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

CERTIFICATION TEST REPORT

FOR

PLAYBAR

MODEL NUMBER: PLAYBAR

FCC ID: SBVRM006
IC: 5273A-RM006

REPORT NUMBER: 12U14339-1, Revision B

ISSUE DATE: SEPTEMBER 27, 2012

Prepared for
Sonos, Inc.
223 E. De La Guerra Street
Santa Barbara
CA, 93101, U.S.A.

Prepared by
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	07/02/12	Initial Issue	F. Ibrahim
A	09/25/12	Replaced 11g 1TX data with 11g 3TX data and updated maximum power table in section 5.2	F. Ibrahim
B	09/27/12	Revised sections 7.1.3 and 5.2	F. Ibrahim

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: Sonos, Inc.
223 E. De La Guerra Street
Santa Barbara, CA, 93101, U.S.A.

EUT DESCRIPTION: PLAYBAR

MODEL: PLAYBAR

SERIAL NUMBER: 1205 00-0E-5B-B0-00-16-E (DFS unit 1)
1205 00-0E-5B-B0-00-46-B (DFS unit 2)
1205 00-0E-5B-B0-06-46-B (Conducted Unit)
1207 00-0E-58-B0-06-88-F (EMI Unit)

DATE TESTED: May 05 – September 27, 2012

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

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

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

Approved & Released For UL CCS By:

FRANK IBRAHIM
EMC SUPERVISOR
UL CCS

Tested By:

DAVID GARCIA
EMC ENGINEER
UL CCS

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.10-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15, 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 possesses an 802.11 g/n wireless card. It is a 2.4/5GHz dual band concurrent module based on two Atheros' Osprey chipsets, AR9381 for 2GHz radio and AR9382 for 5GHz radio. The wireless card supports 802.11g,n functionality for 2.4GHz, and 802.11n for 5GHz. The 2.4GHz radio supports (3x3) MIMO, the 5GHz radio support (2x2) MIMO.

The wireless card is manufactured by Alpha Networks, and the model number of this card is WMC-ND06.

5.2. MAXIMUM OUTPUT POWER

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

Frequency Range (MHz)	Mode	Output Power (dBm)	Output Power (mW)
2412 - 2462	802.11g	26.84	483.06
2412 - 2462	802.11n HT20	29.65	922.57
5745 - 5825	802.11n HT20	26.12	409.26

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes the following antenna arrangement. The maximum antenna gains as a function frequency band utilized for FCC 15.247 operation are given in the following table.

	Antenna A	Antenna B	Antenna D
2412-2462MHz	2.9dBi	4.4dBi	3.7dBi
5745-5825MHz	4.3dBi	N/A	5.5dBi
Antenna A: Monopole Antenna B: Monopole Antenna D: Dipole			

5.4. SOFTWARE AND FIRMWARE

The software/firmware version is V3.9 Build 20.2-54240.

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 two orientations that the device can assume: X (oriented to sit on table; Y (oriented to mount on a wall). In both cases the EUT remained in a horizontal orientation. Orienting the EUT such that its longest dimension was aligned vertically caused the unit to shut down. This preliminary investigation resulted in the following worst-case EUT orientations as a frequency band:

2.4GHz band: Y (wall-mount orientation)
5.8GHz band: X (table-top orientation)

Therefore, all final radiated testing was performed with the EUT as described above for the two frequency bands.

Per the client, only the following data rates are supported by the EUT:

802.11g mode: 24 Mbps (16QAM)
802.11n HT20mode, 2.4GHz Band: 26 Mbps (QPSK, MCS9)
802.11n HT20mode, 5.8GHz Band: 26 Mbps (QPSK, MCS9)

5.6. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

Support Equipment List				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
Laptop	IBM	X32	2884A2U	DoC
AC Adapter	IBM	02K6810	11S02K6810Z3BJ59G5KY	DoC

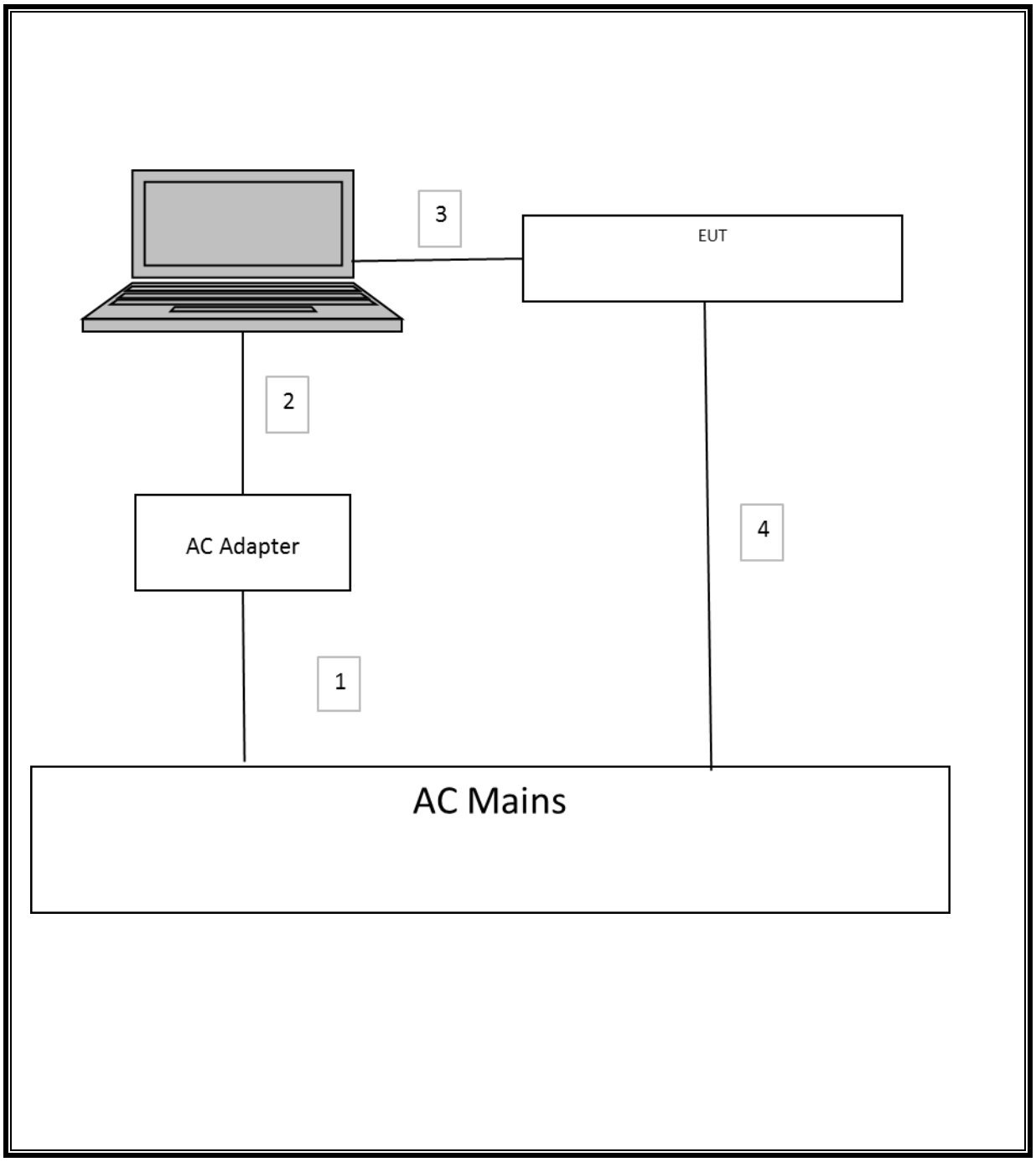
I/O CABLES

I/O Cable List						
Cable No	**Port**	**# of identical ports**	**Connector Type**	**Cable Type**	**Cable Length (m)**	**Remarks**
1	AC	1	AC	Unshielded	1m	
2	DC	1	DC	Unshielded	1.8m	
3	RJ45	2	RJ45	Unshielded	6m	
3	RJ45	2	RJ45	Unshielded	1.8m	
4	AC	1	AC	Unshielded	1.75m	

TEST SETUP

The EUT is a standalone unit with a built in WLAN module. It was connected to a remote laptop PC during tests.

SETUP DIAGRAM FOR TESTS



6. TEST AND MEASUREMENT EQUIPMENT

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

Test Equipment List					
Description	**Manufacturer**	**Model**	**Asset**	**Cal Date**	**Cal Due**
Antenna, Bilog, 30MHz-1 GHz	Sunol Sciences	JB1	C01171	01/26/12	01/26/13
Antenna, Horn, 18 GHz	EMCO	3115	C00872	09/20/11	09/20/12
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00589	07/28/11	07/28/12
Antenna, Horn, 40 GHz	ARA	MWH-2640/B	C00981	06/14/11	06/14/12
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/19/11	08/19/13
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	N02486	03/07/12	03/07/13
LISN, 30 MHz	FCC	50/250-25-2	C00626	12/13/11	12/13/12
Peak / Average Power Sensor	Agilent / HP	E9323A	s/n US40411681	08/04/11	08/04/12
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00558	11/11/11	11/11/12
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C00749	07/18/11	07/18/12
Preamplifier, 40 GHz	Miteq	NSP4000-SP2	C00990	08/02/11	08/02/12
P-Series single channel Power Meter	Agilent / HP	N1911A	s/n GB45100212	08/04/11	08/04/12
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
PSA	Agilent	E4446A	CCS117	03/22/12	03/22/13
30MHz-2Ghz Bi-Log Antenna	Sunol Sciences	JB1	T122	03/22/12	03/22/13
Antenna, Horn, 26.5 GHz	ARA	MWH-1826/B	C00980	08/06/11	10/06/12
Power meter	Agilent	E4416A	PPM3	07/27/12	07/27/13
Power Sensor	Agilent	E932223A	T230	07/26/12	07/26/13

7. ANTENNA PORT TEST RESULTS

7.1. 802.11g THREE CHAINS MODE IN THE 2.4 GHz BAND

7.1.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

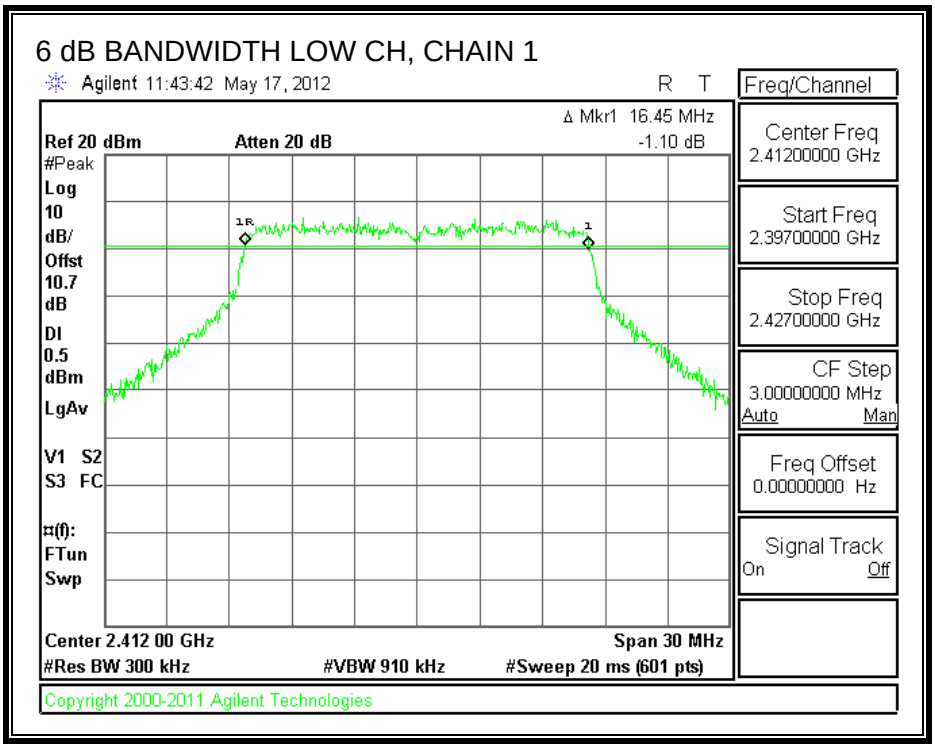
TEST PROCEDURE

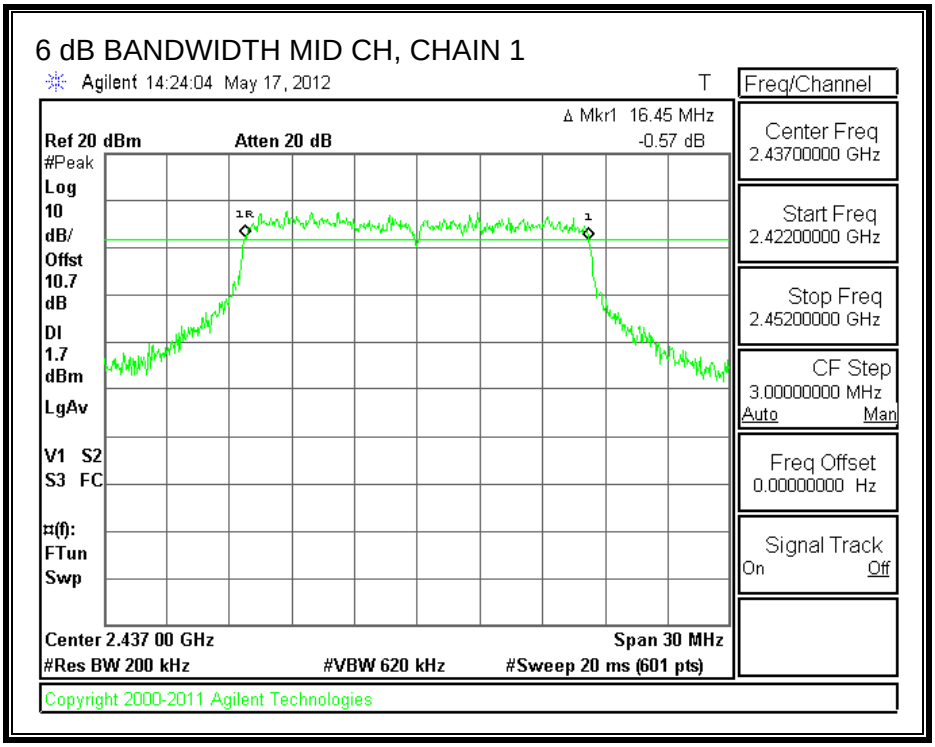
KDB 558074 D01 V01 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247", dated 01/18/2012.

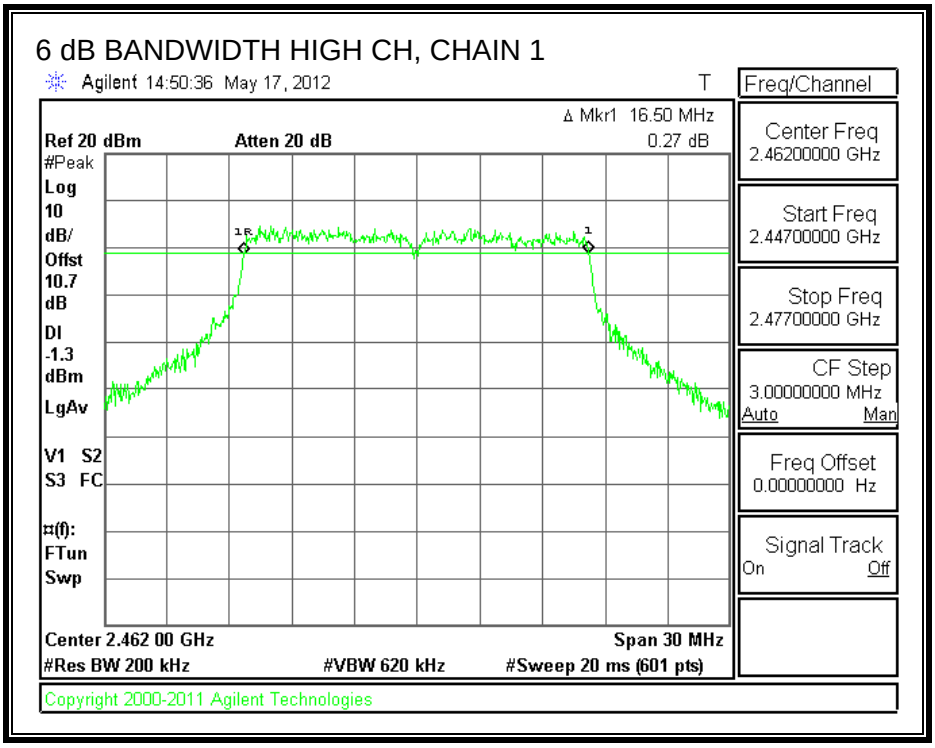
RESULTS

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)
Low	2412	12.60	10.93	12.86	16.98
Middle	2437	12.60	10.00	12.22	16.52
High	2462	13.21	11.28	13.75	17.64

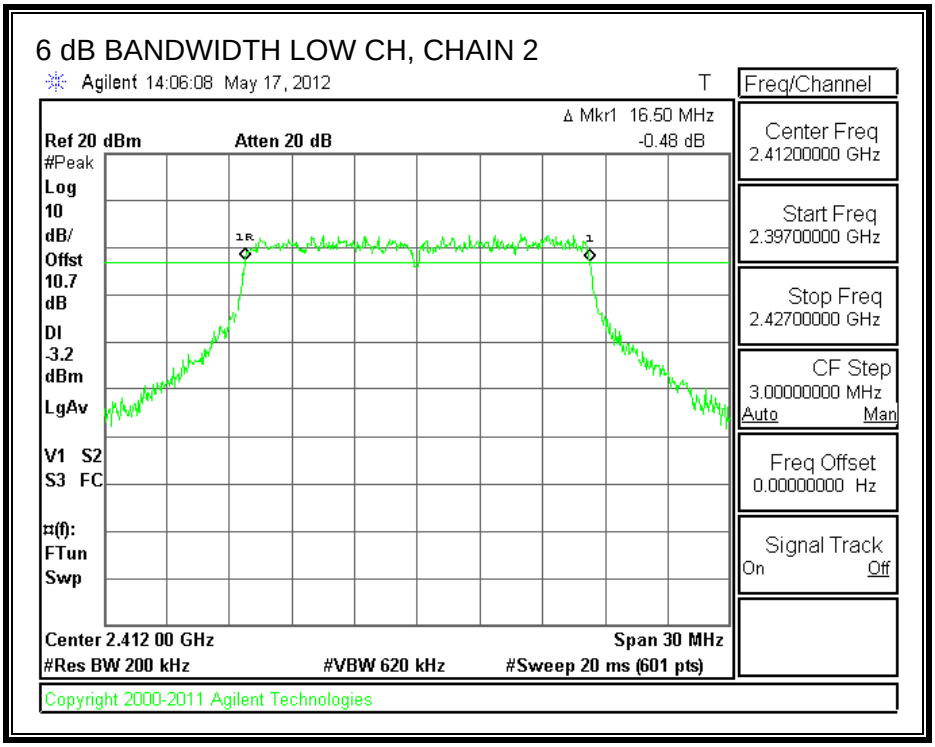
6 dB BANDWIDTH, CHAIN 1

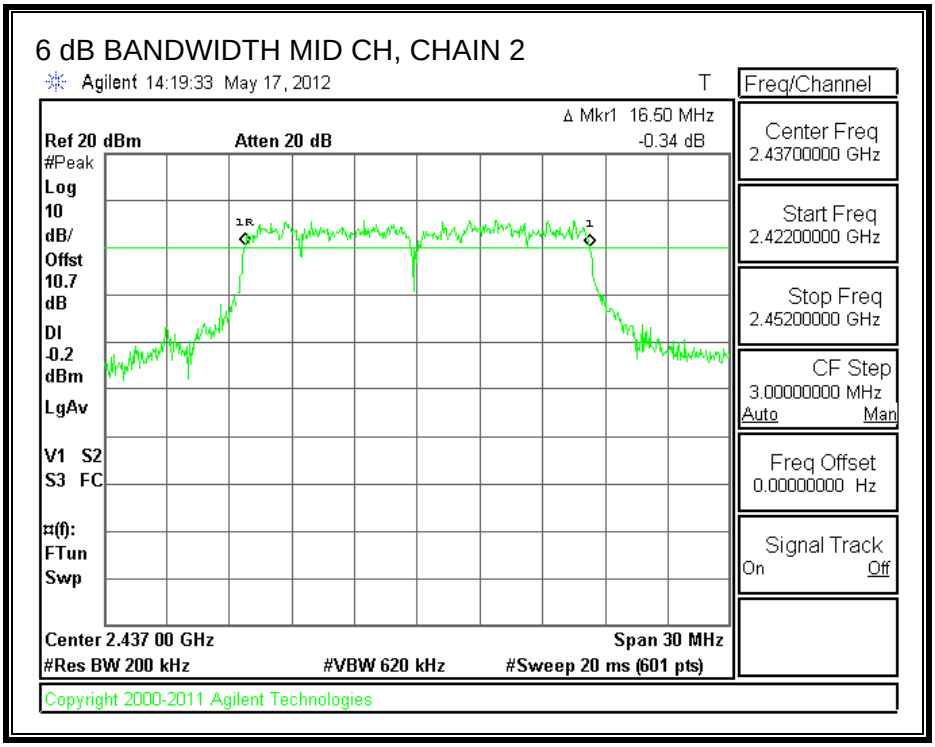


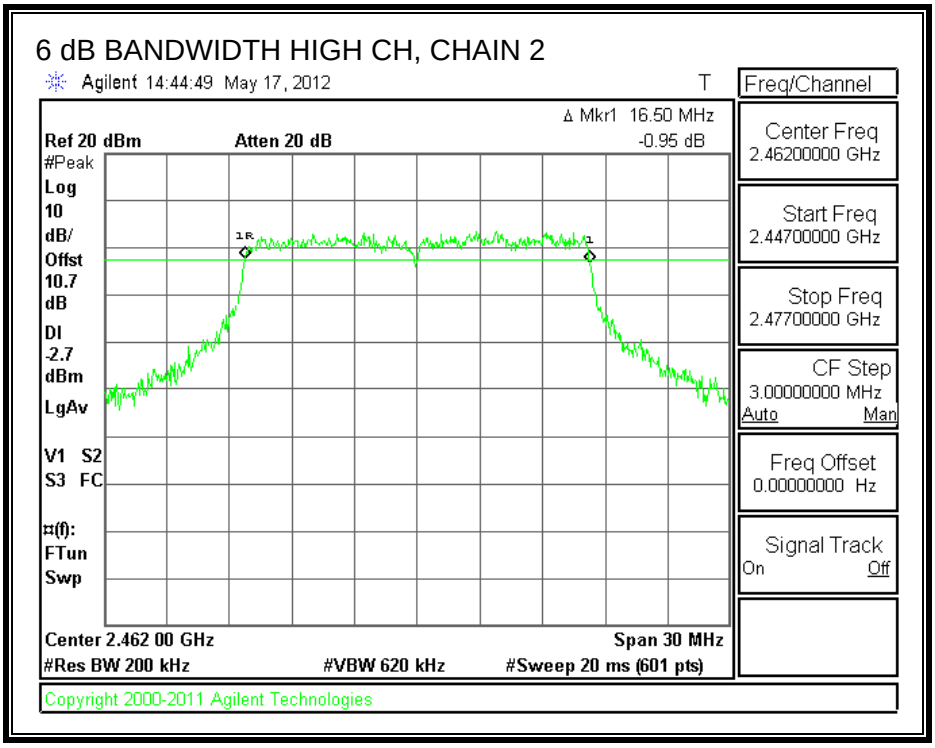




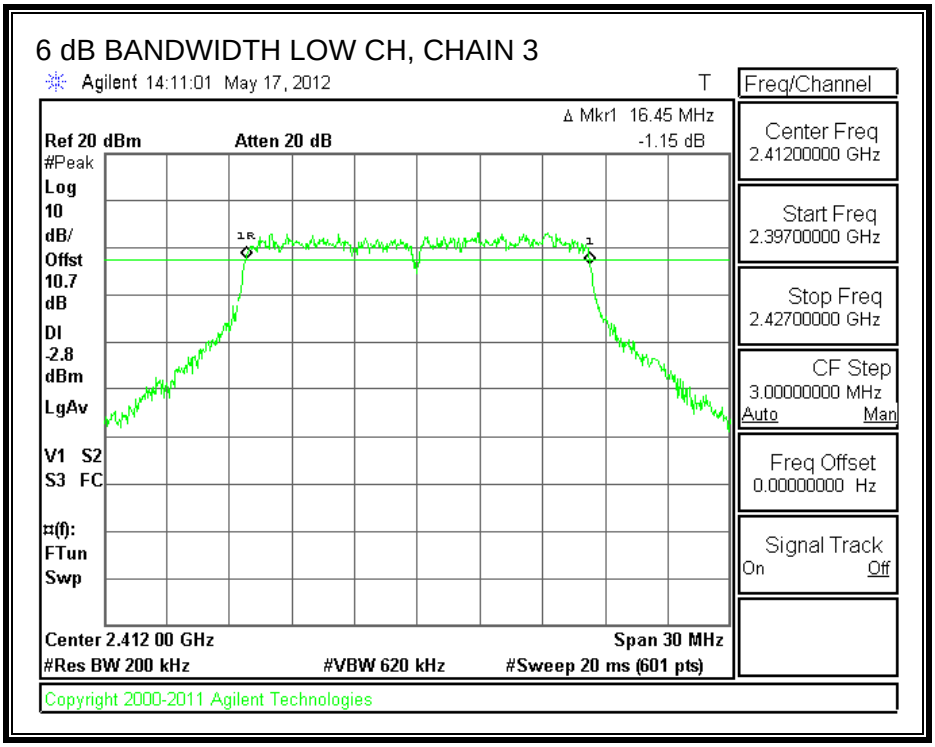
6 dB BANDWIDTH, CHAIN 2

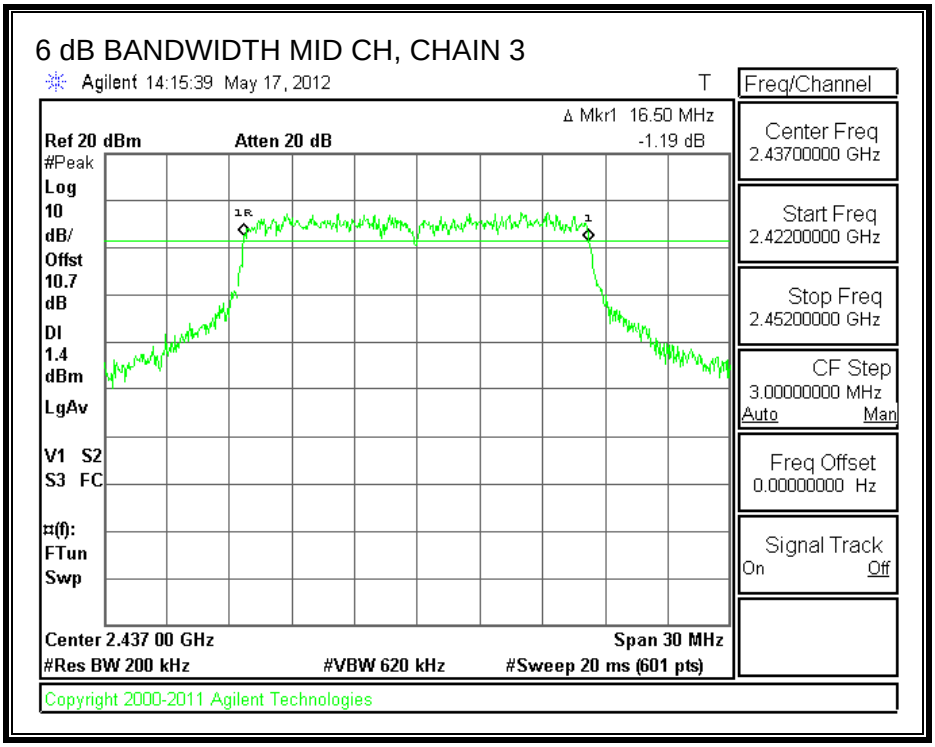


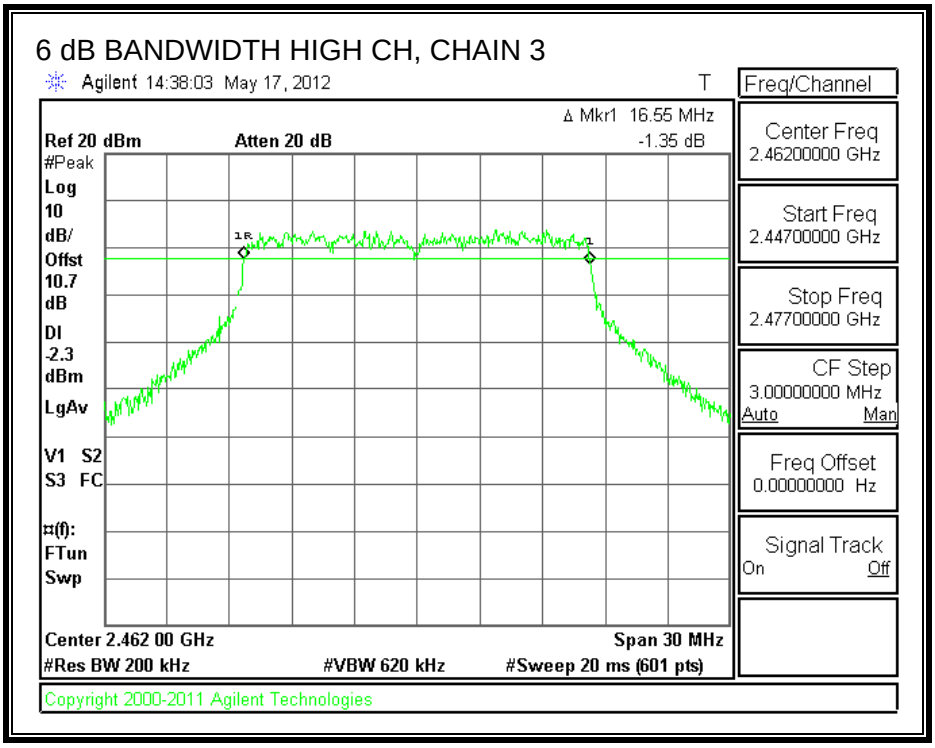




6 dB BANDWIDTH, CHAIN 3







7.1.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

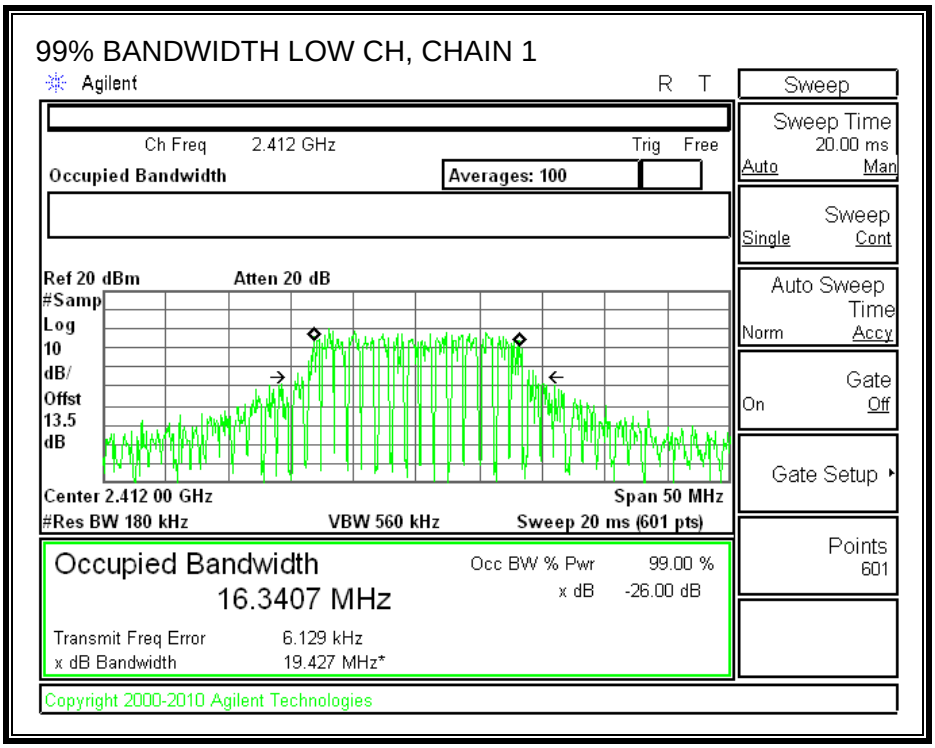
TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

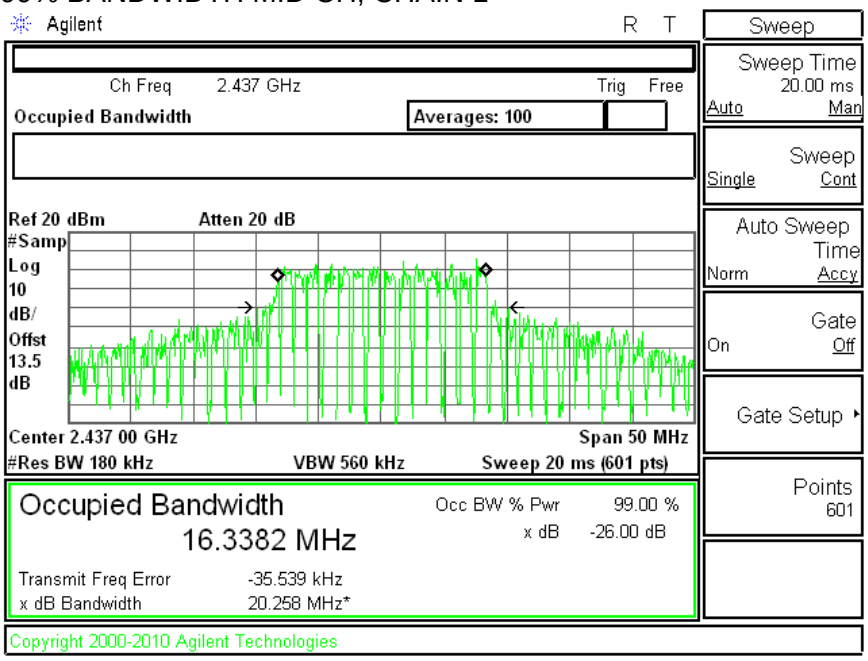
RESULTS

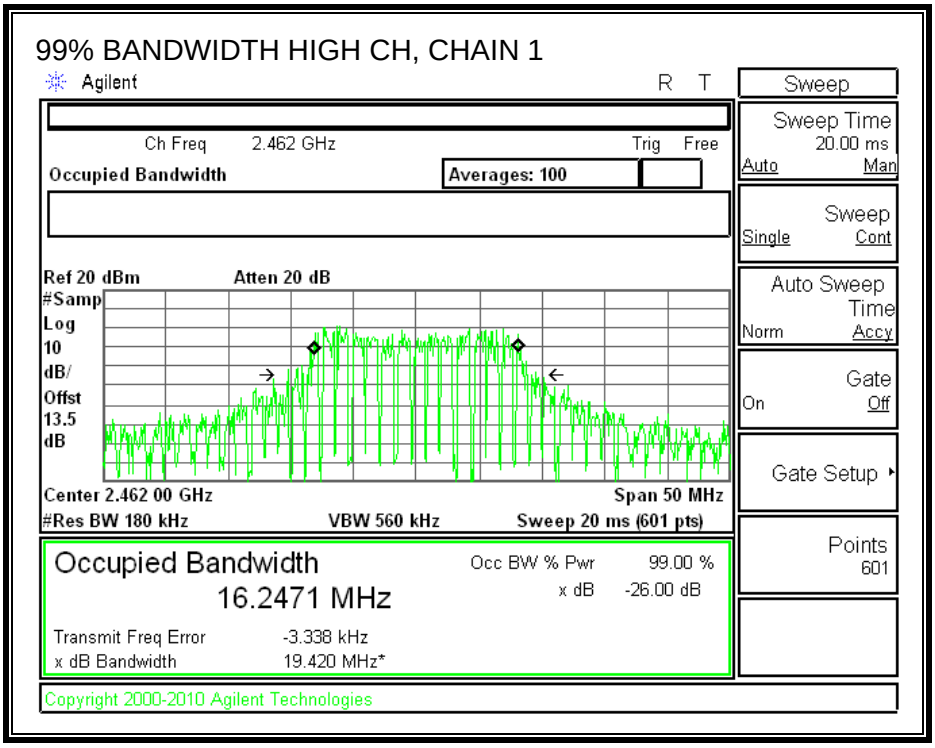
Channel	Frequency (MHz)	Chain 1 99% Bandwidth (MHz)	Chain 2 99% Bandwidth (MHz)	Chain 3 99% Bandwidth (MHz)
Low	2412	16.3407	16.3744	16.3276
Middle	2437	16.3382	16.3783	16.3661
High	2462	16.2471	16.3510	16.3457

99% BANDWIDTH, CHAIN 1

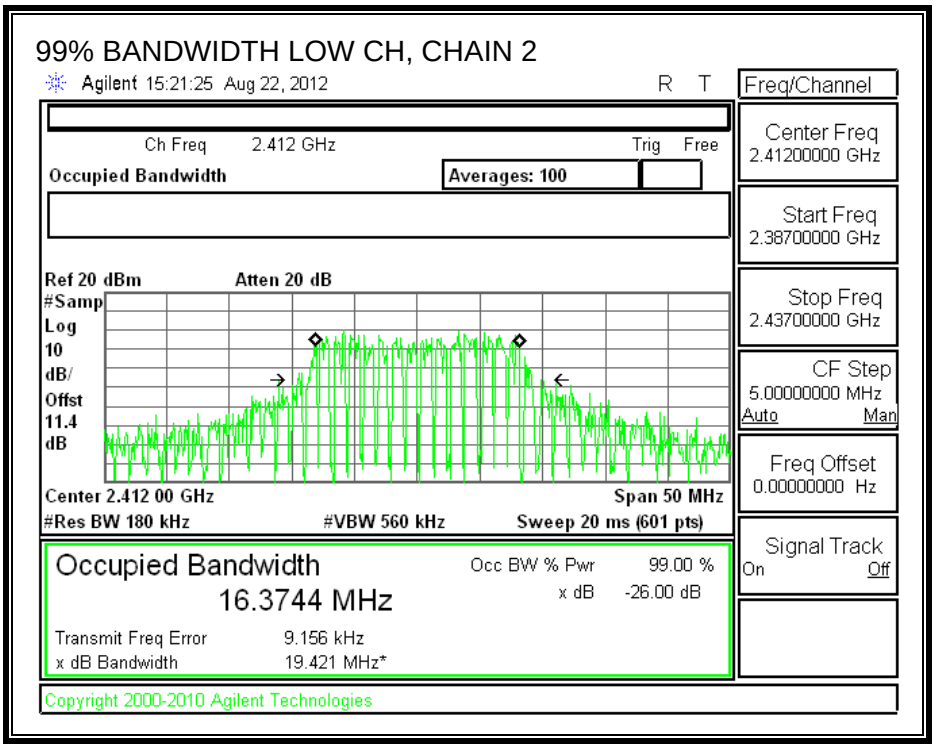


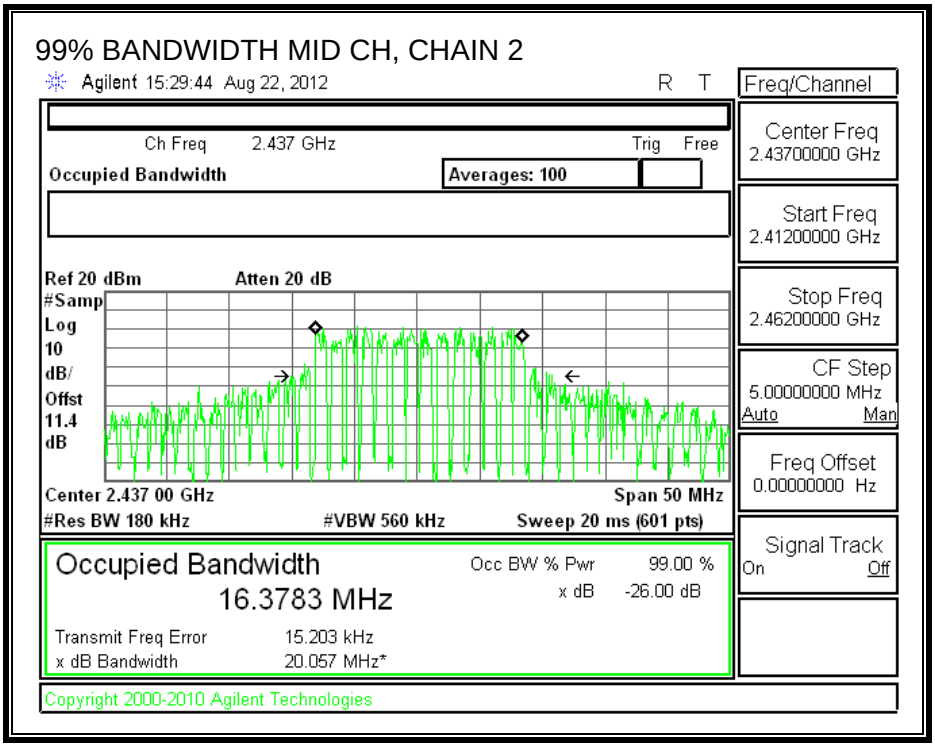
99% BANDWIDTH MID CH, CHAIN 1

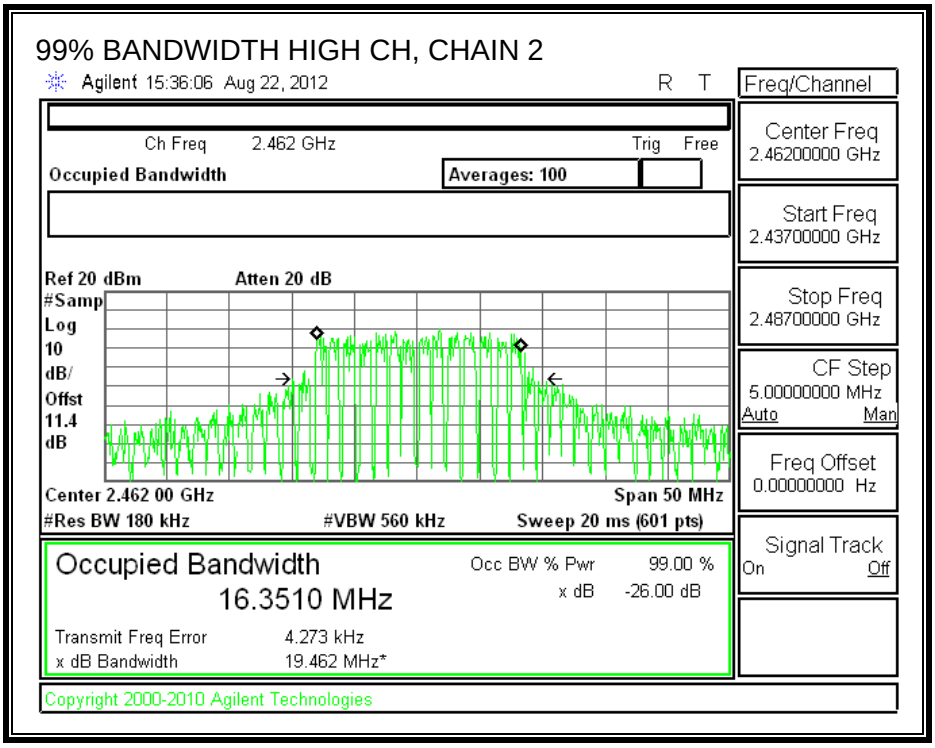




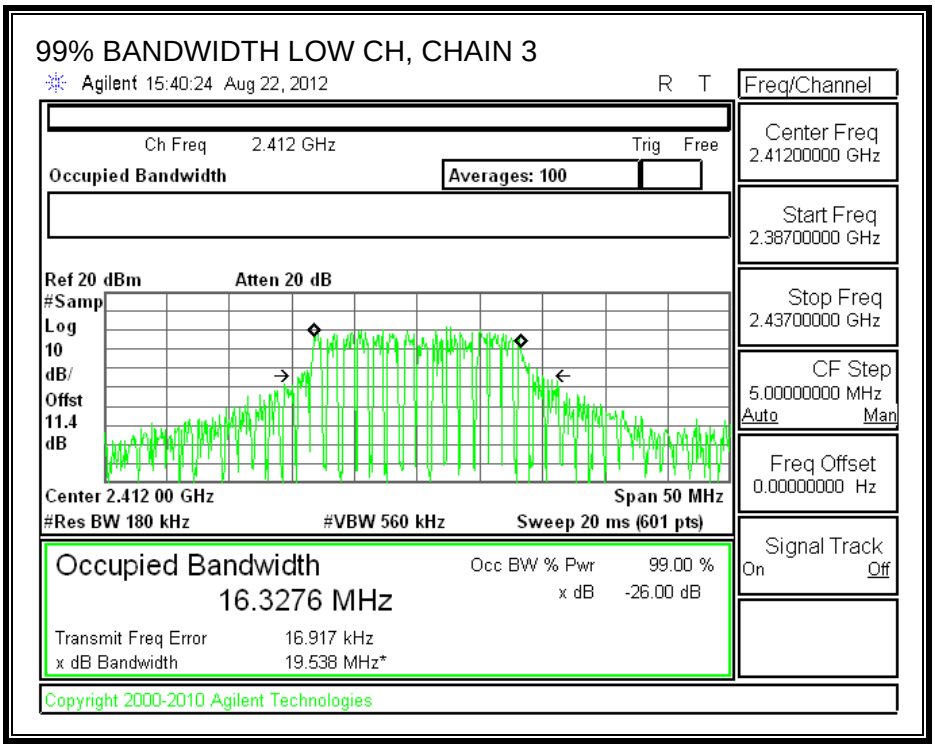
99% BANDWIDTH, CHAIN 2



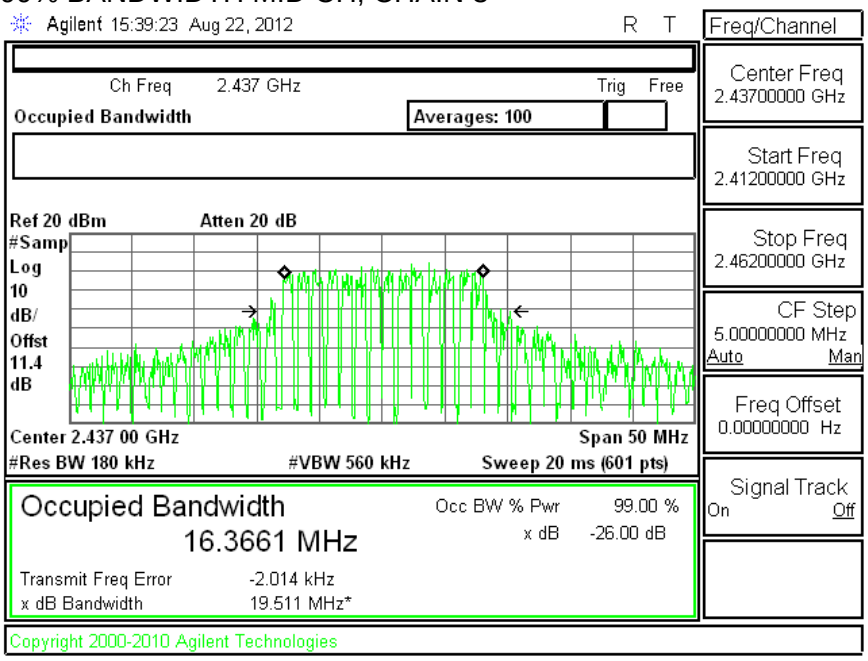


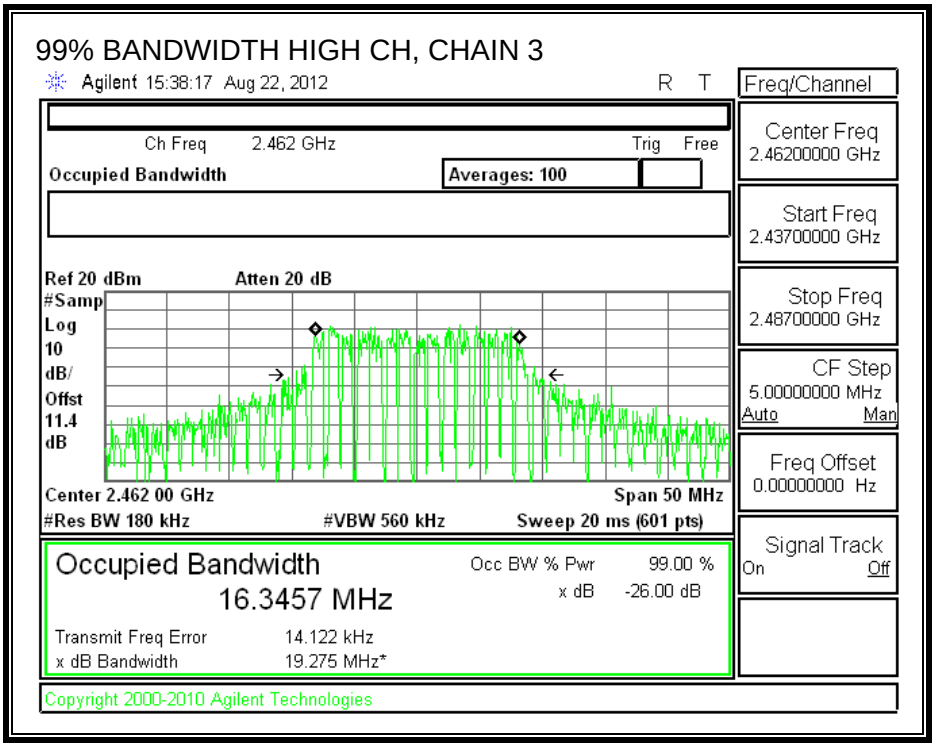


99% BANDWIDTH, CHAIN 3



99% BANDWIDTH MID CH, CHAIN 3





7.1.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The TX chains are correlated and the antenna gain is unequal among the chains. The directional gain is:

Chain 0 Antenna Gain (dBi)	Chain 1 Antenna Gain (dBi)	Chain 2 Antenna Gain (dBi)	Correlated Chains Directional Gain (dBi)
4.40	2.90	3.70	8.46

The corrected limit is 30 dBm – 2.46 = **27.54 dBm**

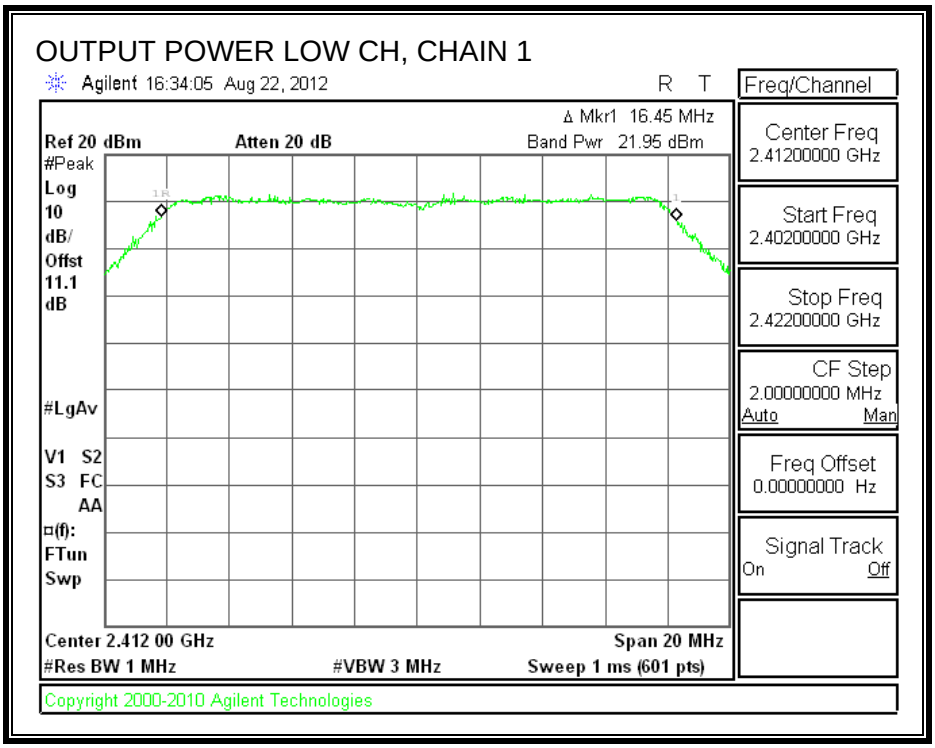
TEST PROCEDURE

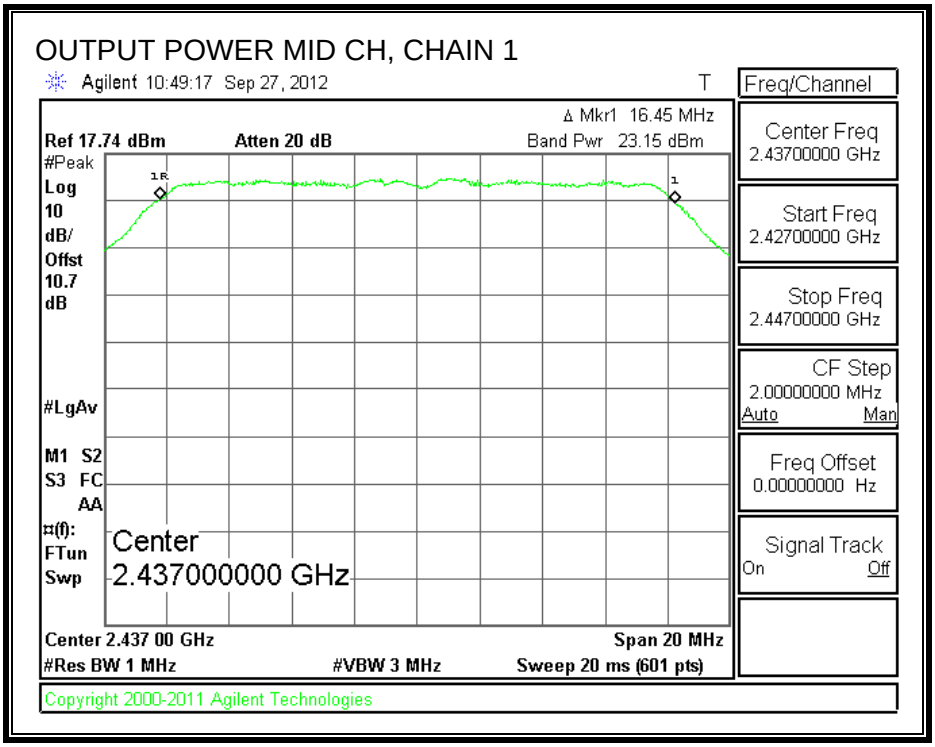
KDB 558074 D01 V01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”, dated 01/18/2012.

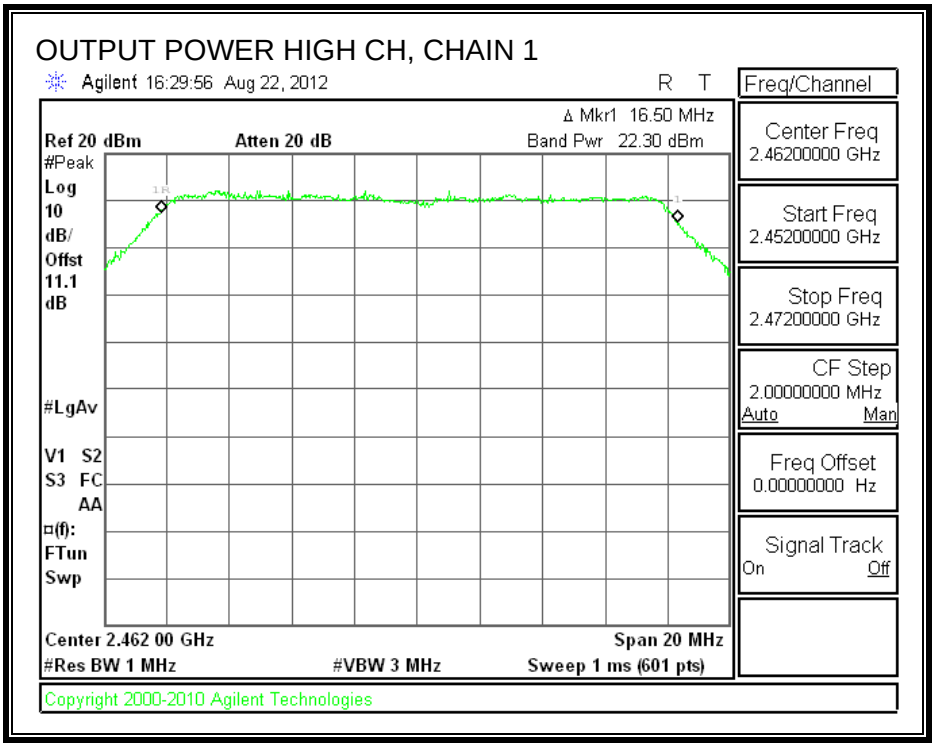
RESULTS

Channel	Frequency (MHz)	Chain 1 PK Power (dBm)	Chain 2 PK Power (dBm)	Chain 3 PK Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	21.95	20.16	21.95	26.20	27.54	-1.34
Mid	2437	23.15	20.10	22.41	26.84	27.54	-0.70
High	2462	22.30	20.55	22.97	26.83	27.54	-0.71

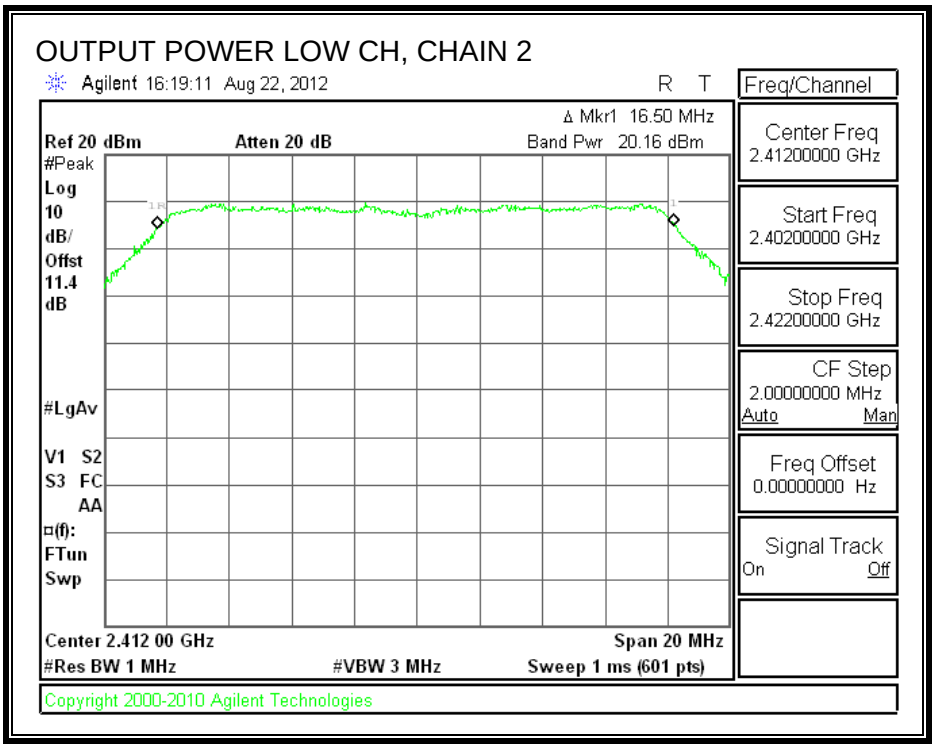
CHAIN 1 OUTPUT POWER

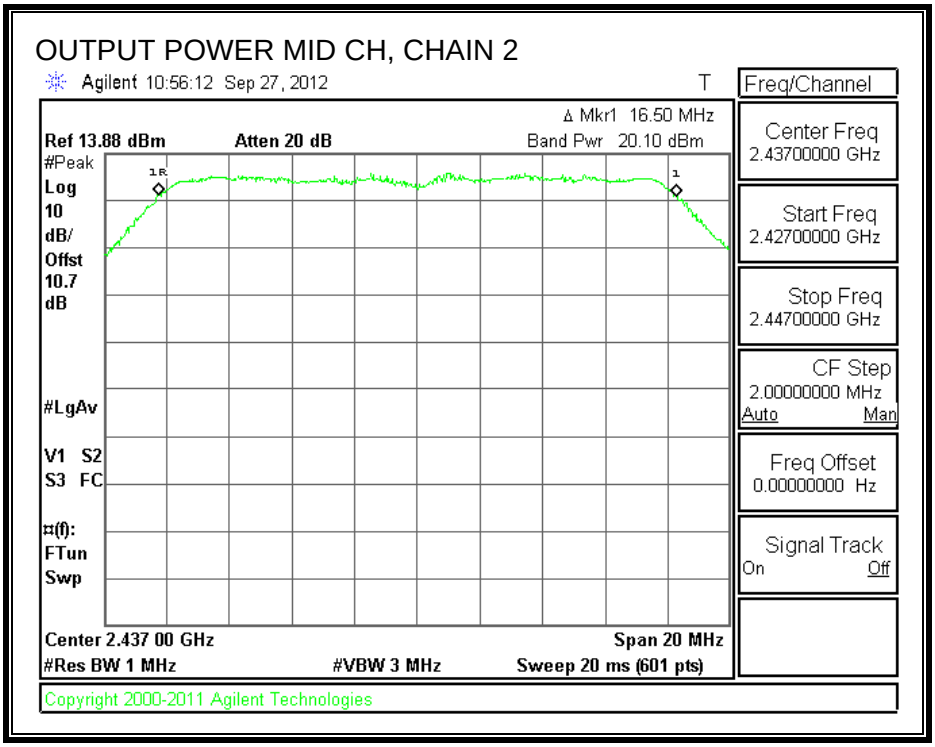


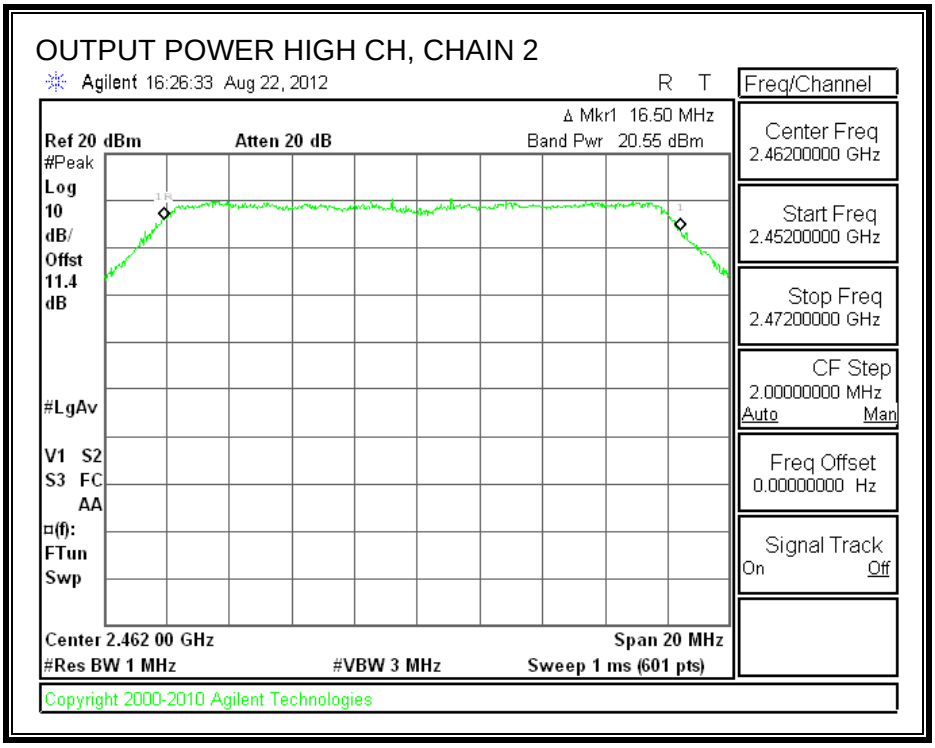




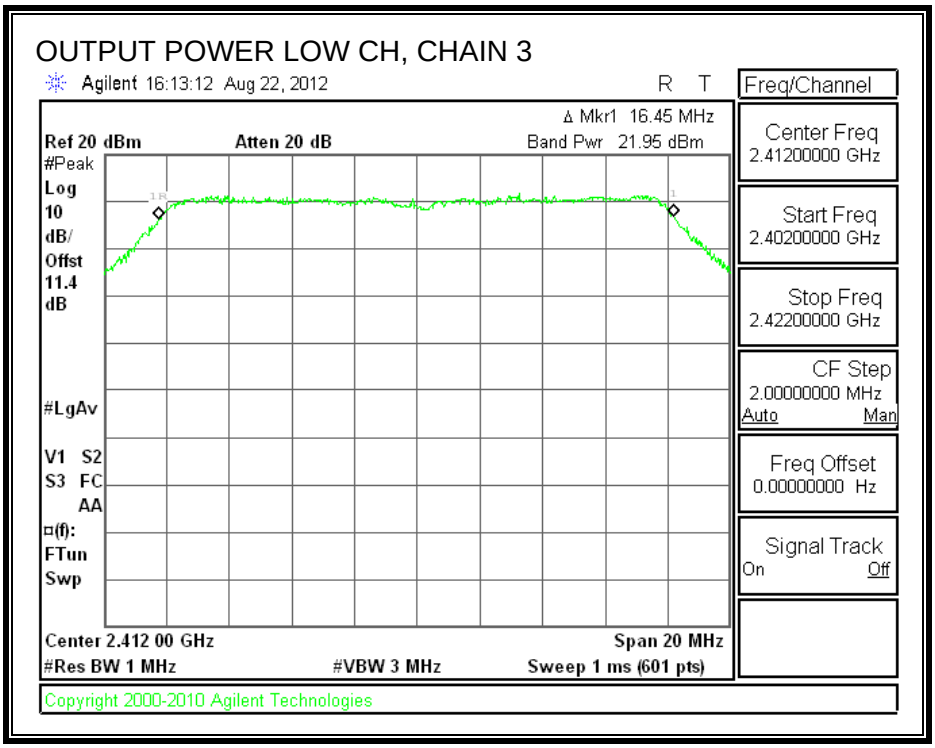
CHAIN 2 OUTPUT POWER

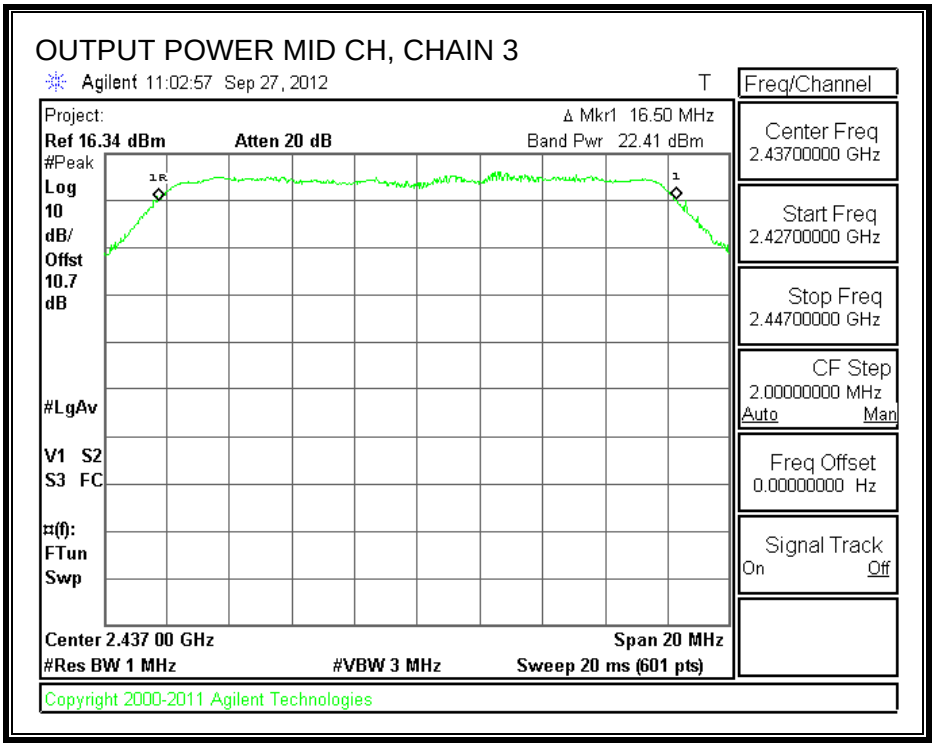


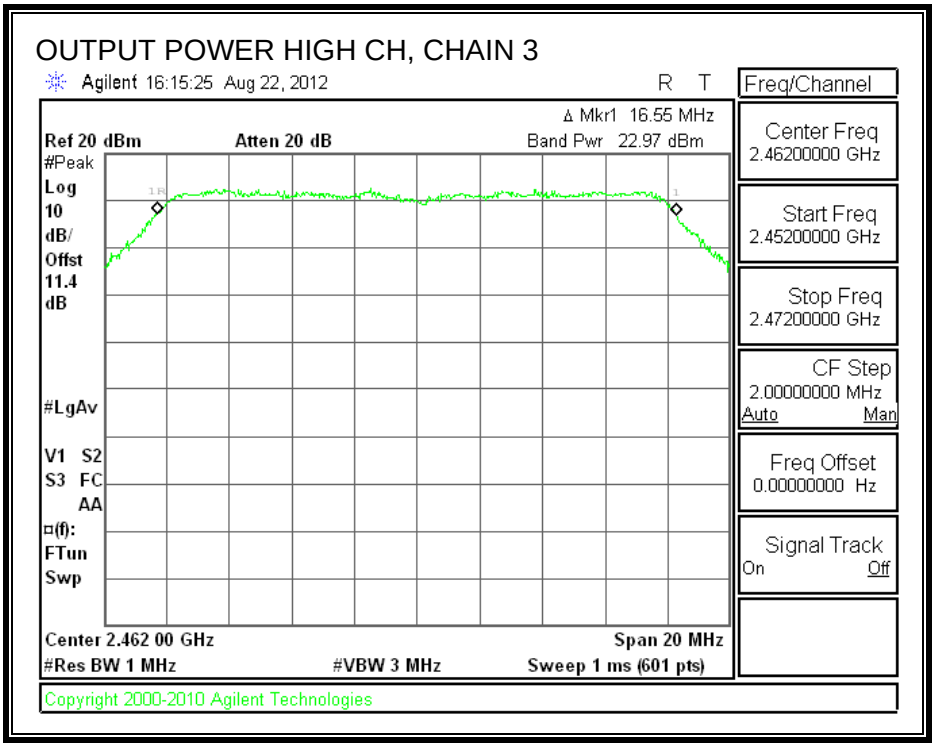




CHAIN 3 OUTPUT POWER







7.1.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11.44 dB (including 10 dB pad and 1.44 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)
Low	2412	12.60	10.93	12.86	16.98
Middle	2437	12.60	10.00	12.22	16.52
High	2462	13.21	11.28	13.75	17.64

7.1.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

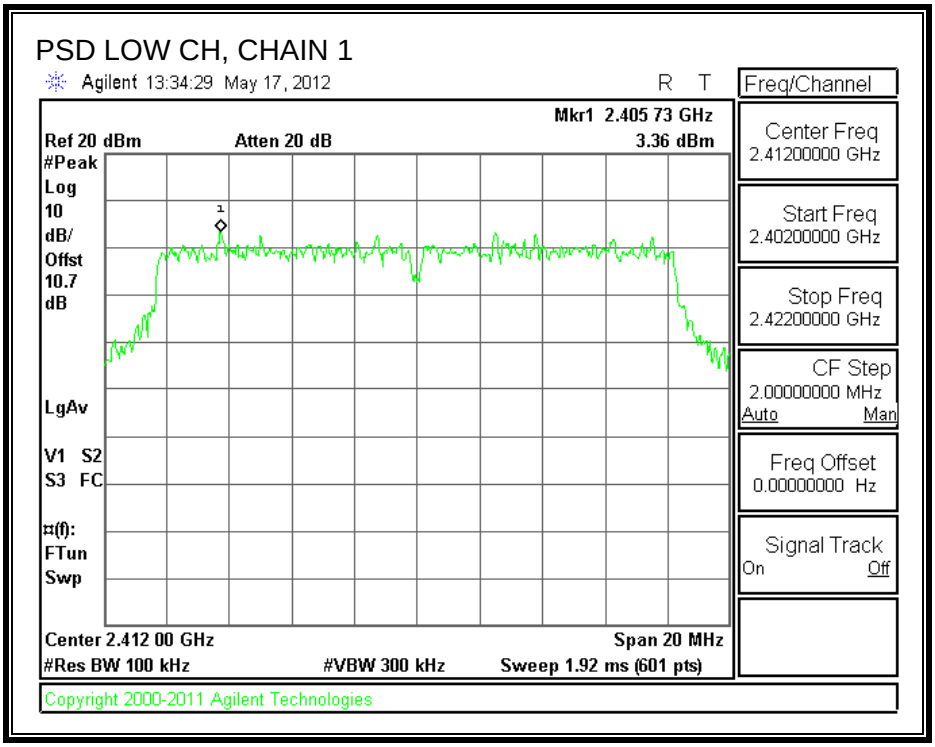
TEST PROCEDURE

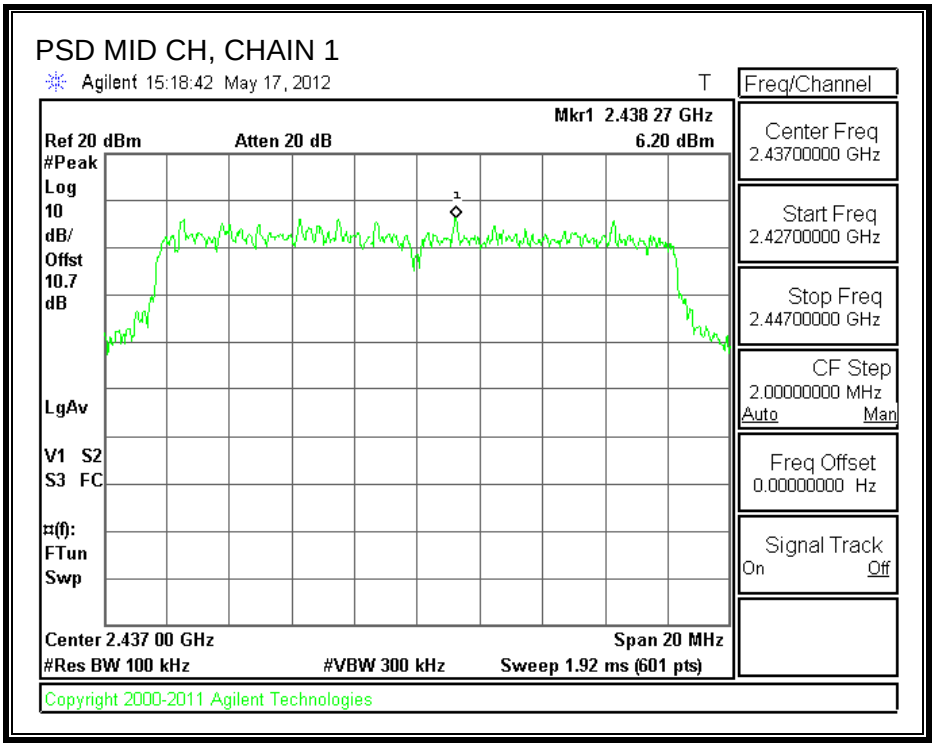
KDB 558074 D01 V01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”, dated 01/18/2012.

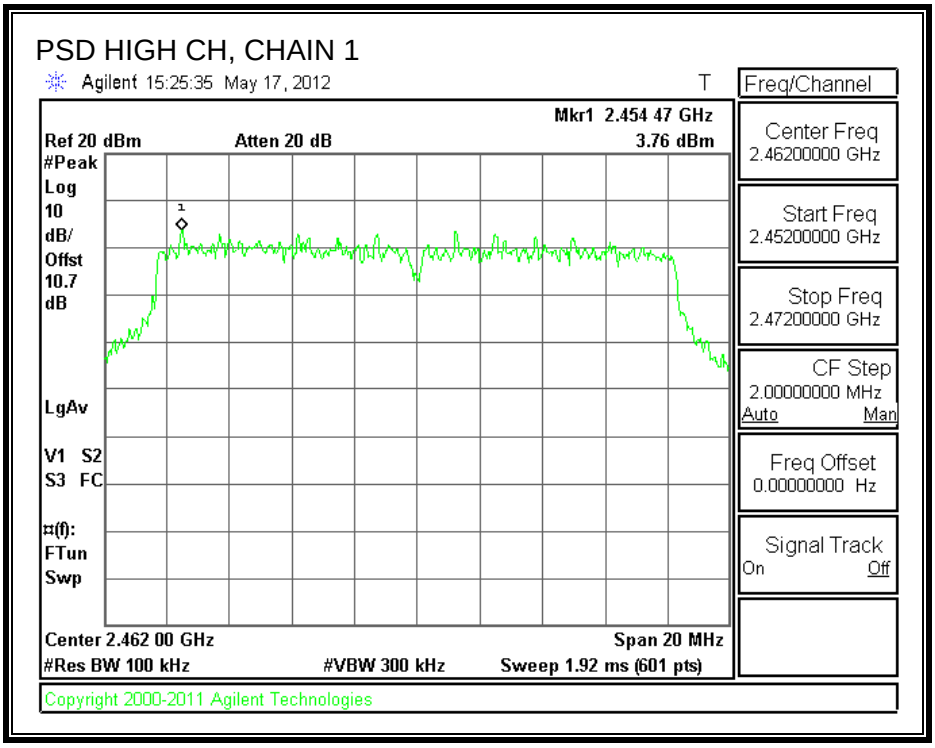
RESULTS

Channel	Frequency (MHz)	Chain 1 PSD (dBm)	Chain 2 PSD (dBm)	Chain 3 PSD (dBm)	10log (3kHz/100kHz)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	3.36	1.20	2.82	-15.20	-7.88	8	-15.88
Middle	2437	6.20	4.17	6.53	-15.20	-4.68	8	-12.68
High	2462	3.76	1.34	3.68	-15.20	-7.37	8	-15.37

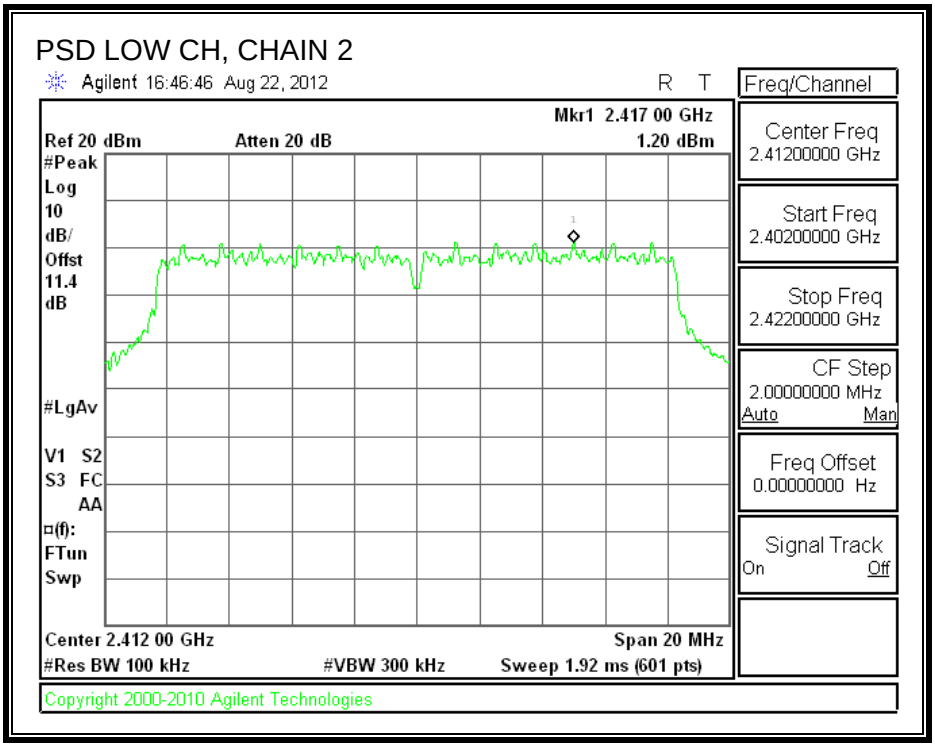
POWER SPECTRAL DENSITY, CHAIN 1

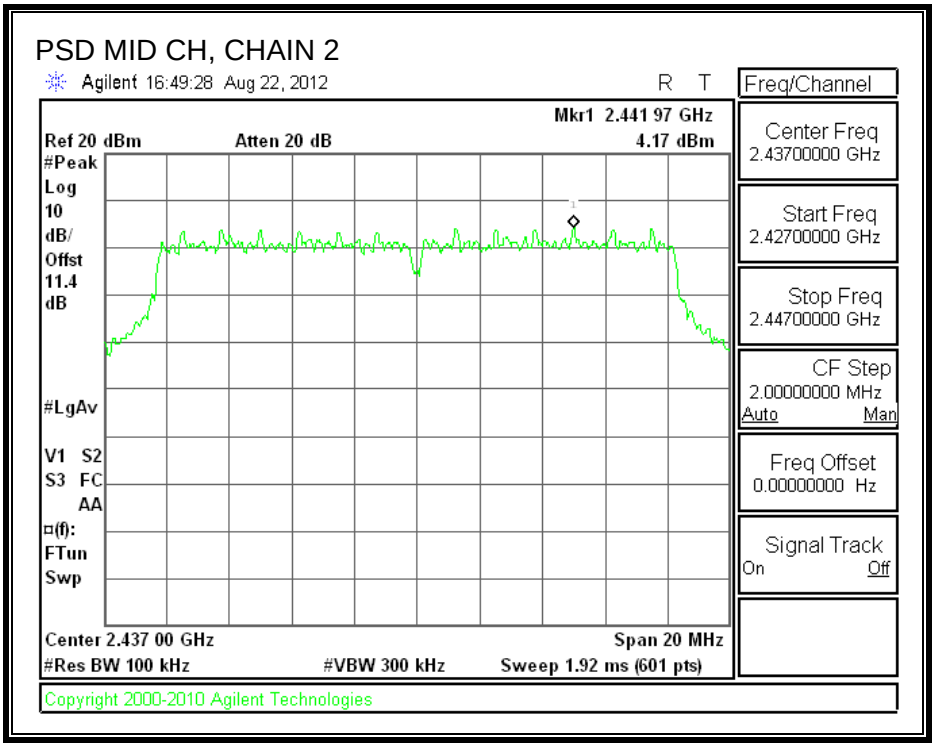


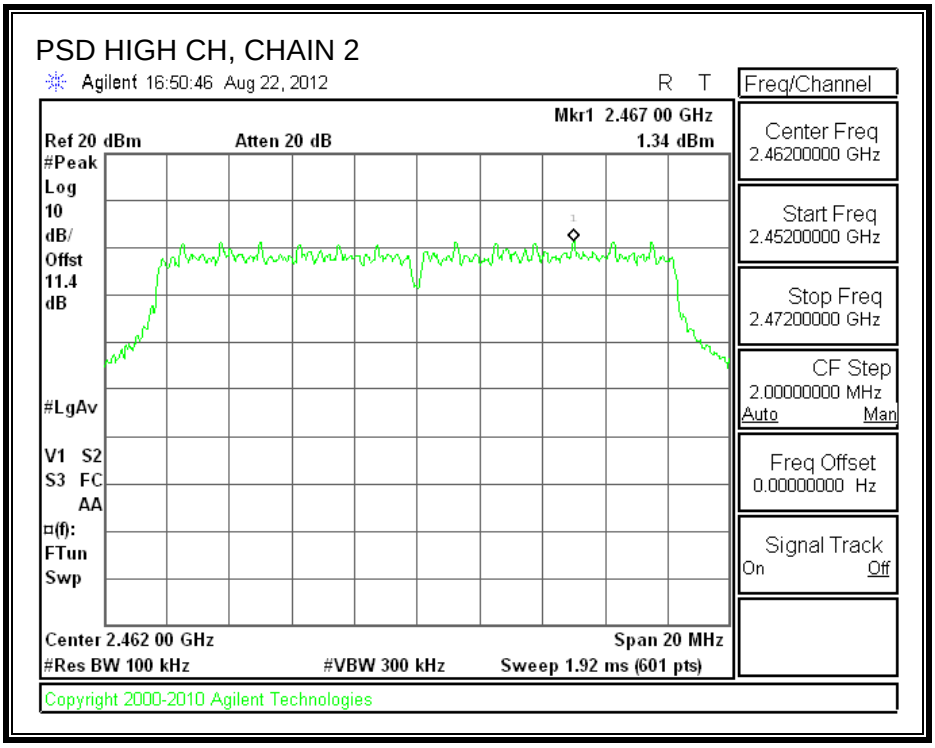




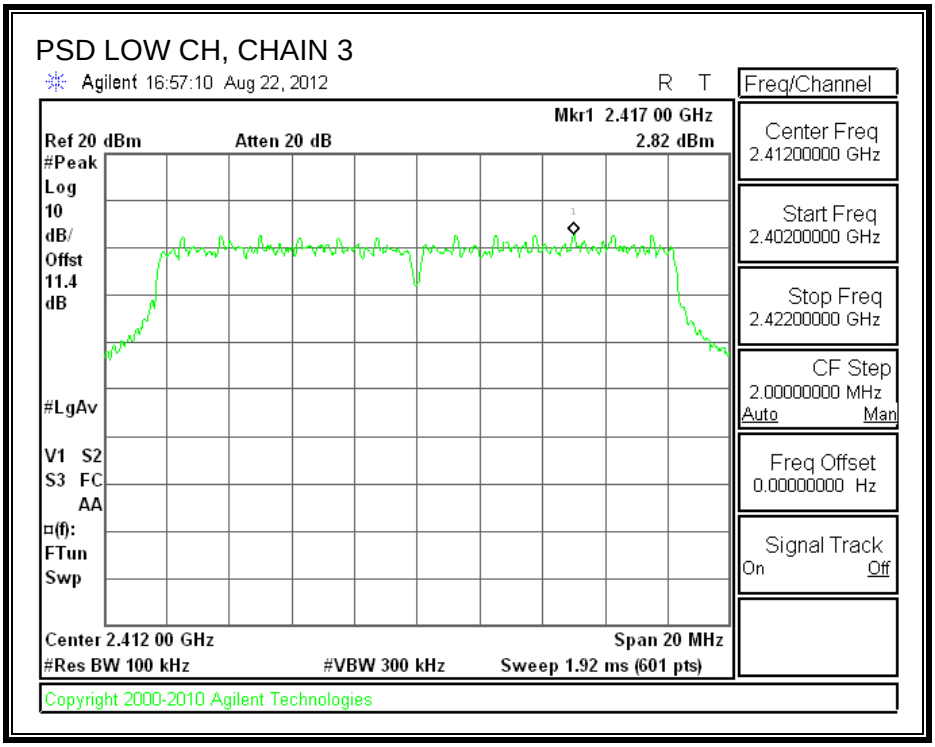
POWER SPECTRAL DENSITY, CHAIN 2



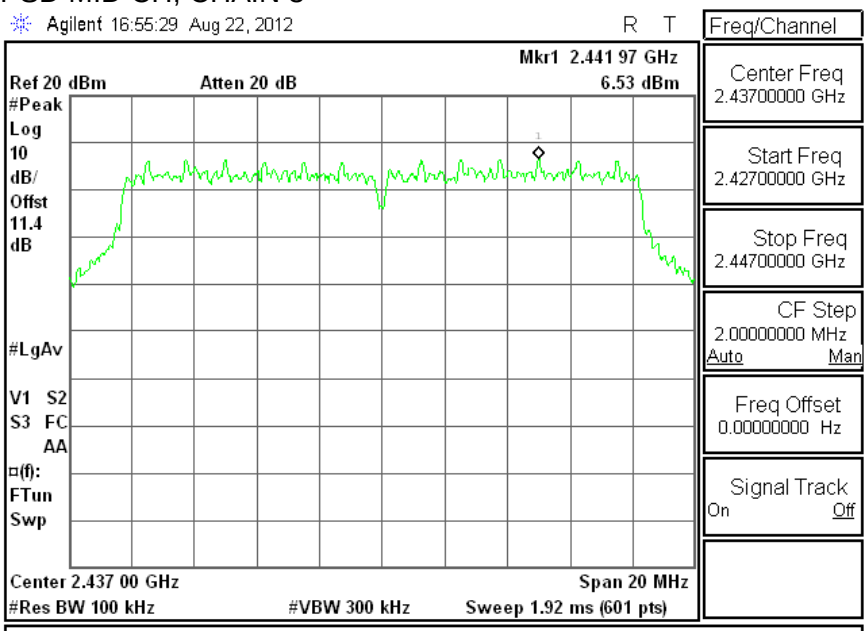


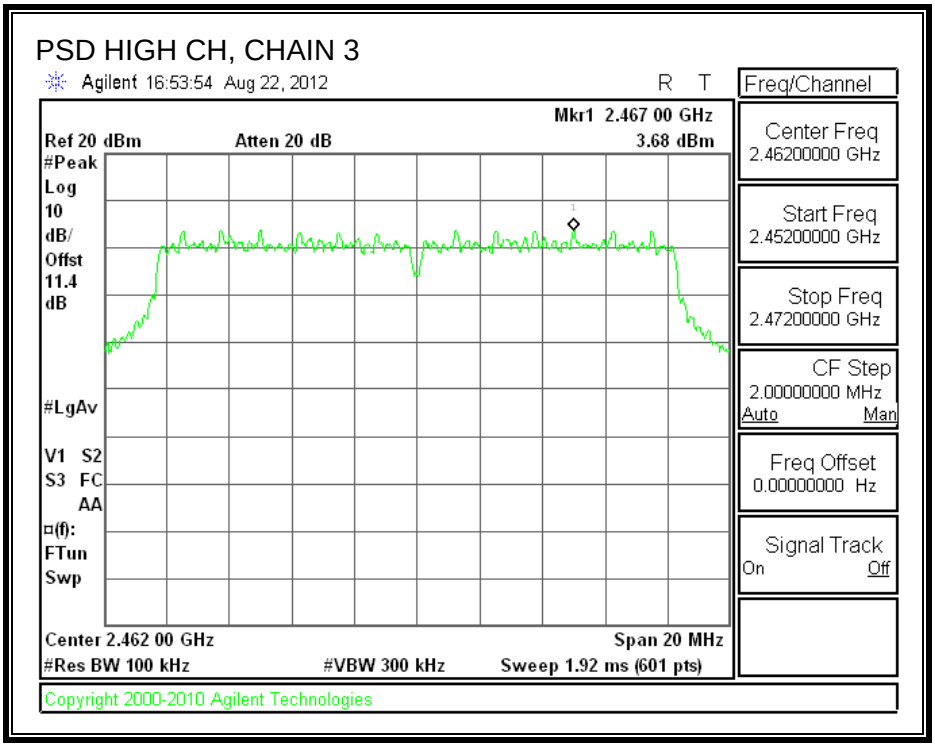


POWER SPECTRAL DENSITY, CHAIN 3



PSD MID CH, CHAIN 3





7.1.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

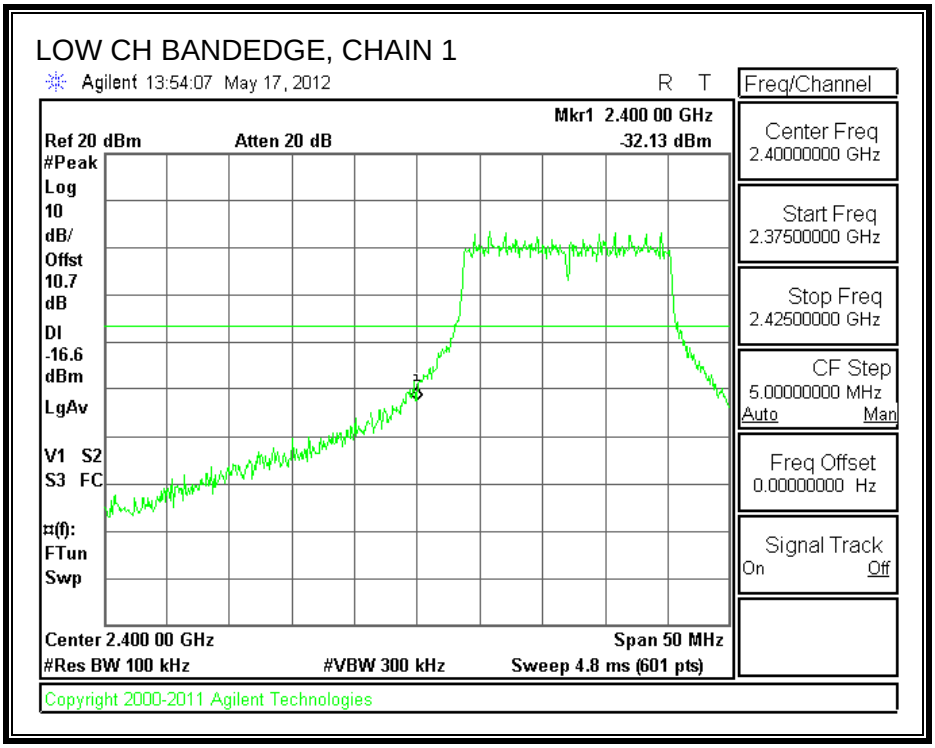
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

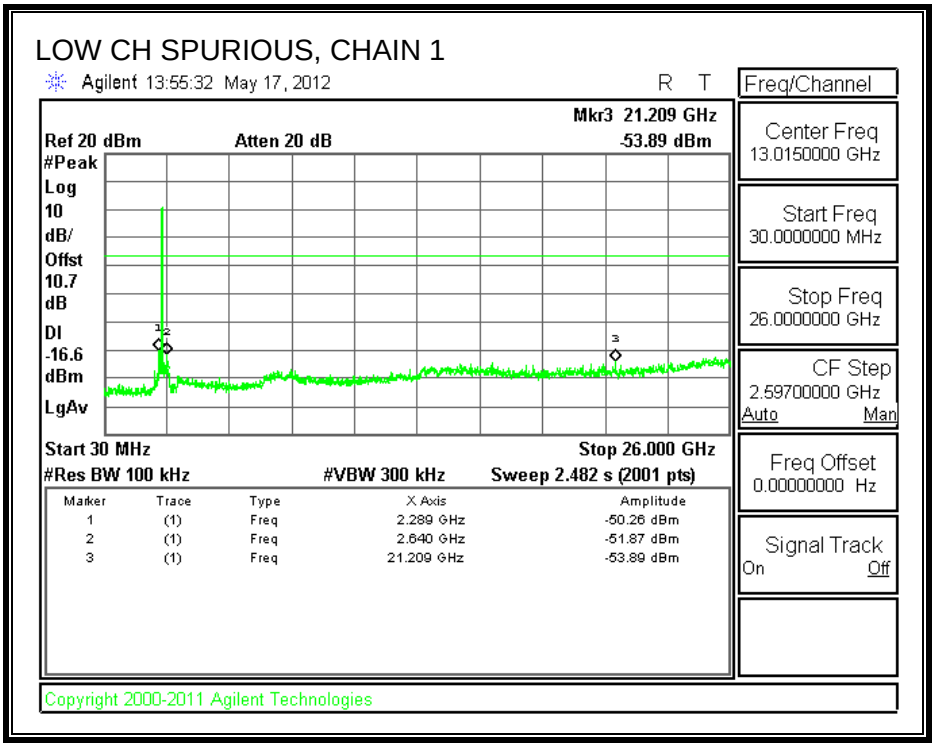
TEST PROCEDURE

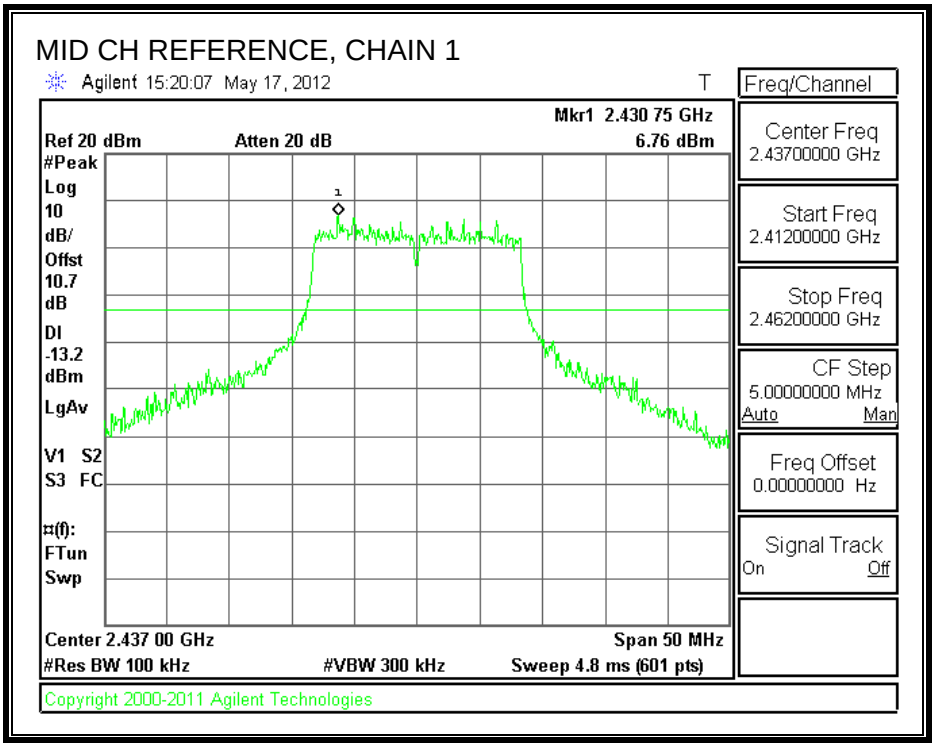
KDB 558074 D01 V01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”, dated 01/18/2012.

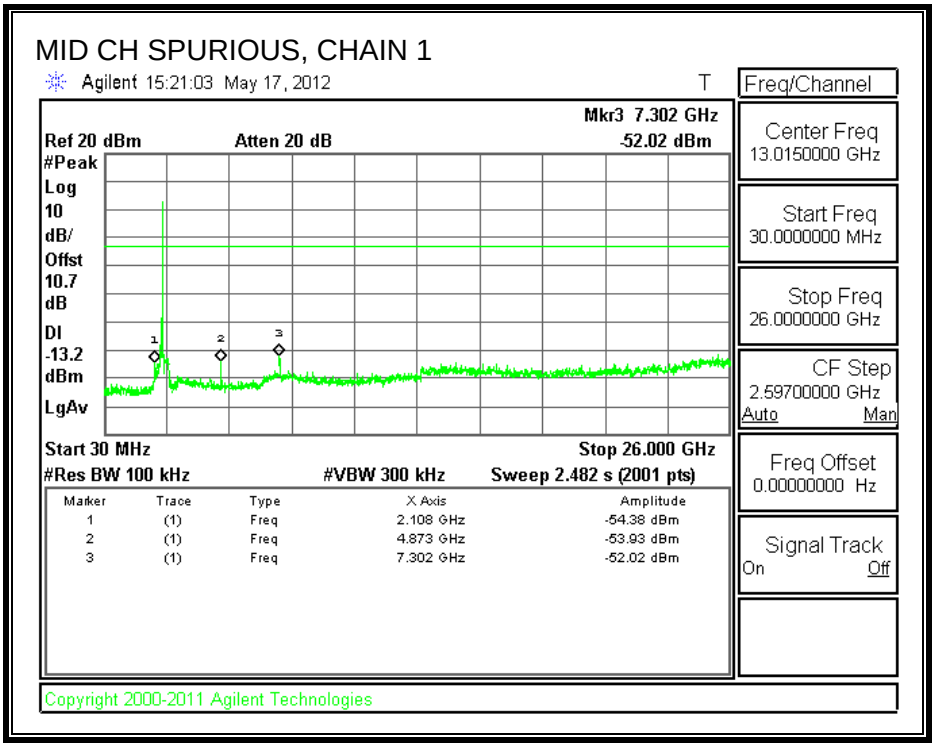
RESULTS

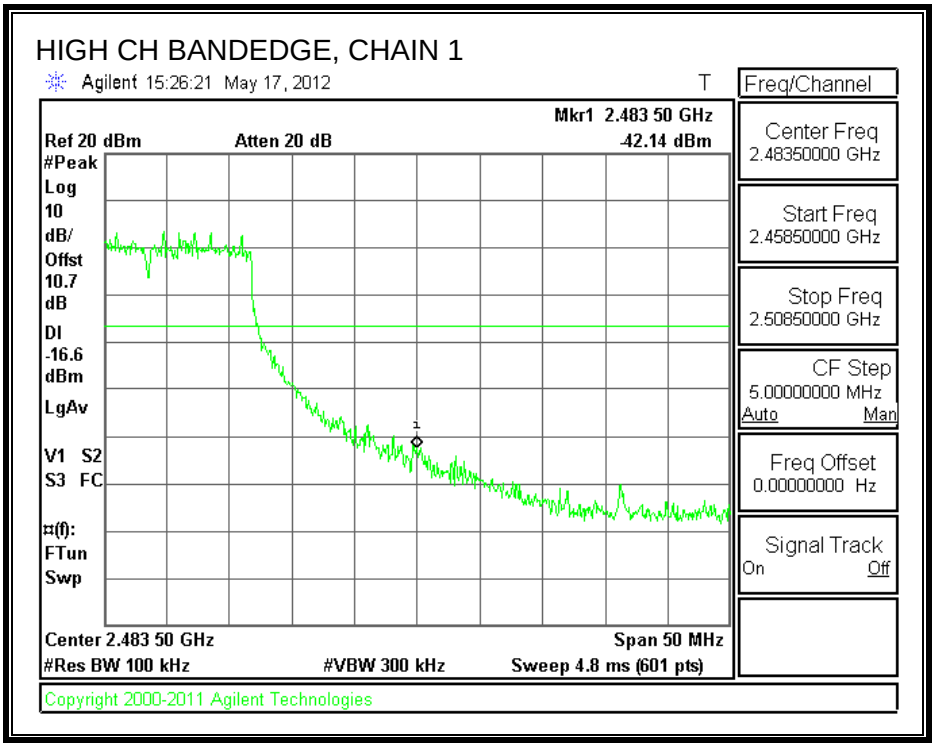
CHAIN 1 SPURIOUS EMISSIONS

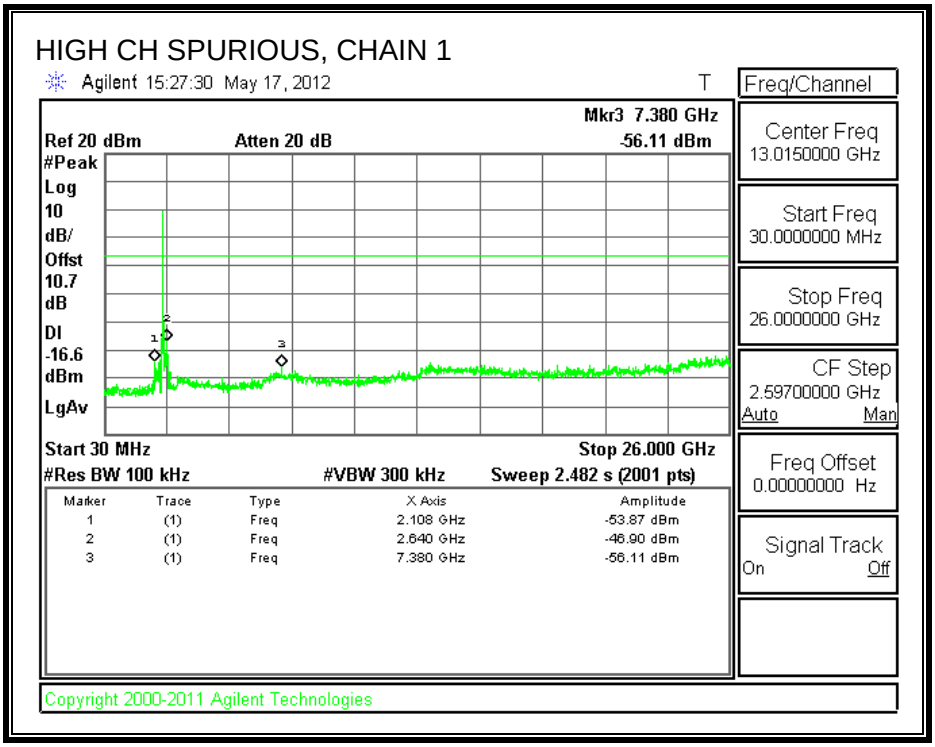




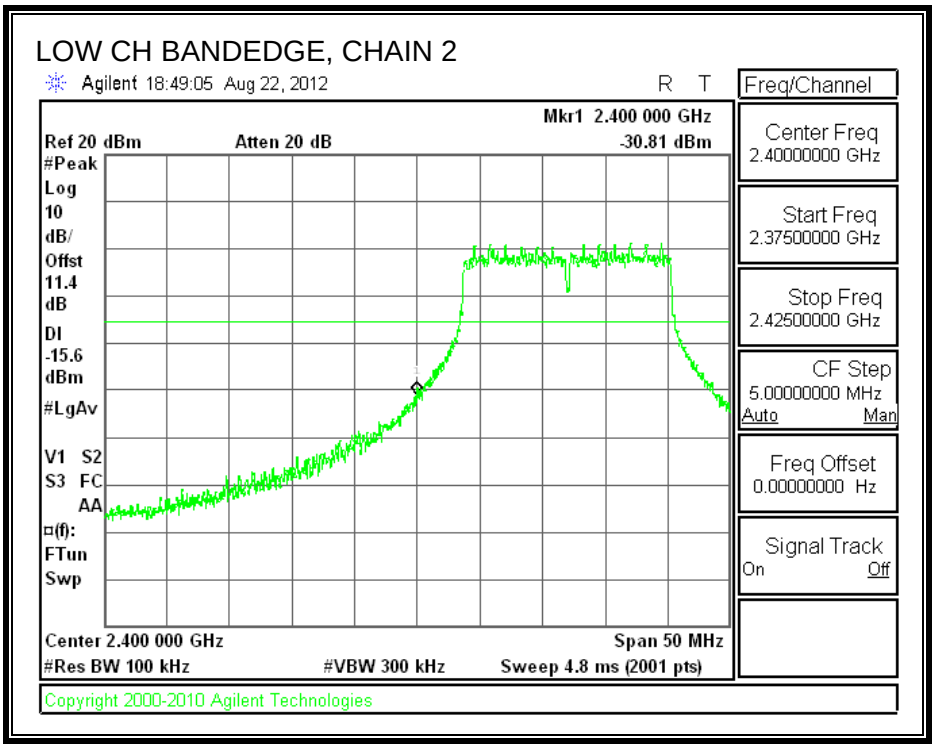


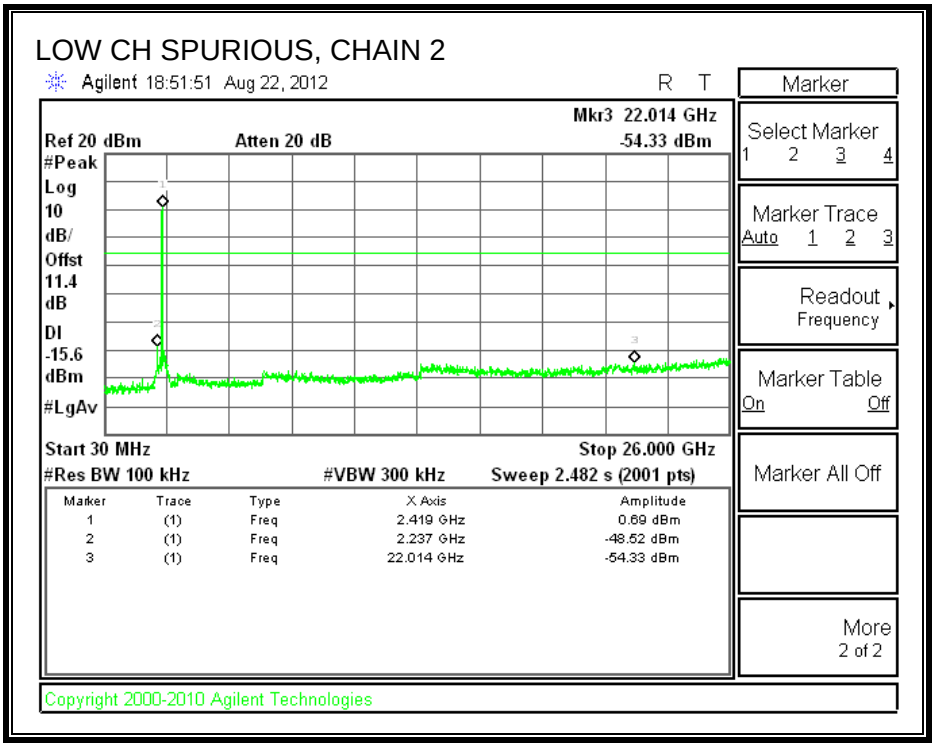


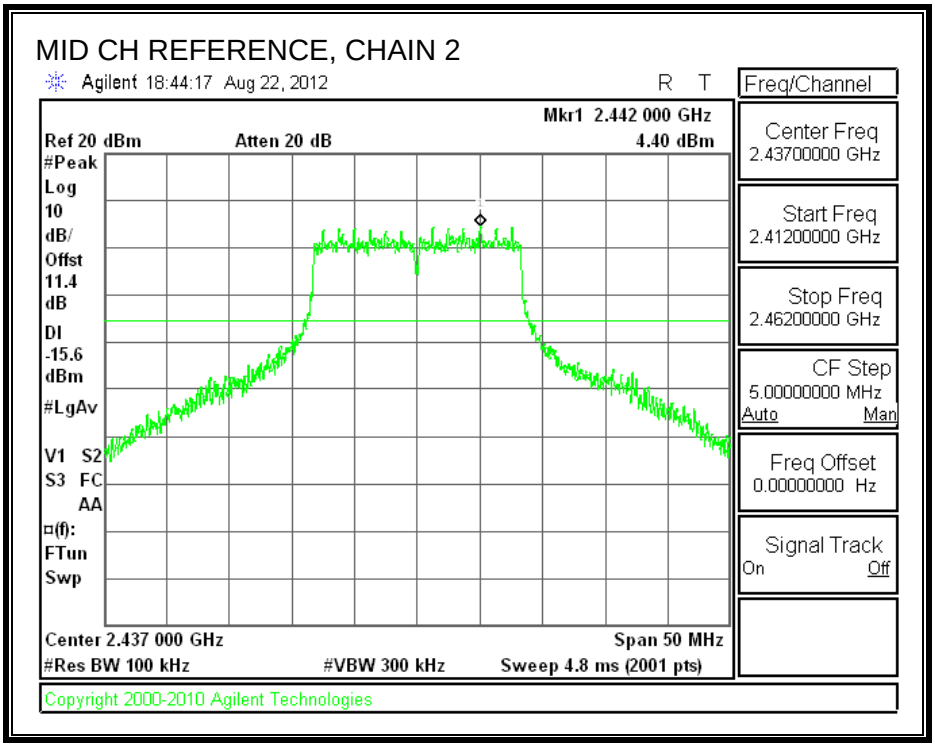


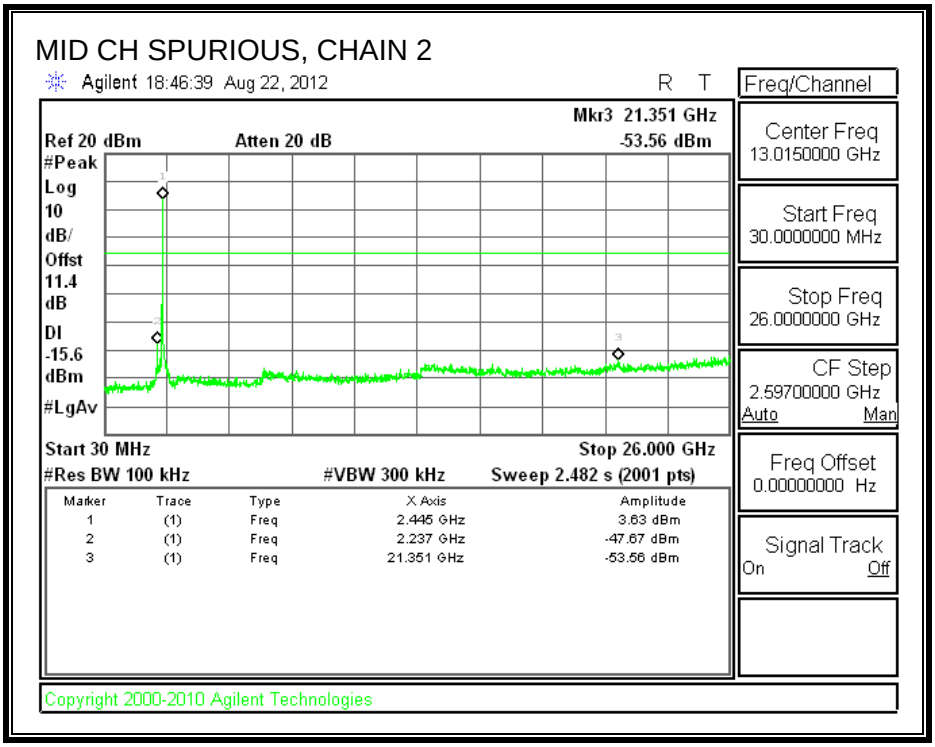


CHAIN 2 SPURIOUS EMISSIONS

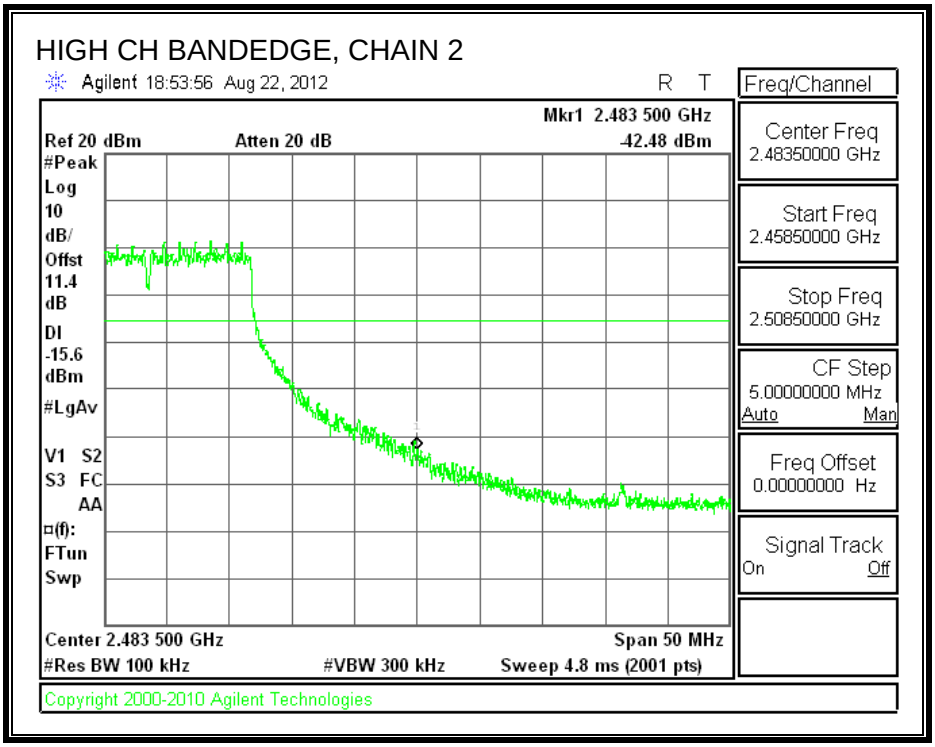


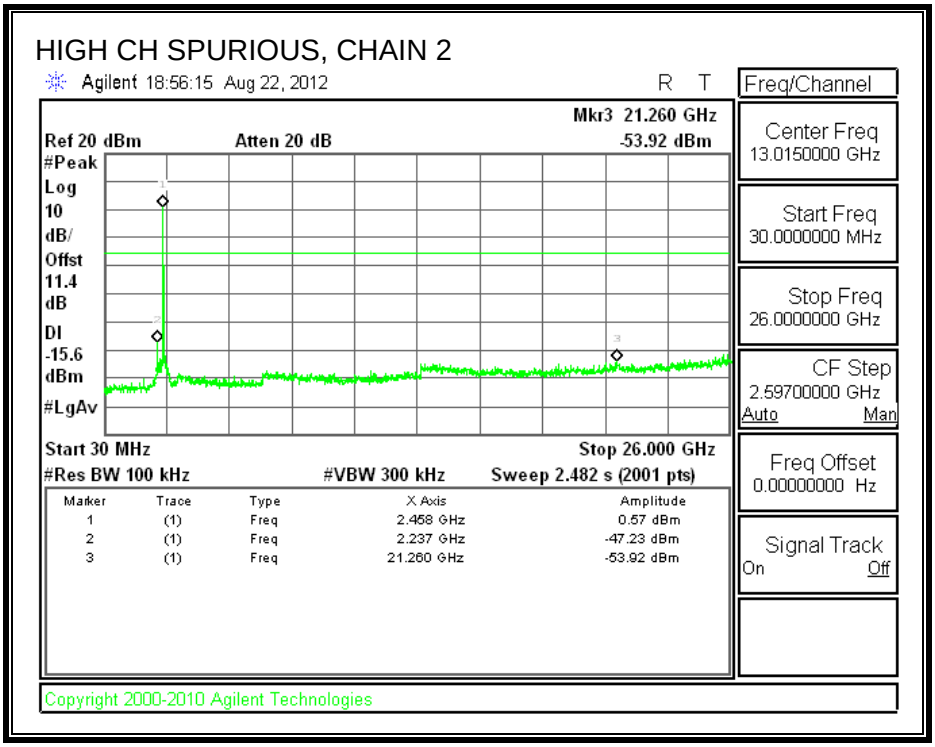




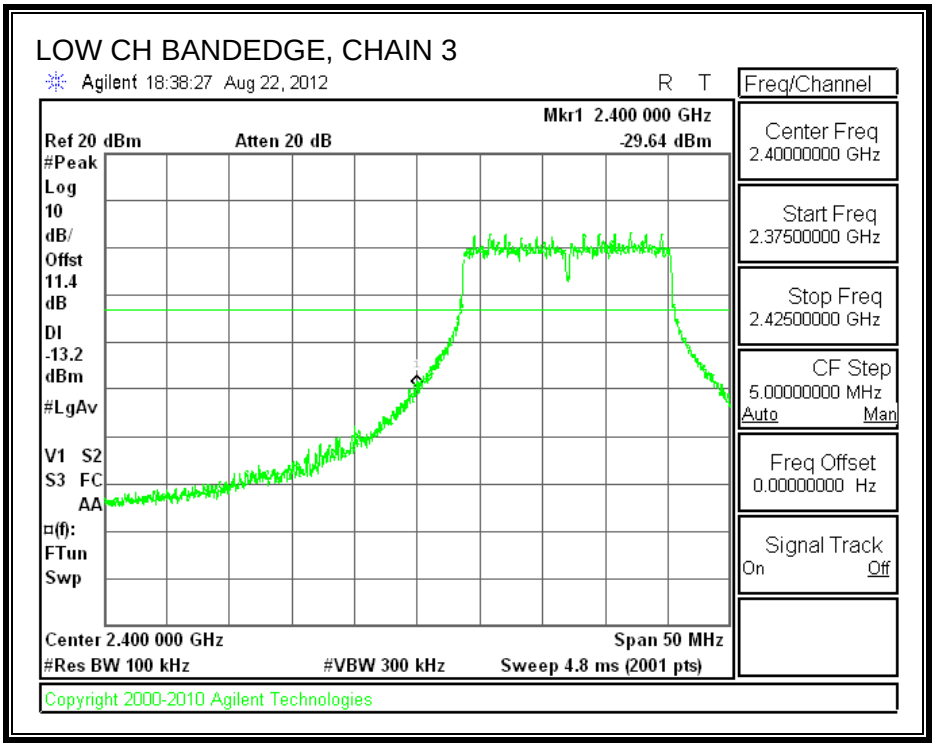


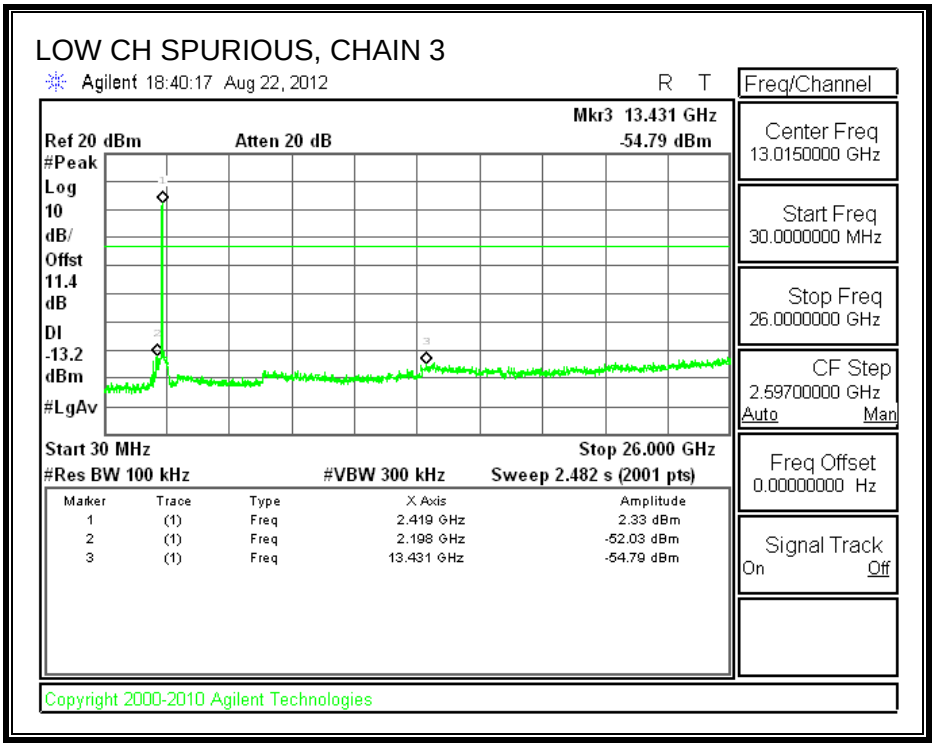
HIGH CH BANDEDGE, CHAIN 2



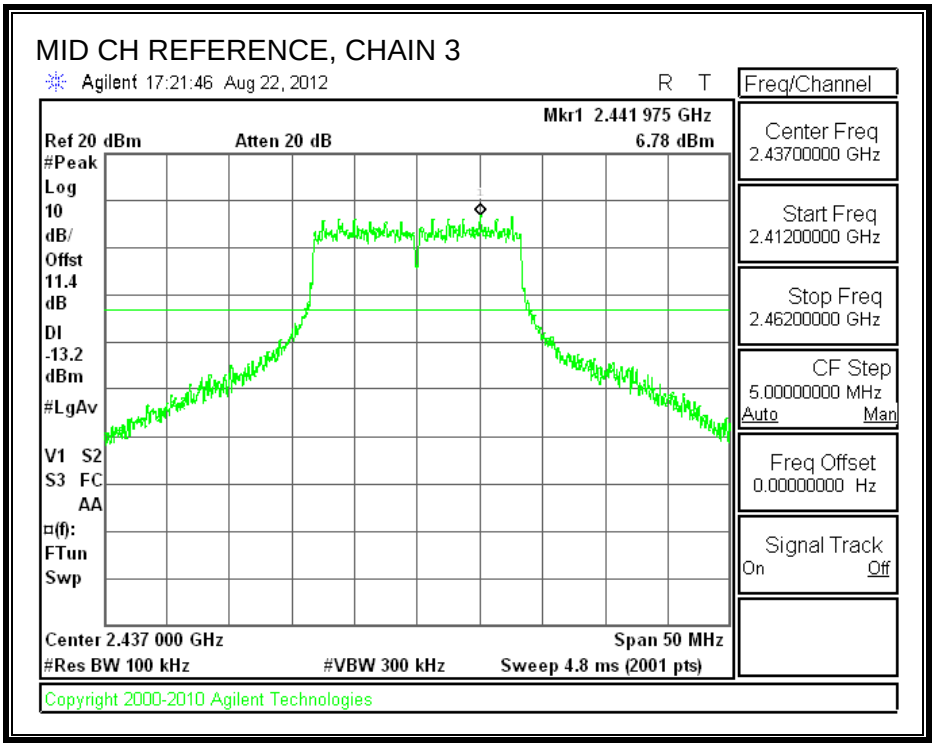


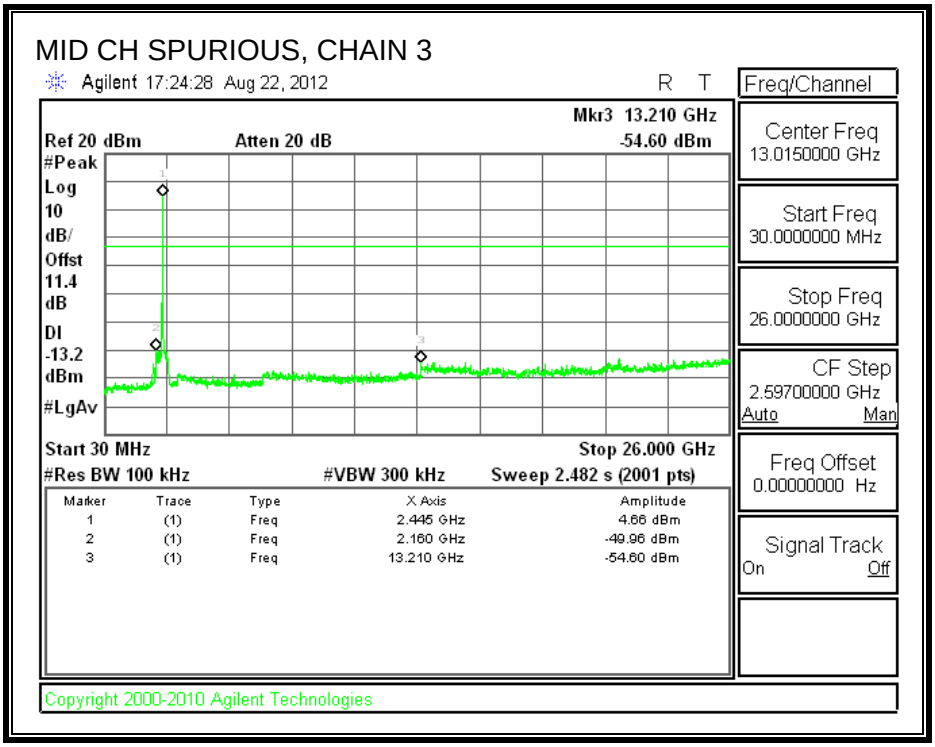
CHAIN 3 SPURIOUS EMISSIONS

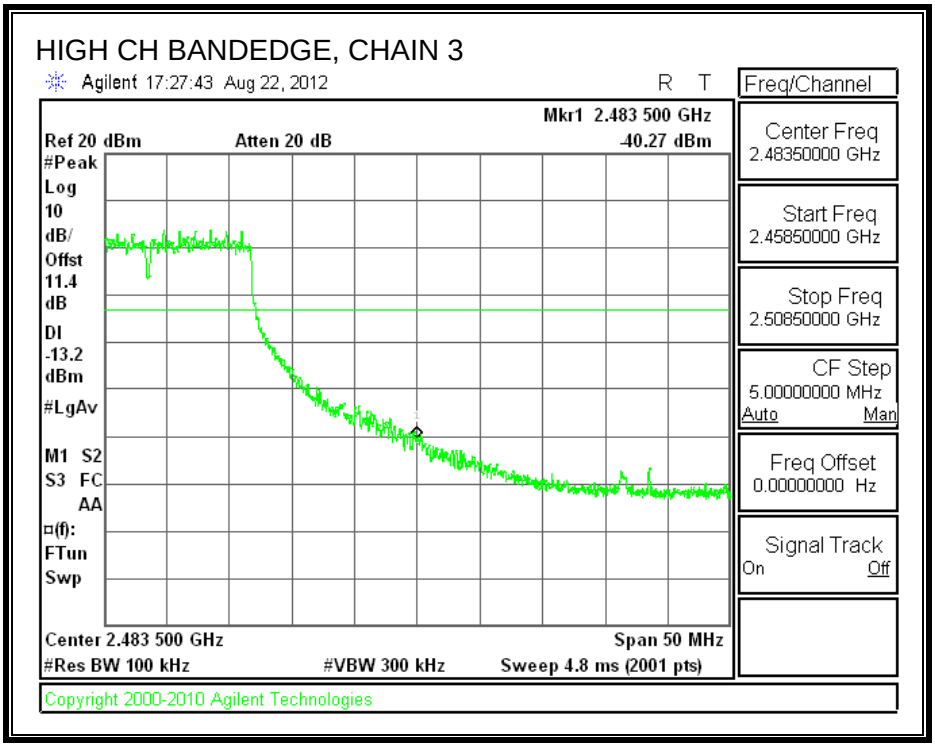


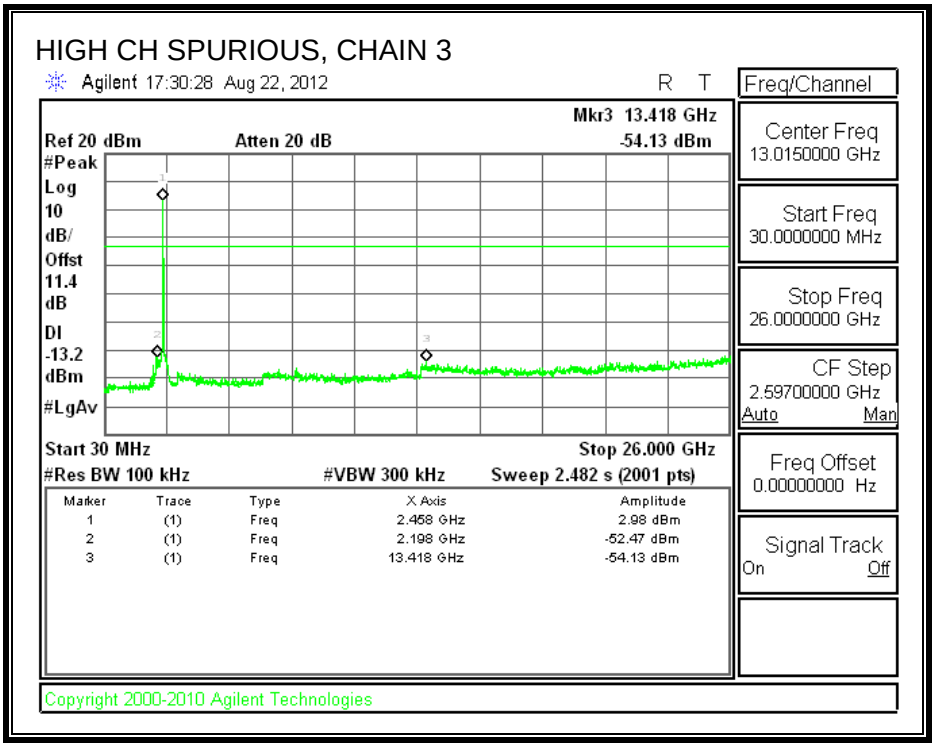


MID CH REFERENCE, CHAIN 3









7.2. 802.11n THREE CHAINS HT20 MODE IN THE 2.4 GHz BAND

7.2.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

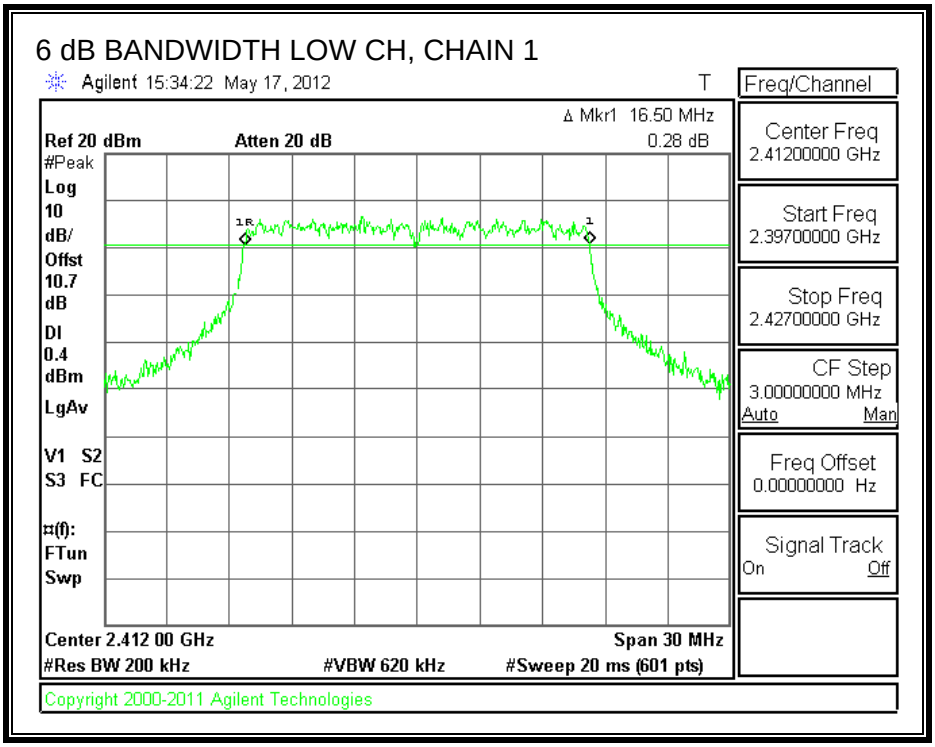
TEST PROCEDURE

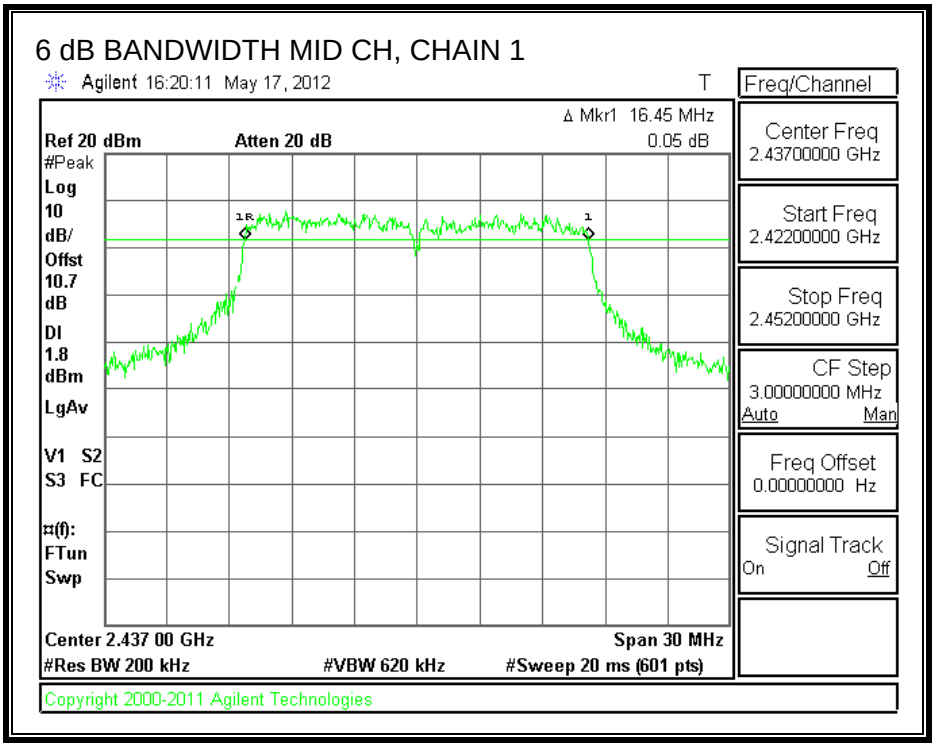
KDB 558074 D01 V01 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247", dated 01/18/2012.

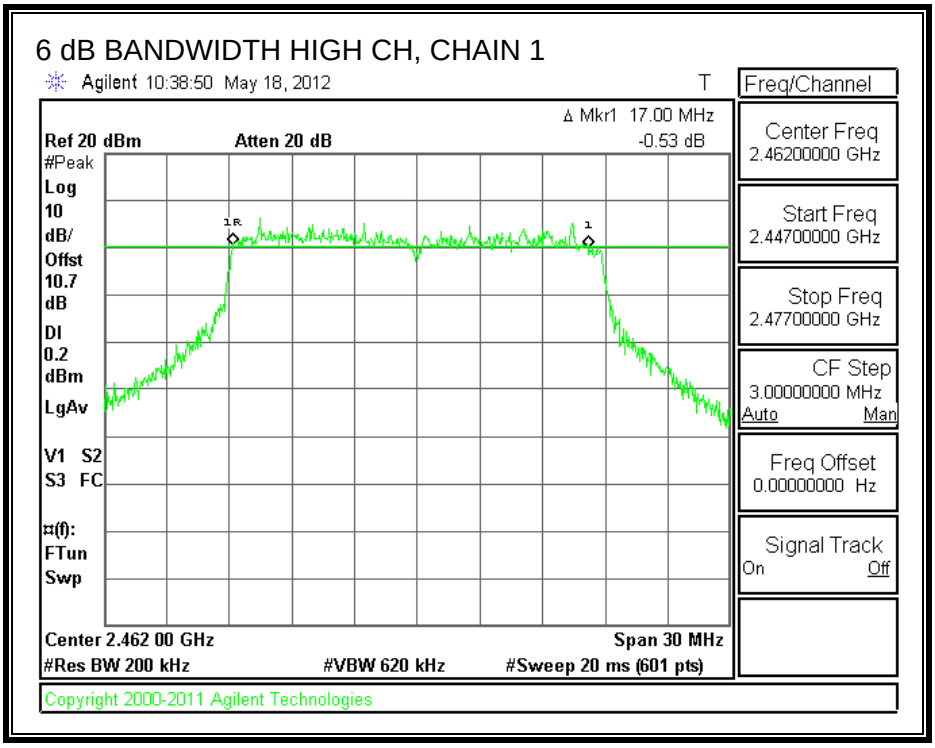
RESULTS

Channel	Frequency (MHz)	Chain 1 6 dB BW (MHz)	Chain 2 6 dB BW (MHz)	Chain 3 6 dB BW (MHz)	Minimum Limit (MHz)
Low	2412	16.50	16.50	16.45	0.5
Middle	2437	16.45	16.45	16.45	0.5
High	2462	17.00	17.65	17.65	0.5

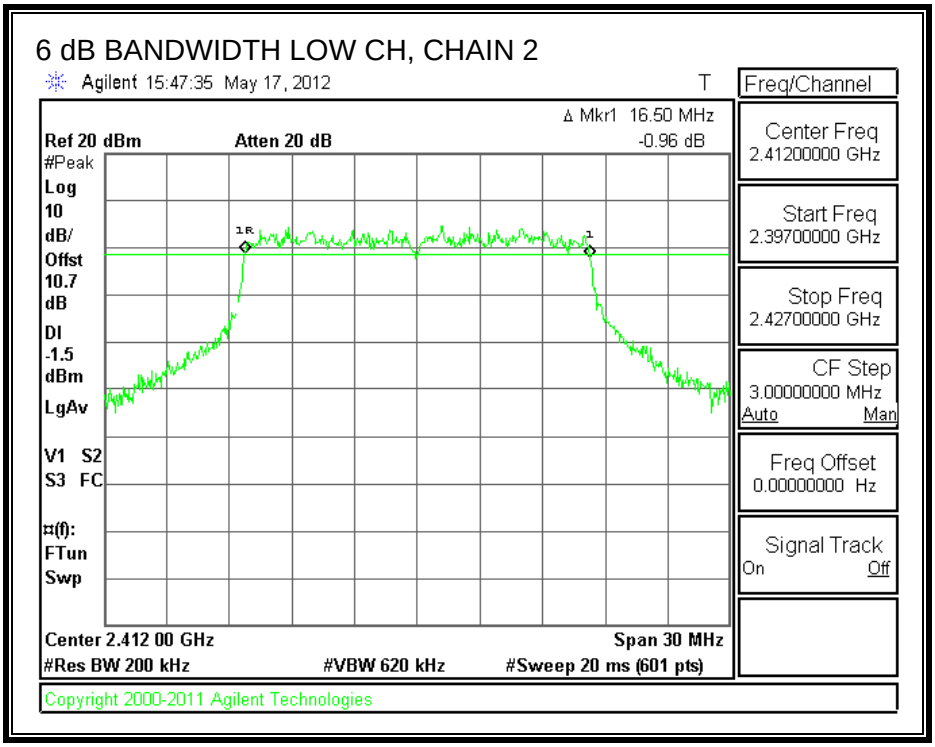
6 dB BANDWIDTH, CHAIN 1

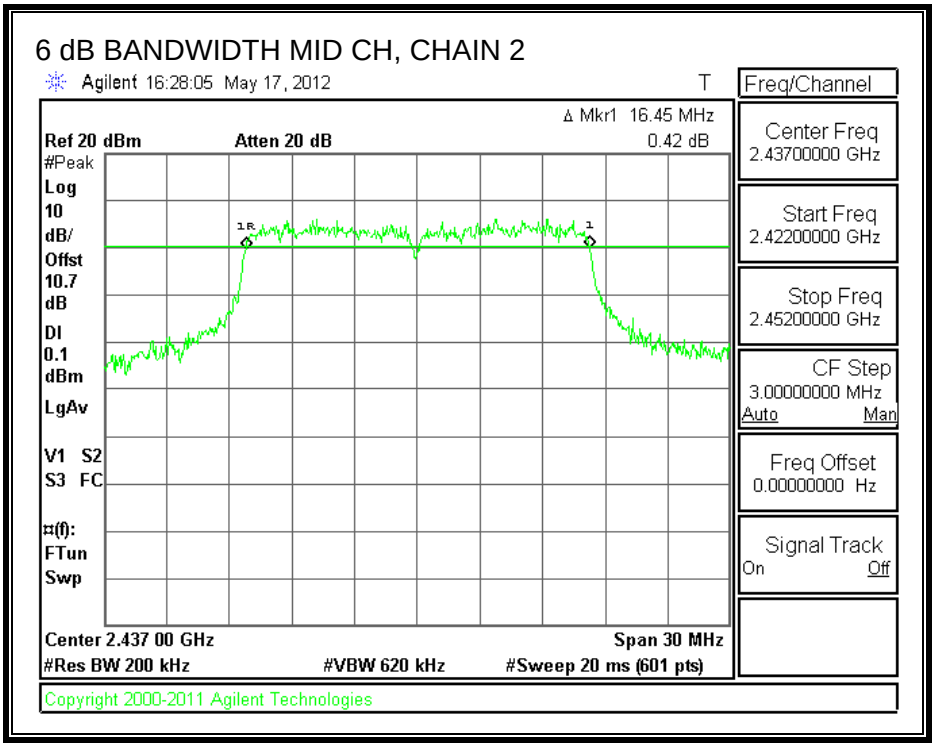


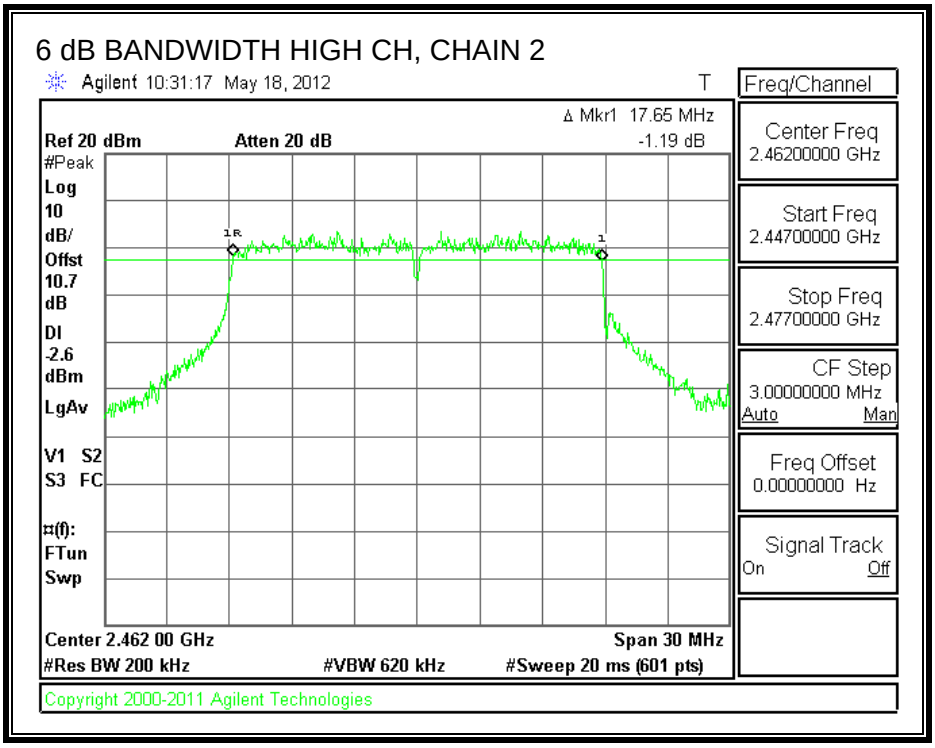




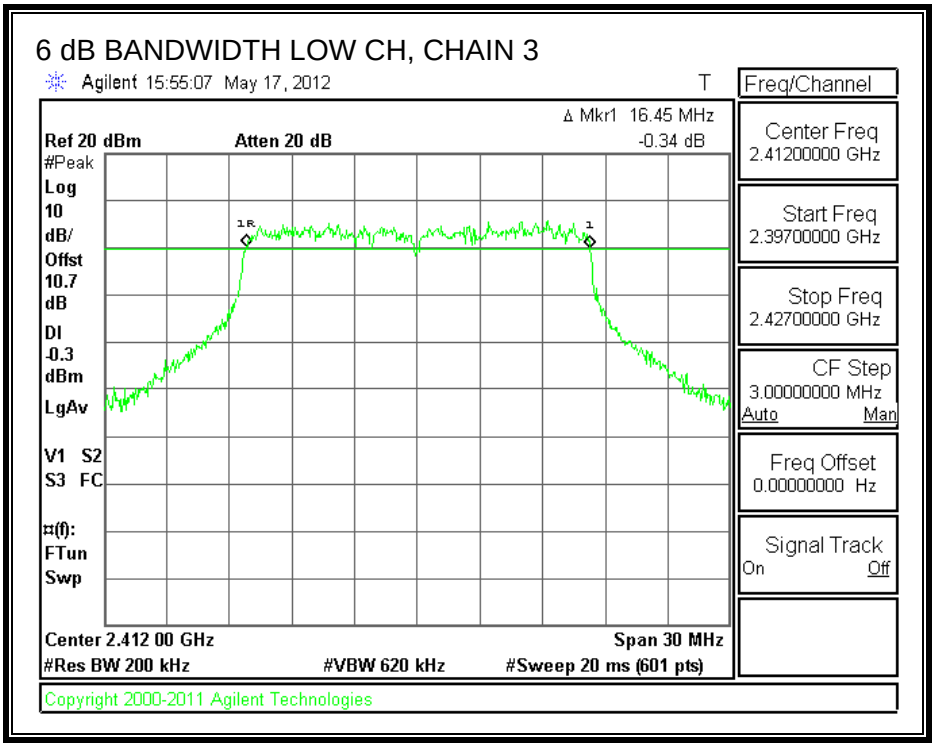
6 dB BANDWIDTH, CHAIN 2

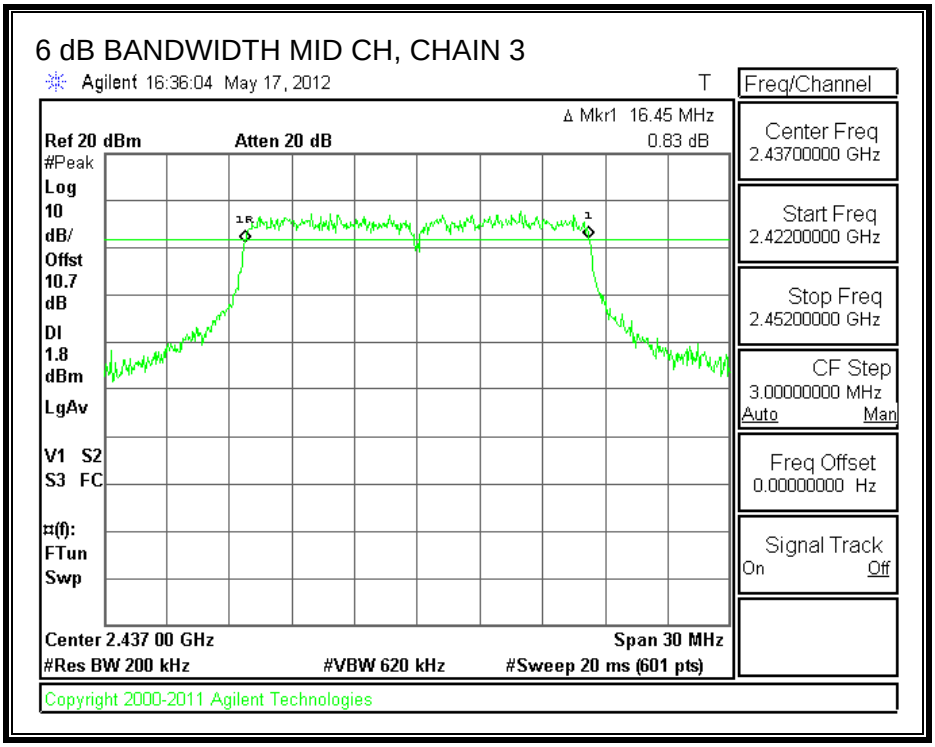


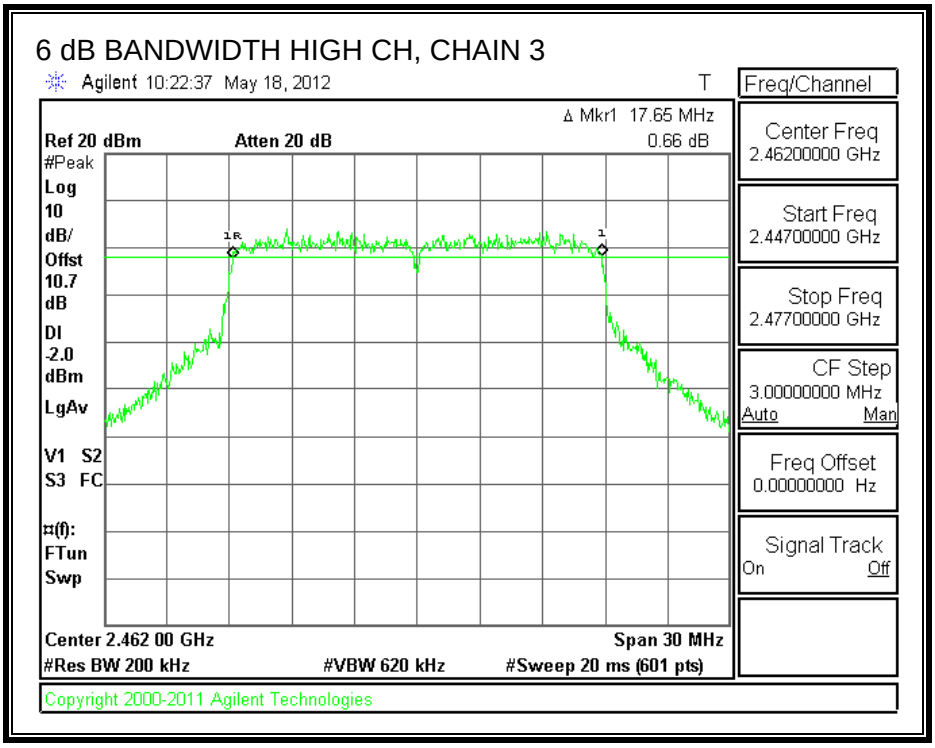




6 dB BANDWIDTH, CHAIN 3







7.2.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

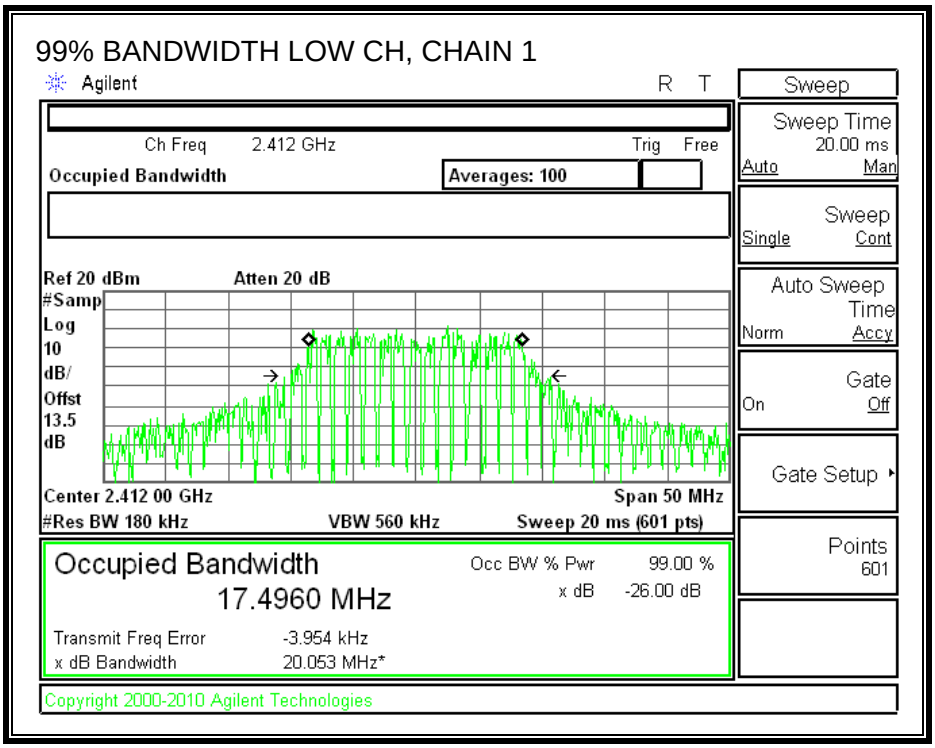
TEST PROCEDURE

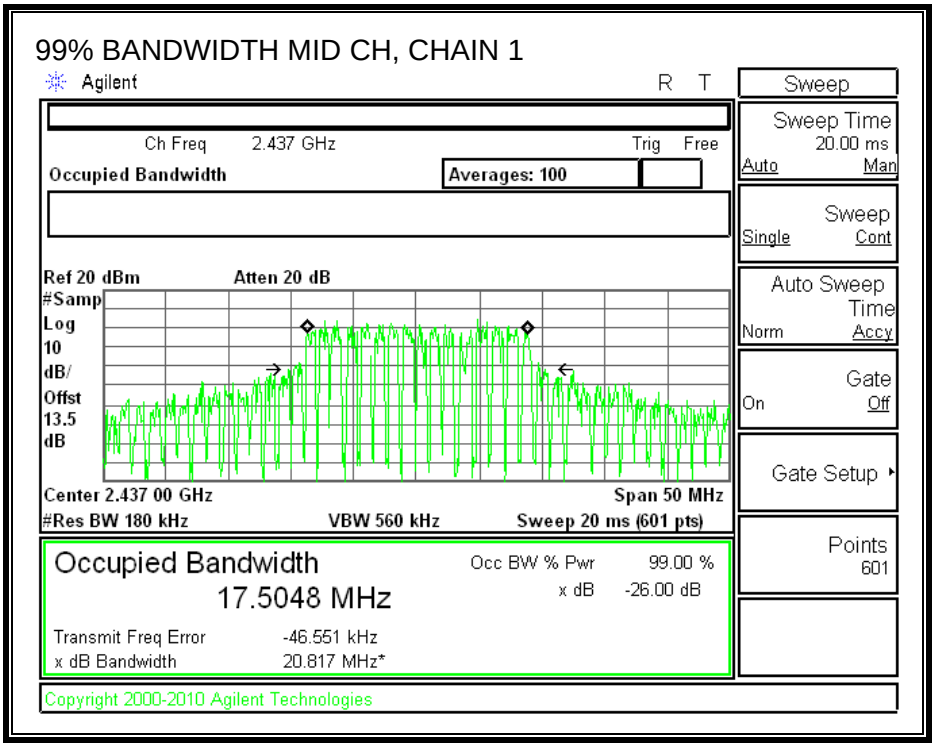
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

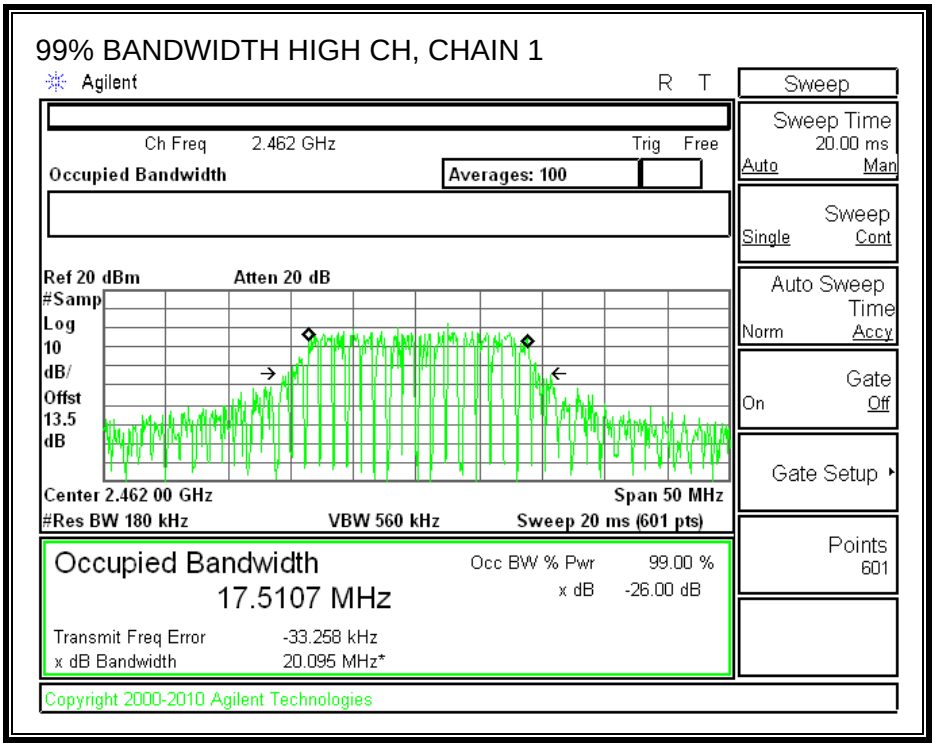
RESULTS

Channel	Frequency (MHz)	Chain 1 99% Bandwidth (MHz)	Chain 2 99% Bandwidth (MHz)	Chain 3 99% Bandwidth (MHz)
Low	2412	17.4960	17.4625	17.4917
Middle	2437	17.5048	17.4938	17.5223
High	2462	17.5107	17.5096	17.4408

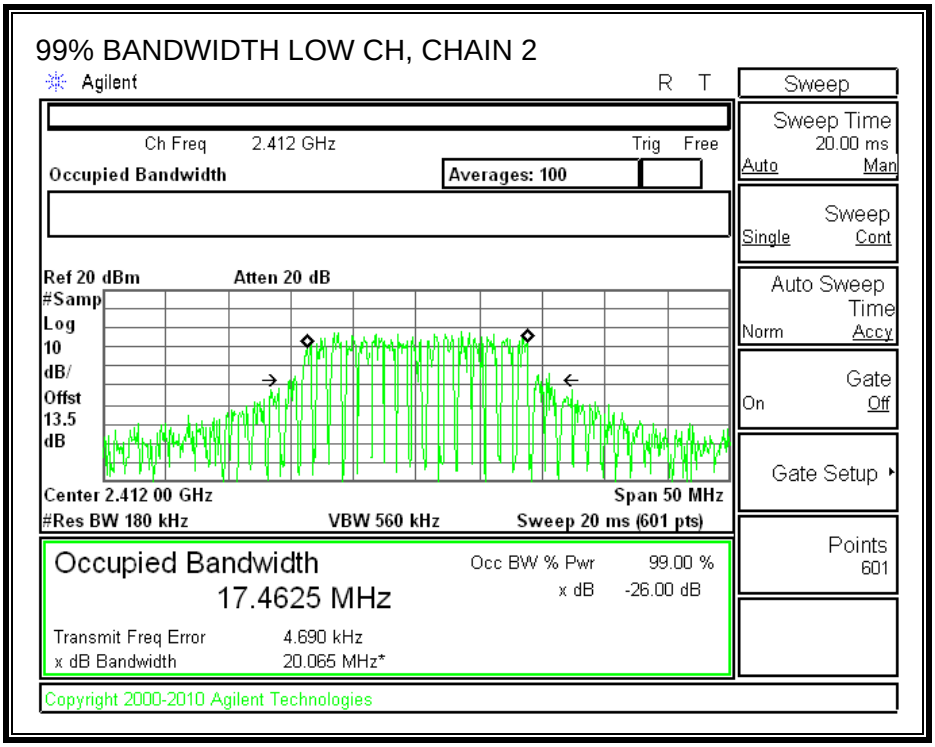
99% BANDWIDTH, CHAIN 1



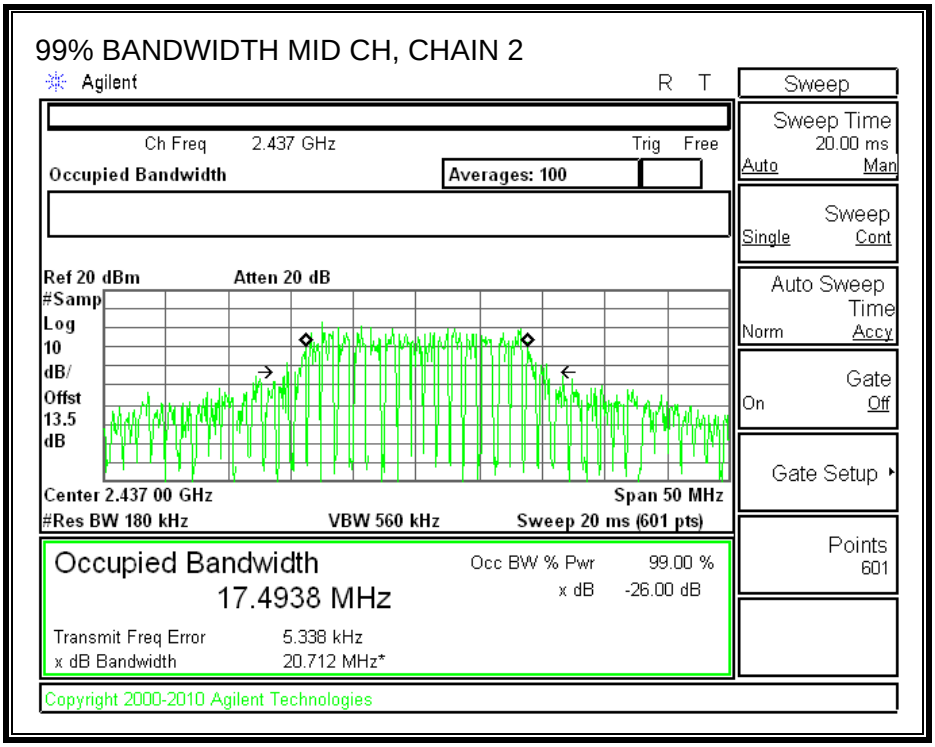


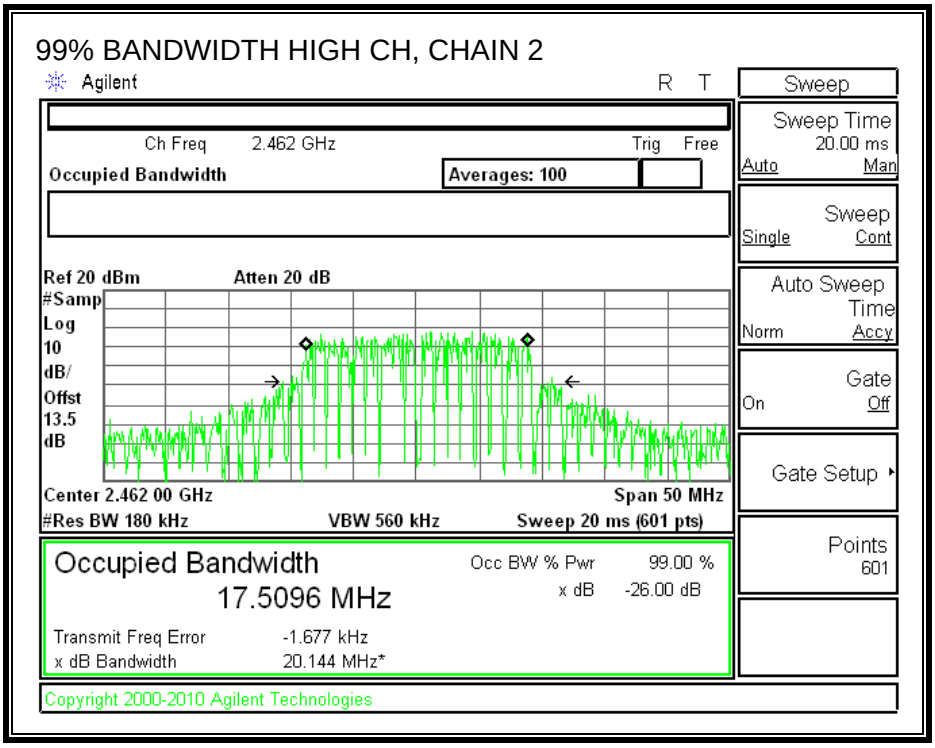


99% BANDWIDTH, CHAIN 2

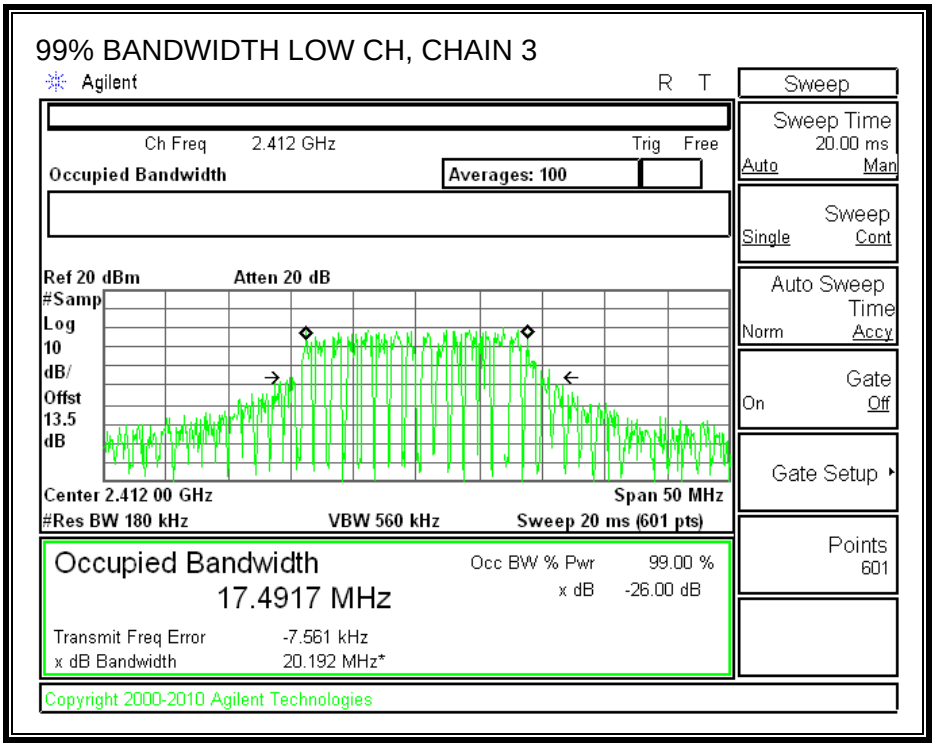


99% BANDWIDTH MID CH, CHAIN 2

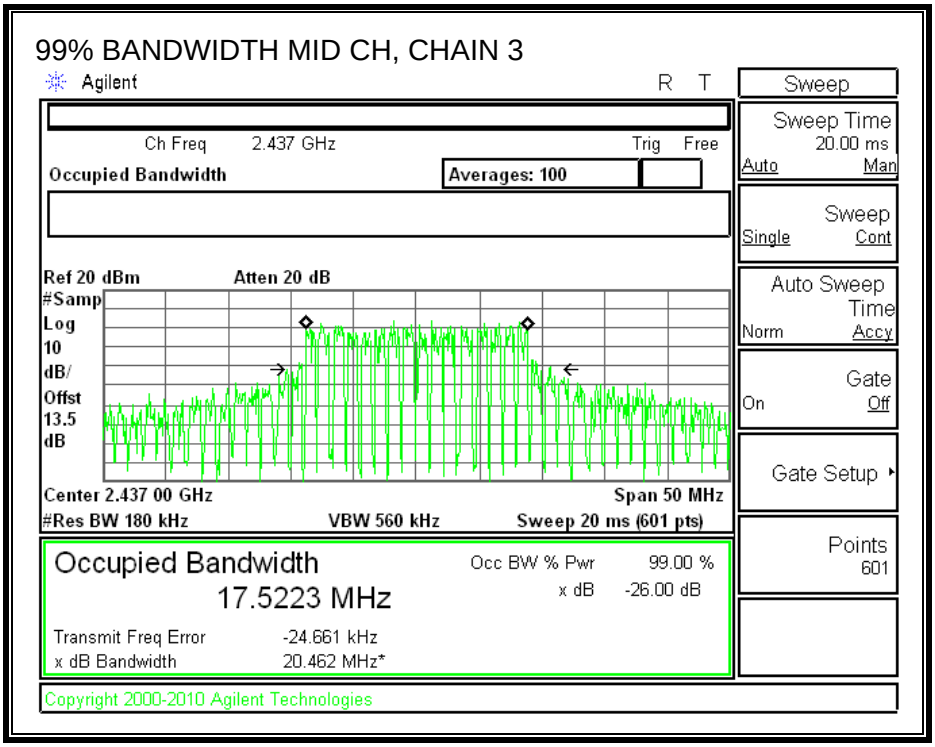


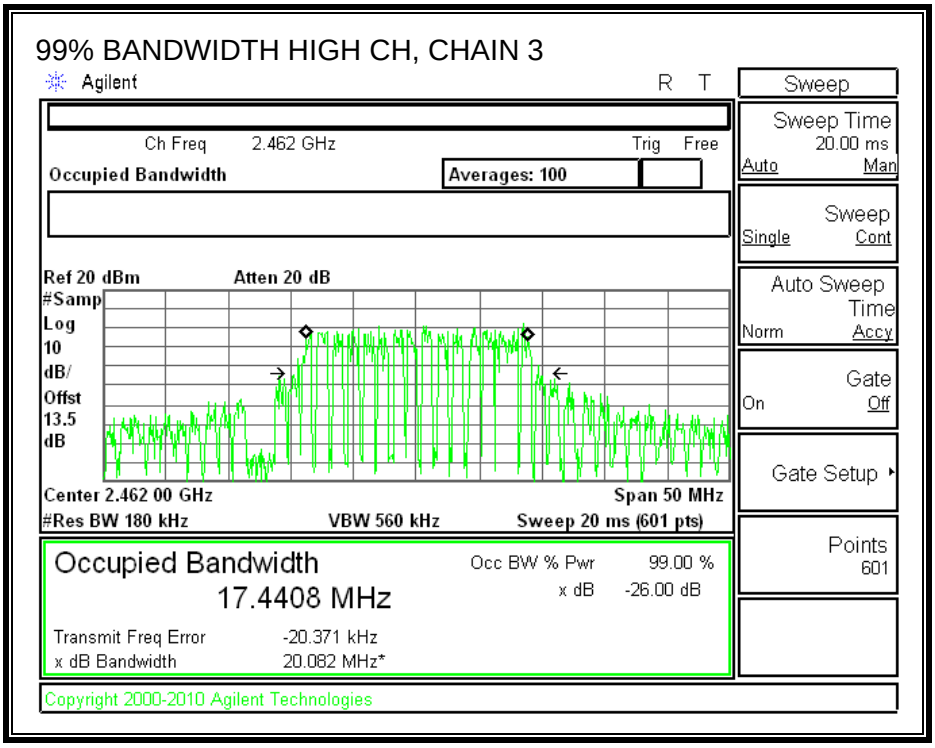


99% BANDWIDTH, CHAIN 3



99% BANDWIDTH MID CH, CHAIN 3





7.2.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

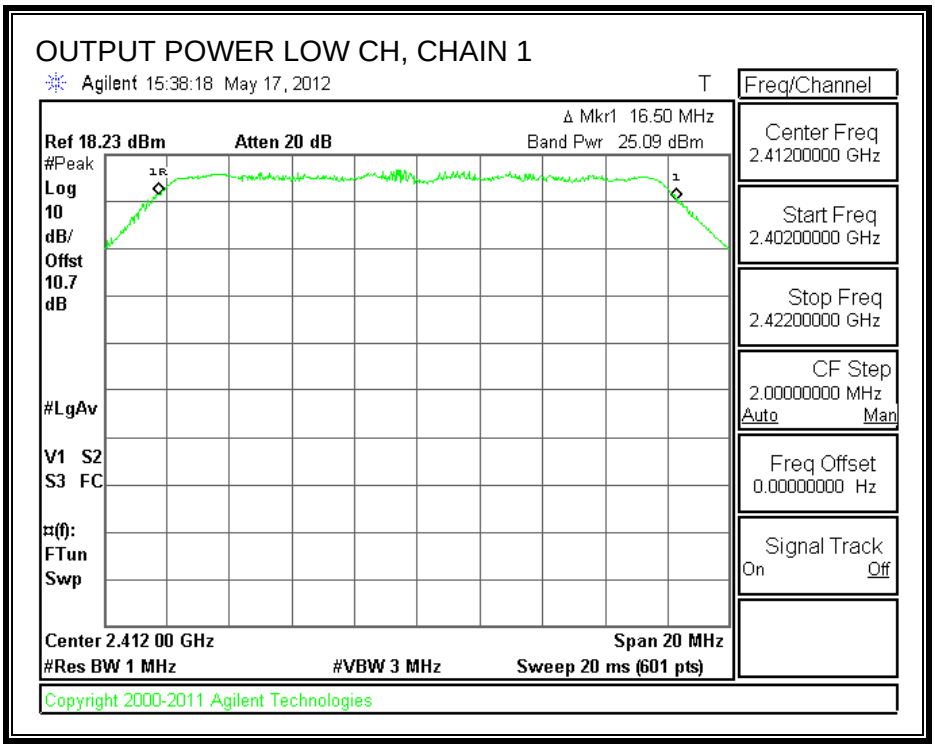
TEST PROCEDURE

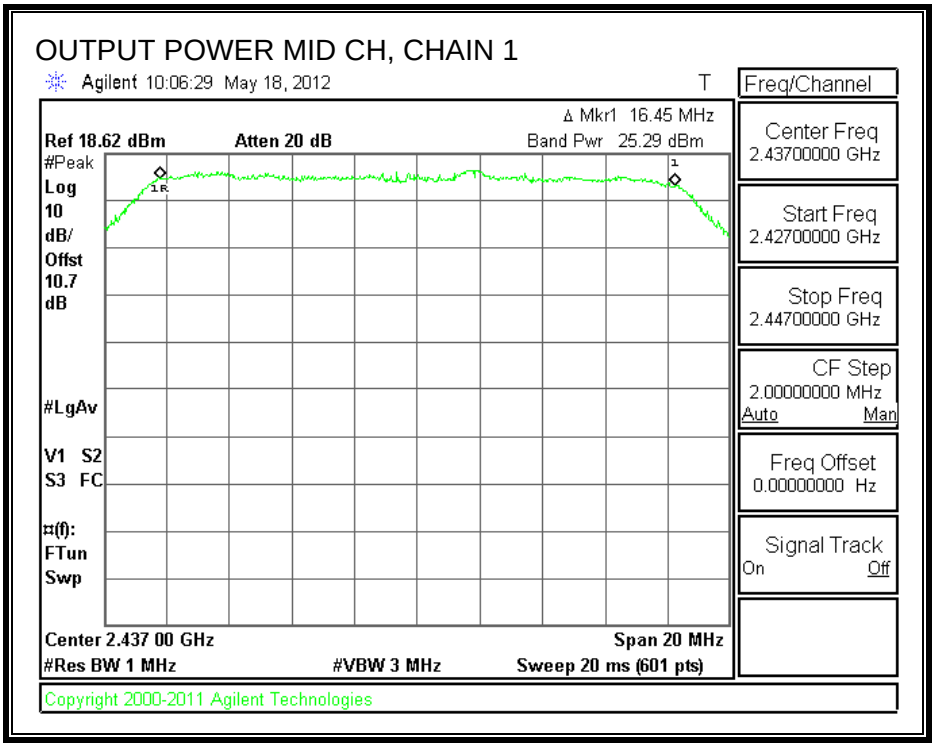
KDB 558074 D01 V01 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247", dated 01/18/2012.

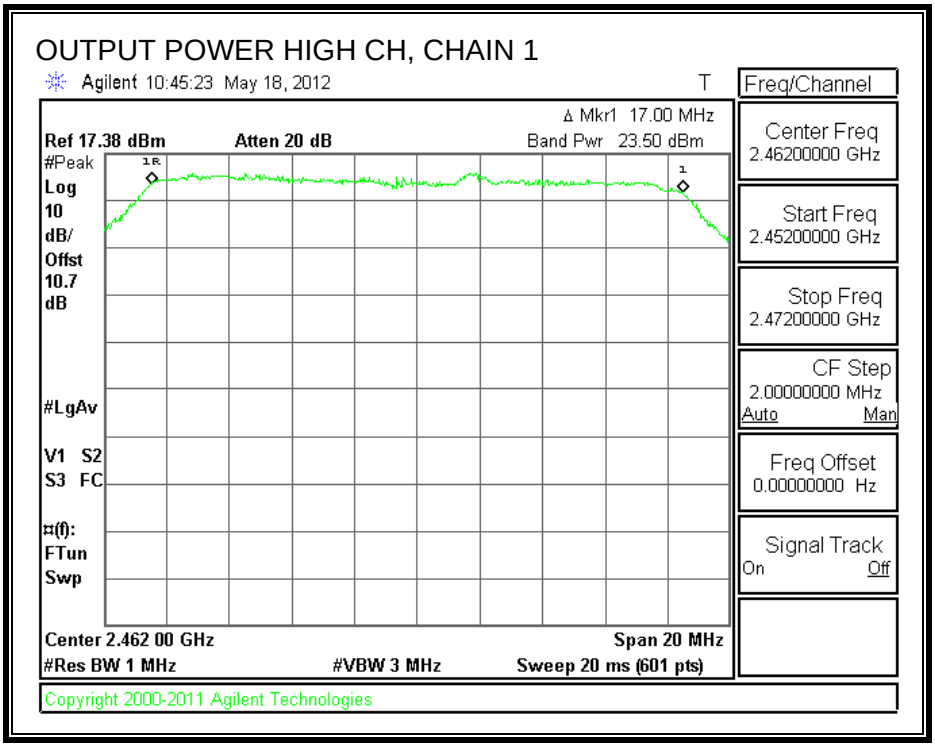
RESULTS

Channel	Frequency (MHz)	Chain 1 PK Power (dBm)	Chain 2 PK Power (dBm)	Chain 3 PK Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	2412	25.09	22.85	24.30	28.95	30.00	-1.05
Mid	2437	25.29	23.82	25.36	29.65	30.00	-0.35
High	2462	23.50	22.21	22.50	27.54	30.00	-2.46

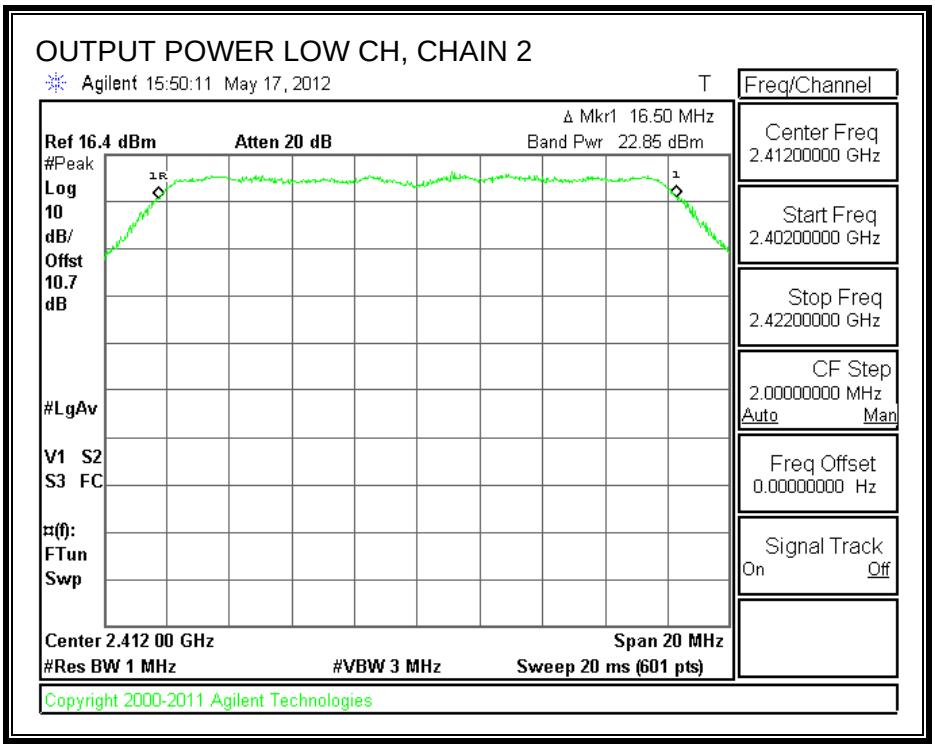
CHAIN 1 OUTPUT POWER

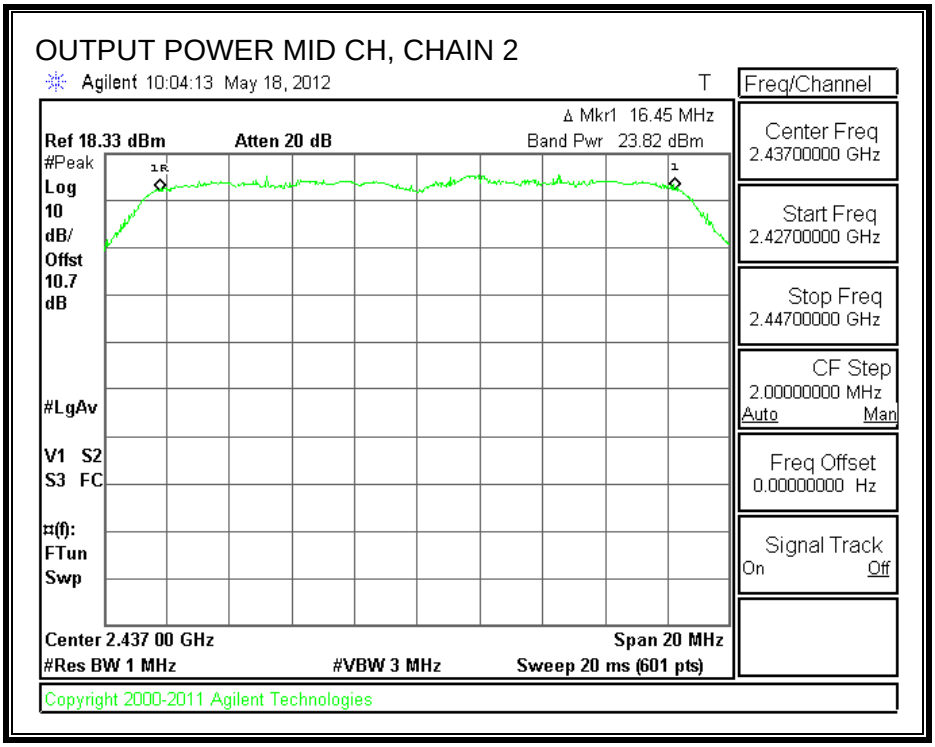


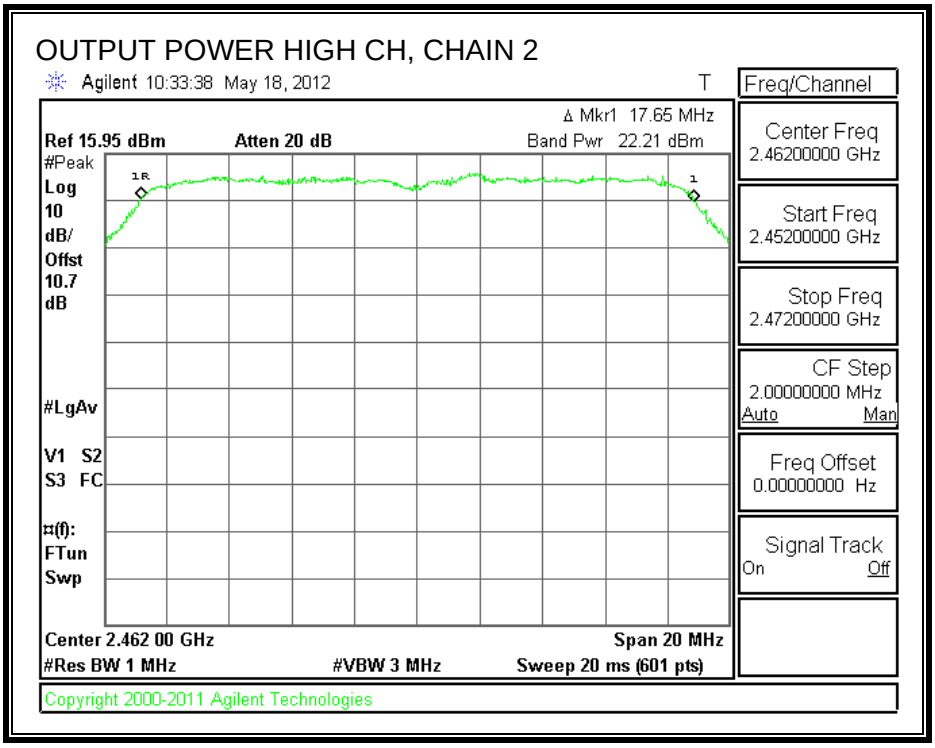




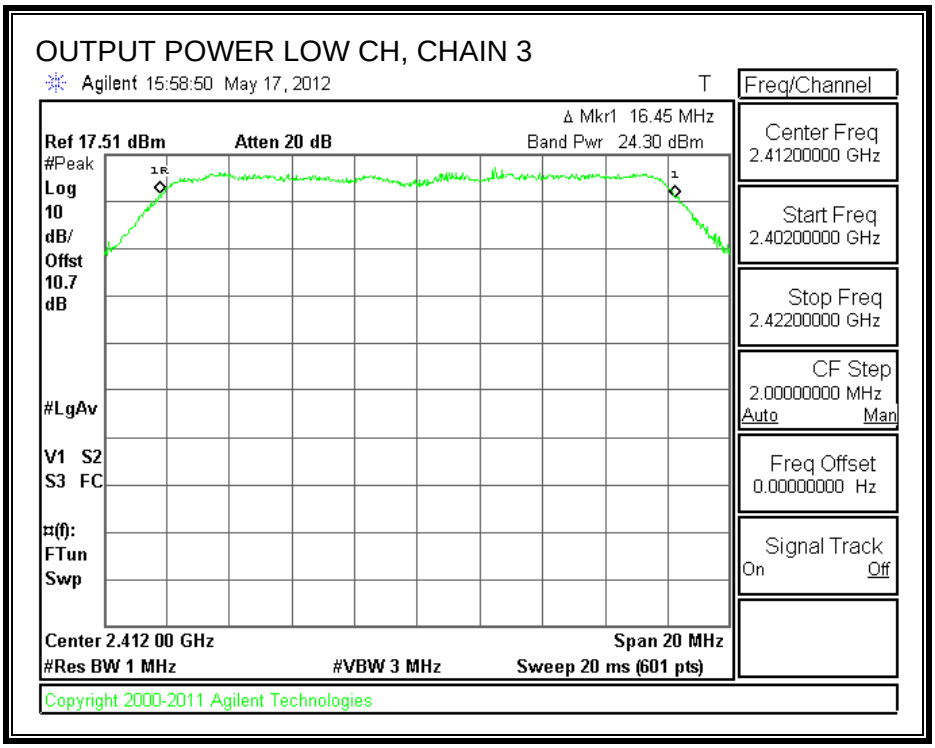
CHAIN 2 OUTPUT POWER

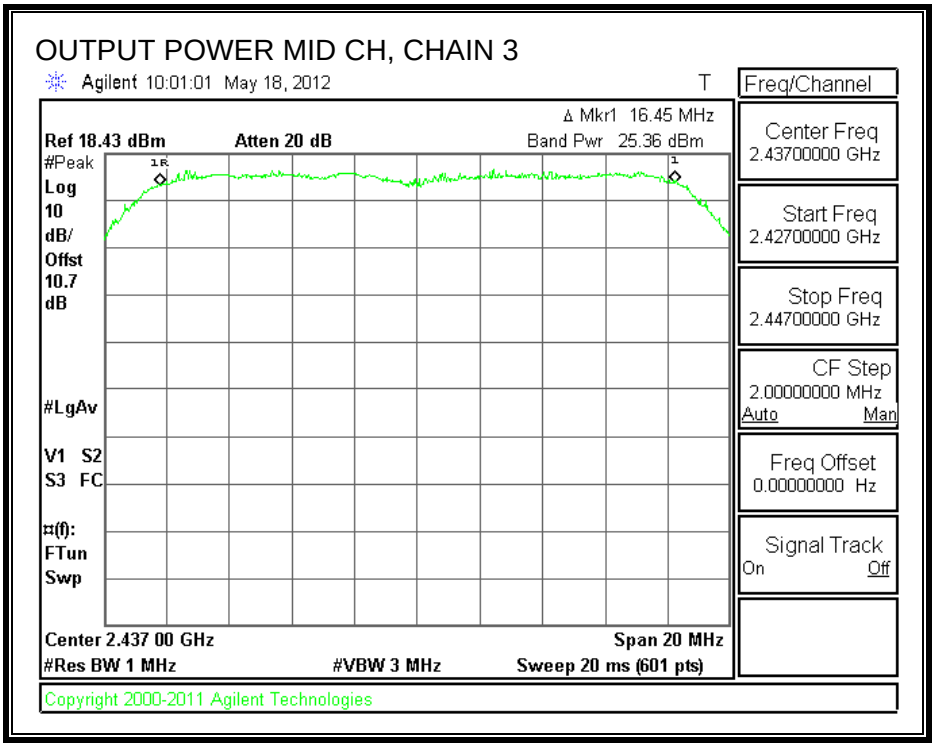


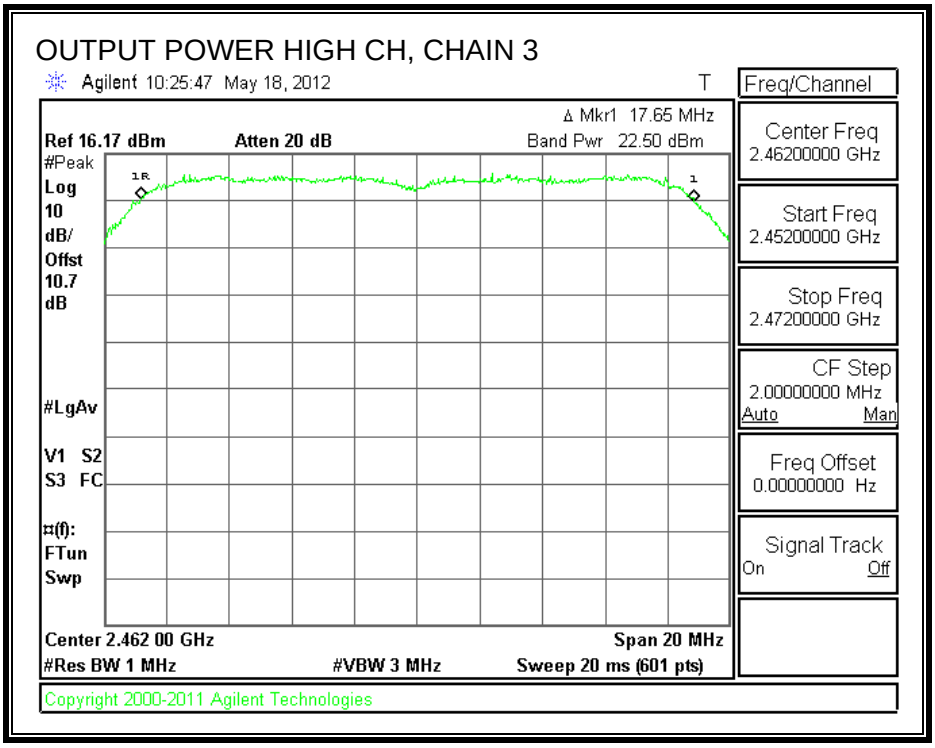




CHAIN 3 OUTPUT POWER







7.2.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 10.68 dB (including 10 dB pad and 0.68 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Chain 3 Power (dBm)	Total Power (dBm)
Low	2412	14.97	12.97	14.22	18.90
Middle	2437	16.12	14.77	16.29	20.55
High	2462	12.94	11.82	12.19	17.11

7.2.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

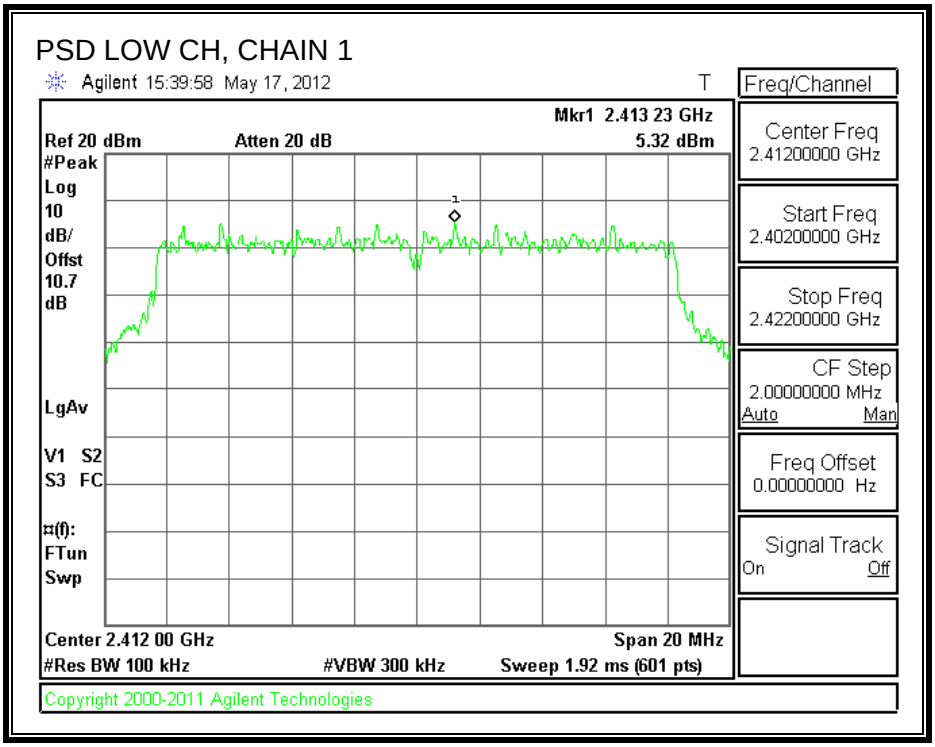
TEST PROCEDURE

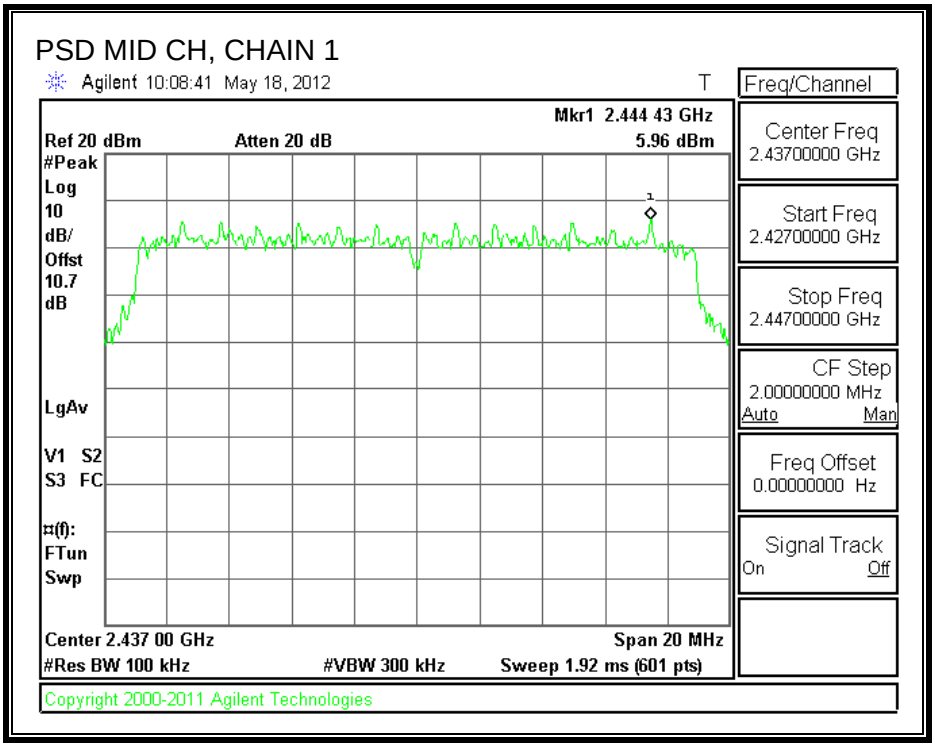
KDB 558074 D01 V01 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247", dated 01/18/2012.

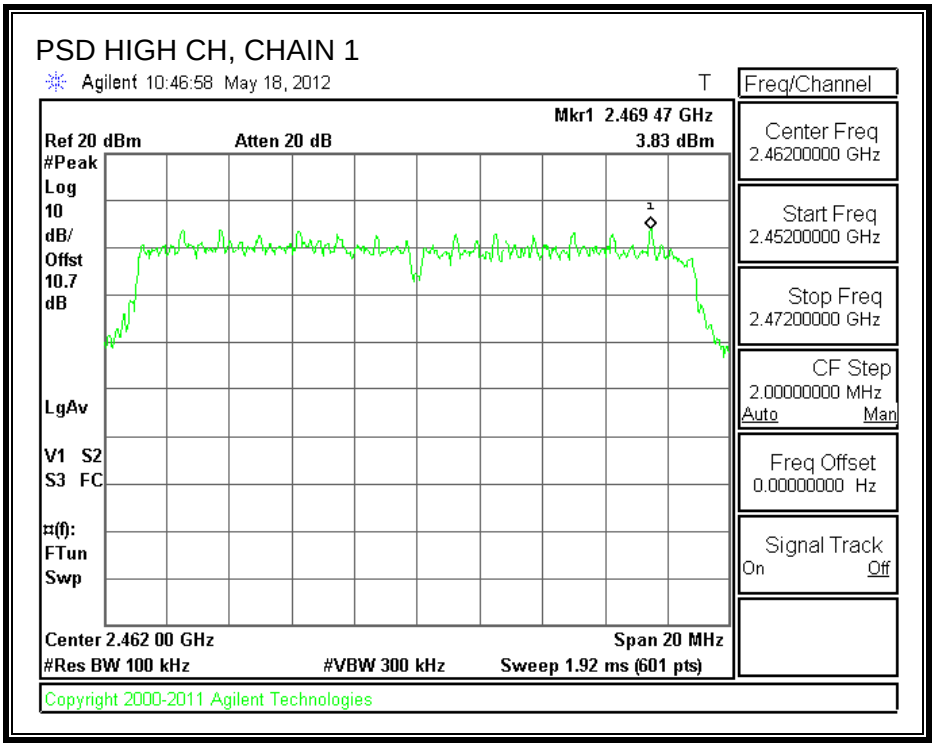
RESULTS

Channel	Frequency (MHz)	Chain 1 PSD (dBm)	Chain 2 PSD (dBm)	Chain 3 PSD (dBm)	10log (3kHz/100kHz)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	5.32	3.28	5.35	-15.20	-5.68	8	-13.68
Middle	2437	5.96	3.99	5.54	-15.20	-5.19	8	-13.19
High	2462	3.83	2.64	2.43	-15.20	-7.42	8	-15.42

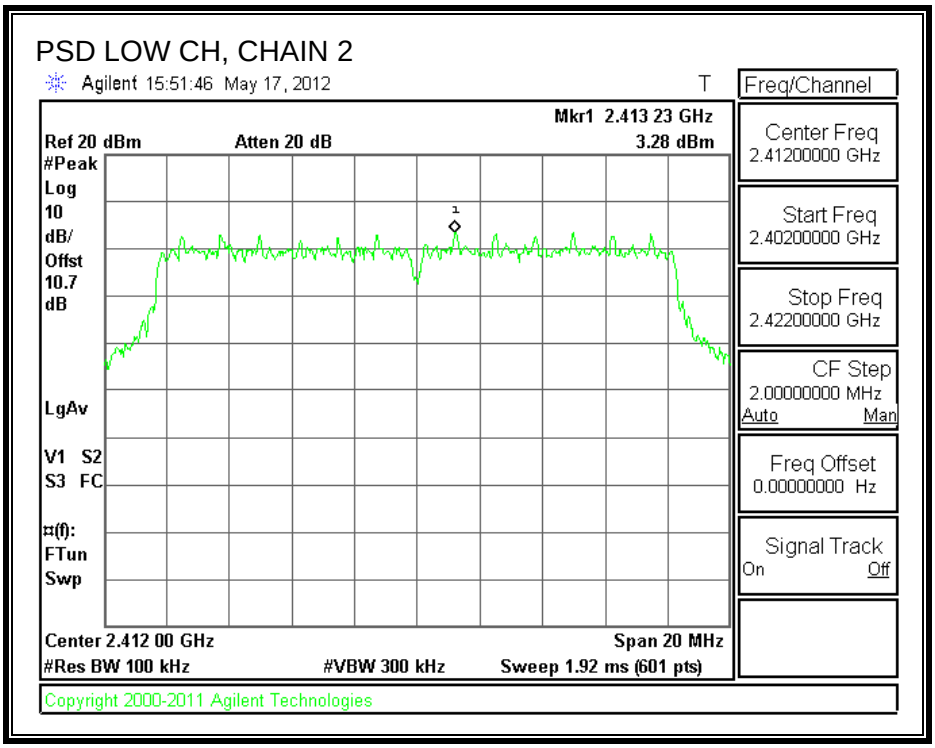
POWER SPECTRAL DENSITY, CHAIN 1

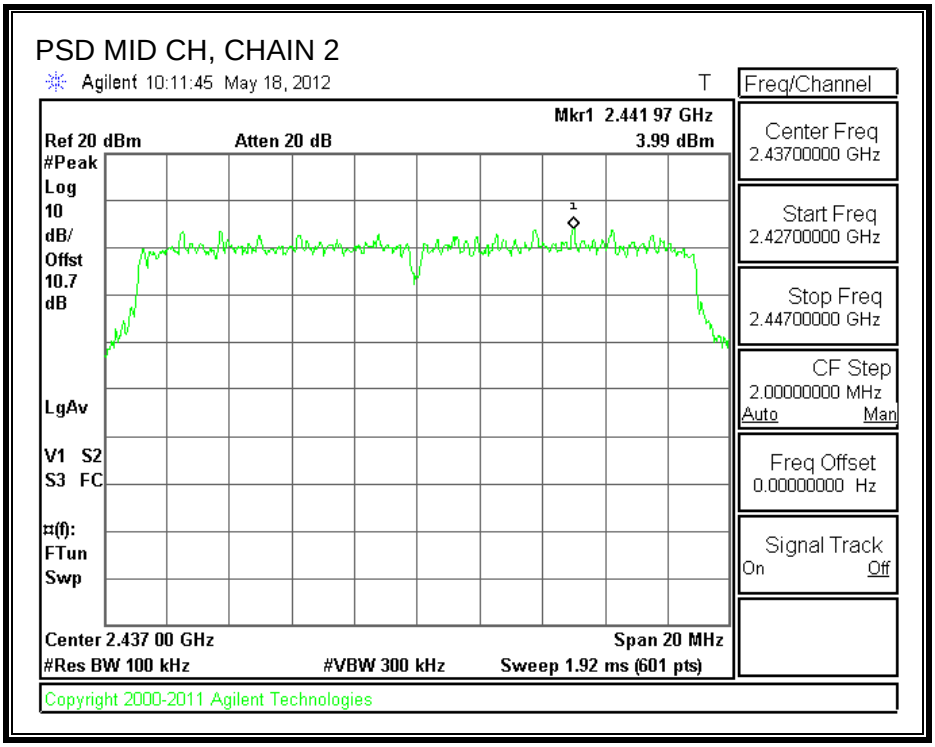


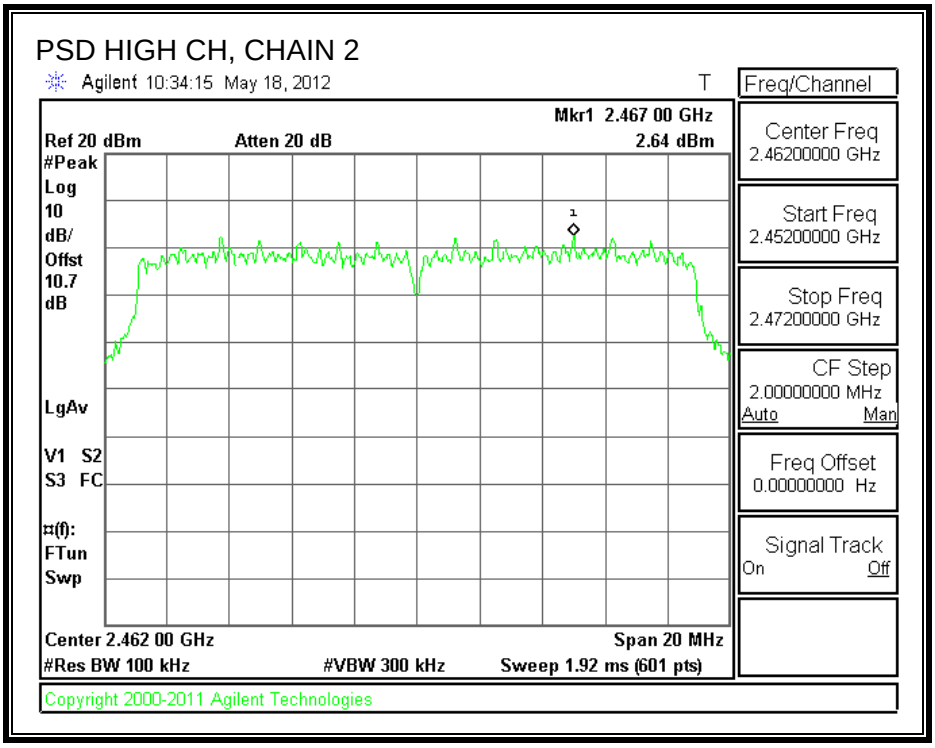




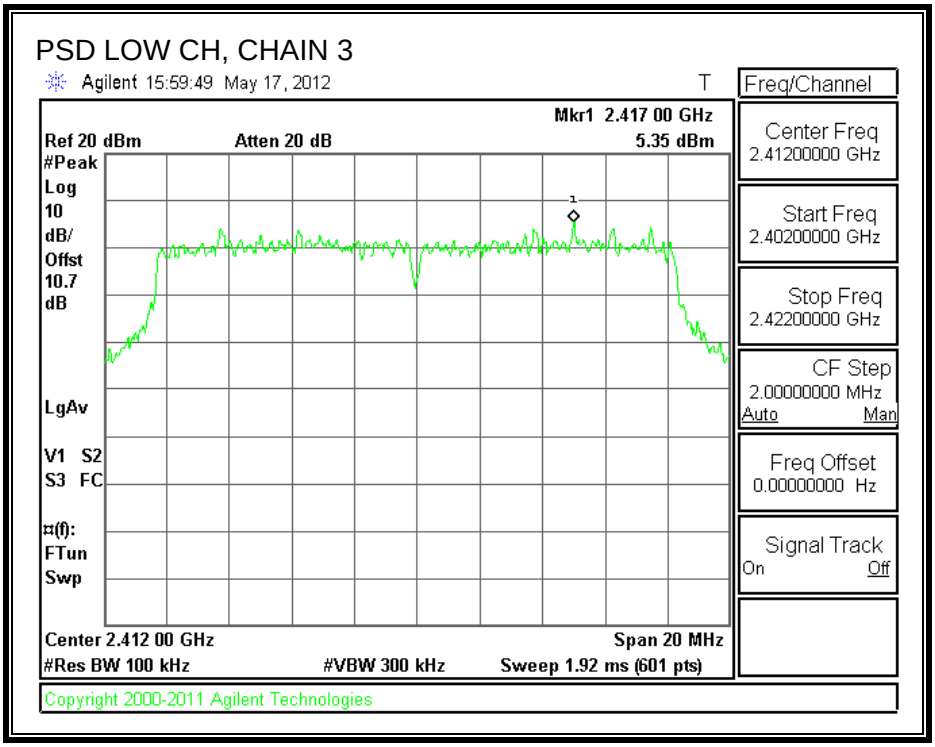
POWER SPECTRAL DENSITY, CHAIN 2

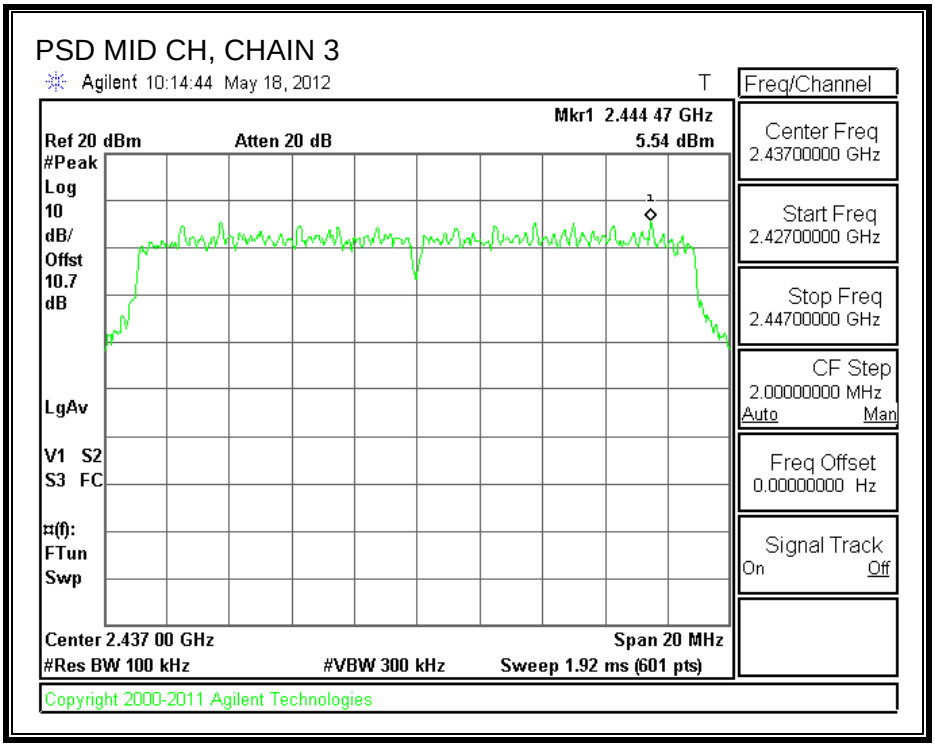


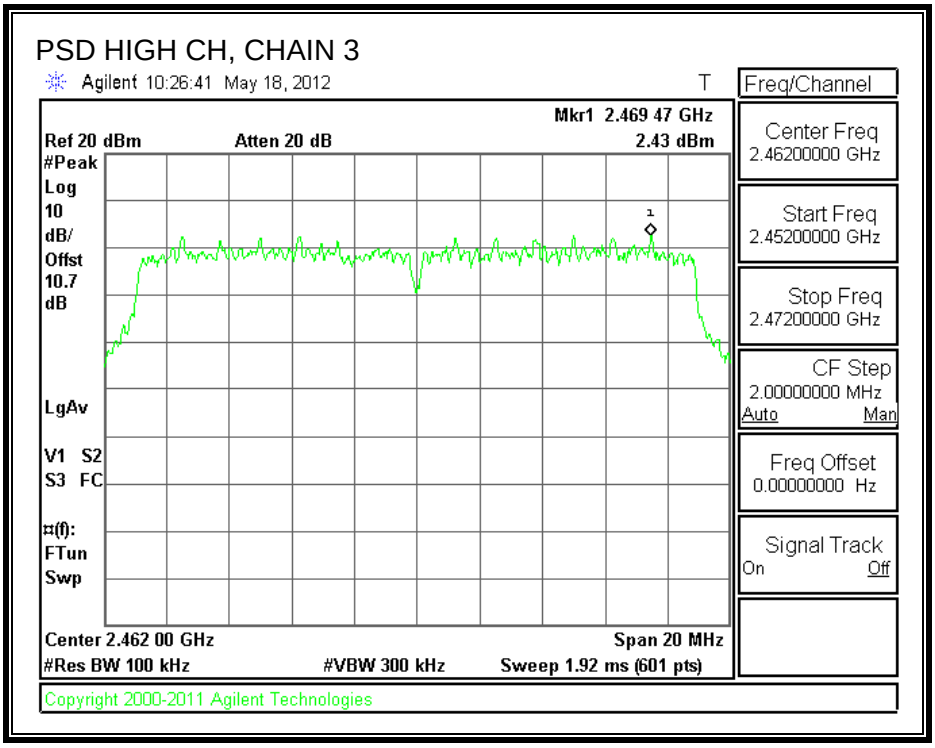




POWER SPECTRAL DENSITY, CHAIN 3







7.2.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

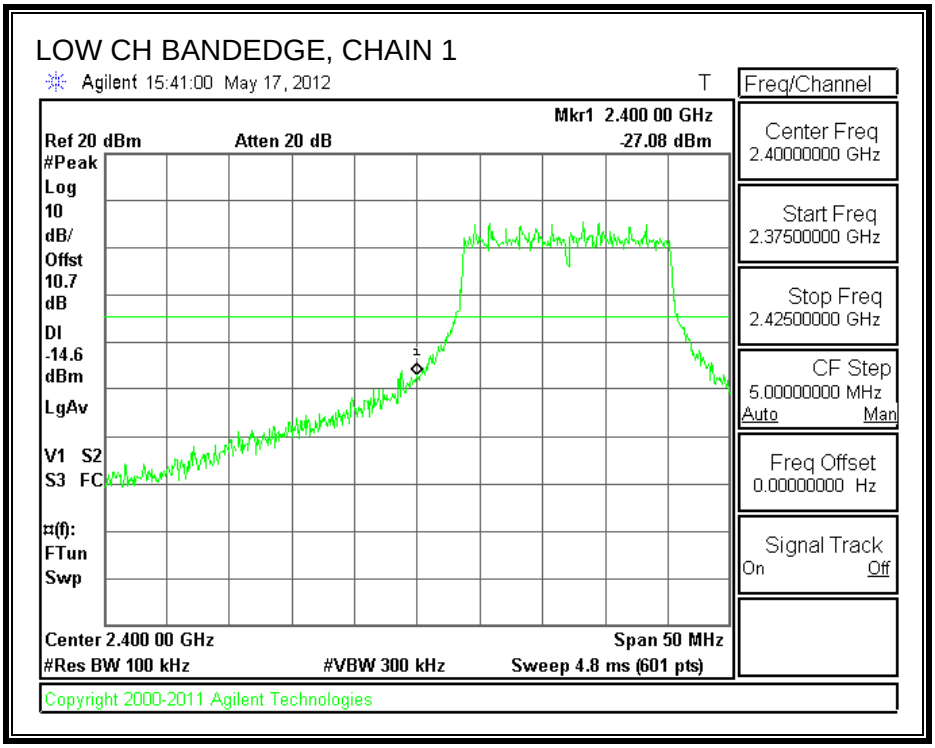
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

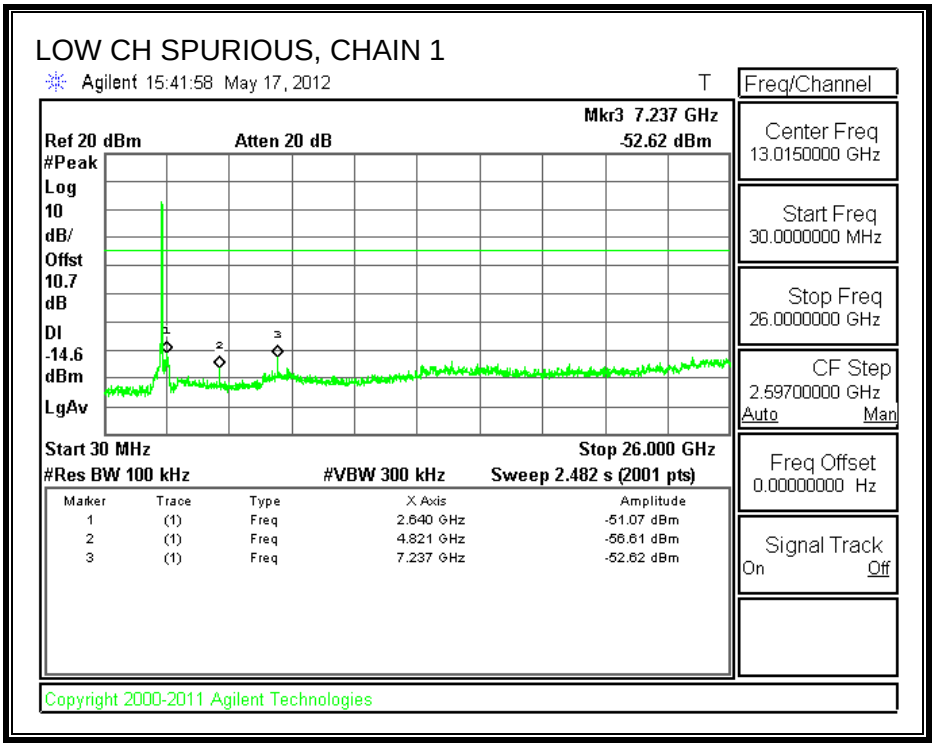
TEST PROCEDURE

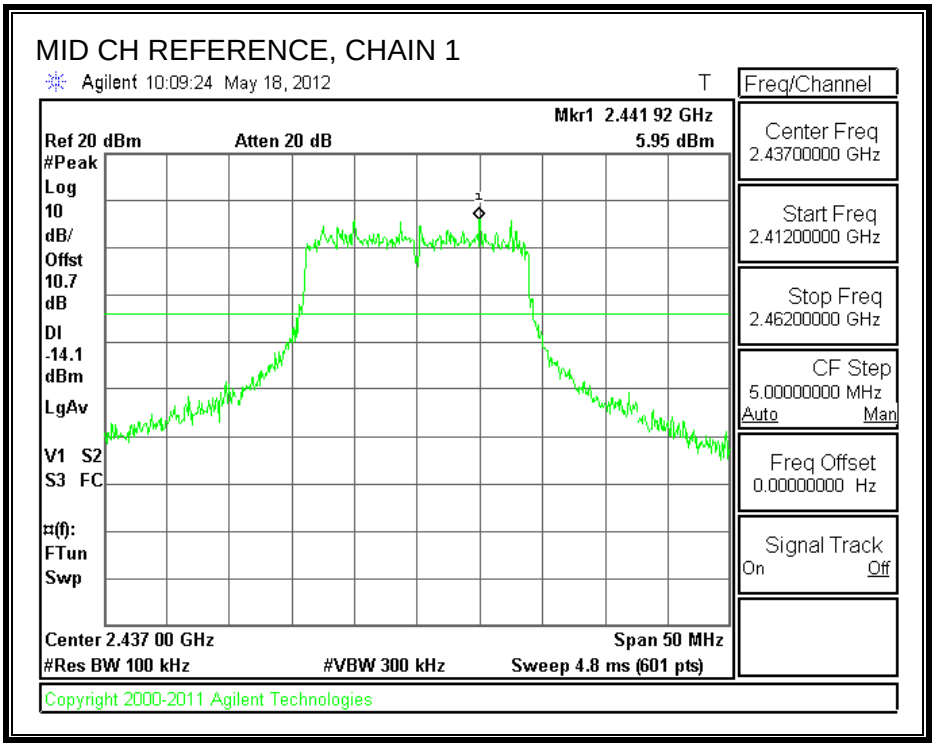
KDB 558074 D01 V01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”, dated 01/18/2012.

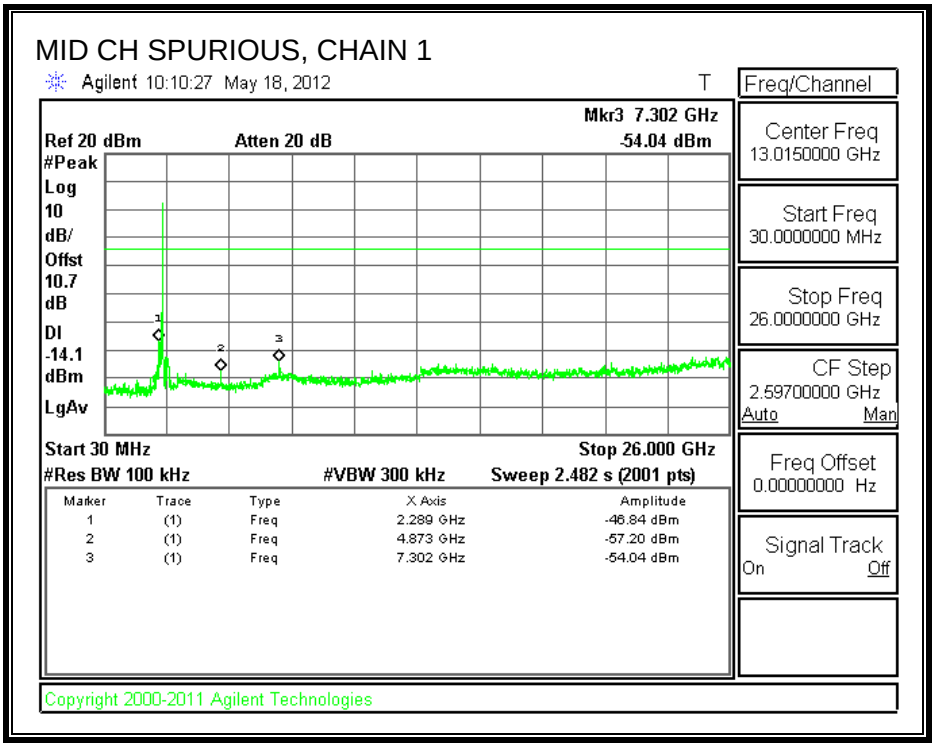
RESULTS

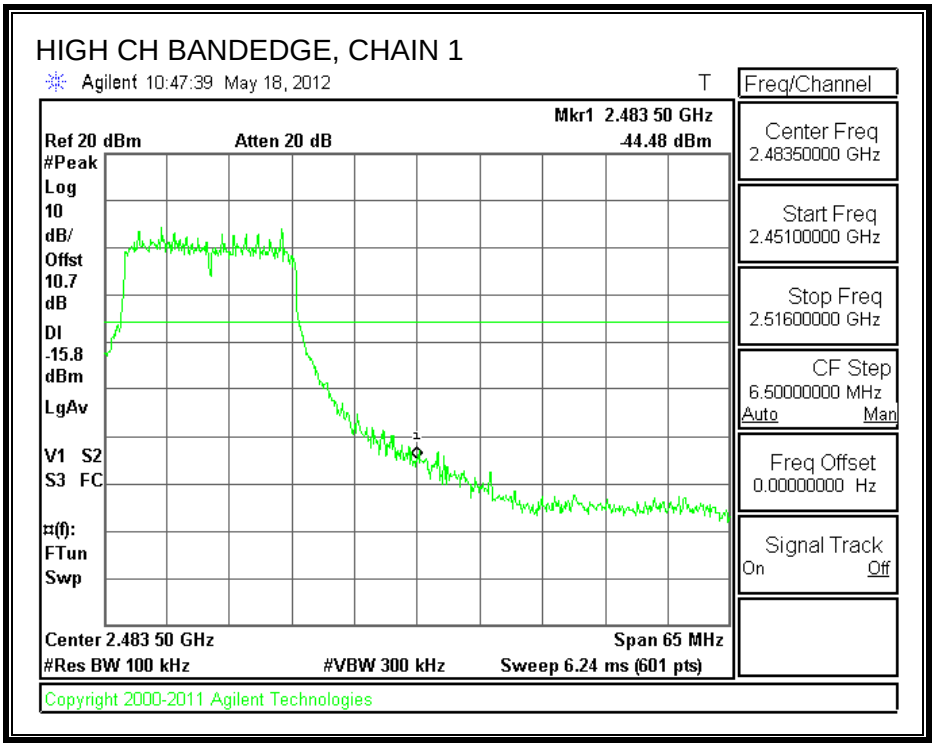
CHAIN 1 SPURIOUS EMISSIONS

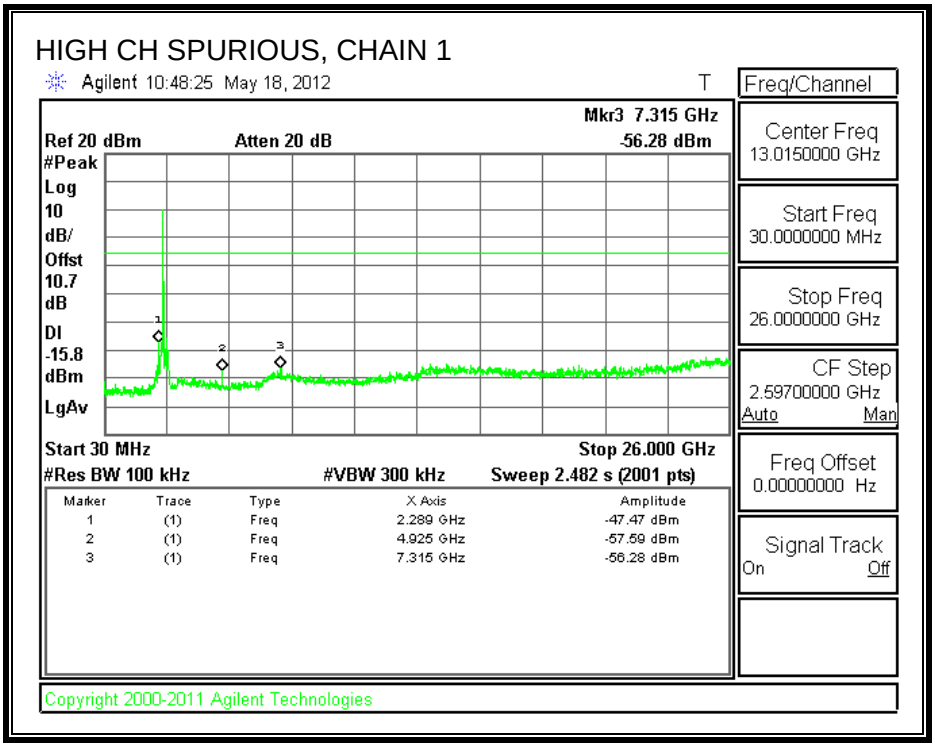




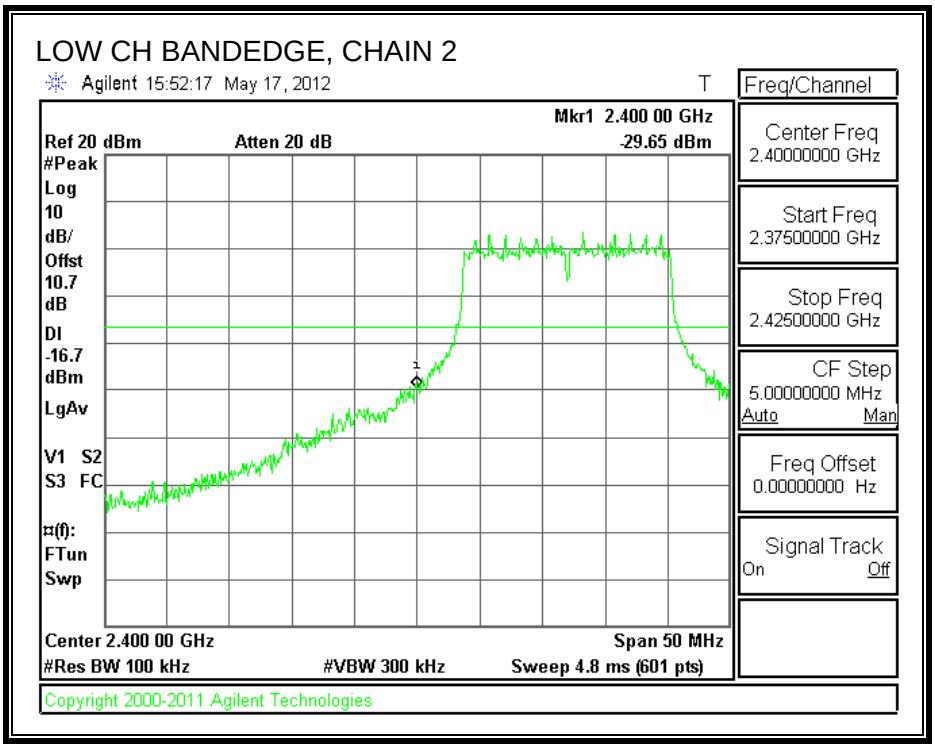


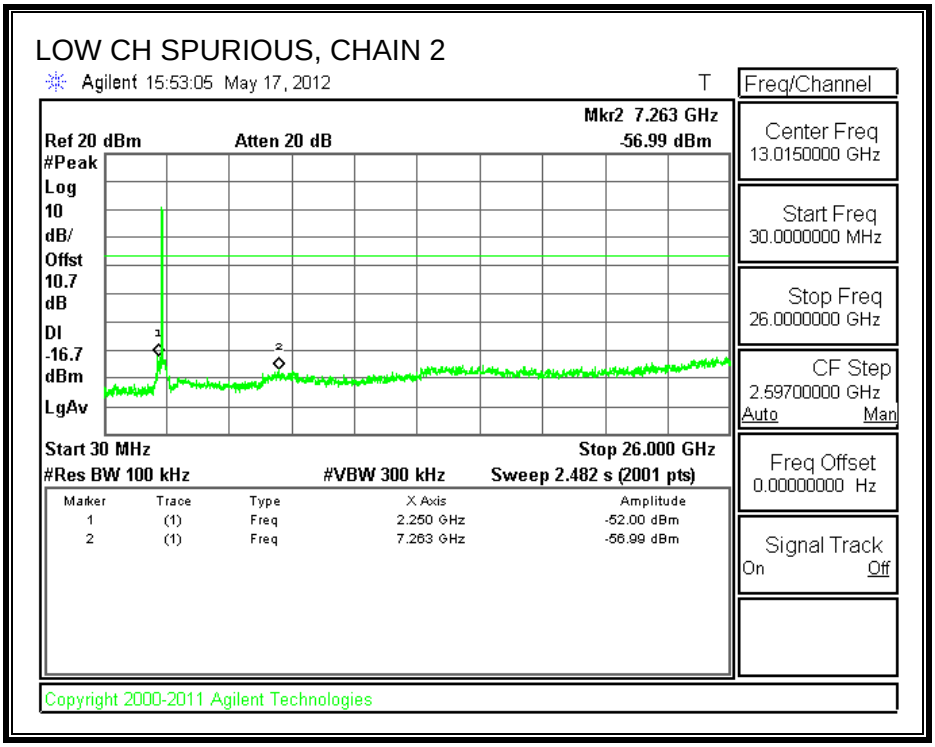


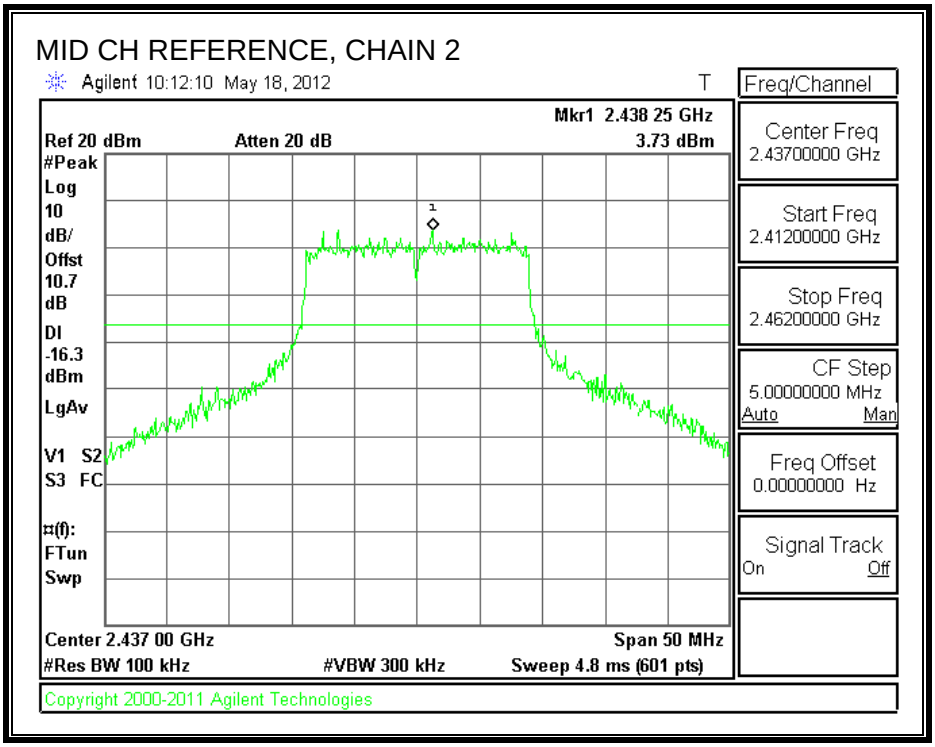


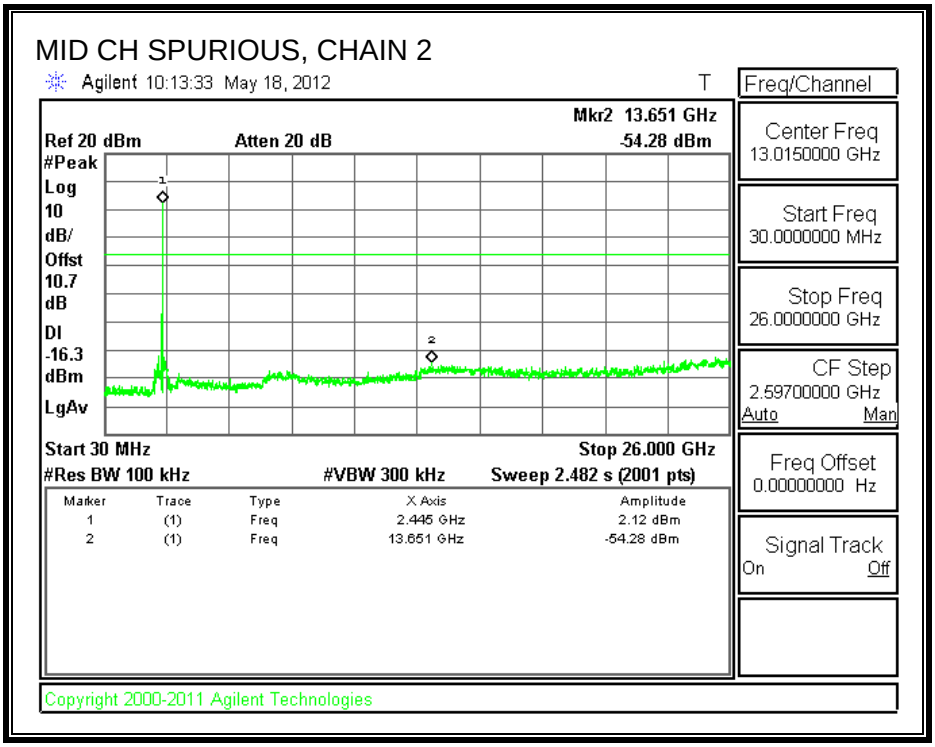


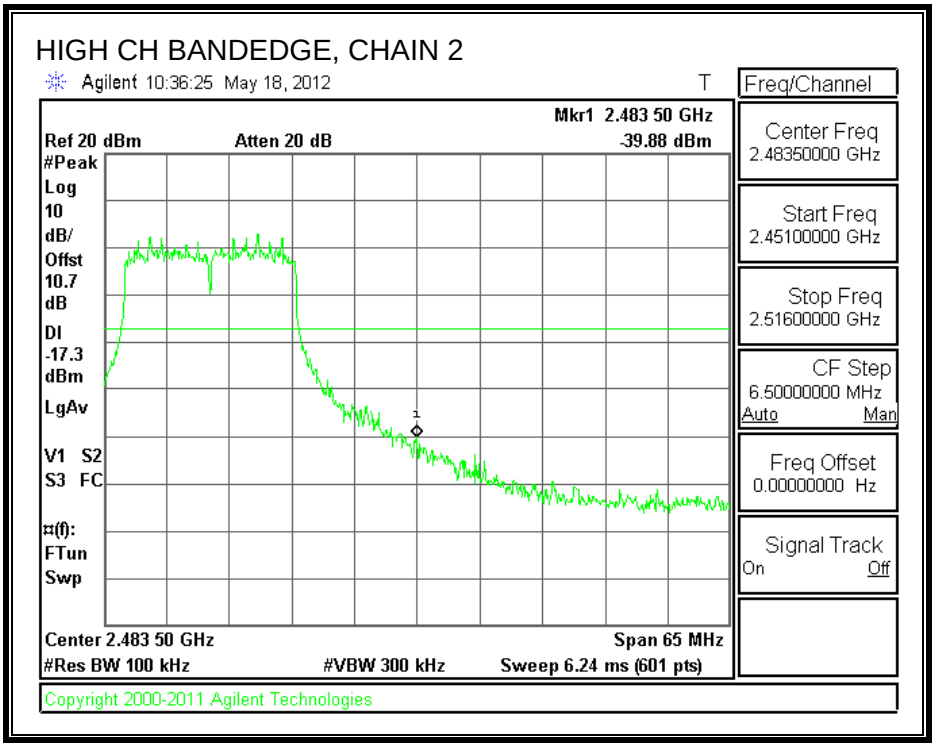
CHAIN 2 SPURIOUS EMISSIONS

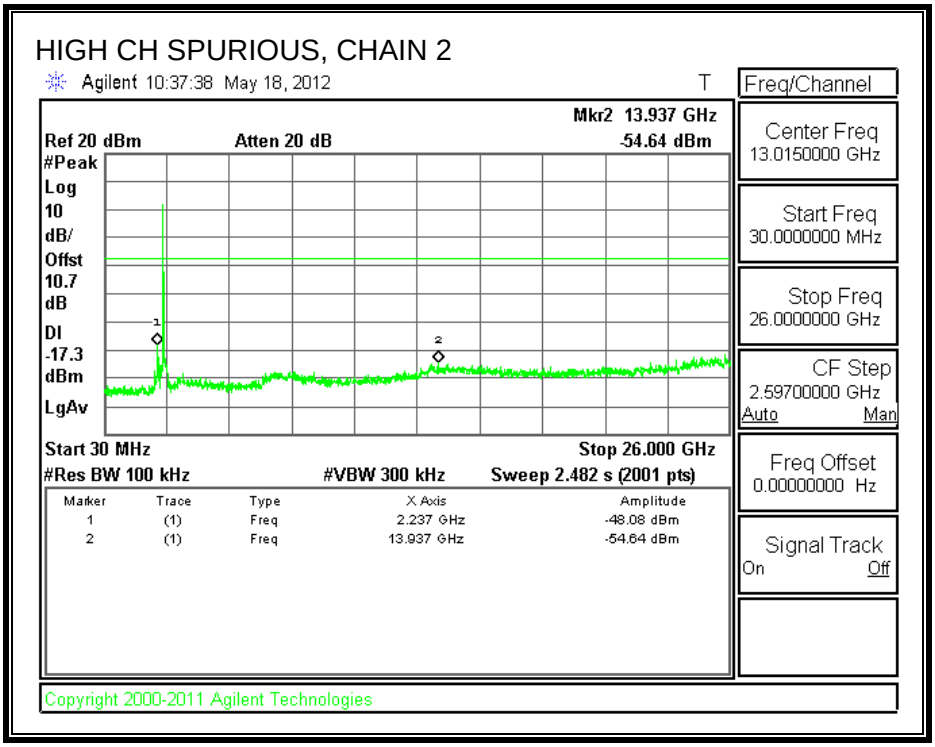




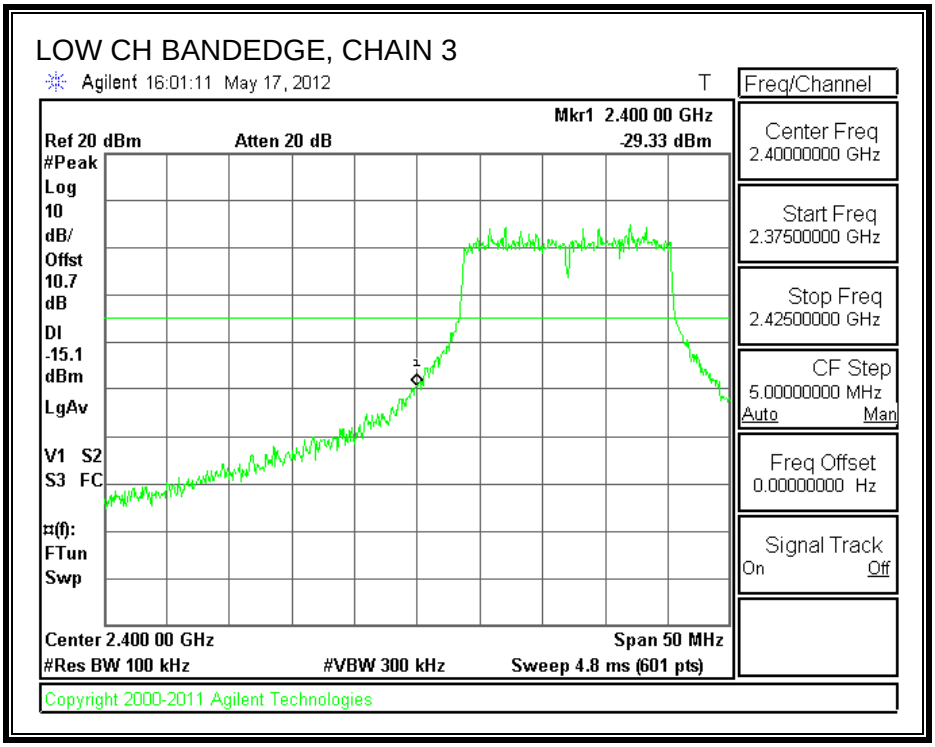


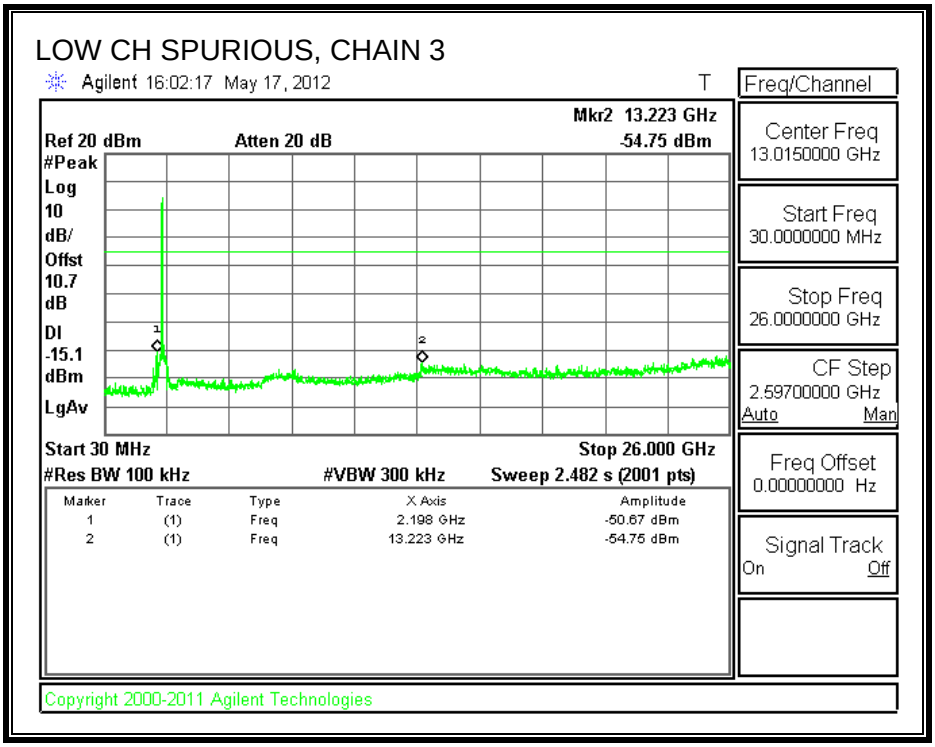


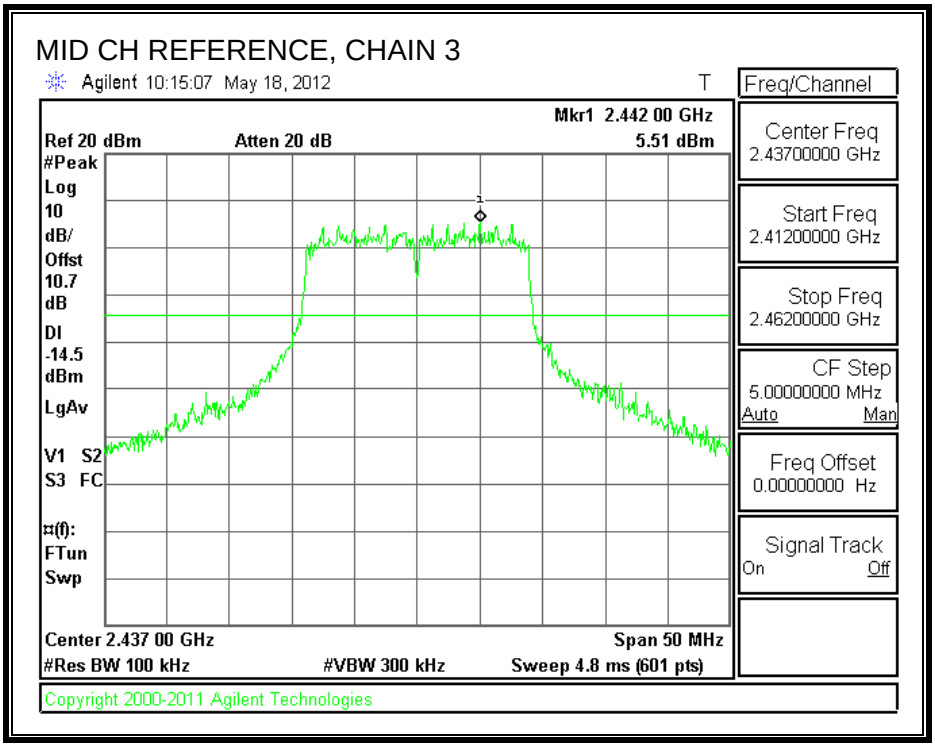


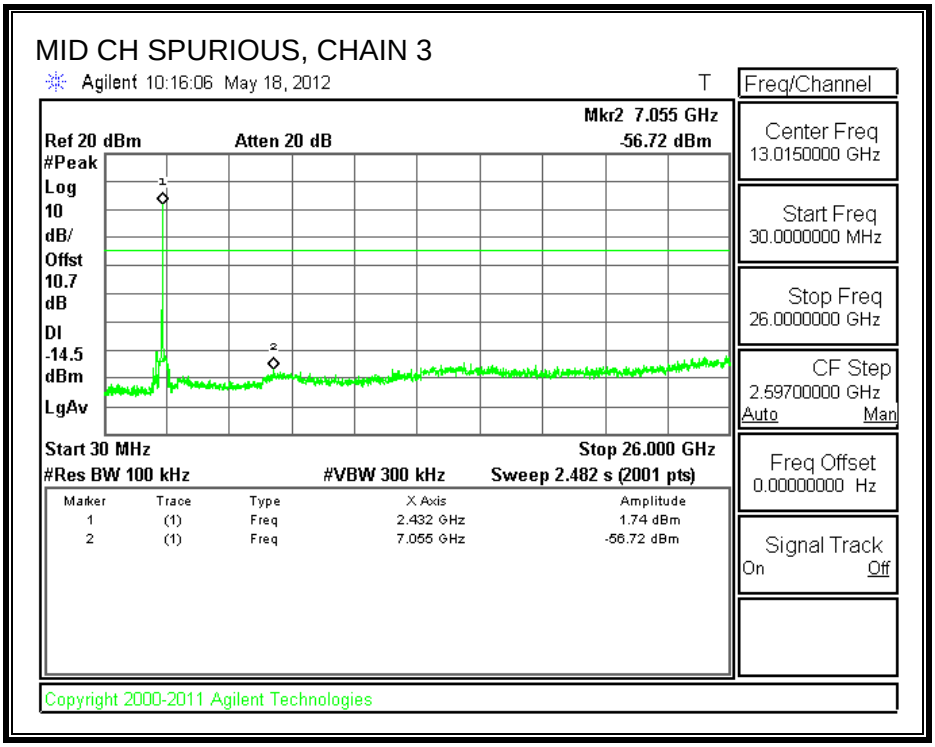


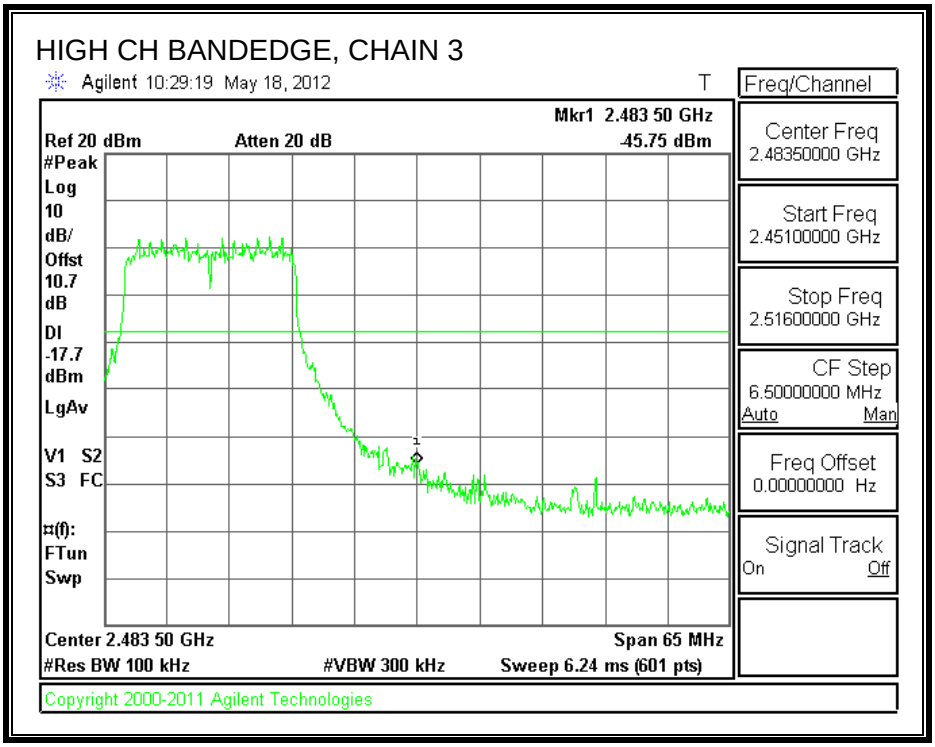
CHAIN 3 SPURIOUS EMISSIONS

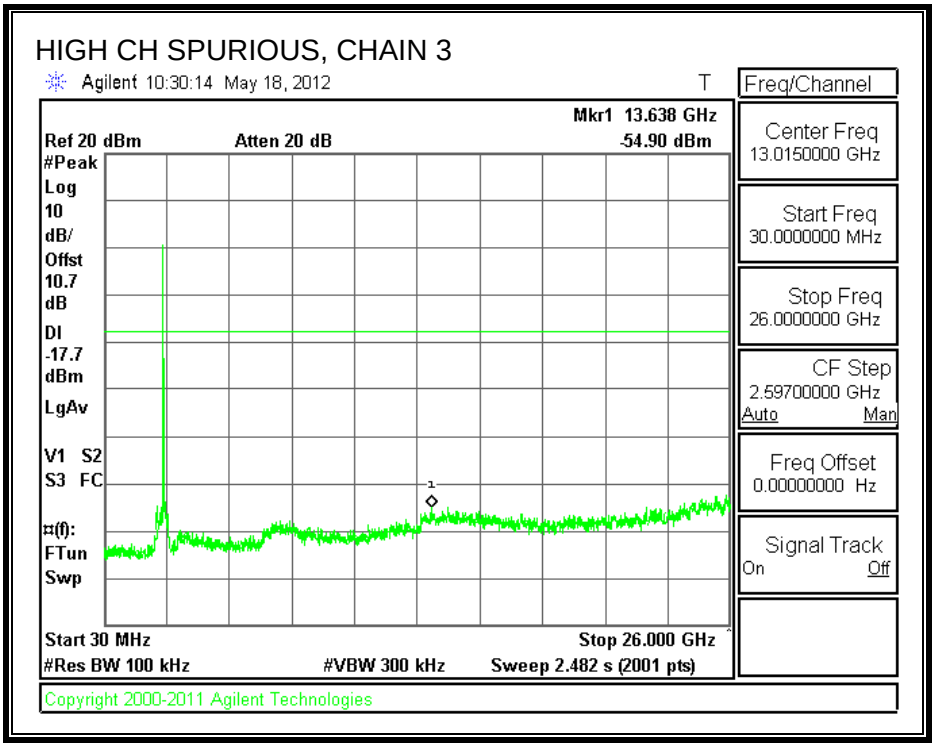












7.3. 802.11n HT20 TWO CHAINS MODE IN THE 5.8 GHz BAND

7.3.1. 6 dB BANDWIDTH

LIMITS

FCC §15.247 (a) (2)

IC RSS-210 A8.2 (a)

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

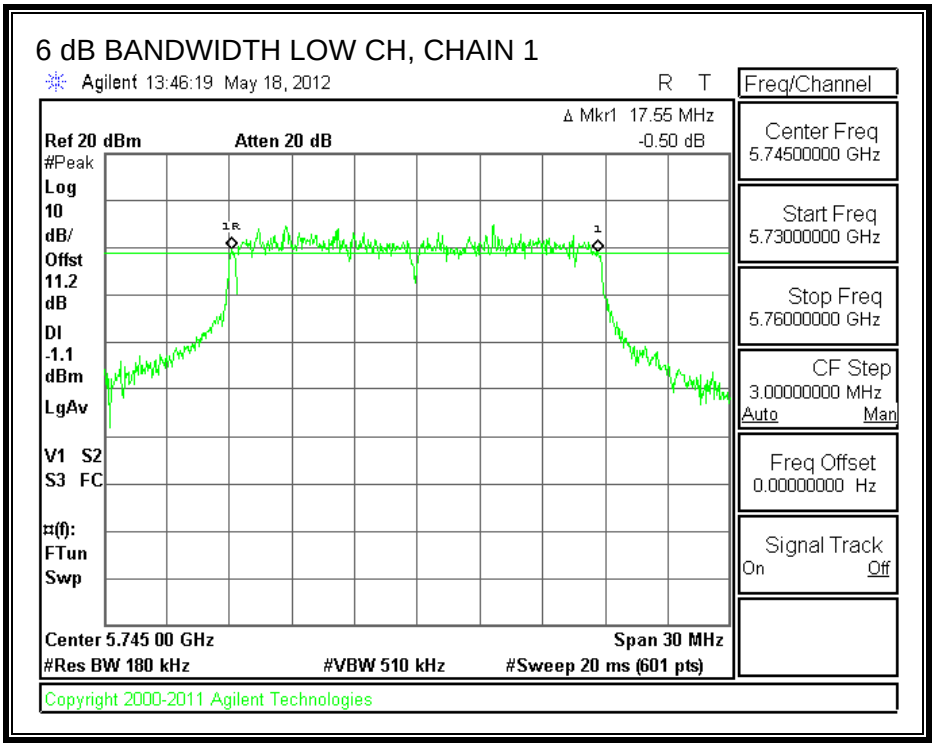
TEST PROCEDURE

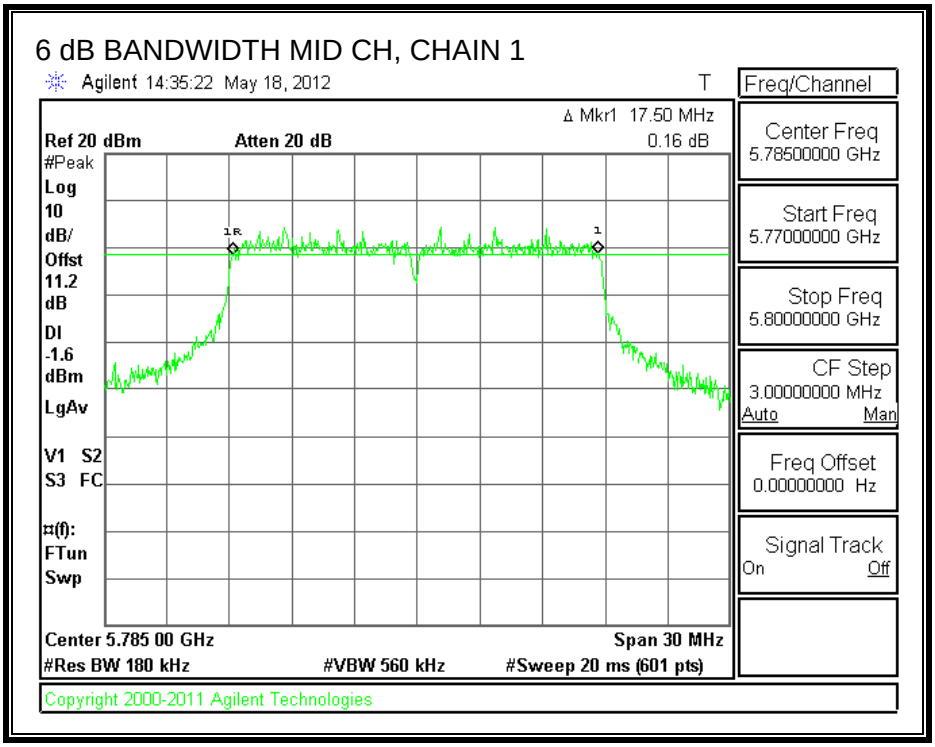
KDB 558074 D01 V01 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247", dated 01/18/2012.

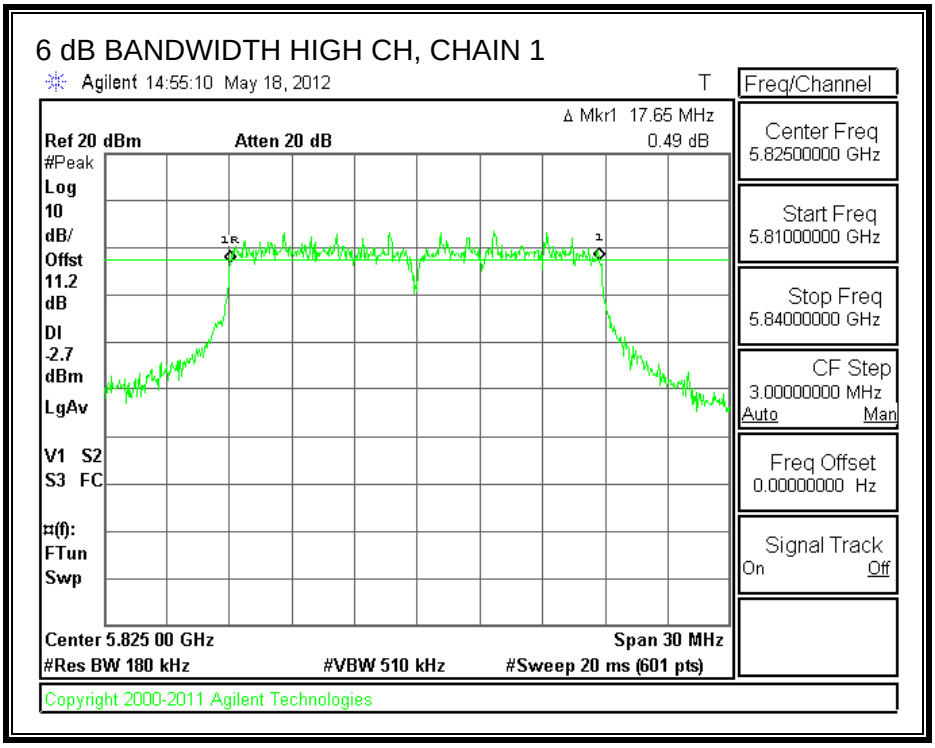
RESULTS

Channel	Frequency (MHz)	Chain 1 6 dB BW (MHz)	Chain 2 6 dB BW (MHz)	Minimum Limit (MHz)
Low	2412	17.55	17.60	0.5
Middle	2437	17.50	17.35	0.5
High	2462	17.65	17.20	0.5

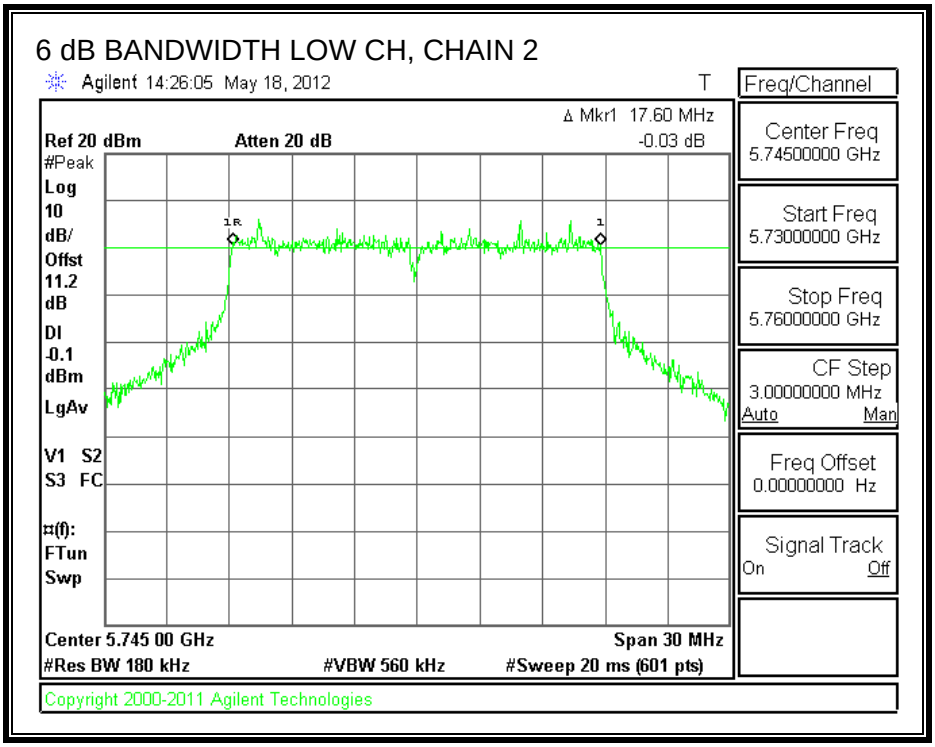
6 dB BANDWIDTH, CHAIN 1

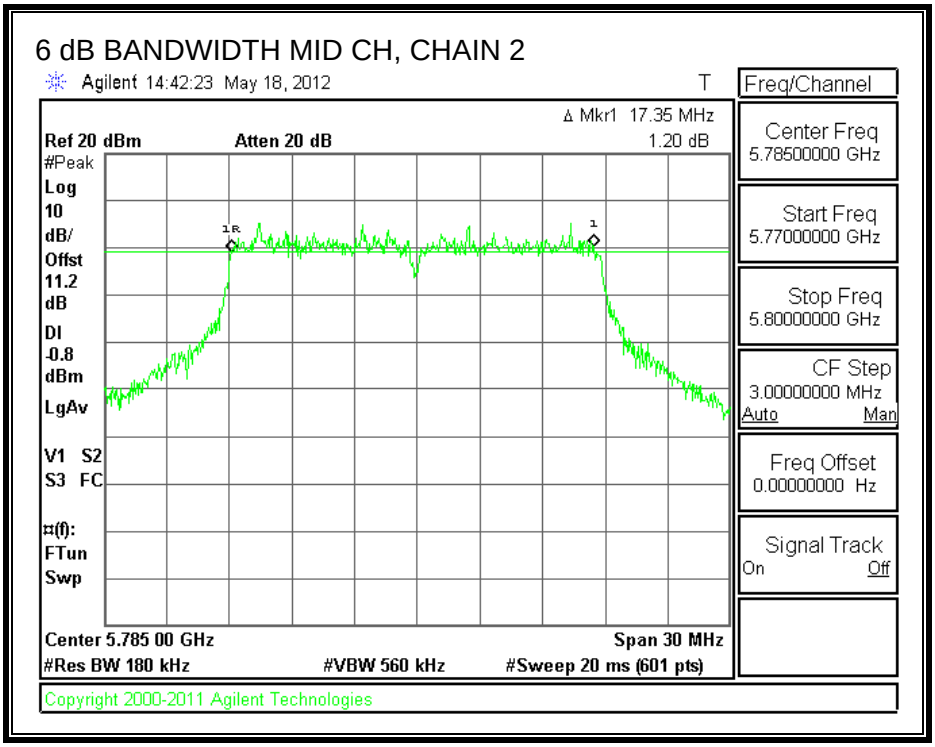


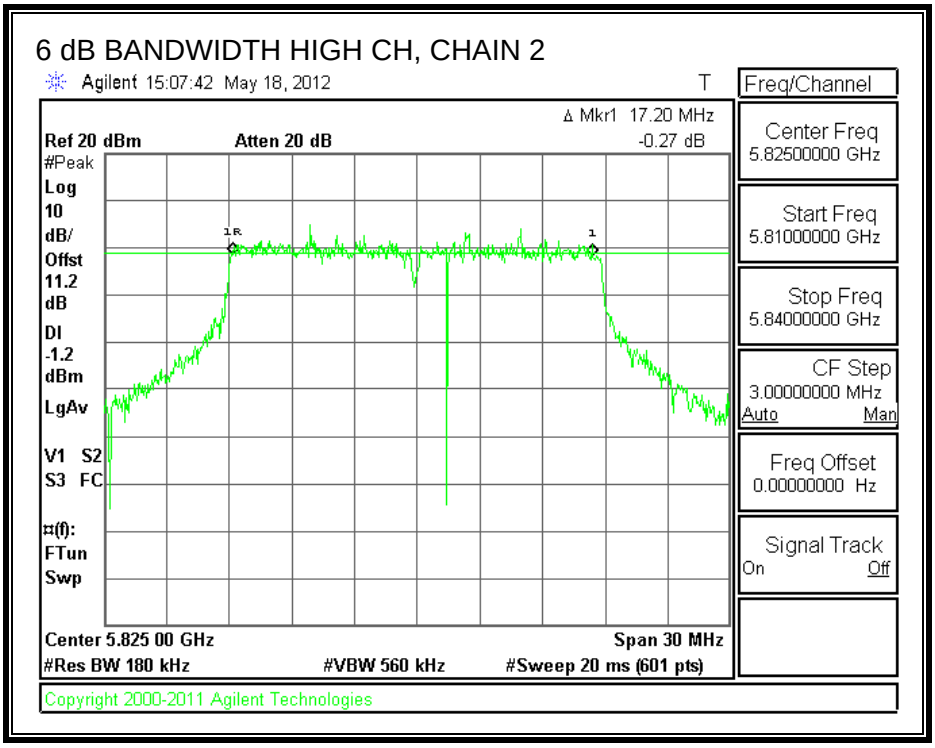




6 dB BANDWIDTH, CHAIN 2







7.3.2. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

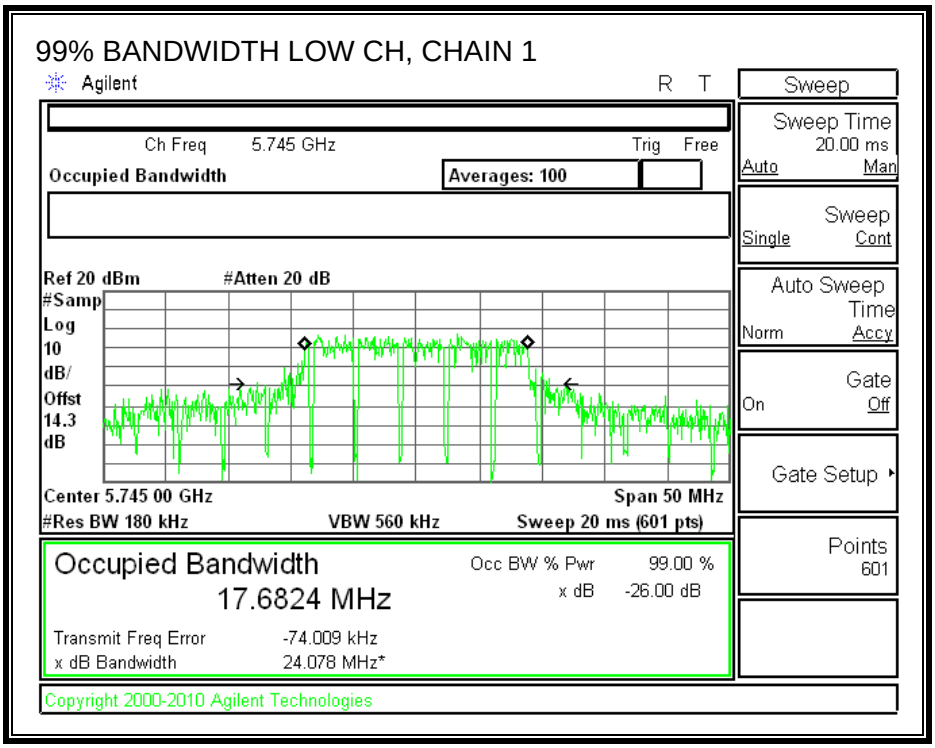
TEST PROCEDURE

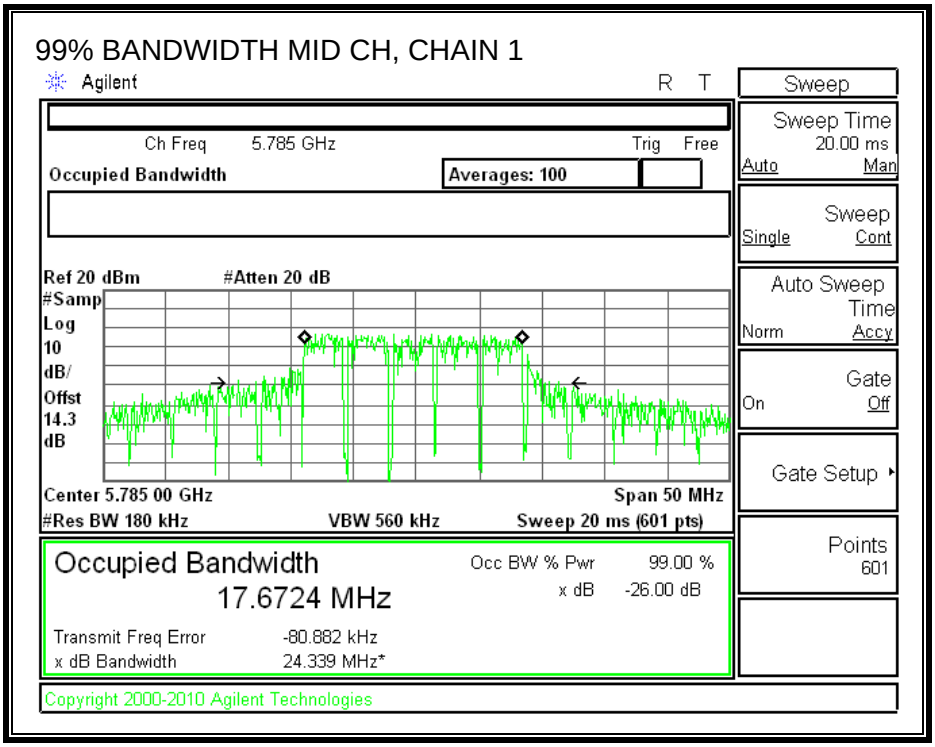
The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

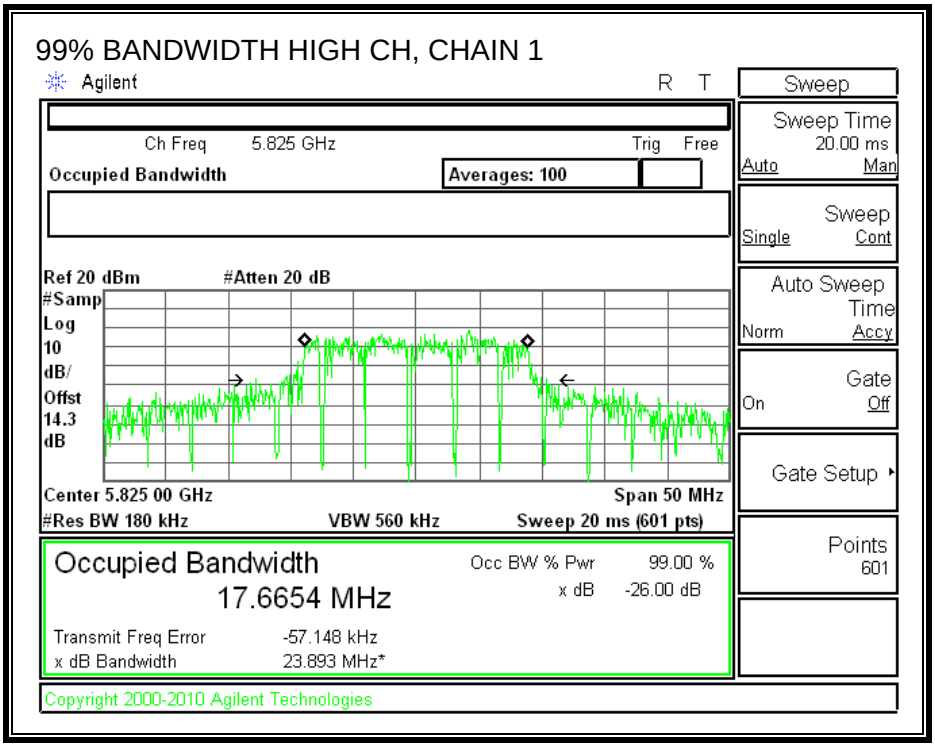
RESULTS

Channel	Frequency (MHz)	Chain 1 99% Bandwidth (MHz)	Chain 2 99% Bandwidth (MHz)
Low	5745	17.6824	17.6575
Middle	5785	17.6724	17.6323
High	5825	17.6654	17.6452

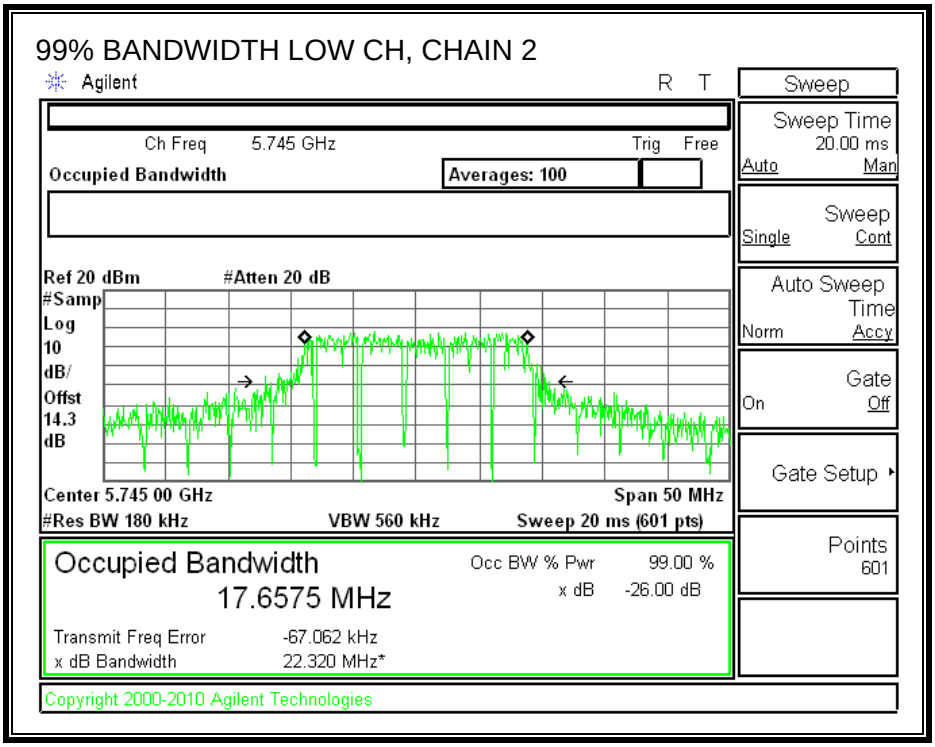
99% BANDWIDTH, CHAIN 1



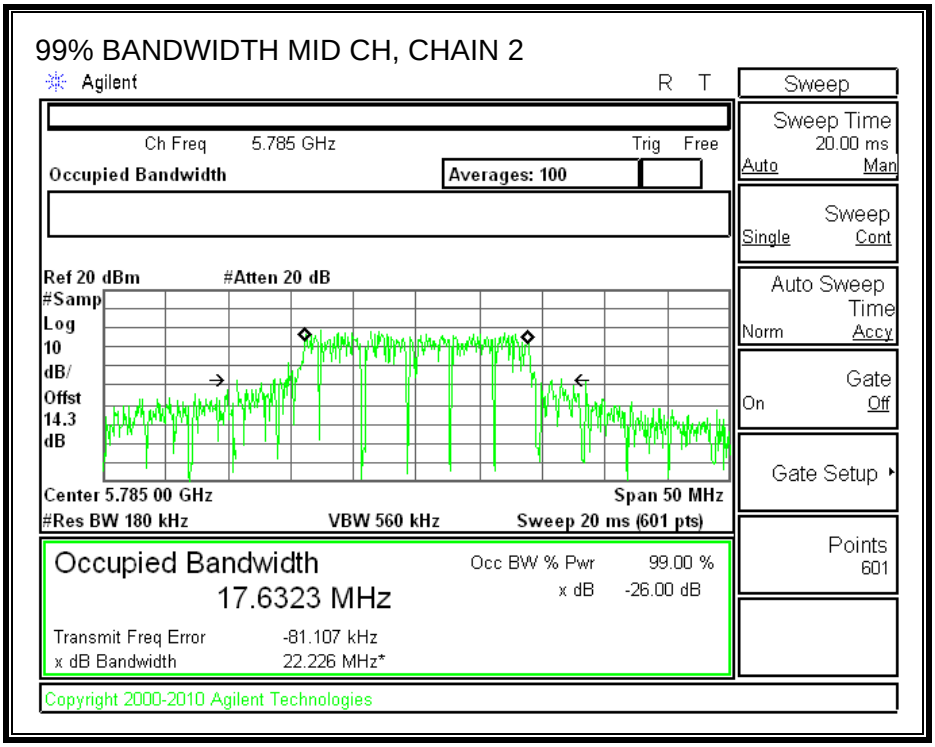


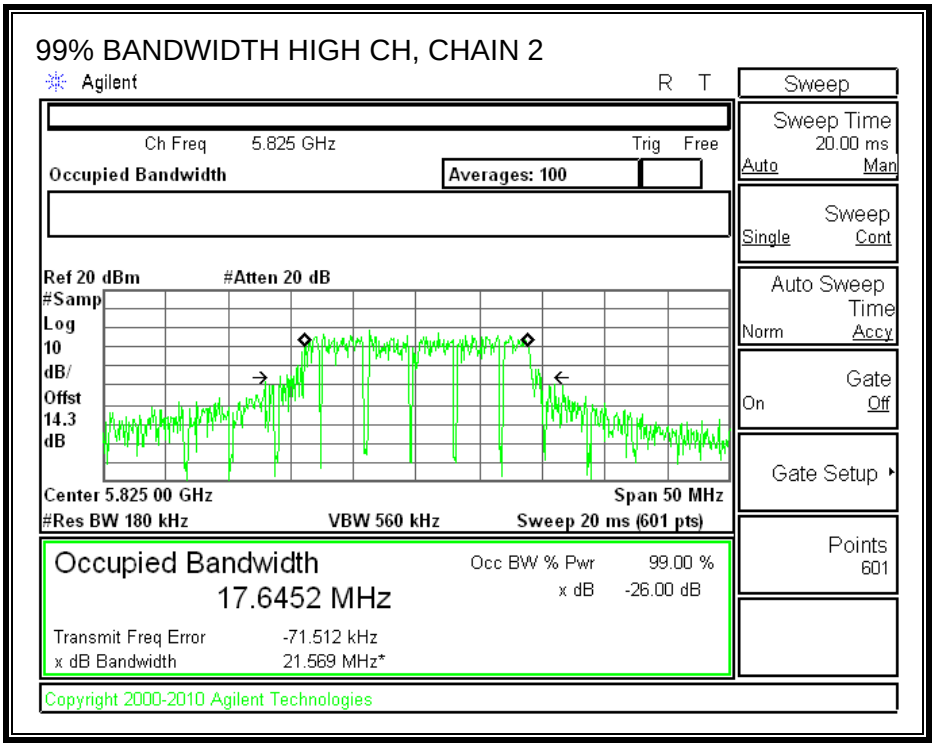


99% BANDWIDTH, CHAIN 2



99% BANDWIDTH MID CH, CHAIN 2





7.3.3. OUTPUT POWER

LIMITS

FCC §15.247 (b)

IC RSS-210 A8.4

The maximum antenna gain is less than or equal to 6 dBi, therefore the limit is 30 dBm.

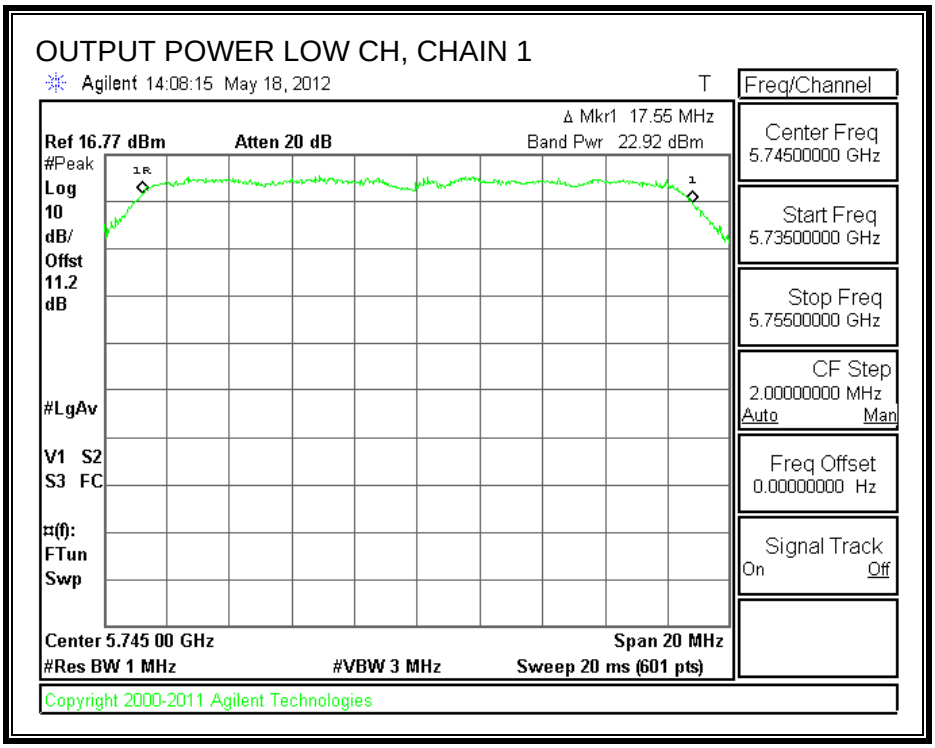
TEST PROCEDURE

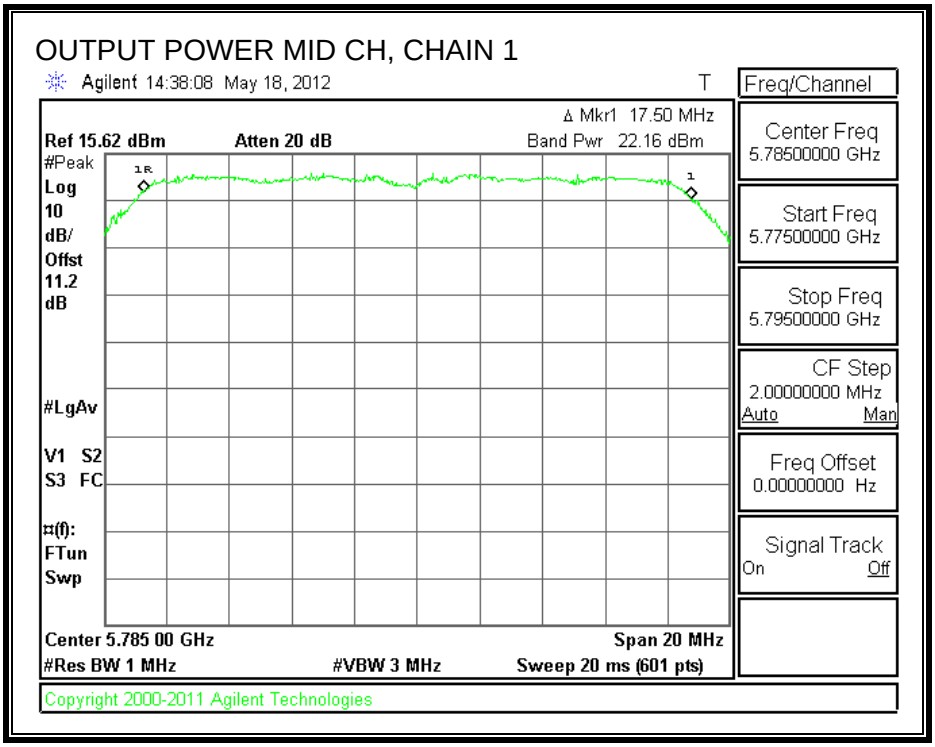
KDB 558074 D01 V01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”, dated 01/18/2012.

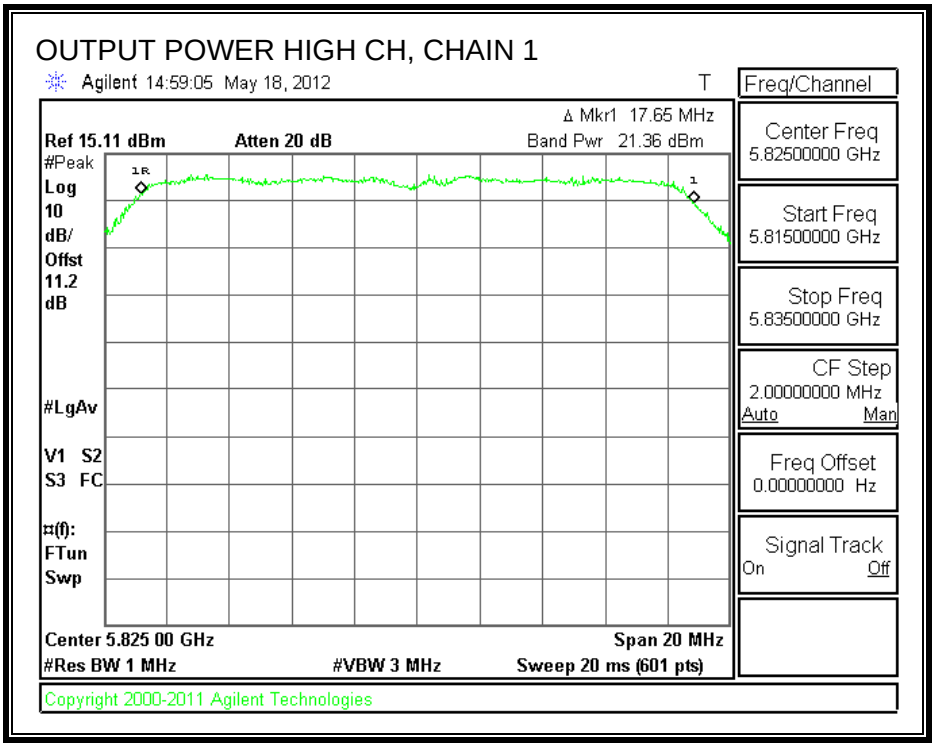
RESULTS

Channel	Frequency (MHz)	Chain 1 PK Power (dBm)	Chain 2 PK Power (dBm)	Total Power (dBm)	Limit (dBm)	Margin (dB)
Low	5745	22.92	23.30	26.12	30.00	-3.88
Mid	5785	22.16	22.99	25.61	30.00	-4.39
High	5825	21.36	21.85	24.62	30.00	-5.38

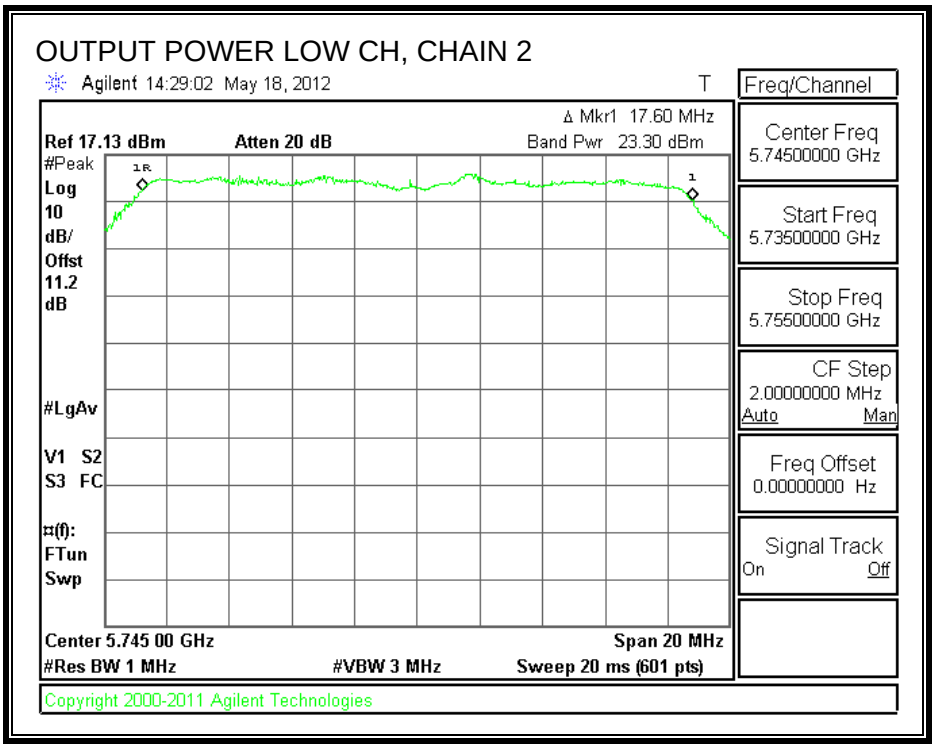
CHAIN 1 OUTPUT POWER

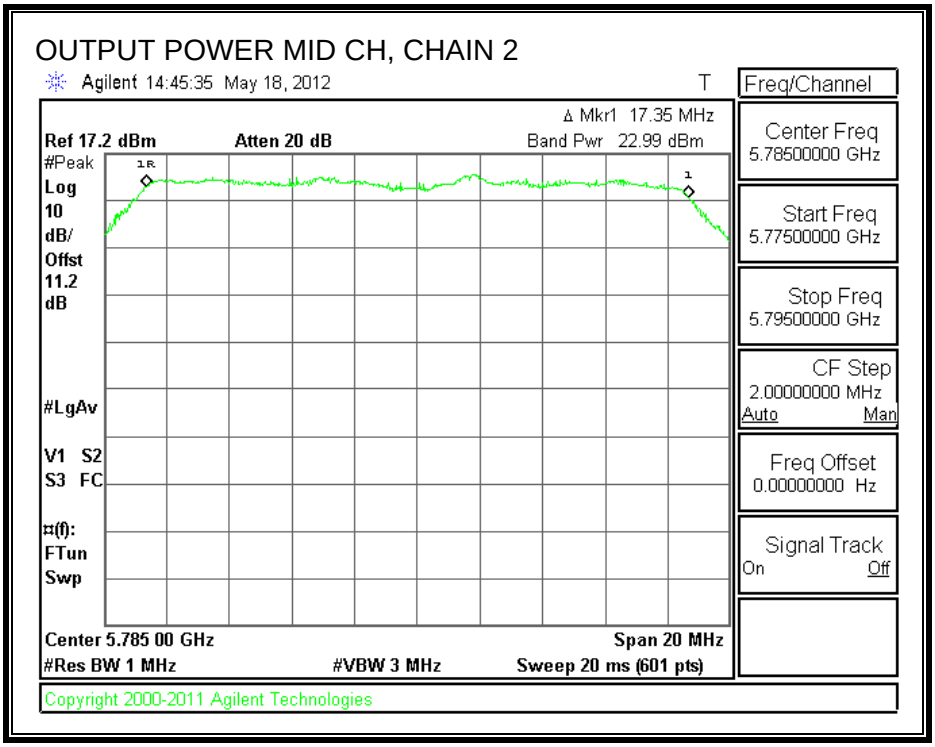


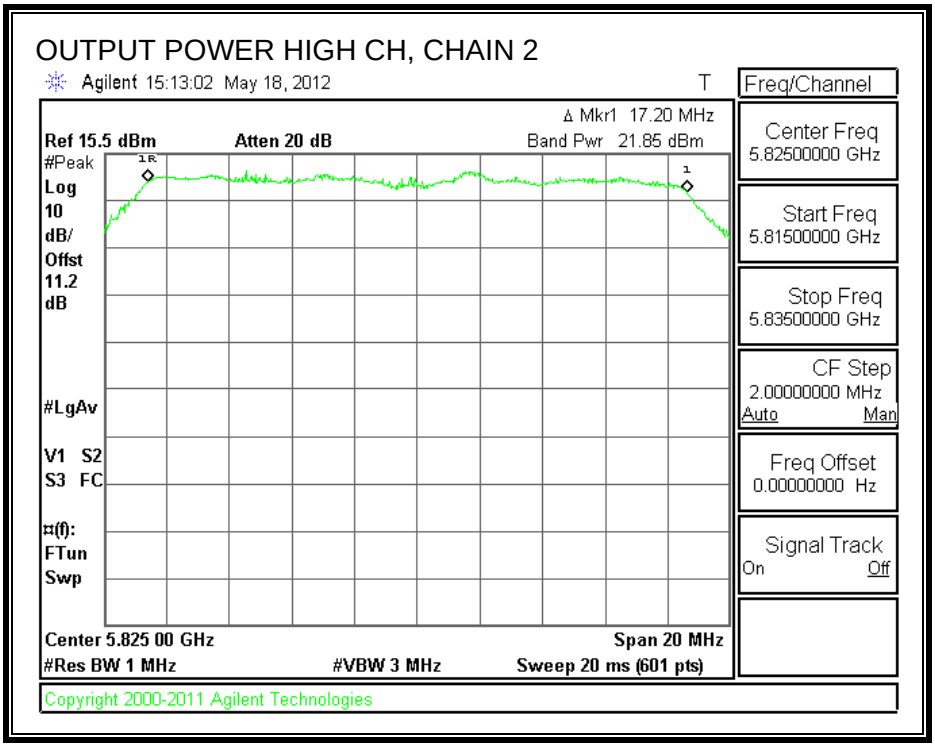




CHAIN 2 OUTPUT POWER







7.3.4. AVERAGE POWER

LIMITS

None; for reporting purposes only.

TEST PROCEDURE

The transmitter output is connected to a power meter.

RESULTS

The cable assembly insertion loss of 11.2 dB (including 10 dB pad and 1.2 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Chain 1 Power (dBm)	Chain 2 Power (dBm)	Total Power (dBm)
Low	5745	13.25	13.39	16.33
Middle	5785	12.23	12.67	15.47
High	5825	11.55	11.84	14.71

7.3.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247 (e)

IC RSS-210 A8.2 (b)

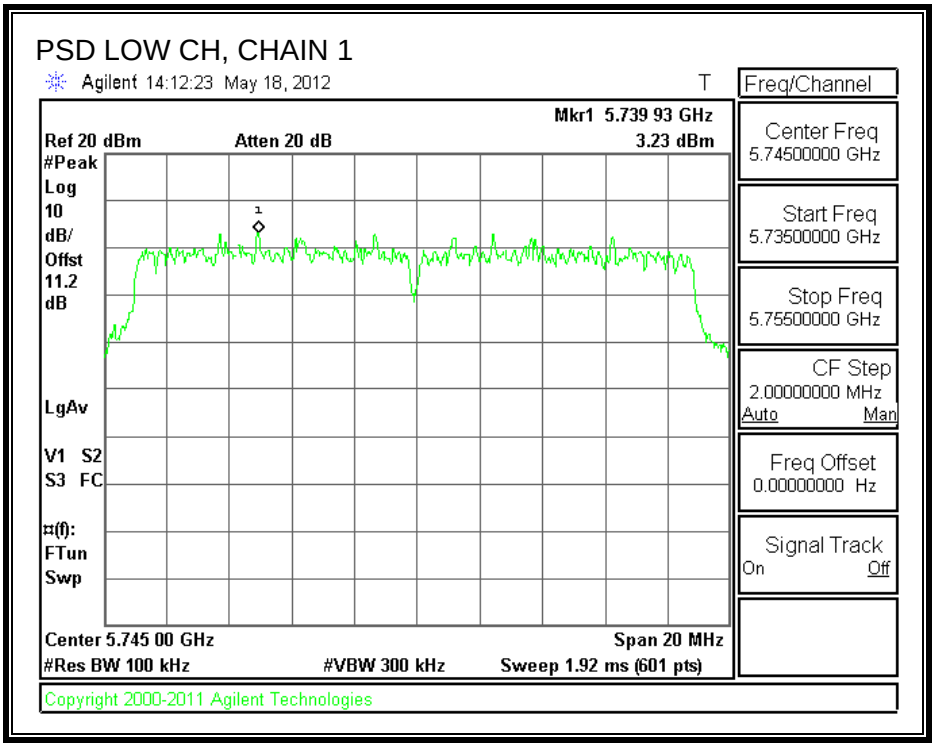
TEST PROCEDURE

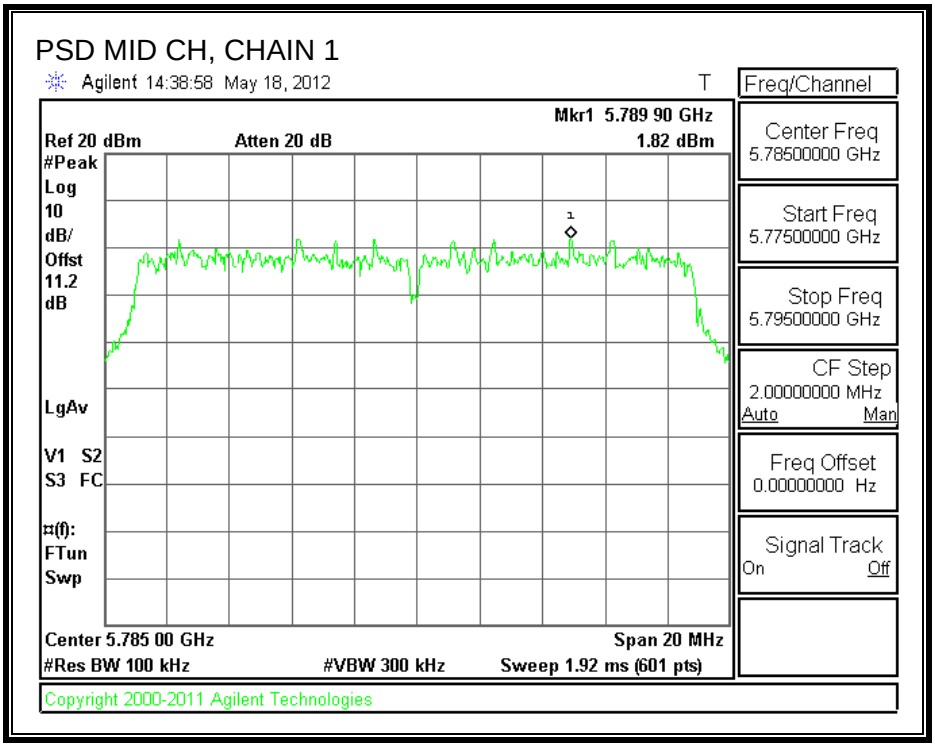
KDB 558074 D01 V01 "Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247", dated 01/18/2012.

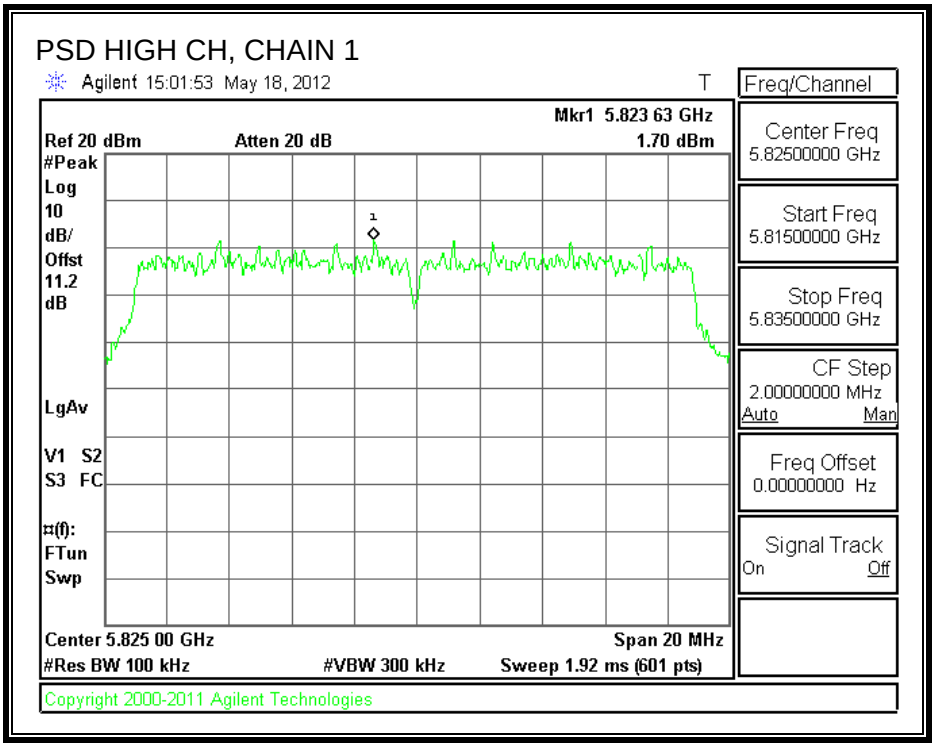
RESULTS:

Channel	Frequency (MHz)	Chain 1 PSD (dBm)	Chain 2 PSD (dBm)	10 Log (3kHz/100kHz)	Total PSD (dBm)	Limit (dBm)	Margin (dB)
Low	5745	3.23	3.61	-15.23	-8.80	8	-16.80
Middle	5785	1.82	3.63	-15.23	-9.40	8	-17.40
High	5825	1.70	2.04	-15.23	-10.35	8	-18.35

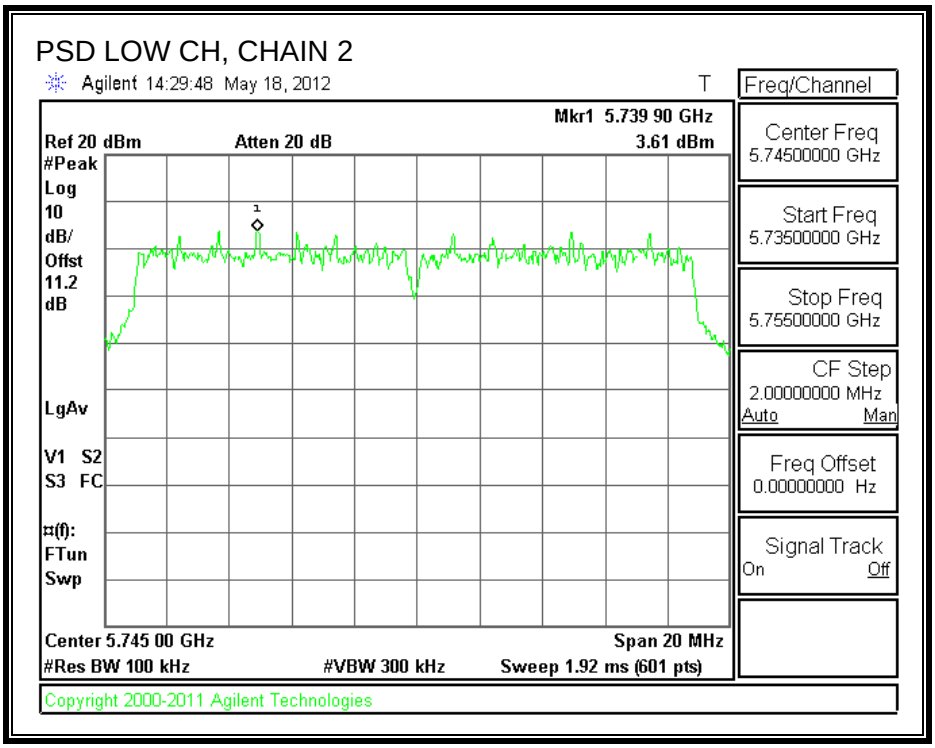
POWER SPECTRAL DENSITY, CHAIN 1

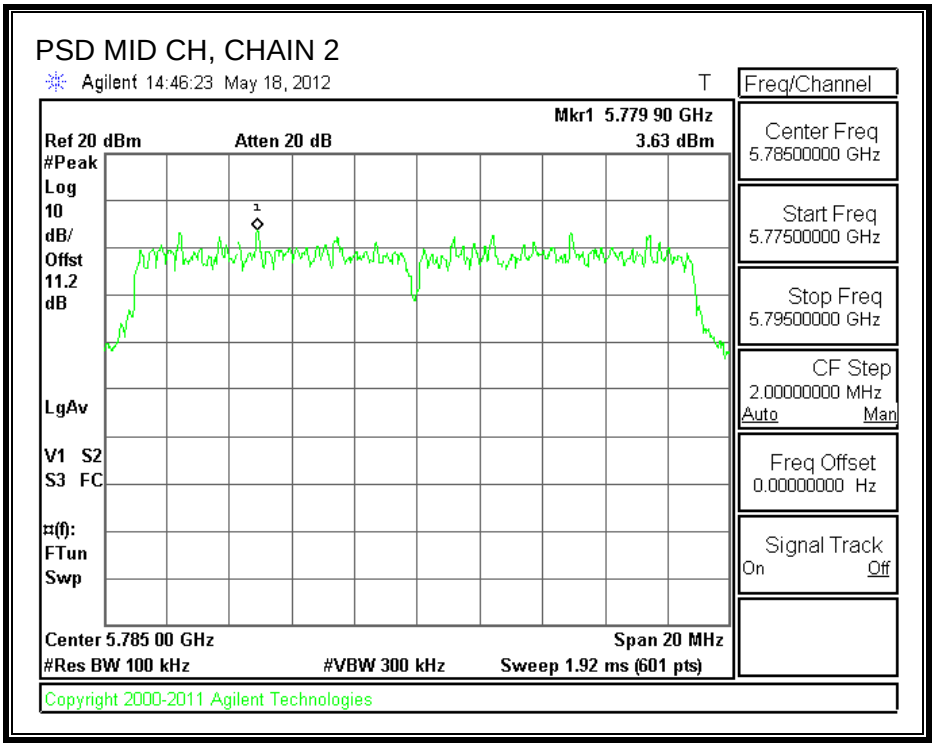


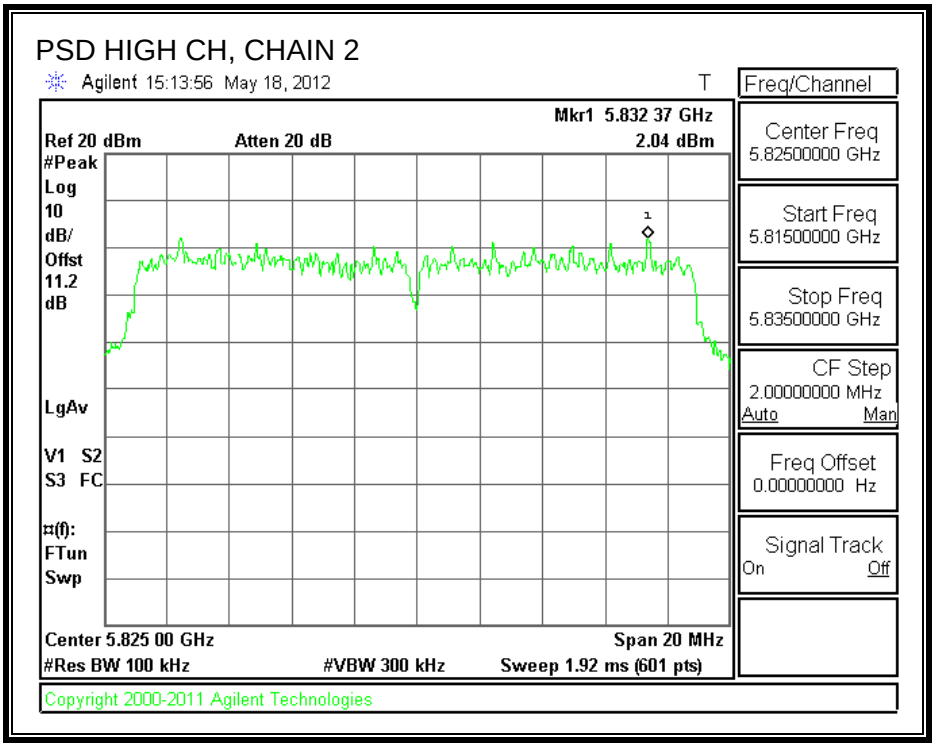




POWER SPECTRAL DENSITY, CHAIN 2







7.3.6. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

IC RSS-210 A8.5

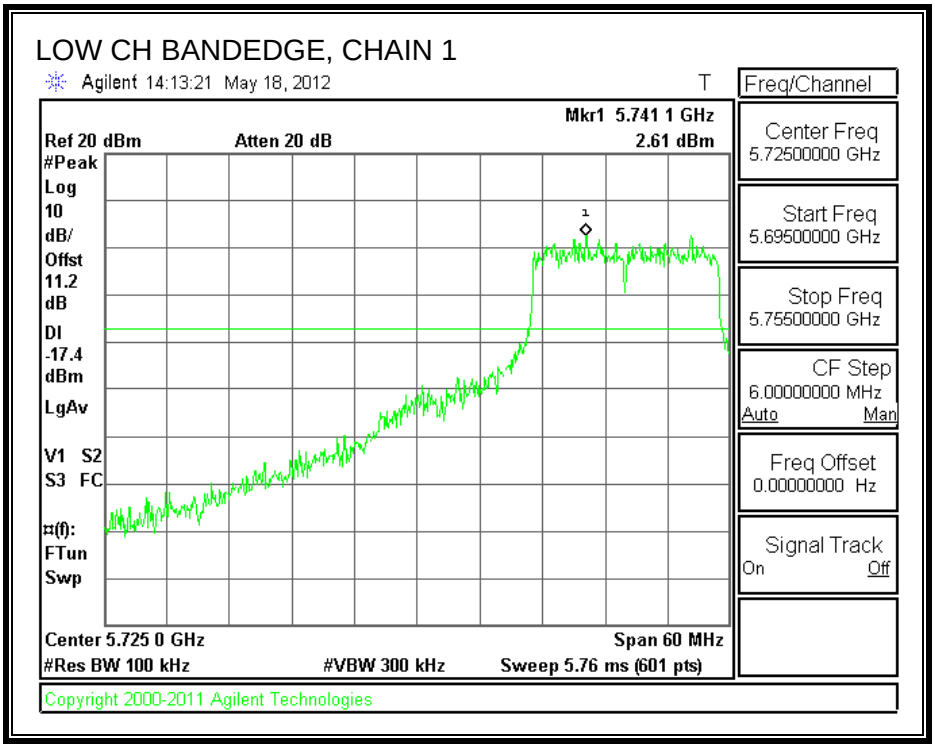
Output power was measured based on the use of a peak measurement, therefore the required attenuation is 20 dB.

TEST PROCEDURE

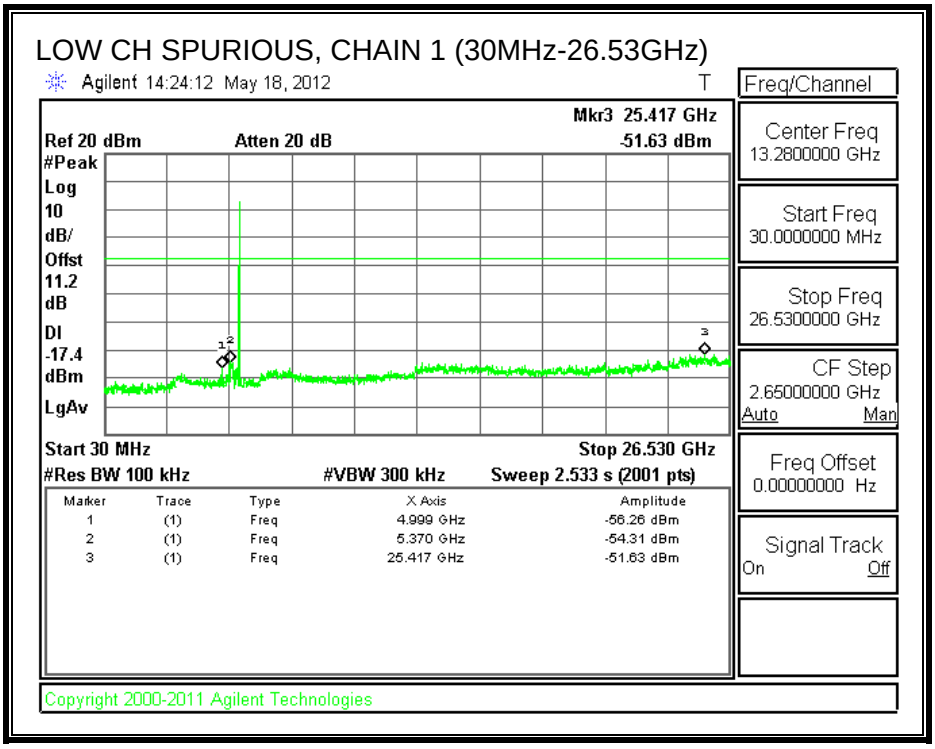
KDB 558074 D01 V01 “Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS) Operating Under 15.247”, dated 01/18/2012.

RESULTS

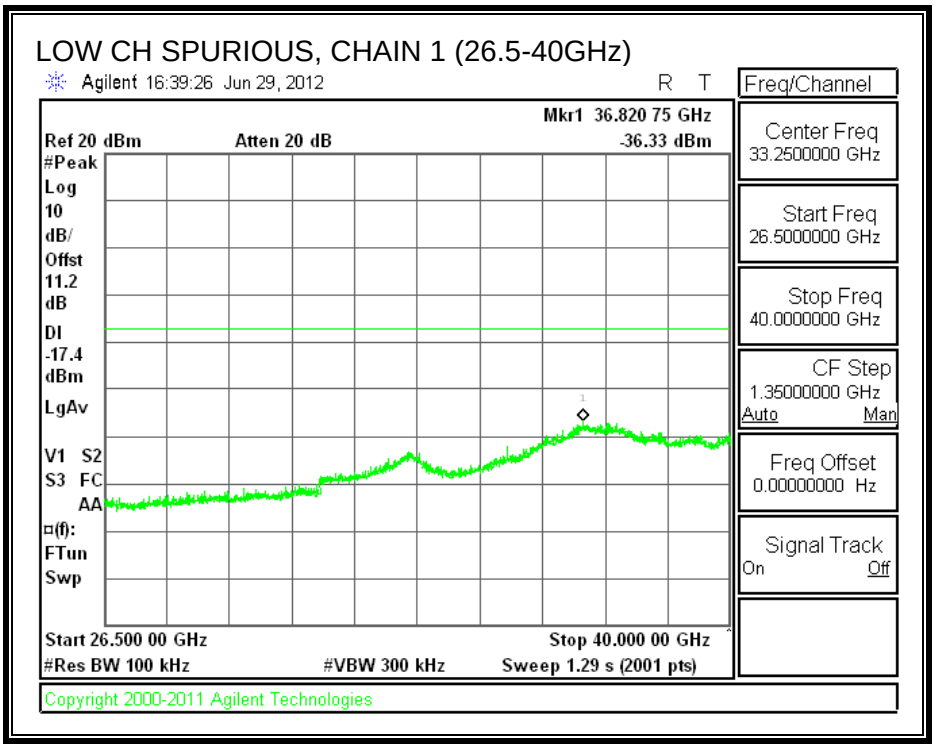
CHAIN 1 SPURIOUS EMISSIONS

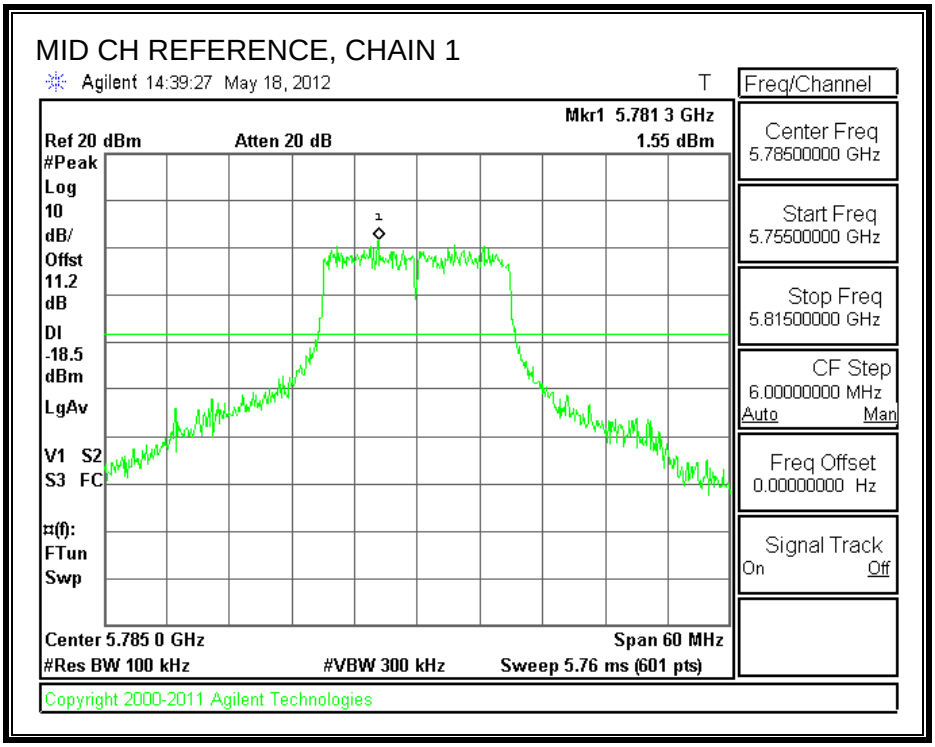


LOW CH SPURIOUS, CHAIN 1 (30MHz-26.53GHz)

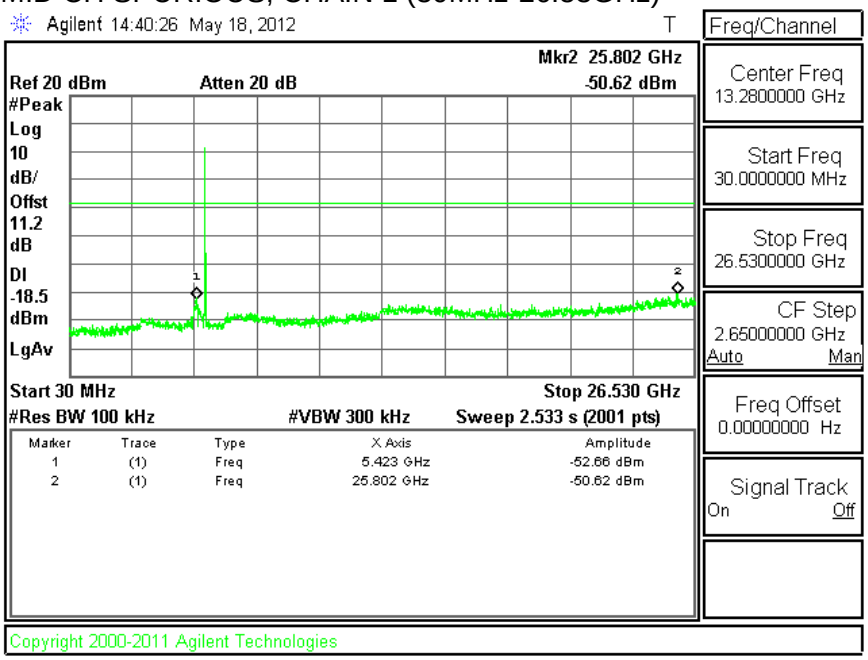


LOW CH SPURIOUS, CHAIN 1 (26.5-40GHz)

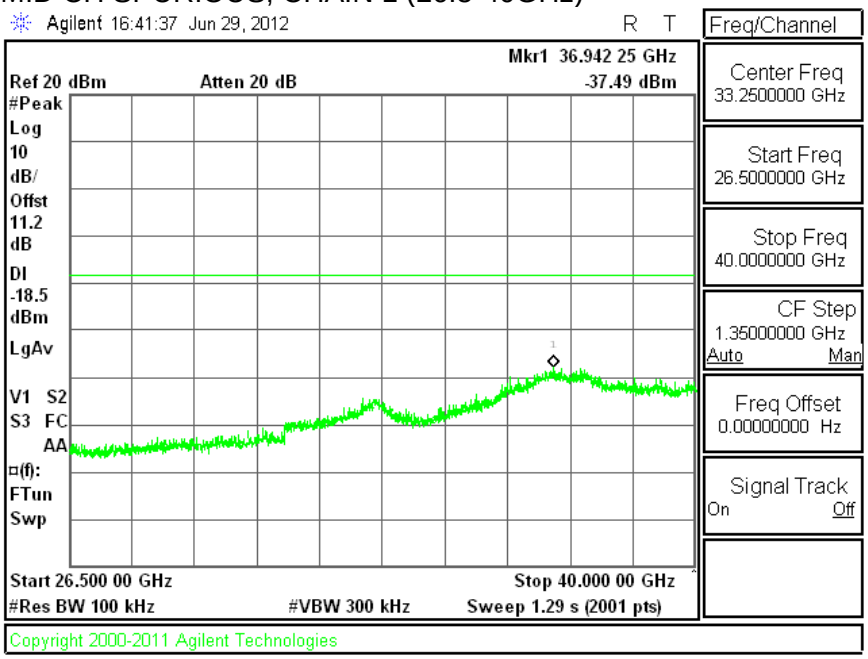


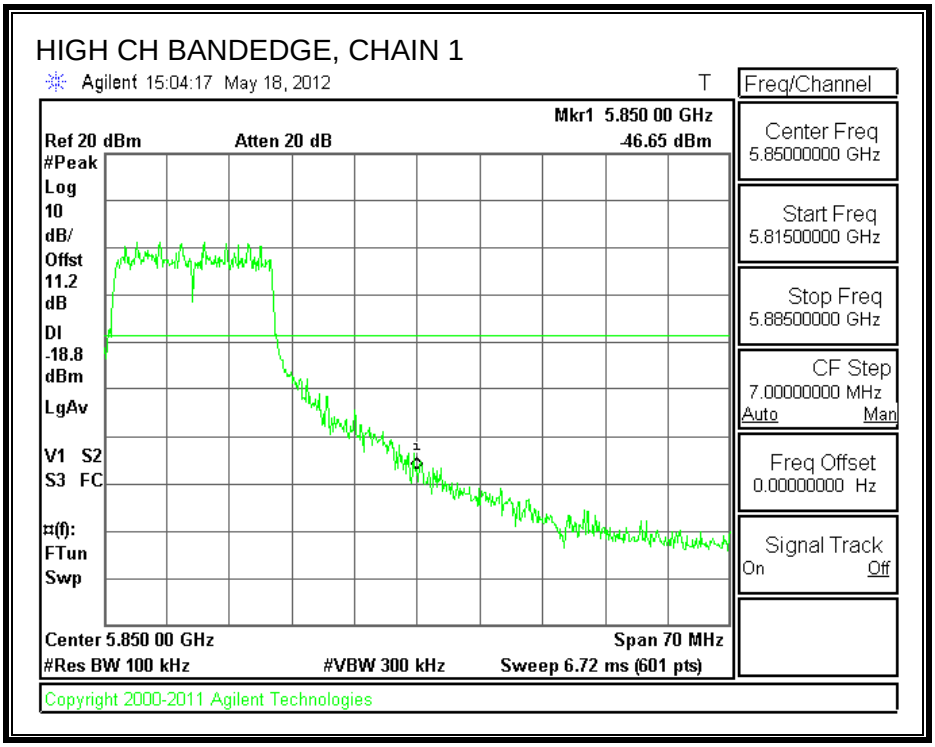


MID CH SPURIOUS, CHAIN 1 (30MHz-26.53GHz)

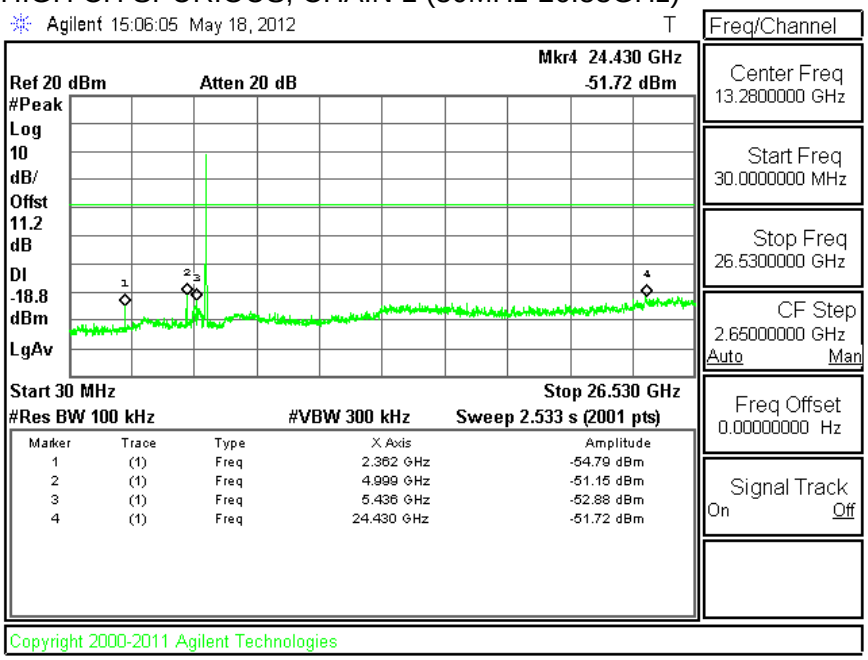


MID CH SPURIOUS, CHAIN 1 (26.5-40GHz)

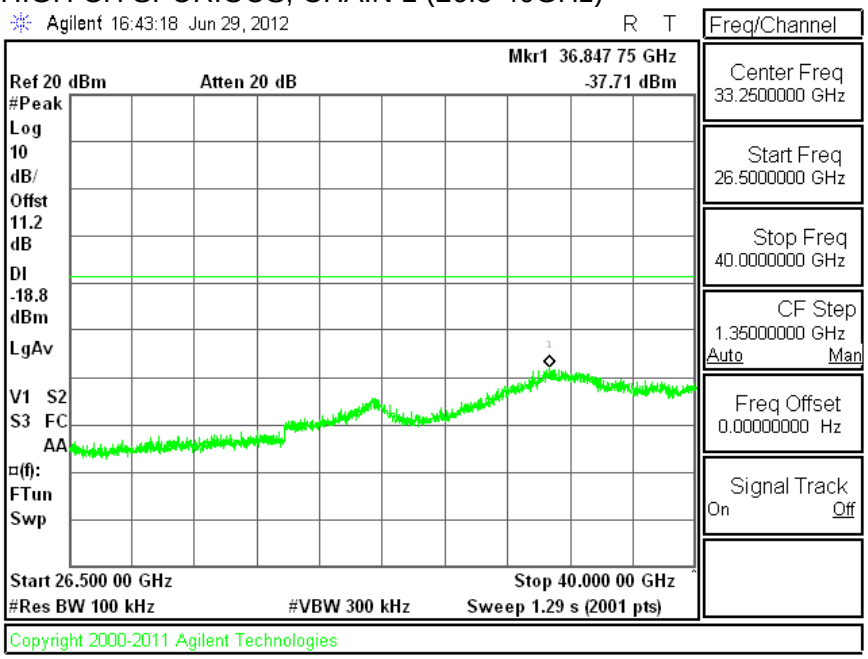




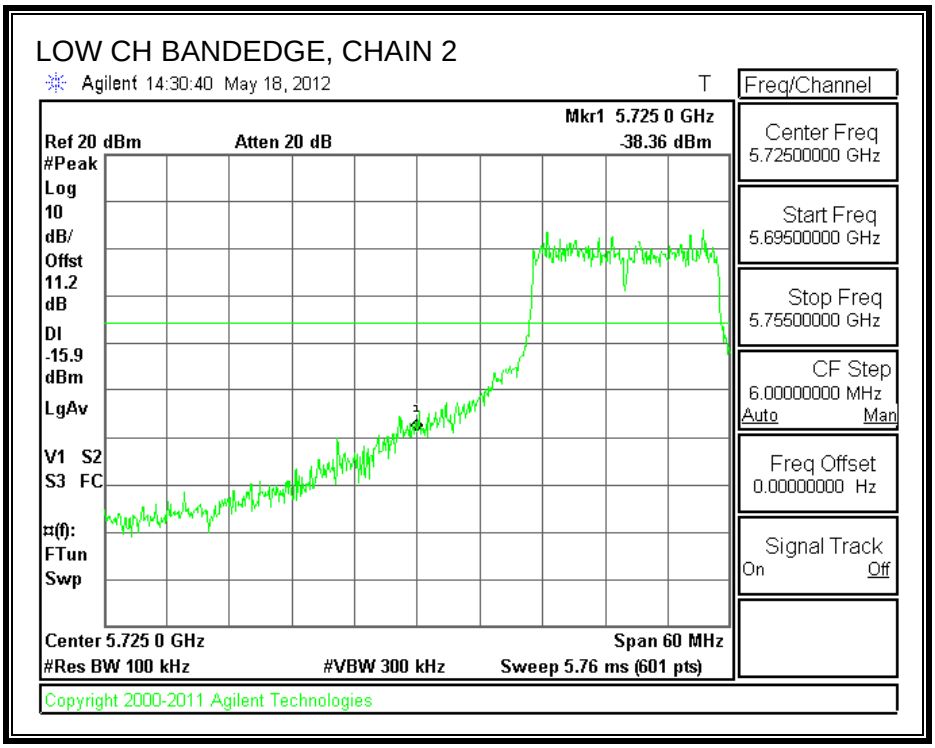
HIGH CH SPURIOUS, CHAIN 1 (30MHz-26.53GHz)



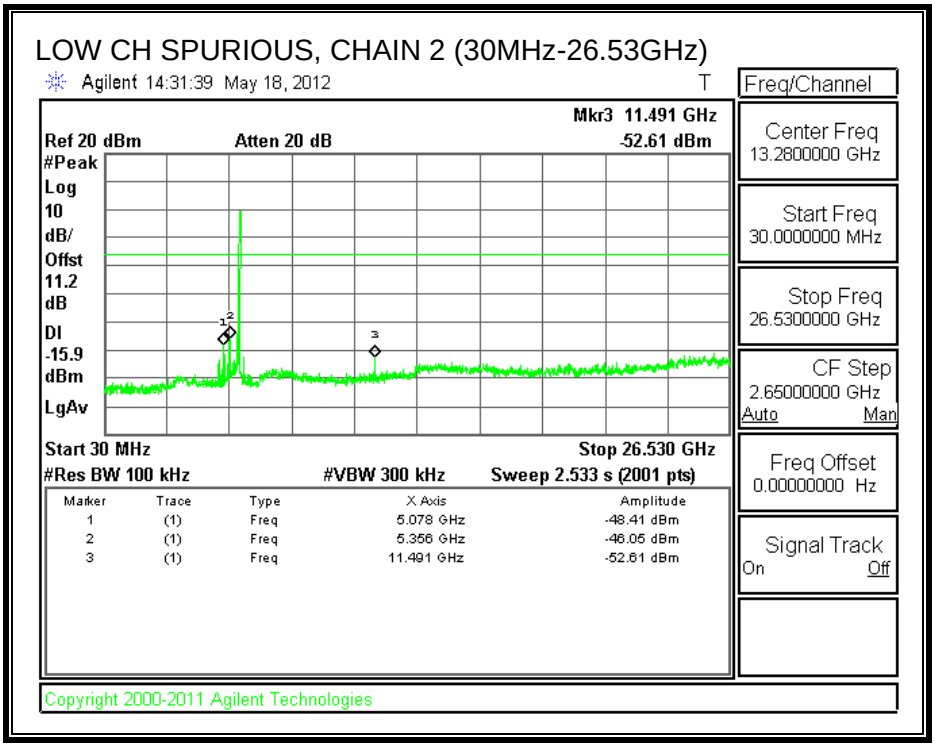
HIGH CH SPURIOUS, CHAIN 1 (26.5-40GHz)



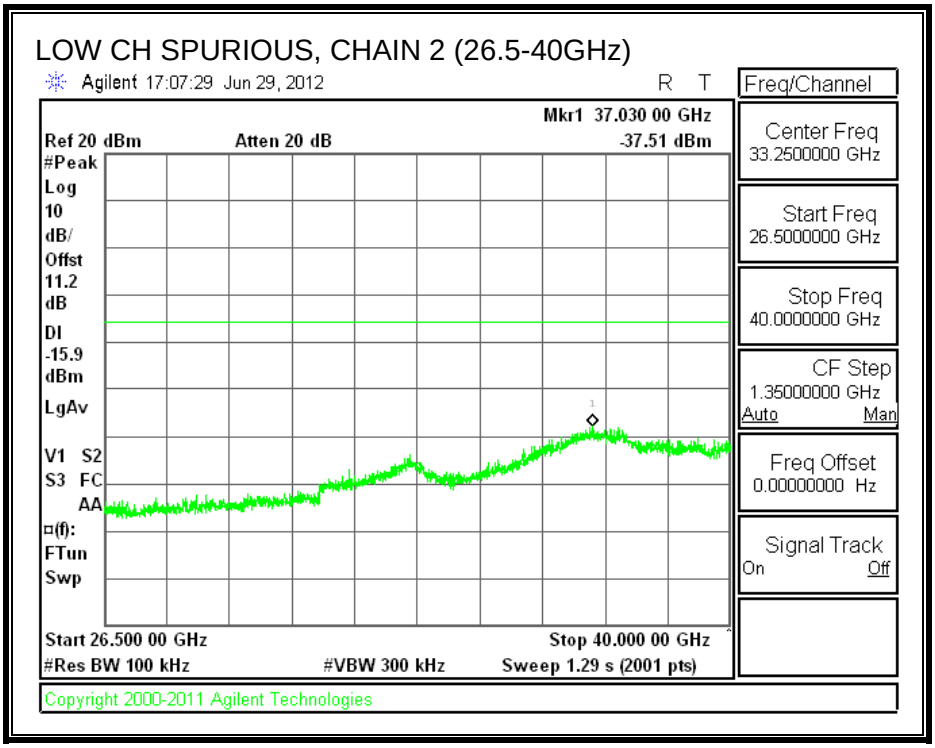
CHAIN 2 SPURIOUS EMISSIONS

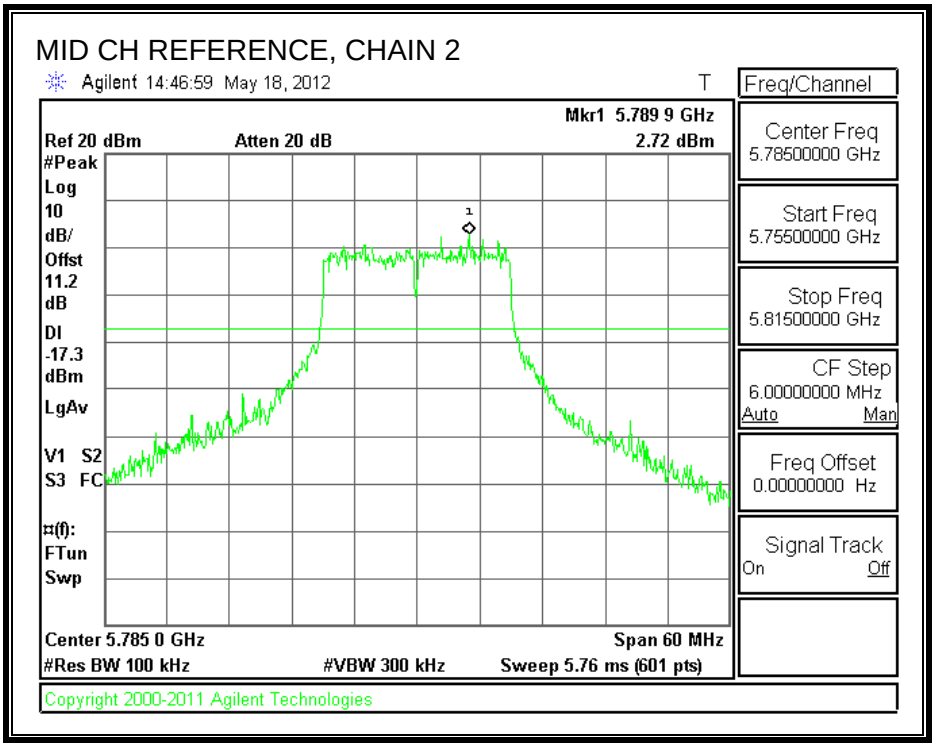


LOW CH SPURIOUS, CHAIN 2 (30MHz-26.53GHz)

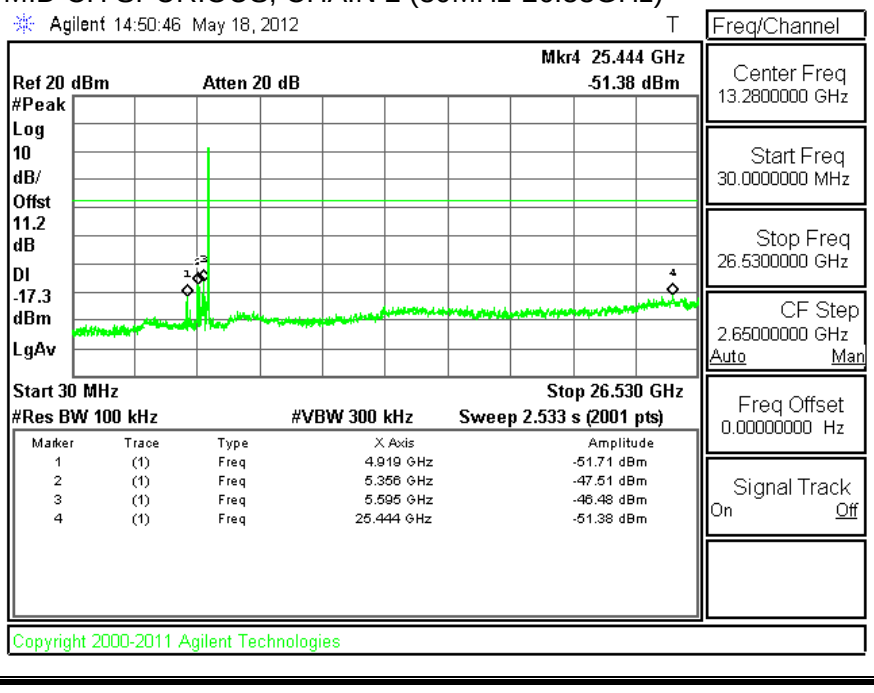


LOW CH SPURIOUS, CHAIN 2 (26.5-40GHz)

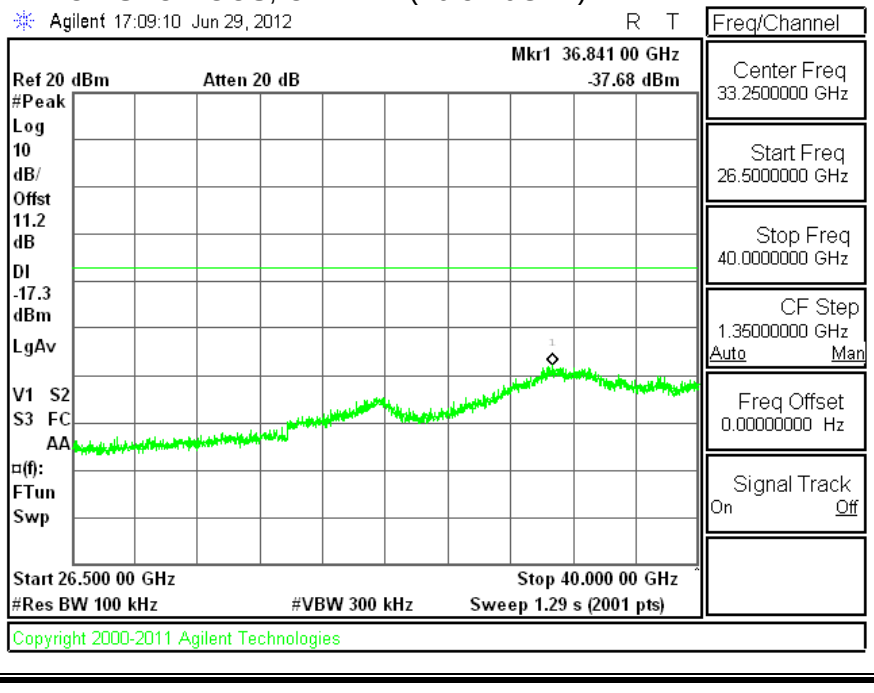


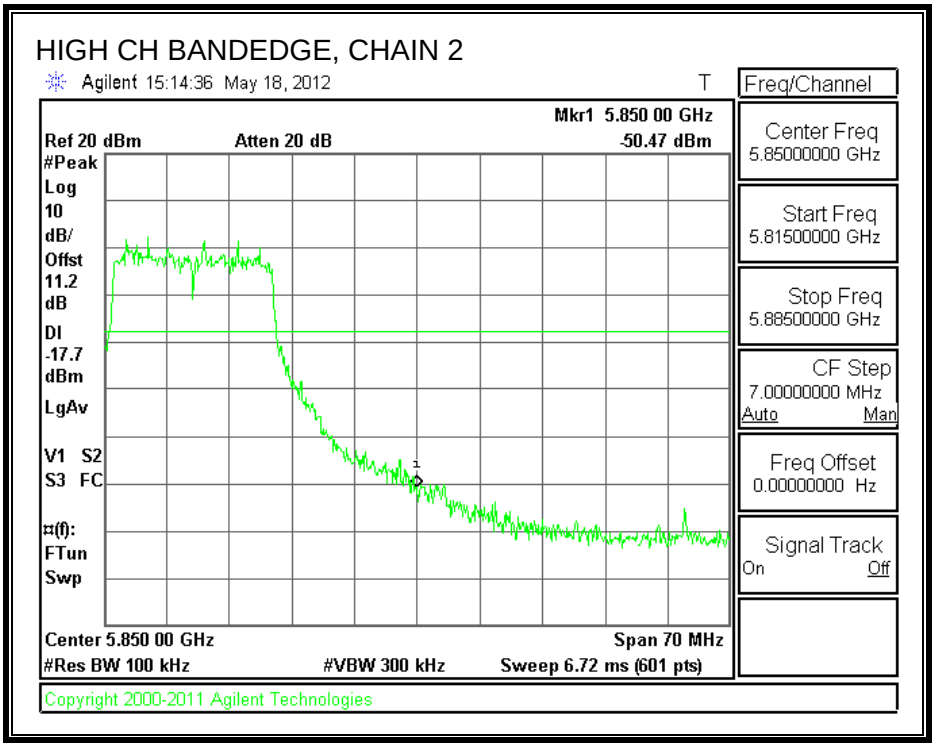


MID CH SPURIOUS, CHAIN 2 (30MHz-26.53GHz)

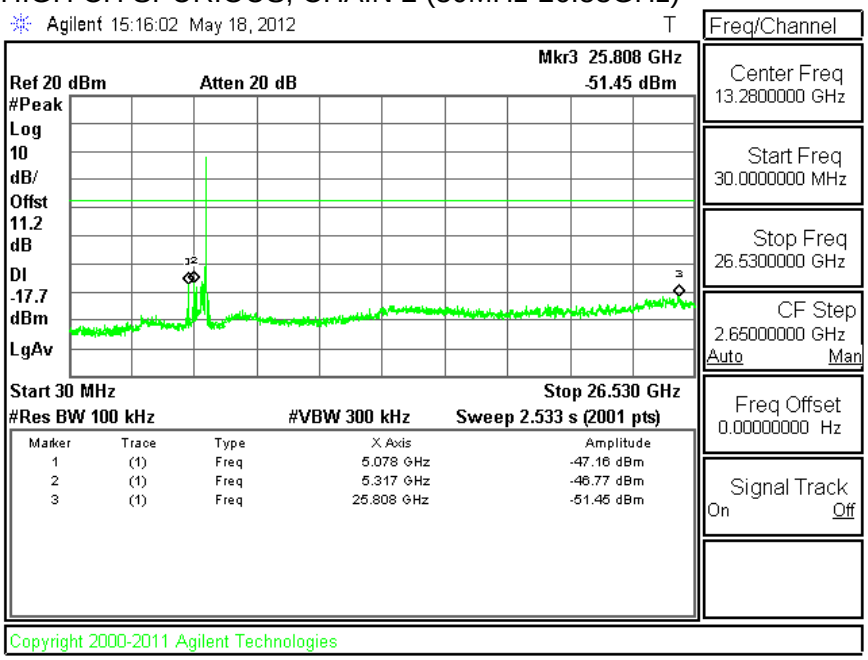


MID CH SPURIOUS, CHAIN 2 (26.5-40GHz)

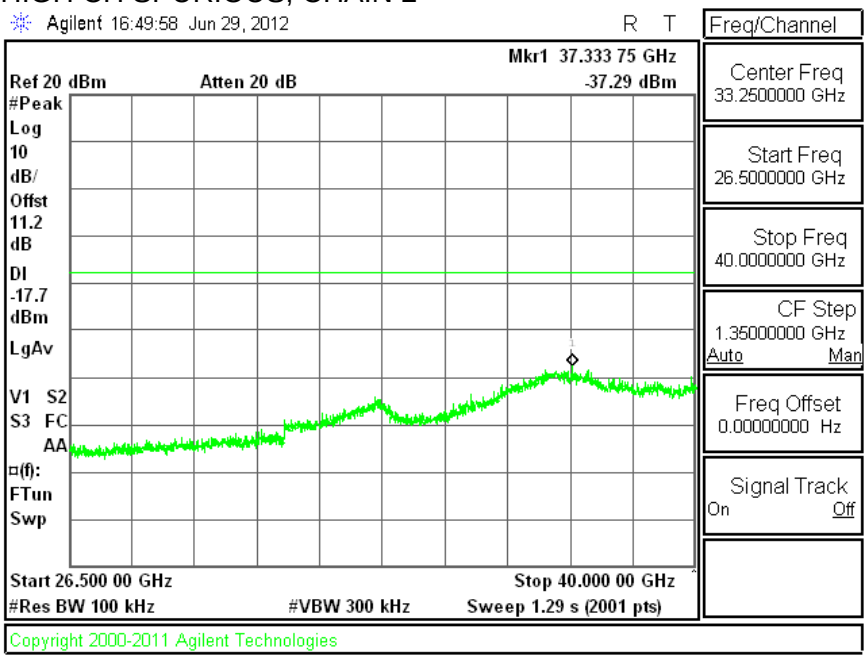




HIGH CH SPURIOUS, CHAIN 2 (30MHz-26.53GHz)



HIGH CH SPURIOUS, CHAIN 2



8. RADIATED TEST RESULTS

8.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-210 Clause 2.6 (Transmitter)

IC RSS-GEN Clause 6 (Receiver)

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

TEST PROCEDURE

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

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

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

The spectrum from 30 MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in the 2.4 GHz band.

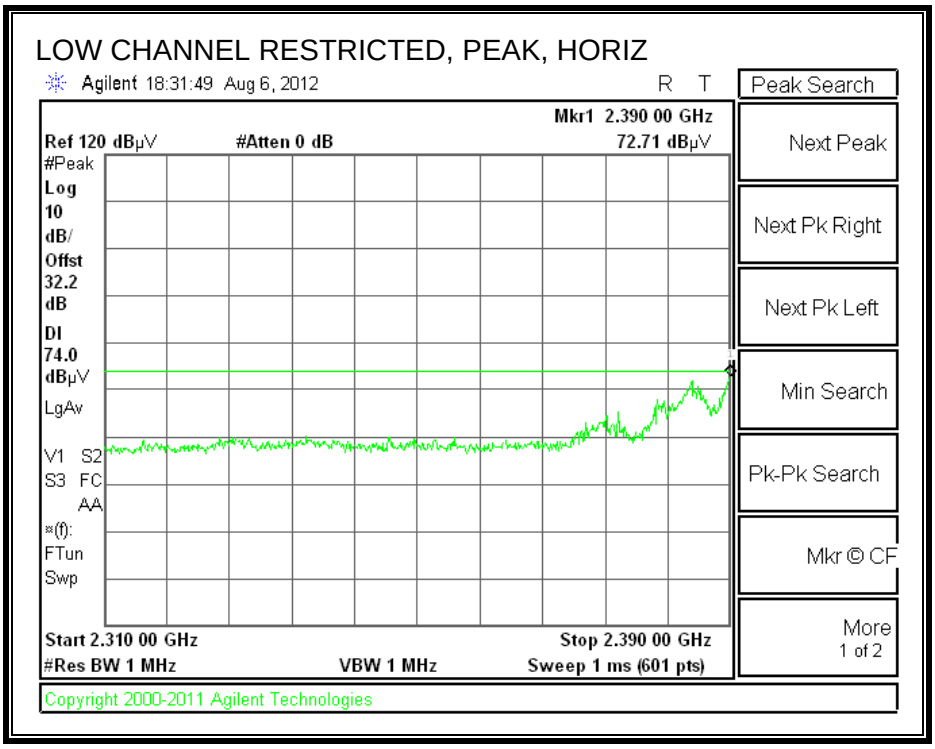
The spectrum from 30 MHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

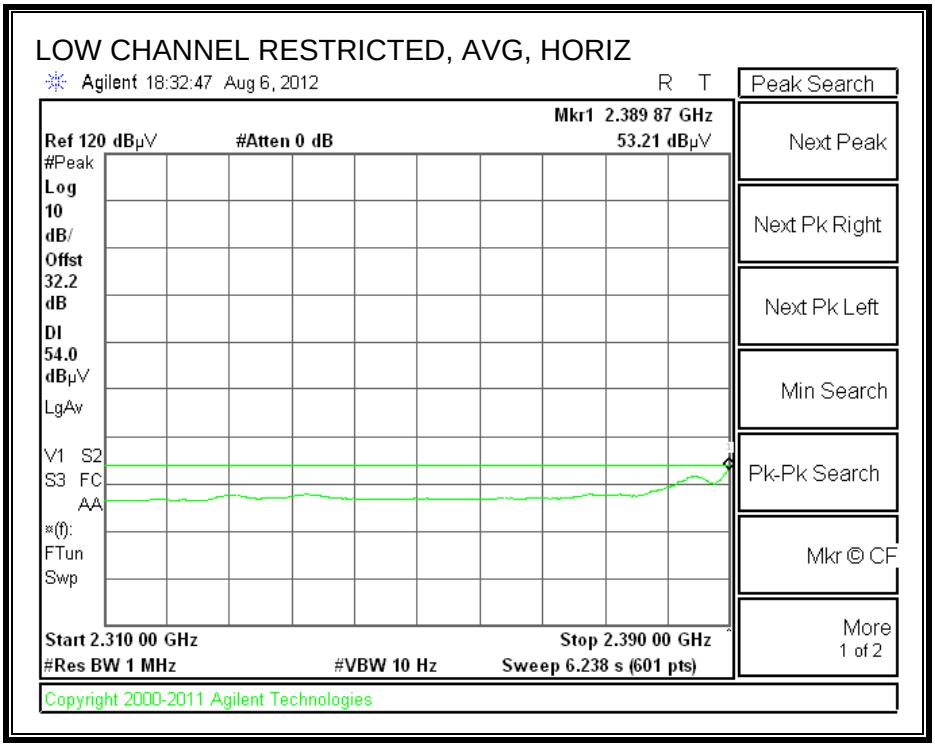
The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized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

8.2. TRANSMITTER ABOVE 1 GHz

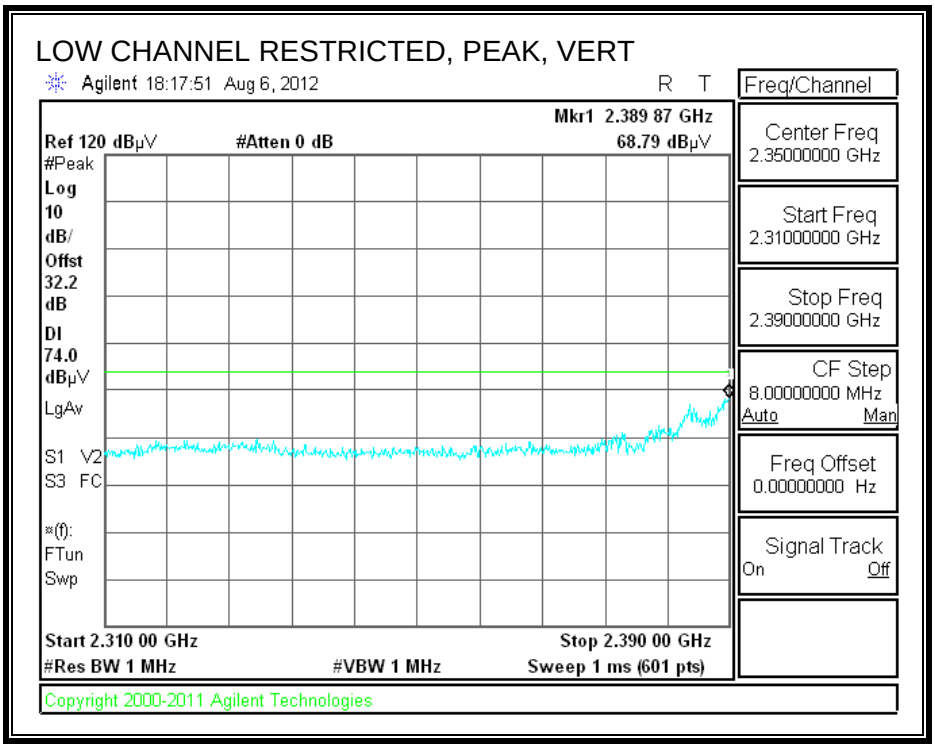
8.2.1. TX ABOVE 1 GHz FOR 802.11g 3TX MODE IN THE 2.4 GHz BAND

RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

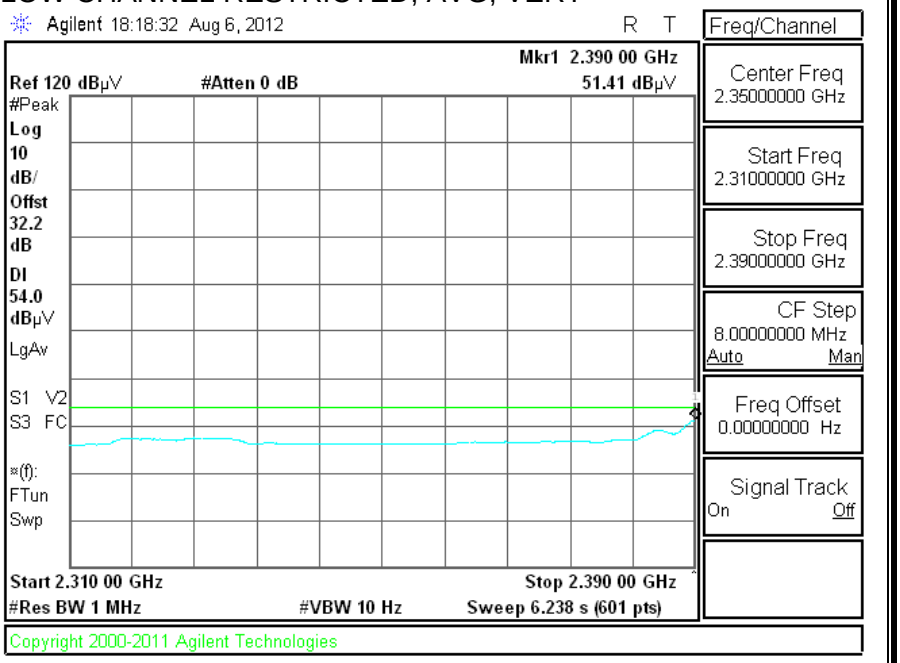




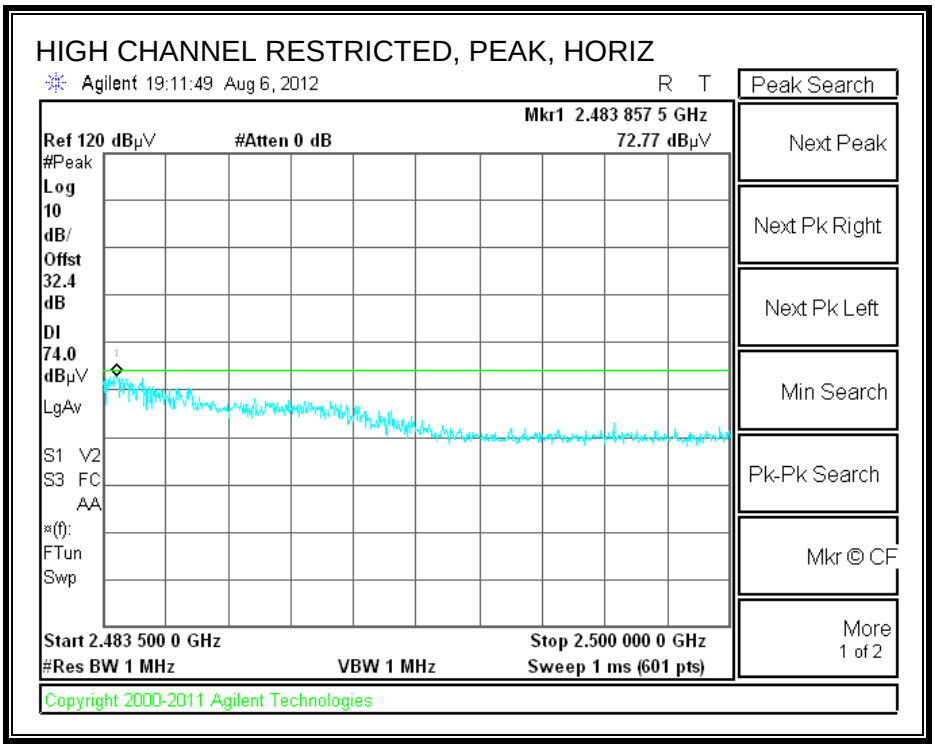
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)

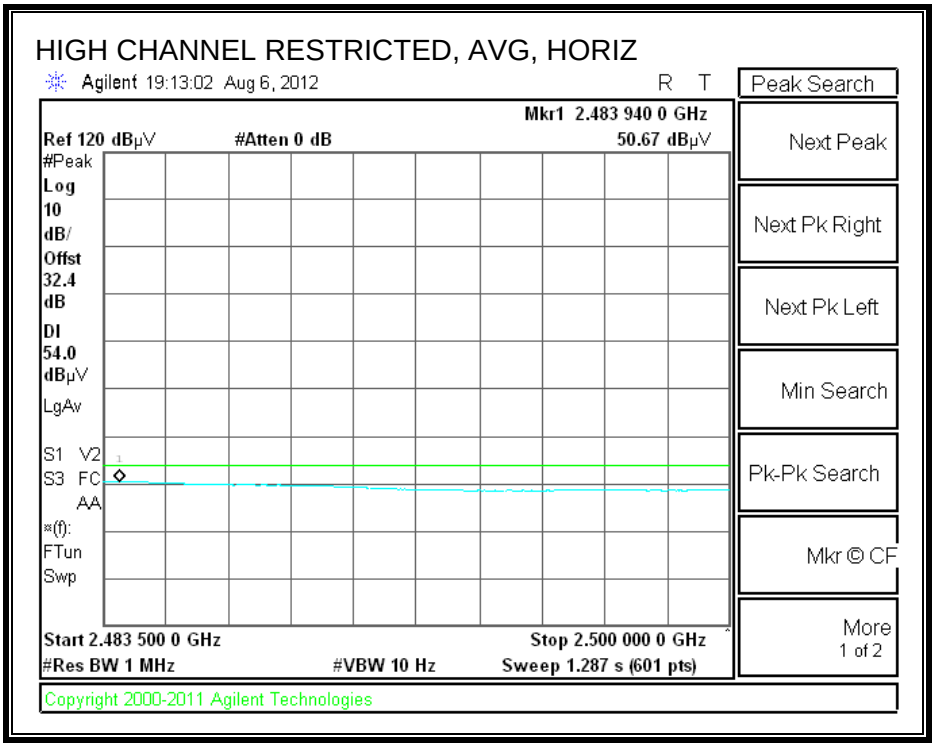


LOW CHANNEL RESTRICTED, AVG, VERT

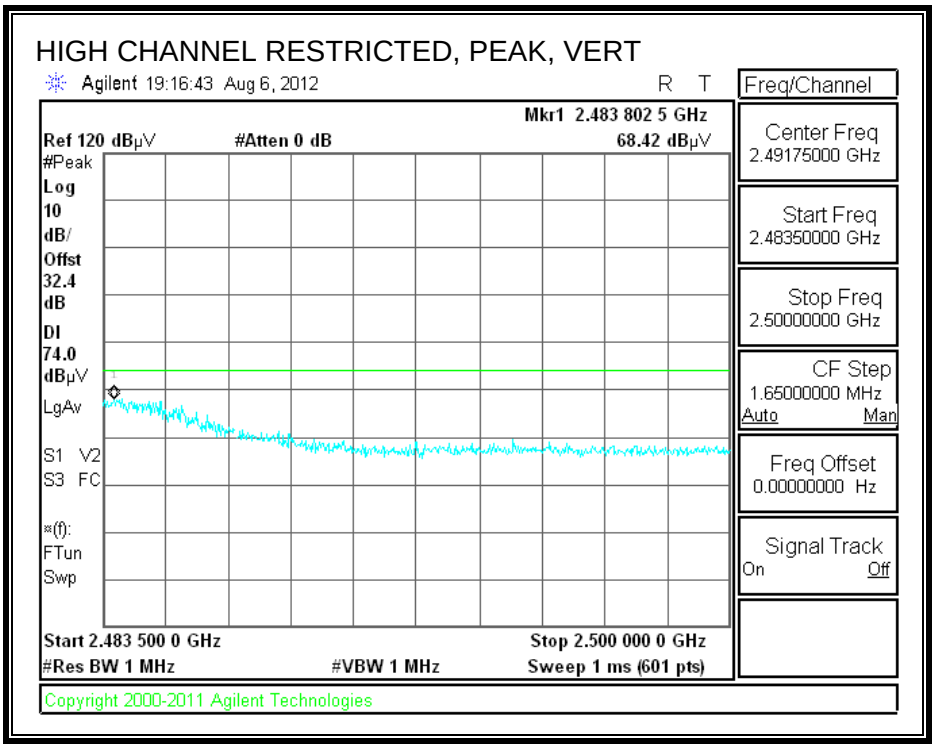


RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

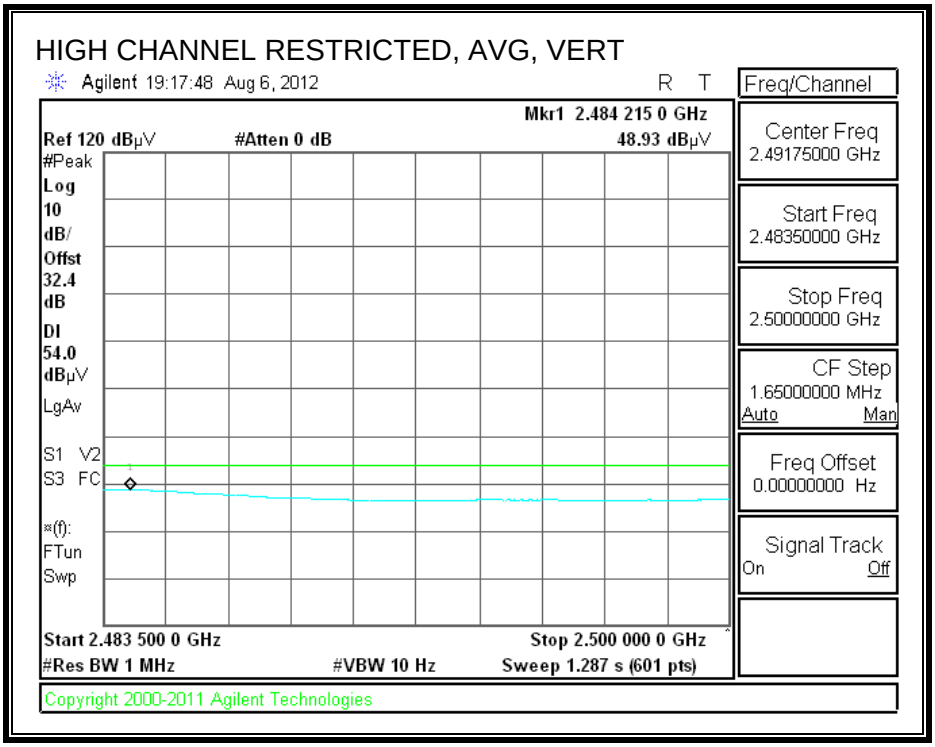




RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HIGH CHANNEL RESTRICTED, AVG, VERT



HARMONICS AND SPURIOUS EMISSIONS

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

Company: SONOS INC.
Project #: 12U14339
Date: 8/6/2012
Test Engineer: Thanh Nguyen
Configuration: EUT at worst position
Mode: 802.11g Tx

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T59; S/N: 3245 @3m	T145 Agilent 3008A0056	T88 Miteq 26-40GHz	T125; ARA 18-26GHz; S/N:1007	FCC 15.209

Hi Frequency Cables

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

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

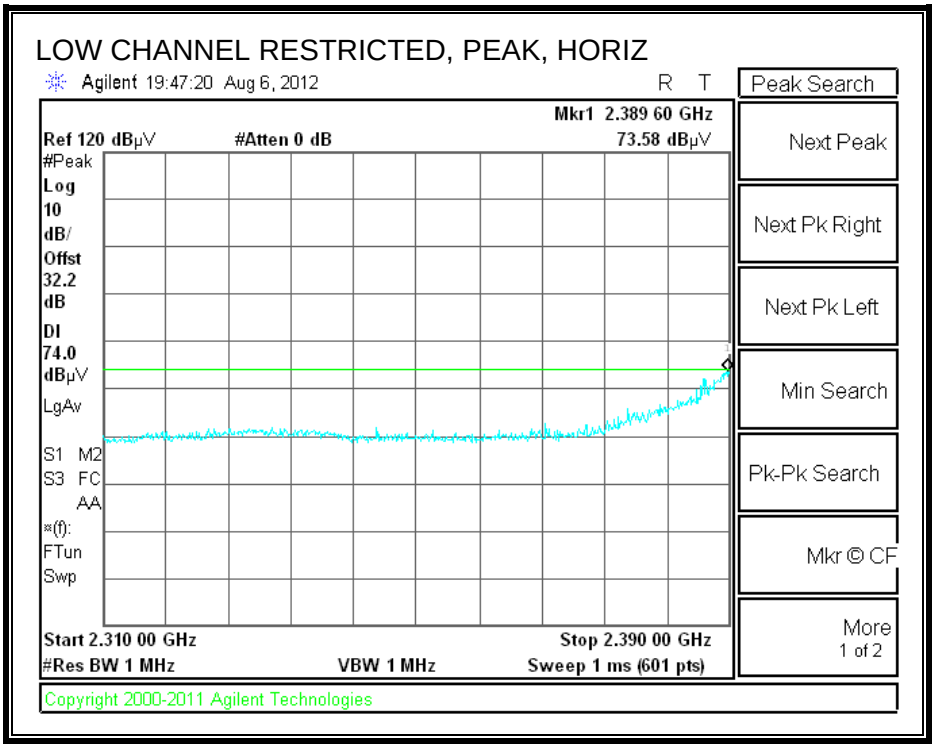
f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
Low Ch															
4.824	3.0	45.7	29.3	33.1	6.3	-34.8	0.0	0.0	50.3	33.9	74	54	-23.7	-20.1	V
7.236	3.0	45.0	28.0	35.7	8.5	-34.9	0.0	0.0	54.3	37.3	74	54	-19.7	-16.7	V
9.648	3.0	40.2	26.6	37.7	9.0	-34.7	0.0	0.0	52.2	38.6	74	54	-21.8	-15.4	V
4.824	3.0	46.4	30.0	33.1	6.3	-34.8	0.0	0.0	51.0	34.6	74	54	-23.0	-19.4	H
7.236	3.0	46.2	30.5	35.7	8.5	-34.9	0.0	0.0	55.5	39.8	74	54	-18.5	-14.2	H
9.648	3.0	38.2	25.7	37.7	9.0	-34.7	0.0	0.0	50.2	37.7	74	54	-23.8	-16.3	H
Mid Ch															
4.874	3.0	50.3	33.3	33.1	6.3	-34.8	0.0	0.0	54.9	37.9	74	54	-19.1	-16.1	H
7.311	3.0	47.2	29.0	35.8	8.5	-34.9	0.0	0.0	56.6	38.4	74	54	-17.4	-15.6	H
9.748	3.0	38.2	25.8	37.7	9.0	-34.7	0.0	0.0	50.3	37.9	74	54	-23.7	-16.1	H
4.874	3.0	52.9	36.0	33.1	6.3	-34.8	0.0	0.0	57.5	40.7	74	54	-16.5	-13.3	V
7.311	3.0	54.0	29.8	35.8	8.5	-34.9	0.0	0.0	63.4	39.2	74	54	-10.6	-14.8	V
9.748	3.0	40.4	28.8	37.7	9.0	-34.7	0.0	0.0	52.5	40.9	74	54	-21.5	-13.1	V
High Ch															
4.924	3.0	54.5	35.7	33.2	6.3	-34.8	0.0	0.0	59.2	40.4	74	54	-14.8	-13.6	V
7.386	3.0	45.0	29.1	35.9	8.5	-34.9	0.0	0.0	54.5	38.6	74	54	-19.5	-15.4	V
9.848	3.0	38.6	26.1	37.8	9.0	-34.7	0.0	0.0	50.8	38.3	74	54	-23.2	-15.7	V
4.924	3.0	48.7	31.8	33.2	6.3	-34.8	0.0	0.0	53.4	36.5	74	54	-20.6	-17.5	H
7.386	3.0	45.0	29.1	35.9	8.5	-34.9	0.0	0.0	54.5	38.6	74	54	-19.5	-15.4	H
9.848	3.0	39.1	27.9	37.8	9.0	-34.7	0.0	0.0	51.3	40.1	74	54	-22.7	-13.9	H

Rev. 11.10.11

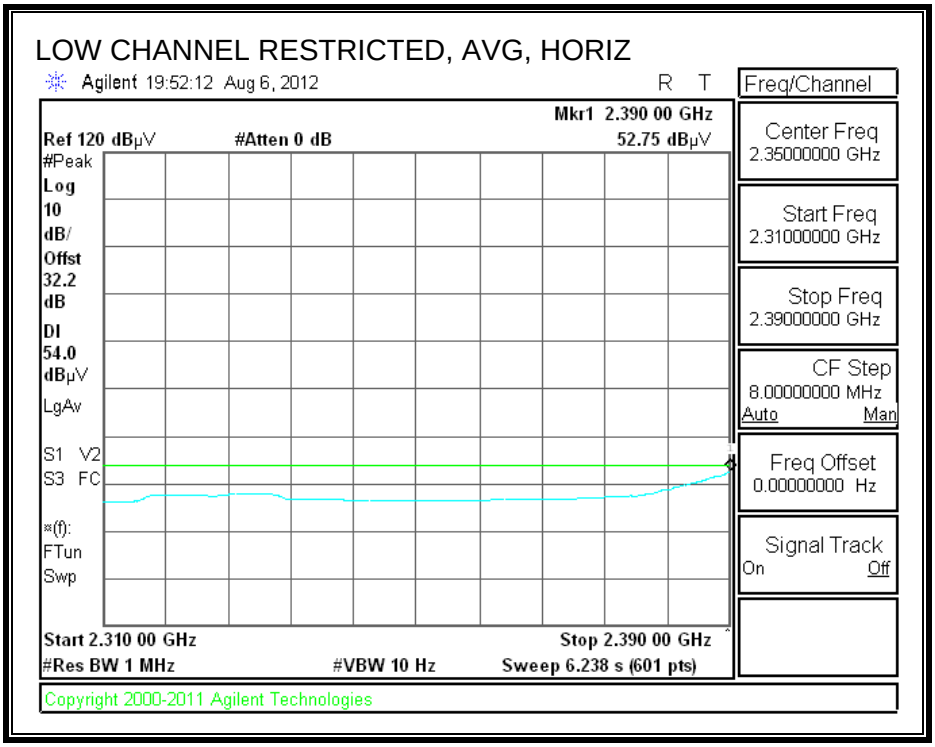
f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field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

8.2.2. TX ABOVE 1 GHz FOR 802.11n HT20 3TX MODE IN THE 2.4 GHz BAND

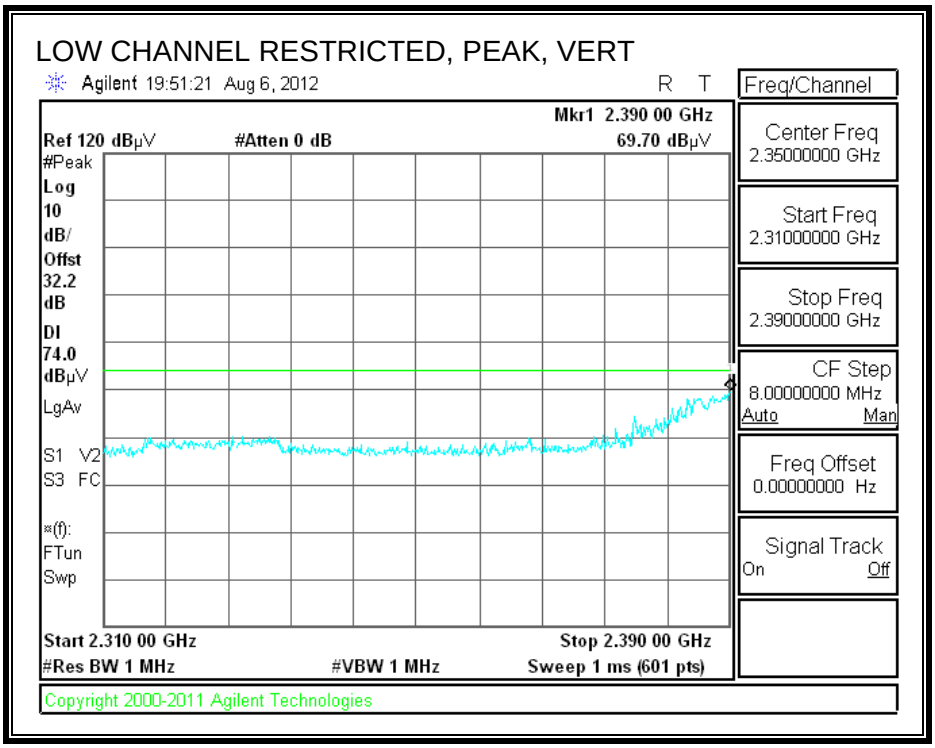
RESTRICTED BANDEDGE (LOW CHANNEL, HORIZONTAL)

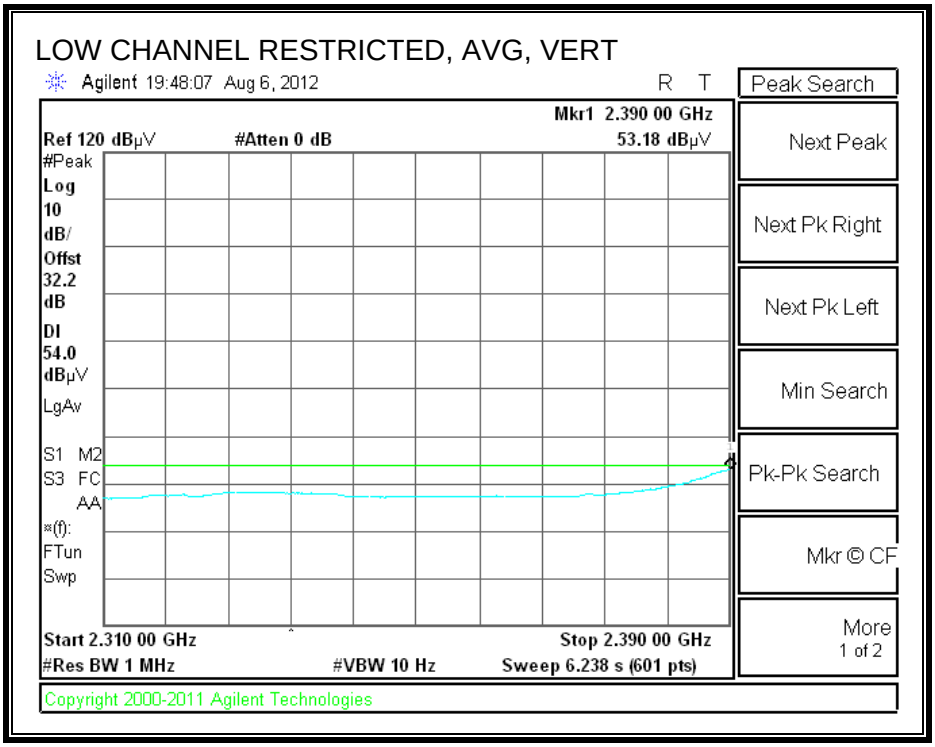


LOW CHANNEL RESTRICTED, AVG, HORIZ

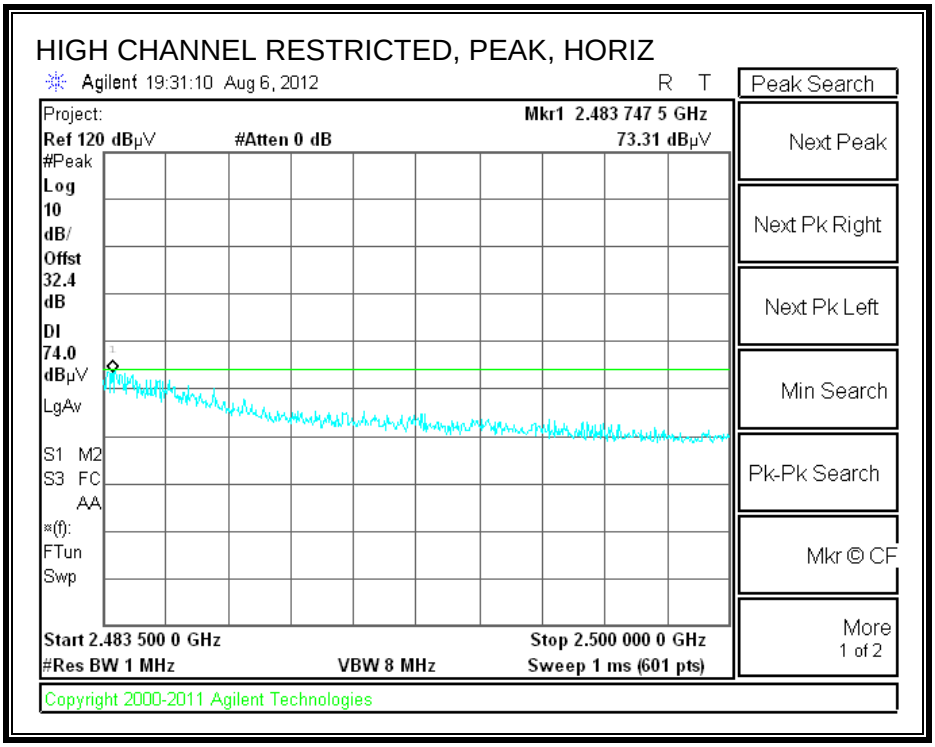


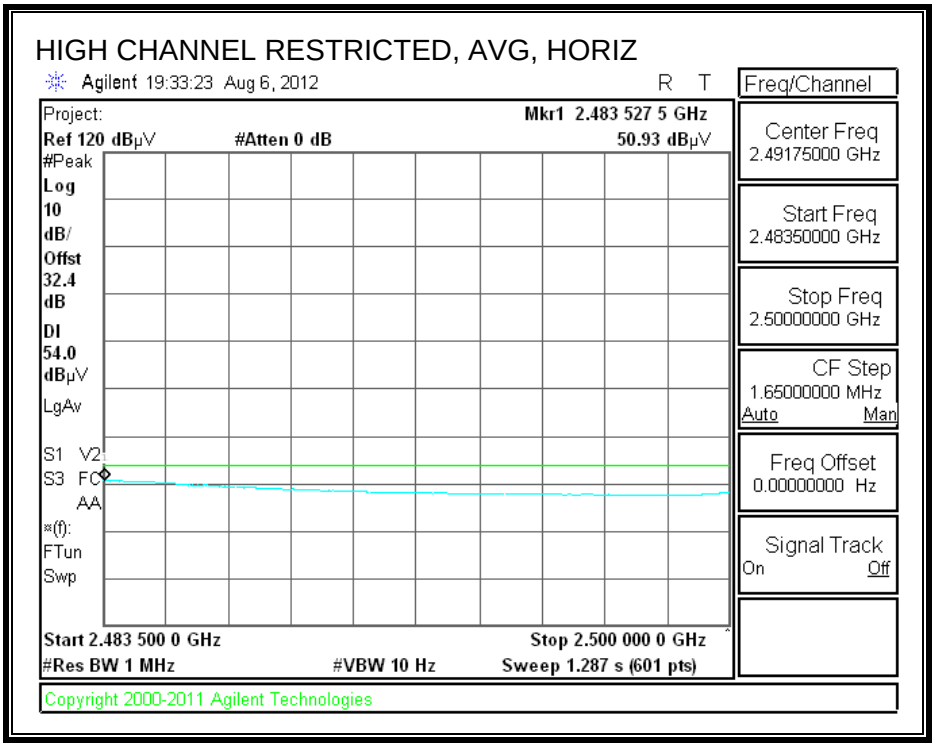
RESTRICTED BANDEDGE (LOW CHANNEL, VERTICAL)



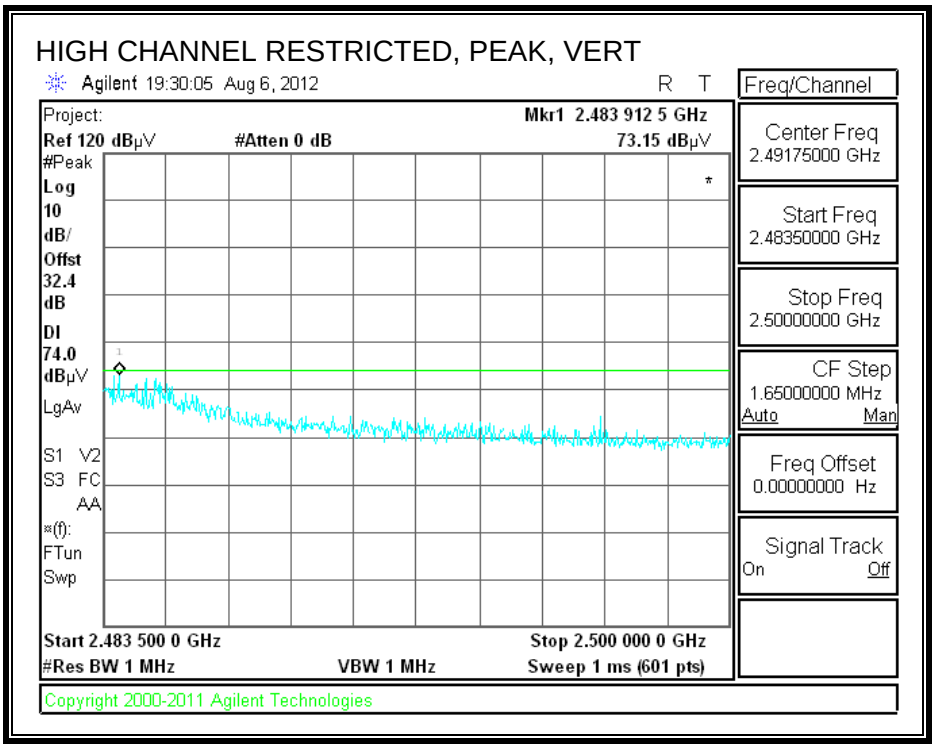


RESTRICTED BANDEDGE (HIGH CHANNEL, HORIZONTAL)

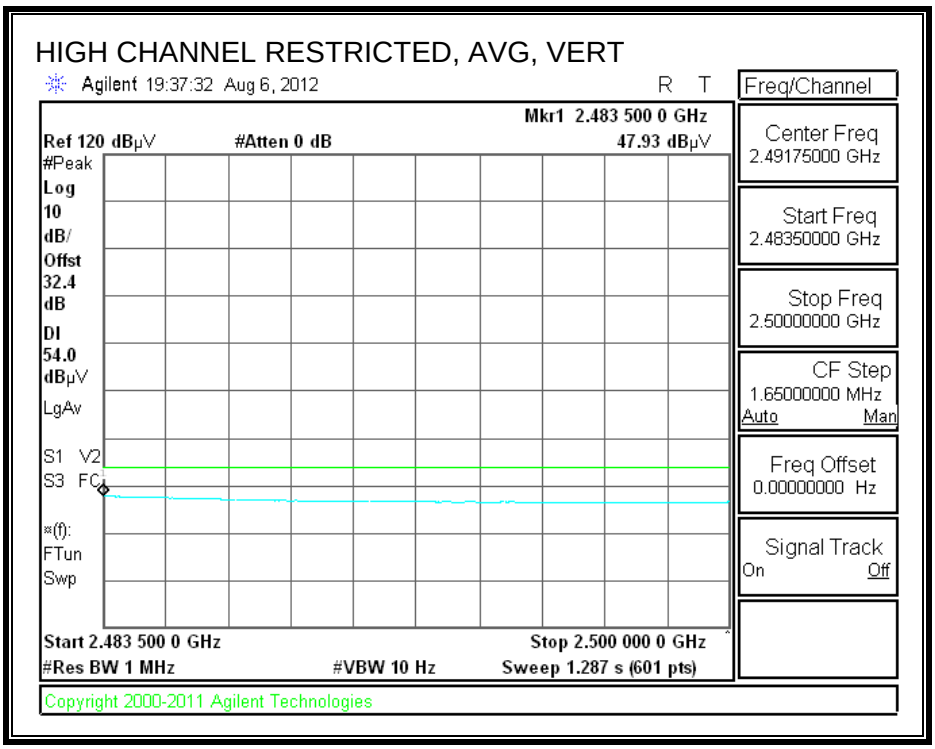




RESTRICTED BANDEDGE (HIGH CHANNEL, VERTICAL)



HIGH CHANNEL RESTRICTED, AVG, VERT



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High Frequency Measurement
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Company: SONOS INC.
Project #: 12U14339
Date: 8/6/2012
Test Engineer: Thanh Nguyen
Configuration: EUT at worst position
Mode: 802.11n 3X3 Tx

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T59; S/N: 3245 @3m	T145 Agilent 3008A0056	T88 Miteq 26-40GHz	T125; ARA 18-26GHz; S/N:1007	FCC 15.209

Hi Frequency Cables

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

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 Ch															
4.824	3.0	45.7	29.3	33.1	6.3	-34.8	0.0	0.0	50.3	33.9	74	54	-23.7	-20.1	V
7.236	3.0	42.4	25.4	35.7	8.5	-34.9	0.0	0.0	51.7	34.7	74	54	-22.3	-19.3	V
9.648	3.0	37.6	24.0	37.7	9.0	-34.7	0.0	0.0	49.6	36.0	74	54	-24.4	-18.0	V
4.824	3.0	43.8	27.4	33.1	6.3	-34.8	0.0	0.0	48.4	31.9	74	54	-25.6	-22.1	H
7.236	3.0	43.6	27.9	35.7	8.5	-34.9	0.0	0.0	52.8	37.2	74	54	-21.2	-16.8	H
9.648	3.0	35.6	23.1	37.7	9.0	-34.7	0.0	0.0	47.6	35.1	74	54	-26.4	-18.9	H
Mid Ch															
4.874	3.0	47.7	30.7	33.1	6.3	-34.8	0.0	0.0	52.3	35.3	74	54	-21.7	-18.7	H
7.311	3.0	44.6	26.4	35.8	8.5	-34.9	0.0	0.0	54.0	35.8	74	54	-20.0	-18.2	H
9.748	3.0	35.6	23.2	37.7	9.0	-34.7	0.0	0.0	47.7	35.3	74	54	-26.3	-18.7	H
4.874	3.0	50.3	33.7	33.1	6.3	-34.8	0.0	0.0	54.9	38.3	74	54	-19.1	-15.7	V
7.311	3.0	53.7	29.0	35.8	8.5	-34.9	0.0	0.0	63.1	38.4	74	54	-10.9	-15.6	V
9.748	3.0	35.2	23.6	37.7	9.0	-34.7	0.0	0.0	47.3	35.7	74	54	-26.7	-18.3	V
High Ch															
4.924	3.0	51.9	33.1	33.2	6.3	-34.8	0.0	0.0	56.6	37.8	74	54	-17.4	-16.2	V
7.386	3.0	42.4	26.5	35.9	8.5	-34.9	0.0	0.0	51.9	36.0	74	54	-22.1	-18.0	V
9.848	3.0	36.0	23.5	37.8	9.0	-34.7	0.0	0.0	48.2	35.6	74	54	-25.8	-18.4	V
4.924	3.0	46.1	29.2	33.2	6.3	-34.8	0.0	0.0	50.8	33.9	74	54	-23.2	-20.1	H
7.386	3.0	42.4	26.5	35.9	8.5	-34.9	0.0	0.0	51.9	36.0	74	54	-22.1	-18.0	H
9.848	3.0	36.5	25.3	37.8	9.0	-34.7	0.0	0.0	48.6	37.4	74	54	-25.4	-16.6	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		

8.2.3. TX ABOVE 1 GHz FOR 802.11n HT20 2TX MODE IN THE 5.8 GHz BAND

HARMONICS AND SPURIOUS EMISSIONS

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: David Garcia
Date: 05/15/12
Project #: 12U14339
Company: Sonos, Inc.
Test Target: FCC 15.205
Mode Oper: 5.8GHz, 11n 2x2

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

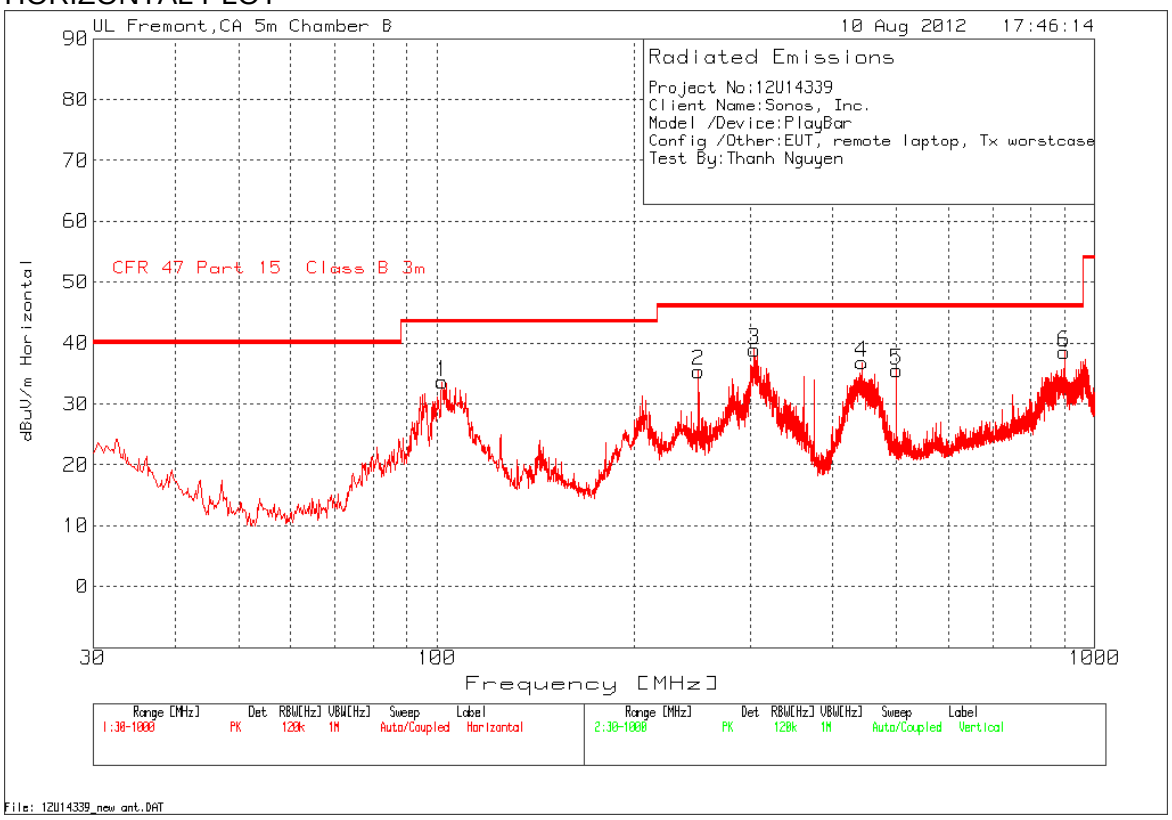
f GHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Fltr dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant.High cm	Table Angle Degree	Notes
Low Channel: 5745 MHz															
11.490	3.0	34.5	38.9	11.3	-33.0	0.0	0.0	51.8	74.0	-22.2	H	P	167.0	121.0	
11.490	3.0	21.4	38.9	11.3	-33.0	0.0	0.0	38.6	54.0	-15.4	H	A	167.0	121.0	
11.490	3.0	34.8	38.9	11.3	-33.0	0.0	0.0	52.1	74.0	-21.9	V	P	158.0	32.0	
11.490	3.0	21.3	38.9	11.3	-33.0	0.0	0.0	38.6	54.0	-15.4	V	A	158.0	32.0	
Mid Channel: 5785 MHz															
11.570	3.0	34.9	38.9	11.3	-33.0	0.0	0.0	52.2	74.0	-21.8	H	P	111.0	312.0	
11.570	3.0	21.5	38.9	11.3	-33.0	0.0	0.0	38.7	54.0	-15.3	H	A	111.0	312.0	
11.570	3.0	34.8	38.9	11.3	-33.0	0.0	0.0	52.1	74.0	-21.9	V	P	98.0	261.0	
11.570	3.0	21.1	38.9	11.3	-33.0	0.0	0.0	38.4	54.0	-15.6	V	A	98.0	261.0	
High Channel: 5825 MHz															
11.650	3.0	33.5	39.0	11.4	-32.9	0.0	0.0	51.1	74.0	-22.9	H	P	173.0	260.0	
11.650	3.0	21.2	39.0	11.4	-32.9	0.0	0.0	38.8	54.0	-15.2	H	A	173.0	260.0	
11.650	3.0	34.8	39.0	11.4	-32.9	0.0	0.0	52.4	74.0	-21.6	V	P	125.0	291.0	
11.650	3.0	21.3	39.0	11.4	-32.9	0.0	0.0	38.9	54.0	-15.1	V	A	125.0	291.0	

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

8.3. WORST-CASE BELOW 1 GHz

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

HORIZONTAL PLOT



HORIZONTAL DATA

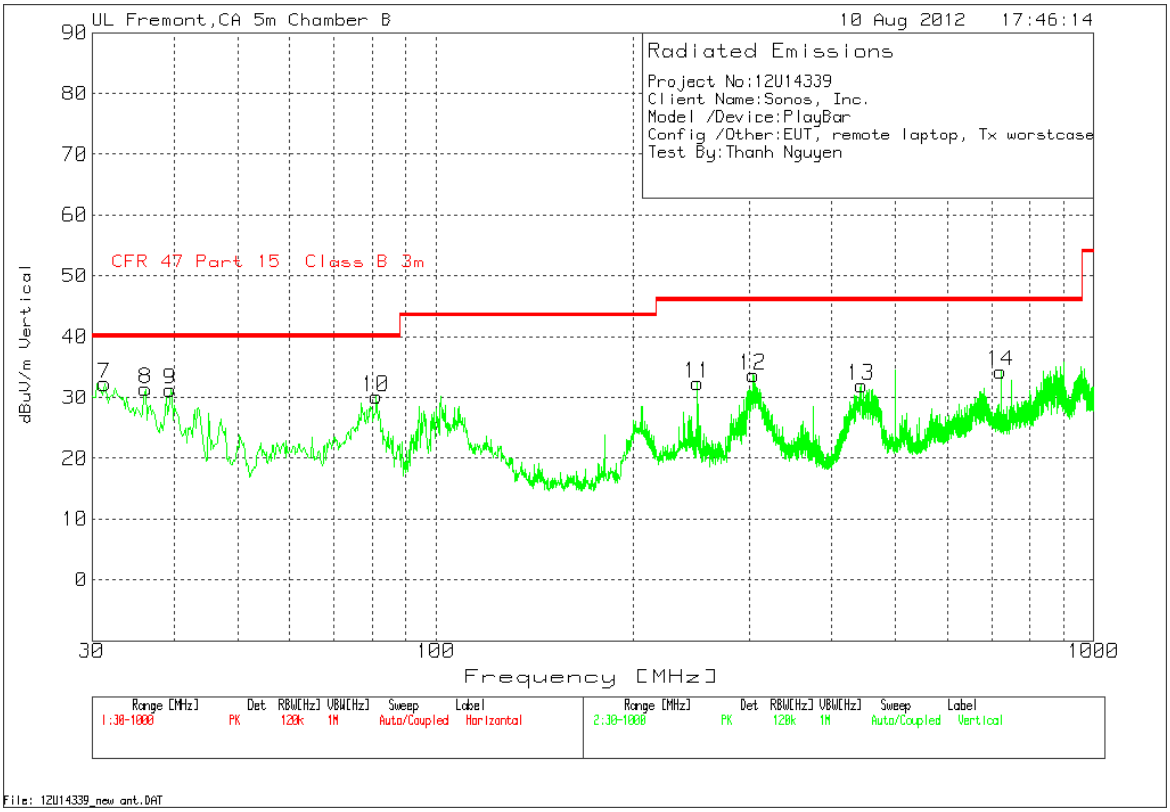
Project No:12U14339
Client Name:Sonos, Inc.
Model /Device:PlayBar
Config /Other:EUT, remote laptop, Tx worstcase
Test By:Thanh Nguyen

Horizontal 30 - 1000MHz

Test Frequency	Meter Reading	Detector	T122 Sunol Bilog.TXT (dB)	5mB Amp Path 30-1000MHz (dB)	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
101.9165	51.34	PK	10.8	-28.5	33.64	43.5	-9.86	300	Horz
250.014	51.11	PK	11.5	-27.2	35.41	46	-10.59	100	Horz
303.709	52.34	PK	13.4	-26.8	38.94	46	-7.06	100	Horz
443.2774	47.01	PK	16.8	-27	36.81	46	-9.19	200	Horz
500.0739	44.83	PK	17.7	-27	35.53	46	-10.47	200	Horz
899.976	40.96	PK	22.3	-24.7	38.56	46	-7.44	100	Horz

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

VERTICAL PLOT



VERTICAL DATA

Vertical 30 - 1000MHz									
Test Frequency	Meter Reading	Detector	T122 Sunol Bilog.TXT (dB)	5mB Amp Path 30-1000MHz (dB)	dBuV/m	CFR 47 Part 15 Class B 3m	Margin	Height [cm]	Polarity
31.3569	41.17	PK	20.4	-29.3	32.27	40	-7.73	100	Vert
36.203	43.9	PK	16.7	-29.2	31.4	40	-8.6	100	Vert
39.4984	46.31	PK	14.2	-29.2	31.31	40	-8.69	100	Vert
81.1751	51.04	PK	7.8	-28.7	30.14	40	-9.86	100	Vert
250.014	48.06	PK	11.5	-27.2	32.36	46	-13.64	100	Vert
303.709	47.08	PK	13.4	-26.8	33.68	46	-12.32	200	Vert
443.4712	42.2	PK	16.8	-27	32	46	-14	200	Vert
722.6079	39.92	PK	20.3	-25.9	34.32	46	-11.68	100	Vert

8.4. 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

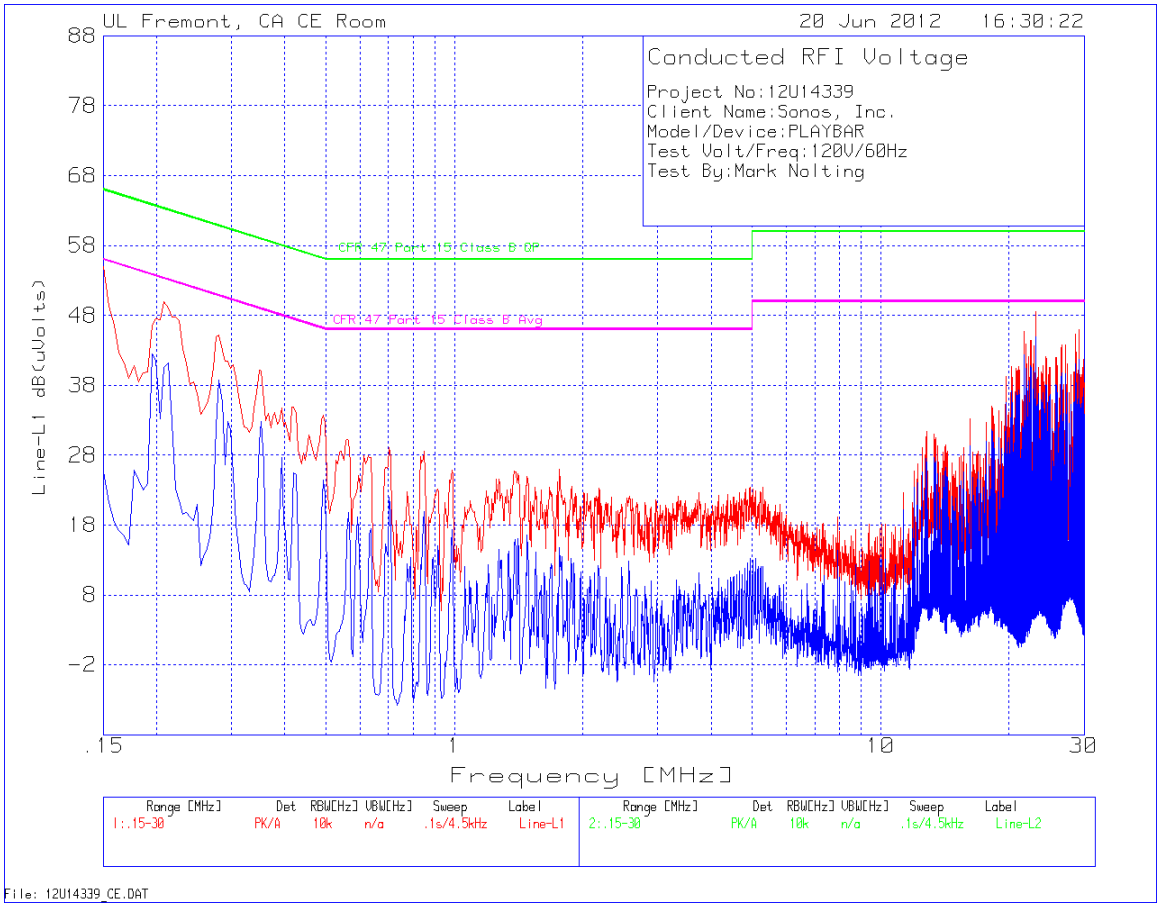
* Decreases with the logarithm of the frequency.

TEST PROCEDURE

ANSI C63.4

RESULTS

LINE 1 PLOT



WORST EMISSIONS

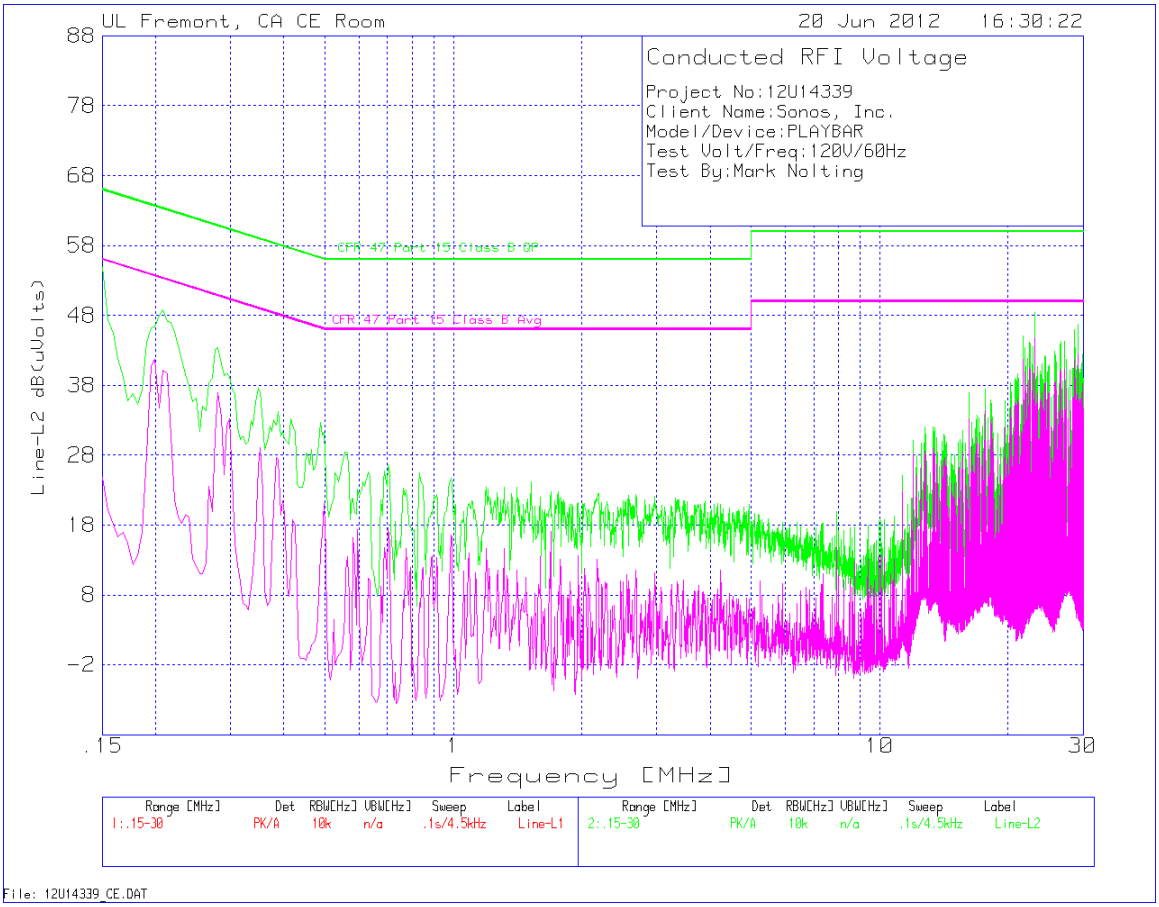
LINE 1 DATA

Project No: 12U14339
Client Name: Sonos, Inc.
Model/Device: PLAYBAR
Test Volt/Freq: 120V/60Hz
Tested By: Mark Nolting

Frequency [MHz]	Meter Reading [dBuV]	Detector	T24 AMN Factor [dB]	Cable Loss [dB]	Corrected Reading [dBuV]	FCC Class-B QP Limit [dBuV]	Margin [dB]	FCC Class-B Av Limit [dBuV]	Margin [dB]
0.1500	54.9	PK	0.1	0.0	55.0	66.0	-11.0	-	-
0.2085	49.9	PK	0.1	0.0	50.0	63.3	-13.4	-	-
0.2805	45.0	PK	0.1	0.0	45.1	60.8	-15.7	-	-
21.6600	45.2	PK	0.3	0.2	45.7	60.0	-14.3	-	-
23.1270	47.9	PK	0.4	0.2	48.5	60.0	-11.5	-	-
29.2335	45.2	PK	0.5	0.3	46.0	60.0	-14.0	-	-
0.1500	25.5	Av	0.1	0.0	25.6	-	-	56.0	-30.4
0.2085	40.5	Av	0.1	0.0	40.6	-	-	53.3	-12.8
0.2805	38.6	Av	0.1	0.0	38.7	-	-	50.8	-12.1
21.6600	41.9	Av	0.3	0.2	42.4	-	-	50.0	-7.6
23.1270	44.3	Av	0.4	0.2	44.9	-	-	50.0	-5.1
29.2335	41.0	Av	0.5	0.3	41.8	-	-	50.0	-8.3

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

LINE 2 PLOT



WORST EMISSIONS

LINE 2 DATA

Project No: 12U14339
Client Name: Sonos, Inc.
Model/Device: PLAYBAR
Test Volt/Freq: 120V/60Hz
Tested By: Mark Nolting

Frequency [MHz]	Meter Reading [dBuV]	Detector	T24 AMN Factor [dB]	Cable Loss [dB]	Corrected Reading [dBuV]	FCC Class-B QP Limit [dBuV]	Margin [dB]	FCC Class-B Av Limit [dBuV]	Margin [dB]
0.1500	54.8	PK	0.1	0.0	54.9	66.0	-11.2	-	-
0.2085	48.7	PK	0.1	0.0	48.8	63.3	-14.5	-	-
0.2805	43.3	PK	0.1	0.0	43.4	60.8	-17.4	-	-
21.6600	44.6	PK	0.3	0.2	45.1	60.0	-14.9	-	-
23.1270	47.9	PK	0.4	0.2	48.5	60.0	-11.5	-	-
29.2335	45.9	PK	0.5	0.3	46.7	60.0	-13.3	-	-
0.1500	24.8	Av	0.1	0.0	24.9	-	-	56.0	-31.1
0.2085	40.1	Av	0.1	0.0	40.2	-	-	53.3	-13.1
0.2805	36.8	Av	0.1	0.0	36.9	-	-	50.8	-13.9
21.6600	41.2	Av	0.3	0.2	41.7	-	-	50.0	-8.3
23.1270	44.2	Av	0.4	0.2	44.8	-	-	50.0	-5.2
29.2335	41.7	Av	0.5	0.3	42.5	-	-	50.0	-7.6

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