FCC 47 CFR PART 15 SUBPART E

CLASS II PERMISSIVE CHANGE

TEST REPORT

FOR

802.11a/b/g/n WLAN PCI-E Mini Card

MODEL NUMBER: BCM943228HM4L

FCC ID: QDS-BRCM1054

REPORT NUMBER: 15U22568- E1V3

ISSUE DATE: FEBRUARY 16, 2016

Prepared for
BROADCOM CORPORATION
190 MATHILDA PLACE
SUNNYVALE, CA 94086, U.S.A.

Prepared by
UL VERIFICATION SERVICES INC.
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
FAX: (510) 661-0888

NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	1/29/16	Initial Issue	H. Mustapha
V2	2/9/16	Updated Section 9.1 with reference to Part 15.407 limits Updated sections 2, 5.6, 7 and 9.1 with the latest version of KD789033 D02 v01r01 Updated section 9.8 with plots Updated section 5.6	H. Mustapha
V3	2/16/16	Updated section 5.6 with statement regarding AC power line conducted emissions Updated antenna gain for 5.8 GHz band in section 5.4	H. Mustapha

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS

COMPANY NAME: BROADCOM CORPORATION
190 MATHILDA PLACE
SUNNYVALE, CA 94086, U.S.A.

EUT DESCRIPTION: 802.11a/b/g/n WLAN PCI-E Mini Card

MODEL: BCM943228HM4L

SERIAL NUMBER: Radiated and Conducted ID: 2202015196-04

DATE TESTED: JANUARY 20 – 28, 2016
NOVEMBER 19 – DECEMBER 1, 2010

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart E	Pass

UL Verification Services Inc. 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 Verification Services Inc. 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 Verification Services Inc. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Verification Services Inc. 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 Verification Services Inc. By:

Huda Mustapha

HUDA MUSTAPHA
PROJECT LEAD
UL Verification Services Inc.

Tested By:

Lionel Lara

LIONEL LARA
WISE LAB TECHNICIAN
UL Verification Services Inc.

FRANK IBRAHIM
PROGRAM MANAGER
UL Verification Services Inc.

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 D02 v01r01, KDB 662911 D01 v02r01 and ANSI C63.10-2013.

3. FACILITIES AND ACCREDITATION

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

The test sites and measurement facilities used to collect data are located at 47173 and 47266 Benicia Street, Fremont, California, USA. Line conducted emissions are measured only at the 47173 address. The following table identifies which facilities were utilized for radiated emission measurements documented in this report. Specific facilities are also identified in the test results sections.

47173 Benicia Street	47266 Benicia Street
☐ Chamber A	☐ Chamber D
☒ Chamber B	☐ Chamber E
☐ Chamber C	☐ Chamber F
	☐ Chamber G
	☐ Chamber H

The above test sites and facilities are covered under FCC Test Firm Registration # 208313. Chambers A through H are covered under Industry Canada company address code 2324B with site numbers 2324B -1 through 2324B-8, respectively.

UL Verification Services Inc. is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://ts.nist.gov/standards/scopes/2000650.htm.

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
Radiated Disturbance, 1 to 6 GHz	± 3.86 dB
Radiated Disturbance, 6 to 18 GHz	± 4.23 dB
Radiated Disturbance, 18 to 26 GHz	± 5.30 dB
Radiated Disturbance, 26 to 40 GHz	± 5.23 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11a/b/g/n WLAN PCI-E Mini Card.

The radio module is manufactured by Broadcom.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

5.8 GHz BAND

Frequency Range (MHz)	Mode	Power, Chain 0 (dBm)	Power, Chain 1 (dBm)	Output Power (dBm)	Output Power (mW)
5.8 GHz band, 1TX					
5745-5825	802.11a Legacy	N/A	18.80	18.80	75.86
5745-5825	802.11n HT20	N/A	18.61	18.61	72.61
5755-5795	802.11n HT40	N/A	18.36	18.36	68.55
5.8 GHz band, 2TX					
5745-5825	802.11n HT20 CDD	18.98	18.40	21.71	148.25
5755-5795	802.11n HT40 CDD	18.41	18.13	21.28	134.36

5.3. LIST OF TEST REDUCTION AND MODES COVERING OTHER MODES

Antenna Port Testing		
Band	**Mode**	**Covered by**
5 GHz bands	802.11a Legacy 1TX	802.11n HT20 CDD 2TX
5 GHz bands	802.11a CDD 2TX	802.11n HT20 CDD 2TX
5 GHz bands	802.11n HT20 1TX	802.11n HT20 CDD 2TX
5 GHz bands	802.11n HT40 1TX	802.11n HT40 CDD 2TX

Radiated Testing		
Band	**Mode**	**Covered by**
5 GHz bands	802.11a Legacy 1TX (Harmonics)	802.11n HT20 CDD 2TX (Harmonics)
5 GHz bands	802.11a CDD 2TX	802.11n HT20 CDD 2TX
5 GHz bands	802.11n HT20 1TX	802.11n HT20 CDD 2TX
5 GHz bands	802.11n HT40 1TX (Harmonics)	802.11n HT40 CDD 2TX (Harmonics)

5.4. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes 802.11abgn WLAN antennas, with maximum gains as table below;

	Antenna Gain		Antenna Gain
GHz	Ant 1 dBi	Ant 2 dBi	Combined dBi
5.2	5.6	5.6	8.61
5.3	5.6	5.6	8.61
5.6	4.2	4.2	7.21

	Antenna Gain		Antenna Gain
GHz	Ant 1 dBi	Ant 2 dBi	Combined dBi
2.4	3.9	3.9	6.91
5.8	5.8	5.8	8.81

5.5. SOFTWARE AND FIRMWARE

The EUT driver software installed during testing was Broadcom, rev. 5.100.82.34.

The test utility software used during testing was BCM Internal, rev. 5.100.RC82.34.

5.6. DESCRIPTION OF CLASS II PERMISSIVE CHANGE

The purpose of this C2PC is to upgrade the device described under section 5.1 of this report to the new rules per KDB 789033 D02 v01r01.

For UNII-1, UNII-2 and UNII-2C bands, other than the 26dB BW and PSD, we have reviewed the original test report (report no. 10U13394-2A) and are hereby attesting that all the current technical requirements are still met and all applicable test procedures remain the same. Therefore, the original test report is still applicable and no additional testing is done.

The EUT is a Slave Device without Radar Detection. Therefore, DFS evaluation as per section 10 in original report no. 10U13394-2 continues to be valid and consistent with requirements of KDB 905462 D02 v01r02, KDB 905462 D03 v01r01, KDB 905462 D04 v01 and KDB 789033 D02 v01r01.

For AC power line conducted emissions, results from 2010 have been reviewed and found to be in compliance with the current limits and procedures.

5.7. WORST-CASE CONFIGURATION AND MODE

The EUT was tested as an external module installed in a test jig board connected to a host Laptop PC.

Radiated emission below 1 GHz and above 18 GHz were performed with the EUT set to transmit at the channel with highest output power as worst-case scenario.

For all modes with single chain SISO, chain 1 (J2) was used for 5GHz band as worst case.

For 5GHz, band edge preliminary investigation showed horizontal polarization was worst case for CDD and SISO modes, therefore only horizontal polarization was tested for these modes.

Worst-case data rates as provided by the client were:

802.11a mode: 6 Mbps
802.11n HT20 mode: MCS0
802.11n HT40 mode: MCS0

For antenna port testing, 2TX modes were considered worst case, where testing was performed at power levels, per transmit chain, greater than or equal to the maximum power in any 1TX mode.

Even though the 26 dB bandwidth was measuring wider than in the original test report, we have verified that this had no significant effect on the power values measured by integration.

5.8. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List			
Description	**Manufacturer**	**Model**	**Serial Number**
Laptop	Lenovo	G560	CBU4473193
AC Adapter	Lenovo	ADP-65KH B	11S36001646ZZ1001FKY6
PCIe. Card	Broadcom	N/A	N/A

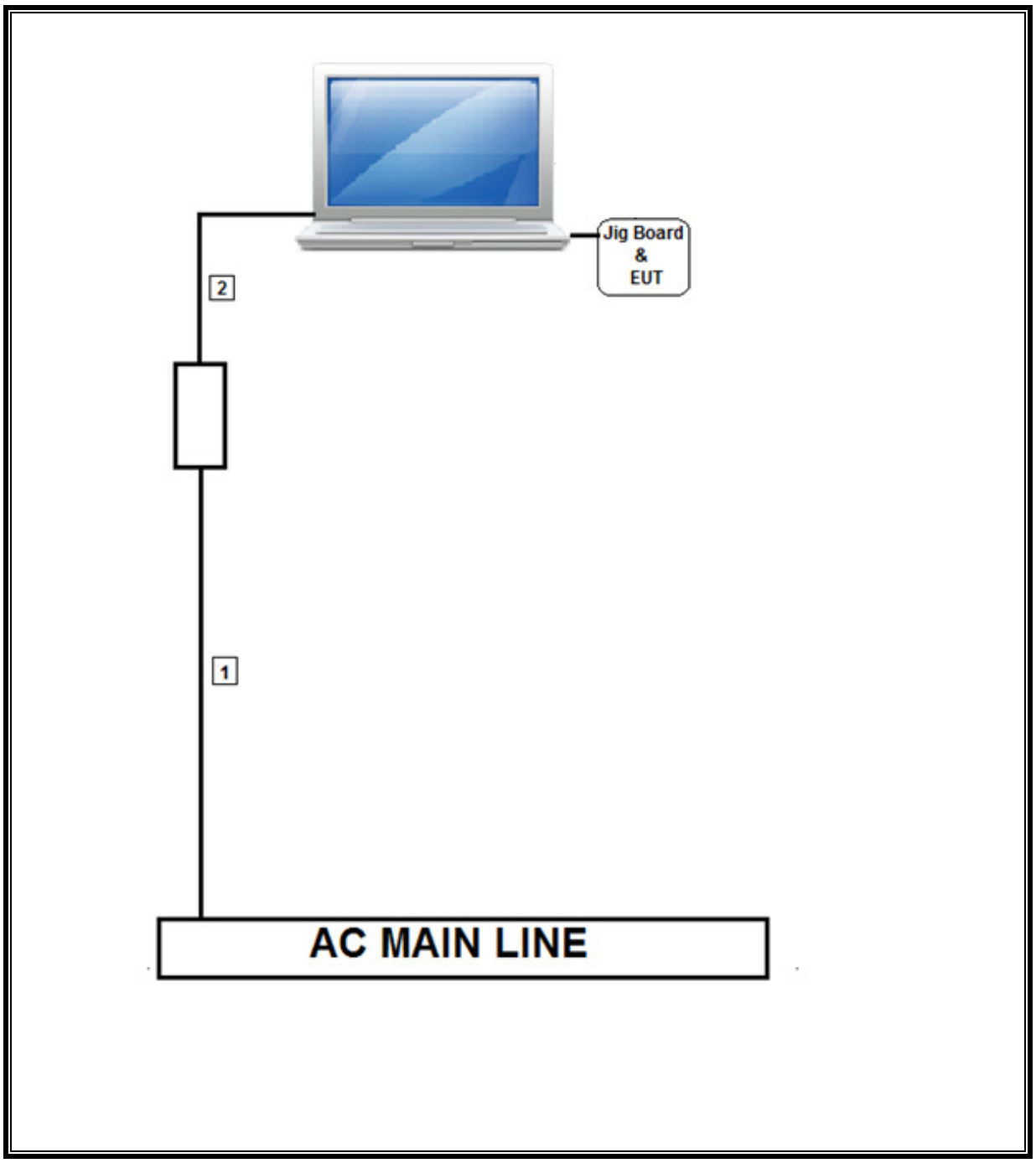
I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	1	US 115V	Shielded	1.5m	NA
2	DC	1	DC	Unshielded	1.5m	Ferrite at laptop's end

TEST SETUP

The EUT was connected to a host laptop via PCIE card. 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	T No.	Cal Date	Cal Due
Radiated Software	UL	UL EMC	Ver 9.5, June 24, 2015		
Conducted Software	UL	UL EMC	Ver 9.5, May 17 2012		
Bilog Antenna 30-1000MHz	Sunol	JB1	185	02/18/15	02/18/16
Horn Antenna 1-18GHz	ETS	3117	136	03/03/15	03/03/16
Horn Antenna 18-26.5GHz	ARA	SWH-28	125	05/12/15	05/12/16
Horn Antenna 26.5- 40GHz	ARA	MWH-2640/B	90	07/28/15	07/28/16
Preamp 10kHz-1000MHz	Sonoma	310	300	11/05/15	11/05/16
Preamp 1-8GHz	Miteq	AMF-4D-01000800-30-29P	782	10/22/15	10/22/16
Preamp 1-26.5GHz	Agilent	8449B	404	04/13/15	04/13/16
Amplifier, 26-40GHz	Miteq	NSP4000-SP2	88	04/07/15	04/07/16
Spectrum Analyzer 3kHz - 44GHz	Agilent	N9030A	907	05/15/15	05/15/16
Coaxial Switchbox	Agilent	SP6T	927	03/03/15	03/03/16
3GHz HPF	Micro-Tronics	HPM17543	487	01/31/15	01/31/16
EMI Test Receiver	Rohde & Schwarz	ECSI 7	212	08/07/15	08/07/16
Spectrum Analzer 3Hz to 44GHz	Agilent	E4440A	123	10/22/15	10/22/16
Power Meter	Agilent	N1911A	T1268	06/07/15	06/07/16

7. MEASUREMENT METHODS

On Time and Duty Cycle: KDB 789033 D02 v01r01, Section B.

Emission BW: KDB 789033 D02 v01e01, Section C.

Conducted Output Power: KDB 789033 D02 v01r01, Section E.3.b (Method PM-G), and KDB 662911 D01 v02r01.

Power Spectral Density: KDB 789033 D02 v01r01, Section F, and KDB 662911 D01 v02r01.

Unwanted emissions in restricted bands: KDB 789033 D02 v01r01, Sections G.2, G.3, G.4, G.5, and G.6.

Unwanted emissions in non-restricted bands: KDB 789033 D02 v01r01, Sections G.2, G.3, G.4, and G.5

8. ANTENNA PORT TEST RESULTS

8.1. ON TIME AND DUTY CYCLE

LIMITS

None; for reporting purposes only.

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 CDD	2.072	2.088	0.992	99.23%	0.00	0.010
802.11n HT20 CDD	1.920	1.948	0.986	98.56%	0.00	0.010
802.11n HT40 CDD	0.9320	0.9520	0.979	97.90%	0.09	1.073

8.2. DUTY CYCLE PLOTS

DUTY CYCLE 802.11a 1TX MODE

DUTY CYCLE 802.11n HT20 CDD 2TX MODE

DUTY CYCLE 802.11n HT40 CDD 2TX MODE

8.3. 802.11a LEGACY MODE IN THE 5.2 GHz BAND

8.3.1. 26 dB BANDWIDTH

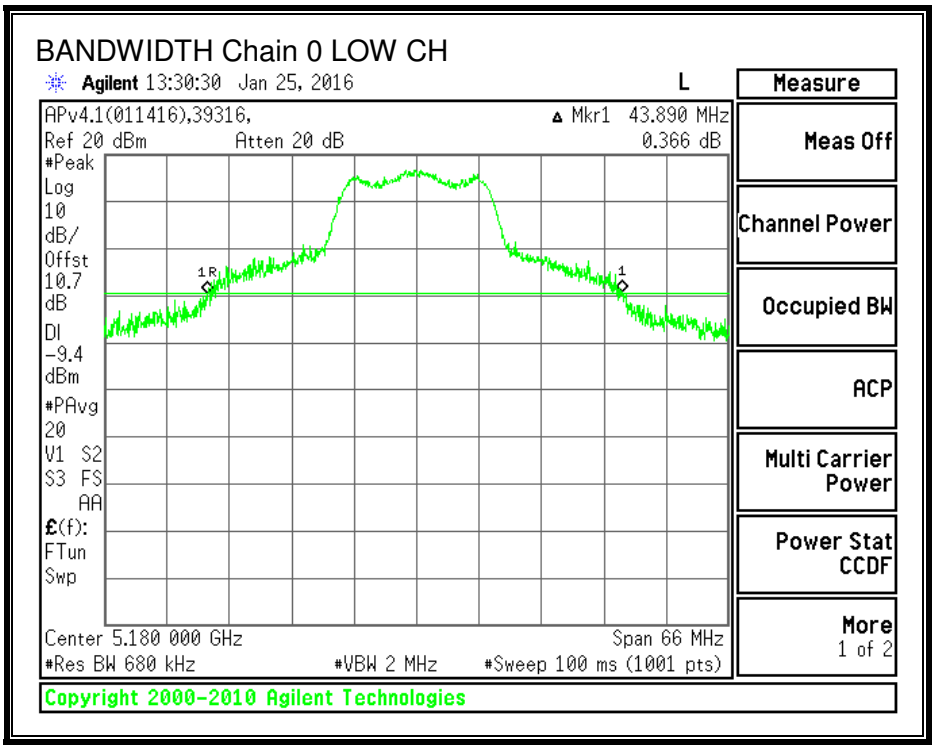
LIMITS

None; for reporting purposes only.

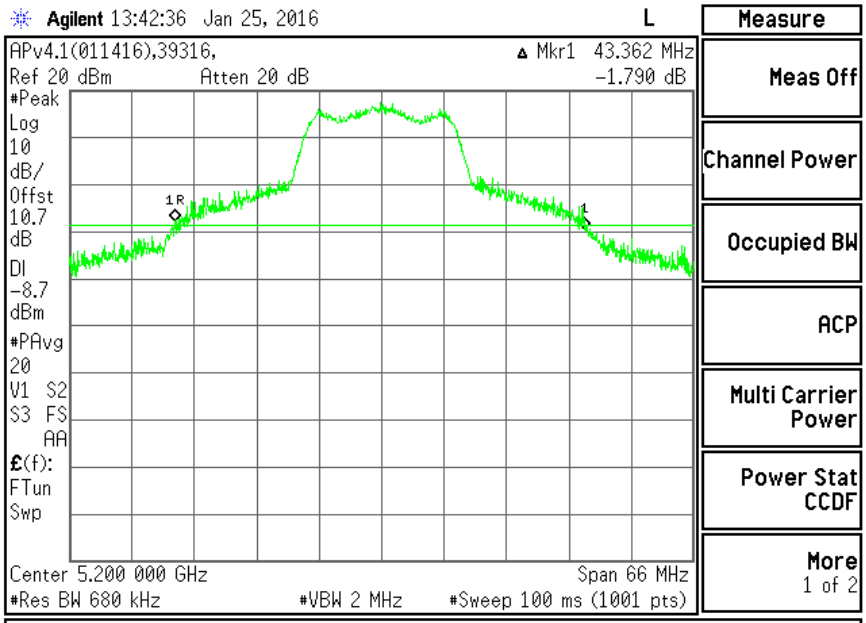
RESULTS

Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)
Low	5180	43.890
Mid	5200	43.362
High	5240	43.692

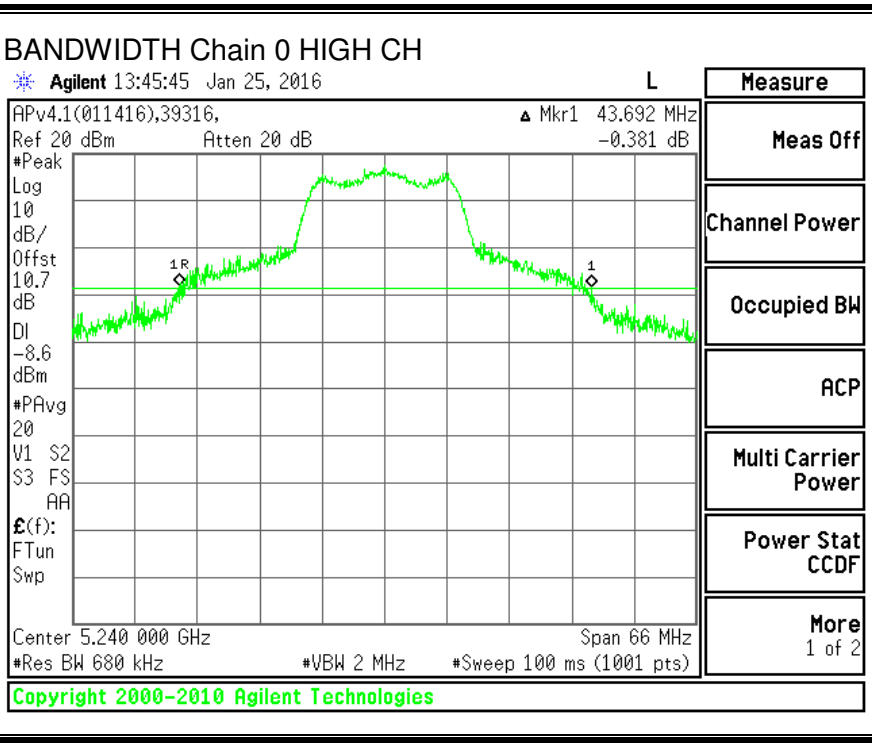
26 dB BANDWIDTH, Chain 0



BANDWIDTH Chain 0 MID CH



BANDWIDTH Chain 0 HIGH CH



8.3.1. PSD

LIMITS

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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 maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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 maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum 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 maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

This is SISO mode, AG is the highest (worst-case) = 5.6 dBi

RESULTS

Antenna Gain and Limits

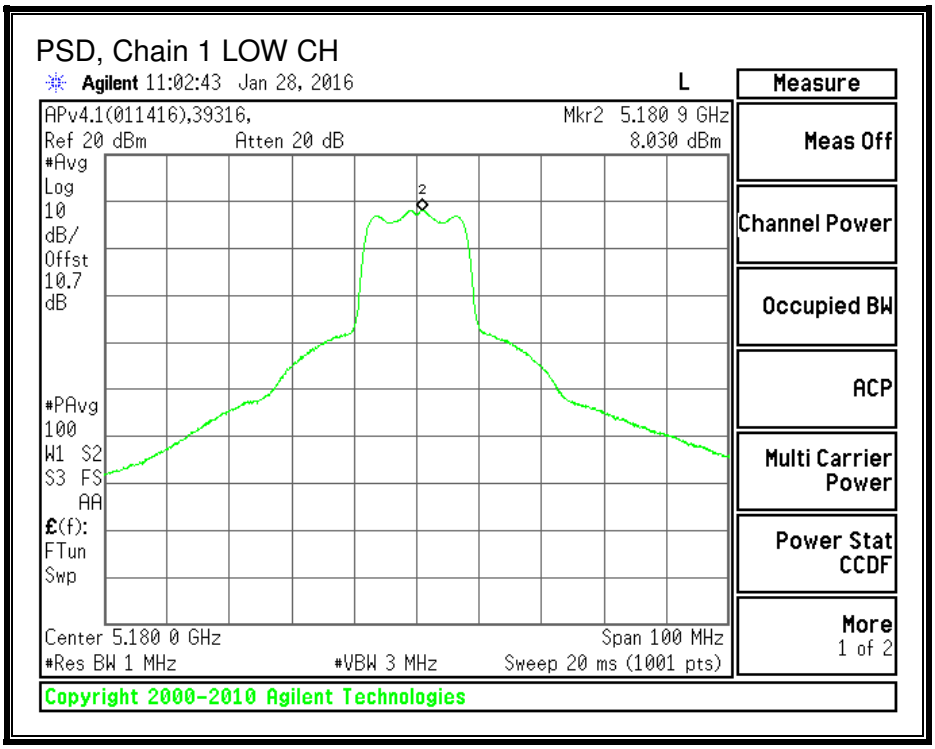
Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5180	5.60	5.60	24.00	11.00
Mid	5200	5.60	5.60	24.00	11.00
High	5240	5.60	5.60	24.00	11.00

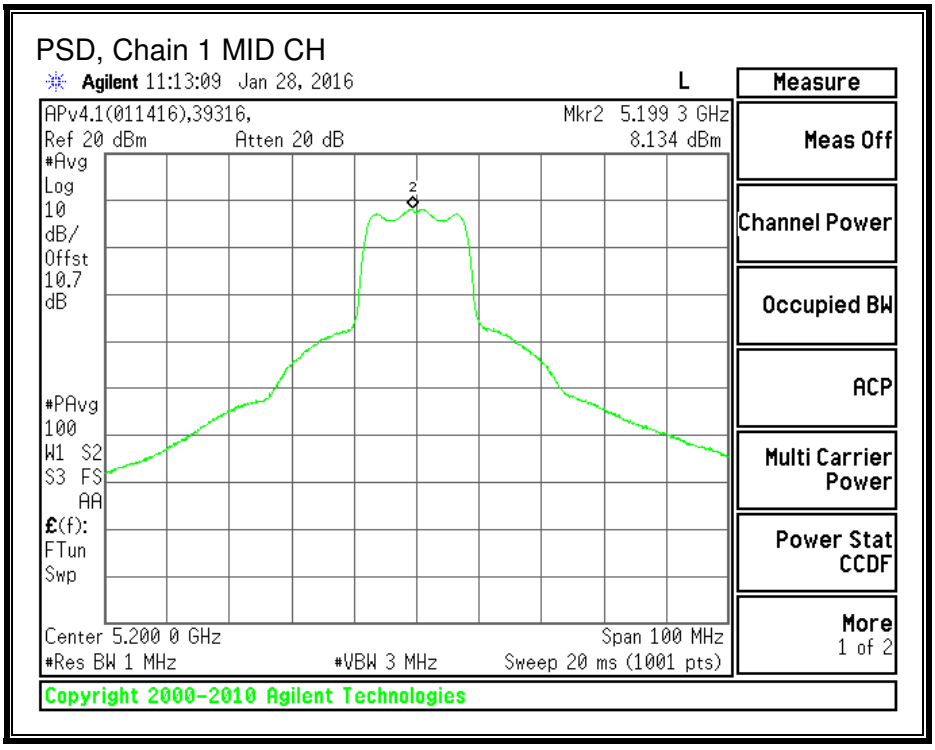
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

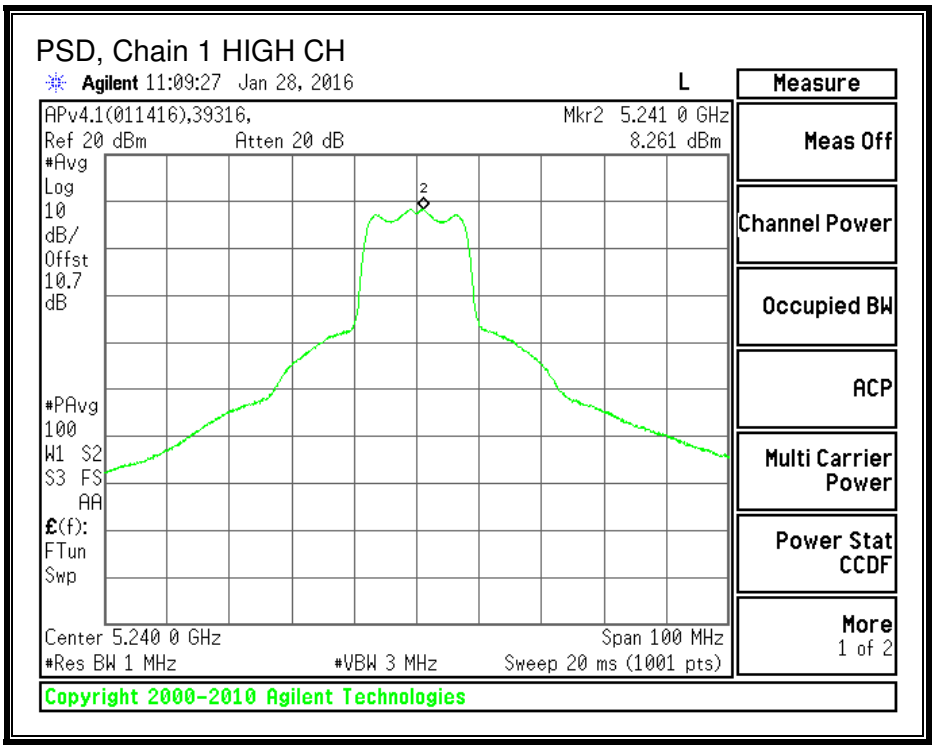
PSD Results

Channel	Frequency (MHz)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5180	8.030	8.030	11.00	-2.97
Mid	5200	8.134	8.134	11.00	-2.87
High	5240	8.261	8.261	11.00	-2.74

PSD, Chain 1







8.4. 802.11n HT20 CDD 2Tx MODE IN THE 5.2 GHz BAND

8.4.1. 26 dB BANDWIDTH

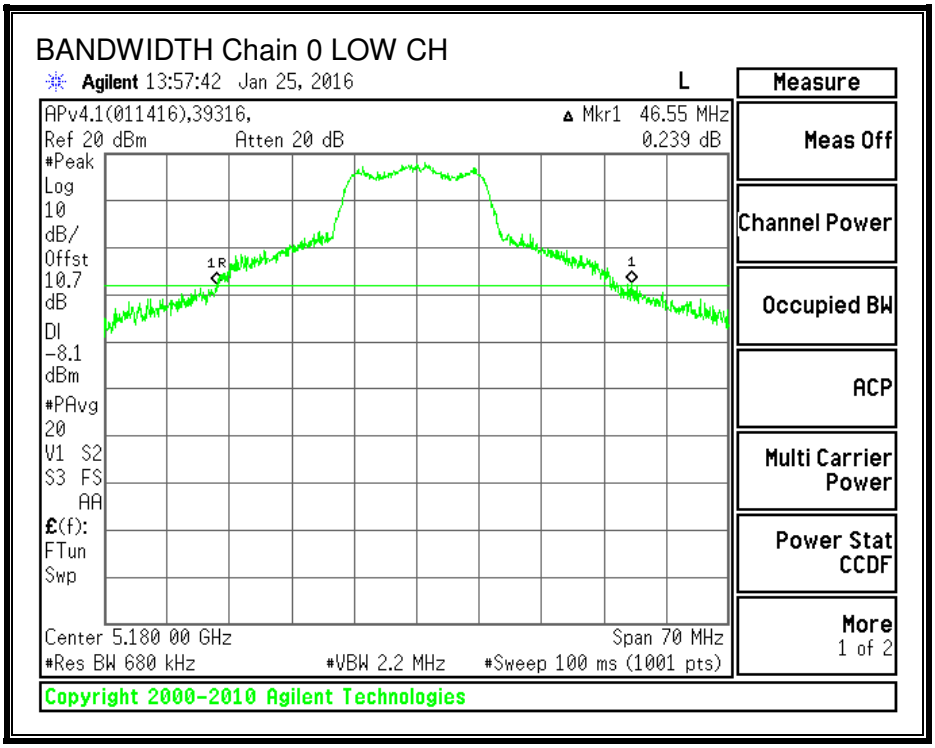
LIMITS

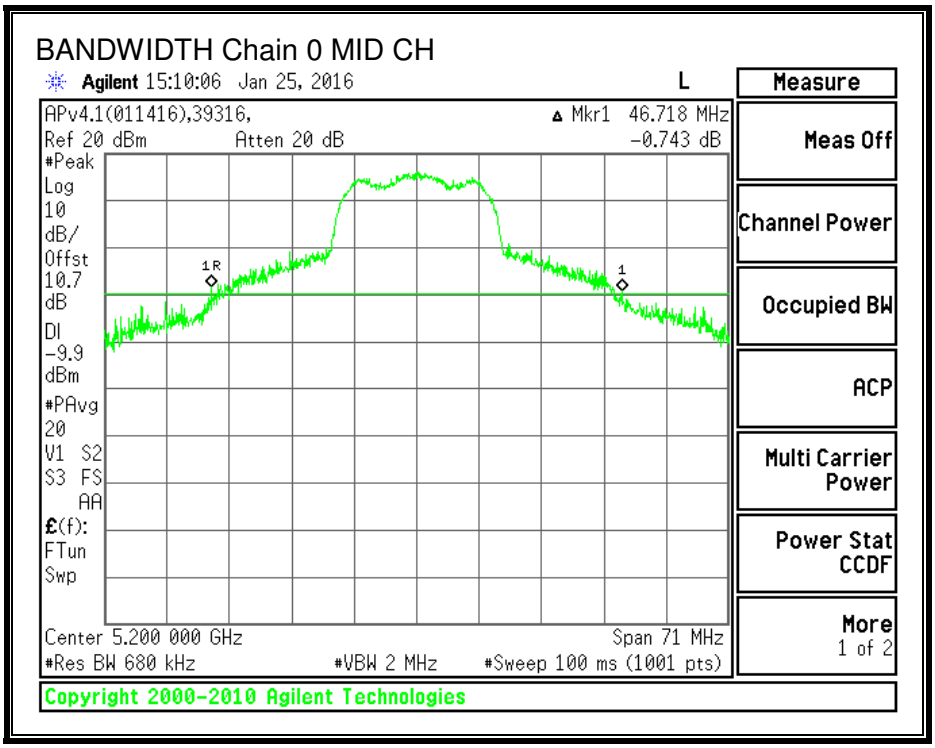
None; for reporting purposes only.

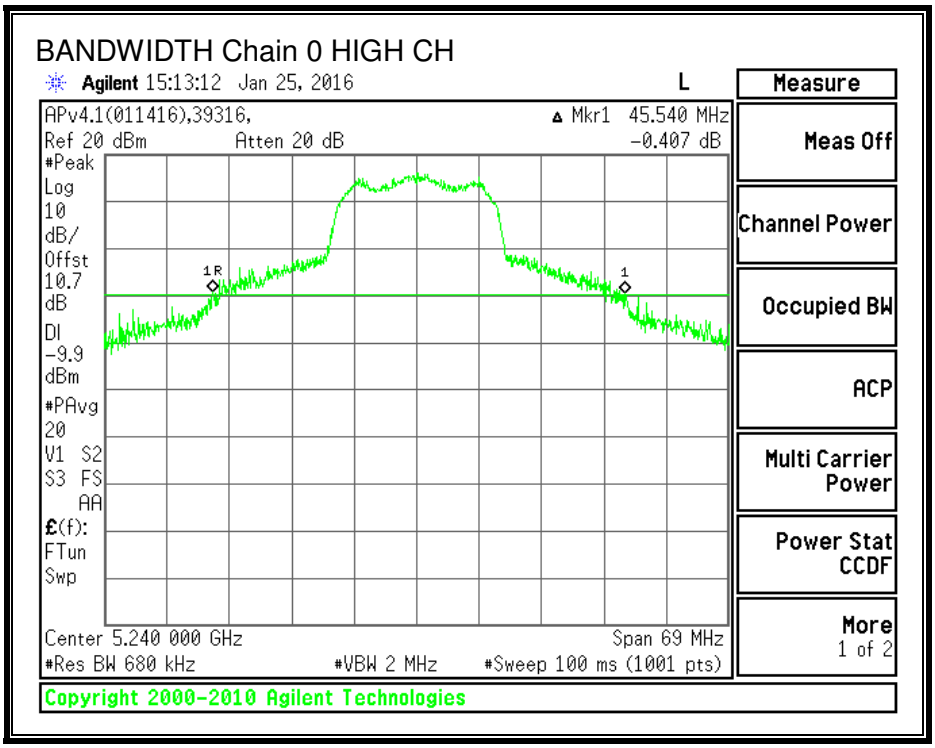
RESULTS

Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5180	46.550	43.560
Mid	5200	46.718	43.160
High	5240	45.540	40.796

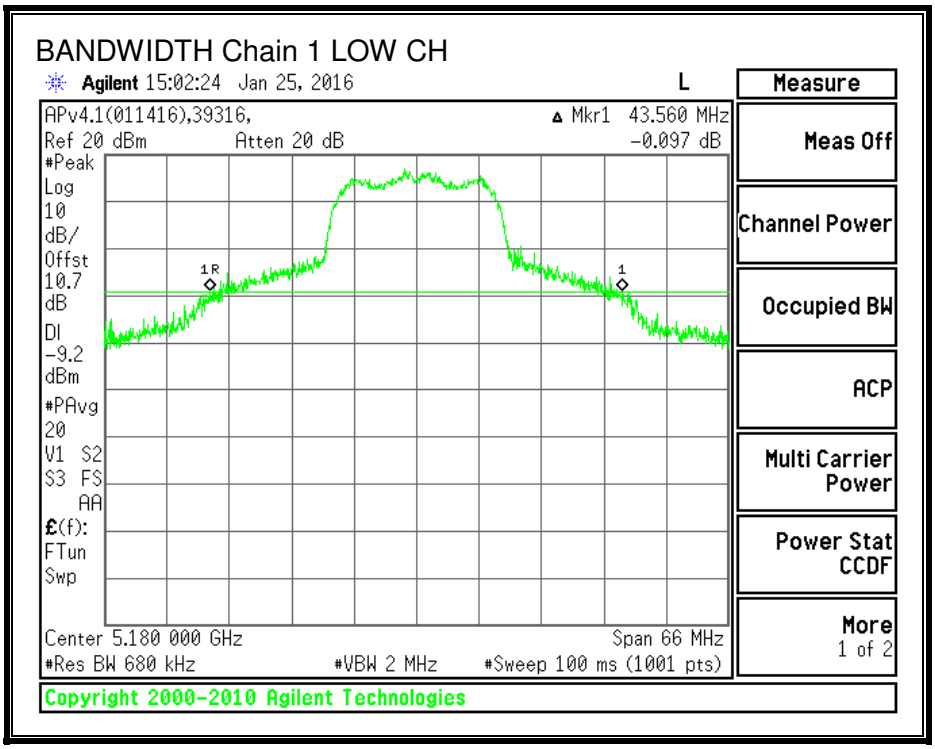
26 dB BANDWIDTH, Chain 0



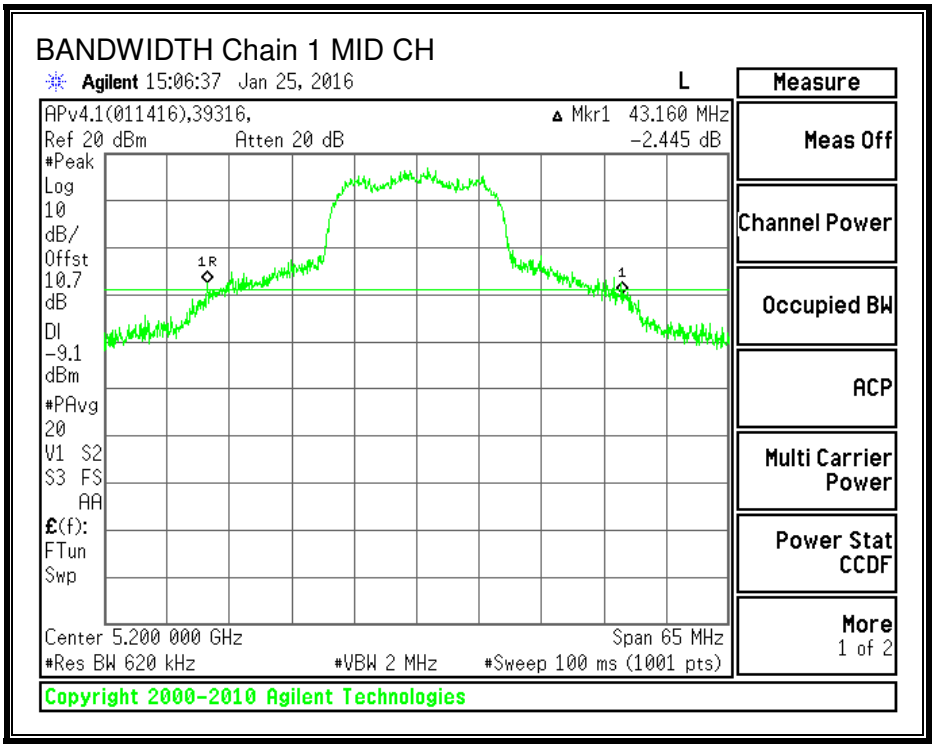




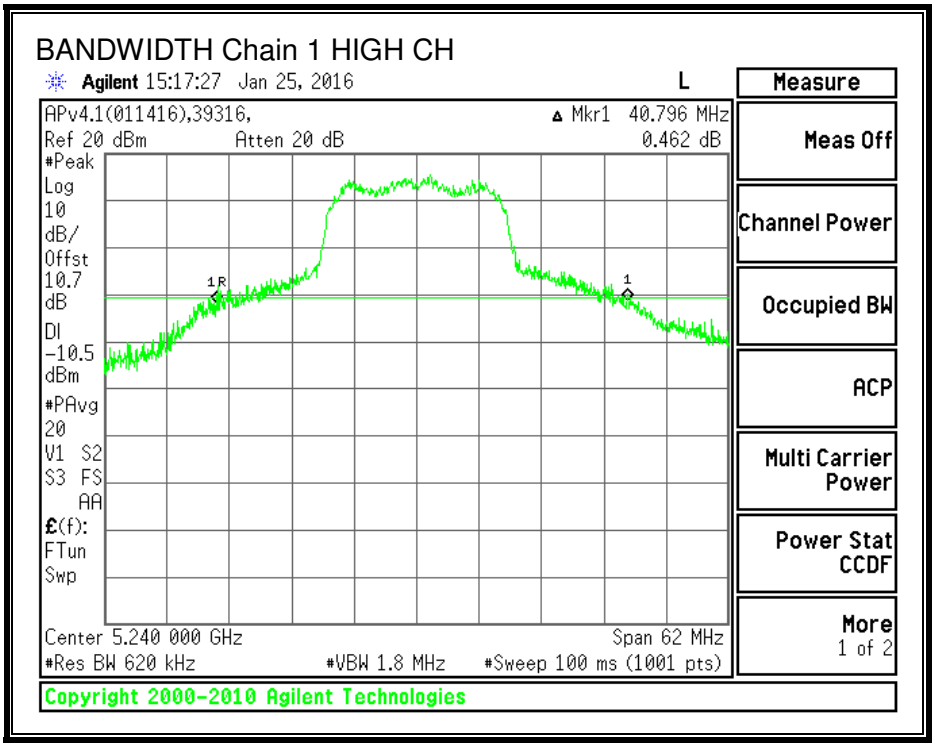
26 dB BANDWIDTH, Chain 1



BANDWIDTH Chain 1 MID CH



BANDWIDTH Chain 1 HIGH CH



8.4.1. PSD

LIMITS

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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 maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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 maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum 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 maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

For PSD, the TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

Antenna Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
5.60	3.01	8.61

RESULTS

Antenna Gain and Limits

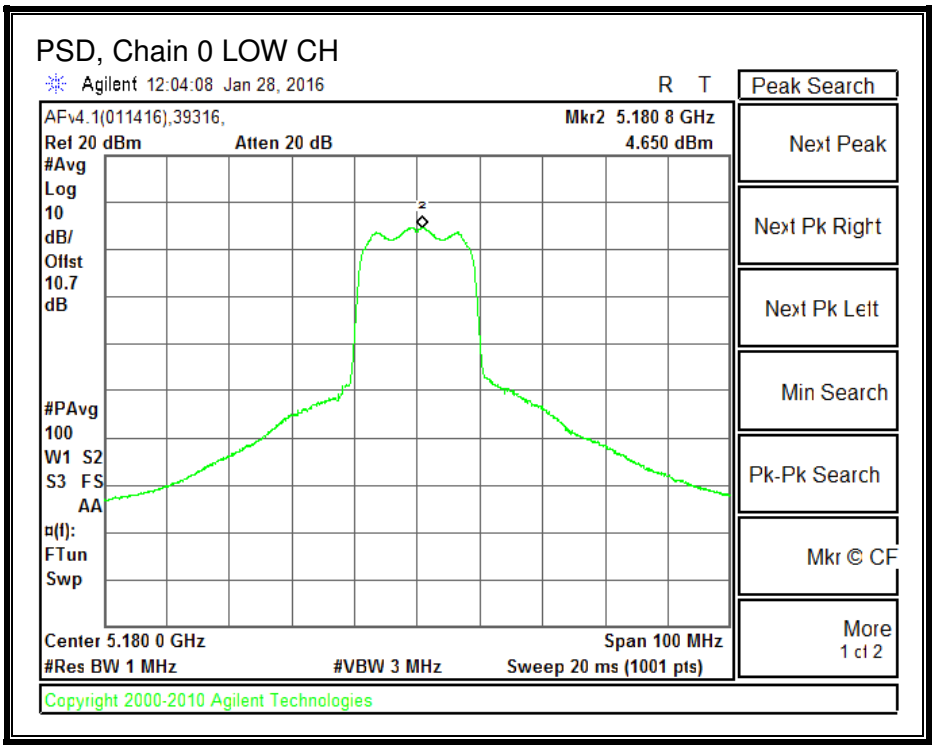
Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5180	5.60	8.61	24.00	8.39
Mid	5200	5.60	8.61	24.00	8.39
High	5240	5.60	8.61	24.00	8.39

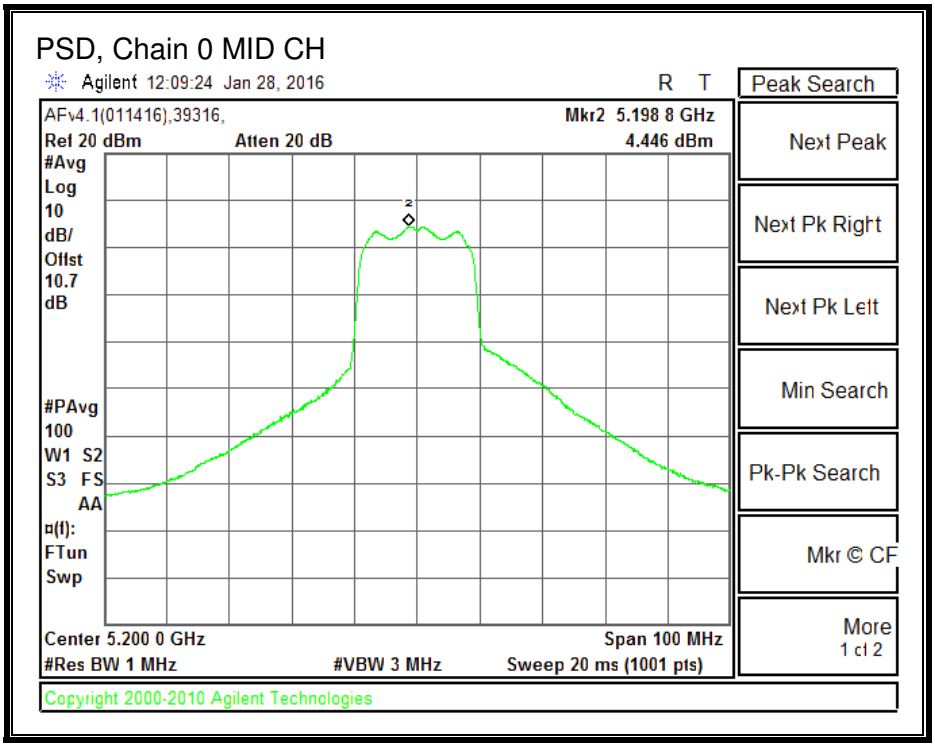
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

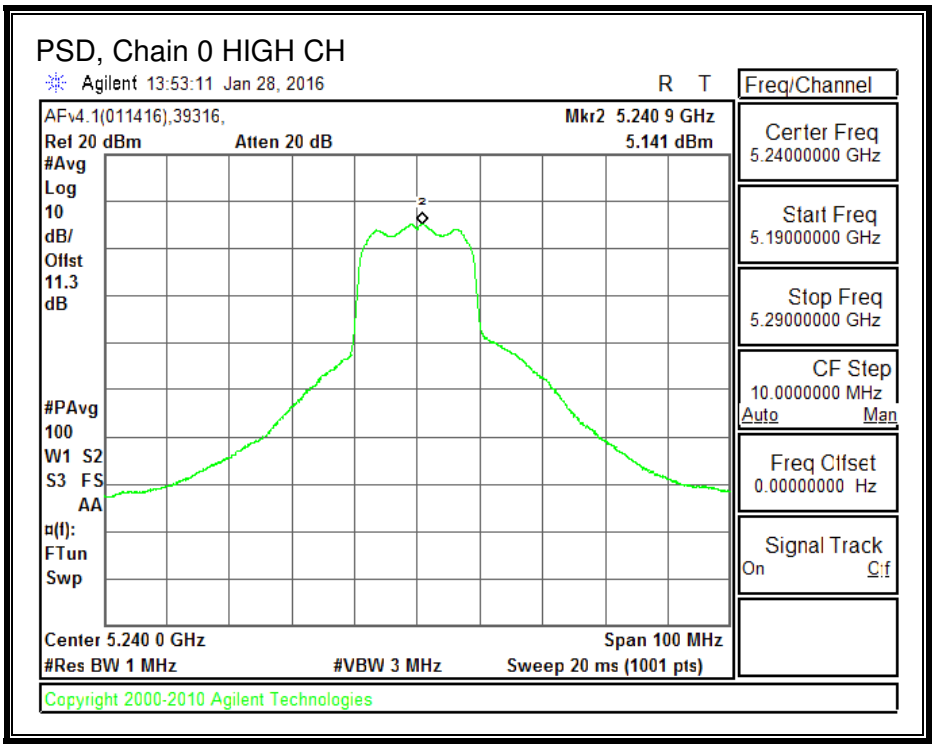
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5180	4.650	5.670	8.200	8.39	-0.19
Mid	5200	4.446	5.071	7.780	8.39	-0.61
High	5240	5.141	5.210	8.186	8.39	-0.20

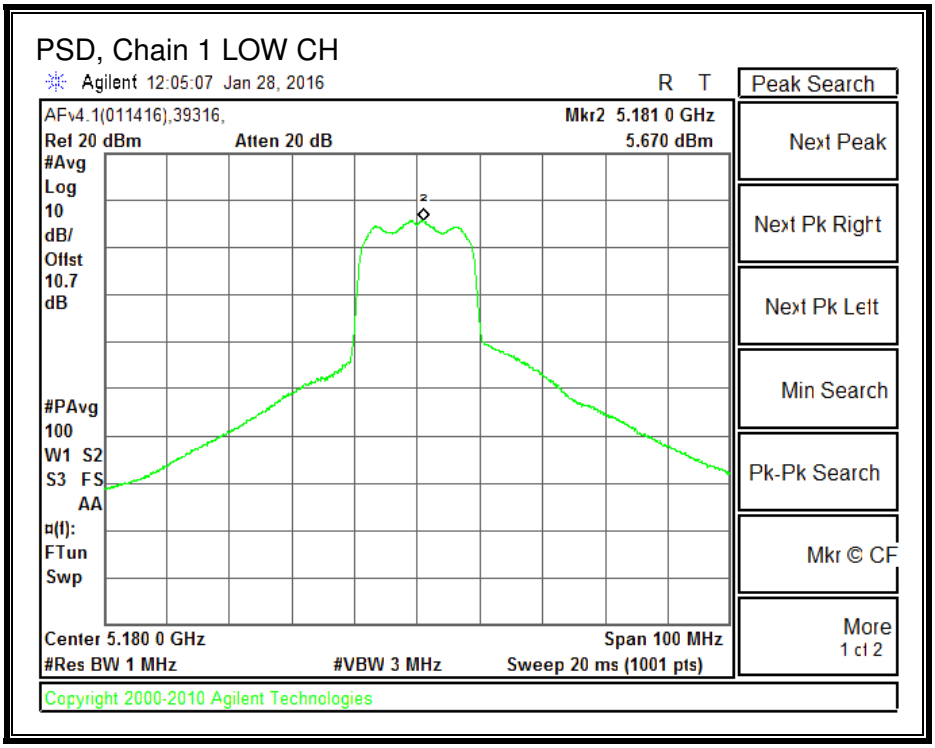
PSD, Chain 0



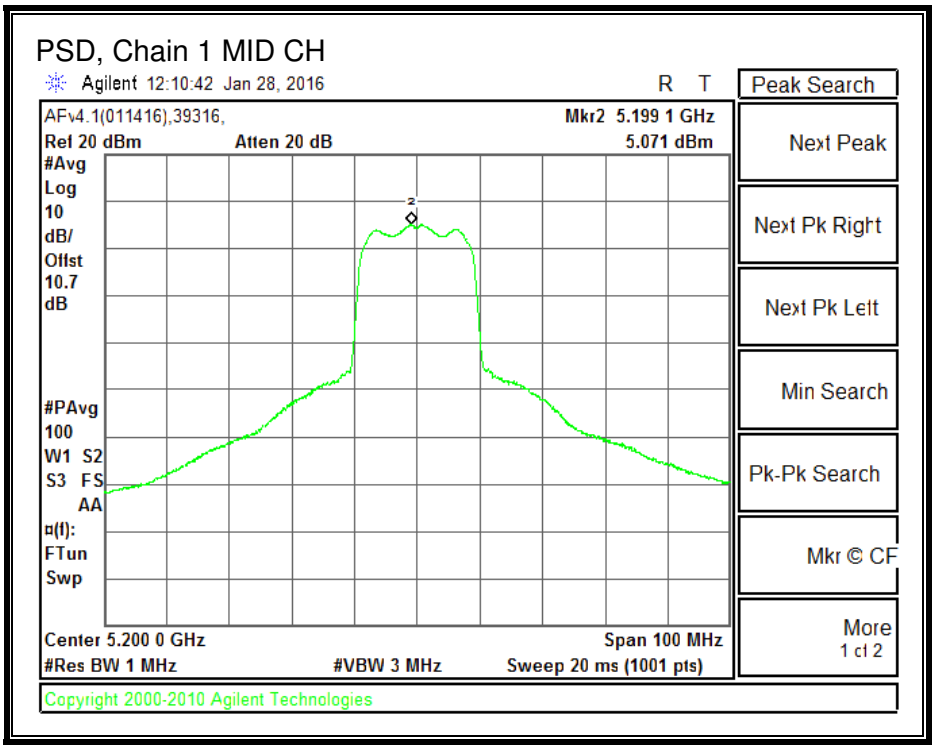




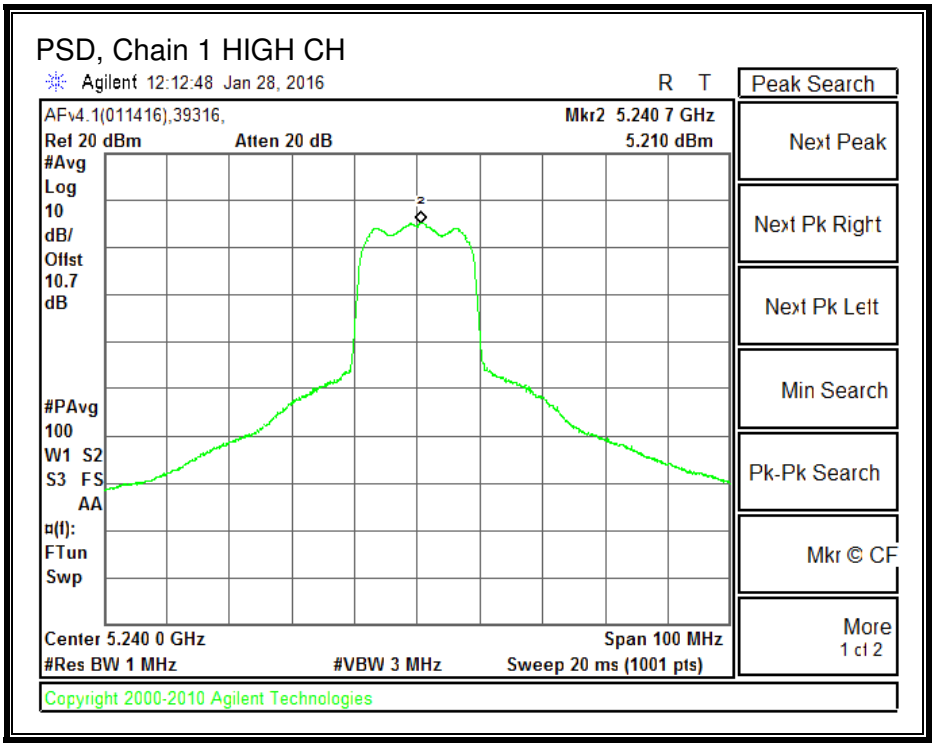
PSD, Chain 1



PSD, Chain 1 MID CH



PSD, Chain 1 HIGH CH



8.5. 802.11n HT40 CDD 2Tx MODE IN THE 5.2 GHz BAND

8.5.1. 26 dB BANDWIDTH

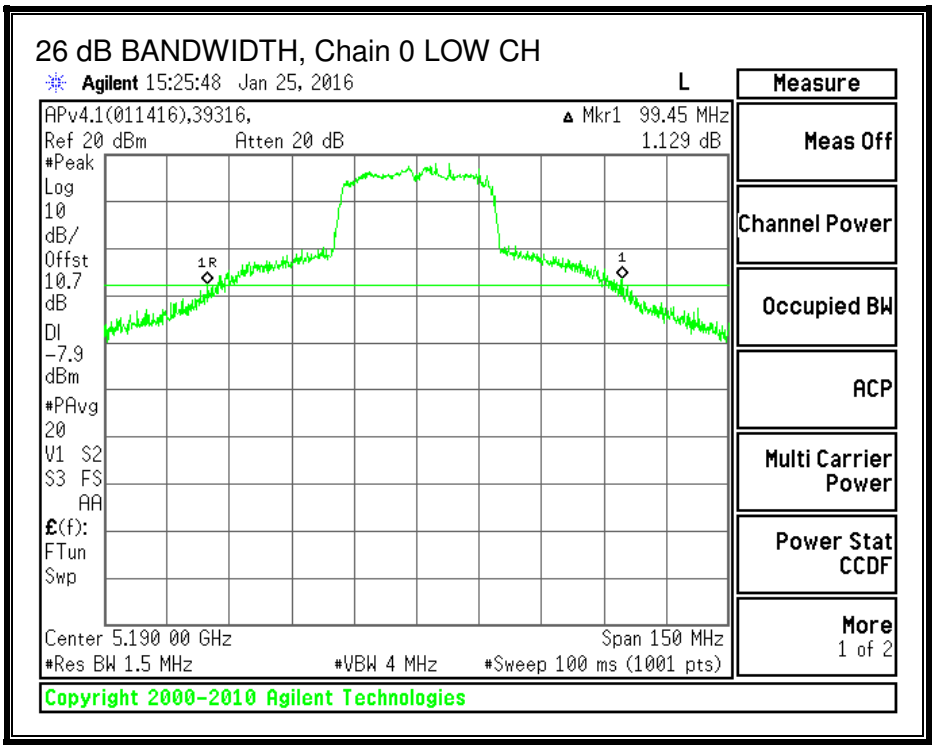
LIMITS

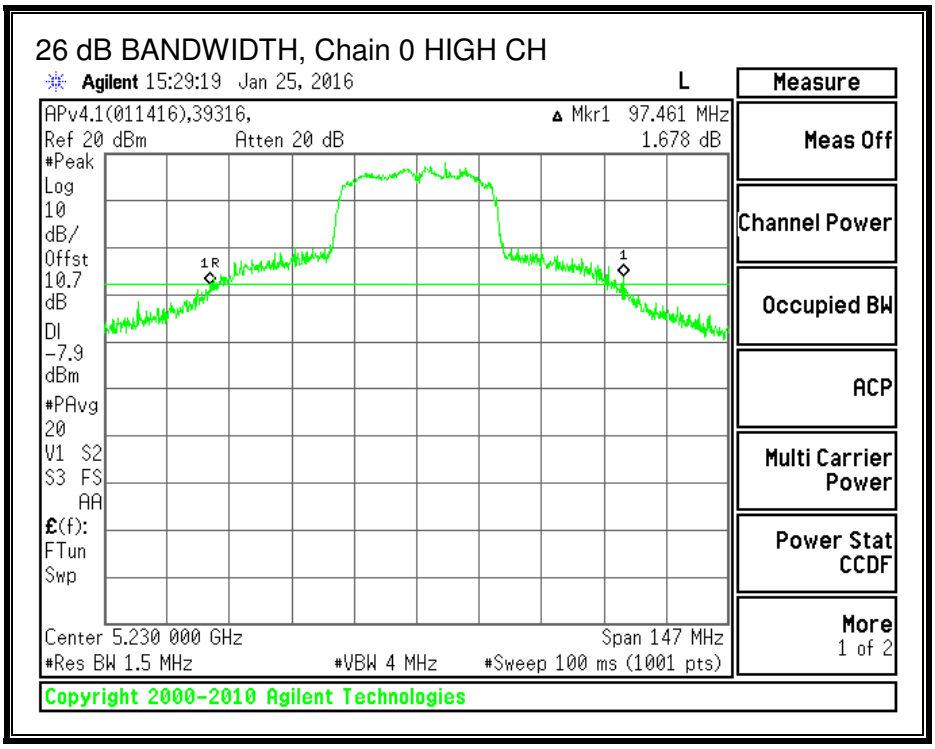
None; for reporting purposes only.

RESULTS

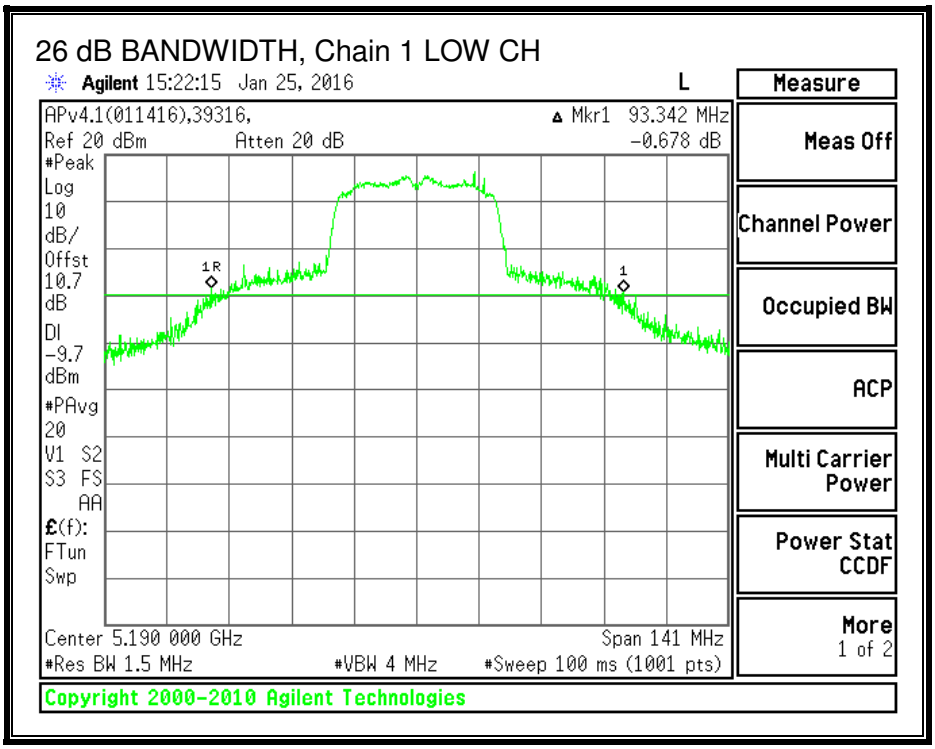
Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5190	99.45	93.34
High	5230	97.46	89.24

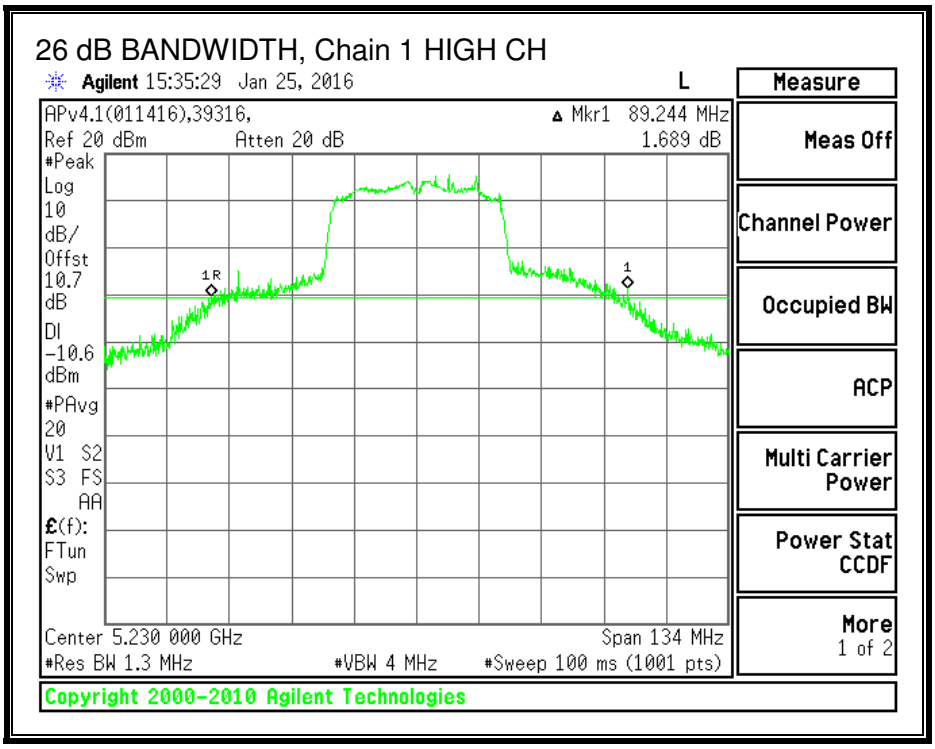
26 dB BANDWIDTH, Chain 0





26 dB BANDWIDTH, Chain 1





8.5.1. PSD

LIMITS

FCC §15.407 (a) (1)

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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 maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 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 maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum 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 maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

For PSD, the TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

Antenna Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
5.60	3.01	8.61

RESULTS

Antenna Gain and Limits

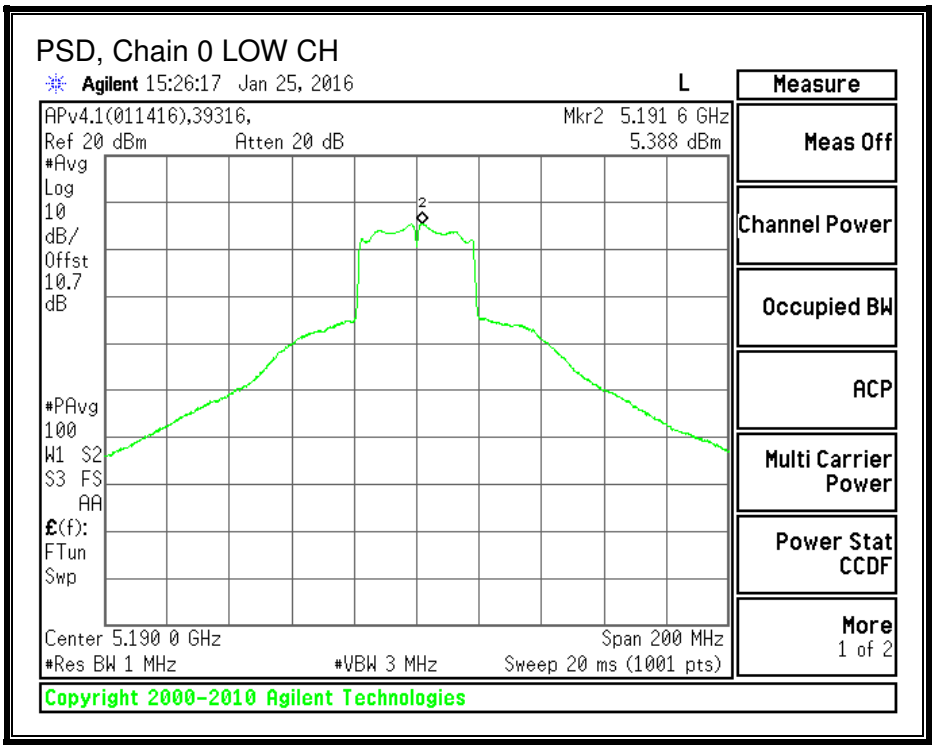
Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5190	5.60	8.61	24.00	8.39
High	5230	5.60	8.61	24.00	8.39

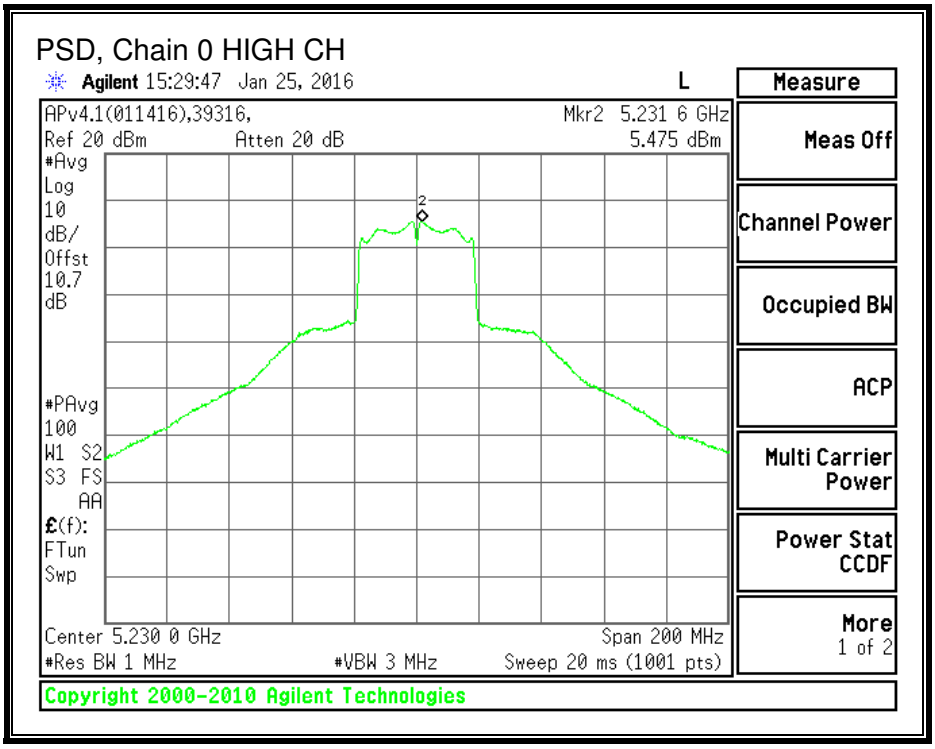
Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd PSD

PSD Results

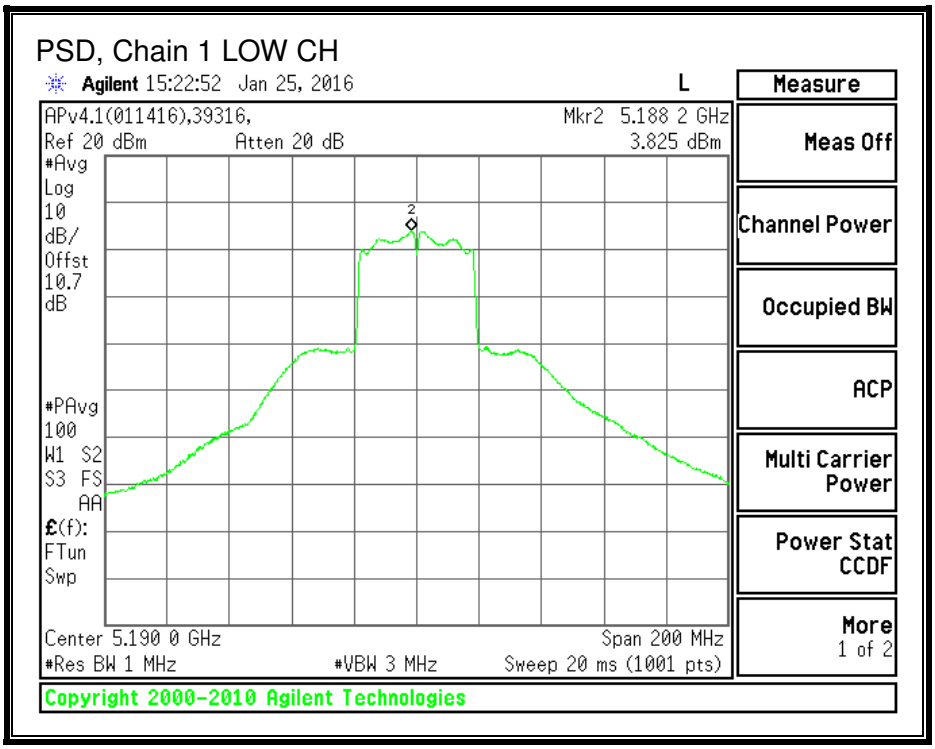
Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5190	5.388	3.825	7.777	8.39	-0.61
High	5230	5.475	3.270	7.611	8.39	-0.78

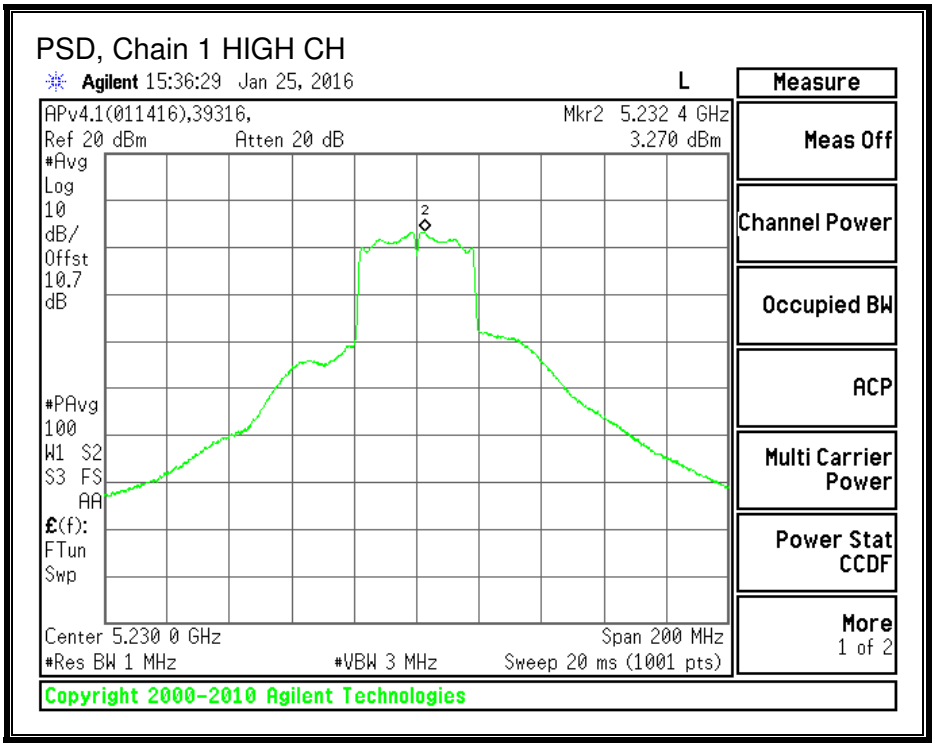
PSD, Chain 0





PSD, Chain 1





8.6. 802.11a LEGACY MODE IN THE 5.3 GHz BAND

8.6.1. 26 dB BANDWIDTH

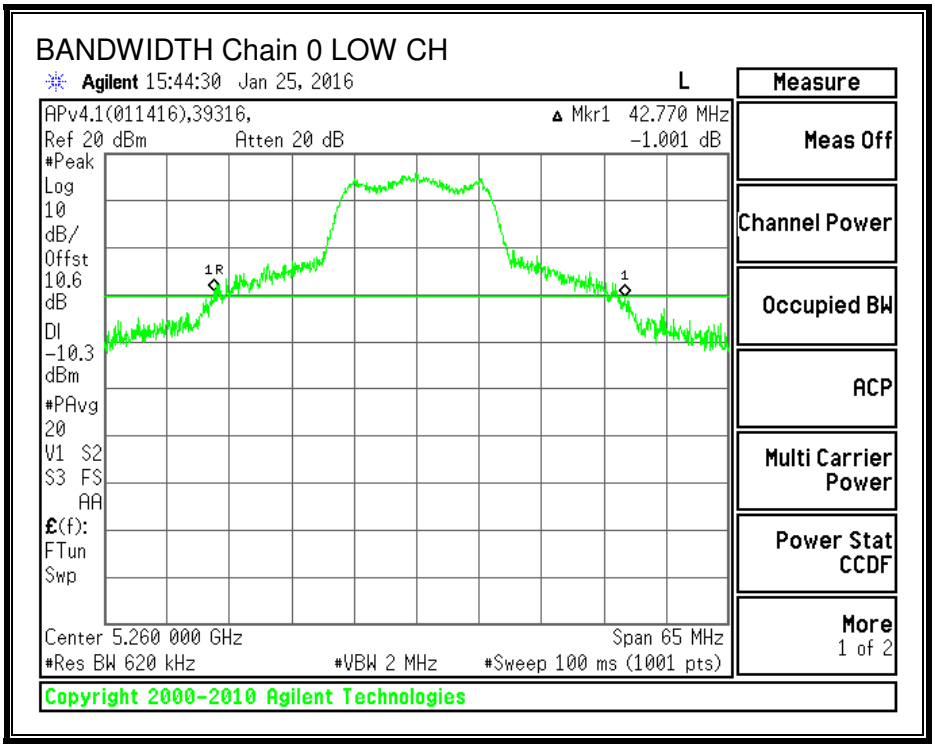
LIMITS

None; for reporting purposes only.

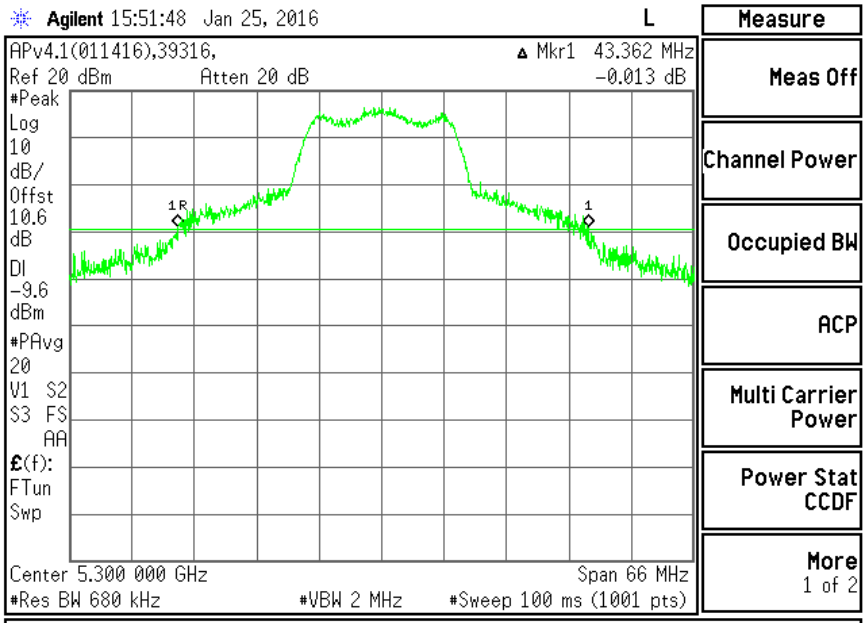
RESULTS

Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)
Low	5260	42.77
Mid	5300	43.36
High	5320	43.82

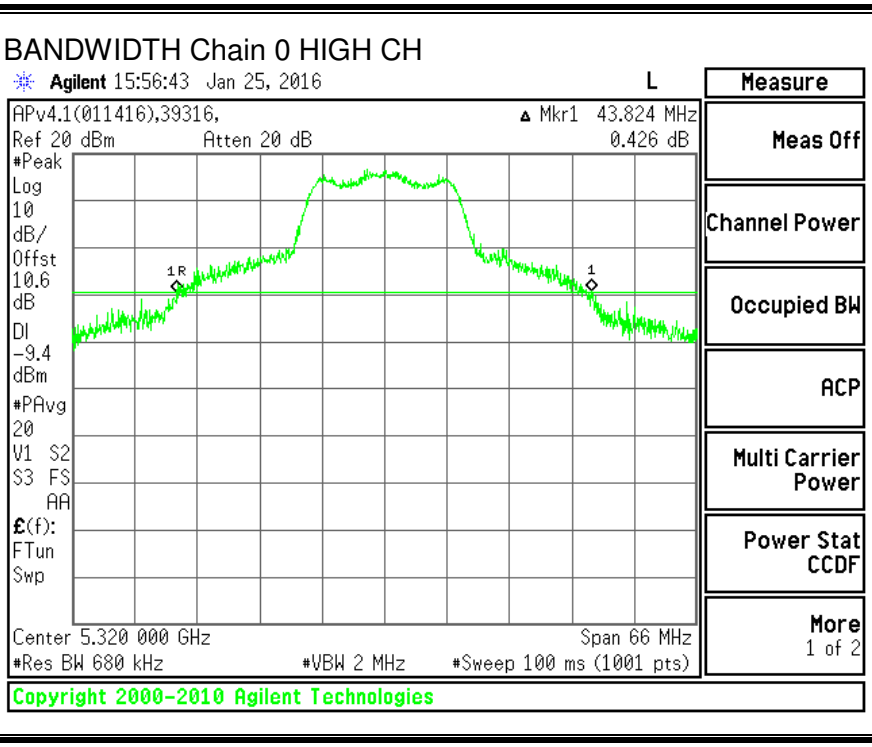
26 dB BANDWIDTH, Chain 0



BANDWIDTH Chain 0 MID CH



BANDWIDTH Chain 0 HIGH CH



8.6.1. PSD

LIMITS

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the 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

This is SISO mode, AG is the highest (worst-case) = 5.6 dBi

RESULTS

Bandwidth, Antenna Gain, and Limits

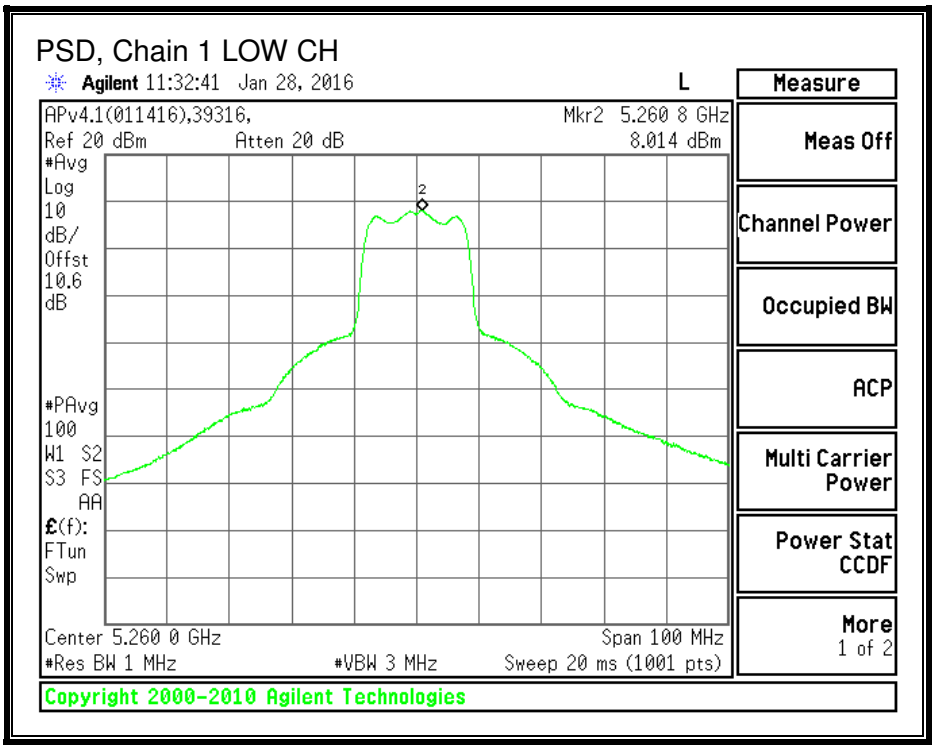
Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain For Power (dBi)	Directional Gain For PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5260	42.77	5.60	5.60	24.00	11.00
Mid	5300	43.362	5.60	5.60	24.00	11.00
High	5320	43.824	5.60	5.60	24.00	11.00

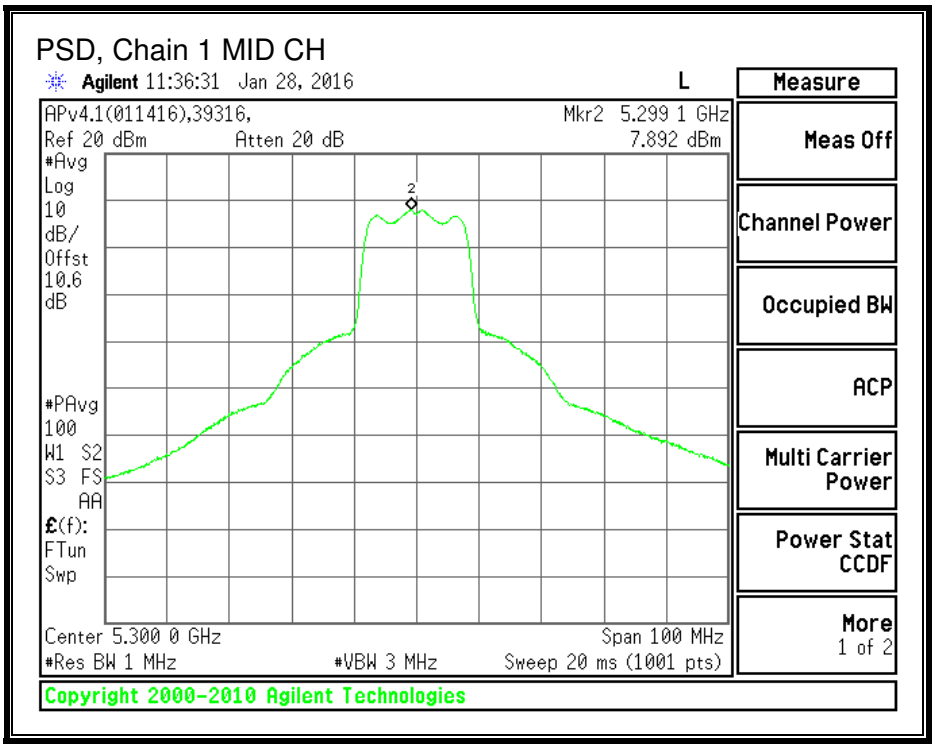
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

PSD Results

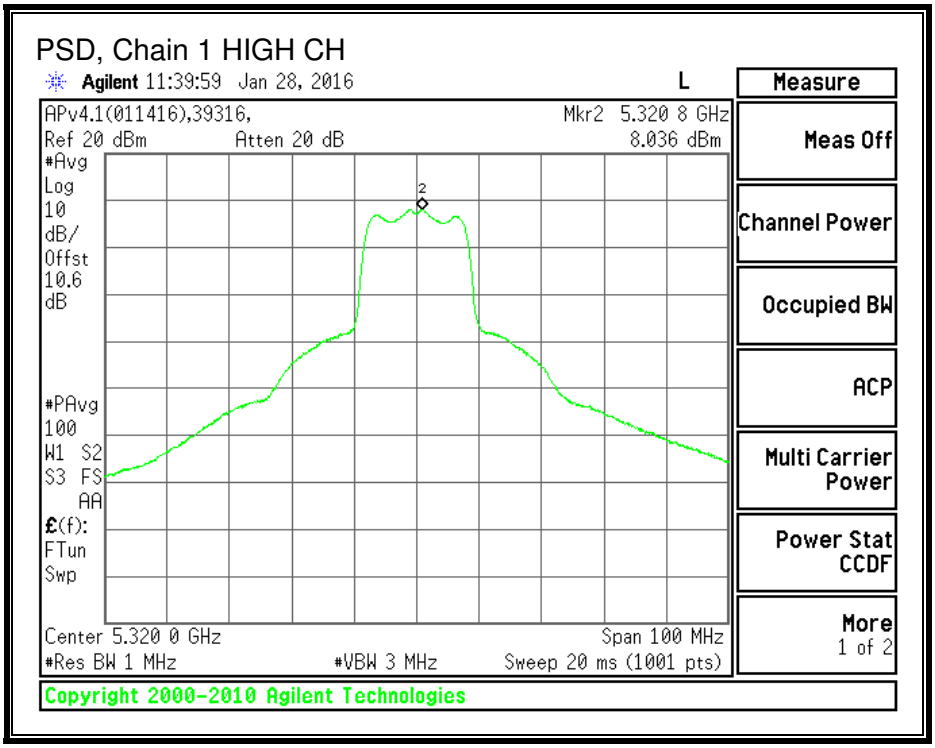
Channel	Frequency (MHz)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5260	8.014	8.014	11.00	-2.99
Mid	5300	7.892	7.892	11.00	-3.11
High	5320	8.036	8.036	11.00	-2.96

PSD, Chain 1





PSD, Chain 1 HIGH CH



8.7. 802.11n HT20 CDD 2Tx MODE IN THE 5.3 GHz BAND

8.7.1. 26 dB BANDWIDTH

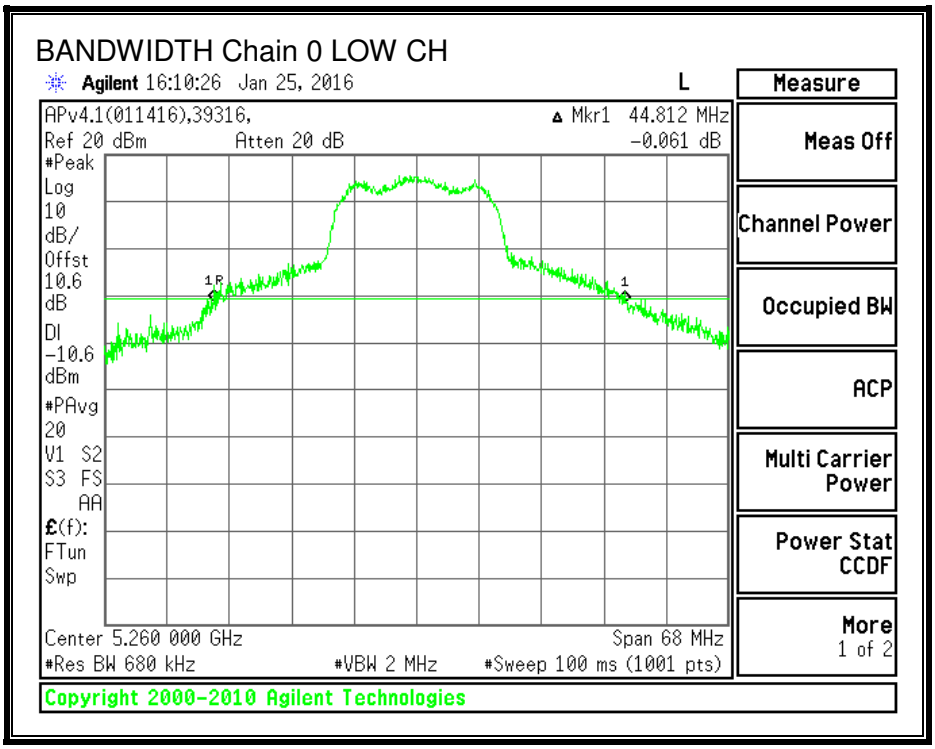
LIMITS

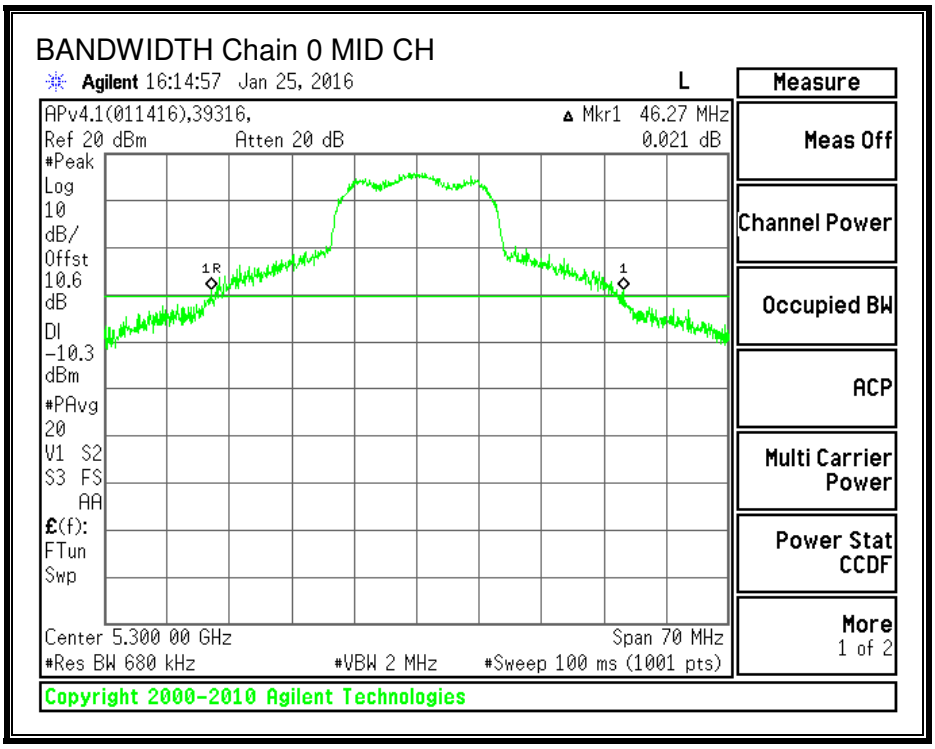
None; for reporting purposes only.

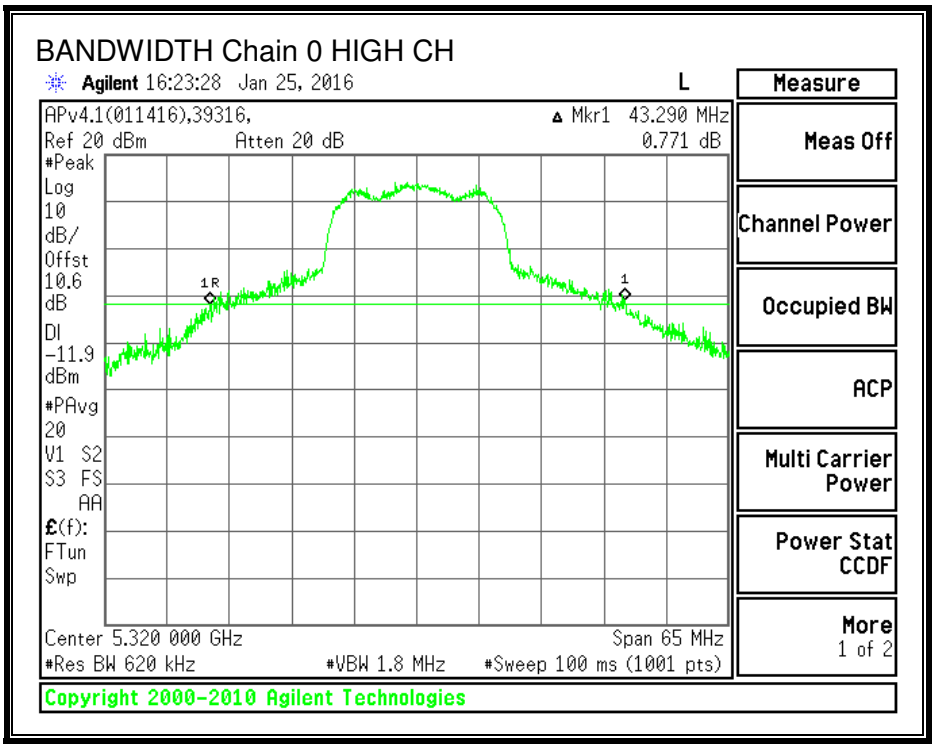
RESULTS

Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5260	44.812	42.496
Mid	5300	46.270	41.391
High	5320	43.290	42.112

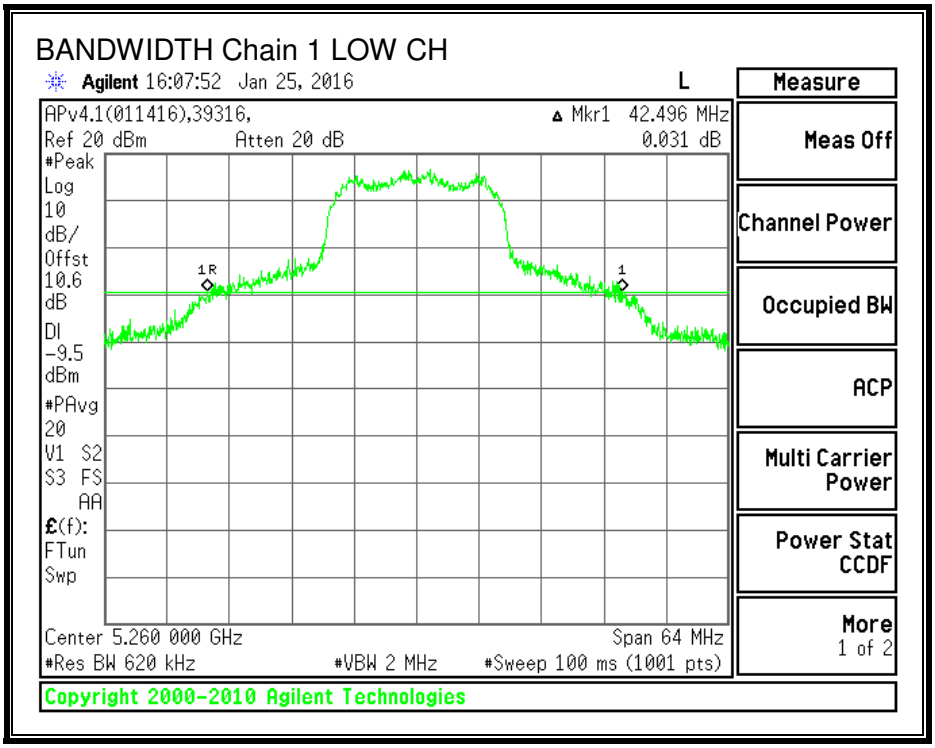
26 dB BANDWIDTH, Chain 0



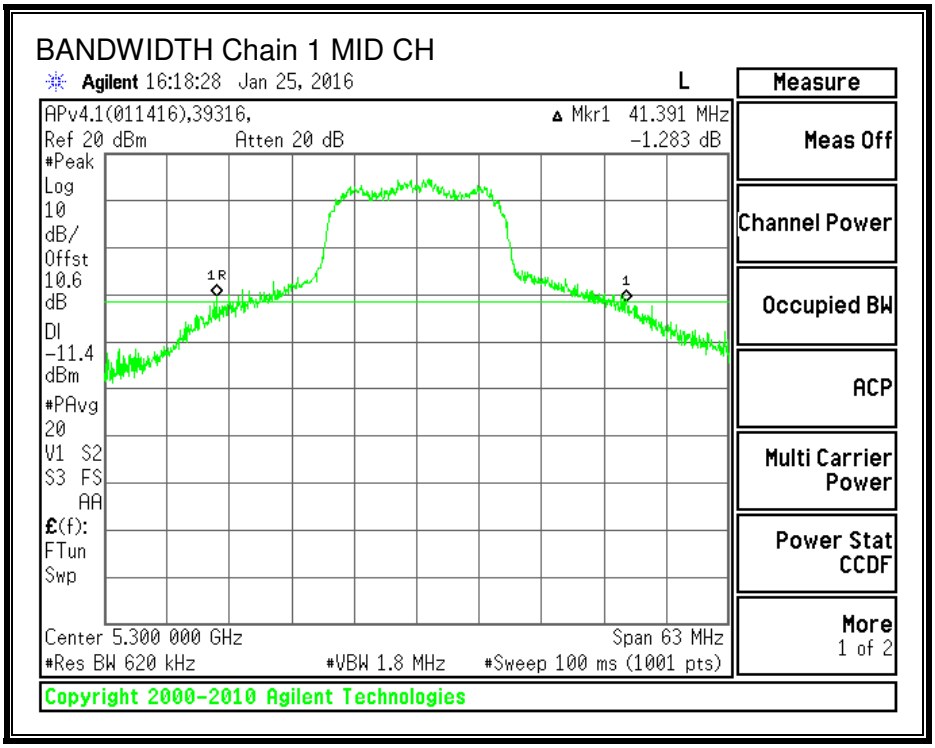




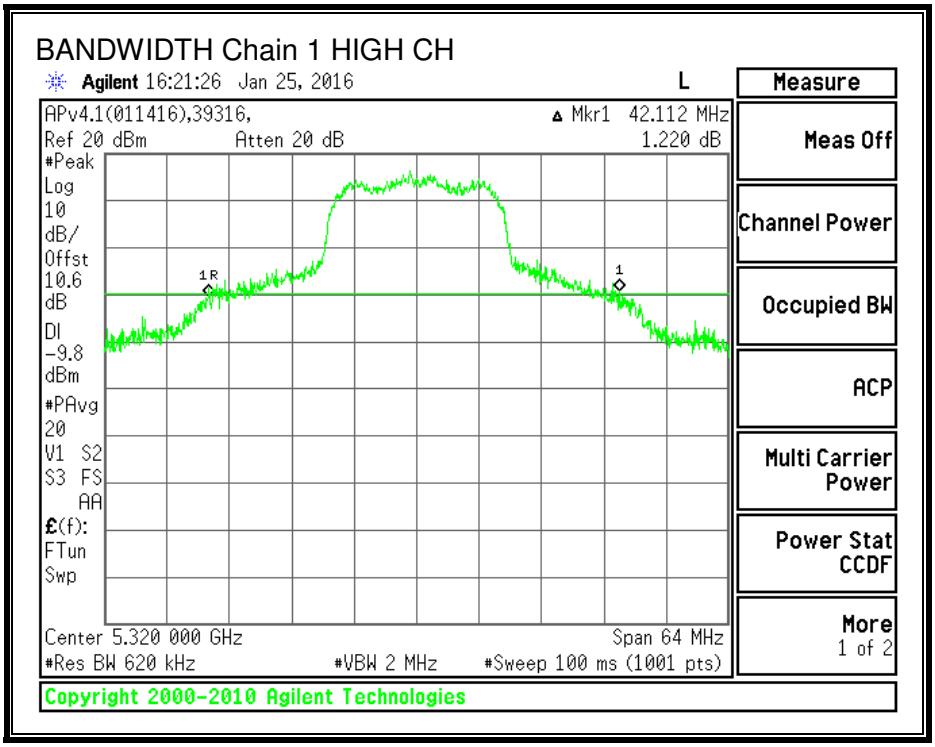
26 dB BANDWIDTH, Chain 1



BANDWIDTH Chain 1 MID CH



BANDWIDTH Chain 1 HIGH CH



8.7.1. PSD

LIMITS

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the 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

For PSD the TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

Antenna Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
5.60	3.01	8.61

RESULTS

Bandwidth, Antenna Gain and Limits

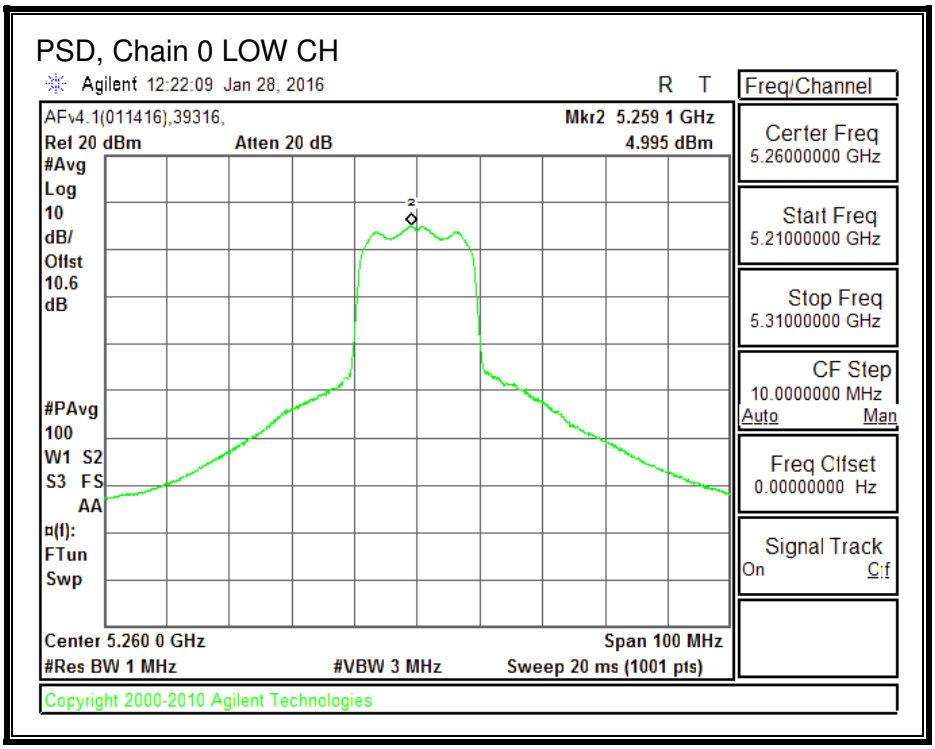
Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5260	42.50	5.60	8.61	24.00	8.39
Mid	5300	41.39	5.60	8.61	24.00	8.39
High	5320	42.11	5.60	8.61	24.00	8.39

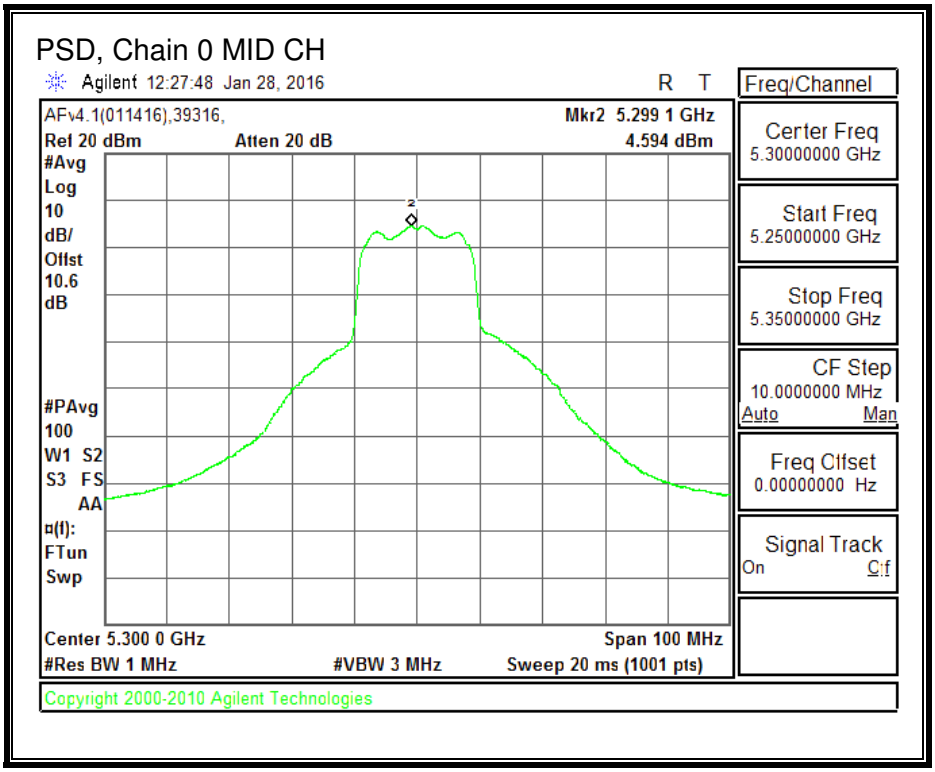
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

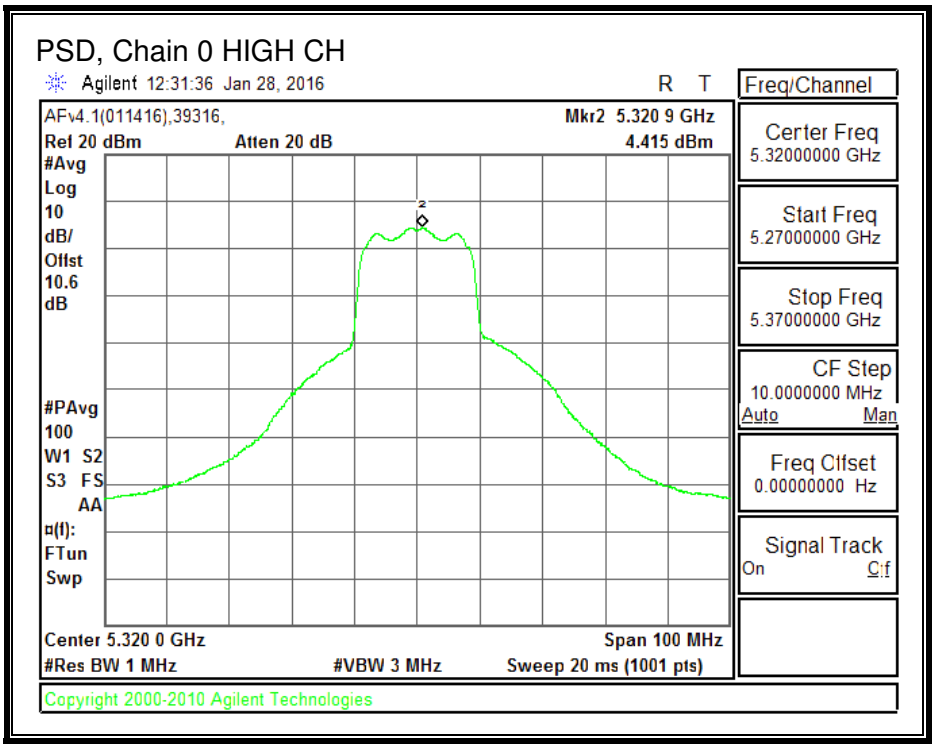
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5260	4.995	5.486	8.258	8.39	-0.13
Mid	5300	4.594	5.672	8.177	8.39	-0.21
High	5320	4.415	5.438	7.967	8.39	-0.42

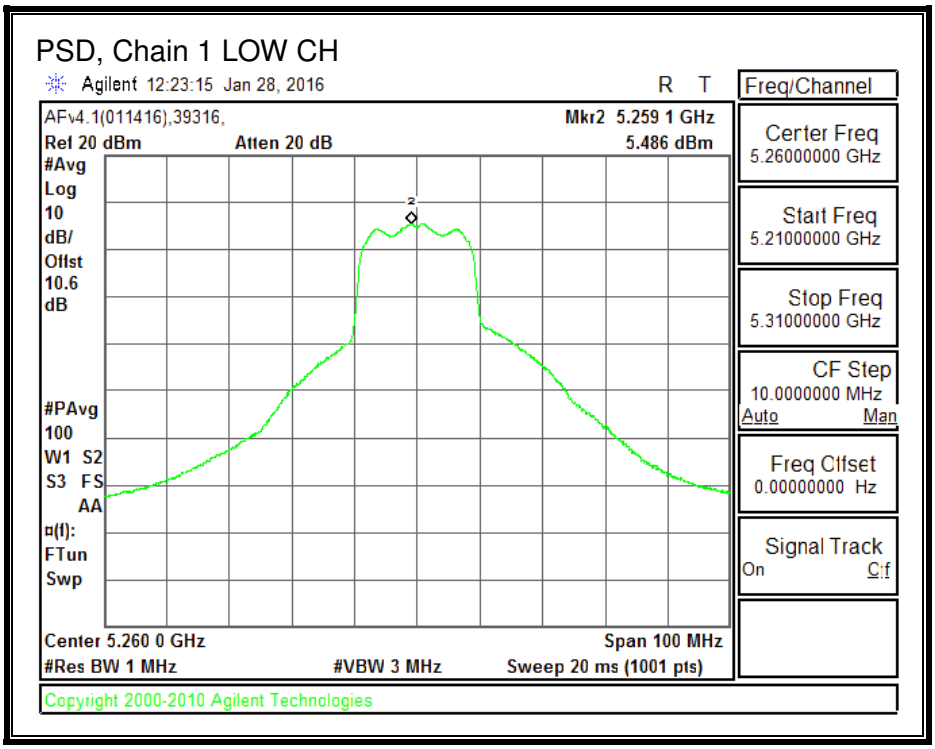
PSD, Chain 0

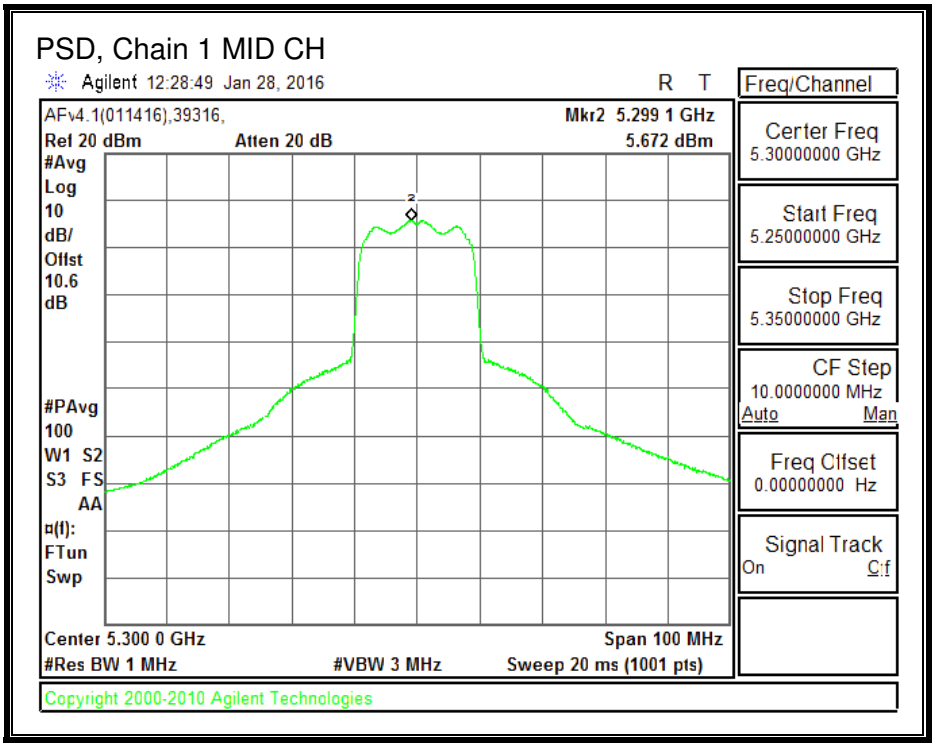


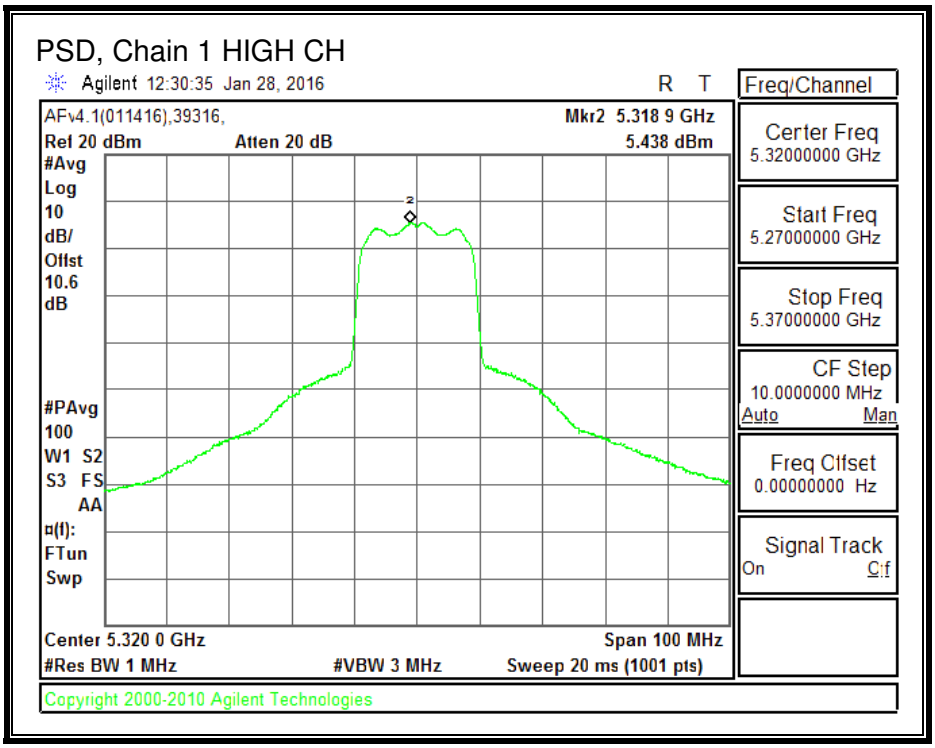




PSD, Chain 1







8.8. 802.11n HT40 CDD 2Tx MODE IN THE 5.3 GHz BAND

8.8.1. 26 dB BANDWIDTH

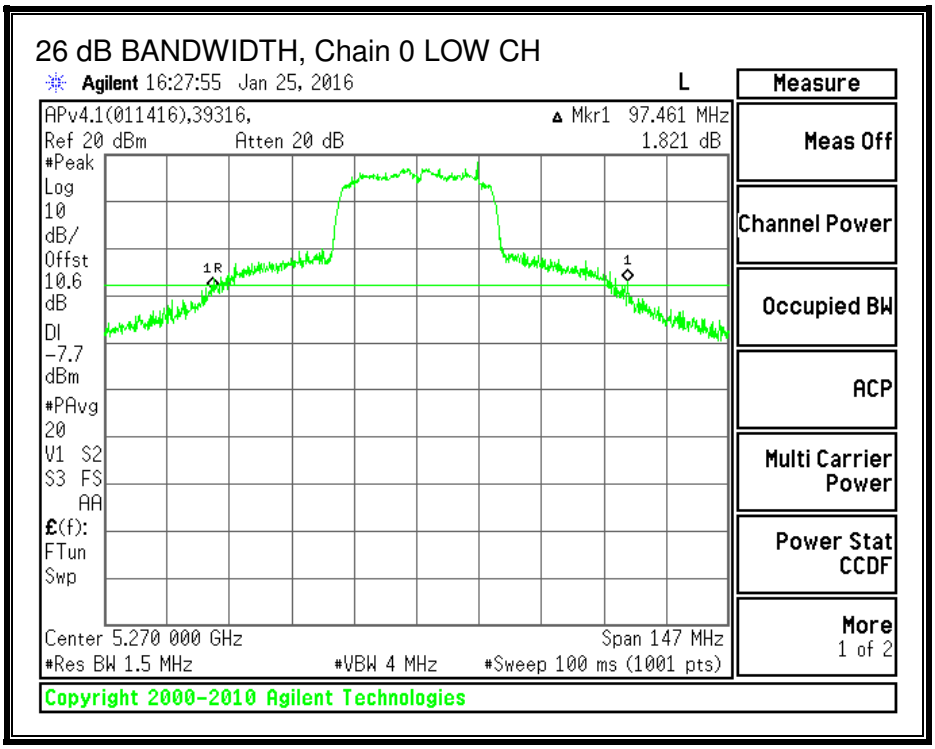
LIMITS

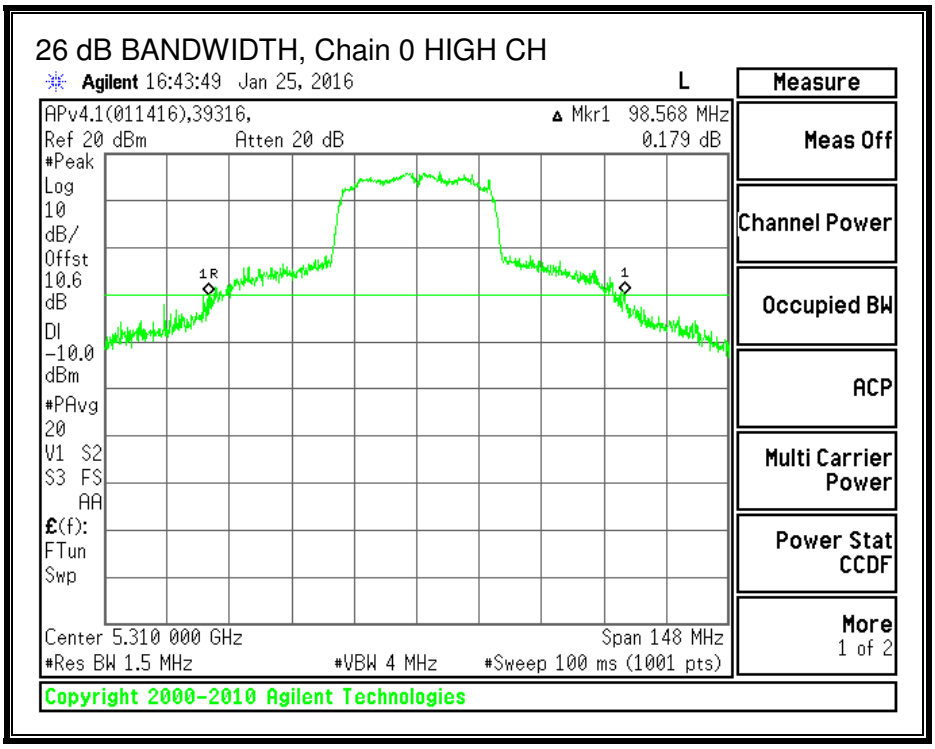
None; for reporting purposes only.

RESULTS

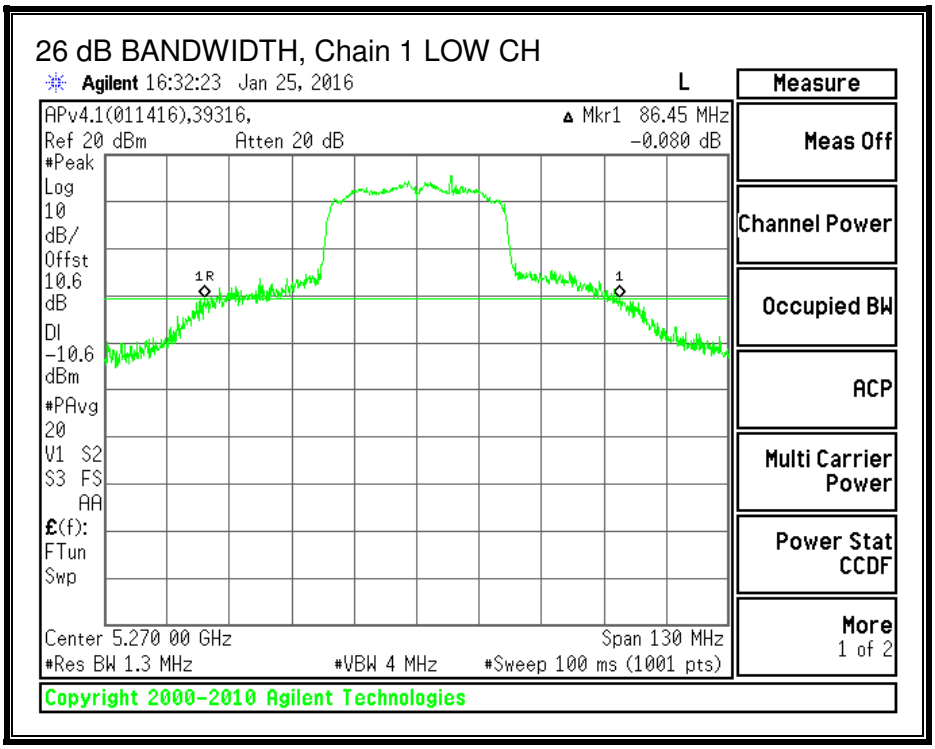
26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
97.461	86.450
98.568	97.090

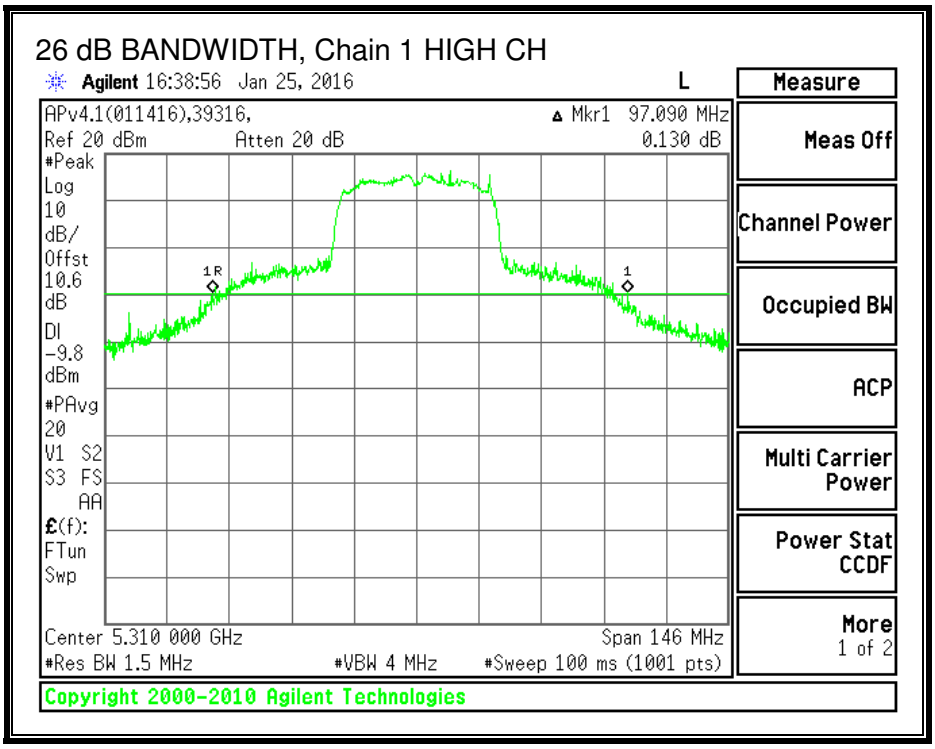
26 dB BANDWIDTH, Chain 0





26 dB BANDWIDTH, Chain 1





8.8.1. PSD

LIMITS

FCC §15.407 (a) (2)

For the band 5.25–5.35 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the 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

For PSD the TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

Antenna Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
5.60	3.01	8.61

RESULTS

Bandwidth, Antenna Gain and Limits

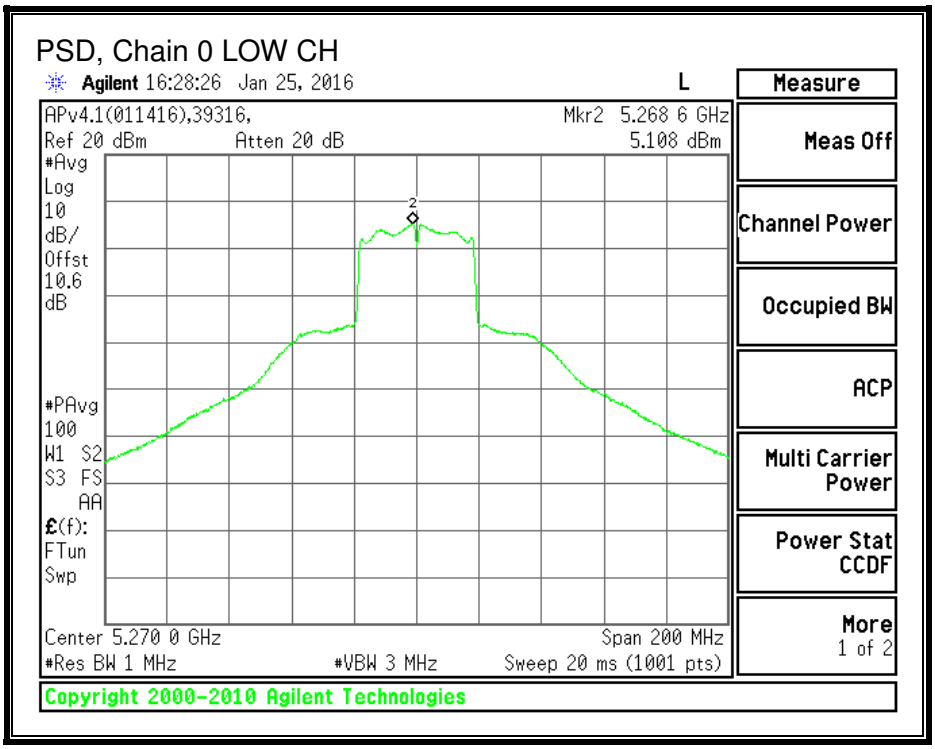
Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5270	86.45	5.60	8.61	24.00	8.39
High	5310	97.09	5.60	8.61	24.00	8.39

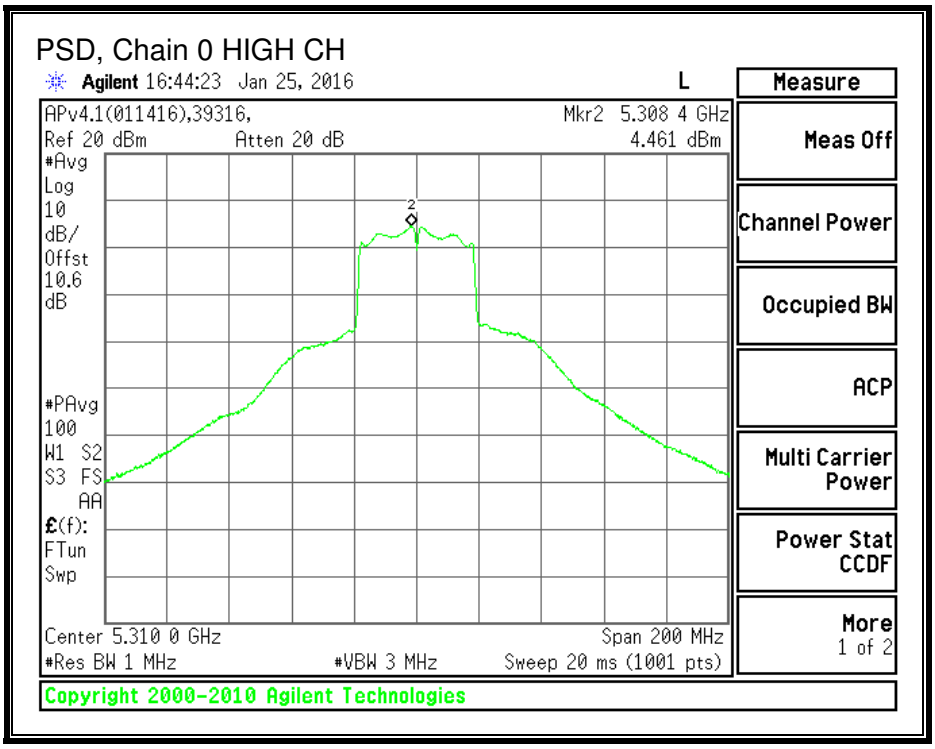
Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd Power & PSD

PSD Results

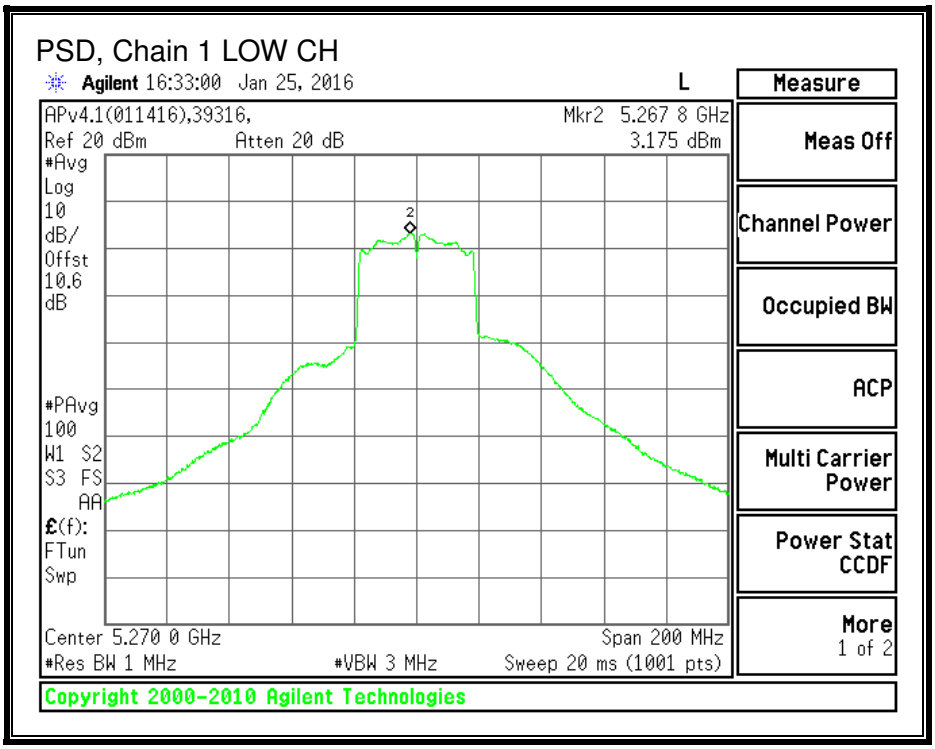
Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5270	5.108	3.175	7.348	8.39	-1.04
High	5310	4.461	3.846	7.265	8.39	-1.13

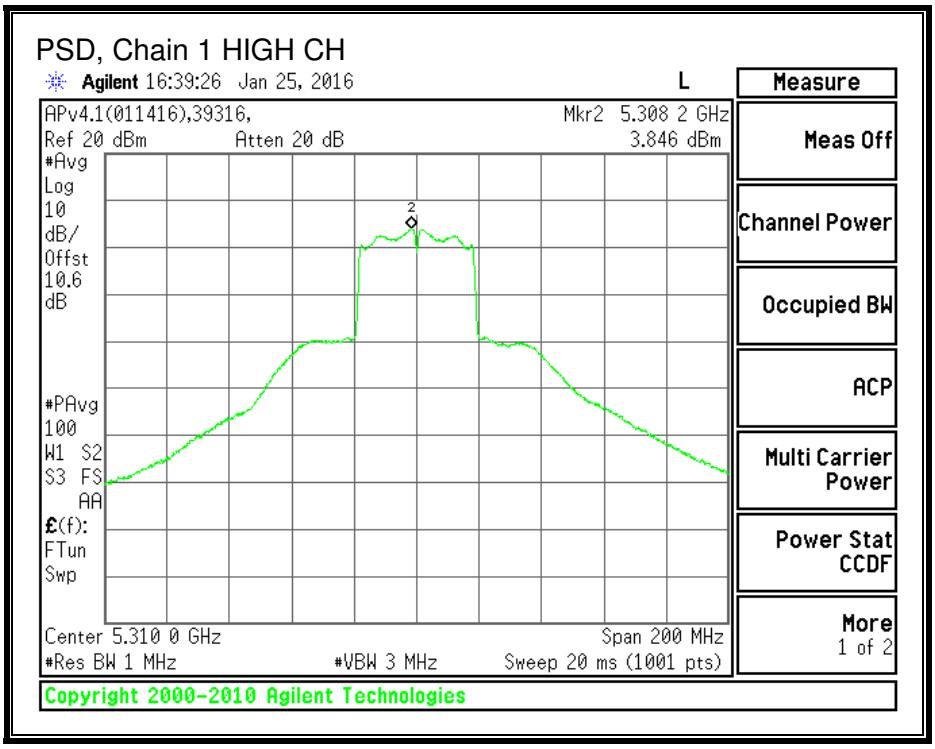
PSD, Chain 0





PSD, Chain 1





8.9. 802.11a LEGACY MODE IN THE 5.6 GHz BAND

8.9.1. 26 dB BANDWIDTH

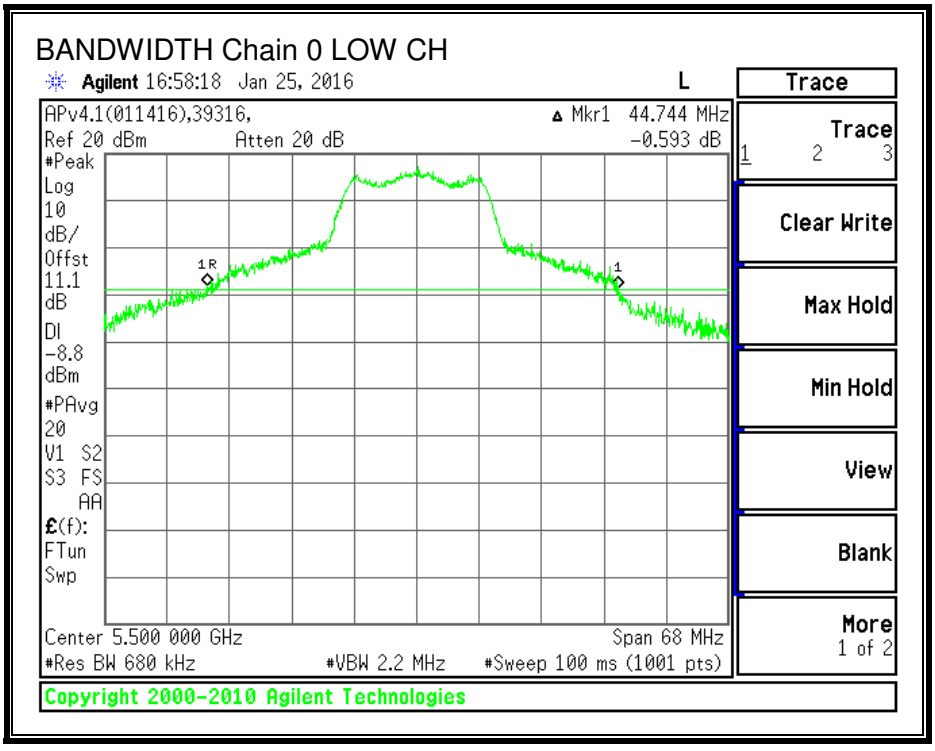
LIMITS

None; for reporting purposes only.

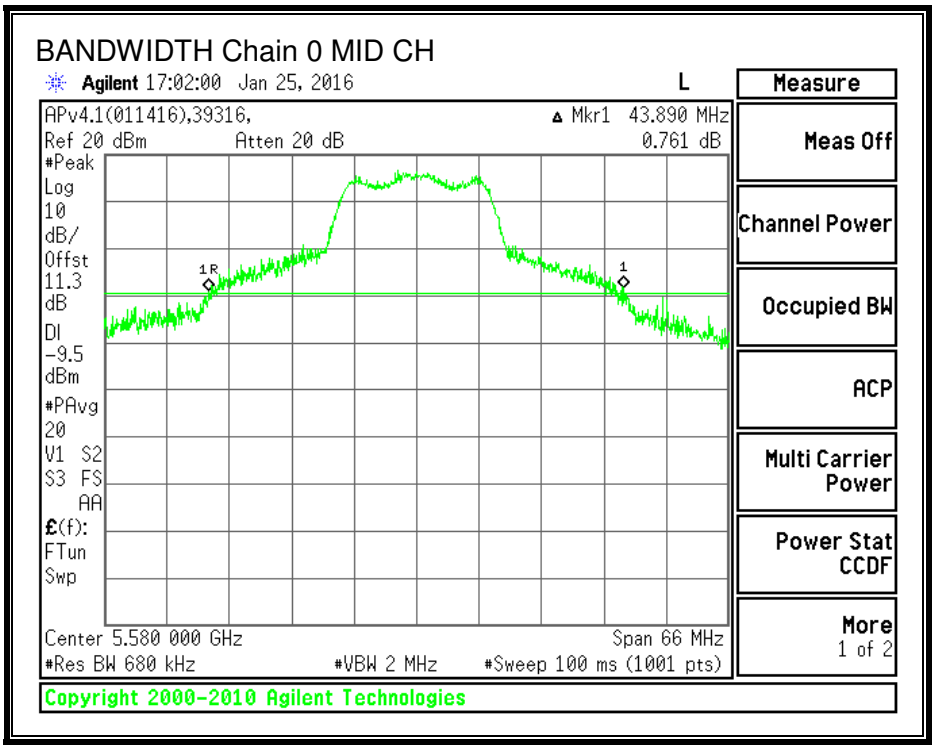
RESULTS

Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)
Low	5500	44.744
Mid	5580	43.890
High	5700	40.382

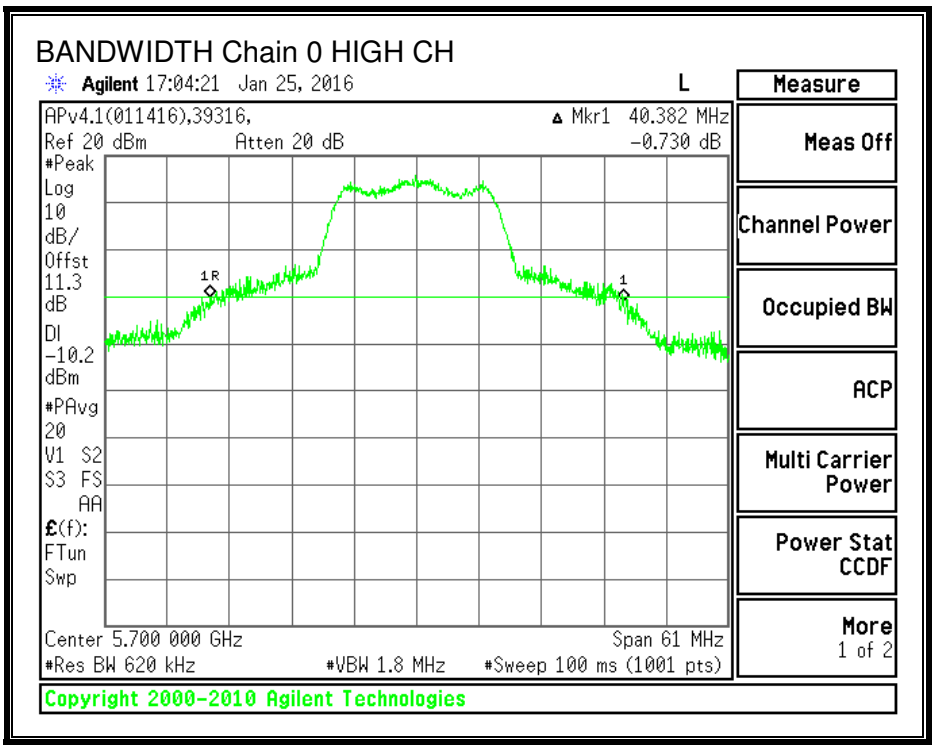
26 dB BANDWIDTH, Chain 0



BANDWIDTH Chain 0 MID CH



BANDWIDTH Chain 0 HIGH CH



8.9.1. PSD

LIMITS

FCC §15.407 (a) (2)

For the band 5.47–5.725 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the 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

This is SISO mode, AG is the highest (worst-case) = 4.2 dBi

RESULTS

Bandwidth, Antenna Gain, and Limits

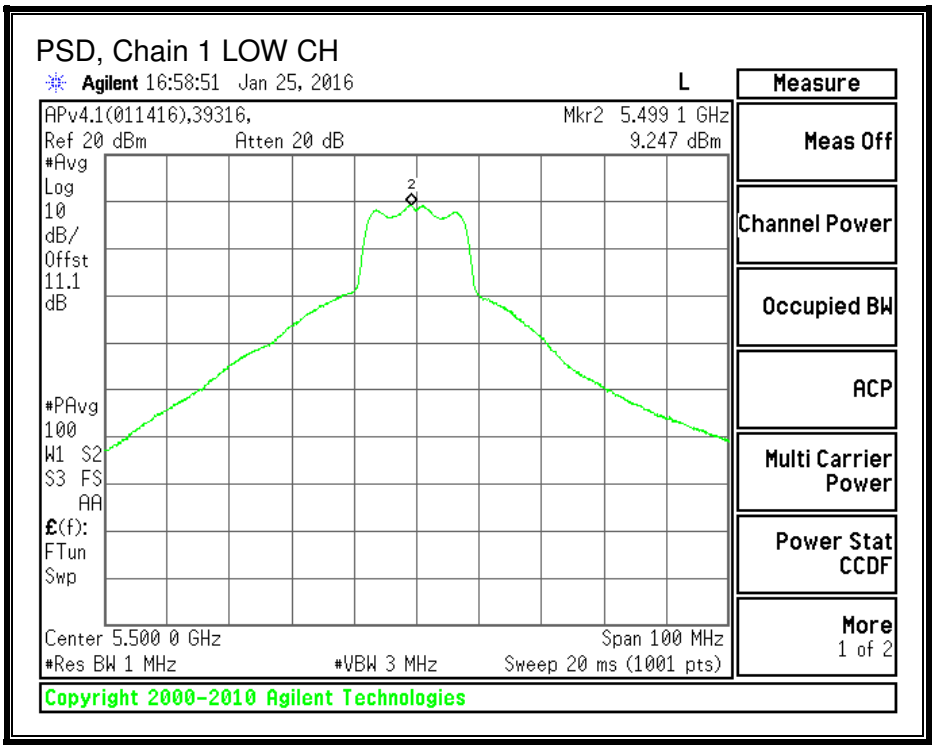
Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5500	44.74	4.20	24.00	11.00
Mid	5600	43.89	4.20	24.00	11.00
High	5700	40.38	4.20	24.00	11.00

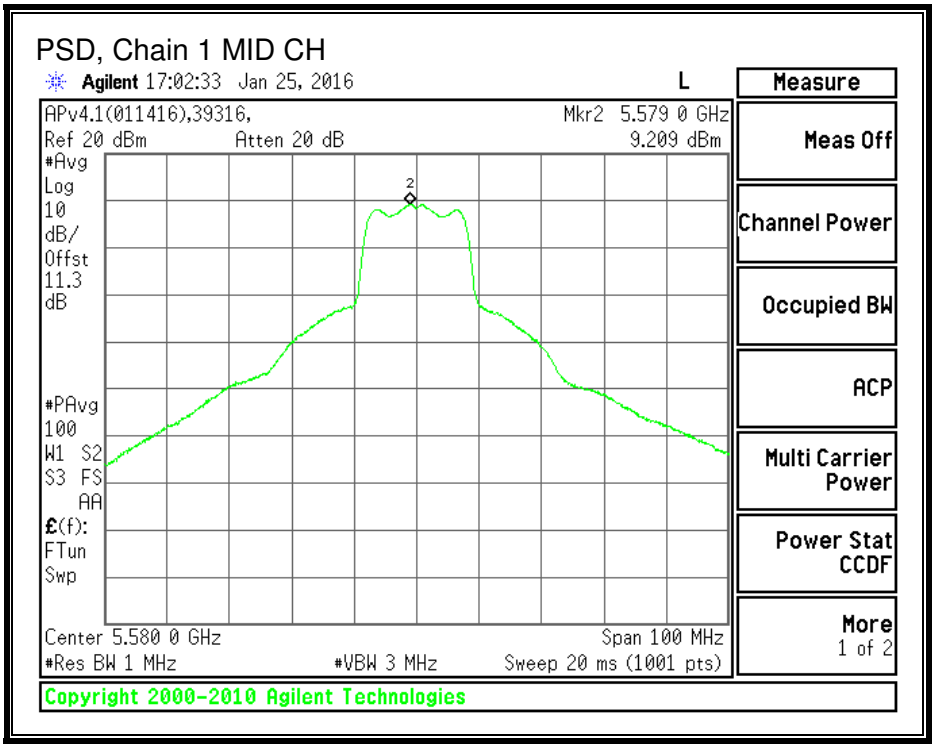
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

PSD Results

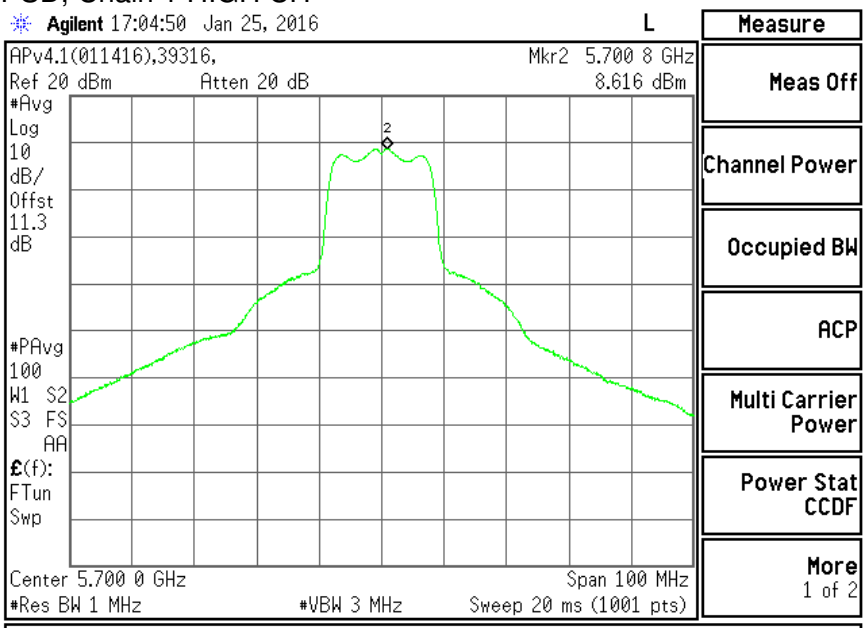
Channel	Frequency (MHz)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5500	9.25	9.25	11.00	-1.75
Mid	5600	9.21	9.21	11.00	-1.79
High	5700	8.62	8.62	11.00	-2.38

PSD, Chain 1





PSD, Chain 1 HIGH CH



8.10. 802.11n HT20 CDD 2Tx MODE IN THE 5.6 GHz BAND

8.10.1. 26 dB BANDWIDTH

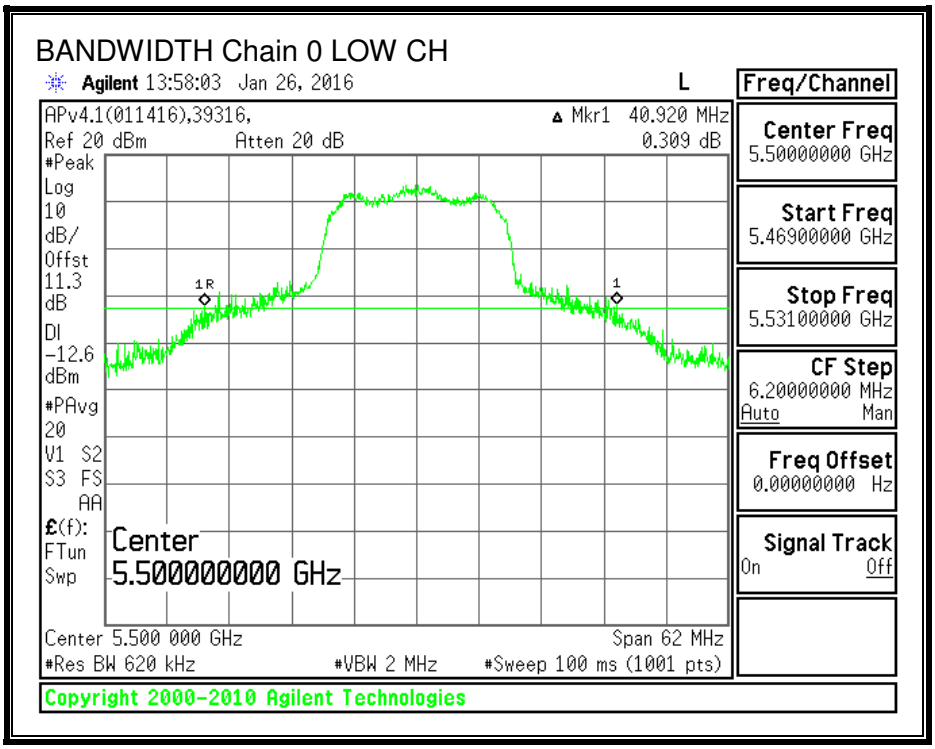
LIMITS

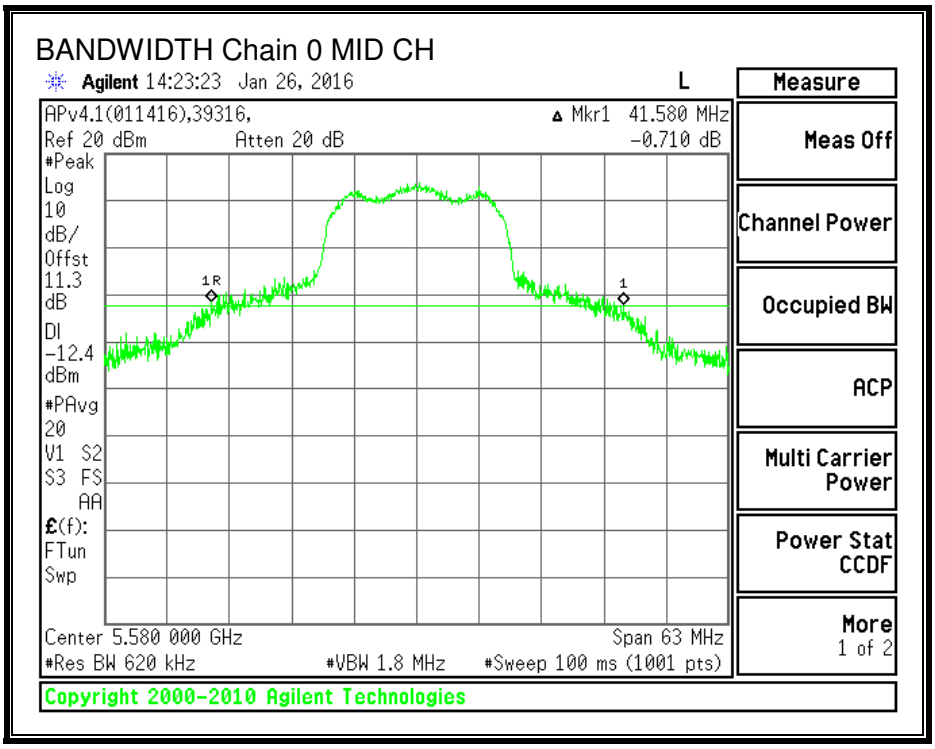
None; for reporting purposes only.

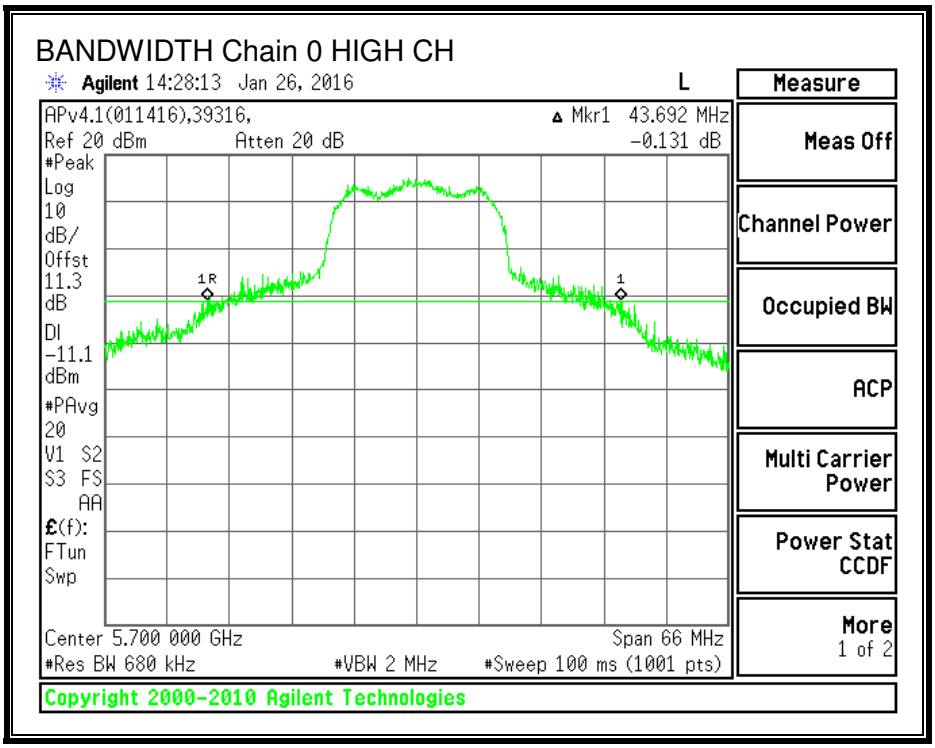
RESULTS

Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5500	40.920	42.112
Mid	5580	41.580	43.890
High	5700	43.692	37.962

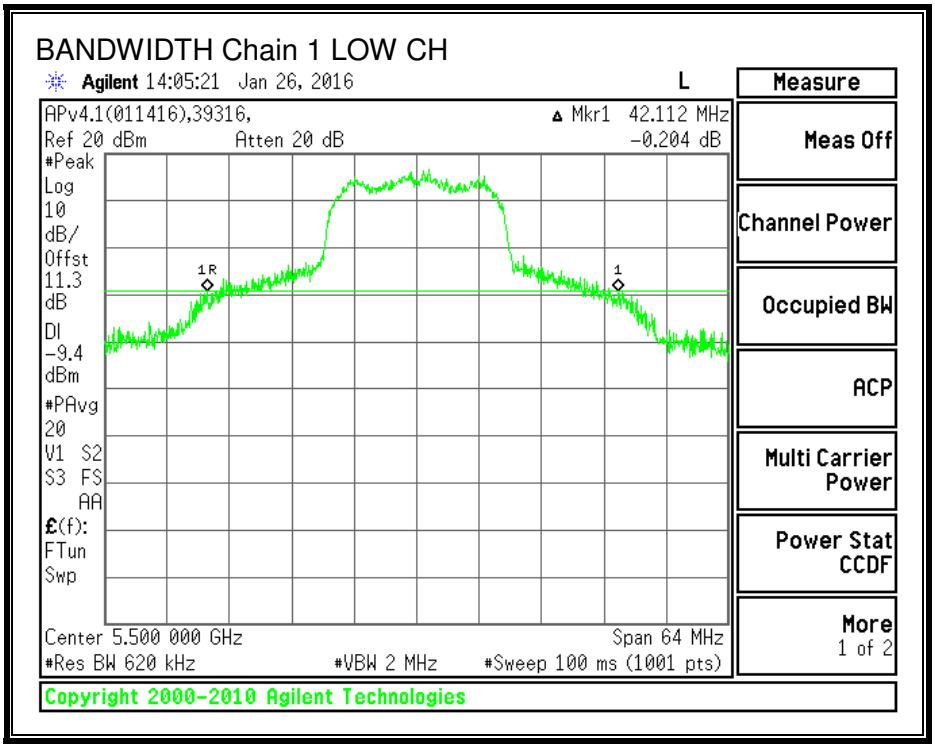
26 dB BANDWIDTH, Chain 0



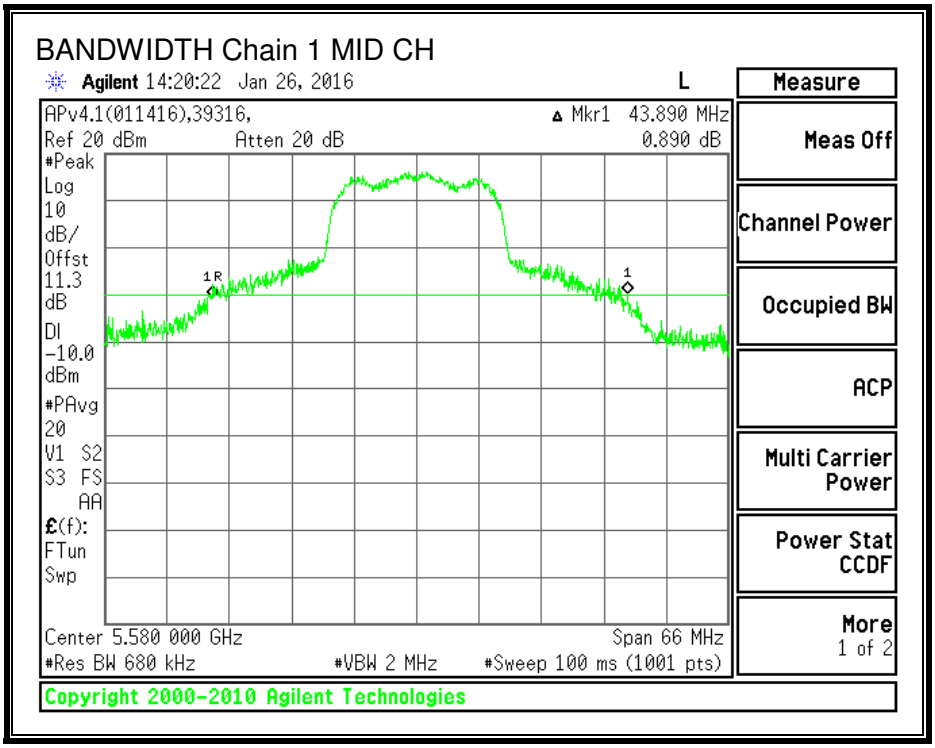




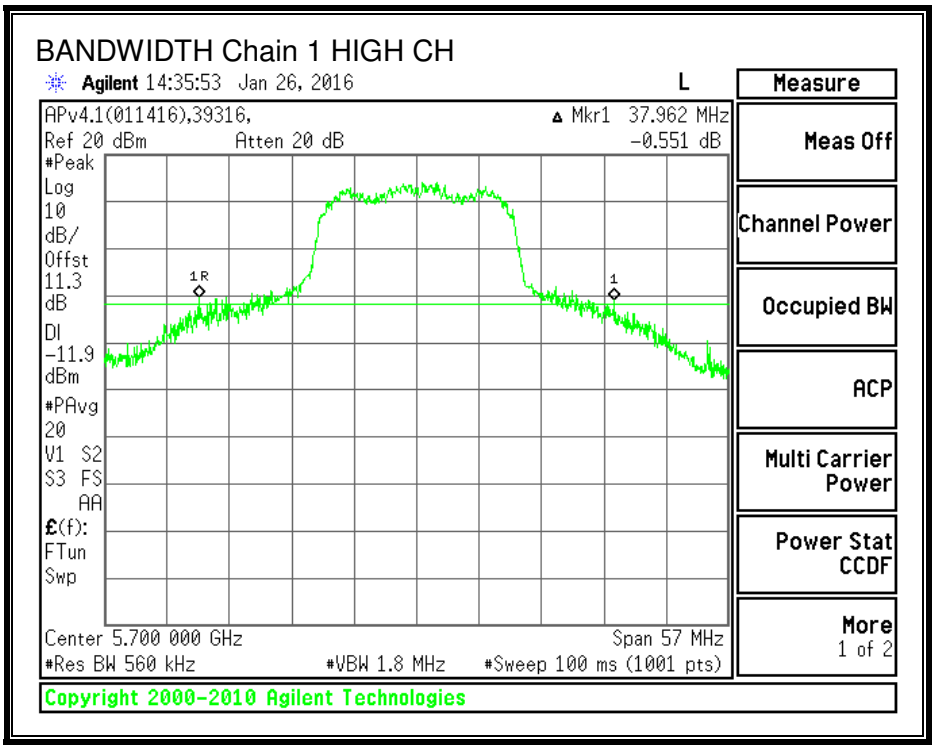
26 dB BANDWIDTH, Chain 1



BANDWIDTH Chain 1 MID CH



BANDWIDTH Chain 1 HIGH CH



8.10.1. PSD

LIMITS

FCC §15.407 (a) (2)

For the band 5.47–5.725 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the 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

For PSD the TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

Antenna Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
4.20	3.01	7.21

RESULTS

Bandwidth, Antenna Gain, and Limits

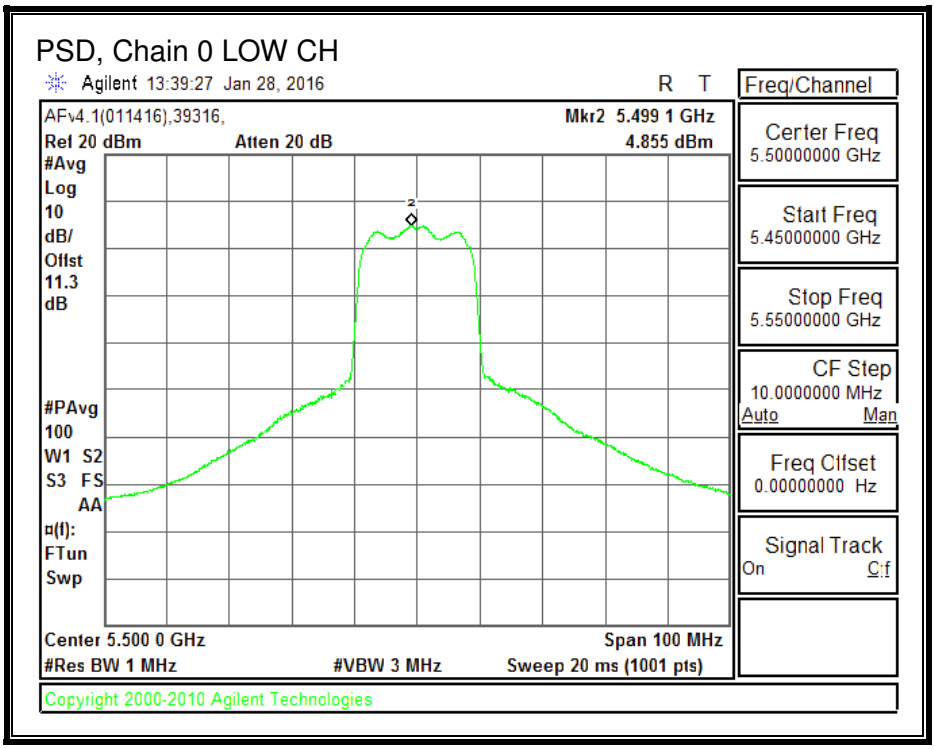
Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5500	40.92	4.20	7.21	24.00	9.79
Mid	5600	41.58	4.20	7.21	24.00	9.79
High	5700	37.96	4.20	7.21	24.00	9.79

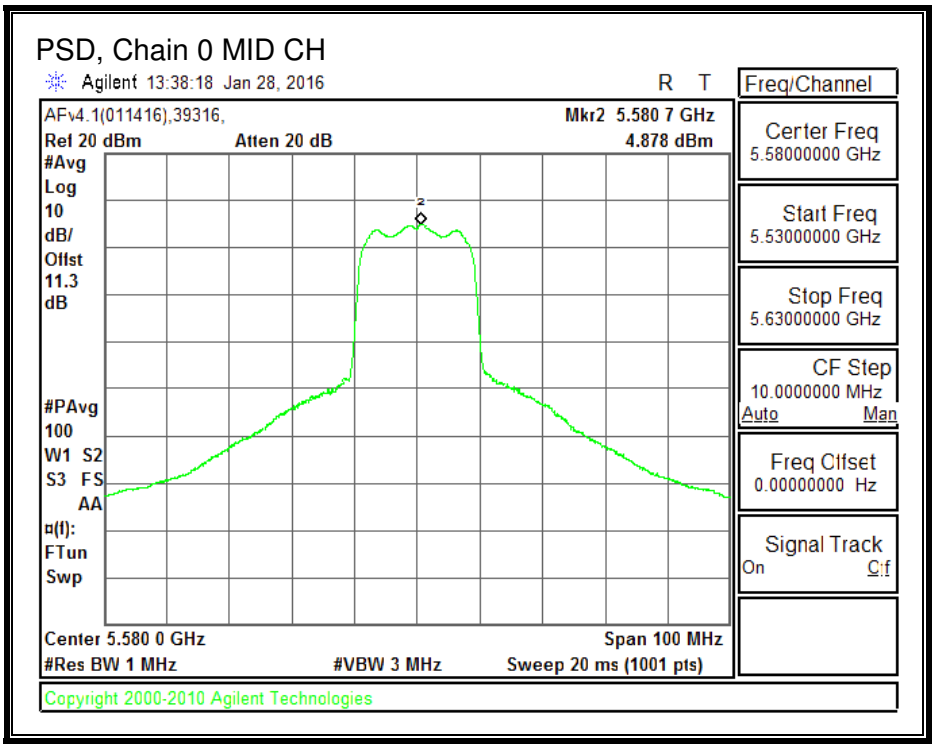
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

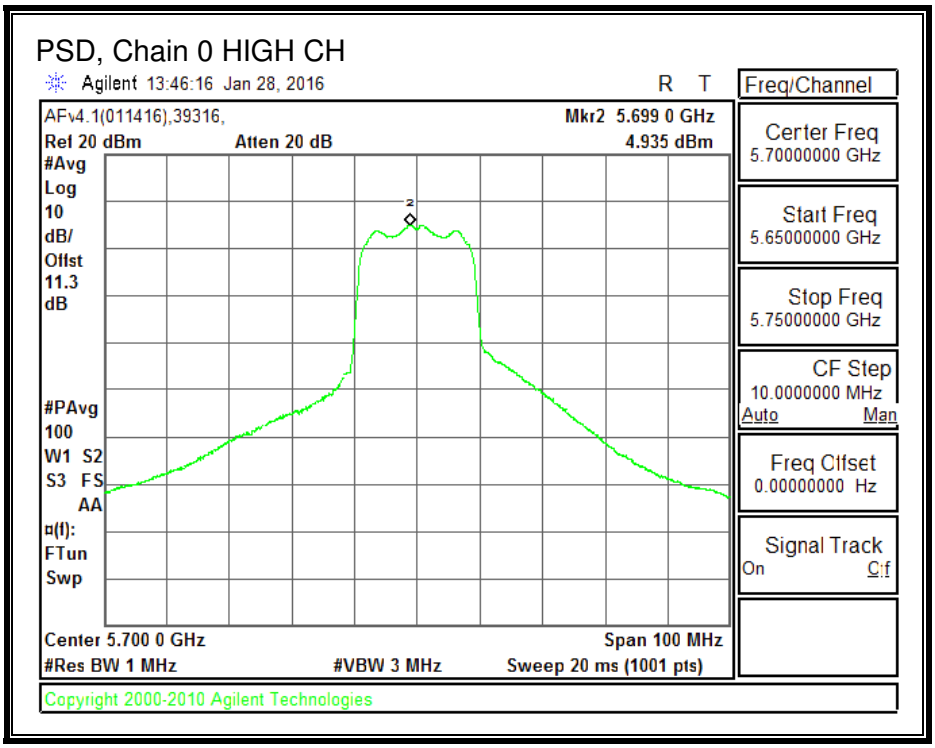
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5500	4.855	7.495	9.383	9.79	-0.41
Mid	5600	4.878	7.642	9.487	9.79	-0.30
High	5700	4.935	7.515	9.424	9.79	-0.37

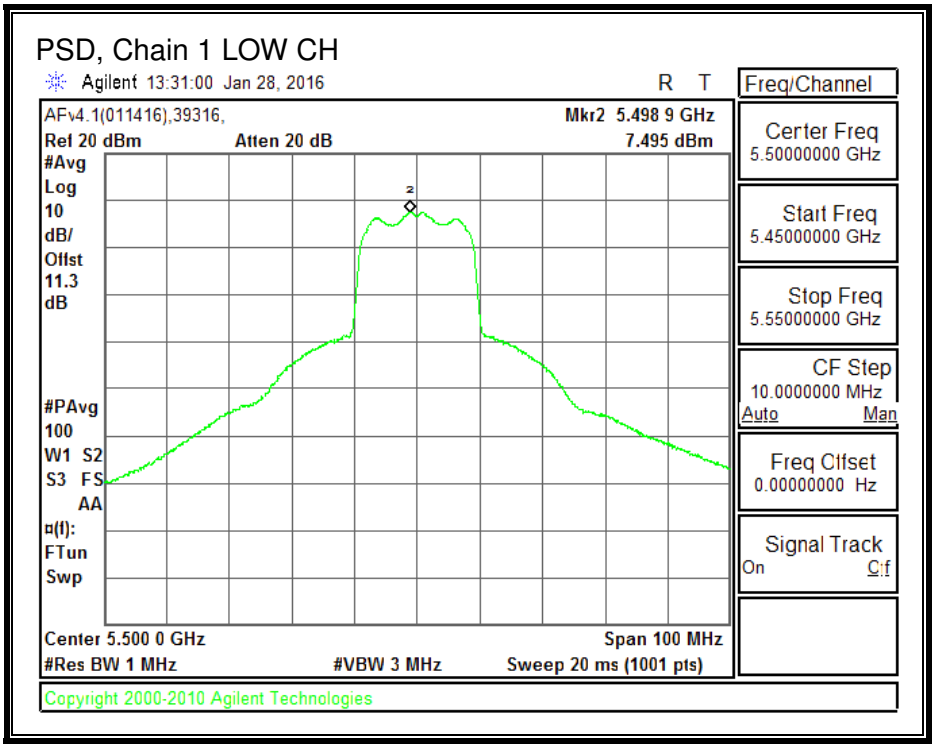
PSD, Chain 0



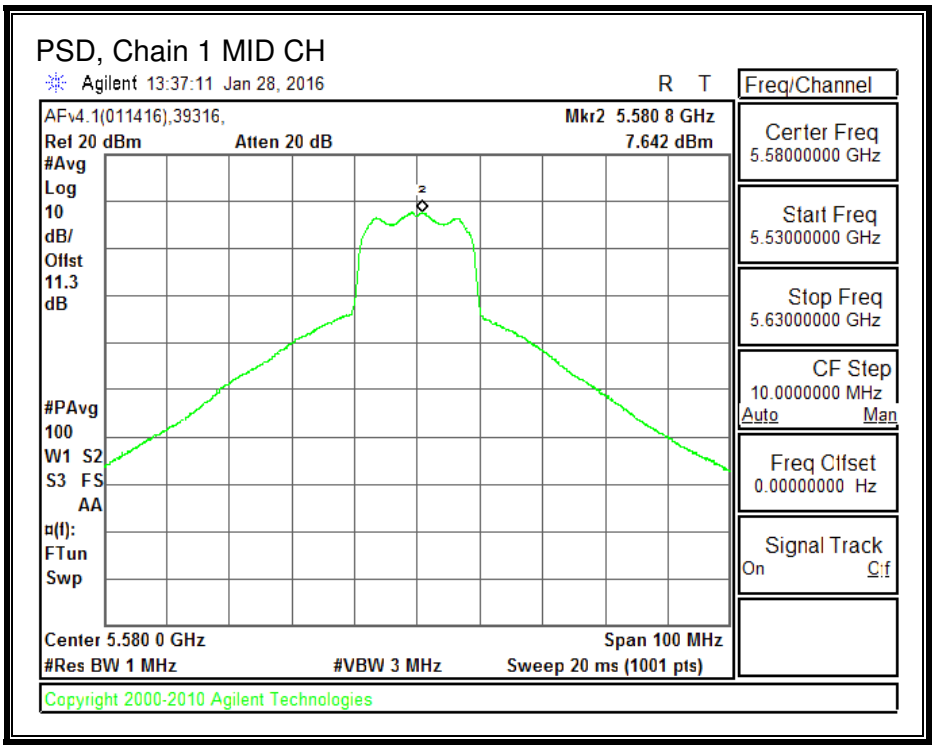




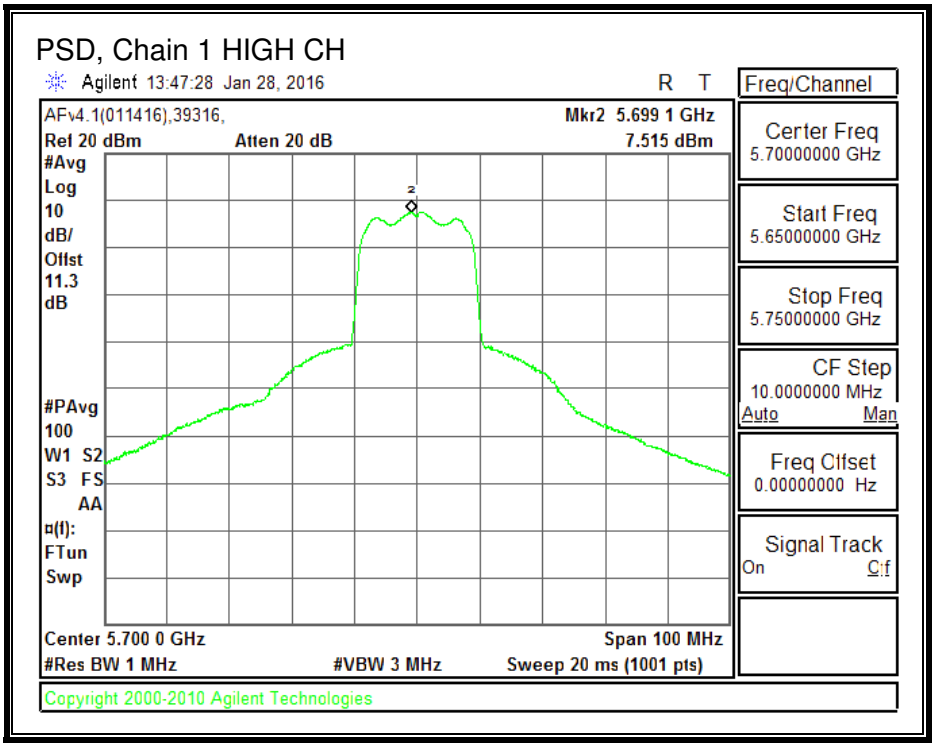
PSD, Chain 1



PSD, Chain 1 MID CH



PSD, Chain 1 HIGH CH



8.11. 802.11n HT40 CDD 2Tx MODE IN THE 5.6 GHz BAND

8.11.1. 26 dB BANDWIDTH

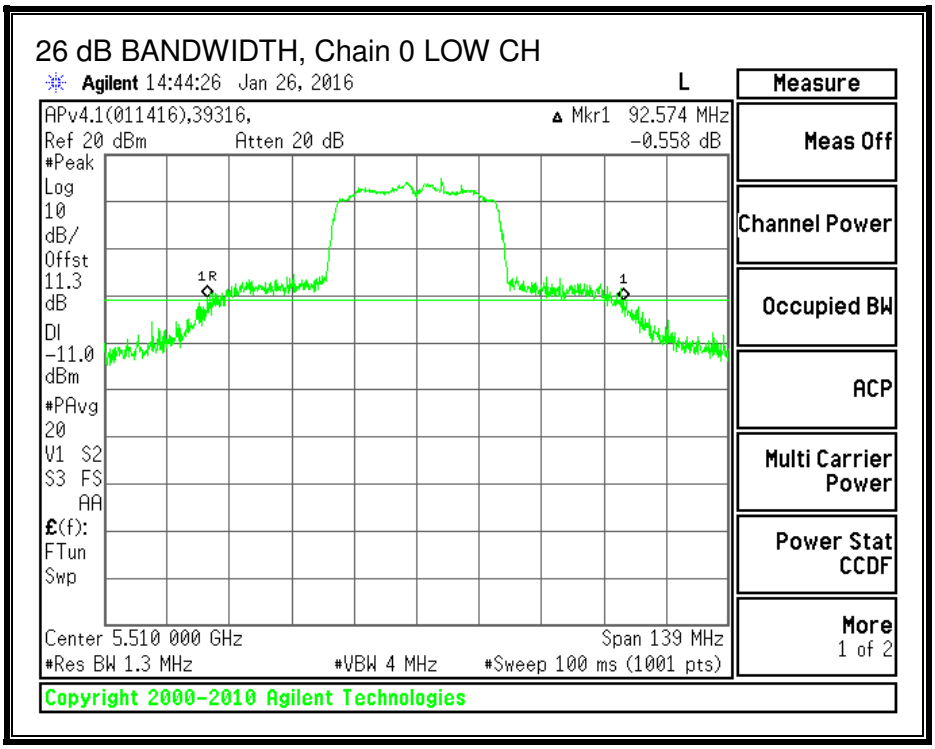
LIMITS

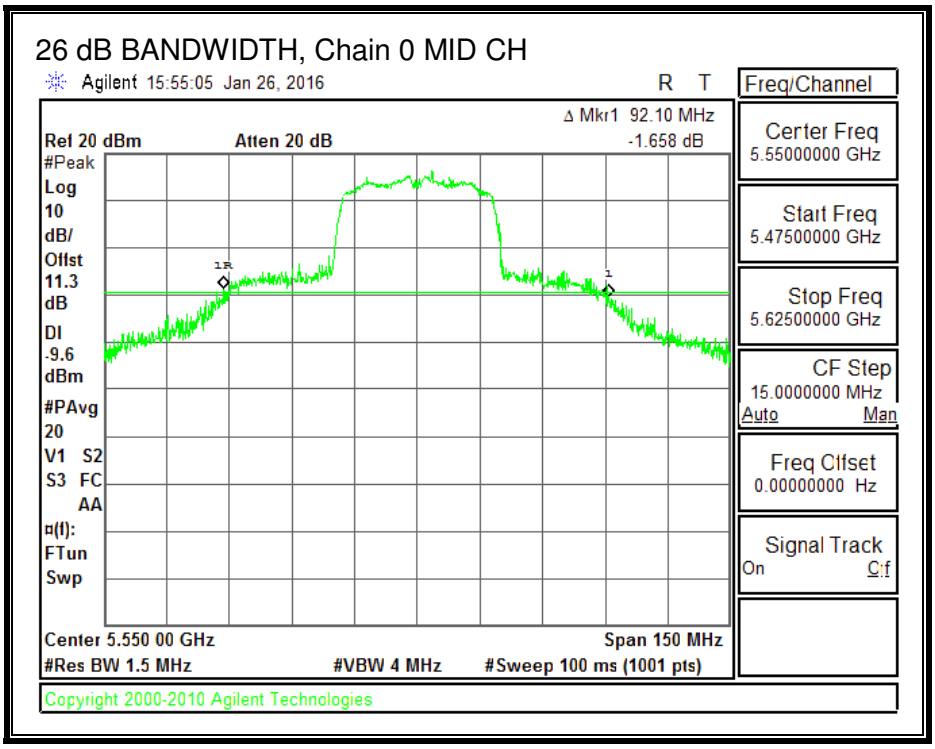
None; for reporting purposes only.

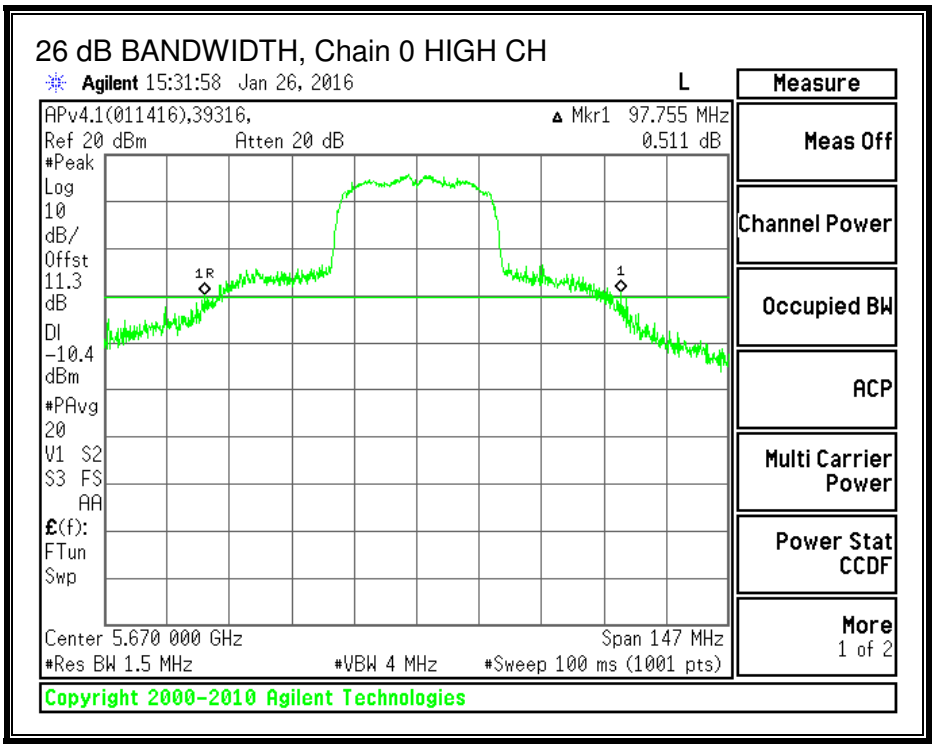
RESULTS

Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5510	92.574	99.450
Mid	5550	92.100	96.900
High	5670	97.755	89.244

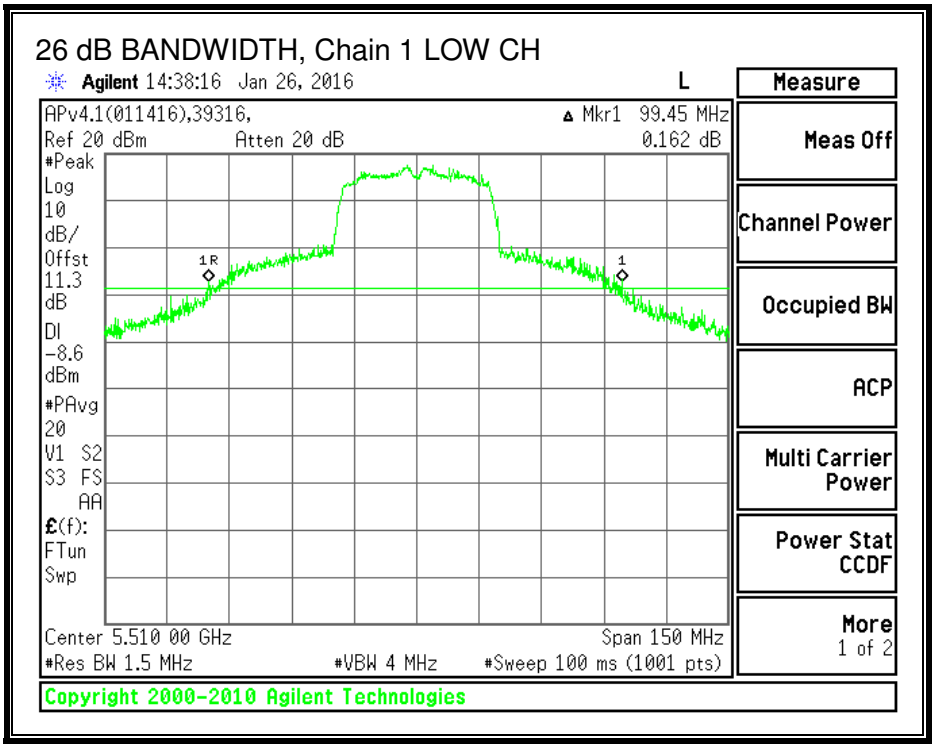
26 dB BANDWIDTH, Chain 0

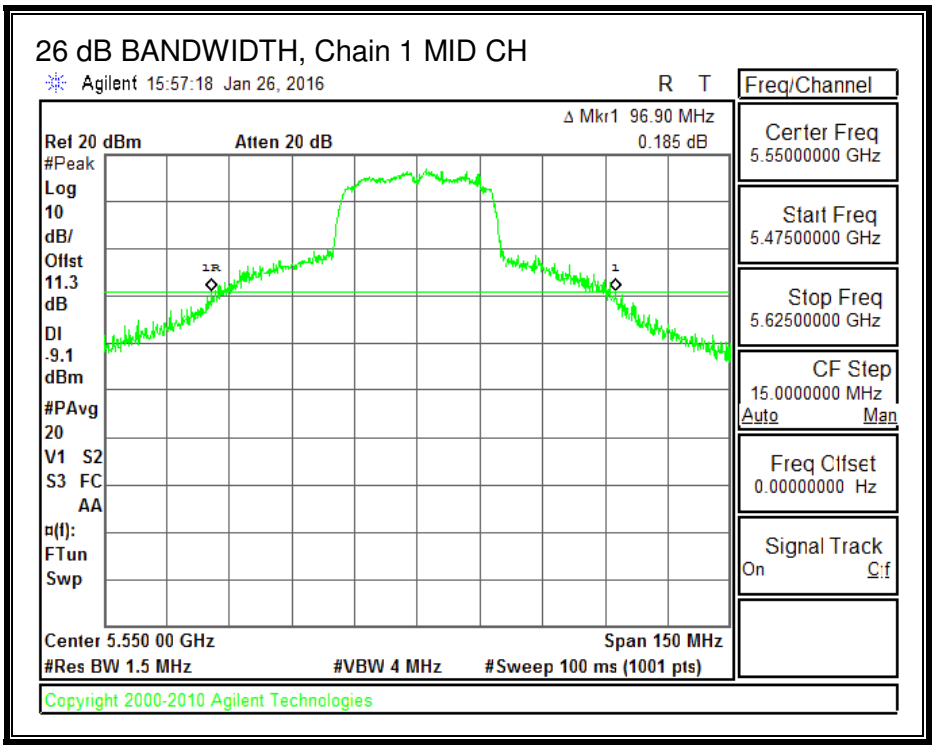


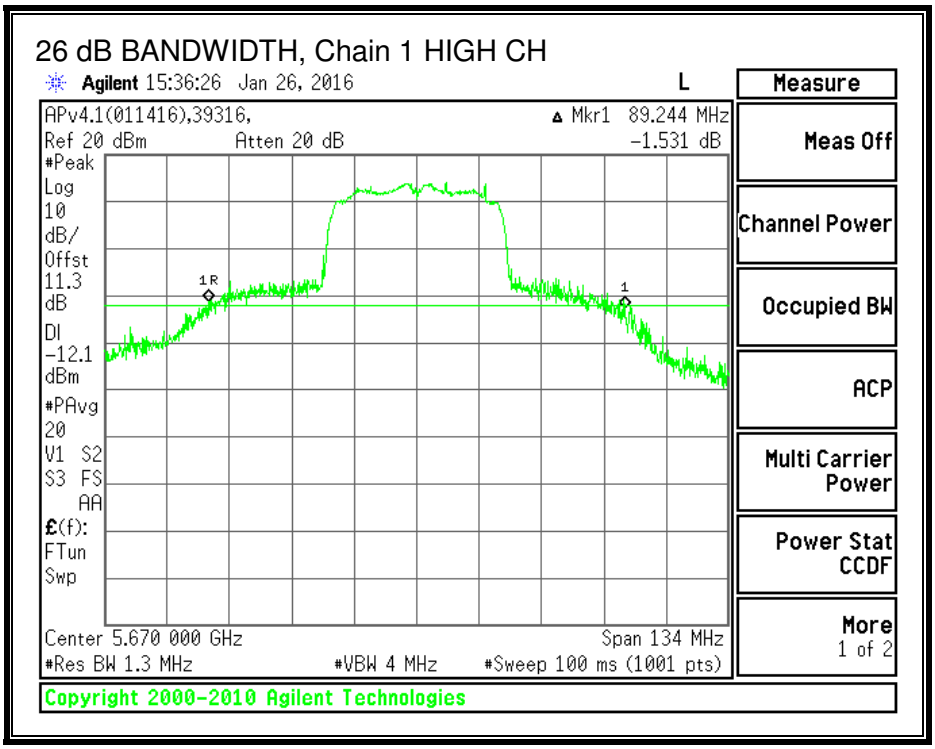




26 dB BANDWIDTH, Chain 1







8.11.1. PSD

LIMITS

FCC §15.407 (a) (2)

For the band 5.47–5.725 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the 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

For PSD the TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

Antenna Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
4.20	3.01	7.21

RESULTS

Bandwidth, Antenna Gain, and Limits

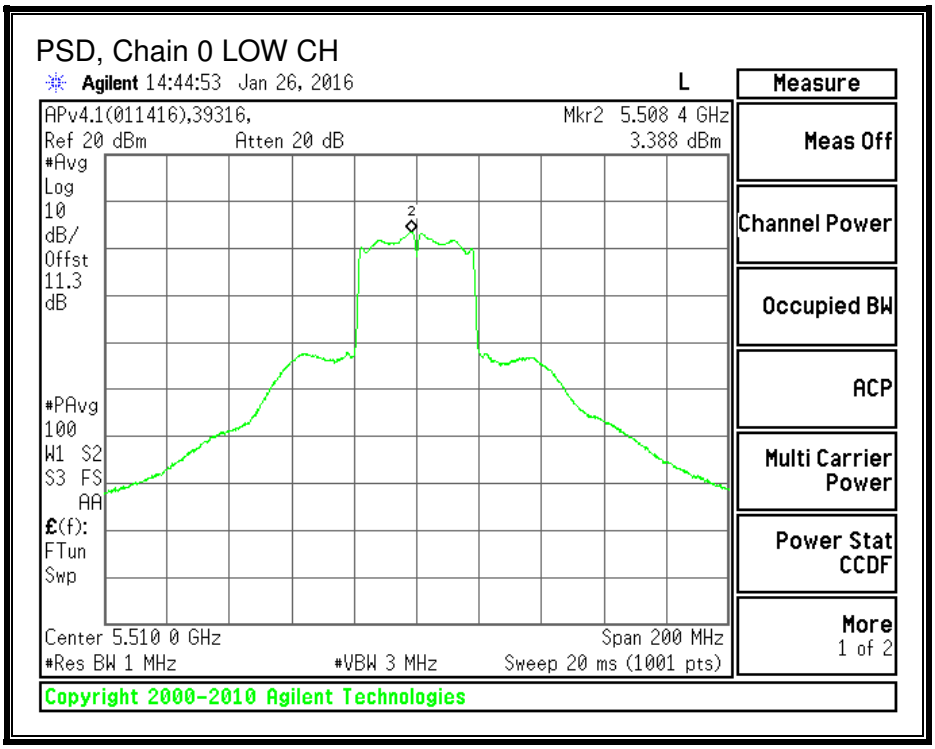
Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Directional Gain for Power (dBi)	Directional Gain for PSD (dBi)	Power Limit (dBm)	PSD Limit (dBm)
Low	5510	92.57	4.20	7.21	24.00	9.79
Mid	5590	92.10	4.20	7.21	24.00	9.79
High	5670	89.24	4.20	7.21	24.00	9.79

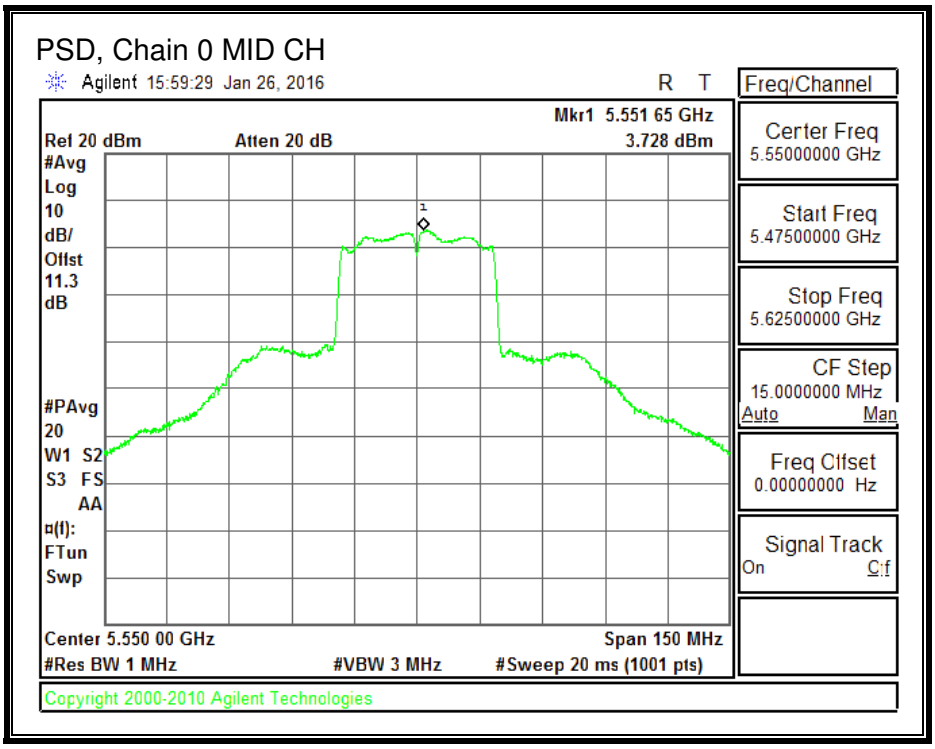
Duty Cycle CF (dB)	0.09	Included in Calculations of Corr'd PSD

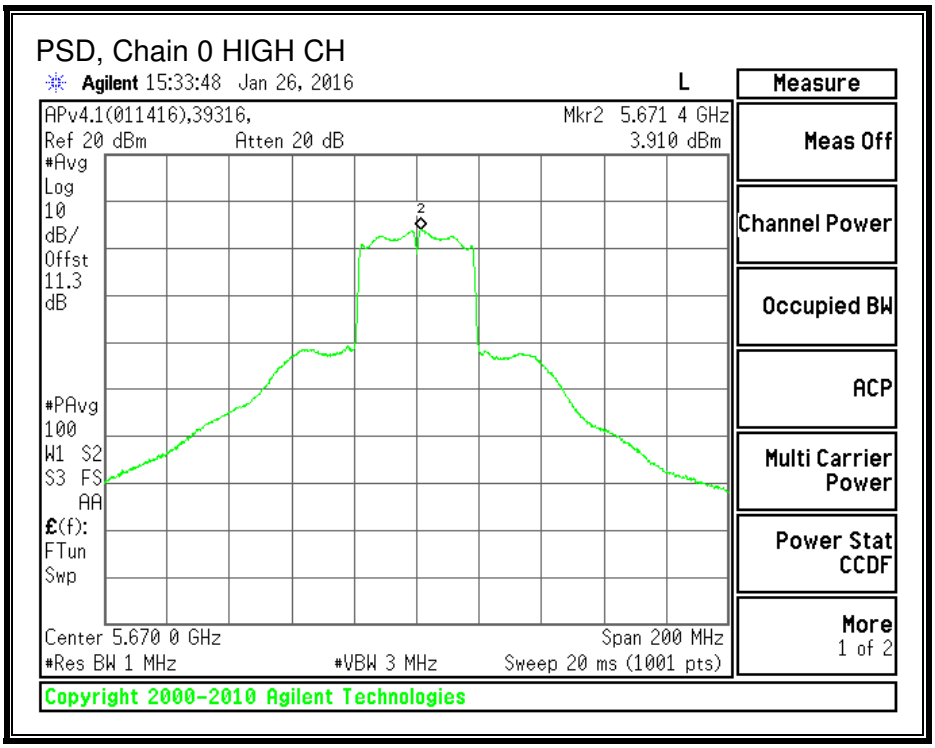
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5510	3.388	5.070	7.410	9.79	-2.38
Mid	5590	3.728	3.815	6.872	9.79	-2.92
High	5670	3.910	3.100	6.624	9.79	-3.17

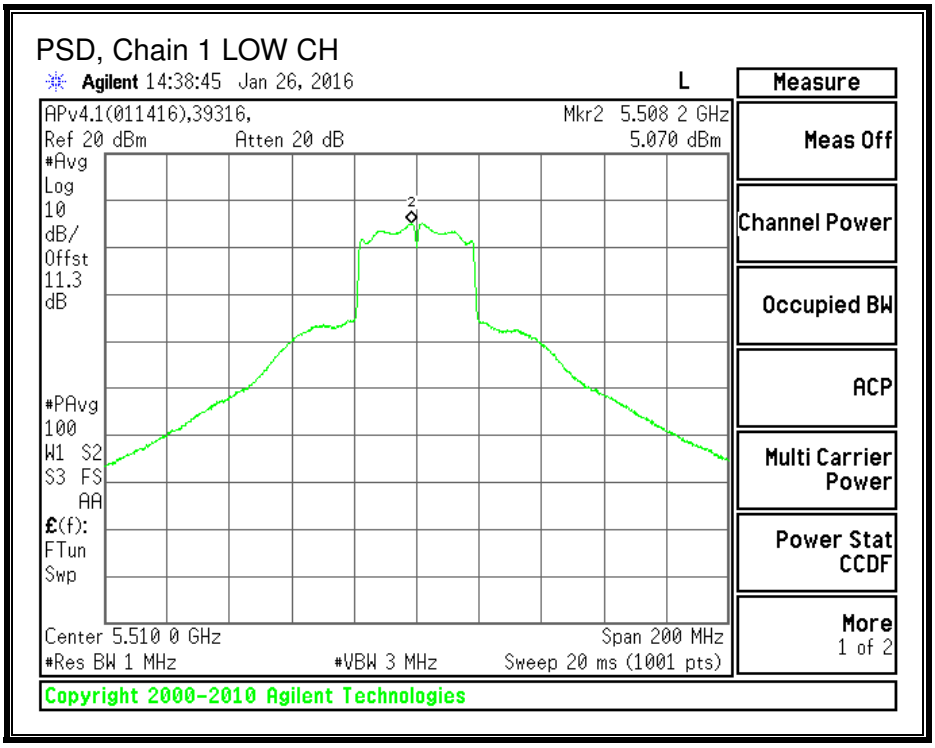
PSD, Chain 0



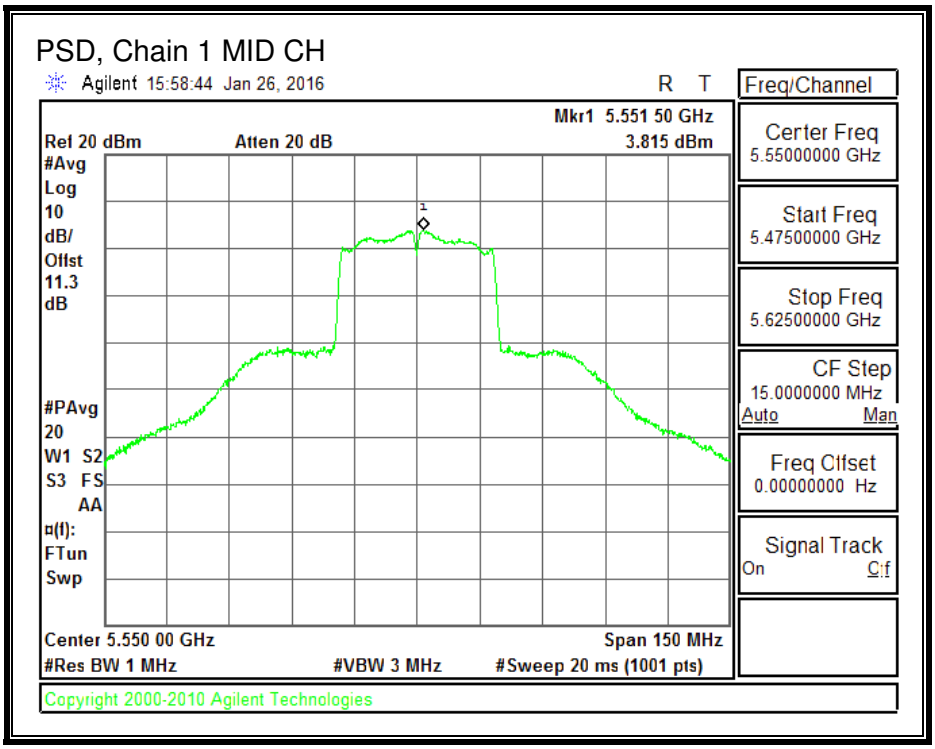




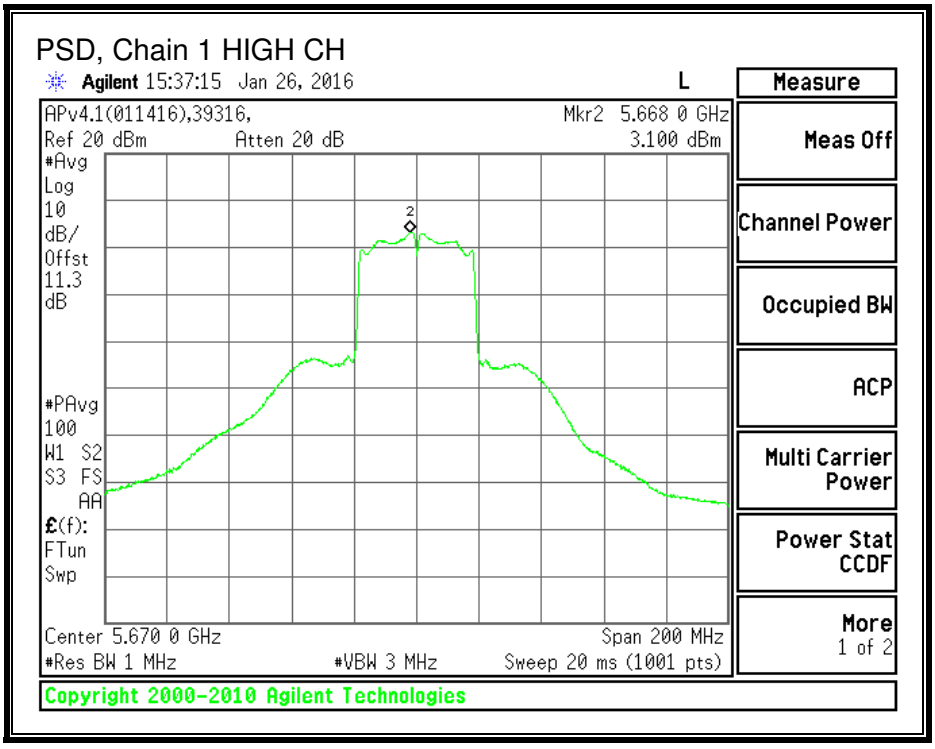
PSD, Chain 1



PSD, Chain 1 MID CH



PSD, Chain 1 HIGH CH



8.12. 802.11a LEGACY MODE IN THE 5.8 GHz BAND

8.12.1. 6 dB BANDWIDTH

LIMITS

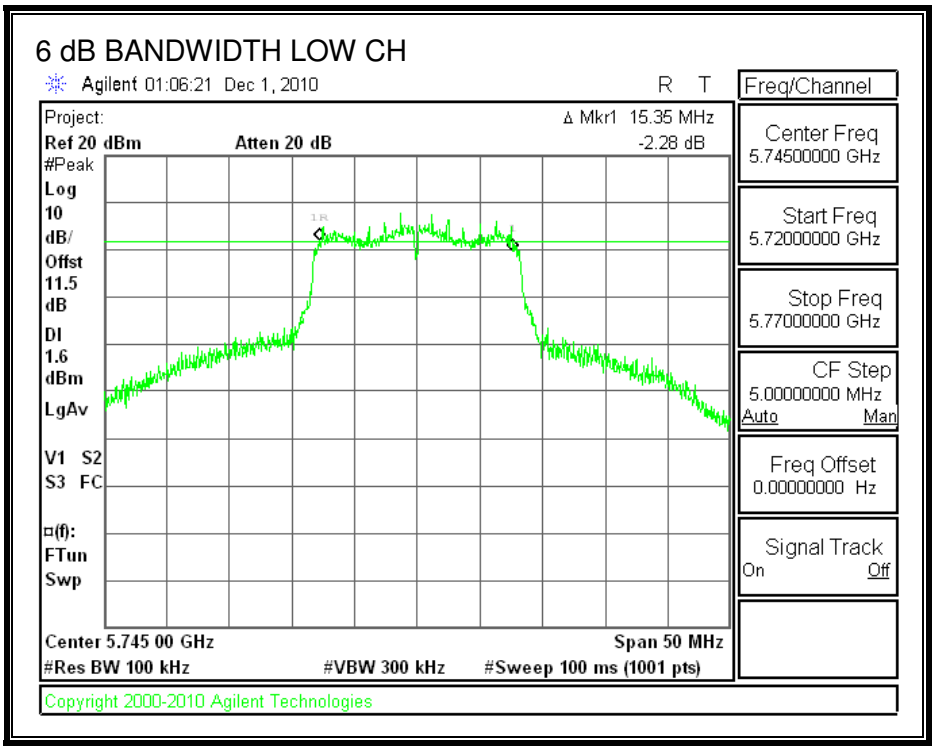
FCC §15.407 (e)

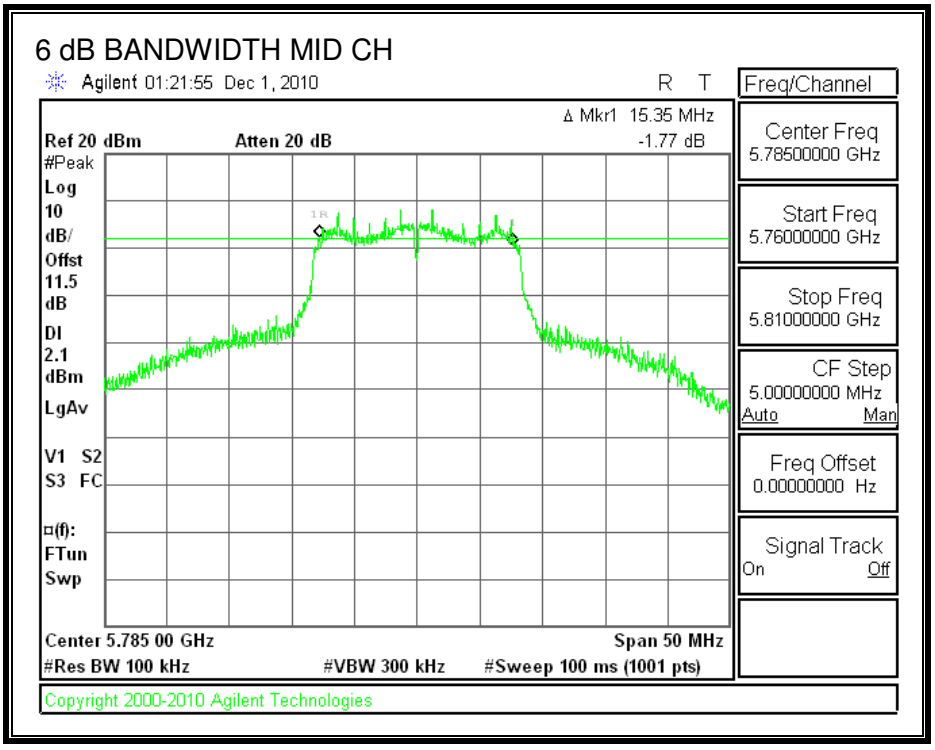
The minimum 6 dB bandwidth shall be at least 500 kHz.

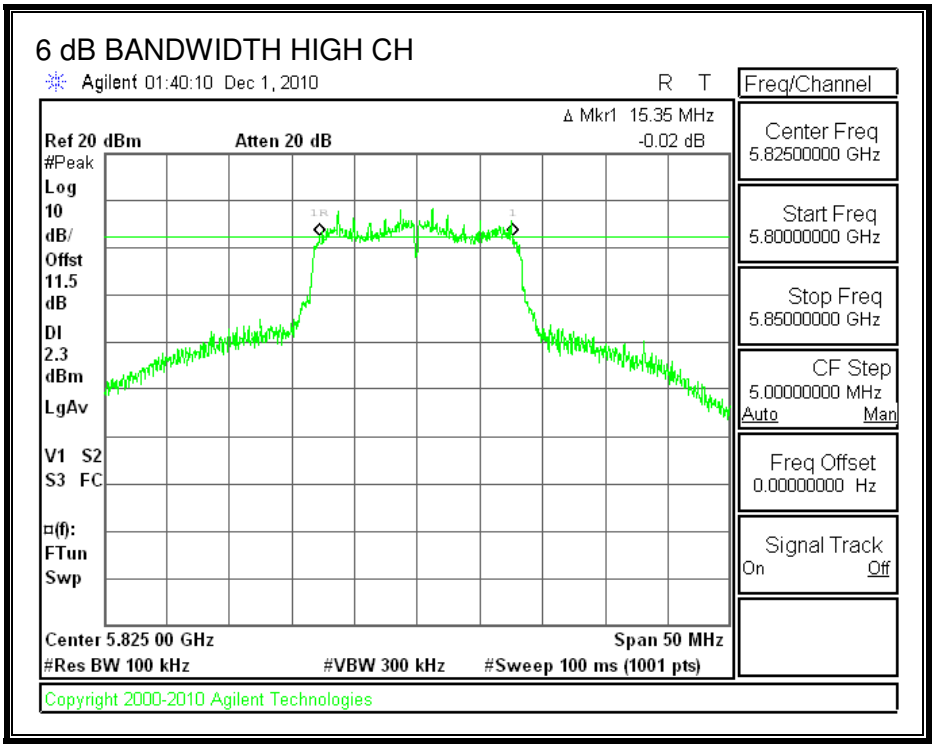
RESULTS

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	Minimum Limit (MHz)
Low	5745	15.35	0.5
Middle	5785	15.35	0.5
High	5825	15.35	0.5

6 dB BANDWIDTH







8.12.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

This is SISO mode, AG is the highest (worst-case) = 5.8 dBi

RESULTS

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Power Limit (dBm)
Low	5745	5.80	30.00
153	5765	5.80	30.00
High	5825	5.80	30.00

Output Power Results

Channel	Frequency (MHz)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	15.53	15.53	30.00	-14.47
153	5765	18.80	18.80	30.00	-11.20
High	5825	18.57	18.57	30.00	-11.43

Note: the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

8.12.1. Maximum Power Spectral Density (PSD)

LIMITS

FCC §15.407 (a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

Antenna Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
5.80	3.01	8.81

RESULTS

Antenna Gain and Limit

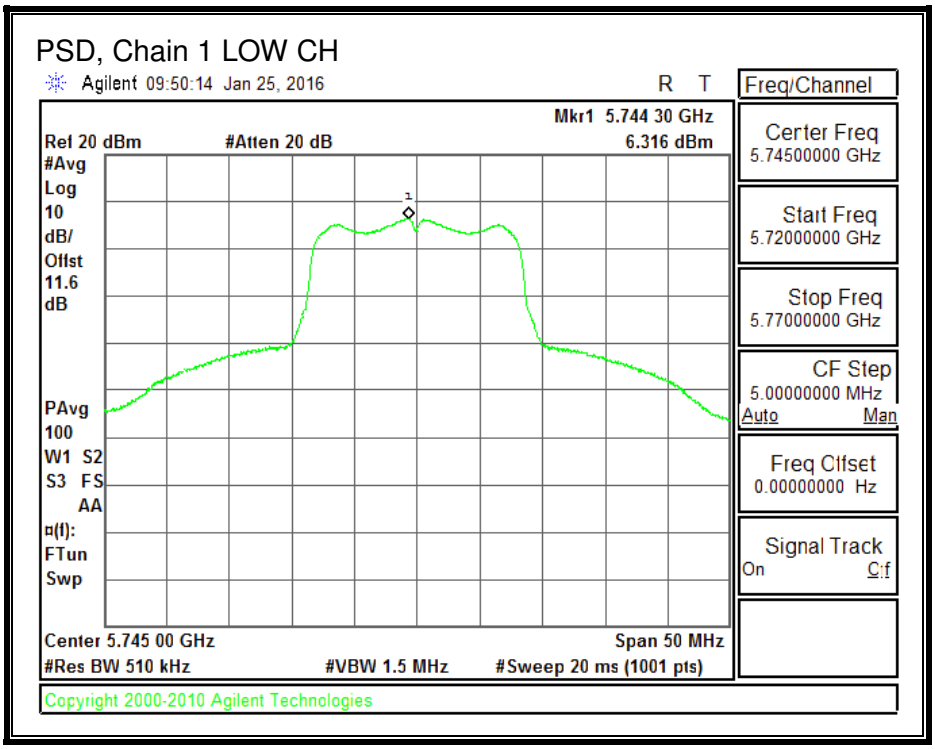
Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Low	5745	8.81	27.19
Mid	5785	8.81	27.19
High	5825	8.81	27.19

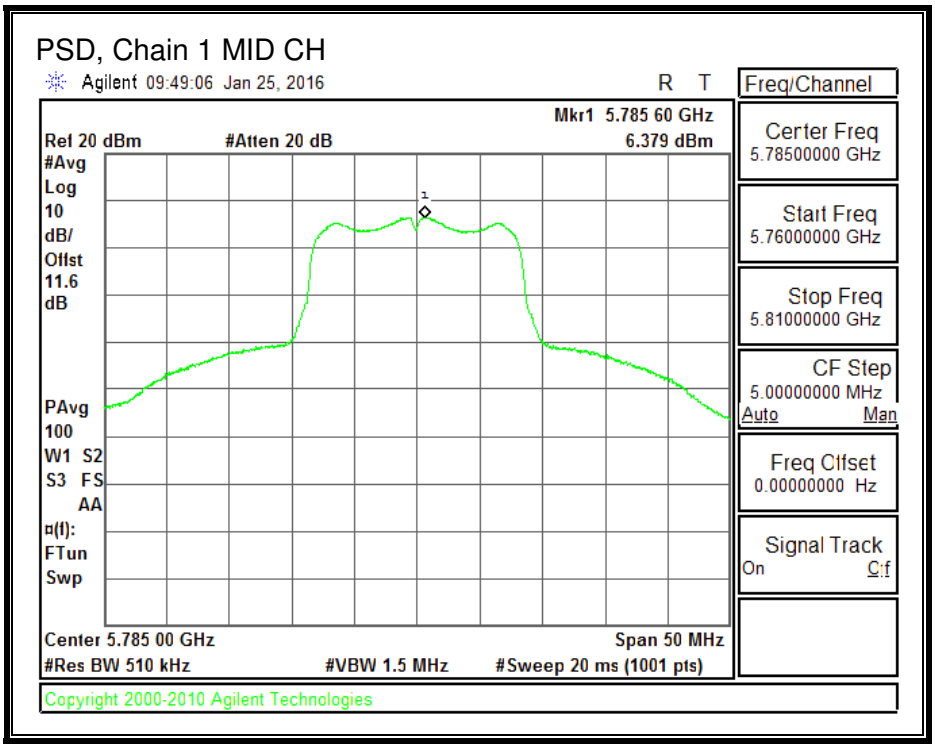
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

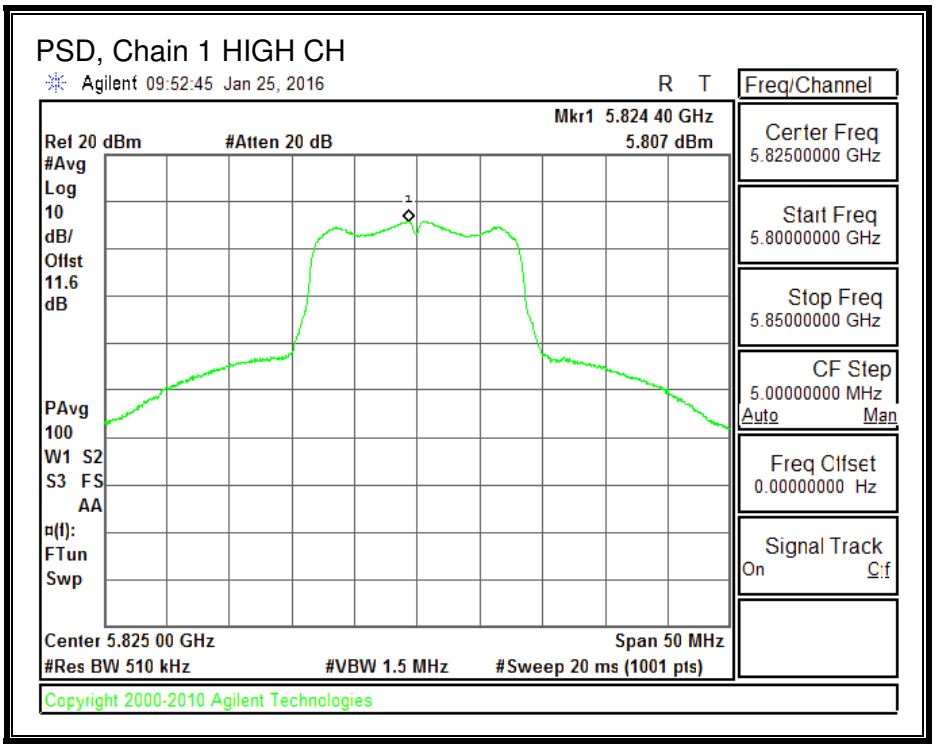
PSD Results

Channel	Frequency (MHz)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5745	6.316	6.32	27.19	-20.87
Mid	5785	6.379	6.38	27.19	-20.81
High	5825	5.807	5.81	27.19	-21.38

PSD, Chain 1







8.13. 802.11n HT20 CDD SISO MODE IN THE 5.8 GHz BAND

8.13.1. OUTPUT POWER

LIMITS

FCC §15.407 (a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

This is SISO mode, AG is the highest (worst-case) = 5.8 dBi

RESULTS

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain for Power (dBi)	Power Limit (dBm)
Low	5745	5.80	30.00
High	5825	5.80	30.00

Output Power Results

Channel	Frequency (MHz)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	15.56	15.56	30.00	-14.44
High	5825	18.61	18.61	30.00	-11.39

Note: the power readings above are measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

8.14. 802.11n HT20 CDD 2Tx MODE IN THE 5.8 GHz BAND

8.14.1. 6 dB BANDWIDTH

LIMITS

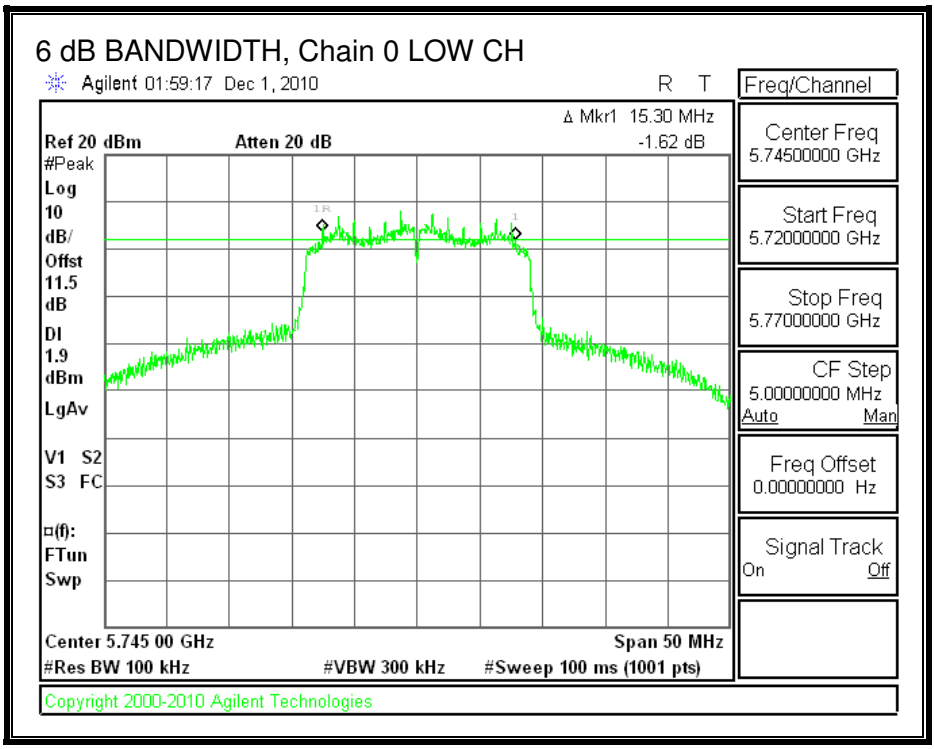
FCC §15.407 (e)

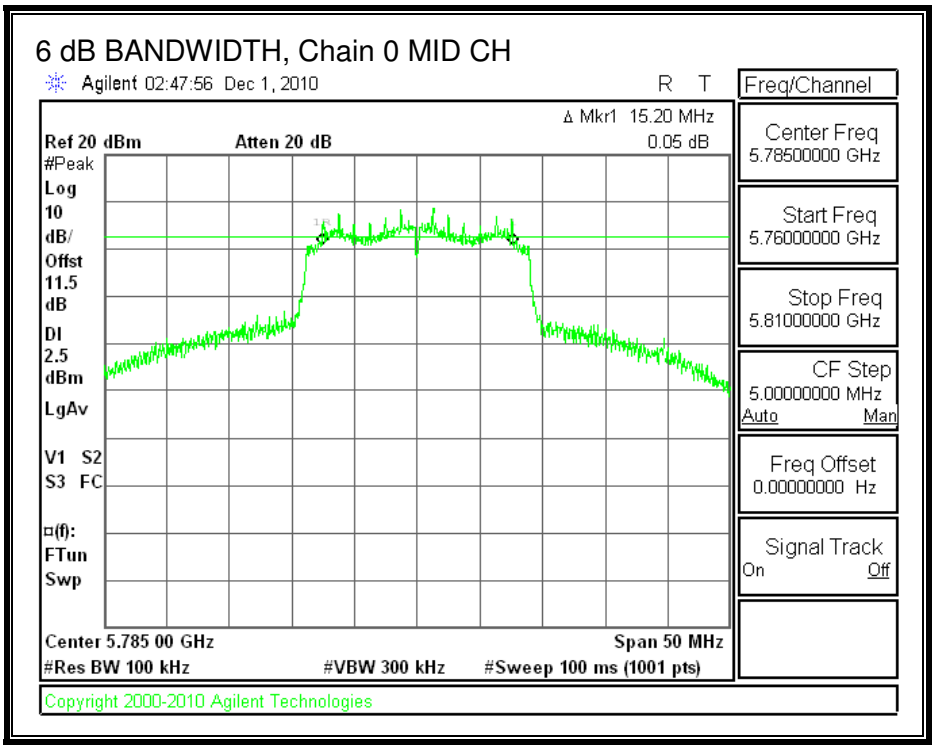
The minimum 6 dB bandwidth shall be at least 500 kHz.

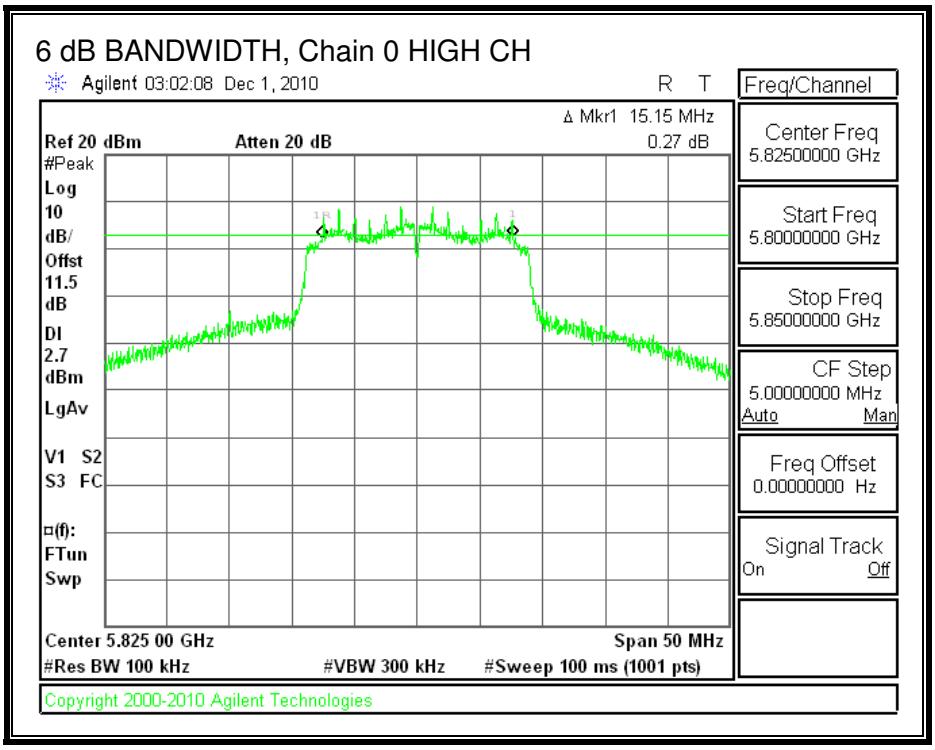
RESULTS

Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	5745	15.30	15.75	0.5
Mid	5785	15.20	15.85	0.5
High	5825	15.15	15.7	0.5

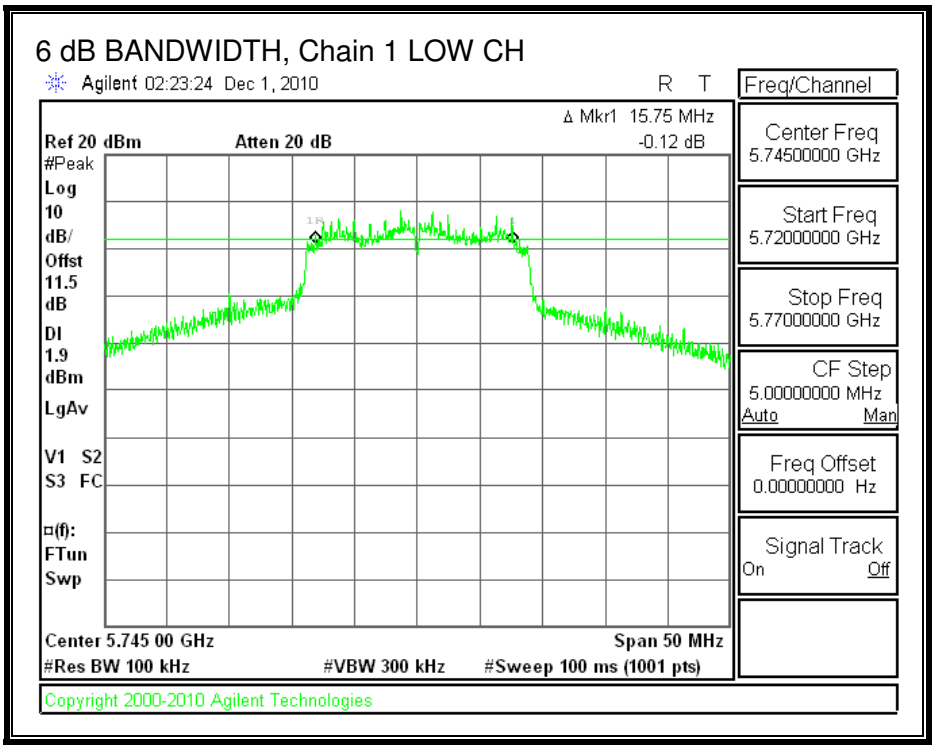
6 dB BANDWIDTH, Chain 0

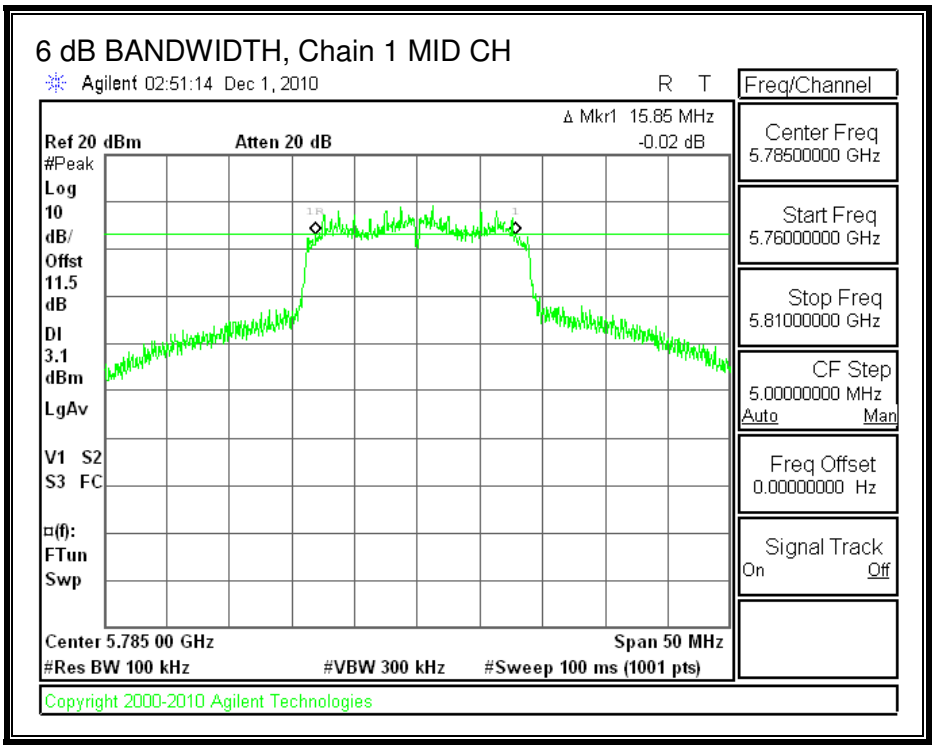


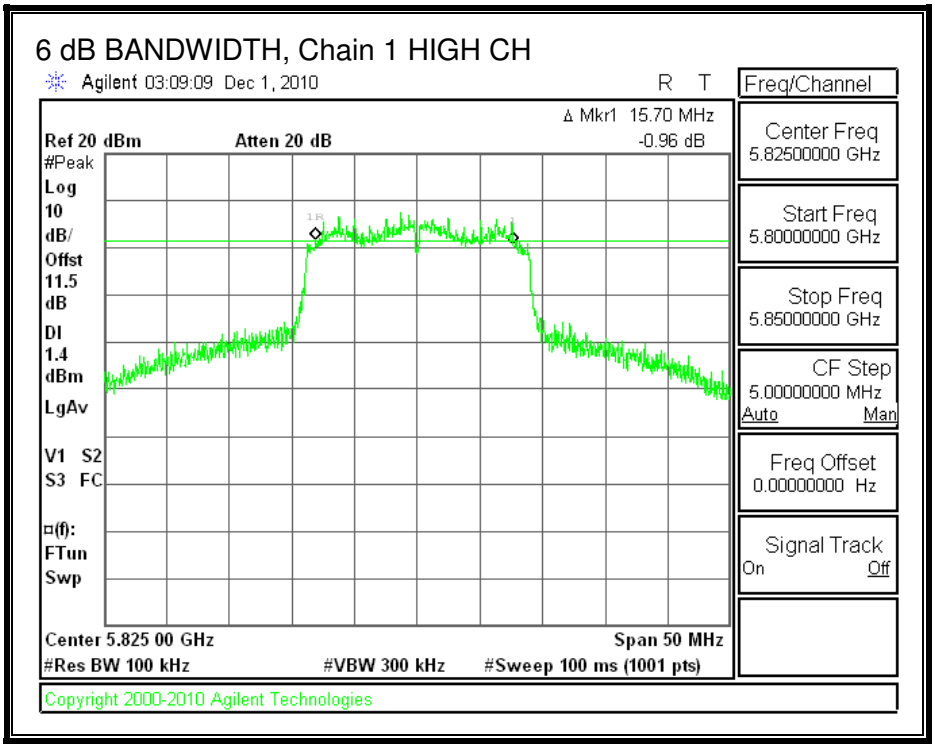




6 dB BANDWIDTH, Chain 1







8.14.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain, 5.8 dBi.

RESULTS

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)
Low	5745	5.80	30.00
153	5765	5.80	30.00
Mid	5785	5.80	30.00
High	5825	5.80	30.00

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5745	12.60	12.60	15.61	30.00	-14.39
153	5765	18.46	18.17	21.33	30.00	-8.67
Mid	5785	18.56	18.12	21.36	30.00	-8.64
High	5825	18.98	18.40	21.71	30.00	-8.29

Note: the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

8.14.3. Maximum Power Spectral Density (PSD)

LIMITS

FCC §15.407 (a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

Antenna Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
5.80	3.01	8.81

RESULTS

Antenna Gain and Limit

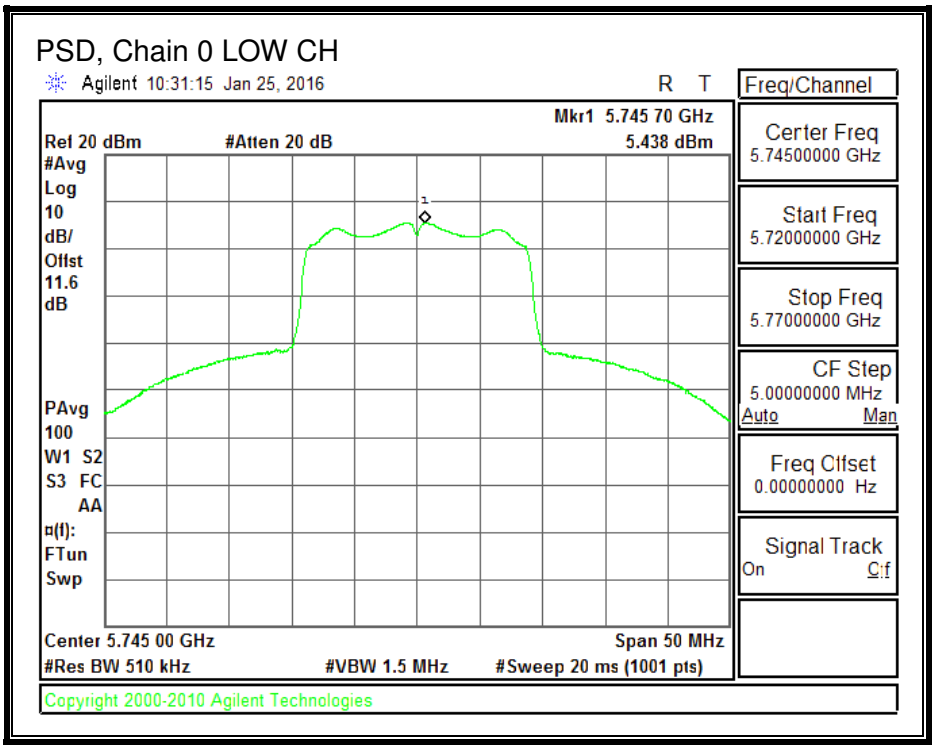
Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Low	5745	8.81	27.19
Mid	5785	8.81	27.19
High	5825	8.81	27.19

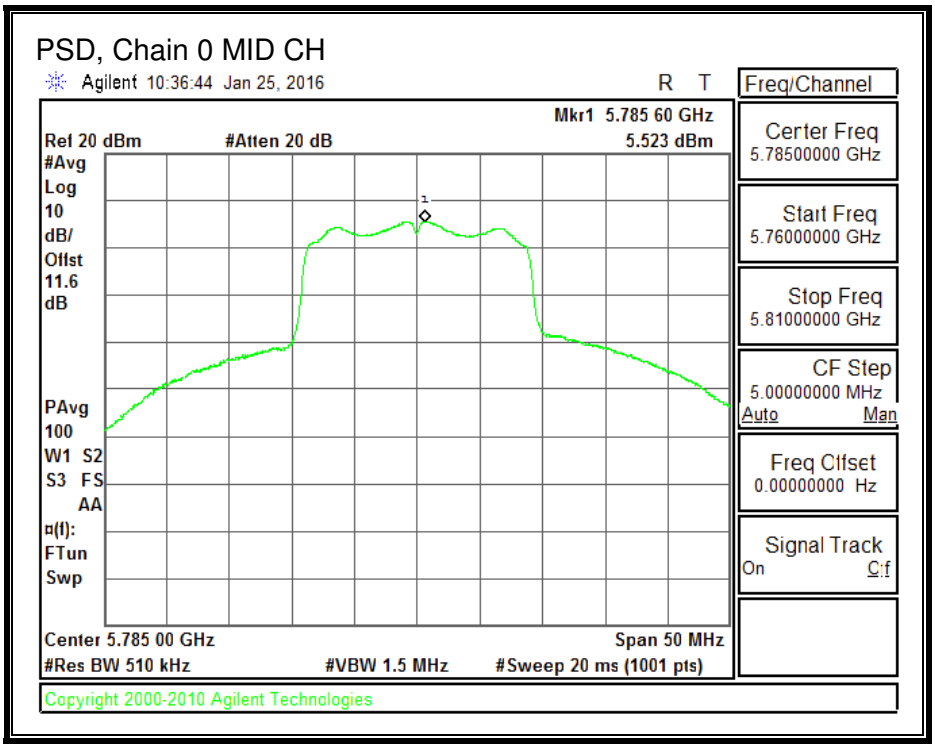
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD

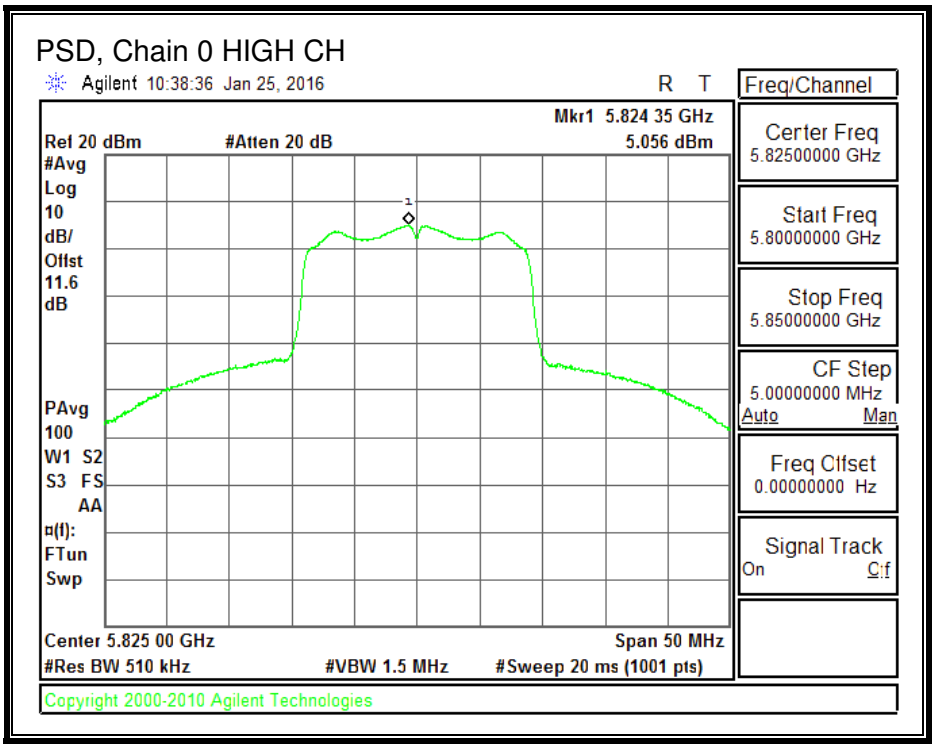
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5745	5.438	4.334	7.93	27.19	-19.26
Mid	5785	5.523	4.838	8.20	27.19	-18.99
High	5825	5.056	3.895	7.52	27.19	-19.67

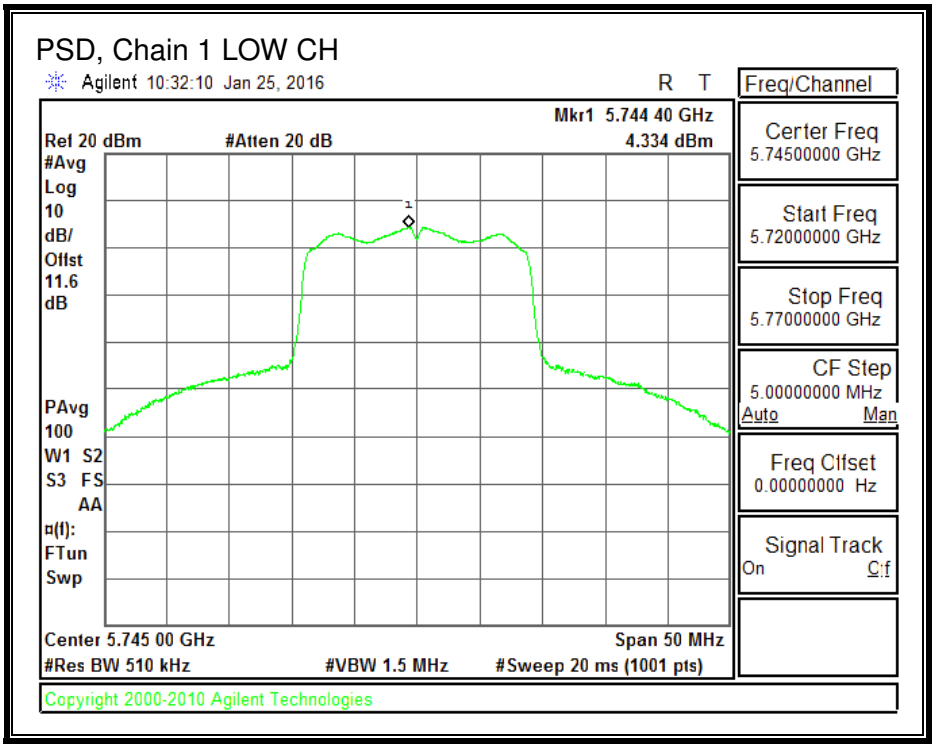
PSD, Chain 0



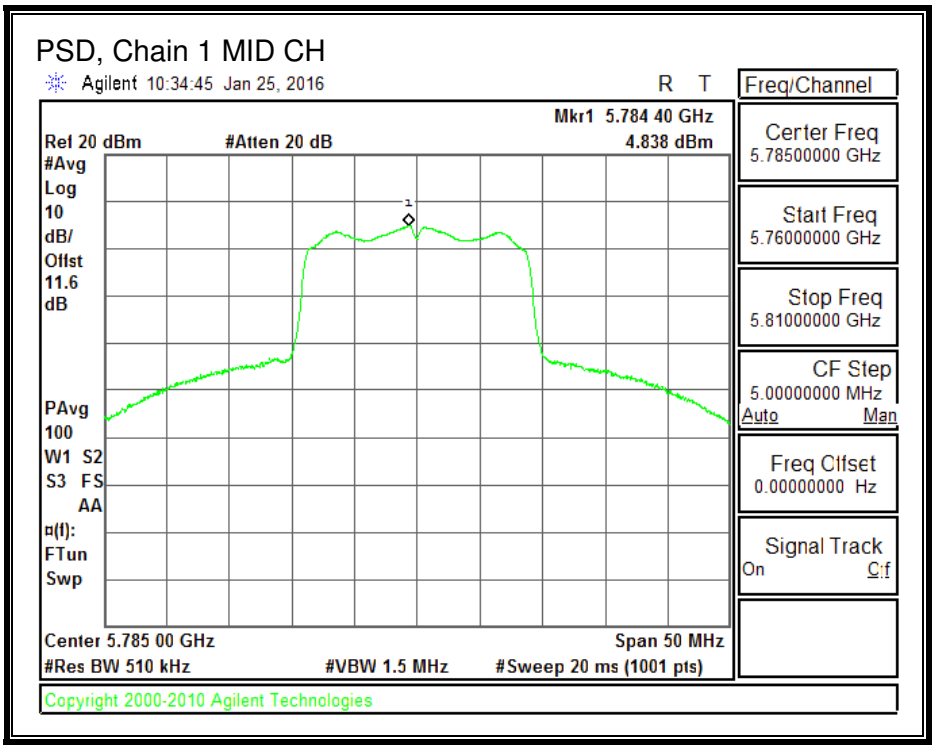




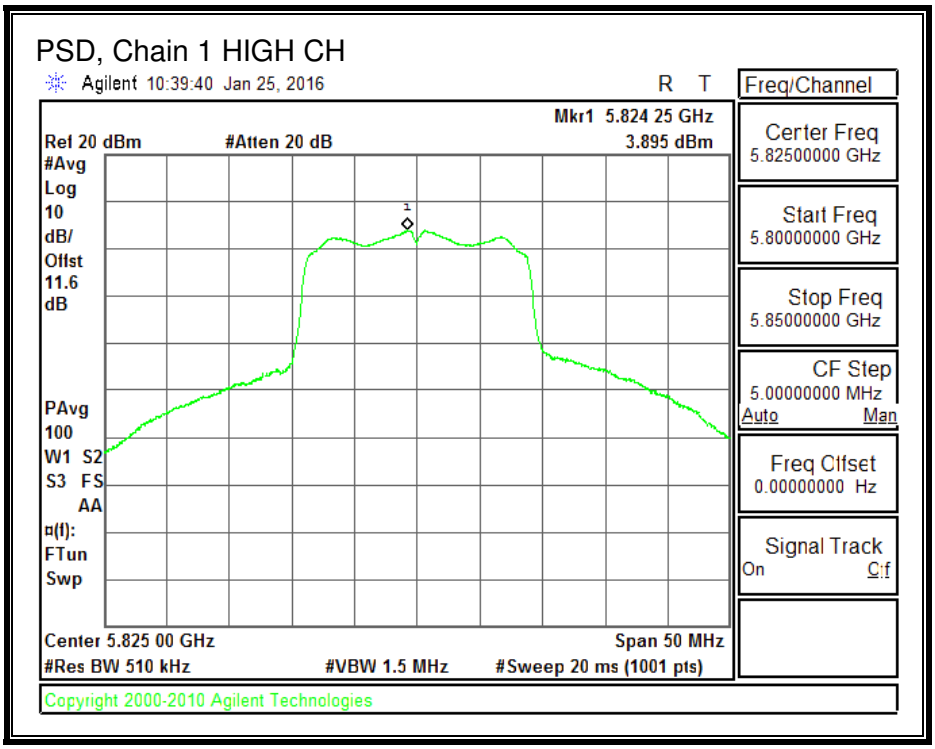
PSD, Chain 1



PSD, Chain 1 MID CH



PSD, Chain 1 HIGH CH



8.15. 802.11n HT40 1Tx MODE IN THE 5.8 GHz BAND

8.15.1. OUTPUT POWER

LIMITS

FCC §15.407 (a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

This is SISO mode, AG is the highest (worst-case) = 5.8 dBi

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)
Low	5755	5.80	30.00
High	5795	5.80	30.00

Output Power Results

Channel	Frequency (MHz)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5755	11.71	11.71	30.00	-18.29
High	5795	18.36	18.36	30.00	-11.64

Note: the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

8.16. 802.11n HT40 CDD 2Tx MODE IN THE 5.8 GHz BAND

8.16.1. 6 dB BANDWIDTH

LIMITS

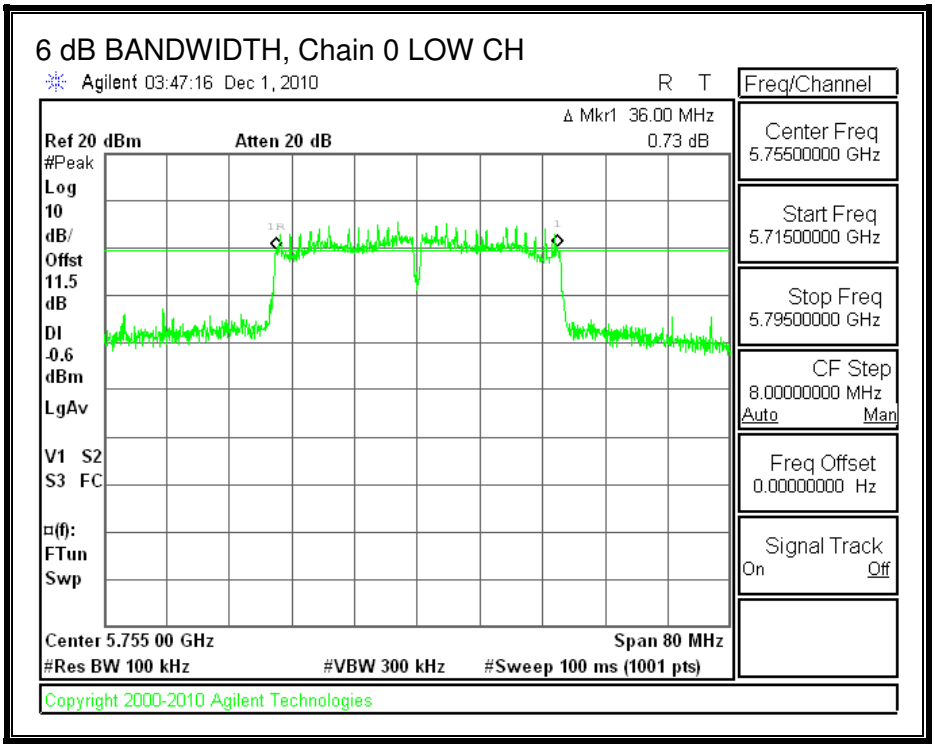
FCC §15.407 (e)

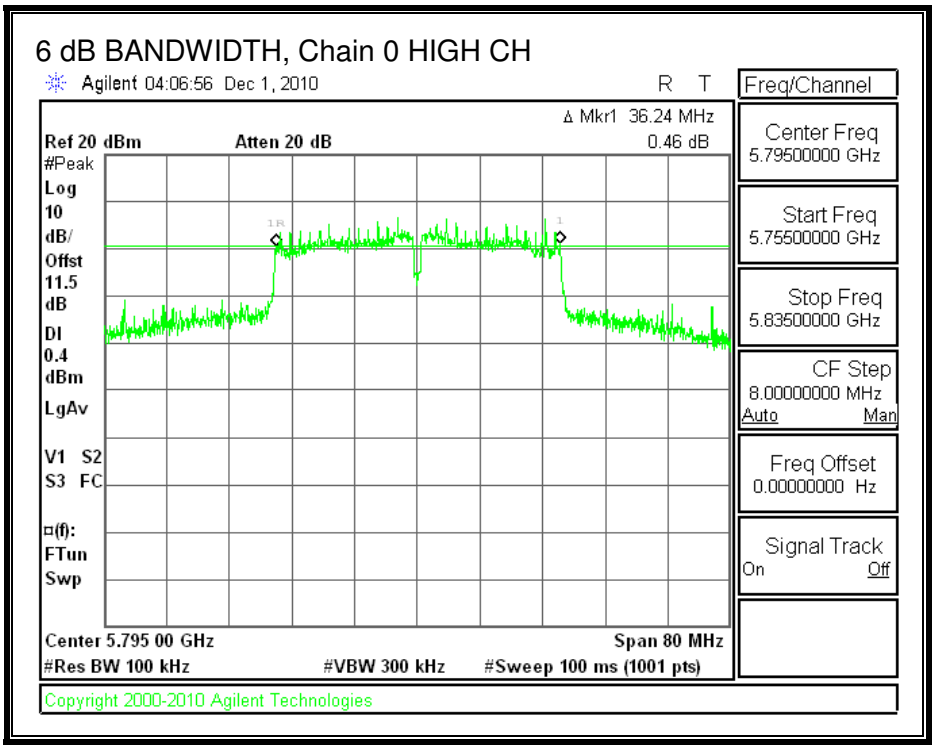
The minimum 6 dB bandwidth shall be at least 500 kHz.

RESULTS

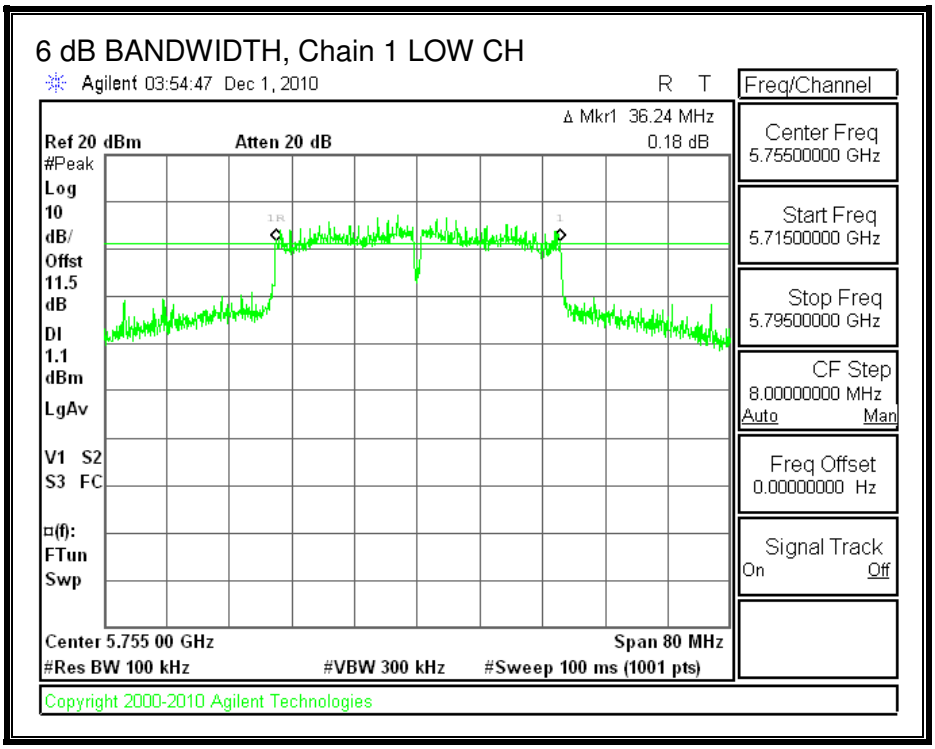
Channel	Frequency (MHz)	6 dB BW Chain 0 (MHz)	6 dB BW Chain 1 (MHz)	Minimum Limit (MHz)
Low	5755	36.00	36.24	0.5
High	5795	36.24	35.12	0.5

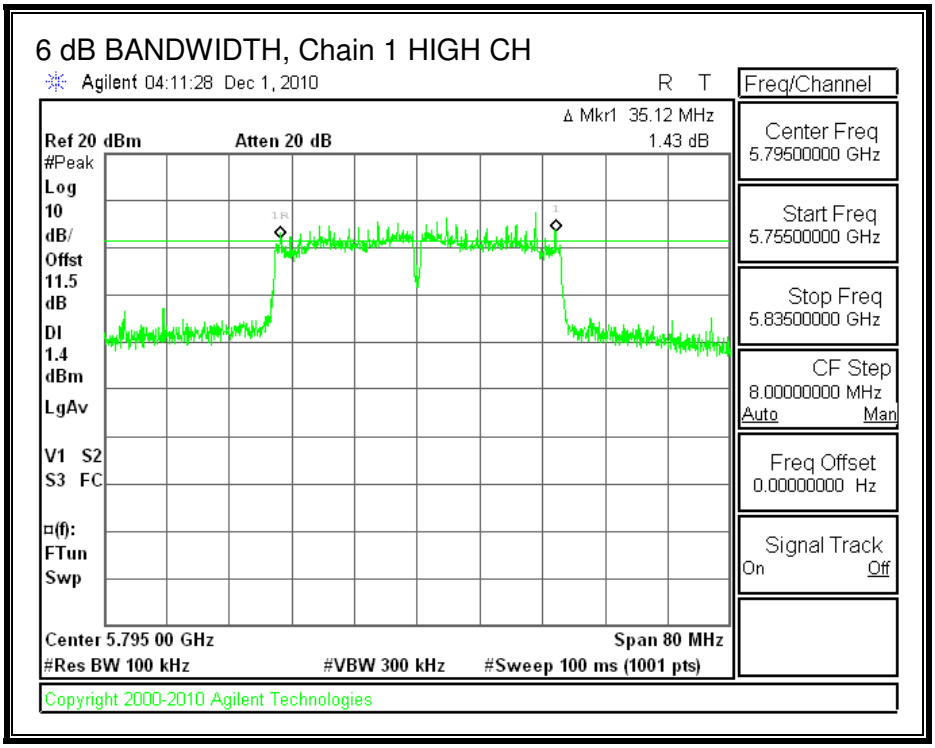
6 dB BANDWIDTH, Chain 0





6 dB BANDWIDTH, Chain 1





8.16.2. OUTPUT POWER

LIMITS

FCC §15.407 (a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are uncorrelated and the antenna gain is the same for each chain. The directional gain is equal to the antenna gain, 5.8 dBi.

RESULTS

Antenna Gain and Limit

Channel	Frequency (MHz)	Directional Gain (dBi)	Power Limit (dBm)
Low	5755	5.80	30.00
High	5795	5.80	30.00

Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5755	8.50	8.80	11.66	30.00	-18.34
High	5795	18.41	18.13	21.28	30.00	-8.72

Note: the power readings above were measured with gated method, and the measurement was taken only during the ON time. No duty cycle correction was necessary.

8.16.3. Maximum Power Spectral Density (PSD)

LIMITS

FCC §15.407 (a) (3)

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

The TX chains are correlated and the antenna gain is the same for each chain. The directional gain is:

Antenna Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
5.80	3.01	8.81

RESULTS

Antenna Gain and Limit

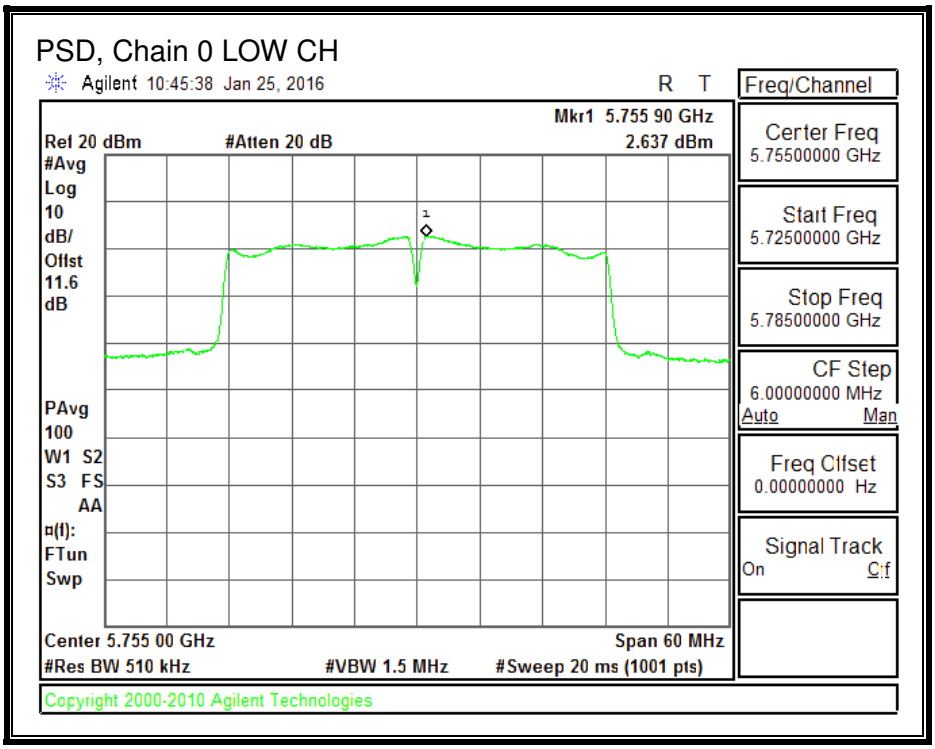
Channel	Frequency (MHz)	Directional Gain (dBi)	PSD Limit (dBm)
Low	5755	8.81	27.19
High	5795	8.81	27.19

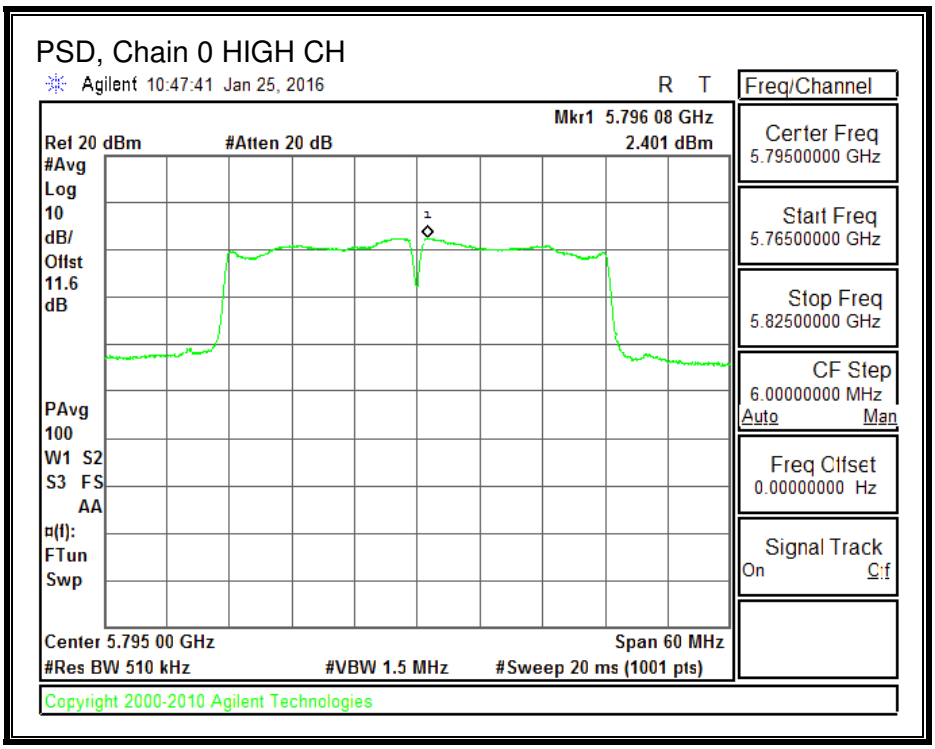
Duty Cycle CF (dB)	0.09	**Included in Calculations of Corr'd PSD**

PSD Results

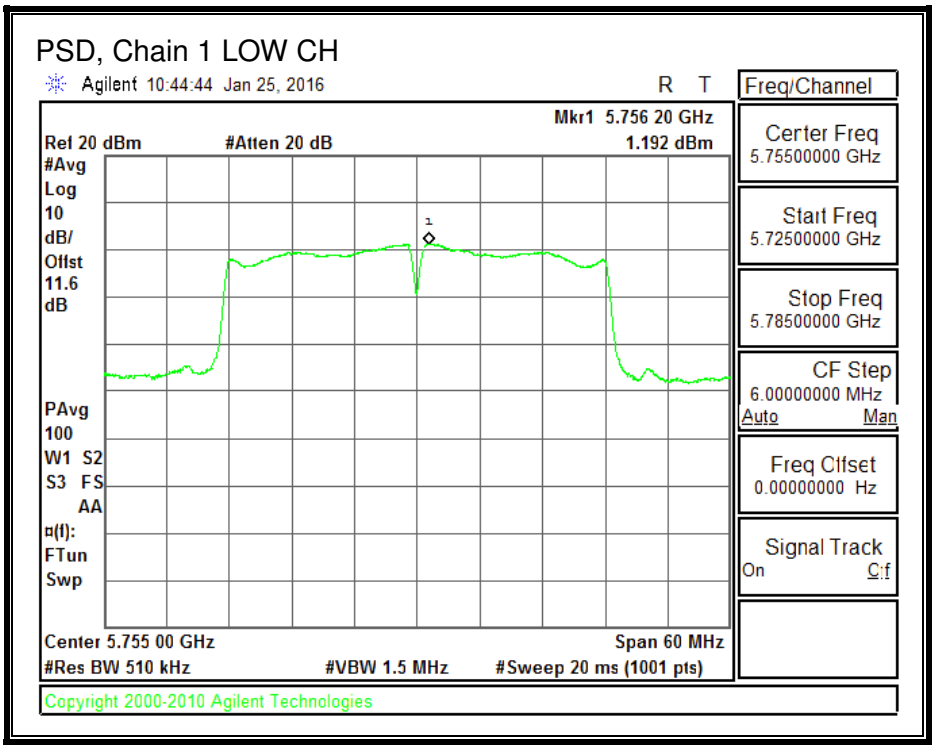
Channel	Frequency (MHz)	Chain 0 Meas PSD (dBm)	Chain 1 Meas PSD (dBm)	Total Corr'd PSD (dBm)	PSD Limit (dBm)	PSD Margin (dB)
Low	5755	2.637	1.192	5.07	27.19	-22.12
High	5795	2.401	0.456	4.64	27.19	-22.55

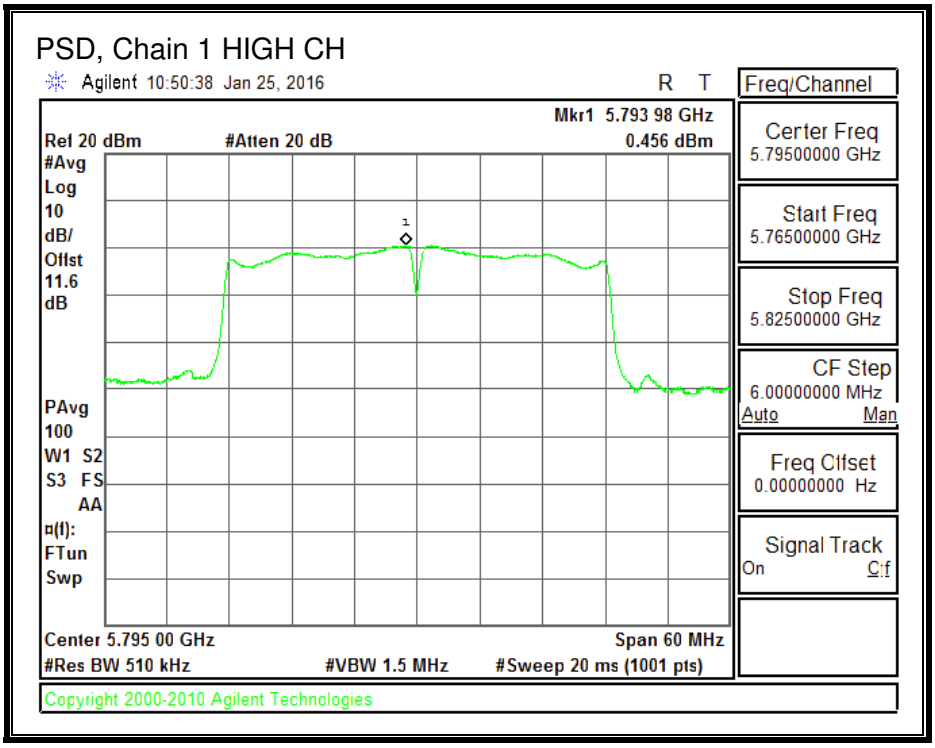
PSD, Chain 0





PSD, Chain 1





9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

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

For non-restricted out-of-band emissions in the 5.725-5.85 GHz band, the applied limits were either in accordance with the ones above or with FCC §15.407(b)(4). See below.

§15.407(b)(4)

For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 150 cm for above 1GHz. 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.

Reference to KDB 789033 D02 v01r01 UNII part G) 6) c) Method AD:

For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor to the reading offset for average measurements.

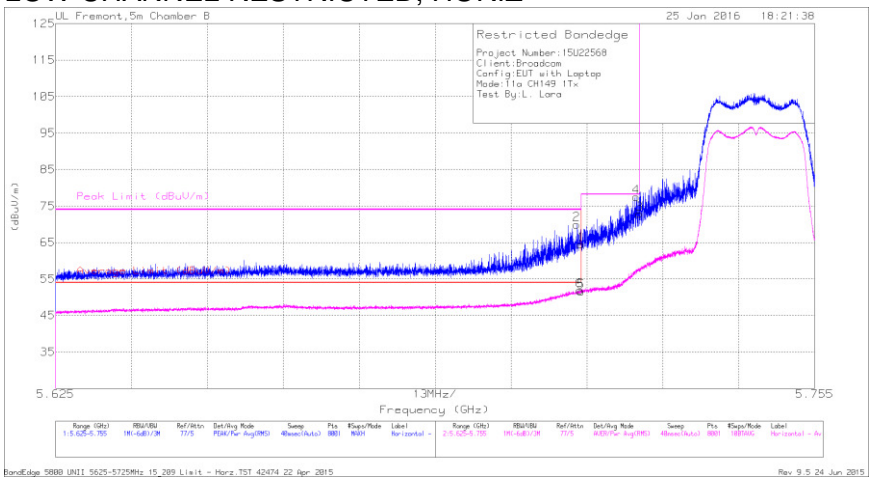
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

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.

9.2. TX ABOVE 1 GHz 802.11a 1Tx MODE IN THE 5.8 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

LOW CHANNEL RESTRICTED, HORIZ



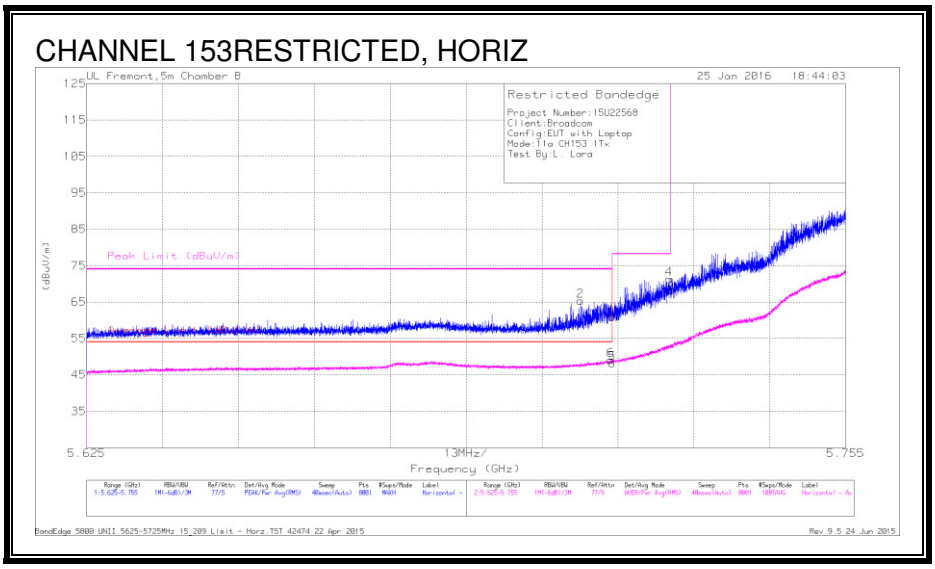
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Bypass (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.714	27.67	Pk	35	7.3	0	69.97	-	-	74	-4.03	91	153	H
1	5.715	22.12	Pk	35	7.3	0	64.42	-	-	74	-9.58	91	153	H
5	5.715	9.29	RMS	35	7.3	0	51.59	54	-2.41	-	-	91	153	H
6	5.715	9.55	RMS	35	7.3	0	51.85	54	-2.15	-	-	91	153	H
4	5.724	35.09	Pk	35	7.4	0	77.49	-	-	78.2	-.71	91	153	H
3	5.725	30.45	Pk	35	7.4	0	72.85	-	-	78.2	-5.35	91	153	H

Pk - Peak detector

RMS - RMS detection

RESTRICTED BANDEDGE (CHANNEL 153)



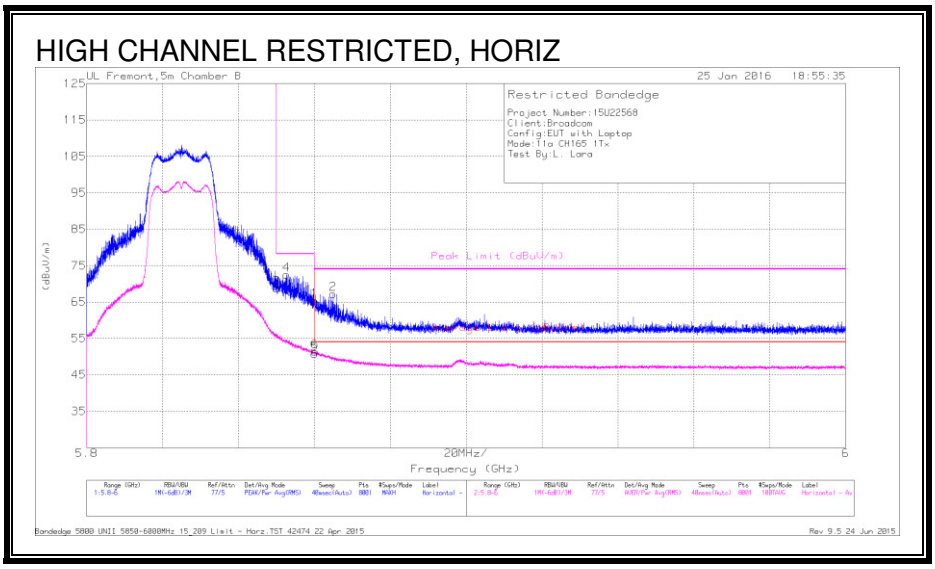
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Bypass (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.71	22.92	Pk	35	7.4	0	65.32	-	-	74	-8.68	90	153	H
1	5.715	18.49	Pk	35	7.3	0	60.79	-	-	74	-13.21	90	153	H
5	5.715	5.93	RMS	35	7.3	0	48.23	54	-5.77	-	-	90	153	H
6	5.715	6.7	RMS	35	7.3	0	49	54	-5	-	-	90	153	H
3	5.725	25.95	Pk	35	7.4	0	68.35	-	-	78.2	-9.85	90	153	H
4	5.725	28.84	Pk	35	7.4	0	71.24	-	-	78.2	-6.96	90	153	H

Pk - Peak detector

RMS - RMS detection

RESTRICTED BANDEDGE (HIGH CHANNEL)



Trace Markers

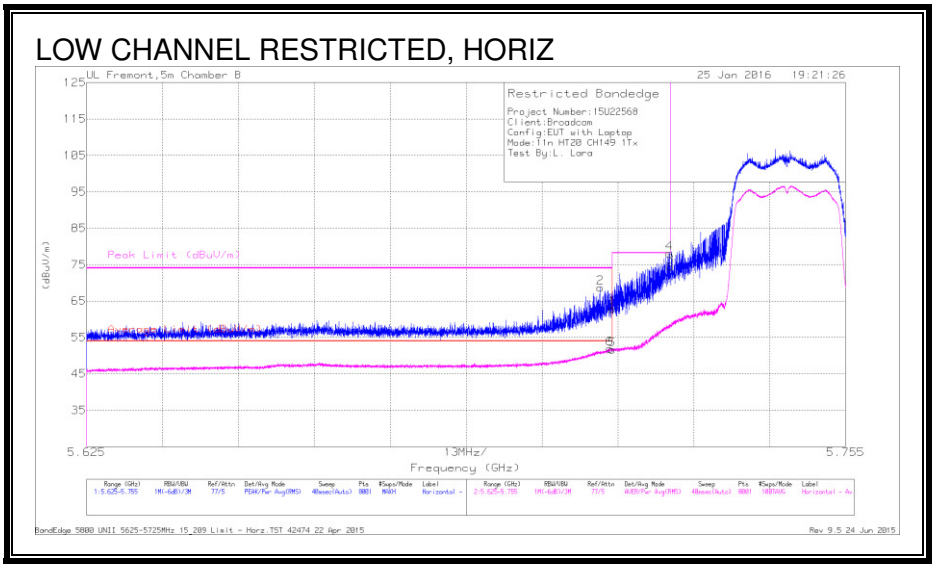
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Bypass (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	5.85	25.94	Pk	35.4	7.5	0	68.84	-	-	78.2	-9.36	104	155	H
4	5.853	29.74	Pk	35.4	7.4	0	72.54	-	-	78.2	-5.66	104	155	H
1	5.86	22.55	Pk	35.4	7.5	0	65.45	-	-	74	-8.55	104	155	H
5	5.86	7.94	RMS	35.4	7.5	0	50.84	54	-3.16	-	-	104	155	H
6	5.86	8.53	RMS	35.4	7.5	0	51.43	54	-2.57	-	-	104	155	H
2	5.865	24.28	Pk	35.4	7.5	0	67.18	-	-	74	-6.82	104	155	H

Pk - Peak detector

RMS - RMS detection

9.3. TX ABOVE 1 GHz 802.11n HT20 1Tx MODE IN THE 5.8 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)



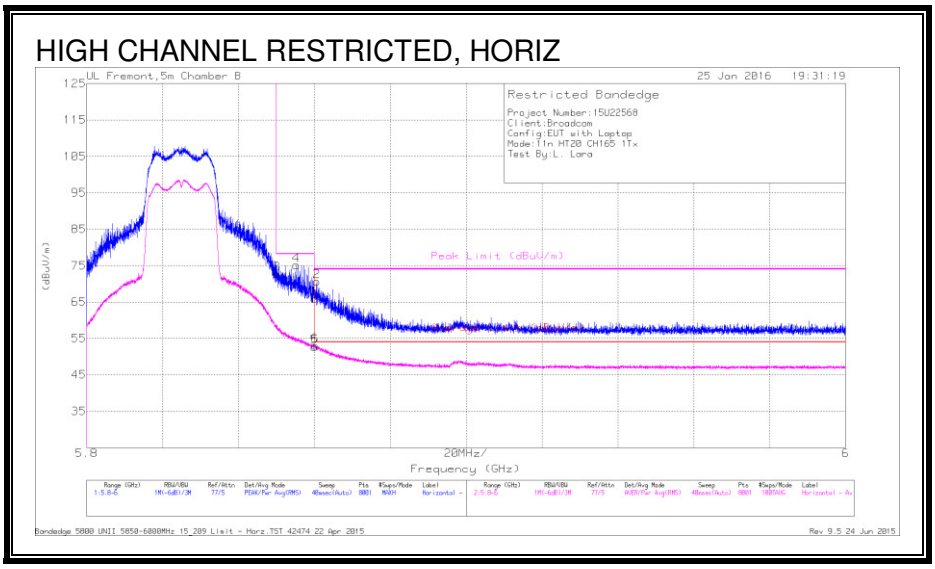
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Bypass (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.713	26.38	Pk	35	7.3	0	68.68	-	-	74	-5.32	135	216	H
1	5.715	20.59	Pk	35	7.3	0	62.89	-	-	74	-11.11	135	216	H
5	5.715	9.32	RMS	35	7.3	0	51.62	54	-2.38	-	-	135	216	H
6	5.715	9.62	RMS	35	7.3	0	51.92	54	-2.08	-	-	135	216	H
3	5.725	32.07	Pk	35	7.4	0	74.47	-	-	78.2	-3.73	135	216	H
4	5.725	35.65	Pk	35	7.4	0	78.05	-	-	78.2	-.15	135	216	H

Pk - Peak detector

RMS - RMS detection

RESTRICTED BANDEDGE (HIGH CHANNEL)



Trace Markers

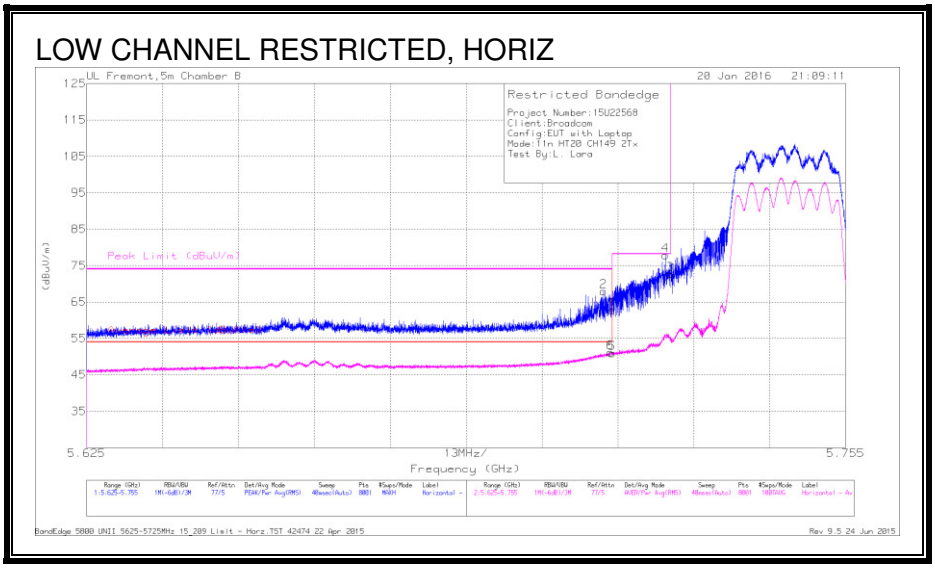
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Bypass (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	5.85	29.9	Pk	35.4	7.5	0	72.8	-	-	78.2	-5.4	103	150	H
4	5.855	32.35	Pk	35.4	7.4	0	75.15	-	-	78.2	-3.05	103	150	H
1	5.86	23.08	Pk	35.4	7.5	0	65.98	-	-	74	-8.02	103	150	H
5	5.86	9.77	RMS	35.4	7.5	0	52.67	54	-1.33	-	-	103	150	H
6	5.86	10.11	RMS	35.4	7.5	0	53.01	54	-.99	-	-	103	150	H
2	5.861	27.71	Pk	35.4	7.5	0	70.61	-	-	74	-3.39	103	150	H

Pk - Peak detector

RMS - RMS detection

9.4. TX ABOVE 1 GHz 802.11n HT20 CDD 2TX MODE IN THE 5.8 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)



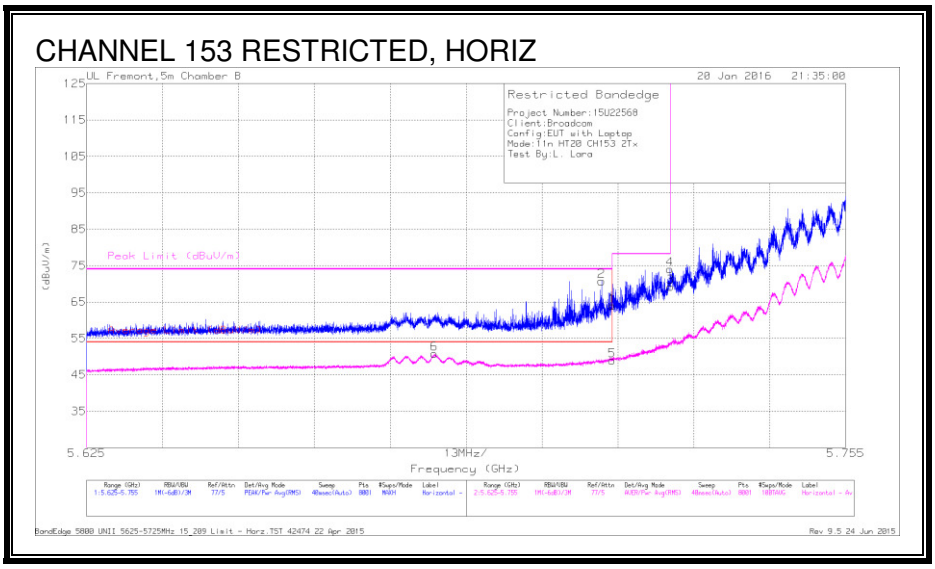
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Bypass (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.714	25.57	Pk	35	7.3	0	67.87	-	-	74	-6.13	174	126	H
1	5.715	20.47	Pk	35	7.3	0	62.77	-	-	74	-11.23	174	126	H
5	5.715	8.6	RMS	35	7.3	0	50.9	54	-3.1	-	-	174	126	H
6	5.715	8.88	RMS	35	7.3	0	51.18	54	-2.82	-	-	174	126	H
4	5.724	35.48	Pk	35	7.4	0	77.88	-	-	78.2	-.32	174	126	H
3	5.725	30.22	Pk	35	7.4	0	72.62	-	-	78.2	-5.58	174	126	H

Pk - Peak detector

RMS - RMS detection

RESTRICTED BANDEDGE (CHANNEL 153)



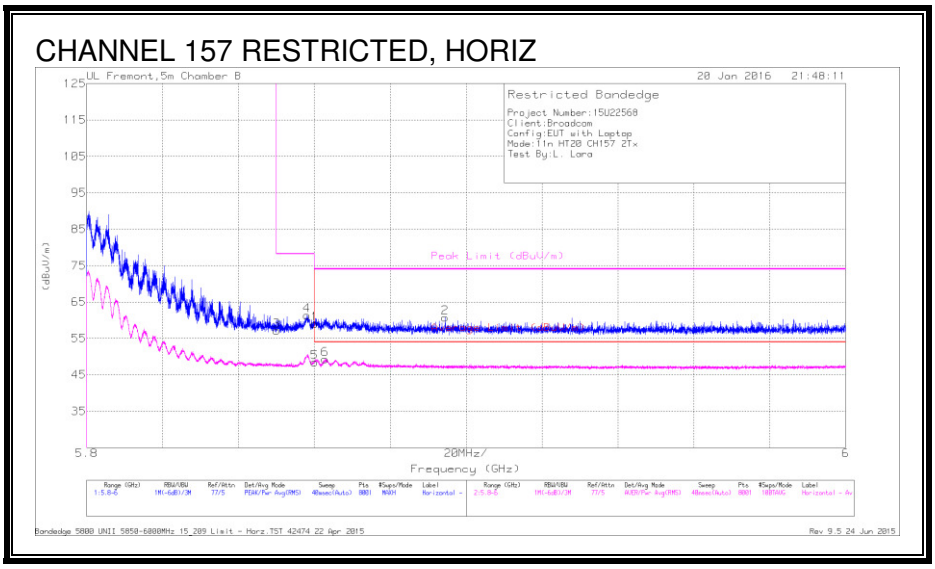
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Bypass (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
6	5.685	8.46	RMS	34.9	7.4	0	50.76	54	-3.24	-	-	119	151	H
2	5.713	28.42	Pk	35	7.3	0	70.72	-	-	74	-3.28	119	151	H
1	5.715	21.66	Pk	35	7.3	0	63.96	-	-	74	-10.04	119	151	H
5	5.715	6.57	RMS	35	7.3	0	48.87	54	-5.13	-	-	119	151	H
3	5.725	26.73	Pk	35	7.4	0	69.13	-	-	78.2	-9.07	119	151	H
4	5.725	31.66	Pk	35	7.4	0	74.06	-	-	78.2	-4.14	119	151	H

Pk - Peak detector

RMS - RMS detection

RESTRICTED BANDEDGE (CHANNEL 157)



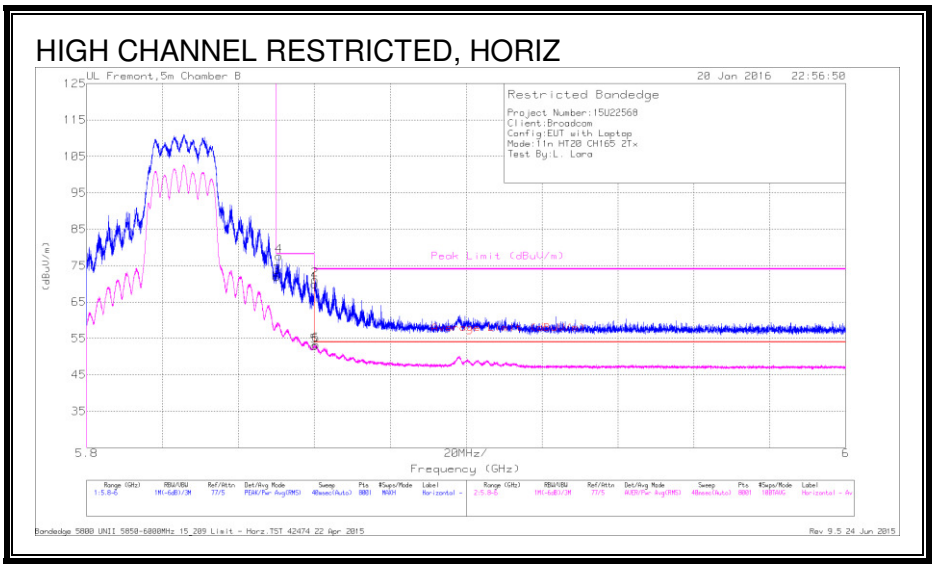
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Bypass (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	5.85	14.24	Pk	35.4	7.5	0	57.14	-	-	78.2	-21.06	123	143	H
4	5.858	18.48	Pk	35.4	7.5	0	61.38	-	-	78.2	-16.82	123	143	H
1	5.86	16.12	Pk	35.4	7.5	0	59.02	-	-	74	-14.98	123	143	H
5	5.86	5.56	RMS	35.4	7.5	0	48.46	54	-5.54	-	-	123	143	H
6	5.863	6.44	RMS	35.4	7.5	0	49.34	54	-4.66	-	-	123	143	H
2	5.894	17.71	Pk	35.5	7.5	0	60.71	-	-	74	-13.29	123	143	H

Pk - Peak detector

RMS - RMS detection

RESTRICTED BANDEDGE (HIGH CHANNEL)



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Bypass (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	5.85	29	Pk	35.4	7.5	0	71.9	-	-	78.2	-6.3	123	147	H
4	5.851	34.65	Pk	35.4	7.5	0	77.55	-	-	78.2	-.65	123	147	H
1	5.86	27.05	Pk	35.4	7.5	0	69.95	-	-	74	-4.05	123	147	H
2	5.86	28.29	Pk	35.4	7.5	0	71.19	-	-	74	-2.81	123	147	H
5	5.86	9.96	RMS	35.4	7.5	0	52.86	54	-1.14	-	-	123	147	H
6	5.86	10.33	RMS	35.4	7.5	0	53.23	54	-.77	-	-	123	147	H

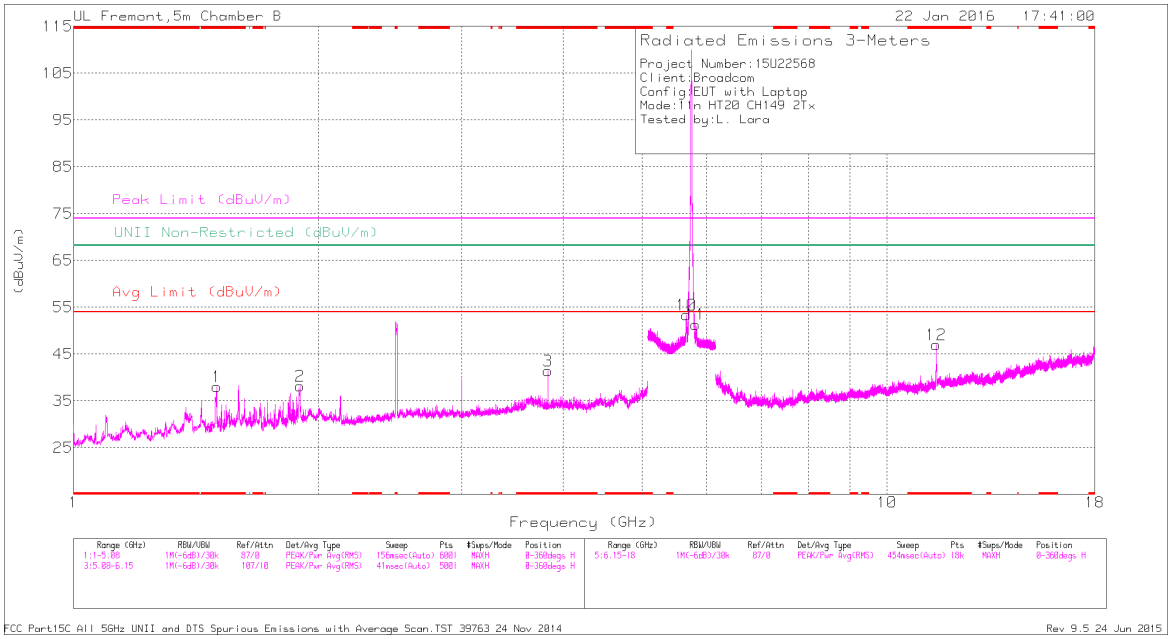
Pk - Peak detector

RMS - RMS detection

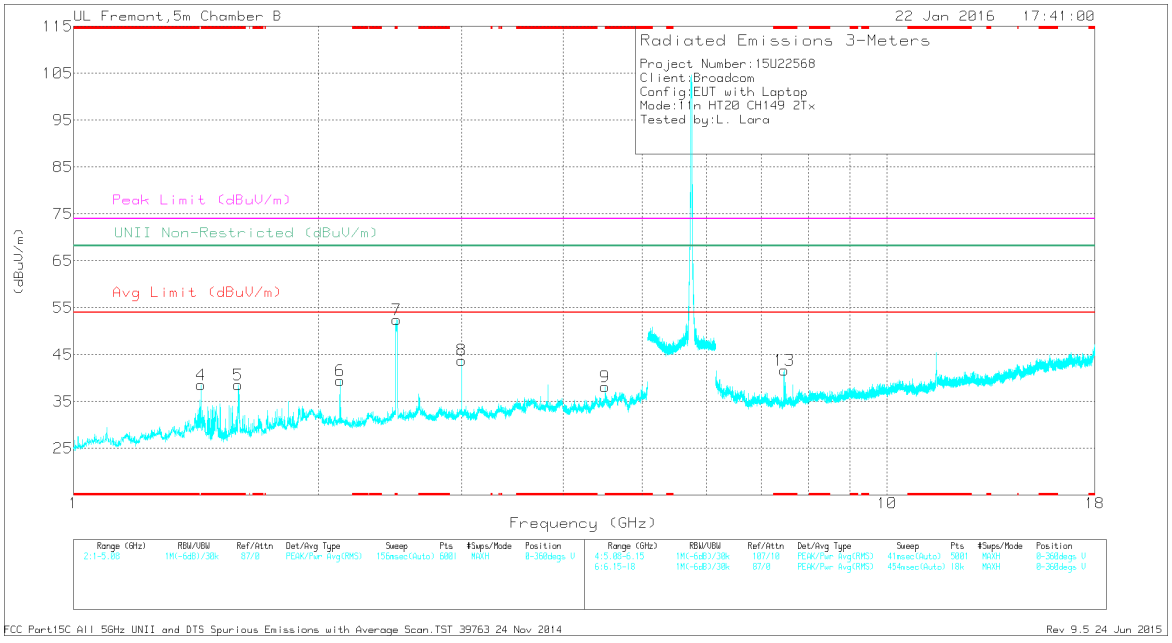
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL

HORIZONTAL



VERTICAL



Trace Markers

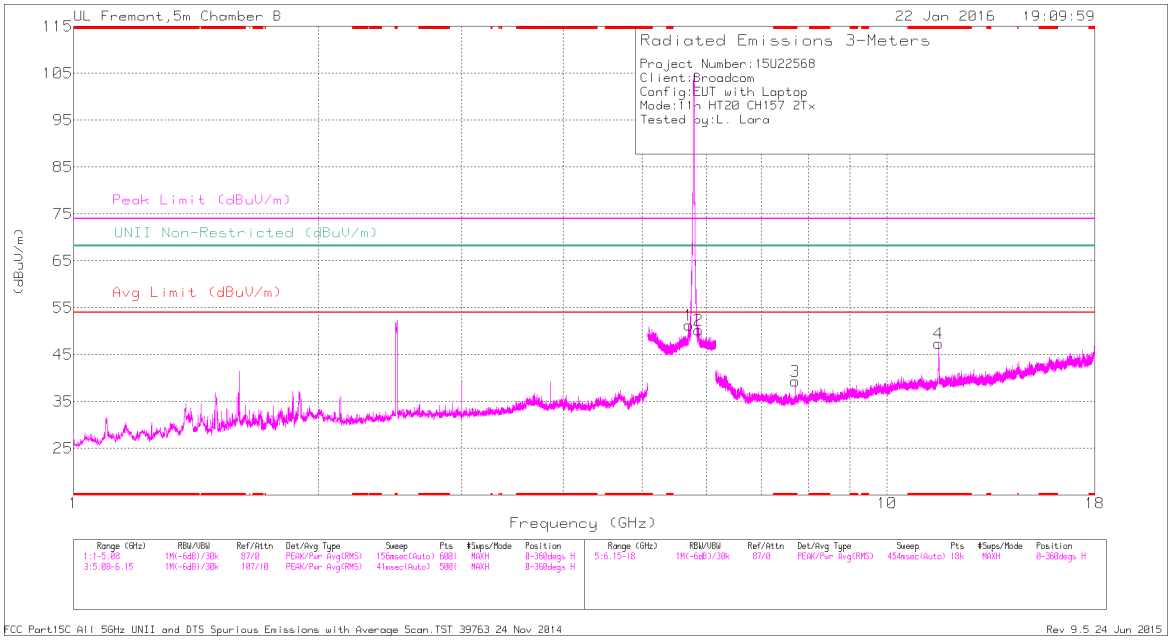
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.499	53.78	PK-U	28.6	-35.5	0	46.88	-	-	74	-27.12	-	-	277	107	H
	* 1.499	38.42	ADR	28.6	-35.5	0	31.52	54	-22.48	-	-	-	-	277	107	H
3	* 3.83	46.42	PK-U	33.4	-33	0	46.82	-	-	74	-27.18	-	-	59	215	H
	* 3.83	40.27	ADR	33.4	-33	0	40.67	54	-13.33	-	-	-	-	59	215	H
5	* 1.593	54.47	PK-U	28.8	-35.3	0	47.97	-	-	74	-26.03	-	-	177	172	V
	* 1.594	32.13	ADR	28.8	-35.3	0	25.63	54	-28.37	-	-	-	-	177	172	V
7	* 2.497	62.99	PK-U	32.5	-34.1	0	61.39	-	-	74	-12.61	-	-	62	206	V
	* 2.489	49.71	ADR	32.5	-34	0	48.21	54	-5.79	-	-	-	-	62	206	V
12	* 11.49	44.86	PK-U	38.3	-25.4	0	57.76	-	-	74	-16.24	-	-	300	182	H
	* 11.49	33.73	ADR	38.3	-25.4	0	46.63	54	-7.37	-	-	-	-	300	182	H
13	* 7.479	39.99	PK-U	35.3	-29.4	0	45.89	-	-	74	-28.11	-	-	15	399	V
	* 7.46	26.67	ADR	35.3	-29.7	0	32.27	54	-21.73	-	-	-	-	15	399	V
4	1.431	53.53	PK-U	29.1	-35	0	47.63	-	-	-	-	68.2	-20.57	199	116	V
2	1.894	49.2	PK-U	31.7	-34.4	0	46.5	-	-	-	-	68.2	-21.7	141	221	H
6	2.132	51.5	PK-U	31.6	-34.9	0	48.2	-	-	-	-	68.2	-20	281	131	V
8	3	49.09	PK-U	32.5	-33.6	0	47.99	-	-	-	-	68.2	-20.21	157	248	V
9	4.5	44.34	PK-U	34	-31.9	0	46.44	-	-	-	-	68.2	-21.76	203	126	V
10	**5.666	39.21	Pk	34.9	-20.7	0	53.41	-	-	-	-	68.2	-14.79	0-360	102	H
11	***5.818	37.15	Pk	35.2	-21	0	51.35	-	-	-	-	68.2	-16.85	0-360	102	H

* - indicates frequency in CFR15.205 Restricted Band.
** - indicates frequency covered by Radiated Band Edge
*** - indicates frequency within the operating band

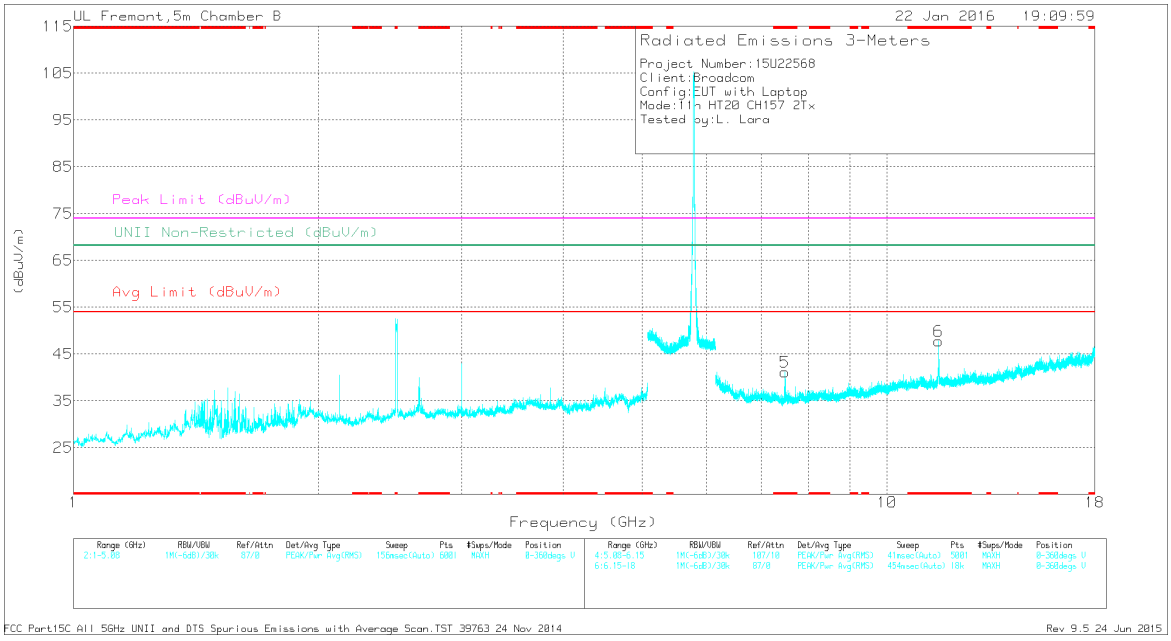
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

MID CHANNEL

HORIZONTAL



VERTICAL



Trace Markers

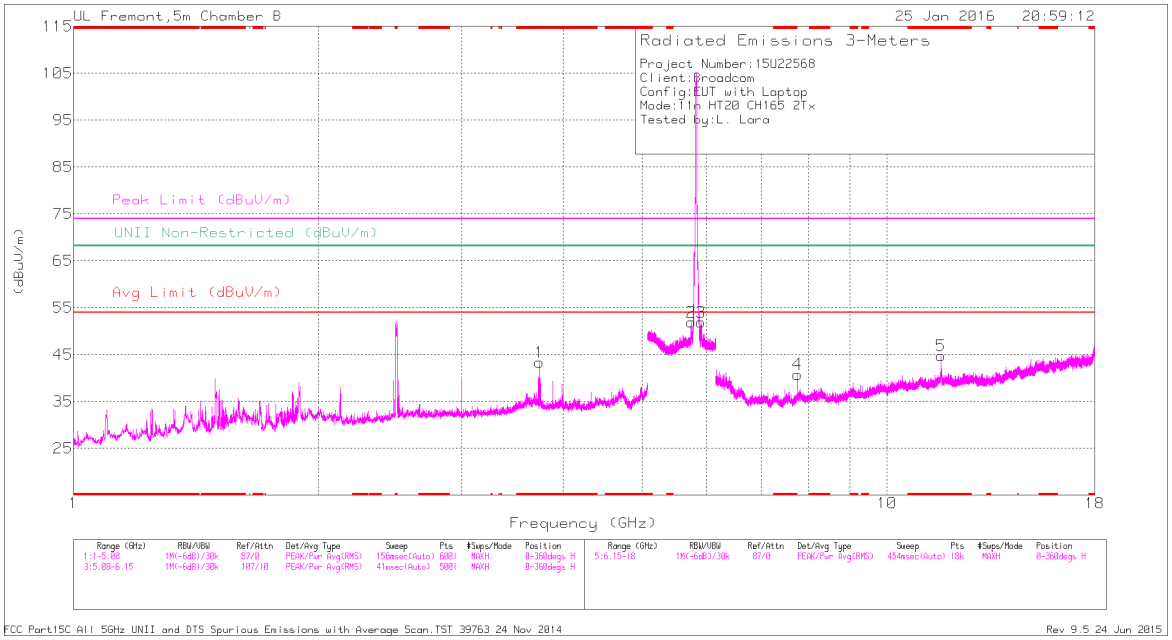
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	* 7.713	41.59	PK-U	35.5	-29.4	0	47.69	-	-	74	-26.31	-	-	294	193	H
	* 7.713	33.07	ADR	35.5	-29.4	0	39.17	54	-14.83	-	-	-	-	294	193	H
4	* 11.57	43.25	PK-U	38.4	-24.6	0	57.05	-	-	74	-16.95	-	-	298	205	H
	* 11.57	32.18	ADR	38.4	-24.6	0	45.98	54	-8.02	-	-	-	-	298	205	H
5	* 7.495	38.26	PK-U	35.3	-29.1	0	44.46	-	-	74	-29.54	-	-	72	397	V
	* 7.495	26.24	ADR	35.3	-29.1	0	32.44	54	-21.56	-	-	-	-	72	397	V
6	* 11.57	40.84	PK-U	38.4	-24.6	0	54.64	-	-	74	-19.36	-	-	323	108	V
	* 11.57	28.91	ADR	38.4	-24.6	0	42.71	54	-11.29	-	-	-	-	323	108	V
1	5.716	54.09	PK-U	35	-21.1	0	67.99	-	-	-	-	68.2	-.21	81	249	H
2	5.847	46.22	PK-U	35.3	-20.7	0	60.82	-	-	-	-	68.2	-7.38	208	105	H

* - indicates frequency in CFR15.205 Restricted Band.

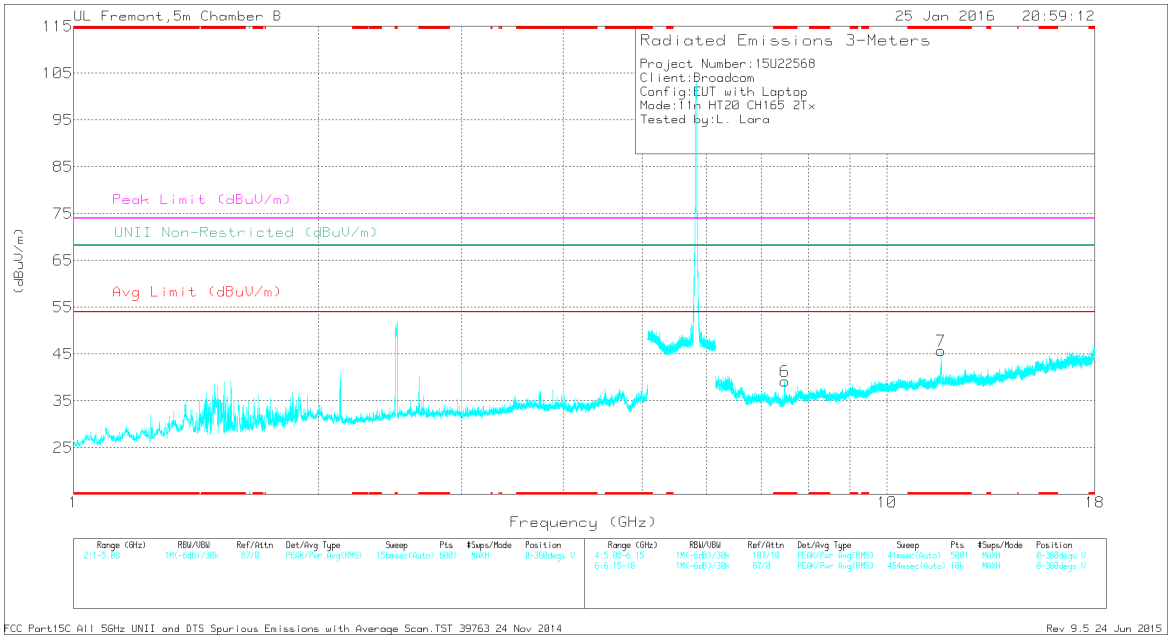
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

HIGH CHANNEL

HORIZONTAL



VERTICAL



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
5	* 11.65	44.55	PK-U	38.5	-24.8	0	58.25	-	-	74	-15.75	-	-	336	315	H
	* 11.65	33.17	ADR	38.5	-24.8	0	46.87	54	-7.13	-	-	-	-	336	315	H
7	* 11.648	41.99	PK-U	38.5	-24.8	0	55.69	-	-	74	-18.31	-	-	319	321	V
	* 11.65	30.51	ADR	38.5	-24.8	0	44.21	54	-9.79	-	-	-	-	319	321	V
1	* 3.745	54.16	PK-U	33.5	-32.7	0	54.96	-	-	74	-19.04	-	-	18	137	H
	* 3.733	31.74	ADR	33.5	-32.7	0	32.54	54	-21.46	-	-	-	-	18	137	H
6	* 7.484	45.03	PK-U	35.3	-29.3	0	51.03	-	-	74	-22.97	-	-	338	149	V
	* 7.485	26.05	ADR	35.3	-29.3	0	32.05	54	-21.95	-	-	-	-	338	149	V
2	***5.744	37.98	Pk	35.1	-21.1	0	51.98	-	-	-	-	68.2	-16.22	0-360	199	H
3	**5.904	37.29	Pk	35.5	-20.9	0	51.89	-	-	-	-	68.2	-16.31	0-360	199	H
4	7.767	41.56	PK-U	35.5	-29.1	0	47.96	-	-	-	-	68.2	-20.24	2	137	H

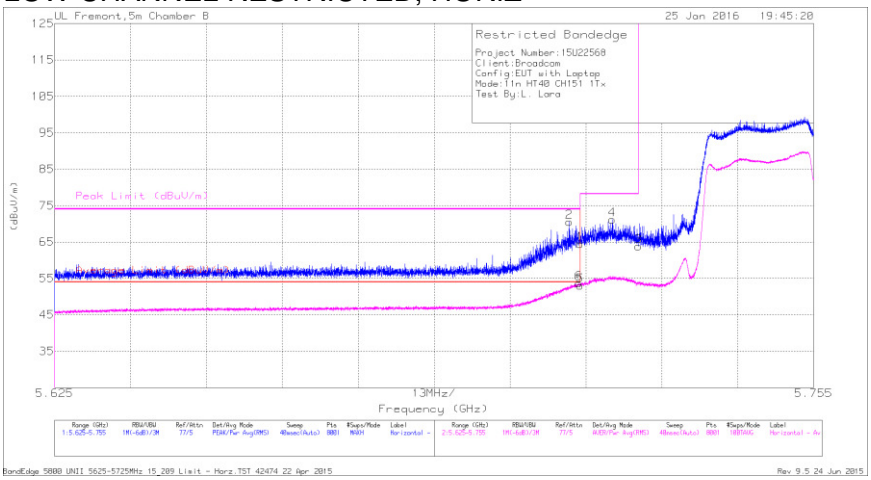
* - indicates frequency in CFR15.205Restricted Band.
** - indicates frequency covered by Radiated Band Edge
*** - indicates frequency within the operating band

PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

9.5. TX ABOVE 1 GHz 802.11n HT40 1Tx MODE IN THE 5.8 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

LOW CHANNEL RESTRICTED, HORIZ



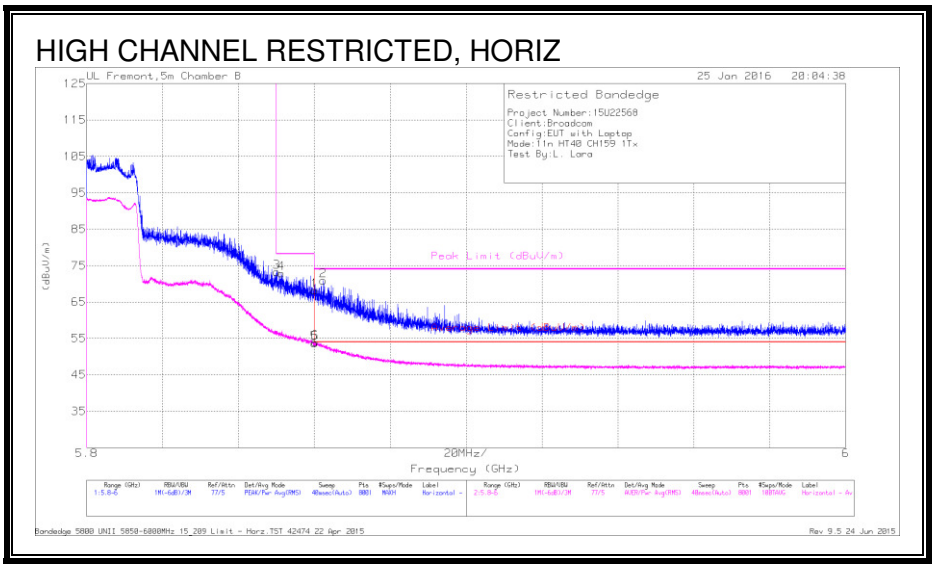
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Bypass (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.713	28.26	Pk	35	7.3	0	70.56	-	-	74	-3.44	92	153	H
1	5.715	22.13	Pk	35	7.3	0	64.43	-	-	74	-9.57	92	153	H
5	5.715	10.61	RMS	35	7.3	.09	53	54	-1	-	-	92	153	H
6	5.715	11.24	RMS	35	7.3	.09	53.63	54	-.37	-	-	92	153	H
4	5.721	28.77	Pk	35	7.4	0	71.17	-	-	78.2	-7.03	92	153	H
3	5.725	21.41	Pk	35	7.4	0	63.81	-	-	78.2	-14.39	92	153	H

Pk - Peak detector

RMS - RMS detection

RESTRICTED BANDEDGE (HIGH CHANNEL)



Trace Markers

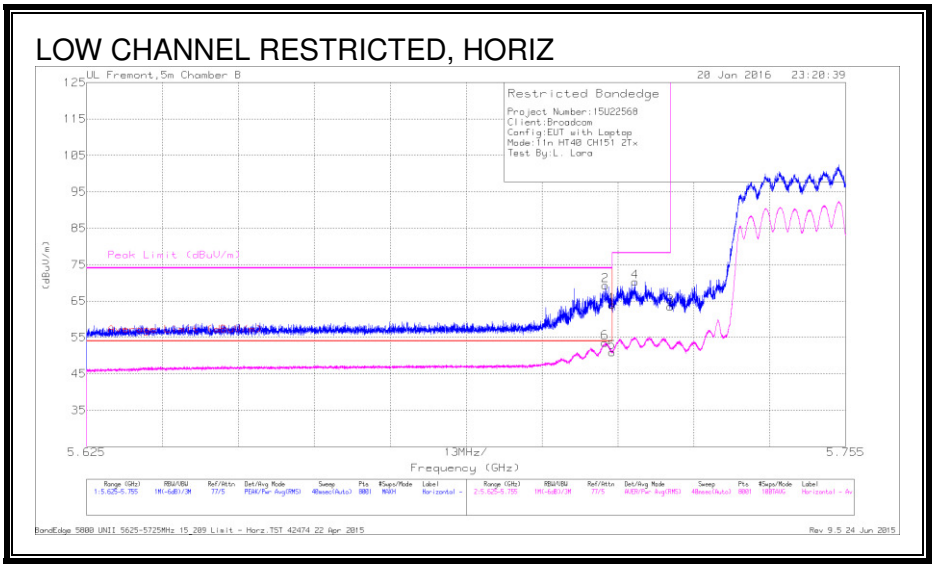
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Bypass (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	5.85	30.32	Pk	35.4	7.5	0	73.22	-	-	78.2	-4.98	102	149	H
4	5.851	29.96	Pk	35.4	7.5	0	72.86	-	-	78.2	-5.34	102	149	H
1	5.86	25.31	Pk	35.4	7.5	0	68.21	-	-	74	-5.79	102	149	H
5	5.86	10.67	RMS	35.4	7.5	.09	53.66	54	-.34	-	-	102	149	H
6	5.86	10.86	RMS	35.4	7.5	.09	53.85	54	-.15	-	-	102	149	H
2	5.862	28.05	Pk	35.4	7.5	0	70.95	-	-	74	-3.05	102	149	H

Pk - Peak detector

RMS - RMS detection

9.6. TX ABOVE 1 GHz 802.11n HT40 CDD 2TX MODE IN THE 5.8 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)



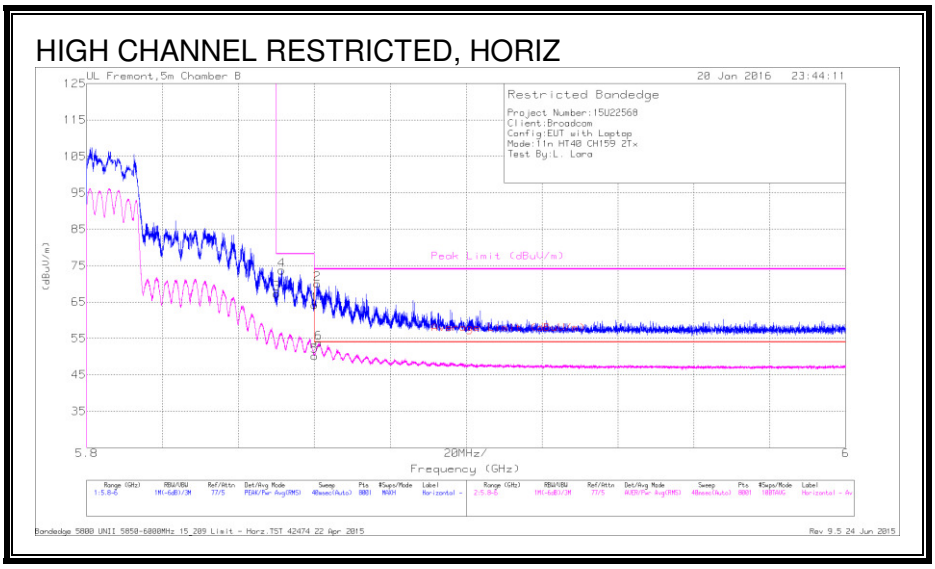
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Bypass (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
2	5.714	26.97	Pk	35	7.3	0	69.27	-	-	74	-4.73	174	128	H
6	5.714	11.19	RMS	35	7.3	.09	53.58	54	-.42	-	-	174	128	H
1	5.715	21.67	Pk	35	7.3	0	63.97	-	-	74	-10.03	174	128	H
5	5.715	8.54	RMS	35	7.3	.09	50.93	54	-3.07	-	-	174	128	H
4	5.719	28	Pk	35	7.3	0	70.3	-	-	78.2	-7.9	174	128	H
3	5.725	21.06	Pk	35	7.4	0	63.46	-	-	78.2	-14.74	174	128	H

Pk - Peak detector

RMS - RMS detection

RESTRICTED BANDEDGE (HIGH CHANNEL)



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Bypass (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
3	5.85	24.46	Pk	35.4	7.5	0	67.36	-	-	78.2	-10.84	125	224	H
4	5.851	30.8	Pk	35.4	7.5	0	73.7	-	-	78.2	-4.5	125	224	H
1	5.86	21.36	Pk	35.4	7.5	0	64.26	-	-	74	-9.74	125	224	H
5	5.86	7.17	RMS	35.4	7.5	.09	50.16	54	-3.84	-	-	125	224	H
2	5.861	27.17	Pk	35.4	7.5	0	70.07	-	-	74	-3.93	125	224	H
6	5.861	10.8	RMS	35.4	7.5	.09	53.79	54	-.21	-	-	125	224	H

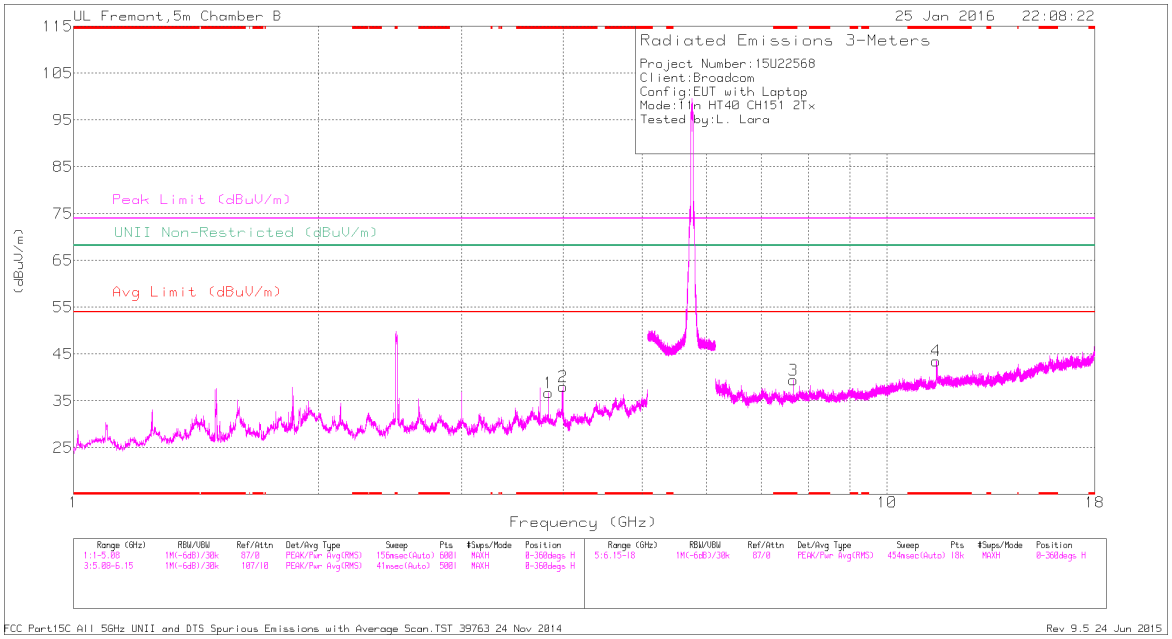
Pk - Peak detector

RMS - RMS detection

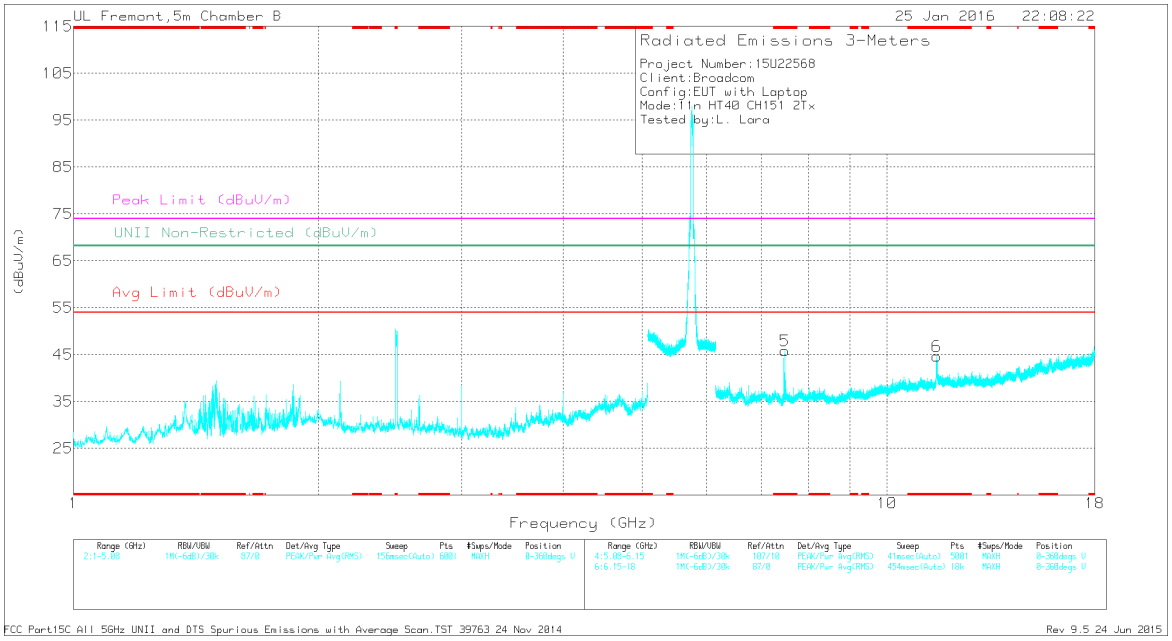
HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL

HORIZONTAL



VERTICAL



Trace Markers

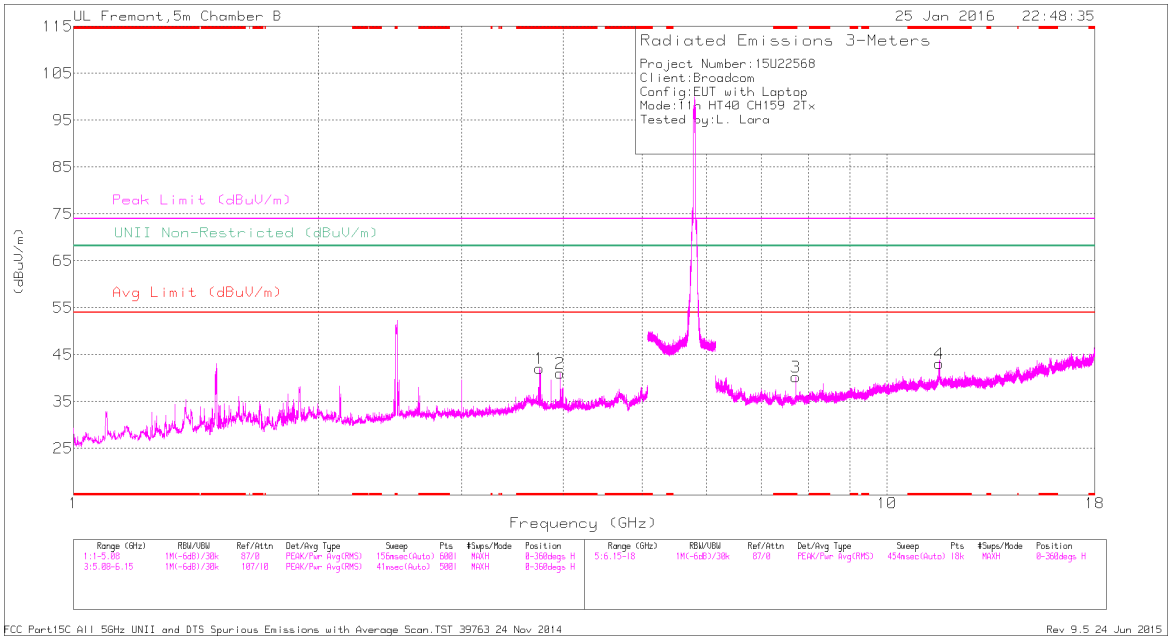
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3.837	45.88	PK-U	33.4	-33	0	46.28	-	-	74	-27.72	-	-	133	372	H
	* 3.837	37.07	ADR	33.4	-33	.09	37.56	54	-16.44	-	-	-	-	133	372	H
2	* 3.988	50.38	PK-U	33.3	-31.7	0	51.98	-	-	74	-22.02	-	-	9	106	H
	* 3.987	29.91	ADR	33.3	-31.7	.09	31.6	54	-22.4	-	-	-	-	9	106	H
3	* 7.674	39.81	PK-U	35.5	-29.8	0	45.51	-	-	74	-28.49	-	-	1	142	H
	* 7.673	31.4	ADR	35.5	-29.8	.09	37.19	54	-16.81	-	-	-	-	1	142	H
4	* 11.51	38.62	PK-U	38.3	-25.3	0	51.62	-	-	74	-22.38	-	-	39	388	H
	* 11.51	27.31	ADR	38.3	-25.3	.09	40.4	54	-13.6	-	-	-	-	39	388	H
5	* 7.496	46.77	PK-U	35.3	-29.1	0	52.97	-	-	74	-21.03	-	-	214	158	V
	* 7.496	26.68	ADR	35.3	-29.1	.09	32.97	54	-21.03	-	-	-	-	214	158	V
6	* 11.51	40.41	PK-U	38.3	-25.3	0	53.41	-	-	74	-20.59	-	-	4	194	V
	* 11.51	27.98	ADR	38.3	-25.3	.09	41.07	54	-12.93	-	-	-	-	4	194	V

* - indicates frequency in CFR15.205 Restricted Band.

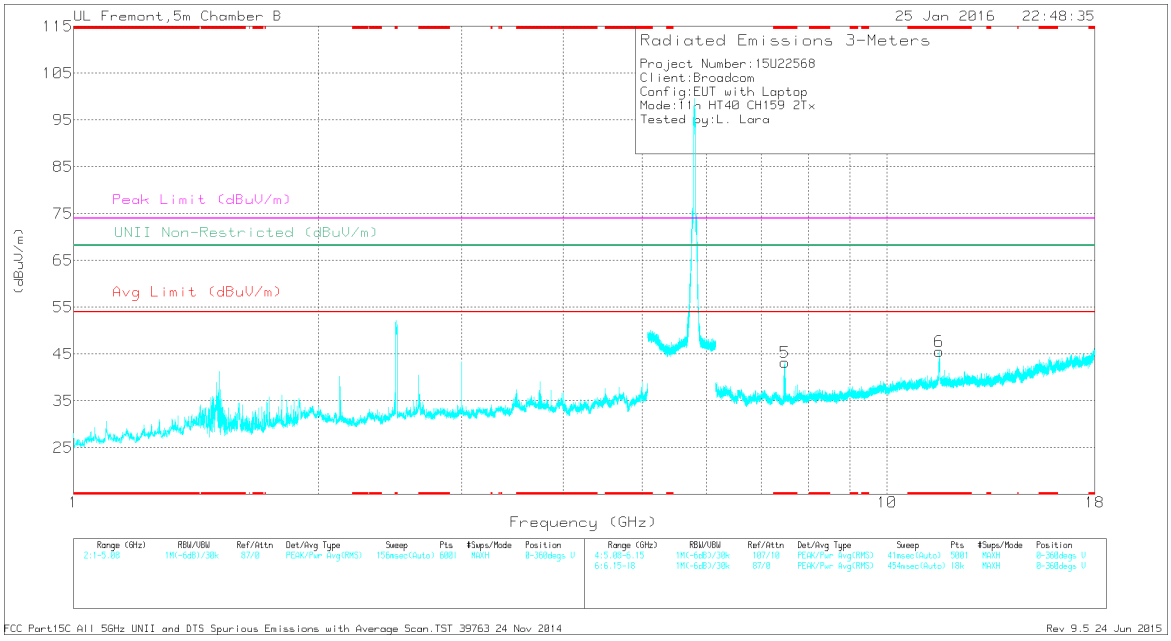
PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

HIGH CHANNEL

HORIZONTAL



VERTICAL



Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T345 (dB/m)	Amp/Cbl/ Fltr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	UNII Non-Restricted (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 3.739	50.05	PK-U	33.5	-32.7	0	50.85	-	-	74	-23.15	-	-	17	383	H
	* 3.739	29.95	ADR	33.5	-32.7	.09	30.84	54	-23.16	-	-	-	-	17	383	H
2	* 3.966	45.6	PK-U	33.4	-31.8	0	47.2	-	-	74	-26.8	-	-	348	110	H
	* 3.967	30.67	ADR	33.4	-31.7	.09	32.46	54	-21.54	-	-	-	-	348	110	H
3	* 7.727	40.71	PK-U	35.5	-29.3	0	46.91	-	-	74	-27.09	-	-	0	144	H
	* 7.727	33.22	ADR	35.5	-29.3	.09	39.51	54	-14.49	-	-	-	-	0	144	H
4	* 11.59	40.71	PK-U	38.4	-24.7	0	54.41	-	-	74	-19.59	-	-	2	222	H
	* 11.59	28.26	ADR	38.4	-24.7	.09	42.05	54	-11.95	-	-	-	-	2	222	H
5	* 7.486	48.84	PK-U	35.3	-29.3	0	54.84	-	-	74	-19.16	-	-	147	130	V
	* 7.486	27.03	ADR	35.3	-29.3	.09	33.12	54	-20.88	-	-	-	-	147	130	V
6	* 11.593	41.59	PK-U	38.4	-24.6	0	55.39	-	-	74	-18.61	-	-	9	108	V
	* 11.588	29.5	ADR	38.4	-24.7	.09	43.29	54	-10.71	-	-	-	-	9	108	V

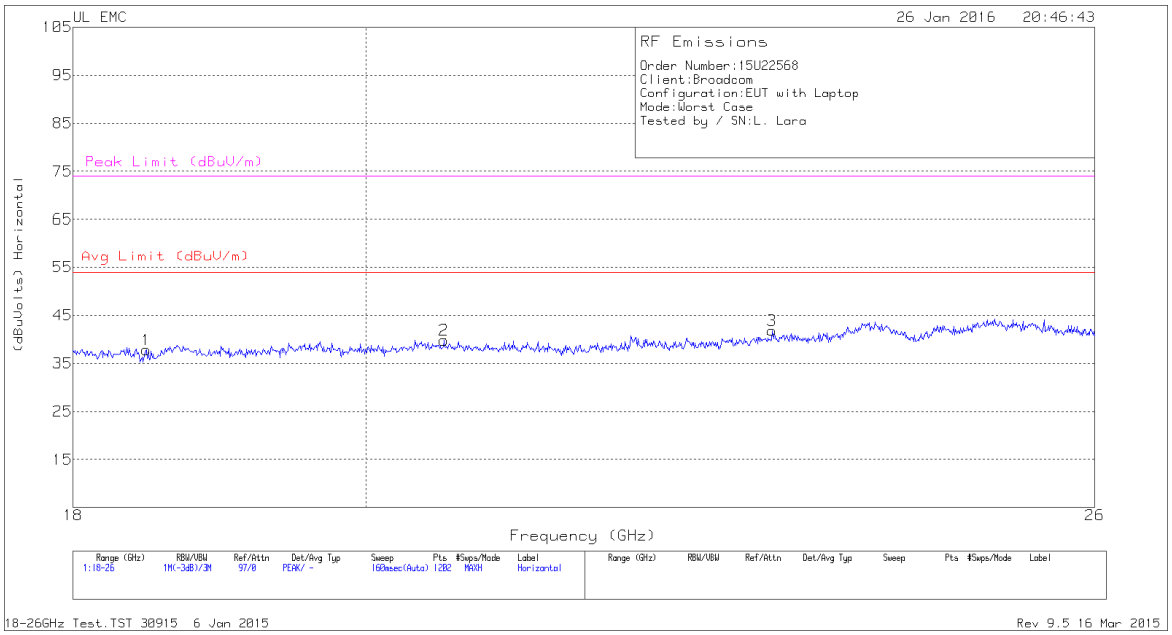
* - indicates frequency in CFR15.205 Restricted Band.

PK-U - U-NII: Maximum Peak
ADR - U-NII AD primary method, RMS average

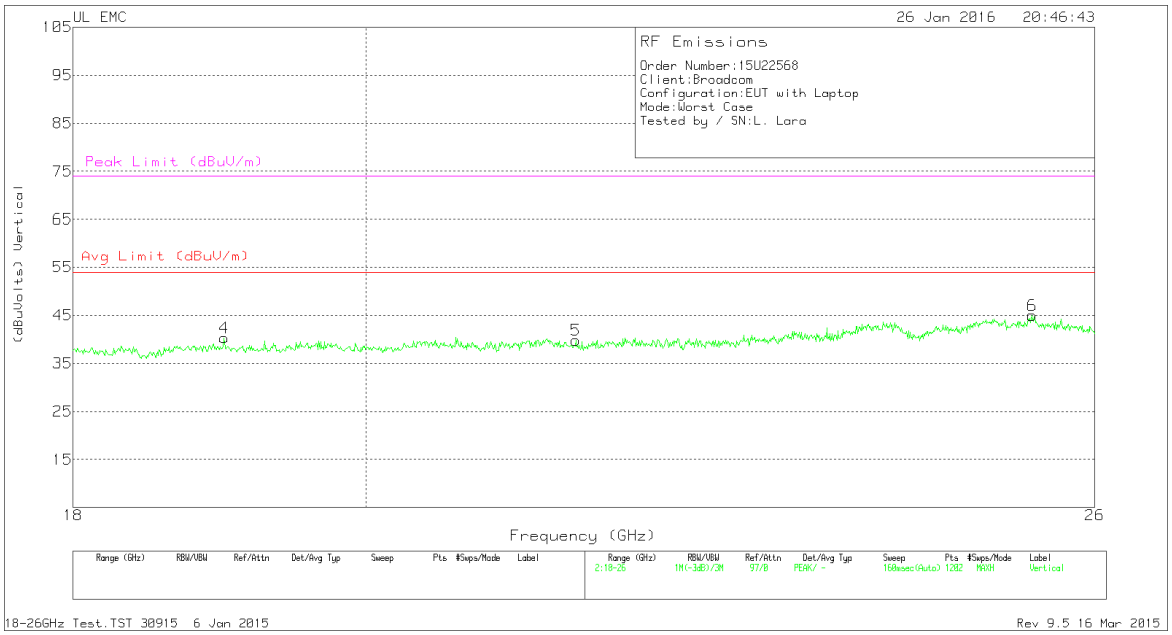
9.7. WORST-CASE ABOVE 18GHz

SPURIOUS EMISSIONS 18 – 26GHz

HORIZONTAL



VERTICAL



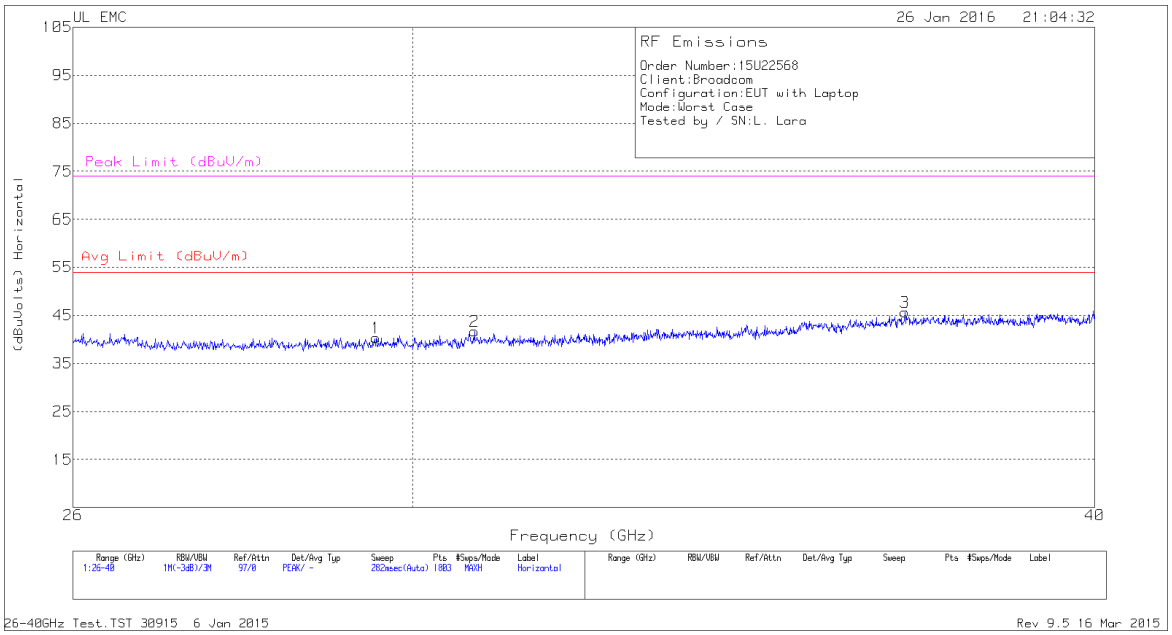
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T477 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	DC Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	18.48	40.53	Pk	32.3	-25.5	-9.5	0	37.83	54	-16.17	74	-36.17
2	20.571	41.63	Pk	33.1	-25.4	-9.5	0	39.83	54	-14.17	74	-34.17
3	23.149	43.03	Pk	33.3	-25	-9.5	0	41.83	54	-12.17	74	-32.17
4	19.006	42.13	Pk	32.5	-24.8	-9.5	0	40.33	54	-13.67	74	-33.67
5	21.57	41.43	Pk	33.1	-25.2	-9.5	0	39.83	54	-14.17	74	-34.17
6	25.42	44.6	Pk	34.2	-24.3	-9.5	0	45	54	-9	74	-29

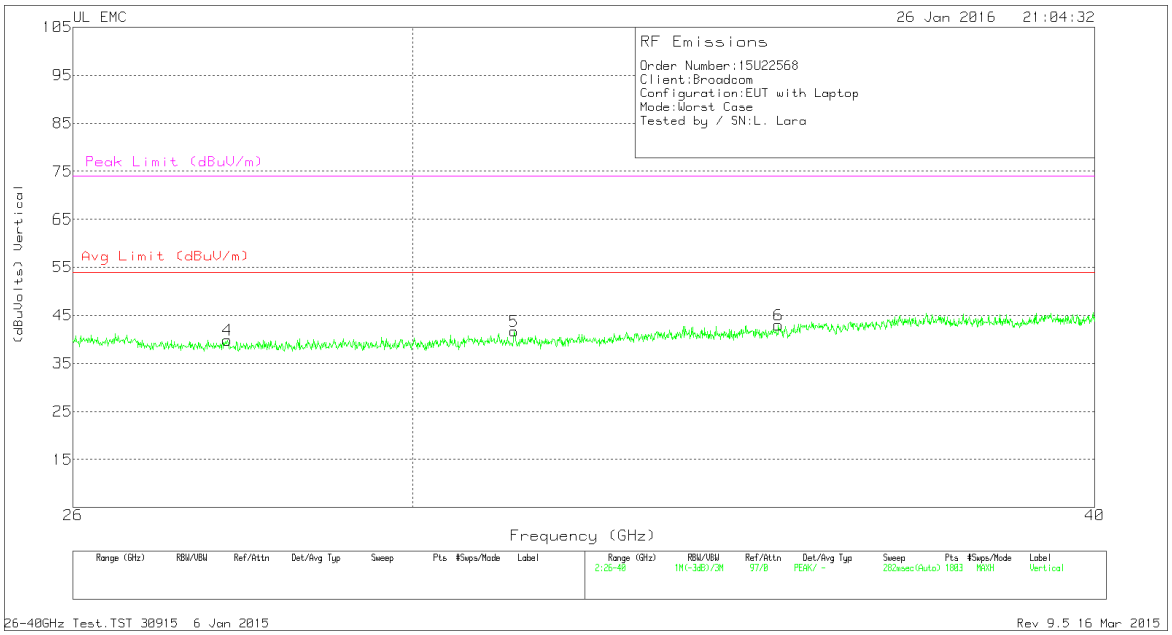
Pk - Peak detector

SPURIOUS EMISSIONS 26 – 40GHz

HORIZONTAL



VERTICAL



Trace Markers

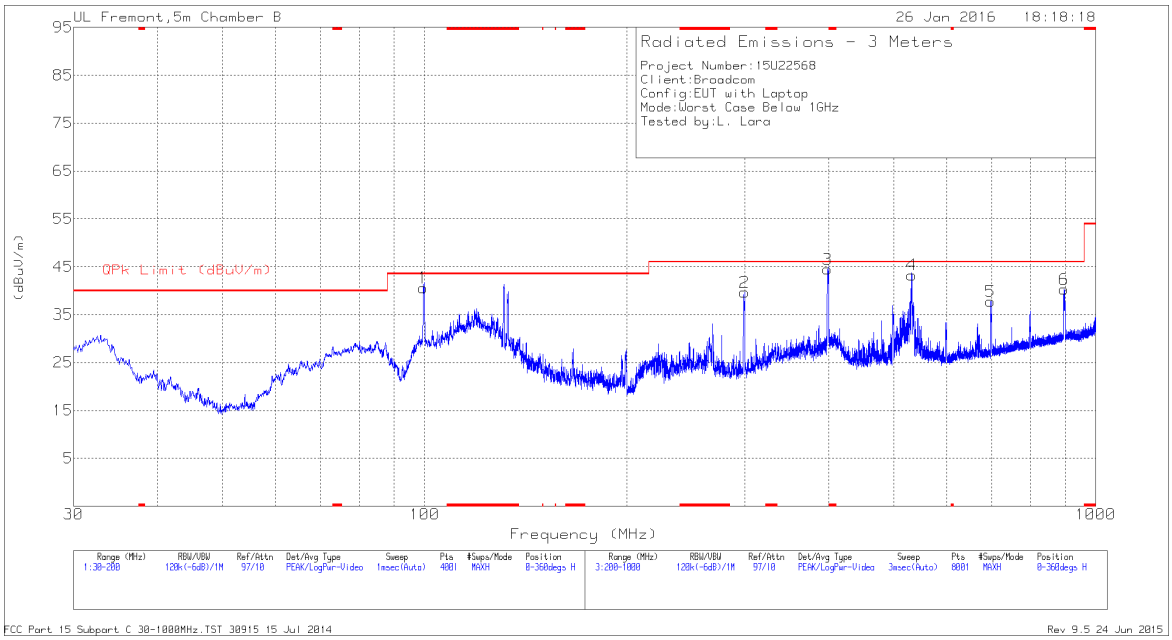
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	T90 AF (dB/m)	Amp/Cbl (dB)	Dist Corr (dB)	Corrected Reading (dBuVolts)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)
1	29.543	46.03	Pk	35.9	-32.1	-9.5	40.33	54	-13.67	74	-33.67
2	30.794	47.77	Pk	36.1	-32.7	-9.5	41.67	54	-12.33	74	-32.33
3	36.923	51.07	Pk	37.2	-33.1	-9.5	45.67	54	-8.33	74	-28.33
4	27.748	44.83	Pk	35.8	-31.3	-9.5	39.83	54	-14.17	74	-34.17
5	31.314	47.77	Pk	36.1	-32.7	-9.5	41.67	54	-12.33	74	-32.33
6	35.004	48.5	Pk	37.2	-33.2	-9.5	43	54	-11	74	-31

Pk - Peak detector

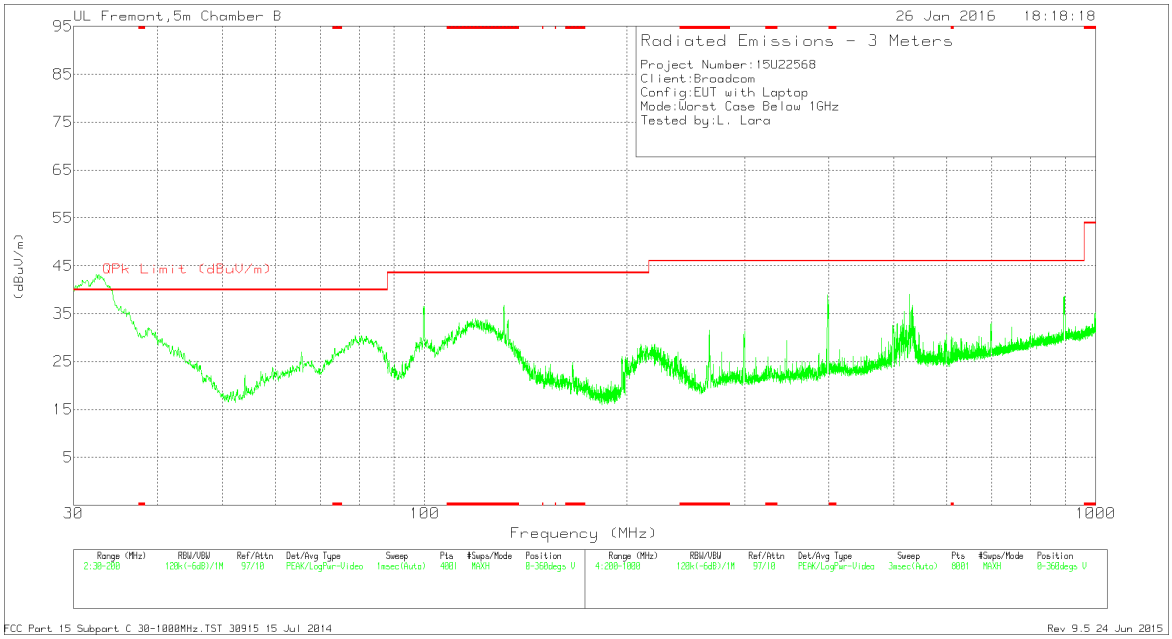
9.8. WORST-CASE BELOW 1 GHz

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

HORIZONTAL



VERTICAL



Note: Signals not marked are generated by support equipment.

Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBuV)	Det	AF T130 (dB/m)	Amp/Cbl (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	QPk Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	99.9055	54	Qp	14.3	-28.2	0	40.1	43.52	-3.42	246	291	H
2	299.7	48.55	Pk	17.3	-26.2	0	39.65	46.02	-6.37	0-360	101	H
3	399.6939	49.16	Qp	19.5	-26.3	0	42.36	46.02	-3.66	215	104	H
4	531.4536	34.62	Qp	21.9	-26.2	0	30.32	46.02	-15.7	46	261	H
5	697	39	Pk	24.1	-25.3	0	37.8	46.02	-8.22	0-360	101	H
6	896.0386	34.72	Qp	26.3	-23.9	0	37.12	46.02	-8.9	239	106	H

* - indicates frequency in CFR15.205 Restricted Band

Pk - Peak detector

Qp - Quasi-Peak detector

10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

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.

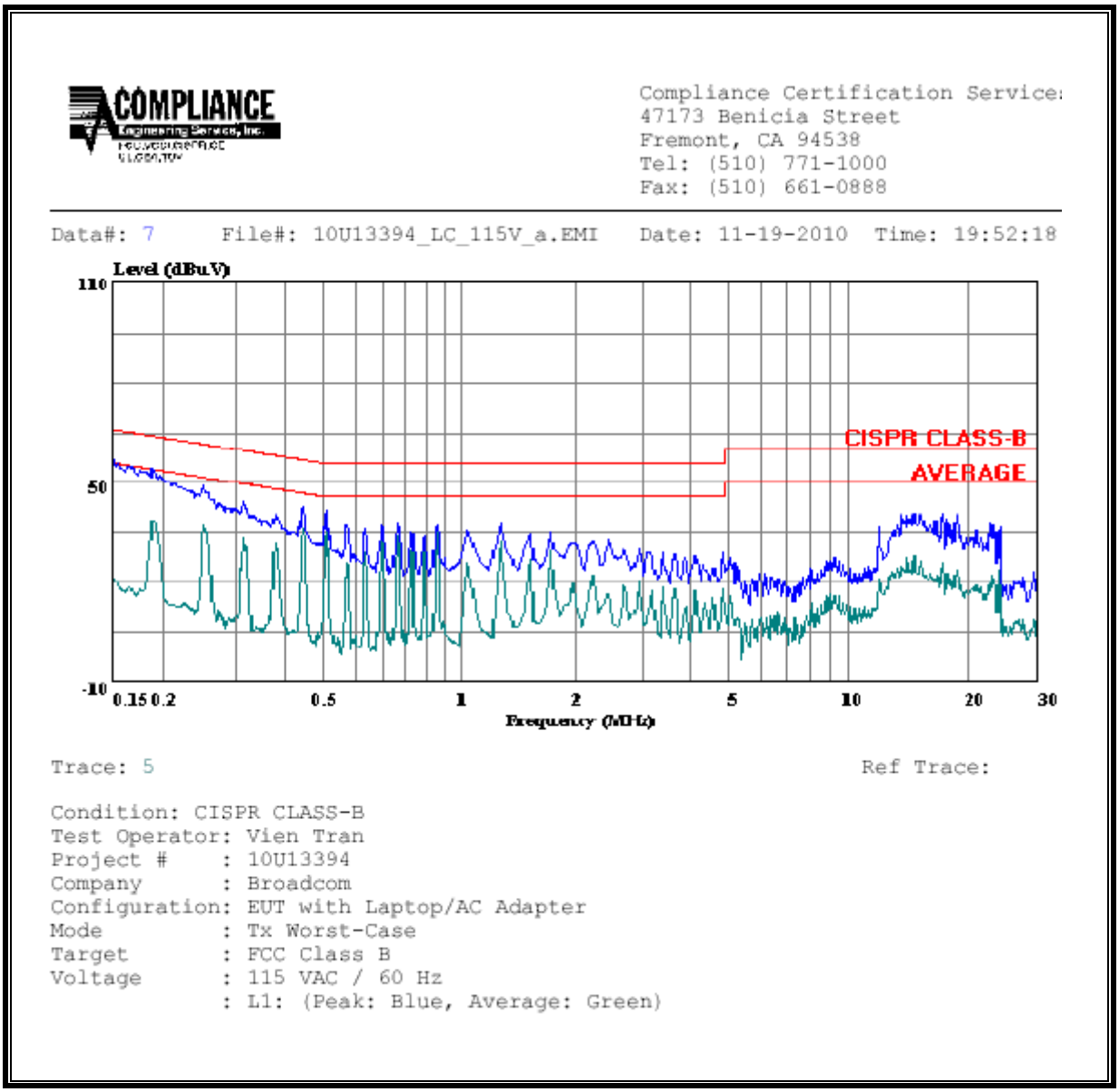
RESULTS

6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)

Freq.	Reading			Closs	Limit	FCC_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.15	56.78	--	21.06	0.00	66.00	56.00	-9.22	-34.94	L1
0.51	41.77	--	34.98	0.00	56.00	46.00	-14.23	-11.02	L1
14.75	40.78	--	25.00	0.00	60.00	50.00	-19.22	-25.00	L1
0.15	59.33	--	23.58	0.00	66.00	56.00	-6.67	-32.42	L2
0.96	39.70	--	37.70	0.00	56.00	46.00	-16.30	-8.30	L2
14.75	39.90	--	24.30	0.00	60.00	50.00	-20.10	-25.70	L2
6 Worst Data									

LINE 1 RESULTS



LINE 2 RESULTS