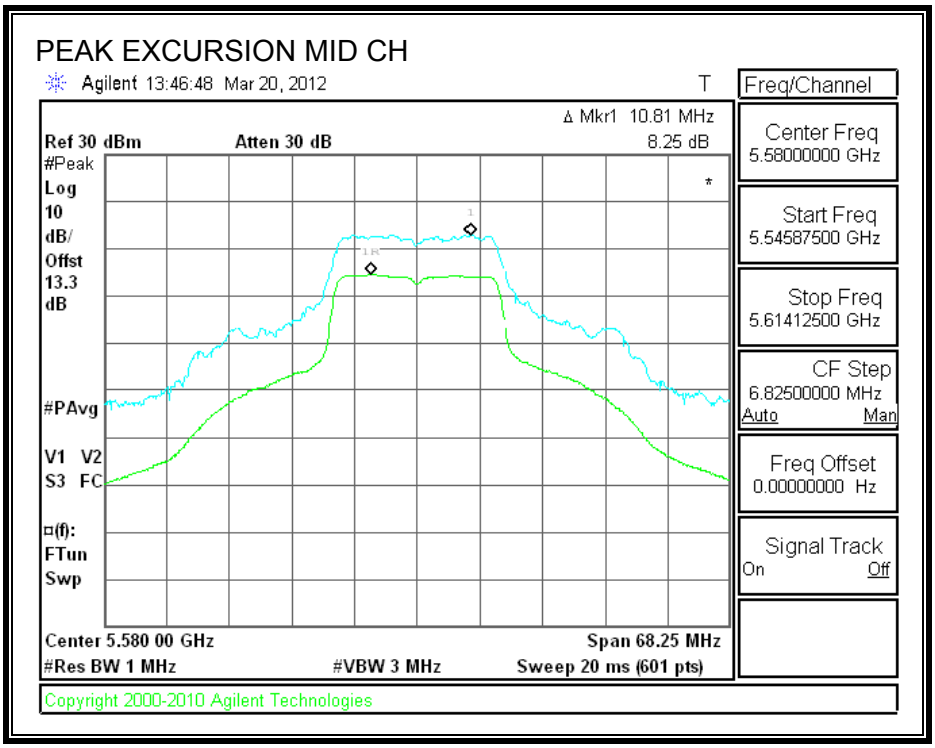
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

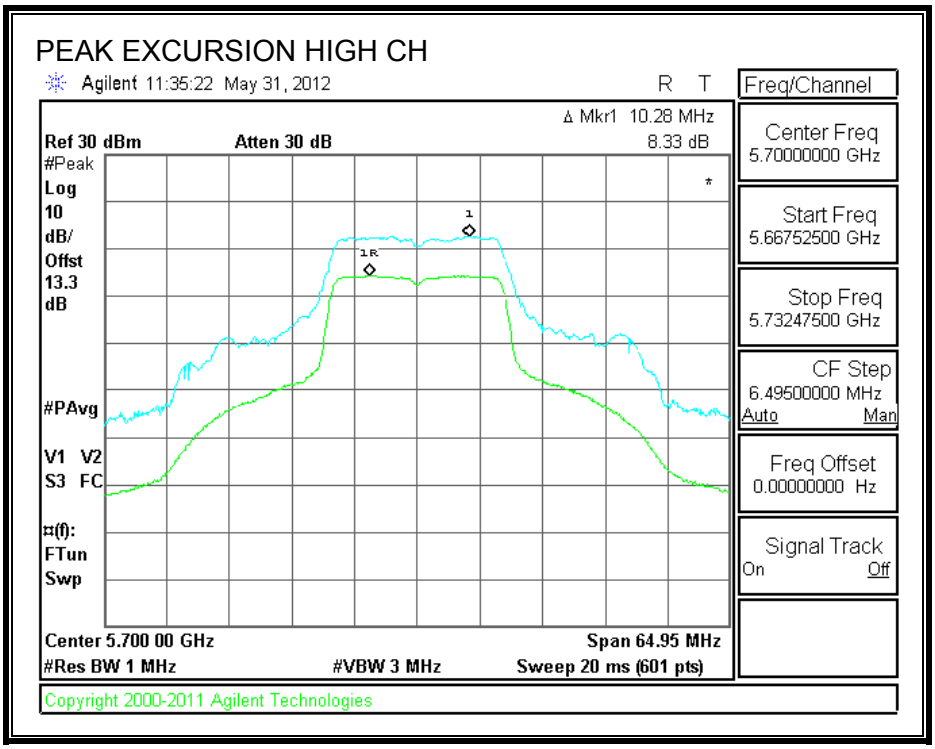
RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5500	8.15	13	-4.9
Mid	5580	8.25	13	-4.8
High	5700	8.33	13	-4.7

PEAK EXCURSION







7.10. 802.11n HT40 MODE IN THE 5.6 GHz BAND

7.10.1. 99% BANDWIDTH

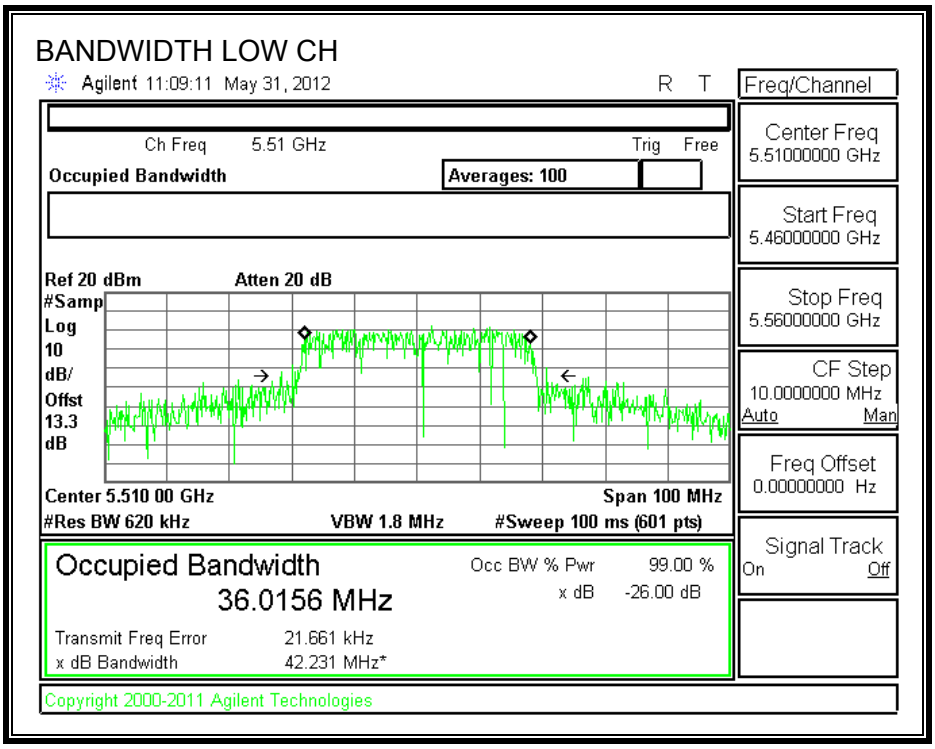
LIMITS

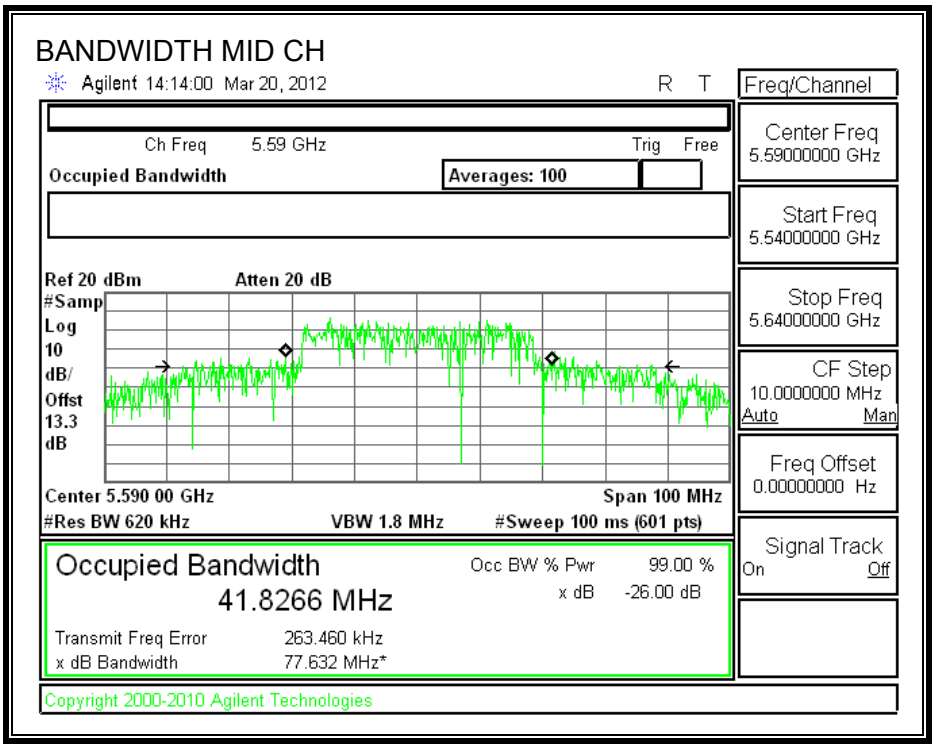
None; for reporting purposes only.

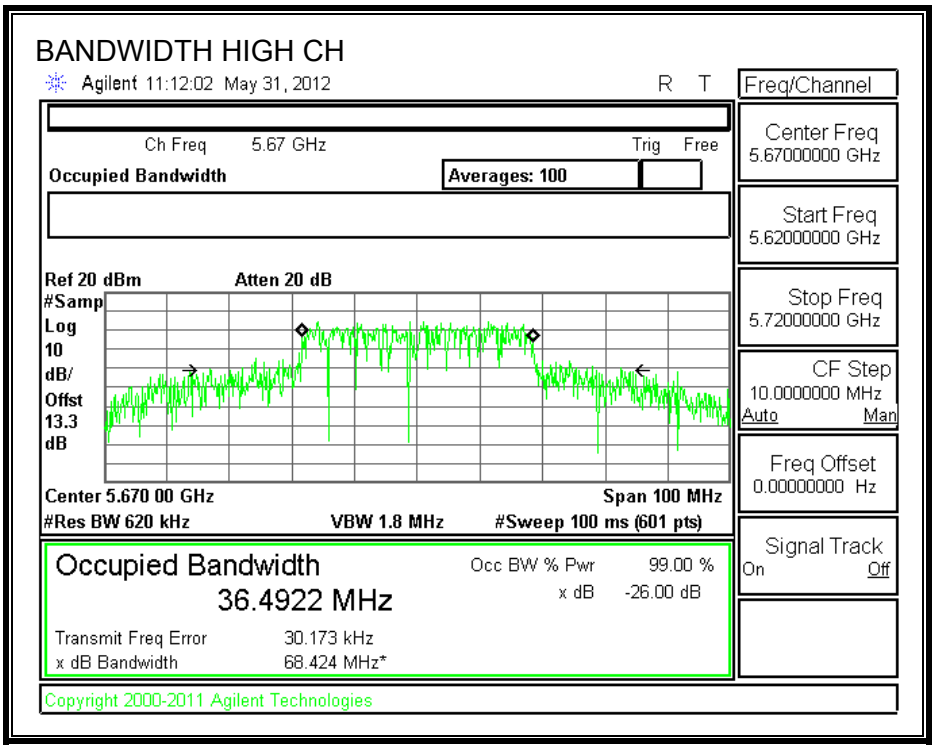
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5510	36.0156
Mid	5550	41.8266
High	5670	36.4922

99% BANDWIDTH







7.10.2. 26 dB BANDWIDTH

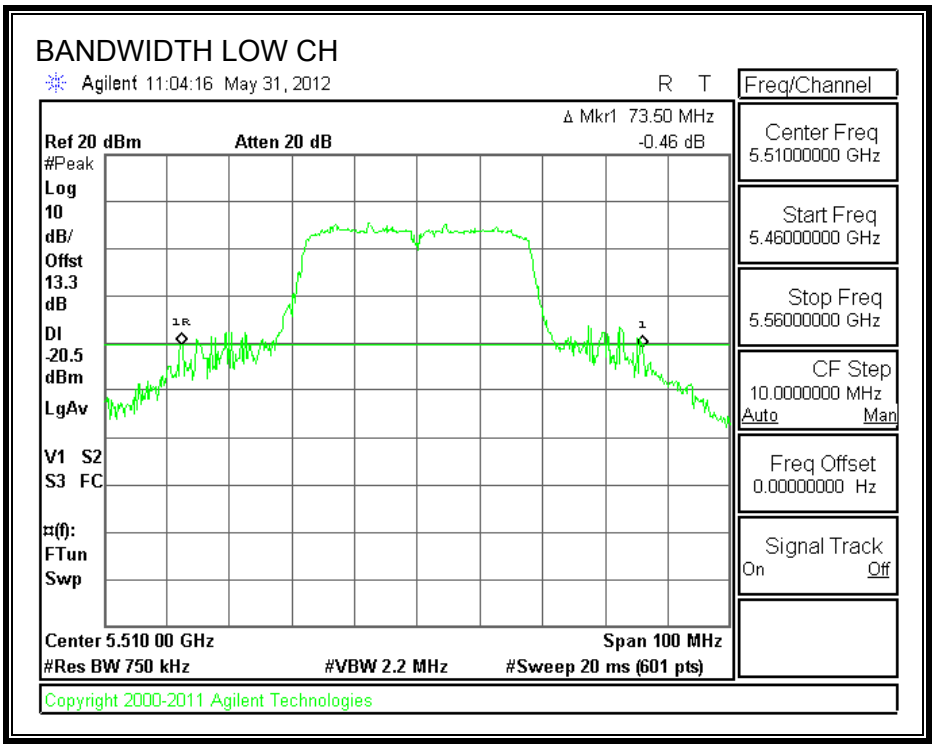
LIMITS

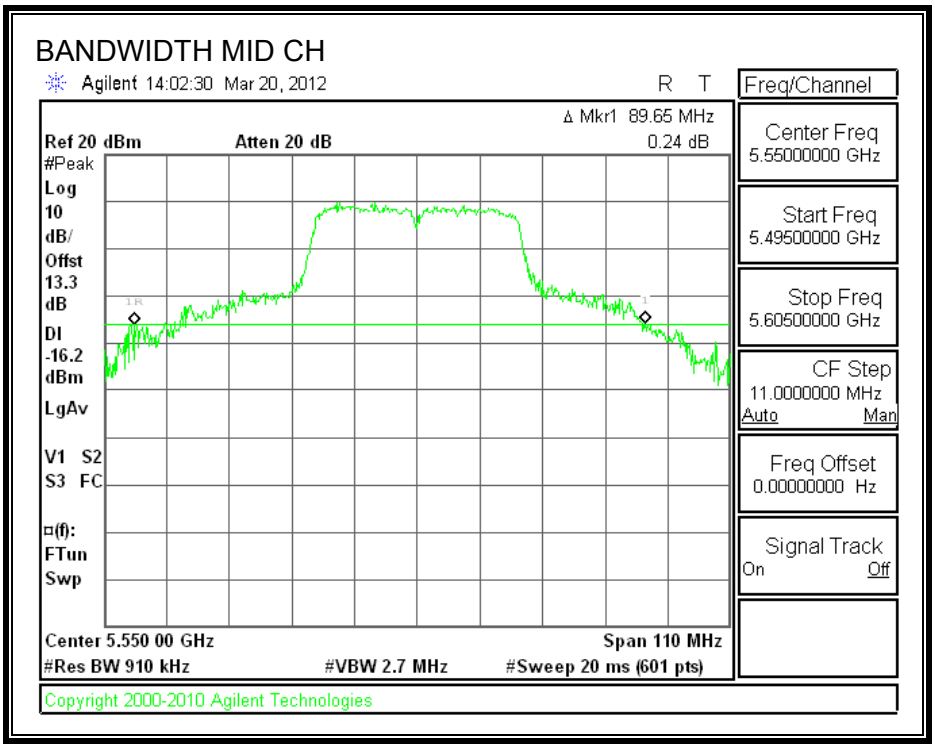
None; for reporting purposes only.

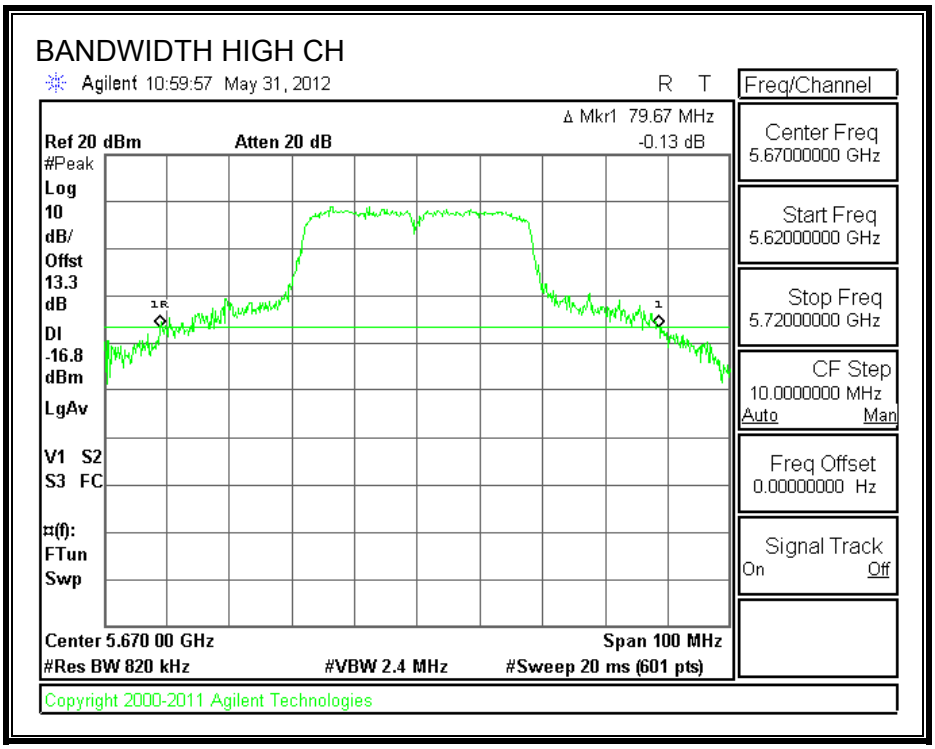
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5510	73.50
Mid	5550	89.65
High	5670	79.67

26 dB BANDWIDTH







7.10.3. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (2)

IC RSS-210 A9.2 (3)

For the 5.25–5.35 GHz and 5.47–5.725 GHz bands, the maximum conducted output power over the frequency bands 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 megahertz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output 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.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	11 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5510	24	73.50	29.66	5.30	24.00	11.00
Mid	5550	24	89.65	30.53	5.30	24.00	11.00
High	5670	24	79.70	30.01	5.30	24.00	11.00

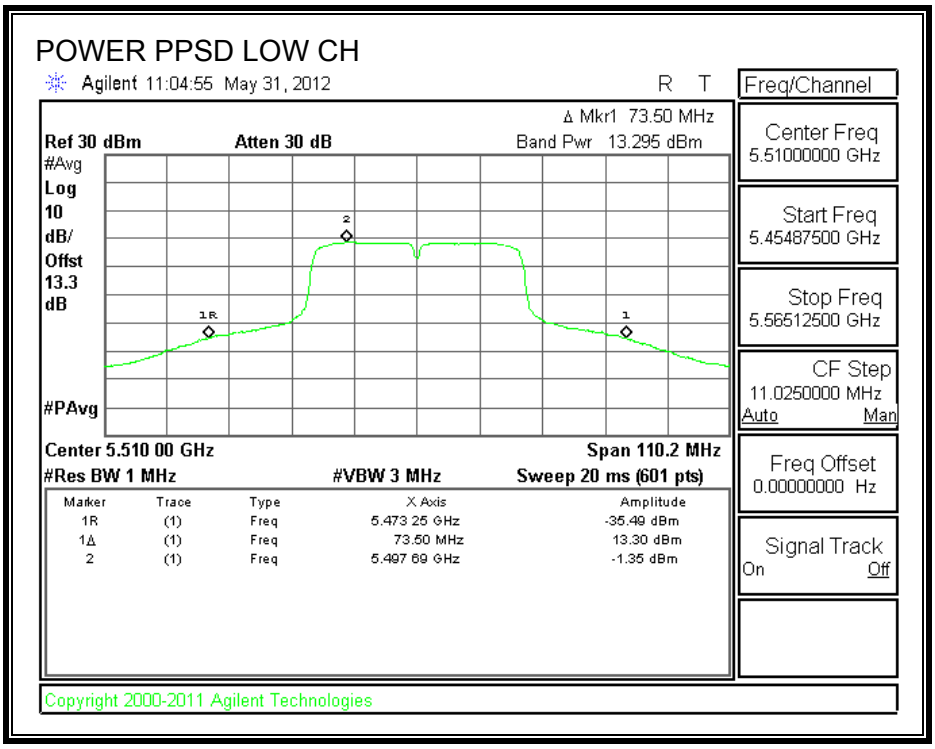
Output Power Results

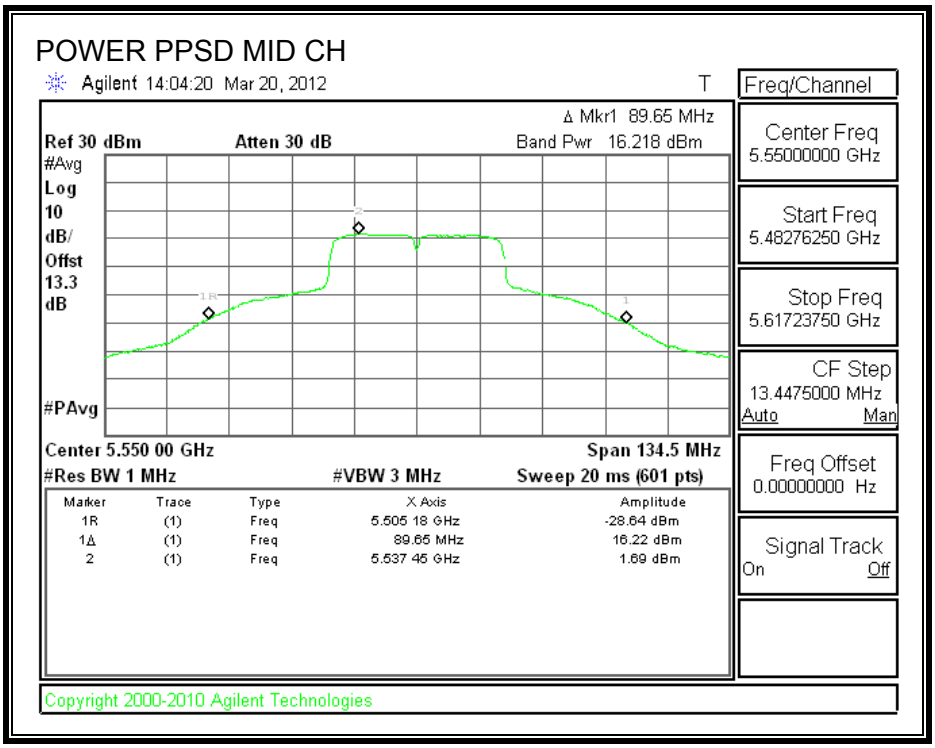
Channel	Frequency (MHz)	Meas Power (dBm)	Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5510	13.295	13.295	24.00	-10.705
Mid	5550	16.218	16.218	24.00	-7.782
High	5670	16.145	16.145	24.00	-7.855

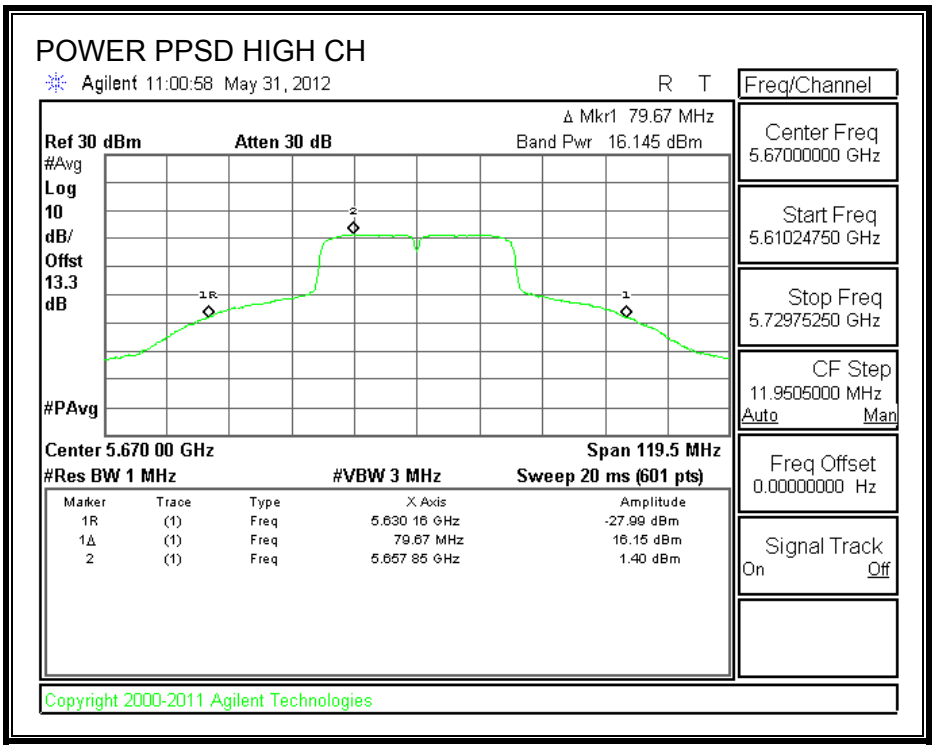
PPSD Results

Channel	Frequency (MHz)	Meas PPSD (dBm)	Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5510	-1.35	-1.35	11.00	-12.35
Mid	5550	1.69	1.69	11.00	-9.31
High	5670	1.40	1.40	11.00	-9.60

OUTPUT POWER AND PPSD







7.10.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 13.3 dB (including 12 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5510	13.5
Mid	5550	16.0
High	5670	16.0

7.10.5. PEAK EXCURSION

LIMITS

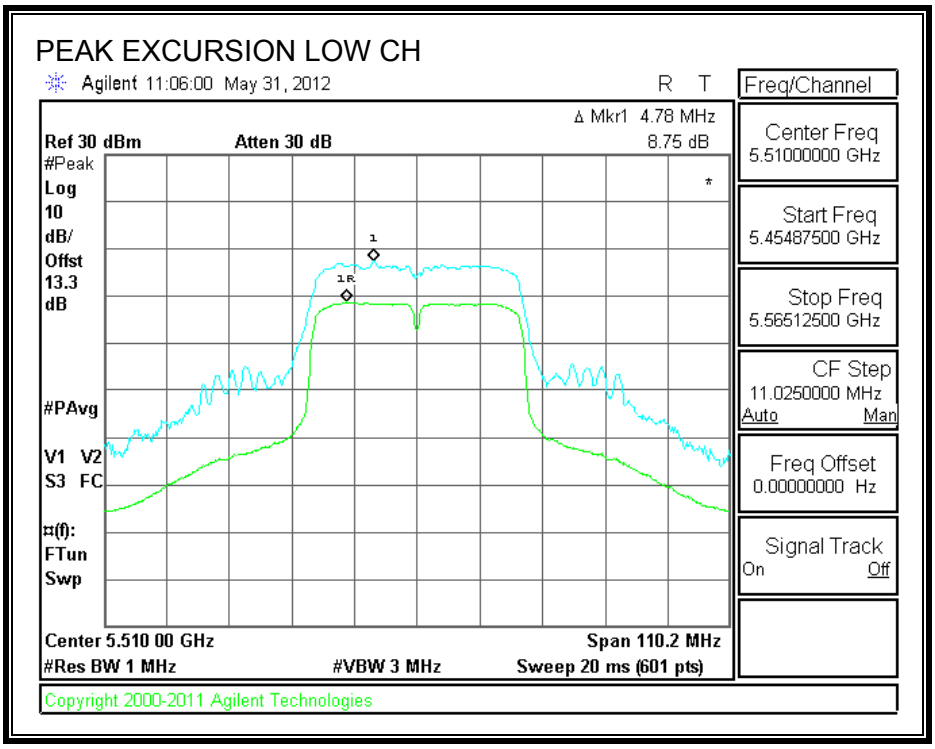
FCC §15.407 (a) (6)

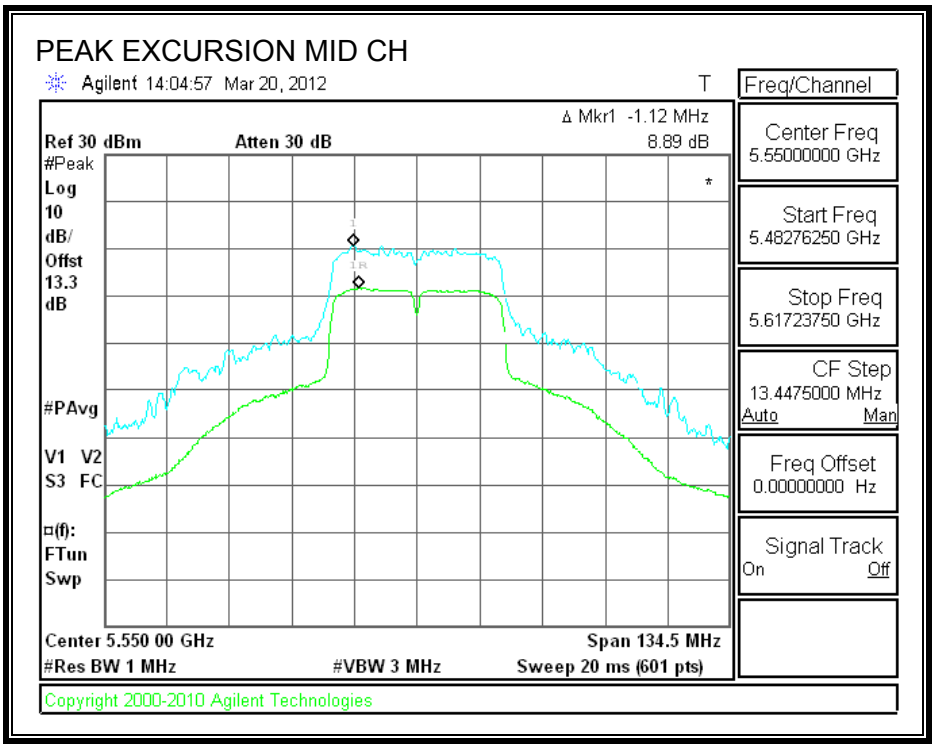
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

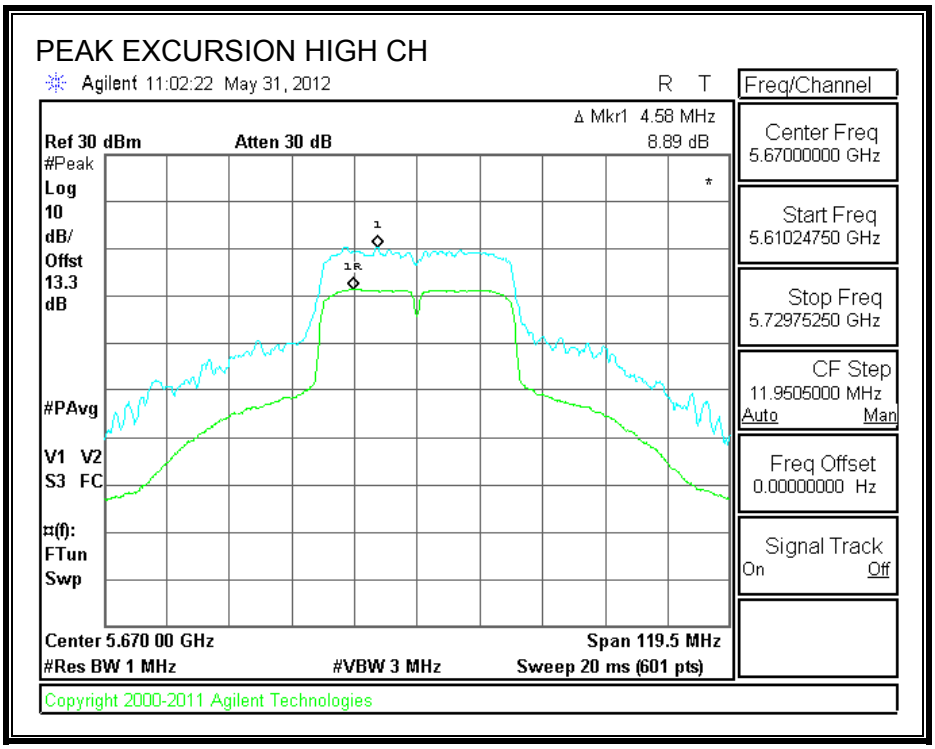
RESULTS

Channel	Frequency (MHz)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5510	8.75	13	-4.3
Mid	5550	8.89	13	-4.1
High	5670	8.89	13	-4.1

PEAK EXCURSION







8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

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.

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; the video bandwidth is set to 1 MHz for peak measurements and as applicable for average measurements.

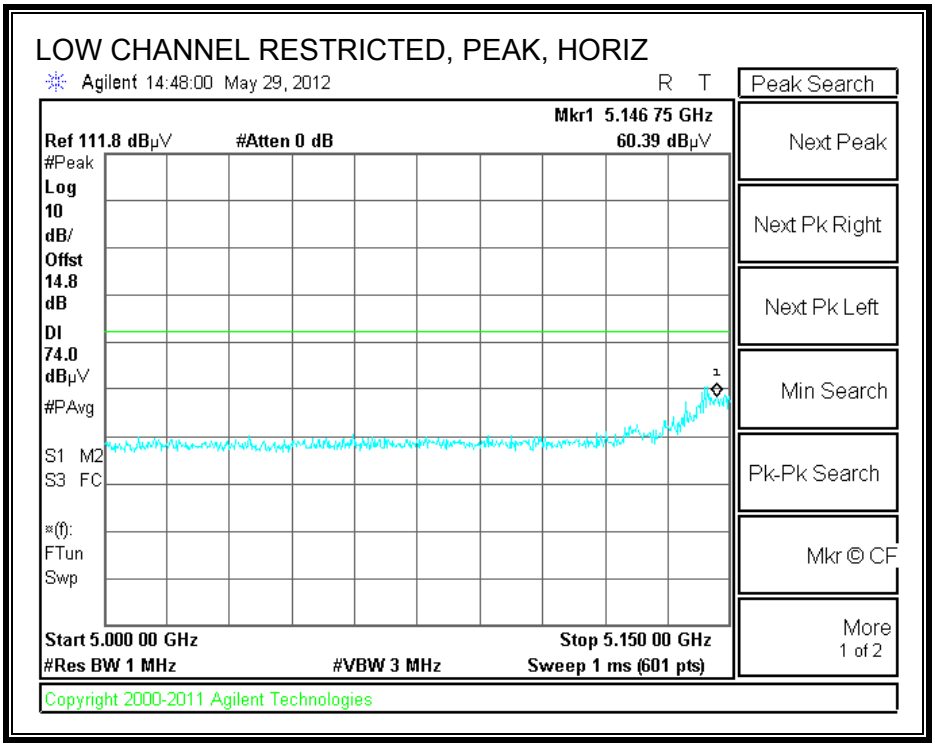
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

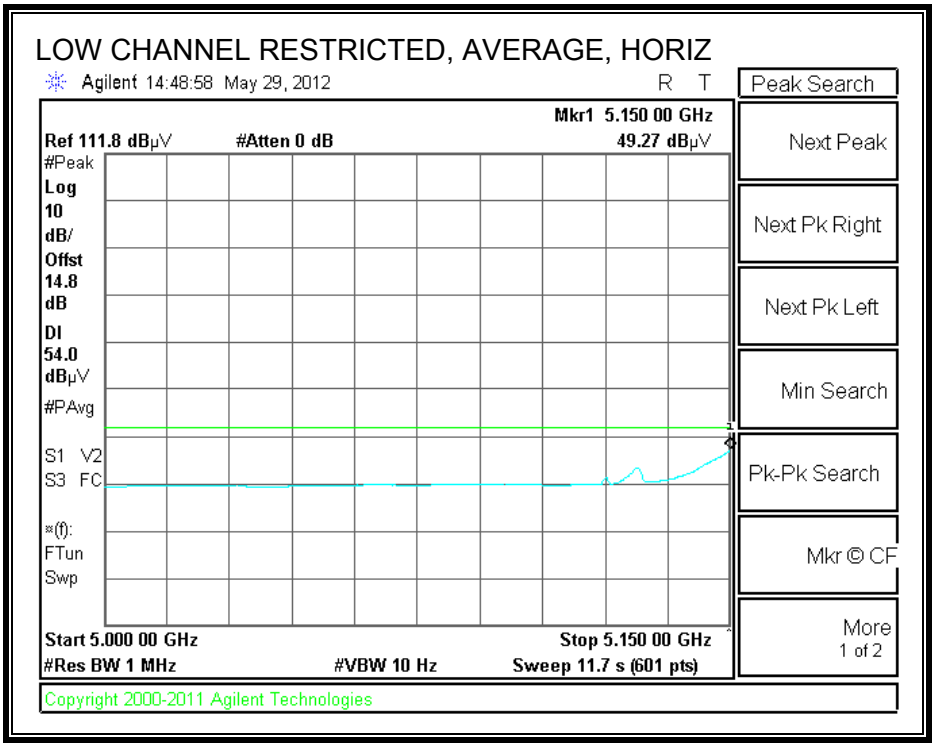
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

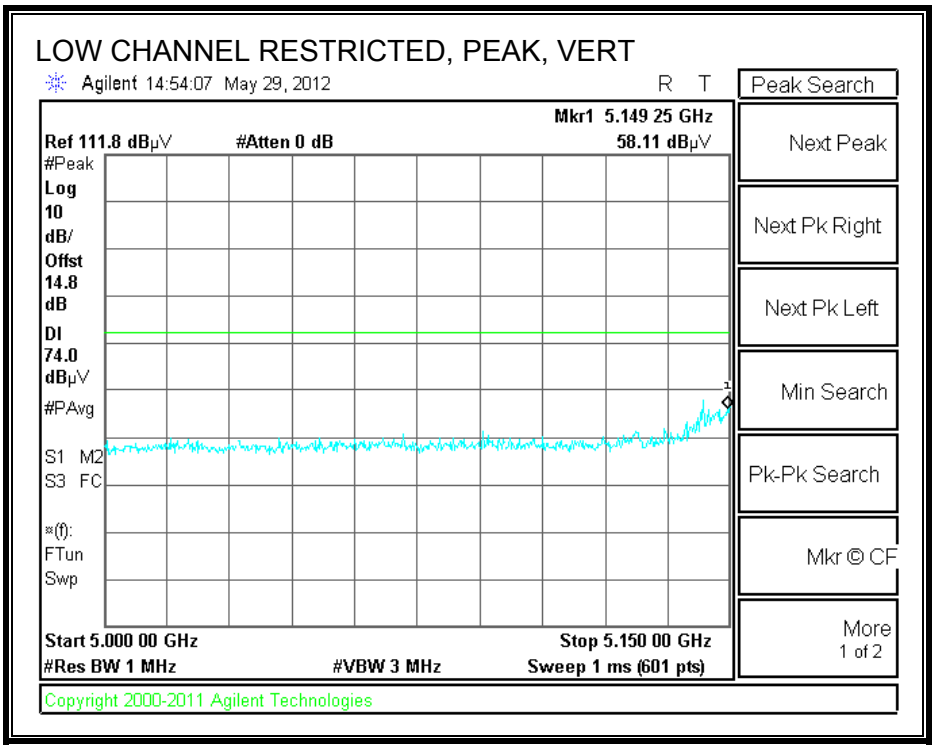
8.2. TRANSMITTER ABOVE 1 GHz

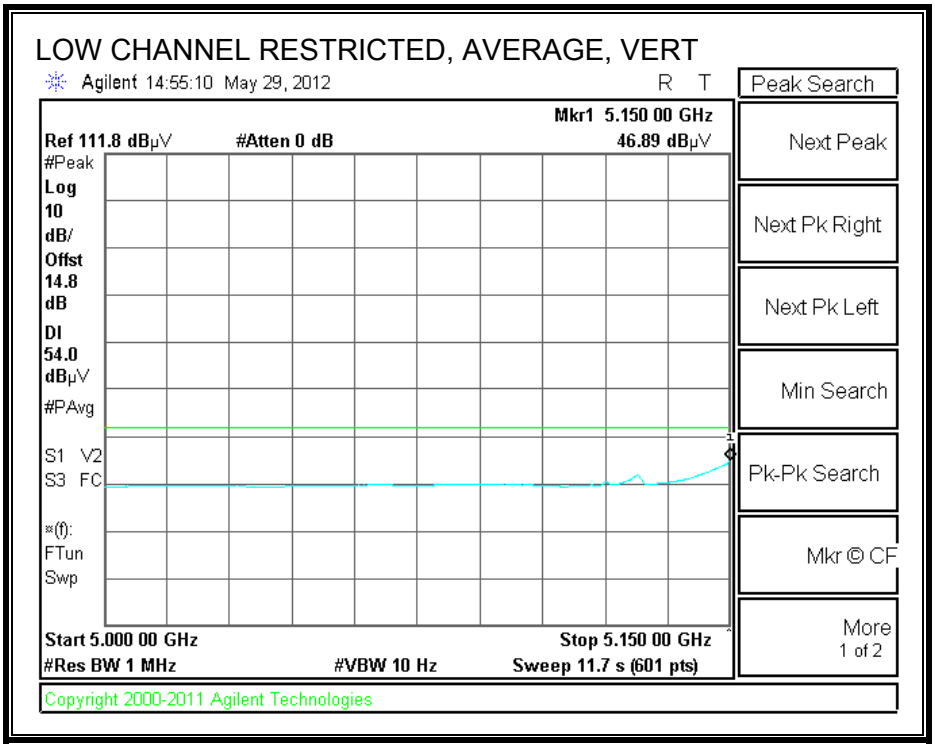
8.2.1. TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)









HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m A Chamber

Test Engr: Dennis Huang
Date: 5/24/2012 - 5/25/2012
Project #: 12U14222
Company: Qualcomm Atheros
Test Target: FCC 15.205
EUT: 802.11a Mode, RF Module: N10G84TRF

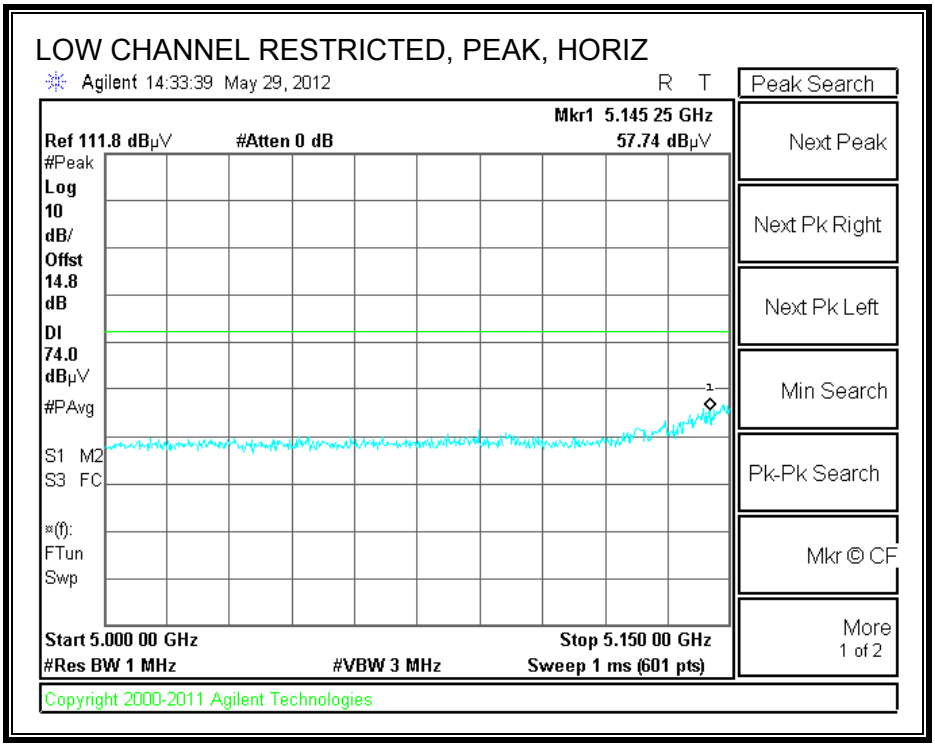
f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

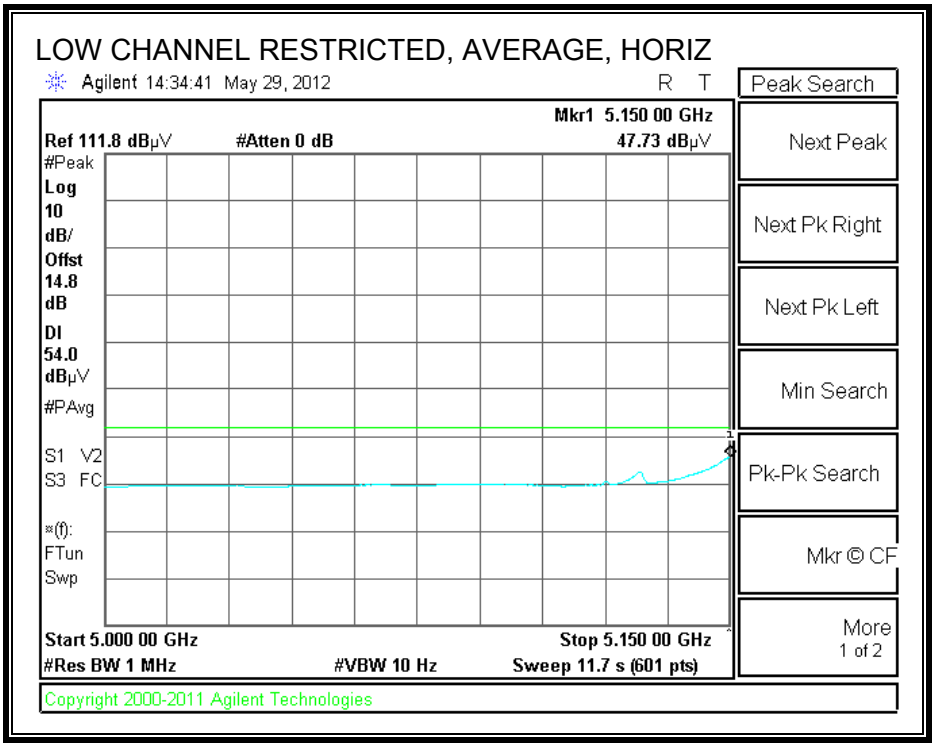
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Channel - 5180MHz															
15.540	3.0	35.8	39.0	12.2	-34.0	0.0	0.7	53.8	74.0	-20.2	V	P	167.8	76.5	
15.540	3.0	23.2	39.0	12.2	-34.0	0.0	0.7	41.2	54.0	-12.8	V	A	167.8	76.5	
15.540	3.0	35.3	39.0	12.2	-34.0	0.0	0.7	53.2	74.0	-20.8	H	P	196.3	83.2	
15.540	3.0	25.7	39.0	12.2	-34.0	0.0	0.7	43.6	54.0	-10.4	H	A	196.3	83.2	
Mid Channel - 5200MHz															
15.600	3.0	36.2	38.8	12.2	-34.0	0.0	0.7	54.0	74.0	-20.0	V	P	100.0	14.5	
15.600	3.0	25.7	38.8	12.2	-34.0	0.0	0.7	43.5	54.0	-10.5	V	A	100.0	14.5	
15.600	3.0	36.3	38.8	12.2	-34.0	0.0	0.7	54.1	74.0	-19.9	H	P	100.0	97.9	
15.600	3.0	25.7	38.8	12.2	-34.0	0.0	0.7	43.5	54.0	-10.5	H	A	100.0	97.9	
High Channel - 5240MHz															
15.720	3.0	36.1	38.4	12.3	-34.0	0.0	0.7	53.5	74.0	-20.5	V	P	100.0	1.8	
15.720	3.0	23.3	38.4	12.3	-34.0	0.0	0.7	40.8	54.0	-13.2	V	A	100.0	1.8	
15.720	3.0	36.0	38.4	12.3	-34.0	0.0	0.7	53.4	74.0	-20.6	H	P	100.0	315.1	
15.720	3.0	25.8	38.4	12.3	-34.0	0.0	0.7	43.2	54.0	-10.8	H	A	100.0	315.1	

Rev. 4.1.2.7
Note: No other emissions were detected above the system noise floor.

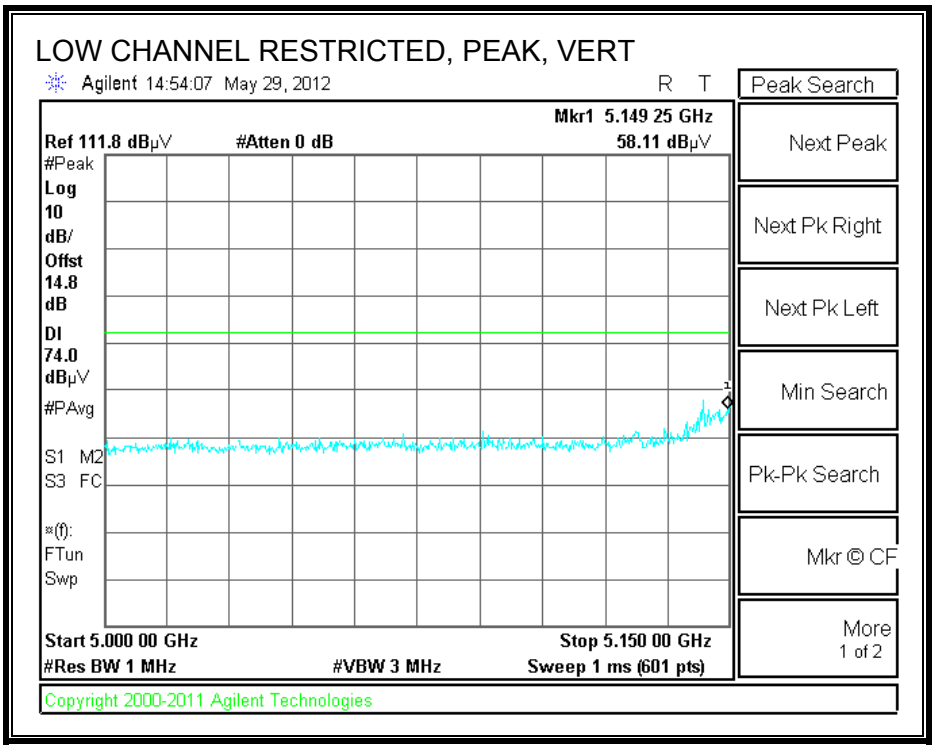
8.2.2. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

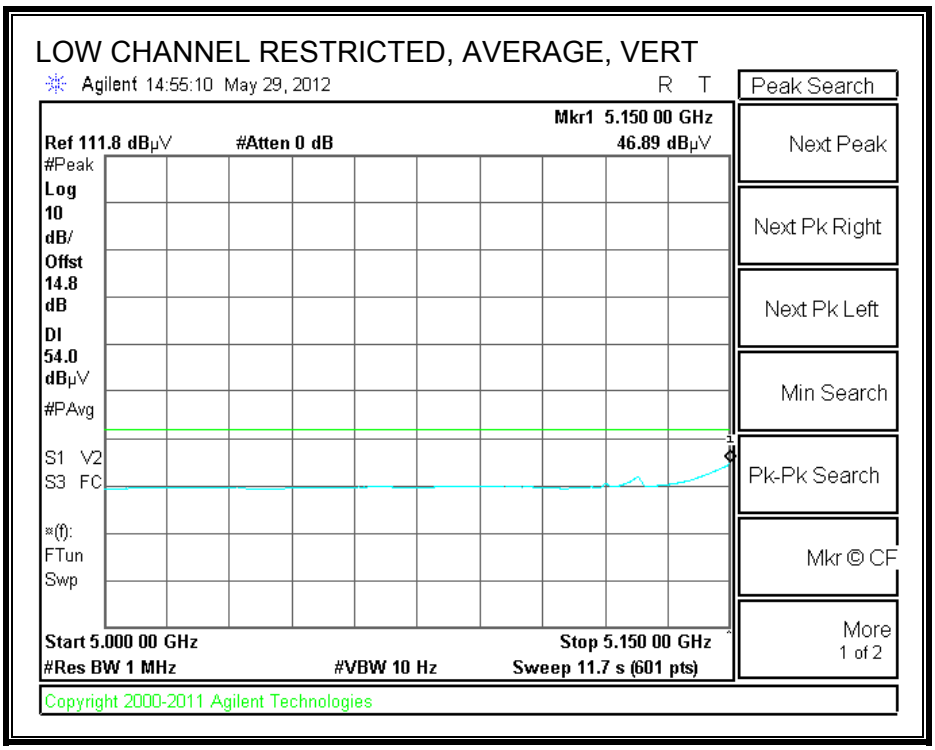




LOW CHANNEL RESTRICTED, PEAK, VERT



LOW CHANNEL RESTRICTED, AVERAGE, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m A Chamber

Test Engr: Dennis Huang
Date: 5/24/2012 - 5/25/2012
Project #: 12U14222
Company: Qualcomm Atheros
Test Target: FCC 15.205
EUT: 802.11n HT20 Mode, MTP PCB SN:016-2-450001, RF Module: N10G84TRF

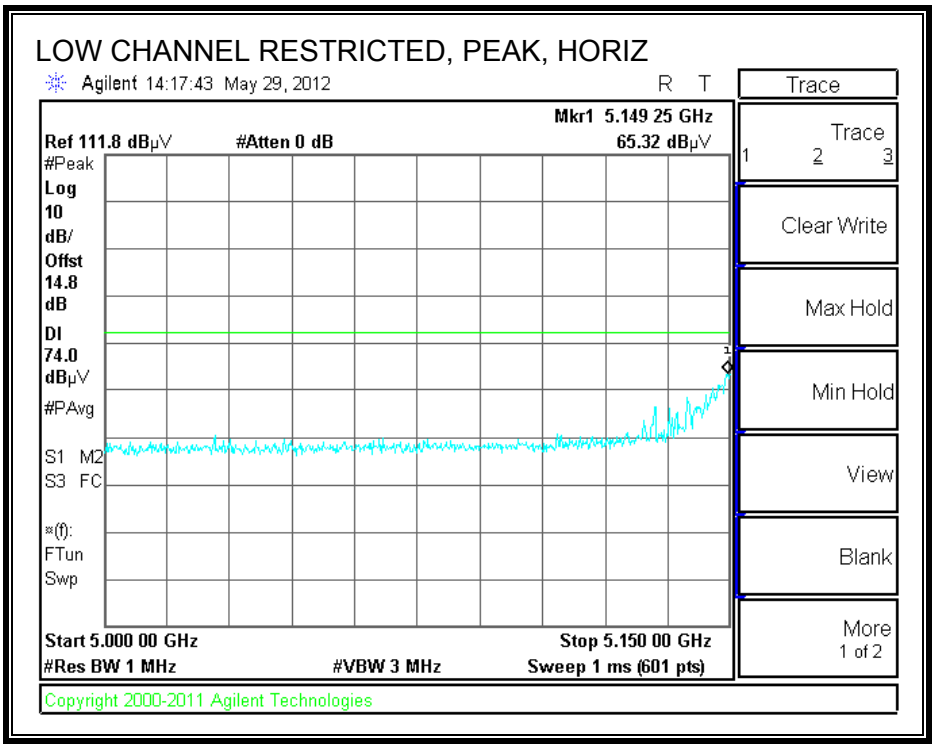
f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

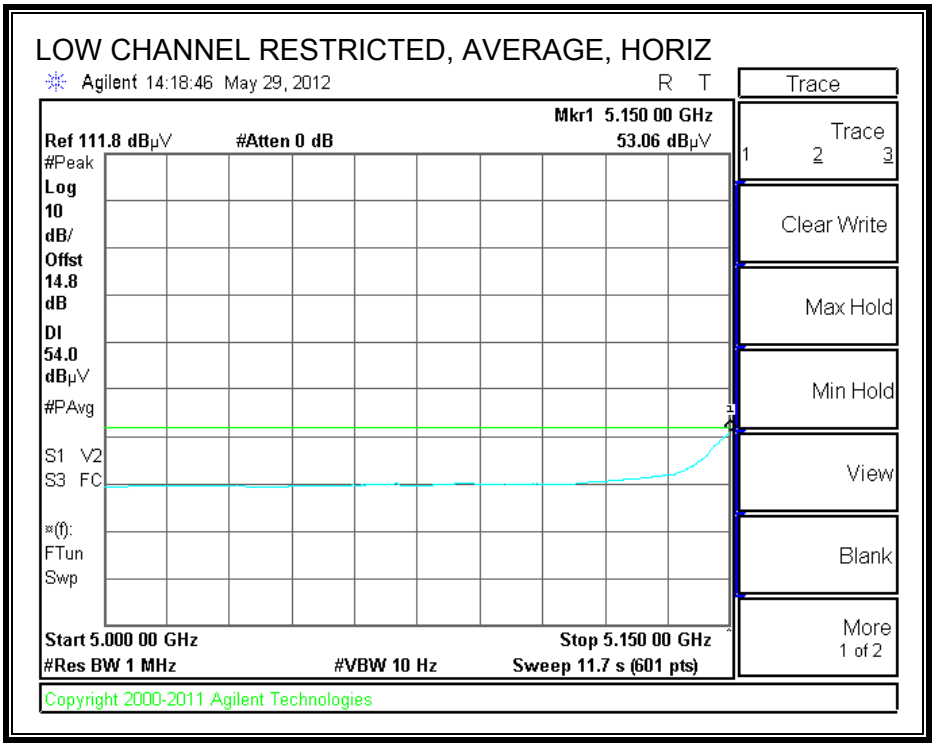
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Channel - 5180MHz															
15.540	3.0	35.8	39.0	12.2	-34.0	0.0	0.7	53.7	74.0	-20.3	V	P	100.0	0.4	
15.540	3.0	25.7	39.0	12.2	-34.0	0.0	0.7	43.6	54.0	-10.4	V	A	100.0	0.4	
15.540	3.0	36.4	39.0	12.2	-34.0	0.0	0.7	54.3	74.0	-19.7	H	P	100.0	119.5	
15.540	3.0	25.7	39.0	12.2	-34.0	0.0	0.7	43.6	54.0	-10.4	H	A	100.0	119.5	
Mid Channel - 5200MHz															
15.600	3.0	35.8	38.8	12.2	-34.0	0.0	0.7	53.6	74.0	-20.4	V	P	100.0	282.1	
15.600	3.0	25.8	38.8	12.2	-34.0	0.0	0.7	43.5	54.0	-10.5	V	A	100.0	282.1	
15.600	3.0	37.1	38.8	12.2	-34.0	0.0	0.7	54.9	74.0	-19.1	H	P	100.0	96.3	
15.600	3.0	25.7	38.8	12.2	-34.0	0.0	0.7	43.5	54.0	-10.5	H	A	100.0	96.3	
High Channel - 5240MHz															
15.720	3.0	37.4	38.4	12.3	-34.0	0.0	0.7	54.8	74.0	-19.2	V	P	100.0	229.6	
15.720	3.0	25.8	38.4	12.3	-34.0	0.0	0.7	43.2	54.0	-10.8	V	A	100.0	229.6	
15.720	3.0	37.4	38.4	12.3	-34.0	0.0	0.7	54.8	74.0	-19.2	H	P	100.0	157.4	
15.720	3.0	25.8	38.4	12.3	-34.0	0.0	0.7	43.2	54.0	-10.8	H	A	100.0	157.4	

Rev. 4.1.2.7
Note: No other emissions were detected above the system noise floor.

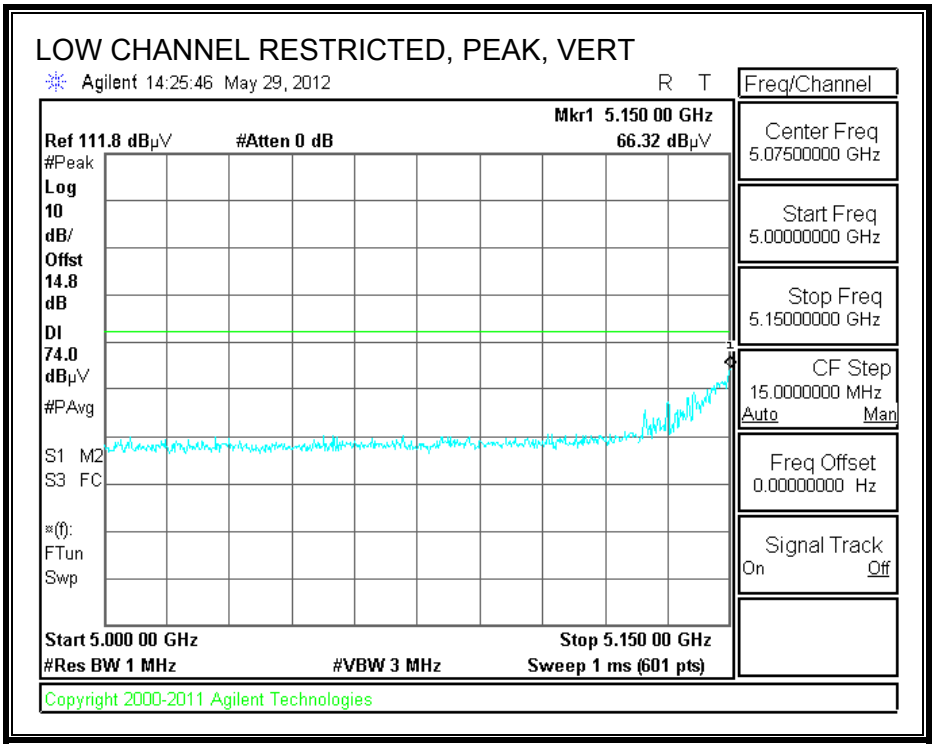
8.2.3. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

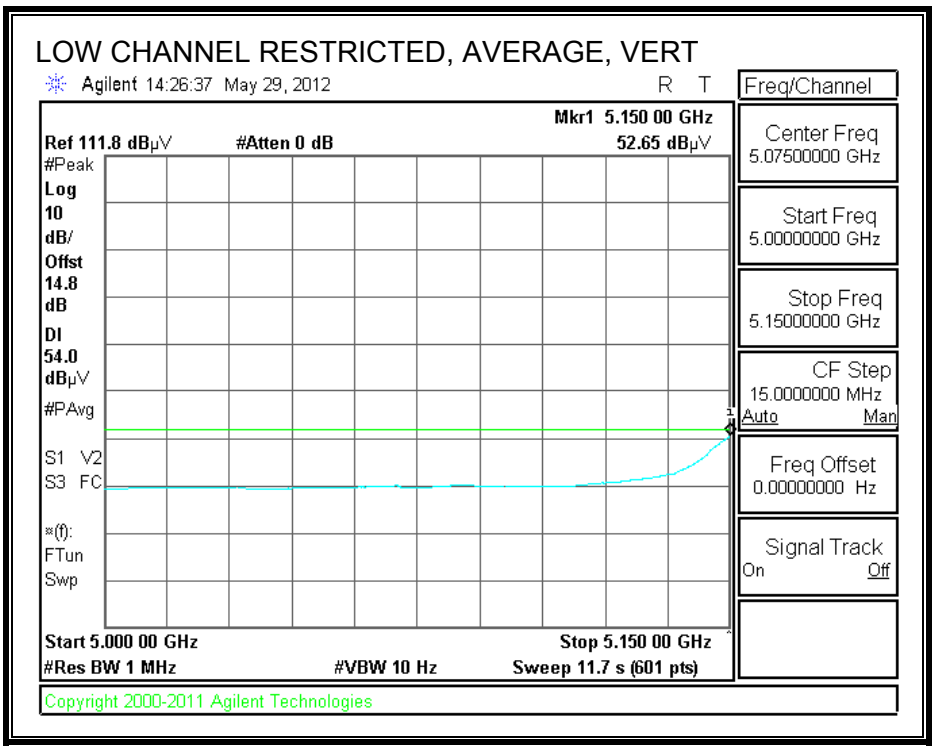




LOW CHANNEL RESTRICTED, PEAK, VERT



LOW CHANNEL RESTRICTED, AVERAGE, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m A Chamber

Test Engr: Dennis Huang
Date: 5/24/2012 - 5/25/2012
Project #: 12U14222
Company: Qualcomm Atheros
Test Target: FCC 15.205
EUT: 802.11n HT40 Mode, MTP PCB SN:016-2-450001, RF Module: N10G84TRF

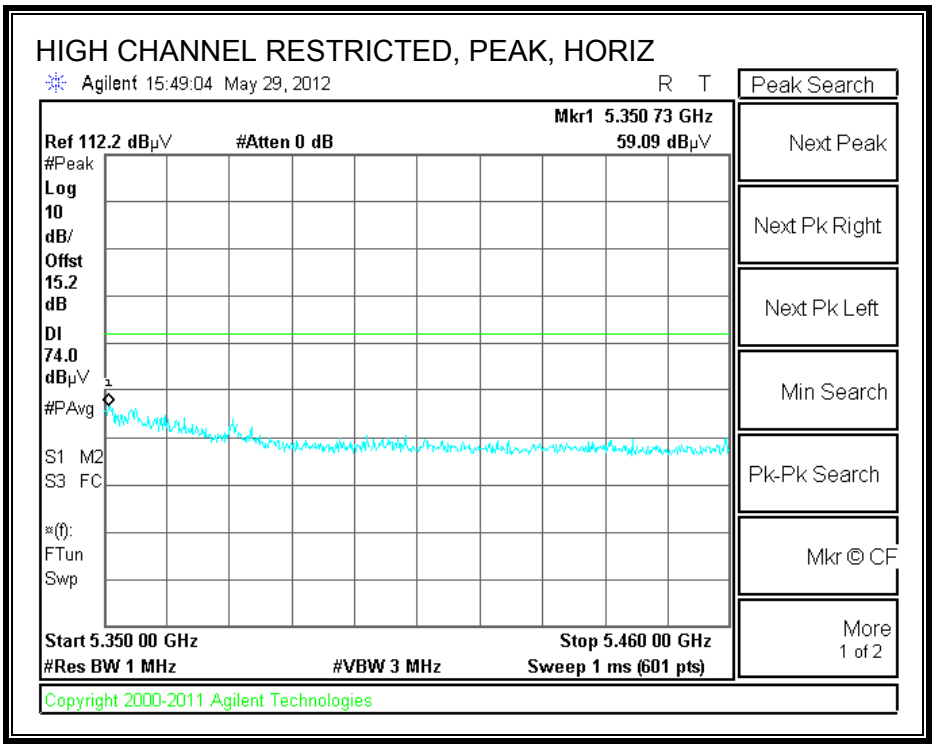
f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

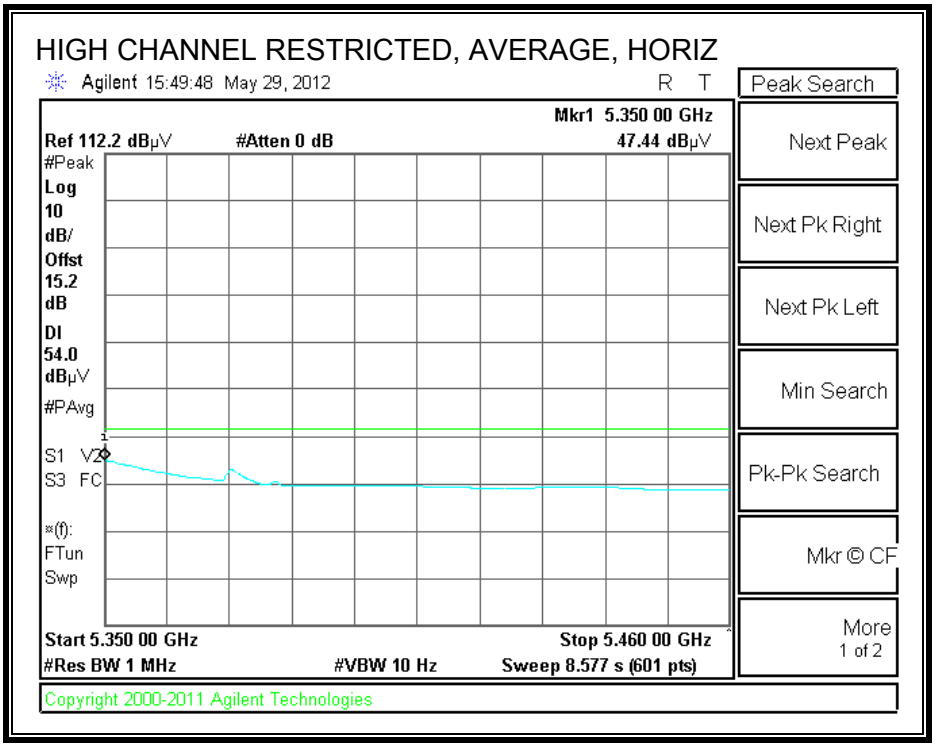
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Channel - 5190MHz															
15.570	3.0	35.6	38.9	12.2	-34.0	0.0	0.7	53.5	74.0	-20.5	V	P	101.9	162.2	
15.570	3.0	25.8	38.9	12.2	-34.0	0.0	0.7	43.7	54.0	-10.3	V	A	101.9	162.2	
15.570	3.0	36.0	38.9	12.2	-34.0	0.0	0.7	53.9	74.0	-20.1	H	P	169.8	111.5	
15.570	3.0	25.8	38.9	12.2	-34.0	0.0	0.7	43.6	54.0	-10.4	H	A	169.8	111.5	
High Channel - 5230MHz															
15.690	3.0	35.4	38.5	12.3	-34.0	0.0	0.7	53.0	74.0	-21.0	V	P	137.0	0.5	
15.690	3.0	23.1	38.5	12.3	-34.0	0.0	0.7	40.7	54.0	-13.3	V	A	137.0	0.5	
15.690	3.0	36.0	38.5	12.3	-34.0	0.0	0.7	53.5	74.0	-20.5	H	P	196.7	128.8	
15.690	3.0	23.1	38.5	12.3	-34.0	0.0	0.7	40.7	54.0	-13.4	H	A	196.7	128.8	

Rev. 4.1.2.7
Note: No other emissions were detected above the system noise floor.

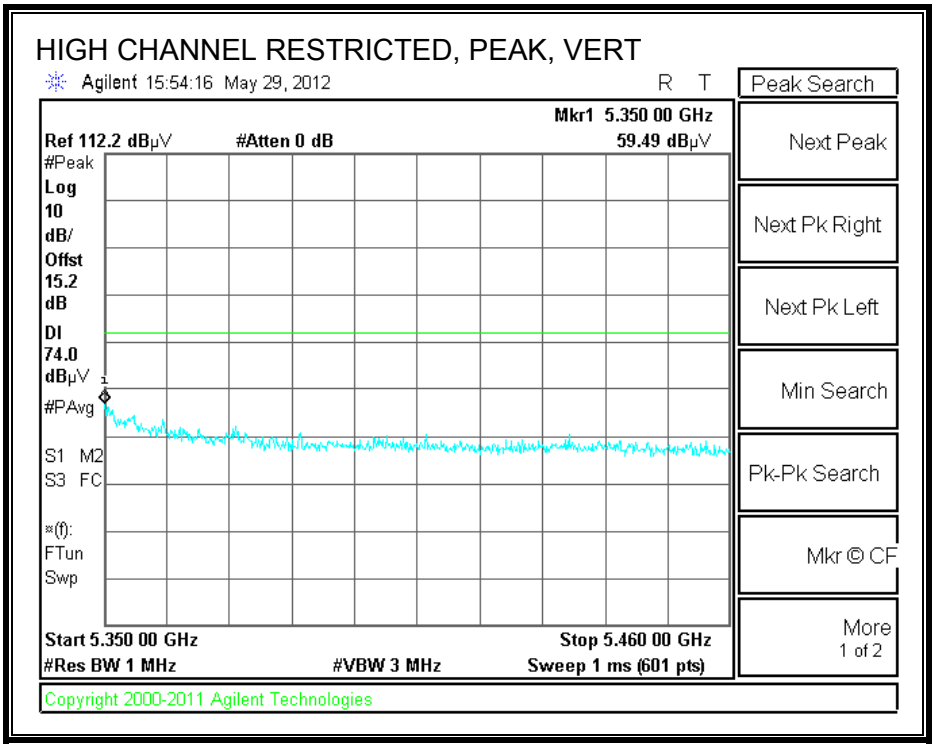
8.2.4. TX ABOVE 1 GHz 802.11a MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL)

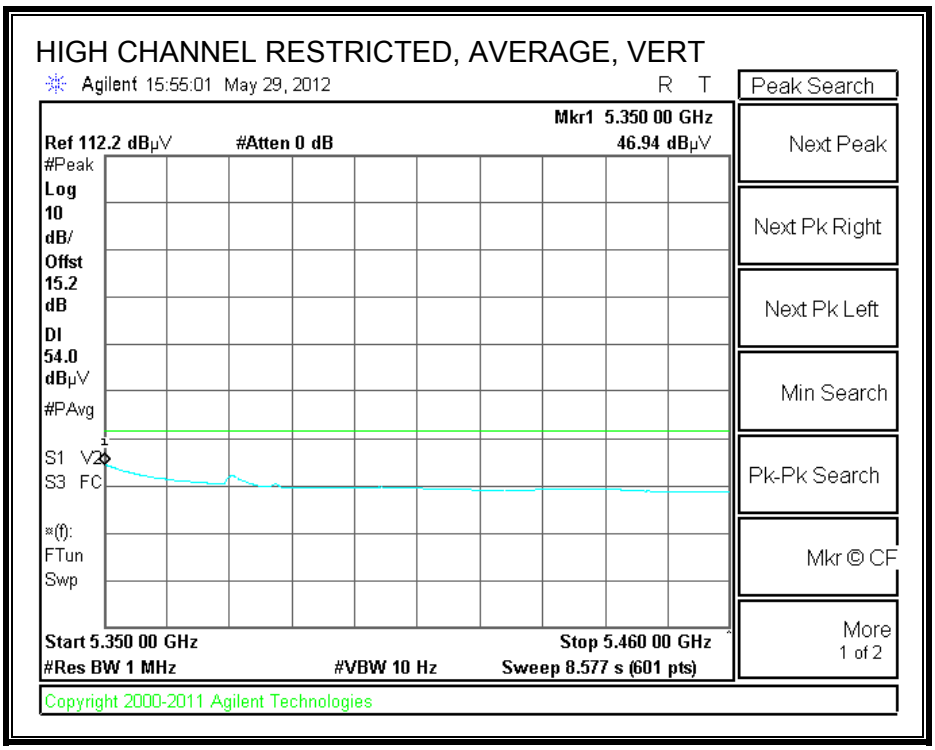




HIGH CHANNEL RESTRICTED, PEAK, VERT



HIGH CHANNEL RESTRICTED, AVERAGE, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m A Chamber

Test Engr: Dennis Huang
Date: 5/24/2012 - 5/25/2012
Project #: 12U14222
Company: Qualcomm Atheros
Test Target: FCC 15.205
EUT: 802.11a Mode, RF Module: N10G84TRF

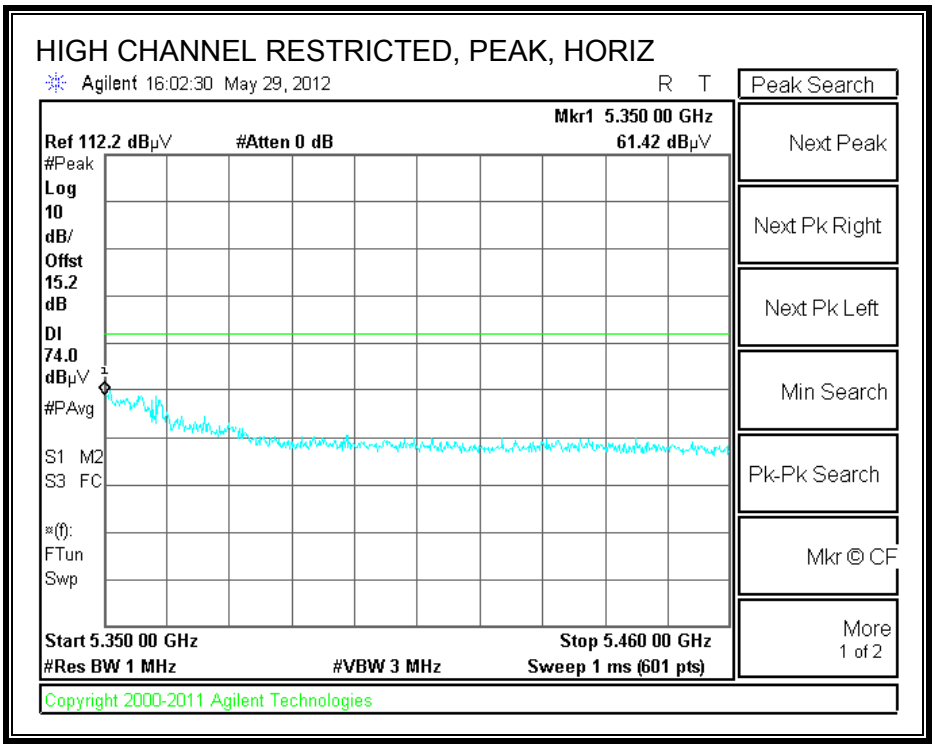
f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

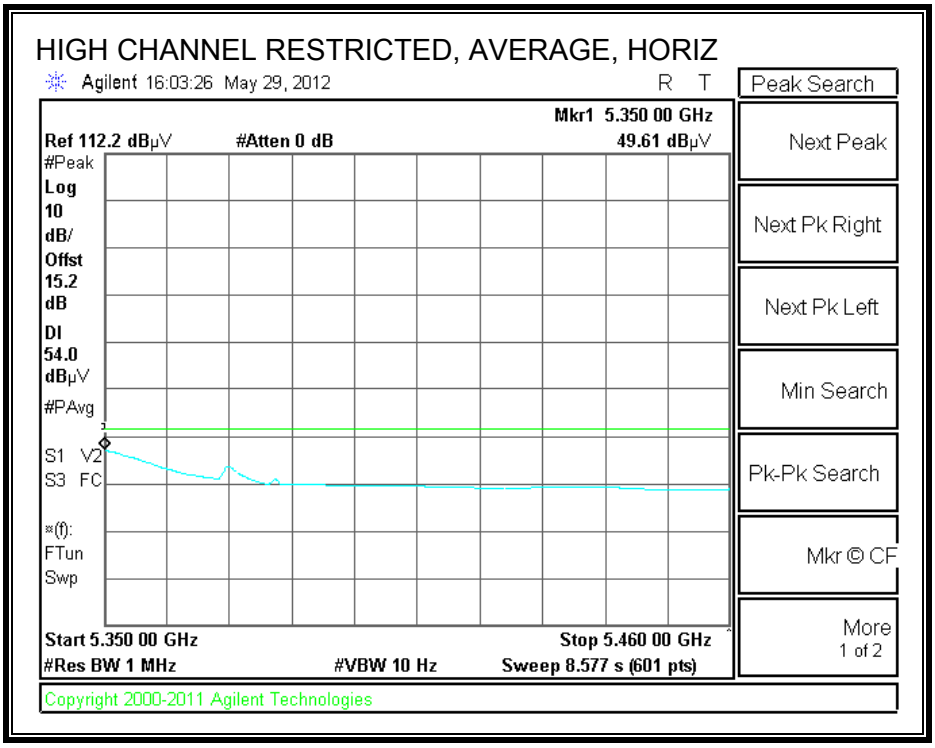
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Channel - 5260MHz															
15.780	3.0	35.6	38.2	12.3	-33.9	0.0	0.7	52.9	74.0	-21.1	V	P	103.3	25.7	
15.780	3.0	25.5	38.2	12.3	-33.9	0.0	0.7	42.8	54.0	-11.2	V	A	103.3	25.7	
15.780	3.0	36.5	38.2	12.3	-33.9	0.0	0.7	53.8	74.0	-20.2	H	P	116.0	339.7	
15.780	3.0	25.5	38.2	12.3	-33.9	0.0	0.7	42.8	54.0	-11.2	H	A	116.0	339.7	
Mid Channel - 5300MHz															
10.600	3.0	35.9	38.3	9.7	-35.7	0.0	0.8	48.9	74.0	-25.1	V	P	133.6	127.8	
10.600	3.0	30.1	38.3	9.7	-35.7	0.0	0.8	43.1	54.0	-10.9	V	A	133.6	127.8	
10.600	3.0	33.7	38.3	9.7	-35.7	0.0	0.8	46.7	74.0	-27.3	H	P	127.1	322.5	
10.600	3.0	23.3	38.3	9.7	-35.7	0.0	0.8	36.3	54.0	-17.7	H	A	127.1	322.5	
15.900	3.0	34.9	37.8	12.4	-33.9	0.0	0.7	51.9	74.0	-22.1	V	P	100.0	23.1	
15.900	3.0	25.0	37.8	12.4	-33.9	0.0	0.7	42.0	54.0	-12.0	V	A	100.0	23.1	
15.900	3.0	35.8	37.8	12.4	-33.9	0.0	0.7	52.8	74.0	-21.2	H	P	101.5	285.7	
15.900	3.0	25.0	37.8	12.4	-33.9	0.0	0.7	42.0	54.0	-12.0	H	A	101.5	285.7	
High Channel - 5320MHz															
10.640	3.0	36.9	38.3	9.8	-35.7	0.0	0.8	50.0	74.0	-24.0	V	P	148.0	167.3	
10.640	3.0	31.5	38.3	9.8	-35.7	0.0	0.8	44.6	54.0	-9.4	V	A	148.0	167.3	
10.640	3.0	34.4	38.3	9.8	-35.7	0.0	0.8	47.5	74.0	-26.5	H	P	185.9	182.4	
10.640	3.0	25.4	38.3	9.8	-35.7	0.0	0.8	38.4	54.0	-15.6	H	A	185.9	182.4	
15.960	3.0	36.3	37.6	12.4	-33.9	0.0	0.7	53.1	74.0	-20.9	V	P	105.0	109.9	
15.960	3.0	25.3	37.6	12.4	-33.9	0.0	0.7	42.1	54.0	-11.9	V	A	105.0	109.9	
15.960	3.0	36.0	37.6	12.4	-33.9	0.0	0.7	52.9	74.0	-21.1	H	P	100.6	40.3	
15.960	3.0	25.3	37.6	12.4	-33.9	0.0	0.7	42.1	54.0	-11.9	H	A	100.6	40.3	

Rev. 4.1.2.7
Note: No other emissions were detected above the system noise floor.

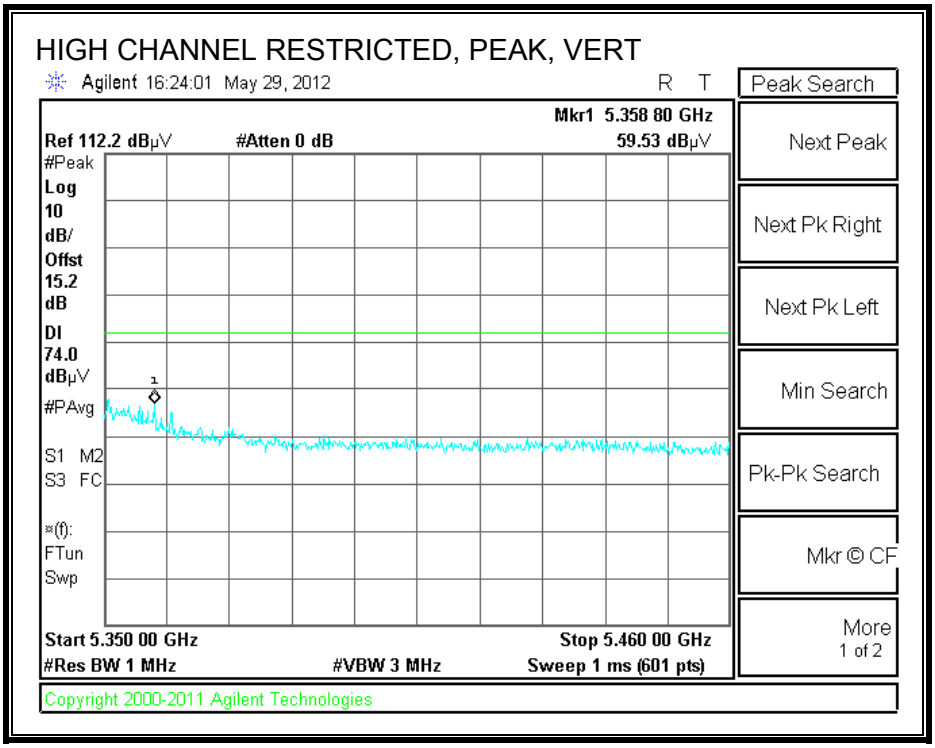
8.2.5. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL)

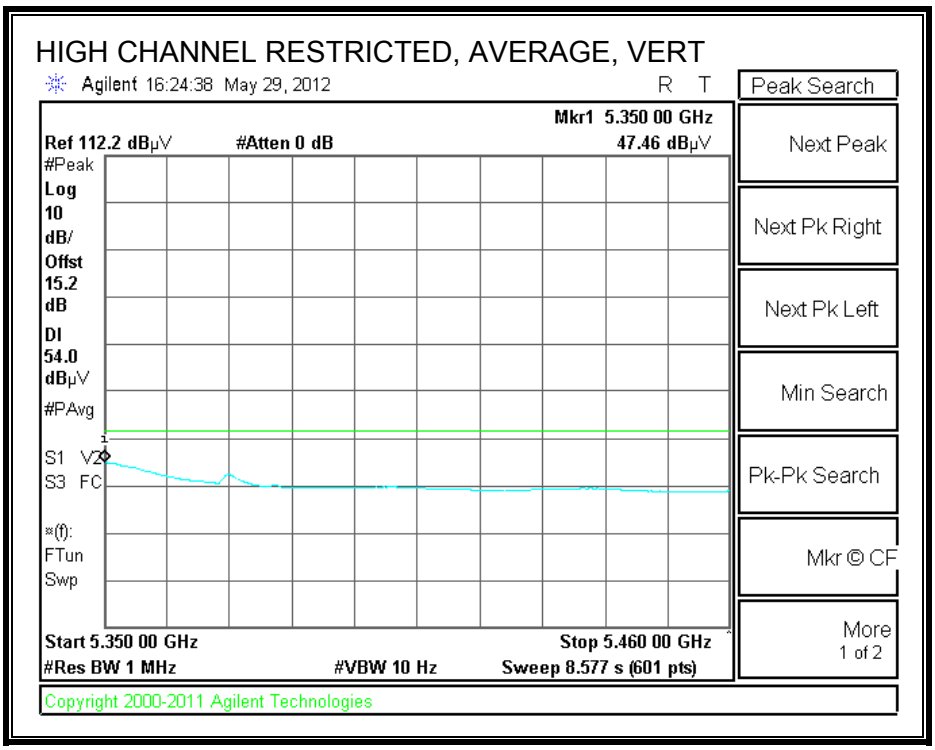




HIGH CHANNEL RESTRICTED, PEAK, VERT



HIGH CHANNEL RESTRICTED, AVERAGE, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m A Chamber

Test Engr: Dennis Huang
Date: 5/24/2012 - 5/25/2012
Project #: 12U14222
Company: Qualcomm Atheros
Test Target: FCC 15.205
EUT: 802.11n HT20 Mode, MTP PCB SN:016-2-450001, RF Module: N10G84TRF

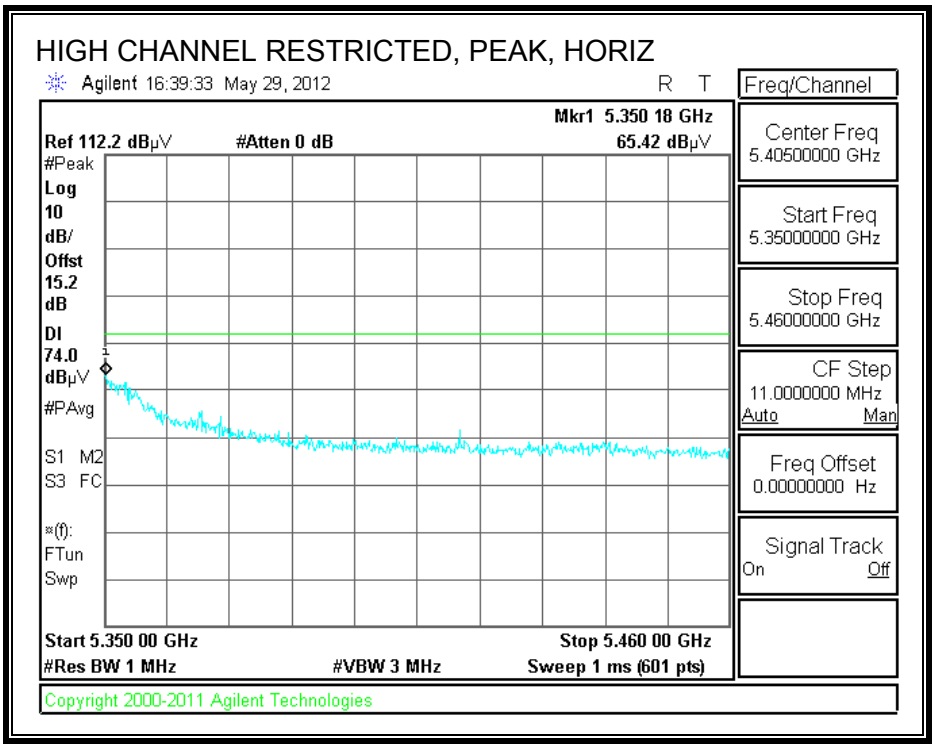
f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

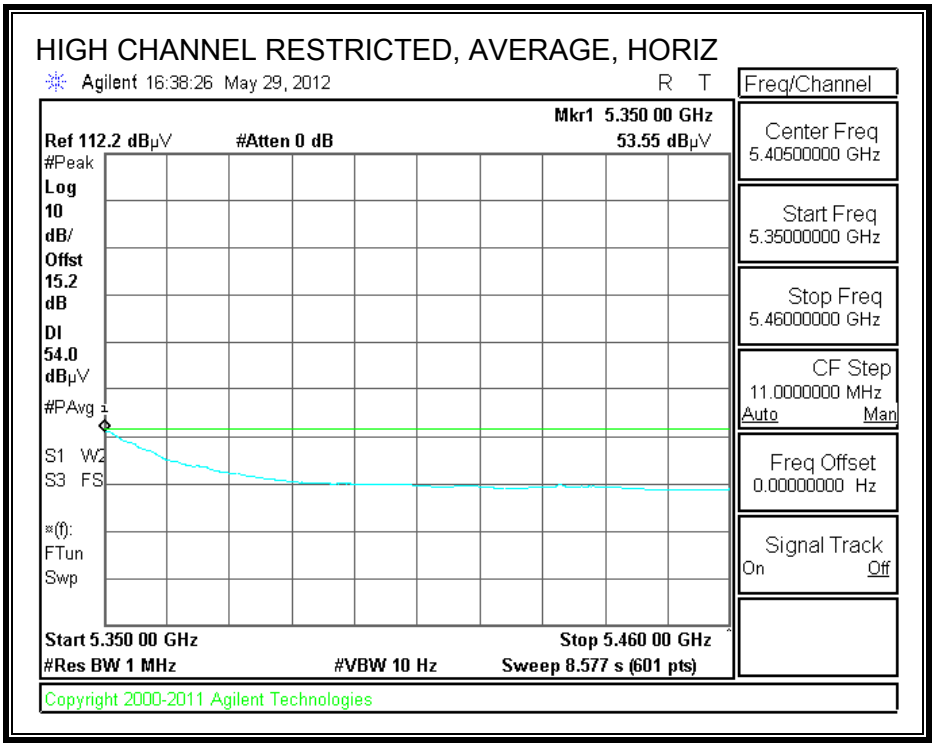
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Channel - 5260MHz															
15.780	3.0	35.2	38.2	12.3	-33.9	0.0	0.7	52.5	74.0	-21.5	V	P	199.1	303.6	
15.780	3.0	25.5	38.2	12.3	-33.9	0.0	0.7	42.8	54.0	-11.2	V	A	199.1	303.6	
15.780	3.0	35.6	38.2	12.3	-33.9	0.0	0.7	52.9	74.0	-21.1	H	P	101.2	170.8	
15.780	3.0	25.5	38.2	12.3	-33.9	0.0	0.7	42.8	54.0	-11.2	H	A	101.2	170.8	
Mid Channel - 5300MHz															
10.600	3.0	36.4	38.3	9.7	-35.7	0.0	0.8	49.4	74.0	-24.6	V	P	133.9	124.1	
10.600	3.0	30.9	38.3	9.7	-35.7	0.0	0.8	43.9	54.0	-10.1	V	A	133.9	124.1	
10.600	3.0	33.7	38.3	9.7	-35.7	0.0	0.8	46.7	74.0	-27.3	H	P	130.5	42.5	
10.600	3.0	25.1	38.3	9.7	-35.7	0.0	0.8	38.1	54.0	-15.9	H	A	130.5	42.5	
15.900	3.0	35.4	37.8	12.4	-33.9	0.0	0.7	52.3	74.0	-21.7	V	P	100.0	263.3	
15.900	3.0	25.0	37.8	12.4	-33.9	0.0	0.7	42.0	54.0	-12.0	V	A	100.0	263.3	
15.900	3.0	35.3	37.8	12.4	-33.9	0.0	0.7	52.3	74.0	-21.7	H	P	197.1	105.1	
15.900	3.0	25.0	37.8	12.4	-33.9	0.0	0.7	42.0	54.0	-12.0	H	A	197.1	105.1	
High Channel - 5320MHz															
10.640	3.0	36.3	38.3	9.8	-35.7	0.0	0.8	49.4	74.0	-24.6	V	P	133.9	125.9	
10.640	3.0	30.8	38.3	9.8	-35.7	0.0	0.8	43.9	54.0	-10.1	V	A	133.9	125.9	
10.640	3.0	34.9	38.3	9.8	-35.7	0.0	0.8	48.0	74.0	-26.0	H	P	181.3	1.9	
10.640	3.0	23.6	38.3	9.8	-35.7	0.0	0.8	36.7	54.0	-17.3	H	A	181.3	1.9	
15.960	3.0	36.1	37.6	12.4	-33.9	0.0	0.7	53.0	74.0	-21.0	V	P	102.1	184.4	
15.960	3.0	25.3	37.6	12.4	-33.9	0.0	0.7	42.1	54.0	-11.9	V	A	102.1	184.4	
15.960	3.0	35.8	37.6	12.4	-33.9	0.0	0.7	52.7	74.0	-21.3	H	P	101.4	94.5	
15.960	3.0	25.3	37.6	12.4	-33.9	0.0	0.7	42.1	54.0	-11.9	H	A	101.4	94.5	

Rev. 4.1.2.7
Note: No other emissions were detected above the system noise floor.

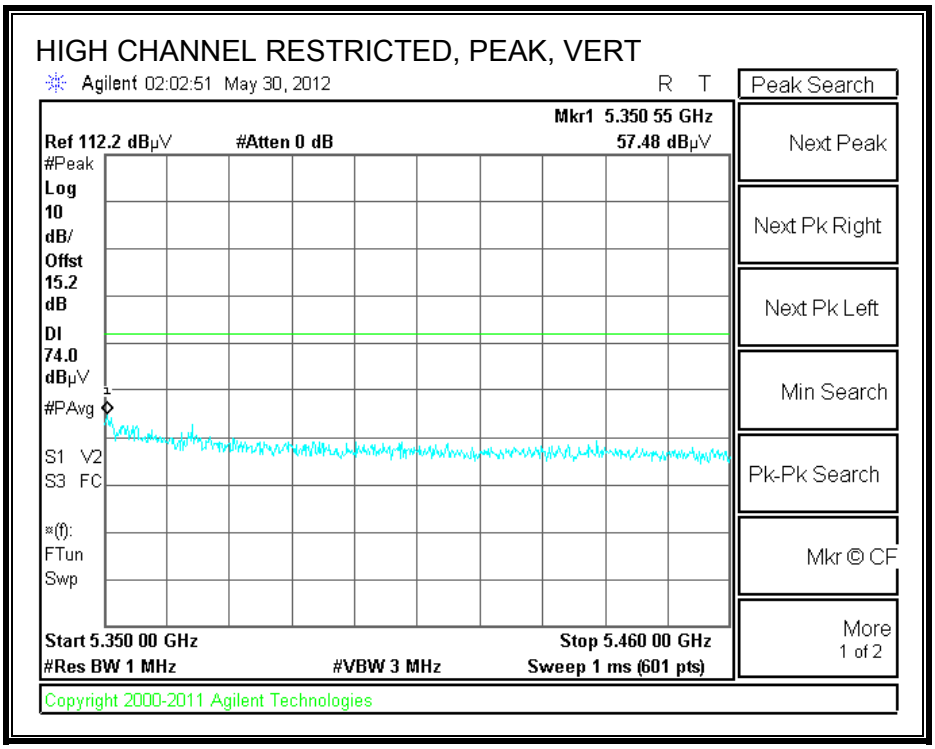
8.2.6. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.3 GHz BAND

RESTRICTED BANDEDGE (HIGH CHANNEL)

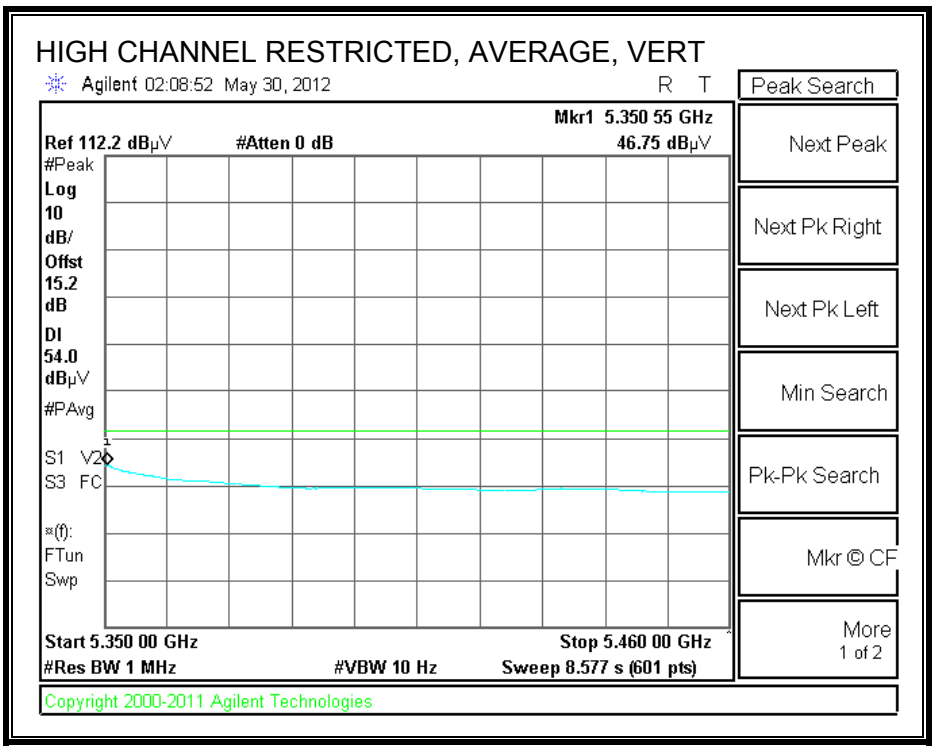




HIGH CHANNEL RESTRICTED, PEAK, VERT



HIGH CHANNEL RESTRICTED, AVERAGE, VERT



HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m A Chamber

Test Engr: Dennis Huang
Date: 5/24/2012 - 5/25/2012
Project #: 12U14222
Company: Qualcomm Atheros
Test Target: FCC 15.205
EUT: 802.11n HT40 Mode, MTP PCB SN:016-2-450001, RF Module: N10G84TRF

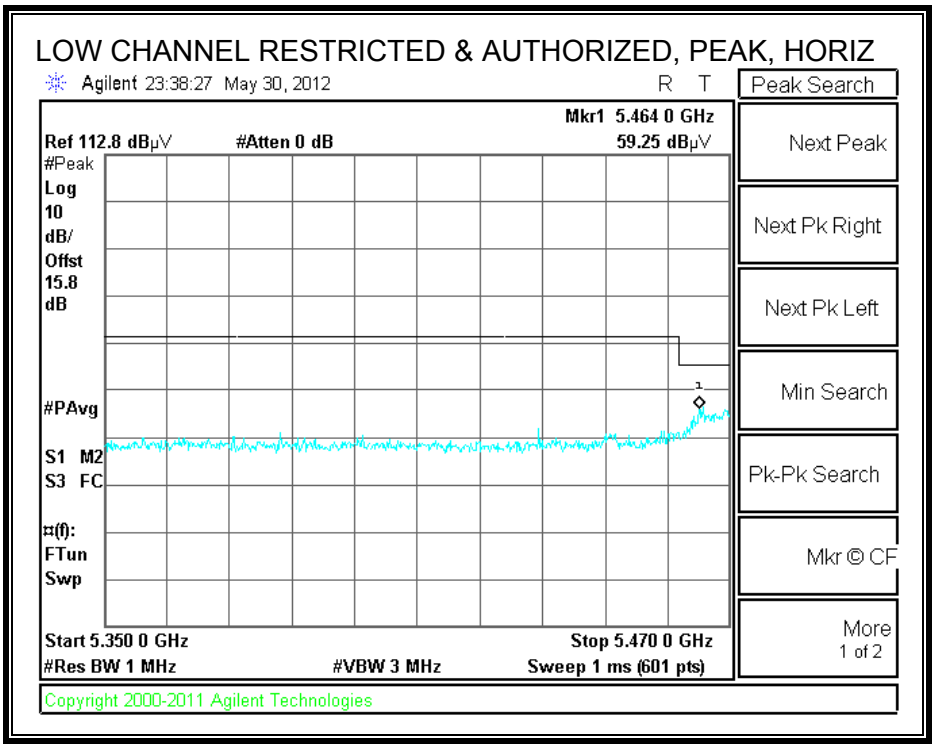
f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

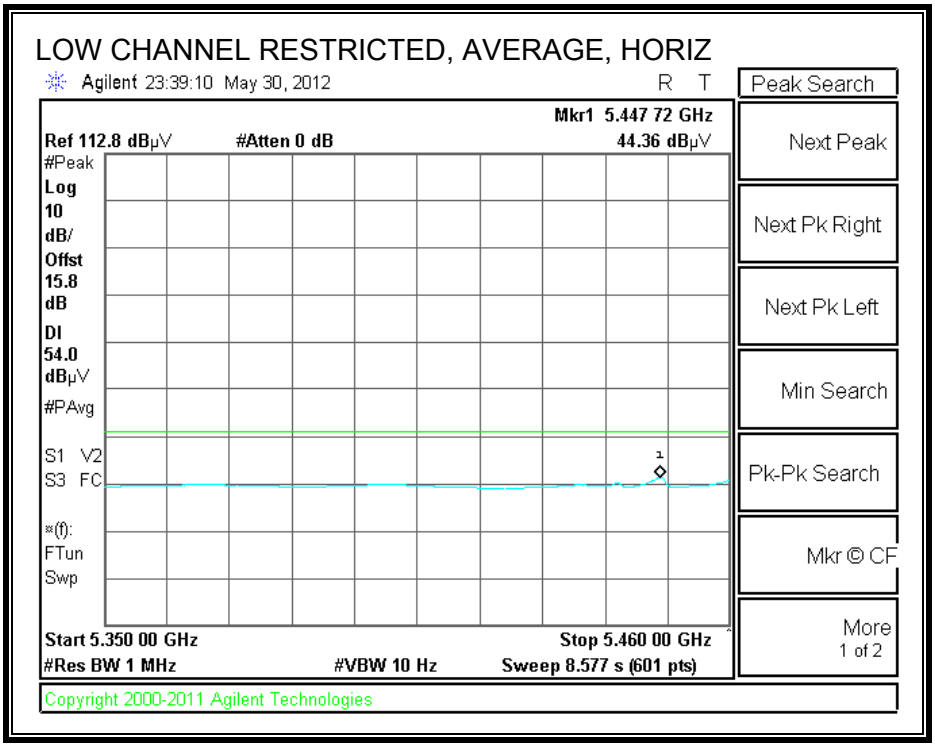
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Channel - 5270MHz															
15.810	3.0	35.8	38.1	12.3	-33.9	0.0	0.7	53.0	74.0	-21.0	V	P	181.6	193.3	
15.810	3.0	25.0	38.1	12.3	-33.9	0.0	0.7	42.2	54.0	-11.8	V	A	181.6	193.3	
15.810	3.0	35.4	38.1	12.3	-33.9	0.0	0.7	52.6	74.0	-21.4	H	P	198.8	48.3	
15.810	3.0	25.0	38.1	12.3	-33.9	0.0	0.7	42.2	54.0	-11.8	H	A	198.8	48.3	
High Channel - 5310MHz															
10.620	3.0	34.8	38.3	9.7	-35.7	0.0	0.8	47.9	74.0	-26.1	V	P	185.8	127.4	
10.620	3.0	27.6	38.3	9.7	-35.7	0.0	0.8	40.7	54.0	-13.3	V	A	185.8	127.4	
10.620	3.0	35.0	38.3	9.7	-35.7	0.0	0.8	48.1	74.0	-25.9	H	P	138.3	198.6	
10.620	3.0	25.5	38.3	9.7	-35.7	0.0	0.8	38.6	54.0	-15.4	H	A	138.3	198.6	
15.930	3.0	35.4	37.7	12.4	-33.9	0.0	0.7	52.3	74.0	-21.7	V	P	146.7	228.5	
15.930	3.0	25.2	37.7	12.4	-33.9	0.0	0.7	42.1	54.0	-11.9	V	A	146.7	228.5	
15.930	3.0	35.2	37.7	12.4	-33.9	0.0	0.7	52.1	74.0	-21.9	H	P	197.5	319.5	
15.930	3.0	25.2	37.7	12.4	-33.9	0.0	0.7	42.1	54.0	-11.9	H	A	197.5	319.5	

Rev. 4.1.2.7
Note: No other emissions were detected above the system noise floor.

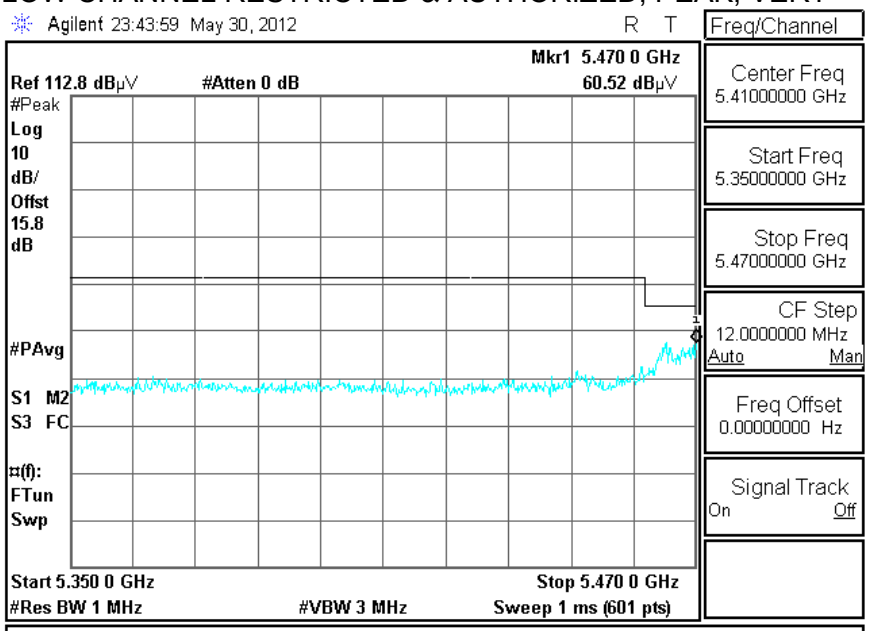
8.2.7. TX ABOVE 1 GHz 802.11a MODE IN THE 5.6 GHz BAND

RESTRICTED & AUTHORIZED BANDEDGE (LOW CHANNEL)

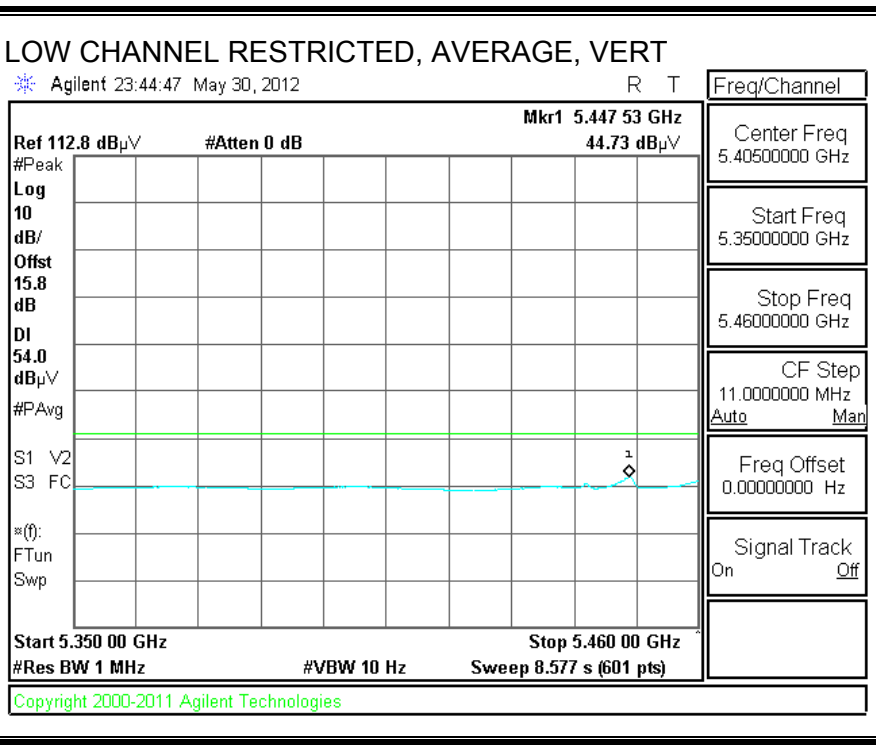




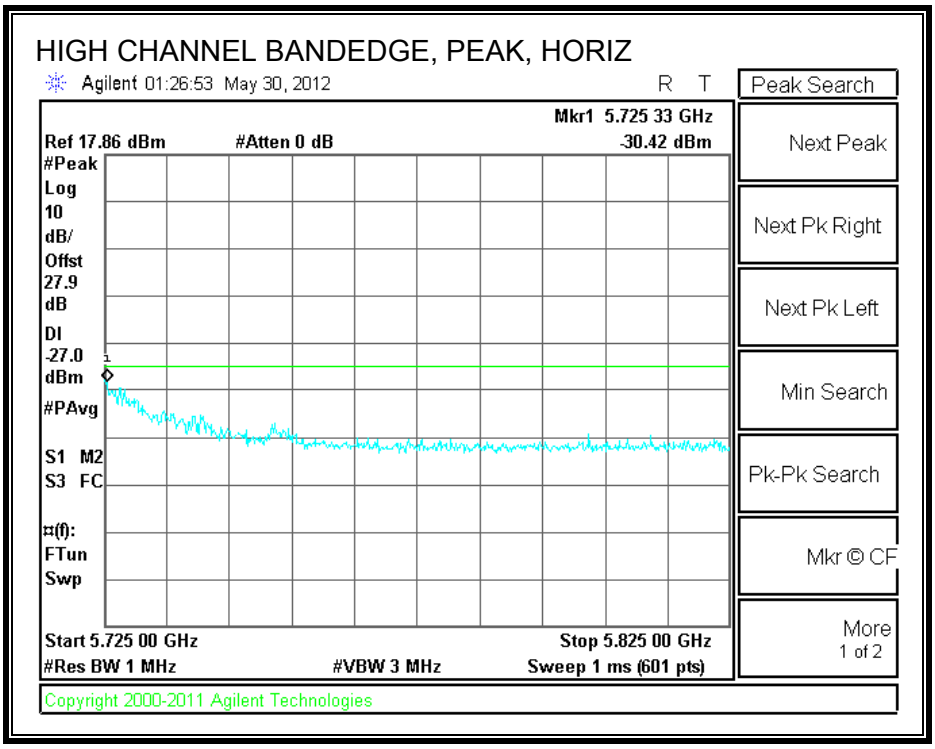
LOW CHANNEL RESTRICTED & AUTHORIZED, PEAK, VERT

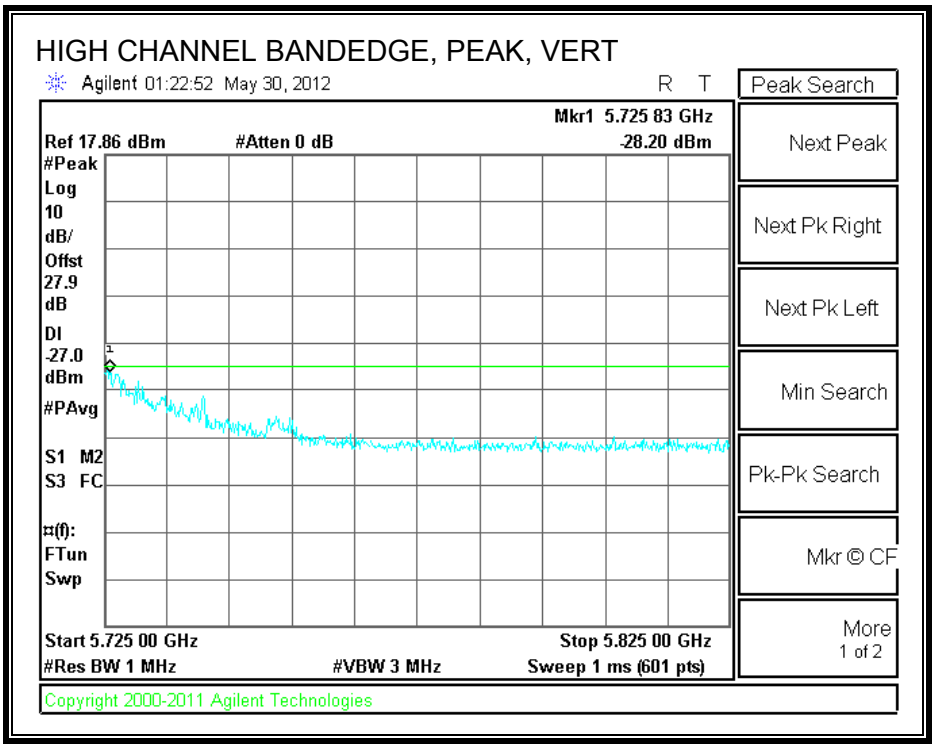


LOW CHANNEL RESTRICTED, AVERAGE, VERT



AUTHORIZED BANDEDGE (HIGH CHANNEL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m A Chamber

Test Engr: Dennis Huang
Date: 5/24/2012 - 5/25/2012
Project #: 12U14222
Company: Qualcomm Atheros
Test Target: FCC 15.205
EUT: 802.11a Mode, RF Module: N10G84TRF

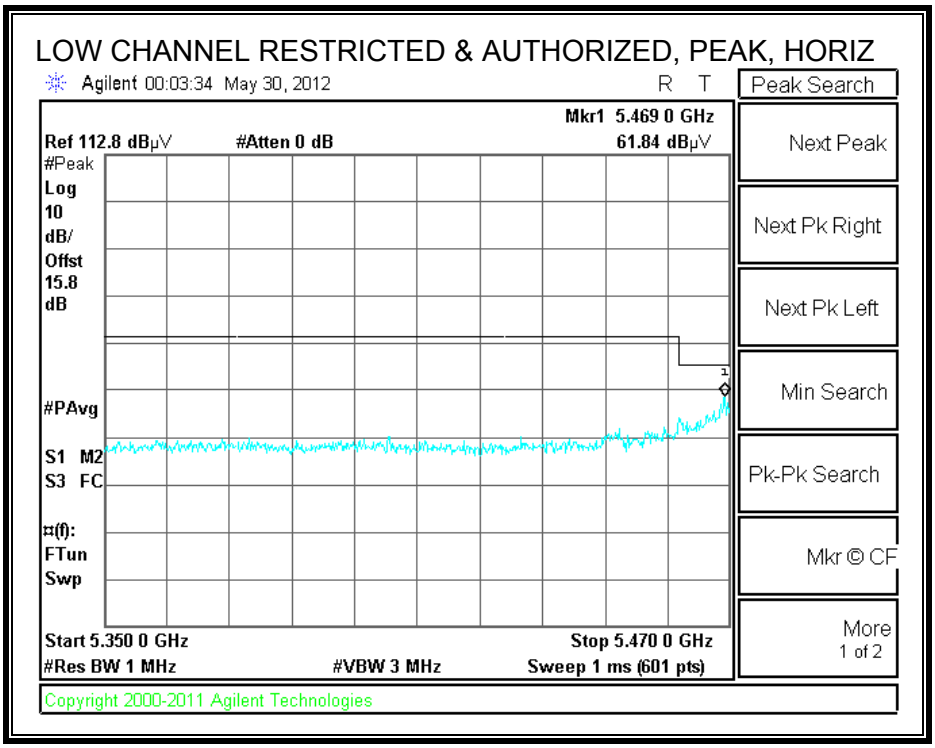
f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

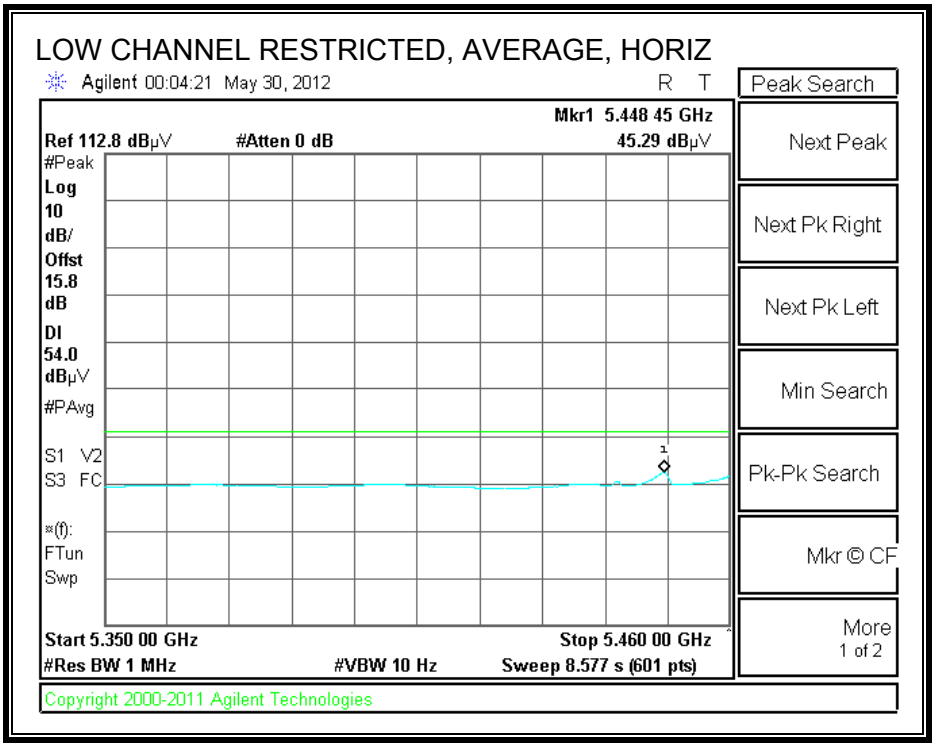
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Channel - 5500MHz															
11.000	3.0	39.9	38.4	10.2	-35.6	0.0	0.7	53.5	74.0	-20.5	V	P	125.5	254.2	
11.000	3.0	35.2	38.4	10.2	-35.6	0.0	0.7	48.8	54.0	-5.2	V	A	125.5	254.2	
11.000	3.0	35.4	38.4	10.2	-35.6	0.0	0.7	49.0	74.0	-25.0	H	P	100.6	1.3	
11.000	3.0	25.4	38.4	10.2	-35.6	0.0	0.7	39.1	54.0	-14.9	H	A	100.6	1.3	
Mid Channel - 5580MHz															
11.160	3.0	36.7	38.5	10.3	-35.6	0.0	0.7	50.7	74.0	-23.3	V	P	132.1	261.2	
11.160	3.0	29.8	38.5	10.3	-35.6	0.0	0.7	43.8	54.0	-10.2	V	A	132.1	261.2	
11.160	3.0	34.5	38.5	10.3	-35.6	0.0	0.7	48.5	74.0	-25.5	H	P	114.7	102.9	
11.160	3.0	24.8	38.5	10.3	-35.6	0.0	0.7	38.8	54.0	-15.2	H	A	114.7	102.9	
High Channel - 5700MHz															
11.400	3.0	38.1	38.7	10.6	-35.6	0.0	0.7	52.6	74.0	-21.4	V	P	128.0	259.5	
11.400	3.0	32.7	38.7	10.6	-35.6	0.0	0.7	47.2	54.0	-6.8	V	A	128.0	259.5	
11.400	3.0	34.6	38.7	10.6	-35.6	0.0	0.7	49.1	74.0	-24.9	H	P	158.1	80.5	
11.400	3.0	25.1	38.7	10.6	-35.6	0.0	0.7	39.6	54.0	-14.4	H	A	158.1	80.5	

Rev. 4.1.2.7
Note: No other emissions were detected above the system noise floor.

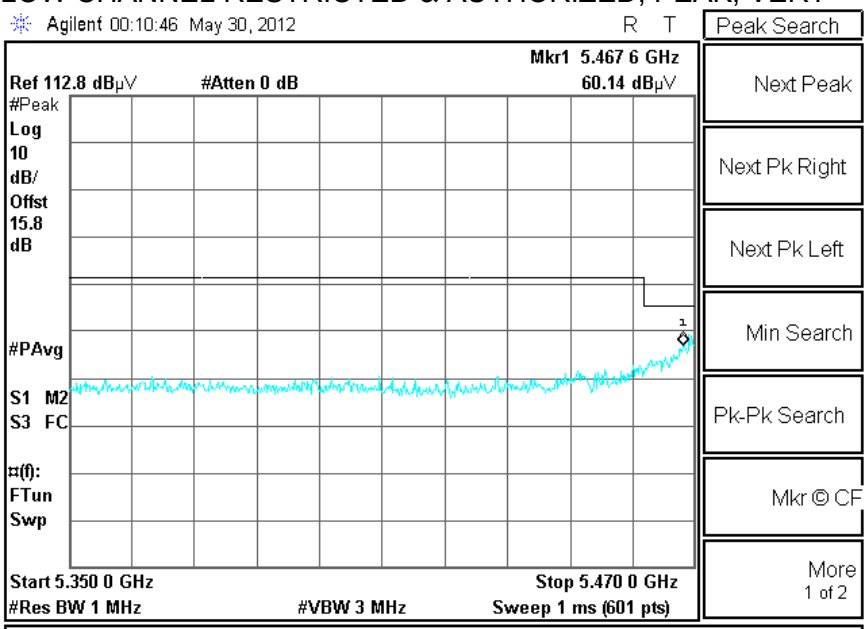
8.2.8. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.6 GHz BAND

RESTRICTED & AUTHORIZED BANDEDGE (LOW CHANNEL)

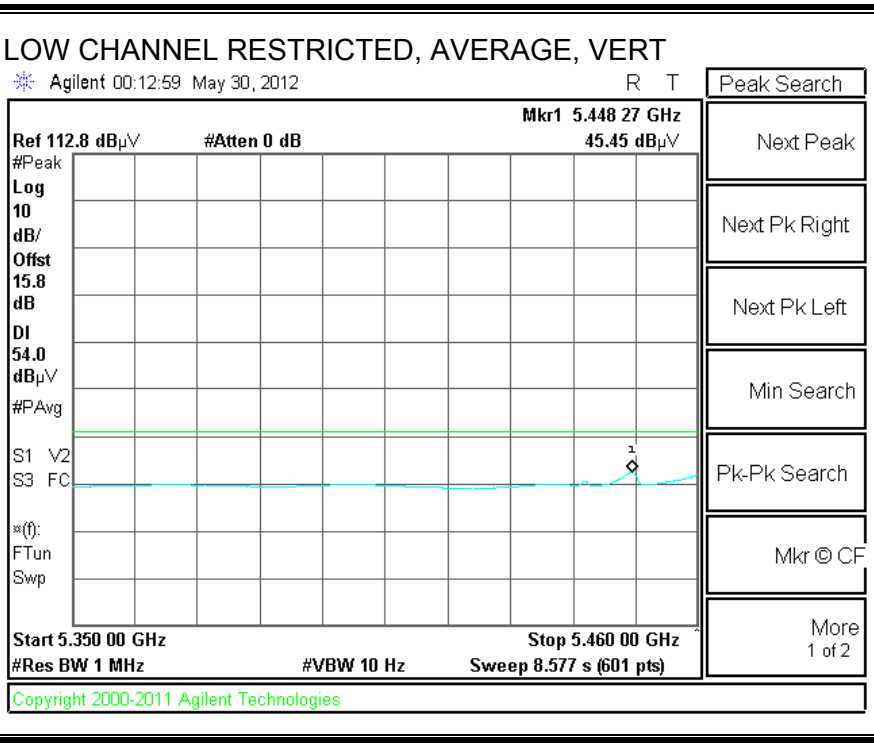




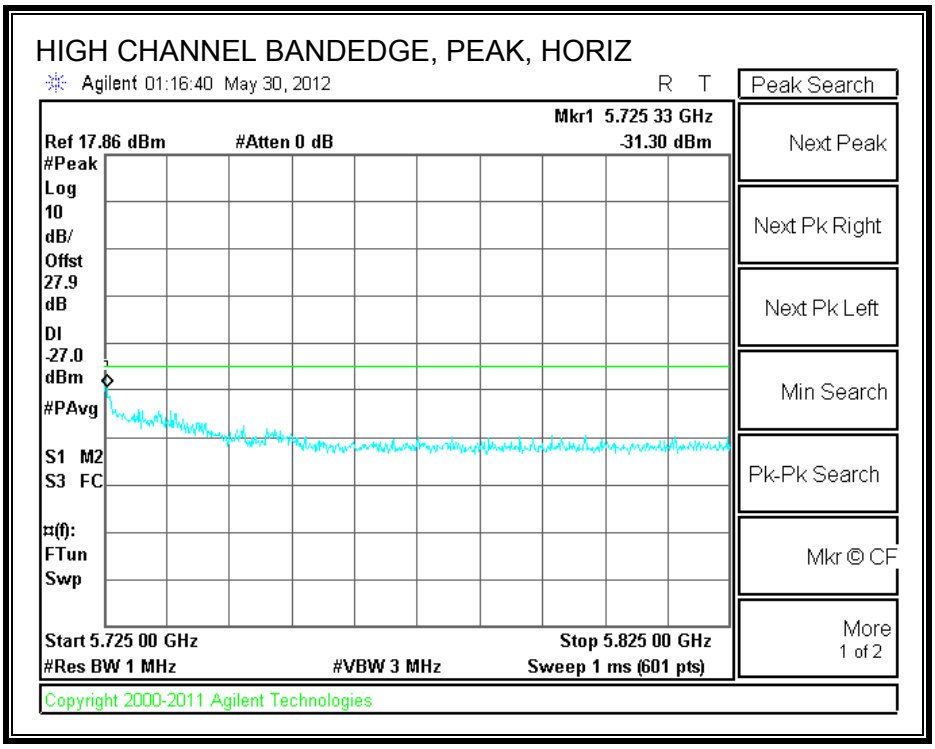
LOW CHANNEL RESTRICTED & AUTHORIZED, PEAK, VERT

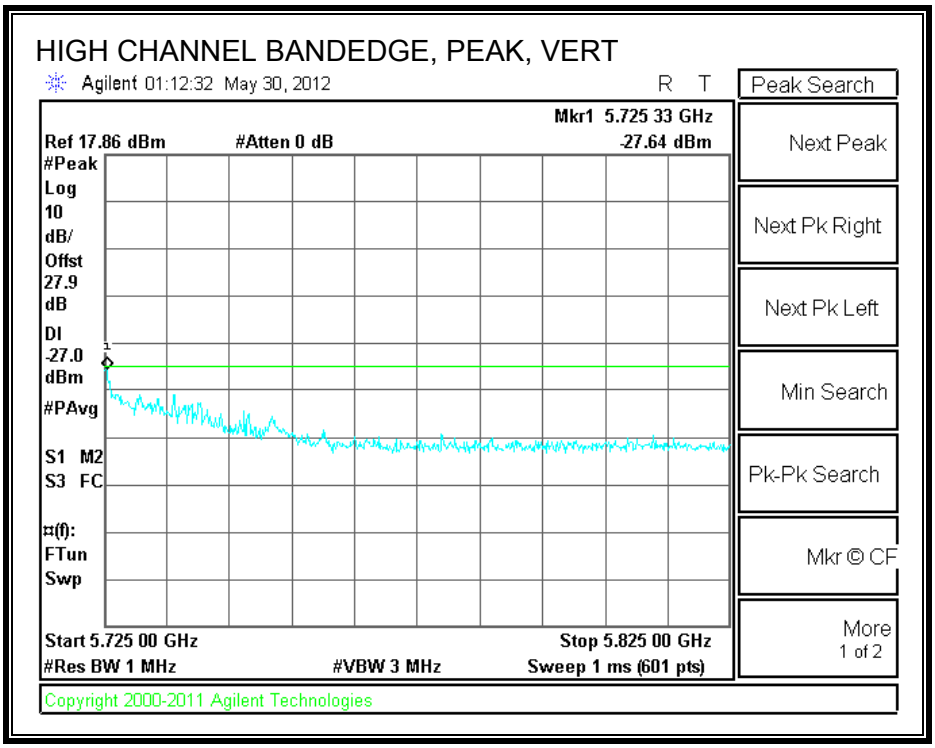


LOW CHANNEL RESTRICTED, AVERAGE, VERT



AUTHORIZED BANDEDGE (HIGH CHANNEL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m A Chamber

Test Engr: Dennis Huang
Date: 5/24/2012 - 5/25/2012
Project #: 12U14222
Company: Qualcomm Atheros
Test Target: FCC 15.205
EUT: 802.11n HT20 Mode, MTP PCB SN:016-2-450001, RF Module: N10G84TRF

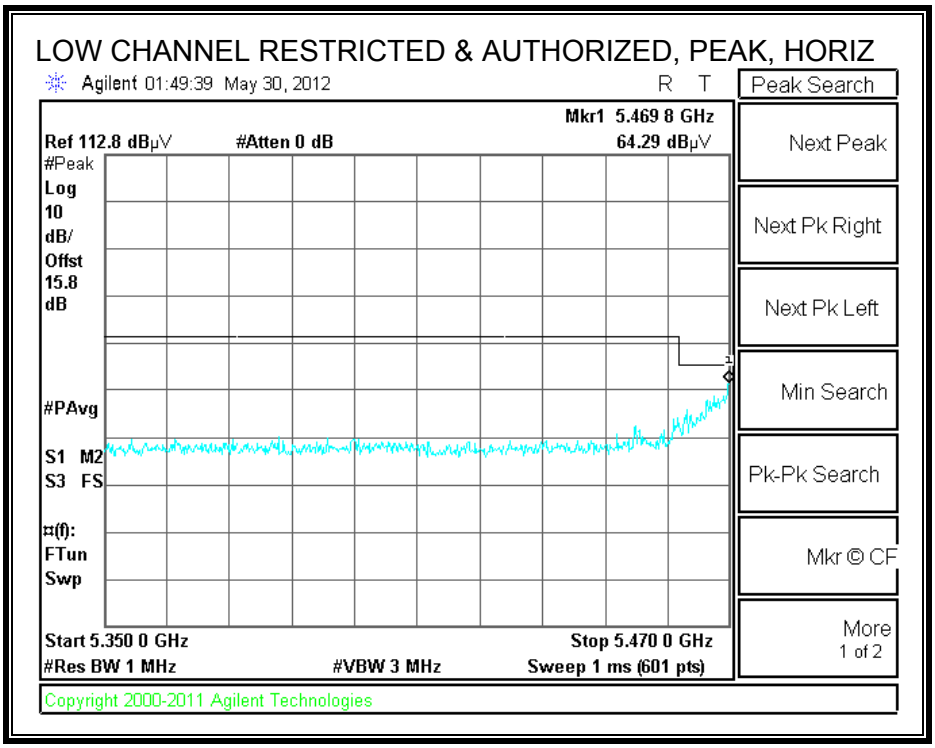
f	Measurement Frequency	Amp	Preamp Gain		Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters		Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m		Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength		Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

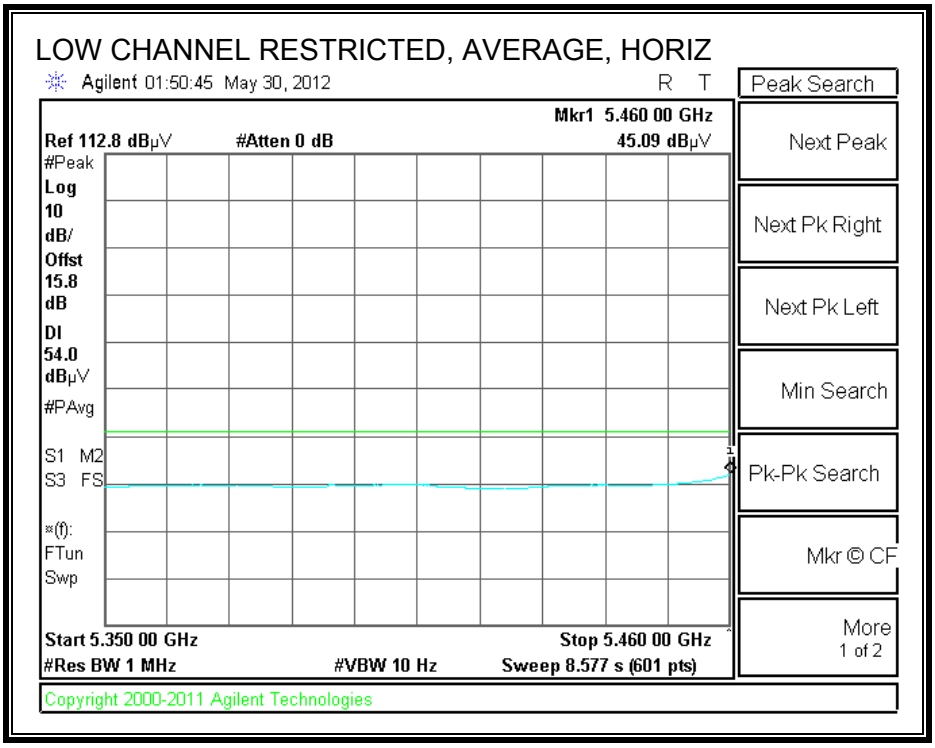
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Channel - 5500MHz															
11.000	3.0	38.6	38.4	10.2	-35.6	0.0	0.7	52.2	74.0	-21.8	V	P	120.6	258.4	
11.000	3.0	33.0	38.4	10.2	-35.6	0.0	0.7	46.6	54.0	-7.4	V	A	120.6	258.4	
11.000	3.0	34.8	38.4	10.2	-35.6	0.0	0.7	48.4	74.0	-25.6	H	P	113.1	231.1	
11.000	3.0	24.3	38.4	10.2	-35.6	0.0	0.7	38.0	54.0	-16.0	H	A	113.1	231.1	
Mid Channel - 5580MHz															
11.160	3.0	36.4	38.5	10.3	-35.6	0.0	0.7	50.4	74.0	-23.6	V	P	184.8	256.5	
11.160	3.0	29.6	38.5	10.3	-35.6	0.0	0.7	43.6	54.0	-10.4	V	A	184.8	256.5	
11.160	3.0	36.7	38.5	10.3	-35.6	0.0	0.7	50.6	74.0	-23.4	H	P	172.2	354.7	
11.160	3.0	26.7	38.5	10.3	-35.6	0.0	0.7	40.7	54.0	-13.3	H	A	172.2	354.7	
High Channel - 5700MHz															
11.400	3.0	37.3	38.7	10.6	-35.6	0.0	0.7	51.9	74.0	-22.1	V	P	106.8	258.9	
11.400	3.0	31.2	38.7	10.6	-35.6	0.0	0.7	45.7	54.0	-8.3	V	A	106.8	258.9	
11.400	3.0	34.4	38.7	10.6	-35.6	0.0	0.7	49.0	74.0	-25.0	H	P	142.0	159.0	
11.400	3.0	24.5	38.7	10.6	-35.6	0.0	0.7	39.0	54.0	-15.0	H	A	142.0	159.0	

Rev. 4.1.2.7
Note: No other emissions were detected above the system noise floor.

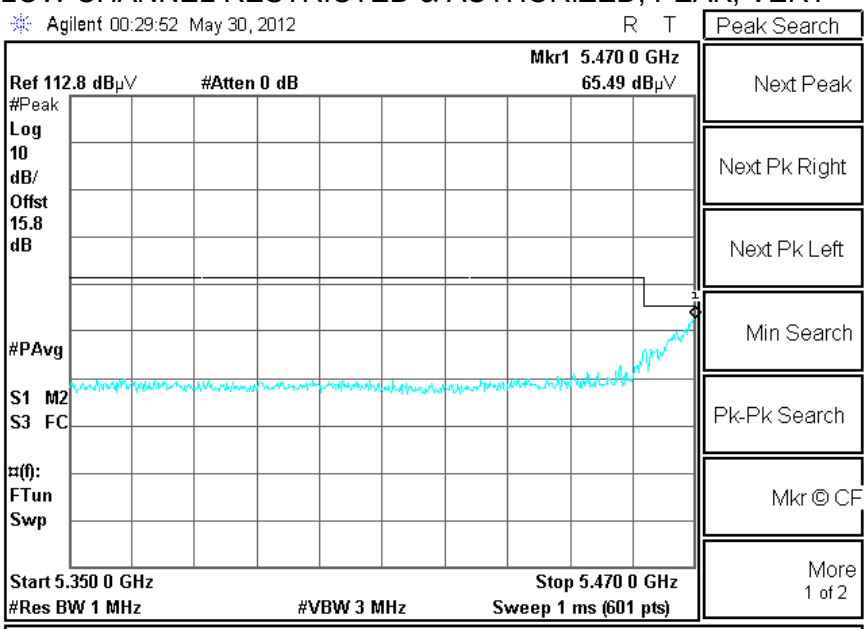
8.2.9. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.6 GHz BAND

RESTRICTED & AUTHORIZED BANDEDGE (LOW CHANNEL)

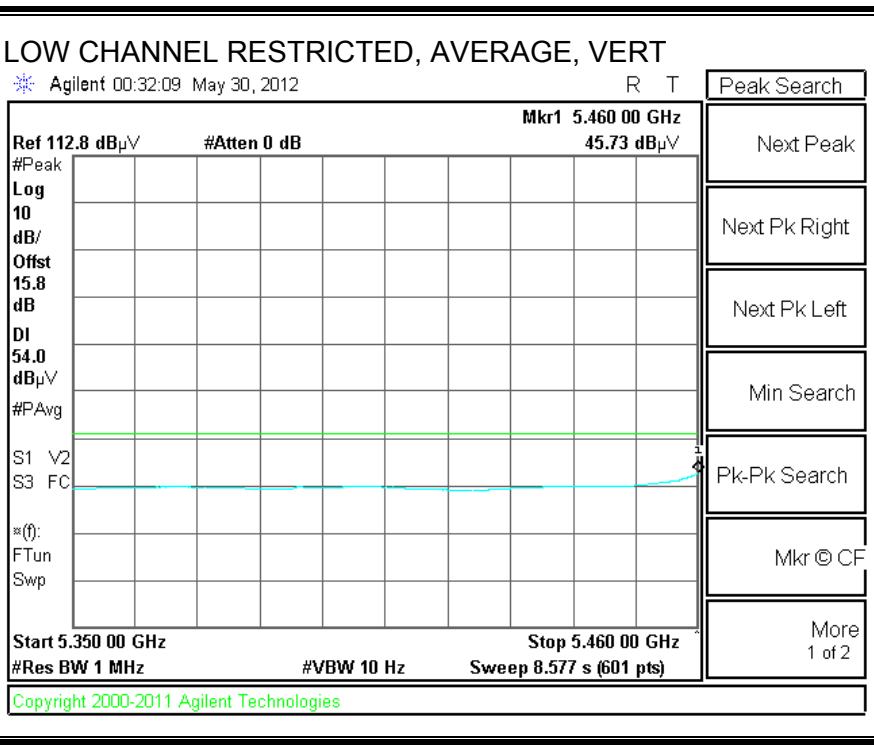




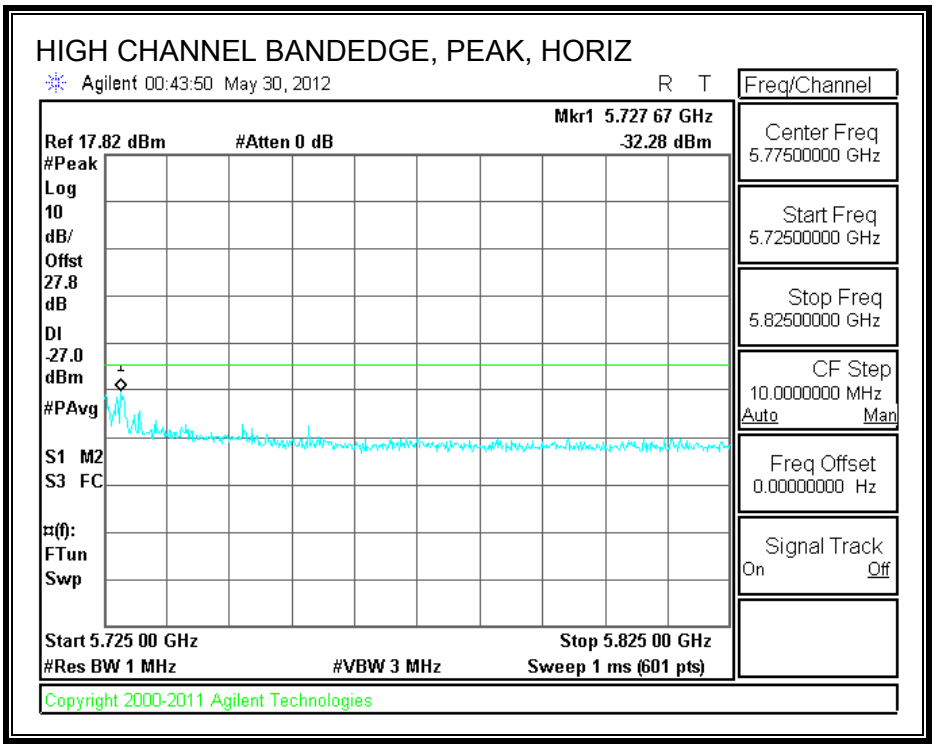
LOW CHANNEL RESTRICTED & AUTHORIZED, PEAK, VERT

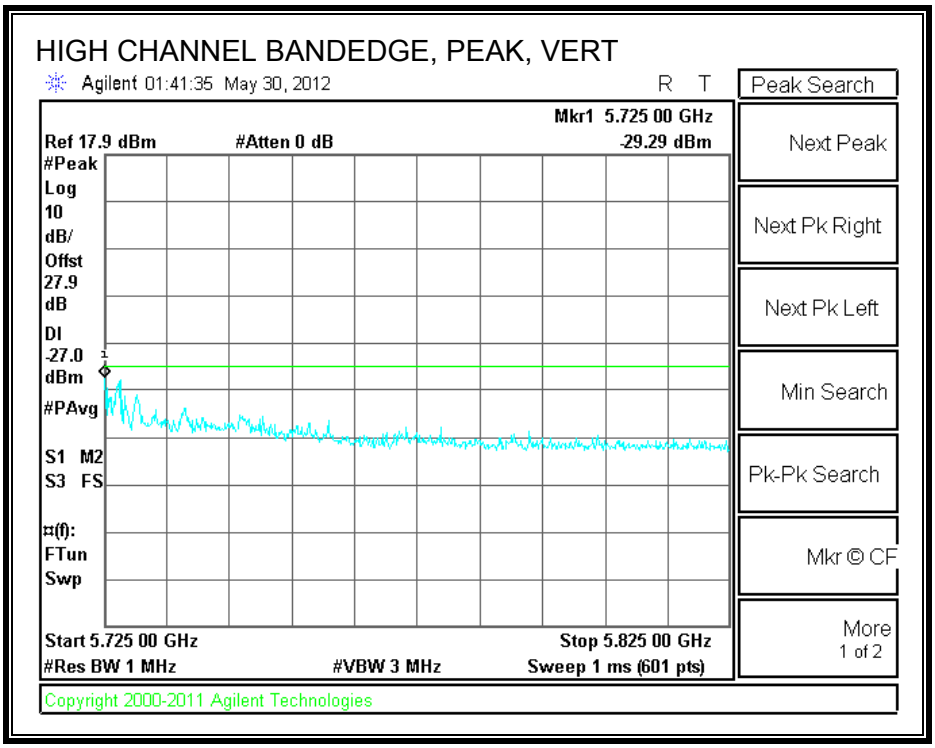


LOW CHANNEL RESTRICTED, AVERAGE, VERT



AUTHORIZED BANDEDGE (HIGH CHANNEL)





HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m A Chamber

Test Engr: Dennis Huang
Date: 5/24/2012 - 5/25/2012
Project #: 12U14222
Company: Qualcomm Atheros
Test Target: FCC 15.205
EUT: 802.11n HT40 Mode, MTP PCB SN:016-2-450001, RF Module: N10G84TRF

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		

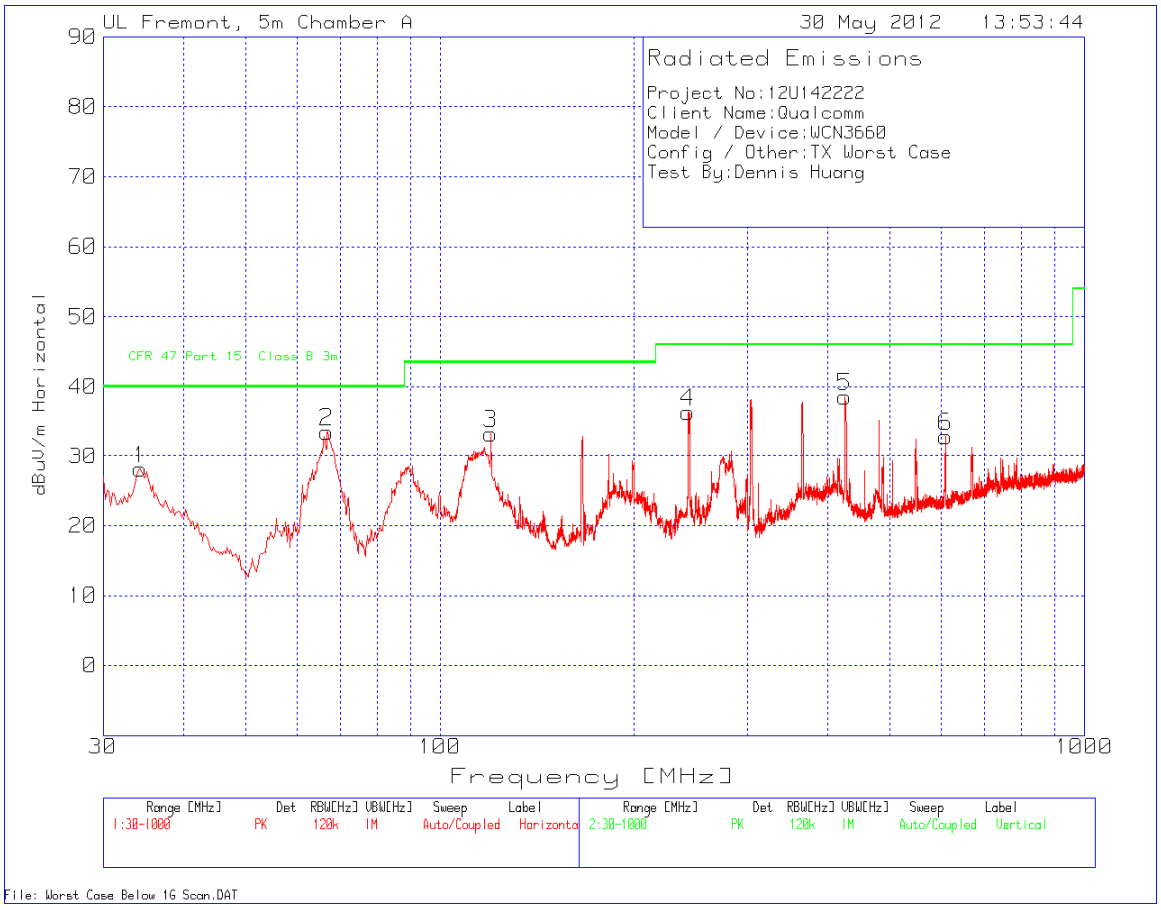
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Channel - 5510MHz															
11.020	3.0	39.1	38.4	10.2	-35.6	0.0	0.7	52.7	74.0	-21.3	V	P	127.1	254.6	
11.020	3.0	34.8	38.4	10.2	-35.6	0.0	0.7	48.5	54.0	-5.5	V	A	127.1	254.6	
11.020	3.0	36.4	38.4	10.2	-35.6	0.0	0.7	50.0	74.0	-24.0	H	P	152.1	126.5	
11.020	3.0	26.4	38.4	10.2	-35.6	0.0	0.7	40.1	54.0	-13.9	H	A	152.1	126.5	
Mid Channel - 5550MHz															
11.100	3.0	39.4	38.5	10.3	-35.6	0.0	0.7	53.2	74.0	-20.8	V	P	117.9	253.5	
11.100	3.0	34.2	38.5	10.3	-35.6	0.0	0.7	48.0	54.0	-6.0	V	A	117.9	253.5	
11.100	3.0	36.0	38.5	10.3	-35.6	0.0	0.7	49.8	74.0	-24.2	H	P	100.9	256.8	
11.100	3.0	27.5	38.5	10.3	-35.6	0.0	0.7	41.3	54.0	-12.7	H	A	100.9	256.8	
High Channel - 5670MHz															
11.340	3.0	37.2	38.7	10.6	-35.6	0.0	0.7	51.6	74.0	-22.4	V	P	118.7	252.6	
11.340	3.0	30.5	38.7	10.6	-35.6	0.0	0.7	44.8	54.0	-9.2	V	A	118.7	252.6	
11.340	3.0	33.8	38.7	10.6	-35.6	0.0	0.7	48.2	74.0	-25.8	H	P	196.2	131.7	
11.340	3.0	24.7	38.7	10.6	-35.6	0.0	0.7	39.1	54.0	-14.9	H	A	196.2	131.7	

Rev. 4.1.2.7
Note: No other emissions were detected above the system noise floor.

8.3. WORST-CASE BELOW 1 GHz

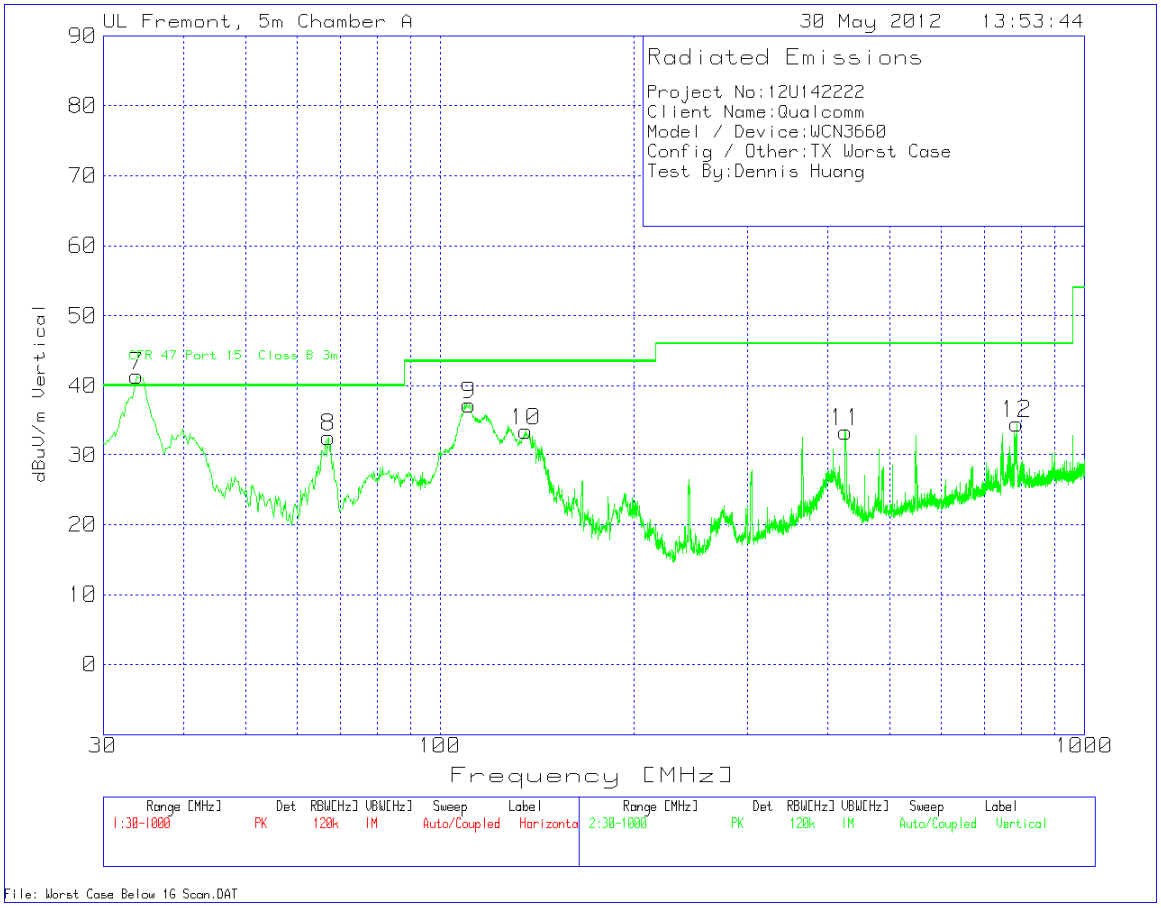
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



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

VERTICAL PLOT



HORIZONTAL AND VERTICAL DATA

Project No:12U14222
Client Name:Qualcomm
Model / Device:WCN3660
Config / Other:TX Worst Case
Test By:Dennis Huang

Test Frequency (MHz)	Raw Reading (dBuV/m)	Detector	Amplifier + Cable Loss [dB]	Bilog Antenna Loss [dB]	Corrected Reading (dBuV/m)	Part 15 Class B Limit (dBuV/m)	Margin	Antenna Height [cm]	Polarity
34.2646	37.67	PK	-27.6	18.1	28.17	40	-11.83	300	Horz
66.8305	52.82	PK	-27.2	7.9	33.52	40	-6.48	400	Horz
119.944	46.15	PK	-26.7	13.8	33.25	43.5	-10.25	300	Horz
243.0356	50.89	PK	-26	11.5	36.39	46	-9.61	100	Horz
425.056	47.42	PK	-25.3	16.4	38.52	46	-7.48	200	Horz
609.7902	38.34	PK	-24	18.5	32.84	46	-13.16	100	Horz

Test Frequency (MHz)	Raw Reading (dBuV/m)	Detector	Amplifier + Cable Loss [dB]	Bilog Antenna Loss [dB]	Corrected Reading (dBuV/m)	Part 15 Class B Limit (dBuV/m)	Margin	Ant Height [cm]	Polarity
34.39	44.67	QP	-27.6	18	35.07	40	-4.93	100	Vert
67.2182	51.91	PK	-27.2	7.9	32.61	40	-7.39	400	Vert
111.0272	51.01	PK	-26.7	12.9	37.21	43.5	-6.29	100	Vert
136.0332	47.17	PK	-26.7	13	33.47	43.5	-10.03	100	Vert
426.8006	42.35	PK	-25.4	16.4	33.35	46	-12.65	200	Vert
787.1583	37.15	PK	-23.3	20.7	34.55	46	-11.45	100	Vert

PK - Peak detector
QP - Quasi-Peak detector
LnAv - Linear Average detector
LgAv - Log Average detector
Av - Average detector
CAV - CISPR Average detector
RMS - RMS detection
CRMS - CISPR RMS detection
Text File: below 1ghz.TXT
File: below 1ghz.DAT

9. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

Frequency of Emission (MHz)	Conducted 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.

LINE 1 RESULTS

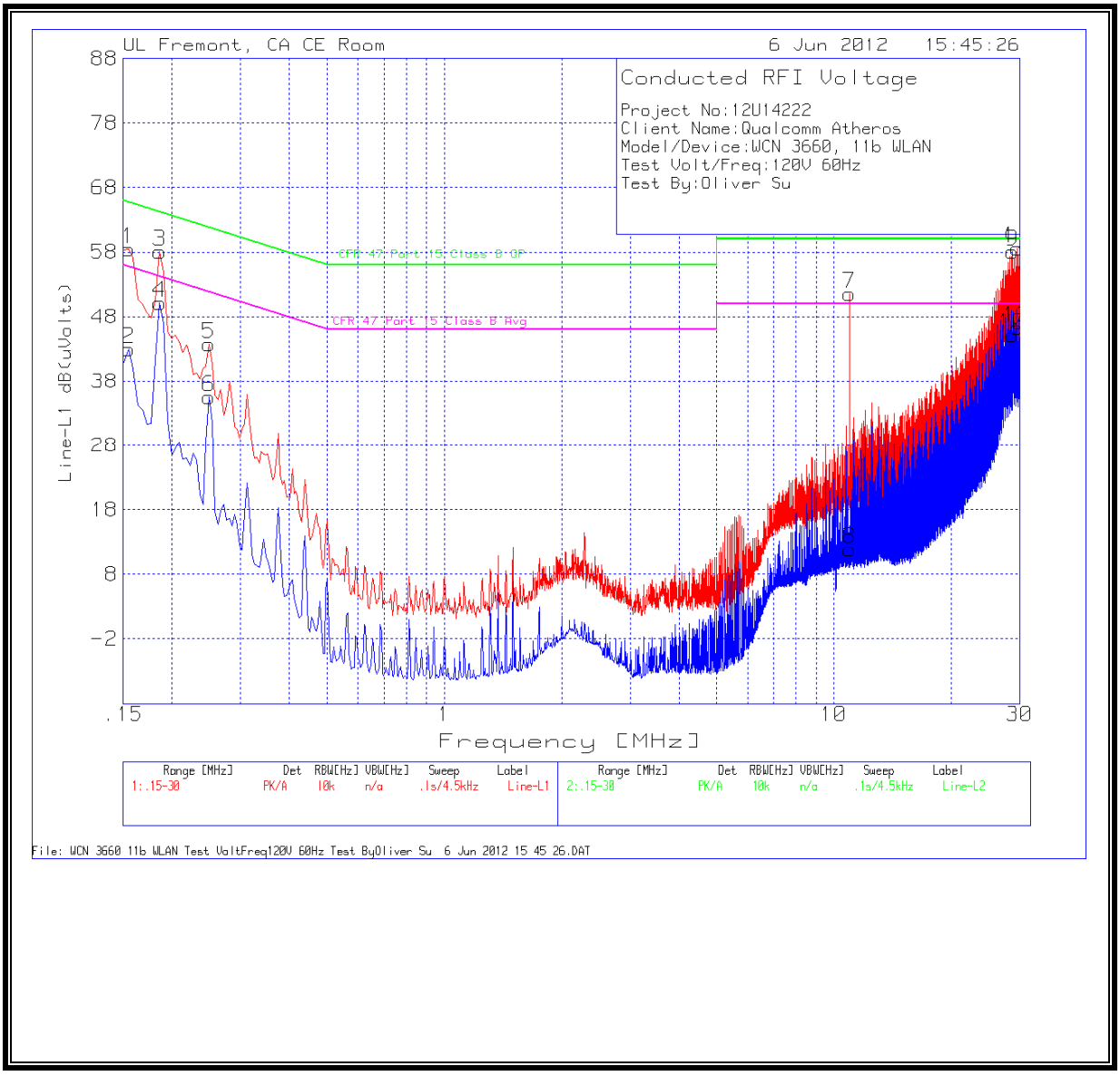
6 WORST EMISSIONS

Line-L1 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L1 (dB)	LC Cables 1&3 (dB)	Corrected Reading dB(uVolts)	CFR 47 Part 15 Class B QP	Margin to Limit (dB)	CFR 47 Part 15 Class B Avg	Margin to Limit (dB)
1	.1545	58.32	PK	.1	0	58.42	65.8	-7.38	-	-
2	.1545	42.86	Av	.1	0	42.96	-	-	55.8	-12.84
3	.186	57.92	PK	.1	0	58.02	64.2	-6.18	-	-
4	.186	50	Av	.1	0	50.1	-	-	54.2	-4.1
5	.249	43.65	PK	.1	0	43.75	61.8	-18.05	-	-
6	.249	35.47	Av	.1	0	35.57	-	-	51.8	-16.23
7	10.986	51.3	PK	.1	.2	51.6	60	-8.4	-	-
8	10.986	11.57	Av	.1	.2	11.87	-	-	50	-38.13
9	28.77	57.29	PK	.5	.3	58.09	60	-1.91	-	-
10	28.77	44.34	Av	.5	.3	45.14	-	-	50	-4.86
11	29.5215	57.75	PK	.5	.3	58.55	60	-1.45	-	-
12	29.5215	45.53	Av	.5	.3	46.33	-	-	50	-3.67

LINE 1 RESULTS



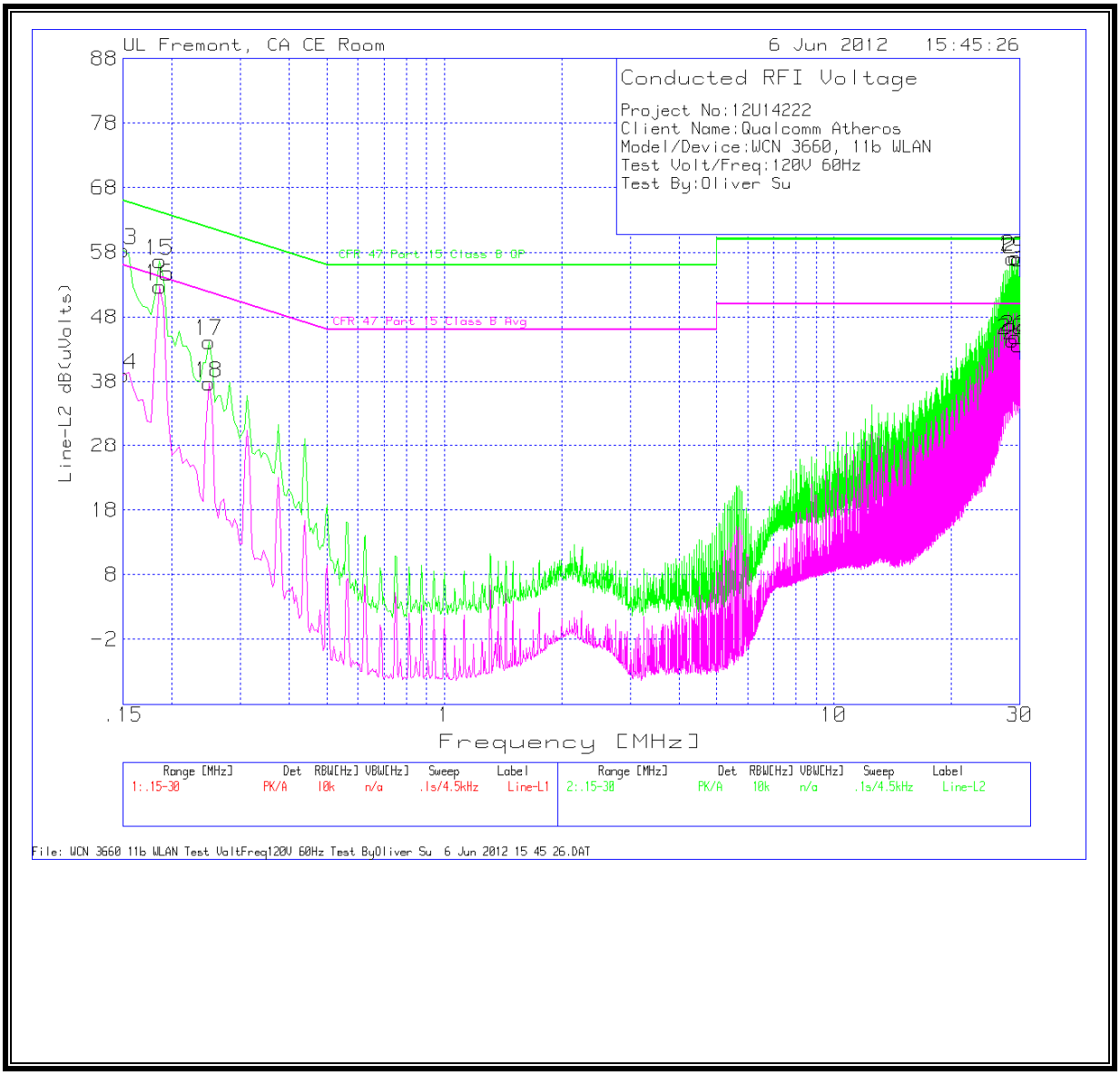
LINE 2 RESULTS

6 WORST EMISSIONS

Line-L2 .15 - 30MHz

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	T24 IL L2 (dB)	LC Cables 2&3 (dB)	Corrected Reading dB(uVolts)	CFR 47 Part 15 Class B QP	Margin to Limit (dB)	CFR 47 Part 15 Class B Avg	Margin to Limit (dB)
13	.15	58.22	PK	.1	0	58.32	66	-7.68	-	-
14	.15	38.85	Av	.1	0	38.95	-	-	56	-17.05
15	.186	56.59	PK	.1	0	56.69	64.2	-7.51	-	-
16	.186	52.66	Av	.1	0	52.76	-	-	54.2	-1.44
17	.249	44.09	PK	.1	0	44.19	61.8	-17.61	-	-
18	.249	37.67	Av	.1	0	37.77	-	-	51.8	-14.03
19	28.77	56.28	PK	.5	.3	57.08	60	-2.92	-	-
20	28.77	43.53	Av	.5	.3	44.33	-	-	50	-5.67
21	29.2695	56.44	PK	.5	.3	57.24	60	-2.76	-	-
22	29.2695	44.14	Av	.5	.3	44.94	-	-	50	-5.06
23	29.769	56.08	PK	.5	.3	56.88	60	-3.12	-	-
24	29.769	42.81	Av	.5	.3	43.61	-	-	50	-6.39



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.

FCC

§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".

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

Requirement	Operational 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 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 Monitoring

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 assuming a 0 dBi receive antenna
Note 2: Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.

Table 4: DFS Response requirement 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 *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 Type	Pulse Width (Microseconds)	PRI (Microseconds)	Pulses	Minimum Percentage of Successful Detection	Minimum Trials
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 (Radar Types 1-4)				80%	120

Table 6 – Long Pulse Radar Test Signal

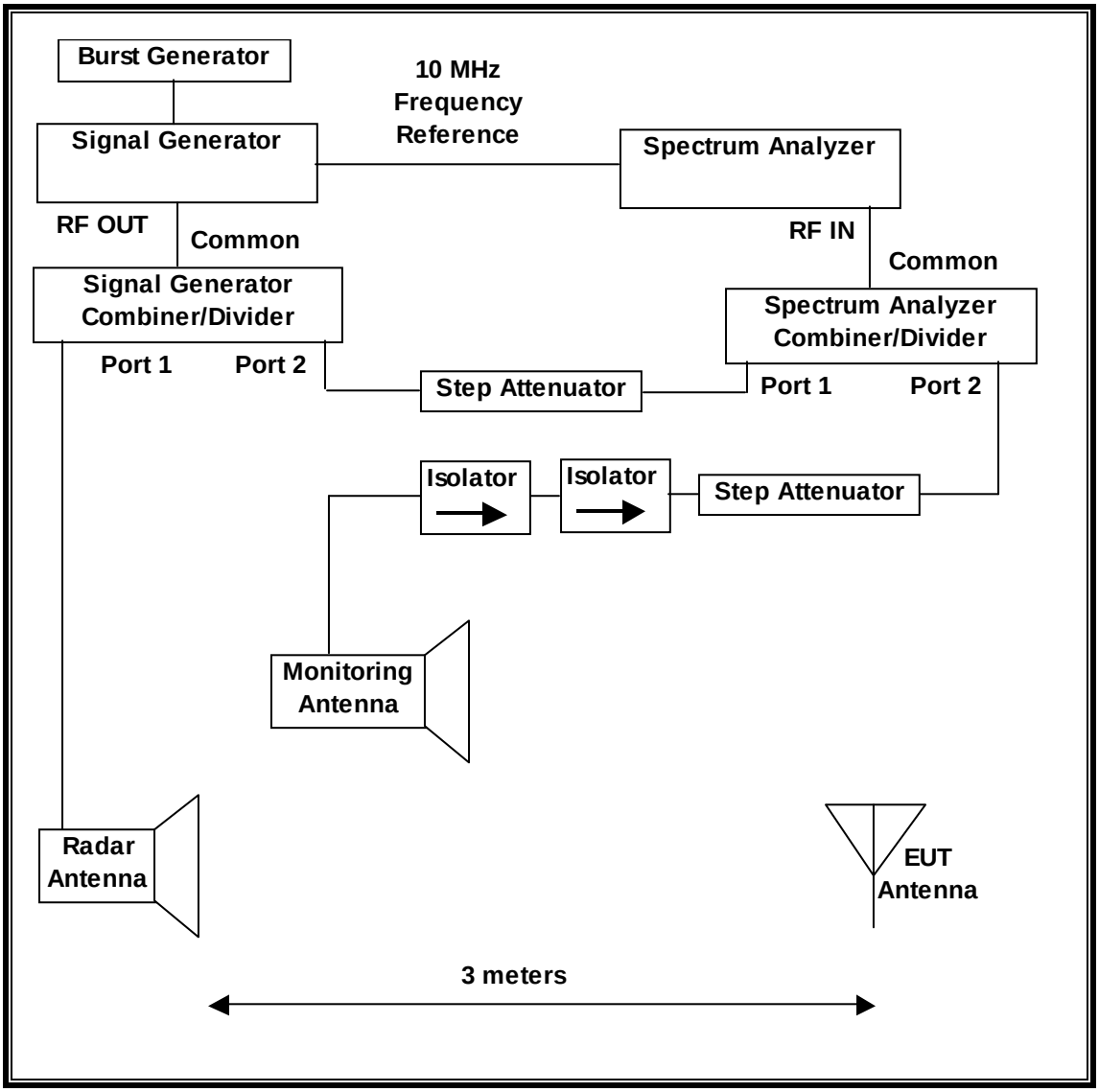
Radar Waveform	Bursts	Pulses per Burst	Pulse Width (µsec)	Chirp Width (MHz)	PRI (µsec)	Minimum Percentage of Successful Detection	Minimum Trials
5	8-20	1-3	50-100	5-20	1000-2000	80%	30

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

10.1.2. TEST AND MEASUREMENT SYSTEM

RADIATED METHOD SYSTEM BLOCK DIAGRAM



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 short pulse types 2, 3 and 4, and the long pulse type 5 parameters are randomized at run-time.

The hopping type 6 pulse parameters are fixed while the hopping sequence is based on the August 2005 NTIA Hopping Frequency List. The initial starting point randomized at run-time and each subsequent starting point is incremented by 475. Each frequency in the 100-length segment is compared to the boundaries of the EUT Detection Bandwidth and the software creates a hopping burst pattern in accordance with Section 7.4.1.3 Method #2 Simulated Freqeuncy Hopping Radar Waveform Generating Subsystem of FCC 06-96 APPENDIX. The frequency of the signal generator is incremented in 1 MHz steps from F_L to F_H for each successive trial. This incremental sequence is repeated as required to generate a minimum of 30 total trials and to maintain a uniform frequency distribution over the entire Detection Bandwidth.

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 analyzer is reconnected to the Common port of the Spectrum Analyzer Combiner/Divider. The Reference Level Offset of the spectrum analyzer is adjusted so that the displayed amplitude of the signal is –64 dBm.

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.

ADJUSTMENT OF DISPLAYED TRAFFIC LEVEL

A link is established between the Master and Slave and the distance between the units is adjusted as needed to provide a suitable received level at the Master and Slave devices. The video test file is streamed to generate WLAN traffic. The monitoring antenna is adjusted so that the WLAN traffic level, as displayed on the spectrum analyzer, is at lower amplitude than the radar detection threshold.

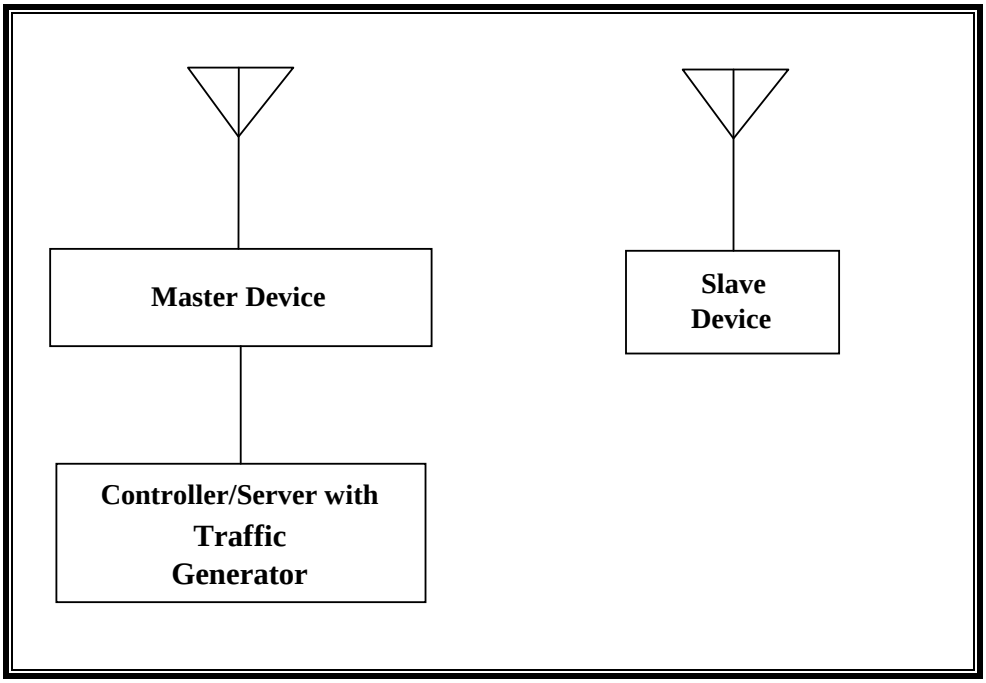
TEST AND MEASUREMENT EQUIPMENT

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

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**Cal Due**
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01178	08/15/12
Vector Signal Generator, 20GHz	Agilent / HP	E8267C	C01066	11/17/12

10.1.3. SETUP OF EUT

RADIATED METHOD EUT TEST SETUP



SUPPORT EQUIPMENT

The following support equipment was utilized for the DFS tests documented in this report:

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Wireless Access Point	Cisco	AIR-AP1252AG-A-K9	FTX15369066	LDK102061
AC Adapter (AP)	Delta Electronics	EADP-45BB B	DTH1306913R	DoC
Notebook PC (Controller/Server)	Dell	PP04X	36737846101	DoC

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 20.84 dBm EIRP in the 5250-5350 MHz band and 20.47 dBm EIRP in the 5470-5725 MHz band.

The only antenna assembly utilized with the EUT has a gain of 5.6 dBi in the 5250-5350 MHz band and 5.3 dBi in the 5470-5725 MHz band.

The rated output power density and minimum antenna gain of the Master unit is assumed to be the worst case. Therefore the interference threshold level was set to –64 dBm.

The EUT uses one transmitter/receiver chain, connected to an antenna to perform radiated tests.

WLAN traffic is generated by streaming data packets from the Master to the Slave using IxChariot version 7.10 SP2 traffic generating software package at a data rate of 5 Mbps. Traffic was generated as referenced by KDB 916201.

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 access point is revision 12.4(10b)JDA3.

UNIFORM CHANNEL SPREADING

This requirement is not applicable to Slave radio devices.

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 –64 dBm. After correction for procedural adjustments, the required radiated threshold at the antenna port is –64 + 1 = -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.

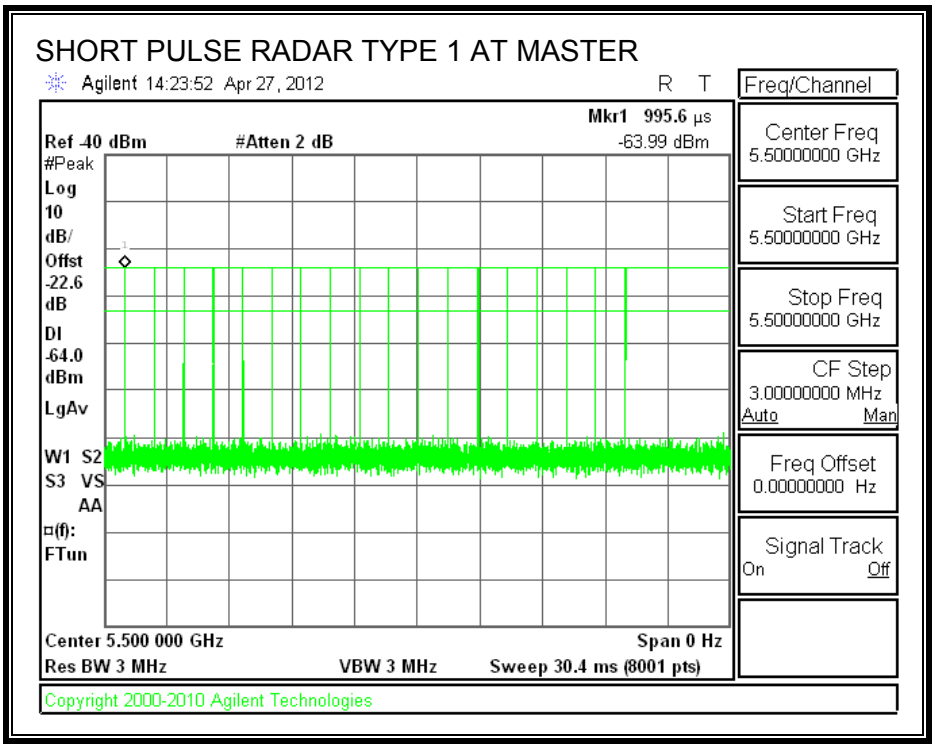
10.2. RESULTS FOR 20 MHz BANDWIDTH

10.2.1. TEST CHANNEL

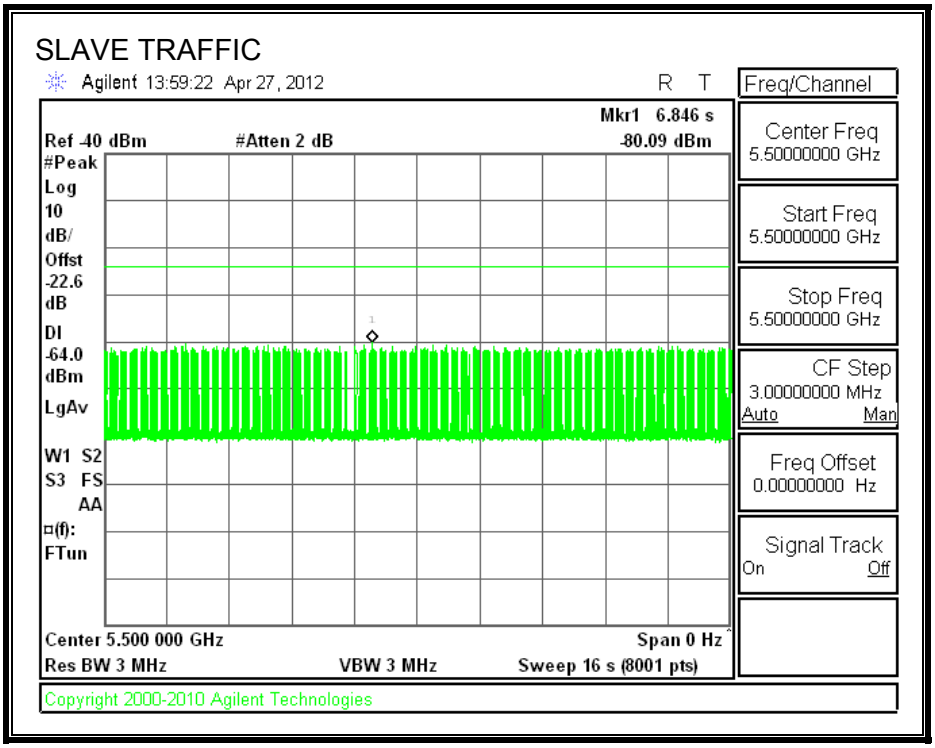
All tests were performed at a channel center frequency of 5500 MHz.

10.2.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



TRAFFIC



10.2.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

10.2.4. 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).

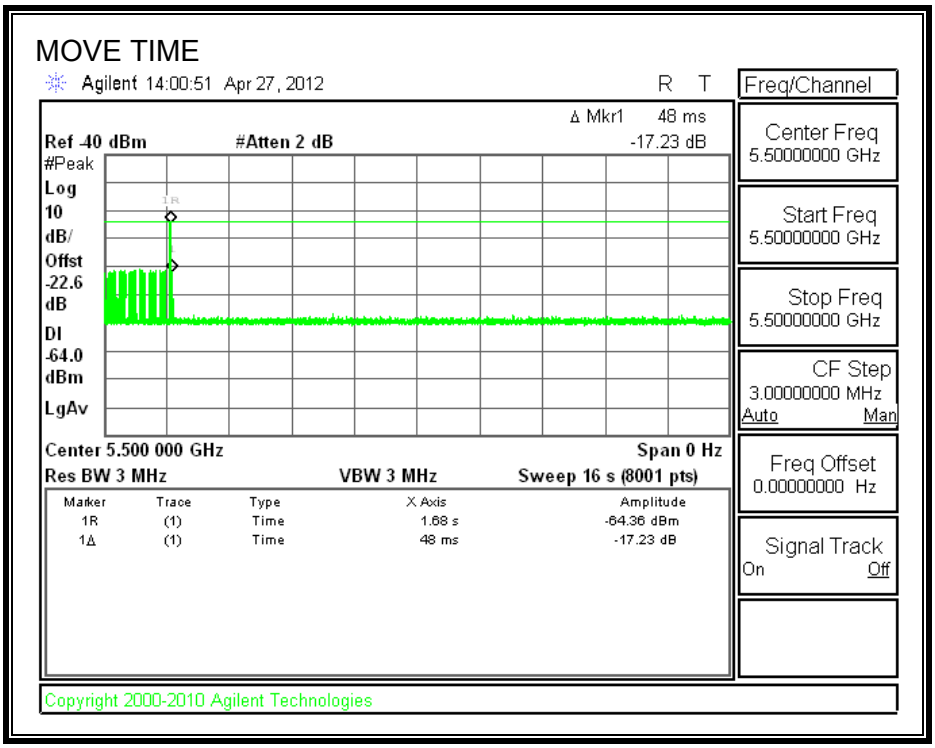
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

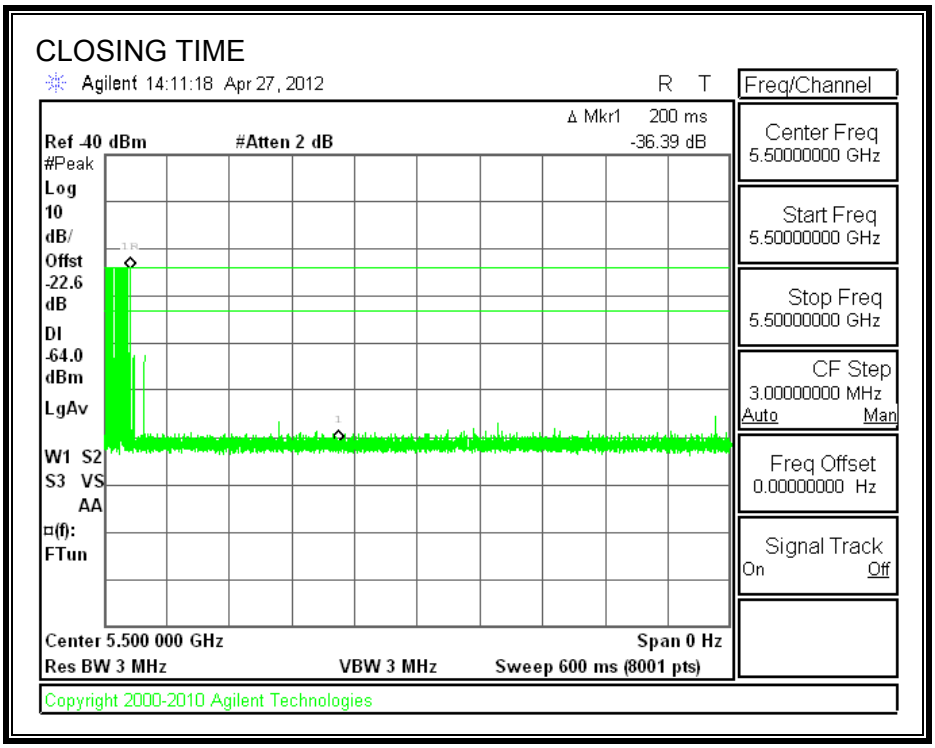
Agency	Channel Move Time (sec)	Limit (sec)
FCC / IC	0.040	10

Agency	Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
FCC	0.0	60
IC	18.0	260

MOVE TIME

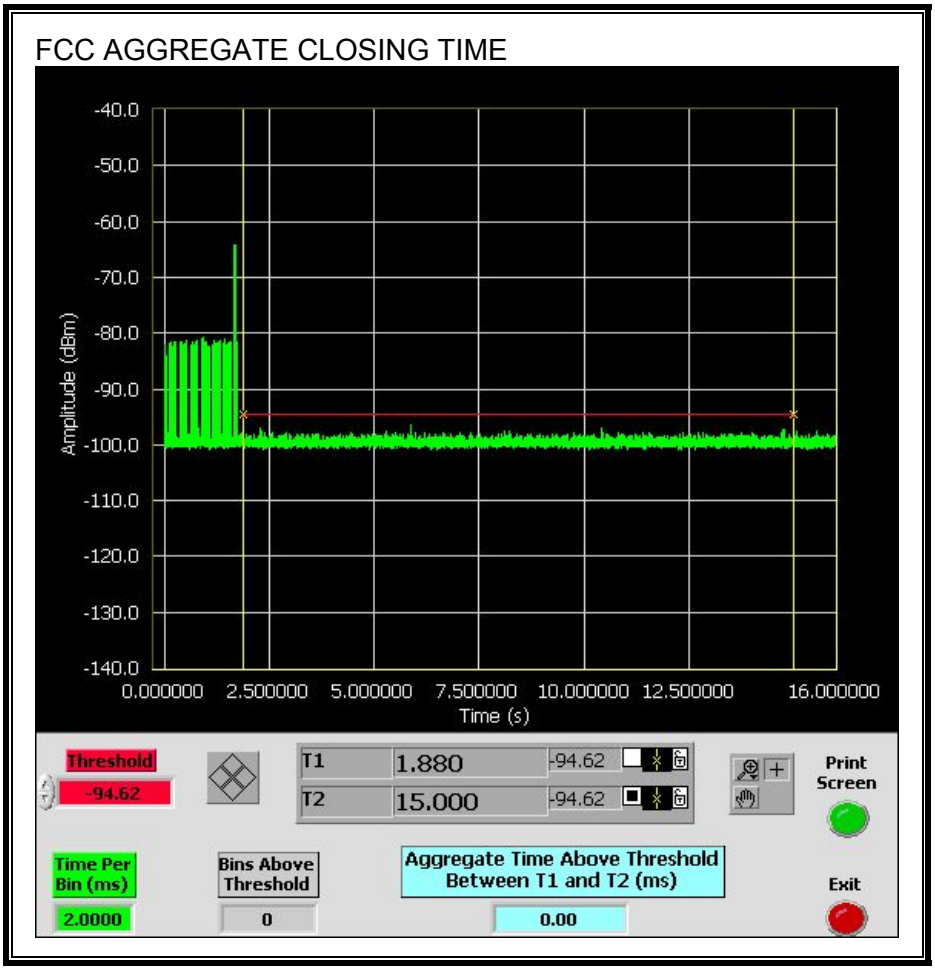


CHANNEL CLOSING TIME

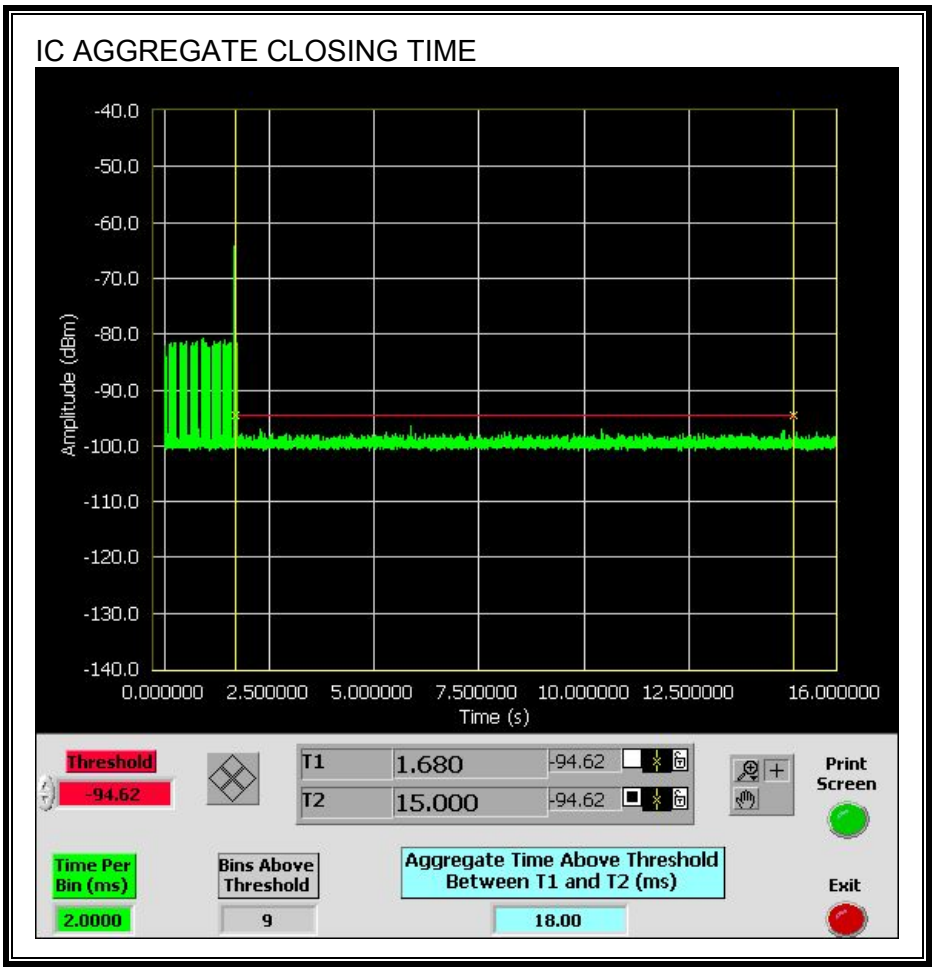


AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

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



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



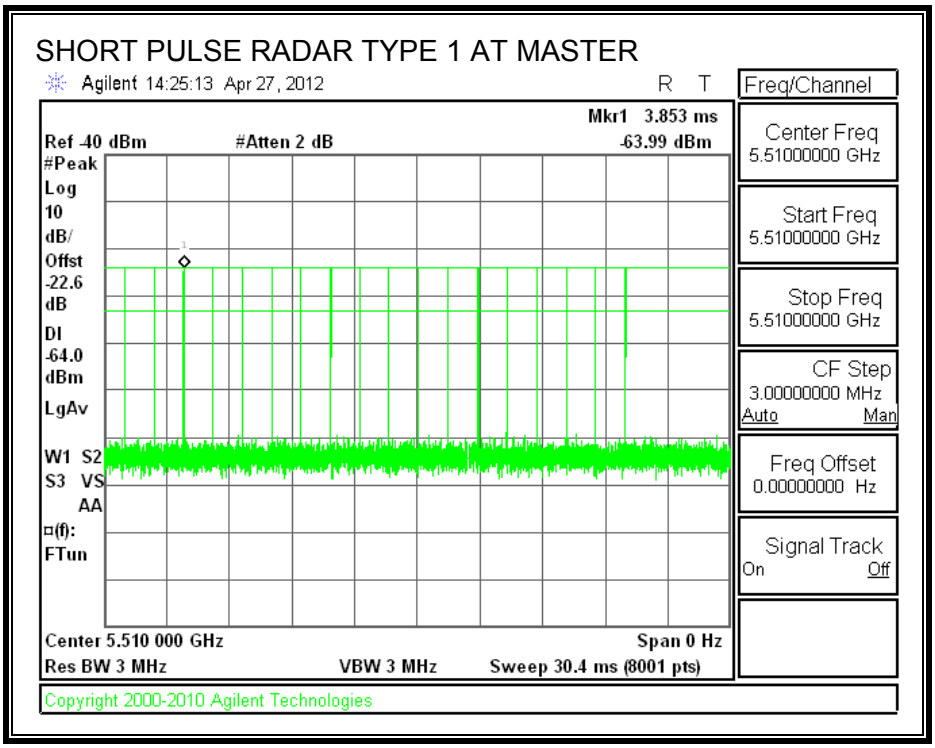
10.3. RESULTS FOR 40 MHz BANDWIDTH

10.3.1. TEST CHANNEL

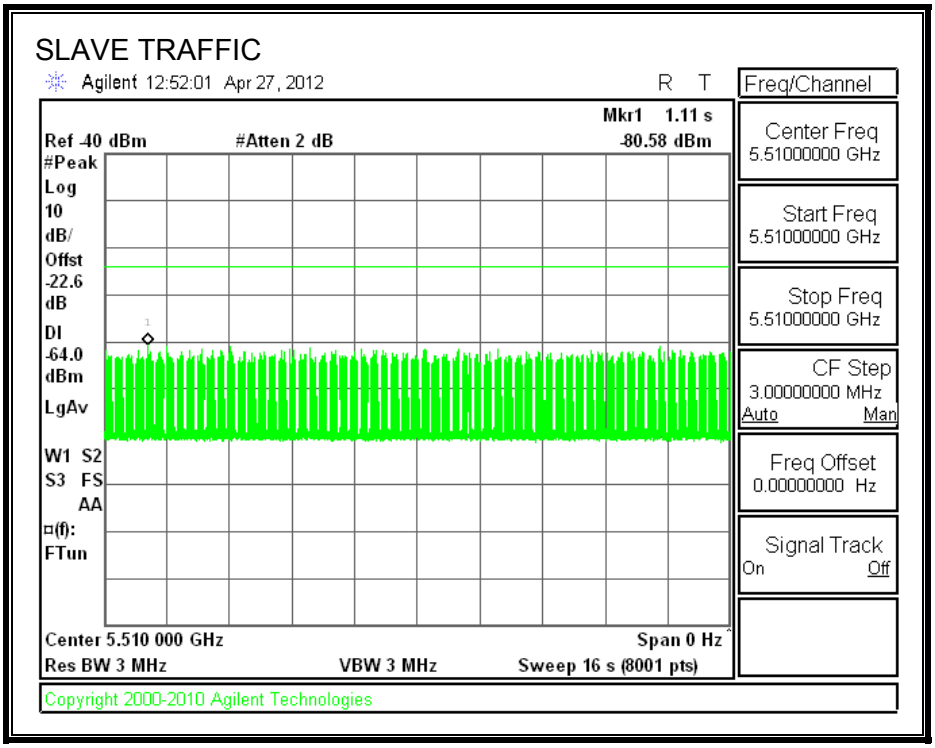
All tests were performed at a channel center frequency of 5510 MHz.

10.3.2. RADAR WAVEFORM AND TRAFFIC

RADAR WAVEFORM



TRAFFIC



10.3.3. OVERLAPPING CHANNEL TESTS

RESULTS

These tests are not applicable.

10.3.4. 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).

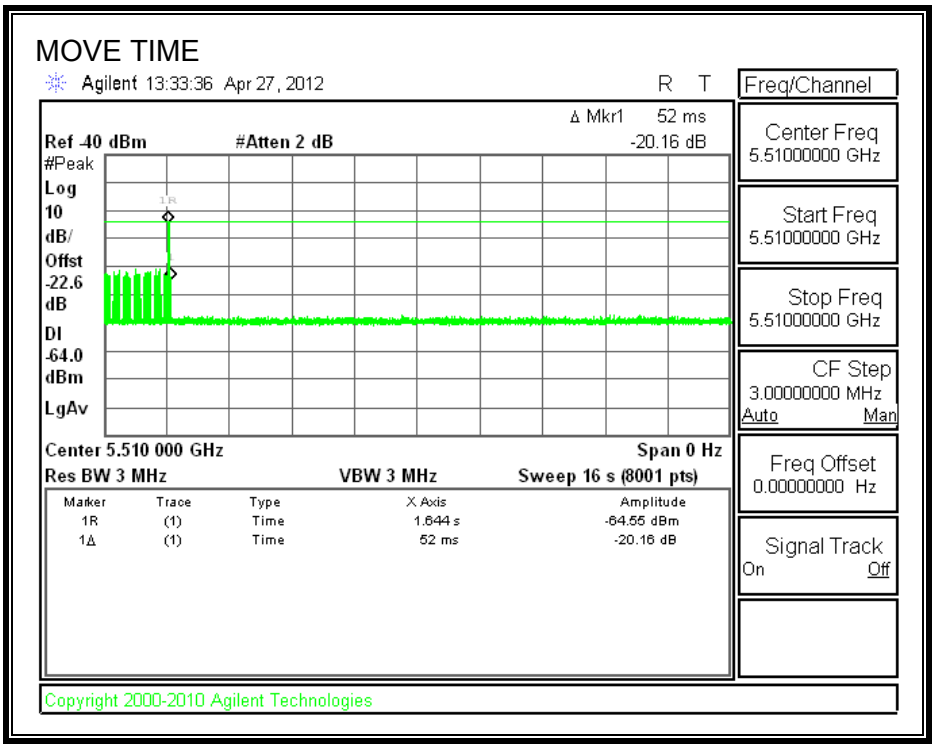
The observation period over which the IC aggregate time is calculated begins at (Reference Marker) and ends no earlier than (Reference Marker + 10 sec).

RESULTS

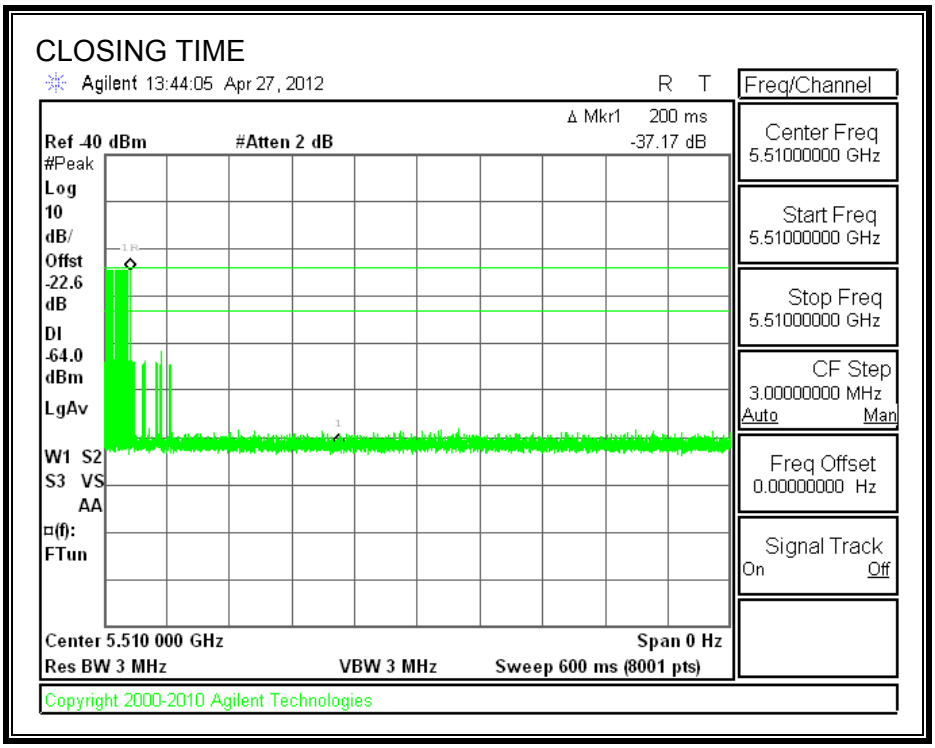
Agency	Channel Move Time (sec)	Limit (sec)
FCC / IC	0.052	10

Agency	Aggregate Channel Closing Transmission Time (msec)	Limit (msec)
FCC	0.0	60
IC	16.0	260

MOVE TIME

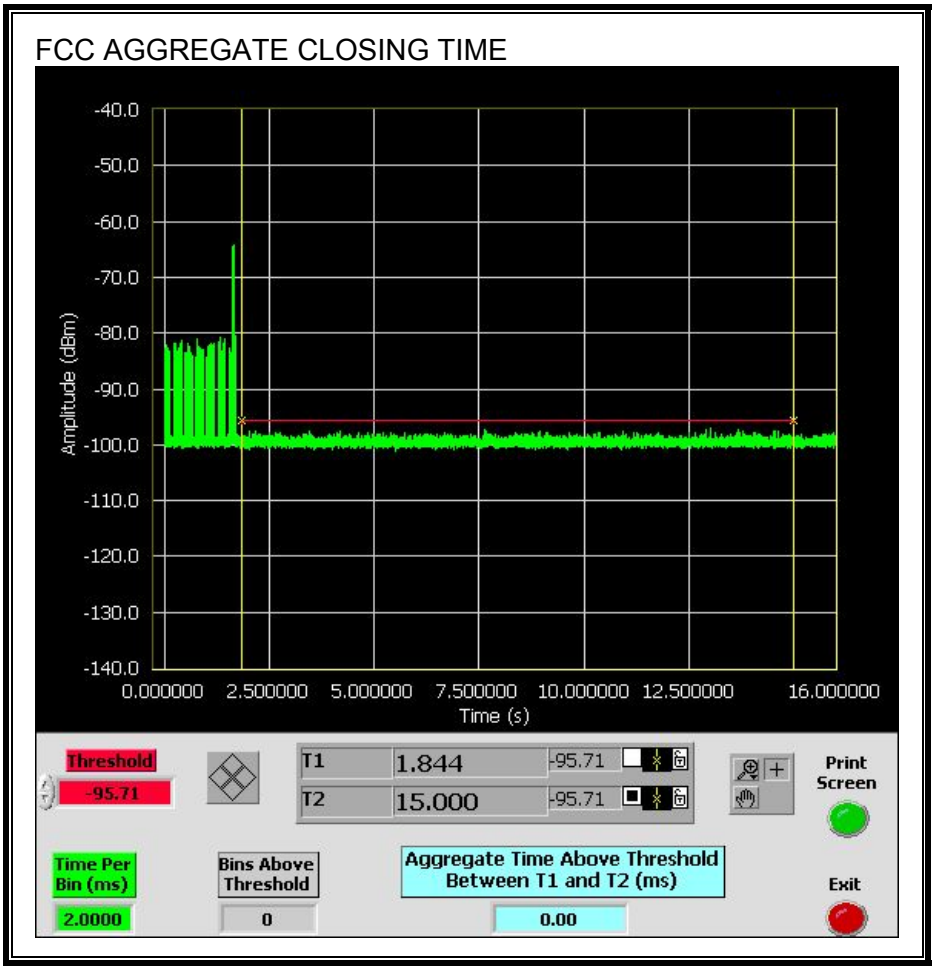


CHANNEL CLOSING TIME

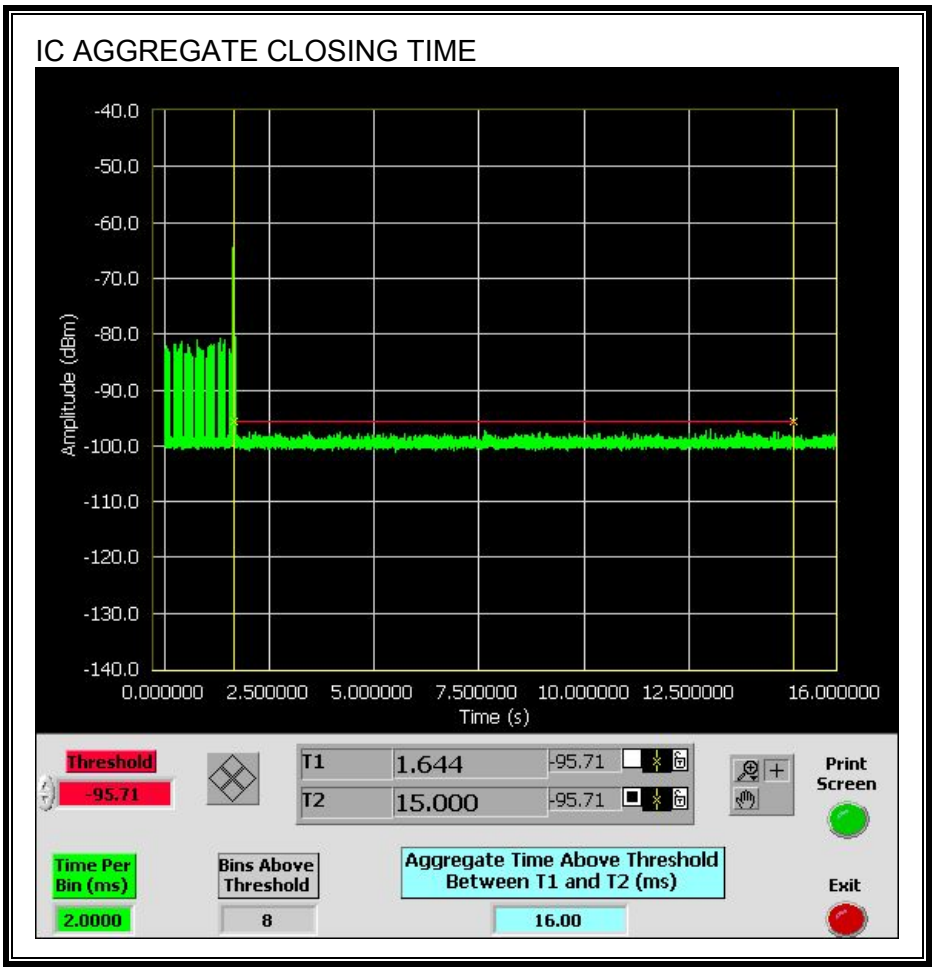


AGGREGATE CHANNEL CLOSING TRANSMISSION TIME

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



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



10.3.5. NON-OCCUPANCY PERIOD

RESULTS

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