FCC 47 CFR PART 15 SUBPART E
INDUSTRY CANADA RSS-210 ISSUE 8

CERTIFICATION TEST REPORT

FOR

2x2 802.11a/b/g/n +BT Module (SiP)

MODEL NUMBER: QCA6234

FCC ID: PPD-QCA6234
IC: 4104A-QCA6234

REPORT NUMBER: 13U14995-2, Revision A

ISSUE DATE: JULY 05, 2013

Prepared for
QUALLCOMM ATHEROS, INC.
1700 TECHNOLOGY DRIVE
SAN JOSE, CA 95100

Prepared by
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	07/03/13	Initial Issue	F. Ibrahim
A	07/05/13	Added Appendix A, Colocation data	T. LEE

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: QUALCOMM ATHEROS, INC.
1700 TECHNOLOGY DRIVE
SAN JOSE, CA 95100

EUT DESCRIPTION: 2x2 802.11a/b/g/n +BT Module (SiP)

MODEL: QCA6234

SERIAL NUMBER: 75720080 and 75720088 (RF); 75720063 (DFS)

DATE TESTED: April 26 - July 01, 2013

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

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:

FRANK IBRAHIM
EMC SUPERVISOR
UL Verification Services Inc.

Tested By:

TONY WAGONER
EMC ENGINEER
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, ANSI C63.10-2009, RSS-GEN Issue 3, and RSS-210 Issue 8.

3. FACILITIES AND ACCREDITATION

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

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

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

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

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is 2x2 802.11a/b/g/n +BT Module (SiP).

Three board variants are provided, no filter version, 3G filter version and LTE filter version. Test was done to worst case among the three boards.

The radio module is manufactured by Qualcomm Atheros, Inc.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted output power as follows:

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
5180 - 5240	802.11a	14.452	27.874
5180 - 5240	802.11n HT20	14.313	26.996
5190 - 5230	802.11n HT40	16.700	46.774
5260 - 5320	802.11a	16.286	42.521
5260 - 5320	802.11n HT20	17.012	50.257
5270 - 5310	802.11n HT40	16.520	44.875
5500 - 5720	802.11a	16.170	41.400
5500 - 5720	802.11n HT20	17.911	61.816
5510 - 5710	802.11n HT40	17.620	57.810

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

Declared antenna gain is 2dBi, radiated BE was verified with a PIFA antenna of 2.56dBi gain for HT40 5310 MHz channel.

5.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was ART2-GUI version 2.3, CART version 4.4

5.5. WORST-CASE CONFIGURATION AND MODE

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

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

A baseline scan was performed on various data rates for 11b and 11g modes, it was found that when Peak detector was used for the test item the highest data rate was worst-case, and when the AVG detector was chosen for a certain test item the lowest data rate was worst-case, and since the items with AVG detector had lower margin and they were more critical, lowest data rates, as follows, were selected for performing the final measurements:

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

Radiated BE for EUT with EBJ antenna was performed for the following modes:

- 11n HT40 in 5.3GHz UNII Band.

The EUT has three variants:

- EUT without filter.
- EUT with 3G filter.
- EUT with Avago filter

Preliminary investigation was performed to determine worst-case variant. Based on the result of the preliminary investigation the EUT without filter was chosen as worst-case for all test items except conducted BE measurement for 11g, 11n HT20 and 11n HT40 (both 2.4 GHz and 5 GHz bands), where 3G filter unit was worst-case; therefore, for these conducted BE measurements 3G filter unit was also tested and power had to be reduced to pass. Two power tables are provided, one for both no filter and Avago filter units, and another table for 3G filter unit.

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	Lenovo	T410 Thinkpad	R8-V8D76 11/03	DoC
SD Card Express Adapter	Bplus	EC230	1100319	N/A

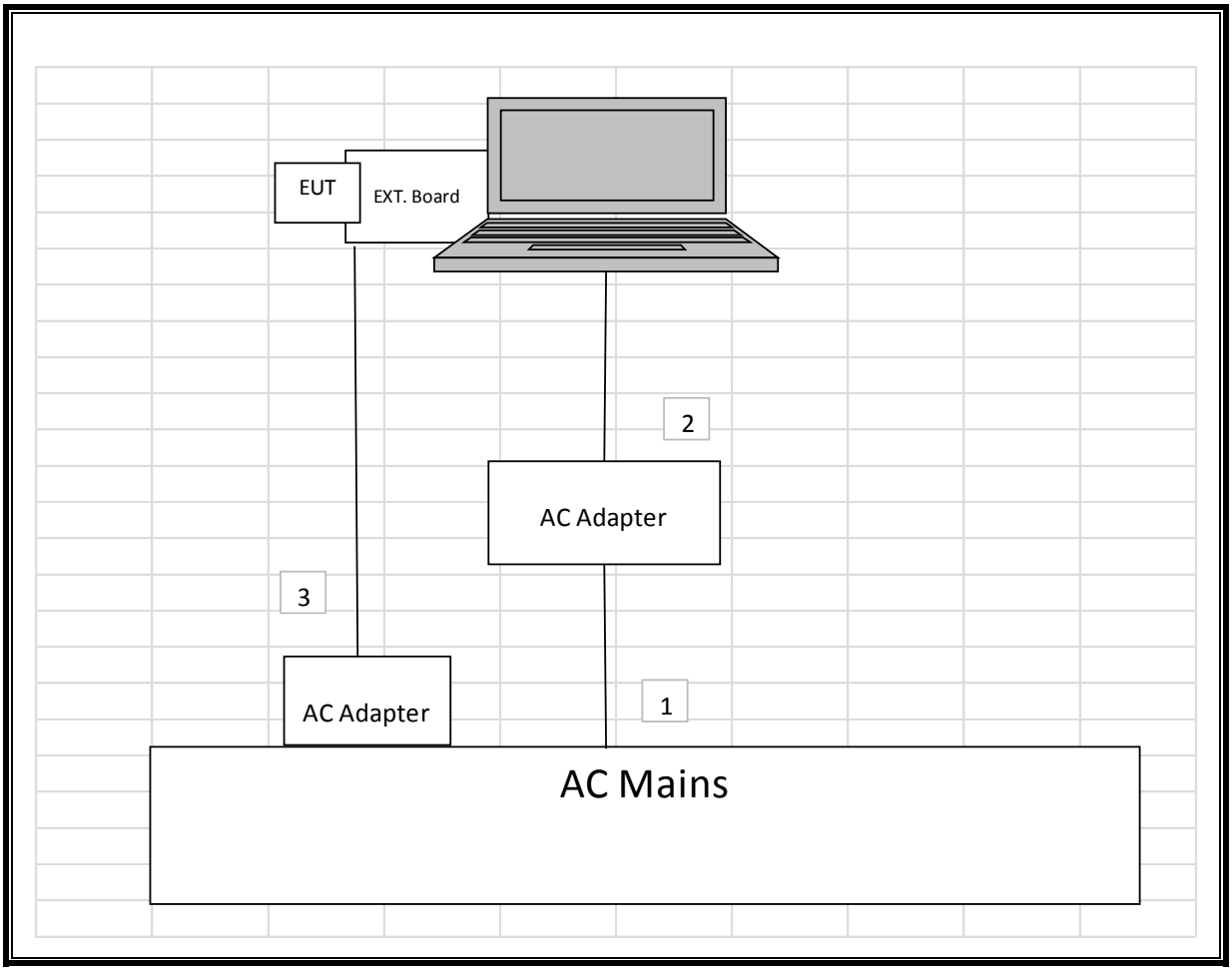
I/O CABLES

Cable No	Port	# of identical ports	Connector Type	Cable Type	Cable Length (m)	Remarks
1	AC	1	AC Adapter	Un-Shielded	1m	NA
2	DC	1	DC	Un-Shielded	1.5m	NA
3	AC	1	AC Adapter	Un-Shielded	1m	NA

TEST SETUP

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

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List					
Description	**Manufacturer**	**Model**	**Asset/ T number**	**Cal Date**	**Cal Due**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/20/12	12/20/13
Spectrum Analyzer	Agilent	N9030A	T313	02/22/13	02/22/14
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01179	02/26/13	02/26/14
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01161	05/07/13	05/07/14
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	T243	03/06/13	03/06/14
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	C01171	02/13/13	02/13/14
Antenna, Horn, 18 GHz	ETS	3117	C01006	12/11/12	12/11/13
Horn Antenna, 1-18GHz	ETS Lindgren	3117	T344	02/19/13	02/19/14
Horn Antenna, 1-18GHz	ETS Lindgren	3117	T345	02/19/13	02/19/14
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00980	11/14/12	11/14/13
Antenna, Horn, 40 GHz	ARA	MWH-2640/B	C00981	06/14/11	06/14/13
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	01/28/13	01/28/14
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00558	03/23/13	03/23/14
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	10/22/12	10/22/13
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	10/19/12	10/19/13
PreAmplifier, 1-26.5GHz	Agilent	8449B	T402	03/23/13	03/23/14
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	08/02/11	08/02/13
Peak Power Meter	Agilent / HP	E4416A	C00963	12/13/12	12/13/13
Peak / Average Power Sensor	Agilent / HP	E9327A	C00964	12/13/12	12/13/13
LISN, 30 MHz	FCC	50/250-25-2	C00626	01/14/13	01/14/14
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/08/12	08/08/13

7. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 789033 Zero-Span Spectrum Analyzer Method.

7.1. ON TIME AND DUTY CYCLE RESULTS

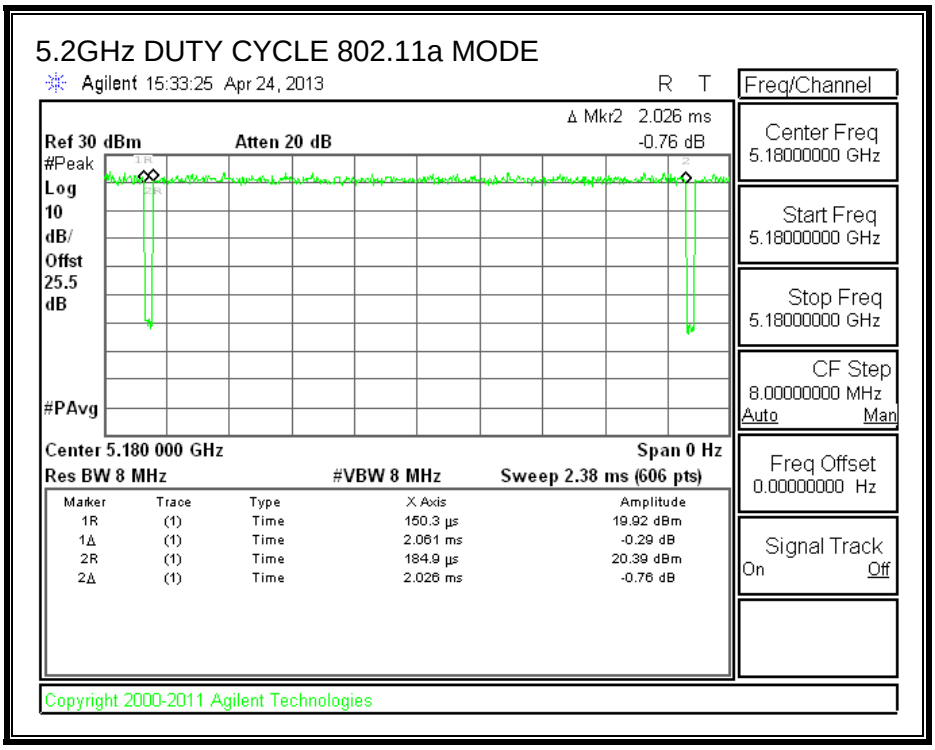
Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/T Minimum VBW (kHz)
802.11a 20 MHz	2.026	2.061	0.983	98.302%	0.00	0.010
802.11n HT20	1.887	1.923	0.981	98.128%	0.00	0.010
802.11n HT40	0.127	0.162	0.782	78.223%	1.07	7.886

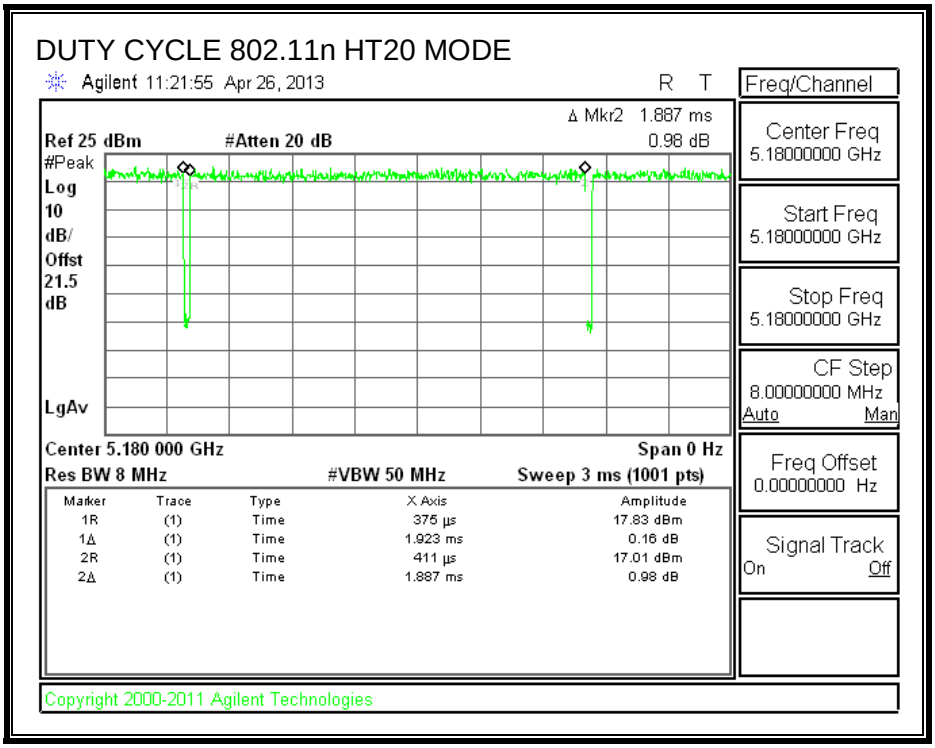
7.2. MEASUREMENT METHODS

KDB 789033 D01 v01R03:

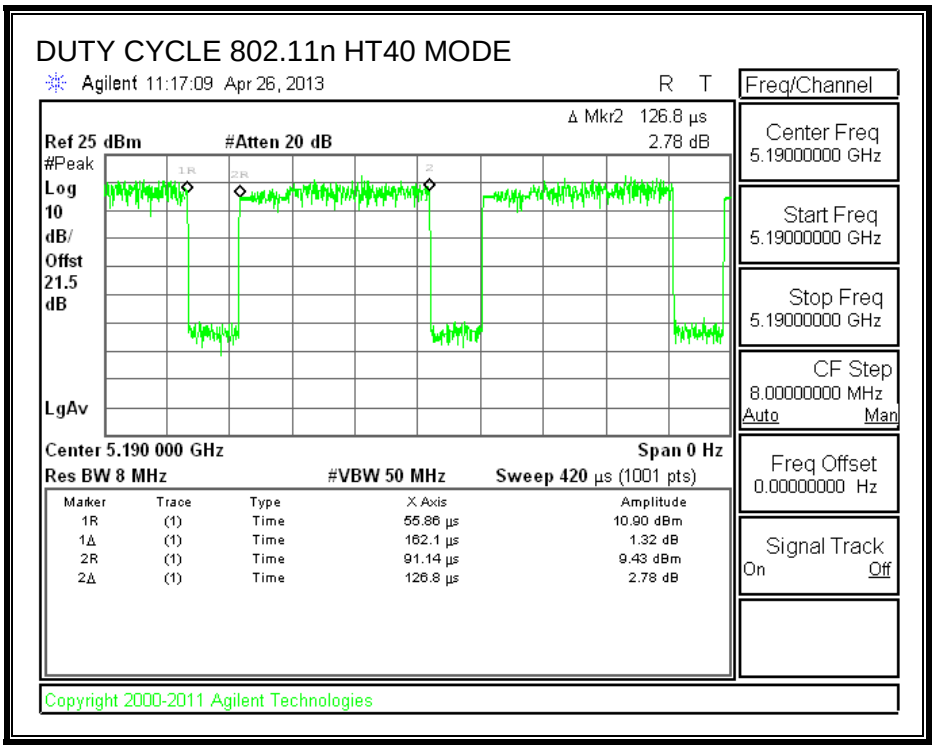
26 dB BW: Section C
99% BW: Section D
Maximum Conducted Power: Section E, Method SA-1 (duty cycle greater than or equal to 98%)
Maximum Conducted Power: Section E, Method SA-2 (duty cycle less than 98%)
Peak Excursion: Section G
TX Spurious Emissions: Section H

7.3. DUTY CYCLE PLOTS





DUTY CYCLE 802.11n HT40 MODE



8. ANTENNA PORT TEST RESULTS

8.1. 802.11a MODE IN THE 5.2 GHz BAND

8.1.1. 26 dB BANDWIDTH

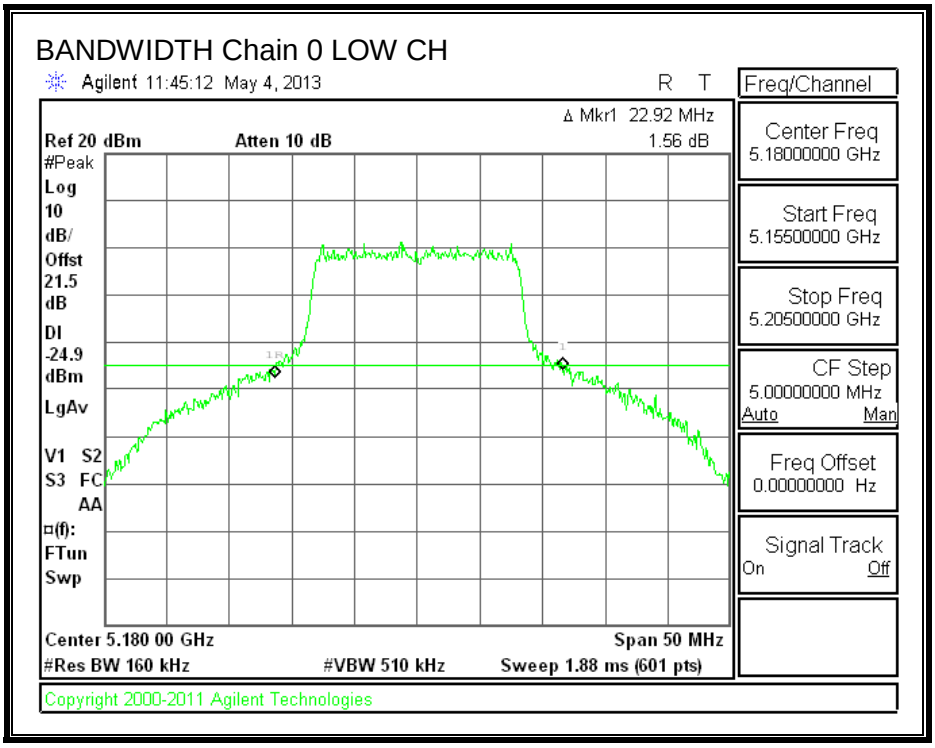
LIMITS

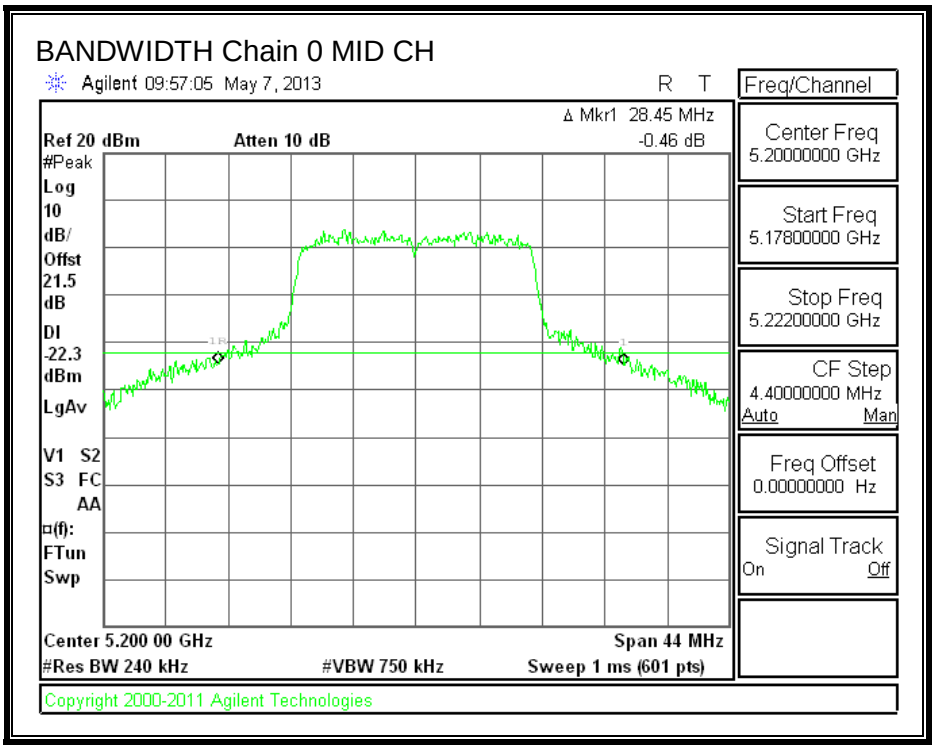
None; for reporting purposes only.

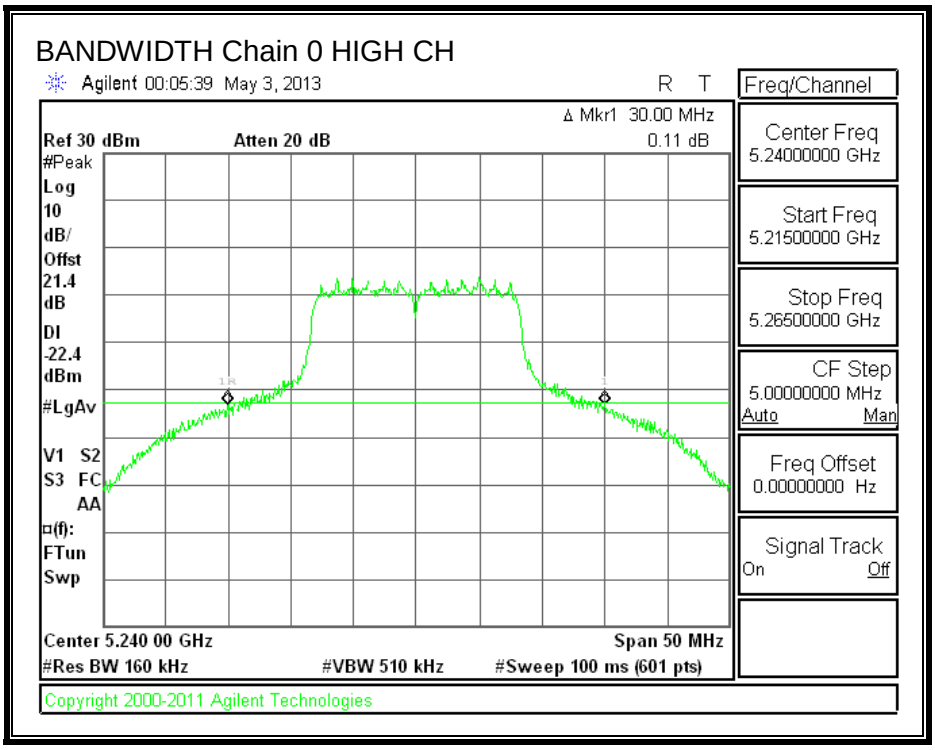
RESULTS

Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5180	22.92	25.00
Mid	5200	28.45	31.08
High	5240	30.00	33.67

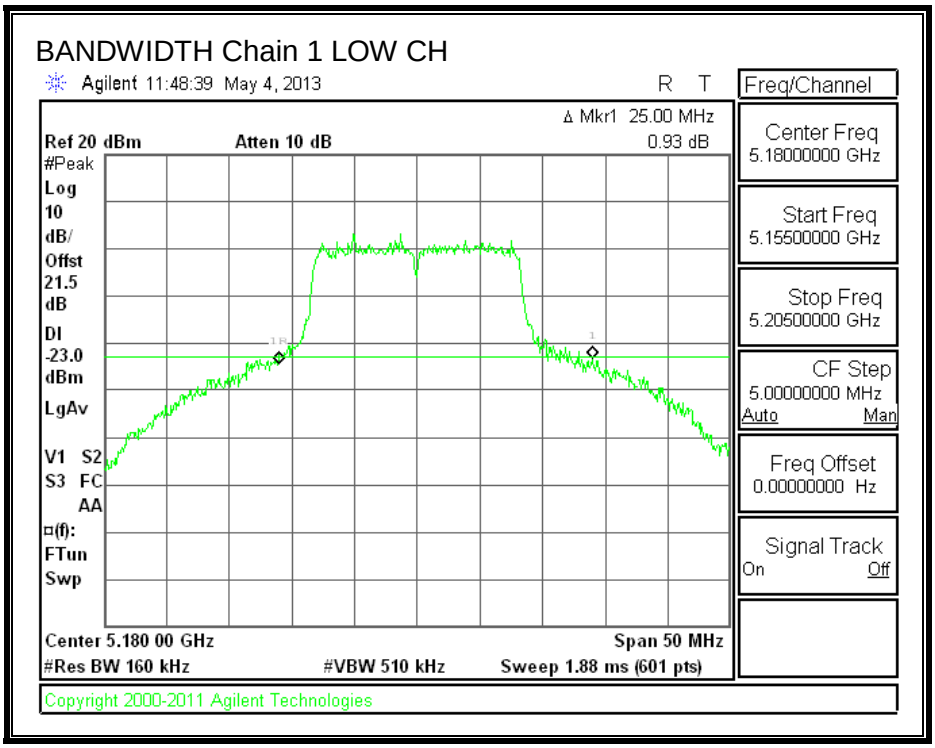
26 dB BANDWIDTH, Chain 0



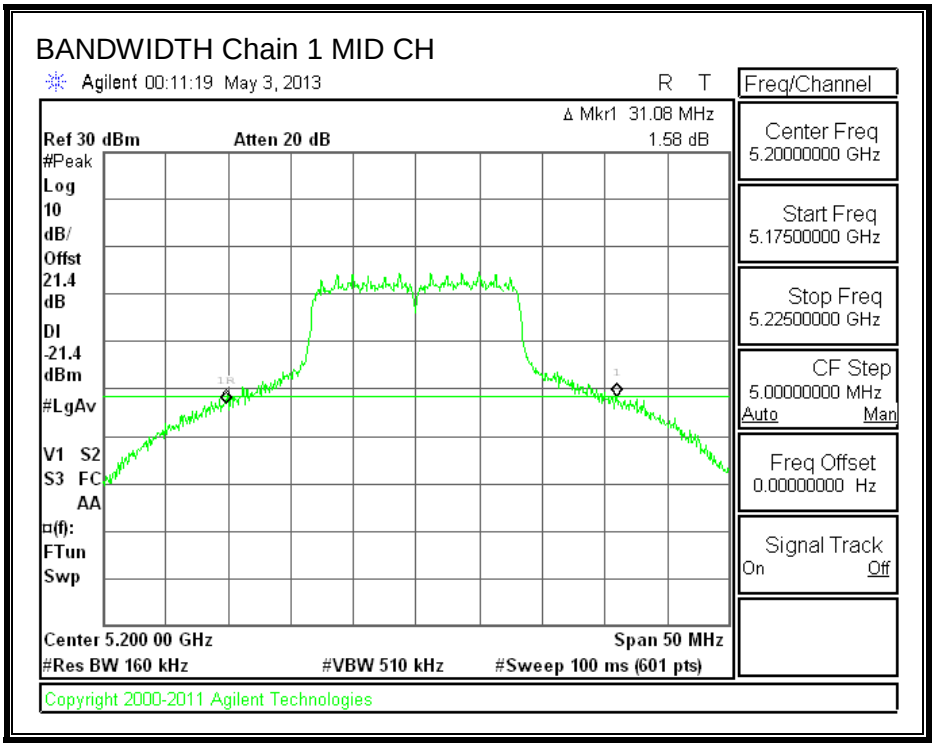




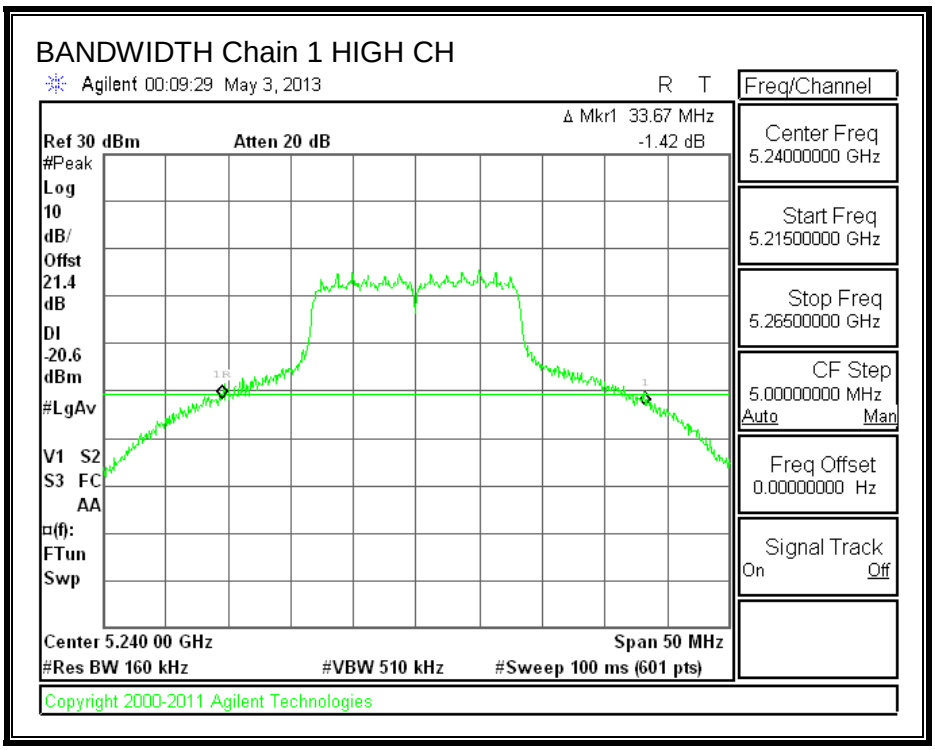
26 dB BANDWIDTH, Chain 1



BANDWIDTH Chain 1 MID CH



BANDWIDTH Chain 1 HIGH CH



8.1.2. 99% BANDWIDTH

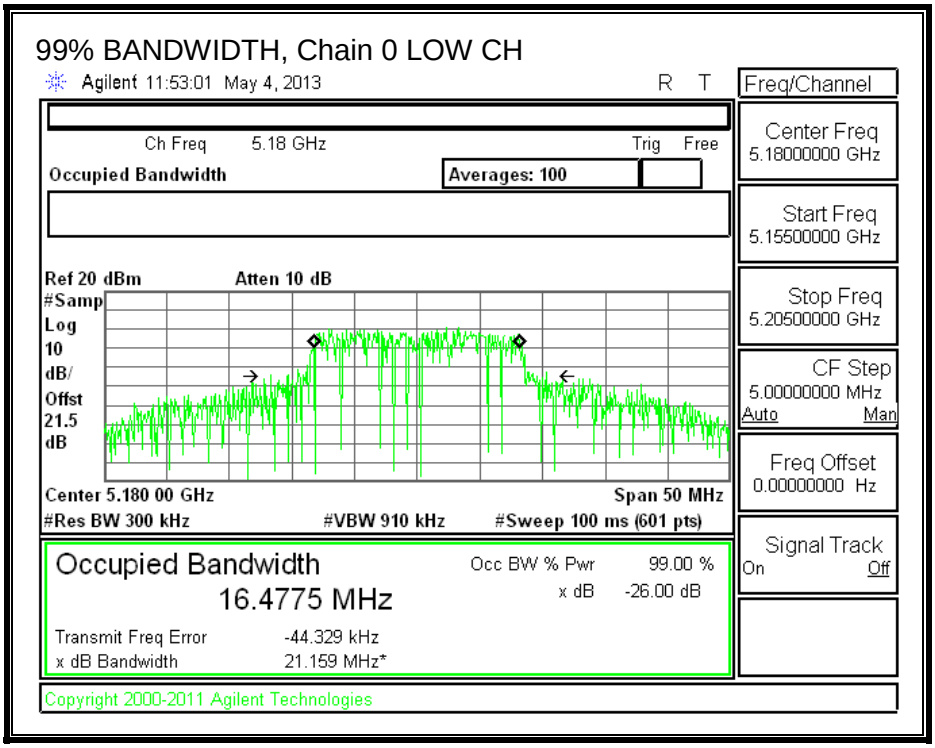
LIMITS

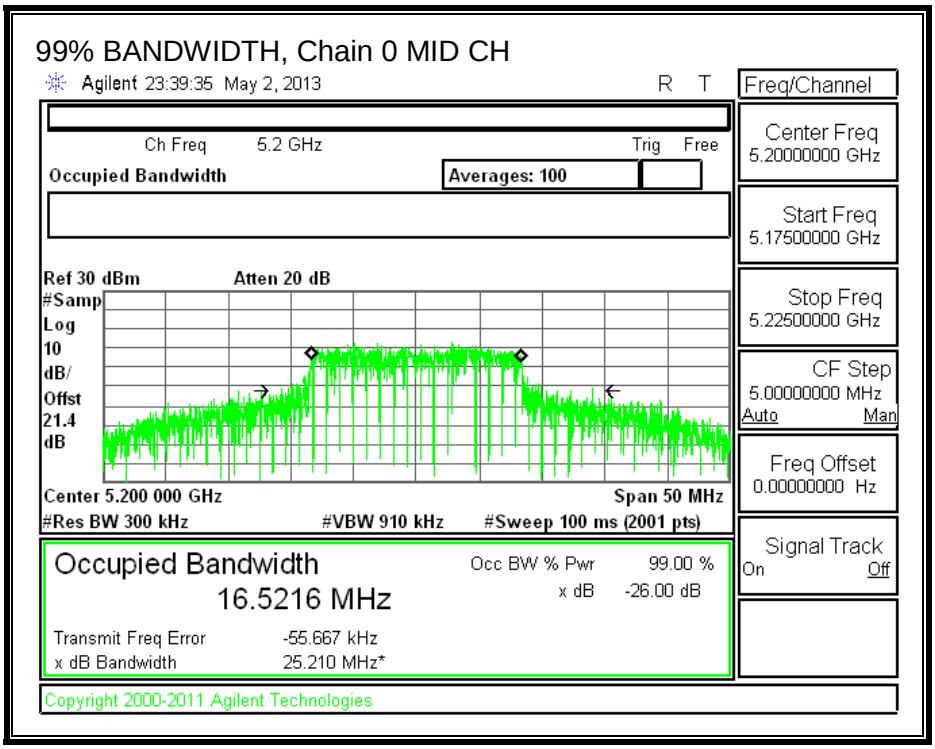
None; for reporting purposes only.

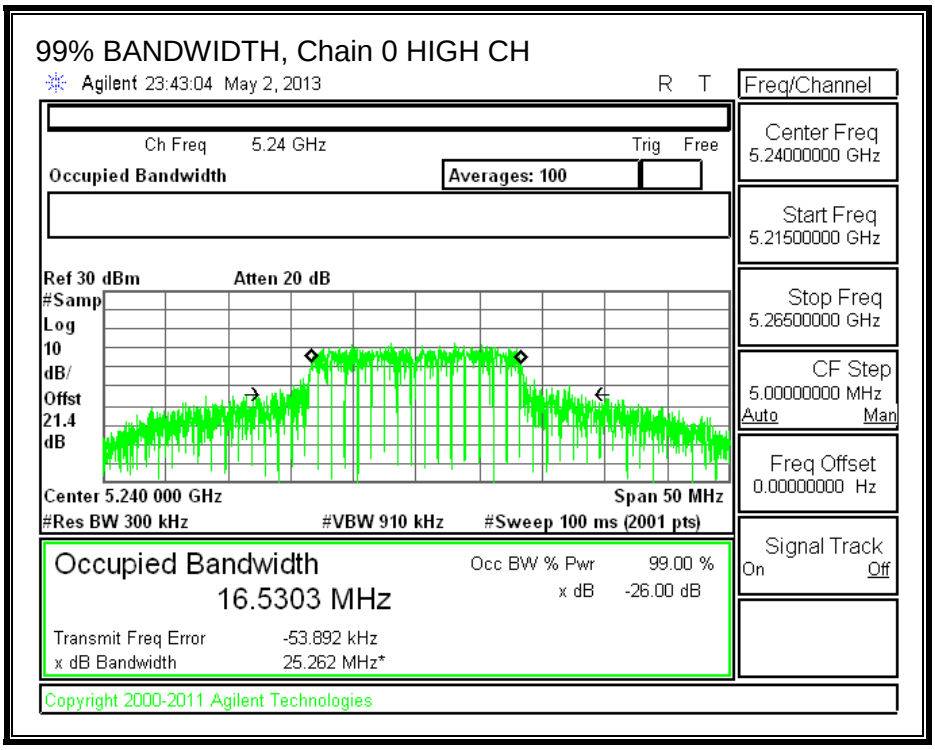
RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	5180	16.4775	16.4910
Mid	5200	16.5216	16.5604
High	5240	16.5303	16.6073

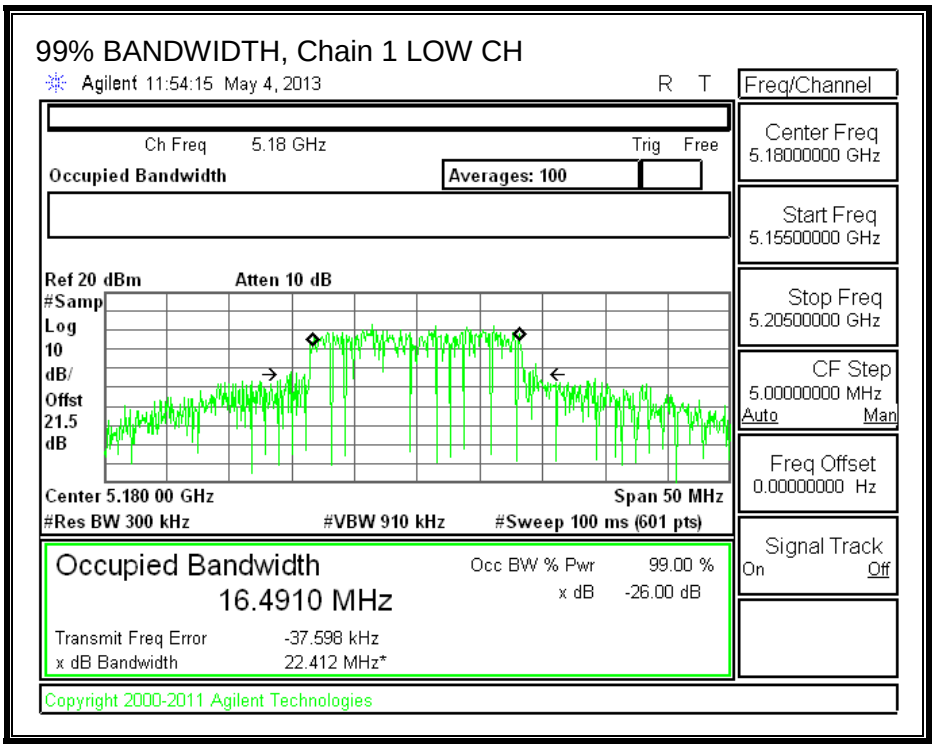
99% BANDWIDTH, Chain 0



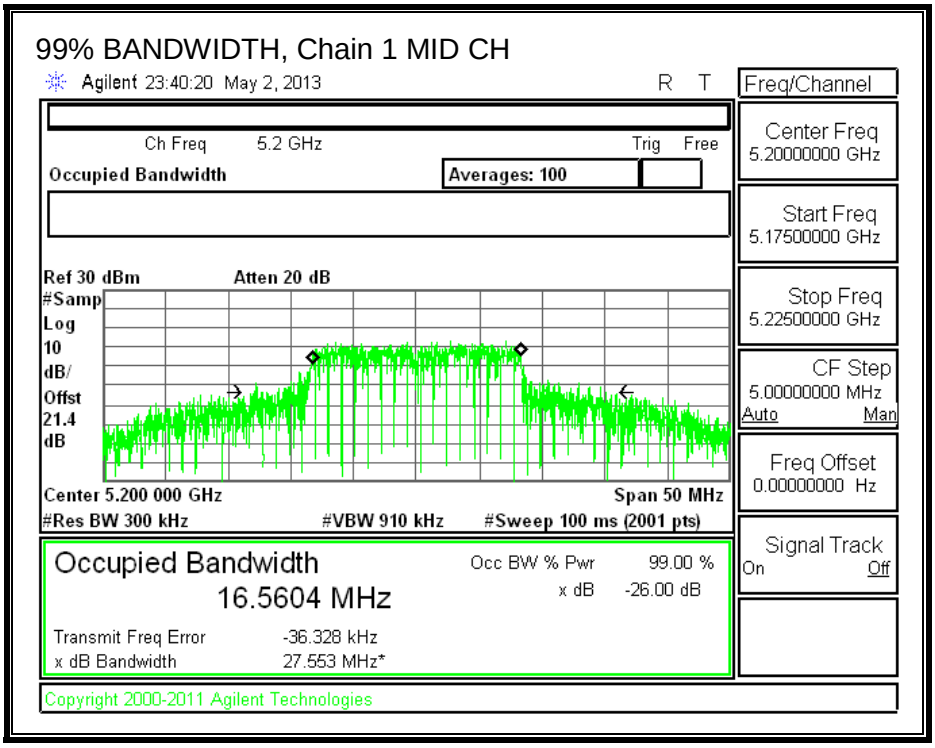




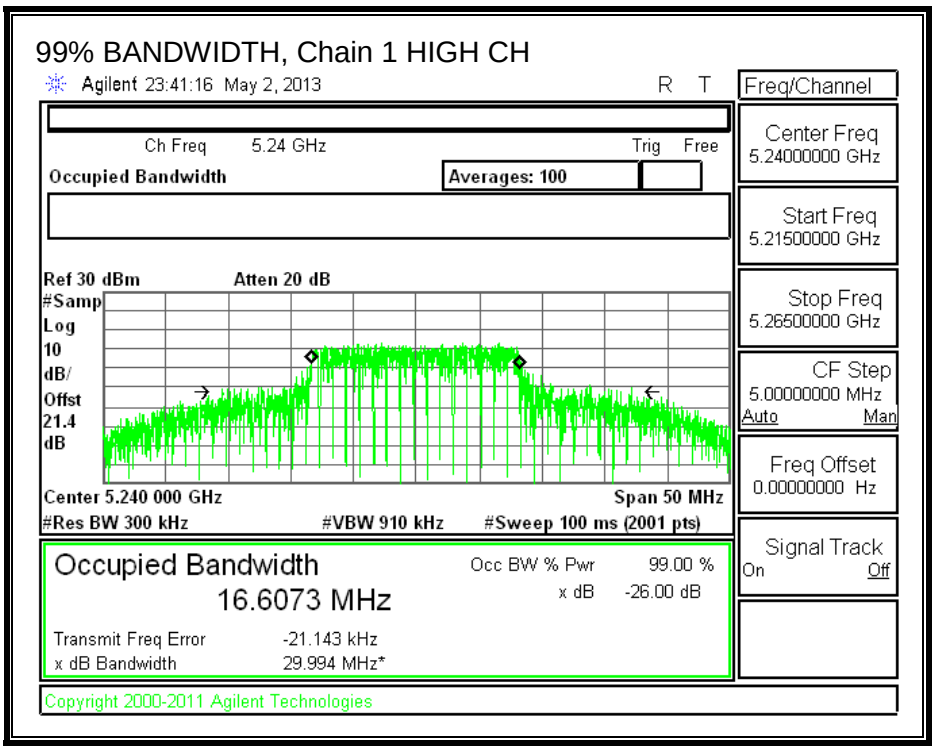
99% BANDWIDTH, Chain 1



99% BANDWIDTH, Chain 1 MID CH



99% BANDWIDTH, Chain 1 HIGH CH



8.1.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 25.46 dB (including two 10 dB pads, 2.06dB cable, and 3.4dB power splitter) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	5180	11.80	12.60	15.23
Mid	5200	11.55	12.80	15.23
High	5240	11.05	13.00	15.14

8.1.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

For output power, the two chains are considered uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
2.00	2.00	2.00

For PSD, the two chains are considered correlated and the antenna gain is unequal among the chains. The directional gain is:

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Correlated Chains Directional Gain (dBi)
2.00	2.00	5.01

Worst-case correlated antenna gain of 5.01 dBi was used in the output power and PSD table.

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5180	22.92	16.4775	5.01
Mid	5200	28.45	16.5216	5.01
High	5240	30.00	16.5303	5.01

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC EIRP Limit (dBm)	Max IC Power (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC eirp PSD Limit (dBm)	PPSD Limit (dBm)
Low	5180	17.00	22.17	17.16	17.00	4.00	10.00	4.00
Mid	5200	17.00	22.18	17.17	17.00	4.00	10.00	4.00
High	5240	17.00	22.18	17.17	17.00	4.00	10.00	4.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PPSD

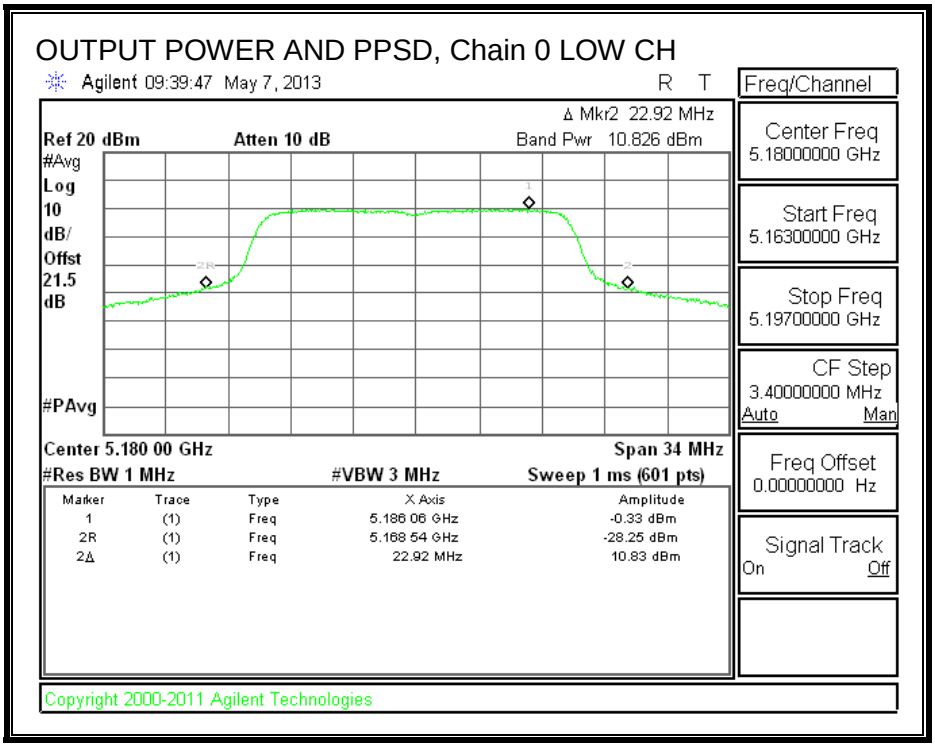
Output Power Results

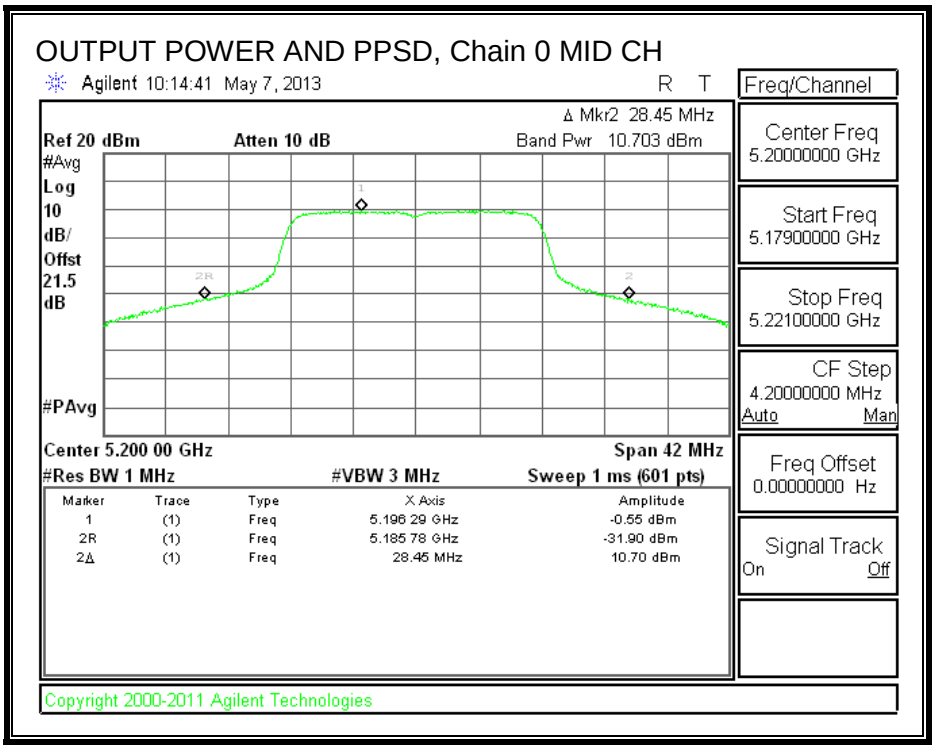
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	10.826	11.748	14.322	17.00	-2.678
Mid	5200	10.703	12.073	14.452	17.00	-2.548
High	5240	10.171	12.153	14.284	17.00	-2.716

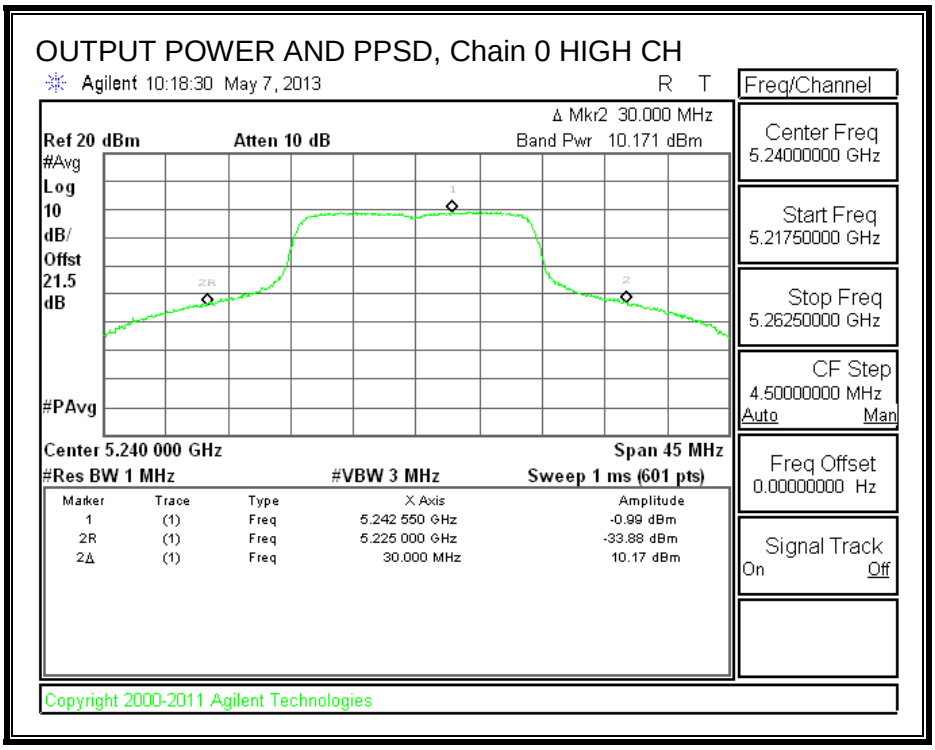
PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Chain 1 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5180	-0.33	0.80	3.28	4.00	-0.72
Mid	5200	-0.55	1.05	3.33	4.00	-0.67
High	5240	-0.99	0.97	3.11	4.00	-0.89

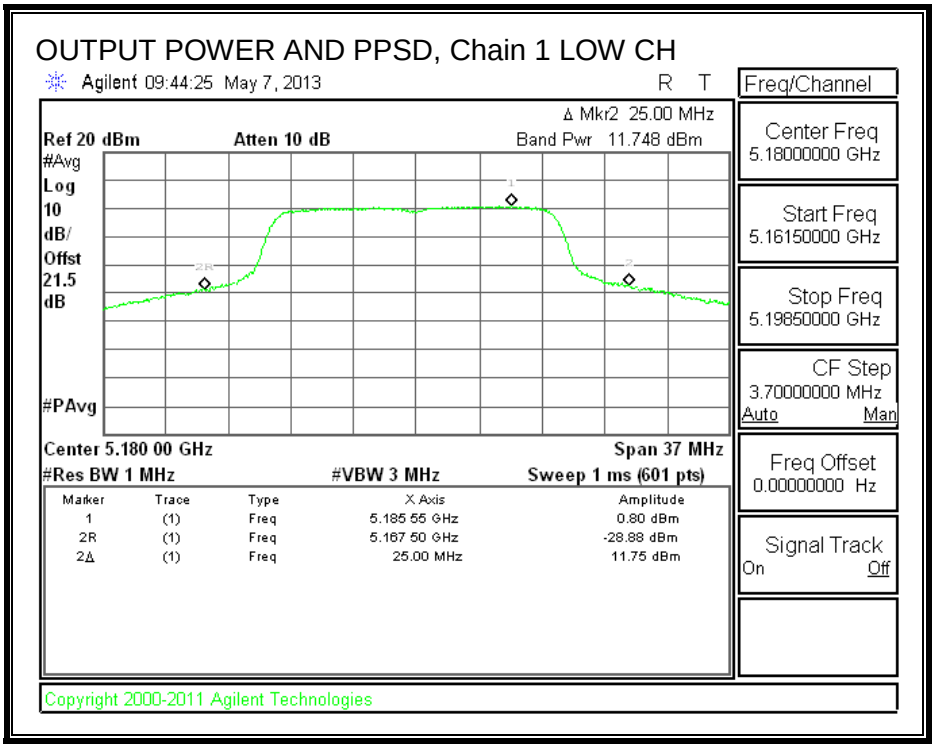
OUTPUT POWER AND PPSD, Chain 0

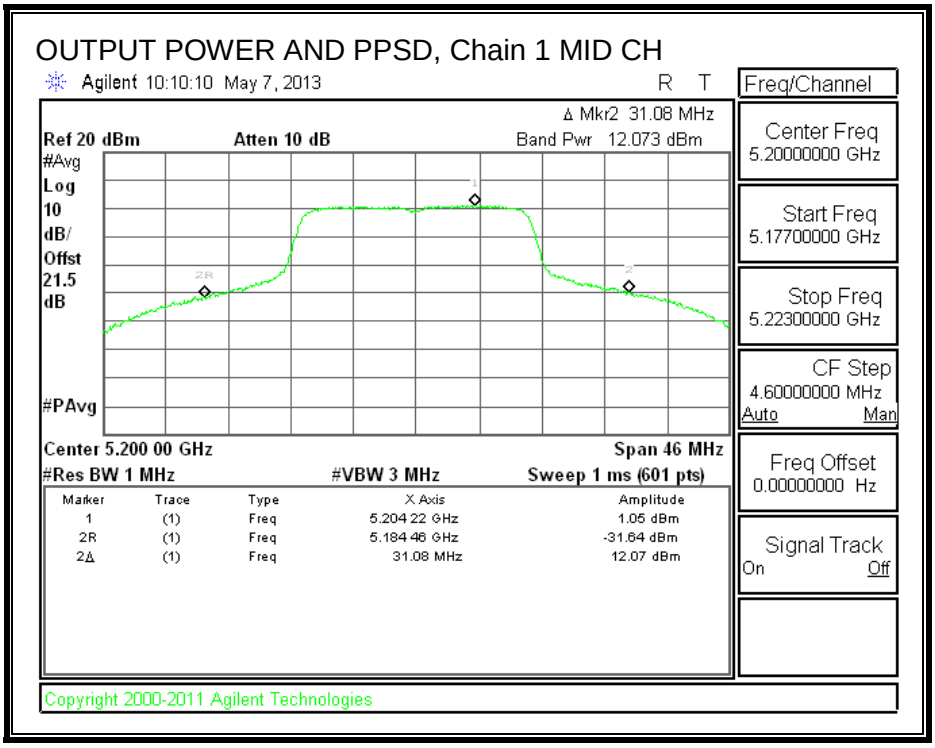


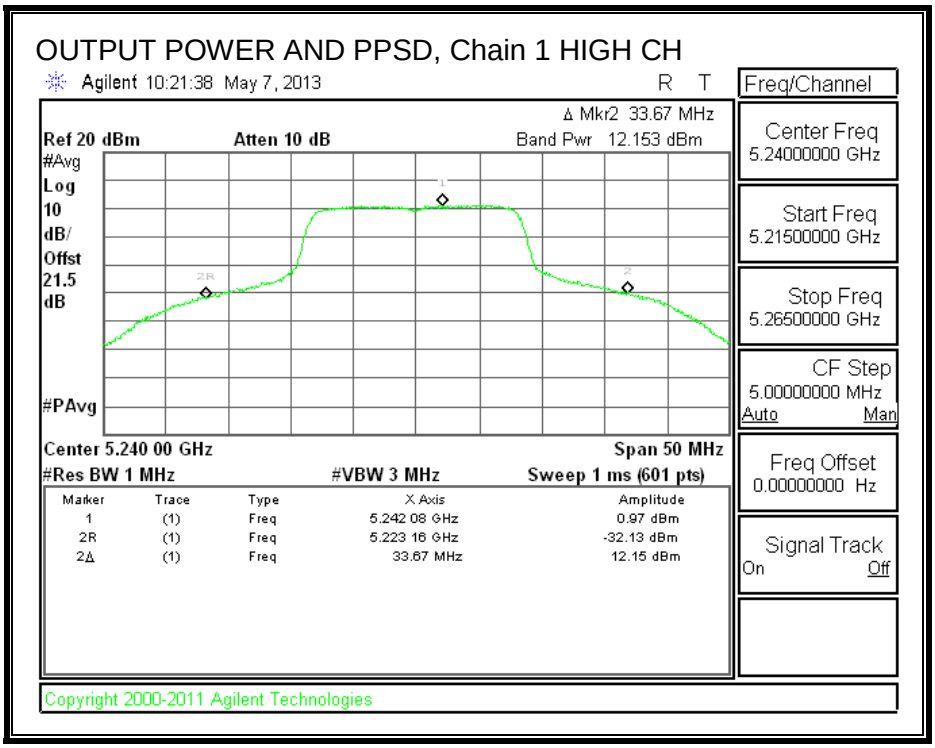




OUTPUT POWER AND PPSD, Chain 1







8.1.5. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

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

RESULTS

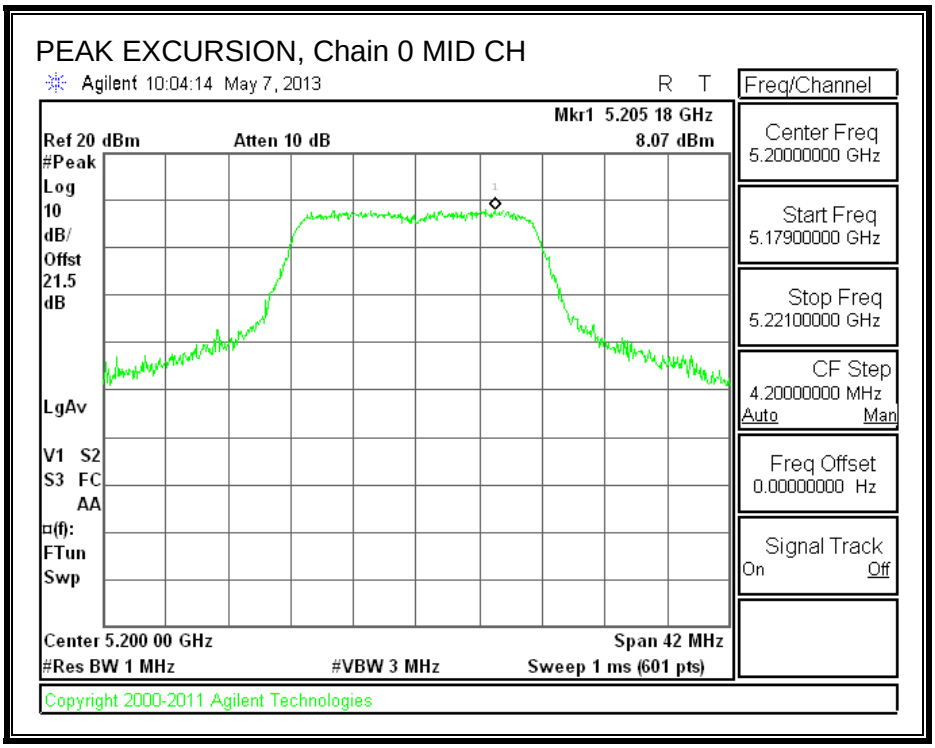
Chain 0

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Mid	5200	8.07	-0.55	0.00	8.62	13	-4.38

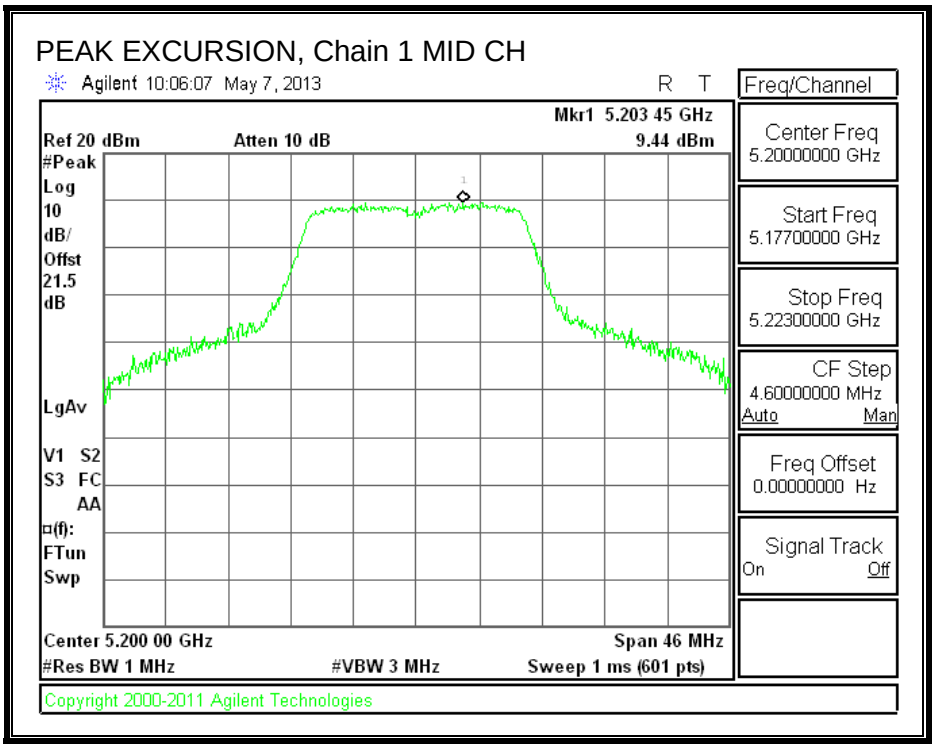
Chain 1

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Mid	5200	9.44	1.05	0.00	8.39	13	-4.61

PEAK EXCURSION, Chain 0

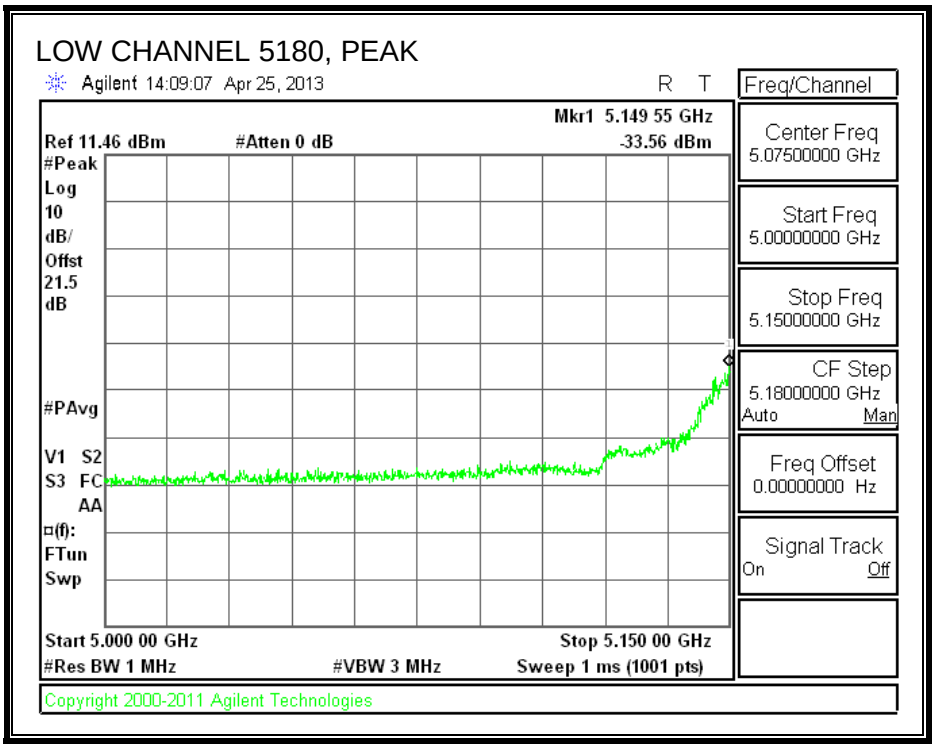


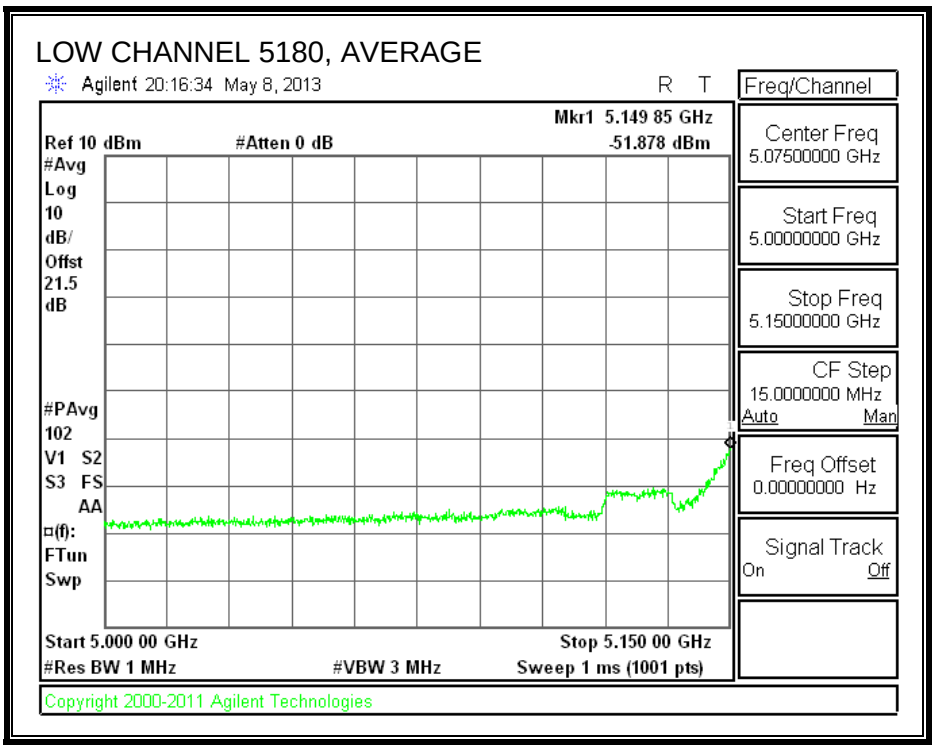
PEAK EXCURSION, Chain 1



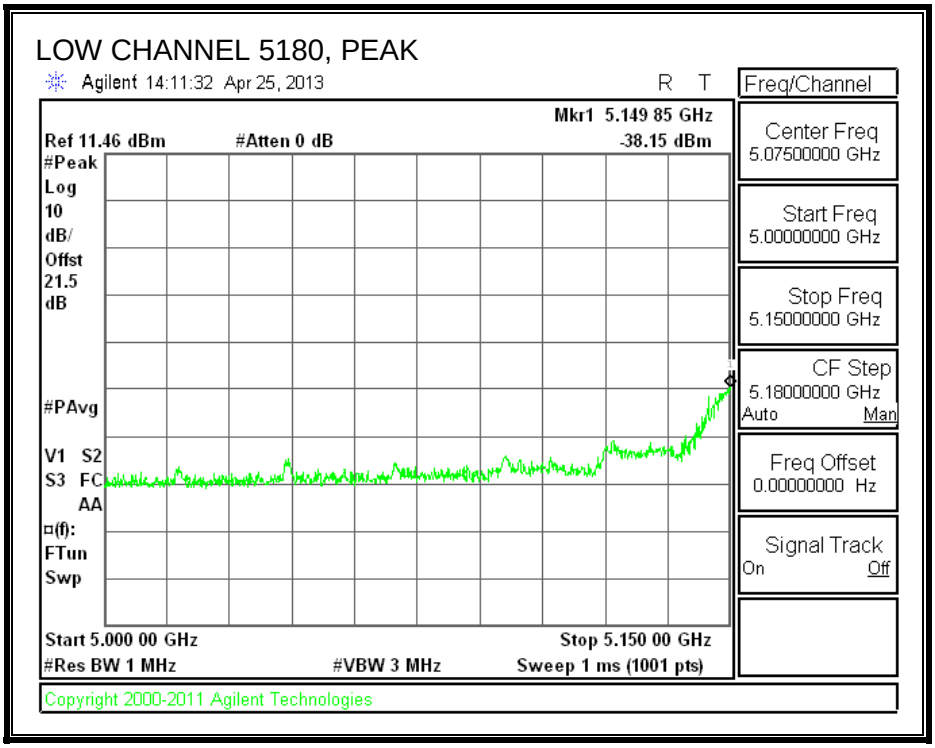
8.1.6. CONDUCTED BANDEDGE, HARMONICS & SPURIOUS (no filter unit)

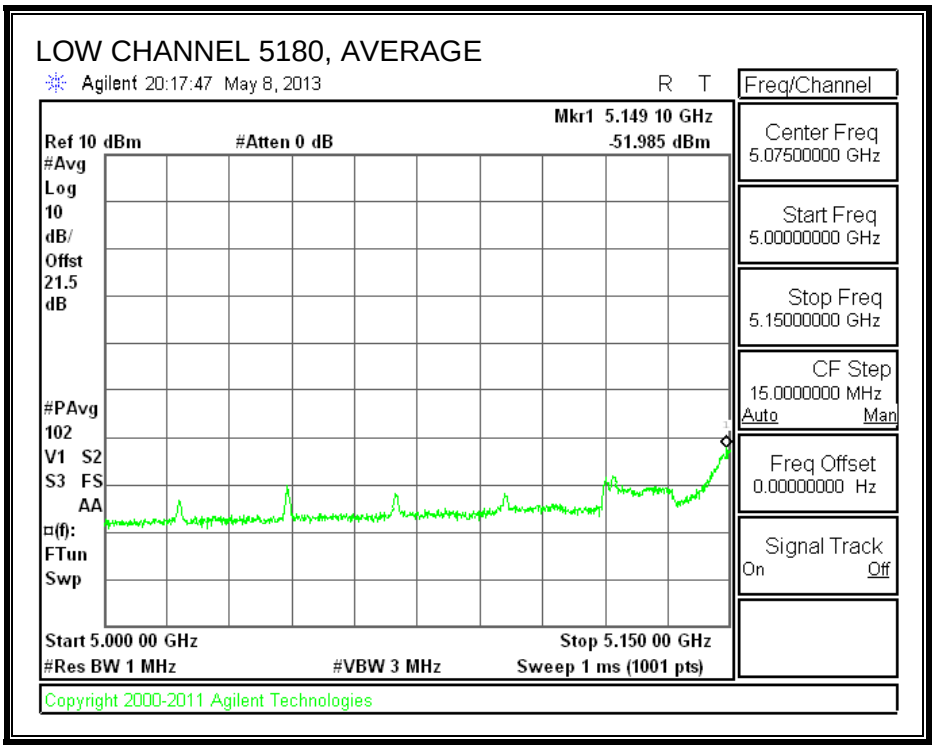
Chain 0
RESTRICTED BANDEDGE





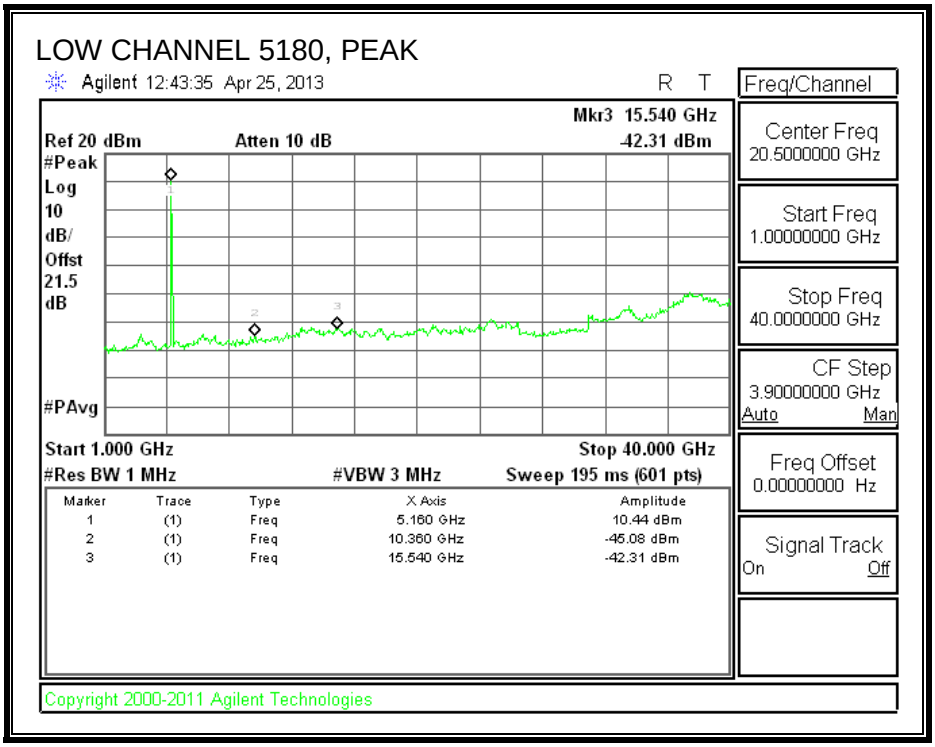
Chain 1

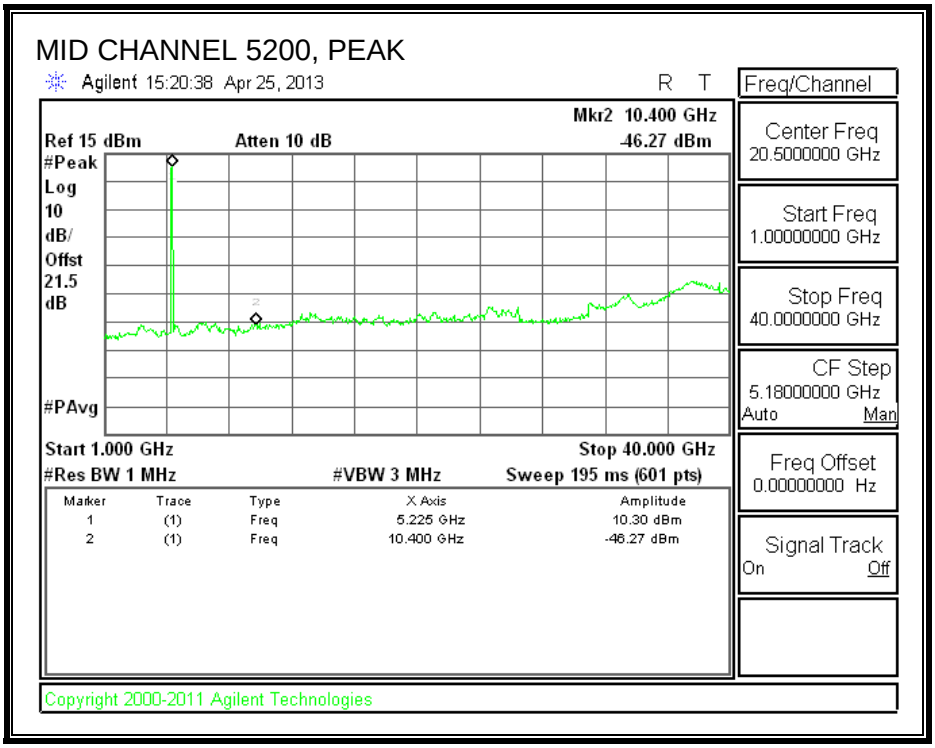


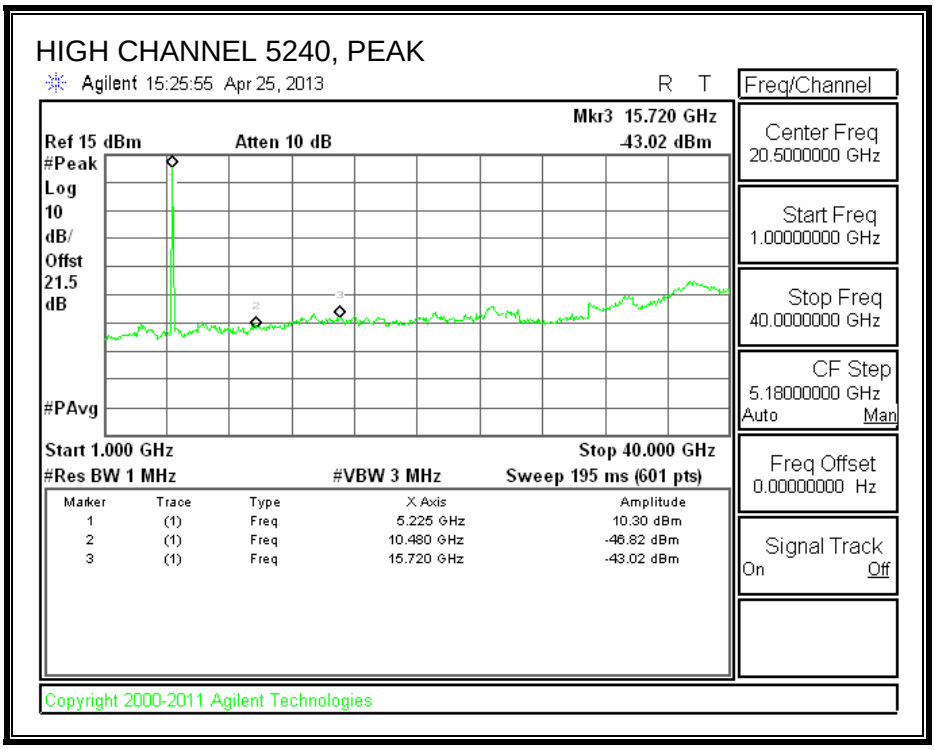


HARMONICS AND SPURIOUS

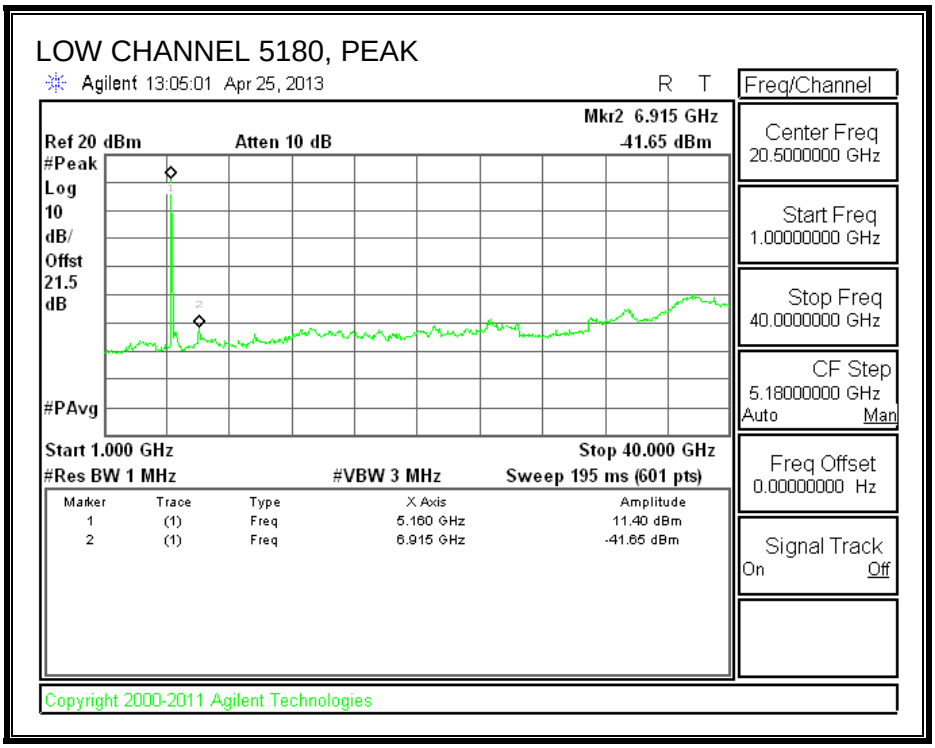
Chain 0



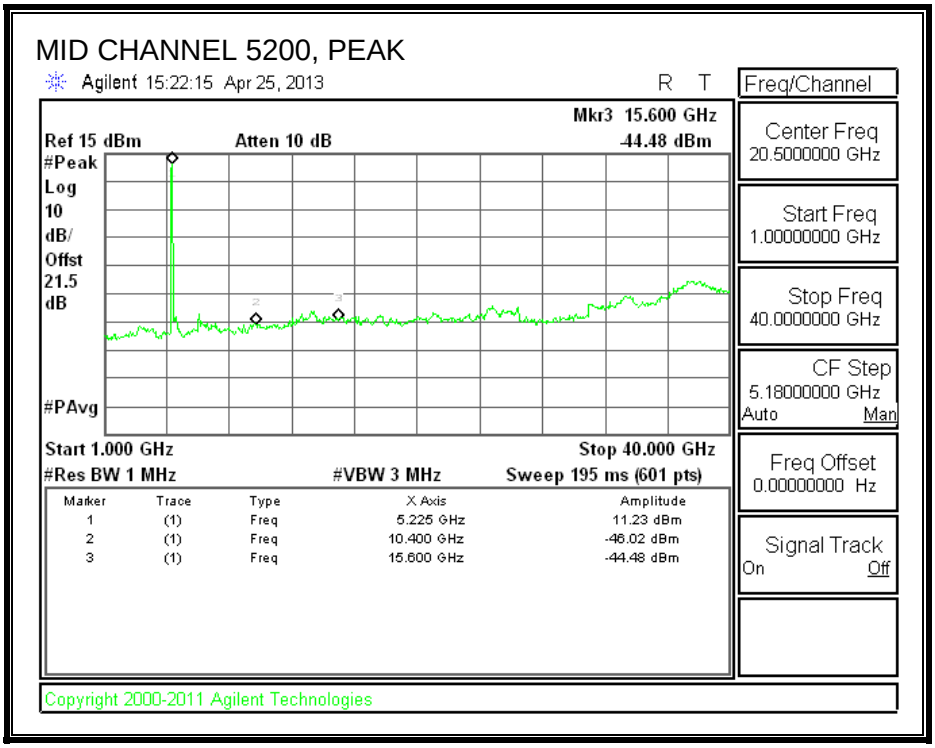




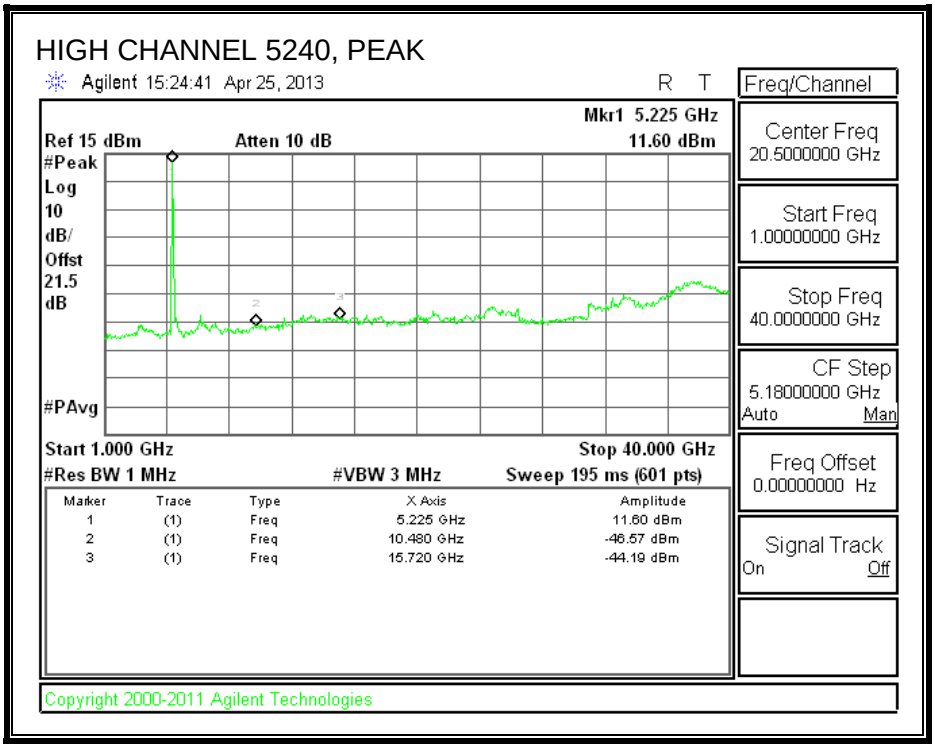
Chain 1



MID CHANNEL 5200, PEAK



HIGH CHANNEL 5240, PEAK



BANDEDGE DATA

2TX Conducted Spurious BE for UNII (in the restricted bands)

Date:	5/9/2013
Test Engineer:	Tony Wagoner
Client:	Qualcomm
Project Number:	13U14995
Configuration:	Tx
Mode of operation:	11a 5.2GHz

Note: if the PK margin is greater than 20 dB, there is no need to get AVG reading.

Channel	Frequency (MHz)	PXA PK Reading Chain 0 (dBm)	PXA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
36 (5180)	5149	-33.56	-38.15	2	-27.25	-21.2	-6.05	17.00	14.5 / 14.65

Channel	Frequency (MHz)	PXA AVG Reading Chain 0 (dBm)	PXA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
36 (5180)	5149	-51.878	-51.985	2	-43.91	-41.2	-2.71	16.50	13.1 / 13.75

SPURIOUS DATA

The data in this table is from testing done at the harmonics shown in the plots with the span of 1MHz.

2TX Conducted Spurious for FCC DTS (in the restricted bands)

Date:	4/25/2013
Test Engineer:	T. Wagoner
Client:	Qualcomm Atheros
Project Number:	13u14995
Configuration:	5.2GHz 11a
Mode of operation:	Tx

Note: if the PK margin is greater than 20 dB, there is no need to get AVG reading.

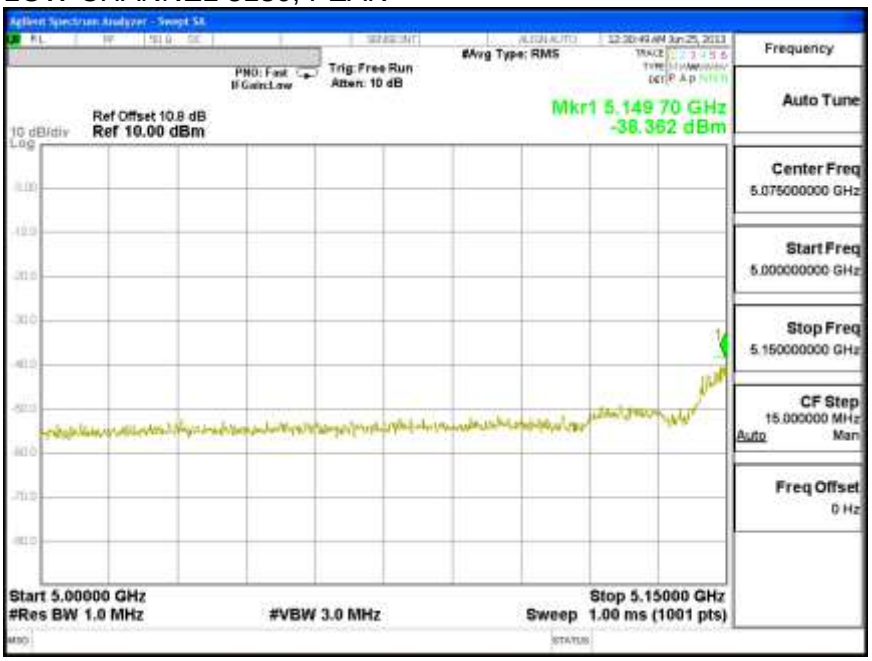
Channel	Frequency (MHz)	PSA PK Reading Chain 0 (dBm)	PSA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
36 (5180)	6915	-53.84	-53.04	2	-45.40	-21.2	-24.20	17.00	15.4 / 15.4
36 (5180)	10.36	-54.57	-52.19	2	-45.20	-21.2	-24.00	17.00	15.4 / 15.4
36 (5180)	15.54	-52.47	-52.06	2	-44.24	-21.2	-23.04	17.00	15.4 / 15.4
40 (5200)	10.4	-55.94	-55.22	2	-47.54	-21.2	-26.34	17.00	15.3 / 16
40 (5200)	15.6	-52.49	-51.71	2	-44.06	-21.2	-22.86	17.00	15.3 / 16
48 (5240)	10.48	-55.59	-55.7	2	-47.62	-21.2	-26.42	17.00	15.3/ 16.6
48 (5240)	15.72	-51.99	-53.06	2	-44.47	-21.2	-23.27	17.00	15.3/ 16.6

Channel	Frequency (MHz)	PSA AVG Reading Chain 0 (dBm)	PSA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)

8.1.7. CONDUCTED BANDEDGE, HARMONICS & SPURIOUS (3G filter unit)

Chain 0
RESTRICTED BANDEDGE

LOW CHANNEL 5180, PEAK

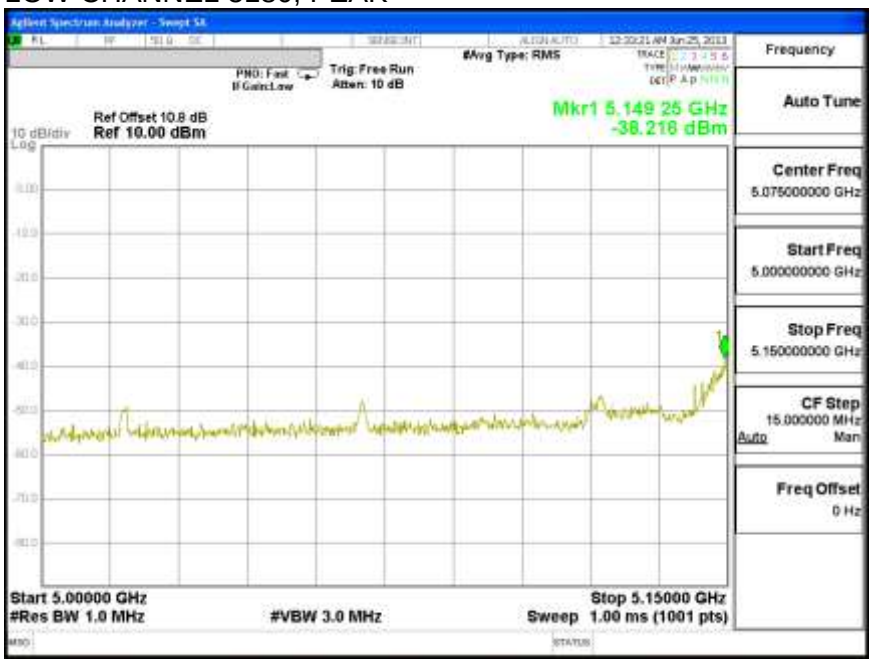


LOW CHANNEL 5180, AVERAGE

Chain 1

RESTRICTED BANDEDGE

LOW CHANNEL 5180, PEAK



LOW CHANNEL 5180, AVERAGE

BANDEDGE DATA

2TX Conducted Spurious BE for UNII (in the restricted bands)

Date:	6/25/2013
Test Engineer:	Tony Wagoner
Client:	Qualcomm
Project Number:	13U14995
Configuration:	Tx
Mode of operation:	11a 5.2GHz

Note: if the PK margin is greater than 20 dB, there is no need to get AVG reading.

Channel	Frequency (MHz)	PXA PK Reading Chain 0 (dBm)	PXA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
36 (5180)	5149	-38.362	-38.216	2	-30.27	-21.2	-9.07	15.00	11.8/12.6

Channel	Frequency (MHz)	PXA AVG Reading Chain 0 (dBm)	PXA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
36 (5180)	5150	-51.872	-51.323	2	-43.57	-41.2	-2.37	15.00	11.8/12.6

8.2. 802.11n HT20 MODE IN THE 5.2 GHz BAND

8.2.1. 26 dB BANDWIDTH

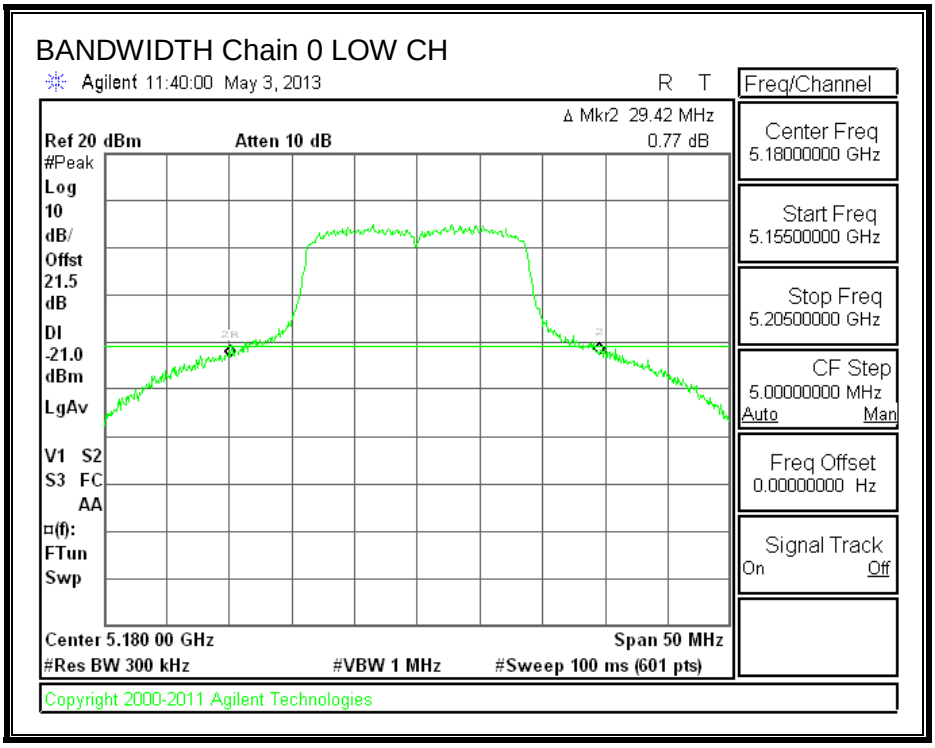
LIMITS

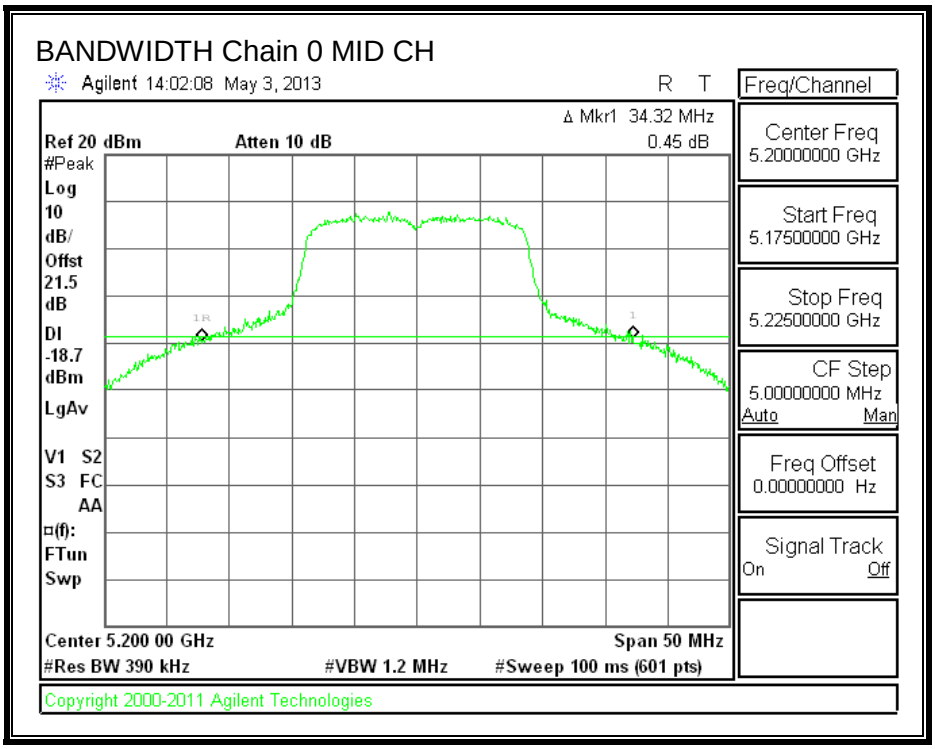
None; for reporting purposes only.

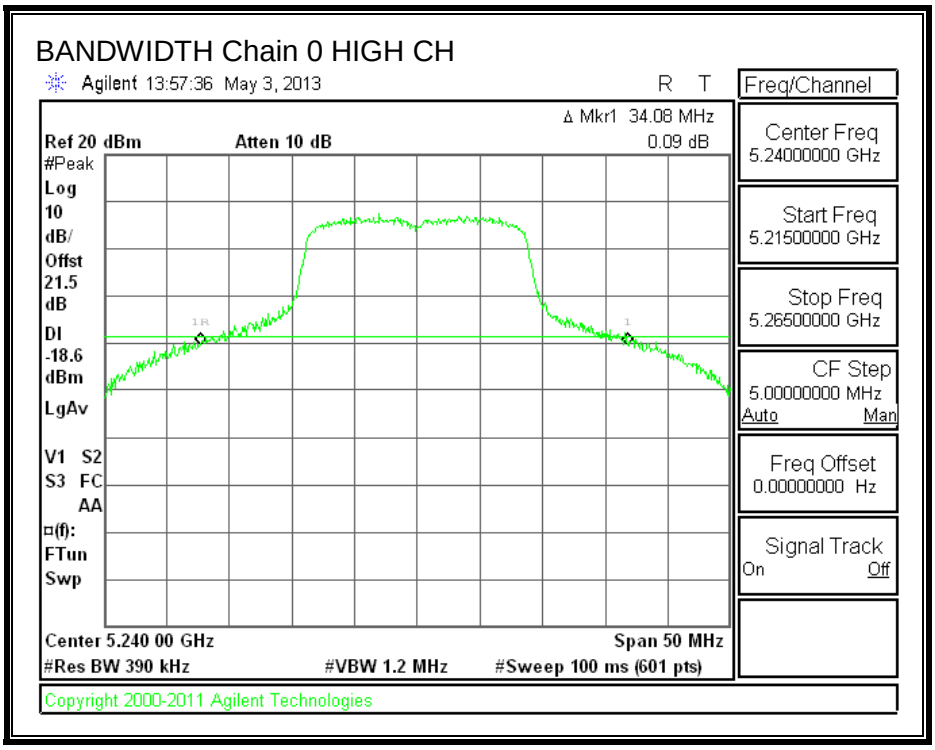
RESULTS

Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5180	29.42	31.83
Mid	5200	34.32	35.67
High	5240	34.08	42.10

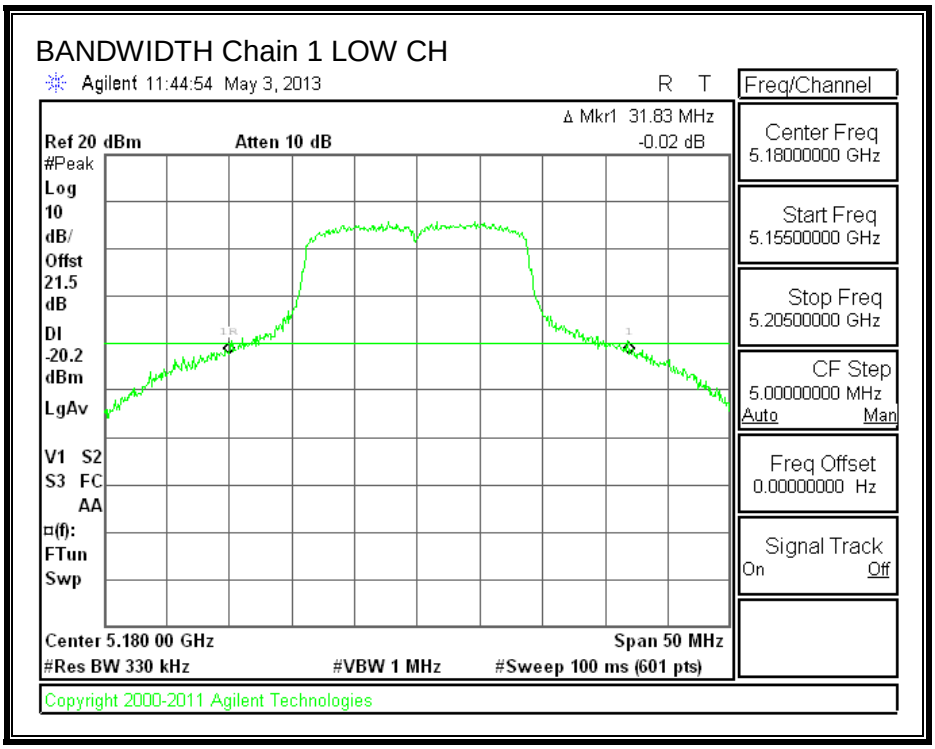
26 dB BANDWIDTH, Chain 0



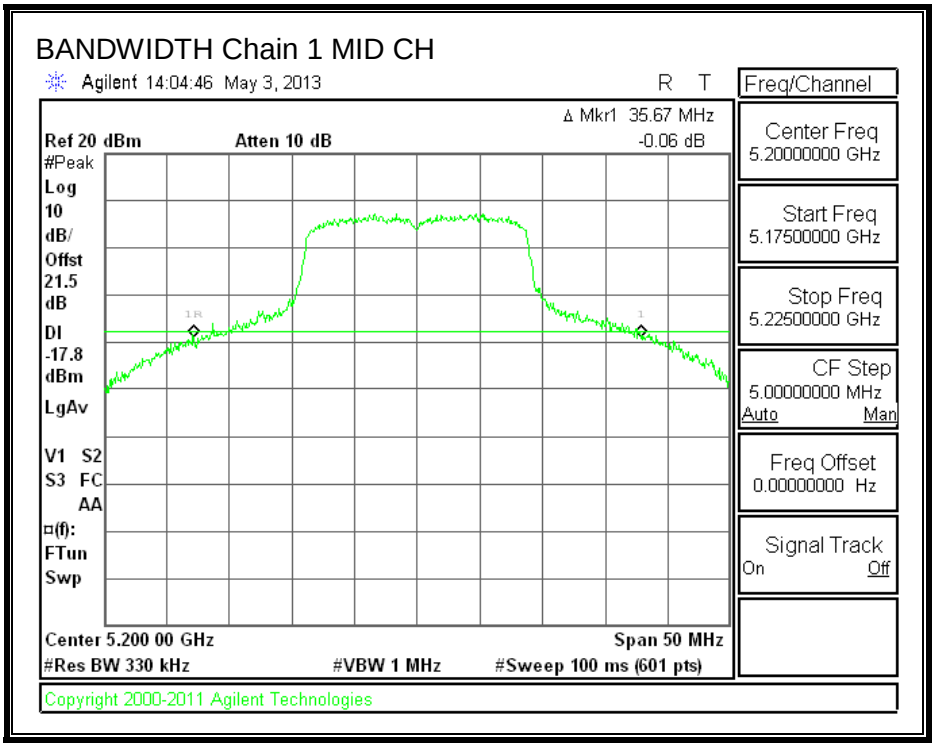




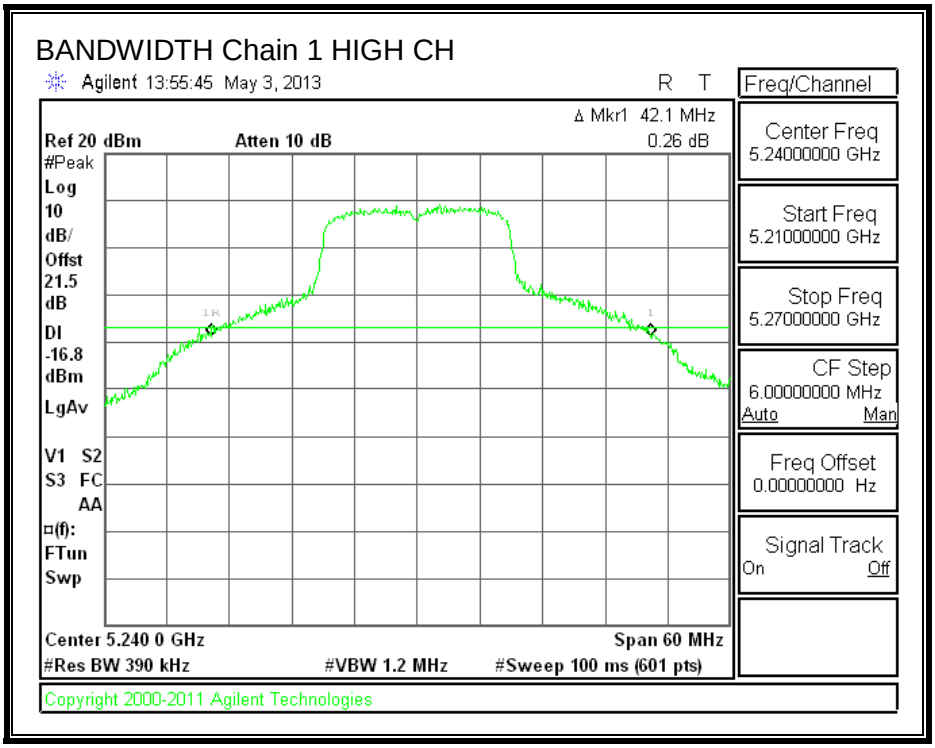
26 dB BANDWIDTH, Chain 1



BANDWIDTH Chain 1 MID CH



BANDWIDTH Chain 1 HIGH CH



8.2.2. 99% BANDWIDTH

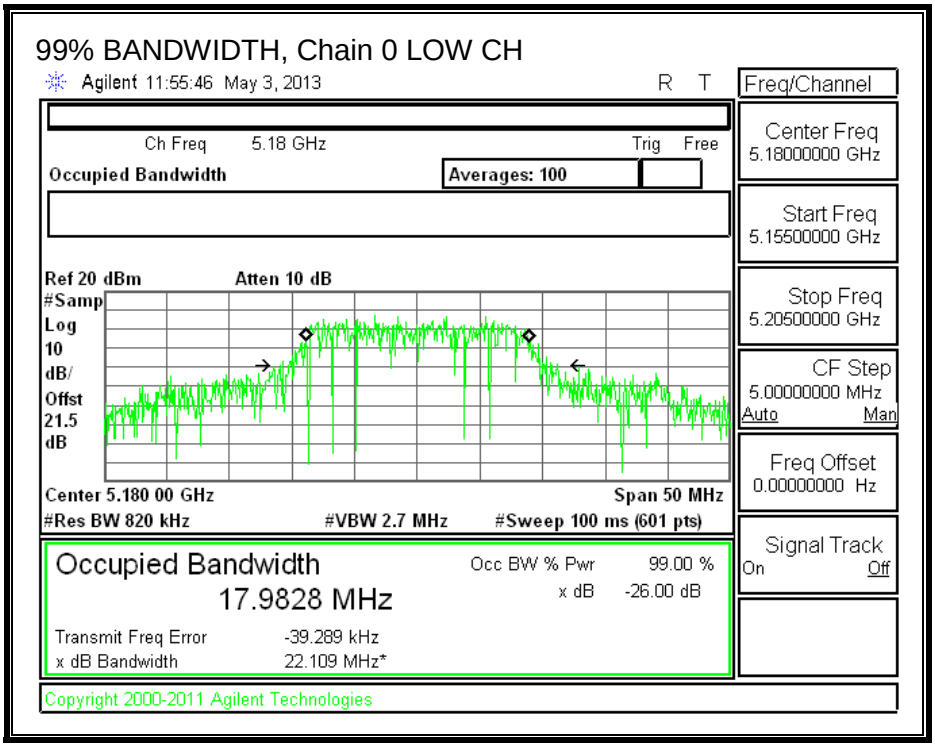
LIMITS

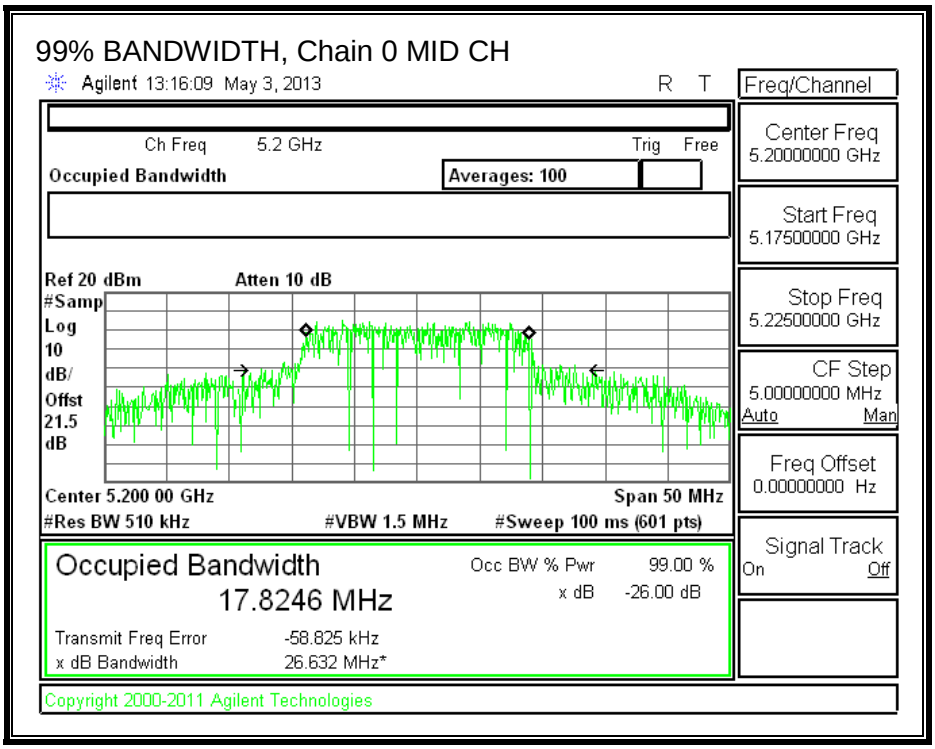
None; for reporting purposes only.

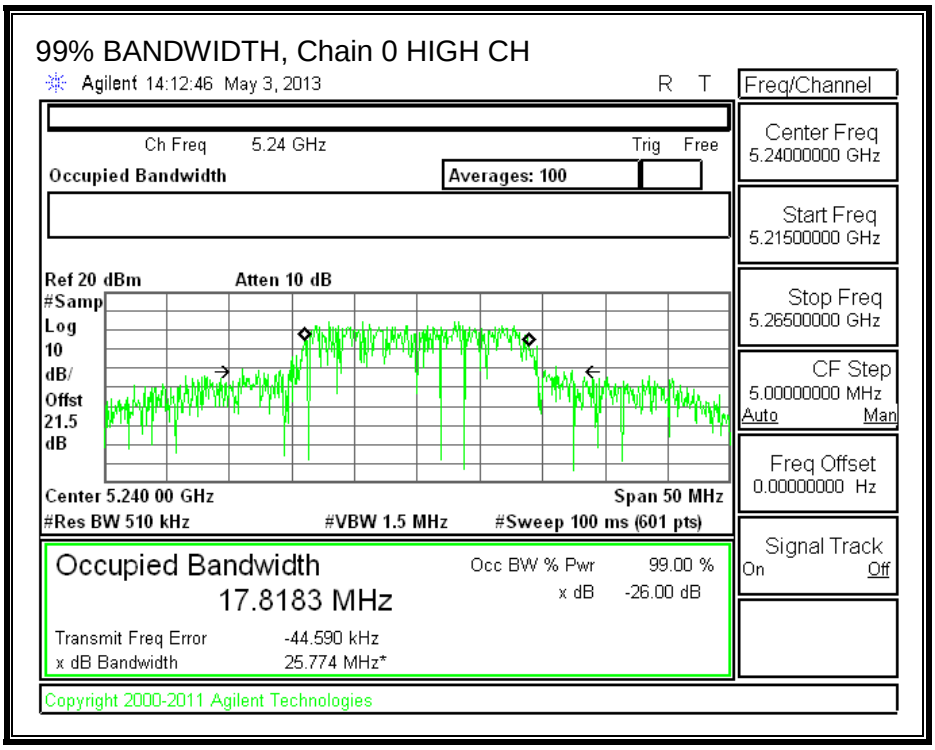
RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	5180	17.9828	18.0374
Mid	5200	17.8246	17.8977
High	5240	17.8183	18.0259

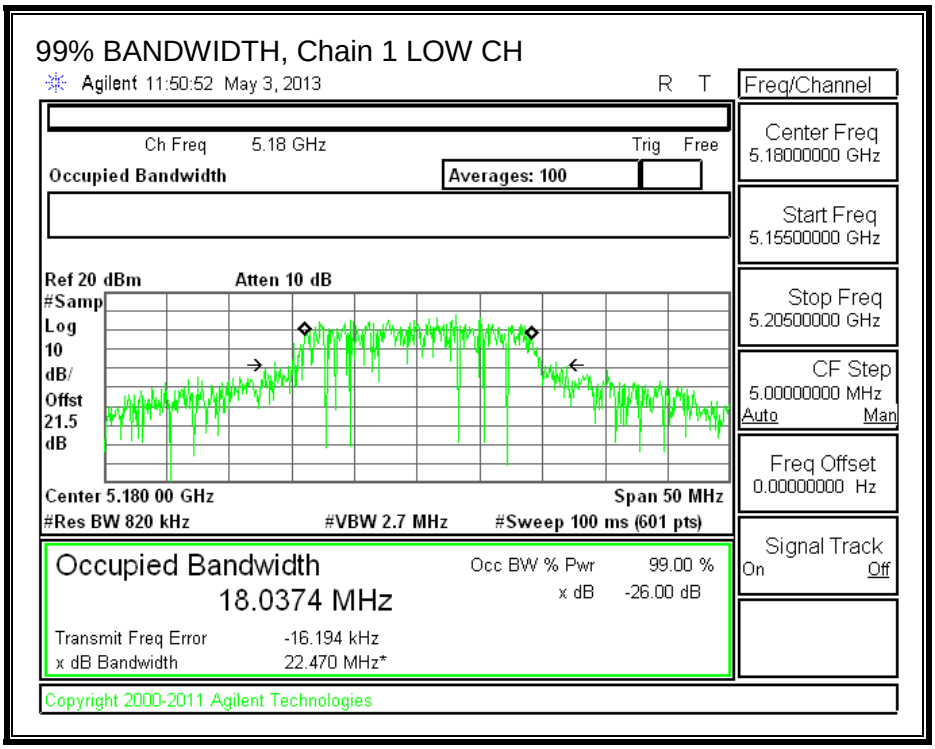
99% BANDWIDTH, Chain 0

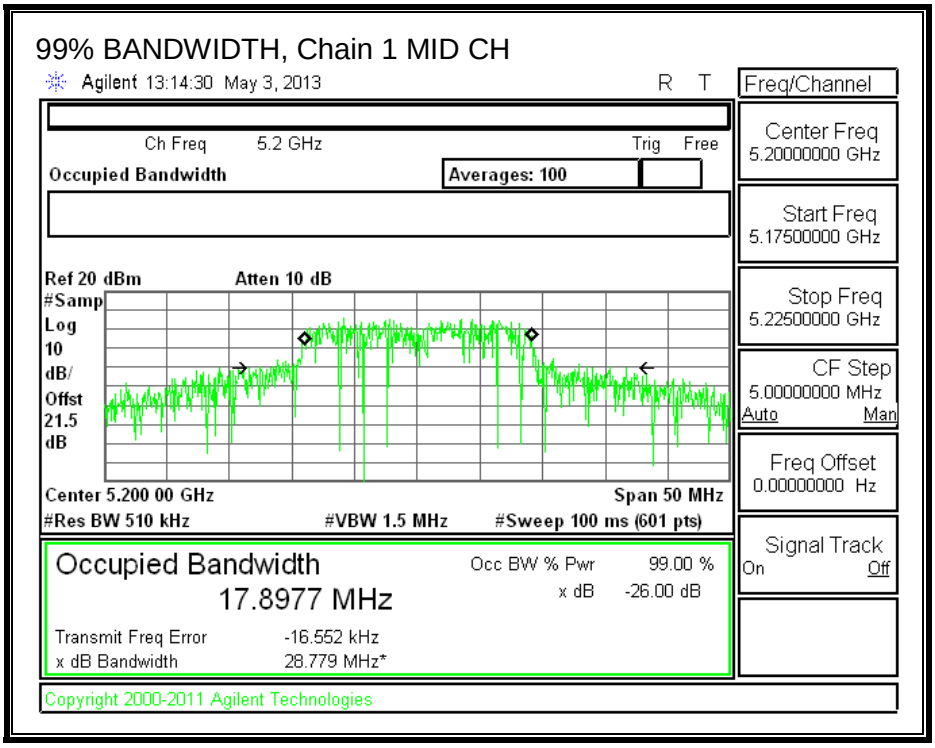


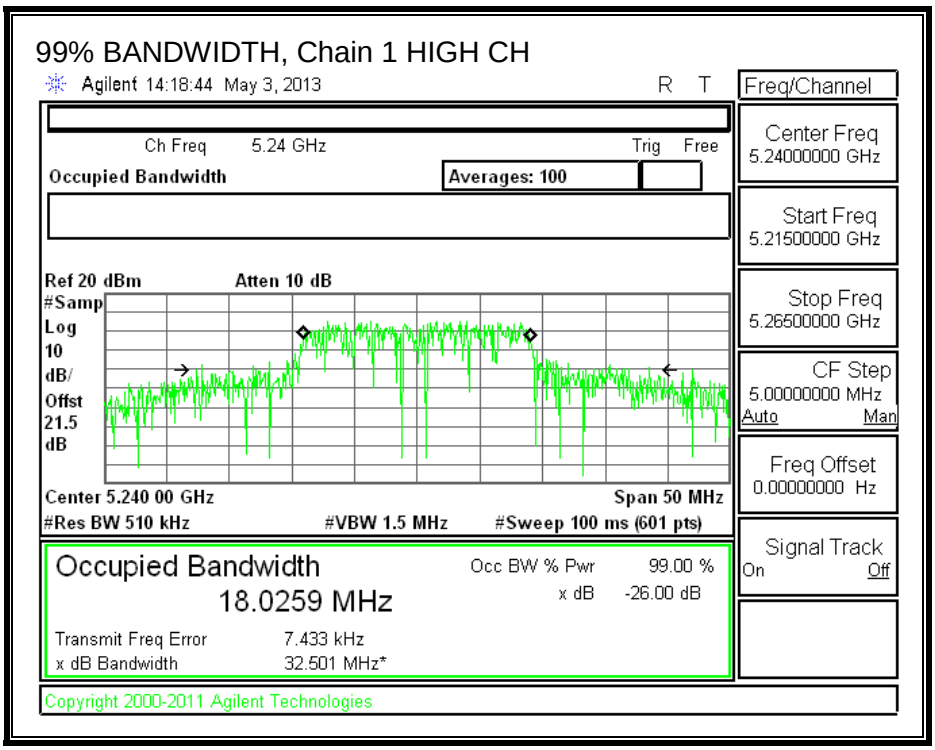




99% BANDWIDTH, Chain 1







8.2.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 25.46 dB (including two 10 dB pads, 2.06dB cable, and 3.4dB power splitter) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	5180	11.6	12.4	15.03
Mid	5200	11.4	12.6	15.05
High	5240	10.9	12.85	14.99

8.2.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

For output power, the two chains are considered uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
2.00	2.00	2.00

For PSD, the two chains are considered correlated and the antenna gain is unequal among the chains. The directional gain is:

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Correlated Chains Directional Gain (dBi)
2.00	2.00	5.01

Worst-case correlated antenna gain of 5.01 dBi was used in the output power and PSD table.

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5180	29.42	17.9828	5.01
Mid	5200	34.32	17.8246	5.01
High	5240	34.08	17.8183	5.01

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC EIRP Limit (dBm)	Max IC Power (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC eirp PSD Limit (dBm)	PPSD Limit (dBm)
Low	5180	17.00	22.55	17.54	17.00	4.00	10.00	4.00
Mid	5200	17.00	22.51	17.50	17.00	4.00	10.00	4.00
High	5240	17.00	22.51	17.50	17.00	4.00	10.00	4.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PPSD

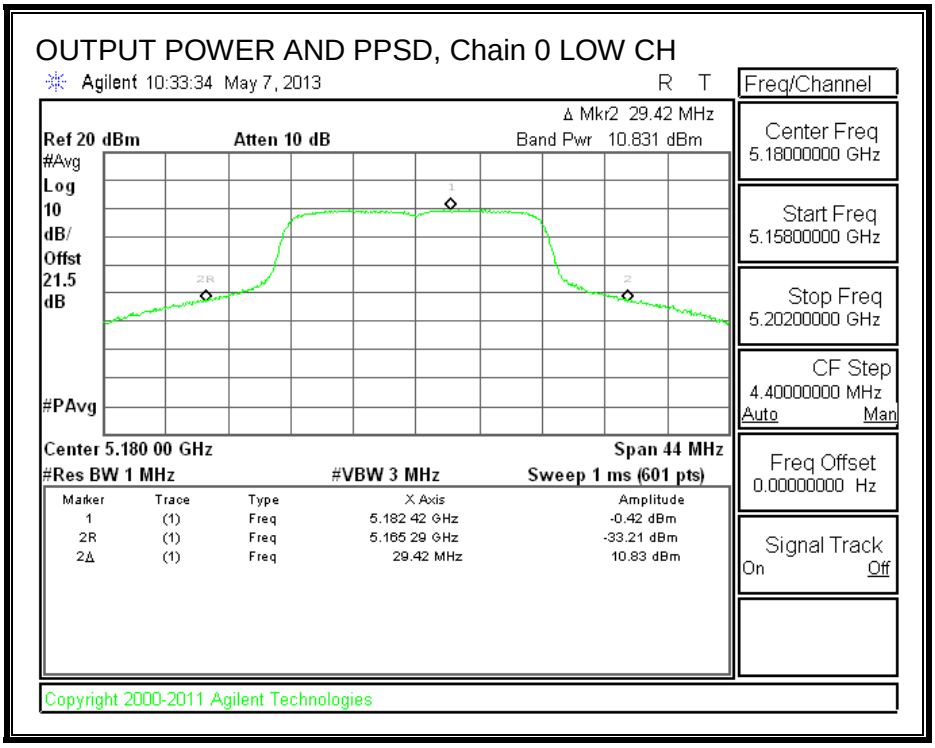
Output Power Results

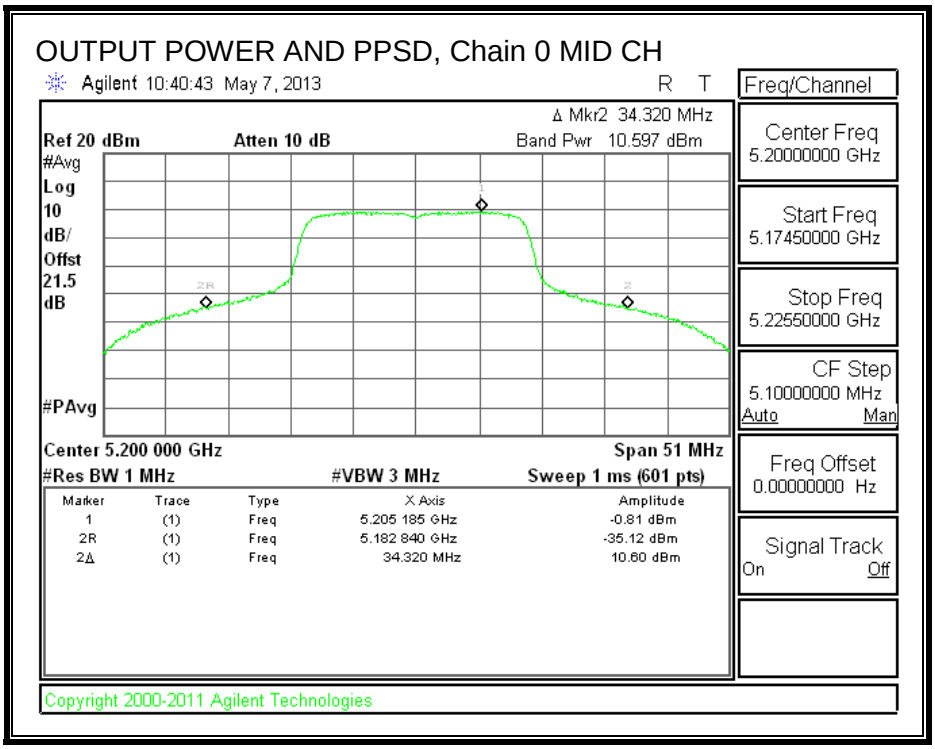
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	10.831	11.729	14.313	17.00	-2.687
Mid	5200	10.597	11.717	14.203	17.00	-2.797
High	5240	10.135	12.073	14.222	17.00	-2.778

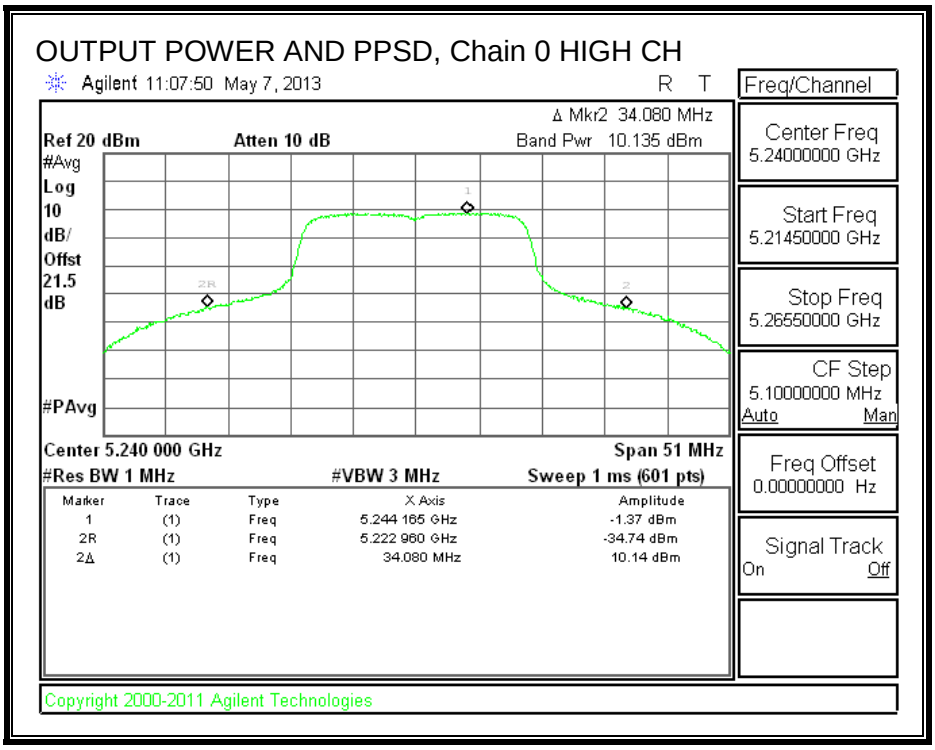
PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Chain 1 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5180	-0.42	0.47	3.06	4.00	-0.94
Mid	5200	-0.81	0.37	2.83	4.00	-1.17
High	5240	-1.37	0.64	2.76	4.00	-1.24

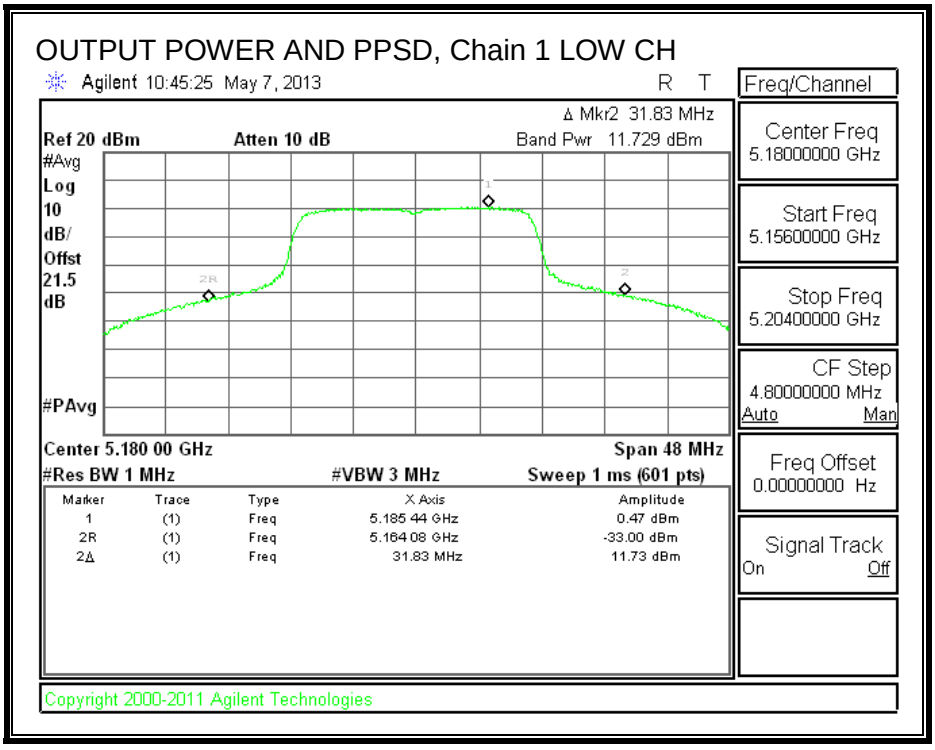
OUTPUT POWER AND PPSD, Chain 0



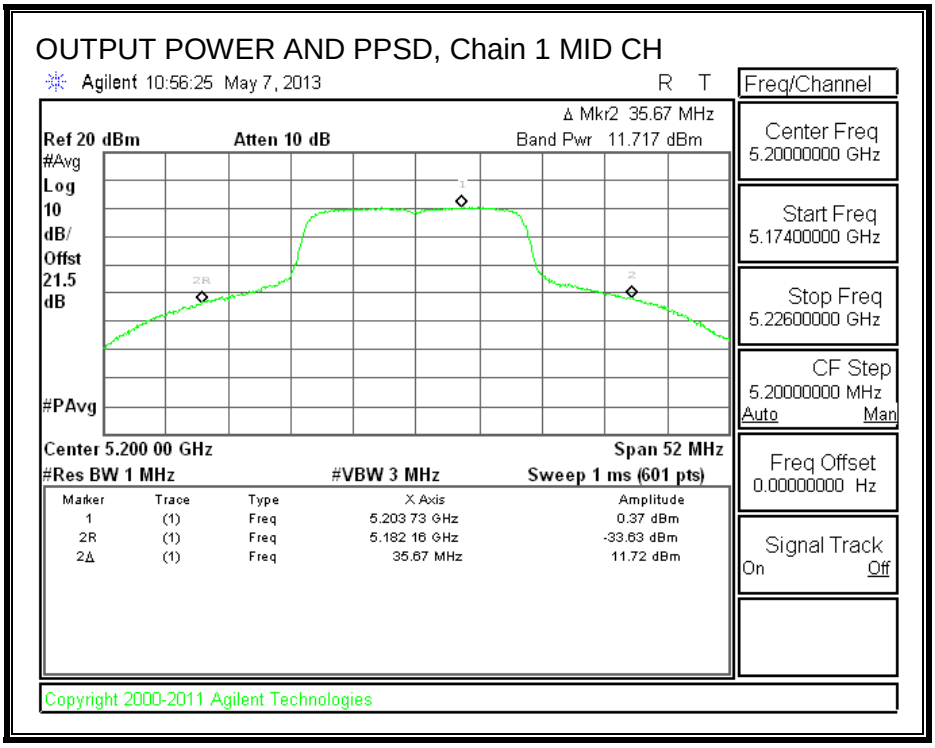




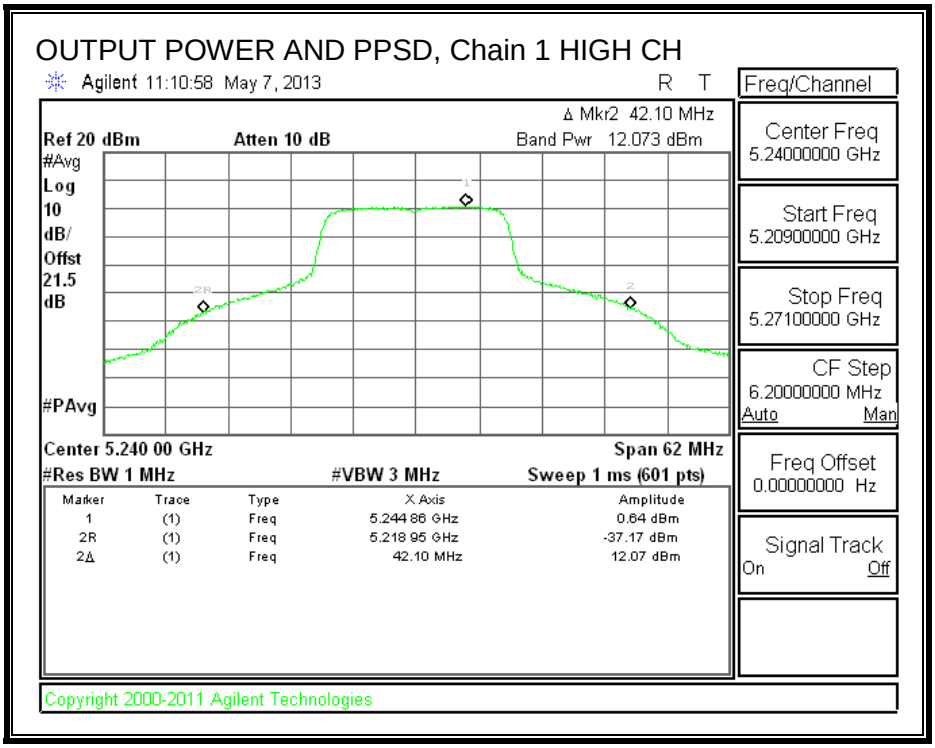
OUTPUT POWER AND PPSD, Chain 1



OUTPUT POWER AND PPSD, Chain 1 MID CH



OUTPUT POWER AND PPSD, Chain 1 HIGH CH



8.2.5. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

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

RESULTS

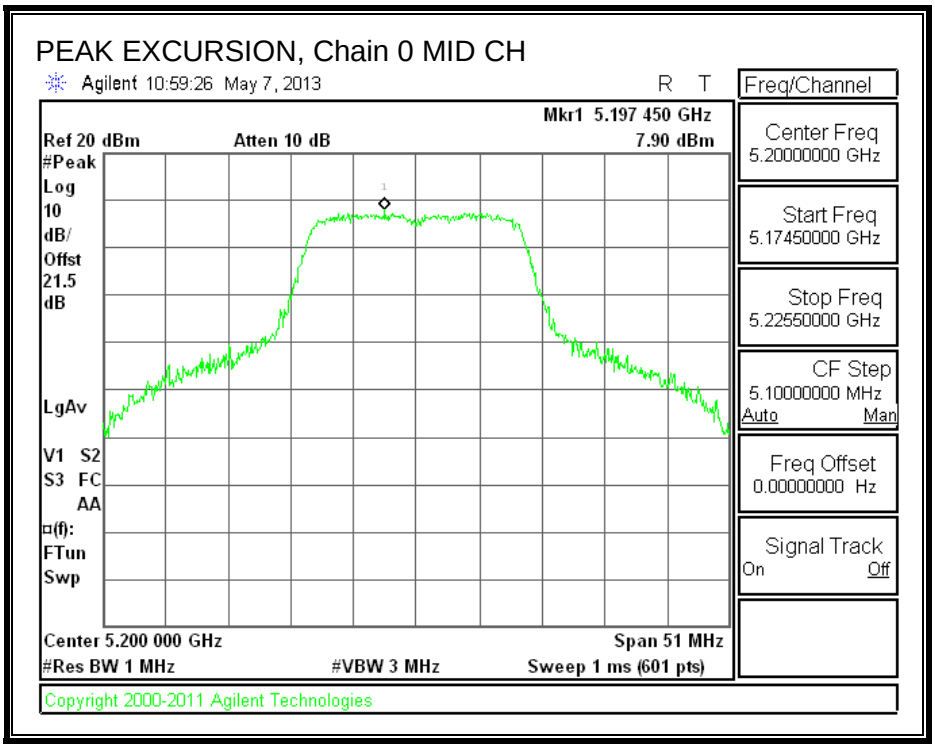
Chain 0

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Mid	5200	7.90	-0.81	0.00	8.71	13	-4.29

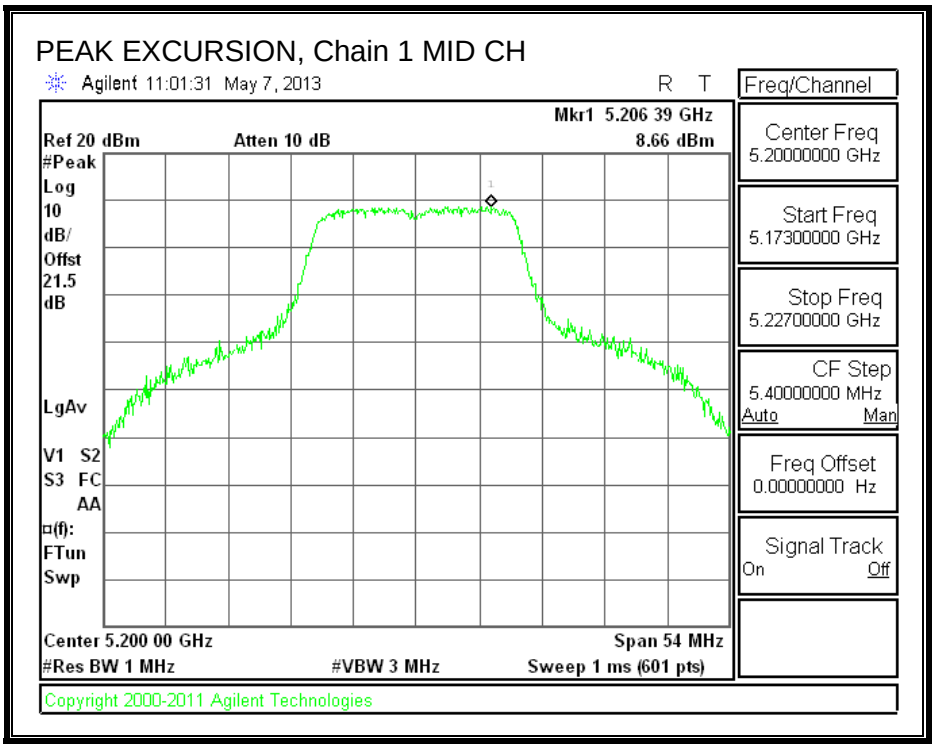
Chain 1

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Mid	5200	8.66	0.37	0.00	8.29	13	-4.71

PEAK EXCURSION, Chain 0

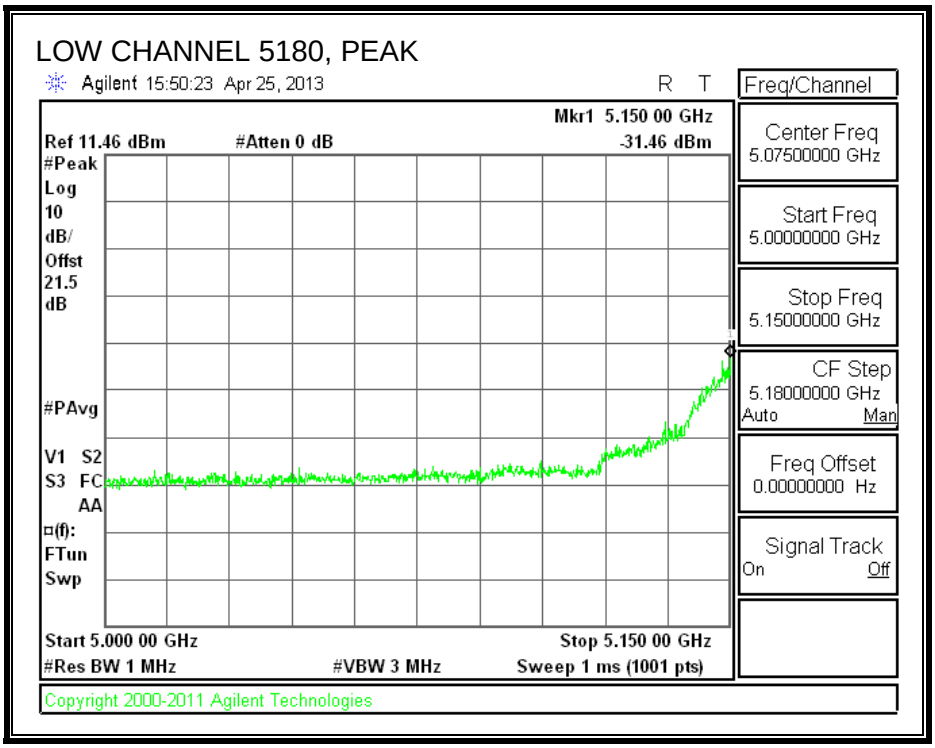


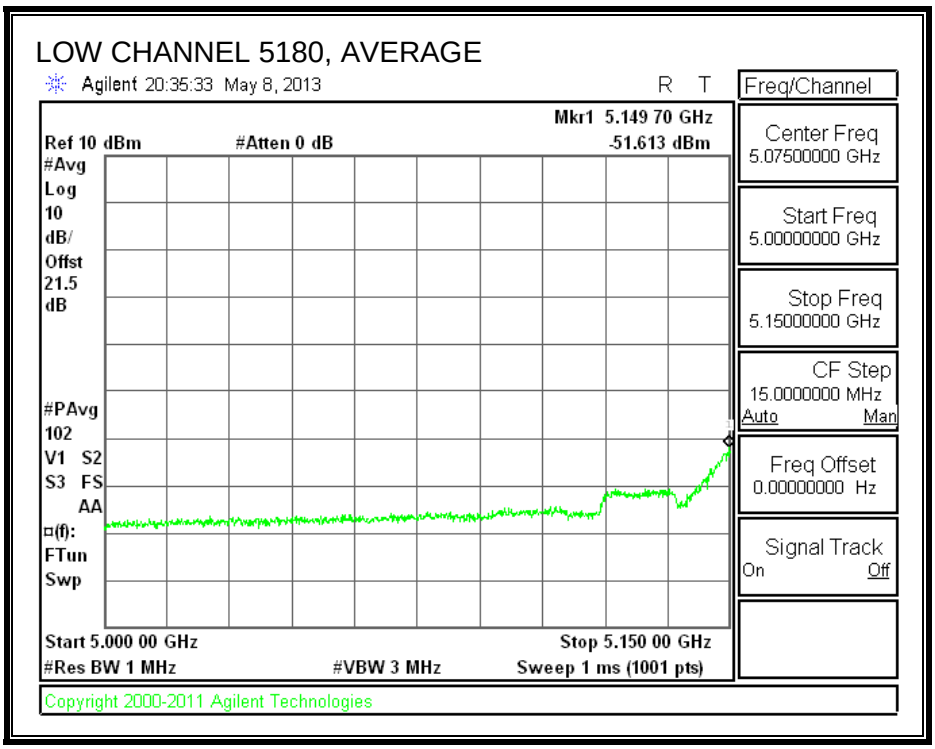
PEAK EXCURSION, Chain 1



8.2.6. CONDUCTED BANDEDGE, HARMONICS & SPURIOUS (no filter unit)

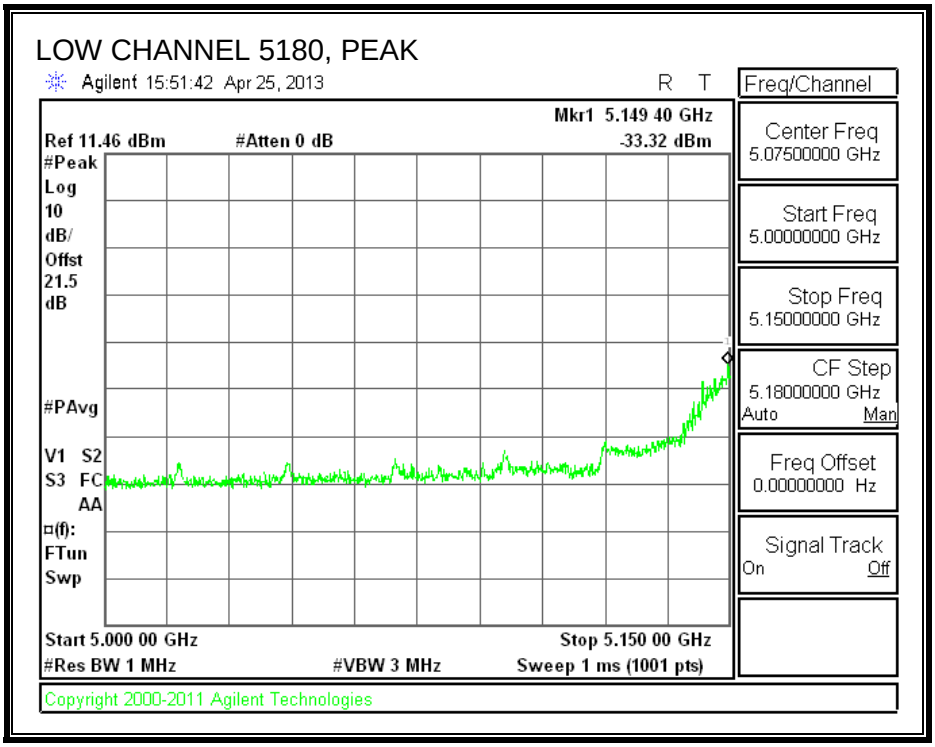
Chain 0
RESTRICTED BANDEDGE

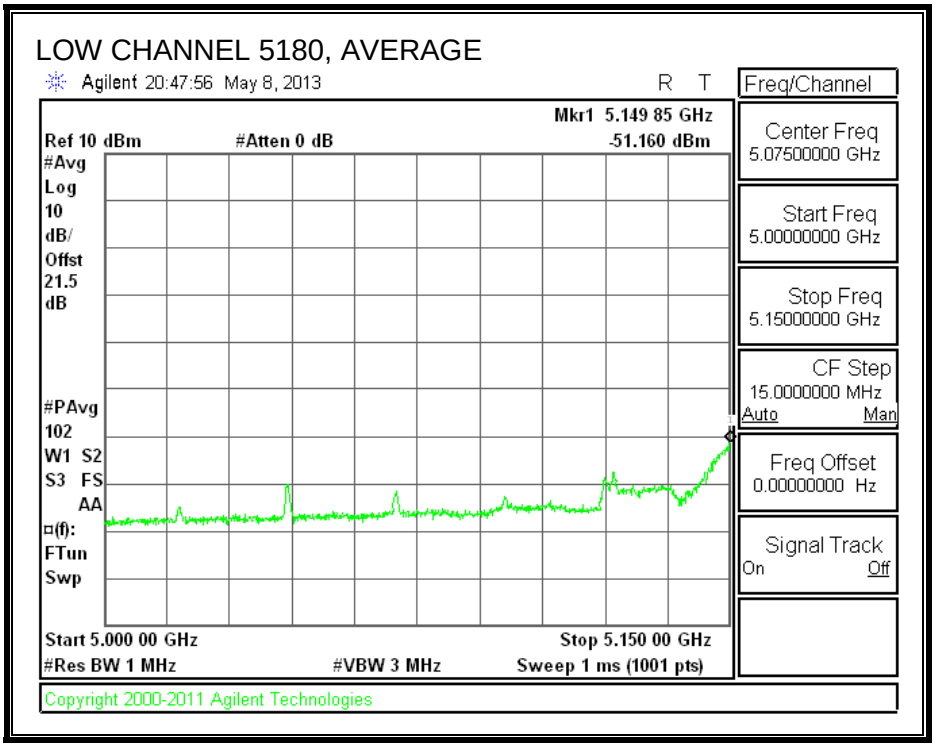




Chain 1

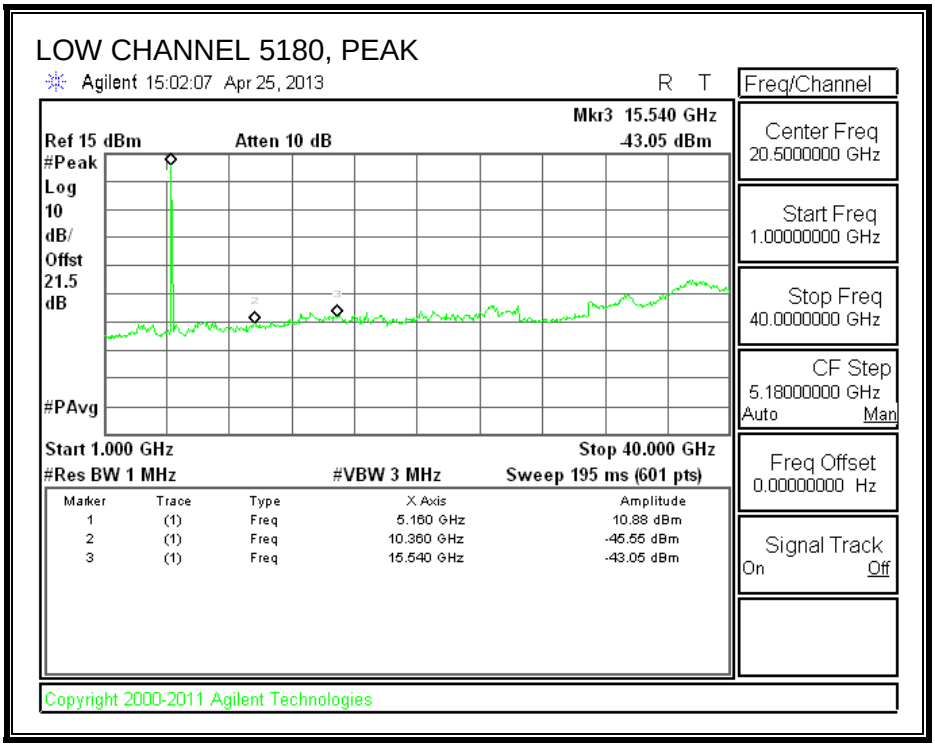
RESTRICTED BANDEDGE

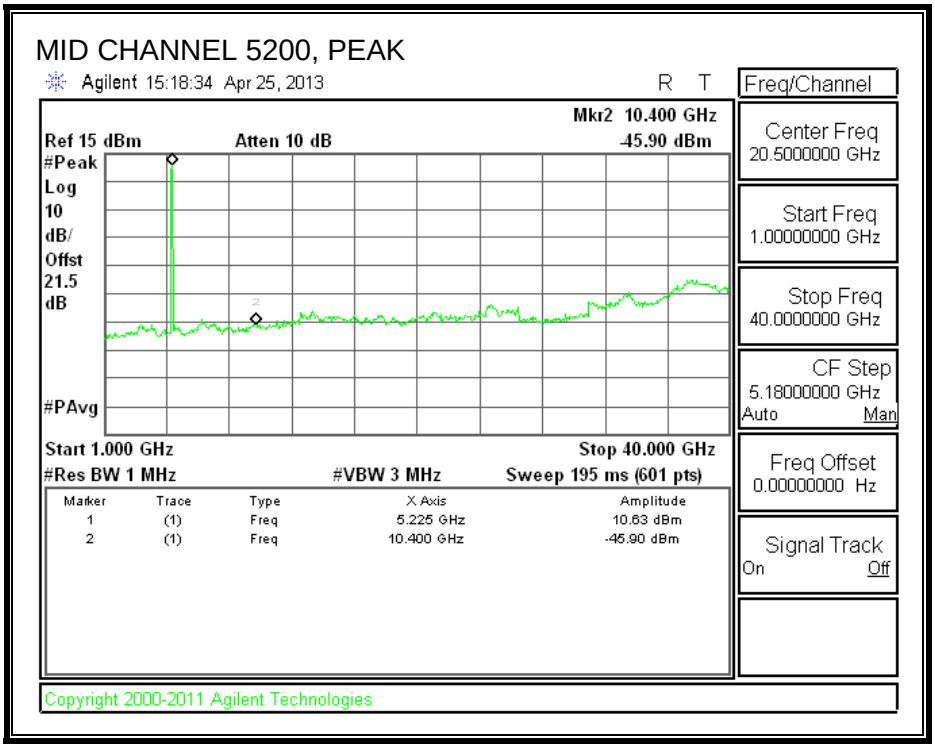


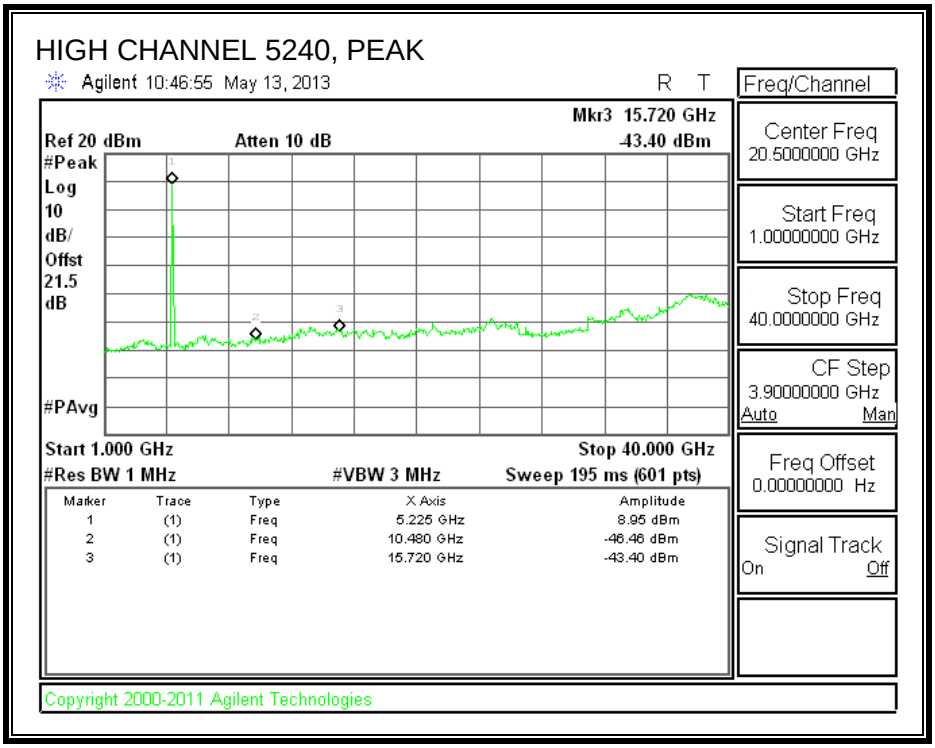


HARMONICS AND SPURIOUS

Chain 0

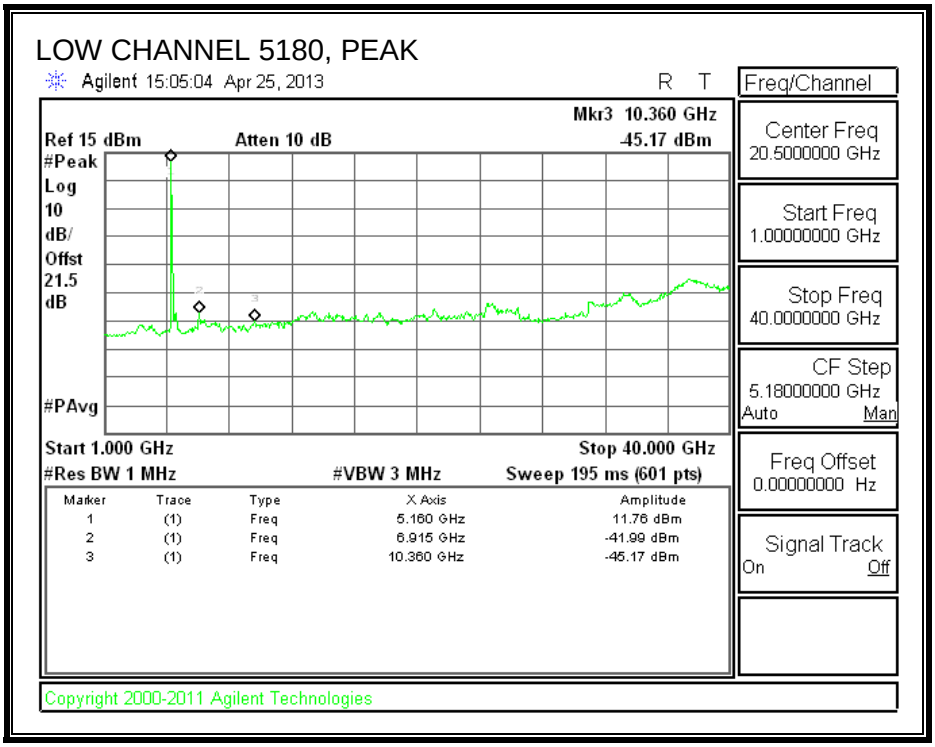




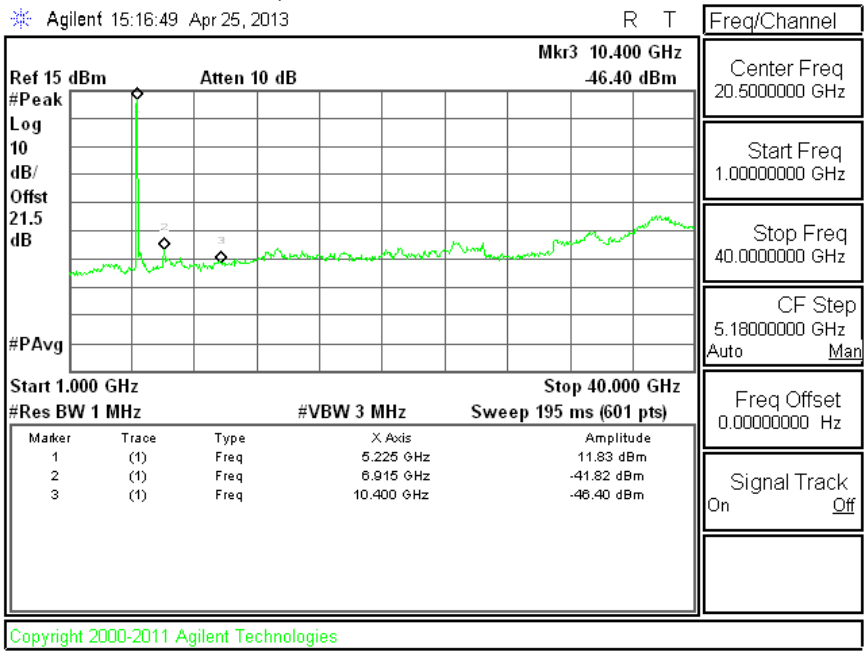


Chain 1

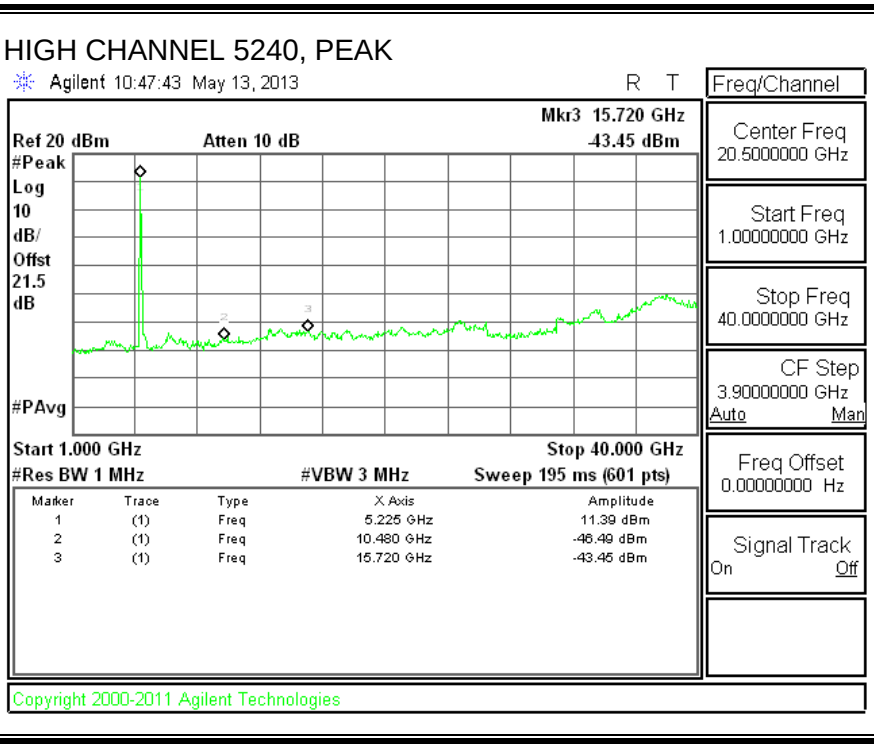
RESTRICTED BANDEDGE (LOW CHANNEL)



MID CHANNEL 5200, PEAK



HIGH CHANNEL 5240, PEAK



BANDEDGE DATA

2TX Conducted Spurious BE for UNII (in the restricted bands)

Date:	5/9/2013
Test Engineer:	Tony Wagoner
Client:	Qualcomm
Project Number:	13U14995
Configuration:	Tx
Mode of operation:	11n 5.2GHz

Note: if the PK margin is greater than 20 dB, there is no need to get AVG reading.

Channel	Frequency (MHz)	PXA PK Reading Chain 0 (dBm)	PXA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
36 (5180)	5150	-31.46	-33.32	2	-24.27	-21.2	-3.07	18.00	15 / 15.3

Channel	Frequency (MHz)	PXA AVG Reading Chain 0 (dBm)	PXA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
36 (5180)	5150	-51.613	-51.16	2	-43.36	-41.2	-2.16	16.50	13 / 13.8

SPURIOUS DATA

2TX Conducted Spurious for FCC DTS (in the restricted bands)

Date:	4/25/2013
Test Engineer:	T. Wagoner
Client:	Qualcomm Atheros
Project Number:	13u14995
Configuration:	5.2GHz 11n HT20
Mode of operation:	Tx

Note: if the PK margin is greater than 20 dB, there is no need to get AVG reading.

Channel	Frequency (MHz)	PSA PK Reading Chain 0 (dBm)	PSA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
36 (5180)	6915	-54.26	-52.79	2	-45.44	-21.2	-24.24	18.00	15 / 15.3
36 (5180)	10.36	-52.16	-53.99	2	-44.96	-21.2	-23.76	18.00	15 / 15.3
36 (5180)	15.54	-52.35	-52.44	2	-44.37	-21.2	-23.17	18.00	15 / 15.3
40 (5200)	10.4	-52.32	-54.88	2	-45.39	-21.2	-24.19	18.00	15 / 15.8
40 (5200)	15.6	-52.15	-52.27	2	-44.19	-21.2	-22.99	18.00	15 / 15.8
48 (5240)	10.48	-53.04	-55.26	2	-45.99	-21.2	-24.79	18.00	15.1/ 16.5
48 (5240)	15.72	-52.46	-51.97	2	-44.19	-21.2	-22.99	18.00	15.1 / 16.5

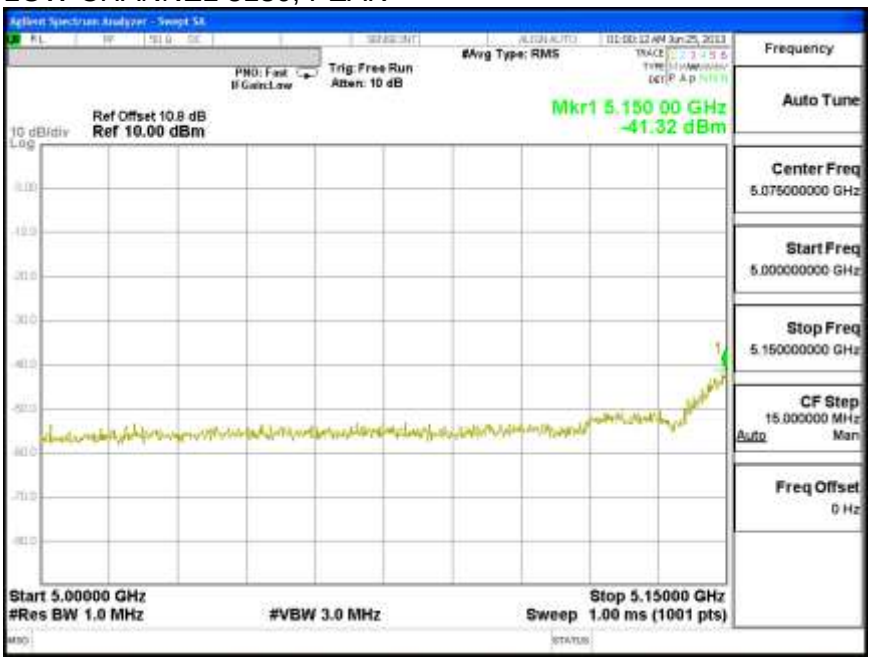
Channel	Frequency (MHz)	PSA AVG Reading Chain 0 (dBm)	PSA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)

The data in this table is from testing done at the harmonics shown in the plots with the span of 1MHz.

8.2.7. CONDUCTED BANDEDGE, HARMONICS & SPURIOUS (3G filter unit)

Chain 0
RESTRICTED BANDEDGE

LOW CHANNEL 5180, PEAK

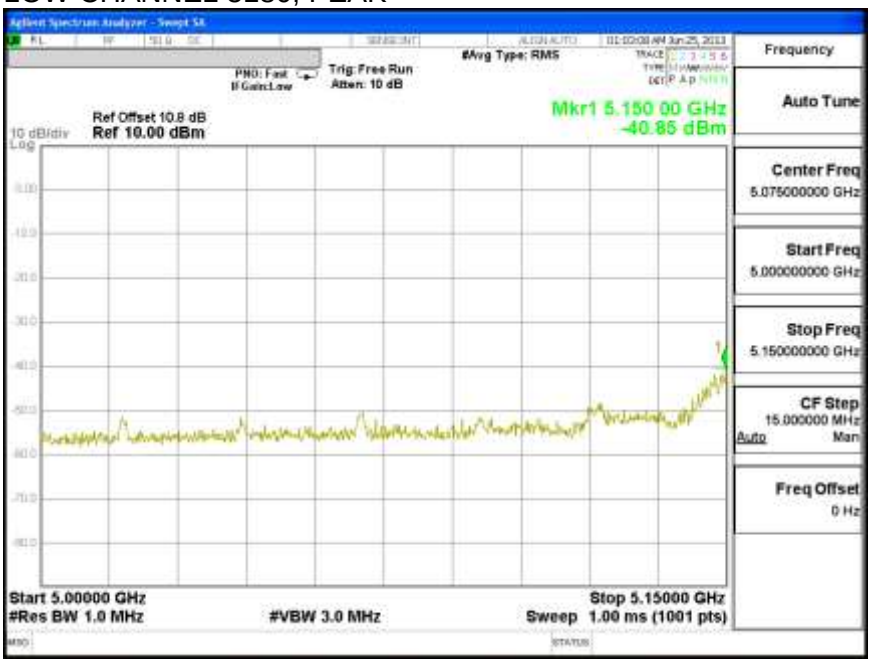


LOW CHANNEL 5180, AVERAGE

Chain 1

RESTRICTED BANDEDGE

LOW CHANNEL 5180, PEAK



LOW CHANNEL 5180, AVERAGE

BANDEDGE DATA

2TX Conducted Spurious BE for UNII (in the restricted bands)

Date:	6/25/2013
Test Engineer:	Tony Wagoner
Client:	Qualcomm
Project Number:	13U14995
Configuration:	Tx
Mode of operation:	11n HT20 5.2GHz

Note: if the PK margin is greater than 20 dB, there is no need to get AVG reading.

Channel	Frequency (MHz)	PXA PK Reading Chain 0 (dBm)	PXA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
36 (5180)	5150	-41.32	-40.85	2	-33.06	-21.2	-11.86	15.00	11.7/12.68

Channel	Frequency (MHz)	PXA AVG Reading Chain 0 (dBm)	PXA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
36 (5180)	5150	-53.593	-52.546	2	-45.02	-41.2	-3.82	15.00	11.7/12.68

8.3. 802.11n HT40 MODE IN THE 5.2 GHz BAND

8.3.1. 26 dB BANDWIDTH

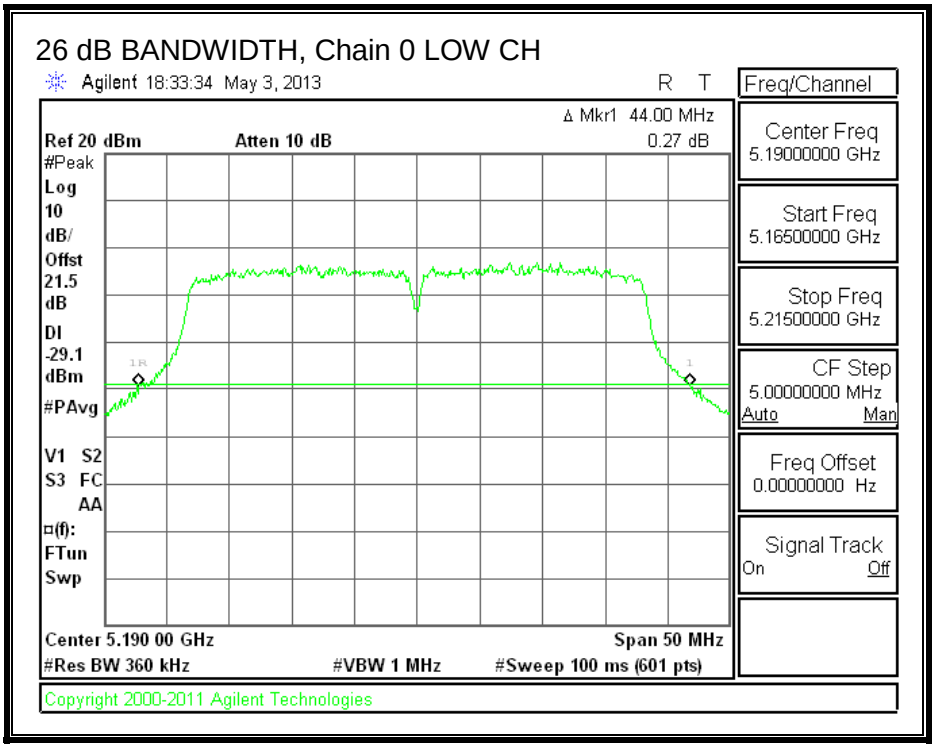
LIMITS

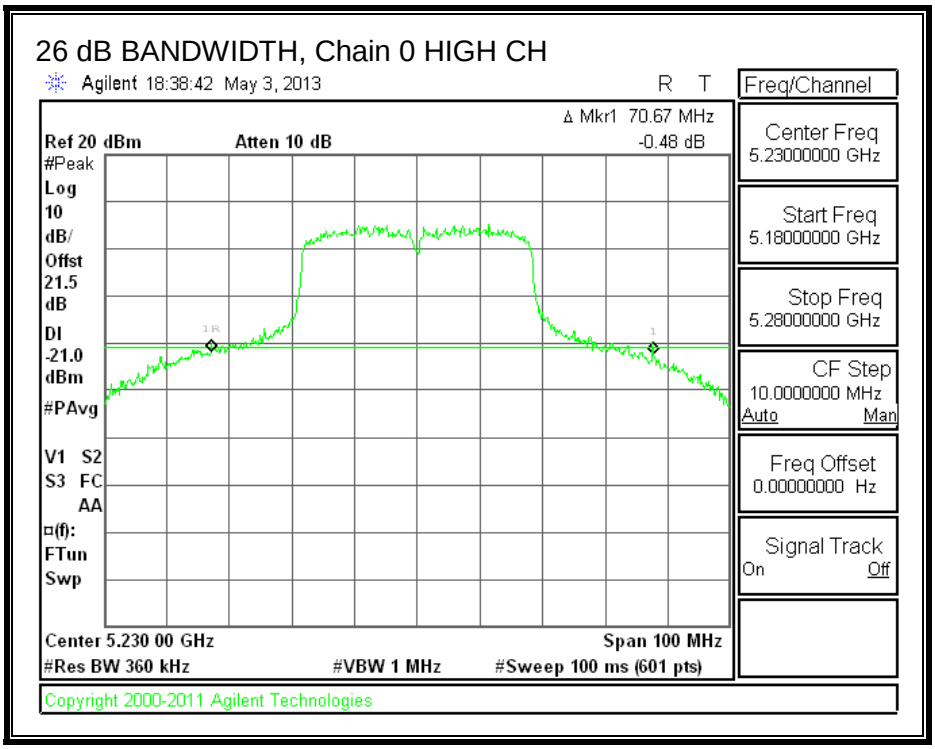
None; for reporting purposes only.

RESULTS

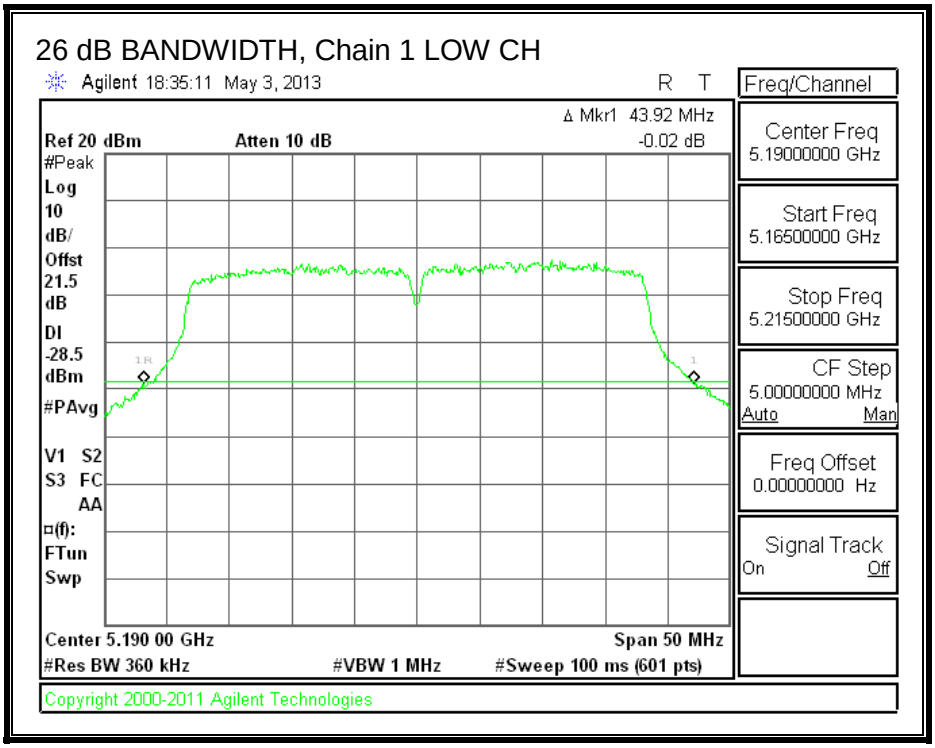
Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5190	44.00	43.92
High	5230	70.67	84.50

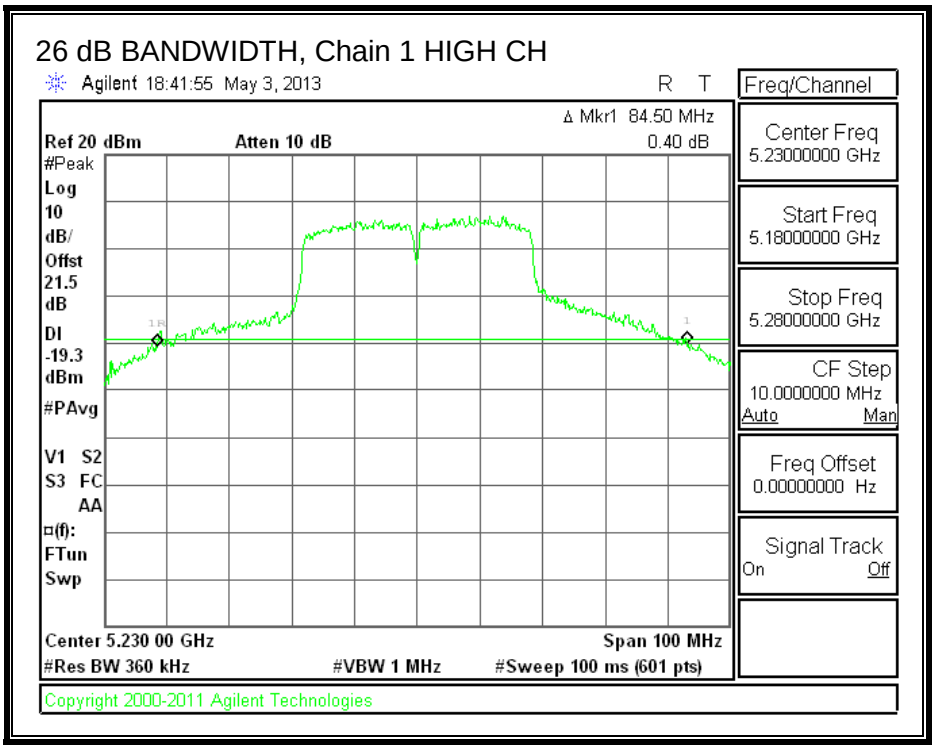
26 dB BANDWIDTH, Chain 0





26 dB BANDWIDTH, Chain 1





8.3.2. 99% BANDWIDTH

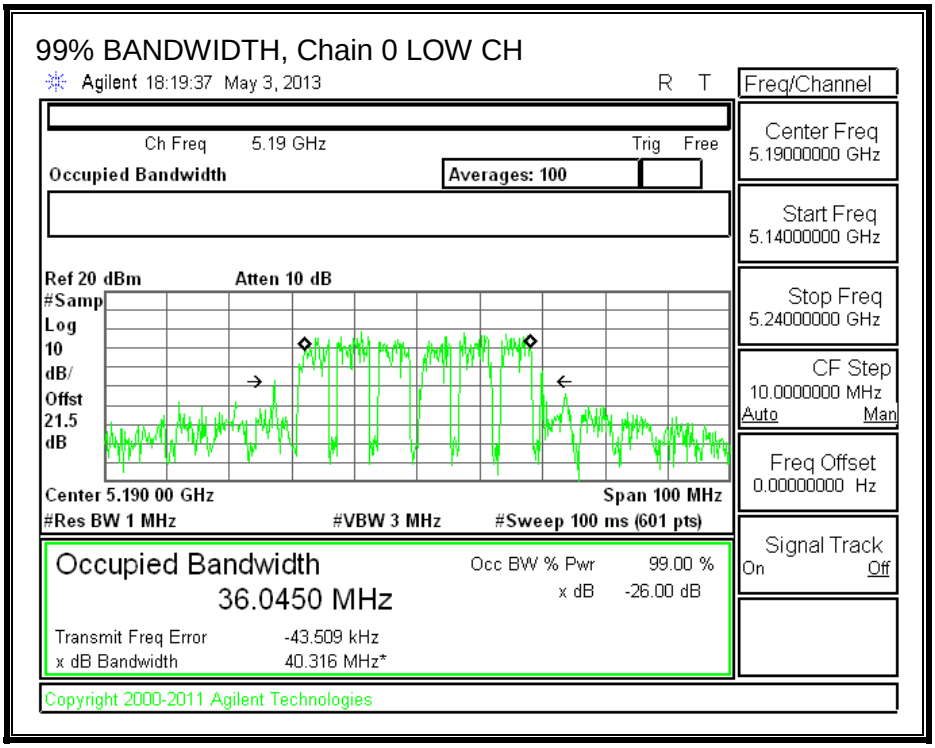
LIMITS

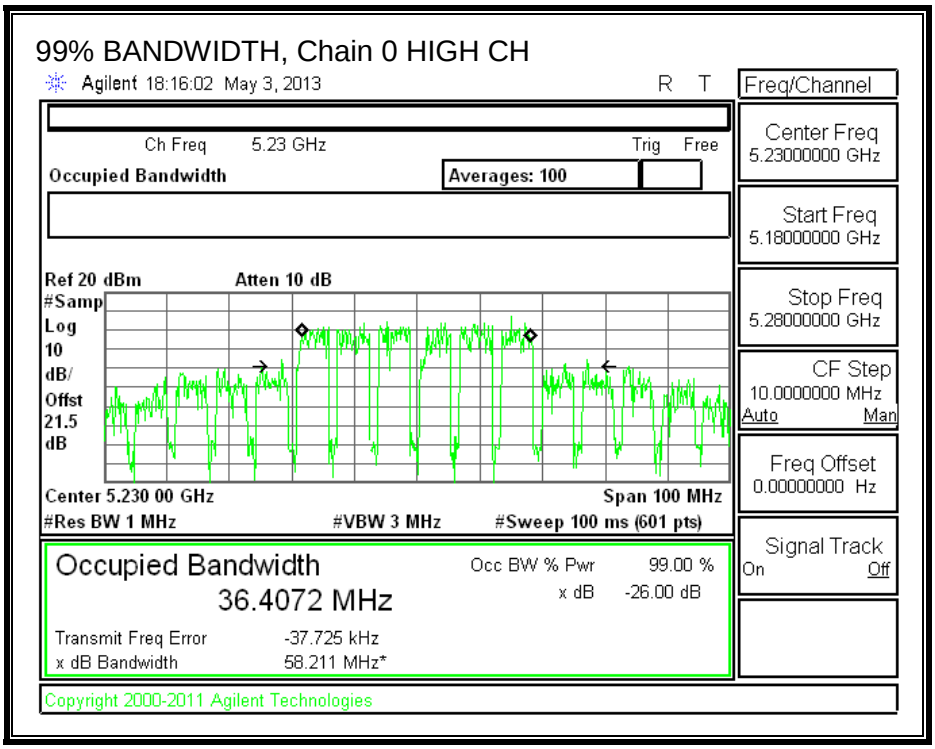
None; for reporting purposes only.

RESULTS

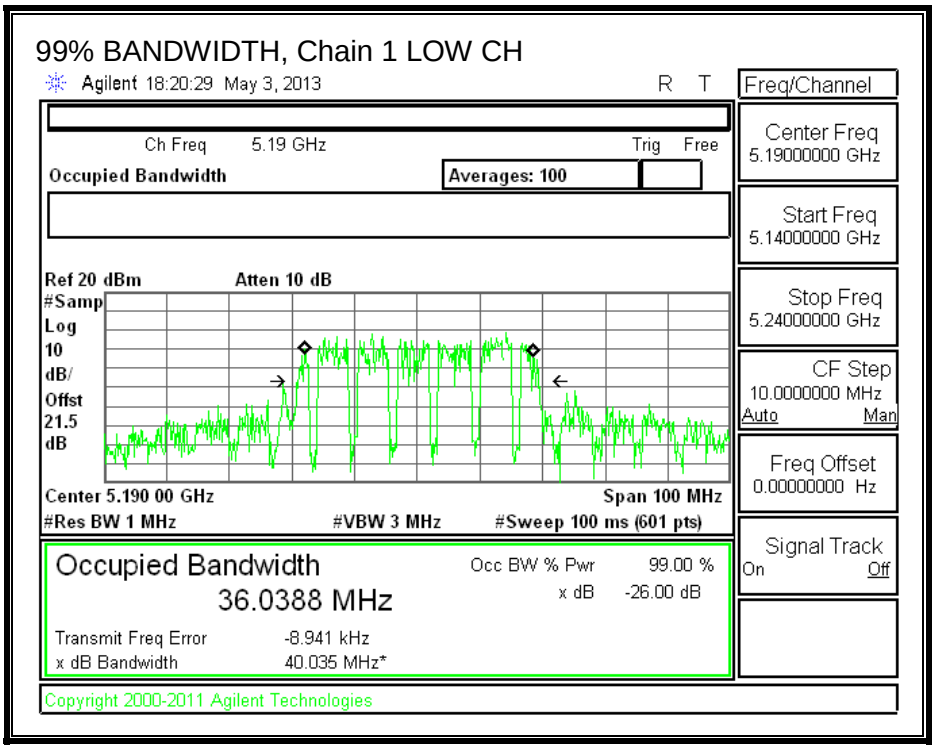
Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	5190	36.0450	36.0388
High	5230	36.4072	38.0510

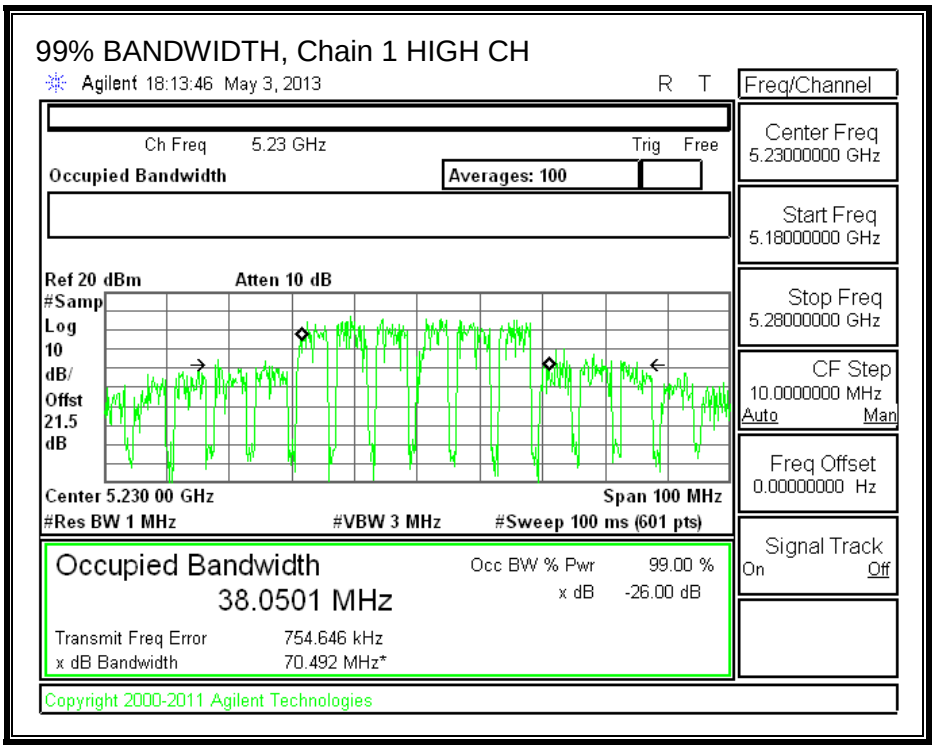
99% BANDWIDTH, Chain 0





99% BANDWIDTH, Chain 1





8.3.3. AVERAGE POWER (No filter unit)

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 25.46 dB (including two 10 dB pads, 2.06dB cable, and 3.4dB power splitter) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	5190	6.50	7.35	9.96
High	5230	8.50	9.00	11.77

8.3.4. AVERAGE POWER (3G filter unit)

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 25.46 dB (including two 10 dB pads, 2.06dB cable, and 3.4dB power splitter) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	5190	5.02	6.44	8.80

8.3.5. OUTPUT POWER AND PPSD (no filter unit)

LIMITS

FCC §15.407 (a) (1)

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

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.

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
2.00	2.00	2.00

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5190	43.9200	36.04	2.00
High	5230	70.6700	36.41	2.00

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC EIRP Limit (dBm)	Max IC Power (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC eirp PSD Limit (dBm)	PPSD Limit (dBm)
Low	5190	17.00	23.00	21.00	17.00	4.00	10.00	4.00
High	5230	17.00	23.00	21.00	17.00	4.00	10.00	4.00

Duty Cycle CF (dB)	1.07	Included in Calculations of Corr'd Power & PPSD

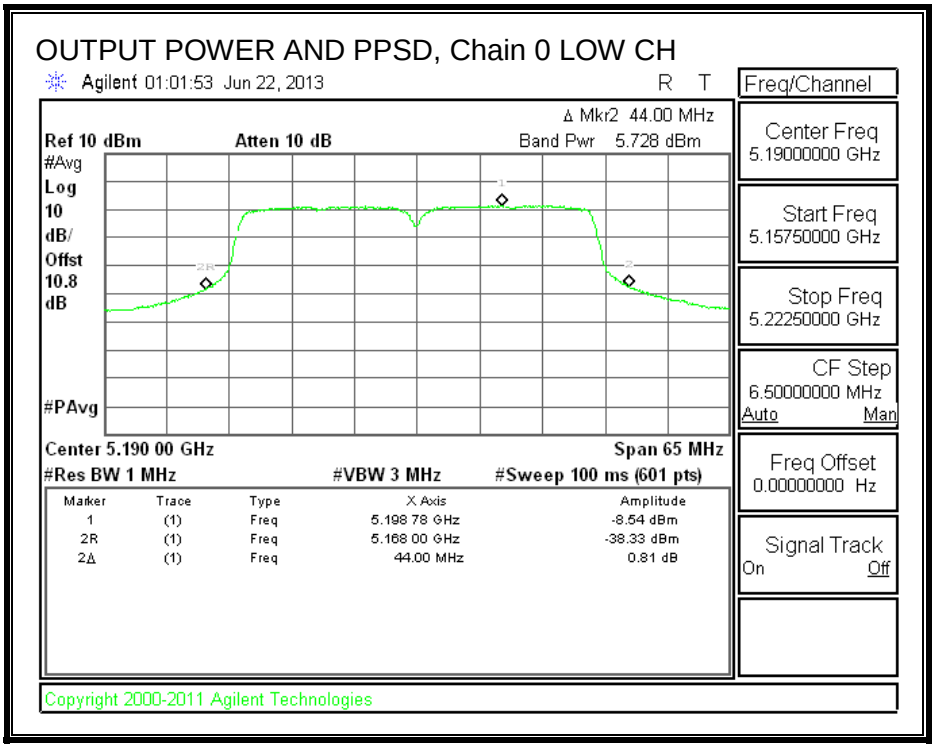
Output Power Results

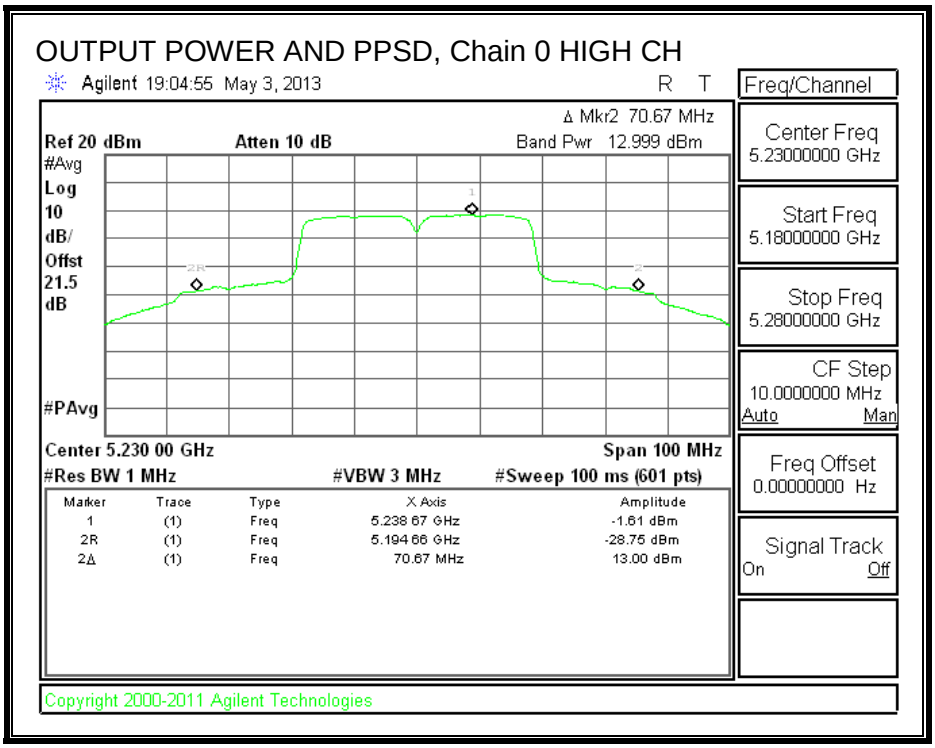
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	5.73	5.79	9.84	17.00	-7.16
High	5230	13.00	12.20	16.70	17.00	-0.30

PPSD Results

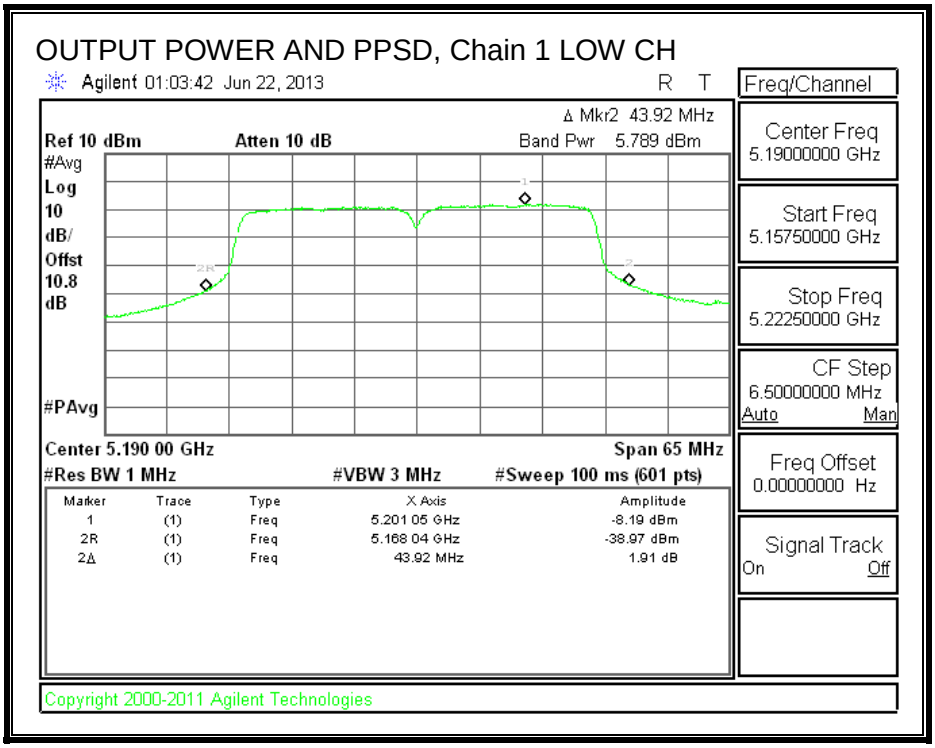
Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Chain 1 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5190	-8.54	-8.19	-4.28	4.00	-8.28
High	5230	-1.61	-1.38	2.59	4.00	-1.41

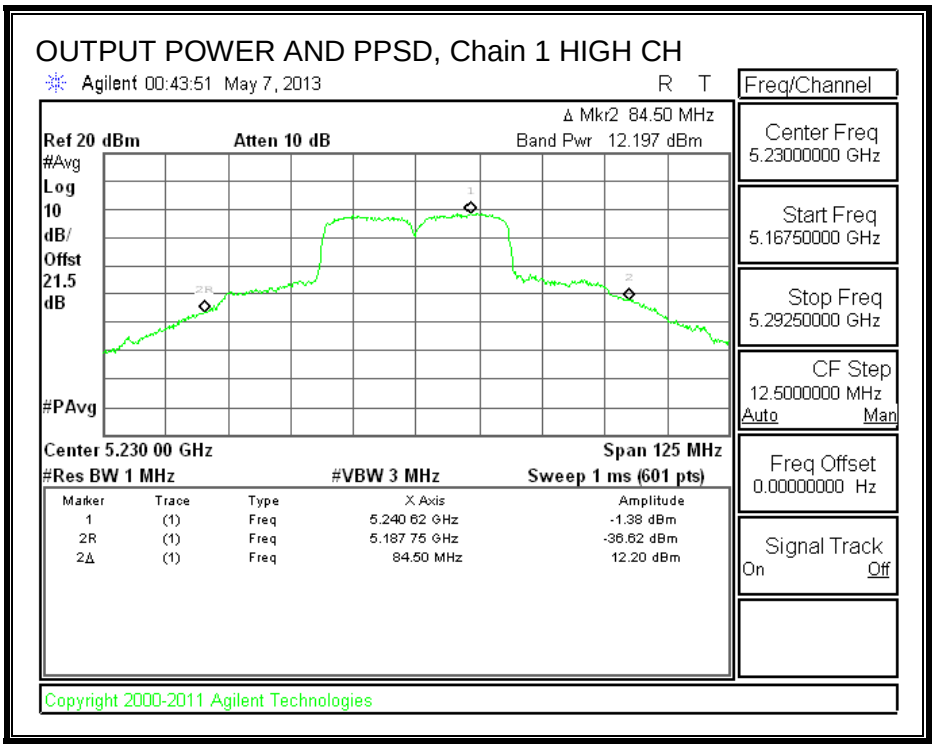
OUTPUT POWER AND PPSD, Chain 0





OUTPUT POWER AND PPSD, Chain 1





8.3.6. OUTPUT POWER AND PPSD (3G filter unit)

LIMITS

FCC §15.407 (a) (1)

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10 log B, where B is the 26–dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 4 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

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.

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
2.00	2.00	2.00

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5190	43.9200	36.04	2.00

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC EIRP Limit (dBm)	Max IC Power (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC eirp PSD Limit (dBm)	PPSD Limit (dBm)
Low	5190	17.00	23.00	21.00	17.00	4.00	10.00	4.00

Duty Cycle CF (dB)	1.07	Included in Calculations of Corr'd Power & PPSD

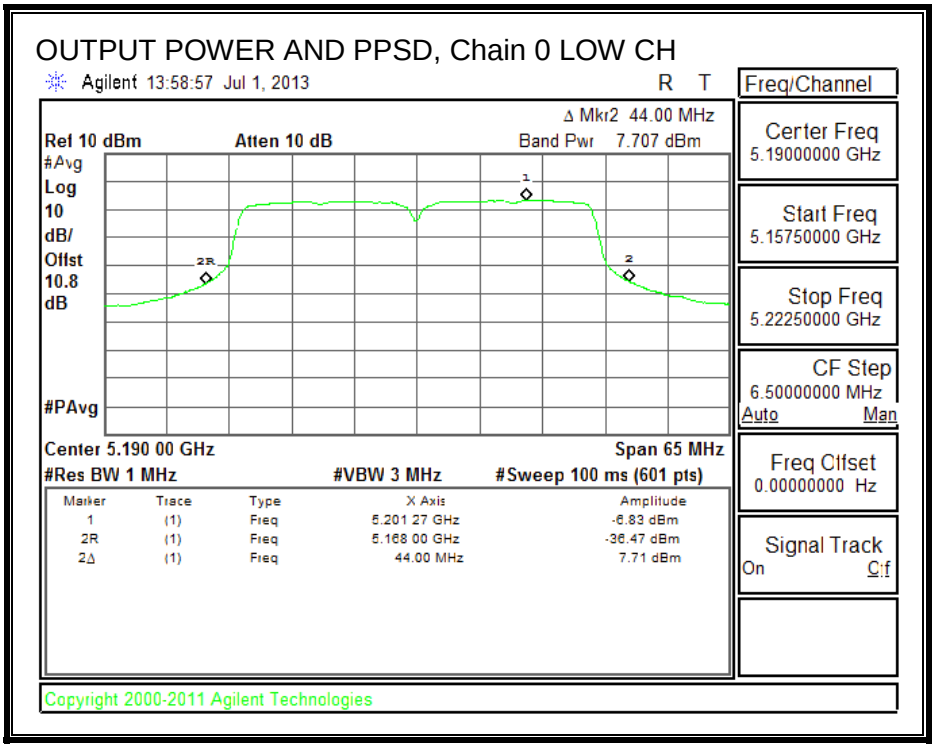
Output Power Results

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	5190	7.707	5.659	10.883	17.00	-6.117

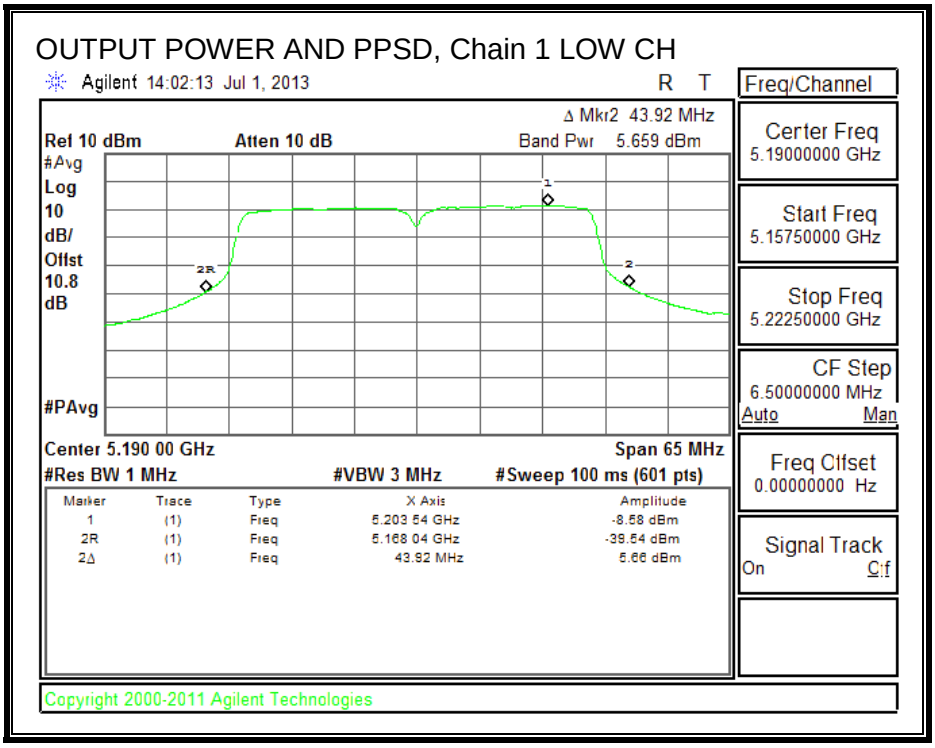
PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Chain 1 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5190	-6.83	-8.58	-3.54	4.00	-7.54

OUTPUT POWER AND PPSD, Chain 0



OUTPUT POWER AND PPSD, Chain 1



8.3.7. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

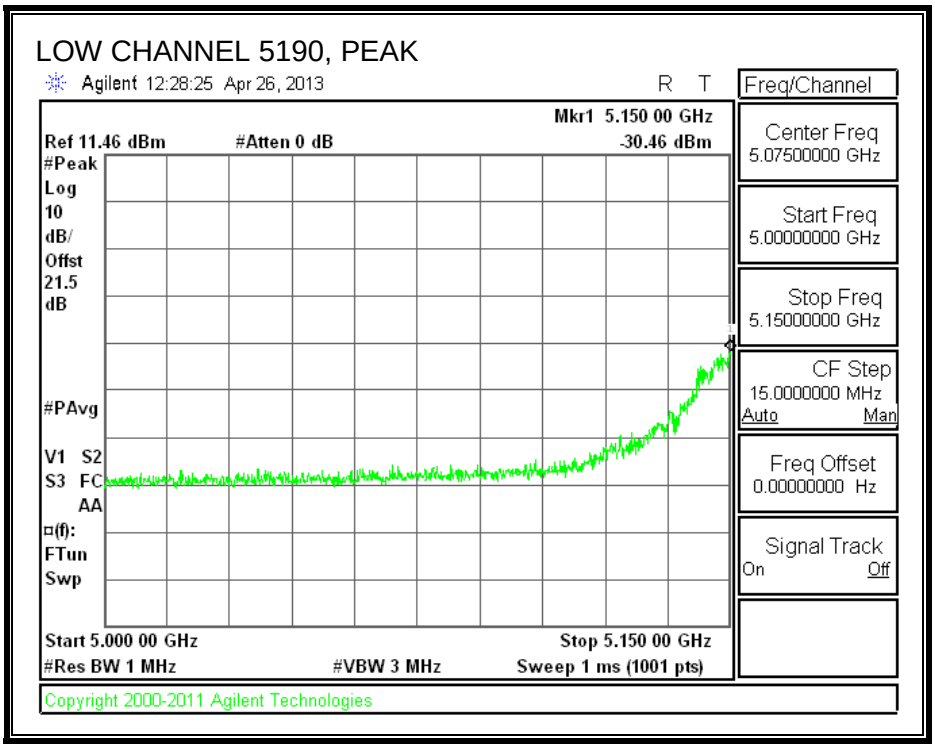
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

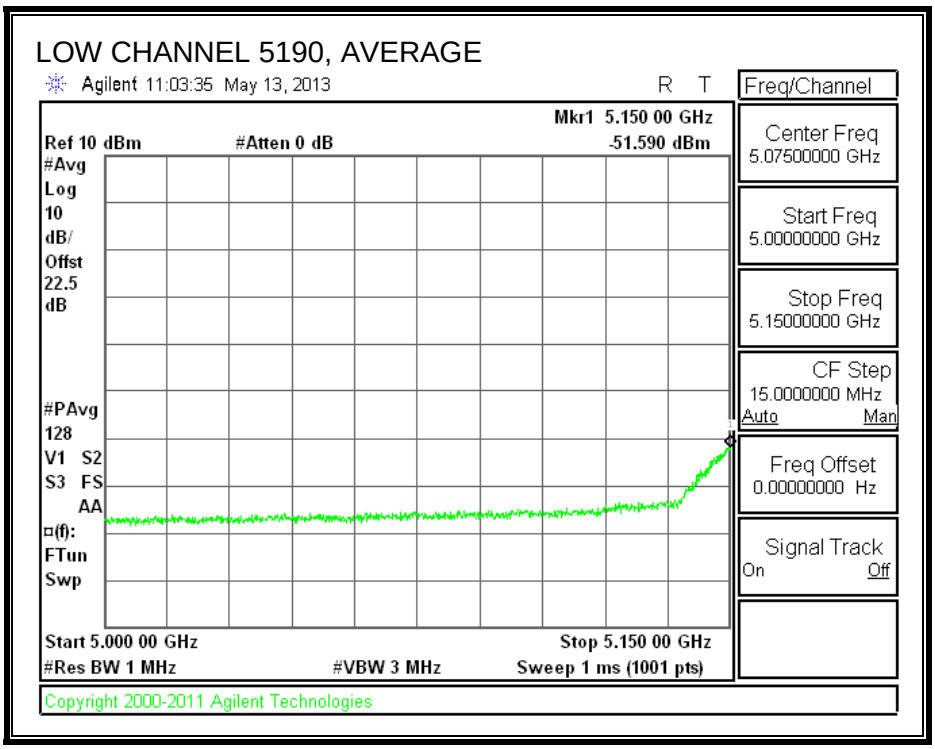
RESULTS

Refer to the results of 802.11n HT20 mode in the 5.2 GHz band.

8.3.8. CONDUCTED BANDEDGE, HARMONICS & SPURIOUS (no filter unit)

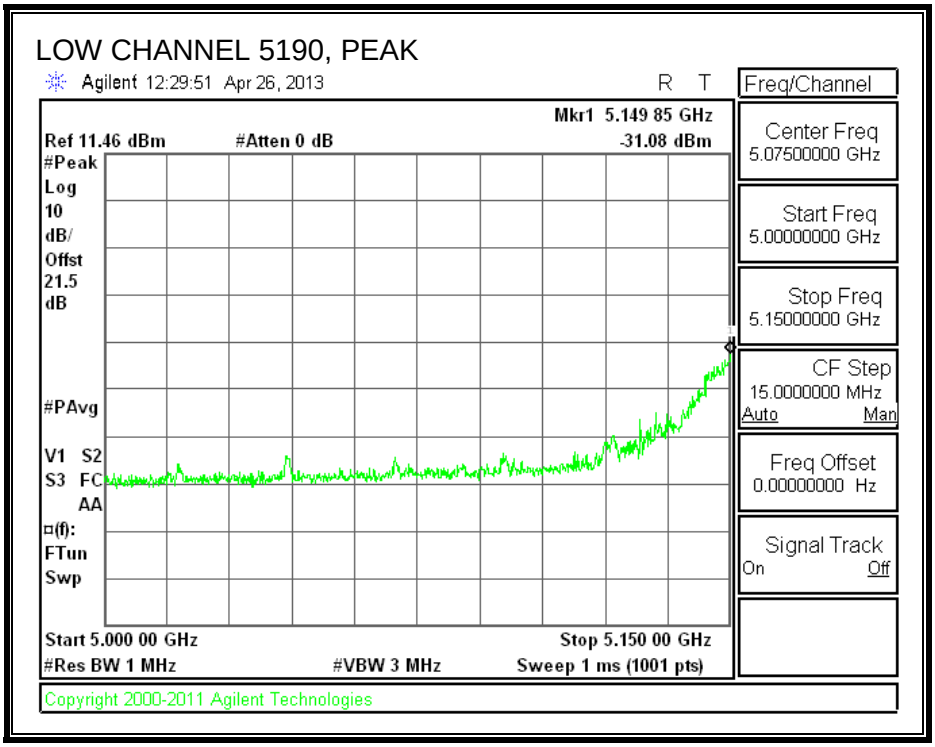
Chain 0
RESTRICTED BANDEDGE

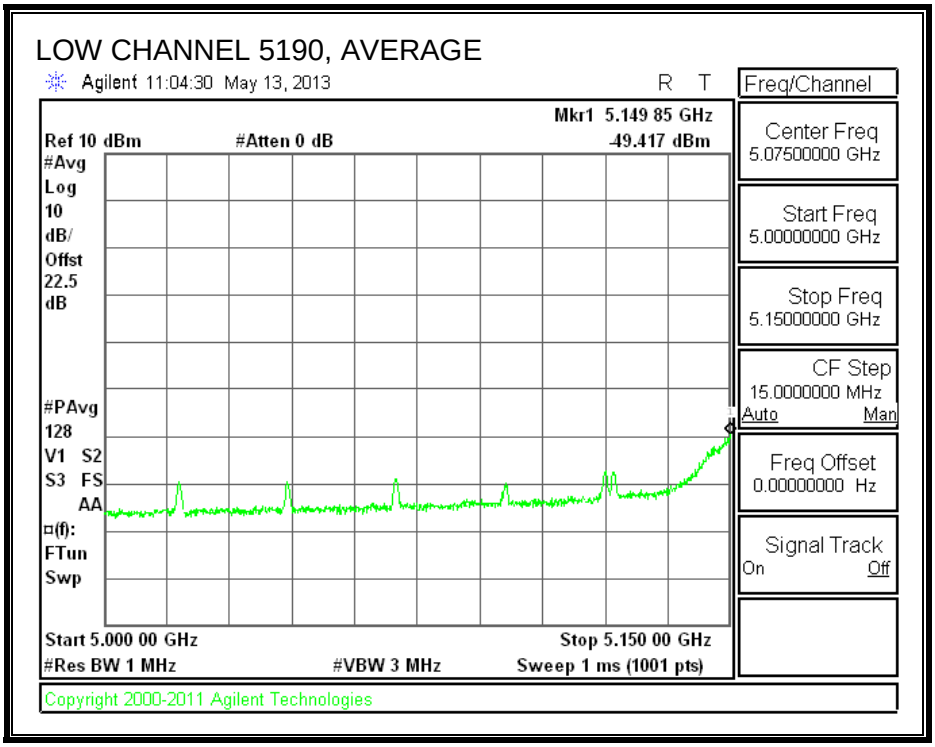




Chain 1

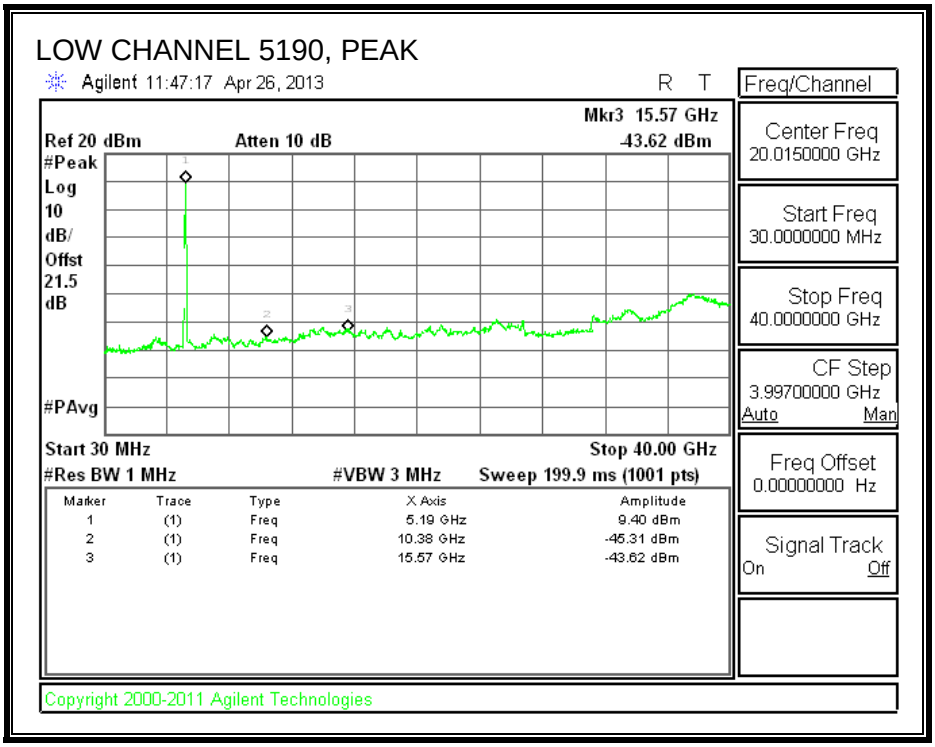
RESTRICTED BANDEDGE

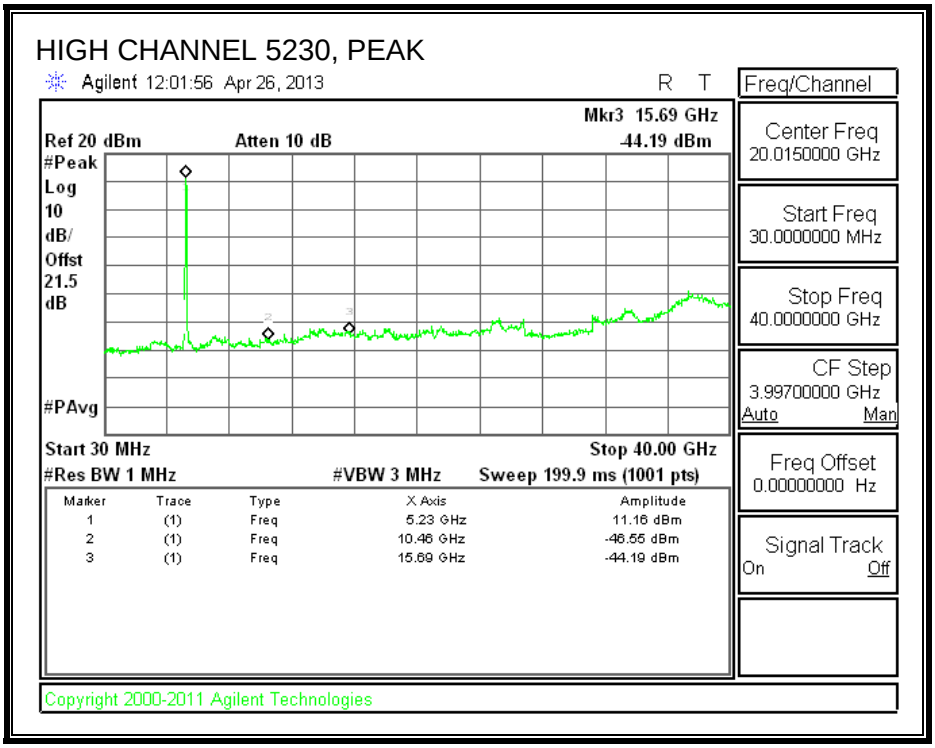




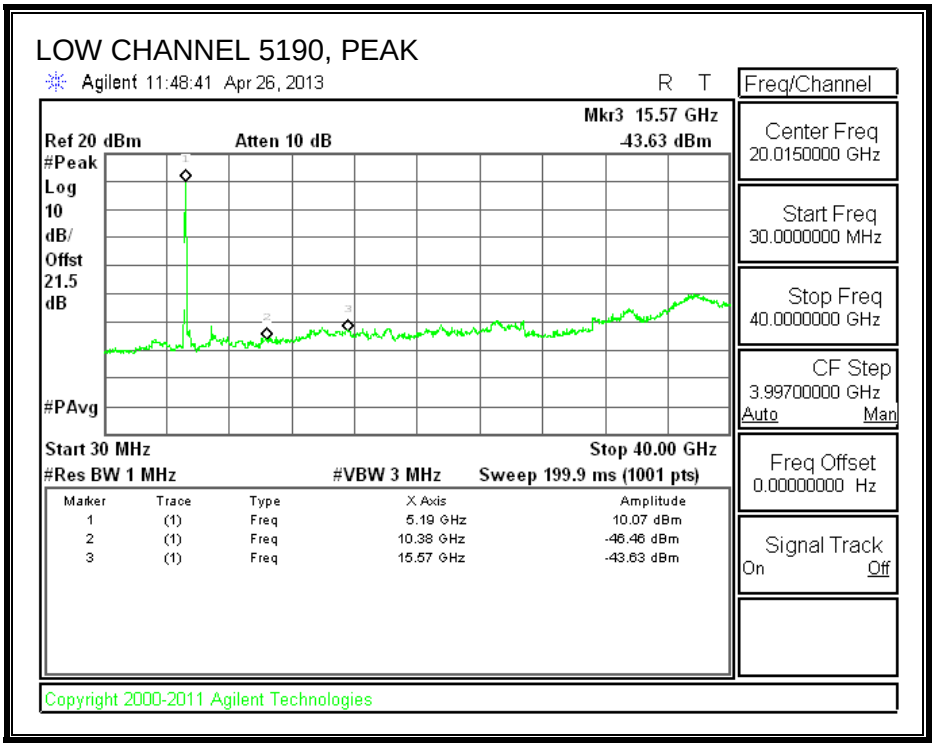
HARMONICS AND SPURIOUS

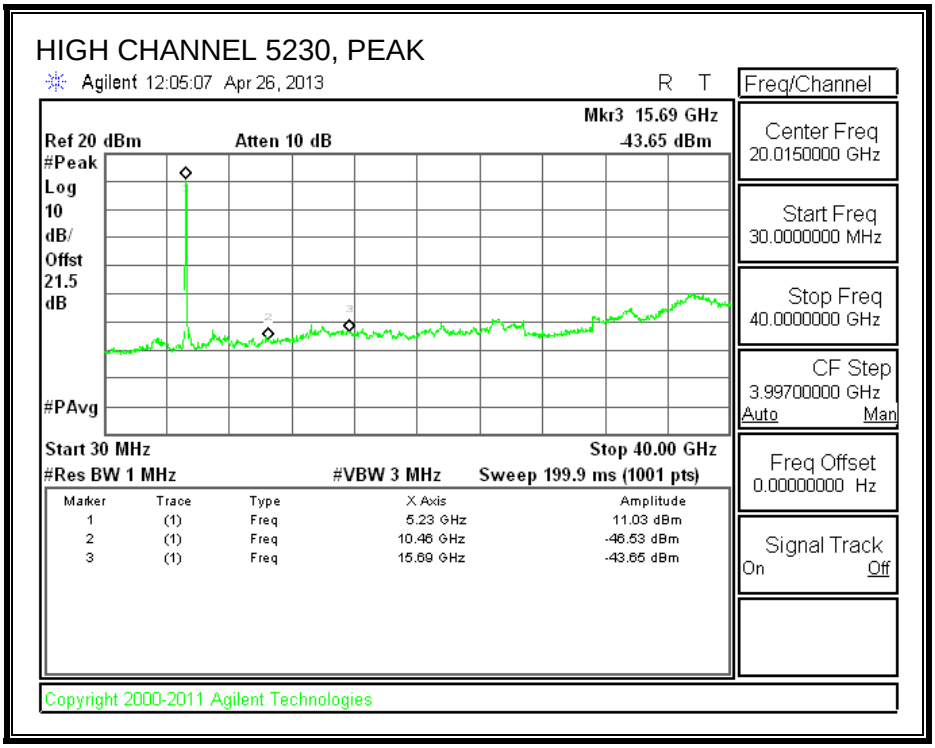
Chain 0





Chain 1





BANDEDGE DATA

2TX Conducted Spurious BE for UNII (in the restricted bands)

Date:	5/9/2013
Test Engineer:	Tony Wagoner
Client:	Qualcomm
Project Number:	13U14995
Configuration:	Tx
Mode of operation:	5.2GHz 11n HT40

Note: if the PK margin is greater than 20 dB, there is no need to get AVG reading.

Channel	Frequency (MHz)	PXA PK Reading Chain 0 (dBm)	PXA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
38 (5190)	5150	-30.46	-31.08	2	-22.74	-21.2	-1.54	12.50	9.8 / 10

Channel	Frequency (MHz)	PXA AVG Reading Chain 0 (dBm)	PXA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
38 (5190)	5149	-51.59	-49.417	2	-42.35	-41.2	-1.15	10.50	6.5 / 7.35

SPURIOUS DATA

The data in this table is from testing done at the harmonics shown in the plots with the span of 1MHz.

2TX Conducted Spurious for UNII (in the restricted bands)

Date:	4/26/2013
Test Engineer:	Tony Wagoner
Client:	Qualcomm Atheros
Project Number:	13u14995
Configuration:	5.2GHz 11n HT40
Mode of operation:	Tx

Note: if the PK margin is greater than 20 dB, there is no need to get AVG reading.

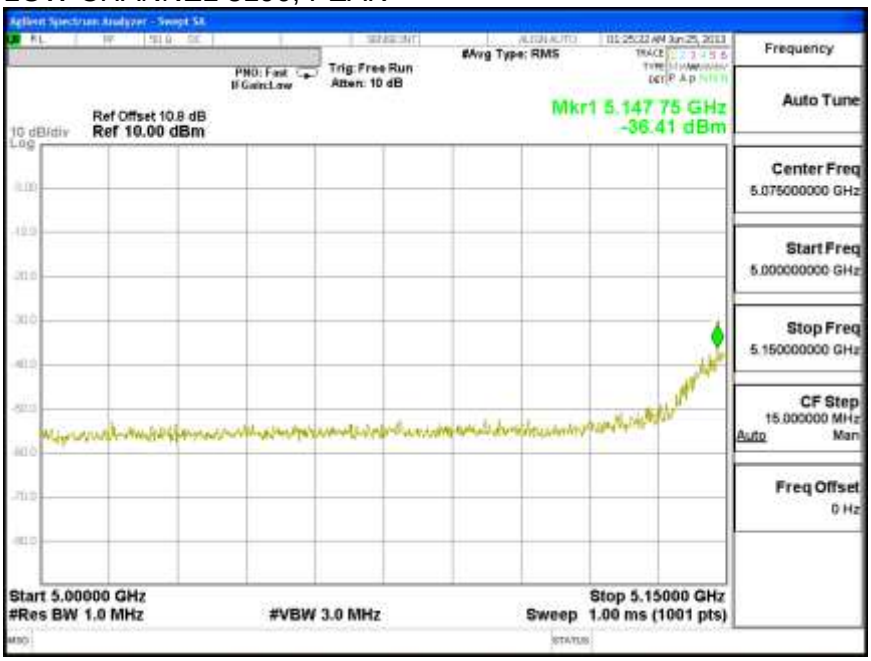
Channel	Frequency (MHz)	PSA PK Reading Chain 0 (dBm)	PSA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
38 (5190)	10.38	-52.74	-54.5	2	-45.51	-21.2	-24.31	18.00	14.85 / 15
38 (5190)	15.57	-52.44	-52	2	-44.19	-21.2	-22.99	18.00	14.85 / 15
46 (5230)	10.46	-54.58	-55.57	2	-47.03	-21.2	-25.83	18.00	14.7 / 16.2
46 (5230)	15.69	-51.98	-52.45	2	-44.19	-21.2	-22.99	18.00	14.7 / 16.2

Channel	Frequency (MHz)	PSA AVG Reading Chain 0 (dBm)	PSA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)

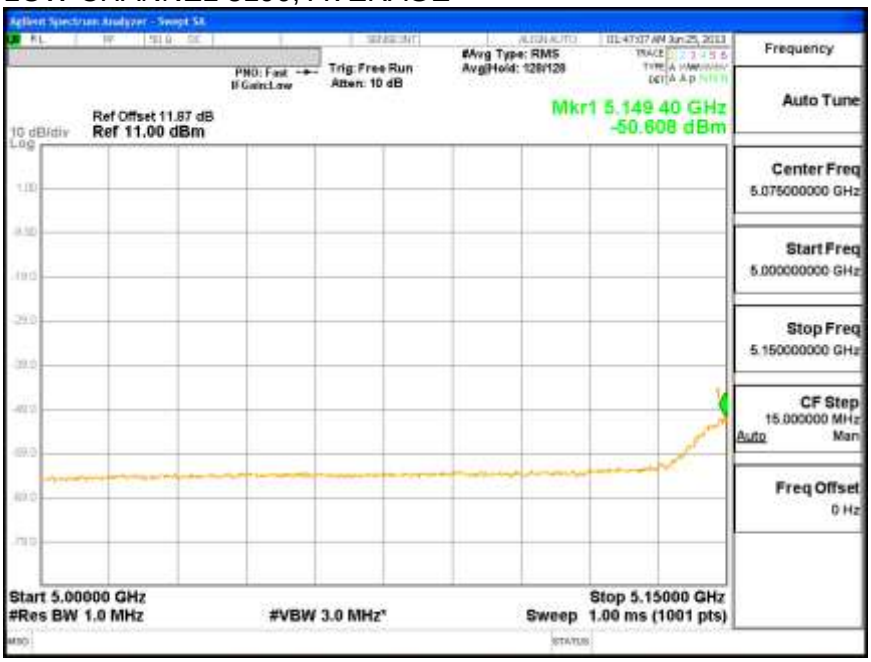
8.3.9. CONDUCTED BANDEDGE, HARMONICS & SPURIOUS (3G filter unit)

Chain 0
RESTRICTED BANDEDGE

LOW CHANNEL 5190, PEAK



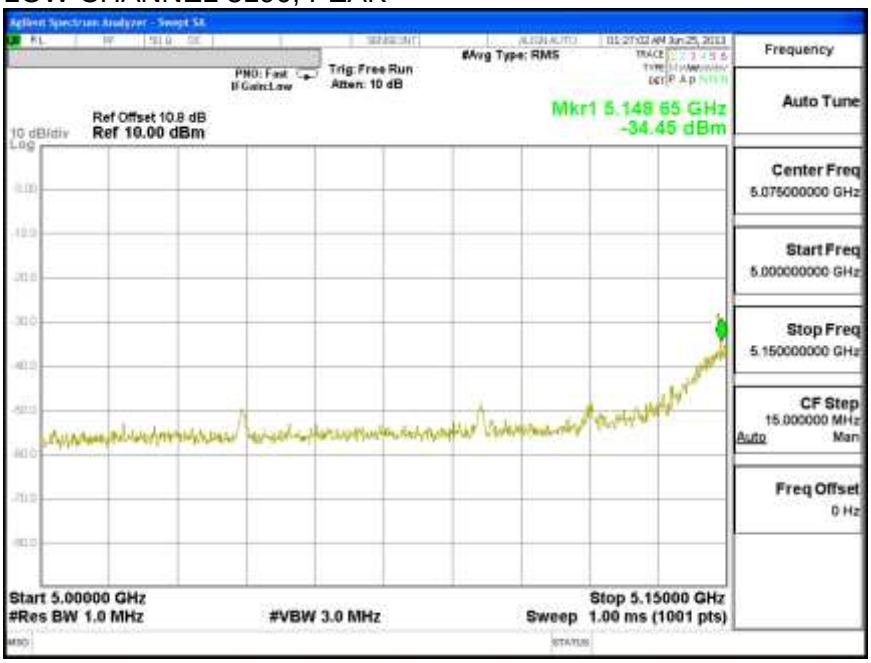
LOW CHANNEL 5190, AVERAGE



Chain 1

RESTRICTED BANDEDGE

LOW CHANNEL 5190, PEAK



LOW CHANNEL 5190, AVERAGE

BANDEDGE DATA

2TX Conducted Spurious BE for UNII (in the restricted bands)

Date:	6/25/2013
Test Engineer:	Tony Wagoner
Client:	Qualcomm
Project Number:	13U14995
Configuration:	Tx
Mode of operation:	11n HT40 5.2GHz

Note: if the PK margin is greater than 20 dB, there is no need to get AVG reading.

Channel	Frequency (MHz)	PXA PK Reading Chain 0 (dBm)	PXA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
38 (5190)	5150	-36.41	-34.45	2	-27.30	-21.2	-6.10	10.00	5.48/6.96

Channel	Frequency (MHz)	PXA AVG Reading Chain 0 (dBm)	PXA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
38 (5190)	5149	-50.608	-49.711	2	-42.12	-41.2	-0.92	9.50	5.02/6.44

8.4. 802.11a MODE IN THE 5.3 GHz BAND

8.4.1. 26 dB BANDWIDTH

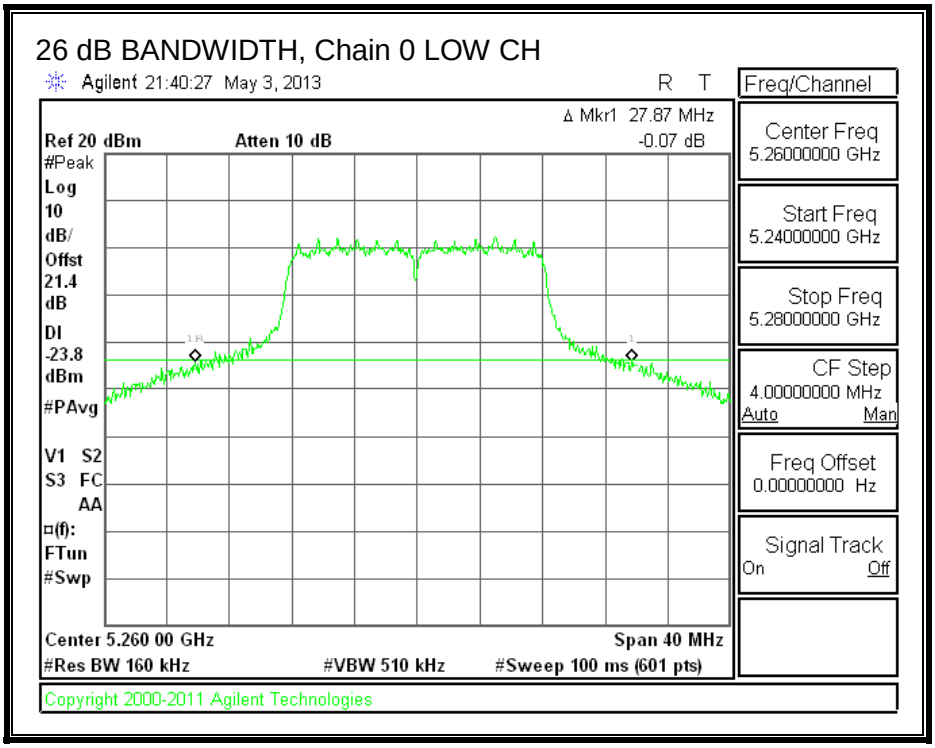
LIMITS

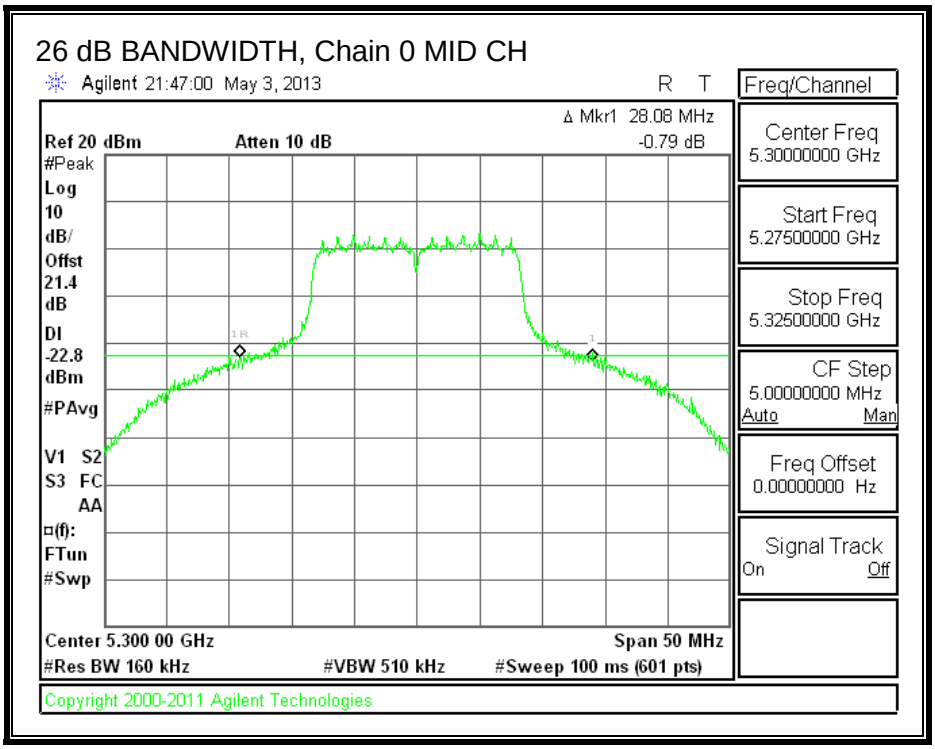
None; for reporting purposes only.

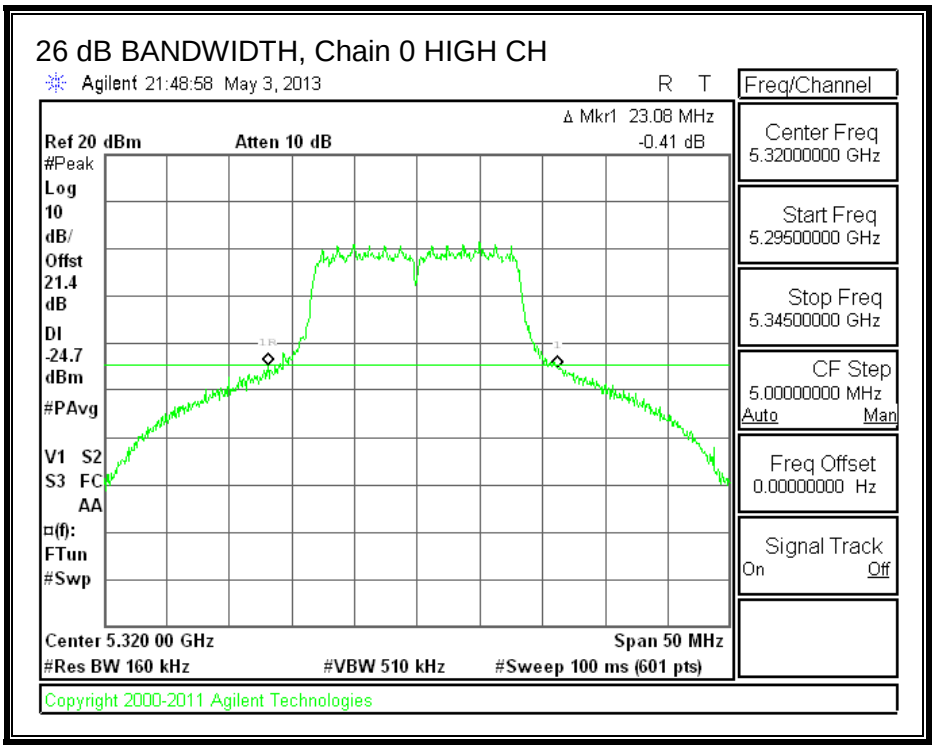
RESULTS

Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5260	27.87	30.40
Mid	5300	28.08	35.00
High	5320	23.08	26.00

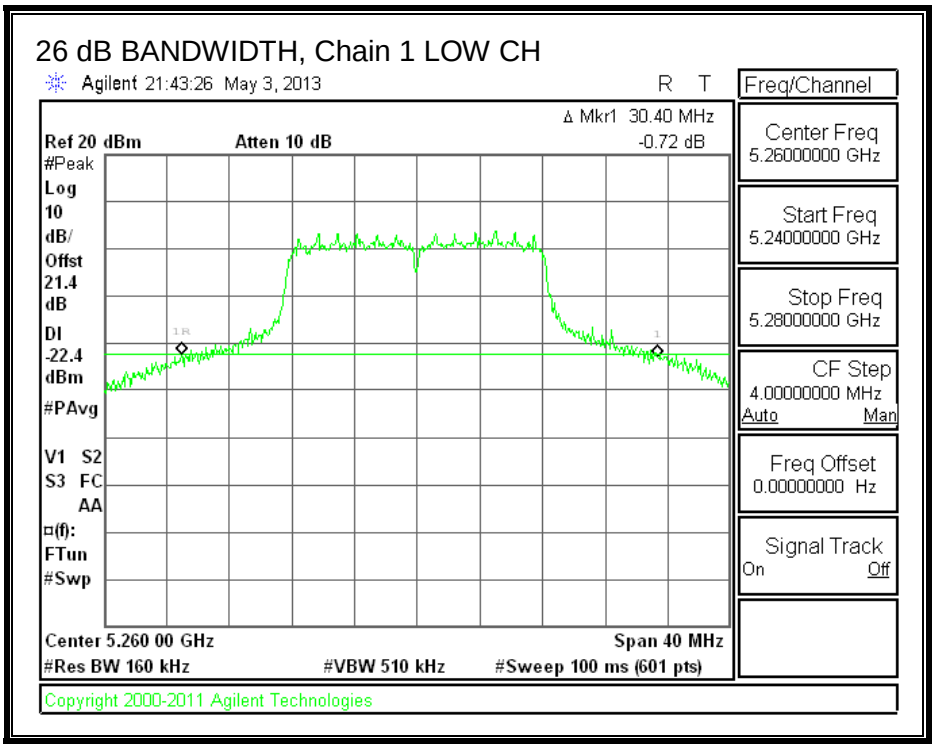
26 dB BANDWIDTH, Chain 0



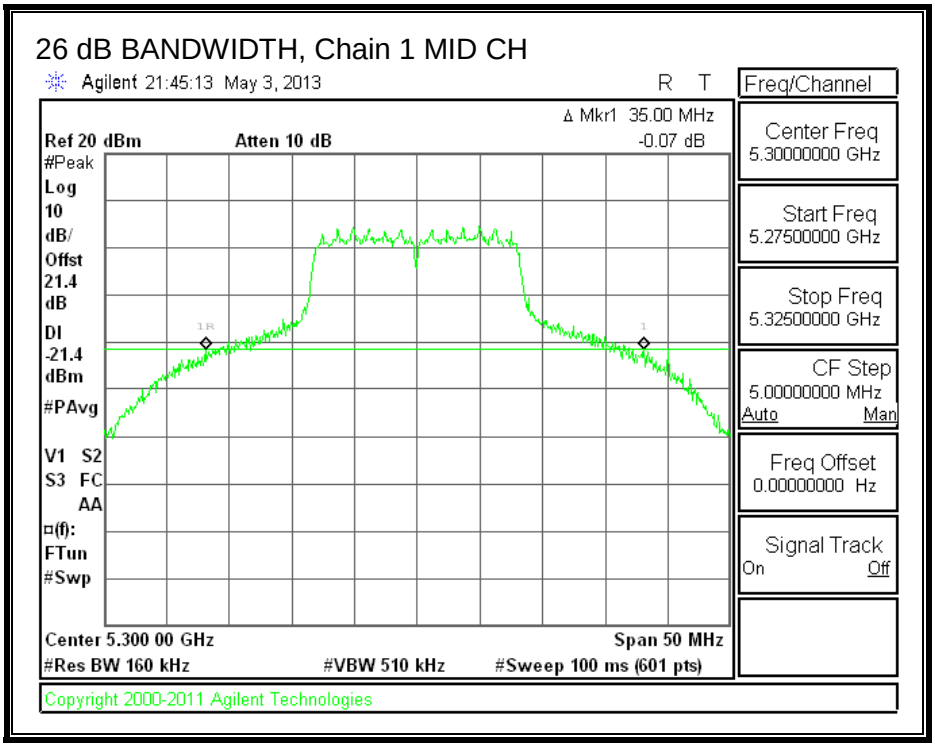




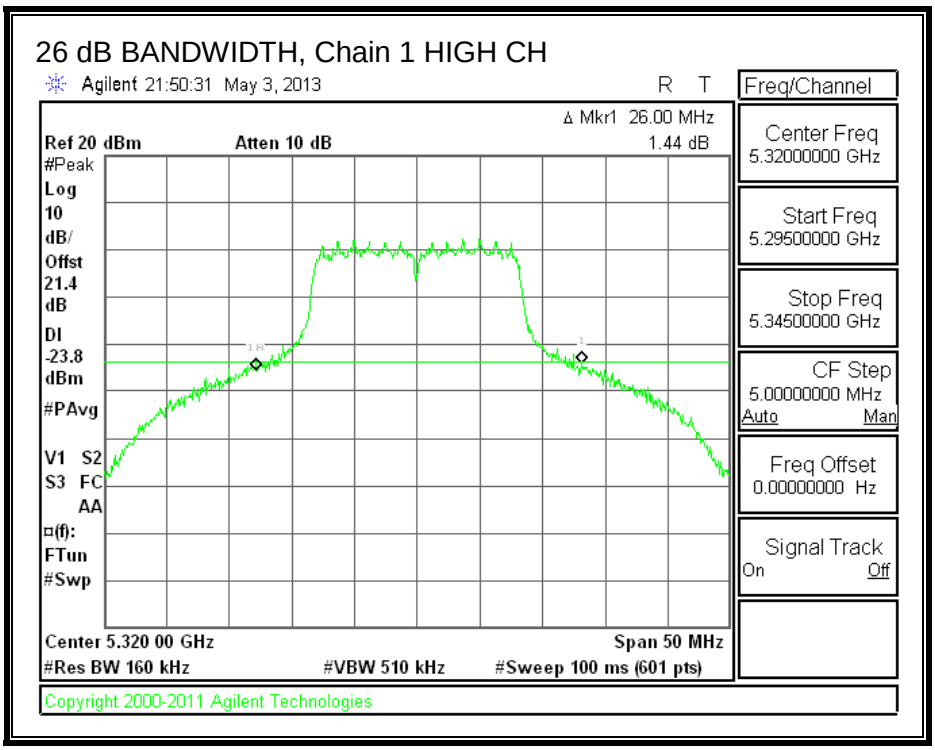
26 dB BANDWIDTH, Chain 1



26 dB BANDWIDTH, Chain 1 MID CH



26 dB BANDWIDTH, Chain 1 HIGH CH



8.4.2. 99% BANDWIDTH

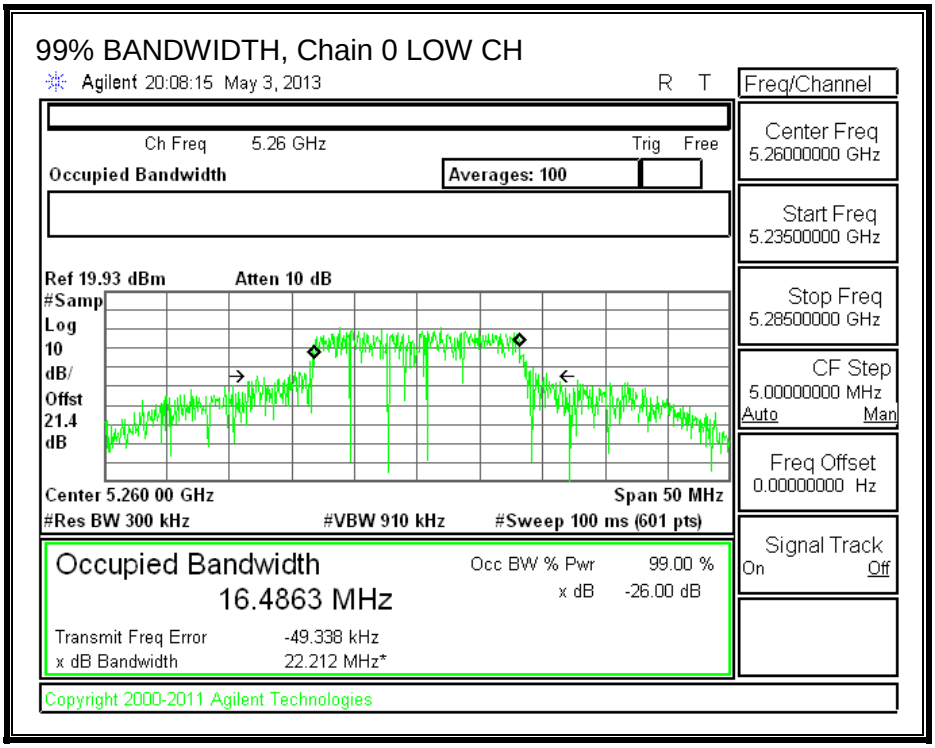
LIMITS

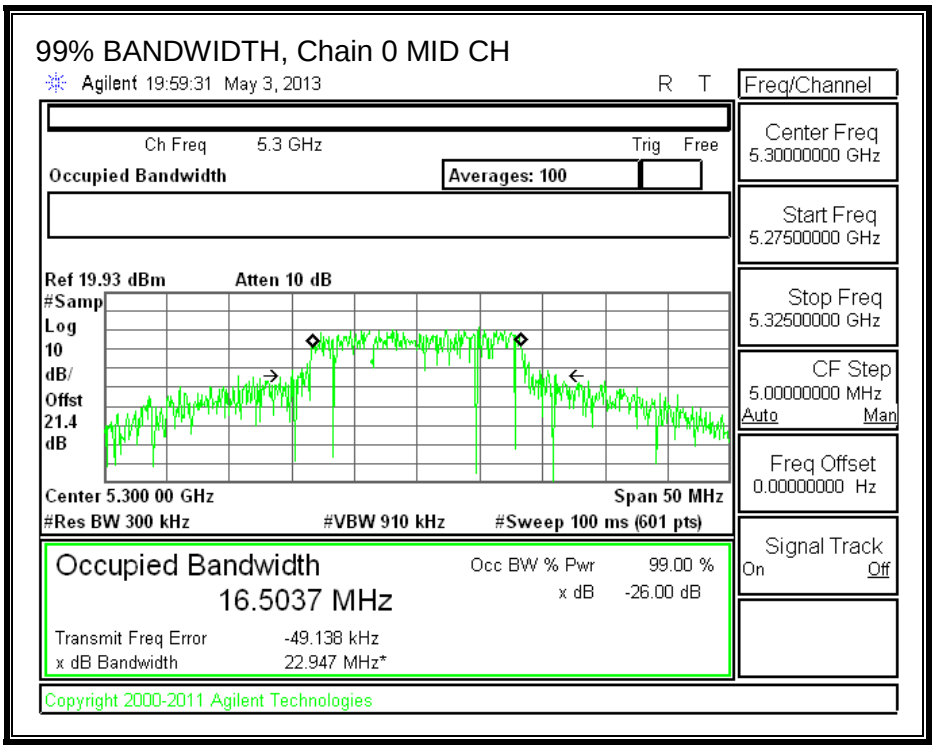
None; for reporting purposes only.

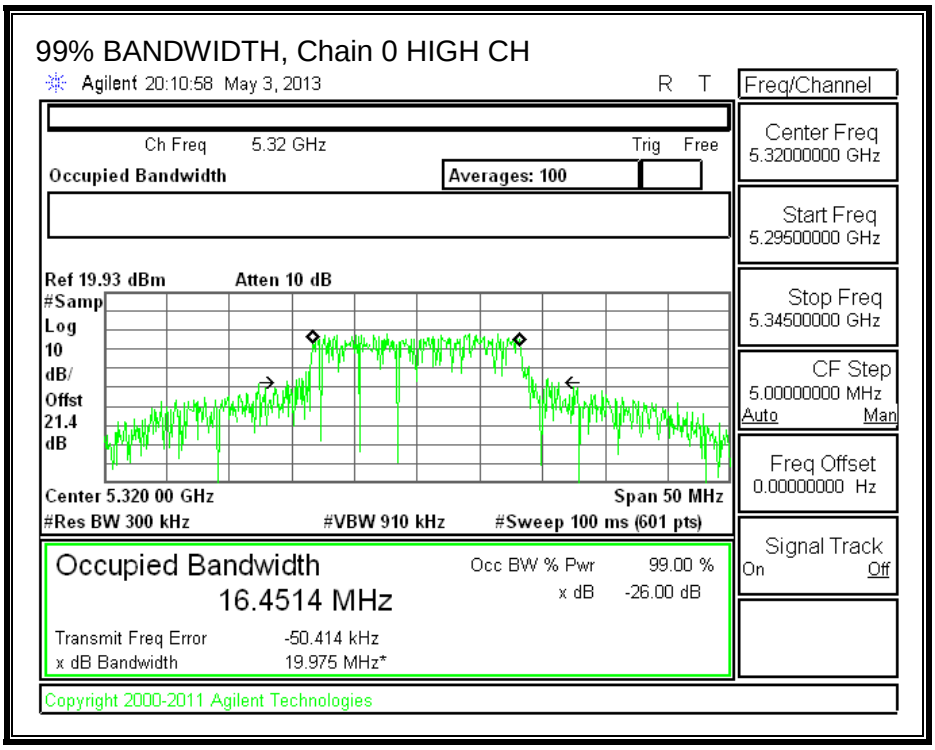
RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	5260	16.4863	16.5249
Mid	5300	16.5037	16.5836
High	5320	16.4514	16.4827

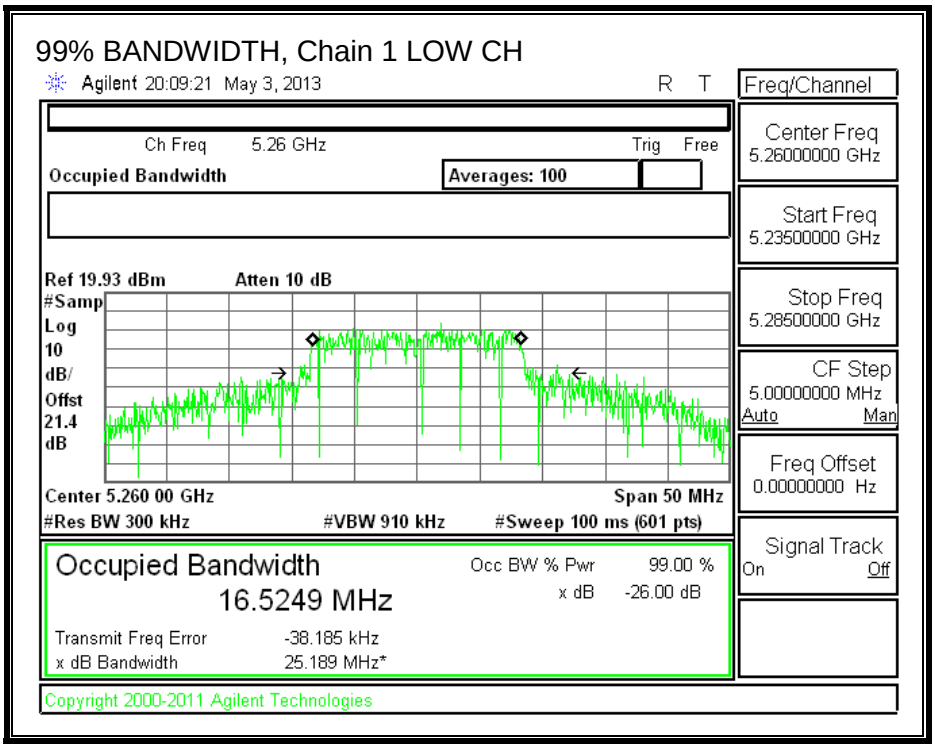
99% BANDWIDTH, Chain 0

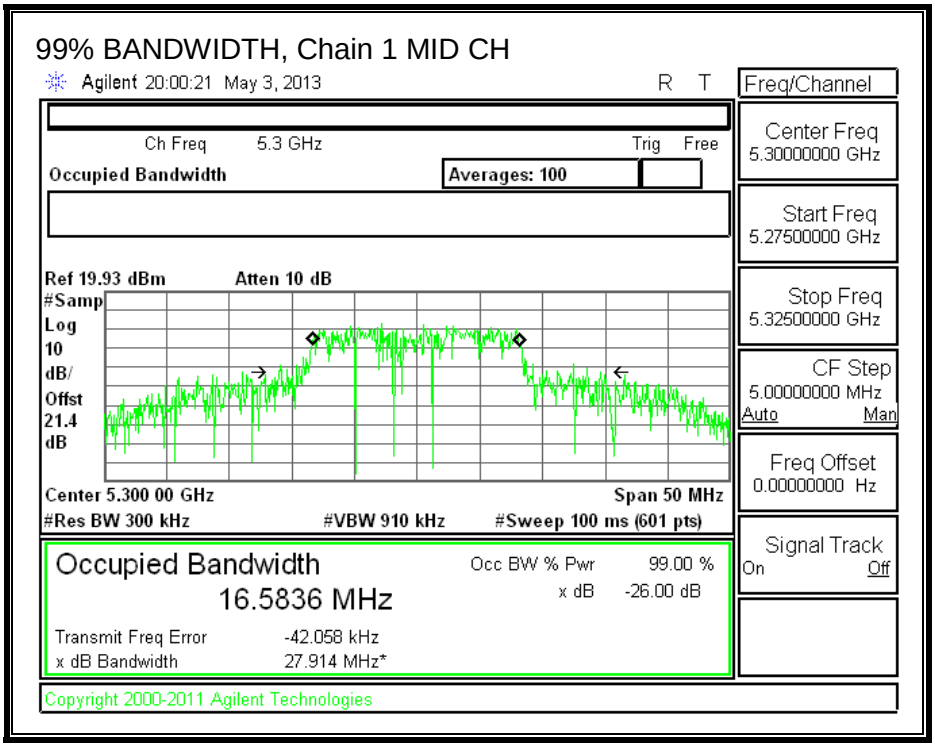


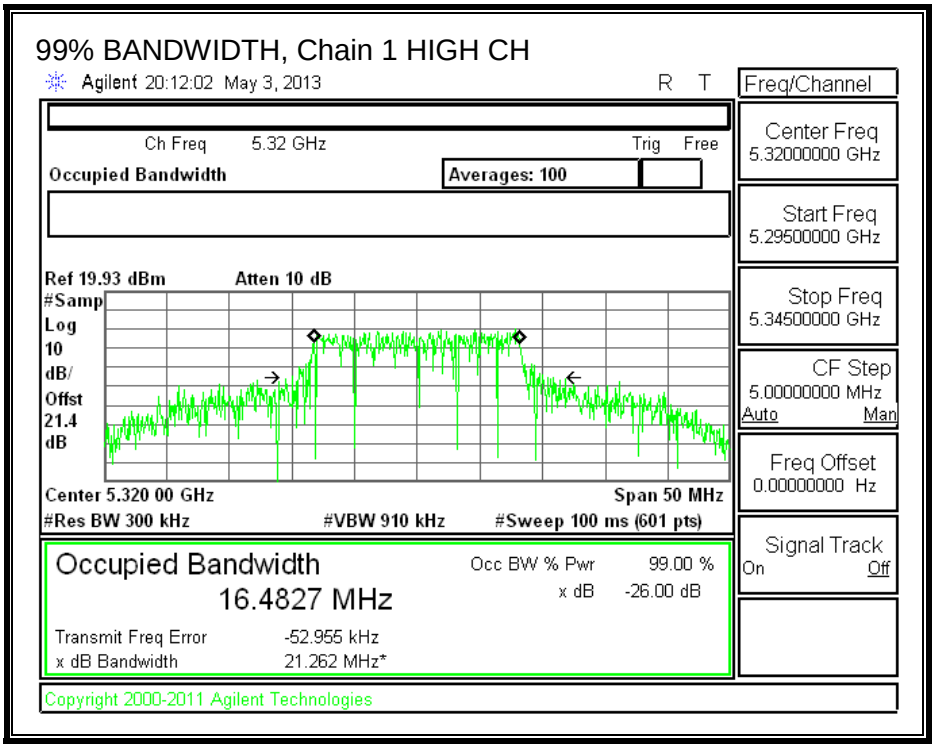




99% BANDWIDTH, Chain 1







8.4.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 25.39 dB (including two 10 dB pads, 1.99 dB cables, and 3.4 dB power splitter) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	5260	14.30	15.90	18.18
Mid	5300	14.12	15.70	17.99
High	5320	12.00	13.30	15.71

8.4.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

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 peak power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the 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.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

For output power, the two chains are considered uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
2.00	2.00	2.00

For PSD, the two chains are considered correlated and the antenna gain is unequal among the chains. The directional gain is:

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Correlated Chains Directional Gain (dBi)
2.00	2.00	5.01

Worst-case correlated antenna gain of 5.01 dBi was used in the output power and PSD table.

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5260	27.87	16.4863	5.01
Mid	5300	28.08	16.5037	5.01
High	5320	23.08	16.4514	5.01

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC PSD Limit (dBm)	PPSD Limit (dBm)
Low	5260	24.00	23.17	29.17	23.17	11.00	11.00	11.00
Mid	5300	24.00	23.18	29.18	23.18	11.00	11.00	11.00
High	5320	24.00	23.16	29.16	23.16	11.00	11.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PPSD

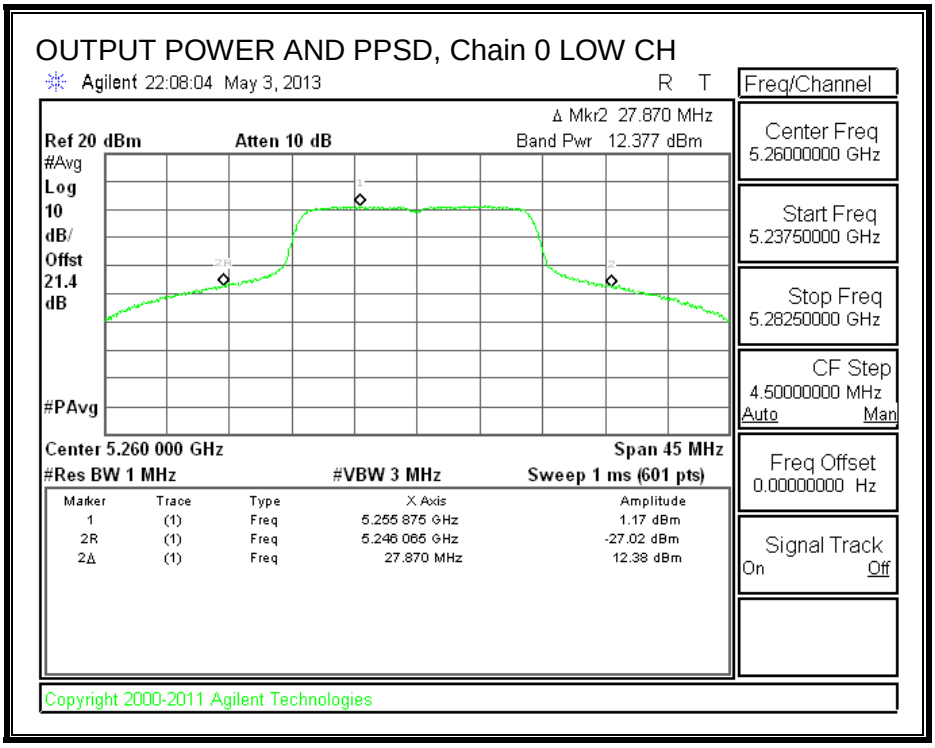
Output Power Results

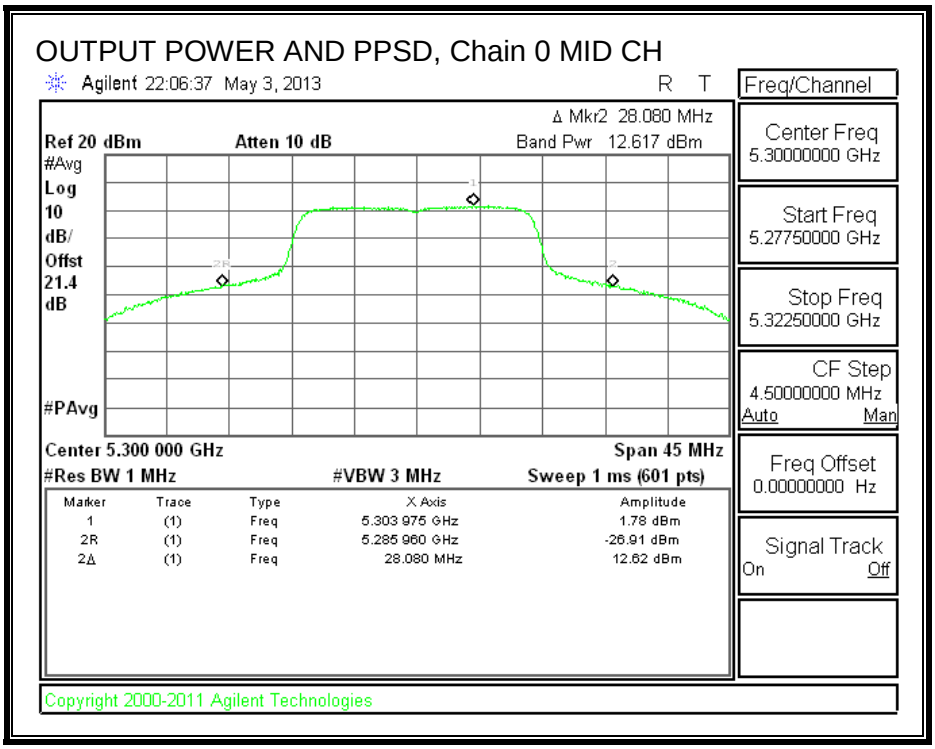
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	12.377	13.938	16.238	23.17	-6.934
Mid	5300	12.617	13.848	16.286	23.18	-6.890
High	5320	10.636	10.947	13.805	23.16	-9.357

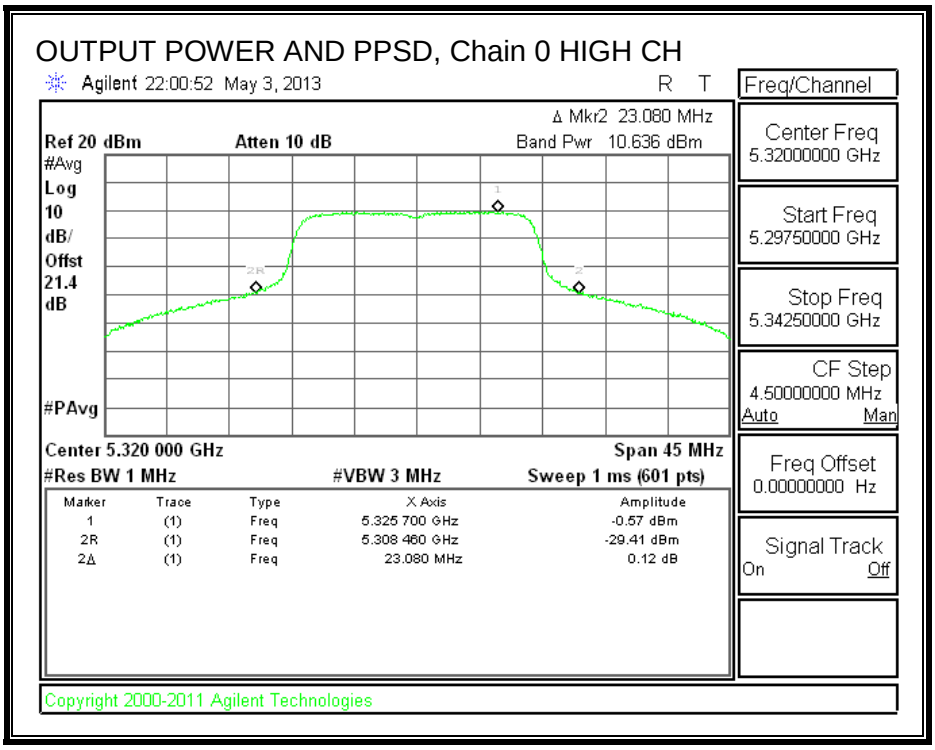
PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Chain 1 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5260	1.17	3.04	5.22	11.00	-5.78
Mid	5300	1.78	2.67	5.26	11.00	-5.74
High	5320	-0.57	-0.16	2.65	11.00	-8.35

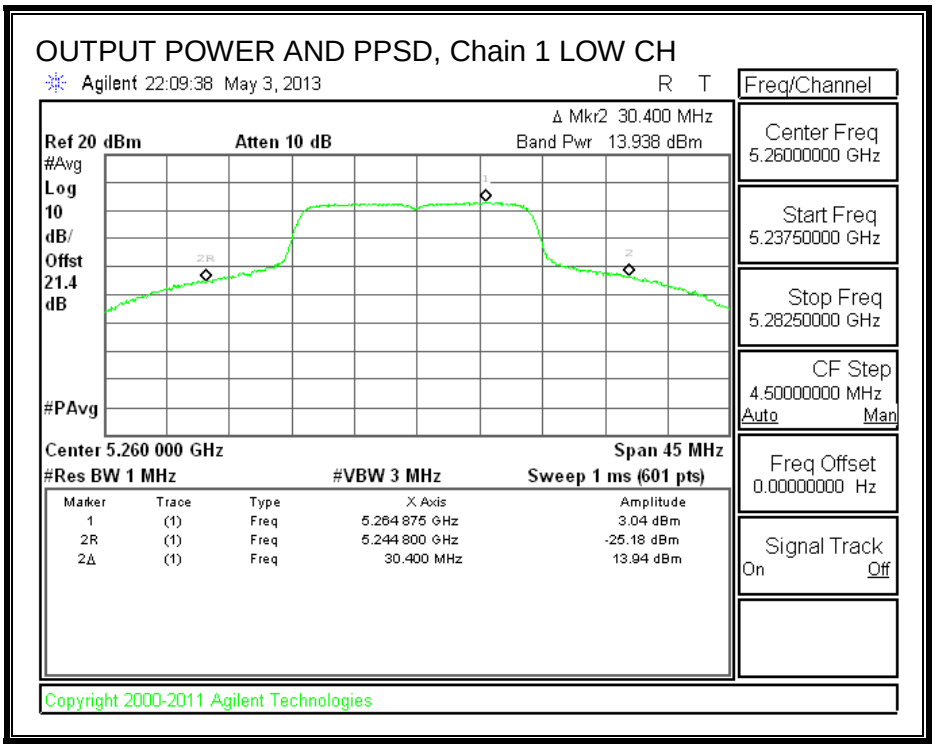
OUTPUT POWER AND PPSD, Chain 0



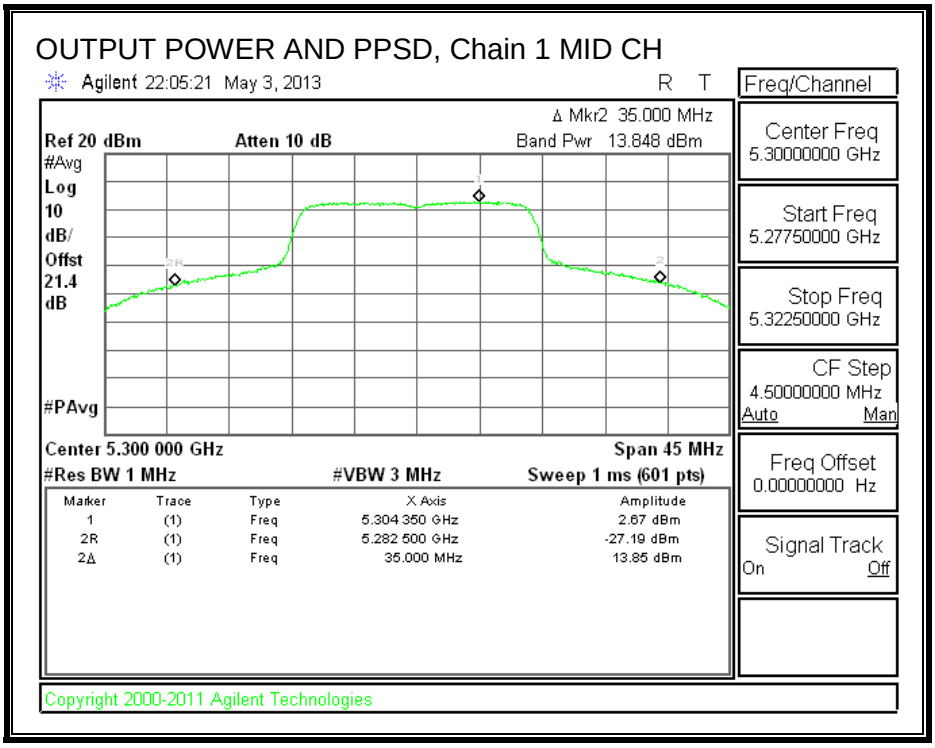




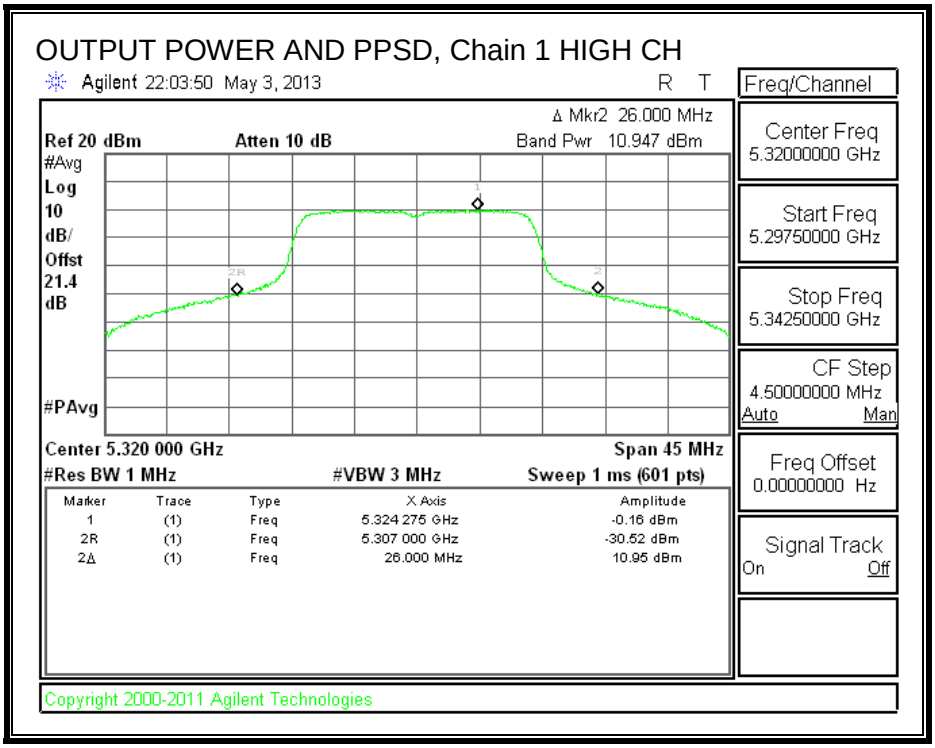
OUTPUT POWER AND PPSD, Chain 1



OUTPUT POWER AND PPSD, Chain 1 MID CH



OUTPUT POWER AND PPSD, Chain 1 HIGH CH



8.4.5. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

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

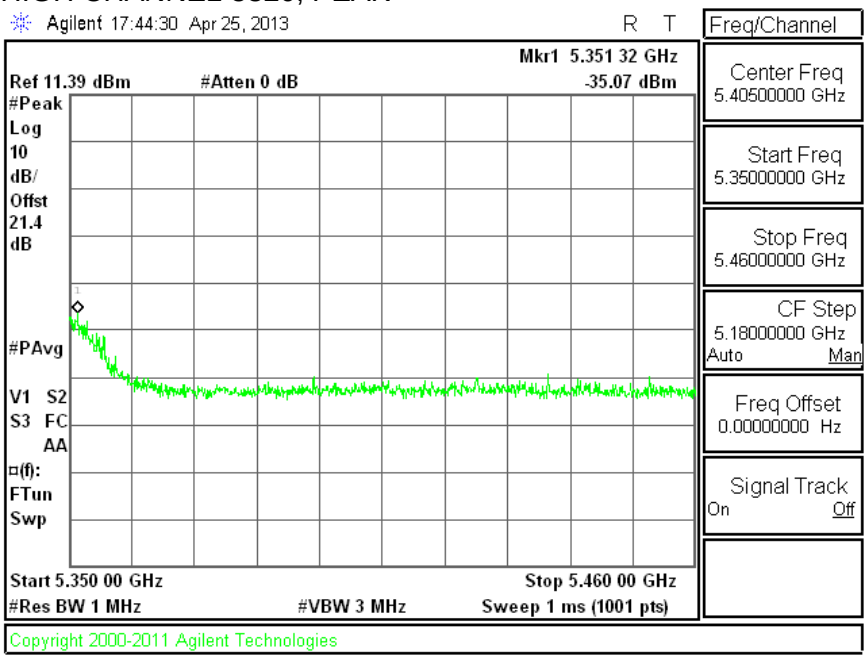
RESULTS

Refer to the results of 802.11a mode in the 5.2 GHz band.

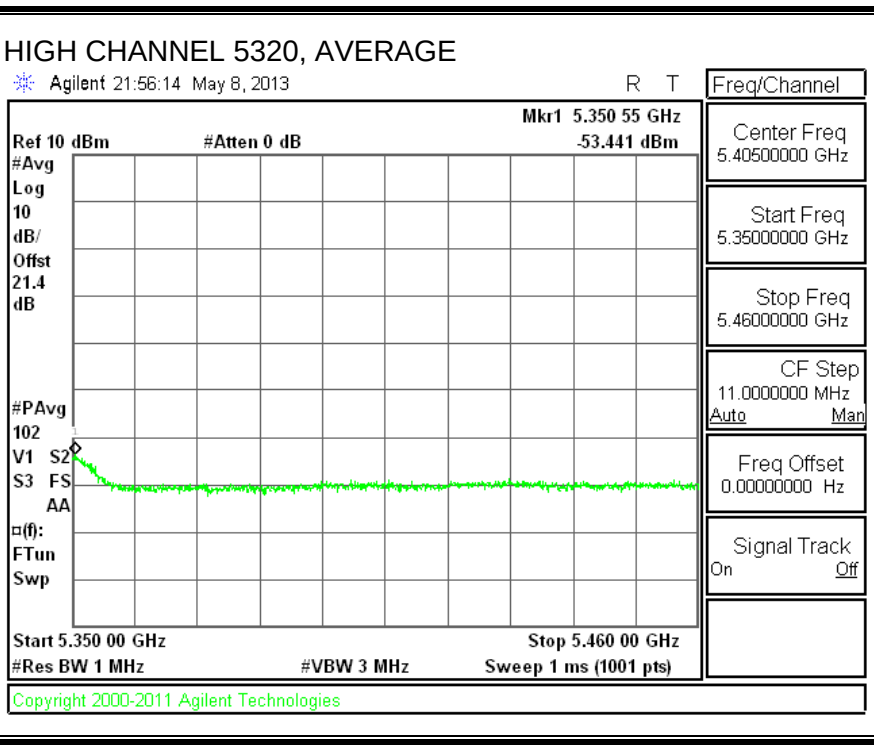
8.4.6. CONDUCTED BANDEDGE, HARMONICS & SPURIOUS (no filter unit)

Chain 0
RESTRICTED BANDEDGE

HIGH CHANNEL 5320, PEAK

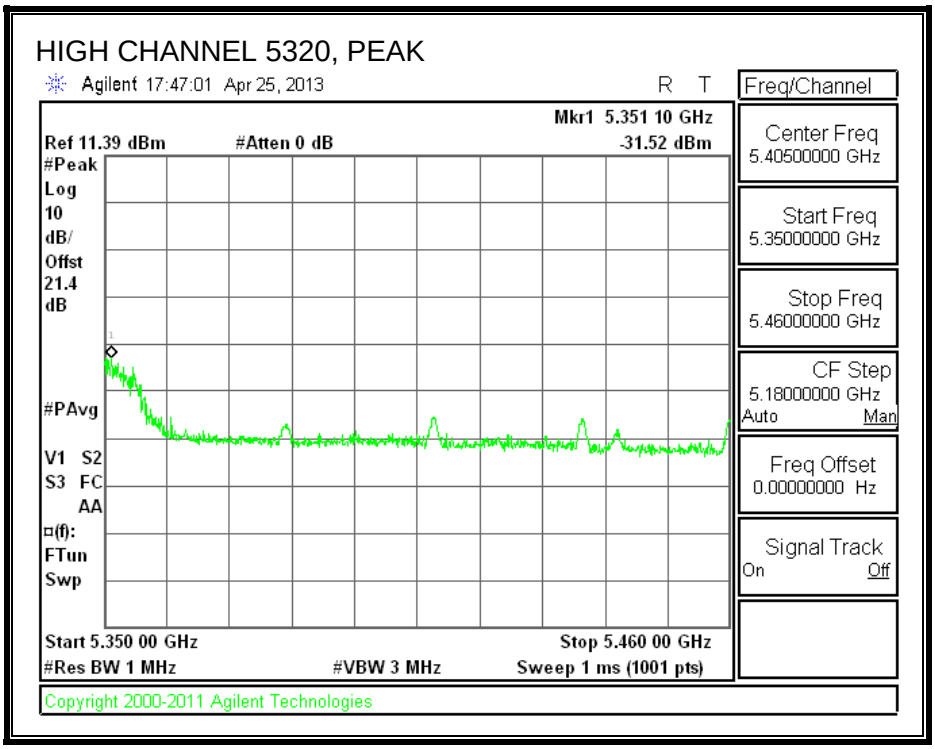


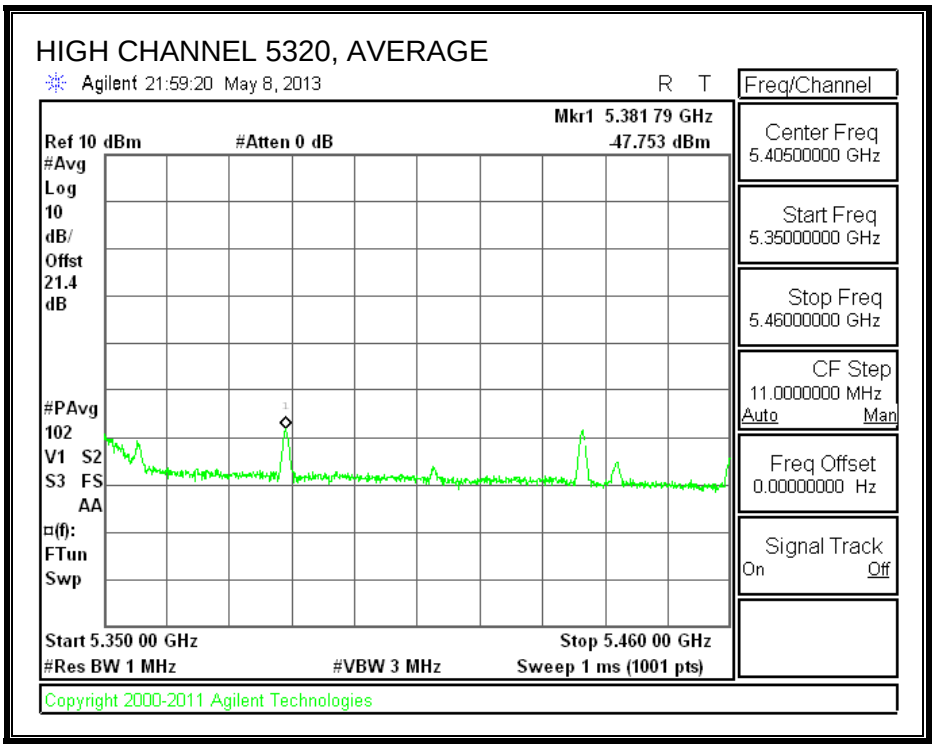
HIGH CHANNEL 5320, AVERAGE



Chain 1

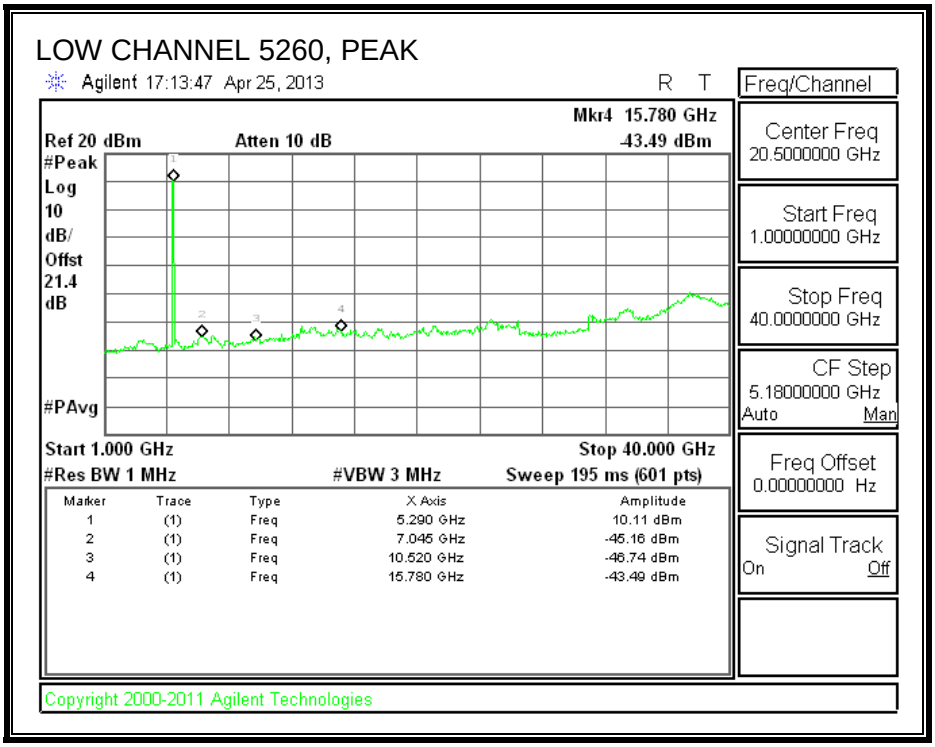
RESTRICTED BANDEDGE

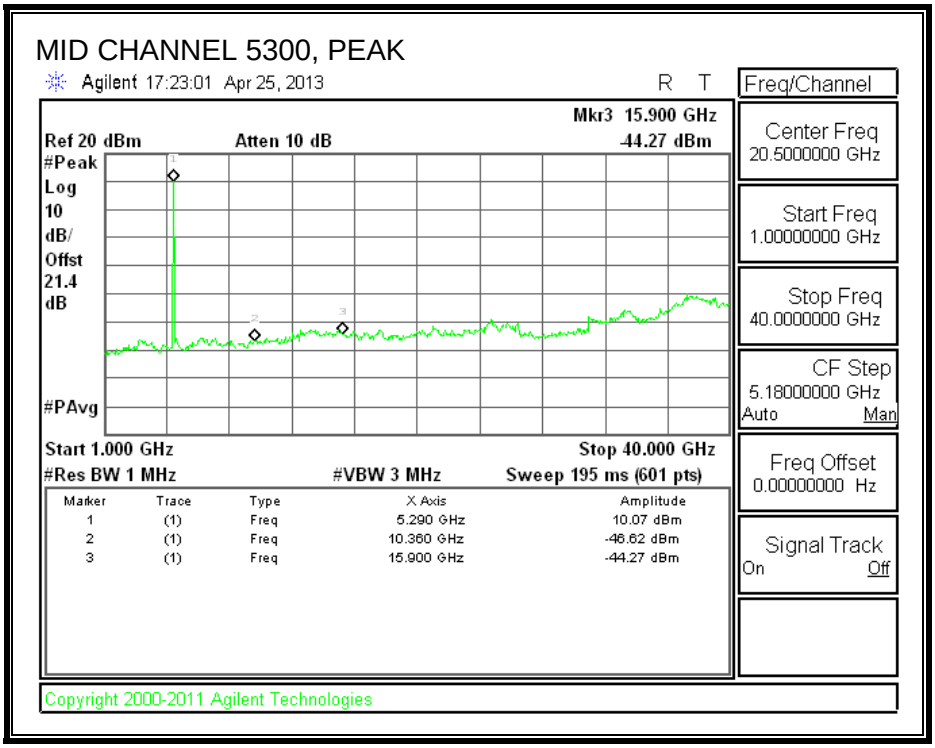


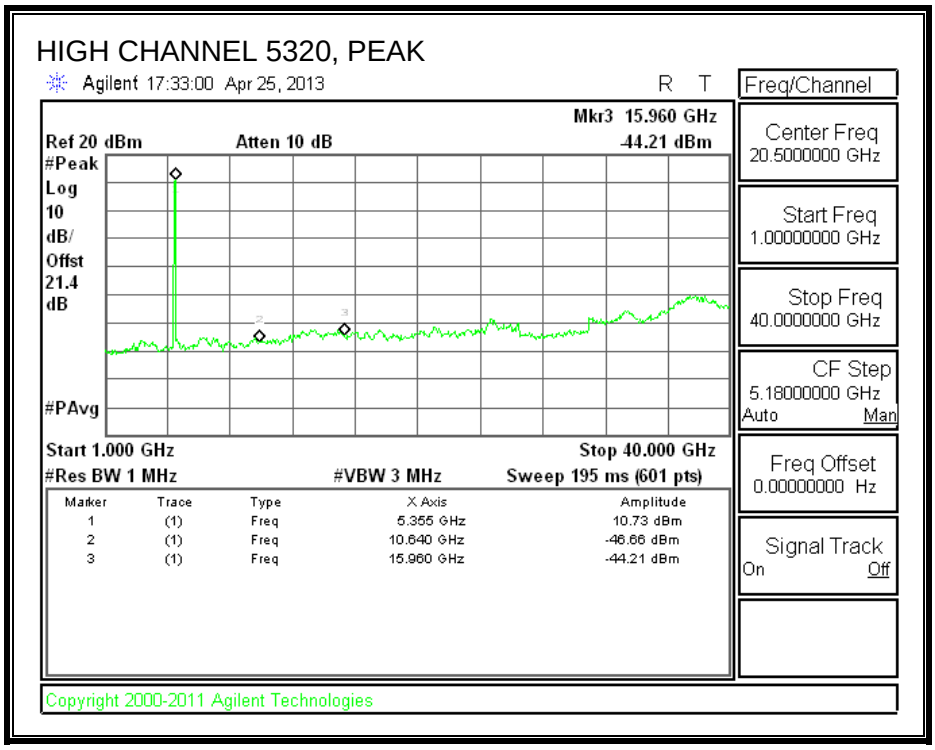


HARMONICS AND SPURIOUS

Chain 0

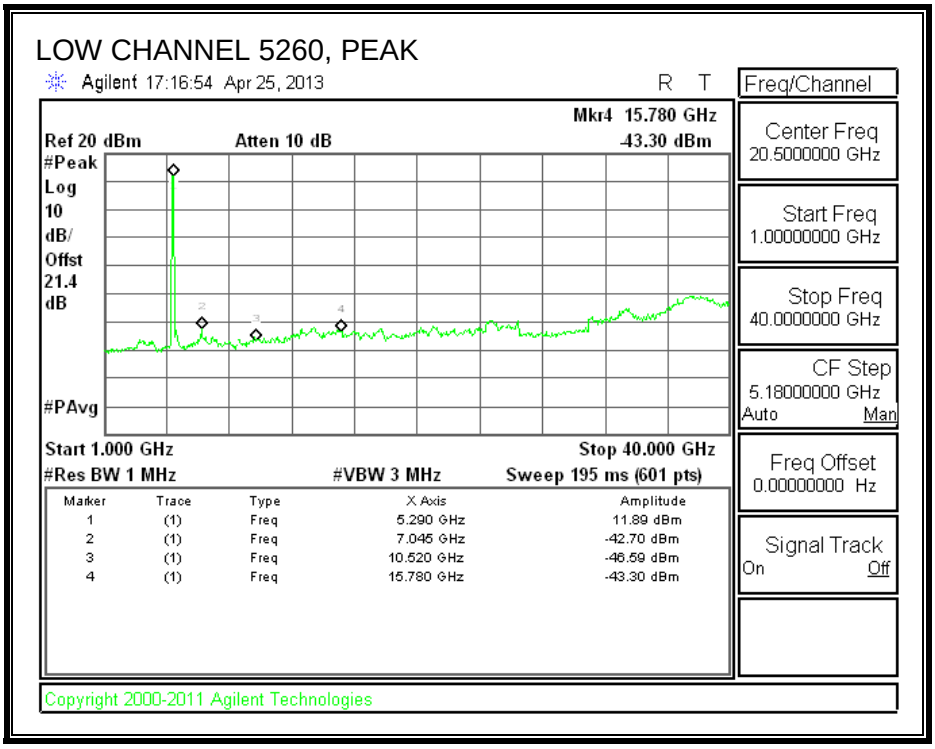




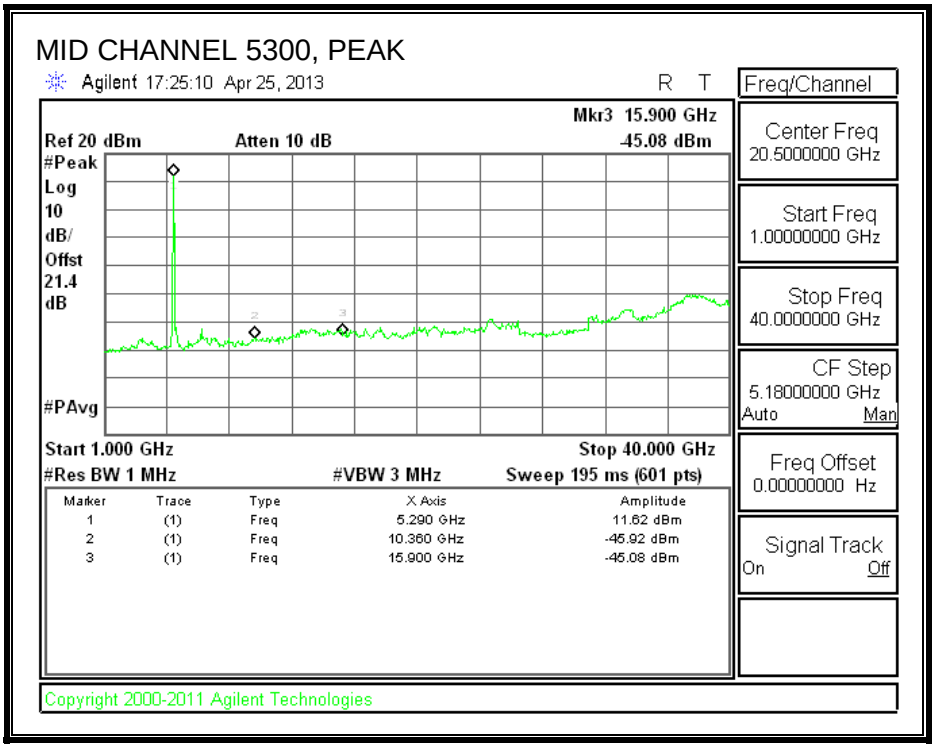


Chain 1

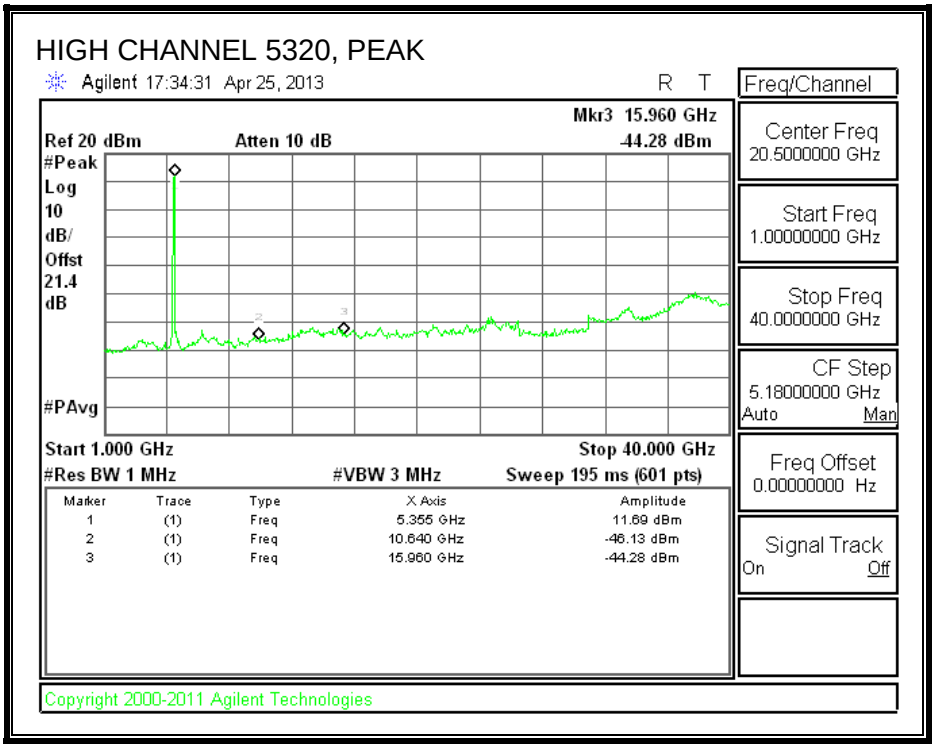
RESTRICTED BANDEDGE (LOW CHANNEL)



MID CHANNEL 5300, PEAK



HIGH CHANNEL 5320, PEAK



BANDEDGE DATA

2TX Conducted Spurious BE for UNII (in the restricted bands)

Date:	5/9/2013
Test Engineer:	Tony Wagoner
Client:	Qualcomm
Project Number:	13U14995
Configuration:	Tx
Mode of operation:	11a 5.3GHz

Note: if the PK margin is greater than 20 dB, there is no need to get AVG reading.

Channel	Frequency (MHz)	PXA PK Reading Chain 0 (dBm)	PXA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
64 (5320)	5351	-35.07	-31.52	2	-24.92	-21.2	-3.72	17.00	14.2 / 15.45

Channel	Frequency (MHz)	PXA AVG Reading Chain 0 (dBm)	PXA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
64 (5320)	5350	-53.441	-47.753	2	-41.71	-41.2	-0.51	16.50	12.0 / 13.3

SPURIOUS DATA

The data in this table is from testing done at the harmonics shown in the plots with the span of 1MHz.

2TX Conducted Spurious for UNII (in the restricted bands)

Date:	4/25/2013
Test Engineer:	T. Wagoner
Client:	Qualcomm Atheros
Project Number:	13u14995
Configuration:	5.3GHz 11a
Mode of operation:	Tx

Note: if the PK margin is greater than 20 dB, there is no need to get AVG reading.

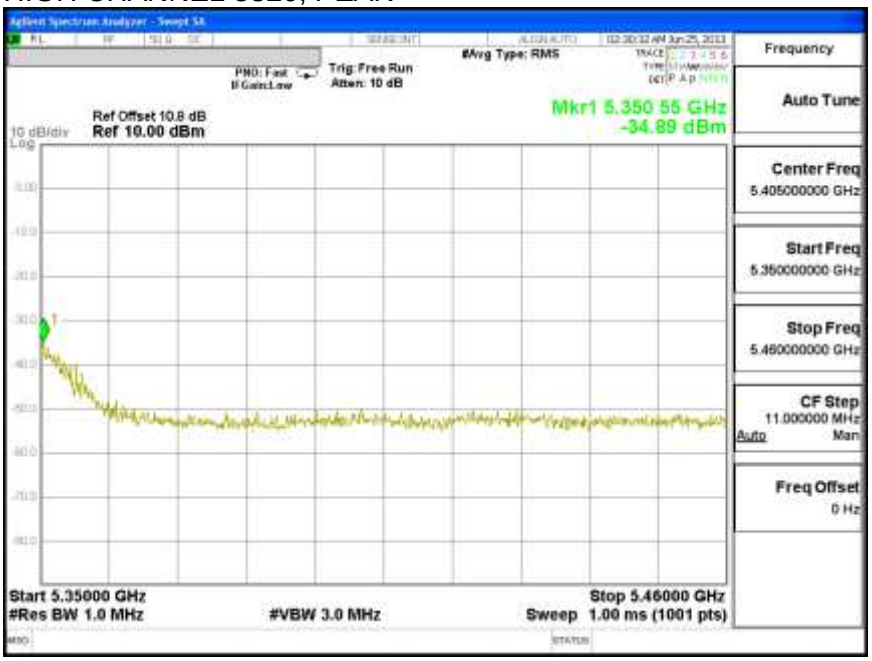
Channel	Frequency (MHz)	PSA PK Reading Chain 0 (dBm)	PSA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
52 (5260)	7045	-55.07	-54.4	2	-46.70	-21.2	-25.50	17.00	14.3 / 15.9
52 (5260)	10.52	-55.43	-56.18	2	-47.77	-21.2	-26.57	17.00	14.3 / 15.9
52 (5260)	15.78	-53.27	-53.42	2	-45.32	-21.2	-24.12	17.00	14.3 / 15.9
60 (5300)	10.36	-54.62	-54.88	2	-46.73	-21.2	-25.53	17.00	14.12 / 15.7
60 (5300)	15.9	-53.13	-52.63	2	-44.85	-21.2	-23.65	17.00	14.12 / 15.7
64 (5320)	10.64	-52.37	-55.6	2	-45.67	-21.2	-24.47	17.00	14.2 / 15.45
64 (5320)	15.96	-53.31	-53.84	2	-45.55	-21.2	-24.35	17.00	14.2 / 15.45

Channel	Frequency (MHz)	PSA AVG Reading Chain 0 (dBm)	PSA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)

8.4.7. CONDUCTED BANDEDGE, HARMONICS & SPURIOUS (3G filter unit)

Chain 0
RESTRICTED BANDEDGE

HIGH CHANNEL 5320, PEAK

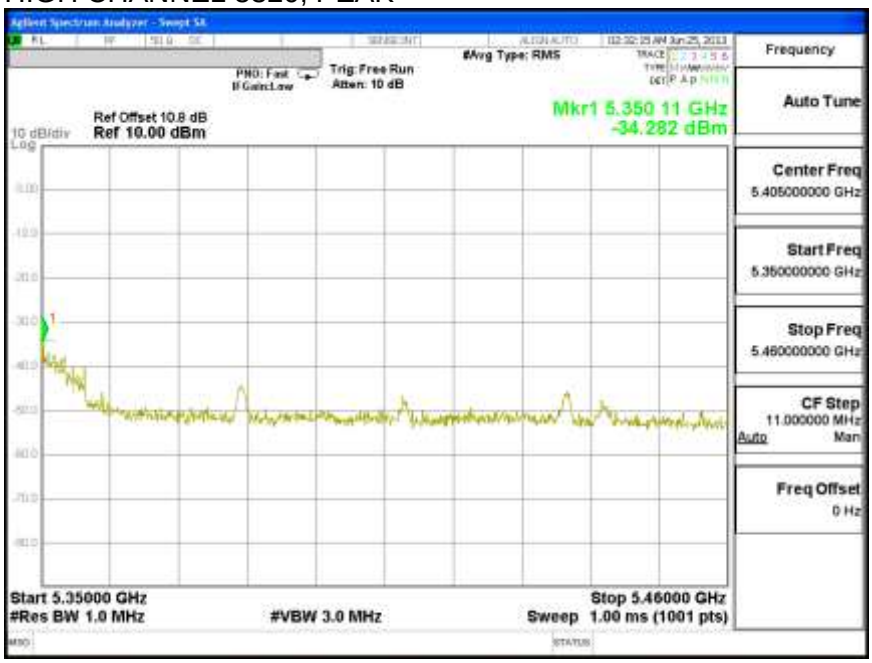


HIGH CHANNEL 5320, AVERAGE

Chain 1

RESTRICTED BANDEDGE

HIGH CHANNEL 5320, PEAK



HIGH CHANNEL 5320, AVERAGE

BANDEDGE DATA

2TX Conducted Spurious BE for UNII (in the restricted bands)

Date:	6/25/2013
Test Engineer:	Tony Wagoner
Client:	Qualcomm
Project Number:	13U14995
Configuration:	Tx
Mode of operation:	11a 5.3GHz

Note: if the PK margin is greater than 20 dB, there is no need to get AVG reading.

Channel	Frequency (MHz)	PXA PK Reading Chain 0 (dBm)	PXA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
64 (5320)	5352	-34.89	-34.282	2	-26.56	-21.2	-5.36	17.00	11.8/12.6

Channel	Frequency (MHz)	PXA AVG Reading Chain 0 (dBm)	PXA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
64 (5320)	5350	-50.803	-48.697	2	-41.60	-41.2	-0.40	16.50	11/12.36

8.5. 802.11n HT20 MODE IN THE 5.3 GHz BAND

8.5.1. 26 dB BANDWIDTH

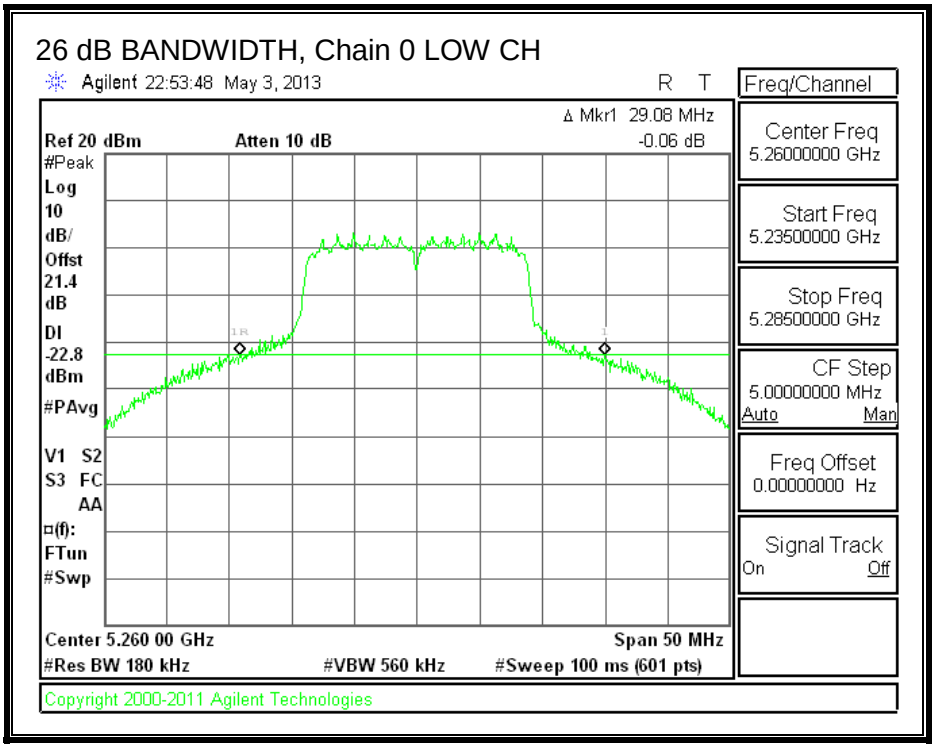
LIMITS

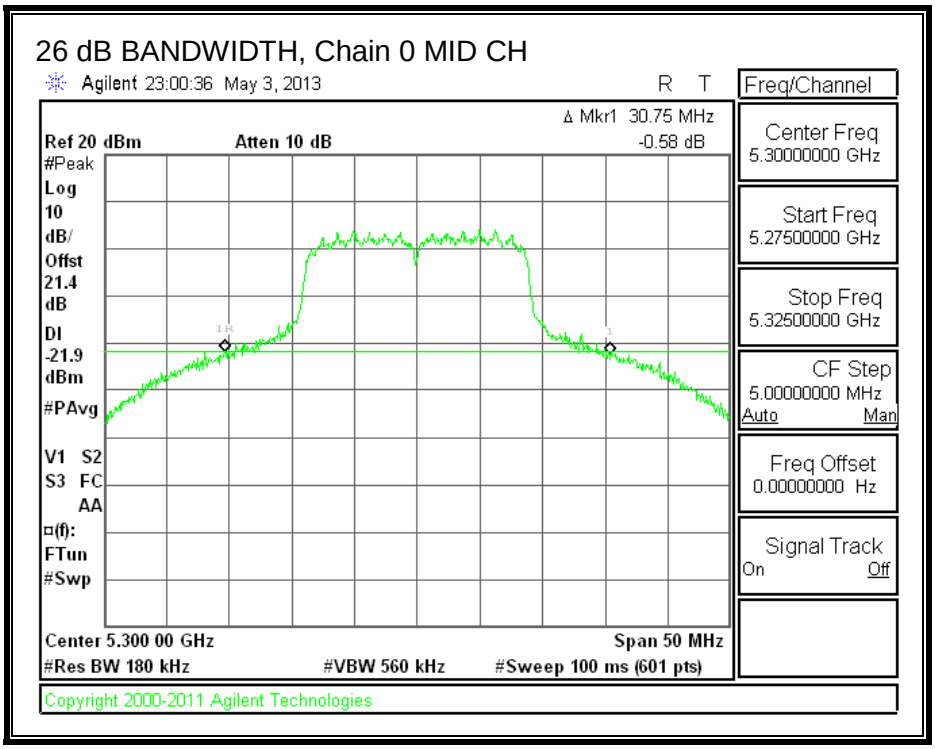
None; for reporting purposes only.

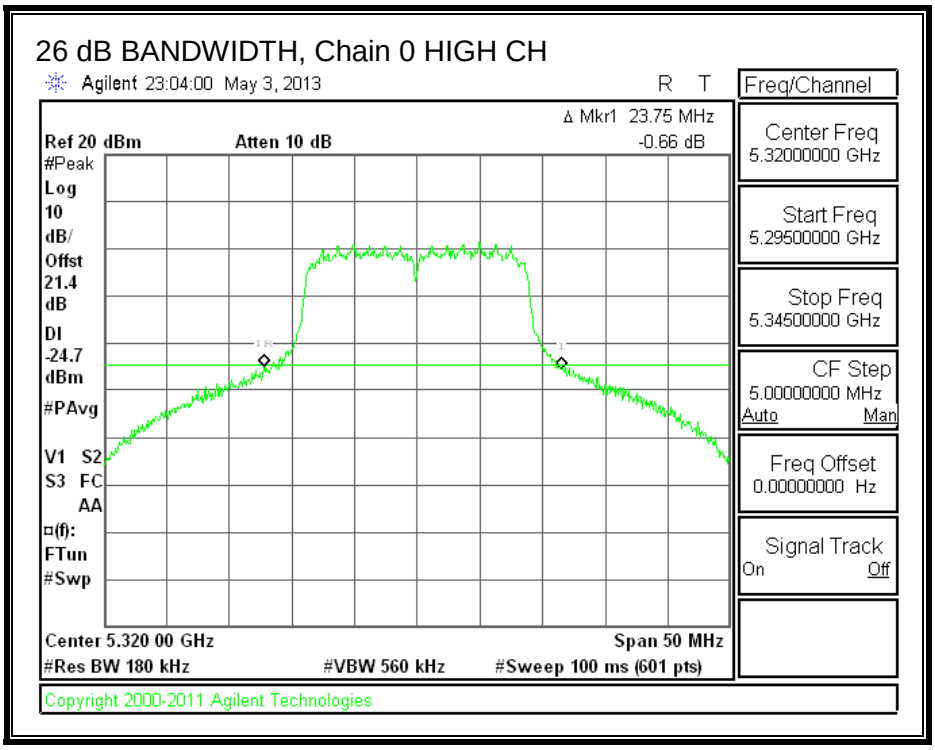
RESULTS

Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5260	29.08	33.92
Mid	5300	30.75	36.92
High	5320	23.75	25.42

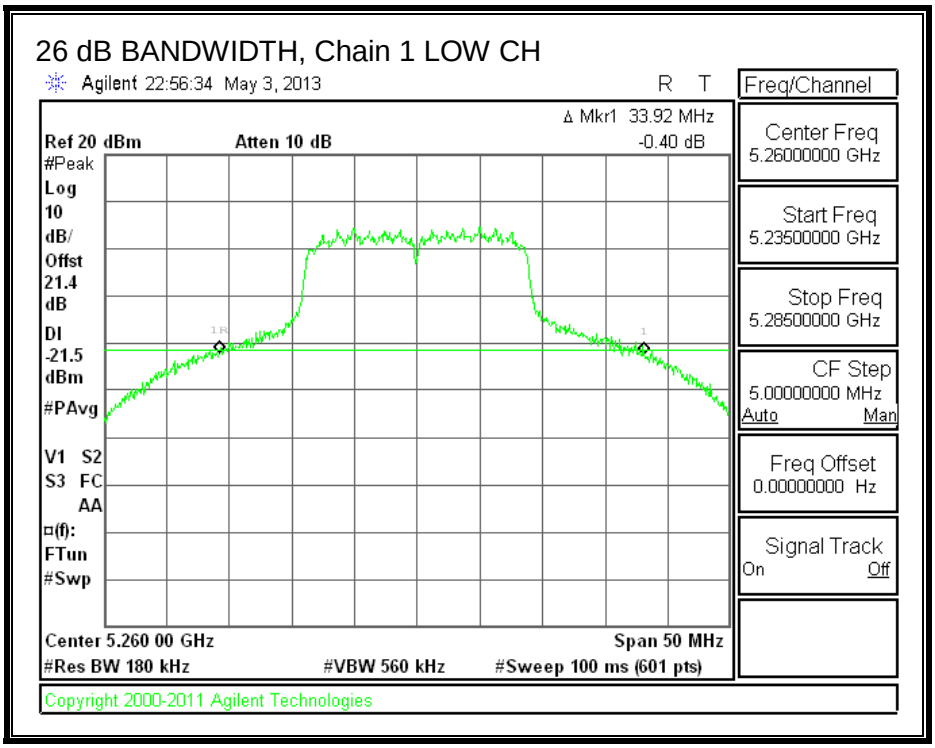
26 dB BANDWIDTH, Chain 0



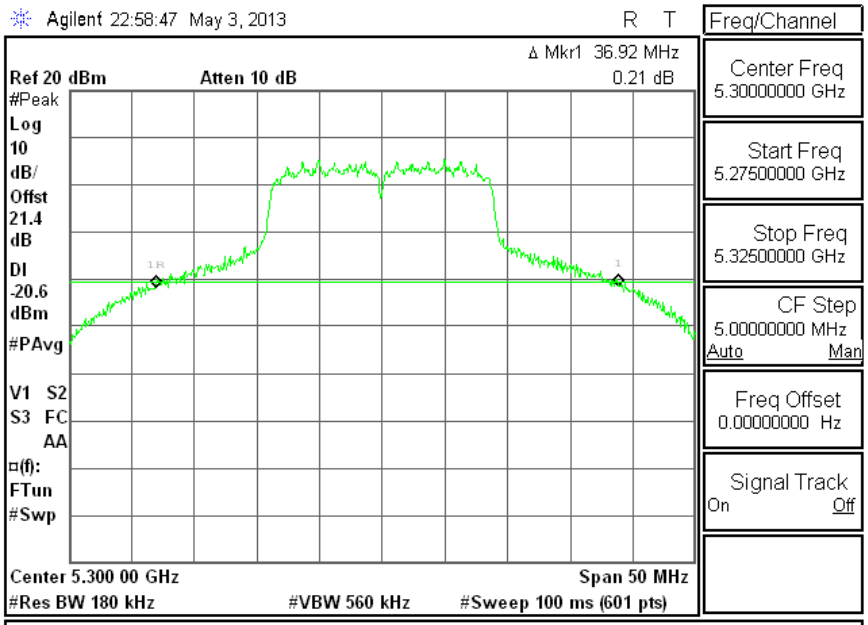




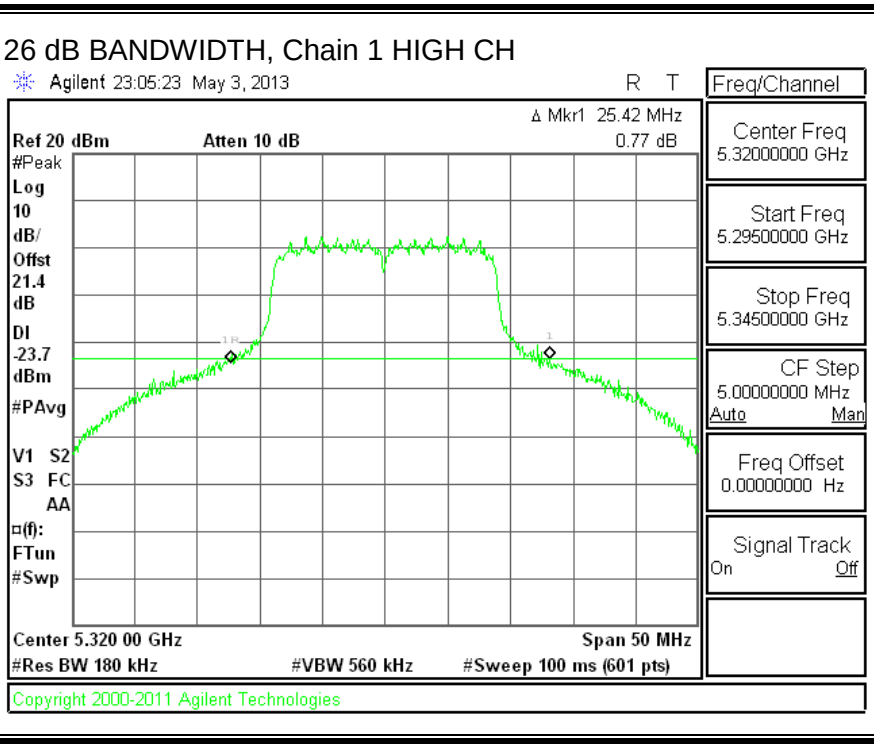
26 dB BANDWIDTH, Chain 1



26 dB BANDWIDTH, Chain 1 MID CH



26 dB BANDWIDTH, Chain 1 HIGH CH



8.5.2. 99% BANDWIDTH

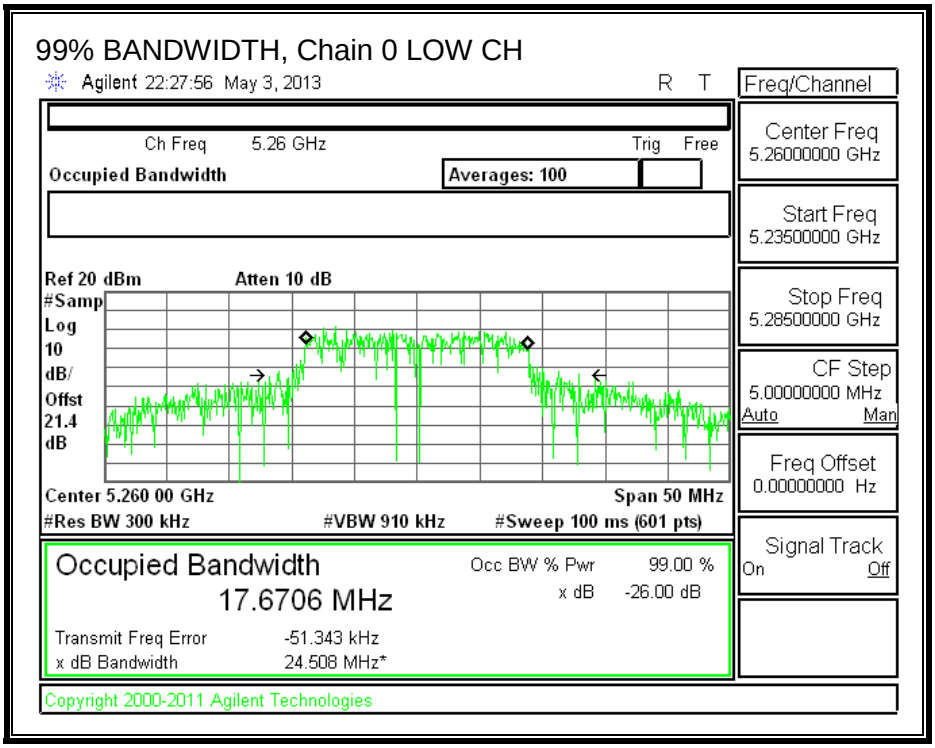
LIMITS

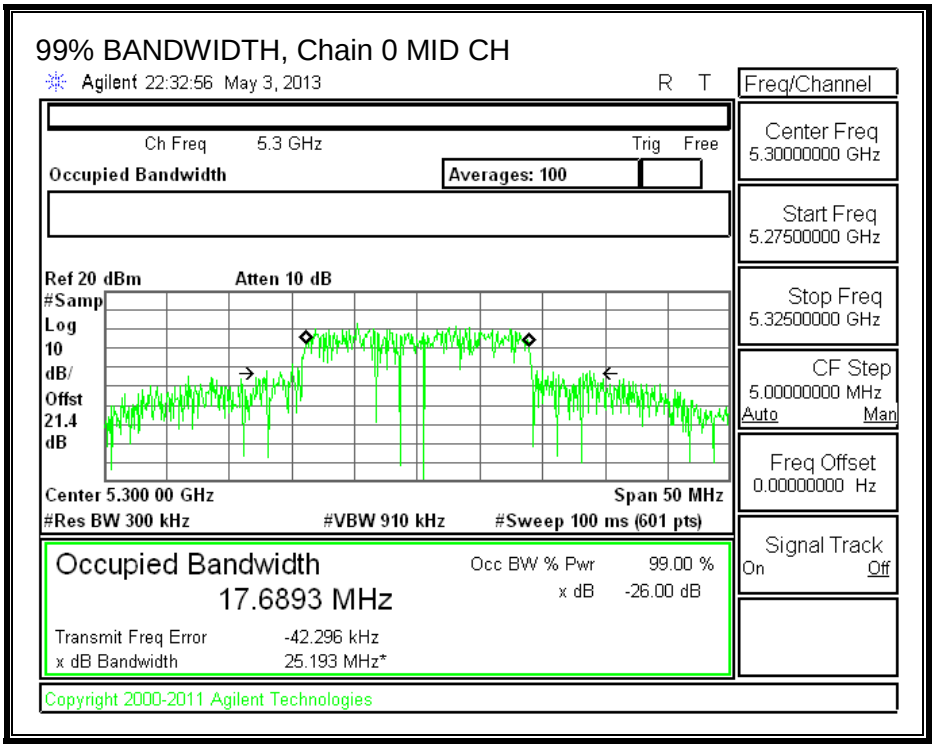
None; for reporting purposes only.

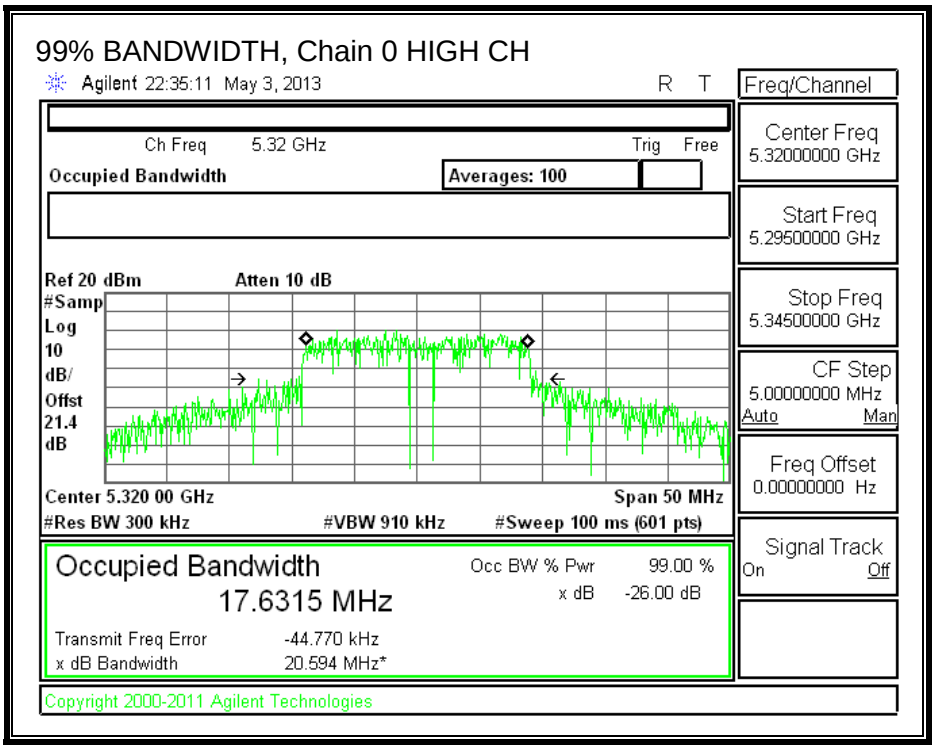
RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	5260	17.6706	18.0458
Mid	5300	17.6893	17.8350
High	5320	17.6315	17.6605

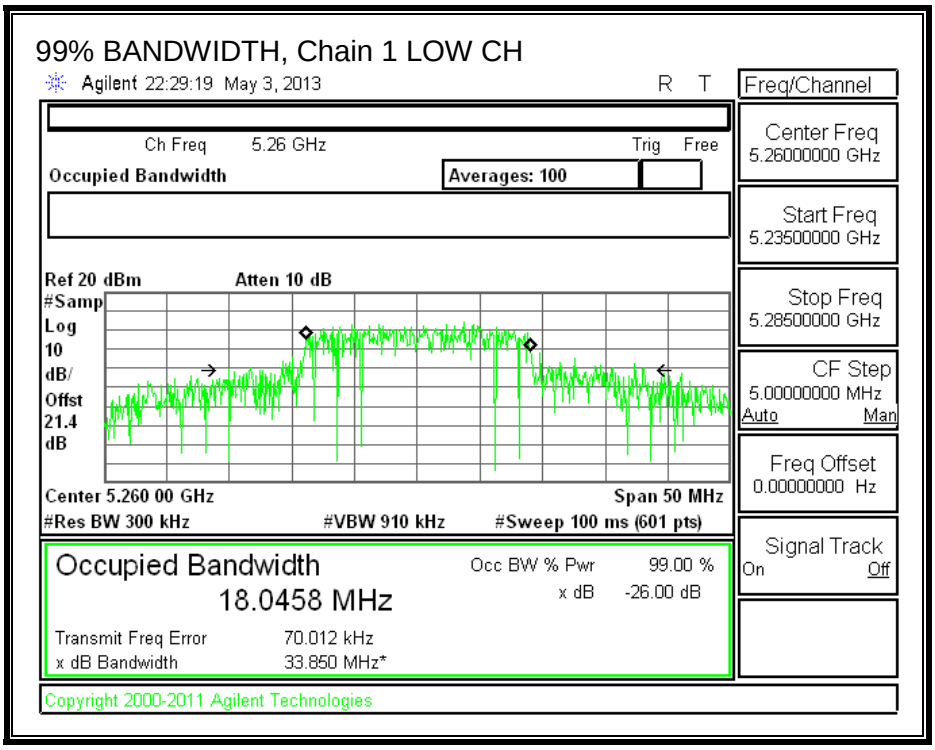
99% BANDWIDTH, Chain 0



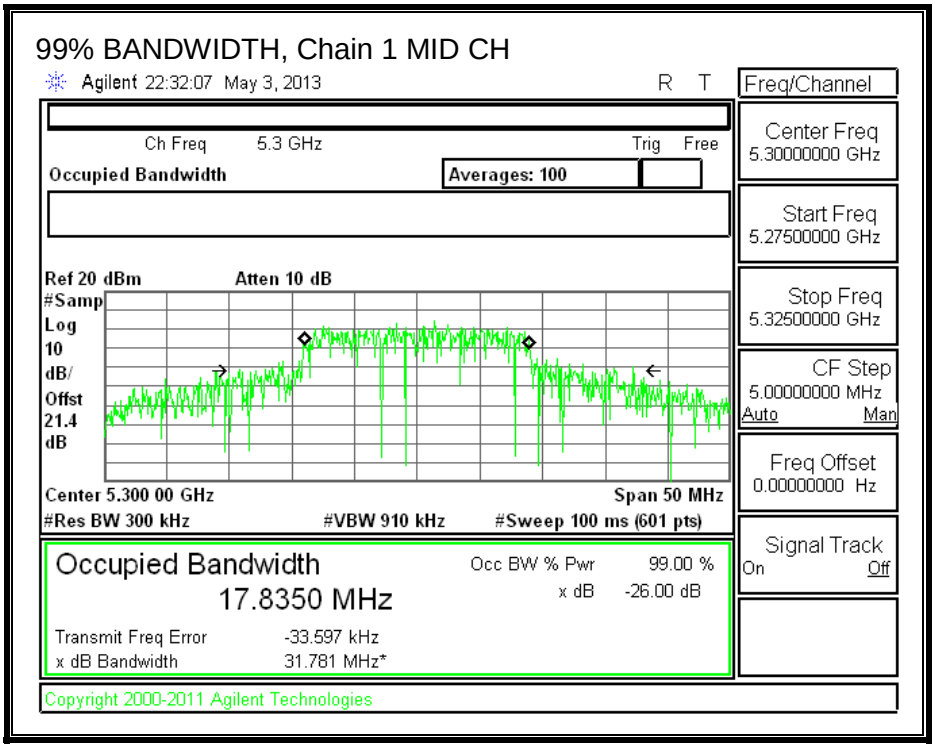




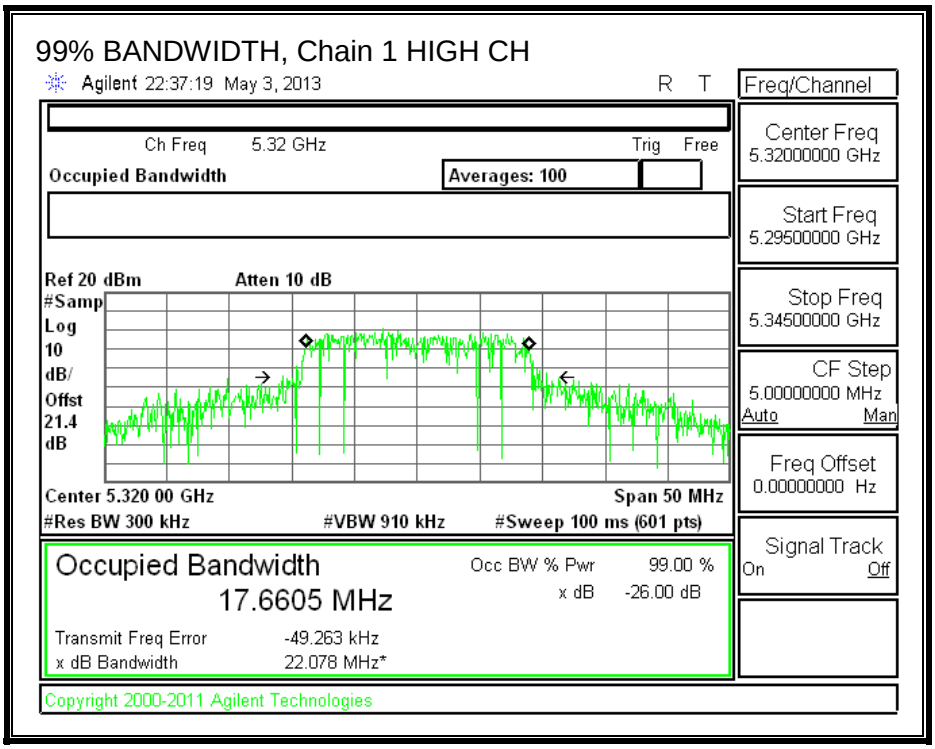
99% BANDWIDTH, Chain 1



99% BANDWIDTH, Chain 1 MID CH



99% BANDWIDTH, Chain 1 HIGH CH



8.5.3. AVERAGE POWER (No filter Unit)

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 25.39 dB (including two 10 dB pads, 1.99 dB cables, and 3.4 dB power splitter) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	5260	14.90	16.50	18.78
Mid	5300	14.80	16.20	18.57
High	5320	11.80	13.50	15.74

8.5.4. AVERAGE POWER (3G filter unit)

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 25.39 dB (including two 10 dB pads, 1.99 dB cables, and 3.4 dB power splitter) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
High	5320	10.40	11.32	13.89

8.5.5. OUTPUT POWER AND PPSD (no filter unit)

LIMITS

FCC §15.407 (a) (1)

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 peak power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the 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.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

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.

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
2.00	2.00	2.00

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5260	29.08	17.6706	2.00
Mid	5300	30.75	17.6893	2.00
High	5320	23.75	17.6315	2.00

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC PSD Limit (dBm)	PPSD Limit (dBm)
Low	5260	24.00	23.47	29.47	23.47	11.00	11.00	11.00
Mid	5300	24.00	23.48	29.48	23.48	11.00	11.00	11.00
High	5320	24.00	23.46	29.46	23.46	11.00	11.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PPSD

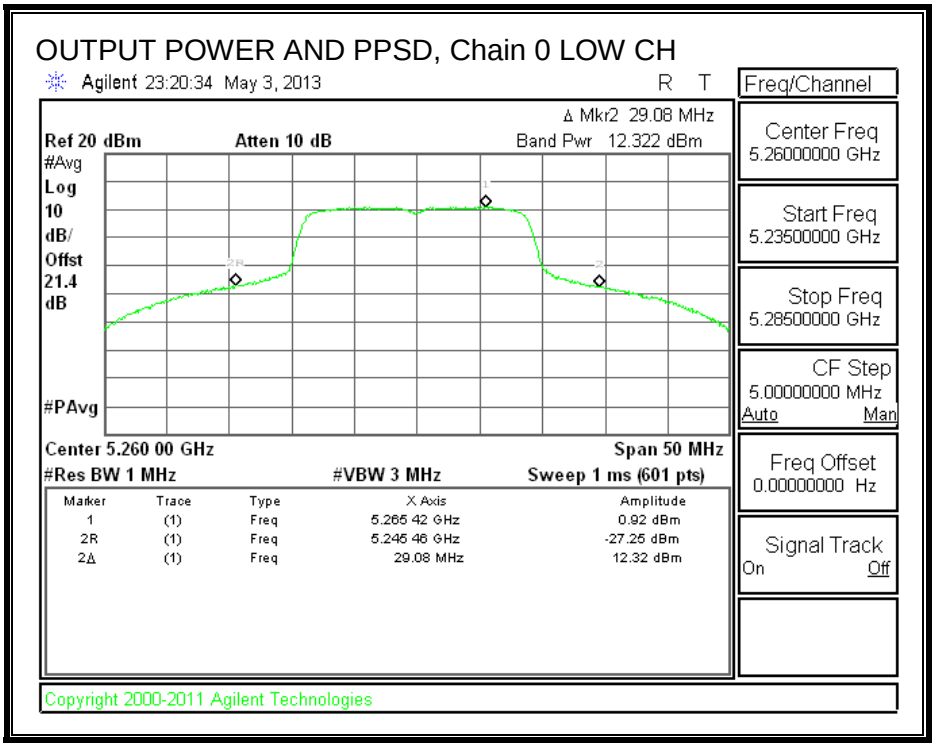
Output Power Results

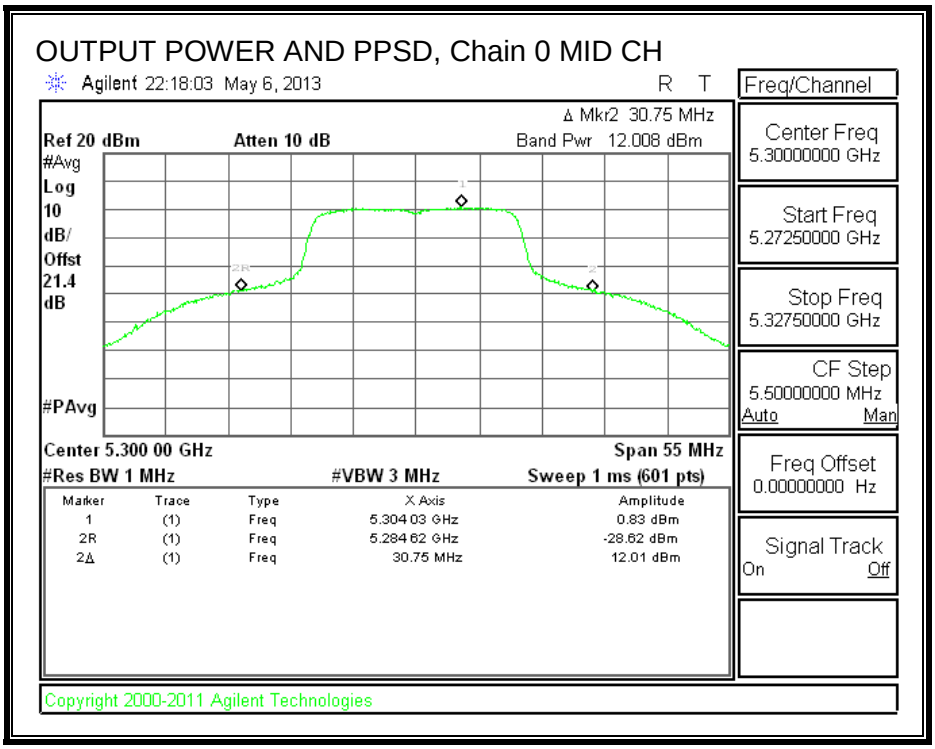
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5260	12.322	15.210	17.012	23.47	-6.460
Mid	5300	12.008	14.411	16.384	23.48	-7.093
High	5320	9.444	11.631	13.684	23.46	-9.779

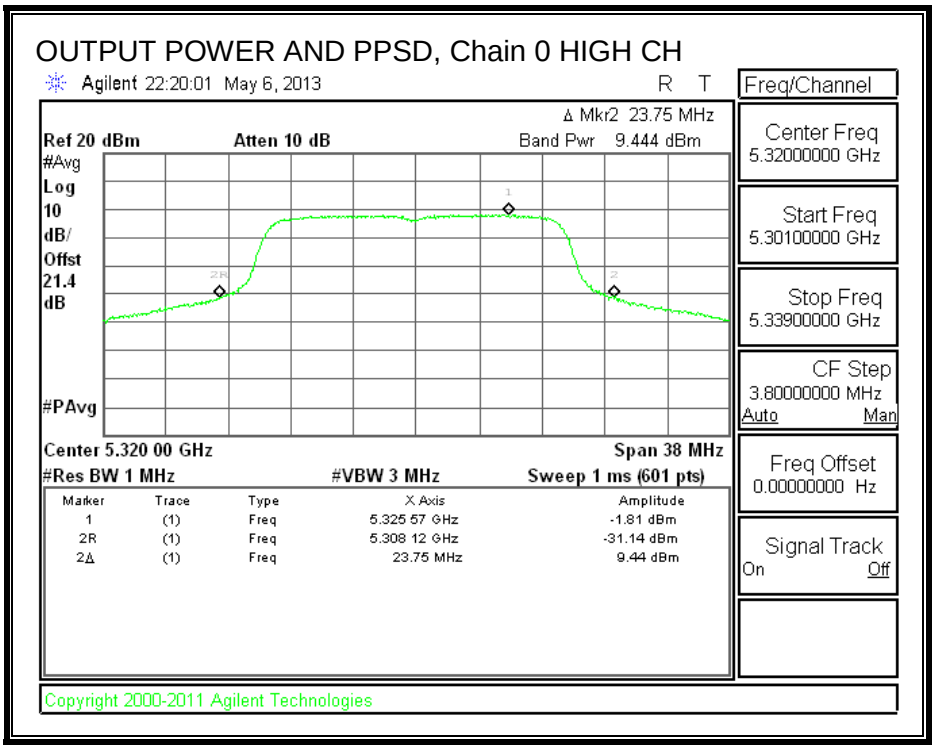
PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Chain 1 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5260	0.92	3.88	5.66	11.00	-5.34
Mid	5300	0.83	3.10	5.12	11.00	-5.88
High	5320	-1.81	0.15	2.29	11.00	-8.71

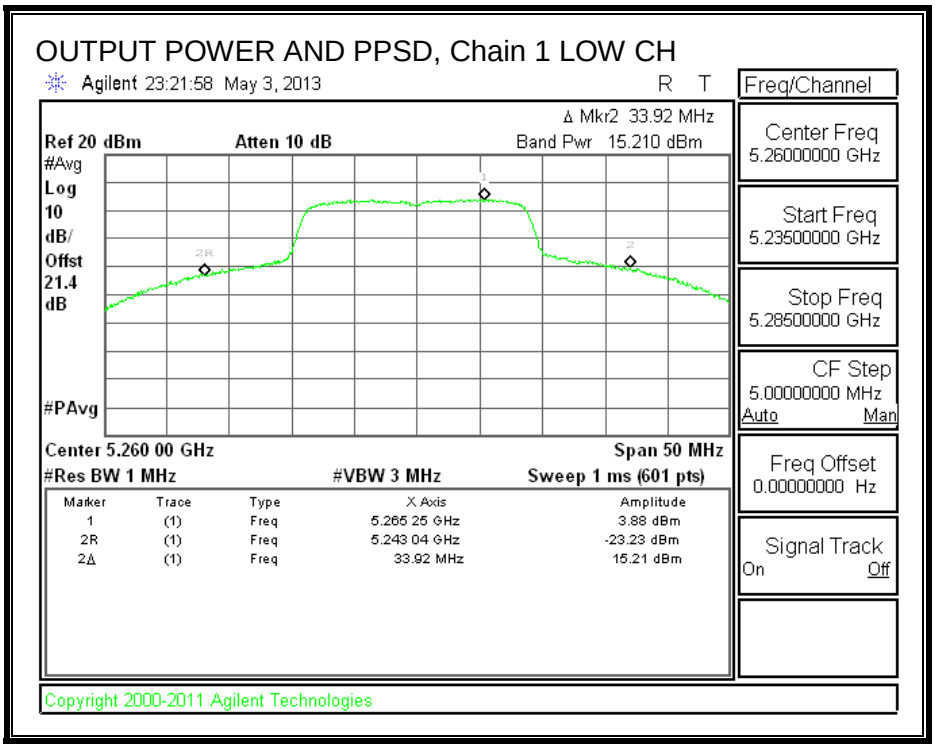
OUTPUT POWER AND PPSD, Chain 0



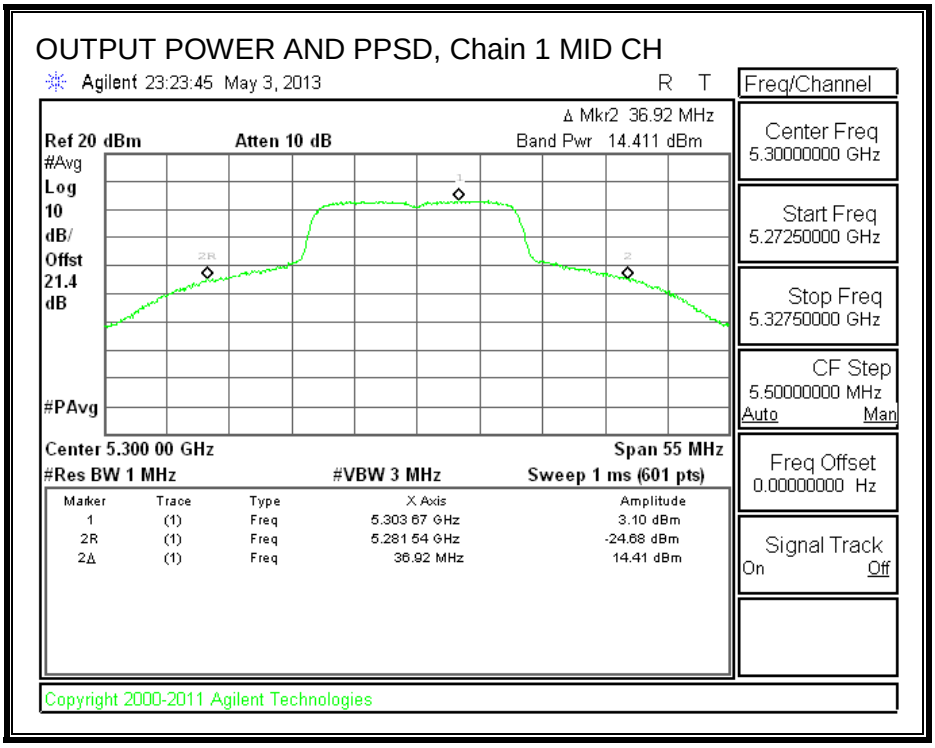




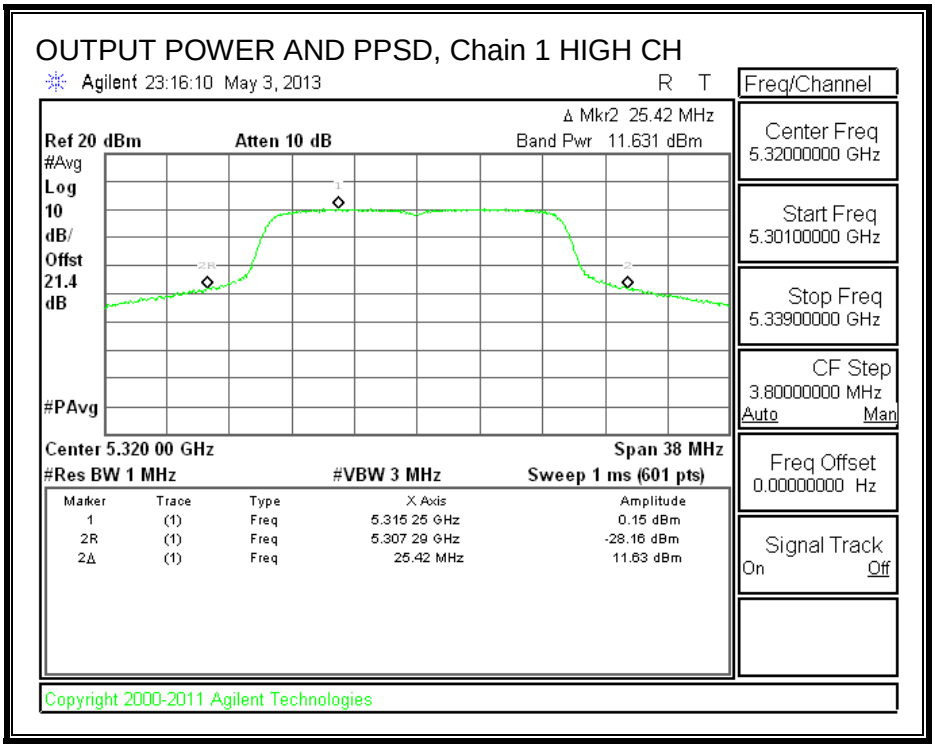
OUTPUT POWER AND PPSD, Chain 1



OUTPUT POWER AND PPSD, Chain 1 MID CH



OUTPUT POWER AND PPSD, Chain 1 HIGH CH



8.5.6. OUTPUT POWER AND PPSD (3G filter unit)

LIMITS

FCC §15.407 (a) (1)

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 peak power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the 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.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

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.

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
2.00	2.00	2.00

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
High	5320	23.75	17.6315	2.00

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC PSD Limit (dBm)	PPSD Limit (dBm)
High	5320	24.00	23.46	29.46	23.46	11.00	11.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PPSD

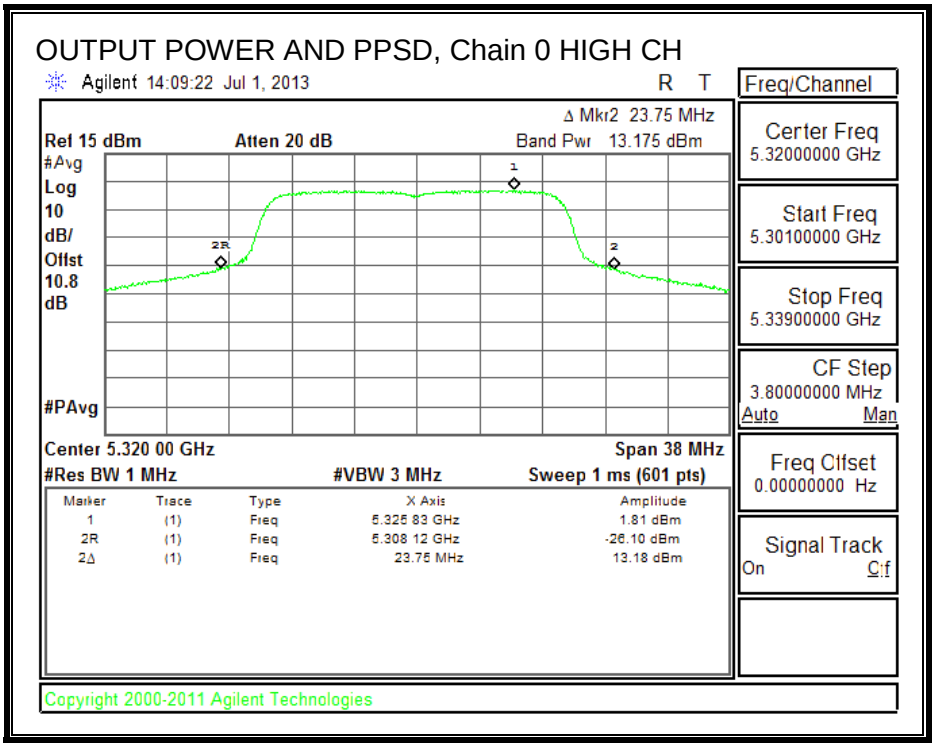
Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
High	5320	13.175	10.415	15.021	23.46	-8.442

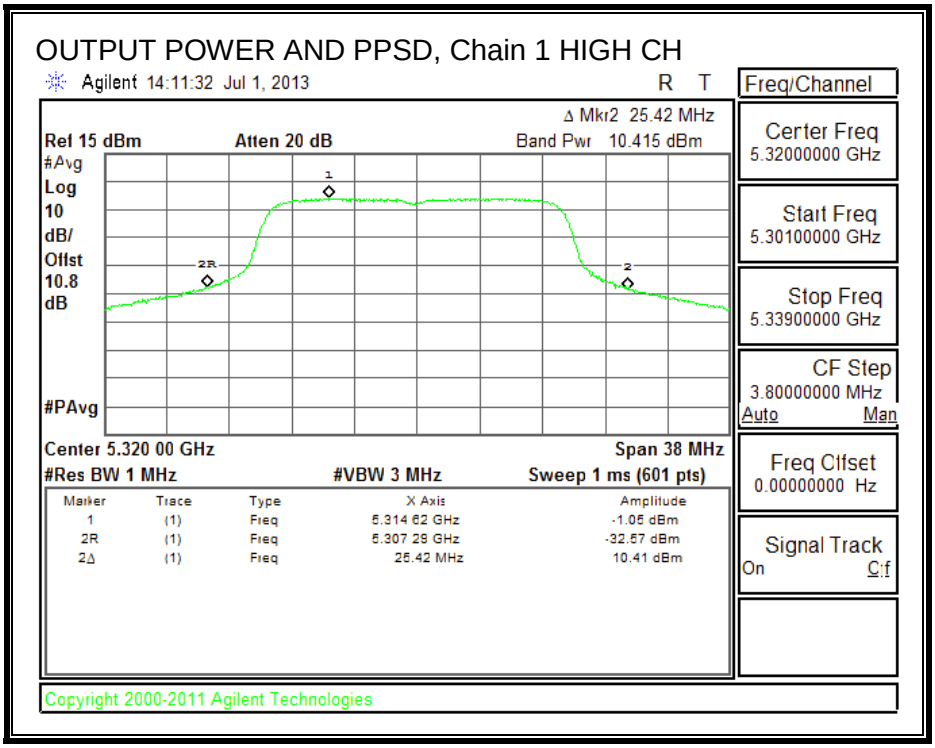
PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Chain 1 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
High	5320	1.81	-1.05	3.62	11.00	-7.38

OUTPUT POWER AND PPSD, Chain 0



OUTPUT POWER AND PPSD, Chain 1



8.5.7. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

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

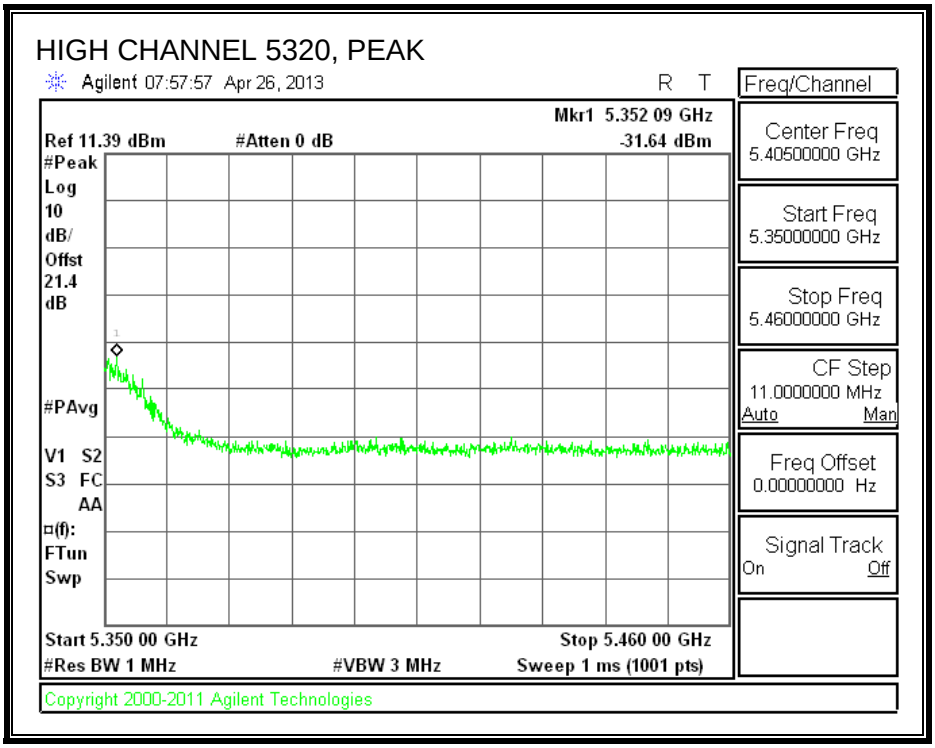
RESULTS

Refer to the results of 802.11n HT20 mode in the 5.2 GHz band.

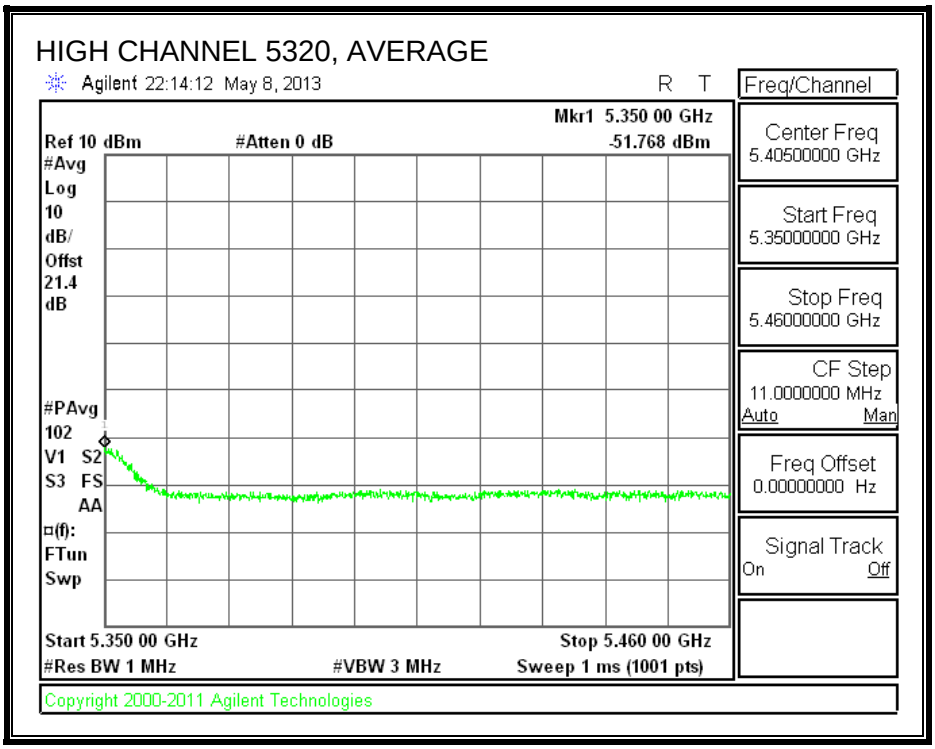
8.5.8. CONDUCTED BANDEDGE, HARMONICS, & SPURIOUS (no filter unit)

Chain 0
RESTRICTED BANDEDGE

HIGH CHANNEL 5320, PEAK



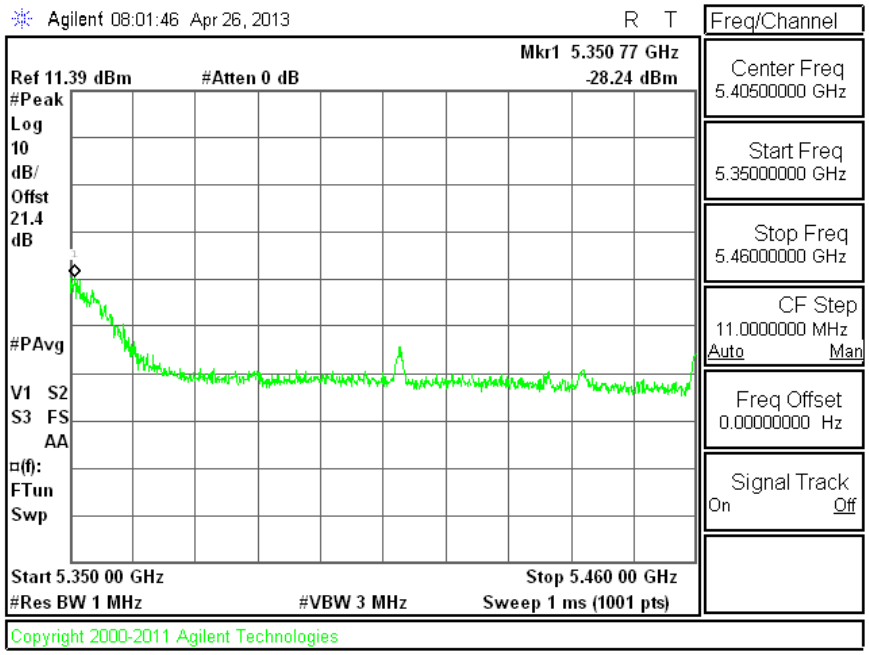
HIGH CHANNEL 5320, AVERAGE



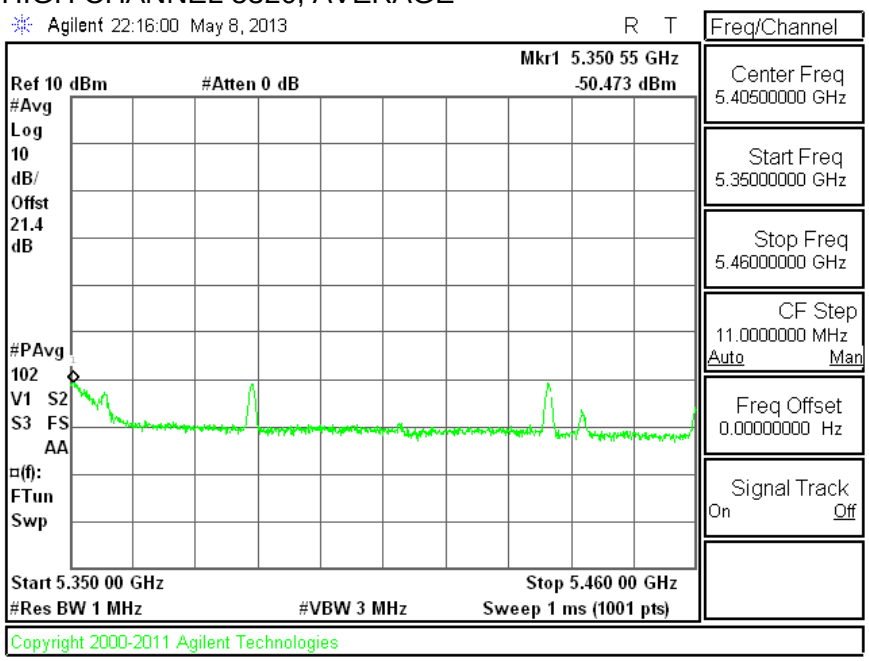
Chain 1

RESTRICTED BANDEDGE

HIGH CHANNEL 5320, PEAK

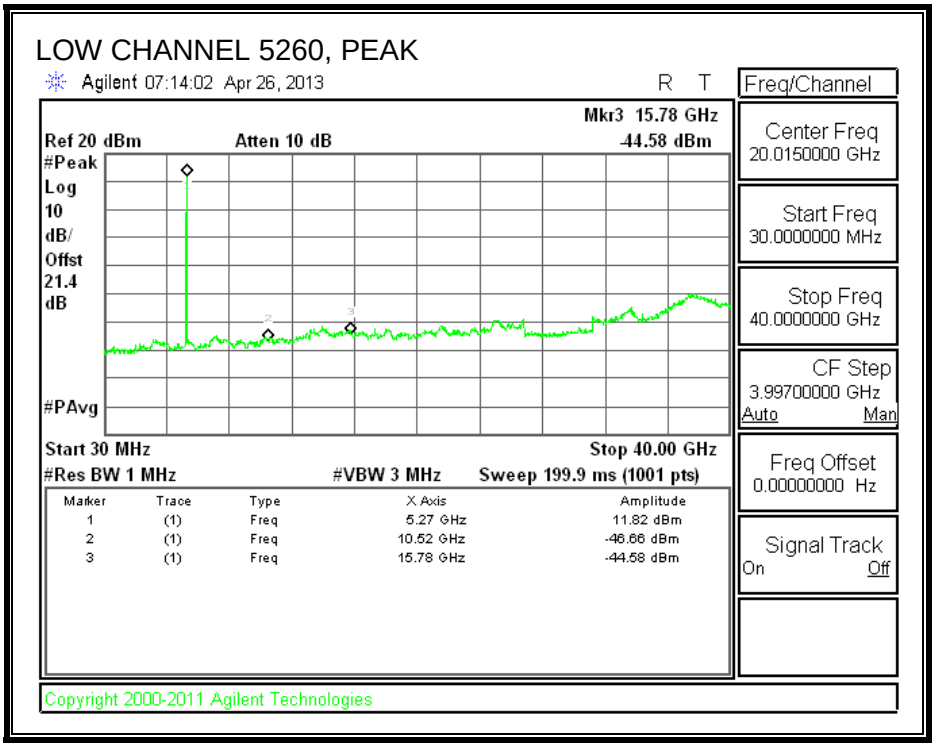


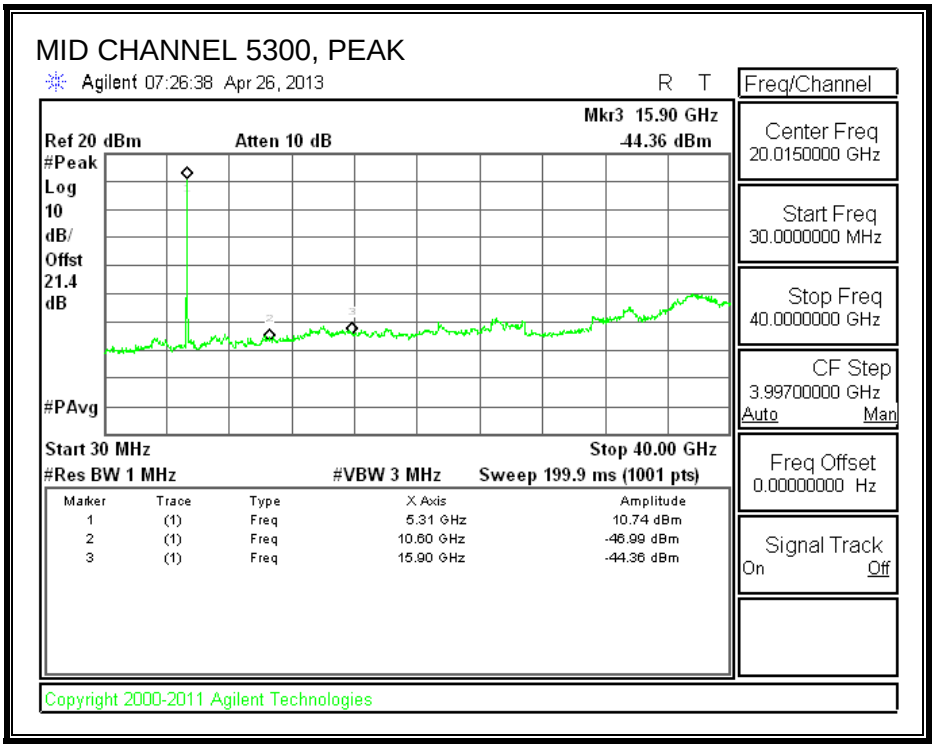
HIGH CHANNEL 5320, AVERAGE

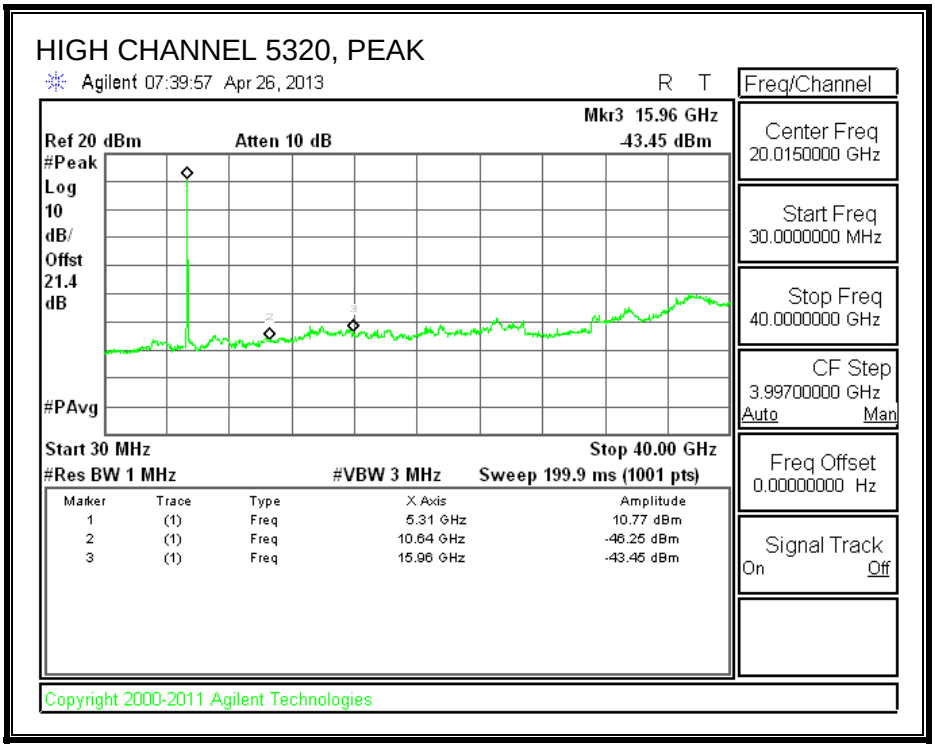


HARMONICS AND SPURIOUS

Chain 0

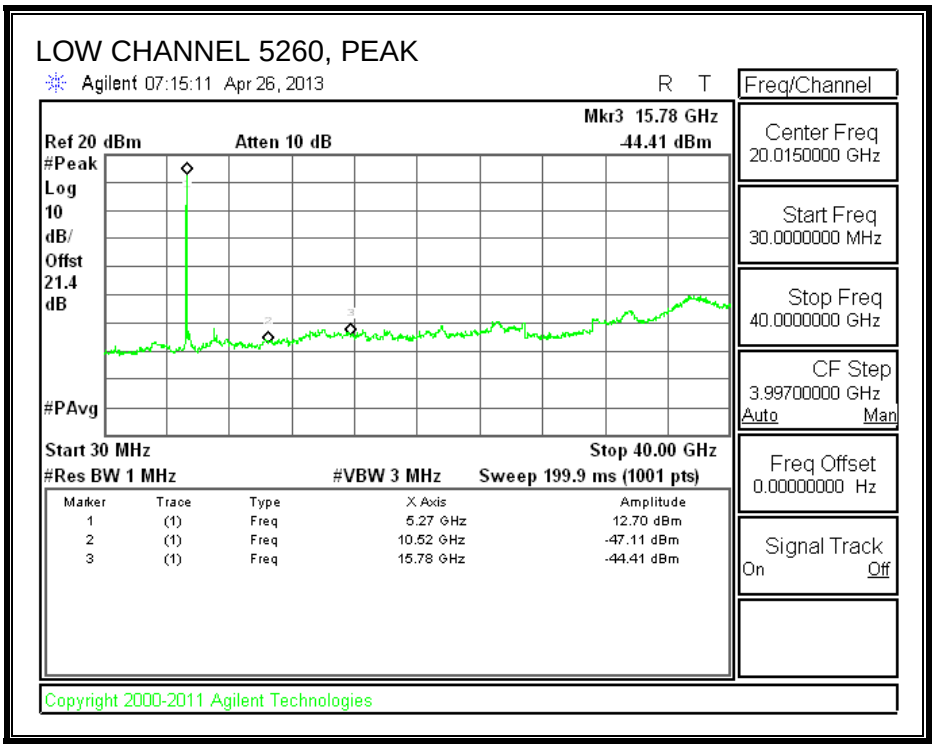




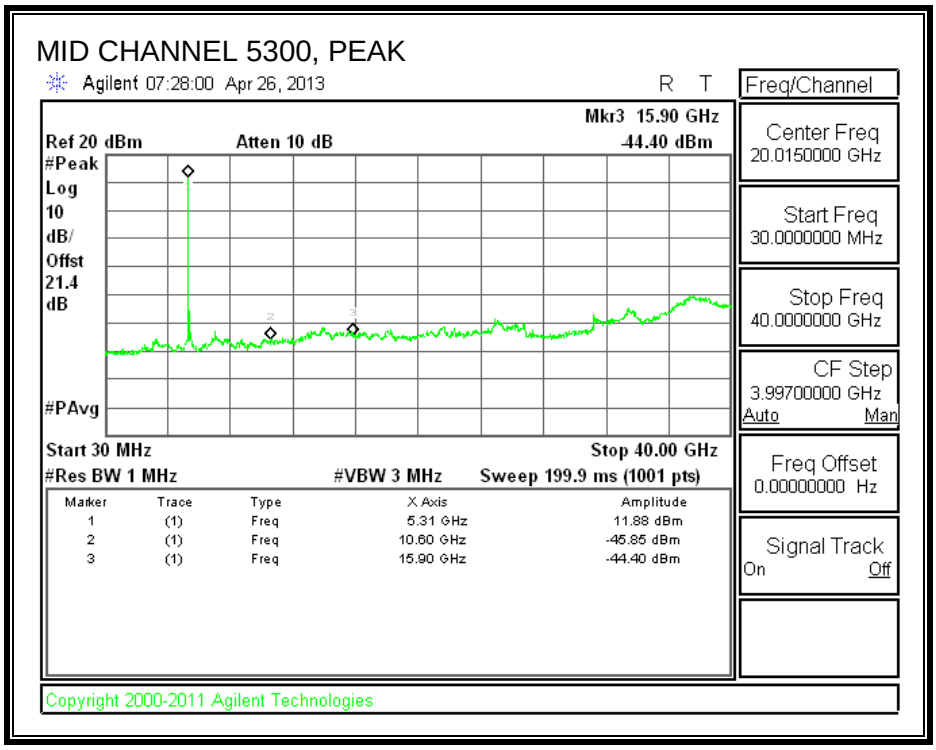


Chain 1

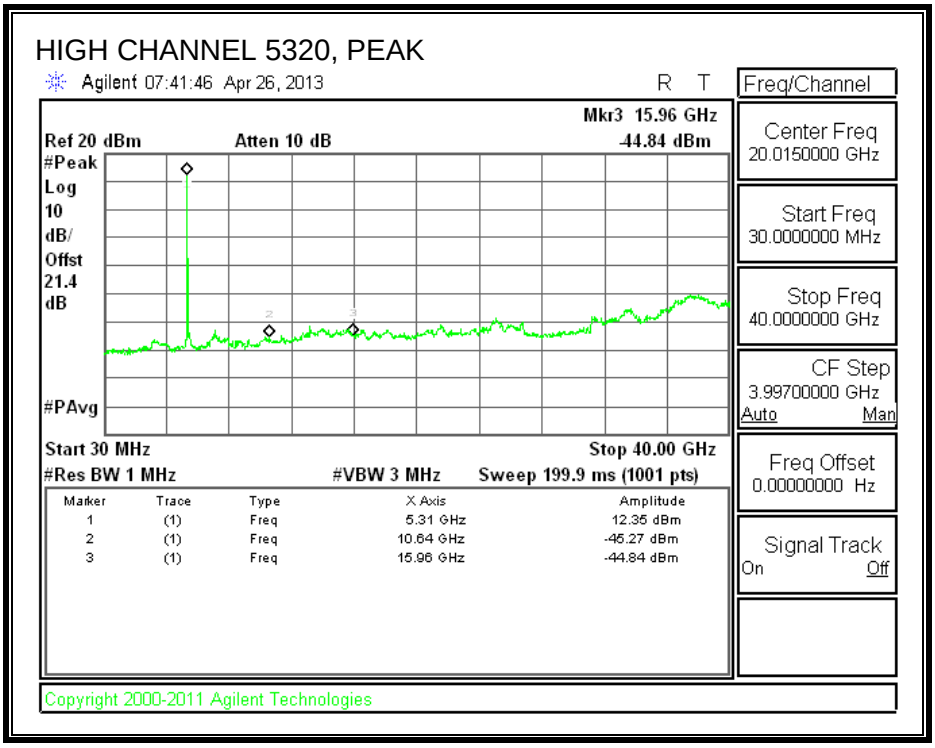
RESTRICTED BANDEDGE (LOW CHANNEL)



MID CHANNEL 5300, PEAK



HIGH CHANNEL 5320, PEAK



BANDEDGE DATA

2TX Conducted Spurious BE for UNII (in the restricted bands)

Date:	5/9/2013
Test Engineer:	Tony Wagoner
Client:	Qualcomm
Project Number:	13U14995
Configuration:	Tx
Mode of operation:	5.3GHz 11n HT20

Note: if the PK margin is greater than 20 dB, there is no need to get AVG reading.

Channel	Frequency (MHz)	PXA PK Reading Chain 0 (dBm)	PXA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
64 (5320)	5352	-31.64	-28.24	2	-21.60	-21.2	-0.40	18.00	14.7 / 16

Channel	Frequency (MHz)	PXA AVG Reading Chain 0 (dBm)	PXA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
64 (5320)	5350	-51.768	-50.473	2	-43.05	-41.2	-1.85	17.00	11.8 / 13.3

SPURIOUS DATA

The data in this table is from testing done at the harmonics shown in the plots with the span of 1MHz.

2TX Conducted Spurious for UNII (in the restricted bands)

Date:	4/26/2013
Test Engineer:	T. Wagoner
Client:	Qualcomm Atheros
Project Number:	13u14995
Configuration:	5.3GHz 11n HT20
Mode of operation:	Tx

Note: if the PK margin is greater than 20 dB, there is no need to get AVG reading.

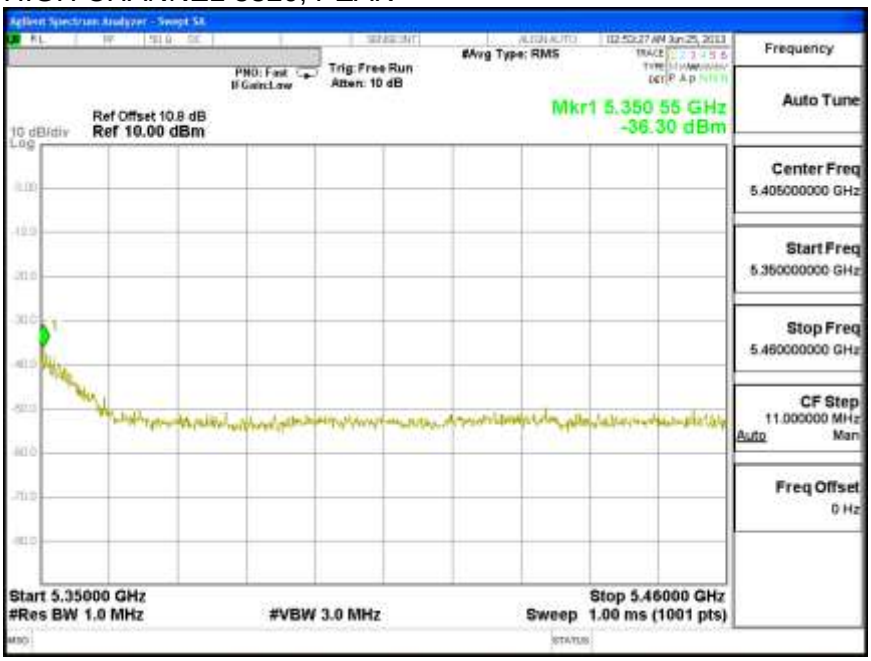
Channel	Frequency (MHz)	PSA PK Reading Chain 0 (dBm)	PSA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
52 (5260)	10.52	-53.86	-55.01	2	-46.38	-21.2	-25.18	18.00	14.9 / 16.5
52 (5260)	15.78	-53.24	-52.53	2	-44.85	-21.2	-23.65	18.00	14.9 / 16.5
60 (5300)	10.6	-52.05	-55.03	2	-45.27	-21.2	-24.07	18.00	14.8 / 16.2
60 (5300)	15.9	-53.85	-52.72	2	-45.23	-21.2	-24.03	18.00	14.8 / 16.2
64 (5320)	10.64	-51.55	-55.06	2	-44.94	-21.2	-23.74	18.00	14.7 / 16
64 (5320)	15.96	-52.89	-52.55	2	-44.70	-21.2	-23.50	18.00	14.7 / 16

Channel	Frequency (MHz)	PSA AVG Reading Chain 0 (dBm)	PSA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)

8.5.9. CONDUCTED BANDEDGE, HARMONICS, & SPURIOUS (3G filter unit)

Chain 0
RESTRICTED BANDEDGE

HIGH CHANNEL 5320, PEAK

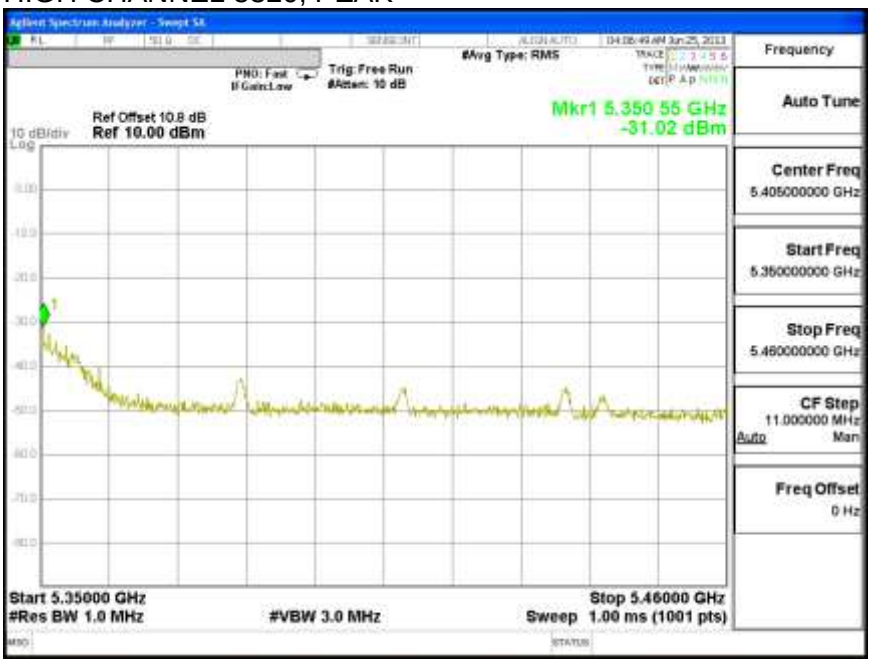


HIGH CHANNEL 5320, AVERAGE

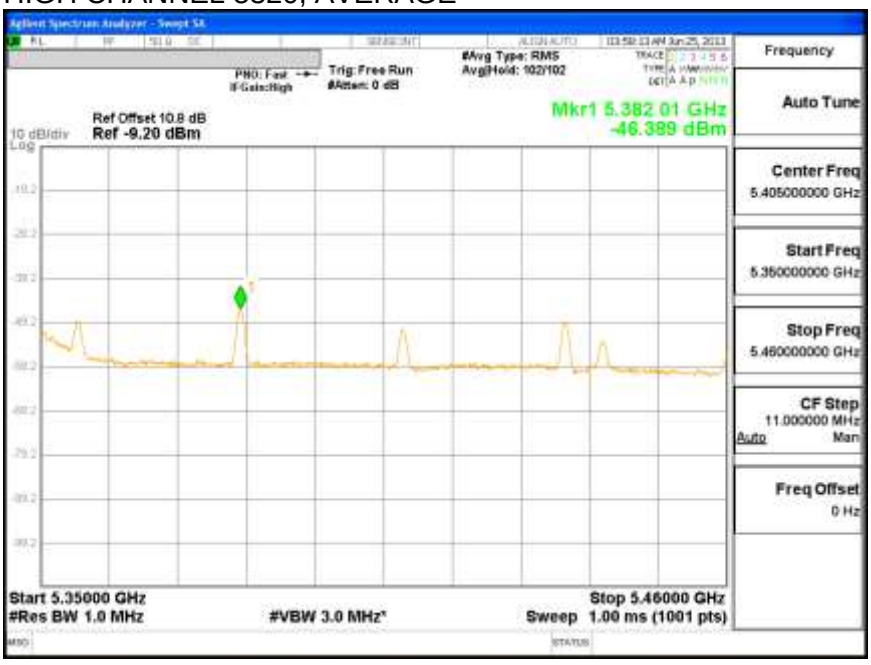
Chain 1

RESTRICTED BANDEDGE

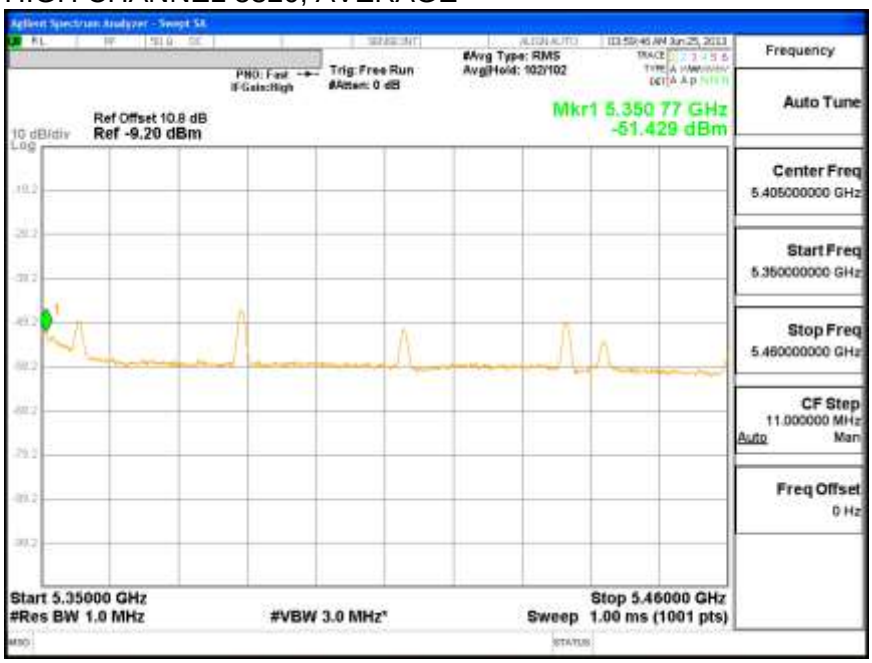
HIGH CHANNEL 5320, PEAK



HIGH CHANNEL 5320, AVERAGE



HIGH CHANNEL 5320, AVERAGE



BANDEDGE DATA

2TX Conducted Spurious BE for UNII (in the restricted bands)

Date:	6/25/2013
Test Engineer:	Tony Wagoner
Client:	Qualcomm
Project Number:	13U14995
Configuration:	Tx
Mode of operation:	11n HT20 5.3GHz

Note: if the PK margin is greater than 20 dB, there is no need to get AVG reading.

Channel	Frequency (MHz)	PXA PK Reading Chain 0 (dBm)	PXA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
64 (5320)	5350	-36.3	-31.02	2	-24.88	-21.2	-3.68	17.00	12.71/15.06

Channel	Frequency (MHz)	PXA AVG Reading Chain 0 (dBm)	PXA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
64 (5320)	5382.01	-60.741	-46.389	2	-41.22	-41.2	-0.02	15.00	10.40/11.32
64 (5320)	5350	-53.124	-51.429	2	-44.17	-41.2	-2.97	15.00	10.40/11.32

8.6. 802.11n HT40 MODE IN THE 5.3 GHz BAND

8.6.1. 26 dB BANDWIDTH

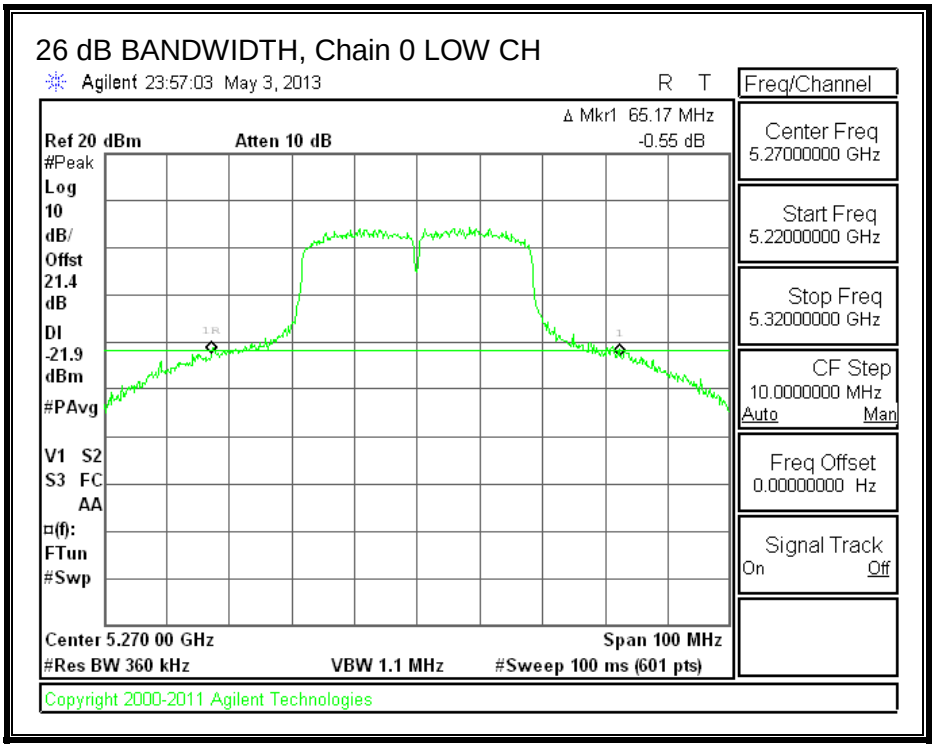
LIMITS

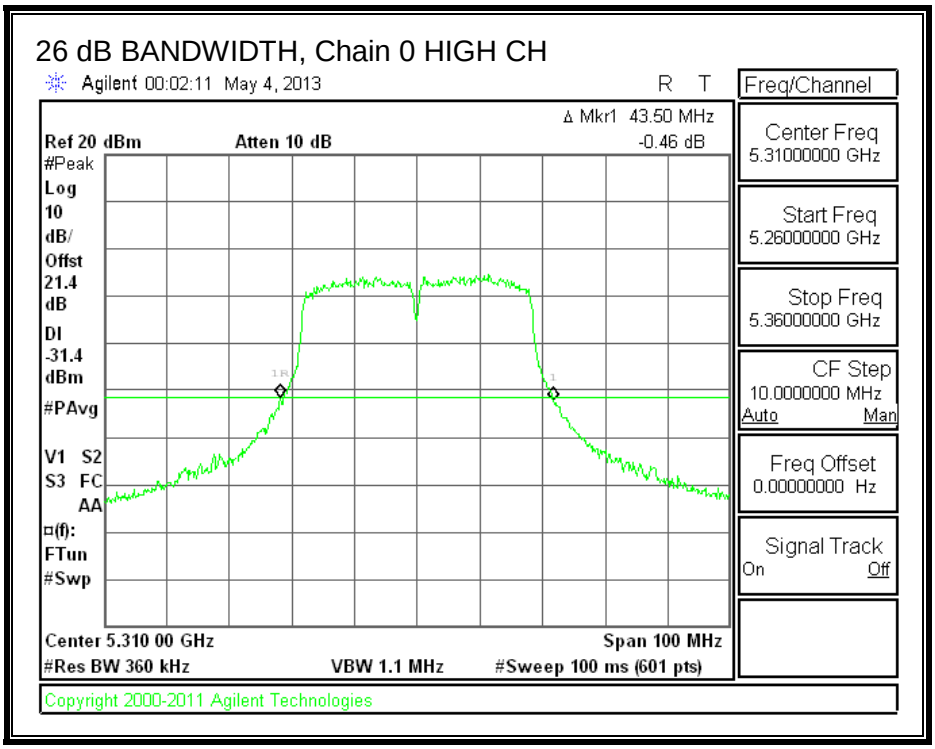
None; for reporting purposes only.

RESULTS

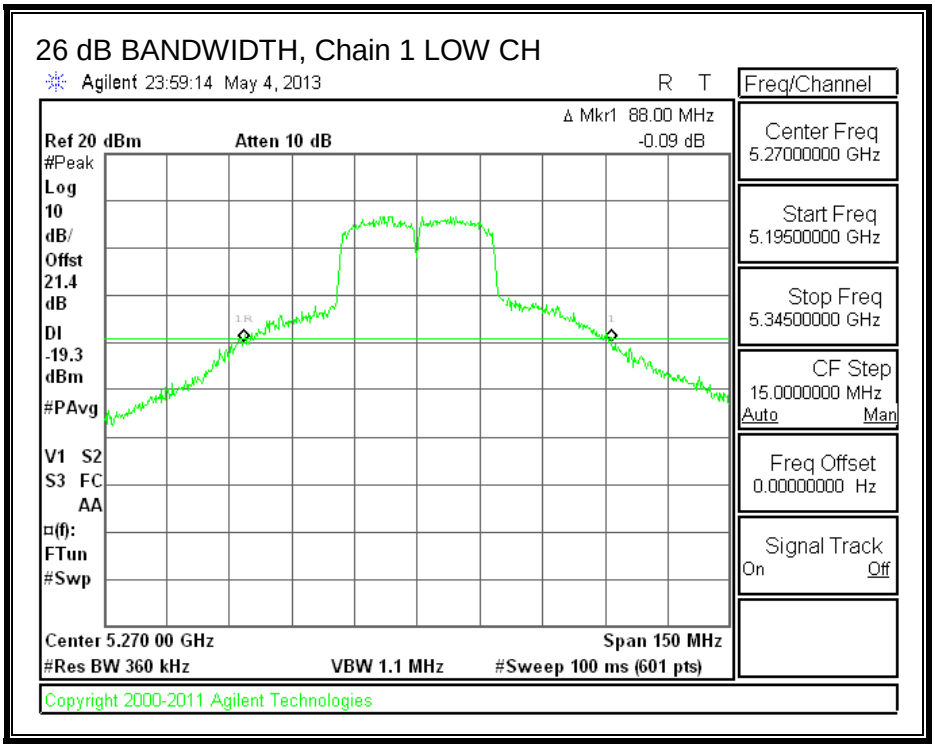
Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5270	65.17	88.00
High	5310	43.50	43.83

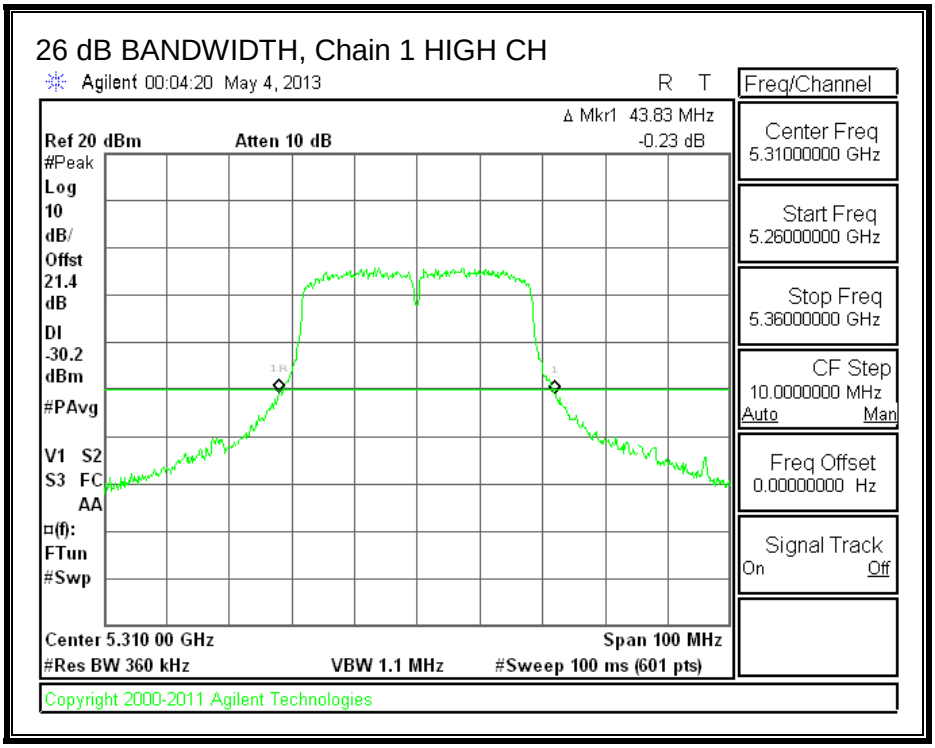
26 dB BANDWIDTH, Chain 0





26 dB BANDWIDTH, Chain 1





8.6.2. 99% BANDWIDTH

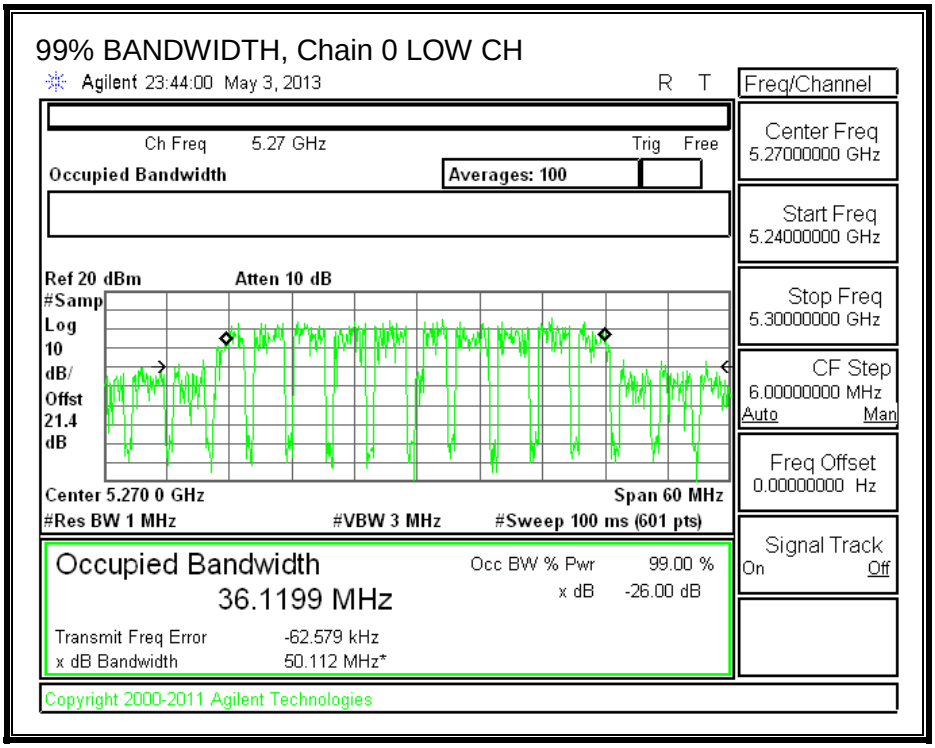
LIMITS

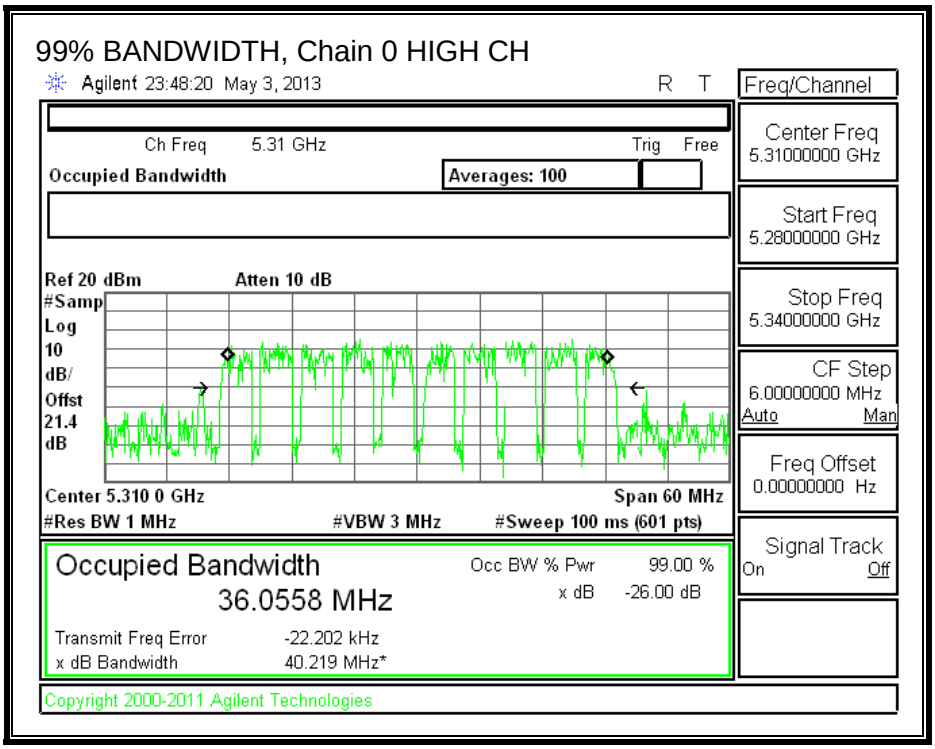
None; for reporting purposes only.

RESULTS

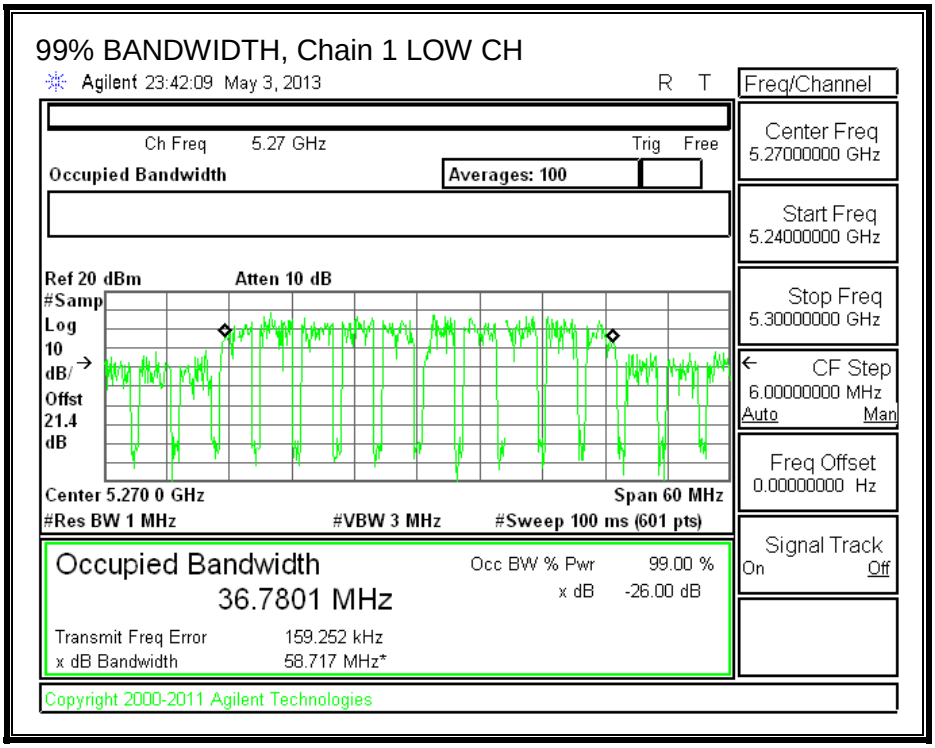
Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	5270	36.1199	36.7801
High	5310	36.0558	36.0051

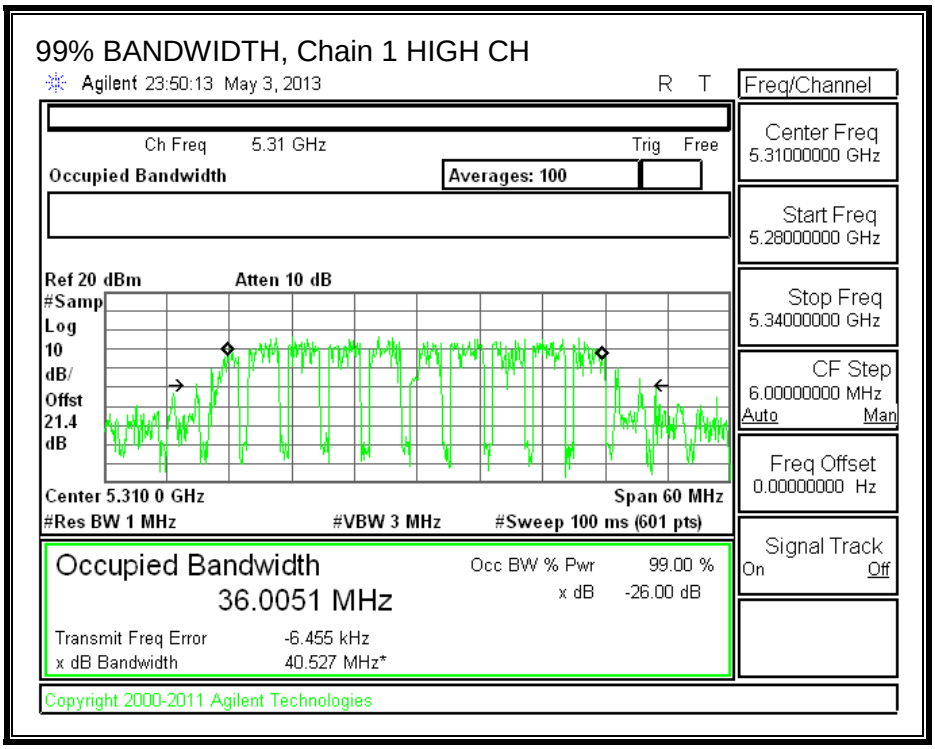
99% BANDWIDTH, Chain 0





99% BANDWIDTH, Chain 1





8.6.3. AVERAGE POWER (No filter unit)

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 25.39 dB (including two 10 dB pads, 1.99 cables, and 3.4 dB power splitter) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	5270	14.30	16.40	18.49
High	5310	9.80	10.50	13.17

8.6.4. AVERAGE POWER (3G filter unit)

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 25.39 dB (including two 10 dB pads, 1.99 cables, and 3.4 dB power splitter) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
High	5310	3.41	5.00	7.29

8.6.5. OUTPUT POWER AND PPSD (no filter unit)

LIMITS

FCC §15.407 (a) (1)

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 peak power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the 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.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

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.

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
2.00	2.00	2.00

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5270	65.2	36.1	2.00
High	5310	43.5	36.0	2.00

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC PSD Limit (dBm)	PPSD Limit (dBm)
Low	5270	24.00	24.00	30.00	24.00	11.00	11.00	11.00
High	5310	24.00	24.00	30.00	24.00	11.00	11.00	11.00

Duty Cycle CF (dB)	1.07	Included in Calculations of Corr'd Power & PPSD

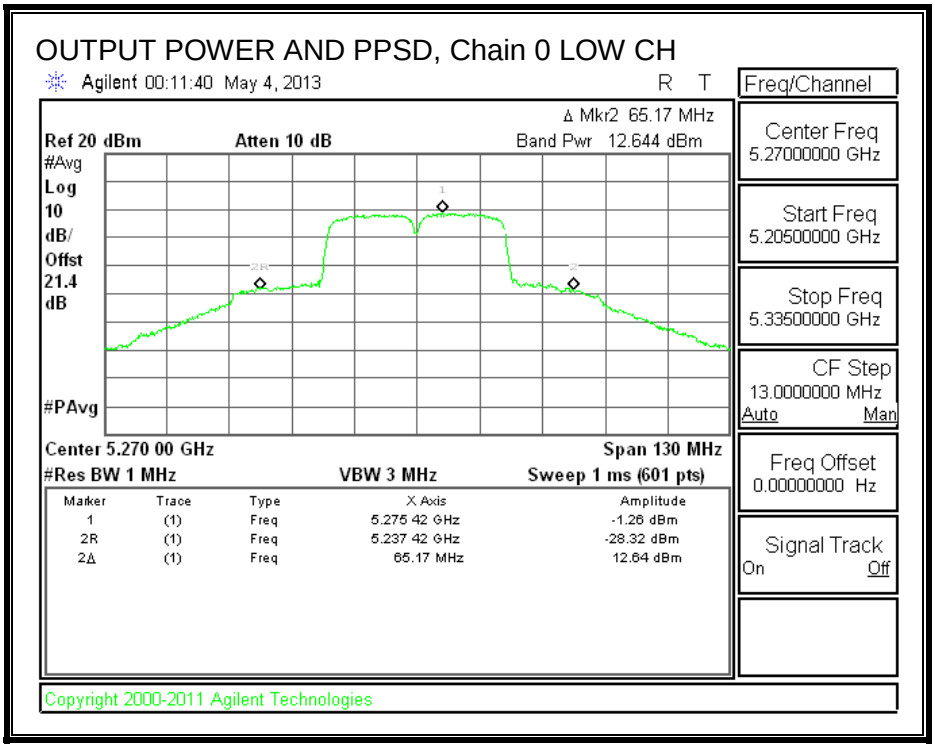
Output Power Results

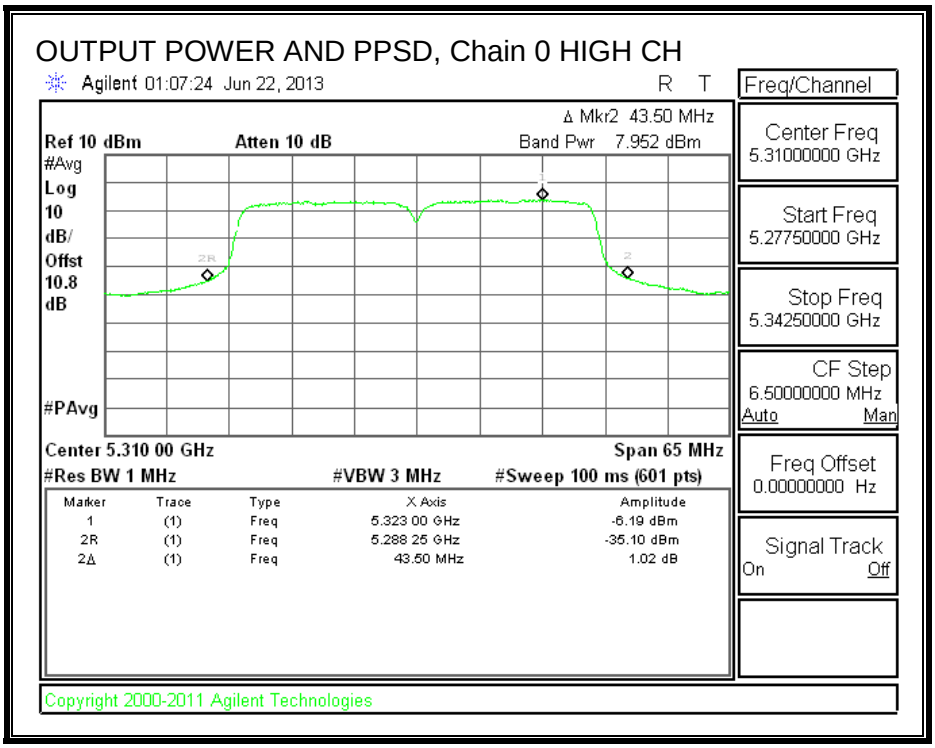
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5270	12.64	12.22	16.52	24.00	-7.48
High	5310	7.95	10.67	13.60	24.00	-10.40

PPSD Results

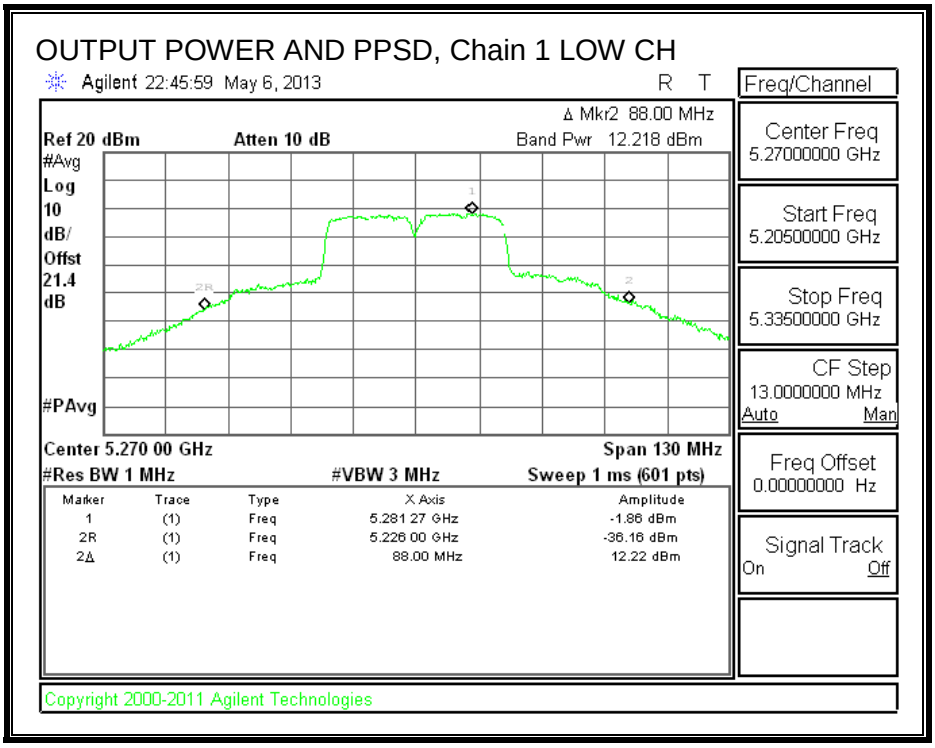
Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Chain 1 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5270	-1.26	-1.86	2.53	11.00	-8.47
High	5310	1.02	0.96	5.07	11.00	-5.93

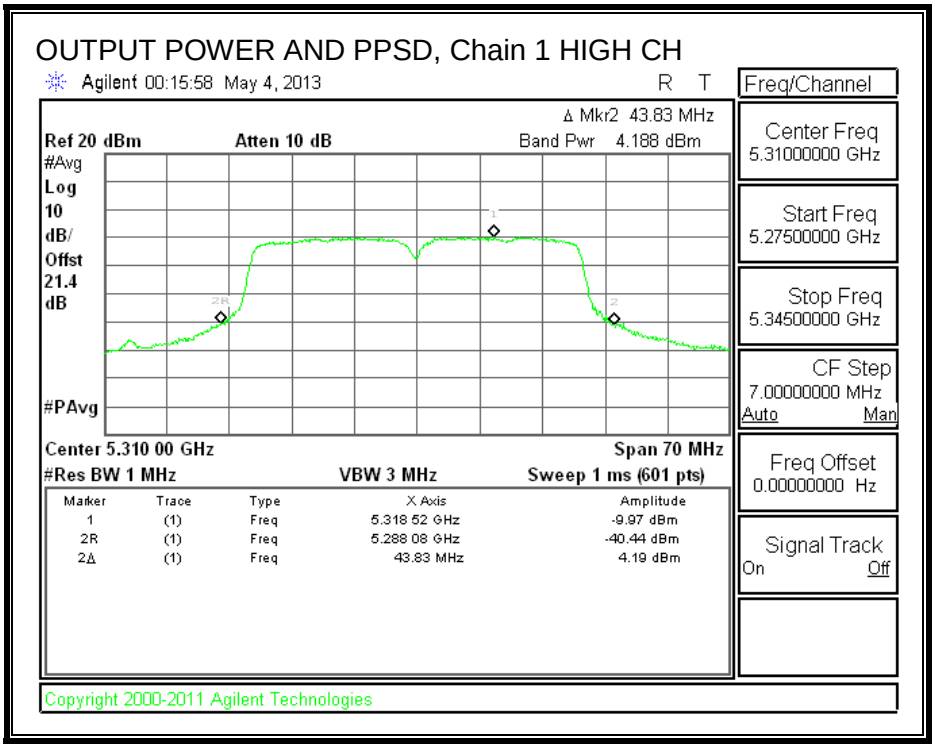
OUTPUT POWER AND PPSD, Chain 0





OUTPUT POWER AND PPSD, Chain 1





8.6.6. OUTPUT POWER AND PPSD (3G filter unit)

LIMITS

FCC §15.407 (a) (1)

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 peak power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the 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.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

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.

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
2.00	2.00	2.00

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
High	5310	43.50	36.0051	2.00

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC PSD Limit (dBm)	PPSD Limit (dBm)
High	5310	24.00	24.00	30.00	24.00	11.00	11.00	11.00

Duty Cycle CF (dB)	1.07	Included in Calculations of Corr'd Power & PPSD

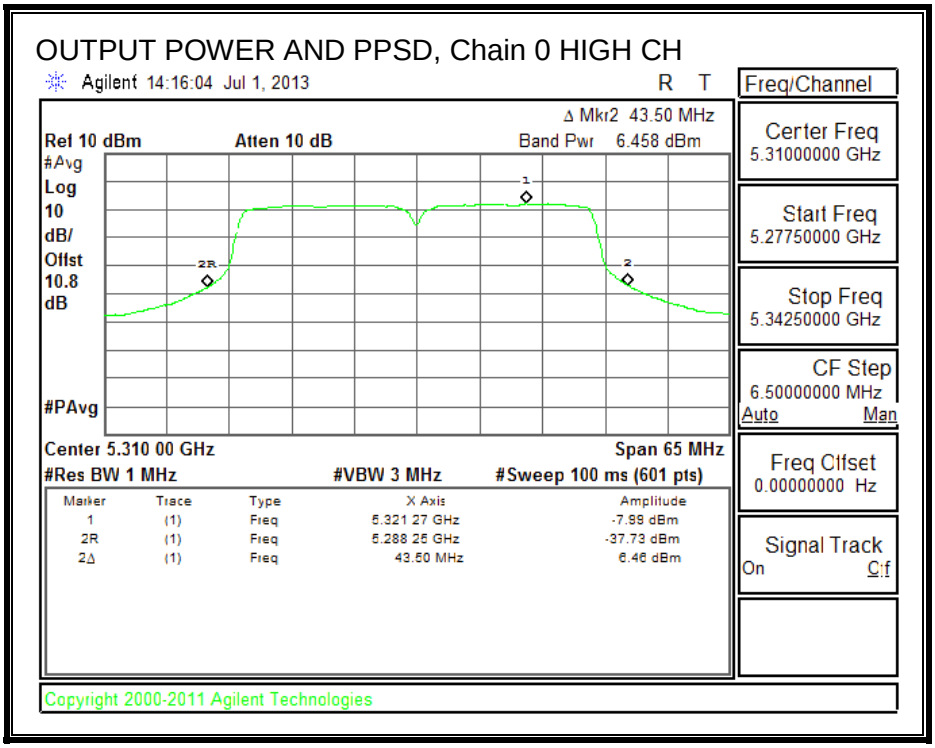
Output Power Results

Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
High	5310	6.458	3.710	9.378	24.00	-14.622

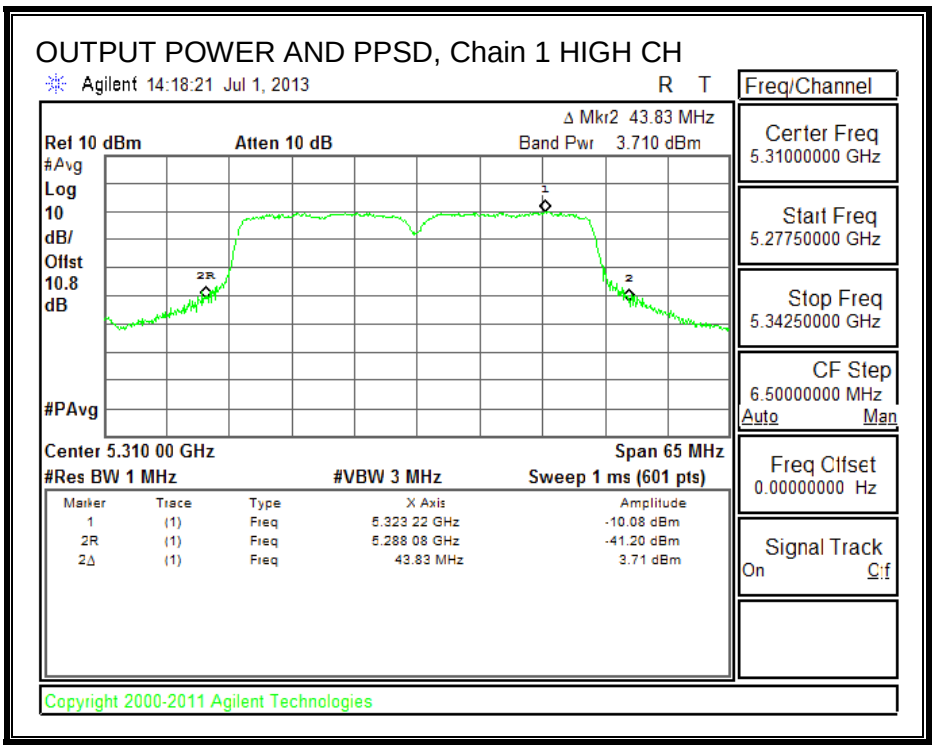
PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Chain 1 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
High	5310	-7.99	-10.08	-4.83	11.00	-15.83

OUTPUT POWER AND PPSD, Chain 0



OUTPUT POWER AND PPSD, Chain 1



8.6.7. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

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

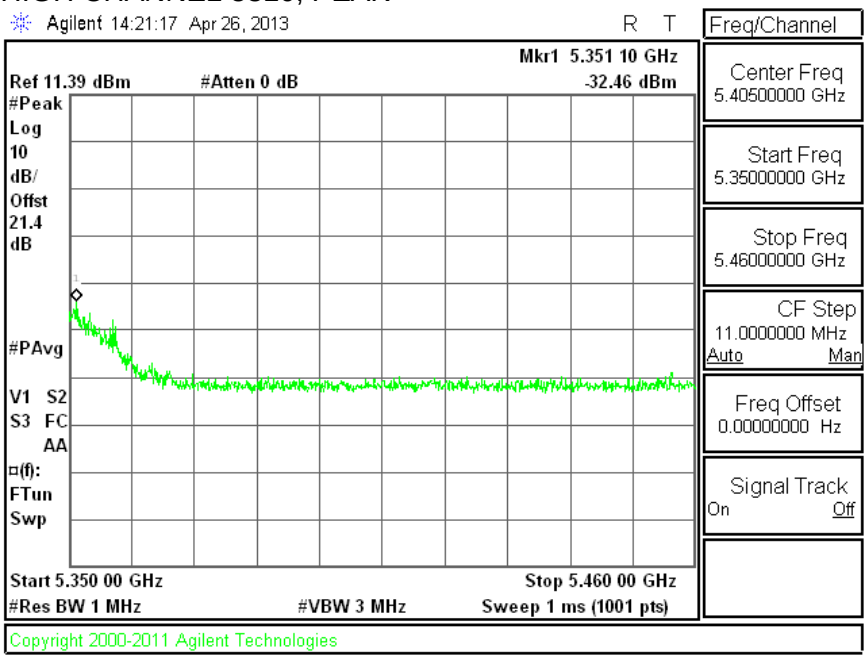
RESULTS

Refer to the results of 802.11n HT20 mode in the 5.2 GHz band.

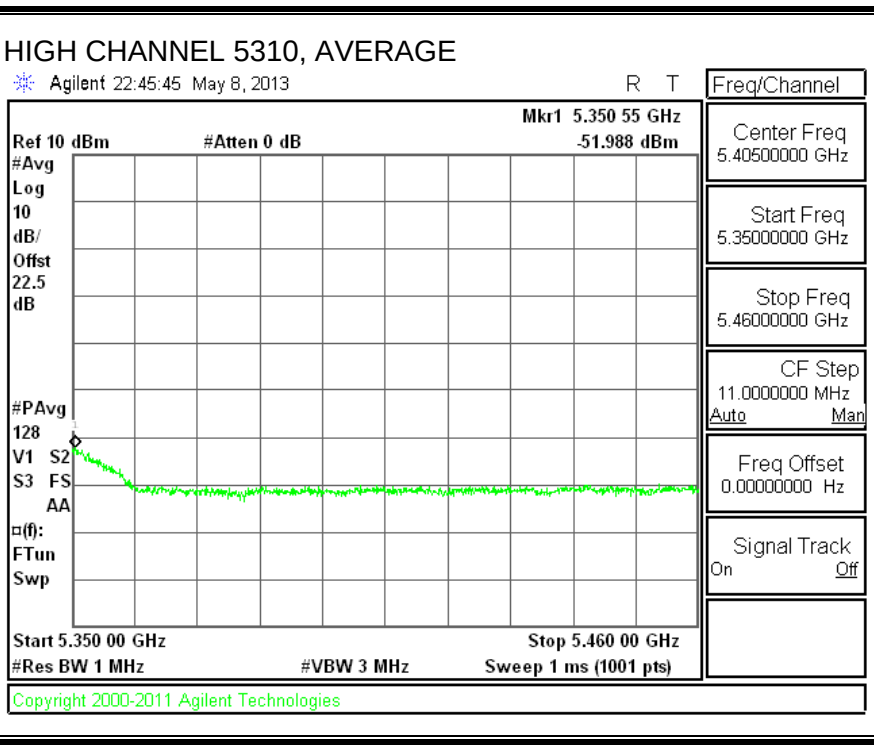
8.6.8. CONDUCTED BANDEDGE, HARMONICS, & SPURIOUS (no filter unit)

Chain 0
RESTRICTED BANDEDGE

HIGH CHANNEL 5310, PEAK



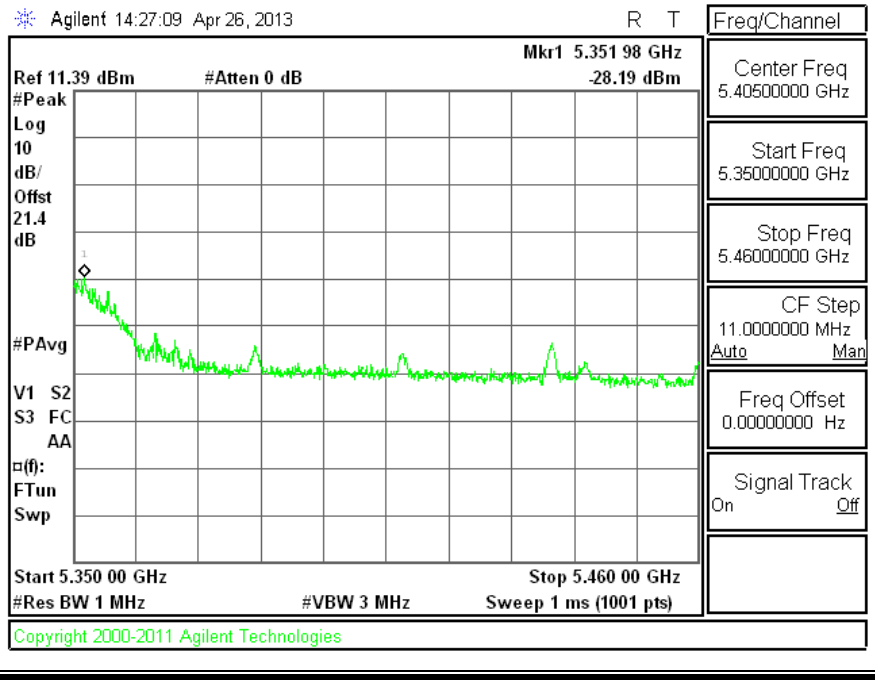
HIGH CHANNEL 5310, AVERAGE



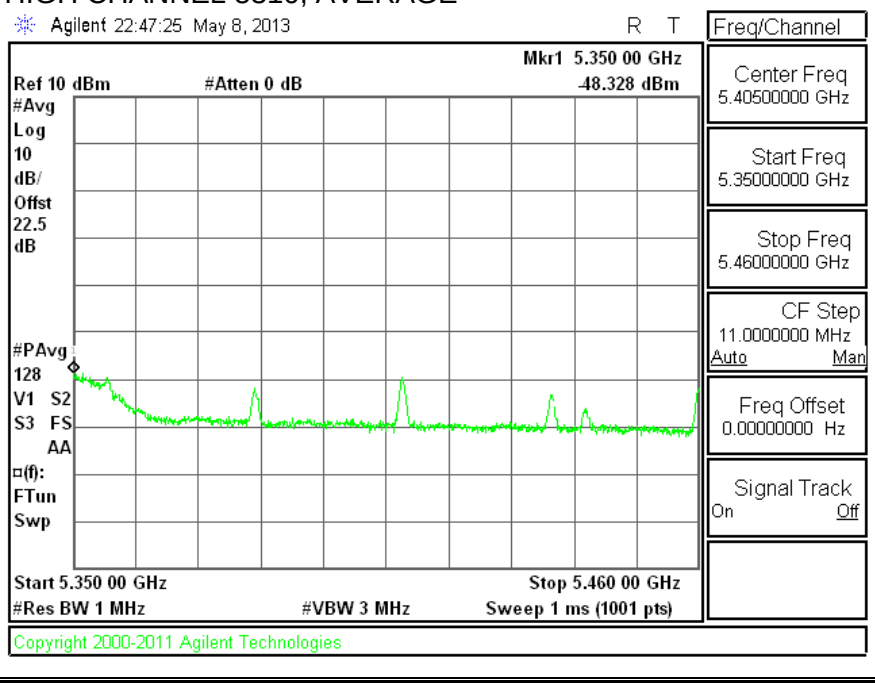
Chain 1

RESTRICTED BANDEDGE

HIGH CHANNEL 5310, PEAK

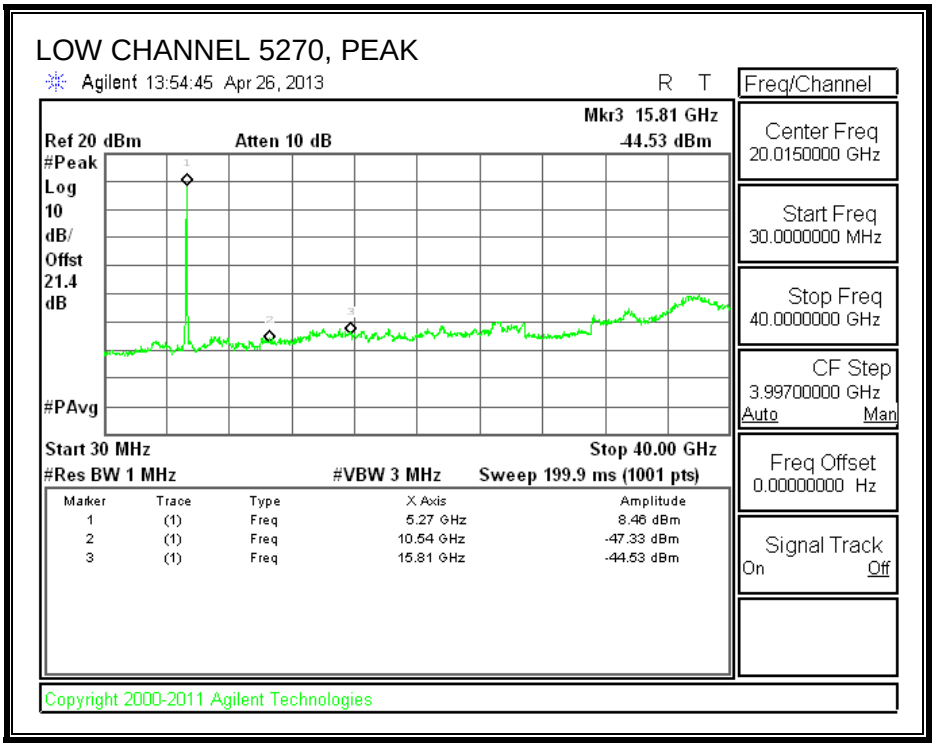


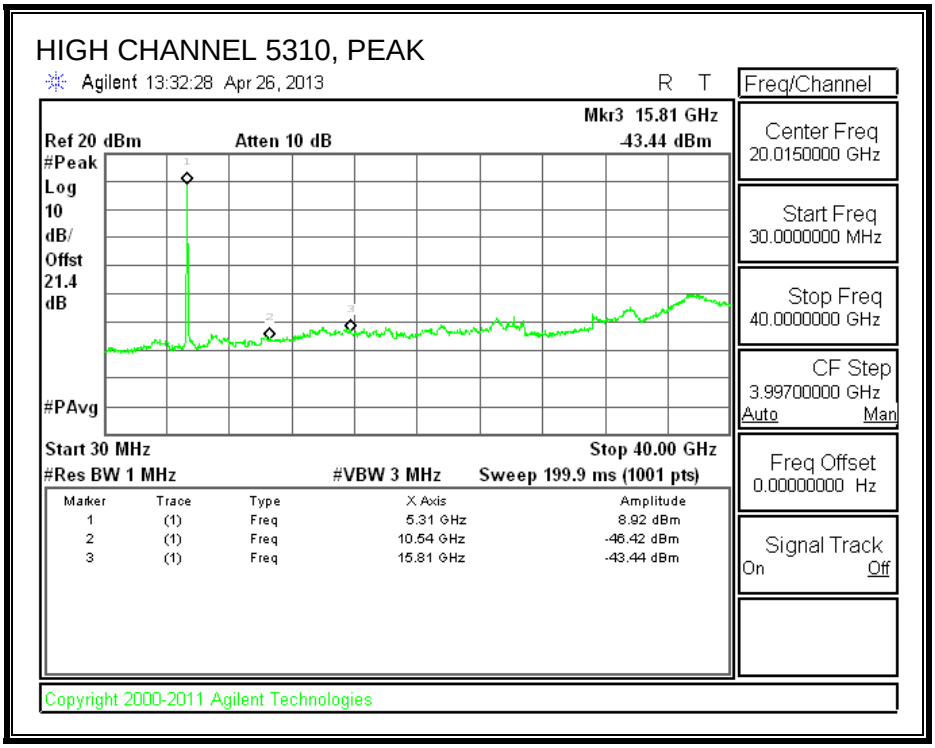
HIGH CHANNEL 5310, AVERAGE



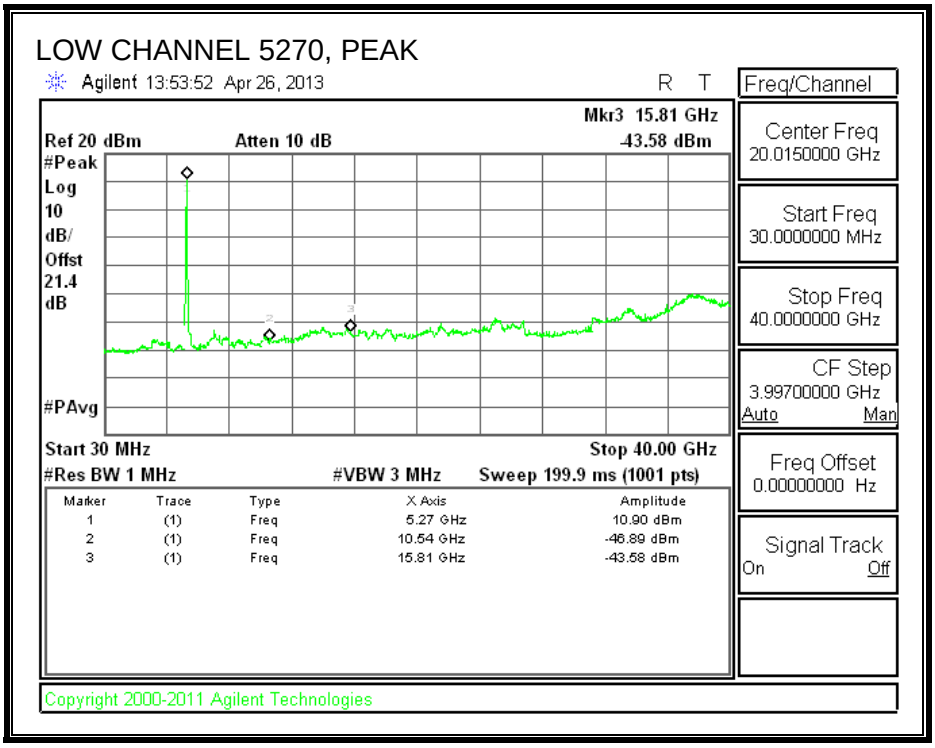
HARMONICS AND SPURIOUS

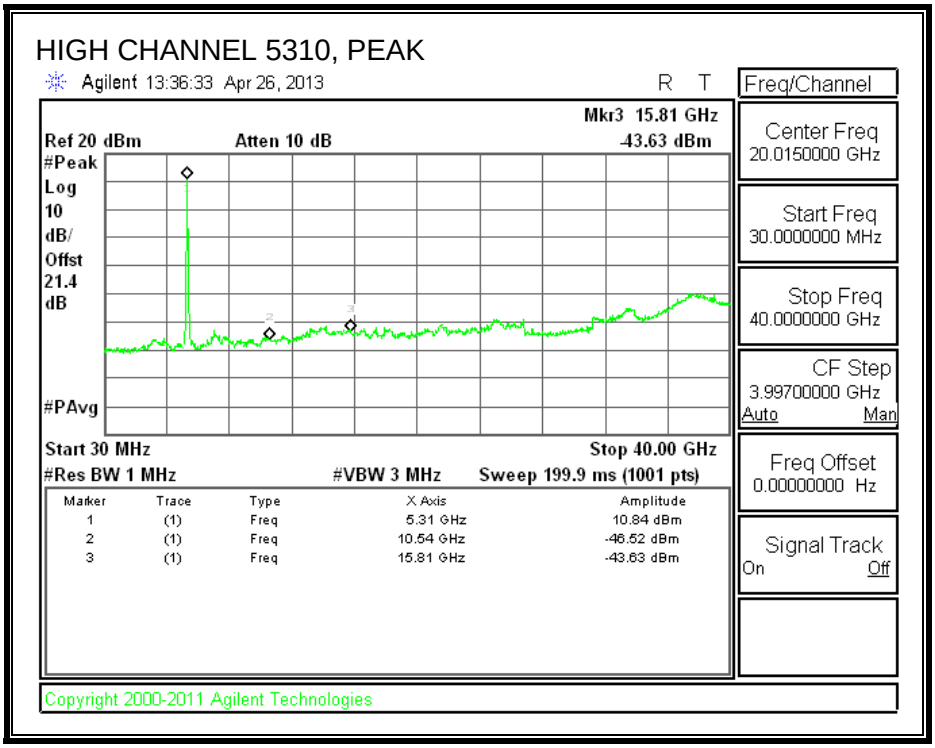
Chain 0





Chain 1





BANDEDGE DATA

2TX Conducted Spurious BE for UNII (in the restricted bands)

Date:	5/9/2013
Test Engineer:	Tony Wagoner
Client:	Qualcomm
Project Number:	13U14995
Configuration:	Tx
Mode of operation:	5.3GHz 11n HT40

Note: if the PK margin is greater than 20 dB, there is no need to get AVG reading.

Channel	Frequency (MHz)	PXA PK Reading Chain 0 (dBm)	PXA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
62 (5310)	5351	-32.46	-28.19	2	-21.80	-21.2	-0.60	10.00	7.10 / 9.4

Channel	Frequency (MHz)	PXA AVG Reading Chain 0 (dBm)	PXA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
62 (5310)	5350	-51.988	-48.328	2	-41.76	-41.2	-0.56	9.50	5.3 / 7.2

SPURIOUS DATA

The data in this table is from testing done at the harmonics shown in the plots with the span of 1MHz.

2TX Conducted Spurious for UNII (in the restricted bands)

Date:	4/26/2013
Test Engineer:	T. Wagoner
Client:	Qualcomm Atheros
Project Number:	13u14995
Configuration:	5.3GHz 11n HT40
Mode of operation:	Tx

Note: if the PK margin is greater than 20 dB, there is no need to get AVG reading.

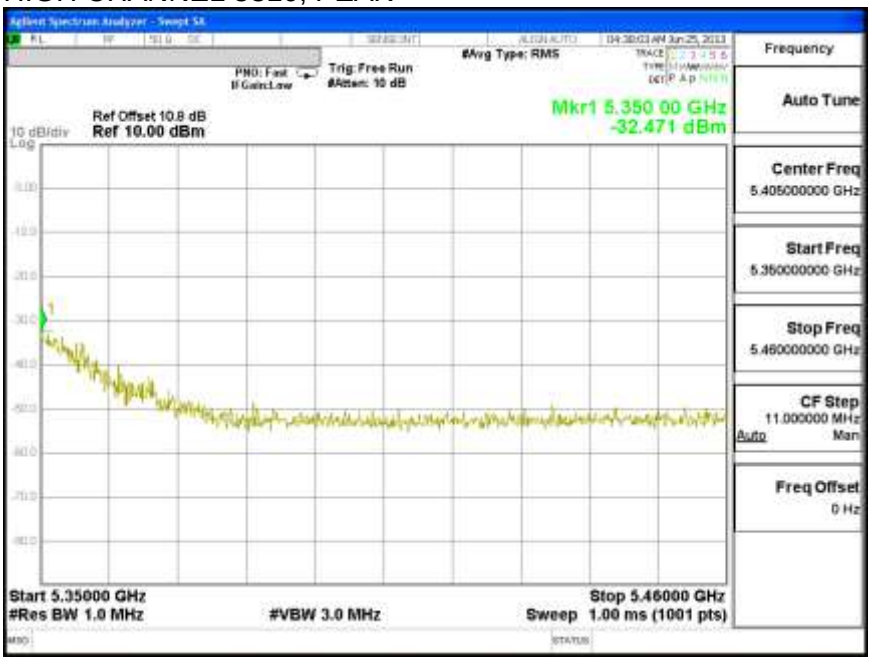
Channel	Frequency (MHz)	PSA PK Reading Chain 0 (dBm)	PSA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
54 (5270)	10.54	-54.78	-54.74	2	-46.74	-21.2	-25.54	18.00	14.3 / 16.4
54 (5270)	15.81	-52.34	-52.85	2	-44.57	-21.2	-23.37	18.00	14.3 / 16.4
62 (5310)	10.62	-53.56	-54.26	2	-45.88	-21.2	-24.68	18.00	14.2 / 16.35
62 (5310)	15.93	-52.97	-53.24	2	-45.08	-21.2	-23.88	18.00	14.2 / 16.35

Channel	Frequency (MHz)	PSA AVG Reading Chain 0 (dBm)	PSA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)

8.6.9. CONDUCTED BANDEDGE, HARMONICS, & SPURIOUS (3G filter unit)

Chain 0
RESTRICTED BANDEDGE

HIGH CHANNEL 5310, PEAK



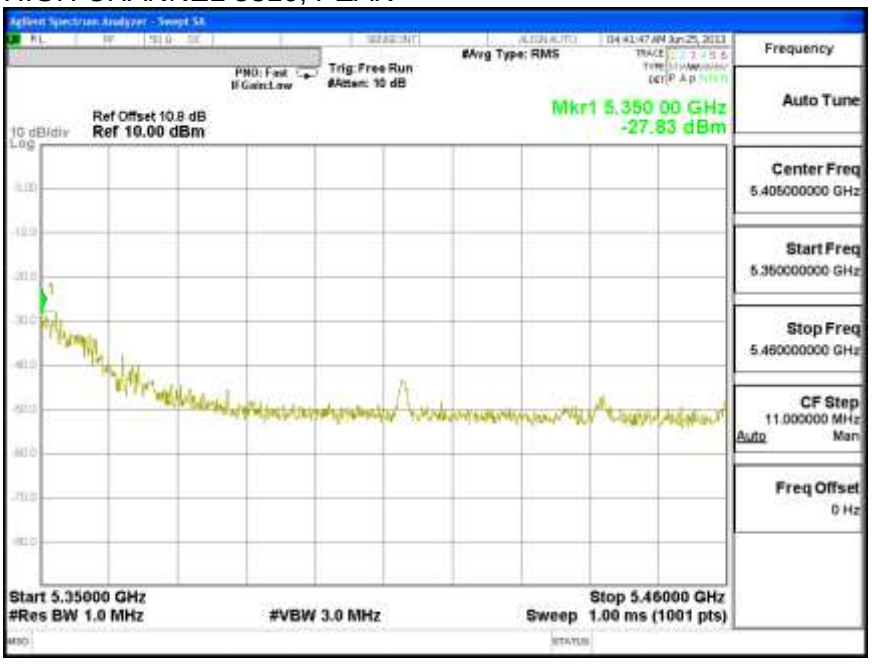
HIGH CHANNEL 5310, AVERAGE

HIGH CHANNEL 5310, AVERAGE

Chain 1

RESTRICTED BANDEDGE

HIGH CHANNEL 5310, PEAK



HIGH CHANNEL 5310, AVERAGE

HIGH CHANNEL 5310, AVERAGE

BANDEDGE DATA

2TX Conducted Spurious BE for UNII (in the restricted bands)

Date:	6/25/2013
Test Engineer:	Tony Wagoner
Client:	Qualcomm
Project Number:	13U14995
Configuration:	Tx
Mode of operation:	11n HT40 5.3GHz

Note: if the PK margin is greater than 20 dB, there is no need to get AVG reading.

Channel	Frequency (MHz)	PXA PK Reading Chain 0 (dBm)	PXA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
62 (5310)	5350	-32.471	-27.83	2	-21.54	-21.2	-0.34	12.00	6.92/8.36

Channel	Frequency (MHz)	PXA AVG Reading Chain 0 (dBm)	PXA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
62 (5310)	5355.94	-57.721	-46.692	2	-41.35	-41.2	-0.15	8.00	3.41/5.0
62 (5310)	5350	-54.073	-51.278	2	-44.43	-41.2	-3.23	8.00	3.41/5.0

8.7. 802.11a MODE IN THE 5.6 GHz BAND

8.7.1. 26 dB BANDWIDTH

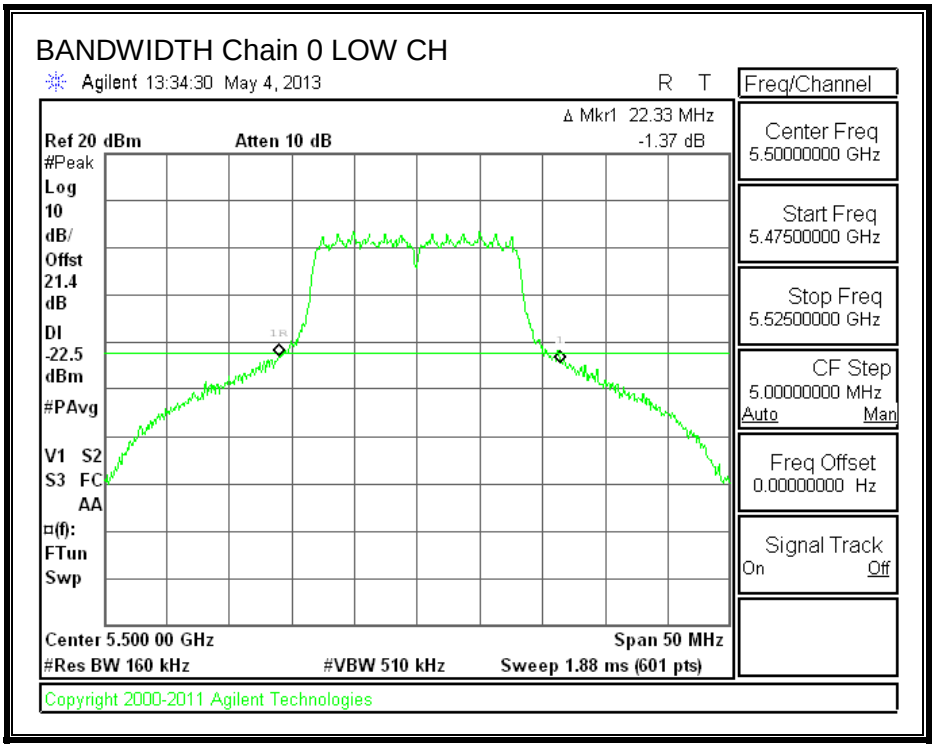
LIMITS

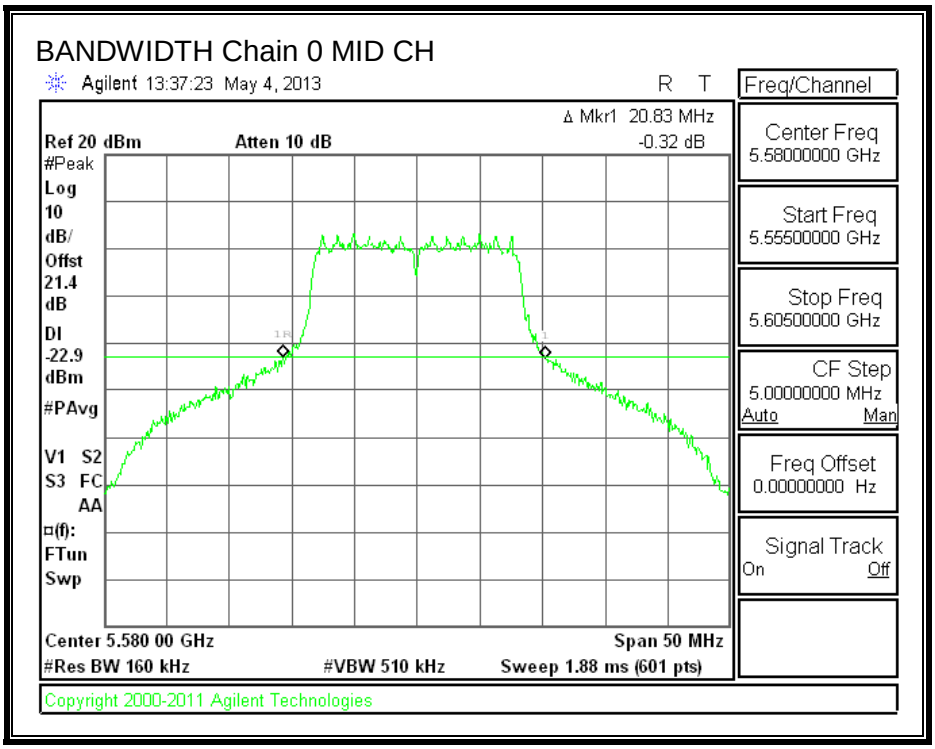
None; for reporting purposes only.

RESULTS

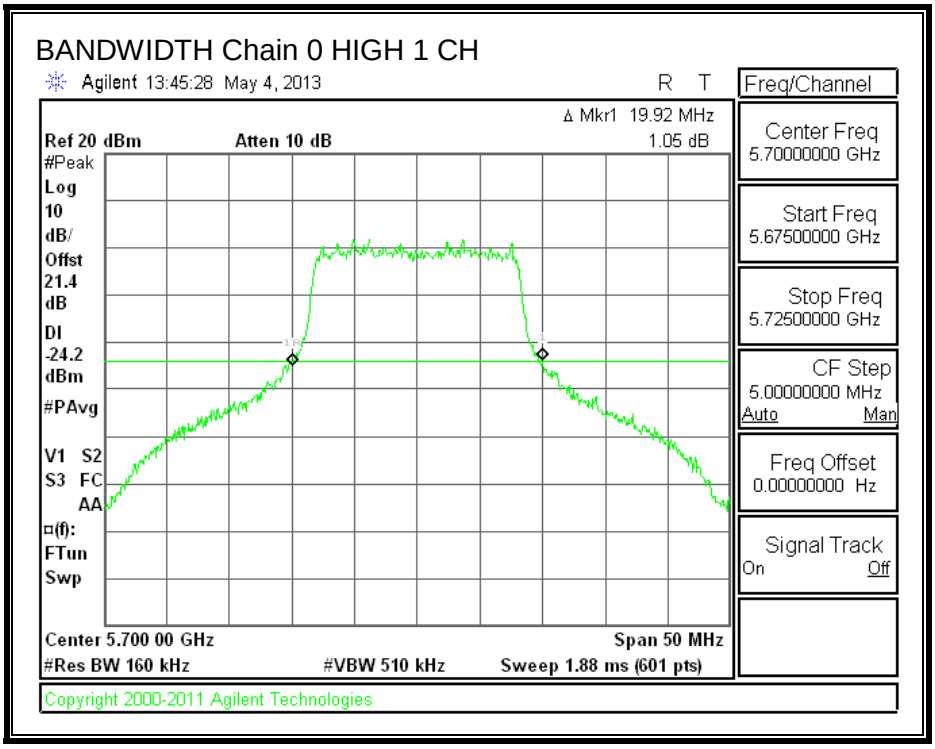
Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5500	22.33	27.17
Mid	5580	20.83	26.00
High 1	5700	19.92	24.33
High 2	5720	21.33	27.75

26 dB BANDWIDTH, Chain 0

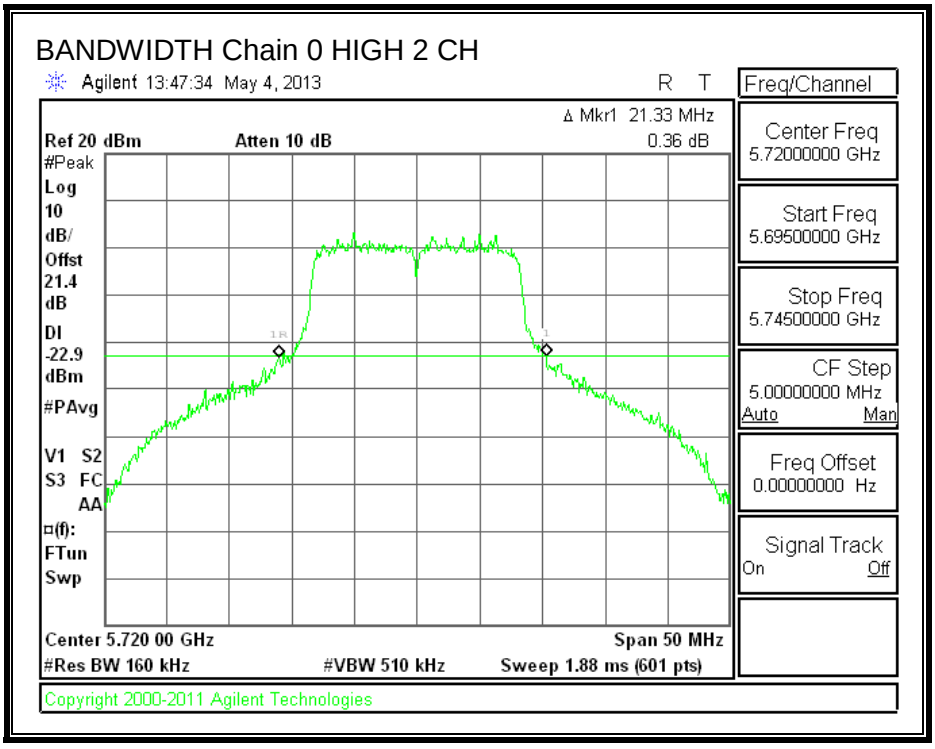




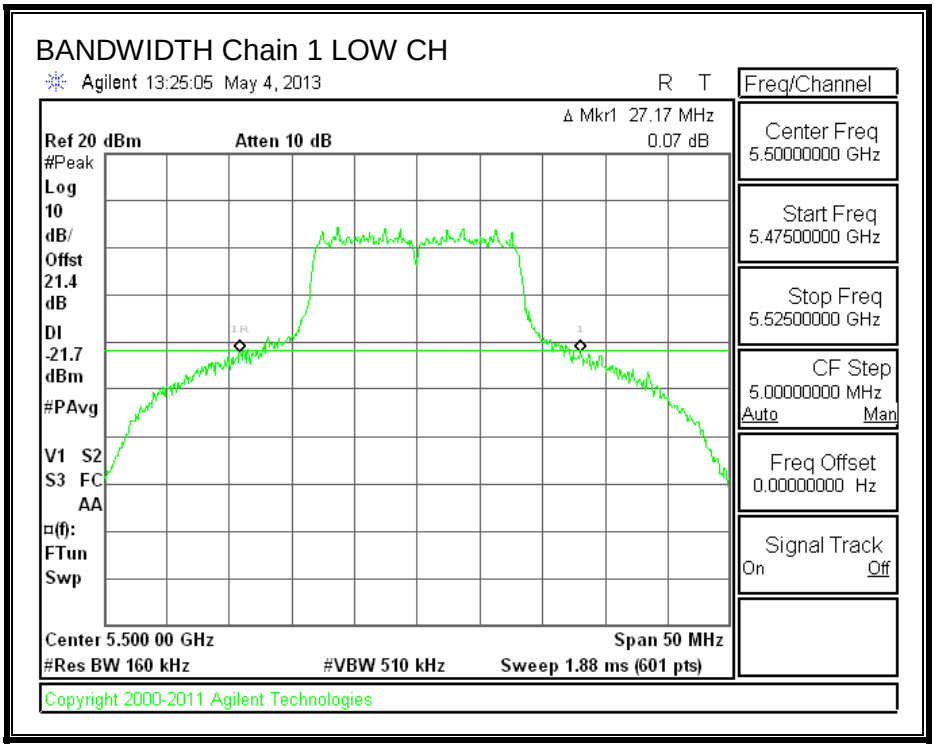
BANDWIDTH Chain 0 HIGH 1 CH

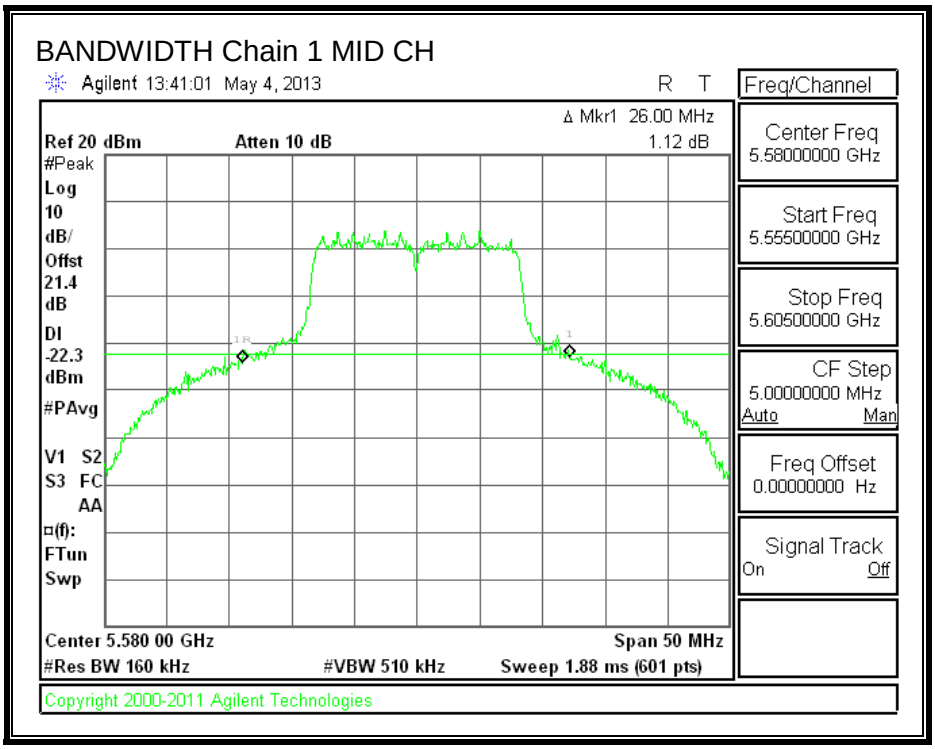


BANDWIDTH Chain 0 HIGH 2 CH

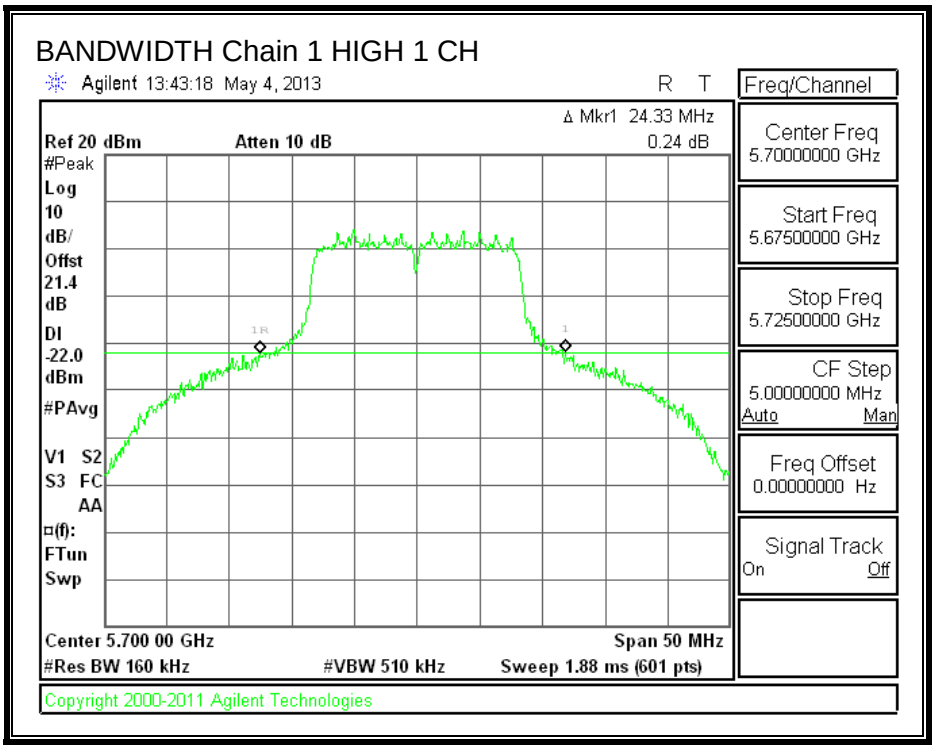


26 dB BANDWIDTH, Chain 1

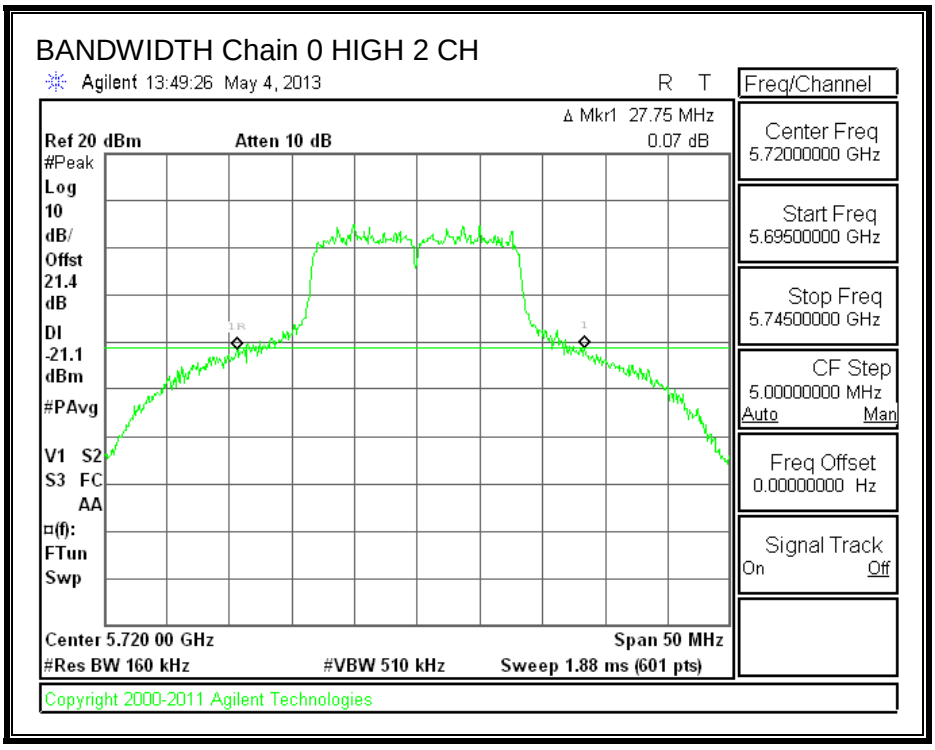




BANDWIDTH Chain 1 HIGH 1 CH



BANDWIDTH Chain 0 HIGH 2 CH



8.7.2. 99% BANDWIDTH

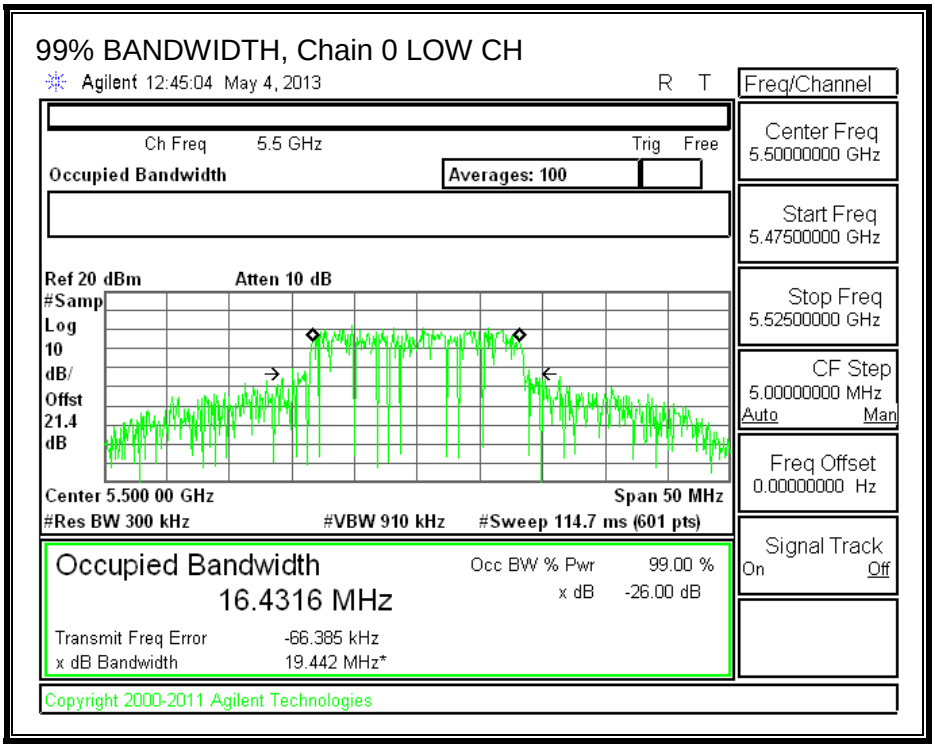
LIMITS

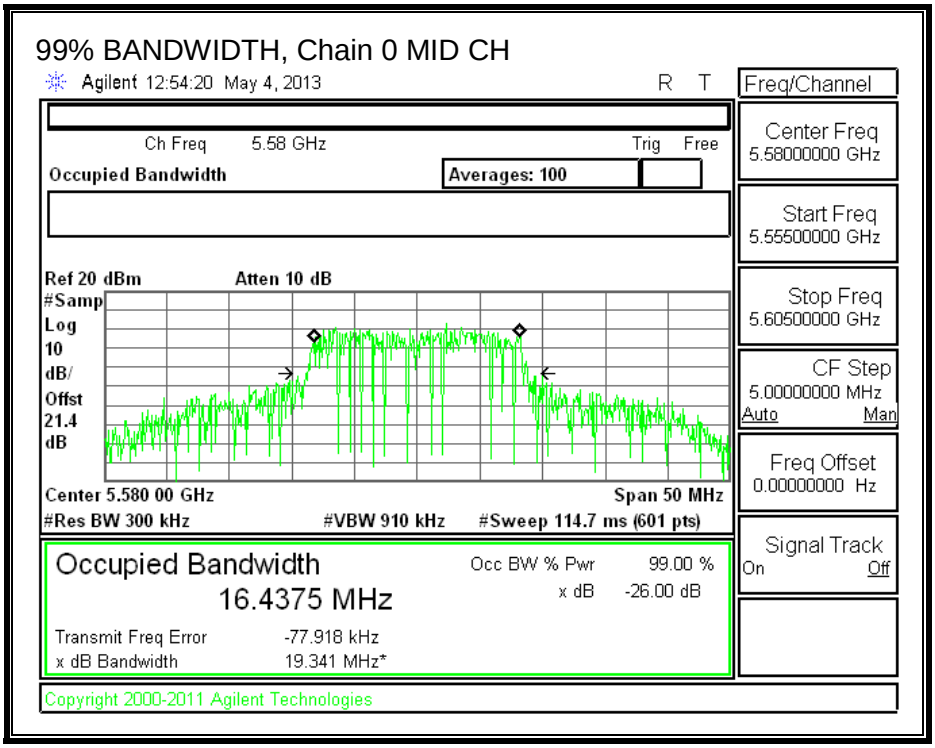
None; for reporting purposes only.

RESULTS

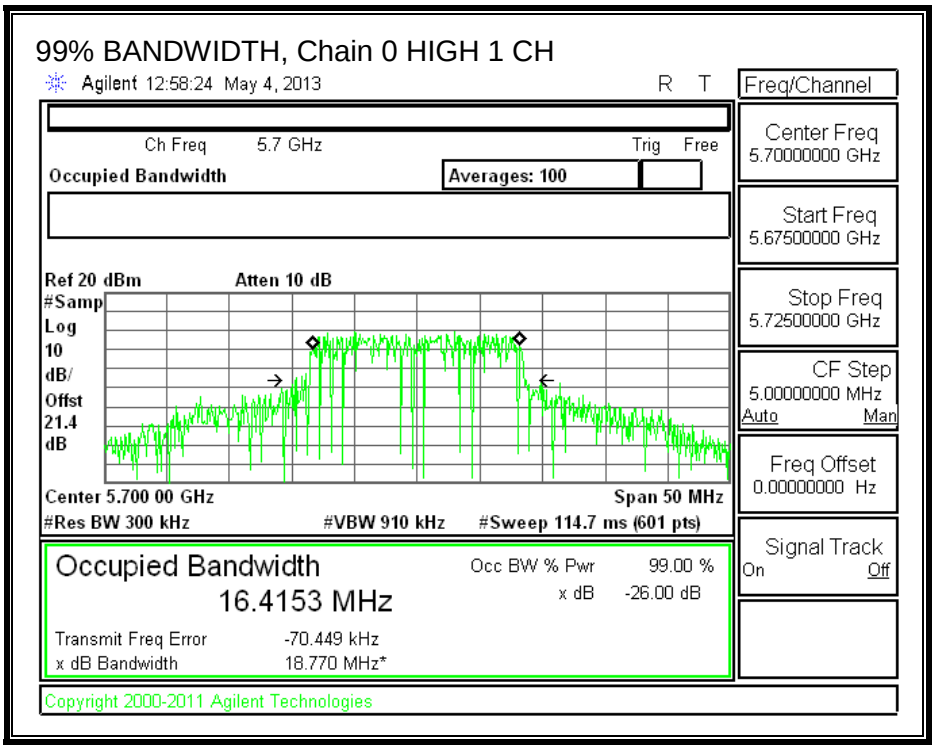
Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	5500	16.4316	16.4902
Mid	5580	16.4375	16.4850
High 1	5700	16.4153	16.4718
High 2	5720	16.4348	16.4888

99% BANDWIDTH, Chain 0

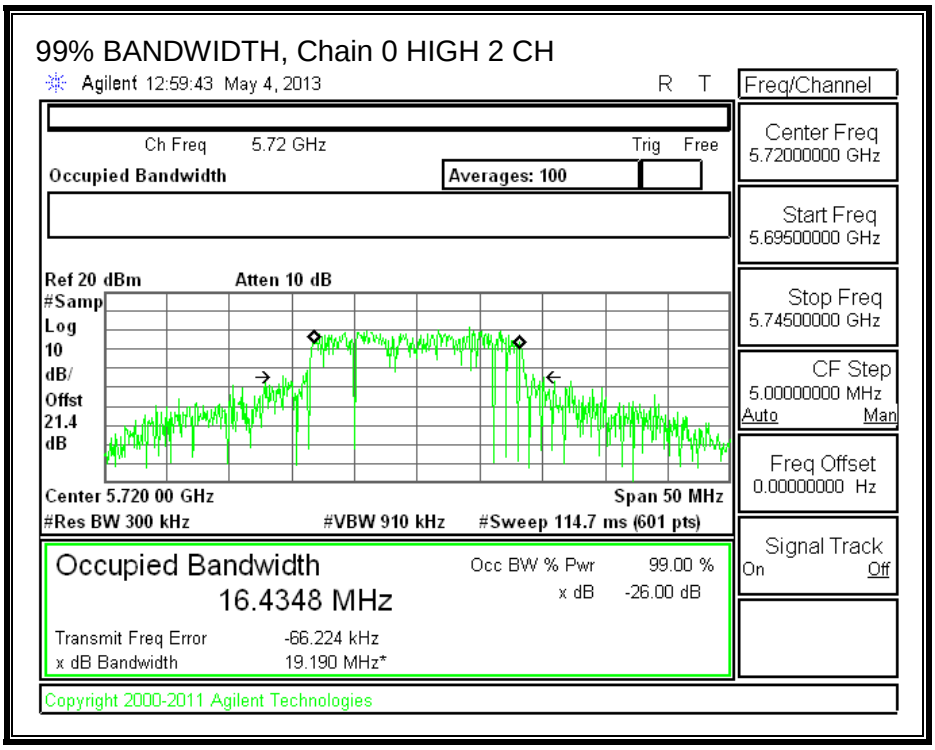




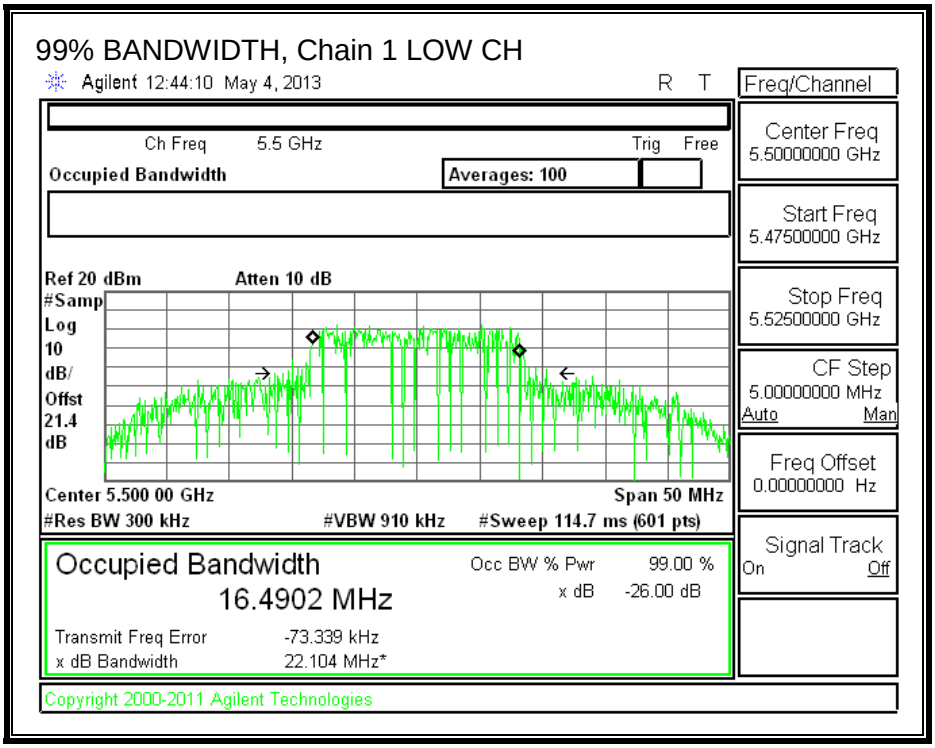
99% BANDWIDTH, Chain 0 HIGH 1 CH

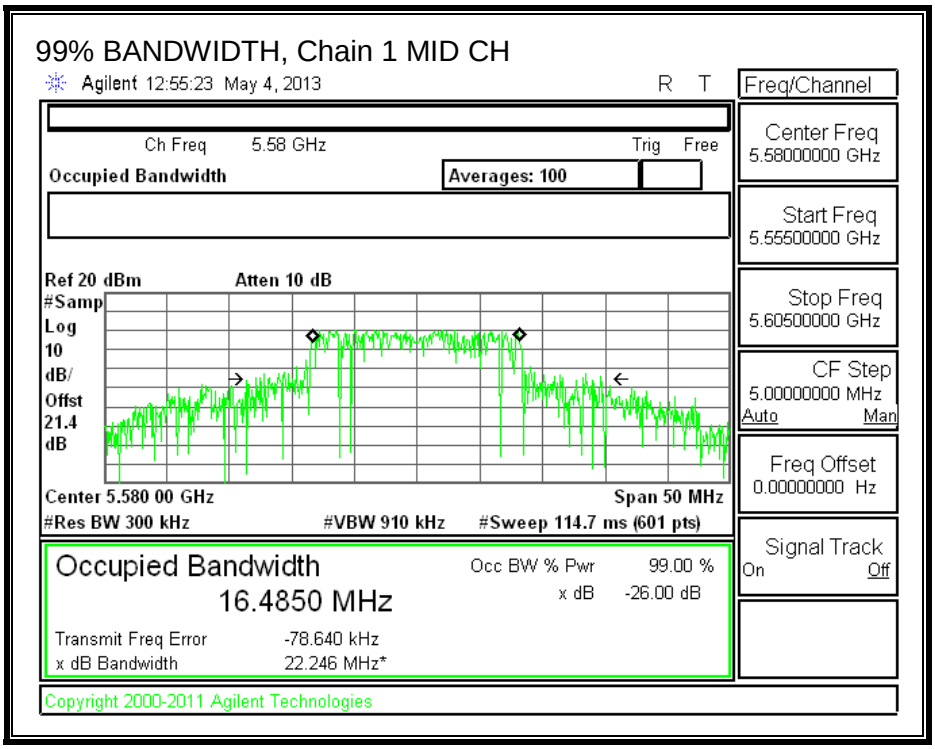


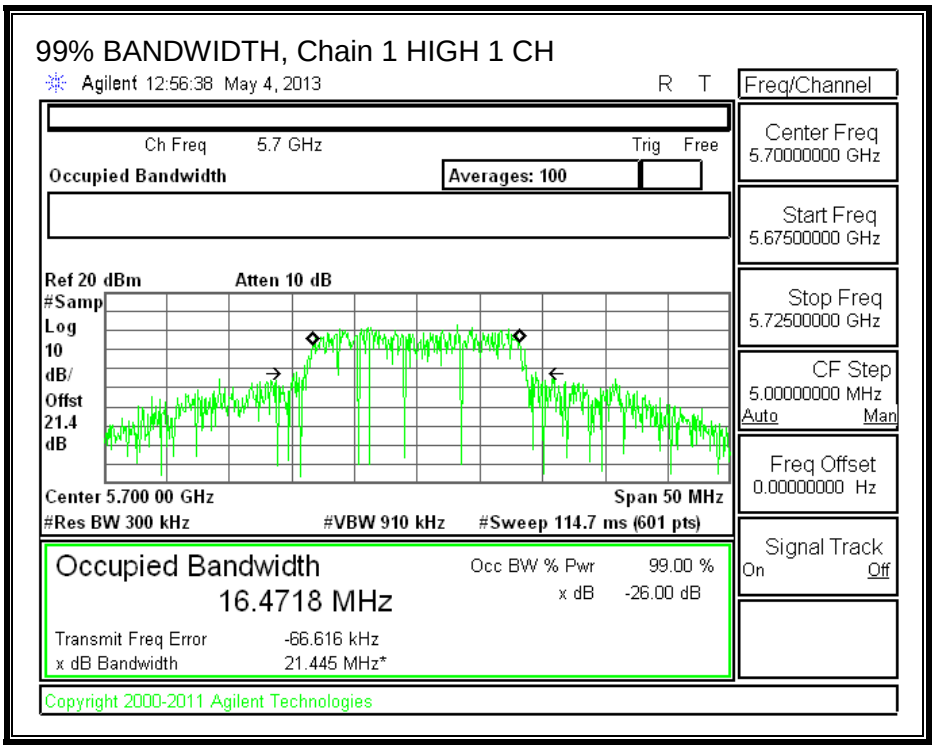
99% BANDWIDTH, Chain 0 HIGH 2 CH

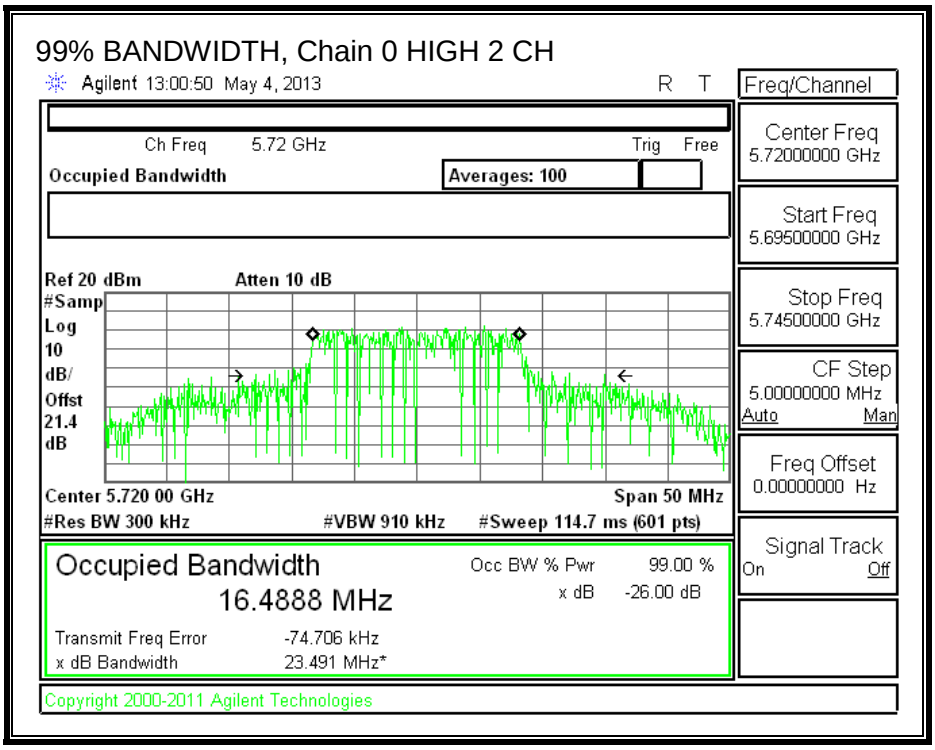


99% BANDWIDTH, Chain 1









8.7.3. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 25.41 dB (including two 10 dB pads, 2.01 dB cables, and 3.4 dB power splitter) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Average Power Results

Channel	Frequency (MHz)	Chain 0 Power (dBm)	Chain 1 Power (dBm)	Total Power (dBm)
Low	5500	12.75	14.25	16.57
Mid	5580	13.00	14.45	16.80
High 1	5700	13.35	14.50	16.97
High 2	5720	13.25	14.50	16.93

8.7.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

For the band 5.5–5.7 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 peak power spectral density shall not exceed 11 dBm in any 1–MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the 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.

IC RSS-210 A9.2 (1)

The maximum e.i.r.p. shall not exceed 200 mW or 10 + 10 log10 B, dBm, whichever power is less. B is the 99% emission bandwidth in MHz. The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

DIRECTIONAL ANTENNA GAIN

For output power, the two chains are considered uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
2.00	2.00	2.00

For PSD, the two chains are considered correlated and the antenna gain is unequal among the chains. The directional gain is:

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Correlated Chains Directional Gain (dBi)
2.00	2.00	5.01

Worst-case correlated antenna gain of 5.01 dBi was used in the output power and PSD table.

RESULTS

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Directional Gain (dBi)
Low	5500	22.33	16.4316	5.01
Mid	5580	20.83	16.4375	5.01
High 1	5700	19.92	16.4153	5.01
High 2	5720	21.33	16.4348	5.01

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC PSD Limit (dBm)	PPSD Limit (dBm)
Low	5500	24.00	23.16	29.16	23.16	11.00	11.00	11.00
Mid	5580	24.00	23.16	29.16	23.16	11.00	11.00	11.00
High 1	5700	23.99	23.15	29.15	23.15	11.00	11.00	11.00
High 2	5720	24.00	23.16	29.16	23.16	11.00	12.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power & PPSD

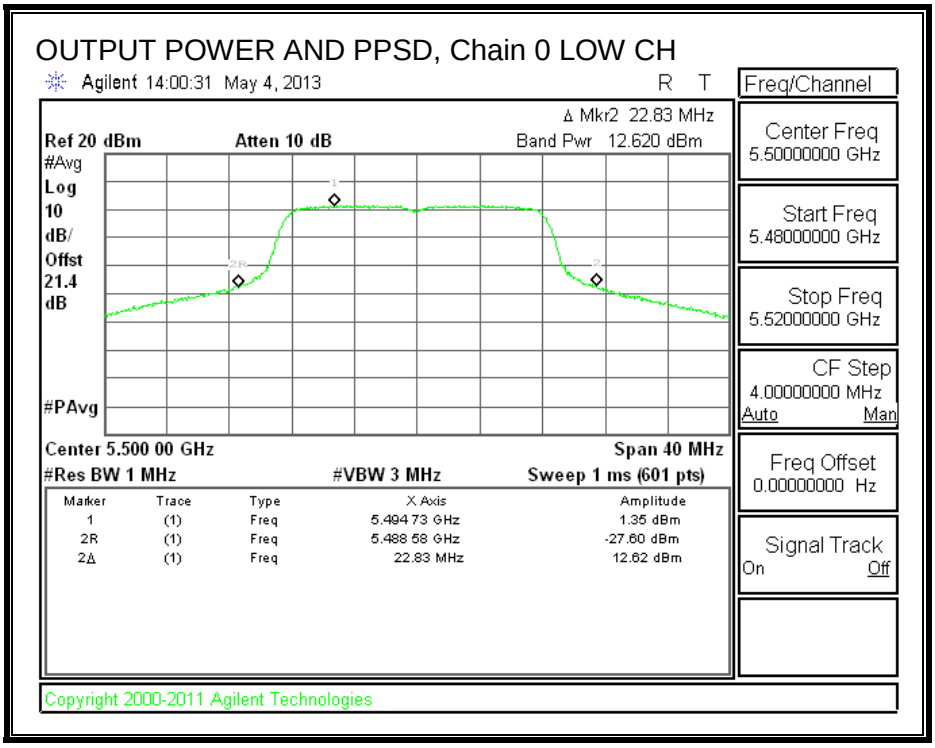
Output Power Results

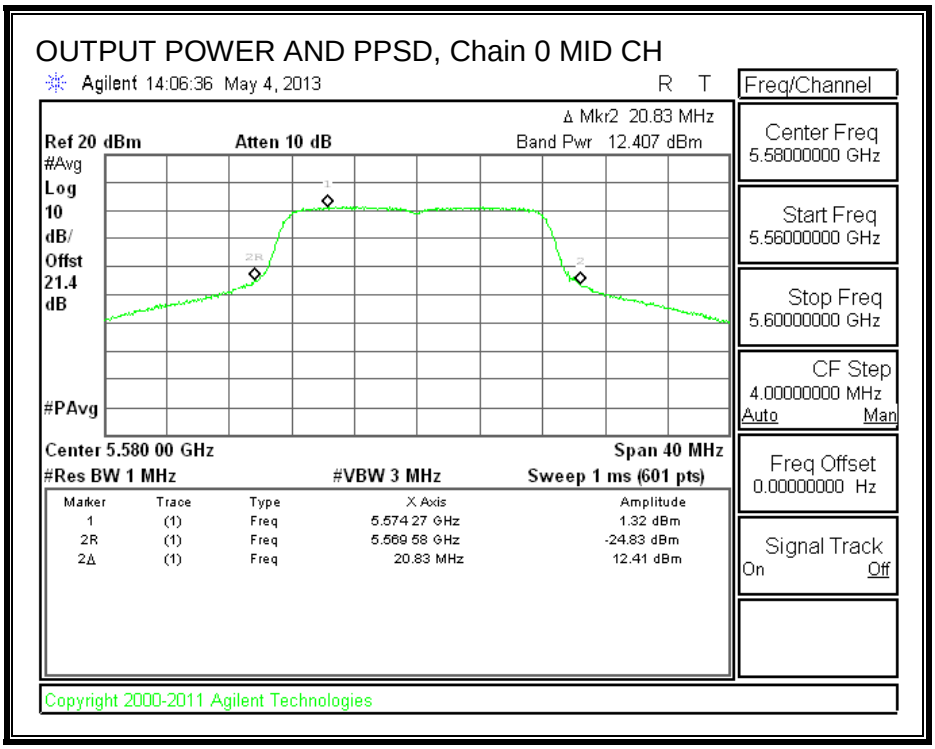
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5500	12.620	13.640	16.170	23.16	-6.987
Mid	5580	12.407	13.281	15.876	23.16	-7.282
High 1	5700	11.281	13.122	15.309	23.15	-7.844
High 2	5720	12.185	13.923	16.151	23.16	-7.007

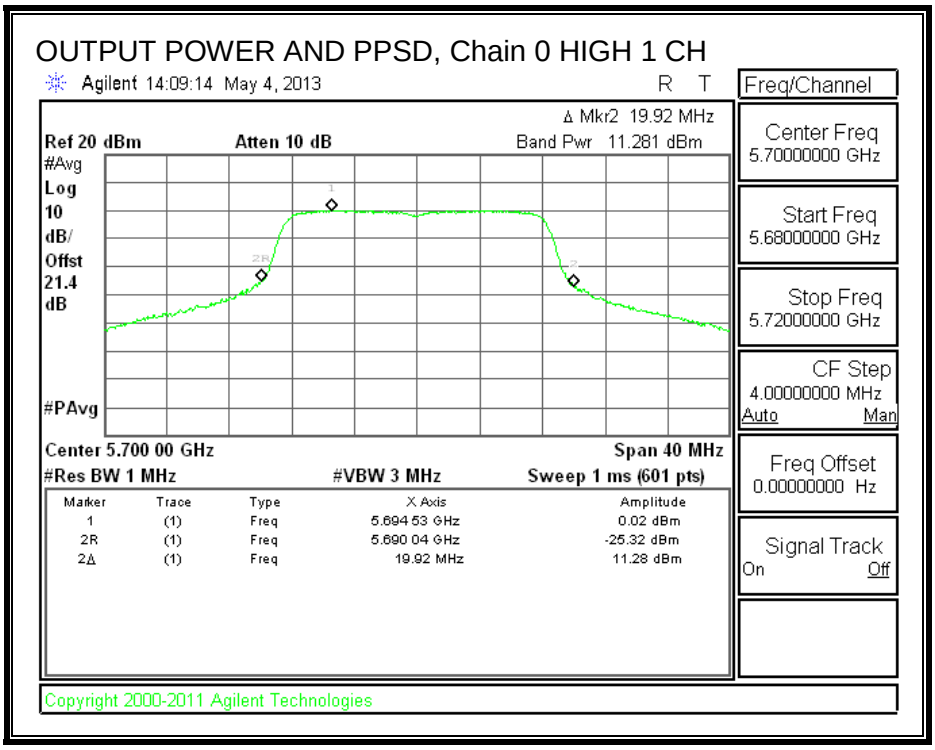
PPSD Results

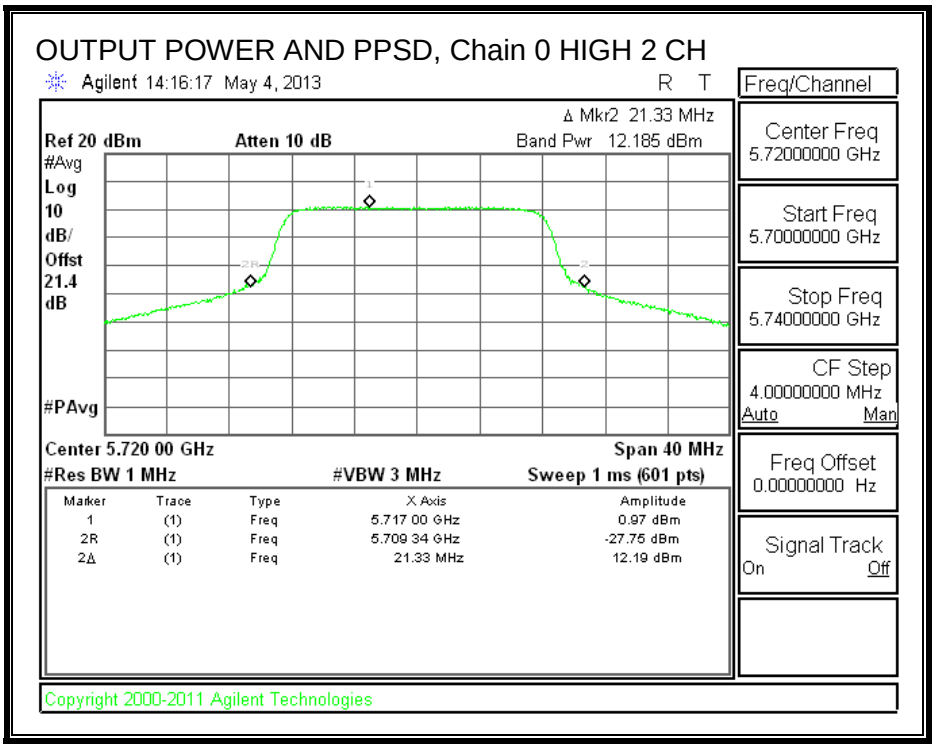
Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Chain 1 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5500	1.35	2.50	4.97	11.00	-6.03
Mid	5580	1.32	2.18	4.78	11.00	-6.22
High 1	5700	0.02	1.98	4.12	11.00	-6.88
High 2	5720	0.97	2.55	4.84	11.00	-6.16

OUTPUT POWER AND PPSD, Chain 0

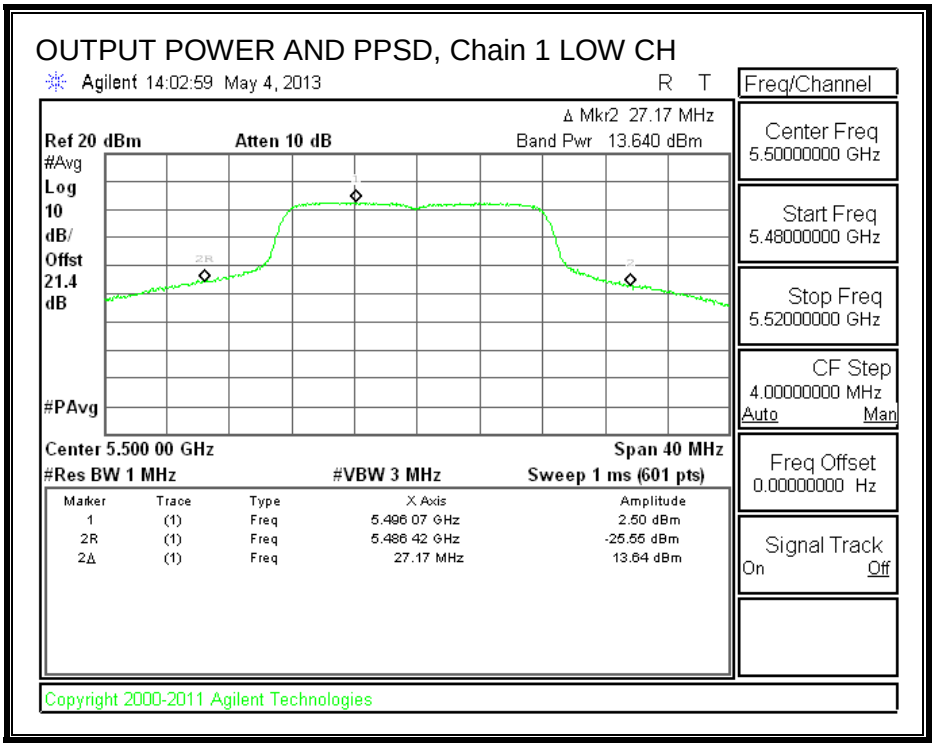


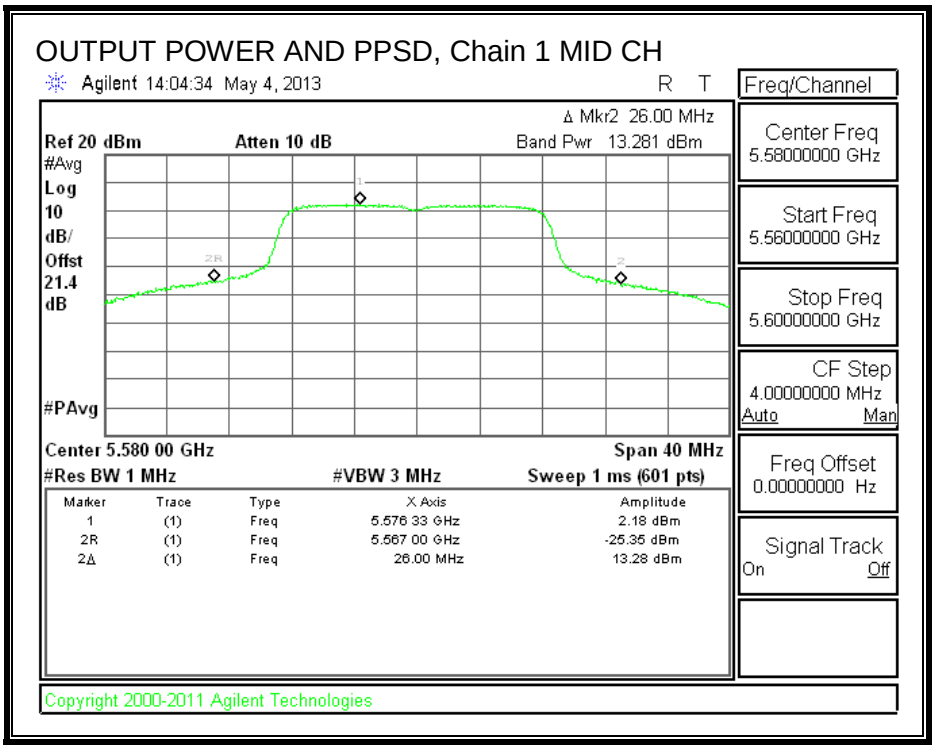


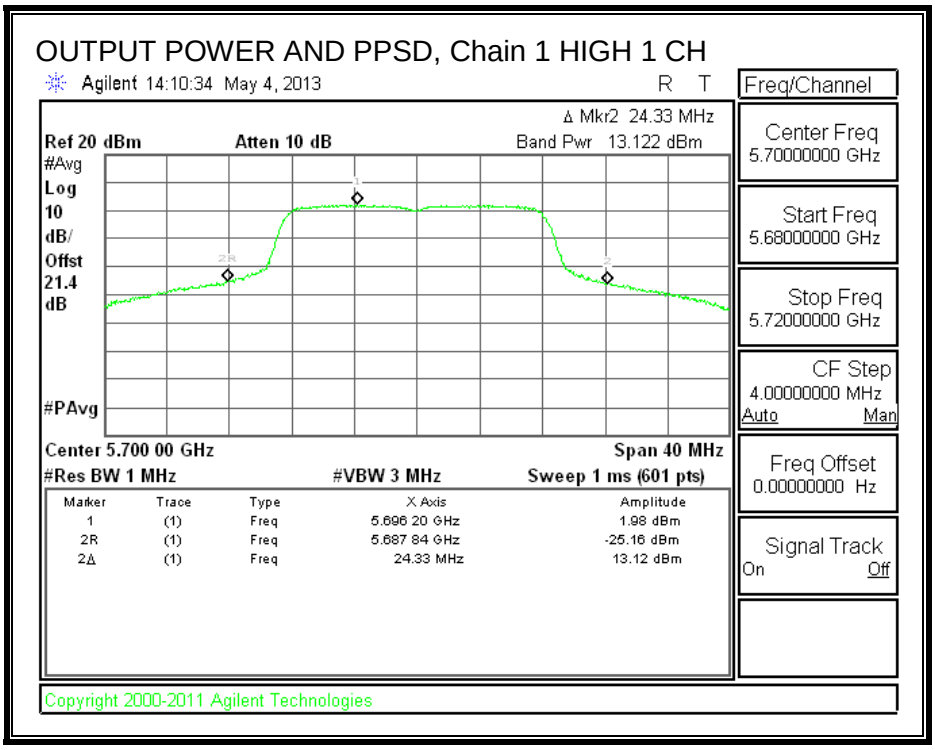


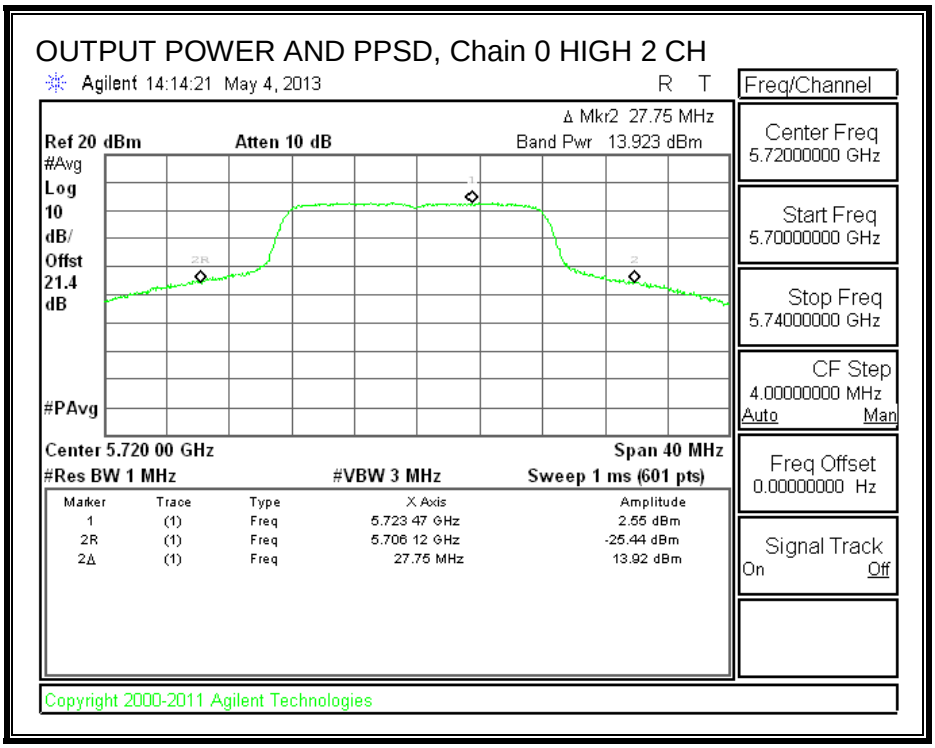


OUTPUT POWER AND PPSD, Chain 1









8.7.5. 802.11a CH 144 2TX MODE IN THE 5.8 GHz BAND

DTS/UNII = 5720 MHz

OUTPUT POWER AND PSD

LIMITS

FCC §15.247

IC RSS-210 A8.4

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

DIRECTIONAL ANTENNA GAIN

For output power, the two chains are considered uncorrelated and the antenna gain is unequal among the chains. The directional gain is:

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Uncorrelated Chains Directional Gain (dBi)
2.00	2.00	2.00

For PSD, the two chains are considered correlated and the antenna gain is unequal among the chains. The directional gain is:

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Correlated Chains Directional Gain (dBi)
2.00	2.00	5.01

Worst-case correlated antenna gain of 5.01 dBi was used in the output power and PSD table.

RESULTS

Limits (FCC), portion in UNII 2 ext band

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Correlated Gain (dBi)	Uncorrelated Gain (dBi)
High	5720	15.7	13.2174	5.01	2.00

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC PSD Limit (dBm)	PPSD Limit (dBm)
High	5720	22.95	22.21	28.21	22.21	11.00	11.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of PPSD

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)
High	5720	12.59	13.96	16.34	28.21	-11.87

PPSD Results

Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Chain 1 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
High	5720	2.28	3.69	6.05	11.00	-4.95

Limits (FCC), portion in 5.8 GHz DTS band

Bandwidth and Antenna Gain

Channel	Frequency (MHz)	Min 26 dB BW (MHz)	Min 99% BW (MHz)	Correlated Gain (dBi)	Uncorrelated Gain (dBi)
High	5720	5.7	3.2174	5.01	2.00

Limits

Channel	Frequency (MHz)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Power Limit (dBm)	FCC PPSD Limit (dBm)	IC PSD Limit (dBm)	PPSD Limit (dBm)
High	5720	18.53	16.08	22.08	16.08	11.00	11.00	11.00

Duty Cycle CF (dB)	0.00	Included in Calculations of PPSD

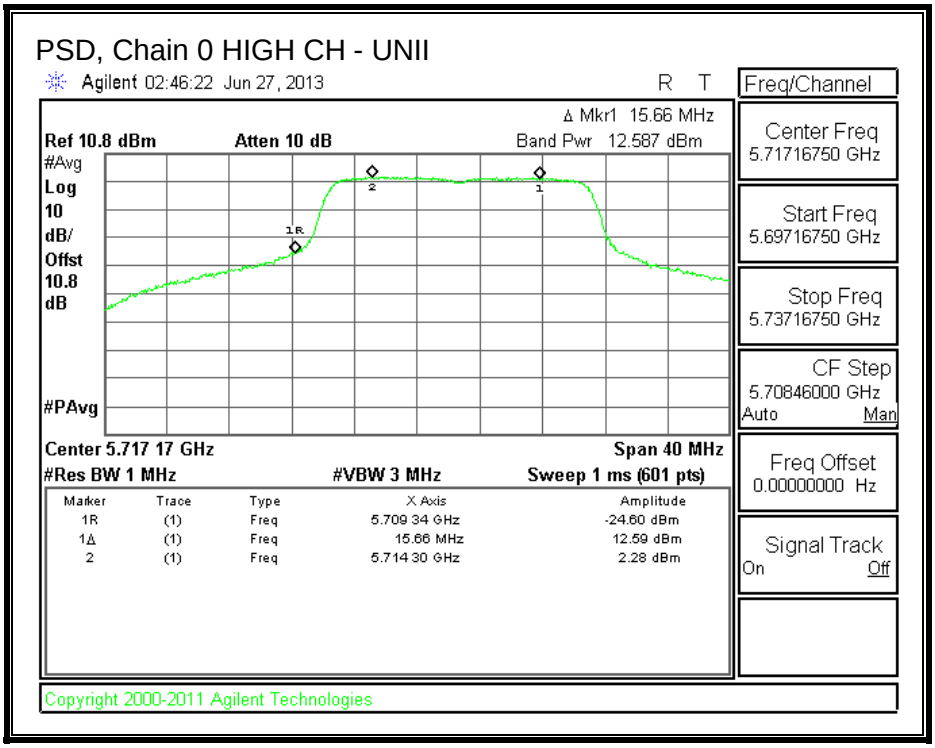
Output Power Results

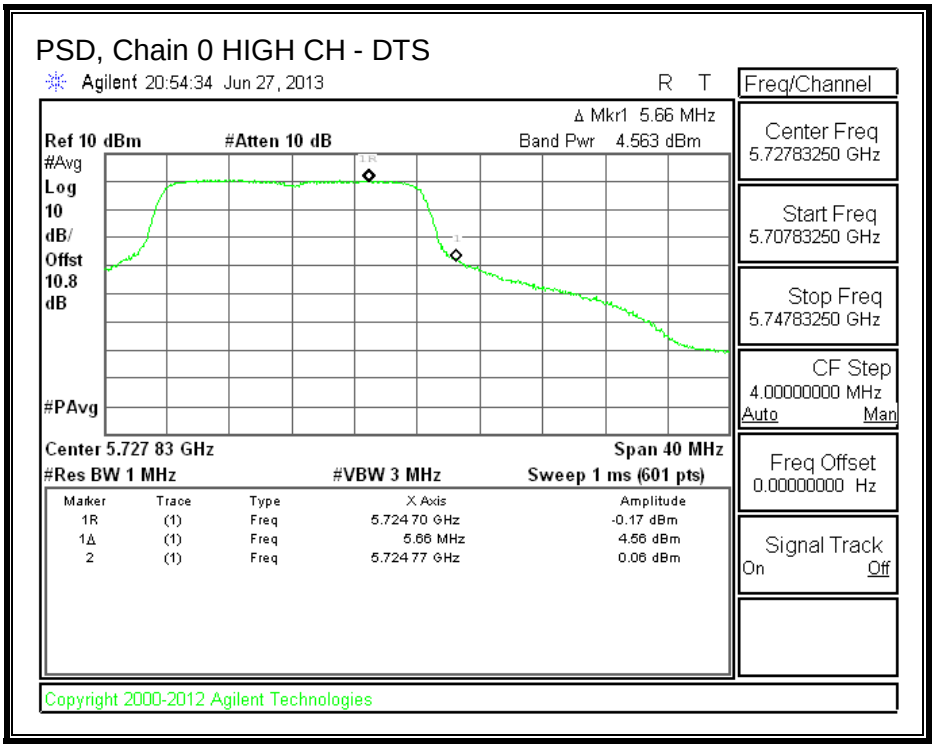
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
High	5720	4.56	5.66	8.16	22.08	-13.92

PPSD Results

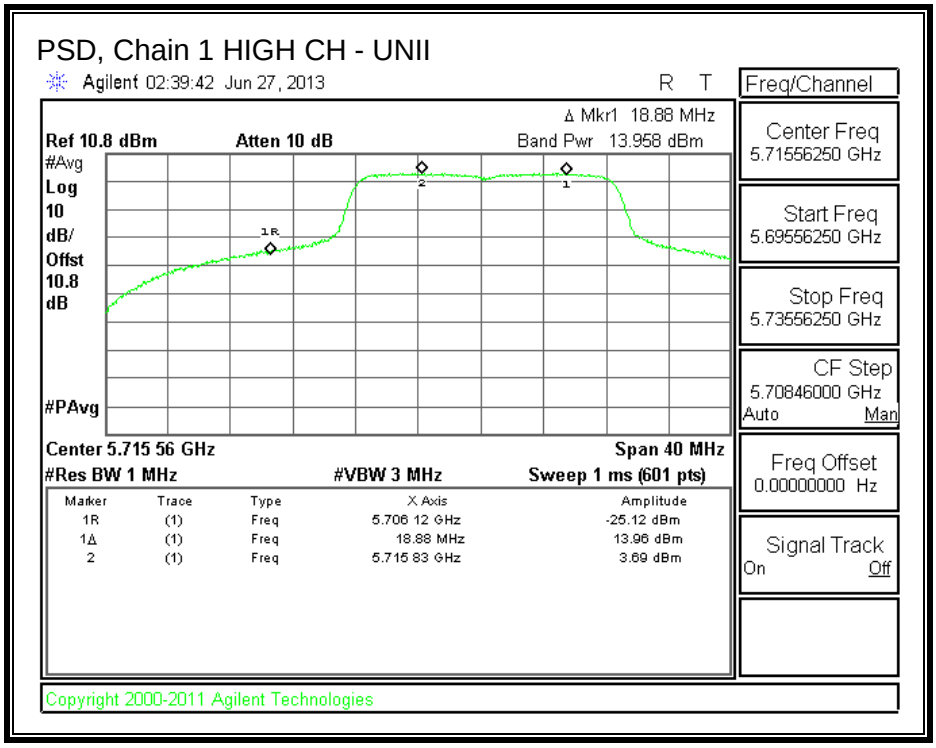
Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Chain 1 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
High	5720	0.006	1.530	3.84	11.00	-7.16

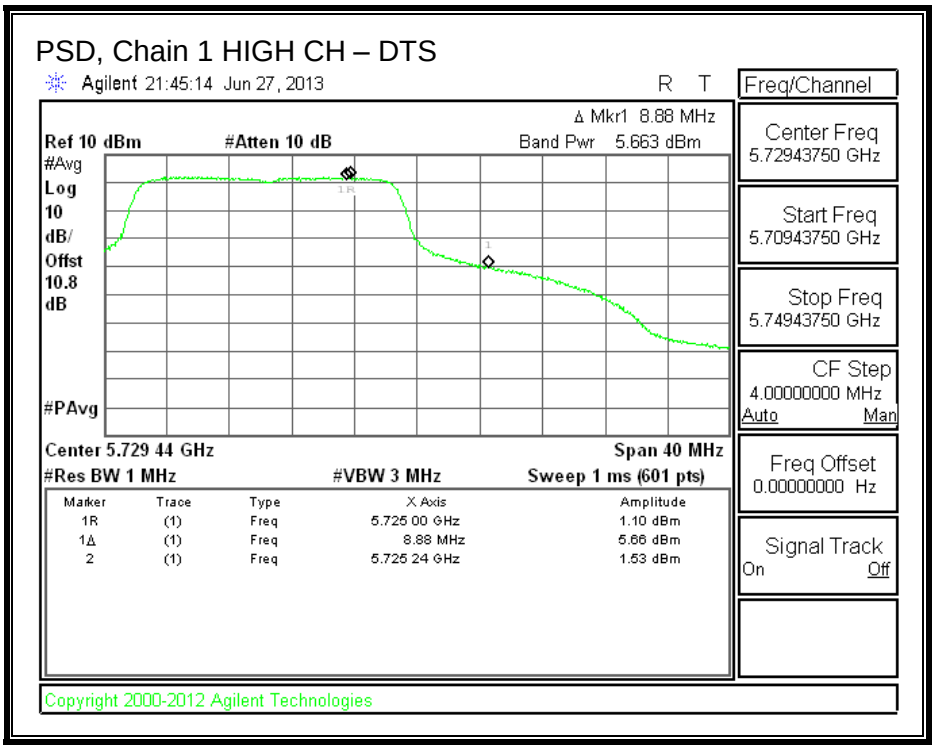
PSD, Chain 0





PSD, Chain 1





8.7.6. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

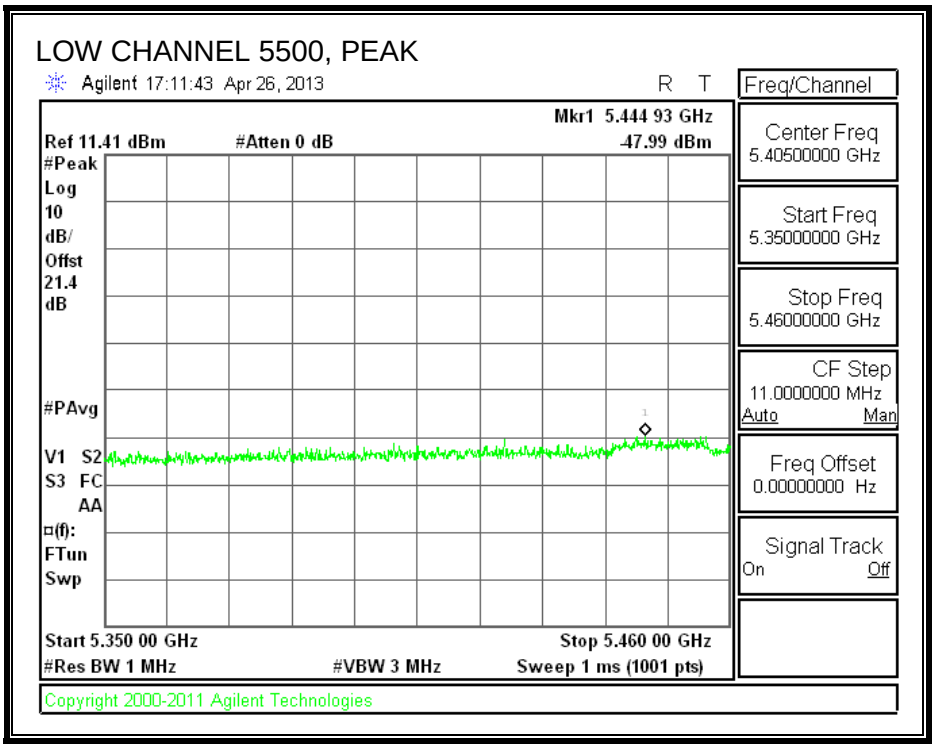
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

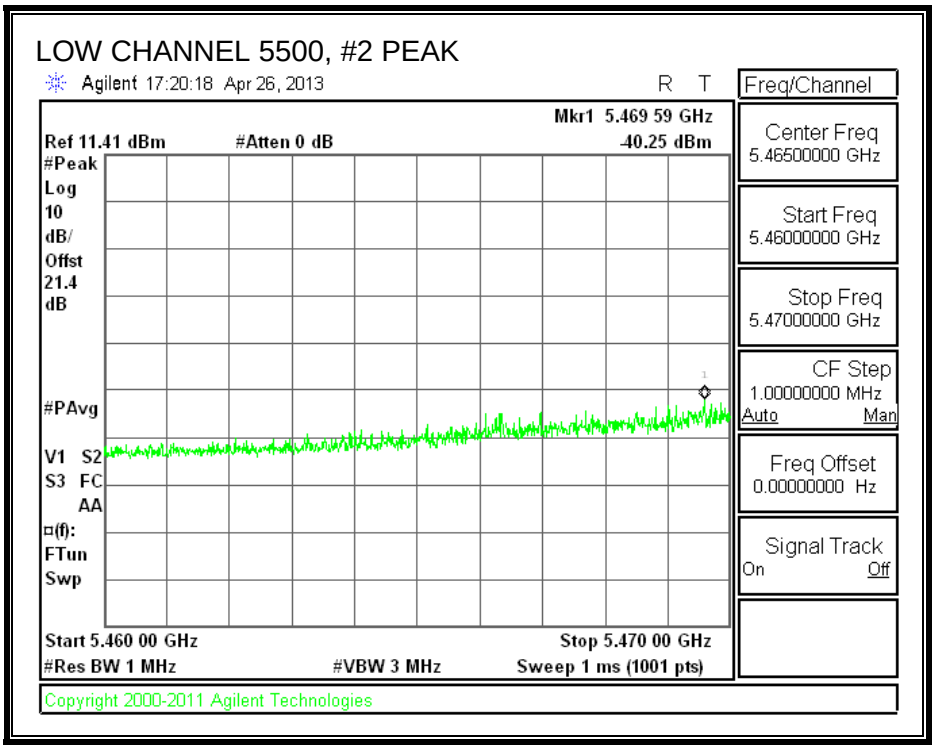
RESULTS

Refer to the results of 802.11a mode in the 5.2 GHz band.

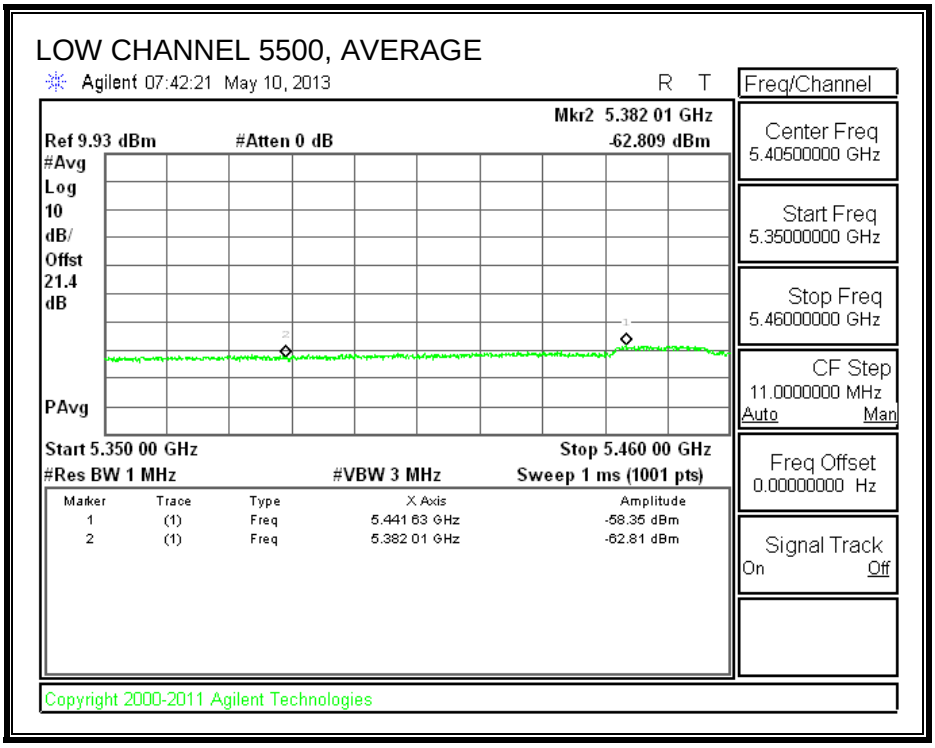
8.7.7. CONDUCTED BANDEDGE, HARMONICS, & SPURIOUS (no filter unit)

Chain 0
RESTRICTED BANDEDGE

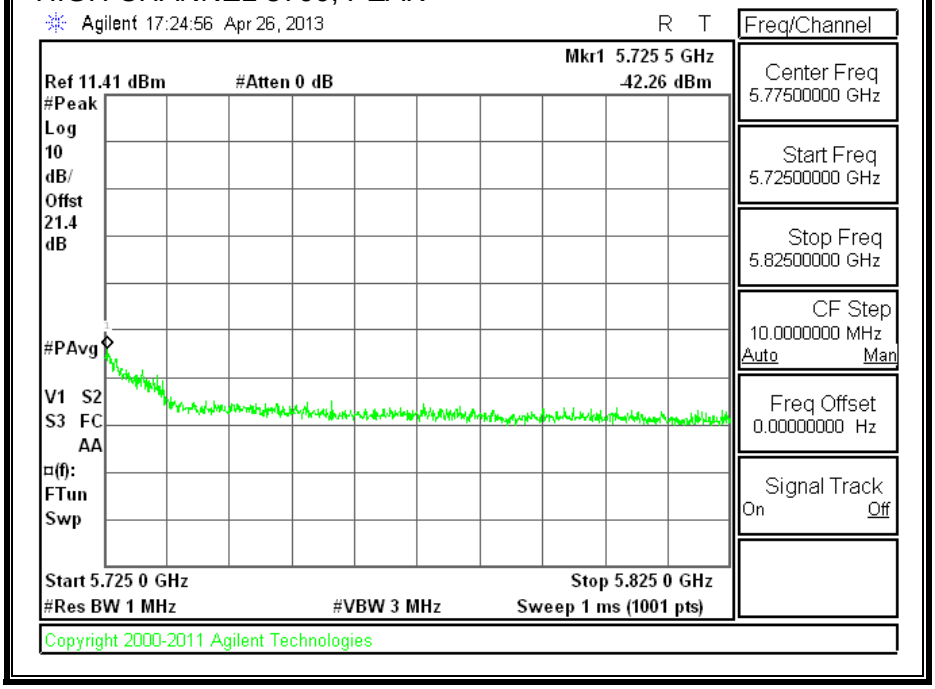




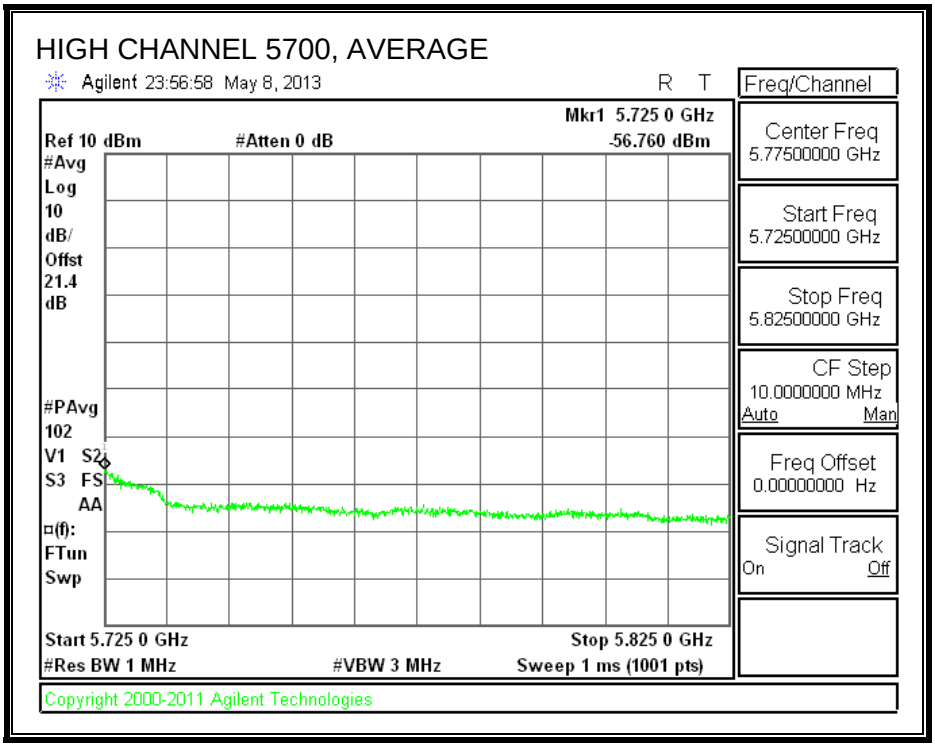
LOW CHANNEL 5500, AVERAGE



HIGH CHANNEL 5700, PEAK

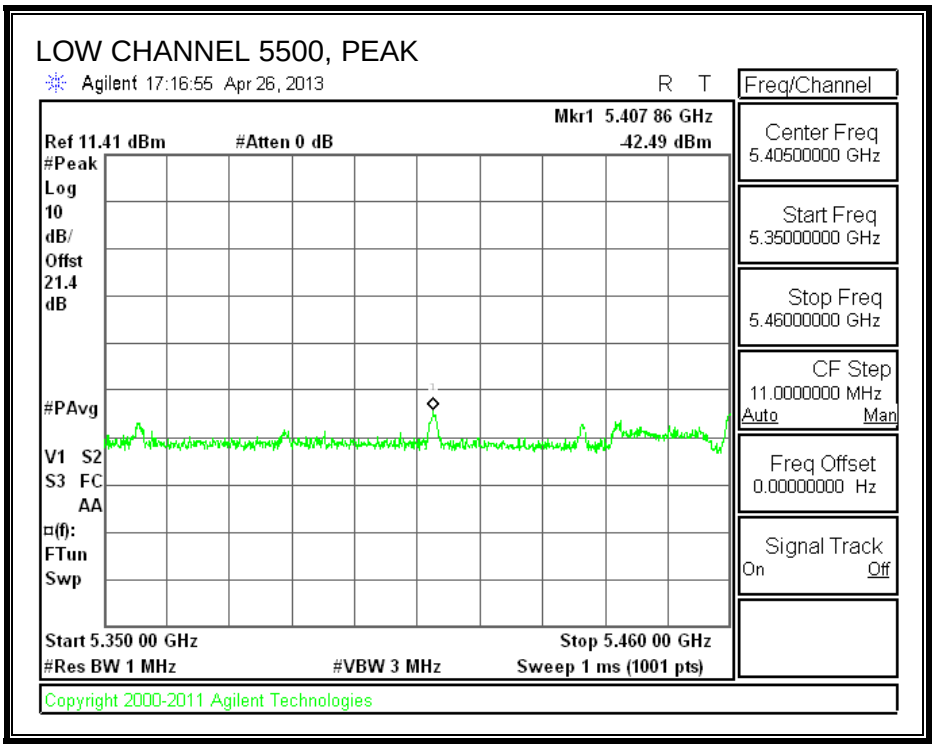


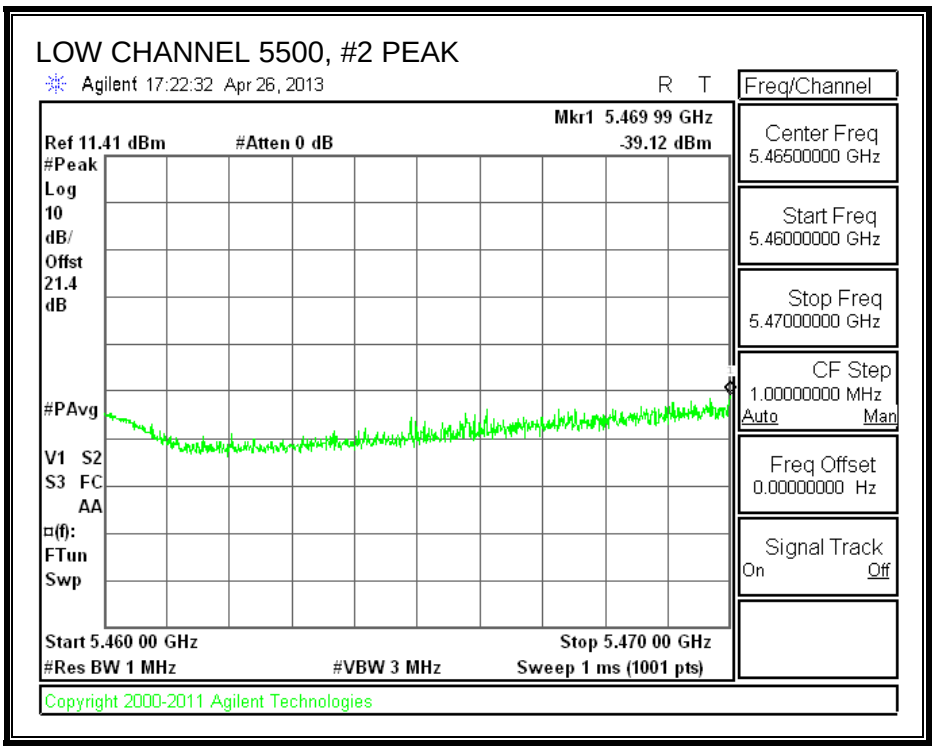
HIGH CHANNEL 5700, AVERAGE



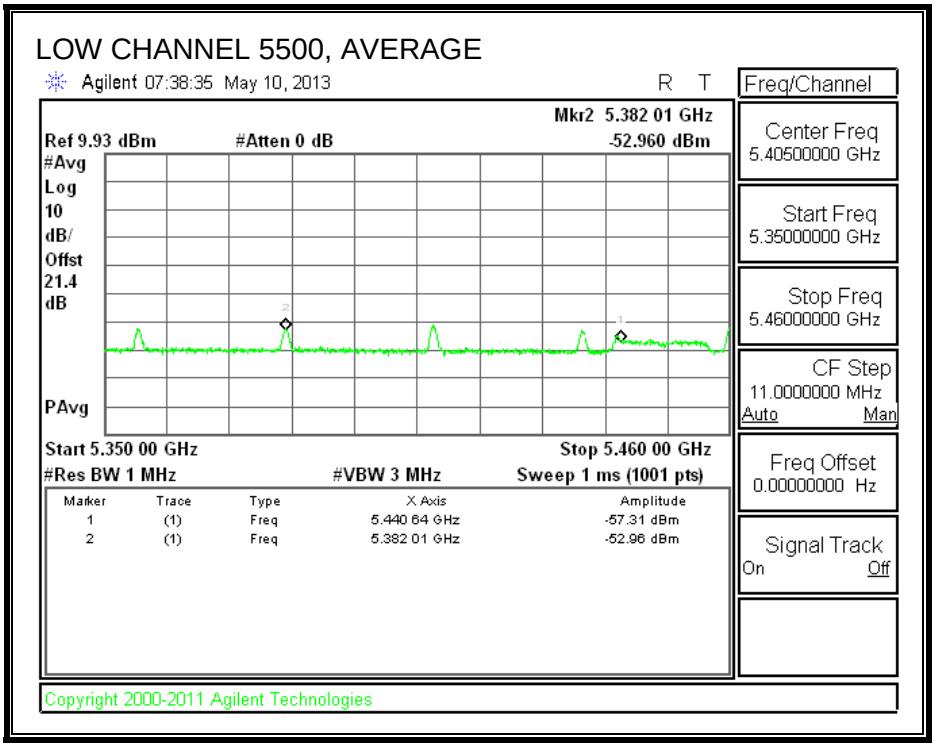
Chain 1

RESTRICTED BANDEDGE

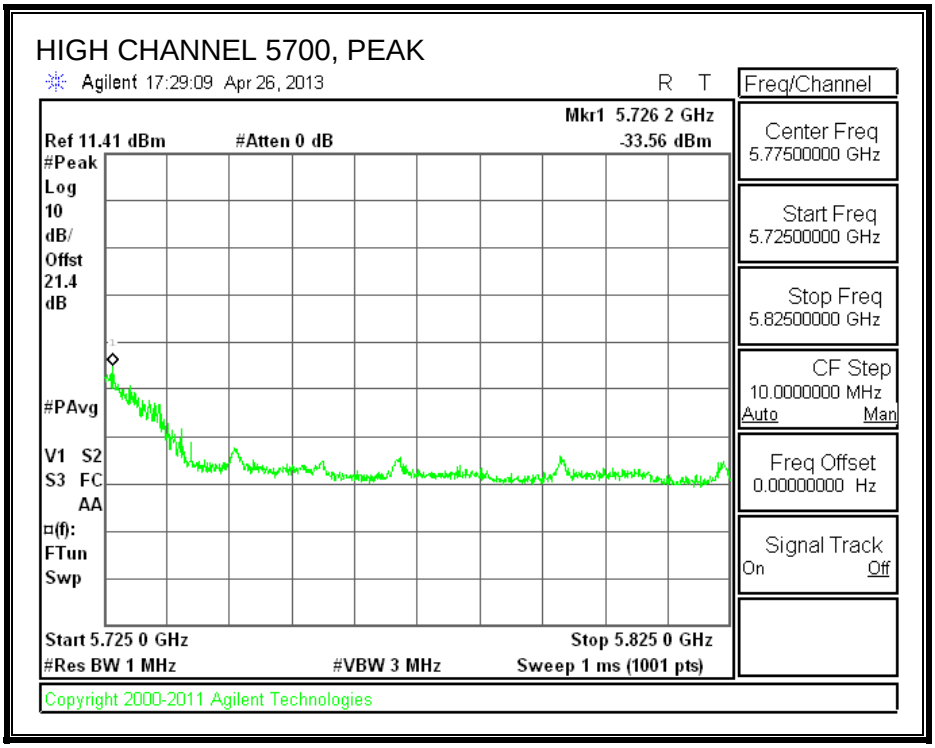




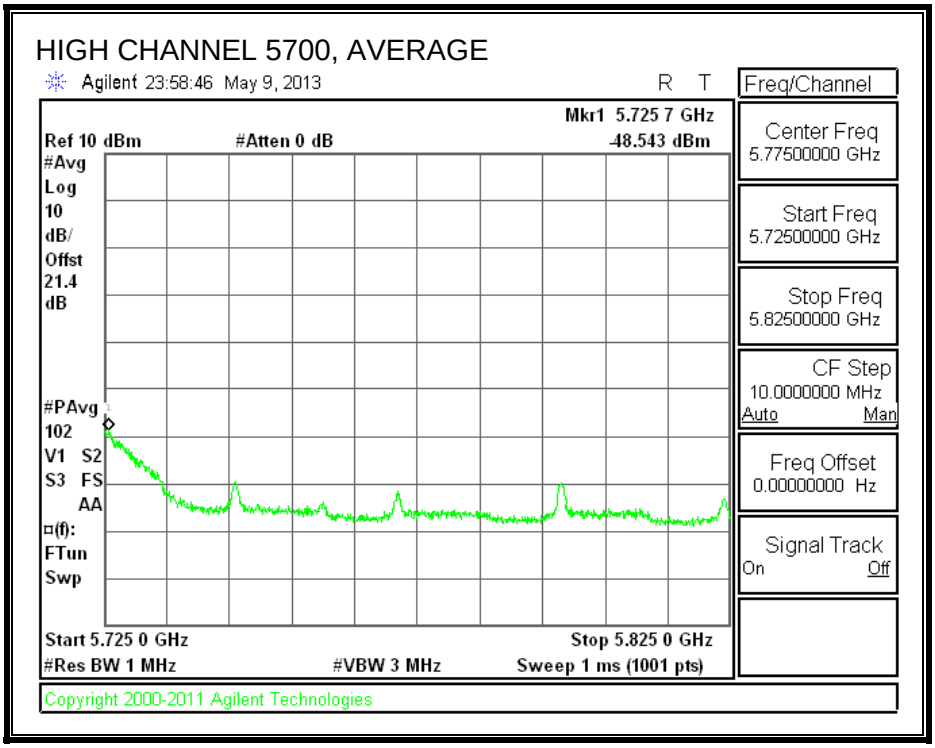
LOW CHANNEL 5500, AVERAGE



HIGH CHANNEL 5700, PEAK

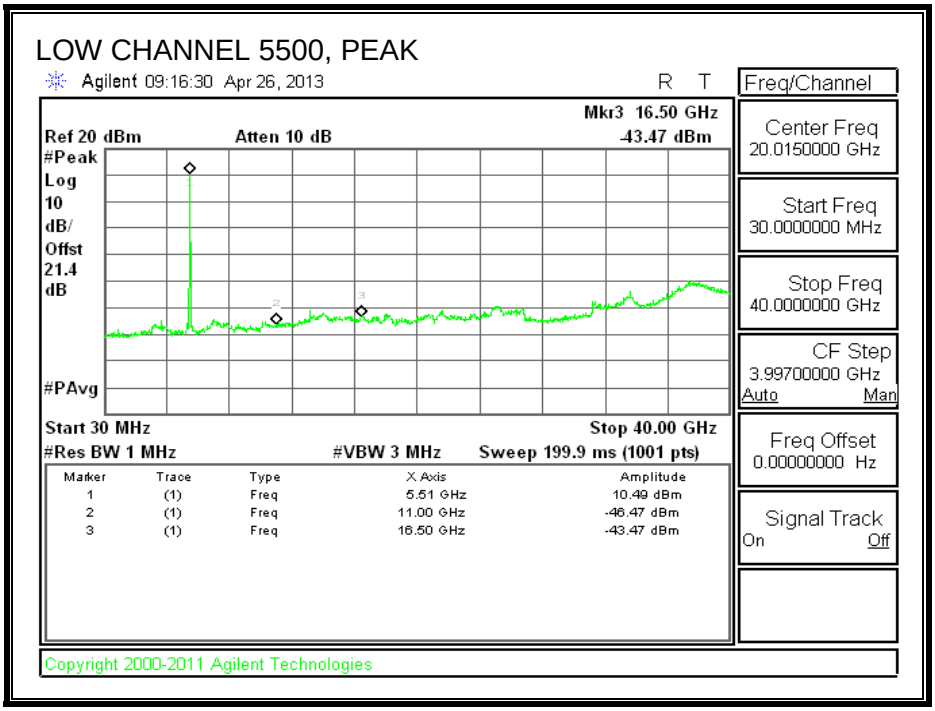


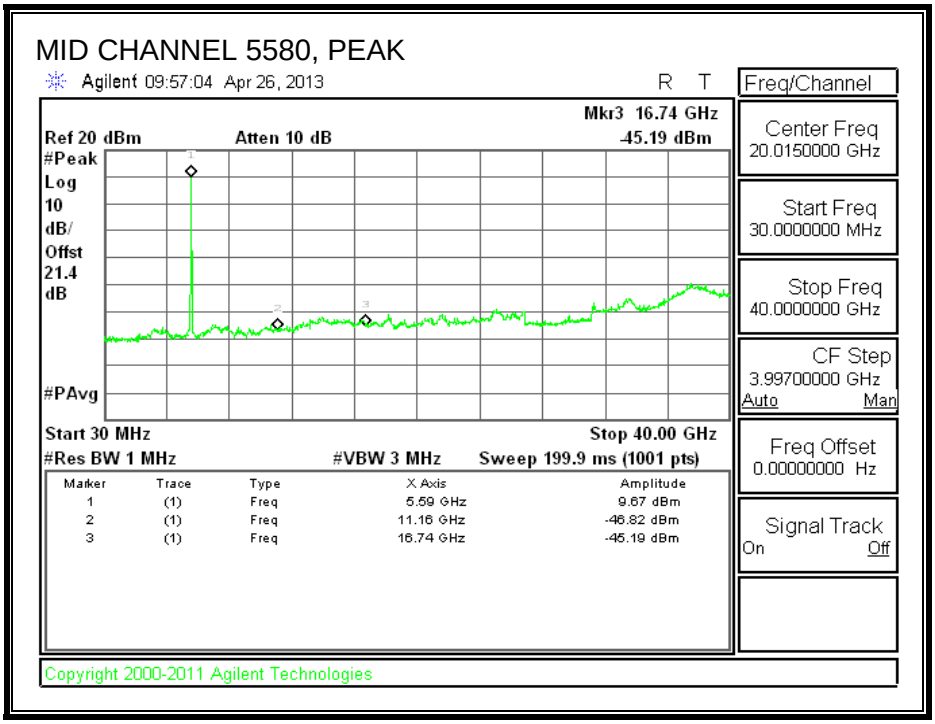
HIGH CHANNEL 5700, AVERAGE



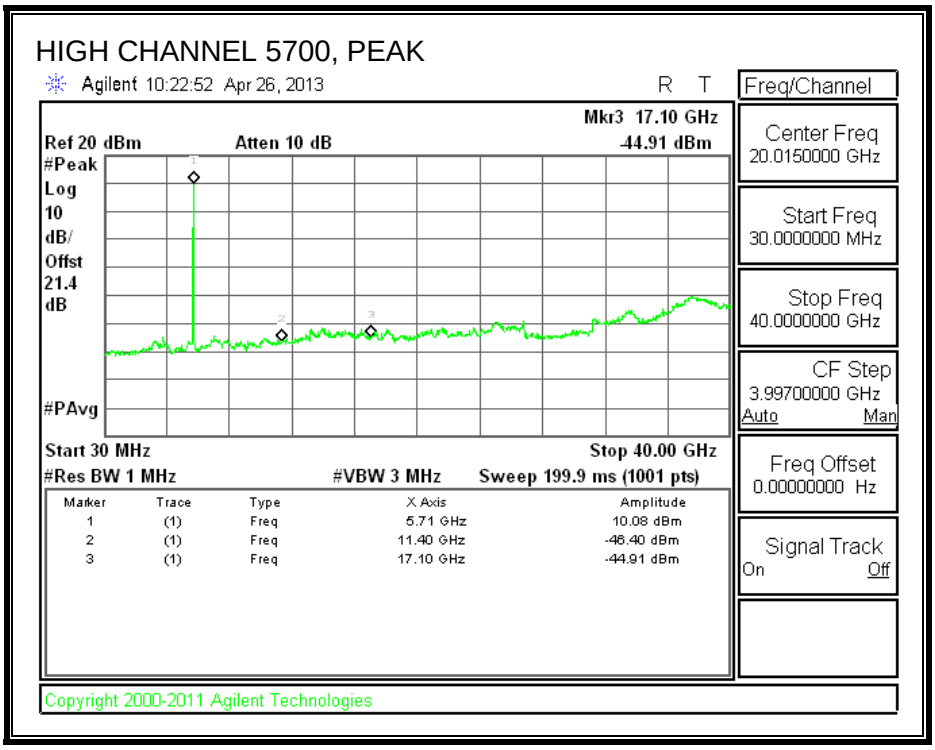
HARMONICS AND SPURIOUS

Chain 0

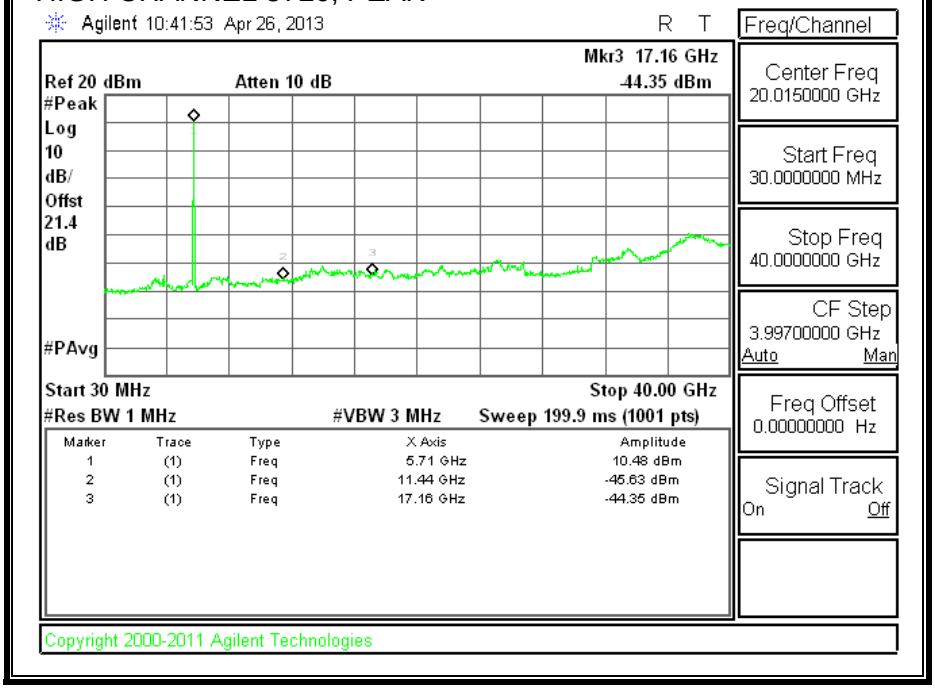




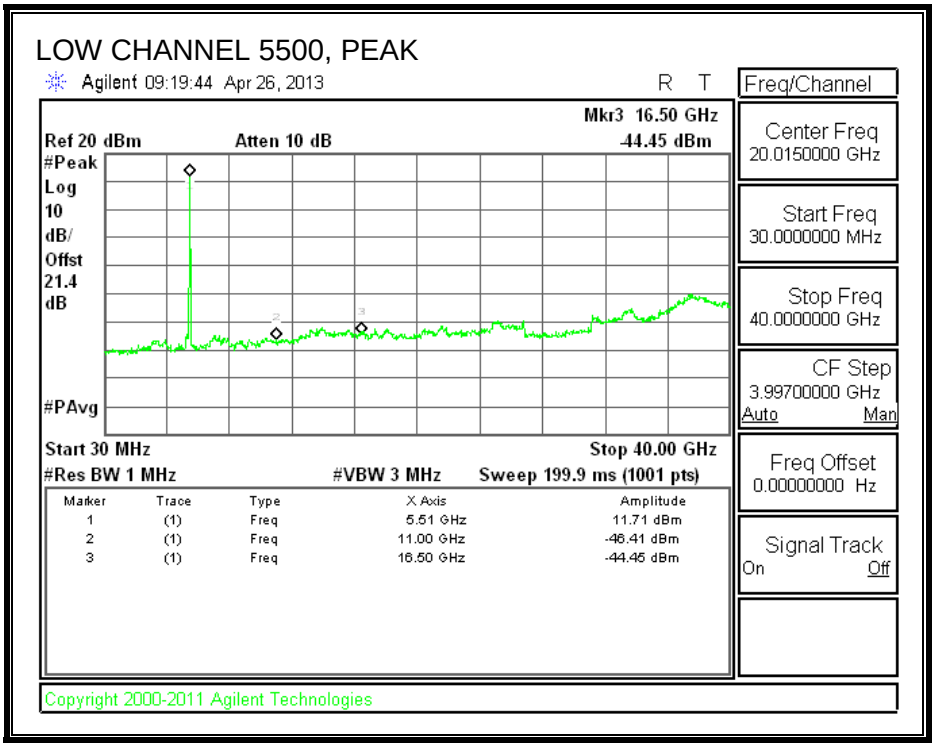
HIGH CHANNEL 5700, PEAK

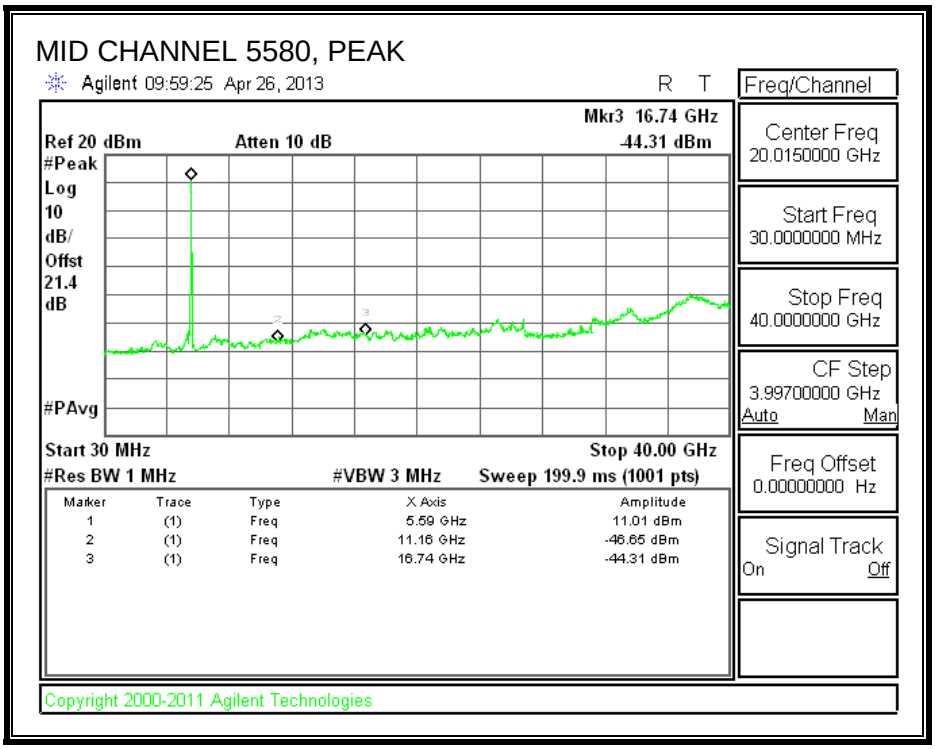


HIGH CHANNEL 5720, PEAK

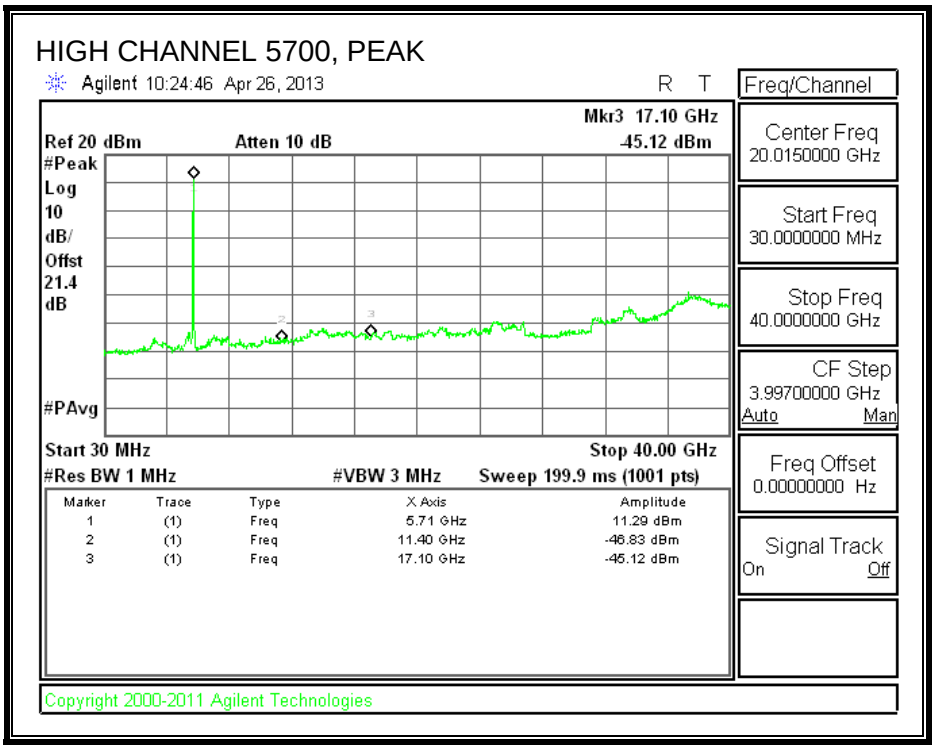


Chain 1

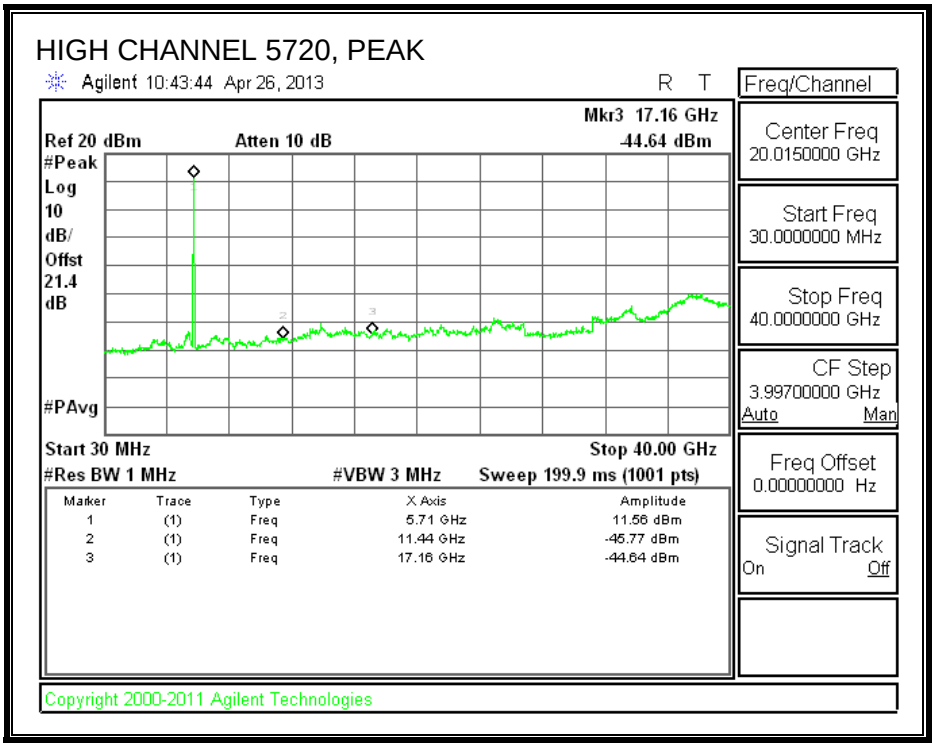




HIGH CHANNEL 5700, PEAK



HIGH CHANNEL 5720, PEAK



BANDEDGE DATA

2TX Conducted Spurious BE for UNII

Date:	5/9/2013
Test Engineer:	Tony Wagoner
Client:	Qualcomm
Project Number:	13U14995
Configuration:	Tx
Mode of operation:	5.5GHz 11a & CH. 144

Note: if the PK margin is greater than 20 dB, there is no need to get AVG rea

Channel	Frequency (MHz)	PXA PK Reading Chain 0 (dBm)	PXA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
100 (5500)	5444	-47.99	-42.49	2	-36.40	-21.2	-15.20	17.00	12.75 / 15.2
100 (5500)	5469	-40.25	-39.12	2	-31.63	-27	-4.63	17.00	12.75 / 15.2
140 (5700)	5725	-42.26	-33.56	2	-28.00	-27	-1.00	17.00	12 / 14.5

Channel	Frequency (MHz)	PXA AVG Reading Chain 0 (dBm)	PXA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
100 (5500)	5440.64	-62.81	-57.31	2	-51.22	-41.2	-10.02	17.00	12.9 / 14.3
100 (5500)	5441.63	-58.35	-52.96	2	-46.85	-41.2	-5.65	17.00	12.9 / 14.3
140 (5700)	5725	-56.76	-48.543	2	-42.92	-41.2	-1.72	17.00	12.4 / 14.5

SPURIOUS DATA

The data in this table is from testing done at the harmonics shown in the plots with the span of 1MHz.

2TX Conducted Spurious for UNII		
Date:	4/26/2013	
Test Engineer:	Tony Wagoner	
Client:	Qualcomm Atheros	
Project Number:	13U14995	
Configuration:	5.5GHz 11a & CH. 144	
Mode of operation:	Tx	**Note:** if the PK margin is greater than 20 dB, there is no need to get AVG reading.

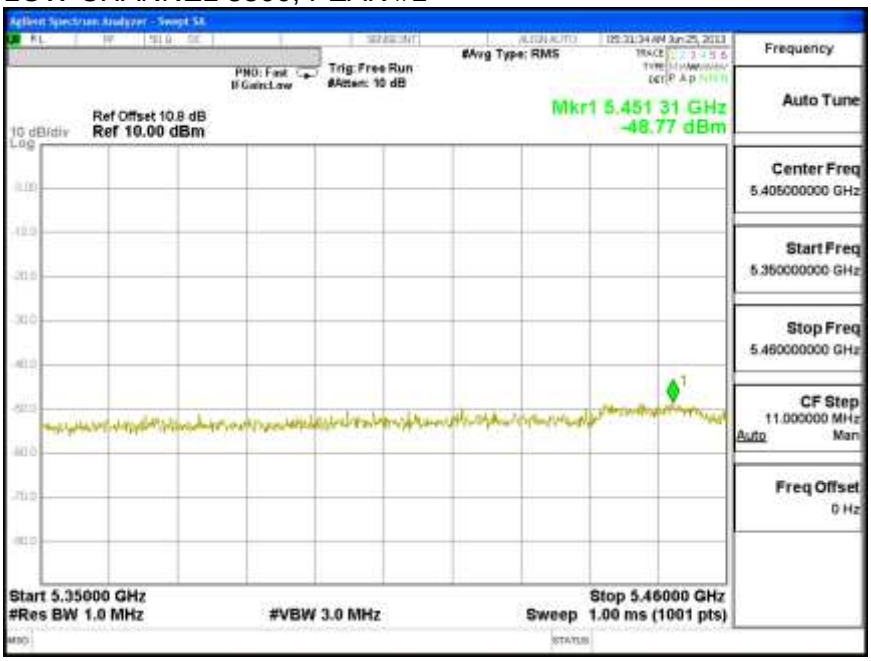
Channel	Frequency (GHz)	PSA PK Reading Chain 0 (dBm)	PSA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
100 (5500)	11	-55.47	-55.68	2	-47.55	-21.2	-26.35	17.00	13.7 / 15.15
100 (5500)	16.5	-51.56	-52.1	2	-43.80	-21.2	-22.60	17.00	13.75 / 15.2
116 (5580)	11.16	-55.27	-55.24	2	-47.23	-21.2	-26.03	17.00	12.9 / 14.35
116 (5580)	16.74	-53.31	-53.36	2	-45.31	-21.2	-24.11	17.00	13 / 14.45
140 (5700)	11.4	-54.69	-55.2	2	-46.92	-21.2	-25.72	17.00	13 / 14.2
140 (5700)	17.1	-53.23	-52.59	2	-44.88	-21.2	-23.68	17.00	13.35 / 14.5

Channel	Frequency (MHz)	PSA AVG Reading Chain 0 (dBm)	PSA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)

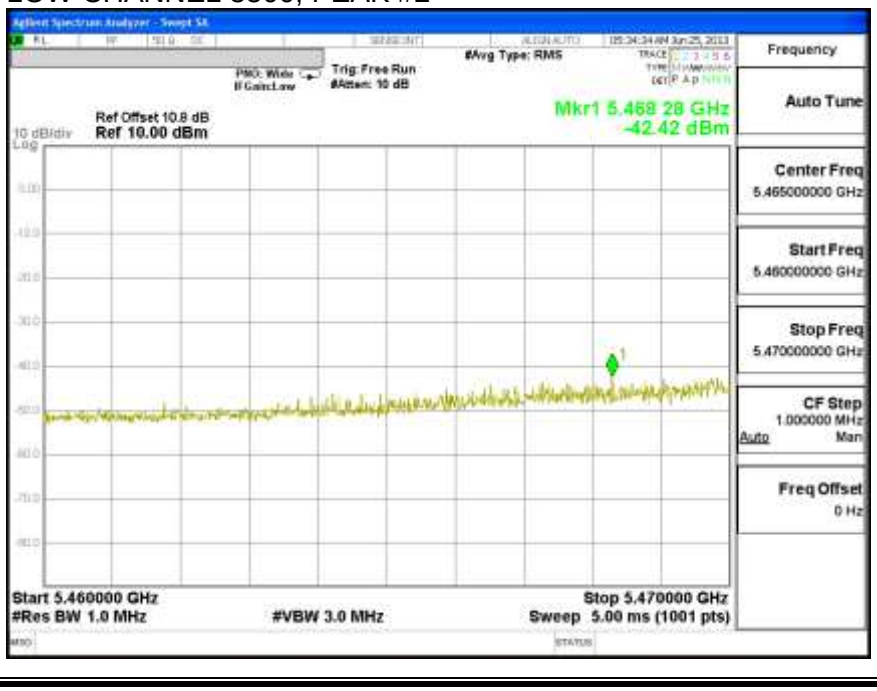
8.7.8. CONDUCTED BANDEDGE, HARMONICS, & SPURIOUS (3G filter unit)

Chain 0
RESTRICTED BANDEDGE

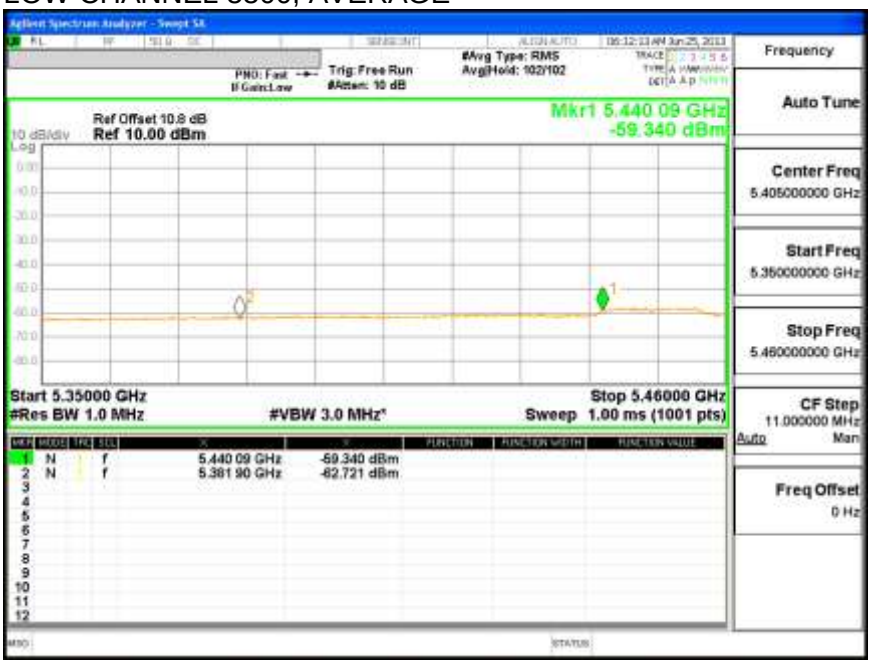
LOW CHANNEL 5500, PEAK #1



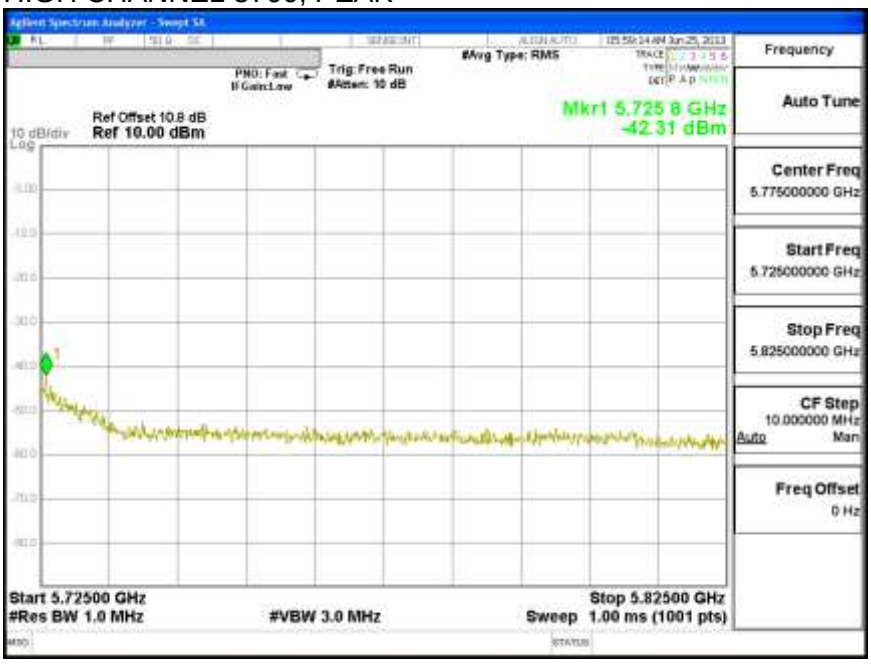
LOW CHANNEL 5500, PEAK #2



LOW CHANNEL 5500, AVERAGE



HIGH CHANNEL 5700, PEAK

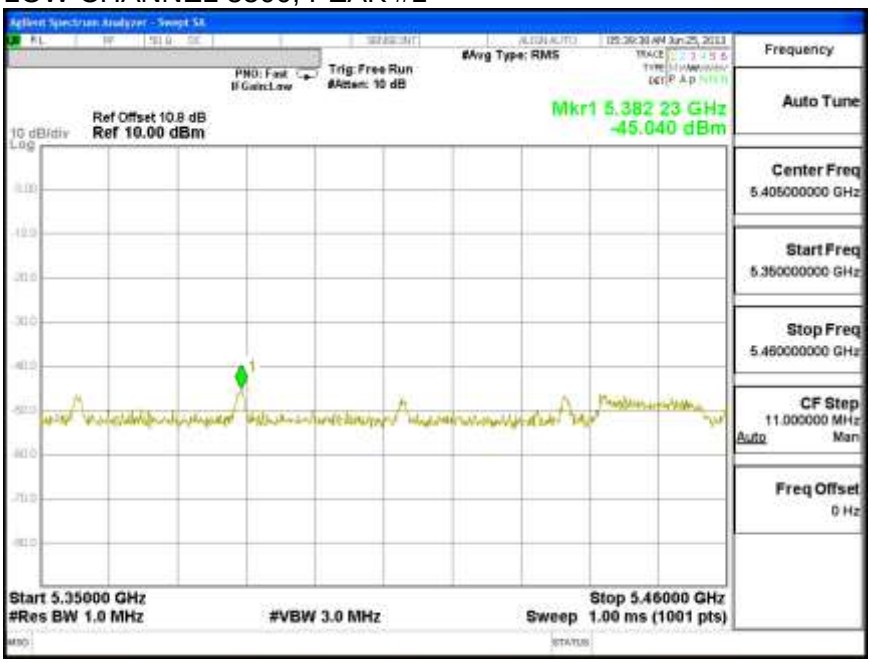


HIGH CHANNEL 5700, AVERAGE

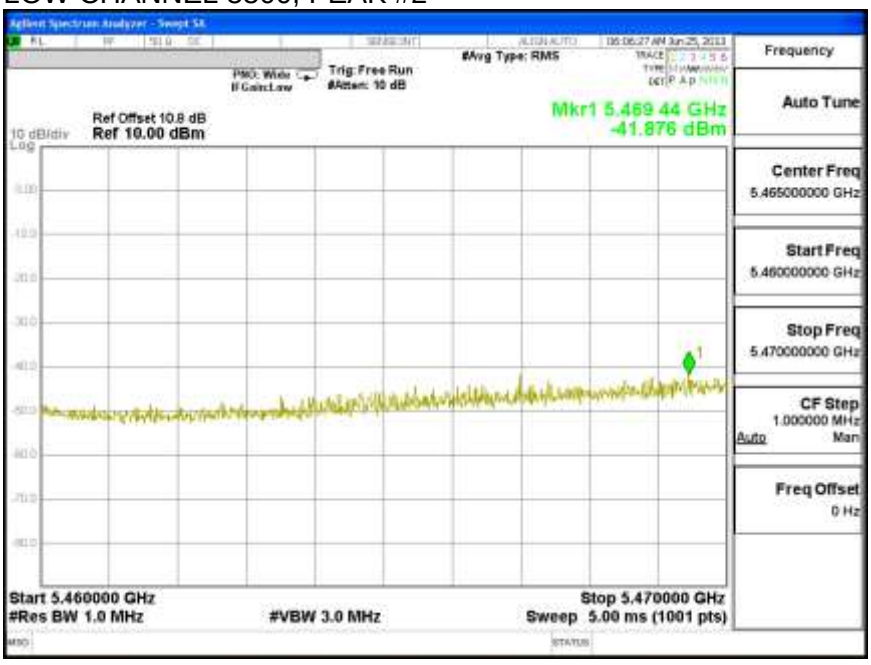
Chain 1

RESTRICTED BANDEDGE

LOW CHANNEL 5500, PEAK #1

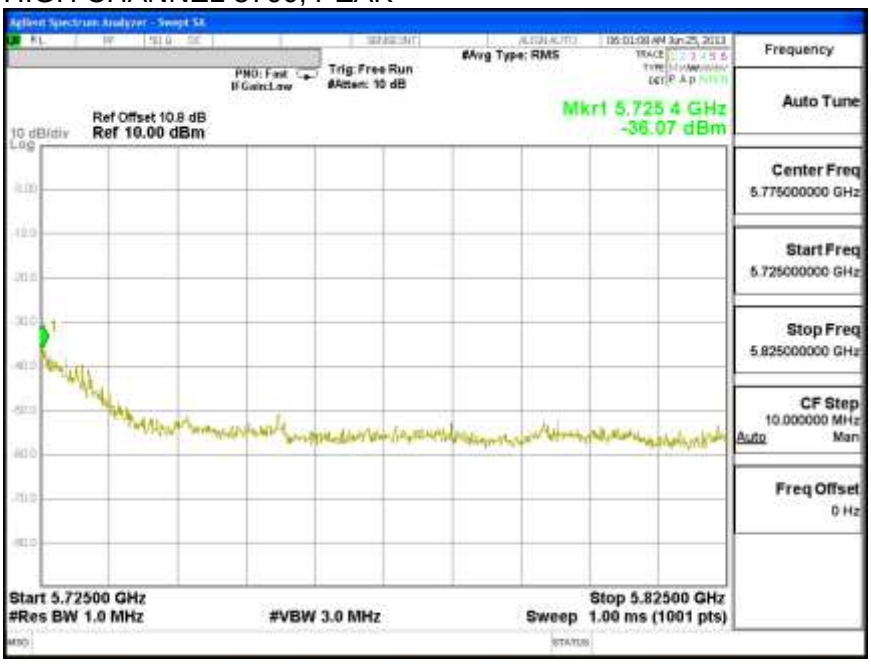


LOW CHANNEL 5500, PEAK #2



LOW CHANNEL 5500, AVERAGE

HIGH CHANNEL 5700, PEAK



HIGH CHANNEL 5700, AVERAGE

BANDEDGE DATA

2TX Conducted Spurious BE for UNII

Date:	6/25/2013
Test Engineer:	Tony Wagoner
Client:	Qualcomm
Project Number:	13U14995
Configuration:	Tx
Mode of operation:	5.5GHz 11a

Note: if the PK margin is greater than 20 dB, there is no need to get AVG reading.

Channel	Frequency (MHz)	PXA PK Reading Chain 0 (dBm)	PXA PK Reading Chain 1 (dBm)	AG/Chain (dBi)	PK EIRP (dBm)	PK E-field Limit (dBm)	PK E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
100 (5500)	5444	-48.77	-45.04	2	-38.50	-21.2	-17.30	17.00	12.75 / 15.2
100 (5500)	5469	-42.42	-41.876	2	-34.12	-27	-7.12	17.00	12.75 / 15.2
140 (5700)	5725	-42.31	-36.07	2	-30.13	-27	-3.13	17.00	12.46 / 14.4

Channel	Frequency (MHz)	PXA AVG Reading Chain 0 (dBm)	PXA AVG Reading Chain 1 (dBm)	AG/Chain (dBi)	AVG EIRP (dBm)	AVG E-field Limit (dBm)	AVG E-field Margin (dB)	Software Setting	AVG Power Meter Reading (dBm)
100 (5500)	5381.9	-62.721	-50.219	2	-44.97	-41.2	-3.77	17.00	12.9 / 14.3
100 (5500)	5440.09	-59.34	-53.925	2	-47.82	-41.2	-6.62	17.00	12.9 / 14.3
140 (5700)	5725	-55.325	-47.649	2	-41.95	-41.2	-0.75	17.00	12.46 / 14.4

8.8. 802.11n HT20 MODE IN THE 5.6 GHz BAND

8.8.1. 26 dB BANDWIDTH

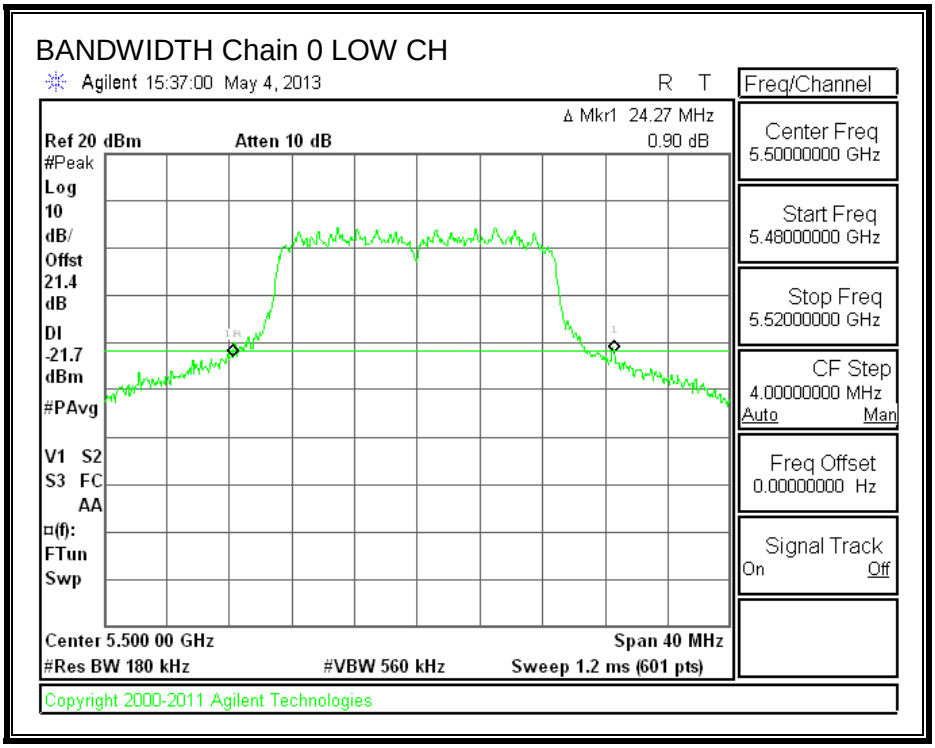
LIMITS

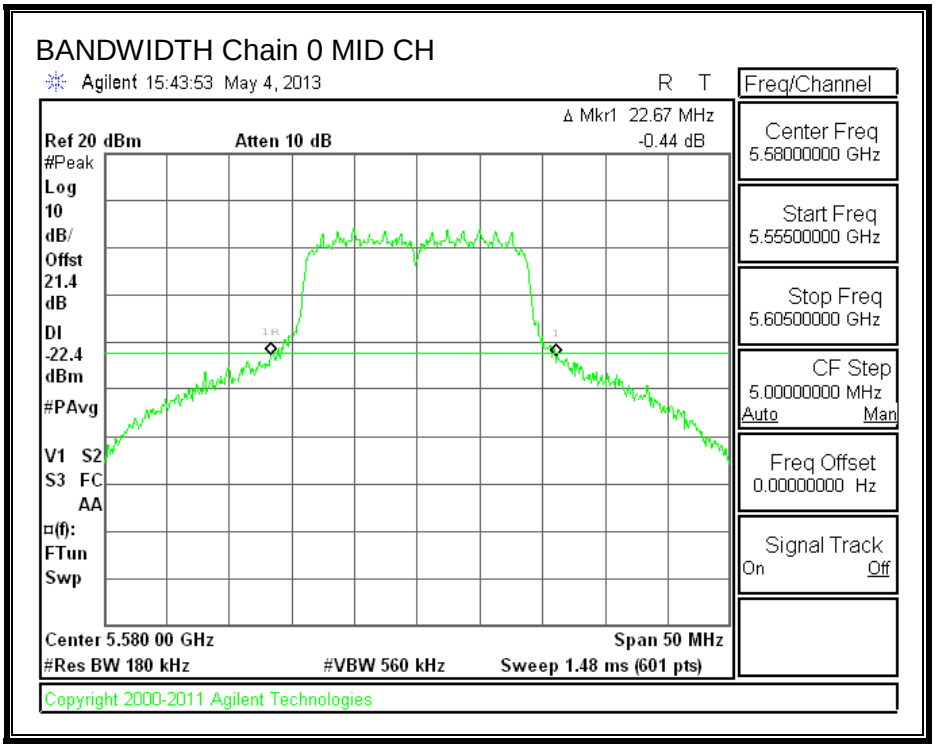
None; for reporting purposes only.

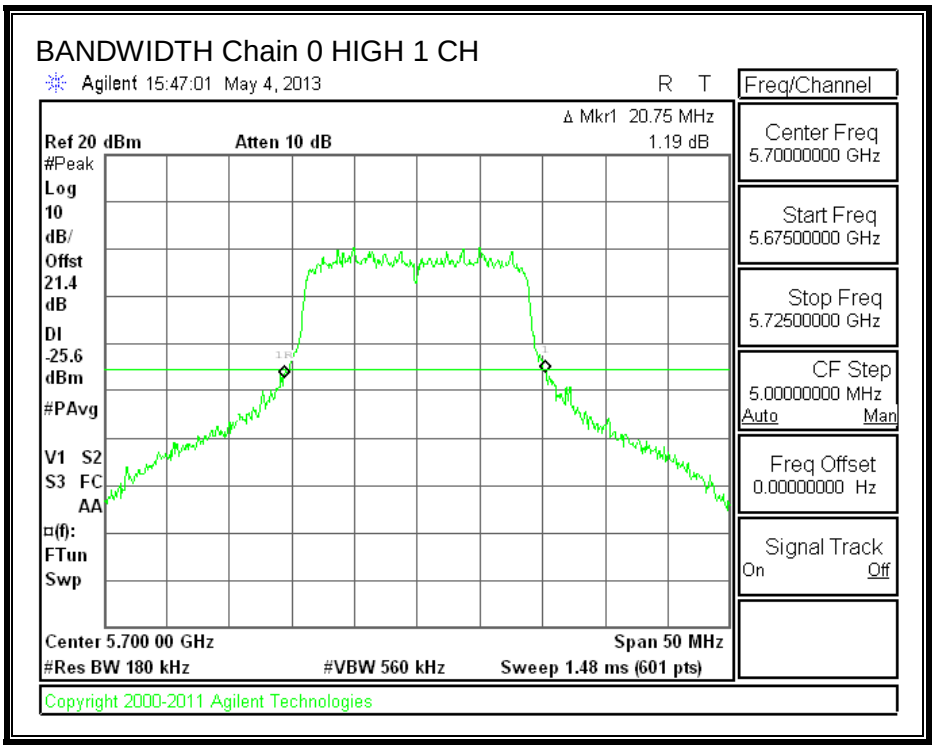
RESULTS

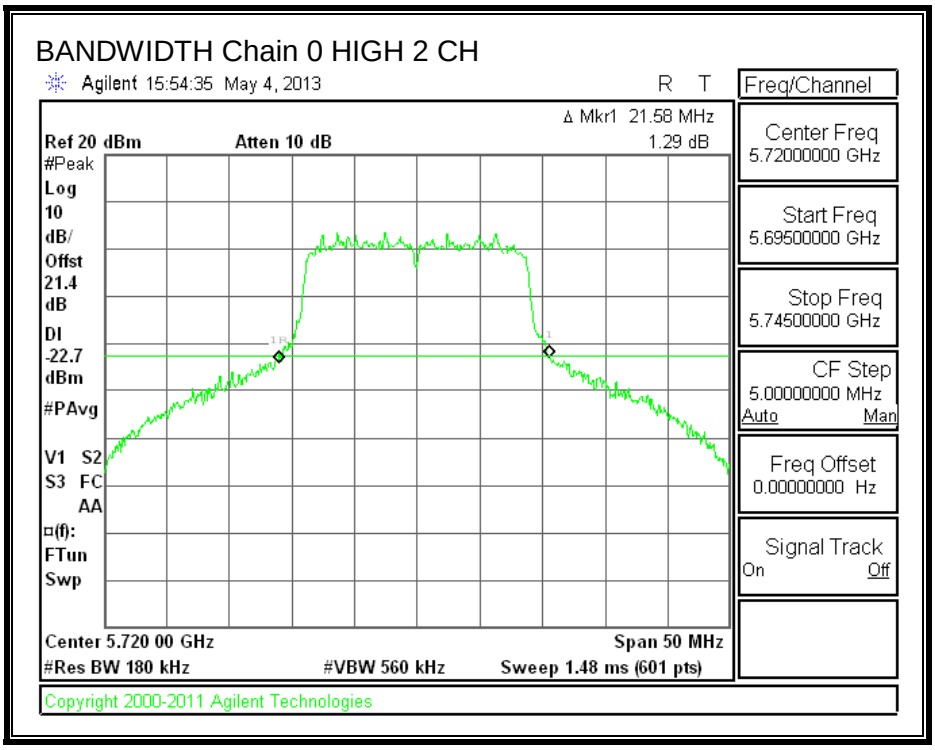
Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5500	24.27	26.83
Mid	5580	28.33	22.67
High 1	5700	20.75	23.08
High 2	5720	21.58	32.25

26 dB BANDWIDTH, Chain 0









26 dB BANDWIDTH, Chain 1