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

CERTIFICATION TEST REPORT

FOR

802.11 a/b/g/n AP MODULE

MODEL NUMBER: AP802

FCC ID: LDKTG2050
IC: 2461B-TG2050

REPORT NUMBER: 12U14476-2, Revision A

ISSUE DATE: AUGUST 29, 2012

Prepared for
CISCO SYSTEMS, INC.
170 WEST TASMAN DRIVE
SAN JOSE, CA 95134, U.S.A.

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	07/24/2012	Initial Issue	T. LEE
A	08/29/2012	Updated Antenna Gain Information on Page 41, revised sections 9.3.4 and 9.4.4 by using correlated gain instead of uncorrelated	F. Ibrahim

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: CISCO SYSTEMS, INC.
170 WEST TASMAN DRIVE
SAN JOSE, CA 95134, U.S.A.

EUT DESCRIPTION: 802.11 a/b/g/n AP MODULE

MODEL: AP802

SERIAL NUMBER: FGL151523FJ

DATE TESTED: JUNE 18, 2012 TO JULY 24, 2012

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

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

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

Approved & Released For UL CCS By:

TIM LEE
EMC SUPERVISOR
UL CCS

Tested By:

DAVID GARCIA
EMC ENGINEER
UL CCS

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC CFR 47 Part 2, FCC CFR 47 Part 15, FCC 06-96, FCC KDB 789033, ANSI C63.10-2009, 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 CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

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

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

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

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

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an 802.11a/b/g/n transceiver.

The radio module is manufactured by Hon Hai.

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	13.26	21.18
5180 - 5240	802.11a Beam Forming	10.18	10.42
5180 - 5240	802.11n HT20	12.64	18.37
5190 - 5230	802.11n HT40	13.92	24.66

5.1. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes an omni-directional antenna, with a maximum peak gain of 4 dBi in the 2.4GHz band and 6dBi in the 5.8GHz Band. The antenna used for testing was Laird, Model MAF95295MO.

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Model	Part Number	Antenna Type	Antenna Gain (dBi)
CI2595-11-000-R Amphenol	Internal	Dual-resonant Omni Directional	2.4GHz (4dBi) 5GHz (6dBi)
MAF95295MO Laird	Internal	Dual-resonant Omni Directional	2.4GHz (4dBi) 5GHz (6dBi)
AIR-ANTM2050D-R	74-3786-01	Dual-resonant Dipole	2.4GHz (1.4dBi) 5GHz (4.5dBi)
AIR-ANT2524DB-R	07-1146-01	Dual-band Dipole	2.4GHz (1.5dBi) 5GHz (3.5dBi)
AIR-ANT5140V-R	07-1050-01	Directional	5GHz (4dBi)
AIR-ANT2440NV-R	07-1098-01	Directional	2.4GHz (4.0dBi)
AIR-ANT5140NV-R	07-1099-01	Directional	5GHz (4.0dBi)

5.2. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was version 12.4.

5.3. 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.

Based on the baseline scan, the worst-case data rates were:

802.11a mode: 6 Mbps
802.11n HT20mode: MCS0
802.11n HT40mode: MCS8

6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop PC	IBM	T20	08K6579	DoC
Mouse	HP	MOAFUO	FATSK0J9W0EG55	DoC
AC Adapter	IBM	02K6657	11S02K6657Z0ZA0755FK	N/A
AC Adapter	Delta Electronics	EADP-60MB B	DTH1537S47M	N/A

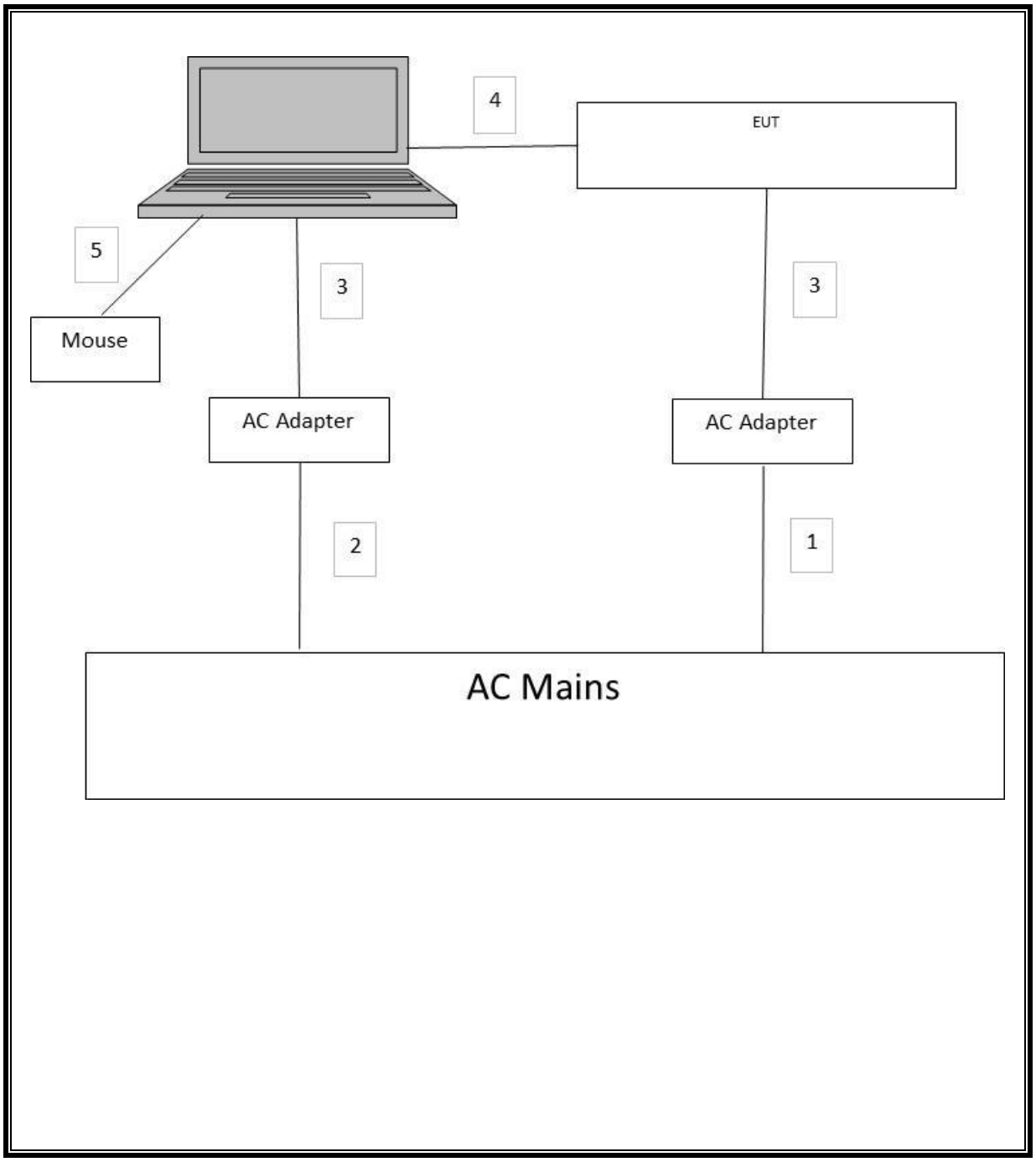
I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC	1	AC	Unshielded	1.9m	
2	AC	1	AC	Unshielded	1.0m	
3	DC	1	DC	Unshielded	1.8m	
4	Serial	1	RJ45	Unshielded	1.8m	
5	USB	3	USB	Unshielded	1.88m	

TEST SETUP

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

SETUP DIAGRAM FOR TESTS



7. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List					
Description	**Manufacturer**	**Model**	**Asset**	**Cal Date**	**Cal Due**
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01161	12/16/11	12/16/12
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	09/02/11	09/02/12
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	12/15/11	12/15/12
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/19/11	08/19/13
Power Meter	Agilent / HP	437B	T221	07/29/11	07/29/12
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	11/11/11	11/11/12
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01052	11/11/11	11/11/12
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	08/02/11	08/02/12
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	11/11/11	11/11/12
Power Sensor, 18 GHz	Agilent / HP	8481A	T225	08/04/11	08/04/12
LISN, 30 MHz	FCC	50/250-25-2	C00626	12/13/11	12/13/12
Antenna, Horn, 18 GHz	EMCO	3115	C00872	09/20/11	09/20/12
Antenna, Horn, 18 GHz	EMCO	3115	C00945	10/06/11	10/06/12
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	T243	02/07/12	02/07/13
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00980	07/28/11	07/28/12
Antenna, Horn, 40 GHz	ARA	MWH-2640/B	C00981	06/14/11	06/14/13

8. ON TIME, DUTY CYCLE AND MEASUREMENT METHODS

LIMITS

None; for reporting purposes only.

PROCEDURE

KDB 789033 Zero-Span Spectrum Analyzer Method.

8.1.1. ON TIME AND DUTY CYCLE RESULTS

Mode	ON Time B (msec)	Period (msec)	Duty Cycle x (linear)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	1/B Minimum VBW (kHz)
802.11a 20 MHz	1.436	1.448	0.992	99.2%	0.04	0.696
802.11n HT20	1.344	1.348	0.997	99.7%	0.01	0.744
802.11n HT40	0.356	0.368	0.967	96.7%	0.14	2.809

8.1.2. MEASUREMENT METHOD FOR POWER AND PPSD

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

The Duty Cycle is less than 98% and consistent therefore KDB 789033 Method SA-2 is used.

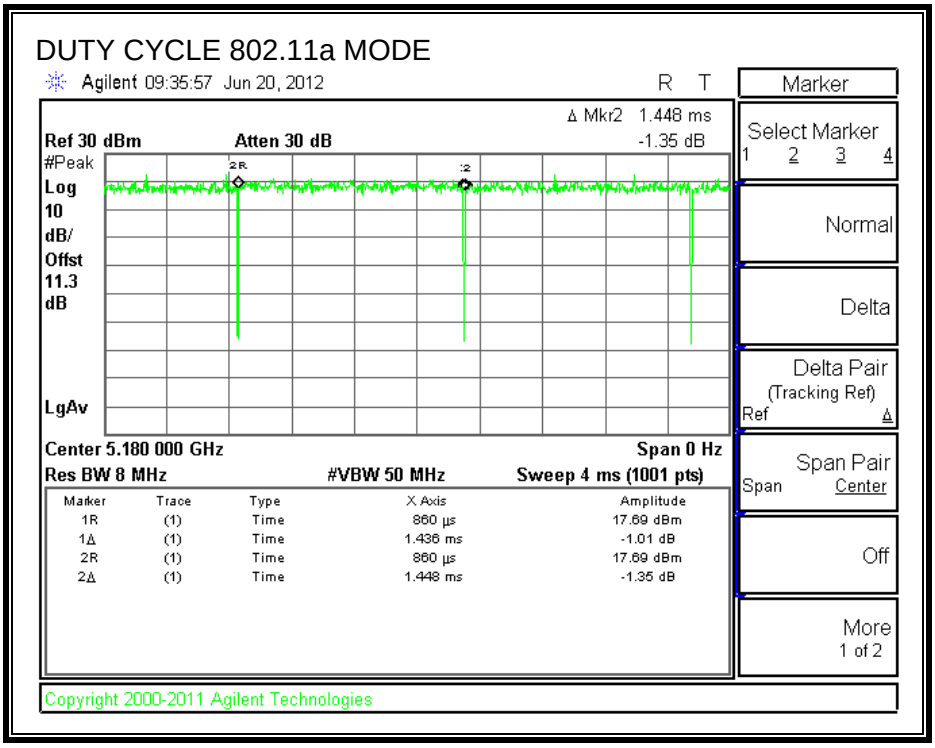
8.1.3. MEASUREMENT METHOD FOR AVG SPURIOUS EMISSIONS ABOVE 1 GHz

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

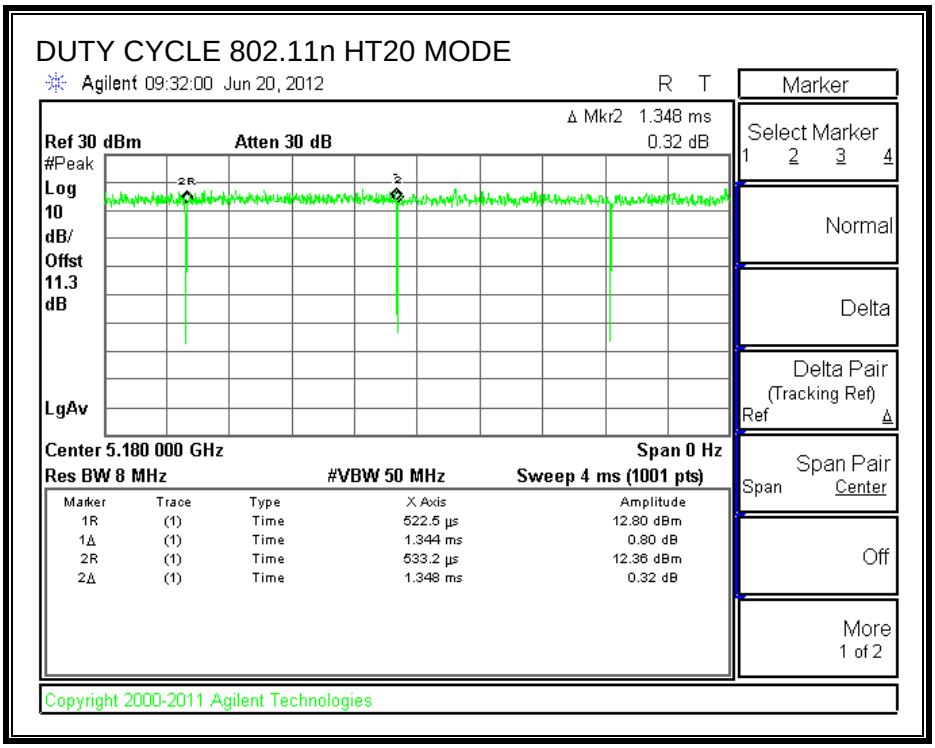
The Duty Cycle is less than 98% and consistent, KDB 789033 Method VB with Power RMS Averaging is used.

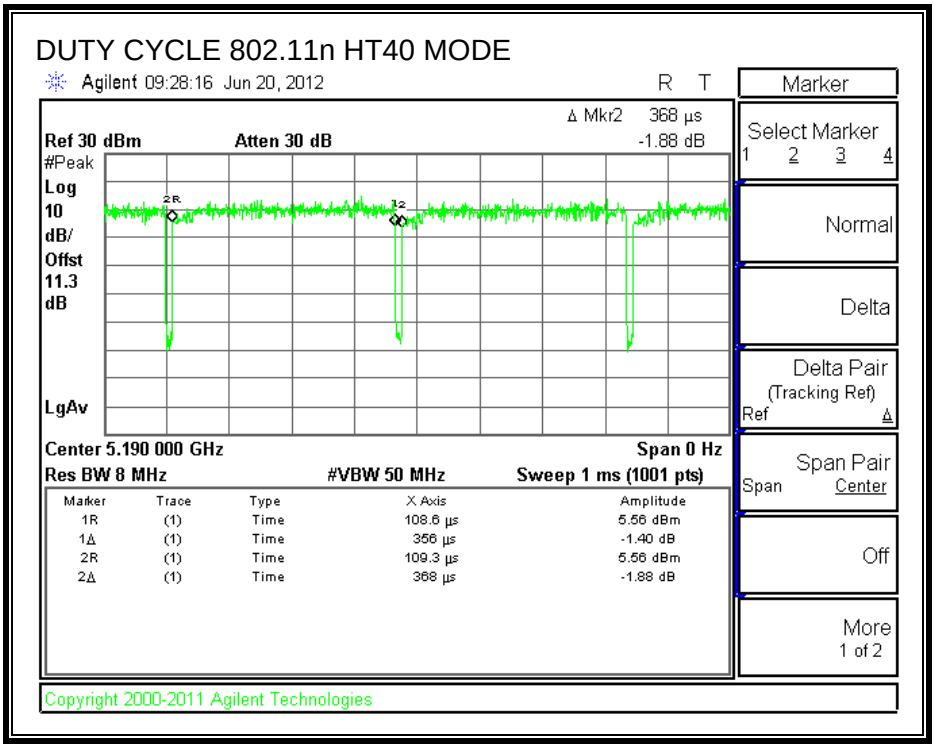
8.1.4. DUTY CYCLE PLOTS FOR 5.15 – 5.25 GHZ BAND

DUTY CYCLE 802.11a MODE



DUTY CYCLE 802.11n HT20 MODE





9. ANTENNA PORT TEST RESULTS

9.1. 802.11a MODE IN THE 5.2 GHz BAND

9.1.1. 26 dB BANDWIDTH

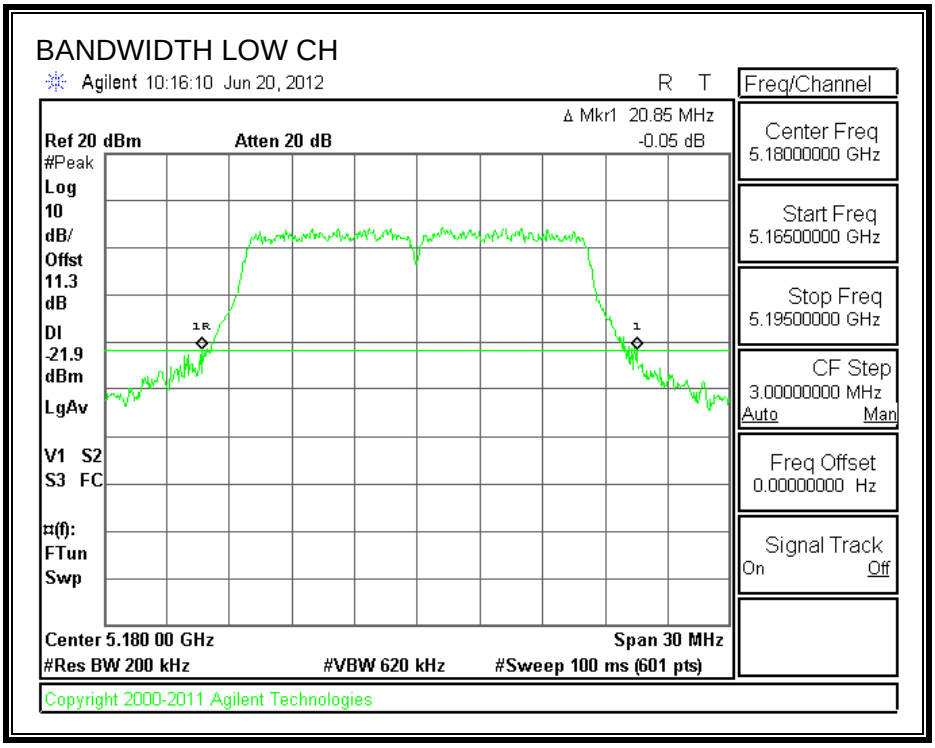
LIMITS

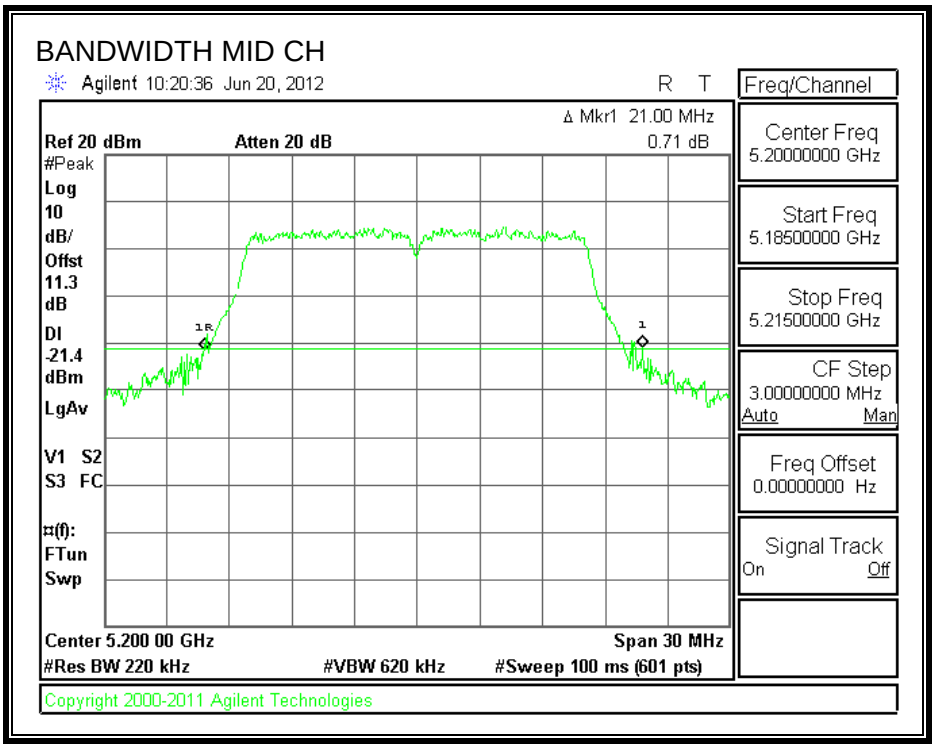
None; for reporting purposes only.

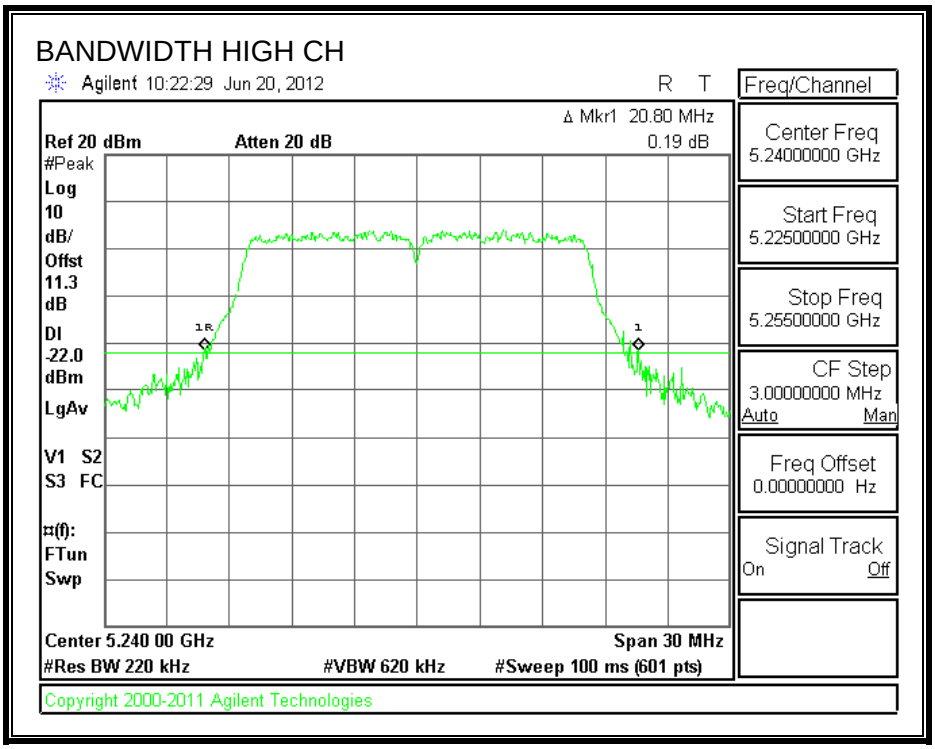
RESULTS

Channel	Frequency (MHz)	26 dB Bandwidth (MHz)
Low	5180	20.85
Mid	5200	21.00
High	5240	20.80

26 dB BANDWIDTH







9.1.2. 99% BANDWIDTH

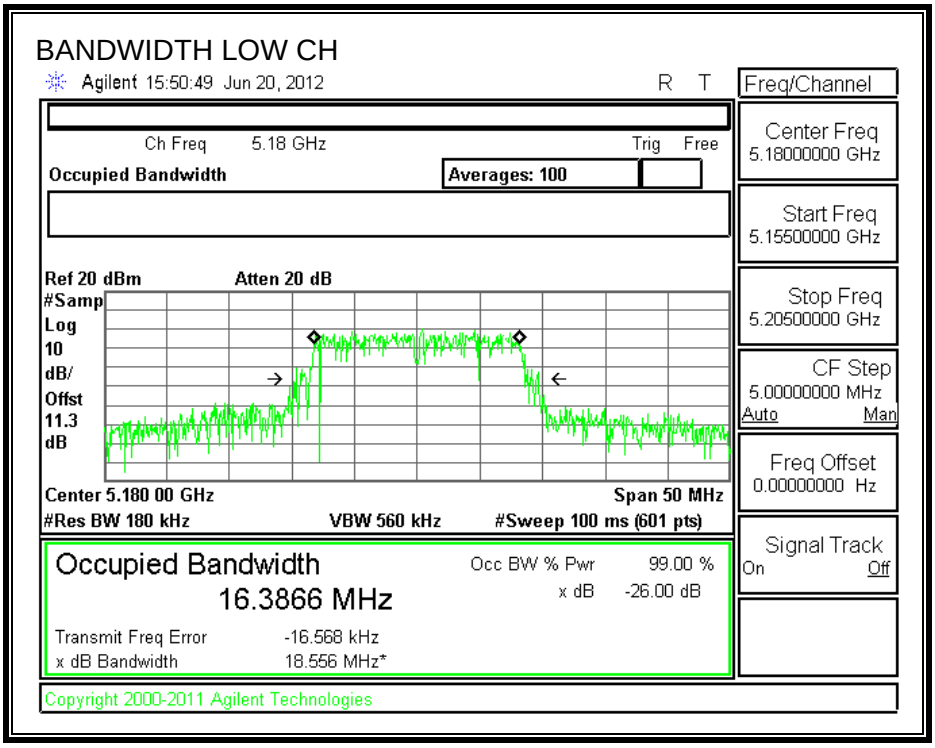
LIMITS

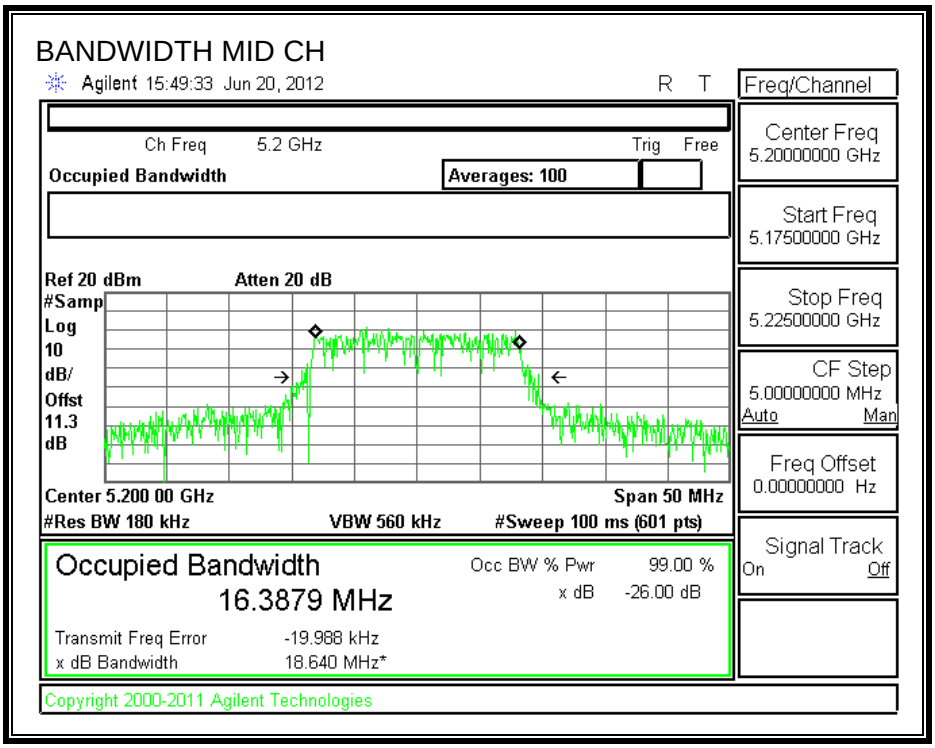
None; for reporting purposes only.

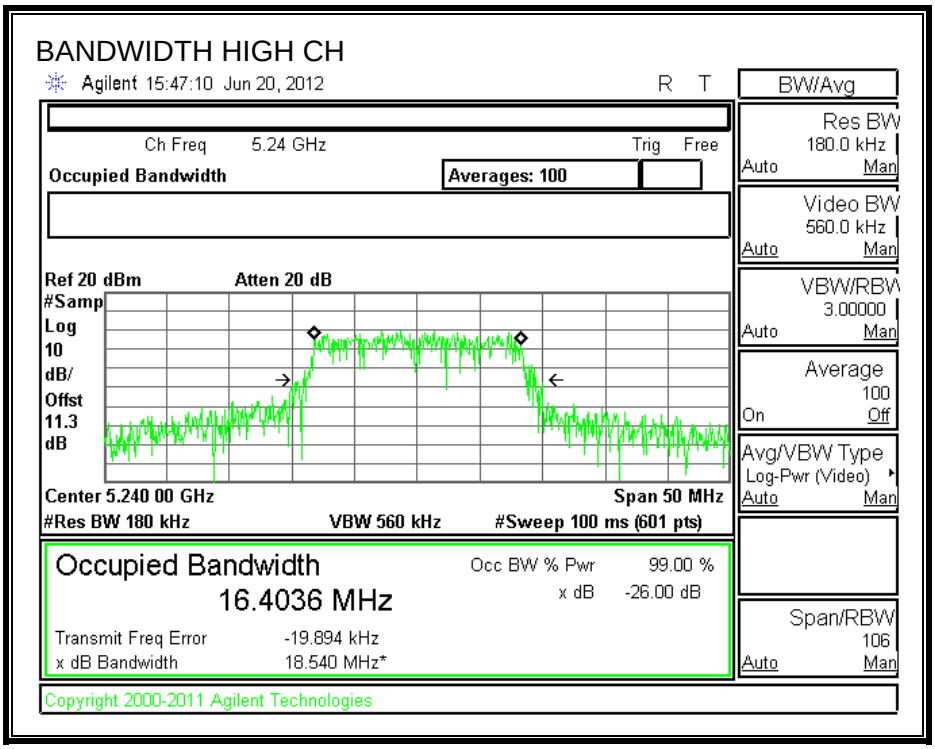
RESULTS

Channel	Frequency (MHz)	99% Bandwidth (MHz)
Low	5180	16.3866
Mid	5200	16.3879
High	5240	16.4036

99% BANDWIDTH







9.1.3. 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 11.3 dB (including 10 dB pad and 1.3 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

RESULTS

Channel	Frequency (MHz)	Power (dBm)
Low	5180	14.3
Mid	5200	14.4
High	5240	13.9

9.1.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

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):
For the 5.15 – 5.25 GHz band, 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

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

FCC RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5180	17	20.85	17.19	6.00	17.00	4.00
Mid	5200	17	21.00	17.22	6.00	17.00	4.00
High	5240	17	20.80	17.18	6.00	17.00	4.00

Duty Cycle CF (dB)	0.04	Included in Calculations of Corr'd Power & PPSD

Output Power Results

Channel	Frequency (MHz)	Meas Power (dBm)	Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	13.142	13.18	17.00	-3.82
Mid	5200	13.224	13.26	17.00	-3.74
High	5240	12.590	12.63	17.00	-4.37

PPSD Results

Channel	Frequency (MHz)	Meas PPSD (dBm)	Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5180	1.57	1.61	4.00	-2.39
Mid	5200	1.68	1.72	4.00	-2.28
High	5240	1.04	1.08	4.00	-2.92

IC RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	10 + 10 Log B EIRP Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5180	17	16.39	22.14	6.00	17.00	4.00
Mid	5200	17	16.39	22.15	6.00	17.00	4.00
High	5240	17	16.40	22.15	6.00	17.00	4.00

Duty Cycle CF (dB)	0.04	Included in Calculations of Corr'd Power & PPSD

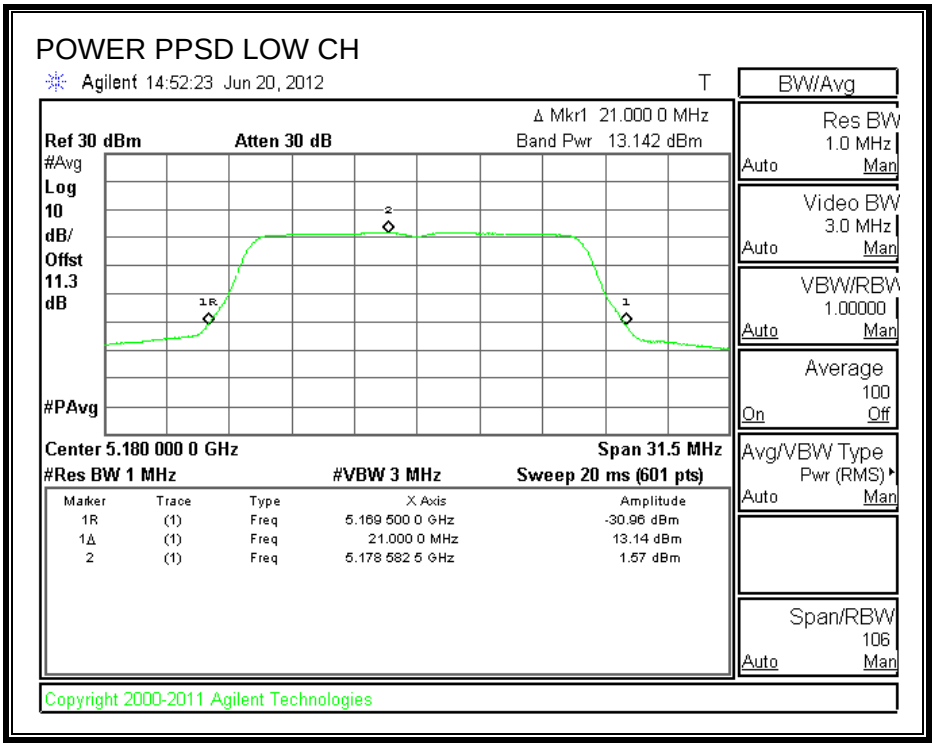
Output Power Results

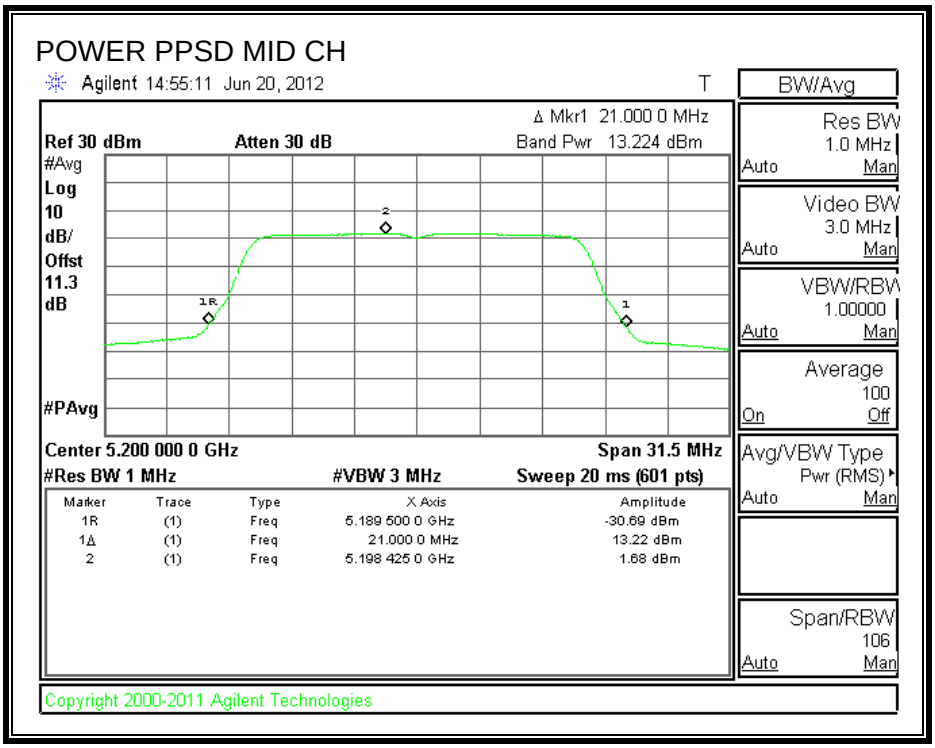
Channel	Frequency (MHz)	Meas Power (dBm)	Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	13.142	13.18	17.00	-3.82
Mid	5200	13.224	13.26	17.00	-3.74
High	5240	12.590	12.63	17.00	-4.37

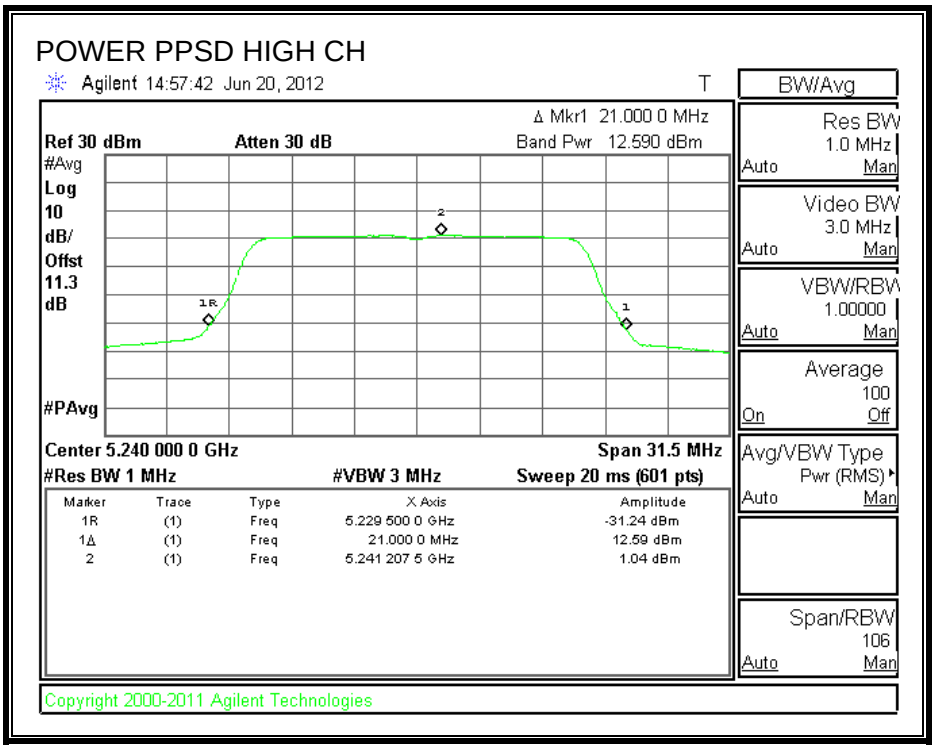
PPSD Results

Channel	Frequency (MHz)	Meas PPSD (dBm)	Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5180	1.57	1.61	4.00	-2.39
Mid	5200	1.68	1.72	4.00	-2.28
High	5240	1.04	1.08	4.00	-2.92

OUTPUT POWER AND PPSD







9.1.5. PEAK EXCURSION

LIMITS

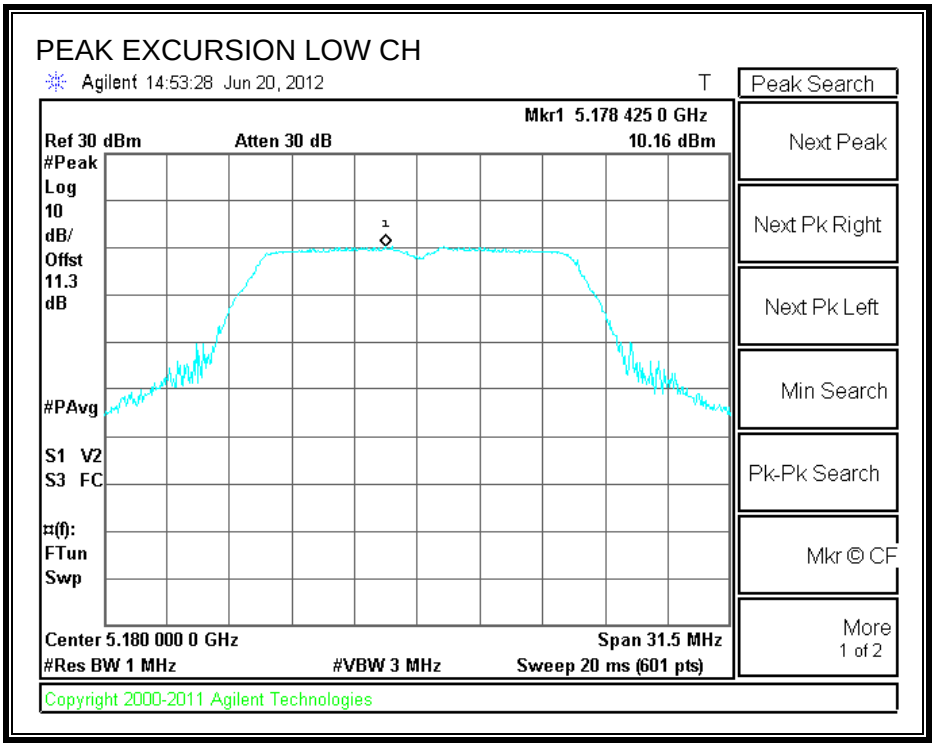
FCC §15.407 (a) (6)

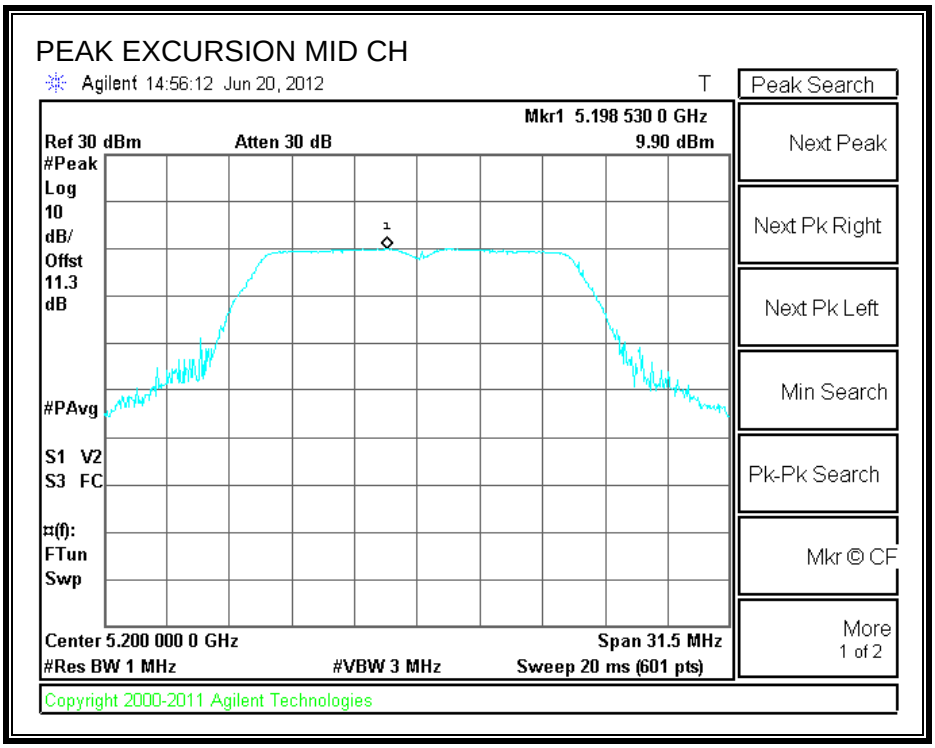
The ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

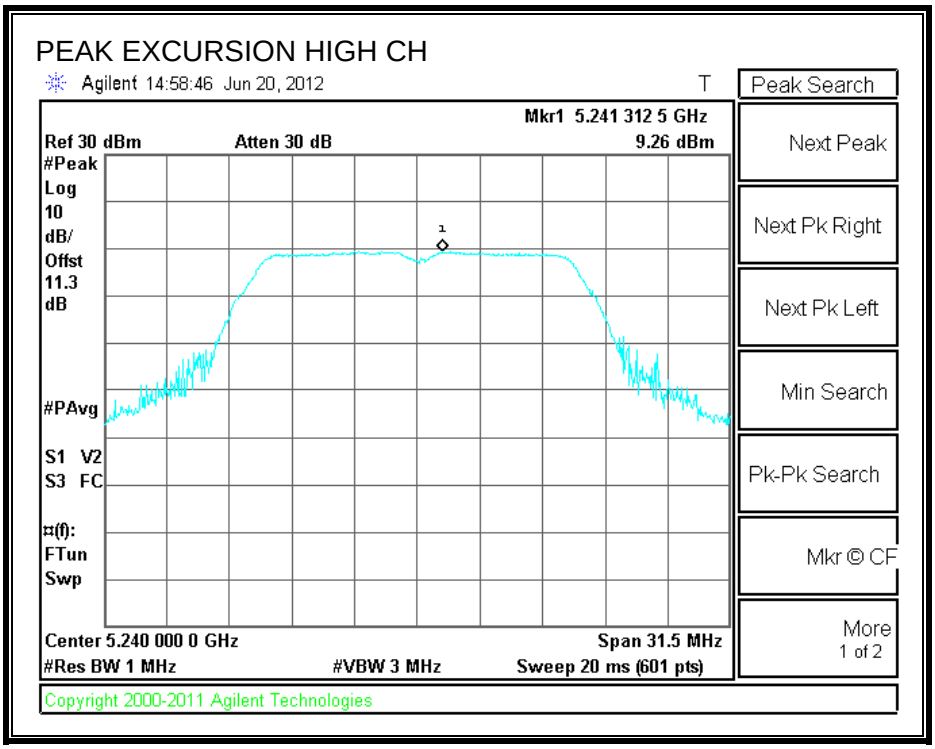
RESULTS

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5180	10.16	1.57	0.04	8.55	13	-4.45
Mid	5200	9.90	1.68	0.04	8.18	13	-4.82
High	5240	9.26	1.04	0.04	8.18	13	-4.82

PEAK EXCURSION







9.2. 802.11a BEAM FORMING MODE IN THE 5.2 GHz BAND

9.2.1. 26 dB BANDWIDTH

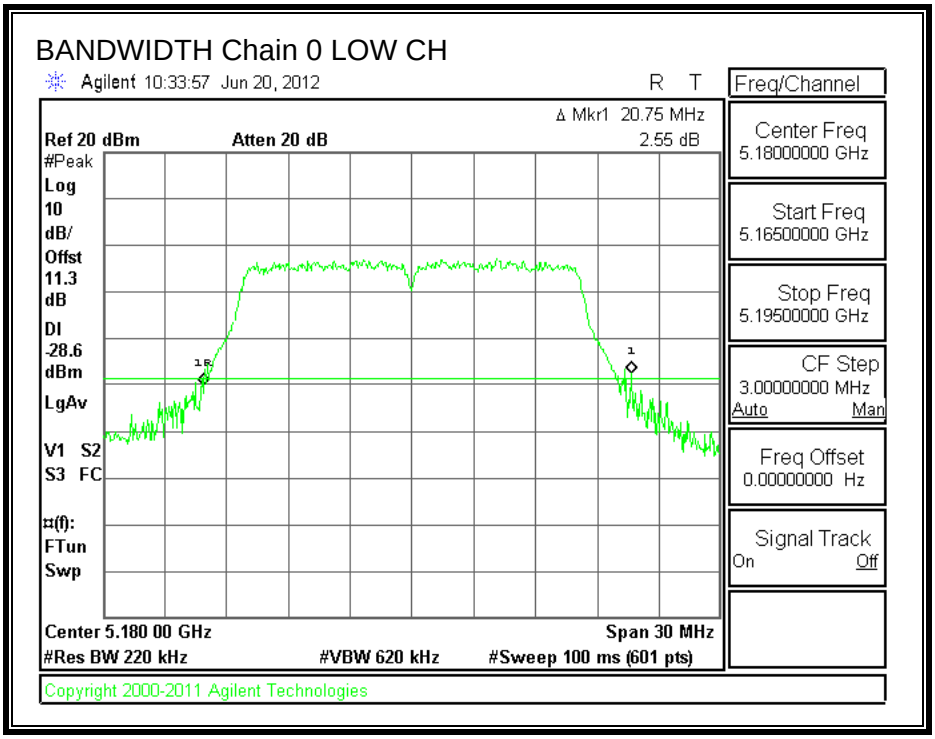
LIMITS

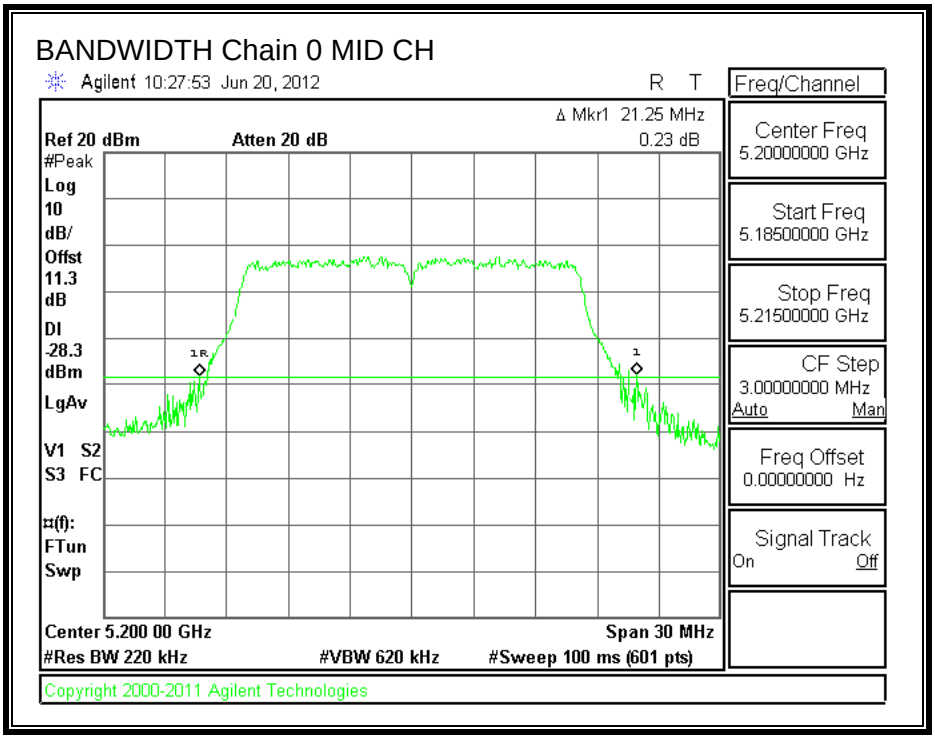
None; for reporting purposes only.

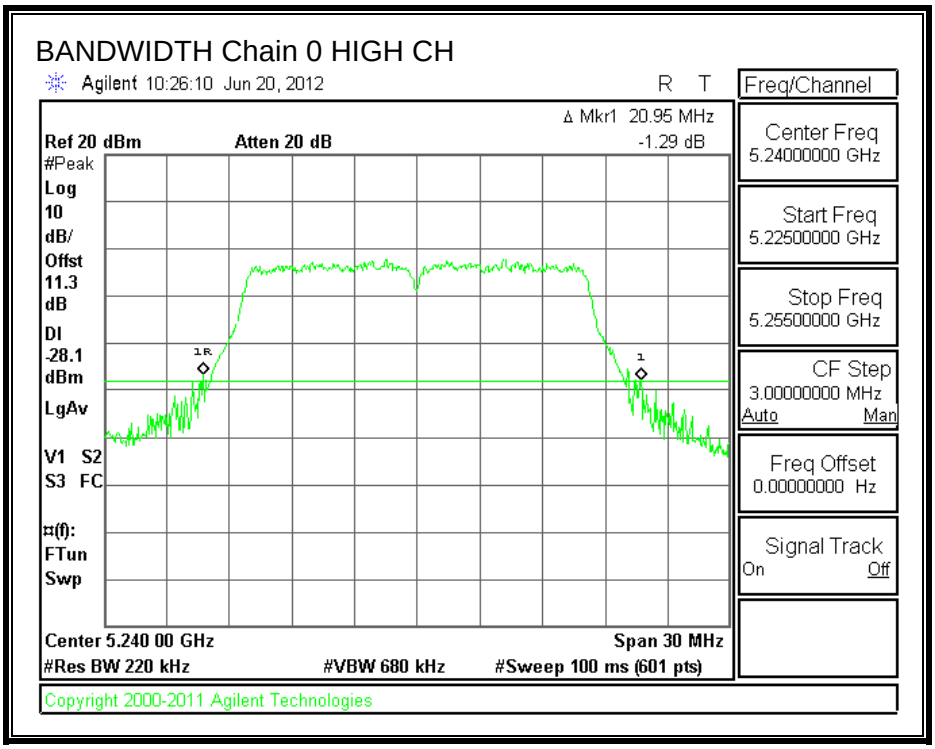
RESULTS

Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5180	20.75	20.85
Mid	5200	21.25	20.65
High	5240	20.95	20.90

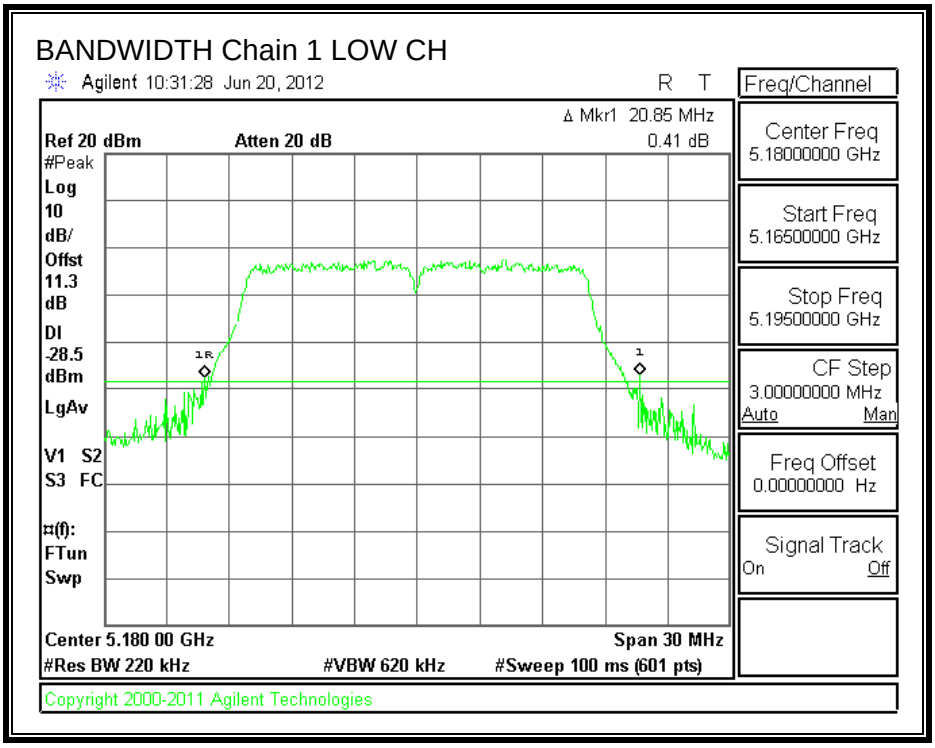
26 dB BANDWIDTH, Chain 0

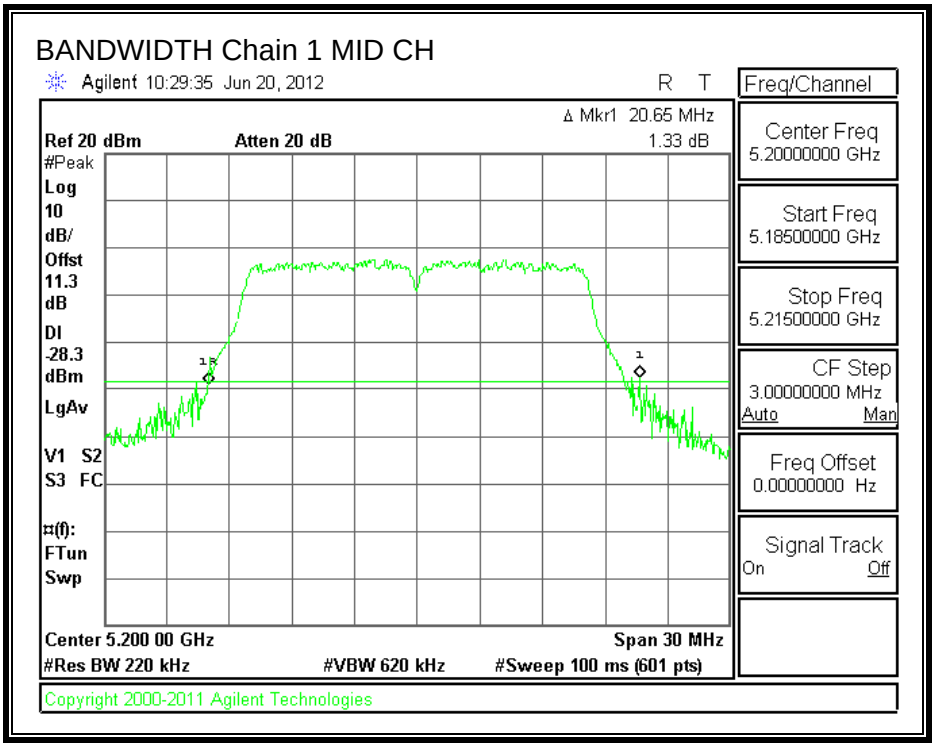


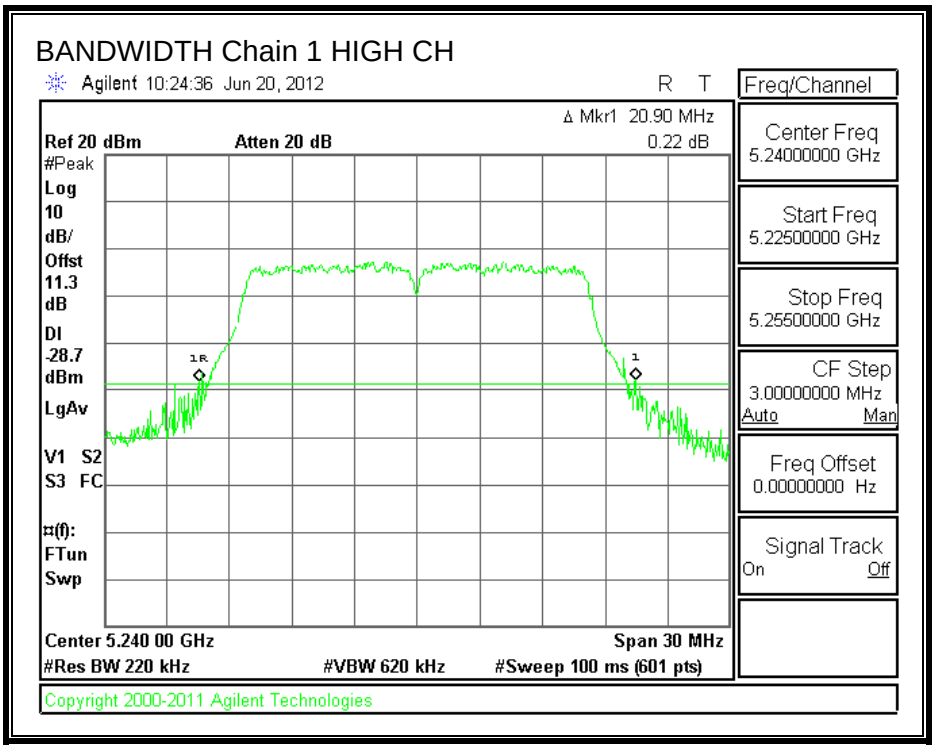




26 dB BANDWIDTH, Chain 1







9.2.2. 99% BANDWIDTH

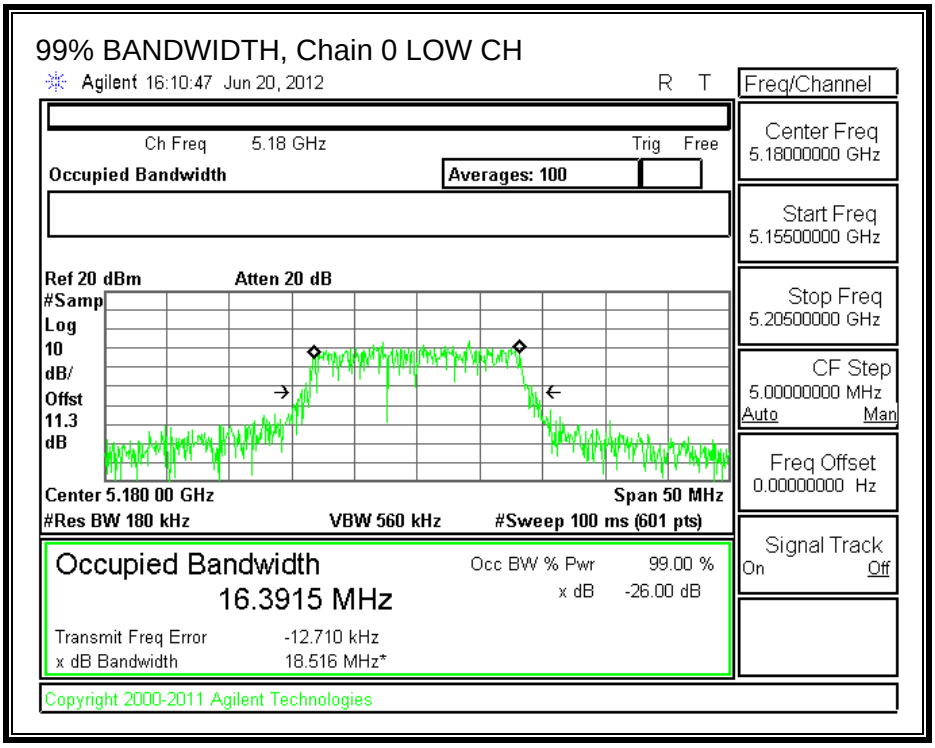
LIMITS

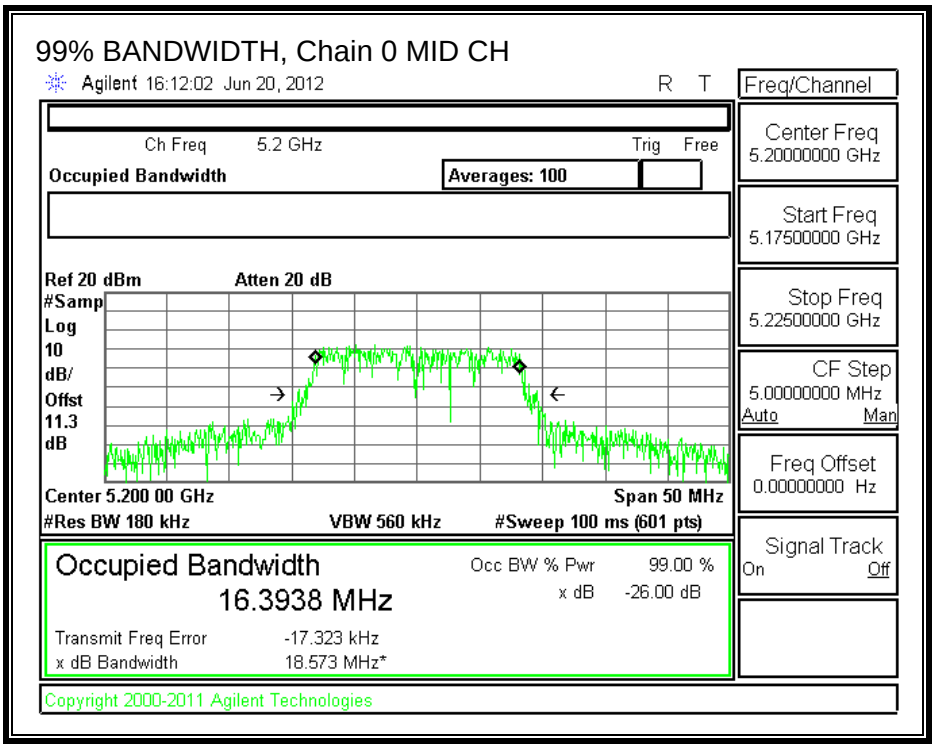
None; for reporting purposes only.

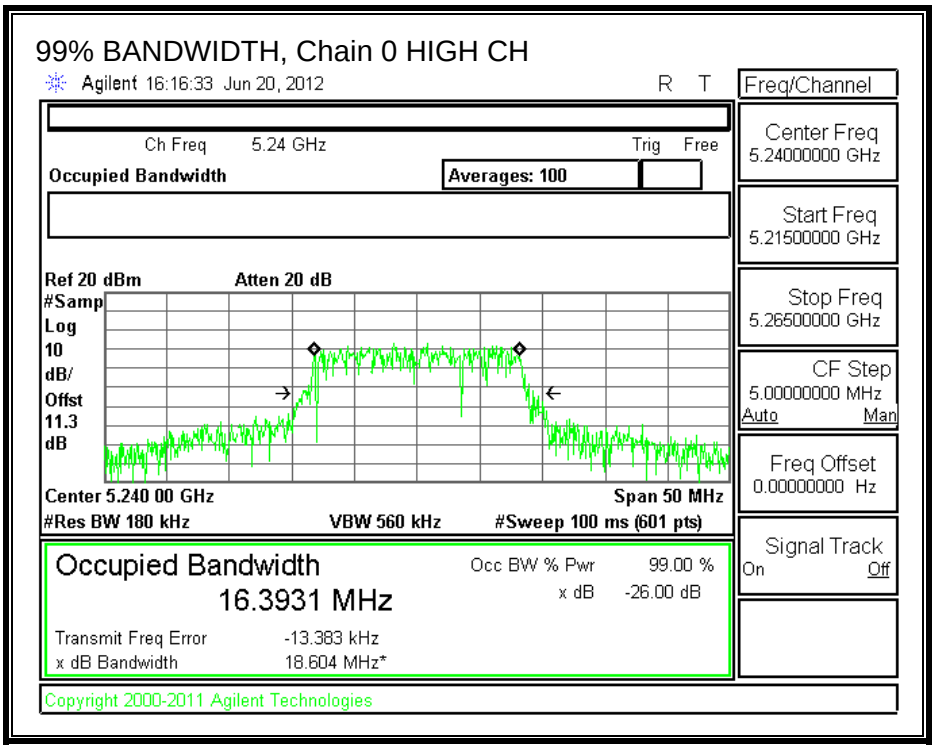
RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	5180	16.3915	16.3839
Mid	5200	16.3938	16.3848
High	5240	16.3931	16.3938

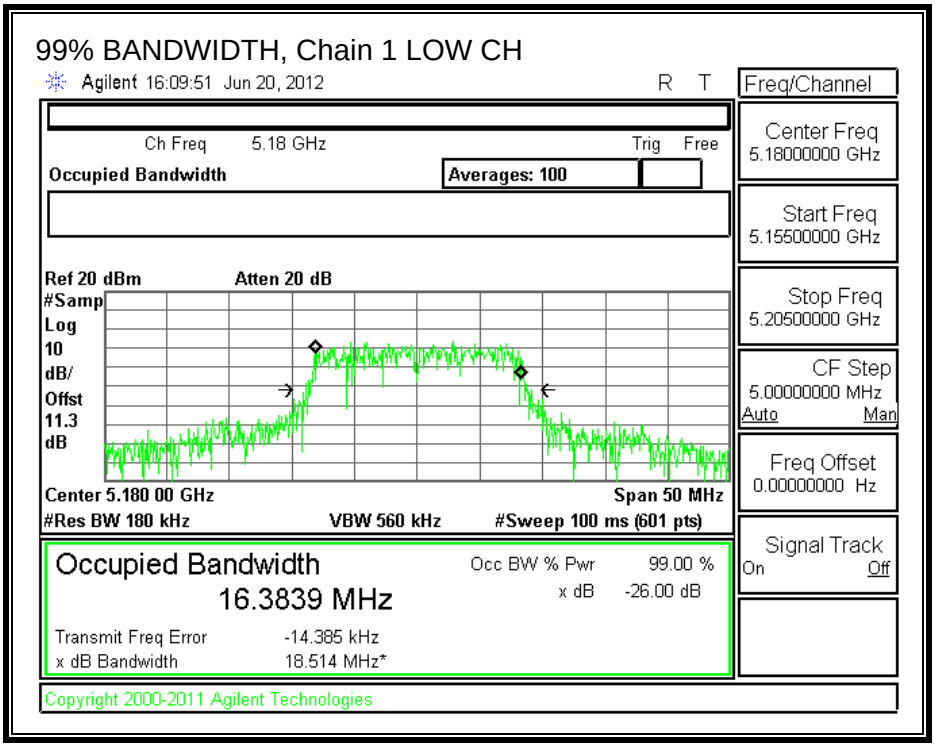
99% BANDWIDTH, Chain 0

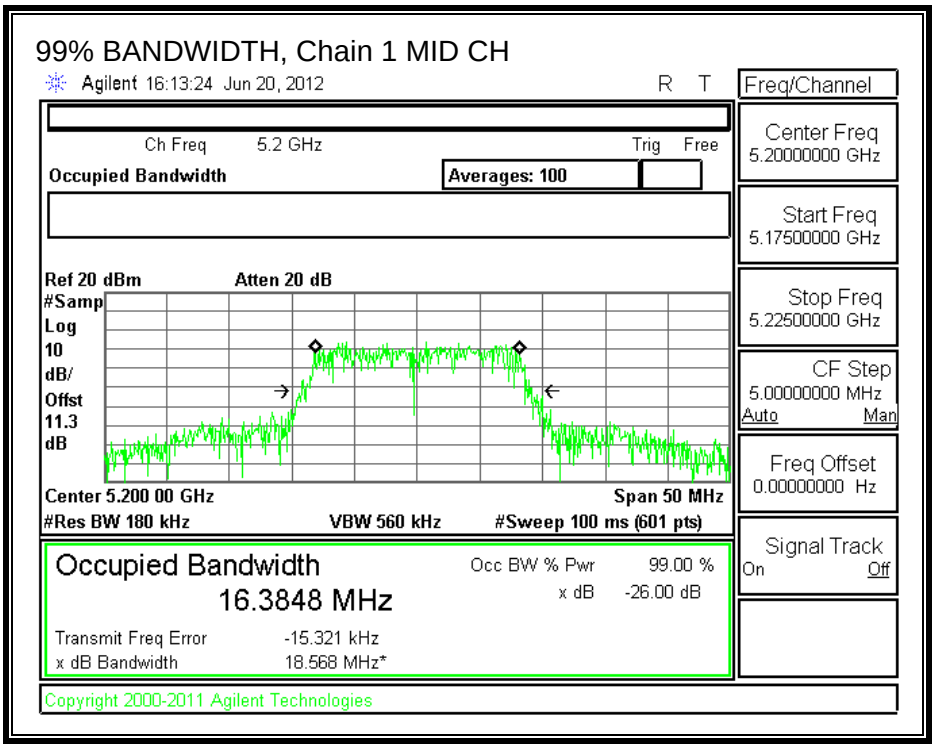


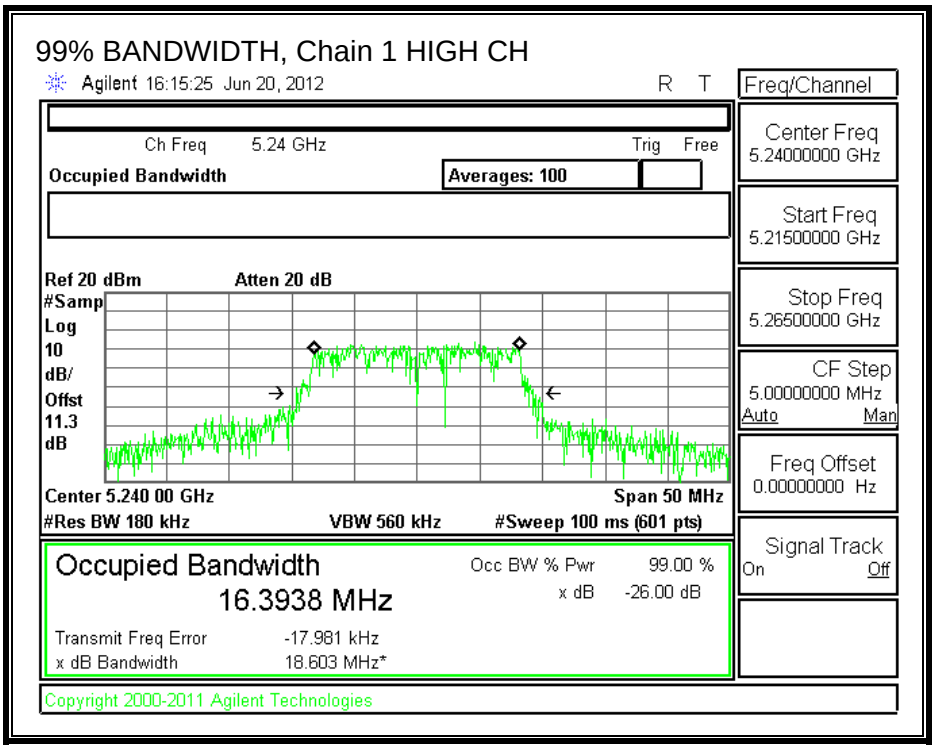




99% BANDWIDTH, Chain 1







9.2.3. 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 11.3 dB (including 10 dB pad and 1.3 dB cable) 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	7.10	7.20	10.16
Mid	5200	7.60	7.60	10.61
High	5240	7.80	7.30	10.57

9.2.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

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):
For the 5.15 – 5.25 GHz band, 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 correlated and the antenna gain is the same for each chain. The directional gain is:

Antenna Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
6.00	3.01	9.01

FCC RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5180	17	20.8	17.17	9.01	13.99	0.99
Mid	5200	17	20.7	17.15	9.01	13.99	0.99
High	5240	17	20.9	17.20	9.01	13.99	0.99

Duty Cycle CF (dB)	0.04	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	5.956	6.193	9.12	13.99	-4.87
Mid	5200	6.339	7.643	10.09	13.99	-3.90
High	5240	6.756	7.481	10.18	13.99	-3.81

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	-5.60	-5.37	-2.44	0.99	-3.43
Mid	5200	-5.23	-3.93	-1.49	0.99	-2.48
High	5240	-4.81	-4.06	-1.37	0.99	-2.36

IC RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	10 + 10 Log B EIRP Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5180	17	16.4	22.14	9.01	13.99	0.99
Mid	5200	17	16.4	22.14	9.01	13.99	0.99
High	5240	17	16.4	22.15	9.01	13.99	0.99

Duty Cycle CF (dB)	0.04	Included in Calculations of Corr'd Power & PPSD

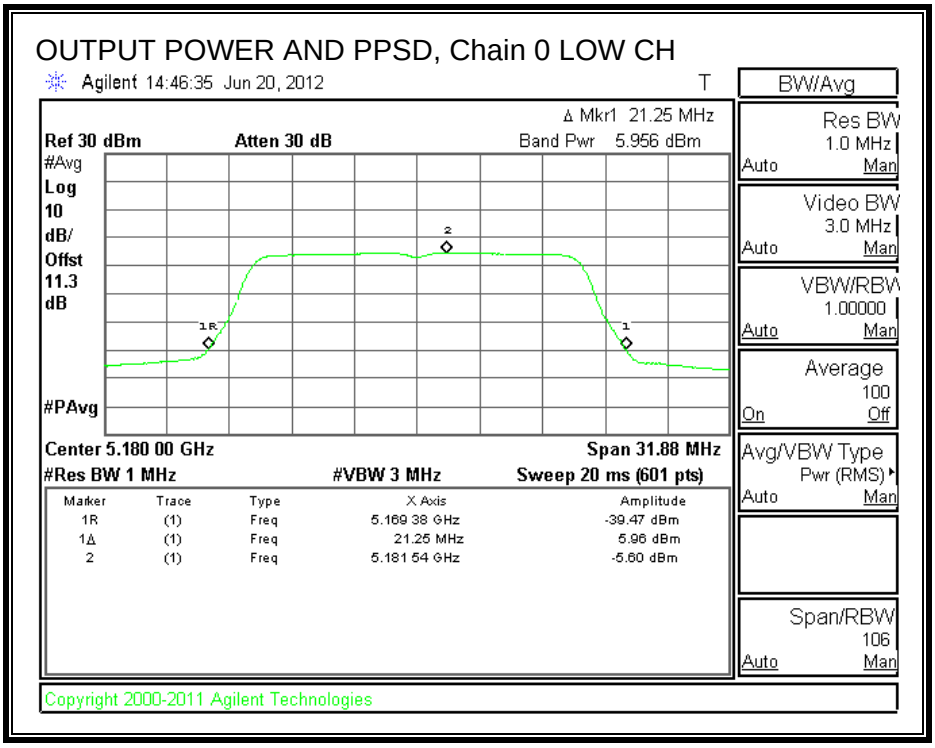
Output Power Results

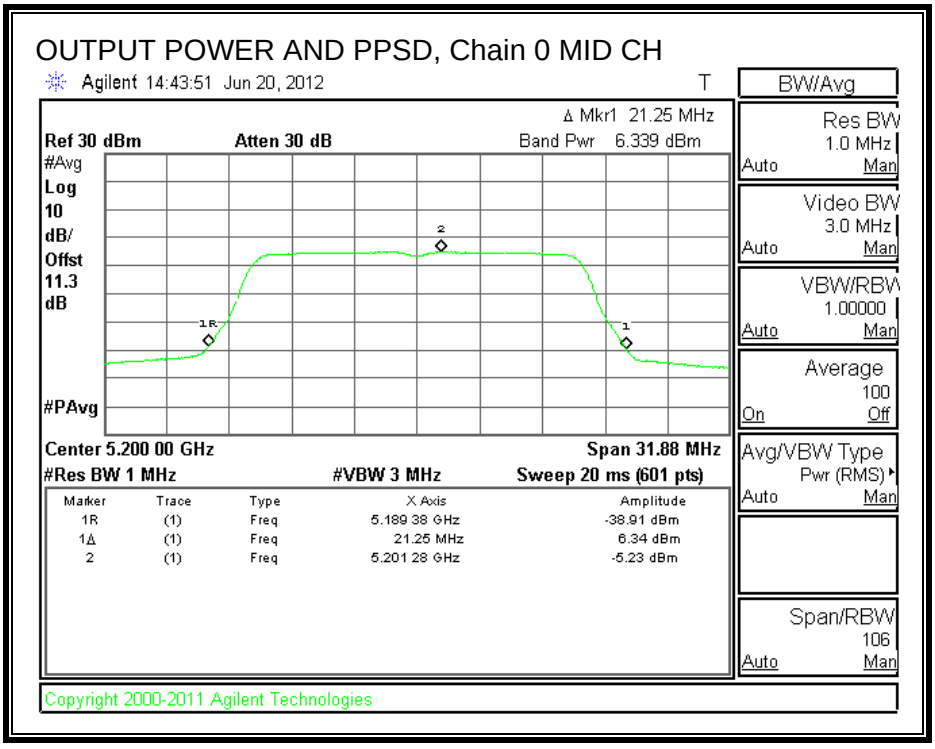
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	5.956	6.193	9.12	13.99	-4.87
Mid	5200	6.339	7.643	10.09	13.99	-3.90
High	5240	6.756	7.481	10.18	13.99	-3.81

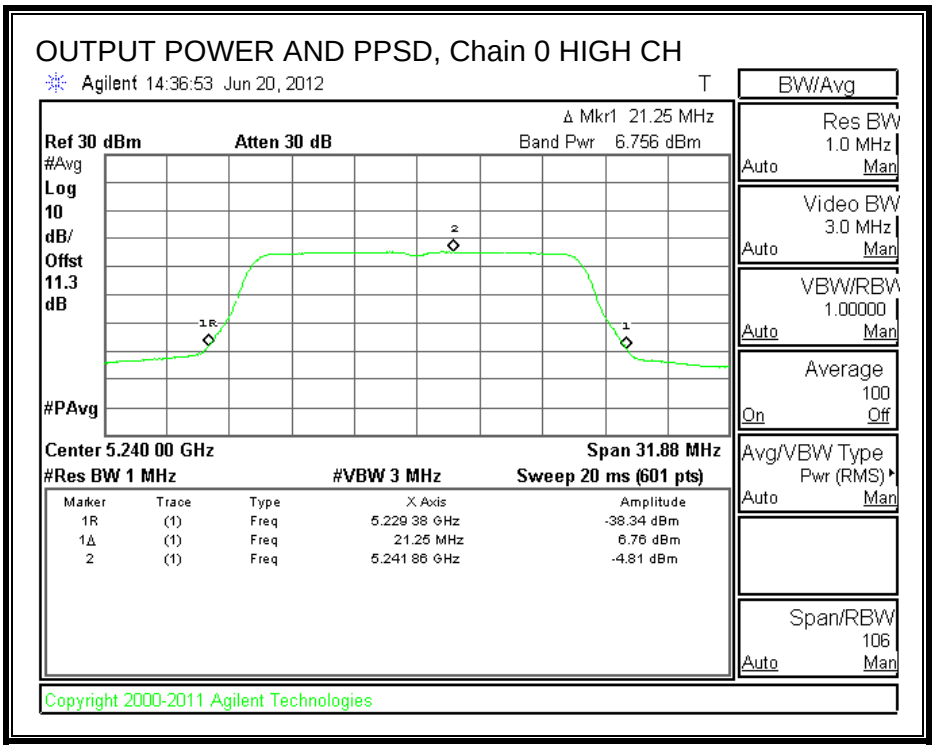
PPSD Results

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	-5.60	-5.37	-2.44	0.99	-3.43
Mid	5200	-5.23	-3.93	-1.49	0.99	-2.48
High	5240	-4.81	-4.06	-1.37	0.99	-2.36

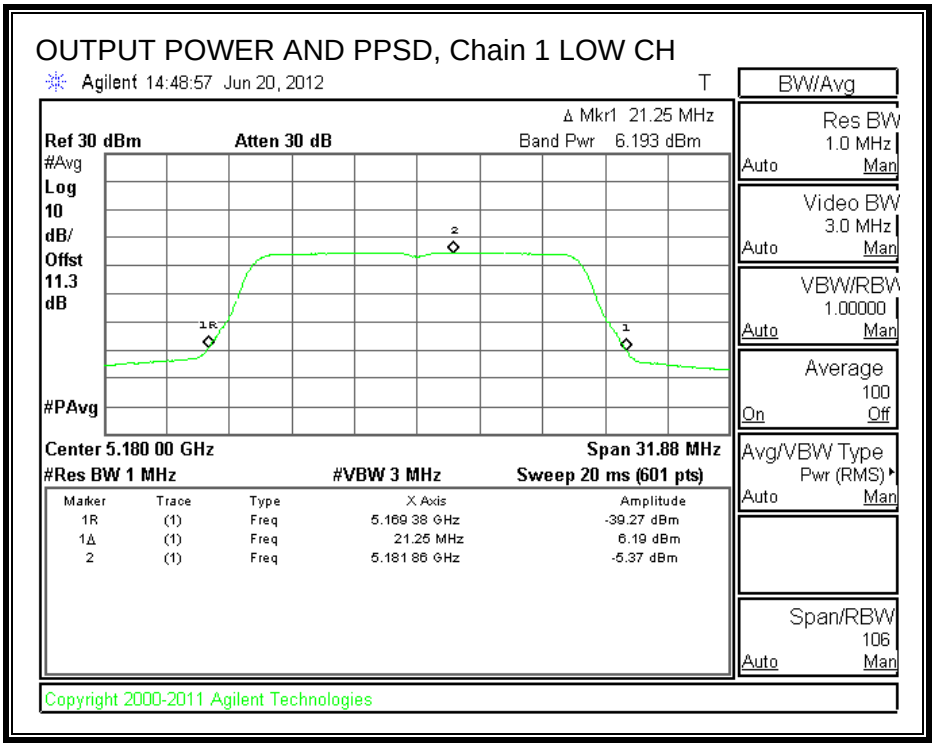
OUTPUT POWER AND PPSD, Chain 0

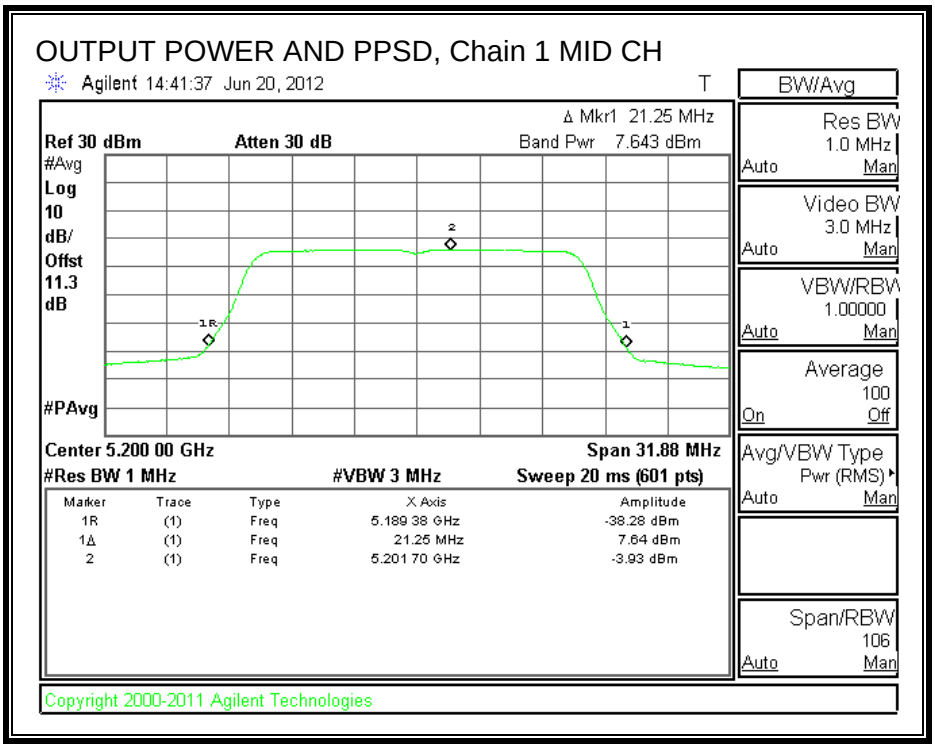


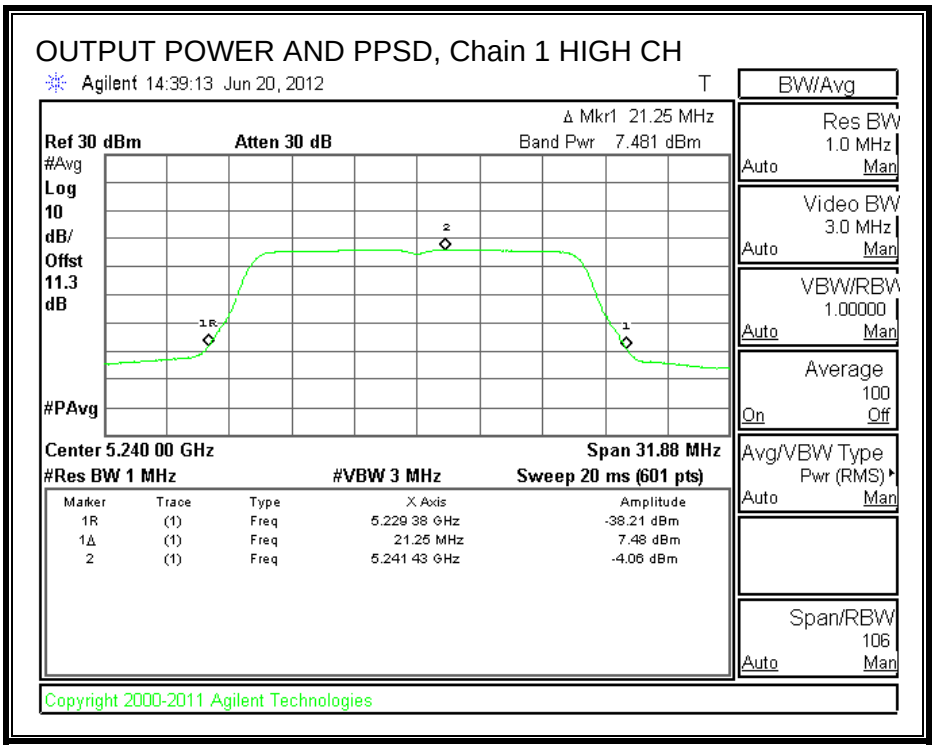




OUTPUT POWER AND PPSD, Chain 1







9.2.5. 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

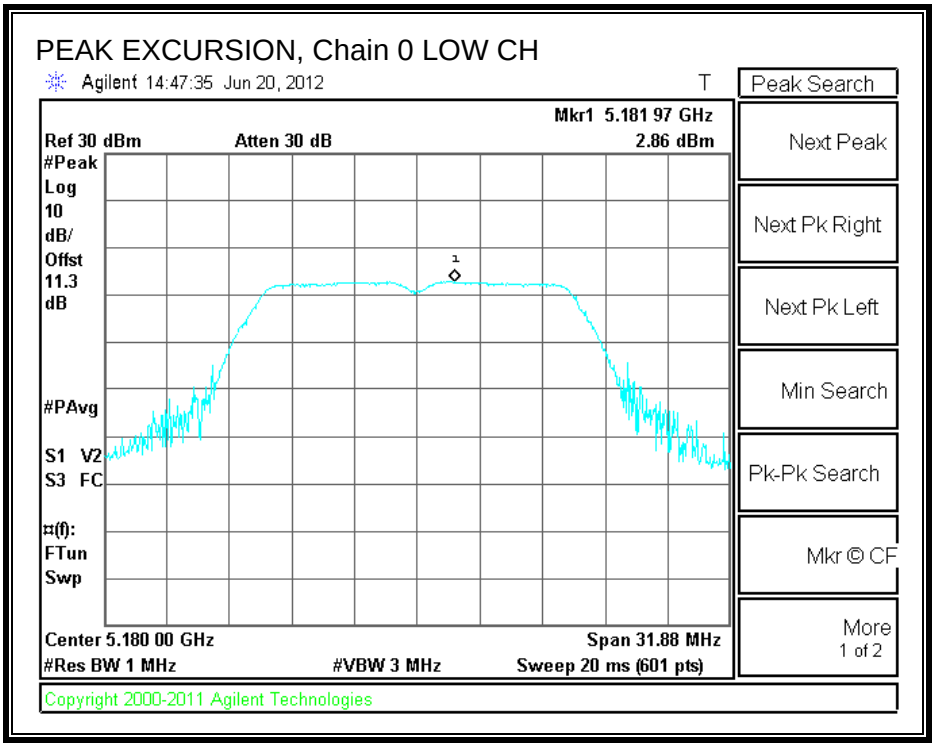
Chain 0

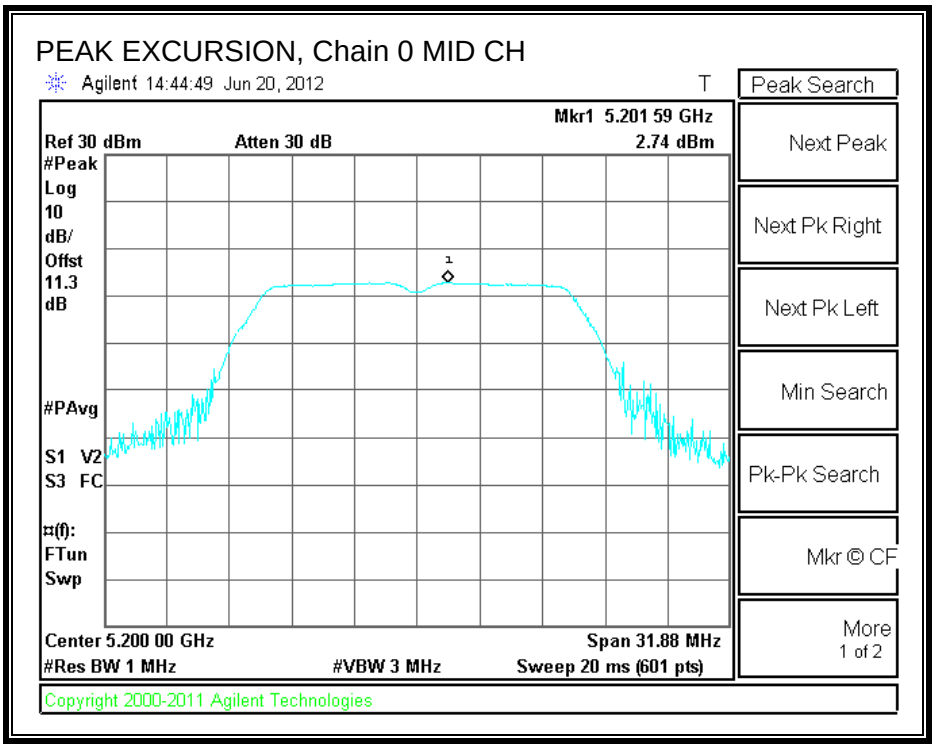
Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5180	2.86	-5.60	0.04	8.42	13	-4.58
Mid	5200	2.74	-5.23	0.04	7.93	13	-5.07
High	5240	3.17	-4.81	0.04	7.94	13	-5.06

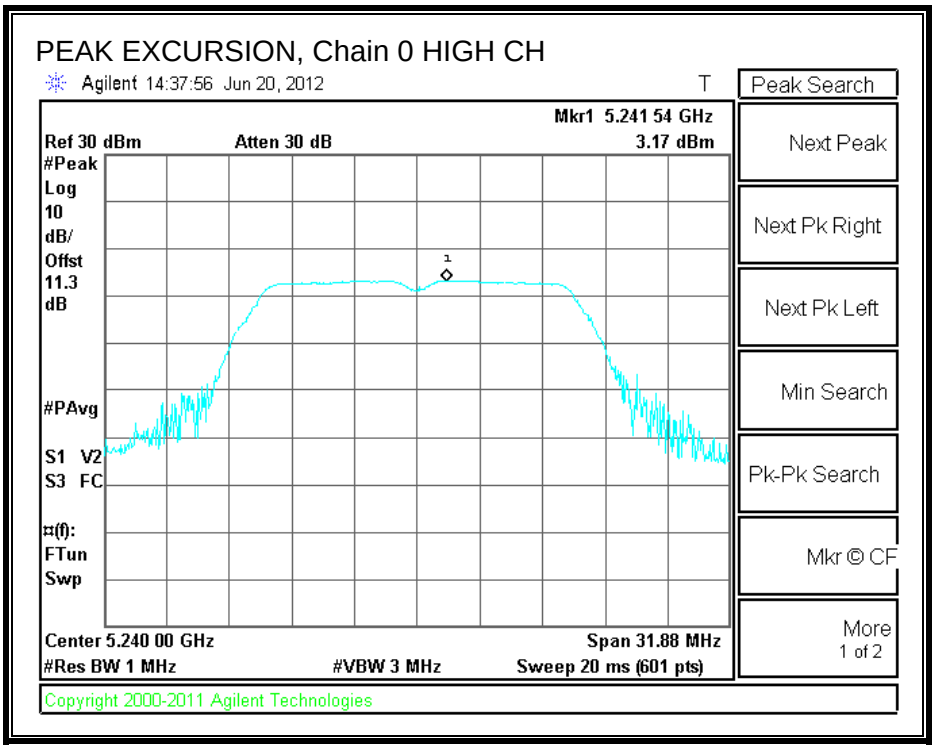
Chain 1

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5180	2.85	-5.37	0.04	8.18	13	-4.82
Mid	5200	4.07	-3.93	0.04	7.96	13	-5.04
High	5240	4.09	-4.06	0.04	8.11	13	-4.89

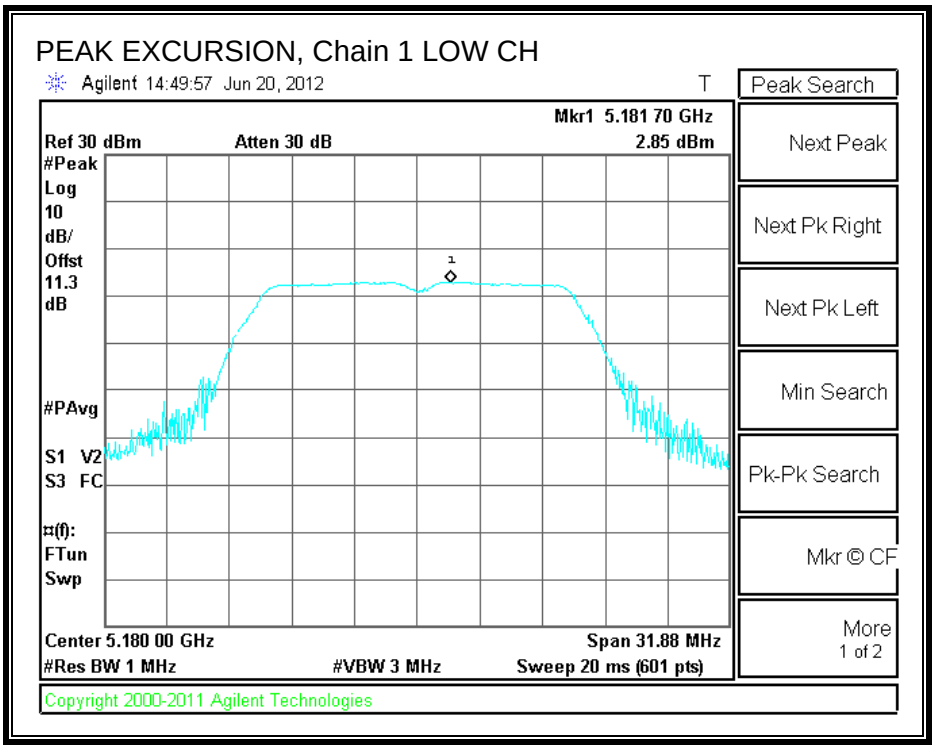
PEAK EXCURSION, Chain 0



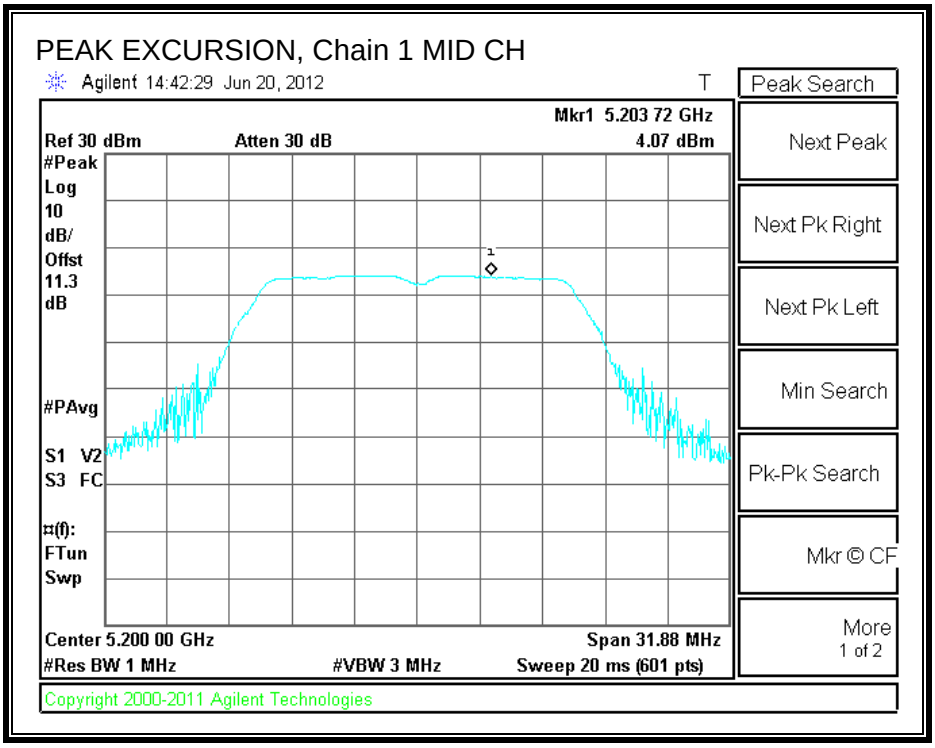




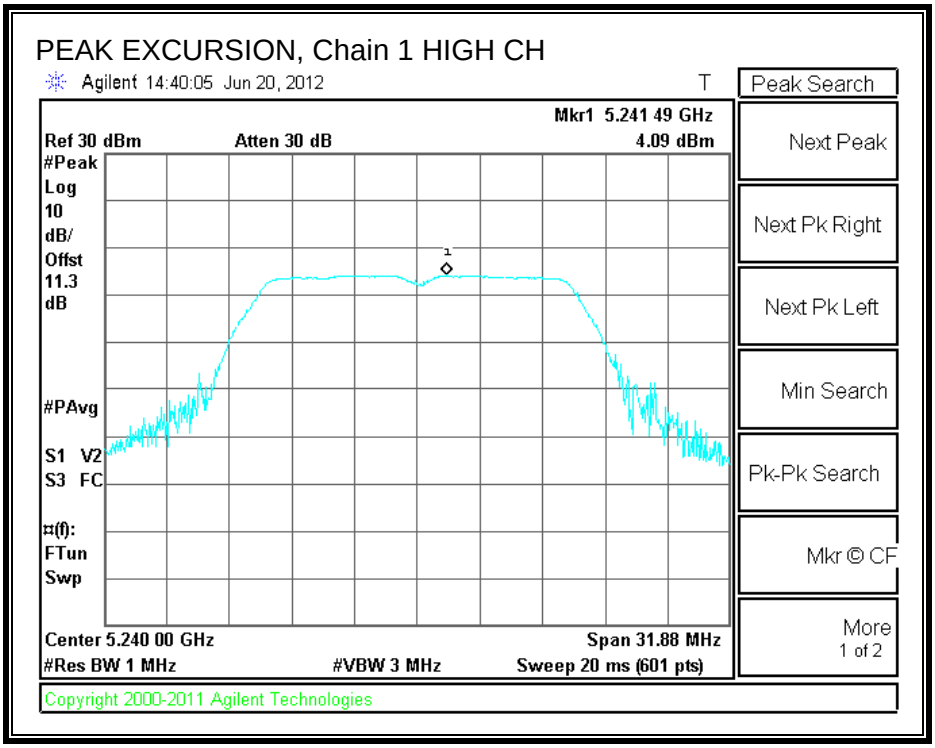
PEAK EXCURSION, Chain 1



PEAK EXCURSION, Chain 1 MID CH



PEAK EXCURSION, Chain 1 HIGH CH



9.3. 802.11n HT20 MODE IN THE 5.2 GHz BAND

9.3.1. 26 dB BANDWIDTH

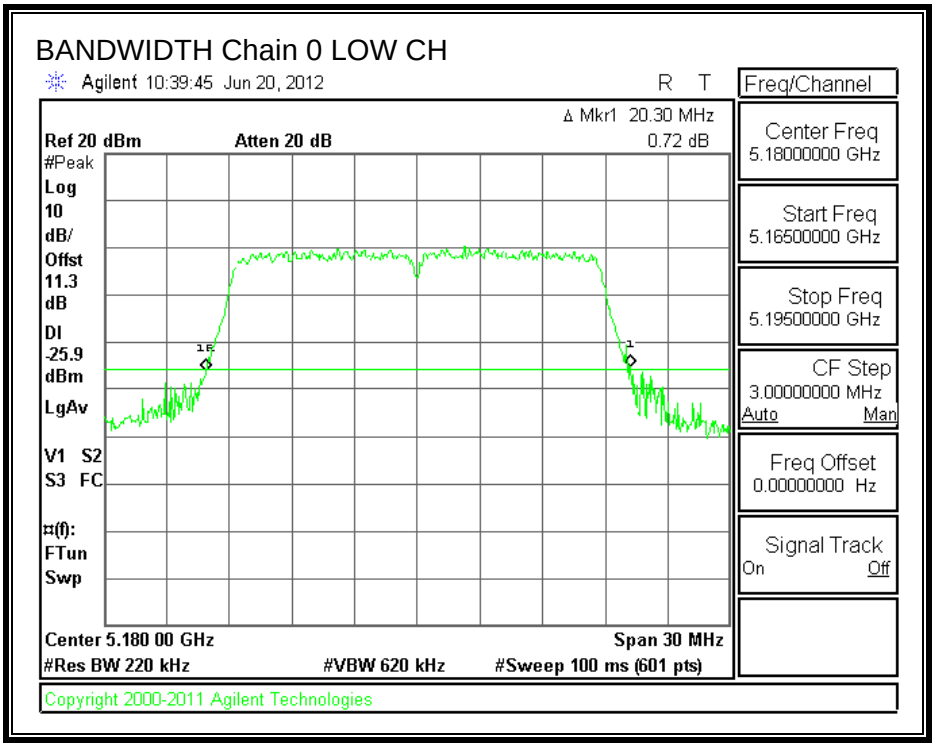
LIMITS

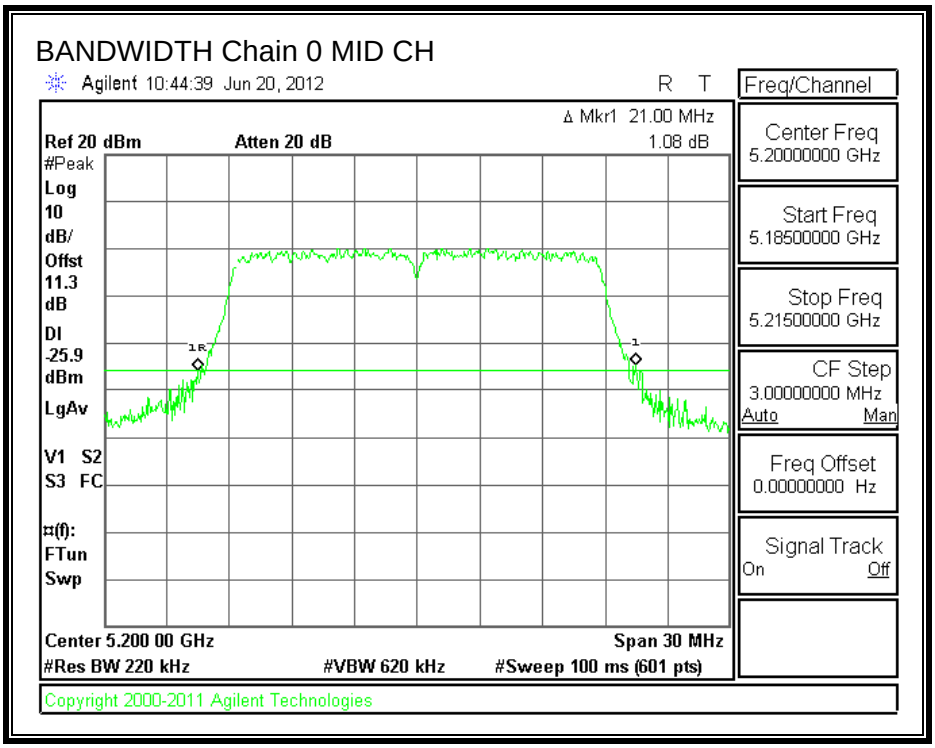
None; for reporting purposes only.

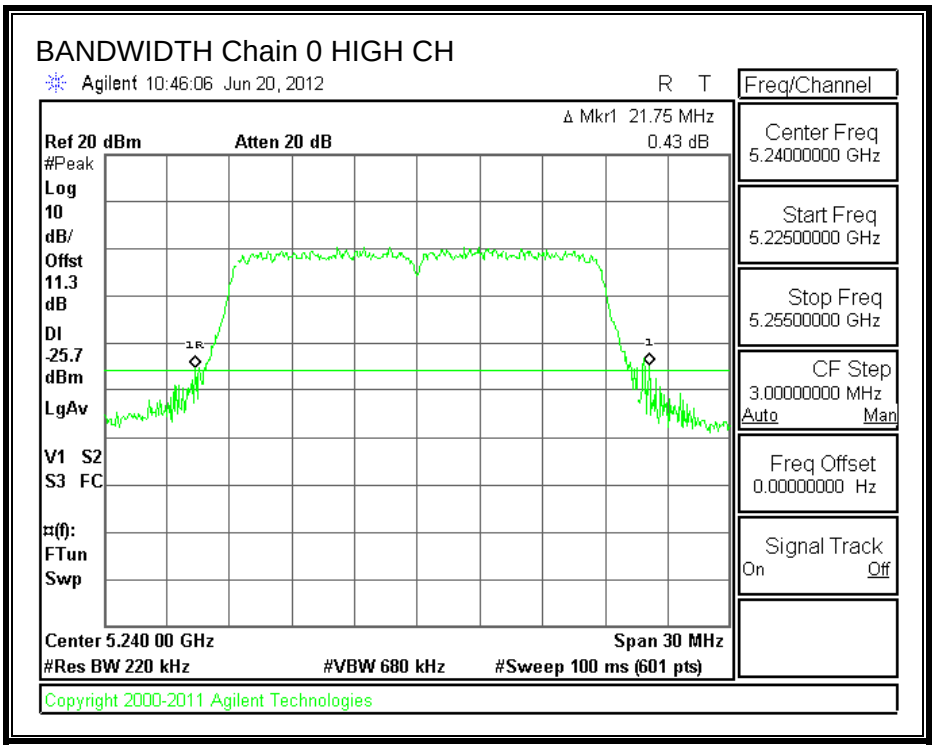
RESULTS

Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5180	20.30	20.60
Mid	5200	21.00	21.25
High	5240	21.75	20.85

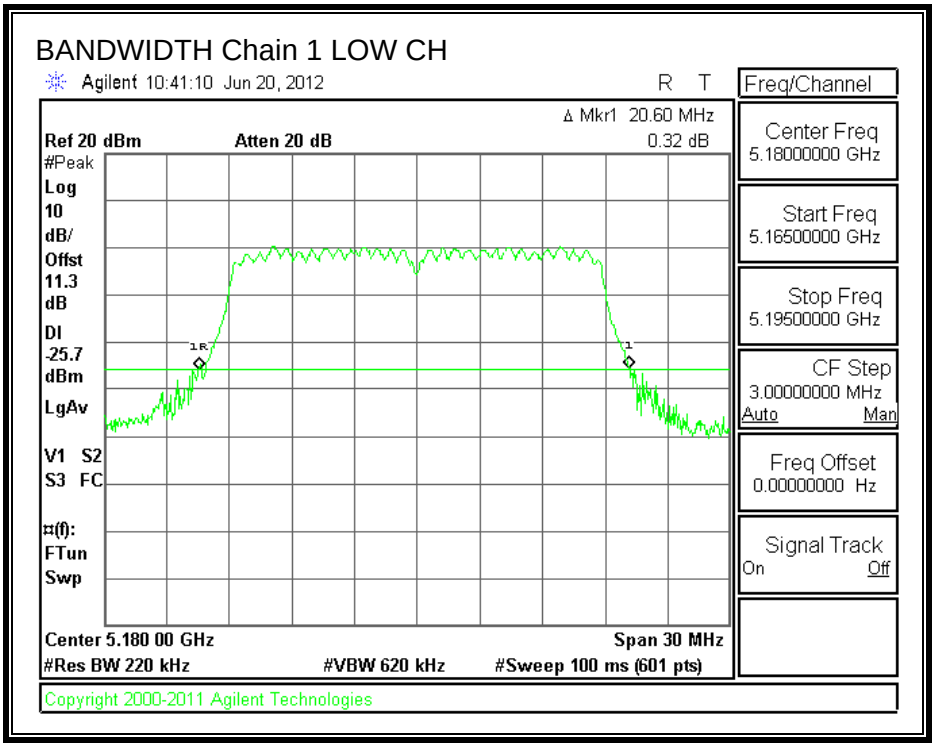
26 dB BANDWIDTH, Chain 0

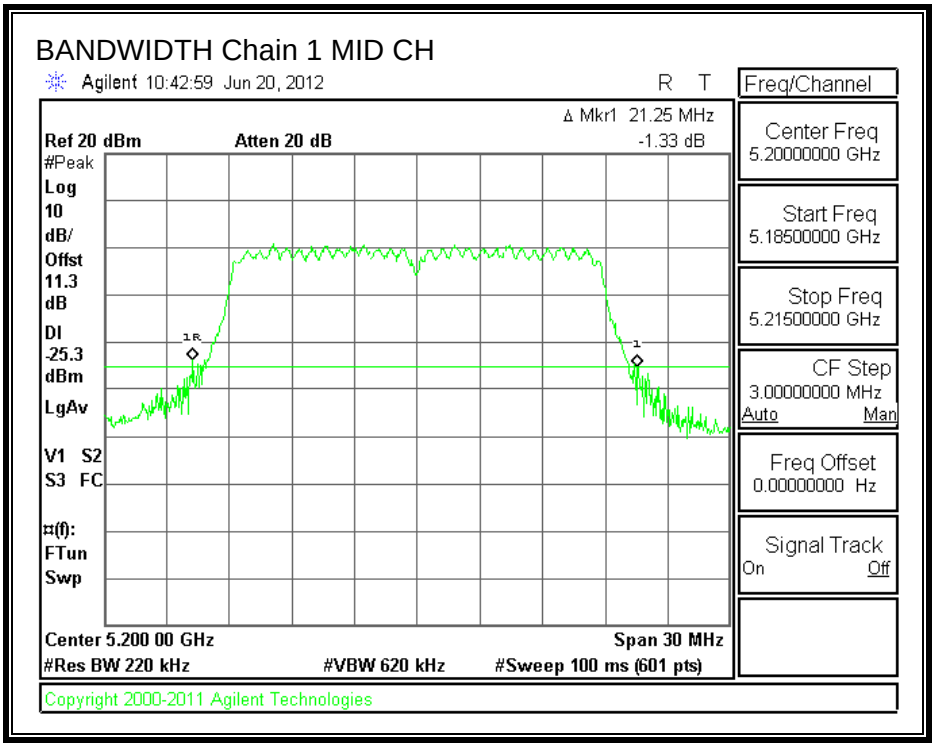


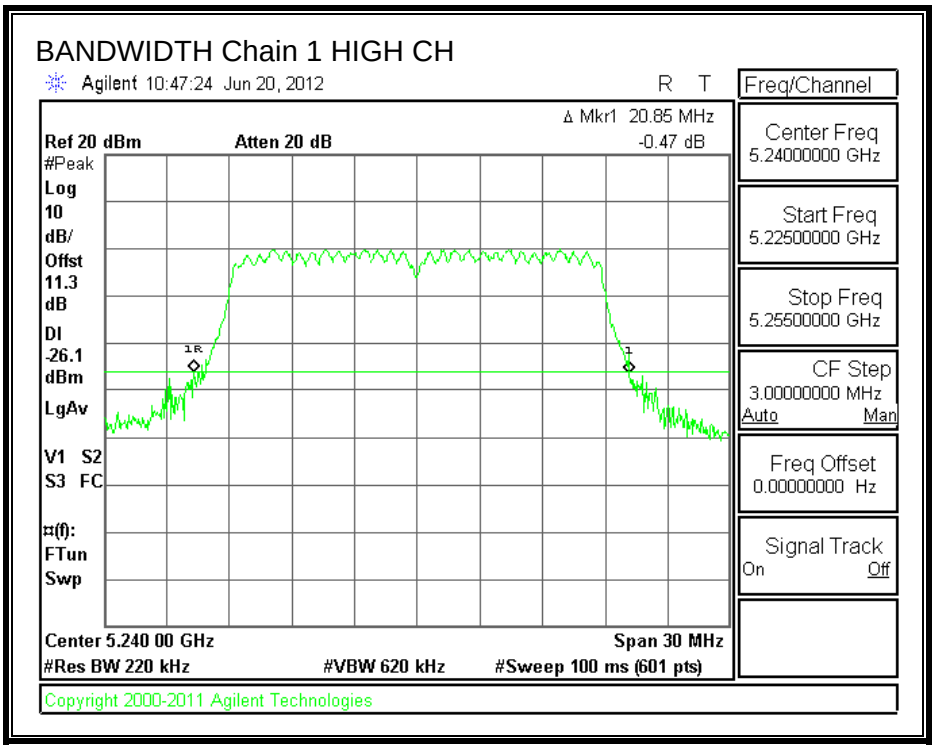




26 dB BANDWIDTH, Chain 1







9.3.2. 99% BANDWIDTH

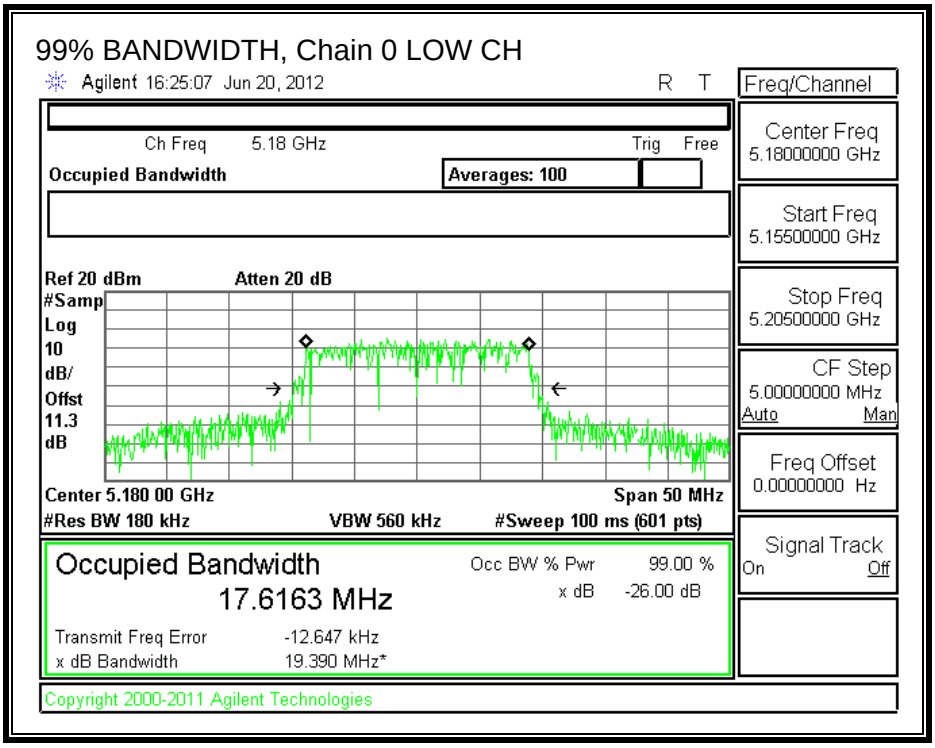
LIMITS

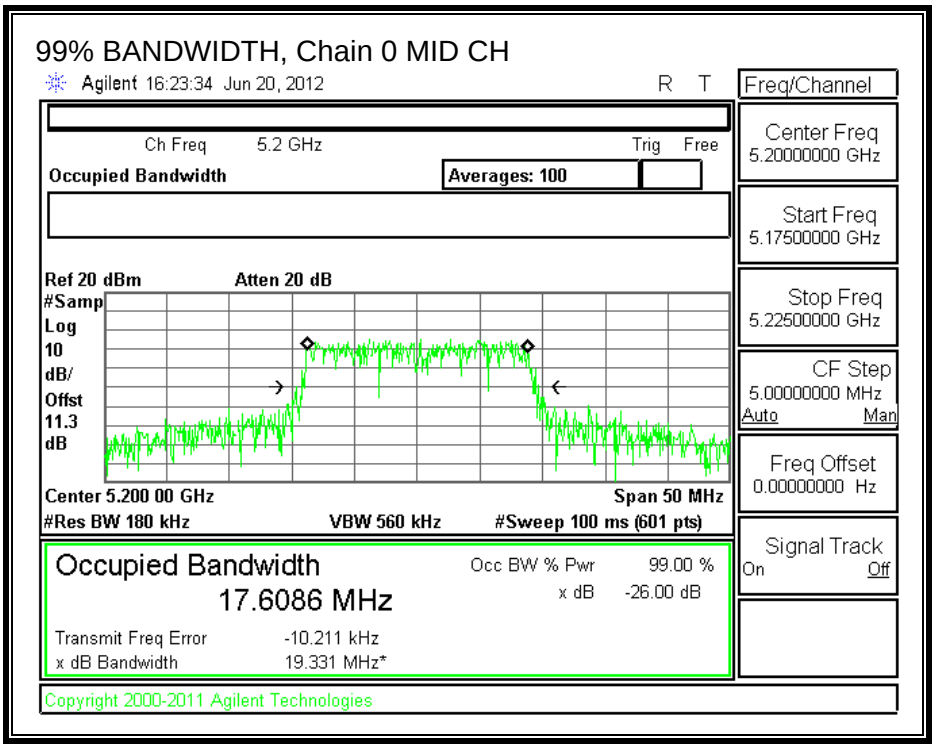
None; for reporting purposes only.

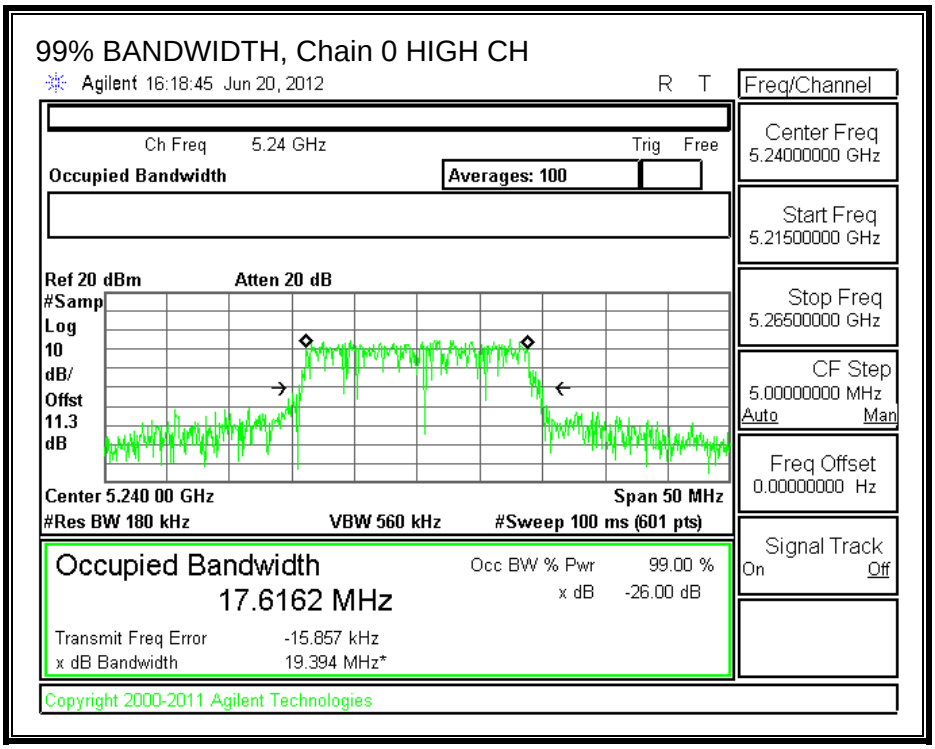
RESULTS

Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	5180	17.6163	17.5826
Mid	5200	17.6086	17.5882
High	5240	17.6162	17.5910

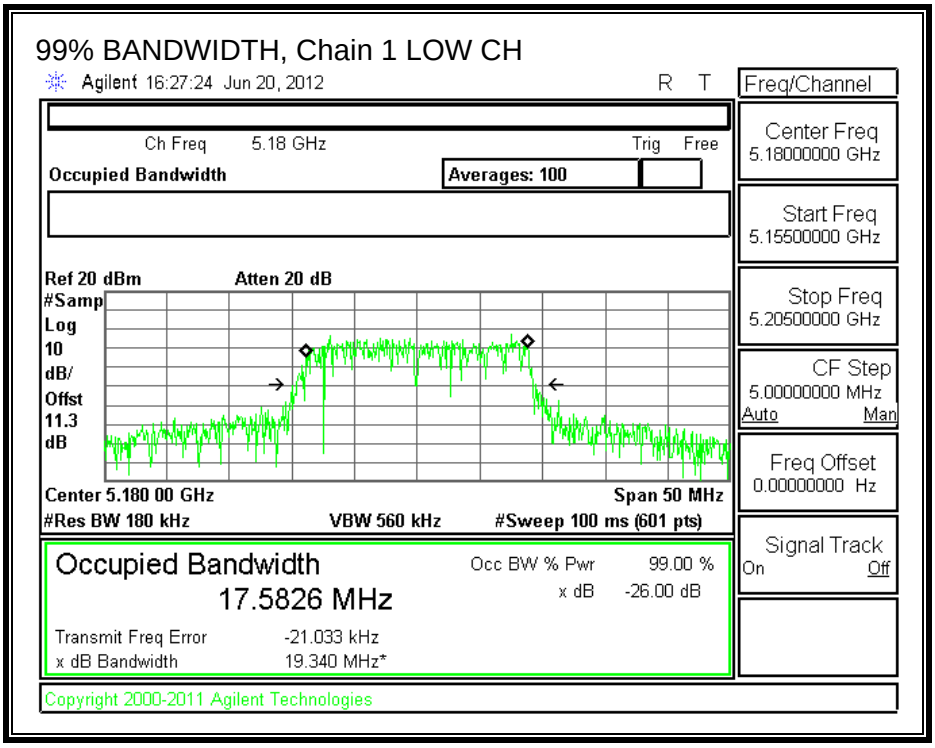
99% BANDWIDTH, Chain 0

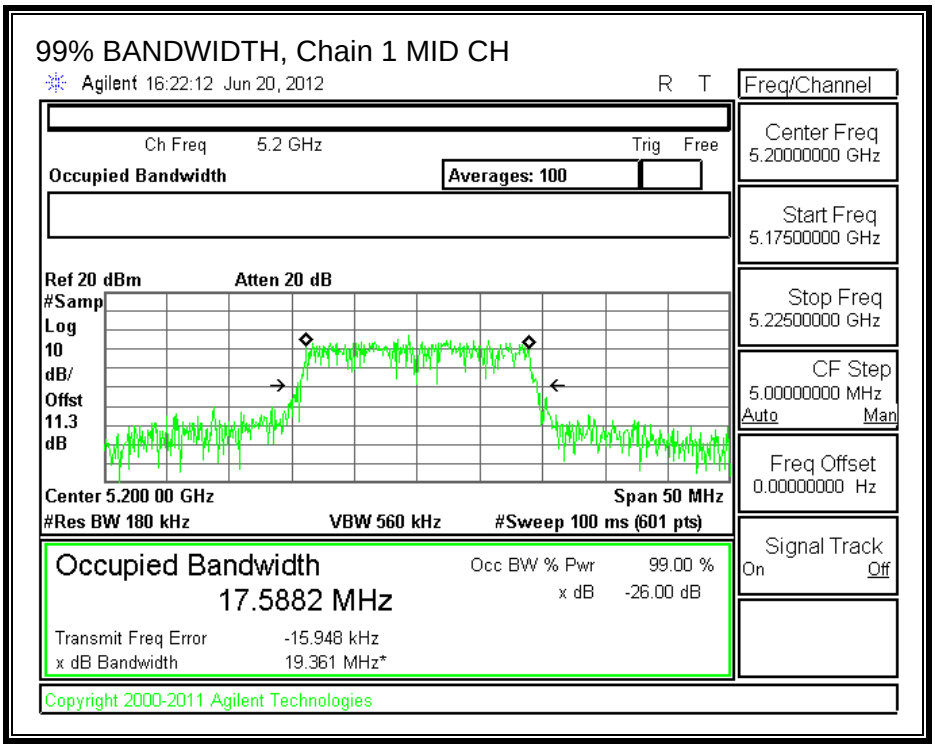


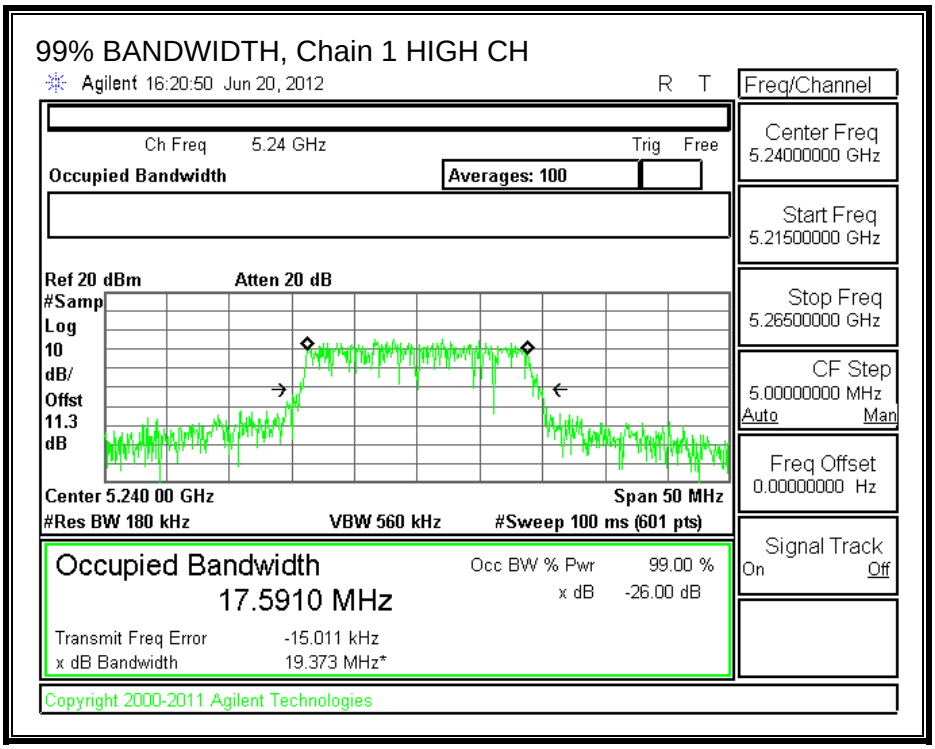




99% BANDWIDTH, Chain 1







9.3.3. 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 11.3 dB (including 10 dB pad and 1.3 dB cable) 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	10.30	10.50	13.41
Mid	5200	10.70	10.40	13.56
High	5240	10.60	10.20	13.41

9.3.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

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):
For the 5.15 – 5.25 GHz band, 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 correlated and the antenna gain is the same for each chain. The directional gain is:

Antenna Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
6.00	3.01	9.01

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FCC RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5180	17	20.3	17.07	9.01	13.99	0.99
Mid	5200	17	21.0	17.22	9.01	13.99	0.99
High	5240	17	20.9	17.19	9.01	13.99	0.99

Duty Cycle CF (dB)	0.01	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	8.826	10.284	12.64	13.99	-1.35
Mid	5200	9.349	9.448	12.42	13.99	-1.57
High	5240	9.542	8.891	12.25	13.99	-1.74

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	-3.05	-1.49	0.82	0.99	-0.17
Mid	5200	-2.54	-2.37	0.57	0.99	-0.42
High	5240	-2.32	-2.93	0.41	0.99	-0.58

IC RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	10 + 10 Log B EIRP Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5180	17	17.6	22.45	6.00	17.00	4.00
Mid	5200	17	17.6	22.45	6.00	17.00	4.00
High	5240	17	17.6	22.45	6.00	17.00	4.00

Duty Cycle CF (dB)	0.01	Included in Calculations of Corr'd Power & PPSD

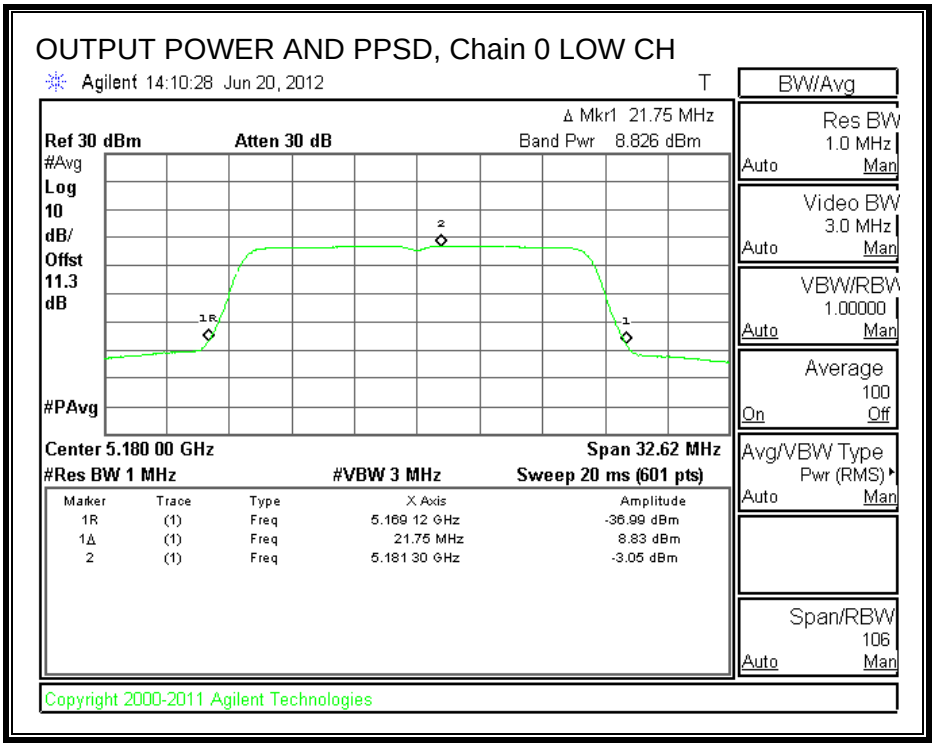
Output Power Results

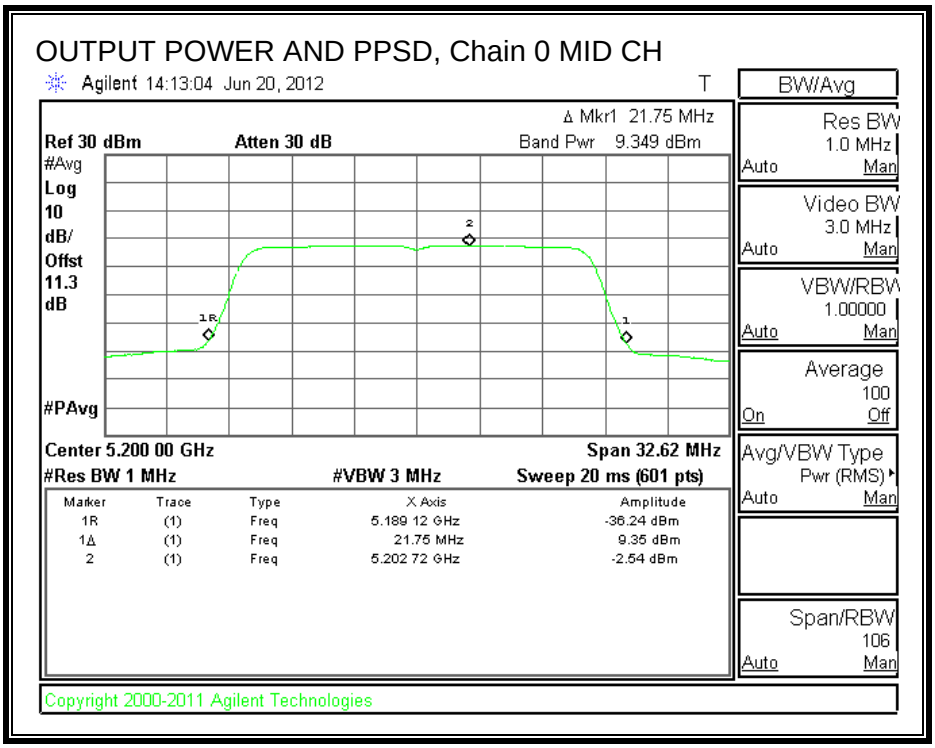
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5180	8.826	10.284	12.64	17.00	-4.36
Mid	5200	9.349	9.448	12.42	17.00	-4.58
High	5240	9.542	8.891	12.25	17.00	-4.75

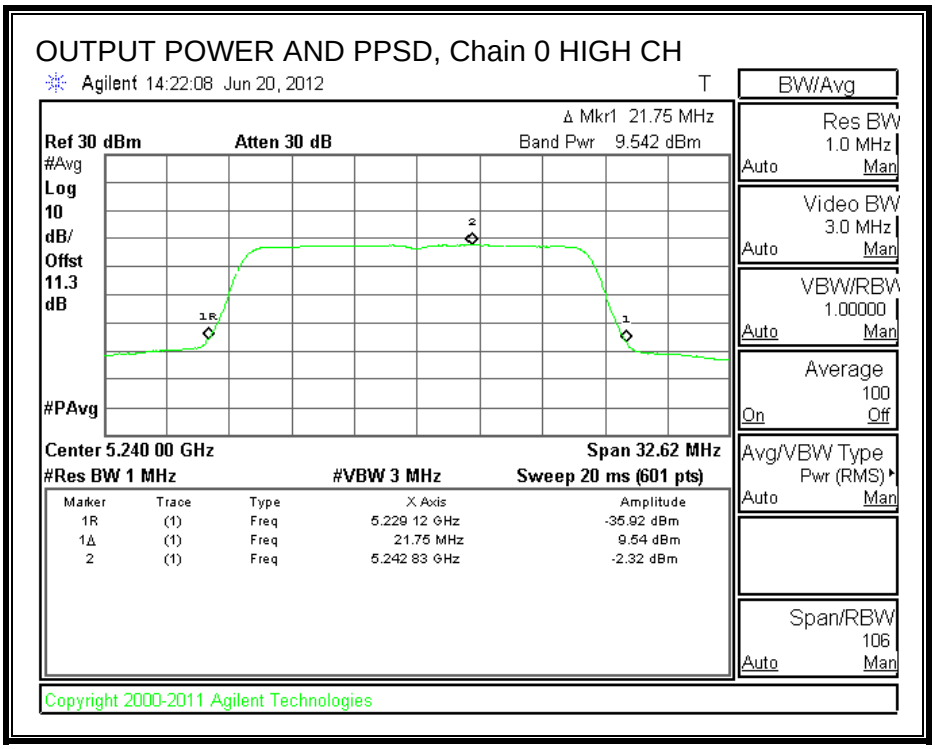
PPSD Results

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	-3.05	-1.49	0.82	4.00	-3.18
Mid	5200	-2.54	-2.37	0.57	4.00	-3.43
High	5240	-2.32	-2.93	0.41	4.00	-3.59

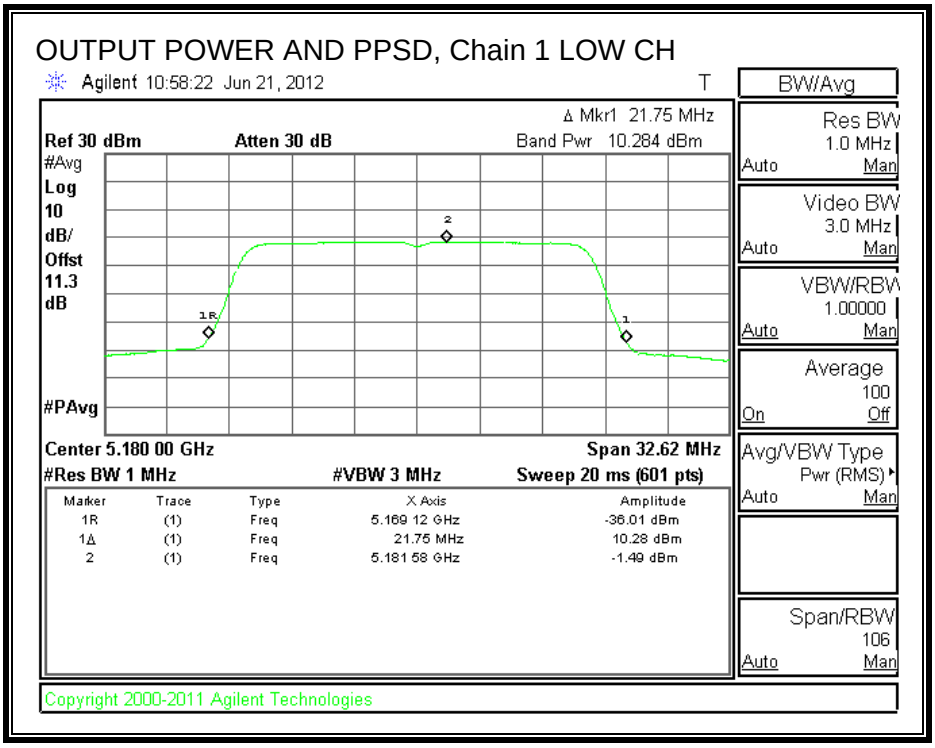
OUTPUT POWER AND PPSD, Chain 0

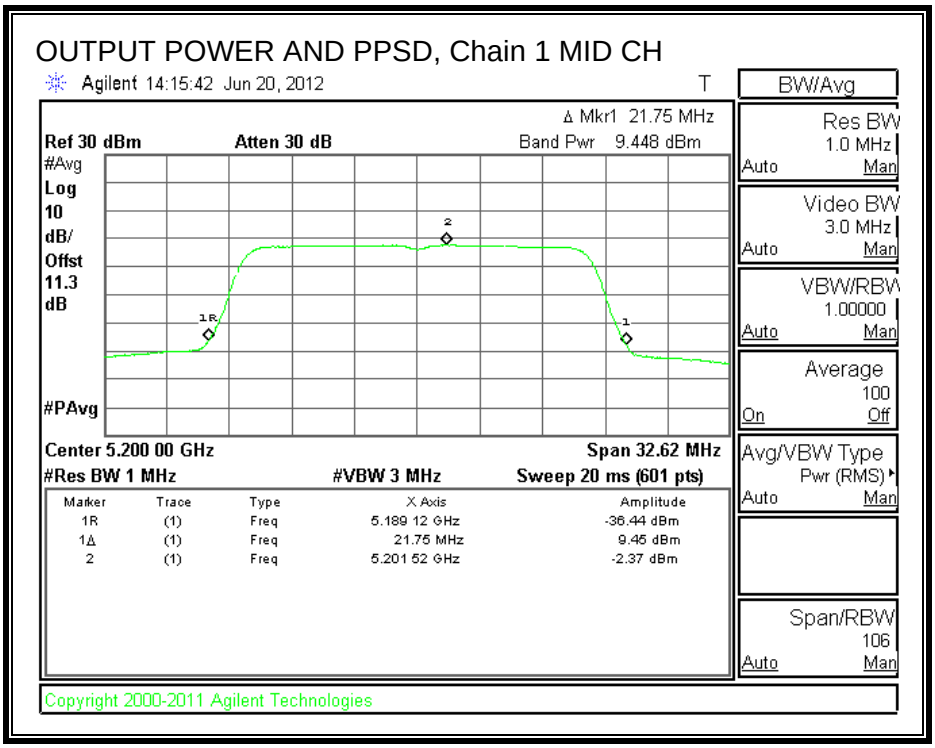


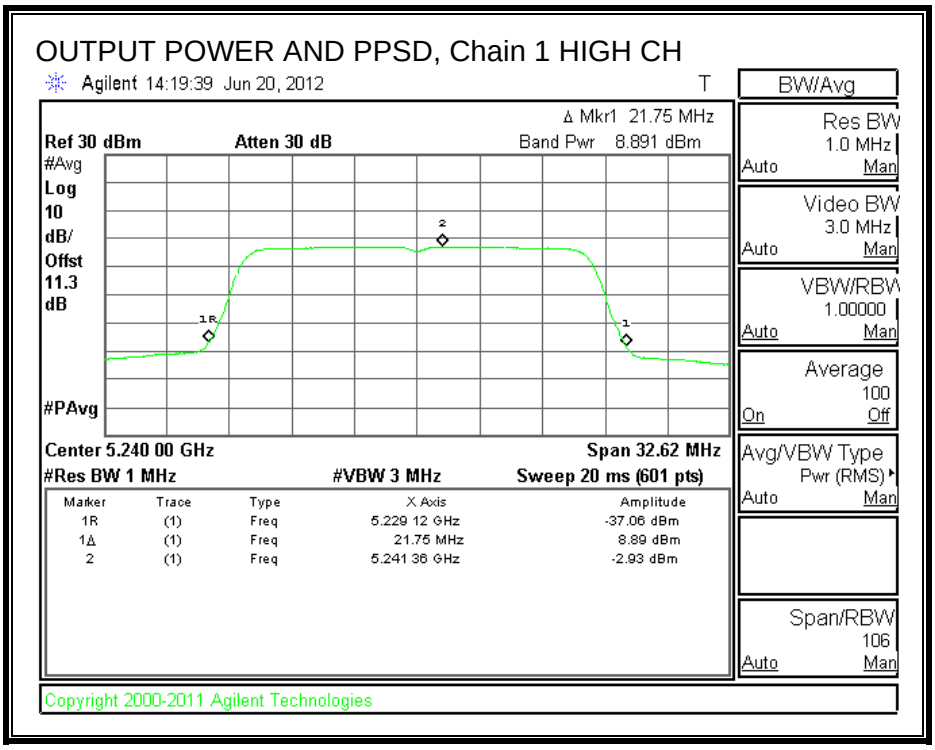




OUTPUT POWER AND PPSD, Chain 1







9.3.5. PEAK EXCURSION

LIMITS

FCC §15.407 (a) (6)

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

RESULTS

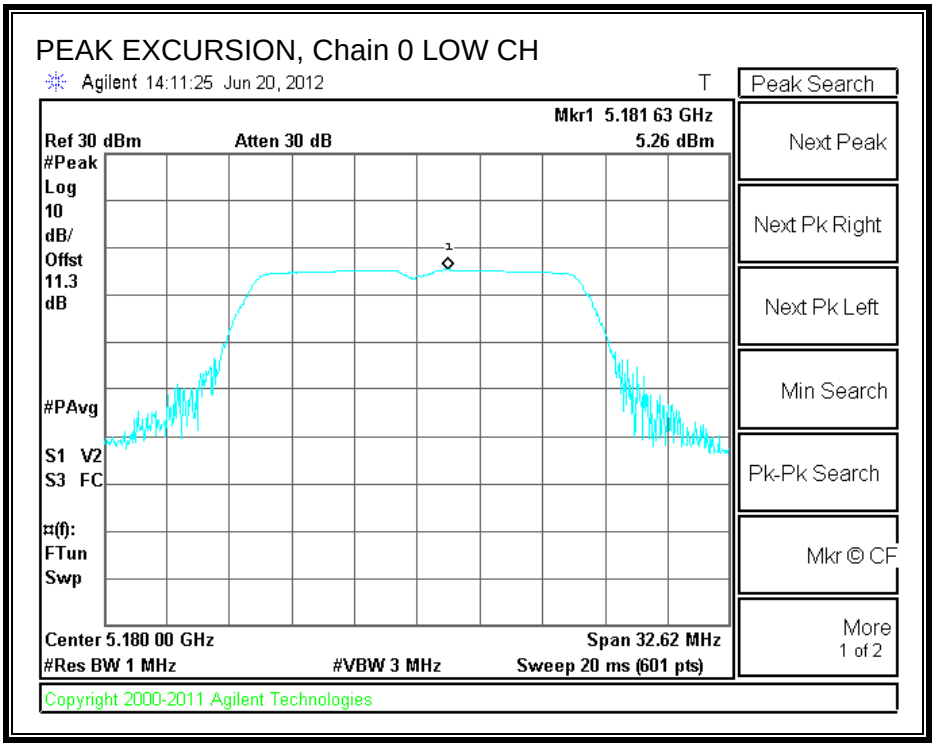
Chain 0

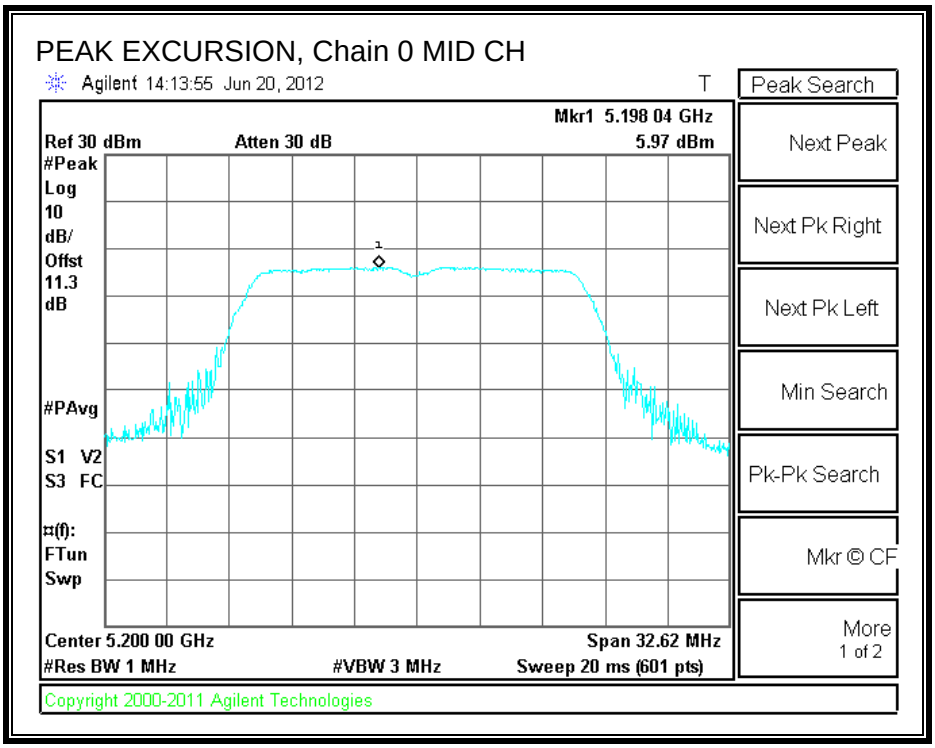
Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5180	5.26	-3.05	0.01	8.30	13	-4.70
Mid	5200	5.97	-2.54	0.01	8.50	13	-4.50
High	5240	5.84	-2.32	0.01	8.15	13	-4.85

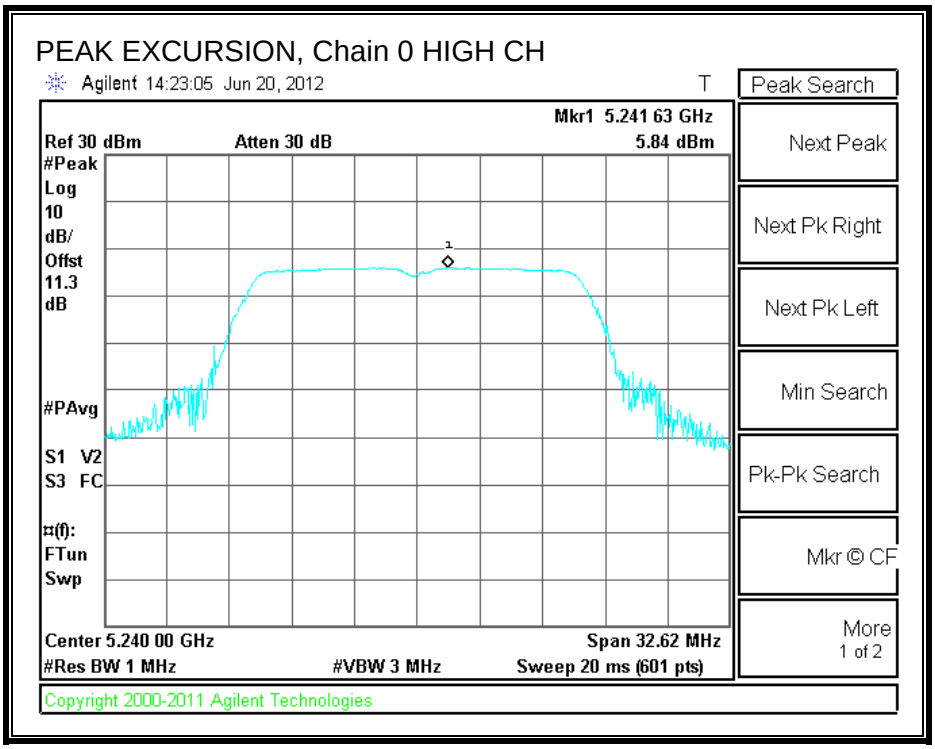
Chain 1

Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5180	8.45	-1.49	0.01	9.93	13	-3.07
Mid	5200	6.97	-2.37	0.01	9.33	13	-3.67
High	5240	6.49	-2.93	0.01	9.41	13	-3.59

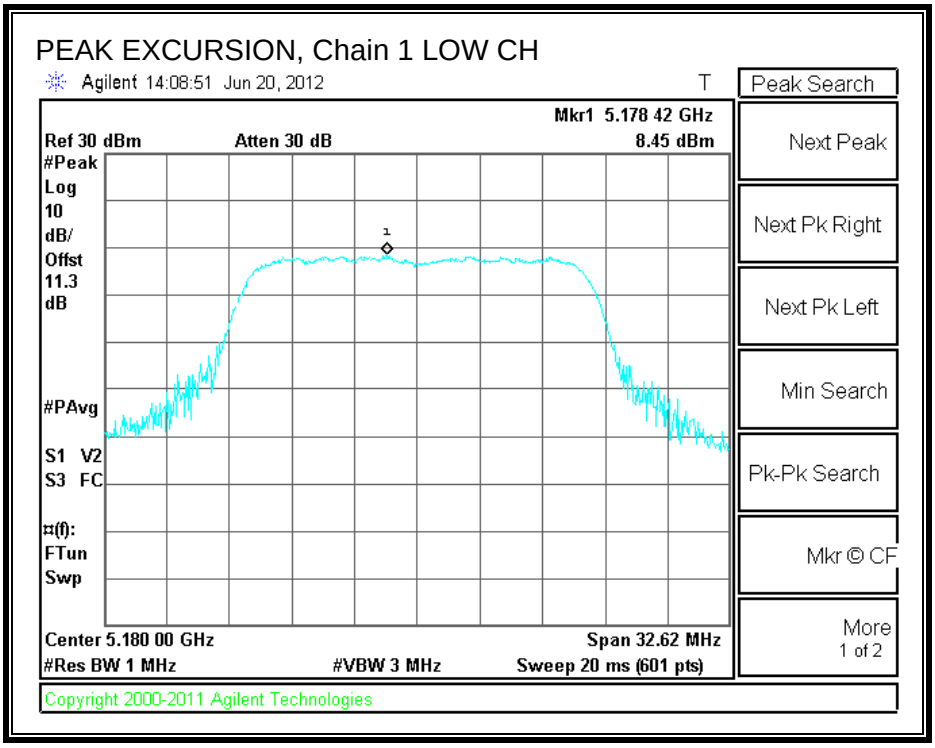
PEAK EXCURSION, Chain 0

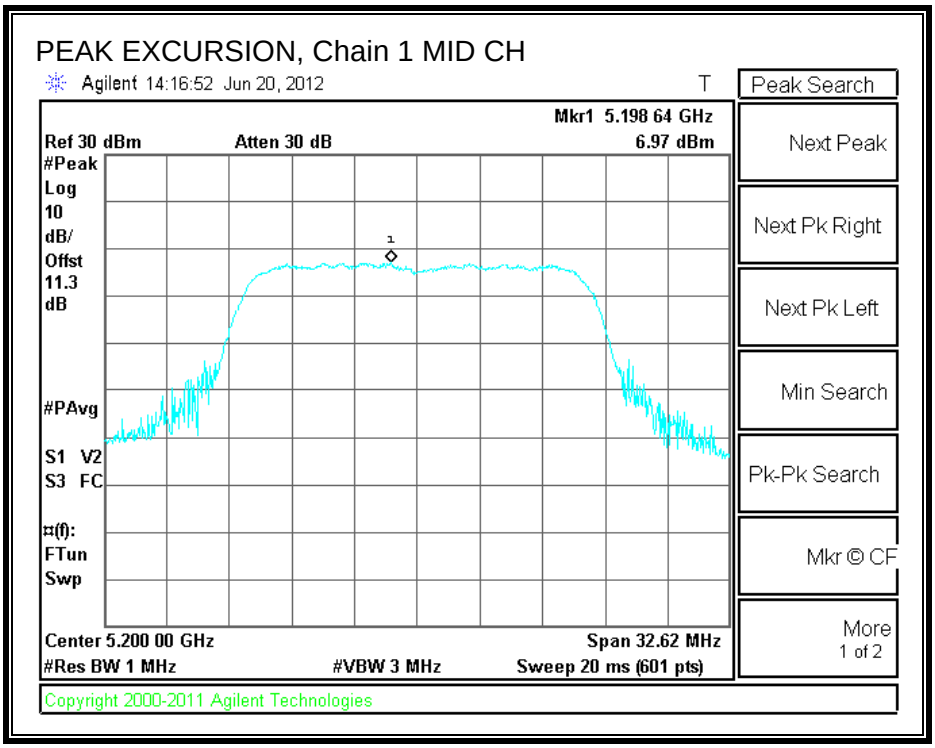


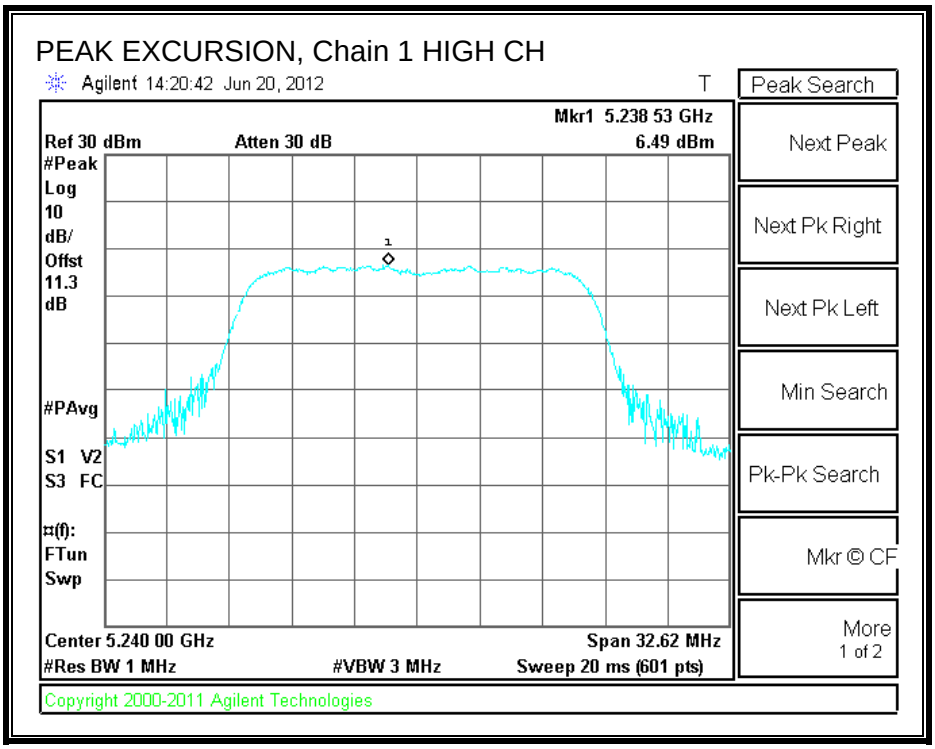




PEAK EXCURSION, Chain 1







9.4. 802.11n HT40 MODE IN THE 5.2 GHz BAND

9.4.1. 26 dB BANDWIDTH

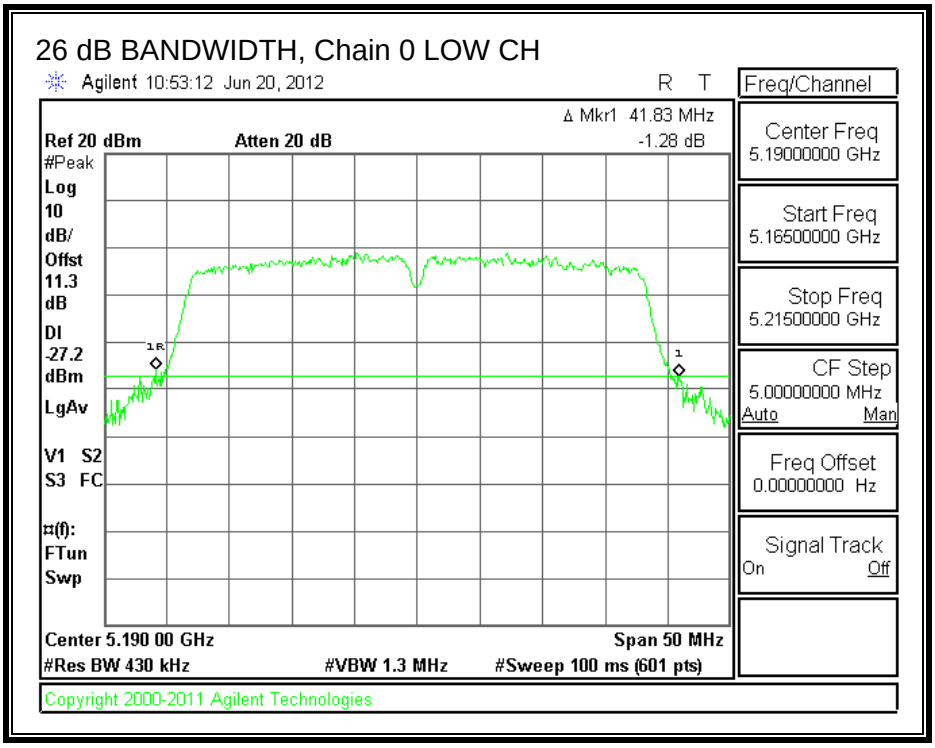
LIMITS

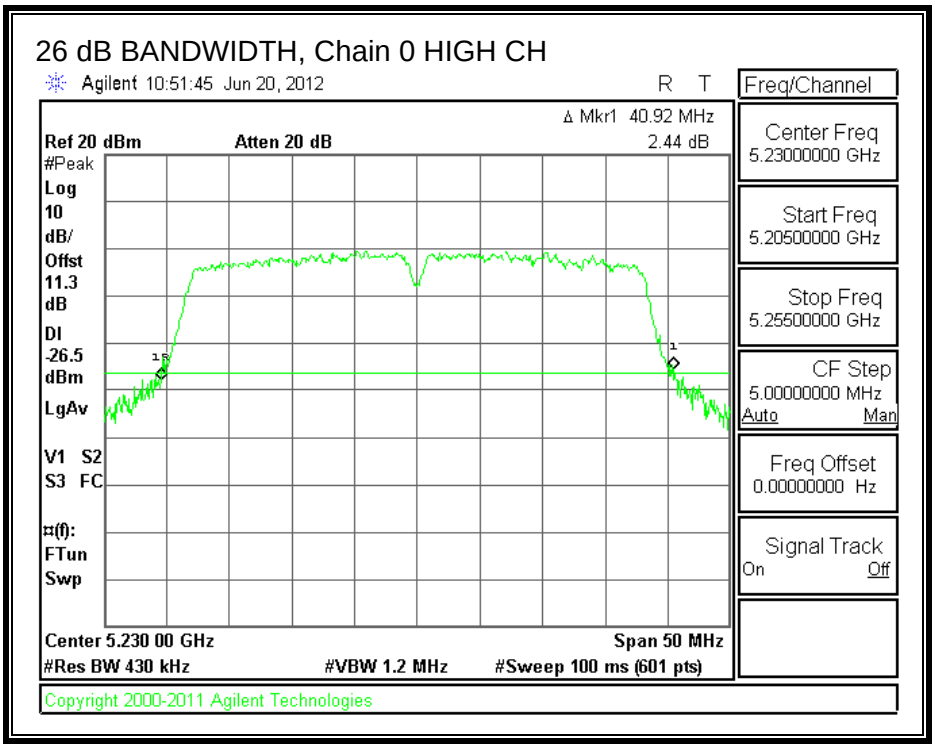
None; for reporting purposes only.

RESULTS

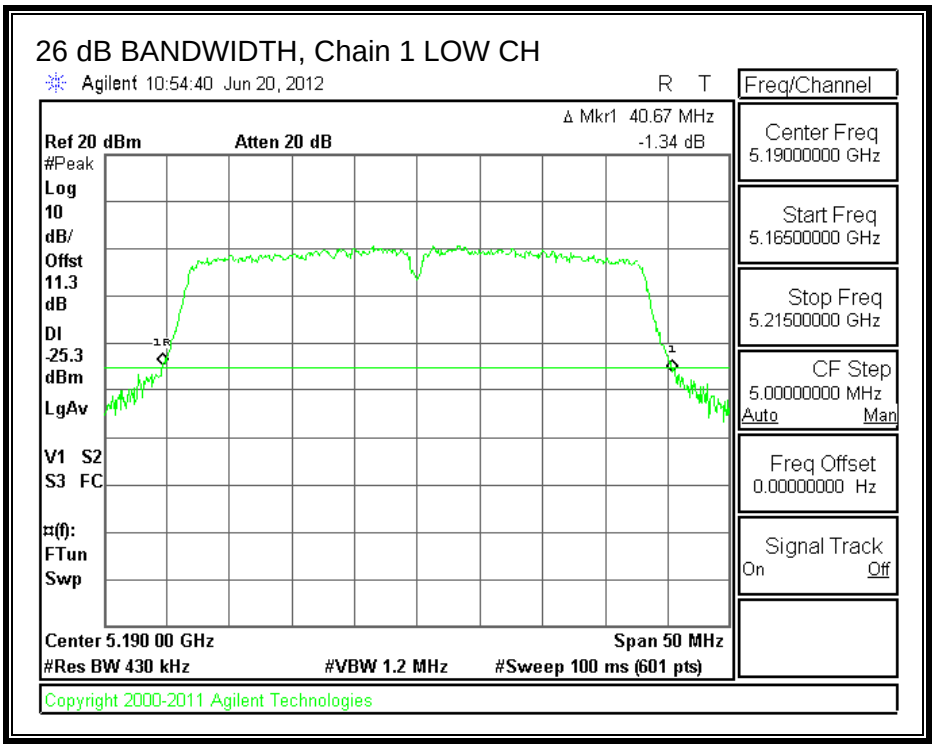
Channel	Frequency (MHz)	26 dB BW Chain 0 (MHz)	26 dB BW Chain 1 (MHz)
Low	5190	41.83	40.67
High	5230	40.92	41.25

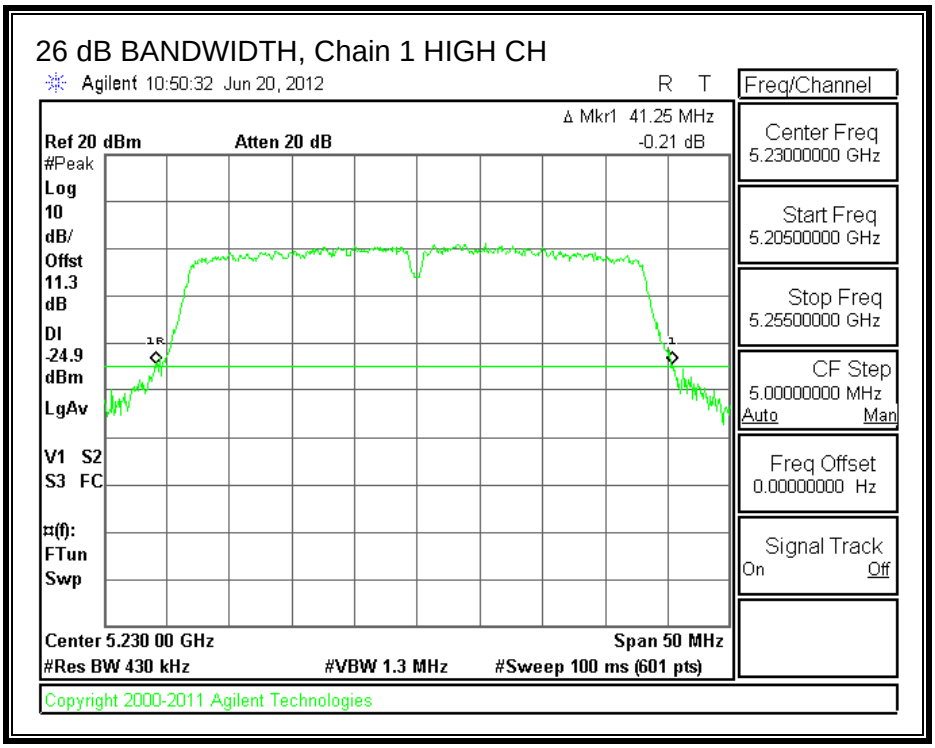
26 dB BANDWIDTH, Chain 0





26 dB BANDWIDTH, Chain 1





9.4.2. 99% BANDWIDTH

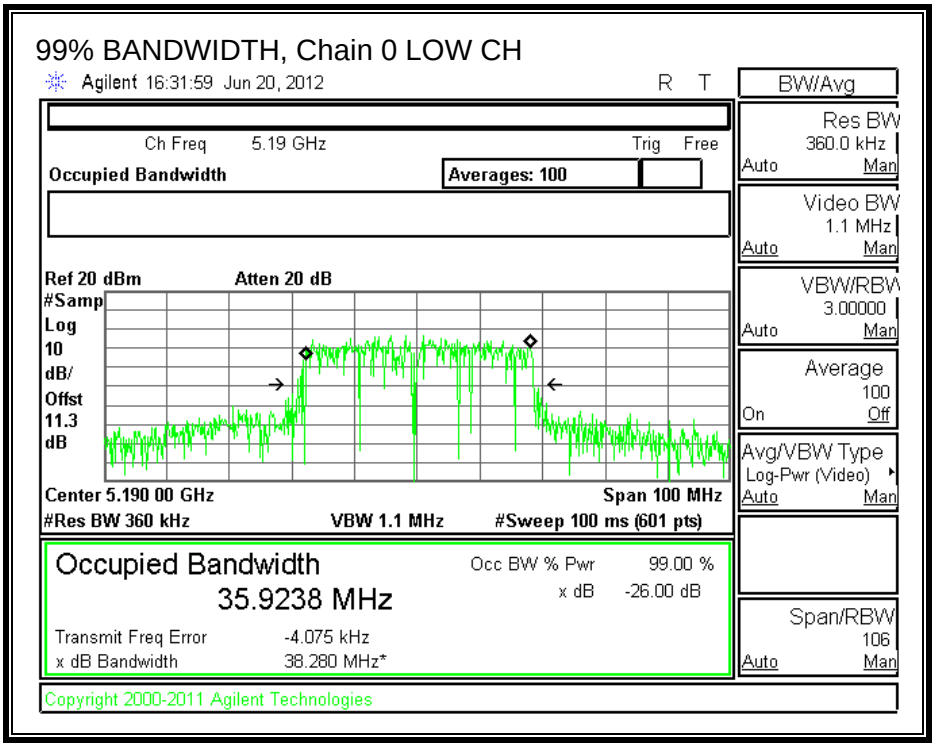
LIMITS

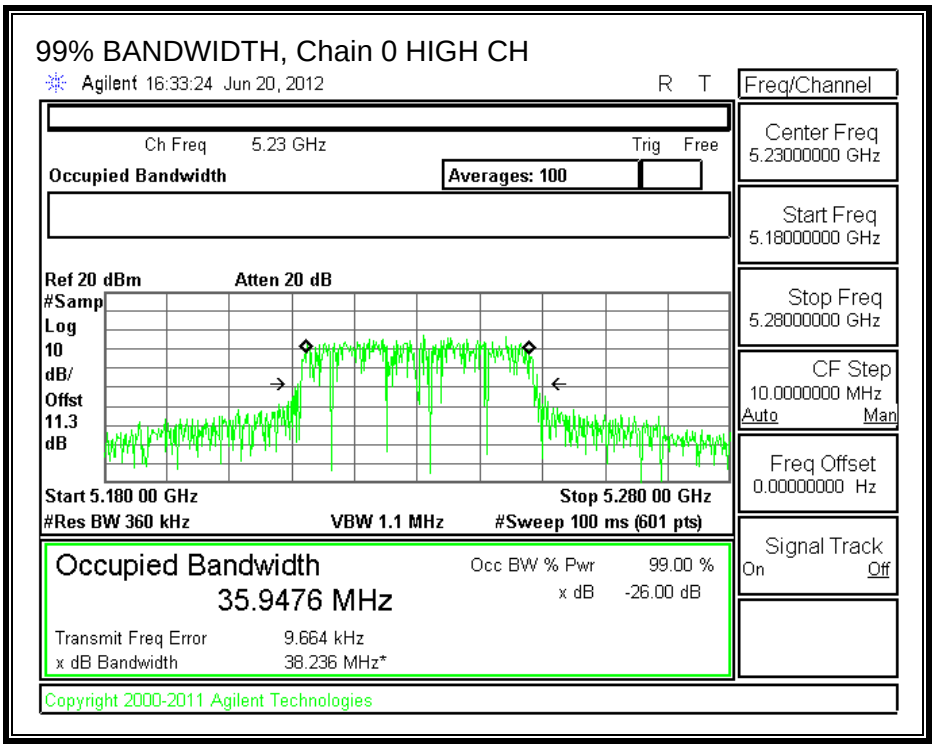
None; for reporting purposes only.

RESULTS

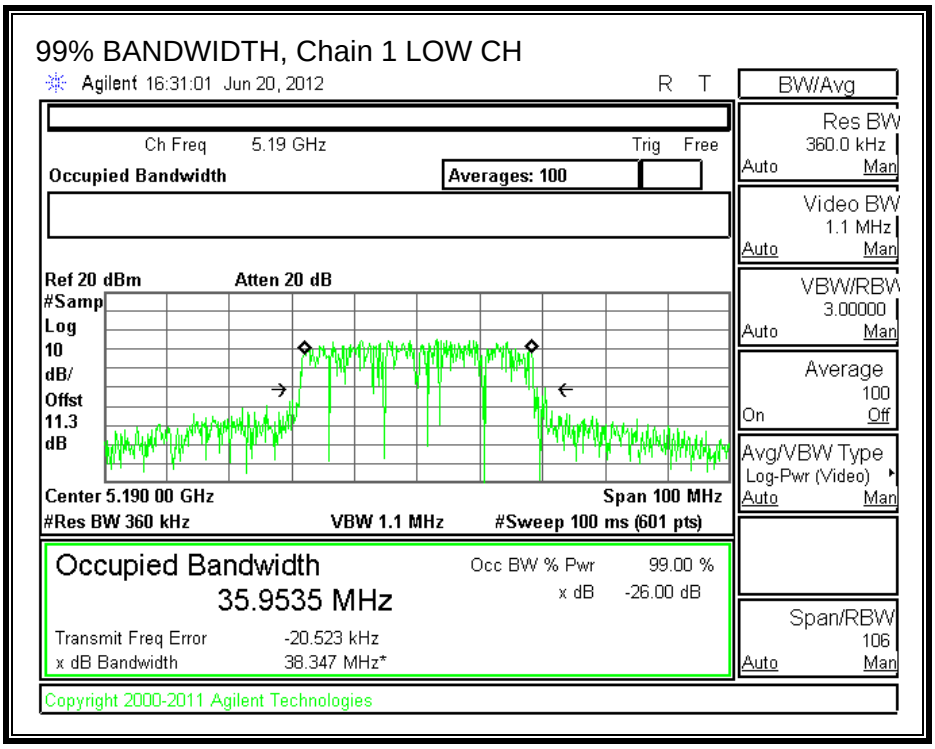
Channel	Frequency (MHz)	99% BW Chain 0 (MHz)	99% BW Chain 1 (MHz)
Low	5190	35.9238	35.9535
High	5230	35.9476	35.9343

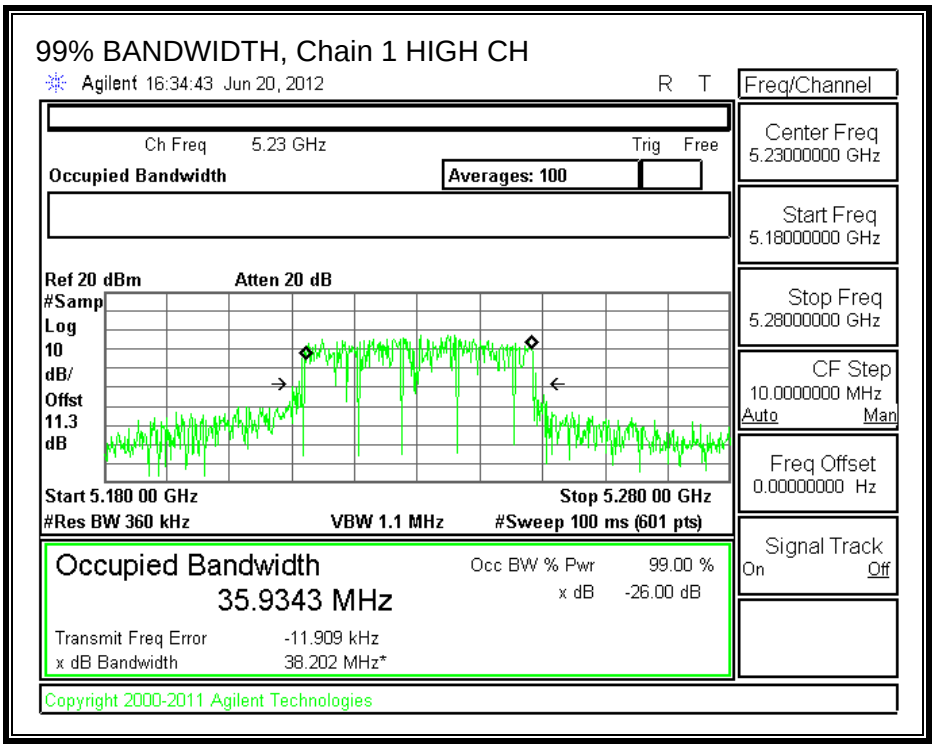
99% BANDWIDTH, Chain 0





99% BANDWIDTH, Chain 1





9.4.3. 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 11.3 dB (including 10 dB pad and 1.3 dB cable) 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	10.00	10.20	13.11
High	5230	10.90	10.50	13.71

9.4.4. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1)

IC RSS-210 A9.2 (1)

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):
For the 5.15 – 5.25 GHz band, 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 correlated and the antenna gain is the same for each chain. The directional gain is:

Antenna Gain (dBi)	10 * Log (2 chains) (dB)	Correlated Chains Directional Gain (dBi)
6.00	3.01	9.01

FCC RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	4 + 10 Log B Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5190	17	40.67	20.09	9.01	13.99	0.99
High	5230	17	40.92	20.12	9.01	13.99	0.99

Duty Cycle CF (dB)	0.14	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	9.852	10.418	13.30	13.99	-0.69
High	5230	10.953	10.572	13.92	13.99	-0.07

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	-4.41	-3.81	-0.95	0.99	-1.94
High	5230	-3.32	-3.72	-0.36	0.99	-1.35

IC RESULTS

Limits

Channel	Frequency (MHz)	Fixed Limit (dBm)	B (MHz)	10 + 10 Log B EIRP Limit (dBm)	Directional Gain (dBi)	Power Limit (dBm)	PPSD Limit (dBm)
Low	5190	17	35.92	25.55	9.01	13.99	0.99
High	5230	17	35.93	25.56	9.01	13.99	0.99

Duty Cycle CF (dB)	0.14	Included in Calculations of Corr'd Power & PPSD

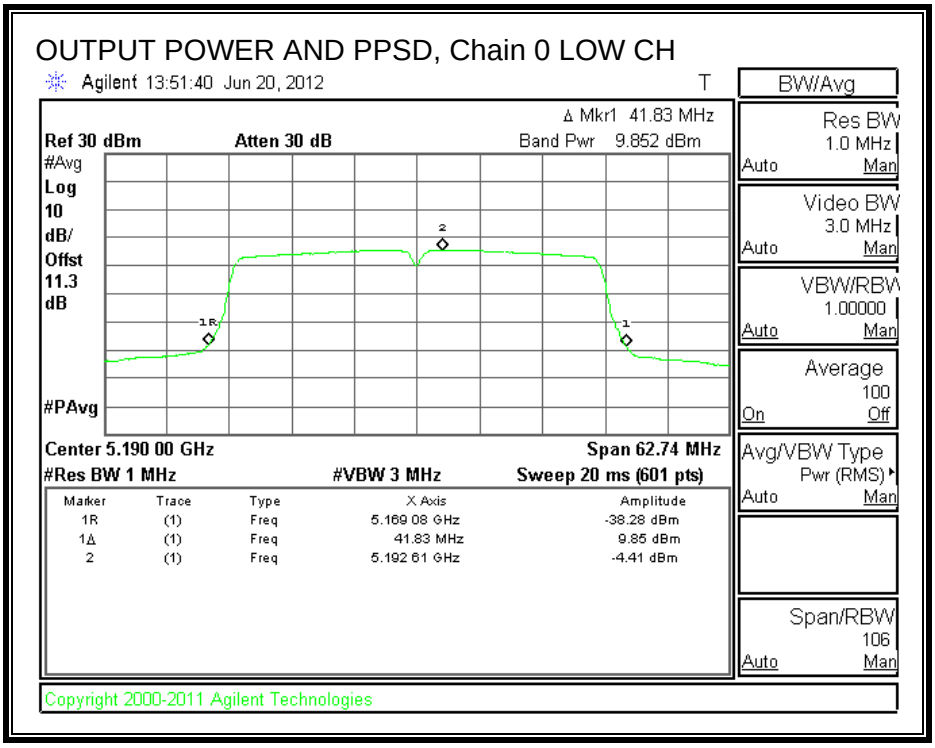
Output Power Results

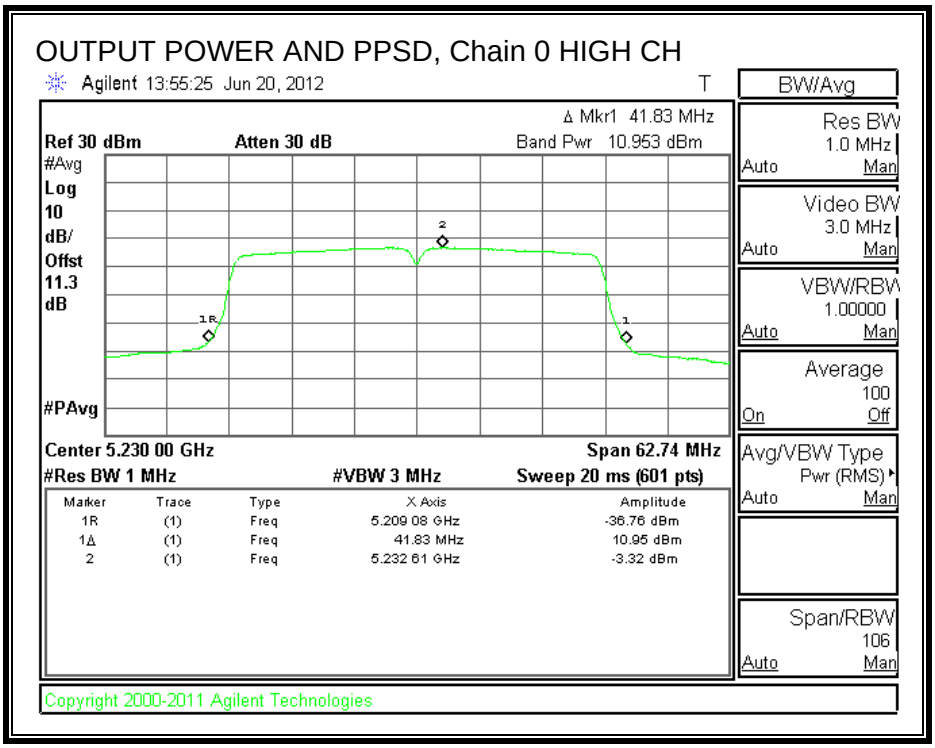
Channel	Frequency (MHz)	Chain 0 Meas Power (dBm)	Chain 1 Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Power Margin (dB)
Low	5190	9.852	10.418	13.30	13.99	-0.69
High	5230	10.953	10.572	13.92	13.99	-0.07

PPSD Results

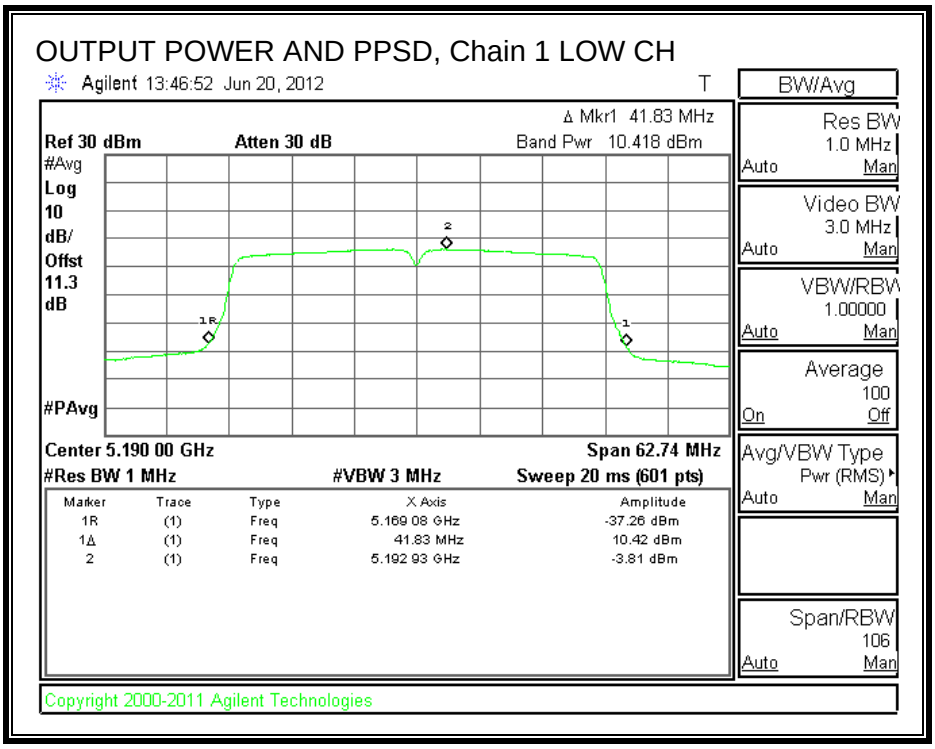
Channel	Frequency (MHz)	Chain 0 Meas PPSD (dBm)	Chain 1 Meas PPSD (dBm)	Total Corr'd PPSD (dBm)	PPSD Limit (dBm)	PPSD Margin (dB)
Low	5190	-4.41	-3.81	-0.95	0.99	-1.94
High	5230	-3.32	-3.72	-0.36	0.99	-1.35

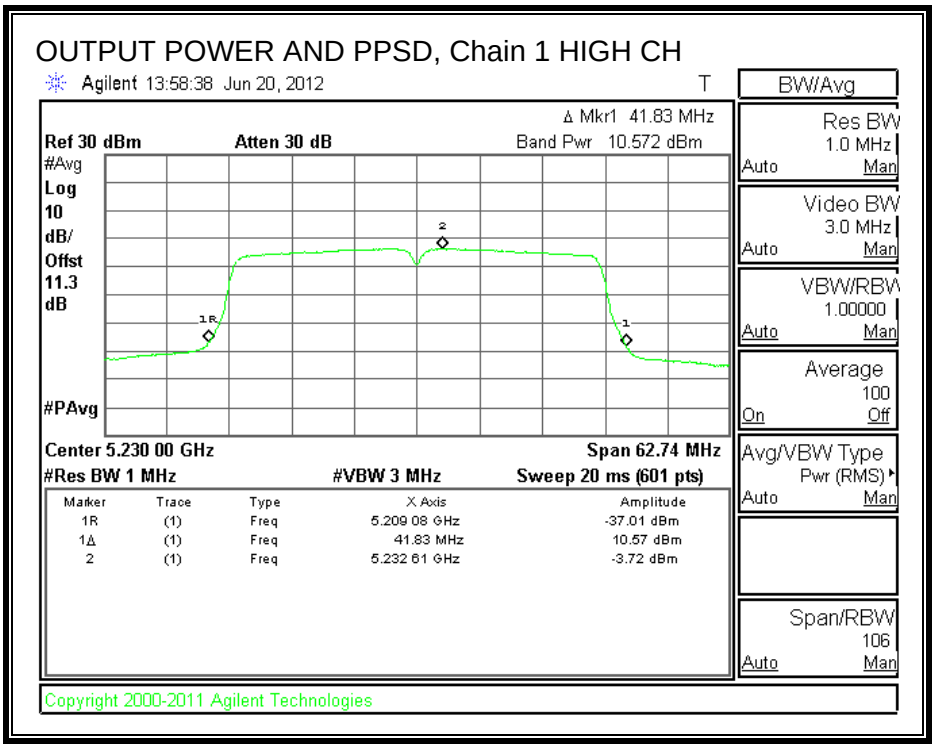
OUTPUT POWER AND PPSD, Chain 0





OUTPUT POWER AND PPSD, Chain 1





9.4.5. 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

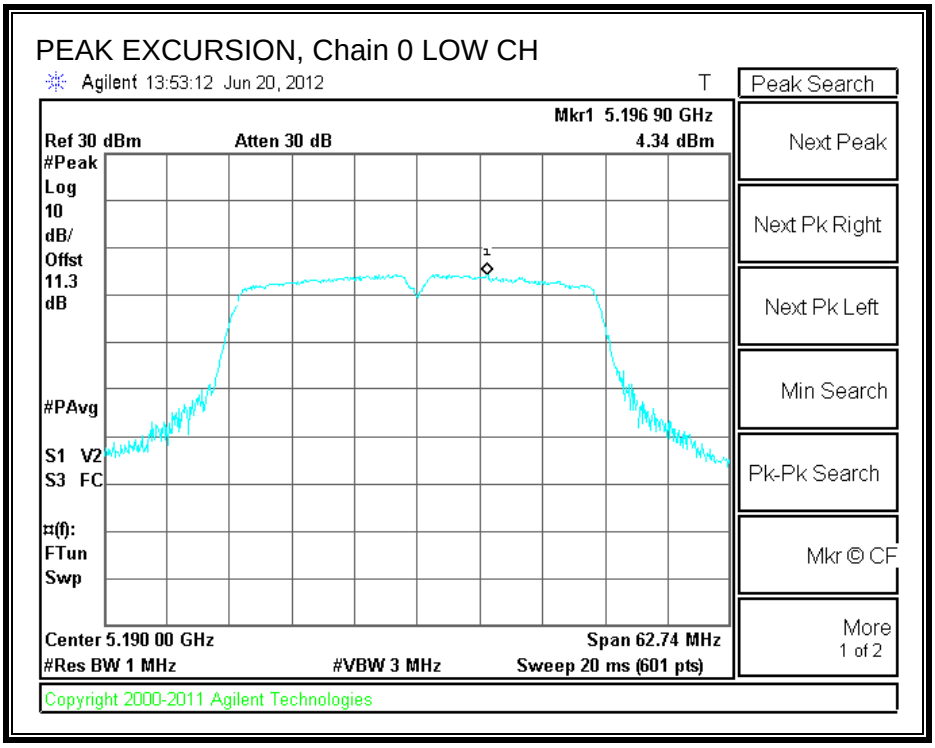
Chain 0

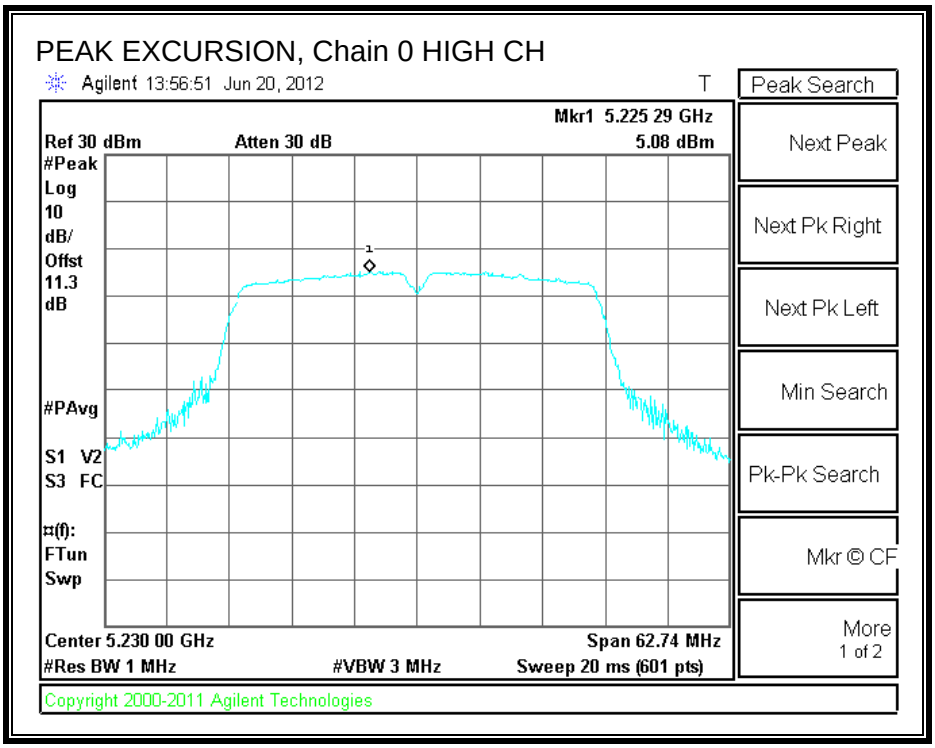
Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5190	4.34	-4.41	0.14	8.61	13	-4.39
High	5230	5.08	-3.32	0.14	8.26	13	-4.74

Chain 1

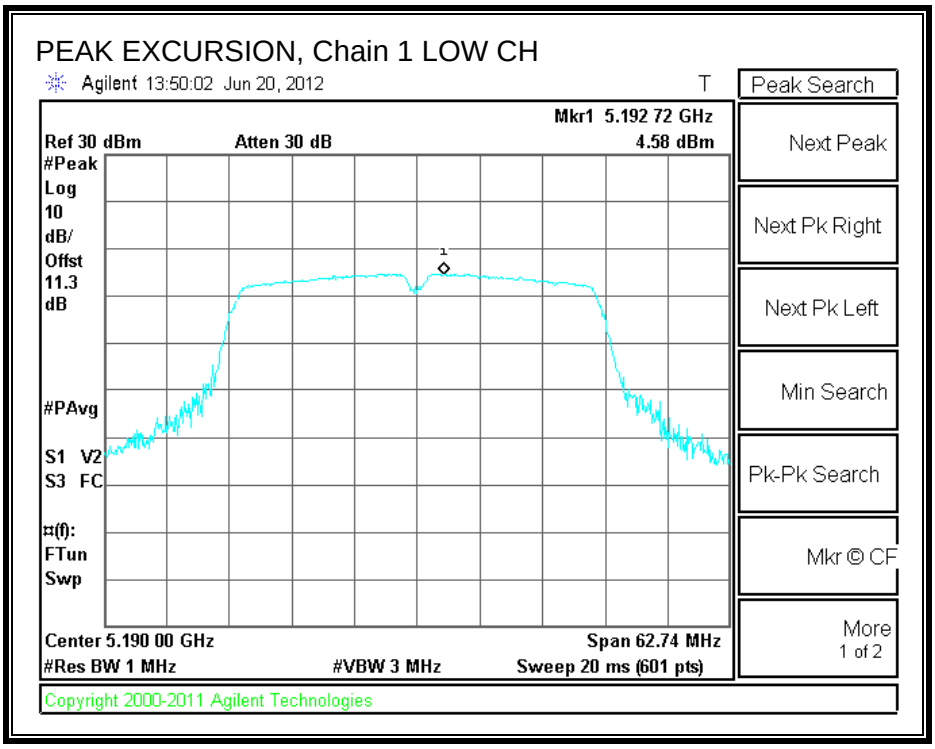
Channel	Frequency (MHz)	PK Level (dBm)	PSD (dBm)	DCCF (dB)	Peak Excursion (dB)	Limit (dB)	Margin (dB)
Low	5190	4.58	-3.81	0.14	8.25	13	-4.75
High	5230	4.73	-3.72	0.14	8.31	13	-4.69

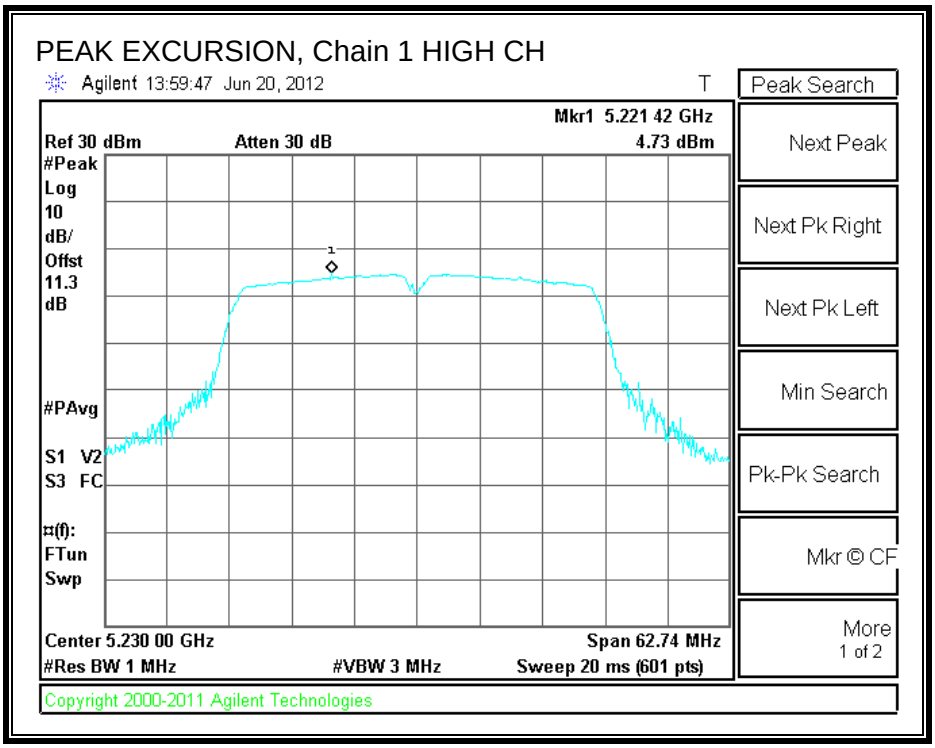
PEAK EXCURSION, Chain 0





PEAK EXCURSION, Chain 1





10. RADIATED TEST RESULTS

10.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

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

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane. The antenna to EUT distance is 3 meters.

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

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

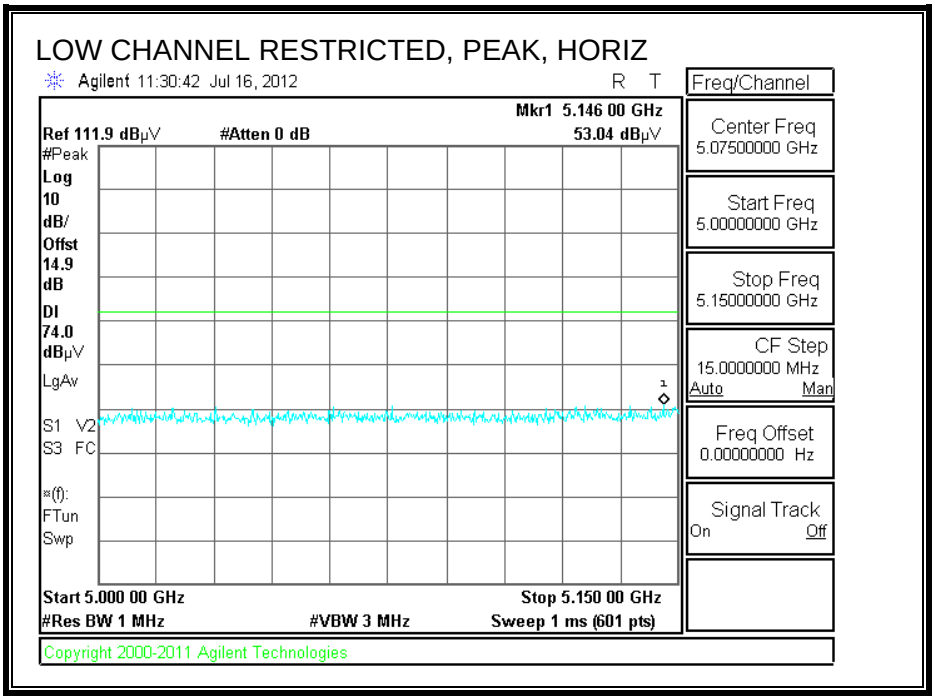
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

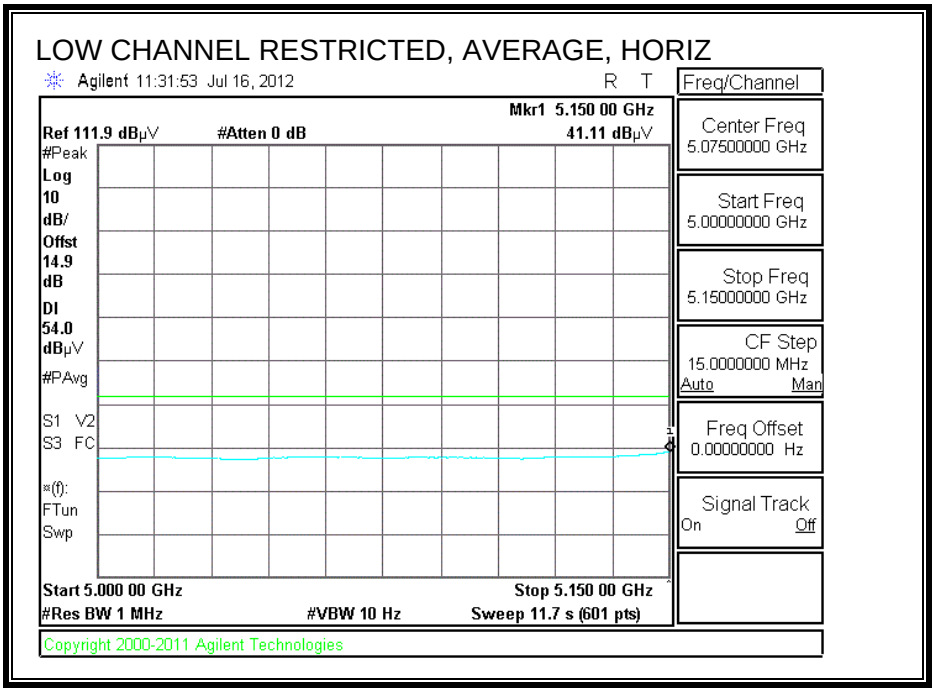
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

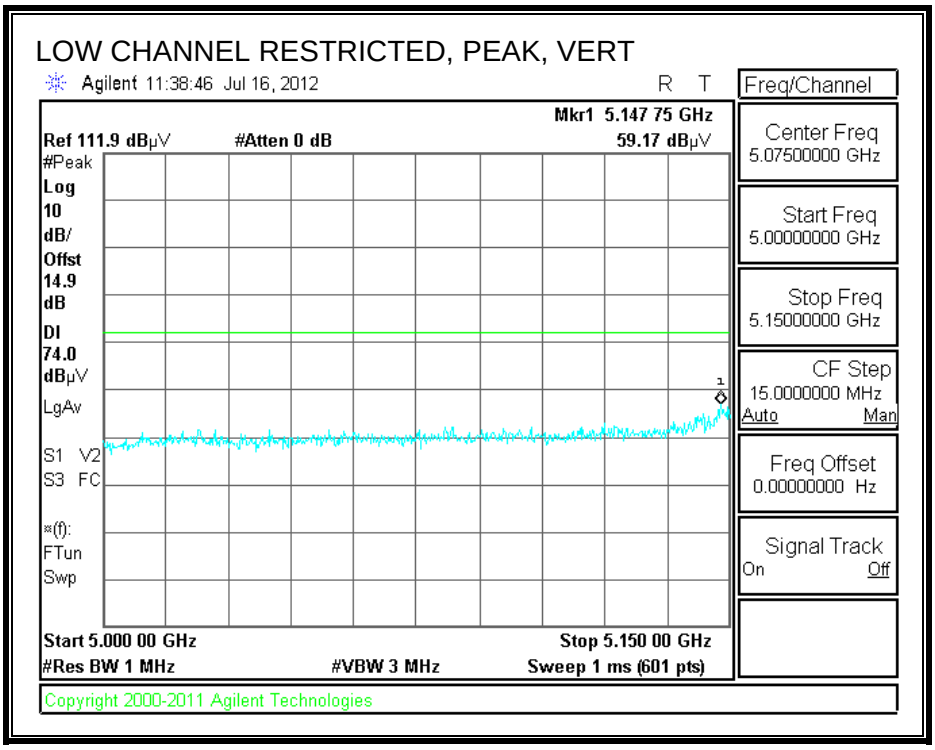
10.2. TRANSMITTER ABOVE 1 GHz

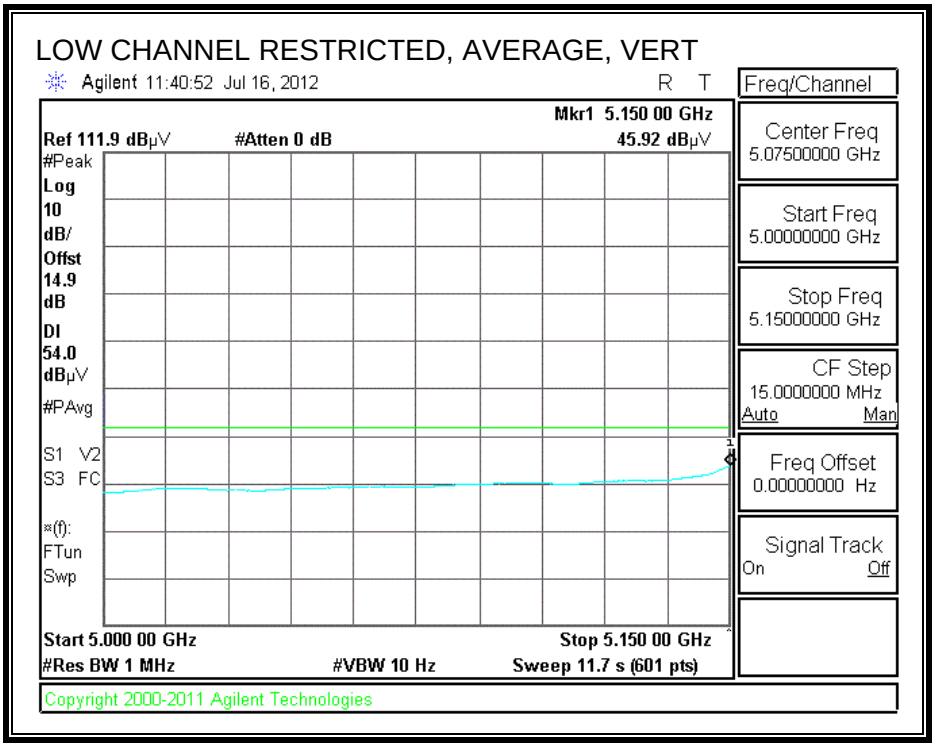
10.3. TX ABOVE 1 GHz 802.11a MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)









HARMONICS AND SPURIOUS EMISSIONS

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

Company: Cisco
Project #: 12U14476
Date: 7/17/2012
Test Engineer: David Garcia
Configuration: EUT, Laptop
Mode: 11a, SISO, 6mb/s

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

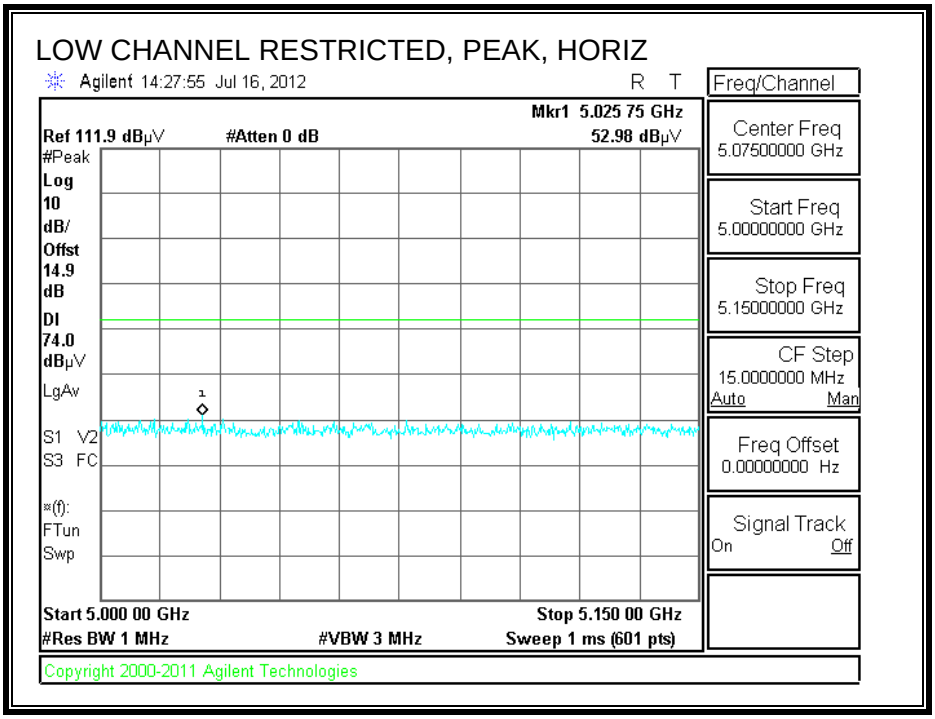
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Channel: 5180 MHz															
15.540	3.0	36.7	27.0	39.0	12.2	-34.0	0.0	0.0	53.8	44.2	74	54	-20.2	-9.8	V
15.540	3.0	34.8	25.5	39.0	12.2	-34.0	0.0	0.0	52.0	42.7	74	54	-22.0	-11.3	H
Middle Channel: 5200 MHz															
15.600	3.0	36.2	25.6	38.8	12.2	-34.0	0.0	0.0	53.3	42.7	74	54	-20.7	-11.3	V
15.600	3.0	34.8	25.0	38.8	12.2	-34.0	0.0	0.0	51.8	42.0	74	54	-22.2	-12.0	H
High Channel: 5240 MHz															
15.720	3.0	35.6	25.0	25.1	12.3	-34.0	0.0	0.0	39.0	28.4	74	54	-35.0	-25.6	V
15.720	3.0	35.3	24.5	38.4	12.3	-34.0	0.0	0.0	52.0	41.3	74	54	-22.0	-12.7	H

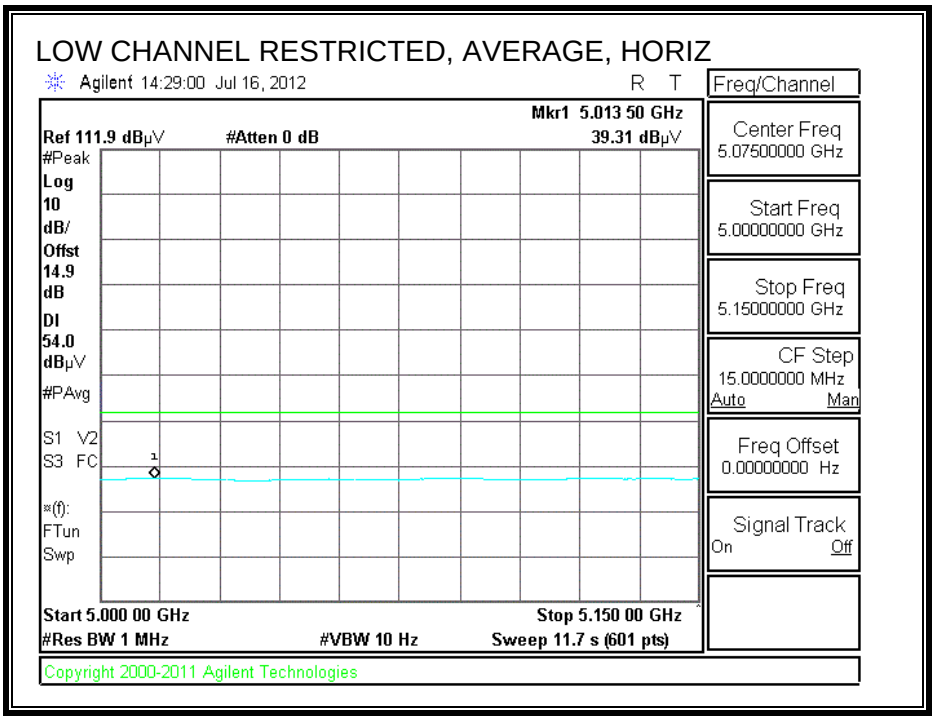
Rev. 11.10.11

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

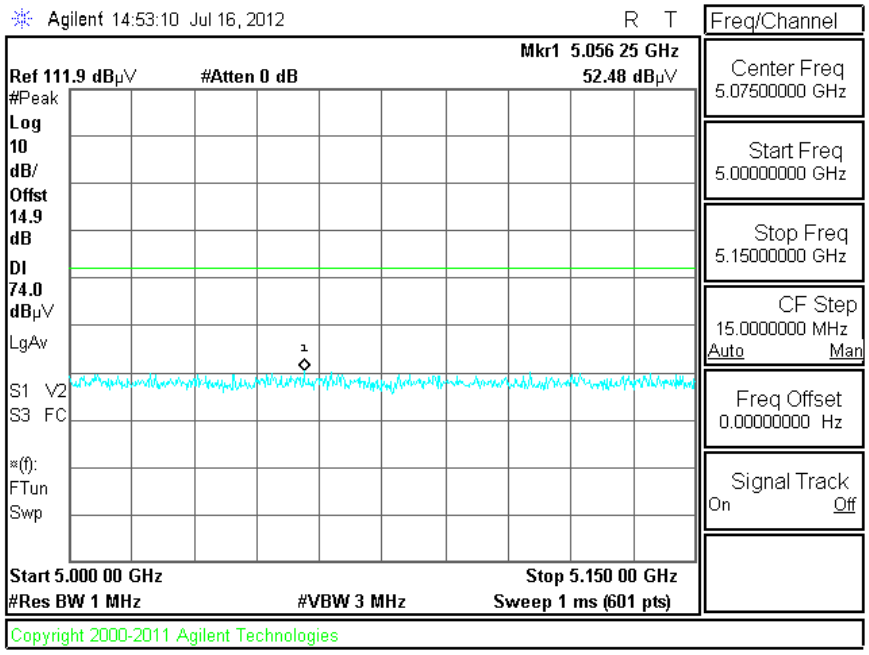
10.4. TX ABOVE 1 GHz 802.11a BEAM FORMING MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)

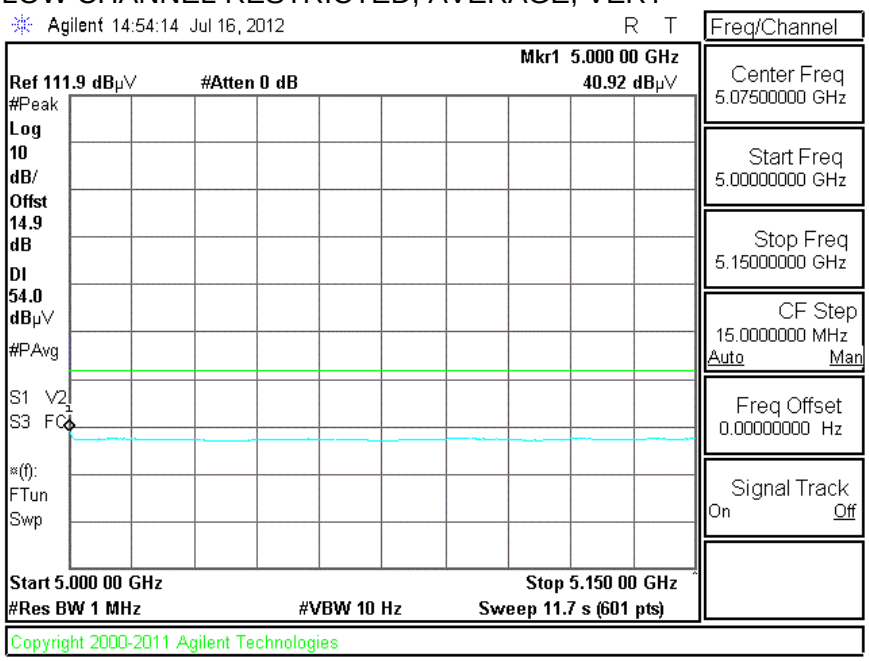




LOW CHANNEL RESTRICTED, PEAK, VERT



LOW CHANNEL RESTRICTED, AVERAGE, VERT



HARMONICS AND SPURIOUS EMISSIONS

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

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Test Engineer: David Garcia
Configuration: EUT, Laptop
Mode: 11a, Beam Forming, 6mb/s

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

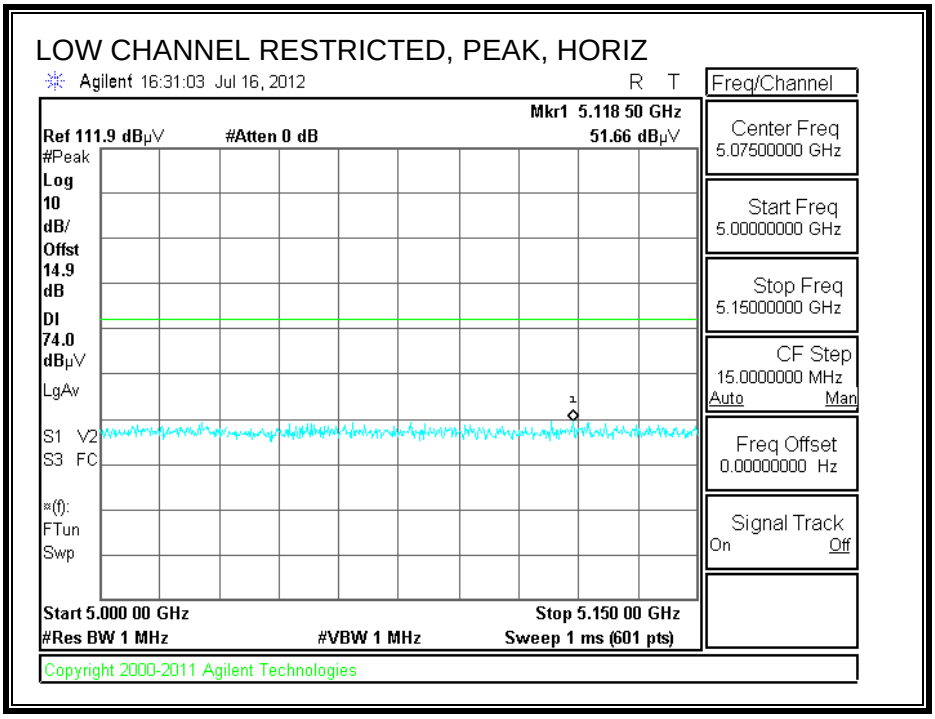
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Channel: 5180 MHz															
15.540	3.0	35.2	25.9	39.0	12.2	-34.0	0.0	0.0	52.4	43.1	74	54	-21.6	-10.9	V
15.540	3.0	34.6	25.2	39.0	12.2	-34.0	0.0	0.0	51.7	42.3	74	54	-22.3	-11.7	H
Middle Channel: 5200 MHz															
15.600	3.0	36.1	25.0	38.8	12.2	-34.0	0.0	0.0	53.1	42.0	74	54	-20.9	-12.0	V
15.600	3.0	35.2	24.5	38.8	12.2	-34.0	0.0	0.0	52.3	41.6	74	54	-21.7	-12.4	H
High Channel: 5240 MHz															
15.720	3.0	35.6	25.1	25.1	12.3	-34.0	0.0	0.0	39.0	28.5	74	54	-35.0	-25.5	V
15.720	3.0	35.4	25.0	38.4	12.3	-34.0	0.0	0.0	52.1	41.7	74	54	-21.9	-12.3	H

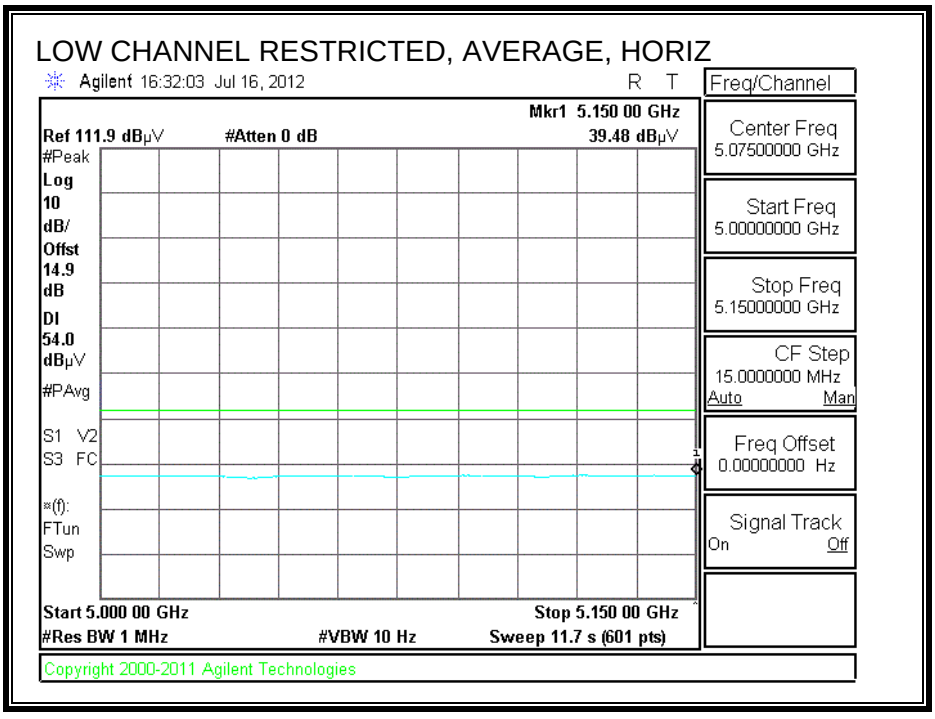
Rev. 11.10.11

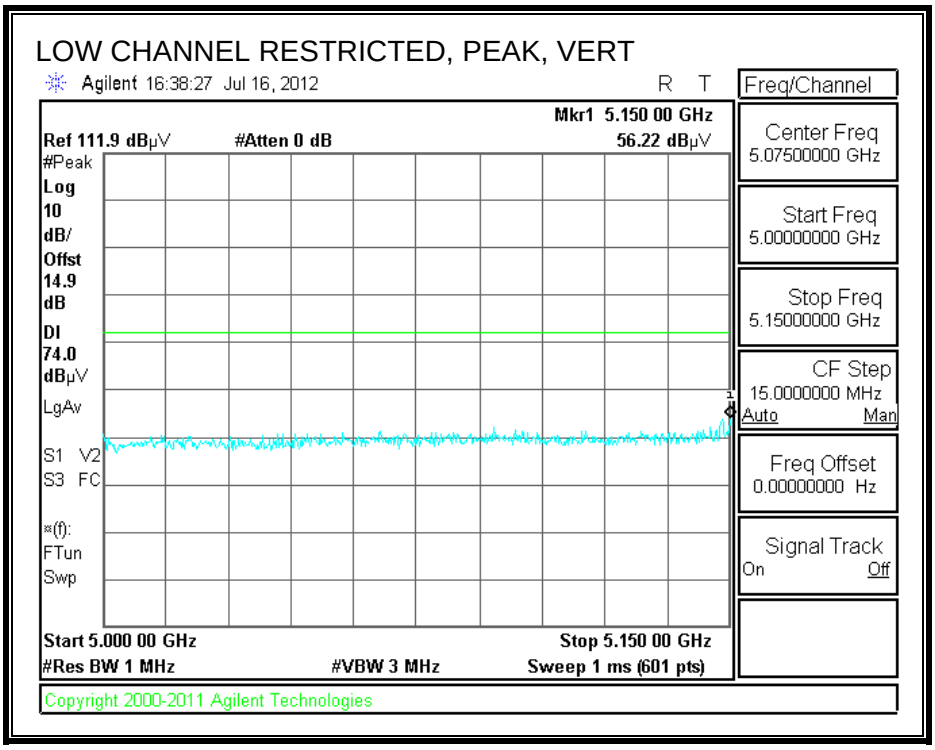
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

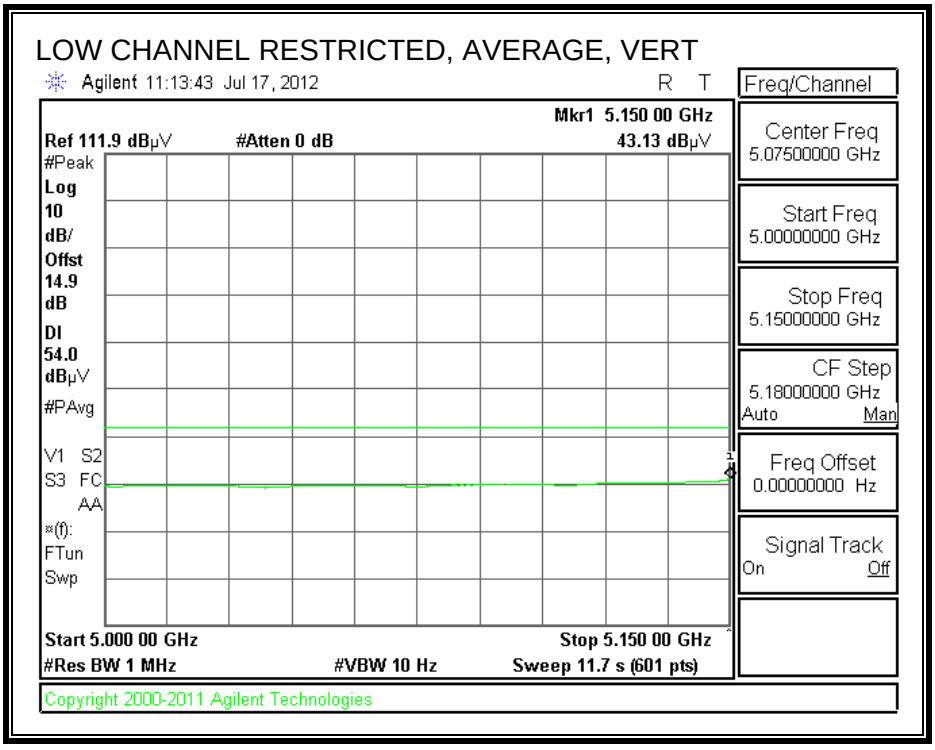
10.5. TX ABOVE 1 GHz 802.11n HT20 MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)









HARMONICS AND SPURIOUS EMISSIONS

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

Company: Cisco
Project #: 12U14476
Date: 7/17/2012
Test Engineer: David Garcia
Configuration: EUT, Laptop
Mode: 11n, HT20 MIMO, MCS0

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

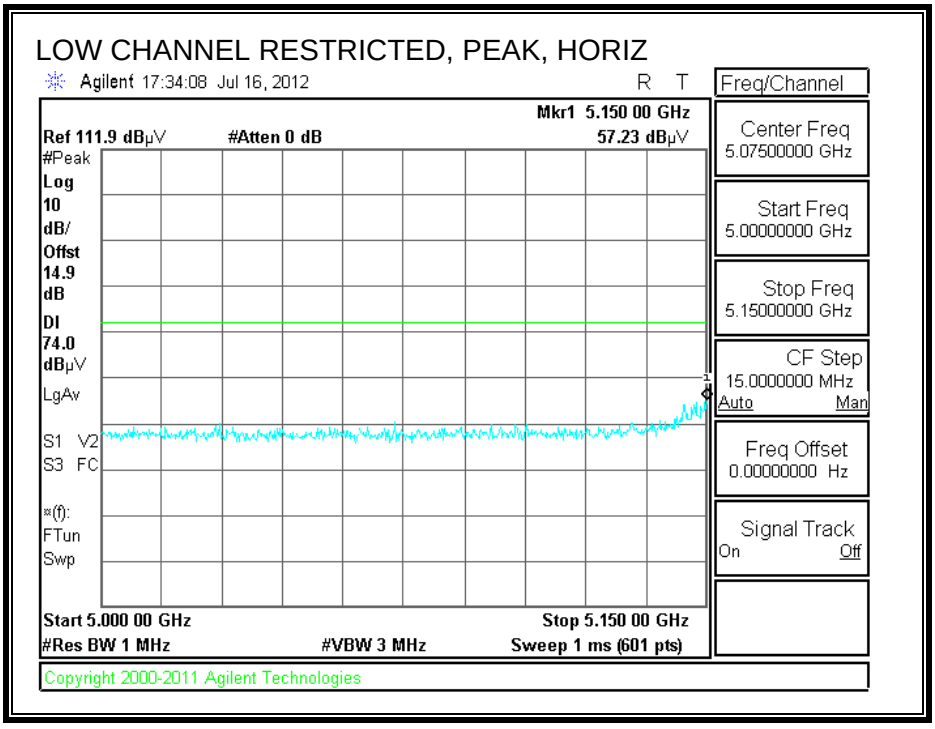
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Channel: 5180 MHz															
15.540	3.0	36.0	25.7	39.0	12.2	-34.0	0.0	0.0	53.2	42.9	74	54	-20.8	-11.1	V
15.540	3.0	35.3	25.1	39.0	12.2	-34.0	0.0	0.0	52.5	42.3	74	54	-21.5	-11.7	H
Middle Channel: 5200 MHz															
15.600	3.0	35.4	25.2	38.8	12.2	-34.0	0.0	0.0	52.4	42.2	74	54	-21.6	-11.8	V
15.600	3.0	35.1	25.0	38.8	12.2	-34.0	0.0	0.0	52.2	42.1	74	54	-21.8	-11.9	H
High Channel: 5240 MHz															
15.720	3.0	35.6	25.3	25.1	12.3	-34.0	0.0	0.0	39.0	28.7	74	54	-35.0	-25.3	V
15.720	3.0	35.0	24.9	38.4	12.3	-34.0	0.0	0.0	51.7	41.7	74	54	-22.3	-12.3	H

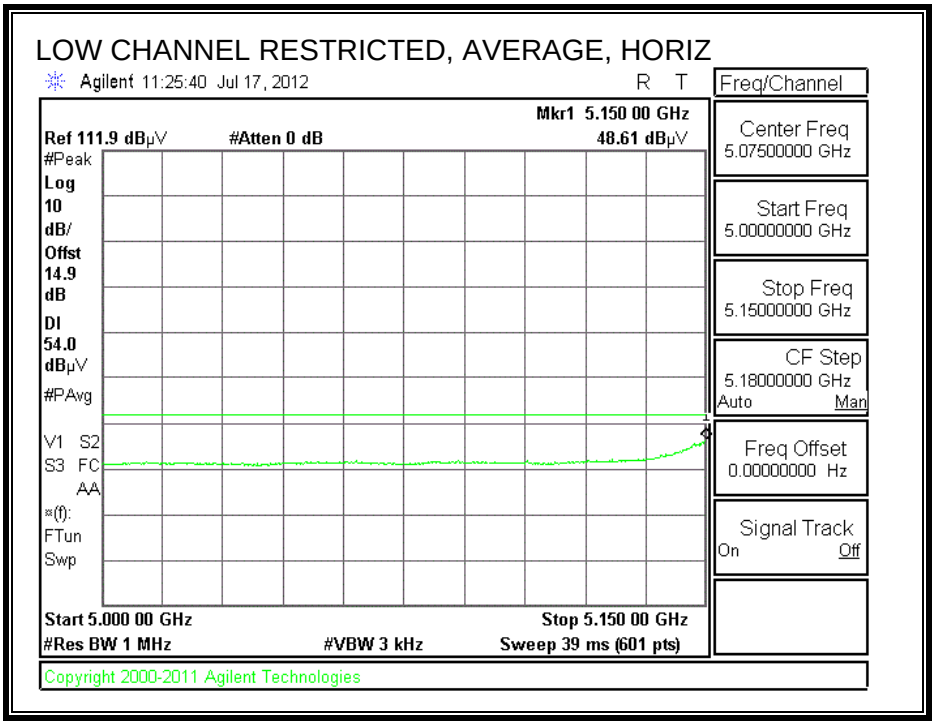
Rev. 11.10.11

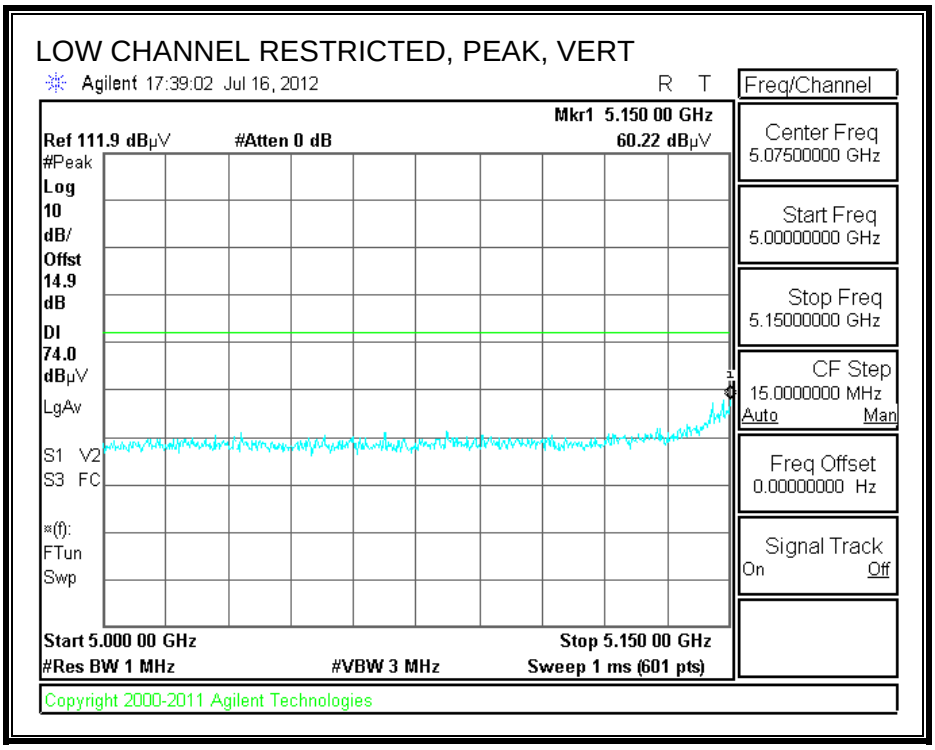
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

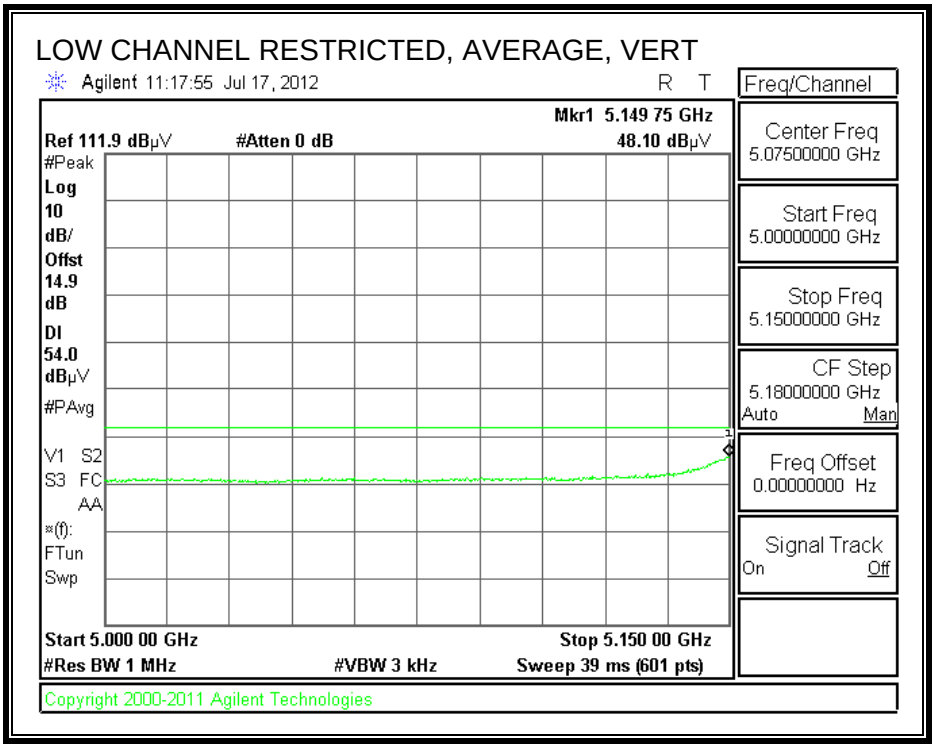
10.6. TX ABOVE 1 GHz 802.11n HT40 MODE IN THE 5.2 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL)









HARMONICS AND SPURIOUS EMISSIONS

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

Company: Cisco
Project #: 12U14476
Date: 7/17/2012
Test Engineer: David Garcia
Configuration: EUT, Laptop
Mode: 11n, HT40 MIMO, MCS8

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T144 Miteq 3008A00931			FCC 15.205

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		R_001

Peak Measurements
RBW=VBW=1MHz
Average Measurements
RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Channel: 5190 MHz															
15.570	3.0	35.9	25.4	38.9	12.2	-34.0	0.0	0.0	53.0	42.5	74	54	-21.0	-11.5	V
15.570	3.0	35.1	25.0	38.9	12.2	-34.0	0.0	0.0	52.2	42.1	74	54	-21.8	-11.9	H
High Channel: 5230 MHz															
15.690	3.0	35.7	25.2	25.1	12.3	-34.0	0.0	0.0	39.1	28.5	74	54	-34.9	-25.5	V
15.690	3.0	34.9	24.9	38.5	12.3	-34.0	0.0	0.0	51.7	41.7	74	54	-22.3	-12.3	H

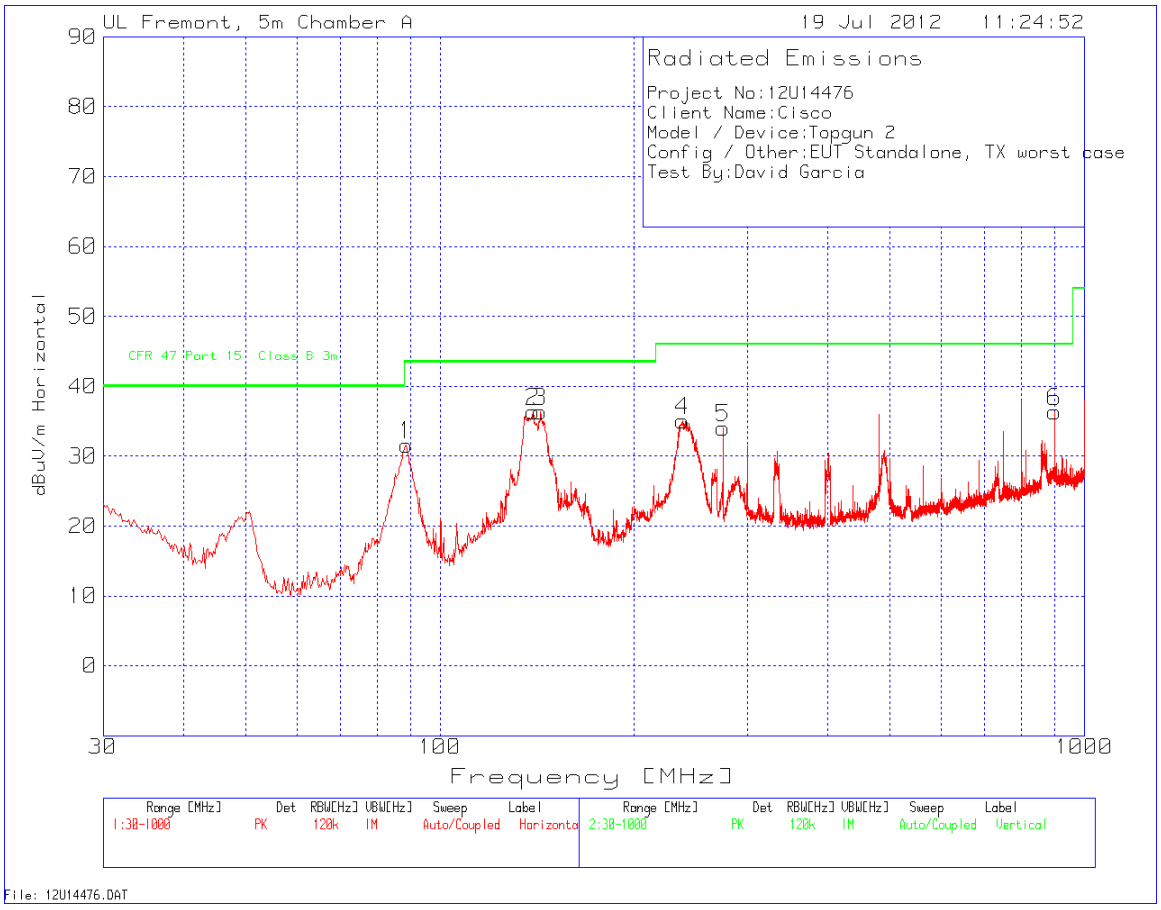
Rev. 11.10.11

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

10.7. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



VERTICAL PLOT

HORIZONTAL AND VERTICAL DATA

Project No:	12U14476
Client Name:	Cisco
Model / Device:	Topgun 2
Config / Other:	EUT Standalone, TX worst case
Test By:	David Garcia

Test Frequency	Meter Reading	Detector	25MHz-1GHz ChmbrA Amplified.TX (dB)	T243 Sunol Bilog.TXT (dB)	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Polarity
88.735	51.14	PK	-27.0	7.5	31.64	43.5	-11.86	Horz
139.5224	50.31	PK	-26.7	12.8	36.41	43.5	-7.09	Horz
143.2054	50.34	PK	-26.6	12.6	36.34	43.5	-7.16	Horz
237.8018	49.76	PK	-26.0	11.3	35.06	46.0	-10.94	Horz
275.02	46.60	PK	-25.9	13.3	34.00	46.0	-12.00	Horz
900.1699	37.60	PK	-23.4	22.2	36.40	46.0	-9.60	Horz
50.3537	53.96	PK	-27.2	7.9	34.66	40.0	-5.34	Vert
88.1535	52.38	PK	-27.0	7.4	32.78	43.5	-10.72	Vert
136.0332	50.25	PK	-26.7	13	36.55	43.5	-6.95	Vert
480.1079	45.07	PK	-25.0	17.3	37.37	46.0	-8.63	Vert
799.952	41.72	PK	-23.3	21	39.42	46.0	-6.58	Vert
1000	40.86	PK	-23.1	23	40.76	54.0	-13.24	Vert

PK - Peak detector
QP - Quasi-Peak detector
Av - Average detector
RMS - RMS detection

11. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

FCC §15.207 (a)

RSS-Gen 7.2.2

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

* Decreases with the logarithm of the frequency.

TEST PROCEDURE

ANSI C63.4

RESULTS

6 WORST EMISSIONS

Project No:	12U14776
Client Name:	Cisco
Model/Device:	Topgun 2
Test Volt/Freq:	120AC/60Hz
Test By:	David Garcia

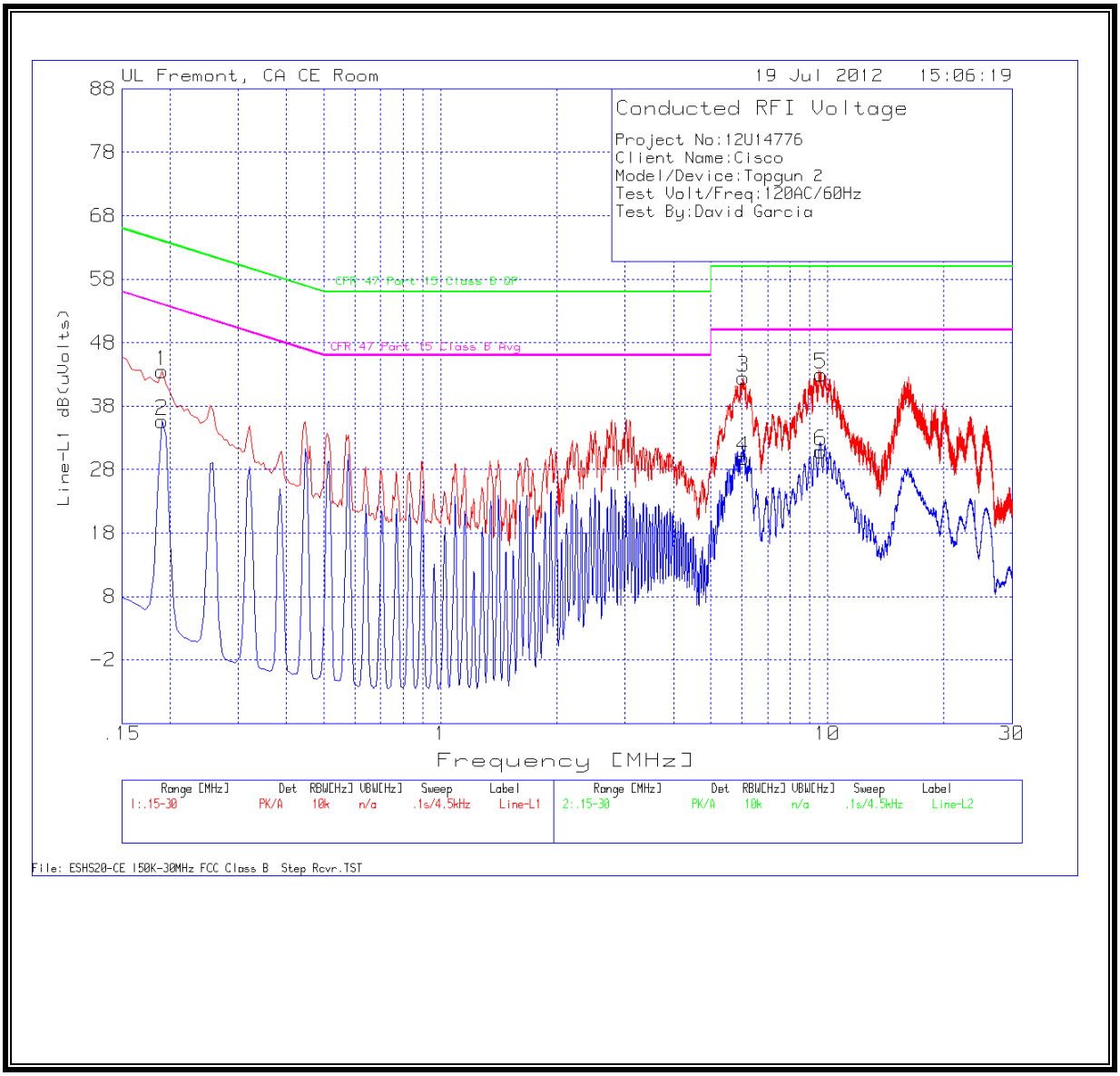
Line-L1 .15 - 30MHz

Test Frequency	Meter Reading	Detector	T24 IL L1.TXT (dB)	LC Cables 1&3.TXT (dB)	dB(uVolts)	CFR 47 Part 15 Class B QP	Margin	CFR 47 Part 15 Class B Avg	Margin
0.1905	43.36	PK	0.1	0.0	43.46	64	-20.54	-	-
0.1905	35.53	Av	0.1	0.0	35.63	-	-	54	-18.37
6.0585	42.31	PK	0.1	0.1	42.51	60	-17.49	-	-
6.0585	29.68	Av	0.1	0.1	29.88	-	-	50	-20.12
9.6405	42.67	PK	0.1	0.2	42.97	60	-17.03	-	-
9.6405	30.60	Av	0.1	0.2	30.9	-	-	50	-19.10

Line-L2 .15 - 30MHz

Test Frequency	Meter Reading	Detector	T24 IL L2.TXT (dB)	LC Cables 2&3.TXT (dB)	dB(uVolts)	CFR 47 Part 15 Class B QP	Margin	CFR 47 Part 15 Class B Avg	Margin
0.1905	44.44	PK	0.1	0.0	44.54	64	-19.46	-	-
0.1905	37.61	Av	0.1	0.0	37.71	-	-	54	-16.29
6.0315	42.64	PK	0.1	0.1	42.84	60	-17.16	-	-
6.0315	31.72	Av	0.1	0.1	31.92	-	-	50	-18.08
9.582	45.98	PK	0.1	0.2	46.28	60	-13.72	-	-
9.582	34.31	Av	0.1	0.2	34.61	-	-	50	-15.39

LINE 1 RESULTS



LINE 2 RESULTS